Anybus Modbus TCP

SSW900-CMB-TCP-N

User's Guide

Anybus Modbus TCP User's Guide

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The information below describes the reviews made in this manual.

Version	Revision	Description
V1.0X	R00	First edition
V1.1X	R01	General revision
V1.2X	R02	General revision
V1.3X	R03	Parameters related to the SSW900-CETH-W accessory. Parameter for adjusting the contrast of the HMI display. Text corrections.
V1.4X	R04	C6.2.1, C11.4. Text corrections.
V1.5X	R05	General revision

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ABOUT THE MANUAL

This manual supplies the necessary information for the operation of the SSW900 soft-starter using the Anybus Modbus TCP interface. This manual must be used together with the SSW900 user's manual and programming manual.

ABBREVIATIONS AND DEFINITIONS

ASCII American Standard Code for Information Interchange
CRC Cycling Redundancy Check
CSMA/CD Carrier Sense Multiple Access/Collision Detection
IP Internet Protocol
MAC Medium Access Control
TCP Transmission Control Protocol
UDP User Datagram Protocol
LSB Least Significant Bit/Byte
MSB Most Significant Bit/Byte
ro Read only
rw Read/write
cfg Configuration

NUMERICAL REPRESENTATION

Decimal numbers are represented by means of digits without suffix. Hexadecimal numbers are represented with the letter 'h' after the number. Binary numbers are represented with the letter 'b' after the number.

DOCUMENTS

The Modbus protocol was developed based on the following specifications and documents:

Document	Version	Source
MODBUS Application Protocol Specification, December 28th 2006.	V1.1b	MODBUS.ORG
MODBUS Messaging On TCP/IP Implementation Guide, October 24th 2006.	V1.0b	MODBUS.ORG

In order to obtain this documentation, consult MODBUS.ORG, which is nowadays the organization that keeps, publishes and updates the information related to the Modbus protocol.

1 MAIN CHARACTERISTICS

Below are the main characteristics for communication of the soft-starter SSW900 with Anybus Modbus TCP accessory.

- The interface follows the Fast Ethernet 100BASE-TX standard.
- It allows communication using the 10 or 100 Mbps rates in half or full duplex mode.
- It has a built-in, two-port Ethernet switch.
- The Ethernet ports work with Auto-MDIX (automatic medium-dependent interface crossover), a technology which automatically detects the type of cable used and configures the connection accordingly, eliminating the need of cross-over cables.
- Operates as Modbus TCP server.
- The server provides up to 4 simultaneous Modbus TCP connections.
- Allows data communication for equipment operation and parameterization.

2 INTERFACE DESCRIPTION

The SSW900 soft-starter has two Slots for accessories (Figura 2.1). Parameters S3.5.1 and S3.5.2 present which accessory was recognized by Slot.

The accessories can be connected to any Slot, but only one type of each communication accessory is allowed. The Anybus-CC communication accessories (regardless of the protocol implanted) are identified on these parameters as *Anybus-CC*.

Read the user's manual of the SSW900 soft-starter before installing or using this accessory.

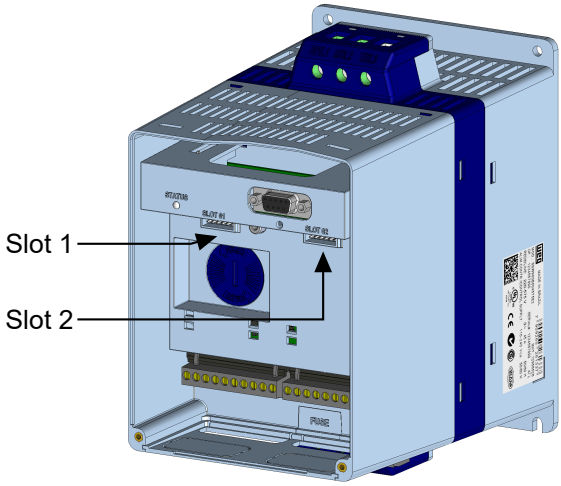
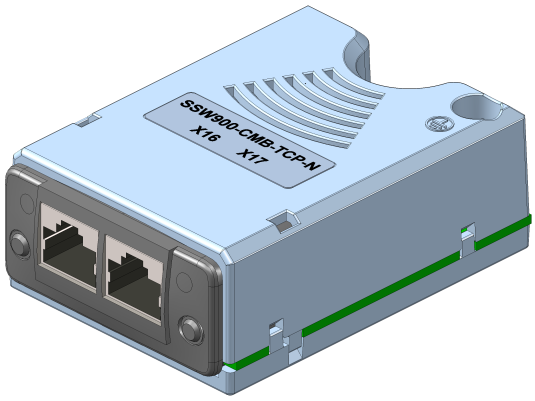


Figure 2.1: *Slots for accessories*

NOTE!
Only one Anybus-CC communication accessory can be connected to the SSW900 soft-starter, even if they are different protocols.

2.1 ANYBUS MODBUS TCP ACCESSORY



SSW900-CMB-TCP-N:

- Supplied items:
  - Installation guide.
  - Anybus Modbus TCP communication module.
  - "torx" screw driver for fixing the module.

2.2 CONNECTORS

The accessory for Modbus TCP communication has two RJ45 connectors for network connection. The connector pin out follows the Fast Ethernet 100BASE-TX standard, using two pairs of cables for data transmission and reception.

The housings of the Ethernet connectors, which are normally connected to the cable shield, have connections between themselves and to the protective earth via an RC circuit.

2.3 INDICATION LEDS

The Modbus TCP accessory has a Link LED indicator in each Ethernet connector (❶ and ❷), and two LEDs for state indication, one for the communication module (MS) and another for the network (NS). These LEDs have the following functions and indications.

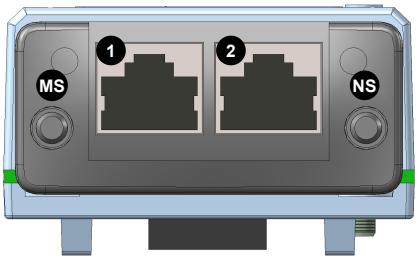


Table 2.1: *Link LED*

State	Description
Off	No link or powered off.
Green, solid	Link up, no activity.
Green, flashing	Link up and activity.

The MS LED indicates the conditions of the module itself. That is, whether it is able to work or not. The table below shows the possible states:

Table 2.2: *State of the Modbus TCP module*

Status	Description	Comments
Off	No power or initializing	-
Green, solid	Normal operation	-
Red, solid	Module in error	Reinitializing the equipment is required.
Red, flashing	IP address is invalid/duplicated	-
Flashing green/red	Equipment performing self-diagnosis	It occurs during initialization.

The NS LED provides information about the state of the Modbus TCP network. The table below presents the description of those states.

Table 2.3: *State of the Modbus TCP network*

Status	Description	Comments
Off	No power or no IP address	-
Green, solid	Connection established	-
Green, flashing	Waiting for connections	-
Red, solid	Invalid/duplicated IP address, or fatal error	Reinitializing the equipment is required. It indicates that the slave cannot enter the network because of addressing problems. Verify if the address is being used by another equipment or if there are installation problems.
Flashing green/red	Equipment performing self-diagnosis	It occurs during initialization.

3 MODBUS TCP NETWORK INSTALLATION

This chapter presents recommendations related to equipment installation in an Modbus TCP network.

3.1 IP ADDRESS

Every equipment in an Ethernet network needs an IP address and subnet mask.

The IP addressing is unique in the network, and each equipment must have a different IP. The subnet mask is used to define which IP address range is valid in the network.

The SSW900 soft-starter allows the use of two methods for programming these features, programmable via C8.3.4:

- Parameters: uses the configurations of IP address, mask and gateway as programmed on equipment parameters.
- DHCP: enable the configuration of the SSW900 via DHCP server. The DHCP can automatically assign IP addresses, subnet mask, etc. to the devices on the network. The configurations performed via parameters are disregarded.

NOTE!
After changing these properties, for the changes to take effect, the equipment must be turned off and on again, or requesting the settings update via C8.3.1.

3.2 COMMUNICATION RATE

The Ethernet interfaces of the SSW900 soft-starter can communicate using the 10 or 100 Mbps rates in half or full duplex mode.

NOTE!
It is important that, for each Ethernet connection made between two points, the baud rate and the duplex mode are set to the same option. If the option AUTO is used in one of the points, you must set the other point also to AUTO, or to half duplex mode.

3.3 CABLE

Recommended characteristics for the cable:

- Standard Ethernet cable, 100Base-TX (FastEthernet), CAT 5e or higher.
- Shielded cable.
- Maximum length between devices: 100 m.

For installation, it is recommended the use of shielded Ethernet cables specific for use in industrial environment.

3.4 NETWORK TOPOLOGY

To connect SSW900 soft-starter in an Modbus TCP network, usually the star connection is made using an industrial switch.

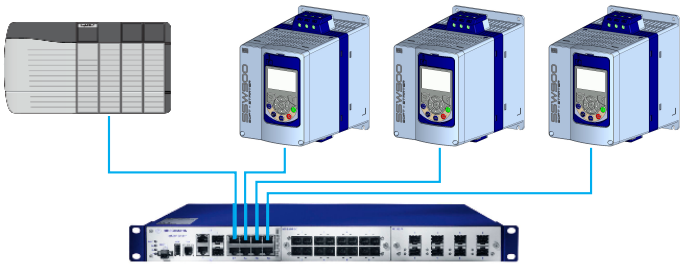


Figure 3.1: *Star topology*

It is also possible to make the connection in daisy chain, allowing a topology equivalent to a bus.

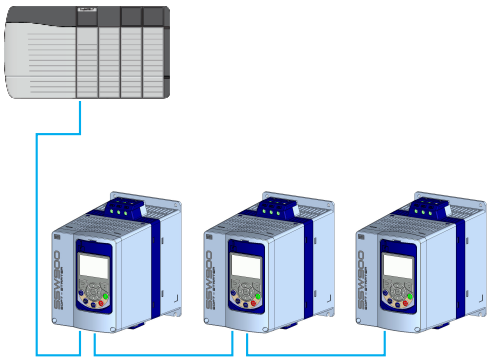


Figure 3.2: *Daisy chain topology*

NOTE!
When the equipment is turned off, the built-in switch is also deactivated, preventing communication with the subsequent equipment.

3.5 RECOMMENDATIONS FOR GROUNDING CONNECTION AND CABLE ROUTING

The correct connection with the ground decreases problems caused by interference in an industrial environment. The following are some recommendations about grounding and cable routing:

- Always use shielded twisted pair Ethernet cables and connectors with metallic housing.
- Connect the equipment grounding via grounding terminal. Avoid the cable connection on multiple grounding points, especially where there are grounds with different potentials.
- Pass signal cables and communication cables in dedicated pathways. Prevent laying these cables next to power cables.

4 S STATUS

Allows viewing of the SSW reading variables.

S5 COMMUNICATIONS

HMI monitoring parameters of the communication interfaces.

For a detailed description, refer to the Anybus-CC, CANopen, DeviceNet, Ethernet and Modbus RTU User's Manuals of the SSW according to the interface used.

S5.1 Status Word

.1 SSW	0 ... 15 Bit

Description:
Word of SSW status.

.1 SSW Word of SSW status.

Bit	Value/Description
Bit 0 Running	0: The motor is not enabled. 1: The motor is enabled.
Bit 1 Gener. Enabled	0: When it is general disabled by any mean. 1: When it is general enabled by all the means.
Bit 2 JOG	0: The JOG function is inactive. 1: The JOG function is active.
Bit 3 Initial Test	0: None. 1: During the initial tests before the motor starting.
Bit 4 Ramp Up	0: It is not accelerating. 1: During the whole acceleration.
Bit 5 Full Voltage	0: There is no full voltage applied to the motor. 1: Full voltage is being applied to the motor.
Bit 6 Bypass	0: With open bypass. 1: With closed bypass.
Bit 7 Ramp Down	0: It is not decelerating. 1: During the whole deceleration.
Bit 8 Remote	0: Local. 1: Remote.
Bit 9 Braking	0: It is not executing braking. 1: During the braking process.
Bit 10 FWD/REV	0: It is not reverting the rotation direction. 1: During the rotation reversion process.
Bit 11 Reverse	0: Forward rotation. 1: Reverse rotation.
Bit 12 Ton	0: None. 1: Time before start (C5.7.2).
Bit 13 Toff	0: None. 1: Time after stop (C5.7.3).
Bit 14 Alarm	0: The SSW is not in alarm condition. 1: The SSW is in alarm condition. Note: The active alarm codes can be read by means of the menu D2.1.
Bit 15 Fault	0: The SSW is not in fault condition. 1: The SSW is in fault condition. Note: The active fault code can be read by means of the menu D1.1.

S5.2 Command Word

.5 Slot1	0 ... 15 Bit
.6 Slot2	0 ... 15 Bit

Description:
Command word of all sources of the SSW. The RUN/STOP and JOG commands of the sources which are not active will be reset.

.5 Slot1 Control word via any communication accessory connected to Slot 1.

.6 Slot2 Command word via any communication accessory connected to Slot 2.

Bit	Value/Description
Bit 0 Start/Stop	**0**: stopping by ramp. **1**: starting by ramp.
Bit 1 Gener. Enabled	**0**: general disable. **1**: general enable.
Bit 2 JOG	**0**: no JOG. **1**: with JOG.
Bit 3 FWD/REV	**0**: clockwise CW. **1**: counterclockwise CCW.
Bit 4 LOC/REM	**0**: local. **1**: remote.
Bit 5 … 6 Reserved	
Bit 7 Reset	**0** → **1**: execute fault reset (if a fault is active). Note: Only in the 0 to 1 transition command.
Bit 8 … 15 Reserved	

NOTE!
If the RUN/STOP and JOG commands are by a certain source and it is active, only these commands can be viewed in S5.2. For security reasons, all the other commands of the other sources which are not active will be reset.

S5.3 Value for Outputs

.1 DO Value	0 ... 15 Bit

Description:
Value for digital and analog outputs via communication.

.1 DO Value Value for the digital outputs via network interfaces.

Bit	Value/Description
Bit 0 DO1	**0**: Inactive. **1**: Active.
Bit 1 DO2	**0**: Inactive. **1**: Active.
Bit 2 DO3	**0**: Inactive. **1**: Active.
Bit 3 … 15 Reserved	

S5.3.2 Value for AO

.1 AO in 10 bits	0 ... 1023

Description:
Value for the analog output via network interfaces.

.1 AO in 10 bits Value for the analog output via network interfaces: 0...1023. 0=0% and 1023=100%.

S5.5 Anybus-CC

.1 Identification	0 ... 25
.2 Comm. Status	0 ... 8

Description:
Status of the Anybus communication accessory and the protocols that use this interface.

.1 Identification It allows identifying the connected Anybus module.

Indication	Description
0 = Disabled	Communication module not installed.
1 ... 15 = Reserved	
16 = Profibus DP	Profibus DP module.
17 = DeviceNet	DeviceNet Module.
18 = Reserved	
19 = EtherNet/IP	EtherNet/IP module.
20 = Reserved	
21 = Modbus TCP	Modbus TCP module.
22 = Reserved	
23 = PROFINET IO	PROFINET IO module.
24 = PROFINET S2	
25 = Reserved	

.2 Comm. Status It informs the communication module status.

Indication	Description
0 = Setup	Module identified, waiting for configuration data (automatic).
1 = Init	Module executing the interface initialization (automatic).
2 = Wait Comm	Module initialized, but without communication with the network master.
3 = Idle	Communication with the network master established, but in idle or programming mode.
4 = Data Active	Communication with the network master established, and I/O data being communicated successfully. ”Online”.
5 = Error	Not available.
6 = Reserved	
7 = Exception	Serious error on the communication interface. The interface requires reinitialization.
8 = Access Error	Access error between the equipment and Anybus interface. Requires interface reset.

5 C CONFIGURATIONS

This menu allows the programming of all SSW configuration parameters.

C8 COMMUNICATIONS

To change information via communication network, the SSW has several standard protocols.

The following necessary accessories and protocols are available:

Protocol	Accessory
CANopen	SSW900-CAN-W
DeviceNet	SSW900-CDN-N, SSW900-CAN-W
EtherNet/IP	SSW900-CETH-IP-N, SSW900-CETH-W
Modbus RTU	SSW900-CRS485-W
Modbus TCP	SSW900-CMB-TCP-N, SSW900-CETH-W
Profibus DP	SSW900-CPDP-N
PROFINET IO	SSW900-CPN-IO-N
PROFINET S2	SSW900-CPN-S2-N

For further details regarding the SSW configuration to operate these protocols, refer to the SSW Communication Manual.

C8.1 I/O Data

Configure network data exchange area.

Use this for cyclic communication over SSW900-CAN-W module (DeviceNet), SSW900-CPDP-N, SSW900-CDN-N, SSW900-CETH-IP-N, SSW900-CPN-IO-N and SSW900-CETH-W (EtherNet/IP). For SSW900-CRS485-W using Modbus RTU protocol or modules SSW900-CMB-TCP-N and SSW900-CETH-W using Modbus TCP protocol, a contiguous area of holding registers (@1500-@1549 and @1600-@1619) can be accessed using standard Modbus functions.

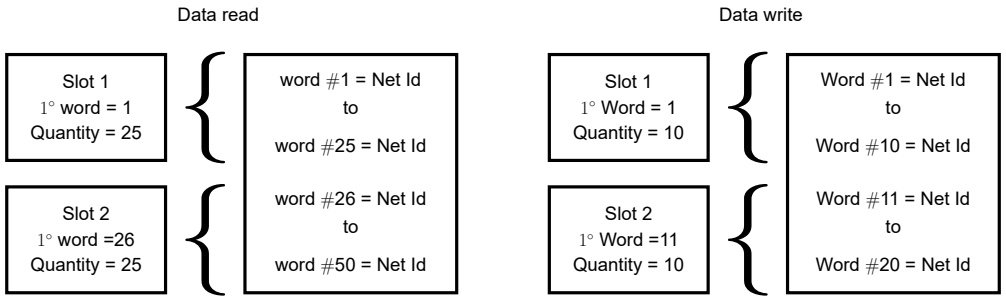


Figure 5.1: *Example of data setting*

C8.1.1 Data Read

Configure a set of 16 bit parameters to read over the network.

C8.1.1 Data Read		
C8.1.1.1 Slot 1 1st Word		
Range:	1 ... 50	**Default:** 1
Properties:	Stopped	

Description:
It sets the index of the first programmable read word for data communication (inputs for master).

C8.1.1 Data Read		
C8.1.1.2 Slot 1 Quantity		
Range:	1 ... 50	**Default:** 1
Properties:	Stopped	

Description:
It sets the number of read words for data communication (inputs for master), from the first word on.

C8.1.1 Data Read		
C8.1.1.3 Slot 2 1st Word		
Range:	1 ... 50	**Default:** 26
Properties:	Stopped	

Description:
It sets the index of the first programmable read word for data communication (inputs for master).

C8.1.1 Data Read		
C8.1.1.4 Slot 2 Quantity		
Range:	1 ... 50	**Default:** 1
Properties:	Stopped	

Description:
It set the number of read words for data communication (inputs for master), from the first word on.

C8.1.1 Data Read
C8.1.1.5 Word #1

C8.1.1.5 to C8.1.1.54

C8.1.1 Data Read		
C8.1.1.54 Word #50		
Range:	0 ... 65535	**Default:** 0
Properties:	Stopped	

Description:
Select the net address of other parameter, which content will be available as reading data for fieldbus interfaces (inputs: sent to master).

The data size of the referenced parameter must be considered. If data size is bigger than 16 bits, the next data read word configuration must be set to the same net address.

C8.1.2 Data Write

Configure a set of 16 bit parameters to write over the network.

C8.1.2 Data Write		
C8.1.2.1 Slot 1 1st Word		
Range:	1 ... 20	**Default:** 1
Properties:	Stopped	

Description:
It sets the index of the first programmable write word for data communication (outputs for master).

C8.1.2 Data Write		
C8.1.2.2 Slot 1 Quantity		
Range:	1 ... 20	**Default:** 1
Properties:	Stopped	

Description:
It sets the number of write words for data communication (outputs for master), from the first word on.

C8.1.2 Data Write		
C8.1.2.3 Slot 2 1st Word		
Range:	1 ... 20	**Default:** 11
Properties:	Stopped	

Description:
It sets the index of the first programmable write word for data communication (outputs for master).

C8.1.2 Data Write		
C8.1.2.4 Slot 2 Quantity		
Range:	1 ... 20	**Default:** 1
Properties:	Stopped	

Description:
It sets the number of write words for data communication (outputs for master), from the first word on.

C8.1.2 Data Write		
C8.1.2.5 Update Delay		
Range:	0.0 ... 999.9 s	**Default:** 0.0
Properties:		

Description:
Whenever there is a transition from offline (without cyclic data) to online (with cyclic write data), the data received via communication networks (write words) is ignored during this programmed time, remaining in the state it was before the beginning of the reception.

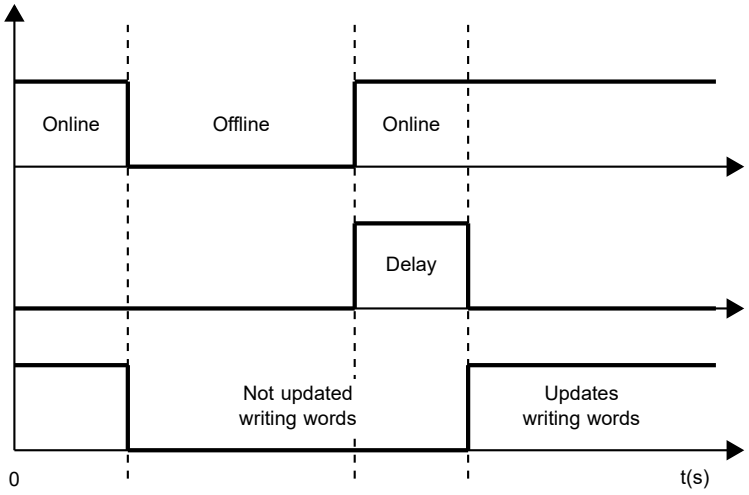


Figure 5.2: *Delay in the update of the I/O words*

C8.1.2 Data Write
C8.1.2.6 Word #1

C8.1.2.6 to C8.1.2.25

C8.1.2 Data Write		
C8.1.2.25 Word #20		
Range:	0 ... 65535	**Default:** 0
Properties:	Stopped	

Description:
Select the net address of other parameter, which content will be available as writing data for fieldbus interfaces (outputs: received from master).

The data size of the referenced parameter must be considered. If data size is bigger than 16 bits, the next data write word configuration must be set to the same net address.

C8.3 Anybus-CC

Configuration for the Anybus-CC communication and protocols that use this interface.

For a detailed description, refer to the SSW900 Anybus-CC User's Manual specific for the desired protocol, supplied in electronic format.

C8.3 Anybus-CC

C8.3.1 Update Configuration

Range:	0 ... 1	**Default:** 0
Properties:	Stopped	

Description:
It allows forcing a reinitialization of the Anybus-CC communication module for the configurations done in the parameters of menus C8.1 and C8.3 to be applied.

The reinitialization implies communication loss. After the process is completed, this parameter automatically goes back to Regular Operation.

Indication	Description
0 = Normal Operation	No action.
1 = Update configuration	Reinitializes the Anybus module.

C8.3 Anybus-CC

C8.3.4 IP Address Configuration

Range:	0 ... 2	**Default:** 1
Properties:		

Description:
It allows to choose how to set the IP address for the modules Anybus-CC EtherNet/IP, Modbus TCP, PROFINET IO or PROFINET S2.

Indication	Description
0 = Parameters	The programming of the IP address, configurations of the subnet mask and gateway must be done through parameters C8.3.5, C8.3.6 and C8.3.7.
1 = DHCP	Enables the DHCP function. The IP address and other network configurations are received from a DHCP server via network.
2 = DCP	The IP address and other network configurations are received via DCP (PROFINET).

NOTE!
After changing this configuration, for the modification to be effective, the equipment must be turned off and then turned on again, or the configurations must be updated through C8.3.1.

C8.3 Anybus-CC

C8.3.5 IP Address

Range:	0.0.0.0 ... 255.255.255.255	**Default:** 192.168.0.10
Properties:		

Description:
It allows programming the IP address of the module Anybus-CC EtherNet/IP, Modbus TCP, PROFINET IO or PROFINET S2. It is only effective if C8.3.4 = Parameters.

NOTE!
After changing this configuration, for the modification to be effective, the equipment must be turned off and then turned on again, or the configurations must be updated through C8.3.1.

C8.3 Anybus-CC

C8.3.6 CIDR

Range: 0 ... 31 **Default:** 24

Properties:

Description:
It allows programming the subnet mask used by the module Anybus-CC EtherNet/IP, Modbus TCP, PROFINET IO or PROFINET S2. It is only effective if C8.3.4 = Parameters.

Indication	Description
0 = Reserved	
1 = 128.0.0.0	Subnet mask.
2 = 192.0.0.0	Subnet mask.
3 = 224.0.0.0	Subnet mask.
4 = 240.0.0.0	Subnet mask.
5 = 248.0.0.0	Subnet mask.
6 = 252.0.0.0	Subnet mask.
7 = 254.0.0.0	Subnet mask.
8 = 255.0.0.0	Subnet mask.
9 = 255.128.0.0	Subnet mask.
10 = 255.192.0.0	Subnet mask.
11 = 255.224.0.0	Subnet mask.
12 = 255.240.0.0	Subnet mask.
13 = 255.248.0.0	Subnet mask.
14 = 255.252.0.0	Subnet mask.
15 = 255.254.0.0	Subnet mask.
16 = 255.255.0.0	Subnet mask.
17 = 255.255.128.0	Subnet mask.
18 = 255.255.192.0	Subnet mask.
19 = 255.255.224.0	Subnet mask.
20 = 255.255.240.0	Subnet mask.
21 = 255.255.248.0	Subnet mask.
22 = 255.255.252.0	Subnet mask.
23 = 255.255.254.0	Subnet mask.
24 = 255.255.255.0	Subnet mask. Factory setting.
25 = 255.255.255.128	Subnet mask.
26 = 255.255.255.192	Subnet mask.
27 = 255.255.255.224	Subnet mask.
28 = 255.255.255.240	Subnet mask.
29 = 255.255.255.248	Subnet mask.
30 = 255.255.255.252	Subnet mask.
31 = 255.255.255.254	Subnet mask.

NOTE!
After changing this configuration, for the modification to be effective, the equipment must be turned off and then turned on again, or the configurations must be updated through C8.3.1.

C8.3 Anybus-CC

C8.3.7 Gateway

Range: 0.0.0.0 ... 255.255.255.255 **Default:** 0.0.0.0

Properties:

Description:
It allows programming the IP address of the standard gateway used by the module Anybus-CC EtherNet/IP, Modbus TCP, PROFINET IO or PROFINET S2. It is only effective if C8.3.4 = Parameters.



NOTE!
After changing this configuration, for the modification to be effective, the equipment must be turned off and then turned on again, or the configurations must be updated through C8.3.1.

C8.3.9 Modbus TCP Timeout

Protection against fault in the Modbus TCP communication.

In case the product does not receive valid Modbus TCP telegrams for writing in the I/O data area (C8.1) or in the SLOT command word a period longer than the setting, a communication error will be indicated, alarm A131 or fault F131 will be displayed on the HMI, depending on the programming of C8.3.9.1, and the action programmed in C8.3.9.2 will be executed.

Time will start counting from the first valid telegram received. This error is only generated for the Anybus-CC Modbus TCP module.

C8.3.9 Modbus TCP Timeout

C8.3.9.1 Mode

Range: 0 ... 2 **Default:** 2

Properties:

Description:
It allows configuring the protection tripping mode for Modbus TCP communication timeout.

Indication	Description
0 = Inactive	No tripping.
1 = Fault F131	Trips as fault. Disables the motor.
2 = Alarm A131	Trips as alarm. Action descrived in C8.3.9.2.

C8.3.9 Modbus TCP Timeout

C8.3.9.2 Alarm Action

Range: 0 ... 4 **Default:** 2

Properties:

Description:
Action for the Modbus TCP communication timeout alarm.

The actions described in this parameter are executed through the writing of the respective bits in the control word of the SLOT to which the Anybus-CC Modbus TCP accessory is connected. Thus, for the commands to be effective, the equipment must be programmed to be controlled by the network interface used. This programming is done through menu C3.

Indication	Description
0 = Indicates Only	No action is taken; the equipment remains in the current state.
1 = Ramp Stop	The stop by ramp command is executed, and the motor stops according to the programmed deceleration ramp.
2 = General Disable	The equipment is general disabled, and the motor stops by inertia.
3 = Change to LOC	The equipment is commanded to local mode.
4 = Change to REM	The equipment is commanded to remote mode.

NOTE!
The alarm action will only have a function if the timeout tripping mode C8.3.9.1 is programmed for Alarm A131.

C8.3.9 Modbus TCP Timeout

C8.3.9.3 Modbus TCP Timeout

Range:	0.0 ... 999.9 s	**Default:** 0.0
Properties:		

Description:
Maximum time without communication.

6 OPERATION IN THE MODBUS TCP NETWORK – SERVER MODE

NOTE!

- The RS485, USB and Ethernet interfaces, for using the same functions to access the data and programming of the equipment, must not be used simultaneously to perform program download or on-line monitoring functions of the SSW900 soft-starter, because conflicts may occur during the simultaneous access to the data.

6.1 AVAILABLE FUNCTIONS

In the Modbus specification are defined the functions used to access different types of data. In the SSW900, in order to access those data the following services (or functions) have been made available:

Table 6.1: *Supported Modbus Functions*

Code	Name	Description
01	Read Coils	Reading of bit blocks of the coil type.
02	Read Discrete Inputs	Reading of bit blocks of the discrete input type.
03	Read Holding Registers	Reading of register blocks of the holding register type.
05	Write Single Coil	Writing in a single bit of the coil type.
06	Write Single Register	Writing in a single register of the holding type.
15	Write Multiple Coils	Writing in bit blocks of the coil type.
16	Write Multiple Registers	Writing in register blocks of the holding register type.
22	Mask Write Register	Writing in holding register using mask.
23	Read/Write Multiple registers	Reading and writing in register blocks of the holding register type.
43	Read Device Identification	Identification of the device model.

6.2 MEMORY MAP

The soft-starter SSW900 has different types of data accessible through the Modbus communication. These data are mapped at data addresses and access functions as described in the following items.

6.2.1 Parameters

The SSW900 soft-starter Modbus communication is based on the reading/writing of the equipment parameters. All parameters of the equipment are available as 16-bit holding registers. The data addressing is done with the offset equal to zero, which means that the parameter's network address (Net Id) corresponds to the register address.

It is necessary to know the device list of parameters to be able to operate the equipment. Thus, it is possible to identify what data are needed for the status monitoring and the control of the functions. The main parameters are:

Monitoring (reading):

- S3.1.3.1 (holding register address 680): Status Word SSW

Command (writing):

- S5.2.5 (holding register address 685): Command Word Slot1
- S5.2.6 (holding register address 686): Command Word Slot2

Refer to the item 10 for a complete parameter list of the equipment.

NOTE!

- Depending on the master that is used, those registers are referenced starting from the base address 40000 or 4x. In this case, the address that must be programmed in the master for a parameter is the address showed in the table 10.2 added to the base address. Refer to the master documentation to find out how to access holding registers.
- It should be noted that read-only parameters can only be read from the equipment, while other parameters can be read and written through the network.
- Parameters that have the property *Stopped* are only changed when the motor is stopped.
- The data is transmitted as an integer value, without the indication of the decimal places. For the number of decimal places, see the item 10.

6.2.2 Memory Markers

Besides the parameters, other types of data as bit markers, word or float, can also be accessed using the Modbus protocol. Those markers are used mainly by the SoftPLC function, available for the SSW900. Refer to the SoftPLC documentation for the description of those markers, as well as for the addresses via Modbus.

6.2.3 Indirect Parameters

Modbus TCP does not define a channel of cyclic data dedicated like in other networks. However, the SSW900, has dedicated registers so as to optimize the access to non-contiguous parameter areas.

The holding registers with address 1500 to 1549 are used to read, while the ones with address 1600 to 1619 write values of the parameters mapped on menu C8.1.

Table 6.2: *Relationship between configuration parameters and access address*

Programmable parameter	Indirect access register	Description
C8.1.1.5 Data Read Word #1	1500	Register 1500 contains the value of the parameter whose Net Id is configured in C8.1.1.5.
⋮		
C8.1.1.54 Data Read Word #50	1549	Register 1549 contains the value of the parameter whose Net Id is configured in C8.1.1.54.
C8.1.2.6 Data Write Word #1	1600	Register 1600 contains the value of the parameter whose Net Id is configured in C8.1.2.6.
⋮		
C8.1.2.25 Data Write Word #20	1619	Register 1619 contains the value of the parameter whose Net Id is configured in C8.1.2.25.

NOTE!

- For the Modbus protocol, each object referenced in the output area is only changed when the last word mapped for this object is written.

6.2.4 Input words

The SSW900 soft-starter has a reading area with 50 16-bit words available for cyclic data exchange of communication networks. The data available in the reading area (Input) is sent to the master of the network. This area is shared between the two Slots.

To map an object in the reading area, follow the steps below.

1. Configure parameter C8.1.1.1 (Slot 1) or C8.1.1.3 (Slot 2). Those parameters indicate which of the reading words starts the input area for the specific Slot.

2. Configure on parameter C8.1.1.2 (Slot 1) or C8.1.1.4 (Slot 2) the quantity of input words which must be transmitted via network.
3. Parameters C8.1.1.5 to C8.1.1.54 enable to configure the data that must be provided on the reading words. Those parameters must contain the network addresses (Net Id) of the data that must be transmitted on the respective reading words. The Net Id list is available on the table 10.2. Consider the size of each parameter mentioned in this list when programming each word.

Example

The example below presents a configuration for Slot 2. Considering the following parameters to be mapped:

- S3.1.3.1 Status Word SSW.
- S1.2.4 Main Line Voltage Average.
- S1.1.4 Current Average.
- S1.5.4 Output Power & P.F. P. F..

Searching parameter information on the table 10.2:

Mapped Parameter	Net Id	Size	Qty Mapped Words	Example Value
S3.1.3.1 Status Word SSW	680	16bit	1	99
S1.2.4 Main Line Voltage Average	4	16bit	1	2186 (218.6 V)
S1.1.4 Current Average	24	32bit	2	23 (2.3 A)
S1.5.4 Output Power & P.F. P. F.	8	8bit	1	14 (0.14)

Therefore, the configuration must be performed as shown below:

1. C8.1.1.3 Data Read Slot 2 1st Word = 26 → first word transmitted via network is the word #26.
2. C8.1.1.4 Data Read Slot 2 Quantity = 5 → sum of the column “Qty mapped words”.
3. Table 6.3 presents the configuration parameters of the words and the content of the reading words.

Table 6.3: *Example of configuration of the writing words.*

Configuration Parameter	Mapped Parameter	Net Id	Input Area Value
C8.1.1.30 Data Read Word #26	S3.1.3.1	680	0063h
C8.1.1.31 Data Read Word #27	S1.2.4	4	088Ah
C8.1.1.32 Data Read Word #28	S1.1.4	24	0017h (S1.1.4 low word)
C8.1.1.33 Data Read Word #29	S1.1.4	24	0000h (S1.1.4 high word)
C8.1.1.34 Data Read Word #30	S1.5.4	8	000Eh

NOTE!

- Mapping of invalid parameters or not available will return zero value.
- The data is transmitted as an integer value, without the indication of the decimal places.
- To obtain the network address (Net Id) of the parameters and the number of decimal places, refer to the item 10.

6.2.5 Output Words

The SSW900 soft-starter has a writing area with 20 16-bit words available for cyclic data exchange of communication networks. The data available in the write area (Output) is received from the network master. This area is shared between the two Slots.

To map an object in the writing area, follow the steps below.

1. Configure parameter C8.1.2.1 (Slot 1) or C8.1.2.3 (Slot 2). Those parameters indicate which of the writing words starts the output area for the specific Slot.
2. Configure on parameter C8.1.2.2 (Slot 1) or C8.1.2.4 (Slot 2) the quantity of reading words which must be transmitted via network.
3. Parameters C8.1.2.6 to C8.1.2.25 enable to configure the data that must be provided on the writing words. Those parameters must contain the network address (Net Id) of the data that must be transmitted on the respective writing words. The Net Id list is available on the table 10.2. Consider the size of each parameter mentioned in list when programming each word.

Exemplo

The example below presents a configuration for Slot 1. Considering the following parameters to be mapped:

- S5.2.5 Command Word Slot1.
- S5.3.1 Value for Outputs DO Value.
- S5.3.2.1 Value for AO AO in 10 bits.

Searching parameter information on the table 10.2:

Mapped Parameter	Net Id	Size	Qty Mapped Words	Example Value
S5.2.5 Command Word Slot1	685	16bit	1	19 = 0013h
S5.3.1 Value for Outputs DO Value	695	16bit	1	7 = 0007h
S5.3.2.1 Value for AO AO in 10 bits	696	16bit	1	1023 = 03FFh

Therefore, the configuration must be performed as shown below:

1. C8.1.2.1 Data Write Slot 1 1st Word = 1 → first word transmitted via network is the word #1.
2. C8.1.2.2 Data Write Slot 1 Quantity = 3 → sum of column “Qty mapped words”.
3. The table 6.4 presents the configuration parameters of the words and the content of the writing words.

Table 6.4: *Example of configuration of the writing words.*

Configuration Parameter	Mapped Parameter	Net Id	Output Area Value
C8.1.2.6 Data Write Word #1	S5.2.5	685	0013h
C8.1.2.7 Data Write Word #2	S5.3.1	695	0007h
C8.1.2.8 Data Write Word #3	S5.3.2.1	696	03FFh

NOTE!

- Mapping of readonly parameters (status, diagnostics) or invalid parameters will have no effect.
- Parameters that have the property *Stopped*, when mapped on the writing words, are only changed when the motor is stopped.
- The parameters written using these words are not saved in non-volatile memory. Thus, if the equipment is turned off and back on, these parameters will return to their original value.
- The data is transmitted as an integer value, without the indication of the decimal places.
- To obtain the network address (Net Id) of the parameters, refer to the item 10.

6.3 DATA ACCESS

The Modbus protocol allows the access only by bits or by 16-bit registers.

To make it possible to write or read a block of more than 2 registers without an error return even if there is an invalid register in the selected range, the following definitions have been used:

- Reading registers that do not represent available parameters return the value zero when the requested number of registers is greater than 2. For requests with a quantity equal to 1 or 2 registers, error code 2 (Invalid data address) is returned.
- Write to registers that represent read-only or invalid parameters have no effect and do not return error when the requested number of registers is greater than 2. For requests with a quantity equal to 1 or 2 registers, error code 2 (Invalid data address) is returned.

Data types greater than 16 bits must be accessed as multiple registers. If the number of registers requested is not sufficient to access the full size of the data type, error code 2 (Invalid data address) is returned.

For example, the float data type take four bytes of memory. In the access by registers, it is necessary to read or write two registers in sequence (least significant value in the first register) so that the four bytes will be accessed.

The Modbus protocol defines that in order to transmit a 16-bit register, the most significant byte (MSB) must be transmitted first. Therefore, if four registers are read in a row, from the register with address 0, the content of each register will be transmitted the following way:

1st Register – 0		2nd Register – 1		3rd Register – 2		4th Register – 3	
W0 MSB	W0 LSB	W1 MSB	W1 LSB	W2 MSB	W2 LSB	W3 MSB	W3 LSB

6.4 COMMUNICATION ERRORS

Communication errors may occur in the transmission of telegrams, as well as in the contents of the transmitted telegrams.

In the event of a successful reception, during the treatment of the telegram, the server may detect problems and send an error message, indicating the kind of problem found:

Table 6.5: *Error codes for Modbus*

Error Code	Description
1	Invalid function: the requested function is not implemented for the equipment.
2	Invalid data address: the data address (register or bit) does not exist.
3	Invalid data value: • Value out of the allowed range. • Writing on data that cannot be changed (read only register or bit).

NOTE!
It is important that it be possible to identify at the client what type of error occurred, in order to be able to diagnose problems during the communication.

7 STARTUP GUIDE

The main steps to start up the SSW900 soft-starter in Modbus TCP network are described below. These steps represent an example of use. Check out the specific chapters for details on the indicated steps.

7.1 INSTALLING THE ACCESSORY

1. Install the communication accessory, as indicated in the installation guide supplied with the accessory.
2. With the module installed, during the recognition stage, the MS and NS LEDs test routine will be performed. After this stage, the MS LED must turn on in green.
3. Observe the content of parameter S5.5.1. Check if the module was recognized. The detection is done automatically and does not require the user's intervention.
4. Connect the cables, considering the recommended instructions in network installation, as described in item 3.5:
   - Use shielded cable.
   - Properly ground network equipment.
   - Avoid laying communication cables next to power cables.

7.2 CONFIGURING THE EQUIPMENT

1. Follow the recommendations described in the user manual to program the device parameters related to the motor parameterization, desired functions for the I/O signals, etc.
2. Program the command sources as desired for the application in menu C3.
3. Configure communication parameters, such as DHCP, IP address, communication rate, etc. in C8.3.
4. Configure the timeout for the Modbus TCP communication in C8.3.9.3.
5. Program the desired action for the equipment in case of communication fault in C8.3.9.
6. Define which data will be read and written at soft-starter SSW900, based on its parameter list. It is not necessary to define I/O words. The Modbus TCP protocol enables direct access to any device parameter, and does not distinguish between cyclic and acyclic data. Nevertheless, data exchange areas can be configured via menu C8.1 (see item 6.2.3). Among the main parameters that can be used to control the device, we can mention:
   - S3.1.3.1 Status Word SSW (read).
   - S5.2.5 Command Word Slot1 (write).
   - S5.2.6 Command Word Slot2 (write).
7. Once the parameters are set, if any of the parameters described in the previous steps were changed, the equipment must be powered off and on again, or an update must be performed by C8.3.1.

7.3 CLIENT CONFIGURATION

The way the network configuration is done depends greatly on the used client and the configuration tool. It is essential to know the tools used to perform this activity. In general, the following steps are necessary to perform the network configuration.

1. Configure the client to access the holding registers, based on the defined equipment parameters to read and write. The register address is based on the parameter's network address (Net Id), as shown in the item 10.
2. It is recommended that reading and writing are done in a cyclic manner, allowing detection of communication errors by timeout. The period of data update must be in accordance with the value programmed in parameter C8.3.9.3.

7.4 COMMUNICATION STATUS

Once the network is assembled and the client programmed, it is possible to use the LEDs and parameters of the equipment to identify some status related to the communication.

- The MS, NS and Link LEDs provide information about the status of the interface and communication.
- The parameter S5.5.2 indicates the status of communication between the device and the network master.

The client of the network must also supply information about the communication with the server.

8 WEB SERVER

Besides the communication protocol, the Ethernet interface also provides a WEB server with a simple HTML page to access SSW900 soft-starter data. If the IP address is known, you can use a web browser by typing the IP address in the browser address bar, and it will present a web page with links to interface settings and device data.

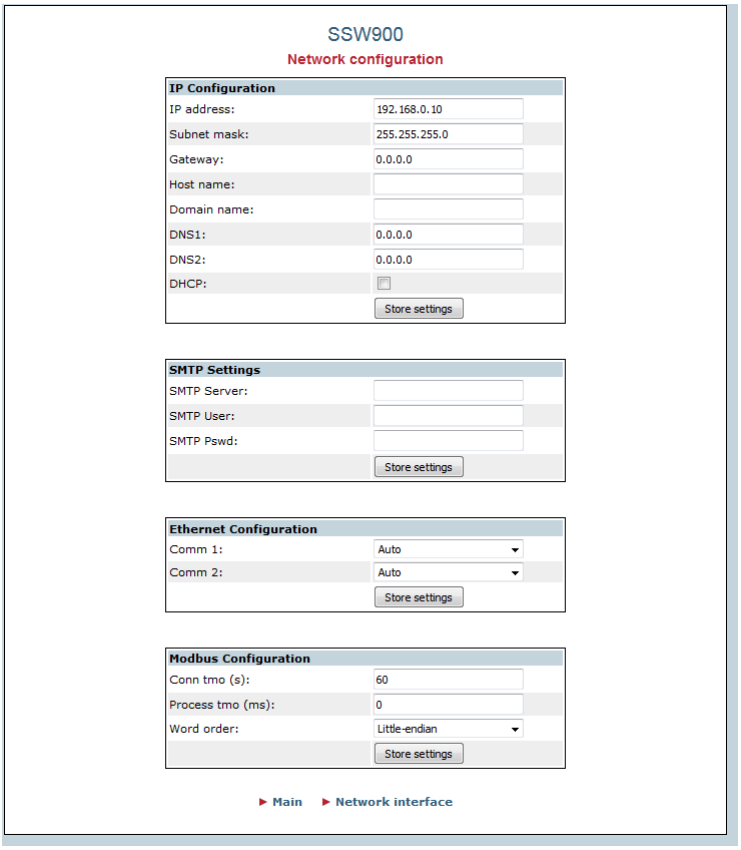


Figure 8.1: *WEB page for interface configuration*

In the interface settings, it presents several fields for programming the IP address, subnet, DHCP, among others. The parameter list of the equipment can also be accessed through the WEB browser via ”Parameter Data” link. This list is presented in a simplified format, with only the integer values, with no indication of decimal places.

9 FAULTS AND ALARMS

Fault/Alarm	Description	Possible Causes
F130: Anybus Access Fault	It indicates access error to the Anybus-CC communication module. It actuates when the SSW cannot exchange data with the Anybus-CC accessory, when the Anybus module identifies some internal fault, or when there is a hardware incompatibility. In order to remove this fault, it is necessary to power the SSW off and on again.	- Check that the accessory is properly fitted. - Check that the equipment firmware version supports the Anybus accessory. - Hardware errors due to improper handling or installation of the accessory, for example, may cause this error. - If possible, carry out tests by replacing the communication accessory.
F131/A131: Anybus Modbus TCP Timeout	It indicates fault in the Modbus TCP communication for Anybus-CC accessory. It occurs when the equipment stopped receiving valid write requests to the Slot Command Word or Data Write Words for a period longer than the programmed (C8.3.9.3). The time counting starts as soon as it receives the first valid write request.	- Check network installation, broken cable or fault/poor contact on the connections with the network, grounding. - Make sure that the Modbus TCP client sends telegrams to the equipment in intervals shorter than the programmed (C8.3.9.3). - Disable this function (C8.3.9.1).

10 QUICK REFERENCES

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10.2 PARAMETERS

Table 10.2: *Characteristics of the parameters for the communication protocol*

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
S1 Status\Measurements						
S1.1	Current					
S1.1.1	R Phase	0.0 to 14544.0 A	1	26	32bit	2
S1.1.2	S Phase	0.0 to 14544.0 A	1	28	32bit	2
S1.1.3	T Phase	0.0 to 14544.0 A	1	30	32bit	2
S1.1.4	Average	0.0 to 14544.0 A	1	24	32bit	2
S1.1.5	Motor %In	0.0 to 999.9 %	1	2	16bit	1
S1.1.6	SSW %In	0.0 to 999.9 %	1	1	16bit	1
S1.2	Main Line Voltage					
S1.2.1	R-S Line	0.0 to 999.9 V	1	33	16bit	1
S1.2.2	S-T Line	0.0 to 999.9 V	1	34	16bit	1
S1.2.3	T-R Line	0.0 to 999.9 V	1	35	16bit	1
S1.2.4	Average	0.0 to 999.9 V	1	4	16bit	1
S1.2.5	Motor %Vn	0.0 to 999.9 %	1	3	16bit	1
S1.2.6	SSW %Vn	0.0 to 999.9 %	1	5	16bit	1
S1.3	Output Voltage					
S1.3.1	Average	0.0 to 999.9 V	1	7	16bit	1
S1.3.2	Motor %Vn	0.0 to 999.9 %	1	6	16bit	1
S1.4	SCR Blocking Voltage					
S1.4.1	R-U Blocking	0.0 to 999.9 V	1	21	16bit	1
S1.4.2	S-V Blocking	0.0 to 999.9 V	1	22	16bit	1
S1.4.3	T-W Blocking	0.0 to 999.9 V	1	23	16bit	1
S1.5	Output Power & P.F.					
S1.5.1	Active	0.0 to 11700.0 kW	1	10	32bit	2
S1.5.2	Apparent	0.0 to 11700.0 kVA	1	12	32bit	2
S1.5.3	Reactive	0.0 to 11700.0 kVAr	1	14	32bit	2
S1.5.4	P. F.	0.00 to 1.00	2	8	8bit	1
S1.6	P.L.L.					
S1.6.1	Status	0 = Off 1 = Ok		16	enum	1
S1.6.2	Frequency	0.0 to 99.9 Hz	1	17	16bit	1
S1.6.3	Sequence	0 = Invalid 1 = RST / 123 2 = RTS / 132		18	enum	1
S1.7	Motor Torque					

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
S1.7.1	Motor %Tn	0.0 to 999.9 %	1	9	16bit	1
S1.8	Control Voltage					
S1.8.1	Input	0.0 to 999.9 V	1	71	16bit	1
S1.8.2	+5V	0.00 to 9.99 V	2	72	16bit	1
S1.8.3	+12V	0.0 to 99.9 V	1	73	16bit	1
S1.8.4	+Vbat	0.00 to 9.99 V	2	75	16bit	1
S1.8.5	+48V	0.0 to 99.9 V	1	76	16bit	1
		S2 Status\I/O				
S2.1	Digital					
S2.1.1	Inputs	Bit 0 = DI1 Bit 1 = DI2 Bit 2 = DI3 Bit 3 = DI4 Bit 4 = DI5 Bit 5 = DI6 Bit 6 ... 15 = Reserved		677	16bit	1
S2.1.2	Outputs	Bit 0 = DO1 Bit 1 = DO2 Bit 2 = DO3 Bit 3 ... 15 = Reserved		678	16bit	1
S2.2	Analog Output					
S2.2.1	Percent	0.00 to 100.00 %	2	673	16bit	1
S2.2.2	Current	0.000 to 20.000 mA	3	674	16bit	1
S2.2.3	Voltage	0.000 to 10.000 V	3	675	16bit	1
S2.2.4	10 bits	0 to 1023	0	676	16bit	1
		S3 Status\SSW900				
S3.1	SSW Status					
S3.1.1	Actual	0 = Ready 1 = Initial Test 2 = Fault 3 = Ramp Up 4 = Full Voltage 5 = Bypass 6 = Reserved 7 = Ramp Down 8 = Braking 9 = FWD/REV 10 = Jog		679	enum	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
		11 = Start Delay 12 = Re-start Delay 13 = General Disabled 14 = Configuration				
S3.1.2	Active Command Source	0 = HMI Keys LOC 1 = HMI Keys REM 2 = DIx LOC 3 = DIx REM 4 = USB LOC 5 = USB REM 6 = SoftPLC LOC 7 = SoftPLC REM 8 = Slot 1 LOC 9 = Slot 1 REM 10 = Slot 2 LOC 11 = Slot 2 REM		232	enum	1
S3.1.3	Status Word					
S3.1.3.1	SSW	Bit 0 = Running Bit 1 = Gener. Enabled Bit 2 = JOG Bit 3 = Initial Test Bit 4 = Ramp Up Bit 5 = Full Voltage Bit 6 = Bypass Bit 7 = Ramp Down Bit 8 = Remote Bit 9 = Braking Bit 10 = FWD/REV Bit 11 = Reverse Bit 12 = Ton Bit 13 = Toff Bit 14 = Alarm Bit 15 = Fault		680	16bit	1
S3.1.4	Configuration Mode					
S3.1.4.1	Status	Bit 0 = System Initialization Bit 1 = Firmware Download Bit 2 = Oriented Start-Up Bit 3 = Incompatible		692	16bit	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
		Bit 4 = Reset Needs Bit 5 = Copy HMI Bit 6 = Test Mode Bit 7 ... 15 = Reserved				
S3.2	Software Version					
S3.2.1	Package	0.00 to 99.99	2	328	16bit	1
S3.2.2	Details					
S3.2.2.1	Control 1 V	0.00 to 99.99	2	330	16bit	1
S3.2.2.2	Control 1 rev.	-32768 to 32767	0	327	s16bit	1
S3.2.2.3	Bootloader V	0.00 to 99.99	2	329	16bit	1
S3.2.2.4	Bootloader rev.	-32768 to 32767	0	323	s16bit	1
S3.2.2.5	HMI rev.	-32768 to 32767	0	322	s16bit	1
S3.2.2.6	Control 2 V	0.00 to 99.99	2	331	16bit	1
S3.2.2.7	Control 2 rev.	-32768 to 32767	0	326	s16bit	1
S3.2.2.8	Accessory 1 V	0.00 to 99.99	2	333	16bit	1
S3.2.2.9	Accessory 1 rev.	-32768 to 32767	0	324	s16bit	1
S3.2.2.10	Accessory 2 V	0.00 to 99.99	2	334	16bit	1
S3.2.2.11	Accessory 2 rev.	-32768 to 32767	0	325	s16bit	1
S3.3	SSW Model					
S3.3.1	Current	0 = 10 to 30 A 1 = 45 to 105 A 2 = 130 to 200 A 3 = 255 to 412 A 4 = 480 to 670 A 5 = 820 to 950 A 6 = 1100 to 1400 A		294	enum	1
S3.3.2	Voltage	0 = 220 to 575 V 1 = 380 to 690 V		296	enum	1
S3.3.3	Control Voltage	0 = 110 to 240 V 1 = 110 to 130 V 2 = 220 to 240 V 3 = 24 V		297	enum	1
S3.3.4	Serial Number	0 to 4294967295	0	298	32bit	2
S3.4	Fan Status					
S3.4.1	Actual	0 = Off 1 = On		293	enum	1
S3.5	Accessories					

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
S3.5.1	Slot 1	0 = Without 1 = Anybus-CC 2 = RS-485 3 = PT100 4 = I/Os Exp. 5 = Profibus 6 = CAN 7 = Ethernet 8 = External Current Acqu.		335	enum	1
S3.5.2	Slot 2	0 = Without 1 = Anybus-CC 2 = RS-485 3 = PT100 4 = I/Os Exp. 5 = Profibus 6 = CAN 7 = Ethernet 8 = External Current Acqu.		336	enum	1
		S4 Status\Temperatures				
S4.1	SCRs Temperature					
S4.1.1	Actual	-22 to 260 °C	0	60	s16bit	1
S4.2	Thermal Class Status					
S4.2.1	Of Maximum	0.0 to 100.0 %	1	50	16bit	1
S4.3	Motor Temperature					
S4.3.1	Channel 1	-20 to 260 °C	0	63	s16bit	1
S4.3.2	Channel 2	-20 to 260 °C	0	64	s16bit	1
S4.3.3	Channel 3	-20 to 260 °C	0	65	s16bit	1
S4.3.4	Channel 4	-20 to 260 °C	0	66	s16bit	1
S4.3.5	Channel 5	-20 to 260 °C	0	67	s16bit	1
S4.3.6	Channel 6	-20 to 260 °C	0	68	s16bit	1
		S5 Status\Communications				
S5.1	Status Word					
S5.1.1	SSW	Bit 0 = Running Bit 1 = Gener. Enabled Bit 2 = JOG Bit 3 = Initial Test Bit 4 = Ramp Up Bit 5 = Full Voltage		680	16bit	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
		Bit 6 = Bypass Bit 7 = Ramp Down Bit 8 = Remote Bit 9 = Braking Bit 10 = FWD/REV Bit 11 = Reverse Bit 12 = Ton Bit 13 = Toff Bit 14 = Alarm Bit 15 = Fault				
S5.2	Command Word					
S5.2.1	DIx	Bit 0 = Start/Stop Bit 1 = Gener. Enabled Bit 2 = JOG Bit 3 = FWD/REV Bit 4 = LOC/REM Bit 5 ... 6 = Reserved Bit 7 = Reset Bit 8 = Brake Bit 9 = Emergency Start Bit 10 ... 15 = Reserved		683	16bit	1
S5.2.2	HMI Key	Bit 0 = Start/Stop Bit 1 = Gener. Enabled Bit 2 = JOG Bit 3 = FWD/REV Bit 4 = LOC/REM Bit 5 ... 6 = Reserved Bit 7 = Reset Bit 8 ... 15 = Reserved		681	16bit	1
S5.2.3	USB	Bit 0 = Start/Stop Bit 1 = Gener. Enabled Bit 2 = JOG Bit 3 = FWD/REV Bit 4 = LOC/REM Bit 5 ... 6 = Reserved Bit 7 = Reset Bit 8 ... 15 = Reserved		682	16bit	1
S5.2.4	SoftPLC			684	16bit	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
		Bit 0 = Start/Stop Bit 1 = Gener. Enabled Bit 2 = JOG Bit 3 = FWD/REV Bit 4 = LOC/REM Bit 5 ... 6 = Reserved Bit 7 = Reset Bit 8 ... 15 = Reserved				
S5.2.5	Slot1	Bit 0 = Start/Stop Bit 1 = Gener. Enabled Bit 2 = JOG Bit 3 = FWD/REV Bit 4 = LOC/REM Bit 5 ... 6 = Reserved Bit 7 = Reset Bit 8 ... 15 = Reserved		685	16bit	1
S5.2.6	Slot2	Bit 0 = Start/Stop Bit 1 = Gener. Enabled Bit 2 = JOG Bit 3 = FWD/REV Bit 4 = LOC/REM Bit 5 ... 6 = Reserved Bit 7 = Reset Bit 8 ... 15 = Reserved		686	16bit	1
S5.3	Value for Outputs					
S5.3.1	DO Value	Bit 0 = DO1 Bit 1 = DO2 Bit 2 = DO3 Bit 3 ... 15 = Reserved		695	16bit	1
S5.3.2	Value for AO					
S5.3.2.1	AO in 10 bits	0 to 1023	0	696	16bit	1
S5.4	RS485 Serial					
S5.4.1	Interface Status	0 = Off 1 = On 2 = Timeout Error		735	enum	1
S5.4.2	Received Telegram	0 to 65535	0	736	16bit	1
S5.4.3	Transmitted Telegram	0 to 65535	0	737	16bit	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
S5.4.4	Telegram with Error	0 to 65535	0	738	16bit	1
S5.4.5	Reception Errors	0 to 65535	0	739	16bit	1
S5.5	Anybus-CC					
S5.5.1	Identification	0 = Disabled 1 ... 15 = Reserved 16 = Profibus DP 17 = DeviceNet 18 = Reserved 19 = EtherNet/IP 20 = Reserved 21 = Modbus TCP 22 = Reserved 23 = PROFINET IO 24 = PROFINET S2 25 = Reserved		750	enum	1
S5.5.2	Comm. Status	0 = Setup 1 = Init 2 = Wait Comm 3 = Idle 4 = Data Active 5 = Error 6 = Reserved 7 = Exception 8 = Access Error		751	enum	1
S5.6	Configuration Mode					
S5.6.1	Status	Bit 0 = System Initialization Bit 1 = Firmware Download Bit 2 = Oriented Start-Up Bit 3 = Incompatible Bit 4 = Reset Needs Bit 5 = Copy HMI Bit 6 = Test Mode Bit 7 ... 15 = Reserved		692	16bit	1
S5.6.2	Control	Bit 0 = Abort Startup Bit 1 ... 15 = Reserved		693	16bit	1
S5.7	CANopen/DeviceNet					
S5.7.1	CAN Controller Status			705	enum	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
		0 = Disabled 1 = Auto-baud 2 = CAN Enabled 3 = Warning 4 = Error Passive 5 = Bus Off 6 = No Bus Power				
S5.7.2	Received Telegram	0 to 65535	0	706	16bit	1
S5.7.3	Transmitted Telegram	0 to 65535	0	707	16bit	1
S5.7.4	Bus Off Counter	0 to 65535	0	708	16bit	1
S5.7.5	Lost Messages	0 to 65535	0	709	16bit	1
S5.7.6	CANopen Comm. Status	0 = Disabled 1 = Reserved 2 = Comm. Enabled 3 = ErrorCtrl.Enab 4 = Guarding Error 5 = HeartbeatError		721	enum	1
S5.7.7	CANopen Node State	0 = Disabled 1 = Initialization 2 = Stopped 3 = Operational 4 = PreOperational		722	enum	1
S5.7.8	DNet Network Status	0 = Offline 1 = OnLine,NotConn 2 = OnLine,Conn 3 = Conn.Timed-out 4 = Link Failure 5 = Auto-Baud		716	enum	1
S5.7.9	DeviceNet Master Status	0 = Run 1 = Idle		717	enum	1
S5.8	Ethernet					
S5.8.1	MBTCP: Communication Status	0 = Disabled 1 = No connection 2 = Connected 3 = Timeout Error		860	enum	1
S5.8.2	MBTCP: Active Connections	0 to 4	0	863	8bit	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
S5.8.3	EIP Master Status	0 = Run 1 = Idle		869	enum	1
S5.8.4	EIP Communication Status	0 = Disabled 1 = No connection 2 = Connected 3 = Timeout in I/O Connection 4 = Duplicated IP		870	enum	1
S5.8.5	Interface Status	Bit 0 = Link1 Bit 1 = Link2 Bit 2 ... 15 = Reserved		889	16bit	1
S5.8.6	Current IP Address	0.0.0.0 to 255.255.255.255		846	ip_address	2
S5.9	Bluetooth					
S5.9.1	MAC Address	00:00:00:00:00:00 to FF:FF:FF:FF:FF:FF		801	MAC_-ADDRESS	3
		S6 Status\SoftPLC				
S6.1	SoftPLC Status					
S6.1.1	Actual	0 = No Application 1 = Install. App. 2 = Incompat. App. 3 = App. Stopped 4 = App. Running		1100	enum	1
S6.2	Scan Cycle Time					
S6.2.1	Actual	0 to 65535 ms	0	1102	16bit	1
S6.3	Value for Outputs					
S6.3.1	DO Value	Bit 0 = DO1 Bit 1 = DO2 Bit 2 = DO3 Bit 3 ... 15 = Reserved		697	16bit	1
S6.3.2	AO Value					
S6.3.2.1	AO in 10 bits	0 to 1023	0	698	16bit	1
S6.4	Parameter					
S6.4.1	User #1	-10000 to 10000	0	1110	s32bit	2
S6.4.2	User #2	-10000 to 10000	0	1112	s32bit	2
S6.4.3	User #3	-10000 to 10000	0	1114	s32bit	2
S6.4.4	User #4	-10000 to 10000	0	1116	s32bit	2
S6.4.5	User #5	-10000 to 10000	0	1118	s32bit	2

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
S6.4.6	User #6	-10000 to 10000	0	1120	s32bit	2
S6.4.7	User #7	-10000 to 10000	0	1122	s32bit	2
S6.4.8	User #8	-10000 to 10000	0	1124	s32bit	2
S6.4.9	User #9	-10000 to 10000	0	1126	s32bit	2
S6.4.10	User #10	-10000 to 10000	0	1128	s32bit	2
S6.4.11	User #11	-10000 to 10000	0	1130	s32bit	2
S6.4.12	User #12	-10000 to 10000	0	1132	s32bit	2
S6.4.13	User #13	-10000 to 10000	0	1134	s32bit	2
S6.4.14	User #14	-10000 to 10000	0	1136	s32bit	2
S6.4.15	User #15	-10000 to 10000	0	1138	s32bit	2
S6.4.16	User #16	-10000 to 10000	0	1140	s32bit	2
S6.4.17	User #17	-10000 to 10000	0	1142	s32bit	2
S6.4.18	User #18	-10000 to 10000	0	1144	s32bit	2
S6.4.19	User #19	-10000 to 10000	0	1146	s32bit	2
S6.4.20	User #20	-10000 to 10000	0	1148	s32bit	2
S6.4.21	User #21	-10000 to 10000	0	1150	s32bit	2
S6.4.22	User #22	-10000 to 10000	0	1152	s32bit	2
S6.4.23	User #23	-10000 to 10000	0	1154	s32bit	2
S6.4.24	User #24	-10000 to 10000	0	1156	s32bit	2
S6.4.25	User #25	-10000 to 10000	0	1158	s32bit	2
S6.4.26	User #26	-10000 to 10000	0	1160	s32bit	2
S6.4.27	User #27	-10000 to 10000	0	1162	s32bit	2
S6.4.28	User #28	-10000 to 10000	0	1164	s32bit	2
S6.4.29	User #29	-10000 to 10000	0	1166	s32bit	2
S6.4.30	User #30	-10000 to 10000	0	1168	s32bit	2
S6.4.31	User #31	-10000 to 10000	0	1170	s32bit	2
S6.4.32	User #32	-10000 to 10000	0	1172	s32bit	2
S6.4.33	User #33	-10000 to 10000	0	1174	s32bit	2
S6.4.34	User #34	-10000 to 10000	0	1176	s32bit	2
S6.4.35	User #35	-10000 to 10000	0	1178	s32bit	2
S6.4.36	User #36	-10000 to 10000	0	1180	s32bit	2
S6.4.37	User #37	-10000 to 10000	0	1182	s32bit	2
S6.4.38	User #38	-10000 to 10000	0	1184	s32bit	2
S6.4.39	User #39	-10000 to 10000	0	1186	s32bit	2
S6.4.40	User #40	-10000 to 10000	0	1188	s32bit	2
S6.4.41	User #41	-10000 to 10000	0	1190	s32bit	2
S6.4.42	User #42	-10000 to 10000	0	1192	s32bit	2
S6.4.43	User #43	-10000 to 10000	0	1194	s32bit	2
S6.4.44	User #44	-10000 to 10000	0	1196	s32bit	2
S6.4.45	User #45	-10000 to 10000	0	1198	s32bit	2
S6.4.46	User #46	-10000 to 10000	0	1200	s32bit	2
S6.4.47	User #47	-10000 to 10000	0	1202	s32bit	2

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
S6.4.48	User #48	-10000 to 10000	0	1204	s32bit	2
S6.4.49	User #49	-10000 to 10000	0	1206	s32bit	2
S6.4.50	User #50	-10000 to 10000	0	1208	s32bit	2
		D1 Diagnostics\Fault				
D1.1	Actual					
D1.1.1	Fxxx	0 to 999	0	90	16bit	1
D1.2	Fault History					
		D2 Diagnostics\Alarms				
D2.1	Actual					
D2.1.1	Axxx 1	0 to 999	0	91	16bit	1
D2.1.2	Axxx 2	0 to 999	0	92	16bit	1
D2.1.3	Axxx 3	0 to 999	0	93	16bit	1
D2.1.4	Axxx 4	0 to 999	0	94	16bit	1
D2.1.5	Axxx 5	0 to 999	0	95	16bit	1
D2.2	Alarm History					
		D3 Diagnostics\Events				
		D4 Diagnostics\Motor On				
D4.1	Start Current					
D4.1.1	Maximum	0.0 to 14544.0 A	1	36	32bit	2
D4.1.2	Average	0.0 to 14544.0 A	1	38	32bit	2
D4.2	Real Start Time					
D4.2.1	Actual	0 to 999 s	0	48	16bit	1
D4.2.2	Final	0 to 999 s	0	49	16bit	1
D4.3	Current Full Voltage					
D4.3.1	Maximum	0.0 to 14544.0 A	1	40	32bit	2
D4.4	Main Line Voltage					
D4.4.1	Maximum	0.0 to 999.9 V	1	54	16bit	1
D4.4.2	Minimun	0.0 to 999.9 V	1	55	16bit	1
D4.5	Main Line Frequency					
D4.5.1	Maximum	0.0 to 99.9 Hz	1	56	16bit	1
D4.5.2	Minimum	0.0 to 99.9 Hz	1	57	16bit	1
D4.6	kWh Counter					
D4.6.1	Total	0.0 to 429496729.5 kWh	1	52	32bit	2
D4.7	Number Start					
D4.7.1	Total	0 to 65535	0	59	16bit	1
		D5 Diagnostics\Temperatures				
D5.1	SCRs Maximum					
D5.1.1	Total	-22 to 260 $^{\circ}C$	0	77	s16bit	1
D5.2	Motor Maximum					
D5.2.1	Channel 1	-20 to 260 $^{\circ}C$	0	80	s16bit	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
D5.2.2	Channel 2	-20 to 260 °C	0	81	s16bit	1
D5.2.3	Channel 3	-20 to 260 °C	0	82	s16bit	1
D5.2.4	Channel 4	-20 to 260 °C	0	83	s16bit	1
D5.2.5	Channel 5	-20 to 260 °C	0	84	s16bit	1
D5.2.6	Channel 6	-20 to 260 °C	0	85	s16bit	1
		D6 Diagnostics\Hours Control				
D6.1	Powered	0 to 4294967295 s	0	42	TIME	2
D6.2	Enabled	0 to 4294967295 s	0	44	TIME	2
D6.3	Fan ON	0 to 4294967295 s	0	46	TIME	2
		D7 Diagnostics\Changed Parameters				
		C1 Configurations\Starting and Stopping				
C1.1	Types of Control	0 = Voltage Ramp 1 = Voltage Ramp + Current Limit 2 = Current Limit 3 = Current Ramp 4 = Pump Control 5 = Torque Control 6 = D.O.L. SCR		202	enum	1
C1.2	Initial Start Voltage	25 to 90 %	0	101	8bit	1
C1.3	Maximum Start Time	1 to 999 s	0	102	16bit	1
C1.4	Start End Detection	0 = Time 1 = Automatic		106	enum	1
C1.5	Initial Current Ramp	150 to 600 %	0	111	16bit	1
C1.6	Current Ramp Time	1 to 99 %	0	112	8bit	1
C1.7	Current Limit	150 to 600 %	0	110	16bit	1
C1.8	Start Torque Chara.	1 = Constant 2 = Linear 3 = Square		120	enum	1
C1.9	Initial Start Torque	10 to 300 %	0	121	16bit	1
C1.10	End Start Torque	10 to 300 %	0	122	16bit	1
C1.11	Minimun Start Torque	10 to 300 %	0	123	16bit	1
C1.12	Min.Start Torq. Time	1 to 99 %	0	124	8bit	1
C1.13	Stop Time	0 to 999 s	0	104	16bit	1
C1.14	Step Down Volt. Stop	60 to 100 %	0	103	8bit	1
C1.15	End Voltage Stop	30 to 55 %	0	105	8bit	1
C1.16	Stop Torque Characte.	1 = Constant 2 = Linear 3 = Square		125	enum	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
C1.17	End Stop Torque	10 to 100 %	0	126	8bit	1
C1.18	Minimum Stop Torque	10 to 100 %	0	127	8bit	1
C1.19	Min. Stop Torque Time	1 to 99 %	0	128	8bit	1
		C2 Configurations\Nominal Motor Data				
C2.1	Voltage	1 to 999 V	0	400	16bit	1
C2.2	Current	0.1 to 2424.0 A	1	401	16bit	1
C2.3	Speed	1 to 3600 rpm	0	402	16bit	1
C2.4	Power	0.1 to 1950.0 kW	1	404	16bit	1
C2.5	P.F. Power Factor	0.01 to 1.00	2	405	8bit	1
C2.6	S.F. Service Factor	0.01 to 1.50	2	406	8bit	1
		C3 Configurations\LOC/REM Selection				
C3.1	Mode	0 = Always LOC 1 = Always REM 2 = HMI LR Key LOC 3 = HMI LR Key REM 4 = DIx 5 = USB LOC 6 = USB REM 7 = SoftPLC LOC 8 = SoftPLC REM 9 = Slot 1 LOC 10 = Slot 1 REM 11 = Slot 2 LOC 12 = Slot 2 REM		220	enum	1
C3.2	LOC Command	0 = HMI Keys 1 = DIx 2 = USB 3 = SoftPLC 4 = Slot 1 5 = Slot 2		229	enum	1
C3.3	REM Command	0 = HMI Keys 1 = DIx 2 = USB 3 = SoftPLC 4 = Slot 1 5 = Slot 2		230	enum	1
C3.4	Commands Copy	0 = No 1 = Yes		231	enum	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
C4 Configurations\I/O						
C4.1	Digital Inputs					
C4.1.1	DI1	0 = Not Used 1 = Start / Stop 2 = Start (3 Wires) 3 = Stop (3 Wires) 4 = General Enable 5 = LOC / REM 6 = JOG 7 = FWD / REV 8 = No External Fault 9 = No External Alarm 10 = Brake 11 = Reset 12 = Load User 1/2 13 ... 16 = Reserved		263	enum	1
C4.1.2	DI2	0 = Not Used 1 = Start / Stop 2 = Start (3 Wires) 3 = Stop (3 Wires) 4 = General Enable 5 = LOC / REM 6 = JOG 7 = FWD / REV 8 = No External Fault 9 = No External Alarm 10 = Brake 11 = Reset 12 = Load User 1/2 13 ... 16 = Reserved		264	enum	1
C4.1.3	DI3	0 = Not Used 1 = Start / Stop 2 = Start (3 Wires) 3 = Stop (3 Wires) 4 = General Enable 5 = LOC / REM 6 = JOG 7 = FWD / REV		265	enum	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
		8 = No External Fault 9 = No External Alarm 10 = Brake 11 = Reset 12 = Load User 1/2 13 = Reserved 14 = Emergency Start 15 ... 16 = Reserved				
C4.1.4	DI4	0 = Not Used 1 = Start / Stop 2 = Start (3 Wires) 3 = Stop (3 Wires) 4 = General Enable 5 = LOC / REM 6 = JOG 7 = FWD / REV 8 = No External Fault 9 = No External Alarm 10 = Brake 11 = Reset 12 = Load User 1/2 13 ... 16 = Reserved		266	enum	1
C4.1.5	DI5	0 = Not Used 1 = Start / Stop 2 = Start (3 Wires) 3 = Stop (3 Wires) 4 = General Enable 5 = LOC / REM 6 = JOG 7 = FWD / REV 8 = No External Fault 9 = No External Alarm 10 = Brake 11 = Reset 12 = Load User 1/2 13 ... 16 = Reserved		267	enum	1
C4.1.6	DI6	0 = Not Used 1 = Start / Stop 2 = Start (3 Wires)		268	enum	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
		3 = Stop (3 Wires) 4 = General Enable 5 = LOC / REM 6 = JOG 7 = FWD / REV 8 = No External Fault 9 = No External Alarm 10 = Brake 11 = Reset 12 = Load User 1/2 13 ... 14 = Reserved 15 = Mot. Thermistor A032 16 = Mot. Thermistor F032				
C4.2	Digital Outputs					
C4.2.1	DO1	0 = Not Used 1 = Running 2 = Full Voltage 3 = Bypass 4 = FWD / REV K1 5 = DC Braking 6 = Without Fault 7 = With Fault 8 = Without Alarm 9 = With Alarm 10 = No Fault / Alarm 11 = SoftPLC 12 = Communication 13 = I motor % > Value 14 = Breaker Shunt Trip		275	enum	1
C4.2.2	DO2	0 = Not Used 1 = Running 2 = Full Voltage 3 = Bypass 4 = FWD / REV K2 5 = DC Braking 6 = Without Fault 7 = With Fault 8 = Without Alarm 9 = With Alarm 10 = No Fault / Alarm		276	enum	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
		11 = SoftPLC 12 = Communication 13 = I motor % > Value 14 = Breaker Shunt Trip				
C4.2.3	DO3	0 = Not Used 1 = Running 2 = Full Voltage 3 = Bypass 4 = Not Used 5 = DC Braking 6 = Without Fault 7 = With Fault 8 = Without Alarm 9 = With Alarm 10 = No Fault / Alarm 11 = SoftPLC 12 = Communication 13 = I motor % > Value 14 = Breaker Shunt Trip		277	enum	1
C4.2.4	DO Comparison Value	10.0 to 500.0 %	1	278	16bit	1
C4.3	Analog Output					
C4.3.1	Function	0 = Not Used 1 = SSW Current % 2 = Line Voltage % 3 = Output Voltage % 4 = Power Factor 5 = Thermal Class Prot. 6 = Output Power W 7 = Output Power VA 8 = Motor Torque % 9 = Value to AO 10 = SCRs Temperature 11 = SoftPLC		251	enum	1
C4.3.2	Gain	0.000 to 9.999	3	252	16bit	1
C4.3.3	Signal	0 = 0 to 20mA 1 = 4 to 20mA 2 = 20mA to 0 3 = 20 to 4mA		253	enum	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
		4 = 0 to 10V 5 = 10V to 0				
		C5 Configurations\Protections				
C5.1	Voltage Protections					
C5.1.1	Motor Undervoltage					
C5.1.1.1	Mode	0 = Inactive 1 = Fault F002 2 = Alarm A002		900	enum	1
C5.1.1.2	Level	0 to 30 %Vn	0	901	8bit	1
C5.1.1.3	Time	0.1 to 10.0 s	1	902	8bit	1
C5.1.2	Motor Overvoltage					
C5.1.2.1	Mode	0 = Inactive 1 = Fault F016 2 = Alarm A016		903	enum	1
C5.1.2.2	Level	0 to 20 %Vn	0	904	8bit	1
C5.1.2.3	Time	0.1 to 10.0 s	1	905	8bit	1
C5.1.3	Motor Voltage Imbalance					
C5.1.3.1	Mode	0 = Inactive 1 = Fault F001 2 = Alarm A001		906	enum	1
C5.1.3.2	Level	0 to 30 %Vn	0	907	8bit	1
C5.1.3.3	Time	0.1 to 10.0 s	1	908	8bit	1
C5.2	Current Protections					
C5.2.1	Motor Undercurrent					
C5.2.1.1	Mode	0 = Inactive 1 = Fault F065 2 = Alarm A065		910	enum	1
C5.2.1.2	Level	0 to 99 %In	0	911	8bit	1
C5.2.1.3	Time	1 to 99 s	0	912	8bit	1
C5.2.2	Motor Overcurrent					
C5.2.2.1	Mode	0 = Inactive 1 = Fault F066 2 = Alarm A066		913	enum	1
C5.2.2.2	Level	0 to 99 %In	0	914	8bit	1
C5.2.2.3	Time	1 to 99 s	0	915	8bit	1
C5.2.3	Current Imbalance					

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
C5.2.3.1	Mode	0 = Inactive 1 = Fault F074 2 = Alarm A074		916	enum	1
C5.2.3.2	Level	0 to 30 %In	0	917	8bit	1
C5.2.3.3	Time	1 to 99 s	0	918	8bit	1
C5.3	Torque Protections					
C5.3.1	Undertorque					
C5.3.1.1	Mode	0 = Inactive 1 = Fault F078 2 = Alarm A078		950	enum	1
C5.3.1.2	Level	0 to 99 %Tn	0	951	8bit	1
C5.3.1.3	Time	1 to 99 s	0	952	8bit	1
C5.3.2	Overtorque					
C5.3.2.1	Mode	0 = Inactive 1 = Fault F079 2 = Alarm A079		953	enum	1
C5.3.2.2	Level	0 to 99 %Tn	0	954	8bit	1
C5.3.2.3	Time	1 to 99 s	0	955	8bit	1
C5.4	Power Protections					
C5.4.1	Underpower					
C5.4.1.1	Mode	0 = Inactive 1 = Fault F080 2 = Alarm A080		960	enum	1
C5.4.1.2	Level	0 to 99 %Pn	0	961	8bit	1
C5.4.1.3	Time	1 to 99 s	0	962	8bit	1
C5.4.2	Overpower					
C5.4.2.1	Mode	0 = Inactive 1 = Fault F081 2 = Alarm A081		963	enum	1
C5.4.2.2	Level	0 to 99 %Pn	0	964	8bit	1
C5.4.2.3	Time	1 to 99 s	0	965	8bit	1
C5.5	Phase Sequence					
C5.5.1	Mode	0 = Inactive 1 = RST - Fault F067 2 = RTS - Fault F068		930	enum	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
C5.6	Bypass Protections					
C5.6.1	Undercurrent	0 = Inactive 1 = Fault F076		919	enum	1
C5.6.2	Overcurrent	0 = Inactive 1 = Fault F063		920	enum	1
C5.6.3	Closed	0 = Inactive 1 = Fault F077		921	enum	1
C5.7	Time Protections					
C5.7.1	Before Start	0.5 to 999.9 s	1	931	16bit	1
C5.7.2	After Stop	2.0 to 999.9 s	1	932	16bit	1
C5.7.3	Between Start	2 to 9999 s	0	933	16bit	1
C5.8	Motor Thermal Protection					
C5.8.1	Ch1 Installed Sensor					
C5.8.1.1	Mode	0 = Off 1 = On 2 = On Stator		1006	enum	1
C5.8.2	Ch1 Sensor Fault					
C5.8.2.1	Mode	0 = Fault F109 and F117 1 = Alarm A109 and A117		998	enum	1
C5.8.3	Ch1 Overtemperature					
C5.8.3.1	Mode	0 = Fault F101 1 = Alarm A101 2 = F101 and A101		966	enum	1
C5.8.3.2	Fault Level	0 to 250 $^{\circ}C$	0	967	8bit	1
C5.8.3.3	Alarm Level	0 to 250 $^{\circ}C$	0	968	8bit	1
C5.8.3.4	Alarm Reset	0 to 250 $^{\circ}C$	0	969	8bit	1
C5.8.4	Ch2 Installed Sensor					
C5.8.4.1	Mode	0 = Off 1 = On 2 = On Stator		1007	enum	1
C5.8.5	Ch2 Sensor Fault					
C5.8.5.1	Mode	0 = Fault F110 and F118 1 = Alarm A110 and A118		999	enum	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
C5.8.6	Ch2 Overtemperature					
C5.8.6.1	Mode	0 = Fault F102 1 = Alarm A102 2 = F102 and A102		970	enum	1
C5.8.6.2	Fault Level	0 to 250 °C	0	971	8bit	1
C5.8.6.3	Alarm Level	0 to 250 °C	0	972	8bit	1
C5.8.6.4	Alarm Reset	0 to 250 °C	0	973	8bit	1
C5.8.7	Ch3 Installed Sensor					
C5.8.7.1	Mode	0 = Off 1 = On 2 = On Stator		1008	enum	1
C5.8.8	Ch3 Sensor Fault					
C5.8.8.1	Mode	0 = Fault F111 and F119 1 = Alarm A111 and A119		1000	enum	1
C5.8.9	Ch3 Overtemperature					
C5.8.9.1	Mode	0 = Fault F103 1 = Alarm A103 2 = F103 and A103		974	enum	1
C5.8.9.2	Fault Level	0 to 250 °C	0	975	8bit	1
C5.8.9.3	Alarm Level	0 to 250 °C	0	976	8bit	1
C5.8.9.4	Alarm Reset	0 to 250 °C	0	977	8bit	1
C5.8.10	Ch4 Installed Sensor					
C5.8.10.1	Mode	0 = Off 1 = On 2 = On Stator		1009	enum	1
C5.8.11	Ch4 Sensor Fault					
C5.8.11.1	Mode	0 = Fault F112 and F120 1 = Alarm A112 and A120		1001	enum	1
C5.8.12	Ch4 Overtemperature					
C5.8.12.1	Mode	0 = Fault F104 1 = Alarm A104 2 = F104 and A104		978	enum	1
C5.8.12.2	Fault Level	0 to 250 °C	0	979	8bit	1
C5.8.12.3	Alarm Level	0 to 250 °C	0	980	8bit	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
C5.8.12.4	Alarm Reset	0 to 250 °C	0	981	8bit	1
C5.8.13	Ch5 Installed Sensor					
C5.8.13.1	Mode	0 = Off 1 = On 2 = On Stator		1010	enum	1
C5.8.14	Ch5 Sensor Fault					
C5.8.14.1	Mode	0 = Fault F113 and F121 1 = Alarm A113 and A121		1002	enum	1
C5.8.15	Ch5 Overtemperature					
C5.8.15.1	Mode	0 = Fault F105 1 = Alarm A105 2 = F105 and A105		982	enum	1
C5.8.15.2	Fault Level	0 to 250 °C	0	983	8bit	1
C5.8.15.3	Alarm Level	0 to 250 °C	0	984	8bit	1
C5.8.15.4	Alarm Reset	0 to 250 °C	0	985	8bit	1
C5.8.16	Ch6 Installed Sensor					
C5.8.16.1	Mode	0 = Off 1 = On 2 = On Stator		1011	enum	1
C5.8.17	Ch6 Sensor Fault					
C5.8.17.1	Mode	0 = Fault F114 and F122 1 = Alarm A114 and A122		1003	enum	1
C5.8.18	Ch6 Overtemperature					
C5.8.18.1	Mode	0 = Fault F106 1 = Alarm A106 2 = F106 and A106		986	enum	1
C5.8.18.2	Fault Level	0 to 250 °C	0	987	8bit	1
C5.8.18.3	Alarm Level	0 to 250 °C	0	988	8bit	1
C5.8.18.4	Alarm Reset	0 to 250 °C	0	989	8bit	1
C5.9	Motor Thermal Class					
C5.9.1	Programming Mode	0 = Standard 1 = Custom		934	enum	1
C5.9.2	Action Mode	0 = Inactive		935	enum	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
		1 = Fault F005 2 = Alarm A005 3 = F005 and A005				
C5.9.3	Alarm Level	0 to 100 %	0	936	8bit	1
C5.9.4	Alarm Reset	0 to 100 %	0	937	8bit	1
C5.9.5	Motor Temperature	0 = T.C. + PT100 1 = T.C. + Th.Im.		938	enum	1
C5.9.6	Thermal Class	0 = Automatic 1 = Class 10 2 = Class 15 3 = Class 20 4 = Class 25 5 = Class 30 6 = Class 35 7 = Class 40 8 = Class 45		939	enum	1
C5.9.7	Motor Data					
C5.9.7.1	Insulation Class	0 = Class A 105°C 1 = Class E 120°C 2 = Class B 130°C 3 = Class F 155°C 4 = Class H 180°C 5 = Class N 200°C 6 = Class R 220°C 7 = Class S 240°C 8 = Class 250°C		940	enum	1
C5.9.7.2	Temperature Rise	0 to 200 $^{\circ}C$	0	942	8bit	1
C5.9.7.3	Ambient Temperature	0 to 200 $^{\circ}C$	0	941	8bit	1
C5.9.7.4	Locked Rotor Time	1 to 100 s	0	943	8bit	1
C5.9.7.5	Locked Rotor Current	2.0 to 10.0 x	1	944	8bit	1
C5.9.7.6	Heating Time Constant	1 to 2880 min	0	945	16bit	1
C5.9.7.7	Cooling Time Constant	1 to 8640 min	0	946	16bit	1
C5.9.8	Thermal Image					
C5.9.8.1	Reset	0 to 8640 min	0	947	16bit	1
C5.10	SSW Short Circuit					
C5.10.1	Motor Off	0 = Inactive 1 = Fault F019		922	enum	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
C5.10.2	Motor On	0 = Inactive 1 = Fault F020		923	enum	1
C5.11	Fault Auto-Reset					
C5.11.1	Mode	0 = Off 1 = On		207	enum	1
C5.11.2	Time	3 to 600 s	0	208	16bit	1
		C6 Configurations\HMI				
C6.1	Password					
C6.1.1	Password	0 to 9999	0	210	16bit	1
C6.1.2	Password Options	0 = Off 1 = On 2 = Change Password		200	enum	1
C6.2	Language					
C6.2.1	Language	0 = Português 1 = English 2 = Español 3 = Français 4 = Downloaded		201	enum	1
C6.3	Date and Time					
C6.3.1	Date and Time	yy/mm/dd and hh:mm:ss		196	date	4
C6.3.2	Day of the Week	0 = Sunday 1 = Monday 2 = Tuesday 3 = Wednesday 4 = Thursday 5 = Friday 6 = Saturday		195	enum	1
C6.4	Main Screen					
C6.5	LCD Display					
C6.5.1	Backlight	1 to 15	0	218	8bit	1
C6.5.2	Contrast	0 to 100 %	0	219	8bit	1
C6.6	Communication Timeout					
C6.6.1	Mode	0 = Inactive 1 = Fault F127 2 = Alarm A127		190	enum	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
C6.6.2	Alarm Action	0 = Indicates Only 1 = Ramp Stop 2 = General Disable 3 = Change to LOC 4 = Change to REM		191	enum	1
C6.6.3	Time	1 to 999 s	0	192	16bit	1
		C7 Configurations\Special Functions				
C7.1	Forward/Reverse					
C7.1.1	Mode	0 = Inactive 1 = By Contactor 2 = Only for JOG		228	enum	1
C7.2	Kick Start					
C7.2.1	Mode	0 = Off 1 = On		520	enum	1
C7.2.2	Time	0.1 to 2.0 s	1	521	8bit	1
C7.2.3	Voltage	70 to 90 %	0	522	8bit	1
C7.2.4	Current	300 to 700 %	0	523	16bit	1
C7.3	Jog					
C7.3.1	Mode	0 = Off 1 = On		510	enum	1
C7.3.2	Level	10 to 100 %	0	511	8bit	1
C7.4	Braking					
C7.4.1	Mode	0 = Inactive 1 = Reverse 2 = Optimal 3 = DC		500	enum	1
C7.4.2	Time	1 to 299 s	0	501	16bit	1
C7.4.3	Level	30 to 70 %	0	502	8bit	1
C7.4.4	End	0 = Inactive 1 = Automatic		503	enum	1
		C8 Configurations\Communications				
C8.1	I/O Data					
C8.1.1	Data Read					
C8.1.1.1	Slot 1 1st Word	1 to 50	0	712	8bit	1
C8.1.1.2	Slot 1 Quantity	1 to 50	0	713	8bit	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
C8.1.1.3	Slot 2 1st Word	1 to 50	0	753	8bit	1
C8.1.1.4	Slot 2 Quantity	1 to 50	0	754	8bit	1
C8.1.1.5	Word #1	0 to 65535	0	1300	16bit	1
C8.1.1.6	Word #2	0 to 65535	0	1301	16bit	1
C8.1.1.7	Word #3	0 to 65535	0	1302	16bit	1
C8.1.1.8	Word #4	0 to 65535	0	1303	16bit	1
C8.1.1.9	Word #5	0 to 65535	0	1304	16bit	1
C8.1.1.10	Word #6	0 to 65535	0	1305	16bit	1
C8.1.1.11	Word #7	0 to 65535	0	1306	16bit	1
C8.1.1.12	Word #8	0 to 65535	0	1307	16bit	1
C8.1.1.13	Word #9	0 to 65535	0	1308	16bit	1
C8.1.1.14	Word #10	0 to 65535	0	1309	16bit	1
C8.1.1.15	Word #11	0 to 65535	0	1310	16bit	1
C8.1.1.16	Word #12	0 to 65535	0	1311	16bit	1
C8.1.1.17	Word #13	0 to 65535	0	1312	16bit	1
C8.1.1.18	Word #14	0 to 65535	0	1313	16bit	1
C8.1.1.19	Word #15	0 to 65535	0	1314	16bit	1
C8.1.1.20	Word #16	0 to 65535	0	1315	16bit	1
C8.1.1.21	Word #17	0 to 65535	0	1316	16bit	1
C8.1.1.22	Word #18	0 to 65535	0	1317	16bit	1
C8.1.1.23	Word #19	0 to 65535	0	1318	16bit	1
C8.1.1.24	Word #20	0 to 65535	0	1319	16bit	1
C8.1.1.25	Word #21	0 to 65535	0	1320	16bit	1
C8.1.1.26	Word #22	0 to 65535	0	1321	16bit	1
C8.1.1.27	Word #23	0 to 65535	0	1322	16bit	1
C8.1.1.28	Word #24	0 to 65535	0	1323	16bit	1
C8.1.1.29	Word #25	0 to 65535	0	1324	16bit	1
C8.1.1.30	Word #26	0 to 65535	0	1325	16bit	1
C8.1.1.31	Word #27	0 to 65535	0	1326	16bit	1
C8.1.1.32	Word #28	0 to 65535	0	1327	16bit	1
C8.1.1.33	Word #29	0 to 65535	0	1328	16bit	1
C8.1.1.34	Word #30	0 to 65535	0	1329	16bit	1
C8.1.1.35	Word #31	0 to 65535	0	1330	16bit	1
C8.1.1.36	Word #32	0 to 65535	0	1331	16bit	1
C8.1.1.37	Word #33	0 to 65535	0	1332	16bit	1
C8.1.1.38	Word #34	0 to 65535	0	1333	16bit	1
C8.1.1.39	Word #35	0 to 65535	0	1334	16bit	1
C8.1.1.40	Word #36	0 to 65535	0	1335	16bit	1
C8.1.1.41	Word #37	0 to 65535	0	1336	16bit	1
C8.1.1.42	Word #38	0 to 65535	0	1337	16bit	1
C8.1.1.43	Word #39	0 to 65535	0	1338	16bit	1
C8.1.1.44	Word #40	0 to 65535	0	1339	16bit	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
C8.1.1.45	Word #41	0 to 65535	0	1340	16bit	1
C8.1.1.46	Word #42	0 to 65535	0	1341	16bit	1
C8.1.1.47	Word #43	0 to 65535	0	1342	16bit	1
C8.1.1.48	Word #44	0 to 65535	0	1343	16bit	1
C8.1.1.49	Word #45	0 to 65535	0	1344	16bit	1
C8.1.1.50	Word #46	0 to 65535	0	1345	16bit	1
C8.1.1.51	Word #47	0 to 65535	0	1346	16bit	1
C8.1.1.52	Word #48	0 to 65535	0	1347	16bit	1
C8.1.1.53	Word #49	0 to 65535	0	1348	16bit	1
C8.1.1.54	Word #50	0 to 65535	0	1349	16bit	1
C8.1.2	Data Write					
C8.1.2.1	Slot 1 1st Word	1 to 20	0	714	8bit	1
C8.1.2.2	Slot 1 Quantity	1 to 20	0	715	8bit	1
C8.1.2.3	Slot 2 1st Word	1 to 20	0	755	8bit	1
C8.1.2.4	Slot 2 Quantity	1 to 20	0	756	8bit	1
C8.1.2.5	Update Delay	0.0 to 999.9 s	1	899	16bit	1
C8.1.2.6	Word #1	0 to 65535	0	1400	16bit	1
C8.1.2.7	Word #2	0 to 65535	0	1401	16bit	1
C8.1.2.8	Word #3	0 to 65535	0	1402	16bit	1
C8.1.2.9	Word #4	0 to 65535	0	1403	16bit	1
C8.1.2.10	Word #5	0 to 65535	0	1404	16bit	1
C8.1.2.11	Word #6	0 to 65535	0	1405	16bit	1
C8.1.2.12	Word #7	0 to 65535	0	1406	16bit	1
C8.1.2.13	Word #8	0 to 65535	0	1407	16bit	1
C8.1.2.14	Word #9	0 to 65535	0	1408	16bit	1
C8.1.2.15	Word #10	0 to 65535	0	1409	16bit	1
C8.1.2.16	Word #11	0 to 65535	0	1410	16bit	1
C8.1.2.17	Word #12	0 to 65535	0	1411	16bit	1
C8.1.2.18	Word #13	0 to 65535	0	1412	16bit	1
C8.1.2.19	Word #14	0 to 65535	0	1413	16bit	1
C8.1.2.20	Word #15	0 to 65535	0	1414	16bit	1
C8.1.2.21	Word #16	0 to 65535	0	1415	16bit	1
C8.1.2.22	Word #17	0 to 65535	0	1416	16bit	1
C8.1.2.23	Word #18	0 to 65535	0	1417	16bit	1
C8.1.2.24	Word #19	0 to 65535	0	1418	16bit	1
C8.1.2.25	Word #20	0 to 65535	0	1419	16bit	1
C8.2	RS485 Serial					
C8.2.1	Serial Protocol	0 ... 1 = Reserved 2 = Modbus RTU		730	enum	1
C8.2.2	Address	1 to 247	0	731	8bit	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
C8.2.3	Baud Rate	0 = 9600 bits/s 1 = 19200 bits/s 2 = 38400 bits/s 3 = 57600 bits/s		732	enum	1
C8.2.4	Bytes Config.	0 = 8 bits, no, 1 1 = 8 bits, even,1 2 = 8 bits, odd, 1 3 = 8 bits, no, 2 4 = 8 bits, even,2 5 = 8 bits, odd, 2		733	enum	1
C8.2.5	Timeout					
C8.2.5.1	Mode	0 = Inactive 1 = Fault F128 2 = Alarm A128		740	enum	1
C8.2.5.2	Alarm Action	0 = Indicates Only 1 = Ramp Stop 2 = General Disable 3 = Change to LOC 4 = Change to REM		741	enum	1
C8.2.5.3	Timeout	0.0 to 999.9 s	1	734	16bit	1
C8.3	Anybus-CC					
C8.3.1	Update Configuration	0 = Normal Operation 1 = Update configuration		749	enum	1
C8.3.2	Address	0 to 255	0	757	8bit	1
C8.3.3	Baud Rate	0 = 125 kbps 1 = 250 kbps 2 = 500 kbps 3 = Autobaud		758	enum	1
C8.3.4	IP Address Configuration	0 = Parameters 1 = DHCP 2 = DCP		760	enum	1
C8.3.5	IP Address	0.0.0.0 to 255.255.255.255		762	ip_address	2
C8.3.6	CIDR	0 = Reserved		761	enum	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
		1 = 128.0.0.0 2 = 192.0.0.0 3 = 224.0.0.0 4 = 240.0.0.0 5 = 248.0.0.0 6 = 252.0.0.0 7 = 254.0.0.0 8 = 255.0.0.0 9 = 255.128.0.0 10 = 255.192.0.0 11 = 255.224.0.0 12 = 255.240.0.0 13 = 255.248.0.0 14 = 255.252.0.0 15 = 255.254.0.0 16 = 255.255.0.0 17 = 255.255.128.0 18 = 255.255.192.0 19 = 255.255.224.0 20 = 255.255.240.0 21 = 255.255.248.0 22 = 255.255.252.0 23 = 255.255.254.0 24 = 255.255.255.0 25 = 255.255.255.128 26 = 255.255.255.192 27 = 255.255.255.224 28 = 255.255.255.240 29 = 255.255.255.248 30 = 255.255.255.252 31 = 255.255.255.254				
C8.3.7	Gateway	0.0.0.0 to 255.255.255.255		766	ip_address	2
C8.3.8	Station Name Suffix	0 to 254	0	770	8bit	1
C8.3.9	Modbus TCP Timeout					
C8.3.9.1	Mode	0 = Inactive 1 = Fault F131 2 = Alarm A131		771	enum	1
C8.3.9.2	Alarm Action	0 = Indicates Only 1 = Ramp Stop 2 = General Disable		772	enum	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
		3 = Change to LOC 4 = Change to REM				
C8.3.9.3	Modbus TCP Timeout	0.0 to 999.9 s	1	759	16bit	1
C8.3.10	Off Line Error					
C8.3.10.1	Mode	0 = Inactive 1 = Fault F129 2 = Alarm A129		897	enum	1
C8.3.10.2	Alarm Action	0 = Indicates Only 1 = Ramp Stop 2 = General Disable 3 = Change to LOC 4 = Change to REM		898	enum	1
C8.4	CANopen/DeviceNet					
C8.4.1	Protocol	0 = Disabled 1 = CANopen 2 = DeviceNet		700	enum	1
C8.4.2	Address	0 to 127	0	701	8bit	1
C8.4.3	Baud Rate	0 = 1 Mbps/Auto 1 = Reserved 2 = 500 Kbps 3 = 250 Kbps 4 = 125 Kbps 5 = 100 Kbps/Auto 6 = 50 Kbps/Auto 7 = 20 Kbps/Auto 8 = 10 Kbps/Auto		702	enum	1
C8.4.4	Bus Off Reset	0 = Manual 1 = Automatic		703	enum	1
C8.4.5	CAN Error					
C8.4.5.1	Mode	0 = Inactive 1 = Fault 2 = Alarm		723	enum	1
C8.4.5.2	Alarm Action	0 = Indicates Only 1 = Ramp Stop		724	enum	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
		2 = General Disable 3 = Change to LOC 4 = Change to REM				
C8.5	Ethernet					
C8.5.1	IP Address Config	 0 = Parameters 1 = DHCP		850	enum	1
C8.5.2	IP Address	0.0.0.0 to 255.255.255.255		852	ip_address	2
C8.5.3	CIDR Sub-net	 0 = Reserved 1 = 128.0.0.0 2 = 192.0.0.0 3 = 224.0.0.0 4 = 240.0.0.0 5 = 248.0.0.0 6 = 252.0.0.0 7 = 254.0.0.0 8 = 255.0.0.0 9 = 255.128.0.0 10 = 255.192.0.0 11 = 255.224.0.0 12 = 255.240.0.0 13 = 255.248.0.0 14 = 255.252.0.0 15 = 255.254.0.0 16 = 255.255.0.0 17 = 255.255.128.0 18 = 255.255.192.0 19 = 255.255.224.0 20 = 255.255.240.0 21 = 255.255.248.0 22 = 255.255.252.0 23 = 255.255.254.0 24 = 255.255.255.0 25 = 255.255.255.128 26 = 255.255.255.192 27 = 255.255.255.224 28 = 255.255.255.240 29 = 255.255.255.248 30 = 255.255.255.252 31 = 255.255.255.254		855	enum	1
C8.5.4	Gateway	0.0.0.0 to 255.255.255.255		856	ip_address	2

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
C8.5.5	MBTCP: TCP Port	0 to 65535	0	865	16bit	1
C8.5.7	EIP Data Profile	0 ... 9 = Reserved 10 = 110/160-Configurable I/O		871	enum	1
C8.5.9	Modbus TCP Error					
C8.5.9.1	Mode	0 = Inactive 1 = Fault F149 2 = Alarm A149		893	enum	1
C8.5.9.2	Alarm Action	0 = Indicates Only 1 = Ramp Stop 2 = General Disable 3 = Change to LOC 4 = Change to REM		894	enum	1
C8.5.9.3	Timeout	0.0 to 999.9 s	1	868	16bit	1
C8.5.10	EtherNet/IP Error					
C8.5.10.1	Mode	0 = Inactive 1 = Fault F147 2 = Alarm A147		895	enum	1
C8.5.10.2	Alarm Action	0 = Indicates Only 1 = Ramp Stop 2 = General Disable 3 = Change to LOC 4 = Change to REM		896	enum	1
C8.6	Bluetooth					
C8.6.1	Mode	0 = Off 1 = On		800	enum	1
C8.6.2	PIN	6 to 6	0	804	STRING_- NUMERIC	4
C8.6.3	Device Name	1 to 15	0	808	STRING_ASCII	8
C9 Configurations\SSW900						
C9.1	Nominal Data					
C9.1.1	Current	0 = 10 A 1 = 17 A 2 = 24 A 3 = 30 A		295	enum	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
		4 = 45 A 5 = 61 A 6 = 85 A 7 = 105 A 8 = 130 A 9 = 171 A 10 = 200 A 11 = 255 A 12 = 312 A 13 = 365 A 14 = 412 A 15 = 480 A 16 = 604 A 17 = 670 A 18 = 820 A 19 = 950 A 20 = 1100 A 21 = 1400 A				
C9.2	Types of Connections					
C9.2.1	Delta Inside	0 = Off 1 = On		150	enum	1
C9.2.2	External Bypass	0 = Without 1 = With		140	enum	1
C9.3	Accessories Config.					
C9.3.1	Slot 1	0 = Automatic 1 = Anybus-CC 2 = RS-485 3 = PT100 4 = I/Os Exp. 5 = Profibus 6 = CAN 7 = Ethernet 8 = External Current Acqu.		337	enum	1
C9.3.2	Slot 2	0 = Automatic 1 = Anybus-CC 2 = RS-485 3 = PT100		338	enum	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
		4 = I/Os Exp. 5 = Profibus 6 = CAN 7 = Ethernet 8 = External Current Acqu.				
C9.4	Fan Configuration					
C9.4.1	Mode	0 = Always Off 1 = Always On 2 = Controlled		203	enum	1
C10 Configurations\Load / Save Parameters						
C10.1	Load / Save User					
C10.1.1	Mode	0 = Not Used 1 = Load User 1 2 = Load User 2 3 = Reserved 4 = Save User 1 5 = Save User 2 6 = Reserved		206	enum	1
C10.2	Copy Function HMI					
C10.2.1	Mode	0 = Off 1 = SSW -> HMI 2 = HMI -> SSW		319	enum	1
C10.3	Erase Diagnostics					
C10.3.1	Mode	0 ... 1 = Not Used 2 = Fault 3 = Alarms 4 = Events 5 = Motor ON 6 = Temperaturas 7 = Hours Control 8 = Thermal Class Status		205	enum	1
C10.4	Load Factory Default					
C10.4.1	Mode	0 = No 1 = Yes		204	enum	1
C10.5	Save Changed Param.					
C10.5.1	Mode			209	enum	1

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
		0 = No 1 = Yes				
		C11 Configurations\SoftPLC				
C11.1	Mode	0 = Stop Program 1 = Run Program		1101	enum	1
C11.2	Action App. Not Running	0 = Inactive 1 = Alarm A708 2 = Fault F708		1103	enum	1
C11.3	Parameter					
C11.3.1	User #1	-10000 to 10000	0	1110	s32bit	2
C11.3.2	User #2	-10000 to 10000	0	1112	s32bit	2
C11.3.3	User #3	-10000 to 10000	0	1114	s32bit	2
C11.3.4	User #4	-10000 to 10000	0	1116	s32bit	2
C11.3.5	User #5	-10000 to 10000	0	1118	s32bit	2
C11.3.6	User #6	-10000 to 10000	0	1120	s32bit	2
C11.3.7	User #7	-10000 to 10000	0	1122	s32bit	2
C11.3.8	User #8	-10000 to 10000	0	1124	s32bit	2
C11.3.9	User #9	-10000 to 10000	0	1126	s32bit	2
C11.3.10	User #10	-10000 to 10000	0	1128	s32bit	2
C11.3.11	User #11	-10000 to 10000	0	1130	s32bit	2
C11.3.12	User #12	-10000 to 10000	0	1132	s32bit	2
C11.3.13	User #13	-10000 to 10000	0	1134	s32bit	2
C11.3.14	User #14	-10000 to 10000	0	1136	s32bit	2
C11.3.15	User #15	-10000 to 10000	0	1138	s32bit	2
C11.3.16	User #16	-10000 to 10000	0	1140	s32bit	2
C11.3.17	User #17	-10000 to 10000	0	1142	s32bit	2
C11.3.18	User #18	-10000 to 10000	0	1144	s32bit	2
C11.3.19	User #19	-10000 to 10000	0	1146	s32bit	2
C11.3.20	User #20	-10000 to 10000	0	1148	s32bit	2
C11.3.21	User #21	-10000 to 10000	0	1150	s32bit	2
C11.3.22	User #22	-10000 to 10000	0	1152	s32bit	2
C11.3.23	User #23	-10000 to 10000	0	1154	s32bit	2
C11.3.24	User #24	-10000 to 10000	0	1156	s32bit	2
C11.3.25	User #25	-10000 to 10000	0	1158	s32bit	2
C11.3.26	User #26	-10000 to 10000	0	1160	s32bit	2
C11.3.27	User #27	-10000 to 10000	0	1162	s32bit	2
C11.3.28	User #28	-10000 to 10000	0	1164	s32bit	2
C11.3.29	User #29	-10000 to 10000	0	1166	s32bit	2
C11.3.30	User #30	-10000 to 10000	0	1168	s32bit	2

Parameter	Description	Range of values	Decimal places	Net Id	Size	Qty mapped words
C11.3.31	User #31	-10000 to 10000	0	1170	s32bit	2
C11.3.32	User #32	-10000 to 10000	0	1172	s32bit	2
C11.3.33	User #33	-10000 to 10000	0	1174	s32bit	2
C11.3.34	User #34	-10000 to 10000	0	1176	s32bit	2
C11.3.35	User #35	-10000 to 10000	0	1178	s32bit	2
C11.3.36	User #36	-10000 to 10000	0	1180	s32bit	2
C11.3.37	User #37	-10000 to 10000	0	1182	s32bit	2
C11.3.38	User #38	-10000 to 10000	0	1184	s32bit	2
C11.3.39	User #39	-10000 to 10000	0	1186	s32bit	2
C11.3.40	User #40	-10000 to 10000	0	1188	s32bit	2
C11.3.41	User #41	-10000 to 10000	0	1190	s32bit	2
C11.3.42	User #42	-10000 to 10000	0	1192	s32bit	2
C11.3.43	User #43	-10000 to 10000	0	1194	s32bit	2
C11.3.44	User #44	-10000 to 10000	0	1196	s32bit	2
C11.3.45	User #45	-10000 to 10000	0	1198	s32bit	2
C11.3.46	User #46	-10000 to 10000	0	1200	s32bit	2
C11.3.47	User #47	-10000 to 10000	0	1202	s32bit	2
C11.3.48	User #48	-10000 to 10000	0	1204	s32bit	2
C11.3.49	User #49	-10000 to 10000	0	1206	s32bit	2
C11.3.50	User #50	-10000 to 10000	0	1208	s32bit	2
C11.4	SoftPLC Application	0 = User 1 = Timer Control 2 = Pump Cleaning		1104	enum	1
A1 Assistant\Oriented Start-up						
A1.1	Mode	0 = No 1 = Yes		317	enum	1

Table 10.3: *Description of the parameter data types*

Data Type	Description
enum	Enumerated type (unsigned 8-bit) contains a list of values with function description for each item.
8bit	Unsigned 8-bit integer, ranges from 0 to 255.
16bit	Unsigned 16-bit integer, ranges from 0 to 65,535.
s16bit	Signed 16-bit integer, ranges from -32,768 to 32,767.
32bit	Unsigned 32-bit integer, ranges from 0 to 4,294,967,295.
s32bit	Signed 32-bit integer, ranges from -2,147,483,648 to 2,147,483,647.
date	Displays the date and time value in the format below: second (1 byte) minute (1 byte) hour (1 byte) day (1 byte) month (1 byte) reserved (1 byte) year (2 bytes)
TIME	Displays the time in the format hh:mm:ss. For network protocols, this data type is transferred as an unsigned 32-bit integer value representing the number of seconds.
ip_address	Unsigned 32-bit integer representing the octets of the IP address.
MAC_ADDRESS	48-bit identifier displayed in XX:XX:XX:XX:XX:XX format.
STRING_ASCII	Text string. For network protocols, this data type is transferred as a string filled with zeros (\0) to the end (maximum parameter size plus one).

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