



Fast, Compact , Open Network Solution  
Next Generation Technology

# XGT Series

Programmable Logic Controller

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Programmable Logic Controller

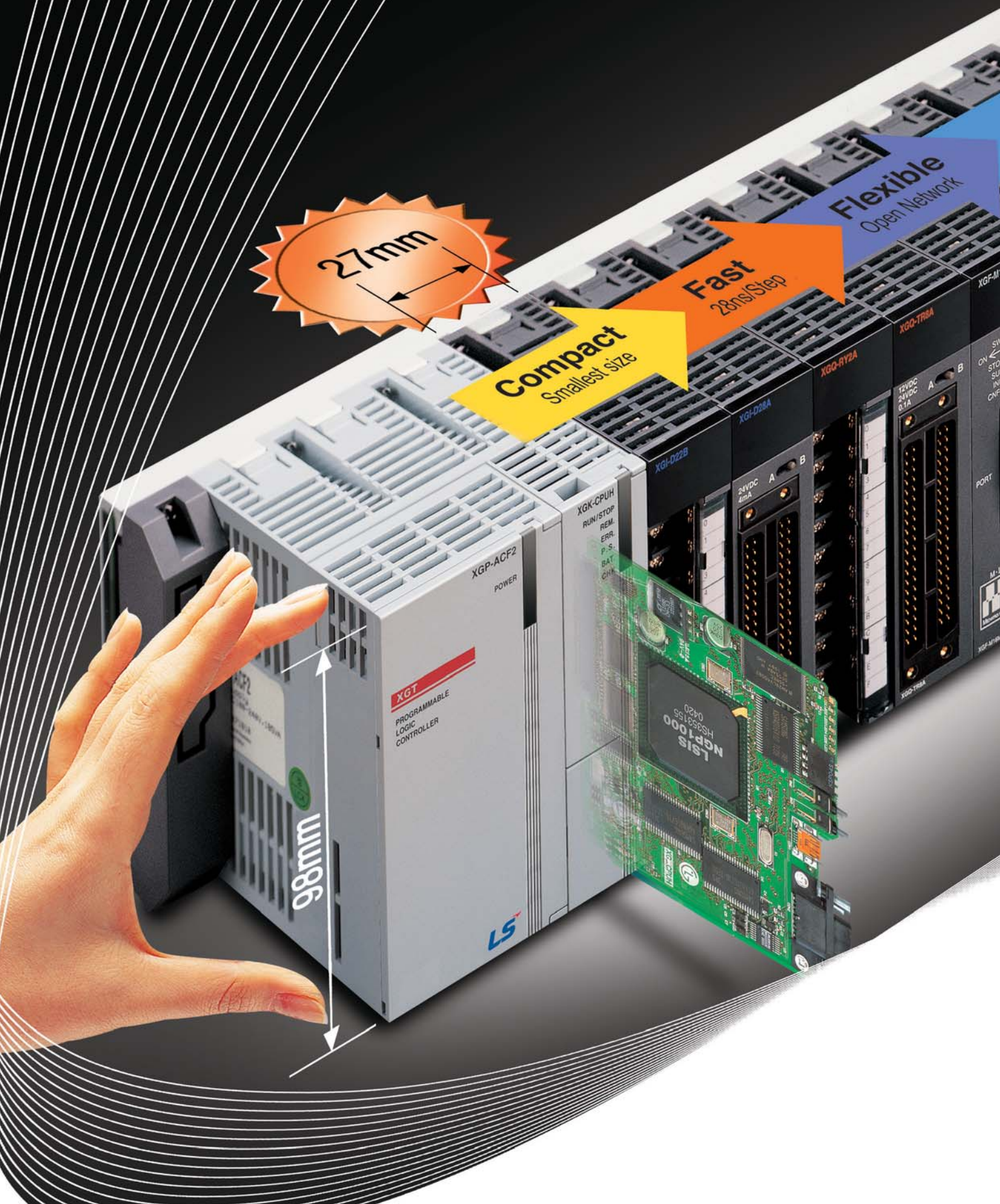
# XGT Series

XGT series incorporate the latest technological achievements in Programmable Logic Controller, made possible by experience and dedication to quality in design and manufacturing.

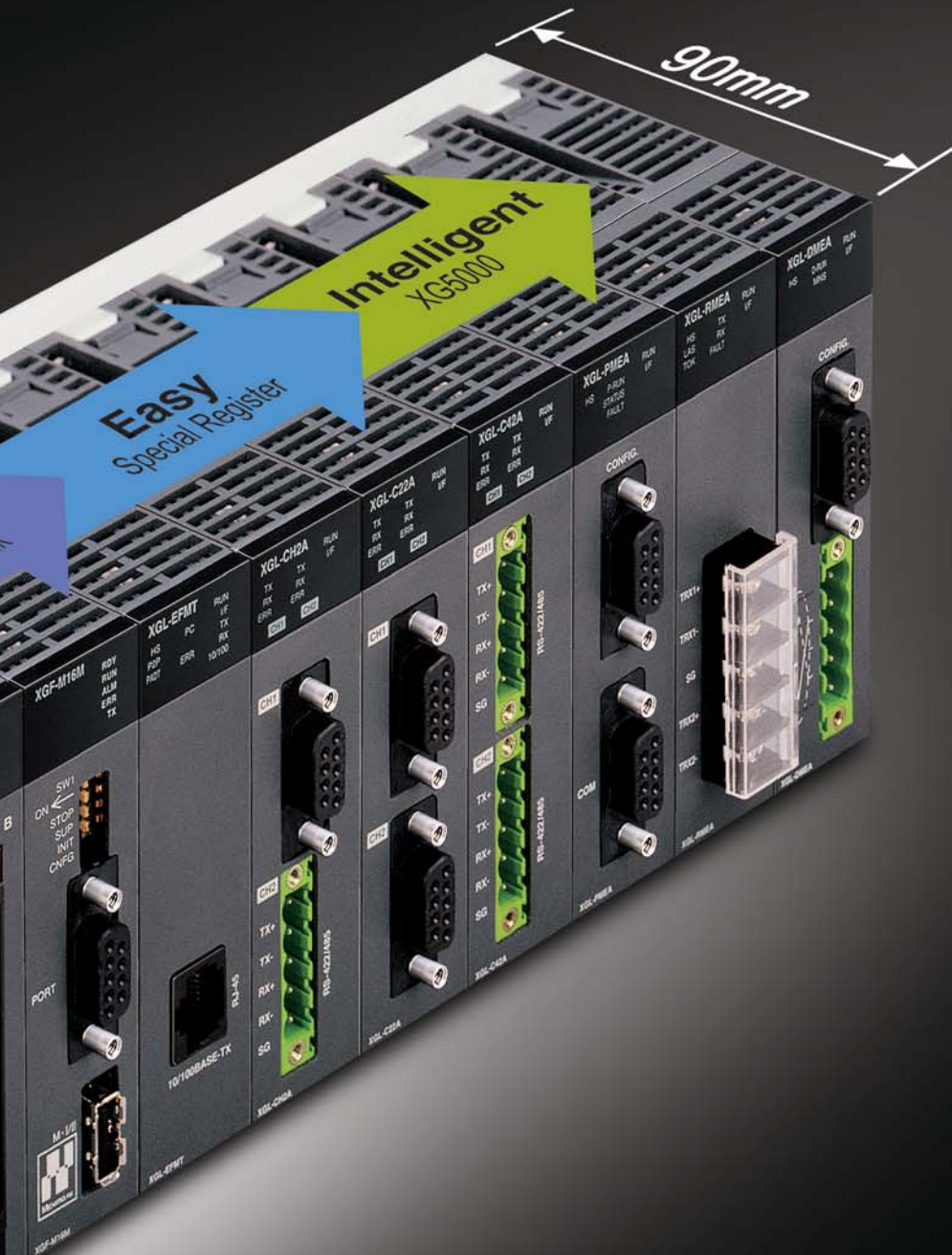




## Features







Programmable Logic Controller

# XGT Series

## neXt Generation Technology

XGT series is the next-generation solution with a new concept providing advanced engineering environment based on open network, fastest processing speed, compact size and user-friendly software.



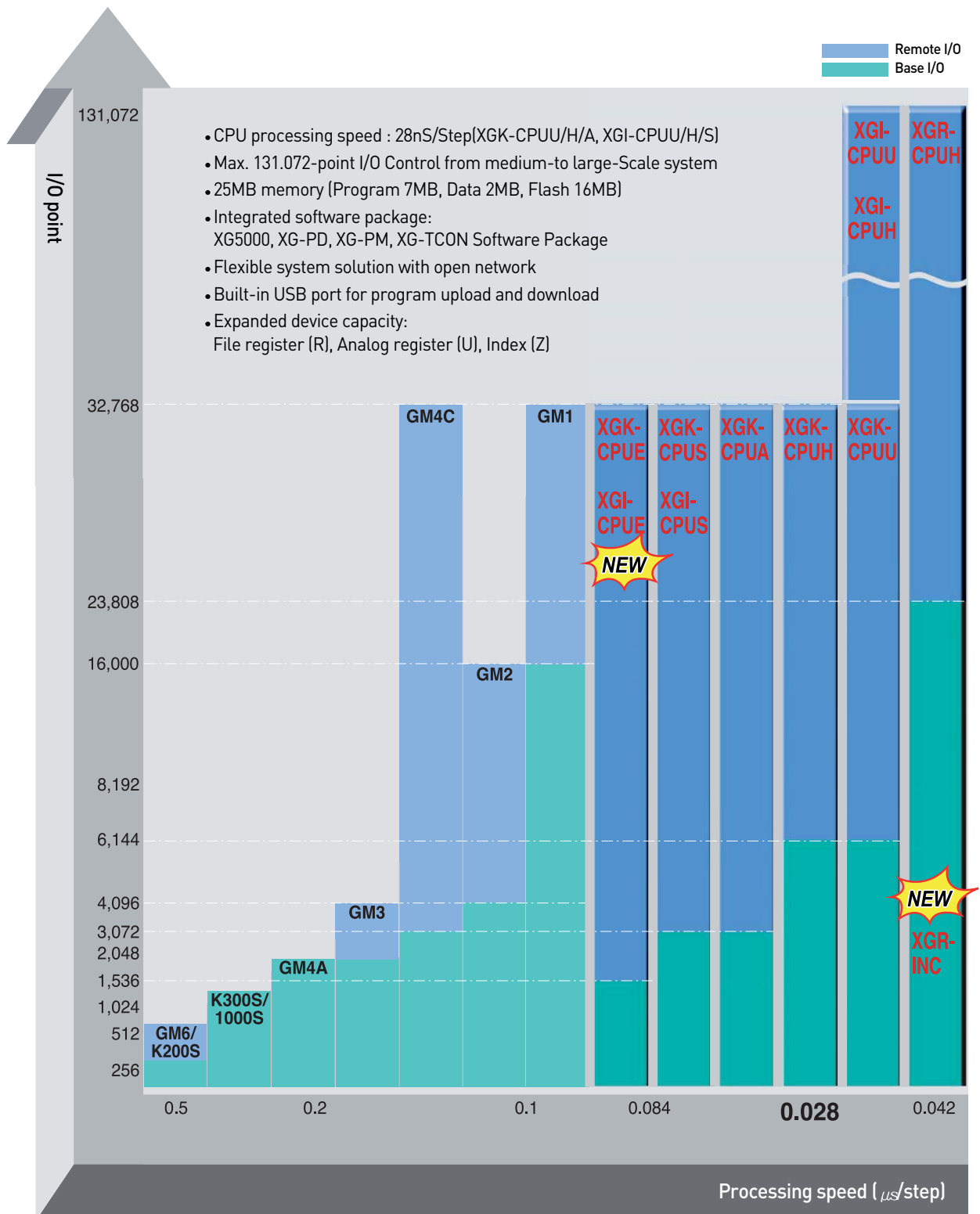


## Features





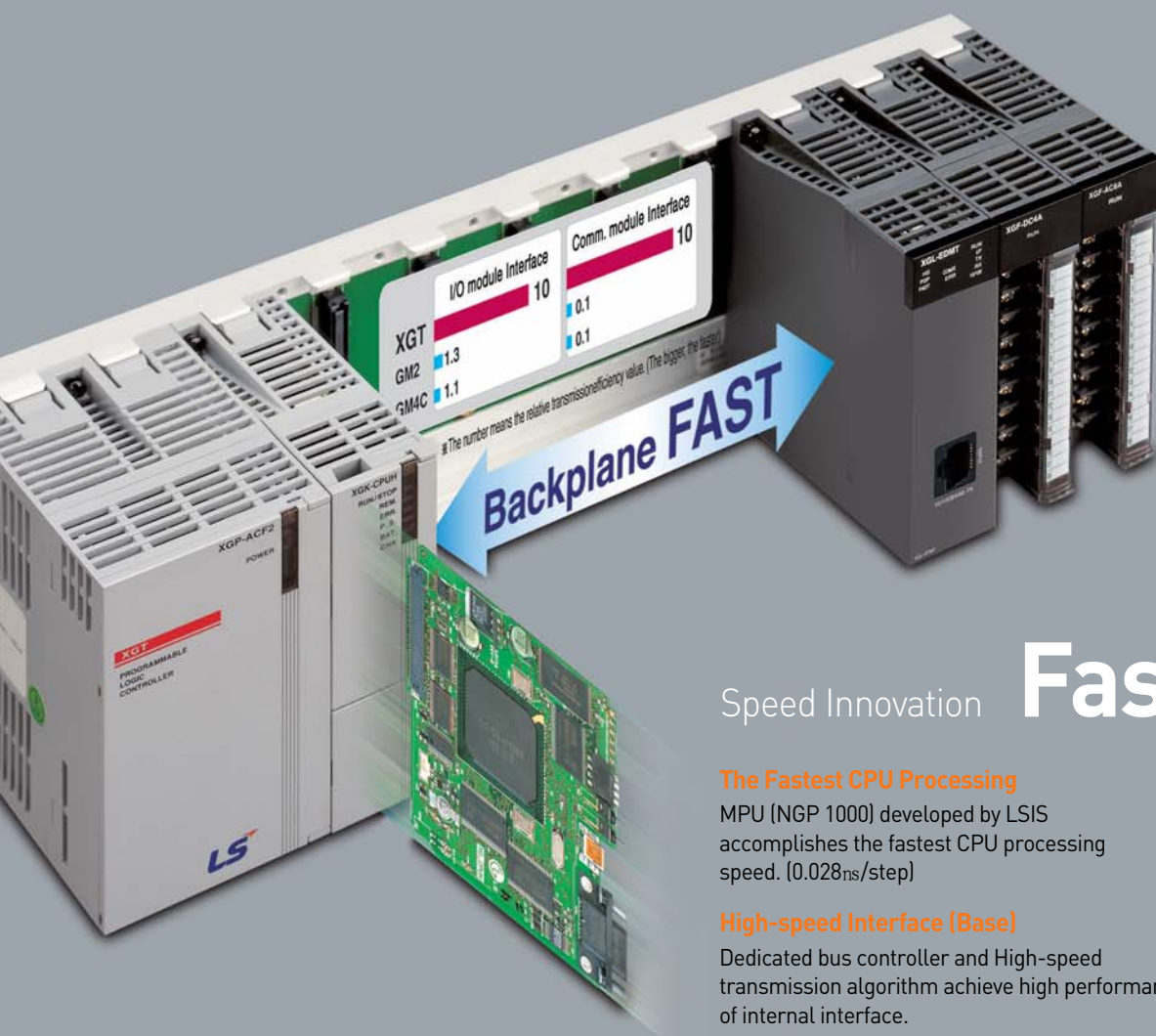
XGT series is the Industrial Workhorse that can support various applications within the typical industrial plant.





Features

# neXt Generation



Speed Innovation

# Fast

### The Fastest CPU Processing

MPU (NGP 1000) developed by LSIS accomplishes the fastest CPU processing speed. (0.028ns/step)

### High-speed Interface (Base)

Dedicated bus controller and High-speed transmission algorithm achieve high performance of internal interface.

| Main Base   | Expansion Base |
|-------------|----------------|
| 20Mbyte/sec | 5Mbyte/sec     |



# Technology

Module Size



## Size Innovation Compact

### The smallest size

The smallest size(Dimensions 27 X 98 X 90) achieves cost-efficiency and various applications.

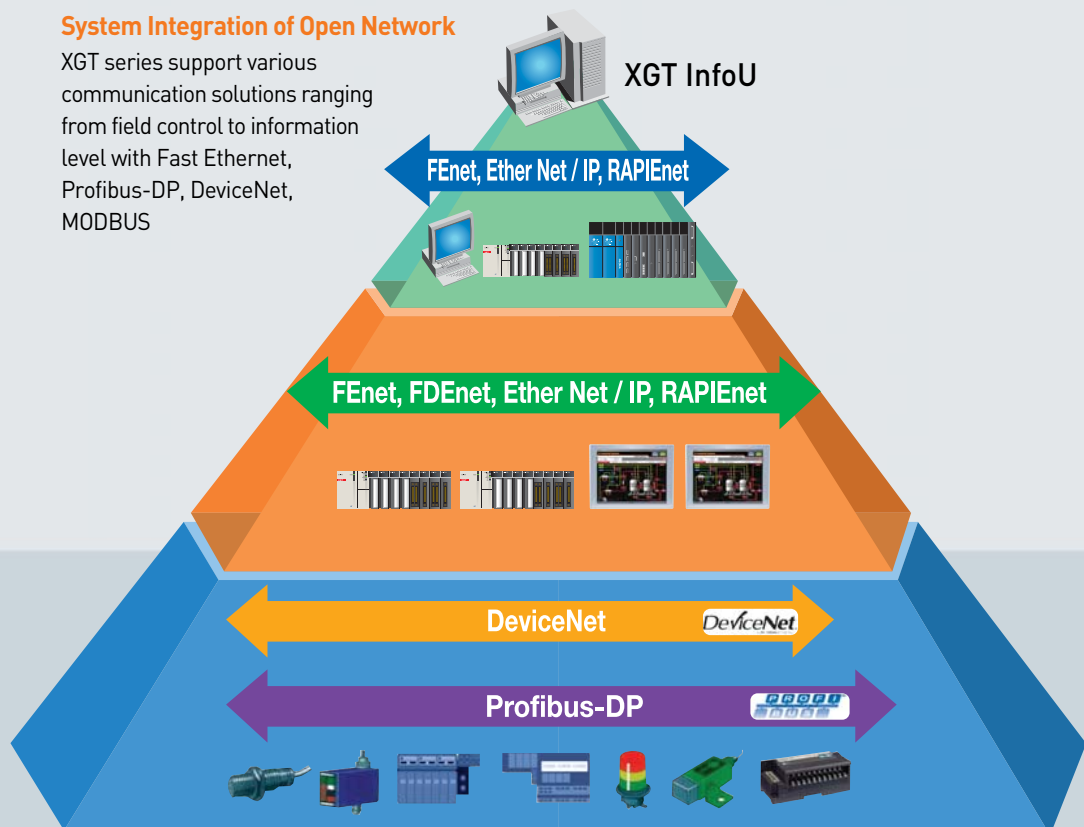
| Item         | Size (WXHxD) |
|--------------|--------------|
| Power Supply | 55X98X90     |
| CPU          | 27X98X90     |
| 8-slot Base  | 318X98X17    |

Network Innovation **Flexible**

## Flexible

## System Integration of Open Network

XGT series support various communication solutions ranging from field control to information level with Fast Ethernet, Profibus-DP, DeviceNet, MODBUS



| Item                   |                  | Fast Ethernet                                                   |        | RAPIEnet | EtherNet/IP                                            | Cnet                   | Fnet                     | Profibus-DP    | DeviceNet    | Rnet                     |
|------------------------|------------------|-----------------------------------------------------------------|--------|----------|--------------------------------------------------------|------------------------|--------------------------|----------------|--------------|--------------------------|
|                        |                  | FEnet                                                           | FDEnet |          |                                                        |                        |                          |                |              |                          |
| Transmission speed     |                  | 10/100 Mbps                                                     |        | 100 Mbps | 100 Mbps                                               | 300~115,200bps         | 1 Mbps                   | Max. 12Mbps    | Max. 500kbps | 1 Mbps                   |
| Transmission distance  |                  | 100m (Node to Node, UTP/STP)<br>2km (Node to Node, Fiber Optic) |        |          | 100m(TP)                                               | Max. 500m<br>(422/485) | 750m(Seg)<br>Max. 5.25km | Max. 12km      | Max. 500m    | 750m(Seg)<br>Max. 5.25km |
| Max. number of station |                  | 64 (HS link)                                                    |        | 64       | TCP 64/128(Client/Server)<br>CIO 64/128(Client/Server) | 32                     | 64                       | 32(Seg)<br>126 | 64           | 64                       |
|                        |                  | 16(Server)                                                      | -      |          |                                                        |                        |                          |                |              |                          |
| Service                | HS link          | ●                                                               | ●      | ●        | -                                                      | -                      | ●                        | ●              | ●            | ●                        |
|                        | XG protocol      | ●                                                               | -      | -        | -                                                      | ●                      | -                        | -              | -            | -                        |
|                        | General protocol | ●Modbus TCP                                                     | -      | -        | ●EtherNet/IP                                           | ●Modbus RTU/ASC II     | -                        | -              | -            | -                        |
|                        | P2P              | ●                                                               | ●      | ●        | ●                                                      | -                      | -                        | -              | -            | -                        |
|                        | XG5000 I/F       | ●                                                               | ●      | ●        | ●                                                      | ●                      | -                        | -              | -            | -                        |
|                        | E-Mail           | ●                                                               | -      | -        | -                                                      | -                      | -                        | -              | -            | -                        |
| Configuration software |                  | XG-GD                                                           |        |          |                                                        |                        | XG-PD & SyCon            |                | XG-PD        |                          |
| Number of installation |                  | 24 (HS link Service : 12, P2P Service : 8)                      |        |          |                                                        |                        |                          |                |              |                          |



# Software Innovation Intelligent

## Integrated Programming & Engineering

XG5000 Software Package provides integrated engineering environment from basic programming to different special module setting as well as diagnosis. This package consists of XG5000 (PLC programming), XG-PD (Communication programming) and APM Software Package (Positioning programming).



### XG5000

Program Editing & Engineering Software Windows-based Easy Operation Multi-PLC Multi-Programming Support Various Monitoring & Diagnosis Functions



### XG-PD

Comm. & Network Parameter Setting Protocol Editing / Network Diagnosis Frame Monitoring / Protocol Analysis



### XG-PM

Positioning Parameter Setting Data Editing, Various Monitoring & Diagnosis Tracking Function

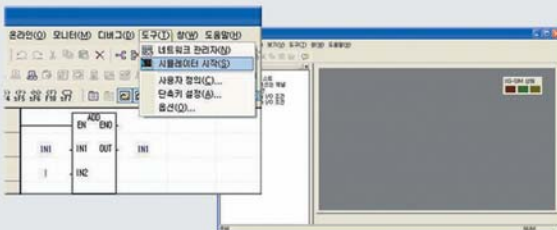


### XG-TCON

Setting the parameters of the temperature control module, Auto Tuning Function, Data & Trend Monitoring

## Simulation

XG5000 alone can run programs, set the I/O conditions, monitoring without XGT PLC



### XG-SIM

Condition of Program Simulation/PLC Online  
Module Simulation/I/O  
Linked XG-PANEL Simulator & Simulation  
Tag Integrated management between XG-SIM and XG-InfoU



# Features

Engineering & Programming Innovation

# Easy

## Special Register

XGT series expand device memory and support advanced programming environment with Index register (Z), File register (U), and Analog register (U).

**R**

### File register

As a non-volatile memory type, data are secured even in times of blackout or CPU reset.

**U**

### Analog register

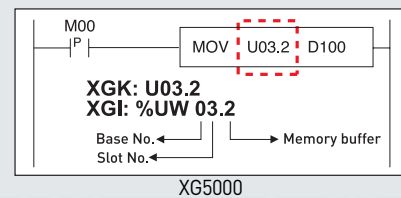
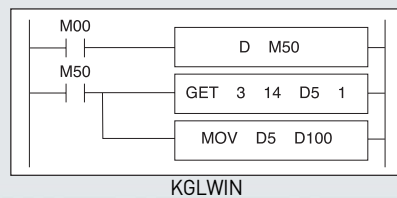
Assigning base, slot and memory buffer of an analog module to device, A/D conversion data can be accessed without analog commands.

**Z**

### Index register

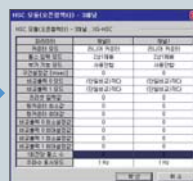
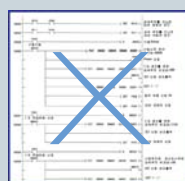
Index register is used in the sequence program for array operation.

## Example of Analog Register

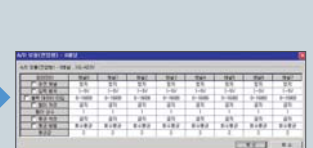
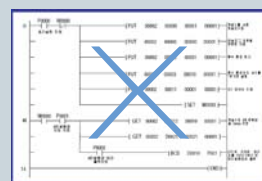


## Analog Operation without Programming

Special module setup and operation is achieved by just parameter setting without additional program.



Set up high-speed



Set up analog module counter module

## Program Modularization and Task Operation

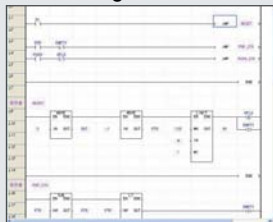
Available to run multiful programs through medulization of scan programs based on functions and author, and to operate task programs triggered by specific conditions.

| Program type | Description             | Number                                                                |
|--------------|-------------------------|-----------------------------------------------------------------------|
| Scan program | Scan                    | Executed in every scan                                                |
| Task program | Initialization task     | Executed only one time when power turns on                            |
|              | Time driven task        | Executed with a constant time interval specified in parameter setting |
|              | Internal task           | Executed by internal condition                                        |
|              | External interrupt task | Executed by external interrupt input                                  |

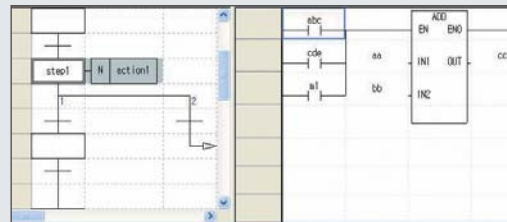


## IEC standard language (XGI): LD, SFC, ST

### Ladder Diagram



### SFC



### ST

```

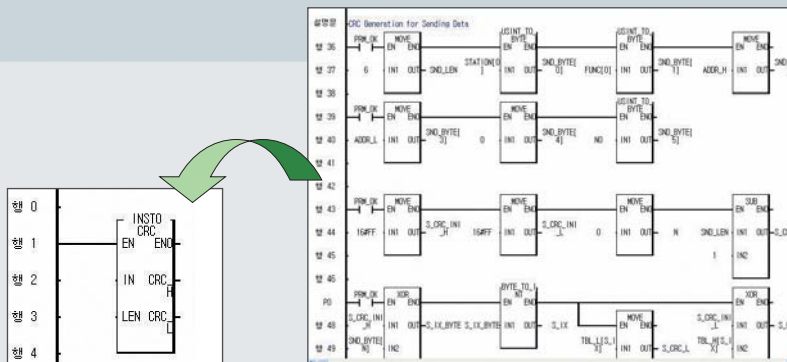
19 S2 := (- B - SORT(B))/(2*B#0) ;
20 END_IF ;
21
22
23 // CASE문 예제
24 TV := WORD_BCD_TO_INT(THIRHWHEEL);
25 TV_ERROR := 0;
26 CASE TV OF
27   1,5: DISPLAY := OVEN_TEMP;
28   2: DISPLAY := MOTOR_SPEED;
29   3: DISPLAY := GROSS - TARE;
30   4, 6..10: DISPLAY := ADD(TV, 4);
31 ELSE DISPLAY := 0;
32   TV_ERROR := 1;
33 END_CASE;
34 INT100 := INT_TO_BCD_WORD(DISPLAY);
35
36 // FOR문 예제
37 SUM := 0;
38 FOR I := 1 TO 9 DO
39   FOR J := 1 TO 2 DO
40     IF FLAG THEN EXIT; END_IF;
41     SUM := SUM + J;
42   END_FOR;
43   SUM := SUM + I;
44 END_FOR;

```

### ST features

- High-level Language
- Fit for the complicate algorithm
- Various open source (Compatibility)
- Easy data processing
- Convenient text editor

## User defined Function block (XGI)



- Standardize the program using function or function block
- Register the standardized program as a library file and reuse the library for another project



# CPU & System Configuration

XGT series contain variety of CPU types for customized solutions which support wide coverage from small / middle- to large size-system control.



IEC based CPU for high-speed  
and large scale application







## CPU Module

### XGK CPU (LS Standard)

Premium CPU for high-speed and large scale application



#### XGK-CPUU (Ultra capacity)

- Program capacity: 128K steps
- I/O points: 6,144
- I/O device point: 32,768 (Remote I/O)
- Processing speed: 28ns/step



#### XGK-CPUH (High performance)

- Program capacity: 64K steps
- I/O points: 6,144
- I/O device point: 32,768 (Remote I/O)
- Processing speed: 28ns/step



#### XGK-CPUA (Advanced)

- Program capacity: 32K steps
- I/O points: 3,072
- I/O device point: 32,768 (Remote I/O)
- Processing speed: 28ns/step

### General sequence controller PLC CPU



#### XGK-CPUS (Standard)

- Program capacity: 32K steps
- I/O points: 3,072
- I/O device point: 32,768 (Remote I/O)
- Processing speed: 84ns/step



#### XGK-CPUE (Economic)

- Program capacity: 16K step
- I/O point: 1,536
- I/O device point: 32,768 (Remote I/O)
- Processing speed: 84ns/step

### XGI CPU (IEC Standard)

Premium CPU for high-speed and large scale application



#### XGI-CPUU (IEC Standard)

- Program capacity: 1Mbyte
- I/O points: 6,144
- I/O device point: 131,072 (Remote I/O)
- Processing speed: 28ns/step
- IEC 61131-3 standard programming  
-LD(ladder), SFC(Sequential Function Chart),  
ST(Structured Text), User defined FB(Function block)
- Powerful built-in PID and Process control  
-Max. 256 loops and variety of process functions
- Utilize the same I/O with XGK CPU
- Enable to convert from GLOFA PLC program to XGI program



#### XGI-CPUH (IEC Standard)

- Program capacity: 512kbyte
- I/O points: 6,144
- I/O device point: 131,072 (Remote I/O)
- Processing speed: 28ns/step
- IEC 61131-3 standard programming  
-LD(ladder), SFC(Sequential Function Chart),  
ST(Structured Text), User defined FB(Function block)
- Powerful built-in PID and Process control  
-Max. 256 loops and variety of process functions
- Utilize the same I/O with XGK CPU
- Enable to convert from GLOFA PLC program to XGI program

### General sequence controller PLC CPU



#### XGI-CPUS (IEC Standard)

- Program capacity: 128kByte
- I/O points: 3,072
- I/O device point: 32,768
- Processing speed: 28ns/step
- IEC 61131-3 standard programming  
-LD(ladder), SFC(Sequential Function Chart),  
ST(Structured Text), User defined FB(Function block)
- Powerful built-in PID and Process control  
-Max. 256 loops and variety of process functions
- Utilize the same I/O with XGK CPU
- Enable to convert from GLOFA PLC program to XGI program

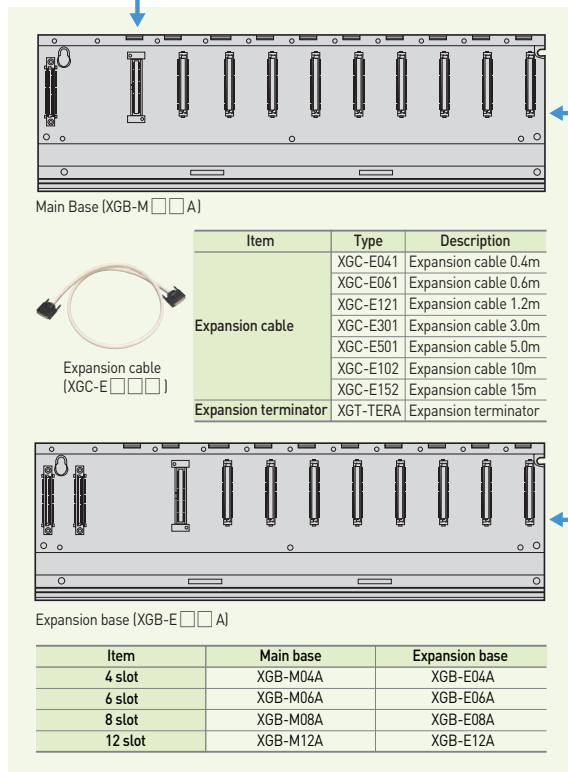
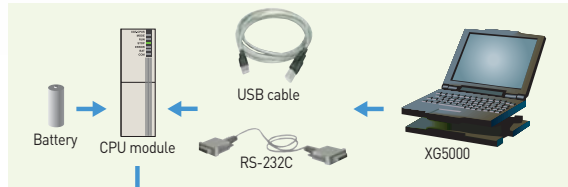


#### XGI-CPUE (IEC Standard)

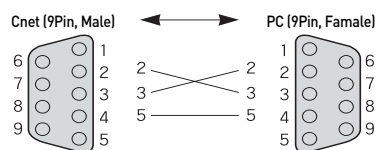
- Program capacity: 64kByte
- I/O points: 1,536
- I/O device point: 32,768
- Processing speed: 84ns/step
- IEC 61131-3 standard programming  
-LD(ladder), SFC(Sequential Function Chart),  
ST(Structured Text), User defined FB(Function block)
- Powerful built-in PID and Process control  
-Max. 256 loops and variety of process functions
- Utilize the same I/O with XGK CPU
- Enable to convert from GLOFA PLC program to XGI program



## CPU Module System composition



### XG5000 Cable (RS-232C)



| CPU module |                        | I/O point |
|------------|------------------------|-----------|
| XGK        | XGK-CPUU, CPUH         | 6,144     |
|            | XGK-CPUA, CPUS         | 3,072     |
|            | XGK-CPUE               | 1,536     |
| XGI        | XGI-CPUU/D, CPUU, CPUH | 6,144     |
|            | XGI-CPUS               | 3,072     |
|            | XGI-CPUE               | 1,536     |

| CPU Connecting Cable |                           |
|----------------------|---------------------------|
| USB 301A             | USB downloading cable     |
| K1C-050A             | RS-232C downloading cable |

| Item          | Type     | Description               |
|---------------|----------|---------------------------|
| USB cable     | USB-301A | USB downloading cable     |
| RS-232C cable | K1C-050A | RS-232C downloading cable |

| Item      | Input module |                    |          |
|-----------|--------------|--------------------|----------|
|           | AC110V       | AC220V             | DC24V    |
| 8 points  | -            | XGI-A21A, XGI-A21C | XGI-D21A |
| 16 points | XGI-A12A     | -                  | XGI-D22A |
| 32 points | -            | -                  | XGI-D24A |
| 64 points | -            | -                  | XGI-D24B |
|           | -            | -                  | XGI-D28A |
|           | -            | -                  | XGI-D28B |

| Power module |              |          |                       |
|--------------|--------------|----------|-----------------------|
| AC           | Free Voltage | XGP-ACF1 | DC5V 3A<br>DC24V 0.6A |
|              | 220V         | XGP-ACF2 | DC5V 6A               |
| DC           |              | XGP-AC23 | DC5V 8.5A             |
|              |              | XGP-DC42 | DC5V 6A               |

| Item      | Output module |          |            |
|-----------|---------------|----------|------------|
|           | Relay         | Triac    | Transistor |
| 8 points  | XGQ-RY1A      | -        | -          |
| 16 points | XGQ-RY2A      | XGQ-SS2A | XGQ-TR2A   |
| 32 points | XGQ-RY2B      | -        | XGQ-TR2B   |
| 64 points | -             | -        | XGQ-TR4A   |
|           | -             | -        | XGQ-TR4B   |
|           | -             | -        | XGQ-TR8A   |
|           | -             | -        | XGQ-TR8B   |

| Item | Input/Output mixed module |                    |
|------|---------------------------|--------------------|
|      | 16-point DC input         | 16-point TR output |

| Special module             |               |                                                                  |
|----------------------------|---------------|------------------------------------------------------------------|
| Analog input               | XGF-AV8A      | Voltage input type, 8Ch                                          |
|                            | XGF-AC8A      | Current input type, 8Ch                                          |
|                            | XGF-AD8A      | Voltage/ Current input, 8Ch                                      |
|                            | XGF-AD4S      | Voltage/ Current input, 4Ch (Isolated)                           |
|                            | XGF-AD16A     | Voltage/ Current input, 16Ch                                     |
|                            | XGF-AW4S      | 2-wire, Voltage/ Current input, 4Ch (Isolated)                   |
| Analog output              | XGF-DV4A      | Voltage output type, 4Ch                                         |
|                            | XGF-DC4A      | Current output type, 4Ch                                         |
|                            | XGF-DV8A      | Voltage output type, 8Ch                                         |
|                            | XGF-DC8A      | Current output type, 8Ch                                         |
| Analog Input/Output        | XGF-DV4S      | Voltage output, 4Ch (Isolated)                                   |
|                            | XGF-DC4S      | Current output, 4Ch (Isolated)                                   |
| High-speed counter         | XGF-AH6A      | Input: 4ch, Voltage/ Current<br>Output: 2Ch Voltage/ Current     |
|                            | XGF-H02A      | Pulse (OC) input type, 2Ch                                       |
|                            | XGF-HD2A      | Pulse (LD) input type, 2Ch                                       |
|                            | XGF-P01A-P03A | Open collector, 1-3axis                                          |
| Positioning                | XGF-PD1A-PD3A | Line drive, 1-3axis                                              |
|                            | XGF-P01H-P04H | Open collector, 1-4axis                                          |
|                            | XGF-PD1H-PD4H | Line drive, 1-4axis                                              |
| Positioning (Network Type) | XGF-PN8A      | LS Standard EtherCAT Net. 8axis                                  |
|                            | XGF-PN8B      | Standard EtherCAT Net. 8axis                                     |
| Motion module              | XGF-M32E      | Standard EtherCAT Net. 32axis                                    |
|                            | XGF-TC4S      | Thermocouple input, 4Ch                                          |
| Temperature control        | XGF-RD4A      | RTD input, 4Ch                                                   |
|                            | XGF-RD4S      | RTD input, 4Ch (Insulated)                                       |
|                            | XGF-TC4UD     | Input: 4ch.(Voltage/Current, RTD/TC)<br>Output: 8ch.(TR/Current) |
| Temperature controller     | XGF-TC4RT     | Controller: 4 loops                                              |
|                            |               | Input: 4ch.(RTD)                                                 |
|                            |               | Output: 4ch.(TR)                                                 |
| Event input                | XGF-50EA      | Controller: 4 loops                                              |
|                            |               | DC24V, 32points                                                  |

| Communication module |          |                                       |
|----------------------|----------|---------------------------------------|
| RAPIEnet             | XGL-EIMT | RAPIEnet Twisted fair 2Ch             |
|                      | XGL-EIMH | RAPIEnet Fiber optic/Twisted fair 1Ch |
|                      | XGL-EIMF | RAPIEnet Fiber optic 2Ch              |
|                      | XGL-ES4T | RAPIEnet Switch, 4Ports               |
|                      | XGL-EIMT | RAPIEnet Twisted fair 2Ch For PC      |
|                      | XGL-EIMF | RAPIEnet Fiber optic 2Ch For PC       |
| Cnet                 | XGL-CH2A | RS-232C/RS-422                        |
|                      | XGL-C22A | RS-232C, 2Ch                          |
|                      | XGL-C42A | RS-422, 2Ch                           |
| Ethernet (Open)      | XGL-EFMT | Fiber optic, Master, SC type          |
|                      | XGL-EFMT | Twisted pair, Master, RJ-45           |
|                      | XGL-EHST | Fast Ethernet, Switching hub          |
| Ethernet (Dedicated) | XGL-EDMF | Fiber optic, Master, SC type          |
|                      | XGL-EDMT | Twisted pair, Master, RJ-45           |
| Rnet                 | XGL-EIPT | Industrial Ethernet, 2ports           |
| EtherNet/IP          | XGL-RMEA | Rnet, Master, TP                      |
|                      | XGL-DMEA | DeviceNet, Master                     |
| Profibus-DP          | XGL-PMEA | Profibus-DP, Master                   |
|                      | XGL-PMEC | Profibus-DP, Master                   |
|                      | XGL-PSRA | Profibus-DP, Slave, Remote Inter face |
| Fnet                 | XGL-PSEA | Profibus-DP, Slave                    |
|                      | XGL-FMEA | Dedicated network                     |



## CPU Module

### Specifications

| Item                 | Description                                       |                            |                      | Standard                             |             |
|----------------------|---------------------------------------------------|----------------------------|----------------------|--------------------------------------|-------------|
| Ambient temperature  | 0 ~ 55 °C                                         |                            |                      |                                      |             |
| Storage temperature  | -25 ~ +70 °C                                      |                            |                      |                                      |             |
| Ambient humidity     | 5 ~ 95%RH, (Non-condensing)                       |                            |                      |                                      |             |
| Storage humidity     | 5 ~ 95%RH, (Non-condensing)                       |                            |                      |                                      |             |
| Vibration resistance | Occasional vibration                              |                            |                      | -                                    | IEC 61131-2 |
|                      | Frequency                                         | Acceleration               | Pulse width          | 10 times each direction (X, Y and Z) |             |
|                      | 10 ≤ f < 57Hz                                     | -                          | 0.075mm              |                                      |             |
|                      | 57 ≤ f < 150Hz                                    | 9.8m/s <sup>2</sup> {1G}   | -                    |                                      |             |
|                      | Frequency                                         | Acceleration               | Pulse width          |                                      |             |
|                      | 10 ≤ f < 57Hz                                     | -                          | 0.035mm              |                                      |             |
|                      | 57 ≤ f < 150Hz                                    | 4.9m/s <sup>2</sup> {0.5G} | -                    |                                      |             |
| Shock resistance     | • Peak acceleration: 147 m/s{15G}                 |                            |                      | IEC 61131-2                          |             |
|                      | • Duration: 11ms                                  |                            |                      |                                      |             |
|                      | • Half-sine, 3 times each direction per each axis |                            |                      |                                      |             |
| Noise resistance     | Square wave impulse noise                         |                            | ± 1,500 V            | LSIS Standard                        |             |
|                      | Electrostatic discharge                           |                            | ± 4kV                | IEC 61131-2, IEC 61000-4-2           |             |
|                      | Radiated electromagnetic field noise              |                            | 27 ~ 500 MHz, 10 V/m | IEC 61131-2, IEC 61000-4-3           |             |
|                      | Fast transient / Burst noise                      |                            | 0.25kV               | IEC 61131-2, IEC 61000-4-4           |             |
| Operating Ambience   | Free from corrosive gases and excessive dust      |                            |                      |                                      |             |
| Altitude             | Up to 2,000m                                      |                            |                      |                                      |             |
| Pollution degree     | Less than equal to 2                              |                            |                      |                                      |             |
| Cooling              | Air-cooling                                       |                            |                      |                                      |             |

\* Pollution degree 2 is nonconductive pollution of the sort where occasionally a temporary conductivity caused by condensation must be expected.

### XGK

| Item                              |                                    | Description                                                                            |             |                                                 |             |           | Remarks              |
|-----------------------------------|------------------------------------|----------------------------------------------------------------------------------------|-------------|-------------------------------------------------|-------------|-----------|----------------------|
|                                   |                                    | XGK-CPUE                                                                               | XGK-CPUS    | XGK-CPUA                                        | XGK-CPUH    | XGK-CPUU  |                      |
| Operation method                  |                                    | Cyclic execution of stored program, Time-driven interrupt, Process-driven interrupt    |             |                                                 |             |           |                      |
| I/O control method                |                                    | Batch processing by scan synchronization (Refresh), Direct input/output by instruction |             |                                                 |             |           |                      |
| Program language                  |                                    | Ladder diagram, Instruction list                                                       |             |                                                 |             |           |                      |
| Number of instructions            | Basic                              | 42                                                                                     |             |                                                 |             |           |                      |
|                                   | Application                        | 600                                                                                    |             |                                                 |             |           |                      |
| Processing speed                  | Sequence instruction ( $\mu$ s)    | 0.084 $\mu$ s/step                                                                     |             | 0.028 $\mu$ s/step                              |             |           |                      |
|                                   | Application instruction ( $\mu$ s) | 0.252 $\mu$ s/step                                                                     |             | 0.084 $\mu$ s/step                              |             |           |                      |
|                                   |                                    | $\pm$ : 0.602 $\mu$ s (S), 1.078 $\mu$ s (D)                                           |             | $\pm$ : 0.602 $\mu$ s (S), 1.078 $\mu$ s (D)    |             |           |                      |
|                                   | Floating instruction ( $\mu$ s)    | $\times$ : 1.106 $\mu$ s (S), 2.384 $\mu$ s (D)                                        |             | $\times$ : 1.106 $\mu$ s (S), 2.384 $\mu$ s (D) |             |           |                      |
|                                   |                                    | $\div$ : 1.134 $\mu$ s (S), 2.66 $\mu$ s (D)                                           |             | $\div$ : 1.134 $\mu$ s (S), 2.66 $\mu$ s (D)    |             |           |                      |
| Program capacity                  |                                    | 16K Step                                                                               | 32K Step    | 32K Step                                        | 64K Step    | 128K Step |                      |
| I/O points (available to install) | With 16-point I/O                  | 384                                                                                    | 768         | 768                                             | 1536        | 1536      |                      |
|                                   | With 32-point I/O                  | 768                                                                                    | 1536        | 1536                                            | 3072        | 3072      |                      |
|                                   | With 64-point I/O                  | 1536                                                                                   | 3072        | 3072                                            | 6144        | 6144      |                      |
| Data area                         | P                                  | P0000 ~ P2047F (32768 points)                                                          |             |                                                 |             |           | I/O relay            |
|                                   | M                                  | M0000 ~ M2047F (32768 points)                                                          |             |                                                 |             |           | Auxiliary relay      |
|                                   | K                                  | K000 ~ K2047F (32768 points )                                                          |             |                                                 |             |           | Special relay        |
|                                   | L                                  | L000 ~ L11263F (32768 points )                                                         |             |                                                 |             |           | Link relay           |
|                                   | F                                  | F000 ~ F2047F (32768 points )                                                          |             |                                                 |             |           | Keep relay           |
|                                   | T                                  | 100ms: T0000 - T0999                                                                   |             |                                                 |             |           | Timer (Adjustable)   |
|                                   |                                    | 10ms: T1000 - T1499                                                                    |             |                                                 |             |           |                      |
|                                   |                                    | 1ms: T1500 - T1999                                                                     |             |                                                 |             |           |                      |
|                                   |                                    | 0.1ms: T2000 - T2047                                                                   |             |                                                 |             |           |                      |
|                                   | C                                  | C0000 ~ C2047                                                                          |             |                                                 |             |           | Counter              |
|                                   | S                                  | S00.00 ~ S127.99                                                                       |             |                                                 |             |           | Step controller      |
|                                   | D                                  | D0000 ~D19999                                                                          |             | D0000 ~ D32767                                  |             |           | Register             |
|                                   | U                                  | U0.0~U1F.31                                                                            | U0.0~U3F.31 | U0.0~U3F.31                                     | U0.0~U7F.31 |           | Analog resister      |
|                                   | Z                                  | 128 points                                                                             |             |                                                 |             |           | Index register       |
| File register                     | R                                  | RAM: 1 block                                                                           |             | RAM: 2 block                                    |             |           | 1 block: R0 ~ R32767 |
|                                   |                                    | Flash: 2M byte, 32 blocks                                                              |             |                                                 |             |           |                      |
| Program type                      | Total program                      | 256                                                                                    |             |                                                 |             |           |                      |
|                                   | Initialization                     | 1 [INT]                                                                                |             |                                                 |             |           |                      |
|                                   | Time-driven                        | 32                                                                                     |             |                                                 |             |           |                      |
|                                   | External                           | 32                                                                                     |             |                                                 |             |           |                      |
|                                   | Internal                           | 32                                                                                     |             |                                                 |             |           |                      |
| Operation mode                    |                                    | RUN, STOP, DEBUG                                                                       |             |                                                 |             |           |                      |
| Self-diagnosis                    |                                    | Execution, Delay, Memory error, I/O error, Battery error, Power error                  |             |                                                 |             |           |                      |
| Programming port                  |                                    | RS-232C (1Ch), USB (1Ch)                                                               |             |                                                 |             |           | MODBUS slave         |
| Data retention at power failure   |                                    | Set "retain" at data declaration                                                       |             |                                                 |             |           |                      |
| Max. expansion stage              |                                    | 1                                                                                      | 3           | 3                                               | 7           |           |                      |
| Current consumption (mA)          |                                    | 960                                                                                    |             | 960                                             |             |           |                      |
| Weight (Kg)                       |                                    | 0.12                                                                                   |             | 0.12                                            |             |           |                      |



## XGI

## CPU

| Item                                       |                           |   | XGI-CPUE                                                                                              | XGI-CPUS                                      | XGI-CPUH                              | XGI-CPUU      | XGI-CPUU/D            | Remarks                                        |
|--------------------------------------------|---------------------------|---|-------------------------------------------------------------------------------------------------------|-----------------------------------------------|---------------------------------------|---------------|-----------------------|------------------------------------------------|
| Operation system                           |                           |   | Reiterative operation, fixed cycle operation, constant scan                                           |                                               |                                       |               |                       |                                                |
| I/O Control system                         |                           |   | Scan synchronous batch processing system(refresh system),<br>direct system by command                 |                                               |                                       |               |                       |                                                |
| Program language                           |                           |   | Ladder Diagram, SFC (Sequential Function Chart),<br>ST (Structured Text)                              |                                               |                                       |               |                       |                                                |
| No. of commands                            | Operator                  |   | 18                                                                                                    |                                               |                                       |               |                       |                                                |
|                                            | Basic function            |   | 136 types + real number operation function                                                            |                                               |                                       |               |                       |                                                |
|                                            | Basic function block      |   | 43                                                                                                    |                                               |                                       |               |                       |                                                |
|                                            | Dedicated function block  |   | Dedicated function blocks by special function modules,<br>communication dedicated function block(P2P) |                                               |                                       |               |                       |                                                |
| Operation processing speed (basic command) | Basic                     |   | 0.084 $\mu$ s /step                                                                                   | 0.028 $\mu$ s / step                          |                                       |               |                       | S: Single real number<br>D: Double real number |
|                                            | MOVE                      |   | 0.252 $\mu$ s /step                                                                                   | 0.084 $\mu$ s /step                           |                                       |               |                       |                                                |
|                                            | Real number operation     |   | $\pm$ : 1.442 $\mu$ s(S),<br>2.87 $\mu$ s(D)                                                          | $\pm$ : 0.392 $\mu$ s(S), 0.924 $\mu$ s(D)    |                                       |               |                       |                                                |
|                                            |                           |   | $\times$ : 1.948 $\mu$ s(S),<br>4.186 $\mu$ s(D)                                                      | $\times$ : 0.896 $\mu$ s(S), 2.240 $\mu$ s(D) |                                       |               |                       |                                                |
|                                            |                           |   | $\div$ : 1.442 $\mu$ s(S),<br>4.2 $\mu$ s(D)                                                          | $\div$ : 0.924 $\mu$ s(S), 2.254 $\mu$ s(D)   |                                       |               |                       |                                                |
| Program memory capacity                    |                           |   | 64KB                                                                                                  | 128KB                                         | 512KB                                 | 1M            |                       |                                                |
| I/O points (installable)                   |                           |   | 1,536points                                                                                           | 3,072points                                   | 6,144points                           |               |                       |                                                |
| Max. I/O memory contact                    |                           |   | 32,768points                                                                                          |                                               |                                       | 131,072points |                       |                                                |
| Data memory                                | Symbolic variable area(A) |   | 64KB<br>(max. 32KB retain settable)                                                                   | 128KB<br>(max. 64KB retain settable)          | 512KB<br>(max. 256KB retain settable) |               |                       |                                                |
|                                            | I variable(I)             |   | 4KB                                                                                                   |                                               | 16KB                                  |               |                       |                                                |
|                                            | Q variable(Q)             |   | 4KB                                                                                                   |                                               | 16KB                                  |               |                       |                                                |
|                                            | Direct variable           | M | 32KB<br>(max. 16KB retain settable)                                                                   | 128KB<br>(max. 64KB retain settable)          | 256KB<br>(max. 128KB retain settable) |               |                       |                                                |
|                                            |                           | R | 32KB $\times$ 1block                                                                                  | 64KB $\times$ 1block                          | 64KB $\times$ 2block                  |               | 64KB $\times$ 16block |                                                |
|                                            |                           | W | 32KB                                                                                                  | 64KB                                          | 128KB                                 |               | 1,024KByte            |                                                |
|                                            | Flag variable             | F | 4KB                                                                                                   |                                               |                                       |               |                       |                                                |
|                                            |                           | K | 4KB                                                                                                   |                                               |                                       | 16KB          |                       |                                                |
|                                            |                           | L | 22KB                                                                                                  |                                               |                                       |               |                       |                                                |
|                                            |                           | N | 42KB                                                                                                  |                                               |                                       |               |                       |                                                |
|                                            |                           | U | 2KB                                                                                                   | 4KB                                           | 8KB                                   |               |                       |                                                |
| Flash area                                 |                           |   | 1M, 16block                                                                                           | 2MB, 32block                                  |                                       |               |                       |                                                |
| Timer                                      |                           |   | No point limit<br>Time range: 0.001~ 4,294,967.295 second(1,193 hours)                                |                                               |                                       |               |                       |                                                |
| Counter                                    |                           |   | No point limit<br>Coefficient range : 64 bit expression                                               |                                               |                                       |               |                       |                                                |
| Program structure                          | Total no. of programs     |   | 256                                                                                                   |                                               |                                       |               |                       |                                                |
|                                            | Initialization task       |   | 1                                                                                                     |                                               |                                       |               |                       |                                                |
|                                            | Fixed cycle task          |   | 32                                                                                                    |                                               |                                       |               |                       |                                                |
|                                            | Internal device task      |   | 32                                                                                                    |                                               |                                       |               |                       |                                                |
| Operation mode                             |                           |   | RUN, STOP, DEBUG                                                                                      |                                               |                                       |               |                       |                                                |
| Restart mode                               |                           |   | Cold, Warm                                                                                            |                                               |                                       |               |                       |                                                |
| Self diagnosis                             |                           |   | Operation delay monitoring, memory fault, I/O fault, battery fault, power fault and etc               |                                               |                                       |               |                       |                                                |
| Data protection in case of power failure   |                           |   | Retain area setting by basic parameters                                                               |                                               |                                       |               |                       |                                                |
| Max. base extension                        |                           |   | 1                                                                                                     | 3                                             | 7                                     |               |                       |                                                |
| Current consumption (mA)                   |                           |   | 940mA                                                                                                 |                                               |                                       | 960mA         |                       |                                                |
| Weight (kg)                                |                           |   | 0.12kg                                                                                                |                                               |                                       |               |                       |                                                |



## CPU Module

### XGK system configuration

| Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | XGK-CPUE                                                                                                                                                                                                                                                                                                             | XGK-CPUS        | XGK-CPUA        | XGK-CPUH, CPUU   |                   |                   |                   |                   |                   |                   |                   |                   |                   |   |   |   |    |    |       |     |  |  |           |           |           |           |           |           |           |           |           |           |  |  |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|---|---|---|----|----|-------|-----|--|--|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--|--|-----------------|-----------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Max. expansion stage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1 Stage                                                                                                                                                                                                                                                                                                              | 3 Stage         | 3 Stage         | 7 Stage          |                   |                   |                   |                   |                   |                   |                   |                   |                   |   |   |   |    |    |       |     |  |  |           |           |           |           |           |           |           |           |           |           |  |  |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |
| Max. installation of module                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 24 Module                                                                                                                                                                                                                                                                                                            | 48 Module       | 48 Module       | 96 Module        |                   |                   |                   |                   |                   |                   |                   |                   |                   |   |   |   |    |    |       |     |  |  |           |           |           |           |           |           |           |           |           |           |  |  |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |
| Max. number of I/O point                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1,536 Points                                                                                                                                                                                                                                                                                                         | 3,072 Points    | 3,072 Points    | 6,144 Points     |                   |                   |                   |                   |                   |                   |                   |                   |                   |   |   |   |    |    |       |     |  |  |           |           |           |           |           |           |           |           |           |           |  |  |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |
| Max. expansion distance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 15m                                                                                                                                                                                                                                                                                                                  |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |   |   |   |    |    |       |     |  |  |           |           |           |           |           |           |           |           |           |           |  |  |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |
| Assignment of I/O number (Fixed)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>64 points are assigned to each slot of base regardless of installation of module.</li><li>I/O numbers equivalent to 12 slots are assigned to a base.</li><li>The starting number of base 0 is P0000.</li></ul>                                                                 |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |   |   |   |    |    |       |     |  |  |           |           |           |           |           |           |           |           |           |           |  |  |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Refer to the following figure regarding the I/O number assignment of 12 slots</li></ul>                                                                                                                                                                                        |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |   |   |   |    |    |       |     |  |  |           |           |           |           |           |           |           |           |           |           |  |  |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |
| <table><tr><th colspan="2">Slot number:</th><th>0</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th></tr><tr><th>Power</th><th>CPU</th><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td>P00<br/>~<br/>P3F</td><td>P40<br/>~<br/>P7F</td><td>P80<br/>~<br/>P11F</td><td>P120<br/>~<br/>P15F</td><td>P160<br/>~<br/>P19F</td><td>P200<br/>~<br/>P23F</td><td>P240<br/>~<br/>P27F</td><td>P280<br/>~<br/>P31F</td><td>P320<br/>~<br/>P35F</td><td>P360<br/>~<br/>P39F</td><td>P400<br/>~<br/>P43F</td><td>P440<br/>~<br/>P47F</td></tr></table>                                                                                     |                                                                                                                                                                                                                                                                                                                      |                 |                 |                  | Slot number:      |                   | 0                 | 1                 | 2                 | 3                 | 4                 | 5                 | 6                 | 7 | 8 | 9 | 10 | 11 | Power | CPU |  |  |           |           |           |           |           |           |           |           |           |           |  |  | P00<br>~<br>P3F | P40<br>~<br>P7F | P80<br>~<br>P11F | P120<br>~<br>P15F | P160<br>~<br>P19F | P200<br>~<br>P23F | P240<br>~<br>P27F | P280<br>~<br>P31F | P320<br>~<br>P35F | P360<br>~<br>P39F | P400<br>~<br>P43F | P440<br>~<br>P47F |
| Slot number:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                      | 0               | 1               | 2                | 3                 | 4                 | 5                 | 6                 | 7                 | 8                 | 9                 | 10                | 11                |   |   |   |    |    |       |     |  |  |           |           |           |           |           |           |           |           |           |           |  |  |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |
| Power                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CPU                                                                                                                                                                                                                                                                                                                  |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |   |   |   |    |    |       |     |  |  |           |           |           |           |           |           |           |           |           |           |  |  |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                      | P00<br>~<br>P3F | P40<br>~<br>P7F | P80<br>~<br>P11F | P120<br>~<br>P15F | P160<br>~<br>P19F | P200<br>~<br>P23F | P240<br>~<br>P27F | P280<br>~<br>P31F | P320<br>~<br>P35F | P360<br>~<br>P39F | P400<br>~<br>P43F | P440<br>~<br>P47F |   |   |   |    |    |       |     |  |  |           |           |           |           |           |           |           |           |           |           |  |  |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |
| I/O assignment (Variable)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>I/O point is assigned automatically according to the installed module.</li><li>I/O parameter is used to install modules.</li><li>The starting number of base 0 is P0000.</li><li>16 points are assigned automatically to the slot of special or communication module</li></ul> |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |   |   |   |    |    |       |     |  |  |           |           |           |           |           |           |           |           |           |           |  |  |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Refer to the following figure regarding the I/O number assignment of 12 slots.</li></ul>                                                                                                                                                                                       |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |   |   |   |    |    |       |     |  |  |           |           |           |           |           |           |           |           |           |           |  |  |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |
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| Slot number:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                      | 0               | 1               | 2                | 3                 | 4                 | 5                 | 6                 | 7                 | 8                 | 9                 | 10                | 11                |   |   |   |    |    |       |     |  |  |           |           |           |           |           |           |           |           |           |           |  |  |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |
| Power                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CPU                                                                                                                                                                                                                                                                                                                  |                 |                 | 16 points        | 16 points         | 32 points         | 64 points         | 16 points         | 32 points         | 32 points         | 64 points         | 32 points         | 16 points         |   |   |   |    |    |       |     |  |  |           |           |           |           |           |           |           |           |           |           |  |  |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                      | P00<br>~<br>P0F | P10<br>~<br>P1F | P20<br>~<br>P3F  | P40<br>~<br>P7F   | P80<br>~<br>P8F   | P90<br>~<br>P10F  | P110<br>~<br>P12F | P130<br>~<br>P16F | P170<br>~<br>P18F | P190<br>~<br>P19F | P200<br>~<br>P21F | P220<br>~<br>P23F |   |   |   |    |    |       |     |  |  |           |           |           |           |           |           |           |           |           |           |  |  |                 |                 |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |

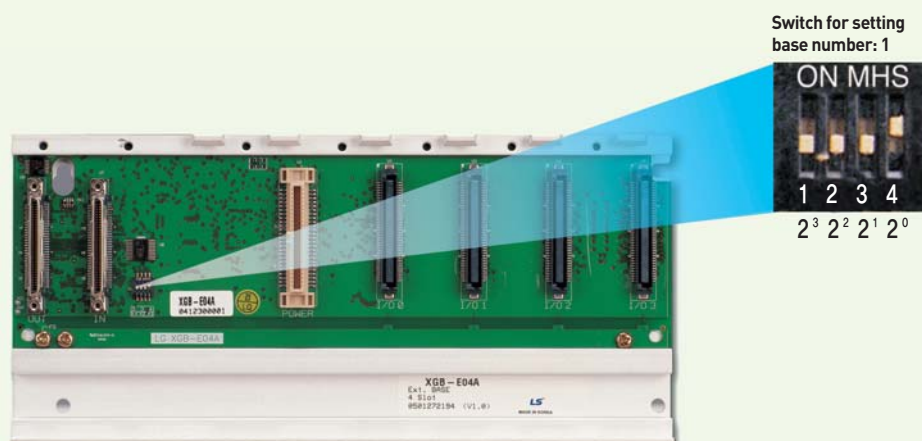
### XGI system configuration

| Item                        | XGI-CPUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | XGI-CPUS     | XGI-CPUH, CPUU, CPUU/D |              |           |           |           |           |           |           |           |           |           |   |   |    |    |       |     |           |           |           |           |           |           |           |           |           |           |           |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------------------|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---|---|----|----|-------|-----|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Max. expansion stage        | 1 Stage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3 Stage      | 7 Stage                |              |           |           |           |           |           |           |           |           |           |   |   |    |    |       |     |           |           |           |           |           |           |           |           |           |           |           |
| Max. installation of module | 24 Module                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 48 Module    | 96 Module              |              |           |           |           |           |           |           |           |           |           |   |   |    |    |       |     |           |           |           |           |           |           |           |           |           |           |           |
| Max. number of I/O point    | 1,536 Points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3,072 Points | 6,144 Points           |              |           |           |           |           |           |           |           |           |           |   |   |    |    |       |     |           |           |           |           |           |           |           |           |           |           |           |
| Max. expansion distance     | 15m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |                        |              |           |           |           |           |           |           |           |           |           |   |   |    |    |       |     |           |           |           |           |           |           |           |           |           |           |           |
| I/O assignment              | <ul style="list-style-type: none"><li>• 64 points are assigned to each slot of base regardless of installation of module.</li><li>• No limit in installation of special module</li><li>• Special module is controlled by function block and the memory assignment is done automatically</li></ul>                                                                                                                                                                                                                                                                                                                                                                         |              |                        |              |           |           |           |           |           |           |           |           |           |   |   |    |    |       |     |           |           |           |           |           |           |           |           |           |           |           |
|                             | <ul style="list-style-type: none"><li>• Refer to the following figure regarding the I/O assignment of 12 slots</li></ul> <table><tr><th colspan="2">Slot number:</th><th>0</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th></tr><tr><td>Power</td><td>CPU</td><td>16 points</td><td>16 points</td><td>32 points</td><td>64 points</td><td>16 points</td><td>32 points</td><td>32 points</td><td>64 points</td><td>32 points</td><td>16 points</td><td>32 points</td><td>32 points</td></tr></table> <div><p>% I × 0.8.0~31</p><p>% Q × 0.9.0~15</p><p>% Q × 0.10.0~31</p><p>% Q × 0.11.0~31</p></div> |              |                        | Slot number: |           | 0         | 1         | 2         | 3         | 4         | 5         | 6         | 7         | 8 | 9 | 10 | 11 | Power | CPU | 16 points | 16 points | 32 points | 64 points | 16 points | 32 points | 32 points | 64 points | 32 points | 16 points | 32 points |
| Slot number:                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0            | 1                      | 2            | 3         | 4         | 5         | 6         | 7         | 8         | 9         | 10        | 11        |   |   |    |    |       |     |           |           |           |           |           |           |           |           |           |           |           |
| Power                       | CPU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 16 points    | 16 points              | 32 points    | 64 points | 16 points | 32 points | 32 points | 64 points | 32 points | 16 points | 32 points | 32 points |   |   |    |    |       |     |           |           |           |           |           |           |           |           |           |           |           |

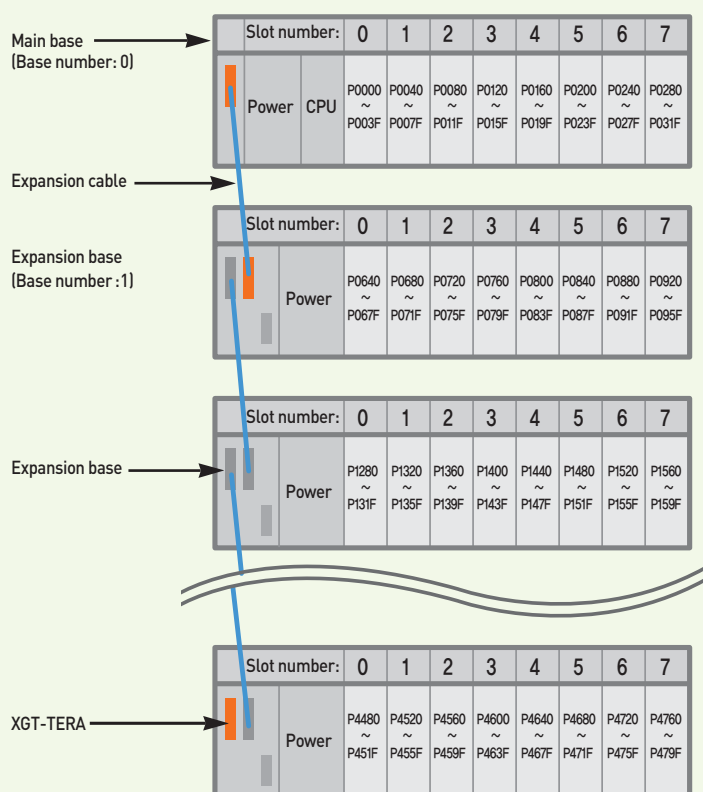


## Expansion system composition

1. The following figure is the example of expansion system with the fixed I/O point type of XGK-CPUH.
2. The address of I/O point is adjustable by XG5000 parameter.



The lowest expansion base should be connected to the upper stage with expansion terminator(XGT-TERA).



XGT-TERA should be installed at the end of the last expansion base.



## I/O module

### Features

- 8, 16, 32, 64 points I/O module
- Operation monitoring by LED display
- Easy maintenance: Terminal block type, one-touch installation of module



### Input module specifications

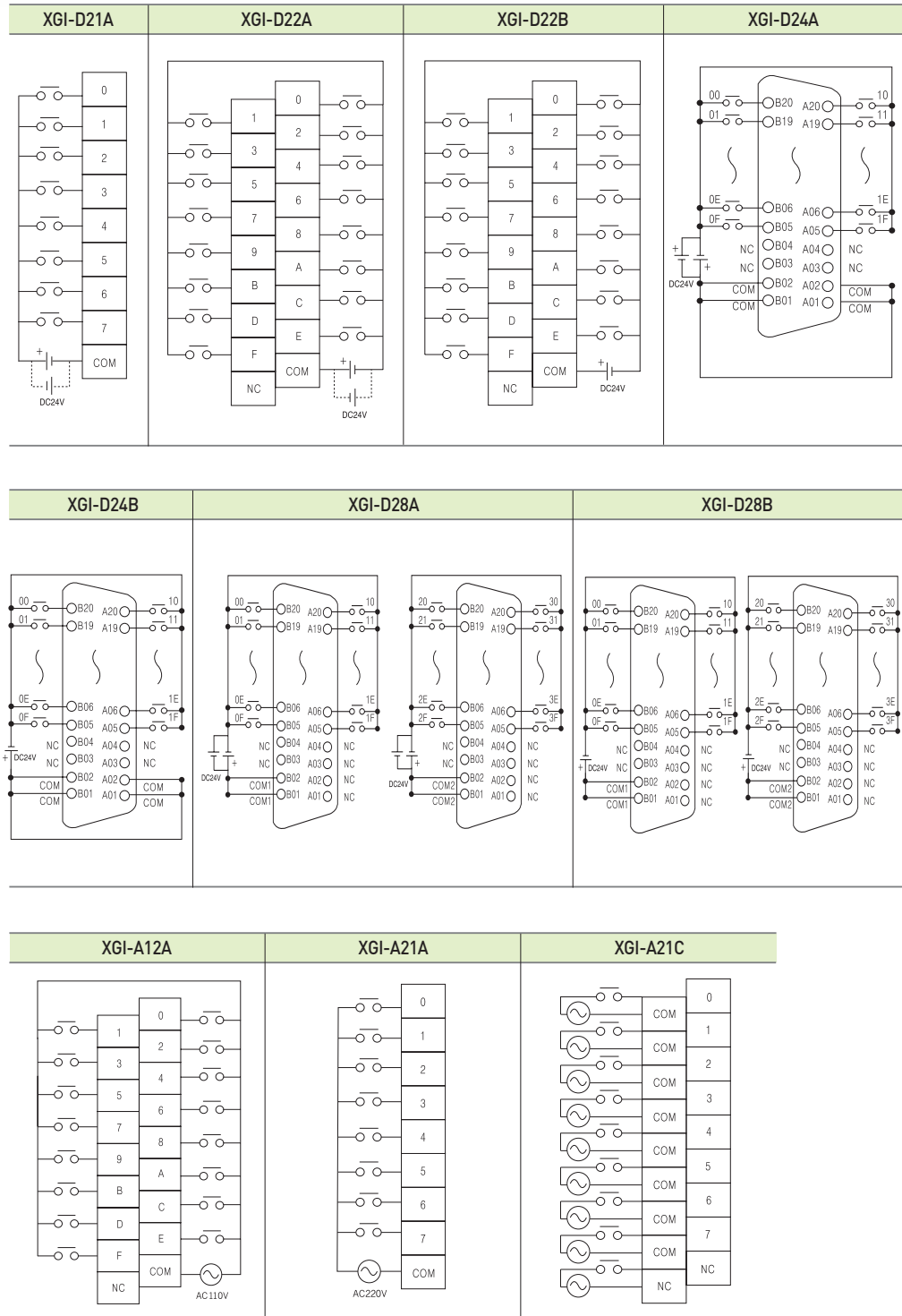
| Item                     |        | DC input                                                         |               |          |               |          |          | AC input                    |                               |                             |          |
|--------------------------|--------|------------------------------------------------------------------|---------------|----------|---------------|----------|----------|-----------------------------|-------------------------------|-----------------------------|----------|
| Type                     |        | XGI-D21A                                                         | XGI-D22A      | XGI-D22B | XGI-D24A      | XGI-D24B | XGI-D28A | XGI-D28B                    | XGI-A12A                      | XGI-A21A                    | XGI-A21C |
| Input point              |        | 8                                                                | 16            |          | 32            |          | 64       |                             | 16                            | 8                           | 8        |
| Rated input voltage      |        | DC24V                                                            |               |          |               |          |          | AC100~120V                  | Free voltage                  | DC100/240V                  |          |
| Rated input current      |        | 4mA                                                              |               |          |               |          |          | 8mA                         | 17mA                          | 17mA                        |          |
| ON voltage/current       |        | 19V or more / 3mA or less                                        |               |          |               |          |          | AC80V or more / 5mA or less | AC130V or more / 10mA or less | AC80V or more / 5mA or less |          |
| OFF voltage/current      |        | DC11V or more / 1.7mA or less                                    |               |          |               |          |          | AC80V or more / 5mA or less | AC60V or more / 2mA or less   | AC30V or more / 1mA or less |          |
| Response                 | Off→On | 1ms/5ms/10ms/20ms/70ms (set by CPU parameter) Initial value: 3ms |               |          |               |          |          | 15mA or less                |                               |                             |          |
|                          | On→Off | 1ms/5ms/10ms/20ms/70ms (set by CPU parameter) Initial value: 3ms |               |          |               |          |          | 25mA or less                |                               |                             |          |
| Common (COM)             |        | 8 points/COM                                                     | 16 points/COM |          | 32 points/COM |          |          | 16 points/COM               | 8 points/COM                  | 1 points/COM                |          |
| Insulation method        |        | Photocoupler                                                     |               |          |               |          |          | Photocoupler                |                               |                             |          |
| Current consumption (mA) |        | 20                                                               | 30            |          | 50            |          | 60       |                             | 30                            | 20                          | 20       |
| Weight (Kg)              |        | 0.1                                                              | 0.12          |          | 0.1           |          | 0.15     |                             | 0.13                          | 0.13                        | 0.13     |

### Output module specifications

| Item                     |         | Relay                |               |          | Transistor   |               |          |          |          |          | Triac                 |               |
|--------------------------|---------|----------------------|---------------|----------|--------------|---------------|----------|----------|----------|----------|-----------------------|---------------|
| Type                     |         | XGQ-RY1A             | XGQ-RY2A      | XGQ-RY2B | XGQ-TR1C     | XGQ-TR2A      | XGQ-TR2B | XGQ-TR4A | XGQ-TR4B | XGQ-TR8A | XGQ-TR8B              | XGQ-SS2A      |
| Output point             |         | 8                    | 16            |          | 8            | 16            |          | 32       |          | 64       |                       | 16            |
| Rated input voltage      |         | DC12/24V, AC110/220V |               |          | DC12/24V     |               |          |          |          |          | AC110/220V            |               |
| Rated input current      | 1 Point | 2A                   |               |          | 2A           | 0.5A          |          | 0.1A     |          |          | 0.6A                  |               |
|                          | Common  | 5A                   |               |          | 0.1A         | 4A            |          | 2A       |          |          | 4A                    |               |
| Response time            | Off→On  | 10ms or less         |               |          | 3ms or less  | 1ms or less   |          |          |          |          | 1ms or less           |               |
|                          | On→Off  | 12ms or less         |               |          | 10ms or less | 1ms or less   |          |          |          |          | 0.5cycle +1ms or less |               |
| Common (COM)             |         | 1 point/COM          | 16 points/COM |          | 1 points/COM | 32 points/COM |          |          |          |          |                       | 16 points/COM |
| Insulation method        |         | Relay                |               |          | Photocoupler |               |          |          |          |          |                       |               |
| Current consumption (mA) |         | 260                  | 500           |          | 100          | 70            |          | 130      |          | 230      |                       | 300           |
| Weight (Kg)              |         | 0.13                 | 0.17          | 0.19     | 0.11         | 0.11          |          | 0.1      |          | 0.15     |                       | 0.2           |
| Surge killer             |         | -                    |               | Varistor | Zener diode  |               |          |          |          |          | Varistor              |               |
| External power supply    |         | -                    |               |          | DC12/24V     | DC            |          |          |          |          |                       | -             |

Note) B1, B2 of 32, 62 points terminal [connector] are shorted inside of the product.

# Wiring diagram for input modules

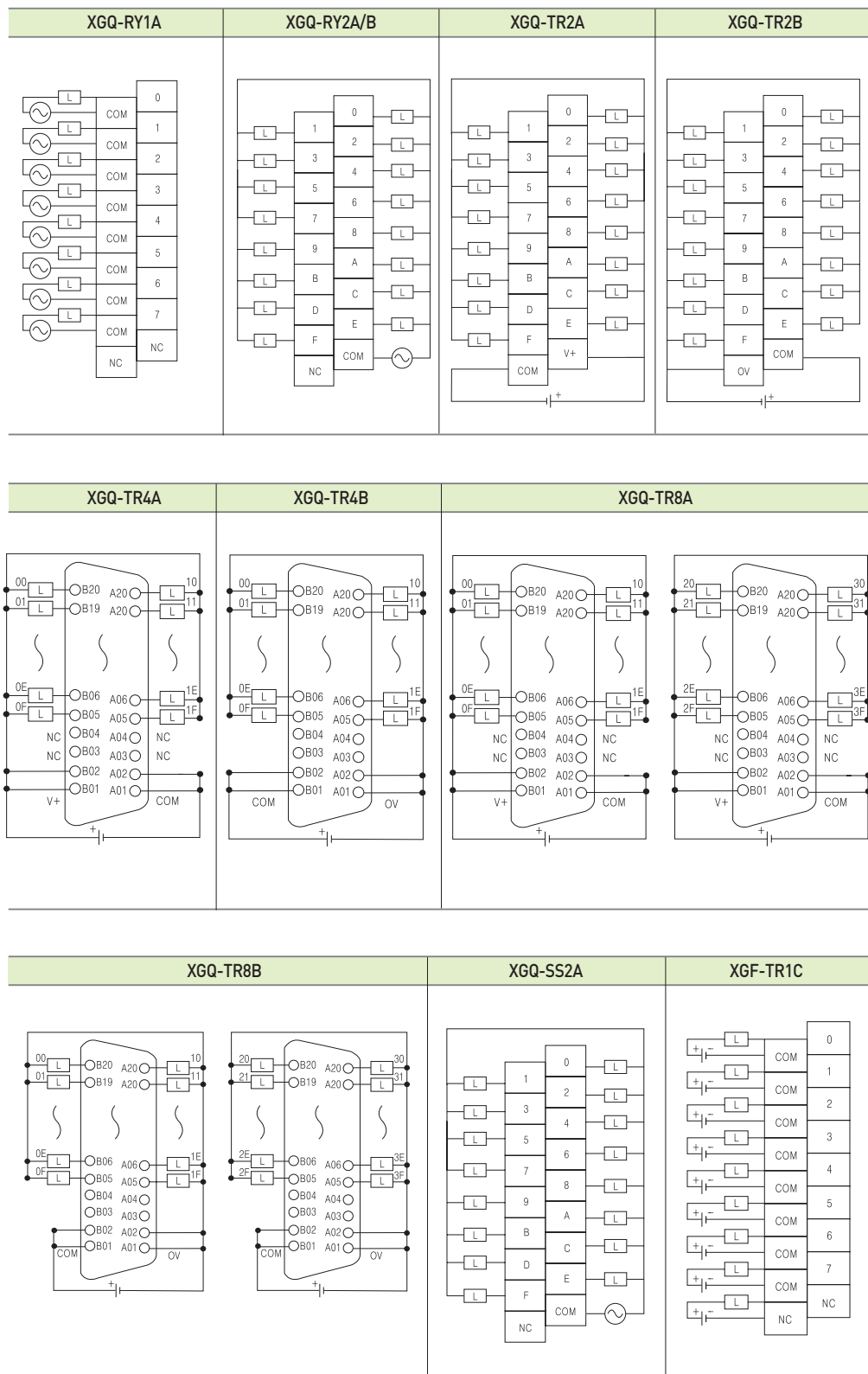






## I/O module

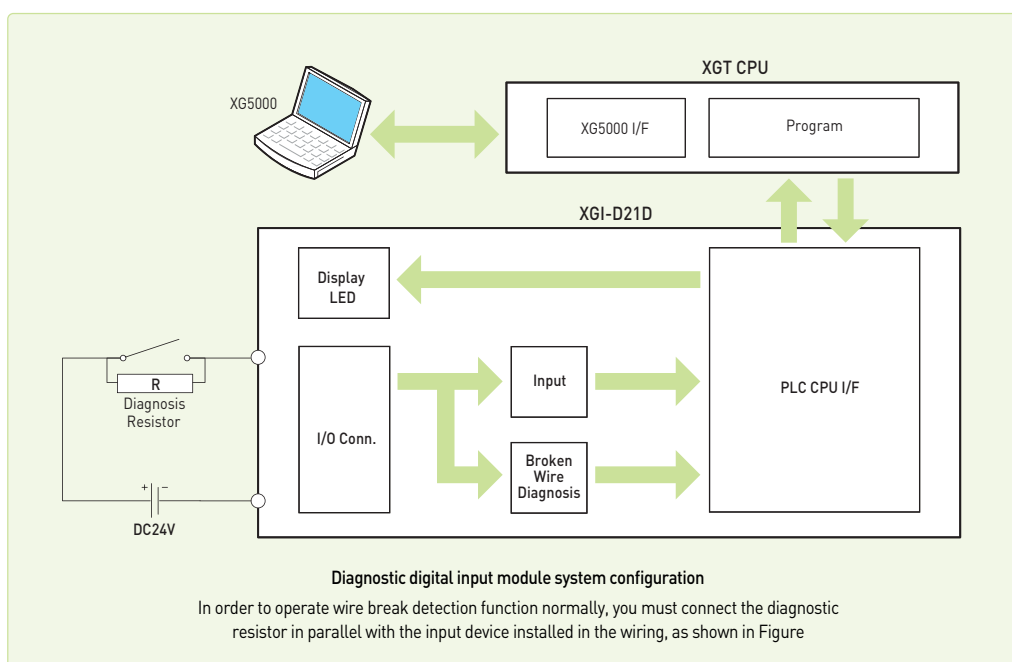
### Wiring diagram for output modules



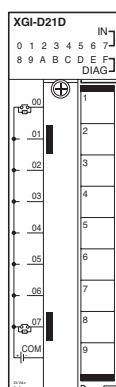


## Diagnostic Digital Input Module(XGI-D21D)

- Diagnostic Digital Input module receives and processes DC 24V input signal. It has a wire break detection function of each input signal.
- Input signal and wire break detection signal are displayed on the device of the CPU module, it can be used in the PLC program.



## Specifications



IN: Input status(0~7)

- On: Input On
- Off: Input Off

DIAG: Diagnosis status(8~F)

- On: broken wire occurs
- Off: Normal state

| Item                          | Specifications                                                                |
|-------------------------------|-------------------------------------------------------------------------------|
| Input point                   | 8 points                                                                      |
| Insulation method             | Photo coupler insulation                                                      |
| Rated input voltage / current | DC24V / Approx. 8mA                                                           |
| Voltage range                 | DC20.4~28.8V (5% and lower ripple rate)                                       |
| On voltage / On current       | 19V and higher / 5.2mA and higher                                             |
| Off voltage / On current      | 11V and lower / 4.7mA and lower                                               |
| Response time (Input filter)  | Off →On<br>1ms/3ms/5ms/10ms/20ms/70ms/100ms, Initial value:3ms                |
|                               | On →Off<br>1ms/3ms/5ms/10ms/20ms/70ms/100ms, Initial value:3ms                |
| Insulation withstand voltage  | DC 500V                                                                       |
| Insulation resistance         | 10 Ω and higher by Insulation ohmmeter                                        |
| Diagnosis function            | Wire break detection                                                          |
| Common method                 | 8 point / 1COM                                                                |
| Suitable cable size           | Stranded cable between 0.3~0.75mm <sup>2</sup> (2.8mm and smaller outer dia.) |
| Suitable clamped terminal     | R1.25-3 (Sleeve built-in clamped terminal is not available)                   |
| Current consumption(mA)       | 60mA                                                                          |
| Operation display             | LED On with input On<br>LED On during wire break                              |
| External connection method    | 9 point Terminal strip connector (M3 X 6 screws)                              |
| Weight                        | 95g                                                                           |

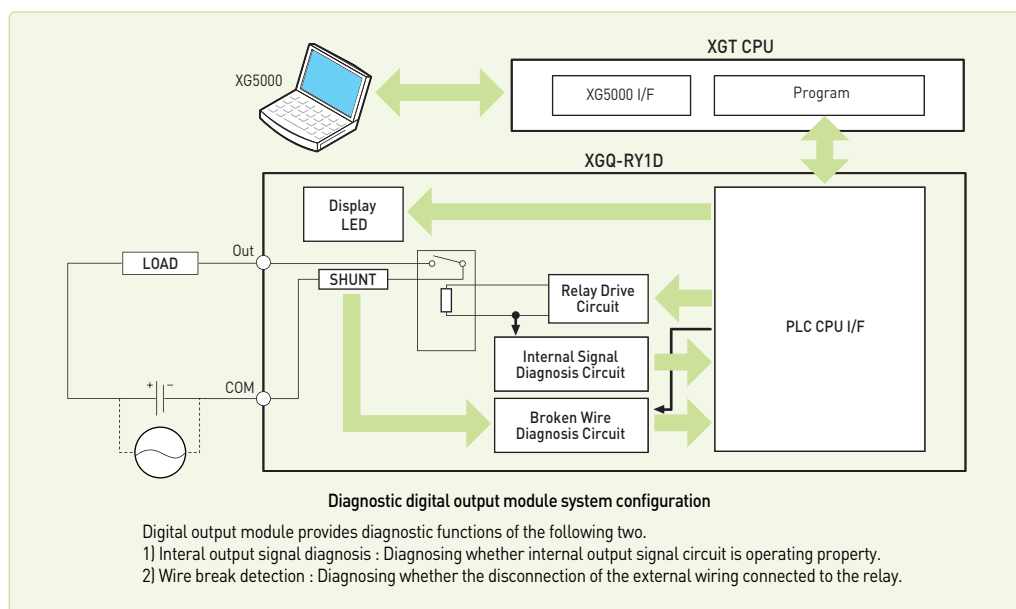


## I/O module

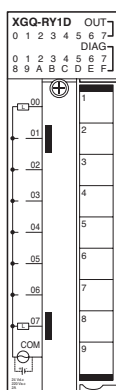


### Diagnostic Digital Output Module(XGQ-RY1D)

- Diagnostic digital output module outputs output signal via the relay to the outside. It has a diagnostic function of the internal signal and wire break detection for each output signal.
- Diagnostic signals are displayed on the device of the CPU module, it can be used in the PLC program.



### Specifications



- OUT: Output status (0 ~ 7)
- On: Relay output On
  - Off: Relay output Off
- DIAG : Diagnosis status
- Internal output signal diagnosis (0 ~ 7)
- On: Internal output signal fail
  - Off: Normal state
- Wire break detection(8~F)
- On: broken wire occurs
  - Off: Normal state

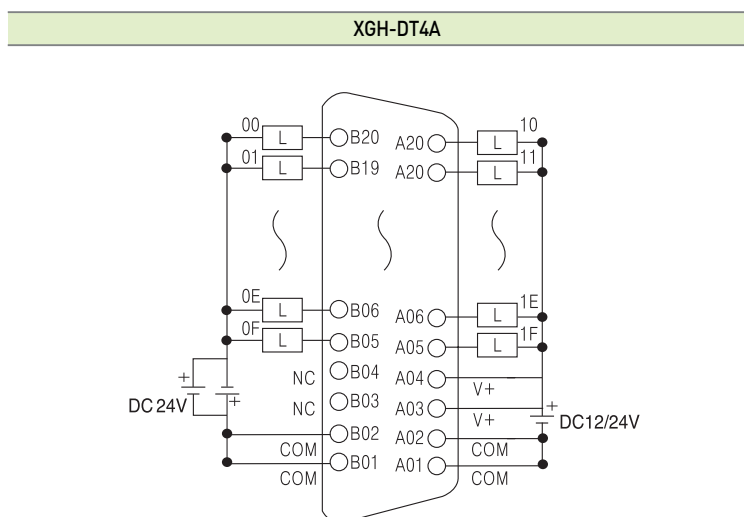
| Item                        |                      | Specifications                                                                                   |
|-----------------------------|----------------------|--------------------------------------------------------------------------------------------------|
| Output point                |                      | 8 points                                                                                         |
| Insulation method           |                      | Relay insulation<br>Photo coupler insulation                                                     |
| Rated load voltage          |                      | DC24V (resistance load) / AC220V (COS $\varphi$ = 1)                                             |
| Rated load current          | 1 point              | 2A                                                                                               |
|                             | Common               | 5A                                                                                               |
| Min. load voltage / current |                      | DC5V / 1mA                                                                                       |
| Max. load voltage / current |                      | AC250V, DC125V / 2A                                                                              |
| Leakage current at Off      |                      | 0.1mA (AC220V, 60Hz)                                                                             |
| Max. switching frequency    |                      | 1,800 times/hour                                                                                 |
| Surge killer                |                      | None                                                                                             |
| Life                        | Mechanical           | 20 million and more times                                                                        |
|                             | Electrical           | Rated load voltage/current 100 thousand and more times                                           |
|                             |                      | AC200V / 1.5A, AC240V / 1A (COS $\varphi$ = 0.7) 100 thousand and more times                     |
|                             |                      | AC200V / 1A, AC240V / 0.5A (COS $\varphi$ = 0.35) 100 thousand and more times                    |
| Response time               | Off $\rightarrow$ On | 10ms and lower                                                                                   |
|                             | On $\rightarrow$ Off | 12ms and lower                                                                                   |
| Diagnosis function          |                      | Wire break detection<br>Internal output signal diagnosis                                         |
| Common method               |                      | 8 point/1COM                                                                                     |
| Current consumption(mA)     |                      | Max. 400mA                                                                                       |
| Operation display           |                      | LED On with output On<br>LED On during wire break<br>LED On when the internal output signal fail |
| External connection method  |                      | 9 point Terminal strip connector (M3 X 6 screws)                                                 |
| Weight                      |                      | 145g                                                                                             |



## Input/output mixed Type (XGH-DT4A)

| Input                        |                               | Output                         |                      |                                              |  |
|------------------------------|-------------------------------|--------------------------------|----------------------|----------------------------------------------|--|
| Input points                 | 16 points                     | Input points                   | 16 points            |                                              |  |
| Insulation method            | Photo coupler                 | Insulation method              | Photo coupler        |                                              |  |
| Rated input voltage          | DC24V                         | Rated input voltage            | DC12/24V             |                                              |  |
| Rated input current          | 4mA                           | Rated input current            | DC10.2~26.4V         |                                              |  |
| Input voltage range          | DC20.4~28.8V                  | Input voltage range            | 0.1A/point, 1.6A/COM |                                              |  |
| Insulation pressure          | AC560Vrms / 3Cycle            | Insulation pressure            | 0.1mA or less        |                                              |  |
| On voltage/current           | DC19V or more / 3mA or more   | On voltage/current             | 0.7A/10ms or less    |                                              |  |
| Off voltage/current          | DC11V or more / 1.7mA or more | Off voltage/current            | Zener diode          |                                              |  |
| Input resistance             | 5.6kΩ                         | Input resistance               | DC 0.2V or less      |                                              |  |
| Response                     | Off →On                       |                                | Off →On              | 1ms or less                                  |  |
|                              |                               |                                |                      |                                              |  |
|                              | On →Off                       |                                | On →Off              | 1ms or less<br>(rated load, resistance load) |  |
|                              |                               |                                |                      |                                              |  |
|                              |                               |                                |                      |                                              |  |
| Common [COM]                 |                               | 16 points/COM                  |                      |                                              |  |
| Operation display            |                               | LED lighting when output is ON |                      |                                              |  |
| Internal current consumption |                               | 100mA                          |                      |                                              |  |
| External connection          |                               | 40-point connector             |                      |                                              |  |
| Weight (kg)                  |                               | 0.1                            |                      |                                              |  |

## Wiring diagram for mixed type



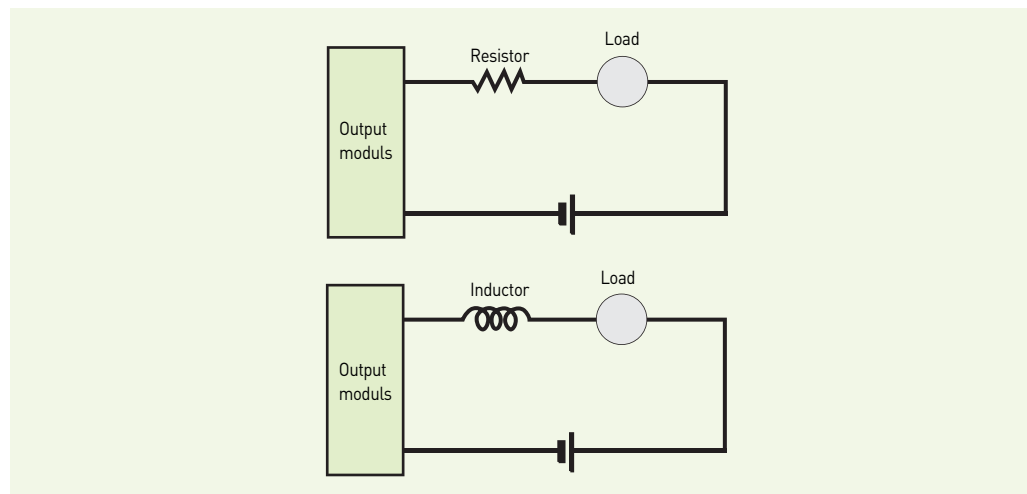
NOTE) Input address for XGK CPU is P00~P0F and Output address is P10~P1F when it is installed on the slot 0.  
Input address for XGI CPU is %IX0.0.0~%IX0.0.15 and Output address is %QX0.0.16~%QX0.0.31



## I/O module

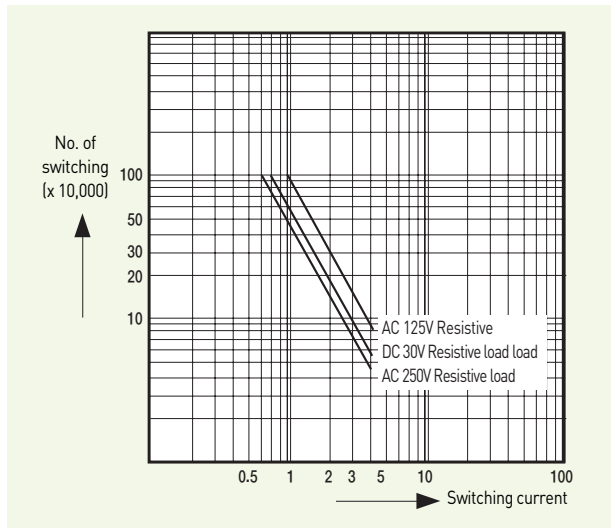
### Precaution during installation of I/O module

- XGT has 2 kinds of digital input type: Current sink input, Current source input. For DC input module has different wiring depending on the input type, digital input type should be selected with consideration about connected input device.
- Max. number of simultaneous input point differs according to the module type. Therefore, review specification of input module before its application.
- Use an interrupt module when a response of high-speed input is demanded. But only one interrupt module can be installed per CPU module.
- If switching frequency is high or inductive switching load is used, the lifespan of relay output module will be reduced. Therefore, it is recommended to use transistor output module or triac output module.
- When driving an inductive load with output module, set the maximum switching frequency as 'ON' for 1 second and 'OFF' for 1 second.
- When using counter or timer with DC/DC converter, it is possible to have inrush current which cause a break down. Therefore to reduce an effect of inrush current, connect resistor or inductor to load or use the module whose max. load current is high.

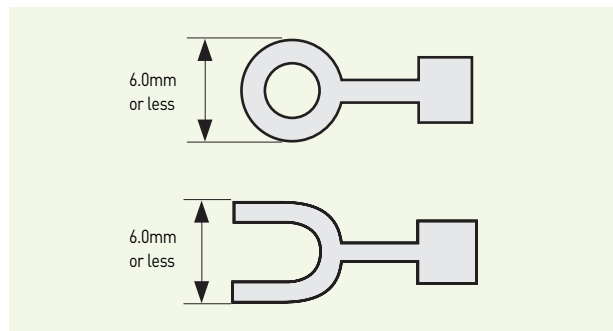


- Fuse of output module is not exchangeable to prevent a damage of external wiring when output module has a short-circuit.
- The number of simultaneous 'ON' points varies depending on input voltage, ambient temperature. Refer to the specification of input module.

- The following graph presents the relay lifespan of relay output module. It shows the maximum lifespan of relay which is used in the relay output.



- Compressed terminal attaching sleeve cannot be mounted to XGT terminal block. The following picture shows appropriate compressed terminals for terminal block.



- Use 0.3~0.75mm<sup>2</sup> twisted pair, below 2.8mm thickness cable for connecting to terminal block.
- Be careful when choosing and using the cable since the permissible current differs according to the insulation thickness.
- Joint torque of fixed screw and terminal block screw of the module needs to be within the range in the following table.

| Joint                                      | Joint torque range |
|--------------------------------------------|--------------------|
| I/O module terminal block screw (M3)       | 42~58 N·cm         |
| I/O module terminal block fixed screw (M3) | 68~89 N·cm         |

- Thermal protector is built in transistor module. Thermal protector is a function that protects PLC from an overload and overheating.





# XGR Redundancy system

Redundancy system for high-speed process control based on IEC



- Processing speed: 42ns/step
- I/O Points: Max. 131,072
- Total memory: 25MB (Program 7MB, Data 2MB, Flash 16MB)
- Switching over time: Min 4.3ms, Max 22ms
- Built-in 256 PID loops control



### High performance

- Processing speed: 42ns/step
- CPU synchronization via fiber optic cable
- I/O Points: Max. 131,072
- Total memory: 25MB (Program 7MB, Data 2MB, Flash 16MB)
- Switching over time Min 4.3ms, Max 22ms

### Easy expansion installation using network

- Max. 31 expansion base
- Distance: Fiber 2km (Max. expansion 60km), Twisted fair 100m (Max. expansion 3km)
- Program upload and download via expansion base
- No limit to install the communication master on the expansion base

### Enhanced maintenance via system history and network ring configuration

- Convenient system analyze using Operation history, Error history, System history
- Ring configuration to prevent a line disconnection error
- Network monitoring, Protocol monitoring function
- Error channel monitoring via flag
- Graphic display for the system configuration
- Safe module exchange via Wizard

### IEC 61131-3 Standard language

- LD, ST, SFC, IL (read only)
- Program configuration and data type based on IEC

### Variety of communication function

- Easy interface using Open network (Ethernet, Profibus-DP, DeviceNet, RS-232C, RS-422/485, etc)
- Max. 24 communication module installation on the expansion base (High speed link 12, P2P 8)
- Network diagnosis via network and frame monitoring
- PLC link via dedicated communication base on Ethernet (RAPIEnet)

### Variety of input and output module

- 8 / 16 / 32 / 64 points (8 / 16 points Relay output)
- Input / Output / Mixed module

### Enhanced analog function

- Enable to install the analog module on the expansion base (Max. 250, Analog input 139)
- Insulated type and Temperature module
- Easy to set the parameter via I/O parameter and flag
- Debugging function via special module monitoring

### Integrated programming & engineering environment

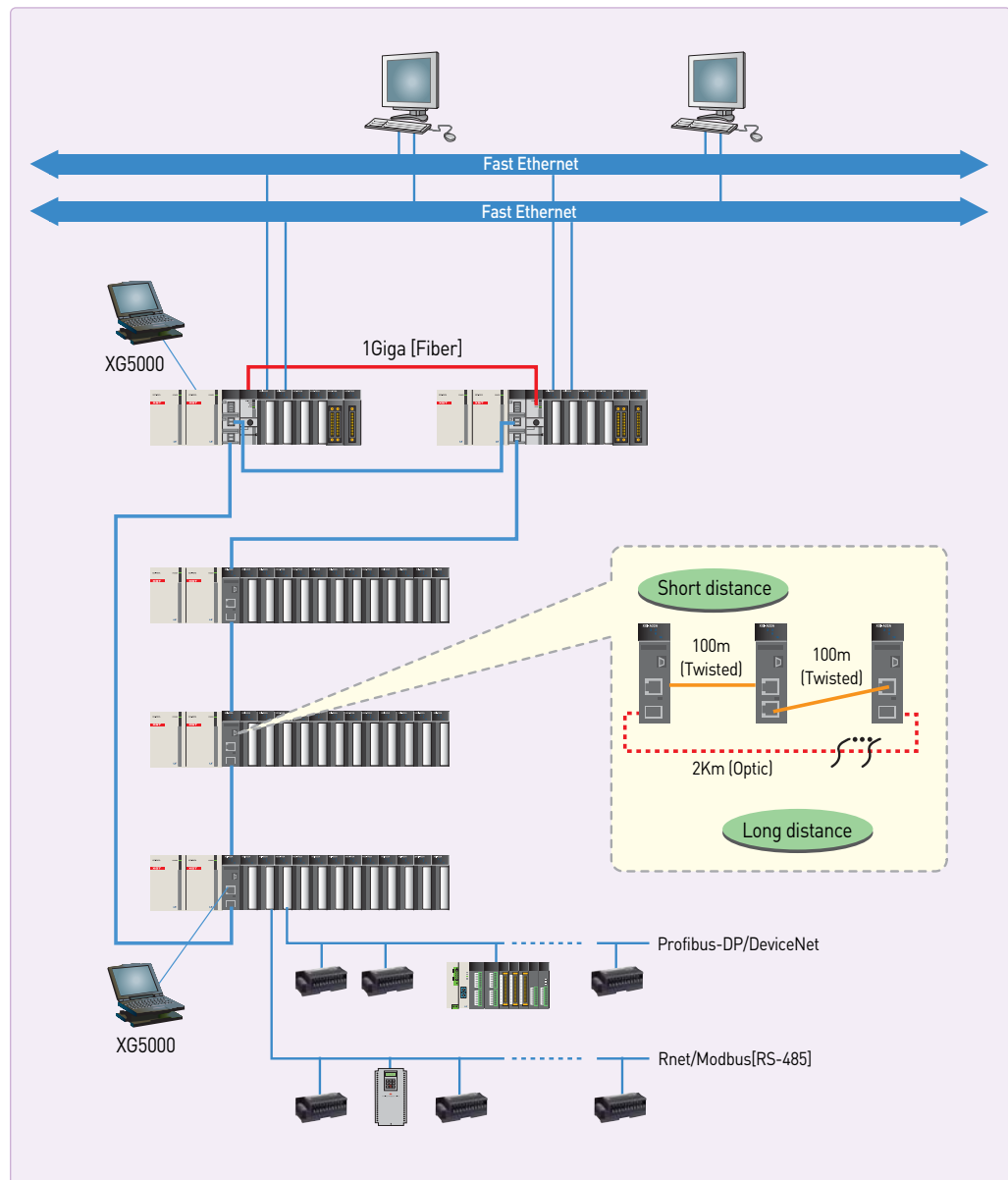
- XG5000 : Easy to program, various monitoring functions and enhanced editing function
- XG-PD : Convenient setup for communication and network parameter
- XG-PM : software package: Software package for positioning module
- XG-PD : Temperature control and function of auto tuning



# XGR Configuration

## XGR Configuration

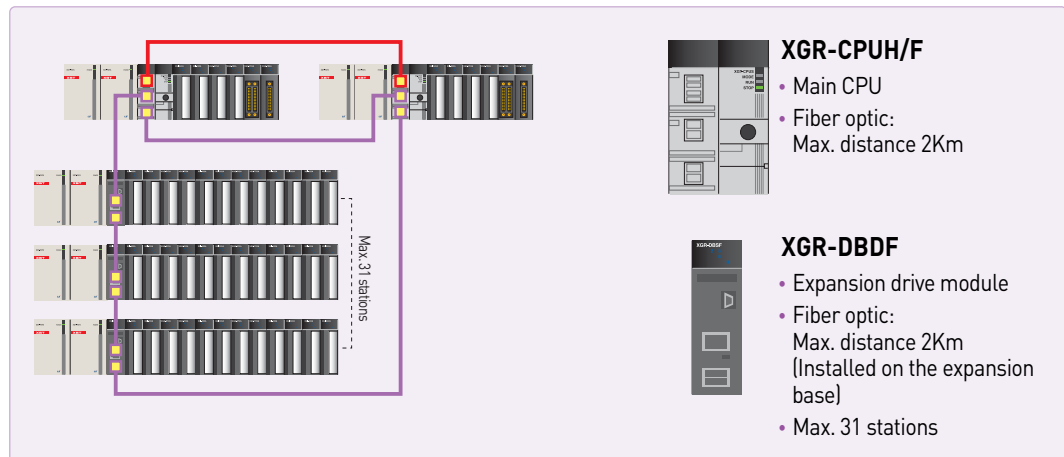
- Base, Power, CPU, Network redundancy
- Dual port and 3 kinds of media (Twisted-Twisted, Optic-Optic, Twisted-Optic)



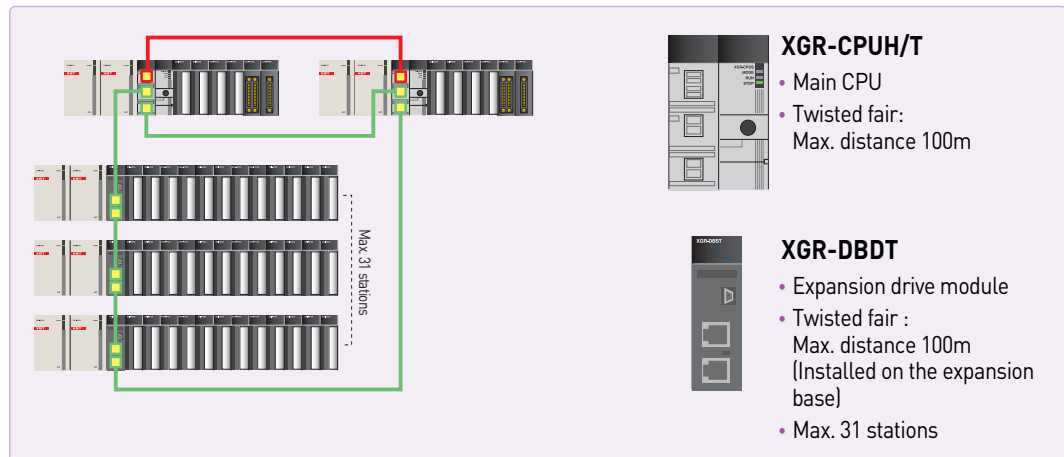


## System configuration method

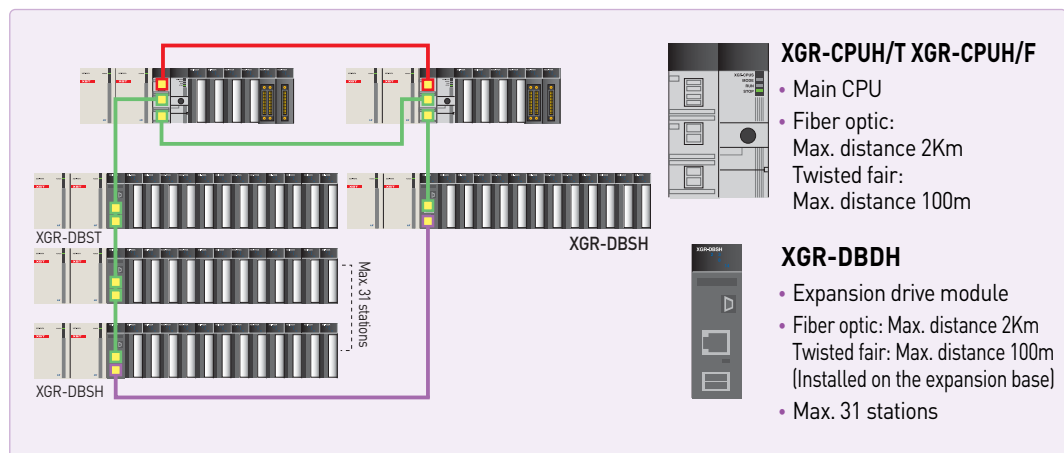
### Fiber-optic



### Twisted pair



### Hybrid ( Twisted pair + Fiber Optic )

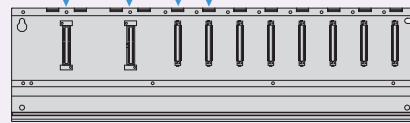
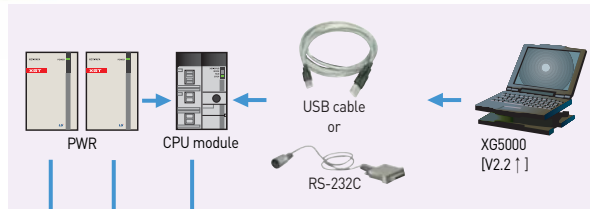


\* Max. expandable distance: Fiber optic 60km, Twisted fair 3km  
 \* CPU synchronization cable: 2m, 5m

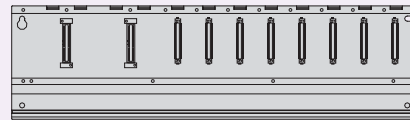


# System configuration

## System configuration



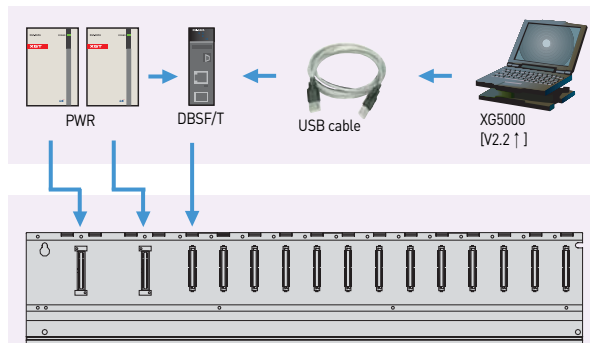
Main base [A Side] XGR-M06P / XGR-M02P



Main base [B Side] XGR-M06P / XGR-M02P

### Main base

- 2 types of CPU (Fiber optic, Twisted fair)
- Power: AC110V, AC220V
- 6slot base: enable to install 6 communication modules



Expansion base XGR-E12P / XGR-E12H

### Expansion base

- Power: 8.5A/AC110V, 8.5A/AC220V
- Expansion drive: Fiber optic, Twisted fair, Hybrid
- EFM\* and EIM\*: not available with 12slot base

| CPU module                |                     |
|---------------------------|---------------------|
| Type                      | I/O point           |
| XGR-CPUH/T [Twisted fair] | 2port 23,808 Points |
| XGR-CPUH/F [Fiber optic]  |                     |

| Type     | I/O point                     |
|----------|-------------------------------|
| USB-301A | USB downloading cable         |
| K1C-050A | RS232C downloading cable      |
| XGC-F201 | CPU synchronization cable: 2m |
| XGC-F501 | CPU synchronization cable: 5m |

| Power    |                                       |
|----------|---------------------------------------|
| XGR-AC12 | 110V 5.5A (Main / Expansion base)     |
| XGR-AC13 | 110V 8.5A (Expansion base)            |
| XGR-AC22 | 220V 5.5A (Main / Expansion base)     |
| XGR-AC23 | 220V 8.5A (Expansion base)            |
| XGR-DC42 | DC24V / 5V 7A (Main / Expansion base) |

| CPU module        |                  |
|-------------------|------------------|
| Type              | I/O point        |
| XGI-CPUU/XGI-CPUH | 6,144 (IEC type) |
| XGK-CPUU/CPUH     | 6,144            |
| XGK-CPUA          | 3,072            |
| XGK-CPUS          | 3,072            |
| XGK-CPUE          | 1,536            |

| Item          | Type     | Description               |
|---------------|----------|---------------------------|
| USB cable     | USB-301A | USB downloading cable     |
| RS-232C cable | K1C-050A | RS-232C downloading cable |

| Power module |              |          |            |
|--------------|--------------|----------|------------|
| AC           | Free Voltage | XGP-ACF1 | DC5V 3A    |
|              |              | XGP-ACF2 | DC24V 0.6A |
|              | 220V         | XGP-AC23 | DC5V 6A    |
| DC           |              | XGP-AC23 | DC5V 8.5A  |
|              |              | XGP-DC42 | DC5V 6A    |

| Item      | Input module |                    |          |
|-----------|--------------|--------------------|----------|
|           | AC110V       | AC220V             | DC24V    |
| 8 points  | -            | XGI-A21A, XGI-A21C | XGI-D21A |
| 16 points | XGI-A12A     | -                  | XGI-D22A |
|           | -            | -                  | XGI-D22B |
| 32 points | -            | -                  | XGI-D24A |
|           | -            | -                  | XGI-D24B |
| 64 points | -            | -                  | XGI-D28A |
|           | -            | -                  | XGI-D28B |

| Item      | Output module |          |            |
|-----------|---------------|----------|------------|
|           | Relay         | Triac    | Transistor |
| 8 points  | XGQ-RY1A      | -        | -          |
| 16 points | XGQ-RY2A      | XGQ-SS2A | XGQ-TR2A   |
|           | XGQ-RY2B      | -        | XGQ-TR2B   |
| 32 points | -             | -        | XGQ-TR4A   |
|           | -             | -        | XGQ-TR4B   |
| 64 points | -             | -        | XGQ-TR8A   |
|           | -             | -        | XGQ-TR8B   |

| Item | Input/Output mixed module |                    |
|------|---------------------------|--------------------|
|      | 16-point DC input         | 16-point TR output |

| Special module             |                                                                         |
|----------------------------|-------------------------------------------------------------------------|
| Analog input               | XGF-AV8A Voltage input type, 8Ch                                        |
|                            | XGF-AC8A Current input type, 8Ch                                        |
|                            | XGF-AD8A Voltage/ Current input, 8Ch                                    |
|                            | XGF-AD4S Voltage/ Current input, 4Ch [Isolated]                         |
|                            | XGF-AD16A Voltage/ Current input, 16Ch                                  |
| Analog output              | XGF-AW4S 2-wire, Voltage/ Current input, 4Ch [Isolated]                 |
|                            | XGF-DV4A Voltage output type, 4Ch                                       |
|                            | XGF-DC4A Current output type, 4Ch                                       |
|                            | XGF-DV8A Voltage output type, 8Ch                                       |
|                            | XGF-DC8A Current output type, 8Ch                                       |
| Analog Input/Output        | XGF-DV4S Voltage output, 4Ch [Isolated]                                 |
|                            | XGF-DC4S Current output, 4Ch [Isolated]                                 |
|                            | XGF-AH6A Input: 4ch, Voltage/ Current Output: 2Ch Voltage/ Current      |
|                            | XGF-HO2A Pulse [OC] input type, 2Ch                                     |
|                            | XGF-HO2A Pulse [LD] input type, 2Ch                                     |
| Positioning                | XGF-PD1A-PD3A Open collector, 1-3axis                                   |
|                            | XGF-PD1H-PD3H Line drive, 1-3axis                                       |
|                            | XGF-PD1H-PD4H Open collector, 1-4axis                                   |
|                            | XGF-PD1H-PD4H Line drive, 1-4axis                                       |
|                            | XGF-PN8A LS Standard EtherCAT Net. 8axis                                |
| Positioning (Network Type) | XGF-PN8B Standard EtherCAT Net. 8axis                                   |
|                            | XGF-PN32E Standard EtherCAT Net. 32axis                                 |
|                            | XGF-TC4S Thermocouple input, 4Ch                                        |
|                            | XGF-RD4A RTD input, 4Ch                                                 |
|                            | XGF-RD4S RTD input, 4Ch [Isolated]                                      |
| Temperature control        | XGF-TC4UD Input: 4ch, Voltage/Current, RTD/TC Output: 8ch, [TR/Current] |
|                            | XGF-TC4UD Controller: 4 loops                                           |
|                            | XGF-TC4RT Input: 4ch, [RTD] Output: 4ch, [TR]                           |
|                            | XGF-TC4RT Controller: 4 loops                                           |
|                            | XGF-SOE A DC24V, 32points                                               |

| Communication module |                                                |
|----------------------|------------------------------------------------|
| RAPIEnet             | XGL-EIMT RAPIEnet Twisted fair 2Ch             |
|                      | XGL-EIMH RAPIEnet Fiber optic/Twisted fair 1Ch |
|                      | XGL-EIMF RAPIEnet Fiber optic 2Ch              |
|                      | XGL-ES4T RAPIEnet Switch. 4Ports               |
|                      | XGL-EIMT RAPIEnet Twisted fair 2Ch For PC      |
| Cnet                 | XGL-EIMF RAPIEnet Fiber optic 2Ch For PC       |
|                      | XGL-CH2A RS-232C/RS-422                        |
|                      | XGL-C22A RS-232C, 2Ch                          |
|                      | XGL-C42A RS-422, 2Ch                           |
|                      | XGL-EFMT Fiber optic, Master, SC type          |
| Ethernet (Open)      | XGL-EFMT Twisted pair, Master, RJ-45           |
|                      | XGL-EHST Fast Ethernet, Switching hub          |
|                      | XGL-EDMF Fiber optic, Master, SC type          |
|                      | XGL-EDMT Twisted pair, Master, RJ-45           |
|                      | XGL-EIPT Industrial Ethernet, 2ports           |
| EtherNet/IP          | XGL-RMEA Rnet, Master, TP                      |
|                      | XGL-DMEA DeviceNet, Master                     |
|                      | XGL-PMEA Profibus-DP, Master                   |
|                      | XGL-PMEC Profibus-DP Slave, Remote interface   |
|                      | XGL-PSRA Profibus-DP Slave                     |
| Fnet                 | XGL-PSEA Profibus-DP Slave                     |
|                      | XGL-FMEA Dedicated network                     |

## Specification

| Item                             |                          | Description                                                                                                                        |              | Remark                                                                          |           |
|----------------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------------------------------------------------------------------------|-----------|
|                                  |                          | XGR-CPUH/F                                                                                                                         | XGR-CPUH/T   |                                                                                 |           |
| Media                            |                          | Fiber optic                                                                                                                        | Twisted pair |                                                                                 |           |
| Operation method                 |                          | Cyclic execution, Periodic operation, Interrupt operation, Fixed scan                                                              |              |                                                                                 |           |
| I/O control method               |                          | Scan synchronized batch processing method (Refresh method)                                                                         |              |                                                                                 |           |
| Program language                 |                          | LD (Ladder Diagram), ST (Structured Text),<br>SFC (Sequential Function Chart), IL (Read only)                                      |              |                                                                                 |           |
| Number of Instructions           | Operator                 | 18                                                                                                                                 |              |                                                                                 |           |
|                                  | Standard function        | 130 + Real type function                                                                                                           |              |                                                                                 |           |
|                                  | Standard function block  | 41                                                                                                                                 |              |                                                                                 |           |
| Special function/ function block |                          | Special function block, Process control function block                                                                             |              |                                                                                 |           |
| Processing speed                 | LD                       | 0.042 $\mu$ s/Step                                                                                                                 |              |                                                                                 |           |
|                                  | MOV                      | 0.126 $\mu$ s/Step                                                                                                                 |              |                                                                                 |           |
|                                  | Real type                | $\pm$ : 0.602 $\mu$ s(S), 1.078 $\mu$ s(D)<br>x : 1.106 $\mu$ s(S), 2.394 $\mu$ s(D)<br>$\div$ : 1.134 $\mu$ s(S), 2.66 $\mu$ s(D) |              | S : Real type<br>D : Long real type                                             |           |
| I/O points                       |                          | I: 131,072 points, Q: 131,072 points [Total: 1131,072]                                                                             |              |                                                                                 |           |
| DRAM                             | Program memory           | 7MB                                                                                                                                |              | Including Upload,<br>Parameter, System area<br>*Battery back-up memory :<br>8MB |           |
|                                  | Data memory              | 2MB                                                                                                                                |              |                                                                                 |           |
|                                  | Reserved memory          | 7MB                                                                                                                                |              |                                                                                 |           |
| Flash memory                     |                          | 16MB                                                                                                                               |              |                                                                                 |           |
| Data memory                      | Direct variable          | 256k Byte                                                                                                                          |              |                                                                                 |           |
|                                  | Auto allocated variable  | 512k Byte                                                                                                                          |              |                                                                                 |           |
|                                  | Timer                    | No limitation, Range: 0.001sec ~ 4,259,967.295sec (1,193hours)                                                                     |              |                                                                                 |           |
|                                  | Counter                  | No limitation, Range: -32,768 ~ +32,767                                                                                            |              |                                                                                 |           |
|                                  | Flag                     | System                                                                                                                             | 4k Byte      |                                                                                 |           |
|                                  |                          | Communication                                                                                                                      | 64k Byte     |                                                                                 | L, N area |
| Special                          |                          | 2k Byte (32 base, 16 slot, 32 channel )                                                                                            |              | U area: Analog device area                                                      |           |
| File register                    |                          | 64k Byte *2                                                                                                                        |              | R area: read/write (Command, XG5000)                                            |           |
| Program                          | Number of program blocks | 256                                                                                                                                |              |                                                                                 |           |
|                                  | Initial task             | 1 [_INT]                                                                                                                           |              |                                                                                 |           |
|                                  | Cycle task               | 32                                                                                                                                 |              |                                                                                 |           |
|                                  | Internal device task     | 32                                                                                                                                 |              |                                                                                 |           |
| Operation mode                   |                          | RUN, STOP, DEBUG                                                                                                                   |              |                                                                                 |           |
| Restart mode                     |                          | Warm, Cold                                                                                                                         |              |                                                                                 |           |
| Self diagnostic functions        |                          | Watchdog timer, Memory error, I/O error, Battery error, Power Supply error                                                         |              |                                                                                 |           |
| Program download                 |                          | RS-232C (1CH), USB (1CH)                                                                                                           |              |                                                                                 |           |
| Data retain                      |                          | Auto allocated variable: set by variable definition<br>Direct variable: set by parameter                                           |              |                                                                                 |           |
| Max. expansion base              |                          | 31 stages                                                                                                                          |              |                                                                                 |           |

## Specification

| Item                                     | Hardware                                    |         | Remark |
|------------------------------------------|---------------------------------------------|---------|--------|
| CPU module                               | 2 slot / Fiber, Twisted fair                |         |        |
| Expansion drive module                   | 1 slot / Fiber, Twisted fair, Hybrid        |         |        |
| Base                                     | Main base: 6 slot, Expansion base: 12 slot  |         |        |
| Power                                    | AC110V                                      | 5V-5.5A |        |
|                                          | AC220V                                      | 5V-5.5A |        |
|                                          | AC110V                                      | 5V-8.5A |        |
|                                          | AC220V                                      | 5V-8.5A |        |
| Expansion method and Max. expansion base | 31 stages by network                        |         |        |
| Base number setting                      | Rotary switch of expansion drive module     |         |        |
| Distance between expansion bases         | Twisted fair: 100m (3km), Fiber: 2km (60km) |         |        |
| Master/Standby switching over time       | 50ms or less                                |         |        |

## Available modules for each base

|   | Base           | Available modules                                                                                                                                                                                                                  |
|---|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Main base      | CPU, Ethernet module (XGL-EFMx), RAPIEnet module (XGL-EIMx)<br>* x: T (Twisted fair), F (Fiber optic), H (Hybrid)                                                                                                                  |
| 2 | Expansion base | I/O modules for XGI (Ethernet based communication module should be installed on Main base<br>Number of communication module: 12 for High-speed link, 8 for P2P<br>Number of analog module: Analog input (139), Analog output (250) |





# XGR-INC Configuration

## XGR-INC (Intelligent Network Controller)



### High performance

#### Premium CPU for high performance and high reliability

- CPU processing speed: 42ns/step
- 32 Bit Micro Processor
- Redundancy system and CPU synchronization by optical cable
- Program memory: 7MB ( included program, upload, parameter and system areas)
- Data memory: 2MB, Flash memory: 16MB
- Master switching over time: min 4.3ms ~ max 22ms

### Intelligent

#### Open network- international standard communication

#### Easy to connect from upper information system to field devices

- Easy expansion installation using network cable - Fiber optic and twisted pair
- Ring Topology for redundancy expansion cable
- Max. 3 expansion base Distance: Fiber 2km (Max. expansion 4km), Twisted pair 100m (Max. expansion 200m)
- Program upload and download via expansion base.
- Ethernet network: XGT, MODBUS TCP, Ethernet/IP protocol
- Ethernet Ring Topology: RAPIEnet
- Serial network: RS-232C/422/485, XGT, MODBUS RTU/ASCII
- Fieldbus network: Profibus-DP, DeviceNet

### Easy

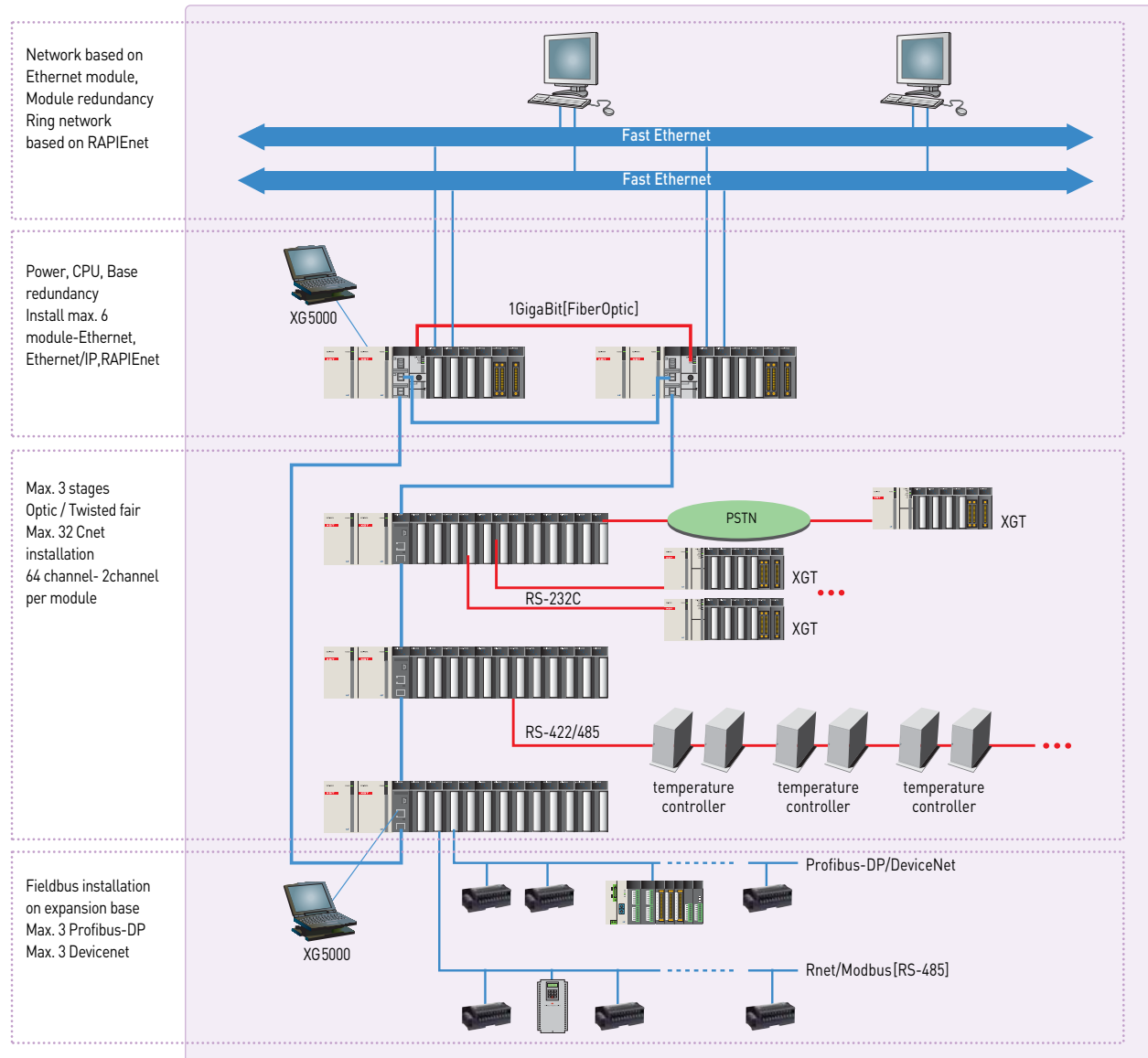
#### Component compatibility with XGT PLC Easy to program using XG5000

- Except CPU, XGR series have compatibility with XGT series-base, power, digital I/O, communication and so on.\*
- IEC 61131-3 Convenient setup for communication and network parameter
- Easy to set heterogeneous protocol using customer communication setting
- Easy to set Profibus-DP, DeviceNet, Rnet and Ethernet using high speed link communication setting
- Variety monitoring means: frame monitor, communication status monitor, communication status flag and so on.

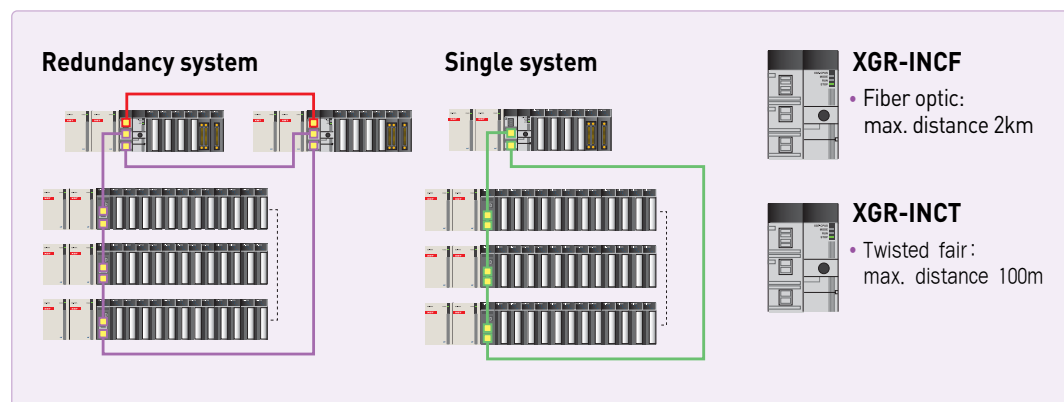
\* Analog I/O and special module are not available.



## XGR-INC configuration



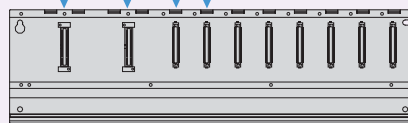
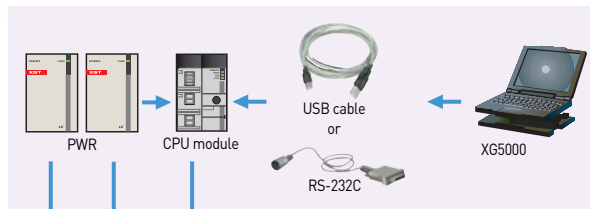
\* PSTN: public switched telephone network.



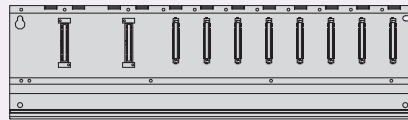


# System configuration

## XGT System configuration



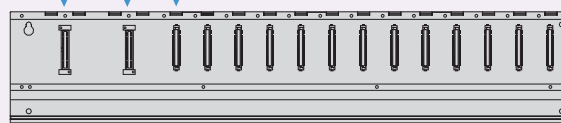
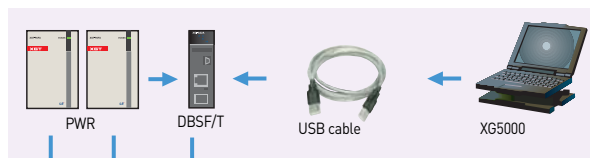
Main base[A side] XGR-M06P



Main base[B side] XGR-M06P

### Main base

- 2 type of XGR-INC
- Power: AC110V, AC220V
- 6slot base: enable to install 6 communication modules based on Ethernet



Expansion base XGR-E12P

### Expansion base

- Expansion drive: Fiber optic, Twisted fair, Hybrid
- Power: 8.5A/AC110V, 8.5A/AC220V
- I/O module: max. 2,304 points
- Serial communication module: 32 modules
- Fieldbus communication module: 3 Pnet modules, 3 Dnet modules

| Base module |                                                 |
|-------------|-------------------------------------------------|
| USB-301A    | USB download cable                              |
| K1C-050A    | RS-232C download cable                          |
| XGC-F201    | Optic, 2m, Redundancy CPU synchronization cable |
| XGC-F501    | Optic, 5m, Redundancy CPU synchronization cable |

| Power module |                                |
|--------------|--------------------------------|
| XGR-AC12     | 110V/DC5V 5.5A, base/expansion |
| XGR-AC13     | 110V/DC5V 8.5A, expansion      |
| XGR-AC22     | 220V/DC5V 5.5A, base/expansion |
| XGR-AC23     | 220V/DC5V 8.5A, expansion      |
| XGR-DC42     | DC24V/DC5V 7A, base/expansion  |

| Expansion drive |                                      |
|-----------------|--------------------------------------|
| XGR-DBST        | Twisted fair 2Ch                     |
| XGR-DBSF        | Fiber optic 2Ch                      |
| XGR-DBSH        | Twisted fair 1Ch and Fiber optic 1Ch |

| Item     | Input module |          |          |
|----------|--------------|----------|----------|
|          | AC110V       | AC220V   | DC24V    |
| 8points  | -            | XGI-A21A | XGI-D21A |
| 16points | XGI-A12A     | -        | XGI-D22A |
|          | -            | -        | XGI-D22B |
| 32points | -            | -        | XGI-D24A |
|          | -            | -        | XGI-D24B |
| 64points | -            | -        | XGI-D28A |
|          | -            | -        | XGI-D28B |

| Item     | Output module |          |            |
|----------|---------------|----------|------------|
|          | Relay         | Triac    | Transistor |
| 8points  | XGQ-RY1A      | -        | -          |
| 16points | XGQ-RY2A      | XGQ-SS2A | XGQ-TR2A   |
|          | XGQ-RY2B      | -        | XGQ-TR2B   |
| 32points | -             | -        | XGQ-TR4A   |
|          | -             | -        | XGQ-TR4B   |
| 64points | -             | -        | XGQ-TR8A   |
|          | -             | -        | XGQ-TR8B   |

| Item        | Communication module |                                                |
|-------------|----------------------|------------------------------------------------|
|             |                      |                                                |
| RAPIEnet    | XGL-EIMT             | RAPIEnet, Twisted fair 2Ch                     |
|             | XGL-EIMT             | RAPIEnet, Fiber optic 2Ch                      |
|             | XGL-EIMH             | RAPIEnet, Twisted fair, Fiber optic            |
|             | XGL-ES4T             | RAPIEnet Switch, 4Ports                        |
|             | XGL-EIMT             | RAPIEnet, Twisted fair 2Ch for PC              |
| FEnet       | XGL-EIMF             | RAPIEnet, Fiber optic 2Ch for PC               |
|             | XGL-EFMT             | Open Ethernet, Twisted fair                    |
|             | XGL-EFMF             | Open Ethernet, Fiber optic                     |
| FDEnet      | XGL-EH5T             | Open Ethernet, Twisted fair 5Ch, Switching HUB |
|             | XGL-EDMT             | Dedicated Ethernet, Twisted fair               |
| Ethernet/IP | XGL-EDMF             | Dedicated Ethernet, Fiber optic                |
|             | XGL-EIPT             | Industrial Ethernet, Twisted fair 2Ch          |
| Cnet        | XGL-CH2A             | RS-232C, RS-422/485                            |
|             | XGL-C22A             | RS-232C 2Ch                                    |
| Dnet        | XGL-C42A             | RS-422/485 2Ch                                 |
|             | XGL-DMEA             | DeviceNet, Master                              |
| Pnet        | XGL-PMEA             | Profibus-DP, Master                            |
|             | XGL-PMEC             |                                                |
| Rnet        | XGL-RMEA             | Rnet, Master                                   |



## Specification

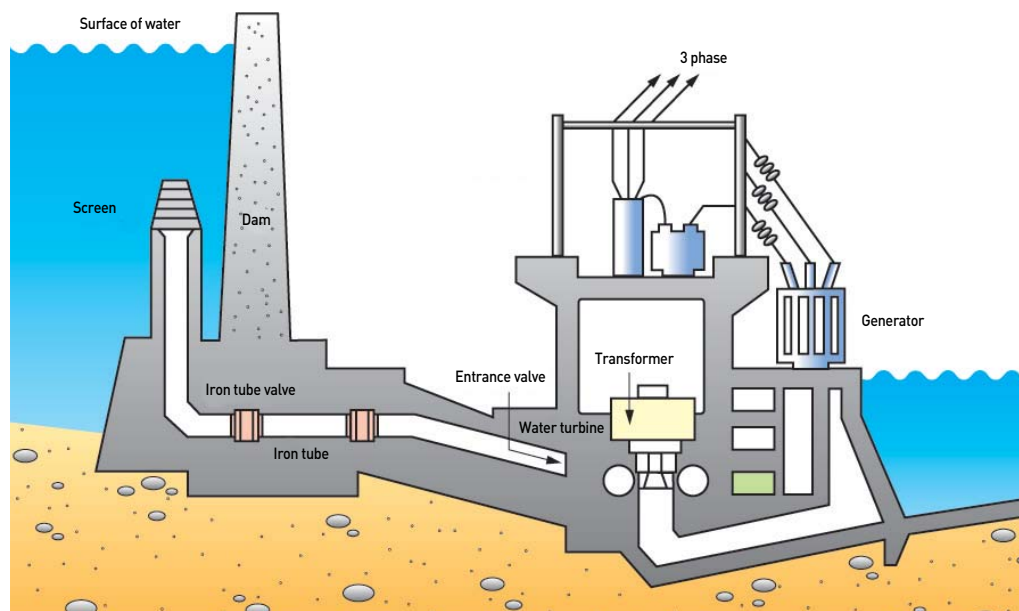
| Item                             |                             |   | XGR-INCT                                                                              | XGR-INCF | Remark                                                             |
|----------------------------------|-----------------------------|---|---------------------------------------------------------------------------------------|----------|--------------------------------------------------------------------|
| Operation method                 |                             |   | Cyclic execution, Fixed scan                                                          |          |                                                                    |
| I/O control method               |                             |   | Scan synchronized batch processing method (Refresh method)                            |          |                                                                    |
| Program language                 |                             |   | Ladder Diagram, Sequential Function Chart, Structured Text                            |          |                                                                    |
| Number of Instruction            | Operator                    |   | 18                                                                                    |          |                                                                    |
|                                  | Standard function           |   | 136 + Real type function                                                              |          |                                                                    |
|                                  | Standard function block     |   | 43                                                                                    |          |                                                                    |
| Processing speed                 | LD                          |   | 0.042ms/step                                                                          |          |                                                                    |
|                                  | MOV                         |   | 0.112ms/step                                                                          |          |                                                                    |
|                                  | Real type                   |   | +, -: 0.602ms[S], 1.078ms[D]<br>*: 1.106ms[S], 2.394ms[D], /: 1.134ms[S], 2.660ms[D]  |          | S: Real type (32bits)<br>D: Long real type (64bits)                |
| Program memory                   |                             |   | 7MB (included upload, parameter, system areas)                                        |          |                                                                    |
| I/O points                       |                             |   | 2,304 points                                                                          |          |                                                                    |
| Number of module installation    | Ethernet                    |   | Ethernet, RAPIEnet, Ethernet/IP<br>Installation on base (max. 6modules)               |          |                                                                    |
|                                  | Serial                      |   | Installation on expansion (max. 32 modules, 64Ch)                                     |          | Serial and Field modules can be installed maximum 32 on expansion. |
|                                  | Fieldbus                    |   | Installation on expansion, Profibus-DP (max. 3 modules), DeviceNet (max. 3 modules)   |          |                                                                    |
| Data memory                      | Auto allocated variable (A) |   | 512k Byte                                                                             |          |                                                                    |
|                                  | Input variable(I)           |   | 16k Byte                                                                              |          |                                                                    |
|                                  | Output variable(Q)          |   | 16k Byte                                                                              |          |                                                                    |
|                                  | Direct variable             | M | 256k Byte(max. 128k Byte in blackout)                                                 |          |                                                                    |
|                                  |                             | R | 64k Byte * 2                                                                          |          |                                                                    |
|                                  |                             | W | 128k Byte                                                                             |          |                                                                    |
| Timer                            |                             |   | No limitation in auto allocated variable area                                         |          |                                                                    |
| Counter                          |                             |   | No limitation in auto allocated variable area                                         |          |                                                                    |
| Program                          | Scan program                |   | 256                                                                                   |          |                                                                    |
|                                  | Initial task                |   | 1 ( _INT)                                                                             |          |                                                                    |
|                                  | Cycle task                  |   | 32                                                                                    |          |                                                                    |
|                                  | Internal device task        |   | 32                                                                                    |          |                                                                    |
| Operation mode                   |                             |   | Run, Stop, Debug                                                                      |          |                                                                    |
| Restart mode                     |                             |   | Warm, cold                                                                            |          |                                                                    |
| Self diagnostic functions        |                             |   | Watchdog timer, Memory error, I/O error, Battery error, Power Supply error            |          |                                                                    |
| Program download                 |                             |   | RS-232C (1Ch), USB (1Ch)                                                              |          | Remote connection using Ethernet                                   |
| Data retain                      |                             |   | Auto allocated variable: set by variable definition Direct variable: set by parameter |          |                                                                    |
| Max. expansion base              |                             |   | 3 stages                                                                              |          |                                                                    |
| Distance between expansion bases |                             |   | 920mA                                                                                 |          | 1,310mA                                                            |
| Current consumption              |                             |   | 260g                                                                                  |          | 280g                                                               |



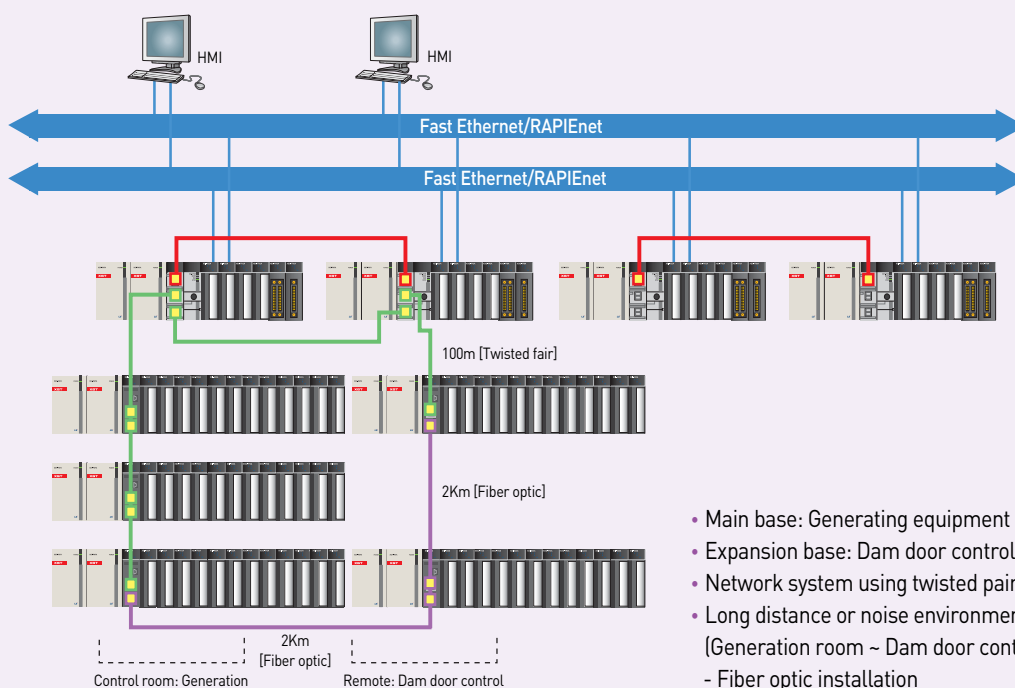


# Application

## Water power generation or Dam door control

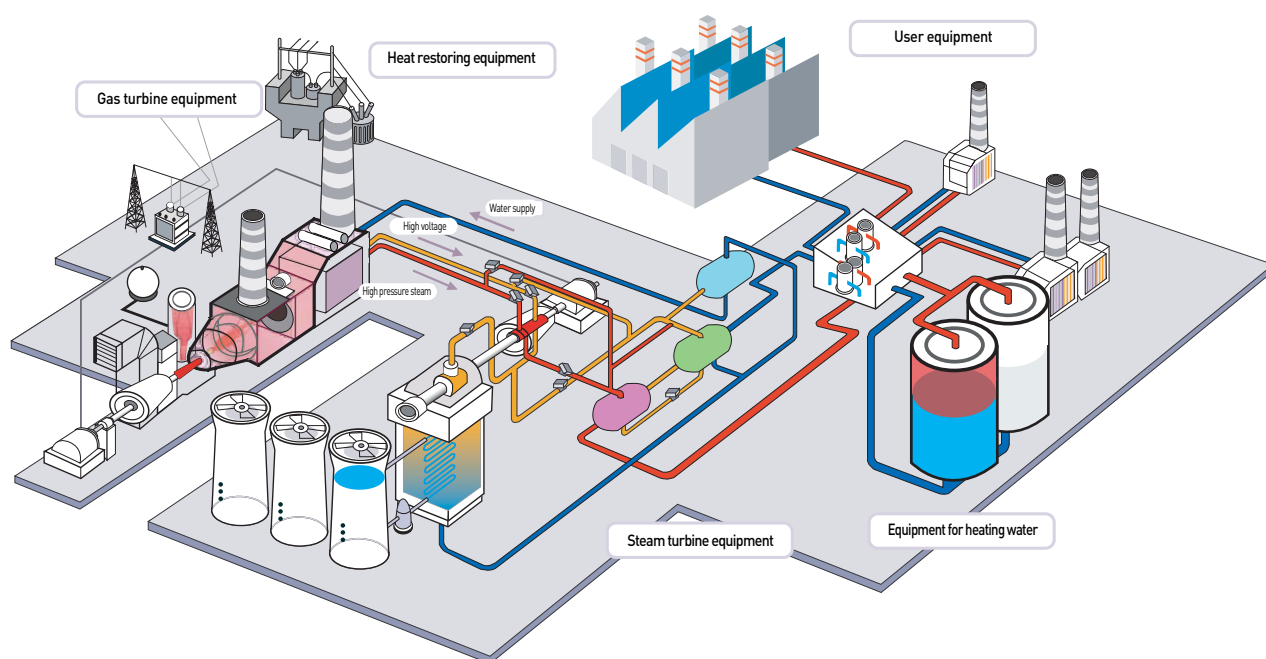


## System configuration



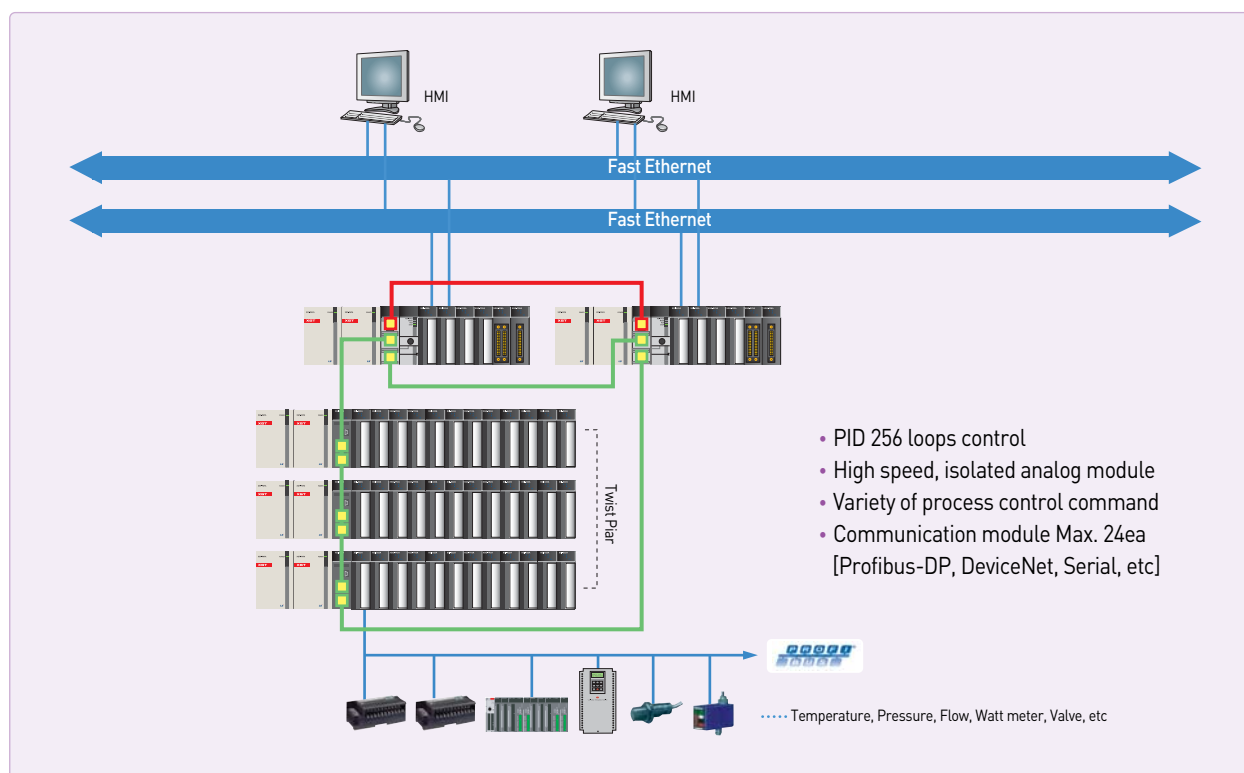
- Main base: Generating equipment control
- Expansion base: Dam door control
- Network system using twisted pair
- Long distance or noise environment (Generation room ~ Dam door control)
- Fiber optic installation

## Generating boiler control



System

## System configuration

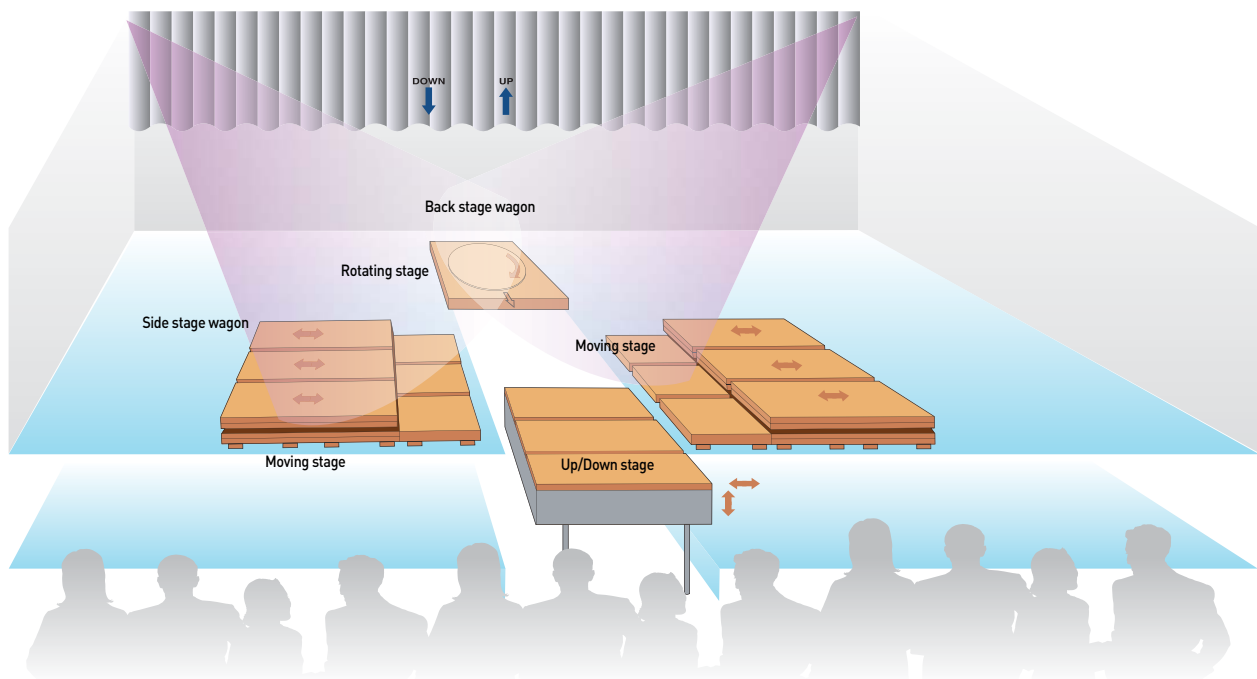




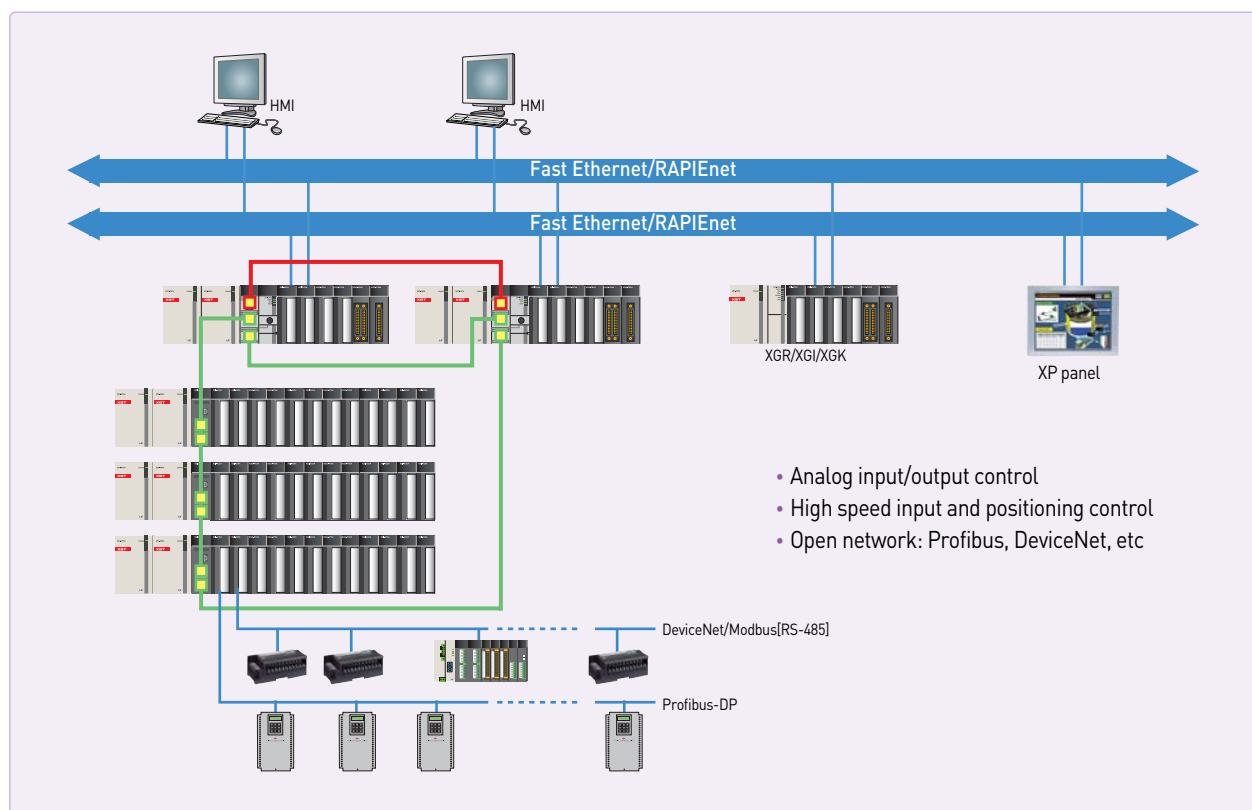


# Application

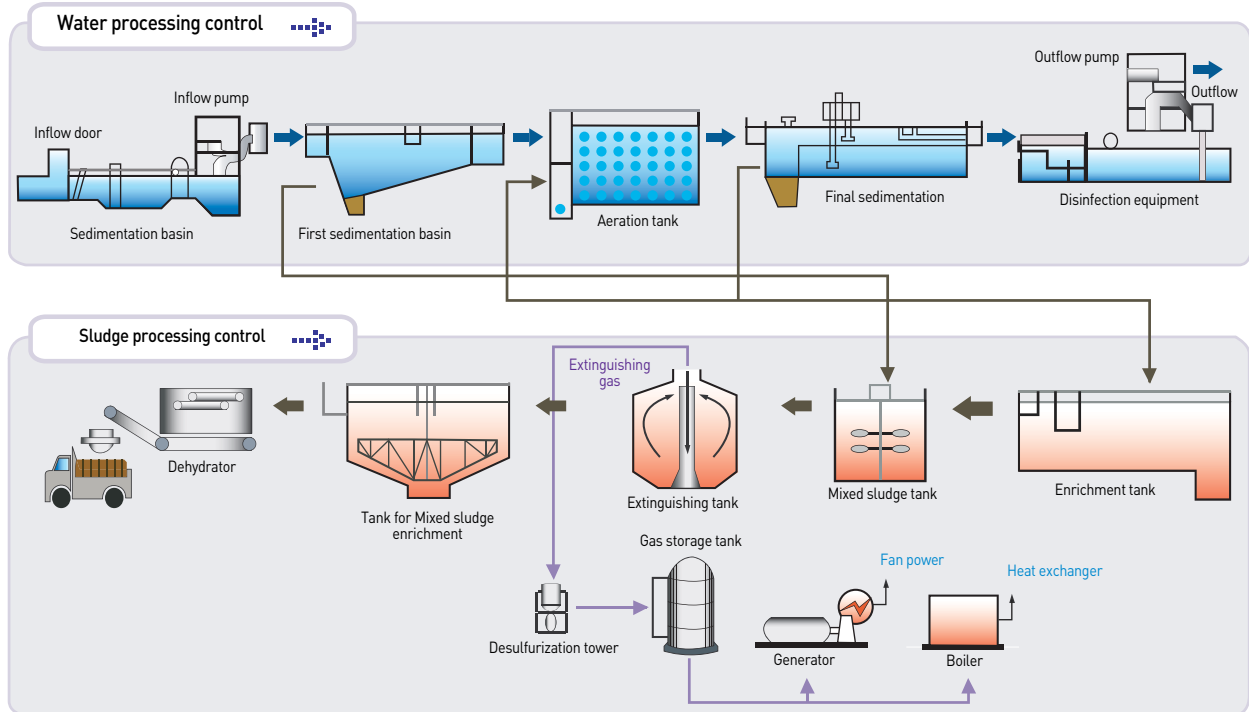
## Stage control



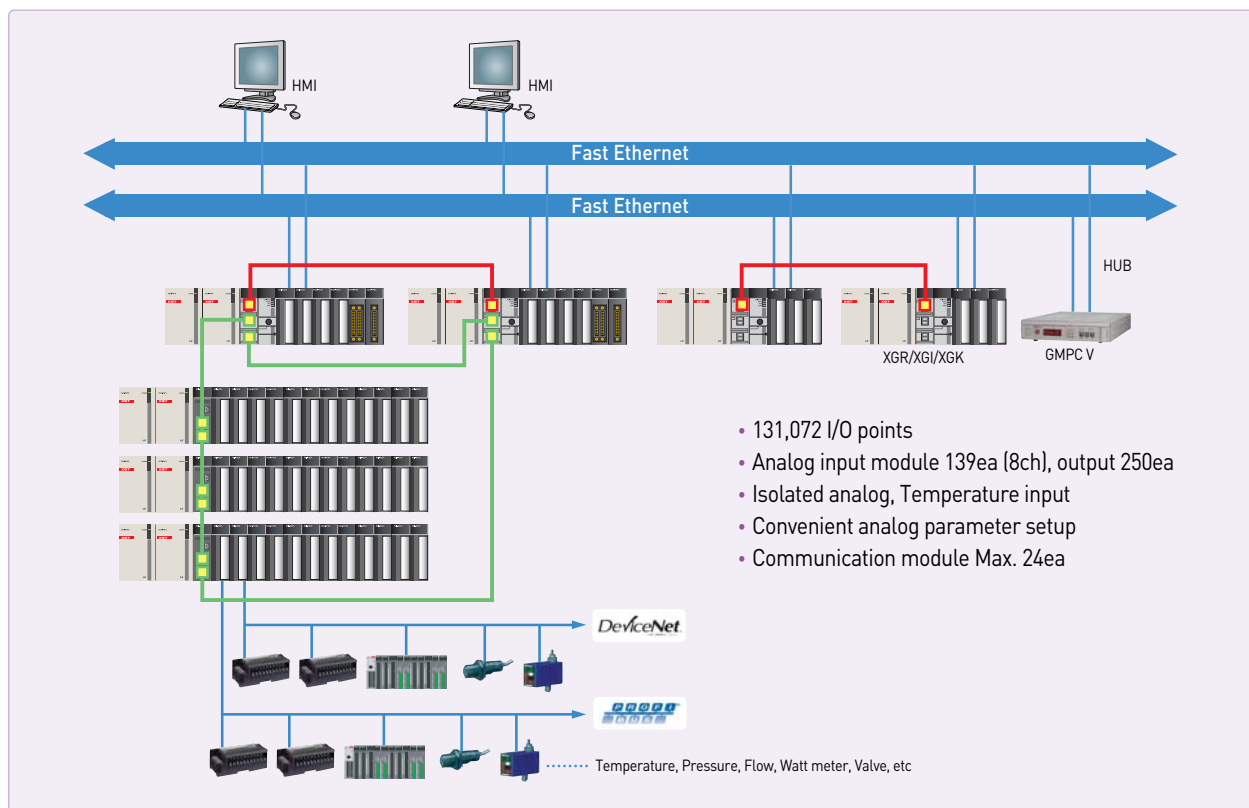
## System configuration



## Water processing control



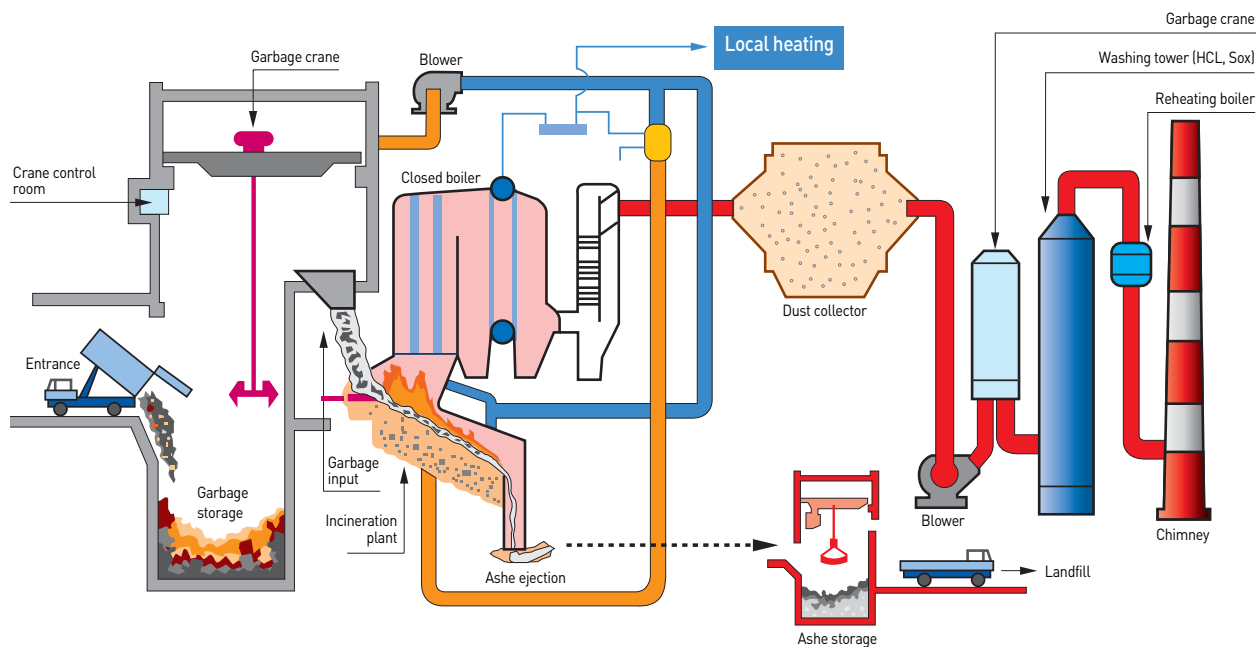
## System configuration



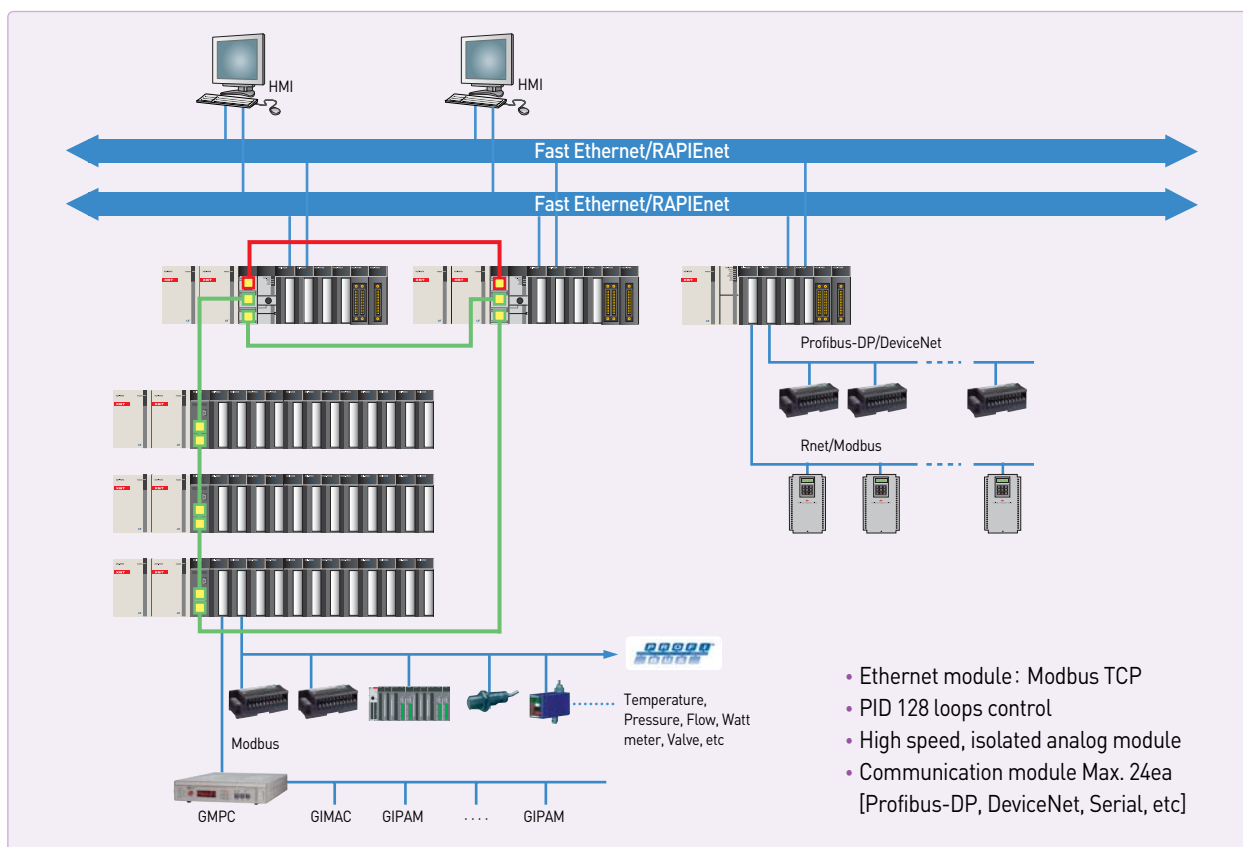


# Application

## Incinerator control

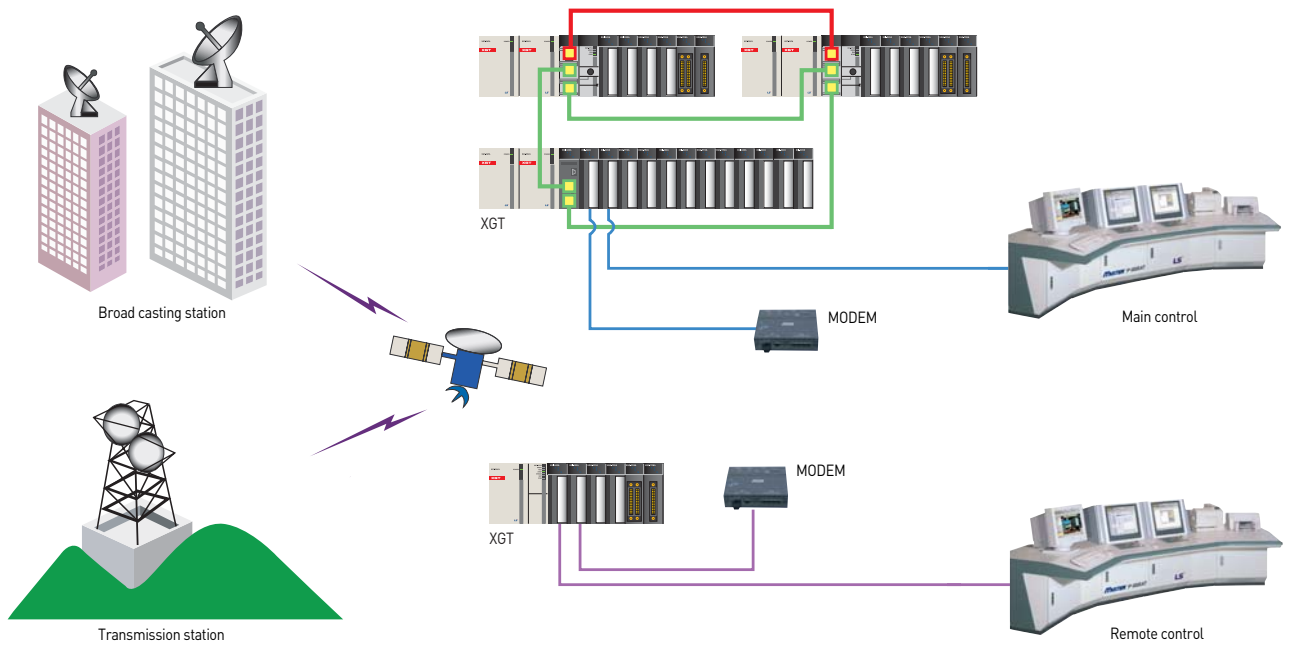


## System configuration

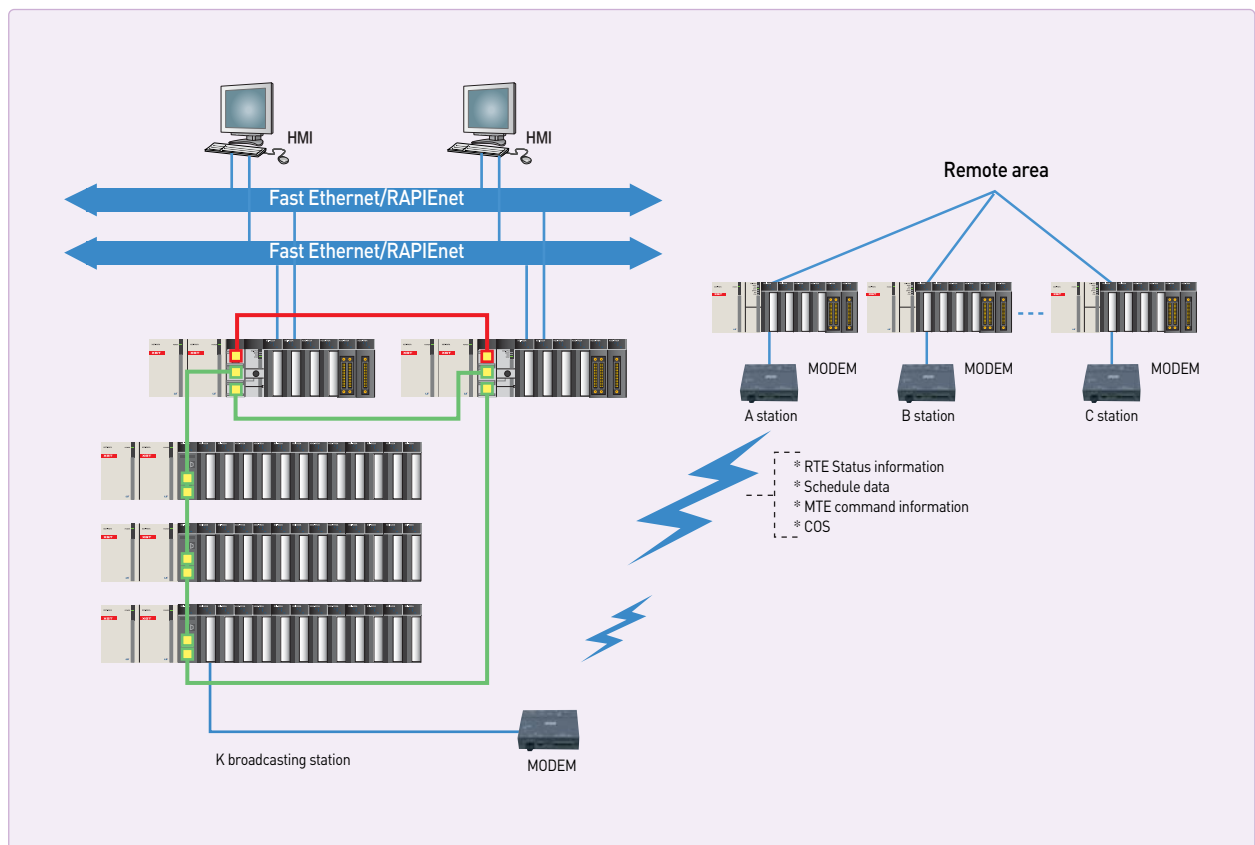


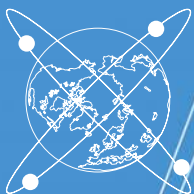


## Broad casting system



## System configuration





# Network



## RAPIEnet

- Communication speed: 100Mbps
- Dual port [T.Pair/F.Optic/Hybrid]
- Built-in high performance industrial switch
- Cyclic Communication [Broadcast Service]
  - 1block:200word
  - Send 64block/Receive 128block
- Event Communication [Peer to Peer Service]



## XGT Fast Ethernet (FEnet)

- 10/100Mbps Industrial high-speed Ethernet
- 10/100Base-TX, 100Base-FX (Optical)
- Open Ethernet (FEnet) and LSIS dedicated Ethernet (FDEnet)
- High reliability and performance with 32-bit processor
- Various connection to HMI S/W [XGT, MODBUS/TCP]



## XGT Ethernet / IP

- EtherNet/IP Conformance Test Suite Version 2.10
- 100BASE-TX/100Mbps full duplex
- No additional switch or hub (built-in switch)
- Wiring reduction and flexible installation
- Auto cross over function
- Various diagnostic function and network status information



## XGT Cnet (Computer Line)

- RS-232C/485/422 communication
- Long-distance communication via modem connection
- Various connection to MMI S/W [XGT, MODBUS RTU, MODBUS ASCII]
- User-defined communication support
- Convenient P2P master [XGT, MODBUS, MODBUS-RTU/ASCII]

# XGT

Along with Ethernet, Profibus-DP, and DeviceNet, XGT series provide the maximum in control integration and communication flexibility.



## XGT Fnet

- Dedicated network for LS PLC
- Easy high-speed link parameter setup
- 1Mbps high-speed communication
- Max. 750m
- Max. 6ea repeater available (Max. expansion 5.25km)
- Network management through Auto scan



## XGT Rnet

- Communication speed: 1Mbps
- Communication distance: Max. 750m
- Max. 6 repeaters (up to 5.25km)
- Network management using Auto-scan (Slave module information)



## XGT Dnet (DeviceNet)

- Connectable to other PLCs and devices
- Compliance of the ODVA standard
- Flexible communication speed setting: 125/250/500Kbps
- Multi-drop and T branch connection
- Communication distance: Max. 500m
- Convenient parameter setting through SyCon/HS link parameter



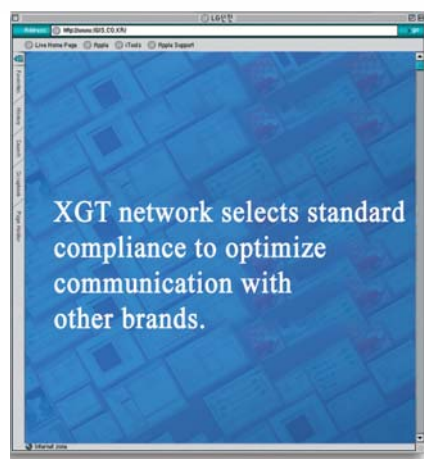
## XGT Pnet (Profibus-DP)

- Optimum communication for a master automation device and distributed slave I/O devices
- Fast slave communication omitting application layer
- Communication distance: Max. 1200m
- Convenient parameter setting through SyCon/HS link parameter



# General introduction

## Features



## RAPInet

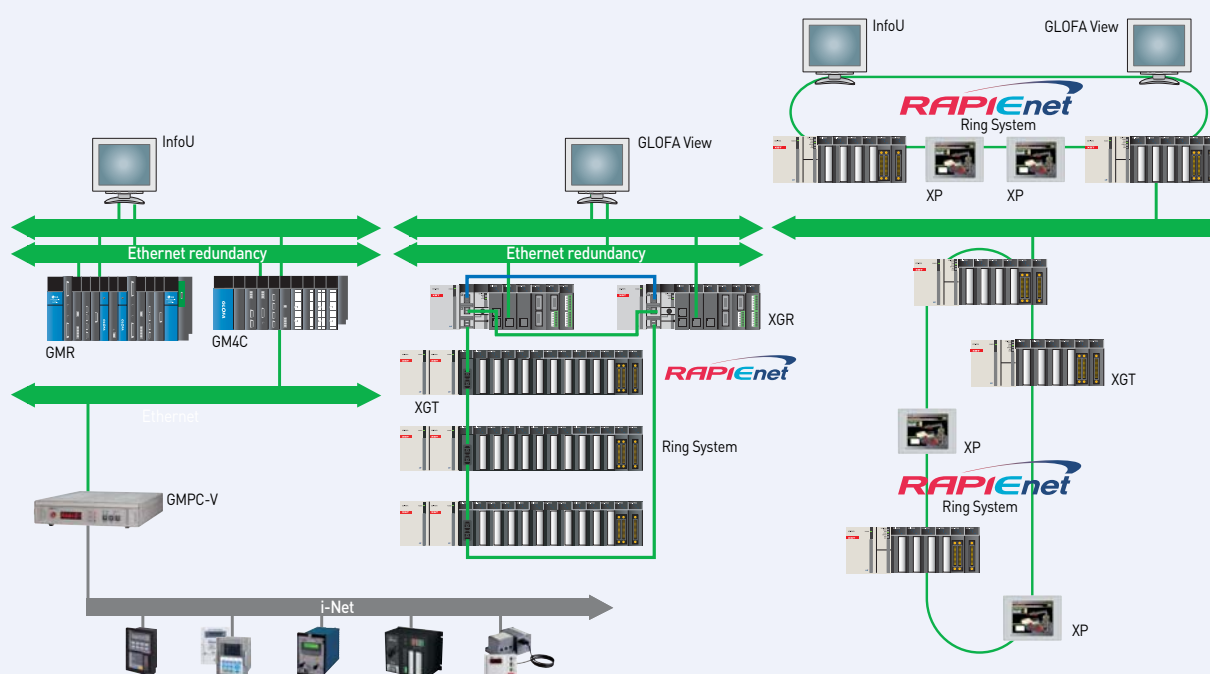
- Communication speed: 100Mbps
- Dual port (T.Pair / F.Optic / Hybrid)
- Built-in high performance industrial switch
- Cyclic Communication (Broadcast Service)
  - 1block:200word
  - Send 64block / Receive 128block
- H/W based Dual port Full duplex Switching
- Real-time / Non real-time service

## XGT Fast Ethernet

- 10/100Mbps Industrial high-speed Ethernet
- 10/100Base-TX, 100Base-FX (Optical)
- Open (Information level) Ethernet: FEnet
- LSIS dedicated (Between LS PLCs) Ethernet: FDEnet
- High reliability and performance with 32-bit processor
- Various connection to MMI S/W (XGT, MODBUS)
- Enhanced network diagnosis

## XGT Ethernet / IP

- EtherNet/IP Conformance Test Suite Version 2.10
- 100BASE-TX/100Mbps full duplex
- No additional switch or hub (built-in switch)
- Wiring reduction and flexible installation
- Auto cross over function
- Various diagnostic function and network status information





### XGT Cnet

- RS-232C/485/422 communication
- Long-distance communication via modem connection
- Various connection to HMI S/W (XGT, MODBUS RTU, MODBUS ASCII)
- User-defined communication
- Convenient P2P master (XGT, MODBUS)

### XGT Fnet

- Dedicated network for LS PLC
- Easy high-speed link parameter setup
- 1Mbps high-speed communication
- Max. 750m
- Max. 6ea repeater available (Max. expansion 5.25km)
- Network management through Auto scan

### XGT Rnet

- High-speed communication: 1Mbps
- Long communication distance: Max. 750m
- Max. 6 repeaters (up to 5.25km)
- Network management using Auto-scan (Slave module information)

### XGT Dnet (DeviceNet)

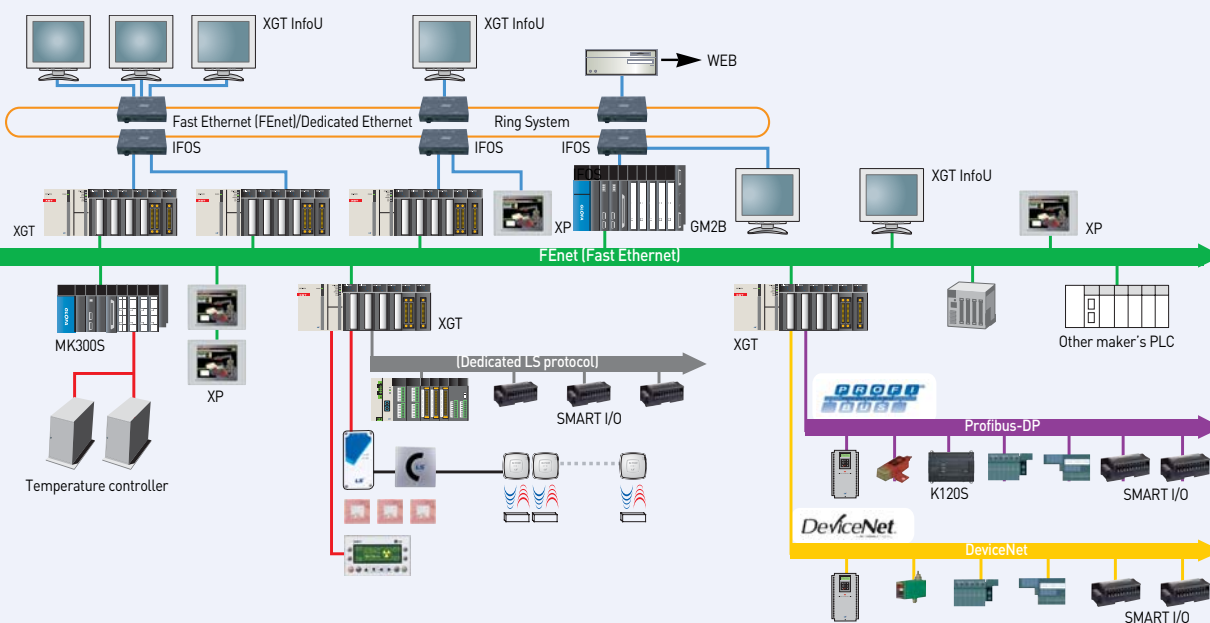
- Connectable to other PLCs and control device
- Compliance of the ODVA standard
- Flexible communication speed setting: 125/250/500Kbps
- Multi-drop and T branch connection
- Long communication distance: Max. 500m

### XGT Pnet (Profibus-DP)

- Optimum communication for a master automation device and distributed slave I/O devices
- Fast slave communication omitting application layer
- Long communication distance: Max. 1200m
- Communication using High-speed link parameter

### Installation number of network module available

| Item                   | XGK / XGI / XGR CPU |
|------------------------|---------------------|
| Total network module   | 24                  |
| High-speed link module | 12                  |
| P2P service            | 8                   |





# RAPIenet

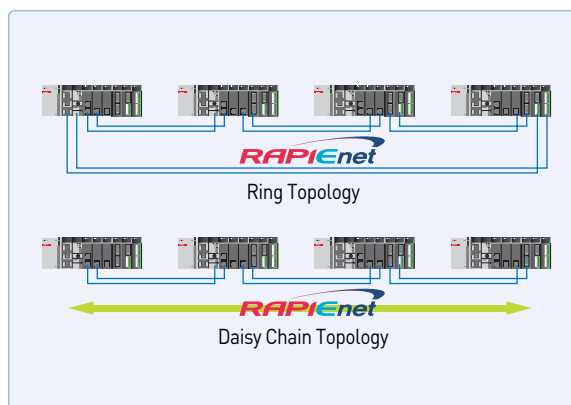
## Features

### 100Mbps Dual Port Ethernet

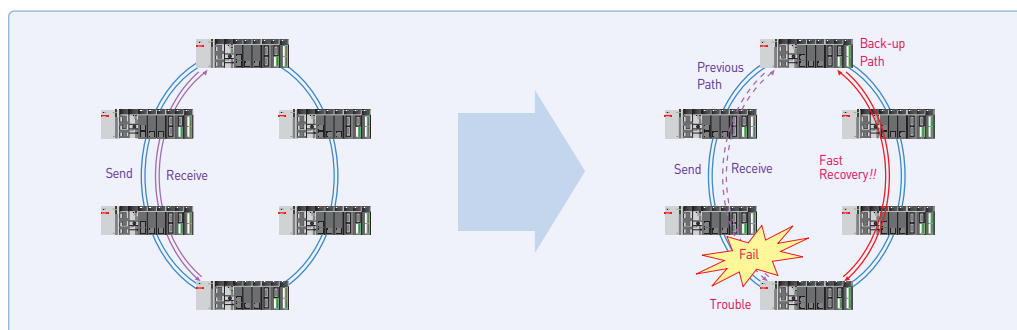
- Communication speed : 100Mbps
- Dual port (T.Pair / F.Optic / Hybrid)
- Built-in high performance industrial switch
- Cyclic Communication (Broadcast Service)
  - 1block : 200word
  - Send 64block / Receive 128block
- Event Communication (Peer to Peer Service)

### Hardware based Full duplex switching

- Dual port full duplex switching (Forwarding/Receiving)
- Real-time / Non real-time service (Frame )

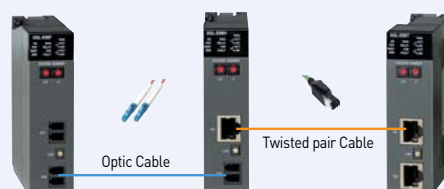


## Redundancy System



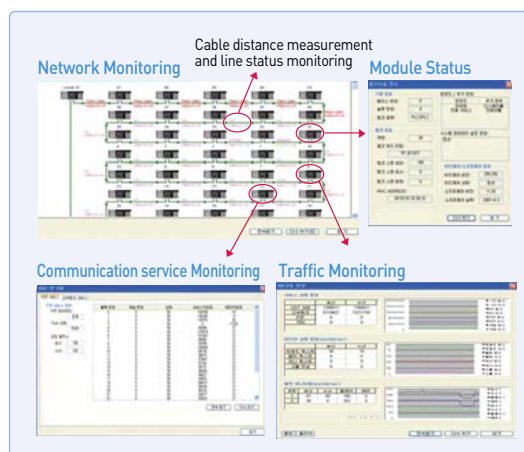
## Hybrid System

- Twisted pair, Fiber optic, Hybrid(T.P+F.O)



## Intelligent Diagnostic Functions

- Alarm for station number collision
- Cable distance measurement (Twisted pair cable)
- Convenient wiring using auto cross over
- Various diagnosis and Network status information
  - (a) CPU status
  - (b) Communication module status
  - (c) Communication service (HS link, Dedicated service, P2P) status
  - (d) Auto scan function to supply module information within the network
  - (e) Packet and Data ring monitoring receiving to Communication module
  - (f) Module diagnosis via network



## Specification

| Item                     |                                     | Specification                                                                                                                                                                                                |                         |
|--------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
|                          |                                     | 100BASE-FX                                                                                                                                                                                                   | 100BASE-TX              |
| Transmission             | Transmission speed Media            | 100Mbps<br>Fiber optic                                                                                                                                                                                       | 100Mbps<br>Twisted Pair |
|                          | Transmission method                 | Base band                                                                                                                                                                                                    |                         |
|                          | Topology                            | Daisy Chain, Ring topology                                                                                                                                                                                   |                         |
|                          | Distance (Node to node)             | 2km                                                                                                                                                                                                          | 100m                    |
|                          | Max. distance (Node to node)        | 128km                                                                                                                                                                                                        | 6,400m                  |
|                          | Max. Node                           | 64nodes                                                                                                                                                                                                      |                         |
|                          | Max. Protocol                       | 1,516bytes                                                                                                                                                                                                   |                         |
|                          | Media access method                 | CSMA/CD                                                                                                                                                                                                      |                         |
|                          | Frame error check                   | CRC 32 = $X^2+X^{31}+X^{30}+X^{29}+X^{28}+X^{27}+X^{26}+X^{25}+X^{24}+X^{23}+X^{22}+X^{21}+X^{20}+X^{19}+X^{18}+X^{17}+X^{16}+X^{15}+X^{14}+X^{13}+X^{12}+X^{11}+X^{10}+X^9+X^8+X^7+X^6+X^5+X^4+X^3+X^2+X+1$ |                         |
|                          | Max. Number For PLC of installation | 12                                                                                                                                                                                                           |                         |
| Mountable slot           | For PC                              | 1                                                                                                                                                                                                            |                         |
|                          | For PLC                             | Main base ~ 7 <sup>th</sup> Expansion base (XGK-CPUH/XGI-CPUU)<br>Main base ~ 3 <sup>rd</sup> Expansion base (XGK-CPUS/CPUA)<br>Main base ~ 1 <sup>st</sup> Expansion base (XGK-CPUE)                        |                         |
| Communications device    | Communication method                | P2P                                                                                                                                                                                                          | High speed link         |
|                          | Data block                          | Client / Server                                                                                                                                                                                              | Multicast, Unicast      |
|                          | Data per block                      | 700word × 64Block                                                                                                                                                                                            | 12,800word              |
|                          | PLC ↔ PLC                           | 700word                                                                                                                                                                                                      | 6,400word               |
|                          | PLC ↔ PC                            | •                                                                                                                                                                                                            | •                       |
| Fail Safe                | Dual communication line             | •                                                                                                                                                                                                            | •                       |
|                          | Recovery Time                       | Within 10m                                                                                                                                                                                                   |                         |
| Network diagnosis        | Bypass of the fail station          | •                                                                                                                                                                                                            | •                       |
|                          | Cable distance measurement          | •                                                                                                                                                                                                            | •                       |
|                          | Station number collision detection  | •                                                                                                                                                                                                            | •                       |
| Dimension (mm)           | PADT                                | •                                                                                                                                                                                                            | •                       |
|                          | For PLC                             | 98(H) × 27(W) × 90(D)                                                                                                                                                                                        |                         |
| Current consumption (mA) | For PLC                             | 18(H) × 120(W) × 174(D)                                                                                                                                                                                      |                         |
|                          | For PLC                             | Twisted pair: 330, Fiber optic: 670, Mixed: 510                                                                                                                                                              |                         |
| Wight (g)                | For PLC                             | Twisted pair: 630, Fiber optic: 630                                                                                                                                                                          |                         |
|                          | For PLC                             | Twisted pair: 102, Fiber optic: 109, Mixed: 105                                                                                                                                                              |                         |
|                          | For PLC                             | Twisted pair: 104, Fiber optic: 128                                                                                                                                                                          |                         |



XGL-EIMF : Fiber optic 2ports  
XGL-EIMH : Twisted pair port/ Fiber optic 1 port  
XGL-EIMT : Twisted pair 2ports



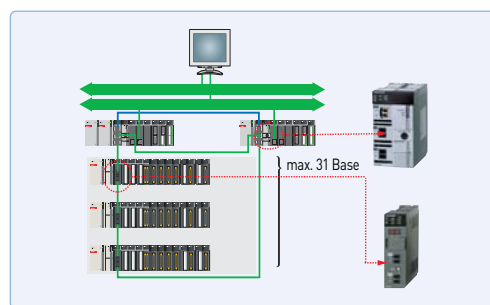
XOL-EIMF : Fiber optic 2ports For PC



XOL-EIMT : Twisted pair 2ports For PC

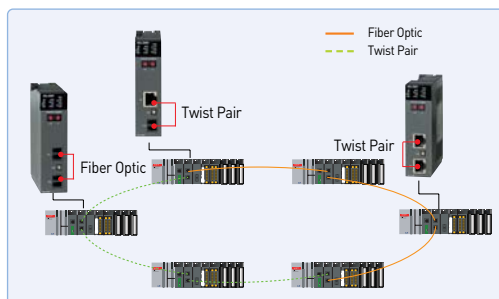
## Redundancy rack type expansion system

- Built-in type for CPU (Redundancy CPU)
  - Max. 31expansion base
- Easy installation
  - Base Auto scan
  - Analog module setup with I/O parameter
  - Easy programming for analog using global variable
  - Max. 24 communication module
- Long distance expansion (Fiber optic: 2km) and loader connection
- Twisted pair/ Fiber optic/ Mixed type communication modules for various system environment

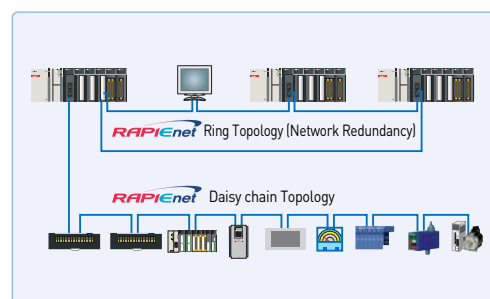


## Controller Level communication

- XGK/XGI/XGR PLC2PLC communication
- Enable to configure Daisy chain without External switch
- Service periodic: within 5ms



## System configuration

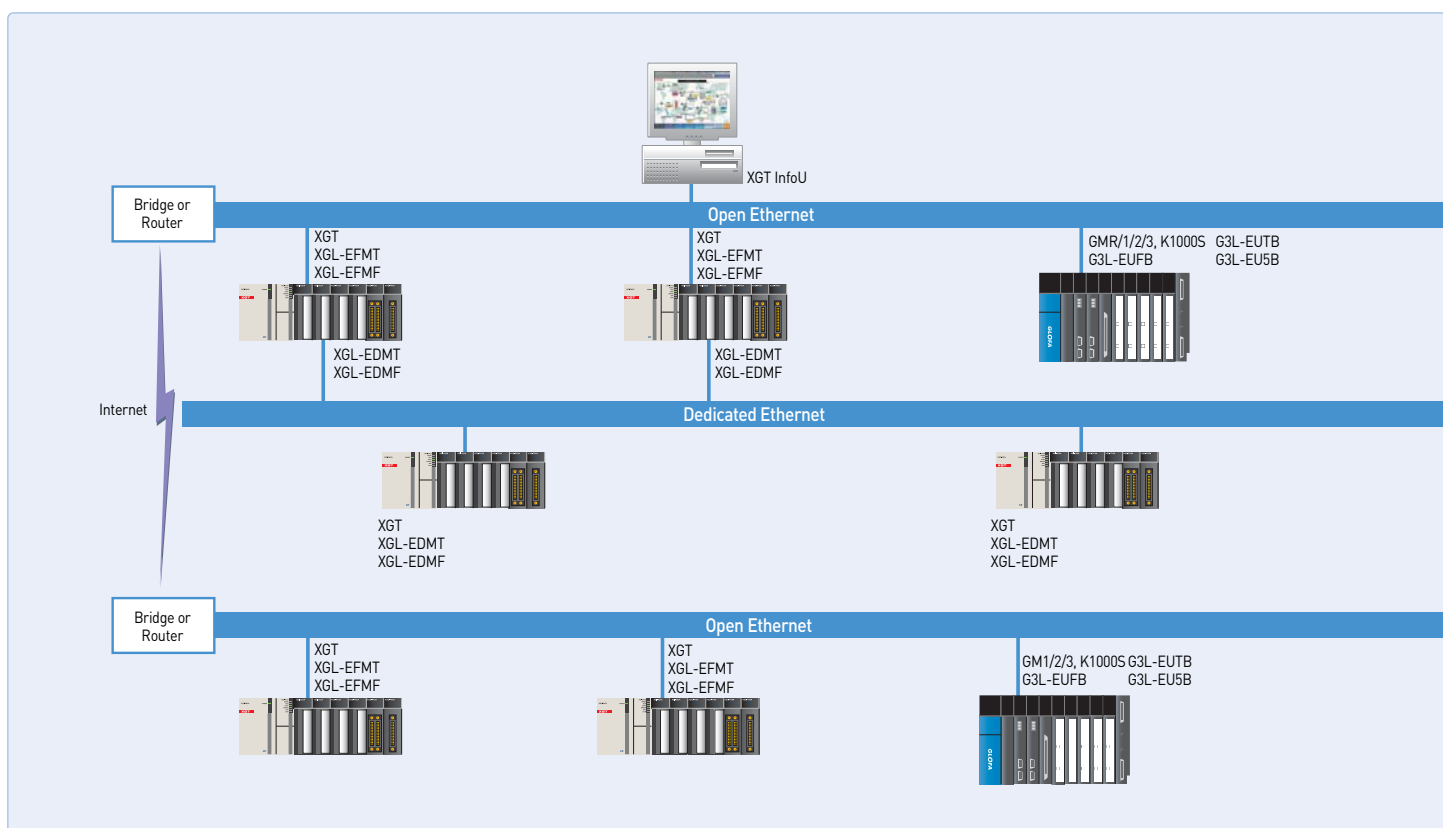




# XGT Ethernet system

## Features

- 10/100Mbps industrial high-speed Ethernet (IEEE802.3)
- High-speed link block (Send 32blocks, Receive 128blocks)
- 10/100Base-TX, 100Base-FX (Fiber optic)
- Open Ethernet and Dedicated protocol
- High performance by 32bit processor
- Remote connection via XG5000
- Module reset function
- Modbus TCP protocol
- Network diagnosis via auto scan
- Easy network configuration and setup via XG-PD
- User defined protocol and P2P service
- PING Test function
- Communication information for services (High speed link, Dedicated service, Media status)





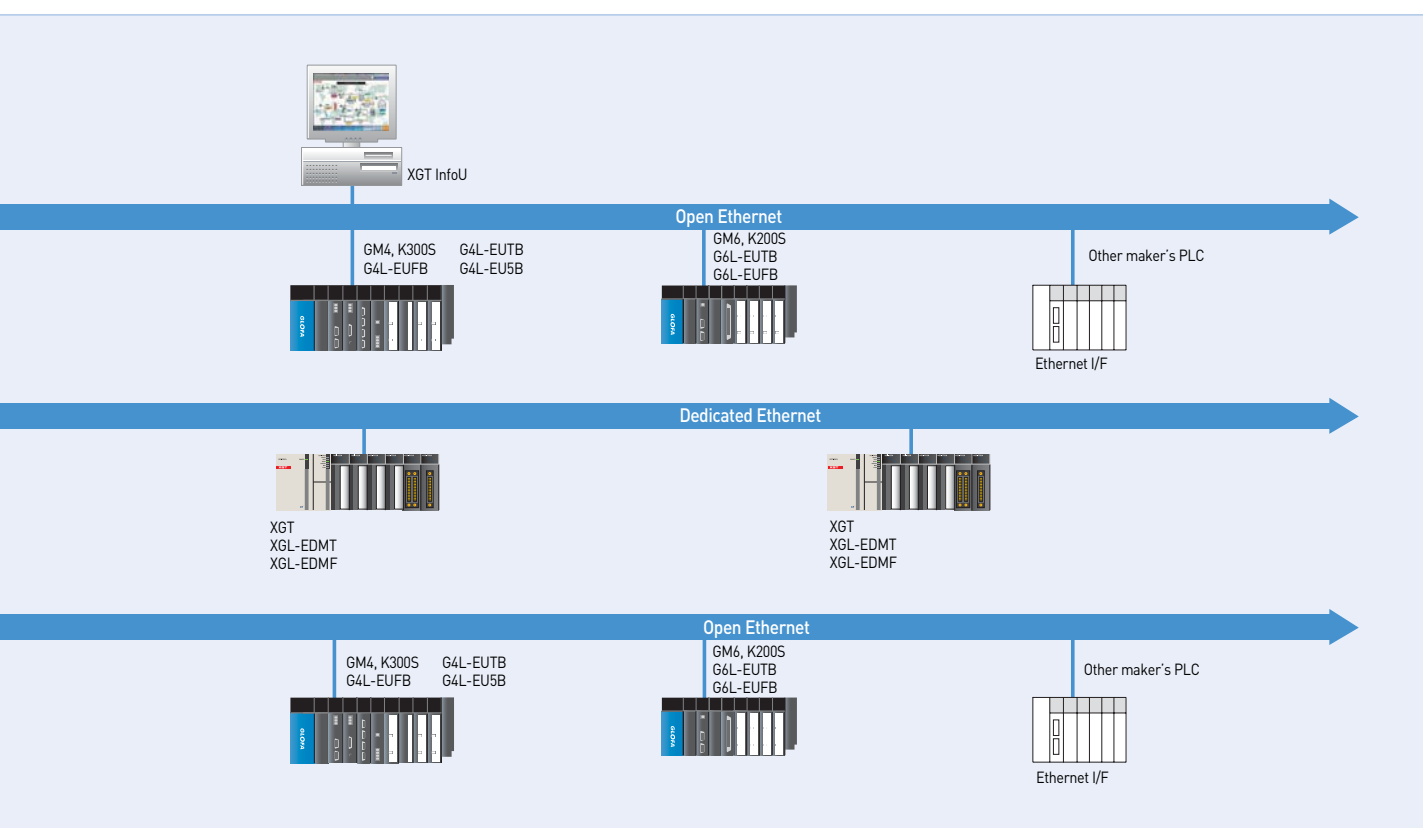
## Specification

### Open Ethernet

| Item                                      | XGL-EFMT                                                                                   | XGL-EFMF                                                   |
|-------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------|
| Communication spec.                       | 10/100 BASE-TX                                                                             | 100 BASE-FX, Fiber Optic                                   |
| Protocol                                  | TCP/IP, UDP/IP                                                                             |                                                            |
| Service                                   | With LS PLCs                                                                               | High-speed link, P2P service                               |
|                                           | With other devices                                                                         | P2P service                                                |
|                                           | Application                                                                                | Dedicated protocol service, XG5000 service, E-Mail service |
| HS link sending/receiving data            | 200 words/block (Max. 128 blocks)                                                          |                                                            |
| No. of channel connectable to upper stage | 16 channels                                                                                |                                                            |
| General use                               | Communication with PC (HMI) and external devices, High-speed communication among LSIS PLCs |                                                            |
| Purpose                                   | UTP/STP Category 5                                                                         | 62.5/125 $\mu$ m, Multi-mode, SC connector                 |
| Current consumption (mA)                  | 410                                                                                        | 630                                                        |
| Weight (kg)                               | 0.11                                                                                       | 0.15                                                       |

### Dedicated Ethernet

| Item                       | XGL-EDMT                                      | XGL-EDMF                                   |
|----------------------------|-----------------------------------------------|--------------------------------------------|
| Communication spec.        | 10/100 BASE-TX                                | 100 BASE-FX, Fiber Optic                   |
| Protocol                   | Dedicated protocol                            |                                            |
| Service                    | With LS PLCs                                  | High-speed link, P2P service               |
|                            | With other devices                            | -                                          |
|                            | Application                                   | XG5000 service                             |
| Sending/receiving data     | 200 words /block                              |                                            |
| No. of connection stations | 64 stations                                   |                                            |
| General use                | High-speed link communication among LSIS PLCs |                                            |
| Purpose                    | UTP/STP Category 5                            | 62.5/125 $\mu$ m, multi-mode, SC connector |
| Current consumption (mA)   | 410                                           | 630                                        |
| Weight (kg)                | 0.11                                          | 0.15                                       |





# XGT Ethernet / IP System

## Features

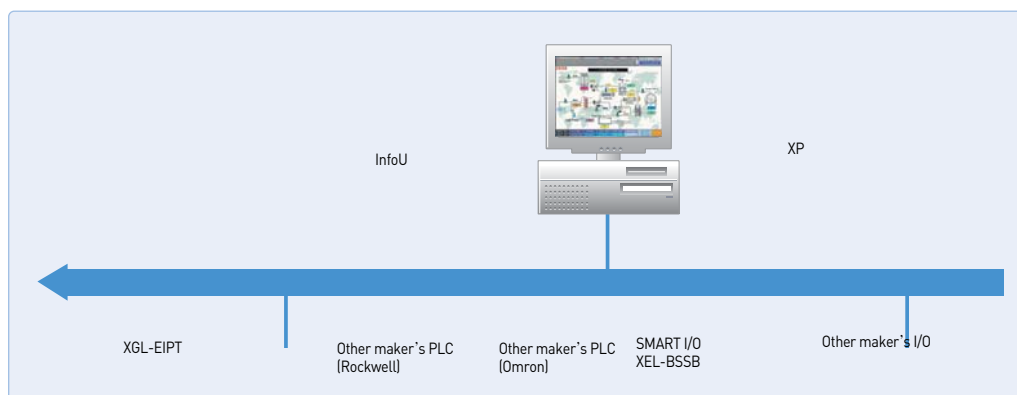
- Extensive Client Messaging Support
- Encapsulated Messages, Explicit Messaging
- Class 3 Connected Explicit Messaging(Server Only)
- Class 1 Connected Implicit(IO) Messaging(Cyclic I/O Service Only)
- EtherNet/IP Conformance Test Suite Version 2.10
- 100BASE-TX , 100Mbps/ Full Duplex
- Max.24ea available on 1 CPU module (Main base / Extension base)
- No additional switch or hub (built-in switch)
- Wiring reduction and flexible installation
- Auto cross over function
- Various diagnostic function and network status information
  - Communication module status
  - P2P status
  - Auto Scan function
  - Packet and data status
  - Communication module diagnosis through network



## Specification

| Item                                 |                            | XGL-EIPT                                                    |
|--------------------------------------|----------------------------|-------------------------------------------------------------|
| Communication speed                  |                            | 100Mbps                                                     |
| Modulation method                    |                            | Base band                                                   |
| Max. expansion length between nodes  |                            | 100m                                                        |
| Access method                        |                            | CSMA/CD(Full Duplex)                                        |
| Topology                             |                            | Line type (Built-in switch), Star type                      |
| Service                              | Periodic communication     | Implicit IO Client                                          |
|                                      | Non-periodic communication | UCMM Client                                                 |
|                                      | Periodic server            | Implicit IO Server                                          |
| Diagnostic function                  |                            | Module information, Auto Scan, Media Information, Ring test |
| Number of connection (Client/Server) | TCP                        | 64/128                                                      |
|                                      | CIP (IO communication)     | 64/128                                                      |
| Max. number of service               |                            | 8                                                           |
| Max. number of module                |                            | 24                                                          |
| Media                                |                            | UTP/STP Category 5                                          |
| Dimension                            |                            | 98(H) × 27(W) × 90(D)                                       |
| Current consumption (mA)             |                            | 400mA                                                       |
| Weight (g)                           |                            | 102                                                         |

## System configuration



# XGT Industrial Optic Ring System

## Features

- 100Base-FX media
- Industrial high-speed Ethernet (IEEE802.3)
- High-speed link to communicate between LS PLCs
- High-speed block to link between modules
- High-speed link and Max. 16 P2P communication
- Loader service via Ethernet (XG5000): Dedicated TCP/IP port 2002
- Easy connection to other system using P2P and XG-PD
- Dedicated protocol and Modbus TCP
- DHCP (Dynamic Host Configuration Protocol)
- Access table to communicate with PC (HMI)



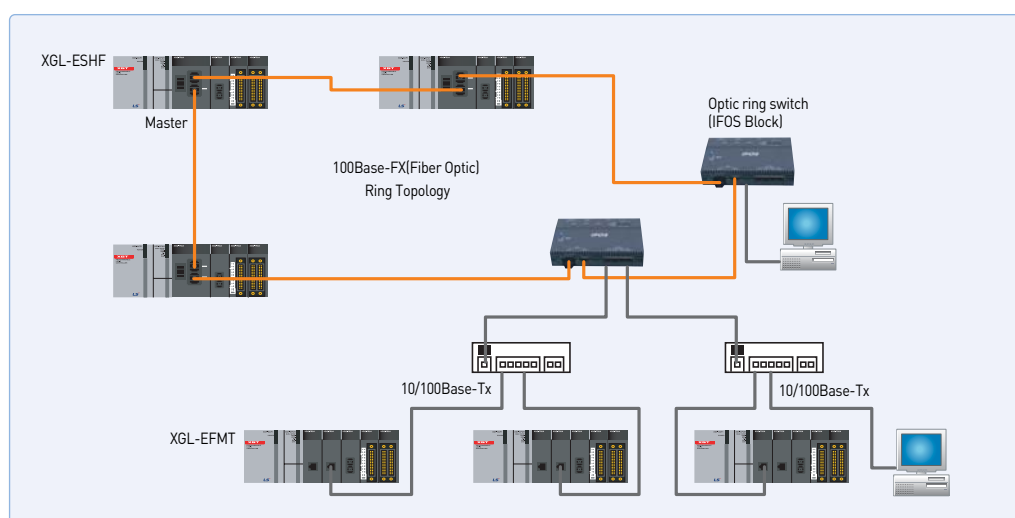
## Specification

| Item                    |                             | XGL-ESHF(100BASE-FX) |
|-------------------------|-----------------------------|----------------------|
| Transmission            | Communication speed         | 100Mbps              |
|                         | Method                      | Base band            |
|                         | Max. Distance(Node to node) | 2km                  |
|                         | Max. Segment length         | -                    |
|                         | Max. node                   | 50ea / segment       |
|                         | Distance (Node to node)     | 0.5m                 |
|                         | Max. Protocol size          | 1,500 bytes          |
|                         | Media access method         | CSMA/CD              |
| Current consumption (A) |                             | 1.2                  |
| Weight (g)              |                             | 220g                 |

## Fiber optic cable

| Item        | Description                            |
|-------------|----------------------------------------|
| Cable type  | Twin strands of Multi mode fiber (MMF) |
| Connector   | SC type                                |
| Diameter    | 62.5/125 $\mu$ m                       |
| Wave length | 1,350nm                                |
| Diminution  | Within 2dB/1,000m                      |

## System configuration





# XGT Ethernet switching hub

## Features

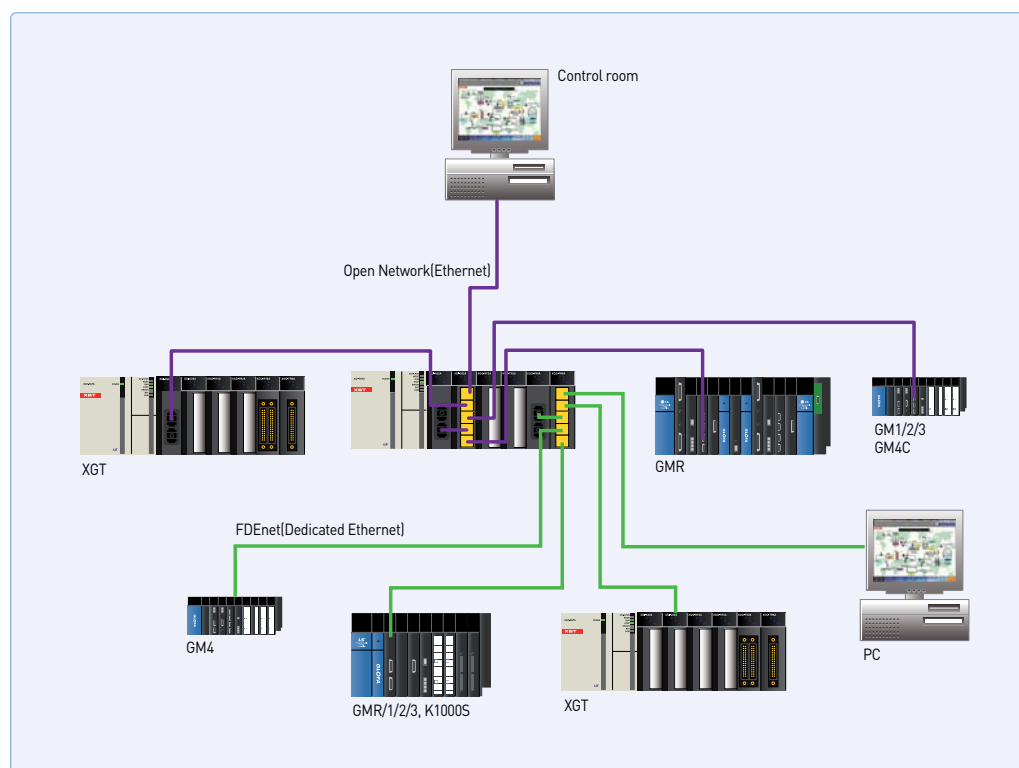
- Rack type: No external power
- Reliability for industrial standard
- Auto Crossover
- FG (Frame Ground) for RJ-45 connector
  - Decreased communication error by shielded FTP/STP cable



## Specification

| Item                     |                     | XGL-EH5T                                      |
|--------------------------|---------------------|-----------------------------------------------|
| Transmission             | Communication speed | 10/100Mbps                                    |
|                          | Port type           | 10/100BASE-TX, TP cable, RJ-45 socket, 5ports |
|                          | Interface           | Auto-Crossing, Auto-Nego., Auto-Polarity      |
|                          | Distance            | 100m                                          |
|                          | Diagnosis           | LED (PWR, Link status, Data)                  |
| Current consumption (mA) |                     | 550                                           |
| Weight (g)               |                     | 90                                            |

## System configuration





# XGT Fnet system

## Features

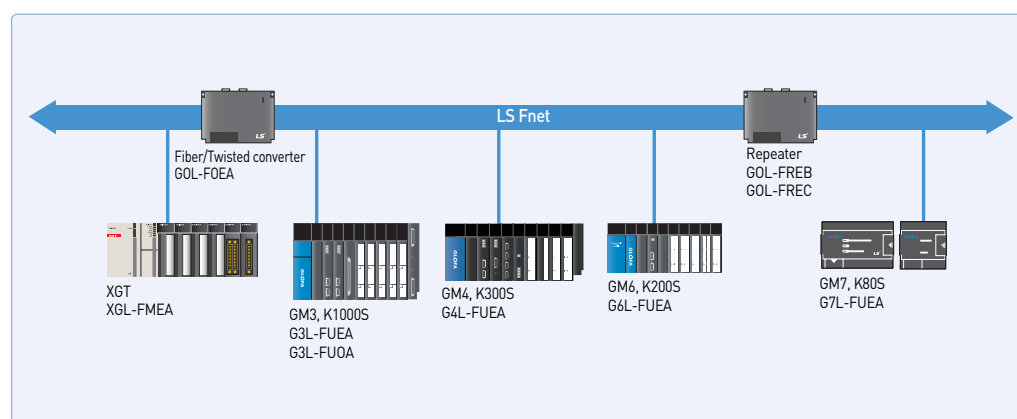
- Dedicated network for LS PLC
- Easy high-speed link parameter setup
- 1Mbps high-speed communication
- Max. 750m
- Max. 6ea repeater available (Max. expansion 5.25km)
- Network management through Auto scan
- Max. 12ea on 1ea base
- Deterministic Network through Token Passing & Broadcasting
- 3,840 Word for each station  
(Send 1920 Word /Receive 1920 Word)
- Max. number of block: Send 32blocks, Receive 64blocks, 60words for each block
- Max. communication points: 3840words  
(64block × 60word)
- Setup: Parameter download via XG-PD
- Diagnosis by XG-PD: Communication module information, High speed link fault, Auto scan



## Specification

| Item                                  | Description                                               |
|---------------------------------------|-----------------------------------------------------------|
| Communication speed                   | 1Mbps                                                     |
| Encoding method                       | Manchester Biphas-L                                       |
| Transmission length (for one segment) | Max. 750m                                                 |
| Transmission length (via repeater)    | Max. 750m × {6ea repeaters+1}=5.25km                      |
| Transmission cable                    | Twisted pair shield cable                                 |
| Max. number of connection             | 64stations (32stations /segment, 64stations for repeater) |
| Max. protocol size                    | 256 bytes                                                 |
| Access method                         | Circulated Token Passing                                  |
| Frame error check                     | CRC 16 check                                              |
| Max. number of installation           | 12ea                                                      |
| Installation base                     | Main base or expansion base                               |
| Current consumption (mA)              | 410                                                       |
| Weight (g)                            | 120                                                       |

## System configuration





# Computer-Link

## Features

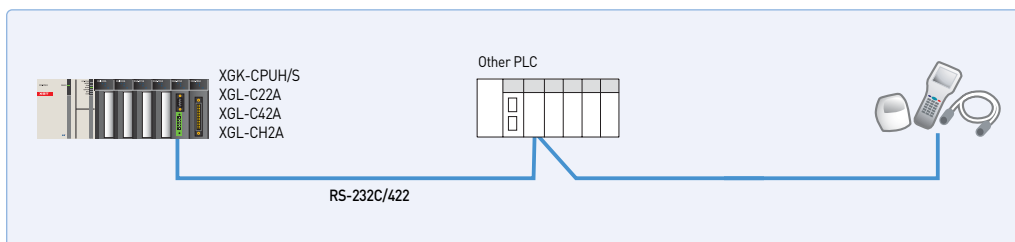
- Easy protocol editing and communication parameter setting: XG-PD
- Long-distance communication via modem connection
- Dedicated protocol for multi-drop configuration connectable up to 32 units
- RS-232C/422 communication port
- Flexible communication speed setting (300~115,200bps)
- Supporting full duplex and half duplex communication
- Max. 12 modules available in one CPU
- P2P service: User-defined communication and XGT/MODBUS master
- Various connection to MMI S/W (XGT, MODBUS RTU, MODBUS ASCII)
- Various diagnosis functions using XG-PD (I/O, link status, service status)
- Communication service information (Dedicated service, P2P service)
- Supporting simultaneously dedicated service in remote connection
- Communication without additional setting when replacing communication module



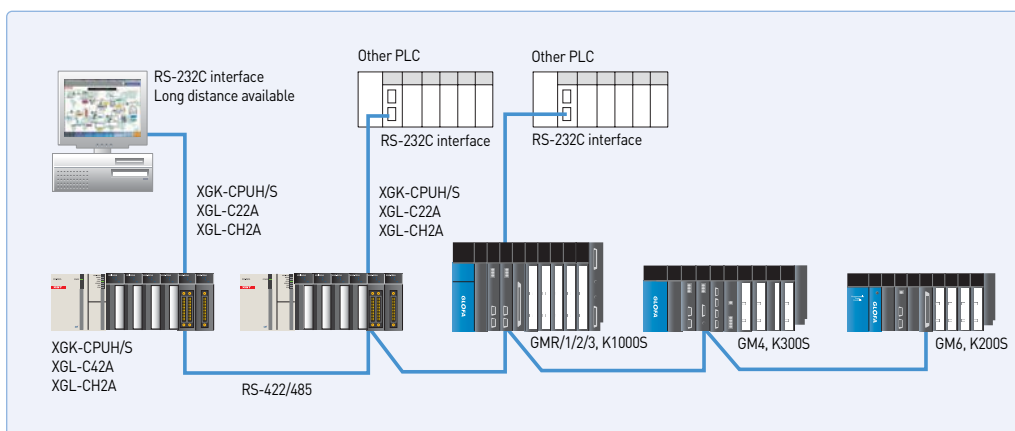
## Various independent operation mode

- Operation mode
- Dedicated protocol mode (Simultaneous support)
- Program upload/download by XG5000 protocol (RS-232C)
- Communication using LSIS dedicated protocol
- User-defined communication of P2P mode and XGT/MODBUS master

## Communication via RS-232C/422



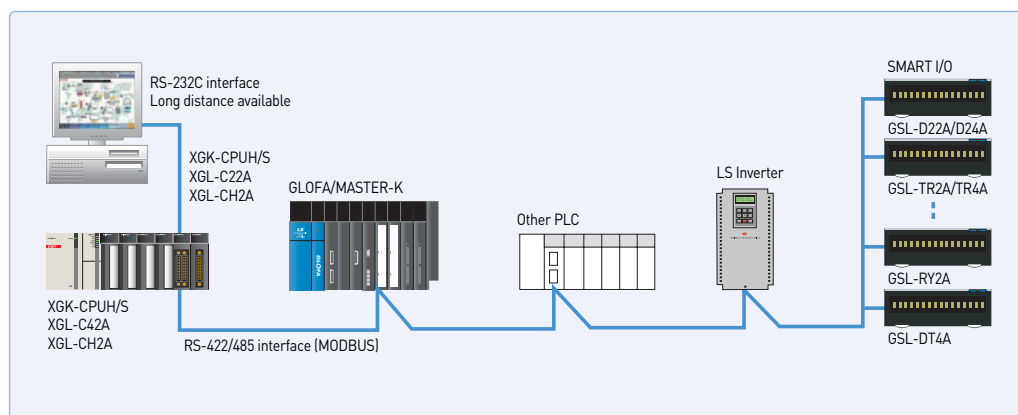
## 1: N and N: M connection (LSIS and other)



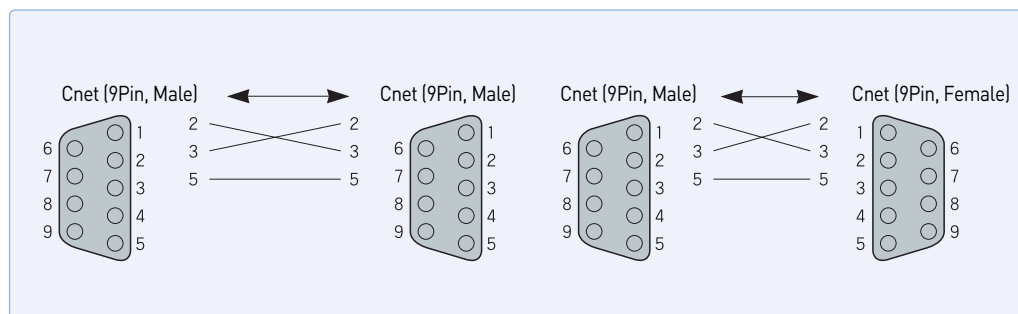
## Specifications

| Item                        |                | Specifications                                                                                                |                    |                           |
|-----------------------------|----------------|---------------------------------------------------------------------------------------------------------------|--------------------|---------------------------|
|                             |                | XGL-C22A                                                                                                      | XGL-C42A           | XGL-CH2A                  |
| Interface                   |                | RS-232C, 2 channels                                                                                           | RS-422, 2 channels | RS-232C/RS-422, 1 channel |
| Modem connection            |                | Remote communication with external devices via modem connection. Available for only RS-232C port.             |                    |                           |
| Communication mode          | Dedicated mode | 1: 1 or 1: N communication using LSIS dedicated protocol                                                      |                    |                           |
|                             | XG5000 mode    | Program upload/download and remote control                                                                    |                    |                           |
|                             | P2P mode       | Communication by protocol using XG-PD (Interface with other PLCs), XGT, MODBUS RTU/ASCII master communication |                    |                           |
| Operation mode              | Server (Slave) | Remote connection simultaneously using XGT/MODBUS Server, user-defined                                        |                    |                           |
|                             | Master         | XGT, MODBUS RTU/ASCII master, user-defined                                                                    |                    |                           |
| Data type                   | Start Bit      | 1                                                                                                             |                    |                           |
|                             | Data Bit       | 7 or 8                                                                                                        |                    |                           |
|                             | Stop Bit       | 1 or 2                                                                                                        |                    |                           |
|                             | Parity         | Even/Odd/None                                                                                                 |                    |                           |
|                             | Setting        | Basic parameter setting with XG-PD                                                                            |                    |                           |
| Synchronization             |                | Asynchronous                                                                                                  |                    |                           |
| Transmission speed (bps)    |                | Selectable among 300/600/1,200/2,400/4,800/9,600/19,200/38,400/57,600/115,200 bps                             |                    |                           |
| Station number setting      |                | Up to 32 stations from 0 to 31 with XG-PD                                                                     |                    |                           |
| Transmission distance       |                | RS-232C: Max. 15m (Extendible by using modem), RS-422/485: Max. 500m                                          |                    |                           |
| Modem communication         |                | Available                                                                                                     | Not available      | Available via RS-232C     |
| Network configuration       |                | RS-232C 1: 1, RS-422 1: 1, 1: N, N: M                                                                         |                    |                           |
| Diagnosis function          |                | Available through LED and XG-PD diagnosis service                                                             |                    |                           |
| Max. number of installation |                | 12                                                                                                            |                    |                           |
| Current consumption (mA)    |                | 310                                                                                                           | 300                | 310                       |
| Weight (Kg)                 |                | 0.12                                                                                                          | 0.12               | 0.12                      |

## MODBUS



## Cnet cable connection





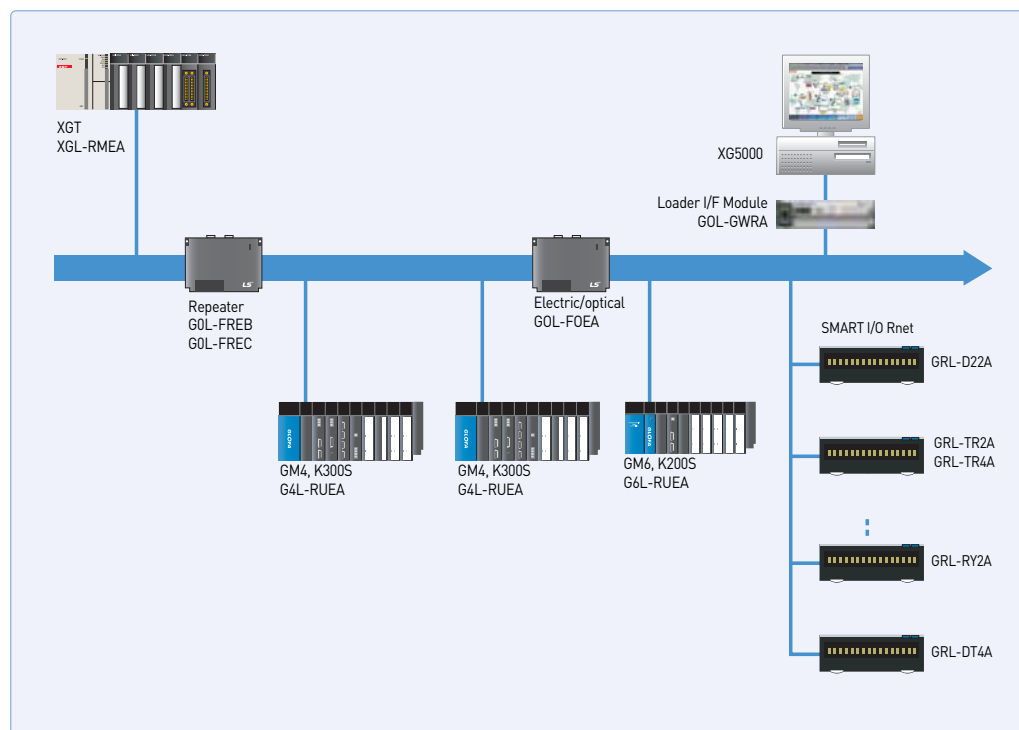
# Rnet system

## Features

- Communication speed: 1Mbps
- Communication distance: Max. 750m
- Available to use max. 6 repeaters (Up to 5.25Km)
- Network management using Auto-scan (Slave module information)
- Multi-drop network with smart I/O
- Network diagnosis and monitoring by XG-PD
- Max. 64 stations of slave modules controlled by one master module



## System configuration



## Specifications

| Item                                        | Specifications [XGL-RMEA]                                                         |
|---------------------------------------------|-----------------------------------------------------------------------------------|
| Transmission speed                          | 1Mbps                                                                             |
| Encoding                                    | Manchester Biphase-L                                                              |
| Transmission distance (Per segment)         | Max. 750m                                                                         |
| Transmission distance (When using repeater) | Max. 750m * {6 repeater + 1} = 5.25Km                                             |
| Transmission cable                          | Twisted pair shield cable                                                         |
| Max. number of connection stations          | Master + Slave = 64 stations (with repeater), 1 segment=32 stations (with master) |
| Max. size of protocol                       | 256 bytes                                                                         |
| Medium access method                        | Circulated Token Passing                                                          |
| Frame error check                           | CRC 16 check                                                                      |
| Max. number of installation                 | 12                                                                                |
| Installation position                       | Main base or expansion base                                                       |
| Current consumption (mA)                    | 410                                                                               |
| Weight (Kg)                                 | 0.12                                                                              |



## SMART I/O

- Reduction of wiring and real-time control of distributed I/O
- Various I/O module (16/32 points)



## Repeater specifications

| Item                                         | Specifications                              |
|----------------------------------------------|---------------------------------------------|
| Type                                         | G0L-FREB: AC110V ~ AC220V, G0L-FREC: DC 24V |
| Communication speed                          | 1Mbps                                       |
| Transmission method                          | Twisted pair shield cable                   |
| Transmission distance                        | Max. 750m per repeater                      |
| Max. number of installation between stations | Max. 6 repeaters                            |
| Max. distance between stations               | 5.25Km (when 6 repeaters are installed)     |
| Fault data reception                         | Error data transmission                     |
| Frame error check                            | CRC 16 check                                |

## Network cable and peripheral devices

| Item                        | Specifications              | Remarks  |
|-----------------------------|-----------------------------|----------|
| Twisted pair electric cable | LIREV-AMESB, 2 × 1mm, 18AWG | LS cable |
| RF terminator               | 110 Ω, 1/2 Watt             | -        |



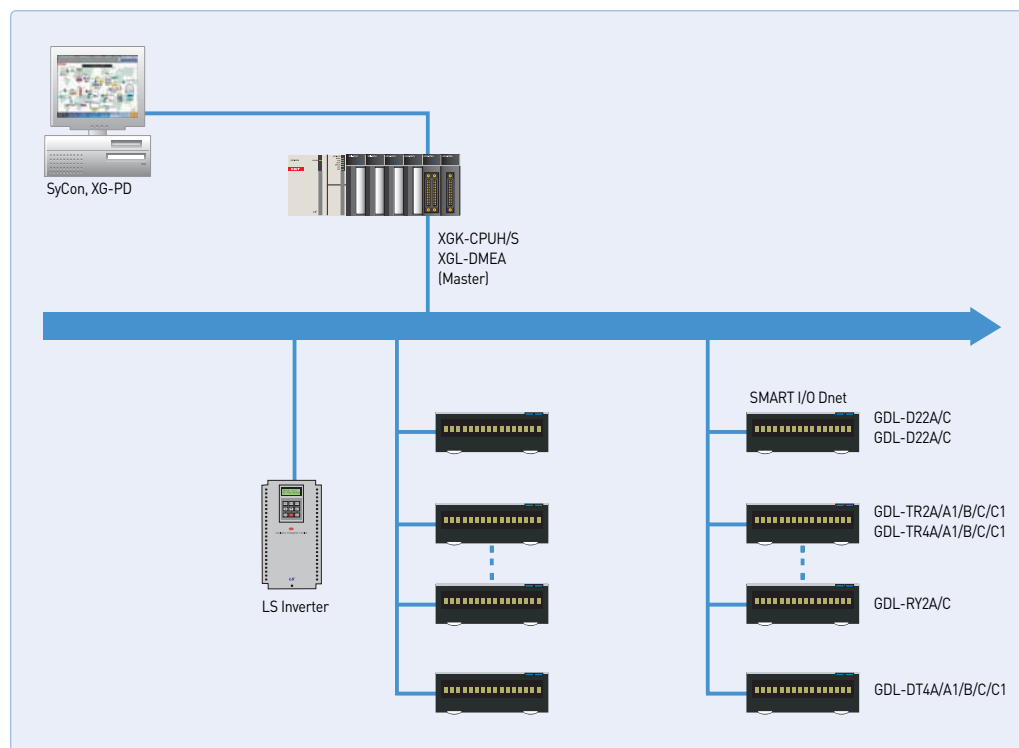
# DeviceNet system

## Features



- DeviceNet protocol
- Direct control of various I/O devices via Dnet system
- Max. 63 slave modules controlled by one master module
- Flexibility in network configuration: Multi-drop and T branch connection
- Connectable to other master module and various slave modules
- Providing 'Auto Network Scan' function and various information with configuration tool (SyCon)
- Communication using High-speed link parameter
- Connectable to various slave I/O including other module  
(Common I/O, Actuator, Switch, Optical switch, Valve, Inverter, A/D module, Position controller etc..)
- Automatic monitoring of slave modules in the network: Auto-scan (XG-PD)
- Easy expansion: up to 12 master modules
- Network setting by SyCon/XG-PD(Parameter setting, diagnosis and monitoring)

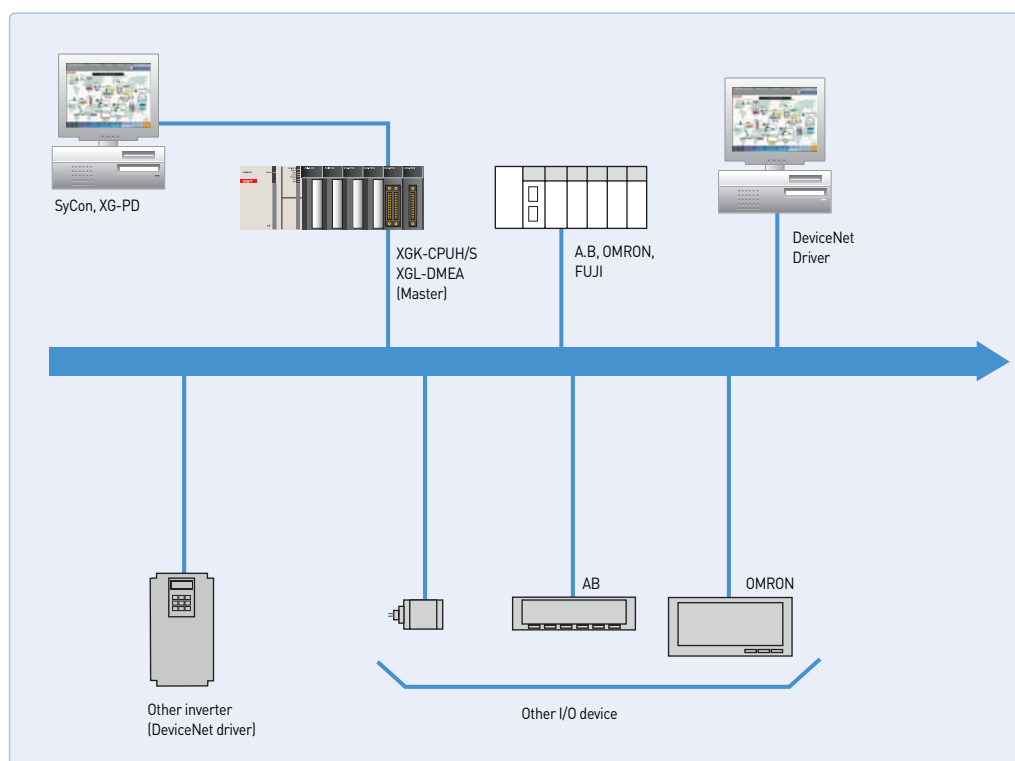
## System configuration with LSIS products



## Specifications

| Item                               | Specifications (XGL-DMEA)                                                                             |                     |                 |                          |
|------------------------------------|-------------------------------------------------------------------------------------------------------|---------------------|-----------------|--------------------------|
| Module type                        | Master                                                                                                |                     |                 |                          |
| Transmission distance and speed    | Trans. speed                                                                                          | Max. network length | Max. drop cable | Length of all drop cable |
|                                    | 500kbps                                                                                               | 100m                | 6m              | 39m                      |
|                                    | 250kbps                                                                                               | 250m                | 6m              | 78m                      |
|                                    | 125kbps                                                                                               | 500m                | 6m              | 156m                     |
| Max. number of connection stations | 64 stations (Master 1 + Slave 63)                                                                     |                     |                 |                          |
| Max. number of node                | Max. 64 MAC ID (Node address)                                                                         |                     |                 |                          |
| Communication method               | Bit Strobe, Poll, COS, Cyclic                                                                         |                     |                 |                          |
| Diagnosis function                 | Duplicated station check Abnormal station detection/CRC error check/Scan List/Operation display (LED) |                     |                 |                          |
| Cable                              | Dnet dedicated cable: 5 (Signal: 2, power: 2, shield: 1)                                              |                     |                 |                          |
| Max. number of installation        | 12                                                                                                    |                     |                 |                          |
| Configuration tool                 | SyCon                                                                                                 |                     |                 |                          |
| Configuration port                 | RS-232C Configuration Port                                                                            |                     |                 |                          |
| Current consumption (mA)           | 440                                                                                                   |                     |                 |                          |
| Weight (Kg)                        | 0.11                                                                                                  |                     |                 |                          |

## System configuration with other products





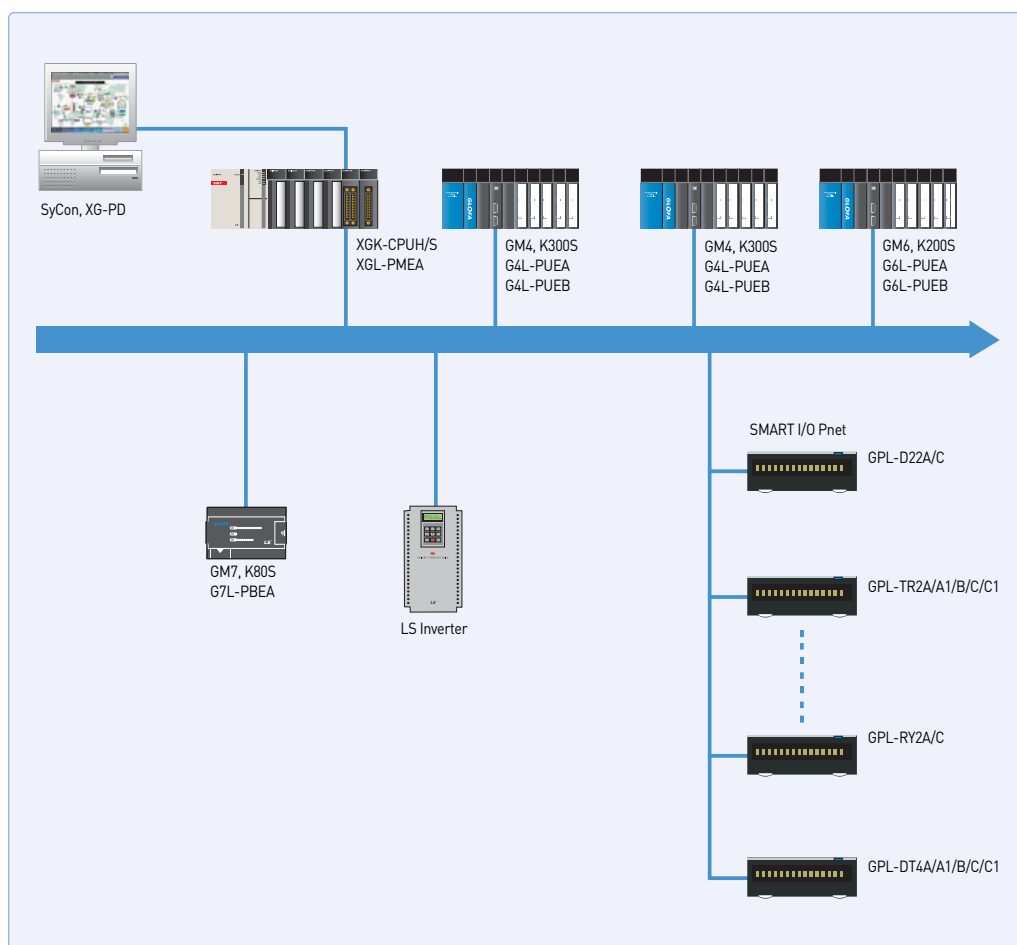
# Profibus-DP [Pnet] system

## Features

- Profibus-DP protocol
- Proper to communicate among a master automation device and distributed slave I/O devices.
- Fast slave communication without application layer
- Transmission speed: 9.6Kbps ~ 12Mbps
- Transmission distance: Max. 1,200m
- Max. 126 slave stations available (32 stations per segment)
- Network setting using SyCon/XG-PD (Parameter setting, diagnosis and monitoring)
- I/O data of master station: 7kbytes
- Automatic monitoring of slave modules in the network: Auto-scan (XG-PD)
- Multi master
- Easy configuration tool : SyCon, PROFICON



## System configuration with LSIS products

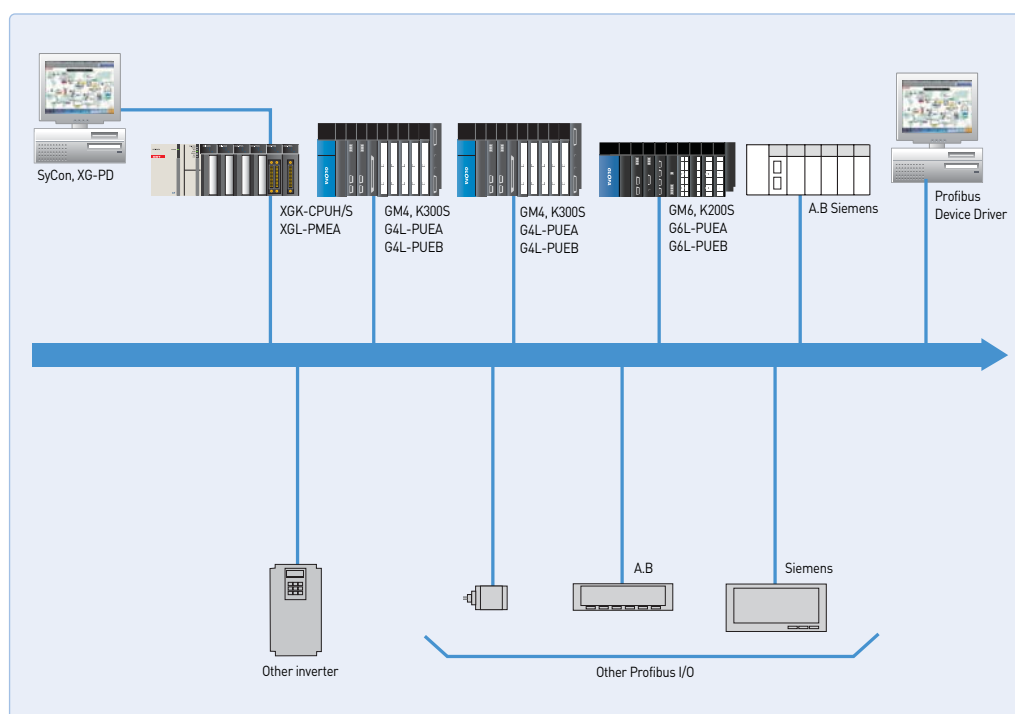




## Specifications

| Item                                      |        | XGL-PMEA                          | XGL-PMEC               |
|-------------------------------------------|--------|-----------------------------------|------------------------|
| Module type                               |        | Master                            |                        |
| Network type                              |        | Profibus-DP                       |                        |
| Standard                                  |        | EN50170/DIN19245                  |                        |
| Interface                                 |        | RS-485 (Electric)                 |                        |
| Media access                              |        | Token Passing & Poll              |                        |
| Topology                                  |        | Bus                               |                        |
| Modulation                                |        | NRZ                               |                        |
| Cable                                     |        | Shield Twisted Pair Cable         |                        |
| Transmission distance and speed           | 1,000m | 9.6K-187Kbps                      |                        |
|                                           | 400m   | 500Kbps                           |                        |
|                                           | 300m   | 1.5Mbps                           |                        |
|                                           | 100m   | 3M-12Mbps                         |                        |
| Max. number of slave stations per network |        | 126                               | 123                    |
| Max. number of slave stations per segment |        | 32                                |                        |
| Max. I/O Data slave                       |        | 244bytes                          |                        |
| Dual Port Memory Size                     |        | 7Kbytes                           |                        |
| Max. I/O data                             |        | Input: 3584byte, Output: 3584byte |                        |
| Max. number of communication points       |        | 7Kbytes                           |                        |
| Communication parameter setting           |        | XG-PD, SyCon                      | XG-PD, PROFICON        |
| Max. number of installation               |        | 12                                |                        |
| Configuration Tool                        |        | SyCon                             | PROFICON               |
| Configuration Port                        |        | RS-232C Configuration Port        | CPU Module loader port |
| Current consumption (mA)                  |        | 550                               | 440                    |
| Weight (Kg)                               |        | 110                               | 130                    |

## System configuration with other products





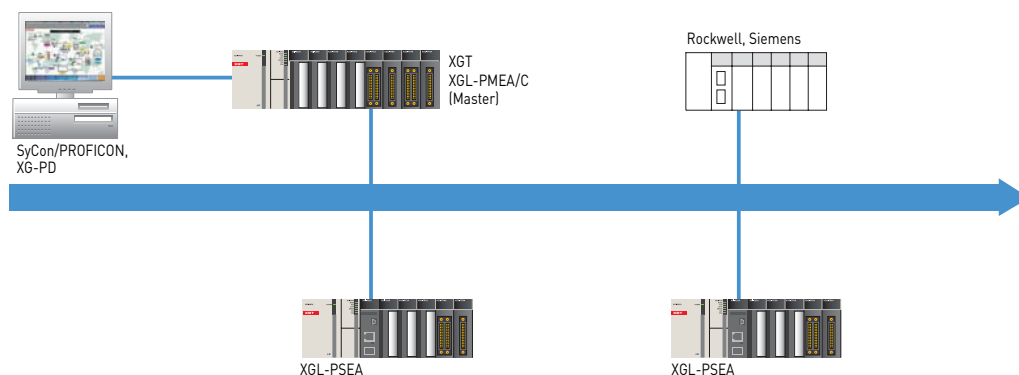
# Profibus-DP[Pnet] Slave I/F system

## Features

- Profibus-DP
- Max. 98 stations available
- Other product Master <-> Pnet Slave I/F Module connect
- I/O configuration through XG-PD high-speed link parameter
- Provides online network status monitoring
- Global Command
  - Sync, Unsync, Freeze, Unfreeze



## System configuration with other products



## Specifications

| Item                             |                        | XGL-PSEA                  |      |       |                                            |     |  |
|----------------------------------|------------------------|---------------------------|------|-------|--------------------------------------------|-----|--|
| Standard                         |                        | EN50170 / DIN 19245       |      |       |                                            |     |  |
| Interface                        |                        | RS-485(Electric)          |      |       |                                            |     |  |
| Media access                     |                        | Polling                   |      |       |                                            |     |  |
| Topology                         |                        | Bus                       |      |       |                                            |     |  |
| Modulation                       |                        | NRZ                       |      |       |                                            |     |  |
| Network Interface                |                        | Auto baud rate            |      |       |                                            |     |  |
| Master / Slave                   |                        | Slave                     |      |       |                                            |     |  |
| Max. number of slave per network |                        | 99                        |      |       |                                            |     |  |
| Max. number of slave per segment |                        | 32                        |      |       |                                            |     |  |
| Cable                            |                        | Shield twisted pair cable |      |       |                                            |     |  |
| Max. I/O data                    |                        | 244 byte                  |      |       |                                            |     |  |
| Configuration tool               |                        | XG-PD                     |      |       |                                            |     |  |
| Transmission distance and speed  | Trans. speed(kbps)     | 9.6                       | 19.2 | 93.75 | 187.5                                      | 500 |  |
|                                  | Max. network length(m) | 1200                      | 1200 | 1200  | 1000                                       | 400 |  |
|                                  | Trans. speed(kbps)     | 1500                      | 3000 | 6000  | 12000                                      | -   |  |
|                                  | Max. network length(m) | 200                       | 100  | 100   | 100                                        | -   |  |
| Max num. of node                 |                        | 99(0~98)                  |      |       |                                            |     |  |
| Max num. of transmission block   |                        | 24                        |      |       |                                            |     |  |
| Max num. of installation         |                        | 12ea (XGR: Max. 6ea)      |      |       |                                            |     |  |
| Installation                     | XGK-CPUU/H, XGI-CPUU   |                           |      |       | Main base ~ 7 <sup>th</sup> Expansion base |     |  |
|                                  | XGK-CPUE, XGI-CPUE     |                           |      |       | Main base ~ 1 <sup>st</sup> Expansion base |     |  |
|                                  | XGK-CPUA/S, XGI-CPUH/S |                           |      |       | Main base ~ 3 <sup>rd</sup> Expansion base |     |  |
|                                  | XGR-CPUH/F, XGR-CPUH/T |                           |      |       | Main base                                  |     |  |
| Current consumption (mA)         |                        | 410                       |      |       |                                            |     |  |
| Weight (g)                       |                        | 103                       |      |       |                                            |     |  |

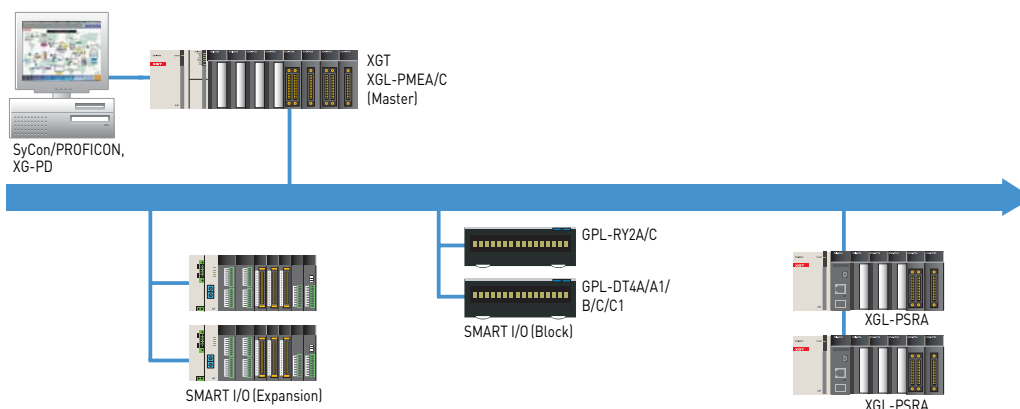
# Profibus-DP [Pnet] Remote I/F system

## Features

- Profibus-DP
- Remote base implementation
- Max. 98 stations available
- Various I/O module
  - DI/DO module
  - AI/AO/RTD/TC module
- Provides online network status monitoring
- Hot swap function



## System configuration with other products



## Specifications

| Item                                |                         | XGL-PSRA                       |      |       |       |     |  |
|-------------------------------------|-------------------------|--------------------------------|------|-------|-------|-----|--|
| Standard                            |                         | EN50170 / DIN 19245            |      |       |       |     |  |
| Interface                           |                         | RS-485 (Electric)              |      |       |       |     |  |
| Media access                        |                         | Polling                        |      |       |       |     |  |
| Topology                            |                         | Bus                            |      |       |       |     |  |
| Modulation                          |                         | NRZ                            |      |       |       |     |  |
| Network Interface                   |                         | Auto baud rate                 |      |       |       |     |  |
| Master / Slave                      |                         | Slave                          |      |       |       |     |  |
| Max. number of slave per network    |                         | 100                            |      |       |       |     |  |
| Max. number of slave per segment    |                         | 32                             |      |       |       |     |  |
| Cable                               |                         | Shield twisted pair cable      |      |       |       |     |  |
| Max. number of communication points |                         | 244 byte                       |      |       |       |     |  |
| Transmission distance and speed     | Trans. speed(kbps)      | 9.6                            | 19.2 | 93.75 | 187.5 | 500 |  |
|                                     | Max. network length (m) | 1200                           | 1200 | 1200  | 1000  | 400 |  |
|                                     | Trans. speed (kbps)     | 1500                           | 3000 | 6000  | 12000 | -   |  |
|                                     | Max. network length (m) | 200                            | 100  | 100   | 100   | -   |  |
| Max num. of node                    |                         | 100 [0~99]                     |      |       |       |     |  |
| Max. number of installation         |                         | 12                             |      |       |       |     |  |
| Max. digital I/O                    |                         | 768                            |      |       |       |     |  |
| Max Analog I/O Channel              |                         | Input : 122ch. / Output : 96ch |      |       |       |     |  |
| Current consumption (mA)            |                         | 600                            |      |       |       |     |  |
| Weight (g)                          |                         | 114                            |      |       |       |     |  |



# Network/BACnet/IP I/F system

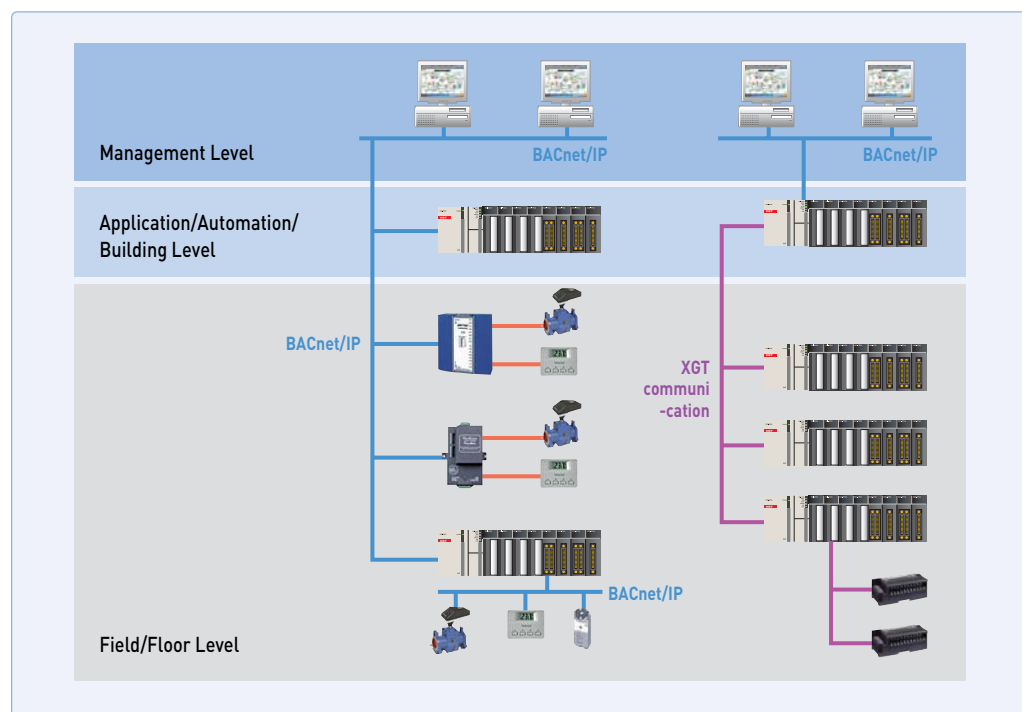
## Features

- Compatibility: compatible with ANSI/ASHRAE 135-1995
- Provides 100BASE-TX media, and supports 100Mbps/Full Duplex.
- Up to 24 modules can be equipped per CPU module, and can be installed on main base or augmenting base. However, they can be installed only on main base in XGR system.
- With its internal switch function, it requires no switch or HUB, which reduces wires and provides flexibility in terms of installation.
- Makes cable works easier with its auto cross-over function.
- Provides various diagnosis functions and status information for modules and networks.



## System configuration

XGT-BIPT module can be connected to BACnet Network using client/server, XGT-BIPT module is used as BACnet server, and sub-device can be controlled by being connected with exclusive power line communication (PLC).



| Device Profile              | B-ASC + Client                                        |
|-----------------------------|-------------------------------------------------------|
| Data Sharing                | DS-RP-A, B<br>DS-RPM-A, B<br>DS-P-A, B<br>DS-WPM-A, B |
| Device & Network Management | DM-DDB-B<br>DM-DOB-B<br>DM-DCC-A, B                   |



## Specifications

| Item                   |                                          | Specification                                                                                                                                                    |
|------------------------|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Transmission standards | Transmission speed                       | 100Mbps                                                                                                                                                          |
|                        | Transmission method                      | Base band                                                                                                                                                        |
|                        | Maximum extension distance between nodes | 100m                                                                                                                                                             |
|                        | Maximum size of protocol                 | 1,536 bytes                                                                                                                                                      |
|                        | Communication access method              | CSMA/CD                                                                                                                                                          |
|                        | Frame error check method                 | CRC 32 = $X^{32} + X^{25} + X^{13} + \dots + X^2 + X + 1$                                                                                                        |
|                        | Maximum number of units installed        | 24 units                                                                                                                                                         |
| Service                | Service type                             | P2P/Server                                                                                                                                                       |
|                        | Maximum communication data               | 1,400 bytes                                                                                                                                                      |
|                        | Support object(Server)                   | Device Object<br>Binary Input Object<br>Binary Output Object<br>Analog Input Object<br>Analog Output Object                                                      |
|                        | Diagnostic function                      | Communication module information<br>Service status information<br>Media information<br>Ping test<br>Auto scan<br>DCC(Device Communication Control)<br>System log |
| Basic standards        | External dimensions(mm)                  | 90(H) × 27(W) × 90(D)                                                                                                                                            |
|                        | Current consumption(mA)                  | 400                                                                                                                                                              |
|                        | Weight(g)                                | 102                                                                                                                                                              |



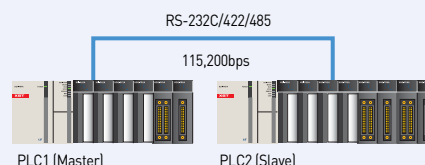
# Computer-Link

## Communication among PLCs

This is a system configuration communicating between XGT PLCs by serial communication. In this case, PLC 1 is the master (Client) and other PLC should be slaves (Server). It is called Master/Slave communication. Master PLC is defined by comm. basic parameter and P2P setting. And slave PLC is defined by basic parameter and driver setting.

## Configuration

PLC1 reads present value, C0000 of PLC 2's up-counter and then saves it in M0200 of PLC1.

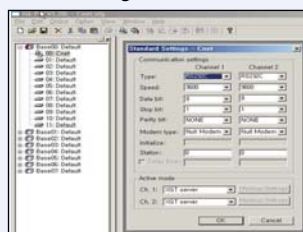


## Data memory

| PLC station | PLC memory | Setting Item                                      |
|-------------|------------|---------------------------------------------------|
| PLC 1       | M0100      | 1. XG-PD parameter setting, 2. XG5000 programming |
| PLC 2       | C0000      | 1. XG-PD parameter setting, 2. XG5000 programming |

## XG-PD setting

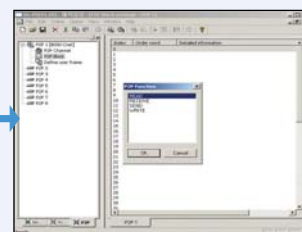
### PLC setting 1 (Master)



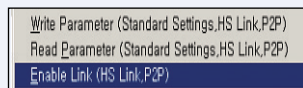
**Communication basic parameter setting**  
Setting up station number, communication speed, etc. And setting up the operation mode as P2P



**P2P channel setting**  
Setting up channel 01 as [XGT client]



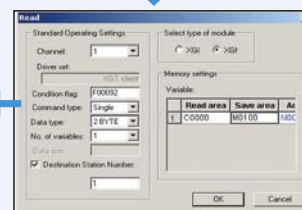
**P2P setting**  
Setting up P2P block (READ)



**Enable Link**  
Enabling P2P for communication start

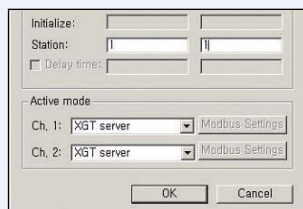


**Parameter writing**  
Downloading parameters to PLC after online connection



**Communication data setting**  
Setting up Read area, Save area, etc.

### PLC setting 2 (Slave)



**Communication parameter setting**  
Setting up station number and channel 01 mode as 1 and XGT server



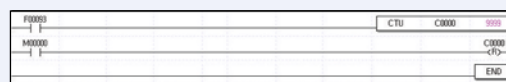
**Parameter writing**  
Downloading parameters to PLC after online connection

\* For basic parameter setting and SyCon setting/change, reset the module (Online reset).

## XG5000 programming

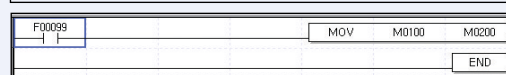
### PLC station 2 setting

Make up-counter program using CTU command



### PLC station 1 setting

Check out the counter value of M0100 is transmitted.

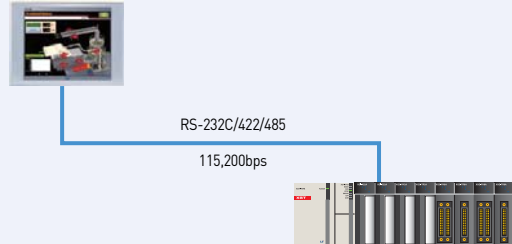


## HMI communication configuration

This is a system configuration to monitor and control PLC (XGT) by XP (HMI).  
In this case, PLC is the slave (Server) and XP should be the master (Client).  
PLC is defined by comm. basic parameter and driver setting.

### configuration

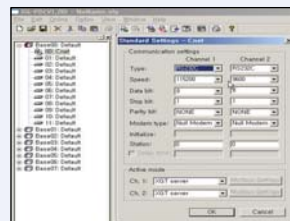
Making On/  
Off touch tag for controlling  
M0001 of XGT



## Data memory

| PLC memory | Setting item               | PMU             |
|------------|----------------------------|-----------------|
| M000D1     | 1. XG-PD parameter setting | Using touch tag |
|            | 2. XG5000 programming      |                 |

## XG-PD setting



**Basic communication parameter setting**  
Setting up station number, communication speed, etc And setting up the operation mode as XGT server



Write Parameter (Standard Settings, HS Link, P2P)  
Read Parameter (Standard Settings, HS Link, P2P)  
Enable Link (HS Link, P2P)

**Parameter writing**  
Downloading parameters to PLC after online connection

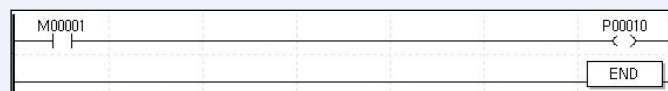


**PMU setting**  
Setting up communication setting (speed, data, stop, parity, etc) same as XGT

\* For basic parameter setting and SyCon setting/change, reset the module (Online reset).

## XG5000 programming

Create program that  
P00010 is on right  
after M00001 is on.





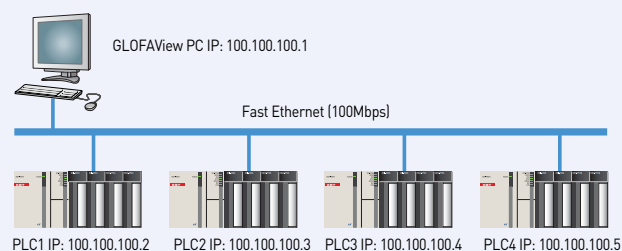
# Communication example (Ethernet)

## HMI communication configuration

This is a data communication system configuration among XGT PLCs via Ethernet network.  
In this case, communication is possible by HS link among PLCs.  
It just needs basic parameter setting and HS link item setting.

## configuration

Read the up-counter value C0000 of PLC1 and monitor it in GLOFAview.

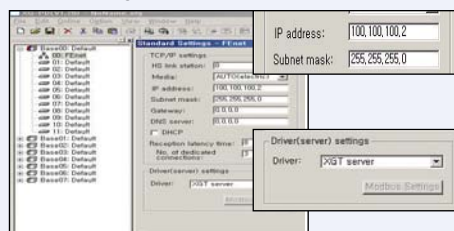


## Data memory

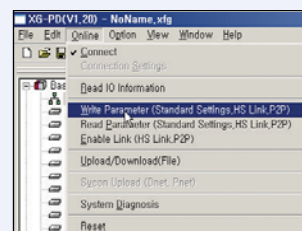
| PLC station | Setting item               | GLOFAview        |
|-------------|----------------------------|------------------|
| C0000       | 1. XG-PD parameter setting | Using analog tag |
|             | 2. XG5000 programming      |                  |

## XG-PD setting

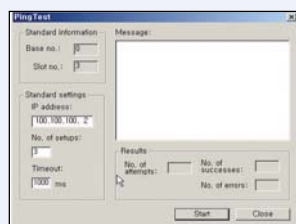
### PLC setting 1 (Master)



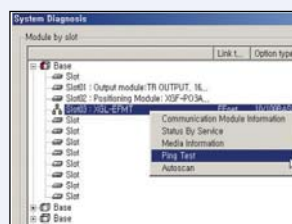
**Basic communication parameter setting**  
Specifying IP address and Subnet mask of PLC as above



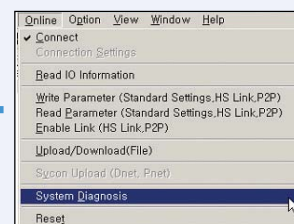
**Parameter writing**  
Downloading parameters to PLC after online connection



**Ping Test**  
Starting diagnosis after inputting IP address of PLC



**System Diagnosis**  
Selecting Ping Test

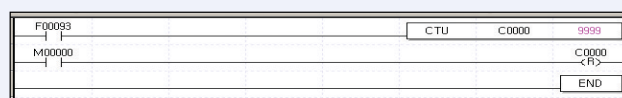


**Communication test**  
Checking online and system diagnosis

\* For basic parameter setting and SyCon setting/change, reset the module (Online reset).

## XG5000 programming

Make the up-counter program using CTU command.  
Check out if the counter value of CTU value is transmitted.



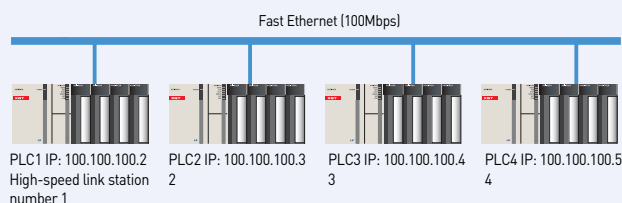


## High-speed link communication

### configuration

This is a configuration for XGT to communicate each other via Ethernet.  
It just needs communication basic parameter setting and High-speed link item setting.

Read present value C0000 of PLC1 and transmit it to M0000 of PLC2.

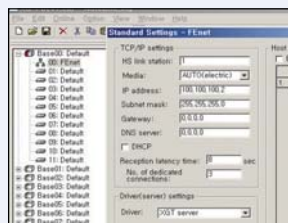


## Data memory

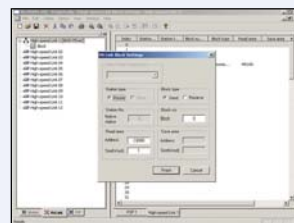
| PLC station | PLC memory | Setting Item                                      |
|-------------|------------|---------------------------------------------------|
| PLC 1       | C0000      | 1. XG-PD parameter setting, 2. XG5000 programming |
| PLC 2       | M0100      | 1. XG-PD parameter setting, 2. XG5000 programming |

## XG-PD setting

### PLC station 1 (setting)



**Basic communication parameter setting**  
Specifying HS link station, IP address and Subnet mask of PLC as above



**Communication data setting**  
Setting up communication data in HS link item as above

Write Parameter (Standard Settings.HS Link.P2P)  
Read Parameter (Standard Settings.HS Link.P2P)  
Enable Link (HS Link.P2P)

#### Parameter writing

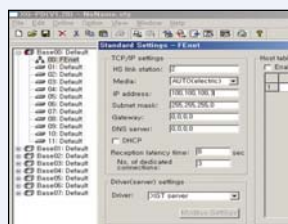
Downloading parameters to PLC after online connection

Write Parameter (Standard Settings.HS Link.P2P)  
Read Parameter (Standard Settings.HS Link.P2P)  
Enable Link (HS Link.P2P)

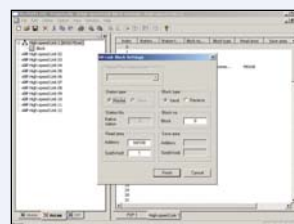
#### Enable Link

Enabling link for communication start

### PLC station 2 (setting)



**Basic communication parameter setting**  
Specifying HS link station, IP address and Subnet mask of PLC as above



**Communication data setting**  
Setting up communication data in HS link item as above

Write Parameter (Standard Settings.HS Link.P2P)  
Read Parameter (Standard Settings.HS Link.P2P)  
Enable Link (HS Link.P2P)

#### Parameter writing

Downloading parameters to PLC after online connection

Write Parameter (Standard Settings.HS Link.P2P)  
Read Parameter (Standard Settings.HS Link.P2P)  
Enable Link (HS Link.P2P)

#### Enable Link

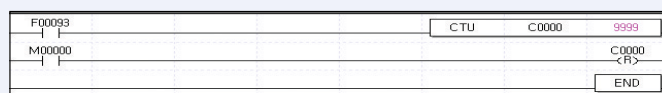
Enabling link for communication start

\* For basic parameter setting and SyCon setting/change, reset the module (Online reset).

## XG5000 programming

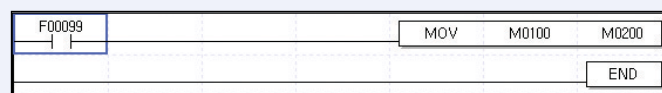
### PLC1 setting

Make the up-counter program using CTU command



### PLC2 setting

Check out if the counter value of M0100 is transmitted.





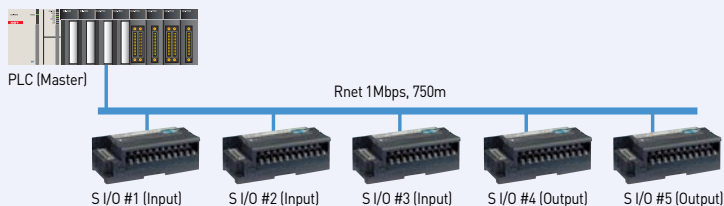
# Communication example (Rnet)

## Remote I/O configuration

LSIS developed communication method is Rnet which is 'Distributed Control System' using Smart I/O. In this case, PLC is the master and the other Smart I/O are slaves. It just needs basic parameter setting for communication and High-speed link setting.

## configuration

PLC controls each Smart I/O (16-point).



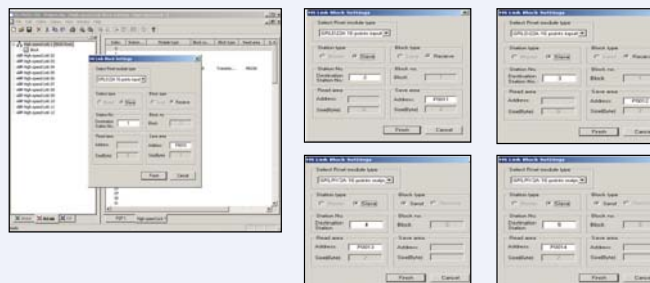
## Data memory

| Smart I/O # | Smart I/O address | PLC address           | Setting item                                         |
|-------------|-------------------|-----------------------|------------------------------------------------------|
| 1           | P0000             | P0010 (P00100~P0010F) | 1. XG-PD parameter setting,<br>2. XG5000 programming |
| 2           | P0000             | P0011 (P00110~P0011F) |                                                      |
| 3           | P0000             | P0012 (P00120~P0012F) |                                                      |
| 4           | P0000             | P0013 (P00130~P0013F) |                                                      |
| 5           | P0000             | P0014 (P00140~P0014F) |                                                      |

## XG-PD setting

### Communication data setting

Setting up type name, station number, address of each station's Smart I/O in HS link item as following example.

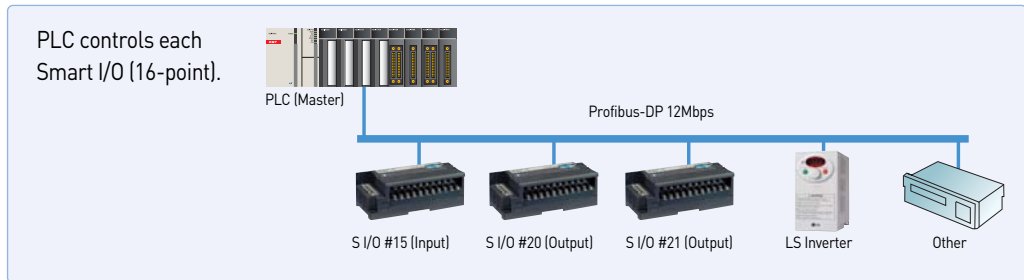


| INDEX | DESCRIPTION | UNIT CODE | UNIT NAME       | UNIT TYPE | UNIT VALUE | UNIT PRICE | UNIT TOTAL | UNIT TAX | UNIT TOTAL TAX |
|-------|-------------|-----------|-----------------|-----------|------------|------------|------------|----------|----------------|
| 1     | 1           | GRU001A   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 2     | 2           | GRU001B   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 3     | 3           | GRU001C   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 4     | 4           | GRU001D   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 5     | 5           | GRU001E   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 6     | 6           | GRU001F   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 7     | 7           | GRU001G   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 8     | 8           | GRU001H   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 9     | 9           | GRU001I   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 10    | 10          | GRU001J   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 11    | 11          | GRU001K   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 12    | 12          | GRU001L   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 13    | 13          | GRU001M   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 14    | 14          | GRU001N   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 15    | 15          | GRU001O   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 16    | 16          | GRU001P   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 17    | 17          | GRU001Q   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 18    | 18          | GRU001R   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 19    | 19          | GRU001S   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 20    | 20          | GRU001T   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 21    | 21          | GRU001U   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 22    | 22          | GRU001V   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 23    | 23          | GRU001W   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 24    | 24          | GRU001X   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 25    | 25          | GRU001Y   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 26    | 26          | GRU001Z   | 10 points in... | 1         | Reception  | PO001      | 2          |          |                |
| 27    | 27          | GRU002A   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 28    | 28          | GRU002B   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 29    | 29          | GRU002C   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 30    | 30          | GRU002D   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 31    | 31          | GRU002E   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 32    | 32          | GRU002F   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 33    | 33          | GRU002G   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 34    | 34          | GRU002H   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 35    | 35          | GRU002I   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 36    | 36          | GRU002J   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 37    | 37          | GRU002K   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 38    | 38          | GRU002L   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 39    | 39          | GRU002M   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 40    | 40          | GRU002N   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 41    | 41          | GRU002O   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 42    | 42          | GRU002P   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 43    | 43          | GRU002Q   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 44    | 44          | GRU002R   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 45    | 45          | GRU002S   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 46    | 46          | GRU002T   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 47    | 47          | GRU002U   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 48    | 48          | GRU002V   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 49    | 49          | GRU002W   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 50    | 50          | GRU002X   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 51    | 51          | GRU002Y   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 52    | 52          | GRU002Z   | 10 points in... | 1         | Reception  | PO002      | 2          |          |                |
| 53    | 53          | GRU003A   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 54    | 54          | GRU003B   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 55    | 55          | GRU003C   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 56    | 56          | GRU003D   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 57    | 57          | GRU003E   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 58    | 58          | GRU003F   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 59    | 59          | GRU003G   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 60    | 60          | GRU003H   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 61    | 61          | GRU003I   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 62    | 62          | GRU003J   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 63    | 63          | GRU003K   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 64    | 64          | GRU003L   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 65    | 65          | GRU003M   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 66    | 66          | GRU003N   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 67    | 67          | GRU003O   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 68    | 68          | GRU003P   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 69    | 69          | GRU003Q   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 70    | 70          | GRU003R   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 71    | 71          | GRU003S   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 72    | 72          | GRU003T   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 73    | 73          | GRU003U   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 74    | 74          | GRU003V   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 75    | 75          | GRU003W   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 76    | 76          | GRU003X   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 77    | 77          | GRU003Y   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 78    | 78          | GRU003Z   | 10 points in... | 1         | Reception  | PO003      | 2          |          |                |
| 79    | 79          | GRU004A   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 80    | 80          | GRU004B   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 81    | 81          | GRU004C   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 82    | 82          | GRU004D   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 83    | 83          | GRU004E   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 84    | 84          | GRU004F   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 85    | 85          | GRU004G   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 86    | 86          | GRU004H   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 87    | 87          | GRU004I   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 88    | 88          | GRU004J   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 89    | 89          | GRU004K   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 90    | 90          | GRU004L   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 91    | 91          | GRU004M   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 92    | 92          | GRU004N   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 93    | 93          | GRU004O   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 94    | 94          | GRU004P   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 95    | 95          | GRU004Q   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 96    | 96          | GRU004R   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 97    | 97          | GRU004S   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 98    | 98          | GRU004T   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 99    | 99          | GRU004U   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 100   | 100         | GRU004V   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 101   | 101         | GRU004W   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 102   | 102         | GRU004X   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 103   | 103         | GRU004Y   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 104   | 104         | GRU004Z   | 10 points in... | 1         | Reception  | PO004      | 2          |          |                |
| 105   | 105         | GRU005A   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 106   | 106         | GRU005B   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 107   | 107         | GRU005C   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 108   | 108         | GRU005D   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 109   | 109         | GRU005E   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 110   | 110         | GRU005F   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 111   | 111         | GRU005G   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 112   | 112         | GRU005H   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 113   | 113         | GRU005I   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 114   | 114         | GRU005J   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 115   | 115         | GRU005K   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 116   | 116         | GRU005L   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 117   | 117         | GRU005M   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 118   | 118         | GRU005N   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 119   | 119         | GRU005O   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 120   | 120         | GRU005P   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 121   | 121         | GRU005Q   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 122   | 122         | GRU005R   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 123   | 123         | GRU005S   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 124   | 124         | GRU005T   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 125   | 125         | GRU005U   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 126   | 126         | GRU005V   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 127   | 127         | GRU005W   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 128   | 128         | GRU005X   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 129   | 129         | GRU005Y   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 130   | 130         | GRU005Z   | 10 points in... | 1         | Reception  | PO005      | 2          |          |                |
| 131   | 131         | GRU006A   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 132   | 132         | GRU006B   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 133   | 133         | GRU006C   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 134   | 134         | GRU006D   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 135   | 135         | GRU006E   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 136   | 136         | GRU006F   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 137   | 137         | GRU006G   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 138   | 138         | GRU006H   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 139   | 139         | GRU006I   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 140   | 140         | GRU006J   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 141   | 141         | GRU006K   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 142   | 142         | GRU006L   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 143   | 143         | GRU006M   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 144   | 144         | GRU006N   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 145   | 145         | GRU006O   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 146   | 146         | GRU006P   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 147   | 147         | GRU006Q   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 148   | 148         | GRU006R   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 149   | 149         | GRU006S   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 150   | 150         | GRU006T   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 151   | 151         | GRU006U   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 152   | 152         | GRU006V   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 153   | 153         | GRU006W   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 154   | 154         | GRU006X   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 155   | 155         | GRU006Y   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 156   | 156         | GRU006Z   | 10 points in... | 1         | Reception  | PO006      | 2          |          |                |
| 157   | 157         | GRU007A   | 10 points in... | 1         | Reception  | PO007      | 2          |          |                |
| 158   | 158         | GRU007B   | 10 points in... | 1         | Reception  | PO007      | 2          |          |                |
| 159   | 159         | GRU007C   | 10 points in... | 1         | Reception  | PO007      | 2          |          |                |
| 160   | 160         | GRU007D   | 10 points in... | 1         | Reception  | PO007      | 2          |          |                |
| 161   | 161         | GRU007E   | 10 points in... | 1         | Reception  | PO007      | 2          |          |                |
| 162   | 162         | GRU007F   | 10 points in... | 1         | Reception  | PO007      | 2          |          |                |
| 163   | 163         | GRU007G   | 10 points in... | 1         | Reception  | PO007      | 2          |          |                |
| 164   | 164         | GRU007H   | 10 points in... | 1         | Reception  | PO007      | 2          |          |                |
| 165   | 165         | GRU007I   | 10 points in... | 1         | Reception  | PO007      |            |          |                |

## High-speed link communication among PLCs

XGT can create 'Distributed Control System' with Smart I/O, Inverter, pneumatic device via Profibus-DP. In this case, PLC is the master and the other devices such as Smart I/O are slaves. It just needs SyCon, basic parameter and High-speed link setting.

### configuration



### Data memory

| Smart I/O # | Smart I/O address | PLC address           | Setting item                                                             |
|-------------|-------------------|-----------------------|--------------------------------------------------------------------------|
| 15          | P0000             | P0010 (P00100~P0010F) | 1. SyCon setting<br>2. XG-PD parameter setting,<br>3. XG5000 programming |
| 20          | P0000             | P0011 (P00110~P0011F) |                                                                          |
| 21          | P0000             | P0012 (P00120~P0012F) |                                                                          |

### XG-PD setting

**SyCon setting**  
For detailed setting instruction, refer to page 43 (SyCon setting)

**HS link setting**  
Uploading SyCon and setting up each Smart I/O station as following example

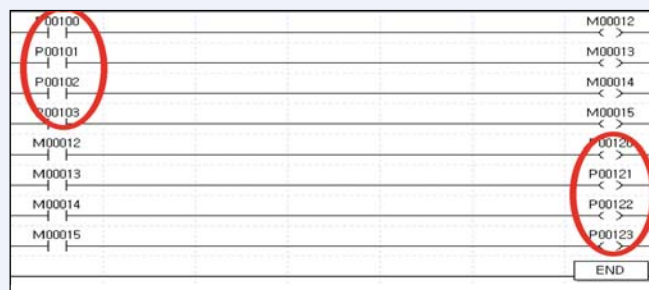
**Parameter writing**  
Downloading parameters to PLC after online connection

**Enable Link**  
Enabling link for communication start

\* For basic parameter setting and SyCon setting/change, reset the module (Online reset).

### XG5000 programming

Write a program using I/O address of Smart I/O Pnet



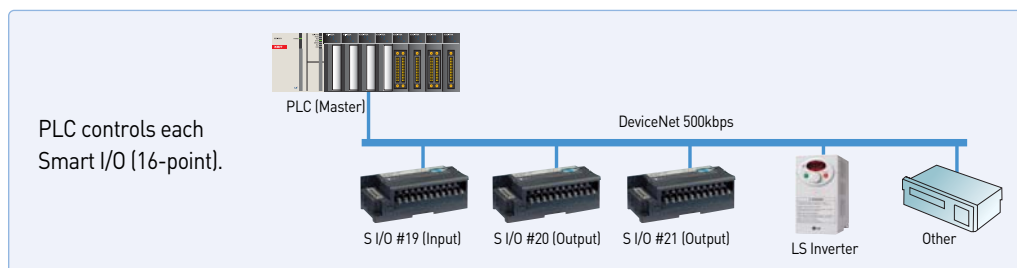


# Communication example (DeviceNet)

## High-speed link communication among PLCs

XGT can create 'Distributed Control System' with Smart I/O, Inverter, pneumatic device via Dnet. In this case, PLC is the master and the other devices such as Smart I/O are Slaves. It just needs SyCon, basic parameter and High-speed link setting.

## configuration



## Data memory

| Smart I/O # | Smart I/O address | PLC address           | Setting item                                                             |
|-------------|-------------------|-----------------------|--------------------------------------------------------------------------|
| 19          | P0000             | P0010 (P00100~P0010F) | 1. SyCon setting<br>2. XG-PD parameter setting,<br>3. XG5000 programming |
| 20          | P0000             | P0011 (P00110~P0011F) |                                                                          |
| 21          | P0000             | P0012 (P00120~P0012F) |                                                                          |

## XG-PD setting

**SyCon setting**  
For detailed setting instruction, refer to page 43 (SyCon setting)

**HS link setting**  
Uploading SyCon and setting up each Smart I/O station as following example

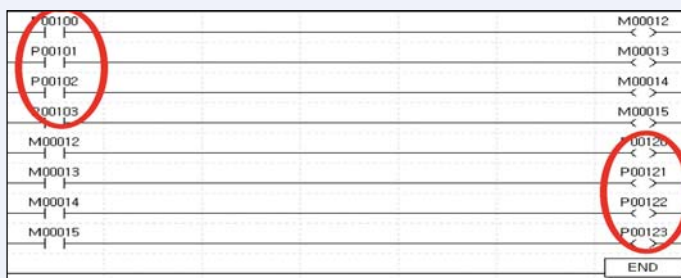
**Parameter writing**  
Downloading parameters to PLC after online connection

**Enable Link**  
Enabling link for communication start

\* For basic parameter setting and SyCon setting/change, reset the module (Online reset).

## XG5000 programming

Write a program using I/O address of Smart I/O Dent.

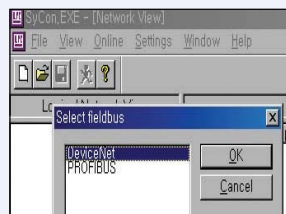




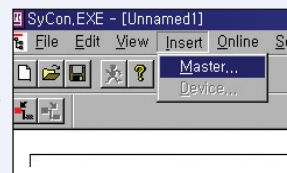
# Communication example (SyCon setting Profibus, DeviceNet)

SyCon is the dedicated software that help user set up the communication environment for Profibus-DP and DeviceNet more easily and conveniently.

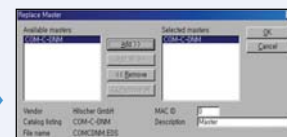
## Example of application



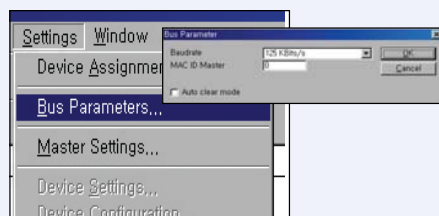
**New file**  
Select fieldbus that is used.



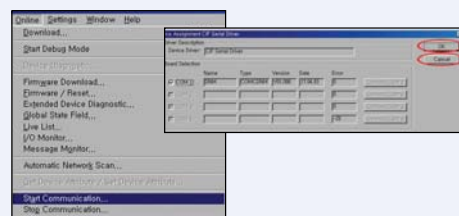
**Basic communication parameter setting**  
Select [Master] in Insert menu.



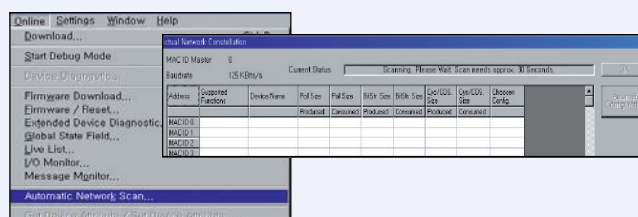
**Master module setting**  
Select [COM-C-DNM] for DeviceNet.  
Select [COM-C-DPM] for Profibus-DP.



**Bus parameter setting**  
Set up communication speed of master module.



**Master module setting**  
After clicking the port button, check, the right check-box.

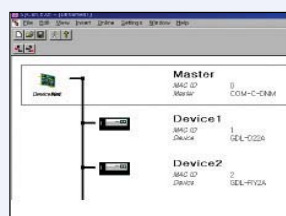


**Automatic network scan of connected Smart I/O**

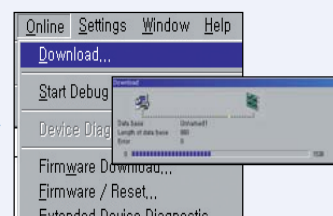
Perform automatic network scan after station number setting and wiring with remote device such as Smart I/O.

At this time, all remote devices should be in normal connection (Power-On, etc).

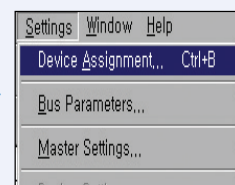
After network scan is completed, press [Automatic Configuration] button and [OK] button.



**Network checking**  
Check normal network (remote) condition.



**Parameter download**



**Disconnect**  
Disconnect the port in Device Assignment.



# SMART I/O (Stand alone)

## Features

- Wiring reduction and real time control of distributed I/O
- Supporting Rnet, DeviceNet, Profibus-DP, MODBUS (RS-422/485)
- Various I/O (DC/TR/Relay) modules with the unit of 16/32 points



## Digital I/O specifications

| Item                         | Input            |             | Output            |          |             | Mixed module     |                   |
|------------------------------|------------------|-------------|-------------------|----------|-------------|------------------|-------------------|
|                              | DC [Sink/Source] |             | Transistor (Sink) |          | Relay       | DC [Sink/Source] | Transistor (Sink) |
| No. of point                 | 16               | 32          | 16                | 32       | 16          | 16               | 16                |
| Rated input (Load voltage)   | DC 24V           |             | DC 24V            |          |             | DC 24V           | DC 24V            |
| Input current (Load current) | 7mA              |             | 0.1A/2A, 0.5A/3A  |          |             | 7mA              | 0.1A/2A, 0.5A/3A  |
| Response time                | Off → On         | 3ms or less | 3ms or less       |          | 3ms or less | 3ms or less      | 3ms or less       |
|                              | On → Off         | 3ms or less | 3ms or less       |          | 3ms or less | 3ms or less      | 3ms or less       |
| Common                       | 16 points/COM    |             | 16 points/COM     |          |             | 16 points/COM    | 16 points/COM     |
| Current consumption          | 200mA            | 300mA       | 280mA             | 380mA    | 550mA       | 350mA            |                   |
| Network                      | Rnet             | GRL-D22A    | GRL-D24A          | GRL-TR2A | GRL-TR4A    | GRL-RY2A         | GRL-DT4A          |
|                              | Profibus-DP      | GPL-D22A    | GPL-D24A          | GPL-TR2A | GPL-TR4A    | GPL-RY2A         | GPL-DT4A          |
|                              | DeviceNet        | GDL-D22A    | GDL-D24A          | GDL-TR2A | GDL-TR4A    | GDL-RY2A         | GDL-DT4A          |
|                              | MODBUS           | GSL-D22A    | GSL-D24A          | GSL-TR2A | GSL-TR4A    | GSL-RY2A         | GSL-DT4A          |

Note1) Specification stated in the table is specification of type A.  
Refer to XGT user's manual.  
● A, C ▲ A, A1, B, C, C1

A Sink, Rated current: 0.1A, terminal fixed type  
A1 Sink, Rated current: 0.5A, terminal fixed type

B Source, Rated current: 0.5A, terminal fixed type  
C Source, Rated current: 0.5A, terminal separated type  
C1 Sink, Rated current: 0.5A terminal separated type

## Analog I/O specifications

| Item                         | GPL-AV8C                                                                                                                                                                                  | GPL-AC8C                                                         | Item                         | GPL-DV4C                                                                                                                                                                                  | GPL-DC4C                                                         |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Input channels               | 8 channels                                                                                                                                                                                |                                                                  | Output channels              | 4 channels                                                                                                                                                                                |                                                                  |
| Analog input                 | DC 1~5V, 0~5V, 0~10V, -10~+10V                                                                                                                                                            | 0~20mA, 4~20mA, -20~20mA                                         | Digital input                | 0~4000, 0~8000, -8000~8000                                                                                                                                                                | 0~8000                                                           |
| Digital output               | 0~4000, 0~8000, -8000~8000                                                                                                                                                                | 0~4000, -8000~8000                                               | Analog output                | DC 1~5V, 0~5V, 0~10V, -10~+10V                                                                                                                                                            | 0~20mA, 4~20mA                                                   |
| Input impedance              | 1MΩ                                                                                                                                                                                       | 250Ω                                                             | Load impedance               | 1KΩ or more (0~5V or 1~5V)<br>2KΩ or more (0~10V or -10~10V)                                                                                                                              | 500Ω or less                                                     |
| Max. resolution              | ±15V<br>1.25mV                                                                                                                                                                            | ±30mA<br>2.5μA                                                   | Resolution                   | 1.25mV                                                                                                                                                                                    | 2.5μA                                                            |
| Accuracy                     | ±0.3% (full scale, Ta=0~55°C)                                                                                                                                                             | ±0.3% (full scale, Ta=23°C±5°C)<br>±0.4% (full scale, Ta=0~55°C) | Accuracy                     | ±0.3% (full scale, Ta=0~55°C)                                                                                                                                                             | ±0.3% (full scale, Ta=23°C±5°C)<br>±0.4% (full scale, Ta=0~55°C) |
| Conversion speed             | 10ms or less / 8 channel                                                                                                                                                                  |                                                                  | Conversion speed             | 10ms or less / 4 channel                                                                                                                                                                  |                                                                  |
| Response period              | 10ms or less / 8 channels + Transmission period (ms)                                                                                                                                      |                                                                  | Response period              | 10ms or less / 8 channels + Transmission period (ms)                                                                                                                                      |                                                                  |
| Insulation method            | Analog input/output terminal with FG→ Insulation<br>Analog input/output terminal with Communication terminal→ Insulation<br>Analog input/output terminal with each channel→ No insulation |                                                                  | Insulation method            | Analog input/output terminal with FG→ Insulation<br>Analog input/output terminal with Communication terminal→ Insulation<br>Analog input/output terminal with each channel→ No insulation |                                                                  |
| External power supply        | DC24V [21.6 ~ 26.4]                                                                                                                                                                       |                                                                  | External power supply        | DC24V [20.4 ~ 28.8]                                                                                                                                                                       |                                                                  |
| External current consumption | DC24V : 220mA                                                                                                                                                                             |                                                                  | External current consumption | 210mA                                                                                                                                                                                     | 240mA                                                            |
| Weight (kg)                  | 0.313                                                                                                                                                                                     | 0.313                                                            | Weight (kg)                  | 0.314                                                                                                                                                                                     | 0.322                                                            |

## Communication specifications

| Item                  | Rnet (Dedicate network for LSIS Smart I/O)    | Profibus-DP                      | DeviceNet                               | MODBUS              |
|-----------------------|-----------------------------------------------|----------------------------------|-----------------------------------------|---------------------|
| Protocol              | LSIS dedicated protocol (Fnet for Remote)     | Profibus-DP (RS-485/EN50170)     | DeviceNet [CAN]                         | MODBUS [RS-422/485] |
| Transmission speed    | 1Mbps                                         | 9.6kbps ~ 12Mbps                 | 125/250/500Kbps                         | 2.4Kbps ~ 38.4Kbps  |
| Transmission distance | 750m/segment                                  | 100m ~ 1.2Km                     | 500/250/125m (Thin cable: 100m)         | 500m                |
| Topology              | Bus Token                                     | Bus                              | Trunk & Drop                            | Bus                 |
| Transmission          | Pass & Broadcast                              | Token Pass & Master/Slave (Poll) | CSMA/NBA (Poll, Cyclic, COS, BitStrobe) | Master/Slave (Poll) |
| No. of stations       | 32/segment (Input: 32, Output: 32)            | 32/segment, 99/network           | 64                                      | 32                  |
| Link capacity         | 2,048 points/master (64 stations × 32 points) | 7Kbyte/master                    | 2,048 points/master                     | 64 points/station   |

Note1) Smart I/O supports Poll type currently, but is supposed to support Cyclic, COS and Strobe later on.

# SMART I/O (MODBUS/TCP, Ether Net/IP Adapter)

## Features

- IEEE 802.3 standard
- MODBUS/TCP, EtherNet/IP
- 10/100BASE-TX media
- Ethernet Twisted pair 2ports (RJ-45)
- 2channels Ethernet MAC
- Auto-Negotiation/Auto-Crossover
- Various system configuration



## Specification

| Items                   |                    | XEL-BSSA                              | XEL-BSSB     |
|-------------------------|--------------------|---------------------------------------|--------------|
| I/F                     | Protocol           | MODBUS TCP                            | EtherNet/ IP |
|                         | Transmission speed | 10 /100Mbps                           |              |
|                         | Connector          | RJ-45(2ports)                         |              |
|                         | Topology           | Software(BootpServer)                 |              |
|                         | IP setup           | Bus, Star                             |              |
| Max. expansion module   |                    | 8ea                                   |              |
| Max. digital I/O point  |                    | 256 points                            |              |
| Max. analog I/O channel |                    | 32ch (Input 16ch, Output 16ch)        |              |
| Operating power         | Rated voltage      | DC 24V                                |              |
|                         | Range              | DC19.2 ~ 28.8V                        |              |
|                         | Rated current      | 1.5A                                  |              |
|                         | Insulation         | Non-Insulation, Comm. Part insulation |              |

## System configuration

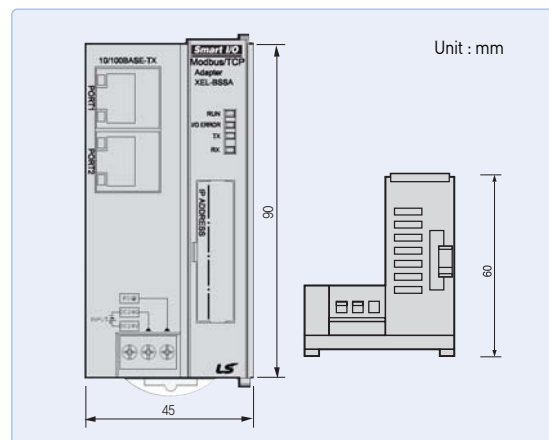
| Items               |           | Description                    | Max. I/O point                      |
|---------------------|-----------|--------------------------------|-------------------------------------|
| Digital I/O         | XBE-DC08A | DC24V input 8pt                | Max. 256 points                     |
|                     | XBE-DC16A | DC24V input 16pt               |                                     |
|                     | XBE-DC32A | DC24V input 32pt               |                                     |
|                     | XBE-RY08A | Relay output 8pt               | Max. 256 points                     |
|                     | XBE-RY16A | Relay output 16pt              |                                     |
|                     | XBE-TN08A | Tr output 8pt, Sink            |                                     |
|                     | XBE-TP08A | Tr output 8pt, Source          |                                     |
|                     | XBE-TN16A | Tr output 16pt, Sink           |                                     |
|                     | XBE-TP16A | Tr output 16pt, Source         |                                     |
|                     | XBE-TN32A | Tr output 32pt, Sink           |                                     |
|                     | XBE-TP32A | Tr output 32pt, Source         |                                     |
| Analog, Temperature | XBE-DN16A | DC24V input 8pt, Tr output 8pt | Input Max. 16ch<br>Output Max. 16ch |
|                     | XBF-AD04A | Current/Voltage input 4Ch      |                                     |
|                     | XBF-DC04A | Current output 4Ch             |                                     |
|                     | XBF-DV04A | Voltage output 4Ch             |                                     |
|                     | XBF-RD04A | RTD input 4Ch                  |                                     |
|                     | XBF-TC04S | TC input 4Ch                   |                                     |

\* When Digital input and Analog input is used together or Digital output Analog output is used, configure the system within 32bytes  
(Ex) If 4ch analog input is used, Digital input can be used max. 192points

## Externals and inscriptions

| Item      | LED status                                          |
|-----------|-----------------------------------------------------|
| RUN       | Operation status                                    |
|           | On: Normal operation<br>Off: Abnormal operation     |
| I/O ERROR | Interface status of expansion module                |
|           | On: Expansion module error<br>Off: Normal operation |
| TX        | Data send status to master                          |
|           | On: Under transmission<br>Off: No data              |
| RX        | Data receive status from master                     |
|           | On: Under receiving<br>Off: No data                 |

## Dimension





# SMART I/O (DeviceNet adapter)

## Features

- Max. 63 stations
- Flexible connection via DeviceNet
- Utilize same I/O modules with XGB
  - Max. 512 I/O points
  - Max. 32 channels analog input/output



## Specification

| Items                         |                        | Description                              |          |          |
|-------------------------------|------------------------|------------------------------------------|----------|----------|
| Communication Specification   |                        | Poll, Bit-strobe, COS/Cyclic             |          |          |
|                               |                        | Group 2 only slave                       |          |          |
|                               |                        | Auto baud rate                           |          |          |
| Module's Type                 |                        | Slave                                    |          |          |
| Max. Node Number (MAC ID)     |                        | 64(0~63)                                 |          |          |
| Number of Expansion I/O Slots |                        | 8                                        |          |          |
| Max. DC I/O Data Size         |                        | Input:32bytes / Output:32bytes           |          |          |
| Max. Analog Channels          |                        | Input : 16Channels / Output : 16Channels |          |          |
| Speed & Distance              | Comm. Speed            | 125 kbps                                 | 250 kbps | 500 kbps |
|                               | Distance               | 500 m                                    | 250 m    | 100 m    |
| Input Power                   | System Power           | DC 24V                                   |          |          |
|                               | Range                  | 19.2V ~ 28.8V(11V operate)               |          |          |
|                               | Output Voltage/Current | 5V(± 20%) / 1.5A                         |          |          |
| Weight[g]                     |                        | 100                                      |          |          |

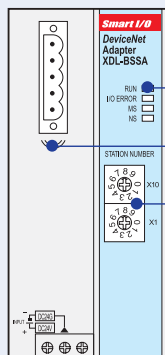
\* When I/O module is installed, check the current consumption  
(Max. Current: 1.5A)

## System configuration

| Items               |           | Description                    | Max. I/O point |
|---------------------|-----------|--------------------------------|----------------|
| Digital I/O         | XBE-DC08A | DC24V input 8pt                | 256points      |
|                     | XBE-DC16A | DC24V input 16pt               |                |
|                     | XBE-DC32A | DC24V input 32pt               |                |
|                     | XBE-RY08A | Relay output 8pt               |                |
|                     | XBE-RY16A | Relay output 16pt              |                |
|                     | XBE-TN08A | Tr output 8pt, Sink            |                |
|                     | XBE-TP08A | Tr output 8pt, Source          |                |
|                     | XBE-TN16A | Tr output 16pt, Sink           |                |
|                     | XBE-TP16A | Tr output 16pt, Source         |                |
|                     | XBE-TN32A | Tr output 32pt, Sink           |                |
|                     | XBE-TP32A | Tr output 32pt, Source         |                |
|                     | XBE-DN16A | DC24V input 8pt, Tr output 8pt |                |
| Analog, Temperature | XBF-AD04A | Current/Voltage input 4Ch      | 16channels     |
|                     | XBF-DC04A | Current output 4Ch             |                |
|                     | XBF-DV04A | Voltage output 4Ch             |                |
|                     | XBF-RD04A | RTD input 4Ch                  |                |
|                     | XBF-TC04S | TC input 4Ch                   |                |

\* When Digital input and Analog input is used together or Digital output Analog output is used, configure the system within 32bytes  
(Ex) If 4ch analog input is used, Digital input can be used max. 192points

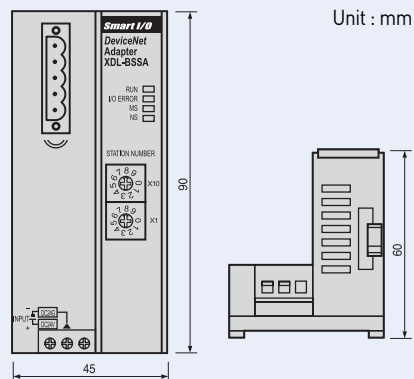
## Externals and inscriptions



- XDL-BSSA LED
- DeviceNet port
- Station switch

| Item      | LED status            |
|-----------|-----------------------|
| RUN       | ON : Normal           |
|           | OFF : Module error    |
| I/O ERROR | ON : I/O module error |
|           | OFF : Normal          |
| MS        | Green ON: Normal      |
|           | Green blink: Normal   |
|           | Red ON: Module error  |
| NS        | Green ON: Normal      |
|           | Green blink: Waiting  |
|           | Green off: Comm. stop |
|           | Red ON: Network error |
|           | Red blink: Disconnect |

## Dimension





# SMART I/O (Profibus-DP adapter)

## Features

- Max. 100 stations (32stations per segment)
- Flexible connection via Profibus
- Utilize same I/O modules with XGB
  - Max. 512 I/O points
  - Max. 32 channels analog input/output



## Specification

| Item         |                               | Performance Specification                             |      |      |       |       |     |
|--------------|-------------------------------|-------------------------------------------------------|------|------|-------|-------|-----|
| Transmission | Standard                      | EN50170 / DIN 19245                                   |      |      |       |       |     |
|              | Interface                     | RS-485(Electric)                                      |      |      |       |       |     |
|              | Media Access                  | Polling                                               |      |      |       |       |     |
|              | Topology                      | BUS                                                   |      |      |       |       |     |
|              | Encoding Method               | NRZ                                                   |      |      |       |       |     |
|              | Interface                     | Sync mode , Freeze mode<br>Auto baud rate             |      |      |       |       |     |
|              | Master/Slave                  | Slave                                                 |      |      |       |       |     |
|              | Cable Type                    | Twisted Pair Shielded Cable                           |      |      |       |       |     |
|              | Comm. Distance                | Kbps                                                  | 9.6  | 19.2 | 93.75 | 187.5 | 500 |
|              |                               | m                                                     | 1200 | 1200 | 1200  | 1000  | 400 |
|              |                               | kpbs                                                  | 1500 | 3000 | 6000  | 12000 | -   |
|              |                               | m                                                     | 200  | 100  | 100   | 100   | -   |
|              | Max. Node Number              | 100 ( 0 ~ 99 )                                        |      |      |       |       |     |
|              | Number of Expansion I/O Slots | 8                                                     |      |      |       |       |     |
|              | IO Data Size                  | 64bytes<br>(Input:32bytes/Output:32bytes)             |      |      |       |       |     |
|              | Number of Analog Channels     | 32Channels (Input :<br>16Channels/Output :16Channels) |      |      |       |       |     |
| Input Power  | System Power                  | Supply Voltage : DC 24Vdc<br>19.2 ~ 28.8Vdc           |      |      |       |       |     |
|              | Output Voltage/ Current       | 5V(±20%) / 1.5A                                       |      |      |       |       |     |
| Weight(g)    |                               | 100                                                   |      |      |       |       |     |

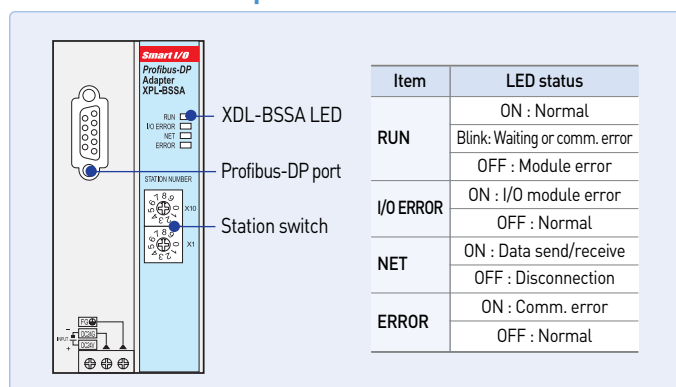
\* When I/O module is installed, check the current consumption  
[Max. Current: 1.5A]

## System configuration

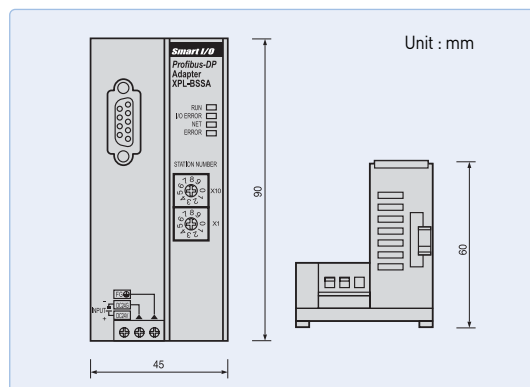
| Item                |           | Description                     | Max. I/O point |
|---------------------|-----------|---------------------------------|----------------|
| Digital I/O         | XBE-DC08A | DC24V input 8pt                 | 256points      |
|                     | XBE-DC16A | DC24V input 16pt                |                |
|                     | XBE-DC32A | DC24V input 32pt                |                |
|                     | XBE-RY08A | Relay output 8pt                |                |
|                     | XBE-RY16A | Relay output 16pt               |                |
|                     | XBE-TN08A | Tr output 8pt, Sink             |                |
|                     | XBE-TP08A | Tr output 8pt, Source           |                |
|                     | XBE-TN16A | Tr output 16pt, Sink            |                |
|                     | XBE-TP16A | Tr output 16pt, Source          |                |
|                     | XBE-TN32A | Tr output 32pt, Sink            |                |
|                     | XBE-TP32A | Tr output 32pt, Source          |                |
|                     | XBE-DN16A | DC24V input 8pt , Tr output 8pt |                |
| Analog, Temperature | XBF-AD04A | Current/Voltage input 4Ch       | 16channels     |
|                     | XBF-DC04A | Current output 4Ch              |                |
|                     | XBF-DV04A | Voltage output 4Ch              |                |
|                     | XBF-RD04A | RTD input 4Ch                   |                |
|                     | XBF-TC04S | TC input 4Ch                    |                |

\* When Digital input and Analog input is used together or Digital output Analog output is used, configure the system within 32bytes  
(Ex) If 4ch analog input is used, Digital input can be used max. 192points.

## Externals and inscriptions



## Dimension





# SMART I/O (Rnet adapter)

## Features

- Max. 63 stations
- LS dedicated protocol (Rnet)
- Utilize same I/O modules with XGB
  - Max. 512 I/O points
  - Max. 32 channels analog input/output



## Specification

| Item                     | Performance Specification      |
|--------------------------|--------------------------------|
| Tran. Rate               | 1Mbps                          |
| Transmission Path        | Bus type                       |
| Method                   | 750m                           |
| Max. Cable Length        | 5 pin connector                |
| Connector type           | Twisted Pair Shielded Cable    |
| Cable type               | 32(non-used repeater),         |
| No. of Station           | 64( used repeater)             |
| (Included Master)        | 512(Input : 256, Output: 256)  |
| Max. Digital I/O points  | 96                             |
| Max. Analog I/O points   | Digital I/O 8                  |
| Number of I/O Slots      | Analog I/O 4                   |
| Selection of Latch/Clear | handling of mode change switch |
| Rated Voltage/current    | DC24V/0.55A                    |
| Weight [g]               | 100                            |

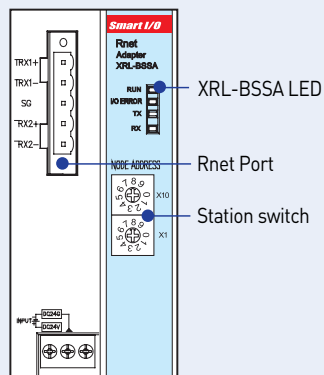
\* When I/O module is installed, check the current consumption  
[Max. Current: 1.5A]

## System configuration

| Item                | Description | Max. I/O point                 |
|---------------------|-------------|--------------------------------|
| Digital I/O         | XBE-DC08A   | DC24V input 8pt                |
|                     | XBE-DC16A   | DC24V input 16pt               |
|                     | XBE-DC32A   | DC24V input 32pt               |
|                     | XBE-RY08A   | Relay output 8pt               |
|                     | XBE-RY16A   | Relay output 16pt              |
|                     | XBE-TN08A   | Tr output 8pt, Sink            |
|                     | XBE-TP08A   | Tr output 8pt, Source          |
|                     | XBE-TN16A   | Tr output 16pt, Sink           |
|                     | XBE-TP16A   | Tr output 16pt, Source         |
|                     | XBE-TN32A   | Tr output 32pt, Sink           |
|                     | XBE-TP32A   | Tr output 32pt, Source         |
|                     | XBE-DN16A   | DC24V input 8pt, Tr output 8pt |
| Analog, Temperature | XBF-AD04A   | Current/Voltage input 4Ch      |
|                     | XBF-DC04A   | Current output 4Ch             |
|                     | XBF-DV04A   | Voltage output 4Ch             |
|                     | XBF-RD04A   | RTD input 4Ch                  |
|                     | XBF-TC04S   | TC input 4Ch                   |
|                     |             | 256points                      |
|                     |             | 16channels                     |

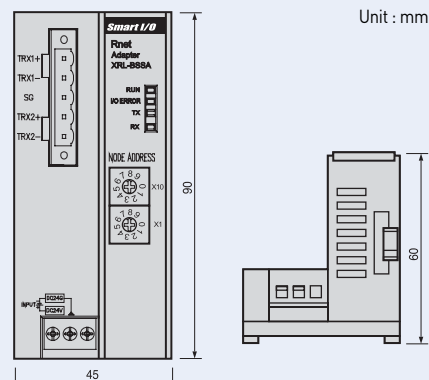
\* When Digital input and Analog input is used together or Digital output Analog output is used, configure the system within 32bytes  
[Ex] If 4ch analog input is used, Digital input can be used max. 192points.

## Externals and inscriptions



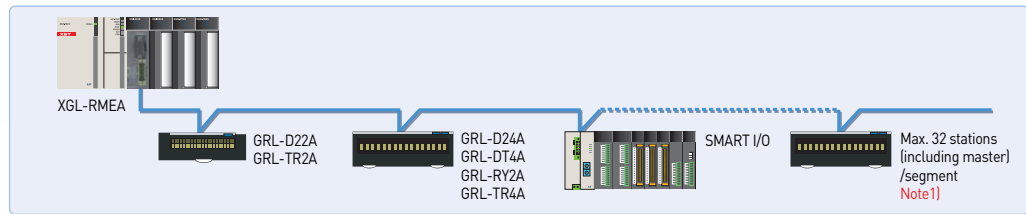
| Item      | LED status            |
|-----------|-----------------------|
| RUN       | ON : Normal           |
|           | OFF : Module error    |
| I/O ERROR | ON : I/O module error |
|           | OFF : Normal          |
| TX        | Data send             |
| RX        | Data receive          |

## Dimension

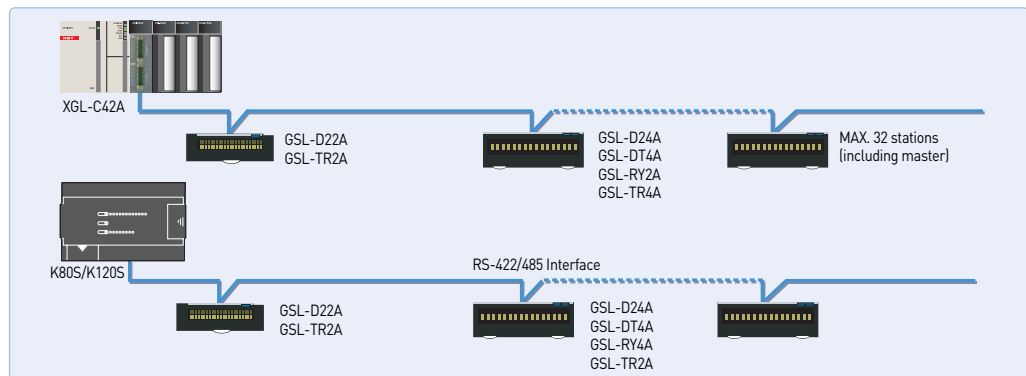


# SMART I/O (Features)

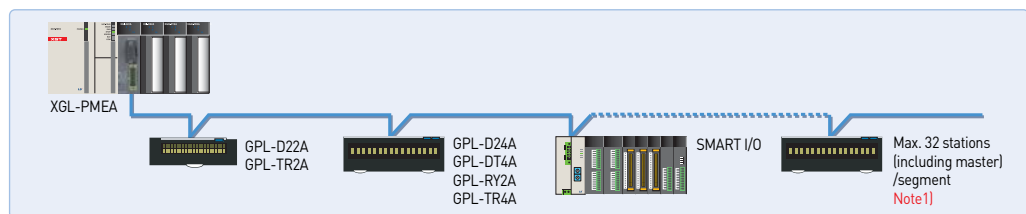
## Smart I/O Rnet system



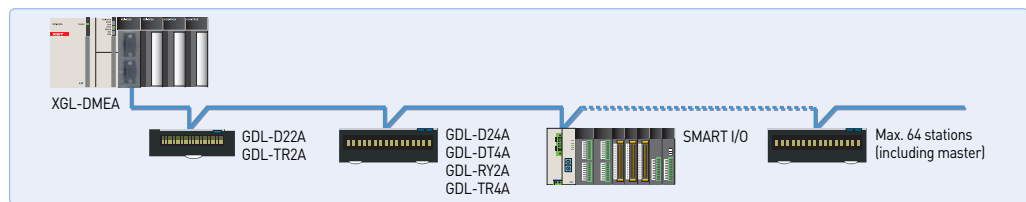
## Smart I/O MODBUS system



## Smart I/O Profibus-DP system

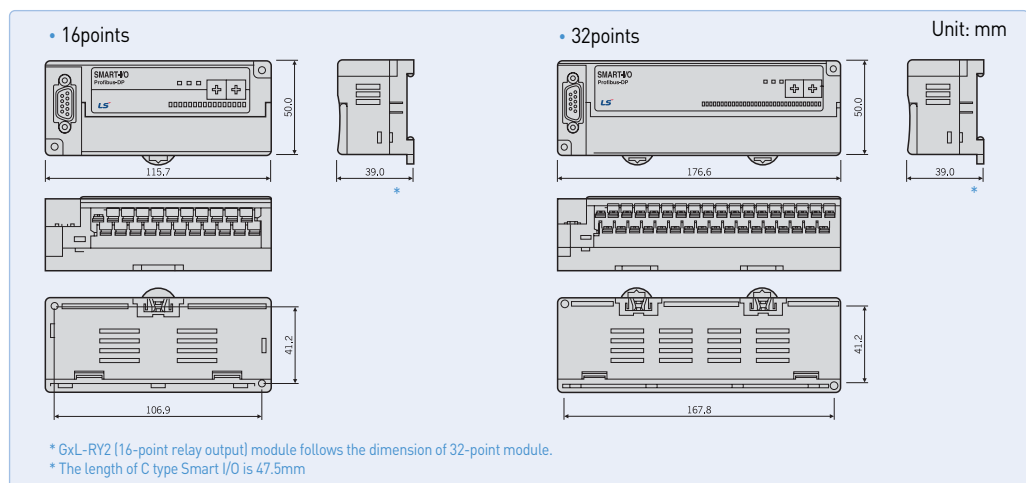


## Smart I/O DeviceNet system



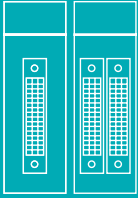
Note1) Segment: Communication section that does not use repeater or second master.

## Dimensions



## Network Standard

| Item                  | LSIS SMART I/O                                 | Profibus-DP                                        | DeviceNet                               | Modbus              |
|-----------------------|------------------------------------------------|----------------------------------------------------|-----------------------------------------|---------------------|
| Protocol              | LSIS Protocol(Remote Fnet)                     | Profibus-DP(RS-485/EN50170)                        | DeviceNet(CAN)                          | Modbus(RS 422/485)  |
| Transmission speed    | 1Mbps                                          | 9.6kbps ~ 12Mbps                                   | 125/250/500kbps                         | 2.4kbps ~ 38.4kbps  |
| Transmission distance | 750m/Segment                                   | 100m ~ 1.2km                                       | 500/250/125m (Thin cable:100m)          | 500m                |
| Circuit Structure     | Bus Token                                      | Bus                                                | Trunk & Drop                            | Bus                 |
| Circuit Control       | Pass & Broadcast                               | Token Pass & Master/Slave (Poll)                   | CSMA/NBA(Poll, Cyclic, COS, Bit Strobe) | Master/Slave (Poll) |
| Connection stations   | 32 stations per segment.<br>Max. 64 stations   | 32 stations per segment<br>99 stations per network | 64 stations                             | 32 stations         |
| Link                  | 2,048 pts./Master<br>[64 stations x 32 points] | 7Kbytes/Master                                     | 2,048 pts./master                       | 64 pts./station     |



# Special

XGT series offer diverse special modules such as analog, HSC, and positioning to satisfy complicated industrial needs



## Revolution of easy to use ... XGT Special module

### Fast processing of parameter and data of special module

- Continually refreshing operation data of special module by CPU module
- Including contact points such as conversion data of AD/DA module and command of HSC & positioning module

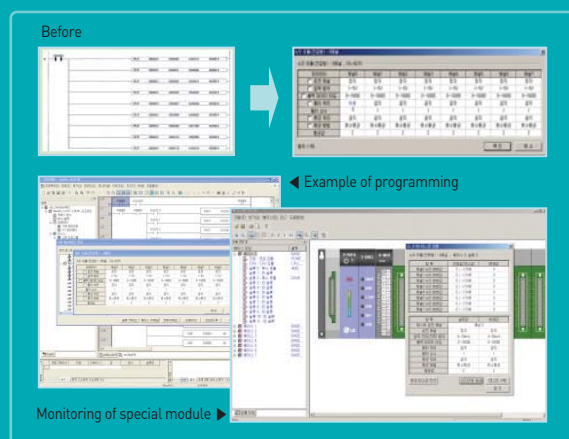
### Easy- to-use

#### (Easy operation parameter setting and data monitoring)

- Convenient parameter setting available through XG5000
- Providing useful functions that can monitor and test operation data and contact points through XG5000

### Simple maintenance (Changing online module)

- Without turning off and holding CPU, users can change special module with ease.





## Analog input/output module



### Analog input module

|           |                                                |
|-----------|------------------------------------------------|
| XGF-AV8A  | 8 channels, voltage                            |
| XGF-AC8A  | 8 channels, current                            |
| XGF-AD8A  | 8 channels, voltage/current                    |
| XGF-AD4S  | 4 channels, voltage/current                    |
| XGF-AD16A | 16 channels, voltage/current                   |
| XGF-AW4S  | 2-wire, Voltage/ Current input, 4Ch (Isolated) |



### Analog output module

|          |                               |
|----------|-------------------------------|
| XGF-DV4A | 4 channels, voltage           |
| XGF-DC4A | 4 channels, current           |
| XGF-DV8A | 8 channels, voltage           |
| XGF-DC8A | 8 channels, current           |
| XGF-DV4S | 4 channels, voltage, Isolated |
| XGF-DC4S | 4 channels, current, Isolated |

### Analog input/output module

|          |                                                              |
|----------|--------------------------------------------------------------|
| XGF-AH6A | Input: 4ch, Voltage/ Current<br>Output: 2Ch Voltage/ Current |
|----------|--------------------------------------------------------------|

## Temperature module



### Temperature input module

|          |                                          |
|----------|------------------------------------------|
| XGF-TC4S | 4 channels, thermocouple input, Isolated |
| XGF-RD4A | 4 channels, RTD input                    |
| XGF-RD4S | 4 channels, RTD input, Isolated          |



### Temperature controller

|           |                                                                                                    |
|-----------|----------------------------------------------------------------------------------------------------|
| XGF-RD8A  | 8 channels input: RTD<br>4 channels input: voltage/current/TC/RTD<br>8 channels output: current/TR |
| XGF-TC4UD | 4 channels input: RTD<br>4 channels output: TR<br>Control: 4loop                                   |

## Positioning module/Motion controller



### Positioning module

|               |                         |
|---------------|-------------------------|
| XGF-PO1A-PD3A | Open collector, 1~3axis |
| XGF-PD1A-PD3A | Line drive, 1~3axis     |
| XGF-PO1H-PD4H | Open collector, 1~4axis |
| XGF-PD1H-PD4H | Line drive, 1~4axis     |

## Motion module



### Motion module

|          |                                |
|----------|--------------------------------|
| XGF-M32E | Standard EtherCAT Net, 32 axes |
|----------|--------------------------------|

## High speed counter module



### High-speed counter module

|          |                                           |
|----------|-------------------------------------------|
| XGF-H02A | 2 channels, Open collector                |
| XGF-HD2A | 2 channels, Line driver                   |
| XGF-H08A | 8-channels high speed counter module, 8Ch |

## Event input module



### High-speed counter module

|          |                 |
|----------|-----------------|
| XGF-S0EA | DC24V, 32points |
|----------|-----------------|



# Analog input module

## Features

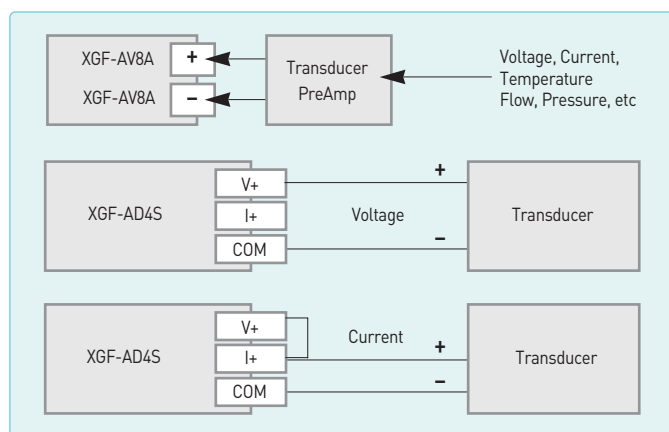
- Fast conversion processing
- High resolution
- Setting and monitoring the special module parameter through XG5000
- Supporting 4 types of digital output data format



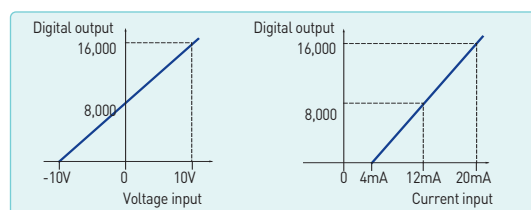
## Specifications

| Item                 | XGF-AV8A (Voltage input)                                                             | XGF-AC8A (Current input)                                                                  |                  | XGF-AD4S (Voltage/Current input) |                                                                                                          |          |                |              |          |
|----------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|------------------|----------------------------------|----------------------------------------------------------------------------------------------------------|----------|----------------|--------------|----------|
| No. of input channel | 8 channels                                                                           |                                                                                           |                  | 4 channels                       |                                                                                                          |          |                |              |          |
| Analog input         | DC 1~5V, 0~5V, 0~10V, -10~10V                                                        | DC 4~20mA, 0~20mA                                                                         |                  | DC 1~5V, 0~5V, 0~10V, -10~10V    |                                                                                                          |          |                |              |          |
|                      |                                                                                      |                                                                                           |                  | DC 4~20mA, 0~20mA                |                                                                                                          |          |                |              |          |
| Digital output       | Selection of input range in program or S/W package (Available to be set per channel) |                                                                                           |                  |                                  |                                                                                                          |          |                |              |          |
|                      | XGF-AV8A                                                                             | Analog input                                                                              |                  | 1~5V                             | 0~5V                                                                                                     | 0~10V    | -10~10V        |              |          |
|                      |                                                                                      | Digital output                                                                            | Unsigned value   |                                  | 0~16,000                                                                                                 |          |                |              |          |
|                      |                                                                                      |                                                                                           | Signed value     |                                  | -8000~8,000                                                                                              |          |                |              |          |
|                      |                                                                                      |                                                                                           | Precise value    | 1,000~5,000                      | 0~5,000                                                                                                  | 0~10,000 | -10,000~10,000 |              |          |
|                      |                                                                                      |                                                                                           | Percentile value |                                  | 0~10,000                                                                                                 |          |                |              |          |
|                      | XGF-AC8A                                                                             | Analog input                                                                              |                  | 4~20mA                           |                                                                                                          | 0~20mA   |                |              |          |
|                      |                                                                                      | Digital output                                                                            | Unsigned value   |                                  | 0~16,000                                                                                                 |          |                |              |          |
|                      |                                                                                      |                                                                                           | Signed value     |                                  | -8,000~8,000                                                                                             |          |                |              |          |
|                      |                                                                                      |                                                                                           | Precise value    | 4,000~20,000                     |                                                                                                          | 0~20,000 |                |              |          |
|                      |                                                                                      |                                                                                           | Percentile value |                                  | 0~10,000                                                                                                 |          |                |              |          |
|                      | XGF-AD4S                                                                             | Analog input                                                                              |                  | 1~5V                             | 0~5V                                                                                                     | 0~10V    | -10~10V        | 4~20mA       | 0~20mA   |
|                      |                                                                                      | Digital output                                                                            | Signed value     |                                  | -32,000~32,000                                                                                           |          |                |              |          |
|                      |                                                                                      |                                                                                           | Precise value    | 1,000~5,000                      | 0~5,000                                                                                                  | 0~10,000 | -10,000~10,000 | 4,000~20,000 | 0~20,000 |
|                      |                                                                                      |                                                                                           | Percentile value |                                  | 0~10,000                                                                                                 |          |                |              |          |
|                      | Resolution                                                                           | 1/16,000                                                                                  |                  |                                  | 1/64,000                                                                                                 |          |                |              |          |
|                      |                                                                                      | 1~5V                                                                                      | 0.250mV          | 4~20mA                           | 1.0μA                                                                                                    | 1 ~ 5V   | 62.5μV         | 4~20mA       | 250nA    |
|                      |                                                                                      | 0~5V                                                                                      | 0.3125mV         |                                  |                                                                                                          | 0~5V     | 78.1μV         |              |          |
|                      |                                                                                      | 0~10V                                                                                     | 0.625mV          | 0~20mA                           | 1.25μA                                                                                                   | 0 ~ 10V  | 156.3μV        | 0~20mA       | 312.5nA  |
|                      |                                                                                      | -10V~10V                                                                                  | 1.250mV          |                                  |                                                                                                          | ± 10V    | 312.5μV        |              |          |
|                      | Accuracy                                                                             | ±0.2% or less (Ambient temperature 25℃)<br>±0.3% or less (Range of operation temperature) |                  |                                  | ±0.05% or less (Ambient temperature 25℃)<br>Temp. coefficient ±16.7ppm/℃(Range of operation temperature) |          |                |              |          |
|                      | Conversion speed                                                                     | 250μs/channel                                                                             |                  |                                  |                                                                                                          |          |                |              |          |
|                      | Max. absolute input                                                                  | 15V                                                                                       | ±30mA            |                                  | Voltage: ±15V, Current: ±30mA                                                                            |          |                |              |          |
|                      | Insulation method                                                                    | Photo-coupler Insulation between input terminal and power supply                          |                  |                                  |                                                                                                          |          |                |              |          |
|                      | No insulation between channels                                                       |                                                                                           |                  | Insulation between channels      |                                                                                                          |          |                |              |          |
| Connection terminal  | 18 points                                                                            |                                                                                           |                  |                                  |                                                                                                          |          |                |              |          |
| No. of occupied      | Fixed type (Setting in basic parameter): 64 points                                   |                                                                                           |                  |                                  |                                                                                                          |          |                |              |          |
| I/O points           | Variable type (Dissolving in basic parameter): 16 points                             |                                                                                           |                  |                                  |                                                                                                          |          |                |              |          |
| Current consumption  | 420mA                                                                                |                                                                                           |                  | 610mA                            |                                                                                                          |          |                |              |          |
| Weight (Kg)          | 0.14                                                                                 |                                                                                           |                  |                                  |                                                                                                          |          |                |              |          |

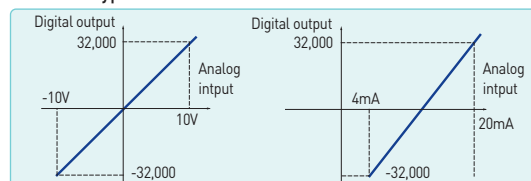
## Configuration



## A/D conversion characteristics



## Insulation type



## Features

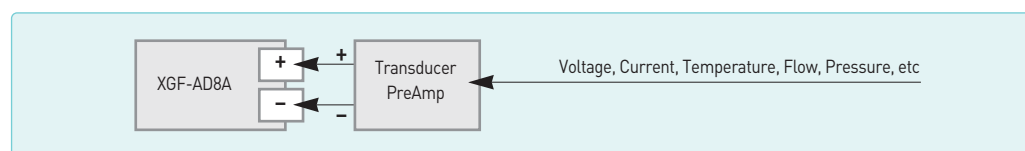
- Fast conversion processing
- High resolution
- Setting and monitoring the special module parameter through XG5000
- Supporting 4 types of digital output data format



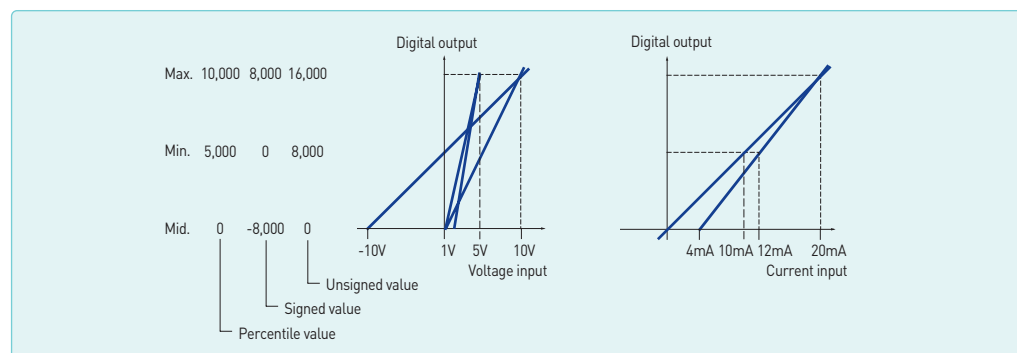
## Specifications

| Item                             |                     | XGF-AD16A                                                                                    |          |          |                | XGF-AD8A                                                 |           |
|----------------------------------|---------------------|----------------------------------------------------------------------------------------------|----------|----------|----------------|----------------------------------------------------------|-----------|
| No. of input channel             |                     | 16 channels                                                                                  |          |          |                | 8 channels                                               |           |
| Analog input                     | Voltage input       | DC 1~5V, DC 0~5V, DC 0~10V, DC -10~10V (Input resistance: 1MΩ)                               |          |          |                |                                                          |           |
|                                  | Current input       | DC4~20mA, DC 0~20mA (Input resistance: 250Ω)                                                 |          |          |                |                                                          |           |
|                                  | Input selection     | Dip switch                                                                                   |          |          |                |                                                          |           |
|                                  | Range selection     | Selection of input range in the program or S / W package (Available to set per each channel) |          |          |                |                                                          |           |
| Digital output                   | Input type          | Voltage input                                                                                |          |          |                | Current input                                            |           |
|                                  |                     | DC 1~5V                                                                                      | DC 0~5V  | DC 0~10V | DC -10~10V     | DC 4~20mA                                                | DC 0~20mA |
|                                  | Unsigned value      | 0~16,000                                                                                     |          |          |                |                                                          |           |
|                                  | Signed value        | -8,000~8,000                                                                                 |          |          |                |                                                          |           |
|                                  | Precise value       | 0~10,000                                                                                     |          |          |                |                                                          |           |
|                                  | Percentile value    | 1,000~5,000                                                                                  | 0~5,000  | 0~10,000 | -10,000~10,000 | 4,000~20,000                                             | 0~20,000  |
|                                  | Resolution(1/16000) | 0.2500mV                                                                                     | 0.3215mV | 0.6250mV | 1.250mV        | 1.00μA                                                   | 1.25μA    |
|                                  | Range selection     | Selection of input type by program or parameter (Available to be set per each channel)       |          |          |                |                                                          |           |
| Resolution                       |                     | ±0.2% or less (Ambient temperature 25℃), ±0.3% or less (Range of operation temperature)      |          |          |                |                                                          |           |
| Max. absolute input              |                     | ±15V                                                                                         |          |          |                | ±30mA                                                    |           |
| Conversion speed                 |                     | 500μs/channels                                                                               |          |          |                | 250μs/channels                                           |           |
| Insulation method                |                     | Photo-coupler insulation between terminal and power supply                                   |          |          |                |                                                          |           |
| Terminal                         |                     | 32 points                                                                                    |          |          |                | 18 points                                                |           |
| No. of occupied I/O points (XGK) |                     | Fixed type (Setting in basic parameter): 64 points                                           |          |          |                | Variable type [Dissolving in basic parameter]: 16 points |           |
| Current consumption              |                     | DC 5V : 420mA                                                                                |          |          |                |                                                          |           |
| Wight                            |                     | 140g                                                                                         |          |          |                |                                                          |           |

## Configuration



## A/D conversion characteristics





# 2Wire Analog input module



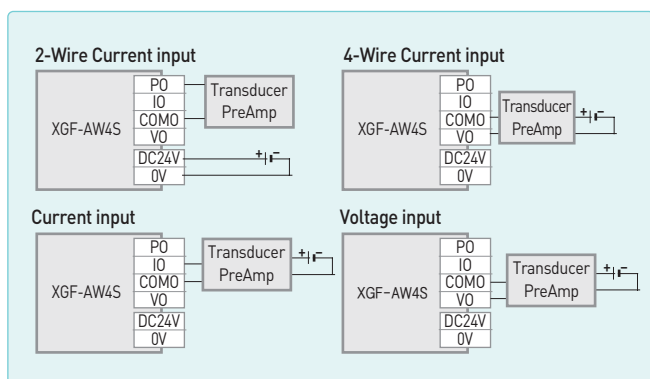
## Features

- 2Wire sensor (transmitter) input
- 1/64000 resolution
- Channel insulation
- Various additional functions

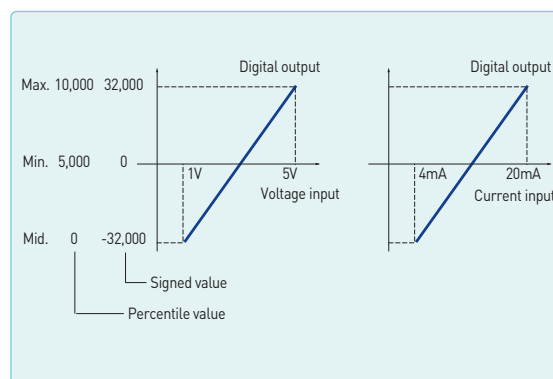
## Specifications

| Item                             |                          | XGF-AW4S                                                                                                         |                                                         |                                             |
|----------------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------|
| No. of input channel             |                          | 4channels                                                                                                        |                                                         |                                             |
| Voltage input                    |                          | DC 1~5V(Input resistance: 11M $\Omega$ )                                                                         |                                                         | DC 4~20mA(Input resistance : 250 $\Omega$ ) |
| Digital output                   | Signed value             | -32,000~32,000                                                                                                   |                                                         | -32,000~32,000                              |
|                                  | Precise value            | 1,000~5,000                                                                                                      |                                                         | 4,000~20,000                                |
|                                  | Percentile value         | 0~10,000                                                                                                         |                                                         | 0~10,000                                    |
|                                  | Resolution(1/64000)      | 0.25mV                                                                                                           |                                                         | 1uA                                         |
|                                  | Range selection          | Selection of input range in program or S/W package (Available to be set per channel)                             |                                                         |                                             |
| Resolution                       |                          | $\pm 0.05\%$ or less (Ambient temperature 25℃), Temp. coefficient $\pm 70$ ppm/℃(Range of operation temperature) |                                                         |                                             |
| Max. absolute input              |                          | $\pm 6$ V                                                                                                        |                                                         | $\pm 30$ mA                                 |
| Conversion speed                 |                          | 10ms/4channels                                                                                                   |                                                         |                                             |
| Insulation                       | Item                     | Method                                                                                                           | Withstand voltage                                       | Resistance                                  |
|                                  | Channel                  | Transformer                                                                                                      | 500VAC, 50/60Hz, 1min,<br>Leakage current: 10mA or less | 500VDC, 10M $\Omega$ or more                |
|                                  | Terminal - Power         | Photo-coupler                                                                                                    |                                                         |                                             |
| Transmitter                      | Voltage                  | DC 24V $\pm 15\%$                                                                                                |                                                         |                                             |
|                                  | Max. current             | 30mA                                                                                                             |                                                         |                                             |
|                                  | Short circuit protection | Limit current: 25 ~35mA                                                                                          |                                                         |                                             |
| External power                   |                          | DC 24V + 20%, -15%                                                                                               |                                                         |                                             |
| Terminal                         |                          | 18 point terminal                                                                                                |                                                         |                                             |
| No. of occupied I/O points (XGK) |                          | Fixed type (Setting in basic parameter): 64 points, Variable type (Dissolving in basic parameter): 16 points     |                                                         |                                             |
| Current                          | DC 5V                    | 180mA                                                                                                            |                                                         |                                             |
| consumption                      | DC 24V                   | 480mA                                                                                                            |                                                         |                                             |
| Wight                            |                          | 140                                                                                                              |                                                         |                                             |

## Configuration



## A/D conversion characteristics





# Analog input module (Isolated)

## Features

- Channel isolation
- 1/64000 resolution
- $\pm 0.05\%$ (25℃) fixed density
- Setting and monitoring the special module parameter through XG5000



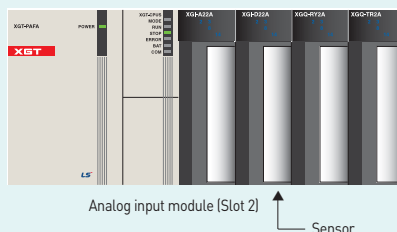
## Specifications

| Item                             |                      | XGF-AD4S                                                                                                |          |                             |                |                      |              |
|----------------------------------|----------------------|---------------------------------------------------------------------------------------------------------|----------|-----------------------------|----------------|----------------------|--------------|
| No. of input channel             |                      | 4 channel                                                                                               |          |                             |                |                      |              |
| Analog input                     | Voltage input        | DC 1~5V, DC 0~5V, DC 0~10V, DC -10~10V (Input resistance: 1M $\Omega$ )                                 |          |                             |                |                      |              |
|                                  | Current input        | DC 4~20mA, DC 0~20mA (Input resistance: 250 $\Omega$ )                                                  |          |                             |                |                      |              |
|                                  | Input selection      | Dip switch                                                                                              |          |                             | -              |                      |              |
|                                  | Range selection      | Selection input range in the program or S/W package(Available to set per each channel)                  |          |                             |                |                      |              |
| Digital output                   | Input type           | Voltage input                                                                                           |          |                             |                | Current input        |              |
|                                  |                      | DC 1~5V                                                                                                 | DC 0~5V  | DC 0~10V                    | DC -10~10V     | DC 4~20 mA           | DC 0~20 mA   |
|                                  | Signed value         | -32,000 ~32,000                                                                                         |          |                             |                |                      |              |
|                                  | Precise value        | 0 ~10,000                                                                                               |          |                             |                |                      |              |
|                                  | Percentile value     | 1,000~5,000                                                                                             | 0~5,000  | 0~10,000                    | -10,000~10,000 | 4,000~20,000         | 0~20,000     |
|                                  | Resolution(1/64,000) | 0.2500mV                                                                                                | 0.3215mV | 0.6250mV                    | 1.250mV        | 1.00 $\mu$ A         | 1.25 $\mu$ A |
|                                  | Range selection      | Selection input range in the program or S/W package(Available to set per each channel)                  |          |                             |                |                      |              |
| Resolution                       |                      | $\pm$ 0.2% or less(Ambient temperature 25℃), $\pm$ 0.3% or less(Range of operation temperature)         |          |                             |                |                      |              |
| Max. absolute input              |                      | $\pm$ 15V                                                                                               |          |                             |                | $\pm$ 30 mA          |              |
| Conversion speed                 |                      | 10ms/4 channel                                                                                          |          |                             |                |                      |              |
| Isolation Standards              | Item                 | Isolation Method                                                                                        |          | Isolation withstand voltage |                | Isolation resistance |              |
|                                  | Channels             | Transformer isolation                                                                                   |          | 500VAC, 50/60Hz             |                | 10M $\Omega$ or more |              |
|                                  | Input-PLC Power      | Photo-coupler isolation                                                                                 |          |                             |                |                      |              |
| Terminal                         |                      | 18 points                                                                                               |          |                             |                |                      |              |
| No. of occupied I/O points (XGK) |                      | Fixed type(Setting in basic parameter):64points, Variable type(Dissolving in basic parameter): 16points |          |                             |                |                      |              |
| Current consumption              |                      | DC 5V: 610 mA                                                                                           |          |                             |                |                      |              |
| Wight                            |                      | 140                                                                                                     |          |                             |                |                      |              |

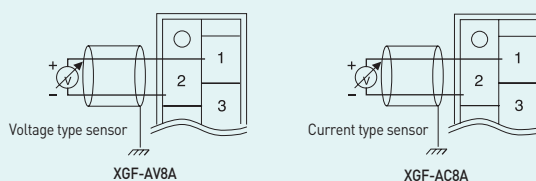
# XGT Analog input module (Example)

This is a simple example to start Analog input module setting. For more details, refer to user's manual.

## System Configuration



## Wiring



## Parameter setting

In the parameter setting box, select slot and analog module that you want to use.  
(This example shows to select '0' channel of voltage input type.)

Parameter setting box showing the selection of Slot 2 and the XGF-AV8A (Voltage, 8-CH) module. The Details button is highlighted.

**XGF-AV8A (Voltage, 8-CH)**

| Parameter        | CH 0      |
|------------------|-----------|
| Channels         | Disable   |
| Input Range      | 1~5V      |
| Output Type      | 0~16000   |
| Filter Process   | Disable   |
| Filter Constants | 1         |
| Average Process  | Disable   |
| Average Method   | Count-Avr |
| Average Value    | 2         |

You need to fill out each item suitable for your system.

Press the <Details> button at lower end of parameter setting box after selecting the module.

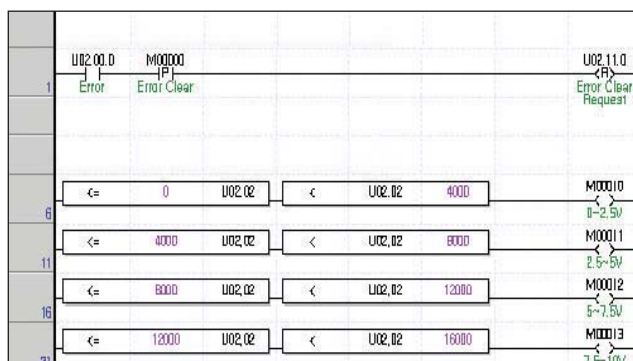
## Programming

Create a program for A/D conversion (0~10V to 0~16,000).

### Special devices for programming

Refer to user's manual for more details.  
U02.0.0: Error  
U02.11.0: Requesting error-clear  
U02.02: Memory of channel A/D value

Uxy.aa.bb  
x: Base number  
y: Slot number  
aa,bb: Refer to user's manual.



# Analog output module

## Features

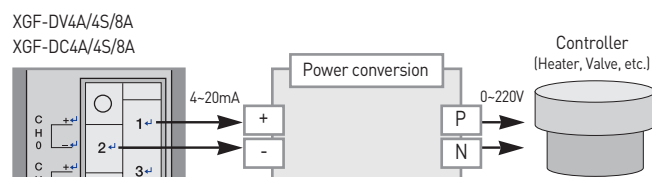
- Fast conversion processing
- High resolution
- Setting and monitoring the special module parameter through XG5000
- Supporting 4 types of digital input data format



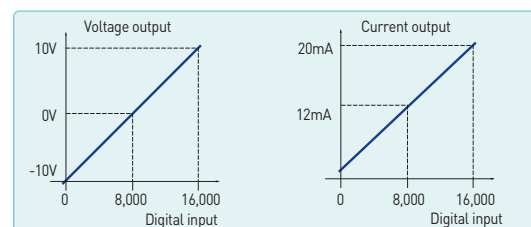
## Specifications

| Item                     | XGF-DV4A, XGF-DV8A, XGF-DV4S (Voltage output type)                                                                                                                                                    |                                 |                  |              | XGF-DC4A, XGF-DC8A, XGF-DC4S (Current output type) |          |                |  |  |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|------------------|--------------|----------------------------------------------------|----------|----------------|--|--|
| No. of output channel    | XGF-DV4A/4S, XGF-DC4A/4S : 4 channels / XGF-DV8A, XGF-DC8A : 8 channels                                                                                                                               |                                 |                  |              |                                                    |          |                |  |  |
| Analog output range      | DC 1-5V, 0-5V                                                                                                                                                                                         |                                 |                  |              | DC 4-20mA                                          |          |                |  |  |
|                          | DC 0-10V, -10-10V                                                                                                                                                                                     |                                 |                  |              | DC 0-20mA                                          |          |                |  |  |
|                          | Selection of input range in the program or S/W package (Available to set per each channel)                                                                                                            |                                 |                  |              |                                                    |          |                |  |  |
| Digital input range      | Analog output                                                                                                                                                                                         | Voltage type                    |                  | 1-5V         | 0-5V                                               | 0-10V    | -10-10V        |  |  |
|                          |                                                                                                                                                                                                       | Digital input                   | Unsigned value   | 0-16,000     |                                                    |          |                |  |  |
|                          |                                                                                                                                                                                                       |                                 | Signed value     | -8,000-8,000 |                                                    |          |                |  |  |
|                          |                                                                                                                                                                                                       |                                 | Precise value    | 1,000-5,000  | 0-5,000                                            | 0-10,000 | -10,000-10,000 |  |  |
|                          |                                                                                                                                                                                                       |                                 | Percentile value | 0-10,000     |                                                    |          |                |  |  |
|                          | Analog output                                                                                                                                                                                         | Current type                    |                  | 4-20mA       |                                                    | 0-20mA   |                |  |  |
|                          |                                                                                                                                                                                                       | Digital input                   | Unsigned value   | 0-16,000     |                                                    |          |                |  |  |
|                          |                                                                                                                                                                                                       |                                 | Signed value     | -8,000-8,000 |                                                    |          |                |  |  |
|                          |                                                                                                                                                                                                       |                                 | Precise value    | 4,000-20,000 |                                                    | 0-20,000 |                |  |  |
|                          |                                                                                                                                                                                                       |                                 | Percentile value | 0-10,000     |                                                    |          |                |  |  |
|                          | 16-bit binary value: selection of input type by program or parameter (Available to be set per each channel)                                                                                           |                                 |                  |              |                                                    |          |                |  |  |
|                          | Max. resolution                                                                                                                                                                                       | 1/16,000 (Per each input range) |                  |              |                                                    |          |                |  |  |
|                          |                                                                                                                                                                                                       | 1-5V                            | 0.250mV          | 4-20mA       |                                                    |          | 1.0μA          |  |  |
| 0-5V                     |                                                                                                                                                                                                       | 0.3125mV                        |                  |              |                                                    |          |                |  |  |
| 0-10V                    |                                                                                                                                                                                                       | 0.625mV                         | 0-20mA           |              |                                                    | 1.25μA   |                |  |  |
| ±10V                     |                                                                                                                                                                                                       | 1.250mV                         |                  |              |                                                    |          |                |  |  |
| Accuracy                 | XGF-DV4A/8A, DC4A/8A : ±0.2% or less (Ambient temperature 25℃), ±0.3% or less (Range of operation temperature)<br>XGF-DV4S/DC4S : ±0.1% or less (Ambient temperature 25℃), temp coefficient: ±80ppm/℃ |                                 |                  |              |                                                    |          |                |  |  |
| Conversion speed         | 250μs/channel                                                                                                                                                                                         |                                 |                  |              |                                                    |          |                |  |  |
| Max. absolute output     | ±15V                                                                                                                                                                                                  |                                 |                  |              | ±24mA                                              |          |                |  |  |
| Insulation method        | Photo-coupler insulation between terminal and power supply<br>XGF-DV4A/8A, XGF-DC4A/8A: No insulation between channels<br>XGF-DV4S, XGF-DC4S (Insulation type): Insulation between channels           |                                 |                  |              |                                                    |          |                |  |  |
| Connection terminal      | 18 point terminal                                                                                                                                                                                     |                                 |                  |              |                                                    |          |                |  |  |
| No. of occupied points   | Fixed type (Setting in basic parameter): assign 64 points                                                                                                                                             |                                 |                  |              |                                                    |          |                |  |  |
|                          | Variable type (Dissolving in basic parameter): assign 16 points                                                                                                                                       |                                 |                  |              |                                                    |          |                |  |  |
| Current consumption (mA) |                                                                                                                                                                                                       | DV4A                            | DV8A             | DV4S         | DC4A                                               | DC8A     | DC4S           |  |  |
|                          | Internal                                                                                                                                                                                              | 190                             | 190              | 200          | 190                                                | 190      | 200            |  |  |
|                          | External                                                                                                                                                                                              | 140                             | 180              | 150          | 210                                                | 300      | 220            |  |  |
| Weight (Kg)              | 0.15                                                                                                                                                                                                  |                                 |                  |              |                                                    |          |                |  |  |

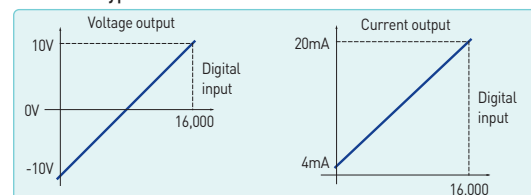
## Output wiring



## I/O conversion characteristics



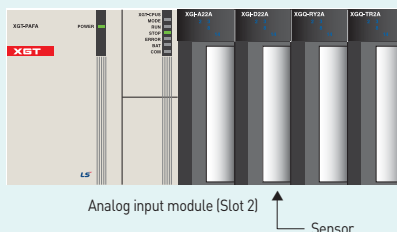
## Insulation type



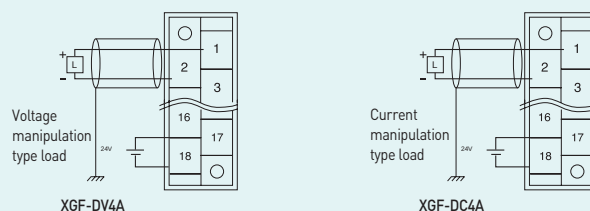
# XGT Analog output module (Example)

This is a simple example to start Analog output module setting. For more details, refer to user's manual.

## System Configuration



## Wiring



## Parameter setting

In the parameter setting box, select slot and analog module that you want to use.  
(This example shows to select '0' channel of voltage output type.)

Diagram illustrating the parameter setting process. The 'I/O Parameter Setting - Fixed allocation (64points)' window shows the 'Module list' with 'XGF-DV4A (Voltage, 4-CH)' selected. The 'Details' button is highlighted. A blue arrow points to the 'Details' window.

**XGF-DV4A (Voltage, 4-CH)**

| Parameter                               | CH 0    |
|-----------------------------------------|---------|
| <input type="checkbox"/> Channels       | Enable  |
| <input type="checkbox"/> Channels       | 0~10V   |
| <input type="checkbox"/> Input Type     | 0~16000 |
| <input type="checkbox"/> CH Output Type | Min     |

You need to fill out each item suitable for your system.

Press the <Details> button at lower end of parameter setting box after selecting the module.

## Programming

Create a program for D/A conversion  
(0~16000 to 0~10V).

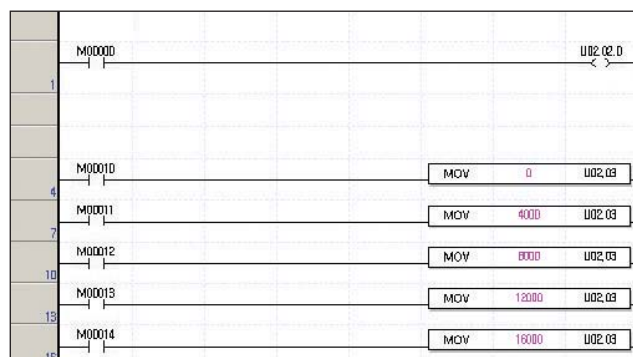
### Special devices for programming

Refer to user's manual for more details.

U02.02.0: Admitting Channel 0 output

U02.03: Output data of channel 0

Uxy.aa.bb  
x: Base number  
y: Slot number  
aa,bb: Refer to user's manual.





# Analog input/output module

## Features

- Input 4channels Output 2channels
- 4channels, 1/8000 resolution
- Parameter setting and monitoring by XG5000

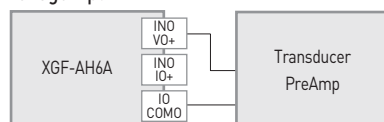


## Specifications

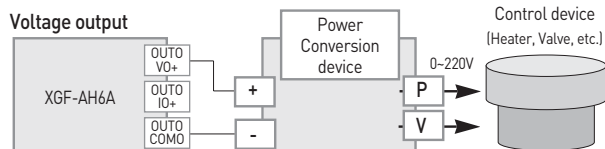
| Item                             |                      |                    | XGF-AH6A                                                                                                     |         |          |                |              |              |
|----------------------------------|----------------------|--------------------|--------------------------------------------------------------------------------------------------------------|---------|----------|----------------|--------------|--------------|
| Input                            | No. of input channel |                    | 4channels                                                                                                    |         |          |                |              |              |
|                                  | Analog output        | Range              | DC1~5V                                                                                                       | DC0~5V  | DC0~10V  | DC-10~10V      | DC4~20mA     |              |
|                                  |                      | Resistance         | 1MΩ                                                                                                          |         |          |                |              | 250Ω         |
|                                  |                      | Selection          | V+ and COM                                                                                                   |         |          |                |              |              |
|                                  | Digital output       | Unsigned value     | 0~8,000                                                                                                      |         |          |                |              | 0~8,000      |
|                                  |                      | Signed value       | -4,000~4,000                                                                                                 |         |          |                |              | -4,000~4,000 |
|                                  |                      | Precise value      | 0~10,000                                                                                                     |         |          |                |              | 0~10,000     |
|                                  |                      | Percentile value   | 1,000~5,000                                                                                                  | 0~5,000 | 0~10,000 | -10,000~10,000 | 4,000~20,000 |              |
|                                  |                      | Resolution(1/8000) | 0.5mV                                                                                                        | 0.625mV | 1.25mV   | 2.5mV          | 2.0uA        |              |
|                                  |                      | Range selection    | Selection of input range in program or S/W package (Available to be set per channel)                         |         |          |                |              |              |
|                                  | Resolution           |                    | ±0.2% or less (Ambient temperature 25℃), ±0.3% or less (Range of operation temperature)                      |         |          |                |              |              |
| Max. absolute input              |                      | ±15V               |                                                                                                              |         |          |                | ±30mA        |              |
| Conversion speed                 |                      | 500us/channels     |                                                                                                              |         |          |                |              |              |
| Output                           | No. of input channel |                    | 2channels                                                                                                    |         |          |                |              |              |
|                                  | Analog output        | Range              | DC1~5V                                                                                                       | DC0~5V  | DC0~10V  | DC-10~10V      | DC4~20mA     |              |
|                                  |                      | Resistance         | 1kΩ or more                                                                                                  |         |          |                |              | 600Ω or less |
|                                  |                      | Selection          | V+ and COM                                                                                                   |         |          |                |              |              |
|                                  | Digital output       | Unsigned value     | 0~8,000                                                                                                      |         |          |                |              | 0~8,000      |
|                                  |                      | Signed value       | -4,000~4,000                                                                                                 |         |          |                |              | -4,000~4,000 |
|                                  |                      | Precise value      | 0~10,000                                                                                                     |         |          |                |              | 0~10,000     |
|                                  |                      | Percentile value   | 1,000~5,000                                                                                                  | 0~5,000 | 0~10,000 | -10,000~10,000 | 4,000~20,000 |              |
|                                  |                      | Resolution(1/8000) | 0.5mV                                                                                                        | 0.625mV | 1.25mV   | 2.5mV          | 2.0uA        |              |
|                                  |                      | Range selection    | Selection of input range in program or S/W package (Available to be set per channel)                         |         |          |                |              |              |
|                                  | Resolution           |                    | ±0.2% or less (Ambient temperature 25℃), ±0.3% or less (Range of operation temperature)                      |         |          |                |              |              |
| Max. absolute input              |                      | ±15V               |                                                                                                              |         |          |                | ±24mA        |              |
| Conversion speed                 |                      | 500us/channels     |                                                                                                              |         |          |                |              |              |
| Insulation method                |                      |                    | Photo-coupler insulation between terminal and power supply                                                   |         |          |                |              |              |
| Terminal                         |                      |                    | 18 point terminal                                                                                            |         |          |                |              |              |
| No. of occupied I/O points (XGK) |                      |                    | Fixed type (Setting in basic parameter): 64 points, Variable type (Dissolving in basic parameter): 16 points |         |          |                |              |              |
| Current consumption (DC5V)       |                      |                    | 770mA                                                                                                        |         |          |                |              |              |
| Wight                            |                      |                    | 140                                                                                                          |         |          |                |              |              |

## Wiring

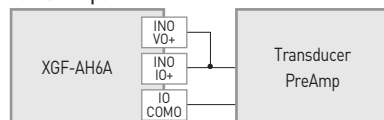
Voltage input



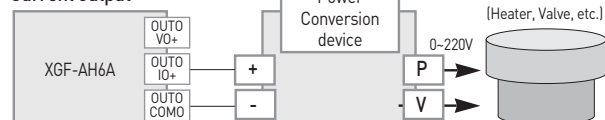
Voltage output



Current input



Current output





# High-speed counter module

## Features

- Parameter setting and monitoring using XG5000
- Incremental encoder available
- Supporting various pulse input (5V, 12V, 24V)
- Various multiplication (1/2 phase pulse input)
- External present input
- Providing function to prevent from counting external signal
- Supporting HTL-level incremental encoder in the line-drive input type



## Specifications

| Item                                    |                             | Specification                                                                                                                                                                                                                                                                      |                          |                                  |
|-----------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------------------------|
|                                         |                             | XGF-H02A                                                                                                                                                                                                                                                                           |                          | XGF-HD2A                         |
| No. of command                          | Signal                      | A Phase, B Phase                                                                                                                                                                                                                                                                   |                          |                                  |
|                                         | Input type                  | Voltage input (Open Collector)                                                                                                                                                                                                                                                     |                          | Differential input (Line Driver) |
|                                         | Signal level                | DC 5/12/24V                                                                                                                                                                                                                                                                        |                          |                                  |
|                                         | Input voltage               | 24V DC<br>(17.0V ~ 26.4V)                                                                                                                                                                                                                                                          | 12V DC<br>(9.8V ~ 13.2V) | 5V DC<br>(4.5V ~ 5.5V)           |
|                                         | Input current               | 7~11mA                                                                                                                                                                                                                                                                             | 7~11mA                   | 7~11mA                           |
|                                         | Min. On guaranteed voltage  | 17.0V                                                                                                                                                                                                                                                                              | 9.8V                     | 4.5V                             |
|                                         | Max. Off guaranteed voltage | 4.5V                                                                                                                                                                                                                                                                               | 3.0V                     | 1.7V                             |
| Counter enable                          |                             | Set by program (Count only in 'Enable')                                                                                                                                                                                                                                            |                          |                                  |
| Max. counting speed                     |                             | 200Kpps                                                                                                                                                                                                                                                                            |                          | 500Kpps (HTL input: 250Kpps)     |
| No. of channels                         |                             | 2 channels                                                                                                                                                                                                                                                                         |                          |                                  |
| Counting range                          |                             | Signed 32 Bit [-2,147,483,647 ~ 2,147,483,647]                                                                                                                                                                                                                                     |                          |                                  |
| Counting type<br>(Program setting)      |                             | Linear count<br>(Generating Carry/Borrow when exceeding counting range, Max/Min value)                                                                                                                                                                                             |                          |                                  |
| Input mode<br>(Program setting)         |                             | 1 Phase input                                                                                                                                                                                                                                                                      |                          |                                  |
|                                         |                             | 2 Phase input                                                                                                                                                                                                                                                                      |                          |                                  |
|                                         |                             | CW/CCW input                                                                                                                                                                                                                                                                       |                          |                                  |
| Signal type                             |                             | Voltage                                                                                                                                                                                                                                                                            |                          |                                  |
| Up/Down counter setting                 | 1-phase input               | Program or B-phase                                                                                                                                                                                                                                                                 |                          |                                  |
|                                         | 2-phase input               | Phase difference                                                                                                                                                                                                                                                                   |                          |                                  |
|                                         | CW/CCW                      | A-phase input: Up count B-phase input: Down count                                                                                                                                                                                                                                  |                          |                                  |
| Multiplication                          | 1-phase input               | 1/2 multiplication (Programming)                                                                                                                                                                                                                                                   |                          |                                  |
|                                         | 2-phase input               | 1/2/4 multiplication (Programming)                                                                                                                                                                                                                                                 |                          |                                  |
|                                         | CW/CCW                      | 1 multiplication                                                                                                                                                                                                                                                                   |                          |                                  |
| Control input                           | Signal                      | Preset signal, Signal to admit additional signal (Setting by terminal block or programming)                                                                                                                                                                                        |                          |                                  |
|                                         | Signal level                | DC 5V/12V/24V input type (Selecting terminal)                                                                                                                                                                                                                                      |                          |                                  |
|                                         | Signal type                 | Voltage                                                                                                                                                                                                                                                                            |                          |                                  |
| External output                         | No. of output point         | 2 points/channel: Terminal output available                                                                                                                                                                                                                                        |                          |                                  |
|                                         | Type                        | Single comparison (>,>=,<,<=) or section comparison                                                                                                                                                                                                                                |                          |                                  |
|                                         | Output type                 | Open Collector (Sink)                                                                                                                                                                                                                                                              |                          |                                  |
| Operating status display                | Input signal                | A-phase, B-phase, Preset signal, Signal to admit additional signal                                                                                                                                                                                                                 |                          |                                  |
|                                         | Output signal               | OUT1, OUT2                                                                                                                                                                                                                                                                         |                          |                                  |
|                                         | Operation status            | Module Ready, Pulse input status of A, B phase                                                                                                                                                                                                                                     |                          |                                  |
| Addition functions<br>(Program setting) |                             | • Count clear, Count latch • Pulse frequency count (Each input channel)<br>• Section count (Set time value:1~60000ms)<br>• Measuring counting number per a unit time (Set time value:1~60000ms)<br>• Preventing from counting (Setting by internal/external input during counting) |                          |                                  |
| No. of occupied                         |                             | Fixed type (Setting in basic parameter): 64 points                                                                                                                                                                                                                                 |                          |                                  |
| I/O points                              |                             | Variable type (Dissolving in basic parameter): 16 points                                                                                                                                                                                                                           |                          |                                  |
| Terminal block                          |                             | 40-pin connector                                                                                                                                                                                                                                                                   |                          |                                  |
| Current consumption                     |                             | 270                                                                                                                                                                                                                                                                                |                          | 330                              |
| Weight (Kg)                             |                             | 0.09                                                                                                                                                                                                                                                                               |                          |                                  |

## Terminal block configuration

### XGF-H02A

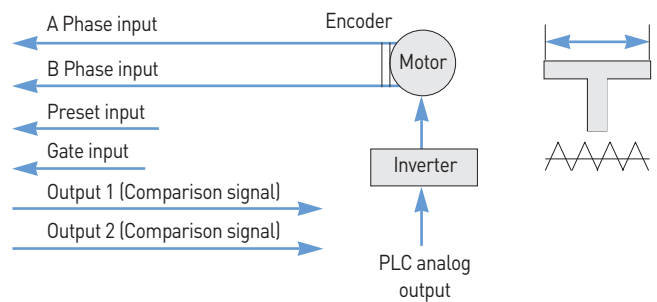
| Pin layout | Pin number |     | Signal name                 |
|------------|------------|-----|-----------------------------|
|            | CH0        | CH1 |                             |
| CH0        | 1          | 17  | A12V A phase DC12V input    |
|            | 2          | 18  | A24V A phase DC24V input    |
|            | 3          | 19  | A_C A phase COM             |
|            | 4          | 20  | A5V A phase DC5V input      |
| CH1        | 5          | 21  | B12V B phase DC12V input    |
|            | 6          | 22  | B24V B phase DC24V input    |
|            | 7          | 23  | B_C B phase COM             |
|            | 8          | 24  | B5V B phase DC5V input      |
| CH0        | 9          | 25  | P12V Preset DC12V input     |
|            | 10         | 26  | P24V Preset DC24V input     |
|            | 11         | 27  | P_C Preset COM              |
|            | 12         | 28  | P5V Preset DC5V input       |
| CH1        | 13         | 29  | G12V Gate DC12V input       |
|            | 14         | 30  | G24V Gate DC24V input       |
|            | 15         | 31  | G_C Gate COM                |
|            | 16         | 32  | G5V Gate DC5V input         |
| CH0        | 33         | 35  | OUT1 Comparison output OUT1 |
|            | 34         | 36  | OUT0 Comparison output OUT0 |
|            | 37         | 38  | 24V External power supply   |
|            | 39         | 40  | 24G DC24V                   |

### XGF-HD2A

| Pin layout | Pin number |     | Signal name                               |
|------------|------------|-----|-------------------------------------------|
|            | CH0        | CH1 |                                           |
| CH0        | 1          | 17  | AI- AI-Input (LINEDRIVE TTL LEVEL Input)  |
|            | 2          | 18  | AI+ AI+Input (LINEDRIVE TTL LEVEL Input)  |
|            | 3          | 19  | AI- AI-Input (LINE DRIVE TTL LEVEL Input) |
|            | 4          | 20  | AI+ AI+Input (LINE DRIVE TTL LEVEL Input) |
| CH1        | 5          | 21  | BI- BI-Input (LINEDRIVE TTL LEVEL Input)  |
|            | 6          | 22  | BI+ BI+Input (LINE DRIVE TTL LEVEL Input) |
|            | 7          | 23  | BI- BI-Input (LINEDRIVE TTL LEVEL Input)  |
|            | 8          | 24  | BI+ BI+Input (LINE DRIVE TTL LEVEL Input) |
| CH0        | 9          | 25  | P12V Preset DC12V input                   |
|            | 10         | 26  | P24V Preset DC24V input                   |
|            | 11         | 27  | P_C Preset COM                            |
|            | 12         | 28  | P5V Preset DC5V input                     |
| CH1        | 13         | 29  | G12V Gate DC12V input                     |
|            | 14         | 30  | G24V Gate DC24V input                     |
|            | 15         | 31  | G_C Gate COM                              |
|            | 16         | 32  | G5V Gate DC5V input                       |
| CH0        | 33         | 35  | OUT1 Comparison output OUT1               |
|            | 34         | 36  | OUT0 Comparison output OUT0               |
|            | 37         | 38  | 24V External power supply                 |
|            | 39         | 40  | 24G DC24V                                 |

## Configuration

| CPU | Setting                                    | Signal name |
|-----|--------------------------------------------|-------------|
|     |                                            |             |
|     | Setting preset value                       | H02A/HD2A   |
|     | Setting set value                          | CH0         |
|     | Writing operation status                   | CH0         |
|     | Counter admission, Reset, Output admission | CH0         |
|     | Reading operation status                   | CH1         |
|     | Reading counting value                     | CH1         |



...



# XGT 8-Channel high speed counter module

## Features

- Multiple high-speed counter input support(8ch, 80-pin connector)
- Only improve performance and safety caused by the use of FPGA enhanced
- Program controlled by the preset function
- Per 1 channel output 1 point(Program setting)
- Input filter can be set (100kpps, 10kpps, 1kpps, 0.1kpps)
- The output signal through the operation status display



## Specifications

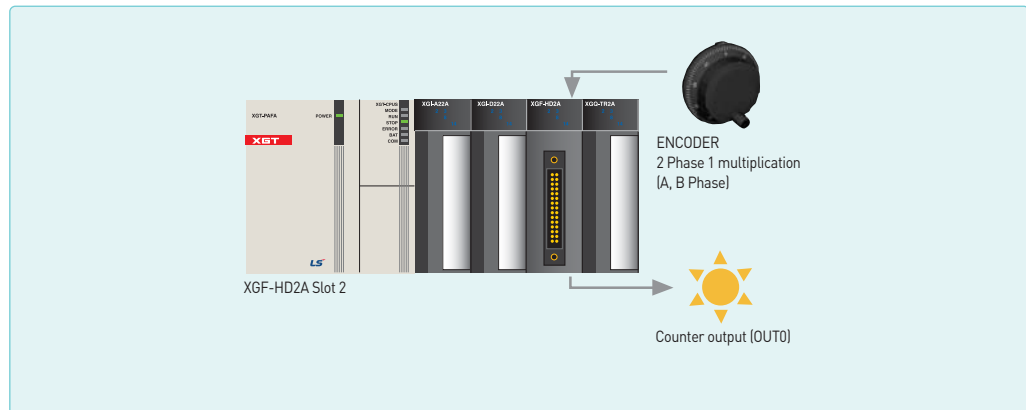
| Item                                |                      | XGF-H08A                                                                 |
|-------------------------------------|----------------------|--------------------------------------------------------------------------|
| No. of Channels                     |                      | 8 channels                                                               |
| Phase                               |                      | 1-phase input, 2-phase input                                             |
| Signal level                        |                      | 5V DC (7 to 11mA), 24V DC (7 to 11mA)                                    |
| Input type                          |                      | 1/2/4 multiplication, CW/CCW                                             |
| Max. counting speed                 |                      | 200 kpps                                                                 |
| Input filter                        |                      | None, 100kpps, 10kpps, 1kpps, 0.1kpps                                    |
| Counting range                      |                      | Signed 32bit [-2147483648 ~ 2147483647]                                  |
| Counting type                       |                      | Linear counter, Ring counter                                             |
| Up/Down Counter setting             | 1-phase input        | B-phase : Up/Down count                                                  |
|                                     | 2-phase input        |                                                                          |
|                                     | CW/CCW               | Phase difference                                                         |
| Multiplication                      | 1-phase input        | A-phase : Up count, B-phase : Down count                                 |
|                                     | 2-phase input        |                                                                          |
|                                     | CW/CCW               | 1 multiplication                                                         |
| External output                     | Comparison detection | Single comparison(→, →=, ←, ←=) or Section comparison                    |
|                                     | Output points        | 1 point/channels : Internal or External output (programming)             |
|                                     | type                 | Open collector output(Sink)                                              |
| Operating status display            | Input signal         | A-phase, B-phase                                                         |
|                                     | Output signal        | OUT                                                                      |
|                                     | Operating condition  | Module ready                                                             |
| Addition functions(Program setting) |                      | Counter clear, Count latch                                               |
|                                     |                      | Section count(Set time value : 1 ~ 60000ms)                              |
|                                     |                      | Pulse frequency(Each input channel)                                      |
|                                     |                      | Measuring counting number per a unit time (Set time value : 1 ~ 60000ms) |
|                                     |                      | Preventing from counting                                                 |
| Power                               |                      | DC5V (600mA)                                                             |
| Terminal block                      |                      | 80-pin connector                                                         |



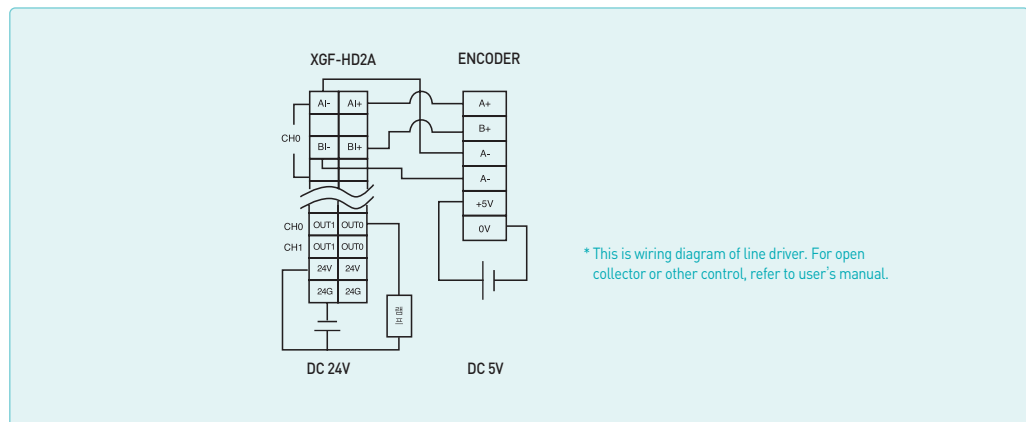
# High-speed counter module (Example)

This is a simple example of high-speed counter module setting.  
For more details, refer to user's manual.

## System Configuration



## Wiring



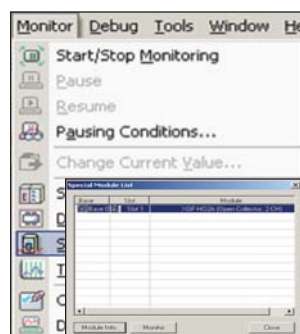
# XGT High-speed counter module (Example)

## Control configuration

- Light a lamp of output when present value reaches 1000 of pulse input counted by encoder.
- Current value of pulse is saved in D100~D101 and is monitored.

## Module test (Online)

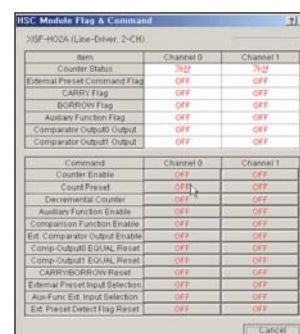
- Module test function of XGT enables to monitor operation status of high-speed counter module and to test-run.



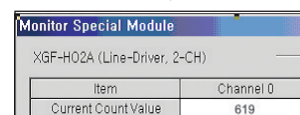
Select [Monitor] → [Special Module Monitoring] in menu and appoint high-speed counter.



After pressing the button for [Start Monitoring], press the button [FLAG monitor].



Change [Counter Enable] status to ON.



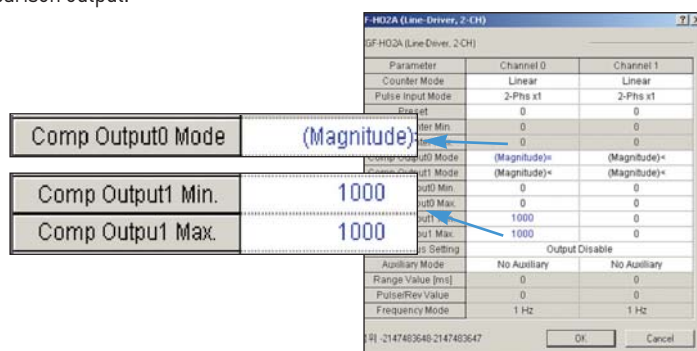
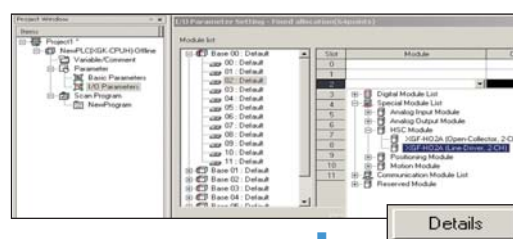
Check current counting value in 'Monitor Special Module' screen box.

## Parameter setting

- In I/O parameter setting box, select slot and analog module that you want to use.  
(This example shows to select 2-channel line driver.)

Press the [Details] button at lower end of parameter setting box after selecting the module.

Input 1000 as Max. and Min. comparison output.

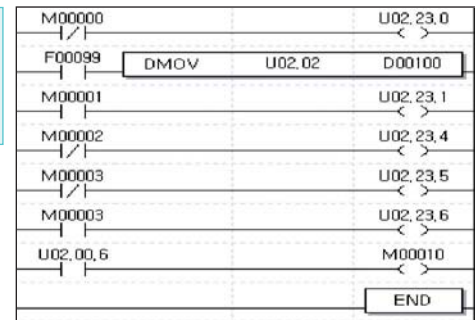


## programming

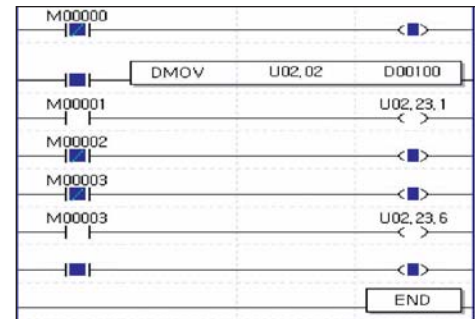
- After completing programming like following figure, download it to PLC and check operation status.  
Special devices for programming

Refer to user's manual for more details.  
U02.23.0: Count operation admission  
U02.23.1: Count preset  
U02.23.4: Consistent output admission  
U02.23.5: Output external terminal admission  
U02.23.6: OUT0 consistent signal reset  
U02.00.6: Contact for checking external output  
(Practically effective output is  
outputted through OUT0 terminal)  
U02.02~U02.03: Counter present value

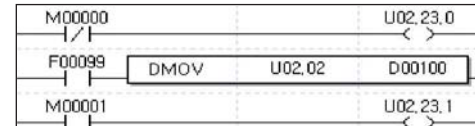
Uxy,aa.bb  
x: Base number  
y: Slot number  
aa,bb: Refer to user's  
manual



After downloading, monitor operation status.



For monitoring just present value, follow the example.





# Positioning module [APM]

## Features

- Highly reliable position control with LSIS ASIC-embedded processor
- Enhanced control with fast control processing speed
- High-speed motor control (Max. pulse output: 1Mbps)
- Circular/linear interpolation, separate/synchronous operation
- Trapezoidal & S-curve acceleration/deceleration
- Easy and quick control through external input (JOG operation included)
- Encoder input support
- High-speed processing of command (4ms)
- Easy to set positioning parameters (Windows)
- Monitoring/Tracking/Simulation
- Available to edit operation parameter data in EXCEL
- Self-diagnosis
- Real-time information and solution for each error



## Specifications

| Item                     |                        |        | Specifications                                                                                                           |  |                                                            |                                                              |
|--------------------------|------------------------|--------|--------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------|--------------------------------------------------------------|
|                          |                        |        | XGF-P01A, XGF-PD1A                                                                                                       |  | XGF-P02A, XGF-PD2A                                         | XGF-P03A, XGF-PD3A                                           |
| Number of axis           |                        |        | 1                                                                                                                        |  | 2                                                          | 3                                                            |
| Interpolation            |                        |        |                                                                                                                          |  | 2-axis linear interpolation, 2-axis circular interpolation | 2/3-axis linear interpolation, 2-axis circular interpolation |
| Control method           |                        |        | Position control, speed control, speed/position control, position/speed control                                          |  |                                                            |                                                              |
| Setting unit             |                        |        | Pulse, mm, inch, degree                                                                                                  |  |                                                            |                                                              |
| Positioning data         |                        |        | Each axis has 400 data items (Operation step number 1~400). It is available to set with software package or programming. |  |                                                            |                                                              |
| Software package         |                        |        | Available (Connected with RS-232C Port of CPU module)                                                                    |  |                                                            |                                                              |
| Data backup              |                        |        | Flash memory (No battery)                                                                                                |  |                                                            |                                                              |
| Positioning              | Positioning method     |        | Absolute / relative method                                                                                               |  |                                                            |                                                              |
|                          | Position address range | mm     | -214748364.8 ~ 214748364.7 (μm)                                                                                          |  |                                                            |                                                              |
|                          |                        | Inch   | -21474.83648 ~ 21474.83647                                                                                               |  |                                                            |                                                              |
|                          |                        | Degree | -21474.83648 ~ 21474.83647                                                                                               |  |                                                            |                                                              |
|                          |                        | Pulse  | -2147483648 ~ 2147483647                                                                                                 |  |                                                            |                                                              |
|                          | Type                   |        | XGF-P0□A: Open collector, XGF-PD□A: Line Driver                                                                          |  |                                                            |                                                              |
|                          | Position speed range   | mm     | 0.01 ~ 20000000.00 (mm/min)                                                                                              |  |                                                            |                                                              |
|                          |                        | Inch   | 0.001 ~ 2000000.000 (inch/min)                                                                                           |  |                                                            |                                                              |
|                          |                        | Degree | 0.001 ~ 2000000.000 (degree/min)                                                                                         |  |                                                            |                                                              |
|                          |                        | Pulse  | XGF-P0□A: 1~200,000 (pulse/sec), XGF-PD□A: 1~1,000,000 (pulse/sec)                                                       |  |                                                            |                                                              |
|                          | Accel/Decel pattern    |        | Trapezoidal & S-curve acceleration/deceleration                                                                          |  |                                                            |                                                              |
|                          | Accel/Decel time       |        | 1 ~ 65,535ms                                                                                                             |  |                                                            |                                                              |
| Max. output pulse        |                        |        | XGF-P0□A: 200Kpps / XGF-PD□A: 1Mpps                                                                                      |  |                                                            |                                                              |
| Max. distance            |                        |        | XGF-P0□A: 2m / XGF-PD□A: 10m                                                                                             |  |                                                            |                                                              |
| Max. encoder input       |                        |        | 200 Kpps                                                                                                                 |  |                                                            |                                                              |
| Error display            |                        |        | LED                                                                                                                      |  |                                                            |                                                              |
| Operation display        |                        |        | LED                                                                                                                      |  |                                                            |                                                              |
| Connection connector     |                        |        | 40 Pin connector                                                                                                         |  |                                                            |                                                              |
| Size of cable            |                        |        | AWG #24                                                                                                                  |  |                                                            |                                                              |
| Occupied points of I/O   |                        |        | 64 points (Fixed type), 16 points (Variable type)                                                                        |  |                                                            |                                                              |
| Current consumption (mA) |                        |        | XGF-P01A: 340                                                                                                            |  | XGF-P02A: 360                                              | XGF-P03A: 400                                                |
|                          |                        |        | XGF-PD1A: 510                                                                                                            |  | XGF-PD2A: 790                                              | XGF-PD3A: 860                                                |
| Weight (kg)              |                        |        | 0.12                                                                                                                     |  | 0.13                                                       | 0.135                                                        |

\* XGF-P0□O: Open Collector type, □: Number of axis  
XGF-PD□O: Line Drive type, □: Number of axis

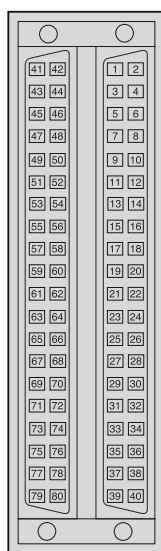


## Terminal block configuration

Pin layout



1 axis



2/3 axes

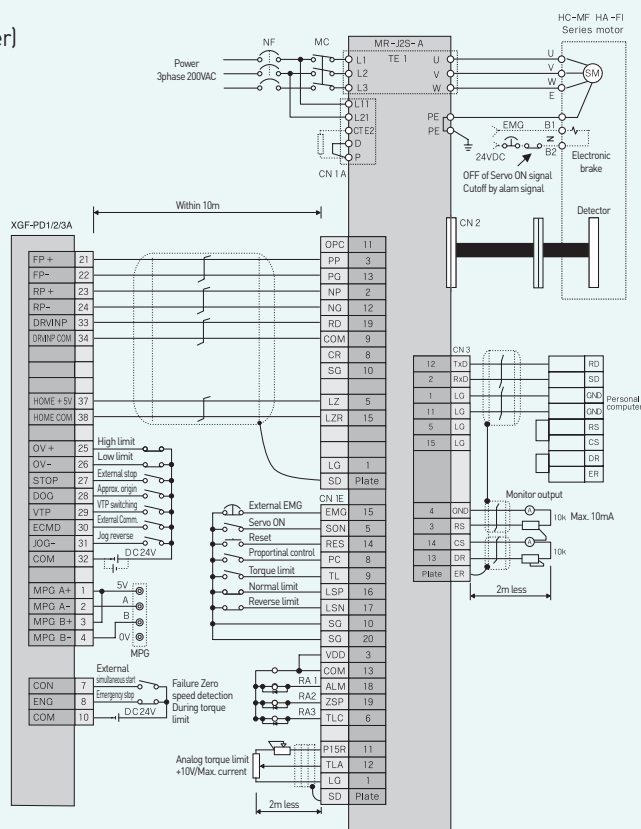
| For                        | Pin number |    |    | Signal name | Signal direction<br>APM - Ext.<br>device                 | Condition |
|----------------------------|------------|----|----|-------------|----------------------------------------------------------|-----------|
|                            | X          | Y  | Z  |             |                                                          |           |
| A<br>x<br>i<br>s           | 21         | 41 | 61 | FP+         | Pulse output (Differential +)                            | →         |
|                            | 22         | 42 | 62 | FP-         | Pulse output (Differential -)                            | →         |
|                            | 23         | 43 | 63 | RP+         | Pulse sign (Differential +)                              | →         |
|                            | 24         | 44 | 64 | RP-         | Pulse sign (Differential -)                              | →         |
|                            | 25         | 45 | 65 | OV+ *       | High limit                                               | ←         |
|                            | 26         | 46 | 66 | OV- *       | Low limit                                                | ←         |
|                            | 27         | 47 | 67 | STOP        | External stop signal                                     | ←         |
|                            | 28         | 48 | 68 | DOG         | Approximate origin                                       | ←         |
|                            | 29         | 49 | 69 | VTP         | Speed/Position switching signal                          | ←         |
|                            | 30         | 50 | 70 | ECMD        | External command signal                                  | Start     |
|                            |            |    |    |             | Skip                                                     | ←         |
|                            |            |    |    |             | JOG+ (Forward)                                           | ←         |
|                            | 31         | 51 | 71 | JOG-        | JOG reverse operation                                    | ←         |
|                            | 32         | 52 | 72 | COM         | Common(OV+, OV-, STOP, DOG, VTP, ECMD, JOG-)             | ↔         |
|                            | 33         | 53 | 73 | DR/INP      | Imposition/Driver Ready signal                           | ←         |
|                            | 34         | 54 | 74 | DR/INP COM  | Imposition/Driver Ready signal Common                    | ↔         |
|                            | 35         | 55 | 75 | HOME +24V   | Zero signal (+24V)                                       | ←         |
|                            | 36         | 56 | 76 | NC          | Not used                                                 |           |
|                            | 37         | 57 | 77 | HOME +5V    | Zero signal (+5V)                                        | ←         |
|                            | 38         | 58 | 78 | HOME COM    | Zero signal (+24V, +5V) Common                           | ↔         |
|                            | 39         | 59 | 79 | 24V         | 24V Power supply (Not used in case of line drive output) |           |
|                            | 40         | 60 | 80 | P COM       | External 24V GND (Not used in case of line drive output) |           |
| C<br>o<br>m<br>m<br>o<br>n | 1          |    |    | MPG A+      | Manual pulse generator/Encoder A+ Input                  | ←         |
|                            | 2          |    |    | MPG A-      | Manual pulse generator/Encoder A- Input                  | ←         |
|                            | 3          |    |    | MPG B+      | Manual pulse generator/Encoder B+ Input                  | ←         |
|                            | 4          |    |    | MPG B-      | Manual pulse generator/Encoder B- Input                  | ←         |
|                            | 5          |    |    | NC          | Not used                                                 | ←         |
|                            | 6          |    |    | NC          | Not used                                                 | ←         |
|                            | 7          |    |    | CON         | External simultaneous start                              | ←         |
|                            | 8          |    |    | EMG *       | Emergency stop                                           | ←         |
|                            | 9          |    |    | NC          | Not used                                                 |           |
|                            | 10         |    |    | COM         | (CON, EMG) Common                                        | ↔         |
|                            | 11~20      |    |    | NC          | Not used                                                 |           |



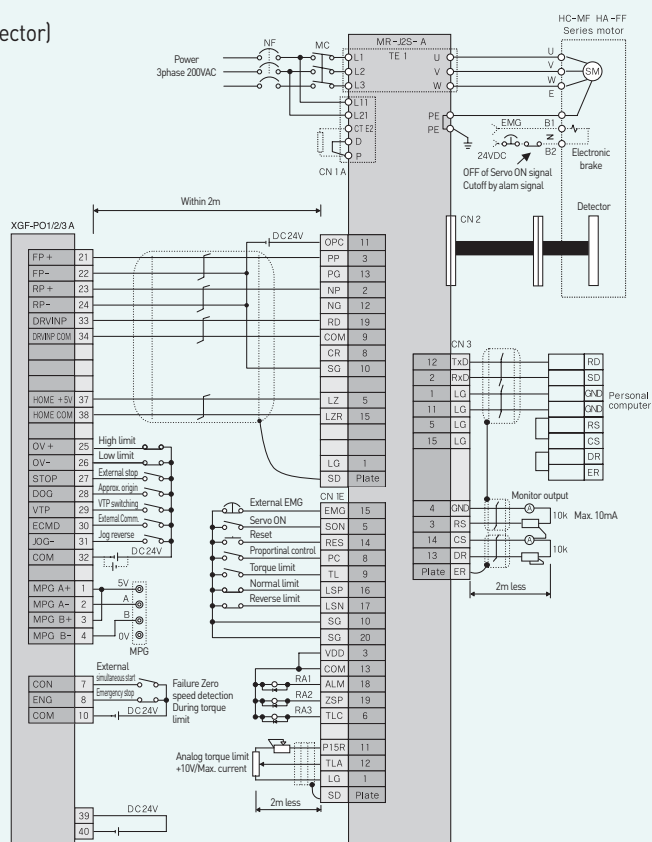
# Positioning module

## Connection with MR-J2/J2S-□A

### • XGF-PD1/2/3A (Line Driver)

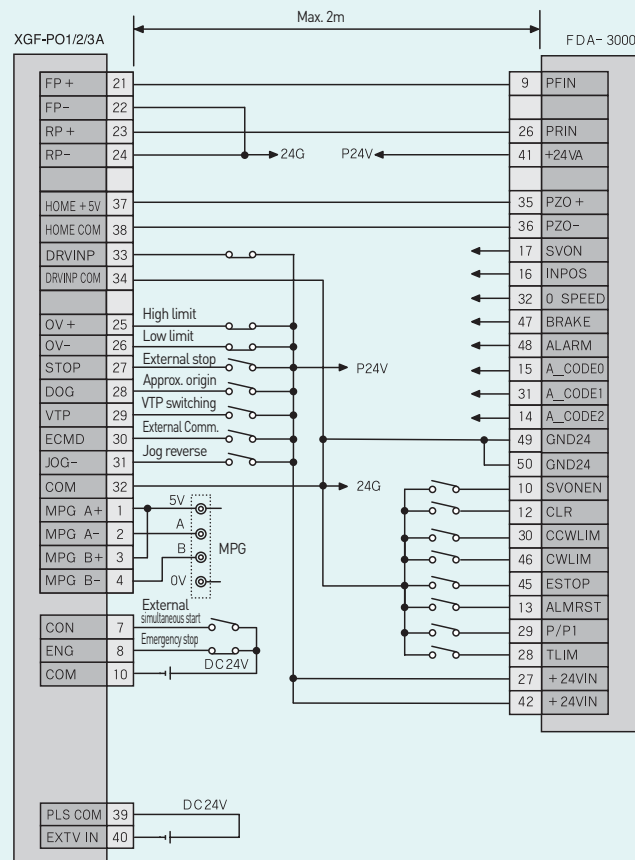


### • XGF-PO1/2/3A (Open Collector)



# Connection with FDA-3000 AC Servo driver

- XGF-P01/2/3A (Open Collector)

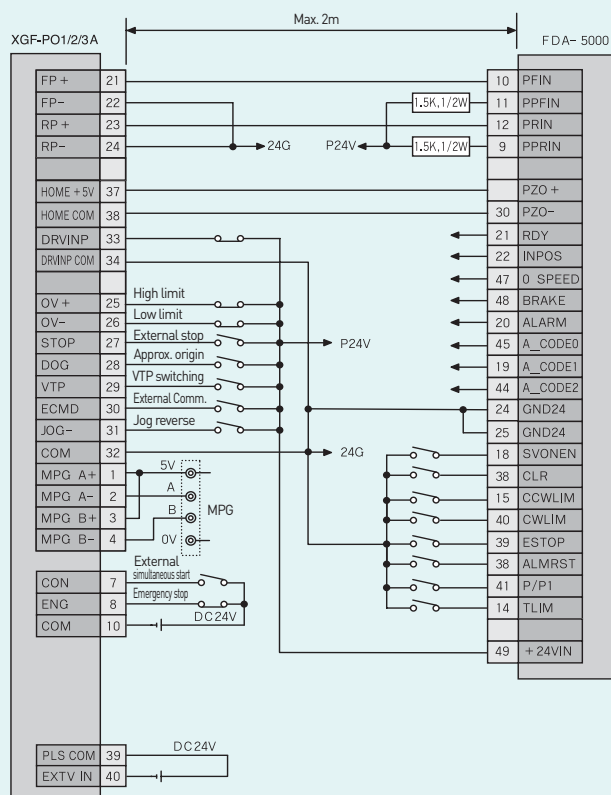




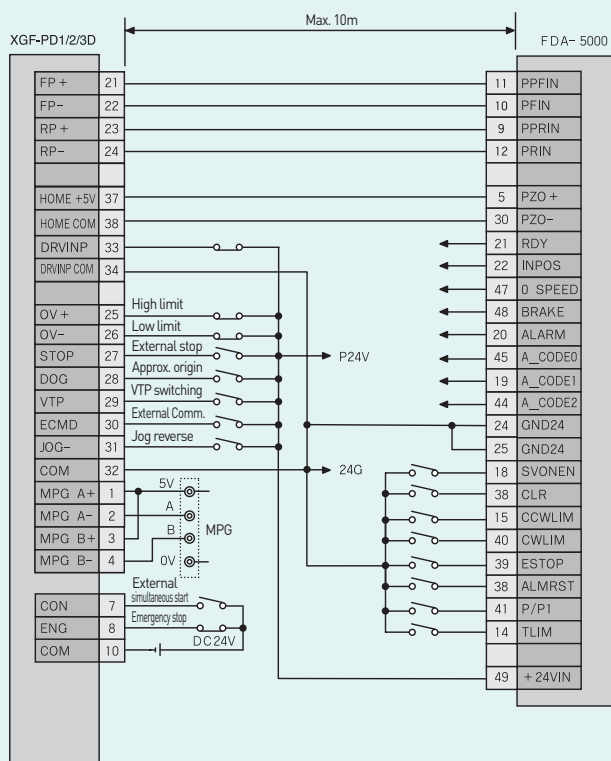
# Positioning module

## Connection with FDA-5000 AC Servo driver

- XGF-PO1/2/3A  
(Open Collector)



- XGF-PD1/2/3A  
(Line Driver)



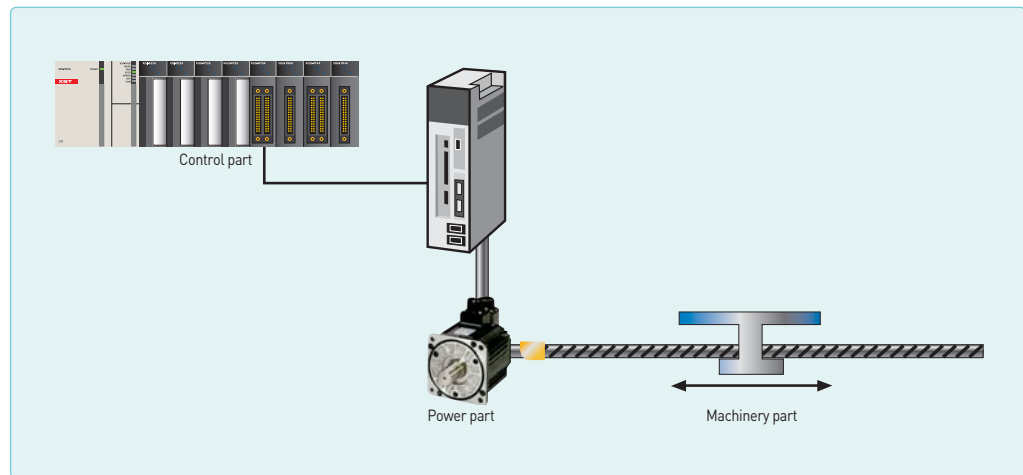


# Positioning module (Example)

This is a simple example to control 1-axis servo motor.

## System configuration

- Positioning system consists of control part, power part, and machinery part.
- Control part: Install APM module on base and complete parameter setting and programming.
- Power part: Power part generates momentum, and it consists of [servo-driver + servo-motor] and [step-driver + step-motor].
- Machinery part: Machinery part is to transport objects, and it can be ball screw, timing belt and rack gear.

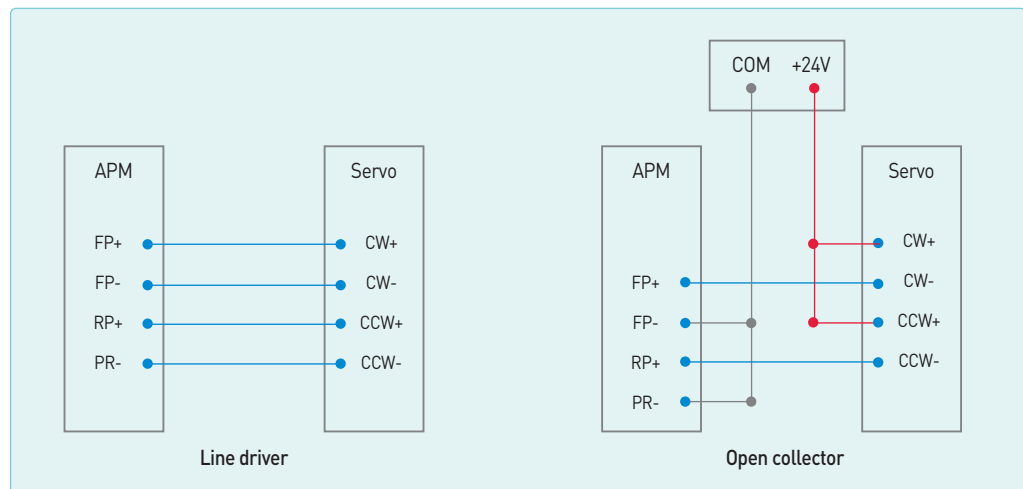


## System design

- APM: Determine type and quantity considering the number of control axis and operation function.
- Driver: Select driver with identical output type of APM.  
(In case output type of APM is line driver, driver should support a pulse train input type of line driver.)
- Motor: Select capacity considering operation characteristics of load.
- Mechanical: Design precise mechanical system to minimize error.

## Connection to drivers

- The following picture is wiring pulse train signal between driver and APM for pulse train signal.
- Terminal besides pulse train signal is used additionally according to user-purpose, system characteristics.
- For wiring of optional terminal of Servo (Step) driver, refer to user's manual.

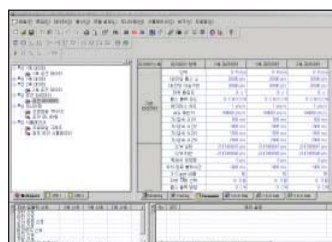




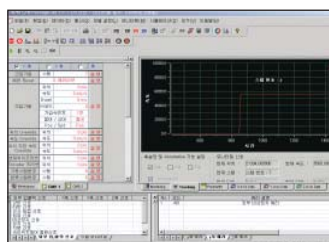
# APM Software Package

## Features

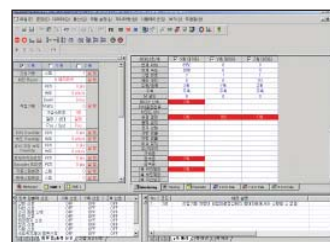
- WINDOWS Support
- All models are available for APM
- Enhanced Parameter editing
- Various monitoring information
- Profile Trace & Monitoring in operation
- Operation data and parameter data can be edited in excel



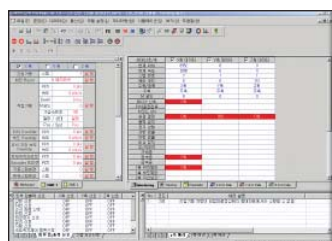
**Operation parameter**  
Improved parameter editing  
(Copy, Paste, Initialization, etc.)



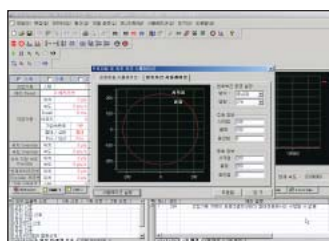
**Monitoring (ON-LINE)**  
Various monitoring  
(Operation type of each axis, etc.)



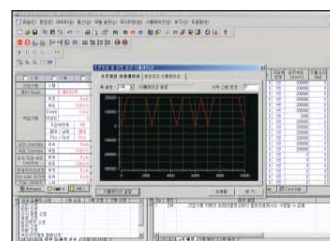
**Circular interpolation simulation (OFF-LINE)**  
Profile graph and simulation of circular interpolation



**Data**  
Available to edit operation parameter in EXCEL



**Profile traces(ON-LINE) / Profile simulation (OFF-LINE)**  
Profile trace and operation monitoring



## (Example)

### Parameter, data setting and transmission

- Set system characteristic, target location, operation speed, and operation type using APM software package.
- Transmit operation parameter and data to APM.

| Item                   |                        | XAxis           |
|------------------------|------------------------|-----------------|
| Basic Parameter        | Unit                   | 1: mm           |
|                        | Pulse per Rotation     | 5000 p/s        |
|                        | Travel per Rotation    | 5000.0 um       |
|                        | Unit Multiplier        | 0: x1           |
|                        | Pulse Output Mode      | 0: CW/CCW       |
|                        | Bias Speed             | 0.01 mm/s       |
|                        | Speed Limit            | 10000.00 mm/s   |
|                        | ACC/DEC No.1           | 500 ms          |
|                        | ACC/DEC No.2           | 1000 ms         |
|                        | ACC/DEC No.3           | 1500 ms         |
|                        | ACC/DEC No.4           | 2000 ms         |
|                        | Sr/ Upper Limit        | 214748364.7 um  |
|                        | Sr/ Lower Limit        | -214748364.8 um |
|                        | Backlash Comp          | 0.0 um          |
|                        | Position Complete Time | 1000 ms         |
| Ext. Command Selection |                        | 0: Stop         |

**Setting parameter of system characteristic**

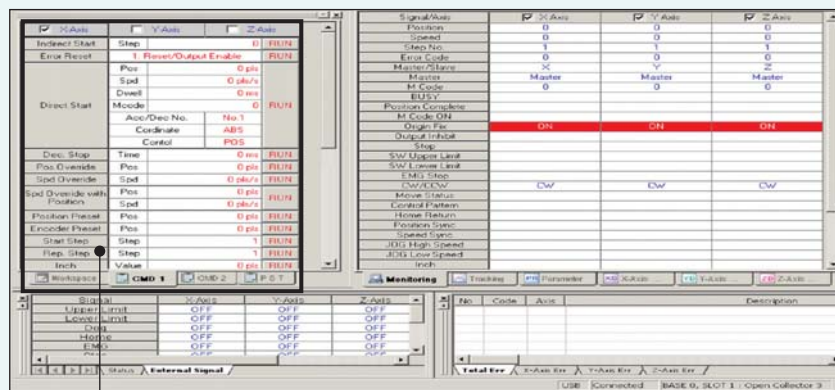


| Step | Coord | Control | Pattern | Method | Address [um] | Sub Address [um] | M Code | A/D No. | Speed [mm/min] | Dwell [ms] | Cx Int Dt |
|------|-------|---------|---------|--------|--------------|------------------|--------|---------|----------------|------------|-----------|
| 1    | ABS   | POS     | END     | SIN    | 0.0          | 0.0              | 0      | No.1    | 0.00           | 0          | Cw        |
| 2    | ABS   | POS     | END     | SIN    | 0.0          | 0.0              | 0      | No.1    | 0.00           | 0          | Cw        |
| 3    | ABS   | POS     | END     | SIN    | 0.0          | 0.0              | 0      | No.1    | 0.00           | 0          | Cw        |
| 4    | ABS   | POS     | END     | SIN    | 0.0          | 0.0              | 0      | No.1    | 0.00           | 0          | Cw        |

**Target location, speed, operation type, operation data**

## Initial system inspection

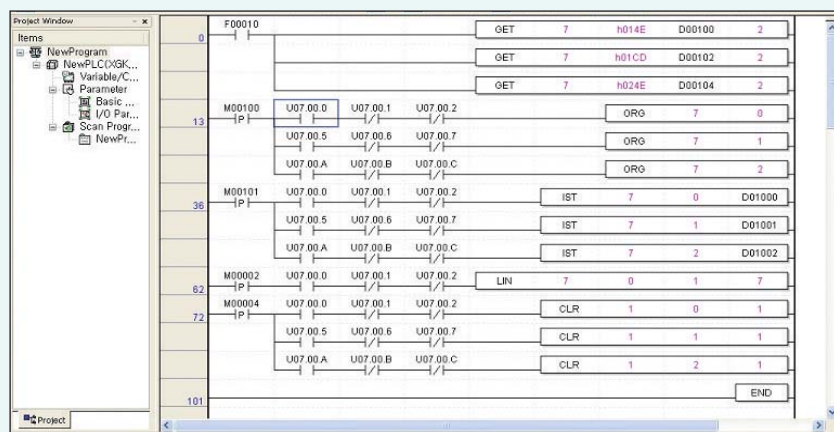
- Perform a trial-run using APM Software Package, and check external wiring, operation data setting, and status of machinery part. It is recommended to do trial-run before programming.
- If a program is saved in CPU and operation mode is 'RUN'  $\frac{1}{4}$ , a unexpected fault can occur due to disagreement between operation condition of operation control program and operation result of APM Software Package.



Operate APM without positioning programming

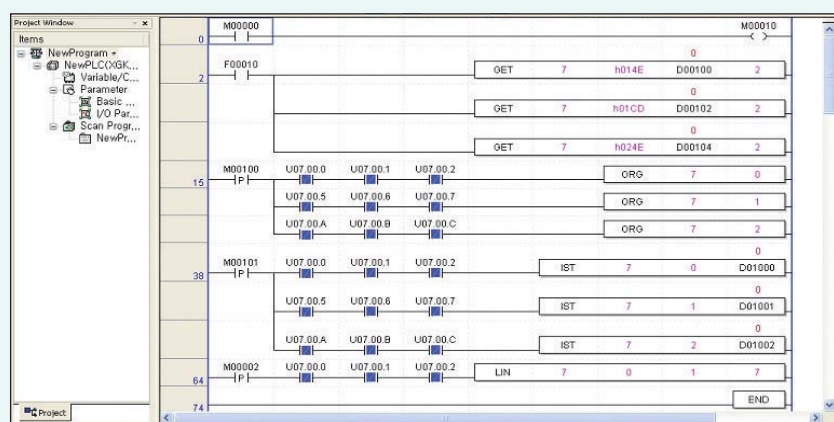
## Programming

- Create a program using dedicated command for APM control.  
ex) Origin point return-ORG, Independent operation-IST



## Program monitoring

- Monitor output condition following input condition and inspect operation status of APM and correct programming error.





# XGT Positioning module (XPM)

## Features

- Max 4Axis, Max pulse output 4Mpps
- Circular/linear/ellipse/helical interpolation
- Asymmetric acceleration and deceleration driving
- FRAM parameter
- XG-PM monitoring, simulation, trace
- CAM profile program

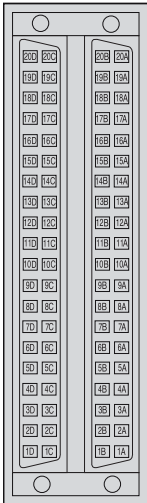


## Specifications

| Item                     |                        |                                                 | XGF-P01H<br>XGF-PD1H                                                                                          | XGF-P02H<br>XGF-PD2H      | XGF-P03H<br>XGF-PD3H               | XGF-P04H<br>XGF-PD4H |
|--------------------------|------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------|---------------------------|------------------------------------|----------------------|
| Number of axis           |                        |                                                 | 1 axis                                                                                                        | 2 axis                    | 3 axis                             | 4 axis               |
| Interpolation            |                        |                                                 | -                                                                                                             | Circular, linear, ellipse | Circular, linear, helical, ellipse |                      |
| Control method           |                        |                                                 | Position control, speed control, speed/position control, position/speed control, FEED                         |                           |                                    |                      |
| Positioning data         |                        |                                                 | Each axis has 400 data items (Operation step number 1~400). It is available to set with XG-PM or programming. |                           |                                    |                      |
| Configuration Tool       |                        |                                                 | XG-PM (Connected with USB or RS-232C Port of CPU module)                                                      |                           |                                    |                      |
| Data backup              |                        |                                                 | FRAM (Parameter, Operation data), Flash memory (CAM Data), No battery                                         |                           |                                    |                      |
| Pulse output             |                        |                                                 | XGF-POxH: Open collector, XGF-PDxH: line driver                                                               |                           |                                    |                      |
| Positioning              | Positioning method     |                                                 | Absolute / Incremental                                                                                        |                           |                                    |                      |
|                          | Position address range | mm                                              | -214,748,364.8~ 214,748,364.7(μm)                                                                             |                           |                                    |                      |
|                          |                        | inch                                            | -21,474.83648 ~ 21,474.83647                                                                                  |                           |                                    |                      |
|                          |                        | degree                                          | -21,474.83648 ~ 21,474.83647                                                                                  |                           |                                    |                      |
|                          |                        | pulse                                           | -2,147,483,648 ~ 2,147,483,647                                                                                |                           |                                    |                      |
|                          | Position address speed | mm                                              | 0.01 ~ 20,000,000.00(mm/min)                                                                                  |                           |                                    |                      |
|                          |                        | inch                                            | 0.001 ~ 2,000,000.000(inch/min)                                                                               |                           |                                    |                      |
|                          |                        | degree                                          | 0.001 ~ 2,000,000.000(degree/min)                                                                             |                           |                                    |                      |
|                          |                        | pulse                                           | 1 ~ 500,000(pulse/sec): Open collector, 1 ~ 4,000,000(pulse/sec): line driver                                 |                           |                                    |                      |
|                          |                        | RPM                                             | 0.1 ~ 100,000.0(RPM)                                                                                          |                           |                                    |                      |
|                          | Accel/Decel pattern    | Trapezoidal & S-curve acceleration/deceleration |                                                                                                               |                           |                                    |                      |
|                          | Accel/Decel time       | 0~2,147,483,647ms                               |                                                                                                               |                           |                                    |                      |
| Max. output pulse        |                        |                                                 | Open collector: 500kpps, line driver: 4Mpps                                                                   |                           |                                    |                      |
| Max. distance            |                        |                                                 | Open collector: 5m, line driver: 10m                                                                          |                           |                                    |                      |
| Max. encoder input       |                        |                                                 | 500kpps                                                                                                       |                           |                                    |                      |
| Error display            |                        |                                                 | LED                                                                                                           |                           |                                    |                      |
| Size of cable            |                        |                                                 | AWG #24                                                                                                       |                           |                                    |                      |
| Occupied points of I/O   |                        |                                                 | 64 points (Fixed type), 16 points (Variable type)                                                             |                           |                                    |                      |
| Connection connector     |                        |                                                 | 40Pin                                                                                                         |                           | 80Pin                              |                      |
| Current consumption (mA) |                        |                                                 | XGF-P01H:400mA                                                                                                | XGF-P02H:410mA            | XGF-P03H:420mA                     | XGF-P04H:430mA       |
|                          |                        |                                                 | XGF-PD1H:520mA                                                                                                | XGF-PD2H:600mA            | XGF-PD3H:850mA                     | XGF-PD4H:890mA       |
| Weight (kg)              |                        |                                                 | 120                                                                                                           |                           | 130                                |                      |



Terminal block configuration



| Pin number         |     |     |     | Signal name |                                          | Remarks |
|--------------------|-----|-----|-----|-------------|------------------------------------------|---------|
| AX1                | AX2 | AX3 | AX4 |             |                                          |         |
| 20A                |     |     |     | MPG A +     | Manual pulse generntor /Encoder A+ input |         |
| 20B                |     |     |     | MPG A -     | Manual pulse generntor /Encoder A- input |         |
| 19A                |     |     |     | MPG B +     | Manual pulse generntor /Encoder B+ input |         |
| 19B                |     |     |     | MPG B -     | Manual pulse generntor /Encoder B- input |         |
| 20C, 19C, 20D, 19D |     |     |     | NC          | Not used                                 |         |
| 18A                | 18B | 18C | 18D | FP +        | Foward pulse (+)                         |         |
| 17A                | 17B | 17C | 17D | FP-         | Foward COM (-)                           |         |
| 16A                | 16B | 16C | 16D | RP +        | Backward pulse (+)                       |         |
| 15A                | 15B | 15C | 15D | RP-         | Backward COM (-)                         |         |
| 14A                | 14B | 14C | 14D | OV +        | Max. signal                              |         |
| 13A                | 13B | 13C | 13D | OV-         | Min. signal                              |         |
| 12A                | 12B | 12C | 12D | DOG         | Appoximate orgin signal                  |         |
| 11A                | 11B | 11C | 11D | EMG         | Emergency stop                           |         |
|                    |     |     |     | STOP        | External stop signal                     |         |
| 10A                | 10B | 10C | 10D | VTP         | Speed / Position switching signal        |         |
| 9A                 | 9B  | 9C  | 9D  | COM         | Common (OV+,OV-,DOG,EMG,STOP,VTP)        |         |
| 8A                 | 8B  | 8C  | 8D  | DR          | Drive ready signal                       |         |
| 7A                 | 7B  | 7C  | 7D  | INP         | In-position                              |         |
| 6A                 | 6B  | 6C  | 6D  | DR/INP COM  | Drive ready/ In-position Common          |         |
| 5A                 | 5B  | 5C  | 5D  | CLR         | Deviation counter clear signal           |         |
| 4A                 | 4B  | 4C  | 4D  | CLR COM     | Deviation counter clear signal Common    |         |
| 3A                 | 3B  | 3C  | 3D  | HOME +5V    | Zero signal ( + 5V)                      |         |
| 2A                 | 2B  | 2C  | 2D  | HOME COM    | Zero signal ( + 5V) Common               |         |
| 1A, 1C             |     |     |     | +24V        | + 24V                                    |         |
| 1B, 1D             |     |     |     | +24V COM    | + 24V GND                                |         |

\* Open collector type module : +24V (1A/1C: 24V, 1B/1D: 0V)

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# XGT Positioning module (Network Type)

## Features

- XGF-PN8A : Dedicated LSIS EtherCAT Network Support (XGT Servo N series)
- XGF-PN8B : Standard EtherCAT Network Support(Standard EtherCAT Servo)
- Direct connect with servo driver Max 8
- 2~8 axis linear interpolation, 2axis circular interpolation, 3axis helical interpolation
- Position, speed, feed control is possible through the various operation
- Parameters, the operation data stored in the FRAM(without Battery)
- CAM for controlling up to eight different types of CAM data



## Specifications

| Item                        |                        | XGF-PN8A/PN8B                                                                                                                                                                |                                 |                                |                                                   |
|-----------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|--------------------------------|---------------------------------------------------|
| Number of axis              |                        | 8 axis                                                                                                                                                                       |                                 |                                |                                                   |
| Interpolation               |                        | 2~8 axis linear, 2axis circular, 3axis helical interpolation                                                                                                                 |                                 |                                |                                                   |
| Control method              |                        | Position, speed, Speed/position, position/speed position/torque, Feed control                                                                                                |                                 |                                |                                                   |
| Setting unit                |                        | pulse, mm, inch, degree                                                                                                                                                      |                                 |                                |                                                   |
| Positioning data            |                        | Each axis has 400 data items (Operation step number 1~400). It is available to set with software package or programming.                                                     |                                 |                                |                                                   |
| XG-PM                       | Port                   | RS-232C, USB                                                                                                                                                                 |                                 |                                |                                                   |
|                             | Data                   | Basic, expansion, manual, servo parameter, operation data, cam data, command information                                                                                     |                                 |                                |                                                   |
|                             | Monitor                | Operation, trace, input sort, error information                                                                                                                              |                                 |                                |                                                   |
| Back-up                     |                        | FRAM(parameter, operation data) no battery                                                                                                                                   |                                 |                                |                                                   |
| Positioning                 | Positioning method     | Absolute/Incremental                                                                                                                                                         |                                 |                                |                                                   |
|                             | Position address range |                                                                                                                                                                              | Absolute                        | Incremental                    | Speed/position, position/speed conversion control |
|                             |                        | mm                                                                                                                                                                           | -214748364.8 ~ 214748364.7[μm]  | -214748364.8 ~ 214748364.7[μm] | -214748364.8 ~ 214748364.7[μm]                    |
|                             |                        | inch                                                                                                                                                                         | -21474.83648 ~ 21474.83647      | -21474.83648 ~ 21474.83647     | -21474.83648 ~ 21474.83647                        |
|                             |                        | degree                                                                                                                                                                       | -21474.83648 ~ 21474.83647      | -21474.83648 ~ 21474.83647     | -21474.83648 ~ 21474.83647                        |
|                             |                        | pulse                                                                                                                                                                        | -2147483648 ~ 2147483647        | -2147483648 ~ 2147483647       | -2147483648 ~ 2147483647                          |
|                             | Position speed range   | mm                                                                                                                                                                           | 0.01 ~ 2000000.00(mm/Min)       |                                |                                                   |
|                             |                        | inch                                                                                                                                                                         | 0.001 ~ 2000000.000(inch/Min)   |                                |                                                   |
|                             |                        | degree                                                                                                                                                                       | 0.001 ~ 2000000.000(degree/Min) |                                |                                                   |
|                             |                        | pulse                                                                                                                                                                        | 1 ~ 20.000.000 (pulse/Sec)      |                                |                                                   |
|                             |                        | RPM                                                                                                                                                                          | 0.1 ~ 100000.0(RPM)             |                                |                                                   |
|                             | Accel/Decel pattern    | Trapezoidal & S-curve acceleration/deceleration                                                                                                                              |                                 |                                |                                                   |
| Accel/Decel time            | 1~2.147.483.647 ms     |                                                                                                                                                                              |                                 |                                |                                                   |
| Manual                      |                        | Jog/ MPG/ inching                                                                                                                                                            |                                 |                                |                                                   |
| Homing method               |                        | Max+Z(Forward), Min+Z(Backward), Near-point+Z(Forward, Backward), Max+near-point+Z(Forward), Min+near-point+Z(Backward), Z(Forward, Backward), near-point(Forward, Backward) |                                 |                                |                                                   |
| The ability to Change speed |                        | Absolute/Percent                                                                                                                                                             |                                 |                                |                                                   |
| Torque                      |                        | Rated torque %                                                                                                                                                               |                                 |                                |                                                   |
| Absolute position System    |                        | 0 (Absolute encoder type servo)                                                                                                                                              |                                 |                                |                                                   |
| Encoder input               | Channel                | 2 Channel                                                                                                                                                                    |                                 |                                |                                                   |
|                             | Max. I. Input          | Max. 200 Kpps                                                                                                                                                                |                                 |                                |                                                   |
|                             | Input method           | line-drive input (RS-422A IEC), open collector output type                                                                                                                   |                                 |                                |                                                   |
|                             | Type                   | CW/CCW, Pulse/Dir, Phase A/B                                                                                                                                                 |                                 |                                |                                                   |
|                             | Connector              | 12 Pin connector                                                                                                                                                             |                                 |                                |                                                   |
| Communication Cycle         |                        | 800 μs                                                                                                                                                                       |                                 |                                |                                                   |
| Max. distance               |                        | 100 m                                                                                                                                                                        |                                 |                                |                                                   |
| Cable                       |                        | STP(Shielded Twisted-pair) cable                                                                                                                                             |                                 |                                |                                                   |
| Error display               |                        | LED                                                                                                                                                                          |                                 |                                |                                                   |
| Operation display           |                        | LED                                                                                                                                                                          |                                 |                                |                                                   |
| Occupied points of I/O      |                        | 64points (Fixed type), 16points (Variable type)                                                                                                                              |                                 |                                |                                                   |
| Current consumption (mA)    |                        | 500 mA                                                                                                                                                                       |                                 |                                |                                                   |
| Weight(kg)                  |                        | 115 g                                                                                                                                                                        |                                 |                                |                                                   |

Terminal block configuration

| Pin layout |  | Pin Number | Signal name |                    |
|------------|--|------------|-------------|--------------------|
| ENC1A+     |  | 1          | ENC1A+      | Encoder1 A+input   |
| ENC1A-     |  | 2          | ENC1A-      | Encoder1 A - input |
| ENC1B+     |  | 3          | ENC1B+      | Encoder1 B+input   |
| ENC1B-     |  | 4          | ENC1B-      | Encoder1 B- input  |
| ENC1Z+     |  | 5          | ENC1Z+      | Encoder1 Z+input   |
| ENC1Z-     |  | 6          | ENC1Z-      | Encoder1 Z- input  |
| ENC2A+     |  | 7          | ENC2A+      | Encoder2 A+input   |
| ENC2A-     |  | 8          | ENC2A-      | Encoder2 A- input  |
| ENC2B+     |  | 9          | ENC2B+      | Encoder2 B+input   |
| ENC2B-     |  | 10         | ENC2B-      | Encoder2 B- input  |
| ENC2Z+     |  | 11         | ENC2Z+      | Encoder2 Z+input   |
| ENC2Z-     |  | 12         | ENC2Z-      | Encoder2 Z- input  |

External encoder wiring

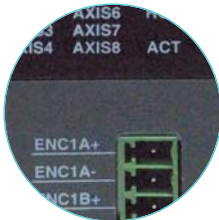
**\* Open collector type**

**\* line-drive type**

| Pin Number | Signal |                    |
|------------|--------|--------------------|
| 1          | ENC1A+ | Encoder1 A+input   |
| 2          | ENC1A- | Encoder1 A - input |
| 3          | ENC1B+ | Encoder1 B+input   |
| 4          | ENC1B- | Encoder1 B- input  |
| 5          | ENC1Z+ | Encoder1 Z+input   |
| 6          | ENC1Z- | Encoder1 Z- input  |
| 7          | ENC2A+ | Encoder2 A+input   |
| 8          | ENC2A- | Encoder2 A- input  |
| 9          | ENC2B+ | Encoder2 B+input   |
| 10         | ENC2B- | Encoder2 B- input  |
| 11         | ENC2Z+ | Encoder2 Z+input   |
| 12         | ENC2Z- | Encoder2 Z- input  |

Special

...



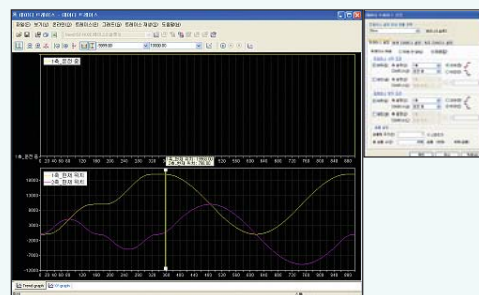
# XGT XG-PM

## Features

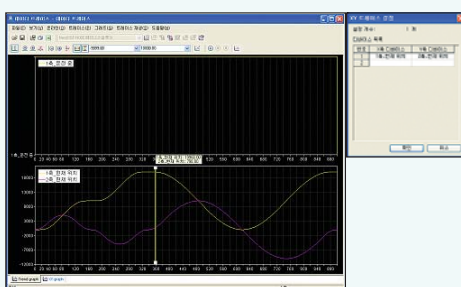
- Configuration tool with updated APM software package
- All models can be used for XGT Positioning module (APM, XPM)
- Simultaneous communications can be accessed with XG5000
- Powerful simulation, trace, monitoring



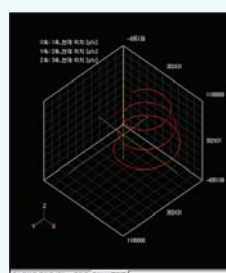
System View



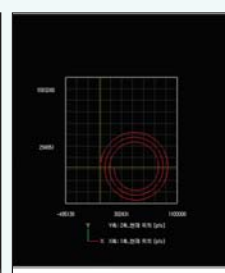
Data trace (trend graph)



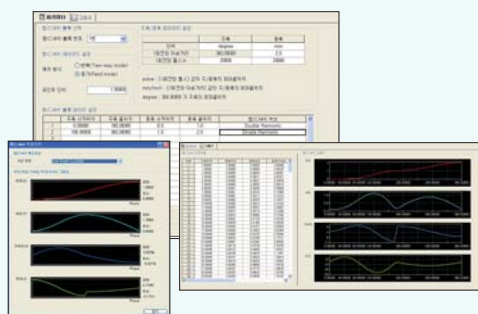
Data trace (XY graph)



XYZ trend  
(3D View)



XYZ monitor  
(2D View)



CAM control profile



Simulation



# Motion Module [EtherCAT]

## Features

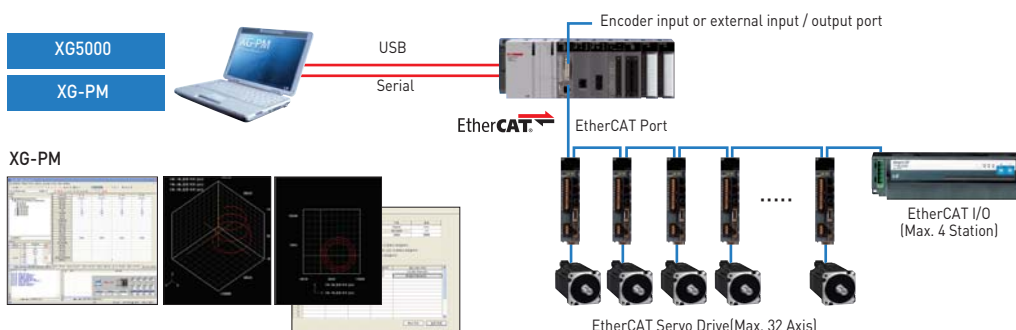
- 32 axes (master) and 4 axes (virtual) control
- EtherCAT CoE supported servo drive
- Communication cycle : 1ms
- Built-in DI/DO 8 points each and EtherCAT I/O 512 points
- Program 2MB
- External encoder input 2ch (line drive)
- Max. transmission distance : 100m



## Specifications

| Item                            |                | XGF-M32E                                                                                                 |
|---------------------------------|----------------|----------------------------------------------------------------------------------------------------------|
| Communication                   |                | EtherCAT (CoE : CANopen over EtherCAT)                                                                   |
| Number of axis                  | Real           | 32 axes                                                                                                  |
|                                 | Virtual        | 4axes                                                                                                    |
|                                 | I/O            | Input/output 8 points each (built-in)<br>EtherCAT I/O connection available                               |
| Control period                  |                | 1ms, 2ms, 4ms (same as main task period)                                                                 |
| Control unit                    |                | Pulse, mm, inch, degree                                                                                  |
| I/O                             | Internal       | Input 8 points, output 8 points                                                                          |
|                                 | External       | EtherCAT I/O 4 ea(max. 256 points)                                                                       |
| Motion Program                  | No. of program | Max. 256 ea                                                                                              |
|                                 | Capacity       | Max. 2Mbyte                                                                                              |
|                                 | Language       | LD(FB), ST                                                                                               |
|                                 | Position data  | 6400 points/all axis                                                                                     |
| Control method                  |                | Position, Velocity, Torque(Servo drivers support) control,<br>Synchronous control, Interpolation control |
| Range of position/velocity      |                | $\pm$ LREAL, 0                                                                                           |
| Acc. Dec. process               |                | Trapezoid type, S-type<br>(Setting to specify the Jerk at function block)                                |
| Acc. Dec. time                  |                | 1 ~ 2, 147, 483, 647ms                                                                                   |
| Manual operation                |                | JOG operation                                                                                            |
| Torque unit                     |                | Rated torque % designation                                                                               |
| Encoder input                   | Channel        | 2 channels                                                                                               |
|                                 | Max. input     | Max. 500Kpps                                                                                             |
|                                 | Input method   | Line drive input (RS-422A IEC specification)<br>Open collector output type encoder                       |
|                                 | Input type     | CW/CCW, Pulse/Dir, Phase A/B                                                                             |
| Max. distance                   |                | 100m                                                                                                     |
| Communication cable             |                | Over CAT.5 STP(Shielded Twisted-pair) cable                                                              |
| Error indication                |                | Indicated by LED                                                                                         |
| Communication status indication |                | Indicated by LED                                                                                         |
| Occupied point I/O              |                | Variable: 16 point, Fixed: 64 point                                                                      |
| Communication physical layer    |                | 100BASE-TX                                                                                               |
| Consumable current(mA)          |                | 900mA                                                                                                    |
| Weight                          |                | 122g                                                                                                     |

## System Configuration





# RTD input module

## Features

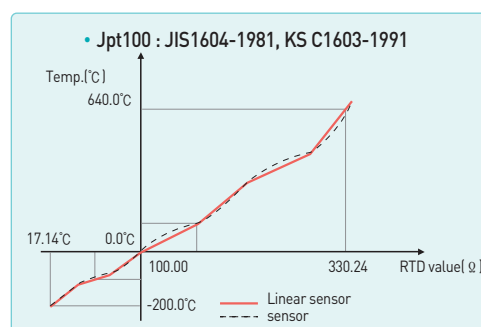
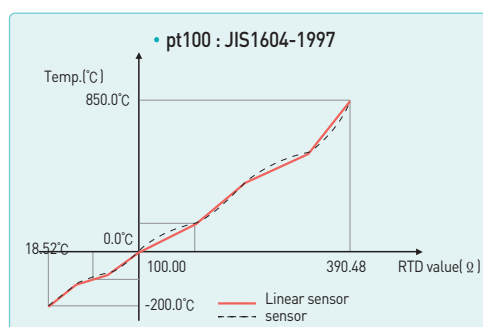
- Supports various additional functions (average, alarm, filter)
- Special module parameter setting and monitoring with XG5000
- Supports digital conversion, temperature display and user scaling
- Support Offset/Gain function(only RD8A)



## Specifications

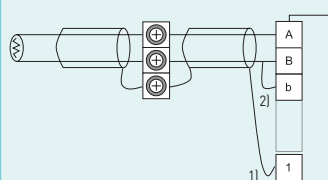
| Item                    |                                    | XGF-RD4A                        | XGF-RD4S                      | XGF-RD8A                      |
|-------------------------|------------------------------------|---------------------------------|-------------------------------|-------------------------------|
| No. of input channel    |                                    | 4 channels                      | 4 channels                    | 8 channels                    |
| Input sensor type       | Pt100                              | JIS C1604-1997                  | JIS C1604-1997                | JIS C1604-1997                |
|                         | JPt100                             | JIS C1604-1981, KS C1603-1991   | JIS C1604-1981, KS C1603-1991 | JIS C1604-1981, KS C1603-1991 |
|                         | PT1000                             | -                               | JIS C1604-1997                | -                             |
|                         | NI100                              | -                               | DIN 43760-1987                | -                             |
| Temperature input range | Pt100                              | -200.0 ~ 850.0℃                 | -200.0 ~ 850.0℃               | -200.0 ~ 850.0℃               |
|                         | JPt100                             | -200.0 ~ 640.0℃                 | -200.0 ~ 640.0℃               | -200.0 ~ 640.0℃               |
|                         | PT1000                             | -                               | -200.0 ~ 850.0℃               | -                             |
|                         | NI100                              | -                               | -60.0 ~ 180.0℃                | -                             |
| Digital output          | Temperature display<br>(unit: 0.1) | Pt100                           | -2,000 ~ 8,500                | -2,000 ~ 8,500                |
|                         |                                    | JPt100                          | -2,000 ~ 6,400                | -2,000 ~ 6,400                |
|                         |                                    | PT1000                          | -                             | -                             |
|                         |                                    | NI100                           | -                             | -                             |
|                         | Scaling display<br>(Customize)     | 0 ~ 65535                       |                               |                               |
|                         |                                    | -32768 ~ 32767                  |                               |                               |
|                         | Accuracy                           | Normal temp.(25℃)               | ±0.2%                         | ±0.1%                         |
| Full temp.(0~55℃)       |                                    | ±0.3%                           | ±70ppm/℃                      | ±0.3%                         |
| Conversion speed        |                                    | 40ms / channel                  |                               |                               |
| Insulation              | Channel to Channel                 | Non-insulation                  | Insulation                    | Non-insulation                |
|                         | Terminal to PLC Power              | Photo-coupler                   |                               |                               |
| Wiring method           |                                    | 3-wire                          | 4-wire                        | 3-wire                        |
| Function                | Average                            | Time average (320~64000ms)      |                               |                               |
|                         |                                    | Counting average(2~64000 count) |                               |                               |
|                         |                                    | Moving average(2~100 samples)   |                               |                               |
|                         | Alarm                              | Process alarm                   |                               |                               |
|                         |                                    | Input changing rate alarm       |                               |                               |
|                         |                                    | Disconnection detection         |                               |                               |
|                         | Offset / Gain                      | -                               |                               | 0                             |
| Filtering               | Digital filter (160~64000ms)       |                                 |                               |                               |
| Terminal block          |                                    | 18-point terminal block         |                               |                               |
| Current consumption     |                                    | 5V: 450mA                       | 5V: 720mA                     | 5V: 450mA                     |
| Weight [g]              |                                    | 150g                            |                               |                               |

## Characteristics of temperature conversion

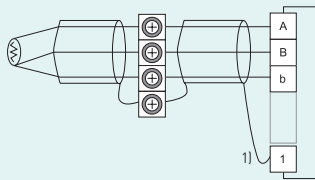


## Wiring

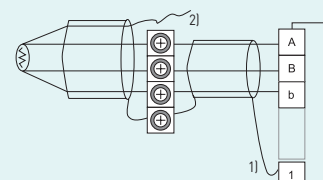
### • Connection with 2-Wire type sensor



### • Connection with 3-Wire type sensor



### • Connection with 4-Wire type sensor



1) When sensor and compensating wire are shielded, shield-connection to FG terminal of the module is available.

2) The wiring of 4-wire type sensor is identical with the wiring of 3-wire type sensor. 3 wires is connected to the module. But the other wire is not connected with the module.

# Thermocouple module



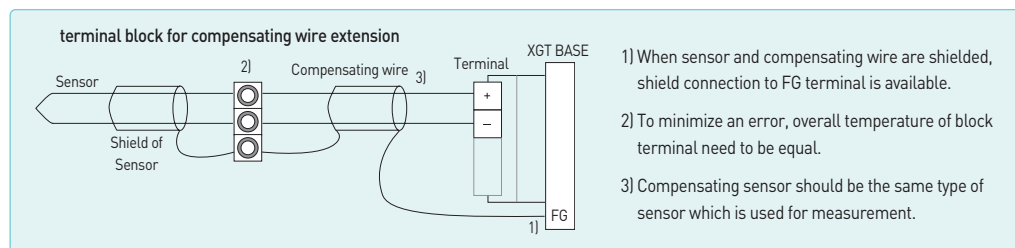
## Features

- Insulation between channels
- $\pm 0.1\%$  (25°C) constant density
- Supports various input sensor (supporting C-type sensor)
- Various additional functions (average, filter, alarm, max/min value display)
- Special module parameter setting and monitoring with XG5000

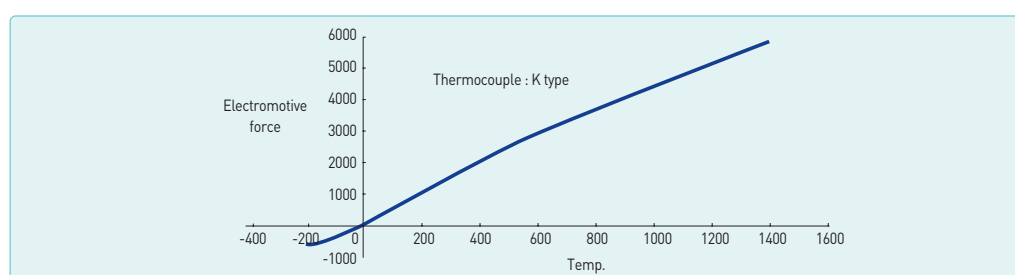
## Specifications

| Item                    | XGF-TC4S                                        |                                                                   |
|-------------------------|-------------------------------------------------|-------------------------------------------------------------------|
| Input channels          | 4 channels                                      |                                                                   |
| Input sensor type       | K, J, E, T, B, R, S, N, C                       | JIS C1602-1995ITS-90                                              |
| Input temperature range | K                                               | -250 ~ 1350°C                                                     |
|                         | J                                               | -200 ~ 1200°C                                                     |
|                         | E                                               | -250 ~ 1000°C                                                     |
|                         | T                                               | -250 ~ 400°C                                                      |
|                         | B                                               | 400 ~ 1800°C                                                      |
|                         | R                                               | -50 ~ 1750°C                                                      |
|                         | S                                               | -50 ~ 1750°C                                                      |
|                         | N                                               | -270 ~ 1300°C                                                     |
| Digital output          | C                                               | 0 ~ 2300°C                                                        |
|                         | Temperature display (unit: 0.1)                 | Display down to the first decimal place [0.1°C]                   |
|                         | Scaling (User range setting)                    | 0 ~ 65535<br>-32768 ~ 32767                                       |
| Accuracy                | Normal temp. (25°C)                             | $\pm 0.1\%$                                                       |
|                         | Temperature coefficient (Operating temp. range) | Some section can permit 0.5%<br>$\pm 100\text{ppm}^\circ\text{C}$ |
| Conversion speed        | 40ms/ channel                                   |                                                                   |
| Insulation              | Between channels                                | Insulation                                                        |
|                         | Between terminals and power                     | Insulation(Photo-Coupler)                                         |
| Compensation            | Automatic compensation by RJC sensing (PT100)   |                                                                   |
|                         | Compensation degree                             | $\pm 1.0\%$                                                       |
| Function                | Average                                         | Average time (320 ~ 6400ms)                                       |
|                         |                                                 | Average number (2 ~ 64000)                                        |
|                         |                                                 | Average move (2 ~ 100)                                            |
|                         | Alarm                                           | Process Alarm                                                     |
|                         |                                                 | Change rate alarm                                                 |
|                         |                                                 | Burn-out detection                                                |
| Terminal block          | Max./Min. values display                        | Digital filter (160 ~ 64000ms)                                    |
|                         |                                                 | Max./Min. values display                                          |
| Terminal block          | 18-point terminal block                         |                                                                   |
| Current consumption     | 5V : 610mA                                      |                                                                   |
| Weight (kg)             | 0.150                                           |                                                                   |

## Input wiring



## Characteristics of I/O conversion





# Temperature controller

## Features

### XGF-TC4UD

- Optimum temperature control
- Universal input: TC, RTD, Voltage, Current
- Isolated input
- Output: Current/Transistor
- Parameter setting via dedicated software: TG-CON
- Variety of control types
  - PID control
  - Cascade control
  - On/ Off control
- Disconnection detection
- Various input functions: Bias, Filter, Square root
- Auto-tuning

### XGF-TC4RT

- Input RTD : Pt100, JPt100, Pt1000
- Control Type : PID, On / Off Control



## Specifications

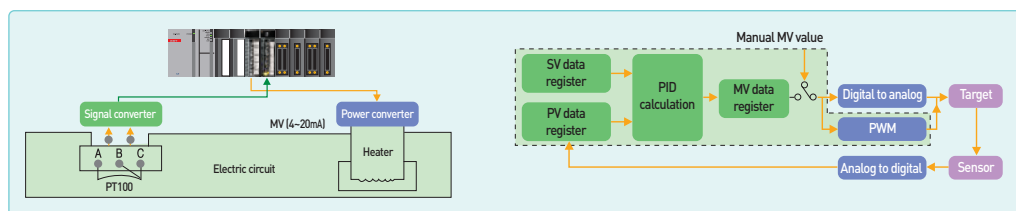
| Item          | XGF-TC4UD                                    |               |                | XGF-TC4RT     |
|---------------|----------------------------------------------|---------------|----------------|---------------|
| No. of loop   | 4 loops                                      |               |                | 4 loops       |
| Input         | Thermo couple                                | K             | -200 ~ 1300 °C | -             |
|               |                                              |               | 0 ~ 500 °C     |               |
|               |                                              | J             | -200 ~ 1200 °C |               |
|               |                                              |               | 0 ~ 500 °C     |               |
|               |                                              | E             | -200 ~ 1000 °C |               |
|               |                                              | T             | -200 ~ 400 °C  |               |
|               |                                              | B             | 400 ~ 1800 °C  |               |
|               |                                              | R             | 0 ~ 1700 °C    |               |
|               |                                              | S             | 0 ~ 1700 °C    |               |
|               |                                              | N             | -200 ~ 1300 °C |               |
|               |                                              | C(W5Re/W26Re) | 0 ~ 2300 °C    |               |
|               |                                              | PL II         | 0 ~ 1300 °C    |               |
|               |                                              | L             | -200 ~ 900 °C  |               |
|               |                                              | U             | -200 ~ 600 °C  |               |
|               | RTD                                          | Pt100         | -200 ~ 850 °C  | -200 ~ 850 °C |
|               |                                              | JPt100        | -200 ~ 600 °C  | -200 ~ 600 °C |
|               |                                              | Pt1000        | -200 ~ 800 °C  | -200 ~ 800 °C |
|               | Voltage                                      | DC mV         | 0 ~ 10mV       | -             |
|               |                                              |               | 0 ~ 100mV      |               |
|               |                                              | DC V          | 0 ~ 1V         | -             |
|               |                                              |               | 1 ~ 5V         | -             |
|               |                                              |               | 0 ~ 5V         |               |
|               |                                              |               | 0 ~ 10V        |               |
|               |                                              |               | -5V ~ 5V       |               |
|               |                                              |               | 10V ~ 10V      |               |
|               | Current                                      | DC mA         | 4 ~ 20mA       | -             |
|               |                                              |               | 0 ~ 20mA       | -             |
| Input channel | 4 channels(Input type selection per channel) |               |                | -             |



## Specifications

| Item                       | XGF-TC4UD                                                              |                                               |                                                                              |                       | XGF-TC4RT                      |  |
|----------------------------|------------------------------------------------------------------------|-----------------------------------------------|------------------------------------------------------------------------------|-----------------------|--------------------------------|--|
| Resolution                 | Resolution Refer to the user's manual (Resolution for each input type) |                                               |                                                                              |                       |                                |  |
| Cold junction compensation | Compensation                                                           |                                               | Automatic compensation by RJC sensor                                         |                       | -                              |  |
|                            | Precision                                                              |                                               | ± 0.2℃                                                                       |                       | -                              |  |
| Digital output             | Temperature display                                                    |                                               | 0.1℃/1℃ (Selection by software)                                              |                       | 0.1℃                           |  |
|                            | Linear display                                                         |                                               | 0~1000                                                                       |                       | -                              |  |
|                            | Scale display                                                          |                                               | Only for voltage/current<br>input Range : -3,000~3,000 Setting range: 0~3000 |                       | -                              |  |
| Conversion speed           | 200ms / module                                                         |                                               |                                                                              |                       | 400ms / 4loops                 |  |
| Control type               | PID, On/Off control                                                    |                                               |                                                                              |                       |                                |  |
| Parameter                  | Set value (SV)                                                         |                                               | Selection per input type                                                     |                       |                                |  |
|                            | Gain                                                                   |                                               | 0 : ON/OFF control, Real type                                                |                       | Range : 0.000~10000.000        |  |
|                            | Integrated time                                                        |                                               | 0 : No Differential control, Real type                                       |                       | Range : 0.000~10000.000        |  |
|                            | Differential time                                                      |                                               | 0 : No Integrated control, Real type                                         |                       | Range : 0.000~10000.000        |  |
| Output                     | No. of output channel                                                  |                                               | 8 channels (PWM or analog output)                                            |                       | 4 channels                     |  |
|                            | PWM                                                                    | Rated load voltage                            | DC 24V                                                                       |                       |                                |  |
|                            |                                                                        | Max. current point                            | 0.1A points                                                                  |                       |                                |  |
|                            |                                                                        | On voltage drop                               | DC 0.3V or less                                                              |                       |                                |  |
|                            |                                                                        | Off leakage current                           | 0.1mA or less                                                                |                       |                                |  |
|                            |                                                                        | Response time                                 | ON ⇒ OFF                                                                     | 1ms or less           |                                |  |
|                            |                                                                        |                                               | OFF ⇒ ON                                                                     | 1ms or less           |                                |  |
|                            |                                                                        | Periodic                                      | 0.5~120.0sec (resolution: 0.5sec)                                            |                       | 0.5~100.0sec(resolution: 0.1s) |  |
|                            | Time resolution                                                        | High value between 10ms or 0.5% of full scale |                                                                              |                       |                                |  |
|                            | Analog output                                                          | Range                                         | 4~20mA                                                                       |                       |                                |  |
|                            |                                                                        | Resistance                                    | 600Ω or less                                                                 |                       |                                |  |
|                            |                                                                        | Resolution                                    | ± 1.0%, 25℃                                                                  |                       |                                |  |
| Precision                  |                                                                        | 8μA                                           |                                                                              |                       |                                |  |
| Insulation                 | Item                                                                   | Insulation                                    | Insulation withstand voltage                                                 | Insulation resistance |                                |  |
|                            | Channel - Channel                                                      | Trans                                         | 500V AC, 50/60Hz 1min,                                                       | 500V DC,              |                                |  |
|                            | Input terminal - PLC                                                   | Photocoupler                                  | Leakage 10mA or less                                                         | 10MΩ or more          |                                |  |
|                            | Current output - Current output                                        | Non insulation                                |                                                                              |                       |                                |  |
|                            | External power- Output                                                 |                                               |                                                                              |                       |                                |  |
| Warm-up                    | 20min or more                                                          |                                               |                                                                              |                       | -                              |  |
| Terminal                   | 18 points terminal                                                     |                                               |                                                                              |                       |                                |  |
| Power                      | 5V, DC 24V (external)                                                  |                                               |                                                                              |                       |                                |  |
| Current consumption        | DC 5V : 900mA (Internal)<br>DC 24V : 300mA (external)                  |                                               |                                                                              |                       | DC 5V: 310mA<br>DC 24V: 28mA   |  |

## Example : Constant temperature



## XG-TCON

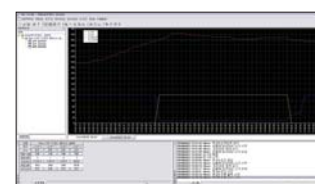
- The configuration tool for the temperature control module
- Easy parameter settings, data monitoring and trend-monitor support
- Auto-tuning operation command to speed up the system is set up and test operation



Data Monitor



Parameter setting(input parameter)



Trend monitor



# Event input module

## Features

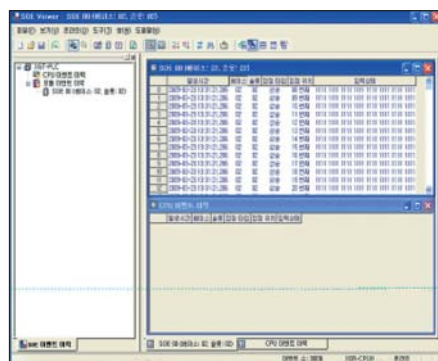
- SOE: Sequence Of Events Recorder
- I/O information collection to analyze the control system in Generation and Transformer
- Event collection in every 1ms
- Max. 300ea data available
- Data retain by built-in memory
- Max. installable module: 16ea
- Event monitoring of history through SOE Viewer



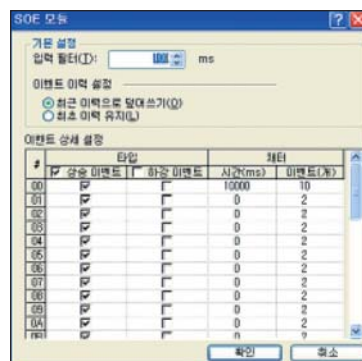
## Specifications

| Item                         |                      | Specifications                                                                                                       |
|------------------------------|----------------------|----------------------------------------------------------------------------------------------------------------------|
|                              |                      | XGF-S0EA                                                                                                             |
| No. of input point           |                      | 32 points                                                                                                            |
| Insulation method            |                      | Photo-Coupler Insulation                                                                                             |
| Memory size                  |                      | 1Mbit                                                                                                                |
| The first event setting time |                      | CPU RTC : 1 ms ( $\pm 2$ ms : delay between modules)<br>RS-422 IRIG-B : 1 ms ( $\pm 0.5$ ms : delay between modules) |
| Rated input voltage          |                      | DC24V                                                                                                                |
| Rated input current          |                      | Approx. 4mA / points                                                                                                 |
| Voltage range                |                      | DC20.4 ~ 28.8V(5% and lower ripple rate)                                                                             |
| On voltage/ On current       |                      | DC19V and higher / 3 mA and higher                                                                                   |
| Off voltage/ Off current     |                      | DC11V and lower / 1.7 mA and lower                                                                                   |
| Input resistance             |                      | Approx. 5.6 k $\Omega$                                                                                               |
| Response time (ms)           | Off $\rightarrow$ On | 100us+Input filter time(User setting: 0~100ms)                                                                       |
|                              | On $\rightarrow$ Off | 150us+Input filter time(User setting: 0~100ms)                                                                       |
| Clock Synchronization        |                      | CPU RTC or RS-422 by IRIG-B format                                                                                   |
| Withstand voltage            |                      | AC560V rms / 3 Cycle (altitude 2000m)                                                                                |
| Insulation resistance        |                      | 10M $\Omega$ and higher (DC500V)                                                                                     |
| COMM method                  |                      | 32point / COM                                                                                                        |
| Current consumption          |                      | 0.4 A (MAX)                                                                                                          |
| Operation display            |                      | LED On with Input On                                                                                                 |
| External connection method   |                      | 40point connector                                                                                                    |
| Size(mm)                     |                      | 27x98x90                                                                                                             |
| Weight                       |                      | 0.2 kg                                                                                                               |

## SOE Viewer



Monitoring window



Parameter setup

# Datalog module

## Features

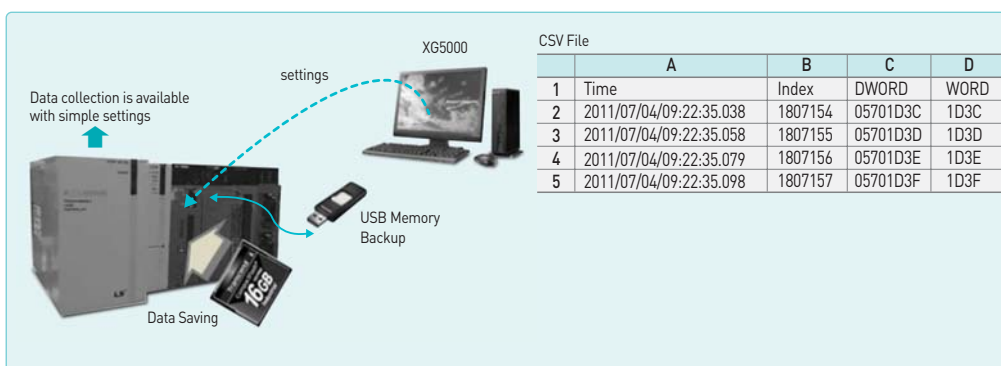
- Capable to easily save PLC device data without PC
- Capable to save PLC control data without missing any change
- Data can be saved whenever scanning is done or they can be saved at an interval of several ms(milliseconds).
- Capable to save a large volume of data file
- Long-term data saving is available since CF card and USB memory with a large volume of up to 16GB can be used.



## Specifications

| Item                              |                              | XGF-DL16A                                                                                                                   |    |    |     |      |
|-----------------------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------|----|----|-----|------|
| CF Card                           | Voltage of power supply      | 3.3V ± 5%                                                                                                                   |    |    |     |      |
|                                   | Card Type                    | CF200I(Transcend's Industrial CF card)                                                                                      |    |    |     |      |
|                                   | Compatibility Capacity       | 1, 2, 4, 8, 16Gbyte                                                                                                         |    |    |     |      |
|                                   | Number of mountable cards    | 1                                                                                                                           |    |    |     |      |
|                                   | Caution                      | Use only industrial CF cards manufactured by Transcend                                                                      |    |    |     |      |
| USB Memory                        | Voltage of power supply      | 5.0V ± 5%                                                                                                                   |    |    |     |      |
|                                   | Memory Type                  | USB 2.0 (Host function)                                                                                                     |    |    |     |      |
|                                   | Compatibility Capacity       | 1, 2, 4, 8, 16Gbyte (Please use USB capacity above CF card capacity)                                                        |    |    |     |      |
|                                   | Saving Method                | Auto Saving through PnP function<br>(Activation of PnP auto duplication: when USB is mounted, when power is supplied again) |    |    |     |      |
|                                   | Number of mountable memories | 1(Unavailable to support USB extension cables)                                                                              |    |    |     |      |
| Data Type                         | BOOL                         | 0 or 1                                                                                                                      |    |    |     |      |
|                                   | BYTE                         | 00 ~ FF                                                                                                                     |    |    |     |      |
|                                   | WORD                         | 0000 ~ FFFF                                                                                                                 |    |    |     |      |
|                                   | DWORD                        | 00000000 ~ FFFFFFFF                                                                                                         |    |    |     |      |
|                                   | LWORD                        | 00000000 00000000 ~ FFFFFFFF FFFFFFFF                                                                                       |    |    |     |      |
|                                   | SINT                         | -128 ~ 127                                                                                                                  |    |    |     |      |
|                                   | INT                          | -32,768 ~ 32,767                                                                                                            |    |    |     |      |
|                                   | DINT                         | -2,147,483,648 ~ 2,147,483,647                                                                                              |    |    |     |      |
|                                   | LINT                         | -576,460,752,303,423,488 ~ 576,460,752,303,423,487                                                                          |    |    |     |      |
|                                   | USINT                        | 0 ~ 255                                                                                                                     |    |    |     |      |
|                                   | UINT                         | 0 ~ 65,535                                                                                                                  |    |    |     |      |
|                                   | UDINT                        | 0 ~ 4,294,967,295                                                                                                           |    |    |     |      |
|                                   | ULINT                        | 0 ~ 1,152,921,504,606,846,975                                                                                               |    |    |     |      |
|                                   | REAL                         | -3.402823466e+038 ~ -1.175494351e-038 or 0 or 1.175494351e-038 ~ 3.402823466e+038                                           |    |    |     |      |
|                                   | LREAL                        | -1.7976931348623157e+308 ~ -2.2250738585072014e-308 or 0 or 2.2250738585072014e-308 ~ 1.7976931348623157e+308               |    |    |     |      |
| Data Saving                       | STRING                       | Fixed letters (Maximum 8 letters)                                                                                           |    |    |     |      |
|                                   | Number of Settings           | Maximum 8                                                                                                                   |    |    |     |      |
|                                   | Number of Data               | Maximum 32                                                                                                                  |    |    |     |      |
|                                   | Saving Kind                  | Saved by the ladder program                                                                                                 |    |    |     |      |
|                                   | File Type                    | CSV file(Extension: csv)                                                                                                    |    |    |     |      |
| SavingSpeed                       | Number of Saving Files       | Total 800 (when using 16Gbyte CF memory)                                                                                    |    |    |     |      |
|                                   | Processing Score(word)       | 4                                                                                                                           | 16 | 64 | 256 | 1024 |
|                                   | Processing Speed(ms)         | 1                                                                                                                           | 4  | 10 | 30  | 120  |
| Time to Initialize CF card        | Capacity(Gbyte)              | 1                                                                                                                           | 2  | 4  | 8   | 16   |
|                                   | Time(s)                      | 10                                                                                                                          | 20 | 40 | 60  | 120  |
| Collection Interval               |                              | 1 ~ 9999999 ms (In consecutive saving)                                                                                      |    |    |     |      |
| In/output Occupation Score        |                              | 32 points 1 slot(Input 22 points, output 10 points)                                                                         |    |    |     |      |
| Clock                             |                              | Synchronized at PLC CPU time whenever it is scanned                                                                         |    |    |     |      |
| DC5V Internal Consumption Current |                              | 0.53A                                                                                                                       |    |    |     |      |
| External Size                     |                              | 98(H)[mm] x 27(W)[mm] x 90(D)[mm]                                                                                           |    |    |     |      |
| Weight                            |                              | 0.13kg                                                                                                                      |    |    |     |      |

## System Configuration







# Software

Software innovation for integrated solution.

XG5000 is the optimum software which can cover various programming needs, debugging, and easy maintenance. Especially, XG-PD achieves customer satisfaction with useful maintenance tool by internet.

XG-PD

A diagram consisting of four overlapping circles. The top-left circle is light blue and contains the text 'XG-PD'. The top-right circle is yellow and contains the text 'XG-PM'. The bottom-left circle is light purple and contains the text 'XG5000'. The bottom-right circle is orange and contains the text 'XG-TCON'. The circles overlap in a central area.

XG-PM

XG5000

XG-TCON

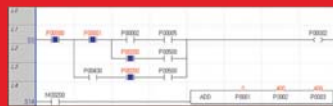




# Programming software XG5000



- Program editing & Engineering software
- Windows-based easy operation
- Multi-PLC, Multi-programming support
- Various monitoring and diagnosis functions
- Windows 2000, XP (Limited use in Windows 98, ME)



Ladder monitor

| PLC | Type | Variable | Value    | Variable | Comment  |
|-----|------|----------|----------|----------|----------|
| 1   | PLC  | 001      | 00000000 | 001      | Variable |
| 2   | PLC  | 001      | 00000000 | 001      | Variable |
| 3   | PLC  | 001      | 00000000 | 001      | Variable |
| 4   | PLC  | 001      | 00000000 | 001      | Variable |
| 5   | PLC  | 001      | 00000000 | 001      | Variable |
| 6   | PLC  | 001      | 00000000 | 001      | Variable |
| 7   | PLC  | 001      | 00000000 | 001      | Variable |
| 8   | PLC  | 001      | 00000000 | 001      | Variable |
| 9   | PLC  | 001      | 00000000 | 001      | Variable |
| 10  | PLC  | 001      | 00000000 | 001      | Variable |
| 11  | PLC  | 001      | 00000000 | 001      | Variable |
| 12  | PLC  | 001      | 00000000 | 001      | Variable |

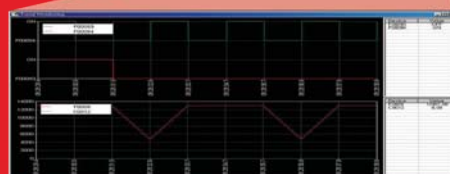
Variable monitor



Forced I/O



System monitor



Trend monitor



Special module monitor

## PROGRAMMING XG5000

### Easy how to use

Letter type, color, short key, tool bar

Convenient editing

Undo, Redo, Excel editing

Structuralized program

Scan, task (Initialization, normal cycle, external contact point, internal device)

Various monitoring

Special module, trend, user-event, etc

## NETWORK SET UP, DIAGNOSIS XG-PD

Communication module parameter setting

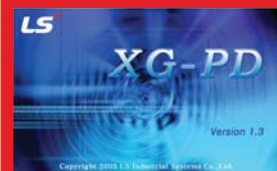
Basic, high-speed link parameter setting

System diagnosis and monitoring

Ping/Self test

Monitoring of sending/receiving frame

Display of status and diagnosis of each module



## POSITIONING XG-PM

Positioning & Operation data

CAM Profile

Monitoring, Simulation, Trace



## TEMPERATURE XG-TCN

Positioning & Auto tuning

Operation & Data condition monitoring

Trends can be monitored





## Features

- Program editing & Engineering software
- Windows-based easy operation
- Multi-PLC, Multi-program, Multi-task in one project
- Various monitoring and diagnosis functions
- Windows 2000, XP (Limited use in Windows 98, ME)



## Programming tools

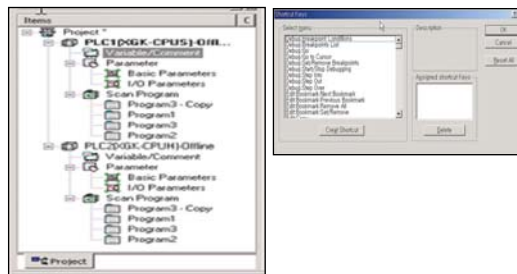
**MPMP (Multi-PLC Multi-programming)**  
Different PLC systems can be edited, monitored, and managed simultaneously in one project.

### Drag & Drop

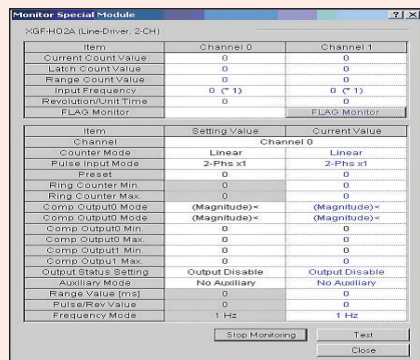
It is available in project, variable/comment, ladder diagram editing and monitoring.

### User-defined shortcut keys

User-defined shortcut keys increase editing convenience.

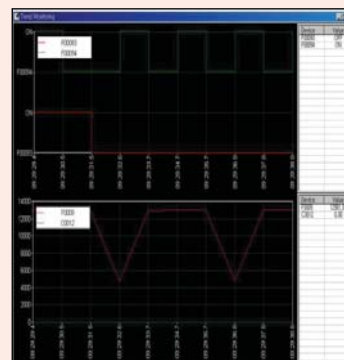


## Monitoring



### Special module monitoring

Monitoring and test-run of various special modules are available.

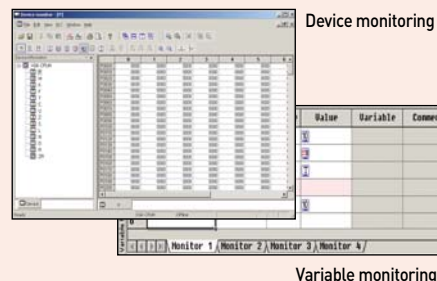


### Trend monitoring

The changing value of specific device can be monitored and saved as a file.



### System monitoring



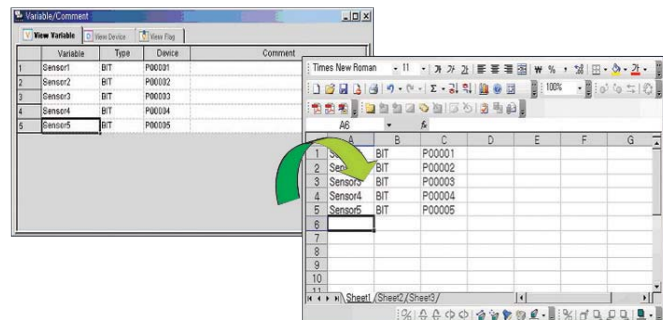
### Variable monitoring

## System requirement

| Item        | System requirement                                         |
|-------------|------------------------------------------------------------|
| O/S         | Windows 2000, XP [Limited use in Windows 98, ME]           |
| CPU         | IBM compatible PC with Min. 200MHz Pentium processor       |
| Memory      | Min. 128M                                                  |
| HDD         | 100 MB (Free memory space)                                 |
| Serial port | Communication port for program transmission (RS-232C, USB) |
| Printer     | Compatible with Windows 98 or later                        |
| Mouse       | Compatible with Windows 98 or later                        |

## Variable and programming editing

- Data input like EXCEL
- Cell-unit edit
- Auto Fill function
- Compatible with Microsoft Excel
- Redo and Undo (Unlimited)
- Segment screen edit

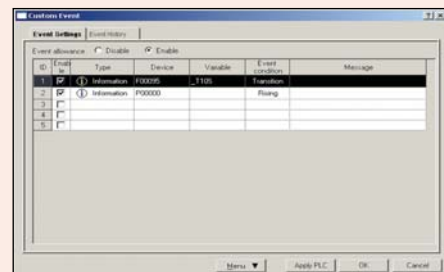


## Improved diagnosis and maintenance



### Module exchange wizard

It supports safe module exchange during 'RUN' mode.



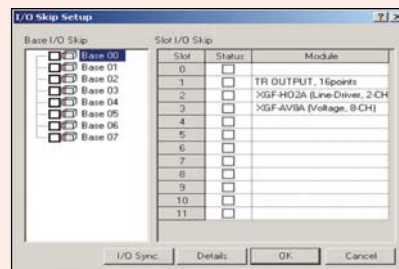
### User-defined event

By registering user-defined event, users can read the record of specified event and use it for PLC operation and debugging



### Forced I/O

The status of external output device can be checked without program. And when input device breaks down, forced input function specifies ON/OFF and can operate the system without interruption of equipment.



### I/O skip, Error Mask

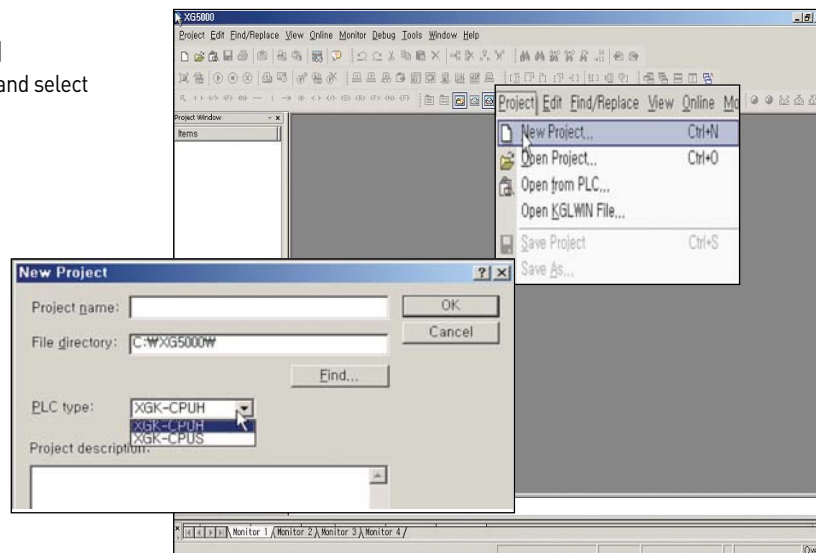
I/O inspection and renewal can be set for specific module and continuous operation is available when an error is occurred.





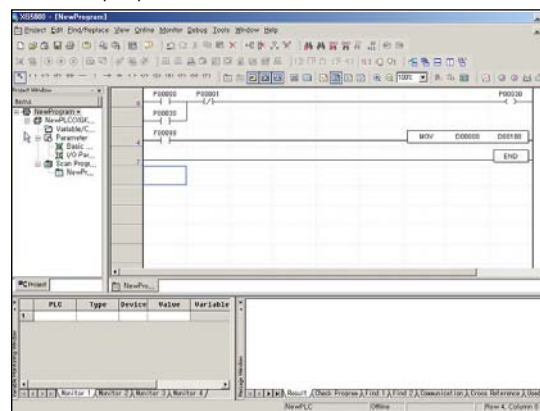
## Program editing

- Start XG5000
- Select [New Project]
- Write project name and select CPU type



## Configure ladder lines as below with ladder input tool bar

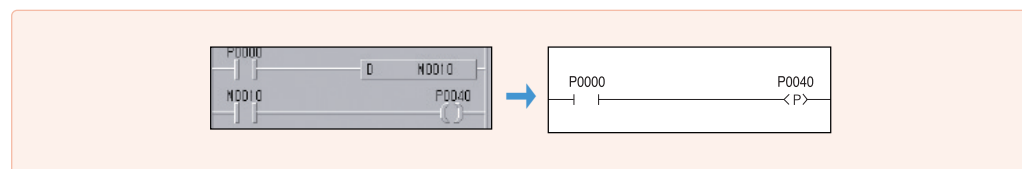
- Select input point and command with ladder tool bar.



| Icon | Description                                                       | Short key |
|------|-------------------------------------------------------------------|-----------|
|      | Arrow mode                                                        | ESC       |
|      | Normally open contact                                             | F3        |
|      | Normally closed contact                                           | F4        |
|      | Positive transition-sensing contact (On for 1 scan when Off → On) | Shift+F1  |
|      | Negative transition-sensing contact (On for 1 scan when On → Off) | Shift+F2  |
|      | Horizontal line                                                   | F5        |
|      | Vertical line                                                     | F6        |
|      | Fill horizontal line                                              | Shift+F8  |
|      | Coil                                                              | F9        |
|      | NOT instruction contact                                           | Shift+F9  |
|      | Negated coil                                                      | F11       |
|      | SET coil                                                          | Shift+F3  |
|      | RESET coil                                                        | Shift+F4  |
|      | Positive transition-sensing coil (On for 1 scan when Off → On)    | Shift+F5  |
|      | Negative transition-sensing coil (On for 1 scan when On → Off)    | Shift+F6  |
|      | Function                                                          | F10       |

## Note) Addition of 'EDGE' detection instructions

Develop user-friendly programming through adding D, D NOT instructions (Rising EDGE, dropping EDGE) to contact and output coil.





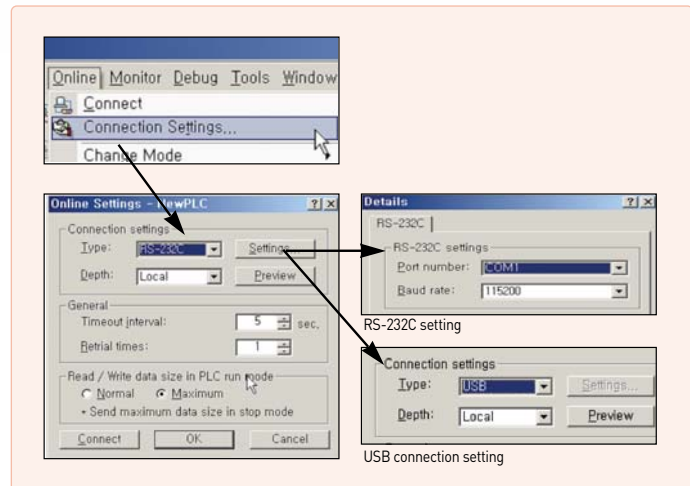
## Program download

### Connection setting

- Check a setting for connection between XGT and XG5000
- XGT supports USB and RS-232C

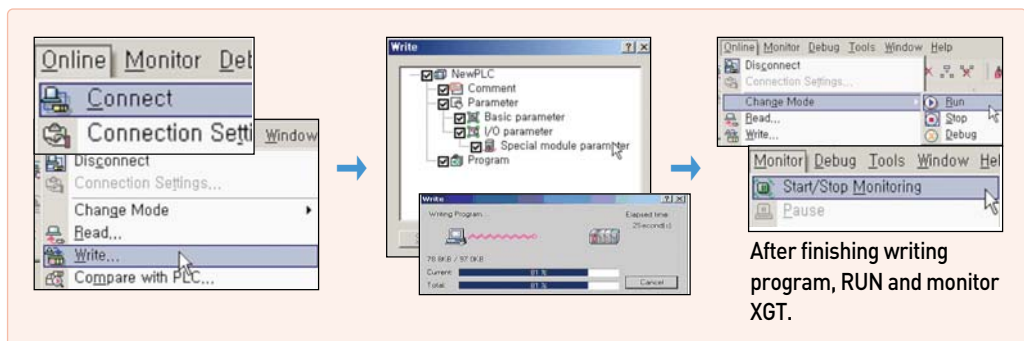
Set up communication port and download speed

\* using 'USB TO RS-232C' converter, 115,200bps connection may be unavailable depending on characteristics of converter. In this case, change the communication speed to 38,400bps.



### Connection

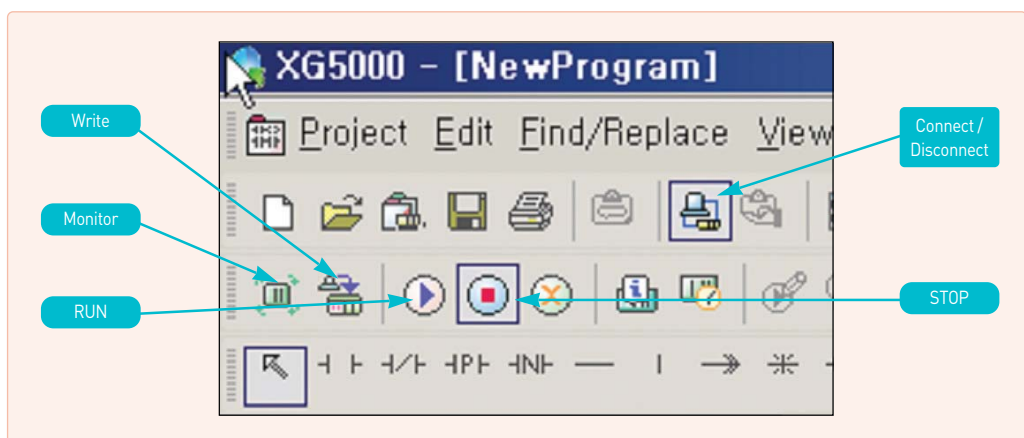
Connect to PLC and download the program as below.



After finishing writing program, RUN and monitor XGT.

### Short icon

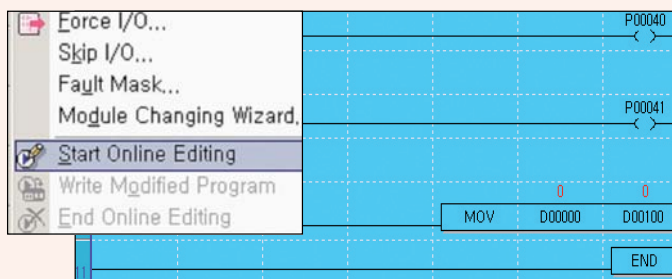
\* XGT doesn't support collective-writing monitoring for system safety.





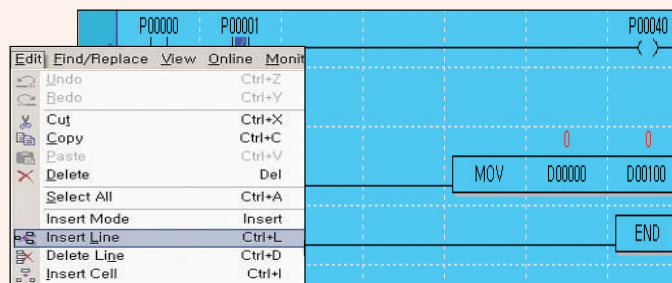
## Online Editing

Select [Start Online Editing] in Online menu.



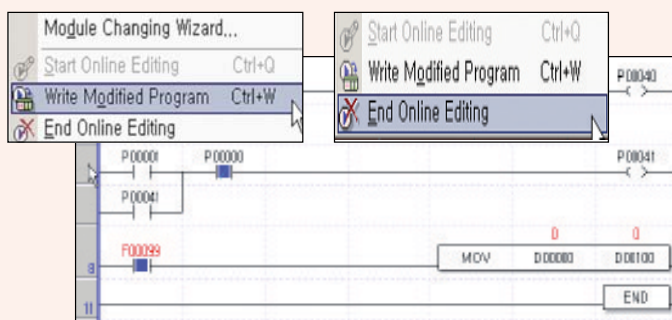
When starting Online Editing, the screen color becomes blue.

Modify the program.



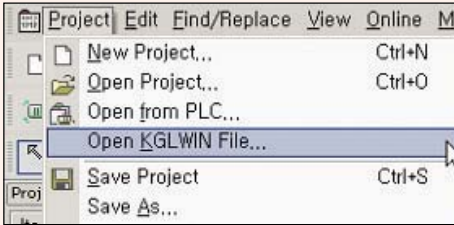
Edit menu

After finishing modifying the program, select [Write Modified Program] and [End Online Editing].

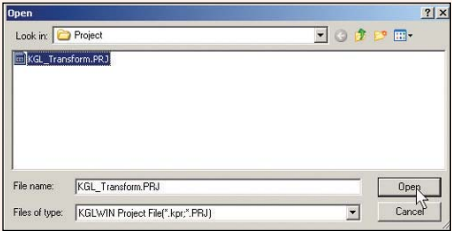


After finishing 'Online Editing'

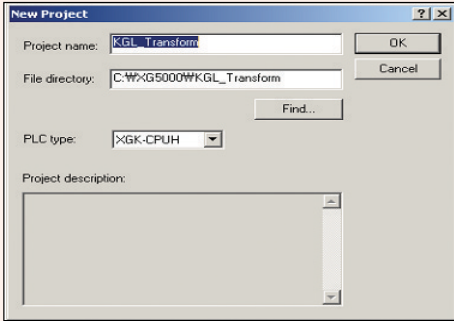
Open a project  
written in  
KGL-WIN



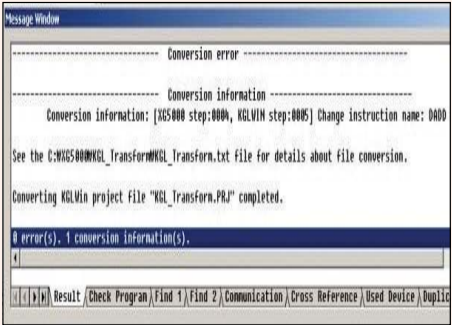
Select [Open KGLWIN file] in project.



Select the file.

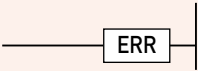


Select the type of XGT CPU.



Check converted information in the message window.

**Note)** Dedicated instructions and special parameters for MASTER-K cannot be converted.  
Mostly General instructions and descriptions are converted.  
Information impossible to be converted is displayed as ERR.



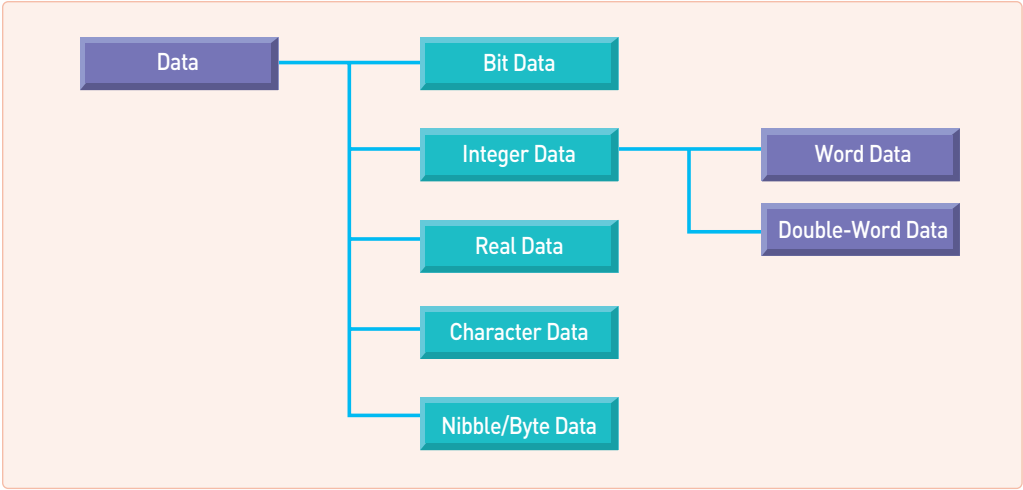
• Content of main special flag (F) change

| MASTER-K | XGT | Specifications            |
|----------|-----|---------------------------|
| F10      | F99 | ON regularly              |
| F11      | F9A | OFF regularly             |
| F12      | F9B | ON during first one scan  |
| F13      | F9C | OFF during first one scan |

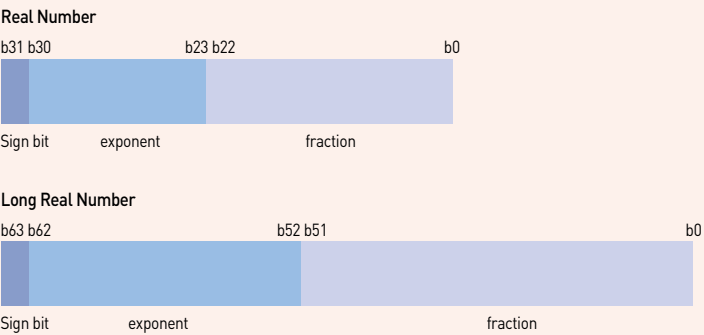
For more detailed information, refer to user's manual.



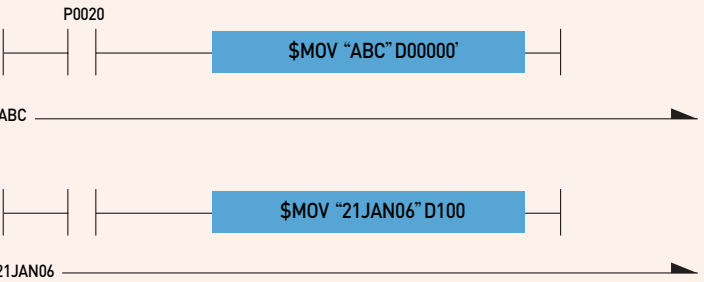
Data type



- Nibble: 4-bit unit data
- Byte: 8-bit unit data
- Real Data: 32-bit/64-bit floating point data



- Character Data: Saving numbers, alphabets, symbols as a type of ASCII code



|      |      |      |
|------|------|------|
| D100 | 0x31 | 0x32 |
| D101 | 0x41 | 0x4A |
| D102 | 0x30 | 0x4E |
| D103 | 0x00 | 0x36 |
| D104 | 0x00 | 0x36 |



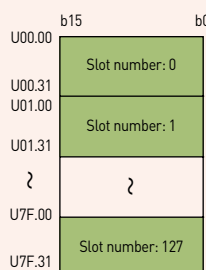
## Device type

| Device                | Size          | Bit Contact         | Word Data                           | Name                   |
|-----------------------|---------------|---------------------|-------------------------------------|------------------------|
| P                     | 32768 points  | P00000 ~ P2047F     | P0000 ~ P2047                       | I/O Relay              |
| M                     | 32768 points  | M00000 ~ M2047F     | M0000 ~ M2047                       | Assistant Relay        |
| L                     | 180224 points | L00000 ~ L11263F    | L0000 ~ L11263                      | Link Relay             |
| N *1)                 | 21K words     | N/A                 | N00000 ~ N21503                     | Comm. data register    |
| K                     | 32768 points  | K00000 ~ K2047F     | K0000 ~ K2047                       | Keep Relay             |
| F                     | 32768 points  | F00000 ~ F2047F     | F0000 ~ F2047                       | Special Relay          |
| T *2)                 | 2048 points   | T0000 ~ T2047       | T0000 ~ T2047                       | Timer                  |
| C *3)                 | 2048 points   | C0000 ~ C2047       | C0000 ~ C2047                       | Counter                |
| U                     | 3072 words    | U00.00.0 ~ U7F.31.F | U00.00 ~ U7F.31                     | Special Module Counter |
| Z                     | 128 words     | N/A                 | Z0 ~ Z127                           | Index Register         |
| S                     | 128 groups    | S00.00 ~ S127.99    | N/A                                 | Step Control Relay     |
| D                     | 32K words     | D00000.0 ~ D32767.F | D00000 ~ D32767                     | Data Register          |
| R (Internal RAM) *4)  | 32K words     | R00000.0 ~ R32767.F | R00000 ~ R32767                     | File Register          |
| ZR (Internal RAM) *5) | 32K words     | N/A                 | ZR00000 ~ ZR65535                   | File Register          |
| R (Expanded)          | 1M words      | N/A                 | Available as much as extension size | File Register          |
| ZR (Expanded)         | 1M words      | N/A                 | Available as much as extension size | File Register          |

Note) 1. When communication module is not used, it can be used as internal data area.  
2. Word data in timer shows a current value of relevant bit contact.  
3. Word data in counter shows a current value of relevant bit contact  
4. Even when using more than 32K words internal RAM, bit contact available to display is R00000.0~R32767.F Also word data enable to be displayed in the range of R00000.0~R32767.F  
5. When internal RAM is more than 32K words, bit contact can be in the range of ZR00000.0~ZR32767.F and word data can be displayed as much as the size of internal RAM

## Special module register U

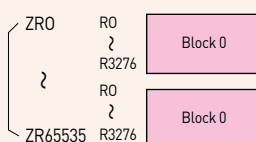
Register for reading data from special module mounted in slot



- Assigning 32 words per slot in U area
- Bit type display available  
Ex) U93.12.x (x: Bit location, Hexadecimal display)
- Available to read/write internal memory value of special module without using PUT (P), GET (P), PUTS (P), GETS (P)
- Basic display in U area  
Ex) Uxy.z  
x: Base number (0~7)  
y: Slot number (0~F)  
z: Word number of special module internal memory

## File register R, ZR

Register that a recorded value is not deleted when power failure is occurred. File register is used for data backup or data storage.



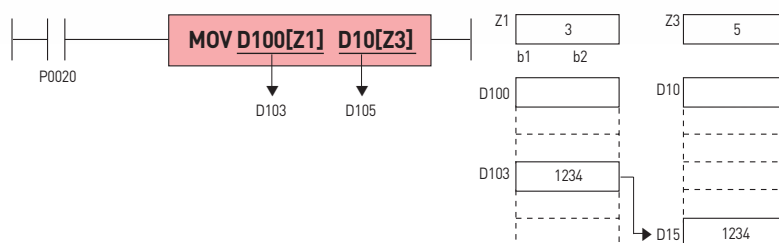
- R: Block unit access
- ZR: Entire file register access
- Internal RAM (Temporary preservation): 32K words
- FLASH (Permanent preservation): 1M words



## Index register

Index register sets up devices using index function.

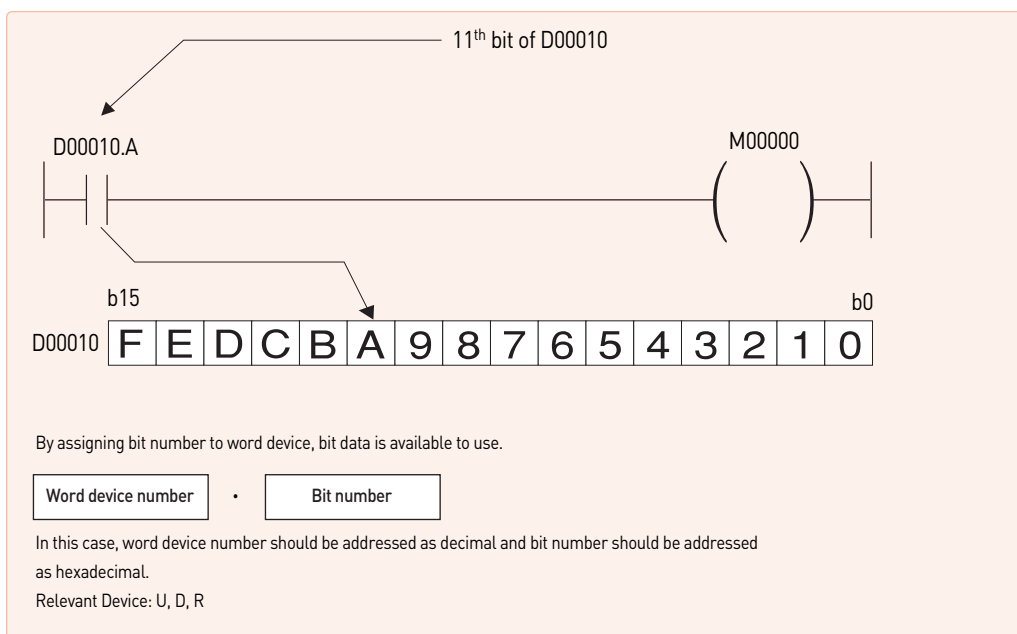
The sum of index register value and directly specified device number is real device number.



## Available Device

- Bit Device: P, M, L, K, F, T, C
  - Word Device: U, D, R, ZR, N, present value of T and present value of C
- Ex) MOV T1[Z1] D10 : If Z1 is 5, present value of T(1+5)=T6 is transmitted to D10.  
Ex) LOAD D10[Z1].5 : If Z1 is 5, LOAD(10+5).5 => LOAD D15.5 is set.

## Bit specifying method of word device



## Instructions

| Classification   | Designations | Symbol    | Description         | No. of step |
|------------------|--------------|-----------|---------------------|-------------|
| 16 Bits transfer | MOV          | MOV S D   | (S) → (D)           | 2           |
|                  | MOVP         | MOVP S D  |                     | 3           |
| 32 Bits          | DMOV         | DMOV S D  | (S+1, S) → (D+1, D) | 2           |
|                  | DMOVP        | DMOVP S D |                     |             |
|                  |              |           | (S+3, S+2, S+1, S)  |             |

① **Classification:** Classifies instructions into applications.

② **Designations:** Displays instruction names to be used in program.

- Display rules: Instructions shall be basically displayed in word unit. According to data size, operation characteristics, real number data process, text process, the rules are as follows;
- Based on Data Size & Type
  - D: Double Word related instruction.
  - R: Real Number related instruction.
  - L: Long Real Number related instruction.
  - However, LMOV is 64 Bits transfer instruction.
  - \$: String related instruction.
  - G: Group calculation.
  - 4: Nibble related instruction, used only at the back of instruction.
  - 8: Byte related instruction, used only at the back of instruction.
  - 3: Instruction that process 3 operands, used only at the back of instruction.
- Based on Operation Characteristics
  - P: Instruction that is executed for 1 scan when input signal is changed OFF = > ON

③ **Symbol:** Displays symbols used in program, showing the number of used operands and the type of Source or Destination. Operand display rules are as follows;

- S: Source, with data value not changed after calculated.
- D: Destination, with data value changeable after calculated.
- N, n: The number to process.
- St, En: Start and End, used only in BSFT & WSFT.
- Sb: Source in case Bit position is specified, mostly used in Nibble/Byte instruction.
- Db: Destination in case Bit position is specified.
- Z: Control word, which means previously specified format as based on each instruction.

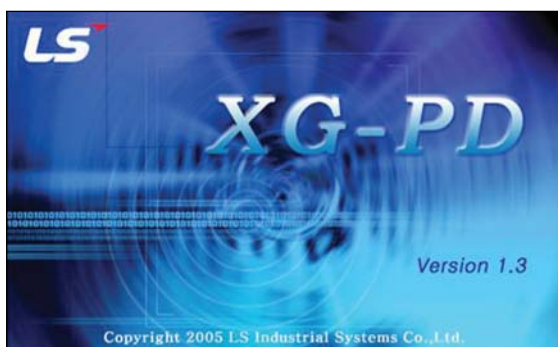
④ **Description:** Describes general functions of instruction.

⑤ **No. of step:** The number of basic steps of instruction, which means the number of steps in case indirect specification, index formula and direct variable input were not used.



## Features

- Default settings of the network and easy of user program
- Network system and provides extensive monitoring and control of the communication module
- Efficient implementation of a fast interface with the CPU to the network management
- Easy access with XGT and MODBUS
- Rich built-in diagnostic function (Condition of CPU, Link, Auto SCAN, Frame monitor)

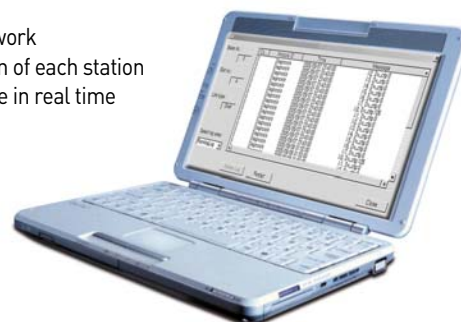


| Item              |                        | RAPiEnet                          | FEnet                                   | FDEnet | IFOS FEnet | Cnet          | EtherNet/IP               | Fnet          | Rnet | DeviceNet       | Profibus-DP   |  |
|-------------------|------------------------|-----------------------------------|-----------------------------------------|--------|------------|---------------|---------------------------|---------------|------|-----------------|---------------|--|
| Service           | High speed link        | ○                                 | ○                                       | ○      | ○          | —             | —                         | ○             | ○    | ○               | ○             |  |
|                   | XGT server protocol    | —                                 | ○                                       | —      | ○          | ○             | —                         | —             | —    | —               | —             |  |
|                   | MODBUS server protocol | —                                 | ○                                       | —      | ○          | ○             | —                         | —             | —    | —               | —             |  |
|                   | P2P                    | ○                                 | ○                                       | ○      | ○          | ○             | ○                         | —             | —    | —               | —             |  |
|                   | XG5000 Service         | ○                                 | ○                                       | ○      | ○          | ○             | —                         | —             | —    | —               | —             |  |
| High speed link   | Max. station           | 64                                | 64                                      | 64     | 64         | —             | —                         | 64            | 64   | 64              | 126           |  |
|                   | No. of block           | 128                               | 128                                     | 128    | 128        | —             | —                         | 64            | 64   | 64              | 126           |  |
|                   | Send block             | 64                                | 32                                      | 32     | 32         | —             | —                         | 32            | 32   | 64              | 126           |  |
|                   | Receive block.         | 128-Send block                    |                                         |        |            | —             | —                         | 64-Send block | 32   | 64              | —             |  |
|                   | Data per block         | 200 words                         |                                         |        |            | —             | —                         | 60 words      |      | 256bytes        | 244bytes      |  |
| P2P               | No. of block           | 64                                | 64                                      | 64     | 64         | 64            | —                         | —             | —    | —               | —             |  |
|                   | Data per block         | 1400bytes                         |                                         |        |            | 256bytes      | —                         | —             | —    | —               | —             |  |
|                   | Service                | —                                 | User defined, XGT client, Modbus client |        |            |               | —                         | —             | —    | —               | —             |  |
| Ether Net/IP      | TCP                    | —                                 | —                                       | —      | —          | —             | 64(Client)<br>128(Server) | —             | —    | —               | —             |  |
|                   | CIO (IO Communication) | —                                 | —                                       | —      | —          | —             | 64(Client)<br>128(Server) | —             | —    | —               | —             |  |
| System diagnosis  |                        | Connection status, network status |                                         |        |            |               |                           |               |      |                 |               |  |
| Media             |                        | 100Base-T/FX                      | 10/100Base-T/FX                         |        |            | 900~115200bps | 100Base-T                 | 1Mbps         |      | 125/250/500Kbps | 9.6K~12Mbps   |  |
| Topology          |                        | Ring, Line                        | Star                                    |        | Ring, Line | Bus           | Star, Line                | Bus           |      | Bus, Star       | Bus           |  |
| Configration Tool |                        | XG-PD                             |                                         |        |            |               |                           |               |      |                 | XG-PD / SyCon |  |

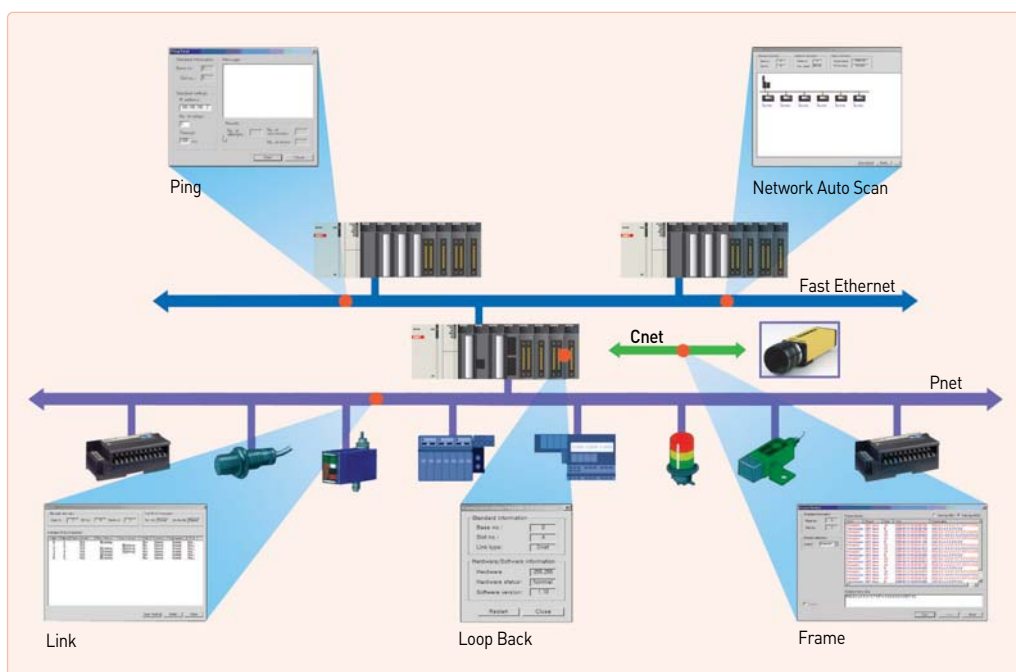


## Various network diagnosis and monitoring

- Auto Scan: Searching and displaying each node connected to network
- Link Monitor: Monitoring status of high-speed link communication of each station
- Frame Monitor: Collecting and displaying sending/receiving frame in real time



| Item               | RAPiEnet | FEnet | FDEnet | IFOS FEnet | Cnet | EtherNet/IP | Fnet | Rnet | DeviceNet | Profibus-DP |
|--------------------|----------|-------|--------|------------|------|-------------|------|------|-----------|-------------|
| Module information | ●        | ●     | ●      | ●          | ●    | ●           | ●    | ●    | ●         | ●           |
| Media status       | ●        | —     | —      | —          | —    | ●           | —    | —    | —         | —           |
| Auto scan          | ●        | ●     | ●      | ●          | ●    | ●           | ●    | ●    | ●         | ●           |
| Ping test          | —        | ●     | ●      | ●          | ●    | —           | —    | —    | —         | —           |
| Link monitoring    | ●        | ●     | ●      | ●          | ●    | ●           | ●    | ●    | ●         | ●           |
| Frame monitoring   | —        | —     | —      | —          | ●    | —           | —    | —    | —         | —           |





## Main Specification

- 1GHz 32bit RISC Embedded CPU
- 16,777,216 TFT color LCD
- 128MB display data and 1MB back-up memory
- Ethernet 1ch, RS-232C 2ch, RS-422/485 1ch
- USB host 3ch and device 1ch
- CF and SD memory card interface

## Main Functions

- PLC ladder monitoring (XGK/XBC PLC only)
- Web Server/Data Server
- Path through
- XP-Remote : Remote controlling and monitoring



| Item                 |               | iXP70-TTA                                                                     | iXP80-TTA             | iXP90-TTA                     |
|----------------------|---------------|-------------------------------------------------------------------------------|-----------------------|-------------------------------|
| Display type         |               | TFT LCD                                                                       |                       |                               |
| Screen size          |               | 26.4cm (10.4 ")                                                               | 30.7cm (12.1 ")       | 38.1cm (15 ")                 |
| Display Resolution   |               | 800 × 600[SVGA]                                                               | 800 × 600[SVGA]       | 1,024 × 768[XGA]              |
| Color indication     |               | 16bit/24bit Color (default 16bit)                                             |                       |                               |
| Indication degree    |               | Left/Right: 80 deg. Upper: 60 deg. Lower: 80 deg.                             |                       |                               |
| Backlight            |               | LED                                                                           |                       |                               |
| Backlight duration   |               | Approx. 60,000h                                                               |                       |                               |
| Brightness           |               | 700 cd/m <sup>2</sup>                                                         | 550 cd/m <sup>2</sup> | 800 cd/m <sup>2</sup>         |
| Touch panel          |               | 4-Line type, analog                                                           |                       |                               |
| Sound Output         |               | Magnetic buzzer (85dB)                                                        |                       |                               |
| Process              |               | ARM Cortex-A8 Core (32bit RISC), 1GHz                                         |                       |                               |
| Audio input          |               | -                                                                             |                       | 1channel, audio input         |
| Audio Output         |               | 1Channel, stereo audio output                                                 |                       |                               |
| Video input          |               | -                                                                             |                       | 1 channel(camera video input) |
| Video output         |               | -                                                                             |                       | D-SUB, 1 channel(monitor)     |
| Memory               | Flash         | 1GB (display 128MB)                                                           |                       |                               |
|                      | Operating RAM | 512MB                                                                         |                       |                               |
|                      | Backup RAM    | 1MB                                                                           |                       |                               |
| Backup data          |               | Date/Hour data, Logging/Alarm/Recipe data and nonvolatile device              |                       |                               |
| Battery duration     |               | Approx. 3 years (Operating ambient temperature of 25°C)                       |                       |                               |
| USB Host             |               | 3 Channels, USB 2.0 host (mouse, keyboard and USB memory driver is available) |                       |                               |
|                      |               | 1Channel, USB 2.0 slave (for download and upload project file)                |                       |                               |
| RS-232C              |               | 1 Channel                                                                     |                       |                               |
| RS-422/485           |               | 1 Channel, RS-422/485 mode                                                    |                       |                               |
| Ethernet             |               | 1 Channel, IEEE802.1a, 10Base-T/100Base-TX                                    |                       |                               |
| CF Card              |               | 1 Slot (Compact Flash)                                                        |                       |                               |
| SD Card              |               | 1 Slot (SDHC)                                                                 |                       |                               |
| Human sensor         |               | Detection range: side 1~1.5m, front 40~50cm                                   |                       |                               |
|                      |               | Angle: high/low 100°, left/right 140° (detecting 5~20 micron infrared light)  |                       |                               |
| Audio output         |               | LINE-OUT 1channel                                                             |                       |                               |
| Expansion module     |               | For communication and I/O option module (available later)                     |                       |                               |
| VM I/F               |               | 4 channels video input (available later)                                      |                       |                               |
| Certifications       |               | CE, UL(cUL), KC                                                               |                       |                               |
| IP Protection        |               | IP65                                                                          |                       |                               |
| Dimension(mm)        |               | 270.5 × 212.5 × 57.0                                                          | 313.0 × 239.0 × 57.0  | 395.0 × 294.0 × 60.0          |
| Panel cut(mm)        |               | 259.0 × 201.0                                                                 | 301.5 × 227.5         | 383.5 × 282.5                 |
| Power                |               | AC100~240V, DC12/24V                                                          |                       |                               |
| Power consumption(W) |               | 42                                                                            | 42                    | 42                            |
| weight(kg)           |               | 2.2                                                                           | 2.4                   | 3.9                           |

# XGT Panel XP Series

## Graphic type XP30/XP50/XP70/XP80/XP90

- High and vivid distinction with 65,536 colors
- High quality raster and vector symbols
- Various BMP JPG GIF graphic file support: BMP, JPG, GIF, WMF, etc
- Simple animation effects: animated GIF
- 10/100BASE-T Ethernet interface
- Convenient and easy screen editing
- Strengthened data management: Logging, Recipe, and Alarm
- Read function of a controller's state information: Monitoring and maintenance
- Multi-lingual display: up to 8 languages
- Offline and concurrent simulation with XG5000
- Easy to change the address of the graphic objects:  
Tag function with XP-Builder
- USB host for peripheral devices: USB Drive, Mouse, keyboard, printer, etc
- Sufficient memory for screen data: 10MB



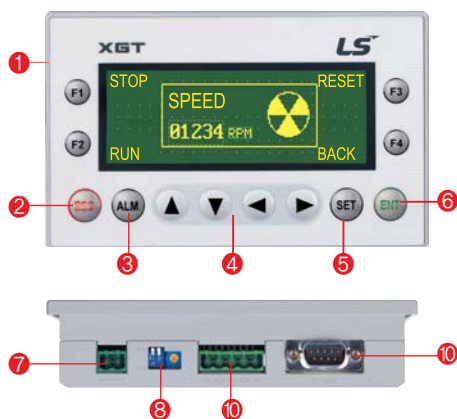
| Item                     |                      | XP30-BTE/DC                                                                                           | XP30-BTA/DC                     | XP30-TTE/DC      | XP30-TTA/DC                           | XP50-TTE/DC                         | XP50-TTA/DC                        | XP70-TTA/AC<br>XP70-TTA/DC | XP80-TTA/AC<br>XP80-TTA/DC | XP90-TTA/AC    |
|--------------------------|----------------------|-------------------------------------------------------------------------------------------------------|---------------------------------|------------------|---------------------------------------|-------------------------------------|------------------------------------|----------------------------|----------------------------|----------------|
|                          |                      | Mono                                                                                                  |                                 |                  | Color                                 |                                     |                                    |                            |                            |                |
| Display description      |                      | Mono Blue LCD                                                                                         |                                 |                  | TFT Color LCD                         |                                     |                                    |                            |                            |                |
| Display Size (inch)      |                      | 14cm [5.7"]                                                                                           |                                 |                  |                                       | 21cm [8.4"]                         | 21cm [8.4"]                        | 26cm [10.4"]               | 31cm [12.1"]               | 38cm [15"]     |
| Resolution               |                      | 320 × 240                                                                                             |                                 |                  |                                       | 640 × 480                           |                                    |                            | 800 × 600                  | 1024 × 768     |
| Color                    |                      | 8-bit Gray Scale                                                                                      |                                 | 256 color        | 65,536 color                          | 256 color                           | 65,536 color                       |                            |                            |                |
| Backlight                |                      | LED                                                                                                   |                                 |                  | CCFL[whole LCD],<br>auto On/Off       | CCFL (Replaceable LCD), Auto on/off |                                    |                            |                            |                |
|                          |                      | 50,000Hours                                                                                           |                                 |                  | 60,000Hours                           | 50,000Hours                         |                                    |                            |                            |                |
| Contrast                 |                      | Adjustable                                                                                            |                                 | Fixed            |                                       |                                     |                                    |                            |                            |                |
| Luminance                |                      | 230cd/m²                                                                                              |                                 | 210cd/m²         | 400cd/m²                              | 200cd/m²                            | 480cd/m²                           | 430cd/m²                   | 400cd/m²                   | 450cd/m²       |
| Viewing<br>angle         | Up/Down(Degree)      | 20/40                                                                                                 |                                 | 80/80            | 70/50                                 | 20/20                               | 50/60                              | 45/65                      | 45/75                      | 50/60          |
|                          | Left/Right(Degree)   | 45/45                                                                                                 |                                 | 80/80            | 70/70                                 | 45/45                               | 65/65                              | 65/65                      | 65/65                      | 75/75          |
| Touch panel              |                      | 4-wire system analog                                                                                  |                                 |                  |                                       |                                     | 8-wire system analog               |                            |                            |                |
| Movement LED             |                      | Green : Run (Monitoring, download drawing data) Red : Error (Communication error, drawing data error) |                                 |                  |                                       |                                     |                                    |                            |                            |                |
| Memory                   | Display data         | 4MB                                                                                                   | 10MB                            | 4MB              | 10MB                                  | 4MB                                 | 10MB                               |                            |                            | 20MB           |
|                          | Backup data          | 128kB                                                                                                 | 512kB                           | 124kB            | 512kB (Logging,<br>alarm data saving) | 128kB                               | 512KB (Logging, alarm data saving) |                            |                            |                |
| Ethernet                 |                      | —                                                                                                     | 1ch, IEEE802.3,<br>10/100Base-T | —                | 1ch, IEEE802.3,<br>10/100Base-T       | —                                   | 1ch, IEEE802.3, 10/100Base-T       |                            |                            |                |
| USB interface            |                      | USB Host ×1                                                                                           | USB Host ×2                     | USB Host ×1      | USB Host ×2                           | USB Host ×1                         | USB Host ×2                        |                            |                            |                |
| Serial                   | RS-232C              | 2ch (1 port for PC Communication)                                                                     |                                 |                  |                                       |                                     |                                    |                            |                            |                |
|                          | RS-422/485           | 1ch, 422/485 optional mode                                                                            |                                 |                  |                                       |                                     |                                    |                            |                            |                |
| CF memory card interface |                      | —                                                                                                     | CF card (TYPE-II) ×1            | —                | CF card (TYPE-II) ×1                  | —                                   | CF card (TYPE-II) ×1               |                            |                            |                |
| AUX interface            |                      | —                                                                                                     | Optional                        | —                | Optional                              | —                                   | Optional                           |                            |                            |                |
| Certification            |                      | CE, UL, KCC                                                                                           |                                 |                  |                                       |                                     |                                    |                            |                            |                |
| Protection               |                      | IP65F (Front Water Proof Structure)                                                                   |                                 |                  |                                       |                                     |                                    |                            |                            |                |
| Size (W × H × D)mm       |                      | 181 × 140 × 56.5                                                                                      | 181 × 140 × 66.5                | 181 × 140 × 56.5 | 181 × 140 × 66.5                      | 240 × 174 × 63                      | 240 × 174 × 73                     | 317 × 243 × 73             |                            | 395 × 249 × 73 |
| Panel Cut (W × H)mm      |                      | 155.5 × 123                                                                                           |                                 |                  |                                       | 228 × 158                           |                                    | 294 × 227                  |                            | 383 × 282      |
| Weight (kg)              |                      | 0.62                                                                                                  | 0.75                            | 0.62             | 0.75                                  | 1.2                                 | 1.4                                | 2.2                        | 2.4                        | 3.9            |
| Power                    | Rated voltage        |                                                                                                       | DC 24V                          |                  |                                       |                                     |                                    | AC100~220V, DC24V          |                            | AC100 ~ 220V   |
|                          | Permitted<br>voltage | AC                                                                                                    | —                               |                  |                                       |                                     |                                    | MIN 85 VAC, MAX 264 VAC    |                            |                |
|                          |                      | DC                                                                                                    | MIN 19.2 VDC, MAX 28.8 VDC      |                  |                                       |                                     |                                    | —                          |                            |                |
|                          | Watt                 | AC                                                                                                    | —                               |                  |                                       |                                     |                                    | 37                         |                            | 40             |
| DC                       |                      | 5                                                                                                     | 8.5                             | 5                | 8.5                                   | 13                                  | 20                                 | 27                         | 30                         | —              |



## XGT Panel XP Series

### Text type XP10

- Screen: 192×64 Graphic STN LCD
- System RAM: 1000 words
- Flash memory: Program/Parameter back up
- Communication: Half-duplex comm.
  - Baud rate: 1200~115200 bps
  - Master/slave setting available
  - RS-232C/RS-485 2 CH separate to use
- Power requirements - 24 V input or 5 V direct input by LS PLC
- Various function key - ESC, ALM, SET, ENT, F1~F4, Arrow keys
- Panel Editor - Easy programming and H/W setting



- 1 Key to control PLC device and screen
- 2 ESC key
- 3 Alarm history
- 4 Data input and Screen change
- 5 PLC data setting
- 6 Enter key
- 7 DC24V input terminal
- 8 RS-232C port to download a project
- 9 Brightness adjustment
- 10 RS-422 port

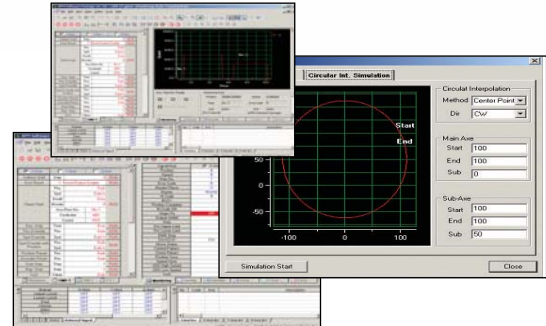
| Item                    |                     | Specifications                                              |            |
|-------------------------|---------------------|-------------------------------------------------------------|------------|
|                         |                     | XP10BKA/DC                                                  | XP10BKB/DC |
| Input voltage           | 5VDC                | DC 4.9 ~ 5.1 (RS-232C port)                                 |            |
|                         | 24VDC               | DC 21.6 ~ 26.4 (DC Input connector)                         |            |
|                         | Consumption current | Less than 200mA                                             |            |
| Display                 |                     | LED back-light (192 x 64 Dots)                              |            |
| Communication interface |                     | RS-232C, RS-422/485                                         |            |
| Flash memory            |                     | 256K bytes                                                  |            |
| Language                |                     | Default: English, Can be switched to Korean/Chinese/Russian |            |
| RTC                     |                     | None                                                        | Supports   |
| Download specification  |                     | 115,200bps                                                  |            |
| Keys                    |                     | 12 Keys (F1~F4, ESC, ALM, ▲, ▼, ◀, ▶, SET, ENT)             |            |



# APM[Positioning module] Software Package

## Features

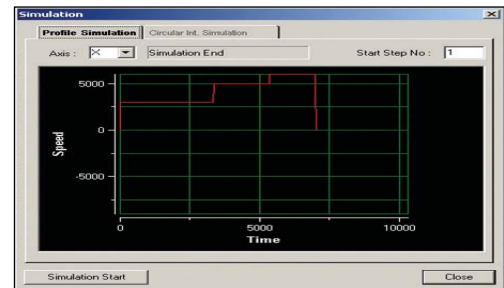
- Windows-based easy operation
- Supporting all types of LS APM module
- Improved parameter editing (Copy, Paste, Initialization, etc.)
- Various monitoring (Operation type of each axis, etc.)
- Profile trace and operation monitoring
- Profile graph and simulation of circular interpolation
- Available to edit operation parameter in EXCEL



| Step | Cord | Control | Pattern | Method | Address [pulse] | Sub-Address [pulse] | M Code | A/D No. | Speed [pulse/s] | Dwell [ms] | Cx In Dir |
|------|------|---------|---------|--------|-----------------|---------------------|--------|---------|-----------------|------------|-----------|
| 1    | ABS  | POS     | END     | SIN    | 10000           | 0                   | 0      | No.1    | 1000            | 0          | CW        |
| 2    | ABS  | POS     | END     | SIN    | 0               | 0                   | 0      | No.1    | 0               | 0          | CW        |
| 3    | ABS  | POS     | END     | SIN    | 0               | 0                   | 0      | No.1    | 0               | 0          | CW        |
| 4    | ABS  | POS     | END     | SIN    | 0               | 0                   | 0      | No.1    | 0               | 0          | CW        |
| 5    | ABS  | POS     | KEEP    | SIN    | 100000          | 0                   | 0      | No.1    | 0               | 0          | CW        |
| 6    | ABS  | POS     | END     | SIN    | 0               | 0                   | 0      | No.1    | 10000           | 0          | CW        |
| 7    | ABS  | POS     | END     | SIN    | 0               | 0                   | 0      | No.1    | 10000           | 0          | CW        |
| 8    | ABS  | POS     | END     | SIN    | 0               | 0                   | 0      | No.1    | 0               | 0          | CW        |
| 9    | ABS  | POS     | END     | SIN    | 0               | 0                   | 0      | No.1    | 0               | 0          | CW        |
| 10   | ABS  | POS     | CONT    | SIN    | 100000          | 0                   | 0      | No.1    | 0               | 0          | CW        |
| 11   | ABS  | POS     | END     | SIN    | 1000            | 0                   | 0      | No.1    | 10000           | 0          | CW        |
| 12   | ABS  | POS     | END     | SIN    | 0               | 0                   | 0      | No.1    | 5000            | 0          | CW        |

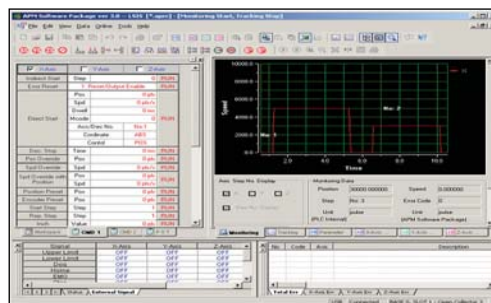
### Operation Data

Define operation method, target location, operation speed of each axis.



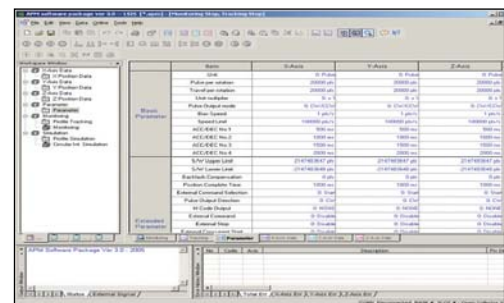
### Profile simulation (Off-line)

Monitoring operation speed of each axis with graph type and saving result as image file.



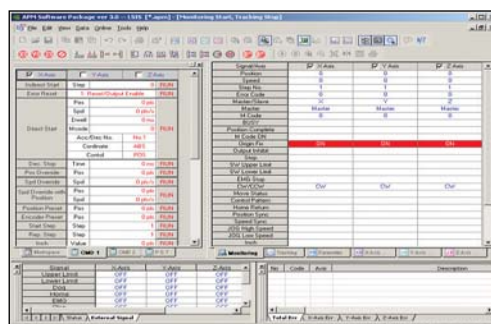
### Profile Trace (On-line)

Monitoring operation speed of each axis with graph type and saving result as image file.



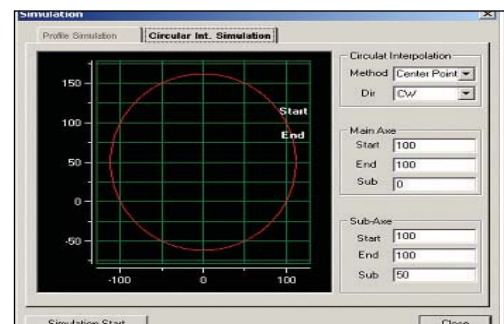
### Operation parameter

Setting basic operation characteristics and limit value.



### Monitoring (On-line)

Checking basic operation characteristics about each axis and monitoring operation condition.



### Circular interpolation simulation (Off-line)



# Product list

## CPU / PWR / Base / I/O

|                |           |                                             |
|----------------|-----------|---------------------------------------------|
| CPU            | XGI-CPUU* | 6,144pt (IEC type), Program memory: 1Mbyte  |
|                | XGI-CPUH* | 6,144pt (IEC type), Program memory:512kbyte |
|                | XGI-CPUS* | 3,072pt (IEC type), Program memory:128kbyte |
|                | XGI-CPUE* | 1,536pt (IEC type), Program memory:64kbyte  |
|                | XGK-CPUU* | 6,144pt, Program memory : 128Ksteps         |
|                | XGK-CPUH* | 6,144pt, Program memory : 64Ksteps          |
|                | XGK-CPUA* | 3,072pt, Program memory : 32Ksteps          |
|                | XGK-CPUS* | 3,072pt, Program memory : 32Ksteps          |
| Power          | XGK-CPUE* | 1,536pt, Program memory : 16Ksteps          |
|                | XGP-ACF1* | Free Voltage/DC5V 3A, DC24V 0.6A            |
|                | XGP-ACF2* | Free Voltage/DC5V 6A                        |
|                | XGP-AC23* | 220V/DC5V 8.5A                              |
| Main base      | XGP-DC42* | DC24V/DC5V 6A                               |
|                | XGB-M04A* | 4 Slot                                      |
|                | XGB-M06A* | 6 Slot                                      |
|                | XGB-M08A* | 8 Slot                                      |
| Expansion base | XGB-M12A* | 12 Slot                                     |
|                | XGB-E04A* | 4 Slot                                      |
|                | XGB-E06A* | 6 Slot                                      |
|                | XGB-E08A* | 8 Slot                                      |
| Input          | XGB-E12A* | 12 Slot                                     |
|                | XGI-A12A  | AC110V, 16pt                                |
|                | XGI-A21A  | AC220V, 8pt                                 |
|                | XGI-A21C  | AC 220V Input, 8pt(1COM)                    |
|                | XGI-D21A  | DC24V, 8pt                                  |
|                | XGI-D22A* | DC24V, 16pt, Sink/Source                    |
|                | XGI-D22B  | DC24V, 16pt, Source                         |
|                | XGI-D24A* | DC24V, 32pt, Sink/Source                    |
| Output         | XGI-D24B  | DC24V, 32pt, Source                         |
|                | XGI-D28A* | DC24V, 64pt, Sink/Source                    |
|                | XGQ-RY1A  | Relay, 8pt                                  |
|                | XGQ-RY2A* | Relay, 16pt                                 |
|                | XGI-D28B  | DC24V, 64pt, Source                         |
|                | XGQ-RY2B  | Relay, 16pt, Surge killer                   |
|                | XGQ-SS2A  | Triac, 16pt                                 |
|                | XGQ-TR1C  | Transist, 8pt(2A, 1COM)                     |
|                | XGQ-TR2A* | Transist, 16pt, Sink                        |
|                | XGQ-TR2B  | Transist, 16pt, Source                      |
|                | XGQ-TR4A* | Transist, 32pt, Sink                        |
|                | XGQ-TR4B  | Transist, 32pt, Source                      |
| Input/output   | XGQ-TR8A* | Transist, 64pt, Sink                        |
|                | XGQ-TR8B  | Transist, 64pt, Source                      |
| Input/output   | XGH-DT4A* | DC24V 16pt, Transist, 16pt, Sink            |

\* : G3 Coating Products

## Special module

|                            |               |                                                                          |
|----------------------------|---------------|--------------------------------------------------------------------------|
| Analog input               | XGF-AV8A*     | Voltage, 8ch                                                             |
|                            | XGF-AC8A*     | Current, 8ch                                                             |
|                            | XGF-AD8A*     | Voltage /Current, 8ch                                                    |
|                            | XGF-AD4S*     | Voltage /Current, 4ch                                                    |
|                            | XGF-AD16A*    | Insulation Voltage /Current, 16ch                                        |
|                            | XGF-AW4S*     | 2-wire, Voltage/ Current input, 4Ch (Isolated)                           |
| Analog output              | XGF-DV4A*     | Voltage, 4ch                                                             |
|                            | XGF-DC4A*     | Current, 4ch                                                             |
|                            | XGF-DV8A*     | Voltage, 8ch                                                             |
|                            | XGF-DC8A*     | Current, 8ch                                                             |
| Analog input/output        | XGF-DV4S*     | Voltage, 4ch, Insulation                                                 |
|                            | XGF-DC4S*     | Current, 4ch, Insulation                                                 |
| High speed counter         | XGF-AH6A*     | Input: 4ch, Voltage/ Current<br>Output: 2Ch Voltage/ Current             |
|                            | XGF-H02A*     | Open collector, 2ch                                                      |
|                            | XGF-HD2A*     | Line drive, 2ch                                                          |
| Positioning                | XGF-H08A*     | 8-channels high speed counter module, 8Ch                                |
|                            | XGF-P01A-P03A | Open collector, 1~3axis                                                  |
|                            | XGF-PD1A-PD3A | Line drive, 1~3axis                                                      |
|                            | XGF-P01H-P04H | Open collector, 1~4axis                                                  |
| Positioning (Network type) | XGF-PD1H-PD4H | Line drive, 1~4axis                                                      |
|                            | XGF-PN8A      | LSIS EtherCAT Network, 8axis                                             |
| Motion control             | XGF-PN8B      | Standard EtherCAT Network, 8axis                                         |
|                            | XGF-M32E      | Standard EtherCAT, 32axes                                                |
| Temperature input          | XGF-TC4S*     | Thermo couple, 4ch, Insulation                                           |
|                            | XGF-RD4A*     | RTD, 4ch                                                                 |
|                            | XGF-RD4S*     | RTD, 4ch, Insulation                                                     |
| Temperature controller     | XGF-RD8A      | RTD, 8ch                                                                 |
|                            | XGF-TC4UD     | Input: 4Ch(Voltage/Cuttent/RTD/TC)<br>Output: 8Ch(TR/Current) 4loops     |
| Event input                | XGF-TC4RT     | Input:4Ch(RTD)<br>Output: 4Ch(TR) 4loops                                 |
|                            | XGF-S0EA      | DC24V, 32points                                                          |
| Datalog                    | XGF-DL16A     | USB 2.0, CF2001, Max. 16Gbyte, 32points(input 22points, output 10points) |

\* : G3 Coating Products

## Communication module

|             |           |                                           |
|-------------|-----------|-------------------------------------------|
| RAPIEnet    | XGL-EIMT  | RAPIEnet Twisted pair                     |
|             | XGL-EIMH  | RAPIEnet Twisted pair/ Fiber              |
|             | XGL-EIMF  | RAPIEnet Fiber optic 2ch                  |
|             | XGL-ES4T  | RAPIEnet Switch, 4Ports                   |
|             | XOL-EIMT  | RAPIEnet Twisted pair 2ch                 |
|             | XOL-EIMF  | RAPIEnet Fiber optic 2ch (PC)             |
| Cnet        | XGL-CH2A* | RS-232C/RS-422                            |
|             | XGL-C22A* | RS-232C, 2ch                              |
|             | XGL-C42A  | RS-422, 2ch                               |
| Ethernet    | XGL-EFMF* | Fiber optic, Open type                    |
|             | XGL-EFMT* | Twisted pair, Open                        |
|             | XGL-EHST  | Fast Ethernet switch hub                  |
| Ethernet/IP | XGL-EIPT  | Industrial Ethernet, 2ports               |
| Dedicated   | XGL-EDMF  | Fiber optic, Dedicated                    |
|             | XGL-EDMT  | Ethernet Twisted pair, Dedicated Ethernet |
| Rnet        | XGL-RMEA* | Rnet, Master                              |
| Dnet        | XGL-DMEA* | DeviceNet, Master                         |
| Pnet        | XGL-PMEA* | Profibus-DP, Master                       |
|             | XGL-PMEC  |                                           |
|             | XGL-PSRA  | Profibus-DP, Slave, Remote Interface      |
|             | XGL-PSEA  | Profibus-DP, Slave I/F system(I/O slot)   |
| Fnet        | XGL-FMEA  | Dedicated network                         |

\* : G3 Coating Products

## XGR module

|                        |             |                                         |
|------------------------|-------------|-----------------------------------------|
| CPU                    | XGR-CPUH/T* | Twisted pair                            |
|                        | XGR-CPUH/F  | Fiber optic                             |
| INC                    | XGR-INCT    | Twisted pair                            |
|                        | XGR-INCF    | Fiber optic                             |
| Power                  | XGR-AC12*   | 110V, 5.5A(Main base)                   |
|                        | XGR-AC13*   | 110V, 8.5A(Expansion base)              |
|                        | XGR-AC22*   | 220V, 5.5A(Main base)                   |
|                        | XGR-AC23*   | 220V, 8.5A(Expansion base)              |
|                        | XGR-DC42*   | DC24V/DC5V 7A, Main/Expansion base)     |
| Base                   | XGR-M02P*   | 2Slot(Main base)                        |
|                        | XGR-M06P*   | 6Slot(Main base)                        |
|                        | XGR-M08P*   | 8Slot(Expansion base)                   |
|                        | XGR-E12P*   | 12Slot, Expansion drive Redundancy base |
|                        | XGR-E12H*   | 12Slot, Expansion drive Redundancy base |
| Expansion drive        | XGR-DBST*   | Twisted pair - Twisted                  |
|                        | XGR-DBSF*   | Pair Fiber optic - Fiber optic          |
|                        | XGR-DBSH*   | Twisted pair - Fiber optic              |
| Sync & Expansion cable | XGC-F201    | 2m (Fiber optic)                        |
|                        | XGC-F501    | 5m (Fiber optic)                        |

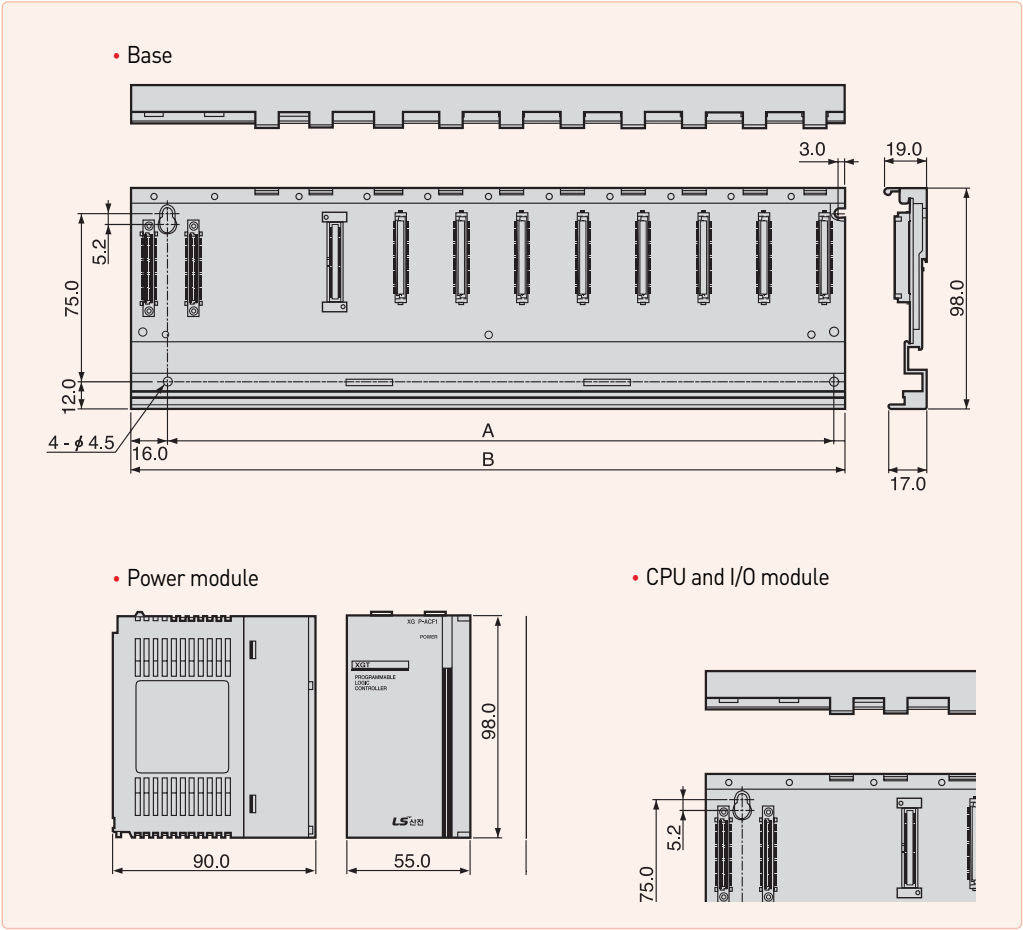
\* : G3 Coating Products

## Cable

| CPU                   | Product  | Description                                             |
|-----------------------|----------|---------------------------------------------------------|
| Expansion cable       | XGC-E041 | 0.4m                                                    |
|                       | XGC-E061 | 0.6m                                                    |
|                       | XGC-E121 | 1.2m                                                    |
|                       | XGC-E301 | 3.0m                                                    |
|                       | XGC-E501 | 5.0m                                                    |
|                       | XGC-E102 | 10m                                                     |
|                       | XGC-E152 | 15m                                                     |
| Termination connector | XGT-TERA | Termination connector for expansion base download cable |
| USB cable             | USB-301A | USB download cable                                      |
| RS232C cable          | K1C-050A | RS232C download cable                                   |
| Dummy                 | XGT-DMMA | Dummy module                                            |
|                       | XGR-DMMA | Dummy module                                            |



# Dimensions

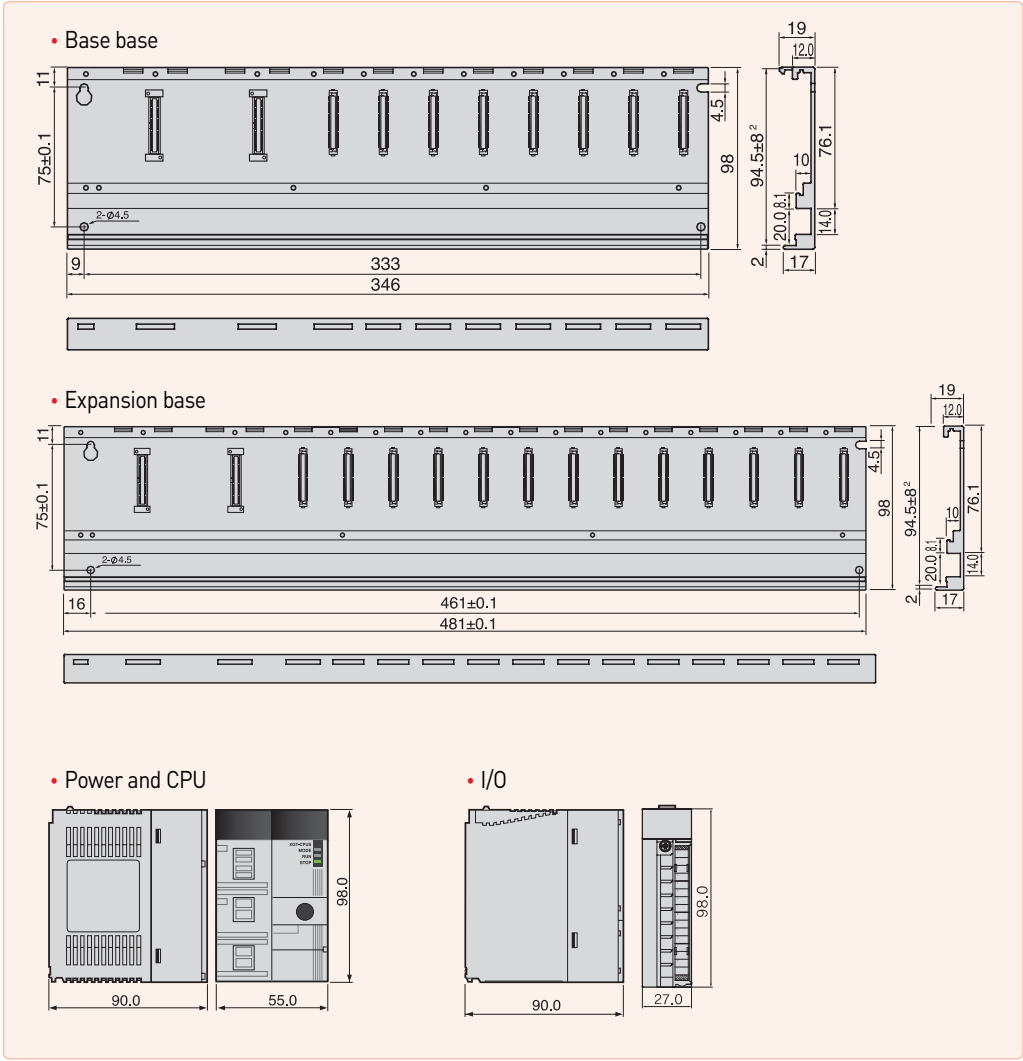


# Base Dimensions (W)

| Item | XGB-M04A/E04A | XGB-M06A/E06A | XGB-M08A/E08A | XGB-M12A/E12A |
|------|---------------|---------------|---------------|---------------|
| A    | 190           | 244           | 298           | 406           |
| B    | 210           | 264           | 318           | 426           |



Dimensions



Base  
Dimensions  
(W)

| Item | XGR-M06P | XGR-E08P | XGR-E12P |
|------|----------|----------|----------|
| A    | 333      | 353      | 461      |
| B    | 346      | 373      | 481      |

# Worldwide Network

Head Office and Domestic Factories (Cheongju, Cheonan, Busan)

## Domestic Factories

- **Head Office**  
LS Tower, 127, LS-ro, Dongan-gu, Anyang-si, Gyeonggi-Do, 431-848, Korea  
Tel : 82-2-2034-4967 Fax : 82-2-2034-4622
- **Cheongju Factory**  
1 Songjeong-dong, Cheongju-si, Chungbuk-do, 361-720, Korea  
Tel : 82-43-261-6114 Fax : 82-43-261-6602
- **Cheonan Factory**  
181 Samseong-ri, Mokcheon-myeon, Cheonan-si Chungnam-do, 330-840 Korea  
Tel : 82-41-550-8114 Fax : 82-41-566-8408
- **Busan Factory**  
1-19 Block Hwajeon-dong, Gangseo-gu, Busan, 618-280, Korea  
Tel : 82-51-795-6114 Fax : 82-51-795-6169

## Overseas Factories

- **Wuxi Factory, CHINA**  
102-A. National High & New Tech Industrial Development Area, Wuxi. Jiangsu. 214028. P.R. China  
Tel : 86-510-8534-6666 Fax : 86-510-8534-4078
- **Dalian Factory, CHINA**  
No. 15. Liaohexi 3-Road. Economic and Technical Development zone. Dalian 116600. China  
Tel : 86-411-273-7777 Fax : 86-411-8730-7560
- **Hanoi Factory, VIETNAM**  
Room 1311, 13th Floor, M3-M4 Building 91 Nguyen Chi Thanh street, Hanoi, Vietnam.  
Tel : 84-4-6275-8055 Fax : 84-4-6275-8056

## R&D Center

- **Advanced Technology R&D Center**  
533 Hogye-dong, Dongan-gu, Anyang-si, Gyeonggi-do, 431-749, Korea  
Tel : 82-31-450-7114
- **Electro Technology R&D Center**  
1 Songjeong-dong, Cheongju-si, Chungcheongbuk-do, 361-720, Korea  
Tel : 82-43-261-6114
- **Automation R&D Center**  
181 Samseong-ri, Mokcheon-myeon, Cheonan-si, Chungcheongnam-do, 330-840, Korea  
Tel : 82-41-550-8272
- **Power Testing & Technology Institute**  
1 Songjeong-dong, Cheongju-si, Chungcheongbuk-do, 361-720, Korea  
Tel : 82-43-261-6114

Cheongju Factory



Wuxi Factory (China)



Cheonan Factory



Dalian Factory (China)

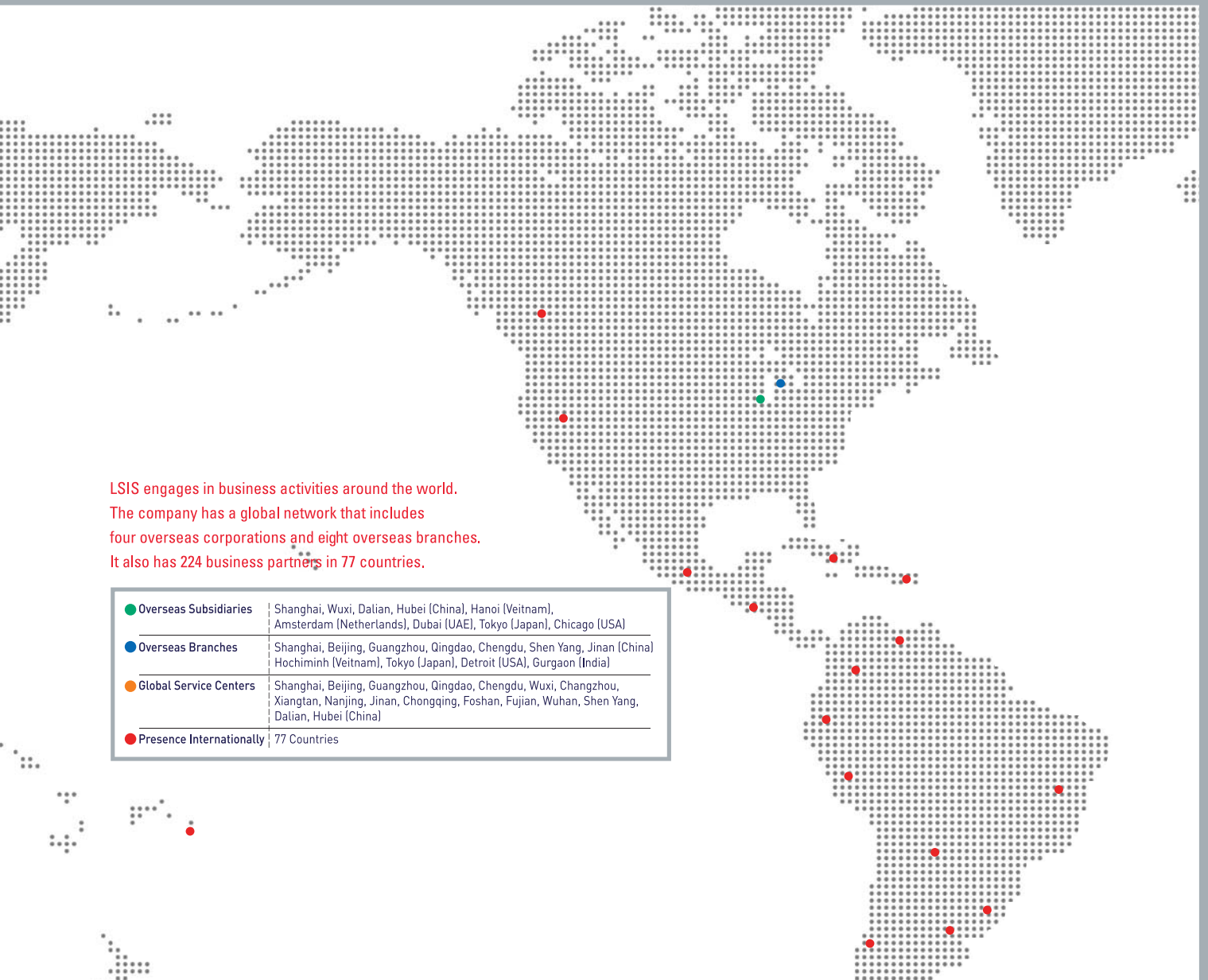


Busan Factory



Hanoi Factory (Vietnam)





LSIS engages in business activities around the world.  
The company has a global network that includes  
four overseas corporations and eight overseas branches.  
It also has 224 business partners in 77 countries.

|                            |                                                                                                                                                               |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ● Overseas Subsidiaries    | Shanghai, Wuxi, Dalian, Hubei (China), Hanoi (Vietnam), Amsterdam (Netherlands), Dubai (UAE), Tokyo (Japan), Chicago (USA)                                    |
| ● Overseas Branches        | Shanghai, Beijing, Guangzhou, Qingdao, Chengdu, Shen Yang, Jinan (China)<br>Hochiminh (Vietnam), Tokyo (Japan), Detroit (USA), Gurgaon (India)                |
| ● Global Service Centers   | Shanghai, Beijing, Guangzhou, Qingdao, Chengdu, Wuxi, Changzhou, Xiangtan, Nanjing, Jinan, Chongqing, Foshan, Fujian, Wuhan, Shen Yang, Dalian, Hubei (China) |
| ● Presence Internationally | 77 Countries                                                                                                                                                  |

## Overseas Subsidiaries

- **LSIS(Shanghai) Co., Ltd. / CHINA**  
32nd Room 1-4, 32/F, Great Wall Building, No.3000 North Zhongshan Road, Putuo District, Shanghai, P.R. China  
Tel : 86-21-5237-9977(609) Fax : 86-21-5237-7189
- **LSIS(Dalian) Co., Ltd. / CHINA**  
No. 15, Liaohexi 3-Road, Economic and Technical Development zone, Dalian, P.R. China  
Tel : 86-411-8731-7542 Fax : 86-411-8730-7560 E-Mail : dskim@lsis.com
- **LSIS(Wuxi) Co., Ltd. / CHINA**  
102-A, National High & New Tech Industrial Development Area, Wuxi, Jiangsu, P.R. China  
Tel : 86-510-8534-6666 Fax : 86-510-8534-4078 E-Mail : sojin@lsis.com
- **LS Hukai Electric(Hubei) Co., Ltd. / CHINA**  
No. 100, Tanjahe Road, Dianjun District, Yichang City, Hubei Province, P.R. China  
Tel : 86-717-667-7536 Fax : 86-717-667-7222 E-Mail : jaewoongh@lsis.com
- **LS-VINA Industrial Systems Co., Ltd. / VIETNAM**  
Room 1311, 13th, M3-M4 Building 91 Nguyen Chi Thanh street, Hanoi, Vietnam  
Tel : 84-4-6275-8055 Fax : 86-21-5237-7189
- **LSIS[ME] FZE / U.A.E.**  
LOB 19-205, JAFZA View Tower, Jebel Ali Free Zone, Dubai, United Arab Emirates  
Tel : 971-4-886-5360 Fax : 971-4-886-5361 E-Mail : shunlee@lsis.com
- **LSIS Europe B.V. / NETHERLANDS**  
1st. Floor, Tupolevlaan 48, 1119NZ, Schiphol-Rijk, The Netherlands  
Tel : 31-20-654-1420 Fax : 31-20-654-1429 E-Mail : junshickp@lsis.com
- **LSIS Japan Co., Ltd. / JAPAN**  
16th, Higashi-Kan, Akasaka Twin Tower, 2-17-22, Akasaka, Minato-ku, Tokyo, Japan  
Tel : 81-3-3582-9128 Fax : 81-3-3582-2667 E-Mail : jschuna@lsis.com
- **LSIS USA Inc. / U.S.A.**  
2000 Millbrook Drive, Lincolnshire, Chicago, IL 60069, United States of America  
Tel : 847-941-8240 Fax : 847-941-8259

## Overseas Branches

- **LSIS Shanghai Office / CHINA**  
Room E-G, 12th, Huamin Empire Plaza, No.726, West Yan'an Road, Shanghai, P.R. China  
Tel : 86-21-5237-9977(702) Fax : 86-21-5237-7189
- **LSIS Beijing Office / CHINA**  
Room 2306, Building B Landgent Center, No.24 Middle Road, East 3rd Ring Road, Chaoyang District, Beijing, P.R. China  
Tel : 86-10-5761-3127 Fax : 86-10-5761-3128 E-Mail : htroh@lsis.com
- **LSIS Guangzhou Office / CHINA**  
Room 1403, 14th, New Poly Tower, 2 Zhongshan Liu Road, Guangzhou, P.R. China  
Tel : 86-20-8326-6784 Fax : 86-20-8326-6287 E-Mail : sojhtroh@lsis.com
- **LSIS Qingdao Office / CHINA**  
Room 2001, Galaxy Building, 29 ShanDong Road, ShiNan District, QingDao, ShanDong, P.R. China  
Tel : 86-532-8501-6058 Fax : 86-532-8501-6057 E-Mail : htroh@lsis.com
- **LSIS Chengdu Office / CHINA**  
Room1710, 17/F Huamin Empire Plaza, NO.1 Fuxin Road, Chengdu, P.R. China  
Tel : 86-28-8670-3201 Fax : 86-28-8670-3203 E-Mail : yangcf@lsis.com
- **LSIS ShenYang Office / CHINA**  
Room 803, Hongyuan Building, 52 South Nanjing Road, Heping District, Shenyang, P.R. China  
Tel : 86-24-2321-9050 Fax : 86-24-8386-7210 E-Mail : yangcf@lsis.com
- **LSIS Jinan Office / CHINA**  
Room 417, Chuangzhan Center, No. 201, Shanda Road, Lixia District, Jinan, Shandong, P. R. China  
Tel : 86-531-8263-8026 Fax : 86-531-8263-8027 E-Mail : yangcf@lsis.com
- **LSIS Tokyo Office / JAPAN**  
16th, Higashi-Kan, Akasaka Twin Tower, 2-17-22, Akasaka, Minato-ku, Tokyo, Japan  
Tel : 81-3-3582-9128 Fax : 81-3-3582-2667
- **LS-VINA Industrial Systems Hochiminh Office / VIETNAM**  
4th, Yoco Building, 41 Nguyen Thi Minh Khai Street, Hochiminh City, Vietnam  
Tel : 84-8-3822-7941 Fax : 81-84-8-3822-7942 E-Mail : sjbaik@lsis.com
- **LSIS Detroit Office / U.S.A.**  
5700 Crooks Rd, Suite 211, Troy, MI 48098, United States of America  
Tel : 1-248-792-2637-8 Fax : 1-248-792-2642t E-Mail : syllee@lsis.com
- **LSIS Gurgaon Office / INDIA**  
109 First Floor, Park Central, Sector-30, Gurgaon- 122 002, Haryana, India  
Tel : +0091-124-493-0070 Fax : 91-1244-930-066 E-Mail : hwyim@lsis.com



## Green Innovators of Innovation



### Safety Instructions

- For your safety, please read user's manual thoroughly before operating.
- Contact the nearest authorized service facility for examination, repair, or adjustment.
- Please contact qualified service technician when you need maintenance.  
Do not disassemble or repair by yourself!
- Any maintenance and inspection shall be performed by the personnel having expertise concerned.

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### HEAD OFFICE

LS-ro 127(Hogye-dong), Dongan-gu, Anyang-si,  
Gyeonggi-do 431-848, Korea

- **NORTH AMERICA / WESTERN EUROPE**  
+82-2-2034-4676 sukyong@lsis.biz (Brian Choi)
- **CIS / TURKEY / EASTERN EUROPE**  
+82-2-2034-4879 dkimc@lsis.biz (Daniel Kim)
- **ASIA / OCEANIA / LATIN AMERICA**  
+82-2-2034-4888 cshwang@lsis.biz (Charles Hwang)
- **MIDDLE EAST**  
+971-4-886-5360 khchoi1@lsis.biz (Lambert Choi)



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### Global Network

- **LSIS(ME) FZE >> Dubai, U.A.E.**  
Address Jafza View Tower Lob 19, Room 205 Along Sheikh Zayed Road Jebel Aali Free Zone Dubai, United Arab Emirates,  
Tel + 971-4-886-5360 Fax + 971-4-886-5361 E-mail dhleef@lsis.biz
- **LSIS(Dalian) Co., Ltd >> Dalian, China**  
Address No. 15.Liaohexi 3-Road. Economic and Technical Development zone. Dalian 116600. China  
Tel +86-411-8730-7510 Fax +86-411-8731-8277 E-mail cuibx@lsis.com.cn
- **LSIS(Wuxi) Co., Ltd >> Wuxi, China**  
Address 102-A. National High & New Tech Industrial Development Area. Wuxi. Jiangsu. 214028. P.R. China  
Tel +86-510-8534-6666 Fax +86-510-8534-4078 E-mail caidx@lsis.com.cn
- **LS-VINA IS Co., Ltd >> Hanoi, Vietnam**  
Address Nguyen Khe Dong Anh, Hanoi  
Tel +84-4-38820 222,3 Fax +84-4-38820 220 E-mail srjo@lsisvina.com, ylsuk@lsisvina.com
- **LSIS Tokyo Office >> Tokyo, Japan**  
Address 16FL Higashi-Kan. Akasaka Twin Tower 2-17-22. Akasaka. Minato-ku Tokyo 107-0052. Japan  
Tel +81-3-3582-9128 Fax +81-3-3582-2667 E-mail jschuna@lsis.biz
- **LSIS Shanghai Office >> Shanghai, China**  
Address Room E-G. 12FL Huamin Empire Plaza. No.726. West Yan'an Road Shanghai 200050. P.R. China  
Tel +86-21-5237-9977(501) Fax +89-21-5237-7189 E-mail llyong@lsis.com.cn
- **LSIS Beijing Office >> Beijing, China**  
Address B-Tower 17FL. Beijing Global Trade Center. No. 36. East BeisanHuan-Road. DongCheng-District. Beijing 100013. P.R. China  
Tel +86-10-5825-6027(666) Fax +86-10-5825-6028 E-mail xunmj@lsis.com.cn
- **LSIS Guangzhou Office >> Guangzhou, China**  
Address Room 1403.14FL. New Poly Tower. 2 Zhongshan Liu Road. Guangzhou. P.R China  
Tel +86-20-8326-6754 Fax +86-20-8326-6287 E-mail chenxs@lsis.com.cn
- **LSIS Chengdu Office >> Chengdu, China**  
Address Room 1710.17FL. Huamin Empire Plaza. No.1 Fu Xing Street. Chengdu. 610016. P.R. China  
Tel +86-28-8670-3201 Fax +86-28-8670-3203 E-mail yangcf@lsis.com.cn
- **LSIS Qingdao Office >> Qingdao, China**  
Address Room 2001.YinHe Bldg. No. 29 Shandong Road, Qingdao. 266071, P.R. China  
Tel +86-532-8501-6058 Fax +86-532-8501-6057 E-mail wangzy@lsis.com.cn