



# 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.**

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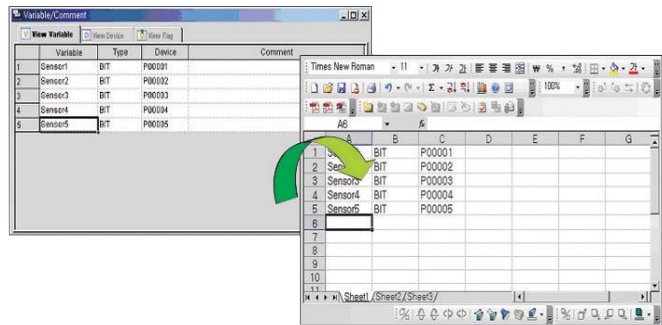


## System requirement

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

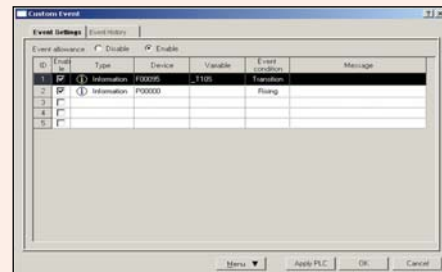
- Data input like EXCEL
- Cell-unit edit
- Auto Fill function
- Compatible with Microsoft Excel
- Redo and Undo (Unlimited)
- Segment screen edit



## Improved diagnosis and maintenance



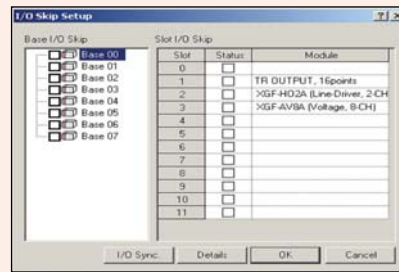
**Module exchange wizard**  
It supports safe module exchange during 'RUN' mode.



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



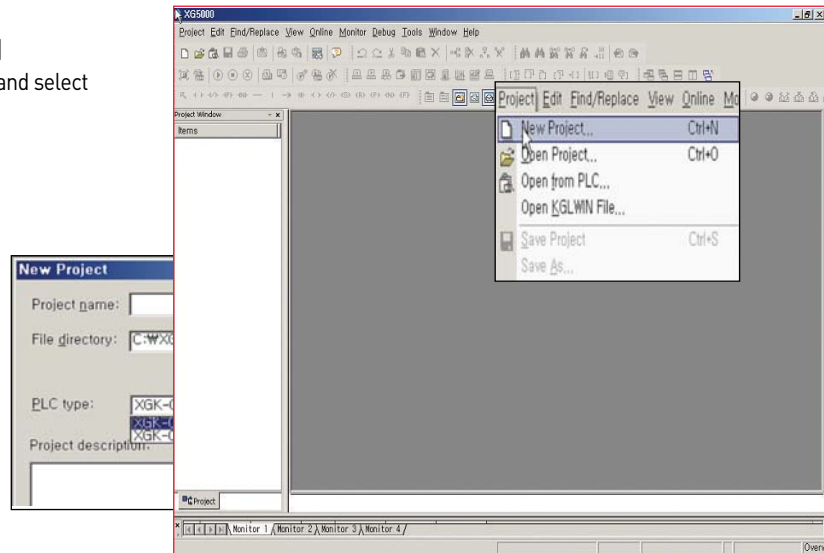
**Forced I/O**  
The status of external output device can be checked without program. And when input device breaks down, forced input function specifies ON/OFF and can operate the system without interruption of equipment.



**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.

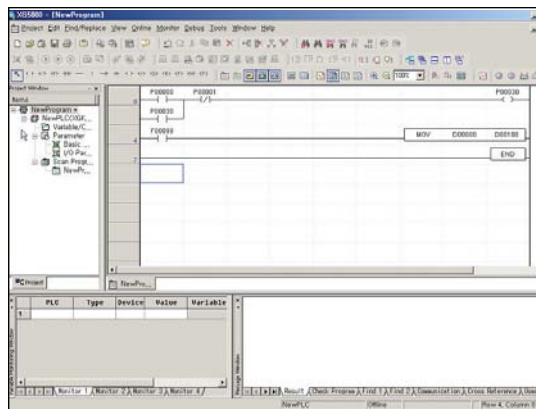
## Program editing

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



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

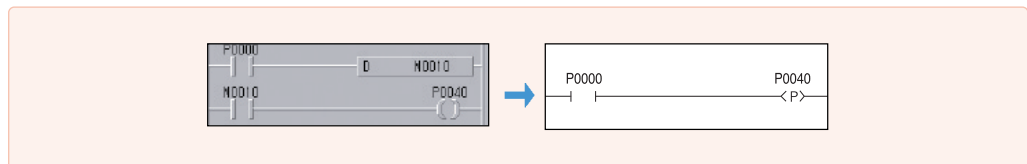
- Select input point and command with ladder tool bar.



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.



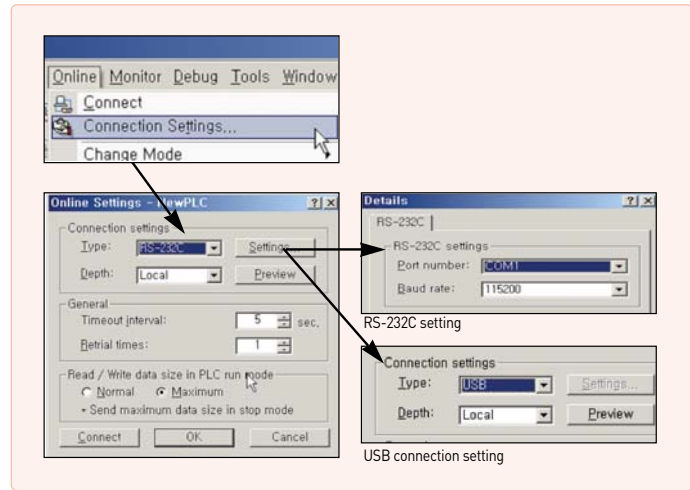
## Program download

### Connection setting

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

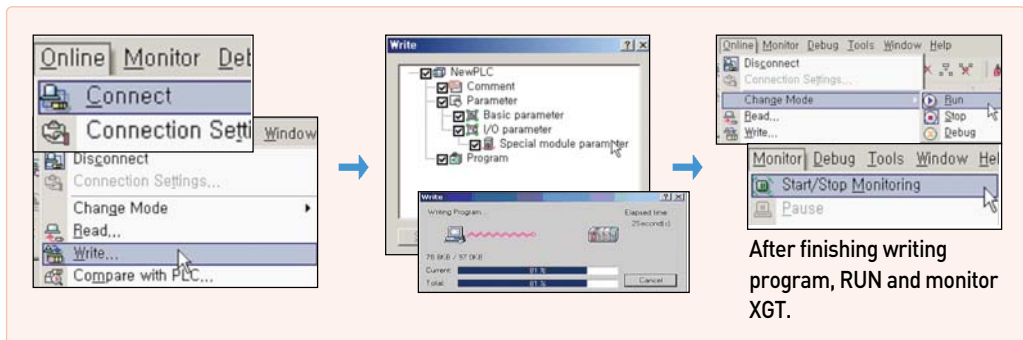
Set up communication port and download speed

\* 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.



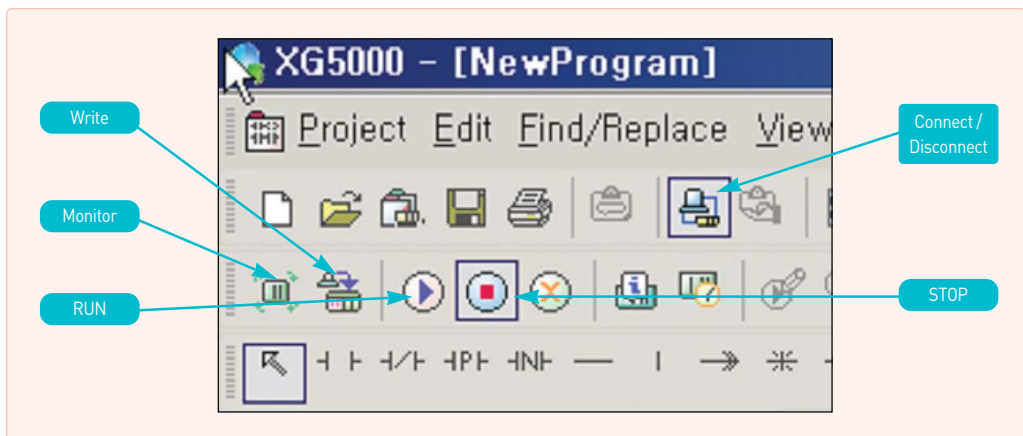
### Connection

Connect to PLC and download the program as below.



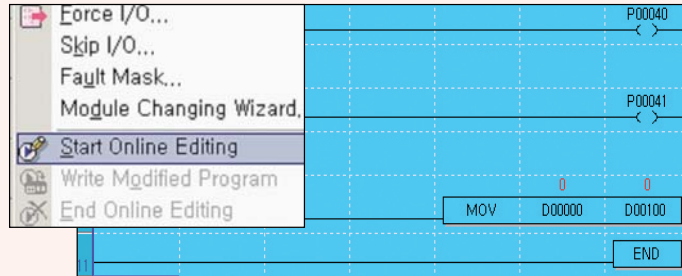
### Short icon

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



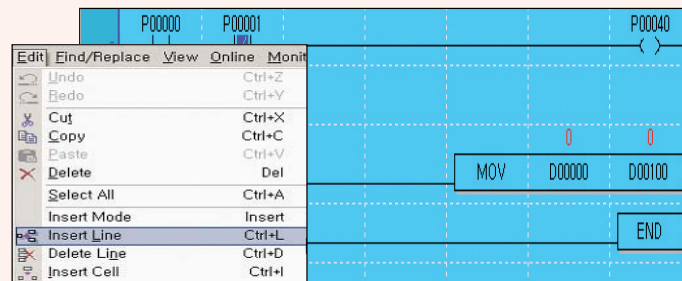
## Online Editing

Select [Start Online Editing] in Online menu.



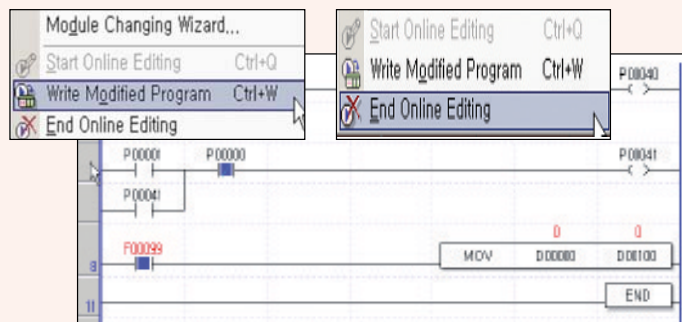
When starting Online Editing, the screen color becomes blue.

Modify the program.



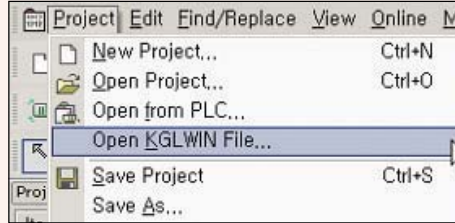
Edit menu

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

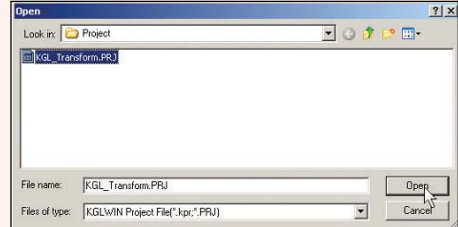


After finishing 'Online Editing'

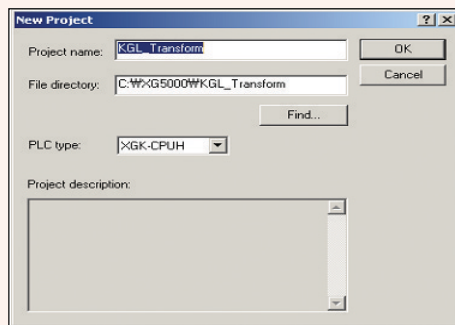
Open a project written in KGL-WIN



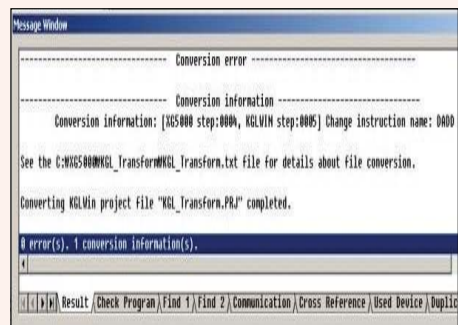
Select [Open KGLWIN file] in project.



Select the file.

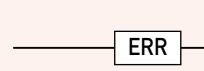


Select the type of XGT CPU.



Check converted information in the message window.

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

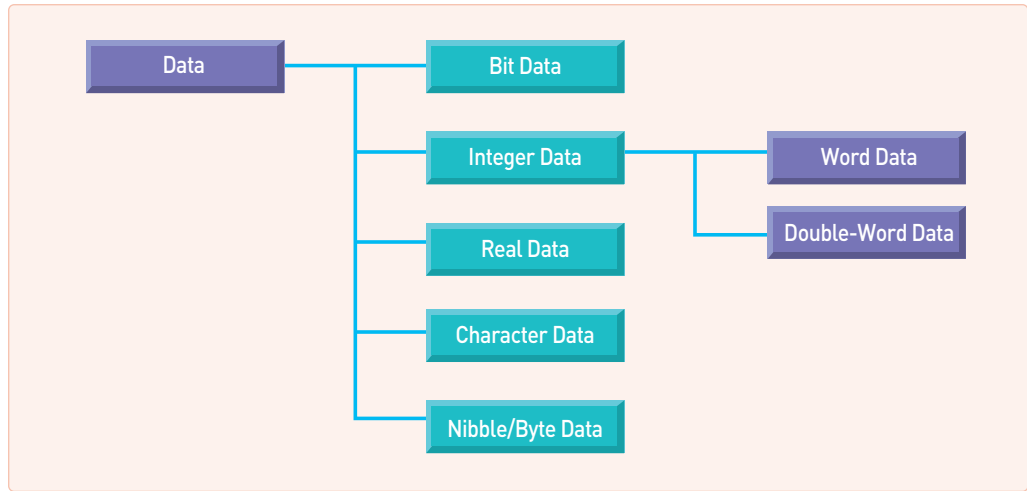


• Content of main special flag (F) change

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

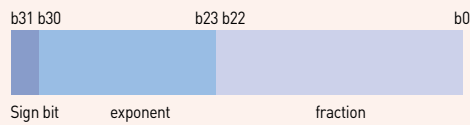
For more detailed information, refer to user's manual.

## Data type

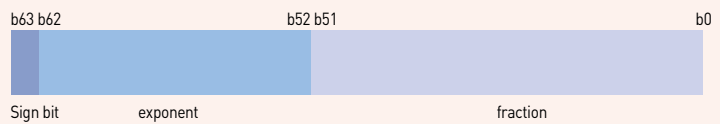


- Nibble: 4-bit unit data
- Byte: 8-bit unit data
- Real Data: 32-bit/64-bit floating point data

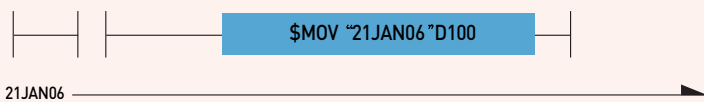
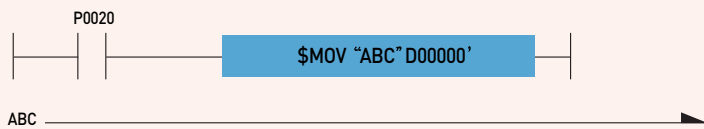
### Real Number



### Long Real Number



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



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



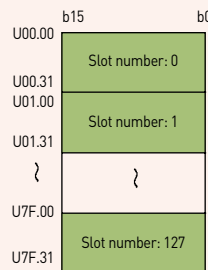
## Device type

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

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

## Special module register U

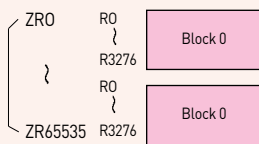
Register for reading data from special module mounted in slot



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

## File register R, ZR

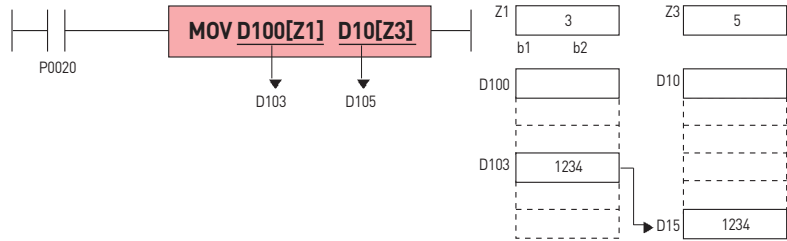
Register that a recorded value is not deleted when power failure is occurred. File register is used for data backup or data storage.



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

## Index register

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



## Available Device

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

## Bit specifying method of word device

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

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

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

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

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

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

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

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

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

## Features

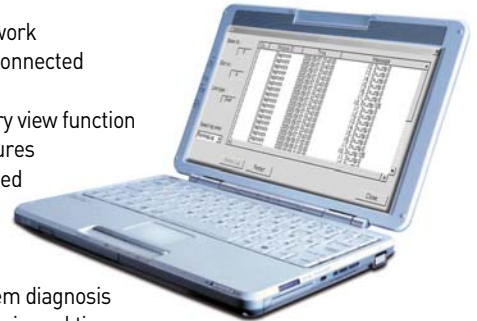
- Default settings of the network and easy of user program
- Network system and provides extensive monitoring and control of the communication module
- Efficient implementation of a fast interface with the CPU to the network management
- Easy access with XGT and Modbus
- Rich built-in diagnostic function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



Item		Industrial Ethernet network				Fieldbus network				
		RAPIDnet	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	2-2147,483,647ms	-	-	-	-	-	-	-
	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
Configuration 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				
	RAPIDnet	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	-	-	-	-	○	-	-	-	-

