LS Industrial Systems
MASTER-K Series
CPU Direct Driver

Supported version TOP Design Studio V1.0 or higher

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".

1. System configuration

The system configuration of TOP and "LS Industrial Systems – MASTER-K Series CPU Direct" is as follows:

Series	CPU	Link I/F	Communication method	System setting	Cable
K1000S	K7P-30AS	Port on CPU unit*Note 1)	RS-232C	3. TOP communication setting 4. External device setting	5. Cable table
K300S	K4P-15AS				
K200S	K3P-07AS K3P-07BS K3P-07CS				
K120S	K7M-D□20U K7M-D□30U K7M-D□40U K7M-D□60U				
K80S	K7M-D□10S K7M-D□20S K7M-D□30S K7M-D□40S K7M-D□60S				
K10S	K14□-D□□				
K30S	K14P-D□□				
K60S	K56P-DRS				
K100S	K2P-02S K2PC-02S				
K10S1	K14P1-DRS				
K500H	K5P-15H				
K1000H	K7P-30H				

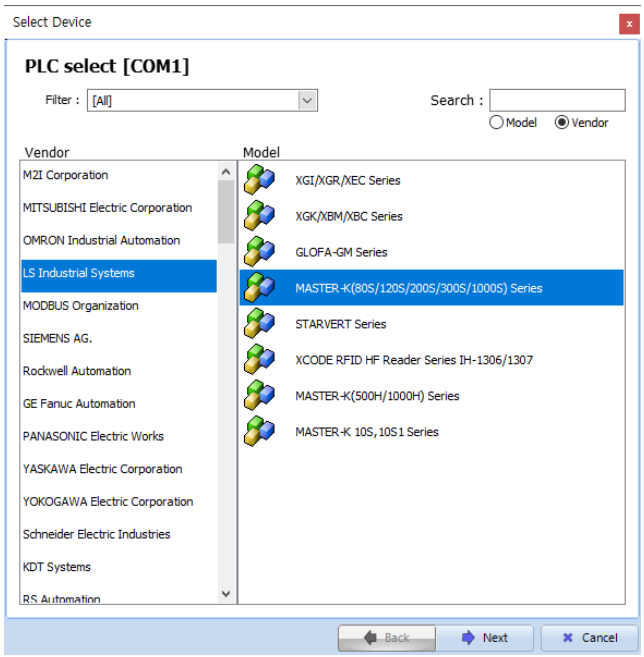
*Note 1) PC connection loader port

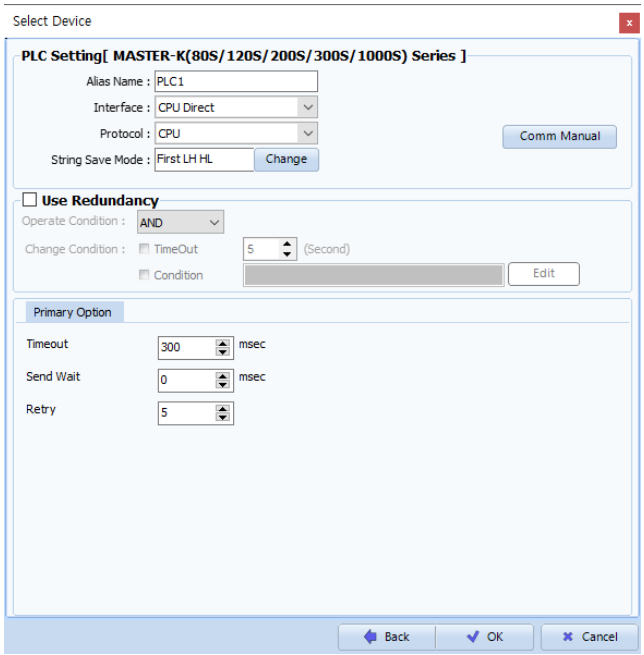
■ Connection configuration

・1:1 (one TOP and one external device) connection

2. External device selection

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





Settings		Contents
TOP	Model	Check the TOP display and process to select the touch model.
External device	Vendor	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
MASTER-K Series	CPU Direct	CPU

Please check the system configuration in Chapter 1 to see if the external device you want to connect is a model whose system can be configured.

3. TOP communication setting

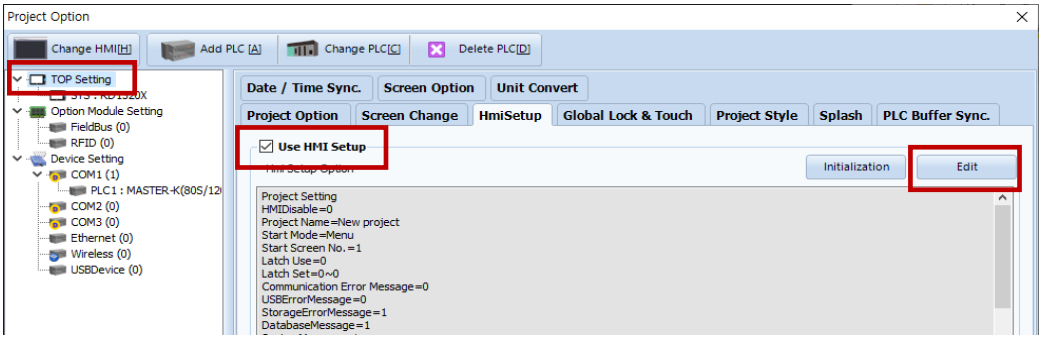
The communication can be set in TOP Design Studio or TOP main menu. The communication should be set in the same way as that of the external device.

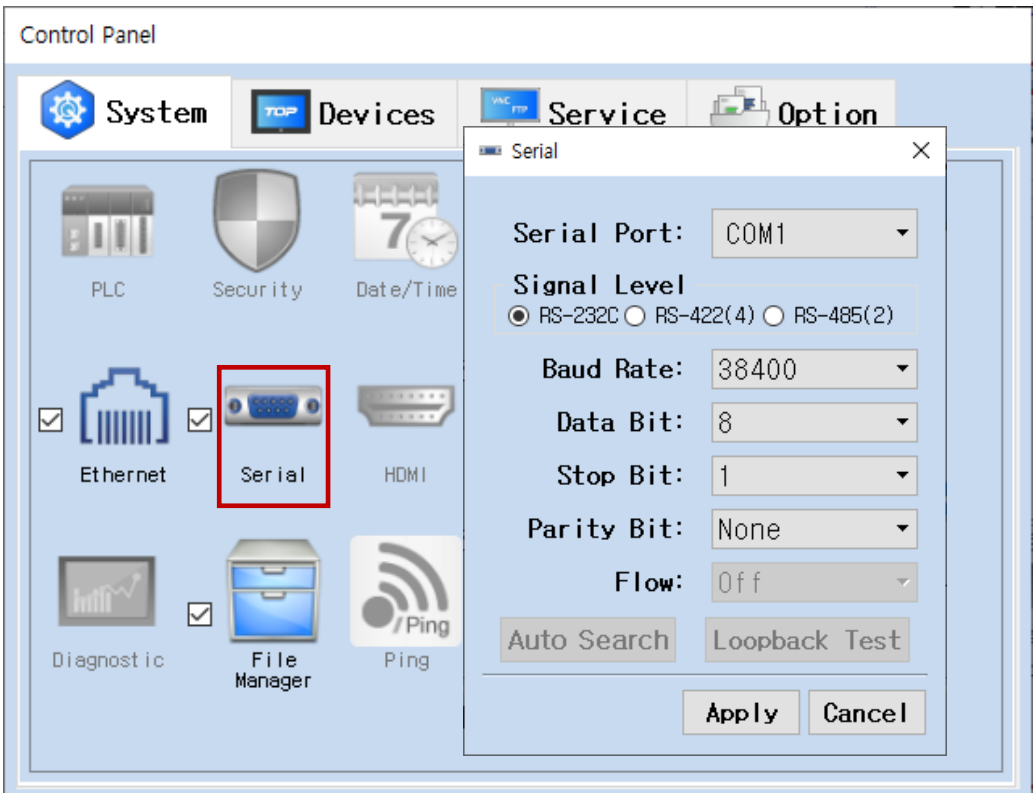
3.1 Communication setting in TOP Design Studio

(1) Communication interface setting

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

– Set the TOP communication interface in TOP Design Studio.





Items	TOP	External device	Remarks
Signal Level (port)	RS-232C	RS-232C (CPU port)	Fixed
Baud Rate	38400		Fixed
Data Bit	8		Fixed
Stop Bit	1		Fixed
Parity Bit	None.		Fixed

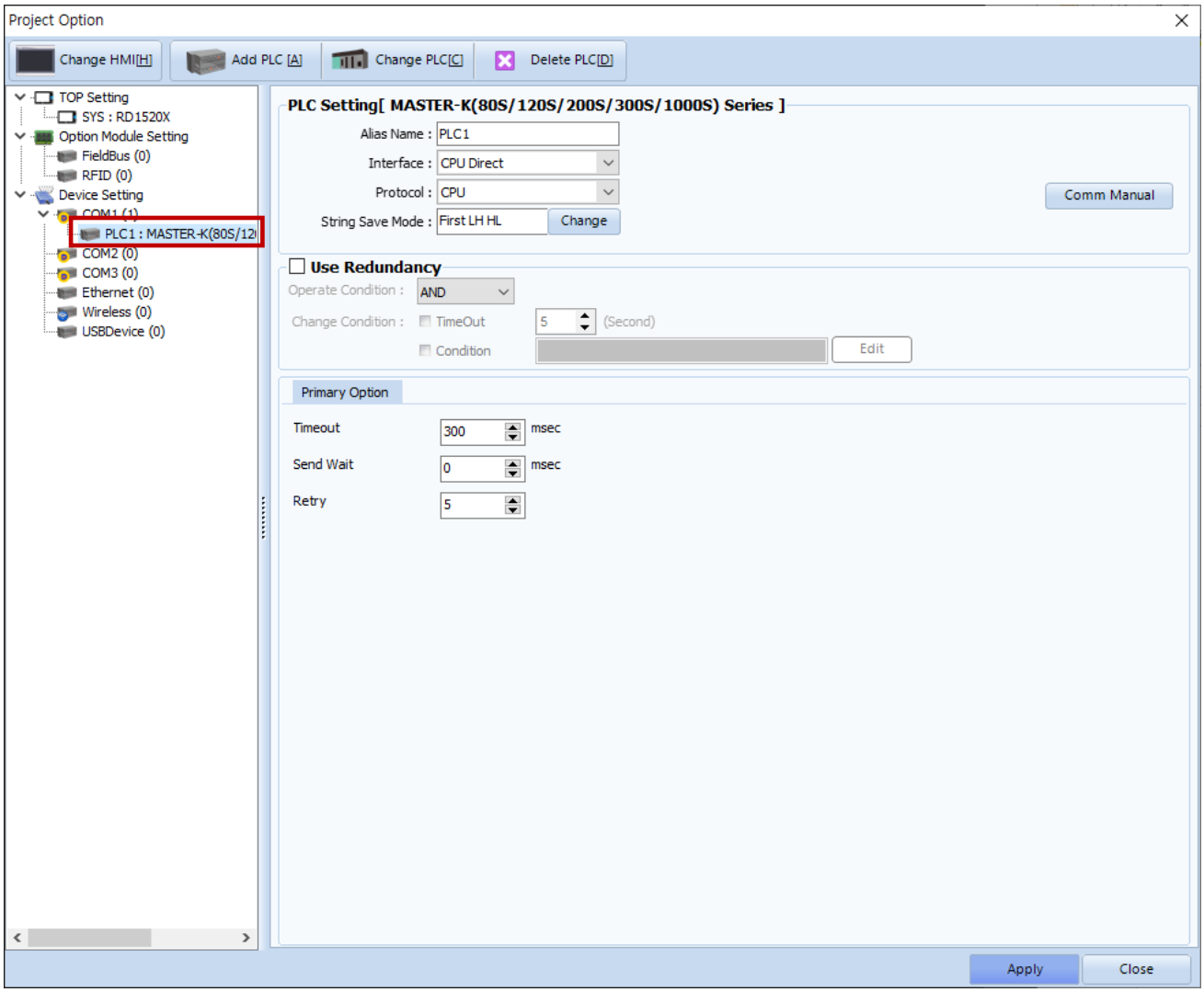
* The above settings are examples recommended by the company.

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 : MASTER-K Series"]

– Set the options of MASTER-K Series CPU Direct communication driver in TOP Design Studio.

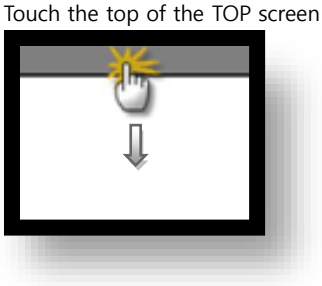


Items	Settings	Remarks
Interface	Select "CPU Direct".	Refer to "2. External device selection".
Protocol	Select "CPU".	
TimeOut (ms)	Set the time for the TOP to wait for a response from an external device.	
SendWait (ms)	Set the waiting time between TOP's receiving a response from an external device and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

3.2. Communication setting in TOP

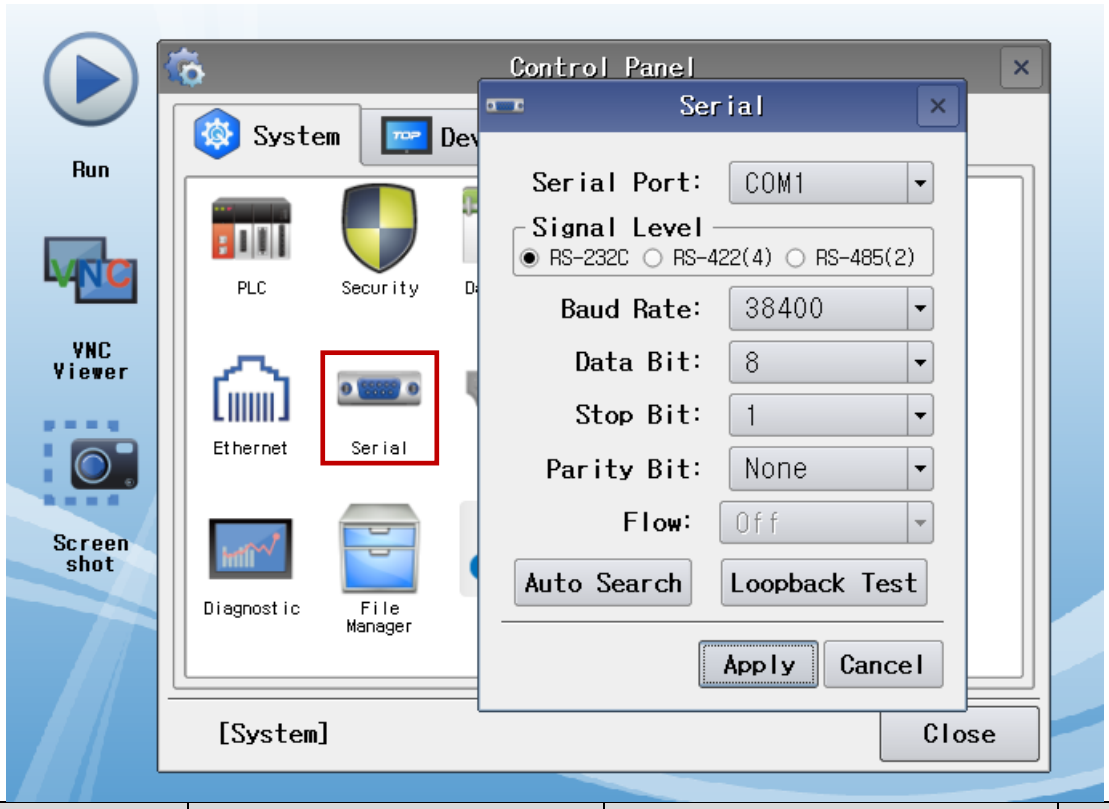
*** This is a setting method when "Use HMI Setup" in the setting items in "3.1 TOP Design Studio" is not checked.**

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



(1) Communication interface setting

■ [Main Screen > Control Panel > Serial]



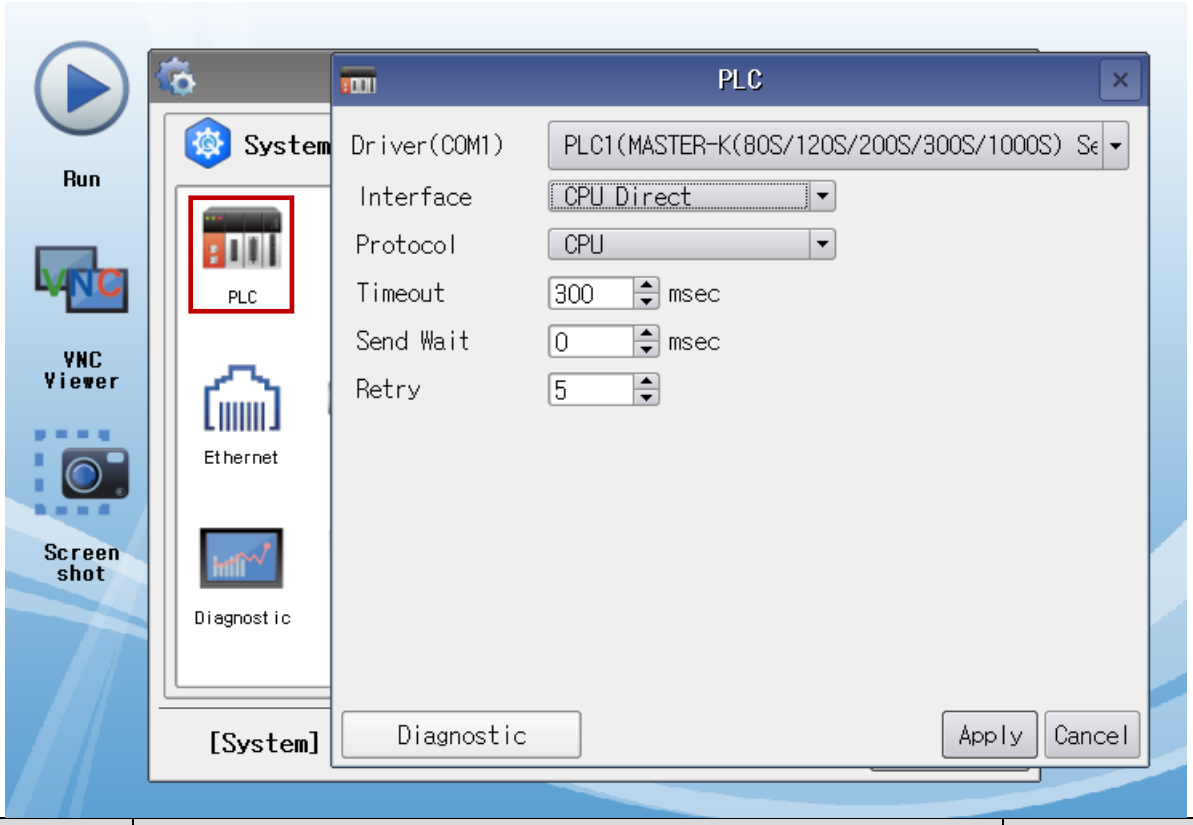
Items	TOP	External device	Remarks
Signal Level (port)	RS-232C	RS-232C (CPU port)	Fixed
Baud Rate	38400		Fixed
Data Bit	8		Fixed
Stop Bit	1		Fixed
Parity Bit	None.		Fixed

* 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]



Items	Settings	Remarks
Interface	Select "CPU Direct".	Refer to "2. External device selection".
Protocol	Select "CPU".	
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.	

3.3 Communication diagnostics

■ Check the interface setting status between the TOP and an 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.

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

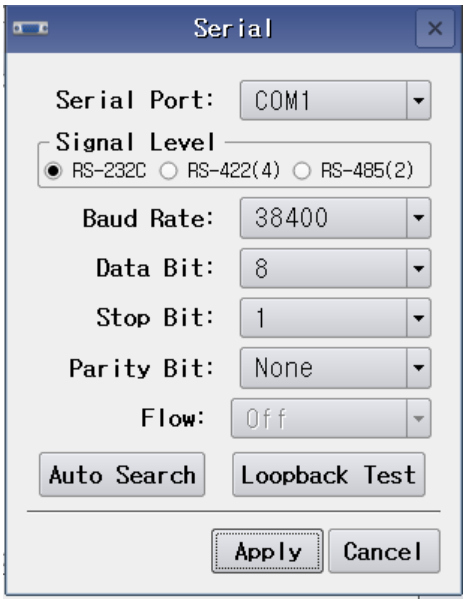
■ Communication diagnostics sheet

- 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 configuration	How to connect the system		OK	NG	1. System configuration
	Connection cable name		OK	NG	
TOP	Version information		OK	NG	2. External device selection 3. Communication setting
	Port in use		OK	NG	
	Driver name		OK	NG	
	Other detailed settings		OK	NG	
	Relative prefix	Project setting	OK	NG	
		Communication diagnostics	OK	NG	
	Serial Parameter	Transmission Speed	OK	NG	
		Data Bit	OK	NG	
		Stop Bit	OK	NG	
		Parity Bit	OK	NG	
External device	CPU name		OK	NG	4. External device setting
	Communication port name (module name)		OK	NG	
	Protocol (mode)		OK	NG	
	Setup Prefix		OK	NG	
	Other detailed settings		OK	NG	
	Serial Parameter	Transmission Speed	OK	NG	
		Data Bit	OK	NG	
		Stop Bit	OK	NG	
		Parity Bit	OK	NG	
	Check address range		OK	NG	6. Supported addresses (For details, please refer to the PLC vendor's manual.)

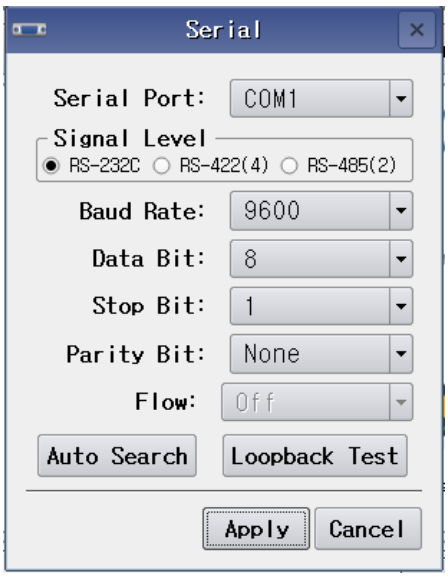
4. External device setting

■ The CPU direct port communication interface for "MASTER-K Series" "K80S, K120S, K200S, K300S, K1000S" is fixed to the below configuration value, therefore configure the TOP interface as follows.



Items	TOP	External device	Remarks
Signal Level (port)	RS-232C	RS-232C (CPU port)	Fixed
Baud Rate	38400		Fixed
Data Bit	8		Fixed
Stop Bit	1		Fixed
Parity Bit	None.		Fixed

■ The CPU direct port communication interface for "MASTER-K Series" "K10S, K10S1, K30S, K60S, K100S, K500H, K1000H" is fixed to the below configuration value, therefore configure the TOP interface as follows.

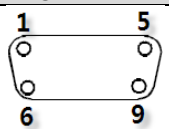
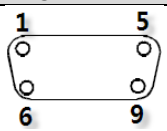


Items	TOP	External device	Remarks
Signal Level (port)	RS-232C	RS-232C (CPU port)	Fixed
Baud Rate	9600		Fixed
Data Bit	8		Fixed
Stop Bit	1		Fixed
Parity Bit	None.		Fixed

5. Cable table

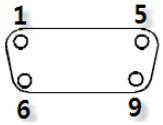
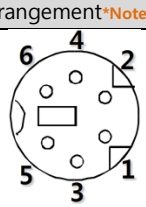
This chapter introduces a cable diagram for normal communication between the TOP and the corresponding device.
(The cable diagram described in this section may differ from the recommendations of "LS Industrial Systems Co., Ltd.")

■ RS-232C (K80S, K120S, K200S, K300S, K1000S, K500H, K1000H) (1:1 connection)

COM			Cable connection	External device		
Pin arrangement*Note 1)	Signal name	Pin number		Pin number	Signal name	Pin arrangement*Note 1)
 Based on communication cable connector front, D-SUB 9 Pin male (male, convex)	CD	1		1	CD	 Based on communication cable connector front, D-SUB 9 Pin male (male, convex)
	RD	2		2	RD	
	SD	3		3	SD	
	DTR	4		4	DTR	
	SG	5		5	SG	
	DSR	6		6	DSR	
	RTS	7		7	RTS	
	CTS	8		8	CTS	
		9		9		

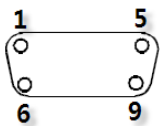
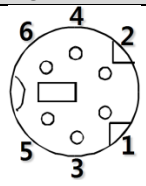
*Note 1) The pin arrangement is as seen from the connecting side of the cable connection connector.

■ RS-232C (K10S, K30S, K60S, K100S) (1:1 connection)

COM			Cable connection	PLC		
Pin arrangement*Note 1)	Signal name	Pin number		Pin number	Signal name	Pin arrangement*Note 1)
 Based on communication cable connector front, D-SUB 9 Pin male (male, convex)	CD	1		1		 Based on communication cable connector front, D-SUB 6 Pin male (male, convex)
	RD	2		2	RD	
	SD	3		3	SD	
	DTR	4		4		
	SG	5		5	SG	
	DSR	6		6		
	RTS	7				
	CTS	8				
		9				

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

■ RS-232C (K10S1) (1:1 connection)

COM			Cable connection	PLC		
Pin arrangement*Note 1)	Signal name	Pin number		Pin number	Signal name	Pin arrangement*Note 1)
 Based on communication cable connector front, D-SUB 9 Pin male (male, convex)	CD	1		1	RD	 Based on communication cable connector front, D-SUB 6 Pin male (male, convex)
	RD	2		2		
	SD	3		3		
	DTR	4		4	SD	
	SG	5		5		
	DSR	6		6	SG	
	RTS	7				
	CTS	8				
		9				

*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	Remarks
Input / Output Relay	P000 – P63F	P00 – P63	
Auxiliary Relay	M000 – M191F	M00 – M191	
Keep Relay	K000 – K31F	K00 – K31	
Link Relay	L000 – L63F	L00 – L63	
Special Relay	F000 – F63F	F00 – F63	Cannot be written
Timer(Contact)	T000 – T255	–	
Timer(Elapsed Value)		T000 – T255	
Counter(Contact)	C000 – C255		
Counter(Elapsed Value)		C000 – C255	
Step Relay		S00 – S99	
Data Register	D0000.00 – D9999.99	D0000 – D9999	

*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