

**ICE-EP2-G20-4B22A-P17 |
ICA-4IO-2M4-G20-B22A-P18
Ethernet G20 Controller with
Motor Roller System**

Manual



With regard to the supply of products, the current issue of the following document is applicable: The General Terms of Delivery for Products and Services of the Electrical Industry, published by the Central Association of the Electrical Industry (Zentralverband Elektrotechnik und Elektroindustrie (ZVEI) e.V.) in its most recent version as well as the supplementary clause: "Expanded reservation of proprietorship"

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1. Introduction

1.1 Content of this Document

This document contains information required to use the product in the relevant phases of the product life cycle. This may include information on the following:

- Product identification
- Delivery, transport, and storage
- Mounting and installation
- Commissioning and operation
- Maintenance and repair
- Troubleshooting
- Dismounting
- Disposal



Note

For full information on the product, refer to the additional documentation on the Internet at www.pepperl-fuchs.com.



Note

For specific device information such as the year of construction, scan the QR code on the device. As an alternative, enter the serial number in the serial number search at www.pepperl-fuchs.com/device-information.

The documentation comprises the following parts:

- This document
- Datasheet

In addition, the documentation may comprise the following parts, if applicable:

EU-type examination certificate

- EU declaration of conformity
- Attestation of conformity
- Certificates
- Control drawings
- Instruction manual
- Functional safety manual
- Other documents

1.2

Target Group, Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismounting lies with the plant operator.

Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismounting of the product. The personnel must have read and understood the instruction manual and the further documentation.

Prior to using the product make yourself familiar with it. Read the document carefully.

1.3

Symbols Used

This document contains symbols for the identification of warning messages and of informative messages.

Warning Messages

You will find warning messages, whenever dangers may arise from your actions. It is mandatory that you observe these warning messages for your personal safety and in order to avoid property damage.

Depending on the risk level, the warning messages are displayed in descending order as follows:



Danger!

This symbol indicates an imminent danger.

Non-observance will result in personal injury or death.



Warning!

This symbol indicates a possible fault or danger.

Non-observance may cause personal injury or serious property damage.



Caution!

This symbol indicates a possible fault.

Non-observance could interrupt the device and any connected systems and plants, or result in their complete failure.

Informative Symbols



Note

This symbol brings important information to your attention.



Tip

This symbol brings important information to your attention.



Example

This symbol provides an example of the issue described.



Action

This symbol indicates a paragraph with instructions. You are prompted to perform an action or a sequence of actions.

1.4

Intended Use

Ethernet G20 MDR Control System

The Ethernet G20 MDR control system enables flexible control of up to 120 motorized drive rollers (MDRs) with a 24 V or 48 V supply voltage using a single IP address. The system consists of the Ethernet G20 controller which is establishing the connection to a higher-level PLC or is directly carrying out the decentralized ZPA logic and the G20 MDR system module which is used to connect up to two MDRs and four digital inputs/outputs. Read through this manual carefully. Be sure to familiarize yourself with the devices before mounting, connecting, and operating.

Operate the devices only as described in this manual. Make sure that the devices and the systems connected to the device work correctly.

1.5

General Safety Information

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismantling lies with the plant operator. Installation and commissioning of all devices may be performed only by trained and qualified personnel.

It is dangerous for the user to make changes and/or repairs. Additionally, doing so voids the warranty and excludes the manufacturer from any liability. In the event of any serious errors, stop using the device. Secure the device against unintended operation. To have the device repaired, return it to your local Pepperl+Fuchs representative or your sales center.



Disposal Information

Electronic waste is dangerous. When disposing of the equipment, observe the current statutory requirements in the relevant country of use and local regulations.

1.6

Declaration of Conformity

This product was developed and manufactured in line with the applicable European standards and directives.



Note

A declaration of conformity can be requested from the manufacturer.

The product manufacturer, Pepperl+Fuchs Group, 68307 Mannheim, Germany, has a certified quality assurance system that conforms to ISO 9001.



ISO9001

2. Cybersecurity

General

- Regularly check the manufacturer portal for cybersecurity alerts at <https://www.pepperl-fuchs.com/cybersecurity>.
- Report all cybersecurity incidents to the manufacturer.
- To protect devices, machines, systems, technical infrastructure and networks against cyber threats, users must have a comprehensive cybersecurity concept in place, which must be continuously reviewed and maintained. General recommendations can be found at <https://www.bsi.bund.de/dok/6603576>.

Security Context

The device is designed for operation in an automation network. This is a secure network with known and trusted participants, which is (physically or logically) separated from the corporate network.

Do not connect the device directly to the internet. Operate the device in a protected network area. Use a firewall to connect the internal protected network to external networks. Configure this with restrictive rules.

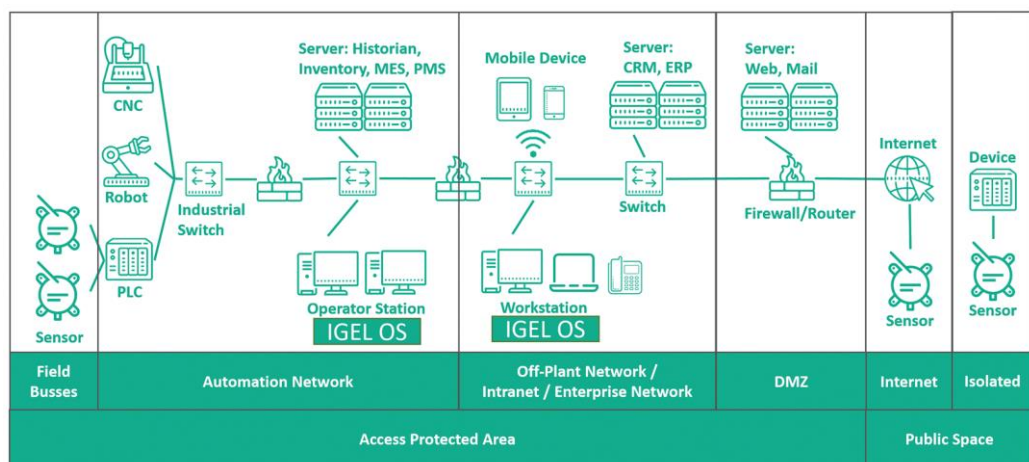


Figure 1: Example of the integration of devices and software into a system

Available Protocols and Services

Protocol / Service	Protocol / Port Number	Factory settings	Service status configurable	Notes
DHCP	UDP/68	Enabled	Yes	
PROFINET	UDP/34964 UDP/49152	Enabled	Yes	
PROFINET DCP		Enabled	No	
EtherNet/IP	TCP/44818 UDP/44818 UDP/2222	Enabled	Yes	
OPC UA	TCP/4840	Disabled	Yes	

HTTP (REST API)	TCP/80	Enabled	Yes	
HTTPS (REST API)	TCP/443	Disabled	Yes	Self-generated certificates The device can generate self-signed certificates that are valid for the device's IP address. If the IP address changes, a new certificate is generated. Encryptions TLSv1.2 is supported. The supported encryption suites for key pairs with ECC are: • TLS_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256 • TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 The following elliptic curves are supported: • secp256r1 • bp256r1 • Curve25519 For RSA key pairs: • TLS_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256 (rsa 2048) • TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 (rsa 2048) Recommendation: If possible, use ECC key pairs with CHACHA20_POLY1305-bulk encryption to achieve the highest transfer rate. All modern clients support this. Browser: Google Chrome, Microsoft Edge, Apple Safari
SNMP	UDP/161	Enabled	Yes	
NTP Client	UDP/123	Disabled	Yes	
LLDP		Enabled	No	
ICMP		Enabled	No	
PortVision	UDP/4606	Enabled	No	

Hardening of the Device

- Physically protect the device and the application against unauthorized access.
- Disable any unused services.
- Ensure that all passwords and user-generated private keys are protected from unauthorized access.
- Avoid reusing passwords for different users and systems.
- Replace passwords, certificates, and keys immediately as soon as you identify potential security vulnerabilities.

- Renew certificates regularly.
- Change passwords regularly.
- Use a suitable password manager to create and store passwords.

Security Functions

- The device has protection against brute force attacks to prevent unauthorized access through password guessing attempts.
- The device implements a session timeout to automatically disconnect connections after a specified period of inactivity.
- The device is assigned a unique default password, which is printed on a sticker on the device.

User Profiles and Rights

The device's web interface has the following user roles and rights.

User profile	Username	Rights	Factory settings	Remark
Administrator	admin	No restrictions	Enabled	Standard user
Observer	observer	Read only	Disabled	Configurable by administrator

- No further user profiles can be defined or users created.
- The rights and names of existing users cannot be changed.

Firmware

Only use firmware from trusted sources. Keep the software up to date. Always use the latest firmware/software version for the device. Check regularly at <https://www.pepperl-fuchs.com/de-de>, whether security updates are available for the products and install them. After the release of a new version, older versions will no longer be supported or maintained.

Decommissioning

Reset the device to factory settings.

3. Product Description

3.1 Use and Application

System Overview

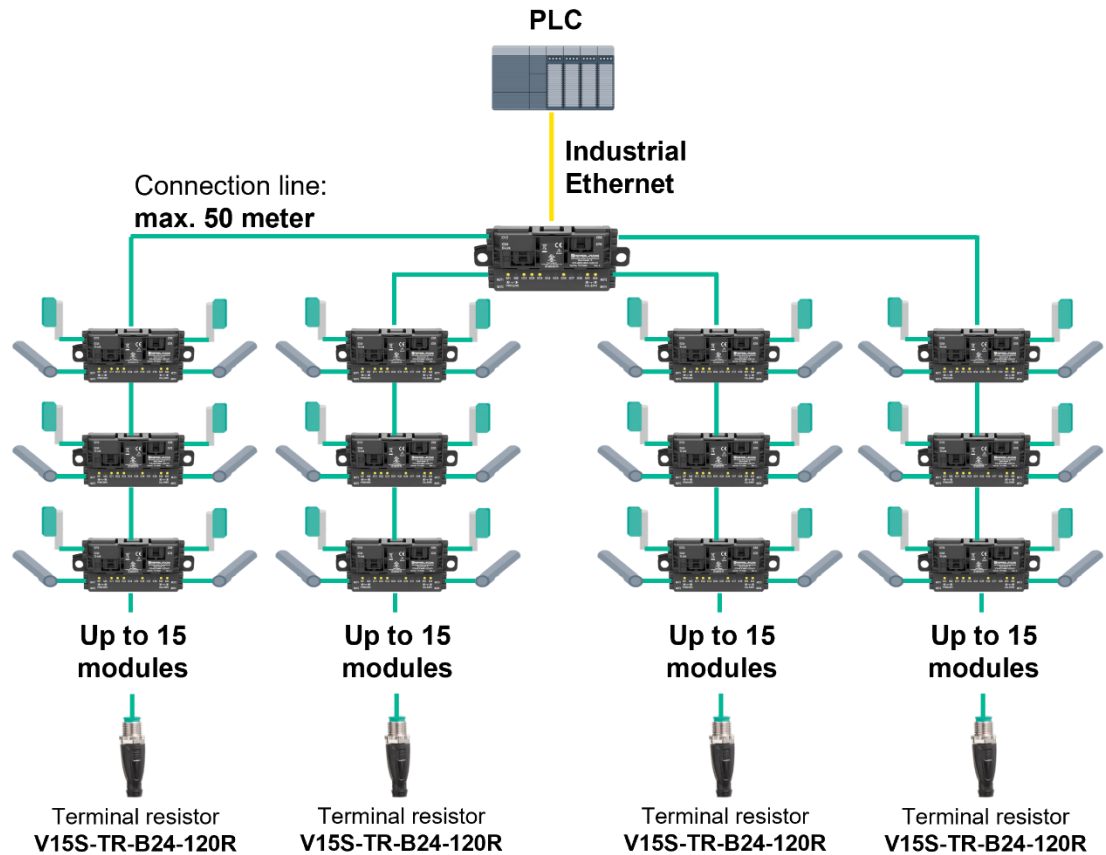


Figure 2: System Overview

Ethernet G20 Controller – ICE-EP2-G20-4B22A-P17

The Ethernet G20 controller enables flexible control of up to 120 MDRs with a 24 V or 48 V supply voltage using a single IP address. The controller offers four connection lines, each enabling connection of up to 15 G20 MDR system modules. Each connection line is designed for lengths of 50 m and should be ended with a termination resistor (V15S-TR-B24-120R). Each system module can connect up to two DC motor rollers. Connected system modules are recognized and addressed automatically.

Control logic for individual MDRs can be implemented either centrally in a PLC or decentrally in the G20 modules due to integrated ZPA logic. With multiprotocol functionality, the Ethernet G20 controller supports communication with a higher-level PLC via PROFINET or EtherNet/IP. Cloud communication is enabled via OPC UA or the integrated REST API.

The compact housing includes integrated cables for Ethernet network connectivity and connection to the G20 system modules. It can be mounted directly onto the carrier rail, and the latching mechanism enables tool-free power supply via flat-cable piercing technology.

G20 MDR System Module – ICA-4IO-2M4-G20-B22A-P18

The G20 MDR system module can connect up to two MDRs with 24 V or 48 V supply voltage and is compatible with numerous different MDRs on the market.

It is connected to an Ethernet G20 controller, which either establishes communication with a higher-level PLC or directly executes decentralized ZPA logic. The Ethernet G20 controller provides up to four lines, each enabling the connection of up to 15 G20 MDR system modules.

The recognition and addressing of connected system modules are performed automatically. Modules are addressed in ascending order from 1–15 based on their position in the line, starting with the system module closest to the Ethernet G20 controller. No spare addresses are available within a single line. The compact housing includes integrated cables for connecting the MDRs, digital inputs/outputs, and for interconnecting G20 MDR system modules in a daisy-chain configuration. The latching mechanism enables power supply via piercing technology of flat cables, without the need for special tools.

Digital Inputs and Outputs

For optimized control of MDRs depending on conditions in the field environment (e.g., switching signal of a light barrier), the module has 4 configurable digital inputs/outputs (PNP). The input characteristic of the inputs corresponds to type 3 in accordance with EN 61131-2. The outputs are resistant to short circuits and overloading. Connections may be configured as 4 inputs or 4 outputs, or combinations of them.

The G20 MDR system module and the digital inputs/outputs are supplied via the Ethernet G20 Controller. Each sensor power supply may deliver up to 200 mA. Each output can operate at up to 200 mA.

For details regarding connection, see [chapter 3.4](#).

Motorized Drive Rollers (MDRs)

The MDRs are supplied with power via an external auxiliary voltage. The permissible auxiliary voltage is 18–56 V. There is a safe separation of the module system supply (line-power via M12-connector) and the MDR supply (auxiliary supply via flat cable), enabling a safe shut-off of MDR supply via an emergency stop and a safety relay. Based on the supplied voltage, the G20 MDR system module can drive 24 V or 48 V DC MDRs. The auxiliary voltage is supplied to the G20 MDR system module via a flat cable. The roller motor supply is protected by a fuse.

3.2 Housing

The housing is specifically designed for logistic applications and can be mounted directly on the carrier rail. All required connection cables, except for the flat cable used for the supply voltage, are directly integrated into the module.

The housing consists of the following main components:

- a mounting base with integrated electronics
- a latch mechanism for connection of the flat cable (supply voltage of MDRs)

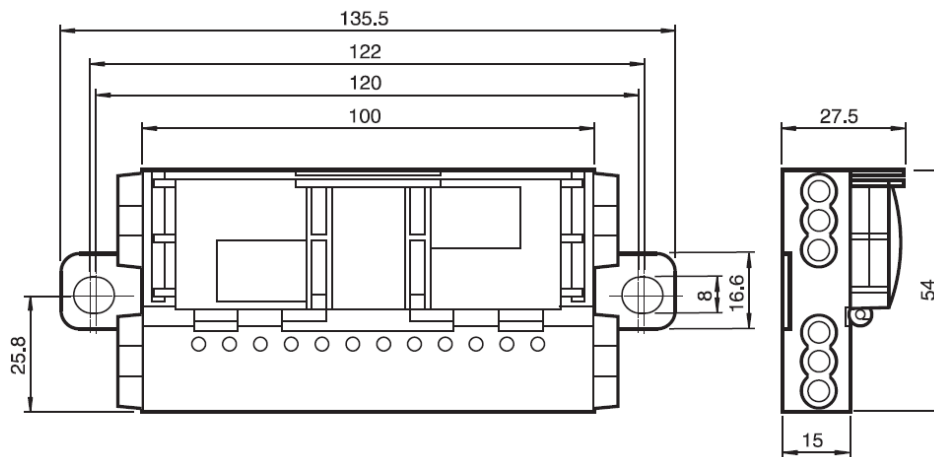


Figure 3: Housing dimensions

3.3 Indicators and Control Elements

3.3.1 LED Displays

Ethernet G20 Controller

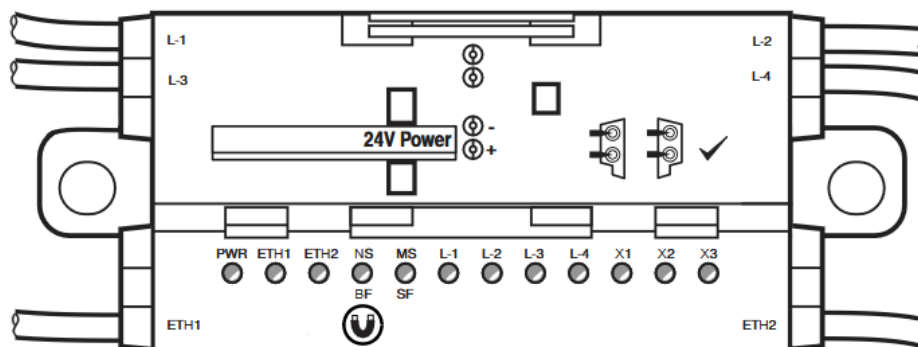


Figure 4: LED indicators Ethernet G20 controller

LED	Status	Function
PWR	Green	Device powered
	Red	Voltage out of range
ETH1/2	Green	Link on Ethernet
	Green blinking	Traffic on Ethernet
NS/BF		EtherNet/IP: Network state Profinet: Bus Fault
MS/SF		EtherNet/IP: Module state PROFINET: System Fault
L-1/2/3/4	Green	System modules connected to the line
	Green flashing	No system module connected to the line; line active
	Off	Line deactivated

	Yellow	High current detected
	Red blinking	Overcurrent shutdown
	Red green blinking	Communication problems
	Red fast flashing	Communication breakdown
	Rainbow	Locator activated
X1/2/3		Currently only used together with magnet
all	Red blinking / magenta	A serious software problem has occurred. Please contact us.

G20 MDR System Module

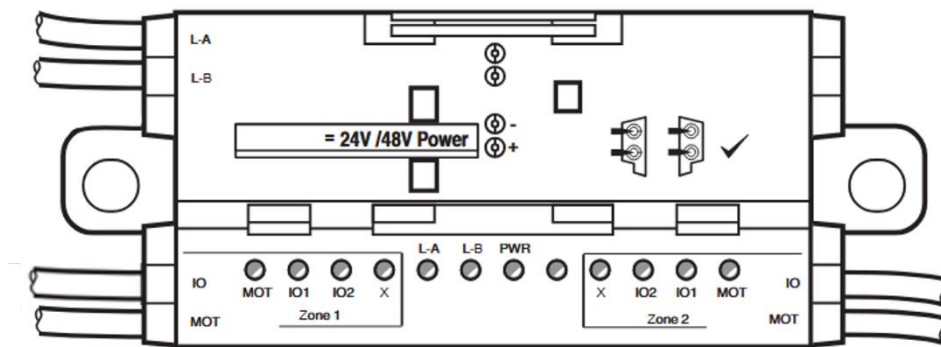


Figure 5: LED indicators G20 MDR system module

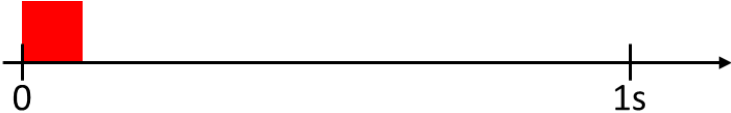
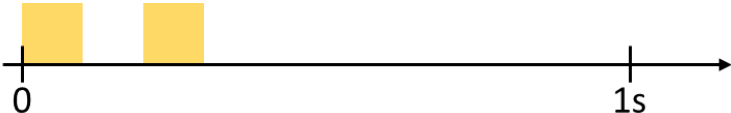
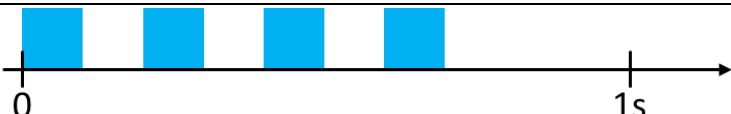
LED	Status	Function
MOT	Yellow	Motor running
	Red / yellow blinking	Fuse defect
	Red	No PWR connected
	Red blinking	Motor error detected / no motor connected
	Off	Motor not running
IO1/2	Yellow	Input / output active
	Red	Output overload
	Red blinking	Input supply overload
	Off	Input / output not active
X	White	Zone is in ZPA mode and ready to receive
	Yellow	Zone is in ZPA mode and not ready to receive
	Off	Zone is not in ZPA mode
L-A	Green	System module is powered by controller and has connection
	Green blinking	System module is powered by controller, but has no connection
L-B	Green	There is no successor to this system module
	Green blinking	There is successor to this system module
PWR	Green	System module is powered by controller and via PWR (flat ribbon)
	Red blinking	System module is only powered via PWR (flat ribbon)
all	Red blinking / magenta	A serious software problem has occurred. Please contact us.

Flashing Pattern for Device Identification (Locator)

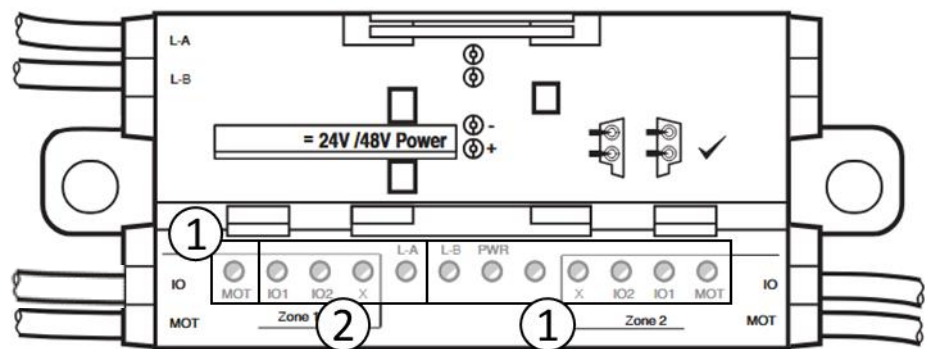
The G20 MDR system modules can be identified in the field through a flashing pattern that indicates both line number and address information.

By default, the flashing pattern is enabled at system startup and automatically disables once a successful connection is established with the PLC. The behavior of the identification pattern can be controlled through multiple interfaces. The system supports configuration via Hall sensor detection, REST API calls, and the web interface. The flashing pattern communicates two critical pieces of information: line identification and system module address.

Line identification is conveyed through a color-coded flashing sequence as follows:

Line	Color	Flashing Pattern
Line 1	Red	
Line 2	Yellow	
Line 3	Green	
Line 4	Blue	

Module address information is encoded in binary form using white LEDs. Each LED position corresponds to a bit in the address binary value, enabling precise identification of individual modules within a network.



- 1 Line identification
- 2 Binary encoded address identification

3.3.2 Hall-Effect Sensor

The Hall-Effect sensor is used to execute various functions of the Ethernet G20 controller using a magnet. To do this, the magnet must be placed in front of the magnet symbol. Two use cases are supported: At startup and during operation.

At Startup



Using the Hall Sensor at Startup

Using the Hall sensor during device power-on allows a factory reset, static IP configuration, or fieldbus change.

1. Power off the Ethernet G20 controller.
2. Place a magnet in front of the magnet symbol.
3. Power on the device.
4. After the power-up LED sequence, the NS LED blinks red, indicating a ~10 s window to remove the magnet.
5. The NS/BF LED then blinks green, indicating another 10 s window to reapply the magnet.
6. If the magnet is applied for approximately 3 s, all LEDs light up green.
7. The NS/BF LED blinks red and X1 blinks yellow. The device is now in “menu mode”, where options can be selected (indicated by the blinking X LED).
8. Removing the magnet causes the NS/BF LED to blink green again. Briefly reapplying the magnet (<3 s) advances to the next menu item (e.g., X2 will blink yellow). This allows navigation through the menu.

Option	Effect
X1	Perform a factory reset (reset password and IP settings, NOT the type of fieldbus)
X2	Set the static IP address “192.168.1.250”, subnet “255.255.255.0”
X3	Change fieldbus (if EtherNet/IP is running, then change to PROFINET and vice versa)

9. To select an option, apply the magnet for more than 3 s while the NS/BF LED is blinking green.
10. If no magnet action is detected for approximately 10 s, the procedure is cancelled and the G20 controller resumes normal operation.



Tip

General operating guidance:

- Red blinking NS/BF LED: Remove the magnet
- Green blinking NS/BF LED: Apply the magnet
- Confirmation (green blinking NS/BF LED): Apply the magnet for approx. 3 s
- Cancellation: No magnet action for approx. 10 s cancels the procedure

During Operation

During operation, the magnet can also be used to activate or deactivate the locator function. After power-up, when LEDs L1 to L4 are blinking in red, green, blue, and yellow, the magnet can be applied for approximately 3 s to start or stop the function.

3.4 Interfaces and Connections

Flat Cable Specification

The modules are compatible with the AS-Interface (ASi) standard flat cable in accordance with IEC 62026-2.

The following flat cable types are available with UL Recognized approval:

AS-Interface Cable Types with UL Approval

Pepperl+Fuchs Designation	Color	Insulation Material	Cross section	UL "Cable Style"	Approval
VAZ-FK-R-BK	Black	TPE	2 × 1.5 mm ²	2103	  
VAZ-FK-PUR-BK	Black	PUR	2 × 1.5 mm ²	20549	  
VAZ-FK-PUR-BK-2.5MM	Black	PUR	2 × 2.5 mm ²	20549 10493	  
VAZ-FK-PUR-GY-2,5MM	Grey	PUR	2 × 2.5 mm ²	21328	  



Warning!

Observe the maximum permissible operating temperature of the cable.

The maximum permissible operating temperature of the ASi flat cable connected to the module must be at least 80 °C.

Input/Output Connections

The sensors and motors are connected to the G20 MDR system module via cables with round M8 connectors:

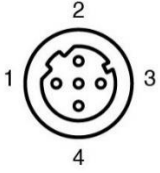
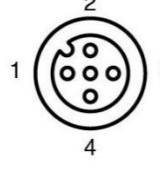
- Sensors: Socket, 4-pin
- Motors: Socket, 5-pin

Motor Supply from Auxiliary Voltage

The motors are supplied directly from the external auxiliary voltage PWR, which cannot be switched off. The voltage is permanently present at contacts 1 and 3 of the 5-pin M8 connector. The connection is protected by a non-resettable 4 A melting fuse.

Plug Assignment Ethernet G20 Controller

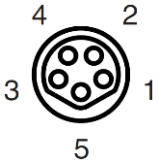
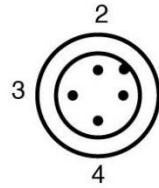
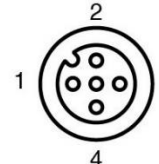
The Ethernet G20 controller is equipped with two integrated Ethernet cables, including an Ethernet switch, enabling direct connection to Ethernet networks in ring topologies. It also provides four cables for direct connection of the first G20 MDR system module in the line.

Connection for	Connectors	Plug type/assignment
Ethernet		LM type in accordance with EN 61076-2-101 M12, 4-pin, plug, screw-locking, D-coded 1: Tx+ 2: Tx- 3: Rx+ 4: Rx-
G20 MDR system module (L-1) (L-2) (L-3) (L-4)		LM type in accordance with EN 61076-2-101 M12, 4-pin, plug, screw-locking, A-coded 1: + 2: H 3: - 4: L

Plug Assignment G20 MDR System Module

The G20 MDR system module includes all necessary cables for connecting inputs/outputs and MDRs, as well as for daisy-chaining preceding and subsequent G20 MDR system modules.

Connection for	Connectors	Plug type/assignment
Inputs/outputs		Input: LF004-GS1-A in accordance with IEC/EN 61076-2-104 M8, 4-pin, socket, union nut, A-coded Suitable mating connector: LM004-Gx1-A or similar 1: V+ sensor supply 2: IO2, IO4, IO6, IO8 3: V- sensor supply 4: IO1, IO3, IO5, IO7

Motor		Motor: NF005-SS1-B in accordance with IEC/EN 61076-2-104 M8, 5-pin, socket, snap-locking, B-coded Suitable mating connector: NM005-Sx1-B or similar 1: MOT+ motor supply 2: DIR direction of rotation 3: MOT- (=PWR-) motor supply 4: ERROR motor fault 5: SPEED- speed signal
G20 MDR system module (L-A) / Ethernet G20 controller (L-1/2/3/4)		LM type in accordance with EN 61076-2-101 M12, 4-pin, plug, screw-locking, A-coded 1: + 2: H 3: - 4: L
G20 MDR system module (L-B)		LM type in accordance with EN 61076-2-101 M12, 4-pin, socket, screw-locking, A-coded 1: + 2: H 3: - 4: L

4. Installation

4.1 Storage and Transportation

Keep the original packaging. Always store and transport the device in the original packaging.

Store the device in a clean and dry environment. The permitted ambient conditions must be considered, see datasheet.

4.2 Unpacking

Check the product for damage while unpacking. If the product is damaged, inform the post office or parcel service and notify the supplier.

Retain the original packaging in case the device must be stored or shipped again at a later date.

Should you have any questions, please contact Pepperl+Fuchs.

4.3 Mounting

Mount the device with both brackets (1) on a solid, continuous surface.

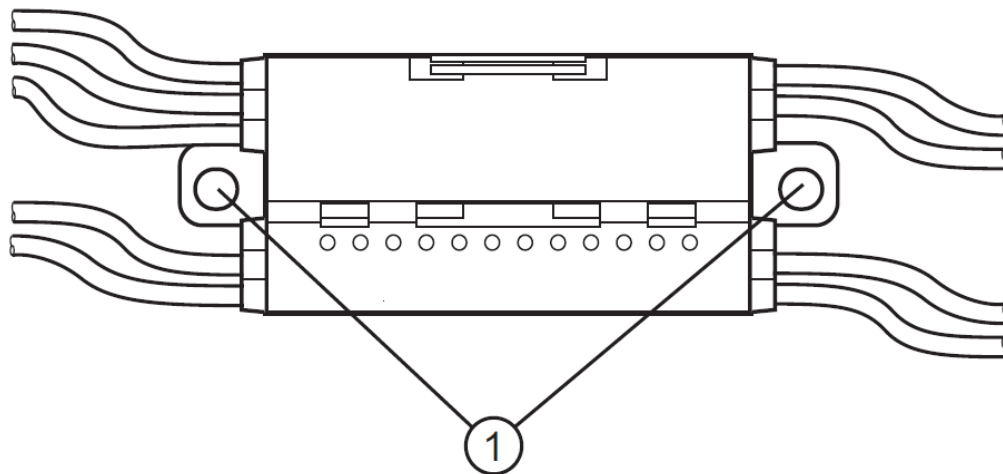


Figure 6: Mounting brackets (1)

4.4 Connecting the Auxiliary Current Flat Cable

The Ethernet G20 controller is connected to the PWR auxiliary power supply via the black cable. The permissible auxiliary voltage range is 18–30 V.

The G20 MDR system module is connected to the PWR auxiliary power supply via the black or gray flat cable. The permissible auxiliary voltage range is 18–56 V.



Warning!

Suitable Auxiliary Voltage

Select an appropriate auxiliary voltage for the motor rollers. The G20 MDR system module can be operated at 24 V and 48 V. However, each motor roller is designed for only one of these voltage levels. Using an incorrect auxiliary voltage may damage the motor rollers.

Flat Cable Connection

1. Electrical contact between the module and flat cable is established via two metal piercing pins using insulation-piercing technology. The flat cable is guided through a hinged cable guide. When closed, the cable guide is secured by a locking bracket and can be reopened without tools.
2. Flat-profile cables are narrow on the upper side (with a visible offset profile edge) and wide on the lower side (profile edge not visible). The cable guide allows insertion from either side, enabling flexible connection of cables already installed in cable ducts.
3. It must be ensured that the profile edge always faces the module. Mechanical reverse polarity protection prevents the cable guide from closing completely if the flat cable is inserted incorrectly.



Caution!

Incorrect Flat Cable Insertion

If the flat cable is inserted incorrectly, the module will not operate.

If the flat cable is installed in the cable guide in the wrong direction, the polarity is reversed. The module is protected against damage by the internal reverse polarity protection.



Warning!

Damage to Contacts

Connect or disconnect the module connections only when the module is de-energized. Otherwise, the contacts may be damaged.



Connecting Flat Cables on the Narrow Side

1. The profile edge is visible from above.
2. Open the cable guide by slightly pushing the locking bracket (1) to the side.
3. Insert the black PWR flat cable into the lower duct with the profile edge (3) facing the module (see "24 V/48 V Power" marking on the module).
4. Ensure that the profile edges of the flat cable are positioned beneath the corresponding reverse polarity protection (2).



Tip

Use the mounting aid VAZ-G20-MH to facilitate closing the cable guide.

Close the cable guide until it engages securely in the locking bracket (1). The metal piercing pins make contact with the fine-stranded conductors in the flat cable.

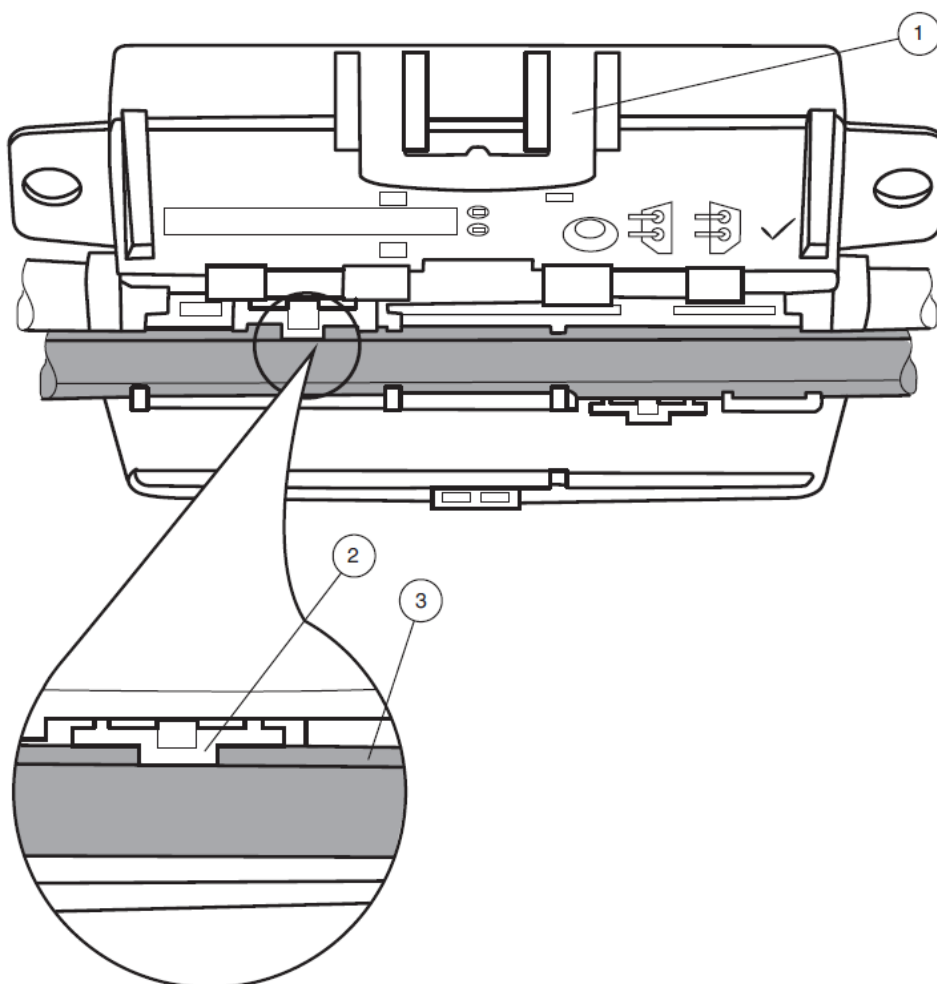


Figure 7: Connecting the flat cable on the narrow side



Connecting the Flat Cable on the Wide Side

1. The profile edge is not visible from above. For clarity in the figure below, a dotted line represents where the edge would be.
2. Open the cable guide by pushing the locking bracket (1) slightly to the side.
3. Insert the black PWR flat cable with the profile edge (2) pointing toward the module into the lower duct (see the "24V/48V Power" marking on the module).



Tip

Use the mounting aid VAZ-G20-MH to facilitate closing the cable guide.

Close the cable guide until it engages securely in the locking bracket (1). The profile edge (2) of the flat cable is above the two reverse polarity protections. The metal piercing pins make contact with the fine-stranded conductors in the flat cable.

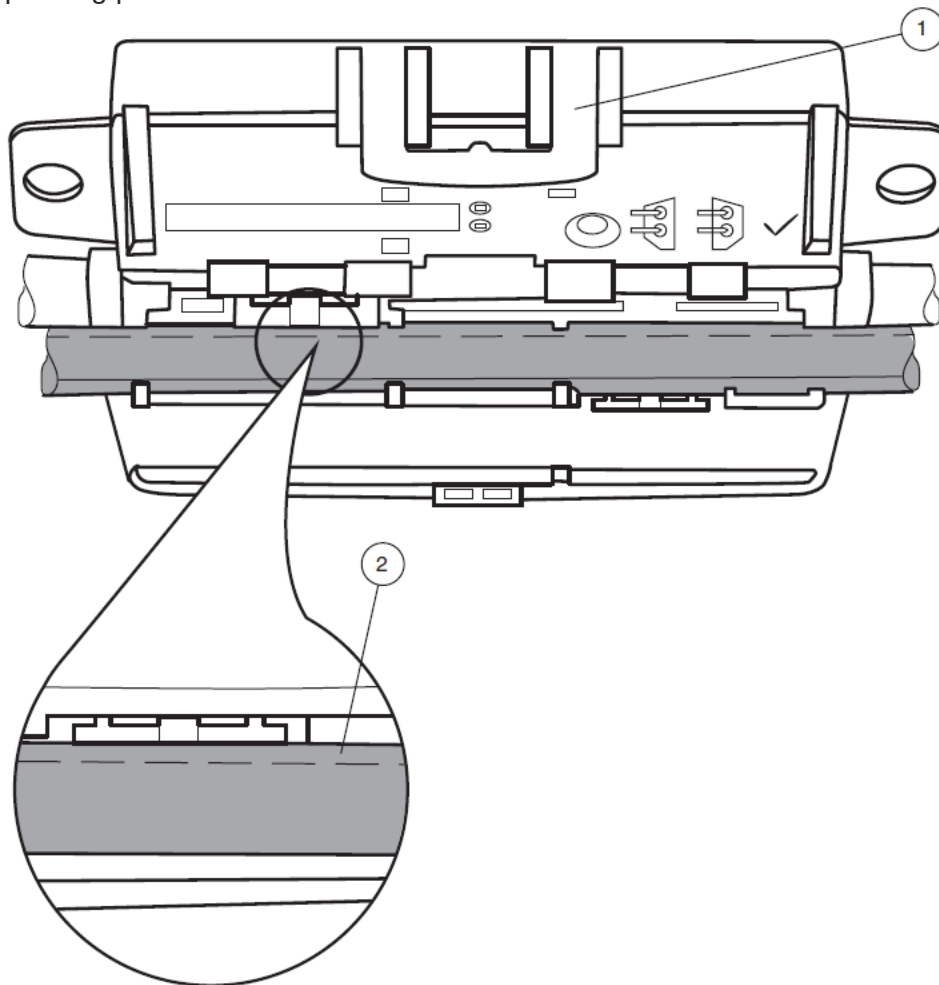


Figure 8: Connecting the flat cable on the wide side (profile edge shown as dotted line)

Flat Cable Inserted Incorrectly

The figure below shows an example of incorrect flat cable insertion. The profile edge (2) does not face the module, resulting in reverse polarity. The flat cable is bent and positioned above the reverse polarity protection (1), preventing the cable guide from closing completely (mechanical reverse polarity protection).

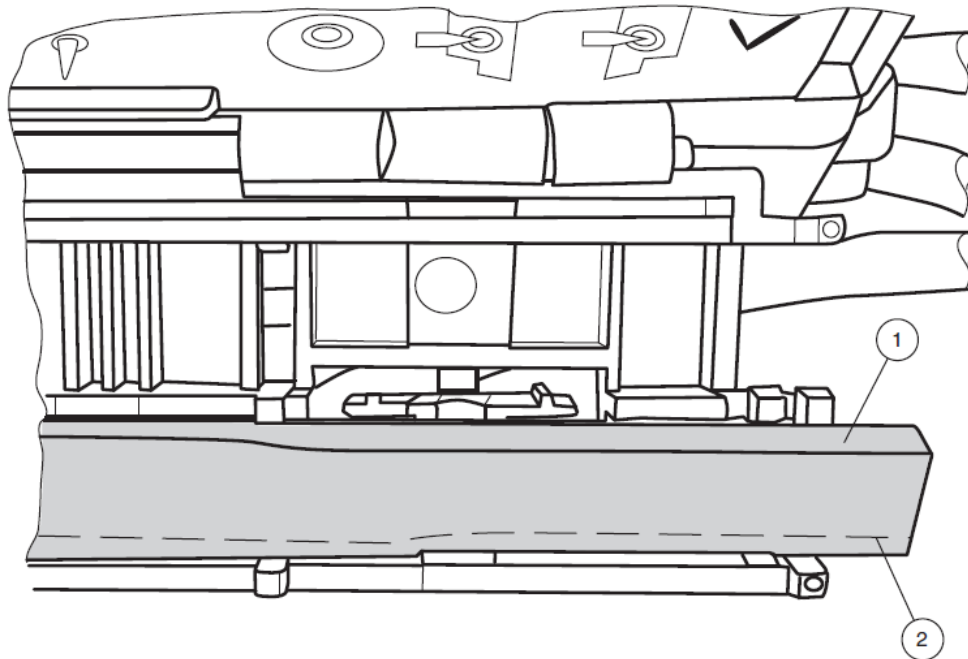


Figure 9: Flat cable inserted incorrectly (profile edge shown as dotted line)

4.5 Connection of G20 Controller and G20 MDR System Modules

All necessary cables and connectors for connection of the Ethernet G20 controller as well as G20 MDR system modules are attached to the modules (except for the flat cable for power supply). Connection is made via standard round plug connectors.

The Ethernet G20 controller is available with the following connection cables:

- Two M12 D-coded Ethernet connectors (ETH1/2) enable connection to a higher-level fieldbus system. An integrated switch enables ring topologies.
- Four M12 A-coded connectors (L1–4) enable connection of the G20 MDR system modules.

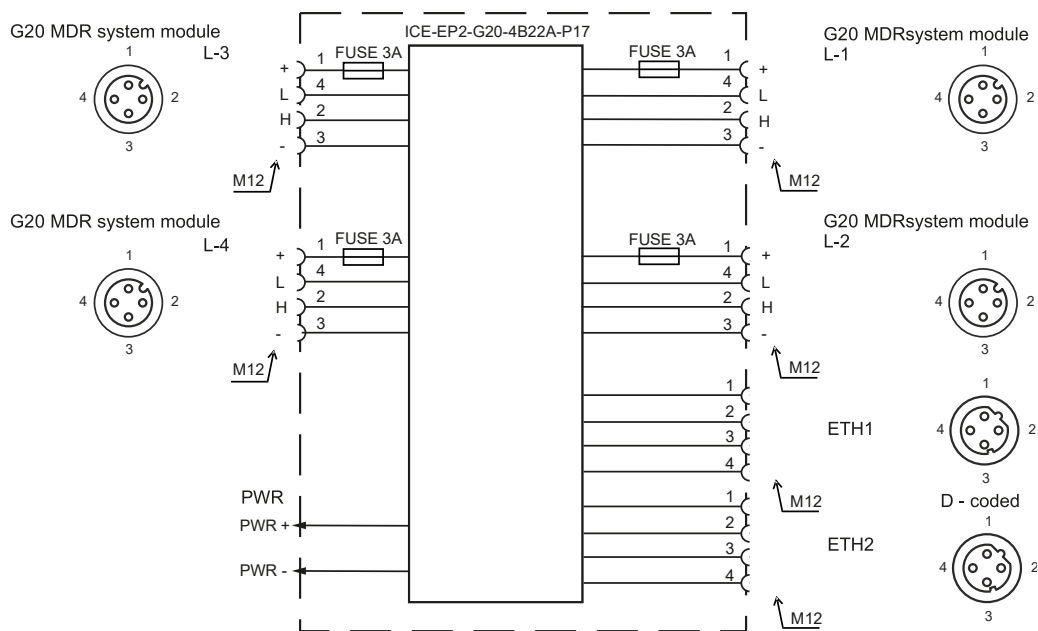


Figure 10: Ethernet G20 controller

G20 MDR System Module

The G20 MDR system module is available with the following connection cables:

- Two M12 A-coded connectors (L-A/B) for connection to the G20 Ethernet controller and for daisy-chaining up to 15 G20 MDR system modules per line.
- L-A is used for connection to the upstream module (towards the controller), while L-B is used for connection to the downstream module (away from the controller). The L-B port of the last G20 MDR system module in the line must be connected to the bus terminator (V15S-TR-B24-120R).
- Two IO cables (IO) for connecting up to four digital inputs/outputs (two IOs per cable)
- Two MDR cables (MOT) for connecting 24 V / 48 V motor rollers

The IO and MDR cables are assigned to Zone 1 and Zone 2. This separation is visually indicated on the module and is also reflected in the web server, as well as in the configuration and process data image.

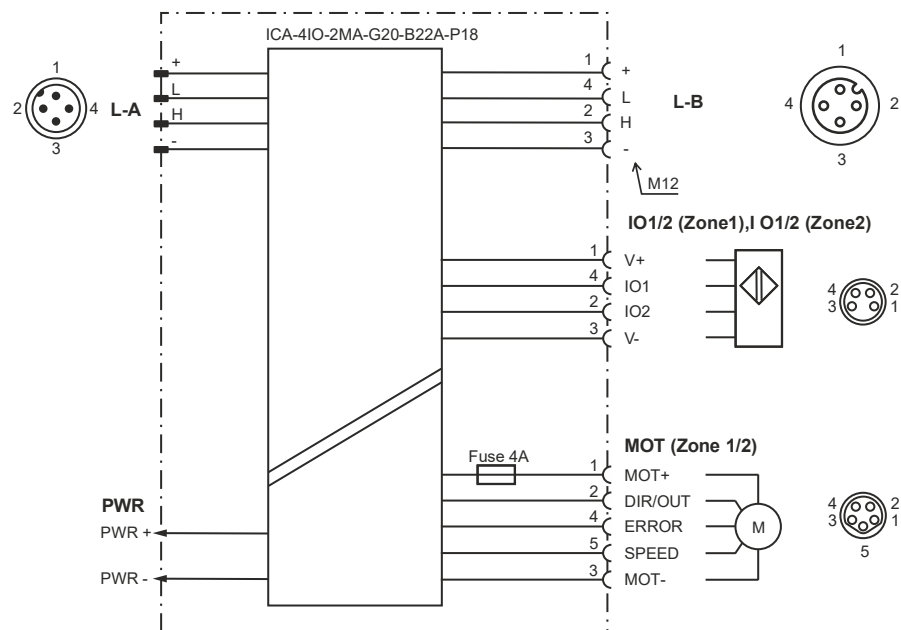


Figure 11: G20 MDR system module



Warning!

Damage to contacts

Connect or disconnect the module connections only when the module is de-energized. Otherwise, the connections may be damaged.

5. Commissioning

5.1 Assigning and Changing an IP Address

By default, the Ethernet G20 controller starts up without a static IP address and automatically obtains an IP address via DHCP. If an Ethernet cable is plugged in and a connection is established, the corresponding ETH LEDs on the controller will light up green.

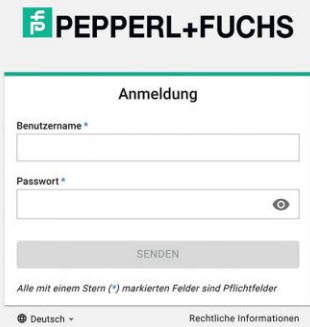
If there is no DHCP server on the network, you can set the controller's IP address in two ways:

- **Using a magnet**
You can use a magnet to force a static IP address (192.168.1.250)
- **Using PortVision DX**
Download the PortVision DX software [here](#) to assign an IP address to the device. To do this, click "Scan" and enable the IO-Link Master / ICE2 / ICE3 option.

Once an IP address has been assigned to the device and the NS/BF LED is flashing green, you can access the G20 controller via the assigned IP address.

Changing the IP Address via the Web Interface:

1. Open the web interface, based on a given IP address
→ The login dialog shows up



The screenshot shows the login page of the Pepperl+Fuchs G20 controller web interface. At the top, the logo 'p+h PEPPERL+FUCHS' is displayed. Below it, the title 'Anmeldung' is centered. There are two input fields: 'Benutzername *' and 'Passwort *'. The password field has a toggle icon (an eye) to the right. Below the fields is a grey button labeled 'SENDEN'. A note below the button states: 'Alle mit einem Stern (*) markierten Felder sind Pflichtfelder'. At the bottom of the form area, there are two links: 'Deutsch' (with a dropdown arrow) and 'Rechtliche Informationen'. At the very bottom of the page, the copyright notice '© Pepperl+Fuchs' is visible.

2. Log in with the following data:

- User name: admin
- Password: Use the code in down right corner including the dashes.

3. Change IP address via **System -> Network interface** or refer to [chapter 5.6](#).



Note

The IP address can only be changed if **no active PLC connection** to the device exists.

4. Change the IP address and click **APPLY**.

→ The new IP address is assigned to the Ethernet G20 controller.



Tip

You can find helpful information under **System -> Events**. To obtain information on the connected system modules, click **Ethernet G20 Controller > Line 1|2|3|4 > SYSTEM MODULES**.

5.2 Process Data and Configuration Glossary

The Ethernet G20 System offers several configuration possibilities in order to adjust the behavior of the Ethernet G20 controller and the G20 MDR system modules according to the requirements of the specific application. Those configurations especially include the power settings per line (L1–L4), detailed motor settings (speed, acceleration, breaking), and timings between trigger events (e.g., sensor switching) and actions to be performed (e.g., turn on MDR).

5.2.1 Line (Powered)

By default, all four lines (L1–L4) of the Ethernet G20 controller are powered, which enables direct connection of G20 MDR system modules. For lines not in use, the power can be disabled via the web interface (see [chapter 5.6.3](#)) or through the respective fieldbus settings (EtherNet/IP: [chapter 5.5](#) / PROFINET: [chapter 5.6](#)).

5.2.2 Motor Settings

5.2.2.1 Motor Speed

The G20 MDR system modules are compatible with various MDRs on the market that use an analog interface (0–10 V) to define the motor speed. Using the “Motor Speed Voltage” parameter, a minimum and maximum voltage level can be configured in increments from 0 to 10,000 mV. These two limits define the range that is scaled to the process data image. The exact speed is then set via the process data image within this range from 0 to 100%.

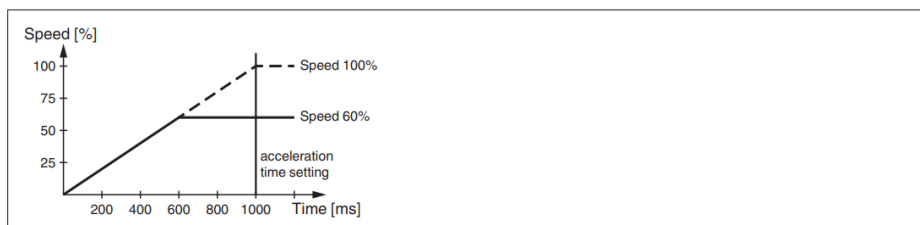
Example:

- Minimum Value = 2000 mV
- Maximum Value = 10000 mV
- Range = 8000 mV (10000 mV – 2000 mV)
- Scale = 80 mV per 1% step (8000 mV / 100%)

For the exact correlation between voltage level and speed, refer to the documentation for the specific MDR in use.

5.2.2.2 Ramp Time

The ramp time defines the acceleration (ramp-up) and braking (ramp-down) behavior of the MDR and can be set in steps of 100 ms. The configured value defines the time (e.g., 1000 ms) required to change the voltage level from the current value to the configured setpoint. The slope remains constant and is independent of the maximum speed. This enables smooth acceleration and braking of the connected MDR. The following diagram illustrates the start behavior of the start/stop ramp using a setting "1000 ms" as an example.



5.2.2.3 Error Logic

Several MDRs with an analog interface provide a separate "Motor Error signal" to indicate a malfunction. By default, the G20 MDR system module is configured as "active high", providing a "0" in the respective data image when no error is present and a "1" when the error signal is active. The corresponding LED on the module flashes only when the signal is active. This behavior can be inverted so that the module provides a "1" when no error is present and a "0" when an error is present. This function may be used to disable the error LED when no MDR is connected.

5.2.2.4 Speed Compensation

Based on the configured speed settings the G20 MDR system module provides a set value for the voltage level as an output to the MDR. Due to the specific characteristics of the MDR in use and the electrical connection (length, cross-section of leads) there might be a small difference between this set value and the present value on the MDR. This can lead to a mismatch between configured and present speed. The "Speed compensation" feature compensates for deviations between the set voltage and the actual voltage, ensuring accurate speed control.

5.2.2.5 Inverted

By default, the G20 MDR system module is configured as "active high". Thus, the MDR output is turned on when a logical "1" is provided in the respective data image and turned off when a logical "0" is provided.

With the "Inverted" function, this logic can be turned around. The MDR output is turned on when a logical "0" is provided in the respective data image and turned off when a logical "1" is provided.

5.2.2.6 Deactivate Ramp

Deactivates the configured ramp time so that there is no delay between the actual speed value and the setpoint value. Depending on the initial speed and the difference between the actual speed and the setpoint speed, the MDR may change speed abruptly.

5.2.3 Inputs / Outputs

Each G20 MDR system module offers a total of 4 configurable digital inputs/outputs. Per IO cable, there are 2 configurable digital IOs linked to the respective Zone (Left = Zone 1 / Right = Zone 2), which are assigned as following:

- Pin 4 = IO1
- Pin 2 = IO2

By default, the G20 MDR system module is configured as “active high” providing a “0” in the respective data image when the IO signal is low and a “1” when the IO signal is high. By default, there is no restriction on how fast or slow the transition from low (0) to high (1) or vice versa needs to be in order to be transferred via the process data image. Hence every single time the signal changes it is displayed accordingly in the process data image. However, in real applications, this can cause issues due to so-called “bouncing signals” or “dry-contact bounce”, which occur when the contacts inside the sensor do not close properly. In this scenario the signal bounces very quickly within microseconds between “0” and “1” and vice versa which can lead to malfunction of the application as the PLC relies its application logic on the transition from “0” to “1”. Configuring a certain signal pulse extension or suppression enables a reliable transfer of signal changes from the lower field level to the higher-level PLC.

5.2.3.1 Rising Pulse Extension

Eliminates bouncing signals in the transition from low (0) to high (1).

The rising pulse extension allows configuration of a defined time period (e.g., 100 µs) during which the logical “1” is maintained after the sensor signal changes from low (0) to high (1), even if the signal changes again within the defined time period. This ensures reliable transmission of signals that are present only for a short time.

5.2.3.2 Falling Pulse Extension

Eliminates bouncing signals in the transition from high (1) to low (0).

The falling pulse extension enables configuration of a defined time period (e.g., 100 µs) during which the logical “0” is maintained after the sensor signal changes from high (1) to low (0), even if the signal changes within the defined time period. This ensures reliable transmission of signals that are present only for a short time.

5.2.3.3 Rising Pulse Suppression

Eliminates bouncing signals in the transition from low (0) to high (1).

The rising pulse suppression allows configuration of a defined time period (e.g., 100 µs) during which the logical “1” is suppressed after the sensor signal changes from low (0) to high (1). As a result, only signal changes that remain stable for a defined period are transferred to the PLC. Signal changes with a duration shorter than the configured rising pulse suppression time are filtered out and not transferred.

5.2.3.4 Falling Pulse Suppression

Eliminates bouncing signals in the transition from low (0) to high (1).

The falling pulse suppression enables configuration of a defined time period (e.g., 100 µs) during which the logical “1” is maintained after the sensor signal changes from high (1) to low (0). Thus, only signal changes that remain stable for a defined period are transferred to the PLC. Signal changes lasting shorter than the configured falling pulse suppression time are filtered out and not transferred.

5.2.3.5 Inverted

By default, the G20 MDR system module is configured as “active high” providing a “0” in the respective data image when the sensor signal is low and a “1” when the sensor signal is high. Using the “Inverted” function, this logic can be reversed. In this case, the G20 MDR system module provides a “1” in the respective data image when the sensor signal is low and a “0” when the sensor signal is high.

5.2.4 Status and Diagnosis Data

The Ethernet G20 system provides detailed status and diagnostic data for both the Ethernet G20 controller and the G20 MDR system modules. This data can be accessed via the fieldbus interface, web interface, or REST API. In most cases, status and diagnostic data is provided as the current value as well as average or historical minimum and maximum values. With the exception of current values, all status and diagnostic data is non-configurable (limit values) and non-resettable (lifetime data).

5.2.4.1 Temperature

The G20 modules can measure the internal temperature of the ICs, whereas “front” refers to the top side of the G20 modules, and “back” refers to the resin-filled side of the modules. The overtemperature threshold is fixed at 100 °C.

5.2.4.2 Voltage and Current / Power Consumption

The Ethernet G20 system can provide data on voltage level and current. This applies at the top level for the Ethernet G20 controller as well as on lower level for the G20 MDR system modules. The voltage level is measured directly at the connection (piercing contacts) between the flat cable and the module, providing insight into whether all

modules are properly powered or whether voltage peaks or drops occur along the line.

Current measurement, particularly within the G20 MDR system modules, provides valuable information on the current supplied to the MDRs. Changes in current values may indicate aging effects in the motor rollers (gradual increase over time) or faults (current peaks). The current value can also serve as an indicator of MDR load, as the weight of transported goods influences current consumption.

Based on voltage and current values, power consumption and energy can be calculated within the module. Startup energy is measured over a fixed time period of 3 seconds.

5.2.4.3 Counters

The module provides several counters that enable detailed analysis of the status of lines and modules.

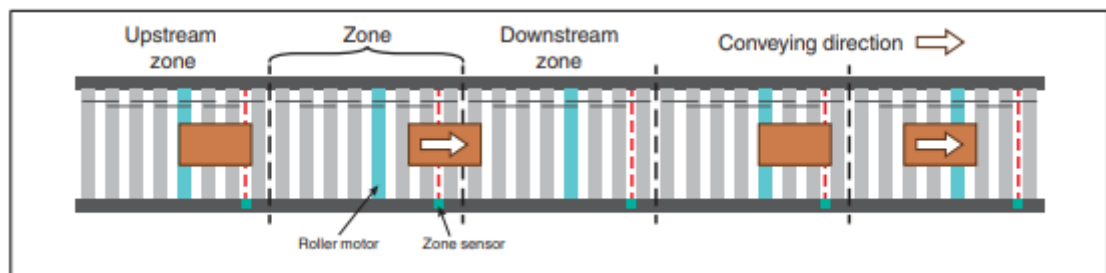
- Receive Count = Number of received telegrams
- Transmit Count = Number of transmitted telegrams
- Total Error Count = Number of communication errors
- On/Off cycles = Number of times a module has been powered on and shut down
- Uptime = Time elapsed since the module was powered on
- Operating time = Total time module has been powered on

5.3 ZPA Operation

The G20 system module can be configured either as PLC controlled (PLC controls the logic of the application) or as ZPA operation (ZPA logic is controlled directly in the Ethernet G20). The main benefits of configuring modules as decentralized ZPA modules are extremely fast reaction times (<1ms) between trigger situation and action (e.g., sensor signal = high > MDR starts) and saving processing resources in the PLC. The ZPA mode can be activated via the different interfaces like web server, fieldbus, or REST API. G20 MDR system modules which are configured as ZPA mode still provide all status and diagnosis data but disregard the motor run signal (all other motor settings are accepted and applied).

5.3.1 Use and Application

During zero pressure accumulation, the conveyed product is moved along a conveyor line in a controlled manner and collisions between the conveyed product are prevented. For this purpose, a conveyor line is divided into several sections or zones. Each zone has its own drive, which can be activated independently of the neighboring zones. At the end of each zone, a zone sensor is installed that detects the conveyed product. The accumulation conveyor logic ensures that there is only ever one conveyed product present in a zone. Conveyed products can therefore only be conveyed to the downstream zone once there is no more conveyed product in that zone. As long as the downstream zone is occupied, the conveyed product is stopped when it reaches the zone sensor and thus accumulates irrespective of subsequent conveyed product.



5.3.2 General Settings

Operating Mode

The operating mode defines the position of a specific G20 MDR system module within a ZPA line.

- Start = First zone within a ZPA section
- Middle = Intermediate zones between the first zone and last zone
- End = Last zone within a ZPA section
- No ZPA = Zone not used within a ZPA section and controlled by a PLC

Transport Direction

The transport direction defines the direction of movement for ZPA zones depending on their orientation relative to the G20 controller and can be configured individually for each zone:

- From controller = Modules and Zones are in ascending order
(Module 1 / Zone 1 > Module 1 / Zone 2 > Module 2 / Zone 1...)
- To Controller = Modules and Zones are in descending order
(Module 15 / Zone 2 > Module 15 / Zone 1 > Module 14 / Zone 2...)

Flipped

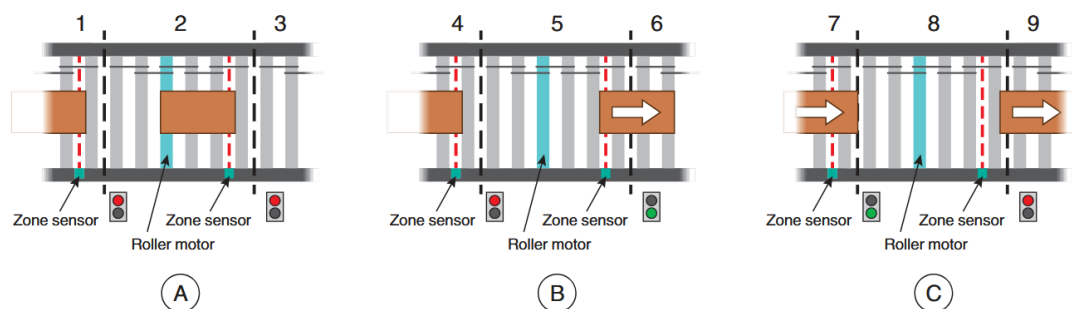
By default, the motors/zones are in ascending order. MOT1 represents Zone 1 and MOT2 represents Zone 2. Zone 2 follows Zone 1. By using "Flipped", this order is changed that Zone 1 follows Zone 2. This function is useful in "U-turn sections" where modules are placed on the opposite side of the conveyor line.

5.3.3 Modes

Standard ZPA Mode

The conveyed product must completely leave the zone before the next conveyed product may enter. As soon as the outgoing conveyed product is no longer detected by the zone sensor, the release signal is set. This operating mode implements zero pressure accumulation with single accumulation and single release. It ensures strict separation of conveyed product while maintaining a defined safety distance.

The following example describes the sequence in the "Standard ZPA" operating mode:



- Step A: Zone (2) has accumulated its conveyed product because downstream zone (3) has not set its release signal (red light). As zone (2) is occupied, it also does not issue a release signal to upstream zone (1).
- Step B: Downstream zone (6) has issued a release signal (green light), and the conveyed product is transferred to the next zone (6). Because the conveyed product has not yet left the zone sensor (5), zone (5) does not issue a release signal to upstream zone (4).

- Step C: The conveyed product has left the zone sensor. Therefore, zone (8) sets the release signal for upstream zone (7) to allow the next conveyed product to be transported. Downstream zone (9) has now fully accepted the conveyed product and prevents further product from entering by withdrawing the release signal.

The following time conditions are used in the "Standard ZPA" operating mode:

- Release time
- Entry time
- Transportation time
- Motor run-on time
- Switch-on delay
- Search time

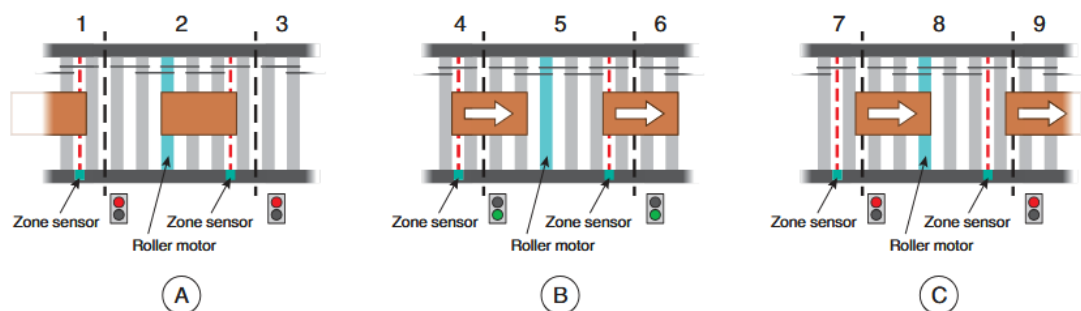
Enhanced Mode

This operating mode implements zero pressure accumulation with block accumulation or block release. A zone allows the next conveyed product enter once the conveyed product currently located in that zone receives the release signal to leave the zone. This reduces the safety distance between conveyed products and increases throughput.

If the foremost zone of an accumulation conveyor line receives a release signal, the signal is forwarded directly to the zones behind it. As a result, all accumulated conveyed products are transported simultaneously to the next zone.

In block release mode, it is ensured that only one additional conveyed product enters the zone at a time. This conveyed product must then advance completely to the zone sensor before the next conveyed product is allowed to enter.

The following example describes the sequence in the "Enhanced ZPA" operating mode:



- Step A: Zone (2) has accumulated its conveyed product because downstream zone (3) has not issued a release signal (red light). Because zone (2) is occupied, it also does not issue a release signal to upstream zone (1).

- Step B: Downstream zone (6) has issued a release signal (green light) and the conveyed product is conveyed to the next zone (6). At the same time, the release signal is forwarded to upstream zone (4) and the following conveyed product is conveyed to zone (5). The conveyed product starts up at the same time.
- Step C: The previous conveyed product has left zone (8), so downstream zone (9) withdraws its release signal. The following conveyed product has also already left upstream zone (7). Zone (8) moves the conveyed product to its zone sensor while it prevents other conveyed product from entering by resetting the release signal.

The following time conditions are used in the "Enhanced ZPA" operating mode:

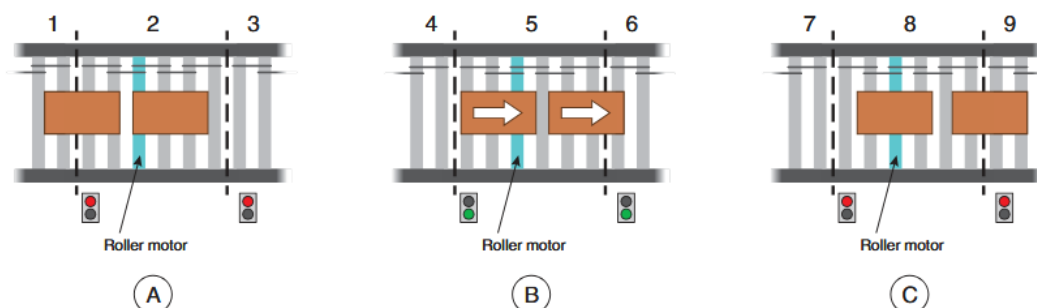
- Release time
- Entry time
- Transportation time
- Motor run-on time
- Switch-on delay
- Search time
- Release delay

Transportation / Transport Jam

In this operating mode, a zone forwards the release signal directly to the zones behind it. At the same time, the release signal also switches on the zone motor. The release is not set independently. Therefore, only a block release is performed, which does not cause the conveyed product to be separated.

Connecting a zone sensor is optional in this operating mode. If a zone sensor is connected, the logic can detect accumulations and shut down the DC roller motor of the zone if required. If the downstream zone operates in a different mode, the zone sensor must be connected so that its status can be forwarded via zone coupling.

The following example describes the "Transportation" operating mode:



- Step A: Downstream zone (3) has not issued a release signal (red light). Zone (2) therefore also does not issue a release signal, and the DC roller motor remains stopped.
- Step B: Downstream zone (6) has issued a release signal (green light). Zone (5) immediately forwards the release signal to upstream zone (4) and switches on its DC roller motor. The conveyed product starts moving at the same time.
- Step C: Downstream zone (9) has reset its release signal. Zone (8) immediately resets its release signal and switches off the DC roller motor.

The following time condition is used in "Transportation" the operating mode:

- Release time (only if a zone sensor is connected)

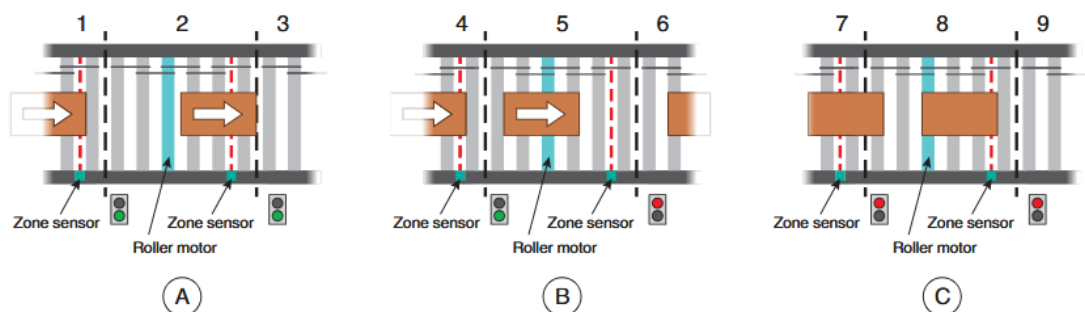
Long Zone Mode

This operating mode is designed for standard zones or enhanced ZPA zones that are significantly longer than the surrounding zones. Such long zones can reduce the overall conveyor throughput, as the distance between conveyed products is primarily determined by the zone length. Therefore, conveyed products are not individually separated in this mode, which may result in increased spacing between them.

If a release signal is present, it is forwarded directly to the zones behind that zone, and the DC roller motor of the zone is switched on (block release). If no conveyed product is detected at the zone sensor, the zone automatically issues a release signal to allow additional conveyed product to enter.

If no conveyed product is detected for a defined period, the DC roller motor is switched off. The motor is restarted when the upstream zone sensor status changes and a conveyed product enters the zone.

The following example describes the sequence in the "Long Zone" operating mode:



- Step A: Downstream zone (3) has issued a release signal (green light). Zone (2) immediately forwards it to its upstream zone (1) and conveys its conveyed product to the next zone (3).

- Step B: Downstream zone (6) has reset its release signal (red light). Because no product has arrived in front of the zone sensor in zone (5) yet, it will retain its release and move the conveyed product to its final position. The subsequent conveyed product (4) can enter freely.
- Step C: The conveyed product has reached zone sensor (8). As downstream zone (9) is still does not issue a release signal, zone (7) stops the conveyed product and resets its release signal to also stop the subsequent conveyed product.

The following time conditions are used in the "Long Zone" operating mode:

- Release time
- Switch-on delay
- Idle mode delay

Secondary Zone Mode

In this operating mode, the ZPA zone acts as a secondary zone to a downstream primary zone. The motor of the secondary zone is switched synchronously with the motor of the primary zone. In this way, the primary zone is extended by the secondary zone.

Signals of the primary zone are transmitted to the upstream zone via the secondary zone. The zone sensor of the secondary zone has no function in this operating mode and does not need to be connected.

All ZPA operating modes can be used as the primary zone; no special configuration is required. Any number of secondary zones can be connected to a single primary zone. The connected secondary zones increase the effective zone length controlled by the primary zone.

The following time conditions for the primary zone and the connected secondary zones are added together:

- Search time
- Transportation time
- Idle mode delay

Always on Zone

In this operating mode, the zone's motor runs continuously.

5.3.4 Timings

The "Timing" settings are only relevant if a G20 MDR system module is configured as ZPA mode and enables detailed configuration of timings to adapt the module behavior to specific application requirements. Timings are especially used to define a certain time period between a trigger event (e.g., sensor switching signal) and an action that should be taken (e.g., turn on motor).

5.3.4.1 After Run Timeout

Once the conveyed product has left the zone sensor of a zone, the motor after-run timeout is activated. This ensures that the motor continues to run so that the conveyed product can completely exit the zone. It also reduces frequent switching of the motors when conveyed products follow each other at short intervals. During this time, subsequent conveyed product can enter the zone without stopping the motor.

5.3.4.2 Delivery Timeout

The delivery timeout is the time required for the conveyed product to leave the upstream zone and pass its zone sensor after the release signal has been set. If the conveyed product takes longer than the delivery timeout, the zone switches off its motor and waits until the conveyed product has either left the upstream zone or is detected in front of its zone sensor.

5.3.4.3 Leaving Timeout

The leaving timeout is the time required for a conveyed product located in front of the zone sensor to move away from the sensor after the motor has been switched on. If this time is exceeded, the zone assumes an accumulation. It switches off the motor and resets the release signal.

Normal operation is resumed once the blocked conveyed product has been manually removed from the zone sensor. The search time then starts again immediately.

5.3.4.4 Long Zone Timeout

The long zone timeout is the time a zone in “Long Zone” operating mode waits for incoming conveyed products while the motor is running. After this time has elapsed, the motors are switched off, while the release signal remains active. The timeout is restarted when the status of the upstream zone sensor changes.

5.3.4.5 Receive Timeout

The receive timeout is the time required for a conveyed product to reach the next zone sensor after leaving the upstream zone sensor. If this time is exceeded, the zone assumes that no conveyed product is present and continues normal operation.

5.3.4.6 Search Timeout

If no conveyed product is detected in front of the zone sensor after startup, or if a conveyed product is unexpectedly removed from the zone sensor during normal operation, the search time starts. During this period, the zone searches for conveyed product that may be located undetected between its sensor and the upstream zone sensor. For this purpose, the motor is switched on and the system waits for a conveyed product to reach the zone sensor.

Once the search time has elapsed, the zone assumes that it is empty and continues normal operation.

In "Standard ZPA" operating mode, the release signal is set during the search time only if a conveyed product is detected in front of the upstream zone sensor. Since the zone cannot determine whether the conveyed product is fully located in the upstream zone or partially extends into the current zone, it sets the release signal.

In "Enhanced ZPA" operating mode, the release signal is always set during the search time to ensure a fast restart of the conveyor line.

If conveyed product is detected at the zone sensor during the search time, the zone continues normal operation. After the conveyed product has left the zone, the system restarts the search to ensure that no conveyed product remains undetected between the zone sensors.

5.3.4.7 Power on Delay

The power-on delay is the time a zone waits after startup before resuming normal operation. It also delays the start of the search for conveyed products that may be undetected between the zone sensors. This prevents current peaks caused by the simultaneous activation of DC roller motors in all modules whose zone sensor does not detect a conveyed product.

5.3.4.8 Release Delay

In the "Enhanced ZPA" operating mode, the forwarding of release signals is delayed by this time when a conveyed product has stopped in front of the zone sensor and subsequent conveyed product has not yet partially entered the zone. The release delay is used to avoid power peaks that would occur due to the simultaneous start of multiple conveyed products.

5.3.4.9 Upstream Delay

In "Standard ZPA", "Enhanced ZPA", and "Long Zone" operating modes, the upstream delay is the time after power-on during which the modules wait to receive a valid signal from the upstream zone. During this period, the zone sensor signal is already transmitted to the downstream zone.

After the upstream delay has elapsed, the modules of the individual zones start searching for conveyed products that may be located undetected between the zone sensors. The search ends as soon as a conveyed product is detected at the zone sensor or when the search time has elapsed.

5.3.5 Manual Intervention in the Conveying Process

Manual Feeding of Conveyed Product

It is always possible to manually feed a conveyed product. In this case, it is assumed that the conveyed product is placed in front of a zone sensor.

Manual Removal of Conveyed Product

It is possible to manually remove a conveyed product from the accumulation conveyor line at any time. The zone logic distinguishes between the following cases:

- **Manual Removal with DC Roller Motor Running**
During removal of a conveyed product, the zone whose sensor the product would have reached next waits for the duration of the transportation time for the conveyed product to arrive. After this time, the zone assumes that no conveyed product is present and continues normal operation.
- **Manual Removal with DC Roller Motor Not Running**
The conveyed product is located in front of a zone sensor. The zone detects the manual removal at the zone sensor. The zone switches on its DC roller motor and starts searching for conveyed products to ensure that the product was not simply pushed back and is now located undetected between the zone sensors. After the search time has elapsed, the zone returns to normal operation.

Manually Correction of Accumulations

When the conveyor line is in operation, one or more conveyed products may become blocked, resulting in an undesired accumulation. If conveyed product takes too long to leave the zone sensor (see release time/entry time), the zone logic detects an accumulation and automatically shuts off the DC roller motor. To resume normal operation, the cause of the accumulation must be eliminated and the blocked conveyed product in front of the zone sensor must be removed.

Ideally, simply slide the conveyed product away from the detection range of the sensor in the conveyor direction. The zone logic will detect that the accumulation has been resolved and will continue normal operation.

5.4 Web Interface

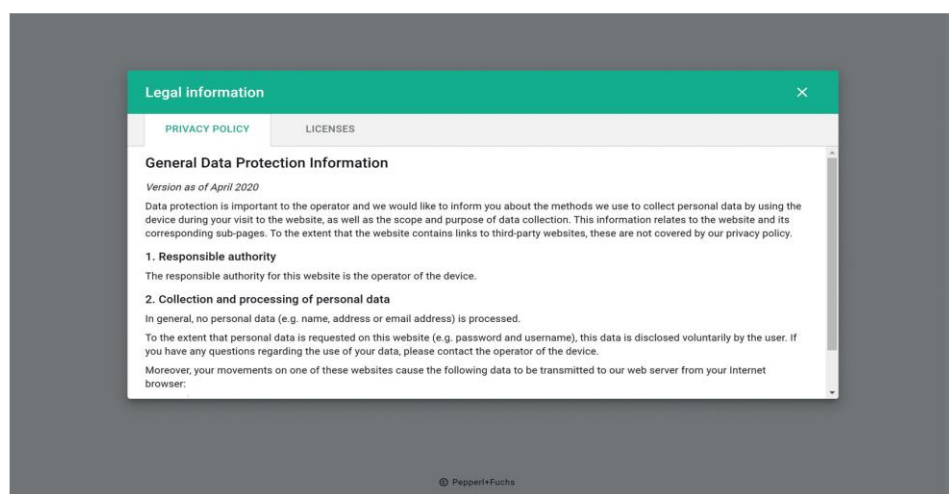
The Ethernet G20 controller offers a web interface that allows convenient configuration and diagnostics of the Ethernet G20 MDR system.

Legal Information

Please refer to the legal information for the most important information on data protection and licenses.

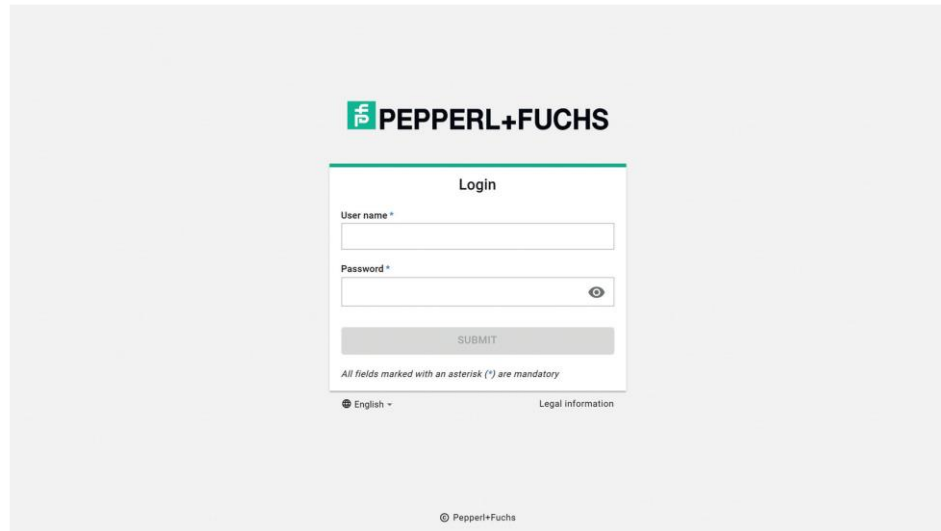
1. Click on the "Legal information" field

➔ The "Legal information" windows opens.



5.4.1 Login

1. Ensure that your computer and the device are on the same network.
2. Enter the device's IP address in the address bar of your browser.
3. Select the language of the web interface by clicking on the language section on the bottom left.
4. Enter the login information.



Note

The web interface is accessed via the fieldbus interfaces ETH1/ETH2.

Open the web interface with a current web browser, such as Google Chrome, Mozilla Firefox and Microsoft® Edge. The web interface is accessed via an HTTP request: `http://<ip - Address>`. The IP address must be configured beforehand.

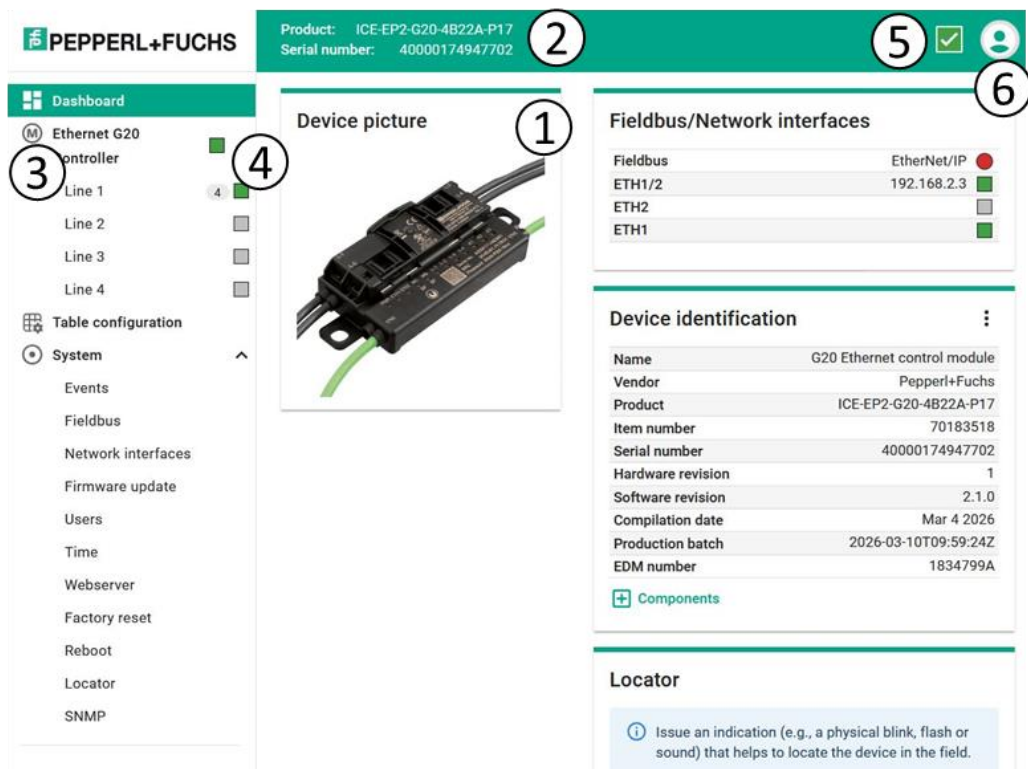
The web interface is responsive and optimized for display on desktop PCs, tablets, and smartphones.

For security reasons, each device is supplied with a unique password, which can be found in the enclosed documents or on the sticker attached to the device.

- Username: admin
- Password: refer to printing on the device next to “ETH2”

5.4.2 Dashboard

After successful login, the dashboard gives a quick overview on device information such as product name and network configuration and status.



1. Main window
2. Top bar
3. Navigation
- 4., 5. Diagnostic symbols
6. User menu

1. Main Window

The main window provides an overview of the following topics:

- Device picture
- Fieldbus/Network interfaces
- Device identification
- Locator function

2. Top Bar

The top bar contains information that is always visible to the user:

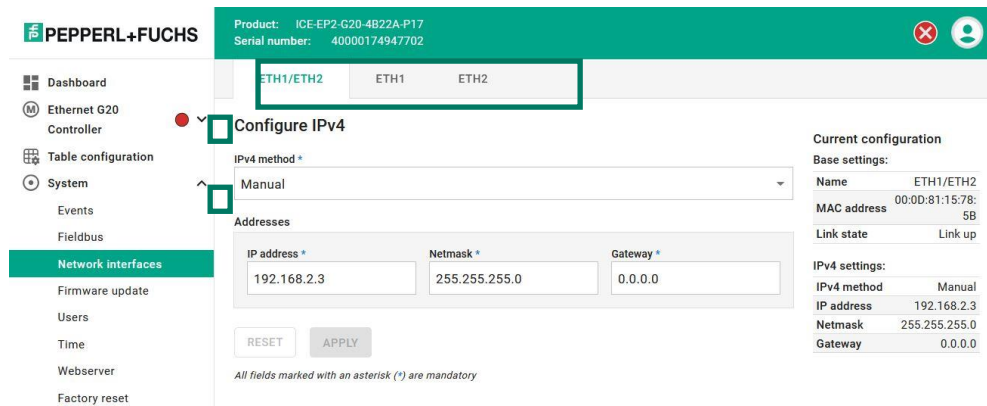
- Device identification: Product name and serial number
- System-wide diagnostics symbol

User menu:

- Web interface language settings
- User settings for the current session
- Password change

3. Navigation

Expand or collapse the menu by clicking on the small arrows in the left menu bar. For menu items with multiple views, a second navigation bar is displayed at the top.



4., 5. Diagnostic Symbols

The web interface provides diagnostic information about system status at different levels. This information is displayed using the following symbols and related dependencies. The meaning of each symbol depends on the associated information.

Symbol	Color	Description
	Gray	Diagnostics disabled
	Green	Device or system is enabled
	Blue	Servicing required
	Yellow	Out of Specification System is outside of the permitted specification or system has a problem that is outside of the system scope
	Orange	Check function
	Red	Error

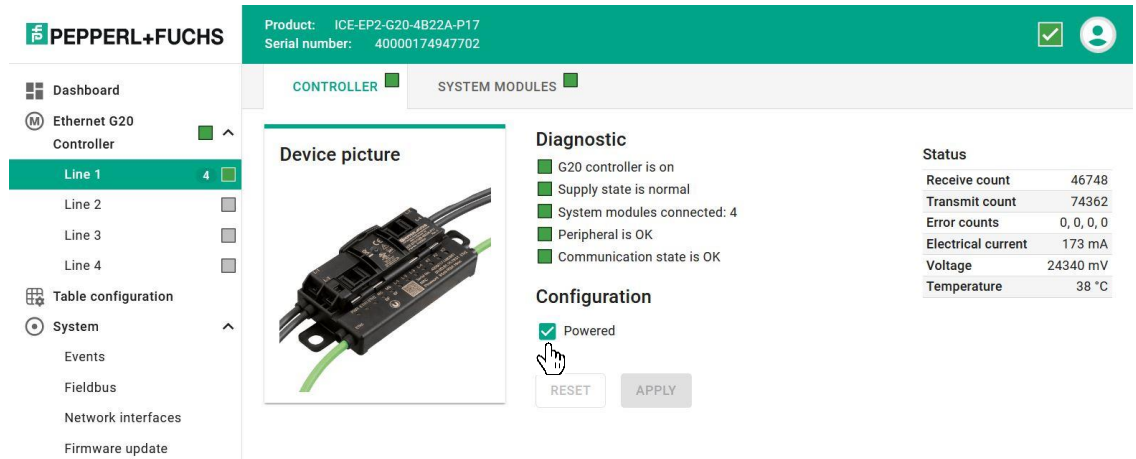
6. User Menu

Clicking the "User symbol" icon (6) opens the "Application settings" submenu, where language and display settings (e.g., dark mode) can be configured.

5.4.3 Ethernet G20 Controller

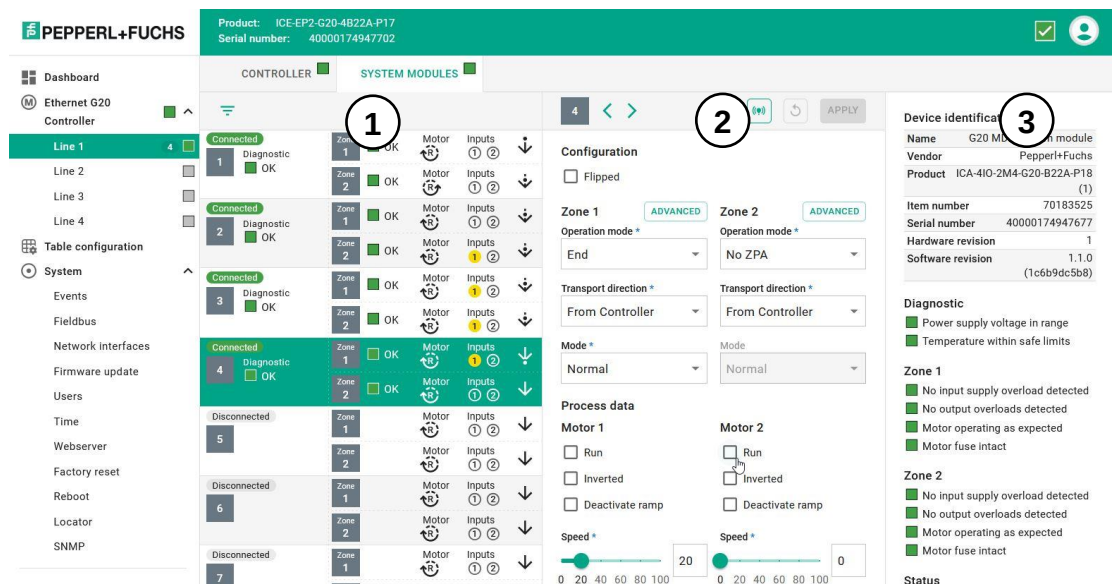
The "Ethernet G20 Controller" screen provides access to the various lines and their respective system modules. It allows system configuration, commissioning, and access to diagnostics and statistical data.

Clicking "Powered" and then "Apply" enables or disables an entire line. A disabled line is indicated by a gray square.



5.4.4 Ethernet G20 System Modules

The "Ethernet G20 System Modules" screen displays detailed information about the modules connected to the respective line. The page is divided into three main sections.



1. System module overview
2. System module configuration
3. System module data

1. System Module Overview

Provides a summary of all connected modules. The modules are numerated according to their address on the line. “Zone 1” represents the MDR connected to “MOT1”, while “Zone 2” represents the MDR connected to “MOT2”.

Clicking the filter icon allows disconnected system modules to be shown or hidden.

PEPPERL+FUCHS

Product: ICE-EP2-G20-4B22A-P17
Serial number: 40000174947702

CONTROLLER **SYSTEM MODULES**

4 < >

Line 1 ☒ Select all ☒ Connected nodes ☒ Disconnected nodes

Line 2

Line 3

Line 4

Table configuration

System

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Line	Module	Status	Zone 1	Zone 2	Motor	Inputs	Direction
Line 1	Zone 1	OK	OK	OK	Motor	Inputs 1 2	↓
	Zone 2	OK	OK	OK	Motor	Inputs 1 2	↓
Line 2	Zone 1	OK	OK	OK	Motor	Inputs 1 2	↓
	Zone 2	OK	OK	OK	Motor	Inputs 1 2	↓
Line 3	Zone 1	OK	OK	OK	Motor	Inputs 1 2	↓
	Zone 2	OK	OK	OK	Motor	Inputs 1 2	↓
Line 4	Zone 1	OK	OK	OK	Motor	Inputs 1 2	↓
	Zone 2	OK	OK	OK	Motor	Inputs 1 2	↓
Line 5	Zone 1	OK	OK	OK	Motor	Inputs 1 2	↓
	Zone 2	OK	OK	OK	Motor	Inputs 1 2	↓

Configuration

☐ Flipped

Zone 1 **ADVANCED**

Operation mode *
No ZPA

Transport direction *
From Controller

Mode
Normal

Process data

Motor 1

☐ Run
☐ Inverted

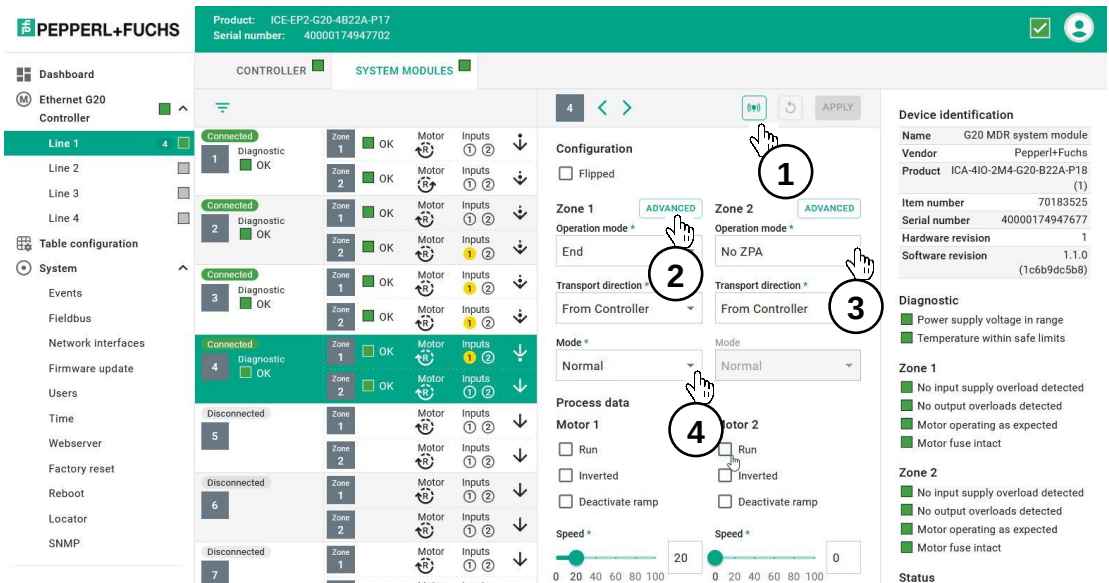
2. System Module Configuration

Provides detailed configuration settings of the respective system module.



Note

Depending on the configuration used in the fieldbus controller, any parameter changed via the web interface may be overwritten after a power cycle.



1. Clicking the antenna symbol activates the locator function. The LEDs then follow a defined flashing pattern, enabling easy identification of the respective system module in the field (see [chapter 3.3.1](#)).
2. Opens the advanced module settings in a separate window, including speed, ramp settings, ZPA timing, and IO filters.
3. Clicking “Operational Mode” allows the respective zone/motor of the module to be configured either for PLC control (No ZPA) or as part of a ZPA line (Start, Middle, or End).
 - **Start** = first motor of an ZPA section
 - **Middle** = sections between Start and End of the ZPA section
 - **End** = last Motor of an ZPA section
4. If a zone/motor is configured as a ZPA section (Start, Middle, or End), the detailed ZPA mode can be selected. For a detailed explanation of the ZPA modes, see [chapter 5.3](#).



Note

Before taking effect, changes made via the web interface must be confirmed by clicking “Apply”. Otherwise, the changes are discarded. Applied changes are stored permanently.

3. System Module Data

Contains detailed identification data (e.g., item number, serial number, hardware/software revision), module diagnostic and status information (e.g., operation time, temperature, and voltage/current level).

5.4.5 Table Configuration

The “Table configuration” provides a convenient way to save (export) or change (import) multiple system module settings as a CSV file, which can be adapted by using Microsoft Excel. This is especially helpful when configuring numerous modules in a ZPA section. The addressing scheme is Line ID (Representing Line 1–4 of the Ethernet controller), Node ID (Representing the MDR submodule address 1–15), and Zone (Representing the MDR of the respective MDR submodule 1–2).

PEPPERL+FUCHS

Product: ICE-EP2-G20-4B22A-P17
Serial number: 40000174947702

Dashboard

Ethernet G20 Controller

Line 1

Line 2

Line 3

Line 4

Table configuration

System

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Table configuration

Line	Node	Zone	Flipped	Operation mode	Transport direction	Mode	Error logic active	Input 1: invert
1	1	1	No	No ZPA	From Controller	Normal	No	No
1	1	2	No	No ZPA	From Controller	Normal	No	No
1	2	1	No	No ZPA	From Controller	Normal	No	No
1	2	2	No	No ZPA	From Controller	Normal	No	No
1	3	1	No	No ZPA	From Controller	Normal	No	No
1	3	2	No	No ZPA	From Controller	Normal	No	No
1	4	1	No	No ZPA	From Controller	Normal	No	No
1	4	2	No	No ZPA	From Controller	Normal	Yes	No
1	5	1	No	No ZPA	From Controller	Normal	No	No
1	5	2	No	No ZPA	From Controller	Normal	No	No
1	6	1	No	No ZPA	From Controller	Normal	No	No

Export as CSV

Import as CSV



Note

Depending on the configuration used in the fieldbus controller, any parameters changed via “Table configuration” may be overwritten after a power cycle.

5.4.6 System

PEPPERL+FUCHS

Product: ICE-EP2-G20-4B22A-P17
Serial number: 40000174947702

Dashboard

Ethernet G20

Controller

Line 1

Line 2

Line 3

Line 4

4

Table configuration

System

Events

Fieldbus

Network interfaces

Firmware update

Users

Time

Webserver

Factory reset

Reboot

Locator

SNMP

Device picture

Fieldbus/Network interfaces

Fieldbus	EtherNet/IP
ETH1/2	192.168.2.3
ETH2	
ETH1	

Device identification

Name	G20 Ethernet control module
Vendor	Pepperl+Fuchs
Product	ICE-EP2-G20-4B22A-P17
Item number	70183518
Serial number	40000174947702
Hardware revision	1
Software revision	2.1.0
Compilation date	Mar 4 2026
Production batch	2026-03-10T09:59:24Z
EDM number	1834799A

Components

Locator

Issue an indication (e.g., a physical blink, flash or sound) that helps to locate the device in the field.

The System section in the navigation bar contains a range of useful functions:

Events	Chronological list of events, categorized in different levels The event log can be downloaded from the module
Fieldbus	Configuration of the fieldbus (EtherNet/IP / PROFINET)
Network interfaces	Configuration of the IPv4 method (DHCP / BOOTP / Manual) and activating/deactivating “Automatic DNS”
Firmware update	Enables easy firmware updates for modules via drag and drop or by selecting a firmware file. The latest firmware is available on the Pepperl+Fuchs website.
Users	When logged in as an admin user, an “observer user” with a separate password can be created. The “observer” has read-only access to the web interface and cannot modify any settings.
Time	Configuration of an NTP server or manual time setting. The time is used, for example, to timestamp events.
Webserver	Enable or disable TLS and certificate handling.
Factory reset	Resets the module to factory default settings. Users can select to retain certain configurations (e.g., passwords) after the reset.

Reboot	Reboots the device
Locator	Activates the LED flashing pattern for module identification in the field (see chapter 3.3.1)
SNMP	Enable or disable SNMP

5.5 EtherNet/IP

After import of the EDS file, the Ethernet G20 MDR controller appears under the vendor “Pepperl+Fuchs” as a “Communications Adapter” with the catalog number “ICE-EP2-G20-4B22A-P17” and the description “Ethernet G20 Controller”.

To operate the Ethernet G20-system with an EtherNet/IP controller, the type of connection must be defined. The system supports either a single connection for all lines combined or individual connections per line. The first option is simpler but consumes more of the controller’s process data memory, while the second option saves memory but requires more experience when adding new lines. Multiple connections are supported.

Both connection types are available with or without a configuration assembly for parameters. A connection without configuration assembly may be used when operating parameters for individual G20 system modules are intended to be set via Class3 communication or via the Ethernet G20 controller web interface.



Note

There is no option to reserve spare addresses within a line.

If a G20 system module is removed from the middle of a line, the automatic recognition and addressing procedure restarts at the next power-up. System modules located downstream of the removed module will receive lower addresses and, as a result, new process data memory.

5.5.1 Assembly Object (0x04)

5.5.1.1 Assembly Instance x00 – Outputs Line x

The assembly Instance represents the output process data of any G20 System modules line, where “x” is a wildcard for the respective line number. Accordingly, output instances 100, 200, 300, and 400 are available.

Byte offset	Description
0	Reserved
1	
2	
3	
4	Line x System module 1
5	

6	
7	
8	
9	
10	Line x System module 2
11	
...	
...	
4*(n-1) + 4	line x System module n
4*(n-1) + 5	
4*(n-1) + 6	
4*(n-1) + 7	
...	...
56	Line x System module 14
57	
58	
59	
60	Line x System module 15
61	
62	
63	

System Module Details

Output process data consumed by G20 system modules

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Output 2 Zone 2	Output 1 Zone 2	Motor 2 deactivate ramp	Motor 2 run	Output 2 Zone 1	Output 1 Zone 1	Motor 1 deactivate ramp	Motor 1 run
1	Motor 1 direction invert	Motor 1 speed (0–100%)						
2	Motor 2 direction invert	Motor 2 speed (0–100%)						
3	Reserved							

5.5.1.2 Assembly Instance x01 – Inputs Line x

The assembly instance represents the input process data of a G20 System module line, where “x” is the respective line number. Accordingly, input instances 101, 201, 301, and 401 are available.

Byte offset	Description
0	Number of G20 MDR system modules connected on the line
1	Power state of the line - normal (0), high current (1), over current (2), over voltage (3)
2	Communication state - normal (0), warning (1), error (2)
3	First system module with issues on the line (0 if no module has issues)

4	Line x System module 1
5	
6	
7	
8	Line x System module 2
9	
10	
11	
...	...
$4*(n-1) + 4$	Line x System module n
$4*(n-1) + 5$	
$4*(n-1) + 6$	
$4*(n-1) + 7$	
...	...
56	Line x System module 14
57	
58	
59	
60	Line x System module 15
61	
62	
63	

System Module Details

Input process data provided by G20 System modules

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	ZPA enabled Zone 1	Reserved	Reserved	Reserved	ZPA release signal Zone 1	Input 2 Zone 1	Input 1 Zone 1	Motor 1 run
1	ZPA enabled Zone 2	Reserved	Reserved	Reserved	ZPA release signal Zone 2	Input 2 Zone 2	Input 1 Zone 2	Motor 2 run
2	Motor 2 fuse defect	Motor 2 error	Motor 1 fuse defect	Motor 1 error	I/O 2 Zone 2 overload	I/O 1 Zone 2 overload	I/O 2 Zone 1 overload	I/O 1 Zone 1 overload
3	Reserved							

5.5.1.3 Assembly Instance x02 – Configuration Line x

The configuration assembly contains parameters for a G20 system module line, where “x” represents the respective line number. Accordingly, configuration assemblies 102, 202, 302, and 402 are available.

Byte offset	Description
0	Line x System module 1
1	
2	
3	
4	
5	
6	Line x System module 2
7	
8	
9	
10	
11	
...	...
$6*(n-1) + 0$	Line x System module 2
$6*(n-1) + 1$	
$6*(n-1) + 2$	
$6*(n-1) + 3$	
$6*(n-1) + 4$	
$6*(n-1) + 5$	
...	...
78	Line x System module 14
79	
80	
81	
82	
83	
84	Line x System module 15
85	
86	
87	
88	
89	

System Module Details

Configuration data stored in this assembly overrides any parameters changed via the web interface for G20 system modules during power-up. Refer to [chapter 5.2](#) for the meaning of the configuration options.

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	ZPA mode zone 1 0 = normal, 1 = enhanced, 2 = long zone, 3 = slave zone, 4 = transport jam zone, 5 = always on zone					Transport direction zone 1 (0 = away from, 1 = to) controller	ZPA config zone 1 (0 = no ZPA, 1 = Start, 2 = End, 3 = Middle)	
1	Flipped **	Reserved					Error logic active low zone 1	Speed compensation active zone 1
2	Ramp-up time zone 1 x 100 ms				Ramp-up time zone 1 x 100 ms			
3	ZPA mode zone 1 0 = normal, 1 = enhanced, 2 = long zone, 3 = slave zone, 4 = transport jam zone, 5 = always on zone, else = crash					Transport direction zone 1 (0 = away from, 1 = to) controller	ZPA config zone 1 (0 = no ZPA, 1 = Start, 2 = End, 3 = Middle)	
4	Reserved						Error logic active low zone 1	Speed compensation active zone 1
5	Ramp-up time zone 1 x 100 ms				Ramp-up time zone 1 x 100 ms			

** 0 MDR driver is not flipped (Zone 1 is closer to the MDR controller than Zone 2).
1 MDR driver is flipped (Zone 2 is closer to MDR controller, than Zone 1).
Valid for the entire module.

5.5.1.4 Assembly Instance 1000 – Outputs All Lines

Byte offset	Description
0	Reserved
1	
2	
3	
4	Line 1 System module 1
5	
6	
7	
...	...
60	Line 1 System module 15
61	
62	
63	
64	Reserved
65	
66	
67	
68	

69	Line 2 System module 1
70	
71	
...	...
124	Line 2 System module 15
125	
126	
127	
128	Reserved
129	
130	
131	
...	...
$64*(m-1) + 4*(n-1) + 4$	Line m, System module n
$64*(m-1) + 4*(n-1) + 5$	
$64*(m-1) + 4*(n-1) + 6$	
$64*(m-1) + 4*(n-1) + 7$	
...	...
192	Reserved
193	
194	
195	
196	Line 4 System module 1
197	
198	
199	
...	...
252	Line 4 System module 15
253	
254	
255	

System Module Details

Output process data consumed by G20 System modules

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Output 2 Zone 2	Output 1 Zone 2	Motor 2 deactivate ramp	Motor 2 run	Output 2 Zone 1	Output 1 Zone 1	Motor 1 deactivate ramp	Motor 1 run
1	Motor 1 direction invert	Motor 1 speed (0–100%)						
2	Motor 2 direction invert	Motor 2 speed (0–100%)						
3	reserved							

5.5.1.5 Assembly Instance 1001 – Inputs All Lines

Byte offset	Description
0	Line 1: connected modules
1	Line 1: power state **
2	Line 1: communication state ***
3	First module with issues
4	Line 1 System module 1
5	
6	
7	
...	...
60	Line 1 System module 15
61	
62	
63	
64	Line 2: connected modules
65	Line 2: power state **
66	Line 2: communication state ***
67	First module with issues
68	Line 2 System module 1
69	
70	
71	
...	...
124	Line 2 System module 15
125	
126	
127	
128	Line 3: connected modules
129	Line 3: power state **
130	Line 3: communication state ***
131	First module with issues
...	...
$64*(m-1) + 4*(n-1) + 4$	Line m, System module n
$64*(m-1) + 4*(n-1) + 5$	
$64*(m-1) + 4*(n-1) + 6$	
$64*(m-1) + 4*(n-1) + 7$	
...	...
192	Line 4: connected modules
193	Line 4: power state **
194	Line 4: communication state ***

195	First module with issues
196	
197	
198	
199	
...	...
252	Line 4 System module 15
253	
254	
255	

System Module Details

Input process data provided by G20 System modules

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	ZPA enabled Zone 1	Reserved	Reserved	Reserved	ZPA release signal Zone 1	Input 2 Zone 1	Input 1 Zone 1	Motor 1 run
1	ZPA enabled Zone 2	Reserved	Reserved	Reserved	ZPA release signal Zone 2	Input 2 Zone 2	Input 1 Zone 2	Motor 2 run
2	Motor 2 fuse defect	Motor 2 error	Motor 1 fuse defect	Motor 1 error	I/O 2 Zone 2 overload	I/O 1 Zone 2 overload	I/O 2 Zone 1 overload	I/O 1 Zone 1 overload
3	Reserved							

5.5.1.6 Assembly Instance 1002 – Configuration All Lines

Byte offset	Description
0	Line 1 System module 1
1	
2	
3	
4	
5	
...	...
84	Line 1 System module 15
85	
86	
87	
88	
89	
90	Line 2 System module 1
91	
92	

93	
94	
95	
...	...
$90 \cdot (m-1) + 6 \cdot (n-1) + 0$	Line m System module n
$90 \cdot (m-1) + 6 \cdot (n-1) + 1$	
$90 \cdot (m-1) + 6 \cdot (n-1) + 2$	
$90 \cdot (m-1) + 6 \cdot (n-1) + 3$	
$90 \cdot (m-1) + 6 \cdot (n-1) + 4$	
$90 \cdot (m-1) + 6 \cdot (n-1) + 5$	
...	...
354	Line 4 System module 15
355	
356	
357	
358	
359	

System Module Details

Configuration data stored in this assembly overrides any parameters changed via the web interface for G20 system modules during power-up. Refer to [chapter 5.2](#) for the meaning of the configuration options.

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	ZPA mode - zone 1 0 = normal, 1 = enhanced, 2 = long zone, 3 = slave zone, 4 = transport jam zone, 5 = always on zone					Transport direction zone 1 (0 = away from, 1 = to) controller	ZPA config zone 1 (0 = no ZPA, 1 = Start, 2 = End, 3 = Middle)	
1	Flipped **	Reserved					Error logic active low zone 1	Speed compensation active zone 1
2	Ramp-up time zone 1 x 100 ms				Ramp-up time - zone 1 x 100 ms			
3	ZPA mode zone 1 0 = normal, 1 = enhanced, 2 = long zone, 3 = slave zone, 4 = transport jam zone, 5 = always on zone, else = crash					transport direction zone 1 (0 = away from, 1 = to) controller	ZPA config zone 1 (0 = no ZPA, 1 = Start, 2 = End, 3 = Middle)	
4	Reserved						Error logic active low zone 1	Speed compensation active zone 1
5	Ramp-up time zone 1 x 100 ms				Ramp-up time zone 1 x 100 ms			

** 0 MDR driver is not flipped (Zone 1 is closer to the MDR controller than Zone 2).
1 MDR driver is flipped (Zone 2 is closer to the MDR controller than Zone 1).
Valid for the entire module.

5.5.2 Implicit Messaging – Class 1 Connections

The following Class 1 connections are possible:

Connection Name	O → T Instance	T → O Instance	Configuration Instance
Line 1 w/config	100 (Outputs Line 1, 64 Byte)	101 (Inputs Line 1, 64 Byte)	102 (Configuration Line 1, 90 Byte)
Line 2 w/config	200 (Outputs Line 2, 64 Byte)	201 (Inputs Line 2, 64 Byte)	202 (Configuration Line 2, 90 Byte)
Line 3 w/config	300 (Outputs Line 3, 64 Byte)	301 (Inputs Line 3, 64 Byte)	302 (Configuration Line 3, 90 Byte)
Line 4 w/config	400 (Outputs Line 4, 64 Byte)	401 (Inputs Line 4, 64 Byte)	402 (Configuration Line 4, 90 Byte)
All Lines w/config	1000 (Outputs All Lines, 256 Byte)	1001 (Inputs All Lines, 256 Byte)	102 (Configuration All Lines, 360 Byte)
Line 1	100 (Outputs Line 1, 64 Byte)	101 (Inputs Line 1, 64 Byte)	
Line 2	200 (Outputs Line 2, 64 Byte)	201 (Inputs Line 2, 64 Byte)	
Line 3	300 (Outputs Line 3, 64 Byte)	301 (Inputs Line 3, 64 Byte)	
Line 4	400 (Outputs Line 4, 64 Byte)	401 (Inputs Line 4, 64 Byte)	
All Lines	1000 (Outputs All Lines, 256 Byte)	1001 (Inputs All Lines, 256 Byte)	

Up to four concurrent Class 1 connections can be opened. “Line X w/config” connections can be freely combined with “Line X” connections, but they cannot be combined with “All Lines ...” connections. Only one “All Lines” connection can be active at a time.

5.5.3 Vendor-Specific CIP Objects

To access additional information and configuration settings, “Explicit Messaging (Class 3 connections)” can be used. Except for the CIP-defined objects, the following vendor-specific CIP objects exist.

5.5.3.1 Line Configuration (0x64)

Class Code

0x64

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Revision	According to specification	Value: 1
2	Get	Max instance	According to specification	
3	Get	Number of Instances	According to specification	
4	Get	Attribute list	According to specification	
5	Get	Service list	According to specification	

Common Services

Service Code		Service Name	Description
0x0E	Class/Instance	Get_Attribute_Single	Returns the contents of the specified attribute.
0x10	Instance	Set_Attribute_Single	Modifies an attribute value.

Instances

1 (Line 1), 2 (Line 2), 3 (Line 3), 4 (Line 4)

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get/Set	Powered	BOOL	Power state of the line

5.5.3.2 Line Status (0x65)

Class Code

0x65

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Revision	According to specification	value: 1
2	Get	Max Instance	According to specification	
3	Get	Number of Instances	According to specification	
4	Get	Attribute list	According to specification	
5	Get	Service list	According to specification	

Common Services

Service Code		Service Name	Description
0x0E	Class/Instance	Get_Attribute_Single	Returns the contents of the specified attribute.

Instances

1 (Line 1), 2 (Line 2), 3 (Line 3), 4 (Line 4)

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Diagnostic	BOOL	Warning present on the line
2	Get	Receive Count	UDINT	
3	Get	Transmit Count	UDINT	
4	Get	Total Error Count	UDINT	
5	Get	Warning Limit Reached	UDINT	
6	Get	Error Passive Reached	UDINT	
7	Get	Error Bus Off Reached	UDINT	
8	Get	Current	UDINT	milliampere
9	Get	Voltage	UDINT	millivolt
10	Get	Temperature	INT	degree Celsius

5.5.3.3 Module Configuration (0x66)

Refer to [chapter 5.2](#) for the meaning of the configuration options.

Class Code

0x66

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Revision	According to specification	Value: 1
2	Get	Max Instance	According to specification	
3	Get	Number of Instances	According to specification	
4	Get	attribute list	According to specification	
5	Get	service list	According to specification	

Common Services

Service Code		Service Name	Description
0x0E	Class/Instance	Get_Attribute_Single	Returns the contents of the specified attribute.
0x10	Instance	Set_Attribute_Single	Modifies an attribute value.

Instances

1–15 (Module 1–15, Line 1), 101–115 (Module 1–15, Line 2), 201–215 (Module 1–15, Line 3), 301–315 (Module 1–15, Line 4)

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get/Set	Flipped	BOOL	
2	Get/Set	Zone 1 operation mode	USINT	NO_ZPA = 0, START = 1, END = 2, MIDDLE = 3
3	Get/Set	Zone 1 transport direction	USINT	FROM_CONTROLLER = 0, TO_CONTROLLER = 1
4	Get/Set	Zone 1 zpa mode	USINT	NORMAL = 0, ENHANCED = 1, LONG_ZONE = 2, SECONDARY_ZONE = 3, TRANSPORT_JAM_ZONE = 4, ALWAYS_ON_ZONE = 5
5	Get/Set	Zone 1 zpa secondary count	USINT	
6	Get/Set	Zone 1 zpa virtual returns	BOOL	
7	Get/Set	Zone 1 zpa timing search timeout	UDINT	millisecond
8	Get/Set	Zone 1 zpa timing delivery timeout	UDINT	millisecond
9	Get/Set	Zone 1 zpa timing after run timeout	UDINT	millisecond
10	Get/Set	Zone 1 zpa timing receive timeout	UDINT	millisecond
11	Get/Set	Zone 1 zpa timing leaving timeout	UDINT	millisecond
12	Get/Set	Zone 1 zpa timing upstream delay	UDINT	millisecond
13	Get/Set	Zone 1 zpa timing box release delay	UDINT	millisecond
14	Get/Set	Zone 1 zpa timing long zone timeout	UDINT	millisecond
15	Get/Set	Zone 1 zpa timing power on delay	UDINT	millisecond
16	Get/Set	Zone 1 motor configuration min speed	UINT	millivolt
17	Get/Set	Zone 1 motor configuration max speed	UINT	millivolt
18	Get/Set	Zone 1 motor configuration speed compensation activated	BOOL	
19	Get/Set	Zone 1 motor configuration error logic active low	BOOL	
20	Get/Set	Zone 1 motor configuration ramp up	UINT	millisecond
21	Get/Set	Zone 1 motor configuration ramp down	UINT	millisecond
22	Get/Set	Zone 1 input inversion 1	BOOL	
23	Get/Set	Zone 1 input filter 0 rising pulse suppression	UDINT	microsecond
24	Get/Set	Zone 1 input filter 0 falling pulse suppression	UDINT	microsecond
25	Get/Set	Zone 1 input filter 0 rising pulse extension	UDINT	microsecond

26	Get/Set	Zone 1 input filter 0 falling pulse extension	UDINT	microsecond
27	Get/Set	Zone 1 input inversion 1	BOOL	
28	Get/Set	Zone 1 input filter 1 rising pulse suppression	UDINT	microsecond
29	Get/Set	Zone 1 input filter 1 falling pulse suppression	UDINT	microsecond
30	Get/Set	Zone 1 input filter 1 rising pulse extension	UDINT	microsecond
31	Get/Set	Zone 1 input filter 1 falling pulse extension	UDINT	microsecond
32	Get/Set	Zone 2 operation mode	USINT	NO_ZPA = 0, START = 1, END = 2, MIDDLE = 3
33	Get/Set	Zone 2 transport direction	USINT	FROM_CONTROLLER = 0, TO_CONTROLLER = 1
34	Get/Set	Zone 2 zpa mode	USINT	NORMAL = 0, ENHANCED = 1, LONG_ZONE = 2, SECONDARY_ZONE = 3, TRANSPORT_JAM_ZONE = 4, ALWAYS_ON_ZONE = 5
35	Get/Set	Zone 2 zpa secondary count	USINT	
36	Get/Set	Zone 2 zpa virt rtr rts	BOOL	
37	Get/Set	Zone 2 zpa timing search timeout	UDINT	millisecond
38	Get/Set	Zone 2 zpa timing delivery timeout	UDINT	millisecond
39	Get/Set	Zone 2 zpa timing after run timeout	UDINT	millisecond
40	Get/Set	Zone 2 zpa timing receive timeout	UDINT	millisecond
41	Get/Set	Zone 2 zpa timing leaving timeout	UDINT	millisecond
42	Get/Set	Zone 2 zpa timing upstream delay	UDINT	millisecond
43	Get/Set	Zone 2 zpa timing box release delay	UDINT	millisecond
44	Get/Set	Zone 2 zpa timing long zone timeout	UDINT	millisecond
45	Get/Set	Zone 2 zpa timing power on delay	UDINT	millisecond
46	Get/Set	Zone 2 motor configuration min speed	UINT	millivolt
47	Get/Set	Zone 2 motor configuration max speed	UINT	millivolt
48	Get/Set	Zone 2 motor configuration speed compensation activated	BOOL	
49	Get/Set	Zone 2 motor configuration error logic active low	BOOL	
50	Get/Set	Zone 2 motor configuration ramp up	UINT	millisecond
51	Get/Set	Zone 2 motor configuration ramp down	UINT	millisecond
52	Get/Set	Zone 2 input inversion 0	BOOL	

53	Get/Set	Zone 2 input filter 0 rising pulse suppression	UDINT	microsecond
54	Get/Set	Zone 2 input filter 0 falling pulse suppression	UDINT	microsecond
55	Get/Set	Zone 2 input filter 0 rising pulse extension	UDINT	microsecond
56	Get/Set	Zone 2 input filter 0 falling pulse extension	UDINT	microsecond
57	Get/Set	Zone 2 input inversion 1	BOOL	
58	Get/Set	Zone 2 input filter 1 rising pulse suppression	UDINT	microsecond
59	Get/Set	Zone 2 input filter 1 falling pulse suppression	UDINT	microsecond
60	Get/Set	Zone 2 input filter 1 rising pulse extension	UDINT	microsecond
61	Get/Set	Zone 2 input filter 1 falling pulse extension	UDINT	microsecond

5.5.3.4 Module Identification (0x67)

Class Code

0x67

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Revision	According to specification	value: 1
2	Get	Max instance	According to specification	
3	Get	Number of Instances	According to specification	
4	Get	Attribute list	According to specification	
5	Get	Service list	According to specification	

Common Services

Service Code		Service Name	Description
0x0E	Class/Instance	Get_Attribute_Single	Returns the contents of the specified attribute.

Instances

1–15 (Module 1–15, Line 1), 101–115 (Module 1–15, Line 2), 201–215 (Module 1–15, Line 3), 301–315 (Module 1–15, Line 4)

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Product Name	STRING	

2	Get	Product Code	UDINT	
3	Get	Software Revision	UDINT	
4	Get	Hardware Revision	UDINT	
5	Get	Serial Number	STRING	

5.5.3.5 Module Status (0x68)

Class Code

0x68

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Revision	According to specification	value: 1
2	Get	Max Instance	According to specification	
3	Get	Number of Instances	According to specification	
4	Get	Attribute list	According to specification	
5	Get	Service list	According to specification	

Common Services

Service Code		Service Name	Description
0x0E	Class/Instance	Get_Attribute_Single	Returns the contents of the specified attribute.

Instances

1–15 (Module 1–15, Line 1), 101–115 (Module 1–15, Line 2), 201–215 (Module 1–15, Line 3), 301–315 (Module 1–15, Line 4)

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Line voltage	UDINT	millivolt
2	Get	PWR voltage	UDINT	millivolt
3	Get	Temperature front	INT	degree Celsius
4	Get	Temperature back	INT	degree Celsius
5	Get	Temperature max	INT	degree Celsius
6	Get	Temperature min	INT	degree Celsius
7	Get	Uptime current	UDINT	second
8	Get	Uptime max	UDINT	second
9	Get	Uptime average	UDINT	second
10	Get	Operating time	UDINT	hour
11	Get	Power cycles	UDINT	
12	Get	Overtemperature time	UDINT	hour

13	Get	Overttemperature cycles	UDINT	
14	Get	Overload time	UDINT	minute
15	Get	Overload cycles	UDINT	
16	Get	Max overload time	UDINT	minute
17	Get	Motor 1 current	DINT	milliampere
18	Get	Motor 1 max current	DINT	milliampere
19	Get	Motor 1 energy	UDINT	watt hour
20	Get	Motor 1 startup energy	UDINT	watt second
21	Get	Motor 1 power	DINT	milliwatt
22	Get	Motor 2 current	DINT	milliampere
23	Get	Motor 2 max current	DINT	milliampere
24	Get	Motor 2 energy	UDINT	watt hour
25	Get	Motor 2 startup energy	UDINT	watt second
26	Get	Motor 2 power	DINT	milliwatt

5.6 PROFINET

After importing the GDML file, the Ethernet G20 controller appears under “Gateways” with the manufacturer “Pepperl+Fuchs” as device “ICE-EP2-G20”-

5.6.1 ICE-EP2-G20-4B22A-P17 (DAP)

The Ethernet G20 MDR controller ICE-EP2-G20-4B22A-P17 is provided with two Device Access Points (DAP).

One DAP contains configuration parameters for all system modules and overwrites existing parameters at each power cycle.

The other DAP does not include any configuration parameters. Therefore, any persistent parameters set via PROFINET RECORDS, the web server, or REST API remain available after a power cycle.

Each DAP provides four slots, with “Line data” modules inserted by default. Each slot represents one line: slot 1 represents line 1, slot 2 represents line 2, and so on.

Each slot (respective Line) also includes 16 subslots. Subslot 1 represents the general status data of each individual line.

The remaining 15 subslots contain the process data for connected system modules.

5.6.2 Line Data (Slot Module)

Each “Line data” module allocates 16 subslots with “Module data” submodules inserted by default.

Subslot 1 represents the line itself and is typically named “Line x.1” with the type “Module Data”.

The remaining 15 subslots represent all G20 MDR system modules.

Starting with subslot 2, system module 1 is assigned, subslot 3 maps the process data of system module 2, and so on.

Input

The Line Data module provides 4 bytes of input data representing the state of the line.

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Number of G20 MDR system modules connected on the line							
1	Power state of the line - normal (0), high current (1), over current (2), over voltage (3)							
2	Communication state - normal (0), warning (1), error (2)							
3	First system module with issues on the line (0 if no module has issues)							

Output

The Line Data module has no output data.

Parameters

The Line Data module includes one parameter.

Byte offset	Data type	Default value	Description
0	Boolean	true	Line Powered

Records

Line Configuration (Index: 0, Size: 1 Byte, READ/WRITE)

Byte offset	Data type	Description
0	Boolean	Line Powered

Line Status (Index: 1, Size: 34 Byte, READ)

Byte offset	Data type	Description
0	UINT32	Receive Count
4	UINT32	Transmit Count
8	UINT32	Total Error Count
12	UINT32	Warning Limit Reached
16	UINT32	Error Passive Reached
20	UINT32	Error Bus Off Reached
24	UINT32	Current
28	UINT32	Voltage
32	INT16	Temperature

5.6.3 Module Data (Submodule)

There are two different types of “Module data” submodules: one with and one without parameters. There are no other differences. The selected DAP determines which type of submodule is inserted by default.

You may delete a submodule and replace it with the other type.

Please note that only submodules without parameters allow configuration by other methods (e.g., web interface, REST-API, or PROFINET Records).

Submodules may also be removed if they are not required.



Note

There is no option for spare addresses in the subslots.

Just in case one deletes a sub-slot and leave it empty, the process data of the System Module assigned to this sub-slot will not be transmitted.

Input

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	ZPA enabled Zone 1	reserved	reserved	reserved	ZPA release signal Zone 1	Input 2 Zone 1	Input 1 Zone 1	Motor 1 run
1	ZPA enabled Zone 2	reserved	reserved	reserved	ZPA release signal Zone 2	Input 2 Zone 2	Input 1 Zone 2	Motor 2 run
2	Motor 2 fuse defect	Motor 2 error	Motor 1 fuse defect	Motor 1 error	I/O 2 Zone 2 overload	I/O 1 Zone 2 overload	I/O 2 Zone 1 overload	I/O 1 Zone 1 overload
3	Reserved							

Output

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Output 2 Zone 2	Output 1 Zone 2	Motor 2 deactivate ramp	Motor 2 run	Output 2 Zone 1	Output 1 Zone 1	Motor 1 deactivate ramp	Motor 1 run
1	Motor 1 direction invert	Motor 1 speed (0–100%)						
2	Motor 2 direction invert	Motor 2 speed (0–100%)						
3	reserved							

Parameters

Refer to [chapter 5.2](#) for the meaning of the configuration options.

Byte offset	Data type	Default value	Description
0	BOOL	false	Flipped
1	UINT8	0	Zone 1 operation mode
2	UINT8	0	Zone 1 transport direction
3	UINT8	0	Zone 1 zpa mode
4	UINT8	0	Zone 1 zpa secondary count
5	BOOL	false	Zone 1 zpa virt rtr rts
6	UINT32	4000	Zone 1 zpa timing search timeout [ms]
10	UINT32	8000	Zone 1 zpa timing delivery timeout [ms]
14	UINT32	2000	Zone 1 zpa timing after run timeout [ms]
18	UINT32	8000	Zone 1 zpa timing receive timeout [ms]
22	UINT32	8000	Zone 1 zpa timing leaving timeout [ms]
26	UINT32	1000	Zone 1 zpa timing upstream delay [ms]
30	UINT32	100	Zone 1 zpa timing box release delay [ms]
34	UINT32	1000	Zone 1 zpa timing long zone timeout [ms]
38	UINT32	0	Zone 1 zpa timing power on delay [ms]
42	UINT16	2000	Zone 1 motor configuration min speed [mV]
44	UINT16	10000	Zone 1 motor configuration max speed [mV]
46	BOOL	true	Zone 1 motor configuration speed compensation activated
47	BOOL	false	Zone 1 motor configuration error logic active low
48	UINT16	0	Zone 1 motor configuration ramp up [ms]
50	UINT16	0	Zone 1 motor configuration ramp down [ms]
52	BOOL	false	Zone 1 input inversion 1
53	UINT32	0	Zone 1 input filter 0 rising pulse suppression [μs]
57	UINT32	0	Zone 1 input filter 0 falling pulse suppression [μs]
61	UINT32	0	Zone 1 input filter 0 rising pulse extension [μs]
65	UINT32	0	Zone 1 input filter 0 falling pulse extension [μs]
69	BOOL	false	Zone 1 input inversion 1
70	UINT32	0	Zone 1 input filter 1 rising pulse suppression [μs]
74	UINT32	0	Zone 1 input filter 1 falling pulse suppression [μs]
78	UINT32	0	Zone 1 input filter 1 rising pulse extension [μs]
82	UINT32	0	Zone 1 input filter 1 falling pulse extension [μs]
86	UINT8	0	Zone 2 operation mode
87	UINT8	0	Zone 2 transport direction
88	UINT8	0	Zone 2 zpa mode
89	UINT8	0	Zone 2 zpa secondary count
90	BOOL	false	Zone 2 zpa virt rtr rts
91	UINT32	4000	Zone 2 zpa timing search timeout [ms]
95	UINT32	8000	Zone 2 zpa timing delivery timeout [ms]
99	UINT32	2000	Zone 2 zpa timing after run timeout [ms]
103	UINT32	8000	Zone 2 zpa timing receive timeout [ms]
107	UINT32	8000	Zone 2 zpa timing leaving timeout [ms]
111	UINT32	1000	Zone 2 zpa timing upstream delay [ms]
115	UINT32	100	Zone 2 zpa timing box release delay [ms]
119	UINT32	1000	Zone 2 zpa timing long zone timeout [ms]
123	UINT32	0	Zone 2 zpa timing power on delay [ms]
127	UINT16	2000	Zone 2 motor configuration min speed [mV]

129	UINT16	10000	Zone 2 motor configuration max speed [mV]
131	BOOL	true	Zone 2 motor configuration speed compensation activated
132	BOOL	false	Zone 2 motor configuration error logic active low
133	UINT16	0	Zone 2 motor configuration ramp up [ms]
135	UINT16	0	Zone 2 motor configuration ramp down [ms]
137	BOOL	false	Zone 2 input inversion 1
138	UINT32	0	Zone 2 input filter 0 rising pulse suppression [μs]
142	UINT32	0	Zone 2 input filter 0 falling pulse suppression [μs]
146	UINT32	0	Zone 2 input filter 0 rising pulse extension [μs]
150	UINT32	0	Zone 2 input filter 0 falling pulse extension [μs]
154	BOOL	false	Zone 2 input inversion 1
155	UINT32	0	Zone 2 input filter 1 rising pulse suppression [μs]
159	UINT32	0	Zone 2 input filter 1 falling pulse suppression [μs]
163	UINT32	0	Zone 2 input filter 1 rising pulse extension [μs]
167	UINT32	0	Zone 2 input filter 1 falling pulse extension [μs]

Records

Refer to [chapter 5.2](#) for the meaning of the configuration options.

Module Configuration (Index: 0, Size: 171 Byte, READ/WRITE)

Byte offset	Data type	Description
0	BOOL	Flipped
1	UINT8	Zone 1 operation mode
2	UINT8	Zone 1 transport direction
3	UINT8	Zone 1 zpa mode
4	UINT8	Zone 1 zpa secondary count
5	BOOL	Zone 1 zpa virt rtr rts
6	UINT32	Zone 1 zpa timing search timeout [ms]
10	UINT32	Zone 1 zpa timing delivery timeout [ms]
14	UINT32	Zone 1 zpa timing after run timeout [ms]
18	UINT32	Zone 1 zpa timing receive timeout [ms]
22	UINT32	Zone 1 zpa timing leaving timeout [ms]
26	UINT32	Zone 1 zpa timing upstream delay [ms]
30	UINT32	Zone 1 zpa timing box release delay [ms]
34	UINT32	Zone 1 zpa timing long zone timeout [ms]
38	UINT32	Zone 1 zpa timing power on delay [ms]
42	UINT16	Zone 1 motor configuration min speed [mV]
44	UINT16	Zone 1 motor configuration max speed [mV]
46	BOOL	Zone 1 motor configuration speed compensation activated
47	BOOL	Zone 1 motor configuration error logic active low
48	UINT16	Zone 1 motor configuration ramp up [ms]
50	UINT16	Zone 1 motor configuration ramp down [ms]
52	BOOL	Zone 1 input inversion 1
53	UINT32	Zone 1 input filter 0 rising pulse suppression [μs]
57	UINT32	Zone 1 input filter 0 falling pulse suppression [μs]

61	UINT32	Zone 1 input filter 0 rising pulse extension [µs]
65	UINT32	Zone 1 input filter 0 falling pulse extension [µs]
69	BOOL	Zone 1 input inversion 1
70	UINT32	Zone 1 input filter 1 rising pulse suppression [µs]
74	UINT32	Zone 1 input filter 1 falling pulse suppression [µs]
78	UINT32	Zone 1 input filter 1 rising pulse extension [µs]
82	UINT32	Zone 1 input filter 1 falling pulse extension [µs]
86	UINT8	Zone 2 operation mode
87	UINT8	Zone 2 transport direction
88	UINT8	Zone 2 zpa mode
89	UINT8	Zone 2 zpa secondary count
90	BOOL	Zone 2 zpa virt rtr rts
91	UINT32	Zone 2 zpa timing search timeout [ms]
95	UINT32	Zone 2 zpa timing delivery timeout [ms]
99	UINT32	Zone 2 zpa timing after run timeout [ms]
103	UINT32	Zone 2 zpa timing receive timeout [ms]
107	UINT32	Zone 2 zpa timing leaving timeout [ms]
111	UINT32	Zone 2 zpa timing upstream delay [ms]
115	UINT32	Zone 2 zpa timing box release delay [ms]
119	UINT32	Zone 2 zpa timing long zone timeout [ms]
123	UINT32	Zone 2 zpa timing power on delay [ms]
127	UINT16	Zone 2 motor configuration min speed [mV]
129	UINT16	Zone 2 motor configuration max speed [mV]
131	BOOL	Zone 2 motor configuration speed compensation activated
132	BOOL	Zone 2 motor configuration error logic active low
133	UINT16	Zone 2 motor configuration ramp up [ms]
135	UINT16	Zone 2 motor configuration ramp down [ms]
137	BOOL	Zone 2 input inversion 1
138	UINT32	Zone 2 input filter 0 rising pulse suppression [µs]
142	UINT32	Zone 2 input filter 0 falling pulse suppression [µs]
146	UINT32	Zone 2 input filter 0 rising pulse extension [µs]
150	UINT32	Zone 2 input filter 0 falling pulse extension [µs]
154	BOOL	Zone 2 input inversion 1
155	UINT32	Zone 2 input filter 1 rising pulse suppression [µs]
159	UINT32	Zone 2 input filter 1 falling pulse suppression [µs]
163	UINT32	Zone 2 input filter 1 rising pulse extension [µs]
167	UINT32	Zone 2 input filter 1 falling pulse extension [µs]

Module Identification (Index: 1, Size: 72 Byte, READ)

Byte offset	Data type	Description
0	STRING	Product Name
30	UINT32	Product Code
34	UINT32	Software Revision
38	UINT32	Hardware Revision
42	STRING	Serial Number

Module Status (Index: 1, Size: 72 Byte, READ)

Byte offset	Data type	Description
0	UINT32	Line voltage
4	UINT32	PWR voltage
8	INT32	Temperature front
12	INT32	Temperature back
16	INT32	Temperature max
20	INT32	Temperature min
24	UINT32	Uptime current
28	UINT32	Uptime max
32	UINT32	Uptime average
36	UINT32	Operating time
40	UINT32	Power cycles
44	UINT32	Overtemperature time
48	UINT32	Overtemperature cycles
52	UINT32	Overload time
56	UINT32	Overload cycles
60	UINT32	Max overload time
64	INT32	Motor 1 current
68	INT32	Motor 1 max current
72	UINT32	Motor 1 energy
76	UINT32	Motor 1 startup energy
80	INT32	Motor 1 power
84	INT32	Motor 2 current
88	INT32	Motor 2 max current
92	UINT32	Motor 2 energy
96	UINT32	Motor 2 startup energy
100	INT32	Motor 2 power

6. REST API

The Ethernet G20 Controller provides a REST API for configuration. (REST = Representational State Transfer, API = Application Programming Interface).

An interface description in accordance with the OpenAPI specification is available on the product detail page of the Pepperl+Fuchs website under the "Software" tab or at <https://pepperl-fuchs.com/openapi>.

7. Servicing and Overhaul

The device is designed and constructed for reliable long-term operation. Therefore, regular cleaning or servicing is not required.

In the event of a failure, always replace the device with an original replacement device.

Your automation, our passion.

Explosion Protection

- Intrinsic Safety Barriers
- Signal Conditioners
- FieldConnex® Fieldbus
- Remote I/O Systems
- Electrical Ex Equipment
- Purge and Pressurization
- Industrial HMI
- Mobile Computing and Communications
- HART Interface Solutions
- Surge Protection
- Wireless Solutions
- Level Measurement

Industrial Sensors

- Proximity Sensors
- Photoelectric Sensors
- Industrial Vision
- Ultrasonic Sensors
- Rotary Encoders
- Positioning Systems
- Inclination and Acceleration Sensors
- Fieldbus Modules
- AS-Interface
- Identification Systems
- Displays and Signal Processing
- Connectivity

Pepperl+Fuchs Quality
Download our latest policy here:

www.pepperl-fuchs.com/quality



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