KOYO Electronic Industries Co., Ltd.

DirectLogic Series

Computer Link Driver

Supported version TOP Design Studio V1.0 or higher

CONTENTS

We want to thank our customers who use the Touch Operation Panel.

1. System configuration

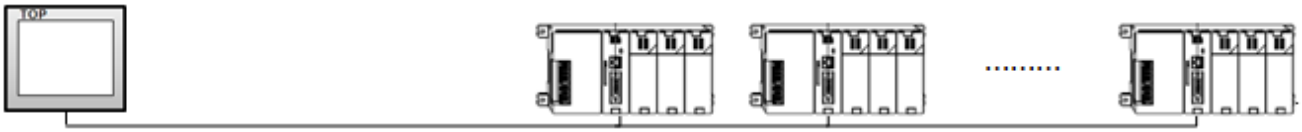
The system configuration of TOP and "KOYO Electronic Industries Co., Ltd. – DirectLogic Series Computer Link" is as follows.

Series	CPU	Link I/F	Communication method	System setting	Cable
DL-205	D2–240	communication port 2 on CPU	RS–232C	3. TOP communication setting 4.1. External device setting 1	5.1. Cable table 1
	D2–250–1	communication port 2 on CPU	RS–232C	3. TOP communication setting 4.1. External device setting 1	5.2. Cable table 2
	D2–260	communication port 2 on CPU	RS–232C	3. TOP communication setting 4.1. External device setting 1	5.3. Cable table 3
		communication port 2 on CPU	RS–422 (4 wire)		
DL-405	D4–403	D4–DCM	RS–232C	3. TOP communication setting 4.2. External device setting 2	5.4 Cable table 4
			RS–422 (4 wire)		
	D4–440	D4–DCM	RS–232C	3. TOP communication setting 4.2. External device setting 2	5.4 Cable table 4
			RS–422 (4 wire)		
		communication port on CPU	RS–232C	3. TOP communication setting 4.1. External device setting 1	5.5 Cable table 5
			RS–422 (4 wire)		
	D4–450	D4–DCM	RS–232C	3. TOP communication setting 4.2. External device setting 2	5.4 Cable table 4
			RS–422 (4 wire)		
		communication port on CPU	RS–232C	3. TOP communication setting 4.1. External device setting 1	5.6 Cable table 6
			RS–422 (4 wire)		
DL-305	D3-330	D3–DCM	RS–422(4 wire)	3. TOP communication setting 4.2. External device setting 2	5.7 Cable table 7

■ Connection configuration

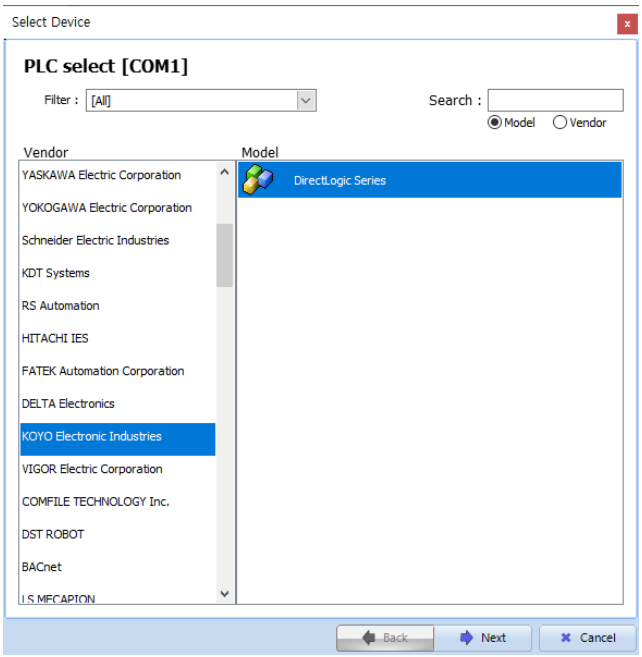
• 1:1 (one TOP and one external device) connection – configuration which is possible in RS232C/422 communication.

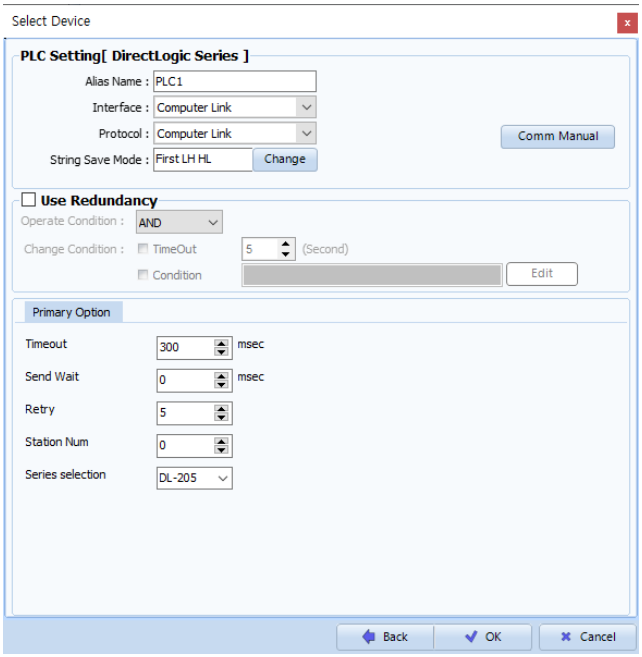
• 1:N (one TOP and multiple external devices) connection – configuration which is possible in RS422 communication.



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 "KOYO Electronic Industries".
	PLC	Select an external device to connect to TOP.

Model	Interface	Protocol
DirectLogic Series	Computer Link	Computer Link

Supported Protocol
DirectNet

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

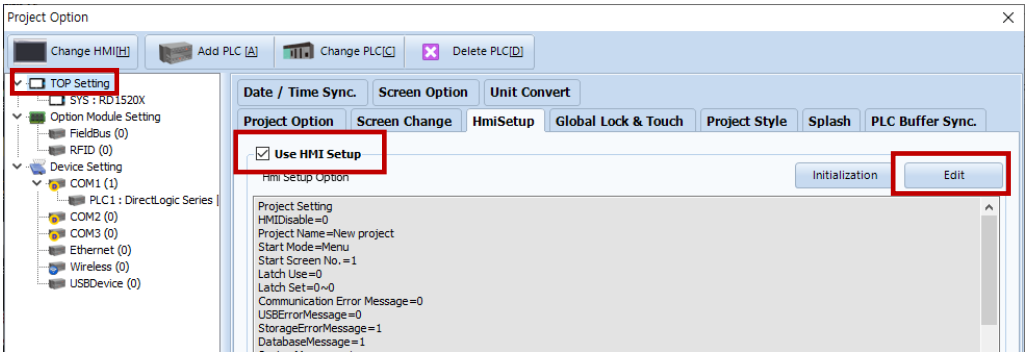
The communication can be set in TOP Design Studio or TOP main menu. The communication should be set in the same way as that of the external device.

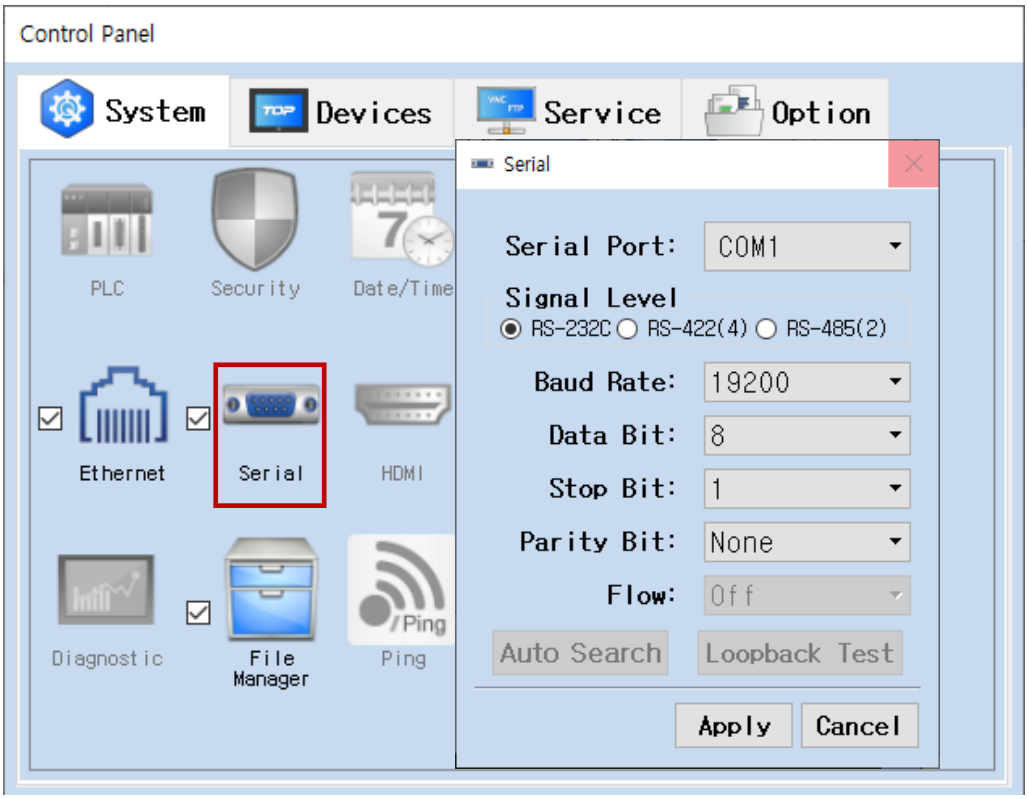
3.1 Communication setting in TOP Design Studio

(1) Communication interface setting

■ [Project > Project properties > TOP settings] → [Project option > Check "Use HMI settings" > Edit > Serial]

– Set the TOP communication interface in TOP Design Studio.





Items	TOP	External device	Remarks
Signal Level (port)	RS-232C RS-422		
Baud Rate	19200		
Data Bit	8		
Stop Bit	1		
Parity Bit	None.		

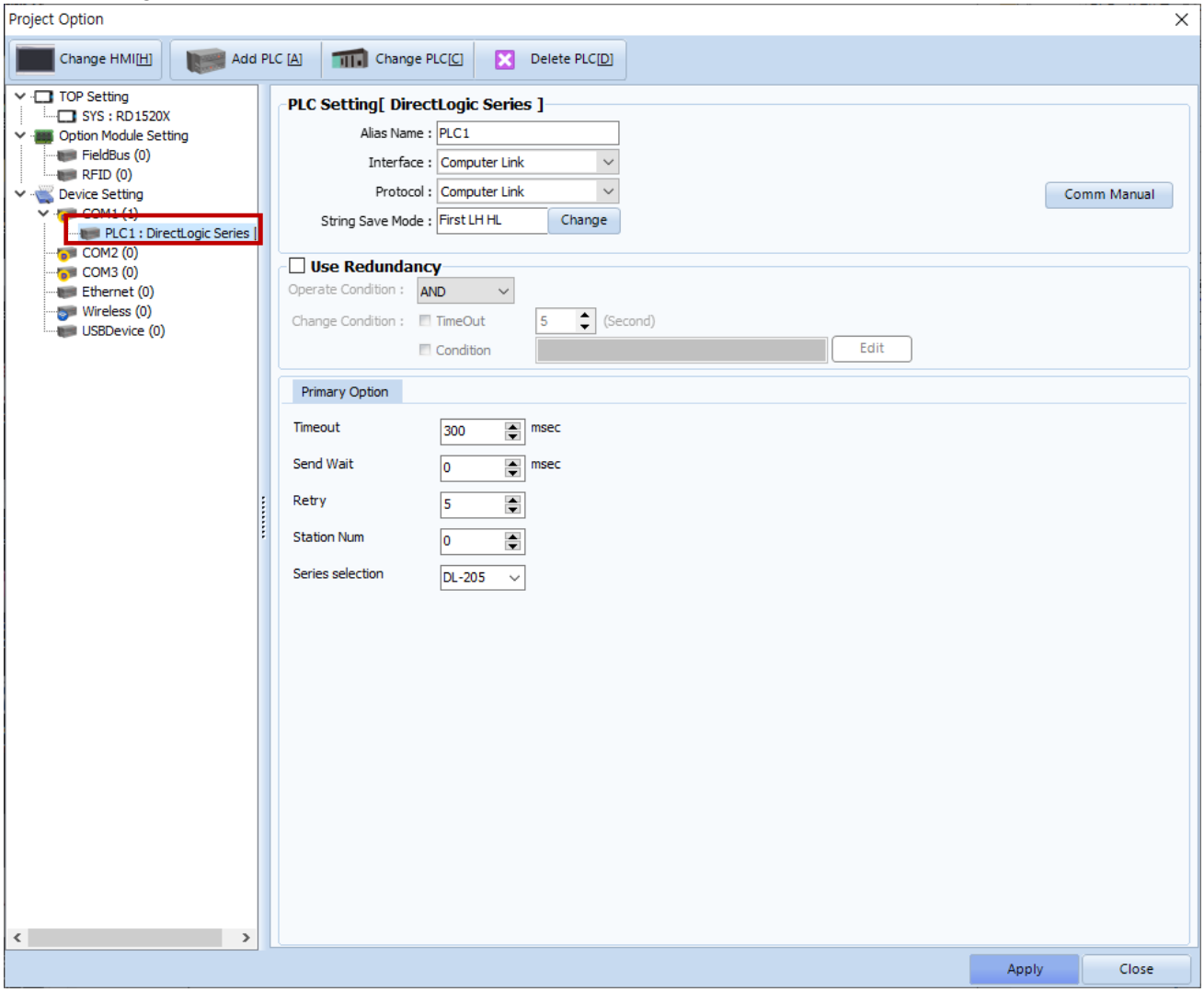
* The above settings are examples recommended by the company.

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 properties > PLC settings > COM > "PLC1 : DirectLogic Series"]

– Set the options of the communication driver of KOYO Electronic Industries – DirectLogic Series Computer Link in TOP Design Studio.

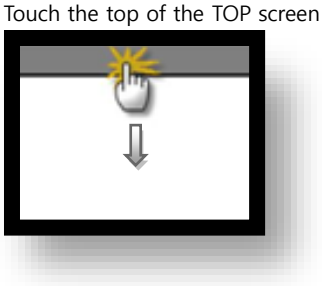


Items	Settings	Remarks
Interface	Select "Computer Link".	Refer to "2. External device selection".
Protocol	Select "Computer Link".	
TimeOut (ms)	Set the time for the TOP to wait for a response from an external device.	
SendWait (ms)	Set the waiting time between TOP's receiving a response from an external device and sending the next command request.	
Station Num	Enter the prefix of an external device.	
Series selection	Select the series of the external device.	

3.2. Communication setting in TOP

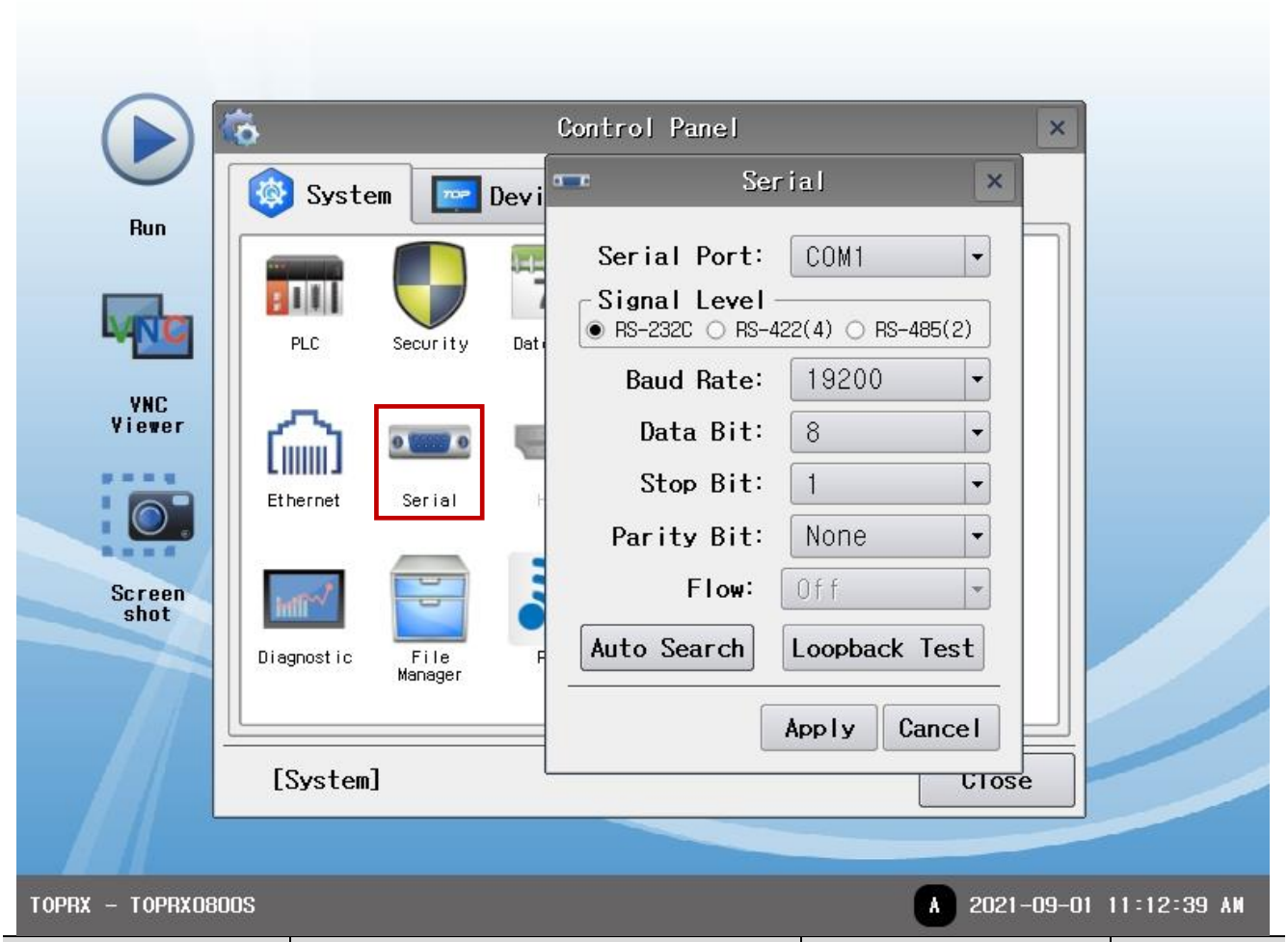
*** This is a setting method when "Use HMI Setup" in the setting items in "3.1 TOP Design Studio" is not checked.**

■ 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-422		
Baud Rate	19200		
Data Bit	8		
Stop Bit	1		
Parity Bit	None.		

* 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 "Computer Link".	Refer to "2. External device selection".
Protocol	Select "Computer Link".	
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.	
Station Num	Enter the prefix of an external device.	
Series selection	Select the series of the external device.	

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.

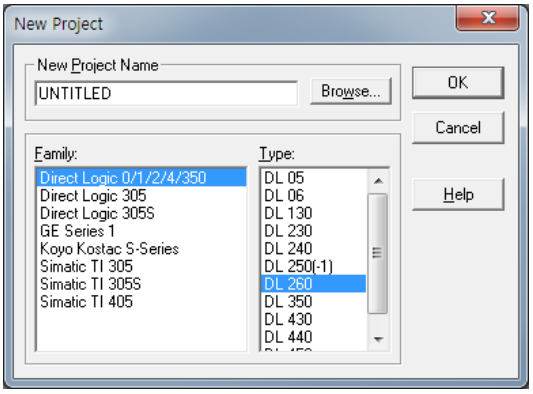
Items	Contents		Check		Remarks
System configuration	How to connect the system		OK	NG	1. System configuration
	Connection cable name		OK	NG	
TOP	Version information		OK	NG	2. External device selection 3. Communication setting
	Port in use		OK	NG	
	Driver name		OK	NG	
	Other detailed settings		OK	NG	
	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

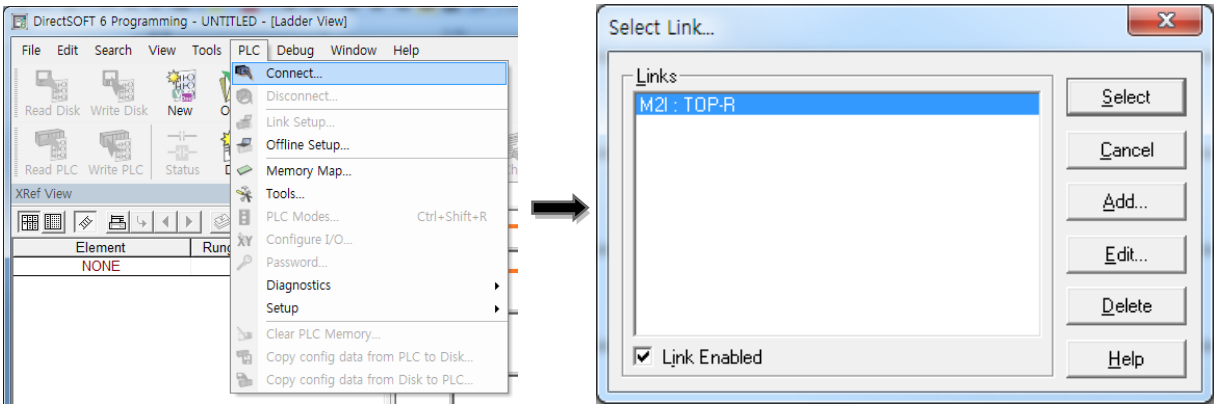
4.1 External device setting 1 (Port on CPU Unit)

Use "DirectLogic Series" Ladder Software "DirectSOFT6 Programming" to set as follows. For more detailed setting method than that described in this example, refer to the PLC user manual.

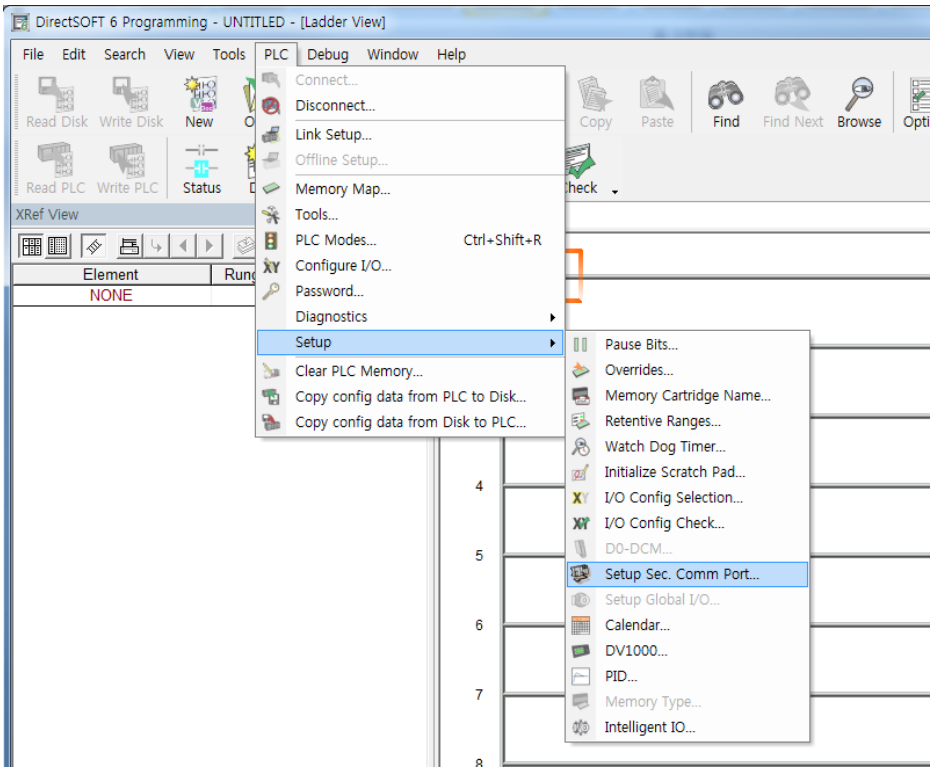
Step. 1 Create a new project.

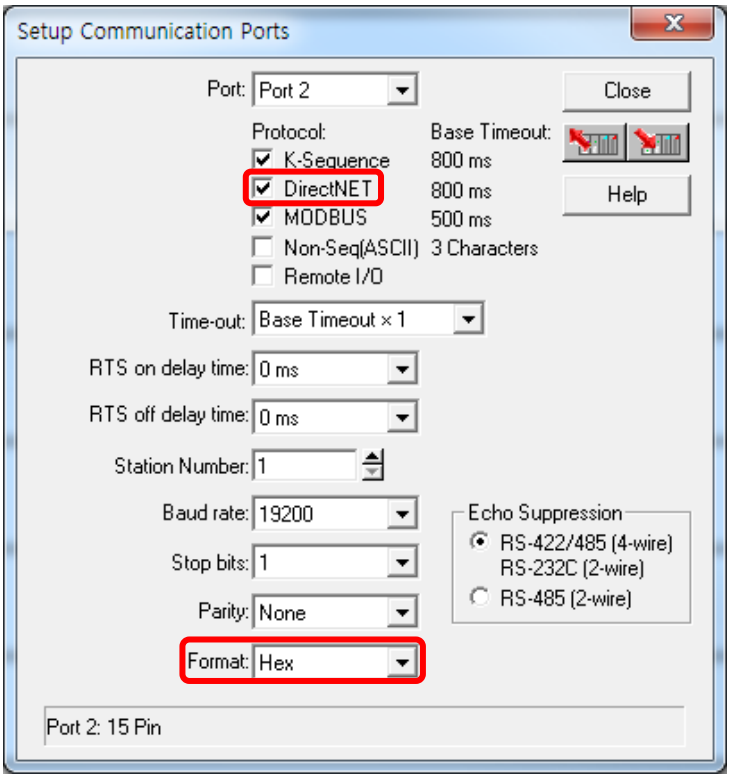


Step. 2 Execute [PLC > Connect] in the menu to set the communication method between PC and PLC and to connect to PLC.



Step. 3 Execute [PLC > Setup > Setup Sec. Comm Port...] in the menu to set the serial communication parameters of the external device.





Items	Settings	Remarks
Port	Port 2	
Protocol	**DirectNET**	**Required settings**
Station Number	1	
Baud rate	19200	
Stop bit	1	
Parity bit	None	
Format	**Hex**	**Required settings**

Step. 4 Send the settings to PLC.

4.2 External device setting 2 (D4-DCM)

Use the Dip Switch of "D4-DCM" communication module to set the communication as follows. After completing the setting, reboot the power.

For more detailed setting method than that described in this example, refer to the PLC user manual.

1. Rotary Switch (Module front, Station No. Setting)

Rotary Swtich	Settings	Settings	Remarks
Station No. x10	0	Station No. : 1	
Station No. x1	1		

2. DIP Switch SW4 setting (Back of the module , Serial Comm. Settings)

DIP Switch	Functions	Settings	Settings	Remarks
1	Baud Rate *Note 1)	On	Baud rate transmission speed: 19,200bps	
2		On		
3		On		
4	Parity	Off	None Parity (On : Odd Parity)	
5	Self Test	Off	Self-diagnosis mode: OFF	
6	Response delay time	Off	Response delay time: 0 ms	
7		Off		
8		Off		

*Note 1)

Baud	SW 1	SW 2	SW 3
4800	On	Off	On
9600	Off	On	On
19200	On	On	On
38400	Off	Off	Off

3. DIP Switch SW5 setting (Back of the module, Protocol Settings)

DIP Switch	Functions	Settings	Settings	Remarks
1	Protocol selection *Note 1)	**Off**	DirectNet Slave	**Fixed**
2		**Off**		
3	Communication Timeout	Off	Timeout enable/disable setting: Normal operation mode	
4	ASCII / HEX Mode	**Off**	Transmission mode: HEX mode	**Fixed**

*Note 1)

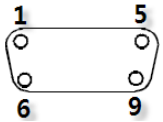
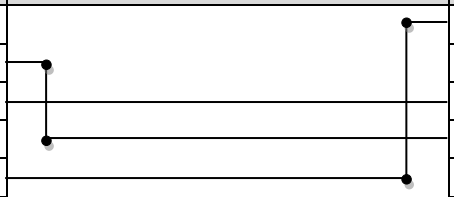
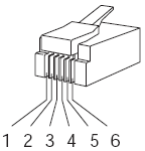
Protocol	SW 1	SW 2
DirectNet Slave	Off	Off
DirectNet Master	Off	On
DirectNet Peer	On	Off
Modbus RTU	On	On

5. Cable table

This chapter introduces a cable diagram for normal communication between the TOP and the corresponding device.
(The cable diagrams described in this chapter may differ from the recommendations of "KOYO Electronic Industries Co., Ltd.".)

5.1 Cable table 1 (D2-240 – Port on CPU Unit)

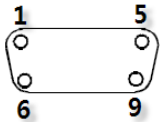
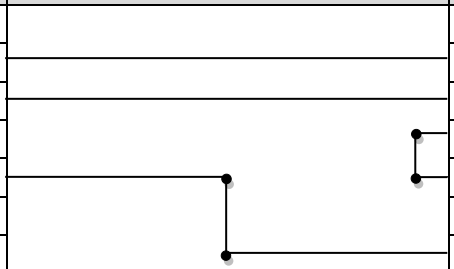
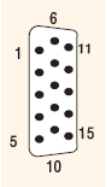
■ **RS-232C** (1:1 connection)

TOP			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	GND	 Based on communication cable connector front, 6 pin male RJ12 (male, convex)
	RD	2		2		
	SD	3		3	RXD	
	DTR	4		4	TXD	
	SG	5		5		
	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.

5.2 Cable table 2 (D2-250-1 – Port on CPU Unit)

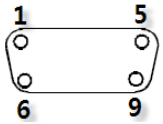
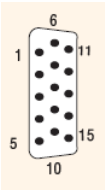
■ **RS-232C** (1:1 connection)

TOP			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	5VDC	 Based on communication cable connector front, D-SUB 15 Pin male (male, convex)
	RD	2		2	TXD	
	SD	3		3	RXD	
	DTR	4		4	RTS	
	SG	5		5	CTS	
	DSR	6		6		
	RTS	7		7	SG	
	CTS	8		8		
		9		9		

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

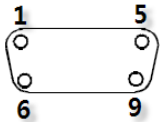
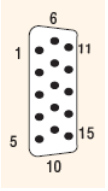
5.3 Cable table 3 (D2-260 – Port on CPU Unit)

■ **RS-232C** (1:1 connection)

TOP			Cable connection	PLC		
Pin arrangement*Note 1)	Signal name	Pin number		Pin number	Signal name	Pin arrangement*Note 1)
	CD	1		1	5VDC	
	RD	2		2	TXD	
	SD	3		3	RXD	
	DTR	4		4	RTS	
	SG	5		5	CTS	
	DSR	6		6		
	RTS	7		7	SG	
	CTS	8		8		
		9		9		
Based on communication cable connector front, D-SUB 9 Pin male (male, convex)						Based on communication cable connector front, D-SUB 15 Pin male (male, convex)

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

■ **RS-422** (1:1 connection)

TOP			Cable connection	PLC		
Pin arrangement*Note 1)	Signal name	Pin number		Pin number	Signal name	Pin arrangement*Note 1)
	RDA	1		6	RXD–	
		2		7	SG	
		3		9	TXD+	
	RDB	4		10	TXD–	
	SG	5		11	RTS+	
	SDA	6		12	RTS–	
		7		13	RXD+	
		8		14	CTS+	
		9		15		
Based on communication cable connector front, D-SUB 9 Pin male (male, convex)	SDB				CTS–	Based on communication cable connector front, D-SUB 15 Pin male (male, convex)

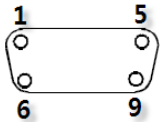
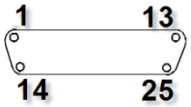
*Note 1) The pin arrangement is as seen from the connecting side of the cable connection connector.

■ **RS-422** 1 : N connection - Refer to 1:1 connection to connect in the following method.

TOP	Cable connection and signal direction	PLC	Cable connection and signal direction	PLC
Signal name		Signal name		Signal name
RDA		SDA		SDA
RDB		SDB		SDB
SDA		RDA		RDA
SDB		RDB		RDB
SG		SG		SG

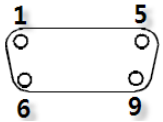
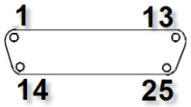
5.4 Cable table 4 (D4-DCM)

■ **RS-232C** (1:1 connection)

TOP			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 25 Pin female (male, convex)
	RD	2		2	TXD	
	SD	3		3	RXD	
	DTR	4		4	RTS	
	SG	5		5	CTS	
	DSR	6		6		
	RTS	7		7	SG	
	CTS	8				
		9		25		

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

■ **RS-422** (1:1 connection)

TOP			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)	RDA	1		14	OUT+	 Based on communication cable connector front, D-SUB 25 Pin female (male, convex)
		2		15	OUT–	
		3		17	IN+	
	RDB	4		16	IN–	
	SG	5		7	0V	
	SDA	6		10	RTS+	
		7		12	CTS+	
		8		11	RTS–	
	SDB	9		13	CTS–	

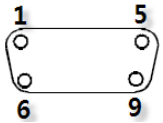
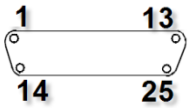
*Note 1) The pin arrangement is as seen from the connecting side of the cable connection connector.

■ **RS-422** 1 : N connection - Refer to 1:1 connection to connect in the following method.

TOP	Cable connection and signal direction	PLC		Cable connection and signal direction	Terminating PLC	
Signal name		Signal name			Signal name	
RDA		14	OUT+		22	OUT+
RDB		15	OUT–		23	OUT–
SDA		17	IN+		24	IN+
SDB		16	IN–		25	IN–
SG		7	0V		7	0V
		10	RTS+		10	RTS+
		12	CTS+		11	CTS+
		11	RTS–		12	RTS–
		13	CTS–		13	CTS–
		22	OUT+		14	OUT+
		23	OUT–		15	OUT–
		24	IN+		17	IN+
		25	IN–		16	IN–

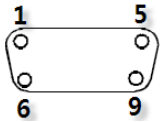
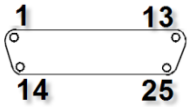
5.5 Cable table 5 (D4-440 – Port on CPU Unit)

■ **RS-232C** (1:1 connection)

TOP			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 25 Pin female (male, convex)
	RD	2		2	TXD	
	SD	3		3	RXD	
	DTR	4		4	RTS	
	SG	5		5	CTS	
	DSR	6		6		
	RTS	7		7	SG	
	CTS	8				
		9		25		

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

■ **RS-422** (1:1 connection)

TOP			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)	RDA	1		14	TXD+	 Based on communication cable connector front, D-SUB 25 Pin female (male, convex)
		2		16	TXD–	
		3		9	RXD+	
	RDB	4		10	RXD–	
		5		7	0V	
	SDA	6		19	RTS+	
		7		11	CTS+	
		8		18	RTS–	
	SDB	9		23	CTS–	

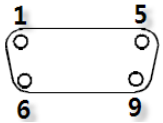
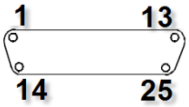
*Note 1) The pin arrangement is as seen from the connecting side of the cable connection connector.

■ **RS-422** 1 : N connection - Refer to 1:1 connection to connect in the following method.

TOP	Cable connection and signal direction	PLC		Cable connection and signal direction	Terminating PLC	
Signal name		Signal name			Signal name	
RDA		14	TXD+		14	TXD+
RDB		16	TXD–		16	TXD–
SDA		9	RXD+		9	RXD+
SDB		10	RXD–		10	RXD–
SG		7	0V		7	0V
		19	RTS+		19	RTS+
		11	CTS+		11	CTS+
		18	RTS–		18	RTS–
		23	CTS–		23	CTS–

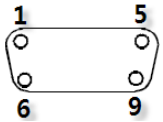
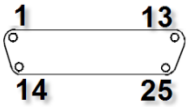
5.6 Cable table 6 (D4-450 – Port on CPU Unit)

■ **RS-232C** (1:1 connection)

TOP			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 25 Pin female (male, convex)
	RD	2		2	TXD	
	SD	3		3	RXD	
	DTR	4		4	RTS	
	SG	5		5	CTS	
	DSR	6		6		
	RTS	7		7	SG	
	CTS	8				
		9		25		

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

■ **RS-422** (1:1 connection)

TOP			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)	RDA	1		14	TXD+	 Based on communication cable connector front, D-SUB 25 Pin female (male, convex)
		2		16	TXD–	
		3		9	RXD+	
	RDB	4		10	RXD–	
		5		7	0V	
	SDA	6		19	RTS+	
		7		11	CTS+	
		8		18	RTS–	
	SDB	9		23	CTS–	

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

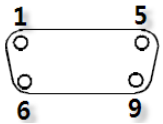
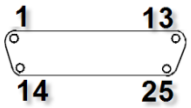
■ **RS-422** 1 : N connection - Refer to 1:1 connection to connect in the following method.

TOP	Cable connection and signal direction	PLC		Cable connection and signal direction	Terminating PLC	
Signal name		Signal name			Signal name	
RDA		14	TXD+		14	TXD+
RDB		16	TXD–		16	TXD–
SDA		9	RXD+		9	RXD+
SDB		10	RXD–		10	RXD–
SG		7	0V		7	0V
		19	RTS+		19	RTS+
		11	CTS+		11	CTS+
		18	RTS–		18	RTS–
		23	CTS–		23	CTS–

5.7 Cable table 7 (D3-330 – Port on CPU Unit)

■ 1:1 connection

■ **RS-422**

TOP			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)	RDA	1		14	OUT+	 Based on communication cable connector front, D-SUB 25 Pin male (male, convex)
		2		15	OUT–	
		3		17	IN+	
	RDB	4		16	IN–	
		5		7	0V	
	SDA	6		10	RTS+	
		7		12	CTS+	
		8		11	RTS–	
	SDB	9		13	CTS–	

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

■ **RS-422** 1 : N connection - Refer to 1:1 connection to connect in the following method.

TOP	Cable connection and signal direction	PLC		Cable connection and signal direction	Terminating PLC	
Signal name		Signal name			Signal name	
RDA		14	OUT+		22	OUT+
RDB		15	OUT–		23	OUT–
SDA		17	IN+		24	IN+
SDB		16	IN–		25	IN–
SG		7	0V		7	0V
		10	RTS+		10	RTS+
		12	CTS+		11	CTS+
		11	RTS–		12	RTS–
		13	CTS–		13	CTS–
		22	OUT+		14	OUT+
		23	OUT–		15	OUT–
		24	IN+		17	IN+
		25	IN–		16	IN–

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.

(1) DL-205

Device	Bit Address	Word Address	Remarks
Input Relay	X0000 ~ X0477	V40400 ~ V40423	
Output Relay	Y0000 ~ Y0477	V40500 ~ V40523	
Control Relay	C0000 ~ C0377	V40600 ~ V40617	
Special Relay	SP000 ~ SP137	V41200 ~ V41205	
	SP320 ~ SP617	V41215 ~ V41230	
Timer (Contact)	T000 ~ T177	V41100 ~ V41107	
Counter (Contact)	CT000 ~ CT177	V41140 ~ V41147	
Stage	S000 ~ S777	V41000 ~ V41037	
Timer (Elapsed Value)	———	V0000 ~ V0177	
Counter (Elapsed Value)	———	V1000 ~ V1177	
Data Register	V2000.0 ~ V3777.15	V2000 ~ V3777	
Special Register	V7746.0 ~ V7777.15	V7746 ~ V7777	

(2) DL-305

Device	Bit Address	Word Address	Remarks
I/O Relay	000 - 157 700 - 767	V000 –V014 V070 – V076(first half 1 byte)	
Control Relay	160 - 377 770 - 777	V016 – V036 V076 (latter half 1 byte)	
Shift Register	400 - 577	V040 - V056	
Timer/Counter(contact)	600 - 677	V060 - V066	
Timer/Counter (elapsed time)	——	V600 - V677	
Data Register	——	V400 - V576	

(3) DL-405

Device	Bit Address	Word Address	Remarks
Input relay	X0000 ~ X0477	V40400 ~ V40423	
Output relay	Y0000 ~ Y0477	V40500 ~ V40523	
Link relay	GX0000 ~ GX1777	V40000 ~ V40077	
Link output relay	GY0000 ~ GY3777	V40200 ~ V40377	
Control relay	C0000 ~ C0377	V40600 ~ V40617	
Special relay	SP000 ~ SP137	V41200 ~ V41205	
	SP320 – SP717	V41215 ~ V41234	
Timer(contact)	T000 ~ T377	V41100 ~ V41107	
Counter(contact)	CT000 ~ CT177	V41140 ~ V41147	
Stage	S0000 ~ S1777	V41000 ~ V41077	
Timer(Elapsed value)	———	V0000 ~ V0377	
Counter(Elapsed value)	———	V1000 ~ V1177	
Data register 1	V400.0 ~ V777.15	V400 ~ V777	
Data register 2	V1400.0 ~ V7377.15	V1400 ~ V7377	
Special register	V7400.0 ~ V7777.15	V7400 ~ V7777	
Data register 3	V10000.0 ~ V37777.15	V10000 ~ V37777	