

# 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 bar 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, parametrizable 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

Output signal 4-20 mA relative humidity and temperature

Fixed relative humidity switching output setting

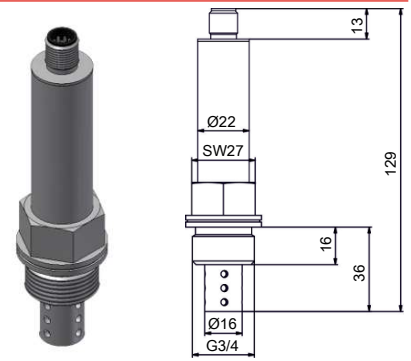
G3/4" connection thread



**Technical Data BCM-WS**

**Sensor type BCM-WS**

Operating pressure max.	50 bar
Medium	-20 °C to +100 °C
Ambient temperature	-20 °C to +70 °C
Threaded connection	G 3/4" pipe thread, EOlastic seal
Max. torque	177 lbf*in
Sensor length from seal face	36 mm
Max. flow rate	60 l/min
Max. flow rate at sensor	3.3 ft/s



**Material / version**

Housing	Stainless steel
Material in contact with media	1.4301, 1.4571, 2.4478, FR4, glass
Weight	approx. 205 g
Protection class*	IP67

\*with plug-in connector screwed on

**Moisture measurement**

Measuring range	0-100 % rel. humidity
Accuracy	± 3 % FS
Analogue output	4 – 20 mA
Tolerance	± 0.5 % FS
Load Ω	= (U <sub>b</sub> – 8 V) / 0.02 A

**Switching output for humidity**

PNP switching output <sup>1)</sup>	Fixed to 80 % relative humidity
Switching current	max. 0.2 A

<sup>1)</sup> others upon request

**Temperature measurement**

Measuring range	-20 °C to +120 °C
Accuracy	± 1.5 % FS
Analogue output	4 – 20 mA
Tolerance	± 0.5 % FS
Load Ω	= (U <sub>b</sub> – 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**

BCM - W S 1 0 0 - [ ] [ ] [ ] [ ]

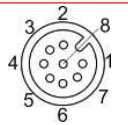
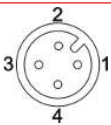
Type designation	BCM Moisture Sensor
W	Humidity
<b>Version</b>	
S	Sensor

<b>Outputs</b>	1S2A 1x switching output / 2 x analogue
1D	Version IO-Link
<b>Process connection</b>	
0	G 3/4

**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
<b>Pin</b>		
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 ( $U_b$ )	10 – 30 V DC (nominal voltage 24 V DC)
Ambient temperature	-20 °C to +70°C (-4 °F to 176 °F)
Display resolution	0.5 %

Version	BCM-WR remote display with sensor	BCM-WD with attached sensor
Mount	35 mm top-hat rail mounting	G3/4
Weight	approx. 335 g	approx. 270 g
Protection class	IP67* (sensor) / IP65 (display)	IP65 (display)

\* with plug-in connector screwed on

**Moisture measurement**

Measuring range	0-100 % rel. humidity
Accuracy	± 3 % FS
Analogue output	Parametrisable current or voltage output (4-20 mA, 2-10 V, 0-10 V or 0-5 V)
Tolerance	± 0.5 % FS
Load $\Omega$ (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
Analogue output	Parametrisable current or voltage output (4-20 mA, 2-10 V, 0-10 V or 0-5 V)
Tolerance	± 0.5 % FS
Load $\Omega$ (current output)	= $(U_b - 8 V) / 0.02 A$



Outputs BCM-WD / BCM-WR

Version	2S2A	1D1S	1D1S2A	1D3S2A
Plug (base)				
Display output & remote	1 x M12 – 8-pin	1 x M12 – 4-pin	2 x M12 - 4-pin	1 x M12 – 8-pin 1 x M12 – 4-pin
Sensor connection jack	1 x M12 – 8-pin	1 x M12 – 8-pin	1 x M12 – 8-pin	1 x M12 – 8-pin
Remote inlet				
Switching outputs	2 x	1 x	1 x	3 x
IO-Link		X	X	X
Humidity analogue output	X		X	X
Temperature analogue output	X		X	X

Model key BCM-WD / BCM-WR

BCM - W    -

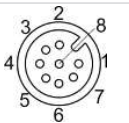
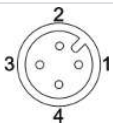
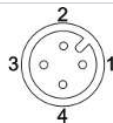
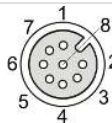
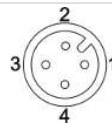

Type designation BCM Moisture Sensor	<p><b>Outputs</b></p> <p>2S2A    2 x switching output / 2 x analogue</p> <p>1D1S    1 x switching output / IO-Link</p> <p>1D1S2A    1 x switching output / IO-Link / 2 x analogue</p> <p>1D3S2A    3 x switching output / IO-Link / 2 x analogue</p>
W    Humidity	
<b>Version</b>	<p><b>Process connection</b></p> <p>0    G 3/4</p>
D    Display with built-in sensor R    Remote display with external sensor	

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

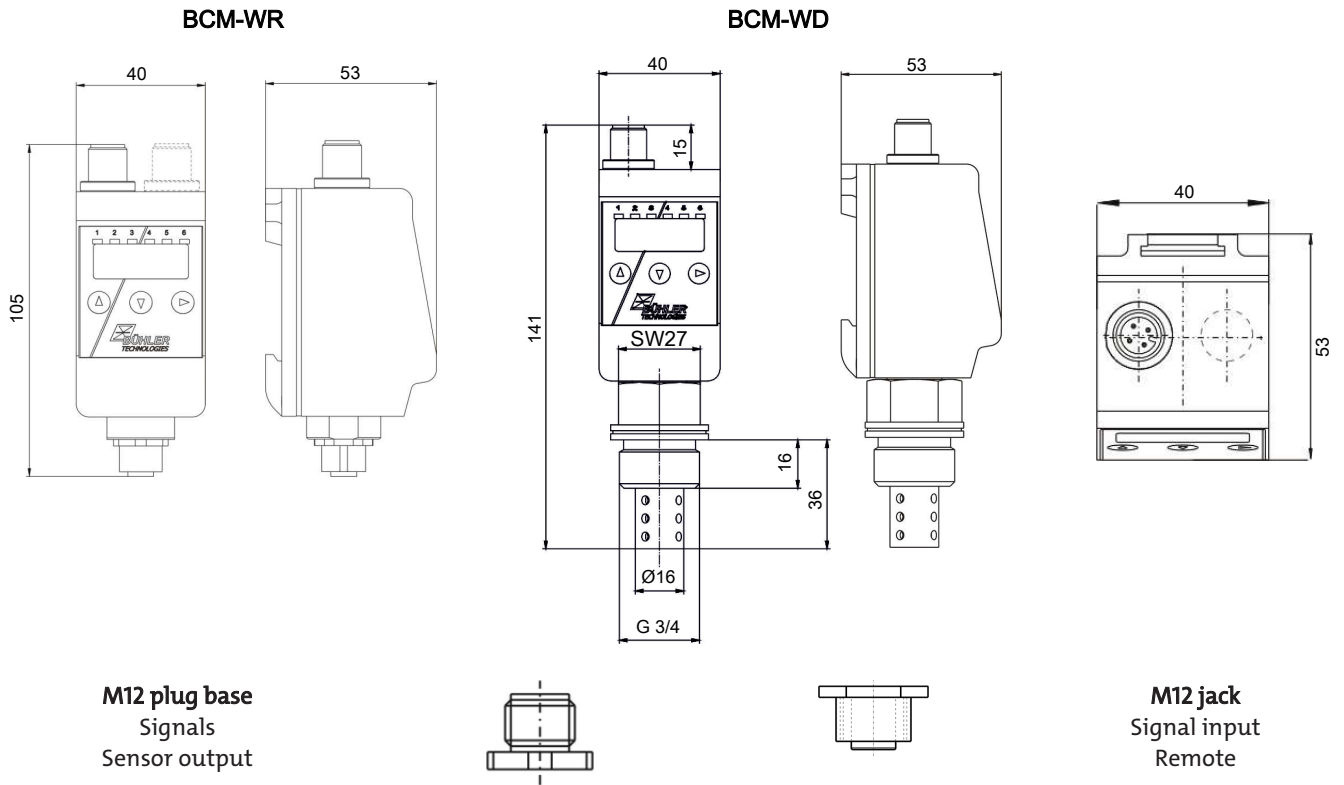
Pin assignment BCM-WR/WD

	Plug A				Plug B	
	WD/WR-2S2A	WD/WR-1D1S / 1D1S2A	WD/WR-1D3S2A	WR	WD/WR-1D1S2A	WD/WR-1D3S2A
Panel plug/jack						
	8-pin	4-pin	4-pin	8-pin	4-pin	8-pin
	Standard	IO-Link	IO-Link	IO-Link		
<b>Pin</b>						
1	L+	L+	L+	L+	L+	
2	L-	DO/S2	DO/S2	L-	I2 Temp	
3	S1 Humidity	L-	L-		L-	S3
4		C/Q	C/Q		I1 humidity	
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	Connecting cable
91 44 05 00 47	Connecting cable, 4-pin
91 44 05 00 33	Connecting cable, 8-pin
15 10 01 00	Assembly block / T-fitting

Dimensions



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 fill level. When installing into a return pipe, be sure not to exceed the maximum flow rate.

Installation example:

