HYOSUNG

MODBUS Slave

V1.0 or higher

MODBUS Serial Slave Driver

TOP Design Studio

Supported version

R

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 Page 2

Describes the devices required for connection, the setting of each device, cables, and configurable systems.

2. External device selection Page 3

Select a TOP model and an external device.

3. TOP communication setting Page 4

Describes how to set the TOP communication.

Page 11

Describes how to set up communication for external devices.

5. Cable table

Page 12

Describes the cable specifications required for connection.

6. Supported addresses

4. External device setting

Page 14

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



1. System configuration

This driver is the "Serial Slave Driver" among the "MODBUS Protocol" of "HYOSUNG".

Depending on the external device (MODBUS Slave Protocol supported), you may set the "command code", "protocol frame format" etc., of the driver separately. In this case, set the detailed settings according to the external device side based on the communication method.

The system configuration with an external device supported by this driver is as follows:

Series	СРИ	Link I/F	Communication method	System setting	Cable
			RS-232C	<u>3. TOP</u>	
	HYOSUNG MODBUS	Slave Device	RS-422 (4 wire)	<u>communication</u> <u>setting</u>	5. Cable table
			RS-485 (2 wire)	<u>setting</u>	

■ Connectable configuration

• 1:1 connection (one MASTER and one TOP) connection

Master			TOP		
 1:N connection 	i (one MASTER a	ind multiple TOPs) conn	ection		
Master			ТОР	Тор	 ТОР
• 1 : N connection	on (multiple Mas	ters and 1 TOP) connec	tion		
Master	Master		Master		Тор



2. External device selection

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

Select Device							x
PLC select [CO	M2]						
Filter : [All]			\sim		Search :		
						1odel (O Vendor
Vendor	^	Model					
I INMOT			HYOSUNG	VADAL			
		$\langle \mathcal{P} \rangle$	HYOSUNG	MODBUS Slave			
CHINO Corporation							
KOLVER Sri							
SENGENUITY							
PELCO							
FASTECH Co., Ltd.	_						
HYOSUNG							
NMEA							
AJINEXTEK Co., Ltd.							
IEC Standard							
CAS							
A&D							
SEHWA CNM	*						
Select Device		S Slave]				×
Select Device PLC Setting[HYOS Alias Name : Interface :	UNG MODBUS	S Slave]				x
Select Device - PLC Setting[HYOS Alias Name : Interface : Protocol :	UNG MODBUS PLC1 Serial MODBUS RTU(S Slave]			Comm	X
Select Device - PLC Setting[HYOS Alias Name : Interface : Protocol :	PLC1 Serial MODBUS RTU(S Slave]		(Comm	x Manual
Select Device PLC Setting[HYOS Alias Name : Interface : Protocol : Use Redundance	UNG MODBUS PLC1 Serial MODBUS RTU(S Slave]		(Comm	X Manual
Select Device PLC Setting[HYOS Alias Name : Interface : Protocol : Use Redundance Operate Condition : AN	UNG MODBUS PLC1 Serial MODBUS RTU(Y ID ~	S Slave]		(Comm	Manual
Select Device PLC Setting[HYOS Alias Name : Interface : Protocol : Operate Condition : Change Condition :	UNG MODBUS PLC1 Serial MODBUS RTU(Y JD TimeOut	S Slave] v v (Second)		[Comm	Manual
Select Device PLC Setting[HYOS Alias Name : Interface : Protocol : Operate Condition : Aliange Condition :	UNG MODBUS PLC1 Serial MODBUS RTU(MODBUS RTU(MD ~ TimeOut Condition	Slave)) V V (Second)			Comm	Manual
Select Device PLC Setting[HYOS Alias Name : Interface : Protocol : Use Redundanc Operate Condition : Change Condition : Primary Option	UNG MODBUS PLC1 Serial MODBUS RTU(MODBUS RTU(TimeOut Condition	Slave)] ▼ ▼ (Second)			Comm	Manual
Select Device PLC Setting[HYOS Alias Name : Interface : Protocol : Use Redundance Operate Condition : Change Condition : Primary Option SendWait (ms)	VING MODBUS PLC1 Serial MODBUS RTU(Y ImeOut Condition 300	Slave)] v v (Second)			Comm Edit	Manual
Select Device PLC Setting[HYOS Alias Name : Interface : Protocol : Use Redundance Operate Condition : Change Condition : Primary Option SendWait (ms) Station Num	UNG MODBUS PLC1 Serial MODBUS RTU(V V D Condition 300 0 ()	Slave)) v v (Second)			Comm Edit	Manual
Select Device PLC Setting[HYOS Alias Name : Interface : Protocol : Use Redundanc Operate Condition : Primary Option SendWait (ms) Station Num [AccessMemoryRange]	UHG MODBUS PLC1 Serial MODBUS RTU(V V TimeOut Condition 300 0 C C C C C C C C C C C C C	S Slave) v v			Comm	Manual
Select Device PLC Setting[HYOS Alias Name : Interface : Protocol : Operate Condition : Ange Condition : Primary Option SendWait (ms) Station Num [AccessMemoryRange] [0 Device]	UNG MODBUS PLC1 Serial MODBUS RTU(Y D TimeOut Condition 300 © 0 © 0 ©	Slave)) v v (Second)	10239		Comm	Manual
Select Device PLC Setting[HYOS Alias Name : Interface : Protocol : Use Redundance Operate Condition : Change Condition : Primary Option SendWait (ms) Station Num [AccessMemoryRange] [0 Device] [1 Device]	UNG MODBUS PLC1 Serial MODBUS RTU(Y ab TimeOut Condition 300 0 0 0 0 0 0 0 0 0 0 0 0	Slave)]	10239		Comm	Manual
Select Device PLC Setting[HYOS Alias Name : Interface : Protocol : Use Redundance Operate Condition : Change Condition : Primary Option SendWait (ms) Station Num [AccessMemoryRange] [0 Device] [1 Device] [3 Device] [4 Device] [5 D	UNG MODBUS PLC1 Serial MODBUS RTU(Y D TimeOut Condition 300 € 0 € 0 € 0 € 0 € 0 €	Slave]	10239 🕃 10239 🕃		Comm	Manual
Select Device PLC Setting[HYOS Alas Name : Interface : Protocol : Use Redundanc Operate Condition : Primary Option SendWait (ms) Station Num [AccessMemoryRange] [0 Device] [1 Device] [3 Device] [4 Device] [4 Device] [4 Device] [4 Device] [4 Device] [5 Device]	UNG MODBUS PLC1 Serial MODBUS RTU(Y UD V TimeOut Condition 0 0 0 0 0 0 0 0 0 0 0 0 0	Slave] ↓ ↓ (Second) ~ ~ ~	10239 🕃 10239 🕃 10239 📚		Comm	Manual
Select Device PLC Setting[HYOS Alias Name : Interface : Protocol : Use Redundanc Operate Condition : Primary Option SendWait (ms) Station Num [AccessMemoryRange] [0 Device] [1 Device] [3 Device] [4 Device] [Packet Count System B	UNG MODBUS PLC1 Serial MODBUS RTU(MODBUS RTU(Source of the series	Slave) v v v (Second)	10239 📚 10239 📚 10239 📚		Comm	X Manual
Select Device PLC Setting[HYOS Alias Name : Interface : Protocol : Use Redundanc Operate Condition : Primary Option SendWait (ms) Station Num [AccessMemoryRange] [0 Device] [1 Device] [3 Device] [4 Device] [Packet Count System B ReadPacketCount	UNG MODBUS PLC1 Serial MODBUS RTU(Y TImeOut Condition 300 € 0 € 0 € 0 € 0 € 0 € 0 € 0 €	Slave) v v v (Second)	10239 🔹 10239 📚 10239 📚 10239 📚		Comm	Manual

Settings		Contents				
TOP	Model	Check the TOP display and proc	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 "HYOSUNG".				
	PLC	Select an external device to connect to TOP.				
		Model	Interface		Protocol	
		HYOSUNG MODBUS Slave	Serial		Set Users	
		Supported Protocol				
	MODBUS RTU MODBUS ASCII				II	
		Please check the system config connect is a model whose syste	ease check the system configuration in Chapter 1 to see if the external device you want ponnect 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 Settings] → [Project Options > "HMI Setting Use" Check > Edit > Serial]
 - Set the TOP communication interface in TOP Design Studio.



Items	ТОР	External device	Remarks
Circuit (news)	RS-232C	RS-232C	
Signal Level (port)	RS-422/485	RS-422/485	
Baud Rate	384	400	
Data Bit	8	3	
Stop Bit		1	
Parity Bit	Nc	ne.	

* 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.

External device connection manual for TOP Design Studio

(2) Communication option setting

- [Project > Project property> PLC setting > COM > "PLC1 : MODBUS Slave]
 - Set the options of the MODBUS Serial Slave driver in TOP Design Studio.

Project Option		×
Change HMI[H] Add P	LC [A] TIT Change PLC[C] Delete PLC[D]	
 - TOP Setting SYS : RD1520X - Option Module Setting FieldBus (0) RFID (0) Ovice Setting COM1 (0) COM2 (1) 	PLC Setting[HYOSUNG MODBUS Slave] Alias Name : PLC1 Interface : Serial Protocol : MODBUS RTU(Slave)	Comm Manual
COM3 (0) Ethernet (0) Wireless (0) USBDevice (0)	Use Redundancy Operate Condition : AND Change Condition : TimeOut 5 (Second) Edit	
	Primary Option SendWait (ms) 300 Station Num 0 [AccessMemoryRange] [0 Device] 0 [1 Device] 0 [2 Device] 0 [3 Device] 0 [4 Device] 0 [7 Device] 0 [9 acket Count System Buffer] ReadPacketCount 0 [32Bit Swap] Unuse	
< >>		
		Apply Close

Items	Settings	Remarks
Interface	Select "Serial".	Refer to "2. External
Protocol	Select the communication protocol between the TOP and an external device.	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.	
Station Num	Set the TOP (Slave) prefix.	
AccessMemoryRange		
0 Devie	0 Device ADDRESS Range Setting	
1 Devie	1 Device ADDRESS Range Setting	
3 Devie	3 Device ADDRESS Range Setting	
4 Devie	4 Device ADDRESS Range Setting	
PacketCountSystemBuffer		
ReadPacketCount	ReadPacket Count	
WritePacketCount	WritPacket Count	
[32BIT SWAP]	Not used, used	

[32BIT SWAP] Changing Unuse to Use will activate the options below.

[220% Curren]		
[32BIT SWap]		
Use 🗸		
32Bit Swap Mode	Little Endian With byte-swapped(2 1 4 3) \sim	
SwapAddressRange	0 ~ 10239	
Swap Address Count	2 ~	
	Swap-SysAddr 1	
🚺 SYS 🗸 🗸 0000		
	Swap-SysAddr 2	
🚺 SYS 🗸 🗸 0000		~

- 32 BIT SWAP MODE

Big Endian Format(4 3 2 1)

Big Endian With byte-swapped(3 4 1 2)

Little Endian Format(1 2 3 4)

Little Endian With byte-swapped(2 1 4 3)

Put the 4 forms of data on the master and the default value is Little Endian With byte-swapped (2 1 4 3).

- SwapAddressRange

The swap sytem buffer range. If you don't intend to use it use 1 to 0 $\,$

- SwapAddressCount

You can choose individually, and not scope. Choose from 1-9.

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 Scree > Control Panel> Serial]

Items	ТОР	External device	Remarks	
Signal Level (port)	RS-232C	RS-232C		
	RS-422/485	RS-422/485		
Baud Rate	38400			
Data Bit	8			
Stop Bit		1		
Parity Bit	No	ne.		

* 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]

	ra.	Poor	Fral Danal				
		101		PLC			×
Run	System	Driver(COM2)	PLC1(HYOSUN	G MODBUS	S Slave)	•	
		Interface	Serial		-		_
MNC		Protocol	MODBUS RTU(Slave)	-		
	PLC See	SendWait	300 🖨				
VNC Viewer		Station N	0				
	[] 🔍	[AccessMe					
	Ethernet Se	[O Device	0	~	10	-	
		[1 Device	11	~	20	-	
Screen	HAT W	[3 Device	21	~	30	•	
Silot	Diagnostic f	[4 Device	31 🜲	~	40		
	Ma	[Packet (
		ReadPacke	500 🜲				- 1
	[System]	Diagnostic				Apply	Cancel

Items	Settings	Remarks
Interface	Select "Serial".	Refer to "2. External
Protocol	Select the communication protocol between the TOP and an external device.	device selection".
TimeOut (ms)	Set the time for the TOP to wait for a response from an external device.	
CondWait (ma)	Set the waiting time between TOP's receiving a response from an external	
Sendwalt (ms)	device and sending the next command request.	
Station Num	Set the TOP (Slave) prefix.	
AccessMemoryRange		
0 Devie	0 Device ADDRESS Range Setting	
1 Devie	1 Device ADDRESS Range Setting	
3 Devie	3 Device ADDRESS Range Setting	
4 Devie	4 Device ADDRESS Range Setting	
PacketCountSystemBuffer		
ReadPacketCount	ReadPacket Count	
WritePacketCount	WritPacket Count	
[32BIT SWAP]	Not used, used	

[32BIT SWAP] Changing Unuse to Use will activate the options below.

					TOP	대한민국대표 디지패널 Touch Operation Panel	
[32B	Bit Swap]						
	Use 👻						
	32Bit Swap Mode	Little Endian With by	yte-swapped(2	143) 🔻			
	SwapAddressRange	0	~	10239			
	Swap Address Count	2 🗸]				=
		Swap-SysAddr 1					
	SYS - 000	10					
		Swap-SysAddr 2					
	SYS - 002	o					-

- 32 BIT SWAP MODE

Big Endian Format(4 3 2 1)

Big Endian With byte-swapped(3 4 1 2)

Little Endian Format(1 2 3 4)

Little Endian With byte-swapped(2 1 4 3)

Put the 4 forms of data on the master and the default value is Little Endian With byte-swapped (2 1 4 3).

- SwapAddressRange

The swap sytem buffer range. If you don't intend to use it use 1 to 0 $\,$

- SwapAddressCount

You can choose individually, and not scope. Choose from 1-9.

3.3 Communication diagnostics

바하미그대표 더위했네

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.
- From [Control panel> Serial], confirm that the COM port settings you want to use are the same as 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 system		OK	NG	1 System configuration
configuration	Connection cable name	2	ОК	NG	<u>1. System computation</u>
TOP	Version information		OK	NG	
	Port in use		OK	NG	
	Driver name		OK	NG	
	Other detailed settings		OK	NG	
	Relative prefix	Project setting	ОК	NG	
		Communication	OK	NC	2. External device selection
		diagnostics	ŬK	NG	3. Communication setting
	Serial Parameter	Transmission	OK	NG	
		Speed	OK	NG	
		Data Bit	OK	NG	
		Stop Bit	OK	NG	
		Parity Bit	OK	NG	
External device	CPU name		OK	NG	
	Communication port name (module name)		OK	NG	
	Protocol (mode)		OK	NG	
	Setup Prefix		OK	NG	
	Other detailed settings		OK	NG	4 External device setting
Serial Parameter	Serial Parameter	Transmission Speed	ОК	NG	4. External device setting
		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

Refer to the user manual of the external device to set "HYOSUNG MODBUS Serial Slave Driver" in the external device I/F.

- Take caution when selecting RTU/ASCII mode in Protocol Frame format.

- Check the contents of the address map on the external device side and use the communication address according to its contents.

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 section may differ from the external device vendor's recommendations.)

■ RS-232C (1:1 connection)

CC	M				PLC
Pin	Signal	Pin	Cable connection	Signal	
arrangement*Note 1)	name	number		name	
15	CD	1			
$(\circ \circ)$	RD	2		SD	
	SD	3		RD	
6 9 Pacad on	DTR	4	•	DTR	
	SG	5		SG	
cable connector	DSR	6	•	DSR	
front	RTS	7	•	RTS	
D-SUB 9 Pin male	CTS	8		CTS	
(male, convex)		9			

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

■ **RS-422** (1:1 connection)

CC	M				PLC
Pin	Signal	Pin	Cable connection	Signal	
arrangement*Note 1)	name	number		name	
15	RDA(+)	1		SDA(+)	
$(\circ \circ)$		2	•	SDB(-)	
		3	•	RDA(+)	
6 9	RDB(-)	4	┝────┥│ ┡────	RDB(-)	
	SG	5		SG	
cable connector	SDA(+)	6	•		
front.		7			
D-SUB 9 Pin male		8			
(male, convex)	SDB(-)	9	•		

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

■ **RS-485** (1:1 connection)

CC	M				PLC
Pin	Signal	Pin	Cable connection	Signal	
arrangement*Note 1)	name	number		name	
15	RDA(+)	1	- p	SDA(+)	
$(\circ \circ)$		2	P	SDB(-)	
		3		RDA(+)	
6 9 Record on	RDB(-)	4	⊢ – –	RDB(-)	
communication	SG	5		SG	
cable connector	SDA(+)	6	-•		
front		7			
D-SUB 9 Pin male		8			
(male, convex)	SDB(-)	9			

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

■ **RS-485** (1:1 connection)

COM3				PLC
Din arrangement	Signal	Cable connection	Signal	
Pin analigement	name		name	
	+	•	SDA(+)	
0	-		SDB(-)	
O SG	SG	└──┐ └── ┤──	RDA(+)	
201 -		•	RDB(-)	
			SG	
0				

RS-422 (1:N connection) – Refer to 1:1 connection to connect in the following way.

TOP	Cable connection and signal	PLC	Cable connection and signal	PLC
Signal name	direction	Signal name	direction	Signal name
RDA(+)		SDA(+)		SDA(+)
RDB(-)		SDB(-)		SDB(-)
SDA(+)		RDA(+)		RDA(+)
SDB(-)		RDB(-)		RDB(-)
SG		SG		SG

■ RS-485 (1:N/N:1 connection) – Refer to 1:1 connection to connect in the following way.

TOP	Cable connection and signal	PLC	Cable connection and signal	PLC
Signal name	direction	Signal name	direction	Signal name
RDA(+)	• •	SDA(+)	• •	SDA(+)
RDB(-)		SDB(-)		SDB(-)
SDA(+)	┝━┫ ┣━	RDA(+)	<u>├</u> ●	RDA(+)
SDB(-)	⊢_ • •	RDB(-)	├	RDB(-)
SG		SG		SG

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.

	Bit Address	Word Address	32 bits	Remarks
Coil	00000.00 – 10239.15	00000 – 10239		
Discrete Input	00000.00 - 10239.15	00000 – 10239	1.41	*Note 1)
Input Register	00000.00 – 10239.15	00000 – 10239	L/H	*Note 1)
Holding Register	00000.00 - 10239.15	00000 – 10239		

*Note 1) Cannot be written (Read-only)

Maximum SYSTEM BUFFER is 10239

"HYOSUNG MODBUS Slave Driver	" Support Command (Function) Table
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Descriptions	Code	Descriptions	Code	Descriptions	Code
Read Coils	01	Diagnostics	08	Write File Record (Homing)	15
		(Homing)			
Read Discrete Inputs	02	Get Comm Event Counter	0B	Mask Write Register (Homing)	16
		(Homing)			
Read Holding Registers	03	Get Comm Event Log	0C	Read/Write Multiple registers	17
		(Homing)		(Homing)	
Read Input Registers	04	Write Multiple Coils	0F	Read FIFO Queue	18
				(Homing)	
Write Single Coil	05	Write Multiple registers	10	Encapsulated I/F Transport	2B
				(Homing)	
Write Single Register	06	Report Slave ID	11		
		(Homing)			
Read Exception Status	07	Read File Record (Homing)	14		
(Homing)					