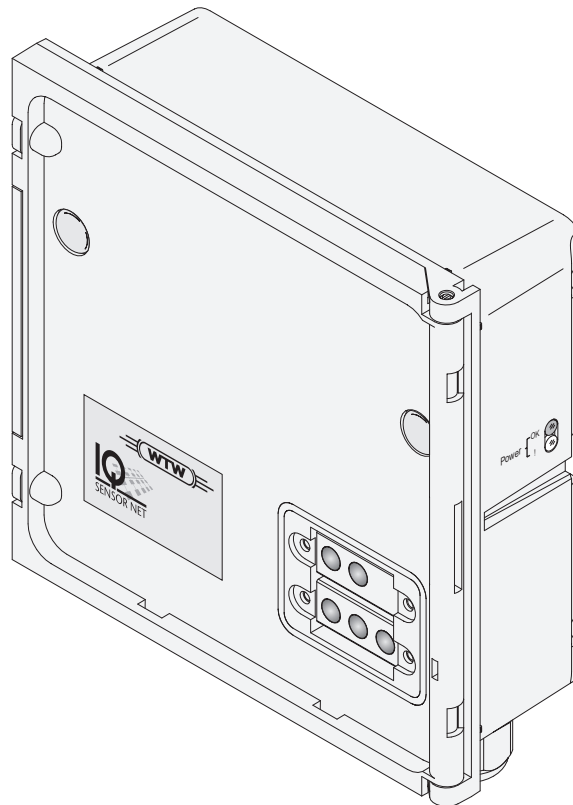# MIQ/CHV

**Valve module for compressed air-operated
sensor cleaning heads**

Accuracy when going to press   The use of advanced technology and the high quality standard of our instruments are the result of continuous development. Consequently, this may result in some differences between this operating manual and your instrument. Also, we cannot guarantee that there are absolutely no errors in this manual. Therefore, we are sure you will understand that we cannot accept any legal claims resulting from the data, figures or descriptions.

1   Overview

General characteristics   The MIQ/CHV valve module provides a switchable compressed air valve for the operation of sensor cleaning heads. The valve is controlled via an external switch. The switch can consist of one of the following:

● the relay of an IQ SENSOR NET MIQ/CR3 combined output module

● the relay of a measurement converter with the R option

● any other switch (relay or sensor)

Warning
The valve circuit must not supply any unauthorized voltages or currents. The circuit must comply with all the standards of a *circuit with limitations* (*Limited Circuit* or *Limited Power*) as well as for *safety extra low voltage* (*SELV*) at all times. For more details, see chapter 6 TECHNICAL DATA.

The valve module is connected with the external switch via a control line.

The following application example shows a cleaning system made up of a CH cleaning head and an MIQ/CHV valve module with a long-range MIQ/PS power supply:
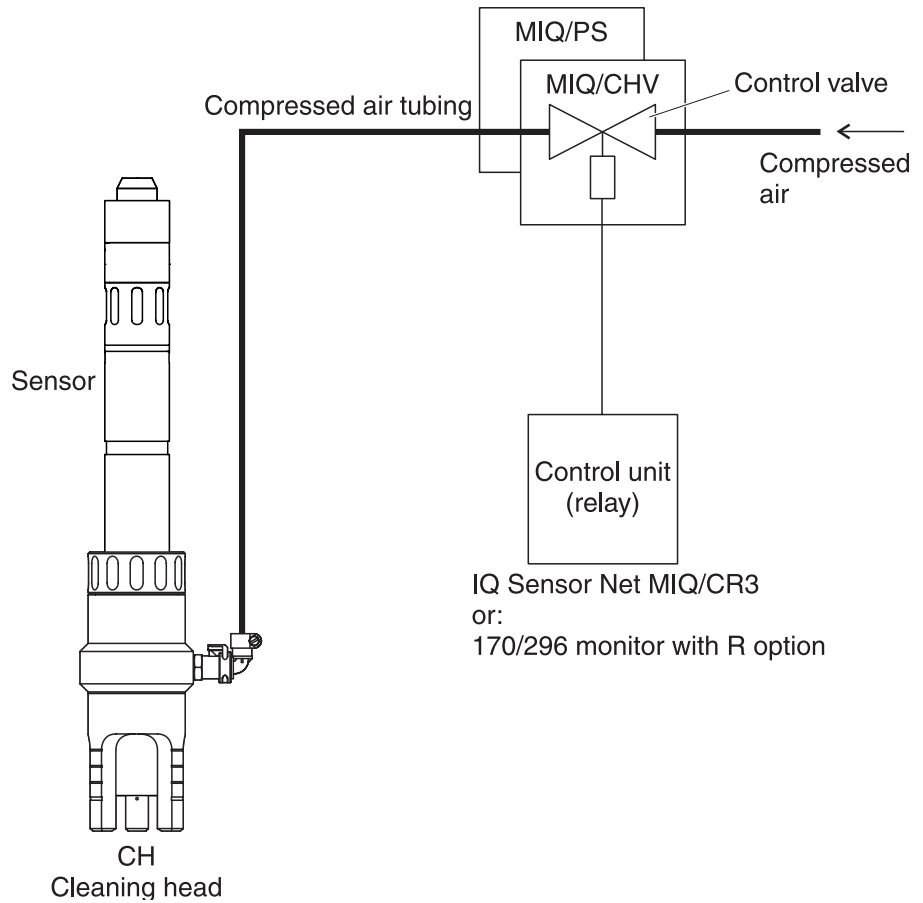
Application example

MIQ/PS

MIQ/CHV — Control valve

Compressed air tubing

Compressed air

Sensor

Control unit (relay)

IQ Sensor Net MIQ/CR3
or:
170/296 monitor with R option

CH
Cleaning head

Fig. 1-1   Application example of the MIQ/CHV valve module

Power supply   The valve module requires a 24 Volt power supply (for details, see chapter 6 TECHNICAL DATA) to operate. When used in the IQ SENSOR NET, the valve module is supplied with voltage by the IQ SENSOR NET.

IQ SENSOR NET compatibility   The MIQ/CHV can be fully integrated in the IQ SENSOR NET using the MIQ standard module housing.

The housing has the same characteristics as all MIQ modules regarding stability, leakproofness and weather resistance. It also provides the same wide variety of installation options (stacked mounting, canopy mounting, tophat rail mounting, etc.).

Terminal strip   The MIQ/CHV has the following electrical connections on the terminal
                            strip inside the housing:

                            ● 1 x valve circuit connection

                            ● 2 x SENSORNET connection

                            Note
                            Due to the limited number of cable glands, only one SENSORNET con-
                            nection can be used. SENSORNET connection 1 or 2 can be selected.

2   Safety instructions

This operating manual contains special instructions that must be
followed during the installation of the MIQ/CHV valve module. Thus, it
is essential for the operator to read this component operating manual
before carrying out any work with the system. Always keep the
operating manual in the vicinity of the valve module.

General safety instructions

The following safety labels in the individual chapters of this operating
manual indicate different levels of danger:

Warning
indicates instructions that must be followed precisely in order to prevent
serious danger to personnel.

Attention
indicates instructions that must be followed precisely in order to avoid
slight injuries to personnel or damage to the instrument or the environ-
ment.

Other labels

Note
indicates notes that draw your attention to special features.

Note
indicates cross-references to other documents, e.g. operating manu-
als.

2.1   Authorized use

The authorized use of the MIQ/CHV consists of providing a control valve for compressed air-operated sensor cleaning heads.
Please adhere to the technical specifications given in chapter 6 TECHNICAL DATA. Only operation according to the instructions in this operating manual is authorized.

Any other use is considered to be **unauthorized**. Unauthorized use invalidates any claims with regard to the guarantee.

2.2   General safety instructions

The MIQ/CHV is constructed and inspected according to the relevant guidelines and norms for electronic instruments (see chapter 6 TECHNICAL DATA).
It left the factory in a safe and secure technical condition.

Function and opera-
tional safety

The failure-free function and operational safety of the MIQ/CHV is only guaranteed if the generally applicable safety measures and the special safety instructions in this operating manual are followed during its use.

The failure-free function and operational safety of the MIQ/CHV is only guaranteed under the environmental conditions that are specified in chapter 6 TECHNICAL DATA.

Safe operation

If safe operation is no longer possible, the MIQ/CHV must be taken out of operation and secured against inadvertent operation.
Safe operation is no longer possible if the MIQ/CHV:

● has been damaged in transport

● has been stored under adverse conditions for a lengthy period of time

● is visibly damaged

● no longer operates as described in this manual.

If you are in any doubt, contact the supplier of your MIQ/CHV.

3 Installation

3.1 Scope of delivery

The following parts are contained within the scope of delivery of the MIQ/CHV:

- MIQ/CHV. All openings and open electrical contacts must be closed with suitable covers or blank covers.
- 2 x cable glands with seal
- 2 x ISO blind nuts M4
- 2 x cheese-head screws M4x16 with plastic washer
- 1 x contact base
- 2 x plastic tapping screws for fixing the contact base
- 1 x hose clip
- Operating manual.

3.2 Mounting for use in the IQ SENSOR NET

The IQ SENSOR NET provides a number of options for integrating the MIQ/CHV mechanically and electrically in the system (stacked mounting, distributed mounting, etc.). The individual types of installation are described in detail in the INSTALLATION chapter of the system operating manual.

3.3 Mounting for other applications

Note
This section is important if you want to operate the MIQ/CHV in connection with conventional measurement converters or some other control unit. For details of mounting in the IQ SENSOR NET, see section 3.2.

3.3.1 Stack mounting

Mounting the power supply module

If the power supply module and the MIQ/CHV are not yet premounted, both modules can be assembled as a stack. This type of mounting is described in this section. Mounting the modules also establishes the electrical connection at the same time.

3 - 2

A stack may consist of up to three modules (e.g. one power supply module and two MIQ/CHV modules). Further MIQ/CHV modules can be connected via the SENSORNET module connections with the aid of IQ SENSOR NET cable (see section 3.3.2 DISTRIBUTED MOUNTING).

Attention
Always place the power supply module at the back of the stack.

Materials required (contained in the scope of delivery)

- 2 x ISO blind nuts M4

- 2 x cheese-head screws M4x16 with plastic washer

- 1 x contact base with two plastic tapping screws.

Tools

- Phillips screw driver.
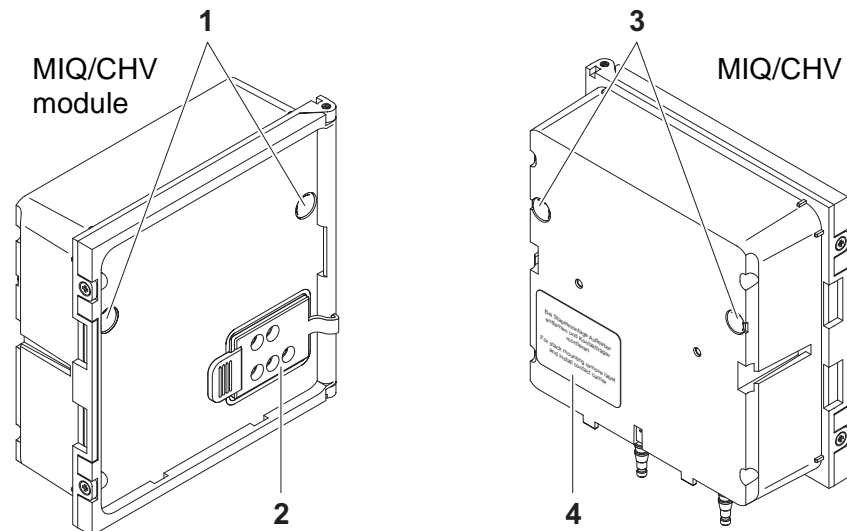
Preparing the stack mounting

Fig. 3-1   Preparing modules for stack mounting

1	Remove the covers from the drilled mounting holes (pos. 1 and 3 in Fig. 3-1).
2	Remove the contact cover (pos. 2).
3	Pull off the adhesive label (pos. 4).

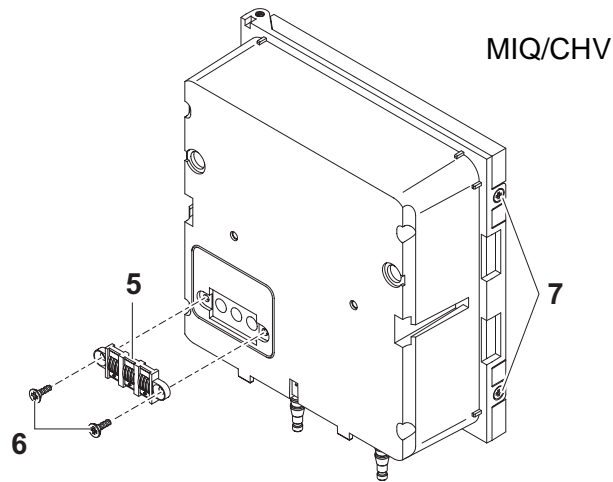**Mounting the contact base**

Fig. 3-2   Mounting the contact base

Attention
Only use the plastic tapping screws supplied for attaching the contact base. They ensure the correct fit.

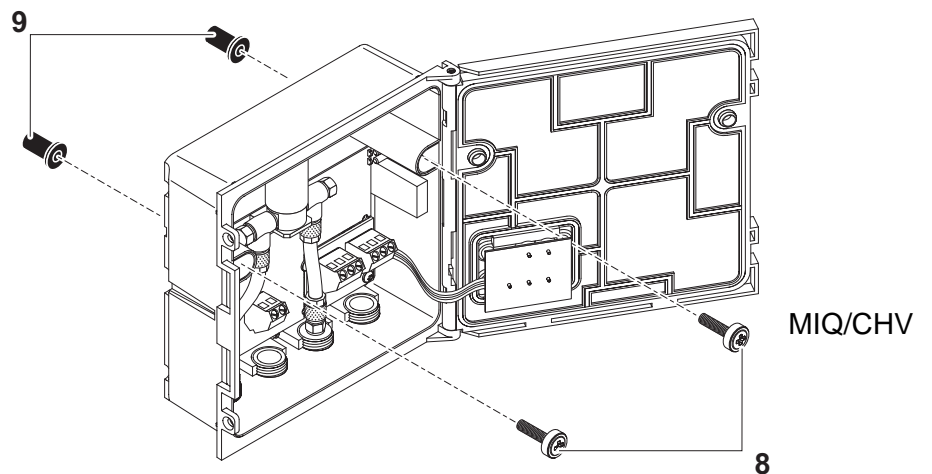| 4	Attach the contact base (pos. 5 in Fig. 3-2) to the front module with the two plastic tapping screws (pos. 6).
5	Remove the two countersunk screws (pos. 7 in Fig. 3-2) on the front module and swing open the module lid.

Premounting the ISO blind nuts

Fig. 3-3   Premounting the ISO blind nuts

3 - 4

6	Insert the cheese-head screws (pos. 8 in Fig. 3-3) with the plastic washers in the drilled mounting holes in the housing and loosely screw in the ISO blind nuts (pos. 9).

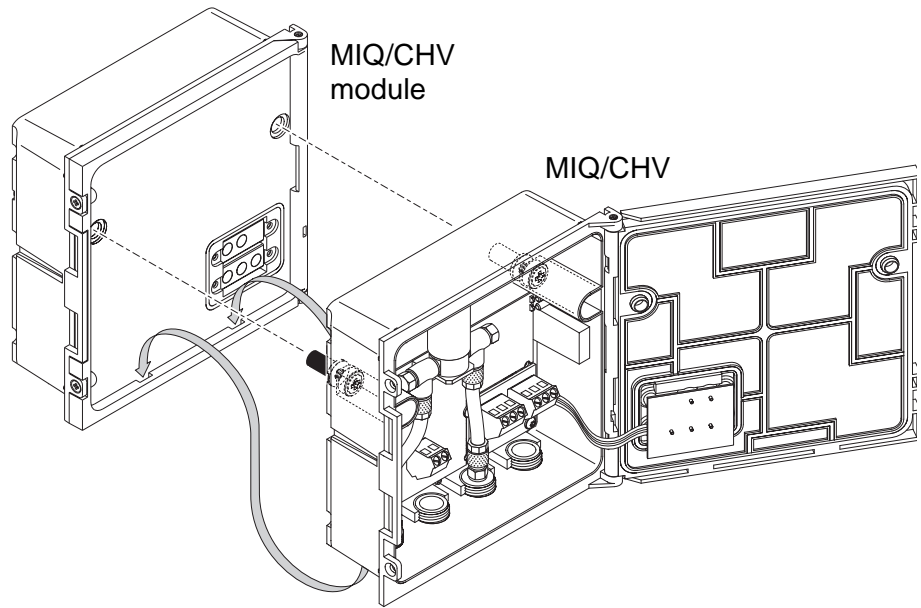**Stacking the modules**

MIQ/CHV module

MIQ/CHV

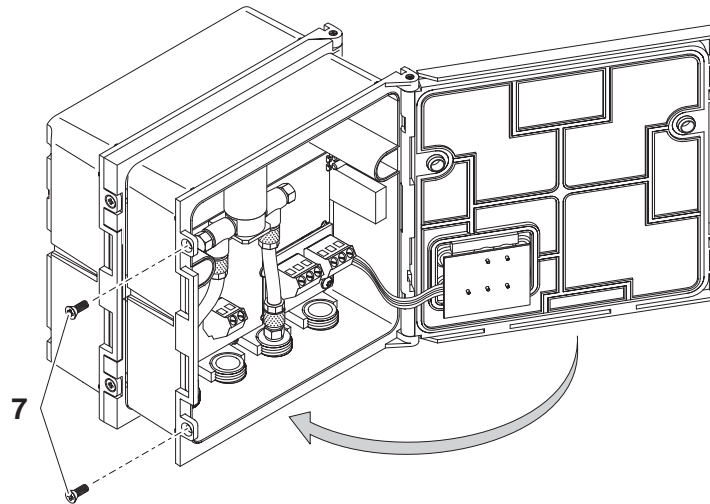*Fig. 3-4   Stacking the modules*

7

Fig. 3-5   Closing the housing

7	Attach the prepared module to the lid of the back module. At the same time, ensure that the two clips on the front module click into place in the lid of the back module. Then tighten the two screws (pos. 8 in Fig. 3-3).
8	Close the lid of the front module and fix in place with the two countersunk screws (pos. 7 in Fig. 3-5).

3.3.2 Distributed mounting

Warning
Electrical voltages that present a danger of electrical shock may be present inside the the power supply module. Before opening the power supply module, read the operating manual. Follow the safety instructions specified there.

General information

Distributed mounting can be made with the aid of the following IQ SENSOR NET cables:

- SNCIQ cable

- SNCIQ/UG earth cable - suitable for underground laying according to VDE 01816, Part 2 and DIN/VDE 0891, Part 6.

The cables are delivered as piece goods (please specify length when ordering!).

All 3-fold terminal strips with the designation "SENSORNET x" can be used for distributed mounting.

Note
Due to the limited number of cable glands, only one SENSORNET connection can be used. SENSORNET connection 1 or 2 can be selected.

Attention
The IQ SENSOR NET cable may only be connected to the SENSORNET connections. Do not connect any wires of the cable with an external electrical potential. Otherwise, malfunctions could occur.

Materials required
- 1 x SNCIQ or SNCIQ/UG connecting cable (see chapter 7 ACCESSORIES AND OPTIONS)
- Wire end sleeves for 0.75 mm^2 wire cross-section with matching crimping tool
- 1 x cable gland with seal (scope of delivery of MIQ module).

Tools
- Cable stripping knife
- Wire stripper
- Phillips screw driver
- Small screw driver.

Preparing the cable ends

|	
1	Cut the cable to the required length.
2	Remove approx. 45 mm of cable insulation (in the case of the SNCIQ/UG earth cable, remove both the inner <u>and</u> outer insulation).
3	Only for the SNCIQ/UG earth cable: Remove a further 35 mm of the outer insulation.
4	Shorten the exposed shielding braid up to the cable sheath.
5	Shorten the two fillers (plastic inlays) up to the cable sheath.
6	Bare the red and green wires and fit them with wire end sleeves.
7	Fit the filler stranded wire with a wire end sleeve.
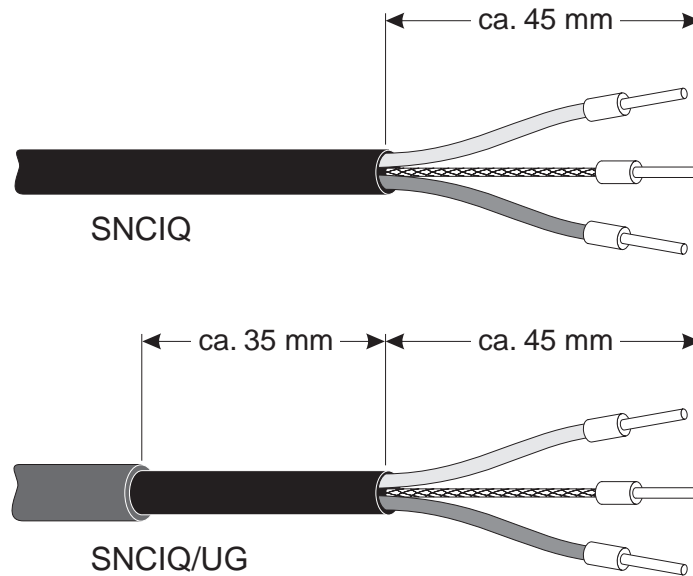
Fig. 3-6   Prepared cable end

Connecting the cables

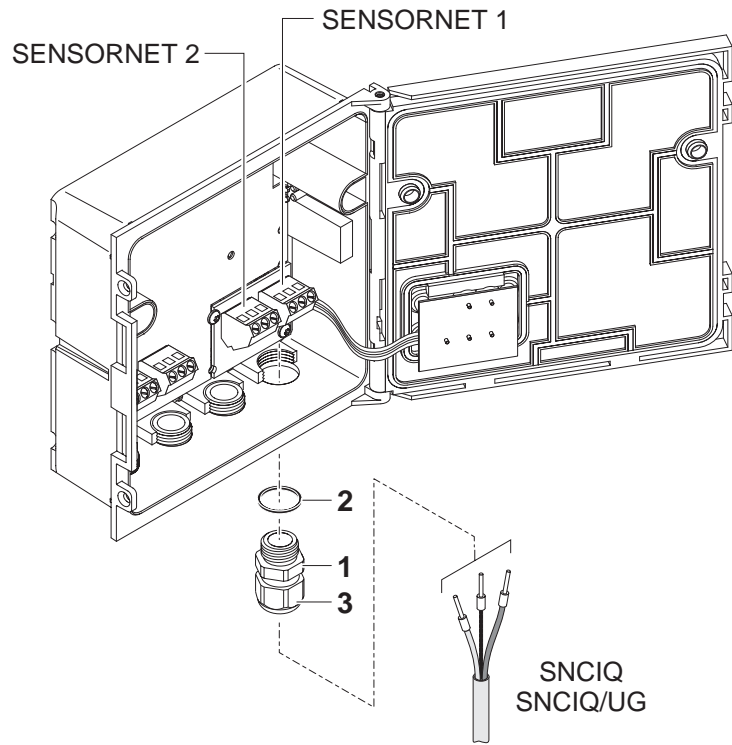| 1	Open the module.
2	Select any SENSORNET connection. Before doing so, look out for the SENSORNET designation.
3	Open the dummy screw fitting under the SENSORNET connection. Keep the dummy screw fitting for possible later modifications.

3 - 8

Fig. 3-7   Connecting the cables to the module

4	Screw the cable gland (pos. 1 in Fig. 3-7) with the sealing ring (pos. 2) into the module housing.
5	Loosen the coupling ring (pos. 3 in Fig. 3-7).
6	Feed the cable through the cable gland into the module housing.
7	Connect the cable ends to the terminal strip. While doing so, look out for the designations of the terminals (red / shield / green).
8	Loosen the coupling ring (pos. 3 in Fig. 3-7).
9	Close the module.

3.4 Installation of the modules at the installation location
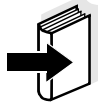
Note
The installation possibilities in the IQ SENSOR NET are described in the IQ SENSOR NET system manual.

3.4.3 General information

Attention
Modules installed outside must always be protected against the effects of the weather (snow, ice and direct solar radiation) by a sun shield. Otherwise, malfunctions can result. Always mount modules vertically. Never install modules without rain protection with the lid facing upwards (danger of retained humidity and penetration of moisture).

Installation options

The most important types of installation for modules and module stacks are described in the following chapters:

- **Mounting on a mounting stand with the SSH/IQ sun shield:**
  The SSH/IQ sun shield provides enough space for one unit made up of up to three stacked MIQ modules (section 3.4.4).

- **Mounting on the SD/K 170 sun shield:**
  The SD/K 170 sun shield provides enough space for two MIQ modules. The sun shield can be mounted on round or square section pipes (e.g. rails) with the aid of the MR/SD 170 mounting kit (section 3.4.5).

- **Wall mounting:**
  The back module of a module stack or a single module is screwed permanently to a wall (section 3.4.6).

Attention
No contact base may be mounted on the back of the module (danger of short-circuit!) if the module is mounted on a wall, a sun shield, or a top hat rail.

3.4.4   Mounting on a mounting stand with the SSH/IQ sun shield

Materials required   ● SSH/IQ sun shield (see chapter 7 ACCESSORIES AND OPTIONS).

Tools   ● 4 mm set screw wrench

● Phillips screw driver.

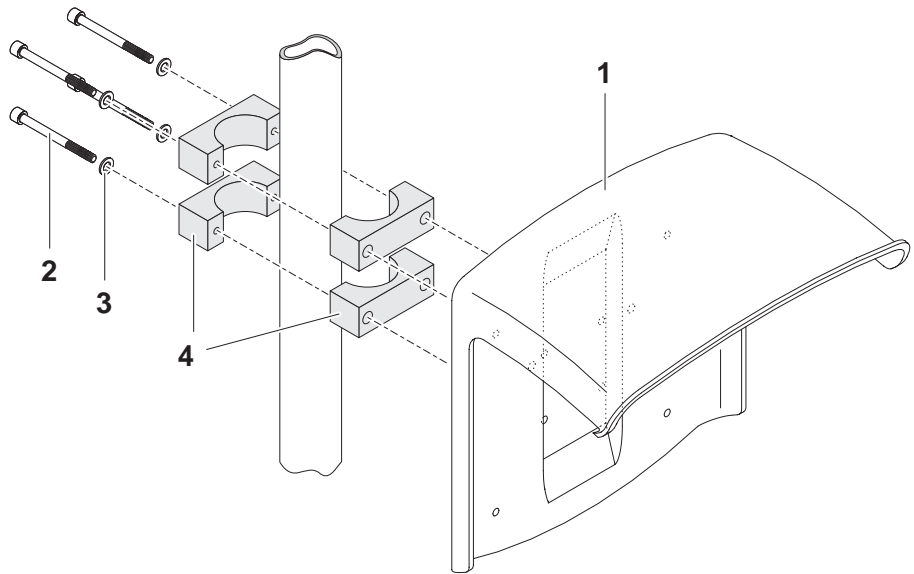**Mounting the sun shield on a mounting stand**

Fig. 3-8   Mounting the SSH/IQ sun shield on a mounting stand

1	Screw the sun shield (pos. 1 in Fig. 3-8) with the four hexsocket head screws (pos. 2), the washers (pos. 3) and the clamps (pos. 4) at the required height on the mounting stand from the back.

Premounting the ISO blind nuts

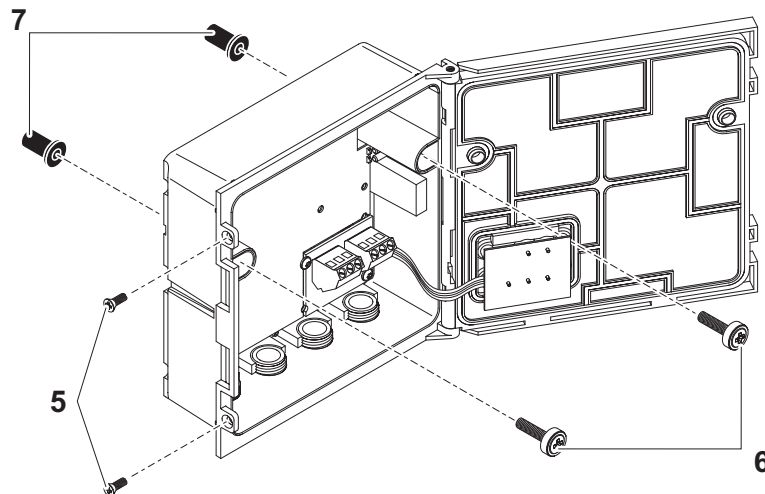*Fig. 3-9   Mounting the sun shield: Premounting the ISO blind nuts*

2	Remove the two screws (pos. 5 in Fig. 3-9) and swing open the module lid.
3	Insert the cheese-head screws (pos. 6 in Fig. 3-9) with the plastic washers in the drilled mounting holes and loosely screw in the ISO blind nuts (pos. 7).

Mounting the module under the sun shield

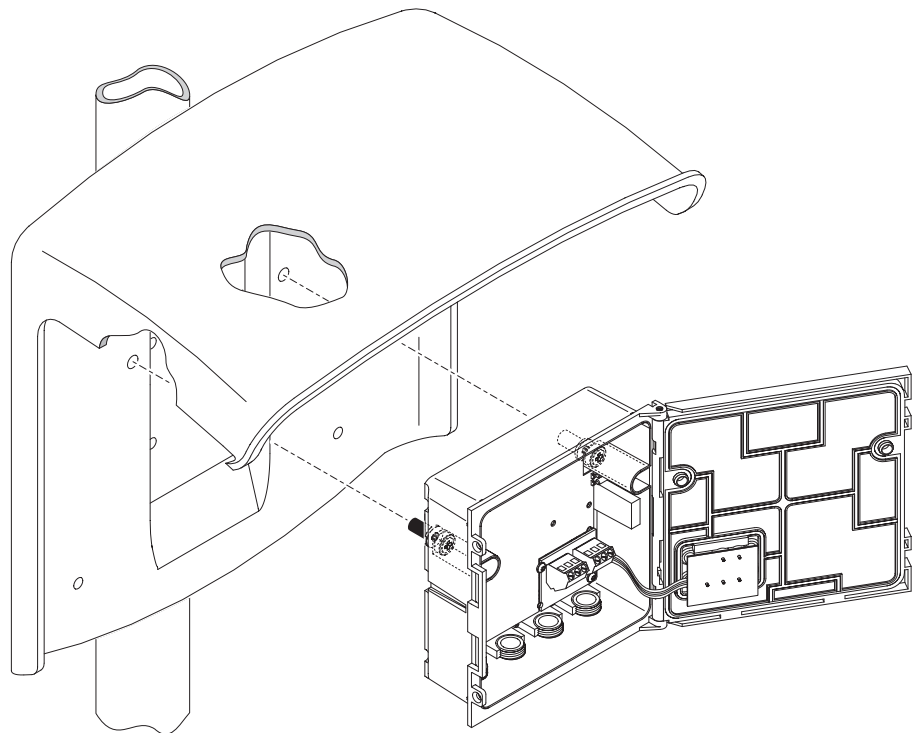*Fig. 3-10   Mounting the module on the SSH/IQ sun shield*

4	Position the module on the sun shield and fix it into place with the two screws (pos. 6 in Fig. 3-9).
5	Close the module lid and fix it in place with the two countersunk screws (pos. 5 in Fig. 3-9).

3.4.5   Mounting under the SD/K 170 sun shield

If a single module is to be installed outside, it must be provided with a sun shield that protects it against the effects of weather. The SD/K 170 sun shield can be mounted directly on a wall, on a mounting stand or on a railing. The MR/SD 170 mounting kit is also required for mounting on a mounting stand or railing.
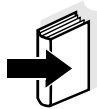
Note
How to mount the sun shield at the installation location is described in the instructions for the sun shield or mounting kit.

Materials required
- SD/K 170 sun shield (see chapter 7 ACCESSORIES AND OPTIONS)
- The MR/SD 170 mounting kit is also required for mounting the sun shield on a mounting stand or railing (see chapter 7 ACCESSORIES AND OPTIONS).

Tools
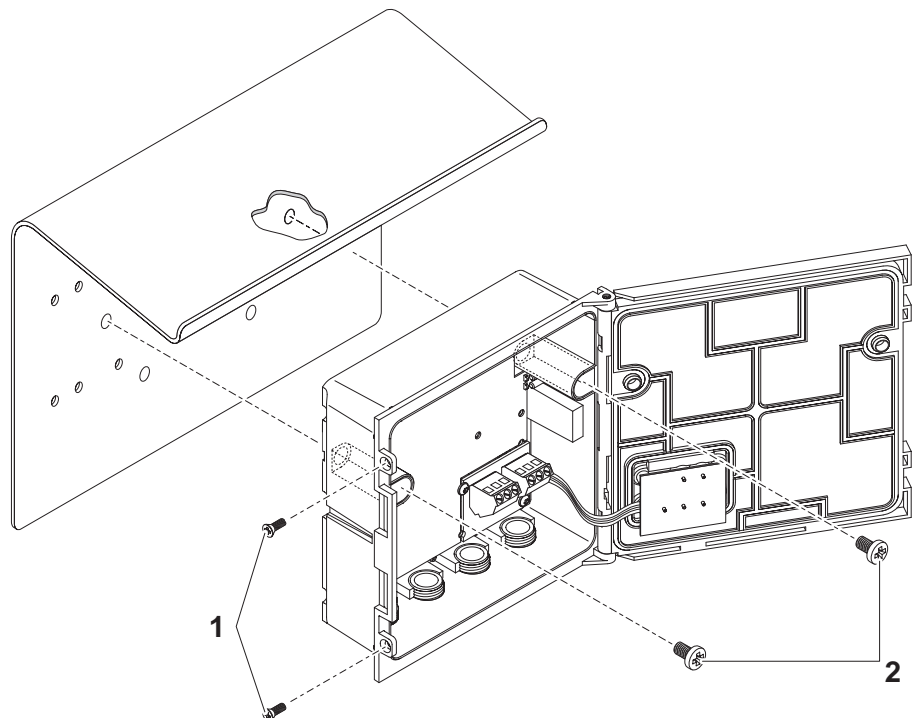- Phillips screw driver.

Mounting the module under the sun shield

Fig. 3-11   Mounting the module on the SD/K 170 sun shield

6	Remove the two screws (pos. 1 in Fig. 3-11) and swing open the module lid.

7	Position the module on the sun shield and fix it into place with the two screws (pos. 2 in Fig. 3-11).
8	Close the module lid and fix it in place with the two countersunk screws (pos. 1 in Fig. 3-11).

3.4.6   Wall mounting:

Materials required   ● WMS/IQ kit for wall mounting (see chapter 7 ACCESSORIES AND OPTIONS).

Note
Depending on the condition of the wall, dowels other than those contained in the kit may be required.

Tools   ● Drilling machine and drill bit, depending on the condition of the wall
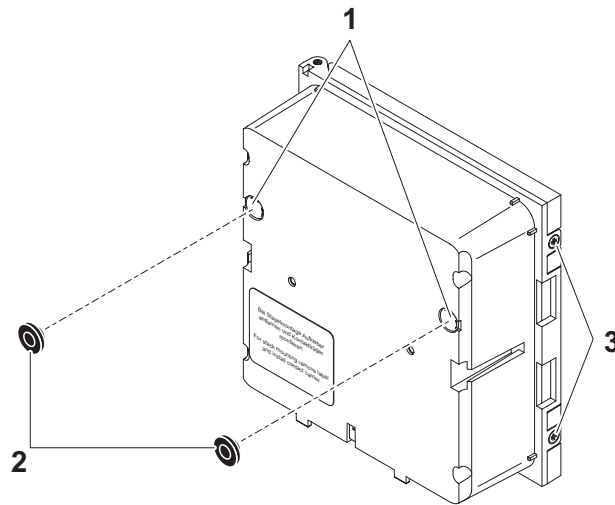
● Phillips screw driver.

Preparing the wall mounting

Fig. 3-12   Preparing the module for wall mounting

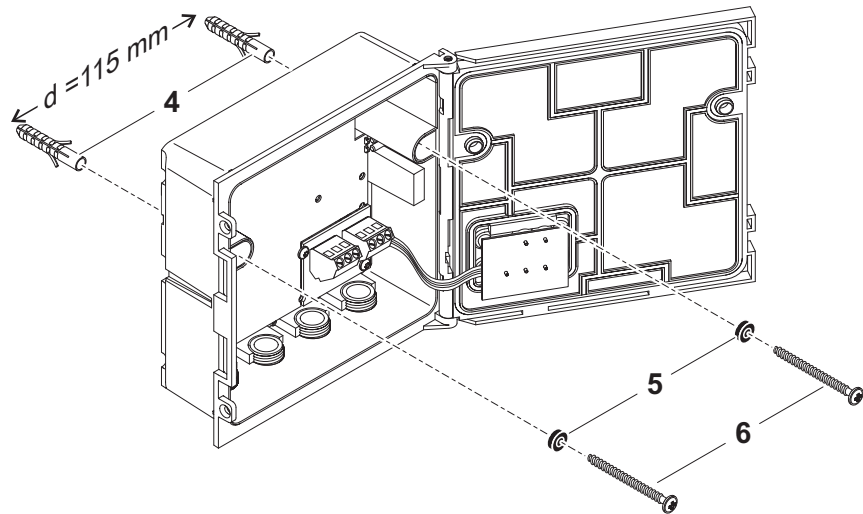| 1	Remove the covers from the drilled mounting holes (pos. 1 in Fig. 3-12).
2	Insert the distance washers (pos. 2) in the drilled mounting holes.
3	Remove the two screws (pos. 3) and swing open the module lid.

Fixing the module in place

Fig. 3-13   Wall mounting

4	Screw the module to the previously drilled wall with the aid of the dowels (pos. 4 in Fig. 3-13), the washers (pos. 5) and the screws (pos. 6).
5	Close the module lid and fix it in place with the two countersunk screws (pos. 2 in Fig. 3-12).

3.5   Connecting the valve control line

Warning

The valve circuit must not supply any unauthorized voltages or currents. The circuit must comply with all the standards of a *circuit with limitations* (*Limited Circuit* or *Limited Power*) as well as for *safety extra low voltage* (*SELV*) at all times. For more details, see chapter 6 TECHNICAL DATA.

General installation instructions

Observe the following instructions when attaching the connecting wires to the terminal strip:

● Shorten all the wires used to the length required for the installation.

● Basically, fit all stranded wire ends with wire end sleeves before connecting them to the terminal strip.

● Any wires that are not used and project into the housing must be cut off as closely as possible to the cable gland.

Materials required

● Wire end sleeves, suitable for the connecting wires, with suitable crimping tool

● 1 x cable gland with sealing ring (scope of delivery MIQ/CHV)

Tools
- Cable stripping knife
- Wire stripper
- Phillips screw driver
- Small screw driver

Warning
Danger of injury from lines that are under pressure. The compressed air glands in the housing may only be opened by a service technician authorized by WTW.

Attention
Danger of burning on a hot resistor. The resistor can heat up to 80 °C during operation. Do not touch the resistor.

Connecting control lines to the terminal strip

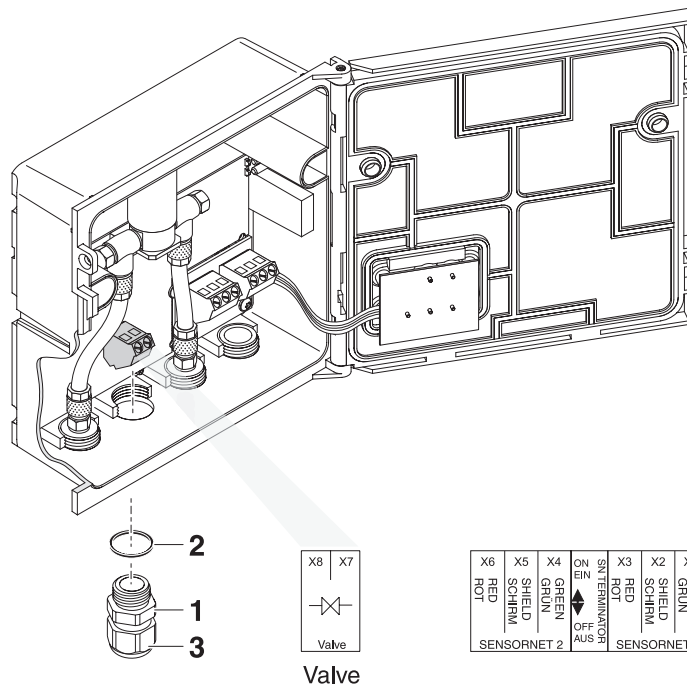| 1	Open the module.
2	Open the left dummy gland.

Fig. 3-14   Clamping termination for the valve control line

3	Screw the cable gland (pos. 1 in Fig. 3-14) with the sealing ring (pos. 2) into the module housing.
4	Loosen the coupling ring (pos. 3 in Fig. 3-14).

5	Feed the line through the cable gland in the module housing.
6	Connect the wires to the terminal strip.
7	Loosen the coupling ring (pos. 3 in Fig. 3-14).
8	Perform the function check according to section 3.6.
9	Close the module.

3.6   Function check

General instructions   After connecting the valve control line, check that the valve triggers correctly. This check is also suitable for the troubleshooting of malfunctions.

A yellow LED (Fig. 3-15) is located on the board for indicating the status of the valve. It lights up when the valve is open.
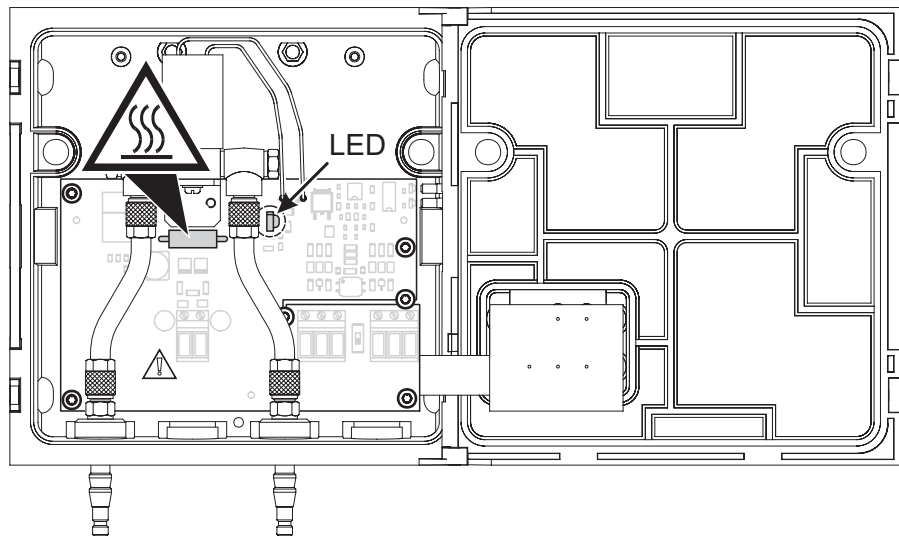

Fig. 3-15   Pilot LED on the board

To check that the valve triggers correctly, proceed as follows:

Warning
Danger of injury from lines that are under pressure. The compressed air glands in the housing may only be opened by a service technician authorized by WTW.

Attention
Danger of burning on a hot resistor. The resistor can heat up to 80 °C during operation. Do not touch the resistor.

1	MIQ/CHV + IQ SENSOR NET: Put the IQ SENSOR NET system into operation. MIQ/CHV + Measurement converter: Supply the power supply module with voltage and put the measurement converter into operation.
2	Open the MIQ/CHV module.
3	Adjust the cleaning intervals on the measuring system so that the relay switches.
4	Check whether the yellow LED on the board of the MIQ/CHV lights up when the relay is closed.

3.7   Connecting the compressed air hoses

General instructions

Pay attention to the following instructions when connecting the compressed air hoses (they can be connected either way round):

● Follow the specification of the compressed air according to chapter 6 TECHNICAL DATA.

● Only use hoses that match the compressed air connections.

● Secure all hose connections with hose clips.

Open the compressed air line

Pay attention to the following instructions if you want to open the compressed air line (e.g. during a modification):

Warning
Danger of injury from lines that are under pressure. Before opening the compressed air line, ensure that the section of line concerned is free of pressure. The compressed air glands in the housing may only be opened by a service technician authorized by WTW.

4 Maintenance and cleaning

4.1 Maintenance

The MIQ/CHV requires no special maintenance.

4.2 Cleaning

MIQ modules

Clean the worst of any dirt off modules that are mounted outside as required. To avoid any coarse dirt getting into the open housing, it is advisable to always roughly clean the module and the surrounding area before the module is opened.

To clean the module, wipe the housing surfaces with a damp, lint-free cloth. If compressed air is available on site, blow off the worst of the dirt beforehand. Keep the housing closed while doing so.

5 What to do if ...

5.1 Tips on clearing faults

No compressed air at the output

Cause	Remedy
– Compressed air supply interrupted or too weak	– Check the compressed air supply
– Supply voltage not present or too low	IQ SENSOR NET: – See the chapter, WHAT TO DO IF... in the system manual Other applications: – See section 5.2 CHECKING THE VOLTAGE SUPPLY
– Error in triggering	– Perform the function check according to section 3.6. – If the LED does not light up, check the triggering (detached terminal connection, broken control line, defective relay output) – Check whether the valve switches (switching noise) when the light of the LED changes. If the valve does not switch, contact WTW.

5.2 Checking the voltage supply

The MIQ/CHV has two LEDs on the side for monitoring the supply voltage (Fig. 5-1).
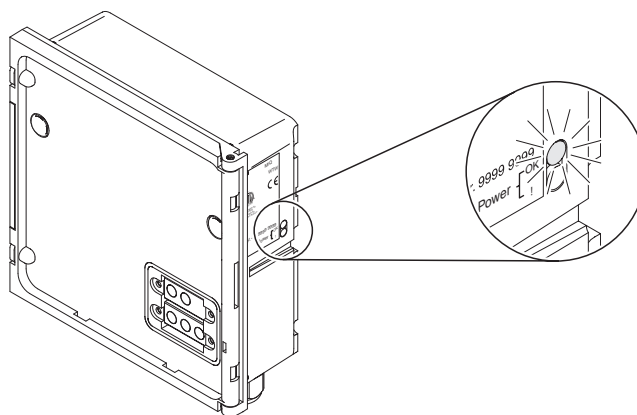

Fig. 5-1   Voltage LEDs on the MIQ/CHV

The LEDs show the following states:

– Yellow lights up   Operational voltage OK

– Red lights up   Operational voltage in warning range. It is possible that the valve may no longer open.

– No LED lights up   Operational voltage in the range of error. The valve no longer functions.

Diagnosing faults in the voltage supply

| Cause	Remedy
– Too many MIQ/CHV on one power supply module	– Install another power supply module and, if necessary, split the installation
– Cable too long for distributed mounting (voltage drop too large)	– Install another power supply module and, if necessary, split the installation
– Electrical connection between the power supply module and MIQ/CHV is defective (distributed mounting)	– Check the cable connection step-by-step starting with the power supply module, and replace any defective cable sections. – Check the contacts on the MIQ modules (stack mounting). Clean any dirty contacts. Carefully bend back contact springs that have been pressed flat or bent (pay attention to sufficient spring tension).

6   Technical data

Dimensions
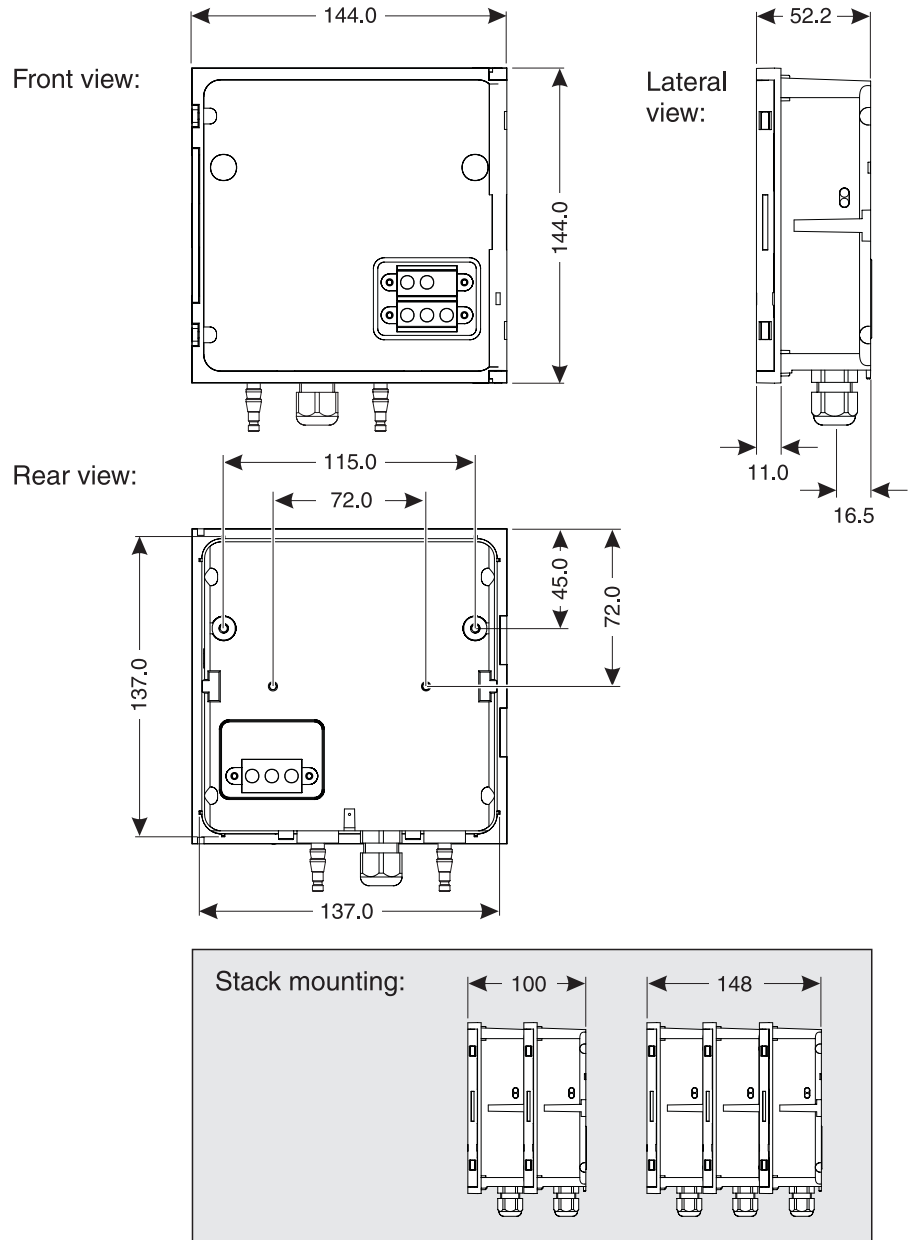
Fig. 6-1   Dimension drawing of the MIQ/CHV (dimensions in mm)

6 - 2

Mechanical construction	Maximum number of modules in a module stack	3 (plus a terminal component in the IQ SEN-SOR NET)
	Materials	– Housing: Polycarbonate with 20 % glass fiber – Pressure hose sleeves: POM
	Weight	Approx. 0.5 kg
	Type of protection	– IP 66 – In accordance with NEMA 4X MIQ modules are not suitable for conduit connection – NEMA 3S

Environmental conditions	**Temperature**	
	Operation	- 20 °C ... + 55 °C (- 20 °C ... + 40 °C for stack mounting on an MIQ/PS)
	Storage	- 25 °C ... + 65 °C
	Relative humidity	
	Yearly average	≤ 90 %
	Dew formation	Possible

Electrical data	Nominal voltage	Max. 24 VDC via a separate power supply module. IQ Sᴇɴsᴏʀ Nᴇᴛ: For details, see chapter Tᴇᴄʜɴɪᴄᴀʟ ᴅᴀᴛᴀ of the IQ Sᴇɴsᴏʀ Nᴇᴛ system operating manual Suitable power supply modules: – MIQ/PS – MIQ/24V
	Power consumption	Approx. 2 W
	Protective class	III
	Number of MIQ/CHV per power supply module	IQ Sᴇɴsᴏʀ Nᴇᴛ: Depending on the power conditions in the whole system (see system manual). Other applications: Maximum of 8 (restrictions possible in long cables due to the voltage drop).

Instrument safety	Applicable norms	– EN 61010-1

EMC product and system characteristics	EN 61326	EMC requirements for electrical resources for control technology and laboratory use – Interference immunity according to EN 61326/A1 table A.1 – Resources for industrial areas, intended for indispensable operation – Interference emission limits for resources of class B
	System lightning protection	Noticeably extended qualitative and quantitative protective characteristics as opposed to EN 61326/A1 table A.1 and NAMUR NE 21
	EN 61000-3-2/A 14	
	EN 61000-3-3	
	FCC, class A	
	NAMUR NE 21	

Terminal connections

IQ SENSOR NET connections	2 Additional connectable SENSORNET terminator (terminating resistor) Note Due to the limited number of cable glands, only one SENSORNET connection can be used. SENSORNET connection 1 or 2 can be selected.
Valve switching contact	1
Terminal type	Screw-type terminal strip, accessible by raising the lid
Terminal ranges	Solid wires:0.2 ... 4.0 mm^2 AWG 24 ... 12 Flexible wires:0.2 ... 2.5 mm^2
Cable feeds	Cable glands M16 x 1.5 on the underside of the module

Valve circuit

Switching voltage	Approx. 12 V
Max. switching current	Approx. 70 mA

Warning
The valve circuit must not supply any unauthorized voltages or currents. The circuit must comply with all the standards of a *circuit with limitations* (*Limited Circuit* or *Limited Power*) as well as for *safety extra low voltage* (*SELV*) at all times. These include the following limiting value specifications:

● AC voltage: max. 30 V effective / 42.4 V peak

● DC voltage: max. 60 V

● Current limit: max. 8 A

● Power output limitation: max. 150 VA

Compressed air

Required air quality	Dry, dust-free and oil-free
Operating pressure	Max. 7x10^5 Pa (7 bar) absolute
Connections	6 mm hose liners

7   Accessories and options

Description	Model	Order no.
Cleaning head for online sensors with 40 mm diameter	CH	900 107
Hose set, consisting of: – 15 m compressed air hose – 1 Quick-acting connection, complete – 2 Hose clamps – 1 Teflon tape	CH/Epack	900 111
Long-range power supply for 100-240 VAC nominal input voltage	MIQ/PS	480 004
Long-range power supply for 24 V AC/DC nominal input voltage	MIQ/24V	480 006
Combined output module with 3 current outputs and 3 relay outputs each	MIQ/CR3	480 014
IQ SENSOR NET cable - please specify required length in m when ordering	SNCIQ SNCIQ/UG	480 046 480 047
Sun shield for a unit of up to three stacked MIQ modules	SSH/IQ	109 295
Sun shield for a unit of up to two stacked MIQ modules	SD/K 170	109 284
Mounting kit for fixing the SD/K 170 sun shield on horizontal or vertical pipes	MR/SD 170	109 286
Kit for wall mounting of a MIQ module	WMS/IQ	480 052
Kit for panel mounting of MIQ modules; Panel aperture 138 x 138 mm in accordance with DIN 43700 or IEC 473	PMS/IQ	480 048
Kit for mounting of MIQ modules on a 35 mm top hat rail in accordance with EN 50022	THS/IQ	480 050