Top 100
Global
Innovator
for 10 years

# XGT Series

## Programmable Logic Controller



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XGT series, innovative solutions for system integration
from field to information level.
Open Network System Integration





neXt Generation Technology

# XGT Series





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FEATURES



**CPU** 14 ~ 31

CPU



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SYSTEM



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NETWORK



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SPECIAL



**SOFTWARE** 122 ~143

SOFTWARE

# Welcome to XGT World*!*

XGT series will meet your needs and expectations, enabling the highest possible productivity and performance levels and more.



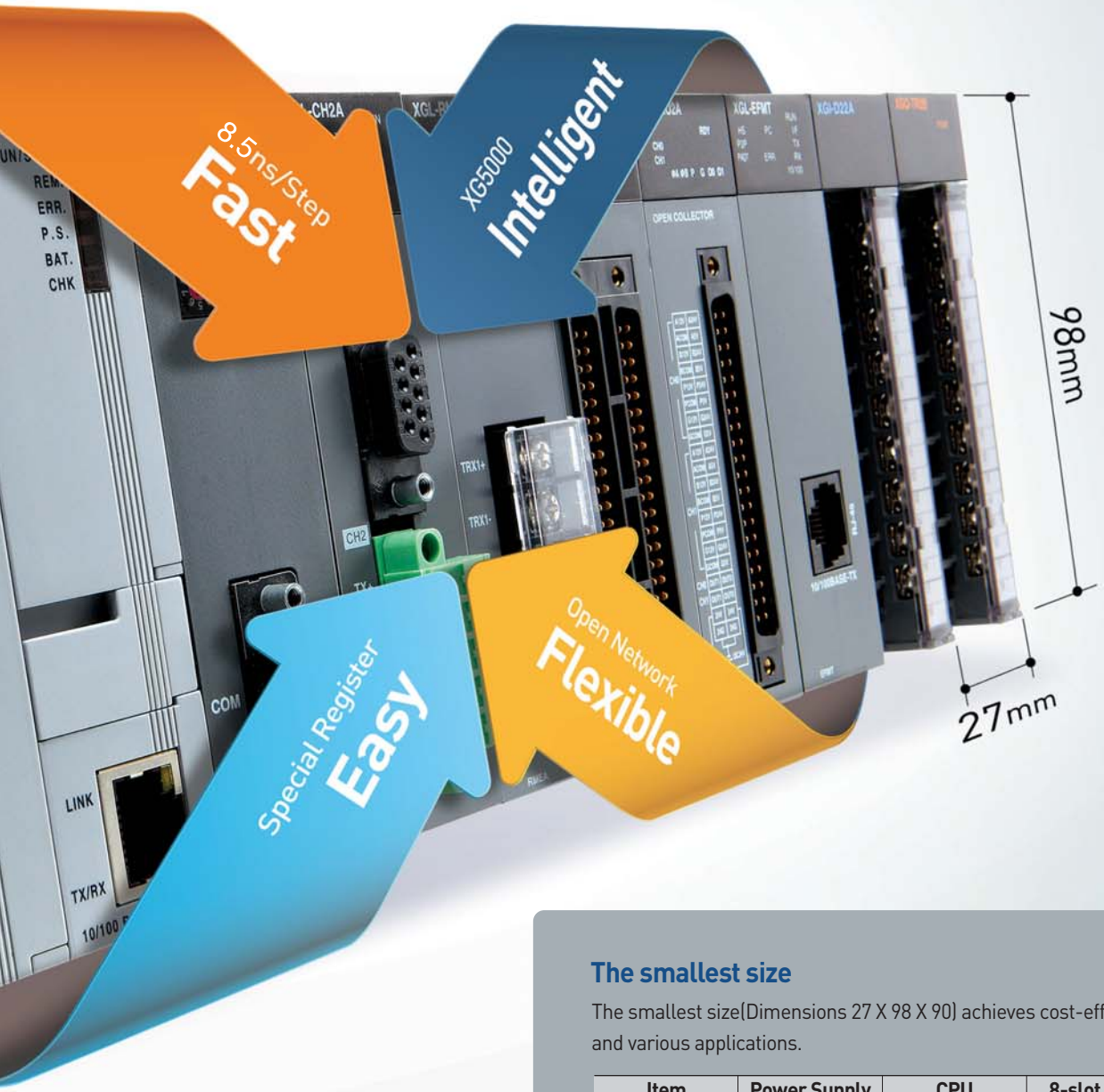
XGK / I

CPUU CPUS
CPUH CPUE
CPUA


XGR
XGK/I
CPUUN
CPUHN
CPUSN

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.






## The smallest size

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

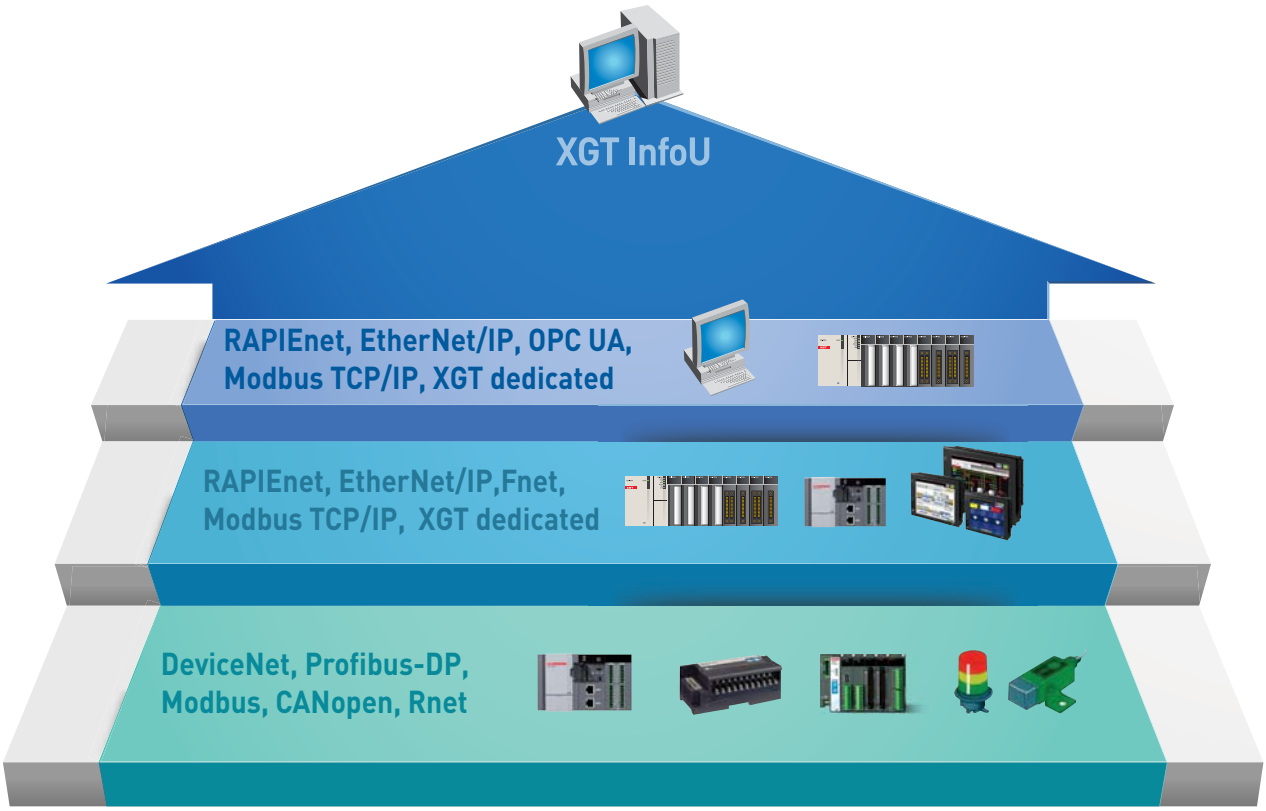
| Item | Power Supply | CPU | 8-slot Base |
|---|---|---|---|
| Size (WXHXD) | 55X98X90 | 27X98X90 | 318X98X17 |

# XGT series, neXt Generation Technology for easier, faster and smarter automation, will provide you with future-oriented solutions, bringing greener, safer and more convenient life for you...

## 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, etc.





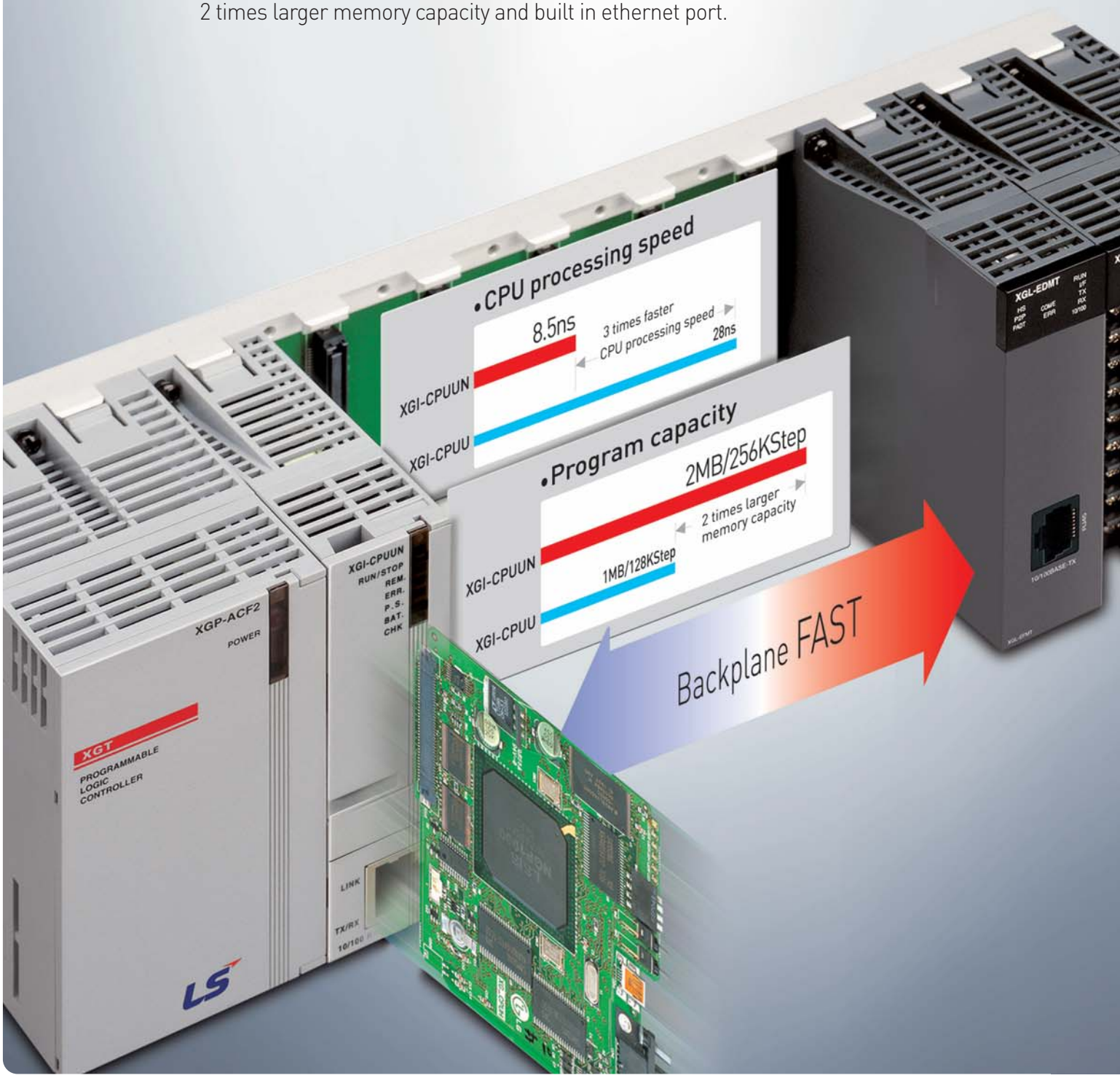

| Item | | Industrial Ethernet network | | | | Fieldbus network | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | RAPIEnet | EtherNet/IP | ModbusTCP/IP | XGT dedicated | Cnet | Fnet | Profibus-DP | DeviceNet | Rnet |
| Master/Client module | | XGL-EFMTB, XGL-EFMFB, XGL-EFMHB | | | | XGL-C22B, XGL-C42B, XGL-CH2B | XGL-FMEA | XGL-PMEB | XGL-DMEB | XGL-RMEB |
| Slave/Server module | | XGL-DBDT, XGL-DBDF, XGL-DBDH | | | | - | - | XGL-PSRA, XGL-PSEA | - | - |
| Transmission speed Media | | 100/1000Mbps | | | | 300 ~ 115,200bps | 1Mbps | Max.12Mbps | Max.500Kbps | 1Mbps |
| Distance (Node to node) | | 100m(Tp) 2Km (Fiber Optic) | | | | Max.1.2km (422/485) | 750m(Seg) Max.5.25km | Max.1.2km | Max.500m | 750m (Seg) Max.5.25km |
| Max. number of connection | | 64 | 64 | 64 | 64 / 16(Server) | 32 | 64 | 32(Seg) 128 | 64 | 64 |
| Protocol | | RAPIEnet | EtherNet/IP | Modbus TCP/IP | XGT dedicated | Modbus RTU/ASCII | Fnet (LS dedicated) | Profibus-DP | DeviceNet | Rnet (LS dedicated) |
| Service | High-speed link | ● | – | – | ● | – | ● | ● | ● | ● |
| | P2P | ● | ● | – | ● | ● | – | – | – | – |
| | XG5000 Service | ● | ● | – | ● | ● | – | – | – | – |
| | E-Mail Service | – | – | – | ● | – | – | – | – | – |
| Configuration Software | | XG5000 | | | | | | | | |
| Max. number of installation | | 24ea(High-speed link : 12ea, P2P service : 8ea) | | | | | | | | |



# Do you want more powerful features and performance? answer is LS ELECTRIC

## XGT New CPU

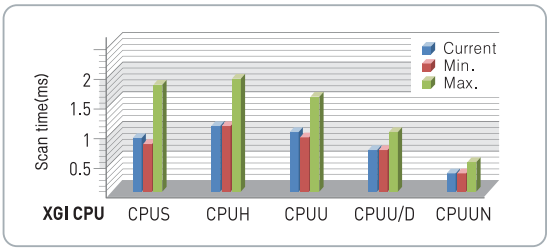
New XGT CPU has 3 times faster cpu processing speed,
2 times larger memory capacity and built in ethernet port.



## Compare of scan time between XGI-CPUU and XGI-CPUUN

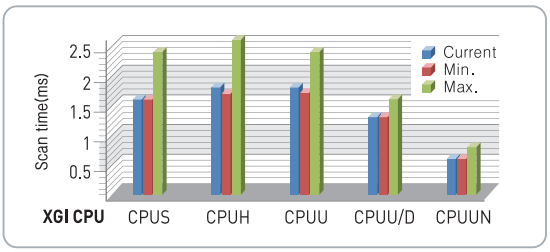
### Using 1 MOVE word

| Item | XGI-CPUUN | XGI-CPUU/D | XGI-CPUU | XGI-CPUH | XGI-CPUS |
|---|---|---|---|---|---|
| Current scan time | 0.2ms | 0.6ms | 0.9ms | 1.0ms | 0.8ms |
| Min. scan time | 0.2ms | 0.6ms | 0.8ms | 1.0ms | 0.7ms |
| Max. scan time | 0.4ms | 0.9ms | 1.5ms | 1.8ms | 1.7ms |



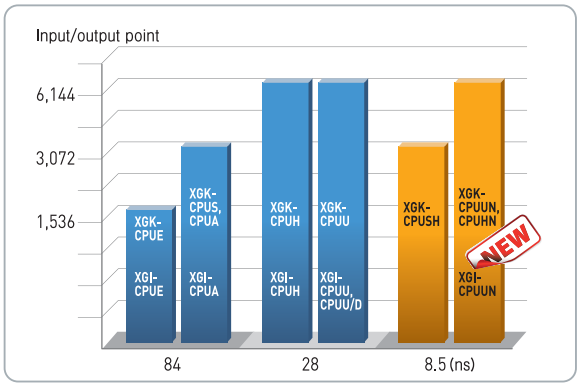

### Using 1,000 MOVE word

| Item | XGI-CPUUN | XGI-CPUU/D | XGI-CPUU | XGI-CPUH | XGI-CPUS |
|---|---|---|---|---|---|
| Current scan time | 0.5ms | 1.2ms | 1.7ms | 1.7ms | 1.5ms |
| Min. scan time | 0.5ms | 1.2ms | 1.6ms | 1.6ms | 1.5ms |
| Max. scan time | 0.7ms | 1.5ms | 2.3ms | 2.5ms | 2.3ms |



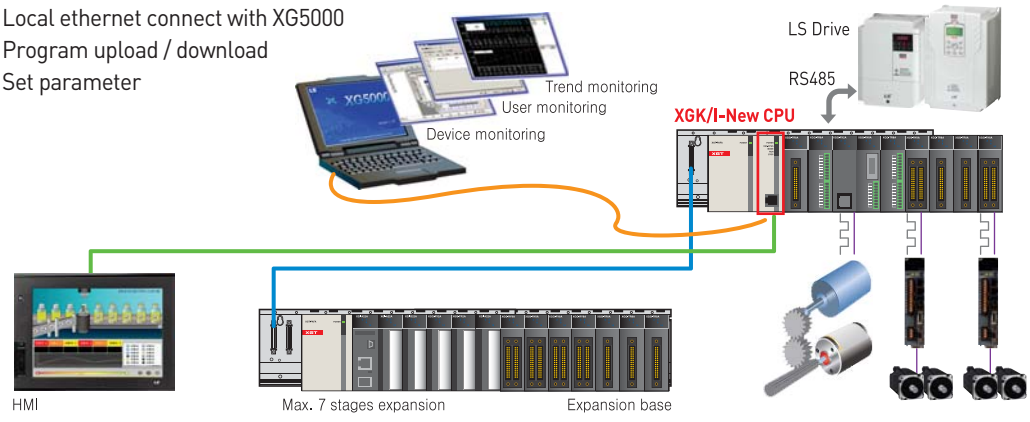

## Device memory range

| CPU | Device memory | XGI-CPUU | XGI-CPUUN |
|---|---|---|---|
| XGI CPU | A | 512KB | 1024KB |
| | M | 256KB | 512KB |
| XGK CPU | P/M/K | 32,768 point | 65,536 point |
| | T | T000 – T2047 | T000 – T8191 |
| | C/S/Z, R/ZR | 2 ~ 8 times larger | |




## Easy connection

- Local ethernet connect with XG5000
- Program upload / download
- Set parameter



# Engineering & Programming
# Innovation Easy

## Special Register

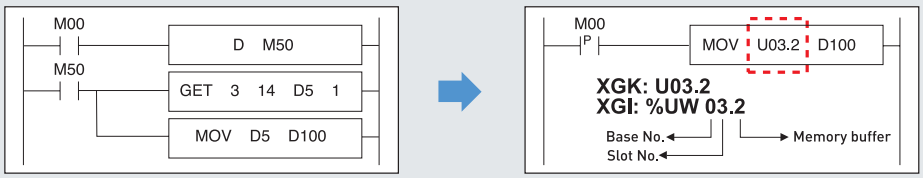
XGT series expand device memory and support advanced programming environment with Index register (Z), File register (U), and Analog register (U).

**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.

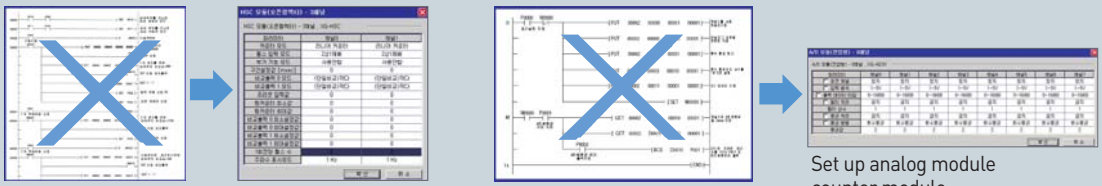
**Example of Analog Register**




KGLWIN XG5000

## 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

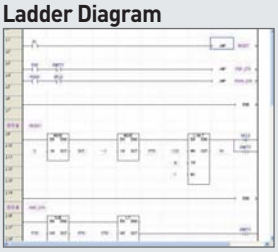
## Program Modularization and Task Operation

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

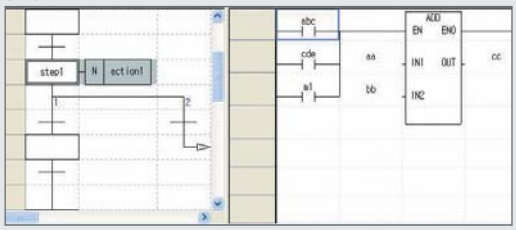
| Program type | | Description | Number |
|---|---|---|---|
| Scan program | Scan | Executed in every scan | 256-task |
| Task program | Initialization task | Executed only one time when power turns on | 1 |
| | Time driven task | Executed with a constant time interval specified in parameter setting | 32 |
| | Internal task | Executed by internal condition | 32 |
| | External interrupt task | Executed by external interrupt input | 32 |

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

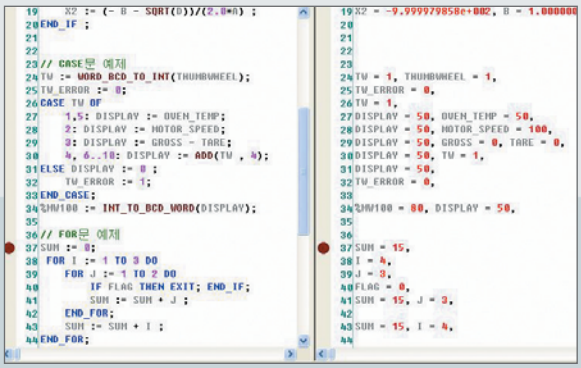
### Ladder Diagram



### SFC




### ST



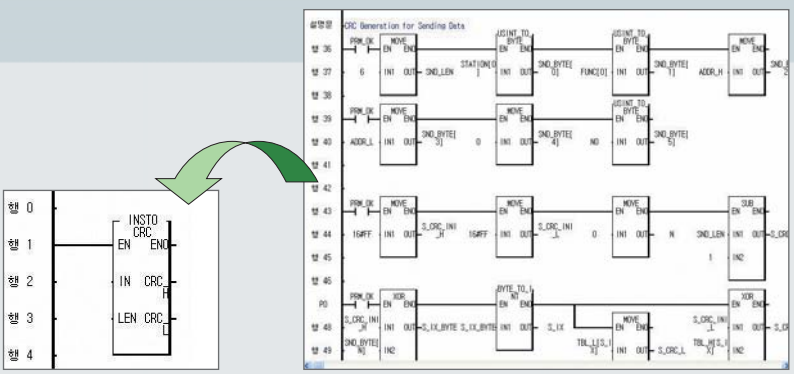
```
// CASE문 예제
TW := WORD_BCD_TO_INT(THUMBWHEEL);
TW_ERROR := 0;
CASE TW OF
    1,5: DISPLAY := OVEN_TEMP;
    2: DISPLAY := MOTOR_SPEED;
    3: DISPLAY := GROSS - TARE;
    4, 6..10: DISPLAY := ADD(TW , 4);
ELSE DISPLAY := 0 ;
    TW_ERROR := 1;
END_CASE;
%MW100 := INT_TO_BCD_WORD(DISPLAY);

// FOR문 예제
SUM := 0;
FOR I := 1 TO 3 DO
    FOR J := 1 TO 2 DO
        IF FLAG THEN EXIT; END_IF;
        SUM := SUM + J ;
    END_FOR;
    SUM := SUM + I ;
END_FOR;
```

### ST features

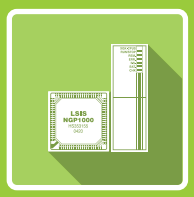
- High-level Language
- Fit for the complicate algorithm
- Various open source (Compatibility)
- Easy data processing
- Convenient text editor

## 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


XGP-ACF2
POWER
XGI-CPUUN
RUN/STOP
REM.
ERR.
P.S.
BAT.
CHK
XGL-PMEC
HS
CFG
P-RUN
STATUS
ERR
RUN
I/F
XGF-DV4A
RUN
XGL-EIPT
I/F
P2P
PADT
SVR
MS
NS
RUN
1 ACT
LNK
2 ACT
LNK
XGF-PN8B
AX1
AX2
AX3
AX4
AX5
AX6
AX7
AX8
RDY
RUN
ACT
XGQ-RY2A
OS DOWN.
STATION NUMBER
x10
x1
TX1
ENC1A+
ENC1A-
ENC1B+
ENC1B-
ENC1Z+
ENC1Z-
ENC2A+
ENC2A-
ENC2B+
ENC2B-



# 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.**

Contents

16 CPU module
24 I/O module



# XGT CPU Module

## XGK CPU (LS Standard)

### Premium CPU for high-speed and large scale application



**XGK-CPUUN**

- Program capacity: 256K steps
- I/O points: 6,144
- I/O device point: 65,536 (Remote I/O)
- Processing speed: 8.5ns/step



**XGK-CPUHN**

- Program capacity: 128K steps
- I/O points: 6,144
- I/O device point: 65,536 (Remote I/O)
- Processing speed: 8.5ns/step



**XGK-CPUSN**

- Program capacity: 64K steps
- I/O points: 3,072
- I/O device point: 65,536 (Remote I/O)
- Processing speed: 8.5ns/step



**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-CPUUN**

- Program capacity: 2MBytes
- I/O points: 6,144
- I/O device point: 131,072 (Remote I/O)
- Processing speed: 8.5ns/step



**XGI-CPUU**

- Program capacity: 1MBytes
- I/O points: 6,144
- I/O device point: 131,072 (Remote I/O)
- Processing speed: 28ns/step



**XGI-CPUH**

- Program capacity: 512KBytes
- I/O points: 6,144
- I/O device point: 131,072 (Remote I/O)
- Processing speed: 28ns/step

### General sequence controller PLC CPU



**XGI-CPUS (IEC Standard)**

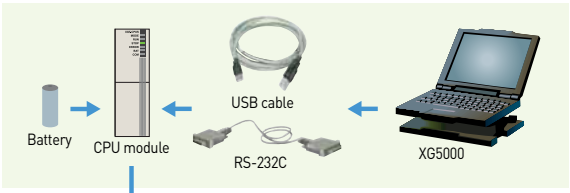
- Program capacity: 128KBytes
- I/O points: 3,072
- I/O device point: 32,768 (Remote I/O)
- Processing speed: 28ns/step

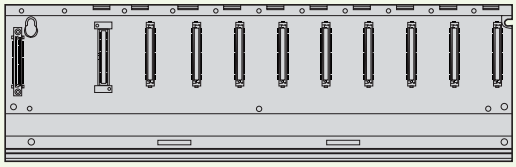


**XGI-CPUE (IEC Standard)**

- Program capacity: 64KBytes
- I/O points: 1,536
- I/O device point: 32,768 (Remote I/O)
- Processing speed: 84ns/step

## CPU Module System composition



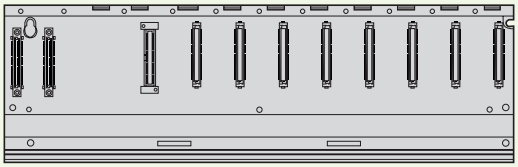



Main Base (XGB-M□□A)



Expansion cable (XGC-E□□□)

| Item | Type | Description |
|---|---|---|
| Expansion cable | XGC-E041 | Expansion cable 0.4m |
| | XGC-E061 | Expansion cable 0.6m |
| | XGC-E121 | Expansion cable 1.2m |
| | XGC-E301 | Expansion cable 3.0m |
| | XGC-E501 | Expansion cable 5.0m |
| | XGC-E102 | Expansion cable 10m |
| | XGC-E152 | Expansion cable 15m |
| Expansion terminator | XGT-TERA | Expansion terminator |



Expansion base (XGB-E□□A)

| Item | Main base | Expansion base |
|---|---|---|
| 4 slot | XGB-M04A | XGB-E04A |
| 6 slot | XGB-M06A | XGB-E06A |
| 8 slot | XGB-M08A | XGB-E08A |
| 10 slot | XGB-M10A | - |
| 12 slot | XGB-M12A | XGB-E12A |



Power module (XGP-□□□□)



Input module (XGI-□□□□)



Output module (XGQ-□□□□)

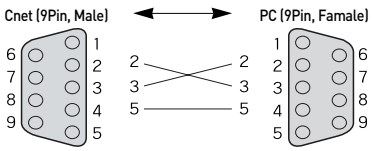


Special module (XGF-□□□□)



Communication module (XGL-□□□□)

## XG5000 Cable (RS-232C)




| | CPU module | I/O point |
|---|---|---|
| XGK | XGK-CPUH,CPUU, CPUHN, CPUUN | 6,144 |
| | XGK-CPUS,CPUA, CPUSN | 3,072 |
| | XGK-CPUE | 1,536 |
| XGI | XGI-CPUUN, 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 | KIC-050A | RS-232C downloading cable |

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

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

| Item | Output module | | |
|---|---|---|---|
| | Relay | Triac | Transistor |
| 8 points | XGQ-RY1A | - | XGQ-TR1C |
| 16 points | XGQ-RY2A | XGQ-SS2A | XGQ-TR2A |
| | XGQ-RY2B | - | XGQ-TR2B |
| 32 points | - | - | XGQ-TR4A |
| | - | - | XGQ-TR4B |
| 64 points | - | - | XGQ-TR8A |
| | - | - | XGQ-TR8B |

| 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 |
| | XGF-DV4S | Voltage output, 4Ch (Isolated) |
| | XGF-DC4S | Current output, 4Ch (Isolated) |
| Analog Input/Output | XGF-AH6A | Input: 4ch, Voltage/ Current |
| | | Output: 2Ch Voltage/ Current |
| High-speed counter | XGF-HO2A | Pulse (OC) input type, 2Ch |
| | XGF-HD2A | Pulse (LD) input type, 2Ch |
| Positioning | XGF-P01H~P04H | Open collector, 1~4axes |
| | XGF-PD1H~PD4H | Line drive, 1~4axes |
| Positioning (Network Type) | XGF-PN8A | LS Standard EtherCAT Net. 8axes |
| | XGF-PN8B | Standard EtherCAT Net. 8axes |
| Motion Module | XGF-M32E | Standard EtherCAT Net. 8axes |
| Temperature control | XGF-TC4S | Thermocouple input, 4Ch |
| | XGF-RD4A | RTD input, 4Ch |
| | XGF-RD4S | RTD input, 4Ch (Insulated) |
| Temperature controller | XGF-TC4UD | Input: 4ch.(Voltage/Current, RTD/TC) |
| | | Output: 8ch.(TR/Current) |
| | | Controller: 4 loops |
| | XGF-TC4RT | Input: 4ch.(RTD) |
| | | Output: 4ch.(TR) |
| | | Controller: 4 loops |
| Event input | XGF-SOEA | DC24V, 32points |
| Data log | XGF-DL16A | USB2.0,CF2001,Max16Gbyte, 32 points 1 slot(Input 22 points, output 10 points) |

| Communication module | | |
|---|---|---|
| RAPIEnet+ - RAPIEnet v2 - EtherNet/IP - Modbus TCP/IP - Dedicated XGT Network | XGL-EFMTB | Master/Client, Twisted fair 2ch. |
| | XGL-EFMFB | Master/Client, Fiber optic 2ch. |
| | XGL-EFMHB | Master/Client, Twisted fair/fiber optic |
| | XGL-DBDT | Expansion driver - Twisted pair 2ch. |
| | XGL-DBDF | Expansion driver - Fiber optic 2ch. |
| | XGL-DBDH | Expansion driver - Fiber optic / Twisted pair |
| | XOL-ES4T | Stand alone switch twisted pair 4ch. |
| | XOL-ES4H | Stand alone switch twisted 2ch. fiber 2ch. |
| | XGL-EH5T | Open Ethernet switching hub |
| Computer Link (Cnet) | XGL-CH2B | RS-232C 1ch, RS-422/485 1ch |
| | XGL-C22B | RS-232C 2ch |
| | XGL-C42B | RS-422/485 2ch |
| DeviceNet(Dnet) | XGL-DMEB | DeviceNet, Master |
| | XGL-DSEB | DeviceNet, Slave |
| Profibus-DP (Pnet) | XGL-PMEB | Profibus-DP, Master |
| | XGL-PSRA | Profibus-DP Slave, Remote interface |
| | XGL-PSEA | Profibus-DP Slave |
| Rnet | XGL-RMEB | Rnet, Master, TP |
| | GOL-RR8T | Rnet stand alone repeater hub |
| Fnet | XGL-FMEA | Fnet, Master |
| BACnet/IP | XGL-BIPT | BACnet client/server |
| RAPIEnet v1 | XGL-EIMT | RAPIEnet, Twisted fair 2Ch |
| | XGL-EIMF | RAPIEnet, Fiber optic 2Ch |
| | XGL-EIMH | RAPIEnet, Twisted fair, Fiber optic |
| EtherNet/IP | XGL-EIPT | Industrial Ethernet, Twisted fair 2Ch |

## 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/s²{1G} | - | | |
| | | | | | |
| | Frequency | Acceleration | Pulse width | | |
| | 10 ≤ f < 57Hz | - | 0.035mm | | |
| | 57 ≤ f < 150Hz | 4.9m/s²{0.5G} | - | | |
| Shock resistance | • Peak acceleration: 147 m/s{15G}<br>• Duration: 11ms<br>• Half-sine, 3 times each direction per each axis | | | | IEC 61131-2 |
| 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-CPUUN | XGK-CPUHN | XGK-CPUSN | |
| 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, SFC (Sequential Function Chart), ST (Structured Text) | | | |
| Number of instructions | Basic | 40 | | | |
| | Application | 700 | | | |
| Processing speed | LD | 0.0085㎲/Step | | | |
| | MOVE | 0.255㎲/Step | | | |
| | Real number operation | ±: 182.2ns (S), 327.3ns (D) | | | S: Single real number<br>D: Double real number |
| | | ×: 336ns (S), 427ns (D) | | | |
| | | ÷: 345ns (S), 808ns (D) | | | |
| Program capacity | | 256Kstep (2,048KB) | 128Kstep (1,024KB) | 64Kstep (512KB) | |
| I/O points (available to install) | | 6,144 | 6,144 | 3,072 | |
| Data area | P | P00000 ~ P4095F(65,536 points ) | | | |
| | M | M00000 ~ M4095F(65,536 points ) | | | |
| | K | K00000 ~ K4095F(65,536 points ) | | | |
| | L | L0000 ~ L11263F(180,224 points ) | | | |
| | F | F0000 ~ F4095F(65,536 points ) | | | |
| | T | 100ms : T0000 - T2999 | | | Timer (Adjustable) |
| | | 10ms : T3000 - T5999 | | | |
| | | 1ms : T6000 - T7999 | | | |
| | | 0.1ms : T8000 - T8191 | | | |
| | C | C0000 ~ C4095 | | | |
| | S | S00.00 ~ S255.99 | | | |
| | D | D0000 ~ D524287 | | D0000 ~ D262143 | |
| | U | U0.0~U7F.31 | | U0.0~U3F.31 | Special module data refresh area |
| | Z | 256 points | | | |
| | N | N00000 ~ N21503 | | | |
| | R | 16 block | 8 block | 2 block | 32K word per 1 block (R0 ~ R32767) |
| Flash area | | 2M byte, 32 blocks | | | Controllable by R device |
| Program type | Total program | 256 | | | |
| | Initialization | 1 (_INT) | | | |
| | Time-driven | 32 | | | |
| | Internal | 32 | | | |
| Operation mode | | RUN, STOP, DEBUG | | | |
| Self-diagnosis | | Execution, Delay, Memory error, I/O error, Battery error, Power error | | | Modbus slave |
| Programming port | | RS-232C (1Ch), USB (1Ch) | | | |
| Data retention at power failure | | Set "retain" at data declaration | | | |
| Max. expansion stage | | 7 | | 3 | Total length 15m |
| Current consumption (mA) | | 960 | | | |
| Weight (Kg) | | 0.12 | | | |

## XGK

| Item | | Description | | | | | Remarks |
|---|---|---|---|---|---|---|---|
| | | XGK-CPUU | XGK-CPUH | XGK-CPUA | XGK-CPUS | XGK-CPUE | |
| 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, SFC (Sequential Function Chart), ST (Structured Text) | | | | | - |
| Number of instructions | Basic | 40 | | | | | - |
| | Application | 700 | | | | | - |
| Processing speed | LD | 0.028㎲/Step | | | 0.084㎲/Step | | - |
| | MOVE | 0.084㎲/Step | | | 0.252㎲/Step | | - |
| | Real number operation | ±: 0.602㎲ (S), 1.078㎲ (D)<br>×: 1.106㎲ (S), 2.394㎲ (D)<br>÷: 1.134㎲ (S), 2.66㎲ (D) | | | ±: 1.442㎲ (S), 2.87㎲ (D)<br>×: 1.948㎲ (S), 4.186㎲ (D)<br>÷: 1.442㎲ (S), 4.2㎲ (D) | | S: Single real number<br>D: Double real number |
| Program capacity | | 128Kstep(512KB) | 64Kstep(256KB) | 32Kstep(128KB) | | 16Kstep(64KB) | - |
| I/O points (availableto install) | | 6,144 | | 3,072 | | 1,536 | - |
| Data area | P | P00000 ~ P2047F(32,768 points) | | | | | - |
| | M | M00000 ~ M2047F(32,768 points) | | | | | - |
| | K | K00000 ~ K2047F(32,768 points) | | | | | - |
| | L | L0000 ~ L11263F(180,224 points) | | | | | - |
| | F | F0000 ~ F2047F(32,768 points) | | | | | - |
| | T | 10ms : T1000 - T1499<br>1ms : T2000 - T2047 | | 100ms : T0000 - T0999<br>1ms : T1500 - T1999 | | | Change area is available by Parameter seting |
| | C | C0000 ~ C2047 | | | | | |
| | S | S00.00 ~ S127.99 | | | | | |
| | D | D0000 ~ D32,767 | | | D0000 ~ D19,999 | | |
| | U | U0.0~U7F.31 | | U0.0~U3F.31 | U0.0~U3F.31 | U0.0~U1F.31 | Special module data refresh area |
| | Z | 128 points | | | | | |
| | N | N00000 ~ N21503 | | | | | |
| | R | 2 block | | | 1 block | | 32K word per 1 block (R0 ~ R32767) |
| Flash area | | 2M byte, 32 blocks | | | | | Controllable by R device |
| Program type | Total program | 256 | | | | | |
| | Initialization | 1 (_INT) | | | | | |
| | Time-driven | 32 | | | | | |
| | Internal | 32 | | | | | |
| Operation mode | | RUN, STOP, DEBUG | | | | | |
| Self-diagnosis | | Execution, Delay, Memory error, I/O error, Battery error, Power error | | | | | Modbus slave |
| Programming port | | RS-232C (1Ch), USB (1Ch) | | | | | |
| Data retention at power failure | | Set "retain" at data declaration | | | | | |
| Max. expansion stage | | 7 | | 3 | | 1 | Total length 15m |
| Current consumption (mA) | | 960 | | 940 | | | |
| Weight (Kg) | | 0.12 | | | | | |

## XGI

| Item | | | XGI-CPUUN | XGI-CPUU/D | XGI-CPUU | XGI-CPUH | XGI-CPUS | XGI-CPUE | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| Operation system | | | Reiterative operation, fixed cycle operation, constant scan | | | | | | |
| I/O Control system | | | Scan synchronous batch processing system(refresh system), direct system by command | | | | | | |
| Program language | | | Ladder Diagram, SFC (Sequential Function Chart), ST (Structured Text) | | | | | | |
| Operation processing speed (basic command) | Operator | | 18 | | | | | | |
| | Basic function | | 136 types + real number operation function | | | | | | |
| | Basic function block | | 43 | | | | | | |
| | Dedicated function block | | Dedicated function blocks by special function modules, communication dedicated function block(P2P) | | | | | | |
| | Basic | | 0.0085㎲/step | 0.028㎲/step | | | | 0.084㎲/step | |
| | MOVE | | 0.255㎲/step | 0.084㎲/step | | | | 0.252㎲/step | |
| | Real number operation | | ± : 0.119㎲(S), 0.281㎲(D) × : 0.272㎲(S), 0.680㎲(D) ÷ : 0.281㎲(S), 0.685㎲(D) | ± : 0.392㎲(S), 0.924㎲(D) × : 0.896㎲(S), 2.240㎲(D) ÷ : 0.924㎲(S), 2.254㎲(D) | | | | ± : 1.442㎲(S), 2.87㎲(D) × : 1.948㎲(S), 4.186㎲(D) ÷ : 1.442㎲(S), 4.2㎲(D) | S: Single real number D: Double real number |
| Program memory capacity | | | 2M | 1M | | 512KB | 128KB | 64KB | |
| I/O points (installable) | | | 6,144 points | | | | 3,072 points | 1,536 points | |
| Max. I/O memory contact | | | 131,072 points | | | | 32,768 points | | |
| Data memory | Symbolic variable area(A) | | 1024KB (max. 512KB retain settable) | 512KB (max. 256KB retain settable) | | | 128KB (max. 64KB retain settable) | 64KB (max. 32KB retain settable) | |
| | I variable(I) | | 16KB | | | | 4KB | | |
| | Q variable(I) | | 16KB | | | | 4KB | | |
| | Direct variable | M | 512KB (max. 256KB retain settable) | 256KB (max. 128KB retain settable) | | | 64KB (max. 32KB retain settable) | 32KB (max. 16KB retain settable) | |
| | | R | 64KB × 16block | | 64KB × 2block | | 64KB × 1block | 32KB × 1block | |
| | | W | 1,024KB | | 128KB | | 64KByte | 32KByte | R |
| | Flag variable | F | 8KB | | 4KB | | | | System flag |
| | | K | 16KB | | | | 4KB | | PID flag |
| | | L | 22KB | | | | | | High speed link flag |
| | | N | 42KB | | | | | | P2P Parameters |
| | | U | | 8KB | | | 4KB | 2KB | Analog data Refresh |
| Flash area | | | 2MB, 32block | | | | | | 1MB, 16block |
| Timer | | | No point limit Time range: 0.001~ 4,294,967.295 second(1,193 hours) | | | | | | 20 bytes of symbolic variable area per point |
| Counter | | | No point limit Coefficient range : 64 bit expression | | | | | | 8 bytes of symbolic variable area per point |
| 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 | | | 7 | | | | 3 | 1 | Total length 15m |
| Current consumption (mA) | | | 960mA | | | | 940mA | | |
| Weight (kg) | | | 0.12kg | | | | | | |

## XGK/XGI CPU built-in Ethernet specification

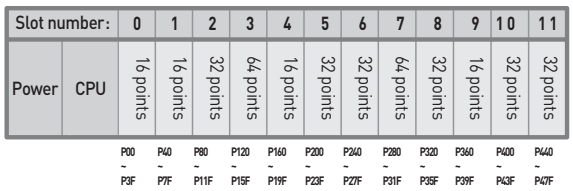
| Item | | XGK-CPUSN, CPUHN, CPUUN / XGI-CPUUN | Remarks |
|---|---|---|---|
| Ethernet | Feature | 1 Port | - |
| | | 10/100BASE-TX | - |
| | | Auto negotiation (Full-duplex and half duplex) | - |
| | | Auto MDIX Crossover | - |
| | | Max. Support 4 channel | Support 8Kbyte each send and receive channel |
| | | Max. Distance between nodes : 100m | - |
| | | Max. Protocol size : 1500Byte | IP Fragmentation is not supported. |
| | Cable | UTP, STP, FTP cables is available | FTP, STP is recommended to prevent noise |
| | Service | Setting communication parameters with XG5000 | - |
| | | Loader service (XG5000 connection) supported | Remote stage 1 connection with PLC is available |
| | | LS protocol(XGT) supported. | Server & TCP supported. Client & UDP not supported. |
| | | Other company's protocol (Modbus TCP/IP) supported | |

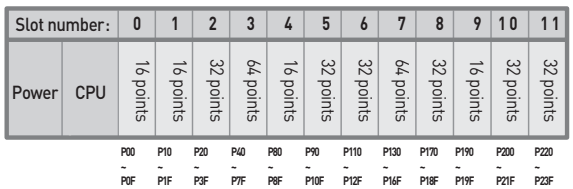




## XGK system configuration

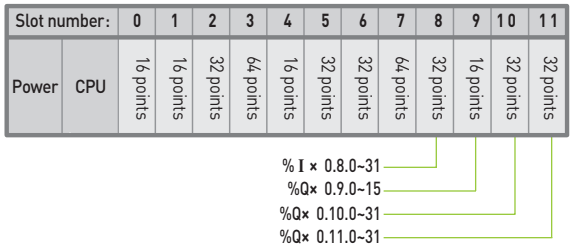
| Item | XGK-CPUE | XGK-CPUS, CPUSN | XGK-CPUA | XGK-CPUH, CPUHN | XGK-CPUU, CPUUN |
|---|---|---|---|---|---|
| Max. expansion stage | 1 Stage | 3 Stage | 3 Stage | 7 Stage | 7 Stage |
| Max. installation of module | 24 Module | 48 Module | 48 Module | 96 Module | 96 Module |
| Max. number of I/O point | 1,536 Points | 3,072 Points | 3,072 Points | 6,144 Points | 6,144 Points |
| Max. expansion distance | 15m | | | | |
| Assignment of I/O number (Fixed) | • 64 points are assigned to each slot of base regardless of installation of module.<br>• I/O numbers equivalent to 12 slots are assigned to a base.<br>• The starting number of base 0 is P0000.<br>• Refer to the following figure regarding the I/O number assignment of 12 slots | | | | |
| I/O assignment (Variable) | • I/O point is assigned automatically according to the installed module.<br>• I/O parameter is used to install modules.<br>• The starting number of base 0 is P0000.<br>• 16 points are assigned automatically to the slot of special or communication module<br>• Refer to the following figure regarding the I/O number assignment of 12 slots. | | | | |



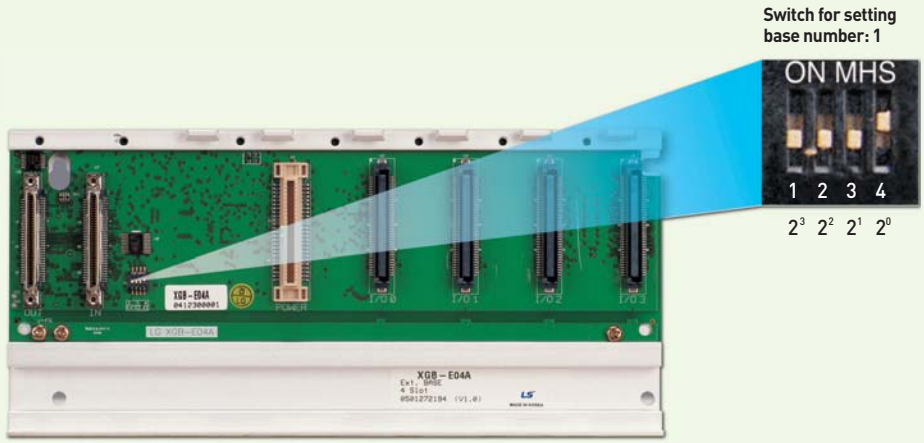

## XGI system configuration

| Item | XGI-CPUU, CPUH, CPUU/D, CPUUN | XGI-CPUS | XGI-CPUE |
|---|---|---|---|
| Max. expansion stage | 7 Stage | 3 Stage | 1 Stage |
| Max. installation of module | 96 Module | 48 Module | 24 Module |
| Max. number of I/O point | 16 point : 1,536 Points<br>32 point : 3,072 Points<br>64 point : 6,144 Points | 16 point : 768 Points<br>32 point : 1,536 Points<br>64 point : 3,072 Points | 16 point : 384 Points<br>32 point : 768 Points<br>64 point : 1,536 Points |
| Max. expansion distance | 15m | | |
| I/O assignment | • 64 points are assigned to each slot of base regardless of installation of module.<br>• No limit in installation of special module<br>• Special module is controlled by function block and the memory assignment is done automatically<br>• Refer to the following figure regarding the I/O assignment of 12 slots | | |

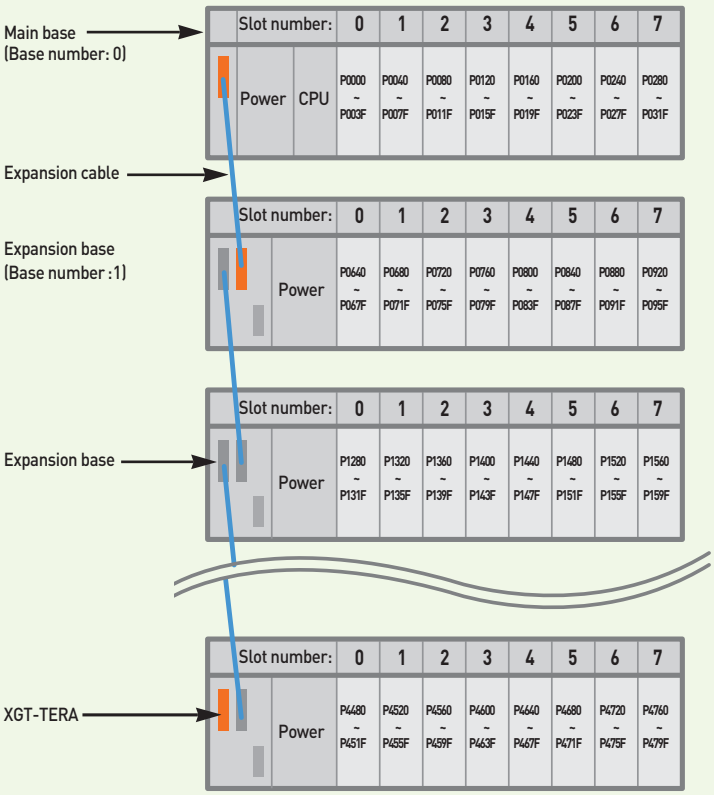


## Expansion system composition

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(XGF-TERA).




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

# XGT 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

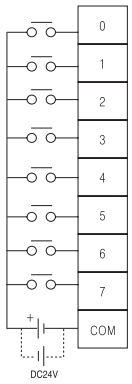
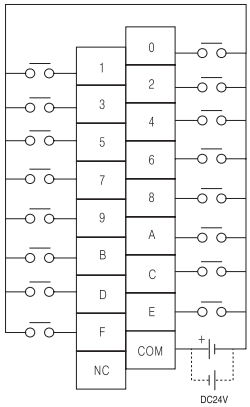
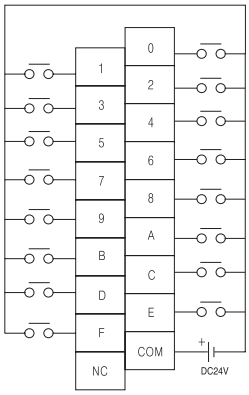
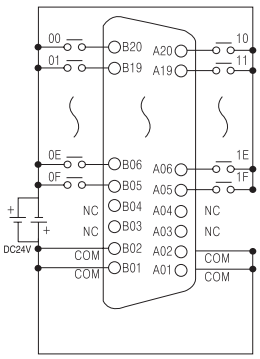
| Item | | DC input | | | | | | | AC input | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | | XGI-D21A | XGI-D22A | XGI-D22B | XGI-D24A | XGI-D24B | XGI-D28A | XGI-D28B | XGI-A12A | XGI-A21A | XGI-A21C |
| Input point | | 8 | 16 | | 32 | | 64 | | 16 | 8 | 8 |
| Rated input voltage | | 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 |

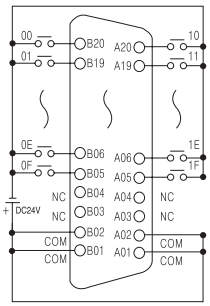
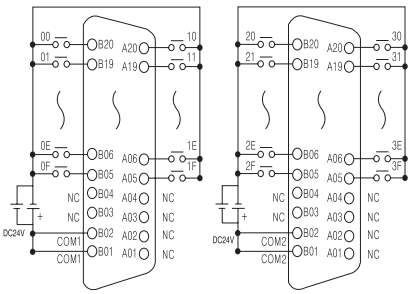
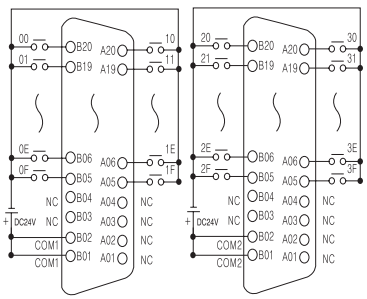
## Output module specifications

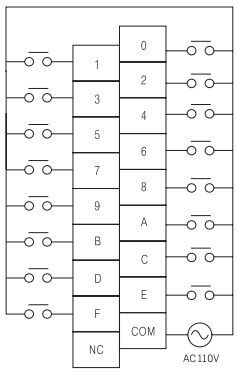
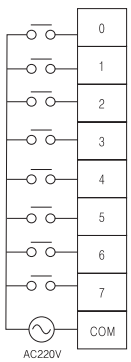
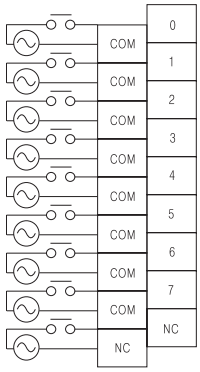
| Item | | Relay | | | Transistor | | | | | | Triac |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | | XGQ-RY1A | XGQ-RY2A | XGQ-RY2B | XGQ-TR1C | XGQ-TR2A | XGQ-TR2B | XGQ-TR4A | XGQ-TR4B | XGQ-TR8A | XGQ-TR8B | XGQ-SS2A |
| Ouput point | | 8 | 16 | | 8 | 16 | | 32 | | 64 | | 16 |
| Rated 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 piont/COM | 16 pionts/COM | | 1 pionts/1COM | 32 pionts/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

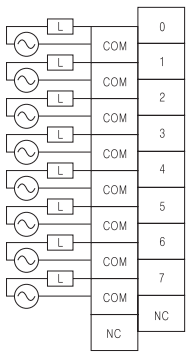
| XGI-D21A | XGI-D22A | XGI-D22B | XGI-D24A |
|---|---|---|---|
|  |  |  |  |

| XGI-D24B | XGI-D28A | XGI-D28B |
|---|---|---|
|  |  |  |

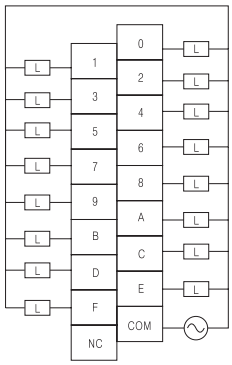
| XGI-A12A | XGI-A21A | XGI-A21C |
|---|---|---|
|  |  |  |

## Wiring diagram for output modules

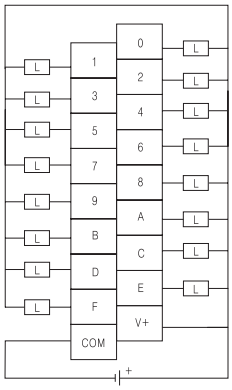
### XGQ-RY1A



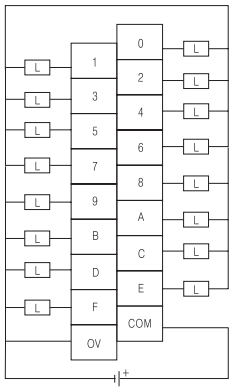

### XGQ-RY2A/B



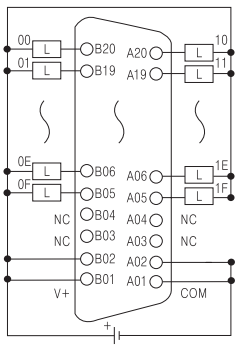

### XGQ-TR2A



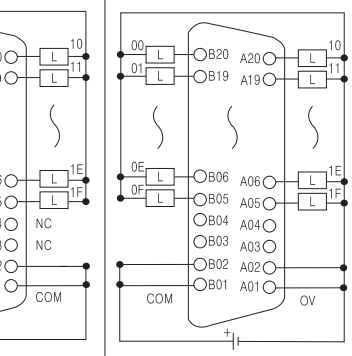

### XGQ-TR2B



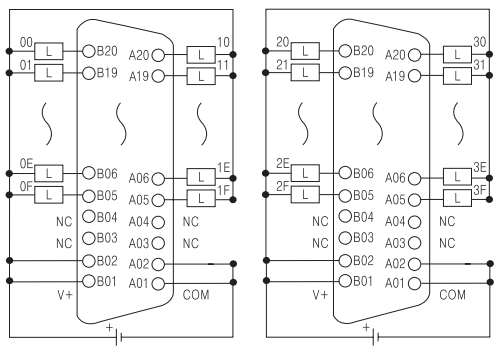

### XGQ-TR4A



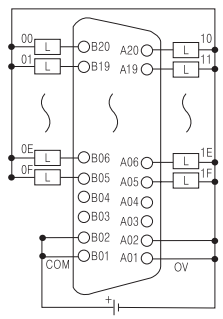

### XGQ-TR4B

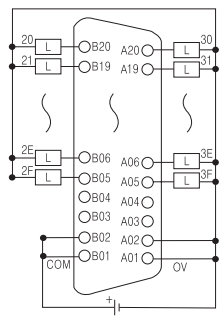



### XGQ-TR8A

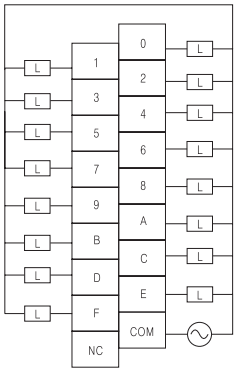



### XGQ-TR8B

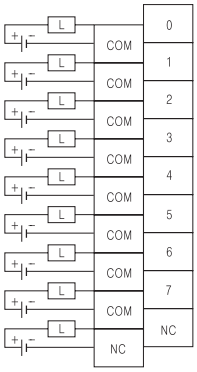



### XGQ-SS2A



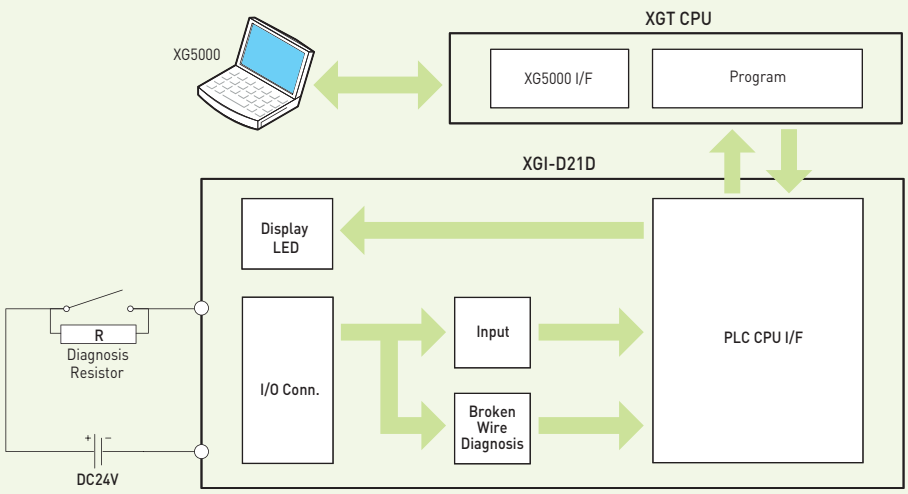

### XGF-TR1C






## Diagnostic Digital Input Module(XGI-D21D)

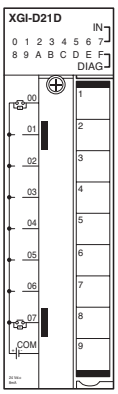
- Diagnostic Digital Input module receives and processes DC 24V input signal. It has a wire break detection function of each input signal.
- Input signal and wire break detection signal are displayed on the device of the CPU module, it can be used in the PLC program.




**Diagnostic digital input module system configuration**

In order to operate wire break detection function normally, you must connect the diagnostic resistor in parallel with the input device installed in the wiring, as shown in Figure

## Specifications




**IN: Input status(0~7)**
- On: Input On
- Off: Input Off

**DIAG: Diagnosis status(8~F)**
- On: broken wire occurs
- Off: Normal state

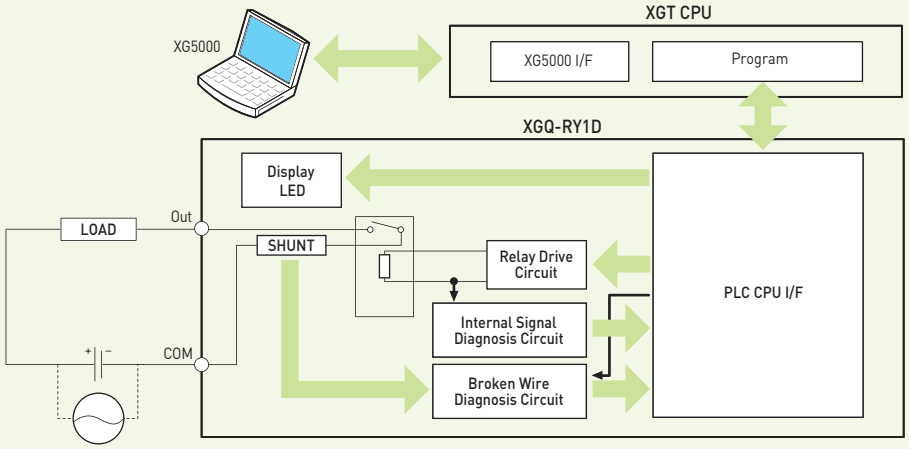
| Item | | Specifications |
|---|---|---|
| Input point | | 8 points |
| Insulation method | | Photo coupler insulation |
| Rated input voltage / current | | DC24V / Approx. 8mA |
| Voltage range | | DC20.4~28.8V (5% and lower ripple rate) |
| On voltage / On current | | 19V and higher / 5.2mA and higher |
| Off voltage / On current | | 11V and lower / 4.7mA and lower |
| Response time (Input filter) | Off→On | 1ms/3ms/5ms/10ms/20ms/70ms/100ms, Initial value:3ms |
| | On→Off | 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 0.3~0.75mm² (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 |

# XGT I/O Module




## Diagnostic Digital Output Module(XGQ-RY1D)

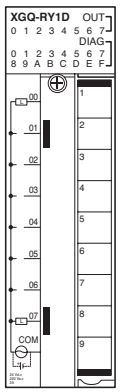
- Diagnostic digital output module outputs output signal via the relay to the outside. It has a diagnostic function of the internal signal and wire break detection for each output signal.
- Diagnositic signals are displayed on the device of the CPU module, it can be used in the PLC program.




**Diagnostic digital output module system configuration**

Digital output module provides diagnostic functions of the following two.
1) Interal output signal diagnosis : Diagnosing whether internal output signal circuit is operating property.
2) Wire break detection : Diagnosing whether the disconnection of the external wiring connected to the relay.

## 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

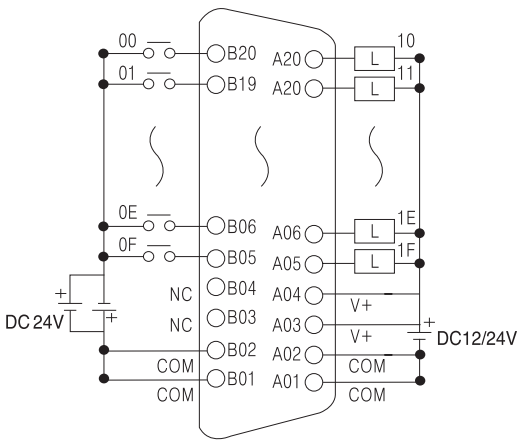
| Item | | Specifications |
|---|---|---|
| Output point | | 8 points |
| Insulation method | | Relay insulation<br>Photo coupler insulation |
| Rated load voltage | | DC24V (resistance load) / AC220V (COS $\varphi$ = 1) |
| Rated load current | 1point | 2A |
| | Common | 5A |
| Min. load voltage / current | | 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 |
| | | DC24V / 1A, DC100V / 0.1A (L / R = 7ms) 100 thousand and more times |
| Response time | Off→On | 10ms and lower |
| | On→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 | | 5.6㏀ | Input resistance | | DC 0.2V or less |
| Response | Off→On | 1ms/3ms/5ms/10ms/20ms/70ms/100ms (Setting by CPU parameter) Initial value: 3ms | Response | Off→On | 1ms or less |
| | On→Off | 1ms/3ms/5ms/10ms/20ms/70ms/100ms (Setting by CPU parameter) Initial value: 3ms | | On→Off | 1ms or less (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

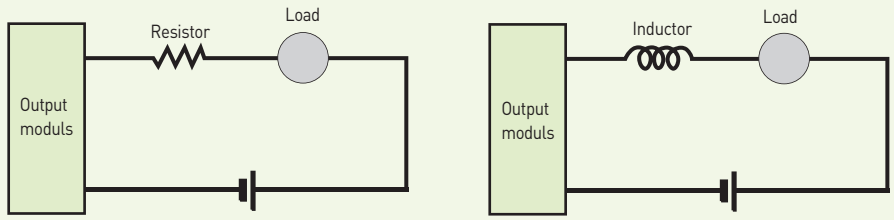
XGH-DT4A



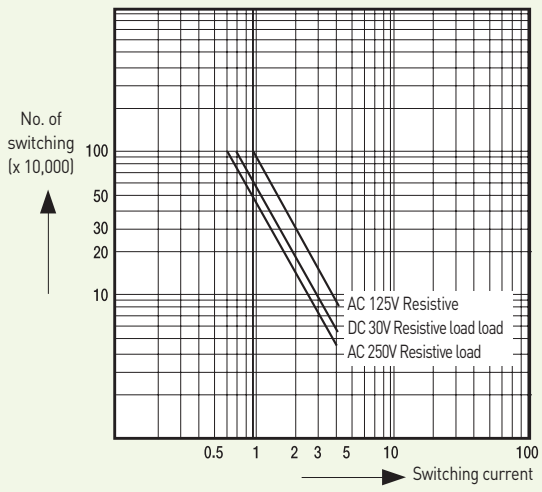

NOTE) Input address for XGK CPU is P00~P0F and Output address is P10~P1F when it is installed on the slot 0.
Input address for XGI CPU is %IX0.0.0~%IX0.0.15 and Output address is %QX0.0.16~%QX0.0.31

## Precaution during installation of I/O module

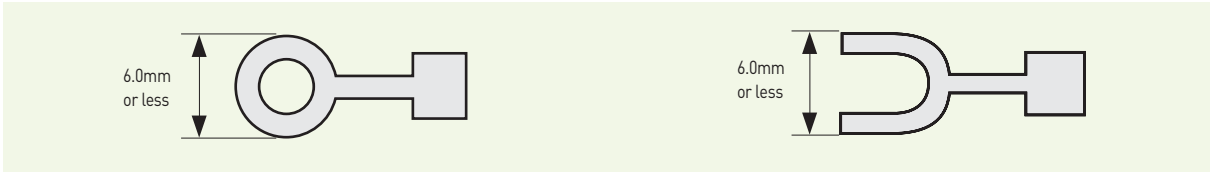
- XGT has 2 kinds of digital input type: Current sink input, Current source input. For DC input module has different wiring depending on the input type, digital input type should be selected with consideration about connected input device.
- Max. number of simultaneous input point differs according to 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.



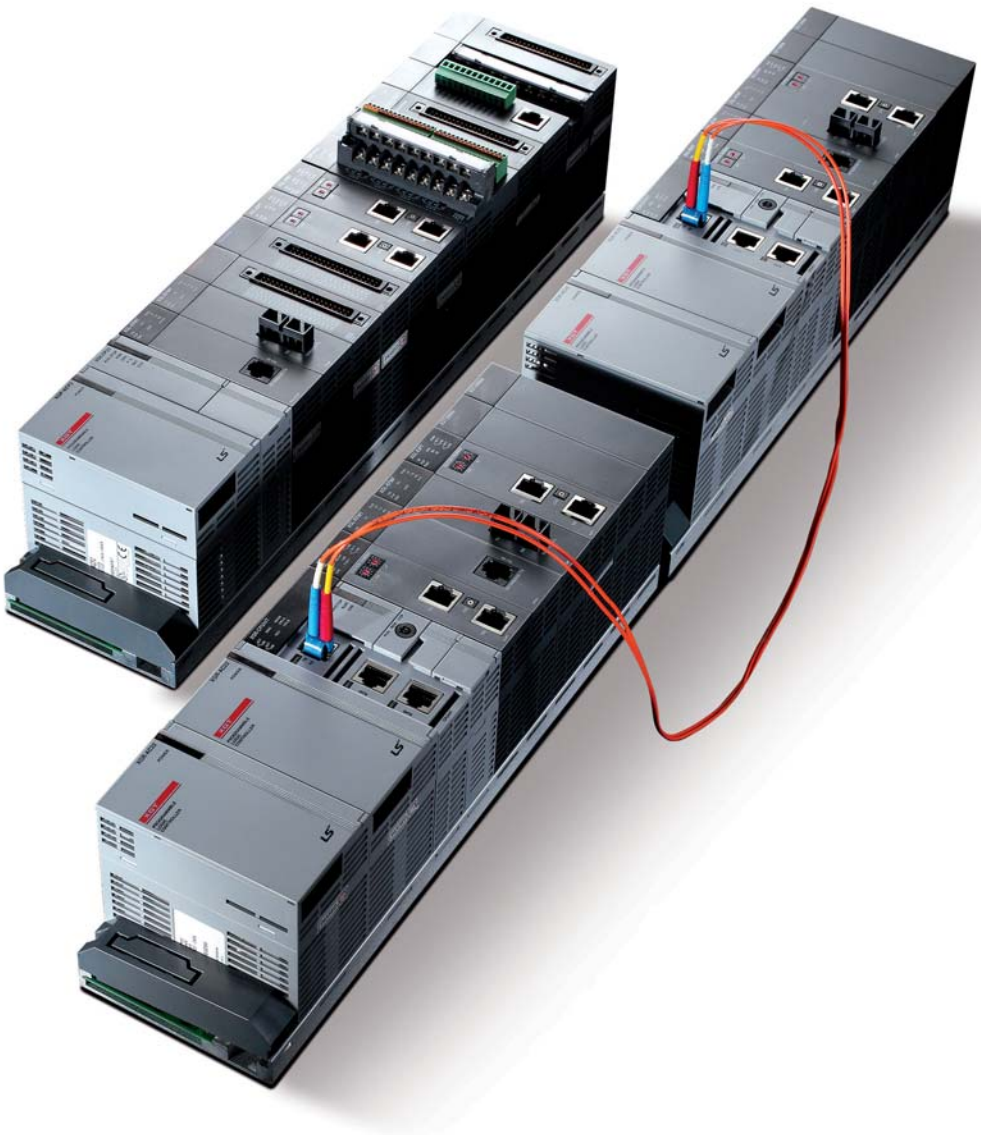
- Compressed terminal attaching sleeve cannot be mounted to XGT terminal block. The following picture shows appropriate compressed terminals for terminal block.




- Use 0.3~0.75mm 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-AC22
POWER
XGT
PROGRAMMBLE
LOGIC
CONTROLLER
XGR-AC22
POWER
XGT
PROGRAMMBLE
LOGIC
CONTROLLER
XGR-CPUH/T
ACT
LINK
RING
MASTER
CPU-A
CPU-B
RED
TX
RX
WAR.
ERR.
RUN
REM
STOP
RJ45
RJ45

# 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

Contents

34 XGR Configuration
36 System configuration
38 Application

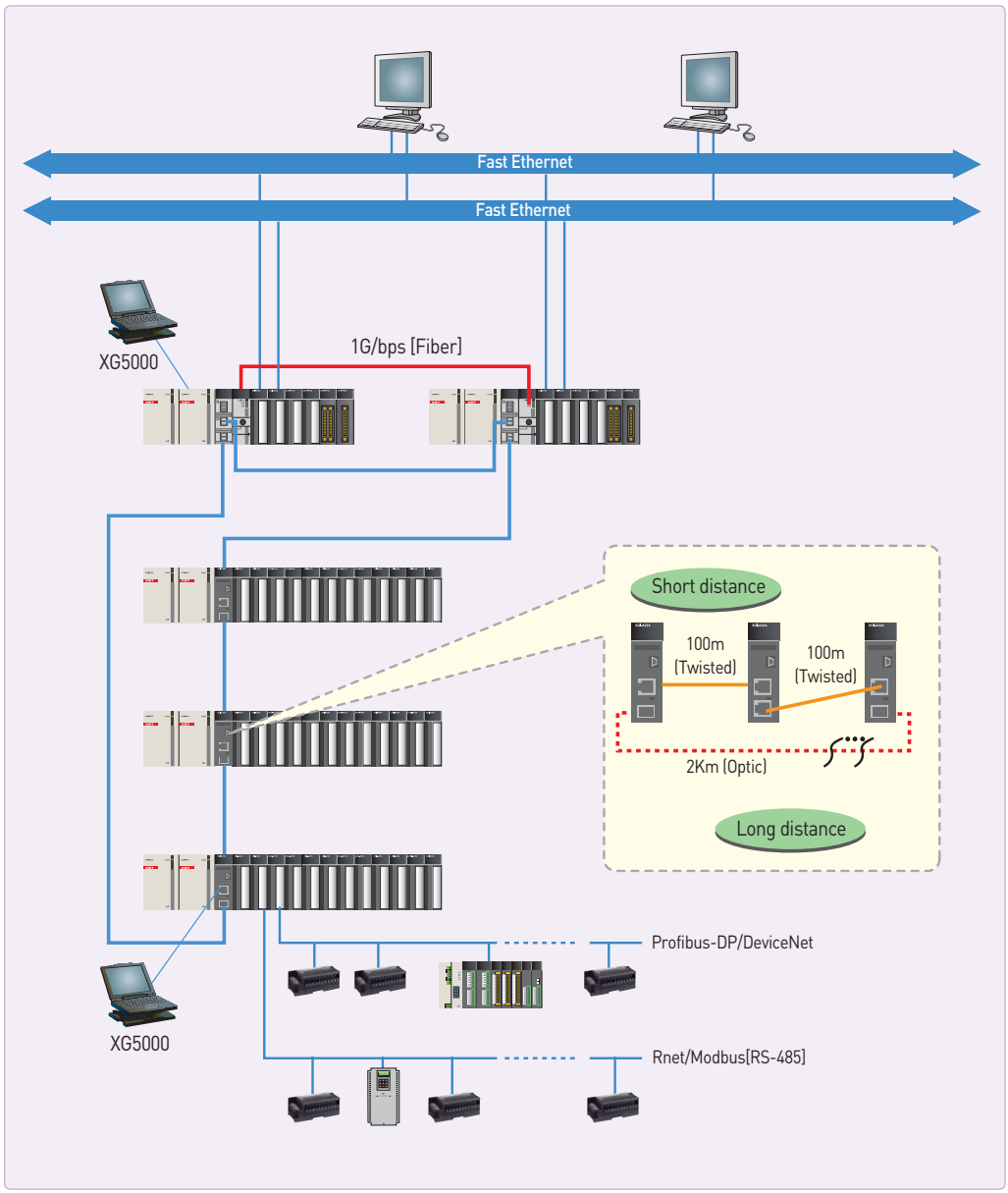


# XGR Configuration

## XGR Configuration

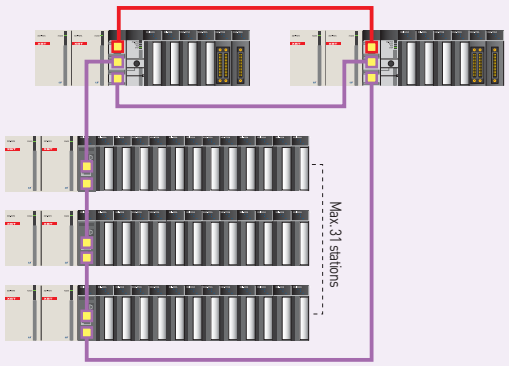
- Base, Power, CPU, Network redundancy
- Dual port and 3 kinds of media (Twisted-Twisted, Optic-Optic, Twisted-Optic)



## System configuration method

### Fiber-optic






**XGR-CPUH/F**

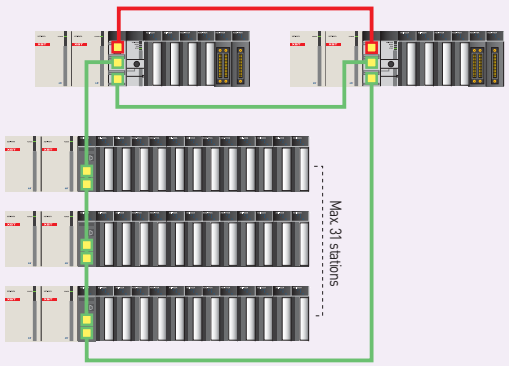
- Main CPU
- Fiber optic:
  Max. distance 2Km



**XGR-DBDF**

- Expansion drive module
- Fiber optic:
  Max. distance 2Km
  (Installed on the expansion base)
- Max. 31 stations

### Twisted pair






**XGR-CPUH/T**

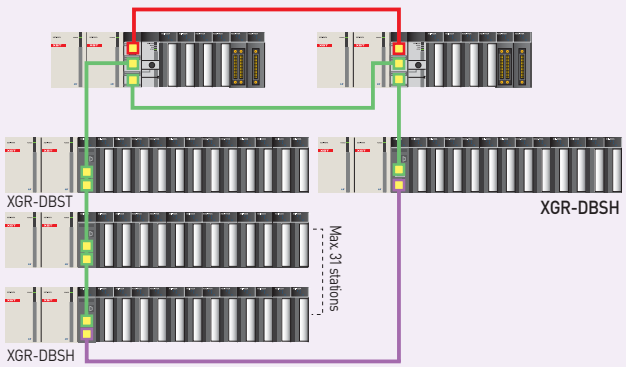
- Main CPU
- Twisted fair:
  Max. distance 100m



**XGR-DBDT**

- Expansion drive module
- Twisted fair :
  Max. distance 100m
  (Installed on the expansion base)
- Max. 31 stations

### Hybrid ( Twisted pair + Fiber Optic )






**XGR-CPUH/T XGR-CPUH/F**

- Main CPU
- Fiber optic:
  Max. distance 2Km
  Twisted fair:
  Max. distance 100m

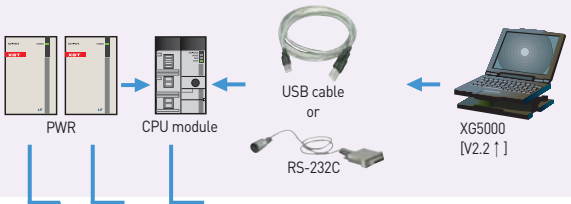


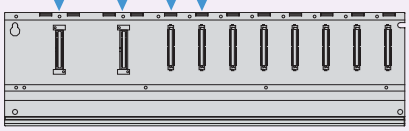
**XGR-DBDH**

- Expansion drive module
- Fiber optic: Max. distance 2Km
  Twisted fair: Max. distance 100m
  (Installed on the expansion base)
- Max. 31 stations

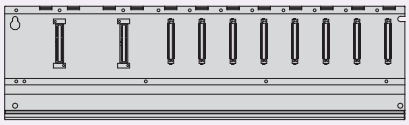
* Max. expandable distance: Fiber optic 60km, Twisted fair 3km
* CPU synchronization cable: 2m, 5m

## System configuration



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

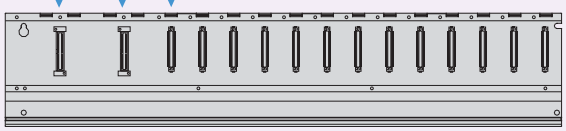


Main base [B Side] XGR-M06P / XGR-M02P

### 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

| XGR module | | |
|---|---|---|
| CPU | XGR-CPUH/T | Twisted pair |
| | XGR-CPUH/F | Fiber optic(2km) |
| | XGR-CPUH/S | Fiber optic(15km) |
| 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-E08P | 8Slot(Expansion base) |
| | XGR-E12P | 12Slot(Expansion base) |
| | XGR-E12H | 12Slot(Expansion base, Drive Redundancy) |
| Expansion drive | XGR-DBST | Twisted pair - Twisted |
| | XGR-DBSF | Pair Fiber optic - Fiber optic(2km) |
| | XGR-DBSH | Twisted pair - Fiber optic(2km) |
| | XGR-DBSFS | Pair Fiber optic - Fiber optic(15km) |
| | XGR-DBSHS | Twisted pair - Fiber optic(15km) |

| XGR module | | |
|---|---|---|
| Expansion drive redundancy | XGR-DBDT | Twisted pair - Twisted |
| | XGR-DBDF | Pair Fiber optic - Fiber optic(2km) |
| | XGR-DBDH | Twisted pair - Fiber optic(2km) |
| Sync & Expansion cable | XGC-F201 | 2m (Fiber optic) |
| | XGC-F501 | 5m (Fiber optic) |

| 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 | - | XGQ-TR1C |
| 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 |
| | 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 |
| | XGF-DV4S | Voltage output, 4Ch (Isolated) |
| | XGF-DC4S | Current output, 4Ch (Isolated) |
| Analog Input/Output | XGF-AH6A | Input: 4ch, Voltage/ Current |
| | | Output: 2Ch Voltage/ Current |
| High-speed counter | XGF-HO2A | Pulse (OC) input type, 2Ch |
| | XGF-HD2A | Pulse (LD) input type, 2Ch |
| Positioning | XGF-P01H-P04H | Open collector, 1~4axes |
| | XGF-P01H-P04H | Line drive, 1~4axes |
| Positioning (Network Type) | XGF-PN8A | LS Standard EtherCAT Net. 8axes |
| | XGF-PN8B | Standard EtherCAT Net. 8axes |
| Motion modnle | XGF-M32E | Standard EtherCAT Nee. 32axes |
| Temperature control | XGF-TC4S | Thermocouple input, 4Ch |
| | XGF-RD4A | RTD input, 4Ch |
| | XGF-RD4S | RTD input, 4Ch (Insulated) |
| Temperature controller | XGF-TC4UD | Input: 4ch.(Voltage/Current, RTD/TC) |
| | | Output: 8ch.(TR/Current) |
| | | Controller: 4 loops |
| | XGF-TC4RT | Input: 4ch.(RTD) |
| | | Output: 4ch.(TR) |
| | | Controller: 4 loops |
| Event input | XGF-SOEA | DC24V, 32points |

| Communication module | | |
|---|---|---|
| RAPIEnet+ -RAPIEnet v2 -EtherNet/IP -Modbus TCP/IP -Dedicated XGT Network | XGL-EFMTB | Master/Client, Twisted fair 2ch. |
| | XGL-EFMFB | Master/Client, Fiber optic 2ch. |
| | XGL-EFMHB | Master/Client, Twisted fair/fiber optic |
| | XOL-ES4T | Stand alone switch twisted pair 4ch. |
| | XOL-ES4H | Stand alone switch twisted 2ch. fiber 2ch. |
| | XGL-EH5T | Open Ethernet switching hub |
| Computer Link (Cnet) | XGL-CH2B | RS-232C 1ch, RS-422/485 1ch |
| | XGL-C22B | RS-232C 2ch |
| | XGL-C42B | RS-422/485 2ch |
| DeviceNet(Dnet) | XGL-DMEB | DeviceNet, Master |
| Profibus-DP (Pnet) | XGL-PMEB | Profibus-DP, Master |
| | XGL-PSRA | Profibus-DP Slave, Remote interface |
| | XGL-PSEA | Profibus-DP Slave |
| Rnet | XGL-RMEB | Rnet, Master, TP |
| | GOL-RR8T | Rnet stand alone repeater hub |
| Fnet | XGL-FMEA | Fnet, Master |
| BACnet/IP | XGL-BIPT | BACnet client/server |

## 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㎲/Step | | |
| | MOV | | 0.126㎲/Step | | |
| | Real type | | ±: 0.602㎲(S), 1.078㎲(D)<br>x : 1.106㎲(S), 2.394㎲(D)<br>÷: 1.134㎲(S), 2.66 ㎲(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, Parameter, System area<br>*Battery back-up memory : 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 | | |

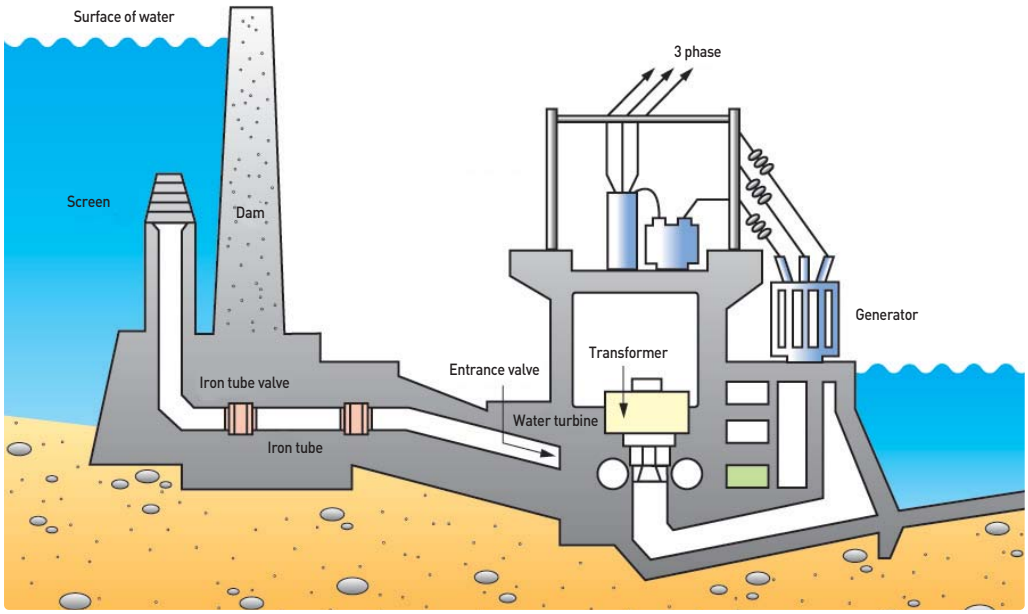
## Specification

| 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 | | |

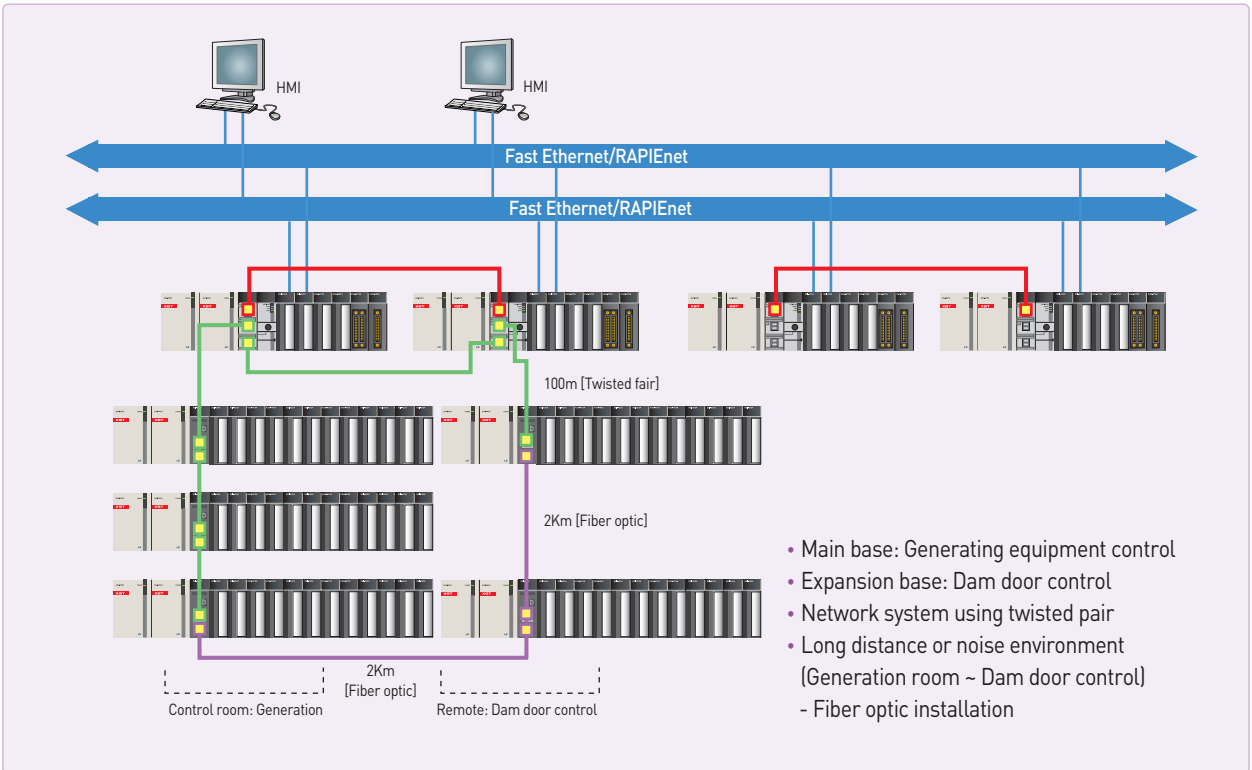
## Available modules for each base

| | 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) |

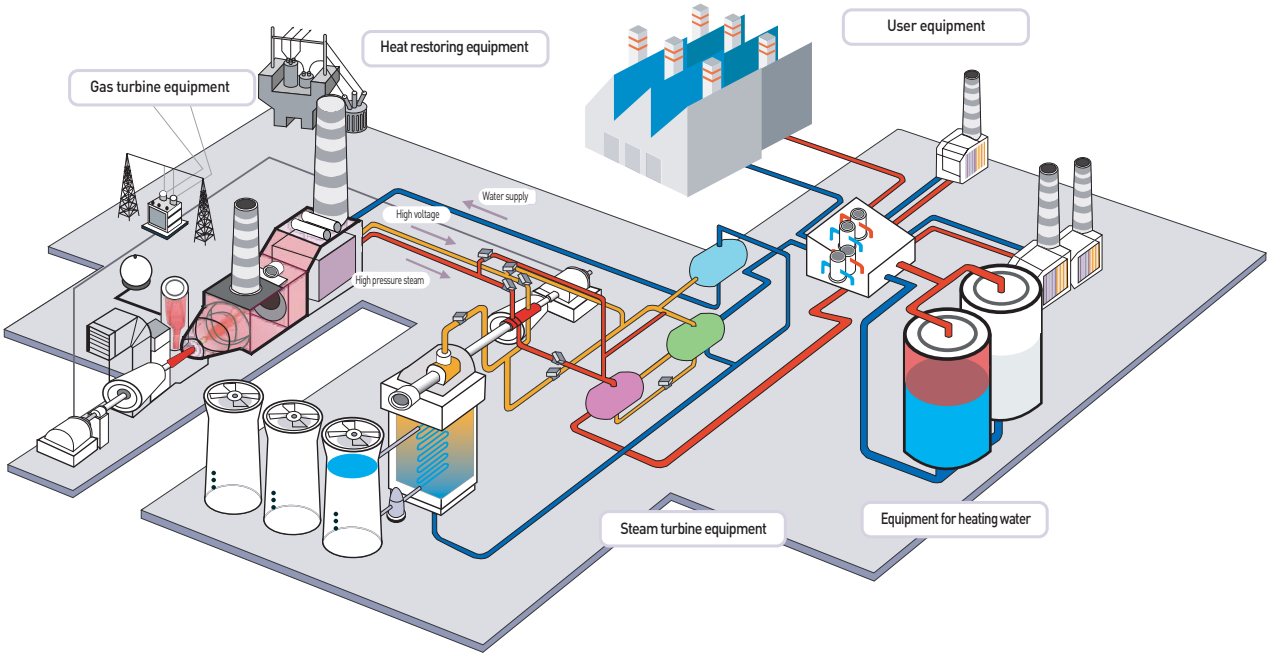
## Water power generation or Dam door control



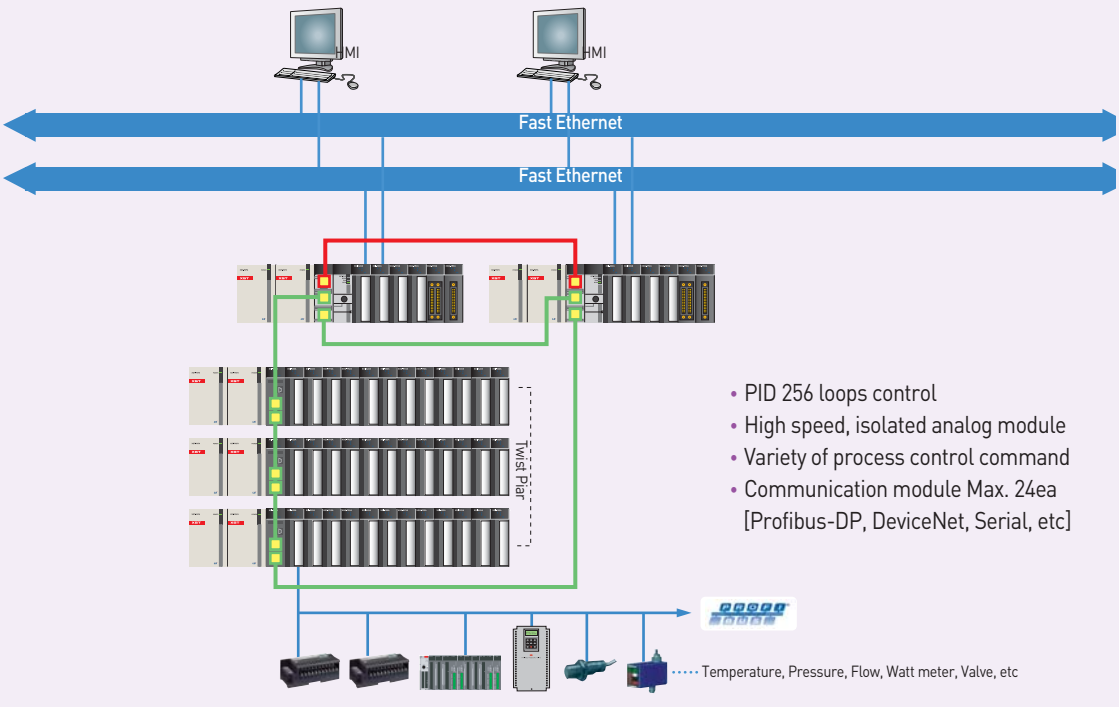

## System configuration



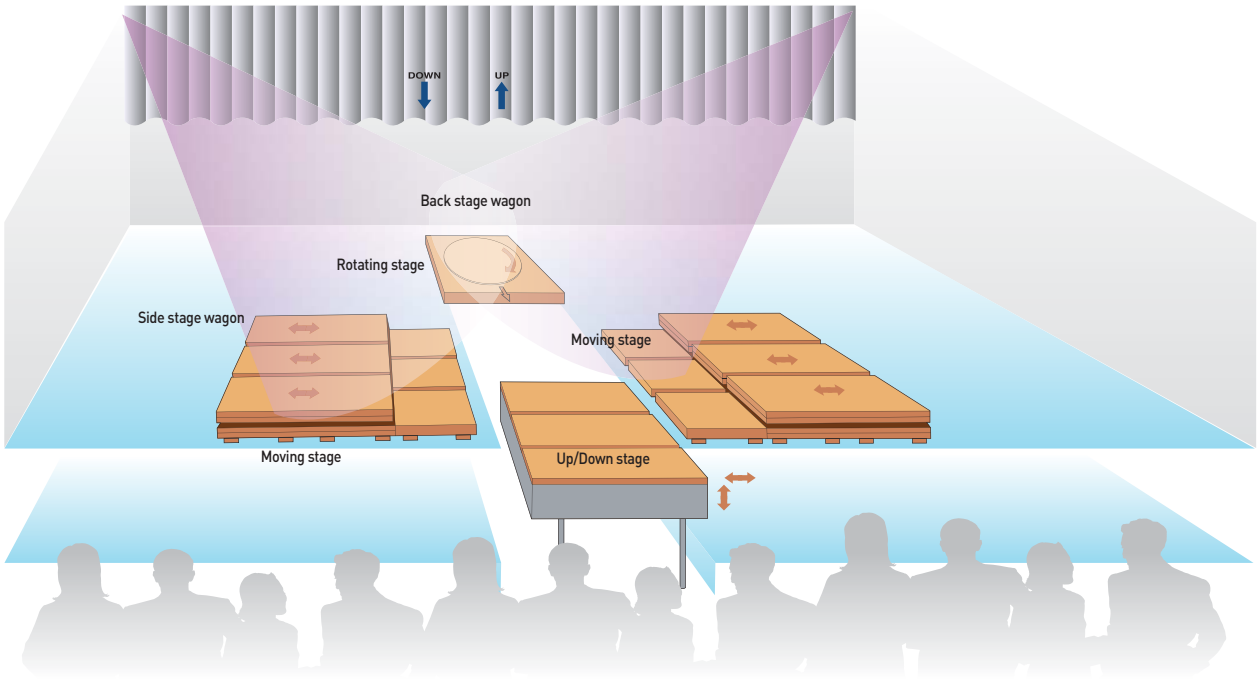
## Generating boiler control



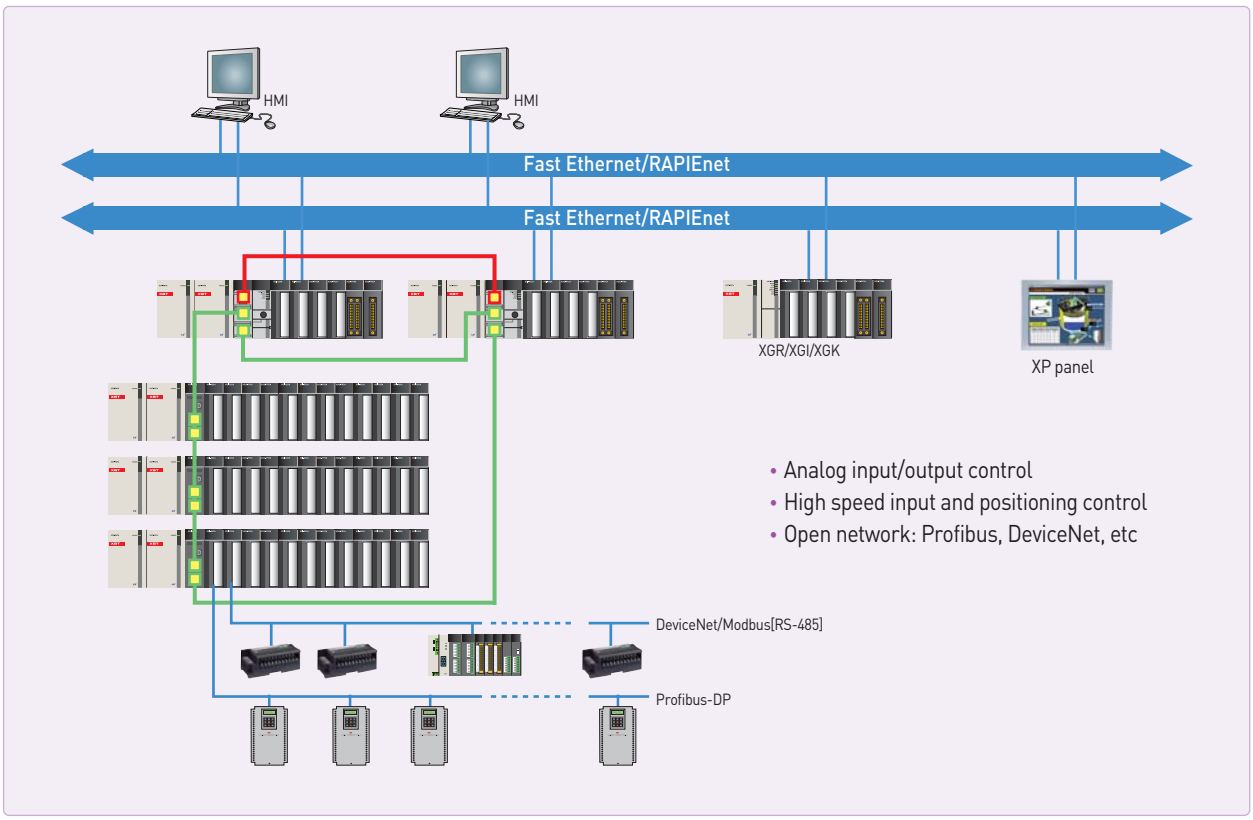

## System configuration



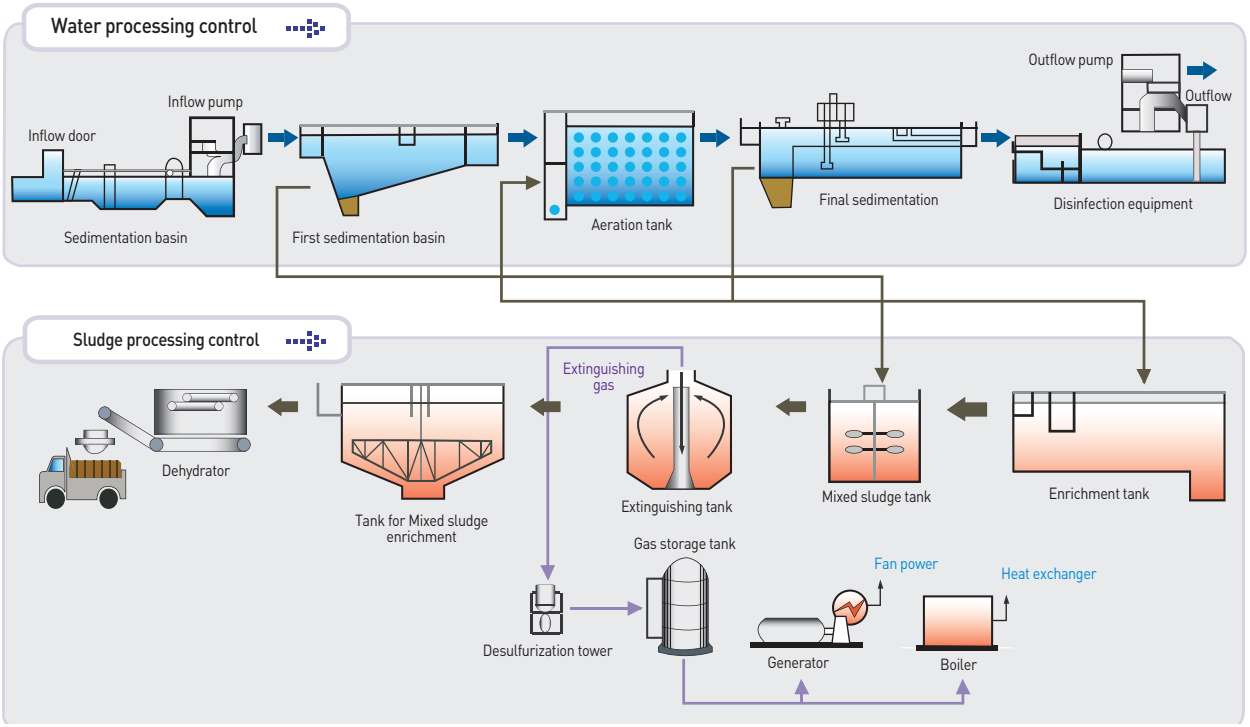
## Stage control



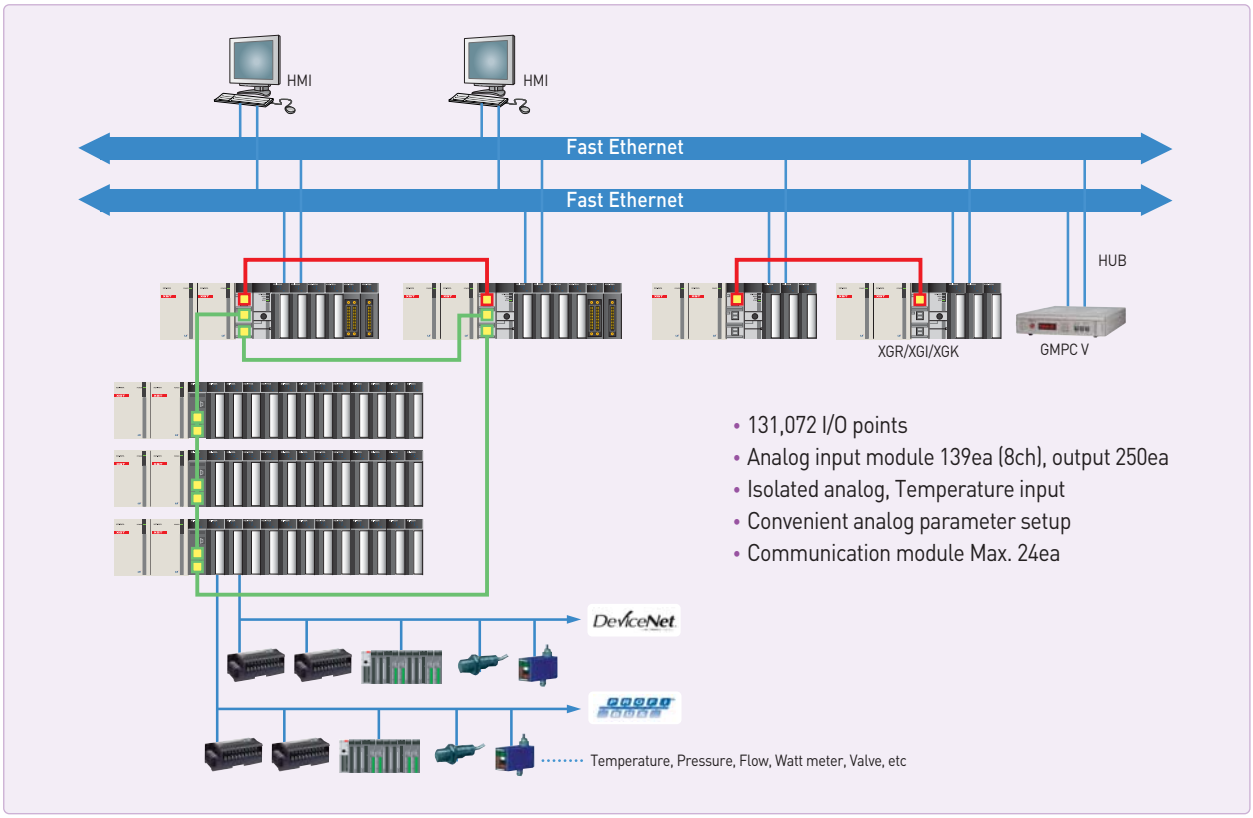

## System configuration



## Water processing control

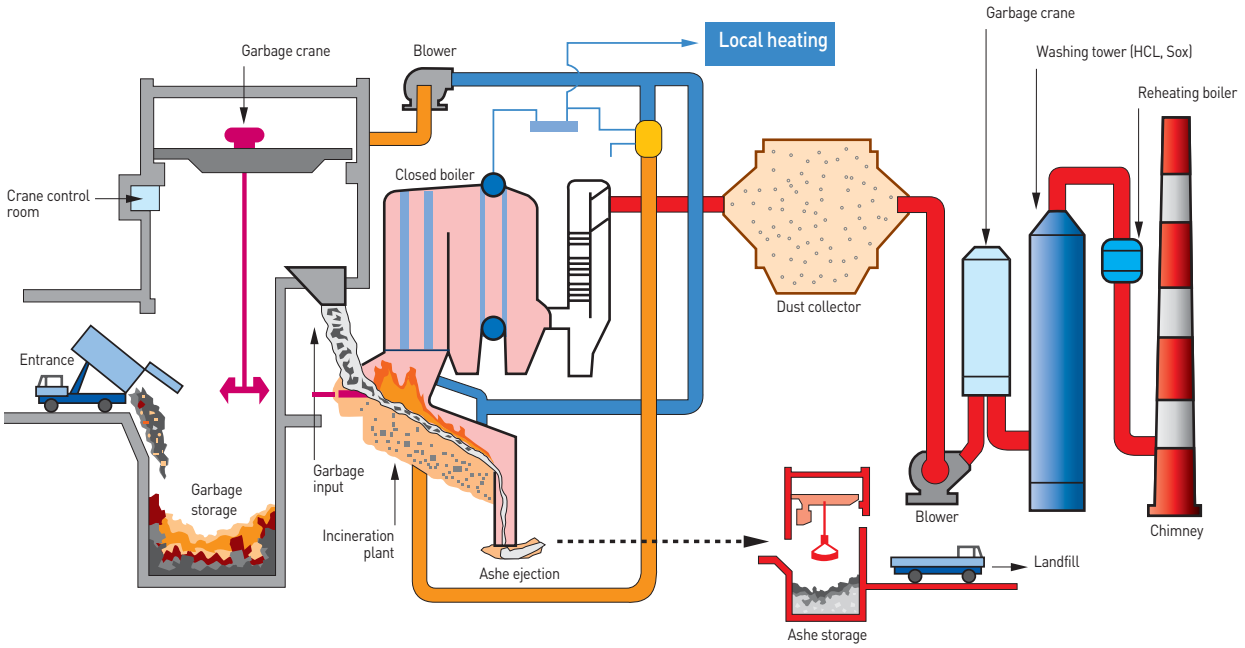



## System configuration

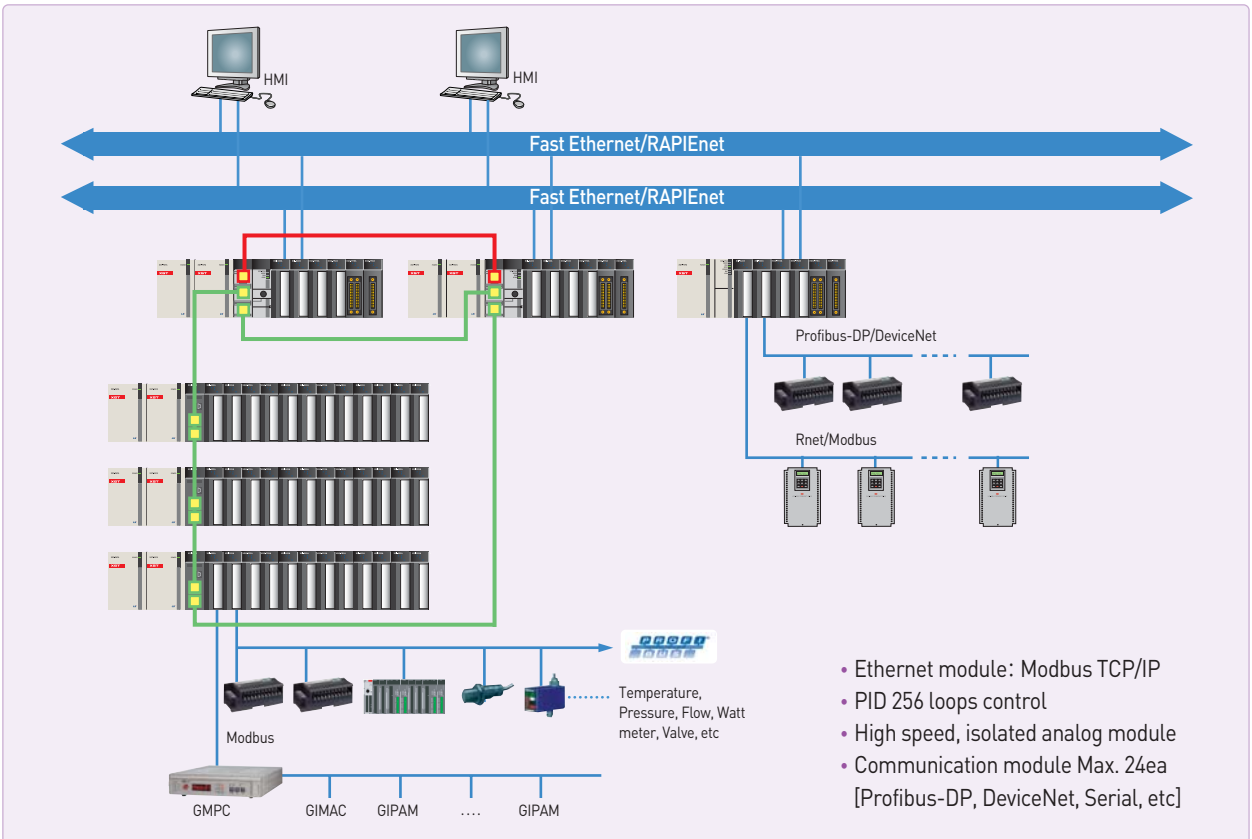



- 131,072 I/O points
- Analog input module 139ea (8ch), output 250ea
- Isolated analog, Temperature input
- Convenient analog parameter setup
- Communication module Max. 24ea

## Incinerator control

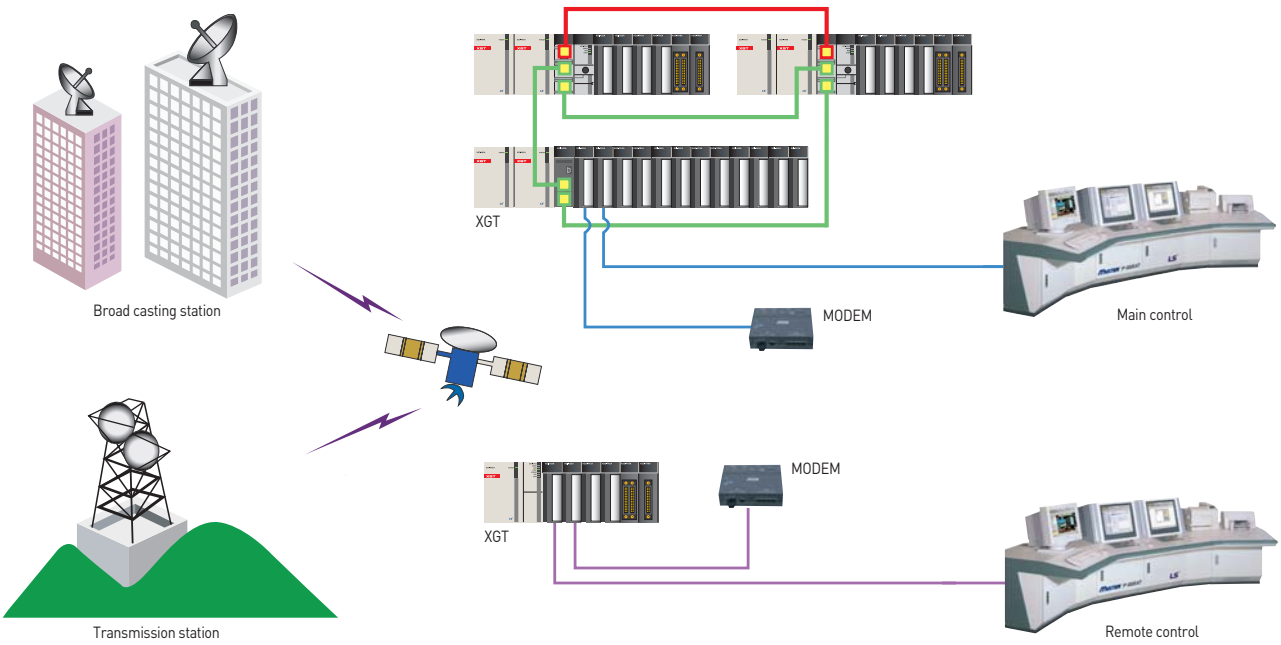



## System configuration



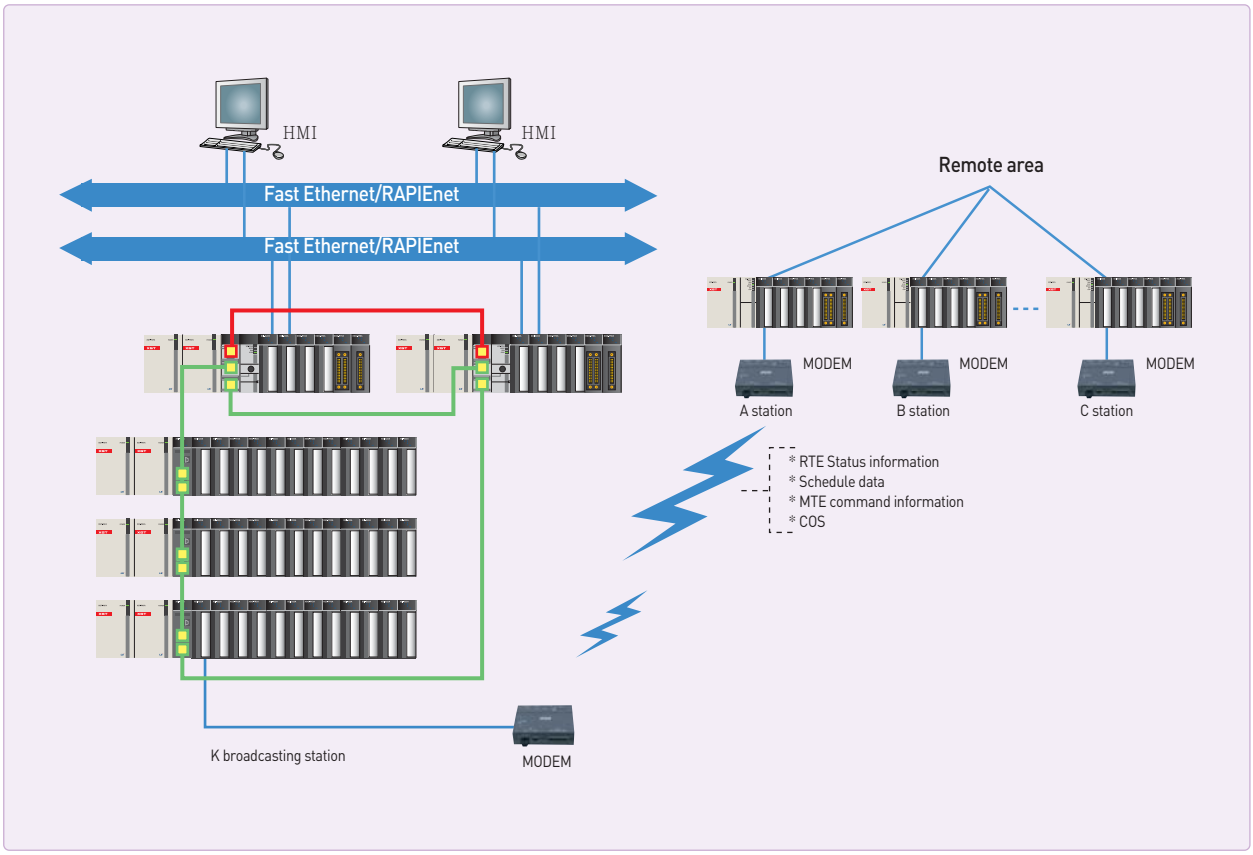

- Ethernet module: Modbus TCP/IP
- PID 256 loops control
- High speed, isolated analog module
- Communication module Max. 24ea [Profibus-DP, DeviceNet, Serial, etc]

## Broad casting system






## System configuration




XGL-CH2A
XGF-M32E
XGF-DL16A
RDY
RUN
ERR
ACT
USB
CF
CH1
CH2
TX+
TX-
RX+
RX-
SG
Industrial Grade
CF CARD
EJECT



# Network

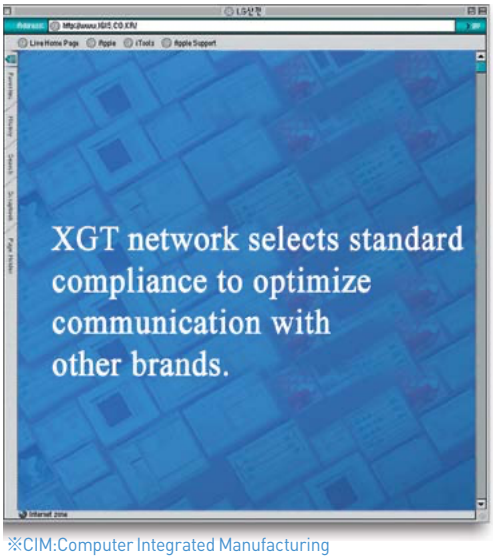
**Along with Ethernet, Profibus-DP, and DeviceNet, XGT series provide the maximum in control integration and communication flexibility.**

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# XGT Network system

## Features




※CIM:Computer Integrated Manufacturing

### About RAPIEnet+

**Real-time, hybrid & ring topology-based industrial Ethernet solution, integrating Modbus TCP/IP, EtherNet/IP and RAPIEnet for IoT, future-oriented technology for high performance & efficiency.**

### RAPIEnet

- IEC standard (RAPIEnet) communication technology applied
- Dedicated network for LS PLC
- Communication speed: 100Mbps, 1Gbps
- Topology : Star, Line, Ring
- Dual port (T.Pair / F.Optic / Hybrid)
- Built-in high performance industrial switch
- Max read/write data size : 1,400 byte
- Max No. of connected stations per network : 64 stations

### EtherNet/IP

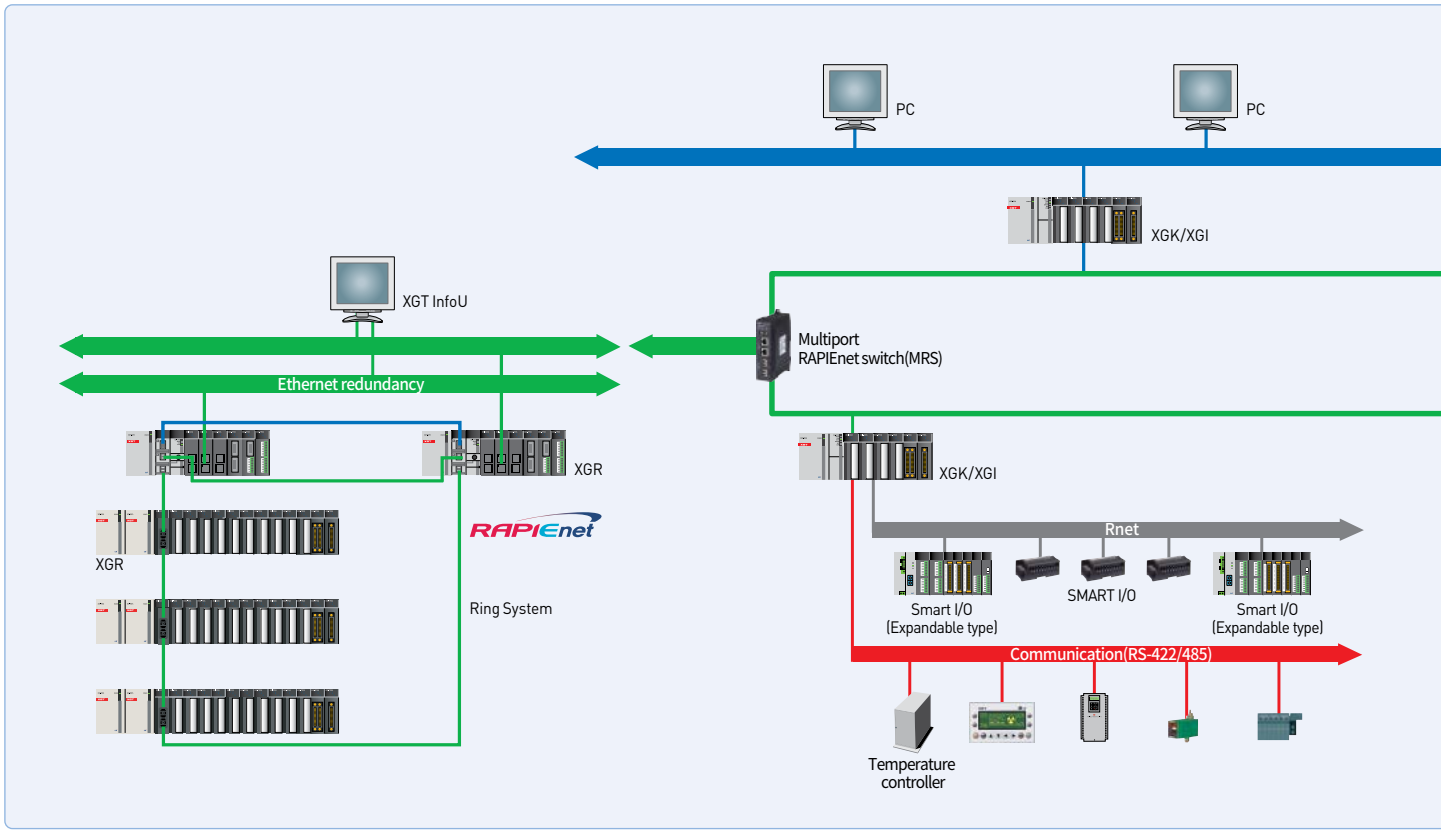
- Topology : Star, Line
- Communication speed: 100Mbps, 1Gbps
- Dual port (T.Pair / F.Optic / Hybrid)
- Built-in high performance industrial switch
- Max read/write data size : 1,400 byte(Non-periodic tag)
- Max No. of connected stations per network : 64 stations

### Modbus TCP/IP

- Eopology : Star, Line
- Communication speed: 100Mbps, 1Gbps
- Dual port (T.Pair / F.Optic / Hybrid)
- Built-in high performance industrial switch
- Max read/write data size : 125/123 Word
- Max No. of connected stations per network : 64 stations

### XGT dedicated

- Topology : Star, Line
- Communication speed: 100Mbps, 1Gbps
- Dual port (T.Pair / F.Optic / Hybrid)
- Built-in high performance industrial switch
- Max read/write data size : 1,400 byte
- Max No. of connected stations per network : 64 stations



### Computer Link(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)

### 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

### Rnet
- High-speedcommunication 1Mbps
- Longcommunicationdistance Max.750m
- Max. 6 repeaters (up to 5.25km)
- Network management using Auto-scan (Slave module information)

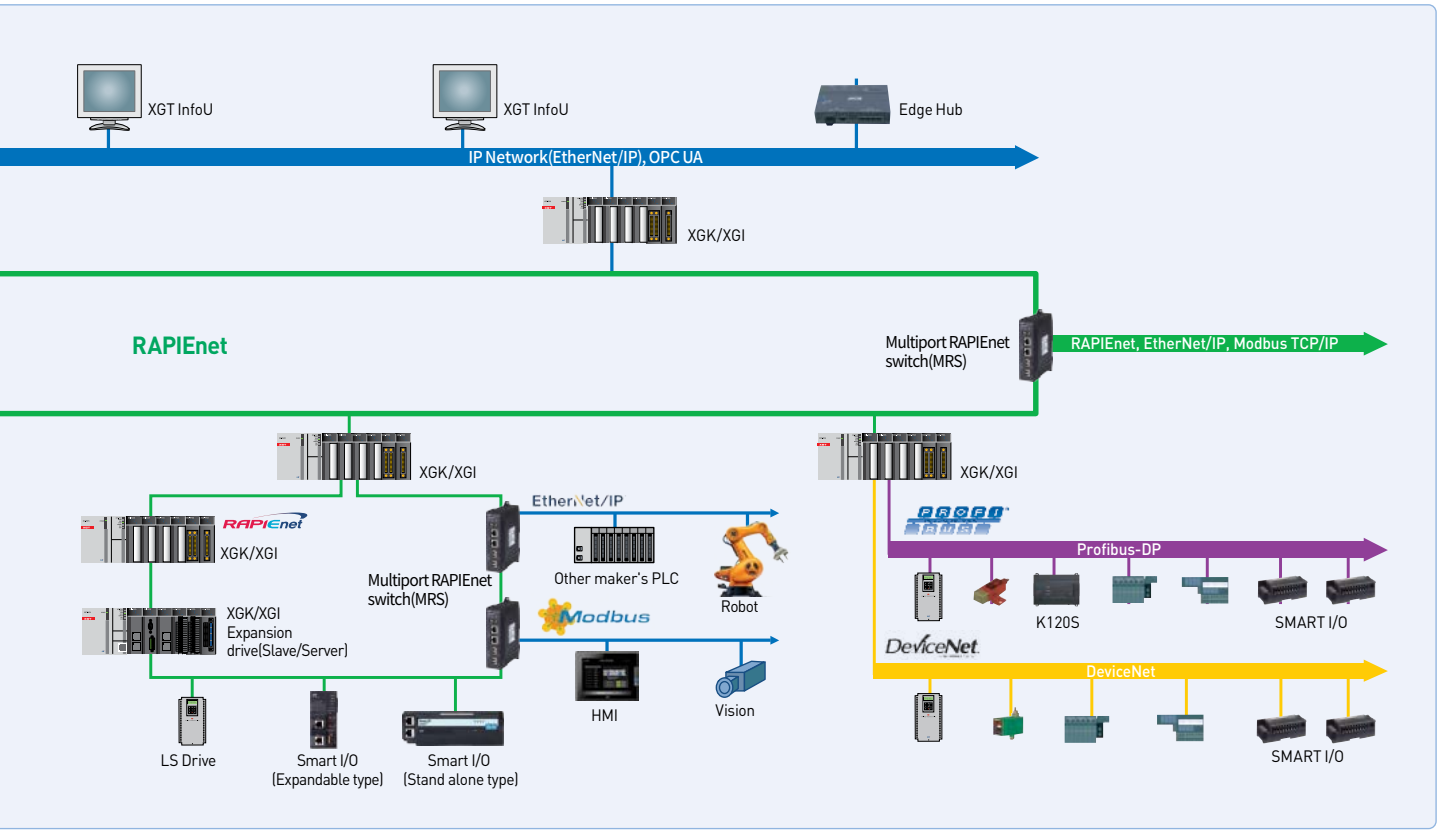
### DeviceNet(Dnet)
- Connectable to other PLCs and control device
- Compliance of the ODVA standard
- Flexible communication speed setting: 125/250/500Kbps
- Multi-drop and T branch connection
- Long communication distance: Max. 500m

### Profibus-DP(Pnet)
- 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

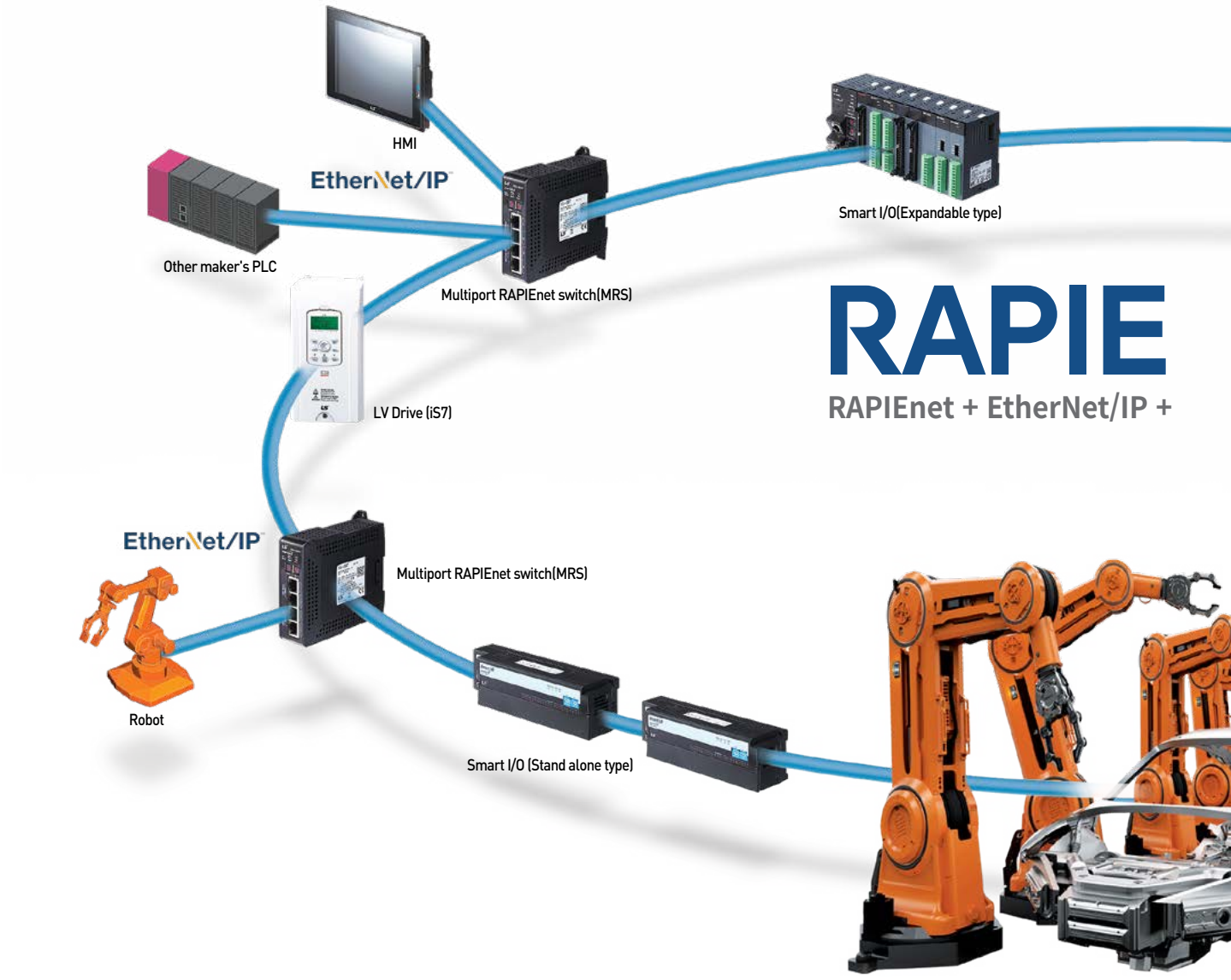
### Installation number of network module available

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





# XGT RAPIEnet+

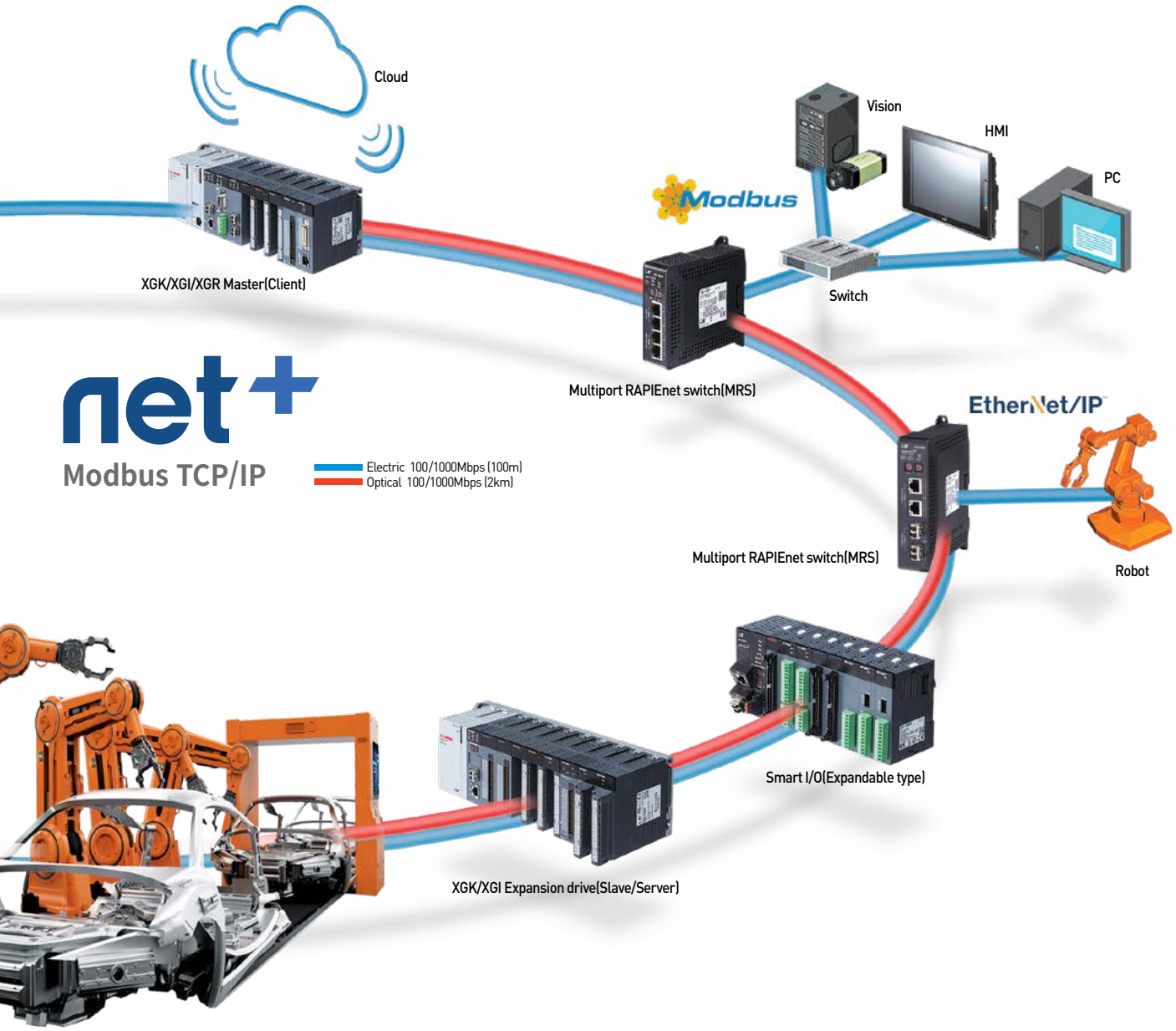



## About RAPIEnet+

**Real-time, hybrid & ring topology-based industrial Ethernet solution, integrating Modbus TCP/IP, EtherNet/IP and RAPIEnet for IoT and future-oriented technology for high performance & efficiency.**

### Professional

- Integrated hybrid network solution
- Three protocols in a single product: Modbus TCP/IP, EtherNet/IP, RAPIEnet
- Various and convenient network system configuration with smart extension service
- IEC standard (RAPIEnet) communication technology applied
- Gibabit Ethernet from 100Mbps to 1Gbps for large networks




NETWORK

## Efficiency

- Efficient network configuration with 2-port Ethernet
- Network cost reduction using electrical to fiber optic cable
- Optimized system configuration with automation products (PLC, remote I/O, Drive, etc.)
- Easy engineering via intuitive and user-friendly programming tool (XG5000)

## Convenience

- Autoscan for netwok registeration
- Min. parameter and programming setup
- Simple editing (add/change) for modules of operating system
- Variable maintenance available: service status, diagnosis, comm. history, etc.

## Reliability

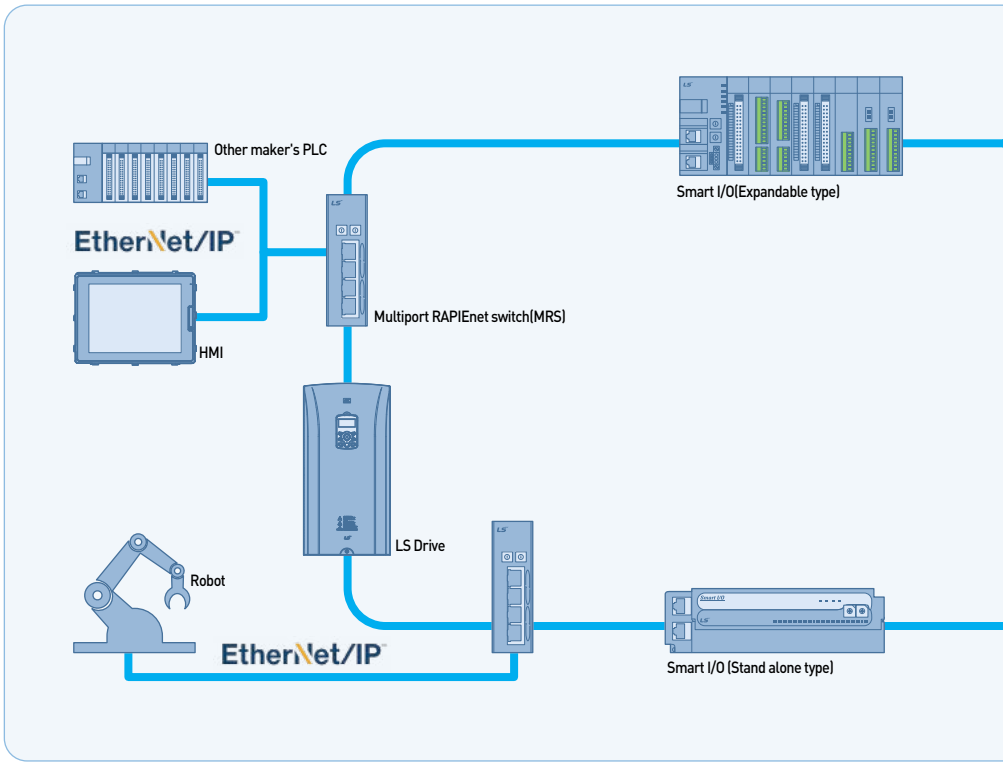
- Reliability improvement for ring topology network
- Various functions for network monitoring and diagnosis
- Noise reduction by fiber-optic network

# XGT RAPIEnet+ System Configuration

## Ring Type

- Ring topology and configuration with third-party devices: reliability & product/ wiring reduction
- Hybrid network (electric/fiber-optic): system cost reductio

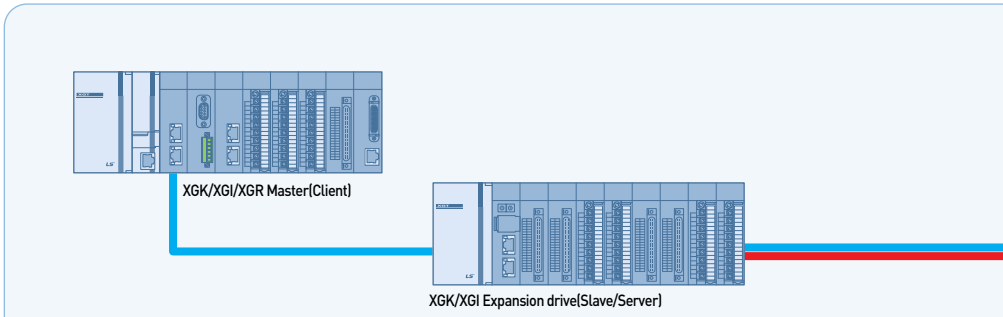
Electric 100/1000Mbps (100m)
Optical 100/1000Mbps (2km)




## Daisy-chain Type

- Integrated network configuration with third-party devices
- EtherNet/IP and Modbus Hybrid communication: product/wiring reduction

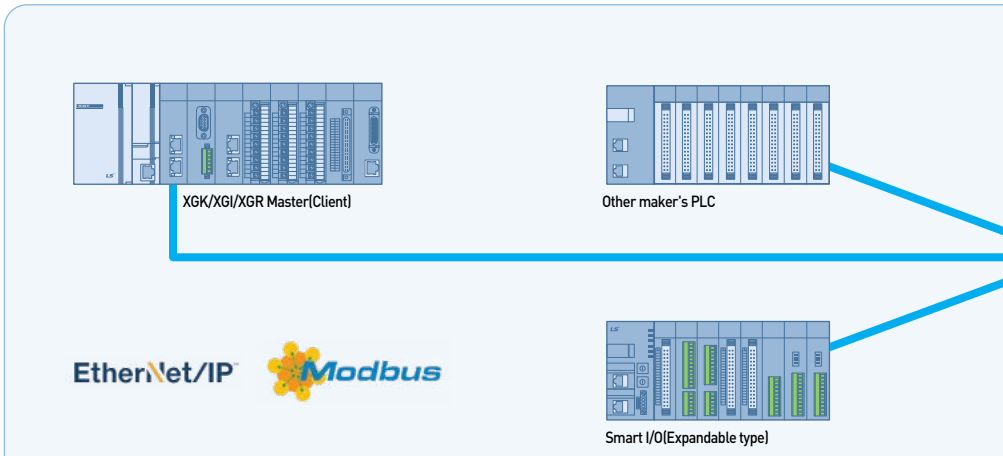
Electric 100/1000Mbps (100m)
Optical 100/1000Mbps (2km)

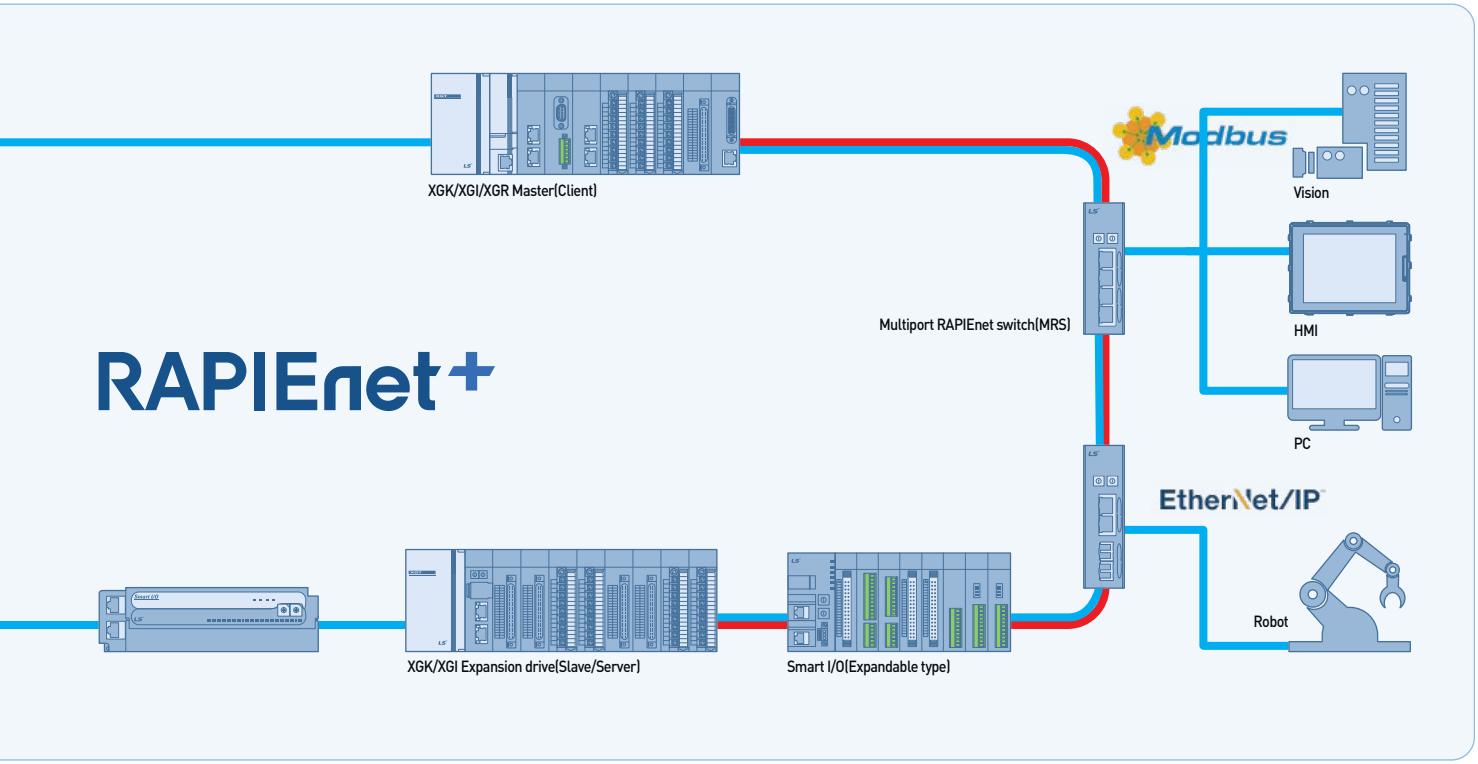


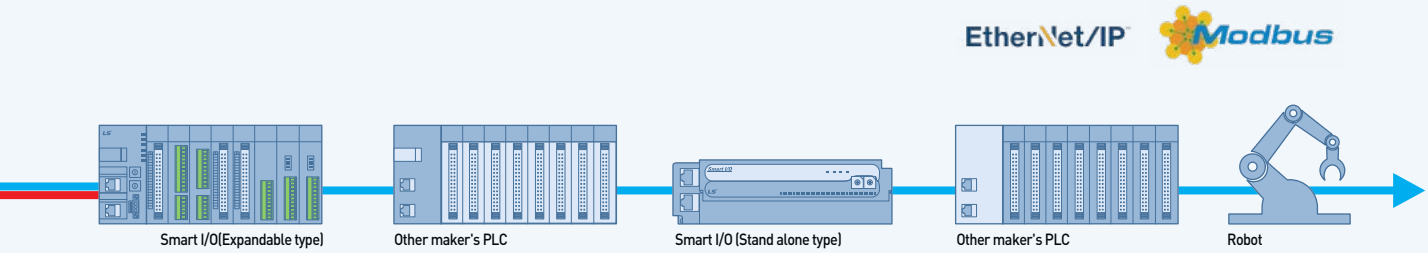

## Star Type

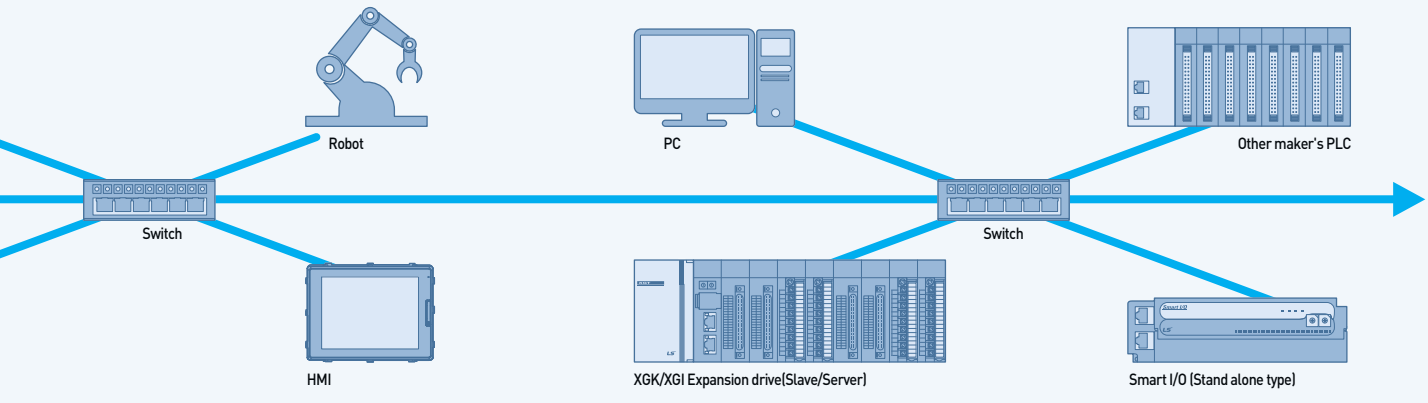
- Integrated network configuration with third-party devices
- Varioud network configuration (general switch application available)

Electric 100/1000Mbps (100m)




RAPIEnet+
XGK/XGI/XGR Master(Client)
Modbus
Vision
HMI
PC
Multiport RAPIEnet switch(MRS)
EtherNet/IP
Robot
XGK/XGI Expansion drive(Slave/Server)
Smart I/O(Expandable type)


EtherNet/IP
Modbus
Smart I/O(Expandable type)
Other maker's PLC
Smart I/O (Stand alone type)
Other maker's PLC
Robot


Robot
PC
Other maker's PLC
Switch
Switch
HMI
XGK/XGI Expansion drive(Slave/Server)
Smart I/O (Stand alone type)

NETWORK

# XGT RAPIEnet+ Master(Client) module

## XGL-EFMTB, XGL-EFMFB, XGL-EFMHB




- Gigabit Ethernet (1Gbps)
- Two-port support
- Ring/Line topology configuration support: no additional switch required
- Modbus TCP/IP, RAPIEnet (v6.0 or higher), EtherNet/IP (v6.0 or higher) protocol support
- Max 5.000pps network load (based on server operation)
- Data processing speed: 1ms
- Various and convenient network system configuraion with Smart Extension Service (v8.0 or higher)
- XG5000 network setup and programming (v4.30 or higher)
- User protocol editing and P2P service: (network with third-party devices)
- Various diagnostic functions and module/ network status information
- Network module check function (Ping test)
- Network service information (HS link, P2P, media status, etc)
- OPC UA Server support (OPC UA Specification v1.03, XGL-EFMxB v7.0)
  - OS replacement for OPC UA Server of XGL-EFMxB in XG5000 is required. (Please refer to user's manual).

## Specification

| Item | | | XGL-EFMTB | XGL-EFMFB | XGL-EFMHB |
|---|---|---|---|---|---|
| Transmission Specifications | Transmission speed (Mbps) | | 10/100/1000 | 100/1000 | Electric: 10/100/1000<br>Optical: 100/1000 |
| | Transmission method | | Baseband | | |
| | Maximum distance between nodes | | 100m<br>(Node-Switch) | 2km<br>(Multi-mode) | Electric: 100m<br>Optical: 2km |
| | Send media | | Electric: Category 5E or higher STP (Shielded Twisted-pair) cable<br>Optical: Multi mode(MMF)/Single mode(SMF) cable | | |
| | Maximum protocol size | | 1,500 Byte | | |
| | Communication network access method | | CSMA/CD | | |
| | Frame error check method | | CRC32 | | |
| Max. load | | | Ethernet: 10,000pps, RAPIEnet: 40,000pps | | |
| Topology | | | Line, Tree, Star, Ring (RAPIEnet Enable) | | |
| Diagnosis function | | | Station number / IP collision detection function, Diagnosis using XG5000 | | |
| Station number / IP setting method | | | Rotary switch, XG5000, BOOTP/DHCP | | |
| Station number / IP setting range | | | Station number setting value set by the tool(XG5000) (0 to 220)<br>- IP: 192.168.1.xx(xx:100 + rotary switch 1~99) | | |
| External connecting terminal | | | RJ45, SFP : PADT connection, data communication | | |
| Basic Specific | Current consumption (mA) | 100Mbps | 560 | 750 | 670 |
| | | 1Gbps | 900 | 740 | 670 |
| | Weight(g) | | 146 | 130 | 120 |

## Network service specification

| Item | | XGL-EFMTB | XGL-EFMFB | XGL-EFMHB |
|---|---|---|---|---|
| RAPIEnet | Data processing unit | Byte(8bit) | | |
| | Max read/write data size | 1,400 byte | | |
| | Max No. of connected stations per network | 221 stations<br>(However, 64 stations are used for the Smart extension service.) | | |
| EtherNet/IP | Data processing unit | Byte(8bit) | | |
| | Max read/write data size | Non-periodic tag: 1,400 Byte<br>Non-periodic object : 1,024 Byte<br>Cycle 1,024 Byte | | |
| | Available communication type | Connection-type (Cycle) messages: Class1<br>Non connection type(Non-periodic ) message: Tag, Object | | |
| | Maximum number of connections | Connection-type (periodic)+ Non connection type(Non-periodic ):64 | | |
| Modbus / TCP | Data processing unit | Word(16bit),bit | | |
| | Max read data size | 125 Word(2,000 Bits) | | |
| | Max write data size | 123 Word(1,968 Bits) | | |
| | Maximum number of connections | 64 | | |
| XGT dedicated | Data processing unit | Byte(8bit) | | |
| | Max read/write data size | 1,400 byte | | |
| | Maximum number of connections | 64 | | |

## Smart extension master

Smart extension service is network service between LS Automation products to enable users to extend several PLCs and drives without network parameter and programming, including EtherNet/IP client service.

| | |
|---|---|
| Smart Extension Setup Wizard | Users could do network setup easily with<br>'Smart Extension Setup Wizard' in XG5000. |
| Smart Extension Autoscan | Autoscan execution of network & control setting during online. |
| Remote Device Setting | * Automatic execution of I/O and Basic Parameter Setting via XGL-EFMxB (master)<br>* Hot swap seting for slave module replacement |
| Smart Extension Diagnosis Flag | Diagnostic infomration service for network devices and modules of Smart Extension system |
| Remote network | Device IP/Station No. change Remote network device IP and station no. change during online based on user setting (master) |

# XGT RAPIEnet+ Expansion driver module

## XGL-DBDT, XGL-DBDF, XGL-DBDH




- Large PLC system configuration with XGL-DBDx(slave module) installation on CPU slot of XGK/XGK main base
  - PLC extension system configuration: 63-stage network extension (XGT base extension: 7 stage)
  - Extension distance: electric 100m, fiber-optic 2km (XGT base extension: 15m)
  - I/O point: Max. 49,152 (XGT base extension: 6,144)
- Modbus TCP/IP, RAPIEnet, EtherNet/IP protocol simultaneou support
- Electric/Fiber-optic/Hybrid module comm. speed: Max. 1Gbps
- 2-port (dual port) support
  - No additional switch required for ring/line topology configuration
- Hot swap for base replacement (add/delete available)
  - Base replacement without system in case of extension base error
- Ring-to-line: fast reconfiguration to line topology for a line fault of ring
- Extension base power redundancy (with XGR extension base)
- Diagnostic function for service status

## Specification

| Item | | XGL-DBDT | XGL-DBDF | XGL-DBDH |
|---|---|---|---|---|
| Transmission Specifications | Transmission speed (Mbps) | 100/1000 | 100/1000 | Electric: 100/1000<br>Optical: 100/1000 |
| | Transmission method | Base band | | |
| | Maximum distance between nodes | 100m@CAT5E or higher | 2km@100Mbps.MM | Electric: 100m<br>Optical: 2km |
| | Send media | Electric: Category 5E or higher STP (Shielded Twisted-pair) cable<br>Optical: Multi mode(MMF)/Single mode(SMF) cable | | |
| | Maximum protocol size | 1,500Bytes | | |
| | Communication network access method | CSMA/CD | | |
| | Frame error check method | CRC32 | | |
| Max. load | | Ethernet: 10,000pps,<br>RAPIEnet: 40,000pps | | |
| Topology | | When using RAPIEnet : Lines, Ring (using MRS if you use a different topology)<br>When not using RAPIEnet : Line, Tree, Star etc. (with switch) | | |
| Diagnosis function | | Station number/IP collision detection function, self-diagnosis service, diagnosis using XG5000 | | |
| Station number / IP setting method | | Rotary switch, XG5000, BOOTP/DHCP | | |
| Station number / IP setting range | | Station number: Rotary switch(1 ~ 99)<br>IP: 192.168.1.xx(xx:100 + rotary switch 1~99) | | |
| External connecting terminal | | USB mini B : PADT connection<br>RJ45, SFP : PADT connection, data communication | | |
| Status indication LED | | PWR, RUN, SVR, I/F, RELAY. PADT, CHK, ERR, FAULT ,LINK, ACT | | |
| Parameter setting | | XG5000(USB, Ethernet port) | | |
| Device file | | EDS file(Only EtherNet/IP) | | |
| Maximum number of modules to be installed | | 12 | | |

## Network service specification

| Item | | XGL-DBDT | XGL-DBDF | XGL-DBDH |
|---|---|---|---|---|
| RAPIEnet | Data processing unit | Byte(8bit) | | |
| | Max read data size | 1,400 Byte | | |
| | Max write data size | 1,400 Byte | | |
| | Max No. of connected stations per network | 64 station | | |
| EtherNet/IP | Data processing unit | Byte(8bit) | | |
| | Max read data size | Non-periodic tag: 1,400 Byte / Non-periodic object: 1,024 Byte / Cycle: 1,024 Byte | | |
| | Max write data size | Non-periodic tag: 1,400 Byte / Non-periodic object: 1,024 Byte / Cycle: 1,024 Byte | | |
| | Available communication type | Connection-type (Cycle) messages: Class1<br>Non connection type(Non-periodic ) message: Tag, Object | | |
| | Maximum number of connections | Connection-type (Cycle):10<br>Non connection type(Non-periodic ) message(Tag, Object):10 | | |
| Modbus TCP/IP | Data processing unit | Word(16bit),bit | | |
| | Max read data size | 125 Word(2,000 Bits) | | |
| | Max write data size | 123 Word(1,968 Bits) | | |
| | Maximum number of connections | 64 | | |

## Available Module

| Item | | I/O module |
|---|---|---|
| Digital | Input | XGI-D21A |
| | | XGI-D22A/B |
| | | XGI-D24A/B |
| | | XGI-D28A/B |
| | | XGI-A12A |
| | | XGI-A21A/C |
| | | XGI-D21D |
| | Output | XGQ-RY1A |
| | | XGQ-RY2A/B |
| | | XGQ-TR1C |
| | | XGQ-TR2A/B |
| | | XGQ-TR4A/B |
| | | XGQ-TR8A/B |
| | | XGQ-SS2A |
| | | XGQ-RY1D |
| | Input/Output | XGH-DT4A |
| Analog | Input | XGF-AV8A |
| | | XGF-AC8A |
| | | XGF-AD4S |
| | | XGF-AD8A |

| Item | | I/O module |
|---|---|---|
| Analog | Input | XGF-AD16A |
| | | XGF-AC4H |
| | | XGF-AW4S |
| | Output | XGF-DV4A |
| | | XGF-DV8A |
| | | XGF-DC4A |
| | | XGF-DC8A |
| | | XGF-DV4S |
| | | XGF-DC4S |
| | | XGF-DC4H |
| | High-speed counter | XGF-HO2A |
| | | XGF-HD2A |
| | | XGF-HO8A |
| | RTD & thermocouple | XGF-RD4A |
| | | XGF-RD4S |
| | | XGF-TC4S |
| | | XGF-RD8A |
| | Input/Output | XGF-AH6A |
| | Temperature controller | XGF-TC4UD |
| | | XGF-TC4RT |

# XGT RAPIEnet+ Smart I/O (Stand alone type)

## GEL-D24C, GEL-DT4C1, GEL-TR4C1, GEL-RY2C, GEL-AV8C, GEL-AC8C, GEL-DV4C, GEL-DC4C

- Modbus TCP/IP, RAPIEnet, EtherNet/IP protocol support
- RJ45 connector
- Flexibility in network topology (ring, line)
  - Redundancy support in ring topology
- Simple module setting with station no. setup (No IP setup required)
- Easy & Simple parameter setup: Autoscan for module add, checkbox for parameter setup (No program required)
- High-speed data processing
- Cost reduction in wiring
- Various diagnostic service
  - Station no. collision error
  - Remote batch processing in O/S upgrade via master module
  - Network status check by CRC error flag
  - Enhanced Autoscan function: station collision, module information, etc.
  - Error flag: comm. error between master and Smart I/Os




## Specification

| Item | | Content | |
|---|---|---|---|
| Transmission Specifications | Transmission speed | PORT1/2: 100Mbps | |
| | Transmission method | Base band | |
| | Maximum distance between nodes | 100m@CAT5E or higher | |
| | Send media | Electric: Category 5E or higher STP (Shielded Twisted-pair) cable | |
| | Maximum protocol size | 1,500Bytes | |
| | Communication network access method | CSMA/CD | |
| | Frame error check method | CRC32 | |
| Max. load | | Ethernet: 10,000pps, RAPIEnet: 40,000pps | |
| Topology | | When using RAPIEnet : Lines, Ring (using MRS if you use a different topology)<br>When not using RAPIEnet : Line, Tree, Star etc. (with switch) | |
| Diagnosis function | | Station number / IP collision detection function, self-diagnosis service, diagnosis using XG5000 | |
| Station number / IP setting method | | Rotary switch, XG5000, BOOTP/DHCP | |
| Station number / IP setting range | | Station number: Rotary switch(1 ~ 99)<br>IP: 192.168.1.xx(xx:100 + rotary switch 1~99) | |
| Status indication LED | | STATUS,PORT1,PORT2, LACTH(output Only) | |
| Parameter setting | | XG5000(Ethernet) | |
| Device file | | EDS file(Only EtherNet/IP) | |
| Protocol | | RAPIEnet, EtherNet/IP, Modbus-TCP, BOOTP, DHCP(RAPIEnet, EtherNet/IP can be Smart extension with XGL-EFMxB) | |
| I/O Refresh size | | Max inputs: refresh size | 64 bytes |
| | | Max inputs: refresh size | 64 bytes |

## Network service specification

| Item | | Content |
|---|---|---|
| RAPIEnet | Data processing unit | Byte(8bit) |
| | Max read data size | 1,400 byte |
| | Max write data size | 1,400 byte |
| | Max No. of connected stations per network | 64 station |
| EtherNet/IP | Data processing unit | Byte(8bit) |
| | Max read data size | Non-periodic tag: 1,400 Byte<br>Non-periodic object : 1,024 Byte<br>Cycle: 1,024 Byte |
| | Max write data size | Non-periodic tag: 1,400 Byte<br>Non-periodic object : 1,024 Byte<br>Cycle: 1,024 Byte |
| | Available communication type | Connection-type (Cycle) messages: Class1<br>Non connection type(Non-periodic ) message: Tag, Object |
| | Maximum number of connections | Connection-type (Cycle) :10<br>Non connection type(Non-periodic ) message(Tag, Object):10 |
| Modbus TCP/IP | Data processing unit | Word(16bit),bit |
| | Max read data size | 125 Word(2,000 Bits) |
| | Max write data size | 123 Word(1,968 Bits) |
| | Maximum number of connections | 64 |

## Input/output specification

| Item | | GEL-D24C | GEL-DT4C1 | GEL-TR4C1 | GEL-RY2C |
|---|---|---|---|---|---|
| Digital I/O | Points | 32(Input) | 16/16(In/Out) | 32(Output) | 16(Output) |
| | Rated input current | 5mA | | - | - |
| | Rated load voltage | - | DC24V | | DC24V/AC220V, 2A/point, 5A/COM |
| | Max. load current | - | 0.5A/point, 3A/COM | | AC250V, DC110V, 1,200times/hour |
| | On voltage | DC 19V or higher | | - | Min. switching load : DC 5V/1mA |
| | Off voltage | DC 6V or less | | - | |
| | Insulation method | Photo coupler insulation | | | |

| Item | | GEL-AV8C | GEL-AC8C | GEL-DV4C | GEL-DC4C |
|---|---|---|---|---|---|
| Analog I/O | Channels | 8 | | 4 | |
| | Input/output type | Voltage | Current | Voltage | Current |
| | Input/outpu range | 1 ~ 5V<br>0 ~ 5V<br>0 ~ 10V<br>-10 ~ 10V | 4 ~ 20mA<br>0 ~ 20mA | 1 ~ 5V<br>0 ~ 5V<br>0 ~ 10V<br>-10 ~ 10V | 4 ~ 20mA<br>0 ~ 20mA |
| | Accuracy | 0.3% (ambient air temperature 0 ~ 55Đ) | | | |
| | Max. resolution | 1/16,000 | | | |
| | Max. conversion rate | 10ms / channels | | | |
| | Insulation method | insulation between input / output terminal and PLC power<br>(no insulation between channels) | | | |

# XGT RAPIEnet+ Smart I/O (Expandable type)

## XEL-BSSRT, XEL-BSSRF, XEL-BSSRH

- Slave PLC system configuration: XEL-BSSRx (extension Smart I/O adaptor) with XGB I/Os (DI/DO/AI/AO)
  - No. of XGB extension I/O: 8
- Modbus TCP/IP, RAPIEnet, EtherNet/IP protocol support
- Electric/Fiber-optic/Hybrid module comm. speed: Max. 1Gbps
- 2-port (dual port) support
  - No additional switch required for ring/ line topology configuration
- Ring-to-line: fast reconfiguration to line topology for a line fault of ring
- Diagnostic function for service status



## Specification

| Item | | XEL-BSSRT | XEL-BSSRF | XEL-BSSRH |
|---|---|---|---|---|
| Transmission Specifications | Transmission speed (Mbps) | 100/1000 | 100/1000 | Electric: 100/1000<br>Optical: 100/1000 |
| | Transmission method | ĐĐĐĐĐ | | |
| | Maximum distance between nodes | 100m@CAT5E or higher | 2km@100Mbps.MM | Electric: 100m<br>Optical: 2km |
| | Send media | Electric: Category 5E or higher STP (Shielded Twisted-pair) cable<br>Optical: Multi mode(MMF)/Single mode(SMF) cable | | |
| | Maximum protocol size | 1,500Bytes | | |
| | Communication network access method | CSMA/CD | | |
| | Frame error check method | CRC32 | | |
| Max. load | | Ethernet: 10,000pps, RAPIEnet: 40,000pps | | |
| Topology | | When using RAPIEnet : Lines, Ring (using MRS if you use a different topology)<br>When not using RAPIEnet : Line, Tree, Star etc. (with switch) | | |
| Diagnosis function | | Station number / IP collision detection function, self-diagnosis service, diagnosis using XG5000 | | |
| Station number / IP setting method | | Rotary switch, XG5000, BOOTP/DHCP | | |
| Station number / IP setting range | | Station number: Rotary switch(1 ~ 99)<br>IP: 192.168.1.xx(xx:100 + rotary switch 1~99) | | |
| External connecting terminal | | USB mini B : PADT connection<br>RJ45, SFP : PADT connection, data communication<br>3pin Push in/Screw fixed type connector : power Input | | |
| Status indication LED | | RUN, RMS, RNS, RELAY, LINK/ACT1, LINK/ACT2 6 types | | |
| Parameter setting | | XG5000(USB, Ethernet) | | |
| Device file | | EDS file(Only EtherNet/IP) | | |
| Maximum number of modules to be installed | | 8ea | | |
| Protocol | | RAPIEnet, EtherNet/IP, Modbus-TCP, BOOTP, DHCP<br>(RAPIEnet, EtherNet / IP can be Smart extension with XGL-EFMxB) | | |

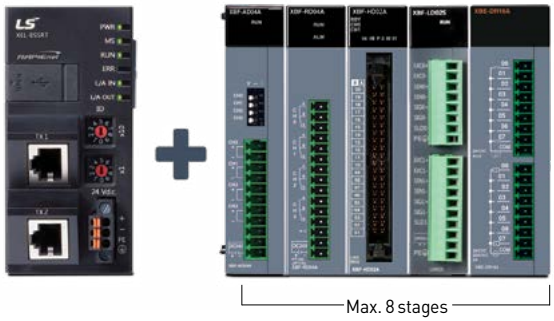
## Network service specification

| Item | | XEL-BSSRT | XEL-BSSRF | XEL-BSSRH |
|---|---|---|---|---|
| RAPIEnet | Data processing unit | Byte(8bit) | | |
| | Max read data size | 1,400 Byte | | |
| | Max write data size | 1,400 Byte | | |
| | Max No. of connected stations per network | 64 station | | |
| EtherNet/IP | Data processing unit | Byte(8bit) | | |
| | Max read data size | Non-periodic tag: 1,400 Byte / Non-periodic object : 1,024 Byte / Cycle: 1,024 Byte | | |
| | Max write data size | Non-periodic tag: 1,400 Byte / Non-periodic object : 1,024 Byte / Cycle: 1,024 Byte | | |
| | Available communication type | Connection-type (Cycle) messages: Class1<br>Non connection type(Non-periodic ) message: Tag, Object | | |
| | Maximum number of connections | Connection-type (Cycle): 10<br>Non connection type(Non-periodic ) message(Tag, Object): 10 | | |
| Modbus TCP/IP | Data processing unit | Word(16bit),bit | | |
| | Max read data size | 125 Word(2,000 Bits) | | |
| | Max write data size | 123 Word(1,968 Bits) | | |
| | Maximum number of connections | 64 | | |

## Available XGB I/O Module

| Item | | Module |
|---|---|---|
| Digital | Input | XBE-DC08A |
| | | XBE-DC16A/B |
| | | XBE-DC32A |
| | | XBE-AC08A |
| | Output | XBE-TN/TP08A |
| | | XBE-TN/TP16A |
| | | XBE-TN/TP32A |
| | | XBE-RY08A/B |
| | | XBE-RY16A |
| | Input/output | XBE-DR16A |
| | | XBE-DN32A |
| Analog | Input | XBF-AD04A |
| | | XBF-AD08A |
| | | XBF-AD04C |

| Item | | Module |
|---|---|---|
| Analog | Output | XBF-DV04A |
| | | XBF-DC04A |
| | | XBF-DC04B |
| | | XBF-DV04C |
| | | XBF-DC04C |
| | Input/output | XBF-AH04A |
| | RTD | XBF-RD04A |
| | | XBF-RD01A |
| | TC | XBF-TC04B |
| | | XBF-TC04S |
| | Load cell | XBF-LD02S |
| | High-speed counter | XBF-HO02A |
| | | XBF-HD02A |



# XGT RAPIEnet+ Multiport RAPIEnet switch(MRS)

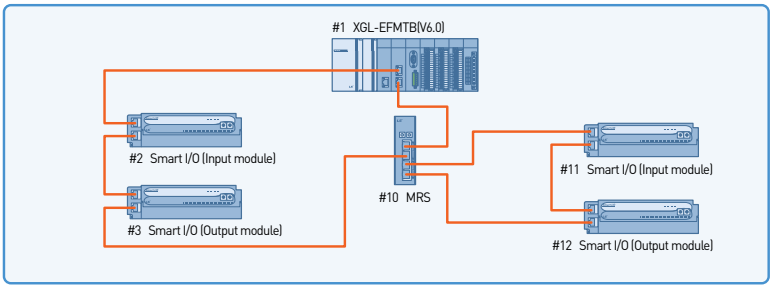
## XOL-ES4T, XOL-ES4H

- Multi-port switch to integrate RAPIEnet, Modbus TCP/IP and EtherNet/IP network
- Max. 64 stations including master module
- Simple module setup with station no.: no additional S/W required.
- Module status information in XG5000 (Autoscan)
- Available from RAPIEnet v2.0 or later.

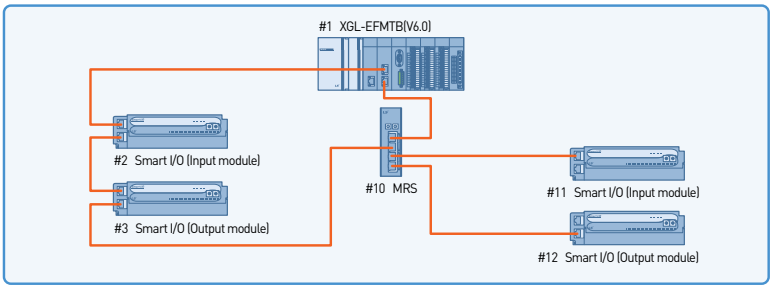


## Various system methods can be configured by using MRS

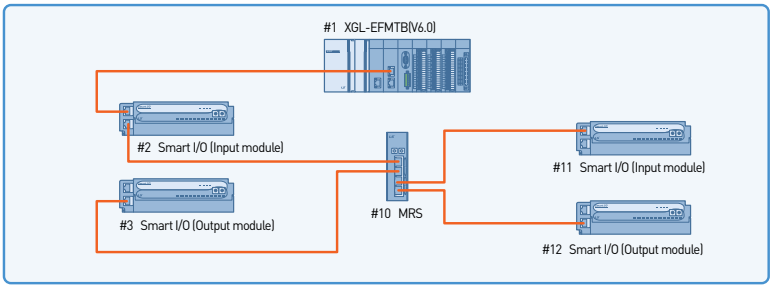
2 Ring System (Ring to Ring)



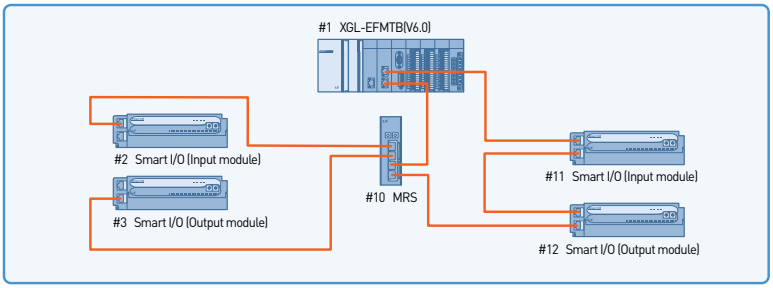

1 Ring / 1 Line System (Ring to Line)




2 Line System (Line to Line)




1 Line / 1 Ring System (Line to Ring)

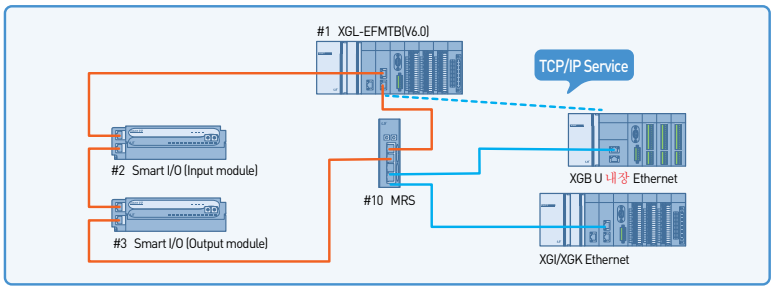


## Specification

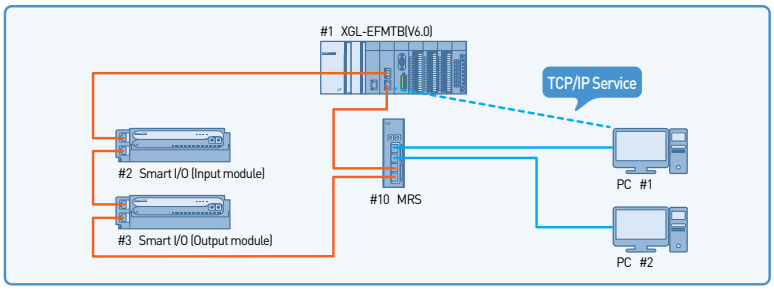
| Item | | RAPIEnet | |
|---|---|---|---|
| | | XOL-ES4T | XOL-ES4H |
| Transmission Specifications | Transmission speed | 100Mbps(1,2 port)<br>100Mbps/1 Gbps (3,4 port) | 100Mbps/1 Gbps (1,2 port, electric)<br>100Mbps/1 Gbps (3,4 port,optical) |
| | Port type and number of ports | RJ45 4Ports | RJ45 2Ports, LC 2Ports |
| | Transmission distance | 100m | 100m/2km |
| | Diagnosis function | LED display | LED display |
| Basic Specifications | Power supply(DC) | 24V(Input range:20.4~28.8V) | |
| | Current consumption(mA) | 300 | 300 |
| | Weight(g) | 200 | 280 |

## Various system methods can be configured by using MRS (Ethernet compatibility)

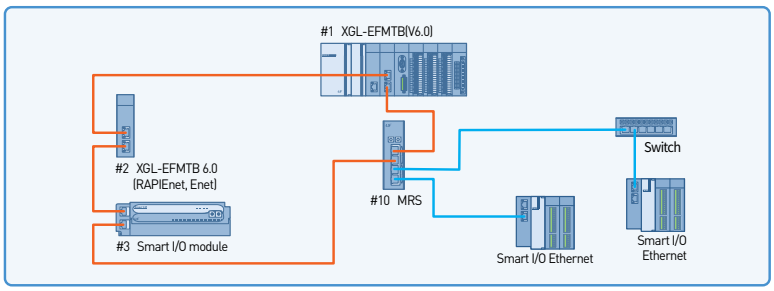
RAPIEnet(1,2 Port), Ethernet(3,4 Port)



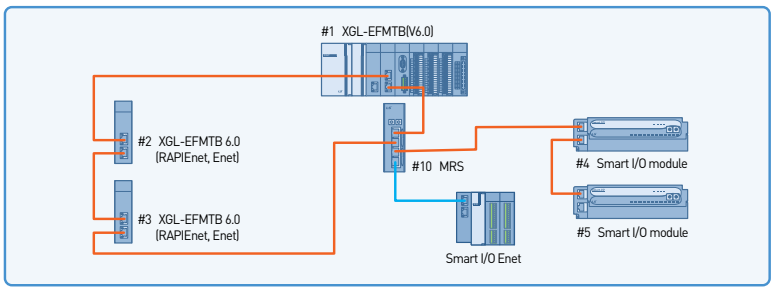

Ethernet(1,2 Port), RAPIEnet(3,4 Port)




Ethernet, RAPIEnet(1,2 Port),
Ethernet(3,4 Port)




RAPIEnet, Ethernet(1,2 Port),
RAPIEnet, Ethernet(3,4 Port)




NETWORK

## XGL-C22B, XGL-CH2B, XGL-C42B

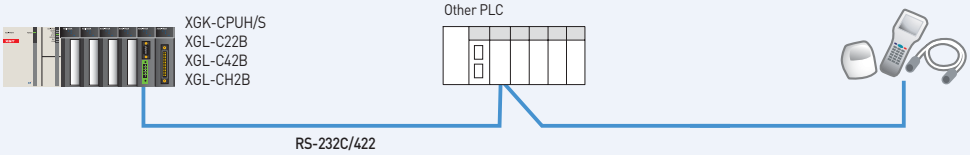


- Smart server recognizes the protocol (XGT dedicated communication or Modbus RTU/ASCII) automatically and operates.
- Repeater mode is able to use as an insulated repeater or convert RS-232C to RS422/485.
- Contains built- in termination resistor and it can be set in the basic parameter window.
- Easy protocol editing and communication parameter setting: XG5000
- 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 XG5000 (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

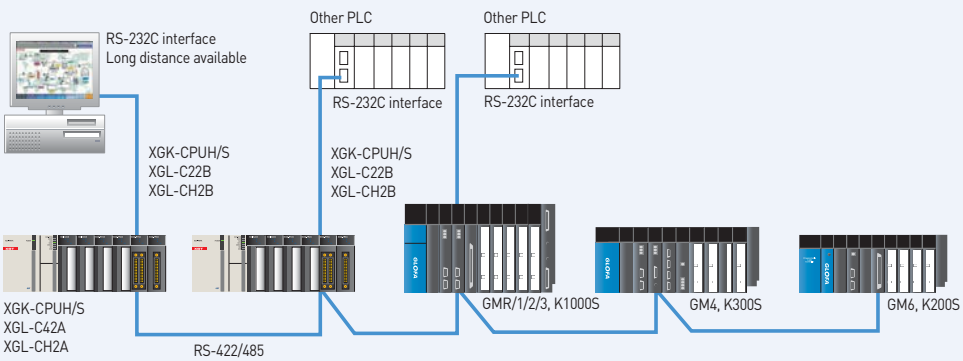
### Various independent operation mode

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

## Communication via RS-232C/422




## 1: N and N: M connection (LS ELECTRICand other)

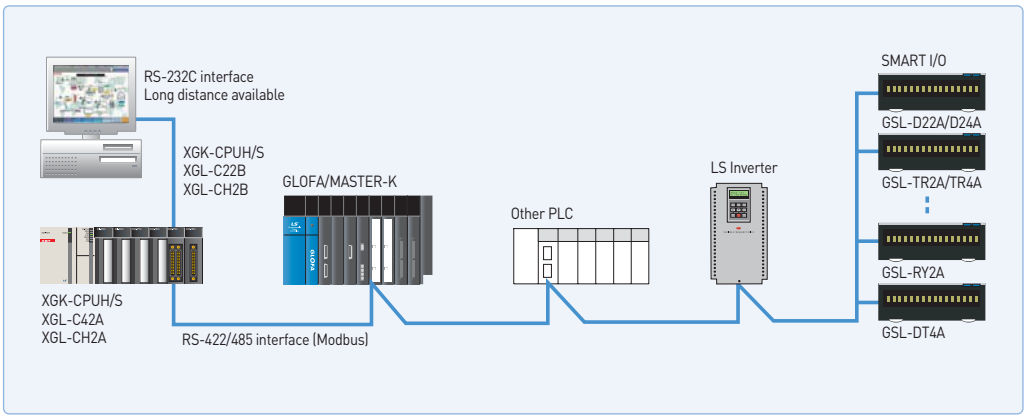


## Specifications

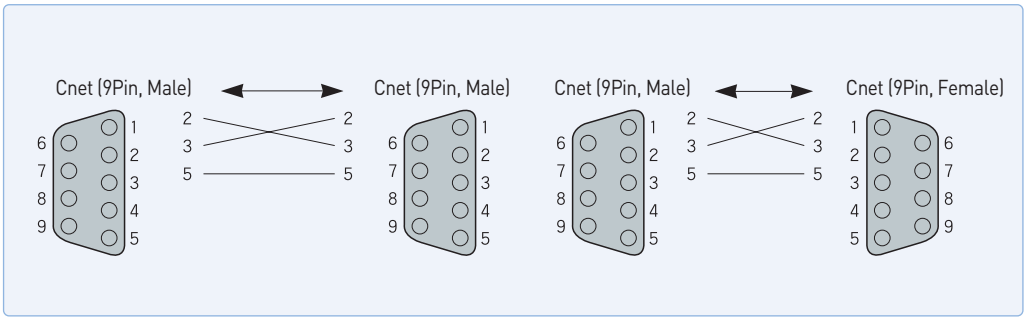
| Item | | Specification | | |
|---|---|---|---|---|
| | | XGL-C22B | XGL-CH2B | XGL-C42B |
| Serial communication channel | RS-232C | 2 channels | 1 channel | - |
| | | Conforms to RS-232C standard | | |
| | Line config | 1:1 | | |
| | RS-422/485 | - | 1 channel | 2 channels |
| | | | Conforms to RS-422/485 standards | |
| | Line config | | 1:1, 1:n, n:1 | |
| Modem connection function | | Remote communication with external devices is available via public telephone line by connecting external modem to the module. | | - |
| Operating mode (specified per port) | P2P | XGT client, Modbus ASCII/RTU client, Use defined communication | | |
| | SERVER | XGT server, Modbus ASCII/RTU server | | |
| Data type | Start Bit | 1 | | |
| | Data Bit | 7 or 8 | | |
| | Stop Bit | 1 or 2 | | |
| | Parity | Even/Odd/None | | |
| Synchronization type | | Asynchronous type | | |
| Detecting error | | BYTE SUM, WORD SUM, BYTE XOR, DLE AB, DLE SIEMENS, LS ELECTRICCRC, CRC 16, BYTE SUM 2' COMP, BYTE SUM 1's COMP 7BIT SUM, 7BIT XOR, CRC 16 IBM, CRC 16 CCITT | | |
| Transmission speed (bps) | | 300/600/1,200 / 1,800 / 2,400 / 3,600 / 4,800 / 7,200 / 9,600/19,200 / 38,400 / 57,600 / 64,000 / 76,800 / 115,200 bps | | |
| Station No. setting | | Setting range : 0-31, Max. station No. : 32 stations | | |
| Transmission Distance(m) | | RS-232C: Max.15 (extendible if modem used) | | - |
| | | - | RS-422/485: Max. 1,200m | |
| Diagnosis function | | Status LED diagnosis XG5000 diagnosis service(Frame monitor, Status by service, Loop-Back diagnosis) History, Saving history | | |
| Appearance size(mm) | | 98(H) X 27(W) X 90(D) | | |
| Current consumption(mA) | | 420 | 480 | 520 |
| Weight(g) | | 121 | 119 | 116 |

* XGL-CH2A / C42A and XGL-CH2B / C42B differ from RS-422 / 485 communication connecter wiring, you refer to the operation manual.

## Modbus




## Cnet cable connection




NETWORK

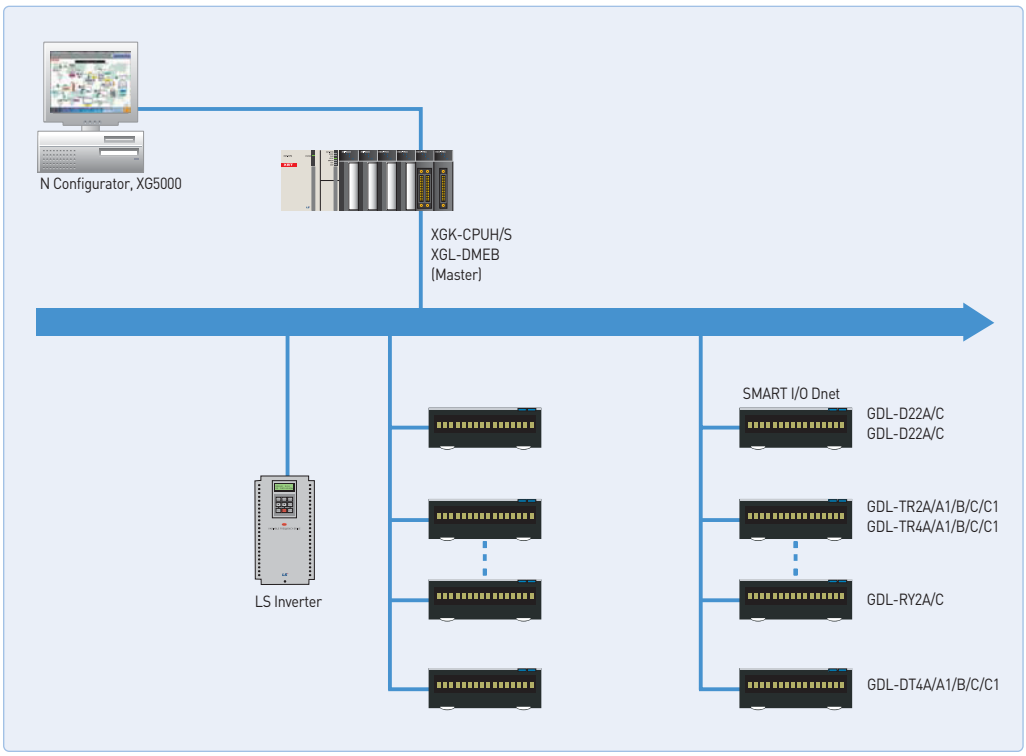
# XGT DeviceNet [Dnet]

## XGL-DMEB, XGL-DSEB



- 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 (N Configurator)
- 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 (XG5000)
- Easy expansion: up to 12 master modules
- Network setting by N Configurator/XG5000(Parameter setting, diagnosis and monitoring)

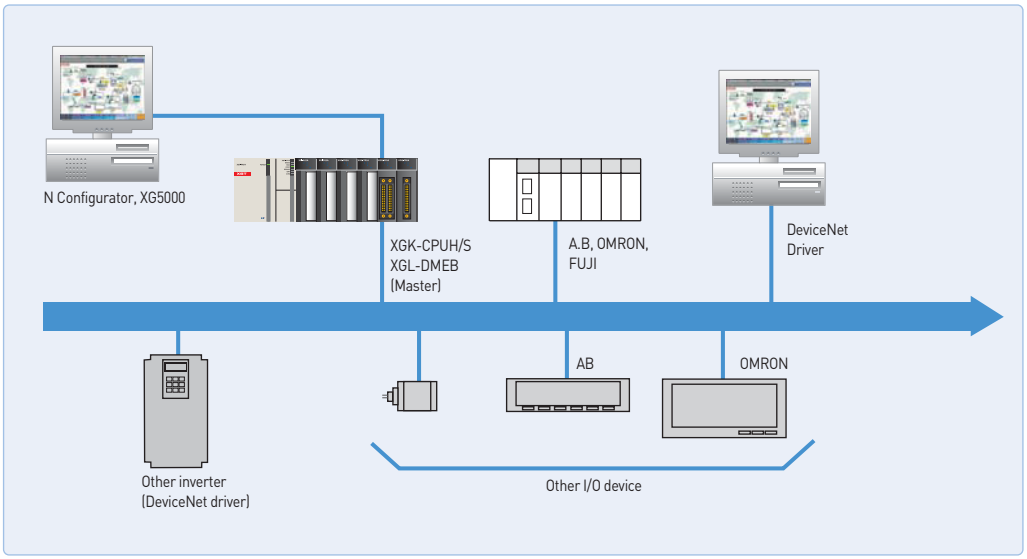
## System configuration with LS ELECTRIC products



## Specifications

| Item | | | Performance Specifications |
|---|---|---|---|
| Transmission Specification | Transmission Speed (kbps) | | 125/250/500 |
| | Transmission Type | I/O Connection | G2, UCMM |
| | | I/O Communication | • XGL-DMEB: Poll, Bit strobe, COS, Cyclic<br>• XGL-DSEB: Poll, COS, Cyclic |
| | Communication distance(m) | Thick Cable | 500 (125kbps)/250 (250kbps)/100 (500kbps) |
| | | Thin Cable | 100 (125/250/500kbps) |
| | Terminal resistance (W) | | 121 (1%, 1/4W) |
| | Max.drop length(m) | 125 kbps | 6 (Max. extended length 156) |
| | | 250 kbps | 6 (Max. extended length 78) |
| | | 500 kbps | 6 (Max. extended length 39) |
| | Data Packet | | 0~8 Bytes |
| | Message Access Control | | CSMA/NBA |
| | Network Structure | | • Trunk/drop line<br>• Power/Signal cable inside the identical network cable |
| | Max. number of nods | | Up to 64 (including master) MAC IDs (MAC Identifier) |
| | System Features | | Insertion and removal of nod available in voltage On status |
| | Operation Voltage | | DC 24V |
| | Diagnosis Function | | Module: Checks duplicated station/ Checks CRC error<br>N Configurator: Detects defective station/Checks BusOff/Auto-scan function<br>XG5000: Monitors High-speed link |
| | Master/Slave Operation | | • XGL-DMEB: Available only in master<br>• XGL-DSEB: Available only in slave |
| Parameter setting | | | • N Configurator (CONFIG Port of Dnet I/F)<br>• Setting to High-speed link of XG5000<br>• Station number, baudrate setting by H/W switch(XGL-DSEB) |
| XG5000 (High -speed link) | Data process unit | | Byte |
| | Send/Receive period | | Select among 10, 20ms, 50ms, 100ms, 200ms, 500ms, 1s, 5s, 10s<br>- Default : 20ms |
| | Max. communication point | | • XGL-DMEB: Send 128,520 points, Receive 128,520 points, 16,065 bytes respectively<br>• XGL-DSEB: Send 2,040 points, Receive 2,040 points, 255 bytes respectively |
| | Max. block number | | 64 (Setting range: 0~63) |
| | Max. point number per block | | 2,040 points (255 bytes) |
| Basic Specification | Max. modules installed | | Up to 12 (available on basic base and added base) |
| | Internal-consumed current (mA) | | 350mA |
| | Weight (g) | | 81g |

## System configuration with other products




NETWORK

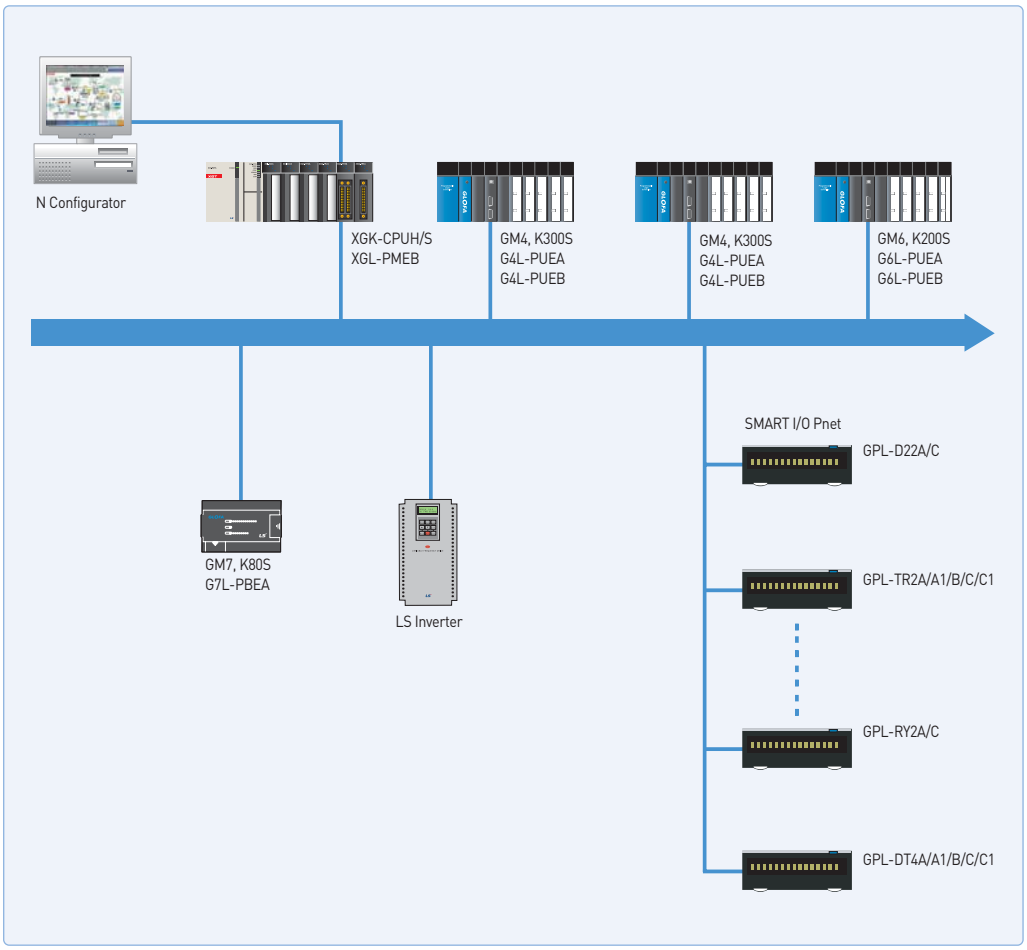
# Profibus-DP [Pnet] system

## XGL-PMEB

- 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 N Configurator / XG5000 (Parameter setting, diagnosis and monitoring)
- I/O data of master station: 7kbytes
- Automatic monitoring of slave modules in the network: Auto-scan (XG5000)
- Multi master
- Easy configuration tool : N Configurator / XG5000



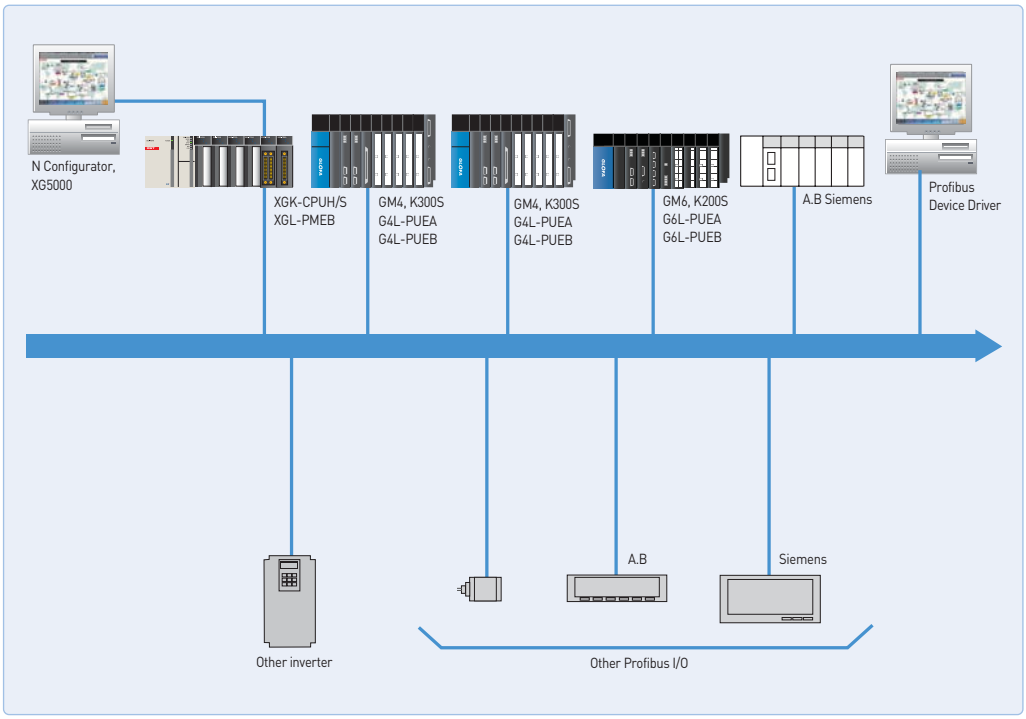

## System configuration with LS ELECTRIC products



## Specifications

| Item | XGL-PMEB | |
|---|---|---|
| Module Type | Master | |
| Network Type | Profibus-DP | |
| Standard | EN50170/DIN19245 | |
| Interface | RS-485 (Electric) | |
| Transmission Route | Bus type | |
| Modulation Type | NRZ | |
| MAC | Local Token Ring | |
| Max. Distance & Transmission Speed | Distance (m) | Transmission Speed (bps) |
| | 1,200 | 9.6k/19.2k/31.25k/45.45k/93.7k |
| | 1,000 | 187.5k |
| | 400 | 500k |
| | 200 | 1.5M |
| | 100 | 3M/6M/12M |
| Max. number of stations per network | 126 | |
| Max. number of stations per segment | 32 (including master & repeater) | |
| Max. number of modules per node | 24 modules | |
| Cable used | Electric-twist shielded pair cable | |
| Max. communication size | 7 KB | |
| Max. size per slave | 244 bytes | |
| Max. number of units to be installed | XGK-CPUH/XGI-CPUU | XGK-CPUS/CPUA/CPUE |
| | 12 | 12 |
| Installation Position | XGK-CPUH/XGI-CPUU | XGK-CPUS/CPUA/CPUE |
| | Basic base ~ expansion stage 7 | Basic base ~ expansion stage 3 |
| Communication Parameters to set | XG5000 , SyCon (XGL-PMEA Dedicated Configuration Tool),<br>N Configurator (XGL-PMEB/C Dedicated Configuration Tool) | |
| Internal-consumed current(mA) | 500 | |
| Weight (g) | 88 | |

## System configuration with other products




NETWORK

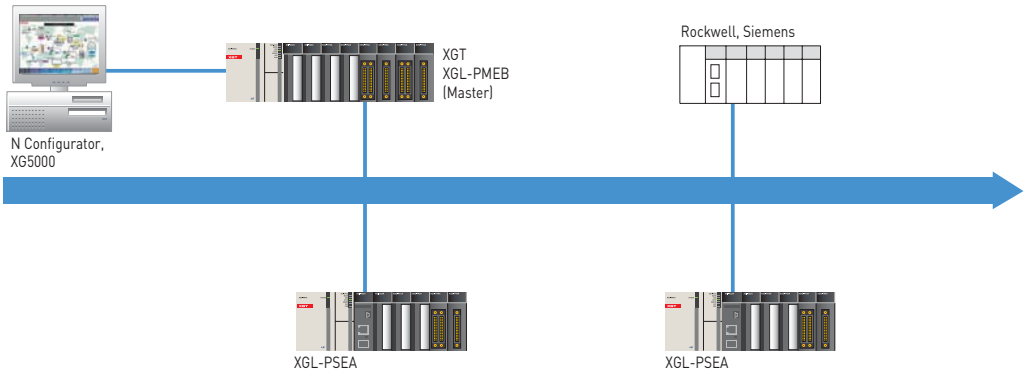
# XGT Profibus-DP[Pnet] Slave I/F system

## XGL-PSEA

- Profibus-DP
- Max. 98 stations available
- Other product Master 〈-〉 Pnet Slave I/F Module connect
- I/O configuration through XG5000 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 | | XG5000 | | | | |
| 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 ~ 7th Expansion base | | |
| | | XGK-CPUE, XGI-CPUE | | Main base ~ 1st Expansion base | | |
| | | XGK-CPUA/S, XGI-CPUH/S | | Main base ~ 3rd Expansion base | | |
| | | XGR-CPUH/F, XGR-CPUH/T | | Main base | | |
| Current consumption (mA) | | 410 | | | | |
| Weight (g) | | 103 | | | | |

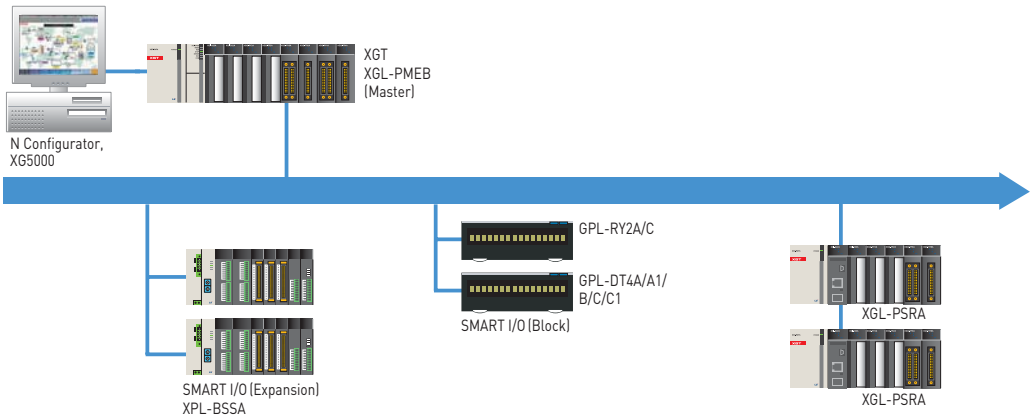
# Profibus-DP [Pnet] Remote I/F system

## XGL-PSRA

- 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

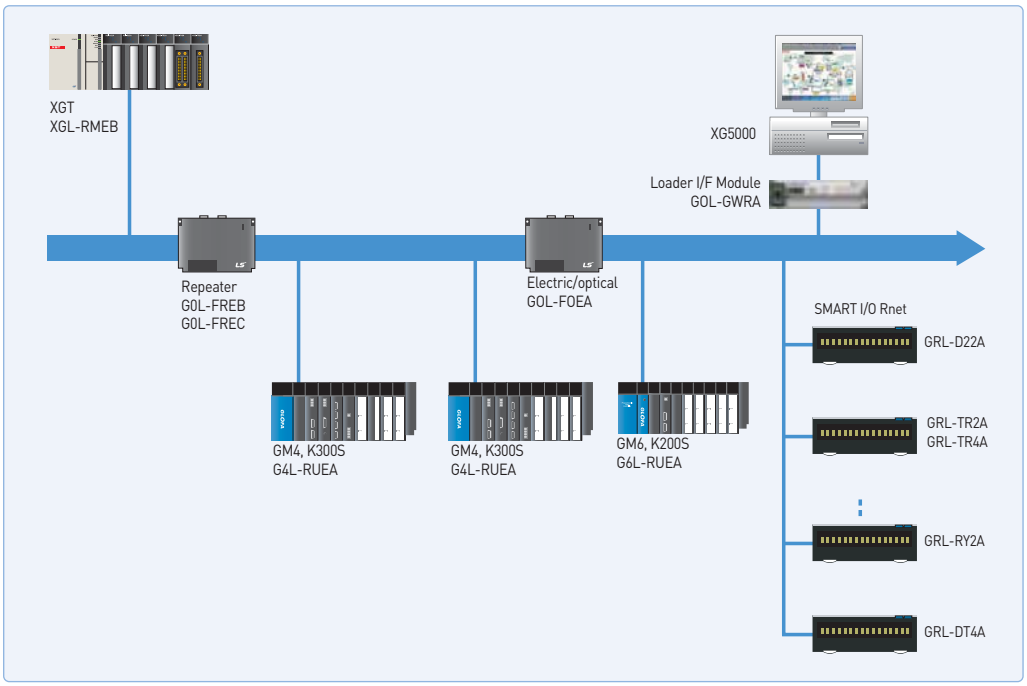
| Item | | XGL-PSRA | | | | |
|---|---|---|---|---|---|---|
| Standard | | EN50170 / DIN 19245 | | | | |
| Interface | | RS-485 (Electric) | | | | |
| Media access | | Polling | | | | |
| Topology | | Bus | | | | |
| Modulation | | NRZ | | | | |
| Network Interface | | Auto baud rate | | | | |
| Master / 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 | | | | |

## XGL-RMEB

- 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 XG5000
- Max. 63 stations of slave modules controlled by one master module




## System configuration




## Specifications

| Item | | Specifications |
|---|---|---|
| Transmission Speed | | 1Mbps<br>(Rnet I/F modules common) |
| Max. Tx distance | | Max. 750m |
| Connection Cable | | Twisted pair shielded cable<br>- LIREV-AMESB 1Px22AWG (7/0.254):LS Cables |
| Maximum stations connected | Network | Master station 1[station no:0(fixed)] +<br>Slave station 31[station no:1~63]<br>= Max. 32 stations<br>(In case of 32 stations, you have to use repeater.)<br>- Only 1 master is available in the network. |
| Diagnostic function | | XG5000 : High Speed Link Monitoring |
| System characteristic | | Available detachment and attachment of slave module during communication |
| Terminal resistance( Ω ) | | 110(5%,1/2W) |
| Master/Slave operation | | Only available as Master |
| XG5000<br>(HS Link) | Data Processing unit | Byte |
| | Tx/Rx cycle | Selection among 20ms, 50ms, 100ms, 200ms,<br>500ms, 1s, 5s, 10s(default :200ms) |
| | Max. Communication points. | 3,720bytes(slave 31stations * 120bytes/station) |
| | Max. Block number | 63(setting range : 0~62) |
| | Max. points by Block | 120 Byte(60words) |
| | Max. Tx. Block number | 32 Blocks |
| | HS Link number | Max. 12 |
| Specification | Max. module mounted | 12 modules(Main Base + Extension Base) |
| | Internal current consumption(mA) | 410 |
| | Weight(g) | 115 |

## 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 | 110Ω , 1/2 W | - |

# XGT Fnet

## XGL-FMEA

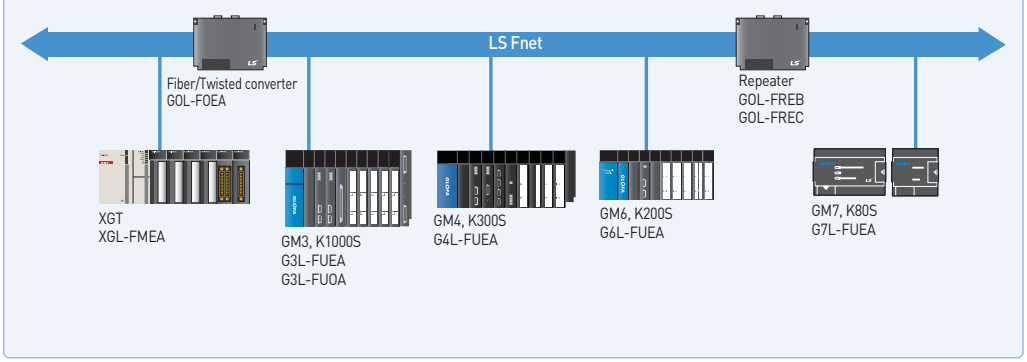
- Dedicated network for LS PLC
- Easy high-speed link parameter setup
- 1Mbps high-speed communication
- Max. 750m
- Max. 6ea repeater available (Max. expansion 5.25km)
- Network management through Auto scan
- Max. 12ea on 1ea base
- Deterministic Network through Token Passing & Broadcasting
- 3,840 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 XG5000
- Diagnosis by XG5000: Communication module information, High speed link fault, Auto scan




## Specification

| Item | Description |
|---|---|
| Communication speed | 1Mbps |
| Encoding method | Manchester Biphase-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



# Ethernet switching hub

## XGL-EH5T

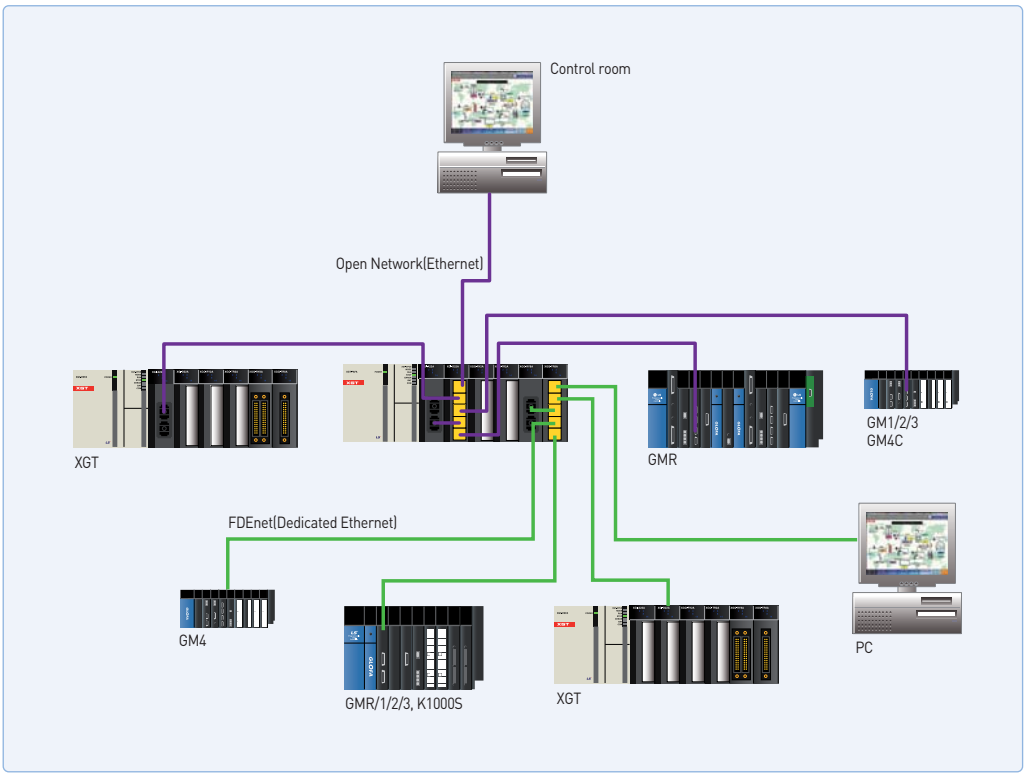
- Rack type: No external power
- Reliability for industrial standard
- Auto Crossover
- FG (Frame Ground) for RJ-45 connector
  - Decreased communication error by shielded FTP/STP cable



## 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 BACnet/IP

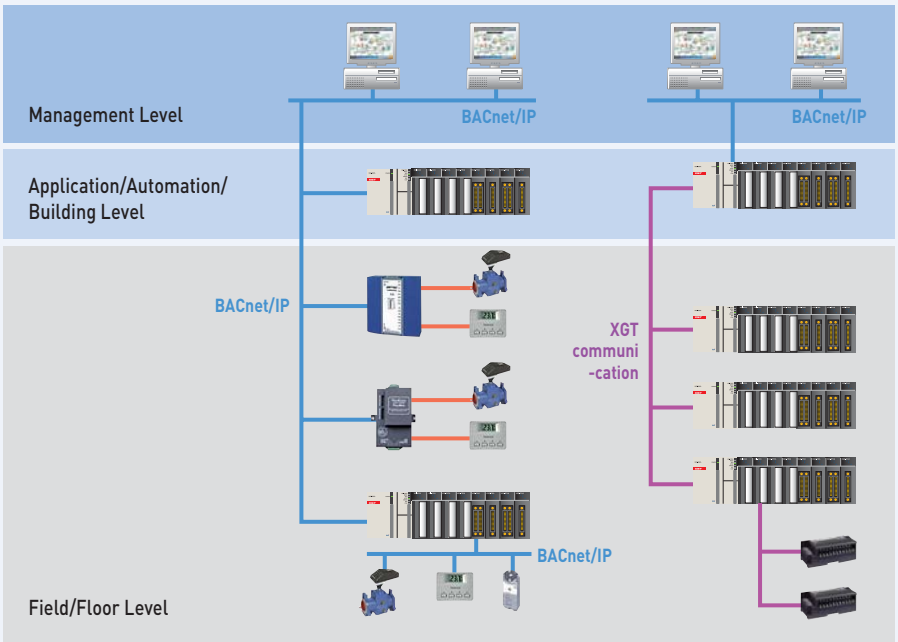
## XGL-BIPT




- 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

XGL-BIPT module can be connected to BACnet Network using client/server, XGL-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 hand |
| | Maximum extension distance between nodes | 100m |
| | Maximum size of protocol | 1,536 bytes |
| | Communication access method | CSMA/CD |
| | Frame error check method | CRC 32 = $X^{32}+X^{26}+X^{23}+ \ldots\ldots +X^{2}+X+1$ |
| | 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 |

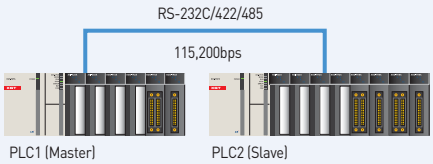
# XGT Computer-Link

## 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.

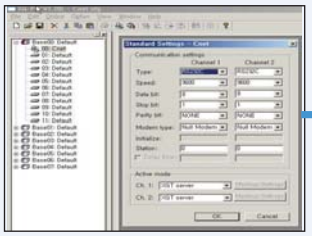



## Data memory

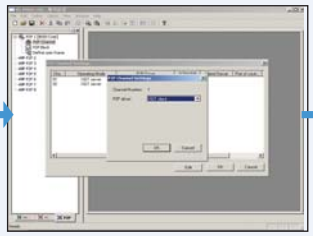
| PLC station | PLC memory | Setting Item |
|---|---|---|
| PLC 1 | M0100 | 1. XG5000 parameter setting, 2. XG5000 programming |
| PLC 2 | C0000 | 1. XG5000 parameter setting, 2. XG5000 programming |

## XG5000 setting

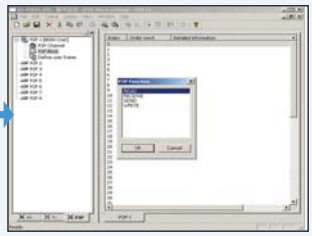
### PLC setting 1 (Master)



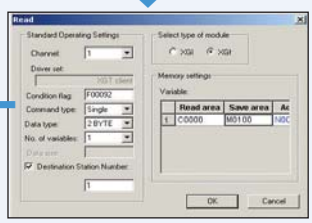
**Communication basic parameter setting**
Setting up station number, communication speed, etc. And setting up the operation mode as P2P



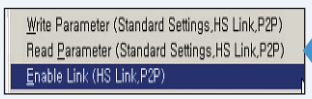
**P2P channel setting**
Setting up channel 01 as [XGT client]



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



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

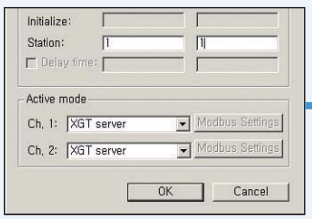



**Enable Link**
Enabling P2P for communication start




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

### PLC setting 2 (Slave)




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

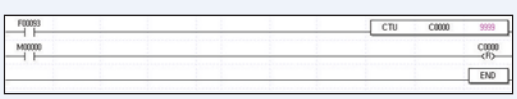



**Parameter writing**
Downloading parameters to PLC after online connection

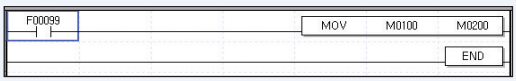
* For basic parameter setting and SyCon setting/change, reset the module (Online reset).

## 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.

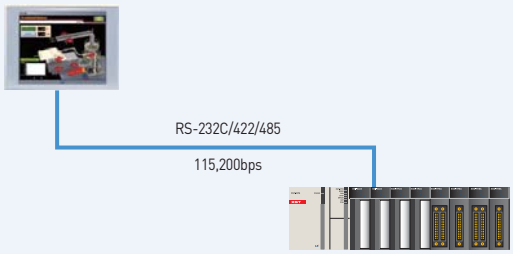


## HMI communication configuration

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

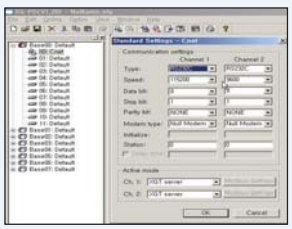
Making On/
Off touch tag for controlling
M0001 of XGT




## Data memory

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

## XG5000 setting



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




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

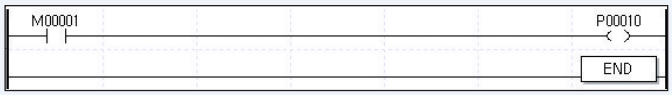


**PMU setting**
Setting up communication setting (speed, data, stop, parity, etc) same as XGT

* 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.




NETWORK

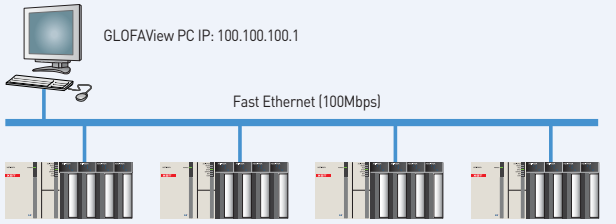
# XGT Communication example (Ethernet)

## 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.

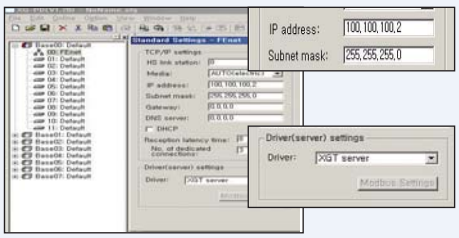



## Data memory

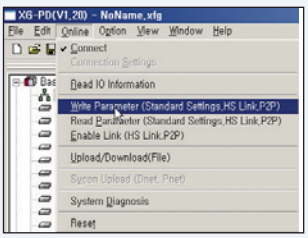
| PLC station | Setting item | GLOFAView |
|---|---|---|
| C0000 | 1. XG5000 parameter setting | Using analog tag |
| | 2. XG5000 programming | |

## XG5000 setting

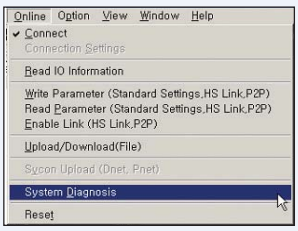
### PLC setting 1 (Master)



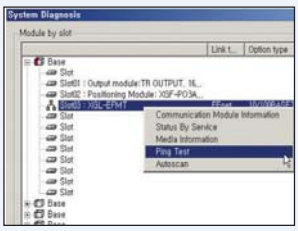

**Basic communication parameter setting**
Specifying IP address and Subnet mask of PLC as above



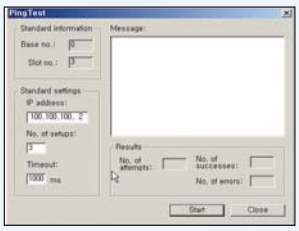

**Parameter writing**
Downloading parameters to PLC after online connection




**Communication test**
Checking online and system diagnosis




**System Diagnosis**
Selecting Ping Test



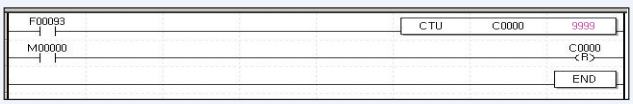

**Ping Test**
Starting diagnosis after inputting IP address of PLC

* 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.



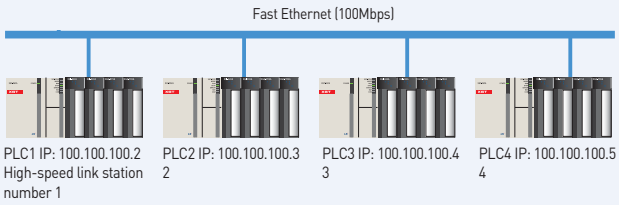



## High-speed link communication

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.

## configuration

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

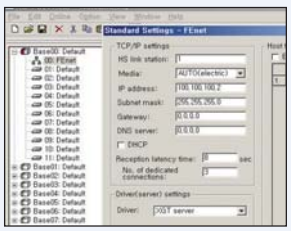



## Data memory

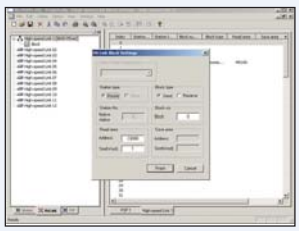
| PLC station | PLC memory | Setting Item |
|---|---|---|
| PLC 1 | C0000 | 1. XG5000 parameter setting, 2. XG5000 programming |
| PLC 2 | M0100 | 1. XG5000 parameter setting, 2. XG5000 programming |

## XG5000 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

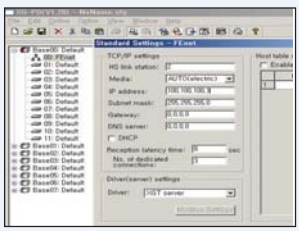



**Parameter writing**
Downloading parameters to PLC after online connection

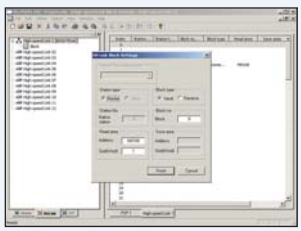



**Enable Link**
Enabling link for communication start

### PLC station 2 (setting)



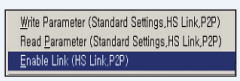
**Basic communication parameter setting**
Specifying HS link station, IP address and Subnet mask of PLC as above



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




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



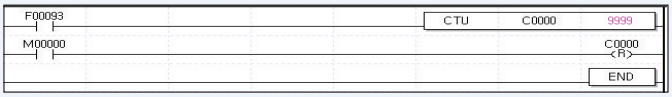

**Enable Link**
Enabling link for communication start

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

## XG5000 programming

### PLC1 setting

Make the up-counter program using CTU command




### PLC2 setting

Check out if the counter value of M0100 is transmitted.




NETWORK

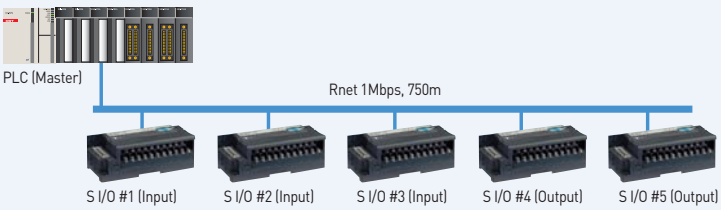
# XGT Communication example (Rnet)

## Remote I/O configuration

LS ELECTRICdeveloped 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).

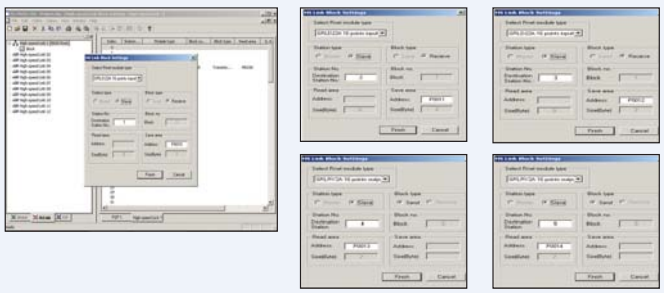


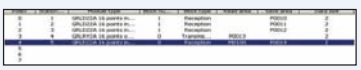

## Data memory

| Smart I/O # | Smart I/O address | PLC address | Setting item |
|---|---|---|---|
| 1 | P0000 | P0010 (P00100~P0010F) | 1. XG5000 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) | |

## XG5000 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.





**HS link registration completed**




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

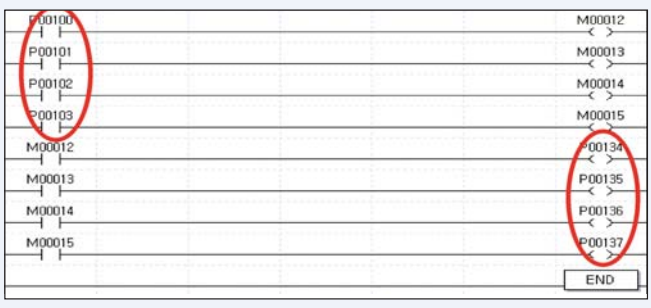



**Enable Link**
Enabling link for communication start

* 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.

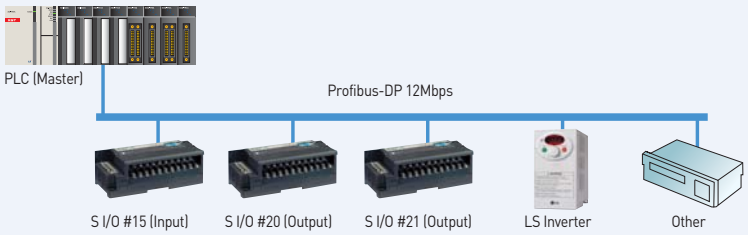


## High-speed link communication among PLCs

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

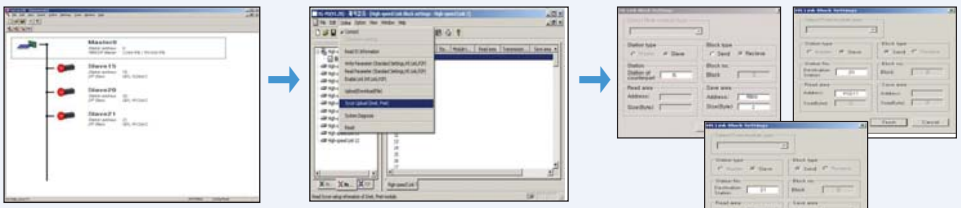
PLC controls each Smart I/O (16-point).




## Data memory

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

## XG5000 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

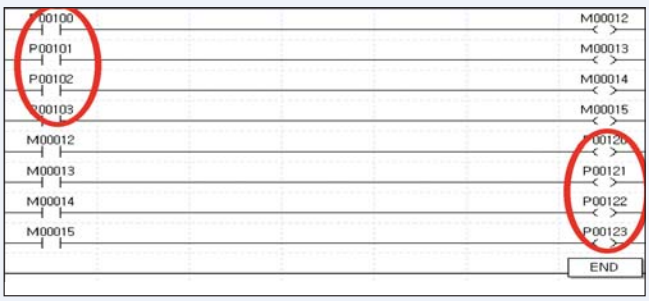



**Enable Link**
Enabling link for communication start

* 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




NETWORK

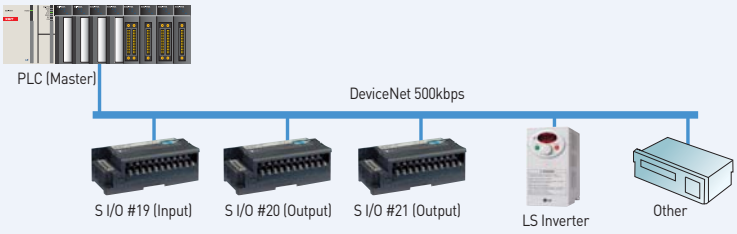
# XGT Communication example (DeviceNet)

## 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

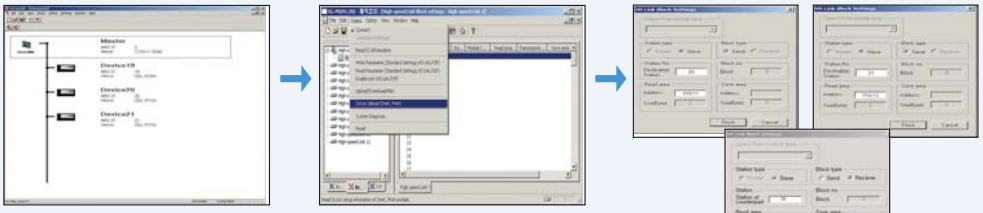
PLC controls each Smart I/O (16-point).




## Data memory

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

## XG5000 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



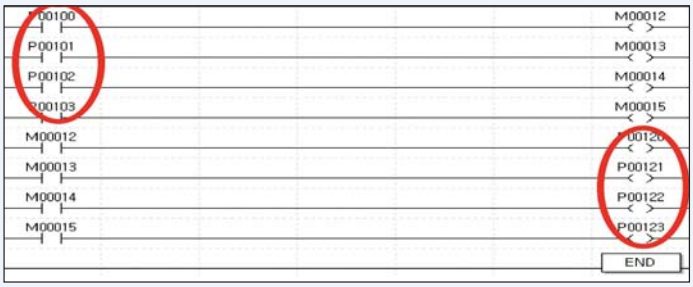

**Parameter writing**
Downloading parameters to PLC after online connection

**Enable Link**
Enabling link for communication start

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

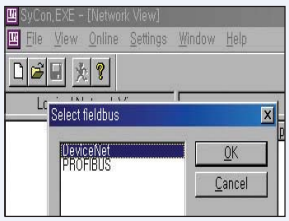
## XG5000 programming

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

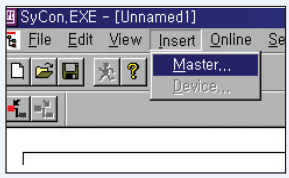


SyCon is the dedicated software that help user set up the communication environment for Profibus-DP and DeviceNet more easily and conveniently.

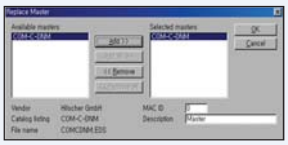
## Example of application



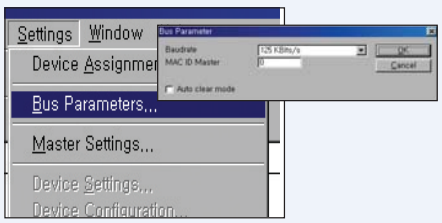

**New file**
Select fieldbus that is used.



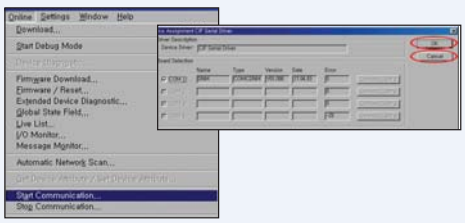

**Basic communication parameter setting**
Select [Master] in Insert menu.



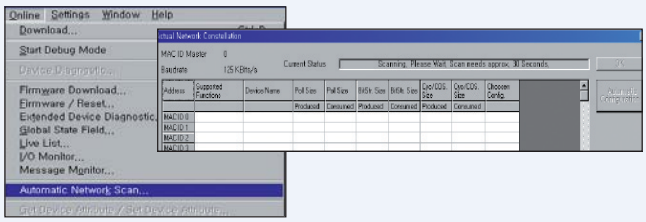
**Master module setting**
Select [COM-C-DNM] for DeviceNet.
Select [COM-C-DPM] for Profibus-DP.



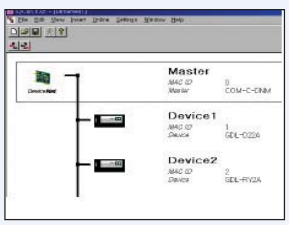

**Bus parameter setting**
Set up communication speed of master module.



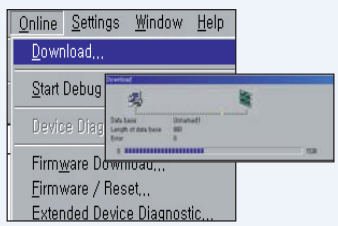
**Master module setting**
After clicking the port button, check, the right check-box.



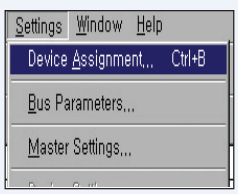

**Automatic network scan of connected Smart I/O**
Perform automatic network scan after station number setting and wiring with remote device such as Smart I/O.
At this time, all remote devices should be in normal connection (Power-On, etc).
After network scan is completed, press [Automatic Configuration] button and [OK] button.




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




**Parameter download**




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

NETWORK

# XGT 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), RAPIEnet
- 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 24 V | | DC 24 V | | DC 24 V/AC 110 V/220 V | DC 24 V | DC 24 V |
| Input current (Load current) | | 7 mA | | 0.1 A/2 A, 0.5 A/3 A | | 2 A/5 A | 7 mA 0.1 A/2 A, 0.5 A/3 A | |
| Response time | Off → On | 3 ms or less | | 3 ms or less | | 3 ms or less | 3 ms or less | 3 ms or less |
| | On → Off | 3 ms or less | | 3 ms or less | | 3 ms or less | 3 ms or less | 3 ms or less |
| Common | | 16 points/COM | | 16 points/COM | | 16 points/COM | 16 points/COM | 16 points/COM |
| Current consumption | | 200 mA | 300 mA | 280 mA | 380 mA | 550 mA | 350 mA | |
| Network | Rnet | GRL-D22C | GRL-D24C | GRL-TR2C1 | GRL-TR4C1 | GRL-RY2C | GRL-DT4C1 | |
| | Profibus-DP | GPL-D22C | GPL-D24C | GPL-TR2C/TR2C1 | GPL-TR4C/TR4C1 | GPL-RY2C | GPL-DT4C/DT4C1 | |
| | DeviceNet | GDL-D22C | GDL-D24C | GDL-TR2C/TR2C1 | GDL-TR4C/TR4C1 | GDL-RY2C | GDL-DT4C/DT4C1 | |
| | Modbus | GSL-D22C | GSL-D24C | GSL-TR2C1 | GSL-TR4C1 | GSL-RY2C | GSL-DT4C1 | |
| RAPIEnet | | - | GEL-D24C | - | GEL-TR4C1 | GEL-RY2C | - | GEL-DT4C1 |

Note1) 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/GEL-AV8C | GPL-AC8C/GEL-AC8C | Item | GPL-DV4C/GEL-DV4C | GPL-DC4C/GEL-DC4C |
|---|---|---|---|---|---|
| Input channels | 8 channels | | Output channels | 4 channels | |
| Analog input | DC 1~5 V, 0~5 V, 0~10 V, -10~+10 V | 0~20 mA, 4~20 mA, - 20~20 mA | 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 1~5 V, 0~5 V, 0~10 V, -10~+10 V | 0~20 mA, 4~20 mA |
| Input impedance | 1 MΩ | 250 Ω | Load impedance | 1 KΩ or more (0~5 V or 1~5 V) | |
| Max. resolution | ±15 V | ±30 mA | | 2 KΩ or more (0~10 V or -10~10 V) | 500 Ω or less |
| | 1.25 mV | 2.5 μA | Resolution | 1.25 mV | 2.5 μA |
| Accuracy | ±0.3% (full scale, Ta=0~55 °C) | ±0.3% (full scale, Ta=23 °C±5 °C) | Accuracy | ±0.3% (full scale, Ta=0~55 °C) | ±0.3% (full scale, Ta=23 °C±5 °C) |
| | | ±0.4% (full scale, Ta=0~55 °C) | | | ±0.4% (full scale, Ta=0~55 °C) |
| Conversion speed | 10 ms or less/8 channel | | Conversion speed | 10 ms or less/4 channel | |
| Response period | 10 ms or less/8 channels + Transmission period (ms) | | Response period | 10 ms or less/8 channels + Transmission period (ms) | |
| | Analog input/output terminal with FG→Insulation | | | Analog input/output terminal with FG→Insulation | |
| Insulation method | Analog input/output terminal with Communication terminal→Insulation | | Insulation method | Analog input/output terminal with Communication terminal→Insulation | |
| | Analog input/output terminal with each channel→No insulation | | | Analog input/output terminal with each channel→No | |
| External power supply | DC 24 V (21.6 ~ 26.4) | | External power supply | insulation | DC 24 V (20.4 ~ 28.8) |
| External current consumption | DC 24 V : 220 mA | | External current consumption | 210 mA | 240 mA |
| Weight (kg) | 0.313 | 0.313 | Weight (kg) | 0.314 | 0.322 |

## Communication specifications

| Item | Rnet (LS dedicated network) | Profibus-DP | DeviceNet | MODBUS | RAPIEnet(RJ-45) |
|---|---|---|---|---|---|
| Protocol | LS ELECTRICdedicated protocol (Fnet for Remote) | Profibus-DP (RS-485/EN50170) | DeviceNet (CAN) | MODBUS (RS-422/485) | Fast Ethernet |
| Transmission speed | 1 Mbps | 9.6 Kbps ~ 12 Mbps | 125/250/500 Kbps | 2.4 Kbps ~ 38.4 Kbps | 100Mbps |
| Transmission distance | 750 m/segment | 100 m ~ 1.2 km | 500/250/125 m (Thin cable: 100 m) | 500 m | 100M |
| Topology | Bus Token | Bus | Trunk & Drop | Bus | CRC32 |
| Transmission | Pass & Broadcast | Token Pass & Master/Slave (Poll) | CSMA/NBA (Poll, Cyclic, COS, Bit Strobe) | Master/Slave (Poll) | CSMA/CD |
| No. of stations | 32/segment (Input: 32, Output: 32) | 32/segment, 99/network | 64 | 32 | 64 |

# (Modbus TCP/IP, Ether Net/IP Adapter)



## Features

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




## Specification

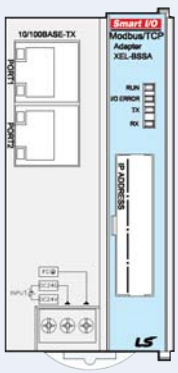
| Items | | XEL-BSSA | XEL-BSSB |
|---|---|---|---|
| I/F | Protocol | Modbus TCP | EtherNet/ IP |
| | Transmission speed | 10 /100Mbps | |
| | Connector | RJ-45(2ports) | |
| | Topology | Software(BootpServer) | |
| | IP setup | Bus, Star | |
| Max. expansion module | | 8ea | |
| Max. digital I/O point | | 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 | |
| | XBE-DN16A | DC24V input 8pt , Tr output 8pt | |
| Analog, Temperature | XBF-AD04A | Current/Voltage input 4Ch | Input Max. 16ch Output Max. 16ch |
| | XBF-AD04C | 4-channel analog input (current / voltage, resolution : 1/16000) | |
| | XBF-DC04A | Current output 4Ch | |
| | XBF-DV04C | 4-channel analog input (voltage, resolution : 1/16000) | |
| | XBF-DV04A | Voltage output 4Ch | |
| | XBF-DV04C | 4-channel analog input (voltage, resolution : 1/16000) | |
| | 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

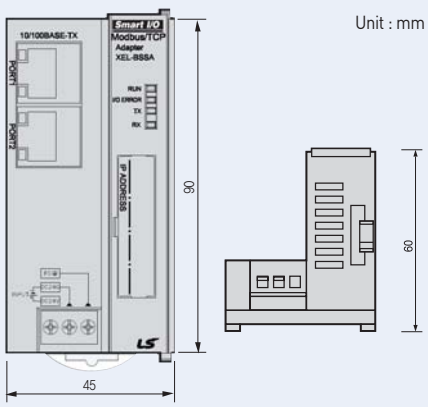
## Externals and inscriptions




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

## Dimension

Unit : mm




NETWORK

# XGT 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 | | |

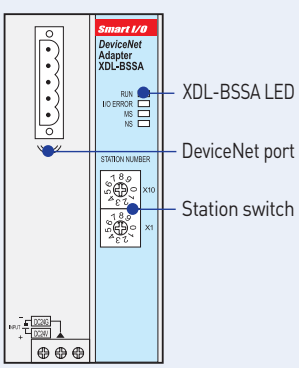
* When I/O module is installed, check the current consumption (Max. Current: 1.5A)

## 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-AD04C | 4-channel analog input (current / voltage, resolution : 1/16000) | |
| | XBF-DC04A | Current output 4Ch | |
| | XBF-DV04C | 4-channel analog input (voltage, resolution : 1/16000) | |
| | XBF-DV04A | Voltage output 4Ch | |
| | XBF-DV04C | 4-channel analog input (voltage, resolution : 1/16000) | |
| | 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

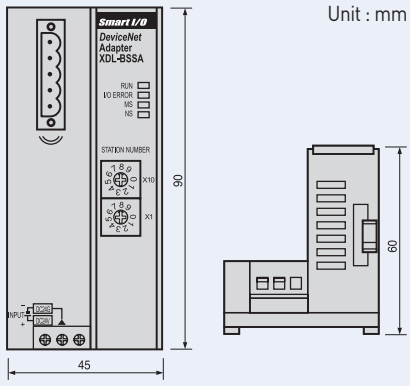
## Externals and inscriptions




| Item | LED status |
|---|---|
| RUN | 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

Unit : mm



# 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 |
| | | kbps | 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 : 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 | | | | |

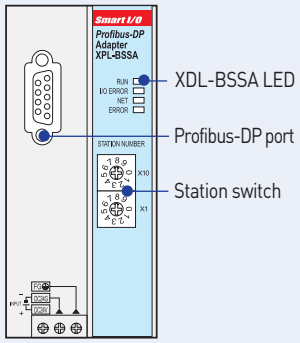
* When I/O module is installed, check the current consumption (Max. Current: 1.5A)

## System configuration

| 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-AD04C | 4-channel analog input (current / voltage, resolution : 1/16000) | |
| | XBF-DC04A | Current output 4Ch | |
| | XBF-DV04C | 4-channel analog input (voltage, resolution : 1/16000) | |
| | XBF-DV04A | Voltage output 4Ch | |
| | XBF-DV04C | 4-channel analog input (voltage, resolution : 1/16000) | |
| | XBF-RD04A | RTD input 4Ch | |
| | XBF-TC04S | TC input 4Ch | |

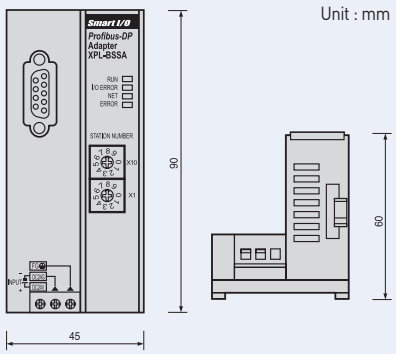
* When Digital input and Analog input is used together or Digital output Analog output is used, configure the system within 32bytes
(Ex) If 4ch analog input is used, Digital input can be used max. 192points

## Externals and inscriptions




| Item | LED status |
|---|---|
| RUN | ON : Normal |
| | Blink: Waiting or comm. error |
| | OFF : Module error |
| I/O ERROR | ON : I/O module error |
| | OFF : Normal |
| NET | ON : Data send/receive |
| | OFF : Disconnection |
| ERROR | ON : Comm. error |
| | OFF : Normal |

## Dimension




NETWORK

# XGT 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 |
|---|---|---|
| Transmission | 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 |

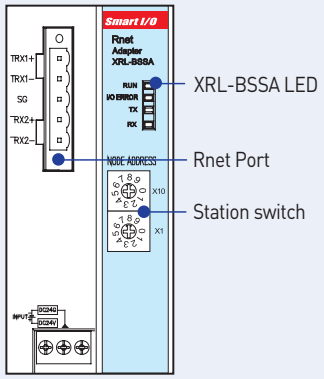
* When I/O module is installed, check the current consumption (Max. Current: 1.5A)

## System configuration

| 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-AD04C | 4-channel analog input (current / voltage, resolution : 1/16000) | |
| | XBF-DC04A | Current output 4Ch | |
| | XBF-DV04C | 4-channel analog input (voltage, resolution : 1/16000) | |
| | XBF-DV04A | Voltage output 4Ch | |
| | XBF-DV04C | 4-channel analog input (voltage, resolution : 1/16000) | |
| | 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.

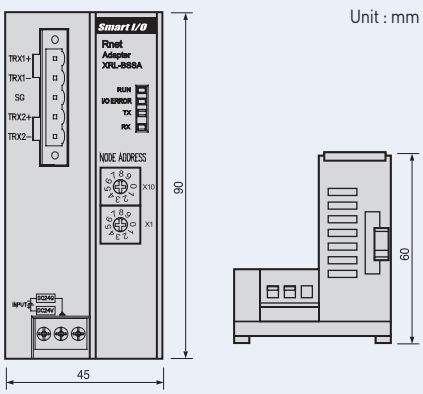
## Externals and inscriptions




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

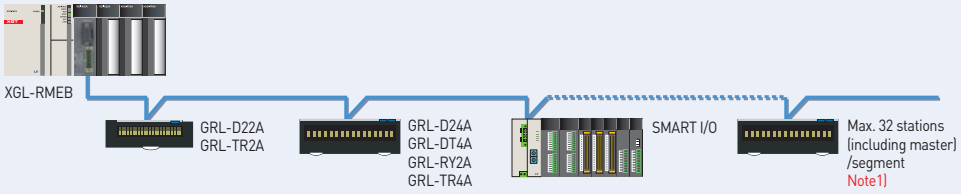
## Dimension

Unit : mm

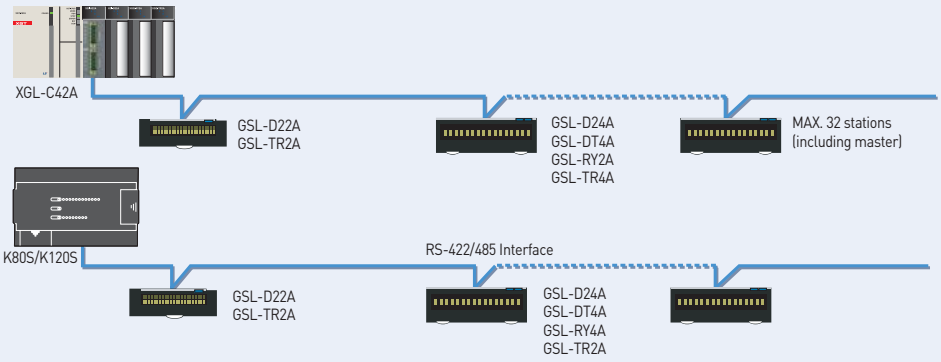


# SMART I/O (Features)

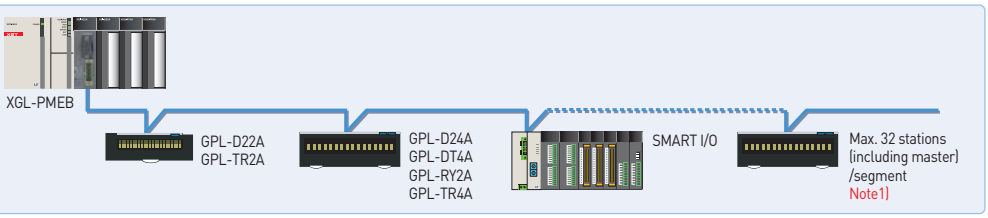
## Smart I/O Rnet system



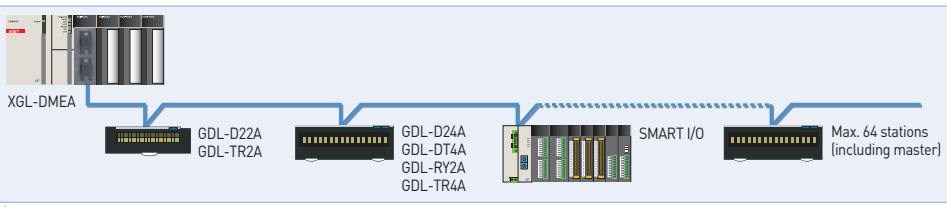

## Smart I/O Modbus system




## Smart I/O Profibus-DP system




## Smart I/O DeviceNet system

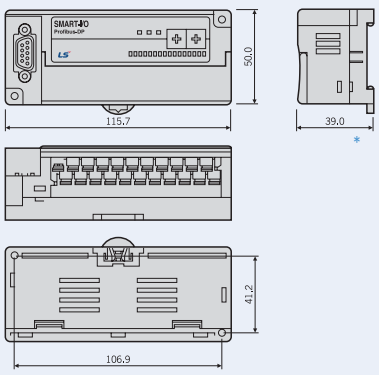



Note1) Segment: Communication section that does not use repeater or second master.

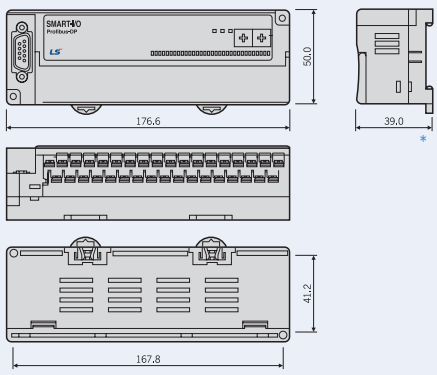
## Dimensions

Unit: mm

• 16points




• 32points




* GxL-RY2 (16-point relay output) module follows the dimension of 32-point module.
* The length of C type Smart I/O is 47.5mm

## Network Standard

| Item | Rnet (LS dedicated network) | Profibus-DP | DeviceNet | MODBUS | RAPIEnet(RJ-45) |
|---|---|---|---|---|---|
| Protocol | LSELECTRIC dedicated protocol (Fnet for Remote) | Profibus-DP (RS-485/EN50170) | DeviceNet (CAN) | MODBUS (RS-422/485) | Fast Ethernet |
| Transmission speed | 1 Mbps | 9.6 Kbps ~ 12 Mbps | 125/250/500 Kbps | 2.4 Kbps ~ 38.4 Kbps | 100Mbps |
| Transmission distance | 750 m/segment | 100 m ~ 1.2 km | 500/250/125 m (Thin cable: 100 m) | 500 m | 100M |
| Topology | Bus Token | Bus | Trunk & Drop | Bus | CRC32 |
| Transmission | Pass & Broadcast | Token Pass & Master/Slave (Poll) | CSMA/NBA (Poll, Cyclic, COS, Bit Strobe) | Token Pass & Master/Slave (Poll) | CSMA/CD |
| No. of stations | 32/segment (Input: 32, Output: 32) | 32/segment, 99/network | 64 | 32 | 64 |

NETWORK


XGI-D22A
XGQ-TR4A
XGL-CH2A
XGL-DMEA
XGF-PO3A
XGF-M16M
XGQ-TR2A
XGI-D24A

# Special

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

Contents


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120 Event input module
122 Datalog module




## 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

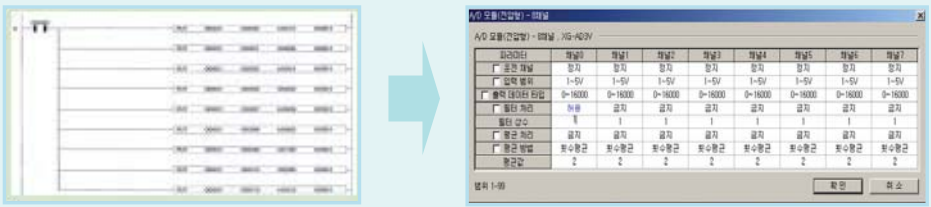
### Easy- to-use(Easy operation parameter setting and data monitoring)

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

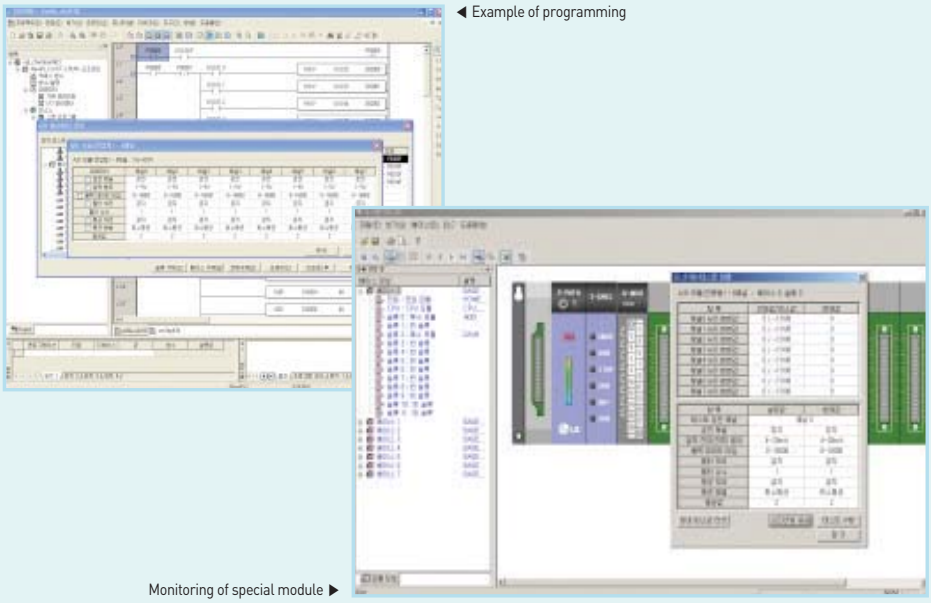
### Simple maintenance (Changing online module)

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

Before



◀ Example of programming



Monitoring of special module ▶

## 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 |
| XGF-TC4UD | 4 channels input: voltage/current/TC/RTD<br>8 channels output: current/TR |
| XGF-TC4RT | 4 channels input: RTD<br>4 channels output: TR<br>Control: 4loop |

## Positioning module/Motion controller



### Positioning module

| | |
|---|---|
| XGF-P01A~P03A | Open collector, 1~3axis |
| XGF-PD1A~PD3A | Line drive, 1~3axis |
| XGF-P01H~P04H | 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-SOEA | DC24V, 32points |

SPECIAL

# XGT 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<br>DC 4~20mA, 0~20mA |

**Digital output**

Selection of input range in program or S/W package (Available to be set per channel)

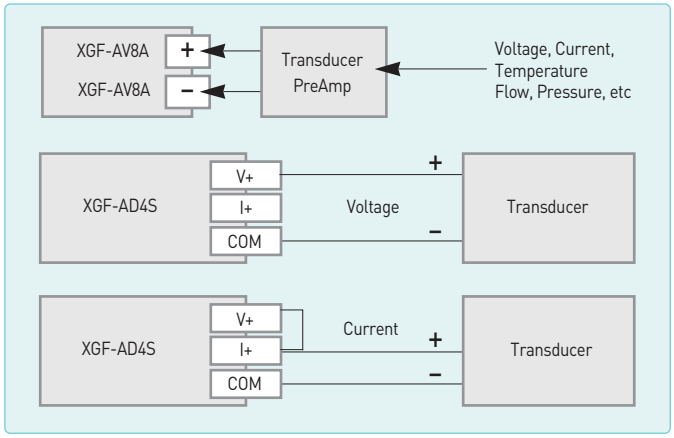
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| XGF-AV8A | Analog input | | 1~5V | 0~5V | 0~10V | -10~10V | |
| | Digital output | Unsigned value | 0~16,000 | | | | |
| | | Signed value | -8000~8,000 | | | | |
| | | Precise value | 1,000~5,000 | 0~5,000 | 0~10,000 | -10,000~10,000 | |
| | | Percentile 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**

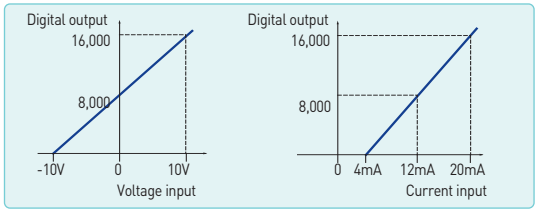
| XGF-AV8A | | | | XGF-AD4S | | | |
|---|---|---|---|---|---|---|---|
| 1/16,000 | | | | 1/64,000 | | | |
| 1~5V | 0.250mV | 4~20mA | 1.0μA | 1 ~ 5V | 62.5μV | 4~20mA | 250nA |
| 0~5V | 0.3125mV | | | 0~5V | 78.1μV | | |
| 0~10V | 0.625mV | 0~20mA | 1.25μA | 0 ~ 10V | 156.3μV | 0~20mA | 312.5nA |
| -10V~10V | 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 | | |

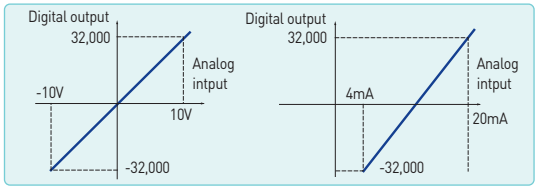
## Configuration




## A/D conversion characteristics




### Insulation type





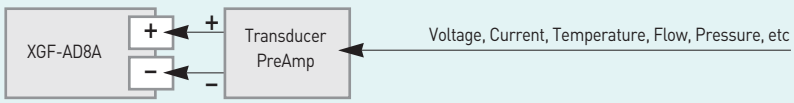
## Features

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

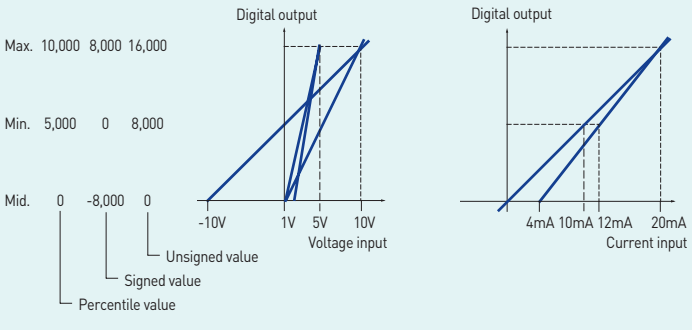
## Specifications

| 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 | DC4~20㎃, DC 0~20㎃ (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) | | | | | |
| | Input type | Voltage input | | | | Current input | |
| | | DC 1~5V | DC 0~5V | DC 0~10V | DC -10~10V | DC 4~20㎃ | DC 0~20㎃ |
| Digital output | 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 | 1.00㎂ | 1.25㎂ |
| | 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 | | | | ±30㎃ | |
| Conversion speed | | 500㎲/channels | | | 250㎲/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 : 420㎃ | | | | | |
| Wight | | 140g | | | | | |

## Configuration




## A/D conversion characteristics




SPECIAL

# XGT 2Wire Analog input module

## Features

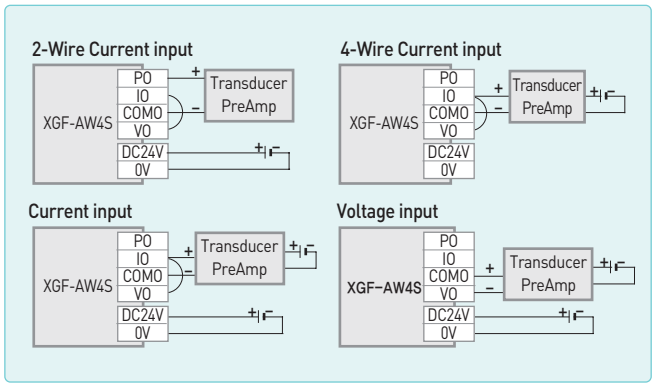
- 2Wire sensor (transmitter) input
- 1/64000 resolution
- Channel insulation
- Various additional functions



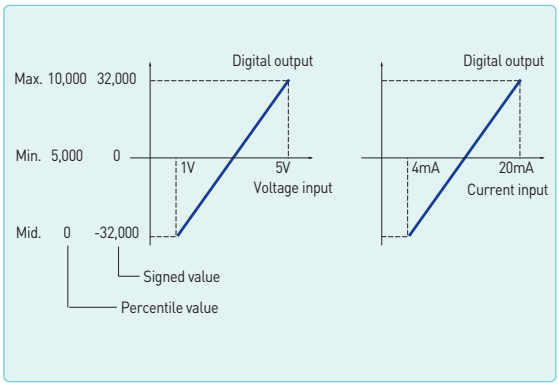
## Specifications

| Item | | XGF-AW4S | | |
|---|---|---|---|---|
| No. of input channel | | 4channels | | |
| Voltage input | | DC 1~5V(Input resistance: 1MΩ) | DC 4~20mA(Input resistance : 250Ω) | |
| 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 | | ±0.05% or less (Ambient temperature 25℃), Temp. coefficient ±70ppm/℃(Range of operation temperature) | | |
| Max. absolute input | | ±6V | ±30mA | |
| Conversion speed | | 10ms/4channels | | |
| Insulation | Item | Method | Withstand voltage | Resistance |
| | Channel | Transformer | 500VAC, 50/60Hz, 1min, Leakage current: 10mA or less | 500VDC,10MΩ or more |
| | Terminal - Power | Photo-coupler | | |
| Transmitter | Voltage | DC 24V ± 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
- ±0.05%(25℃) fixed density
- Setting and monitoring the special module parameter through XG5000



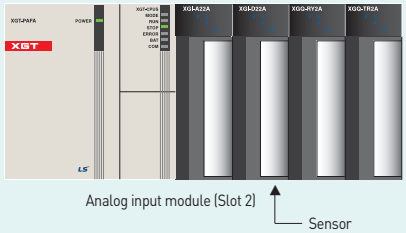
## Specifications

| 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: 1㏁) | | | | | |
| | Current input | DC 4~20㎃, DC 0~20㎃ (Input resistance: 250Ω) | | | | | |
| | Input selection | Dip switch | | | – | | |
| | Range selection | Selection input range in the program or S/W package(Available to set per each channel) | | | | | |
| | Input type | Voltage input | | | | Current input | |
| | | DC 1~5V | DC 0~5V | DC 0~10V | DC -10~10V | DC 4~20㎃ | DC 0~20㎃ |
| Digital output | 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) | 0.0625mV | 0.0781mV | 0.1563mV | 0.3125mV | 0.25㎂ | 0.3125㎂ |
| | Range selection | Selection input range in the program or S/W package(Available to set per each channel) | | | | | |
| Resolution | | ±0.2% or less(Ambient temperatue 25℃), ±0.3% or less(Range of operation temperature) | | | | | |
| Max. absolute input | | ±15V | | | | ±30㎃ | |
| Conversion speed | | 10ms/4 channel | | | | | |
| Isolation Standards | Item | Isolation Method | | Isolation withstand voltage | | Isolation resistance | |
| | Channels | Transformer isolation | | 500VAC, 50/60Hz | | 10㏁ 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㎃ | | | | | |
| Wight | | 140 | | | | | |

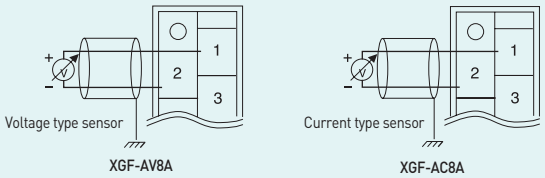
# Analog input module (Example)

## System Configuration

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

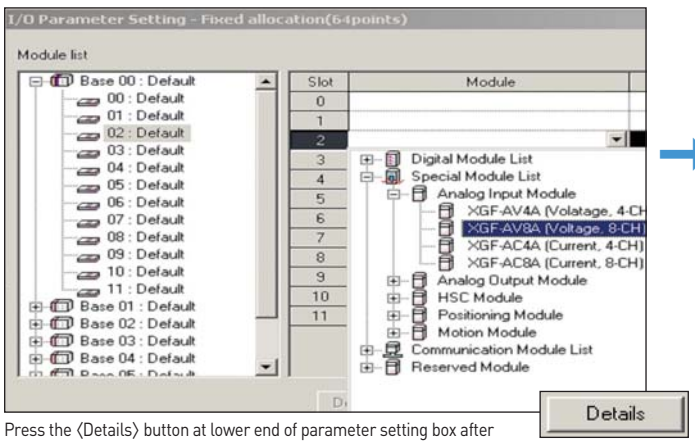



## Wiring

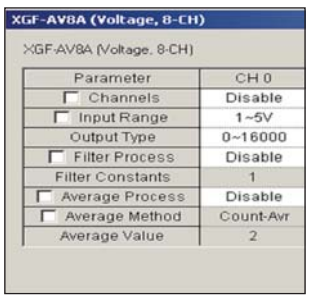



## Parameter setting

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.)




Press the 〈Details〉 button at lower end of parameter setting box after selecting the module.




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

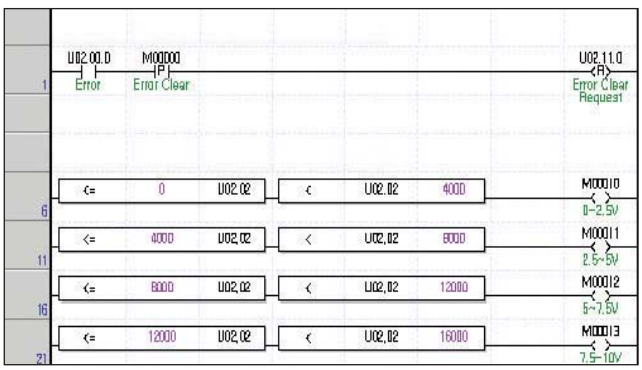
## Programming

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 | | 4~20㎃ | | 0~20㎃ | |
| | 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) | | | | | | |

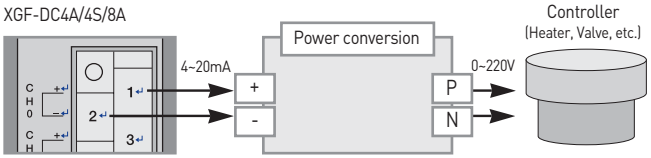
| | | | | |
|---|---|---|---|---|
| Max. resolution | 1/16,000 (Per each input range) | | | |
| | 1~5V | 0.250㎷ | 4~20㎃ | 1.0㎂ |
| | 0~5V | 0.3125㎷ | | |
| | 0~10V | 0.625㎷ | 0~20㎃ | 1.25㎂ |
| | ±10V | 1.250㎷ | | |
| Accuracy | XGF-DV4A/8A, DC4A/8A : ±0.2% or less (Ambient temperature 25℃), ±0.3% or less (Range of operation temperature) | | | |
| | XGF-DV4S/DC4S : ±0.1% or less (Ambient temperature 25℃), temp coefficient: ±80ppm/℃ | | | |
| Conversion speed | 250㎲/channel | | | |
| Max. absolute output | ±15V | | ±24㎃ | |
| 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 |

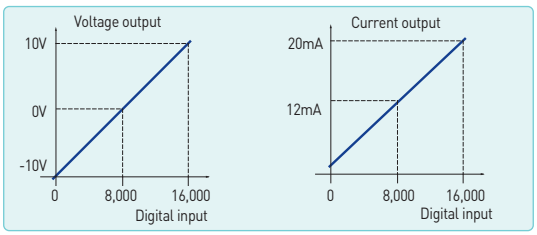
| | |
|---|---|
| Weight (Kg) | 0.15 |

## Output wiring

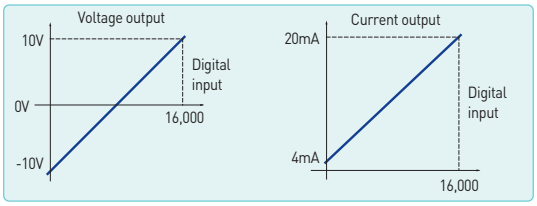
XGF-DV4A/4S/8A
XGF-DC4A/4S/8A




## I/O conversion characteristics




Insulation type

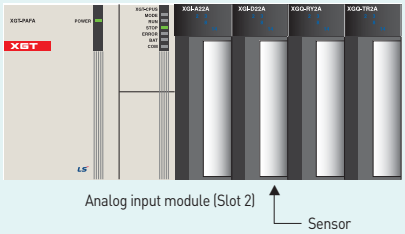



SPECIAL

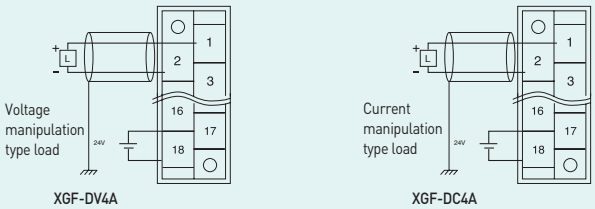
# Analog output module (Example)

## System Configuration

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

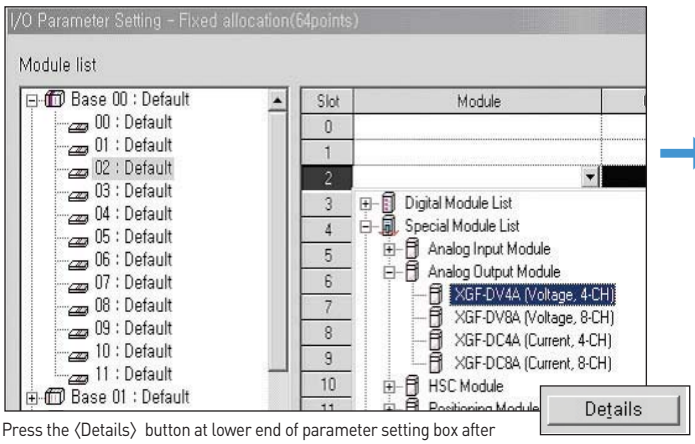



## Wiring

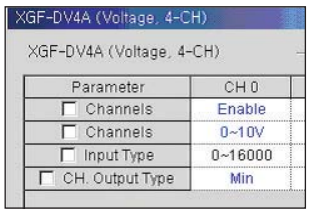



## Parameter setting

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.)




Press the 〈Details〉 button at lower end of parameter setting box after selecting the module.




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

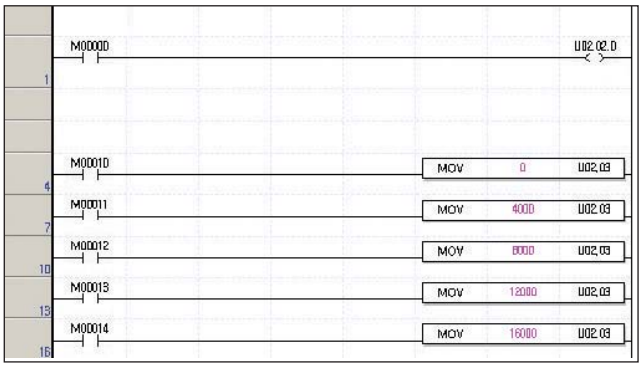
## Programming

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

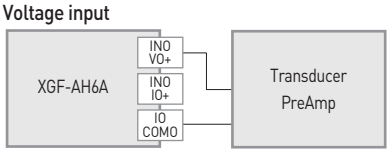


## Specifications

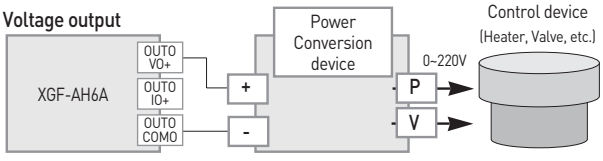
| Item | | | XGF-AH6A | | | | |
|---|---|---|---|---|---|---|---|
| Input | No. of input channel | | 4channels | | | | |
| | Analog output | Range | DC1~5V | DC0~5V | DC0~10V | DC-10~10V | DC4~20mA |
| | | Resistance | 1MΩ | | | | 250Ω |
| | | Selection | V+ and COM | | | | |
| | Digital output | Unsigned 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 | | 500㎳/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

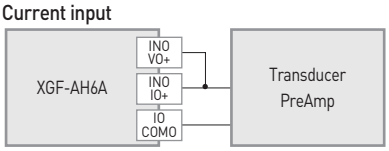
Voltage input



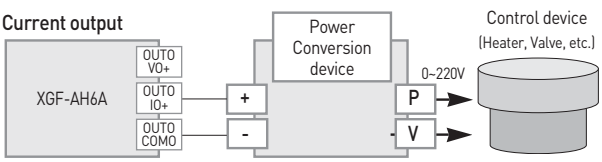

Voltage output




Current input




Current output




SPECIAL

# XGT HART interface analogue/digital conversion module

## Features

- It supports HART protocol
  In the input range of 4 ~ 20mA, bi-directional digital communication is available by using analog signal wiring. If analog wiring is currently used, there is no need to add wiring for HART communication (HART communication is not supported in the range of 0 ~ 20mA)
- High accuracy
- Operation parameters setting/monitoring
- Input disconnection detection function



## Specifications

| Item | | XGF-AC4H | | XGF-DC4H | |
|---|---|---|---|---|---|
| No. of Channels | | 4channels | | 4channels | |
| Analog input/output range | | DC4~20mA,DC 0~20mA, (Input Resistance 250Ω ) | | DC 4~20mA,DC 0~20mA, (Load resistance 600Ω or less) | |
| Digital input/ output | Analog output/Digital input | DC4~20mA | DC0~20mA | DC4~20mA | DC0~20mA |
| | Signed value | -32000~32000 | | -8000~8000 | |
| | Unsigned value | - | | 0~1600 | |
| | Precise value | 4000~2000 | 0~2000 | 4000~2000 | 0~2000 |
| | Percentile value | 0~10000 | | | |
| Max. resolution | | 0 / 64000 | | | |
| | | 4~20mA:250.0㎁, 0~20mA:312.5㎁ | | 4~20mA:1.00㎂, 0~20mA:1.25㎂ | |
| Accuracy | | ±0.10% or less (when ambient temperature is 25℃±5℃) | | ±0.10% or less (when ambient temperature is 25℃±5℃) | |
| | | ±0.25% or less (when ambient temperature is 0℃~55℃) | | ±0.3% or less (when ambient temperature is 0℃~55℃) | |
| Conversion speed | | 10ms/4channels | | | |
| Absolute Max. input/output | | ±3mA | | DC 24mA | |
| Analog input points | | 4 channels / 1module | | | |
| Isolation specification | | Photo-coupler isolation between input terminal and PLC power (no isolation between channels) | | | |
| Terminal connected | | 18-point terminal | | | |
| I/O points occupied | | Fixed type: 64 points, Non fixed type : 16 points | | | |
| HART communication method | | Mono drop only Primary master only | | | |
| Internal-consumed current | | DC5V:340㎃ | | DC5V:200㎃, DC24V:220mA | |
| Weight (g) | | 145 | | 150 | |

# 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



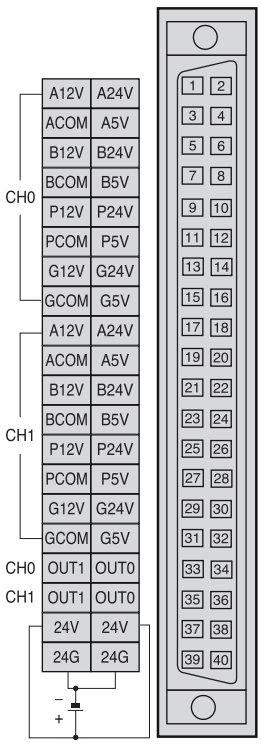
## Specifications

| Item | | | XGF-HO2A | | | 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 | | | RS-422 Line Drive/HTL LEVEL Line Drive |
| | Input voltage | | 24V DC (17.0V ~ 26.4V) | 12V DC (9.8V ~ 13.2V) | 5V DC (4.5V ~ 5.5V) | Line Driver |
| | Input current | | 7~11mA | 7~11mA | 7~11mA | RS-422 Line Drive HTL Level Line Drive |
| | 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 (Program setting) | | | Linear count (Generating Carry/Borrow when exceeding counting range, Max/Min value) | | | |
| Input mode (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 (Program setting) | | | • Count clear, Count latch • Pulse frequency count (Each input channel) • Section count (Set time value:1~60000ms) • Measuring counting number per a unit time (Set time value:1~60000ms) • 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 | | | |

SPECIAL

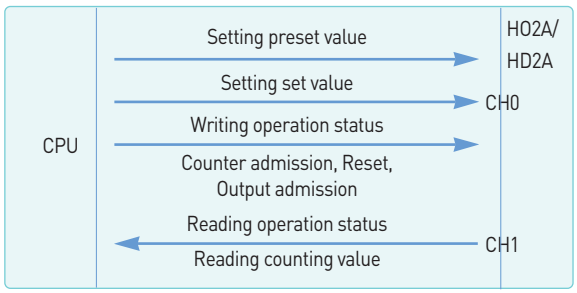
## Terminal block configuration

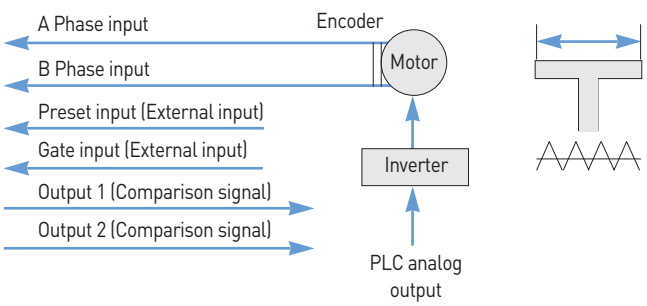
### XGF-H02A



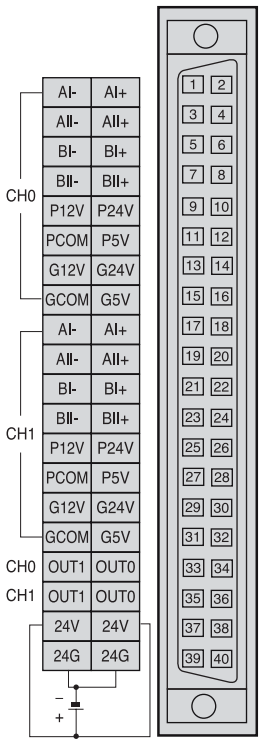

| Pin number | | Signal name | |
|---|---|---|---|
| CH0 | CH1 | | |
| 1 | 17 | A12V | A phase DC12V input |
| 2 | 18 | A24V | A phase DC24V input |
| 3 | 19 | A_C | A phase COM |
| 4 | 20 | A5V | A phase DC5V input |
| 5 | 21 | B12V | B phase DC12V input |
| 6 | 22 | B24V | B phase DC24V input |
| 7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

## Configuration



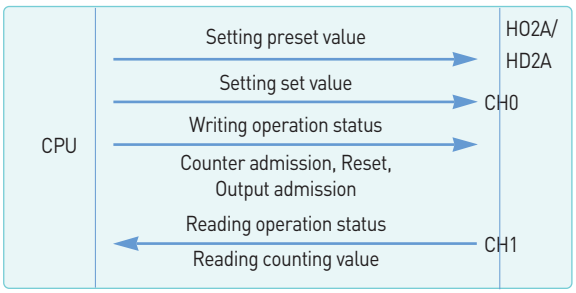



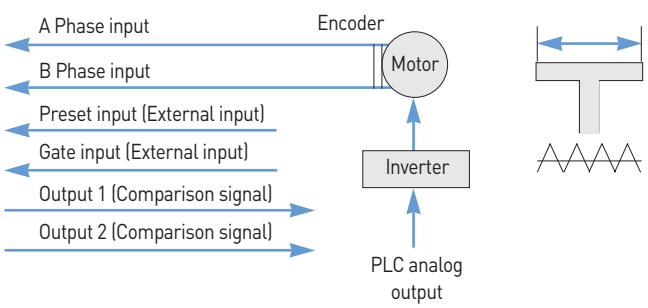
## XGF-HD2A

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



## Configuration




SPECIAL

# XGT 8-Channel high peed 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

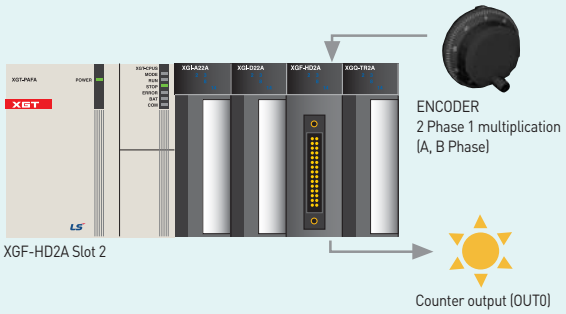
## Specifications

| 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 | Phase difference |
| | CW/CCW | A-phase : Up count, B-phase : Down count |
| Multiplica-tion | 1-phase input | 1/2 multiplication(Programming) |
| | 2-phase input | 1/2/4 multiplication(Programming) |
| | 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 |

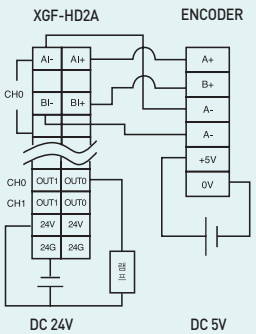
# High-speed counter module (Example)

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

## System Configuration




## Wiring




* This is wiring diagram of line driver. For open collector or other control, refer to user's manual.

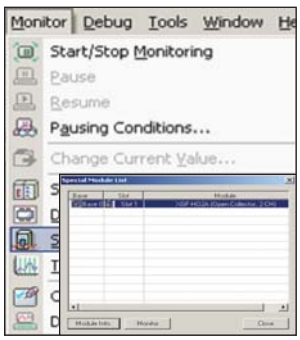
# XGT High-speed counter module (Example)

## 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.



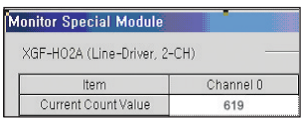

Select [Monitor] → [Special Module Monitoring] in menu and appoint high-speed counter.



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



Change [Counter Enable] status to ON.



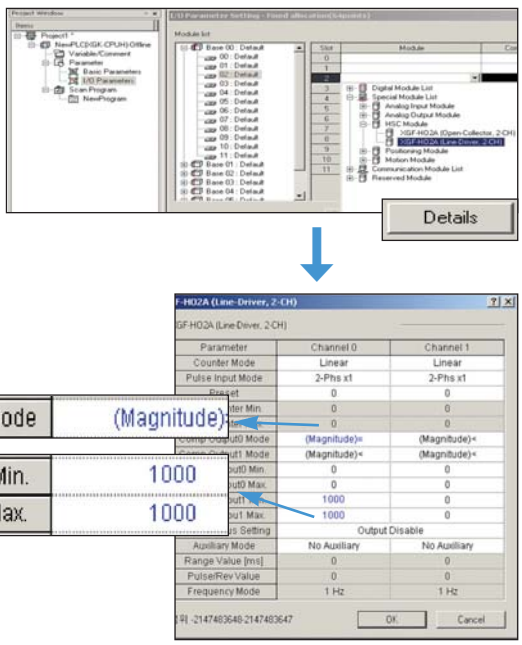

Check current counting value in 'Monitor Special Module' screen box.

## 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.



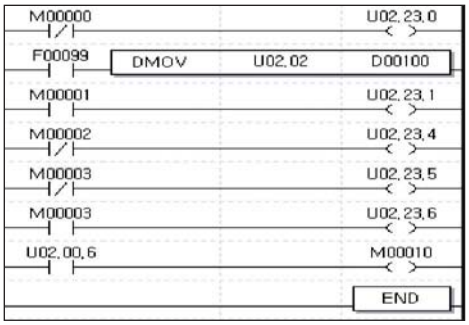
## programming

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

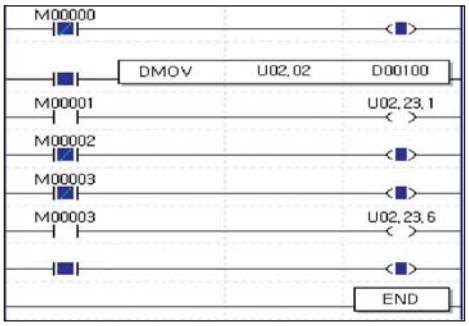
Special devices for programming

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

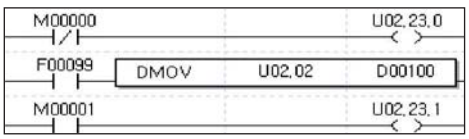
Uxy.aa.bb
x: Base number
y: Slot number
aa,bb: Refer to user's manual




After downloading, monitor operation status.




For monitoring just present value, follow the example.




SPECIAL

# XGT Positioning module(XPM)

## Features

- Max 4Axis, Max pulse output 4Mpps
- Circular/linear/ellipse/helical interpolation
- Asymmetric acceleration and deceleration driving
- FRAM parameter
- XG5000 monitoring, simulation, trace
- CAM profile program

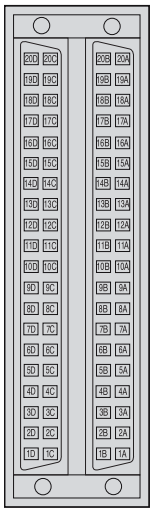



## Specifications

| Item | | | XGF-PO1H<br>XGF-PD1H | XGF-PO2H<br>XGF-PD2H | XGF-PO3H<br>XGF-PD3H | XGF-PO4H<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 XG5000 or programming. | | | |
| Configuration Tool | | | XG5000 (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(㎛) | | | |
| | | 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(㎜/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-PO1H:400mA | XGF-PO2H:410mA | XGF-PO3H:420mA | XGF-PO4H:430mA |
| | | | XGF-PD1H:520mA | XGF-PD2H:600mA | XGF-PD3H:850mA | XGF-PD4H:890mA |
| Weight (kg) | | | 120 | | 130 | |

## Terminal block configuration





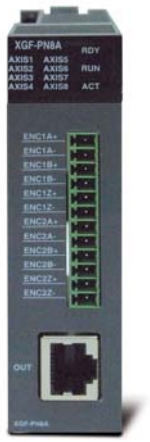
| Pin number | | | | Signal name | | Remarks |
|---|---|---|---|---|---|---|
| AX1 | AX2 | AX3 | AX4 | | | |
| 20A | | | | MPG A+ | Manual pulse generntor / Encoder A+ input | |
| 20B | | | | MPG A– | Manual pulse generntor / Encoder A- input | |
| 19A | | | | MPG B+ | Manual pulse generntor / Encoder 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 (0V+,0V-,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)

# XGT Positioning module(Network Type)

## Features

- XGF-PN8A : Dedicated LS ELECTRICEtherCAT 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

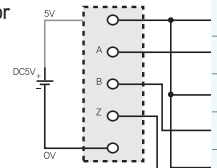
| Item | | XGF-PN8A/PN8B | | | XGF-PN4B |
|---|---|---|---|---|---|
| Number of axis | | 8 axis | | | 4 axis |
| Interpolation | | 2~8 axis linear, 2axis circular, 3axis helical interpolation | | | |
| Control method | | Position, speed, Speed/position, position/speed position/torque, Feed control | | | |
| 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. | | | |
| XG5000 | 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 | Positoning method | Absolute/Incremental | | | |
| | Position address range | | Absolute | Incremental | Speed/position, position/speed conversion control |
| | | mm | -214748364.8 ~ 214748364.7(㎛) | -214748364.8 ~ 214748364.7(㎛) | -214748364.8 ~ 214748364.7(㎛) |
| | | 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 ~ 20000000.00(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. 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 ㎲ | | | |
| 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 ㎃ | | | |
| Weight(kg) | | 115 g | | | |

## Terminal block configuration

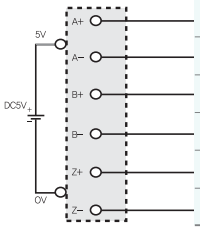
| Pin layout | Pin Number | Signal name | |
|---|---|---|---|
| ENC1A+ | 1 | ENC1A+ | Encoder1 A+input |
| ENC1A- | 2 | ENC1A- | Encoder1 A - input |
| ENC1B+ | 3 | ENC1B+ | Encoder1 B+input |
| ENC1B- | 4 | ENC1B- | Encoder1 B - input |
| ENC1Z+ | 5 | ENC1Z+ | Encoder1 Z+input |
| ENC1Z- | 6 | ENC1Z- | 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 |

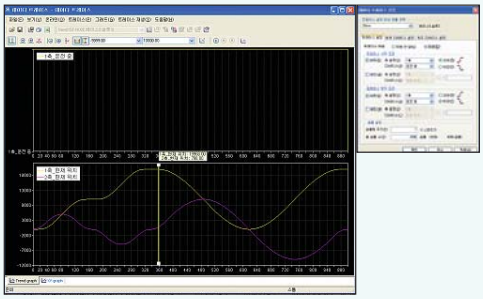
## Features

- 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

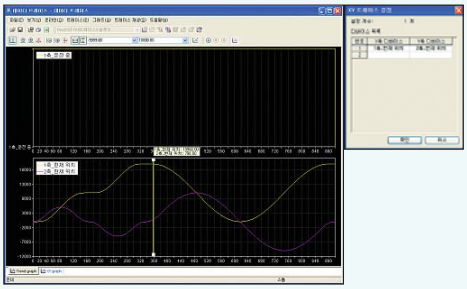




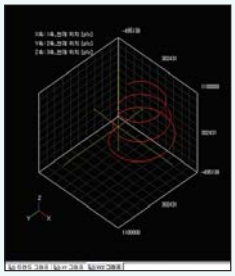

System View



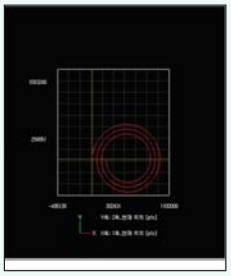
Data trace (trend graph)



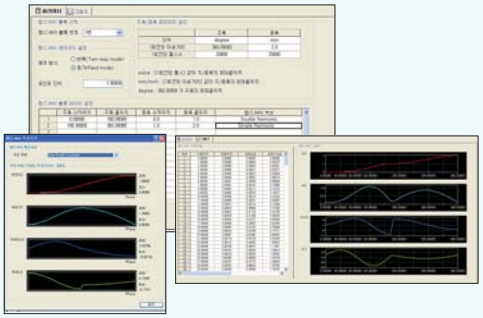
Data trace (XY graph)



XYZ trend
(3D View)



XYZ monitor
(2D View)



CAM control profile



Simulation

# Motion Module[EtherCAT]





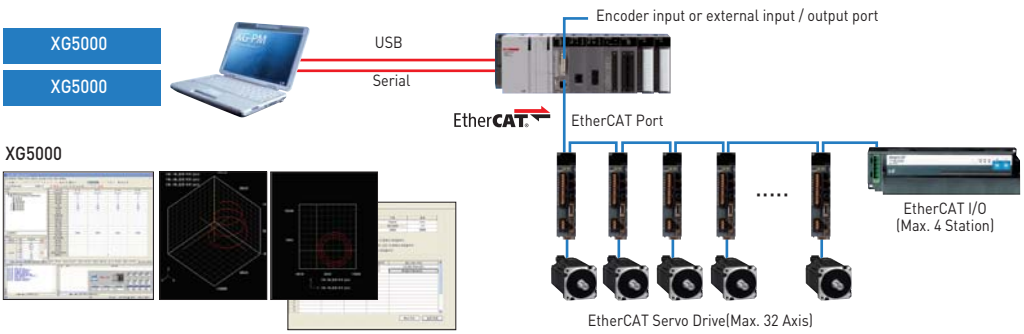

## Features

- 32 axes (master) and 4 axes (virtual) control
- EhterCAT 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

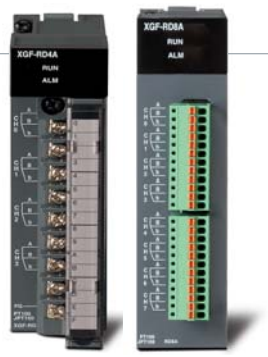
| Item | | XGF-M32E |
|---|---|---|
| Communication | | EtherCAT (CoE : CANopen over EtherCAT) |
| Number of axis | Real | 32 axes |
| | Virtual | 4axes |
| | I/O | Input/output 8 points each (built-in)<br>EtherCAT I/O connection available |
| Control period | | 1ms, 2ms, 4ms (same as main task period) |
| 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 aixs |
| Control method | | Position, Velocity, Torque(Servo drivers support) control,<br>Synchronous control, Interpolation control |
| Range of position/velocity | | ± 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 chennels |
| | 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 Confignration




SPECIAL

# XGT RTD input module



## Features

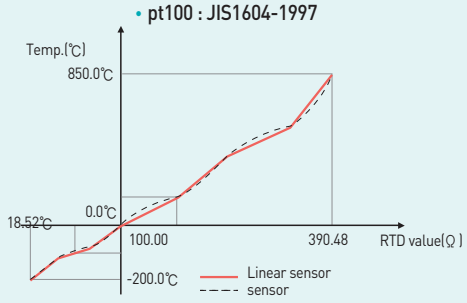
- Supports various additional functions (average, alarm, filter)
- Special module parameter setting and monitoring with XG5000
- Supports digital conversion, temperature display and user scaling
- Support Offset/Gain function(only RD8A)

## Specifications

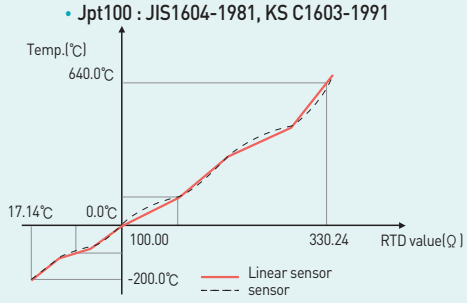
| Item | | | XGF-RD4A | XGF-RD4S | XGF-RD8A |
|---|---|---|---|---|---|
| No. of input channel | | | 4 channels | 4 channels | 8 channels |
| Input sensor type | | Pt100 | JIS C1604-1997 | JIS C1604-1997 | JIS C1604-1997 |
| | | JPt100 | JIS C1604-1981, KS C1603-1991 | JIS C1604-1981, KS C1603-1991 | 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 (unit: 0.1) | Pt100 | -2,000 ~ 8,500 | -2,000 ~ 8,500 | -2,000 ~ 8,500 |
| | | JPt100 | -2,000 ~ 6,400 | -2,000 ~ 6,400 | -2,000 ~ 6,400 |
| | | PT1000 | - | -2,000 ~ 8,500 | - |
| | | NI100 | - | -2,000 ~ 1,800 | - |
| | Scaling display (Customize) | | 0 ~ 65535 | | |
| | | | -32768 ~ 32767 | | |
| Accuracy | Normal temp.(25° C) | | ±0.2% | ±0.1% | ±0.2% |
| | Full temp.(0~55° C) | | ±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

• pt100 : JIS1604-1997

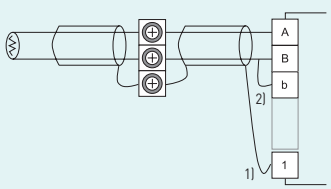



• Jpt100 : JIS1604-1981, KS C1603-1991

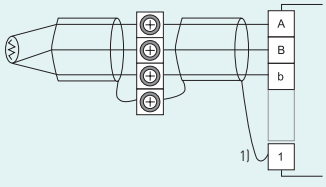



## Wiring

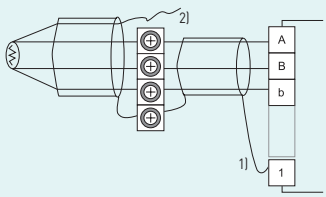
• Connection with 2-Wire type sensor




• 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





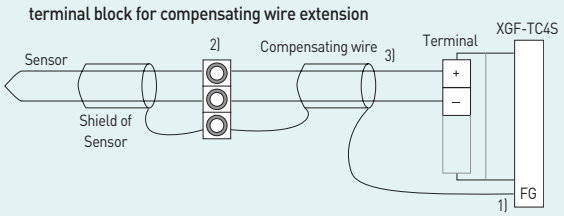
## Features

- Insulation between channels
- ±0.1% (25℃) 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℃ |
| | J | -200 ~ 1200℃ |
| | E | -250 ~ 1000℃ |
| | T | -250 ~ 400℃ |
| | B | 400 ~ 1800℃ |
| | R | -50 ~ 1750℃ |
| | S | -50 ~ 1750℃ |
| | N | -270 ~1300℃ |
| | C | 0 ~ 2300℃ |
| Digital output | Temperature display (unit: 0.1) | Display down to the first decimal place (0.1℃) |
| | Scaling (User range setting) | 0 ~ 65535 |
| | | -32768 ~ 32767 |
| Accuracy | Normal temp. (25℃) | ±0.1% |
| | | Some section can permit 0.5% |
| | Temperature coefficient (Operating temp. range) | ±100ppm℃ |
| Conversion speed | 40ms/ channel | |
| Insulation | Between channels Insulation | |
| | Between terminals and power | Insulation(Photo-Coupler) |
| Compensation | Automatic compensation by RJC sensing (PT100) | |
| | Compensation degree | ±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 |
| | Filter | Digital filter (160 ~ 64000ms) |
| | Max./Min. values display | Max./Min. values display |
| Terminal block | 18-point terminal block | |
| Current consumption | 5V : 610mA | |
| Weight (kg) | 0.150 | |

## Input wiring

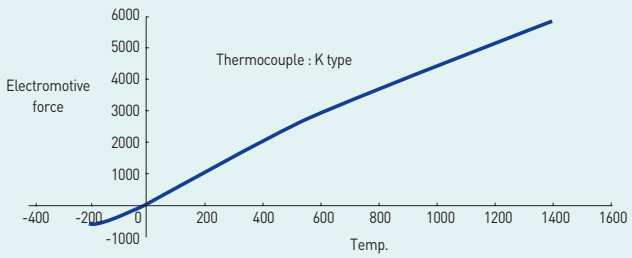



1) When sensor and compensating wire are shielded, shield connection to FG terminal is available.

2) To minimize an error, overall temperature of block terminal need to be equal.

3) Compensating sensor should be the same type of sensor which is used for measurement.

## Characteristics of I/O conversion




SPECIAL

# XGT 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

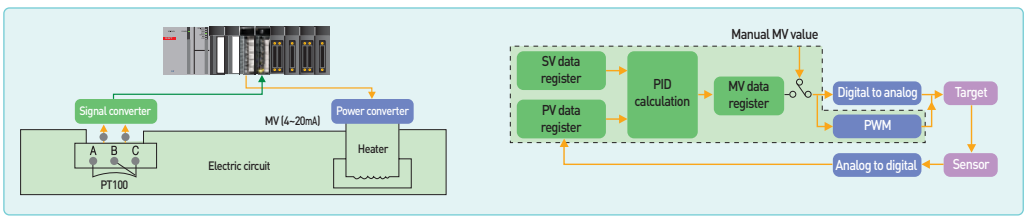
## Specifications

| 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 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 | | |
| | | Response time 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 | 8㎂ | | |
| Insulation | Item | | Insulation | Insulation withstand voltage | Insulation resistance |
| | Channel - Channel | | Trans | 500V AC, 50/60Hz 1min, Leakage 10mA or less | 500V DC, 10MΩ or more |
| | Input terminal - PLC | | Photocoupler | | |
| | 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

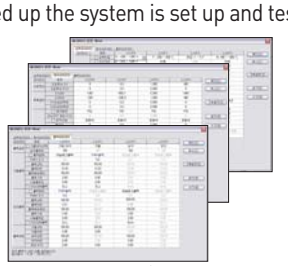



## XG-TCON

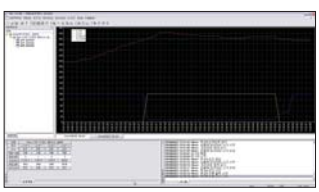
- The configuration tool for the temperature control module
- Easy parameter settings, data monitoring and trend-monitor support
- Auto-tuning operation command to speed up the system is set up and test operation



Data Monitor



Parameter setting(input parameter)



Trend monitor

SPECIAL

# XGT Event input module

## Features

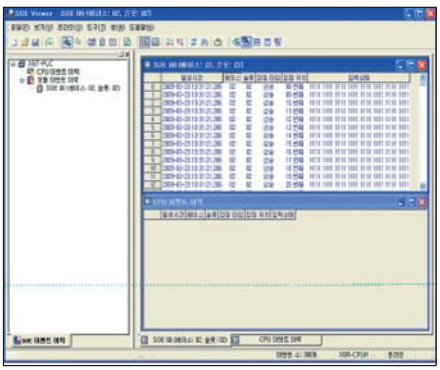
- SOE: Sequence Of Events Recorder
- I/O information collection to analyze the control system in Generation and Transformer
- Event collection in every 1ms
- Max. 300ea data available
- Data retain by built-in memory
- Max. installable module: 16ea
- Event monitoring of history through SOE Viewer



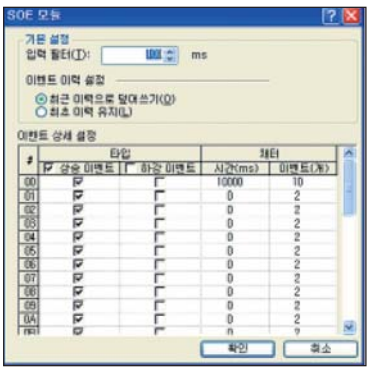

## Specifications

| Item | | XGF-SOEA |
|---|---|---|
| No. of input point | | 32 points |
| Insulation method | | Photo-Coupler Insulation |
| Memory size | | 1Mbit |
| The first event setting time | | CPU RTC : 1 ms (±2ms : delay between modules)<br>RS-422 IRIG-B :1 ms (±0.5ms : 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 kΩ |
| Response time (㎳) | Off → On | 100us+Input filter time(User setting: 0~100ms) |
| | On → 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 | | 10MΩ 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

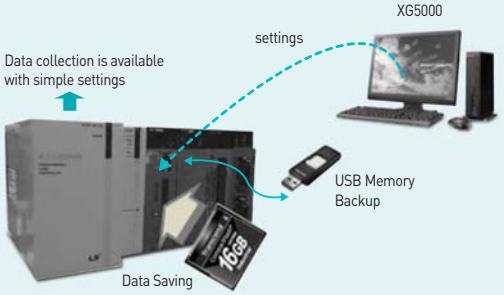
- Capable to easily save PLC device data without PC
- Capable to save PLC control data without missing any change
  - Data can be saved whenever scanning is done or they can be saved at an interval of several ms(milliseconds).
- Capable to save a large volume of data file
  - Long-term data saving is 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 | | | | |
| | STRING | Fixed letters (Maximum 8 letters) | | | | |
| Data Saving | Number of Settings | Maximum 8 | | | | |
| | Number of Data | Maximum 32 | | | | |
| | Saving Kind | Saved by the ladder program | | | | |
| | File Type | CSV file(Extension: csv) | | | | |
| | Number of Saving Files | Total 800 (when using 16Gbyte CF memory) | | | | |
| SavingSpeed | 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 | | | | |

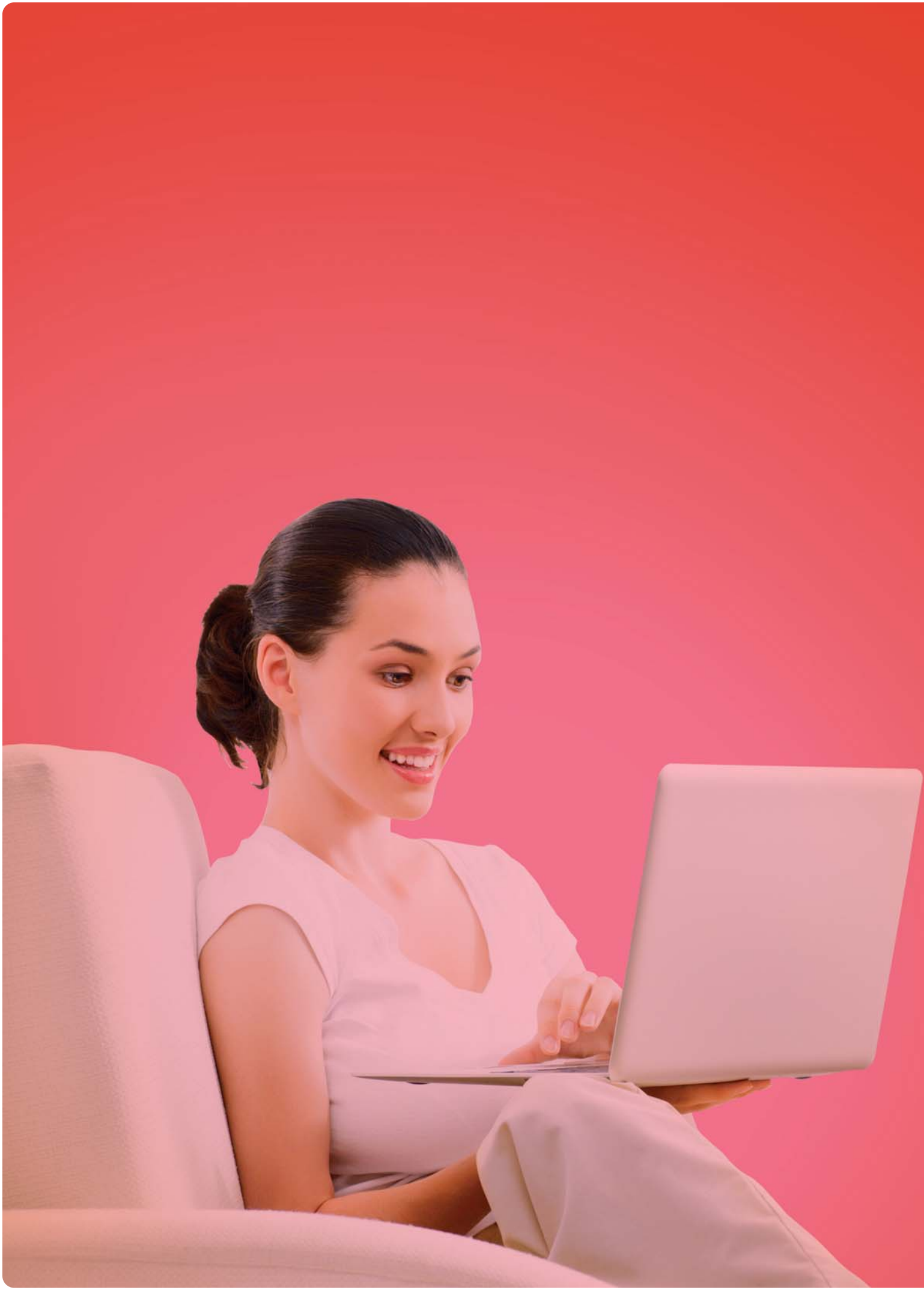
## System Configuration




CSV File

| | A | B | C | D |
|---|---|---|---|---|
| 1 | Time | Index | DWORD | WORD |
| 2 | 2011/07/04/09:22:35.038 | 1807154 | 05701D3C | 1D3C |
| 3 | 2011/07/04/09:22:35.058 | 1807155 | 05701D3D | 1D3D |
| 4 | 2011/07/04/09:22:35.079 | 1807156 | 05701D3E | 1D3E |
| 5 | 2011/07/04/09:22:35.098 | 1807157 | 05701D3F | 1D3F |

SPECIAL





# Software

## Software innovation for integrated solution.

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

Contents

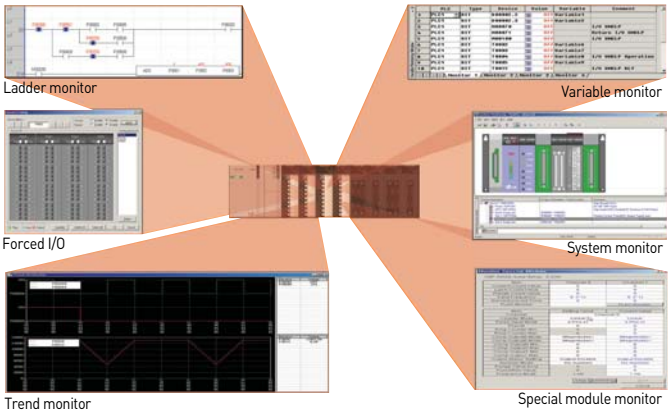

124 XG5000 programming
134 XG5000 Communication Parameters
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137 XGT Panel eXP2 Series
139 APM[Positioning module] Software Package
140 Product list
142 Dimensions

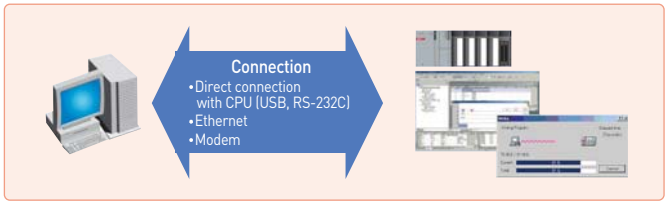
# XGT XG5000 programming

## 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, VISTA, Win7, Win8(32/64bits) (Limited use in Windows 98, ME)



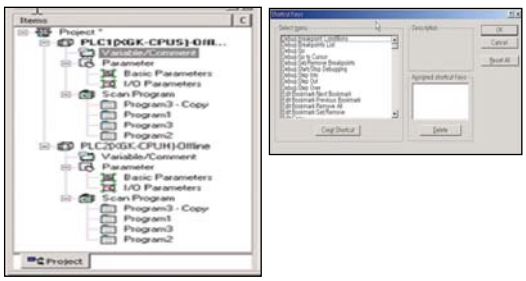




## Programming tools

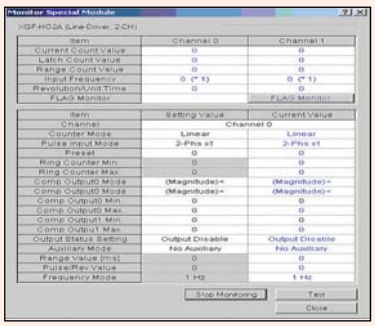
**MPMP (Multi-PLC Multi-programming)**
Different PLC systems can be edited, monitored, and managed simultaneously in one project.

**Drag & Drop**
It is available in project, variable/comment, ladder diagram editing and monitoring.

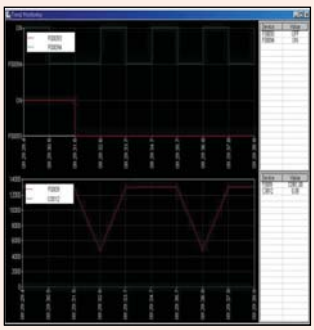
**User-defined shortcut keys**
User-defined shortcut keys increase editing convenience.



## Monitoring



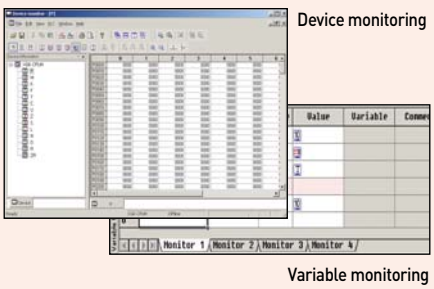
**Special module monitoring**
Monitoring and test-run of various special modules are available.



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



**System monitoring**



**Device monitoring**

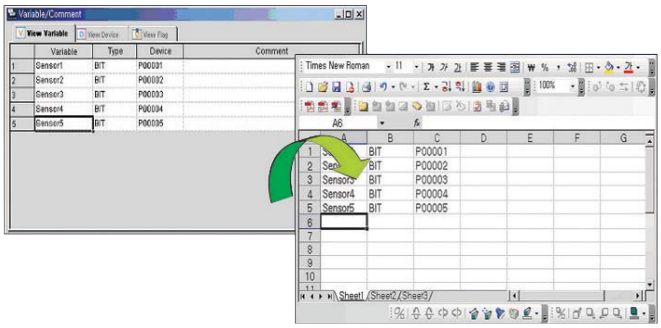
**Variable monitoring**

## System requirement

| Item | System requirement |
|---|---|
| O/S | Windows 2000, XP, VISTA, Win7, Win8(32/64bits) (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

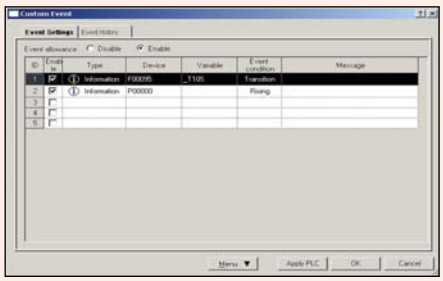
- Data input like EXCEL
- Cell-unit edit
- Auto Fill function
- Compatible with Microsoft Excel
- Redo and Undo (Unlimited)
- Segment screen edit



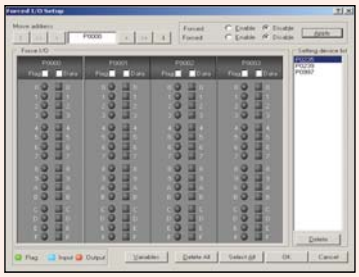
## Improved diagnosis and maintenance



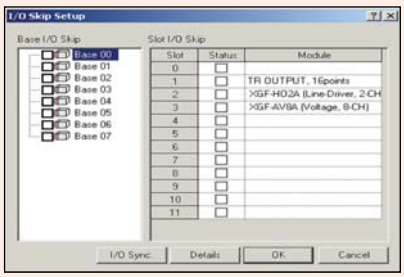
**Module exchange wizard**
It supports safe module exchange during 'RUN' mode.



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



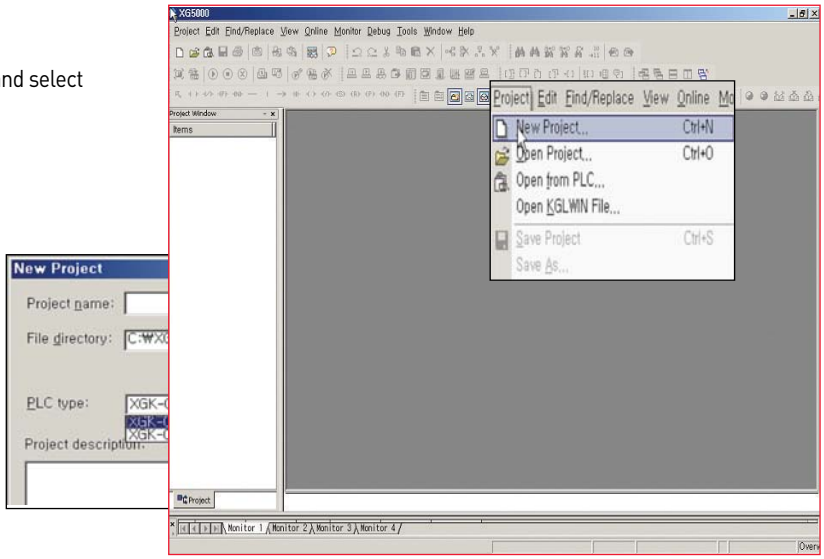
**Forced I/O**
The status of external output device can be checked without program. And when input device breaks down, forced input function specifies ON/OFF and can operate the system without interruption of equipment.



**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.

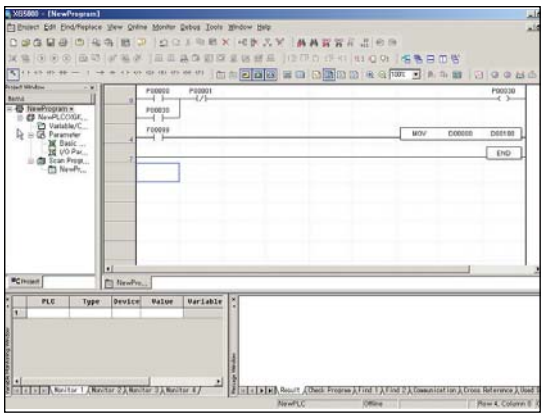
## Program editing

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




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

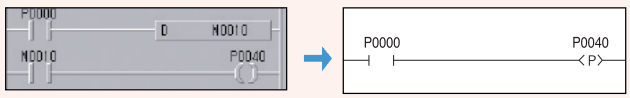
- Select input point and command with ladder tool bar.



| 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.



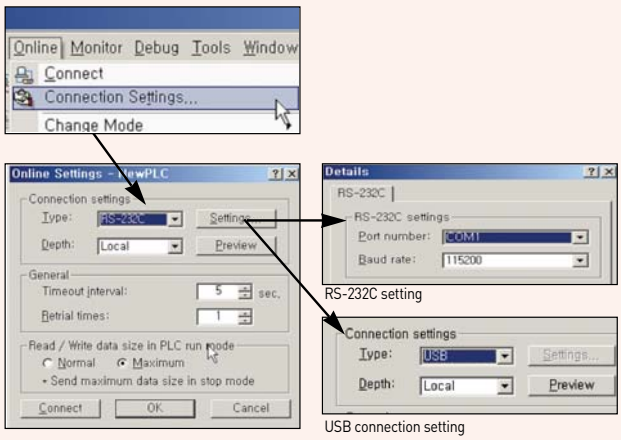
## Program download

### Connection setting

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

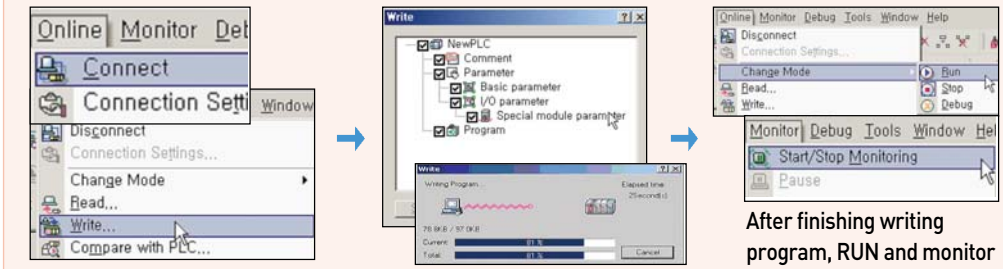
**Set up communication port and download speed**

* 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

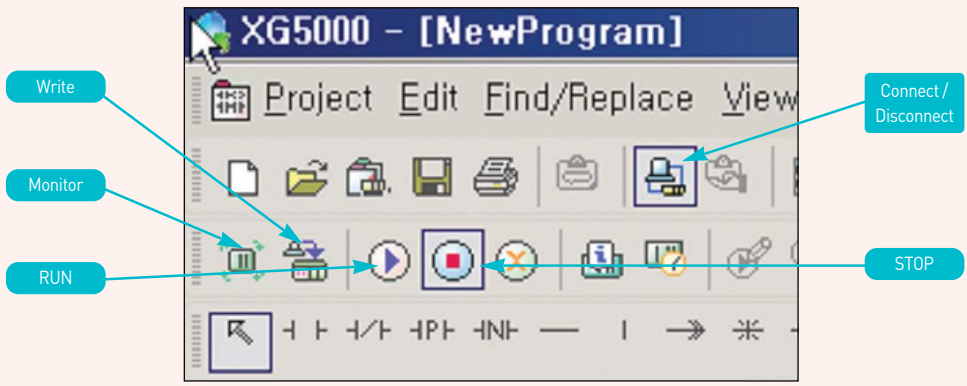
Connect to PLC and download the program as below.




**After finishing writing program, RUN and monitor XGT.**

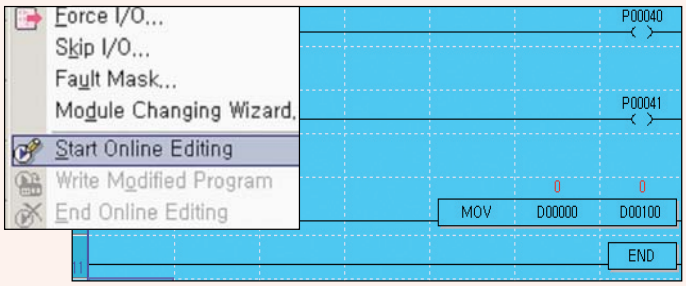
### Short icon

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



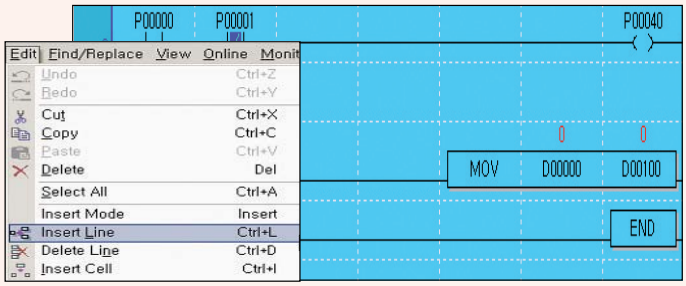
## Online Editing

Select [Start Online Editing] in Online menu.



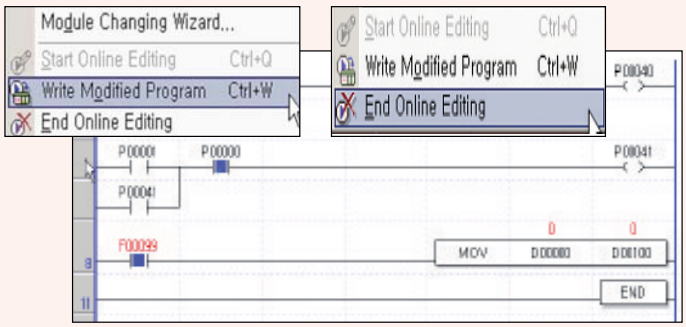

When starting Online Editing, the screen color becomes blue.

Modify the program.



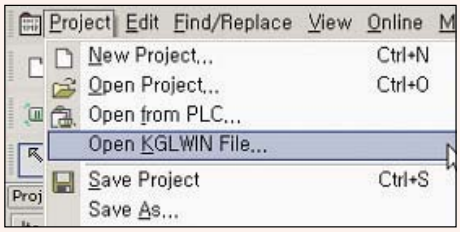

Edit menu

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

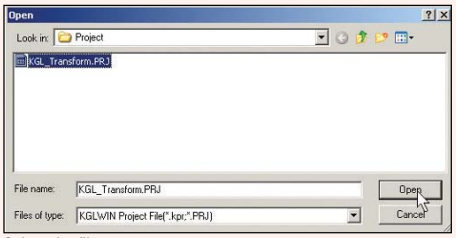



After finishing ' Online Editing'

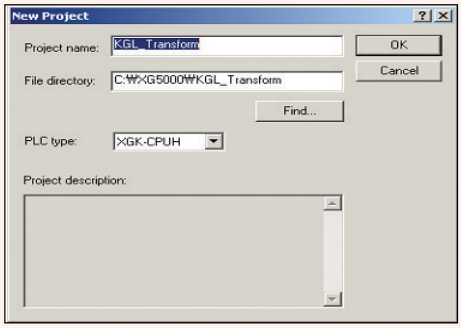
## Open a project written in KGL-WIN



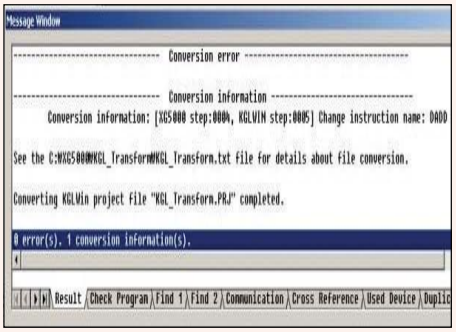

Select [Open KGWIN file] in project.




Select the file.

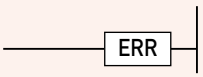



Select the type of XGT CPU.




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.

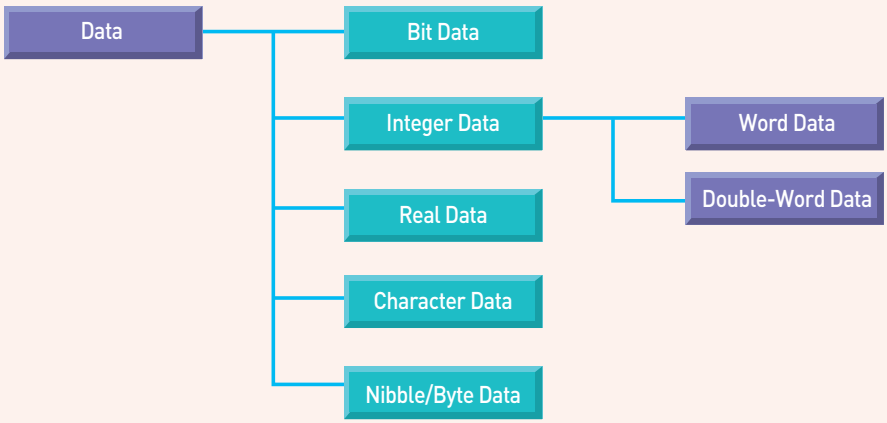



• Content of main special flag (F) change

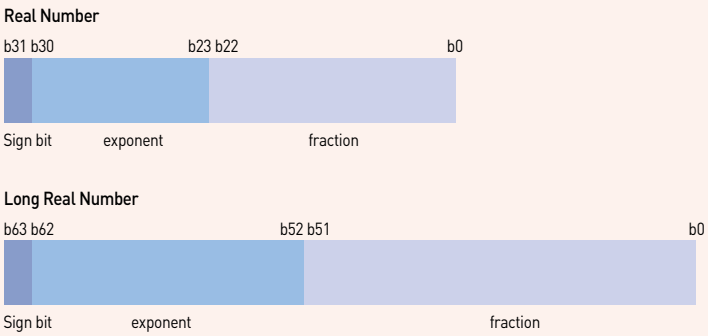
| MASTER-K | XGT | Specifications |
|---|---|---|
| F10 | F99 | ON regularly |
| F11 | F9A | OFF regularly |
| F12 | F9B | ON during first one scan |
| F13 | F9C | OFF during first one scan |

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

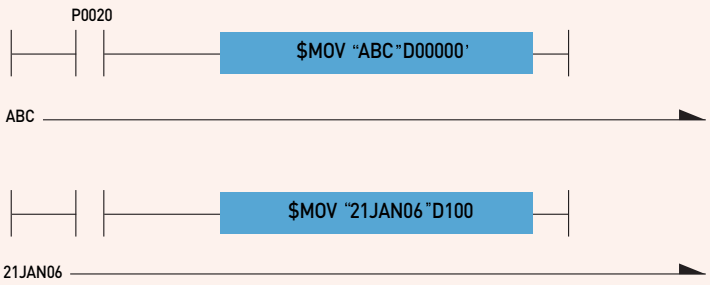
## Data type




- 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 |

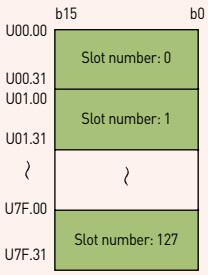
## Device type

| 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

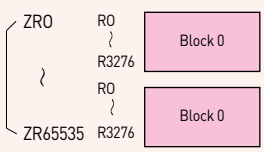
Register for reading data from special module mounted in slot




- 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.



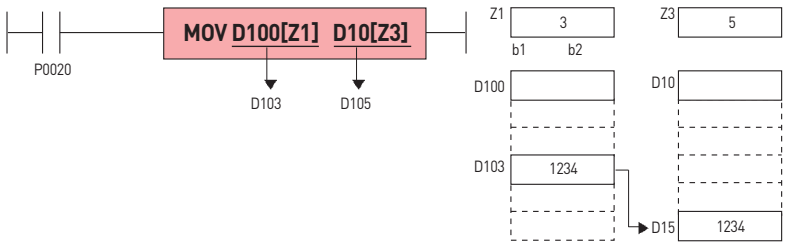

R: Block unit access
ZR: Entire file register access

Internal RAM (Temporary preservation): 32K words
FLASH (Permanent preservation): 1M words

SOFTWARE

## Index register

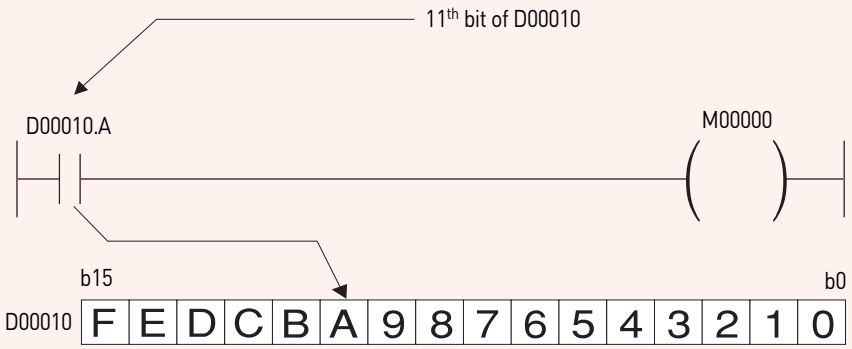
Index register sets up devices using index function.
The sum of index register value and directly specified device number is real device number.




### 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

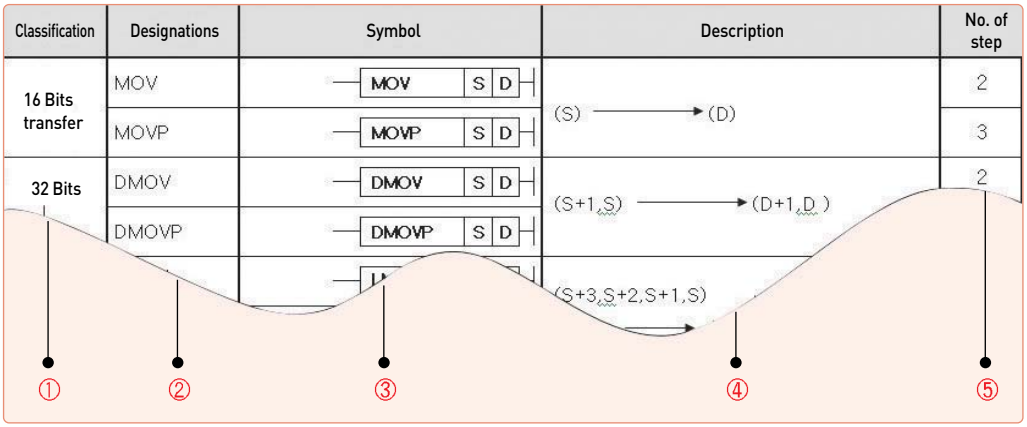



By assigning bit number to word device, bit data is available to use.

Word device number · Bit number

In this case, word device number should be addressed as decimal and bit number should be addressed as hexadecimal.
Relevant Device: U, D, R

## Instructions




**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.

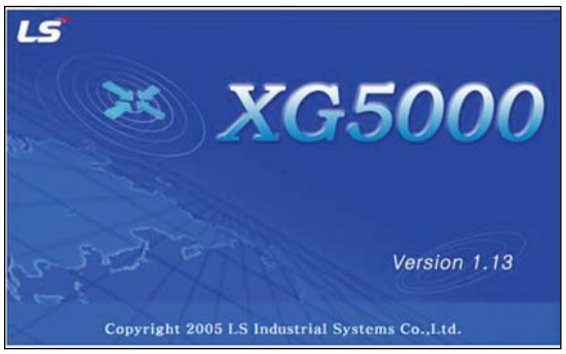
**④ Description: Describes general functions of instruction.**

**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.**

# XG5000 Communication Parameters

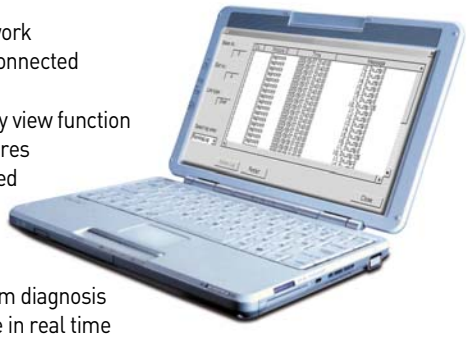
## Features

- 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)



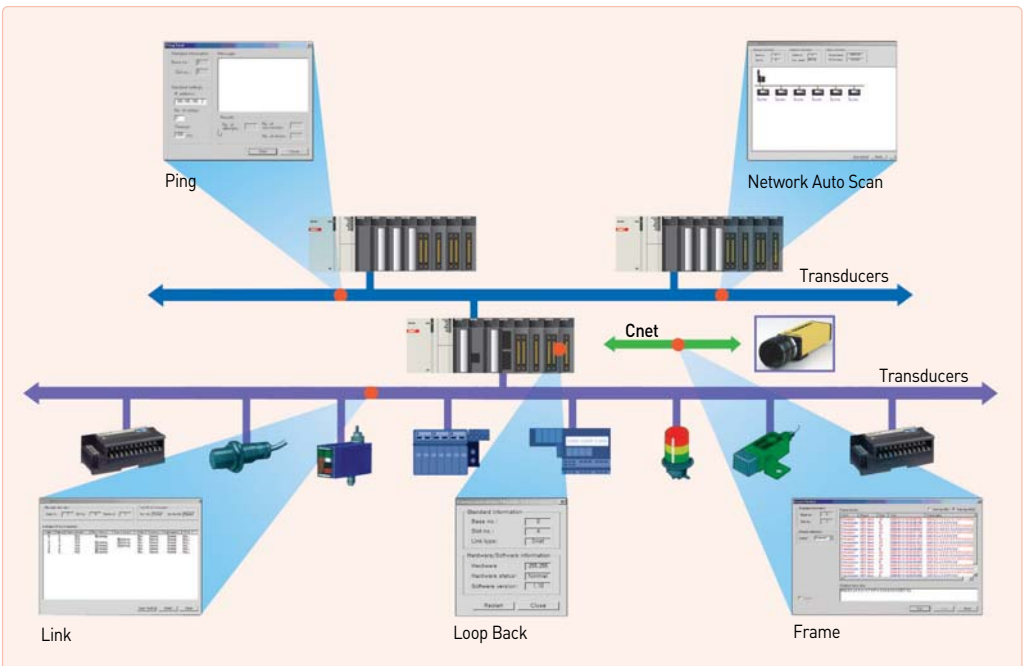

| Item | | Industrial Ethernet network | | | | Fieldbus network | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | RAPIEnet | EtherNet/IP | Modbus TCP/IP | XGT dedication | Cnet | Fnet | Rnet | DeviceNet | Profibus-DP |
| Network service | Smart extension | ○ | ○ | - | - | - | - | - | - | - |
| | High speed link | ○ | - | - | ○ | - | ○ | ○ | ○ | ○ |
| | P2P | ○ | ○ | ○ | ○ | ○ | - | - | - | ○ |
| | XGT server | - | - | - | ○ | ○ | - | - | - | - |
| | Modbus server | - | - | ○ | - | ○ | - | - | - | - |
| Smart extension | Max. station | 63 | 63 | - | - | - | - | - | - | - |
| | Network cycle time | 2~1000ms | 2~2,147,483,647ms | - | - | - | - | - | - | - |
| | No. of block | 64 | 64 | - | - | - | - | - | - | - |
| | Data per block | 768 bytes | 1400 bytes | - | - | - | - | - | - | - |
| High speed link | Max. station | 64 | - | - | 64 | - | 64 | 64 | 63 | 123 |
| | No. of block | 128 | - | - | 128 | - | 64 | 64 | 63 | 123 |
| | Send block | 64 | - | - | 32 | - | 32 | 32 | 63 | 123 |
| | Receive block | 128 - Send block | - | - | 128 - Send block | - | 64 - Send block | 32 | 63 | 123 |
| | Data per block | 200 words | - | - | 200 words | - | 60 words | 60 words | 256 bytes | 244 bytes |
| P2P | No. of block | 64 | 64 | 64 | 64 | 64 | - | - | - | 64 |
| | Data per block | 1400 bytes | 1400 bytes | 125 bytes | 1400 bytes | 256 bytes | - | - | - | 244 bytes |
| Transmission speed Media | | 100/1,000Mbps | 100/1,000Mbps | 100/1,000Mbps | 100/1,000Mbps | 900~115,200Mbps | 1Mbps | 1Mbps | 125/250/500kbps | 9.6k~12,000kbps |
| Topology | | Ring, Line, Srat | Line, Srat | Line,Srat | Line, Srat | Bus | Bus | Bus, Srat | Bus, Srat | Bus, Srat |
| Configration Tool | | XG5000 | | | | | | | XG5000 / N Configurator | |

## Various network diagnosis and monitoring



- Auto Scan: Searching and displaying each node connected to network
- Ping Test : Indicates the port connection status of other stations connected to the network.
- View Communication Module Log : Communication module history view function of XG5000 program can check whether error occurred and measures
- Remote O/S download : Update OS of the remote module connected to the network.
- Loopback test : This function is to check for port anomalies and performs a loopback test for each port.
- System synchronization : Synchronize current PLC status to system diagnosis
- Frame Monitor: Collecting and displaying sending/receiving frame in real time

| Item | Industrial Ethernet network | | | | Fieldbus network | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | RAPIEnet | EtherNet/IP | Modbus TCP/IP | XGT dedication | Cnet | Fnet | Rnet | DeviceNet | Profibus-DP |
| Communication module status | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Service status | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Media information | ○ | ○ | ○ | ○ | ○ | - | - | - | - |
| Auto Scan | ○ | ○ | ○ | ○ | - | ○ | ○ | ○ | ○ |
| Ping Test | - | ○ | ○ | ○ | - | - | - | - | - |
| View Communication Module Log | ○ | ○ | ○ | ○ | ○ | ○ | ○ | - | ○ |
| Remote O/S download | ○ | - | - | - | - | - | - | - | - |
| Loopback test | ○ | ○ | ○ | ○ | ○ | - | - | - | - |
| System synchronization | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Frame monitor | - | - | - | - | ○ | - | - | - | - |



# XGT Panel iXP2 Series

## Main Specification

- Aluminum body frame, responsive touch screen.
- Easy-to-use Multi-touch, gesture, dual screen, portrait mode.
- Multi connected with 1Gbits 2ch.
  Ethernet between PC to PLC.
- Various interfaces : USB host /device, SD card, HDMI.
- High resolution : 1024 X 768
- IP66, UL type 4x, NEMA 4x standards
- Explosion proof. IECEx, ATEX, KCs




CE KC c UL US LISTED

| Item | | iXP2-0800A/D | iXP2-1000A/D | iXP2-1200A/D | iXP2-1500A/D |
|---|---|---|---|---|---|
| Display type | | TFT color LCD | | | |
| Screen size | | 8.4″ | 10.4″ | 12.1″ | 15″ |
| Display resolution | | 800 ×600 | 1,024 ×768 | | |
| Color indication | | 24-bit color (16.7M colors) | | | |
| Backlight | | LED method, automatic On / Off support | | | |
| Backlight lifetime | | 50,000 hour | | | |
| Touch panel | | Capacitive touch | | | |
| Audio output | | Magnetic buzzer (85dB) | | | |
| Processor | | 1GHz, Dual core | | | |
| Memory | Flash | 1GB | | | |
| | Operating RAM | 1GB | | | |
| | Backup RAM | 1 Mbyte | | | |
| Backup data | | Date / Time data, Logging / Alarm / Recipe data, Non-volatile devices | | | |
| Battery | | CR2032(3.0V/210mAh, About 3years/25℃) | | | |
| Video output | | 1 × HDMI | | | |
| Ethernet | | 1 ×10Base-T / 100Base-TX, 1 × 10Base-T / 100Base-TX / 1000Base-T | | | |
| USB host | | 3 x USB 2.0 (Front × 1, Rear x 2) | | | |
| USB device | | 1 × USB 2.0 (Send / Receive front, PC and project data etc.) | | | |
| RS-232C | | 1 × RS-232C (DSUB 9 / Male type) | | | |
| RS-422/485 | | 1 × RS-422/485 (Terminal block) | | | |
| Multi-language | | Can display 12 languages simultaneously | | | |
| Animation | | GIF format support | | | |
| Recipe | | Support | | | |
| Data logging | | Support | | | |
| Script launcher | | Support | | | |
| Standard certification | | CE, KC, UL, IECEx, ATEX, KCs | | | |
| Protection standard | | IP66, Conform to the UL type 4x, NEMA 4x standard | | | |
| Explosion proof | | Ex nA IIC T5 Gc, Ex tc IIIC T100℃ Dc IP64 | | | |
| Dimensions (mm) | | 240 ×180 × 60 | 271 ×212 × 60 | 313 × 239 x 60 | 395 × 294 × 66 |
| Panel cut (mm) | | 228.5 × 158.5 | 259.0 × 201.0 | 301.5 × 227.5 | 383.5 × 282.5 |
| Power | | iXP2-xxxxA : AC100 / 240V, iXP2-xxxxD : DC24V | | | |
| Power consumption (W) | | 25 | 25 | 30 | 30 |
| Weight (Kg) | | 1.87 | 2.35 | 3.0 | 4.6 |

# XGT Panel eXP2 Series

## Fully compatible with eXP

- Panel cut, interface, design, and drawing file are 100% compatible.

## Superior Performance

- ARM Cortex A8 800MHz, eMMC 4G, DDR3

## Enhanced product reliability

- LCD Backlight lifespan extended
- Non Battery Type NVRAM

## Variety of interfaces and functions

- Various communication drivers and Micro SD I/F available



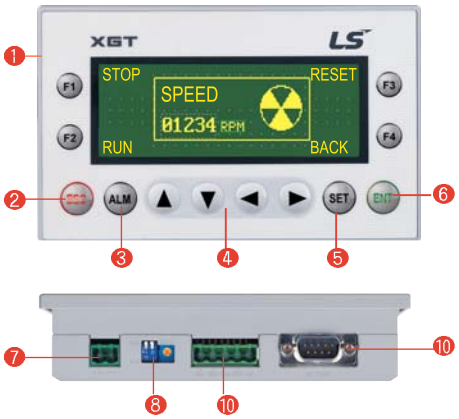
| Item | | eXP2-04□*0D | eXP2-05□*0D | eXP2-05□*2D | eXP2-07□*0D | eXP2-07□*1D | eXP2-07□*2D | eXP2-10□*0D | eXP2-10□*1D |
|---|---|---|---|---|---|---|---|---|---|
| Display Type | | TFT Color LCD | | | | | | | |
| Screen Size | | 10.9cm (4.3") | 14.2cm (5.6") | | 17.8cm (7") | | | 25.9cm (10.1") | |
| Display Resolution | | 480 x 272 | 640 x 480 | | 800 x 480 | | | 1024 x 600 | |
| Color Indication | | 24Bit Color (16.7M) | 18Bit Color (262,144) | | 24Bit Color (16.7M) | | | 24Bit Color (16.7M) | |
| Indication Degree | | Left/Right: 60 deg.<br>Upper: 40 deg.<br>Lower: 50 deg | Left/Right: 60 deg.<br>Upper: 40 deg.<br>Lower: 60 deg. | | Left/Right: 70 deg.<br>Upper: 50 deg.<br>Lower: 70 deg. | | | Left/Right: 70 deg.<br>Upper: 50 deg.<br>Lower: 70 deg. | |
| Backlight | | LED Type (Supports Backlight Auto-off Function) | | | | | | | |
| Backlight Duration | | 50,000 Hours | 20,000 Hours | | 50,000 Hours | | | 30,000 Hours | |
| Touch Panel | | 4-Wire Resistive, Analog | | | | | | | |
| Audio Output | | Magnetic Buzzer (85dB) | | | | | | | |
| Process | | 800MHz | 800MHz | | 800MHz | | | 800MHz | |
| Memory | Drawing Memory | 64MB | 64MB | | 64MB | | | 64MB | |
| | Operating RAM | 512MB | 512MB | | 512MB | | | 512MB | |
| | Operating RAM | 128KB | 128KB | | 128KB | | | 128KB | |
| Backup Data | | Date/Hour Data, Logging/Alarm/Recipe Data and Nonvolatile Device | | | | | | | |
| Battery Life | | Approx. 3 years (Operating Ambient Temperature of 50°C) | | | | | | | |
| Ethernet | | 1 Channel, IEEE802.1a, 10Base-T/100Base-TX | | - | 1 Channel, IEEE802.1a, 10Base-T/100Base-TX | | - | 1 Channel, IEEE802.1a, 10Base-T/100Base-TX | |
| USB Host | | 1 Channel, USB 2.0 Host (Mouse, keyboard, printer, USB flash drive, etc.) | | | | | | | |
| USB Device | | - | 1 Channel, USB 2.0 Device (for Download and Upload Project) | | | | | 1 Channel, USB 2.0 Device (for Download and Upload Project File) | |
| Micro SD Card | | - | - | | - | 1 Channel SDHC Class10 | - | - | 1 Channel SDHC Class10 |
| RS-485, RS-232C | | 1 Channel, RS-232C (DSUB 9/Male Type) | | | 2 Channels, RS-485, RS-232C (DSUB 9/Male Type) | | | | |
| RS-422/485 | | 1 Channel, RS-422/485 (DSUB 9/Male Type) | | | 1 Channel, RS-422/485 Mode (Terminal Type) | | | | |
| Multi-language | | Up to 12 Language Simultaneously | | | | | | | |
| Animation | | GIF Format is Available | | | | | | | |
| Recipe | | Available | | | | | | | |
| Data Logging | | Available | | | | | | | |
| Script Executor | | Available | | | | | | | |
| Certifications | | CE, UL(cUL), UL Type 4X, KC | | CE, UL(cUL), KC | CE, UL(cUL), UL Type 4X, KC | | CE, UL(cUL), KC | CE, UL(cUL), UL Type 4X, KC | |
| Protection Standard | | IP65 Note 1) | IP65 Note 1) | | IP65 Note 1) | | | IP65 Note 1) | |
| Dimension (mm) | | 128 x 102 x 32.5 | 165 x 132.5 x 36.1 | | 208 x 154 x 44.4 | | | 276 x 218 x 35.1 | |
| Panel Cut (mm) | | 119 x 93 | 156 x 123.5 | | 192 x 138 | | | 260 x 202 | |
| Rated Voltage | | DC24V | DC24V | | DC24V | | | DC24V | |
| Power Consumption (W) | | 4 | 5.5 | 5.5 | 6 | | | 6 | |
| Weight (kg) | | 0.27 | 0.43 | 0.43 | 0.59 | 0.59 | 0.58 | 1.0 | 1.0 |

□*:0 (WinCE 7.0 Core), 1 (WinCE 7.0 Pro)
Note 1): IP66 for UL Type 4X models.

## 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 reguirements - 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



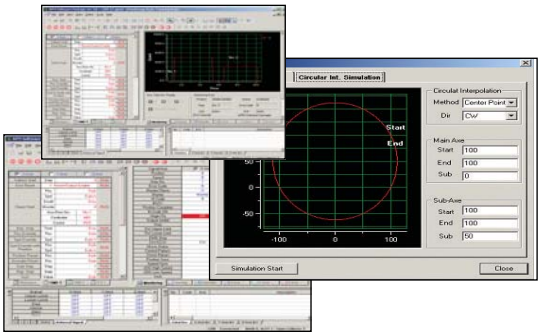




1. Key to control PLC device and screen
2. ESC key
3. Alarm history
4. Data input and Screen change
5. PLC data setting
6. Enter key
7. DC24V input terminal
8. RS-232C port to download a project
9. Brightness adjustment
10. RS-422 port

| 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) | |

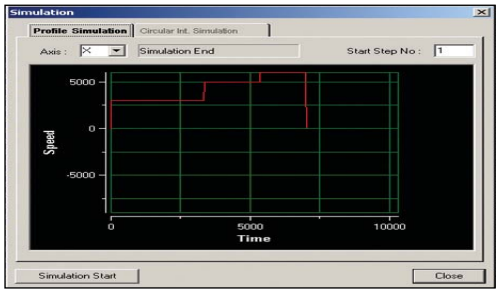
## Features

- 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

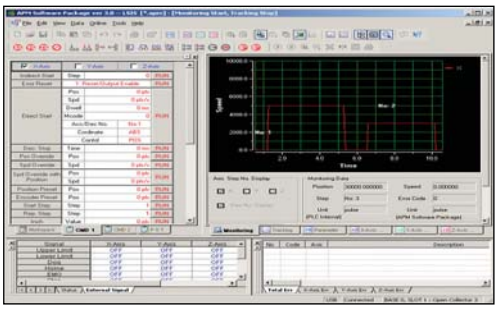


| Step | Cord | Control | Pattern | Method | Address [pulse] | Sub Address [pulse] | M Code | A/D No. | Speed [pls/s] | Dwell [ms] | Cir.Int Dir |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ABS | POS | END | SIN | 10000 | 0 | 0 | No.1 | 1000 | 0 | CW |
| 2 | ABS | POS | END | SIN | 0 | 0 | 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 |

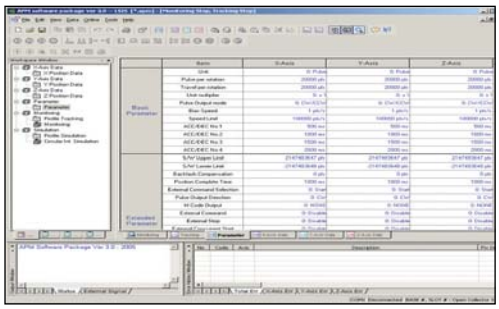
**Operation Data**
Define operation method, target location, operation speed of each axis.



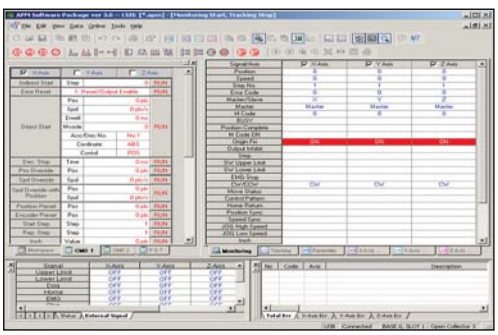

**Profile simulation (Off-line)**
Monitoring operation speed of each axis with graph type and saving result as image file.



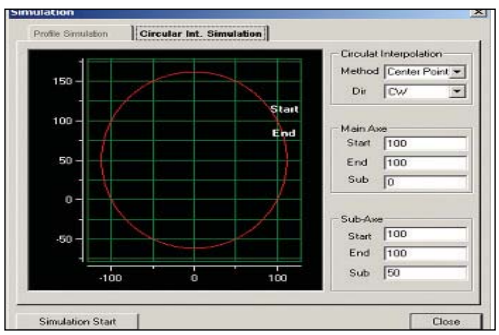
**Profile Trace (On-line)**
Monitoring operation speed of each axis with graph type and saving result as image file.



**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)**

SOFTWARE

# XGT Product list

## CPU / PWR / Base / I/O

| | | |
|---|---|---|
| CPU | XGK-CPUH,* CPUU, CPUHN, CPUUN | 6,144pt, Program memory : 64Ksteps |
| | XGK-CPUS,* CPUA, CPUSN | 3,072pt, Program memory : 32Ksteps |
| | XGK-CPUE* | 1,536pt, Program memory : 16Ksteps |
| | XGI-CPUUN, CPUU/D, CPUU, CPUH* | 9,144pt (IEC type), Program memory:1Mbyte |
| | XGI-CPUS* | 3,072pt (IEC type), Program memory:128kbyte |
| | XGI-CPUE* | 1,536pt (IEC type), Program memory:64kbyte |
| Power | XGP-ACF1* | Free Voltage/DC5V 3A, DC24V 0.6A |
| | XGP-ACF2* | Free Voltage/DC5V 6A |
| | XGP-AC23* | 220V/DC5V 8.5A |
| | XGP-DC42* | DC24V/DC5V 6A |
| Main base | XGB-M04A* | 4 Slot |
| | XGB-M06A* | 6 Slot |
| | XGB-M08A* | 8 Slot |
| | XGB-M10A* | 10 Slot |
| | XGB-M12A* | 12 Slot |
| Expansion base | XGB-E04A* | 4 Slot |
| | XGB-E06A* | 6 Slot |
| | XGB-E08A* | 8 Slot |
| | XGB-E12A* | 12 Slot |
| Input | 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 |
| | XGI-D24B | DC24V, 32pt, Source |
| | XGI-D28A* | DC24V, 64pt, Sink/Source |
| | XGI-D28B | DC24V, 64pt, Source |
| Output | XGQ-RY1A | Relay, 8pt |
| | XGQ-RY2A* | Relay, 16pt |
| | 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 |
| | 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-AD16A* | Insulation Voltage /Current, 16ch |
| | XGF-AD4S* | Voltage /Current, 4ch |
| | 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 |
| | XGF-DV4S* | Voltage, 4ch, Insulation |
| | XGF-DC4S* | Current, 4ch, Insulation |
| Analog input/output | XGF-AH6A* | Input: 4ch, Voltage/ Current<br>Output: 2Ch Voltage/ Current |
| HART I/F Analog input/output | XGF-AC4H | Input: 4ch |
| | XGF-DC4H | Output: 4Ch |
| High speed counter | XGF-HO2A* | Open collector, 2ch |
| | XGF-HD2A* | Line drive, 2ch |
| | XGF-HO8A * | 8-channels high speed counter module, 8Ch |
| Positioning | XGF-P01H~P04H | Open collector, 1~4axis |
| | XGF-PD1H~PD4H | Line drive, 1~4axis |
| Positioning (Network type) | XGF-PN8A | LS ELECTRIC EtherCAT Network, 8axis |
| | XGF-PN8B | Standard EtherCAT Network, 8axis |
| | XGF-PN4B | Standard EtherCAT Network, 4axis |
| Motion control | XGF-M16M | MECHATROLINK-II, 4axis |
| | XGF-M32E | Standard EtherCAT, 32axes |
| Temperature input | XGF-RD8A | RTD, 8ch |
| | XGF-RD4A* | RTD, 4ch |
| | XGF-RD4S* | RTD, 4ch, Insulation |
| | XGF-TC4S* | Thermo couple, 4ch, Insulation |
| Temperature controller | XGF-TC4UD | Input: 4Ch(Voltage/Cuttent/RTD/TC)<br>Output: 8Ch(TR/Current) 4loops |
| | XGF-TC4RT | Input:4Ch(RTD)<br>Output: 4Ch(TR) 4loops |
| Event input | XGF-SOEA | DC24V, 32points |
| Datalog | XGF-DL16A | USB 2.0, CF2001, Max. 16Gbyte, 32points(input 22points, output 10points) |

* : G3 Coating Products

## Communication module

| | | |
|---|---|---|
| RAPIEnet+<br>-RAPIEnet v2<br>-EtherNet/IP<br>-Modbus TCP/IP<br>-Dedicated XGT Network | XGL-EFMTB* | Master/Client, Twisted fair 2ch. |
| | XGL-EFMFB* | Master/Client, Fiber optic 2ch. |
| | XGL-EFMHB* | Master/Client, Twisted fair/fiber optic |
| | XGL-DBDT | Expansion driver-Twisted pair 2ch. |
| | XGL-DBDF | Expansion driver-Fiber optic 2ch. |
| | XGL-DBDH | Expansion driver-Fiber optic/Twisted pair |
| | XOL-ES4T | Stand alone switch twisted pair 4ch. |
| | XOL-ES4H | Stand alone switch twisted 2ch. fiber 2ch. |
| | XGL-EH5T | Open Ethernet switching hub |
| Computer Link (Cnet) | XGL-CH2B* | RS-232C 1ch, RS-422/485 1ch |
| | XGL-C22B* | RS-232C 2ch |
| | XGL-C42B* | RS-422/485 2ch |
| DeviceNet(Dnet) | XGL-DMEB* | DeviceNet, Master |
| Profibus-DP (Pnet) | XGL-PMEB* | Profibus-DP, Master |
| | XGL-PSRA | Profibus-DP Slave, Remote interface |
| | XGL-PSEA | Profibus-DP Slave |
| Rnet | XGL-RMEB* | Rnet, Master, TP |
| | GOL-RR8T | Rnet stand alone repeater hub |
| Fnet | XGL-FMEA | Fnet, Master |
| BACnet/IP | XGL-BIPT | BACnet client/server |
| RAPIEnet V1 | XGL-EIMT | RAPIEnet, Twisted fait 2ch |
| | XGL-EIMF | RAPIEnet, Fiber optic 2ch |
| | XGL-EIMH | RAPIEnet, Twisted fair, Fiber optic |
| EtherNet/IP | XGL-EIPT | Industridl Ethernet, Twisted fair 2ch |

* : G3 Coating Products

## XGR module

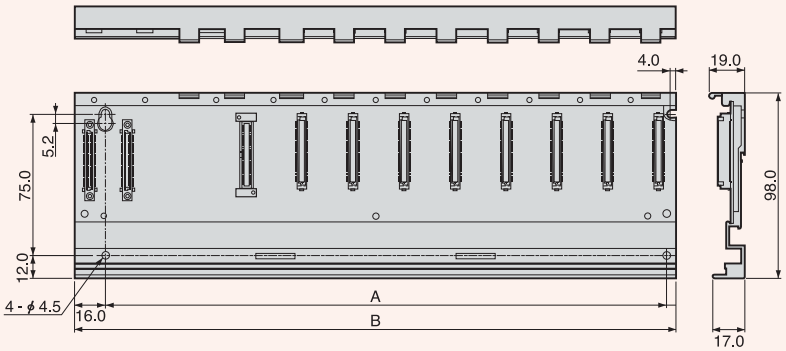
| | | |
|---|---|---|
| CPU | XGR-CPUH/T* | Twisted pair |
| | XGR-CPUH/F | Fiber optic(2km) |
| | XGR-CPUH/S | Fiber optic(15km) |
| Power | XGR-AC12* | 110V, 5.5A(Main base) |
| | XGR-AC13* | 110V, 8.5A(Expansion base) |
| | XGR-AC22* | 220V, 5.5A(Main base) |
| | XGR-AC23* | 220V, 8.5A(Expansion base) |
| | XGR-DC42* | DC24V/DC5V 7A, Main(Expansion base) |
| Base | XGR-M06P* | 6Slot(Main base) |
| | XGR-M02P* | 2Slot(Main base) |
| | XGR-E08P | 8Slot(Expansion base) |
| | XGR-E12P* | 12Slot(Expansion base) |
| | XGR-E12H* | 12Slot(Expansion base, Drive Redundancy) |
| Expansion drive | XGR-DBST* | Twisted pair - Twisted |
| | XGR-DBSF* | Pair Fiber optic - Fiber optic(2km) |
| | XGR-DBSH* | Twisted pair - Fiber optic(2km) |
| | XGR-DBSFS | Pair Fiber optic - Fiber optic(15km) |
| | XGR-DBSHS | Twisted pair - Fiber optic(15km) |
| Expansion drive redundancy | XGR-DBDT | Twisted pair - Twisted |
| | XGR-DBDF | Pair Fiber optic - Fiber optic(2km) |
| | XGR-DBDH | Twisted pair - Fiber optic(2km) |

* : G3 Coating Products

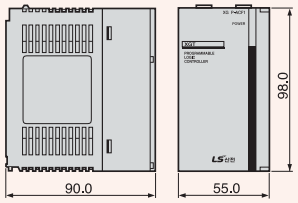
| CPU | Product | Description |
|---|---|---|
| Expansion cable | XGC-E041 | 0.4m |
| | XGC-E061 | 0.6m |
| | XGC-E121 | 1.2m |
| | XGC-E301 | 3.0m |
| | XGC-E501 | 5.0m |
| | XGC-E102 | 10m |
| | XGC-E152 | 15m |
| Termination connector | XGT-TERA | Termination connector for expansion base download cable |
| USB cable | USB-301A | USB download cable |
| RS232C cable | K1C-050A | RS232C download cable |
| Sync & Expansion cable | XGC-F201 | 2m (Fiber optic) |
| | XGC-F501 | 5m (Fiber optic) |
| Dummy | XGT-DMMA | Dummy module |
| | XGR-DMMA | Dummy module |

## Dimensions

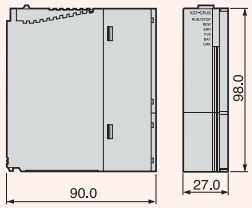
• Base




• Power module



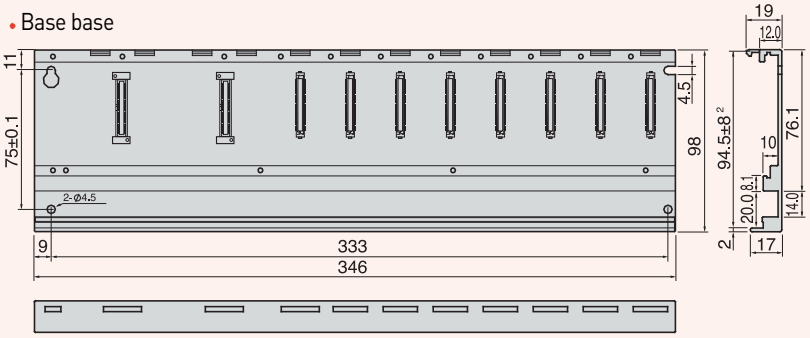

• CPU and I/O module



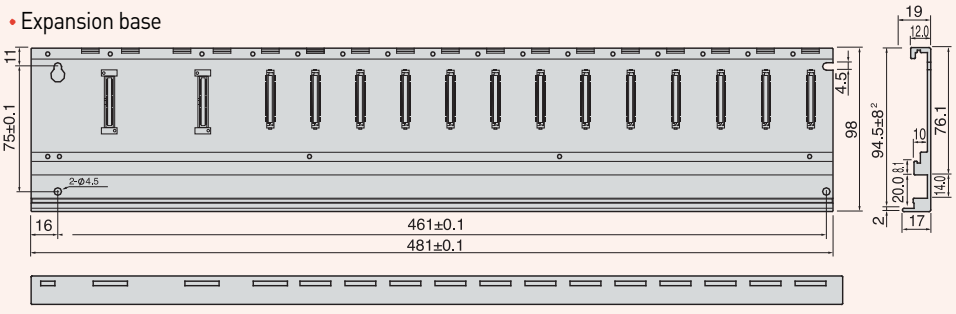

**Base Dimensions (W)**

| Item | XGB-M04A/E04A | XGB-M06A/E06A | XGB-M08A/E08A | XGB-M10A | XGB-M12A/E12A |
|---|---|---|---|---|---|
| A | 190 | 244 | 298 | 356 | 406 |
| B | 210 | 264 | 318 | 375 | 426 |

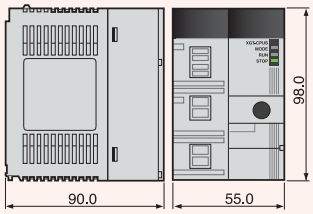
• Base base



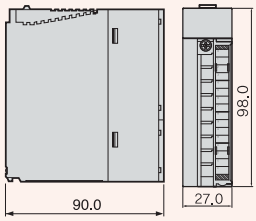

• Expansion base




• Power and CPU




• I/O




**Base Dimensions (W)**

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

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* Service will update sequentially in 2022~2023.

FUTURING SMART ENERGY

We open up a brighter future through
efficient and convenient energy solutions.



**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.



- According to The WEEE Directive, please do not discard the device with your household waste.

LS ELECTRIC

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**2022. 05**

Specifications in this catalog are subject to change without notice due to continuous product development and improvement.



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