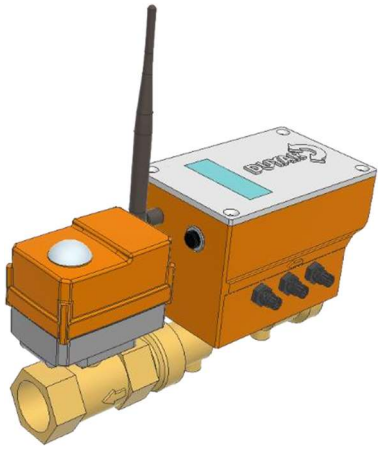
A heatmeter with a sensor-operated position, flow, or energy control function, including flow, energy, and delta T monitoring, featuring a 2-way PN 25 ball control valve with internal and external threads.

- 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



General Information

Type	DN	Rp ["]	G ["]	V'min [m³ /h]	V'nom [m³ /h]	Kvs theoretical [m³ /h]	PN	Cable length
T-1205-015	015	1/2	3/4	0.015	1.5	3.2	25	1 m
T-1205-020	020	3/4	1	0.020	2.5	5.3	25	1 m
T-1205-025	025	1	1 1/4	0.035	3.5	8.8	25	1 m
T-1205-032	032	1 1/4	1 1/2	0.060	6	14.1	25	1 m
T-1205-040	040	1 1/2	2	0.100	10	19.2	25	1 m
T-1205-050	050	2	2 1/2	0.600	15	30.4	25	1 m

Kvs theoretical: Pressure fall calculation for theoretical Kvs value

Structure

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

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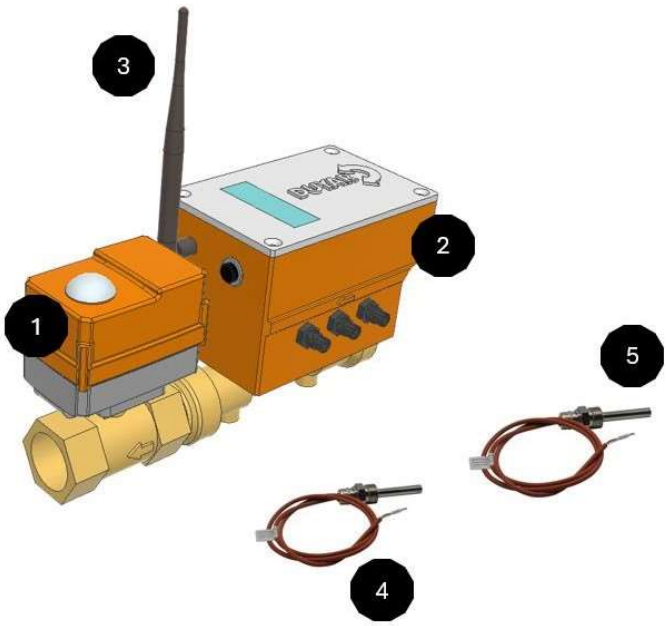
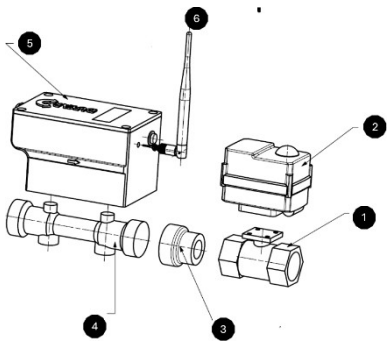


External temperature sensor 5 Integrated heat sensor 4
Logic module 2
Sensor module 2
Motorized ball control valve 1

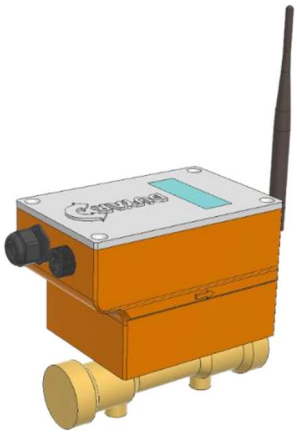


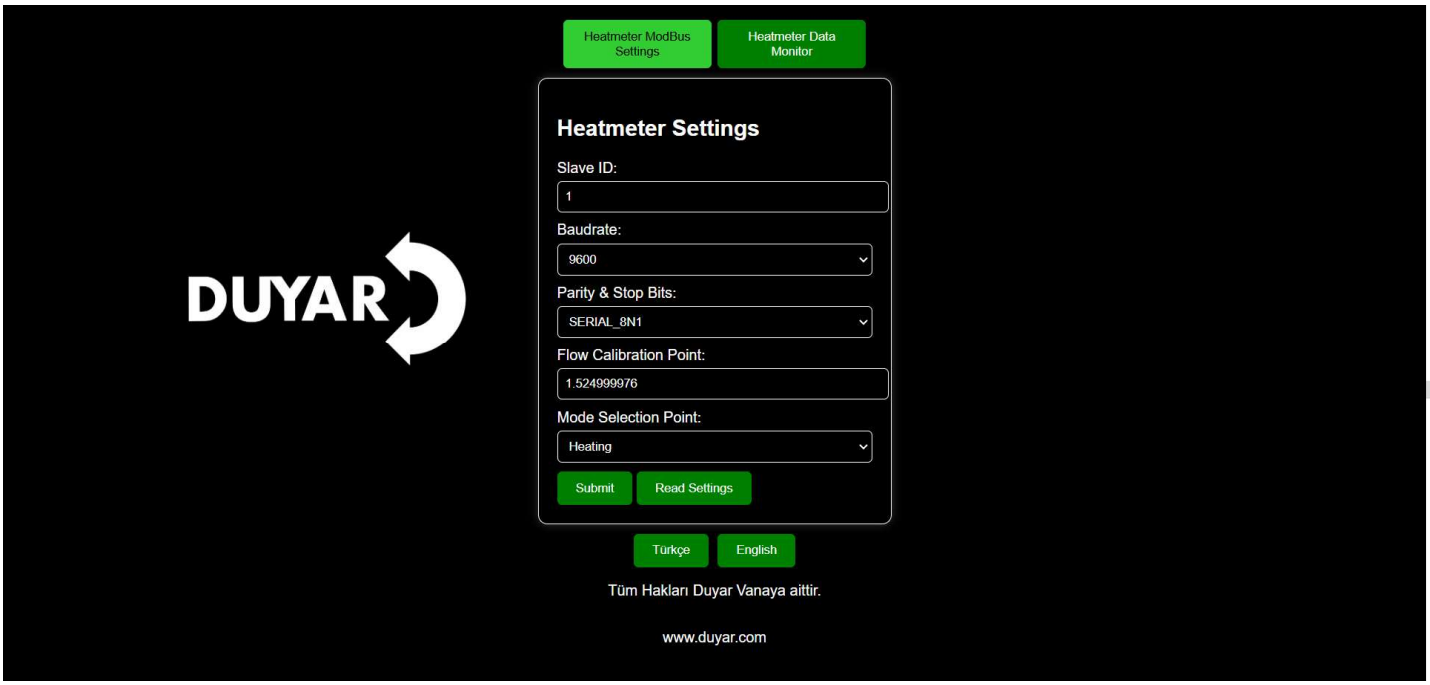
The modular design of the heatmeter allows the logic module to remain in the system even if the sensor module is replaced.

Heatmeter sensor:

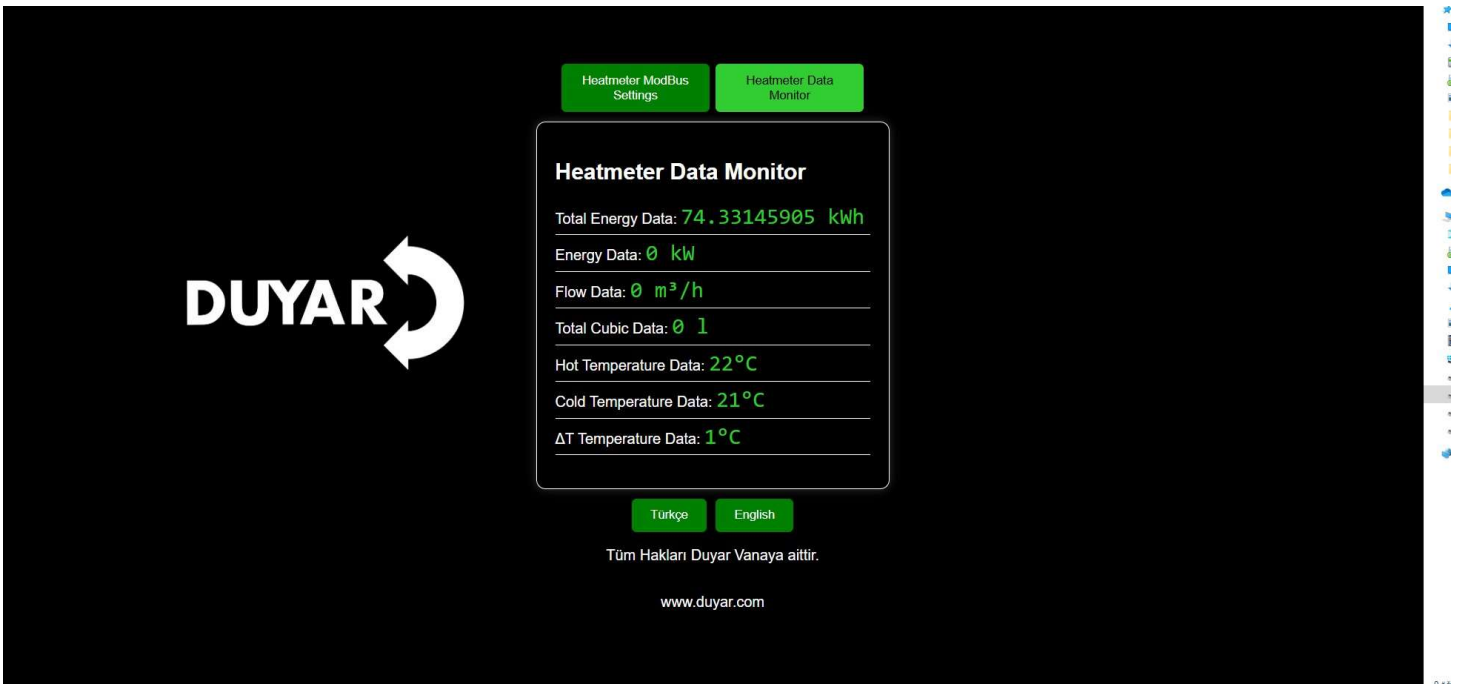
It consists of a sensor module and a logical controller that has connected temperature sensors and includes a calculator unit and a measurement system. Communication settings can be made with the integrated web interface in the heatmeter sensor module and all read data can be accessed from this interface. These data can also be accessed with the built-in LCD screen.
In terms of hardware features, it has two temperature sensors (one integrated) and is based on the ultrasonic measurement principle.
It can measure energy.
The supply can operate in the range of 5VDC-28VDC. It can keep total energy data in its memory.

integrated interface can be accessed via wi -fi.
Password: 123456789
The address 192.168.4.1 is entered.

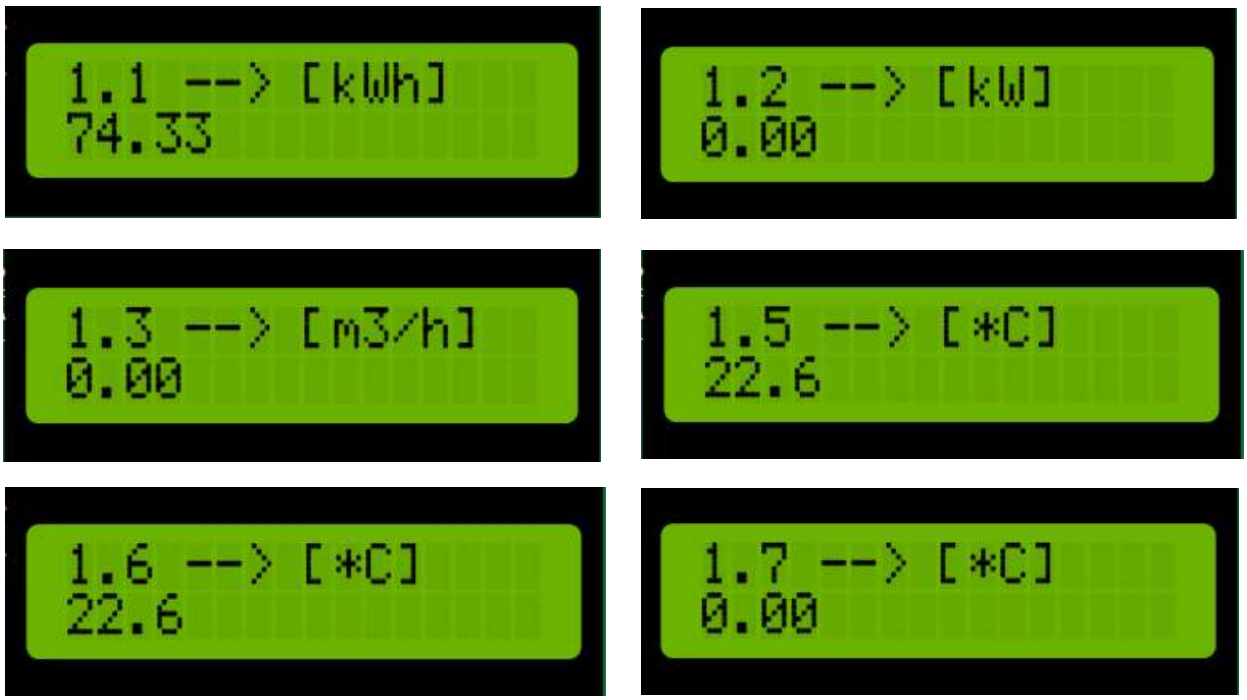




The interface heatmeter sensor settings in the image above are included. Heatmeter sensor with Modbus RTU communication feature Slave ID, Baudrate , Parity and Stop Bits settings can be made.
The coefficient at the calibration point can be changed. However, this setting is a factory setting. It is not recommended to enter. Otherwise, incorrect flow data will be obtained.



The interface above contains heat meter sensor measurement data. These data can also be accessed from here.
This data can be kept in memory as Total Energy Data kWh, Energy Data Kw, Flow Data m3/h, Total liters (reset when power is turn off.)
Input-Output Temperature data (˚C) and Temperature Difference (˚C) are included.
This data is also available on the integrated LCD Display.



1.1 - Total stored energy data (kWh)

1.2 - Instant Energy data (kW)

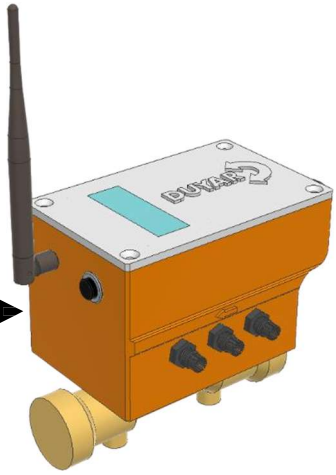
1.3 - Flow Data (m3/h)

1.5 - Input Temperature Data (°C)

1.6 - Output Temperature Data (°C)

1.7 - Delta T Data (°C)

The button is pressed to switch between LCD data.



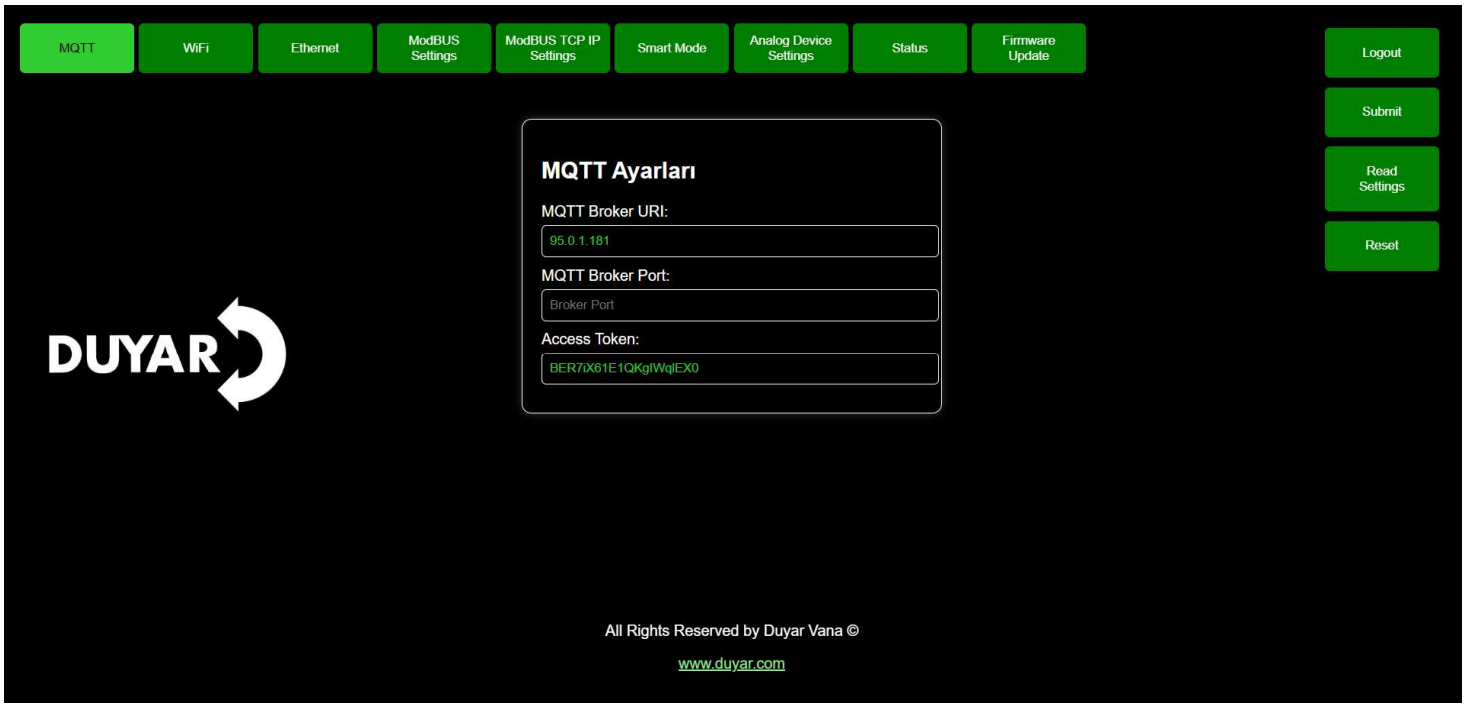
Logic Controller:

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.

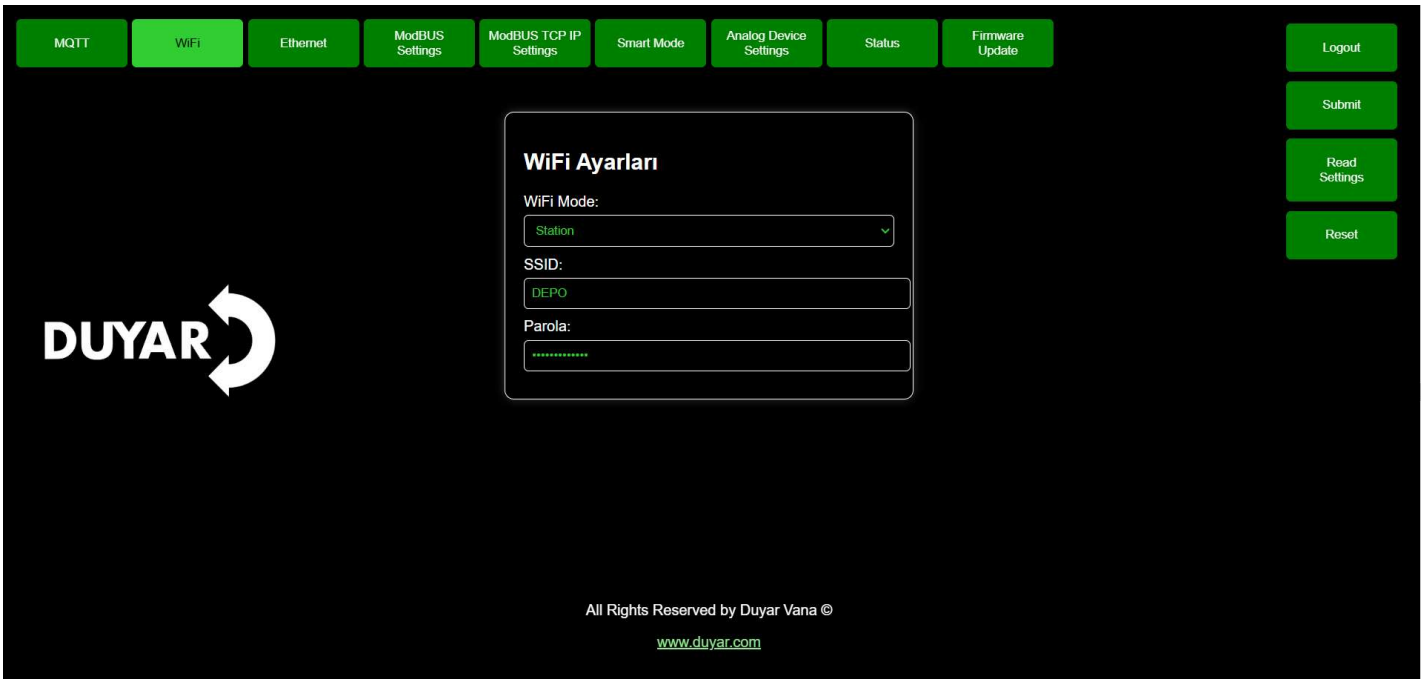
Password: 12345678

The address 192.168.4.1 is entered.



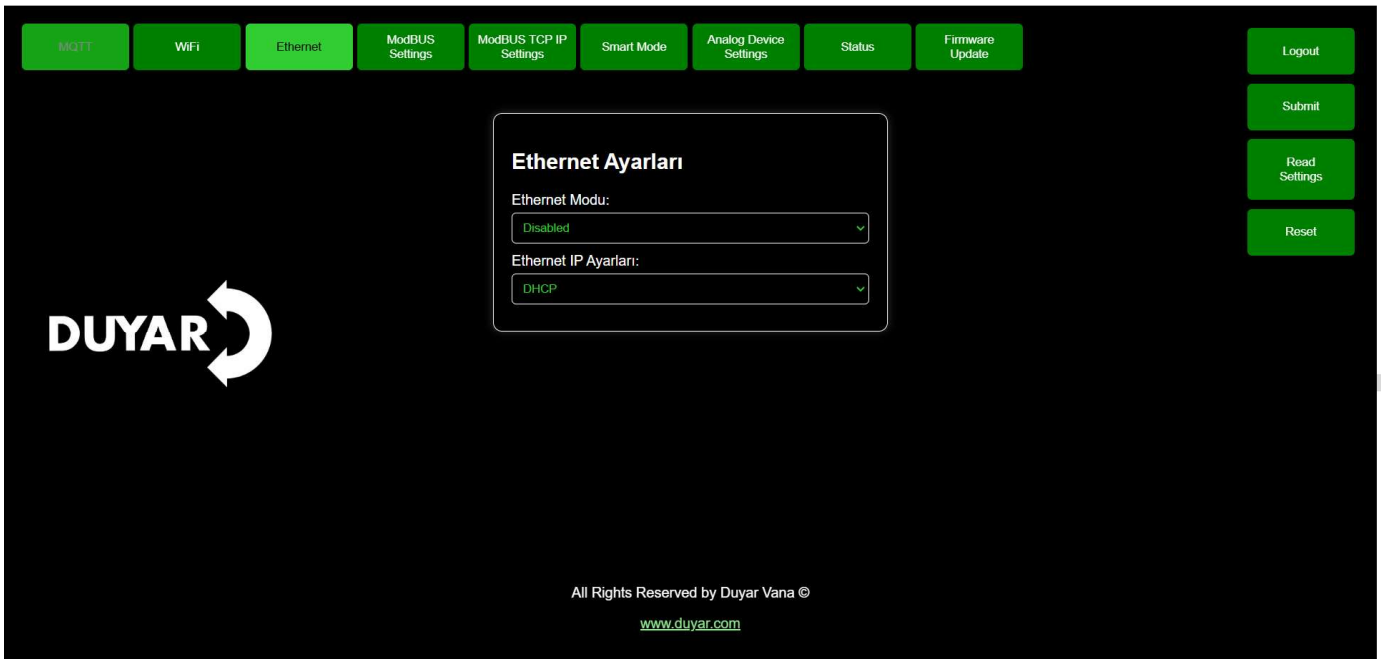
a) **Logic Controller Integrated Interface - MQTT:** This section is where web-based interface settings are configured.

- **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.

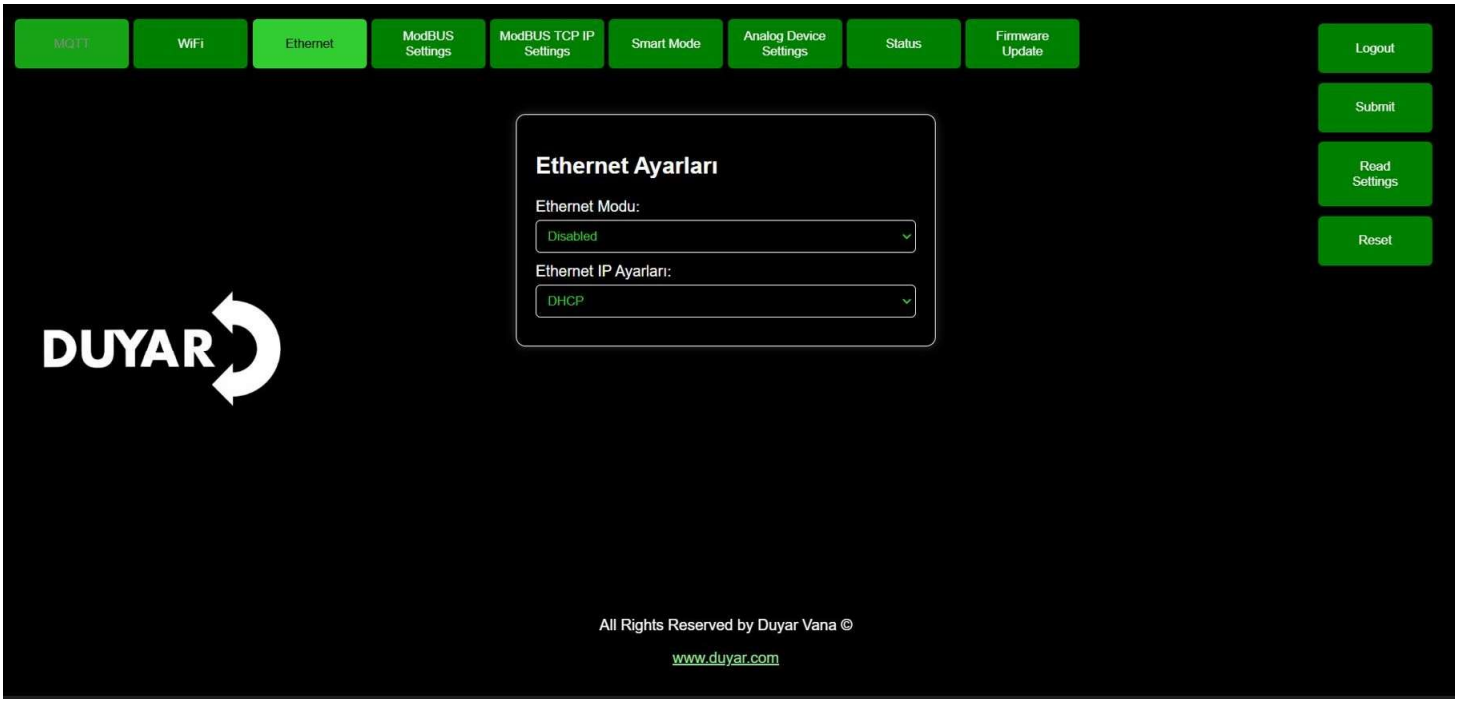


b) **Logic Controller Wi-Fi Settings:** This section allows data from the device to be transferred to the web-based interface using a wireless communication option.

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

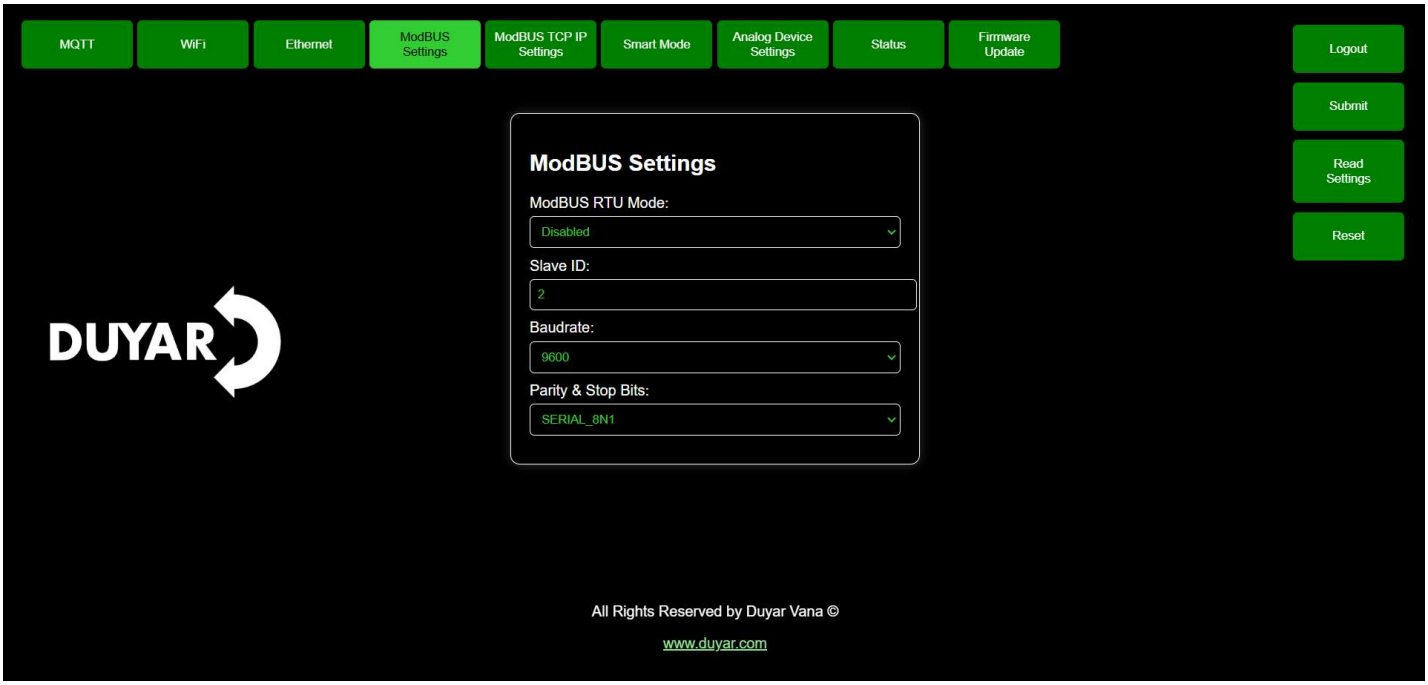


Wi-Fi Mode: By default, it is set to **Access Point** mode. This setting is chosen to enable access to the device.



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

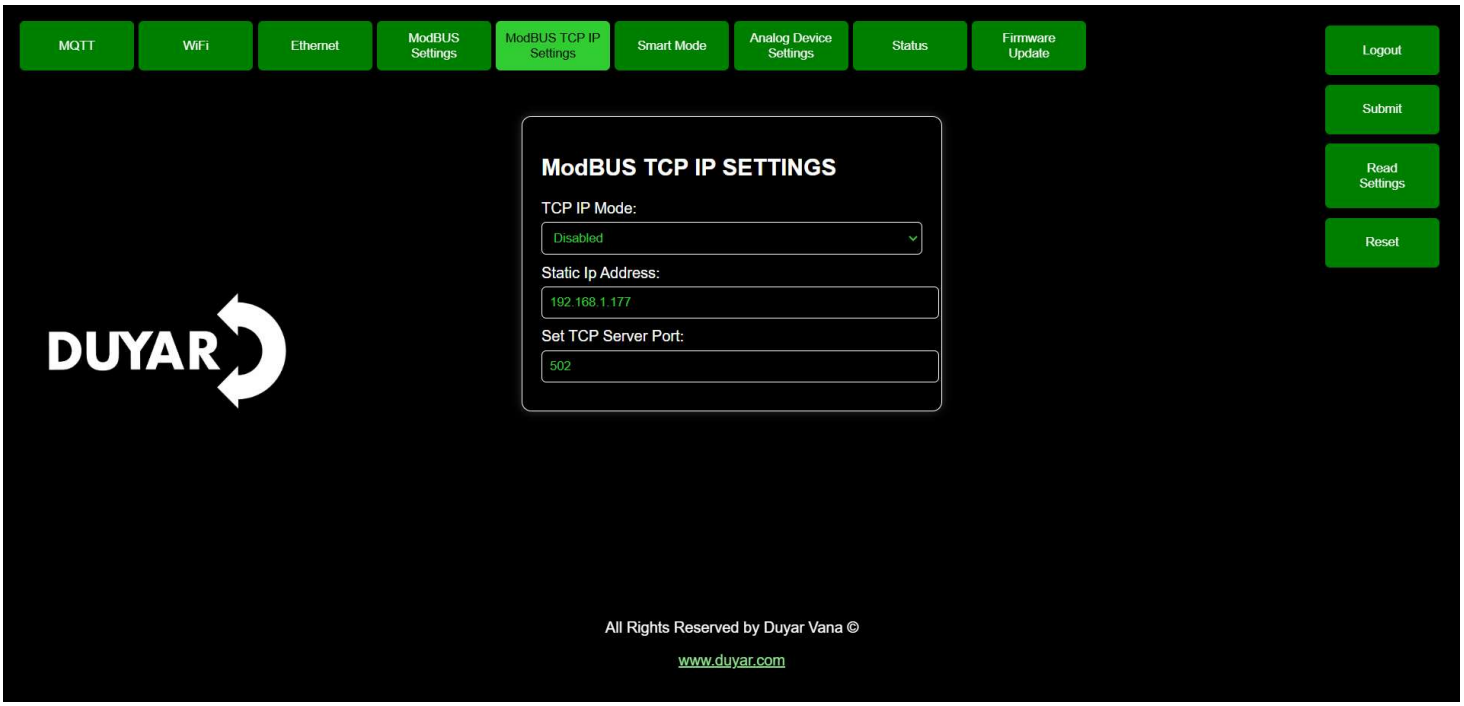
- **Ethernet Mode:** Should be set to Enabled. IP settings can remain as DHCP.
- **Wi-Fi Mode:** Should be set to Access Point. Otherwise, the device will attempt to connect to the internet via both wired and wireless connections, which may cause it to enter a reset loop after a while.



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

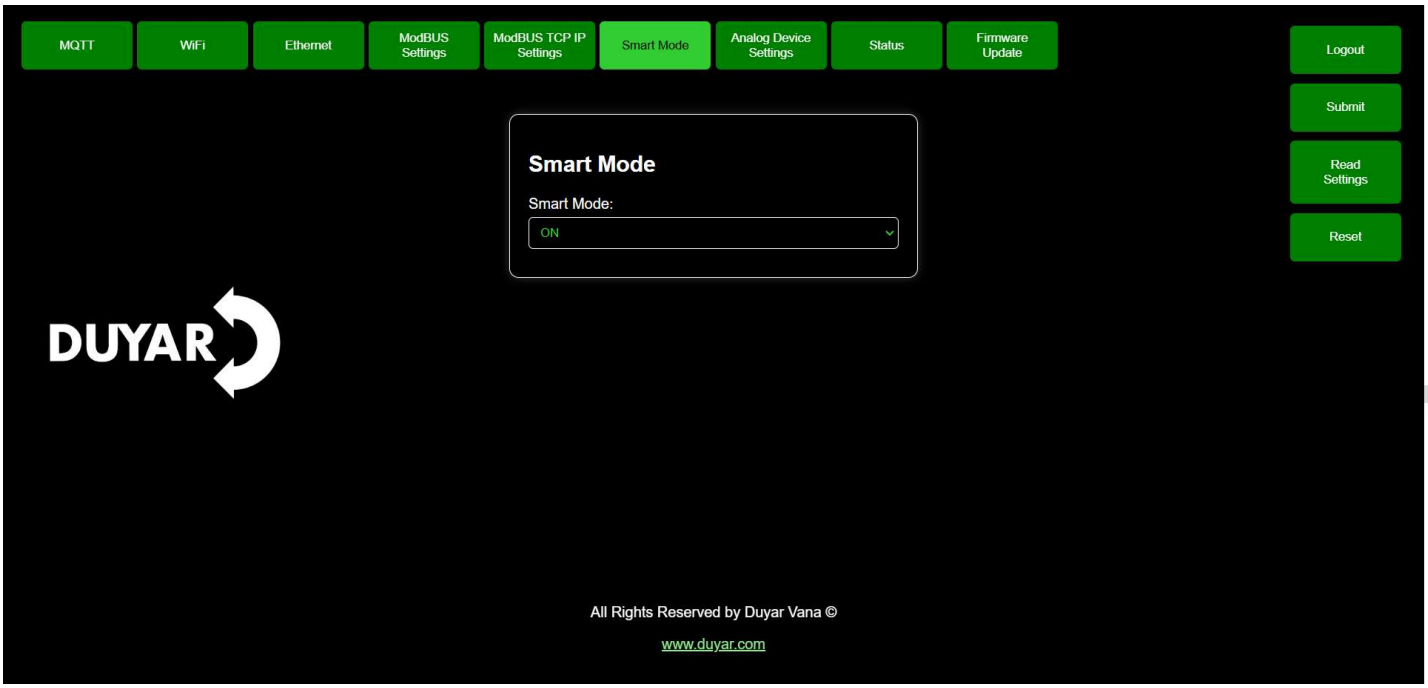


e) **Logic Controller ModBUS TCP/IP Settings:** If the device is to be controlled via a different SCADA system instead of the web-based interface, the ModBUS TCP/IP option can be used.

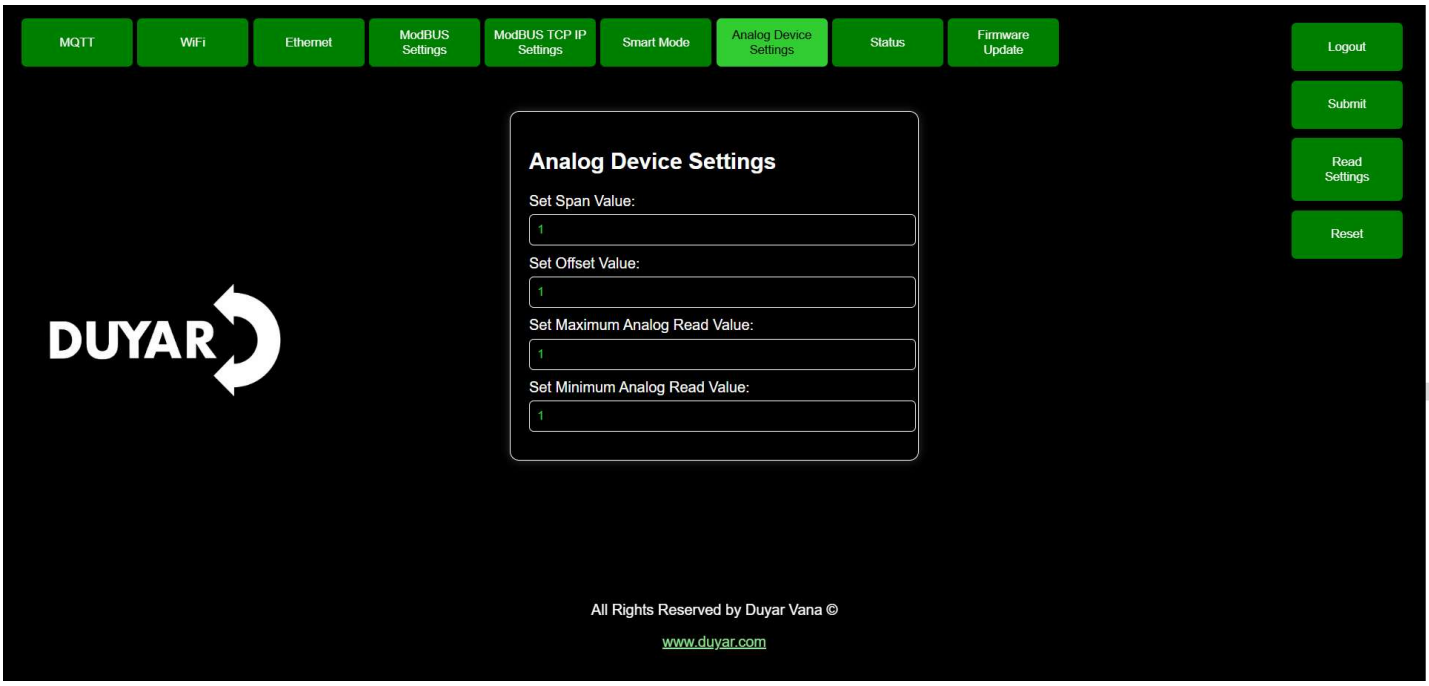
- **Device Static** IP: 192.168.1.177
- **Server Port**: Default set to 502

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

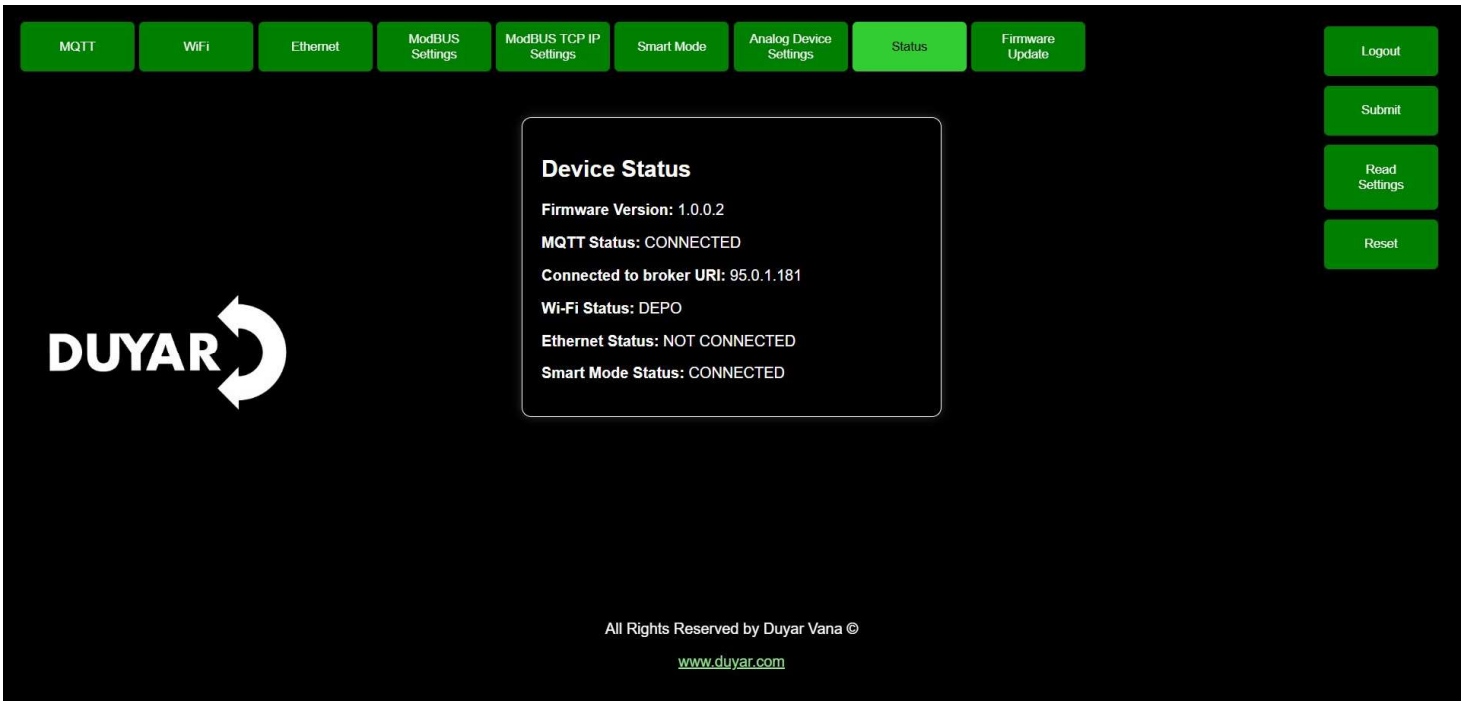
- Wi-Fi Mode: Access Point
- Ethernet Mode: Disabled
- ModBUS RTU Mode: Disabled
- Smart Mode: OFF



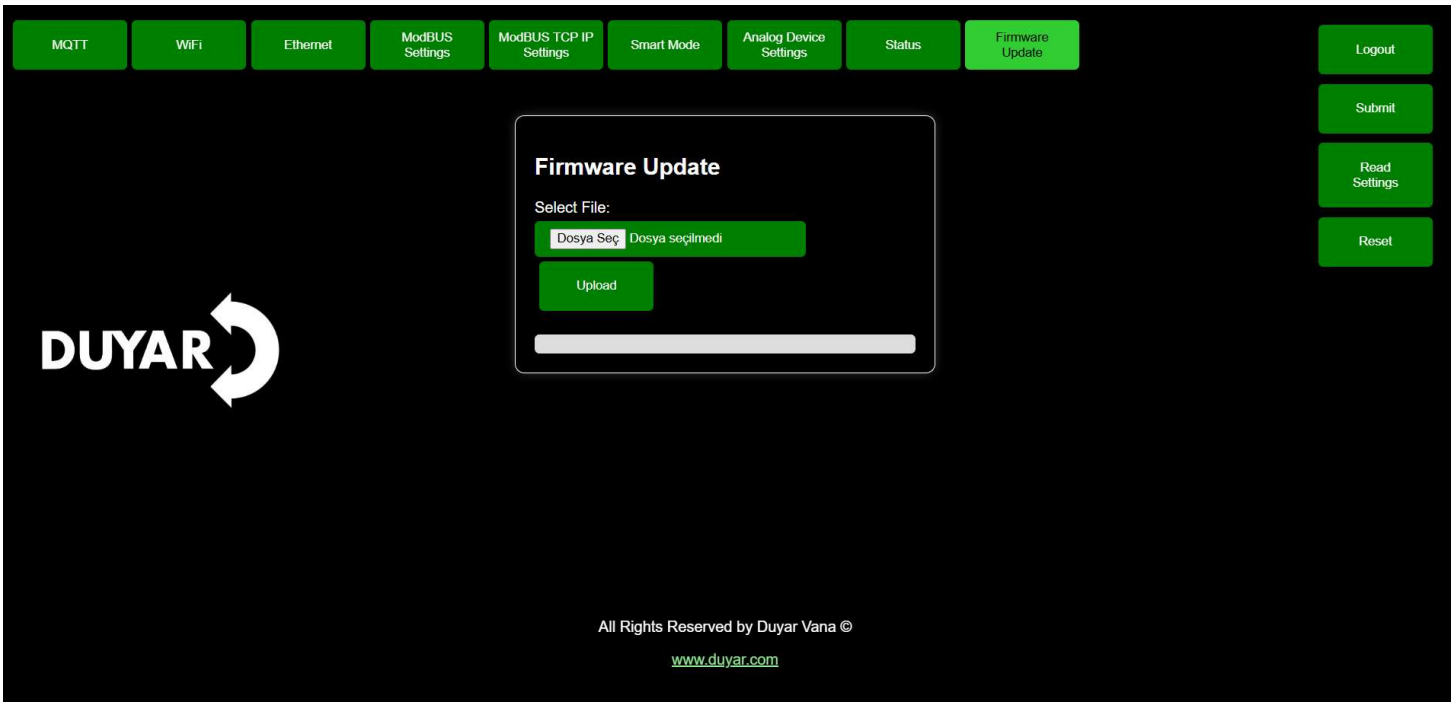
f) **Logic Controller Smart Mode:** This setting should be set to ON to enable communication with the device through the web-based interface. By activating this mode, you can program the device and access data via the web-based interface.



f) **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 supply 220VAC- 24VDC
	Nominal supply voltage frequency	50/60 Hz
	Nominal Supply Voltage Range	DC24V
	Study in mode strength consumption	15W (DN 15, 20, 25,32, 40, 50)
	Power Consumption in Operation Mode	5 W (DN 15, 20, 25, 32, 40, 50)
	Connections (Power / Control)	Cable 1 m, 8x 0.75 mm^2
	Connection, Ethernet	RJ45 socket
	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	Max . 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	Integrated Web Interface
	Compatible Fluids	Cold and hot water
	Fluid temperature	-10...100°C [14...248°F] optional(150°C)
	Fluid temperature notes	-10...2°C inter- fluid at temperature shaft heatingapparatus or valve neck extension piece to be used recommended.
	Closing pressure Δ ps	16bar

	Flow characteristic	Equal percentage, optimized in the opening range
Function data	Sealing level	Completely leak-proof, **Sealing Level: A**
	Pipe connection	Internal and external threaded
	Assembly direction	From vertical to horizontal (based on the shaft)
	By hand intervention element	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	Measuring principle	Ultrasonic flow measurement
	Flow Measurement Accuracy:	±%2 (20%...100%) V'nom)
	Minimum Flow Measurement:	V'nom'un 0.5% of
	Protection degree IEC/EN	IP54
	Pollution degree	3
	Environment humidity	Max . 95% relative humidity, non-condensing
	Environment temperature	-30...50°C [-22...122°F]
	Storage temperature	-40...80°C [-40...176°F]
Materials	Valve body	Brass

Teknik veriler

Materials

Flow measurement Brass pipe	body
Mil	Brass
Shaft EPDM gasket	O-ring

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 15	90 kW
DN 20	150 kW
DN 25	210 kW
DN 32	350 kW
DN 40	590 kW
DN 50	880 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.

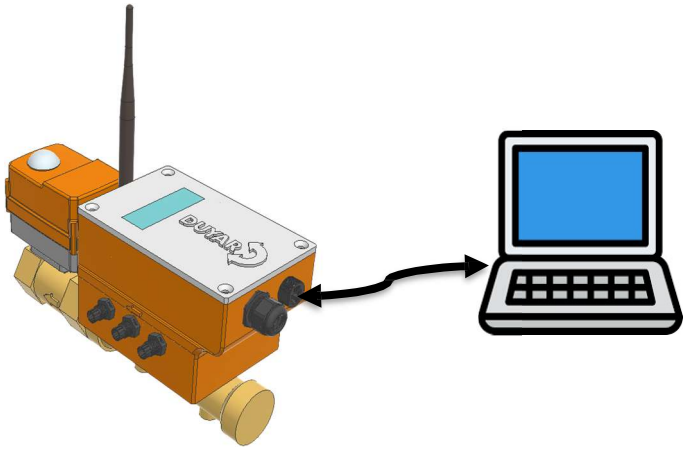
Closing the Valve

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.

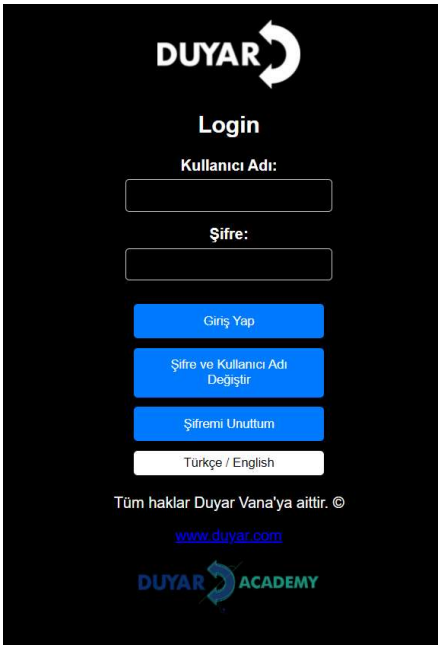
Communication Customization can be performed via the internal web server (RJ45 connection via web browser) or through Wi-Fi.
Additional information regarding the internal web server can be found in the separate documents provided.

"Peer to Peer" connection
https://192.168.4.1
The laptop must 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 Weight: 47gr Stainless Steel Sensor Head Length:25mm Stainless Steel Sensor Head Diameter: 4.7mm

Accessories

Spare sensor modules

Description	Type
Heatmeter sensor Module DN 15	Ultrasonic
Heatmeter sensor Module DN 20	Ultrasonic
Heatmeter sensor Module DN 25	Ultrasonic
Heatmeter sensor Module DN 32	Ultrasonic
Heatmeter sensor Module DN 40	Ultrasonic
Heatmeter sensor Module DN 50	Ultrasonic

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

Electric connections

Power Information:

Red: 24VDC

Black: 0V

Yellow - Green : Ground

Output Signals:

1: RS485 - A + ModBUS RTU

2: RS485 - B - ModBUS RTU

3: OUT 1 - 2 - IN VCC Input

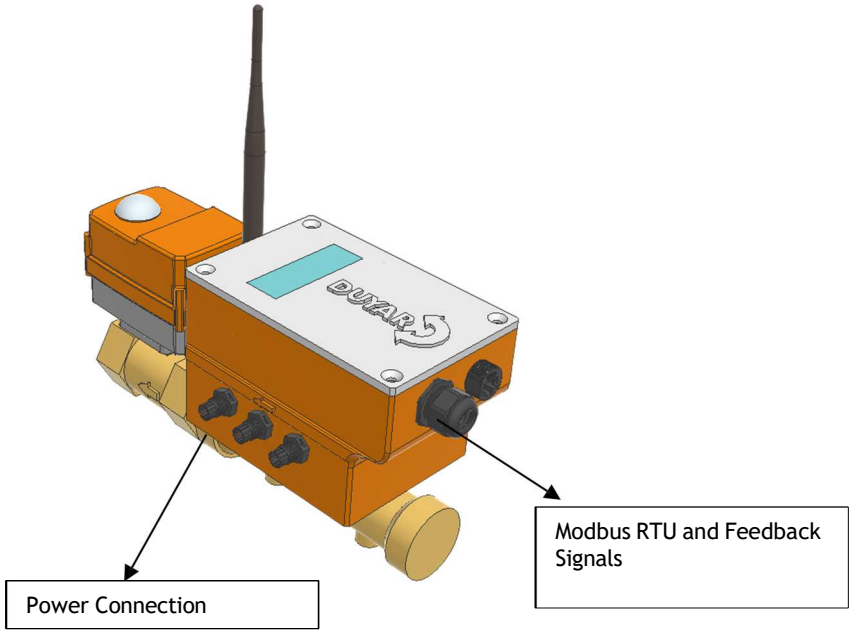
4: OUT 1 - Feedback Dry Contact

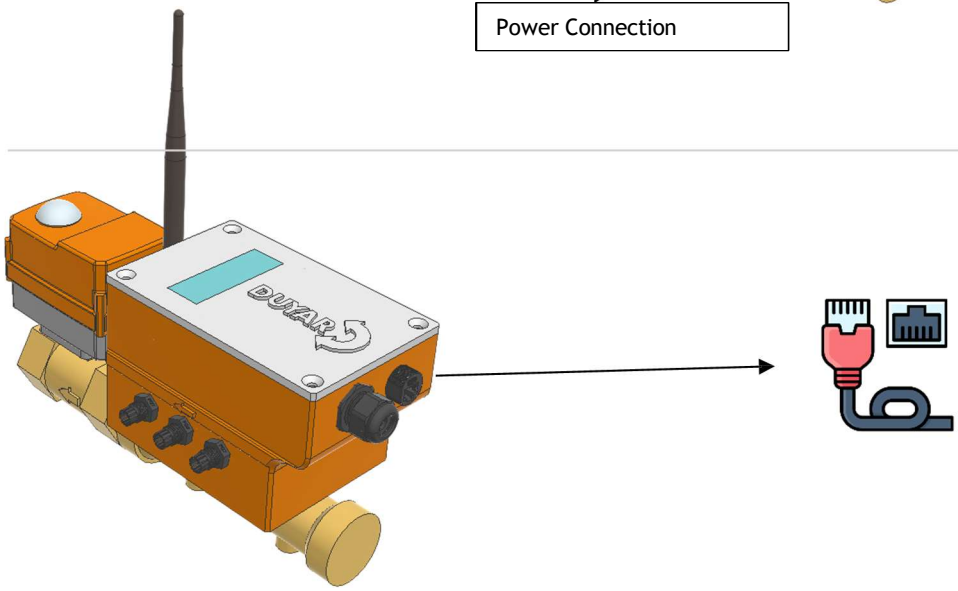
5: OUT 2 - Feedback Dry Contact

6: Analog Feedback - VCC 24VDC

7: Analog Feedback - OUT Output Signal

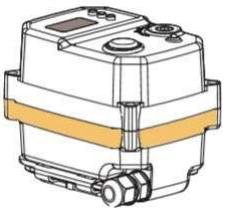
8: Analog Feedback - 0V

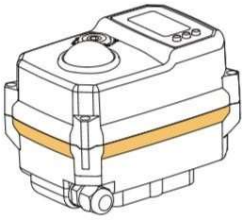


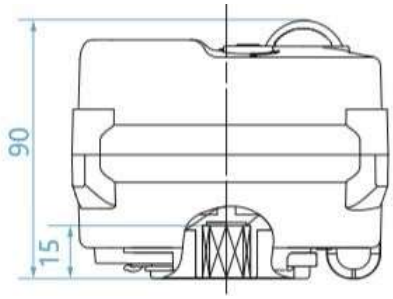


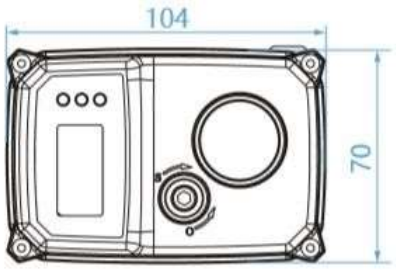
The RJ45 socket input enables ModBUS TCP/IP communication or the device's internet connection.

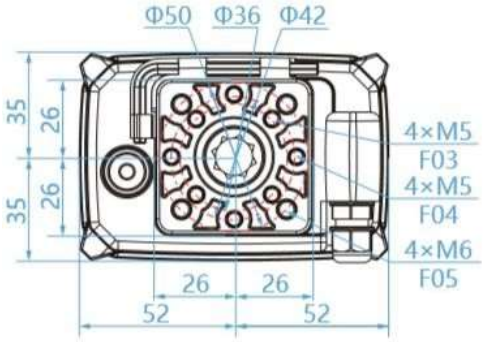
Actuator Information Section



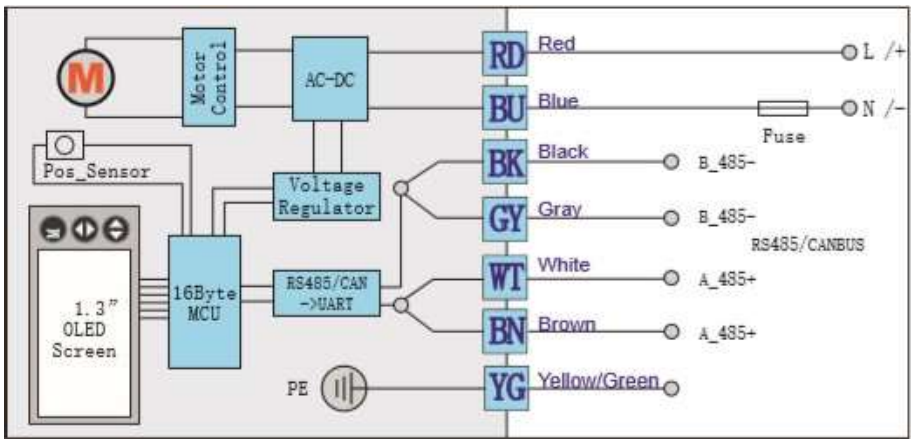


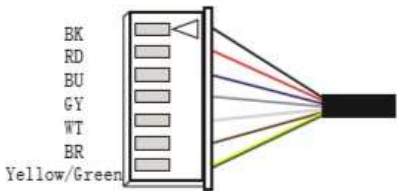






Electrical Wiring Diagram





Actuator Information

User Parameters

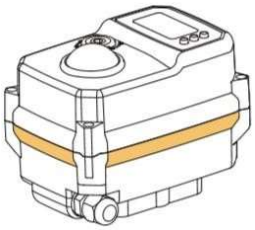
The necessary adjustments can be made from the screen interface on the actuator. These settings are set as factory default for the Smart Valve. **It is not recommended to make these adjustments** . This section only describes the parameter settings that can be made if the actuator is selected for use.

When the M button on the actuator is pressed for 3 seconds, the user settings screen appears.
The password on the relevant screen **is 312.** This password is entered using the relevant arrow keys.

Instructions:

- **When K3 is pressed,** the value increases.
- **Pressing K2** decreases the value.
- **Pressing M** moves to the next item.

NoValvCtr : In this setting screen, you can set what the actuator should do if no command is given to the actuator when the first power is given.

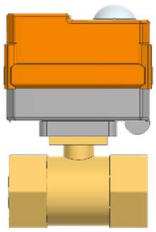


ALLDV: All devices on serial port
U0DEV: device serial port 0 – ModBUS data
U1DEV: device serial port 1 – Bluetooth data transfer
ON: The command for the actuator to fully open the valve is processed.
OFF: The command for the actuator to completely close the valve is processed.
KEEP: Let the actuator maintain its position.
B33: The actuator will stop at the position value given in the position range in this command. The position range is 0%-100%.

Press the M key to go to the other 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_ 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.

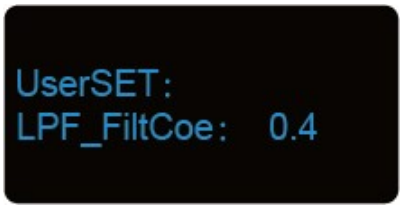


LPF_Filtcoe : Low- Pass Filter) means Filter .

• 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:

- **When K3 is pressed,** the value increases.
- **Pressing K2** decreases the value.
- **Pressing M** moves 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 Working Speed Adjustment:

Instructions:

- **When the K3 key is pressed** , the value increases by 1%.
- **When the K2 key is pressed** , the value decreases by 1%.
- **When the M key is pressed** , the next setting item is selected.

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

MODBUS Settings:

▫ **Press and hold the** M key, the “M” icon in the upper right corner will start flashing.

After approximately 3 seconds, " Userset " mode will be entered.

▫ Enter the password “222” on the password screen and proceed to the next setting **.**

ModBus ID Setting:

- InitModbusParam : Initial settings of ModBus parameters are made.
- ModBus ID: The default value is 100.

Instructions:

- By pressing the M key, you can move on to the next setting.

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

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

Parity : The user can set this parameter on the upper computer (Upper Computer) can be configured according to the Parity setting.

- Options:
  - Even (Even)
  - Odd
  - None (No Parity)
- Default Setting: Even

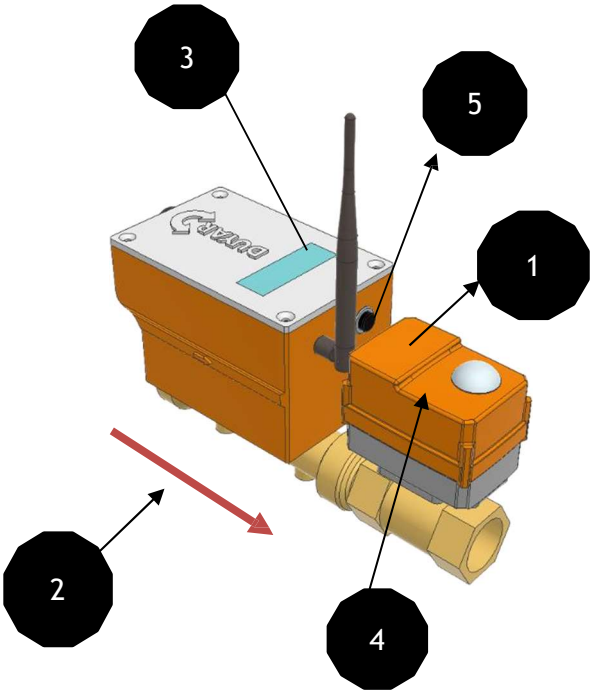
Manual Mode:

Press the K3 button and enter the password 111. After entering, turn on and off with the arrow keys.

Operating controls And indicators

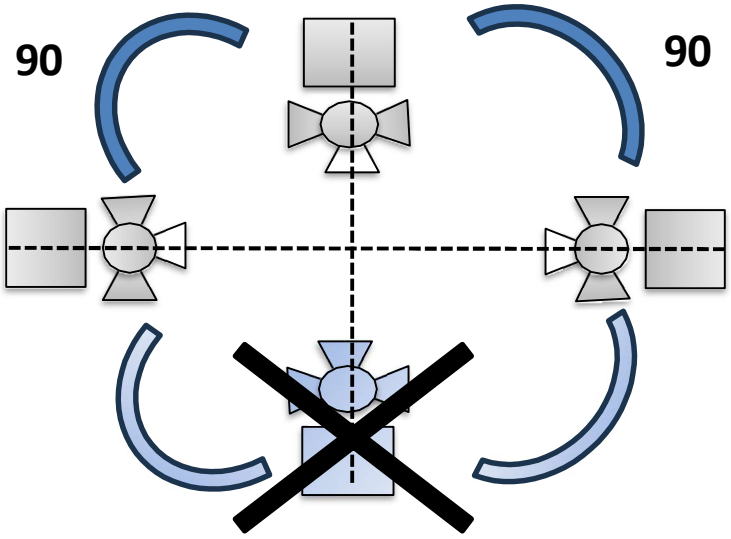
1. LCD indicator : Valve Live Position Indicator and Settings
2. Flow direction
3. Proximity communication interface: Displays Energy, Flow Rate, Inlet-Outlet Temperature, and Difference. Press button number
4. By hand intervention element button

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.



Assembly place, return line It is recommended to install it on the return line

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

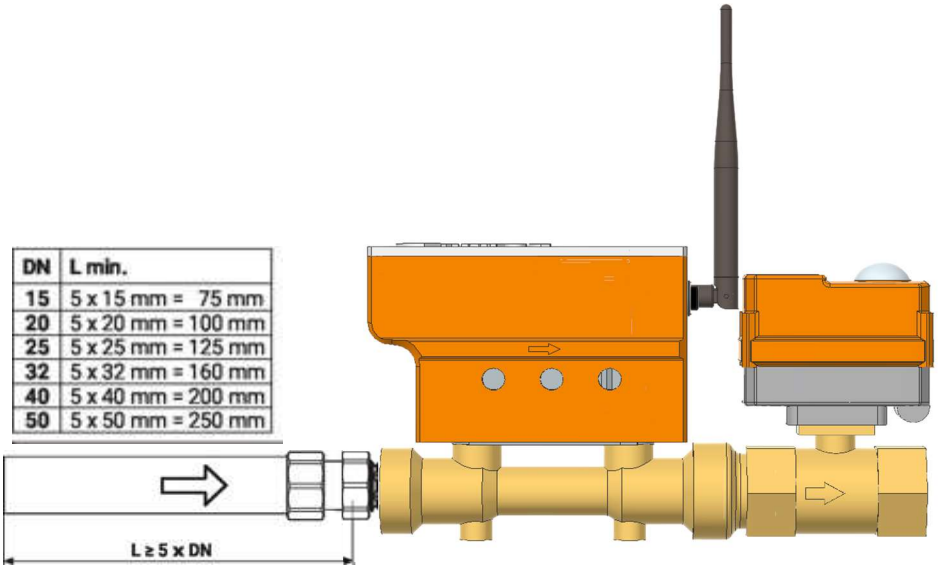
The system should be thoroughly flushed to remove contaminants before installing the heatmeter.

Stress Prevention

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

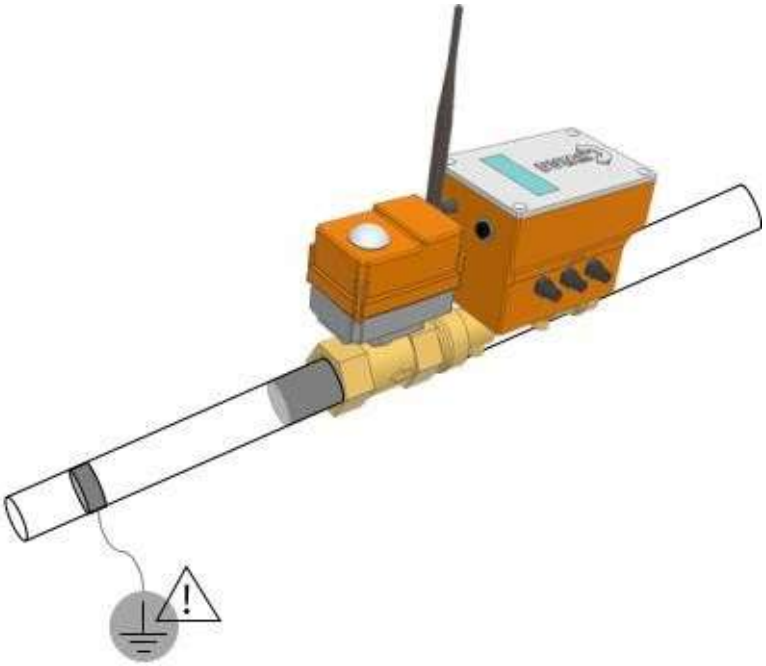
Inlet Section

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



Assembly notes

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.



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		

ModBUS Register Information - Smart Valve

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		

TAG	ADRESS	MODBUSS ADRESS	DATA CONTENT	REGISTER TYPE
ACTUATOR POS READ	20	40021	0xHHLL	int16t
ACTUATOR POS WRITE	2	40003	0xHHLL	int16t

If only the actuator is planned to be used, the two ModBUS registers listed above are able to be used.

Actuator ModBUS Comm. Info

【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.

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

TAG	ADRESS	MODBUSS ADRESS	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