

# Siemens S7-300 MPI

Supported Series: Siemens S7-300 series PLC Website: <u>http://www.siemens.com/entry/cc/en/</u>

## HMI Setting:

Parameters	Recommende	Options	Notes
PLC type	SIEMENS S7-30	0 MPI	
PLC I/F	RS-485 2W		
Baud rate	187.5K	19200,187.5K	*Note
Data bits	8		
Parity	Even		
Stop bits	1		
PLC sta. no.	2	2 ~ 31	

\*Note: MPI 19200bps does not support the following models: MT8071iP2, MT8102iP, MT6102iQ, TK6071iP, TK6071iQ, TK8071iP, TK8072iP

Online simulator	NO	Extend address mode	Yes
Broadcast command	NO		

## **Device Address:**

Bit/Word	Device type	Format	Range	Memo
В	I	DDDDo	0 ~ 40957	Input (I)
В	Q	DDDDo	0 ~ 40957	Output (O)
В	М	DDDDo	0 ~ 40957	Bit Memory
В	DBnBit	FFFFFDDDDo	0 ~ 6553599997	Data Register Bit
В	DBxBit	FFFFFDDDDDo	0 ~ 10700655327	
Б	DB1Bit ~		0 055057	Data Register Bit
D	DB99Bit	000000	0~000007	
W	IW	DDDD	0 ~ 4095	Input (I)
W	QW	DDDD	0 ~ 4095	Output (O)
Byte	MB	DDDD	0 ~ 4095	Bit Memory Byte
W	MW	DDDD	0 ~ 4095	Bit Memory
DW	MD	DDDD	0 ~ 4094	
Byte	DBBn	FFFFDDDD	0 ~ 655359999	Data Register
Byte	DBBx	FFFFFDDDDD	0 ~ 1070065535	

PLC Connection Guid							
Bit/Word	Device type	Format	Range	Memo			
W	DBn	FFFFFDDDD	0 ~ 655359999	Data Register (must be even)			
W	DBx	FFFFFDDDDD	0 ~ 1070065535				
			0 655250000	Data Register Double Word			
Dvv	חספט	FFFFDDDD	0~000099999	(must be even)			
DW	DBDx	FFFFFDDDDD	0 ~ 1070065535				
W	DBn_String	FFFFFDDDD	0 ~ 655359999				
W	DBx_String	FFFFFDDDDD	0 ~ 1070065535				
W	DBn_String1	FFFFFDDDD	0 ~ 655359999				
W	DBx_String1	FFFFFDDDDD	0 ~ 1070065535				
DW	DBDn_String	FFFFFDDDD	0 ~ 655359999				
DW	DBDx_String	FFFFFDDDDD	0 ~ 1070065535				
W	DB1 ~ DB99	DDDDD	0 ~ 65535	Data Register (must be even)			
W	Т	DDDDD	0 ~ 65535				
W	С	DDDDD	0 ~ 65535				

• Double word and floating point value must use DBDn device type.

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## **Multi-HMIs-Multi-PLCs Communication Setting:**



For SIEMENS S7-300 MPI driver in Multi-HMIs-Multi-PLCs communication, [Max. station no. (MPI network)] parameter must be correctly set. This setting is relevant to the station no. of the devices, as shown, two HMI (station no. 0, 1) and two PLC (station no. 2, 3) are in MPI network, Max. Station No. should be set to 3.

Device Properties
Name : SIEMENS 57-300 MPI
OHMI OPLC
Location : Local 💌 Settings
PLC type : SIEMENS S7-300 MPI
V.2.00, SIEMEN6_S7_300_MP1.so
PLC UF : RS-465 2W
COM1 (187:5K,E,8,1) Settings
PLC default station no. : 2
Default station no. use station no. variable
Max. station no. (MPI network) : 3
Interval of block pack (words) : 5
Max. read-command size (words): 20
Max. write-command size (words): 20
OK Cancel



For the effectiveness of communication, users may set PLC device in STEP 7 as shown below. In Properties MPI / Network Settings, set Highest MPI address to the number closest to the actual device station number.

General Paramete Address: Highest address: 31 Transmission rate: 1	rs   5 • 87.5 Kbps		
Subnet: not networked MPI(1)	 187.5 Kbps	New	
perties - MPI			
lighest MPI address:	15 V Change		
ransmission rate:	19.2 Kbps           187.5 Kbps           1.5 Mbps           3 Mbps           6 Mbps           12 Mbps		



- HMI sta. no. can not be the same as PLC sta. no.
- Highly recommended that the device station numbers start from 0 sequentially and correctly set [Max. station no. (MPI network)].



### How to Import Tag:

SIEMENS STEP 7 program allows building files of user-defined tag (\*.dif file and \*.AWL file), and import these files in EasyBuilder8000/EasyBuilderPro -> System Parameter Settings. The following describes how to build and import these two types of files.

### 1. Building \*.dif File

a > In "Symbols" create user-defined tag.



b · Click **Export** to export the edited file and click **Save**.

🗟 s	ymbol Editor - [S7 Program(3) (Symbols) 312\M3\CF	U 312C]	
8	Symbol Table Edit Insert View Options Window Help		Export ?
1	Open Close	Ctrl+O Ctrl+F4	Save in: @ Desktop
2 - 3 - 4	Properties		My Computer Conversion New Folder
5 6	Export		EBpro_v450_500  Bpro_v450_500 EBproV500
7 8	Print Print Preview Page Setup	Ctrl+P	
9 10 11 12	1 312\M3\CPU 312C\\Symbols 2 CPU315_2DP_PN\SIMATIC 300\CPU 315-2 PN/DP\\Symbols 3 CPU315_2DP_PN\SIMATIC 300(3)\CPU 315-2 PN/DP\\Symbols		Save as type: Data Interchange Format (*.DIF)
$\frac{13}{14}$	4 CP0315_20P_PN(51MATEC 300(2)(CP0 315-2 PN)DP((Symbols Exit	Alt+F4	



# 2. Building \*.AWF File

a > In **Blocks** create items as shown below:

⊡~ 🎒 312	System data	🕞 OB1	🖽 DB1	🖽 DB2	🖪 DB3
🚊 📶 МЗ	DB4	🖽 DB5	🖽 DB6	🖽 DB7	🖽 DB8
🖮 📓 CPU 312C	🗗 DB10	🕞 DB11	🖽 DB14	🖽 DB16	🖽 DB19
🖻 🗊 S7 Program(3)	🗗 DB20	🖽 DB30	🕞 DB32	🖽 DB40	🖽 DB41
	🕞 DB42	🕞 DB43	🕞 DB44	🕞 DB45	🖽 DB50
Blocks	🕞 DB51	🕞 DB52	🕞 DB53	🕞 DB55	🖽 DB60
	🕞 DB64	🖽 DB70	🕞 DB80	🕞 DB85	🖽 DB90
	🕞 DB98	🕞 DB99	🕞 DB100	🕞 DB101	급 DB110
	🔁 DB111	🖽 DB120			

b • Open LAD/STL, FBD – Programming S7 Blocks, click File -> Generate Source.

💼 STEP 7 🔹 🕨		🛅 NCM 57 🛛 🔸		I AD/STI /FBD : Program blocks
🛅 STEP 7-MicroWIN V4.0.6.35 🔹 🕨	·	Configure SIMATIC Workspace		File View Options Help
🛅 TD Keypad Designer V1.0.6.35 🕨		🔩 Converting S5 Files		New Ctrl+N
🛅 WinCC flexible 2008 🔹 🕨	·	🔣 LAD, STL, FBD - Programming S7 Blocks		Open Ctrl+O
🍠 SIMATIC Manager		Memory Card Parameter Assignment		Generate Source Ctrl+T
57-1200 Documentation	·	🞇 NetPro - Configuring Networks		1 312\M3\CPU 312C\\DB2-Off
🛅 Fatek PLC		🔀 PID Control Parameter Assignment		2 312\M3\CPU 312C\\block
🛅 BrowserPlus		S7-PDIAG - Configuring Process Diagnostics		3 312\M3\CPU 312C\\test 4 312\M3\CPU 312C\\test
🛅 ENI Utility		Setting the PG-PC Interface		+ 312(h)(CPO 312C()DB11-0h
🛅 WinPcap		II 405-S7 Converting TI Files		Exit Alt+F4
📶 Wireshark		jii TI 505-57 Converting TI Files		

c > Select **Sources** as storage path, specify the file name then click **OK**.

New			
Entry point: Project  Name: 312	View: Component view Storage path: C:\Program File:	v 💽	C Online © Offline Browse
	Object name:	Object_Tag	
	Object type:	STL Source	<b>_</b>
ОК			Cancel Help





## d > Select the objects to be exported then click **OK**.

Generate source Object_Tag							
Note: Automatic generation of single sources per block: Menu 'Options' > 'Customize' in the 'Sources' tab							
Path: 312\M3\CPU 312C\S7 Program(3)\Source         Blocks Not Selected:         DB1         DB3         DB4         DB5         DB7         DB8         DB10         DB14         DB15         DB14         DB15         DB14         DB15         DB14         DB15         DB14         DB15         DB16         DB32         DB40	ces Blocks Selected: DB2 DB6 DB11 DB20						
Name/Family: Addresses Addresses Addresses Addresses							
Source contains checksum of the blocks	Synbolic						
ОК	Cancel Help						

e • Under **Sources** there will be names of the saved files, select **Export Source** to build \*.AWL file.

SIMATIC Manager - [312 0	C:\Program	Files\Siemens\Step7		
File Edit Insert PLC View	Options Win	idow Help		
D 😂   🎛 🛲   X 🖻 🖻			🔁 📔 < No Filter	Export source
⊡ <b>£9</b> 312 ⊡ <b>∭</b> M3	Dbject_T	Open Object	Ctrl+Alt+O	Look in: 🞯 Desktop 💽 🔶 💼 🕂 🏢 -
🖻 🚺 CPU 312C		Cut	Ctrl+X	Arry Documents
⊡ sr] S7 Program(3)		Сору	Ctrl+C	👤 My Computer 🛛 🔁 New Folder
Blocks		Paste	Ctrl+V	Wy Network Places New Folder (2)
		Delete	Del	Carey706  EBpro_v450_500 Contemporation Contemporatio Contemporation Contemporation Contemporation Contemporati
		Insert New Object	•	EBproV500
		PLC		
		Compile	Ctrl+B	
		Export Source		File name: Object_Tag Same
		Print	νς <b>,</b>	Files of type: Sources (*.awl;*.gr7,*.scl;*.inp;*.zg;*.sdg;*.sd ▼ Cancel
		Rename	F2	
		Object Properties	Alt+Return	
		Special Object Properti	es 🕨	



The generated \*.dif and \*.AWL files can be imported in EasyBuilder8000/EasyBuilderPro **System Parameter Settings**, by clicking **Import Tag**.

stem Param	eter Settings						×
Font	Ex	tended Mer	mory	1	Printer/Backup S	erver	
Device	Model	Gene	eral	System S	Setting	Security	-
NO.	Name	Location	Device typ	е	Interface		UF F
iMH lead	Local HMI	Local	MT6070iH/	MT8070	Disable	1	N/A
New	Delete	) Set	ttings	Import	Tag		>

Tag information successfully imported.







## **Pass-Through Settings:**

**[Designate client IP]:** In Pass-through mode designate the client IP address to connect HMI. The "client" usually refers to Siemens Step 7 application.

Disable pass-throug	Jh		
IP address :	192 . 168 . 1	. 10	
	ОК	Cancel	

### [Utility Manager Settings]:

Utility manager -> Serial Pass-through Mode: MPI ISOTCP

Serial Pass-through
Interface (PC <-> HMI)
Ethernet     COM port
Virtual COM Port (PC <-> PLC)
COM3
Install Uninstall
Settings of Destination HMI
Mode : MPI ISOTCP V
IP: 192.168.1.133
Communication port : 8010 V (Default : 8000)
Pass-through port:102
PLC connection : COM 1 (LW-9902 on HMI))
Apply
Exit

**Note:** Only supports single-step monitoring address, continuous monitoring address function cannot be used in pass-through.

The following lists the system registers relevant to Siemens S7-200 PPI and Siemens S7-300 MPI Pass-through feature.

- [LW-10850: disable/enable (0 : disable, 1 : normal, 2 : IP limited) (siemens pass-through)]
- [LW-10851: destination COM port (siemens pass-through)]: Generally refers to the COM port connected with PLC.
- [LW-10852: destination PLC station no. (siemens pass-through)]
- [LW-10853: communication protocol (0 : invalid, 1 : PPI, 2 : MPI) (siemens pass-through)]
- [LW-10854 to LW-10857: IP of connecting client (siemens pass-through)]: Displays current client IP address connected with HMI.
- [LW-10858 to LW-10861: IP of designated client (siemens pass-through)]: If LW-10850 is set to 1, the system registers can be used to designate the client IP connected with HMI.
- [LW-10862: connection status (0 : ready, 1 : client connecting) (siemens pass-through)]
- [LW-10863: execution status (0 : normal, 1 : error) (siemens pass-through)]
- [LW-10864: the last error (siemens pass-through)]

# The following table lists the error codes, the description of each code, and the possible reason.

Error Code	Description	Possible Reason
0	Successfully executed	
1	Prohibit client from connecting	HMI is already running pass-through and
	НМІ	won't accept any request from other client.
2	Prohibit client from connecting	When LW-10850 is set to 1, the client IP for
	НМІ	connecting HMI is different from the IP
		specified in LW-10858 ~ LW-10861.
3	Invalid communication	Invalid setting in LW-10853.
	protocol	
4	Invalid PLC station number	The PLC station number specified in
		LW-10852 does not exist.
5	Delayed communication	PLC connection failure.
6	Busy communication	PLC does not accept pass-through request,
		please confirm PLC settings.
7	Invalid pass-through request	Environment setup failure.



# EasyAccess2.0 Network Pass-througth:

### Obtain SubnetID using S7-300 MPI SubnetID Tool

Setp1: Create S7-300 MPI Project, the options in **[Pass-Through Settings]** are all set to **unchecked.** Download the project to the HMI and make sure it communicates well with the PLC.

Device Settings	Х
Name : Siemens S7-300 MPI	
O HMI O Device	
Location : Local V Settings	
* Select Local for a device connected to this HMI, or Remote for a device connected through another HMI.	
Device type : Siemens \$7-300 MPI	
Device ID : 102, V.3.30, SIEMENS_S7_300_MPI.e30	
I/F: RS-485 2W V	
* Support off-line simulation on HMI (use LB-12358).	
COM : COM1 (187.5K,E,8,1) Settings	
* supported for units produced after July, 2018	
Device default station no. : 2	
Default station no. use station no. variable	
Max. station no. (MPI network) : 2 ~	
How to designate the station no. in object's address?	
Interval of block pack (words) : 5 V	
Max, write-command size (words) : 20	
	_
OK Cancel	





Step2: Open EasyAccess2.0, connect to the target HMI, and obtain the HMI IP.



#### Step3: Utility Manager -> S7-300 MPI SubnetID tool



Step4: Set HMI IP and Port number, After setting, click the button [Get SubnetID]

30 SubnetID Query App	- 🗆 🗙					
File						
PLC/HMI IP :	Port :					
10.7.60.48	102					
Subnet ID list :						
Please enter the button	Get SubnetID					



## Siement Step7 Software Operation

### Step1: Enable [Set PG/PC Interface]

SIMATIC Manager								
File	PLC	View	Options	Window	Help		_	
🗅 🗃 🚼 🕯		Customize			Ctrl+Alt+E	1		
			Simula	ite Module:	5			
			Set PG	5/PC Interf	ace			
			_					

Step2: Interface: Select the network card used [TCP/IP -> ... ]

And click Properties (to enter the interface on the right), make sure to check [Do not assgin IP addresses automatically]

Set DC/DC Interface	Properties - TCP/IP(Auto) -> Intel(R) PRO/1000 T Se 🛛 🔀
Set PG/PC Interface Access Path LLDP Access Point of the Application: S70NLINE (STEP 7) -> TCP/IP(Auto) -> Intel(R) PR0/1000 1  (Standard for STEP 7)	TCP/IP network IE-PG Access Details The IP addresses described here are needed by STEP 7 if the node is in a different subnetwork than the local IP address of the programming device. STEP 7 creates additional IP addresses on the local programming device / PC for this purpose.
Interface Parameter Assignment Used: TCP/IP(Auto) -> Intel(R) PRO/1000 T Se Properties Diagnostics Diagnostics Diagnostics Diagnostics Diagnostics Diagnostics Diagnostics Diagnostics Diagnostics Diagnostics Diagnostics Diagnostics Diagnostics	Do not assign IP addresses automatically     Assign IP addresses unique to the project     IP address Subnet mask Network address First IP address Last
Add/Remove: Select OK Cancel Help	
	OK Cancel Help



Step3: Open the project and click [Upload Station to PG...]

SIMATIC Man	ager - S7_Pro1			
File Edit Insert	FLC View Options Window Help			
🗅 🥔 🚼 👳	Access Rights	•	< No Filter >	🖸 🏹 💥 🗃 🔁 🛄 📢
2	Download Configure Comple and Download Objects Upload to PG Upload to PG Copy RMI to RCM Download User Program to Memory Card Save to Memory Card Baktrieve from Memory Card Manage M7 System Display Accessible Nodes Change Module Identification CPU Messages Display Force Values Monitor/Modify Variables	Ctrl+L Ctrl+K	17proj\S7_Pro1 on (1) (1)(2) (1)~(2) (2) (4) \$\$ MPI(13) \$\$ MPI(4) (AAAAAAAA	SIMATIC 300(1) SIMATIC 300(1)(1) SIMATIC 300(1)(1)(1)(1) SIMATIC 300(1)(1)(1)(1)(1) SIMATIC 300(1)(1)(1)(1)(3) SIMATIC 300(1)(1)(3) SIMATIC 300(1)(1)(3) MPI(01) MPI(11) MPI(14) MPI(2) CHAPTER (10) Ethernet(12)
_	Diagnostic/Setting	•		
	PROFIBUS Edit Ethernet Node Assign PG/PC Cancel PG/PC Assignment Update Pirmware Update the Operating System	•		
	Save Service Data			

### Step4: Select [Can be reached by means of gateway]

Fill in the fields in sequence [MPI] [PLC station number] [S7 subnet ID] [IP address] Finally, directly click [OK] to start uploading the PLC project. If you click [View], the PLC will not be found (as shown in the figure below).

Reck: 0 = Slot 0 = Target Station: C Local (* Can be reached by means of gateway Enter connection to target station: 1st gateway Type Address S7 subnet ID IP address MPI 2 FEDC-9527 10.7.60.48 Accessible Nodes	Which modu	de do you want to reach	?	
Enter connection to target station: Ist gateway Type Address S7 subnet ID IP address MPI 2 FEDC-9527 10.7.60.48 Accessible Nodes View	Rack: Not: Farget Statio	0 ↔ 0 ↔ n: C Local	abad bu waxaa af waxaa	
Type     Address     \$7 subnet ID     IP address       MPI     2     FEDC-9527     10.7.60.48	Enter conn	ection to target station:	chet by mean of games	1st gateway
MPI 2 FEDC-9527 10.7.60.48 Accessible Nodes View	Туре	Address	S7 subnet ID	IP address
Lccessable Nodes	MPI	2	FEDC-9527	10.7.60.48
	Provide A for the second secon	rvices connected to an e ust be appropriately pro by use of firewalls an r more information abo the Wwww.siemens.com/fi	View nterprise network or direc tected against unauthoriz d network segmentation. ut industrial security, plea industrialisecurity	tly to the internet ed access, se visit:



# Wiring Diagram:

### RS-485 2W

The serial port pin assignments may vary between HMI models, please click the following link for more information.

НМІ		PLC
<u>Link</u>		RS485 2W 9 D-Sub Male
Data-	<>	8 Data-
Data+	<>	3 Data+
GND	<>	5 GND