A heatmeter with a sensor-operated position, flow, or energy control function, including flow, energy, and delta T monitoring, featuring a 2-way PN 16 ball control valve with Flanged

- Nominal supply: DC 24V
- Proportional and communicative control
- Closed cold and hot water systems
- Ethernet TCP/IP, built-in web interface
- Modbus RTU, Modbus TCP/IP, MQTT
- Conversion of sensor signals
- Energy control, flow control, position control

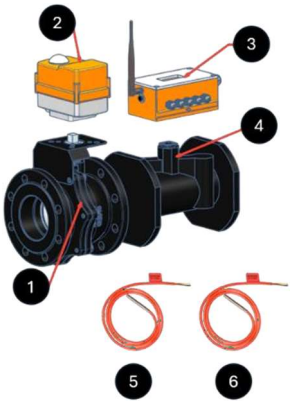
Type General Information

Type	DN	V'nom [l/min]	V'nom [m³/h]	Kvs Theor. [m³/h]	PN
T-1205-065	065	417	25.0	50	16
T-1205-080	080	667	40.0	80	16
T-1205-100	100	1000	60.0	120	16
T-1205-150	150	2500	150.0	300	16
T-1205-200	200	4167	250.0	500	16
T-1205-250	250	6667	400	800	16
T-1205-300	300	10000	600	1200	16

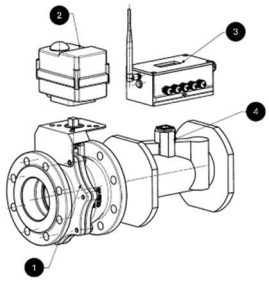
Kvs theor.: Theoretical Kvs value for pressure drop calculation

Construction

Components: Duyar Smart Valve consists of a ball control valve, a motor, and a heatmeter equipped with a logic and sensor module.
The logic module includes the heatmeter and communication interface. All relevant data is measured and recorded in the sensor module.



External temperature sensor: **6**
Internal temperature sensor: **5**
Sensor housing: **4**
Logic and sensor module: **3**
Ball control motor: **2**
Ball control valve: **1**



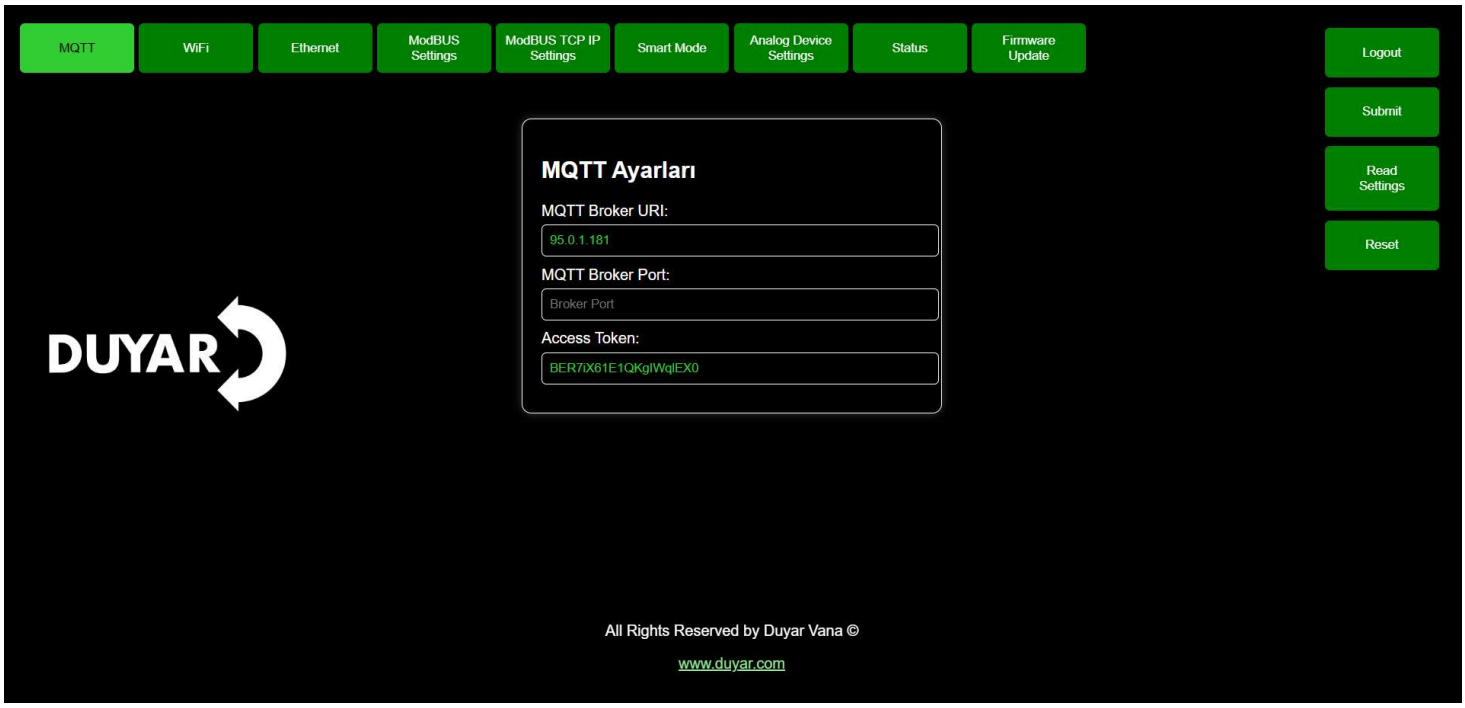
The modular design of the heatmeter allows the logic module to remain in the system even if the sensor module is replaced.

Heatmeter:

It consists of a sensor module with connected temperature sensors, a computing unit, a measurement system, and a logical controller. The built-in LCD screen provides access to energy, flow rate, inlet-outlet temperature values, and temperature difference data.
In terms of hardware features, it includes two temperature sensors (one integrated) and operates based on an ultrasonic measurement principle for energy measurement.It functions within a 24 VDC power supply range and can store total energy data in its memory.

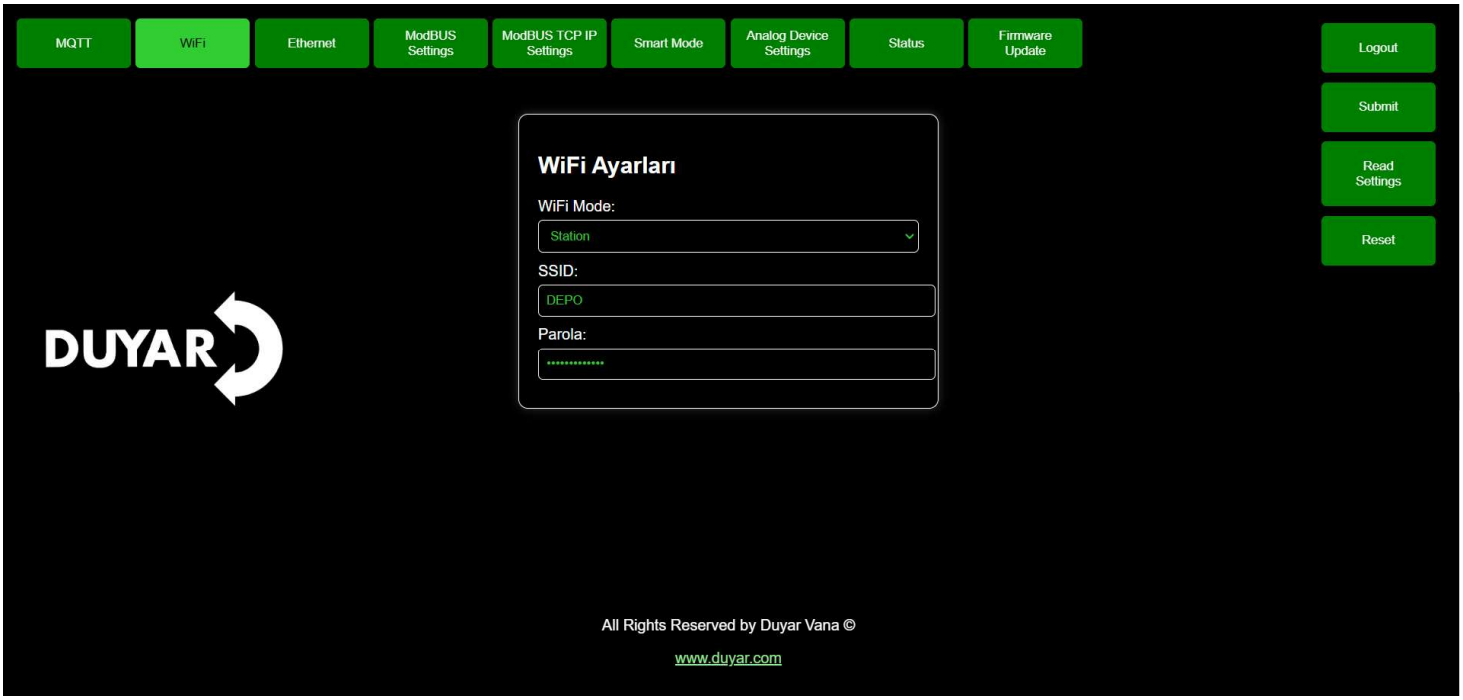
Logic Controller

The Smart Valve performs all logical operations, collects data from connected slave devices, and executes scenario functions using its algorithms.
All communication and valve programming processes are handled in this section. Initial settings can be configured through the integrated interface.The integrated interface can be accessed via Wi-Fi.
Password: 12345678
Access Address: 192.168.4.1



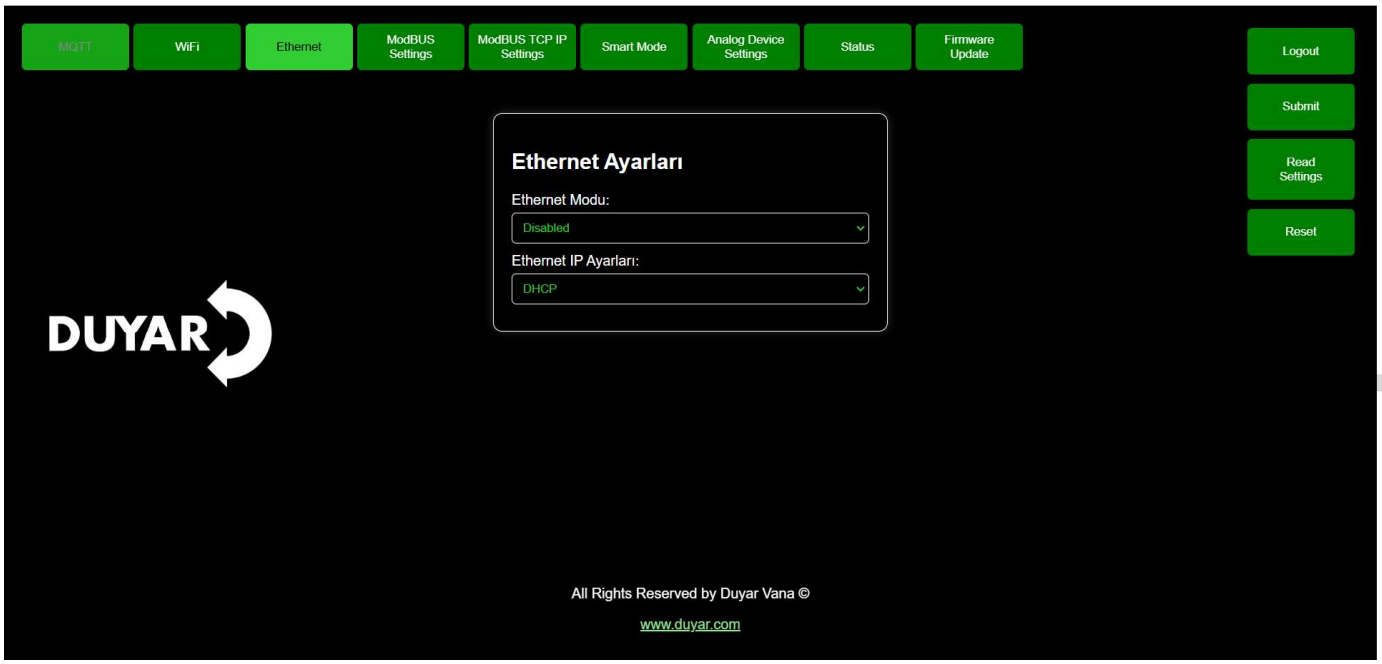
a) **Logic Controller Integrated Interface - MQTT:** This section is where web-based interface settings are configured.

- **MQTT Broker URI:** Must be set to **95.0.1.181.**
- **Access Token:** Each user has a unique 20-digit access token. This key must be entered in this section; otherwise, access to the web-based interface will not be possible.

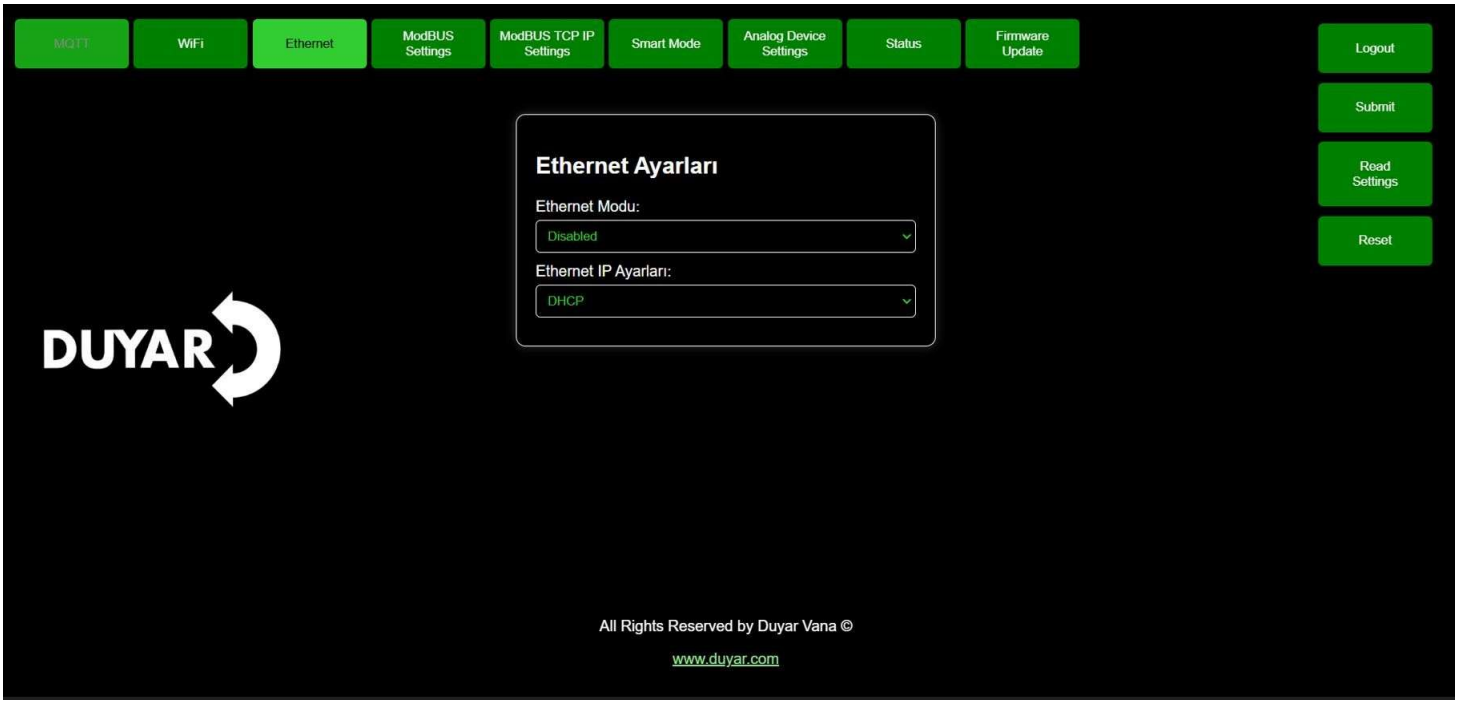


b) **Logic Controller Wi-Fi Settings:** This section allows data from the device to be transferred to the web-based interface using a wireless communication option.

- **Wi-Fi Mode:** Station
- SSID: Name of the wireless network to connect to
- Password: Wireless network password must be entered.

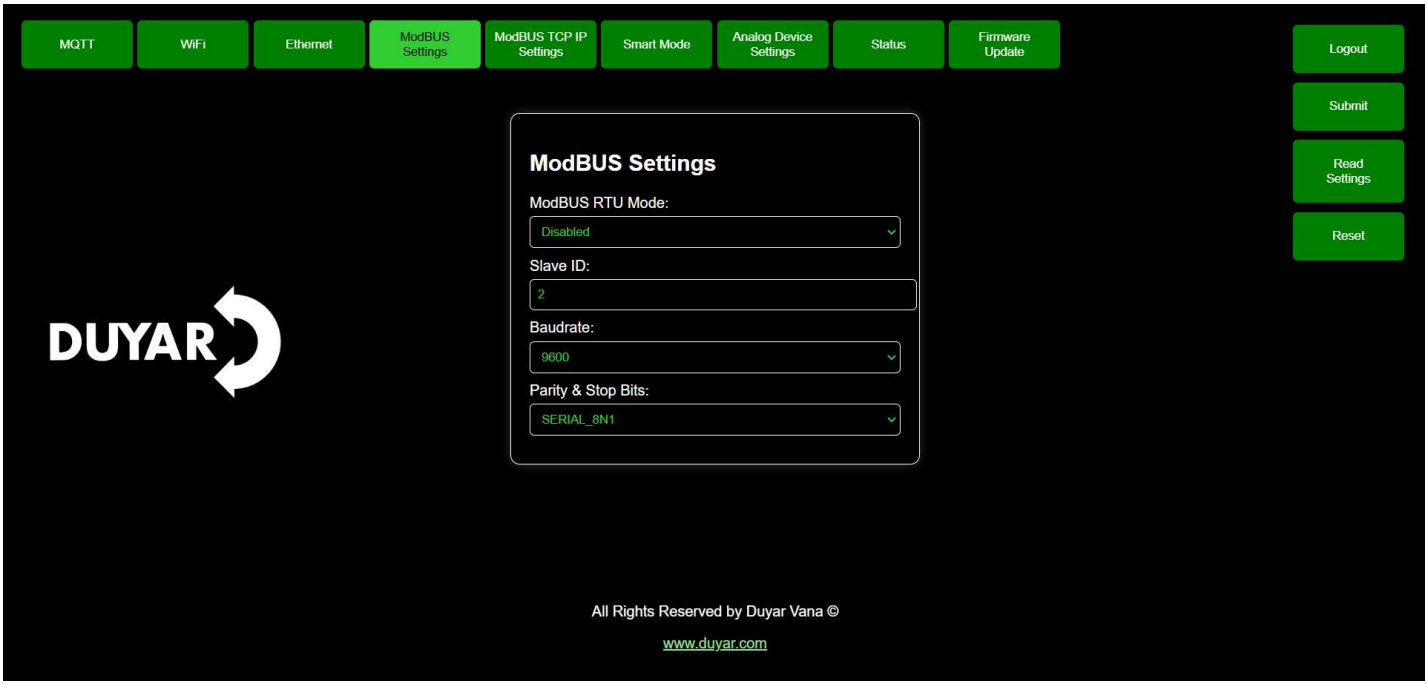


Wi-Fi Mode: By default, it is set to **Access Point** mode. This setting is chosen to enable access to the device.



c) **Logic Controller Ethernet Settings:** If a wired internet connection is to be established via the RJ45 socket:

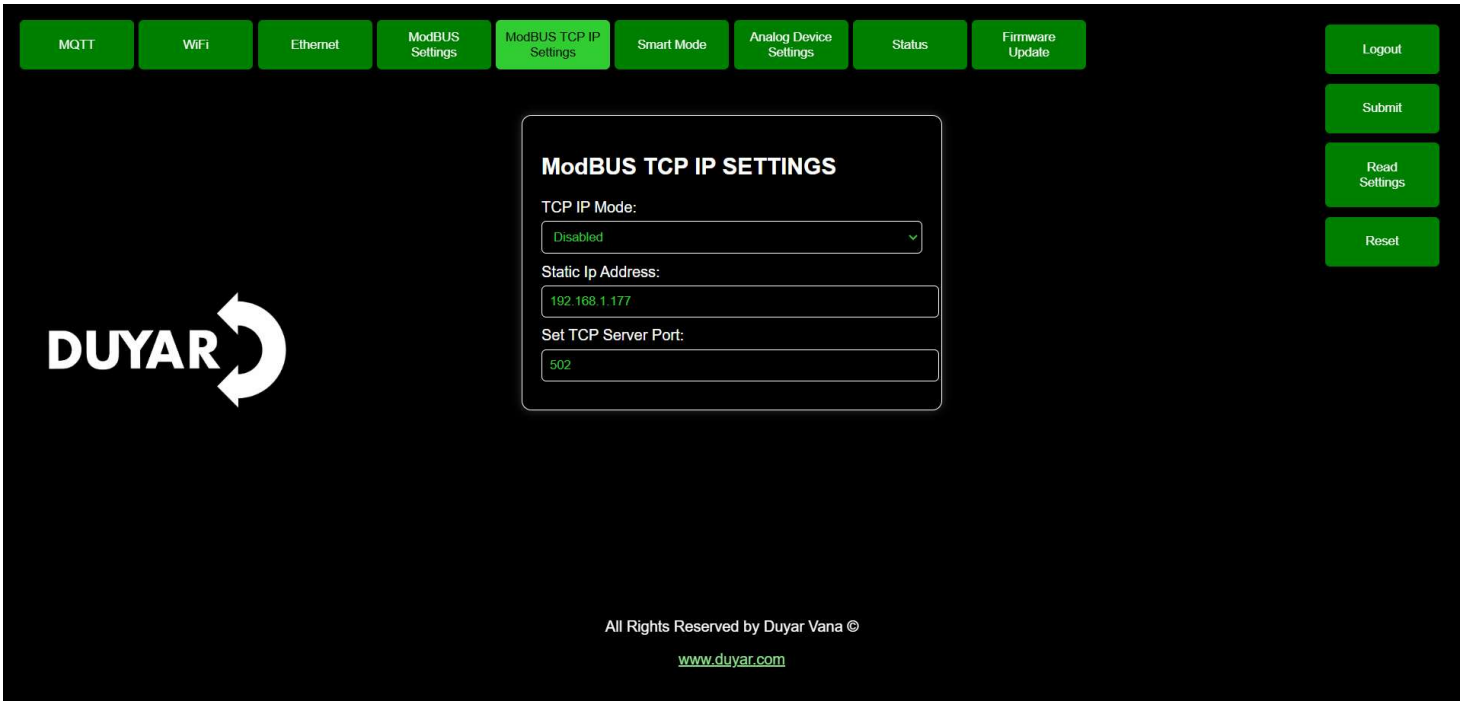
- **Ethernet Mode:** Should be set to Enabled. IP settings can remain as DHCP.
- **Wi-Fi Mode:** Should be set to Access Point. Otherwise, the device will attempt to connect to the internet via both wired and wireless connections, which may cause it to enter a reset loop after a while.



d) **Logic Controller ModBUS Settings:** If the device is to be controlled via a different SCADA system instead of the web-based interface, the **ModBUS RTU** option can be selected. The user can configure the appropriate communication settings as needed..

Note: When this option is used, the following settings should be applied:

- Wi-Fi Mode: Access Point
- Ethernet Mode: Disabled
- ModBUS TCP/IP: Disabled
- Smart Mode: OFF

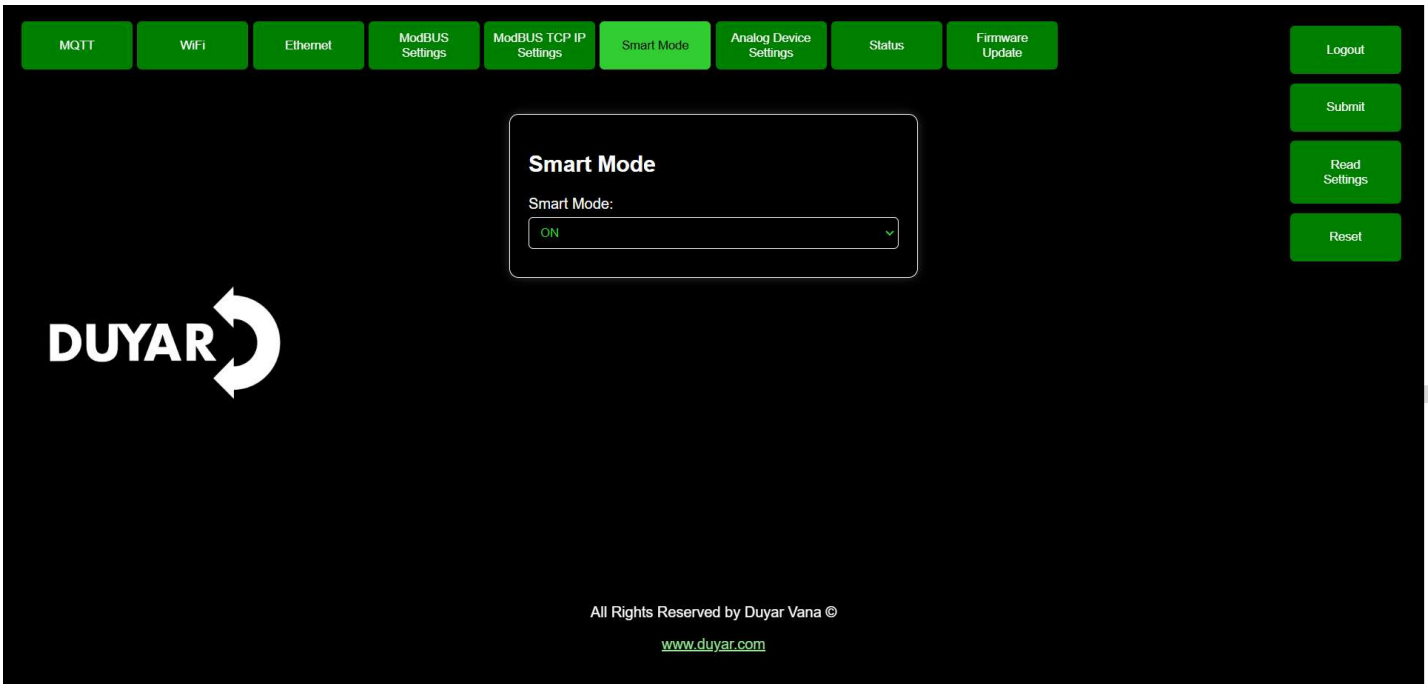


e) **Logic Controller ModBUS TCP/IP Settings:** If the device is to be controlled via a different SCADA system instead of the web-based interface, the ModBUS TCP/IP option can be used.

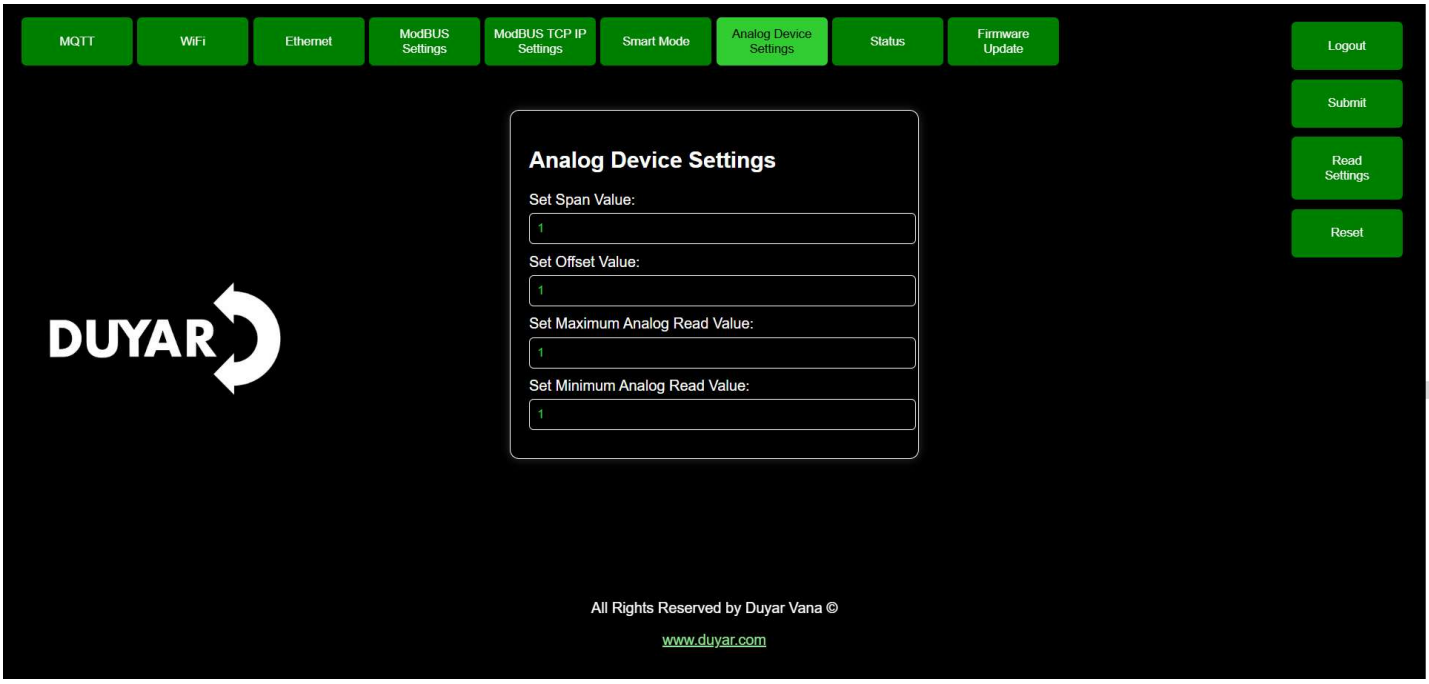
- **Device Static** IP: 192.168.1.177
- **Server Port**: Default set to 502

Note: When this option is used, the following settings should be applied:

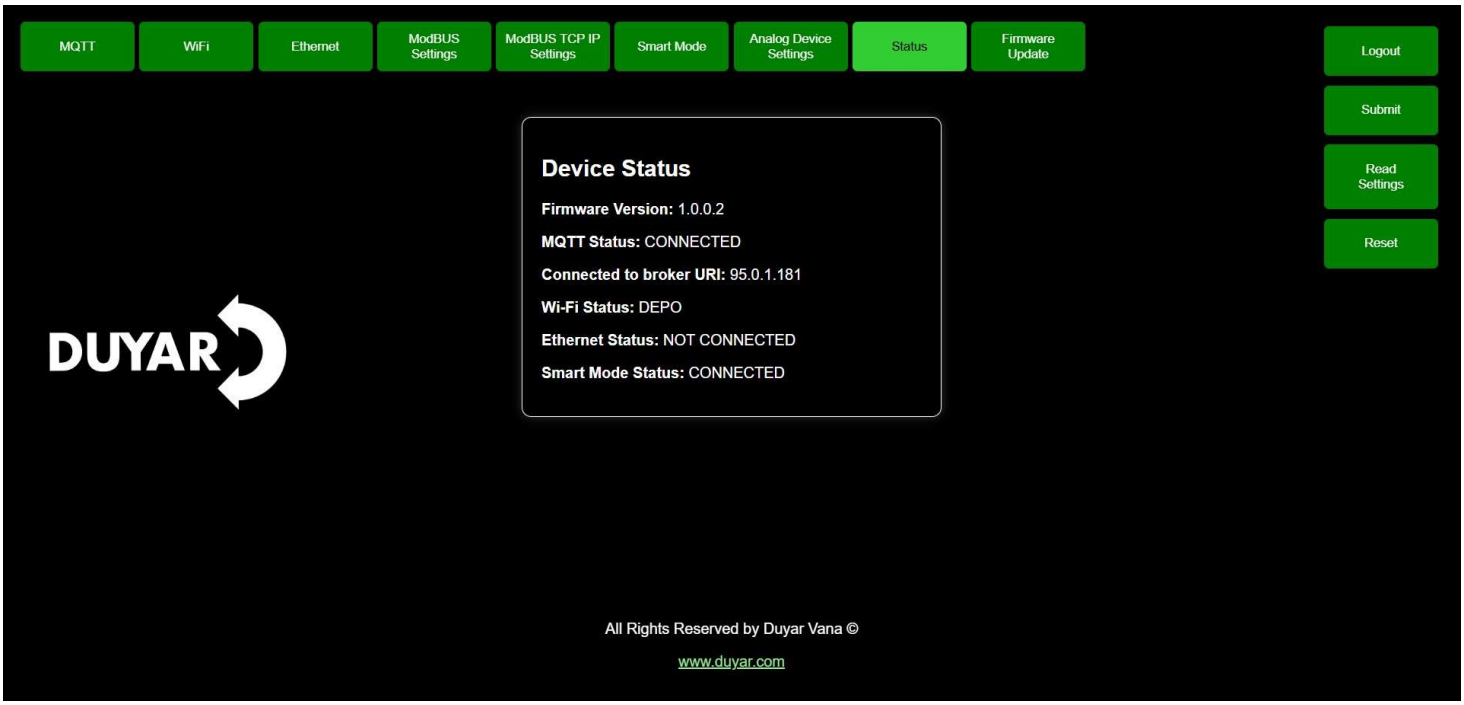
- Wi-Fi Mode: Access Point
- Ethernet Mode: Disabled
- ModBUS RTU Mode: Disabled
- Smart Mode: OFF



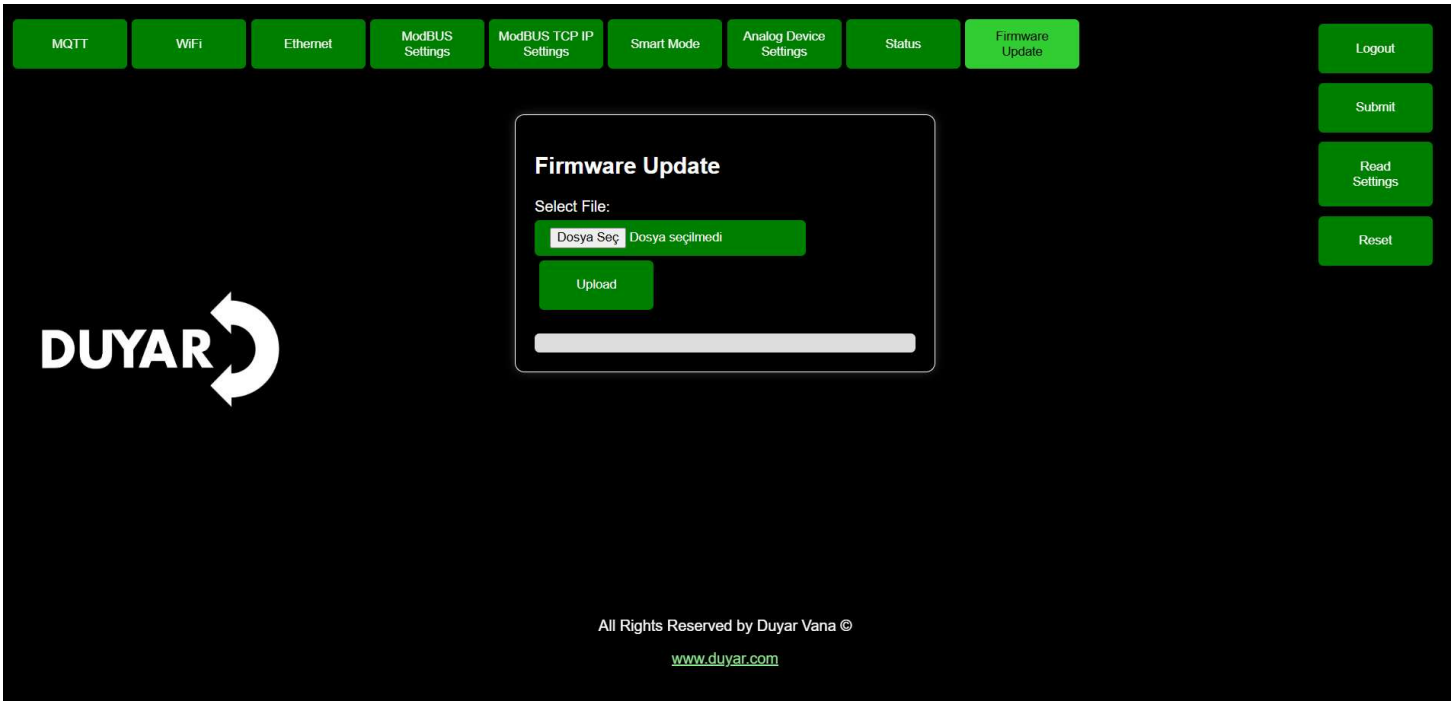
f) **Logic Controller Smart Mode:** This setting should be set to ON to enable communication with the device through the web-based interface. By activating this mode, you can program the device and access data via the web-based interface.



g) **Logic Controller Analog Device Settings:** This section is used to configure settings when an analog sensor is added to the device.If not used, all parameters should be set to 1.



a) **Logic Controller Status Tab:** This section provides information about the device's connection status.



b) Logic Controller Firmware Update: The Smart Valve device can be updated remotely (over-the-air) with firmware updates.

c) Logout Button: Used to exit the interface page.

d) Submit: Sends all configured settings from the interface to the device via this button. After submitting, the Reset button must be pressed.

Note: Before pressing the reset button, ensure that the settings configured in the web-based interface of the Smart Valve device are saved using the Save button. Otherwise, the device will retain the last saved functionality and data.

f) Read Settings: This button retrieves all existing settings from the device.

Technical Data

Electrical Specifications	Nominal Supply	DC 24 V - Power Suppy: 220VAC- 24VDC
	Nominal Supply Voltage Frequency	50/60 Hz
	Nominal Supply Voltage Range	DC24V
	Power Consumption in Operation Mode:	60W (DN 65, 80, 100) 50W (DN150), 80W(DN200)
	Connections (Power / Control)	Cable 1 m, 8x 0.75 mm²
	Ethernet Connection	RJ45 soket
	Conductors, Cables	AC/DC 24V, cable length <100m, shielding or twisting not required
Data Bus Communication	Communication Control	Modbus TCP, Modbus RTU, MQTT
	Position Feedback U	0…10V, 2...10 V
	Feedback signal U note	Maks. 1 mA
	Adjustable Maximum Flow (V'max)	25% to 100% of V'nom
	Control Accuracy	±5% (for 25% to 100% of V'nom) Level II
	Customization	Via integrated web interface
	Compatible Fluids	Cold and hot water
	Fluid Temperature Range	-10...100°C [14...248°F] Optional (150°C)
	Fluid Temperature Note	For fluid temperatures between -10°C and 2°C, a shaft heating device or valve neck extension should be used.
	Closing Pressure Δps	16bar

	Flow Characteristics	Equal percentage, optimized in the opening range
Functional Data	Sealing Level	Completely leak-proof, **Sealing Level: A**
	Pipe Connection	Flange
	Mounting Orientation	From vertical to horizontal (based on the shaft)
	Manual Operation Component	Lever(Allen)
Measurement Data	Measured Values	Flow Rate Supply fluid temperature Return fluid temperature Fluid temperature differences Energy
	Temperature Sensor	Pt1000- EN 60751, 2-wire technology permanently attached Cable Length for External Sensor T1: 3 m Integrated Flow Sensor T2
Flow Measurement	Measurement Principle	Ultrasonic Flow Measurement
	Flow Measurement Accuracy:	±%2 (%20...100 V'nom)
	Minimum Flow Measurement:	0.5%' of V'nom
	Protection Class (IEC/EN)	IP54, IP67(Optional)
	Pollution Degree	3
	Ambient Humidity	Max. %95 relative humidity, non-condensing
	Ambient Temperature	-30...50°C [-22...122°F]
	Storage Temperature	-40...80°C [-40...176°F]
Materials	Valve Body Material	EN-GJS-400 (GGG 40)

Safety Notes

- This device is designed for use in **fixed heating, ventilation, and air conditioning (HVAC) systems** and should not be used outside the specified application areas, especially in **aircraft or other airborne vehicles**.
- **Outdoor applications** are only permitted if the device is not directly exposed to **water (seawater), snow, ice, sunlight, or corrosive gases**, and if environmental conditions consistently remain within the threshold values specified in the technical catalog.
- Installation must be carried out **only by qualified professionals**. All relevant **regulations must be followed** during installation.
- The device contains **electrical and electronic components** and **must not be disposed of as household waste**. Local disposal regulations must be followed.

Product Features

Operating Mode The **HVAC performance device** consists of four main components:

- Ball Control Valve (CCV)
- Flow Sensor Measurement Pipe
- Temperature Sensors
- Motor

The **HVAC performance device** can be controlled via **communication protocols** or **analog signals**. The fluid is detected by the **sensor inside the measurement pipe**, and the **flow rate** is determined accordingly. The measured value is balanced within the **setpoint range**. The **motor adjusts the valve position** to correct deviations. The **rotation angle (α)** changes based on **differential pressure** via the control element.

Power Calculation The heatmeter **calculates instantaneous thermal power** based on the **current flow rate and** temperature difference.

Energy Consumption Energy consumption data can be accessed through:

- Bus
- Integrated Web Server
- Web-Based Interface
- LCD Screen

Spare Parts The thermal energy meter sensor modüle consist of:

1x Sensor Module with an integrated temperature sensor (T2) and an external temperature sensor(T1).

Power Control Alternatively, the **DDC control signal** can be assigned to the **required output power** in the heat exchanger.Based on **water temperature** and **weather conditions**, the **Smart Valve** regulates the required amount of water (**V'**) to achieve the **desired power level**.
The **maximum controllable power** in the heat exchanger within the **power control module** is:

DN 065	**1700 kW**
DN 080	**2400 kW**
DN 100	**4200 kW**
DN 150	**9500 kW**
DN 200	**17300 kW**

Control Characteristics The system is **calibrated with a precise speed sensor**, ensuring **stable quality control**. However, it is **not suitable for fast control processes** such as **domestic water regulation**.

Energy Control
Q'nom: The maximum possible output power in the heat exchanger.
Q'maks: The maximum power output set by the highest DDC control signal, adjustable between 1% and 100% of Q'nom.
Q'min: Fixed at 0% (non-adjustable).

Flow Control
V'nom: The maximum possible flow rate.
V'maks: The maximum flow rate set by the highest DDC control signal, adjustable between 25% and 100% of V'nom.

Position Control
In this mode, the control signal is assigned to the valve opening angle
(e.g., setpoint = 90, α = 90°).
As a result, the operation becomes pressure-dependent, similar to a standard valve.
Motor runtime: 35 seconds for 90° rotation

Creeping Flow Suppression Considering the very low flow rate at the opening point, this is no longer measurable by the sensor within the required tolerance. This range is electronically ignored.

Opening the Valve

The valve remains closed until the flow corresponding to 1% of the required nominal flow (V'nom) value is reached by the DDC control signal. Once this value is exceeded, control is activated along the flow characteristic.

Closing the Valve

Control remains active along the flow characteristic until the required flow of 1% of the nominal flow (V'nom) value is reached. Once the level drops below this value, the flow is maintained at 1% of V'nom. If the level falls below the flow corresponding to 0.5% of V'nom as required by the DDC control signal, the valve will close.

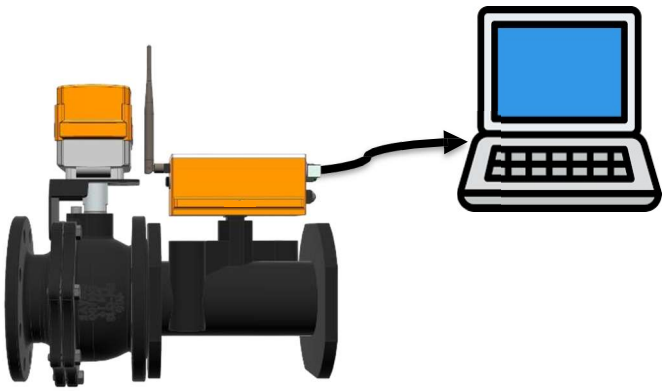
Customizable Unit Factory settings cover most typical applications.
Customization can be performed via the internal web server (RJ45 connection via web browser) or through Wi-Fi.
Additional information regarding the internal web server can be found in the separate documents provided.

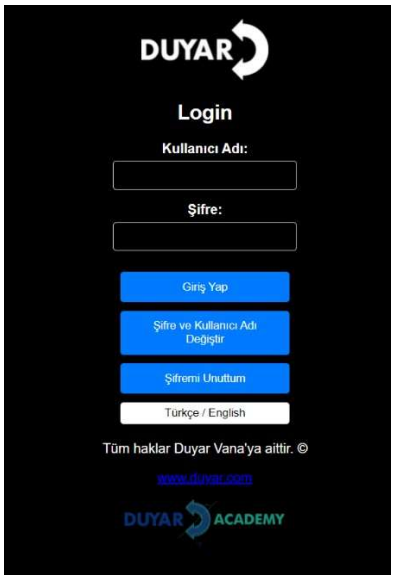
Communication Customization can be performed via the internal web server (RJ45 connection via web browser) or through Wi-Fi.
Additional information regarding the internal web server can be found in the separate documents provided.

"Peer-to-Peer"Connection
https://192.168.4.1
The Laptop should be set to "DHCP" Make sure that only one network connection is active.

Standard IP address:
https://192.168.4.1
Static IP address

Password (Read Only):
Username: «duyar»
Password: «1965»





Hydronic Balancing
Through the internal web server, the maximum flow rate (equivalent to 100% requirement) can be easily and reliably adjusted in a few steps on the device itself. If the device is integrated into a management system, the balancing can be performed directly by the management system.

Delta-T Manager
If a heating or cooling coil is operated with a very high flow rate and consequently a very low delta T, a high power output will not occur.
Low delta T's cause heat generators or cooling machines to provide energy at lower efficiency. Additionally, too much water is circulated by the pumps, which unnecessarily increases energy consumption.
With the Smart Valve, it is easy to identify off-design operations from the design file and detect inefficient energy use.
The integrated delta T manager allows the user to define a delta T threshold value. If the value falls below this threshold, the Smart Valve automatically limits the flow to prevent this.
The Delta T manager can be activated in energy control, flow control, and position control operating modes. It cannot be used in differential pressure control mode.

Analog - Communication Hybrid Mode
Through an analog DDC control signal, standard control, internal web server, ModbusRTU, ModBUS TCPIP, and MQTT communication can be used for position feedback.

Power and Energy Monitoring Functions
The HVAC performance device is equipped with two temperature sensors. One sensor (T2) is already mounted on the calorimeter device, and the other sensor (T1) must be mounted in the field on the opposite side of the water circuit. The two sensors are shipped with system connections already made.
The sensors are used to record the fluid temperature on the supply and return lines at the consumption point (heating/cooling coil). With the integrated flow measurement in the system, the water amount is known, and the energy consumed by the consumer can be calculated. Additionally, the heating/cooling energy is determined by evaluating the energy over a specific time period.
For example, current data such as temperature, flow volumes, heat exchanger energy consumption, etc., can be recorded and accessed at any time via a web browser or communication unit.

Data Logging
The recorded data can be used for overall system optimization and to determine the performance of the consumption point (heating/cooling coil).
CSV files downloaded through the web browser.

Product Features

Manual Intervation Element Control via Allen key (manual opening/closing can be performed with the device on the motor).

High Functional Safety The valve motors are protected against mechanical jams. They automatically stop when they reach the end position without the need for limit switches.

Included Parts

Description	Type
RJ connection module IP67 Protected	Panel Type
PT1000 Temperature Sensors	Stainless Steel Waterproof Protection
	ISO9001 ISO14001 CE

Accessories

Spare Sensor Modules

Description	Type
Heatmeter Module DN 065	Ultrasonic
Heatmeter Module DN 080	Ultrasonic
Heatmeter Module DN 100	Ultrasonic
Heatmeter Module DN 150	Ultrasonic
Heatmeter Module DN 200	Ultrasonic

Tools	Description Type
For wired and wireless installation, on-site operation, and troubleshooting.	Web Module

Electrical Connections

Power Information:

Red: 24VDC

Black: 0V

Yellow – Green : Ground

Feedback:

1: RS485 – A + ModBUS RTU

2: RS485 – B – ModBUS RTU

3: OUT 1 – 2 – IN VCC Giriş

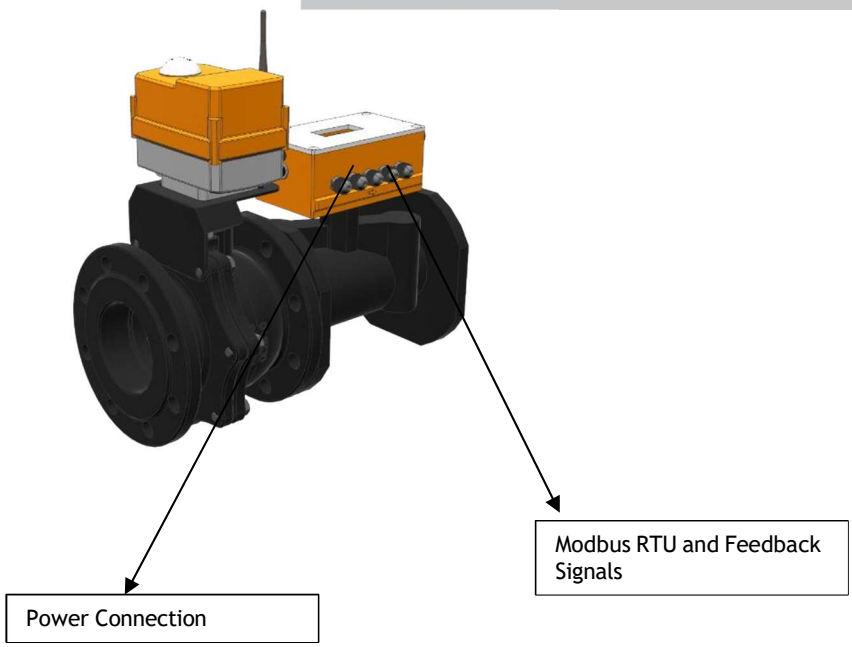
4: OUT 1 – Feedback Dry Contact

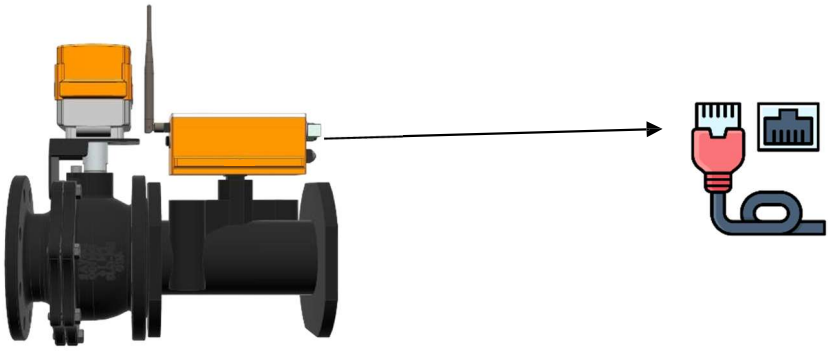
5: OUT 2 – Feedback Dry Contact

6: Analog Feedback– VCC 24VDC

7: Analog Feedback – OUT SIGNAL

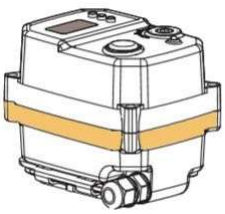
8: Analog Feedback – 0V

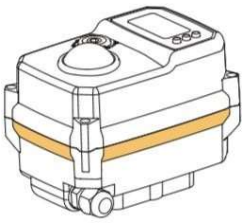


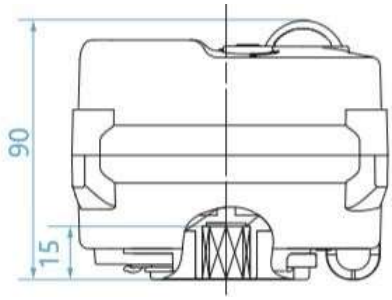


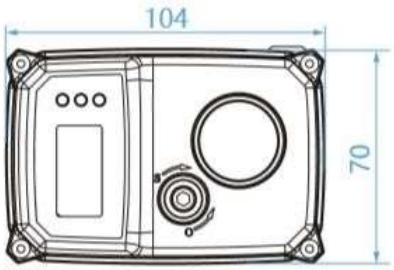
The RJ45 socket input enables ModBUS TCP/IP communication or the device's internet connection.

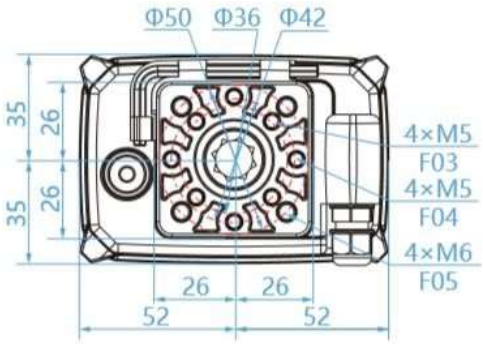
Actuator Information Section



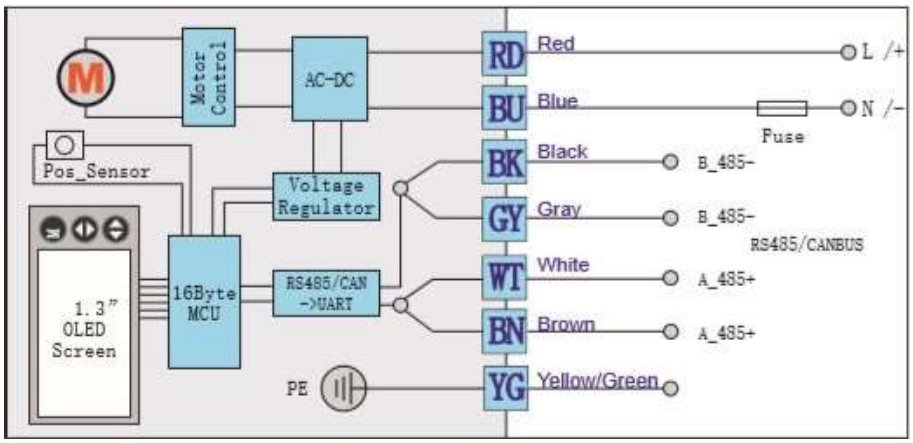


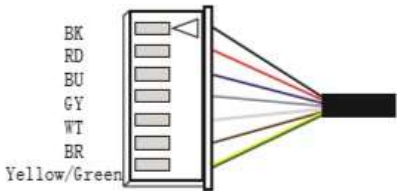






Electrical Connection Information



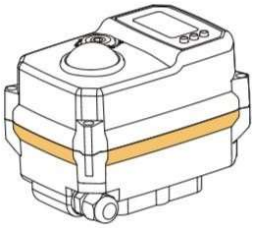


Actuator Information Section

User Parameters

The necessary adjustments can be made through the screen interface on the actuator. These settings are factory-default for the Smart Valve. **It is not recommended to modify these settings.** This section only explains the parameter settings that can be adjusted if the actuator is selected for use.
When the M button on the actuator is pressed for 3 seconds, the user settings screen will appear.
The password for this screen is 312. The password entry is done using the corresponding arrow keys.
Instructions:
- Press K3 to increase the value.
- Press K2 to decrease the value.
- Press M to move to the next item.

NoValvCtr: In this settings screen, when the first power is supplied, if no command is given to the actuator, this setting determines what the actuator should do.



ALLDV: All devices on the serial port

U0DEV: Device serial port 0 – ModBUS data

U1DEV: Device serial port 1 – Bluetooth data transmission

ON: The command is processed to fully open the actuator valve.

OFF: The command is processed to fully close the actuator valve.

KEEP: The actuator will maintain its current position.

B33: The actuator will stop at the position corresponding to the given position range in this command. The position range is from 0% to 100%.

Press the M button to move to the next menu.

Deadzone Setting:
The main function is to adjust the valve's control sensitivity.
The larger the deadzone, the less sensitive the valve will be.
The smaller the deadzone, the more sensitive the valve will be, but this tends to cause oscillation in the system.
The system default is 1.0%.

MVF_FilCoe:
The larger the value, the better the filtering effect, but the response time of the actuator to the signal will be longer.
Under the condition of ensuring the stability of the input signal, it is recommended that users select a smaller value for this parameter. This value should not be too high.
Filtering is disabled when the valve is at the 0 position.
The default value is 16.

LPF_Filtcoe: Stands for Low-Pass Filter.

• The smaller the coefficient, the more stable the filtering effect, but the lower the precision.
• The larger the coefficient, the higher the precision, but the filtering effect becomes less stable.
• When the value is 0, filtering is disabled.

Default value: 0.4User Settings (UserSET):

- **LPF_FiltCoe:** 0.4

- **Instructions:**
  • Press K3 to increase the value.
  • Press K2 to decrease the value.
  • Press M to proceed to the next item..

Speedmax Settings:

The main function is to set the maximum operating speed.
• When a larger value is selected, the operating speed increases, but the maximum speed will not exceed the nominal speed.
• Note: Adjusting the speed affects the output torque.
o When a smaller value is selected, the torque also decreases.

System Default: 100%.

SpeedMin Setting:

The main function is to set the minimum operating speed.

• When a smaller value is selected, the operating speed decreases, but the minimum speed will not fall below the nominal speed.

• Note: Adjusting the speed affects the output torque.

o When a smaller value is selected, the torque also decreases.

Manual Operating Speed Setting:

Instructions:

• Press the K3 button to increase the value by 1%.

• Press the K2 button to decrease the value by 1%.

• Press the M button to proceed to the next setting.

When the user switches to manual operation mode, the operating speed of the actuator is determined by this parameter.

MODBUS Settings:

• Hold the M button, and the "M" icon in the upper right corner will start blinking.

• After approximately 3 seconds, the device will enter "Userset" mode.

• Enter the code "222" on the password screen and proceed to the next setting

ModBus ID Settings:

- InitModbusParam: The initial setting of the ModBus parameters is configured..
- ModBus ID: The default value is set to 100.

Instructions:

- Press the M button to move to the next setting

Baud: The user can select different Baud Rate values for the actuator through this parameter.

- **Default Baud Rate:** 9600
- **Selectable Baud Rate:**
  - 1200
  - 2400
  - 4800
  - 9600
  - 19200
  - 38400
  - 57600
  - 115200

Parity: The user can configure this parameter according to the Upper Computer's Parity setting.

• Options:

o Even

o Odd

o None

• Default Setting: Even

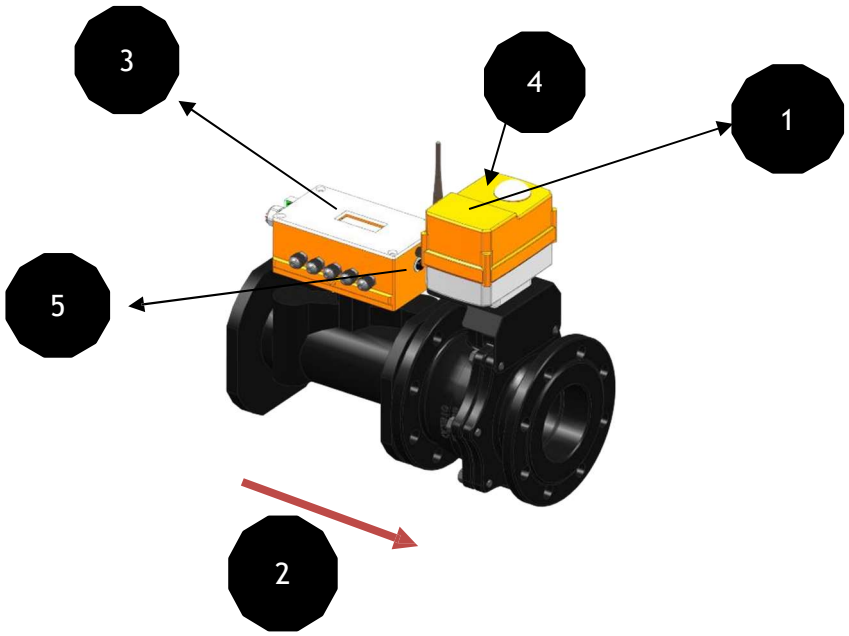
Manual Mode:

Press the K3 button and enter the code 111. After entering, use the arrow keys to turn the device on/off.

Operating Controls and Indicators

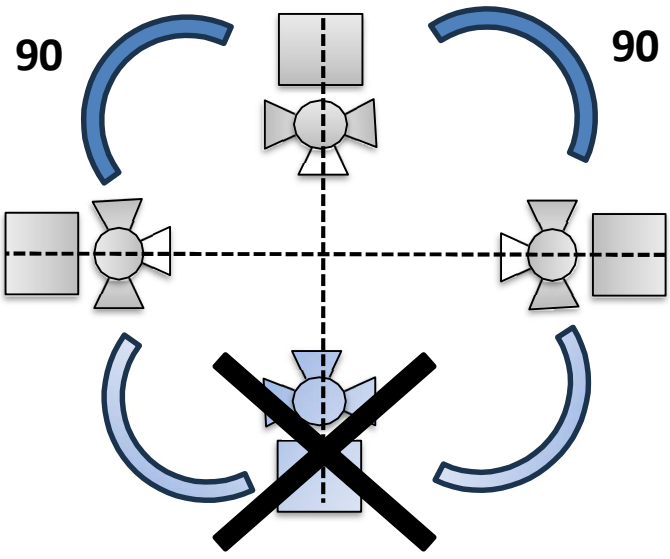
1. LCD Panel: Valve Live Position Indicator and Settings
2. Flow Direction
3. Proximity communication interface: Displays Energy, Flow Rate, Inlet-Outlet Temperature, and Difference. Press button number 5
4. Manual intervention element button.

   Remove the device: Ensure that the motor is not rotating, remove the device from the motor, and place it in the relevant area. Manual switching on/off is possible



Assembly notes.

Permitted Installation Direction The ball valve can be installed in a position between vertical and horizontal. It cannot be installed in a suspended position, with the shaft facing downward.



Installation Location, Return Line It is recommended to install it on the return line

Installation of the Immersion Sleeve and Temperature Sensor:
The valve is equipped with two fully connected temperature sensors.
• T2: This sensor is mounted on the thermal energy measuring instrument.
• T1: This sensor should be installed either before the consumer (on the return line valve; recommended) or after the consumer (on the supply line valve).
Note:
The cables between the valve unit and the temperature sensors should not be shortened or extended.

Water Quality Requirements

The water quality requirements specified in VDI 2035 must be adhered to.
Smart valves are adjustment devices. Care must be taken to ensure the valves are not contaminated for proper long-term operation (e.g., welding slag during installation). It is recommended to install an appropriate filter..

Service

The ball valve, rotary actuators, and sensors do not require maintenance.
Before any service work on the control element, it is essential to isolate the rotary actuator from the power source (by disconnecting the electrical cable). Pumps in the relevant section of the pipe system should be stopped, and sliding valves should be closed (if necessary, allow all components to cool, and the system pressure must always be reduced to ambient pressure levels).
The globe valve and rotary actuator should not be returned to service until they are correctly installed according to the instructions and the pipework is recharged by trained personnel.

Flow Direction

The flow direction indicated by an arrow on the housing must be followed; otherwise, the flow will be measured incorrectly.

Pipe Cleaning

The system should be thoroughly flushed to remove contaminants before installing the heatmeter.

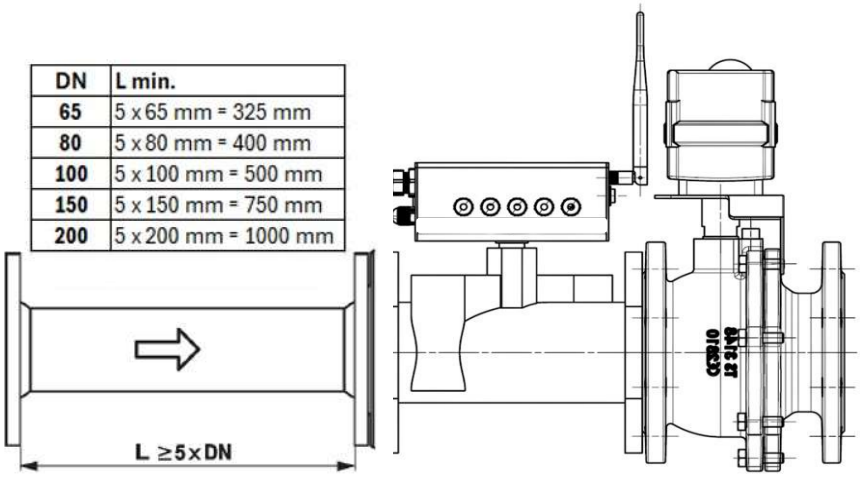
Stress Prevention

The heatmeter should not be exposed to excessive strain caused by pipes or fittings.

Inlet Section

To achieve the specified measurement accuracy, a flow stabilization section or an inlet section must be created downstream of the flow sensor in the direction of flow. Its dimensions should be at least 5 x DN

DN	L min.
65	5 x 65 mm = 325 mm
80	5 x 80 mm = 400 mm
100	5 x 100 mm = 500 mm
150	5 x 150 mm = 750 mm
200	5 x 200 mm = 1000 mm



ModBUS Register Information - SMART VALVE

Modbus Register Description				
No.	Address	Description	Register Type	Unit
1	0	Control Mode: 0: Position Control Mode 1: Flow Control Mode 2: Energy Control Mode 3: ΔT Control Mode	int16	#
2	1	ΔT Manager Status 0: ΔT Manager : OFF 1: ΔT Manager : ON	int16	#
3	2	Override Control 0 : Position Set Point [Valve will be act according to set point data] 1 :Fully Close Valve Data 2: Fully Open Valve Data	int16	#
4	#	#	#	#
5	4	Save Data 0: Data All set points and modes are not saved (save status closed) 1: Data All set points and modes are saved (save status open) When the Save Data is 1 (save all adjustsments) after this Register has to be Closed (Save Data = 0)	int16	#
6	#	#	#	#
7	6	Valve Status 0: Valve Closed Data 1: Valve Opened Data 2: Valve In Control Data When the read valve position data is 0°, Valve fully Closed When the read valve position data is 90°, Valve fully Opened When the read valve position data between 0 - 90° , Valve in control data	int16	°
8	7	Sensor 1 Temperature Error Counter When the temperature sensor has problem, the counter is count until the problem is solved	int16	#
9	8	Sensor 2 Temperature Error Counter When the temperature sensor has problem, the counter is count until the problem is solved	int16	#
10	9	Energy Realized Error Counter When the temperature sensor has problem, the counter is count until the problem is solved	int16	#
11	10	Position Set Point Data [°] Set valve position btw 0-90°	int16	°
12	11	Absolute Read Position Data [°] Read Valve Position Data btw 0-90°	int16	°
13	12	Flow Treshold Value HighWord | LowWord	int32 | float	m3/h
14	13	Set Flow Treshold Data		

15	14	Energy Treshold Value HighWord | LowWord	int32 | float	kWh
16	15	Set Energy Treshold Data		
17	16	ΔT Treshold Value HighWord | LowWord	int32 | float	°C
18	17	Set ΔT Treshold Value		
19	18	Volumetric Max Value HighWord | LowWord	int32 | float	m3/h
20	19	Set Volumetric Max Value		
21	20	Flow Set Point Data HighWord | LowWord	int32 | float	m3/h
22	21	Set Flow Value		
23	22	Energy Set Point Data HighWord | LowWord	int32 | float	kWh
24	23	Set Energy Data		
25	24	ΔT Set Point Data HighWord | LowWord	int32 | float	°C
26	25			
27	26	Absolute Flow Read Data[m3/h] HighWord | LowWord	int32 | float	m3/h
28	27	Reading the Flow value in cubic meter		
29	28	Absolute Energy Read Data[kWh] HighWord | LowWord	int32 | float	kWh
30	29	Reading the Energy Data in kWh		
31	30	Absolute Cubic Volume Flow Read Data[m3] HighWord | LowWord	int32 | float	m3
32	31	Reading the Volumetric Flow in cubic meter [m3]		
33	32	Absolute Total Energy Read Data [kWh] HighWord | LowWord	int32 | float	kWh
34	33	Reading the Total Energy Value [kWh]		
35	34	Absolute ΔT Read Data [°C] HighWord | LowWord	int32 | float	°C
36	35	Reading the ΔT = T1-T2 Value in °C		
37	36	Absolute Temperature 1 Read Data [°C] HighWord | LowWord	int32 | float	°C
38	37	Reading the T1 Temperature Data		
39	38	Absolute Temperature 2 Read Data [°C] HighWord | LowWord	int32 | float	°C
40	39	Reading the T2 Temperature Data		
41	40	Absolute Differantial Water Pressure [Bar] HighWord | LowWord	int32 | float	Bar
42	41	Reading the Differantial Water Pressure Data		
43	42	Analog Output Feedback Signal Selection [V/C]	int16	#
44	43	Absolute Feedback Voltage Data [V] HighWord| LowWord	int32 | float	V
45	44	Reading the Feedback Voltage Signal Data		
46	45	Absolute Feedback Current Data [mA] HighWord| LowWord	int32 | float	mA
47	46	Reading the Feedback Current Signal Data		

ModBUS Address Information - Just Actuator Usage

【Function code of master computer and RS485 bus valve communication】

03/04 Read data in valve register.

06 Write data into valve register: xx xx double byte data.

【Read valve command format send by master computer】

Valve_Addr	03/04	00	XX	00	YY	CRCL	CRCH

Among: Valve_Addr means the bus address which gonna operate "read";

03/04 means read valve register;

00 XX meand the register address.

00 YY means read YY*2 byte data from 00 XX;

CRCL CRCH is the two byte CRC proofreading code which is sent by master computer

【Returned correct data format after read valve】

Valve_Addr	03/04	YY*2	DAT_1	DAT_2	···	DAT_{YY*2}	CRCL	CRCH

Among: Valve_Addr means the return data valve bus address which can be write;

04 means read the valve register;

YY means read two byte data YY*2;

DAT_1 DA T_2···DAT_{YY} are read data;

CRCL CRCH are two byte CRC proofreading code which calculated by valve MCU.

【Command format data which was send by master computer for write valve operation】

Valve_Addr	06	00	XX	DATH	DATL	CRCL	CRCH

Among: Valve_Addr means the bus address which gonne write the valve;

06 means write valve register;

00 XX means the register address which need to be write(can only be writable register);

DATH DATL are data which need to be write;

CRCL CRCH are two byte CRC proofreading code which was sent by master computer.

【The correct feedback command forat of write valve operation】

Valve_Addr	06	00	XX	DATH	DATL	CRCL	CRCH

Among: Valve_Addr means the return data valve bus address which can be write;

06 means write valve register;

00 XX means the register address which need to be write(can only be writable register);

DATH DATL are data which need to be write;

1、Command format for read single byte data

Send format: Valve_Addr 03/04 00 XX 00 01 CRCL CRCH

Among: Valve_Addr means currut operation valve bus address;
03/04 means read valve register;
00 XX means read register address;
00 01 means read one byte data;
CRCL CRCH means two byte CRC proof-reading code.
When Valve_Addr =0, no data return;
When Valve_Addr!=0, The valve meeting the address number will have return;

When return correct, it will return: Valve_Addr 04 02 DATH DATL CRCL CRCH

Among: Valve_Addr means a feedback data valve bus address which accept read operation;
DATH DATL the readed data;
CRCL CRCH is the CRC proof-reading two byte code which calculated by valve MCU.

【Example】Read the opening angle of valve:
Master computer send: 64 04 00 14 00 01 CRCL CRCH
Valve feedback: 64 04 02 AA BB CRCL CRCH
Opening angle: (AA*256+BB) /10

2、Control valve open/close

Send format: Valve_Addr 06 00 04 00 CMD CRCL CRCH 06 00 04 00 CMD CRCL CRCH

Among: Valve_Addr 06 00 04 00 CMD CRCL CRCH means the bus address of currect operate valve;
00 04 means the register of stock valve' s open/close command.
CMD means set valve' s open/close command;
CRCL CRCH means two byte CRC proof-reading code.

When the communicate are going well, valve will feedback: Valve_Addr 06 00 02 SETH SETL CRCL CRCH

3、Modify the valve ID address with no condition(Need customized,default factory standard have no this function):

Send format: **FD 5D 00 06 00 Addr CRCL CRCH**

Feedback: **Addr** 5D 01 E5 CRCL CRCH

Example: for unknown valve address, modify the address to 1 mandatory

Master computer send: FD 5D 00 06 00 01 D9 FA

Slave computer feedback: 01 5D 01 E5 50 11

4、4、Read current work state and valve opening angle

Send format: Valve_Addr 04/03 00 52 00 02 CRCL CRCH

Feedback: Valve_Addr 04/03 04 [0001][0014] CRCL CRCH

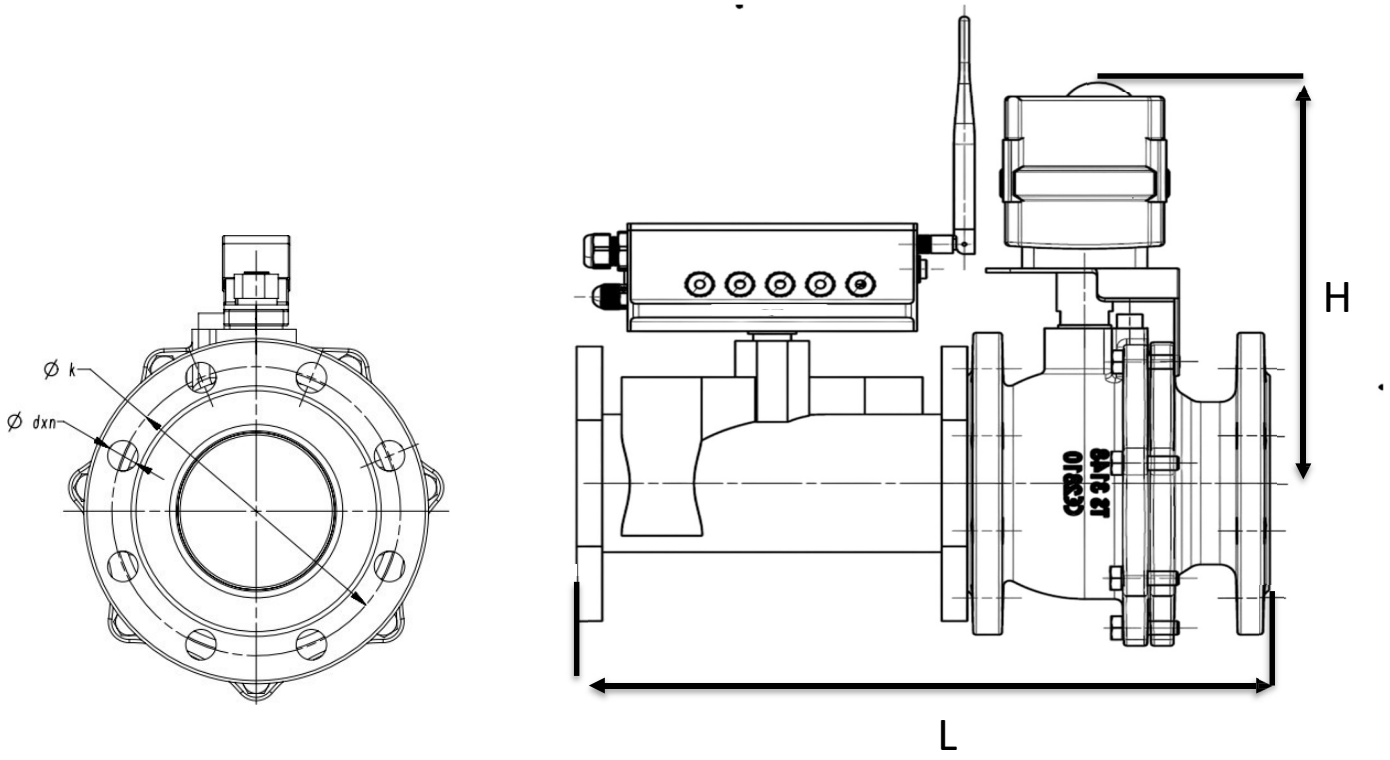
Send: 64 04 00 52 00 02 d9 ef

Feedback: 64 04 04 00 STATUS HH LL CRCL CRCH Among 【STATUS】 means valve state, 【HH LL】means valve position.

TAG	ADRESS	MODBUSS ADRES	REGISTER TYPE
FLOW	0	40001	float
ENERGY	2	40003	float
HOT TEMP	4	40005	float
COLD TEMP	6	40007	float
DT TEMP	8	40009	float
VOLUME	10	40011	float
TOTAL ENERGY	12	40013	float
ERRORT1	14	40015	int16t
ERRORT2	15	40016	int16t
ERRORENERGY	16	40017	int16t

The following ModBUS addresses should be used only at locations where the use of a heatmeter is required.

Dimensions - SMART VALVE



Type	DN	L(mm)	H(mm)	D(mm)	d(mm)	k(mm)
T-1205-065	65	370	245	185	19x4	145
T-1205-080	80	405	250	200	19x8	160
T-1205-100	100	440	255	220	19x8	180
T-1205-150	150	650	269	285	23x8	240
T-1205-200	200	695	289	340	28x12	295