



Manual

Encoders with EtherNet/IP Interface

EtherNet/IP^{*}

pulses for automation

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1 Document

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Image sources

Screenshots from Studio 5000 Logix Designer V34

EtherNet/IP ODVA Technology Overview Series CIP on EtherNet Technology

Code sources

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2 General Information



Please read this document carefully before working with the product, mounting it or starting it up.

2.1 Target Group

The device may only be planned, mounted, commissioned and serviced by persons having the following qualifications and fulfilling the following conditions:

- · Technical training.
- Briefing in the relevant safety guidelines.
- Constant access to this documentation.

2.2 Symbols used / Classification of the Warnings and Safety instructions

	Classification:
	This symbol, together with the signal word DANGER , warns against immediately imminent threat to life and health of persons.
	The non-compliance with this safety instruction will lead to death or severe adverse health effects.
	Classification:
	This symbol, together with the signal word WARNING , warns against a potential danger to life and health of persons.
	The non-compliance with this safety instruction may lead to death or severe adverse health effects.
	Classification:
	This symbol, together with the signal word CAUTION , warns against a potential danger for the health of persons.
	The non-compliance with this safety instruction may lead to slight or minor adverse health effects.
ATTENTION	Classification:
	The non-compliance with the ATTENTION note may lead to material damage.

NOTICE	Classification:
	Additional information relating to the operation of the product, and hints and recommendations for efficient and trouble-free operation.

2.3 Transport / Storage

Check the delivery immediately upon receipt for possible transport damages. If you do not mount the device immediately, store it preferably in its transport package.

The device must be stored at a dry and dust-free location, in compliance with the technical data, see chapter Technical Data [\triangleright 7].

3 Product Description

3.1 Technical Data

NOTICE	Technical Data
	All technical data, as well as the mechanical and electrical characteristics, are specified in the data sheets of the corresponding device variant, for special versions in the corresponding quotation / customer drawing of the product.
NOTICE	Observe the configuration

3.1.1 Technical Data Sendix F58xx

Singleturn technology	Optical
Multiturn technology	Battery-buffered, electronic counter, flash technology
Singleturn resolution (MUR) Maximum default	19 bit 18 bit
Multiturn resolution (NDR) Maximum default	24 bit 12 bit
Total resolution (TMR) Maximum default	30 bit 30 bit
Scaling	Supports USF Supports gear factor
Accuracy	± 0,0137° (over the whole temperature range)

Mechanical Characteristics for the Sendix F58xx Encoders

Maximum rotational speed	
IP67 (for short periods– 10 min) IP67 (continuous operation)	9000 min⁻¹ 6000 min⁻¹
Starting torque (at 20 °C)	
IP67	< 0,01 Nm
Mass moment of inertia	
Shaft version Hollow shaft version	3,0 x 10⁻⁶ kg·m² 6,0 x 10⁻⁶ kg·m²
Permissible shaft load	
radial axial	80 N 40 N
Protection level (acc. to EN 60529)	
Housing side Shaft side	IP67 IP65 (optional IP67)
Working temperature range	-40°C +80°C [-40°F +176°F
Materials	
Shaft/hollow shaft Flange Housing	Stainless steel Aluminum Aluminum
Shock resistance (acc. to EN 60068-2-27)	2500 m/s², 6 ms
Vibration resistance (acc. to EN 60068-2-6)	100 m/s², 55 2000 Hz

Electrical characteristics for the Sendix F58xx encoders

Supply voltage	10 30 V DC
Maximum current consumption	250 mA
Supply voltage reverse polarity protection	Yes

3.2 Supported Standards and Protocols

The EtherNet/IP standards and features implemented in the device are listed below:

3.2.1 Sendix F58xx Standards & Features

- CIP Version v3.32
- EtherNet/IP Version v1.30
- LLDP
- BOOTP
- DHCP

EtherNet/IP Features

• DLR (Device Level Ring) possible

- QoS (Quality of Service) possible
- ACD (Address Conflict Detection)
- · Multicast and Unicast ability
- · Connection to up to 5 controllers

General Information on EtherNet/IP

EtherNet/IP Conformance Tested	Version CT-19, August 2022
EtherNet/IP Specification	Vol 2, Ed 1.30
CIP Specification	Vol 1, Ed 3.32
CIP Position Sensor Object	rev. 2 (Class Code: 0x23)

Implemented Objects (CIP Objects)

- · Identity Object
- Message Router
- · Assembly Object
- Connection Manager
- · Position Sensor Object
- QoS Object
- · Port Object
- TCP/IP Interface Object
- EtherNet Link Object

3.3 Interface Description EtherNet/IP

The real time EtherNet for industrial automation applications allows simultaneous Internet and enterprise connectivity for Industry 4.0 and Industrial IoT applications.

3.3.1 EtherNet/IP Communication Network

EtherNet/IP is an application layer that organizes data transmission between transmitters and receivers in the industrial network. All data is grouped in objects. Every EtherNet/IP field device (EtherNet-IP "Adapter") manages a collection of objects. An object corresponds to a collection of related data. There are two types of objects: Necessary objects and application objects.

Necessary objects must be implemented in every EtherNet/IP field device for the network communication. These include among others: Identity object, connection object, EtherNet/IP object and TCP object. For example, the identity object contains the vendor ID, the product name and the serial number of the device. The TCP/IP object contains among others the TCP/ IP address, the net mask and the gateway address.

If for example several TCP/IP access addresses are used, there will be several TCP/IP objects. If there are several objects of a class, they are called instances. Instances of the same object of a class each have the same attributes and properties.

The data in the respective objects are called attributes.

Accessing to a determined attribute requires the object number, the instance number and the attribute number.

For example, the encoder has a single "Position Sensor object" (object number 0x23, instance number 1) with the attributes Position, Velocity, Acceleration, etc. The compilation of the objects forms the data infrastructure for the network.

3.3.2 EtherNet/IP and CIP

The object-oriented Common Industrial Protocol (CIP), issued by the Open DeviceNet Vendor Association (ODVA), distinguishes between "implicit" I/O messages and "explicit" question/ answer telegrams for configuration and data acquisition.

Explicit messages read or write a specific object, attribute, and instance through the router and return a response with corresponding data.

Implicite messages are defined by the manufacturer. Data from various objects is collected in an assembly in the device and transmitted to the network in bundled form. Incoming messages are also sent to the assembly in the device and distributed to the objects from there.

While explicit messages are embedded in TCP frames, data for real-time applications are sent via UDP. Switches that form the center of a star-shaped network topology prevent data collisions of the devices connected via point-to-point connection.

EtherNet/IP can be used to implement various network topologies: including star topology or line topology with standard EtherNet devices or a Device Level Ring (DLR) with EtherNet/IP devices specially parameterized for this purpose.



EtherNet/IP typically achieves "soft" real-time with cycle times of approximately 10 milliseconds.



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3.3.3 Parameterizing

The network integration requires the EDS files of the field devices to be configured. EDS files are simple text files in the ASCII format. They describe how the field device can be used in the EtherNet/IP network and the available objects, attributes and services. EDS files contain all data relevant for engineering and data exchange with the device. The minimum requirement is an information about the identity to allow network tools to recognize the device.

3.3.4 Addressing

Field devices for EtherNet/IP networks support DHCP (Dynamic Host Configuration Protocol) and BOOTP for the allocation of the IP address.

3.3.5 Non-Volatile Memory

The Sendix F58 encoder offers the advantage of a non-volatile memory (FRAM) for all saved non-constant internal and external parameters, application and configuration data, which remain preserved after a power off/power on cycle of the encoder.

Thanks to the implementation of the non-volatile memory as FRAM, this encoder has the advantage of allowing the user to reconfigure it (e.g. preset value) or to modify its configuration (e.g. IP address configuration, encoder configuration, etc.) as often as necessary.

4 Installation

NOTICE	Observe the operation manual
	Installation instructions can be found in the relevant operation manual.

See document: R60070 - Encoder

4.1 Electrical Installation

4.1.1 General Information for the Connection

ATTENTION	Destruction of the device
	Before connecting or disconnecting the signal cable, always disconnect the power supply and secure it against switching on again.
NOTICE	General safety instructions
	Make sure that the entire system is in a de-energized state during electrical installation.
NOTICE	No open cable wires
	Connect all required cable wires / connectors before commissioning. Insulate individually all unused ends of the output signals to avoid short-circuits.
	 Electrostatic discharges at the contacts of the connector or at the cable ends could damage or destroy the device. Take appropriate precautionary measures.
NOTICE	Traction relief
	Always mount all cables with traction relief.
NOTICE	Use shielded data lines
	Use exclusively shielded data lines to comply with the EMC interference immunity requirements in force for interference emissions and external interference.

4.1.2 Terminal Assignment

The encoder has three connectors, two of them are the two Ethernet ports.

In this documentation, these ports are designated as Ethernet IN/OUT ports.

The central connector is the power supply of the encoder. The power supply connector is an A-coded M12 plug.

Both Ethernet connectors are D-coded M12 sockets. The assignment of the signals to the pins is described in the table below.

3x M12, 4-	oole	Connector			
	Li	nk 1 - Etherne	\sim_2		
Signal	TxD+	RxD+	TxD-	RxD-	
Pin	1	2	3	4	•
					Socket, D-coded
		Voltage	supply		
Signal	+ V	-	0 V	-	
Pin	1	2	3	4	
					Plug, A-coded
	Li	nk 2 - Etherne	et Port IN / Ol	JT	$\sqrt{2}$
Signal	TxD+	RxD+	TxD-	RxD-	
Pin	1	2	3	4	•
					Socket, D-coded

The two external encoder connectors "PORT 1" and "PORT 2" are used for the Ethernet communication. One of the two ports is sufficient for a star structure. Both ports are required for a line or ring structure. In principle, the data ports are equivalent and can be chosen freely.



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NOTICE

M12 connector cover

Both Ethernet ports are provided with a plastic cap. If only one of both ports is to be used, the cap of the other port must be tightened at a torque of 1 Nm [0.74 ft-lb] to ensure the IP protection level.

Signal assignment of an M12 to RJ45 cable

M12 to RJ45 direct

Signal	M12 Pin	RJ45 Pin
TxD+	1	1
TxD-	3	2
RxD+	2	3
RxD-	4	6

4.1.2.1 Information for EMC-Compliant Installation

Requirements for cables

a) Use exclusively shielded twisted-pair cables to connect the device.

b) Comply with the maximum permissible connection cables length.

EMC acc. to EN 61326-1	Criterion A	Criterion B	
	The device operates trouble-free, user data transmission proceeds without disturbance, internally stored data and configurations remain preserved.	During a failure, a disturbed transmission of the user data is allowed, internally stored data and configurations remain preserved.	
Interference immunity	Is achieved with a shielded line.	Is achieved with an unshielded line.	
	Class A Industrial environment	Class B Living area	
	The device has a radiation according to Class A.	The device has a radiation according to Class B.	
Radiation	Is achieved with an unshielded line.	Is achieved with a shielded line.	
NOTICE	Grounding of the encoder housi	ng	
	The cable shield is connected inter When using a stator coupling for in coupling is sufficiently conductive. O directly connected to a protective e	nally to the encoder housing. stallation, make sure that this Otherwise, the housing should be arth.	
	 For this purpose, also provide all in chapter Information for EMC-C 	or this purpose, also provide alternative measures, as described chapter Information for EMC-Compliant Installation [] 14].	

Shielding and Equipotential Bonding

- a) Apply the cable shield on a large contact area ideally 360°. Use e. g. a shield terminal to this purpose.
- b) Pay attention to proper cable shield fastening.
- c) Preferably connect the shield on both sides with low impedance to the protective earth (PE), e.g.on the device and/or on the evaluation unit. In the event of potential differences, the shield must only be applied on one side.
- d) If shielding is not possible, appropriate filtering measures must be taken.
- e) Make sure that no short-time overvoltages can occur on the signal and power supply lines when the protective earth is connected to the shield on one side only.
- f) For the large-area connection of the cable shield, use the shield terminal provided to this purpose. It can easily be mounted on the top-hat rail.



Order code	8.0000.4G06.0312	8.0000.4G06.0718
Material	Spring steel, galvanized	
Shield diameter	3.0 12.0 mm	7.0 18.0 mm

Kübler offers a wide range of connection cables in various versions and lengths, see www.kuebler.com/connection technology.

Kübler offers various solutions for EMC-compliant installation, e.g. shield terminals for the electrical cabinet, see www.kuebler.com/accessories.

4.1.3 Network topologies

Network topologies result from the functional requirements imposed on the respective network. However, network planners must also consider aspects such as management, performance, spatial environment, safety, maintenance and savings potential. Thus, the network topology is in practice always a compromise resulting from very different considerations.

Basically, any network topology can be achieved with Industrial Ethernet. There are essentially three patterns used to arrange devices in a network: the star, the line and the ring. Each of these three basic physical topologies in turn includes the smallest topology possible: the point-to-point topology between two participants.

- The star topology includes point-to-point connections between a central network participant and all others, which are arranged in star with respect to it. The transmission medium runs point-to-point between them, resulting in a star structure.
- In the line topology, all participants are interconnected by means of a common transmission medium. This medium is called bus, so this topology is also called bus topology.
- In the ring topology ("Device Level Ring"), the devices are wired in a ring structure. The two network ports of the devices are connected to the respective neighboring devices on both sides. The first and the last device in the ring are connected each with one of their ports to the ring master.



NOTICE	Topology and line length	
	Independently of the chosen topology, the length of the line between the single devices shall in no case exceed 100 m. In the event of line lengths exceeding 100 m, the single devices must be coupled through suitable switches.	

5 Commissioning and Operation



Risk of injury due to rotating shafts

Hair and loose clothing can be caught by rotating shafts.

- · Prepare all work as follows:
- ⇒ Switch the operating voltage off and stop the drive shaft.
- $\Rightarrow\,$ Cover the drive shaft if the operating voltage cannot be switched off.

5.1 Overview of the Connectors and LEDs

The encoder has five LEDs (No. 5 - 9).



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1	Ethernet Port – Link 2	5	Link 2	9	Link 1
2	Supply voltage	6	NET - Network	10	Switch: x100
3	Cover screw	7	MOD - Module	11	Switch: x10
4	Ethernet Port – Link 1	8	ENC – Encoder	12	Switch: x1

Display	LED	Description
LINK 1		The LINK 1 LED lights up green when the Ethernet connection is available and flashes yellow during data exchange. The LED is off in all other cases.
LINK 2		The LINK 2 LED lights up green when the Ethernet connection is available and flashes yellow during data exchange. The LED is off in all other cases.
NET		The NET LED displays the current status of the network. The (all) statuses are listed in the NET LED table.
MOD		The MOD LED displays the current status of the system. The (all) statuses are listed in the MOD LED table.
ENC		The ENC LED displays the current status of the encoder. The (all) statuses are listed in the ENC LED table.

NET LED

Display	LED	Description	Measures
Off	\bigcirc	No power supply / IP address.	Check the voltage and the polarity.
On		Connected; the connected device has an IP address and a CIP connection.	n/a
Flashing		No connection; the device has an IP address, but no CIP connection.	Establish the connection / Check the network connection.
On		Error IP address already allocated to another device.	Correct the IP address conflict.
Flashing		Warning; connection timeout (recoverable error). Erased by resetting or by a new connection.	Restore the connection.
Flashing		Self-test when switching on.	n/a

MOD LED

Display	LED	Description	Measures
Off	\bigcirc	No power supply.	Check the voltage and the polarity.
On		Device ready for operation.	n/a
Flashing		Standby / idle.	n/a
On		Error; device not ready (unrecoverable error).	Check the alarms (attribute 44).
Flashing		Warning; device still in operation (recoverable error).	Check the warnings (attribute 47).
Flashing		Self-test when switching on.	n/a

ENC LED

Display	LED	Description	Measure
Off	\bigcirc	No power supply.	Check the voltage and the polarity.
On		Device ready for operation.	
On	•	Manufacturer-specific warning; device still in operation (recoverable error).	Check the warnings (attribute 47).
Flashing		Manufacturer-specific warning; device not ready (unrecoverable error).	Check the alarms (attribute 44).

5.1.1 Encoder Rotary Switches

The three rotary switches of the encoder (switch x1, x10, x100) form a three-digit decimal number with the units, the tens and the hundreds.

The switch positions are only taken over when switching on the power supply. The switches should be set only when the power supply is switched off. Modifying the switch positions during operation is not provided for. In this case, the encoder detects the changes and switches over to an error condition.

300, 555, 800 are so-called transient switch positions, the encoder does not switch to normal operation mode when they are set.

The rotary switches always have priority. If e.g. a static IP address is set, changes via the TCP/ IP object with "Object State Conflict" are rejected.

Switch position	Meaning
000	Address assignment per DHCP.
1 to 254	Use the static IP address (standard: 192.168.1.x, subnet mask: 255.255.255.0), the last digit "x" of the IP address is defined by the rotary switches.
300	Explicit Protection mode OFF, see chapter Implicit Protection Mode and Explicit Protection Mode [▶ 50].
555	Encoder reset to factory setting, see chapter Resetting the Encoder [▶ 20].
800	Explicit Protection mode ON, see chapter Implicit Protection Mode and Explicit Protection Mode [> 50].
other positions	Reserved, not to be used!

5.2 Quick Start Guide

5.2.1 Default Settings

5.2.1.1 Encoder Factory Settings

The Address Conflict Detection (ACD) is enabled.

In delivery condition, the rotary switches are set to 000 (DHCP address allocation).

5.2.1.2 Setting the IP Address With the Rotary Switches

A fixed IP address can also be allocated using the address selector switches on the device in case the address allocation via DHCP is not desired.

- a) Disconnect the encoder from the power supply.
- b) Unscrew the cover screw on the encoder, see chapter Overview of the Connectors and LEDs [▶ 17].
- c) Turn the rotary switches to the desired position, see chapter Encoder Rotary Switches
 [▶ 19].
- d) Re-start the encoder.

⇒ After the new start, the encoder can communicate using the address set.

Attribute ID:	Attribute name	Default value	Remark
12	Direction Counting Toggle	0	Increasing clockwise.
14	Scaling Function Control	1	ON
16	Measuring Units per Span (MUR)	262,144 (18 bits)	
17	Total Measuring Range (TMR)	1,073,741,824 (30 bits) (multiturn encoders)	
		262,144 (18 bits) (singleturn encoders)	
19	Preset Value	0	
22	Position Low Limit	0	
23	Position High Limit	1,073,741,823 (multiturn encoders)	
		262,143 (singleturn encoders)	
25	Velocity Format	0x1F0F	Revolutions per minute.
26	Velocity Resolution	1	Currently not used.
27	Minimum Velocity Setpoint	-9000	
28	Maximum Velocity Setpoint	9000	
30	Acceleration Format	0x0812	Revolutions per second ² .
31	Acceleration Resolution	1	Currently not used.
32	Minimum Acceleration Setpoint	-6366	
33	Maximum Acceleration Setpoint	6366	
100	Gear Factor	0	OFF
101	Gear Factor, Numerator	4096	
102	Gear Factor, Denominator	1	
110	Velocity Filter Integration Time	20	
112	Acceleration Filter Integration Time	20	

Also refer to

Encoder Factory Settings [▶ 19]

5.2.1.3 Resetting the Encoder

There are two ways to reset the encoder to the factory settings.

With the Rotary Switches

Resetting the encoder to the factory settings with the rotary switches corresponds to a type 1 reset.

- a) Disconnect the encoder from the power supply.
- b) Set the rotary switches to 555.
- c) Connect the encoder to the power supply.
- d) Wait for approximately 5 seconds.
- e) Disconnect the encoder from the power supply.
- f) Set the rotary switches to the position desired for operation, e.g. 000.
- g) Connect the encoder to the power supply.
- ⇒ The encoder is now reset.

With the Identity Object

To reset the encoder with the Identity object, the "Reset" service (Service Code 0x05) must be carried out with Parameter "1", see chapter EtherNet/IP Services of the Position Sensor Object [▶ 34].

There are two encoder reset types, which differ in behavior:

Reset Type 0

To reset the encoder with the Identity object, the "Reset" service (Service Code 0x05) must be written with Parameter "0".

The encoder behaves as if the power supply had been switched off and on again ("power cycle").

Reset Type 1

The saved encoder configuration is set back to the "factory" delivery condition and saved (necessary objects and application objects). Then, the switching off and on of the power supply is simulated or carried out.

5.2.2 Configuration

NOTICE	Position jumps after configuration changes
	Please note that a configuration change (e.g. a change of one or several of the Position Sensor object attributes No. 12, 14, 16, 17, 100, 101, 102 and others) lead to a sudden change of the position sent by the encoder.
	configuration changes.

5.2.2.1 Integrating the Encoder in the Logix Designer

In order to use the encoder to its full extent, it must be integrated in the Studio 5000 Logix Designer software and in your control network.

- a) Set the IP address and the subnet mask of the computer Logix Designer is running on.
- b) Under Windows, call the menu "Control panel / Network and Sharing Center".
- c) Open the menu "Properties" of the used network interface.

	perties		×
Networking Sharin	ng		
Connect using:			
ASIX AX88	179 USB 3.0 to Gigabit Ethe	met Adapter	
This connection u	ses the following items:	Configure	
I Internet File and I I I I I I I I I I I I I I I I I I I	Printer Sharing for Microsoft ket Scheduler Protocol Version 4 (TCP/IPv	Networks	
Microsoft Microsoft Microsoft Microsoft Microsoft Microsoft	Network Adapter Multiplexo LLDP Protocol Driver Protocol Version 6 (TCP/IPv	or Protocol 6)	~
Microsoft Microsoft Microsoft Internet Install	: Network Adapter Multiplexo : LLDP Protocol Driver Protocol Version 6 (TCP/IPv Uninstall	6) Properties	•

- d) Select "Internet Protocol Version 4" and click on "Properties".
- e) Input the following exemplary values: IP address: 192.168.1.111, subnet mask 255.255.255.0.

Internet Protocol Version 4 (TCP/IPv4	I) Properties
General	
You can get IP settings assigned autor supports this capability. Otherwise, yo administrator for the appropriate IP se	natically if your network u need to ask your network ettings.
Obtain an IP address automatica	lly
OUSE the following IP address:	
IP address:	192.168.1.1
Subnet mask:	255.255.255.0
Default gateway:	192.168.1.1
Obtain DNS server address autor	natically
OUSE the following DNS server add	dresses
Preferred DNS server:	· · ·
Alternate DNS server:	· · ·
Validate settings upon exit	Advanced
	OK Cancel

IMG-ID: 9007199572876299

f) Start the Logix Designer software and create a new project. A controller with switch and backplane is already configured in the following project example.

💰 New Project	w Project						
1756-L84ES Guar F58x8_A3_Commisior	rdLogix® 5580 Safety Controller ^{ning}						
Revision:	34 *						
Chassis:	1756-A4 4-Slot ControlLogix Chassis v						
Slot:	0 ~ (i) Project default will be SIL2/PLd with no safety partner.						
Security Authority:	No Protection ~						
	Use only the selected Security Authority for authentication and authorization						
Secure With:	Logical Name <controller name=""></controller>						
	Permission Set						
Description:]					
	Cancel Back Next	Fir	nish				

g) Below the "Ethernet" node, select the menu item "New Module".

 Logical Model I/O Configuration E 1756 Backplane, [0] 1756-L84E 	1756 S F5	-A4 8x8_A3_Commisioning
Ethernet	•	New Module
	Ĵ	Import Module Discover Modules Paste Ctrl+V Properties Alt+Enter
Bus Size		Print

IMG-ID: 318139147

h) Select the suitable Kübler encoder.

t Module Type				
talog Module Discovery Favorites				
F58*A3	Clear	Filters		Show Filters $~$ \scriptstyle
Catalog Number 8.F5855/F5878.XXAN.A322 8.F5868/F5888.XXAN.A322	Description F5858/78 A3 EIP ST F5868/88 A3 EIP MT	Vendor Kuebler GmbH Kuebler GmbH	Category Encoder Encoder	

i) Input the desired name of the new encoder (here: F58X8_A3_Encoder) and its IP address (here: 192.168.1.30).

New Module					×
General*	General				
- Connection Module Info Internet Protocol - Pet Configuration - Network	Type: Vendor: Parent: Name: Description: Module Defin Revision: Bectronic K Connection	8 F5966/F5888.XXAN A322 F5888/88 A3 EIP MT Kuebler GmbH Local F58X8_A3_Encoder F58X8_A3_Encoder 0 0 0 0 0 H 0 H 0 H 0 H 0 H 0 H	met Address hrvate Network: P Address: fost Name:	192.168.1. 192. 168 . 1 . 30	
Status: Creating			ОК	Cancel He	эlp

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j) Select the desired connection. For this example, use the connection "Status + Position + Velocity + Acceleration + PresetAndDirectionCounting + Config".

Module Definition					×
Revision: 1 V 001 🜩					
Electronic Keying: Compatible Module V					
Connections:					
Name		Size		Tag Su	uffix
Status + Position + Velocity + Acceleration + PresetAndDirectionCounting + Config	Input:	16			F58X8_A3_Encoder:I1
×	Output:	8	SINT	1	F58X8_A3_Encoder:O
Status - Poston - Vabioty - Acceleration - PresetAudDrector/Country - Contry - Poston - Status Poston - Status Status - Poston - Velocity - Acceleration					
<					>
			OK	Cano	el Help

k) Select data length DINT.

	Module Definition*						×
Re	vision: 1 V 001 文						
Co	nnections:						
Г	Name		Size		Tag Su	Iffix	
	Statue + Desition + Malacity + Acceleration + DreestAndDirectionCounting + Config	Input:	16	SINT	1	F58X8_A3_	Encoder:11
		Output:	8			F58X8_A3_	Encoder:O
	Select a connection			SINT			
				DINT	-		
				NUME TO			
<							>
				OK	Cance	el	Help

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⇒ You can now change the configuration values of the encoder under "Controller Tags / F58X8_A3_Encoder:C.".

	Scope: DF564_AG_com v Store: M Tept							
a 🛁 Controller FSbd_A3_Commisioning 💦 🧃	Num	Mills Mars	a tata	Outo Xeen	Developing			
Controller Tags	PSV9 A3 Secondary Department Counting		Decimal	2001	Cola resultaria D Darkaite 1 Constenioriate			
E Controlle Fault Handler	TING AS Foundary Contraction for		Desired	200				
C Tacks	THE IS CONTRACTOR OF THE		Cecimal	1000	A Conference of the Off			
A 🔿 MainTask	Passing of the second participation		Cecinal					
b 5 MainProgram	Fisht, Arjanciden, Messanguezbenevert	202100	Decimal	DINI	Measuring Unity Neuralizan			
Li Safety lask (20 ma)	 Folke, AU Incodent. Tetal Measuring Kange 	1272741824	Decimal	Davei	Total Measuring Kange			
Unscheduled	FSDQ_A3_EncoderC.Preset		Decimal	DINT	Preset Value			
Motion Groups	FSEQ_A3_Enceder/C.PodSeeLouLinit	2 0	Decimal	DINT	Lower Limit of the Position			
Alarm Manager	FSEXE_A3_Encoder/C PositionHighLimit	1070741020	Decimal	Devit	Upper Limit of the Position			
Assets	FSEQ_A3_Encoder/C.GearFactorNumerator	4095	Decimal	DENT	Numerator for the number of revolutions			
Add-On Indhuchens	FSDRD_A3_Encoder/C.GearFactorDenominator	1	Decimal	DINT	Denominator for the number of revolutions			
W User-Defined	FSEXE_A3_Encoder/C.WelocityFormat	16#190F	Hec	NT	Speed unit: 1964h a counts/i; 1955h a counts/m; 1955h a turns/i; 1957h a turns/mir; 1930h a turns/h			
(E Strings	FSEG_A3_Encoder/CAccelerationFormat	1640812	Hec	INT	Acceleration unit 0810h = countu/ms ¹ ; 0811h = countu/s ¹ ; 0812h = turnu/s ¹ ; 0813h = rad/s ¹			
K Add- On-Defined	FSEX8_A3_Encoder:C.WeckyMinimumSetpoint	-9000	Decimal	DINT	Lower limit of the speed Setpoint			
P @ Prelefined	FSEX8_A3_Encoder:C.WookyMaximumSetpoint	9000	Decimal	DINT	Upper limit of the speed Setpoint			
Tuest	FSEK3_A3_Encoder:C.WeocitySetpointHysteresis	0	Decimal	DINT	Hysteresis for the speed limits. The unit depends on attribute ID 17h			
Logical Model	FSEK8_A3_Encoder:C.WacityFilterIntegration	20	Decimal	DINT	Number of measured values from which a mean value is formed			
1/0 Configuration	FSEX8_A3_EncoderC.WoothyFilterBendwidth	100	Decimal	DINT	Bandwidth of the low pass filter in Hz 0 = Deactivated			
 In 1756 Backplane, 1756-A4 Point 1786 J Mrs 786-A4 	FSER8_A3_Encoder:CAccelerationMinimumSetp	int -5365	Decimal	DINT	Lower limit of acceleration in counts/ ms ⁴ . If the acceleration undercuts this value, the warning flag is set.			
 B TH TSC INTE Super- 	FSER8 A3 Encoder/C AccelerationMaximumSetp	oint 6366	Decimal	DINT	Upper limit of acceleration in county/ ms ⁴ . If the acceleration exceeds this value, the warning flag is set.			
4 👬 Ethernet	FS8/8 A3 Encoder/C AccelerationSetpointHyster	pia 0	Occimel	DINT	Hoteresis for the acceleration limit values			
# 8.F5868/F5888.XXAN.A322.F58X8_A	FS8/8 A3 Encoder/C AccelerationFilterIntegration	20	Occimel	DINT	Number of measured values from which a mean value is formed			
1756-EN3TR Switch	FSER A3 FrenderC ArestmationFilterRandwidt	100	Oscimal	DAVE	Rendwidth of the low new filter in Hr () = Dearticuted			
En 1796, 1985 ESEM AL Commission	+ FSR08 #3 Former11	1.1	6.4	OTOR AFSING	Instance Assembly 20			
>	FSR8 A3 Encoder/1.ConnectionEasted	0	Decimal	800	fin Nn Fault			
	# FSRIG A3 Enventer/1.Data	6	() Orvinal	DINITIAL	initary a Journhly 200			
	E FSR08 A3 Encoderci1.Data(0)	0	Devinal	DAU	Device Alarms Bate 0.1 / Device Faults Bate 2.3			
	FS808 A3 Encoder/1Data[1]	87656961	Decimal	ONT	Position value			
	ESSOR 43 Encoderci1.Data[2]	9	Deviced	DAU	Warity men			
	ESSOR 43 Encoderol Data [3]	9	Decimal	DAU	Acceleration			
	 FSR38 A3 Ferroder 01 	6	6.3	OTOR RESING	Instance Accessible 781			
	 FSRS A3 Enceder/01.Data 	6	() Decimal	DINITIZI	Instance dopenally 201			
	h 55978 A2 Exceder O1 Datal11	0	Decimal	De/T	Prist Bit 1 - Report Score Command // Prist Bit 1 - Direction Counting Command			

⇒ The integration of the encoder in your Logix Designer project is now completed.

The description texts of the configuration values that can be seen in the screenshots have been input manually by the user.

5.2.2.2 Setting the Preset

In the standard factory configuration, attribute 12 ("Direction Counting") has the value 0 ("Clockwise").

In this case, the position value increases for clockwise shaft rotation (looking at the shaft from the flange side).

If attribute 12 has the value 1 ("Counterclockwise"), the counting direction is reversed. The position value then decreases accordingly for clockwise shaft rotation.

The following alternative possibilities are available to configure the preset value and the direction of rotation.

Setting the Preset Value Using the Configuration Assembly

For this variant, the PLC transmits the desired preset value once when establishing the connection from the PLC to the encoder via Configuration assembly No. 779.

a) For this purpose, input the desired preset value in bytes 12-15 of Configuration assembly No. 779 before establishing the connection between the PLC and the encoder.

	🔨 🚦 Madule Properties: Switch (ILFS660/FS888203AVA322-1.021)	Cost Cost	roler Tags - FSBAR, A3,	commissioning(controller) ×	
	Scope: DF55k6_A3_Comm ~ Show: All Tage				 T Ster Name Ater
a 😴 Controller FSbd_A3_Commissioning	New	- Weber	· State	Data Data	Devrintice
O Controller Tags	A ESTER AT Excedent		13	00000556655665000000	Instance Acceptible 779
Power-Up Handler	FSSR 43 Founder C Directore Counting		0 Decimal	8001	Code sensatives 1 - Citybeine 1 - Counterclockwise
a 🖾 Teolo	ESOVE #3 Excepter/ ScalarScreeting		1 Decised	900	1 - college (reaction control (N)
4 🔿 MaioTask	F301 A1 Ecceler C Gendletteduration		0 Decimal	800	1 - Gan Betty Exection ON
 MainProgram Safet-Tack (20 cm) 	2 FS03 A3 PrenderC Mean rind Intellected Action		262144 Decimal	DRIT	Manuface Hotelynochitics 176 - 302144
P. J. Selet/Program	N 55978 A) Georgias (Tetal Managing Pages		1672741934 Decise of	DelT	Tetel Manualan Panan ann 1077319834
IV scheduled	A COULAI Secolar Charat	101	1234 Decimal	DAU	Dant Vika intera 70
Motion Groups	A 1997 Di Insender Charles I and and	-	O Decimal	007	I must be the Andrea
P Alern Manager	A 559/2 43 Second of Backard and		1072741934 Decimal	CAU	Dense Linde of the Resident
Add-On Instructions	 Margarian Constant Spectra 		C Outing	047	Non-control on the results of an el street
🔺 🔛 Data Types	h 1971 11 factor Contractioners		1 Decimal	000	Paramientar de las harries el revolución
E User-Defined			2000		
Manage Strange	 PSONE_AS_EncoderC. Vectory Yorman CENE_AS_EncoderC. Vectory Yorman 		2007 Decimal	INT I	speed unit: inven it counts is, inven it counts into it counts int
P seldined	Print, ALERCORE CALLEBRARY ING		2000 Decision	101	ALCERTISTIC AND ALCERTISTICS AND THE COUNTY'S COUNTY'S COUNTY'S AND ALCERTISTS
Module-Defined	 FSUG_AL_ECONFCLINEOR/MERIPHOREPORT 		-9000 Decimal	UNI	Lover live of the speed sepone
iii Trends	PSSN3_A3_Encoder-C.VelecityMeximumSetpoint		9000 Decimal	DINT	Upper limit of the speed Selpoint
S Logical Model	> >SSU,ALEncoderC.VexolyselpowPhysleress		0 Decasal	OWI	Hysteress for the speed limits. The unit depends on Attribute ID 198
4 C 176 Reckelane 1756-24	FSD3_A1_Encoder.C.WebcityFiberIntegration		20 Decimal	DIVIT	Number of measured values from which a mean value is formed
1 [0] 1756-LINES F58x8_A3_Commissioning	FSSR3_A3_EncoderC.VelocityFilterBandwidth		100 Decimal	ONT	Eandwidth of the low pass filter in Hz 0 n Deactivated
 [1] 1756-ENSTR Switch 	 FS803_A3_Encoder C.Acceleration/VinimumSetpoint 		-6366 Decimal	ONT	Lower limit of acceleration in counts/ ms ¹ . If the acceleration undercuts this value, the warning flag is set.
4 🚠 Ethernet	FSD3_A3_EncoderC.AccelerationMaximumSetpoin		6366 Decimal	Devit	Upper limit of acceleration in counts/ res ² . If the acceleration exceeds this value, the warning flag is set.
# 1756 DVITE Guide A	 FSS02_A3_Encoder:C.AccelerationSetpointHysteresis 		0 Decimal	ONT	Hystensis for the acceleration limit values
A 🚑 Dhenet	 FS803, A3, Encoder C.AccelerationFilteIntegration 		20 Decimal	ONT	Number of measured values from which a mean value is formed
# 1756-L84ES F58x8_A3_Commissioning	▶ FSDQ_A3_EncoderC.AccelerationFilteRandwidth		100 Decireal	DINT	Bandwidth of the low pace filter in Hz 0 = Deactivated
	 FSEX8_A3_Encoder/1 		6.3	_0338:8F5868F5888DOVA.	. Instance Assembly 780
	FSBX8,A3,Encoder/1.ConnectionFaulted		0 Decimal	800L	0 = No Fault
	FSDQ_A3_Encodeci1.Data		() Decircal	Deviting .	Instance Assembly 780
	▲ FSEK5_A3_Encoder:01		(-)	0308.0758687588800A	Instance Assembly TD
	 FS8X8_A3_Encoder:01.Data 		() Decimal	0NT[2]	Instance Assembly 781
	FSER A3_EncoderO1.Data(3)		0 Decireal	ONT	Byte 0 Bit 01 - Preset Trigger Command: 1+ Pres, Val Inst 779, 2 + Pres, Val Inst 781 // Byte 2 Bit 01 - Direction Counting Comman
	FSERE A3 Encoder:01.Deta[1]		3670 Decimal	DINT	Preset Value Instance 701

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- b) Then let the PLC establish the connection to the encoder.
- c) Set the "Preset Trigger Command" bits in byte 0 of Output assembly No. 781 first to 0.

	series Busined of the series of the			· h
Controller Tools, AJ, Continuationing Controller Taos	Name II	Value * Style	Data Type	Description
Controller Fault Handler	FS8X8_A3_Encoder/C.DirectionCounting	0 Decimal	8006	Code sequence 0 = Clockwise 1 = Counterclockwise
III Pewer-Up Handler	FS808, A3, Encoder C.ScalingFunction	1 Decimal	800L	1 = scaling function centrel ON
Tacks	FSDG_A3_Encoder.C.GearFactorFunction	0 Decimal	800L	1 = Gear Factor Function ON
 A MainTask b MainTask 	▶ FSSR_A3_Encoder:C.MeasuringUnitsPerfavolution	262144 Decimal	DINT	Mazzaring Units/workston 126 : 262144
A (1) SafetyTauk (20 mel	FS808.A3.Encoder.C.TotalMeasuringRange	1673741824 Decimal	ONT	Total Measuring Range man, 1073741834
D _1, SeletyProgram	FSR0LAL Encoder C.Preset	1234 Decimal	ONT	Preset Value Instance 779
Inscheduled	▶ FSDQ_A3_Encoder:C.PositionLowLimit	0 Decimal	DINT	Lower Limit of the Position
Marin Maaaaa	FS8/8 A3 Encoder/C/PositionHighLimit	1073741824 Decimal	ONT	Upper Limit of the Position
Assets	FSR03_A3_EncoderC.GearFactorNumerator	47 Decimal	ONT	Numerator for the number of revolutions
Add On Instructions	▶ FSD0_A3_Encoder:C.GearFactorDenominator	2 Decimal	DINT	Denominator for the number of revolutions
a 🔤 Data Types	FSSR A3 Encoder-C/lelocityformat	7951 Decimal	INT	Speed unit: 1994h = counts/s: 1993h = counts/ms: 1995h = tama/s: 1997h = tama/mirc 1910h = tama/h
Strings	FS808, A3, Encoder C.AccelerationFormat	2066 Decimal	INT	Acceleration unit 0810h = counts/ves ¹ 0811h = counts/s ² 0812h = turns/s ¹ 0813h = rad/s ²
E Add-On-Defined	▶ FSD0L,A3_Encoder:C.VelocityMinimumSetpoint	-9000 Decimal	DINT	Lower limit of the speed Setpoint
P 🙀 Predefined	FSSQ A3 Encoder-C Velocity-MeximumSetpoint	9000 Decimal	ONT	Upper limit of the upped Setpoint
P R Module-Defined	FS808.A3.Encoder:CVelocitySetpointHysterpis	0 Decimal	ONT	Husteresis for the speed limits. The unit depends on attribute ID 19h
Logical Medel	 FSIDI AT Encoder C. Velocity Filterintegration 	20 Decimal	ONT	Number of measured values from which a mean value is formed
VO Configuration	F300 Al IncoderC/VelocityFilterEendwidth	100 Decimal	DNT 100	Eandwidth of the low pass filter in Hz 0 ; Deactivated
1756 Beckplane, 1756-24	FS808 A3 Encoder C Acceleration/MinimumSetpoint	-5366 Decimal	ONT	Lower limit of acceleration in county/ ms ¹ . If the acceleration undercats this value, the warning flag is set.
 III 1756-ENSTR Salivity 	FSR03_A3_EncoderC.AccelerationMaximumSetpoint	6366 Decimal	ONT	Upper limit of acceleration in counts/ ms ² . If the acceleration exceeds this value, the warning flag is set.
A 🚣 Rithernet	FSDQ A3 EncoderCAccelerationSetpointHysteresis	0 Decimal	ONT TWO	Hysteresis for the acceleration limit values
@ 8.F5868.F5888.XXAN.A322.F5808_A3_E	FSDI8 A3 Encoder/CAccelerationFilteIntegration	20 Decimal	ONT	Number of measured values from which a mean value is formed
1750-EN3TR Switch	FSR08_A3_EncoderC.AccelerationFilteRendwidth	100 Decimal	ONT	Randwidth of the low pass filter in Hg 0 = Deactivated
Bt 1756-184FS F5848 A3 Commissioning	A FSERE A3 Encodecil	U	0200-0F5868F5888DOA	instance Assembly 700
	FSD/E A3 Encoder/1.ConnectionFaulted	0 Decimal	8001	0 :: No Fault
	FS808_A3_Encoder/10ata	(L) Decimal	ONTHE	Instance Assembly 780
,	# FSER2 A3 Encoder01	L)	ODDR OF SMORT SMORT	instance Assembly 701
	< F350 A3 Encoder/01/Date	L3 Decimal	09/123	Instance Assembly 701
	FS848.A3 Encoder/01.Data(0)	0 Occimal	ONT	Bute 0 Bit 01 - Preset Trigger Command: 1+ Pres Xel Inst 779, 2 + Pres Xel Inst 781 // Bute 2 Bit 01 - Direction Counting Comman
	FSERR_A3_Encoder/01.Data[1]	7654321	0 NT	Preset Value Instance 781
	PresetVessage	7-0 0 0 0 0 0 0 0	R ESSAGE	Service code (b10) Instance 1. Class (b23, Attribute (b13)
	PresetOneShot	15-2 5 0 0 0 0 5 0	Used: N	
	PrestTringer	23-16 0 0 0 0 0 0 0	a Description	
	 Preset/alue 	21-24 6 0 0 0 0 6 0	⁴ Instance Asserbby 70	11 Byte 0 Bit 01 - Preset Trigger
	H H Montor Taga (Ddt Taga /		1 Commands 1 - Pore Val last 773	
Search Benudia 🔤 Provin			2 = Poos_Vol lest 701)	<i>y</i>

- d) Then set the "Preset Trigger Command" bits to 1 (designated in the EDS file as "SetPresetValueFromConfigurationAssembly").
- ➡ Modifying the value triggers the setting of the preset value. The "Preset Trigger Command" bits can then be set to 0 again.

Setting the Preset Value Using Explicit Messaging

To set the preset by explicit messaging, appropriately insert an MSG command in connection with an ONS command in your PLC program (as described in the following illustrations).

🥏 Controlle	r Tags - F58x8_A3_Commisioning(controller) 🔋 🗄 MainProgram - MainRoutine 🛛 🛛	
Q Q	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	Explicit message for Preset setting 	rectionCountina + Confia"
	because of implicit Protection Mode, all "Set Attribute Single" commands are	rejected. Service code 0x10, Instance 1, Class 0x23, Attribute 0x13
0	Preseffinger PreseffindeStot	MSG Message Control PresetMessage (CEN) (ON)- (ER)-

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a) Press the button with the three points to open the configuration dialog of the MSG block.

Message Configuration - PresetMessage		×
Configuration Communication Tag		
Message Type: CIP Generic	\checkmark	
Service Set Attribute Single ✓	Source Element: PresetValue	~
Service 10 (Hex) Class: 23 (Hex)	Destination	(Bytes)
Instance: 1 Attribute: 13 (Hex)	New Tag	
⊖ Enable ⊖ Enable Waiting ⊖ Start	O Done Done Length: 0	
Error Code: 16#0005 Extended Error Code: Error Path: F58X8_A3_Encoder Error Tast: Class or instance not supported	🗌 Timed Out 🗢	
	Cancel Apply	Help

Carry out the following settings in tab Configuration:

- b) Service Type: Set Attribute
- c) Instance: 1 (since only one device is connected to the controller)
- d) Class: 23 (Hex) (Position Sensor Object)
- e) Attribute: 13 (Hex) (Preset Value)
- f) Source Element: PresetValue
- g) Source Length: 4

Message Configuration - PresetMessage	×
Configuration Communication Tag	
دی Path: <mark>F58X8_A3_Encoder</mark>	Browse
F58X8_A3_Encoder	
Communication Method	0 (Octal)
 ○ Enable ○ Enable ○ Enor Code: 16#0005 Extended Error Code: □ Time Error Path: F58X8_A3_Encoder Error Text: Class or instance not supported 	Length: 0 ied Out ←
OK Cancel Ap	pply Help

Carry out the following settings in tab Configuration:

h) Click on button Browse beside field Path to select the connected encoder.

Setting the Preset Value Using the Output Assembly

To set the preset value with Output assembly No. 781, select the connection called "Status + Position + Velocity + Acceleration + PresetAndDirectionCounting + Config" in the "Module Definition" dialog of Logix Designer when integrating the encoder.

Centroler Organizer + 8 3	Module Properties: Switch (EFSB68/FSB88.XXXMA322.1.001)	Controller Tags - FSRid, A3_Com	nisianingtontrailet) ×			
9 M	Score: DFSbd_A3_Com - Score Al Taga			🗸 😨 litter Name Alter		
a 🖳 Controller F5bd_A3_Commisioning	Mana Sel	Mater & State	Date Yes	Benedative		
Controller Tags	1993 M Facebook Sucherburgers	1 Decimal	toon into	To configure	N	
Controller Hauft Handler	The state of the s	1 Decimal	1000	1. Carly rescion conserve		
A ST Tasks	Poola_ko_Encodent_Joean actorrunction	V Decimal	tooc	TH GER FROM FUNCTION ON		
< C MainTask	 Fills (A) second C Meaning or directive second on 	25214 Decival	LINI	Measuring contonevariability	18 + 25/14	
E MainProgram	P 750X3_A3_EncoderC.TotalMeasuringRange	1075741824 Decimal	DINT	Total Measuring Range max. 1	0734824	
 SafetyTask (20 ms) 	FS8X8,A3,EncoderC.Preset	1234 Decimal	DINT	Preset Value Instance 779		
P Safety#xogram	FSERE_A3_EncoderC.PositionLowLimit	0 Decimal	DINT	Lower Limit of the Position		
h - Mation General	FS8X3_A3_EncoderC.PositionHighLimit	1073741824 Decimal	DINT	Upper Limit of the Position		
🕨 🧰 Alarm Manager	FS833,A3,EncoderC.GewFactorNumerator	47 Decimal	DINT	Numerator for the number of	revolutions	
🔺 🖳 Assets	FSD3_A3_EncoderC.GeaFactorDenominator	2 Decimal	DINT	Denominator for the number	of revolutions	
Add-On Instructions	F5833_A3_EncoderC.VelocityFermat	7951 Decimal	NT	Speed unit 1F04h = counts/s;	1F05h = counts/me; 1F0Eh = tums/s; 1F0Fh = tums/min; 1F10h = tums/h	
 Contentioned 	FS838, A3, Encoder/C.AccelerationFormat	2066 Decimal	NT	Acceleration unit 0810h - cos	arts/ms ² ,0811h = counts/s ² ,0812h = turns/s ² ,0813h = rad/s ²	
Sterney Sterney	FSD3 A3 ExcoderC/Moch/MinimumSetpoint	-9000 Decimal	DINT	Lower limit of the speed Setor	pirt.	
K Add-On-Onlined	FS8x8.A3.EncoderC.MdocityMaximumSetpoint	9000 Decimel	DINT	Upper limit of the speed Setor	oint .	
Predefined	FSERE_A3_EncodesC.MoocitySetpointHysteresis	0 Decimal	DINT	Hysteresis for the speed limits	The unit depends on attribute ID 19h	
 Image Module-Delwed Transfer 	FS5X3_A3_EncoderC.WoothyFilterIntegration	20 Decimal	DINT	Number of measured values from which a mean value is formed		
h Logical Model	FS8X8.A3.EncoderC.NdockyFilterBandwidth	100 Decimal	DINT	Bandwidth of the low pass filter in Hz 0 = Deactivated		
a 🖾 0/0 Configuration	FSD3_A3_EncoderC.AccelerationMinimumSetpoint	-6356 Decimal	DINT	Lower limit of acceleration in	counts/ ms ² . If the acceleration undercute this value, the warning flag is set.	
 International and the second se	FS833_A3_EncoderC AccelerationMaximumGetpoint	6366 Decimal	DINT	Upper limit of acceleration in	counts/ ms ² . If the acceleration exceeds this value, the warning flag is set.	
 II (1) 1756-ENGTR Switch 	FS833,A3,EncoderCAccelerationSetpointHysteresis	0 Decimal	DINT	Hysteresis for the acceleration	finit values	
4 💑 Ethernet	FSD3_A3_EncoderCAccelerationFilterintegration	20 Decimal	DINT	Number of measured values f	from which a mean value is formed	
© 8F5888/F5888.XXAN.A322 F5808_A3	E FS833_A3_EncoderCAccelerationFilterBandwidth	100 Decimel	DINT	Bandwidth of the low pass filt	ter in Hz 0 = Deactivated	
g 1/34-ENGTK Switch	 FSIDR, A3, Encoder/1 	()	_0308-RF5868F588800A	. Instance Assembly 780		
Br 1756-L&4ES FSBull, A3, Commissioning	FSDA3_A3_Encoder/1.ConnectionFaulted	0 Decimal	\$00L	0 = No Fault		
	F58x3_A3_Encoder/1.Deta	() Decimel	DINT(4)	Instance Assembly 780		
	▲ FSDR_A3_Enceder.01	()	_0000.0F5050F500000A	 Instance Assembly 781 		
	 FSEND_A3_Encoder:01.Data 	() Decimal	DINT[2]	Instance Assembly 781		
	FS808_A3_Encoder:01.Data(0)	0 0ecimel	DINT	Byte 0 Bit 01 - Preset Trippe	er: Command: 1= Pres, Val. Inst. 778; 2 = Pres, Val. Inst. 781 // Byte 2: Bit 01 - Direction Counting Command	
	FSEXE_A1_Encoder:01.Data[1]	7 7 6 5 6 2 2 2	ONT	Preset Value Instance 721		
	PresetMessage	7-0 0 0 0 0 0 0 1	essage	Service code 0x10, Instance 1,	Class 0x23, Attribute 0x13	
	PresetOneShet	15-0 0 0 0 0 0 0 0	Used N			
	PresetTrigger	23-16 0 0 0 0 0 0 0	Description			
	PresetValue	31-24 0 0 0 0 0 0 0	Instance Assembly 761 8	yte 0 Bit 01 - Preset Trigger	201	
	Terru, Message	(-)	1= Pres, Vol 1est 779,		Diess 0x23, Amiliante 0x96	
<	K Noellor Tags (Edi Tags /		2 = Pres_Val Inst 781 //			
-			Dyte 2 Bit 01 - Directio	on Counting Command		

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For this variant, the PLC transmits the desired preset value via Configuration assembly No. 781 when the connection from the PLC to the encoder is already established.

- a) Set the "Preset Trigger Command" bits in byte 0 of Output assembly No. 781 first to 0.
- b) Then let the PLC establish the connection to the encoder.
- c) Input the desired preset value in bytes 4-7 of Output assembly No. 781.
- d) Then set the "Preset Trigger Command" bits to 2 (designated in the EDS file as "SetPresetValueFromOutputAssembly").
- ➡ Modifying the value triggers the setting of the preset value. The "Preset Trigger Command" bits must then be set to 0 again.

5.2.2.3 Setting the Direction of Rotation

Standard factory setting

In the standard factory configuration, attribute 12 ("Direction Counting") has the value 0 ("Clockwise").

In this case, the position value increases for clockwise shaft rotation (looking at the shaft from the flange side).

If attribute 12 has the value 1 ("Counterclockwise"), the counting direction is reversed. The position value then decreases accordingly for clockwise shaft rotation.

The following alternative possibilities are available to configure the preset value and the direction of rotation.

Setting the Direction of Rotation Using the Output Assembly

To set the direction of rotation with Output assembly No. 781, select the connection called "Status + Position + Velocity + Acceleration + PresetAndDirectionCounting + Config" in the "Module Definition" dialog of Logix Designer when integrating the encoder.

Centreder Organizer	1 ×	Module Properties: Switch (EF5866)/F5888.XXAVLA222.1.001)	Contrailer Tags - Filtel, Al, Corea	ikioning(cestrolec) ×	
07		Score DFS8x8_A3_Com v Show All Tags			V To Atter Many Alter.
 Controller FSIte, A3_Commissioning 	_	Name	Volue + Stale	Data Tener	Devriation
Controller Tags	-	b FSER 43 FounderC TotalNews singRapper	1079741824 Deviced	ONT	Total Menusian Rever may 107021834
Power-Up Handler		FSERE AT Encoder/C.Preset	1224 Decimal	ONT	Preset Value Instance 779
🔺 🖳 Tanka		FSER 43 Encoder C Resident and imit	d Derimal	ONT	I must limit of the Proving
A C MainTack		FSERE A3 Encoder C PositionHighLimit	1072761826 Decimal	ONT	Unper Limit of the Position
Construction		E 1983 AS Encoder C Genetacted Ameridan	47 Decimal	ONT	Numerator for the number of such time.
J. SafetyProgram		F5883 A3 Encoder C. GeorFacto Devocementar	2 Decival	ONT	Desaminator for the number of resolutions
iii Usscheduled		▶ F3543 A3 Encoder/C/lelochyformat	7951 Decimal	INT	Speed unit 1994k a counte/a 1955k a counte/me 1955k a turne/a 1955k a turne/mix 1915k a turne/h
P Motion Groups		ESS3 A3 Encoder C. Acceleration Encoder	2016 Deviced	INT	Acceleration unit 0010h a countryleys ¹ 0011h a countryle ¹ 0012h a harrys ¹ 0013h a social
A Sateb		FSERE AT Encoder/Clifelocity/AnimumSetpoint	-9000 Decimal	ONT	Lower limit of the speed Setpoint
Add-On Instructions		FSER A3 FounderC ScienceAssimum/staniat	9000 Deviced	ONT	University of the second Setuping
4 🖾 Oata Types		FSERE A3 Enceder/C19/ecitySetpointHysteresis	0 Decimal	ONT	Hysterecis for the speed limits. The unit depends on attribute ID 19h
The Obser-Defined		FSER8 A3 Encoder-CitelocityFilterIntegration	20 Decimal	ONT	Number of measured values from which a mean value is formed
K Add-On-Defined		ESSIS A3 Encoder Citelects FilterRandwidth	100 Decimal	ONT	Randwidth of the low cast filter in Hz 0 + Deactivated
Fig Predefined		P 15545 A3 Encoder/C.AccelerationMinimumGetpoint	-6006 Decimal	ONT	Lower limit of acceleration in counts/ rm ⁴ . If the acceleration undercute this value, the warning flag is set.
Fig Module-Defined Transfit		FS813, A3, Encoder C.AccelerationMainrunGetpoint	6366 Decival	ONT	Upper limit of acceleration in counts/ ms ¹ . If the acceleration exceeds this value, the warning flag is set.
Logical Model		F3543 A3 Encoder/C.AccelerationSetpointPhotomsis	9 Decimal	ONT	Historesis for the acceleration limit values
▲ ⊆UO Configuration		FS888,A3,EncoderC.AccelerationFilterIntegration	20 Decival	ONT	Number of measured values from which a mean value is formed
# 🗰 1756 Backplane, 1756-A4		FSDB AJ Encoder:C.AccelerationFilterEandwidth	100 Decimal	ONT	Bandwidth of the low pass filter in Hz 0 a Deactivated
 [1] [1/34-CMAS FORCAS COMMISSION [4] [1] [1/36-FNSTE Solity 	°	 FS808 A3. Encoder/1 	[-]	.0308-8F5968F5888CCA.	Instance Assembly 780
4 🔥 Ethemet		FSERE A3 Encoder/1.ConnectionFaulted	0 Decimal	8001	D a No Fault
@ LF9864F988.XXANA322F986	8,A5,8	F5848 A3 Encoder/1.Deta	[] Decimal	0N1H	Instance Assembly 780
1755-ENGTR Switch		# FSIDIL_A1_Encoder:01	[-]	ORDERFENDERSERECCA.	Instance Assembly 701
D 1756-LINES F58-0, A2_Commissioning		 FSERS_A3_Encoder:01.Deta 	[] Decimal	ONT[2]	Instance Assembly 781
		FSRX8_A3_EncoderO1.Data(3)	9 131072 Decival	ONT	Rote 0 Bit 01 - Preset Trigger Command: 1+ Pres, Val Inst 776; 2 + Pres, Val Inst 781 // Byte 2 Bit 01 - Direction Counting Command
		FSSR3_A3_Encoder01.Data(1)	7654321	0 NT	Preset Value Instance 701
•		> PresetMessage		0 ESSAGE	Service code 0x10, Instance 1, Class 0x23, Attribute 0x13
		PresetOreShot	15-5 0 0 0 0 0 0 0	0 001	
		PresetTrigger	23-16 0 0 0 0 0 0 1	Uhre	
		Frecetibliae	31-24 0 0 0 0 0 0 0	DINT Used Y	plicit Messaging
	- 1	Temp_Message	()	Description	enterce 1, Class 0x23, Attribute 0x86
	- 1	Temp_onelihot	0 Decimal	sourcing unrection 731: 1	OT CH, TE COW

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For this variant, the PLC transmits the desired direction of rotation setting via Output assembly No. 781 when the connection from the PLC to the encoder is already established.

- a) Set the "Direction Counting Trigger" bits in byte 2 of Output assembly No. 781 first to 0.
- b) Then let the PLC establish the connection to the encoder.
 - ⇒ Set the "Direction Counting Trigger" bits to value 1 to set the direction of rotation to "Clockwise" (CW) (designated as "SetDirectionToCW" in the EDS file).
 - ⇒ Set the "Direction Counting Trigger" bits to value 2 to set the direction of rotation to "Counterclockwise" (CCW) (designated as "SetDirectionToCCW" in the EDS file).

⇒ Changing the value of the "Direction Counting Trigger" bits leads to the change of the direction of rotation. The "Direction Counting Trigger" bits can then be set to 0 again.

Setting the Direction of Rotation Using Explicit Messaging

NOTICE	The Implicit Protection mode prevents attribute changes via explicit messaging Write Access.		
	Note that the encoder switches to Implicit Protection mode when establishing the communication "Status + Position + Velocity+ Acceleration + PresetAndDirectionCounting + Config" between the PLC and the encoder (see chapter Implicit Protection Mode and Explicit Protection Mode [▶ 50]) and thus rejects all "Set Attribute Single" accesses.		

The direction of rotation can be set with a "Set Attribute Single" access to Position Sensor object attribute 12. The encoder changes the direction of rotation as soon as the "Set Attribute Single" access is completed.

Setting the Direction of Rotation Using the Configuration Assembly

To set the direction of rotation with Configuration assembly No. 779, select the connection called "Status + Position + Velocity + Acceleration + PresetAndDirectionCounting + Config" in the "Module Definition" dialog of Logix Designer when integrating the encoder.

Controller Organizer • 0 ×	Medule Properties Switch (EFS888/FS888.XXANLA322.1.001)	Controller Tags - F58x8, A3, Come	nisioningkontroleto ×	
8 M	Scope: \$F58x3_A3_Cover ~ Show: Al Tage			 T_k letter have letter
a 🔛 Controller FSbd, A3, Commissioning	No. 10	Mahar A Bada	Date Terrs	Develotion
O Controller Tags	A DEVICE AS Exception? Total House strateforms	ATTAINS Designal	Contra (geo	Teleformeter Press and WITTINI
Controller Hauft Handler	- Find of the second stripting	AND DE L	CONT.	A set of the set of th
A ST Tests	 FSEAD_AD_DICEMENC/PREE 	1234 DEOMAI	UNI	Preset wave Persence (7)
A Ch MainTask	 FSR0_AS_breakerC.PasteeLowLawl 	© Decimal	DINI	Lower Limit of the Postion
E MeinProgram	FSD0_A3_IncederCPositionHighLinit	1073741824 Decimal	DINT	Upper Limit of the Position
A 🕒 SafetyTack (20 mc)	FS808_A3_Enceder:C.GearFactorNumerator	47 Decimal	DINT	Numerator for the number of revolutions
PSafetyProgram	FSEQLA3_Enceder/C.GearFactorDenominator	2 Decimal	DINT	Denominator for the number of revolutions
k Motion Garage	FSD0_A3_Encoder:CitelocityFormat	7951 Decimal	INT	Speed unit: 1704h = counts/i; 1705h = counts/m; 1705h = turne/i; 1707h = turne/mir; 1710h = turne/h
P # Alern Manager	FS808_A3_Enceder:C.AccelerationFormat	2066 Decimal	INT	Acceleration unit 0810h = counts/ve5; 0811h = counts/s*; 0812h = turns/s*; 0813h = red/s*
🖌 🖳 Annets	FSDR, A3, Encoder C.YelocityMinimumSetpoint	-9000 Decimal	DINT	Lower limit of the speed Setpoint
Add-On Instructions	FSD0_A3_Encoder:C1lelocityMaximumSetpoint	9000 Decimal	DINT	Upper limit of the speed Setpoint
A Curs type:	FSID8_A3_Enceder:C3lelocitySetpointHysteresis	0 Decimel	DINT	Hysteresis for the speed limits. The unit depends on attribute ID 13h
Stringt	FSID0_A3_EncoderC3elocityFilterintegration	20 Decimal	DINT	Number of measured values from which a mean value is formed
KE Add-On-Defined	FSDR_A1_Encoder:ClielocityFilterEandwidth	100 Decimal	DINT	Bandwidth of the low pass filter in Hz 0 = Deactivated
P rg Predefined	FS808_A3_Enceder/CAcceleration/VinimumSetpoint	-6366 Decimal	DINT	Lower limit of acceleration in counts/ ms*. If the acceleration undercuts this value, the warning flag is set.
F Ig Module-Defined	FSIDR, A3, Encoder/C.Acceleration/MaximumSetpoint	6366 Decimal	DINT	Upper limit of acceleration in counts/ ms ¹ . If the acceleration exceeds this value, the warning flag is set.
Logical Model	FSD0_A3_Encoder:C.AccelerationSetpointHysteresis	0 Decimal	DINT	Hysteresis for the acceleration limit values
▲ G V0 Configuration	FSI08_A3_Enceder/CAccelerationFilteIntegration	20 Decimel	DINT	Number of measured values from which a mean value is formed
R 101 1756 LARS F584 A3 Commission	FSIDR_A1_EncoderC.AccelerationFilteRandwidth	100 Decimal	DINT	Bandwidth of the law pass filter in Hz 0 = Deactivated
a 📲 [1] 1756-ENJTR Switch	# FSDA3_A3_Encodec/1	()	_0000 OF SOME SAME COA.	Instance Assembly 700
4 🐉 tithernet	FS808_A3_Enceder/1.ConnectionFaulted	0 Decimel	BOOL	0 = No Fault
40 87586075881334N 4322 F5838,43,5	FSIDR_A3_Encoder/1.Data	[] Decimal	DINT[4]	Instance Assembly 780
4 & Elternet	▲ F50X3_A3_Encodec01	()	_COOR OF SOME SAME OCA.	Instance Assembly 701
D 1756-L645 F5bd_A1_Commissioning	 FS808_A3_Enceder:01.Date 	() Decimel	DINT(2)	Instance Assembly 781
	F5833_A3_ExcoderO1.Data[3]	65536 Decimal	DINT	Byte 0: Bit 01 - Preset Trigger: Command: 1= Pres_3bit Inst 779; 2 = Pres_3bit Inst 781 // Byte 2: Bit 01 - Direction Counting Command:
	FSER3_A3_Encoder:01.Data(1)	7654323	0 NT	Preset Value Instance 701
	PresetMessage	7-0 0 0 0 0 0 0 0	P ESSAGE	Service code 0x10, Instance 1, Class 0x23, Attribute 0x13
	PresetOneShot	15-6 0 0 0 0 0 0 0	o pou	
	PresetTrigger	22-16 0 0 0 0 0 0 0	1 how	
	Presetlake	31-24 0 0 0 0 0 0 0	P DINT Used Y	t Messeging
	Temp_Message	()	N Description	The A COM A COM A COM Proce L. Class 0.02, Amylikute 0.06
			Courreng Unecoon r	28 9 ° CW, 1 ° CCB

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For this variant, the desired direction of rotation is transmitted when establishing the connection from the PLC to the encoder via Configuration Assembly No. 779.

a) Enter the direction of rotation in bit 0 of byte 0 of Configuration Assembly No. 779 (designated in the EDS File as "DirectionCounting").

Meaning:

Value 0 = "Clockwise" (CW)

Value 1 = "Counterclockwise" (CCW)

5.3 Protocol Features CIP

The data (configuration-/parameterizing data, measured values, output data) of the EtherNet/IP encoder are organized in parameters (more precisely, in the attributes of the Position Sensor object with attribute numbers and attribute names).

Every attribute has a data type with a different length, e.g. WORD or DINT, the EDS file describes the attributes.

These attributes are summarized in a meaningful way for the assemblies defined in the encoder. The EDS file also describes these assemblies.

Some connections are assigned to these assemblies (predefined, saved in the EDS file). The user can select connections in Logix Designer for data transfer from and to the encoder.

5.4 Configuration Parameters Description

5.4.1 EtherNet/IP Services of the Position Sensor Object

The encoder supports the following services for the Position Sensor object (class code: 0x23 = 35):

Service code	Service name	Implemented for class (instance = 0)	Implemented for instance = 1	Description of the service
0x05	Reset	Yes	No	Resets all parameter values to the factory setting and saves them in the non-volatile memory. Carries out a reset of the encoder.
				Reset Service Parameter Byte = 0: emulates as closely as possible the switch-off and switch-on cycle.
				Reset Service Parameter Byte = 1: resets the encoder as closely as possible to the factory configuration and then emulates as closely as possible the switch-off and switch-on cycle. Resets the IP configuration and the encoder parameters to the factory setting.
				After this operation, it may be necessary to set a preset value, see chapter Setting the Preset [▶ 27].
0x0E	Get Attribute Single	Yes	Yes	Returns the content of the attribute.
0x10	Set Attribute Single	Yes	Yes	Modifies the value of the attribute.

5.4.2 Configuration Assemblies

The meaning of the attribute number can be found in chapter "Class Attributes EtherNet / CIP Position Sensor Object".

The encoder supports the following assembly instance for the transfer of the configuration:

Assembly instance no.	Byte	Designation	Attribute no.
779	0	Configuration Parameter LSB Bit 0 – Direction Counting Bit 1 – Scaling Function Bit 2 – Gear Factor Bit 3…7 – reserved, always 0	12, 14, 100
	1	reserved, always 0	-
	2	reserved, always 0	-
	3	reserved, always 0	-
	4	Measuring Units Per Revolution LSB	16
	5	Measuring Units Per Revolution	
	6	Measuring Units Per Revolution	
	7	Measuring Units Per Revolution MSB	
	8	Total Measuring Range LSB	17
	9	Total Measuring Range	
	10	Total Measuring Range	
	11	Total Measuring Range MSB	
	12	Preset LSB	19
	13	Preset	
	14	Preset	
	15	Preset MSB	
	16	Position Low Limit LSB	22
	17	Position Low Limit	
	18	Position Low Limit	
	19	Position Low Limit MSB	
	20	Position High Limit LSB	23

Assembly instance no.	Byte	Designation	Attribute no.	
	21	Position High Limit		
	22	Position High Limit		
	23	Position High Limit MSB		
	24	Gear Factor, Numerator LSB	101	
	25	Gear Factor, Numerator		
	26	Gear Factor, Numerator		
	27	Gear Factor, Numerator MSB		
	28	Gear Factor, Denominator LSB	102	
	29	Gear Factor, Denominator		
	30	Gear Factor, Denominator		
	31	Gear Factor, Denominator MSB		
	32	Velocity Unit LSB	25	
	33	Velocity MSB		
	34	Acceleration Unit LSB	30	
	35	Acceleration Unit MSB		
	36	Velocity Minimum Setpoint LSB	27	
	37	Velocity Minimum Setpoint		
	38	Velocity Minimum Setpoint		
	39	Velocity Minimum Setpoint MSB		
	40	Velocity Maximum Setpoint LSB	28	
	41	Velocity Maximum Setpoint		
	42	Velocity Maximum Setpoint		
	43	Velocity Maximum Setpoint MSB		
	44	Velocity Setpoint Hysteresis LSB	114	

1

Assembly nstance no.	Byte	Designation	Attribute no.
	45	Velocity Setpoint Hysteresis	
	46	Velocity Setpoint Hysteresis	
	47	Velocity Setpoint Hysteresis MSB	
	48	Velocity Filter Integration LSB	110
	49	Velocity Filter Integration	
	50	Velocity Filter Integration	
	51	Velocity Filter Integration MSB	
	52	Velocity Filter Bandwidth LSB	111
	53	Velocity Filter Bandwidth	
	54	Velocity Filter Bandwidth	
	55	Velocity Filter Bandwidth MSB	
	56	Acceleration Minimum Setpoint LSB	32
	57	Acceleration Minimum Setpoint	
	58	Acceleration Minimum Setpoint	
	59	Acceleration Minimum Setpoint MSB	
	60	Acceleration Maximum Setpoint LSB	33
	61	Acceleration Maximum Setpoint	
	62	Acceleration Maximum Setpoint	
	63	Acceleration Maximum Setpoint MSB	
	64	Acceleration Setpoint Hysteresis LSB	115
	65	Acceleration Setpoint Hysteresis	
	66	Acceleration Setpoint Hysteresis	
	67	Acceleration Setpoint Hysteresis MSB	
	68	Acceleration Filter Integration LSB	112

Assembly instance no.	Byte	Designation	Attribute no.
	69	Acceleration Filter Integration	
	70	Acceleration Filter Integration	
	71	Acceleration Filter Integration MSB	
	72	Acceleration Filter Bandwidth LSB	113
	73	Acceleration Filter Bandwidth	
	74	Acceleration Filter Bandwidth	
	75	Acceleration Filter Bandwidth MSB	

5.4.3 EtherNet/IP Attributes

5.4.3.1 Standardized Attributes

The encoder supports the following attributes of the Position Sensor object (class: 0x23, instance: 1) for the configuration and for the transmission of process data:

A subset of the attributes is contained in the assemblies and can be read or written cyclically through an I/O "implicit message" connection. Other less frequently used attributes can only be read or written through "explicit message".

Attribute ID	Access	Name	Description	Data type	MinMax value (default)	Remark
3	Get	Position Value Unsigned	Current position value	UDINT	-	
11	Get	Position Sensor Type	0x0001 = Singleturn 0x0002 = Multiturn	UINT	-	

Attribute ID	Access	Name	Description	Data type	Min…Max value (default)	Remark
12	Set	Direction Counting	Code sequence 0 = clockwise 1 = counterclockwise	BOOL	(0)	
14	Set	Scaling Function Control	Scaling 0 = Off 1 = On	BOOL	(1)	When On, USF is on. When Off, USF is disabled, raw position output (18 bits ST / 12 bits MT).
15	Set	Position Format	Position measurement format 0x1001 = counts	ENGUNIT	0x1001 0x1001	Always counts.
16	Set	Measuring Units Per Revolution	Number of measuring units per revolution (MUR)	UDINT	0x00000001 0x00080000 (0x00040000)	
17	Set	Total Measuring Range	Number of measuring units over the whole measuring range (TMR)	UDINT	0x0000004 0x4000000 (0x4000000)	Number of distinguishable revolutions (NDR) = TMR / attribute 16. The Logix Designer EDS handling limits the data type to DINT at the maximum.
18	Set	Position Measuring Increment	Minimum resolution (always 1)	UDINT	0x00000001 0x00000001	
19	Set	Preset Value	Preset value	DINT	0x00000000 attribute 17 - 1 (0x00000000)	
21	Get	Position State Register	Indicates whether the range defined by attributes 22 and 23 is undershot / exceeded. Bit 0 = outside of the range	Byte	(0x00)	

Attribute ID	Access	Name	Description	Data type	MinMax value (default)	Remark
			Bit 1 = above the range Bit 2 = below the range Bit 3 7 = reserved			
22	Set	Position Low Limit	Lower limit value for the position	DINT	0x00000000 Attribut 17 - 1 (0x00000000)	Attribute 22 ≤ attribute 23 Attribute 23 must be ≤ attribute 17
23	Set	Position High Limit	Upper limit value for the position	DINT	0x00000000 attribute 17 - 1 (0x3FFFFFFF)	(TMR), otherwise configuration error.
24	Get	Velocity Value	Current velocity The format is defined by attributes 25 and 26.	DINT	-	
25	Set	Velocity Format	Velocity unit 0x1F04 = counts/s 0x1F05 = counts/ms 0x1F0E = revolutions/s 0x1F0F = revolutions/min 0x1F10 = revolutions/h	ENGUNIT	(0x1F04)	If the unit counts/s ² or counts/ms ² is selected, the measured value in the attribute always relates to a fixed number of 52,4288 counts per revolution (19 bits), independently of the Scaling Function Control or Gear Factor settings.
26	Set	Velocity Resolution	Minimum resolution of the velocity measurement.	UDINT	0x0000001 0x0000001	
27	Set	Minimum Velocity Setpoint	Lower limit for the velocity in counts/ s. If the velocity becomes lower than this value, the warning flag (attribute 47) is set.	DINT	-78,643,200 78,643,200 (-39,321,600)	(attribute 27 + attribute 114) ≤ attribute 28.
28	Set	Maximum Velocity Setpoint	Upper limit for the velocity in counts/ s. If the velocity exceeds this value, the warning flag (attribute 47) is set.	DINT	-78,643,200 78,643,200 (39,321,600)	

Attribute ID	Access	Name	Description	Data type	Min…Max value (default)	Remark
29	Get	Acceleration Value	Current acceleration The format is defined by attributes 30 and 31.	DINT	-	
30	Set	Acceleration Format	Acceleration unit 0x0810 = counts/ms ² 0x0811 = counts/s ² 0x0812 = revolutions/s ² 0x1503 = rad/s ²	ENGUNIT	(0x0811)	If the unit counts/s ² or counts/ms ² is selected, the measured value in the attribute always relates to a fixed number of 52,4288 counts per revolution (19 bits), independently of the Scaling Function Control or Gear Factor settings.
31	Set	Acceleration Resolution	Minimum resolution of the acceleration measurement.	UDINT	0x00000001 0x00000001	
32	Set	Minimum Acceleration Setpoint	Lower limit for the acceleration in counts/s ² . If the acceleration becomes lower than this value, the warning flag (attribute 47) is set.	DINT	-2,147,483,647 2,147,483,647 (-1,668,860,53 6)	(attribute 32 + attribute 115) ≤ attribute 33.
33	Set	Maximum Acceleration Setpoint	Upper limit for the acceleration in counts/s ² . If the acceleration exceeds this value, the warning flag (attribute 47) is set.	DINT	-2,147,483,647 2,147,483,647 (1,668,860,536)	
44	Get	Alarms	Bit field with flags for the alarms (see chapter Position Sensor Alarms [▶ 49]).	WORD	-	
45	Get	Supported Alarms	Bit field of the supported alarms.	WORD	-	
46	Get	Alarm Flag	0 = No alarm 1 = Alarm active.	BOOL	-	Logical OR of all alarm bits.

Attribute ID	Access	Name	Description	Data type	Min…Max value (default)	Remark
47	Get	Warnings	Bit field with flags for the warnings (see chapter Position Sensor Warnings [▶ 49]).	WORD	-	
48	Get	Supported Warnings	Bit field of the supported warnings.	WORD	-	
49	Get	Warning Flag	0 = No warnings 1 = Warning active.	BOOL	-	Logical OR of all warning bits.
51	Get	Offset Value	Offset value calculated when initializing the preset function.	DINT	-	

5.4.3.2 Manufacturer-Specific Attributes

Attribut e ID	Access	Name	Description	Data type	Min…Max value (default)	Comment
100	Set	Gear Factor	Enables the gear factor function 0 = Gear factor function off 1 = Gear factor function on.	BOOL	(0)	Overwrites the setting of the scaling function when set to 1.
101	Set	Gear Factor, Numerator	Count for the gear factor	UDINT	1 16.777.216 (4.096)	
102	Set	Gear Factor, Denominator	Denominator for the gear factor	UDINT	1 131.072 (1)	
110	Set	Velocity Filter Integration Time	Number of measured values used to form the average speed value.	UDINT	0 128 (1)	Filter for the moving average.

Attribut e ID	Access	Name	Description	Data type	Min…Max value (default)	Comment
111	Set	Velocity Filter Bandwidth	Bandwidth of the low-pass filter in Hz. 0 = disabled	UDINT	0 500 (100)	First-order low-pass filter.
112	Set	Acceleration Filter Integration Time	Number of measured values used to form the average acceleration value.	UDINT	0 128 (1)	Filter for the moving average.
113	Set	Acceleration Filter Bandwidth	Bandwidth of the low-pass filter in Hz. 0 = disabled	UDINT	0 500 (100)	First-order low-pass filter.
114	Set	Velocity Setpoint Hysteresis	Hysteresis for the speed limits (attributes 27 and 28).	UDINT	0 78.643.200 (0)	The unit depends on attribute 25.
115	Set	Acceleration Setpoint Hysteresis	Hysteresis for the acceleration limits (attributes 32 and 33).	UDINT	0 2.147.483.647 (0)	The unit depends on attribute 30.
130	Get	Device Alarms	Bit field of the device alarms.	WORD	-	See chapter Device Alarms [▶ 49].
131	Get	Device Faults	Bit field of the device faults.	WORD	-	See chapter Device Faults [▶ 50].
150	Get	Temperature Value	Current temperature in °C with ±5 °C accuracy.	INT	-	
151	Get	Battery Voltage	Current battery voltage in mV.	UINT	-	
152	Get	Power Supply Voltage	Current power supply voltage in mV.	UINT	-	

5.4.3.3 Scaling Parameters

The encoder offers a choice between three options to calculate the position, which are described in the following sections.

The value range of the position values for all options described here is 0 to 1,073,741,823 (corresponds to 30 bits).

Position calculation without scaling function

The unscaled position calculation is active when attribute 14 (Scaling Function Control) = 0 and attribute 100 (Gear Factor) = 0.

Position Sensor object Attribute No.	Position Sensor object Attribute name	Attribute value used in the position calculation
12	Direction Counting Toggle	yes
16	MUR	no
17	TMR	no
19	Preset	yes
101	Numerator	no
102	Denominator	no

The encoder forms the position value as follows:

Bits 0–17	Bits 18-29
18 bits singleturn position	12 bits multiturn position

Description of the position calculation:

The position value increases by the amount of 262,144 units for the rotation of the shaft of 360 angle degrees in counting direction.

The position value decreases by the amount of 262,144 units for the rotation of the shaft of 360 angle degrees against the counting direction. When Direction Counting Toggle = 1 is set, the counting direction is reversed.

When exceeding the value 1,073,741,823, the next value is 0, and when undershooting the value 0, the next value is 1,073,741,823 (1,073,741,823 is the maximum value representable with 30 bits).

Position Calculation With Scaling Function

The position calculation with scaling function is active when attribute 14 (Scaling Function Control) = 1 and attribute 100 (Gear Factor) = 0.

Position Sensor object Attribute No.	Position Sensor object Attribute name	Attribute value used in the position calculation
12	Direction Counting Toggle	yes
16	MUR	yes
17	TMR	yes
19	Preset	yes
101	Numerator	no
102	Denominator	no

Description of the position calculation:

The position value increases [or decreases, if attribute 12 = 1] by the amount of MUR units for a full revolution of the shaft in counting direction.

When exceeding the value TMR-1, the next value is 0, and when undershooting the value 0, the next value is TMR-1.

Position Calculation With Gear Factor

The position calculation with gear factor is active when attribute 100 (Gear Factor) = 1.

When attribute 100 (Gear Factor) = 1, the value of attribute 14 (Scaling Function) is ignored.

When attribute 100 is not 0, it thus overrides attribute 14.

The following restrictions apply to the configuration values and to the configuration process:

• When the gear factor function is enabled (thus attribute 100 = 1), the following condition must be met:

TMR (Attr. 17) \leq (numerator (attr. 101) / denominator (attr. 102)) * 524288 (phys. total resolution)

Position Sensor object Attribute No.	Position Sensor object Attribute name	Attribute value used in the position calculation
12	Direction Counting Toggle	yes
16	MUR	no
17	TMR	yes
19	Preset	yes
101	Numerator	yes
102	Denominator	yes

Description of the position calculation:

The position value increases [or decreases, if attribute 12 = 1] by the amount of TMR units when the axis is rotated by the fraction numerator / denominator of a full revolution in the counting direction.

When undershooting the value 0, the next value is TMR -1 and when exceeding the value TMR -1, the next value is 0.

5.5 Process Data Description

5.5.1 Process Data Description

Process data can be read either via the "Position Sensor object" using explicit message or via the Assembly object of the encoder.

The assemblies contain selected (fixed) process data. Part of the process data is only contained in the assemblies, other process data is only contained in the "Position Sensor object".

The following assembly instances are implemented. They contain the process data for cyclic data transmission according to the tables below.

The meaning of the attribute numbers can be found in chapter EtherNet/IP Attributes [38].

5.5.1.1 Supported connections

The sensor supports the following connections, which are described in the EDS File :

Connection name	Configuration assembly no.	Producing assembly no.	Consuming assembly no.
Status + Position + Velocity + Acceleration + PresetAndDirectionCounting + Config	779	780	781
Position	not used	1	not used
Position + Status	not used	2	not used
Position + Velocity	not used	3	not used
Status + Position + Velocity + Acceleration	not used	780	not used

5.5.1.2 Input Assemblies

Assembly instance no.	Byte	Designation	Attribute no.	
1	0	Position LSB	3	
	1	Position		
	2	Position		
	3	Position MSB		
2	0	Position LSB	3	
	1	Position		
	2	Position		
	3	Position MSB		
	4	Warning and Alarm Flags	49 / 46	
3	0	Position LSB	3	
	1	Position		
	2	Position		
	3	Position MSB		
	4	Velocity LSB	24	
	5	Velocity		
	6	Velocity		
	7	Velocity MSB		
780	0	Device Alarms LSB	130	
	1	Device Alarms MSB		
	2	Device Faults LSB	131	
	3	Device Faults MSB		
	4	Position LSB	3	
	5	Position		
	6	Position		
	7	Position MSB		
	8	Velocity LSB	24	
	9	Velocity		
	10	Velocity		
	11	Velocity MSB		
	12	Acceleration LSB	29	
	13	Acceleration	_	
	14	Acceleration	_	
	15	Acceleration MSB		

5.5.1.3 Output Assemblies

Assembly instance no.	Byte	Designation	Attribute no.
781	0	Preset Trigger Bit 01 – Preset Trigger Command Bit 27 – reserved, always 0	-
	1	reserved, always 0	-
	2	Direction Counting Trigger Bit 01 – Direction Counting Command Bit 27 – reserved, always 0	-
	3	reserved, always 0	-
	4	Preset LSB	-
	5	Preset	-
	6	Preset	-
	7	Preset MSB	-

5.5.1.4 Value Table of the Preset Trigger Command Bits

Value	Description
0	Initial value, must be transmitted at least one at the beginning.
1	Trigger: Carry out the preset with the value written previously in bytes no. 12-15 of Configuration assembly no. 779.
2	Trigger: Carry out the preset with the value written previously in bytes no. 4-7 of Output assembly no. 781.
3	reserved

5.5.1.5 Value Table of the Direction Counting Command Bits

Value	Description
0	Initial value, must be transmitted at least one at the beginning.
1	Trigger: Set the direction of rotation to CW (Clockwise). The encoder automatically sets attribute 12 ("Direction Counting") to the value 0 ("Clockwise").
2	Trigger: Set the direction of rotation to CCW (Counterclockwise). The encoder automatically sets attribute 12 ("Direction Counting") to the value 1 ("Counterclockwise").
3	reserved

5.5.2 Position Sensor Warnings

Bit	Description of the bits of Position Sensor attribute 47
0	The maximum velocity has been exceeded.
4	Battery charge low.
6	The speed is lower than the lower limit value configured with attribute 27.
7	The speed exceeds the upper limit value configured with attribute 28.
8	The acceleration is lower than the lower limit value configured with attribute 32.
9	The acceleration exceeds the upper limit value configured with attribute 33.
10	The position is outside of the range configured with attributes 22 and 23.

5.5.3 Position Sensor Alarms

Bit	Description of the bits of Position Sensor attribute 44
0	Position error.
1	Diagnostic fault / Error during the self-test.

5.5.4 Device Alarms

Description of the bits of Position Sensor attribute 130.

These bits indicate minor faults.

Bit	Description	ls reset when corrected	Notice
0	The speed is lower than the lower limit value configured with attribute 27.	Yes	
1	The speed exceeds the upper limit value configured with attribute 28.	Yes	
2	The acceleration is lower than the lower limit value configured with attribute 32.	Yes	
3	The acceleration exceeds the upper limit value configured with attribute 33.	Yes	
4	The position is below the range configured with attribute 22.	Yes	
5	The position is above the range configured with attribute 23.	Yes	ENC LED flashes red.
8	Battery charge level low (≤ 3.0 V DC).	No	Typical voltage 3.6 V DC.
9	Device status conflict (rotary switches)	Yes	e.g. position of rotary switches 000 (DHCP) vs. manually assigned IP address via Engineering Tool.

5.5.5 Device Faults

Description of the bits of Position Sensor attribute 131.

These bits indicate major faults.

Bit	Description	ls reset when correcte d	Notice
0	Device temperature outside of the permissible range.	Yes	< -40°C or > 100°C [< -40°F or > 212°F]
1	Maximum velocity exceeded.	Yes	> 9000 min ⁻¹ and hyst1 %
2	Supply voltage outside of the allowable range.	Yes	< 9 V DC or > 31 V DC
8	Battery charge level critical.	No	≤ 2.7 V DC Replace the device.
9	Sensor error.	No	Replace the device.
10	Memory error.	No	Replace the device.
11	General internal fault.	No	Replace the device.

5.6 Implicit Protection Mode and Explicit Protection Mode

Implicit Protection mode and Explicit Protection mode are safety enhancements, which are activated automatically by the encoder when establishing certain connections or which can be activated by the user by means of rotary switches.

Automatic Activation and Deactivation of the Implicit Protection Mode

The Implicit Protection mode is activated automatically on the device as soon as a CIP Class 1 [Cyclic I/O] connection is established with the device. This mode is deactivated on the device as soon as the connection is ended.

Protective Functions in Implicit Protection Mode and Explicit Protection Mode

Both in Implicit Protection mode and in Explicit Protection mode, the device rejects the following configuration changes:

- · Changes of the Ethernet configuration settings, e.g. the port speed.
- Changes of IP settings such as e.g. IP address, mask and DHCP mode.
- · Device firmware update.
- · Disabling or repeated enabling of external product ports.
- Execution of remote resets (resets triggered via the network).

Implicit Protection Mode: Enhanced Protection When the Exclusive Owner Connection is Active.

When the Exclusive Owner connection named "Status + Position + Velocity + Acceleration + PresetAndDirectionCounting + Config" (read / write connection) defined in the EDS File is established, the device rejects, in addition to the protective functions mentioned above, also the following:

Changing any attribute of the Position Sensor object.

This feature protects the device from simultaneous configuration changes in two different ways (via Output assembly No. 781 and via write access on the attributes of the Position Sensor object).

Overview Table of the Protective Functions of the Protection Modes

The following table gives a detailed description of the protective functions:

Protection mode (attribute 19 in the Identity object)

Implicit Explicit (bit 0 = 1) (bit 3 = 1)					
Switching on:	An "Implicit Message between the F	Rotary switches: 800			
	Other "Implicit Message" I/O connection active	Connection "Status + Position +Velocity + Acceleration + PresetAndDirectionCounti ng + Config" active			
Switching off:	End the connection		Rotary switches: 300 / 555		
Functions:					
Reset	no		no		
Change Ethernet settings	no		no		
FW update	yes		yes		
Read attributes	yes		yes		
Write attributes	yes no		no		

Activating the Explicit Protection Mode

Proceed as follows to activate the Explicit Protection mode:

- a) Switch the power supply of the encoder off.
- b) Set the rotary switches to position 800.
- c) Switch the power supply on and wait until the module status display flashes red, the network status display goes out and the status displays go out.
- d) Switch the power supply off.
- e) Set the rotary switches for normal operation.
- f) Switch the power supply on.
- ⇒ The device is now in Explicit Protection mode.

Deactivating the Explicit Protection Mode

Proceed as follows to deactivate the Explicit Protection mode:

- a) Switch the power supply of the encoder off.
- b) Set the rotary switches to position 300.
- c) Switch the power supply on and wait until the module status display flashes red, the network status display goes out and the status displays go out.
- d) Switch the power supply off.
- e) Set the rotary switches for normal operation.

- f) Switch the power supply on.
- ⇒ The device is no longer in Explicit Protection mode.

5.7 Features Description

5.7.1 Address Conflict Detection (ACD) Feature

As a standard, the "ACD" feature (Address Conflict Detection) of EtherNet/IP is activated. If this function is not required, it can be deactivated. Object 0xF5 (TCP/IP) instance 1, attribute 11 allows reading information about address conflicts. To switch ACD off, write the value 0 in object 0xF5 (TCP/IP), instance 1, attribute 10. This can slightly accelerate the start-up of the device. Details can be found in the CIP / EtherNet/IP specification, see also chapter Overview of the Connectors and LEDs [▶ 17].

5.7.2 Device Level Ring (DLR)-Feature

The "Device Level Ring" feature can be switched on when setting up a device ring for protection against breakage of a single EtherNet network cable, see chapter Network topologies [▶ 15]. All devices connected to the ring must imperatively have two EtherNet ports.

- a) In window "Properties" of the PLC or in the network interface of Logix Designer, open tab "Network".
- b) Set the PLC e.g. as ring supervisor and set the network topology to "Ring".
- \Rightarrow The encoder now supports a ring topology.

6 Annex

6.1 Scaling

The usability of the measured values output by the measuring system essentially depends on their scaling. Scaling the measured values presupposes that mathematical operations must be carried out, which, depending on the device type, are integrally or only partly supported. There are basically 3 different scaling types:

- 1. Binary scaling = Scaling function
- 2. Non-binary scaling = Universal Scaling function
- 3. Scaling by means of the gear factor = Gear Factor

6.2 Subnet mask in conjunction with the IP address

Each IP address can be subdivided into a network address and a host address. The subnet mask determines at which place this separation takes place. This basically determines the maximum possible number of host addresses and network addresses. The host addresses can be compared with the participants in an Ethernet network.

There are basically 3 address classes A, B and C.

Class A:

16,777,214 hosts per network

Subnet mask: 255.0.0.0

Maximum address range network address: 127,255,255,255

IP address	IP address	IP address	IP address
1st octet	2nd octet	3rd octet	3rd octet
1.	0.	0.	0.

Class B:

65,534 hosts per network

Subnet mask: 255.255.0.0

Maximum address range network address: 191,255,255,255

IP address	IP address	IP address	IP address
1st octet	2nd octet	3rd octet	4th octet
128.	1.	0.	0.

Class C:

254 hosts per network

Subnet mask: 255.255.255.0

Maximum address range network address: 223.255.255.255

IP address	IP address	IP address	IP address
1st octet	2nd octet	3rd octet	4th octet
192.	0.	1.	0.

The standard subnet mask is 255.255.255.0, thus allowing 254 network participants.

6.3 Decimal / Hexadecimal conversion table

Dec	Hex								
0	0x0	51	0x33	102	0x66	153	0x99	204	0xCC
1	0x1	52	0x34	103	0x67	154	0x9A	205	0xCD
2	0x2	53	0x35	104	0x68	155	0x9B	206	0xCE
3	0x3	54	0x36	105	0x69	156	0x9C	207	0xCF
4	0x4	55	0x37	106	0x6A	157	0x9D	208	0xD0
5	0x5	56	0x38	107	0x6B	158	0x9E	209	0xD1
6	0x6	57	0x39	108	0x6C	159	0x9F	210	0xD2
7	0x7	58	0x3A	109	0x6D	160	0xA0	211	0xD3
8	0x8	59	0x3B	110	0x6E	161	0xA1	212	0xD4
9	0x9	60	0x3C	111	0x6F	162	0xA2	213	0xD5
10	0xA	61	0x3D	112	0x70	163	0xA3	214	0xD6
11	0xB	62	0x3E	113	0x71	164	0xA4	215	0xD7
12	0xC	63	0x3F	114	0x72	165	0xA5	216	0xD8
13	0xD	64	0x40	115	0x73	166	0xA6	217	0xD9
14	0xE	65	0x41	116	0x74	167	0xA7	218	0xDA
15	0xF	66	0x42	117	0x75	168	0xA8	219	0xDB
16	0x10	67	0x43	118	0x76	169	0xA9	220	0xDC
17	0x11	68	0x44	119	0x77	170	0xAA	221	0xDD
18	0x12	69	0x45	120	0x78	171	0xAB	222	0xDE
19	0x13	70	0x46	121	0x79	172	0xAC	223	0xDF
20	0x14	71	0x47	122	0x7A	173	0xAD	224	0xE0
21	0x15	72	0x48	123	0x7B	174	0xAE	225	0xE1
22	0x16	73	0x49	124	0x7C	175	0xAF	226	0xE2
23	0x17	74	0x4A	125	0x7D	176	0xB0	227	0xE3
24	0x18	75	0x4B	126	0x7E	177	0xB1	228	0xE4
25	0x19	76	0x4C	127	0x7F	178	0xB2	229	0xE5
26	0x1A	77	0x4D	128	0x80	179	0xB3	230	0xE6
27	0x1B	78	0x4E	129	0x81	180	0xB4	231	0xE7
28	0x1C	79	0x4F	130	0x82	181	0xB5	232	0xE8
29	0x1D	80	0x50	131	0x83	182	0xB6	233	0xE9
30	0x1E	81	0x51	132	0x84	183	0xB7	234	0xEA

Dec	Hex								
31	0x1F	82	0x52	133	0x85	184	0xB8	235	0xEB
32	0x20	83	0x53	134	0x86	185	0xB9	236	0xEC
33	0x21	84	0x54	135	0x87	186	0xBA	237	0xED
34	0x22	85	0x55	136	0x88	187	0xBB	238	0xEE
35	0x23	86	0x56	137	0x89	188	0xBC	239	0xEF
36	0x24	87	0x57	138	0x8A	189	0xBD	240	0xF0
37	0x25	88	0x58	139	0x8B	190	0xBE	241	0xF1
38	0x26	89	0x59	140	0x8C	191	0xBF	242	0xF2
39	0x27	90	0x5A	141	0x8D	192	0xC0	243	0xF3
40	0x28	91	0x5B	142	0x8E	193	0xC1	244	0xF4
41	0x29	92	0x5C	143	0x8F	194	0xC2	245	0xF5
42	0x2A	93	0x5D	144	0x90	195	0xC3	246	0xF6
43	0x2B	94	0x5E	145	0x91	196	0xC4	247	0xF7
44	0x2C	95	0x5F	146	0x92	197	0xC5	248	0xF8
45	0x2D	96	0x60	147	0x93	198	0xC6	249	0xF9
46	0x2E	97	0x61	148	0x94	199	0xC7	250	0xFA
47	0x2F	98	0x62	149	0x95	200	0xC8	251	0xFB
48	0x30	99	0x63	150	0x96	201	0xC9	252	0xFC
49	0x31	100	0x64	151	0x97	202	0xCA	253	0xFD
50	0x32	101	0x65	152	0x98	203	0xCB	254	0xFE
								255	0xFF

6.4 Conversion table Data types

Data type	Figure type	Length in bits	Length in bytes
BOOL	Binary	1	-
BYTE	Binary	8	1
WORD	Binary	16	2
DWORD	Binary	32	4
LWORD	Binary	64	8
SINT	Integer	8	1
INT	Integer	16	2
DINT	Integer	32	4
UINT	Integer	32	4
LINT	Integer	64	8
REAL	Floating point number	32	4
LREAL	Floating point number	64	8

7 Contact

You want to get in touch with us:

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Glossary

ACD

Address Conflict Detection

ASCII

American Standard Code for Information Interchange. 7-bit coding

BOOL

Data type. A BOOL (or Boolean) represents a truth value that may be either true or false.

BOOTP

Bootstrap Protocol

CCW



counterclockwise. Related to the direction of rotation. The position value increases for counterclockwise shaft rotation (looking at the shaft from the flange side).

CIP

Common Industrial Protocol

CW



clockwise. Related to the direction of rotation. The position value increases for clockwise shaft rotation (looking at the shaft from the flange side).

Default

English for standard, generally used as default value. Factory-preset value of a changeable configuration value.

DHCP

Dynamic Host Configuration Protocol

DINT

Data type. An operand of the data type DINT (double integer) has a length of 32 bits and is made of two components: a sign and a numerical value in two's complement.

DLR

Device Level Ring

DWORD

Data type. A DWORD consists of two WORDs, each consisting of 2 bytes, each of them consisting of 8 bits.

EDS File

EDS (Electronic Data Sheet). An EDS file corresponding to the device is provided by the manufacturer. It contains accurate machine-readable information about the device and its communication EDS files contain among others descriptions of the device (name, product code, manufacturer ID) and its communication. It contains the available objects, attributes, assemblies, parameters and connections with descriptions, precise definitions of the data types and data lengths. An EDS file greatly simplifies the integration of a device in a PLC system.

EMC

Electromagnetic compatibility

FRAM

Abbreviation: Ferroelectric Random Access Memory, non-volatile memory, in which the save and erase operations are carried out by changing the polarization in a ferroelectric layer.

INT

Data type. Integer. An integer is generally made of 16 bits.

LED

Light Emitting Diode. Semiconductor component that emits light.

LLDP

Link Layer Discovery Protocol. Protocol defining the network topology.

LSB

engl. Least Significant Bit

LWORD

Data type. Long WORD consisting of two DWORDs.

MSB

engl: Most Significant Bit

MSG command

MSG current path command ("Message") as described in the Logix Designer manual.

MUR

Measuring Units per Revolution

ODVA

Open DeviceNet Vendor Association: the ODVA is an organization for the development of standards and a member association counting world leader companies in industrial automation among its members. The ODVA defines and publishes the documentation relating to the CIP and EtherNet/IP standards.

ONS command

ONS current path command ("One Shot") as described in the Studio 5000 Logix Designer software manual.

PΕ

Abbreviation: Protective Earth, cable for safety protection against electric shocks (protective earth conductor).

PLC

Programmable Logic Controller

QoS

Quality of Service

RMA

Return Material Authorization, authorization to return material, e.g. in the case of complaints.

SINT

Data type. Short integer. An operand of the data type SINT (short INT) has a length of 8 bits and is made of two components: a sign and a numerical value.

TCP/IP

TCP/IP means "Transmission Control Protocol/Internet Protocol" and allows devices connected to the Internet to communicate with each other via networks

TMR

Total Measuring Range

UDP

Abbreviation: User Datagram Protocol is a minimal, connectionless network protocol, that belongs to the transport layer of the Internet protocols family.

UINT

Data type. An operand of the data type UINT (Unsigned INT) has a length of 16 bits and contains numerical values without sign.

USF

Universal Scaling Function, a nonbinary scaling function (without overflow error)

WORD

Data type. A WORD includes 2 bytes, each of them including 8 bits.



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