
# BELVEN SMART VALVE
# THEMIS SERIES

**Belven Controls, Beyond Valves**

# BELVEN SMART VALVE THEMIS SERIES

BVSV is applied in the hydraulic network of the heating and cooling system to realize holographic data collection and hydraulic control of the network; it solves the problem of systematization of data collection of the network system and synchronization of hydraulic balance control. All data can be displayed locally through mobile terminals or presented on cloud platforms through RS-485 and MODBUS-RTU transmission, which can provide hardware support for digital management and control of the network.

BVSV can realize valve position, flow, pressure difference, temperature, temperature difference, and energy control based on the collected system data; at the same time, control parameters can be manually set through APP and platform. Platform algorithm output and remote parameter setting are supported, ultimately realizing digital hydraulic balance control of the system.

# BVSV
## BELVEN SMART VALVE THEMIS SERIES
## DN25-DN450

## TECHNICAL SPECIFICATION

- Size: DN25-DN450
- Leakage rate: No leakage at the factory (correct flow direction)
- Medium: Water or neutral fluid
- Working temperature: Medium temperature 0℃ ~100℃ , ambient temperature -20℃ ~70℃
- Connection: Threaded/flange connection
- Pressure range: 0~16bar
- Pressure rating: PN16
- Temperature measurement accuracy: Class AA
- Flow measurement accuracy: ±2% ( ≥ 4%Qnom)
- Pressure measurement accuracy: ±0.5%FS (FS means the max pressure range)
- Control accuracy: Minimum controllable flow 4%Qnom
  ±10% 4%~10%Qnom
  ±5% ≥ 10%Qnom
- Overload pressure: 200%FS
- Acquisition frequency: 2S (custom)
- Valve core construction: Ball valve/Butterfly valve
- Control characteristics: Equal percentage characteristics and linear optional
- Data output: Energy/load/flow/temperature/temperature difference/pressure/pressure difference/valve position feedback/setting parameters/pipeline network attributes
- Control output: static balance/dynamic flow balance/dynamic pressure difference balance/temperature difference/temperature (three types)/energy control

Note: Pressure above PN16 or medium temperature above 80℃ is available upon request.

## MATERIAL

| | |
|---|---|
| Body | DN25~DN50: Brass<br>DN50~DN450: Carbon steel/ductile iron/stainless steel |
| Core/shaft | DN20~DN50: Stainless steel/Brass<br>DN50~DN450: Stainless steel |
| Meter head | PC+ABS plastic |
| Meter head cover | ABS plastic |
| Sealing Materials | Temperature Base: EPDM/FKM<br>Pressure base: PTFE<br>Transducer base: NBR/FKM<br>Shaft base: NBR/FKM<br>Core base: PTFE |
| Pressure guide and exhaust connector | Brass |
| Three-way switching valve | Brass |
| Pressure probe | Stainless steel |
| Temperature probe | Stainless steel |
| Temperature and pressure base | Stainless steel |
| Ferrule connect | Brass/Stainless steel |
| Transducer base | Brass/Stainless steel |

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## DN25-DN450

belven controls

## TECHNICAL SPECIFICATION

| | | |
|---|---|---|
| Sensor components | Temperature sensor | PT1000 Class AA Core |
| | Flow sensor | Ultrasonic Piezo Ceramic Core |
| | Pressure sensor | Piezoresistive Diffused Silicon Core |
| Data communication | Communication interface | RS485, Bluetooth |
| | Communication protocol | MODBUS-RTU, CJ/T188 |
| Input/output signal | RS485 | MODBUS RTU |
| | Bluetooth | MODBUS RTU |
| | Analog value | 0~10V |
| | | 2~10V |
| | | 0~20mA |
| | | 4~20mA |
| | Switching value | Dry contact |
| Data display | Display form | Local mobile terminal display |
| | Display content | Energy, Load, Flow, Temperature, Temperature Difference, Pressure, Differential Pressure, Valve Position Feedback, Set Parameters |
| Wiring method | Self-contained cable | |
| Pressure difference range | Maximum differential pressure ΔPmax | 450KPa (ΔPmax: maximum differential pressure when all properties are met) |
| | Closing differential pressure | 600KPa |
| Small diameter electrical parameters (DN25~DN150) | Rated voltage | 24VDC±10% |
| | Rated power | 14W |
| | Static holding | 2W |
| | Moisture-proof power | 5W (built-in heater) |
| Large diameter electrical parameters (DN200~DN450) | Rated Voltage | 220VAC |
| | Rated power | DN200:102W<br>DN250:130W<br>DN300:190W<br>DN350:192W<br>DN400:212W<br>DN450:212W |
| | Static Holding | 12W |
| | Moisture-proof power | 8W (built-in heater) |
| Manual operation | Manual operation allowed in power-off/manual mode | |
| Protection level | IP54 | |
| Output torque | DN25~DN150 | 70N·m |
| | DN200~DN450 | 350~2500N·m |
| Control speed | 15~100s/90° (default 60s/90° ) | |
| Maintenance requirement | Maintenance-free | |

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## DN25-DN450

## FLOW RANGE

| Flow rate range for different sizes (Qmin~Qnom) | | |
|---|---|---|
| Brass (ball valve) | Carbon steel/ductile iron/stainless steel (ball valve) | Carbon steel/ductile iron/stainless steel (butterfly valve) |
| DN25: 0.14 ~ 3.5m³/h<br>DN32: 0.19 ~ 4.8m³/h<br>DN40: 0.32 ~ 8.0m³/h<br>DN50: 0.48 ~ 12.0m³/h | DN50: 0.6 ~ 15m³/h<br>DN65: 1.0 ~ 25m³/h<br>DN80: 1.6 ~ 40m³/h<br>DN100: 2.4 ~ 60m³/h<br>DN125: 4.0 ~ 100m³/h<br>DN150: 6.0 ~ 150m³/h<br>DN200: 10.0 ~ 250m³/h | DN200: 10.0 ~ 250m³/h<br>DN250: 16.0 ~ 400m³/h<br>DN300: 24.0 ~ 600m³/h<br>DN350: 30.0 ~ 750m³/h<br>DN400: 36.0 ~ 900m³/h<br>DN450: 48.0 ~ 1200m³/h |

## FEATURES

| | |
|---|---|
| **Data Output** | Energy / Load / Flow / Temperature / Differential Temperature / Pressure / Differential Pressure / Valve Position Feedback / Setting Parameters / Network Properties |
| **Control Outputs** | Static Balance / Dynamic Flow Balance / Dynamic Differential Pressure Balance / Differential Temperature / Temperature (three types) / Energy Control |
| **Control Characteristics** | Equal Percentage Characteristics and Linear Selectable |

## SELECTION PRINCIPLE

In order to prevent the influence of local resistance disturbance caused by reducer on the accuracy of ultrasonic flow detection, the design pipe diameter should be selected, and the design flow rate should fall within the measuring range.

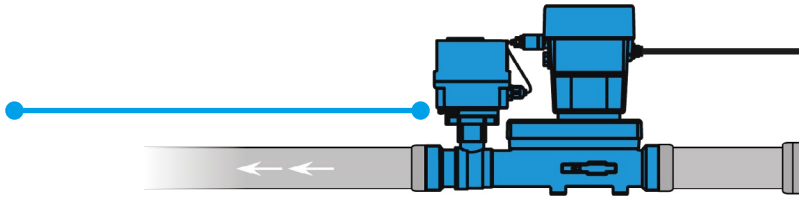
# BVSV

## BELVEN SMART VALVE THEMIS SERIES

## DN25-DN450

## FEATURES

Flow rate: 17.8 $m^3/h$
Valve position: 80.0%
Return water pressure: 356.0KPa
Return water temperature: 12.7℃



Control target: 95.0 KPa
Target measurement: 94.6 KPa
Control mode: Dynamic pressure difference control
Working mode switching: Refrigeration working mode

**NEW DISPLAY MODE**

Bluetooth scanning/Modbus-RTU/RS485, realizing non-contact display and parameter setting

**NEW STRUCTURAL DESIGN**

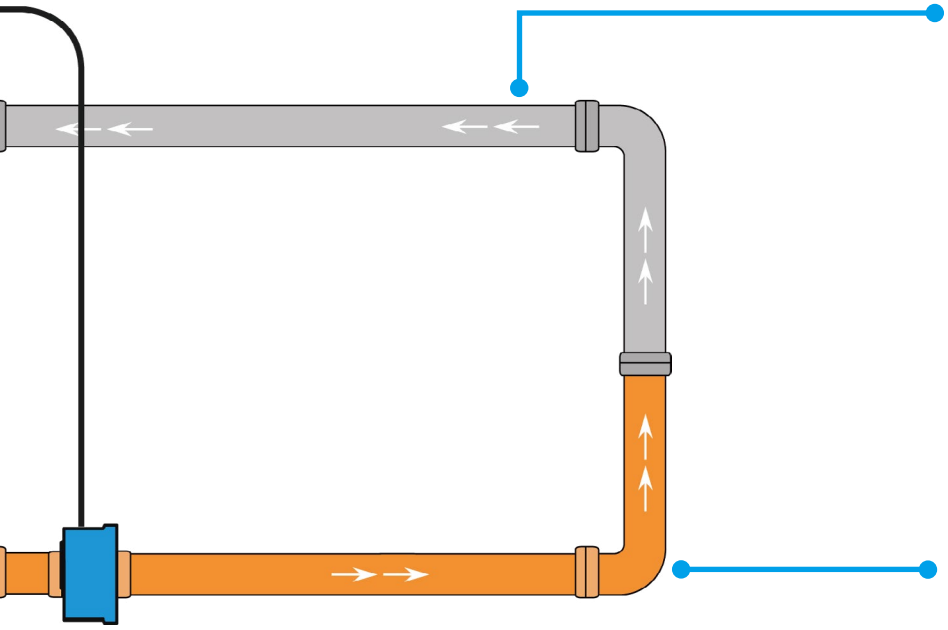
Unique exhaust and backwash design, dual-channel valve body structure and thermal insulation design make pressure data measurement output more accurate and durable, and flow data measurement more accurate

**NEW DATA PROCESSING**

Easy data access to the smart water conservancy platform to achieve systematic and synchronous data collection Data management

**RELIABLE SETTINGS**

Precisely control the equipment through professional APP or platform, effectively reducing system debugging and diagnosis time



Cumulative cooling capacity: 7199 KW·h
Cumulative heating capacity: 5600 KW·h
Load: 101.5 KW
Pressure difference: 94.6 KPa
Temperature difference: 4.9 ℃

Water supply pressure: 450.6 Kpa
Water supply temperature: 7.8 ℃

**WINTER AND SUMMER SWITCHING**

Automatically determine the winter and summer mode to realize automatic switching of winter and summer working conditions

**MULTIPLE CONTROL METHODS**

Multiple balance control logics, including static balance, dynamic flow balance, dynamic pressure difference balance, temperature, temperature difference, and energy control modes to choose from, greatly meeting the system's various hydraulic control needs

**VISUAL DATA**

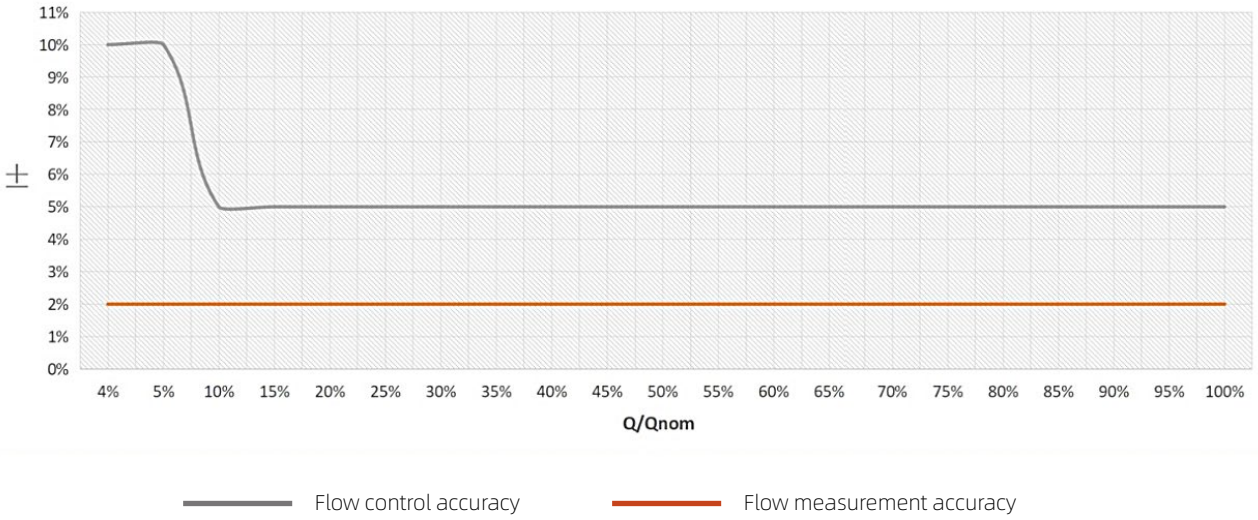
Remote control, one-click acquisition of pipe network data curves, to help the refined management of the system

**MODULAR DESIGN**

Modular product design to achieve pressure replacement of key components, more convenient maintenance

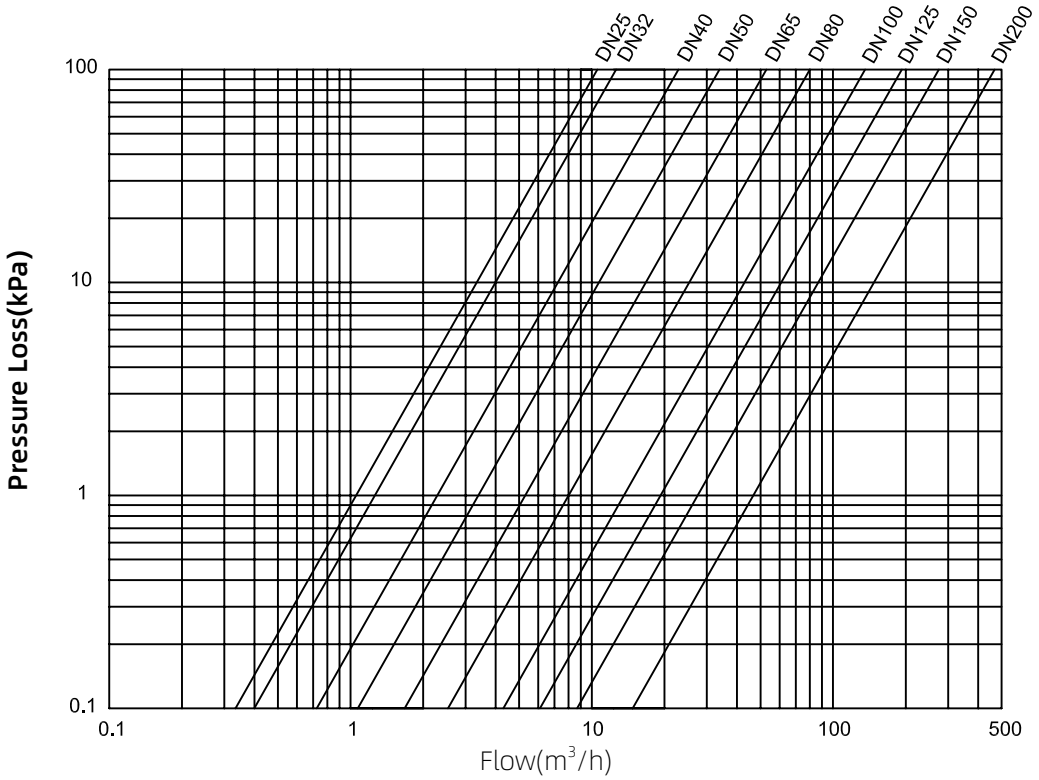
# BVSV
BELVEN SMART VALVE THEMIS SERIES
DN25-DN450

## FLOW ACCURACY CURVE




## PRESSURE LOSS

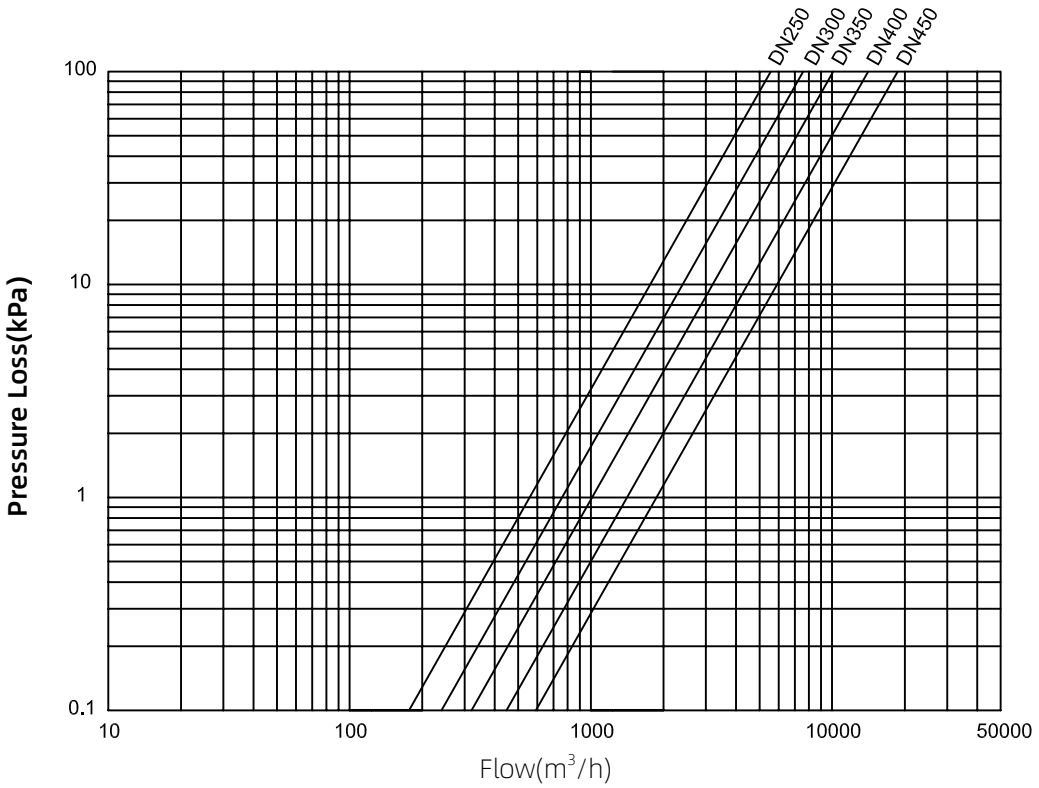
**DN25-DN200**




| SIZE | DN25 | DN32 | DN40 | DN50 | DN65 | DN80 | DN100 | DN125 | DN150 | DN200 |
|---|---|---|---|---|---|---|---|---|---|---|
| Kvs | 10.5 | 12.5 | 22.9 | 33.9 | 52 | 78.8 | 137 | 195 | 276 | 465 |

# BVSV
## BELVEN SMART VALVE THEMIS SERIES
## DN25-DN450

**DN250-DN450**




| SIZE | DN250 | DN300 | DN350 | DN400 | DN450 |
|---|---|---|---|---|---|
| Kvs | 5583 | 7602 | 10273 | 14128 | 18712 |

## CODING SYSTEM

**BELVEN SMART VALVE THEMIS**

| BV | SV | - | THEMIS | - | 32 | - | G |
|---|---|---|---|---|---|---|---|
| BV brand | Belven Smart Valve | | Star Version<br>Flow, pressure and temperature integrated<br>(Flow rate, temperature, pressure difference) | | Size | | Material: ductile iron<br>H: Brass (DN50 and below optional)<br>W: Carbon steel (DN50 and above optional)<br>S: Stainless steel (DN50 and above optional)<br>G: Ductile iron (DN50 and above optional) |

**BELVEN SMART VALVE**

| BV | SV | - | Q/QT | - | 32 | - | G |
|---|---|---|---|---|---|---|---|
| BV brand | Belven Smart Valve | | Standard Version<br>Q: Flow Only<br>QT: Flow, temperature | | Size | | Material: ductile iron<br>H: Brass (DN50 and below optional)<br>W: Carbon steel (DN50 and above optional)<br>S: Stainless steel (DN50 and above optional)<br>G: Ductile iron (DN50 and above optional) |

**TEMPERATURE AND PRESSURE SENSOR**

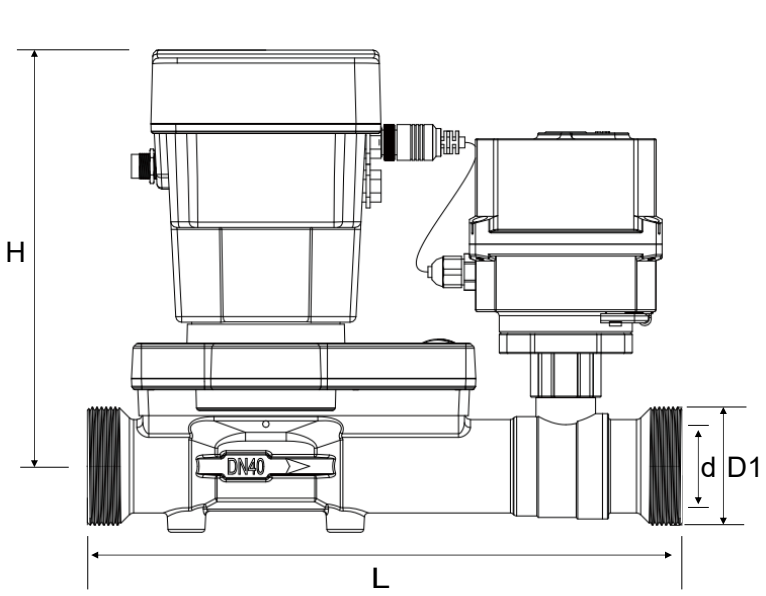
| BV | - | 25 | - | 16 |
|---|---|---|---|---|
| BV brand | | Probe length | | Pressure range |

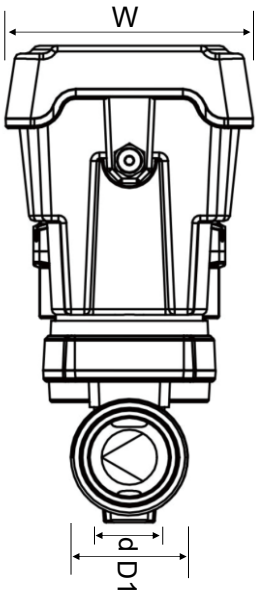
# BVSV

## BELVEN SMART VALVE THEMIS SERIES

DN25-DN450

## DIMENSIONS



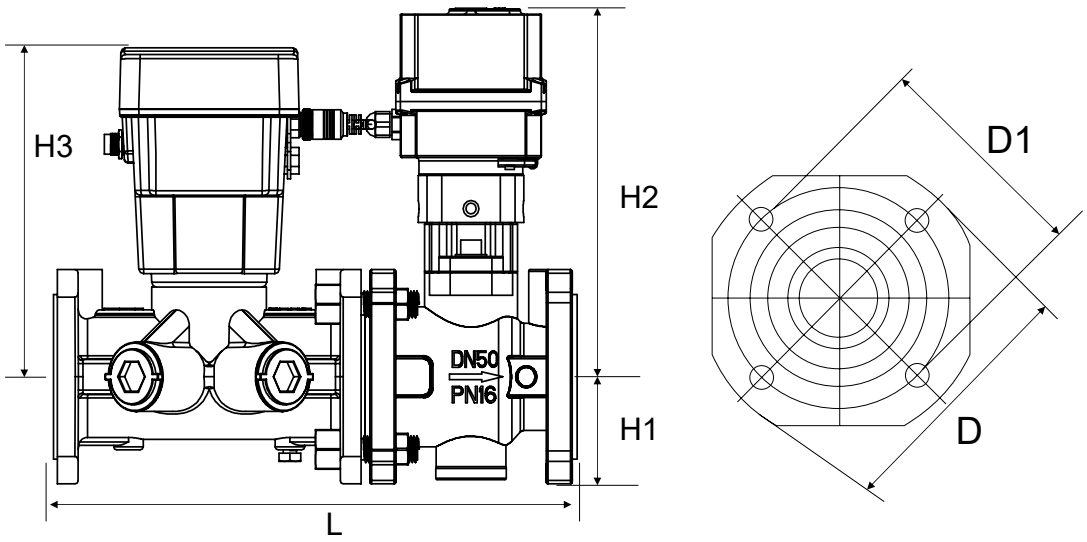




| SIZE | L (mm) | H (mm) | W (mm) | D1 (mm) | d (mm) | KVS | WEIGHT (kg) |
|---|---|---|---|---|---|---|---|
| DN25 | 300 | 204 | 125 | G1 1/4 | 25 | 10.5 | 2.8 |
| DN32 | 300 | 213 | 125 | G1 1/2 | 32 | 12.5 | 4.3 |
| DN40 | 300 | 213 | 125 | G2 | 40 | 22.9 | 4.9 |
| DN50 | 300 | 214 | 125 | G2 1/2 | 50 | 33.9 | 5.6 |

Note: 1. Main material: brass; 2. Threaded connection (ISO 228-1:2000); 3.Core construction: V-shaped hemisphere; 4. Weight only for star version

# BVSV
## BELVEN SMART VALVE THEMIS SERIES
## DN25-DN450

### DIMENSIONS

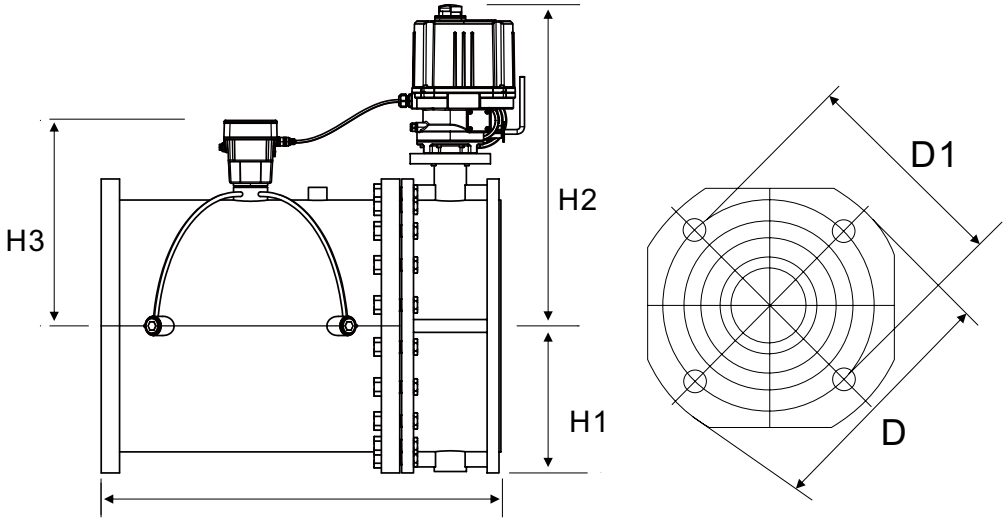



| SIZE | BOLT NUMBER OF HOLES-HOLE DIAMETER | D (mm) | D1 (mm) | L (mm) | H1 (mm) | H2 (mm) | H3 (mm) | KVS | WEIGHT OF DUCTILE IRON (kg) | WEIGHT OF STAINLESS STEEL (kg) | WEIGHT OF CARBON STEEL (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DN50 | 4-19 | 165 | 125 | 340 | 65 | 235 | 190 | 45 | 16.3 | 17.6 | 17.5 |
| DN65 | 4-19 | 185 | 145 | 341 | 75 | 240 | 205 | 52 | 18.9 | 20.4 | 20.3 |
| DN80 | 8-19 | 200 | 160 | 402 | 92 | 252 | 208 | 78.8 | 26.5 | 28.6 | 28.4 |
| DN100 | 8-19 | 220 | 180 | 440 | 101 | 268 | 224 | 137 | 32.1 | 34.6 | 34.4 |
| DN125 | 8-19 | 250 | 210 | 471 | 115 | 282 | 250 | 195 | 42.1 | 45.5 | 45.2 |
| DN150 | 8-23 | 285 | 240 | 553 | 135 | 294 | 265 | 276 | 57.9 | 62.4 | 62.1 |
| DN200 | 12-23 | 340 | 295 | 653 | 159 | 314 | 311 | 465 | 87.7 | 94.7 | 94.1 |

Note: 1. Main material: ductile iron/stainless steel/carbon steel optional; 2. Flange connection (ISO 7005-2:1988); 3.Core construction: W-shaped hemisphere; 4. Weight only for star version

# BVSV
## BELVEN SMART VALVE THEMIS SERIES
## DN25-DN450

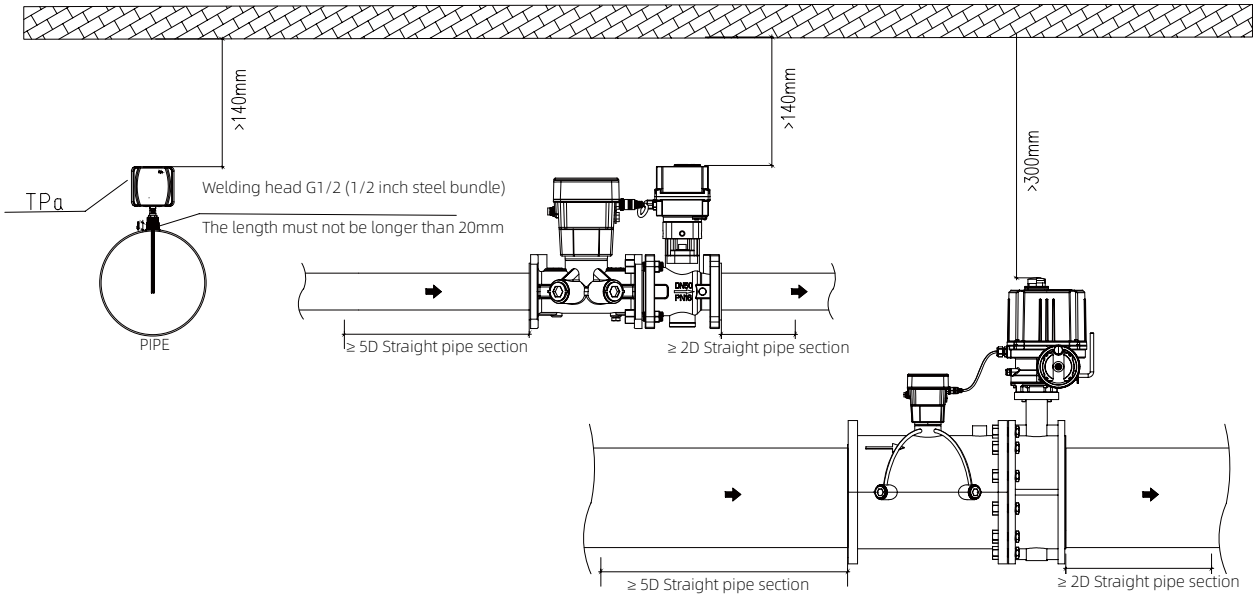
### DIMENSIONS

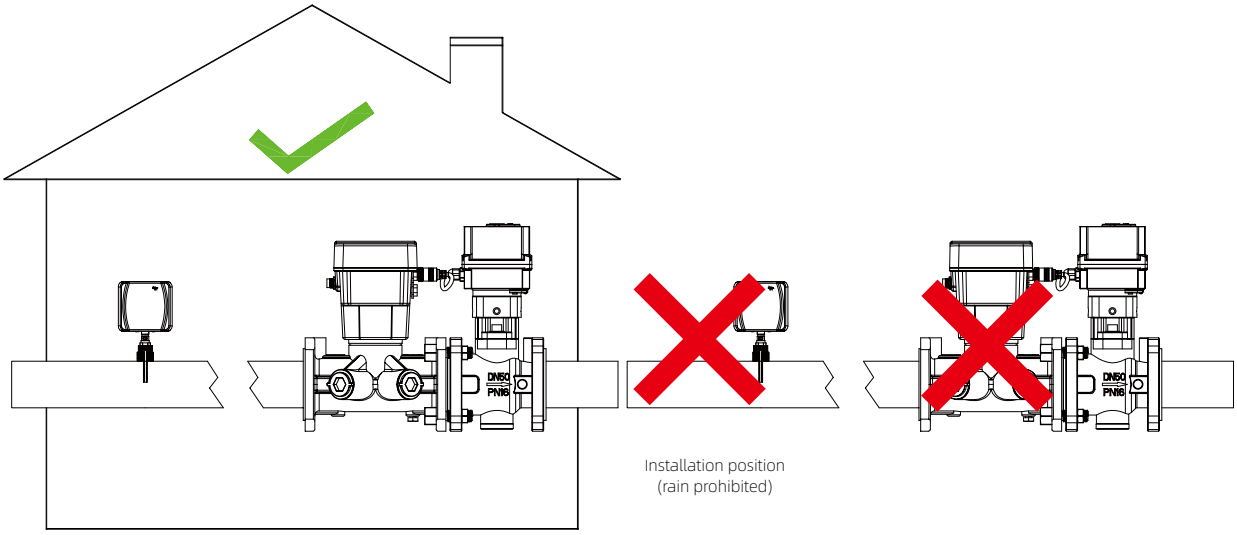



| SIZE | BOLT NUMBER OF HOLES-HOLE DIAMETER | D (mm) | D1 (mm) | L (mm) | H1 (mm) | H2 (mm) | H3 (mm) | KVS | WEIGHT OF DUCTILE IRON (kg) | WEIGHT OF STAINLESS STEEL (kg) | WEIGHT OF CARBON STEEL (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DN200 | 12-23 | 340 | 295 | 515 | 170 | 576 | 306 | 2709 | 92.5 | 94.5 | 94.1 |
| DN250 | 12-28 | 405 | 355 | 615 | 203 | 606 | 334 | 5583 | 115.8 | 126.8 | 124.3 |
| DN300 | 12-28 | 460 | 410 | 678 | 230 | 634 | 359 | 7602 | 143.2 | 152.1 | 153.7 |
| DN350 | 16-28 | 520 | 470 | 740 | 260 | 670 | 389 | 10273 | 193.4 | 235.3 | 207.7 |
| DN400 | 16-31 | 580 | 525 | 816 | 290 | 702 | 414 | 14128 | 300.2 | 355.9 | 322.3 |
| DN450 | 20-31 | 640 | 585 | 870 | 320 | 702 | 448 | 18712 | 351.9 | 413.9 | 377.8 |

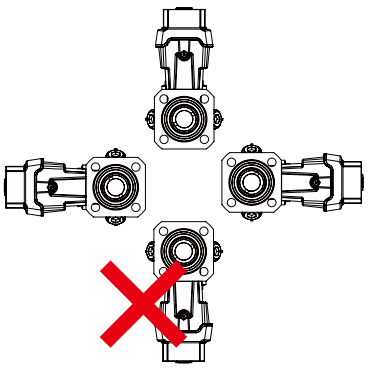
Note: 1. Main material: ductile iron/stainless steel/carbon steel optional; 2. Flange connection (ISO 7005-2:1988); 3.Core construction: Floating butterfly plate; 4. Weight only for star version

## INSTALLATION DIAGRAM

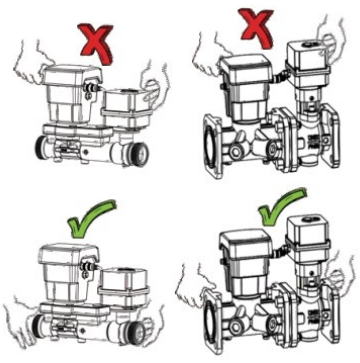


Installation position
(rain prohibited)

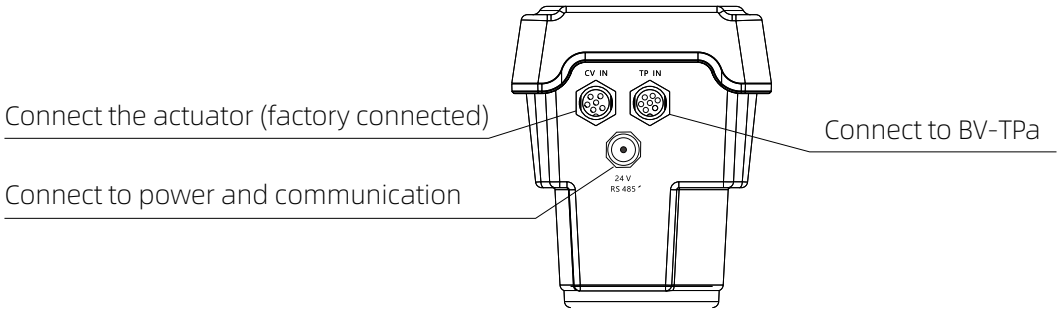


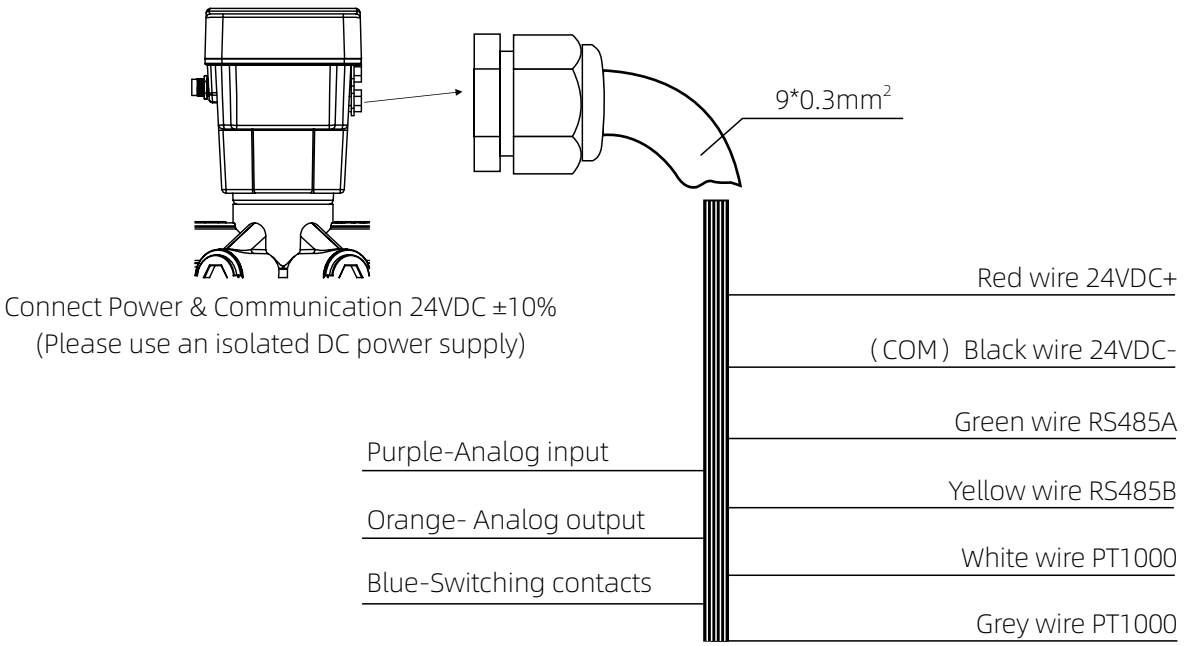
Installation direction
(invert prohibited)

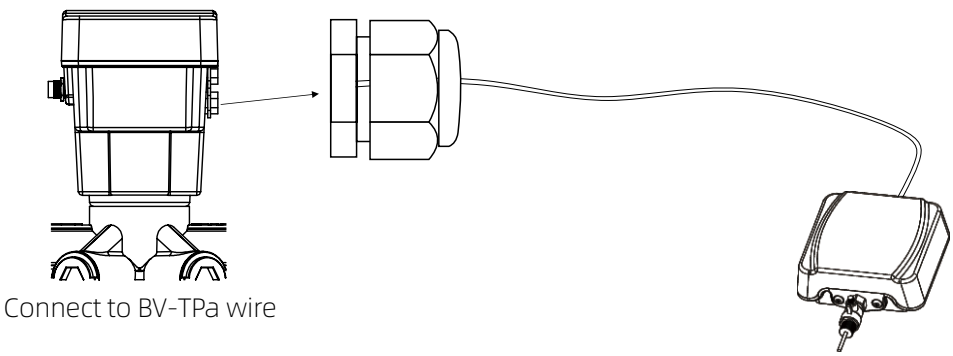


Handling method
(do not lift the head)

## SMALL DIAMETER WIRING DIAGRAM

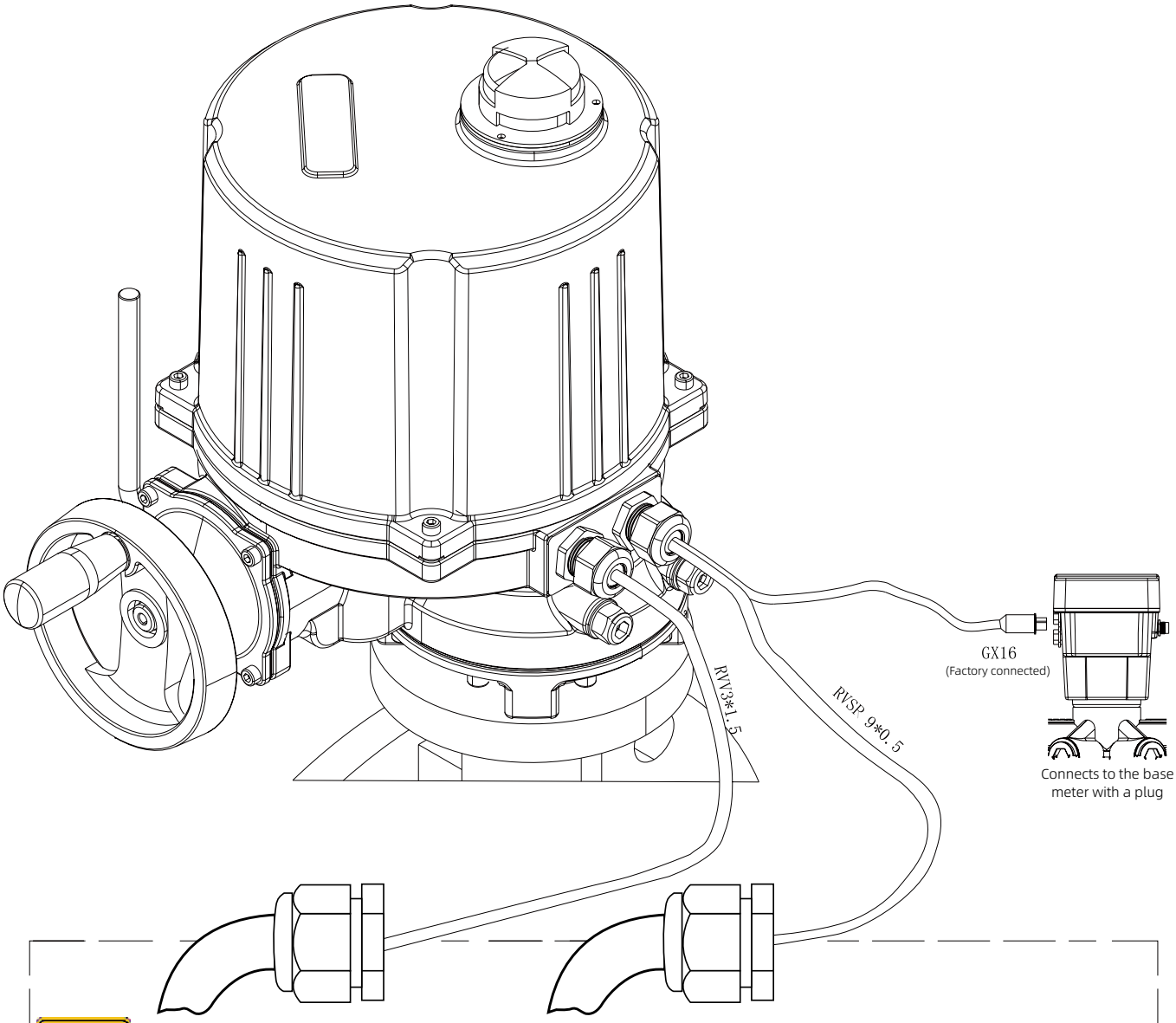



Note: The factory standard cable is 1.5m long. Other specifications are available upon request.

## LARGE DIAMETER WIRING DIAGRAM





Red wire Live wire【220VAC】
Blue wire Neutral Wire N
Yellow-green wire Grounding wire

**User Wiring Interface**

Purple wire Analog input
Orange wire Analog Output
Red wire Switching value+ (passive)
Blue wire Switching value- (passive)
Green wire RS485A
Yellow wire RS485B
White wire PT1000
Grey wire PT1000
Black wire common terminal (COM)

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Klappen клапан
De la soupape 阀门 バルブ Ventil
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info@belvencontrols.com
www.belvencontrols.com