

## CAN@net Basic USER MANUAL

4.01.0335.20000  
Version 1.0  
Publication date 2026-04-30



## Important User Information

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# 1. User Guide

Please read the manual carefully. Make sure you fully understand the manual before using the product.

## 1.1. Target Audience

This manual addresses trained personnel who are familiar with CAN, CAN FD and the applicable national standards. Only ESD trained staff is authorized to install the interface. The contents of the manual must be made available to any person authorized to use or operate the product.

## 1.2. Related Documents

| Document                                  | Author |
|-------------------------------------------|--------|
| <i>CAN@net NT Manual Generic Protocol</i> | HMS    |
| User Manual <i>CAN@net NT C-API</i>       | HMS    |

## 1.3. Document History

| Version | Date       | Description   |
|---------|------------|---------------|
| 1.0     | April 2026 | First release |

## 1.4. Trademark Information

Ixxat<sup>®</sup> is a registered trademark of HMS Industrial Networks. All other trademarks mentioned in this document are the property of their respective holders.

## 1.5. Conventions

### Instructions, Results and Lists

Instructions and results are structured as follows:

- instruction 1
- instruction 2
  - result 1
  - result 2

Lists are structured as follows:

- item 1
- item 2

### Code

This font is used to represent program code and other types of data input and output such as configuration scripts.

```
Code
```

### User Interaction Elements

User interaction elements (buttons etc.) are indicated with bold text.

## Cross-References and Links

Cross-reference within this document: [Link example](#)

External link (URL): <https://www.hms-networks.com/ixxat>

## Safety Symbols



### DANGER

Instructions that must be followed to avoid an imminently hazardous situation which, if not avoided, will result in death or serious injury.



### WARNING

Instructions that must be followed to avoid a potential hazardous situation that, if not avoided, could result in death or serious injury.



### CAUTION

Instruction that must be followed to avoid a potential hazardous situation that, if not avoided, could result in minor or moderate injury.



### IMPORTANT

Instruction that must be followed to avoid a risk of reduced functionality and/or damage to the equipment, or to avoid a network security risk.

## Information Symbols



### NOTE

Additional information which may facilitate installation and/or operation.



### TIP

Helpful advice and suggestions.

## 2. Safety Instructions



### IMPORTANT

Risk of interference to radio and television if used in office or home environment!

Use exclusively included accessories. Use exclusively shielded cables.

Make sure, that the shield of the interface is connected with the device plug and the plug on the other side.



### IMPORTANT

Connection disturbance possible if extension cable or longer cable is used!

HMS recommends connecting the interface directly to the computer using an USB-compliant cable, or via an active USB hub according to the USB specification.

### General Safety Instructions

- Protect product from moisture and humidity.
- Protect product from too high or too low temperature (see [Technical Data, p. 26](#)).
- Protect product from fire.
- Do not paint the product.
- Do not modify or disassemble the product. Service must be carried out by HMS Industrial Networks.
- Store products in dry and dust-free place.
- Only use indoors (without corrosive gas, flammable gas, dust and dirt etc.).

### Intended Use

The components are used to connect computer systems to CAN and CAN FD networks and to connect the CAN and CAN FD networks with each other. They are intended for installation on standard DIN rail.

### 3. Scope of Delivery

Included in scope of delivery:

- CAN@net Basic
- Safety and Compliance Information

The following is available for download on the CAN@net Basic support pages on [www.ixxat.com/support-bridges-gateways](http://www.ixxat.com/support-bridges-gateways).

Software:

- CAN-Gateway Configurator Basic – CAN@net Basic

Manuals and guides:

- CAN@net NT Manual Generic Protocol
- C-API ixcan for CAN@net NT



## 4. Product Description



### TIP

To use all features the latest version of the CAN-Gateway Configurator Basic as well as the latest firmware of the CAN@net Basic must be installed.

The CAN@net Basic hardware provides connectivity to Ethernet and CAN networks with various operational modes. The application firmware provides functions to access a CAN bus from virtually every Ethernet host. The CAN@net Basic provides message filtering, based on CAN identifiers, for Bridge and Interface mode. In the Interface mode the filter can be configured by ASCII commands. In the Bridge mode the configuration tool is used to configure the filter.

### 4.1. Features

- 1 x CAN connection (4-pin push-in connector)
- 1 x RJ45 Ethernet port, 10/100 Mbit/s
- 1 x USB 2.0 hi-speed (480 Mbit/s), compatible with USB 3.x, type C
- CAN/CAN FD according to ISO 11898-1:2015
- CAN high speed according to ISO 11898-2:2016
- configuration via USB
- freely configurable baud rates
- automatic baud rate detection
- platform independent due to ASCII protocol
- With the CAN-Gateway Configurator Basic a configuration can be created, modified, written to and read from the target device via USB connection.

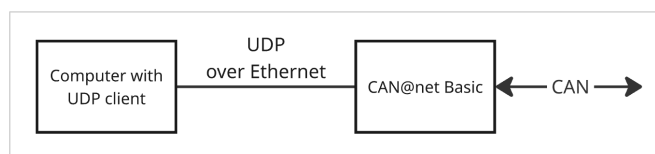
### 4.2. Default Configuration

Upon delivery, the device is not preconfigured and does not have an assigned IP address. Before commissioning, the device must be configured via the USB interface and assigned a valid IP address.

### 4.3. Operating Modes

#### 4.3.1. ASCII Interface

In ASCII interface operating mode, the CAN@net Basic is connected to the local intranet or Internet (VPN required). This allows a UDP client within the reach of this intranet or internet to connect to the CAN@net Basic and gain access to the CAN system. The host can exchange commands and CAN messages via the ASCII protocol. The CAN@net Basic in the role of the server forwards the commands and messages to the CAN bus and vice versa.



For information about the communication in the ASCII interface operating mode and commands that are used to exchange CAN messages, see CAN@net NT Manual Generic Protocol for Gateway Mode [www.ixxat.com/support-bridges-gateways](http://www.ixxat.com/support-bridges-gateways).

**NOTICE**

The CAN@net Basic only supports the ASCII protocol in UDP mode. Data exchange via TCP is not possible!

The following settings are possible

- Network settings such as IP address
- UDP status message
- Action rules such as "UDP communication timeout"

All other settings for the CAN operating mode and message filtering are made directly via ASCII commands.

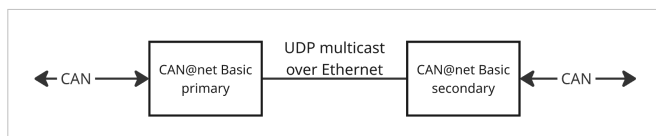
**Ixxat C-API Ixcan**

The C-API Ixcan uses the ASCII protocol interface to access the CAN@net Basic. The C-API Ixcan converts API calls into corresponding ASCII commands according to the ASCII protocol.

For more information about the C-API Ixcan see User Manual CAN@net NT C-API Ixcan on the product support pages on [www.ixxat.com/support-bridges-gateways](http://www.ixxat.com/support-bridges-gateways).

**4.3.2. CAN-ETH Bridge Primary/Secondary**

In the CAN-ETH Bridge primary/secondary operating mode, two CAN@net Basic devices are connected to each other via UDP over Ethernet to link two physically separate CAN networks to form a shared logical network. One device must be configured as CAN-ETH Bridge primary and the other as CAN-ETH Bridge secondary here. The primary device automatically detects the baud rate of the connected CAN bus and sends it to the secondary device. This enables operation without manual specification of the baud rate. Optionally, different baud rates can be set for both devices to enable use in networks with different baud rates. In addition, message filtering can be configured so that only defined CAN messages are forwarded to the other network.

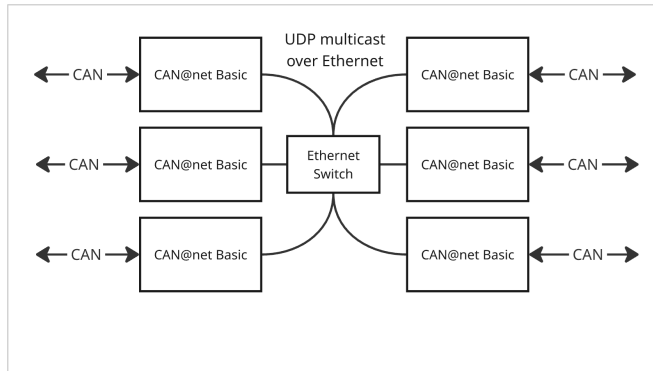


The following settings are possible:

- Network settings such as IP address
- CAN baud rate or automatic baud rate detection
- Action rules such as "Start CAN after bus-off" or "Distribute detected CAN baud rates"
- CAN message filtering in both directions: "UDP to CAN" and "CAN to UDP"
- UDP status message

### 4.3.3. CAN-ETH Bridge Multiple

Up to 64 CAN@net Basic devices can be connected to each other in CAN-ETH Bridge multiple operating mode via UDP multicast over Ethernet to link several spatially separated CAN networks into a shared logical network. All devices must be configured in CAN-ETH Bridge multiple operating mode for this purpose. Each device requires a unique IP address, while a shared UDP multicast address is used for all devices. Different baud rates can be defined for each device for operation. Message filtering can also be set up to forward only selected CAN messages. In this context, CAN identifier mapping can also be useful, where the identifier of a CAN message is adapted during forwarding from Ethernet to CAN.



The following settings are possible when using the CAN-Gateway Configurator Basic:

- Network settings such as IP address
- CAN baud rate or automatic baud rate detection
- Action rules such as "Start CAN after bus-off" or "CAN message reception timeout"
- CAN message filtering with identifier mapping in both directions: "UDP to CAN" and "CAN to UDP"
- UDP status message

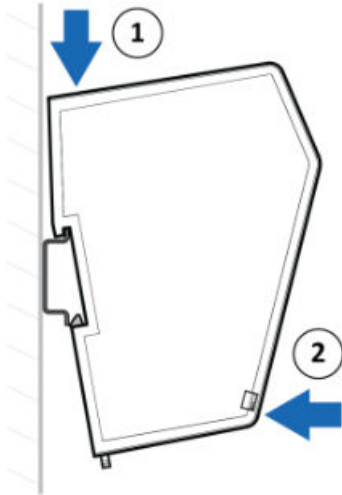
## 4.4. C-API Ixcan

The C-API Ixcan uses the ASCII protocol interface to access the CAN@net Basic. The C-API Ixcan converts the API calls into corresponding ASCII commands according to the ASCII Gateway Mode of the CAN@net Basic.

For more information about the C-API ixcan see User Manual *CAN@net NT C-API ixcan* on the product support pages on [www.ixxat.com/support-bridges-gateways](http://www.ixxat.com/support-bridges-gateways).

## 5. Installation

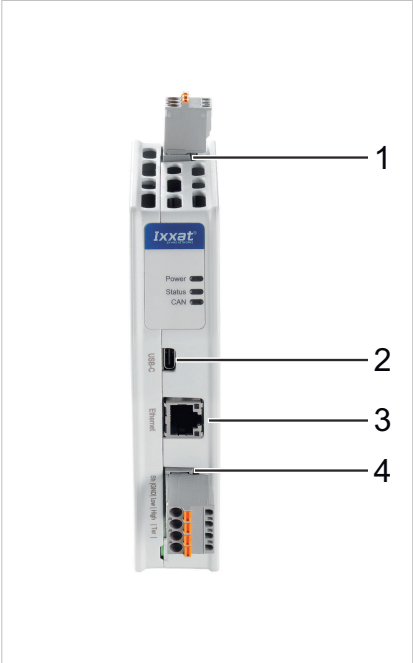
### 5.1. Mounting the Device



1. Make sure, that the device is not connected to power supply.
2. Hook the device onto the upper lip of the rail and push downwards (1).
3. Push the device towards the rail until it snaps into place (2).

5.2. Connectors

|   |          |
|---|----------|
| 1 | Power    |
| 2 | USB      |
| 3 | Ethernet |
| 4 | CAN      |



The connection plugs can be plugged in or unplugged. The plugs have a spring clip mechanism. The lines are inserted directly in the spring terminals without screws and can be removed again (push-in type).



**IMPORTANT**

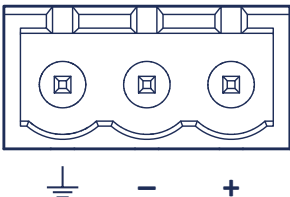
The spring clip plugs should only be inserted/installed within a temperature range of –5 °C to +85 °C.

Connection capacity of the plugs

|                                                                       |                                              |
|-----------------------------------------------------------------------|----------------------------------------------|
| Rigid wire cross-section                                              | 0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>  |
| Flexible wire cross-section                                           | 0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>  |
| AWG wire cross-section                                                | 24 ... 12                                    |
| Flexible wire cross-section, with end ferrule, without plastic sleeve | 0.25 mm <sup>2</sup> ... 2.5 mm <sup>2</sup> |
| Flexible wire cross-section, with end ferrule, with plastic sleeve    | 0.25 mm <sup>2</sup> ... 2.5 mm <sup>2</sup> |
| Stripping length                                                      | 10 mm                                        |

### 5.2.1. Power Supply

#### Pin Allocation

|  | Pin | Signal           |
|-----------------------------------------------------------------------------------|-----|------------------|
|                                                                                   | ⏏   | Functional Earth |
|                                                                                   | -   | Ground GND       |
|                                                                                   | +   | 10-30 VDC        |

### 5.2.2. USB-C Port

Provided to connect the device for configuration.

### 5.2.3. Ethernet Port

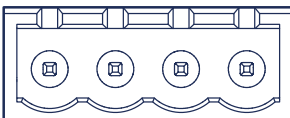
Designed as standard RJ45 port with pin allocation according to Ethernet standard. Because of the Ethernet PHY auto-crossover feature the device can be connected with a crossover cable or with a one-to-one network cable.

The shield of the Ethernet port is connected to the functional earth via 1 nF capacitor and a 4.7 MOhm resistor in parallel (RC circuit).

| Pin | Signal             |
|-----|--------------------|
| 1   | TX+                |
| 2   | TX-                |
| 3   | RX+                |
| 4   | Connected to pin 5 |
| 5   | Connected to pin 4 |
| 6   | RX-                |
| 7   | Connected to pin8  |
| 8   | Connected to pin7  |

### 5.2.4. CAN Connector

#### Pin Allocation

| <br><b>Sh GND Low High</b> | Pin  | Signal        |
|---------------------------------------------------------------------------------------------------------------|------|---------------|
|                                                                                                               | Sh   | Shield (SHLD) |
|                                                                                                               | GND  | CAN GND (GND) |
|                                                                                                               | Low  | CAN low (L)   |
|                                                                                                               | High | CAN high (H)  |

The shield of the CAN connector is connected to the functional earth via a 1.0 nF capacitor and 4.7 MOhm resistor in parallel (RC circuit). The functional earth of the device is connected to the top-hat rail if the device is mounted to a top-hat rail.

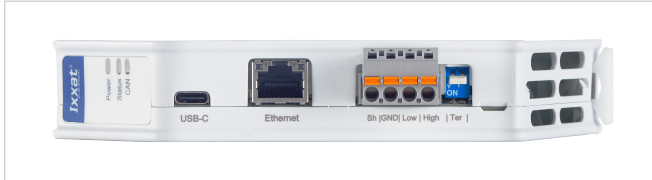


#### NOTE

For best noise immunity, ground the shields of the CAN cables.

### 5.3. Bus termination resistor

The bus termination resistor prevents reflections at the line ends and ensures a current path for discharge of the dominant level to the recessive level. To achieve optimum signal quality, each electrical CAN segment must be terminated at both ends with the characteristic impedance of the line. A bus termination resistor is present on the device and can be activated/deactivated via DIP switch. The termination resistor is activated upon delivery.



### 5.4. Installing the Software

The CAN-Gateway Configurator Basic is required to configure CAN@net Basic devices. This tool can be downloaded from the HMS homepage and installed on a Windows PC.



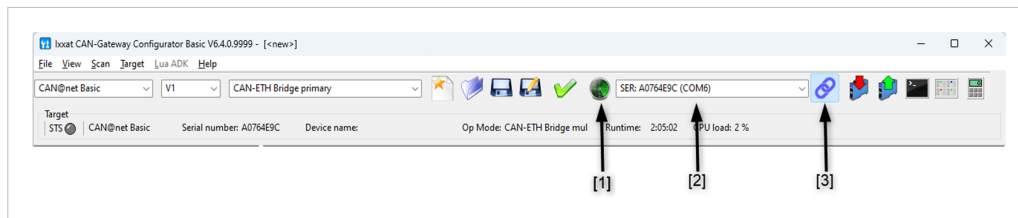
#### NOTICE

The CAN-Gateway Configurator Basic and the device firmware are continually being further developed. For this reason, you should regularly check whether newer versions are available on the Ixxat product support pages: [www.ixxat.com/support-bridges-gateways](http://www.ixxat.com/support-bridges-gateways).

- The CAN-Gateway Configurator Basic is located in the following folder after installation:  
“C:\Program Files\HMS\Ixxat CAN-Gateway Configurator Basic”
- A firmware update can be carried out via the CAN-Gateway Configurator Basic, see [Checking and Updating the Firmware, p. 12](#).

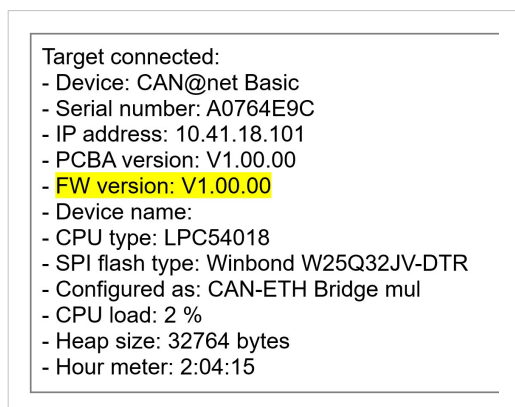
## 5.5. Checking and Updating the Firmware

Before updating the firmware, check whether a new version of the CAN-Gateway Configurator Basic is available. In this case, this must be installed first and used to update the firmware.



### Checking the Device Firmware

1. Ensure that the CAN@net Basic is connected to the PC via USB and to a power supply.
2. Start the CAN-Gateway Configurator Basic.
3. Open the **Scan** menu and select **Selected devices** (or **Scan** button [1]).  
Connected devices are displayed with their serial number in the status window.
4. Select the desired device in the **Target device** selection dialog [2] and press the **Connect** button [3].  
The data for the selected device, including the version numbers, is displayed in the status window.



5. Check on the [homepage](#) whether firmware with a higher version number is available.
6. If applicable, download the firmware update and unpack the ZIP file.
7. Load the unpacked HFU file onto the target device via the **Target** menu and **Update firmware**.  
The firmware of the connected device is updated and restarted.
8. Reconnect to the device via the **Connect** button and check in the status window whether the update was successful.
9. If the status LED on the CAN@net Basic flashes red, reload the configuration onto the device.



# 6. Configuration

## 6.1. Basic Configuration

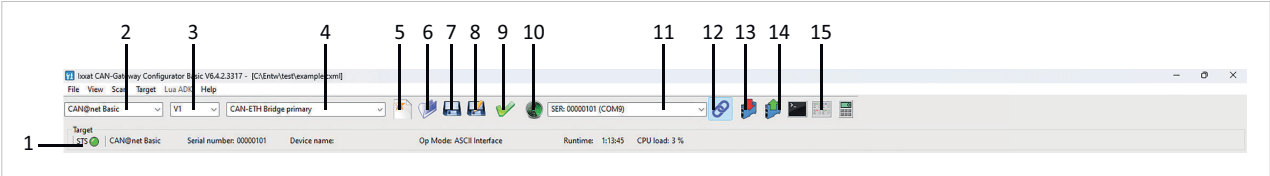


**NOTICE**  
Connection disturbance possible if extension cable or longer cable is used!

HMS recommends connecting the interface directly to the computer using an USB-compliant cable, or via an active USB hub according to the USB specification.



**TIP**  
It is possible to add information about the configuration in fields **Author**, **Configuration Name** and **Additional Info** in the configuration tree entry **Info**.



|    |                                                                             |
|----|-----------------------------------------------------------------------------|
| 1  | Information about target device ( <b>STS</b> reflects Status LED of device) |
| 2  | Drop-down list <b>Select device type</b>                                    |
| 3  | Drop-down list <b>Select device version</b>                                 |
| 4  | Drop-down list <b>Select operational mode</b>                               |
| 5  | Button <b>New</b>                                                           |
| 6  | Button <b>Open</b>                                                          |
| 7  | Button <b>Save</b>                                                          |
| 8  | Button <b>Save as</b>                                                       |
| 9  | Button <b>Verify</b>                                                        |
| 10 | Button <b>Scan</b>                                                          |
| 11 | Combo box <b>Target device</b>                                              |
| 12 | Button <b>Connect</b>                                                       |
| 13 | Button <b>Write to</b>                                                      |
| 14 | Button <b>Read from</b>                                                     |
| 15 | Button <b>Dashboard</b>                                                     |

There are essentially three ways to create a configuration:

- 1. Read the configuration from the device and change it using the  button.
- 2. Read an existing configuration from the PC and change it via the  button.
- 3. Create a new configuration via the  button.

The configuration must then be written back to the device via the  button button and therefore activated.

If a new configuration is created, the operating mode must be selected first:

- For operation as a CAN interface, the **ASCII interface** operating mode must be selected.
- For operation to connect two CAN networks to form a shared logical network, the **CAN-ETH Bridge primary** operating mode must be selected and **CAN-ETH Bridge secondary** must be selected for the second device.
- For operation with more than two CAN@net Basic devices, the **CAN-ETH Bridge multiple** operating mode must be selected.

In all three cases, it may be necessary to adjust the IP address and possibly the network mask as well.

If desired, further settings can be configured (see the following chapter).

After changing a configuration, it must be:

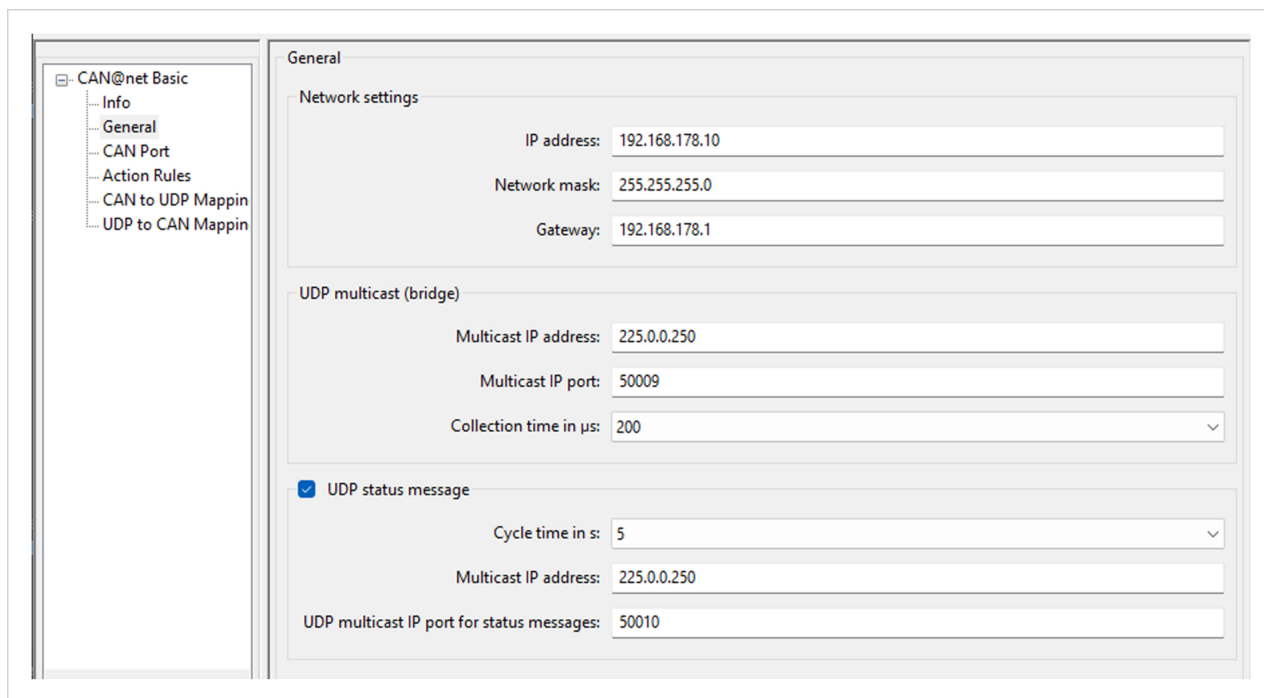
- saved locally via the  button.
- written to the target device via the  button.



### IMPORTANT

The configuration can only be changed via the USB connection.

## 6.1.1. General Settings



The screenshot shows the 'General' configuration window for 'CAN@net Basic'. On the left is a tree view with options: Info, General (selected), CAN Port, Action Rules, CAN to UDP Mappin, and UDP to CAN Mappin. The main area is divided into sections:

- Network settings:**
  - IP address: 192.168.178.10
  - Network mask: 255.255.255.0
  - Gateway: 192.168.178.1
- UDP multicast (bridge):**
  - Multicast IP address: 225.0.0.250
  - Multicast IP port: 50009
  - Collection time in µs: 200 (with a dropdown arrow)
- UDP status message:** (checked checkbox)
  - Cycle time in s: 5 (with a dropdown arrow)
  - Multicast IP address: 225.0.0.250
  - UDP multicast IP port for status messages: 50010

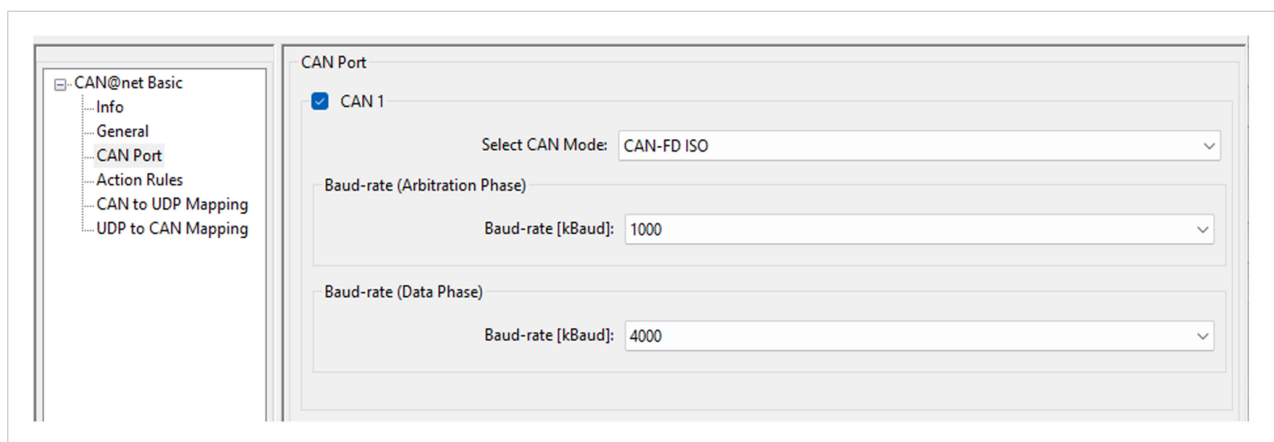
The following settings can be made in the configuration tree in **General**:

- **Network settings:** The IPv4 address set here is used exclusively for sending.
- **UDP multicast (bridge):** The IPv4 address set here is used for communication between the *CAN@net Basic* devices. All devices that are to "see" each other must have the same multicast IP address and the same **multicast IP port**.

The **collection time in  $\mu$ s** is used as the collection time for CAN messages. A small value increases the data traffic on Ethernet, but at the same time reduces the message jitter for forwarded CAN messages. With a large value, the message traffic on Ethernet tends to be reduced, as several CAN messages are sent per UDP packet.

- If the **UDP status message** box is activated, a UDP status message is sent cyclically at the specified **cycle time in s** to the specified **multicast IP address**. The CAN-Gateway Configurator Basic is able to display the status messages of several devices via the **Dashboard** window if the PC is connected to the same network segment.

### 6.1.2. CAN Port



The settings under **CAN Port** can be used to set:

- the CAN baud rate (bit timing) for **classic CAN** mode
- the values for arbitration phase and data phase for **CAN-FD ISO** and **CAN-FD non-ISO** mode
- automatic baud rate detection
- or no baud rate

Secondary device only: The setting **no baud rate** only makes sense in combination with the action rule **Take over received CAN baud rate**. In this case, the device waits for a baud rate to be communicated to it via the UDP connection.

#### Arbitration Phase and Data Phase

CAN FD uses two baud rates: one for the arbitration phase, which is limited to the maximum of Classic CAN (1000 kBit/s) and one for the data phase (up to 8 MBit/s).

#### User Defined Baud Rates



#### NOTICE

HMS Industrial Networks recommends using preset standard baud rates. If user defined baud rates are used make sure, that the entered values are valid.

If the baud rate is set with the bit timing register of the controller, baud rates that are not defined by CiA can be used.

1. For user defined baud rates select user defined via register values.
2. Set the values for Prescaler, SJW, TSEG1 and TSEG2.

The clock frequency of the CAN module applied for the calculation of the baud rate is 80 MHz.

Formula for the calculation of the baud rate:

$$\text{baud rate [kBaud]} = 80,000 / ((\text{TSEG1} + \text{TSEG2} + 1) * \text{Prescaler})$$

### Calculator for Baud Rate Register Values

With the integrated calculator all necessary register values for a desired baud rate can be calculated. A distinction must be made here between **Classic CAN/Arbitration Phase** and **CAN-FD/Data Phase**.

1. To open the calculator click button **Calculator** in the toolbar.
2. Then change the desired baud rate in the **Baud rate** field and, if necessary, the desired sample point ratio as a percentage in the **Sample point ratio** field.
3. Click button **Calc.** Possible values and sample points for the desired baud rate are displayed.

### Setting Recommendations for CAN FD



#### NOTICE

HMS Industrial Networks recommends using the same bit timing settings in all connected nodes.

Observe the following recommendations:

- Set arbitration and data phase prescaler as low as possible.
- Configure the same arbitration sample point for all CAN nodes.
- Configure the same data phase primary sample point for all CAN nodes.
- Set SJW for arbitration phase as large as possible.
- Set SJW for data phase as large as required by used oscillator (clock source).

### Automatic Baud Rate Detection

The ports with activated automatic baud rate detection remain in automatic baud rate detection until the baud rate is detected.

During automatic baud rate detection, the CAN and status LEDs indicate the status.

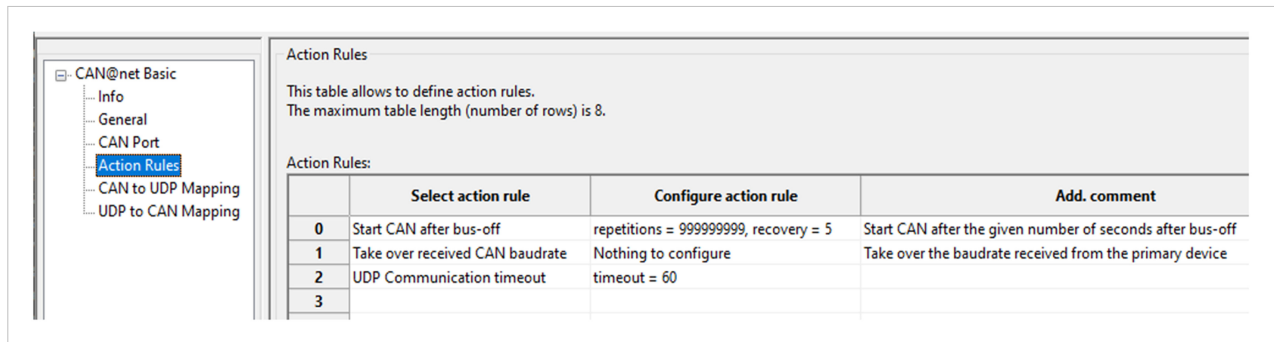
| State                                                     | CAN LED         | Status LED                |
|-----------------------------------------------------------|-----------------|---------------------------|
| Automatic baud rate detection active                      | Orange flashing | Green and orange flashing |
| Baud rate detected/taken over and communication available | Green flashing  | Green flashing            |

### Sending detected baud rate to another CAN@net Basic

Action rules can be used to send a baud rate detected on one *CAN@net Basic* to a second (or third etc.) *CAN@net Basic*. This setting is automatically active in **CAN-ETH Bridge primary/secondary** operating mode, but can be changed:

- **Distribute detected CAN baud rate** is active for **CAN-ETH Bridge primary**
- **Take over received CAN baud rate** is active for **CAN-ETH Bridge secondary**

### 6.1.3. Action Rules



Action rules can be used to define actions that are executed by CAN@net Basic after an event occurs. To define an action:

- An action must be selected in the **Select action rule** column.
- The action can then be parameterized in the Configure action rule column if necessary.

#### Possible actions

| Action name                       | Description                                                                                                                                                                | Further settings                                                                                                                                                                                                  |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Start CAN after bus-off           | Restarting the CAN controller and therefore the CAN communication after the CAN controller has detected a bus-off.                                                         | <b>Repetitions:</b> Maximum permitted number of start attempts. The number "0" leads to the action rule not being activated.<br><b>Recovery time:</b> Minimum waiting time in seconds between two start attempts. |
| Use previously stored baud rates  | Start the CAN controller after power-on with the previously determined and saved baud rate (only active if <b>automatic baud rate detection</b> is set for the baud rate). |                                                                                                                                                                                                                   |
| Distribute detected CAN baud rate | If a baud rate is detected in <b>automatic baud rate detection</b> mode, this information is passed on to other devices.                                                   |                                                                                                                                                                                                                   |
| Take over received CAN baudrate   | The value for the CAN baud rate received via UDP is used locally to set the CAN controller. The CAN controller is stopped, reinitialized and restarted here.               |                                                                                                                                                                                                                   |

### 6.1.4. Message Mapping

Only messages that are entered in the mapping table are forwarded. Received CAN messages for which no mapping exists are discarded. This applies in both directions, i.e. "CAN to UDP" and "UDP to CAN".

Individual messages or entire message groups can be forwarded per rule/line. In addition, the CAN message format and the message identifier can be adapted for forwarding.

Even if a message is entered more than once (e.g. overlapping value range or multiple entries of the same message identifier), the message is only forwarded once. Message duplication or multiplication is therefore not possible.

#### Blocking Filter Function

If the value "discard" is entered in the **Tx Msg Format** field for a rule, the messages for this rule are not forwarded, but discarded. **Discard** rules are always checked first so that a message can be specifically blocked even if this or these message identifiers are contained in another rule.

**IMPORTANT**

If hexadecimal values are used, they must begin with 0x.

Example: 0x55

**Possible Entries**

| Column         | Possible entries                                                                                                                                                                                                                                                                                                     |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rx Msg Format  | <b>Standard, Extended</b><br>Defines the format in which messages are received, <b>standard</b> (11 bit identifiers) or <b>extended</b> (29 bit identifier).                                                                                                                                                         |
| Rx Filter Type | <b>Identifier, Mask/Value, Range</b>                                                                                                                                                                                                                                                                                 |
| Mask           | Used with <b>Mask/Value</b> filter, defines which bits of an identifier are relevant for the filter and which are not relevant, see <b>Mask/Value</b> filter.                                                                                                                                                        |
| Value          | With <b>Mask/Value</b> filter: Defines the values for the filter-relevant bits (as defined in Mask), see <b>Mask/Value</b> filter.<br>With <b>Identifier</b> filter: defines the identifier.                                                                                                                         |
| First          | First value of the identifier range.                                                                                                                                                                                                                                                                                 |
| Last           | Last value of the identifier range.                                                                                                                                                                                                                                                                                  |
| Tx Msg Format  | <b>CAN, CAN FD, as received, discard</b><br>With <b>CAN</b> , the message is forwarded as Classic CAN messages, with <b>CAN FD</b> as CAN FD messages. Using <b>as received</b> , the message is forwarded in the same format as it was received. With <b>discard</b> , the message is not forwarded, but discarded. |
| Tx ID format   | <b>Standard, Extended</b><br>Defines the format with which messages are forwarded: <b>Standard</b> (11-bit identifier) or <b>Extended</b> (29-bit identifier).                                                                                                                                                       |
| Tx Base ID     | Defines the identifier with which messages are forwarded (see examples below).                                                                                                                                                                                                                                       |

**Example Tx Base ID**

For message groups (mask/value or range), Tx Base ID defines the smallest identifier value of the group. An offset is calculated as follows for the other identifier values.

| Filter type | Rx                       | Tx Base ID | Transmitted identifier |
|-------------|--------------------------|------------|------------------------|
| Range       | First: 0x100 Last: 0x200 | 0x300      | 0x300 – 0x400          |
| Mask/Value  | Mask: 0x700 Value: 0x100 | 0x200      | 0x200 – 0x2FF          |
| Identifier  | 0x123                    | 0x456      | 0x456                  |

**6.1.5. Mask/Value Filter**

With the Mask/Value filter (available for either 11 bit or 29 bit identifiers) possible valid identifiers based on bit masks can be defined.

Binary representation of mask:

- binary positions with value 1 are relevant for the filter
- binary positions with value 0 are not relevant for the filter

Binary representation of value:

- Defines the values for the positions that are marked as relevant (1) in mask.
- Values in positions that are marked as not relevant (0) in mask are ignored.

The following formula expresses the condition under which an identifier passes the filter:

- if (value & mask) == (identifier & mask) then identifier is valid

#### Example 11 Bit Identifier

|               | hex                                                                                                                    | bin            |
|---------------|------------------------------------------------------------------------------------------------------------------------|----------------|
| <b>Value</b>  | 0x100                                                                                                                  | 0001:0000:0000 |
| <b>Mask</b>   | 0x700                                                                                                                  | 0111:0000:0000 |
| <b>Result</b> | 0x1XX                                                                                                                  | 0001:XXXX:XXXX |
|               | Any identifier between 0x100 and 0x1FF passes the filter, as only the first 3 bits of the mask are marked as relevant. |                |

#### Example 29 Bit Identifier

|               | hex                                                                               | bin                                     |
|---------------|-----------------------------------------------------------------------------------|-----------------------------------------|
| <b>Value</b>  | 0x10003344                                                                        | 0001:0000:0000:0000:0011:0011:0100:0100 |
| <b>Mask</b>   | 0x1F00FFFF                                                                        | 0001:1111:0000:0000:1111:1111:1111:1111 |
| <b>Result</b> | 0x10003344                                                                        | 0001:0000:XXXX:XXXX:0011:0011:0100:0100 |
|               | All identifiers with 0x10xx3344 (positions xx can be any number) pass the filter. |                                         |

#### Mask/Value Filter

| Value | Mask  | Valid message identifiers which pass the filter |
|-------|-------|-------------------------------------------------|
| 0x100 | 0x7FF | 0x100                                           |
| 0x100 | 0x700 | 0x100–0x1FF                                     |
| 0x000 | 0x000 | 0x000–0x7FF                                     |

## 6.2. Dashboard

The **dashboard** integrated in the CAN-Gateway Configurator Basic provides status information for several CAN@net Basic devices and therefore is used to monitor the devices. Status messages are received via UDP Multicast. If the CAN@net Basic is connected via USB, the status information is also collected and displayed via USB.

| CAN@net Basic Dashboard |            |            |                 |         |             |          |             |             |              |             |             |             |             |              |        |        |        |
|-------------------------|------------|------------|-----------------|---------|-------------|----------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|--------------|--------|--------|--------|
|                         | Serial no. | FW version | IP address      | Counter | Status      | CPU load | CAN Rx Cnt. | CAN Tx Cnt. | CAN Err Cnt. | ETH Rx Cnt. | ETH Tx Cnt. | ETH Rx Ovr. | ETH Tx Ovr. | ETH Err Cnt. | Pool 0 | Pool 1 | Pool 2 |
| 1                       | 00000101   | V0.04.01   | 10.41.18.101    | 11      | Operational | 1        | 0           | 0           | 0            | 0           | 0           | 0           | 0           | 0            | 32     | 50     | 50     |
| 2                       | 00000102   | V0.04.01   | 192.168.178.102 | 342     | Operational | 1        | 0           | 0           | 0            | 0           | 0           | 0           | 0           | 0            | 32     | 50     | 50     |
| 3                       | 00000103   | V0.04.00   | 10.41.18.101    | 34      | Operational | 1        | 0           | 0           | 0            | 0           | 0           | 0           | 0           | 0            | 32     | 50     | 50     |
| 4                       | 00000107   | V0.04.00   | 10.41.18.107    | 68      | Operational | 1        | 0           | 0           | 0            | 0           | 0           | 0           | 0           | 0            | 32     | 50     | 50     |
| 5                       |            |            |                 |         |             |          |             |             |              |             |             |             |             |              |        |        |        |
| 6                       |            |            |                 |         |             |          |             |             |              |             |             |             |             |              |        |        |        |

To open the dashboard, click button  **Dashboard** in the toolbar.

## Displayed Values

| Column       | Description                                                                           |
|--------------|---------------------------------------------------------------------------------------|
| Serial No.   | Serial number                                                                         |
| FW version   | Firmware version number                                                               |
| IP address   | IP Address                                                                            |
| Count        | Transmission counter that is incremented with each transmission of the status message |
| State        | Status of the CAN@net Basic                                                           |
| CPU load     | CPU utilization in percent                                                            |
| CAN Rx Cnt.  | Number of CAN messages received via CAN                                               |
| CAN Tx Cnt.  | Number of CAN messages transmitted via CAN                                            |
| CAN Err Cnt. | Number of errors (status changes) in the CAN controller                               |
| ETH Rx Cnt.  | Number of CAN messages received via Ethernet                                          |
| ETH Tx Cnt.  | Number of CAN messages transmitted via Ethernet                                       |
| ETH Rx Ovr.  | Number of messages that could not be forwarded via CAN                                |
| ETH Tx Ovr.  | Number of messages that could not be forwarded via Ethernet                           |
| ETH Err Cnt. | Number of Ethernet network errors                                                     |
| Pool 0       | Number of available memory blocks from memory pool 0                                  |
| Pool 1       | Number of available memory blocks from memory pool 1                                  |
| Pool 2       | Number of available memory blocks from memory pool 2                                  |

## Timeout Monitoring

The reception frequency of the status message is recorded and monitored for each device/line. If the status message is not received (for longer than the cycle time + 2 s), the data in the line is displayed in red.

If the status message is received again, the red text disappears again.

### 6.2.1. Dashboard Status Bar

IP address: 225.0.0.250 Port number: 50010 10.10.116.15 No logging Reset

## Displayed Values

| Column               | Description                                                                                                                                                                    |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IP address           | UDP multicast address used, taken from the currently loaded configuration                                                                                                      |
| Port number          | UDP port number used, taken from the currently loaded configuration                                                                                                            |
| <IP address>         | The IP address used by the PC to receive UDP multicast messages. Can be adjusted if necessary.                                                                                 |
| No Logging / Logging | Selection field for switching logging on/off (additional writing of the received data to the text file "C:\Users\<User name>\AppData\Roaming\CanBgiConfig\CANanet_status.log") |
| Reset                | Resetting the display values                                                                                                                                                   |



## 6.2.2. Status Messages and Device Status

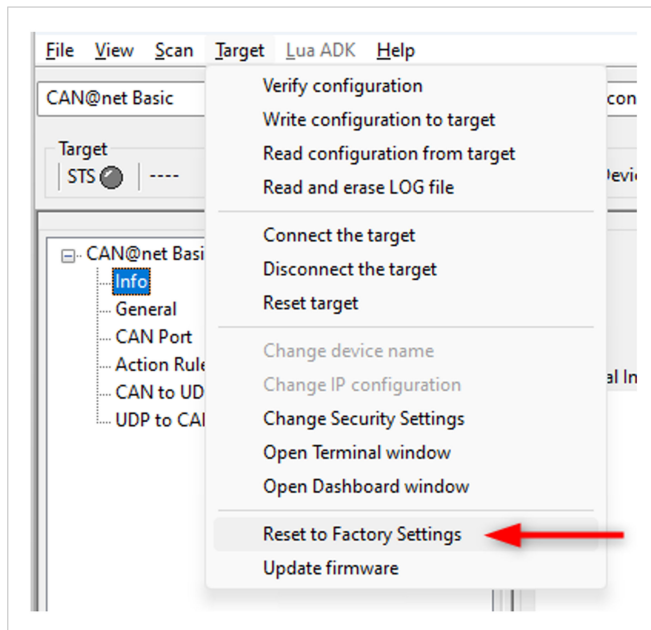
The UPD status message has the following format (almost all values are 32 bits in size, with numerical values in "little-endian" format):

| Position     | Description                                                       |
|--------------|-------------------------------------------------------------------|
| Byte 0 – 3   | String "DVST" without final \0 (DVST stands for device status)    |
| Byte 3 – 7   | Size of the message (payload) (currently 76)                      |
| Bytes 8 – 11 | Version number (currently 1)                                      |
| Byte 12 – 15 | Firmware version number as 4-byte array: [0, major, minor, build] |
| Byte 16 – 19 | Serial number                                                     |
| Byte 20 – 23 | Message counter, incremented with each message                    |
| Byte 24 – 25 | CPU load in percent (16-bit)                                      |
| Byte 26 – 27 | Device status (16-bit)                                            |
| Byte 28 – 31 | IP address as 32-bit value                                        |
| Byte 32 – 35 | CAN message reception counter                                     |
| Byte 36 – 39 | CAN message transmission counter                                  |
| Byte 40 – 43 | CAN error counter                                                 |
| Byte 44 – 47 | ETH message reception counter                                     |
| Byte 48 – 51 | ETH message transmission counter                                  |
| Byte 52 – 55 | ETH message reception overflow counter                            |
| Byte 56 – 59 | ETH message transmission overflow counter                         |
| Byte 60 – 63 | ETH error counter                                                 |
| Byte 64 – 67 | Number of memory blocks in pool 0                                 |
| Byte 68 – 71 | Number of memory blocks in pool 1                                 |
| Byte 72 – 75 | Number of memory blocks in pool 2                                 |

### Device Status

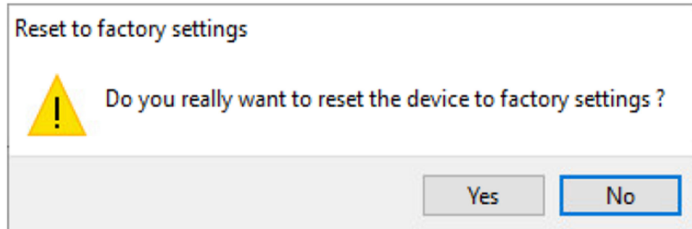
| State                 | Value | Description                                                                                                                                                                                         |
|-----------------------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Operational</b>    | 5     | Device is in normal operation.                                                                                                                                                                      |
| <b>Configuring</b>    | 4     | Device is currently being configured, state is normally scrolled through quickly and is therefore not visible.                                                                                      |
| <b>Preoperational</b> | 3     | The device is in an intermediate state, e.g.: <ul style="list-style-type: none"> <li>• Wait for CAN baud rate detection</li> <li>• Wait for contacting by client in ASCII interface mode</li> </ul> |
| <b>Warning</b>        | 2     | <ul style="list-style-type: none"> <li>• Error occurred during configuration (see LOG file)</li> <li>• Maximum LOG file size reached, no further entries possible</li> </ul>                        |
| <b>Error</b>          | 1     | Fatal error occurred (see LOG file)                                                                                                                                                                 |

## 6.3. Reset to Factory Settings



With **Reset to Factory Settings** it is possible to reset the configuration of a connected device to factory settings.

1. Make sure that the device is connected via USB.
2. Open menu **Target** and select **Reset to Factory Settings**.

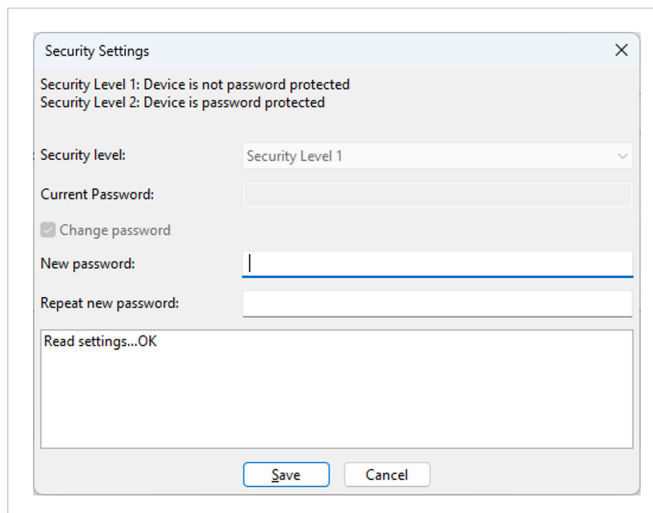


3. Click button **Yes** to confirm the reset.
  - Configuration is reset to factory settings.
  - Connection to the CAN-Gateway Configurator is lost.
4. Click button **Connect** after approx. 10 seconds to reconnect the device.

## 6.4. Security Settings

The CAN@net Basic can be protected with a password. If the password is activated, the following cannot be done without a password:

- An existing configuration cannot be read out.
- Changes cannot be made to the configuration.



To change the password, open the **Target** menu and select **Change Security Settings**.

- If a password is not stored, **Security Level 1** is displayed. You now have the option of entering and confirming a password.
- If a password is already stored, **Security Level 2** is displayed. To change the password, the previous password must also be entered.
- If no new password is entered (input field remains empty), password protection is deactivated.

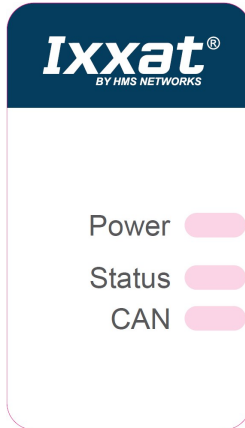
## 6.5. Read and erase LOG File

In case of an error the device writes the error in a log file. The log file can be read from the device, saved as a txt file and send to the Ixxat support if needed.

1. Open menu **Target** and select **Read and erase LOG file**.
  - Window **Save Log File As** is opened
2. Define a file name and save the file.
  - .txt-file is created and saved.
  - Configuration file is saved.

## 7. Operation

### 7.1. LEDs



### 7.2. Power LED

Indicates the status of the power supply.

| LED state | Description | Comments                                                                                                                                  |
|-----------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Off       | No power    | Possible causes: device not connected to power supply, fuse of device damaged, internal power supply damaged, power supply not sufficient |
| Green     | Power       | Device fully functional                                                                                                                   |

### 7.3. Status LED

Indicates the device status.

| LED state                    | State          | Comments                                                                                                                                                                   |
|------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Off                          | Undefined      | No firmware, device defective.                                                                                                                                             |
| Green flashing (1 Hz)        | Operational    | Device in normal operation.                                                                                                                                                |
| Red/green flashing (1 Hz)    | Warning        | Maximum LOG file size reached, invalid configuration or file system defective.<br>1. Write a valid configuration to the device.<br>2. Read LOG file.                       |
| Orange/green flashing (1 Hz) | Preoperational | Device waiting for CAN communication to detect a baud rate or for the client application (ASCII interface operating mode).                                                 |
| Orange flashing (1 Hz)       | Configuring    | State is normally passed through very quickly. If the state is not completed after 2 s, the device has no configuration.<br>• Write the saved configuration to the device. |
| Red flashing (1 Hz)          | Error          | Fatal device error.<br>• Read out log file for further information.                                                                                                        |

## 7.4. CAN LED

Indicates the status of the CAN interface.

| LED state              | Description                                             | Comments                                                                                                              |
|------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Off                    | No CAN communication                                    | No connection to CAN                                                                                                  |
| Orange flashing        | Indicates a state of the automatic baud rate detection  | See User Manual <i>CAN-Gateway Configurator Basic</i>                                                                 |
| Green flashing / green | CAN communication                                       | LED is triggered with each CAN message                                                                                |
| Red flashing           | CAN communication, CAN controller in <i>Error</i> state | CAN controller in <i>Error Warning</i> or <i>Error Passive</i> state, reception/transmission of CAN messages possible |
| Red                    | Bus off                                                 | CAN controller is in <i>Bus Off</i> state, no CAN communication possible                                              |

## 7.5. Link/Activity LED

Indicates connection status of the Ethernet interface.

| LED state      | Description      | Comments                                                  |
|----------------|------------------|-----------------------------------------------------------|
| Off            | No link detected | No connection to Ethernet network, Network cable damaged  |
| Green          | Link             | Ethernet connection established, no communication present |
| Green flashing | Activity         | Ethernet connection established, communication present    |

## 8. Technical Data

|                                                     |                                                                                                                                                                 |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CAN high-speed channels                             | 1                                                                                                                                                               |
| CAN high-speed interface                            | Removable push-in connectors                                                                                                                                    |
| CAN high-speed bit rates                            | 20 to 1000 kBit/s                                                                                                                                               |
| CAN FD bit rates                                    | Arbitration rate: 500 to 1000 kbit/s, data rate: 500 to 8000 kbit/s                                                                                             |
| CAN/CAN FD transceiver                              | TCAN1044 or compatible                                                                                                                                          |
| CAN controller frequency                            | 80 MHz                                                                                                                                                          |
| Galvanic isolation                                  | CAN: 2.5 kV for 1 minute; Ethernet: 1.5 kV for 1 minute                                                                                                         |
| USB interface                                       | USB 2.0 hi-speed (480 Mbit/s), compatible with USB 3.x                                                                                                          |
| USB connector                                       | USB type C                                                                                                                                                      |
| Ethernet protocols                                  | UDP/IP with DHCP, UDP Broadcast/Multicast                                                                                                                       |
| Ethernet standard                                   | 10BASE-T / 100BASE-TX (10/100 Mbit/s)                                                                                                                           |
| Ethernet connector                                  | RJ45, twisted pair                                                                                                                                              |
| Ethernet channels                                   | 1                                                                                                                                                               |
| ASCII interface mode                                | all system with UDP/TCP IPv4 support                                                                                                                            |
| Power supply                                        | 10-30 V DC                                                                                                                                                      |
| Dimensions                                          | 108 x 149 x 27 mm                                                                                                                                               |
| Net weight                                          | 127 g                                                                                                                                                           |
| Operating temperature                               | -40°C to +85°C                                                                                                                                                  |
| Storage temperature                                 | -40°C to +85°C                                                                                                                                                  |
| Protection class                                    | IP20                                                                                                                                                            |
| Relative humidity                                   | 0 to 90 %, non-condensing                                                                                                                                       |
| Certification                                       | CE, FCC                                                                                                                                                         |
| Housing material                                    | PC-ABS, UL 94                                                                                                                                                   |
| LED                                                 | 1x Power (green), 1x Status (red/orange/green, SW-controlled), 1x CAN (red/orange/green, SW-controlled), 1x Ethernet (green, LNK/ACT and SW-controlled in RJ45) |
| Operating system for CAN-Gateway Configurator Basic | Windows 11                                                                                                                                                      |

## 9. Support/Return Hardware

### Support

To contact support, go to <https://support.hms-networks.com/hc/en-us>.

### Return Hardware

Please follow the instructions under <https://www.hms-networks.com/en/support/product-returns>.

## 10. Regulatory Compliance

### 10.1. CE Compliance



The product is in compliance with the Electromagnetic Compatibility Directive. More information and the Declaration of Conformity is found at [www.hms-networks.com/](http://www.hms-networks.com/).

Enter the article number in the search field. The CE Declaration of Conformity can be found in the 'Support and Downloads' section.

### 10.2. FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

Product name

Responsible party

HMS Industrial Networks Inc

Address

35 E. Wacker Dr, Suite 1700 Chicago , IL 60601

Phone

+1 312 829 0601



#### IMPORTANT

Any changes or modifications not expressly approved by HMS Industrial Networks could void the user's authority to operate the equipment.



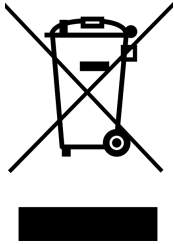
#### IMPORTANT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



## 10.3. Disposal and Recycling



You must dispose of this product properly according to local laws and regulations. Because this product contains electronic components, it must be disposed of separately from household waste. When this product reaches its end of life, contact local authorities to learn about disposal and recycling options, or simply drop it off at your local HMS office or return it to HMS.

For more information, see [www.hms-networks.com/sustainability](http://www.hms-networks.com/sustainability).