



## Ball Valve Servo LoRaWAN

SKU: BVSLWE01



### Quick-Start

This is a secure wireless LoRaWAN controllable Valve Motor Servo. For wireless operation it requires a LoRaWAN network with support for Class C devices. The device will support OTAA method to join the network. Don't use the device without being mounted on a ball valve. Right after power up it will try calibrating the end position which will fail when not mounted correctly.

### Important safety information

Please read this manual carefully. Failure to follow the recommendations in this manual may be dangerous or may violate the law. The manufacturer, importer, distributor and seller shall not be liable for any loss or damage resulting from failure to comply with the instructions in this manual or any other material. Use this equipment only for its intended purpose. Follow the disposal instructions. Do not dispose of electronic equipment or batteries in a fire or near open heat sources.

### Product Description

The BVS is a motor to retrofit existing and installed ball valves into smart water-controlling devices. The motor is powered by a 12 V external power supply or - optionally – a battery block.

The variable clamps allow mounting the device even in complex pipe installations. The patented motor coupling ensures easy installation and precise long-term operation. The device can operate in difficult environmental conditions, even submerged under water and allows directly connecting one additional local water sensor pad by cable.

The device can operate in two modes:

**Stand-Alone:** No further wireless connectivity is needed. A single click on the button opens and closes the valve. Clicking the button during open or close operation stops movement. The next click will continue the operation. Escaping water is detected by the external sensor pad and the valve it shut off accordingly. The button on the device allows clearing the alarm. Device in factory reset state operate in stand-alone mode without further configuration.

**LoRaWAN Network Mode:** The device joined a LoRaWAN network as Class C device. All functions of the Stand-Alone mode remain active. Leakage or Temperature Alarms are forwarded to the LoRaWAN network and Class C commands can control the motor.

### Calibration

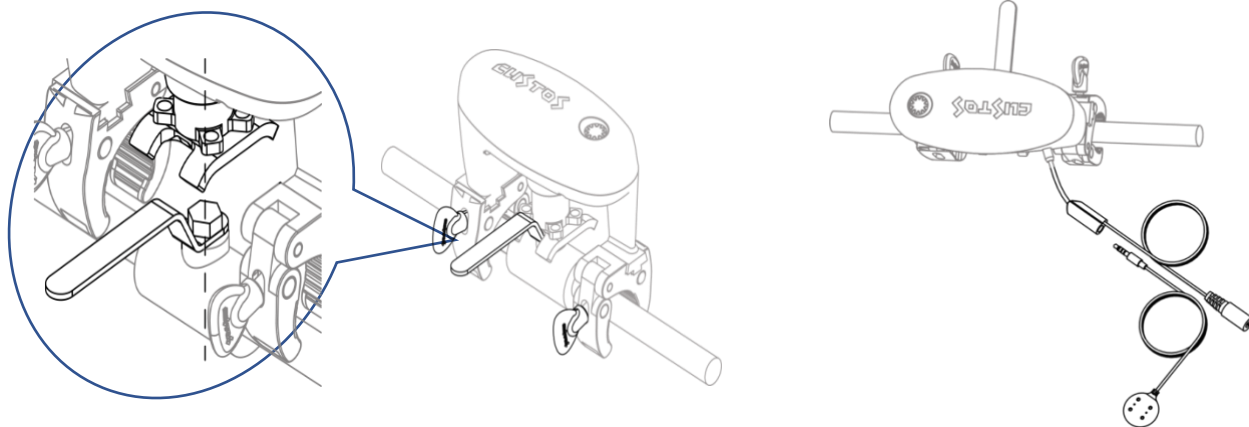
The BSV is able to both measure the rotation angle and detect the end positions of the handle. It can therefore gently reach the end positions to avoid any friction and unneeded mechanical stress. Whenever the device is powered or repowered it will do a calibration run first. To start the calibration just hit the button once. You will witness some movements of the handle and after 10...20 seconds the device is ready to operate.

Calibration requires the BVS is mounted to a ball valve. The device will detect if no valve is present and stop calibration. In this case the operation of the handle (both by button and by wireless command) is disabled.

### Installation

1. Make sure the power is disconnected.
2. Choose the right size of the fork according to the size of the valve handle.

3. Make sure the two tightening knobs and the handle face opposite direction (handle must have clearance to move)
4. Tighten clamps with hands while holding down the BVS.
5. If needed – unplug the dust cover and connect the local Water Sensor Probe.
6. Connect the DC Power Adapter to the power wire coming from the BVS and tighten the water seal.
7. Plug in the power adaptor into 230 V power socket.



## Usage

### Button Usage

The device has one single button with a three color Led built in. You can click on the button or keep the button pushed for some seconds. The BVS will help you counting the second by beeping every second. The device is designed for outdoor use and must prevent malfunction caused by water drops on the button. Hence, please push the button firmly (not too shy) even for clicking so that the touchless button will recognize your finger.

### Local or remote open and close of the valve

Single click on the button starts the opening or closing action. Clicking the button during phase of movement stops the movement. Another click of the button resume operation. (Please note that first operation of valve after power on will always cause calibration. Refer to chapter 'calibration' for more details.)

LoRaWAN commands allow opening and closing of the valve using ON/OFF commands. Please refer to the payload description for further details.

### Local Alarm

When the local sensor probe is attached it will detect water and cause an alarm. The alarm is reported to a LoRaWAN server and it causes the valve to close. Blinking of red Led plus frequent sound of the buzzer indicate the alarm status. You can't operate the valve anymore before alarm is cleared.

To clear alarm keep the button pressed for two seconds (count two beeps). Triple green link of the LED confirms clearing the alarm.

### LoRaWAN Payload

#### Uplink - message from BVS to Server

The Uplink command is always a 5 Byte command that serves both as heartbeat and encodes certain information send from the BVS to the server. When sent regularly port 10 is used, when sent as alarm frame port 16 is used.

#### **ALARM – TEMP\_MSB – TEMP\_LSB. - FW\_MAJOR - FW\_MINOR**

The 16 Bit Value TEMP encodes the ambient temperature of the BVS: FW Minor and FW major are reporting the firmware version. The alarm is single Byte bit mapped:

- Bit 0: External Water Contact Sensor tripped
- Bit 1: reserved
- Bit 2: Heart Beat Event
- Bit 3: reserved
- Bit 4: reserved
- Bit 5: Valve Closed
- Bit 6: Valve Opened

[Downlink - messages from Server to BVS](#)

Communication Port: 10

### Command 0x01 -VAL MSB-VAL LSB: Set Heartbeat Interval

Sets the Heartbeat Interval in minutes between 1 and 0x10E0 (3 days)

### Command 0x02 VAL

Controls the Valve: VAL = 0x00 fully closes the valve, 0xff fully opens the valve, every value between 0x00 and 0xff partly opens the valve

## Technical Data

Parameter	Value
Model No.	BVS-LWU01 (US) / BVS-LWE01 (EU)
Dimensions	14.8 x 9.6 x 13.3mm
Weight	BVS Unit: 603g
Body Color	White
Knob Color	Blue
Waterproof and Dustproof	IP66 level / Outdoor deployment
Usage	For Indoor and Outdoor Water Valve On/Off
Operation Temperature	14~122° F (-10 ~ +50°C)
Relative Humidity	8% ~ 80%

Parameter	Value
LoRa Module	SX 1261
Region Frequency	EU: 868.42 & 869.85MHz
Motor Torque Power	Adaptive torque output max: 6n.m
Water Leak Sensor	Local Water Leak Sensor Probe
Temperature Sensor	Built-in MCP9700x, Range from -40°C to +125°C / (-40°F to +257°F)
Action Button	Touch Sense Button x 1
LED Indicator	3 colors LED. (Green, Yellow & Red)
Sound Indicator	Buzzer (Max. 85dB)
Power Supply	AC-DC: AC (110V 60Hz / 220V 50Hz); DC (12V / 1A)
Power Consumption	Standby: ~10mA @ 12VDC = 0.12W Full Operation: Max ~700mA @ 12VDC = 8.4W

## Support and Contact

Should you encounter any problem, please give us an opportunity to address it before returning this product. Please check our website [www.aqua-scope.com](http://www.aqua-scope.com) and particularly the support section for answers and help. You can also send a message to [info@aqua-scope.com](mailto:info@aqua-scope.com)

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Phone: +372 (0) 6248002  
 eMail: [info@aqua-scope.com](mailto:info@aqua-scope.com)  
 Web: [www.aqua-scope.com](http://www.aqua-scope.com)



## Declaration of Conformity

Aqua-Scope Technology OÜ, Sakala 7-2, 10141 Tallinn, Republic of Estonia,

The radio emitting device works on frequency 868...849 MHz with output power of 4 dBm. (2.5 mW)

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## Disposal Guidelines

Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities. Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging health and well-being.

