LS Industrial Systems

XGK / XBM / XBC Series

CPU Direct Driver

V1.0 or higher

Supported version TOP Design Studio



CONTENTS

We would like to thank our customers for using M2I's "Touch Operation Panel (M2I TOP) Series". Read this manual and familiarize yourself with the connection method and procedures of the "TOP and external device".

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Describes how to set the TOP communication.

4. External device setting

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5. Cable table

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Describes the cable specifications required for connection.

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Refer to this section to check the addresses which can communicate with an external device.



1. System configuration

The system configuration of TOP and "LS Industrial Systems Co., Ltd – XGK / XBM / XBC Series CPU Direct" is as follows:

| Series | CPU*Note 1) | Link I/F | Communication method | System setting | Cable | |
|--------|--|---------------------------------|-------------------------|---|----------------|--|
| XGK | XGK-CPUH XGK-CPUA XGK-CPUS XGK-CPUE XGK-CPUU | PADT connector (9 pin) *Note 2) | RS232 | <u>3. TOP</u> communication setting | 5. Cable table | |
| XGB | XBM-D□16S XBM-D□32S XBC-D□32H XBC-D□64H | PADT connector (6 pin) *Note 2) | RS232 | <u>4. External device</u> <u>setting</u> | | |

*Note 1) Check that the CPU unit is labeled as version V 1.1 or higher.

*Note 2) PADT Access connector: the PLC CPU connector used to connect to the PC Ladder S/W XG5000

Connection configuration (TOP connection–External device connection)

• 1:1 (one TOP and one external device) connection – configuration which is possible in RS232C communication.

| 1 | ΠĒ | - | |
|---|----|---------|---|
| | | and and | Ē |



2. External device selection

■ Select a TOP model and a port, and then select an external device.

| PLC select [CO | м11 | | | | |
|--|---|---|------------------------|-----------------------|-------------|
| Filter - Tail | мтј | | | Conveh . | |
| Filter : [All] | | | ▼ | Search : Mode | el O Vendor |
| Vendor | | Mode | • | | |
| M2I Corporation | | ^ 🌮 | XGI/XGR/XEC Series | | |
| MITSUBISHI Electric Corpo | oration | 8 | XGK/XBM/XBC Series | | |
| OMRON Industrial Automa | ation | - 8 | GLOFA-GM Series | | |
| LS Industrial Systems | | | MASTER-K(80S/120S/2 | 005/3005/1000S) Seri | es |
| MODBUS Organization | | | STARVERT Series | | |
| SIEMENS AG. | | | STARVERT SERES | | |
| Rockwell Automation | | | XCODE RFID HF Reade | r Series IH-1306/1307 | |
| GE Fanuc Automation | | | MASTER-K(500H/1000H | l) Series | |
| PANASONIC Electric Work | s | | MASTER-K 10S, 10S1 Se | ries | |
| YASKAWA Electric Corpora | ation | | | | |
| YOKOGAWA Electric Corpo | oration | | | | |
| Schneider Electric Industri | ies | | | | |
| KDT Systems | | | | | |
| RS Automation | | ¥ | | | |
| | | Series 1 | | | |
| PLC Setting[XGK/X | | | | | |
| Alias Name : | PLC1 | Jenes J | | | |
| PLC Setting[XGK/X Alias Name : [Interface : [Protocol : [| PLC1 CPU Direct | Jener J | ~ | | |
| PLC Setting[XGK/X Alias Name : Interface : Protocol : String Save Mode : | PLC1 CPU Direct CPU First LH HL | C | ↓ ↓ hange | Cc | omm Manual |
| PLC Setting[XGK/X Alias Name : Interface : Protocol : String Save Mode : | PLC1 CPU Direct CPU First LH HL | C | ∨ ∨ | Cc | omm Manual |
| PLC Setting[XGK/X Alias Name : Interface : Protocol : String Save Mode : Use Redundancy Operate Condition : ANC | PLC1 CPU Direct CPU First LH HL | (c | v v | CC | omm Manual |
| Alias Name : Interface : Protocol : String Save Mode : Use Redundancy Operate Conditor : ANC Change Conditor : | PLC1 CPU Direct CPU First LH HL | CI | hange (Second) | Cc | omm Manual |
| Alias Name : Interface : Protocol : String Save Mode : Use Redundancy Operate Condition : Change Cond | PLC1 CPU Direct CPU First LH HL , D D Condition | CI | hange (Second) | Cc | omm Manual |
| PIL: Setting[XGK/X Alias Name : Interface : Protocol : String Save Mode : Use Redundancy Operate Condition : AN Change Condition : 1 Change Condition : 1 C | PLC1 CPU Direct CPU First LH HL , , , , , , , , , , , , , , , , , , , | 5 | hange (Second) | | emm Manual |
| PLC Setting[XGK/X Alias Name : Interface : Protocol : String Save Mode : Use Redundancy Deprate Condition : Change Condition : Primary Option Timeout | PLC1 CPU Direct CPU First LH HL TimeOut Condition | CI 5 msec | hange (Second) | CC | omm Manual |
| PLC Setting[XGK/X Alias Name : Interface : Protocol : String Save Mode : Use Redundancy Operate Condition : AN Change Condition : AN Change Condition : T Primary Option Timeout Send Wait | PLC1 CPU Direct CPU First LH HL D v TimeOut Condition 300 | CI 5 ■ msec ■ msec | ↓ hange (Second) | | Edit |
| Alias Name : Interface : Protocol : String Save Mode : Use Redundancy Operate Condition : ANC Change Condition : ANC Change Condition : C Primary Option Timeout Send Wait Retry | PLC1 CPU Direct CPU First LH HL imeOut Condition 3000 0 5 | CI 5 msec msec | hange (Second) | C (| Edit |
| PLC Setting[XGK/X Alias Name : Interface : Protocol : String Save Mode : Use Redundancy Operate Condition : IN Change Condition : I | PLC1 CPU Direct CPU First LH HL , D D Condition 300 0 5 | CI 5 msec msec | ↓ hange (Second) | | Edit |
| PLC Setting[XGK/X Alias Name : Interface : Protocol : String Save Mode : Use Redundancy Operate Condition : ANC Change Condition : I Change Condition : I Change Condition : Change Con | CPU Direct CPU Direct CPU First LH HL , , , , , , , , , , , , , , , , , , , | CI 5 ■ msec ■ msec | ange (Second) | | Edit |
| PLC Setting[XGK/X Alias Name : Interface : Protocol : String Save Mode : Use Redundancy Operate Condition : Change Condition : Primary Option Timeout Send Wait Retry | PLC1 CPU Direct CPU First LH HL Condition 3000 5 | Cl 5 msec msec msec | hange (Second) | | Edit |
| PLC Setting[XGK/X Alias Name : Interface : Protocol : String Save Mode : Use Redundancy Operate Condition : AN Change Condition : I Change Condition : I Ch | PLC1 CPU Direct CPU First LH HL Condition 3000 0 5 | € msec msec msec | hange (Second) | | Edit |
| PLC Setting[XGK/X Alias Name : Interface : Protocol : String Save Mode : Use Redundancy Operate Condition : ANC Change Condition : I Change Condition : I Primary Option Timeout Send Wait Retry | PLC1 CPU Direct CPU First LH HL Condition 300 0 5 | C I 5 msec ♥ msec ♥ | L Second) | | Edit |

| Settings | | Contents | | | | | |
|-----------------|--------|--|--|---------------------------------|--|--|--|
| ТОР | Model | Check the TOP display and pro | Theck the TOP display and process to select the touch model. | | | | |
| External device | Vendor | Select the vendor of the extern | Select the vendor of the external device to be connected to TOP. | | | | |
| | | Select "LS Industrial Systems". | | | | | |
| | PLC | Select an external device to connect to TOP. | | | | | |
| | | Model | Interface | Protocol | | | |
| | | XGK / XBM / XBC Series | CPU Direct | CPU | | | |
| | | Please check the system confi connect is a model whose syst | guration in Chapter 1 to see if em can be configured. | the external device you want to | | | |



3. TOP communication setting

The communication can be set in TOP Design Studio or TOP main menu. The communication should be set in the same way as that of the external device.

3.1 Communication setting in TOP Design Studio

(1) Communication interface setting

■ [Project > Project Property > TOP Setting] → [Project Option > "Use HMI Setup" Check > Edit > Serial]



| Items | ТОР | External device | Remarks |
|---------------------|---------|-----------------|---------|
| Signal Loval (part) | | RS-232C | Fixed |
| Signal Level (port) | RS-232C | (CPU port) | |
| Baud Rate | 115200 | | Fixed |
| Data Bit | 8 | 3 | Fixed |
| Stop Bit | 1 | | Fixed |
| Parity Bit | No | ne. | Fixed |

* The above settings are examples recommended by the company.

| Items | Description |
|--------------|---|
| Signal Level | Select the serial communication method between the TOP and an external device. |
| Baud Rate | Select the serial communication speed between the TOP and an external device. |
| Data Bit | Select the serial communication data bit between the TOP and an external device. |
| Stop Bit | Select the serial communication stop bit between the TOP and an external device. |
| Parity Bit | Select the serial communication parity bit check method between the TOP and an external device. |



(2) Communication option setting

- [Project > Project Property > Device Setting > COM > "PLC1 : XGK/XBM/XBC Series"]
 - Set the options of the XGK / XBM / XBC Series CPU Direct communication driver in TOP Design Studio.

| Project Option | | | | × |
|----------------------|--|---|-------|-----------|
| Change HMI[H] Add PL | .C [A] TTT Change PL | C Delete PLCD | | |
| Change HMI[H] | C (A) Change PL PLC Setting[XGK/X Alias Name : Interface : Protocol : String Save Mode : Use Redundancy Operate Condition : AN Change Condition : AN Change Condition : C Primary Option Timeout Send Wait Retry | Image: Constraint of the sector o | Co | mm Manual |
| < > | | | | |
| | | | Apply | Close |

| Items | Settings | Remarks |
|---------------|---|-----------------------|
| Interface | Select "CPU Direct". | Refer to "2. External |
| Protocol | Select "CPU". | device selection". |
| TimeOut (ms) | Set the time for the TOP to wait for a response from an external device. | |
| SendWait (ms) | Set the waiting time between TOP's receiving a response from an external device and | |
| | sending the next command request. | |



3.2. Communication setting in TOP

* This is a setting method when "Use HMI Setup" in the setting items in "3.1 TOP Design Studio" is not checked.

■ Touch the top of the TOP screen and <u>drag</u> it down. Touch "EXIT" in the pop-up window to go to the main screen.



(1) Communication interface setting

■ [Main Screen > Control Panel > Serial]

| | 6 | Control Panel × |
|---------------|----------------------------|--|
| | 🔯 System 🔤 | 📼 Serial 🗙 |
| Kun | | Serial Port: COM1 🔹 |
| | | Signal Level ● RS-232C ○ RS-422(4) ○ RS-485(2) |
| | | Baud Rate: 115200 - |
| VNC Viewer | | Data Bit: 8 🔹 |
| | Ethernet Seriel | Stop Bit: 1 |
| \bigcirc | Ethernet Serial | Parity Bit: None 🔻 |
| Screen | Harry - | Flow: Off 💌 |
| SHUT | Diagnostic File Manager | Auto Search Loopback Test |
| | | Apply Cancel |
| | [System] | Close |

| Items | ТОР | External device | Remarks |
|---------------------|---------|-----------------|---------|
| Signal Lovel (port) | | RS-232C | Fixed |
| Signal Level (port) | KS-232C | (CPU port) | |
| Baud Rate | 115200 | | Fixed |
| Data Bit | 8 | | Fixed |
| Stop Bit | 1 | | Fixed |
| Parity Bit | ٢ | lone. | Fixed |

* The above settings are setting examples recommended by the company.

| Items | Description |
|--------------|---|
| Signal Level | Select the serial communication method between the TOP and an external device. |
| Baud Rate | Select the serial communication speed between the TOP and an external device. |
| Data Bit | Select the serial communication data bit between the TOP and an external device. |
| Stop Bit | Select the serial communication stop bit between the TOP and an external device. |
| Parity Bit | Select the serial communication parity bit check method between the TOP and an external device. |



(2) Communication option setting

■ [Main Screen > Control Panel > PLC]

SendWait (ms)

| | | (0 | 1001 | PLC | | × |
|------------|----------------|----------------------|---------------------------|---|-------|-----------------------|
| | Run | 🔇 Syst | Driver(COM1) Interface | PLC1(XGK/XBM/XBC Series) CPU Direct | | |
| | MC | PLC | Protocol Timeout | CPU | | |
| | VNC Viewer | | Send Wait Retry | 0 🔹 msec 5 🗣 | | |
| | 0. | Ethernet | | | | |
| | Screen shot | intli ^{wy*} | | | | |
| | | Diagnostic | | | | |
| | | [System | Diagnostic | | Apply | Cancel |
| Itoms | | Settings | | | P | emarks |
| Interface | | Select "CPU Direc | t". | | F | Refer to "2. External |
| Protocol | | Select "CPU". | | | | device selection". |
| TimeOut (m | IS) | Set the time for t | he TOP to wait for a | response from an external device. | | |

Set the waiting time between TOP's receiving a response from an external device and

sending the next command request.



3.3 Communication diagnostics

■ Check the interface setting status between the TOP and external device.

- Touch the top of the TOP screen and drag it down. Touch "EXIT" in the pop-up window to go to the main screen.
- Check if the COM port settings you want to use in [Control Panel > Serial] are the same as those of the external device.
- Diagnosis of whether the port communication is normal or not
- Touch "Communication diagnostics" in [Control Panel > PLC].
- The Diagnostics dialog box pops up on the screen and determines the diagnostic status.

| ОК | Communication setting normal |
|----------------|--|
| Time Out Error | Communication setting abnormal |
| | - Check the cable, TOP, and external device setting status. (Reference: Communication diagnostics sheet) |

■ Communication diagnostics sheet

- If there is a problem with the communication connection with an external terminal, please check the settings in the sheet below.

| Items | Contents | | Check | | Remarks | |
|-----------------|-------------------------|-----------------|----------|------------------------|---------------------------------------|--|
| System | How to connect the sy | stem | OK | NG | 1 Cretem configuration | |
| configuration | Connection cable name | 5 | OK | NG | 1. System configuration | |
| TOP | Version information | | OK | NG | | |
| | Port in use | | OK | NG | | |
| | Driver name | | OK | NG | | |
| | Other detailed settings | | ОК | NG | | |
| | Relative prefix | Project setting | OK | NG | | |
| | | Communication | | NC | 2. External device selection | |
| | | diagnostics | ŬK | NG | 3. Communication setting | |
| | Serial Parameter | Transmission | <u> </u> | NG | | |
| | | Speed | ÜK | NG | | |
| | | Data Bit | OK | NG | | |
| | | Stop Bit | OK | NG | | |
| | | Parity Bit | OK | NG | | |
| External device | CPU name | OK | NG | | | |
| | Communication port n | ОК | NG | | | |
| | Protocol (mode) | OK | NG | | | |
| | Setup Prefix | OK | NG | | | |
| | Other detailed settings | OK | NG | 4 Estemplishes estimat | | |
| | Serial Parameter | Transmission | OK | K NG | 4. External device setting | |
| | | Speed | ŬK | | | |
| | | Data Bit | OK | NG | | |
| | | Stop Bit | OK | NG | | |
| | | Parity Bit | OK | NG | | |
| | Check address range | | | | 6. Supported addresses | |
| | | | OK | NG | (For details, please refer to the PLC | |
| | | | | | vendor's manual.) | |



4. External device setting

• Loader port communication interface of the "XGK / XBM / XBC Series" is fixed as the target configuration value of the following example.



5. Cable table

This chapter introduces a cable diagram for normal communication between the TOP and the corresponding device. (The cable diagram described in this section may differ from the recommendations of "LS Industrial Systems Co., Ltd.")

| TOP | СОМ | | | XGK | RS-232C P | ort on CPU Unit |
|---------------------|--------|--------|------------------|--------|-----------|---------------------|
| Pin | Signal | Pin | Cable connection | Pin | Signal | Pin |
| arrangement*Note 1) | name | number | | number | name | arrangement*Note 1) |
| 1 5 | CD | 1 | | 1 | CD | 1 5 |
| (° °) | RD | 2 | | 2 | RD | (° °) |
| | SD | 3 | | 3 | SD | |
| Based on | DTR | 4 | | 4 | DTR | Based on |
| communication | SG | 5 | | 5 | SG | communication |
| cable connector | DSR | 6 | | 6 | DSR | cable connector |
| front, | RTS | 7 | | 7 | RTS | front, |
| D-SUB 9 Pin male | CTS | 8 | | 8 | CTS | D-SUB 9 Pin male |
| (male, convex) | | 9 | | 9 | | (male, convex) |

■ XGK RS-232C Port on CPU Unit (1:1 connection)

*Note 1) The pin arrangement is as seen from the connecting side of the cable connection connector.

■ XGB (XBM/XBC) RS-232C Port on CPU Unit (1:1 connection)

| TOP | СОМ | | | XGB | RS-232C P | ort on CPU Unit |
|---------------------|--------|--------|------------------|--------|-----------|---------------------|
| Pin | Signal | Pin | Cable connection | Pin | Signal | Pin |
| arrangement*Note 1) | name | number | | number | name | arrangement*Note 1) |
| | CD | 1 | | 1 | | 6 4 2 |
| 1 5 | RD | 2 | • | 2 | RD | \sim \sim |
| | SD | 3 | • | 3 | SG | |
| 6 9 | DTR | 4 | | 4 | | $\sim ~$ |
| Based on | SG | 5 | • | 5 | | 3 3 |
| communication | DSR | 6 | • | 6 | SD | Based on |
| cable connector | RTS | 7 | | | | communication |
| front, | CTS | 8 | | | | cable connector |
| D-SUB 9 Pin male | | 9 | | | | front, |
| (male, convex) | | 5 | | | | D-SUB 6 Pin male |
| , | | | | | | (male, convex) |

*Note 1) The pin arrangement is as seen from the connecting side of the cable connection connector.



6. Supported addresses

The devices available in TOP are as follows:

The device range (address) may differ depending on the CPU module series/type. The TOP series supports the maximum address range used by the external device series. Please refer to each CPU module user manual and be take caution to not deviate from the address range supported by the device you want to use.

| Device | Bit Address | Word Address | Remark |
|-------------------------|-------------------|----------------|----------------------|
| Input/Output Relay | P0 – P4095F | P0 – P4095 | |
| Auxiliary Relay | M0 – M4095F | M0 – M4095 | |
| Keep Relay | K0 — K4095F | K0 — K4095 | |
| Special Relay | F0 — F4095F | F0 — F4095 | Cannot be written |
| Timer(Contact) | T0 – T8191 | | |
| Counter(Contact) | C0 – C8191 | | |
| Timer(Elapsed Value) | | T0 – T8191 | |
| Counter(Elapsed Value) | | C0 – C8191 | |
| Special Module Register | U0.0.0 – U7F.31.F | U0.0 – U7F.31 | |
| Index Register | | Z0 – Z255 | |
| Step Controller | | S0 – S255 | |
| Link Relay | L0 – L11263F | L0 – L11263 | |
| Communication Register | | N0 – N21503 | |
| Data Register | D0.0 – D524287.F | D0 – D524287 | |
| File Register | R0.0 – R32767.F | R0 – R32767 | |
| File Register | ZR0 – ZR524287.F | ZR0 – ZR524287 | |

*The lower 16 BIT data of 32 BIT data is saved in the address whose screen has been registered, and the upper 16 BIT data is saved in the address next to the address whose screen has been registered.

Ex. When saving 32 BIT data hexadecimal data 12345678 in address D00100, it is saved to 16 BIT device address as follows:

| Items | 32BIT | 16BIT | |
|-----------------------------|----------|--------|--------|
| Address | D00100 | D00100 | D00101 |
| Input data (hexadecimal) | 12345678 | 5678 | 1234 |