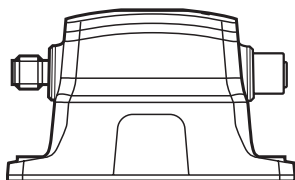




Device manual
Valve sensor
MVQ201

GB

80287622/02 08/2021



1 Preliminary note

Technical data, approvals, accessories and further information at www.ifm.com.

1.1 Symbols used

► Instruction

> Reaction, result

[...] Designation of keys, buttons or indications

→ Cross-reference



Important note

Non-compliance may result in malfunction or Non-compliance may result in malfunction or interference.



Information

Supplementary note

2 Safety instructions

- The device described is a subcomponent for integration into a system.
 - The manufacturer is responsible for the safety of the system.
 - The system manufacturer undertakes to perform a risk assessment and to create a documentation in accordance with legal and normative requirements to be provided to the operator and user of the system. This documentation must contain all necessary information and safety instructions for the operator, the user and, if applicable, for any service personnel authorised by the manufacturer of the system.
- Read this document before setting up the product and keep it during the entire service life.
- The product must be suitable for the corresponding applications and environmental conditions without any restrictions.
- Only use the product for its intended purpose (→ Functions and features).
- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property may occur.
- The manufacturer assumes no liability or warranty for any consequences caused by tampering with the product or incorrect use by the operator.
- Installation, electrical connection, set-up, operation and maintenance of the product must be carried out by qualified personnel authorised by the machine operator.

- The device transmits data to one or several actuators. They start and execute processes and actions. Incorrect operation may cause damage to machines, material or persons.
- Protect units and cables against damage.

3 Functions and features

With this unit angular movements and positions of the valve between 0° ... 179.9° and -180° ... 0° can be determined. The unit generates output signals according to the operating mode and the parameter setting.

Connect the device to a master with IO-Link port class A.

4 Installation

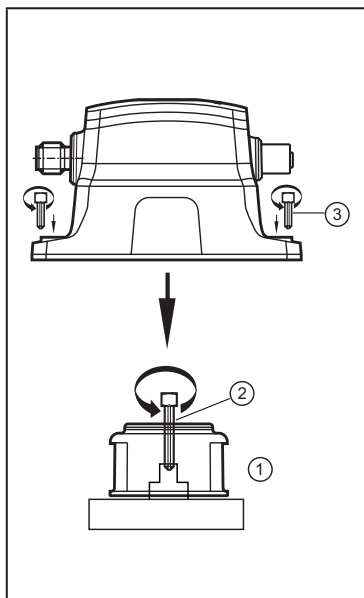


- ▶ Disconnect power before installation.
- ▶ Ensure that the machine stands still.
- ▶ Do not start the drive during installation.
- ▶ Keep potential interfering sources (magnets, heat sources etc.) at a distance.



This product complies with the standard EN 61000-6-4. This product may cause radio interference in domestic areas.

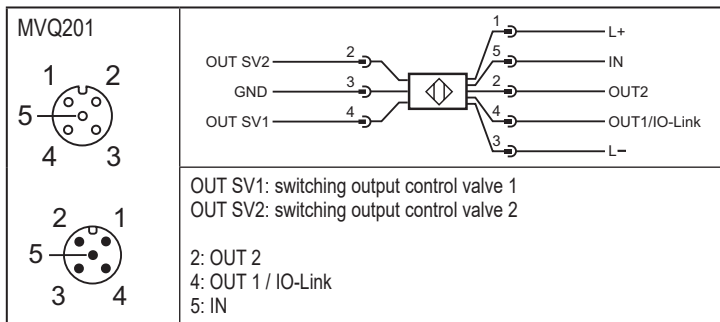
- ▶ If required, take appropriate EMC screening measures.



- ▶ Use the two notches (1) at the bottom of the target puck as a mounting aid for a precise positioning on the shaft.
- ▶ Align the target puck. The yellow indicator can be rotated to show the desired open position.
- ▶ Fix the target puck to the valve head using the supplied screw (2), tightening torque 2 Nm.
- ▶ Put the unit over the target puck.
- ▶ Use an optional mounting plate, depending on the mechanical interface.
- ▶ Fix the unit to the actuator housing using the supplied screws (3).
 - Tightening torque when using a plastic mounting plate: 1.5 Nm.
 - Tightening torque without mounting plate: 3 Nm.

5 Electrical connection

► Disconnect the installation from power and connect the unit.



The output to the control valve can be switched via IO-Link or a digital input.



► Only connect the device to a master port class A.

5.1 Switching functions

Pin	Connection
OUT1 (pin 4)	Communication IO-Link Switching output valve position open in SIO mode
OUT 2 (pin 2)	Switching output valve position closed
IN1 (Pin5)	Triggering the control valve output with a binary switching signal. The input is switched off if there is a valid IO-Link signal.



If the outputs do not respond to signals from the controller:

► Check IO-Link communication.

5.1.1 Watchdog

If the device does not receive any valid process data from the master via IO-Link for longer than 1.5 s, the control valve outputs are switched according to the digital input.

5.1.2 Output configuration of the control valves in SIO mode

The behaviour of the control valve outputs on the input signal (IN) can be changed via IO-Link as indicated in the table.

Monostable		
IN1	Control valve 1	Control valve 2
0	0	0
1	1	0
Bistable		
IN1	Control valve 1	Control valve 2
0	0	1
1	1	0

5.2 Teach function

Auto teach function

Activation of the automatic teach mode. The device automatically triggers the control valve outputs by approaching both end positions 3x.

> Memorisation if both end positions have been recognised.

PLC teach function

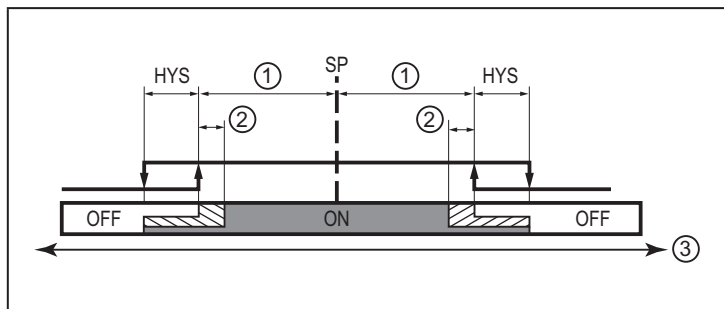
Activation of a passive teach mode. The device waits for the commands from the controller.

> Memorisation if both end positions have been recognised.



The end position is detected if the angle position does not change after a movement of more than 0.2 s.

6 Function diagram



1: Tolerance range

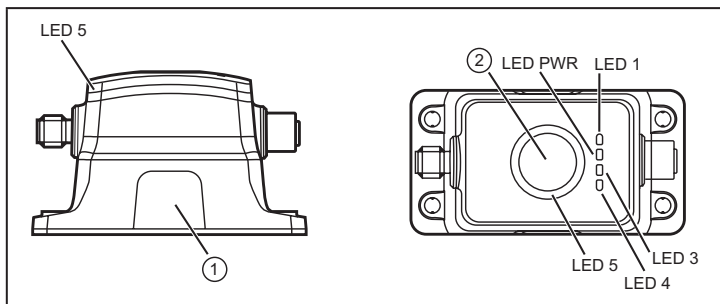
2: Seal warning range within the tolerance range (only SSC2 closed)

3: Angle of the valve

SP = set point

HYS = hysteresis

7 Operating and display elements



- 1: window for optical position indication (OPEN)
2: inductive teach button

LED		Function
1	white is on	switching status OUT1 – valve position open
2	PWR green is on	voltage applied to the unit
3	---	not used
4	white is on	switching status OUT2 - valve position closed
5	ring	yellow on - switching status OUT1 blue on - switching status OUT2 (colours programmable, yellow and blue preset at the factory) red flashes - fault in the unit • no pulse pick-up available • teach error - switch points SSC1 and SSC2 overlap • end position not reached after set time has elapsed • unit faulty
5	ring	green flashes - identification mode active via IO-Link (deactivates itself automatically after 30 s or if inductive teach button is activated)



The LED colours in the table are the default colours and can be customised.

8 Function

8.1 IO-Link

This unit has an IO-Link communication interface which enables direct access to process and diagnostic data. In addition it is possible to set the parameters of the unit while it is in operation. Operation of the unit via the IO-Link interface requires an IO-Link master.

With a PC, suitable IO-Link software and an IO-Link adapter cable, communication is possible while the system is not in operation.

The IODDs necessary for the configuration of the unit, detailed information about process data structure, diagnostic information, parameter addresses and the necessary information about the required IO-Link hardware and software can be found at www.ifm.com.

The IO-Link interface provides the following (additional) functions using suitable hardware and software:

- Remote parameter setting of the unit
- Noise-immune signal transmission without measured value losses
- Transmission of the parameter settings to a replaced sensor or to other sensors of the same type.
- Simultaneous reading of all process values and the binary switching signals
- Comprehensive display of error and event messages
- Management of device tags
- Evaluation of the process values and diagnostic data via IO-Link master.
- Paperless logging of parameter sets, process values and diagnostic information
- Setting the outputs of the control valve directly via IO-Link.

9 Parameter setting

The parameters of the unit can be set both via the inductive teach button and via IO-Link. To be able to use all the functions of the unit, an IO-Link communication is required.

Parameters can be set before installation and set-up of the unit or during operation via the IO-Link interface.



If parameters are changed during operation, this will influence the function of the plant.

- Ensure that there will be no malfunctions in your plant.

During parameter setting the unit remains in the operating mode. It continues to monitor with the existing parameter until the parameter setting has been completed.



The device transmits data to one or several actuators. They start and execute processes and actions. Incorrect operation may cause damage to machines, material or persons.

- Ensure that the entered values are correct.

- Connect the unit to a parameter setting software via suitable hardware.

9.1 Parameters



The following IO-Link parameters merely provide an overview. A complete list can be found in the IODD of the unit.

Parameter	Description	Setting range
TI Select	Teach selection	SSC1 / SSC2 / SSC3 default = SSC1
ou2	Switch point 1	-180.0°...179.9° Steps 0.1°
SSC Param SP1	Switch point 1	-180.0°...179.9° Steps 0.1°
SSC Config Logic	Switch point logic	0 High active (NO) 1 Low active (NC)
SSC Config Hyst	Switch point hysteresis	0.1°...5°
SSC Tol	Tolerance of the switching channel 1	0.1°...15.0°
Pin 5 /gr assignment	Functional assignment for pin 5 / grey	In / OFF

Advanced Teach configuration	Selection of the automatic parameter setting mode	Off / Auto / PLC
Advanced Teach	Starts the set advanced teach	
Advanced Teach cancel	Cancels the advanced teach	
ModE	Operating mode Setting of the switching thresholds for the digital input (after input voltage)	24 V input 12 V input
Power cycles	Number of switch-on operations since delivery	0...2147483647
Operating hours	Operating hours counter since delivery	0...2147483647
Valve offset	Installation offset of the valve	-180.0°...179.9° Steps 0.1°
SSC1 and SSC2 Swap switch points	Swap switch point	
Leak warning range	Setting of the leak warning range	0.0...15°

9.2 Manual parameter setting

9.2.1 Switch points

The unit has three switch points (SSCs). Two of them can be set via the inductive teach button, the third switch point can be configured via IO-Link. Tolerance and hysteresis can be set separately for each switch point, with an additional seal monitoring for SSC2.

9.2.2 Parameter setting via inductive teach button

The sensor is adjusted using a metal object, e.g. a screwdriver.

Teaching switch point 1 (SSC1) - valve open

- ▶ Activate teach button until the LED ring flashes yellow. Remove metal tool.
- > LED ring yellow on, switch point is set.

Teaching switch point 2 (SSC2) - valve closed

- ▶ Change valve position manually.
- ▶ Activate teach button until the LED ring flashes blue. Remove metal tool.
- > LED ring blue on, switch point is set.

Swapping switch points SSC1 and SSC2

- ▶ Activate teach button until the LED ring flashes yellow / blue. Remove metal tool.
- > LED ring yellow or blue on, switch point has been swapped.

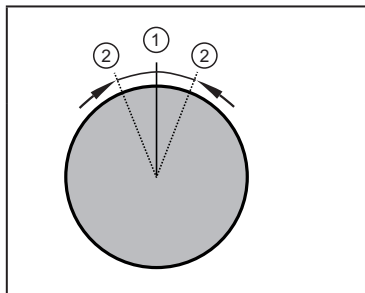
Lock unit

- ▶ Activate teach button (approx. 20 s) until the LED ring briefly flashes once.
- > Unit is locked, no parameter setting possible.

Unlock unit

- ▶ Activate teach button (approx. 20 s) until the LED ring briefly flashes once.

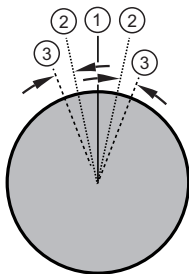
10 Settings



Settings tolerance

Set a tolerance range between 0.1° and 15° around the taught/set switch point.

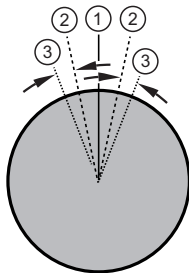
- 1: Teach point
- 2: Tolerance width



Setting hysteresis

The hysteresis is around the tolerance range, can be set between 0.1° and 5° .

- 1: Teach point
- 2: Tolerance width
- 3: Hysteresis



Setting leak warning range

In the closed position SSC2, the unit features leak monitoring in the range from 0.0° to 15° . Deposits or wear can be detected. This leak warning range lies within the tolerance range and is activated and defined by selecting a value (>0) which is deduced from the tolerance range limits.

- 1: Teach point
- 2: Leak warning range
- 3: Tolerance width

10.1 Timeout

Timeout indicates the maximum duration for closing or opening before the sensor signals a blockage.

Adjustable time: Between 0...30 s, factory settings 0 s / OFF).



In parallel, the parameters for the maximum closing and opening duration must be adjusted manually (timeout $\geq$ maximum closing / opening duration).

10.2 Colours

For each switching output (SSC) different display colours of the LED ring can be set individually.

You can choose among the following colours:

blue, green, cyan, red, magenta, yellow and white.

The colour feedback can be deactivated.

10.3 Opening / closing duration

The minimum/maximum closing/opening duration of the drive can be freely set and monitored. The sensor provides a warning via IO-Link if the actual value is above or below the limit value.

Adjustable time: Between 0...30 s

(factory setting: minimum opening/closing duration: 0 s; maximum opening/closing duration: 30 s).

During the auto teach, the opening and closing duration can alternatively be set via a relative tolerance window.

(Tolerance: time monitoring in % of the measured opening and closing duration during the auto teach).

11 Disposal

After use dispose of the unit in an environmentally friendly way in accordance with the applicable national regulations.