HYOSUNG

VADAL

Welding Controller

V1.4.9.52 or higher

Supported version TOP Design Studio



CONTENTS

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

Ί.	System configuration	Page
	Describes connectable devices and network configuration	ons.
2.	External device selection	Page
	Select a TOP model and an external device.	
3.	TOP communication setting	Page
	Describes how to set the TOP communication.	
4.	External device setting	Page '
	Describes now to set up communication for external ac	evices.
5.	Cable table	Page 1
5.	Cable table Describe the cable specifications required for connection	Page '
5. 6.	Cable table Describe the cable specifications required for connectio Supported addresses	Page ' n. Page '



1. System configuration

The system configuration of TOP and "VADAL Welding Controller" is as follows.

Series	CPU	Link I/F	Communication method	System setting	Cable
VADAL		RS-485 Port on the board	RS485	<u>3. TOP</u> communication <u>setting</u> <u>4. External device</u> <u>setting</u>	<u>5. Cable table</u>

Connectable configuration

• 1:1 connection



• 1:N connection





2. External device selection

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

PLC select [CO	DM1]				
Filter : [All]			~	Search :	
				۲	Model 🔿 Vendor
Vendor		Model			
HYOSUNG	^		HYOSUNG VADAL		
NMEA .			HYOSUNG MODBUS Slave	e	
AJINEXTEK Co., Ltd.					
IEC Standard					
CAS					
A&D					
SEHWA CNM					
SHINHAN Electronics					
BONGSHIN LOADCELL					
FANUC Co., Ltd.	- 1				
MINEBEA Co., Ltd.					
Azbil Corporation	- 1				
KORO TECHNOLOGY					
ROBOSTAR	~				
PLC Setting[HYOS Alias Name :]			
Interface	Serial		~		
Interrace :		ol	\sim	0	
Protocol	VADAL Protoc				Comm Manual
Protocol : String Save Mode :	VADAL Protoc	Chan	ge	l	Comm Manual
Protocol : String Save Mode :	VADAL Protoc	Chan	ge		Comm Manual
The race : Protocol : String Save Mode : Use Redundance Operate Condition : A Charges Condition :	VADAL Protoc	Chan	ge		Comm Manual
The race : Protocol : String Save Mode : Use Redundance Operate Condition : Change Condition :	VADAL Protoc First LH HL V ND ~ TimeOut Condition	Chan	ge (Second)		Comm Manual
Trende Protocol String Save Mode Use Redundane Operate Condition : Change Condition : Primary Option	VADAL Protoc First LH HL V ND V TimeOut Condition	Chan	ge (Second)		Comm Manual
String Save Mode : String Save Mode : Use Redundance Operate Condition : Primary Option Timeout	VADAL Protoc First LH HL V ND V TimeOut Condition	Chan 5 ¢	ge (Second)		Comm Manual
Internet Protocol String Save Mode Use Redundance Operate Condition : Primary Option Timeout Send Wait	VADAL Protoc First LH HL V ID Condition 300	Chan	ge (Second)		Comm Manual
Protocol : String Save Mode : Use Redundance Operate Condition : Primary Option Timeout Send Wait Retry	VADAL Protoc First LH HL Y TimeOut Condition 300 5 5	Chan 5 ¢	ge (Second)		Edit
Protocol : String Save Mode : Use Redundane Operate Condition : Change Condition : Primary Option Timeout Send Wait Retry Station	VADAL Protoc First LH HL Y ND Condition 300 5 5 5 5 5 5 5 5 5 5 5 5 5	Chan 5 ¢	ge (Second)		Edit
Protocol String Save Mode Use Redundance Operate Condition : Primary Option Timeout Send Wait Retry Station Station Save Address	VADAL Protoc First LH HL Y ND → 1 TimeOut 2 Condition 300 € 5 € 5 € 5 € 5 € 5 € 5 €	Chan 5 ↓ msec] 1 ↓	(Second)		Edit
Protocol String Save Mode Use Redundanc Operate Condition : Primary Option Timeout Send Wait Retry Station Station Save Address Type Offset (A Dev.)	VADAL Protoc First LH HL y ND → TimeOut Condition 5 € Set (1:N) → ISYS Set Sys Set (1:N) →	Chan 5 ↓ msec] msec] 1 ↓ 04006	(Second)		Edit
Internet Protocol String Save Mode Use Redundanc Operate Condition : Primary Option Timeout Send Wait Retry Station Station Station Save Address Type Offset (A Dev.) Type Offset (P Dev.)	VADAL Protoc First LH HL Y ND → TimeOut Condition 300 章 5 章 5 set (1:N) → Syst Syst Syst Syst Syst	Chan 5 ↓ msec msec] 1 √ 04006 √ 04003 √ 04003	(Second)		Edit
Internet Protocol String Save Mode Use Redundance Operate Condition : Primary Option Timeout Send Wait Retry Station Station Station Save Address Type Offset (A Dev.) Type Offset (P Dev.) Timer No.	VADAL Protoc First LH HL	Chan 5 ¢ msec msec 1 v 04006 v 04003 v 04003 v 04003	(Second)		Edit
Protocol : String Save Mode : Use Redundanc Operate Condition : Change Condition : Primary Option Timeout Send Wait Retry Station Station Save Address Type Offset (A Dev.) Type Offset (P Dev.) Timer No. Data Conv	VADAL Protoc First LH HL Y ND J TimeOut Condition 300 Set (1:N) ~ Set (1:N) ~ Set (1:N) ~ Sys Sys Sys Sys Sys	Chan 5 ¢ msec msec 1 1 \$ 04006 \$ 04003 \$ 04003 \$ 04005	95 (Second)		Edit

Settings		Contents			
ТОР	Model	Select the TOP model.	Select the TOP model.		
External device	Vendor	Select the vendor of the ex Select "HYOSUNG".	elect the vendor of the external device to be connected to the TOP. elect "HYOSUNG".		
	PLC	Select the external device	to be connected to the TOP.		
		Model	Interface	Protocol	
		HYOSUNG VADAL	Serial	VADAL Protocol	
		Please check the system of connect is a model whose	configuration in Chapter 1 system can be configured.	to see if the external device you want to	



3. TOP communication setting

The communication can be set in TOP Design Studio or TOP-R 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] → [Property] → [TOP Setting] → [HMI Setup] → [Use HMI Setup Check] → [Edit] → [Serial]

- Set the TOP communication interface in TOP Design Studio.



Items	ТОР	External device	Remarks
Signal Level	RS-485	RS-485	
Baud Rate	384		
Data Bit	8		
Stop Bit	1		
Parity Bit	Eve	n	

 \ast The above settings are $\underline{examples}$ 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 : HYOSUNG VADAL]
 - Set the options of the communication driver of HYOSUNG VADAL in TOP Design Studio.

ject Option			
Change HMI[H] 🛛 💓 Add	PLC [A] TTTT Change PLC[C] 🔀 Delete PLC[D]		
TOP Setting	PLC Setting[HYOSUNG VADAL]		
SYS : RD1520X	Alias Name : PI C1		
FieldBus (0)			
	Interface : Senai		
Cevice Setting	Protocol : VADAL Protocol	Co	mm Manual
PLC1 + HYOSUNG VADAL	String Save Mode : First LH HL Change		
COM2 (0)			
	Use Redundancy		
Ethernet (0)	Operate Condition : AND V		
Wireless (0)	Change Condition : TimeOut 5 (Second)		
USBDevice (0)	Edit		
	Primary Option		
	Timeout and Tel mean		
	300 Sinsec		
	Send Wait 0 msec		
	Keuy 5		
	Station Set (1:N) V 1		
	Station Save Address SYS V 04006		
	Type Offset (A Dev.) Sys V 04003		
	Type Offset (P Dev.)		
	SYS V 04005		
	• Data Copy		
	Src No.		
	STS V 04000 V ED E		
	Dst No. Begin USYS V 04001		
	Dst No. End		
	515 V V4022 V L3 📖		
>			

ltems	Settings	Remarks
Interface	Select "Serial".	Refer to "2. External
Protocol	Select the communication protocol between the TOP and an external device.	device selection".
String Save Mode	Set the byte order of data when entering the string data.	
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.	
Retry	Set the number of request retries when the data request result is no response/negative response.	
Station	Set (1:N): Request data with the entered station number.	
	Search (1:1): Search for external devices. It sends "QV" command from 1 to 15, and	
	when it receives a response, it stops searching and starts data	
	communication.	
Stataion Save	Set the TOP internal address where the station number of the external device is saved.	
Address	If you select the Station item as Search (1:1), you can change the value of this internal	
	address to change the station number of the external device during the Run.	
Type Offset (A Dev.)	Set the TOP internal address that sets the series number when requesting data (welder	*Note 1)
	data) for address A.	Note I)
Type Offset (P Dev.)	Set the TOP internal address that sets the series number when requesting data (welder	*Note 1)
	data) for address P.	Note I)
Timer No.	Set the TOP internal address that sets the timer no. when sending a timer no change	*Noto 2)
	command ('N') that uses the address N.	Note 2)
Data Copy	Setting for address C operation	
Src No.	Set the TOP internal address to enter the source series number.	
Dst No. Begin	Set the TOP internal address to enter the destination starting series number	
Dst No. End	Set the TOP internal address to enter the destination end series number	

*Note 1) Command composition method: X[TOP internal address value] Y[Address] QB

*Note 2) Command composition method: N[TOP internal address value]

External device connection manual for TOP Design Studio



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

■ [Control Panel] → [Serial]



Items	ТОР	External device	Remarks
Signal Level	RS-485	RS-485	
Baud Rate	384		
Data Bit	8		
Stop Bit	1		
Parity Bit	Eve	n	

* 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

■ [Control Panel] \rightarrow [PLC]

	ŵ		PLC	×
	🔯 Syst	Driver(COM1)	PLC1(HYOSUNG VADAL) -	
KUII		Interface	Serial 💌	
		Protocol	VADAL Protocol 🔹	
M NC	PLC	Timeout	300 🖨 msec	
VNC		Send Wait	0 🖨 msec	
Viewer	l 🏠	Retry	5	
	Ethernet	Station	Set (🕶 1 ≑	
0.		Station S	SYS:04006:16:16:DEC:RW	
Screen	. mit	Type Offs	SYS:04003:16:16:DEC:RW	
shot	Intil *	Type Offs	SYS:04003:16:16:DEC:RW	
	Diagnostic	Timer No.	SYS: 04005: 16: 16: DEC: RW	
		Data Cor		•
	[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".
String Save Mode	Set the byte order of data when entering the string data.	
TimeOut (ms)	Set the time for the 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	
Sendwalt (ms)	sending the next command request.	
Retry	Set the number of request retries when the data request result is no response/negative response.	
Station	Set (1:N): Request data with the entered station number.	
	Search (1:1): Search for external devices. It sends "QV" command from 1 to 15, and when	
	it receives a response, it stops searching and starts data communication.	
Stataion Save	Set the TOP internal address where the station number of the external device is saved. If	
Address	you select the Station item as Search (1:1), you can change the value of this internal	
	address to change the station number of the external device during the Run.	
Type Offset (A Dev.)	Set the TOP internal address that sets the series number when requesting data (welder	*Noto 1)
	data) for address A.	Note T)
Type Offset (P Dev.)	Set the TOP internal address that sets the series number when requesting data (welder	*Noto 1)
	data) for address P.	Note 1)
Timer No.	Set the TOP internal address that sets the timer no. when sending a timer no change	*Note 2)
	command ('N') that uses the address N.	Note 2)
Data Copy	Setting for address C operation	
Src No.	Set the TOP internal address to enter the source series number.	
Dst No. Begin	Set the TOP internal address to enter the destination starting series number.	
Dst No. End	Set the TOP internal address to enter the destination end series number.	

*Note 1) Command composition method: X[TOP internal address value] Y[Address] QB

*Note 2) Command composition method: N[TOP internal address value]



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 that the settings of the connected ports in [Control Panel] \rightarrow [Serial] are the same as the settings of the external device.
- Diagnosis of whether the port communication is normal or not
- Touch "Communication diagnostics" in [Control Panel] \rightarrow [PLC].
- Check whether communication is connected or not.

Communication	Communication setting normal
diagnostics	
succeeded	
Error message	Communication setting abnormal
	- Check the cable. TOP, and external device settings. (Refer to 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 sys	stem	OK	NG	1 System configuration
configuration	Cable		OK	NG	1. System configuration
ТОР	Version		OK	NG	
	Communication port		OK	NG	
	Communication driver	and protocol	OK	NG	
	Other detailed settings	tailed settings		NG	
	Relative prefix	Project setting	OK	NG	
		Communication	OK	NC	2. External device selection
		diagnostics	ŬK	NG	3. Communication setting
	Serial Parameter	Transmission	OK	NC	
		Speed	ОК	NG	
		Data Bit	OK	NG	
		Stop Bit	OK	NG	
		Parity Bit	OK	NG	
External device	CPU		OK	NG	
	Communication port		OK	NG	
	Protocol		OK	NG	
	Setup Prefix		OK	NG	
	Other detailed settings		OK	NG	
	Serial Parameter	Transmission	OK	NC	
		Speed	ŬK	NG	
		Data Bit	OK	NG	
		Stop Bit	OK	NG	
		Parity Bit	OK	NG	
	Check address range				5. Supported addresses
			OK	NG	(For details, please refer to the PLC
					vendor's manual.)



4. External device setting

Refer to the vendor's user manual to identically configure the communication settings of the external device to that of the TOP.



5. Cable table

This chapter introduces a cable diagram for normal communication between the TOP and the corresponding device. (The cable diagrams in this section may differ from the external device vendor's recommendations.)

■ **RS-485** (1:1 connection)



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

■ **RS-485** (1:1 connection)

СОМ			External device		
Din arrangement	Signal	Cable connection	Signal		
Pin arrangement	name		name		
	+		+		
0	-		-		
SG SG	SG				
01 -					

■ RS-485 (1:N connection)

TOP	Cable connection and signal	Device	Cable connection and signal	Device
Signal name	direction	Signal name	direction	Signal name
RDA(+)	•	+		+
RDB(-)		-		-
SDA(+)	-•			
SDB(-)	•			
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.

Device	Description	Bit	Word	Read/Write	Remarks
D	Welder data	D000:00.00 ~ D255:99.15	D000:00 ~ D255:99	R/W	*Note 1)
А	Welder data	A00.00 ~ A99.15	A00 ~ A99	R/W	*Note 2)
Р	Welder data	P00.00 ~ P99.15	P00 ~ P99	R/W	*Note 3)
Т	Welding mode	T0.00 ~ T0.15	TO	R/W	*Note 4)
V	Version	-	V0 ~ V1	R	*Note 5)
G	Welding in progress Operation startng series number	-	G0	R	
ΗХ	When data errors Series number	-	HX0	R	
HY	When data errors Item number	-	HYO	R	
ZI	Input signal	ZI0.00 ~ ZI0.15	Z10	R	
ZO	Output signal	ZO0.00 ~ ZO0.15	ZO0	R	
E	Error code	-	E0 ~ E4	R	
Q	Data change flag	-	Q0	R	
S	Welder status	S0.00 ~ S0.15	SO	R	*Note 6)
С	Series data copy	C0.00	C0	W	*Note 7
Ν	Timer No. change	N0.00	N0	W	*Note 8
Ι	Welding condition initialization	10.00	10	W	
R	Status reset	-	RO	W	

*Note 1) D[Series]:[Item]

*Note 2) The address of the A device enters the items of the welder data, and the value of the TOP internal address set in the communication option 'Type Offset (A Dev.)' is applied as a series.

*Note 3) The address of the P device enters the items of the welder data, and the value of the TOP internal address set in the communication option 'Type Offset (P Dev.)' is applied as a series.

*Note 4)

Value	Status
0	Welding mode
1	Test mode
C	Pressurized
5	mode

*Note 5)

Address	Data
0	Version
1	Software
I	number

*Note 6)

Bit	15~4	3	2	1	0
	Reserved	Stepper done	Number of	Alarm	Abnormal
Status	area		hitting point		
			done		

*Note 7) Transmit the series data copy command ('C') when Writing operation of data to the C device. Parameters required for command transmission are applied as the value of TOP internal address set in the communication option 'Data Copy'.

*Note 8) Transmit the timer no change command ('N') when Writing operation of data to the N device. Transmitted timer no. is applied as the value of TOP internal address set in the communication option 'Timer No.'