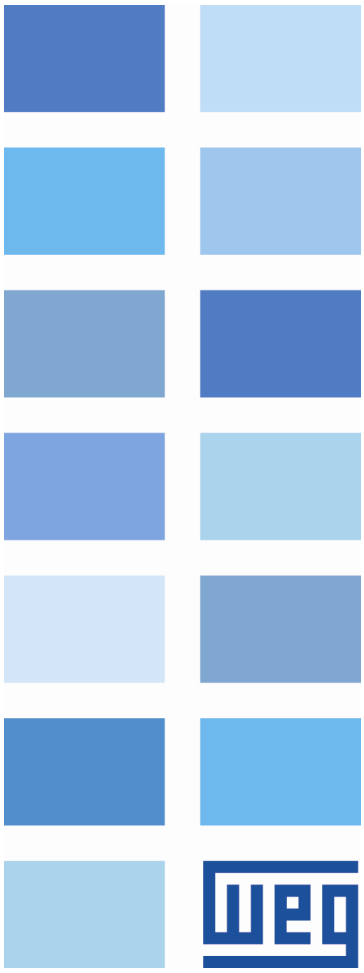
Ethernet

SSW900-CETH-W

User's Guide



Ethernet User's Guide

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ABOUT THE MANUAL

This manual supplies the necessary information for the operation of the SSW900 soft-starter using the Ethernet 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
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 - MODBUS TCP

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.

DOCUMENTS - ETHERNET/IP

The EtherNet/IP protocol was developed based on the following specifications and documents:

Document	Version	Source
CAN Specification	2.0	CiA
Volume One - Common Industrial Protocol (CIP) Specification	3.26	ODVA
Volume Two - EtherNet/IP Adaptation of CIP	1.24	ODVA
Media Planning and Installation Manual - EtherNet/IP	PUB00148R0	ODVA

In order to obtain this documentation, consult ODVA, which is nowadays the organization that keeps, publishes and updates the information related to the EtherNet/IP network.

1 MAIN CHARACTERISTICS

Below are the main characteristics for communication of the soft-starter SSW900 with SSW900-CETH-W 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.
- It has a built-in WEB server (HTTP), which provides access to configuration and parameterization of the equipment.

1.1 MODBUS TCP SPECIFIC CHARACTERISTICS

- Operates as Modbus TCP server.
- The server provides up to 4 simultaneous Modbus TCP connections.
- Allows data communication for equipment operation and parameterization, as well as markers and data used for SSW900 ladder programming.

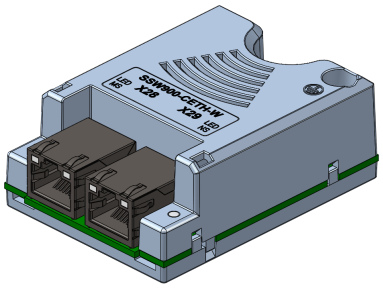
1.2 ETHERNET/IP SPECIFIC CHARACTERISTICS

- It is supplied with an EDS file for the network master configuration.
- Allows up to 50 input words and 20 output words for cyclic data communication.
- Acyclic data available for parameterization.
- Up to 4 CIP Class 1 and Class 3 connections.
- Support to Unconnected Explicit Messages.

2 INTERFACE DESCRIPTION

The SSW900 uses an accessory to provide a Ethernet interface for communication. Characteristics for this interface are presented below.

2.1 ETHERNET ACCESSORY



SSW900-CETH-W:

- Supplied items:
  - Installation guide.
  - Ethernet communication module.

2.2 CONNECTORS

The accessory for Ethernet 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.

2.3 INDICATION LEDS

The Ethernet accessory has a Speed LED and a Link LED indicator in each Ethernet connector, and two bicolor LED for status indication (MS and NS). These LEDs have the following functions and indications.

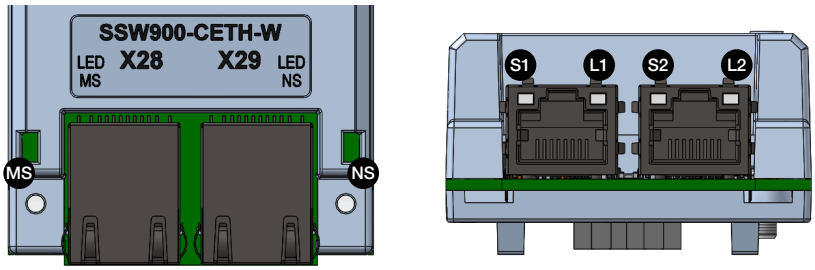


Table 2.1: *Speed LED (S1/S2)*

State	Description
Off	10 Mbps.
Green, solid	100 Mbps.

Table 2.2: *Link LED (L1/L2)*

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

Table 2.3: *Module Status LED (MS)*

Status	Description	Comments
Off	No power	-
Flashing green/red	Equipment performing self-diagnosis	It occurs during initialization.
Green, flashing (500ms ON / 500ms OFF)	Module enabled, waiting detection and connection between module and product.	-
Green, solid	Normal operation.	-
Red, flashing (500ms ON / 500ms OFF)	Recoverable error.	Indicates failure to exchange data between accessory and product.
Red, solid	Fatal error	Reinitializing the equipment is required.

Table 2.4: *Network Status LED (NS)*

Status	Description	Comments
Off	No power	-
Flashing green/red	Equipment performing self-diagnosis	It occurs during initialization.
Green, flashing (500ms ON / 500ms OFF)	Module enabled, waiting for connections.	-
Green, solid	At least one EtherNet/IP connection established.	-
Red, flashing (500ms ON / 500ms OFF)	EtherNet/IP connection timeout.	Indicates Exclusive Owner connection has timed out.

3 ETHERNET NETWORK INSTALLATION

This chapter presents recommendations related to equipment installation in an Ethernet 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 menu C8.5.1:

- 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.

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 of the cable used in the installation:

- 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 Ethernet network, usually the star connection is made using an industrial switch.

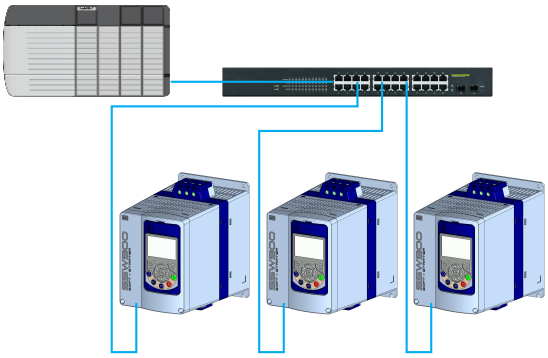


Figure 3.1: *Star topology*

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

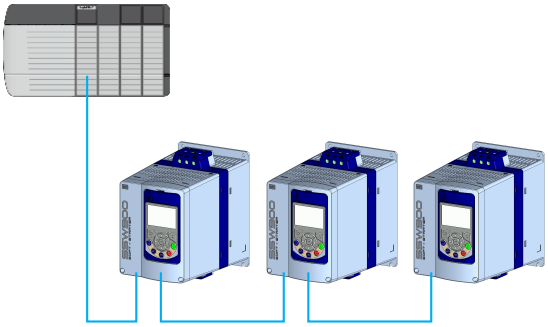


Figure 3.2: *Daisy chain topology*

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%.

S5.8 Ethernet

.1 MBTCP: Communication Status	0 ... 3
.2 MBTCP: Active Connections	0 ... 4
.3 EIP Master Status	0 ... 1
.4 EIP Communication Status	0 ... 4
.5 Interface Status	0 ... 15 Bit
.6 Current IP Address	0.0.0.0 ... 255.255.255.255

Description:
Parameters for configuration and operation of the Ethernet interface.

.1 MBTCP: Communication Status This parameter indicates Modbus TCP communication status of SSW900-CETH-W accessory.

Indication	Description
0 = Disabled	Communication disabled, no accessory.
1 = No connection	Communication enabled, but no active Modbus TCP connection.
2 = Connected	At least one active Modbus TCP connection.
3 = Timeout Error	Device detected timeout at Modbus TCP communication, programmed through C8.5.9.

.2 MBTCP: Active Connections This parameter indicates the number of active Modbus TCP connections.

The equipment allows up to 4 simultaneous Modbus TCP connections. If a connection is inactive for approximately 1 minute, the connection is closed automatically by the server.

.3 EIP Master Status It indicates the EtherNet/IP network master status.

Indication	Description
0 = Run	Reading and writing telegrams are processed normally and updated by the master.
1 = Idle	Only the reading telegrams from the slaves are updated by the master. Writing, in this case, remains disabled.

.4 EIP Communication Status This parameter indicates EtherNet/IP communication status.

Indication	Description
0 = Disabled	No interface, interface disabled or with no IP address configured.
1 = No connection	Communication enabled, but no I/O connections are established with network master.
2 = Connected	Communication enabled and I/O connection established with network master. At this state, device effectively perform data exchange through network.
3 = Timeout in I/O Connection	I/O connection has timed out.
4 = Duplicated IP	Reserved.

.5 Interface Status Parameter for status indication of Ethernet interface.

Bit	Value/Description
Bit 0 Link1	**0:** No link at port 1. **1:** Link active at port 1.
Bit 1 Link2	**0:** No link at port 2. **1:** Link active at port 2.
Bit 2 … 15 Reserved	

.6 Current IP Address It allows viewing the IP address in use by the SSW900-CETH-W accessory.

5 C CONFIGURATIONS

This menu allows the programming of all SSW configuration parameters.

C8 COMMUNICATION

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

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.

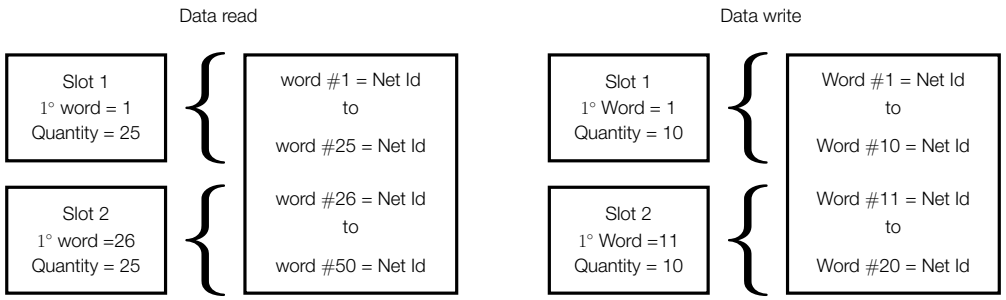


Figure 5.1: *Example of data setting*

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.

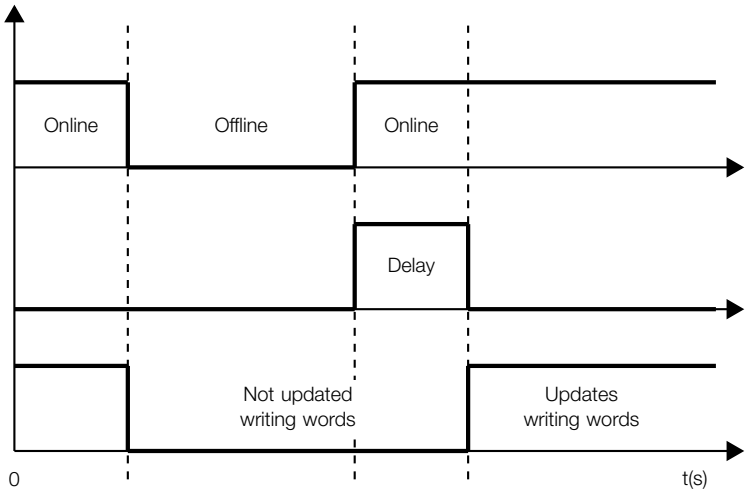


Figure 5.2: *Delay in the update of the I/O words*

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.

C8.5 Ethernet

Parameters for configuration and operation of the Ethernet interface using SSW900-CETH-W accessory.

C8.5 Ethernet

C8.5.1 IP Address Config

Range: 0 ... 1 **Default:** 1

Properties:

Description:
It allows to choose how to set the IP address for SSW900-CETH-W accessory.

Indication	Description
0 = Parameters	The programming of the IP address, configurations of the subnet mask and gateway must be done through the other parameters in the menu C8.5.
1 = DHCP	Enables the DHCP function. The IP address and other network configurations are received from a DHCP server via network.

C8.5 Ethernet

C8.5.2 IP Address

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

Properties:

Description:
It allows programming the IP address for SSW900-CETH-W accessory. It is valid only if C8.5.1 = Parameters.

C8.5 Ethernet

C8.5.3 CIDR Sub-net

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

Properties:

Description:
This parameters allow you to program the sub-net mask for SSW900-CETH-W accessory. It is valid only if C8.5.1 = Parameters.

The following table shows the allowed values for the CIDR notation and equivalent dot notation for the subnet mask:

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.

C8.5 Ethernet

C8.5.4 Gateway

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

Properties:

Description:

These parameters allow you to program the IP address of the default gateway for SSW900-CETH-W accessory. It is valid only if C8.5.1 = Parameters.

C8.5 Ethernet

C8.5.5 MBTCP: TCP Port

Range: 0 ... 65535 **Default:** 502

Properties:

Description:

This parameter allow you to program the TCP port for Modbus TCP connections.

Port 502 is the default TCP port for Modbus TCP connections, and is always available. If it is required to have any additional port to establish Modbus TCP connections, you can program the number of another TCP port in this parameter.

NOTE!
For the changes in this parameter be effective, the equipment must be powered off and on again.

C8.5 Ethernet

C8.5.7 EIP Data Profile

Range: 0 ... 10 **Default:** 10

Properties:

Description:
It allows you to select which instance of the Assembly class is used when exchanging I/O data with EtherNet/IP network master.

The instance of the selected Assembly class defines the format of the cyclic data (I/O) to communicate with the device.

Indication	Description
0 ... 9 = Reserved	Reserved
10 = 110/160-Configurable I/O	Program I/O instances 110/160, containing 1 to 50 reading words + 1 to 20 writing words, configurable through the C8.1 menu.

C8.5.9 Modbus TCP Error

Protection against Modbus TCP communication interruption using SSW900-CETH-W accessory.

In case the product does not receive valid Modbus TCP telegrams for a period longer than the setting at C8.5.9.3, a communication error will be indicated, alarm A149 or fault F149 will be displayed on the HMI, depending on the programming of C8.5.9.1, and the action programmed in C8.5.9.2 will be executed.

Time will start counting from the first valid telegram received.

C8.5.9 Modbus TCP Error

C8.5.9.1 Mode

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

Properties:

Description:
It allows configuring the tripping mode of the protection against interruption in the communication with the network master.

Indication	Description
0 = Inactive	No tripping.
1 = Fault F149	Trips as fault. Disables the motor.
2 = Alarm A149	Trips as alarm. Action described in C8.5.9.2.

C8.5.9 Modbus TCP Error

C8.5.9.2 Alarm Action

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

Properties:

Description:
Action for Modbus TCP communication error.

When programmed the tripping mode of the protection for Alarm option, this action is performed if, after starting the Modbus TCP communication, the product does not receive valid Modbus TCP telegrams for longer than the programmed time.

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 accessory Ethernet. Thus, for the commands to be effective, the equipment must be programmed to be controlled by the network interface used.

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.

C8.5.9 Modbus TCP Error

C8.5.9.3 Timeout

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

Properties:

Description:
Time to detect interruption in Modbus TCP communication.

Time will start counting from the first valid telegram received. This error is only generated for SSW900-CETH-W accessory.

The value 0.0 disables this function.

C8.5.10 EtherNet/IP Error

Protection against interruption in the communication with EtherNet/IP network master using SSW900-CETH-W accessory.

If for some reason there is an interruption in the communication between the product and the network master, a communication error will be indicated, alarm A147 or fault F147 will be shown on the HMI, depending on the programming of C8.5.10.1, and the action programmed in C8.5.10.2 will be executed.

This action is performed in two situations:

- If the communication between product and network master using EtherNet/IP protocol is active and with cyclic data exchange, and this communication is interrupted.
- If the communication between product and network master using EtherNet/IP protocol is active in RUN mode, and the transition to IDLE mode occurs.

C8.5.10 EtherNet/IP Error

C8.5.10.1 Mode

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

Properties:

Description:
It allows configuring the tripping mode of the protection against interruption in the communication with the network master.

Indication	Description
0 = Inactive	No tripping.
1 = Fault F147	Trips as fault. Disables the motor.
2 = Alarm A147	Trips as alarm. Action described in C8.5.10.2.

C8.5.10 EtherNet/IP Error

C8.5.10.2 Alarm Action

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

Properties:

Description:
Action for the EtherNet/IP Offline communication alarm.

When programmed the tripping mode of the protection for Alarm option, this action is performed if, after starting communication with network master, this communication is interrupted.

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 accessory Ethernet. Thus, for the commands to be effective, the equipment must be programmed to be controlled by the network interface used.

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.

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 12 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 12.2 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 12.

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 12.2. 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 12.2:

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 7.1 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 12.

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 12.2. 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 12.2:

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 7.2 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 12.

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 OPERATION IN THE ETHERNET/IP NETWORK

7.1 CYCLIC DATA

Cyclic data is the data normally used for status monitoring and equipment control. For EtherNet/IP protocol, the interface supports an I/O connection as configured through instances of the Assembly class available for the product.

The instances of the Assembly class are used to configure the I/O data communicated with the master of EtherNet/IP network. According to the selected profile, it is possible to define the format, size and content of the I/O data. It is possible to select the I/O instance used for communication through menu C8.5.7.

For the SSW900 soft-starter, only one instance of the Assembly class is available. It is necessary the configuration to be made both at the slave and master.

7.1.1 Instances 110/160: Configurable I/O data

Using this profile, it is possible to communcate up to 50 input words and 20 output words, configured through the I/O data in menu C8.1. There are no pre-defined words, and the entire I/O area can be configured as desired.

7.1.2 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 12.2. 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 12.2:

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 7.1 presents the configuration parameters of the words and the content of the reading words.

Table 7.1: *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 12.

7.1.3 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 12.2. 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 12.2:

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 7.2 presents the configuration parameters of the words and the content of the writing words.

Table 7.2: *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 12.

7.2 ACYCLIC DATA

In addition to the cyclic data, the interface also provides acyclic data via *explicit messaging*. Using this type of communication, you can access any equipment parameter. Access to this type of data is commonly done using instructions for reading or writing data, which should indicate the class, instance, and attribute to the desired parameter. The table 7.10 describes how to address the parameters for SSW900 soft-starter.

7.3 EDS FILE

Each device on an EtherNet/IP network has an EDS configuration file, which contains information about the device functions on the network. This file is used by a master or configuration software to program devices present at EtherNet/IP network.

The EDS file is available from WEG website (http://www.weg.net). It is important to note if the EDS configuration file is compatible with the firmware version of the SSW900 soft-starter.

7.4 SUPPORTED OBJECT CLASSES

Any EtherNet/IP equipment is modeled as a set of objects. The objects are responsible for defining the function that each device will have. The following sections present detailed information about these object classes.

7.4.1 Identity Class (01h)

Provides general information about the device identity such as VendorID, Product Name, Serial Number, etc.. The following attributes are implemented:

Table 7.3: Identity Class instance attributes

Attribute	Method	Name	Default	Description
1	GET	Vendor ID	355h	Manufacturer identifier.
2	GET	Device Type	2bh	Product Type.
3	GET	Product Code	1700h	Product Code.
4	GET	Revision		Firmware revision.
5	GET	Status		Device status.
6	GET	Serial Number		Serial Number.
7	GET	Product Name	SSW900	Product name.

7.4.2 Message Router Class (02h)

Provides information on the explicit message router object. This class does not have any attribute implemented in the SSW900.

7.4.3 Assembly Class (04h)

This class is responsible for grouping several attributes in only one connection. Only the attribute Data (3) is implemented in the SSW900.

Table 7.4: Assembly class instance attributes

Atribute	Method	Name	Description
3	GET	Data	Data contained in the assembly object.

The Assembly class contains the following instances in the SSW900:

Table 7.5: Assembly class instances

Instance	Size	Description
110	up to 40 bytes	Producing Instance.
160	up to 100 bytes	Consuming Instance.

7.4.4 TCP/IP Interface Class (F5h)

The following attributes have been implemented:

Table 7.6: TCP/IP Interface Class attributes

Attribute	Method	Name	Min/Max	Description
1	GET	Revision	1 - 65535	Revision of the TCP/IP Interface Object Class Definition upon which the implementation is based.

Table 7.7: TCP/IP Interface Class instance attributes

Attribute	Method	Name	Min/Max	Default	Description
1	GET	Status	-	-	
2	GET	Configuration Capability	-	-	
3	GET/SET	Configuration Control	-	-	
4	GET	Physical Link Object	-	-	
5	GET/SET	Interface Configuration	-	-	
6	GET/SET	Host Name	-	-	
13	GET	Encapsulation Inactivity Timeout	-	-	

7.4.5 Ethernet Link Class (F6h)

The following attributes have been implemented:

Table 7.8: Ethernet Link Class attributes

Attribute	Method	Name	Min/Max	Description
1	GET	Revision	1 - 65535	Revision of the Ethernet Link Object Class Definition upon which the implementation is based.

Table 7.9: Ethernet Link Class instance attributes

Attribute	Method	Name	Min/Max	Default	Description
1	GET	Interface Speed	-	-	
2	GET	Interface Flags	-	-	
3	GET	Physical Address	-	-	
11	GET	Interface Capability	-	-	

7.4.6 Manufacturer Specific Class (64h)

For SSW900 soft-starter, the manufacturer specific classes are used for mapping all device parameters. These classes allow the user to read from and write to any parameter through the network. For this, EtherNet/IP CIP Class 3 messages or Unconnected Explicit messages can be used.

SSW900 uses class 100 for parameter access, and the parameter number is defined according to instance and attribute, as shown in table 7.10:

Table 7.10: Manufacturer Specific Class

Class	Instance	Attributes	Accessed Parameters
Classe 100 (64h) (Vendor Specific)	1	100 ... 199	Parameters with Net ID 0 - 99
Classe 100 (64h) (Vendor Specific)	2	100 ... 199	Parameters with Net ID 100 - 199
Classe 100 (64h) (Vendor Specific)	3	100 ... 199	Parameters with Net ID 200 - 299
Classe 100 (64h) (Vendor Specific)	4	100 ... 199	Parameters with Net ID 300 - 399
Classe 100 (64h) (Vendor Specific)	5	100 ... 199	Parameters with Net ID 400 - 499
Classe 100 (64h) (Vendor Specific)	6	100 ... 199	Parameters with Net ID 500 - 599
⋮	⋮	⋮	⋮
Classe 100 (64h) (Vendor Specific)	10	100 ... 199	Parameters with Net ID 900 - 999
Classe 100 (64h) (Vendor Specific)	11	100 ... 199	Parameters with Net ID 1000 - 1099
⋮	⋮	⋮	⋮

For this list, status and diagnostics objects typically allow read-only access, while configuration objects allow read/write access:

- For read access (Get Attribute Single), the request must contain 1 byte with the size in bytes of the data read.
- For write access (Set Attribute Single), the request must contain the number of bytes written according to the size of the data accessed.

Examples:

- Net ID 4 - S1.2.4 Main Line Voltage Average: class 64h, instance 1, attribute 104, size 2 bytes.
- Net ID 680 - S3.1.3.1 Status Word SSW: class 64h, instance 7, attribute 180, size 2 bytes.
- Net ID 685 - S5.2.5 Command Word Slot1: class 64h, instance 7, attribute 185, size 2 bytes.

NOTE!

- For instances of this class, the SSW900 uses only attribute 5.
- The data is transmitted as an integer value, without the indication of the decimal places.
- To obtain the network address (Net Id) used to identify the instance number of the parameters, as well as the size of the data accessed, refer to the item 12.

8 WEB SERVER

Ethernet interface also provides a WEB server with a simple page to access SSW900 soft-starter data. 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.

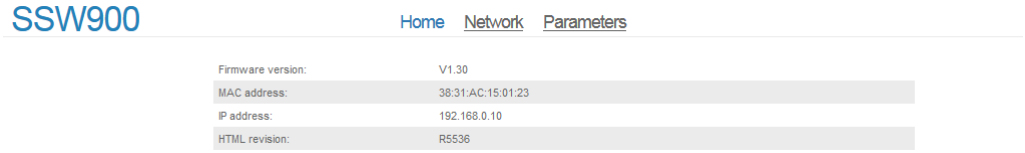


Figure 8.1: *WEB page*

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 ”Parameters” link.

9 STARTUP GUIDE - MODBUS TCP

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.

9.1 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. 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.

9.2 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 C8.5.
4. Configure the timeout for the Modbus TCP communication in C8.5.9.3.
5. Program the desired action for the equipment in case of communication fault in C8.5.9.
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).

9.3 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 12.
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 C8.5.9.3.

9.4 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 S5.8.1 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.

10 STARTUP GUIDE - ETHERNET/IP

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

10.1 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.

10.2 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 C8.5.
4. Program the desired action for the equipment in case of communication fault in C8.5.10.
5. Define which data will be read and written at soft-starter SSW900 using menu C8.1. 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).

10.3 CONFIGURING THE MASTER

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. Load the EDS file[1] to the list of devices in the network configuration tool.
2. Select SSW900 soft-starter from the available list of devices on the network configuration tool. This can be done manually or automatically, if allowed by the tool. The EtherNet/IP module is described in the network as "SSW900".
3. For the master configuration, in addition to the IP address used by the EtherNet/IP module, you must indicate the number of instances of I/O and the amount of data exchanged with the master in each instance. For the communication module for EtherNet/IP, the following values must be programmed:
   - Input instance: 160
   - Output instance: 110

Once configured, the NS LED will be on in green. It is in this condition that cyclic data exchange effectively occurs between the slave and the master of the network.

[1] The EDS file is available from WEG website (http://www.weg.net). It is important to note if the EDS configuration file is compatible with the firmware version of the SSW900 soft-starter.

10.4 COMMUNICATION STATUS

Once the network is assembled and the master 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 S5.8.3 indicates the status of communication between the device and the network master.

The master of the network must also supply information about the communication with the slave.

10.5 OPERATION USING PROCESS DATA

Once the communication is established, the data mapped in the I/O area is automatically updated between master and slave. Among the main parameters that can be used to control the device, we can mention:

- S3.1.3.1 Status Word SSW.
- S5.2.5 Command Word Slot1.
- S5.2.6 Command Word Slot2.

It is important to know these parameters to program the master as desired for the application.

10.6 ACCESS TO PARAMETERS – ACYCLIC MESSAGES

Besides the I/O data (cyclic) communication, the EtherNet/IP protocol also defines a kind of acyclic telegram (*explicit messages*), used especially in asynchronous tasks, such as parameter setting and configuration of the equipment.

The EDS file provides the full parameter list of the equipment, which can be accessed via *explicit messages*. The item 7.2 describes how to address the parameters of the soft-starter SSW900 via acyclic messages.

11 FAULTS AND ALARMS

Fault/Alarm	Description	Possible Causes
F147/A147: EtherNet/IP Communication Offline	It indicates communication error with EtherNet/IP master. It occurs when, for any reason, after the cyclic communication of the master with the product is started, this communication is interrupted. This is detected if the I/O Exclusive Owner connection times out, or if master goes to IDLE state. Communication interruption is identified .	● Check the status of the network master. ● Check the network installation, broken cable or failed/bad contact in the network connections.
F149/A149: Timeout Modbus TCP	It indicates that the device stopped receiving valid telegrams for a period longer than the setting in C8.5.9.3. The time counting starts as soon as it receives the first valid telegram.	● Check network installation, broken cable or fault/poor contact on the connections with the network, grounding. ● Ensure the Modbus TCP client always sends telegrams to the equipment in a time shorter than the setting in C8.5.9.3. ● Disable this function in C8.5.9.3.

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12.2 PARAMETERS

Table 12.2: *Characteristics of the parameters for the communication protocol*

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
S1 Status\Measurements										
S1.1	Current									
S1.1.1	R Phase	0.0 to 14544.0 A	1	64h	01h	7Eh	UDINT	26	32bit	2
S1.1.2	S Phase	0.0 to 14544.0 A	1	64h	01h	80h	UDINT	28	32bit	2
S1.1.3	T Phase	0.0 to 14544.0 A	1	64h	01h	82h	UDINT	30	32bit	2
S1.1.4	Average	0.0 to 14544.0 A	1	64h	01h	7Ch	UDINT	24	32bit	2
S1.1.5	Motor %In	0.0 to 999.9 %	1	64h	01h	66h	UINT	2	16bit	1
S1.1.6	SSW %In	0.0 to 999.9 %	1	64h	01h	65h	UINT	1	16bit	1
S1.2	Main Line Voltage									
S1.2.1	R-S Line	0.0 to 999.9 V	1	64h	01h	85h	UINT	33	16bit	1
S1.2.2	S-T Line	0.0 to 999.9 V	1	64h	01h	86h	UINT	34	16bit	1
S1.2.3	T-R Line	0.0 to 999.9 V	1	64h	01h	87h	UINT	35	16bit	1
S1.2.4	Average	0.0 to 999.9 V	1	64h	01h	68h	UINT	4	16bit	1
S1.2.5	Motor %Vn	0.0 to 999.9 %	1	64h	01h	67h	UINT	3	16bit	1
S1.2.6	SSW %Vn	0.0 to 999.9 %	1	64h	01h	69h	UINT	5	16bit	1
S1.3	Output Voltage									
S1.3.1	Average	0.0 to 999.9 V	1	64h	01h	6Bh	UINT	7	16bit	1
S1.3.2	Motor %Vn	0.0 to 999.9 %	1	64h	01h	6Ah	UINT	6	16bit	1
S1.4	SCR Blocking Voltage									
S1.4.1	R-U Blocking	0.0 to 999.9 V	1	64h	01h	79h	UINT	21	16bit	1
S1.4.2	S-V Blocking	0.0 to 999.9 V	1	64h	01h	7Ah	UINT	22	16bit	1
S1.4.3	T-W Blocking	0.0 to 999.9 V	1	64h	01h	7Bh	UINT	23	16bit	1
S1.5	Output Power & P.F.									
S1.5.1	Active	0.0 to 11700.0 kW	1	64h	01h	6Eh	UDINT	10	32bit	2
S1.5.2	Apparent	0.0 to 11700.0 kVA	1	64h	01h	70h	UDINT	12	32bit	2
S1.5.3	Reactive	0.0 to 11700.0 kVAr	1	64h	01h	72h	UDINT	14	32bit	2
S1.5.4	P. F.	0.00 to 1.00	2	64h	01h	6Ch	USINT	8	8bit	1
S1.6	P.L.L.									
S1.6.1	Status	0 = Off 1 = Ok		64h	01h	74h	USINT	16	enum	1
S1.6.2	Frequency	0.0 to 99.9 Hz	1	64h	01h	75h	UINT	17	16bit	1
S1.6.3	Sequence	0 = Invalid 1 = RST / 123 2 = RTS / 132		64h	01h	76h	USINT	18	enum	1
S1.7	Motor Torque									

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
S1.7.1	Motor %Tn	0.0 to 999.9 %	1	64h	01h	6Dh	UINT	9	16bit	1
S1.8	Control Voltage									
S1.8.1	Input	0.0 to 999.9 V	1	64h	01h	ABh	UINT	71	16bit	1
S1.8.2	+5V	0.00 to 9.99 V	2	64h	01h	ACh	UINT	72	16bit	1
S1.8.3	+12V	0.0 to 99.9 V	1	64h	01h	ADh	UINT	73	16bit	1
S1.8.4	+Vbat	0.00 to 9.99 V	2	64h	01h	AFh	UINT	75	16bit	1
S1.8.5	+48V	0.0 to 99.9 V	1	64h	01h	B0h	UINT	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		64h	07h	B1h	WORD	677	16bit	1
S2.1.2	Outputs	Bit 0 = DO1 Bit 1 = DO2 Bit 2 = DO3 Bit 3 ... 15 = Reserved		64h	07h	B2h	WORD	678	16bit	1
S2.2	Analog Output									
S2.2.1	Percent	0.00 to 100.00 %	2	64h	07h	ADh	UINT	673	16bit	1
S2.2.2	Current	0.000 to 20.000 mA	3	64h	07h	AEh	UINT	674	16bit	1
S2.2.3	Voltage	0.000 to 10.000 V	3	64h	07h	AFh	UINT	675	16bit	1
S2.2.4	10 bits	0 to 1023	0	64h	07h	B0h	UINT	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		64h	07h	B3h	USINT	679	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	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		64h	03h	84h	USINT	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		64h	07h	B4h	WORD	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		64h	07h	C0h	WORD	692	16bit	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	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	64h	04h	80h	UINT	328	16bit	1
S3.2.2	Details									
S3.2.2.1	Control 1 V	0.00 to 99.99	2	64h	04h	82h	UINT	330	16bit	1
S3.2.2.2	Control 1 rev.	-32768 to 32767	0	64h	04h	7Fh	INT	327	s16bit	1
S3.2.2.3	Bootloader V	0.00 to 99.99	2	64h	04h	81h	UINT	329	16bit	1
S3.2.2.4	Bootloader rev.	-32768 to 32767	0	64h	04h	7Bh	INT	323	s16bit	1
S3.2.2.5	HMI rev.	-32768 to 32767	0	64h	04h	7Ah	INT	322	s16bit	1
S3.2.2.6	Control 2 V	0.00 to 99.99	2	64h	04h	83h	UINT	331	16bit	1
S3.2.2.7	Control 2 rev.	-32768 to 32767	0	64h	04h	7Eh	INT	326	s16bit	1
S3.2.2.8	Accessory 1 V	0.00 to 99.99	2	64h	04h	85h	UINT	333	16bit	1
S3.2.2.9	Accessory 1 rev.	-32768 to 32767	0	64h	04h	7Ch	INT	324	s16bit	1
S3.2.2.10	Accessory 2 V	0.00 to 99.99	2	64h	04h	86h	UINT	334	16bit	1
S3.2.2.11	Accessory 2 rev.	-32768 to 32767	0	64h	04h	7Dh	INT	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		64h	03h	C2h	USINT	294	enum	1
S3.3.2	Voltage	0 = 220 to 575 V 1 = 380 to 690 V		64h	03h	C4h	USINT	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		64h	03h	C5h	USINT	297	enum	1
S3.3.4	Serial Number	0 to 4294967295	0	64h	03h	C6h	UDINT	298	32bit	2
S3.4	Fan Status									
S3.4.1	Actual	0 = Off 1 = On		64h	03h	C1h	USINT	293	enum	1
S3.5	Accessories									

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	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.		64h	04h	87h	USINT	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.		64h	04h	88h	USINT	336	enum	1
S4 Status\Temperatures										
S4.1	SCRs Temperature									
S4.1.1	Actual	-22 to 260 °C	0	64h	01h	A0h	INT	60	s16bit	1
S4.2	Thermal Class Status									
S4.2.1	Of Maximum	0.0 to 100.0 %	1	64h	01h	96h	UINT	50	16bit	1
S4.3	Motor Temperature									
S4.3.1	Channel 1	-20 to 260 °C	0	64h	01h	A3h	INT	63	s16bit	1
S4.3.2	Channel 2	-20 to 260 °C	0	64h	01h	A4h	INT	64	s16bit	1
S4.3.3	Channel 3	-20 to 260 °C	0	64h	01h	A5h	INT	65	s16bit	1
S4.3.4	Channel 4	-20 to 260 °C	0	64h	01h	A6h	INT	66	s16bit	1
S4.3.5	Channel 5	-20 to 260 °C	0	64h	01h	A7h	INT	67	s16bit	1
S4.3.6	Channel 6	-20 to 260 °C	0	64h	01h	A8h	INT	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		64h	07h	B4h	WORD	680	16bit	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	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		64h	07h	B7h	WORD	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		64h	07h	B5h	WORD	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		64h	07h	B6h	WORD	682	16bit	1
S5.2.4	SoftPLC			64h	07h	B8h	WORD	684	16bit	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	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		64h	07h	B9h	WORD	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		64h	07h	BAh	WORD	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		64h	07h	C3h	WORD	695	16bit	1
S5.3.2	Value for AO									
S5.3.2.1	AO in 10 bits	0 to 1023	0	64h	07h	C4h	UINT	696	16bit	1
S5.4	RS485 Serial									
S5.4.1	Interface Status	0 = Off 1 = On 2 = Timeout Error		64h	08h	87h	USINT	735	enum	1
S5.4.2	Received Telegram	0 to 65535	0	64h	08h	88h	UINT	736	16bit	1
S5.4.3	Transmitted Telegram	0 to 65535	0	64h	08h	89h	UINT	737	16bit	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
S5.4.4	Telegram with Error	0 to 65535	0	64h	08h	8Ah	UINT	738	16bit	1
S5.4.5	Reception Errors	0 to 65535	0	64h	08h	8Bh	UINT	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 ... 25 = Reserved		64h	08h	96h	USINT	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		64h	08h	97h	USINT	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		64h	07h	C0h	WORD	692	16bit	1
S5.6.2	Control	Bit 0 = Abort Startup Bit 1 ... 15 = Reserved		64h	07h	C1h	WORD	693	16bit	1
S5.7	CANopen/DeviceNet									
S5.7.1	CAN Controller Status	0 = Disabled		64h	08h	69h	USINT	705	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
		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	64h	08h	6Ah	UINT	706	16bit	1
S5.7.3	Transmitted Telegram	0 to 65535	0	64h	08h	6Bh	UINT	707	16bit	1
S5.7.4	Bus Off Counter	0 to 65535	0	64h	08h	6Ch	UINT	708	16bit	1
S5.7.5	Lost Messages	0 to 65535	0	64h	08h	6Dh	UINT	709	16bit	1
S5.7.6	CANopen Comm. Status	0 = Disabled 1 = Reserved 2 = Comm. Enabled 3 = ErrorCtrl.Enab 4 = Guarding Error 5 = HeartbeatError		64h	08h	79h	USINT	721	enum	1
S5.7.7	CANopen Node State	0 = Disabled 1 = Initialization 2 = Stopped 3 = Operational 4 = PreOperational		64h	08h	7Ah	USINT	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		64h	08h	74h	USINT	716	enum	1
S5.7.9	DeviceNet Master Status	0 = Run 1 = Idle		64h	08h	75h	USINT	717	enum	1
S5.8	Ethernet									
S5.8.1	MBTCP: Communication Status	0 = Disabled 1 = No connection 2 = Connected 3 = Timeout Error		64h	09h	A0h	USINT	860	enum	1
S5.8.2	MBTCP: Active Connections	0 to 4	0	64h	09h	A3h	USINT	863	8bit	1
S5.8.3	EIP Master Status			64h	09h	A9h	USINT	869	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
		0 = Run 1 = Idle								
S5.8.4	EIP Communication Status	0 = Disabled 1 = No connection 2 = Connected 3 = Timeout in I/O Connection 4 = Duplicated IP		64h	09h	AAh	USINT	870	enum	1
S5.8.5	Interface Status	Bit 0 = Link1 Bit 1 = Link2 Bit 2 ... 15 = Reserved		64h	09h	BDh	WORD	889	16bit	1
S5.8.6	Current IP Address	0.0.0.0 to 255.255.255.255		64h	09h	92h	UDINT	846	ip_address	2
S5.9	Bluetooth									
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		64h	0Ch	64h	USINT	1100	enum	1
S6.2	Scan Cycle Time									
S6.2.1	Actual	0 to 65535 ms	0	64h	0Ch	66h	UINT	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		64h	07h	C5h	WORD	697	16bit	1
S6.3.2	AO Value									
S6.3.2.1	AO in 10 bits	0 to 1023	0	64h	07h	C6h	UINT	698	16bit	1
S6.4	Parameter									
S6.4.1	User #1	-10000 to 10000	0	64h	0Ch	6Eh	DINT	1110	s32bit	2
S6.4.2	User #2	-10000 to 10000	0	64h	0Ch	70h	DINT	1112	s32bit	2
S6.4.3	User #3	-10000 to 10000	0	64h	0Ch	72h	DINT	1114	s32bit	2
S6.4.4	User #4	-10000 to 10000	0	64h	0Ch	74h	DINT	1116	s32bit	2
S6.4.5	User #5	-10000 to 10000	0	64h	0Ch	76h	DINT	1118	s32bit	2
S6.4.6	User #6	-10000 to 10000	0	64h	0Ch	78h	DINT	1120	s32bit	2
S6.4.7	User #7	-10000 to 10000	0	64h	0Ch	7Ah	DINT	1122	s32bit	2
S6.4.8	User #8	-10000 to 10000	0	64h	0Ch	7Ch	DINT	1124	s32bit	2

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
S6.4.9	User #9	-10000 to 10000	0	64h	0Ch	7Eh	DINT	1126	s32bit	2
S6.4.10	User #10	-10000 to 10000	0	64h	0Ch	80h	DINT	1128	s32bit	2
S6.4.11	User #11	-10000 to 10000	0	64h	0Ch	82h	DINT	1130	s32bit	2
S6.4.12	User #12	-10000 to 10000	0	64h	0Ch	84h	DINT	1132	s32bit	2
S6.4.13	User #13	-10000 to 10000	0	64h	0Ch	86h	DINT	1134	s32bit	2
S6.4.14	User #14	-10000 to 10000	0	64h	0Ch	88h	DINT	1136	s32bit	2
S6.4.15	User #15	-10000 to 10000	0	64h	0Ch	8Ah	DINT	1138	s32bit	2
S6.4.16	User #16	-10000 to 10000	0	64h	0Ch	8Ch	DINT	1140	s32bit	2
S6.4.17	User #17	-10000 to 10000	0	64h	0Ch	8Eh	DINT	1142	s32bit	2
S6.4.18	User #18	-10000 to 10000	0	64h	0Ch	90h	DINT	1144	s32bit	2
S6.4.19	User #19	-10000 to 10000	0	64h	0Ch	92h	DINT	1146	s32bit	2
S6.4.20	User #20	-10000 to 10000	0	64h	0Ch	94h	DINT	1148	s32bit	2
S6.4.21	User #21	-10000 to 10000	0	64h	0Ch	96h	DINT	1150	s32bit	2
S6.4.22	User #22	-10000 to 10000	0	64h	0Ch	98h	DINT	1152	s32bit	2
S6.4.23	User #23	-10000 to 10000	0	64h	0Ch	9Ah	DINT	1154	s32bit	2
S6.4.24	User #24	-10000 to 10000	0	64h	0Ch	9Ch	DINT	1156	s32bit	2
S6.4.25	User #25	-10000 to 10000	0	64h	0Ch	9Eh	DINT	1158	s32bit	2
S6.4.26	User #26	-10000 to 10000	0	64h	0Ch	A0h	DINT	1160	s32bit	2
S6.4.27	User #27	-10000 to 10000	0	64h	0Ch	A2h	DINT	1162	s32bit	2
S6.4.28	User #28	-10000 to 10000	0	64h	0Ch	A4h	DINT	1164	s32bit	2
S6.4.29	User #29	-10000 to 10000	0	64h	0Ch	A6h	DINT	1166	s32bit	2
S6.4.30	User #30	-10000 to 10000	0	64h	0Ch	A8h	DINT	1168	s32bit	2
S6.4.31	User #31	-10000 to 10000	0	64h	0Ch	AAh	DINT	1170	s32bit	2
S6.4.32	User #32	-10000 to 10000	0	64h	0Ch	ACh	DINT	1172	s32bit	2
S6.4.33	User #33	-10000 to 10000	0	64h	0Ch	AEh	DINT	1174	s32bit	2
S6.4.34	User #34	-10000 to 10000	0	64h	0Ch	B0h	DINT	1176	s32bit	2
S6.4.35	User #35	-10000 to 10000	0	64h	0Ch	B2h	DINT	1178	s32bit	2
S6.4.36	User #36	-10000 to 10000	0	64h	0Ch	B4h	DINT	1180	s32bit	2
S6.4.37	User #37	-10000 to 10000	0	64h	0Ch	B6h	DINT	1182	s32bit	2
S6.4.38	User #38	-10000 to 10000	0	64h	0Ch	B8h	DINT	1184	s32bit	2
S6.4.39	User #39	-10000 to 10000	0	64h	0Ch	BAh	DINT	1186	s32bit	2
S6.4.40	User #40	-10000 to 10000	0	64h	0Ch	BCh	DINT	1188	s32bit	2
S6.4.41	User #41	-10000 to 10000	0	64h	0Ch	BEh	DINT	1190	s32bit	2
S6.4.42	User #42	-10000 to 10000	0	64h	0Ch	C0h	DINT	1192	s32bit	2
S6.4.43	User #43	-10000 to 10000	0	64h	0Ch	C2h	DINT	1194	s32bit	2
S6.4.44	User #44	-10000 to 10000	0	64h	0Ch	C4h	DINT	1196	s32bit	2
S6.4.45	User #45	-10000 to 10000	0	64h	0Ch	C6h	DINT	1198	s32bit	2
S6.4.46	User #46	-10000 to 10000	0	64h	0Dh	64h	DINT	1200	s32bit	2
S6.4.47	User #47	-10000 to 10000	0	64h	0Dh	66h	DINT	1202	s32bit	2
S6.4.48	User #48	-10000 to 10000	0	64h	0Dh	68h	DINT	1204	s32bit	2
S6.4.49	User #49	-10000 to 10000	0	64h	0Dh	6Ah	DINT	1206	s32bit	2
S6.4.50	User #50	-10000 to 10000	0	64h	0Dh	6Ch	DINT	1208	s32bit	2

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
D1 Diagnostics\Fault										
D1.1	Actual									
D1.1.1	Fxxx	0 to 999	0	64h	01h	BEh	UINT	90	16bit	1
D1.2	Fault History									
D2 Diagnostics\Alarms										
D2.1	Actual									
D2.1.1	Axxx 1	0 to 999	0	64h	01h	BFh	UINT	91	16bit	1
D2.1.2	Axxx 2	0 to 999	0	64h	01h	C0h	UINT	92	16bit	1
D2.1.3	Axxx 3	0 to 999	0	64h	01h	C1h	UINT	93	16bit	1
D2.1.4	Axxx 4	0 to 999	0	64h	01h	C2h	UINT	94	16bit	1
D2.1.5	Axxx 5	0 to 999	0	64h	01h	C3h	UINT	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	64h	01h	88h	UDINT	36	32bit	2
D4.1.2	Average	0.0 to 14544.0 A	1	64h	01h	8Ah	UDINT	38	32bit	2
D4.2	Real Start Time									
D4.2.1	Actual	0 to 999 s	0	64h	01h	94h	UINT	48	16bit	1
D4.2.2	Final	0 to 999 s	0	64h	01h	95h	UINT	49	16bit	1
D4.3	Current Full Voltage									
D4.3.1	Maximum	0.0 to 14544.0 A	1	64h	01h	8Ch	UDINT	40	32bit	2
D4.4	Main Line Voltage									
D4.4.1	Maximum	0.0 to 999.9 V	1	64h	01h	9Ah	UINT	54	16bit	1
D4.4.2	Minimun	0.0 to 999.9 V	1	64h	01h	9Bh	UINT	55	16bit	1
D4.5	Main Line Frequency									
D4.5.1	Maximum	0.0 to 99.9 Hz	1	64h	01h	9Ch	UINT	56	16bit	1
D4.5.2	Minimum	0.0 to 99.9 Hz	1	64h	01h	9Dh	UINT	57	16bit	1
D4.6	kWh Counter									
D4.6.1	Total	0.0 to 429496729.5 kWh	1	64h	01h	98h	UDINT	52	32bit	2
D4.7	Number Start									
D4.7.1	Total	0 to 65535	0	64h	01h	9Fh	UINT	59	16bit	1
D5 Diagnostics\Temperatures										
D5.1	SCRs Maximum									
D5.1.1	Total	-22 to 260 °C	0	64h	01h	B1h	INT	77	s16bit	1
D5.2	Motor Maximum									
D5.2.1	Channel 1	-20 to 260 °C	0	64h	01h	B4h	INT	80	s16bit	1
D5.2.2	Channel 2	-20 to 260 °C	0	64h	01h	B5h	INT	81	s16bit	1
D5.2.3	Channel 3	-20 to 260 °C	0	64h	01h	B6h	INT	82	s16bit	1
D5.2.4	Channel 4	-20 to 260 °C	0	64h	01h	B7h	INT	83	s16bit	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
D5.2.5	Channel 5	-20 to 260 °C	0	64h	01h	B8h	INT	84	s16bit	1
D5.2.6	Channel 6	-20 to 260 °C	0	64h	01h	B9h	INT	85	s16bit	1
D6 Diagnostics\Hours Control										
D6.1	Powered	0 to 4294967295 s	0	64h	01h	8Eh	UDINT	42	TIME	2
D6.2	Enabled	0 to 4294967295 s	0	64h	01h	90h	UDINT	44	TIME	2
D6.3	Fan ON	0 to 4294967295 s	0	64h	01h	92h	UDINT	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		64h	03h	66h	USINT	202	enum	1
C1.2	Initial Start Voltage	25 to 90 %	0	64h	02h	65h	USINT	101	8bit	1
C1.3	Maximum Start Time	1 to 999 s	0	64h	02h	66h	UINT	102	16bit	1
C1.4	Start End Detection	0 = Time 1 = Automatic		64h	02h	6Ah	USINT	106	enum	1
C1.5	Initial Current Ramp	150 to 500 %	0	64h	02h	6Fh	UINT	111	16bit	1
C1.6	Current Ramp Time	1 to 99 %	0	64h	02h	70h	USINT	112	8bit	1
C1.7	Current Limit	150 to 500 %	0	64h	02h	6Eh	UINT	110	16bit	1
C1.8	Start Torque Chara.	1 = Constant 2 = Linear 3 = Square		64h	02h	78h	USINT	120	enum	1
C1.9	Initial Start Torque	10 to 300 %	0	64h	02h	79h	UINT	121	16bit	1
C1.10	End Start Torque	10 to 300 %	0	64h	02h	7Ah	UINT	122	16bit	1
C1.11	Minimun Start Torque	10 to 300 %	0	64h	02h	7Bh	UINT	123	16bit	1
C1.12	Min.Start Torq. Time	1 to 99 %	0	64h	02h	7Ch	USINT	124	8bit	1
C1.13	Stop Time	0 to 999 s	0	64h	02h	68h	UINT	104	16bit	1
C1.14	Step Down Volt. Stop	60 to 100 %	0	64h	02h	67h	USINT	103	8bit	1
C1.15	End Voltage Stop	30 to 55 %	0	64h	02h	69h	USINT	105	8bit	1
C1.16	Stop Torque Characte.	1 = Constant 2 = Linear 3 = Square		64h	02h	7Dh	USINT	125	enum	1
C1.17	End Stop Torque	10 to 100 %	0	64h	02h	7Eh	USINT	126	8bit	1
C1.18	Minimum Stop Torque	10 to 100 %	0	64h	02h	7Fh	USINT	127	8bit	1
C1.19	Min. Stop Torque Time	1 to 99 %	0	64h	02h	80h	USINT	128	8bit	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
C2 Configurations\Nominal Motor Data										
C2.1	Voltage	1 to 999 V	0	64h	05h	64h	UINT	400	16bit	1
C2.2	Current	0.1 to 2424.0 A	1	64h	05h	65h	UINT	401	16bit	1
C2.3	Speed	1 to 3600 rpm	0	64h	05h	66h	UINT	402	16bit	1
C2.4	Power	0.1 to 1950.0 kW	1	64h	05h	68h	UINT	404	16bit	1
C2.5	P.F. Power Factor	0.01 to 1.00	2	64h	05h	69h	USINT	405	8bit	1
C2.6	S.F. Service Factor	0.01 to 1.50	2	64h	05h	6Ah	USINT	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		64h	03h	78h	USINT	220	enum	1
C3.2	LOC Command	0 = HMI Keys 1 = DIx 2 = USB 3 = SoftPLC 4 = Slot 1 5 = Slot 2		64h	03h	81h	USINT	229	enum	1
C3.3	REM Command	0 = HMI Keys 1 = DIx 2 = USB 3 = SoftPLC 4 = Slot 1 5 = Slot 2		64h	03h	82h	USINT	230	enum	1
C3.4	Commands Copy	0 = No 1 = Yes		64h	03h	83h	USINT	231	enum	1
C4 Configurations\I/O										
C4.1	Digital Inputs									

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
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		64h	03h	A3h	USINT	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		64h	03h	A4h	USINT	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 8 = No External Fault 9 = No External Alarm 10 = Brake		64h	03h	A5h	USINT	265	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
		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		64h	03h	A6h	USINT	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		64h	03h	A7h	USINT	267	enum	1
C4.1.6	DI6	0 = Not Used 1 = Start / Stop 2 = Start (3 Wires) 3 = Stop (3 Wires) 4 = General Enable 5 = LOC / REM		64h	03h	A8h	USINT	268	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
		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		64h	03h	AFh	USINT	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 11 = SoftPLC 12 = Communication 13 = I motor % > Value		64h	03h	B0h	USINT	276	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
		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		64h	03h	B1h	USINT	277	enum	1
C4.2.4	DO Comparison Value	10.0 to 500.0 %	1	64h	03h	B2h	UINT	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		64h	03h	97h	USINT	251	enum	1
C4.3.2	Gain	0.000 to 9.999	3	64h	03h	98h	UINT	252	16bit	1
C4.3.3	Signal	0 = 0 to 20mA 1 = 4 to 20mA 2 = 20mA to 0 3 = 20 to 4mA 4 = 0 to 10V 5 = 10V to 0		64h	03h	99h	USINT	253	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
C5.1	Voltage Protections									
C5.1.1	Motor Undervoltage									
C5.1.1.1	Mode	0 = Inactive 1 = Fault F002 2 = Alarm A002		64h	0Ah	64h	USINT	900	enum	1
C5.1.1.2	Level	0 to 30 %Vn	0	64h	0Ah	65h	USINT	901	8bit	1
C5.1.1.3	Time	0.1 to 10.0 s	1	64h	0Ah	66h	USINT	902	8bit	1
C5.1.2	Motor Overvoltage									
C5.1.2.1	Mode	0 = Inactive 1 = Fault F016 2 = Alarm A016		64h	0Ah	67h	USINT	903	enum	1
C5.1.2.2	Level	0 to 20 %Vn	0	64h	0Ah	68h	USINT	904	8bit	1
C5.1.2.3	Time	0.1 to 10.0 s	1	64h	0Ah	69h	USINT	905	8bit	1
C5.1.3	Motor Voltage Imbalance									
C5.1.3.1	Mode	0 = Inactive 1 = Fault F001 2 = Alarm A001		64h	0Ah	6Ah	USINT	906	enum	1
C5.1.3.2	Level	0 to 30 %Vn	0	64h	0Ah	6Bh	USINT	907	8bit	1
C5.1.3.3	Time	0.1 to 10.0 s	1	64h	0Ah	6Ch	USINT	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		64h	0Ah	6Eh	USINT	910	enum	1
C5.2.1.2	Level	0 to 99 %In	0	64h	0Ah	6Fh	USINT	911	8bit	1
C5.2.1.3	Time	1 to 99 s	0	64h	0Ah	70h	USINT	912	8bit	1
C5.2.2	Motor Overcurrent									
C5.2.2.1	Mode	0 = Inactive 1 = Fault F066 2 = Alarm A066		64h	0Ah	71h	USINT	913	enum	1
C5.2.2.2	Level	0 to 99 %In	0	64h	0Ah	72h	USINT	914	8bit	1
C5.2.2.3	Time	1 to 99 s	0	64h	0Ah	73h	USINT	915	8bit	1
C5.2.3	Current Imbalance									
C5.2.3.1	Mode	0 = Inactive 1 = Fault F074		64h	0Ah	74h	USINT	916	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
		2 = Alarm A074								
C5.2.3.2	Level	0 to 30 %In	0	64h	0Ah	75h	USINT	917	8bit	1
C5.2.3.3	Time	1 to 99 s	0	64h	0Ah	76h	USINT	918	8bit	1
C5.3	Torque Protections									
C5.3.1	Undertorque									
C5.3.1.1	Mode	0 = Inactive 1 = Fault F078 2 = Alarm A078		64h	0Ah	96h	USINT	950	enum	1
C5.3.1.2	Level	0 to 99 %Tn	0	64h	0Ah	97h	USINT	951	8bit	1
C5.3.1.3	Time	1 to 99 s	0	64h	0Ah	98h	USINT	952	8bit	1
C5.3.2	Overtorque									
C5.3.2.1	Mode	0 = Inactive 1 = Fault F079 2 = Alarm A079		64h	0Ah	99h	USINT	953	enum	1
C5.3.2.2	Level	0 to 99 %Tn	0	64h	0Ah	9Ah	USINT	954	8bit	1
C5.3.2.3	Time	1 to 99 s	0	64h	0Ah	9Bh	USINT	955	8bit	1
C5.4	Power Protections									
C5.4.1	Underpower									
C5.4.1.1	Mode	0 = Inactive 1 = Fault F080 2 = Alarm A080		64h	0Ah	A0h	USINT	960	enum	1
C5.4.1.2	Level	0 to 99 %Pn	0	64h	0Ah	A1h	USINT	961	8bit	1
C5.4.1.3	Time	1 to 99 s	0	64h	0Ah	A2h	USINT	962	8bit	1
C5.4.2	Overpower									
C5.4.2.1	Mode	0 = Inactive 1 = Fault F081 2 = Alarm A081		64h	0Ah	A3h	USINT	963	enum	1
C5.4.2.2	Level	0 to 99 %Pn	0	64h	0Ah	A4h	USINT	964	8bit	1
C5.4.2.3	Time	1 to 99 s	0	64h	0Ah	A5h	USINT	965	8bit	1
C5.5	Phase Sequence									
C5.5.1	Mode	0 = Inactive 1 = RST - Fault F067 2 = RTS - Fault F068		64h	0Ah	82h	USINT	930	enum	1
C5.6	Bypass Protections									
C5.6.1	Undercurrent	0 = Inactive		64h	0Ah	77h	USINT	919	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
		1 = Fault F076								
C5.6.2	Overcurrent	0 = Inactive 1 = Fault F063		64h	0Ah	78h	USINT	920	enum	1
C5.6.3	Closed	0 = Inactive 1 = Fault F077		64h	0Ah	79h	USINT	921	enum	1
C5.7	Time Protections									
C5.7.1	Before Start	0.5 to 999.9 s	1	64h	0Ah	83h	UINT	931	16bit	1
C5.7.2	After Stop	2.0 to 999.9 s	1	64h	0Ah	84h	UINT	932	16bit	1
C5.7.3	Between Start	2 to 9999 s	0	64h	0Ah	85h	UINT	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		64h	0Bh	6Ah	USINT	1006	enum	1
C5.8.2	Ch1 Sensor Fault									
C5.8.2.1	Mode	0 = Fault F109 and F117 1 = Alarm A109 and A117		64h	0Ah	C6h	USINT	998	enum	1
C5.8.3	Ch1 Overtemperature									
C5.8.3.1	Mode	0 = Fault F101 1 = Alarm A101 2 = F101 and A101		64h	0Ah	A6h	USINT	966	enum	1
C5.8.3.2	Fault Level	0 to 250 °C	0	64h	0Ah	A7h	USINT	967	8bit	1
C5.8.3.3	Alarm Level	0 to 250 °C	0	64h	0Ah	A8h	USINT	968	8bit	1
C5.8.3.4	Alarm Reset	0 to 250 °C	0	64h	0Ah	A9h	USINT	969	8bit	1
C5.8.4	Ch2 Installed Sensor									
C5.8.4.1	Mode	0 = Off 1 = On 2 = On Stator		64h	0Bh	6Bh	USINT	1007	enum	1
C5.8.5	Ch2 Sensor Fault									
C5.8.5.1	Mode	0 = Fault F110 and F118 1 = Alarm A110 and A118		64h	0Ah	C7h	USINT	999	enum	1
C5.8.6	Ch2 Overtemperature									
C5.8.6.1	Mode	0 = Fault F102		64h	0Ah	AAh	USINT	970	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
		1 = Alarm A102 2 = F102 and A102								
C5.8.6.2	Fault Level	0 to 250 °C	0	64h	0Ah	ABh	USINT	971	8bit	1
C5.8.6.3	Alarm Level	0 to 250 °C	0	64h	0Ah	ACh	USINT	972	8bit	1
C5.8.6.4	Alarm Reset	0 to 250 °C	0	64h	0Ah	ADh	USINT	973	8bit	1
C5.8.7	Ch3 Installed Sensor									
C5.8.7.1	Mode	0 = Off 1 = On 2 = On Stator		64h	0Bh	6Ch	USINT	1008	enum	1
C5.8.8	Ch3 Sensor Fault									
C5.8.8.1	Mode	0 = Fault F111 and F119 1 = Alarm A111 and A119		64h	0Bh	64h	USINT	1000	enum	1
C5.8.9	Ch3 Overtemperature									
C5.8.9.1	Mode	0 = Fault F103 1 = Alarm A103 2 = F103 and A103		64h	0Ah	AEh	USINT	974	enum	1
C5.8.9.2	Fault Level	0 to 250 °C	0	64h	0Ah	AFh	USINT	975	8bit	1
C5.8.9.3	Alarm Level	0 to 250 °C	0	64h	0Ah	B0h	USINT	976	8bit	1
C5.8.9.4	Alarm Reset	0 to 250 °C	0	64h	0Ah	B1h	USINT	977	8bit	1
C5.8.10	Ch4 Installed Sensor									
C5.8.10.1	Mode	0 = Off 1 = On 2 = On Stator		64h	0Bh	6Dh	USINT	1009	enum	1
C5.8.11	Ch4 Sensor Fault									
C5.8.11.1	Mode	0 = Fault F112 and F120 1 = Alarm A112 and A120		64h	0Bh	65h	USINT	1001	enum	1
C5.8.12	Ch4 Overtemperature									
C5.8.12.1	Mode	0 = Fault F104 1 = Alarm A104 2 = F104 and A104		64h	0Ah	B2h	USINT	978	enum	1
C5.8.12.2	Fault Level	0 to 250 °C	0	64h	0Ah	B3h	USINT	979	8bit	1
C5.8.12.3	Alarm Level	0 to 250 °C	0	64h	0Ah	B4h	USINT	980	8bit	1
C5.8.12.4	Alarm Reset	0 to 250 °C	0	64h	0Ah	B5h	USINT	981	8bit	1
C5.8.13	Ch5 Installed Sensor									
C5.8.13.1	Mode			64h	0Bh	6Eh	USINT	1010	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
		0 = Off 1 = On 2 = On Stator								
C5.8.14	Ch5 Sensor Fault									
C5.8.14.1	Mode	0 = Fault F113 and F121 1 = Alarm A113 and A121		64h	0Bh	66h	USINT	1002	enum	1
C5.8.15	Ch5 Overtemperature									
C5.8.15.1	Mode	0 = Fault F105 1 = Alarm A105 2 = F105 and A105		64h	0Ah	B6h	USINT	982	enum	1
C5.8.15.2	Fault Level	0 to 250 °C	0	64h	0Ah	B7h	USINT	983	8bit	1
C5.8.15.3	Alarm Level	0 to 250 °C	0	64h	0Ah	B8h	USINT	984	8bit	1
C5.8.15.4	Alarm Reset	0 to 250 °C	0	64h	0Ah	B9h	USINT	985	8bit	1
C5.8.16	Ch6 Installed Sensor									
C5.8.16.1	Mode	0 = Off 1 = On 2 = On Stator		64h	0Bh	6Fh	USINT	1011	enum	1
C5.8.17	Ch6 Sensor Fault									
C5.8.17.1	Mode	0 = Fault F114 and F122 1 = Alarm A114 and A122		64h	0Bh	67h	USINT	1003	enum	1
C5.8.18	Ch6 Overtemperature									
C5.8.18.1	Mode	0 = Fault F106 1 = Alarm A106 2 = F106 and A106		64h	0Ah	BAh	USINT	986	enum	1
C5.8.18.2	Fault Level	0 to 250 °C	0	64h	0Ah	BBh	USINT	987	8bit	1
C5.8.18.3	Alarm Level	0 to 250 °C	0	64h	0Ah	BCh	USINT	988	8bit	1
C5.8.18.4	Alarm Reset	0 to 250 °C	0	64h	0Ah	BDh	USINT	989	8bit	1
C5.9	Motor Thermal Class									
C5.9.1	Programming Mode	0 = Standard 1 = Custom		64h	0Ah	86h	USINT	934	enum	1
C5.9.2	Action Mode	0 = Inactive 1 = Fault F005 2 = Alarm A005 3 = F005 and A005		64h	0Ah	87h	USINT	935	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
C5.9.3	Alarm Level	0 to 100 %	0	64h	0Ah	88h	USINT	936	8bit	1
C5.9.4	Alarm Reset	0 to 100 %	0	64h	0Ah	89h	USINT	937	8bit	1
C5.9.5	Motor Temperature	0 = T.C. + PT100 1 = T.C. + Th.Im.		64h	0Ah	8Ah	USINT	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		64h	0Ah	8Bh	USINT	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		64h	0Ah	8Ch	USINT	940	enum	1
C5.9.7.2	Temperature Rise	0 to 200 °C	0	64h	0Ah	8Eh	USINT	942	8bit	1
C5.9.7.3	Ambient Temperature	0 to 200 °C	0	64h	0Ah	8Dh	USINT	941	8bit	1
C5.9.7.4	Locked Rotor Time	1 to 100 s	0	64h	0Ah	8Fh	USINT	943	8bit	1
C5.9.7.5	Locked Rotor Current	2.0 to 10.0 x	1	64h	0Ah	90h	USINT	944	8bit	1
C5.9.7.6	Heating Time Constant	1 to 2880 min	0	64h	0Ah	91h	UINT	945	16bit	1
C5.9.7.7	Cooling Time Constant	1 to 8640 min	0	64h	0Ah	92h	UINT	946	16bit	1
C5.9.8	Thermal Image									
C5.9.8.1	Reset	0 to 8640 min	0	64h	0Ah	93h	UINT	947	16bit	1
C5.10	SSW Short Circuit									
C5.10.1	Motor Off	0 = Inactive 1 = Fault F019		64h	0Ah	7Ah	USINT	922	enum	1
C5.10.2	Motor On	0 = Inactive 1 = Fault F020		64h	0Ah	7Bh	USINT	923	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
C5.11	Fault Auto-Reset									
C5.11.1	Mode	0 = Off 1 = On		64h	03h	6Bh	USINT	207	enum	1
C5.11.2	Time	3 to 600 s	0	64h	03h	6Ch	UINT	208	16bit	1
		C6 Configurations\HMI								
C6.1	Password									
C6.1.1	Password	0 to 9999	0	64h	03h	6Eh	UINT	210	16bit	1
C6.1.2	Password Options	0 = Off 1 = On 2 = Change Password		64h	03h	64h	USINT	200	enum	1
C6.2	Language									
C6.2.1	Language	0 = Português 1 = English 2 = Español 3 = Français 4 = Downloaded		64h	03h	65h	USINT	201	enum	1
C6.3	Date and Time									
C6.3.1	Date and Time	yy/mm/dd and hh:mm:ss		64h	02h	C4h	SHORT_-STRING	196	date	4
C6.3.2	Day of the Week	0 = Sunday 1 = Monday 2 = Tuesday 3 = Wednesday 4 = Thursday 5 = Friday 6 = Saturday		64h	02h	C3h	USINT	195	enum	1
C6.4	Main Screen									
C6.5	LCD Display									
C6.5.1	Backlight	1 to 15	0	64h	03h	76h	USINT	218	8bit	1
C6.5.2	Contrast	0 to 100 %	0	64h	03h	77h	USINT	219	8bit	1
C6.6	Communication Timeout									
C6.6.1	Mode	0 = Inactive 1 = Fault F127 2 = Alarm A127		64h	02h	BEh	USINT	190	enum	1
C6.6.2	Alarm Action	0 = Indicates Only		64h	02h	BFh	USINT	191	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
		1 = Ramp Stop 2 = General Disable 3 = Change to LOC 4 = Change to REM								
C6.6.3	Time	1 to 999 s	0	64h	02h	C0h	UINT	192	16bit	1
C7 Configurations\Special Functions										
C7.1	Forward/Reverse									
C7.1.1	Mode	0 = Inactive 1 = By Contactor 2 = Only for JOG		64h	03h	80h	USINT	228	enum	1
C7.2	Kick Start									
C7.2.1	Mode	0 = Off 1 = On		64h	06h	78h	USINT	520	enum	1
C7.2.2	Time	0.1 to 2.0 s	1	64h	06h	79h	USINT	521	8bit	1
C7.2.3	Voltage	70 to 90 %	0	64h	06h	7Ah	USINT	522	8bit	1
C7.2.4	Current	300 to 700 %	0	64h	06h	7Bh	UINT	523	16bit	1
C7.3	Jog									
C7.3.1	Mode	0 = Off 1 = On		64h	06h	6Eh	USINT	510	enum	1
C7.3.2	Level	10 to 100 %	0	64h	06h	6Fh	USINT	511	8bit	1
C7.4	Braking									
C7.4.1	Mode	0 = Inactive 1 = Reverse 2 = Optimal 3 = DC		64h	06h	64h	USINT	500	enum	1
C7.4.2	Time	1 to 299 s	0	64h	06h	65h	UINT	501	16bit	1
C7.4.3	Level	30 to 70 %	0	64h	06h	66h	USINT	502	8bit	1
C7.4.4	End	0 = Inactive 1 = Automatic		64h	06h	67h	USINT	503	enum	1
C8 Configurations\Communication										
C8.1	I/O Data									
C8.1.1	Data Read									
C8.1.1.1	Slot 1 1st Word	1 to 50	0	64h	08h	70h	USINT	712	8bit	1
C8.1.1.2	Slot 1 Quantity	1 to 50	0	64h	08h	71h	USINT	713	8bit	1
C8.1.1.3	Slot 2 1st Word	1 to 50	0	64h	08h	99h	USINT	753	8bit	1
C8.1.1.4	Slot 2 Quantity	1 to 50	0	64h	08h	9Ah	USINT	754	8bit	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
C8.1.1.5	Word #1	0 to 65535	0	64h	0Eh	64h	UINT	1300	16bit	1
C8.1.1.6	Word #2	0 to 65535	0	64h	0Eh	65h	UINT	1301	16bit	1
C8.1.1.7	Word #3	0 to 65535	0	64h	0Eh	66h	UINT	1302	16bit	1
C8.1.1.8	Word #4	0 to 65535	0	64h	0Eh	67h	UINT	1303	16bit	1
C8.1.1.9	Word #5	0 to 65535	0	64h	0Eh	68h	UINT	1304	16bit	1
C8.1.1.10	Word #6	0 to 65535	0	64h	0Eh	69h	UINT	1305	16bit	1
C8.1.1.11	Word #7	0 to 65535	0	64h	0Eh	6Ah	UINT	1306	16bit	1
C8.1.1.12	Word #8	0 to 65535	0	64h	0Eh	6Bh	UINT	1307	16bit	1
C8.1.1.13	Word #9	0 to 65535	0	64h	0Eh	6Ch	UINT	1308	16bit	1
C8.1.1.14	Word #10	0 to 65535	0	64h	0Eh	6Dh	UINT	1309	16bit	1
C8.1.1.15	Word #11	0 to 65535	0	64h	0Eh	6Eh	UINT	1310	16bit	1
C8.1.1.16	Word #12	0 to 65535	0	64h	0Eh	6Fh	UINT	1311	16bit	1
C8.1.1.17	Word #13	0 to 65535	0	64h	0Eh	70h	UINT	1312	16bit	1
C8.1.1.18	Word #14	0 to 65535	0	64h	0Eh	71h	UINT	1313	16bit	1
C8.1.1.19	Word #15	0 to 65535	0	64h	0Eh	72h	UINT	1314	16bit	1
C8.1.1.20	Word #16	0 to 65535	0	64h	0Eh	73h	UINT	1315	16bit	1
C8.1.1.21	Word #17	0 to 65535	0	64h	0Eh	74h	UINT	1316	16bit	1
C8.1.1.22	Word #18	0 to 65535	0	64h	0Eh	75h	UINT	1317	16bit	1
C8.1.1.23	Word #19	0 to 65535	0	64h	0Eh	76h	UINT	1318	16bit	1
C8.1.1.24	Word #20	0 to 65535	0	64h	0Eh	77h	UINT	1319	16bit	1
C8.1.1.25	Word #21	0 to 65535	0	64h	0Eh	78h	UINT	1320	16bit	1
C8.1.1.26	Word #22	0 to 65535	0	64h	0Eh	79h	UINT	1321	16bit	1
C8.1.1.27	Word #23	0 to 65535	0	64h	0Eh	7Ah	UINT	1322	16bit	1
C8.1.1.28	Word #24	0 to 65535	0	64h	0Eh	7Bh	UINT	1323	16bit	1
C8.1.1.29	Word #25	0 to 65535	0	64h	0Eh	7Ch	UINT	1324	16bit	1
C8.1.1.30	Word #26	0 to 65535	0	64h	0Eh	7Dh	UINT	1325	16bit	1
C8.1.1.31	Word #27	0 to 65535	0	64h	0Eh	7Eh	UINT	1326	16bit	1
C8.1.1.32	Word #28	0 to 65535	0	64h	0Eh	7Fh	UINT	1327	16bit	1
C8.1.1.33	Word #29	0 to 65535	0	64h	0Eh	80h	UINT	1328	16bit	1
C8.1.1.34	Word #30	0 to 65535	0	64h	0Eh	81h	UINT	1329	16bit	1
C8.1.1.35	Word #31	0 to 65535	0	64h	0Eh	82h	UINT	1330	16bit	1
C8.1.1.36	Word #32	0 to 65535	0	64h	0Eh	83h	UINT	1331	16bit	1
C8.1.1.37	Word #33	0 to 65535	0	64h	0Eh	84h	UINT	1332	16bit	1
C8.1.1.38	Word #34	0 to 65535	0	64h	0Eh	85h	UINT	1333	16bit	1
C8.1.1.39	Word #35	0 to 65535	0	64h	0Eh	86h	UINT	1334	16bit	1
C8.1.1.40	Word #36	0 to 65535	0	64h	0Eh	87h	UINT	1335	16bit	1
C8.1.1.41	Word #37	0 to 65535	0	64h	0Eh	88h	UINT	1336	16bit	1
C8.1.1.42	Word #38	0 to 65535	0	64h	0Eh	89h	UINT	1337	16bit	1
C8.1.1.43	Word #39	0 to 65535	0	64h	0Eh	8Ah	UINT	1338	16bit	1
C8.1.1.44	Word #40	0 to 65535	0	64h	0Eh	8Bh	UINT	1339	16bit	1
C8.1.1.45	Word #41	0 to 65535	0	64h	0Eh	8Ch	UINT	1340	16bit	1
C8.1.1.46	Word #42	0 to 65535	0	64h	0Eh	8Dh	UINT	1341	16bit	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
C8.1.1.47	Word #43	0 to 65535	0	64h	0Eh	8Eh	UINT	1342	16bit	1
C8.1.1.48	Word #44	0 to 65535	0	64h	0Eh	8Fh	UINT	1343	16bit	1
C8.1.1.49	Word #45	0 to 65535	0	64h	0Eh	90h	UINT	1344	16bit	1
C8.1.1.50	Word #46	0 to 65535	0	64h	0Eh	91h	UINT	1345	16bit	1
C8.1.1.51	Word #47	0 to 65535	0	64h	0Eh	92h	UINT	1346	16bit	1
C8.1.1.52	Word #48	0 to 65535	0	64h	0Eh	93h	UINT	1347	16bit	1
C8.1.1.53	Word #49	0 to 65535	0	64h	0Eh	94h	UINT	1348	16bit	1
C8.1.1.54	Word #50	0 to 65535	0	64h	0Eh	95h	UINT	1349	16bit	1
C8.1.2	Data Write									
C8.1.2.1	Slot 1 1st Word	1 to 20	0	64h	08h	72h	USINT	714	8bit	1
C8.1.2.2	Slot 1 Quantity	1 to 20	0	64h	08h	73h	USINT	715	8bit	1
C8.1.2.3	Slot 2 1st Word	1 to 20	0	64h	08h	9Bh	USINT	755	8bit	1
C8.1.2.4	Slot 2 Quantity	1 to 20	0	64h	08h	9Ch	USINT	756	8bit	1
C8.1.2.5	Update Delay	0.0 to 999.9 s	1	64h	09h	C7h	UINT	899	16bit	1
C8.1.2.6	Word #1	0 to 65535	0	64h	0Fh	64h	UINT	1400	16bit	1
C8.1.2.7	Word #2	0 to 65535	0	64h	0Fh	65h	UINT	1401	16bit	1
C8.1.2.8	Word #3	0 to 65535	0	64h	0Fh	66h	UINT	1402	16bit	1
C8.1.2.9	Word #4	0 to 65535	0	64h	0Fh	67h	UINT	1403	16bit	1
C8.1.2.10	Word #5	0 to 65535	0	64h	0Fh	68h	UINT	1404	16bit	1
C8.1.2.11	Word #6	0 to 65535	0	64h	0Fh	69h	UINT	1405	16bit	1
C8.1.2.12	Word #7	0 to 65535	0	64h	0Fh	6Ah	UINT	1406	16bit	1
C8.1.2.13	Word #8	0 to 65535	0	64h	0Fh	6Bh	UINT	1407	16bit	1
C8.1.2.14	Word #9	0 to 65535	0	64h	0Fh	6Ch	UINT	1408	16bit	1
C8.1.2.15	Word #10	0 to 65535	0	64h	0Fh	6Dh	UINT	1409	16bit	1
C8.1.2.16	Word #11	0 to 65535	0	64h	0Fh	6Eh	UINT	1410	16bit	1
C8.1.2.17	Word #12	0 to 65535	0	64h	0Fh	6Fh	UINT	1411	16bit	1
C8.1.2.18	Word #13	0 to 65535	0	64h	0Fh	70h	UINT	1412	16bit	1
C8.1.2.19	Word #14	0 to 65535	0	64h	0Fh	71h	UINT	1413	16bit	1
C8.1.2.20	Word #15	0 to 65535	0	64h	0Fh	72h	UINT	1414	16bit	1
C8.1.2.21	Word #16	0 to 65535	0	64h	0Fh	73h	UINT	1415	16bit	1
C8.1.2.22	Word #17	0 to 65535	0	64h	0Fh	74h	UINT	1416	16bit	1
C8.1.2.23	Word #18	0 to 65535	0	64h	0Fh	75h	UINT	1417	16bit	1
C8.1.2.24	Word #19	0 to 65535	0	64h	0Fh	76h	UINT	1418	16bit	1
C8.1.2.25	Word #20	0 to 65535	0	64h	0Fh	77h	UINT	1419	16bit	1
C8.2	RS485 Serial									
C8.2.1	Serial Protocol	0 ... 1 = Reserved 2 = Modbus RTU		64h	08h	82h	USINT	730	enum	1
C8.2.2	Address	1 to 247	0	64h	08h	83h	USINT	731	8bit	1
C8.2.3	Baud Rate	0 = 9600 bits/s		64h	08h	84h	USINT	732	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
		1 = 19200 bits/s 2 = 38400 bits/s 3 = 57600 bits/s								
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		64h	08h	85h	USINT	733	enum	1
C8.2.5	Timeout									
C8.2.5.1	Mode	0 = Inactive 1 = Fault F128 2 = Alarm A128		64h	08h	8Ch	USINT	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		64h	08h	8Dh	USINT	741	enum	1
C8.2.5.3	Timeout	0.0 to 999.9 s	1	64h	08h	86h	UINT	734	16bit	1
C8.3	Anybus-CC									
C8.3.1	Update Configuration	0 = Normal Operation 1 = Update configuration		64h	08h	95h	USINT	749	enum	1
C8.3.2	Address	0 to 255	0	64h	08h	9Dh	USINT	757	8bit	1
C8.3.3	Baud Rate	0 = 125 kbps 1 = 250 kbps 2 = 500 kbps 3 = Autobaud		64h	08h	9Eh	USINT	758	enum	1
C8.3.4	IP Address Configuration	0 = Parameters 1 = DHCP 2 = DCP		64h	08h	A0h	USINT	760	enum	1
C8.3.5	IP Address	0.0.0.0 to 255.255.255.255		64h	08h	A2h	UDINT	762	ip_address	2
C8.3.6	CIDR	0 = Reserved 1 = 128.0.0.0 2 = 192.0.0.0		64h	08h	A1h	USINT	761	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
		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		64h	08h	A6h	UDINT	766	ip_address	2
C8.3.8	Station Name Suffix	0 to 254	0	64h	08h	AAh	USINT	770	8bit	1
C8.3.9	Modbus TCP Timeout									
C8.3.9.1	Mode	0 = Inactive 1 = Fault F131 2 = Alarm A131		64h	08h	ABh	USINT	771	enum	1
C8.3.9.2	Alarm Action	0 = Indicates Only 1 = Ramp Stop 2 = General Disable 3 = Change to LOC 4 = Change to REM		64h	08h	ACh	USINT	772	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
C8.3.9.3	Modbus TCP Timeout	0.0 to 999.9 s	1	64h	08h	9Fh	UINT	759	16bit	1
C8.3.10	Off Line Error									
C8.3.10.1	Mode	0 = Inactive 1 = Fault F129 2 = Alarm A129		64h	09h	C5h	USINT	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		64h	09h	C6h	USINT	898	enum	1
C8.4	CANopen/DeviceNet									
C8.4.1	Protocol	0 = Disabled 1 = CANopen 2 = DeviceNet		64h	08h	64h	USINT	700	enum	1
C8.4.2	Address	0 to 127	0	64h	08h	65h	USINT	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		64h	08h	66h	USINT	702	enum	1
C8.4.4	Bus Off Reset	0 = Manual 1 = Automatic		64h	08h	67h	USINT	703	enum	1
C8.4.5	CAN Error									
C8.4.5.1	Mode	0 = Inactive 1 = Fault 2 = Alarm		64h	08h	7Bh	USINT	723	enum	1
C8.4.5.2	Alarm Action	0 = Indicates Only 1 = Ramp Stop 2 = General Disable 3 = Change to LOC		64h	08h	7Ch	USINT	724	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
		4 = Change to REM								
C8.5	Ethernet									
C8.5.1	IP Address Config	0 = Parameters 1 = DHCP		64h	09h	96h	USINT	850	enum	1
C8.5.2	IP Address	0.0.0.0 to 255.255.255.255		64h	09h	98h	UDINT	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		64h	09h	9Bh	USINT	855	enum	1
C8.5.4	Gateway	0.0.0.0 to 255.255.255.255		64h	09h	9Ch	UDINT	856	ip_address	2
C8.5.5	MBTCP: TCP Port	0 to 65535	0	64h	09h	A5h	UINT	865	16bit	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
C8.5.7	EIP Data Profile	0 ... 9 = Reserved 10 = 110/160-Configurable I/O		64h	09h	ABh	USINT	871	enum	1
C8.5.9	Modbus TCP Error									
C8.5.9.1	Mode	0 = Inactive 1 = Fault F149 2 = Alarm A149		64h	09h	C1h	USINT	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		64h	09h	C2h	USINT	894	enum	1
C8.5.9.3	Timeout	0.0 to 999.9 s	1	64h	09h	A8h	UINT	868	16bit	1
C8.5.10	EtherNet/IP Error									
C8.5.10.1	Mode	0 = Inactive 1 = Fault F147 2 = Alarm A147		64h	09h	C3h	USINT	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		64h	09h	C4h	USINT	896	enum	1
C8.6	Bluetooth									
C8.6.1	Mode	0 = Off 1 = On		64h	09h	64h	USINT	800	enum	1
C9 Configurations\SSW900										
C9.1	Nominal Data									
C9.1.1	Current	0 = 10 A 1 = 17 A 2 = 24 A 3 = 30 A 4 = 45 A 5 = 61 A 6 = 85 A 7 = 105 A		64h	03h	C3h	USINT	295	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
		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		64h	02h	96h	USINT	150	enum	1
C9.2.2	External Bypass	0 = Without 1 = With		64h	02h	8Ch	USINT	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.		64h	04h	89h	USINT	337	enum	1
C9.3.2	Slot 2	0 = Automatic 1 = Anybus-CC 2 = RS-485 3 = PT100 4 = I/Os Exp. 5 = Profibus 6 = CAN 7 = Ethernet		64h	04h	8Ah	USINT	338	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
		8 = External Current Acqu.								
C9.4	Fan Configuration									
C9.4.1	Mode	0 = Always Off 1 = Always On 2 = Controlled		64h	03h	67h	USINT	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		64h	03h	6Ah	USINT	206	enum	1
C10.2	Copy Function HMI									
C10.2.1	Mode	0 = Off 1 = SSW -> HMI 2 = HMI -> SSW		64h	04h	77h	USINT	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		64h	03h	69h	USINT	205	enum	1
C10.4	Load Factory Default									
C10.4.1	Mode	0 = No 1 = Yes		64h	03h	68h	USINT	204	enum	1
C10.5	Save Changed Param.									
C10.5.1	Mode	0 = No 1 = Yes		64h	03h	6Dh	USINT	209	enum	1
C11 Configurations\SoftPLC										
C11.1	Mode			64h	0Ch	65h	USINT	1101	enum	1

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
		0 = Stop Program 1 = Run Program								
C11.2	Action App. Not Running	0 = Inactive 1 = Alarm A708 2 = Fault F708		64h	0Ch	67h	USINT	1103	enum	1
C11.3	Parameter									
C11.3.1	User #1	-10000 to 10000	0	64h	0Ch	6Eh	DINT	1110	s32bit	2
C11.3.2	User #2	-10000 to 10000	0	64h	0Ch	70h	DINT	1112	s32bit	2
C11.3.3	User #3	-10000 to 10000	0	64h	0Ch	72h	DINT	1114	s32bit	2
C11.3.4	User #4	-10000 to 10000	0	64h	0Ch	74h	DINT	1116	s32bit	2
C11.3.5	User #5	-10000 to 10000	0	64h	0Ch	76h	DINT	1118	s32bit	2
C11.3.6	User #6	-10000 to 10000	0	64h	0Ch	78h	DINT	1120	s32bit	2
C11.3.7	User #7	-10000 to 10000	0	64h	0Ch	7Ah	DINT	1122	s32bit	2
C11.3.8	User #8	-10000 to 10000	0	64h	0Ch	7Ch	DINT	1124	s32bit	2
C11.3.9	User #9	-10000 to 10000	0	64h	0Ch	7Eh	DINT	1126	s32bit	2
C11.3.10	User #10	-10000 to 10000	0	64h	0Ch	80h	DINT	1128	s32bit	2
C11.3.11	User #11	-10000 to 10000	0	64h	0Ch	82h	DINT	1130	s32bit	2
C11.3.12	User #12	-10000 to 10000	0	64h	0Ch	84h	DINT	1132	s32bit	2
C11.3.13	User #13	-10000 to 10000	0	64h	0Ch	86h	DINT	1134	s32bit	2
C11.3.14	User #14	-10000 to 10000	0	64h	0Ch	88h	DINT	1136	s32bit	2
C11.3.15	User #15	-10000 to 10000	0	64h	0Ch	8Ah	DINT	1138	s32bit	2
C11.3.16	User #16	-10000 to 10000	0	64h	0Ch	8Ch	DINT	1140	s32bit	2
C11.3.17	User #17	-10000 to 10000	0	64h	0Ch	8Eh	DINT	1142	s32bit	2
C11.3.18	User #18	-10000 to 10000	0	64h	0Ch	90h	DINT	1144	s32bit	2
C11.3.19	User #19	-10000 to 10000	0	64h	0Ch	92h	DINT	1146	s32bit	2
C11.3.20	User #20	-10000 to 10000	0	64h	0Ch	94h	DINT	1148	s32bit	2
C11.3.21	User #21	-10000 to 10000	0	64h	0Ch	96h	DINT	1150	s32bit	2
C11.3.22	User #22	-10000 to 10000	0	64h	0Ch	98h	DINT	1152	s32bit	2
C11.3.23	User #23	-10000 to 10000	0	64h	0Ch	9Ah	DINT	1154	s32bit	2
C11.3.24	User #24	-10000 to 10000	0	64h	0Ch	9Ch	DINT	1156	s32bit	2
C11.3.25	User #25	-10000 to 10000	0	64h	0Ch	9Eh	DINT	1158	s32bit	2
C11.3.26	User #26	-10000 to 10000	0	64h	0Ch	A0h	DINT	1160	s32bit	2
C11.3.27	User #27	-10000 to 10000	0	64h	0Ch	A2h	DINT	1162	s32bit	2
C11.3.28	User #28	-10000 to 10000	0	64h	0Ch	A4h	DINT	1164	s32bit	2
C11.3.29	User #29	-10000 to 10000	0	64h	0Ch	A6h	DINT	1166	s32bit	2
C11.3.30	User #30	-10000 to 10000	0	64h	0Ch	A8h	DINT	1168	s32bit	2
C11.3.31	User #31	-10000 to 10000	0	64h	0Ch	AAh	DINT	1170	s32bit	2
C11.3.32	User #32	-10000 to 10000	0	64h	0Ch	ACh	DINT	1172	s32bit	2
C11.3.33	User #33	-10000 to 10000	0	64h	0Ch	AEh	DINT	1174	s32bit	2
C11.3.34	User #34	-10000 to 10000	0	64h	0Ch	B0h	DINT	1176	s32bit	2
C11.3.35	User #35	-10000 to 10000	0	64h	0Ch	B2h	DINT	1178	s32bit	2

Parameter	Description	Range of values	Decimal places	Class	Instance	Attribute	CIP data type	Net Id	Size	Qty mapped words
C11.3.36	User #36	-10000 to 10000	0	64h	0Ch	B4h	DINT	1180	s32bit	2
C11.3.37	User #37	-10000 to 10000	0	64h	0Ch	B6h	DINT	1182	s32bit	2
C11.3.38	User #38	-10000 to 10000	0	64h	0Ch	B8h	DINT	1184	s32bit	2
C11.3.39	User #39	-10000 to 10000	0	64h	0Ch	BAh	DINT	1186	s32bit	2
C11.3.40	User #40	-10000 to 10000	0	64h	0Ch	BCh	DINT	1188	s32bit	2
C11.3.41	User #41	-10000 to 10000	0	64h	0Ch	BEh	DINT	1190	s32bit	2
C11.3.42	User #42	-10000 to 10000	0	64h	0Ch	C0h	DINT	1192	s32bit	2
C11.3.43	User #43	-10000 to 10000	0	64h	0Ch	C2h	DINT	1194	s32bit	2
C11.3.44	User #44	-10000 to 10000	0	64h	0Ch	C4h	DINT	1196	s32bit	2
C11.3.45	User #45	-10000 to 10000	0	64h	0Ch	C6h	DINT	1198	s32bit	2
C11.3.46	User #46	-10000 to 10000	0	64h	0Dh	64h	DINT	1200	s32bit	2
C11.3.47	User #47	-10000 to 10000	0	64h	0Dh	66h	DINT	1202	s32bit	2
C11.3.48	User #48	-10000 to 10000	0	64h	0Dh	68h	DINT	1204	s32bit	2
C11.3.49	User #49	-10000 to 10000	0	64h	0Dh	6Ah	DINT	1206	s32bit	2
C11.3.50	User #50	-10000 to 10000	0	64h	0Dh	6Ch	DINT	1208	s32bit	2
C11.4	SoftPLC Application	0 = User 1 = Timer Control 2 = Pump Cleaning		64h	0Ch	68h	USINT	1104	enum	1
A1 Assistant\Oriented Start-up										
A1.1	Mode	0 = No 1 = Yes		64h	04h	75h	USINT	317	enum	1

Table 12.3: *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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