

# Special Documentation

## **DATEXEL DAT8024M Converter**

### **Modbus TCP to 4-20 mA**

Vibronic

Density Calculator QML51 for liquids





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# 1 About this document

## 1.1 Document function

This manual is Special Documentation and does not replace the Operating Instructions included in the scope of supply.

It forms part of the Operating Instructions and serves as a reference for the DATEXEL DAT8024M converter in conjunction with the Density Calculator QML51.

## 1.2 Content and scope

This documentation includes the description of the DATEXEL converter in conjunction with Density Calculator QML51.

- Specifications
- Installation
- Electrical connection
- Commissioning

## 1.3 Symbols

### 1.3.1 Safety symbols

#### CAUTION

This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.

#### DANGER

This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

#### NOTICE

This symbol contains information on procedures and other facts which do not result in personal injury.

#### WARNING

This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

### 1.3.2 Symbols for certain types of information and graphics

#### Tip

Indicates additional information


#### Reference to another section

**1.**, **2.**, **3.** Series of steps

**1, 2, 3, ...**

Item numbers

## 1.4 Documentation

 For an overview of the scope of the associated Technical Documentation, refer to the following:

- *Device Viewer* ([www.endress.com/deviceviewer](http://www.endress.com/deviceviewer)): Enter the serial number from the nameplate
- *Endress+Hauser Operations app*: Enter serial number from nameplate or scan matrix code on nameplate.

**Complete documentation for the DATEXEL 8024M is available on the manufacturer's website (Download section):**

<https://www.datexel.it>

## 2 Introduction

The DAT8024M is a versatile, isolated 4-channel Modbus TCP converter designed for industrial automation and process control applications.

The DAT8024M converts Modbus TCP signals via Ethernet 10/100BaseT into precise analog outputs.

The following output types are supported: 0 to 20 mA, 4 to 20 mA, 0 to 10 V, 2 to 10 V. This allows flexible integration into a wide range of control systems.

The DAT8024M has active and passive outputs.

Passive outputs require an external 24 V<sub>DC</sub> power source for operation, similar to standard 2-wire transmitters.

Active outputs, by contrast, feature an integrated 24 V<sub>DC</sub> power source, simplifying installation and reducing the need for external power supplies.

### NOTICE

#### Important note that must be observed

A function is only available when a DAT8024M converter is used; a DAT8024 converter (without the suffix "M") cannot be used.

- ▶ Use **DAT8024M 041016**.

## 3 Specifications

Output: 4 channels.

Current output: 4 to 20 mA, 0 to 20 mA.

Voltage output: 0 to 10 V, 2 to 10 V.

Communication: Ethernet 10/100 T: Modbus TCP.

Power supply: 18 to 30 V<sub>DC</sub>. Reverse polarity protection 60 V<sub>DC</sub>.

Power consumption: Standby 60 mA. Max. 115 mA.

Operating temperature: -10 to 60 °C (14 to 140 °F).

Storage temperature: -40 to 85 °C (-40 to 185 °F).

Humidity: 0 to 90 % (non-condensing).

Housing: Self-extinguishing material.

Dimensions: width: 22.5 mm (7/8 in), height: 100 mm (4 in), depth: 120 mm (4.75 in)

Weight: 170 g (6 oz).

EMC: for industrial environments.

Interference immunity: EN 61000-6-2.

Interference emission: EN 61000-6-4.

Insulation: Input, each channel, power supply, 1 500 V<sub>AC</sub>, 50 Hz, 1 min,

Configuration: Configurable via PC.

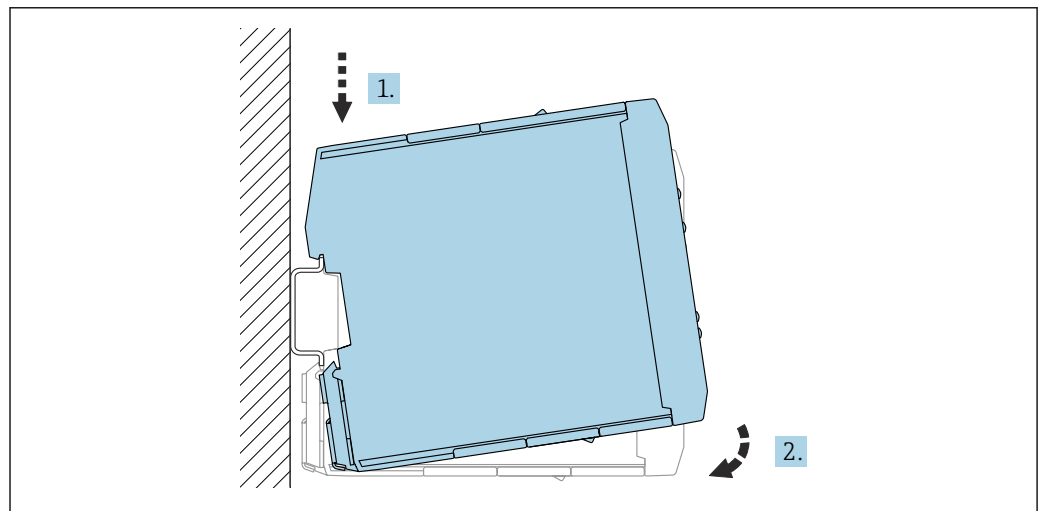
## 4 Installation

### 4.1 Orientation

Vertical or horizontal installation on DIN rail (TH35 in accordance with EN 60715).

### 4.2 Installing the device

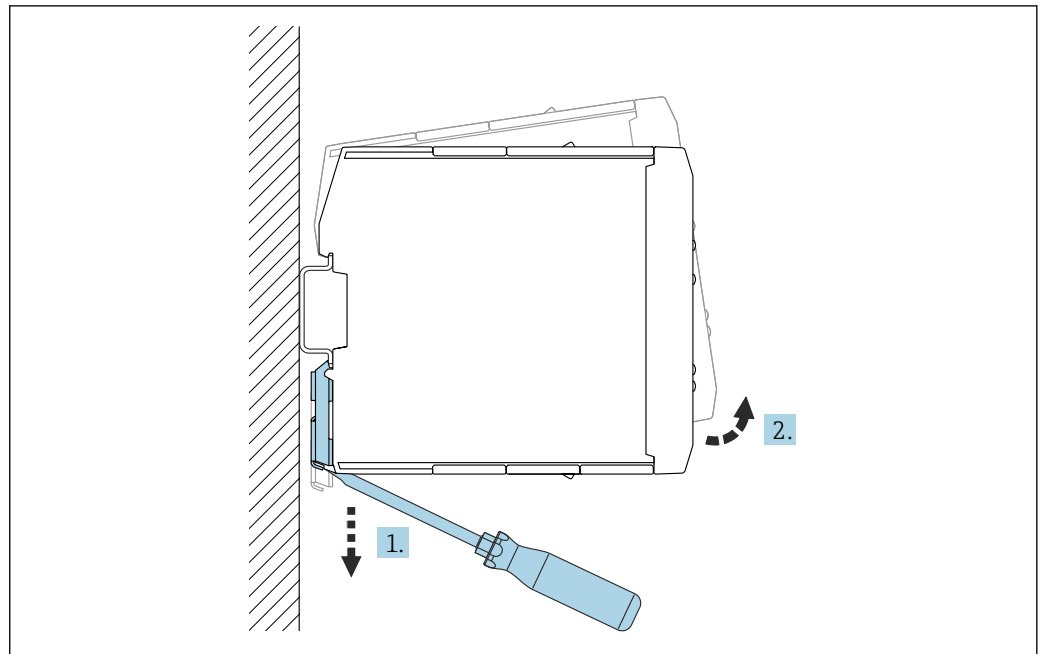
- ▶ Install the device on a DIN rail.



A0046188

1. Hook the housing onto the DIN rail.
2. Press the housing downward until it snaps into place on the DIN rail.

### 4.3 Removing device from top-hat rail



1. Unlock the latch.
2. Pull up the housing.

## 5 Electrical connection

### **⚠ WARNING**

#### **Risk of electric shock!**

Burn injuries, cardiac arrhythmia, and other injuries caused by shock reactions following an electric shock can result.

- ▶ Always switch off the supply voltage first and measure to check that it is de-energized. Only then install or wire the device.
- ▶ Compare the supply voltage with the rated voltage indicated on the nameplate.
- ▶ Only properly trained specialist staff may perform electrical connection work.
- ▶ Observe the grounding concept of the plant.
- ▶ Comply with local workplace safety regulations.

### 5.1 Terminals

Power supply 18 to 30 V<sub>DC</sub>: terminals 0 (+), P (-)

INIT: terminal Q

Four current outputs are available (OUT0, OUT1, OUT2, OUT3)

Active current output at terminals: I and AUX

Passive current output at terminals: I and GNA

Voltage output

Output 0: terminals 3 (+), 4 (-)

Output 1: terminals 7 (+), 8 (-)

Output 2: terminals 11 (+), 12 (-)

Output 3: terminals 15 (+), 16 (-)

Passive current output

Output 0: terminals 1 (+), 4 (-)

Output 1: terminals 5 (+), 8 (-)

Output 2: terminals 9 (+), 12 (-)

Output 3: terminals 13 (+), 16 (-)

Active current output

Output 0: terminals 2 (+), 1 (-)

Output 1: terminals 6 (+), 5 (-)

Output 2: terminals 10 (+), 9 (-)

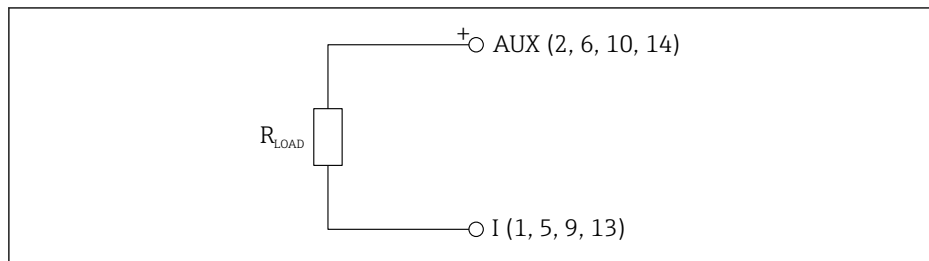
Output 3: terminals 14 (+), 13 (-)

## 5.2 Connecting the device

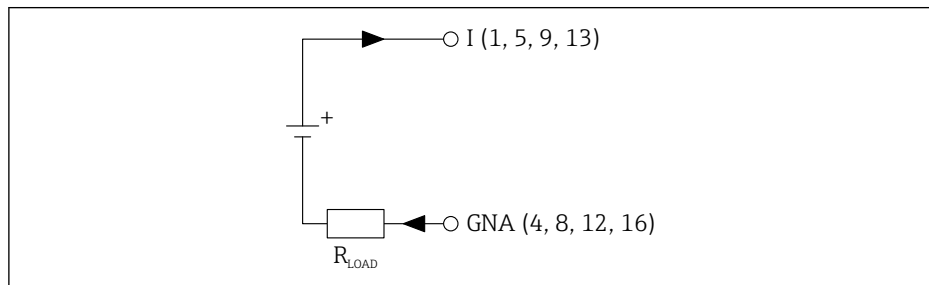
**⚠ Warning!** Always switch off the supply voltage first and measure to check that it is de-energized. Only then install or wire the device. Observe the safety instructions at the start of this section.

1. Connect the power supply 18 to 30 V<sub>DC</sub> to terminals 0 (+), P (-) of DAT8024M.
2. Connect the PC or hub/switch to the DAT8024M using a CAT5 crossover cable.
3. Connect the LAN1 (Ethernet RJ45) of the QML51 to the hub/switch.
4. Connect the current outputs if necessary.

↳ Connection diagram, active current output:



Connection diagram, passive current output:



## 6 Commissioning


### 6.1 DAT8024M connection setup

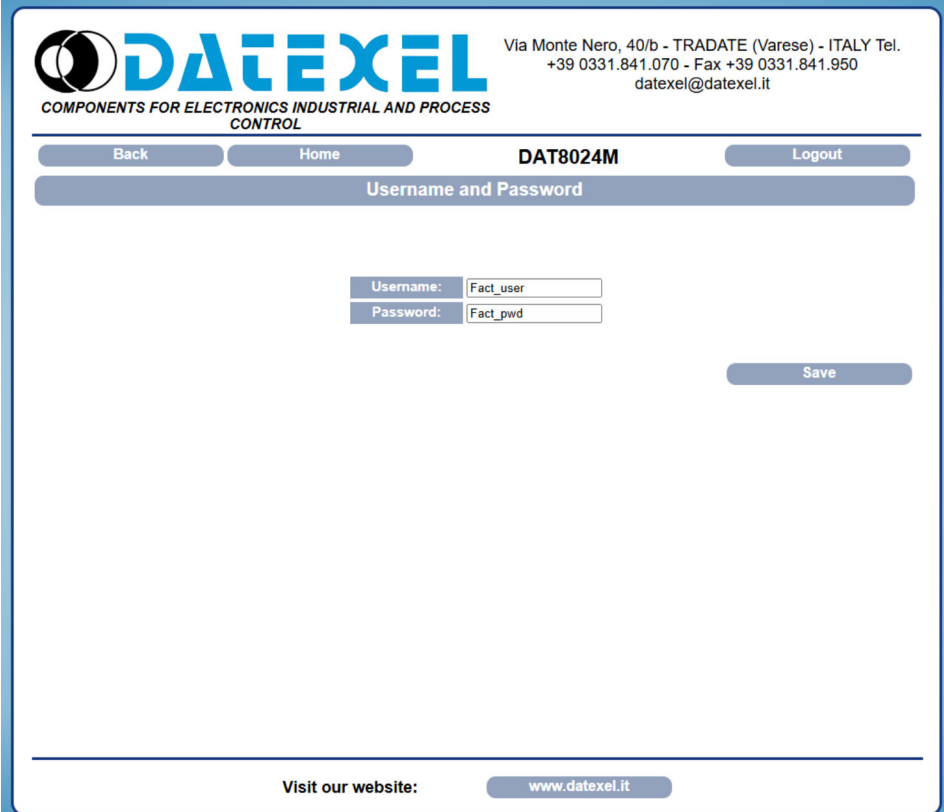
 When connecting via LAN to a company network: please contact your system administrator.

1. Open the web browser.
2. Connect the PC to the device using a LAN cable.
3. Set the IP address on the PC (network part: octets 1 to 3 must match the device; host part: octet 4 must differ, e.g: 192.168.1.**213**)
4. Set the subnet mask on the PC: 255.255.255.0
5. Enter the IP address 192.168.1.100 in the address bar.
6. Click "Enter".
  - ↳ The "Username and Password" window opens.

 The device has the default IP address: 192.168.1.100

### 6.2 Username and password

-  The following buttons are located in the top section of all pages:
- **Back:** -> Clicking the "Back" button returns you to the previous page.
  - **Home:** -> Clicking the "Home" button returns you to the Home page.
  - **Logout:** -> Clicking the "Logout" button logs you out and returns you to the login page.



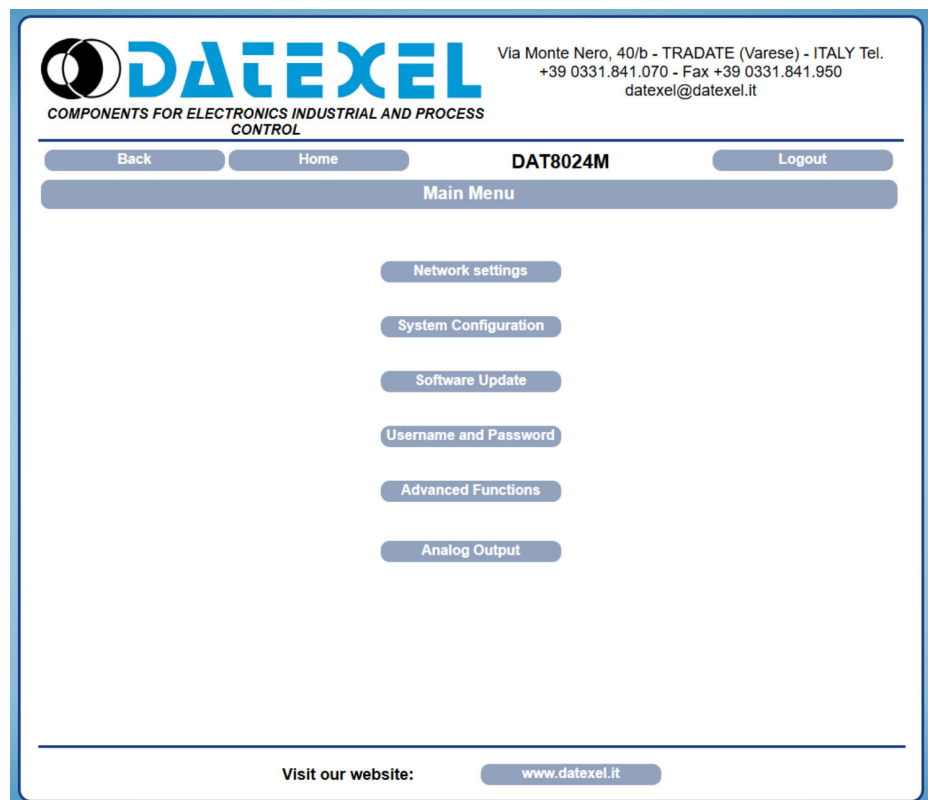
The screenshot shows the web interface for the DAT8024M device. At the top left is the DATEXEL logo with the tagline 'COMPONENTS FOR ELECTRONICS INDUSTRIAL AND PROCESS CONTROL'. To the right of the logo is the contact information: 'Via Monte Nero, 40/b - TRADATE (Varese) - ITALY Tel. +39 0331.841.070 - Fax +39 0331.841.950 datexel@datexel.it'. Below this is a navigation bar with buttons for 'Back', 'Home', 'DAT8024M', and 'Logout'. The main content area is titled 'Username and Password' and contains two input fields: 'Username:' with the value 'Fact\_user' and 'Password:' with the value 'Fact\_pwd'. A 'Save' button is located at the bottom right of the form. At the very bottom of the page, there is a footer with the text 'Visit our website:' and a button for 'www.datexel.it'.

**Enter username and password.**

1. Username: Fact\_user
2. Password: Fact\_pwd
3. Click the "Save" button.

### 6.3 Selecting the language

1. Select the desired language -> Select language
2. Press "OK" to confirm.
  - ↳ The "Main Menu" window opens.



### 6.4 Network settings

- i** When connecting via LAN to a company network: please contact your system administrator.
- i** The IP address must be unique within the network.

The screenshot shows the DATEXEL web interface for the DAT8024M converter. At the top left is the DATEXEL logo with the tagline "COMPONENTS FOR ELECTRONICS INDUSTRIAL AND PROCESS CONTROL". To the right of the logo is the company address: "Via Monte Nero, 40/b - TRADATE (Varese) - ITALY Tel. +39 0331.841.070 - Fax +39 0331.841.950 datexel@datexel.it". Below the logo is a navigation bar with buttons for "Back", "Home", "DAT8024M", and "Logout". A "Network settings" header is centered below the navigation bar. The main content area contains the instruction "Enter the new network parameters and press SAVE". There are four rows of input fields: "IP Address" (192, 168, 1, 100) with the value 192.168.1.100; "Subnet Mask" (255, 255, 255, 0) with the value 255.255.255.0; "Gateway Mask" (192, 168, 1, 1) with the value 192.168.1.1; and "Socket Timeout" (10) with the unit "min". A "Save" button is located at the bottom right of the form. At the bottom of the page, there is a footer with the text "Visit our website:" and a button containing the URL "www.datexel.it".

1. Change the network settings if necessary.
2. Click the "Save" button.
  - ↳ The new network settings are saved.

## 6.5 System configuration

The screenshot shows the DATEXEL web interface for the DAT8024M converter. At the top, there is a navigation bar with buttons for 'Back', 'Home', 'DAT8024M', and 'Logout'. Below this is a 'System Configuration' header. The main configuration area contains several fields and checkboxes:

- Name:** DAT8024
- Modbus Address:** 1
- MAC Address:** 74:D5:C6:8C:E1:F9
- WatchDog Enable:**
- TimeOut:** 5
- WatchDog Event:**
- PowerUp Event:**

At the bottom right of the configuration area are 'Refresh' and 'Save' buttons. At the very bottom, there is a 'Visit our website:' link pointing to [www.datexel.it](http://www.datexel.it).

1. To change the name of DAT8024M, enter the new name in the "Name" field.
2. To change the Modbus address for the Modbus TCP module, make the change in the "Modbus Address" field.
3. Activate the watchdog timer in the "WatchDog Enable" field.
4. Set the desired time in the "TimeOut" field.
5. Activate the watchdog event in the "WatchDog Event" field.
6. Activate the power-up event register in the "PowerUp Event" field.
7. Click the "Save" button.
  - ↳ The entries are saved.

## 6.6 Advanced functions

DATEXEL  
COMPONENTS FOR ELECTRONICS INDUSTRIAL AND PROCESS CONTROL

Via Monte Nero, 40/b - TRADATE (Varese) - ITALY Tel. +39 0331.841.070 - Fax +39 0331.841.950  
datexel@datexel.it

Back Home **DAT8024M** Logout

Advanced Functions

Enable Master TCP Function:

IP Address: 192.168.1.10 Device Node ID: 3 Port: 502 Start Register: 1 Number of Registers: 4 Delay Polling (ms): 100

Save

Enable Scale Function:

	Physical ZERO	Physical SPAN	Output ZERO	Output SPAN	
Analog Out 0:	0	20000	0	20000	Write Ch0
Analog Out 1:	0	20000	0	20000	Write Ch1
Analog Out 2:	0	20000	0	20000	Write Ch2
Analog Out 3:	0	20000	0	20000	Write Ch3

Save

Visit our website: [www.datexel.it](http://www.datexel.it)

1. Select the "Enable Master TCP Function" function.
2. Enter the IP address of the QML51 in the "IP Address" field.
3. Enter 3 in the "Device Node ID" field.
4. Enter the desired value in the "Port" field (default value: 502).
5. Enter 1 in the "Start register" box.
  - ↳ For two connected converters: enter 1 for the first converter and 5 for the second converter (since 4 registers are available per converter).
  - For three connected converters: enter 1 for the first converter, 5 for the second converter and 9 for the third converter.
  - For additional converters, proceed according to the same logic.
6. Enter 4 in the "Number of Registers" field.
7. Enter the desired value in the "Delay Polling (ms)" field.
  - ↳ "Delay Polling": -> update interval of the current outputs
8. Click the "Save" button.
  - ↳ The entries are saved.

## 6.7 Configuring the analog output (Analog Output)

DATEXEL  
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datexel@datexel.it

Back Home **DAT8024M** Logout

Analog Output

	Output Type	Value	Safe	PowerUp	
Analog Out 0:	20mA	3.600	3.600	3.600	Write Ch0
Analog Out 1:	20mA	3.600	3.600	3.600	Write Ch1
Analog Out 2:	20mA	4.027	3.600	3.600	Write Ch2
Analog Out 3:	20mA	19.026	3.600	3.600	Write Ch3

Read All Save All

Visit our website: [www.datexel.it](http://www.datexel.it)

1. Under "Output Type", select the "20 mA" option.
  2. Enter 3.6 mA under "Safe".
  3. Enter 3.6 mA under "Power Up".
  4. Click "Write Ch0".
    - ↳ The values entered for the corresponding channel are applied.
  5. Check the mA output at terminals 1 and 2.
- i** **Value:** current output value transmitted by the Density Calculator QML51. For test purposes, a value can also be entered directly here, which is then output as a current signal.
- **Safe:** current output value that is output in an alarm condition.
  - **Power Up:** current output value that is output during device start-up.
  - **Write Ch0...3:** Clicking this button applies the values entered for the corresponding channel.
  - **Read all:** Click this button to update all the measured values.
  - **Save all:** Click this button to save all entries.
- i** Each channel can be configured independently.

## 6.8 Additional settings

- i** All other settings are made in the Density Calculator QML51.
- i** See the operating instructions for Density Calculator QML51.





[www.addresses.endress.com](http://www.addresses.endress.com)

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