SIEMENS

Communications SmartLinx Modules

Operating Instructions

01/2018
A5E43778525-AA

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

⚠ WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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1.1 Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines, and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit:

http://www.siemens.com/industrialsecurity.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under

http://www.siemens.com/industrialsecurity.

1.2 Technical Support or Product Feedback

For product feedback or technical support, please contact your local Siemens representative or e-mail us at www.siemens.com/automation/support-request.

1.3 The Manual

Note

Please follow the installation and operating procedures for a quick, trouble-free installation and to ensure the maximum accuracy and reliability of your Siemens SmartLinx module.

This manual applies to the following SmartLinx modules:

- DeviceNet
- PROFIBUS DP-V0
- PROFIBUS DP-V1
- MODBUS TCP/IP
- EtherNet/IP
- PROFINET

This manual will help you install and connect the Siemens SmartLinx module and set it up for communication within a network. The manual is targeted at a technical audience in the industrial communications field with a sound working knowledge of each respective SmartLinx module.

We always welcome questions, comments, or suggestions about manual content, design, and accessibility.

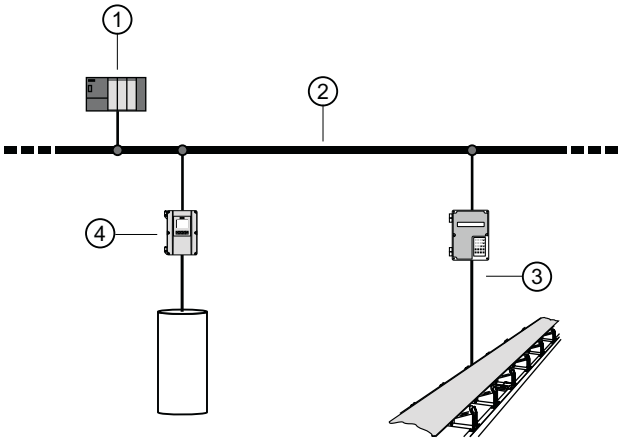
For the complete library of Siemens operating instructions, go to www.siemens.com.

1.4 SmartLinx modules

Note

This product is intended for use in industrial areas. Operation of this equipment in a residential area may cause interference to several frequency-based communications.

The Siemens SmartLinx modules are plug-in communications cards designed to interface a Siemens SmartLinx-compatible device to a module-specific network.



① PLC or PC Master
② Bus system
③ Weighing device
④ Level device

DeviceNet and EtherNet/IP are open standard controlled by the Open DeviceNet Vendors Association (ODVA). More information is available at the web site www.odva.org.

PROFIBUS and PROFINET are open standard controlled by PROFIBUS/PROFINET INTERNATIONAL industry groups worldwide. More information is available on the website www.profibus.com.

MODBUS TCP/IP is an open standard controlled by Open Modbus Organization. More information is available on the web site at http://www.modbus.org/

The Modbus/TCP protocol is an implementation of the standard Modbus protocol running on top of TCP/IP. The built in Modbus/TCP server provides access to the Input and Output Data areas via a subset of the functions defined in the Modbus/TCP specification.

All Modbus/TCP messages are exchanged through TCP port no. 502 and the Modbus/TCP server can handle a maximum of 8 simultaneous connections. For detailed information regarding the Modbus/TCP protocol, consult the Open Modbus Specification. (Page 69)

Note

Siemens does not own any of the SmartLinx module protocols. All information related to one of these is subject to change without notice.

Installing

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The SmartLinx module is either pre-installed in the Siemens device or shipped separately for on-site installation. Refer to the operating instructions of your Siemens device for details on module location and physical installation.

2.1 Compatibility

For each respective SmartLinx card, there are different hardware and software configurations available depending on the equipment used.

2.1.1 Software Compatibility

If a device is SmartLinx ready, it will work with the correct SmartLinx card for that device. However, if the firmware version is a lower number than the one listed below, the Map Element Selection Parameter (P762) will not be available. Also, for the BW500, BW500/L and the SF500, the read block will be a smaller size.

Product	Software Rev.	Device-Net	PROFI-BUS DP	PROFI-BUS DP-V1	MODBUS TCP/IP	EtherNet/IP	PROFI-NET
Milltronics BW500/L	3.13	x	x		x	x	x
Milltronics BW500		x	x		x	x	x
Milltronics SF500		x	x		x	x	x
MultiRanger 100	1.16.00-00	x	x				
MultiRanger 200		x	x				
MultiRanger 200 HMI	2.01.01-10	x	x	x	x	x	x
HydroRanger 200	1.16.00-00	x	x				
HydroRanger 200 HMI	2.01.01-10	x	x	x	x	x	x

Retrofits

If you are replacing an older SmartLinx device with a new SmartLinx device, and you are using any product other than the BW500, BW500/L or SF500, then you can use the default values for P762.

If you are replacing a BW500 or SF500 with FW < 3.05 with a new device, then set P762 primary index 15 = 0, and P762 primary index 16 = 0.

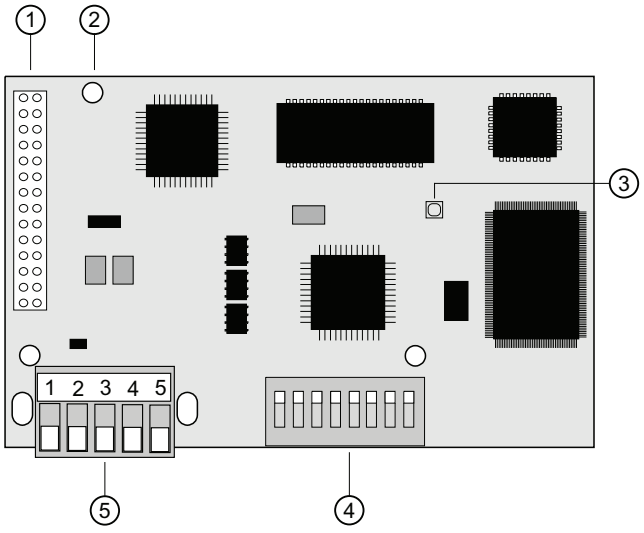
2.1.2 Hardware Compatibility

All available SmartLinx card configurations are shown here for reference.

Note

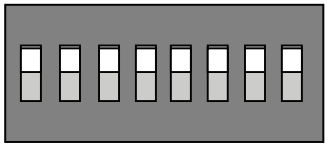
- Install the SmartLinx module so that the mounting holes align and the pin connectors mate correctly.
- Correct cable routing is important for electromagnetic noise suppression. Follow the routing instructions contained your device operating instructions.

2.1.2.1 DeviceNet

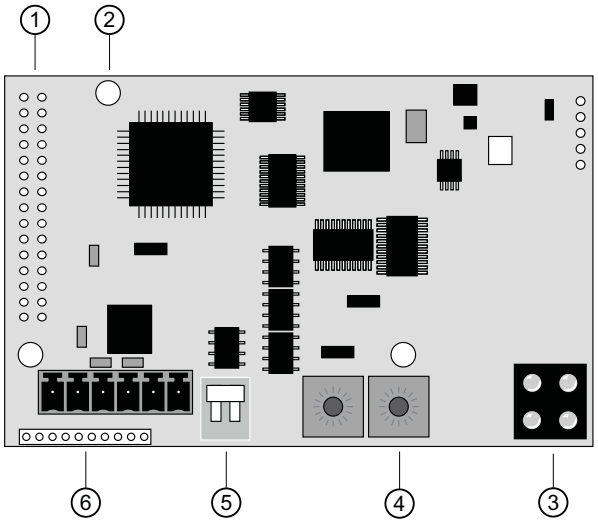


①	Module connector (underside, 34-pin) to Siemens device	④	DIP Switches
②	Mounting hole	⑤	Terminal block, removable
③	Operation LED		

Refer to the following diagram to view the DIP switches. DIP Switches 1 to 8 must be in the ON position to allow the selection of Media Access Control (MAC) ID and data rate.

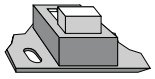
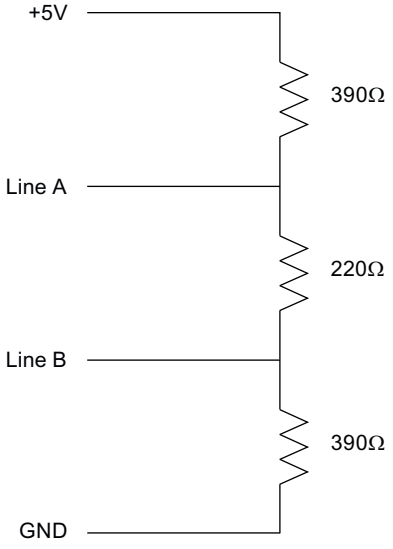
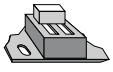


2.1.2.2 PROFIBUS DP-V0/V1



① Module connector (underside, 34-pin) to Siemens device
② Mounting hole
③ LED status indicators
④ Node address switches
⑤ Termination switch
⑥ Terminal block

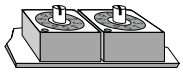
Termination switch

Termination	Setting	Switch position
open (not used)	off	
	on	

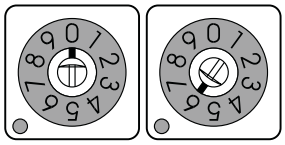
Termination of the bus at both end points is required. See Specifications (Page 69) for details.

Setting the Bus Address

Set the two rotary switches to the address for this slave.



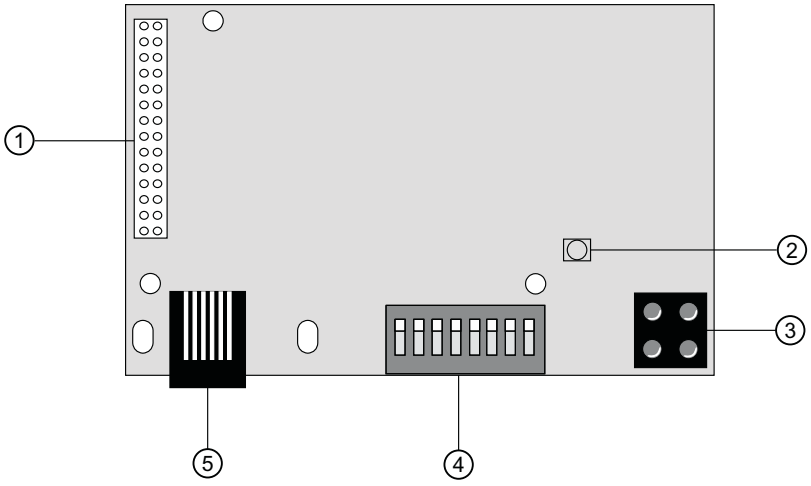
Use a slave address switch in the range 03 to 99. This example shows the value “06.”



Note

The address set by the dip switches are only read at power up. If you make a change to the address while the Siemens instrument power is on, you will will need to restart the device.

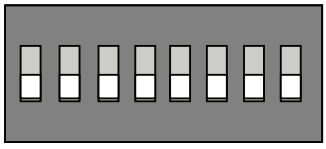
2.1.2.3 MODBUS TCP/IP and EtherNet/IP



① Module connector (underside, 34-pin) to Siemens device
② Operation LED
③ Status indicators (These LEDs indicate run time status and errors to the user)
④ Configuration Switch 3-1 'TCP/IP Settings'
⑤ Ethernet controller

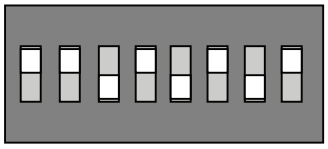
Setting all of the dip switches to the off position specifies that the network address will be set by the network configuration tool.

Set all dip switches "off".



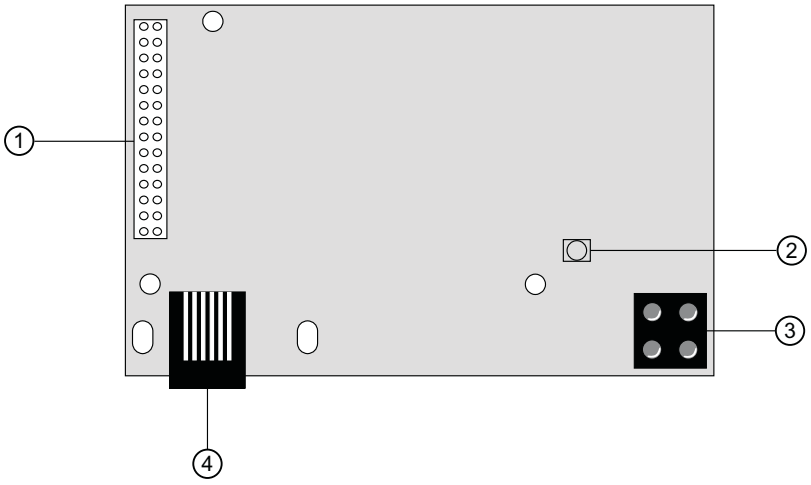
To set the last octet of the IP address via the dip switches, specify the binary coded decimal value by setting the appropriate switches, for example the following IP address is set to 192.168.0.42.

The dip switches below represent the last octet , ‘42’ or "00101010", 0 is up and 1 is down.



The switch settings are only read on power up of the device.

2.1.2.4 PROFINET

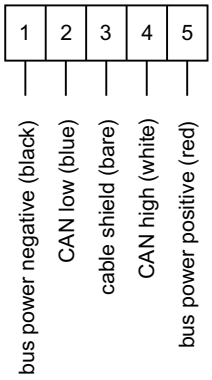


① Module connector (underside, 34-pin) to Siemens device
② Operation LED
③ Status indicators (These LEDs indicate run time status and errors to the user)
④ Ethernet connector

2.2 Cable Connector

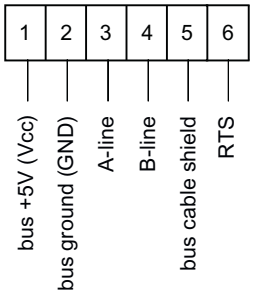
DeviceNet

Connect the DeviceNet card using cable which conforms to DeviceNet specifications and terminate according to the network requirements.



SmartLinx PROFIBUS DP-V0/V1

Connect using Belden PROFIBUS cable 3079A or equivalent and terminate according to PROFIBUS DP-V0/V1 specification and conventions.



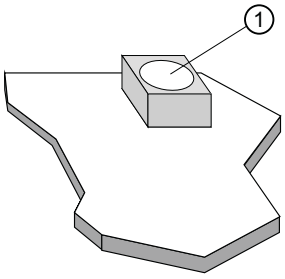
Note

- To daisy-chain devices, connect both wires to the existing A-line, and B-line and bus shield terminals.
- RTS is used in some equipment to determine the direction of transmission. In most applications only A-line, B-line, and shield, are used.

Operation

3

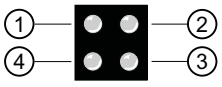
Operation LED



① LED
- blinks orange as the module is initialized
- blinks green during normal operation

3.1 LED status indicators

3.1.1 DeviceNet



① Reserved
② Network Status
③ Module Status
④ Reserved

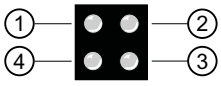
LED	State	Description
Network Status	OFF Green Red Green (blinking) Red (blinking)	Not powered/Not on-line Link OK on line, connected Critical Link Failure On line not connected Connection Time Out
Module Status	OFF Red Green Red (blinking)	No power Unrecoverable fault Device is operational Minor Fault

3.1.2 PROFIBUS DP-V0

Note

This assignment is applicable for the following devices:

- MultiRanger 200 HMI
- HydroRanger 200 HMI
- MultiRanger 100/200
- HydroRanger 100/200
- BW500
- BW500 Lite
- SF500



① Not used
② Fieldbus Online
③ Fieldbus Offline
④ Fieldbus Diagnostics

LED	State	Description
Fieldbus Online	Green Green, flashing Red OFF	Bus online, data exchange possible Clear mode Application stopped Bus not online, or no power
Fieldbus Offline	Red OFF	Bus offline Bus not offline, or no power
Fieldbus Diagnostics	OFF Red, flashing	No diagnostics present, or no power Error in Configuration Data, in Parameter Data, or in initialization of the Fieldbus communication ASIC.

Error conditions of the red diagnostics light

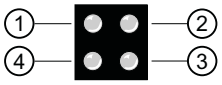
1Hz - Error in configuration	Indicates that the I/O length variable set during initialization is not equal to the length set during configuration of the network. See Configuring the slave device on page 10 for lengths supported by the SmartLinx module, and see your PLC documentation for setting the I/O length variable.
2Hz - Error in user parameter data	Indicates that the length and / or contents of the user parameter data set during initialization of the module is greater than the length and/or contents set during configuration of the network. See Configuring the slave device on page 10 for supported lengths.
4Hz - Error in initialization	Consult your Siemens representative.

3.1.3 PROFIBUS DP-V1

Note

This assignment is applicable for the following devices:

- MultiRanger 200 HMI
- HydroRanger 200 HMI



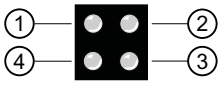
① Acyclic Traffic
② Fieldbus Online
③ Fieldbus Offline
④ Fieldbus Diagnostics

LED	State	Description
Acyclic Traffic	Green OFF	Executing a request. No request being executed, or no power
Fieldbus Online	Green Green, flashing Red OFF	Bus online, data exchange possible Clear mode Application stopped Bus not online, or no power
Fieldbus Offline	Red OFF	Bus offline Bus not offline, or no power
Fieldbus Diagnostics	OFF Red, flashing	No diagnostics present, or no power Error in Configuration Data, in Parameter Data, or in initialization of the Fieldbus communication ASIC.

Error conditions of the red diagnostics light

1Hz - Error in configuration	Indicates that the I/O length variable set during initialization is not equal to the length set during configuration of the network. See Configuring the slave device on page 10 for lengths supported by the SmartLinx module, and see your PLC documentation for setting the I/O length variable.
2Hz - Error in user parameter data	Indicates that the length and / or contents of the user parameter data set during initialization of the module is greater than the length and/or contents set during configuration of the network. See Configuring the slave device on page 10 for supported lengths.
4Hz - Error in initialization	Consult your Siemens representative.

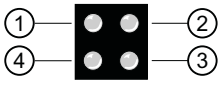
3.1.4 MODBUS TCP/IP and EtherNet/IP



① Link (Activity)
② Module Status
③ Network Status
④ Activity

LED	State	Description
Link (Activity)	OFF Green	Link not sensed Link sensed
Module Status	OFF Green (1Hz) Red (1Hz) Red (2Hz) Red (4Hz) Red	No power IP address not set using configuration switch Invalid MAD address (Internal Error) Failed to load Ethernet connection from FLASH Internal Error (Fatal) Duplicate IP address detected
Network Status	This LED indicates the number of established Modbus TCP/IP connections to the module. The number of established connections is equal to the number of flashes on this led.	
Activity	Green (flashing)	Each time a packet is received or transmitted

3.1.5 PROFINET



① Link (Activity)
② Communication Status
③ Module Status
④ not used

LED	State	Description
Link (Activity)	Green Green, flashing OFF	Link established Receiving/transmitting data No link or power off
Communication Status	Green Green, 1 flash OFF	On line, RUN - Connection with IO Controller established - IO Controller is in RUN state On line, STOP - Connection with IO Controller established - IO Controller is in STOP state Off line - No connection with IO Controller
Module Status	Green Green, 1 flash Green, 2 flashes Red, 1 flash Red, 3 flashes Red, 4 flashes OFF	Initialized, no error Diagnostic data available Blink. Used by an engineering tool to identify the Anybus module. Configuration Error - Too many modules/submodules - I/O size derived from IO Controller configuration is too large - Configuration mismatch (no/wrong module) No Station Name or no IP address assignet Internal error No power or not initialized

3.1.6 Module Identification

Note

Parameters P794 and P795 are used together to identify the module type and protocol used.. Please refer to the Parameters chapter of your Siemens device operating instructions for more details about the subject.

MultiRanger 200 HMI and HydroRanger 200 HMI used parameter 3.2.12.4 for module type and parameter 3.2.12.5 .for the protocol type.

P794 (3.2.12.4.) SmartLinx Module Type (Read only)

Indentifies the module used

Value	Module
0	No module present
1	Anybus DT module
2	Anybus S module

P795 (3.2.12.5.) SmartLinx Protocol (Read only)

Identifies the protocol used: The value varies according to the module, and whether it is a Type 1 or Type 2.

Siemens device	Module	SmartLinx Module Type value	SmartLinx Protocol value
MultiRanger 200 HMI	PROFIBUS DP-V1	2	5
HydroRanger 200 HMI		2	5
MultiRanger 100/200 BW500/SF500	PROFIBUS DP-V0	2	1
MultiRanger 100/200, BW500/SF500, MultiRanger 200 HMI, HydroRanger 200 HMI	DeviceNet	2	37
BW500/SF500, BW500L, MultiRanger 200 HMI, HydroRanger 200 HMI	MODBUS TCP/IP	2	BW500/BW500L/ SF500 = 131
BW500/SF500, BW500L, MultiRanger 200 HMI, HydroRanger 200 HMI	EtherNet/IP	2	BW500/BW500L/ SF500 = 131
BW500/SF500, BW500L, MultiRanger 200 HMI, HydroRanger 200 HMI	PROFINET	2	BW500/BW500L/ SF500 = 132

P634 Communication Totalizer Resolution for BW500/L and SF500 only

Parameter P634 is used to set the number of fixed decimal places for Total 1 and Total 2 for SmartLinx communication.

P634 Index	Description	Value		# of decimal places
Primary Index 1	Total 1 for SmartLinx communication	3	*1	3
		2		2
		1		1
		0		0
Primary Index 2	Total for SmartLinx communication	3	*	3
		2		2
		1		1
		0		0

The asterisk (*) denotes factory setting.

3.2 Communication Setup

3.2.1 DeviceNet

The SmartLinx DeviceNet module is a slave device on the network. It is a DeviceNet Group 2 server only as determined in the predefined master/slave connection definitions.

3.2.1.1 EDS Files

DeviceNet requires an Electronic Data Sheet (EDS) to configure a slave. An EDS contains product specific information and is designed to make configuration easier.

MultiRanger 100/200, HydroRanger 200, MultiRanger 200 HMI, HydroRanger 200 HMI, BW500, SF500 and BW500 Lite

Note

To determine the SmartLinx card firmware version, see the lower right corner of the card. The last 3 numbers indicate the firmware version. e.g. Firmware version 2.2.1:

Anybus
M00453
3266-2.2.1

The file for the SmartLinx DeviceNet card is called hms-1003.eds for card firmware V2.2.1, and EDS_ABS_DEV_2_3.EDS for card firmware ≥ 2.2.1.

The file can be downloaded from Siemens Service and Support.

I/O Configuration

The data size of the input and output modules is dependent on P762, and on the type of unit the module is plugged into (see the three categories below). The following instructions assume that P762 is set to the default values shown in the chart in chapter Map Element Selection (Page 29).

Note

P762 is not available on:

- MultiRanger 200 HMI
- HydroRanger 200 HMI

SmartLinx module	MultiRanger 100/200, HydroRanger 200		BW500/ SF500		BW500 Lite		MultiRanger HMI HydroRanger HMI	
	Input data	Output data	Input data	Output data	Input data	Output data	Input data	Output data
DeviceNet	42 Word	13 Word	34 Word	19 Word	23 Word	10 Word	42 Word	13 Word

Some configurations may also require some of the following information:

- Device Type is 12(0x0c)
- Product code is 12
- Vendor ID is 90 (0x5a)

3.2.1.2 Communications Parameters

The following parameters must be defined in the Siemens device to establish successful communication. Instructions on how to set these parameters are found in the associated device manual.

Note

* denotes factory setting.

P751 Baud Rate

Sets the baud rate according to the following table

0 = 125 Kbps *
1 = 250 Kbps
2 = 500 Kbps

P752 MAC ID

Sets the MAC ID (slave address). Valid addresses range from 0 to 63. The default value is 63.

Sample Code

Also online are some sample PLC programs for the Allen-Bradley PLC5, SLC500, and ControlLogix. These programs are intended as a guide only. Siemens assumes no responsibilities for their application.

Set-up Procedure

The set-up procedure will vary depending on the type of equipment used. Generally do the following steps:

1. Import the Siemens EDS file into your network configuration software.
2. In the software, configure the Siemens instrument at the desired MAC address.
3. Add the Siemens instrument to the ScanList of the scanning instrument (DeviceNet master). It would be added as Polled I/O with the Rx and Tx as stated on page 12 for the product you are using.
4. Download the new configuration into the DeviceNet Scanner.
5. Configure the Siemens device to the correct baud rate and MAC ID (P751, P752) and connect it to the network. Refer to the following section on Specific Parameters.
6. Program the PLC to read and write the information from the scanner. This step varies with the PLC. For example, for the PLC5, set up a block transfer read and a block transfer write. Please see the Support website for example code.

3.2.2 PROFIBUS DP-V0/V1

The SmartLinx PROFIBUS DP-V0/V1 module is a slave on the bus, and does not use any Siemens device parameters for configuration. Set the rotary switches on the module to the desired slave address. Other settings are provided in the GSD file or are automatically detected if the default read and write block sizes are being used.

3.2.2.1 GSD Files

A PROFIBUS master requires the GSD file for each device on the network. The GSD file contains parameter and capability information regarding the slave device.

For the **SmartLinx PROFIBUS DP-V0** module, the GSD file is hms.1003.gsd

For the **SmartLinx PROFIBUS DP-V1** module, the GSD file is SIEM81C6.gsd

The files can be downloaded from Siemens Service and Support website:

PROFIBUS DP-V0 Support Disk (https://support.industry.siemens.com/cs/document/18732178/support-disk-for-smartlinx-profibus-dp?dti=0&pnid=17252&lc=en-WW)

PROFIBUS DP-V1 Support Disk (https://support.industry.siemens.com/cs/document/109481809/gsd%3A-hydroranger-200-hmi-multiranger-200-hmi-profibus-dp-simatic-s7-pcs7-step7-tia-portal-?dti=0&pnid=17252&lc=en-WW)

Note

After you import the GSD files, you can find HMS1003.gsd module in the hardware catalogue. If you are using Step 7, go to PROFIBUS DP > Additional Field Devices > General > Anybus-S-PDP.

SIEM91C6.gsd can be found under PROFIBUS DP <General><SIEMENS AG><MultiRanger 200/ HydroRanger 200>

3.2.2.2 Baud rate

The SmartLinx PROFIBUS DP modules automatically configure themselves to the correct baud rate for the PROFIBUS DP network. Follow the PROFIBUS guidelines with regards to bus length and baud rate.

I/O Configuration

Note

P762 is not available on:

- MultiRanger 200 HMI
- HydroRanger 200 HMI

SmartLinx module	MultiRanger 100/200, HydroRanger 200		BW500/ SF500		BW500 Lite		MultiRanger HMI HydroRanger HMI	
	Input data	Output data	Input data	Output data	Input da-ta	Output data	Input data	Output data
PROFIBUS DP-V0	42 Word	13 Word	34 Word	19 Word	23 Word	10 Word	42 Word	13 Word
PROFIBUS DP-V1							19 Word	

PROFIBUS DP-V0/V1 Sample code

Online are some sample PLC programs for Siemens Step7 and TIA portal. Set-up procedure will vary depending on the type of equipment used. Generally use the following steps:

1. Import the Siemens GSD file into your network configuration software.
2. Add the Siemens instrument to the network configuration, in the case of Step7 this is hardware configuration.
3. In the software configure the desired input and output data sizes for particular Siemens instrument.
4. Download the new configuration into the PROFINET I/O controller.
5. Connect the Siemens device to the network7
6. Program the PLC to read and write the information from the relevant data areas, this step varies with the PLC type.

For example, Step7 and TIA Portal will allow you to read and write data via a VAT table or watch list to ensure that communications is working correctly.

3.2.3 MODBUS TCP/IP

Note

The MODBUS TCP/IP module is not supported by MultiRanger 100/200 and HydroRanger 200.

The MODBUS TCP/IP module acts as a MODBUS TCP/IP Server on the Ethernet network, and does not require any parameters to be setup in the Siemens device for the default configuration.

Note

If the default block sizes are changed in P762 this will affect the default configuration block sizes.

Note

P762 is not available on:

- MultiRanger 200 HMI
- HydroRanger 200 HMI

SmartLinx module	BW500/SF500		BW500 Lite		MultiRanger HMI HydroRanger HMI
	Input data	Output data	Input data	Output data	Indput data
MODBUS TCP/IP	34 Word	19 Word	23 Word	10 Word	19 Word

3.2.3.1 Holding Registers

Note

All Siemens level and weighing instruments data maps are supported and implemented into the Holding registers.

Please see table below for the Modbus function codes that are supported.

Function Code	Holding registers
Read Multiple	03
Read Input	04
Write Single	06
Force Multiple	16

3.2.3.2 Supported Exception Codes for MODBUS TCP/IP

Code	Function	Description
0x01	Illegal function	The function code in the query is not supported
0x02	Illegal data address	The data address received in the query is outside the initialized memory area
0x03	Illegal data value	The data in the request is illegal

3.2.3.3 Network Address

The network settings are configured either through the on-board web server or the Anybus IP configuration tool, or via the DIP switch settings (Page 12).

3.2.4 EtherNet/IP

Note

The EtherNet/IP module is not supported by MultiRanger 100/200 and HydroRanger 200.

The SmartLinx EtherNet/IP module is a Server on the Ethernet network, and does not use any Siemens device parameters for the default configuration.

Note

If the default block sizes are changed in P762, this will affect the default configuration block sizes.

Note

P762 is not available on:

- MultiRanger 200 HMI
- HydroRanger 200 HMI

3.2.4.1 Configuring the slave device

The Siemens device appears to the master as an I/O device. For example, the BW500 or SF500 appears as a “generic Ethernet module” in the hardware configuration in RSLogix.

Define input and output data sizes for the EtherNet/IP I/O configuration as shown below.

The data size of the input and output modules is dependent on P762, and on the type of unit the module is plugged into, (either Level or Weighing). (The following instructions assume that P762 is set to the default values shown in the chart on Map Element Selection.)

SmartLinx module	BW500/SF500		BW500 Lite		MultiRanger HMI HydroRanger HMI
	Input data	Output data	Input data	Output data	Indput data
EtherNet/IP	34 Word	19 Word	23 Word	10 Word	19 Word

3.2.4.2 Network Address

The network settings are configured either through the on-board web server or the Anybus IP configuration tool, or via the DIP switch settings (Page 12).

Sample code

Online are some sample PLC programs for Allen Bradley RSLogix programming software.

These programs are intended as a guide only. Siemens assumes no responsibilities for their application.

Set-up Procedure

The set-up procedure will vary depending on the type of equipment used. Generally do the following steps:

1. Add the Siemens instrument to the i/o configuration as a general Ethernet module
2. In the software configure the desired input and output data sizes for particular Siemens instrument
3. Download the new configuration into the controller
4. Connect the Siemens device to the network
5. Program the PLC to read and write the information from the relevant data areas

Go to monitor program TAG's to view the data from the Siemens instrument.

3.2.5 PROFINET

Note

The PROFINET module is not supported by MultiRanger 100/200 and HydroRanger 200.

The SmartLinx PROFINET module is a slave on the bus, and does not use any Siemens device parameters for the default configuration. Other settings are provided in the GSDML file or are automatically detected.

Note

If the default block sizes are changed in P762, this will affect the default configuration block sizes.

Note

P762 is not available on:

- MultiRanger 200 HMI
- HydroRanger 200 HMI

SmartLinx module	BW500/SF500		BW500 Lite		MultiRanger HMI HydroRanger HMI
	Input data	Output data	Input data	Output data	Indput data
PROFINET	34 Word	19 Word	23 Word	10 Word	19 Word

3.2.5.1 GSDML File

PROFINET master devices require a configuration file for each slave device on the network. This file configures the master for the capabilities and limitations of the slave.

For the SmartLinx PROFINET module, this file is:

BW500, BW500/L, SF500

GSDML-V2.3-HMS-ABSPRT-20130121.gsdml

HydroRanger 200 HMI, MultiRanger 200 HMI

GSDML-V1.0-Siemens-multihmi-20170912.xml

The file can be downloaded from Siemens Service and Support. (http://www.siemens.com/automation/service&support)

Note

BW500, BW500 Lite and SF500

After you import the GSDML file, you can find the hardware in the hardware catalogue. If you are using TIA Portal, go to Other field devices > PROFINET > General > HMS.

Select ABS-PRT.

MultiRanger 200 HMI and HydroRanger 200 HMI

Go to Other field devices > PROFINET > General > SIEMENS AG > Multi-Hydro200-HMI.

3.2.5.2 Network address

The PROFINET master sets the PROFINET Device Name and IP Address. This function can be called different things in different Masters. For the TIA Portal you go through an online function called ‘Accessible devices’ to find the device, and then you set the PROFINET Device Name and IP Address.

Note

For the PROFINET master to recognize the slave, the card must be connected on the same sub-net as the PROFINET master. Setting the network mask on your PC to 0.0.0.0, will ensure that your configuration software will be able to find the card.

3.2.5.3 Configuring the network settings

The SmartLinx PROFINET module has an on-board Web server for Network configuration.

Viewing the network settings on the Web server. Open your web browser and enter the IP address of the SmartLinx PROFINET module on your network. The default IP address for the SmartLinx module is http://192.168.0.1

Make the desired network changes to your configuration and select the ‘save’ button to store the configuration.

Note

These programs are intended as a guide only. Siemens assumes no responsibilities for their application.

Sample code

Online are some sample PLC programs for Siemens Step7 and TIA portal.

Set-up procedure will vary depending on the type of equipment used. Generally use the following steps:

1. Import the Siemens GSDML file into your network configuration software.
2. Add the Siemens instrument to the network configuration. In the case of Step7 this is hardware configuration.
3. In the software, configure the desired input and output data sizes for particular Siemens instrument.
4. Download the new configuration into the PROFINET I/O controller.
5. Connect the Siemens device to the network7.
6. Program the PLC to read and write the information from the relevant data areas. This step varies with the PLC type.

For example, Step7 and TIA Portal will allow you to read and write data via a VAT table or watch list to ensure that communications is working correctly.

3.2.6 Map Element Selection

P762 Map Element Selection Parameter

P762 allows you to select what elements to include in the Input and Output Tables. By selecting only the data required, you can reduce the amount of data being transferred over the bus.

Note

- P762 should only be modified by an advanced user who wants to limit the amount of data being transferred. See Appendix A – Reducing the amount of data being transferred over the Bus on page 46 for more details.
  Changes do not take effect until after a power cycle.
- P762 is not supported by the MultiRanger 200 HMI and HydroRanger 200 HMI.

The following chart gives the default values for this parameter. If the default values are used then the configuration and Data Map (Page 35) in the main body of this manual remain correct. If any of these values is changed, then the Data Map will be shortened and the configuration will change. Please see *Appendix A: Reducing the amount of data being transferred over the Bus* for details on how to use P762.

MultiRanger 100/200, HydroRanger 200			
P762 Index	**Name of area**	**Default value**	**Range**
1	Instrument Status	1	0 = No 1 = Yes
2	Reading	10	0 = No 1...10 = include that number of items
3	Alarm	10	

MultiRanger 100/200, HydroRanger 200			
4	Point-on-priority	1	0 = No 1 = Yes
5	MPA	1	
6	SPA	1	
7	Operating Mode	1	

Milltronics BW500, Milltronics BW500/L, Milltronics SF500				
P762 Index	Name of area	Default value		Range
		BW500, SF500	BW500/L	
1	Instrument Status	1	1	0 = No 1 = Yes
2	Rate	1	1	
3	Load	1	1	
4	Speed	1	1	
5	Total	1	1	
6	Relay Status	1	1	
7	DI Status	1	1	
8	SPA	1	1	
9	Command Control	1	1	
10	MultiSpan	1	0	
11	PID	1	0	
12	Batch	1	0	
13	Batch Prewarn	1	0	
14	Word Order	1	1	
15	Status 2	1[1)]	1	
16	Batch Total	1[1)]	0	

[1)] For firmware V 3.05, the default is 0. For all higher versions, the default is 1.

Application Layer

4

Note

The parameter section does not apply to the MultiRanger 200 HMI and HydroRanger 200 HMI.

This section describes the meaning of data read from and written to the Siemens SmartLinx device slave memory. The output words (PLC master Write operation) and input words (PLC master Read operation) are described in the Data Map.

4.1 Parameter Indexes

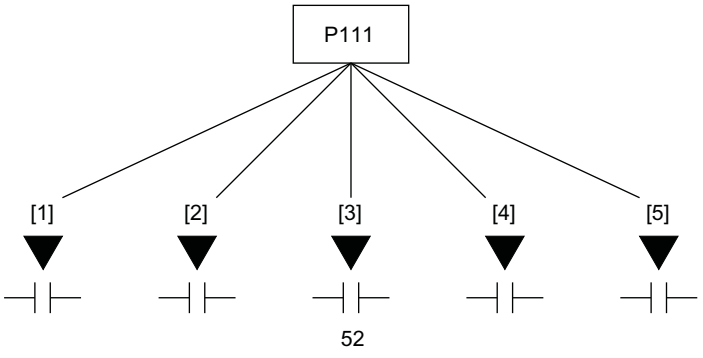
Most parameters used on Siemens SmartLinx devices are indexed. Indexing allows a parameter to relate to more than one input or output. For example, many parameters are indexed by measurement point while others are indexed by relay output or discrete input. The way that indexes are handled in the memory map depends on the data access method used.

4.1.1 Primary Index

An index that relates to an input or output is called a Primary Index.

Example:

P111[3] = 52
means P111 (Relay Control Function) for relay 3 is set to value 52.



4.1.2 Secondary Index

Note

The secondary index is only applicable to the following products:

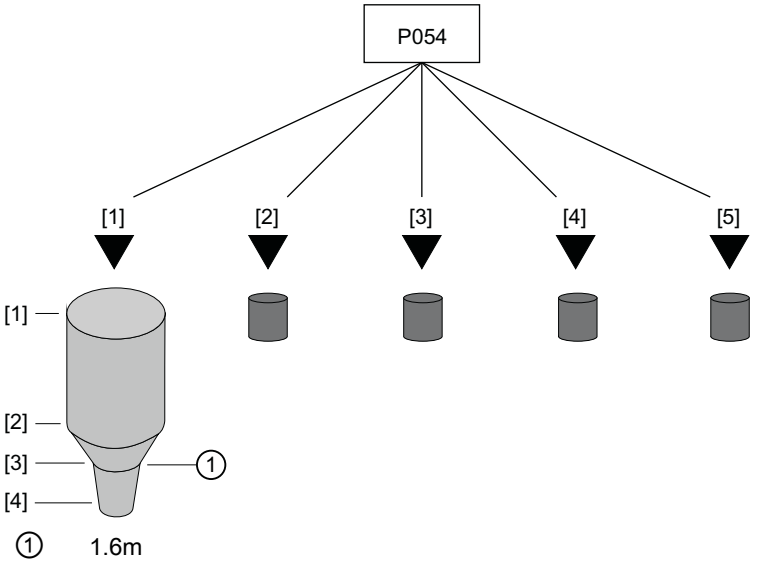
- MultiRanger 100/200
- HydroRanger 200

Sometimes a parameter requires a second index to allow for multiple values on an indexed input or output. For example, a measurement point which calculates a reading on volume can require characterization breakpoints. These breakpoints are given on a secondary index (the primary index relates to the transducer input).

An index that relates to a previously indexed parameter is called a secondary index. (On some older Siemens products, the secondary index is called a mark.)

Example:

P054 [1,3] = 1.6m
means P054 (Breakpoint Levels) for breakpoint 3 on transducer 1 is set to 1.6m



4.2 Data Access Methods

There are three different methods used in the memory mapping to give access to the SmartLinx device parameter table. They are:

- Direct Access
- Multiple Parameter Access (MPA)
- Single Parameter Access (SPA)

4.2.1 Direct Access

Certain values are mapped directly into words. These words can be monitored continuously but they are not configurable.

4.2.2 Multiple Parameter Access (MPA)

Note

- MPA is used on MultiRanger 100/200 and HydroRanger 200 Level products only.
- In Siemens' products, the memory is arranged as Parameter number, Primary Index, Secondary Index.

This is a hand-shaking method where the user specifies the parameter number, secondary index, decimal place, and format, then the SmartLinx writes into a certain area all 10 primary indexes of that parameter.

Using Multiple Parameter Access (MPA)

1. In the output table of the PLC (Write Block), write the values for the parameter number, secondary Index, decimal place and format in the correct location.
2. Monitor the Input table of the PLC (Read Block), and watch for the values you wrote to appear in the appropriate locations of the Read block, then go to Step 3.
3. Read the requested values in the appropriate location of the Read Block. These values are continuously updated. Continue reading from these words until values for another parameter are required. At that time, go to step 1.

Note

MPA values are only updated in Run mode (word 12 = 0).

Parameter Indexing with MPA

Primary Index

The primary index is implicit in the memory address. MPA values are returned through words 21 to 30 of the Read block (see Read Block).

Secondary Index

The secondary index is nearly always left at zero. See the device for information on parameters, including those which require a secondary index.

4.2.3 Single Parameter Access (SPA)

Note

SPA is used on both Level and Weighing Products except for MultiRanger 200 HMI and HydroRanger 200 HMI.

This is a hand-shaking method where the PLC specifies:

- parameter number
- primary index
- secondary index
- decimal place
- format
- read/write flag
- value

With this method any value in the Siemens product can be read or written.

Note

Parameter P999 (Master Reset) is not accessible via the SmartLinx interface on Level products.

Using Single Parameter Access (SPA)

SPA allows continuous monitoring or demand programming of a parameter.

Reading a Parameter

1. Set the Read/Write flag in the output table (Write Block) to 0, “Read”
2. Write the Parameter Number, Primary Index, Secondary Index, Decimal Place and Format in the correct locations.

   Note

   If there is no secondary index, then place a 0 in this location.

3. Monitor the Input table of the PLC (Read Block) and watch for the values you wrote to appear in the appropriate locations, then go to Step 4.
4. Read the requested parameter value in the Input table (Read Block). These values are continuously updated. Continue reading from these words until values for other parameters are required. At that time, go back to step 1.

Writing a Parameter

1. Set the Read/Write flag in the output table (Write Block) to 0, “Read”
2. Write the Parameter Number, Primary Index, Secondary Index, Decimal Place and Format in the correct locations.

3. Write the new value of the parameter into the correct location of the output memory (Write Block)
4. Verify the unit is in program mode (not needed for BW500). For Level see bit 10 of status word in Read Block.
5. If the unit is not in program mode, write 1 to the operating mode word in the output memory (Write Block). Please note writing 1 will only work if the word is set to 0. Otherwise, change the word to 0 before writing a 1 for the parameter to take effect.
6. Set the Read / Write flag in the output table (Write Block) to a 1 “write”.
7. Monitor the Input table of the PLC (Read Block) and watch for the values you wrote to appear in the appropriate locations.
8. Set Read / Write flag back to 0.
9. Place unit in Run mode.

Note

Parameters for Level Products should only be written to while the unit is in PROGRAM mode. If the level device is still in RUN mode, the written value might be ignored.

4.3 Data Map

4.3.1 Level Products

Note

The data maps shown for the Write and Read Blocks apply if P762 is set to the default values. If any of these values are changed, the data map will be shortened and the configuration will change.

MultiRanger 200 HMI and HydroRanger 200 HMI does not support P762.

This section describes the data structure for the data read and written to the device.

The write block refers to the data being written to the device from the master.
The read block refers to the data being read from the device by the master.

4.3.1.1 MultiRanger 100/200 and HydroRanger 200 Write Block

Note

This section describes the process data available in the write block that can be written to the MultiRanger 100/200 or the HydroRanger 200. Please refer to the Parameters chapter of the Siemens device operating instructions for details about the parameters used in the table below.

PROFIBUS DP-V0 and DeviceNet

Word	Description	Access	Data Type
0	Measurement point on priority	direct	bitmapped
1	Parameter number	MPA	integer
2	Secondary index (mark)		integer
3	Decimal place		integer
4	Format		0/1
5	Parameter number	SPA	integer
6	Primary index (point)		integer
7	Secondary index (mark)		integer
8	New value		integer
9	Decimal place		integer
10	Format		0/1
11	Read/write flag		0/1
12	Operating mode	direct	0/1

Word 0: Point-on-Priority

Bits 00-09 set the priority status of corresponding indexed points 1 to 10.

Bit	09	08	07	06	05	04	03	02	01	00
Index	10	9	8	7	6	5	4	3	2	1

Bit status 0 = normal

Bit status 1 = priority

For example, if bits 00 and 02 are set to 1, points 3 and 1 are on priority scan. All other bits are reserved and contain 0.

Bit	09	08	07	06	05	04	03	02	01	00
Index	0	0	0	0	0	0	0	1	0	1

In order to use word 00 to control point-on-priority, you must configure the Siemens SmartLinx device to permit this. For each point, set Parameter P720 to 1 (SmartLinx SPA) to permit priority control for that point.

Word 1: Parameter Number, MPA

Specifies the parameter number for the returned values in words 21 to 30. See Read Block.

Word 2: Secondary Index, MPA

Specifies the secondary index for the parameter specified by word 1. This word is ignored for parameters that don't use multiple indexes. See Parameter Indexes (Page 31) for more information.

Word 3: Decimal Place, MPA

Specifies the number of decimal places to shift the returned values in words 21 to 30 of the Read Block. Positive values indicate that the decimal place shifts to the left, and negative values indicate that the decimal place shifts to the right.

For example:

word 3 = 1: all returned values have the decimal place shifted 1 space to the left and a returned value of 5,213 is interpreted as 521.3

word 3 = –1: a returned value of 5,213 is interpreted as 52,130

Word 4: Format, MPA

Sets the format for the returned values in words 21 to 30.

0 = normal

1 = percent

Note

When the format is selected as "percent" the decimal place value (word 3 of the Write block) is ignored and two decimal places are always used. For example, a value of 5947 represents 59.47%.

Word 5: Parameter, SPA

Specifies the requested parameter number for Single Parameter Access (Page 34)(SPA).

Word 6: Primary Index, SPA

Specifies the primary index number for the parameter in word 5.

Word 7: Secondary Index, SPA

Specifies the secondary index for the parameter in word 5. This word is ignored for parameters that don't use multiple indexes. See Parameter Indexes (Page 31) for more information.

Word 8: Value, SPA

This word contains the value written to the specified parameter and index. The format of this word is specified by words 9 to 10.

To write a value, ensure word 11 = 1 and word 12 =1.

Word 9: Decimal Place, SPA

This word specifies the number of decimal places for the value in word 8 of the Write Block and word 38 of the Read Block. Positive values indicate that the decimal place shifts to the left, and negative values indicate that the decimal place shifts to the right.

For example:

word 9 = 1: all returned values have the decimal place shifted 1 space to the left and a returned value of 5,213 is interpreted as 521.3.

word 9 = –1: a returned value of 5,213 is interpreted as 52,130.

Word 10: Format, SPA

This word sets the format for the value in word 8 of the Write Block and word 38 of the Read Block.

0 = normal

1 = percent

Word 11: Read/Write Flag, SPA

This word instructs the read/write application of word 8.

0 = read parameter as described by words 5, 6, 7, 9 and 10; word 8 ignored

1 = set parameter to the value described by words 5 to 10

Word 12: Operating Mode, SPA

This word sets the operating mode of the Siemens SmartLinx device.

The operating mode can get out of sync if the remote device resets back to run mode locally. This can happen due to a time-out or through local programming. The mode is always reported correctly through the Read Block.

To reset the device to program mode, write 0 to synchronize the SmartLinx module with the device and then write 1 to set the device to program mode.

0 = run mode

1 = program mode

4.3.1.2 MultiRanger 100/200 and HydroRanger 200 Read Block

Note

This section describes the process data available which can be read from the MultiRanger 100/200 or the HydroRanger 200. Please refer to the Parameters chapter of the your Siemens device operating instructions for details about the parameters used in the table below.

Values in words 0 to 20 and 41 are directly available; no write operation is required to request them.

Values in words 21 to 41 are determined by the write operation that requested them, either MPA or SPA. See Write Block (Page 36).)

PROFIBUS DPV0 and DeviceNET

Words	Description	Access	Data Type
0	Instrument status	direct	bitmapped
1-10	Point reading		integer
11-20	Point alarm and status		bitmapped
21-30	Returned values	MPA	integer
31	Decimal place		integer
32	Format		0/1
33	Parameter number		integer
34	Parameter secondary index		integer
35	Parameter	SPA	integer
36	Parameter primary index		integer
37	Parameter secondary index		integer
38	Value		integer
39	Decimal place		integer
40	Format		0/1
41	Read/write flag		0/1

Word 0: Instrument Status

Bit	Description										
00 to 09	Measurement Point Status Indicates the operation of measurement points 1 to 10										
	bit	09	08	07	06	05	04	03	02	01	00
	index	10	9	8	7	6	5	4	3	2	1
	0 = operational 1 = non-operational 'Non-operational' means that either the point is not configured or there is an error in the reading. Further information is available in the Point Alarm and Status words (words 11 to 20)										
10	Operating Mode 0 = Siemens SmartLinx device in **RUN** mode 1 = Siemens SmartLinx device in **PROGRAM** mode										
11 to 15	Reserved (These bits are reserved and set to 0).										

Word 1 to 10: Point Reading

These words contain the value of parameter P920 (Reading) for points 1 to 10, respectively. The reading is expressed as a percent of full scale, multiplied by 100, giving a range of –20,000 to 20,000 which corresponds to -200.00% to 200.00%.

Note

These values may contain numeric level data for inoperative or malfunctioning points: refer to read word 0, and read words 11 to 20 for the actual operational status of the measurement points.

Word 11 to 20: Point Alarm and Status

These words contain the corresponding alarm and status bits for indexed measurement points 1 to 10, respectively.

Bit status 0 = false

Bit status 1 = true

Bit	Description
00	Point not in service
01	Point failsafe timer expired
02	Point failed (cable shorted, open, or transceiver problem)
03	Point temperature sensor failed
04 to 12	Reserved for future use
13	Level emptying
14	Level filling
15	Scan mode priority

Words 21 to 30: Returned Values, MPA

These words contain values requested by writing to words 1 to 4 of the Write Block. The type of data and format are specified with that request, and returned in Read words 31 to 34.

Words 31 and 32; 33 and 34: Decimal Place, Format, Parameter Number and Secondary Index, MPA

These words contain the last values written to Write block words 1 and 4. These words indicate what information is contained in Read block words 21 to 30. These words are provided because there can be a delay between writing a request via a Write, and the appearance of the requested values.

Use these words as an indicator that the requested information is updated.

Words 35 to 37 and 39 to 41: Parameter Number / Primary Index / Secondary Index and Decimal Place / Format / Read Write Flag, SPA

These words contain the last values written to words 5 to 7 and 9 to 11 of the Write block. They confirm that the parameter value has been written. These words are not updated until the value has been successfully transferred and stored in the Siemens SmartLinx device.

See Write formats (Page 36) for details.

Word 38: Returned Value, SPA

This word contains the current value of the parameter identified by words 35 to 37 and 39 to 40, regardless of the value of word 11 (Write flag).

If this value does not change when a new value is written to word 8 (Parameter Value) then check the following:

1. Words 5 to 7 and 9 to 10 of the Write block **should match** words 35 to 37 and 39 to 40 of the Read block: if not, then the device hasn't responded yet.
2. If words 5 to 7 and 9 to 10 of the Write block **do** match words 35 to 37 and 39 to 40, of the Read block, then the parameter value has not been updated. Check that the device is in **PROGRAM** mode and that the program lock (P000) is not on, then try again.

MultiRanger 200 HMI and HydroRanger 200 HMI MODBUS TCP

Read block

Register	Description	Data Type	Bytes	Parameter
40001	**PV Point 1 (Process variable for Point 1) in Programmed units** PV is displayed as an IEEE floating point number.	Float	4	3.2.6.2. Reading
40003	**PV Point 1 Status Profi status** PV status byte. See next table for more details.	Word	2	Status Word
40004	**PV Point 1 Signal Strength** The 3.2.9.4. Echo Strength (in dB) from Transducer 1. The value range is from minimum -30 to maximum 99.	Word	2	3.2.9.4. Echo Strength
40005	**PV Point 2 (Process variable for Point 2) in Programmed units**	Float	4	3.2.6.2 Reading
40007	**PV Point 2 Status Profi status** PV status byte. See next table for more details.	Word	2	Status Word
40008	**PV Point 2 Signal Strength** The 3.2.9.4. Echo Strength (in dB) from Transducer 1. The value range is from minimum -30 to maximum 99.	Word	2	3.2.9.4. Echo Strength
40009	**PV Point 3 (Process variable for Point 3) in Programmed units**	Float	4	3.2.6.2. Reading
40011	**PV Point 3 Status Profi status** PV status byte. See next table for more details.	Word	2	Status Word
40012	**Digital inputs** The value of the digital inputs are mapped into this Word. Bit 0 is the Digital Input 1.	Word	2	2.9.2.3. Discrete Input 1 Scaled State
40013	**Relay outputs** The value of the relay outputs are mapped into this Word. Bit 0 is the Relay Output 1.	Word	2	2.6.6. Raw mA Input Value
40014	**mA input 1** The value of the analog input is mapped into this Word.	Float	4	
40016	**Totalizer 1** References the Totalizer parameter within the Siemens device.	UINT32	4	
40018	**Totalizer 2** References the Totalizer parameter within the Siemens device.	UINT32	4	

PV status byte

Hexadecimal number	Byte Status
0x80	Good
0x10	Bad: malfunction
0x1f	Bad: out of service

4.3.1.3 MultiRanger 200 HMI and HydroRanger 200 HMI Read Block

Note

This section describes the process data available that can be read from the MultiRanger 200 HMI or the HydroRanger 200 HMI. Please refer to the Parameters chapter of the your Siemens device operating instructions for details about the parameters used in the table below. An application example of acyclic communications with Step7 and TIA portal is available from Siemens Service and Support.

PROFIBUS DPV1 and Ethernet/IP Read block

Word Offset	Description	Data Type	Bytes	Parameter
0	**PV Point 1 (Process variable for Point 1) in Programmed units** PV is displayed as an IEEE floating point number.	Float	4	3.2.6.2. Reading
2	**PV Point 1 Status Profi status** PV status byte. See next table for more details.	Word	2	Status word
3	**PV Point 1 Signal Strength** The 3.2.9.4. Echo Strength (in dB) from Transducer 1. The value range is from minimum -30 to maximum 99.	Word	2	3.2.9.4. Echo Strength
4	**PV Point 2 (Process variable for Point 2) in Programmed units**	Float	4	3.2.6.2 Reading
6	**PV Point 2 Status Profi status** PV status byte. See next table for more details.	Word	2	Status word
7	**PV Point 2 Signal Strength** The 3.2.9.4. Echo Strength (in dB) from Transducer 1. The value range is from minimum -30 to maximum 99.	Word	2	3.2.9.4. Echo Strength

Word Offset	Description	Data Type	Bytes	Parameter
8	**PV Point 3 (Process variable for Point 3) in Programmed units**	Float	4	3.2.6.2. Reading
10	**PV Point 3 Status Profi status** PV status byte. See next table for more details.	Word	2	Status word
11	**Digital inputs** The value of the digital inputs are mapped into this Word. Bit 0 is the Digital Input 1.	Word	2	2.9.2.3. Discrete Input 1 Scaled State
12	**Relay outputs** The value of the relay outputs are mapped into this Word. Bit 0 is the Relay Output 1.	Word	2	
13	**mA input 1** The value of the analog input is mapped into this Word.	Float	4	2.6.6. Raw mA Input Value
15	**Totalizer 1** References the Totalizer parameter within the Siemens device.	UINT32	4	
17	**Totalizer 2** References the Totalizer parameter within the Siemens device.	UINT32	4	

Word 2: PV Point 1 Status Profi Status

PV status byte.

Hexadecimal number	Byte Status
0x80	Good
0x10	Bad: malfunction
0x1f	Bad: out-of-service

PROFIBUS DP-V1 Acyclic communication

The PROFIBUS DP-V1 and PROFINET offers both cyclic and acyclic communications for the MultiRanger 200 HMI and HydroRanger 200 HMI Smartlinx module.

The PROFIBUS DP-V1 and PROFINET card allows a Class 1 and Class 2 master to communicate acyclically to the MultiRanger 200 HMI or HydroRanger 200 HMI.

The acyclic communications allows the master to read and write parameters in the MultiRanger 200 HMI or HydroRanger 200 HMI.

Module configuration

When acyclic communication is required, ensure you insert 6 modules of input with a total input size of 19 words.

Slot Index table (Acyclic)

The following table shows the slot and index assignments of the different elements (or parameters). The elements are numbered in the order that they are returned.

Please see the *Parameters* chapter of your Siemens device operating instructions for details on the parameters used below.

Note

Slot 1 (module 1) is assigned to level Point 1, while Slot 2 (module 2) is for level Point 2 and Slot 3 (module 3) is for level Point 3.

Slot	Absolute Index	Parameter name (number) - Data Type		Total Bytes
1 or 2	50	1. Sensor Mode (2.1.3.) - UINT8 2. Material (2.1.6.) - UINT8 3. Rate Filter (2.3.5.) - UINT8	4. Transducer (2.1.5.) - UINT8 5. Empty (2.2.4.) - Float32 6. Span (2.2.2.) - Float32	12
1 or 2	51	1. Vessel Shape (2.7.2.) - UINT8 2. Maximum Volume (2.7.3) - Float32	3. Dimension A (2.7.4.) - Float32 4. Dimension L (2.7.5.) - Float32	13
1 or 2	52	1. Fuzz Filter (2.11.5.6.) - UINT8 2. Echo Lock (2.11.5.4.) - UINT8 3. Echo lock up - UINT8	4. Echo lock down - UINT8 5. Echo Lock Window (2.11.5.5.) - UINT16	6
1 or 2	53	1. Algorithm (2.11.2.2.) - UINT8 2. Blanking (2.2.6.) - Float32 3. Range Extension (2.2.7.) - Float32 4. Submergence Detection (2.11.2.8.) - UINT8 5. Shot/pulse Mode (2.1.17.) - UINT8 6. Echo Time Filtered (3.2.9.7.) - Float 32 7. Echo Time Raw (3.2.9.8.) - Float32 8. Spike Filter (2.11.2.7.) - UINT16 9. Narrow Echo Filter (2.11.2.6.) - UINT16 10. Reform Echo (2.11.2.5.) - UINT16 11. Window Sill - UINT8 12. Number of Short Shots (2.1.11.) - UINT8	13. Number of Long Shots (2.1.12.) - UINT8 14. Short Shot Frequency (2.1.7.) - Float32 15. Long Shot Frequency (2.1.8.) - Float32 16. Short Shot Duration (2.1.9.) - Float32 17. Long Shot Duration (2.1.10.) - Float32 18. Short Shot Bias (2.11.2.10.) - UINT8 19. Short Shot Floor (2.11.2.11.) - UINT8 20. Short Shot Range (2.11.2.12.) - Float32	50

Slot	Absolute Index	Parameter name (number) - Data Type		Total Bytes
1 or 2	54	1. Short Echo Threshold (2.11.2.4.) - UINT8 2. Long Echo Threshold (2.11.2.3.) - UINT8 Short Confidence (3.2.9.3.) - UINT8	4. Long Confidence (3.2.9.2.) - UINT8 5. Echo Strength (3.2.9.4.) - UINT8	4
1 or 2	55	1. TVT Type (2.11.3.6.) - UINT8 2. TVT Shaper (2.11.4.) - UINT8 3. TVT dB (2.11.3.7.) - UINT8 4. TVT ms (2.11.3.8.) - UINT16 5. TVT Slope Minimum (2.11.3.9.) - UINT16	6. Auto Suppression Range (2.11.3.3.) - Float32 7. Hover Level (2.11.3.4.) - UINT8	12
1 or 2	56	1. Temperature Source (2.11.1.4.) - UINT8 2. Fixed Temperature () - Float32 3. Temp sens alloc start - UINT8	4. Temp sens alloc end - UINT8 5. Process Temperature (2.11.1.3.) - Float32	11
1 or 2	57	1. Discrete Input Number (2.9.1.2.) - UINT8 2. Level Override Value (2.9.1.3.) - Float32	3. Override Time Delay (2.9.1.4.) - Float32	7
1 or 2	58	1. Fill Rate/minute (2.3.2.) - Float32 2. Empty Rate/minute (2.3.3.) - Float32 3. Filling Indicator (2.3.9.) - Float32 4. Emptying Indicator (2.3.10.) - Float32	5. Rate Filter (2.3.5.) - UINT8 6. Rate Filter Time (2.3.6.) - Float32 7. Rate Filter Distance (2.3.7.) - Float32	25
1 or 2	59	Shot Delay (2.1.16.) - UINT32		4
1 or 2	60	Scan Time (2.1.15.) - Float32		4
1 or 2	61	1. Primary Measuring Device (2.13.2.) - UINT8 2. Flow Exponent (2.13.4.1.) - Float32 3. Maximum Head (2.13.4.2.) - Float32 4. Maximum Flow (2.13.4.3.) - Float32 5. Zero Head (2.13.4.5.) - Float32	6. Flow Time Units (2.13.4.4.) - UINT8 7. Flowrate Decimal (2.13.4.6.) - UINT8 8. Flowrate Units (2.13.4.7.) - UINT8 9. Low Flow Cutoff (2.13.4.8.) - Float32	24
1 or 2	62	1. mA Output Range (2.5.2.) - UINT8 2. Current Output Function (2.5.3.) - UINT8 3. mA alloc start - UINT8 4. mA alloc end - UINT8 5. 0/4 mA Level Value (2.6.2.) - Float32	6. 20 mA Level Value (2.6.3.) - Float32 7. Minimum mA Limit (2.5.7.)- Float32 8. Maximum mA Limit (2.5.8.) - Float32	20
1 or 2	63	1. Pump by Rate (2.8.1.8.) - UINT8 2. Level Setpoint Variation (2.8.2.6.2.) - Float32		5
1 or 2	64	1. Flow Maximum (3.2.6.15.) - Float32 2. Flow Minimum (3.2.6.16.) - Float32		8

Slot	Absolute Index	Parameter name (number) - Data Type		Total Bytes
1 or 2	65	1. Inflow/discharge Adjust (2.7.7.) - UINT8 2. Totalizer Multiplier (2.14.5.) - INT8 3. Totalizer Decimal Position (2.14.4.) - UINT8	4. Multiplier (2.10.1.2.) - INT8 5. Mantissa (2.10.2.2.) - Float32 6. Exponent (2.10.2.3.) - INT8	9
1 or 2	66	1. Space (3.2.6.11.) - Float32 2. Distance (3.2.6.12.) - Float32 3. Volume (3.2.6.5.) - Float32	4. Flow (3.2.6.14.) - Float32 5. Head (3.2.6.13.) - Float32	20
1 or 2	67	1. Level (3.2.6.3.) - Float32 2. mA value xducer - Float32		8
1 or 2	68	1. Transducer Temperature (3.2.6.17.) - Float32 2. Transducer Temperature Maximum (3.2.8.2.) - Float32 3. Transducer Temperature Minimum (3.2.8.3.) - Float32		12
1 or 2	69	1. Reading Maximum (3.2.6.8.) - Float32 2. Reading Minimum (3.2.6.9.) - Float32		8
1 or 2	70	Sensor Offset (2.2.5.) - Float32		4
1 or 2	71	Auto Sound Velocity (2.11.1.8.) - Float32		4
1 or 2	72	Auto Zero Head (2.13.3.) - Float32		4
1 or 2	73	1. Noise Average (3.2.9.5.) - UINT8 2. Noise Peak (3.2.9.6.) - UINT8	3. Noise minimum - UINT8	3
1 or 2	74	1. Rate (3.2.6.6.) - Float32 2. Pump Records (3.2.7.) - Float32		8
1 or 2	75	Auto False Echo Suppression (2.11.3.2.) - UINT8		1
1 or 2	77	1. LOE Timer (2.4.2.) - Float32 2. Fail-safe Mode (2.4.4.) - UINT8	3. Material Level (2.4.5.) - Float32	9
1 or 2	78	1. mA Fail-safe Mode (2.4.8.) - UINT8 2. mA Fail-safe Value (2.4.9.) - Float32		5
1 or 2	80-111	1. Breakpoint Level - Float32 2. Breakpoint Volume - Float32		8
1 or 2	112-151	TVT Shaper (2.11.4.) - INT8		1
1 or 2	152-157	PMD Dimensions (2.13.5.) - Float32		4
1 or 2	158-189	1. Head 1 (2.13.6.1.1.) - Float32 2. Flow 1 (2.13.6.1.2.) - Float32		8
3	50	Scan Time (2.1.15.) - Float32		4
3	51	1. Level (3.2.6.3.) - Float32 2. mA Value Transducer - Float32		8
3	52	1. Reading Maximum (3.2.6.8.) - Float32 2. Reading Minimum (3.2.6.9.) - Float32		8
3	53	1. Scaled mA Input Value (2.6.5.) - Float32 2. Raw mA Input Value (2.6.6.) - Float32	3. mA Input (3.2.6.19.) - Float32	12
3	54	1. mA Input Range (2.6.1.) - UINT8 2. 0/4 mA Level Value (2.6.2.) - Float32	3. 20 mA Level Value (2.6.3.) - Float32 4. mA Damp Filter (2.6.4.) - Float32	13

Slot	Absolute Index	Parameter name (number) - Data Type		Total Bytes
3	55-56	Discrete Input 1 Scaled State (2.9.2.3.) - Float32		4
3	57-58	Discrete Input 1 (2.9.2.1.) - UINT8		1
3	59	1. TS-3 Temperature (3.2.6.18.) - Float32 2. TS-3 Temperature Maximum (3.2.8.4.) - Float32	3. TS-3 Temperature Minimum (3.2.8.5.) -Float32	
3	63	1. LOE Timer (2.4.2.) - Float32 2. Fail-safe Mode (2.4.4.) - UINT8	3. Material Level (2.4.5.) - Float32	9
3	64	Milliamp Output (2.5.9.) - Float32		4
3	65-96	1. Breakpoint Level - Float32 2. Breakpoint Volume - Float32		8
3	97	1. Vessel Shape (2.7.2.) - UINT8 2. Maximum Volume (2.7.3.) - Float32	3. Dimension A (2.7.4.) - Float32 4. Dimension L (2.7.5.) - Float32	13
4	98	1. Sensor Mode (2.1.3.) - UINT8 2. Material (2.1.6.) - UINT8 3. Rate Filter (2.3.5.) - UINT8	4. Transducer (2.1.5.) - UINT8 5. Empty (2.2.4.) - Float32 6. Span (2.2.2.) - Float32	12
4	50	Relay Duration (2.10.1.3.) - INT32		4
4	51	Preset Applications (2.8.1.3.) - UINT8		1
4	52	1. Run-ON Interval (2.8.2.7.1.) - INT32 2. Delay Between Starts (2.8.2.8.1.) - INT32	3. Power Resumption Delay (2.8.2.8.2.) - INT32	12
4	53-58	1. Service Ratio (2.8.1.12.) - Float32 2. Run-ON Duration (2.8.2.7.3.) - INT32 3. Pump Group (2.8.2.2.) - UINT8 4. Flush Pump (2.10.3.2.) - UINT8	5. Flush Cycles (2.10.3.3.) - UINT16 6. Flush Interval (2.10.3.4.) - UINT16 7. Flush Duration (2.10.3.5.) - UINT32	18
4	59-64	1. Level Source (2.8.1.2.) - UINT8 2. Relay Function (2.8.1.4.) - UINT8 3. ON Setpoint (2.8.1.5.) - Float32 4. OFF Setpoint (2.8.1.6.) - Float32 5. Relay Interval Setpoint (2.8.2.4.) - INT32	6. Relay Dead Band (2.8.2.5.) - Float32 7. Relay Logic (2.8.1.11.) - UINT8 8. Relay Fail-safe (2.8.2.3.) - INT8	20
4	65-70	Relay Logic Test (3.2.5.) - UINT8		1
4	71-76	1. Pump Run Time (3.2.7.3.) - Float32 2. Pump Hours (3.2.7.2.) - Float32	3. Pump Starts (3.2.7.4.) - UINT16 4. Pump Run-ONs (3.2.7.5.) - UINT16	12
5	50	1. Manufacturer string - n/a 2. DD_revision - n/a		41
5	51	Product - UINT8		1
5	52	1. Tag (3.1.1.) - UINT8 2. Message (3.1.3.) - UINT8 3. Descriptor (3.1.2.) - UINT8	4. Date Last Configured (3.1.10.) - UINT8	4

Slot	Absolute Index	Parameter name (number) - Data Type		Total Bytes
5	53	1. Manufacture Date (3.1.9.) - INT32 2. Serial Number Date - n/a 3. Serial Number Batch - n/a	4. Static Feature Status - INT32 5. Firmware Revision (3.1.7.) - UINT8	9
5	56	Write Protection (5.1.) - INT16		2
5	57	User PIN (5.2.) - INT16		2
5	58	1. Powered Days - INT32 2. Power ON Resets - UINT16		6
5	59	1. Comm Bitrate - INT32 2. Comm Addr1 - INT32 3. Comm Addr2 - INT32 4. Comm Size1 - INT32 5. Comm Terminate - INT32 6. Comm Bits - UINT8	7. Comm Error - UINT16 8. Comm Error Count - INT32 9. Comm Fieldbus Interface - INT16 10. Comm Fieldbus Type - INT16	31
5	60	Diagnostic information (for testing)		240
5	61	1. Shot Synchro (2.1.13.) - UINT8 2. Scan Delay (2.1.14.) - UINT32		5
5	62	Units (2.1.1.) - UINT8		1
5	63	1. Default Auxiliary Reading (2.12.7.) - INT16 2. Auxiliary Value - n/a		2
5	64	Milliamp Output (2.5.9.) - Float32		4
5	65-68	mA Control Parameter - n/a		0
5	69-75	Comm Memory Map - UINT8		1
5	76-77	1. Shot Synchro (2.1.13.) - UINT8 2. Scan Delay (2.1.14.) - UINT32 3. Device Address (4.2.) - INT32 4. Serial Baud Rate (4.5.) - Float32 5. Parity (4.6.) - UINT8	6. Data Bits (4.7.) - UINT8 7. Stop Bits (4.8.) - UINT8 8. Modem Available (4.9.) - UINT8 9. Modem Inactivity Timeout (4.10.) - UINT16	17
5	78	Parameter Index Location (4.11.) - UINT16		2
5	79-80	Communications Control (5.4.) - INT16		2
5	81	1. Soft Key - UINT16 2. Display Delay (2.12.8.) - Float32 3. Param Scroll Access - UINT8	4. Local Display Backlight (2.12.1.) - UINT8 5. Main Display - UINT8	9
5	82-84	1. Decimal Position (2.12.4.) - UINT8 2. Convert Reading (2.12.5.)- Float32	3. Offset Reading (2.12.6.) - Float32	9
5	88	1. Tag (3.1.1.) - UINT8 2. Message (3.1.3.) - UINT8 3. Descriptor (3.1.2.) - UINT8	4. Date Last Configured (3.1.10.) - UINT8	4

Note

Ethernet/IP does not support explicit messaging for parameter access to the Siemens instrument.

4.3.2 Weighing Products

Note

The data maps shown for the Write and Read Blocks apply if P762 is set to the default values. If any of these values are changed, the data map will be shortened and the configuration will change.

This section describes the meaning of the data read from and written to the device with a SmartLinx card.

Write Block

Note

The following two charts do not apply to MODBUS TCP/IP. The data refers to the PROFIBUS DPV0, PROFINET, Ethernet/IP and DeviceNET SmartLinx modules.

BW500 and SF500

Description	Start	End	Size	Data Type
Parameter number, SPA	0	0	1	integer
Primary index, SPA	1	1	1	integer
Secondary index, SPA	2	2	1	integer
New value, SPA	3	4	2	UINT32
Decimal place, SPA	5	5	1	integer
Format, SPA	6	6	1	integer
Read/write flag, SPA	7	7	1	integer
Command control	8	8	1	bitmapped
Multispan selection	9	9	1	1-4
PID 1 setpoint value	10	11	2	UINT32
PID 2 setpoint value	12	13	2	UINT32
Batch setpoint value	14	15	2	UINT32
Batch prewarn setpoint value	16	17	2	UINT32
Word order	18	18	1	0/1

Note

All the 32 bit numbers (except for the SPA numbers) have a fixed decimal place of 3 digits. For example, PID 1 setpoint value of 3,245 is a value of 3.245 in the BW500 and the SF500.

To make a change to any parameter in the BW500 or the SF500 using SmartLinx, P799 Communications Control must be set to 1.

BW500/L

Description	Start	End	Size	Data Type
Parameter number, SPA	0	0	1	integer
Primary index, SPA	1	1	1	integer
Secondary index, SPA	2	2	1	integer
New value, SPA	3	4	2	UINT32
Decimal place, SPA	5	5	1	integer
Format, SPA	6	6	1	integer
Read/write flag, SPA	7	7	1	integer
Command control	8	8	1	bitmapped
Word order	9	9	1	0/1

Parameter, SPA

Specifies the parameter number for Single Parameter Access (SPA), see Single Parameter Access.

Primary index, SPA

Specifies the primary index number for the parameter specified by word 0.

Secondary index, SPA

Specifies the secondary index for the parameter specified by word 0. This word is ignored for parameters that don’t use multiple indexes.

New value, SPA

The new value of the specified parameter and index.

Decimal place, SPA

This word specifies the number of decimal places for the value in words 3 and 4. Positive values indicate that the decimal place shifts to the left, and negative values indicate that the decimal place shifts to the right. For example:

word 5 = 1: all returned values have the decimal place shifted 1 space to the left and a returned value of 5,213 is interpreted as 521.3

word 5 = –1: a returned value of 5,213 is interpreted as 52,130

Format, SPA

This word is always set to 0.

Read/write flag, SPA

This word determines whether the device will allow parameter values to be written.

0 = Read

1 = Write

Command control, operational commands

The command control word is used to control the unit. Each bit gives access to a command or state as if the operator was using the keypad.

Bits initiating a command (6 to 11) must change state in order to cause the command to begin. For example, to reset totalizer 1, Bit 8 must be cleared to 0, and then set to 1. It can stay set or clear for any period.

BW500 and SF500

Bit #	Description	Bit Clear (0)	Bit Set (1)
00	PID 1 mode	manual	auto
01	PID 1 freeze	no	yes
02	PID 1 setpoint source	local	remote
03	PID 2 mode	manual	auto
04	PID 2 freeze	no	yes
05	PID 2 setpoint source	local	remote
06	zero	no change	start
07	span	no change	start
08	reset totalizer 1	no change	reset
09	reset totalizer 2	no change	reset
10	reset batch totalizer	no change	reset
11	print		print
12	reserved		
13	reserved		
14	reserved		
15	reserved		

BW500/L

Bit #	Description	Bit Clear (0)	Bit Set (1)
06	zero	no change	start
07	span	no change	start
08	reset totalizer 1	no change	reset
09	reset totalizer 2	no change	reset
10	reserved		
11	print		print
12	reserved		
13	reserved		
14	reserved		
15	reserved		

Bit 00 and 03: PID Mode (BW500 and SF500 only)

Sets the mode of PID control to either manual (output determined by P410 – PID Manual) or auto (output determined by PID control in device).

Bit 02 and 05: Setpoint Source (BW500 and SF500 only)

Controls the location of the setpoint. If it is set as “local”, then the setpoint used is internal to the BW500 or SF500. If the setpoint source is set to “remote”, then the setpoint is controlled by a mA input. For setpoint control through communications, this must be set to “local.”

Bit 01 and 04: Freeze (BW500 and SF500 only)

Suspends PID function when PID Mode = 1 (auto) and holds the output at the last value. PID functionality resumes when the freeze bit is cleared.

Bit 06: Zero

Sets the zero point for calibration of the belt scale. This is a momentary setting that must be reset to 0 once the input is accepted. To check that the input was accepted, read word 0, bit 7 (zero status) and ensure it shows 1. Once it shows a 1, reset this bit to 0.

Bit 07: Span

Sets the span for calibration of the belt scale.

This is a momentary setting that must be reset to 0 once the input is accepted. To check that the input has been accepted, read word 0, bit 8 (Span Status) and ensure it shows a 1. Once it shows 1, reset this bit to 0.

Bit 08: Reset Totalizer 1

Causes the internal totalizer 1 to be reset to 0. This is a momentary setting that must be reset to 0 once the input is accepted. Using a timer is recommended to reset this back to 0.

Bit 09: Reset Totalizer 2

Causes the internal totalizer 2 to be reset to 0. This is a momentary setting that must be reset to 0 once the input is accepted. Using a timer is recommended to reset this back to 0.

Bit 10: Reset Batch Totalizer (BW500 and SF500 only)

Causes the batch totalizer to be reset to 0. This is a momentary setting that must be reset to 0 once the input is accepted. Using a timer is recommended to reset this back to 0.

Bit 11: Print

Starts print operation. One of the communications ports on your Siemens Integrator must be configured for a printer. This is a momentary setting that must be reset to 0 once the input is accepted. Using a timer is recommended to reset this back to 0.

Multispan Selection (BW500 and SF500)

Sets the current span (1 to 4). Any parameters that relate to span will use this value to determine which span is referenced. See the operating instructions for the BW500 or SF500 for more information on multispan.

PID Setpoints (BW500 and SF500 only)

Contain the current setpoint values as P415 in the Milltronics BW500 or SF500. To write these setpoints bits 02 and 05 in word 8 - Control must be set to “local.”

Batch Setpoint (BW500 and SF500 only)

Contain the current setpoint value as P564 in the Milltronics BW500 or SF500.

Batch Pre-warn Setpoint (BW500 and SF500 only)

Contain the current setpoint value as P567 in the Milltronics BW500 or SF500.

Word order

This word controls which word comes first in the UINT32 integers. For a value 0, the most significant word is given first. For a value 1, the least significant word is given first.

0 = MSW first

1 = LSW first

Note

To make a change to any parameter in the BW500/L using SmartLinx, P799 Communications Control must be set to 1.

Read Block

Note

Values returned in the words in the Read are in response to the Write to the device with the SmartLinx card. Words 0 through 20 have values with fixed meanings and formats. This means that you do not have to start communications with a Write in order to use Read, the data is always there. Words 22 through 29 are values returned in response to writing words 0 through 7 for Single Parameter Access (SPA), (Page 34)see Write Block.

BW500 and SF500

Description	Start	End	Size	Type
Instrument status 1	0	0	1	bitmapped
Rate	1	2	2	UINT32
Load	3	4	2	UINT32
Speed	5	6	2	UINT32
Total 1	7	8	2	UINT32
Total 2	9	10	2	UINT32
Relay status	11	11	1	bitmapped
Discrete input status	12	12	1	bitmapped
Multispan selection	13	13	1	integer
PID 1 setpoint value	14	15	2	UINT32
PID 2 setpoint value	16	17	2	UINT32
Batch setpoint value	18	19	2	UINT32
Batch prewarn setpoint value	20	21	2	UINT32
Parameter, SPA	22	22	1	integer
Primary index, SPA	23	23	1	integer
Secondary index, SPA	24	24	1	integer
New value, SPA	25	26	2	UINT32
Decimal place, SPA	27	27	1	integer
Format, SPA	28	28	1	integer
Read/write flag, SPA	29	29	1	1/0
Word order	30	30	1	1/0

Description	Start	End	Size	Type
Instrument status 2	31	31	1	bitmapped
Batch total	32	33	2	UINT32

BW500/L

Description	Start	End	Size	Type
Instrument status 1	0	0	1	bitmapped
Rate	1	2	2	UINT32
Load	3	4	2	UINT32
Speed	5	6	2	UINT32
Total 1	7	8	2	UINT32
Total 2	9	10	2	UINT32
Relay status	11	11	1	bitmapped
Discrete input status	12	12	1	bitmapped
Parameter, SPA	13	13	1	integer
Primary index, SPA	14	14	1	integer
Secondary index, SPA	15	15	1	integer
New value, SPA	16	17	2	UINT32
Decimal place, SPA	18	18	1	integer
Format, SPA	19	19	1	integer
Read/write flag, SPA	20	20	1	integer
Word order	21	21	1	integer
Instrument status 2	22	22	1	bitmapped

Instrument status 1

This word is used to feed back the current operating state of the product. Each bit gives the state of different parts of the product, some mutually exclusive, others are not. The state should be checked to verify operation.

Rate

Contains the current rate reading in engineering units. (For a full description of this reading, please refer to your Siemens Integrator operating instructions.)

Load

Contains the current load reading in engineering units. (For a full description of this reading, please refer to your Siemens Integrator operating instructions.)

Speed

Contains the current load reading in engineering units. (For a full description of this reading, please refer to your Siemens Integrator operating instructions.)

Total 1

(The number of fixed decimal places for this value is controlled by P634 primary indexes 1 and 2. The default setting is 3.) Contains the current value for totalizer 1 in engineering units. (For a full description of this reading, please refer to your Siemens Integrator operating instructions.)

Total 2

(The number of fixed decimal places for this value is controlled by P634 primary indexes 1 and 2. The default setting is 3.) Contains the current value for totalizer 2 in engineering units. (For a full description of this reading, please refer to your Siemens Integrator operating instructions.)

Relay Status

Shows the current logical status of all relays.

Bit	04	03	02	01	00
Relay	05	04	03	02	01

0 = Relay not asserted

1 = Relay asserted

“Asserted” indicates that the function controlling the relay is in an active state. Relay contacts can open or close based on this state; see your device manual for details.

Discrete Input Status

Shows the current logical status of all discrete inputs.

Bit	04	03	02	01	00
Input	05	04	03	02	01

0 = Discrete input open

1 = Discrete input closed

Multispan Selection (BW500 and SF500 only)

Shows the currently selected span (1 to 4).

PID 1 Setpoint Value (BW500 and SF500 only)

Contains the current setpoint value for PID 1 in engineering units. (For a full description of this reading, please refer to your Siemens Integrator operating instructions.)

PID 2 Setpoint Value (BW500 and SF500 only)

Contains the current setpoint value for PID 2 in engineering units. (For a full description of this reading, please refer to your Siemens Integrator operating instructions.)

Batch Setpoint Value (BW500 and SF500 only)

Contains the value of P564 – Batch Setpoint. (For a full description of this parameter, please refer to your Siemens Integrator operating instructions.)

Batch Pre-Warn Setpoint Value (BW500 and SF500 only)

Contains the value of P567 – Batch Pre-Warn Setpoint. (For a full description of this parameter, please refer to your Siemens Integrator operating instructions.)

Parameter Number / Primary Index / Secondary Index, Decimal Place, Format, Read/Write flag

These words contain the last values written to words 0 to 2 and words 5 to 7 of the Write area. They confirm that the parameter value has been written. These words are not updated until the value has been successfully transferred and stored in the Siemens SmartLinx device.

Use these words as an indicator that the requested information has been updated.

Value, SPA

The value of the specified paramter and index.

Word Order

The placement of the most significant word (MSW).

0 = MSW first

1 = MSW second

Instrument Status 2 (40034)

This word is used to feed back the current operating state of the product. Each bit gives the state of different parts of the product, some mutually exclusive, others are not. The state should be checked to verify operation.

Bit #	Description	Bit Clear (0)	Bit Set (1)
0	Totalizer 1 overflow	no overflow	overflow condition
1	Totalizer 2 overflow	no overflow	overflow condition

Bit 0 Totalizer 1 overflow

If Totalizer 1 has overflowed, (that is, has exceeded the spaces available in SmartLinx), this bit is set. The overflow condition can be changed by reducing Communication Totalizer resolution (P634).

Bit 1 Totalizer 2 overflow

If Totalizer 2 has overflowed, (that is, has exceeded the spaces available in SmartLinx), this bit is set. The overflow condition can be changed by reducing Communication Totalizer resolution (P634).

Batch Totalizer (BW500 and SF500 only)

Contains the current value for the Batch Totalizer in engineering units. (For a full description of this reading, please refer to your Siemens Integrator operating instructions.)

Note

The following two charts only apply to MODBUS TCP/IP.

BW500 and SF500 Write Block

41025	Parameter number, SPA	integer
41026	Primary index, SPA	integer
41027	Secondary index, SPA	integer

41028	New value, SPA	UINT32
41030	Decimal place, SPA	integer
41031	Format, SPA	integer
41032	Read/write flag, SPA	integer
41033	Command control	bitmapped
41034	Multispan selection	bitmapped
41035	PID 1 setpoint value	UINT32
41037	PID 2 setpoint value	UINT32
41039	batch setpoint value	UINT32
41041	batch prewarn setpoint value	UINT32
41043	word order	0/1

BW500/L

41025	Parameter number, SPA	integer
41026	Primary index, SPA	integer
41027	Secondary index, SPA	integer
41028	New value, SPA	UINT32
41030	Decimal place, SPA	integer
41031	Format, SPA	integer
41032	Read/write flag, SPA	integer
41033	Command control	bitmapped
41034	Word order	0/1

Parameter number SPA (41025)

Specifies the parameter number for Single Parameter Access (SPA) (Page 34)

Primary index, SPA (41026)

Specifies the primary index number for the parameter specified by word 0.

Secondary index, SPA (41027)

Specifies the secondary index for the parameter specified by word 0. This word is ignored for parameters that don’t use multiple indexes.

New value, SPA (41028)

The new value of the specified parameter and index.

Decimal place, SPA (41030)

This word specifies the number of decimal places for the value in words 3 and 4. Positive values indicate that the decimal place shifts to the left, and negative values indicate that the decimal place shifts to the right. For example: word 5 = 1: all returned values have the decimal place shifted 1 space to the left and a returned value of 5,213 is interpreted as 521.3 word 5 = –1: a returned value of 5,213 is interpreted as 52,130

Format, SPA (41031)

This word is always set to 0.

Read/write flag, SPA (41032)

This word determines whether the device will allow parameter values to be written.

0 = Read

1 = Write

Command control, operational commands (41033)

The command control word is used to control the unit. Each bit gives access to a command or state as if the operator was using the keypad.

Bits initiating a command (6 to 11) must change state in order to cause the command to begin. For example, to reset totalizer 1, Bit 8 must be cleared to 0, and then set to 1. It can stay set or clear for any period.

BW500 and SF500

Bit #	Description	Bit Clear (0)	Bit Set (1)
00	PID 1 mode	manual	auto
01	PID 1 freeze	no	yes
02	PID 1 setpoint source	local	remote
03	PID 2 mode	manual	auto
04	PID 2 freeze	no	yes
05	PID 2 setpoint source	local	remote
06	zero	no change	start
07	span	no change	start
08	reset totalizer 1	no change	reset
09	reset totalizer 2	no change	reset
10	reset batch totalizer	no change	reset
11	print		print
12	reserved		
13	reserved		
14	reserved		
15	reserved		

BW500/L

Bit #	Description	Bit Clear (0)	Bit Set (1)
06	zero	no change	start
07	spa	no change	start
08	reset totalizer 1	no change	reset
09	reset totalizer 2	no change	reset
10	reserved		
11	print		print
12	reserved		
13	reserved		
14	reserved		
15	reserved		

Bit 00 and 03: PID Mode (BW500 and SF500 only)

Sets the mode of PID control to either manual (output determined by P410 – PID Manual) or auto (output determined by PID control in device).

Bit 02 and 05: Setpoint Source (BW500 and SF500 only)

Controls the location of the setpoint. If it is set as "local", then the setpoint used is internal to the BW500 or SF500. If the setpoint source is set to "remote", then the setpoint is controlled by a mA input. For setpoint control through communications, this must be set to "local."

Bit 01 and 04: Freeze (BW500 and SF500 only)

Suspends PID function when PID Mode = 1 (auto) and holds the output at the last value. PID functionality resumes when the freeze bit is cleared.

Bit 06: Zero

Sets the zero point for calibration of the belt scale. This is a momentary setting that must be reset to 0 once the input is accepted. To check that the input was accepted, read word 0, bit 7 (zero status) and ensure it shows 1. Once it shows a 1, reset this bit to 0.

Bit 07: Span

Sets the span for calibration of the belt scale. This is a momentary setting that must be reset to 0 once the input is accepted. To check that the input has been accepted, read word 0, bit 8 (Span Status) and ensure it shows a 1. Once it shows 1, reset this bit to 0.

Bit 08: Reset Totalizer 1

Causes the internal totalizer 1 to be reset to 0. This is a momentary setting that must be reset to 0 once the input is accepted. Using a timer is recommended to reset this back to 0.

Bit 09: Reset Totalizer 2

Causes the internal totalizer 2 to be reset to 0. This is a momentary setting that must be reset to 0 once the input is accepted. Using a timer is recommended to reset this back to 0.

Bit 10: Reset Batch Totalizer (BW500 and SF500 only)

Causes the batch totalizer to be reset to 0. This is a momentary setting that must be reset to 0 once the input is accepted. Using a timer is recommended to reset this back to 0.

Bit 11: Print

Starts print operation. One of the communications ports on your Siemens Integrator must be configured for a printer. This is a momentary setting that must be reset to 0 once the input is accepted. Using a timer is recommended to reset this back to 0.

Multispan Selection (BW500 and SF500) (41034)

Sets the current span (1 to 4). Any parameters that relate to span will use this value to determine which span is referenced. See the operating instructions for the BW500 or SF500 for more information on multispan.

PID Setpoints (BW500 and SF500 only) (41035 to 41038)

Contain the current setpoint values as P415 in the Milltronics BW500 or SF500. To write these setpoints bits 02 and 05 in word 8 - Control must be set to "local."

Batch Setpoint (BW500 and SF500 only) (41039)

Contain the current setpoint value as P564 in the Milltronics BW500 or SF500.

Batch Pre-warn Setpoint (BW500 and SF500 only) (41041)

Contain the current setpoint value as P567 in the Milltronics BW500 or SF500.

Word order (41043)

This word controls which word comes first in the UINT32 integers. For a value 0, the most significant word is given first. For a value 1, the least significant word is given first.

0 = MSW first

1 = LSW first

BW500 and SF500 Read Block

40001	Instrument status 1	bitmapped
40002	Rate	UINT32
40004	Load	UNIT32
40006	Speed	UINT32
40008	Total 1	UINT32
40010	Total 2	UINT32
40012	Relay status	bitmapped
40013	Discrete input status	bitmapped
40014	Multispan selection	integer
40015	PID 1 setpoint value	UINT32
40017	PID 2 setpoint value	UINT32
40019	Batch setpoint value	UINT32
40021	Batch prewarn setpoint value	UINT32
40023	Parameter, SPA	integer
40024	Primary index, SPA	integer
40025	Secondary index, SPA	integer
40026	New value, SPA	UINT32
40028	Decimal place, SPA	integer
40029	Format, SPA	integer
40030	Read/write flag, SPA	0/1
40031	Word order	0/1
40032	Instrument status 2	0/1
40033	Batch total 1	UINT32

Instrument Status 1 (40001)

This word is used to feed back the current operating state of the product. Each bit gives the state of different parts of the product, some mutually exclusive, others are not. The state should be checked to verify operation.

Rate (40002)

Contains the current rate reading in engineering units. (For a full description of this reading, please refer to your Siemens Integrator operating instructions.)

Load (40004)

Contains the current load reading in engineering units. (For a full description of this reading, please refer to your Siemens Integrator operating instructions.)

Speed (40006)

Contains the current speed reading in engineering units. (For a full description of this reading, please refer to your Siemens Integrator operating instructions.)

Total 1 (40008)

(The number of fixed decimal places for this value is controlled by P634 primary indexes 1 and 2. The default setting is 3.) Contains the current value for totalizer 1 in engineering units. (For a full description of this reading, please refer to your Siemens Integrator operating instructions.)

Total 2 (40010)

(The number of fixed decimal places for this value is controlled by P634 primary indexes 1 and 2. The default setting is 3.) Contains the current value for totalizer 2 in engineering units. (For a full description of this reading, please refer to your Siemens Integrator operating instructions.)

Relay Status (40012)

Shows the current logical status of all relays.

Bit	04	03	02	01	00
Relay	05	04	03	02	01

0 = Relay not asserted

1 = Relay asserted

"Asserted" indicates that the function controlling the relay is in an active state. Relay contacts can open or close based on this state; see your device manual for details.

Discrete Input Status (40013)

Shows the current logical status of all discrete inputs.

Bit	04	03	02	01	00
Relay	05	04	03	02	01

0 = Discrete input open

1 = Discrete input closed

Multispan Selection (BW500 and SF500 only) (40014)

Shows the currently selected span (1 to 4).

PID 1 Setpoint Value (BW500 and SF500 only) (40015)

Contains the current setpoint value for PID 1 in engineering units. (For a full description of this reading, please refer to your Siemens Integrator operating instructions.)

PID 2 Setpoint Value (BW500 and SF500 only) (40017)

Contains the current setpoint value for PID 2 in engineering units. (For a full description of this reading, please refer to your Siemens Integrator operating instructions.)

Batch Setpoint Value (BW500 and SF500 only) (40019)

Contains the value of P564 – Batch Setpoint. (For a full description of this parameter, please refer to your Siemens Integrator operating instructions.)

Batch Pre-Warn Setpoint Value (BW500 and SF500 only) (40021)

Contains the value of P567 – Batch Pre-Warn Setpoint. (For a full description of this parameter, please refer to your Siemens Integrator operating instructions.)

Parameter Number / Primary Index / Secondary Index, Decimal Place, Format, Read/Write flag (40023 to 40030)

These words contain the last values written to words 0 to 2 and words 5 to 7 of the Write area. They confirm that the parameter value has been written. These words are not updated until the value has been successfully transferred and stored in the device with a SmartLinx card.

Use these words as an indicator that the requested information has been updated.

Word Order (40031)

The placement of the most significant word (MSW).

0 = MSW first

1 = MSW second Instrument

Instrument Status 2 (40032)

This word is used to feed back the current operating state of the product. Each bit gives the state of different parts of the product, some mutually exclusive, others are not. The state should be checked to verify operation.

Bit #	Description	Bit Clear (0)	Bit Set (1)
0	Totalizer 1 overflow	no overflow	overflow condition
1	Totalizer 2 overflow	no overflow	overflow condition

Bit 0 Totalizer 1 overflow

If Totalizer 1 has overflowed, (that is, has exceeded the spaces available in SmartLinx), this bit is set. The overflow condition can be changed by reducing Communication Totalizer resolution (P634).

Bit 1 Totalizer 2 overflow

If Totalizer 2 has overflowed, (that is, has exceeded the spaces available in SmartLinx), this bit is set. The overflow condition can be changed by reducing Communication Totalizer resolution (P634).

Batch Totalizer (BW500 and SF500 only) (40033)

Contains the current value for the Batch Totalizer in engineering units. (For a full description of this reading, please refer to your Siemens Integrator operating instructions.)

4.4 Data Types

The Siemens device parameters take on many values in various formats, as discussed in the Siemens device operating instructions. For the convenience of the programmer, those values are converted to and from 16-bit integer numbers, since those are easily handled by most PLCs.

4.4.1 Integer

Level Products

Integer parameter values are by far the most common. For example, parameter P920 Reading (see the Parameters chapter of your MultiRanger 100/200 or HydroRanger 200 operating instructions for details) returns a number representing the current reading (either Level or Volume in percentage, depending on the Siemens device configuration).

Numeric values must be in the range –20,000 to +20,000 to be valid. If a parameter is requested and its value is more than +20,000, the number 32,767 is returned; if it is less than –20,000, the number –32,768 is returned. If this happens, increase the number of decimal places for that parameter.

If a parameter cannot be expressed in terms of percent (example: Span), or has no meaningful value, the special number 22,222 is returned. Try requesting the parameter in units, or refer to the Siemens device operating instructions to understand the format and use of the requested parameter.

Weighing Products

Integers used on the Weighing products can have any valid value. So, the entire range from -32,768 to 32,767 or 0 to 65,535 is available and no values are used as error conditions.

4.4.2 Bit Values

Bits are packed into registers in groups of 16 bits (1 word). In this operating instructions, bits are numbered from 00 to 15, with bit 00 referring to the least significant bit and bit 15 referring to the most significant bit.

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
MSB															LSB

4.4.3 Floating Point Number

Note

Floating Point Number ist only applicable to MultiRanger 200 HMI and HydroRanger 200 HMI.

The IEEE single precision floating point standard representation requires a 32-bit word, which is represented as numbers from 0 to 31, left to right. The first bit is sign bit 'S', the next eight bits are exponent bits 'E', and the final 23 bits is fraction 'F':

F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	E	E	E	E	E	E	E	E	S
31-9																					8-1								0

4.4.4 Unsigned Integer (UINT32)

Large numbers are put into unsigned 32-bit integers. By default, they are set up so that the first word (register) is the most significant word (MSW) and the second word (register) is the least significant word (LSW) depending on the setting of the word order bit.

For example, when reading words 7 and 8, the 32 bits would look as follows:

word 7			word 8		
15	MSW	0	15	LSW	0
31	32-bit integer value (UINT32)				0

The whole is read as a 32-bit integer.

4.4.5 Split Values

Note

Used for MultiRanger 200 and HydroRanger 200 products only.

Certain parameters are actually a pair of numbers separated by a colon, in the format xx:yy.

One example is P807, Transducer Noise, where:

xx = the average noise value in dB

yy = the peak noise in dB

The number which corresponds to xx:yy, either for reading or setting a parameter, is determined by the following formula:

For storing to the Siemens device:

value= (xx + 128) x 256 + (yy + 128)

For reading from the Siemens device:

xx = (value / 256) – 128

yy = (value % 256) – 128

To compute the modulus where % is the modulus operator:

value1 = value / 256

value2 = remainder of value1

value3 = value2 x 256

yy = value3 - 128

It may simplify programming to notice:

xx = (most significant byte of value) – 128

yy = (least significant byte of value) – 128

4.4.6 Text Messages

Note

Used for MultiRanger 200 and HydroRanger 200 products only.

If a device parameter returns a text message, that message is converted to an integer and provided in the register. The numbers are shown in the following table.

Number	Text message
22222	Invalid value
30000	OFF
30001	ON
30002	Parameter values of multiple points to not match
30003	Parameter does not exist
30004	ERR
30005	ERR1
30006	OPEN
30007	SHORT
30008	PASS
30009	FAIL
30010	HOLD
30011	LO
30012	HI
30013	DE
30014	EN
30015	Parameters has not been set
-32768	Value is less than -20,000
32767	Value is greater than 20,000

4.4.7 Relay Function Codes (2.8.1.4. Relay Function Only)

Note

Please note that the MultiRanger 200 HMI and the HydroRanger 200 HMI offer more function codes. For details, see their respective operating instructions.

If a device parameter returns a relay function code, that message is converted to a number and is then displayed. The numbers are shown in the following table:

Control	Relay function code	Number	2.8.1.4. Relay Function
General	OFF, relay not used	0	OFF
	Undesignated Level Alarm	1	Level
	LoLo Level Alarm	2	Level - LL
	Lo Level Alarm	3	Level - L
	Hi Level Alarm	4	Level - H
	HiHi Level Alarm	5	Level - HH
	In-bounds Alarm	6	In-bounds
	Out-of-bounds Alarm	9	Out-of-bounds
	Rate of Level Change Alarm	12	Rate of Change
	Temperature Alarm	15	Temperature
	Loss of Echo (LOE) Alarm	20	LOE
	Transducer Cable Fault Alarm	16	Cable Fault
Flow	Totalizer	22	Totalizer
	Flow Sampler	23	Flow Sampler
Pump	Fixed Duty Assist	25	Fixed Duty Assist
	Fixed Duty Backup	26	Fixed Duty Backup
	Alternate Duty Assist	30	Alternate Duty Assist
	Alternate Duty Backup	31	Alternate Duty Backup
	Service Ratio Duty Assist	35	Service Ratio Duty Assist
	Service Ratio Duty Backup	36	Service Ratio Duty Backup
	First In First Out (FIFO)	40	First In First Out
Control	Flush Value	65	Flush Value
	Communication	66	Communication

See *2.8.1.4. Relay Function* of your Siemens device operating instructions for full details about this parameter.

Troubleshooting 5

5.1 General

In all cases, perform the following:

1. Verify that your device has the correct module by checking parameters 3.2.10.4. Smartlinx Module Type (P794) and 3.2.10.5. Smartlinx Protocol (P795). (See the Parameters chapter of your Siemens device operating instructions for details.)
2. Check 3.2.10.1. Hardware Status (P790). (See the Parameters chapter of your Siemens device operating instructions for details.) Below are the possible states:

Hardware status	Description/action
PASS	The SmartLinx module is ready for use.
FAIL	Either the module, or the module connector on the Siemens device is defective.
ERR1	The Siemens software doesn't recognize the ID number of the installed module. Please contact your Siemens representative to get a software upgrade or to receive instructions.

3. Make sure the Siemens device is set to a unique address to prevent conflict with any other slave(s) on the bus.
4. Check the configuration of the scanning master to make sure it is functioning properly.

Device not coming online

If you have configured the Siemens device in the Master and downloaded it to the processor, but the device is not coming online:

DeviceNet

1. The card passes the built-in self-test, but will not connect to the network.

- Check to make sure P751, P752 are set correctly and that you do not have another instrument on the LAN with the same MAC ID.
- Check to make sure all 8 DIP switches are set correctly.
- Check the wiring to the card (or terminal strips)
- Verify that the Read and Write Block sizes are correct. This is particularly important if you are using P762.

2. The lights on the card indicate that it is OK and communicating, but I cannot see any data in the PLC.

- When configuring the master, map the data to the M files (AB only) and add the code to the PLC.
- Some Device net scanners have a control word where you can place the scanner in Ideal Mode. Check that your scanner is in Run mode.

PROFIBUS DP modules

- Check which GSD file you are using to make sure that it is the correct one (see GSD files (Page 23)).
- Check the wiring to the module. In particular, check that you have lines A and B connected correctly.
- Verify that you have set the correct IP address on the module. Also, please note that the module does not see a charge until the power has been cycled.
- Verify that the Read and Write block sizes are correct.This is particularly important if you are using P762.

MODBUS TCP/IP and EtherNet/IP

- Check the cable to the card. In particular, check that it is not damaged in any way, and verify that it is a functioning cable.
- Verify that you set the correct IP address on the card.
- Verify that the Read and Write Block sizes are correct. This is particularly important if you are using P762.

PROFINET

- Check which GSDML file you are using to make sure that it is the correct one (see GSDML file). (Page 27)
- Check the cable to the card. In particular, check that it is not damaged in any way, and verify that it is a functioning cable.
- Verify that you set the correct IP address on the card.
- Verify that the Read and Write Block sizes are correct. This is particularly important if you are using P762.

Other devices dropping out

If the network was working fine until you connected to the Siemens device, at which time other devices dropped out:

- Check the termination switch on the SmartLinx module. The network cable has to be terminated at both ends of the LAN, but not in between.
- Check your grounding. The SmartLinx module specifications require that all devices be on the same ground. Improper grounding can cause unpredictable effects.

Technical Data

6

6.1 Specifications

Specifications	DeviceNet	PROFIBUS DP	PROFIBUS DP-V1	MODBUS TCP/IP	EtherNet/IP	PROFINET
Application	Compatible with a master instrument on a Rev. 2.00 DeviceNet bus	Compatible with a master device on a PROFIBUS DP-V0 bus	Compatible with a master device on a PROFIBUS DP-V1 bus	MODBUS TCP Server device on an industrial Ethernet network	Compatible with an Ethernet/IP Client device on an industrial Ethernet network	Compatible with a master device on a PROFINET bus
Compatible devices	• Milltronics BW500 • Milltronics BW500/L • Milltronics SF500 • MultiRanger 100/200 • HydroRanger 200 • MultiRanger 200 HMI • HydroRanger 200 HMI	• Milltronics BW500 • Milltronics SF500 • MultiRanger 100/200 • HydroRanger 200	• MultiRanger 200 HMI • HydroRanger 200 HMI	• Milltronics BW500 • Milltronics BW500/L • Milltronics SF500 • MultiRanger 200 HMI • HydroRanger 200 HMI	• Milltronics BW500 • Milltronics BW500/L • Milltronics SF500 • MultiRanger 200 HMI • HydroRanger 200 HMI	• Milltronics BW500 • Milltronics BW500/L • Milltronics SF500 • MulitRanger 200 HMI • HydroRanger 200 HMI
Communication settings	Baud rate: 125, 250 or 500 Kbps Network address: 0 to 63	Baud rate: 9.6 Kbaud to 12 Mbaud, automatically detected		Network configuration can be done via the Anybus IP configuration setup tool or via the on board web server.	Network configuration can be done via the Anybus IP configuration setup tool or via the on board web server	IP address & PROFINET Device Name (configured over the network via a PROFINET master)
Connection	Terminal block	Terminal block		RJ45	RJ45	RJ45
Termination	External 121 Ω ¼ W resistor required at far ends of the LAN	Switch selectable, open or special active termination as per PROFIBUS specification (see Termination Switch (Page 11))				

Specifications	DeviceNet	PROFIBUS DP	PROFIBUS DP-V1	MODBUS TCP/IP	EtherNet/IP	PROFINET
Cable	As per DeviceNet specification, REV. 2.00	Belden PROFIBUS cable 3079A, or equivalent		CAT 5 industrial Ethernet cable	CAT 5 industrial Ethernet cable	CAT 5 industrial Ethernet cable
Load/Draw	From bus power: less than 70 mA					

Appendix: Reducing Transferred Data

A

Note

Reducing the data map size is not possible for the MultiRanger 200 HMI and HydroRanger 200 HMI.

You can limit the amount of data being transferred over the Bus, and save both bandwidth and memory, by using P762. However, when you reduce the size of the data map, the configuration will change. If the data block sizes in the device do not match what is configured in the master, no communications will occur. Therefore it is critical to calculate the size of the new map. The calculation is different for level applications and for weighing applications.

The following sections provide explanations and examples of the calculation required, together with a worksheet to use as a template. The first section explains how it works with level products, and the second explains how it works with weighing products. In each section, the Write Block map is calculated first, followed by the Read Block.

The SmartLinx map[1)] is controlled by the values of the indices of P762. By turning on an index (setting the value to one or more), you activate both the read and write blocks associated with that index. The table below shows which values in the read/write blocks are turned on by each P762 index.

[1)] For examples of the data maps before modification, see Data map (Page 35).

A.1 Level Products

A.1.1 MultiRanger 100/200 and HydroRanger 200

Name of area	P762 Point	Value	Read area turned on	Write area turned on
Status	1	1	Instrument status	-
Reading	2	1-10	1-10 point readings	-
Alarm	3	1-10	1-10 point alarm and status	-
Point-on-priority	4	1	-	Measurement point-on-priority
MPA	5	1	Returned values (1-10)	Parameter number
			Decimal place	Secondary index
			Format	Decimal place
			Parameter number	Format
			Secondary index	-

Name of area	P762 Point	Value	Read area turned on	Write area turned on
SPA	6	1	Parameter number	Parameter number
			Primary index	Primary index
			Secondary index	Secondary index
			Returned value	New value
			Decimal value	Decimal place
			Format	Format
			Read/write	Read/write
Operating Mode	7	1	-	Operating Mode

A.1.2 Write Block

The standard Write block is made up of the following sections: point on priority, MPA, SPA, and operating mode. If any of these sections is 'turned off' by setting the corresponding part of P762 to a zero, the new map will shift down accordingly and the size will be reduced by that amount. Multiply the parameter value by the memory size, then add up the results to get the total.

Write Block Template for Level Products for the MultiRanger 100/200 and HydroRanger 200

Name of area	P762 Point	value	Memory size for Write Block per value	Result of multiplying value * memory size
Status	1		0	
Reading	2		0	
Alarm	3		0	
Point-on-priority	4		1	
MPA	5		4	
SPA	6		7	
Operating Mode	7		1	
			Total words:	

Example 1:

If you want only Point status, and to read the first 7 point readings, the chart is:

Name orf area	P762 Point	value	Memory size for Write Block per value	value * memory size
Status	1	1	0	0
Reading	2	7	0	0
Alarm	3	0	0	0
Point-on-priority	4	0	1	0
MPA	5	0	4	0
SPA	6	0	7	0
Operating Mode	7	-	1	-
			Total words:	0

The output data block (Write block) is now 0 words in size (0 bytes).

Example 2:

If you want only SPA, then the chart is:

Name orf area	P762 Point	value	Memory size for Write Block per value	value * memory size
Status	1	0	0	0
Reading	2	0	0	0
Alarm	3	0	0	0
Point-on-priority	4	0	1	0
MPA	5	0	4	0
SPA	6	1	7	7
Operating Mode	7	0	1	0
			Total words:	7

The output data block (Write block) is now 7 words in size (14 bytes) and the Word numbers have shifted to a lower value.

Word	Description
0	Parameter number
1	Parameter primary index
2	Parameter secondary index
3	Parameter value
4	Decimal place
5	Format
6	Read/write flag

Original Write Bock Data Map for the MultiRanger 100/200 and HydroRanger 200

Words	Description	Access	Data Type
0	Measurement point-on-priority	direct	bitmapped
1	Parameter number		integer
2	Parameter secondary index[1)]	MPA	integer
3	Decimal place		integer
4	Format		0/1
5	Parameter number		integer
6	Parameter primary index		integer
7	Parameter secondary index		integer
8	Parameter value	SPA	integer
9	Decimal place		0/1
10	Format		0/1
11	Read/write flag		0/1
12	Operating Mode	direct	0/1

[1)] The primary index is implicit in the address of the returned parameter values.

A.1.3 Read Block

The standard Read block is made up of the following sections: status, reading, alarm, MPA, and SPA. If any of these sections are 'turned off' by setting the corresponding part of P762 to a zero, the new map will shift down accordingly and the size will be reduced by that amount for the Read block. Multiply the parameter value by the memory size, then add up the results to get the total.

Read Block Template for the MultiRanger 100/200 and HydroRanger 200

Name of area	P762 Point	value	Memory size for Read Block per value	Result of multiplying value * memory size
Status	1		1	
Reading	2		1	
Alarm	3		1	
Point-on-priority	4		0	
MPA	5		14	
SPA	6		7	
Operating Mode	7		0	
			Total words:	

Example 1:

If you want only Instrument status, and to read the first 7 point readings, then the chart is:

Name of area	P762 Point	value	Memory size for Read Block per value	value * memory size
Status	1	1	1	1
Reading	2	7	1	7
Alarm	3	0	1	0
Point-on-priority	4	0	0	0
MPA	5	0	14	0
SPA	6	0	7	0
Operating Mode	7	0	0	0
			Total words:	8

The input data block (Read block) is now 8 words in size (16 bytes), and the Word numbers have shifted to a lower value.

New Read Block Data map:

Word	Description
0	Instrument status
1	Reading for point 1
2	Reading for point 2
3	Reading for point 3

Word	Description
4	Reading for point 4
5	Reading for point 5
6	Reading for point 6
7	Reading for point 7

Example 2:

If you want only SPA, then the chart is:

Name of area	P762 Point	value	Memory size for Read Block per value	value * memory size
Status	1	0	1	0
Reading	2	0	1	0
Alarm	3	0	1	0
Point-on-priori-ty	4	0	0	0
MPA	5	0	14	0
SPA	6	1	7	7
Operating Mode	7	0	0	0
			Total words:	7

The input data block (Read block) is now 7 words in size (14 bytes), and the Word numbers have shifted to a lower value.

New Read Block Data map:

Word	Description
0	Parameter number
1	Parameter primary number
2	Parameter secondary number
3	Parameter returned value
4	Decimal place
5	Format
6	Read/write flag

Original Read Block Data map for the MultiRanger 100/200 and HydroRanger 200

Words	Description	Access	Data Type
0	Instrument status		bitmapped
1-10	Point reading	direct	integer
11-20	Point alarm and status		bitmapped
21-30	Returned values		integer
31	Decimal place		integer
32	Format	MPA	0/1
33	Parameter number		integer
34	Parameter secondary index		integer

Words	Description	Access	Data Type
35	Parameter	SPA	integer
36	Parameter primary index		integer
37	Parameter secondary index		integer
38	Value		integer
39	Decimal place		integer
40	Format		0/1
41	Read/write flag		0/1

A.2 Weighing Products

Name of area	P762 Point	Value	Read area turned on	Write area turned on
Status	1	1	Instrument status	-
Rate	2	1	Rate	-
Load	3	1	Load	-
Speed	4	1	Speed	-
Total	5	1	Total 1	-
			Total 2	
Relay status	6	1	Relay status	-
DI status	7	1	Discrete input status	-
SPA	8	1	Parameter number	Parameter number
			Primary index	Primary index
			Secondary index	Secondary index
			Returned value	New value
			Decimal place	Decimal place
			Format	Format
			Read/write	Read/write
Command Control	9	1	-	Command Control
Multispan	10	1	-	Multispan Selection
PID	11	1	-	PID 1 setpoint value
				PID 2 setpoint value
Batch	12	1	-	Batch setpoint value
Batch Prewarn	13	1	-	Batch Prewarn setpoint value
Word Order	14	1	Word Order	Word order
Status 2	15	1	Instrument Status 2	-
Batch Total	16	1	Batch Total	-

The standard Write block is made up of the following sections: SPA, command control, multispan, PID, batch, batch prewarn, word order. If any of these sections are ‘turned off’ by setting the corresponding part of P762 to a zero, the new map will shift down accordingly and the size will be reduced by that amount. Multiply the parameter value by the memory size, then add up the results to get the total.

Write Block Template for Weighing Products

Name of area	P762 Point	Value	Memory size for Write Block per value	Result of multiplying value * memory size
Status	1		0	
Rate	2		0	
Load	3		0	
Speed	4		0	
Total	5		0	
Relay Status	6		0	
DI Status	7		0	
SPA	8		8	
Command Control	9		1	
Multispan	10		1	
PID	11		4	
Batch	12		2	
Batch Prewarn	13		2	
Word Order	14		1	
Status 2	15		0	
Batch Total	16		0	

Example 1:

If you want only rate, load, and batch prewarn, then the chart is:

Name of area	P762 Point	Value	Memory size for Write Block per value	Result of multiplying value * memory size
Status	1	0	0	0
Rate	2	1	0	0
Load	3	1	0	0
Speed	4	0	0	0
Total	5	0	0	0
Relay Status	6	0	0	0
DI Status	7	0	0	0
SPA	8	0	8	0
Command Control	9	0	1	0
Multispan	10	0	1	0
PID	11	0	4	0
Batch	12	0	2	0
Batch Prewarn	13	1	2	2
Word Order	14	0	1	0
Status 2	15	0	0	0
Batch Total	16	0	0	0
			Total words:	2

The input data block (Write block) is now 2 words in size (4 bytes) and the Word numbers have shifted to a lower value:

New Write Bock Data Map:

Word	Description
0-1	Batch prewarn

Original Write Block Data Map for Weighing Products:

Description	Start	End	Size	Data Type
Parameter Number, SPA	0	0	1	integer
Primary index, SPA	1	1	1	integer
Secondary index, SPA	2	2	1	integer
Value, SPA	3	4	2	UINT32
Decimal place, SPA	5	5	1	integer
Format, SPA	6	6	1	integer
Read/write flag, SPA	7	7	1	integer
Command control	8	8	1	bitmapped
Multispan selection	9	9	1	1-4
PID 1 setpoint value	10	11	2	UINT32
PID 2 setpoint value	12	13	2	UINT32
Batch setpoint value	14	15	2	UINT32
Batch prewarn setpoint value	16	17	2	UINT32
Word order	18	18	1	0/1

The standard Read block is made up of the following sections: status, rate, load, speed, total, relay status, DI status, multispan, PID, batch, batch prewarn, SPA, Word order. If any of these sections are ‘turned off’ by setting the corresponding part of P762 to a zero, the new map will shift down accordingly and the size will be reduced by that amount, for the Read block. Multiply the parameter value by the memory size, then add up the results to get the total.

Read Block Template for Weighing Products

Name of area	P762 Point	Value	Memory size for Write Block per value	Result of multiplying value * memory size
Status	1		1	
Rate	2		2	
Load	3		2	
Speed	4		2	
Total	5		4	
Relay Status	6		1	
DI Status	7		1	
SPA	8		8	
Command Control	9		0	
Multispan	10		1	
PID	11		4	
Batch	12		2	
Batch Prewarn	13		2	
Word Order	14		1	

Name of area	P762 Point	Value	Memory size for Write Block per value	Result of multiplying value * memory size
Status 2	15		1	
Batch Total	16		2	
			Total words:	

Example 1:

If you want only rate, load, and batch prewarn, the chart is:

Name of area	P762 Point	Value	Memory size for Write Block per value	Result of multiplying value * memory size
Status	1	0	1	0
Rate	2	1	2	2
Load	3	1	2	2
Speed	4	0	2	0
Total	5	0	4	0
Relay Status	6	0	1	0
DI Status	7	0	1	0
SPA	8	0	8	0
Command Control	9	0	0	0
Multispan	10	0	1	0
PID	11	0	4	0
Batch	12	0	2	0
Batch Prewarn	13	0	2	2
Word Order	14	0	1	0
Status 2	15	0	1	0
Batch Total	16	0	2	0
			Total words:	6

The input data block (Read block) is now 6 words in size (12 bytes) and the Word numbers have shifted to a lower value:

New Read Block Data Map

Word	Description
0-1	Rate
2-3	Load
4-5	Batch prewarn

Original Read Block Data Map for Weighing Products

Description	Start	End	Size	Data Type
Instrument status	0	0	1	bitmapped
Rate	1	2	2	UINT32
Load	3	4	2	UINT32
Speed	5	6	2	UINT32
Total 1	7	8	2	UINT32

Description	Start	End	Size	Data Type
Total 2	9	10	2	UINT32
Relay Status	11	11	1	bitmapped
Discrete input status	12	12	1	bitmapped
Multispan selection	13	13	1	integer
PID 1 setpoint value	14	15	2	UINT32
PID 2 setpoint value	16	17	2	UINT32
Batch setpoint value	18	19	2	UINT32
Batch prewarn setpoint value	20	21	2	UINT32
Parameter, SPA	22	22	1	integer
Primary index, SPA	23	23	1	integer
Secondary index, SPA	24	24	1	integer
Value, SPA	25	26	2	UINT32
Decimal place, SPA	27	27	1	integer
Format, SPA	28	28	1	integer
Read/write flag, SPA	29	29	1	1/0
Word order	30	30	1	1/0
Insturment status 2[1)]	31	31	1	bitmapped
Batch total[1)]	32	32	2	UINT32

[1)] This is only available in firmware V 3.05 or higher.

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