

Oil Moisture Sensor BCM

Water or moisture is just as much an undesired parameter in hydraulic and lubrication systems as particles and air, and can cause significant system damage.

The Bühler Condition Monitoring Water Sensor (BCM-W) was designed specifically to continuously monitor the water content of oil whilst also measuring the temperature. The capacitive operating principle ensures reliable information on the saturation level of the respective oil regardless of the water absorption capacity.

The BCM-W product line has a variety of functions. Starting with a pure sensor with switching- and 4-20 mA output all the way to digital communication in form of IO link, it covers all parameters. The version with display allows the display to be mounted directly to the sensor or externally.

Special features

Requires no calibration depending on the respective oil

Up to 50 psi pressure resistance

Continuously logs the relative humidity

Continuously logs the temperature

Reliable measuring system

Display version

IO-Link output

Relative humidity as well as temperature analogue outputs, parametrisable 4-20 mA, 0-5 V, 0-10 V, 2-10 V

Up to 4 PNP switching outputs

Direct or external display mounting

Sensor type

IO-Link output

Output signal 4-20 mA relative humidity and temperature

Fixed relative humidity switching output setting

G3/4" connection thread

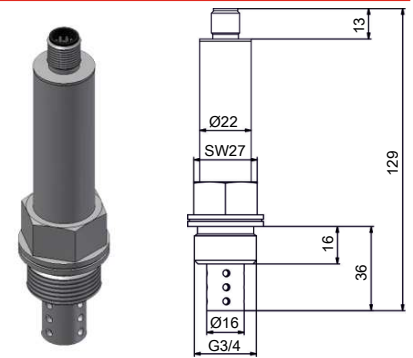


General technical data

| | |
|------------------------------|----------------------------------------------------------------|
| Max. operating pressure | 50 bar |
| Medium | -20 °C to + 80 °C |
| Threaded connection | G3/4" pipe thread, EOlastic seal |
| max. torque | 20 Nm |
| Sensor length from seal face | 36 mm |
| max. flow rate | 60 L/min |
| max. flow rate at sensor | 5 m/s |
| Chemical resistance | Mineral oil based liquids, synthetic esters and biopetroleumms |

Technical Data BCM-WS
Sensor type BCM-WS

| | |
|--------------------------|------------------------------------|
| Ambient temperature | -20 °C to + 70 °C |
| Supply voltage (U_b) | 18 - 30 V (nominal voltage 24 VDC) |


Material/Version

| | |
|--------------------------------|------------------------------------|
| Housing | Stainless steel/aluminium |
| Material in contact with media | 1.4301, 1.4571, 2.4478, FR4, glass |
| Weight | approx. 205 g |
| IP rating | IP67* |

*with plug-in connector screwed on

IO-Link

| | |
|------------------|---------------|
| IO-Link | Revision 1.1 |
| Baudrate | COM2 (38.4 k) |
| SIO Mode | Yes |
| min. time period | 20 ms |

Moisture measurement

| | |
|-----------------|-----------------------------------------|
| Measuring range | 0 - 100 % rel. humidity |
| Accuracy | ± 3 % FS |
| Analog output | 4 – 20 mA (0 – 100 % relative humidity) |
| Tolerance | ± 0.5 % FS |
| Load Ω | = ($U_b - 8 V$) / 0.02 A |

Switching output for humidity

| | |
|------------------------------------|---------------------------------|
| PNP switching output ¹⁾ | Fixed to 80 % relative humidity |
| Switching current | max. 0.2 A |

¹⁾ others on request

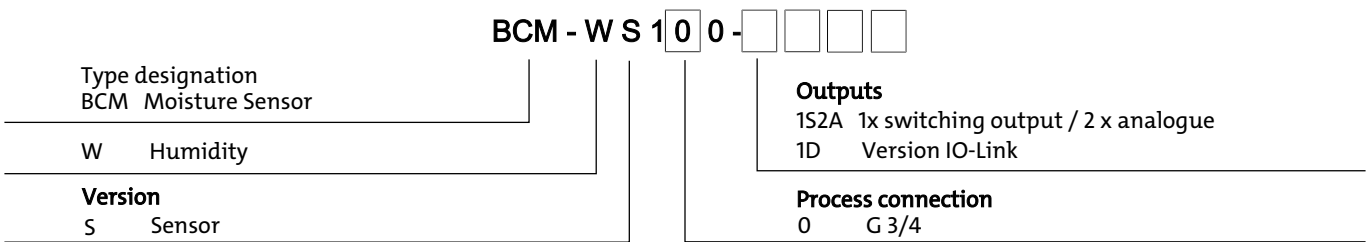
Temperature measurement

| | |
|-----------------|----------------------------------|
| Measuring range | -20 °C to +120 °C |
| Accuracy | ± 1.5 % FS |
| Analog output | 4 – 20 mA (-20 to +120 °C) |
| Tolerance | ± 0.5 % FS |
| Load Ω | = (U _B – 8V) / 0.02 A |

Outputs BCM-WS

| Version | 1S2A | 1D |
|-----------------------------|-----------------|-----------------|
| Plug (base) | 1 x M12 – 8-pin | 1 x M12 – 4-pin |
| Switching output (fixed) | X | |
| IO-Link | | X |
| Humidity analogue output | X | |
| Temperature analogue output | X | |

Model key BCM-WS


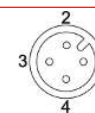


Ordering example:

You require: Moisture sensor, 1 switching output fixed and analogue output for humidity and temperature

Order: BCM-WS-100-1S2A

Pin assignment BCM-WS

| | WS-1S2A | WS-1D |
|-----------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| |  |  |
| Panel plug/jack | 8-pin | 4-pin |
| | Standard | IO Link |
| Pin | | |
| 1 | L+ | L+ |
| 2 | L- | |
| 3 | S1 humidity | L- |
| 4 | | C/Q |
| 5 | | |
| 6 | I1 humidity | |
| 7 | I2 temp. | |
| 8 | | |

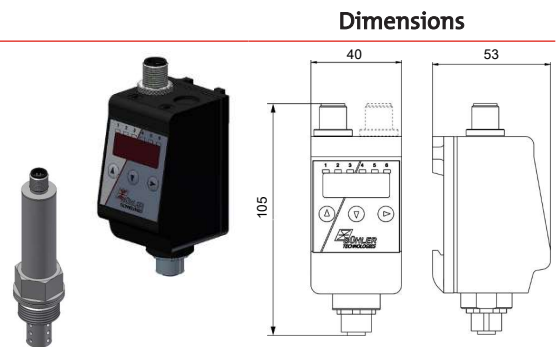
Technical Data BCM-WR/BCM-WD

Sensor with Display and Control Unit

Analysis and Display Electronics

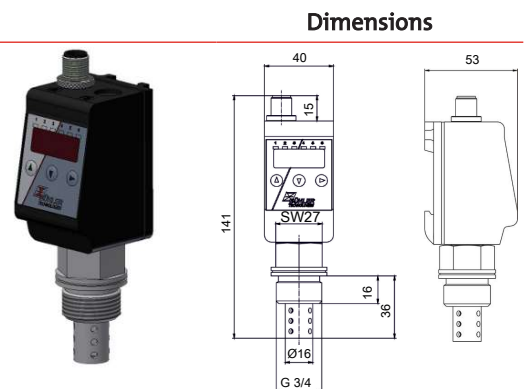
| | |
|----------------------------------|--------------------------------------------------------|
| Display | 4 character 7 segment LED |
| Display unit | 0 – 100 % relative humidity |
| Operation | via 3 keys |
| Memory | Min./Max. data memory |
| Starting current input | approx. 100 mA for 100 ms |
| Current input during operation | approx. 50 mA (without current- and switching outputs) |
| Supply voltage (U _b) | 18 – 30 VDC (nominal voltage 24 VDC) |
| Ambient temperature | -20 °C to +70°C |
| Display resolution | 0.5 %, 0.5 °C, °F |

| Version | BCM-WR remote display with sensor |
|-----------------|-----------------------------------|
| Mounting | 35 mm top hat rail mounting/ G3/4 |
| Weight | approx. 335 g incl. sensor |
| Display housing | PA |
| IP rating | IP65* (display)/IP67* (sensor) |



* with plug-in connector screwed on

| Version | BCM-WD with attached sensor |
|-----------------|-----------------------------|
| Mounting | G3/4 |
| Weight | approx. 270 g |
| Display housing | PA |
| IP rating | IP65* (display) |



*with plug-in connector screwed on

IO-Link

| | |
|------------------|----------------|
| IO-Link | Revision 1.1 |
| Baudrate | COM3 (230.4 k) |
| SIO Mode | Yes |
| min. time period | 10 ms |

Moisture measurement

| | |
|-------------------------|-------------------------------------------------------------------------------------|
| Measuring range | 0 - 100 % rel. humidity |
| Accuracy | ± 3 % FS |
| Analog output | Parametrisable current or voltage output (4 - 20 mA, 2 - 10 V, 0 - 10 V or 0 - 5 V) |
| Tolerance | ± 0.5 % FS |
| Load Ω (current output) | = (U _b – 8 V) / 0.02 A |

Switching outputs

| | |
|----------------------|--------------------------------------------------------|
| PNP switching output | Parametrisable switching function and switching output |
| Switching current | max. 0.2 A per output |

Temperature measurement

| | |
|-------------------------|-------------------------------------------------------------------------------------|
| Measuring range | -20 °C to +120 °C |
| Accuracy | ± 1.5 % FS |
| Analog output | Parametrisable current or voltage output (4 - 20 mA, 2 - 10 V, 0 - 10 V or 0 - 5 V) |
| Tolerance | ± 0.5 % FS |
| Load Ω (current output) | = (U _B - 8 V) / 0.02 A |

Outputs BCM-WD/BCM-WR

| Version | 2S2A | 1D1S | 4S2A |
|---------------------------------|-----------------|-----------------|-----------------|
| Plug (base) | 1 x M12 – 8-pin | 1 x M12 – 4-pin | 1 x M12 – 4-pin |
| Display & remote | | | 1 x M12 – 8-pin |
| Sensor connection jack (bottom) | 1 x M12 – 8-pin | 1 x M12 – 8-pin | 1 x M12 – 8-pin |
| Remote | | | |
| Switching outputs | 2 x | 1 x | 4 x |
| IO-Link | | X | |
| Humidity analog output | X | | X |
| Temperature analog output | X | | X |

Model key BCM-WD/BCM-WR

BCM - W 1 0 0 -

| | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Type designation BCM Moisture Sensor</p> <hr/> <p>W Humidity</p> <hr/> <p>Version</p> <p>D Display with built-in sensor R Remote display with external sensor</p> | <p>Outputs</p> <p>2S2A 2 x switching output / 2 x analogue 1D1S 1 x switching output / IO-Link 4S2A 4x switching output / 2 x analogue</p> <hr/> <p>Process connection</p> <p>0 G 3/4</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Ordering example:

You require: Moisture sensor with built-in sensor, 2 PNP switching outputs and analogue output for humidity and temperature
 Order: BCM-W-D-100-2S2A

Pin assignment BCM-WR/WD

| | Plug A | | | Plug B | Sensor connection jack |
|-----------------|-------------|------------|------------|-------------|------------------------|
| | WD/WR-2S2A | WD/WR-1D1S | WD/WR-4S2A | WD/WR-4S2A | WR |
| | | | | | |
| Panel plug/jack | 8-pin | 4-pin | 4-pin | 8-pin | 8-pin |
| | Standard | IO-Link | IO-Link | | IO-Link |
| Pin | | | | | |
| 1 | L+ | L+ | L+ | | L+ |
| 2 | L- | DO/S2 | S2 | | L- |
| 3 | S1 Humidity | L- | L- | S3 | |
| 4 | | C/Q | S1 | | |
| 5 | S2-Temp. | | | S4 | |
| 6 | I1 humidity | | | I1 humidity | I1 humidity |
| 7 | I2 temp. | | | I2 temp. | I2 temp. |
| 8 | | | | | |

Accessories

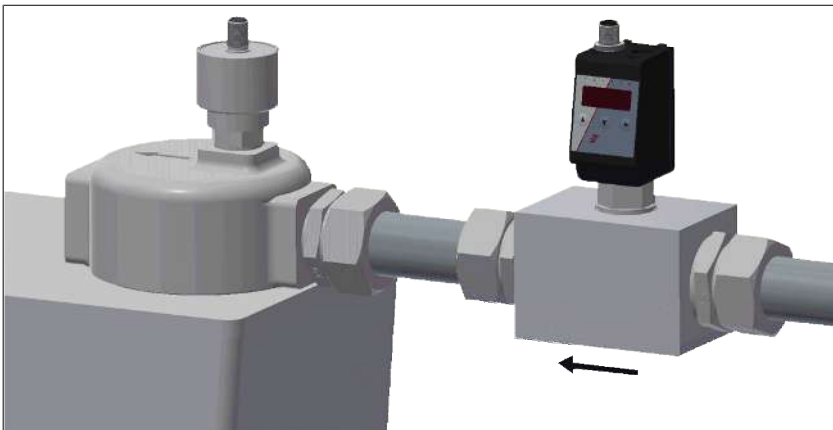
| Item no. | Description |
|----------------|------------------------------|
| 91 44 05 00 49 | Coupler cable, 3 m |
| 91 44 05 00 47 | Connecting cable, 4-pin, 5 m |
| 91 44 05 00 33 | Connecting cable, 8-pin, 5 m |
| 15 10 01 00 | Assembly block/T-piece |

Installation recommendation

Proper moisture sensor function requires the entire sensor element to be inside the medium at all times. The sensor version is suitable for installation at the side of the tank. Here the installation position should be below the minimum liquid level. When installing into a return pipe, be sure not to exceed the maximum flow rate.

With the BCM-WR version the remote display mounts to a top hat rail.

Installation example:



Assembly block dimensions:

