

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

ANALOG VALVE POSITION TRANSMITTER

BERMAD Code Q, Model BUS004J

Scope:

This document provides instructions and information required for properly connecting BERMAD Analog Valve Position Transmitter to the control system, verifying its factory settings, re-calibrating it if required and troubleshooting possible issues.



Safety guidelines:

When installing, calibrating, or maintaining the Analog Valve Position Transmitter ensure the following:

- This document and the information enclosed within it contain restricted and/or privileged information that is intended only for usage by the customer’s qualified engineers, electricians or programmers.
- Only qualified and trained personnel shall take any action in reliance on this document, including installation, connection, operation and maintenance of the Analog Valve Position Transmitter, and must do so in full compliance with all applicable regulations, standards and safety instructions related to this type of work.
- The sensor must be powered only by 24 VDC. Using any other power source may permanently damage the sensor and will void the warranty.
- Never disassemble the valve, its components, or its accessories while the system is pressurized.
- Verify that the procedures you intend to perform will not cause damage to any system components or consumers.

Application:

This Analog Ultrasonic Valve Position Transmitter assembly is an accessory that enables remote signaling of the opening rate of BERMAD control valves, allowing to determine the valve's relative flow coefficient by referring to the Kv; Cv versus Valve Travel Graph in the engineering data of the relevant valve series. It is equipped with an easy to set ultrasonic sensor that measures, without mechanical contact, the movement of the valve position indicator.

Operation:

Ultrasonic sound waves are emitted by the sensor (2) and are reflected from the target disc (3) connected to the valve's position indicator rod (8). The reflected echo is received by the sensor, which calculates the distance based on the sound travel time. The sensor generates an analog output signal (4–20 mA) proportional to the distance between the sensor and the target disc.

Refer to WWW.BERMAD.COM for product page and other information

Connection:

- Install the valve as described in the relevant IOM for the valve's specific model.
- Connect the Analog Valve Position Transmitter to an appropriate electronic controller or PLC as specified in the following table:

Brown	+24VDC	+Ub
Blue	-24VDC / Analog In (-)	0V
Black	Analog In (+)	Out I/O
White	Not Connected	Sync

Calibration verification:

- The Analog Valve Position Transmitter is factory set to 4mA when the valve is closed and 20mA when the valve is fully (100%) open.
- The output reading is relative to the valve's travel, i.e.: 12mA for 50% opening rate and 20mA for 100% open (fully open).
- Refer to "Valve Travel" table at the end of this document.
- If the readings deviate from these values, recalibrate the sensor as described in the following section.

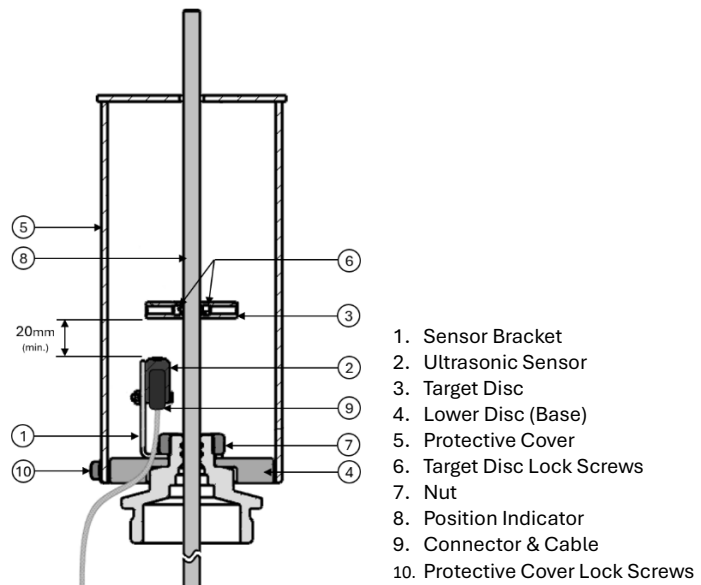
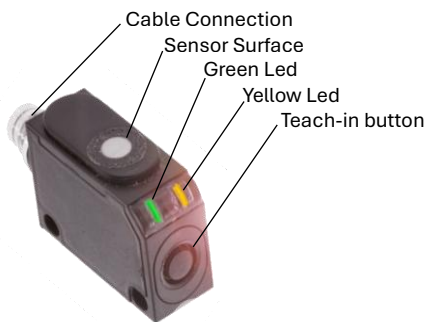
Sensor Calibration Procedure:

This procedure requires closing and opening of the valve, use caution to minimize its effect on the system.

- Hydraulically close the valve.
- Remove the protective cover (5) by loosening the three Allen screws (10).
- Loosen the target disc (3) lock screws (6) and position it with its bottom at least 20 mm above the top of the sensor (2), to keep out of the sensor's blind zone (refer to drawing below).
- Tighten the lock screws (6).
- Press the sensor's teach-in button for about 3 seconds until both LEDs flash simultaneously.
- Open the valve fully.
- Press the sensor's teach-in button for about 1 second until the control LEDs stop flashing.
- The Analog Valve Position Transmitter is calibrated.
- Replace the protective cover (5) and tighten the three Allen screws (10) securing the cover to base (4).

Note: The calibration mode maximum duration is 30 seconds. If the valve's opening time exceeds 30 seconds, then the calibration is stopped uncompleted. Use the following steps on large valves or whenever the opening time is longer than 30 seconds:

- Ensure that the valve is closed.
- Position the target disc (3) in the closed position, at least 20mm above the sensor (2).
- Make a mark on the valve's position indicator rod (8).
- Make a second mark higher on the indicator rod for the fully open position of the target disc, using the distance value from "Valve Travel" table at the end of this document (Ensure that both marks are either at the bottom of the target disc, or its top).
- Press the sensor's teach-in button for about 3 seconds until both LEDs flash intermittently.
- Release the lock screws (6), slide the target disc (3) to the fully open mark and tighten the lock screws.
- Shortly press the sensor's teach-in button until the control lights stop flashing.
- Recheck the calibration as described in "Calibration verification".
- Re-position the target disc at the closed position mark.
- Replace the protective cover (5) and tighten the three Allen screws (10) securing the cover to base (4).



Maintenance:

- Verify that all nuts and screws of the assembly are tight.
- In case of excessive caked-on dirt clean the white sensor surface and the inside of the housing.

Troubleshooting:

- No analog output
 - Check that connector and cable (9) are properly connected.
 - Check power supply.
- Analog output is wrong, i.e.: output at fully open valve is less than 20mA

Note: The sensor is equipped with an internal temperature compensation. Due to the sensor's self-heating, the temperature compensation reaches its optimum working point after approximately 30 minutes of operation.

 - Check that all nuts and screws of the assembly are tight.
 - Confirm that assumed fully open position of the valve corresponds to value in "Valve Travel" table.
 - Re-calibrate the sensor.
- Both LEDs are off
 - Check that connector and cable (9) are properly connected
 - Check power supply
- Green LED is on (Yellow LED is off)
 - Power is available, but target (3) is out of the adjusted range (too close or too far).
 - Re-calibrate the sensor.
- Yellow LED is on (Green LED is off)
 - Target (3) is within the adjusted range.
 - Normal operation, no action required.

Supporting information:

- Valve Travel

Diameter	1.5"	2"	2.5"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"	
	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	
700 Sigma EN	mm	16	16	22	25	32	-	50	62	80	100	-	134	-	-	-
	inch	0.63	0.63	0.87	0.98	1.26	-	1.97	2.44	3.15	3.94	-	5.28	-	-	-
700 Sigma ES	mm	-	-	16	22	25	32	41	50	62	80	100	100	134	134	134
	inch	-	-	0.63	0.87	0.98	1.26	1.61	1.97	2.44	3.15	3.94	3.94	5.28	5.28	5.28
700-00	mm	16	16	16	25	32	-	50	62	80	100	100	134	134	134	-
	inch	0.63	0.63	0.63	0.98	1.26	-	1.97	2.44	3.15	3.94	3.94	5.28	5.28	5.28	-
800	mm	17	17	20	23	30	-	50	58	66	100	100	135	135	135	-
	inch	0.67	0.67	0.79	0.91	1.18	-	1.97	2.28	2.6	3.94	3.94	5.31	5.31	5.31	-
700 Large		M5	M5M	M5L												
	mm	167	200	250												
	inch	6.57	7.87	9.84												