# SIEMENS AG.

# **SIMETIC S7 Series**

# **ETHERNET(OP Communication) Driver**

OS Compatible version

Over 4.0.0.0

Over 4.0



**XDesignerPlus** 

# **CONTENTS**

Thank you for using M2I's "Touch Operation Panel(M2I TOP) Series". Please read out this manual and make sure to learn connection method and process of TOP External device"

### **1.** System configuration

### Page 2

It explains device for connection, setup of, cable and structural system. Please choose proper system referring to this point.

### 2. Selecting TOP model and external

### Page 4

### devices

Select TOP model and external device..

### **3.** Example of system settings

### Page 5

It explains setup example for communication connection between the device and external terminal.

Select example according to the system you choose in "1. System structure"

#### Page 8 4. Communication settings details

It explains the way of configuring TOP communication.

If external setup is changed, make sure to have same setup of TOP with external device by referring to this chapter.

### 5. Support address

### Page 10

Check available addresses to communicate with external devices referring to this chapter.



## 1. System configuration

TOP와 "SIEMENS AG - SIEMETIC S7 Series CPU ETHERNET(OP Communication)"의 시스템 구성은 아래와 같습니다.

Series	CPU	Link I/F	Method	System settings	Cable
SIMETIC S7-300	CPU312 IFM CPU313 CPU314 CPU314 IFM CPU315 CPU315(F)-2 DP CPU315(F)-2 PN/DP CPU316 CPU316-2 DP CPU317-2 DP CPU317-2 DP CPU317-2 CPU318-2 CPU318-2 CPU319-3 PN/DP CPU614 CPU388	CP 343-1 Lean CP 343-1 IT CP 343-1			
	CPU315-2 PN/DP CPU317-2 PN/DP CPU319-3 PN/DP	CPU Integrated Ethernet Port	Ethernet TCP	<u>3.1 설정 예제</u> <u>13.1 Setting</u> Example 1	Twisted pair cable*Caution1)
SIMETIC S7-400	CPU412-1 CPU412-2 DP CPU413-1 CPU413-2 DP CPU414-2 DP CPU414-3 DP CPU416-1 CPU416-2 DP CPU416-3 DP CPU416-3 DP CPU417-4 CPU416-3PN/DP CPU417 CPU486 CPU414-3PN/DP	CP 443-1 Lean CP 443-1 IT CP 443-1		<u>( Page 5 )</u>	
	CPU414-3PN/DP CPU416-3PN/DP	CPU Integrated Ethernet Port			

\*Caution1) Twisted pair cable

- This means STP(Shielded Twisted Pair cable) or UTP (Unshielded Twisted Pair cable) category 3,4,5.

- You can connect to configurational device such as hub, transceiver depends on the configuration and in this case, use direct cable.



■ Possible Connecting Configuration

• 1 : 1 connection(1 TOP and 1 External Device)



• 1 : N Connection (1 TOP and several external devices) Connection





## 2. Selecting TOP model and external devices

Select the external devices to connect to TOP.

-도액드 열성	
	HMI / PLC Uint
Series XTOP Series Model XTOP15TX-SA/SD	Vendor SIEMENS AG. PLC Model SIMETIC S7 Series CPU ETHERNET(OP Communic
	PLC
Vendor	Model
M2I CorporationMITSUBISHI Electric CorporationOMRON Industrial AutomationLS Industrial SystemsMODBUS OrganizationSIEMENS AG.SIEMENS AG.Rockwell Automation (AB)GE Fanuc AutomationPANASONIC Electric WorksYASKAWA Electric CorporationYOKOGAWA Electric CorporationSchneider Electric IndustriesKDT SystemsRS Automation(SAMSUNG)HITACHI IESFATEK Automation CorporationDELTA ElectronicsKOYO Electronic IndustriesVIGOR Electric CorporationComfile TechnologyDongbu(DASAROBOT)ROBOSTAR	PROFIBUS DP Slave         PROFIBUS DP Slave(EX Packet)         SIMETIC S7 Series 3964(R)/RK512         SIMETIC S7 Series CPU ETHERNET(OP Communication)         SIMETIC S7 Series ETHERNET(FETCH/VRITE)         SIMETIC S7 Series MPI Direct         SIMETIC S7 Series MPI with PC adaptor         SIMETIC S7-200 Series PPI

Setting	details	Contents					
TOP	Series	Select the name of a TOP series that is to be connected to PLC.					
		Before downloading the settings, install the OS version specified in the table below according to					
		TOP series.					
		Series Version name					
		XTOP / HTOP					
	Name	Select the model name of TOP product.					
External device	Manufacturer	Select the manufacturer of external devices to be connected to TOP.					
		Select "SIEMENS AG".					
	PLC	Select the model series of external devices to be connected to TOP.					
		Please choose "SIEMETIC S7 Seri	es CPU ETHERNET(OP Communic	cation)".			
		Please check, in the "1. System of	configuration", if the relevant ext	ernal device is available to set a			



			system configuration.
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## 3. Example of system settings

The setup of communication interface between TOP and SIEMTIC S7 is recommended as below.

### 3.1 Example of settings 1

Set the system as below.

Details	ТОР	SIEMTIC S	7 Series	Remark
IP Address*Caution1)Caution2)	192.168.0.50	192.168	User settings	
Subnet Mask	255.255.255.0	255.255	.255.0	User settings
Protocol	ТСР	ТСР		User settings
Port	2000	Read Port	102	User settings
		Write Port	102	

\*Caution1) The network address (the 3 front digits of IP, 192.168.000) TOP and external device must be identical. \*Caution2) Please do not use the same IP address in the same network.

### (1) XDesignerPlus setup

After setting the below details in [Project > Project Settings], download the detailed settings using TOP tool.

	From right window [ HMI Sotup > check Lice HMI Sotup > Davice Manager ]											
⊡ PLC Setting	HMI Setup Se	pcial Buffer S	Sync	. 50	tup >	CI		/3C	11111 30			iger j
	V Use HMI Set	up	-									
Ethernet (1)	System Setup	PLC Setup	Devi	ce M	anager		Interfac	e				
PLC1 : SIMETIC S7 Seri						-	* Net	wor	k			
FieldBus (0)			102		100		0		<b>E0</b>			
USB Device (0)	- IP address :		192	-	100	-	0	-	50	-		
CF Card Setting	- Subnet mask	C.	255		255	-	255	1	0	2		
····· CFCard	- Gateway :		192	7	168	Ŧ	0	Ŧ	1	<del>R</del> i		
	- From righ	t window	[ HMI	Se	tup >	· cł	neck L	Jse	HMI Se	etup > PLO	[ Setup ]	
	HMI Setup Se	pcial Buffer (	Sync									
	Use HMI Set	tup										
	System Setup	PLC Setup	Devi	ce N	lanage	r I	Interfac	ce				
		(PLC1	) SIME	TIC	S7 Se	ries	CPU E	TH	ERNET(	OP Commur	nication)	
	PLC IP :	192	\$ 168	3	0	\$	51	\$				
	Read Port :	102		\$					Time Out	ne –	1000	\$ msec.
	Write Port :	102		\$					Wait bef	ore send :	0	t msec.
	TOP Port :	2000		\$					Protocol	in an	TCP	•
	External de	evice setti	nas									
			comr		nicati	าท	driver	fo	r "SIFM		Series CPI	I FTHERNET(O
	This sets the	option of		miir								
L	This sets the	option of	com	nur	ncativ	011	anver	10		illic 57 c		
L	This sets the Communicatio	option of on)".	com	nur	incatio	F		nm lr	1fo			
	This sets the Communicatio	option of on)".	com	nur		F	PLC Con	nm lr	nfo			
L	Inis sets the Communicatio	option of on)". (PLC) :	192	thur t	, 168	F	LC Con	nm lr	nfo \$ . 51			
L	This sets the Communicatio IP Address ( Read Port (t	option of on)". (PLC) : 0~65535) :	192 102	thur t	168	P	LC Con	nm lr	nfo \$ . 51	¢		

-Reading port / writing port: Choose the port number that will be used for ethern communication.





#### (2) External device settings

Setup as below using SIEMTIC S7 Ladder Software STEP 7. Please refer the PLC user manual for more detailed information if you need.



Please do not use the same IP address in the same network.

- 1. Create a new project in [New Project] at upper bar of main menu of [SIMETIC Manager].
- 2. Select menu [Insert] > [Station] > [1 SIMETIC 400 Station] or [2 SIMETIC 300 Station]. → Add CPU
- 3. Double click added "[SIMETIC 400(1)]" or [SIMETIC 300(1)] CPU > Relevant CPU [Hardware] → New [HW Config] window appears.
- **4.** Open "[SIMATIC 400] > [RACK-400]" or "[SIMATIC 300] > [RACK-300]" at left tree window in [HW Config], select Base unit model, and register it using Drag & Drop to the right bottom.
- 5. Select [SIMATIC 400] > [PS-400] or [PS-300] and then appropriate power supply unit, and drag & drop it to the current Rack.
- 6. Select [SIMATIC 400] > [CPU-400] or [CPU-300] and then appropriate CPU unit and drag& drop it to the current Rack.
- (If [Properties] PROFIBUS interface DP] windows appears, press [Cancel] to finish).
  - ◆ When CPU PN/IO setting, right click [PN/IO] which is registered on CPU의 X2 > select [Object Properties...]

( A new [Prop	erties] w	ndow will be appe	ared.)	
Properties - PN-IC	0 - (R0/S2	.2)		
General Addresses	Options			
Short description:	PN-IO			
<u>D</u> evice name:	PN-IO			
_ Interface				
Type:	Ethernet			
Address:	192, 168, 0, 51			
Networked:	yes	Properties		
<u>C</u> omment:				
				~
				1
				11-1-2
UK			Cancel	Help

If communication card is used, select additional [SIMATIC 300] > [CP-300] 혹은 [SIMATIC 400] > [CP-400] to choose ethernet communication unit that is being used and drag & drop on current rack.

- ♦ When setting CP443-1 or CP343-1, right click [Ethernet communication unit name] > Select [Object Properties...]
  - ( A new [Properties] window will be appeared.)

Properties - CP 343-	1 - (R0/S4)	×
IP Access Protectio General	n   IP.Configuration   PROFINET   Diagnostics Addresses   Options   Time-of-Day Synchronization	l
Short Description:	CP 343-1 S7 CP for Industrial Ethernet TCP/IP with SEND-RECEIVE and FETCH -WRITE interface, PROFINET IO controller, PROFINET CBA, long data, UDP, TCP, ISO, S7 communication, routing, module replacement without PG, 10/100 Mbps, initialization over LAN, IP multicast, NTP,	
Order No,/ firmware	6GK7 343-1EX21-0XE0 / V1.1	
<u>N</u> ame:	[CP 343-1	
- Interface		
Type: Ethe	ernet	
Address: 192,	168,0,51	
Networked: Yes	Properties	
<u>C</u> omment:		
1		
1		
OK	Cancel Help	
large state of the		_

Solution on the next page.



7. From [Properties] Tap [General] > Click [Properties...] in the [Interface]. ( A new [Properties] window will be appeared.)

**8.** From [Parameters] Tap in [Properties] window, input [IP address] and [Subnet mask] of Ethernet communication module, and click [New...] key to register the information.

◆ In case of PN/IO	<ul> <li>In case of Ethernet Communication Module</li> </ul>
Properties - Ethernet interface PN-10 (R0/S2.2)	Properties - Ethernet interface CP 343-1 (R0/S4)
General       Parameters         JP address:       [192,168,0.51]         Subnet mask:       [255,255,255,0]         Subnet:	General       Parameters         Image: Set MAC address / use ISO protocol         MAC address:         Image: Set Mac address:
OK Cancel He	Ir OK Cancel Hel

9. Main Menu [Station] > select [Save And Compile] to error checking and save settings, download the saved information to PLC.

**10.** Reset the power of PLC after downloading.



## 4. Communication settings details

Communication settings are available at XDesignerPlus or TOP main menu. Communication settings must be identical with the external devices.

### 4.1 XDesignerPlus settings details

Select [Project > Project property] to show the below window.



#### Communication Interface Settings

Details	Contents
IP Address	Setup the IP address that TOP receives in the network.
Subnet mask	Input subnet mask of network
Gateway	Input subnet mask of network
PLC IP address	Input IP address that external device gets received.
Read Port / Write Port	Choose port number that will be used for ethernet communication of external device.
TOP port	Port number will be automatically setup if ethernet commucation with external device is in
	progress.
PLC address [0~65535]	Address of other device. Select between [0 - 65535].
Ethernet time out	Set up TOP's waiting time from external device at [0 - 99] x 100mSec.
Delay time of transmission	Set up TOP's waiting time between response receiving – next command request transmission
[ x1 mSec ]	from external device at [ 0 – 5000 ] x 1 mSec.



Protocol	Choose the protocol type that are authorized to use following external devices and setup port
	number.



#### 4.2 TOP main menu setup item

- When a buzzer is on during the power reset, touch 1 spot at the upper LCD to move to "TOP Management Main" display.

- Set up driver interface at TOP according to below	Step1 → Step2.
(Press "TOP ethernet setup" in <b>Step 1</b> to change s	setup at <b>Step 2</b> .)



Step 1. [ PLC setup ] - Setup driver interface.

PLC setup	
PLC IP: 192.168.0.51	Communication Interface
Protocol : TCP	Settings
PLC Read Port : 102	
PLC Write Port : 102	
TOP Port : 2000	
PLC Address : 00	
Timeout : 1000 [mSec]	
Delay time of transmission : 0 [mSec]	
TOP IP: 192.168.0.50	
OP Ethernet setting communication diagnosis	

Step 1–Reference.	
Details	Contents
PLC IP	It is an IP address that external device was given.
Protocol Choose the protocol type that are authorized to use following external devices and number.	
PLC Read Port	It is the port address that will be used for ethernet of external device.
PLC Write Port	It is the port address that will be used for ethernet of external device.
TOP port	Port number will be automatically setup if ethernet commucation with external device is in progress.
PLC address [0~65535]	Address of other device. Select between [0 - 65535].
Timeout [ x1 mSec ]	Set up TOP's waiting time from external device at [0 - 5000] x 1mSec.
Delay Time before transmitting [ x1 mSec]	Set up TOP's waiting time between response receiving – next command request transmission from external device at [ $0 - 5000$ ] x 1 mSec.
TOP IP	Setup the IP address that TOP receives in the network.

Step 2. [PLC Setup] > [TOP Ethernet Setup] - Setup the serial parameter of correspond port.

Port Settings	
* Ethernet Communication	Ethernet Port
+ Network setting	Communication Interface
- MAC : 00 - 15 - ID - 00 - 30 - 52 (each device has different address)	Settings
- IP Address : 192. 168 . 0 . 50	
- Subnet mask : 255 255 . 255 . 0	
- Gateway : 192 168 . 0 . 1	

Step 2–Reference.

Step 2-Reference.			
Details Contents			
MAC	Physical official address in the network.		
IP Address	Setup the IP address that TOP receives in the network.		
Subnet mask	An address that divides the network ID and host ID regarding of IP address.		
Gateway	An address that connects a network to another network.		





#### 4.3 Communication diagnosis

■ TOP - Confirming interface setting condition between external devices

- Move to Menu by clicking the top side of LCD screen as resetting the power of TOP.

- [Main Menu >Communication setting] Confirm if detail in number 20~24 is identical to the setup information of "■Setup exercise 1".

- PLC Setup > Click the button in "Communication diagnosis" of TOP Ethernet.

- Diagnosis dialog box will pop up on the screen, you can judge by following information that are shown on box no. 3 section.

OK!	Communication setting succeeded
Time Out Error!	Communication setting error
	- Error in the setting situation of Cable and TOP / External device
	(reference : Communication Diagnosis sheet)

Communication Diagnosis Sheet

- Please refer to the information below if you have a problem between external devices and communication connection.

Details	Contents				Con	firm		
TOP	Version Information		xDesignerPlus :		O.S :			
	Name of Driver						OK	NG
	External device information	IP Address					ОК	NG
	(xDesignerPlus	Subnet mask					OK	NG
	Project setting)	Gateway				OK	NG	
	TOP Information	Protocol	UDP/IP			TCP/IP	ОК	NG
	(Main Device Menu Setting)	IP Address					ОК	NG
		Subnet mask					OK	NG
		Gateway					OK	NG
	Other specified sett	ing info					OK	NG
System configuration	System Connection	Method	1:1	1:N N:1		N:1	ОК	NG
	Name of cable (Hub usage)		Direct (Use Hub) Cross (No Hub)		oss (No Hub)	OK	NG	
External device	Name of CPU						ОК	NG
	Name of communic	ation device					OK	NG
	Protocol(mode)						OK	NG
	Other specified sett	ing info			_		OK	NG
	IP Address		(Local)		(Destinat	ion)	OK	NG
	Port number		(Local)		(Destinat	ion)	OK	NG
	Subnet mask						OK	NG
	Gateway						ОК	NG
	Address range conf	irm (other docs)					ОК	NG



## 5. Support address

Devices that are usable with TOP is as below.

There might be difference in the range of device (address) by type / series of CPU module TOP series supports the maximum address range that external device series use Please refer each CPU module user manual carefully for devices that you desired to use to prevent not getting out of range.

	Bit address		Word address		32 bits	Remark
Input Relay	I00000.0 –	E00000.0 -	IW00000 –	EW00000 -	H/L	_
* caution1)	I04095.7	E04095.7	IW04095	EW04095	*caution4caution5)	
Output Relay	Q00000.0	A00000.0 –	QW00000 –	AW00000 –		_
* caution2)	-	A04095.7	QW04095	AW04095		
	Q04095.7					
Data Block	DB000	01 : DBX00000 -	DB00001 : DBW00000 -			_
	DB655	35 : DBX65533.7	DB65535 : DBW65532			
Internal Memory	M00000.0 - M08192.7		MW00000 - MW08192			_
Timer*caution3)	_		T00000 – T00255			Unavailable
						to write
Counter*caution3)	-	_	C00000 –	Z00000 –		Unavailable
			C00255	Z00255		to write

\*Caution1) Input Device (I,IW) might not be able to input read on the address of IW0 ~ IW2 because depends on the type of CPU, it becomes subordinate in the integrated I/O. Please refer to the PLC Manual.

\*Caution2) Output Device (Q, QW, QD) can write value only in the Run Mode. Output value will be reset if it's STOP Mode.

\*Caution3) Device Restricted to Read only

For displaying the timer, use the calculatation tag, and then devide the timer value to two piece.

At the following example, the inner buffer 1001 means the current timer value and the inner buffer 1002 means the unit. It means Unit) 0:10ms, 1:100ms, 2:1sec, 3:10sec

Preview	Conc	dition Ope	ration In	formation		
	OPE	RATION scar	delay 1	\$	x 500ms 🔻	
	No	Operation	DataType	Expression	1	
	1	WORD	DEC	(SYS)1001 = T0000 & 4095		
	2	WORD	DEC	(SYS)1002	2 = T0000 >> 12	

Internal 🔻	1001
Type Casting	
Nothing	•

\*Caution 4) Regarding on Word device, 32 but Data will be saved in the order of from High / Low, 16 bit each. (Example) VW00000 (32bit data, 0x12345678) → VW00000(16bit, 0x1234) VW00002(16bit, 0x5678) \*Caution5) Checks "Word Swap" function when 32BIT address is used.

Data Size	⑦ 16bit	32bit	🚺 Word Swap