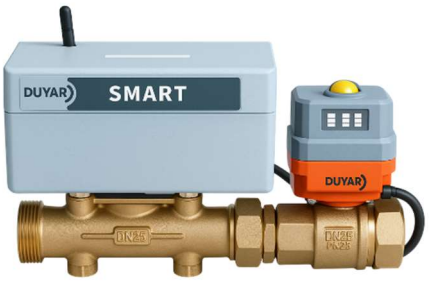
A heatmeter with a sensor-operated position, flow, delta T, energy control function, including flow, energy, and delta T monitoring-control, featuring a 2- way PN 25 ball control valve with internal and external threads.



- 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, delta T 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 characterized 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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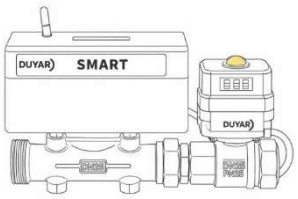
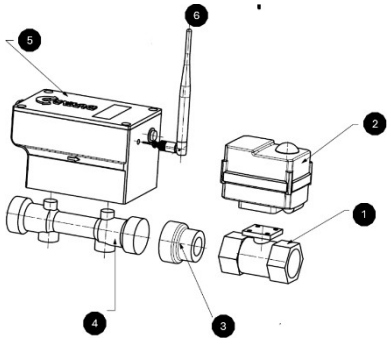


External temperature sensor 5 Integrated heat sensor 4
Logic module 2
Sensor module 2
Motorized ball control valve 1

.

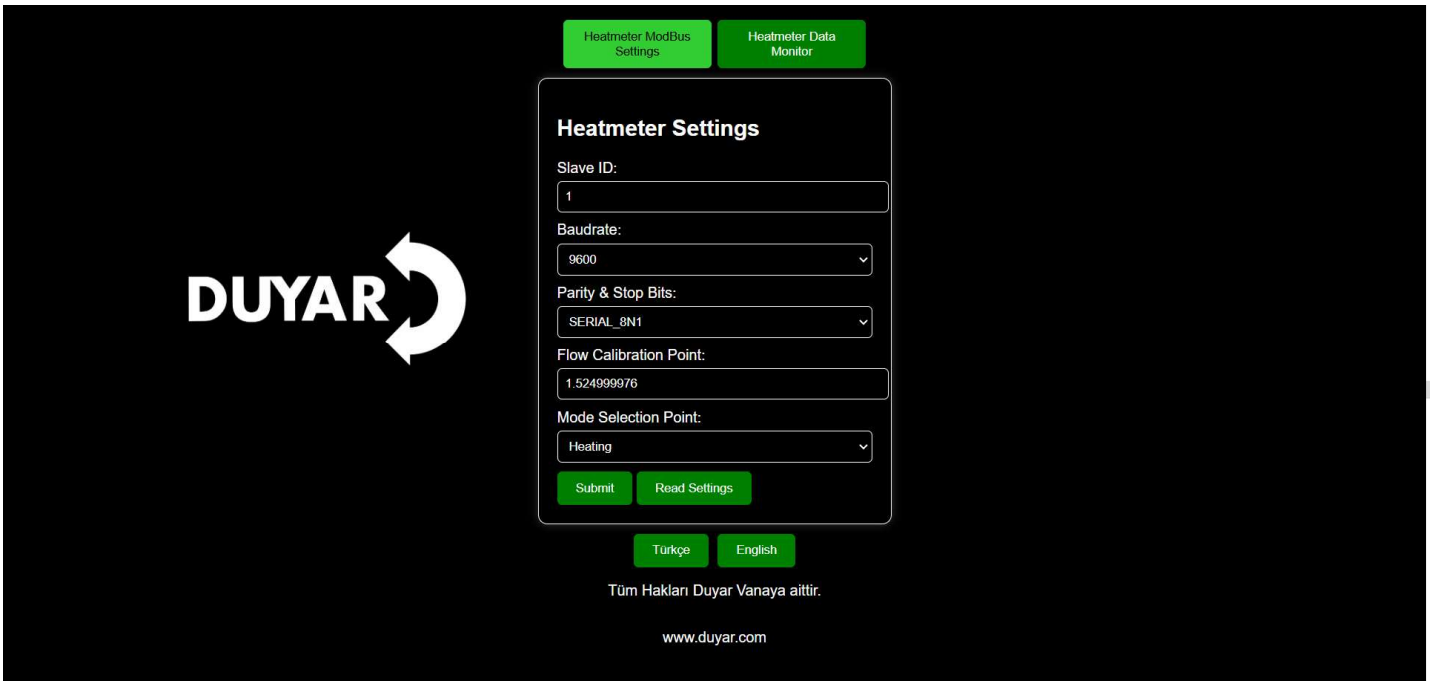


The modular design of the heatmeter allows the logic module to remain in the system even if the sensor module is replaced.

Heatmeter sensor:

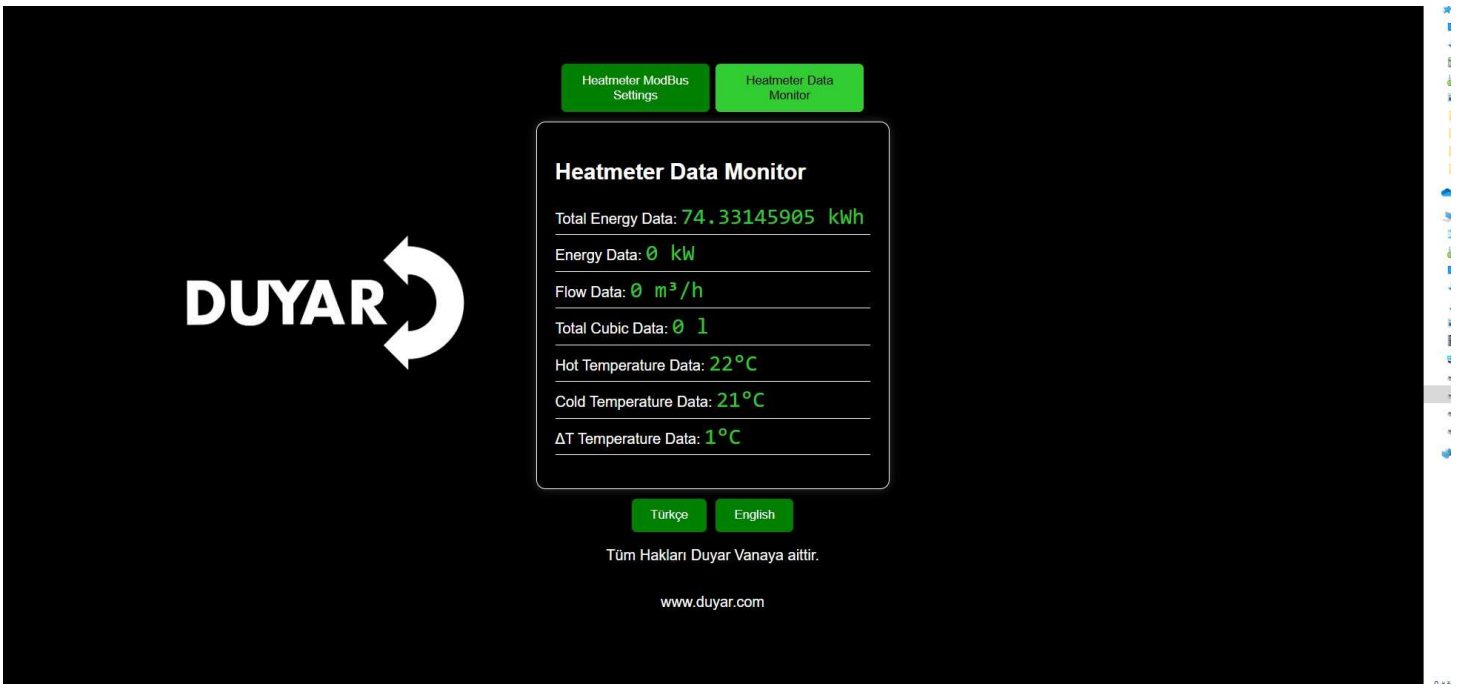
It consists of a sensor module and a logical controller that has connected temperature sensors and includes a calculator unit and a measurement system. Communication settings can be made with the integrated web interface in the heatmeter sensor module and all read data can be accessed from this interface.
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.

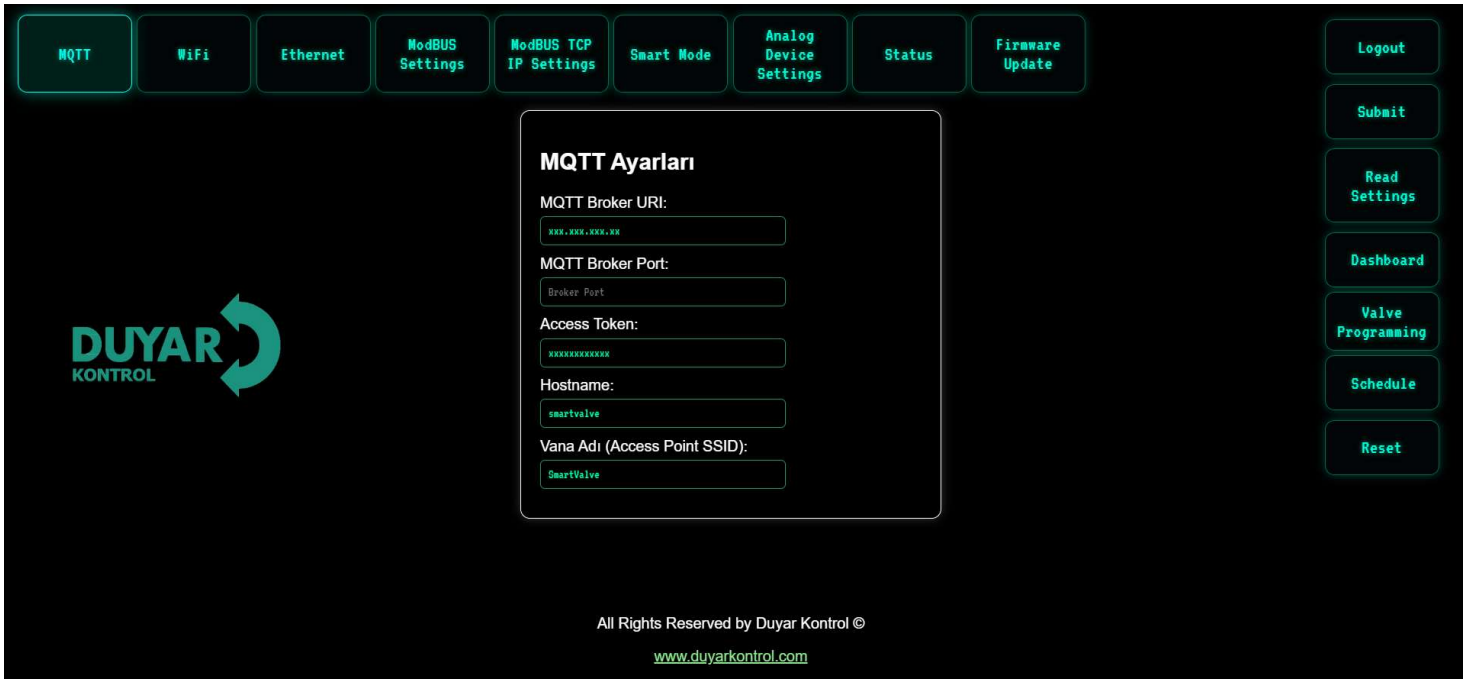
Logic Controller:

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.

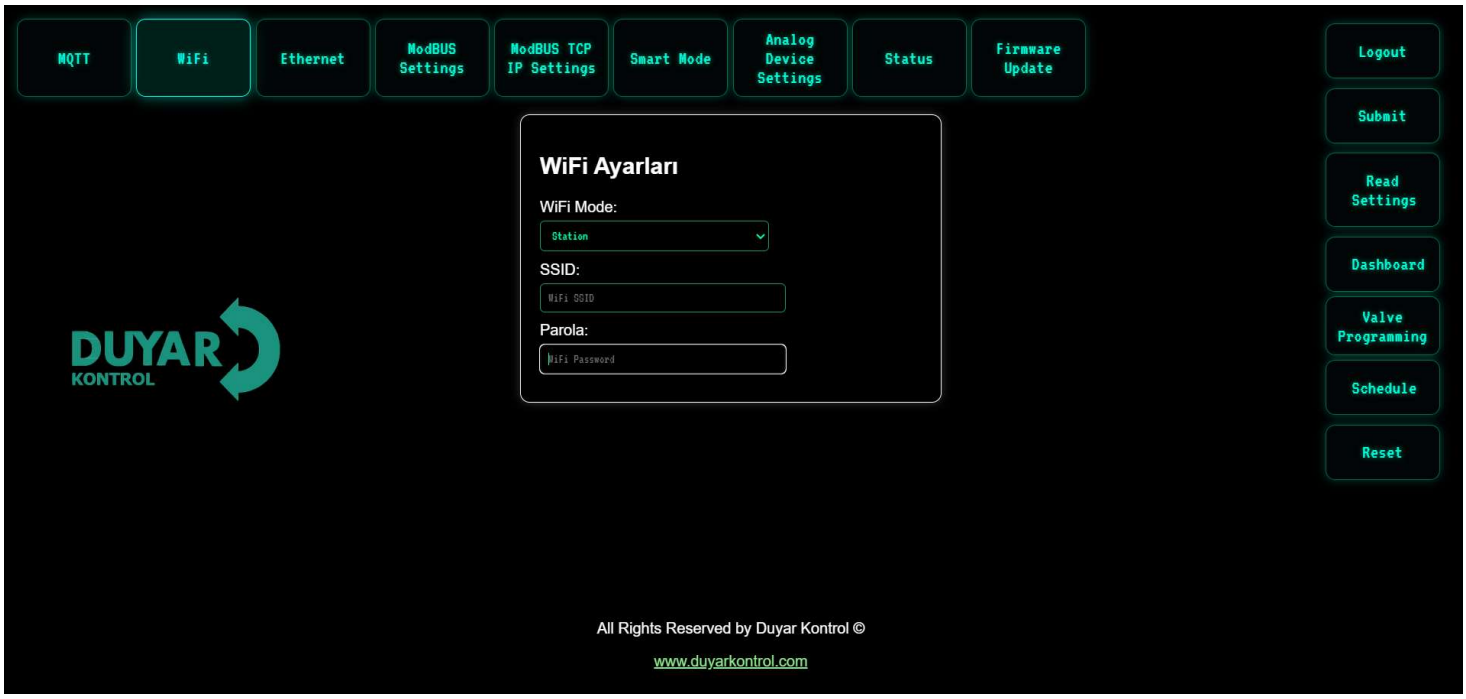
Password: 12345678

The address 192.168.4.1 is entered.



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

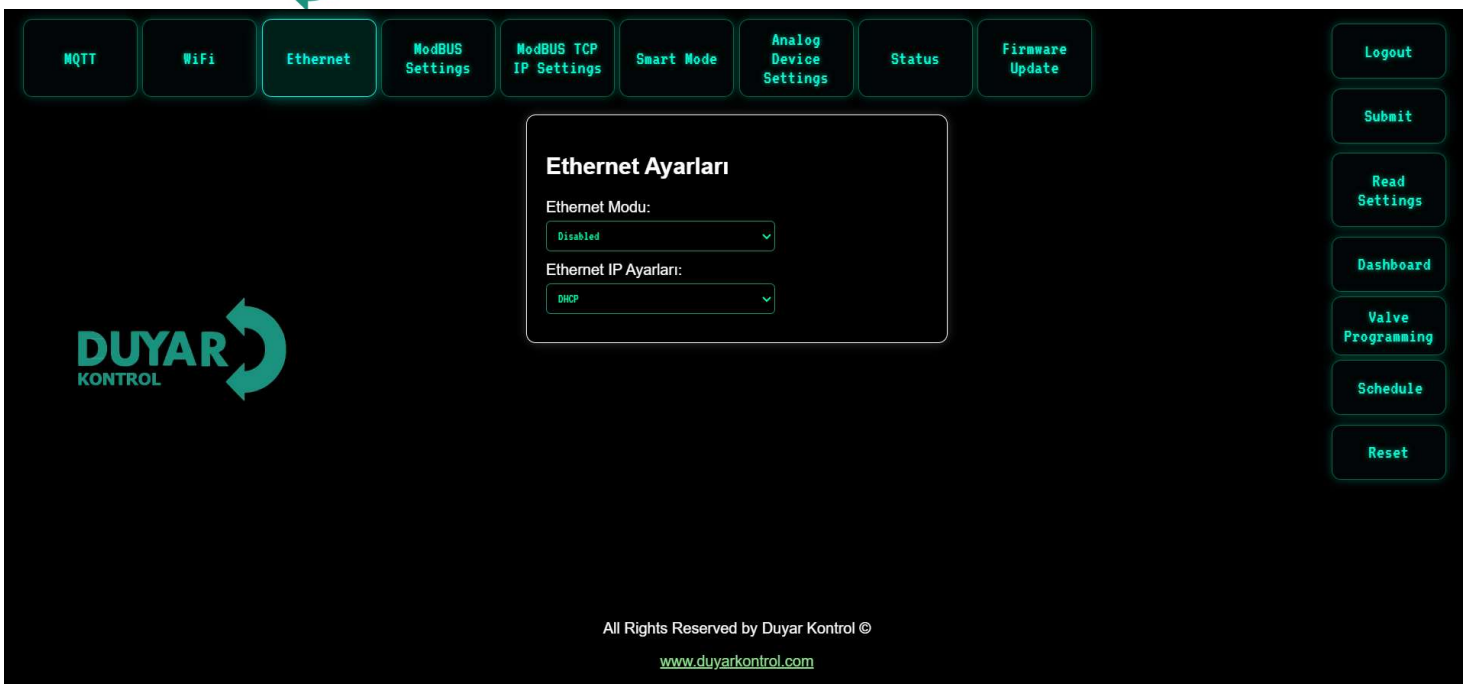
- **MQTT Broker URI:** Must be set to **95.0.1.181**.
- **Access Token:** Each user has a unique 20-digit access token. This key must be entered in this section; otherwise, access to the web-based interface will not be possible.



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.

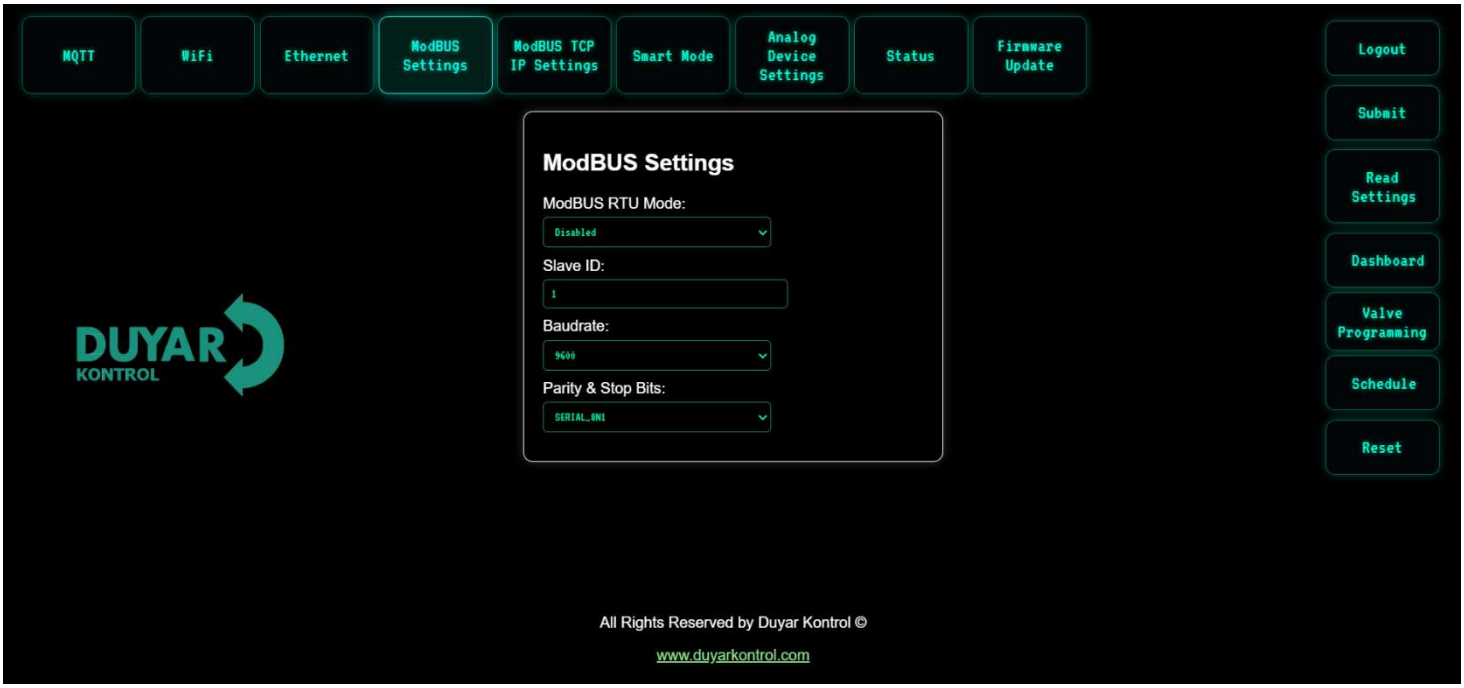
- **Wi-Fi Mode:** Station
- SSID: Name of the wireless network to connect to
- Password: Wireless network password must be entered.

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:

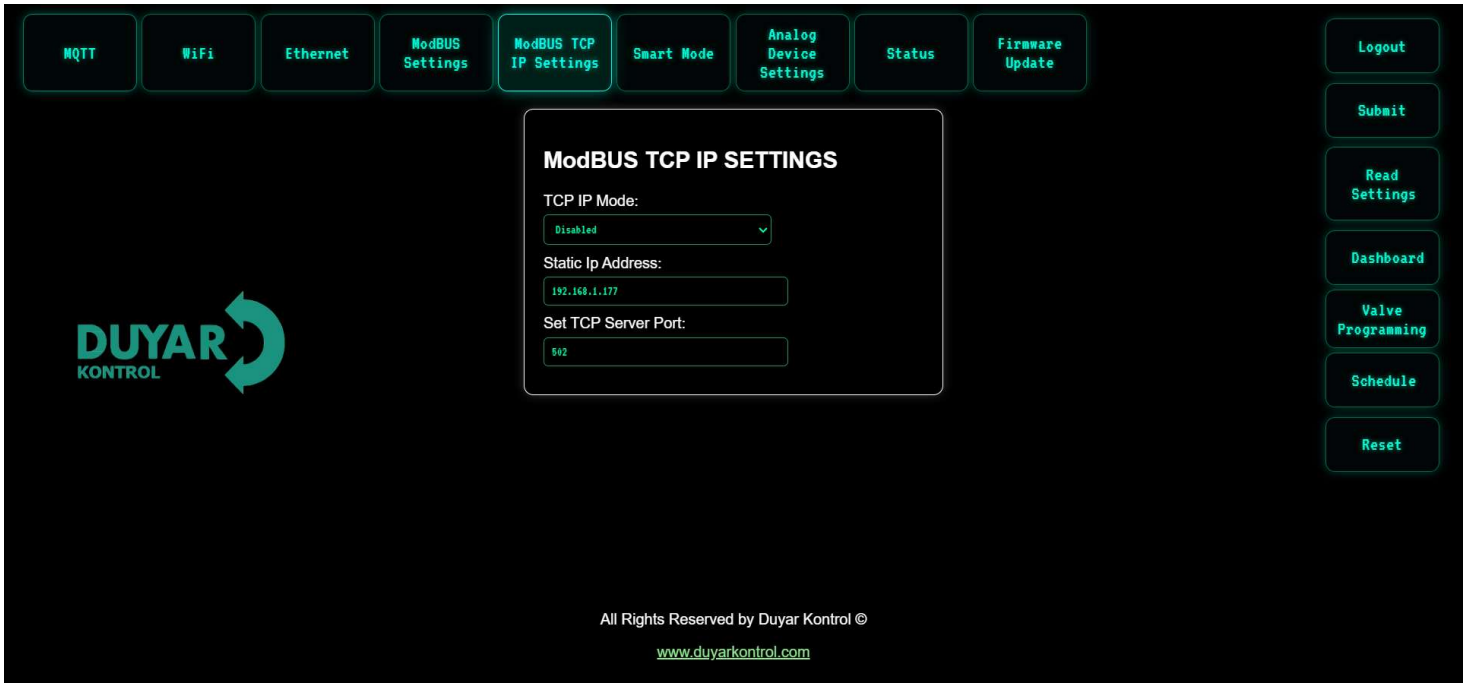
- **Ethernet Mode:** Should be set to Enabled. IP settings can remain as DHCP.
- **Wi-Fi Mode:** Should be set to Access Point. Otherwise, the device will attempt to connect to the internet via both wired and wireless connections, which may cause it to enter a reset loop after a while.



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.Baudrate: 2400, 4800,9600,19200,38400,57600 and 115200

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

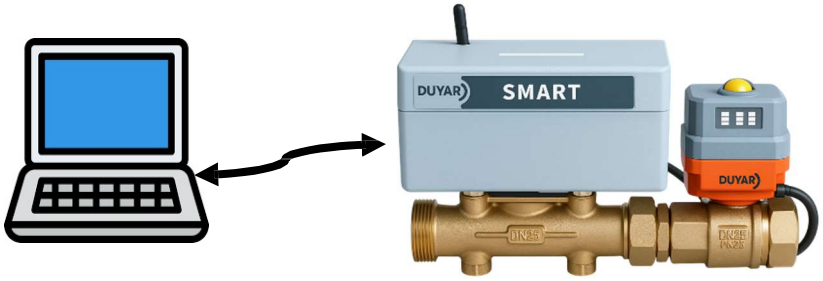


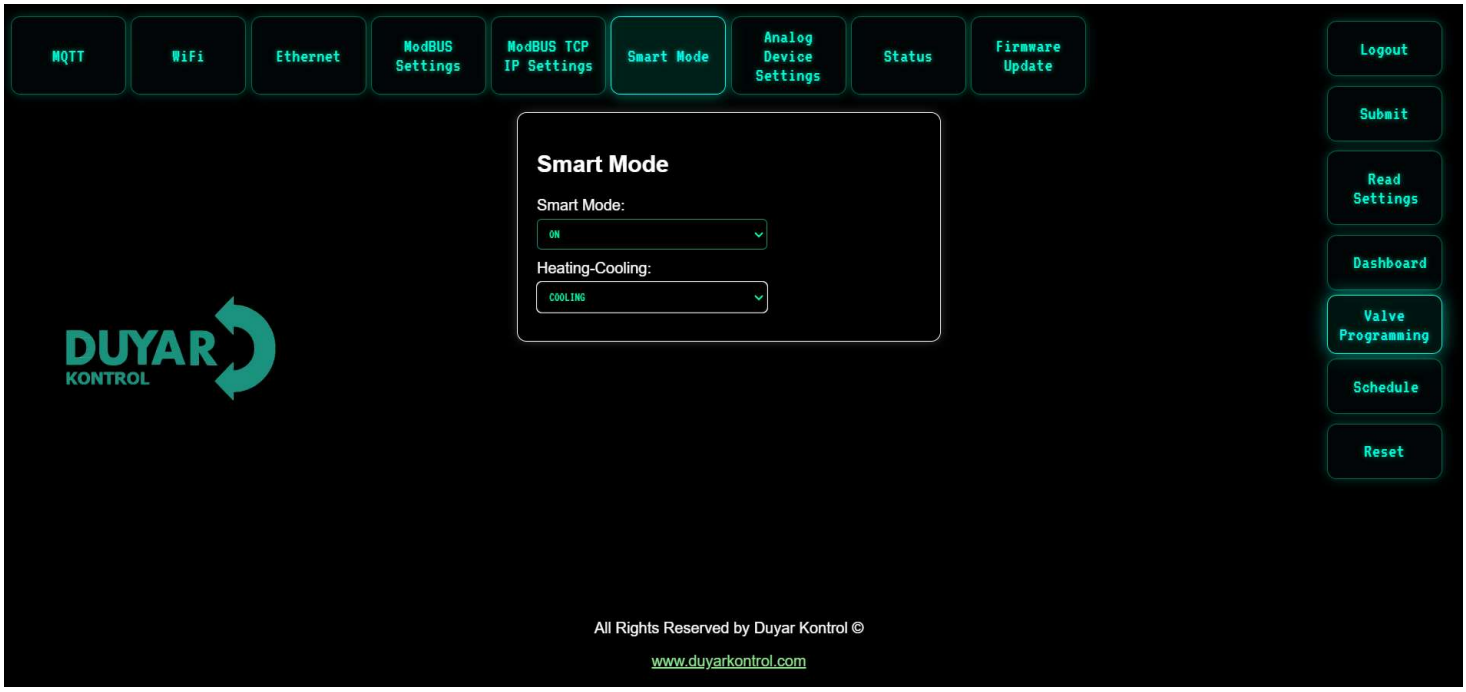
e) **Logic Controller ModBUS TCP/IP Settings:** If the device is to be controlled via a different SCADA system instead of the web-based interface, the ModBUS TCP/IP option can be used.

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

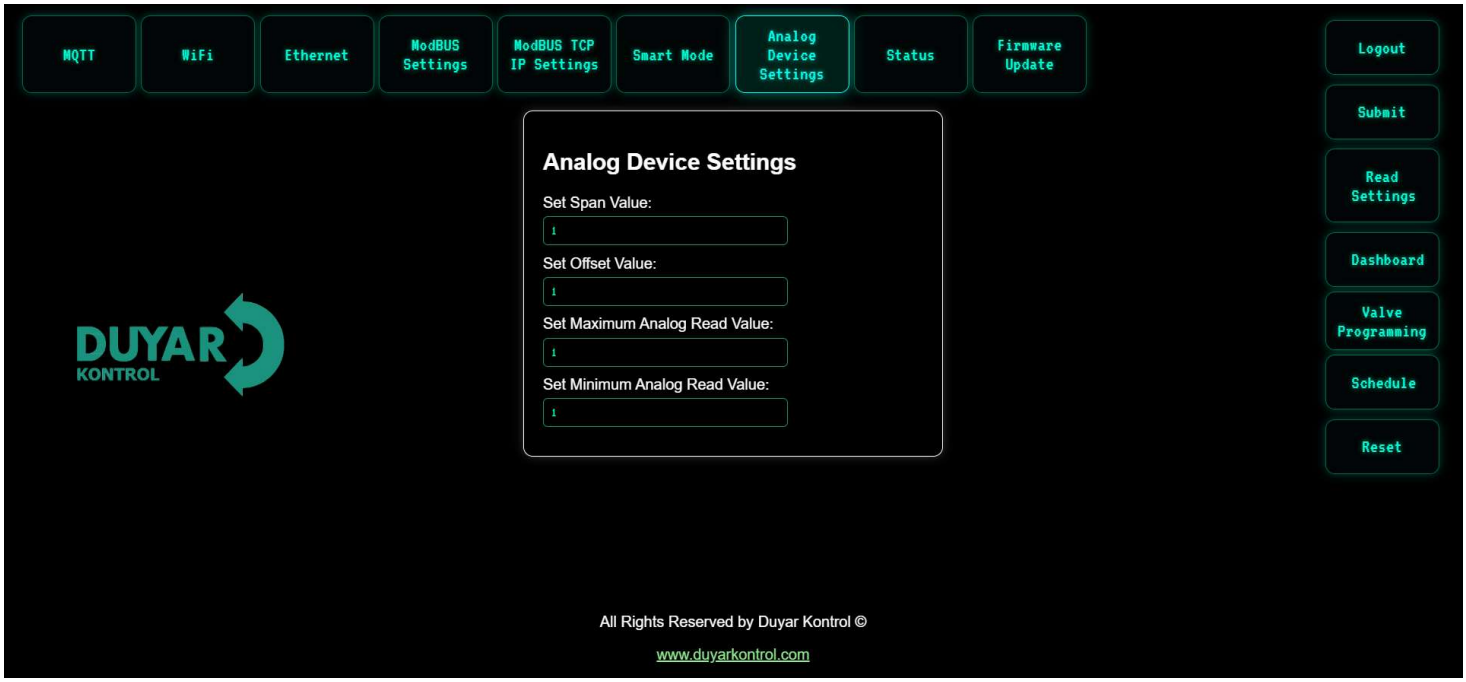
Note: When this option is used, the following settings should be applied:

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

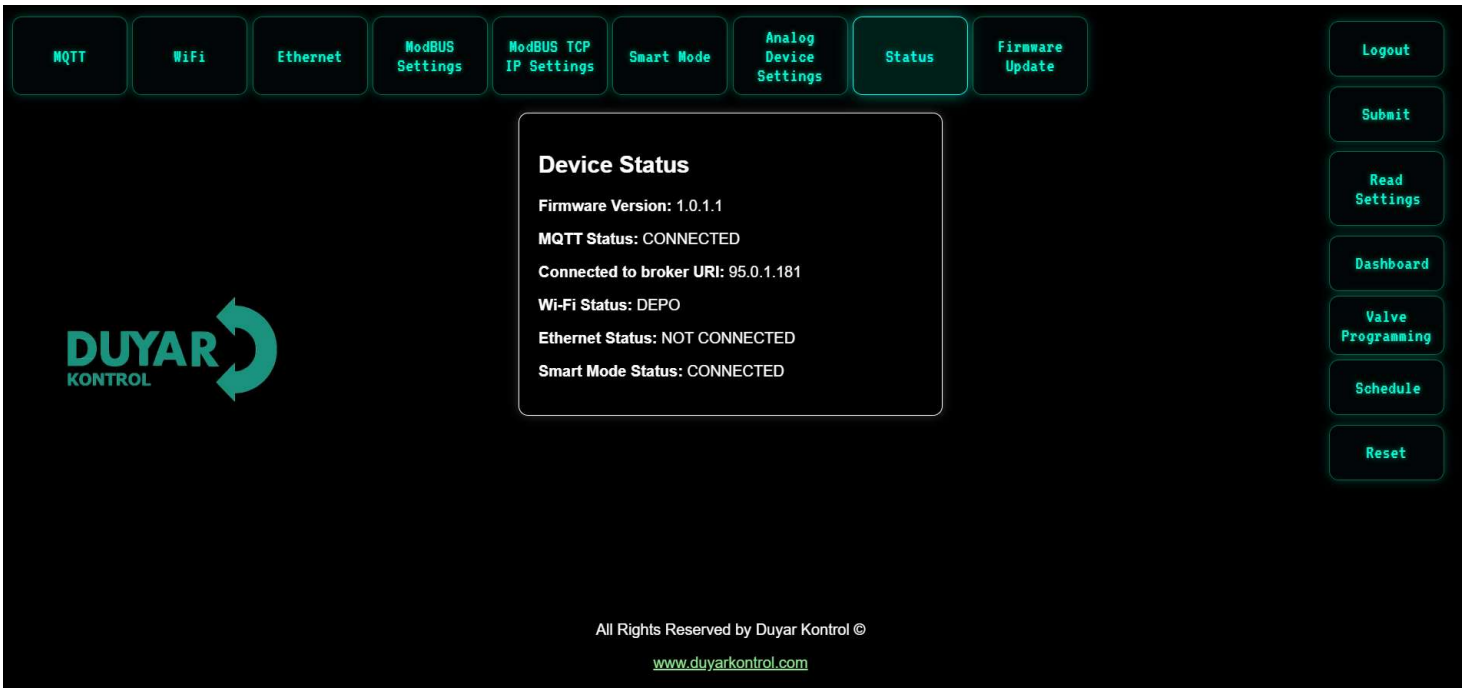




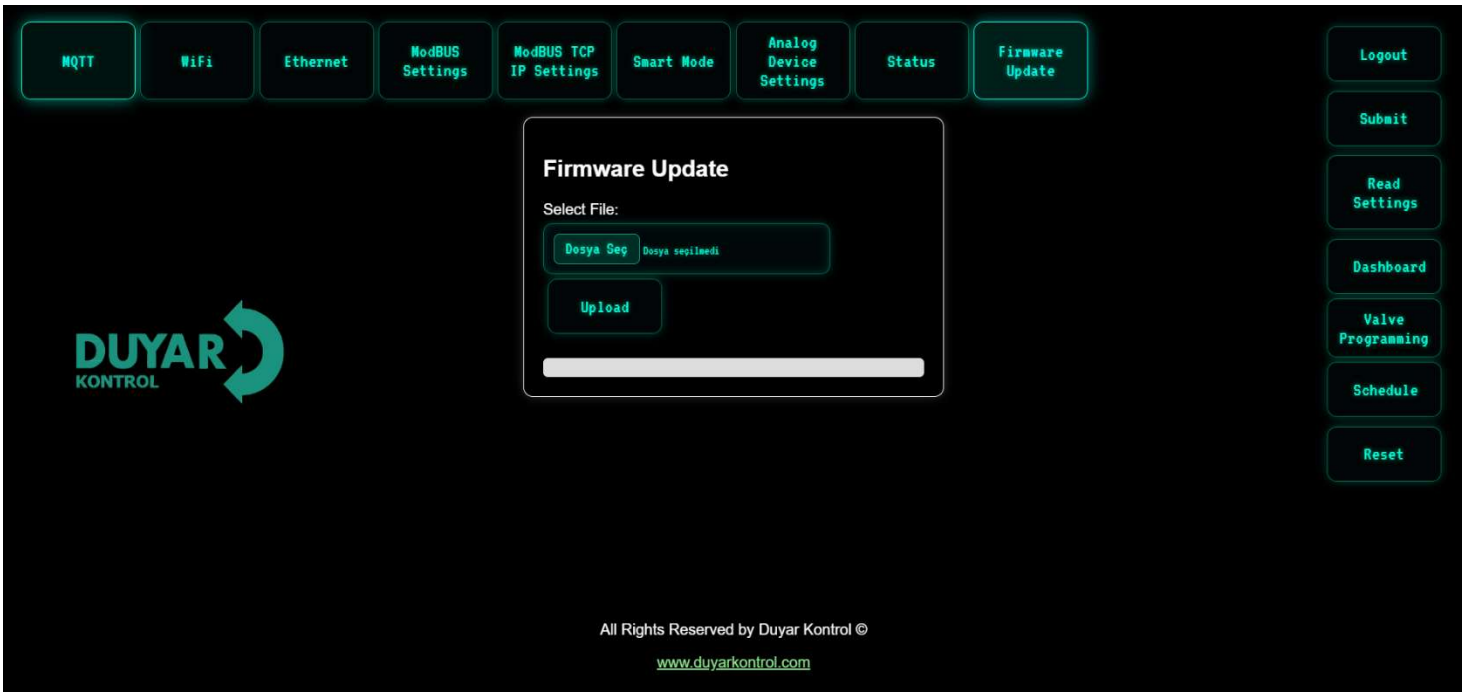
f) **Logic Controller Smart Mode:** This setting should be set to ON to enable communication with the device through the web-based interface. By activating this mode, you can program the device and access data via the web-based interface. Also, the heating and cooling system can be adjusted as needed.



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.



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



- **i) Logic Controller Firmware Update:** The Smart Valve device can be updated remotely (over-the-air) with firmware updates**.**
- **j) Logout Button:** Used to exit the interface page.
- **k) 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 functionality and data saved.
- **l) Read Settings:** This button retrieves all existing settings from the device.

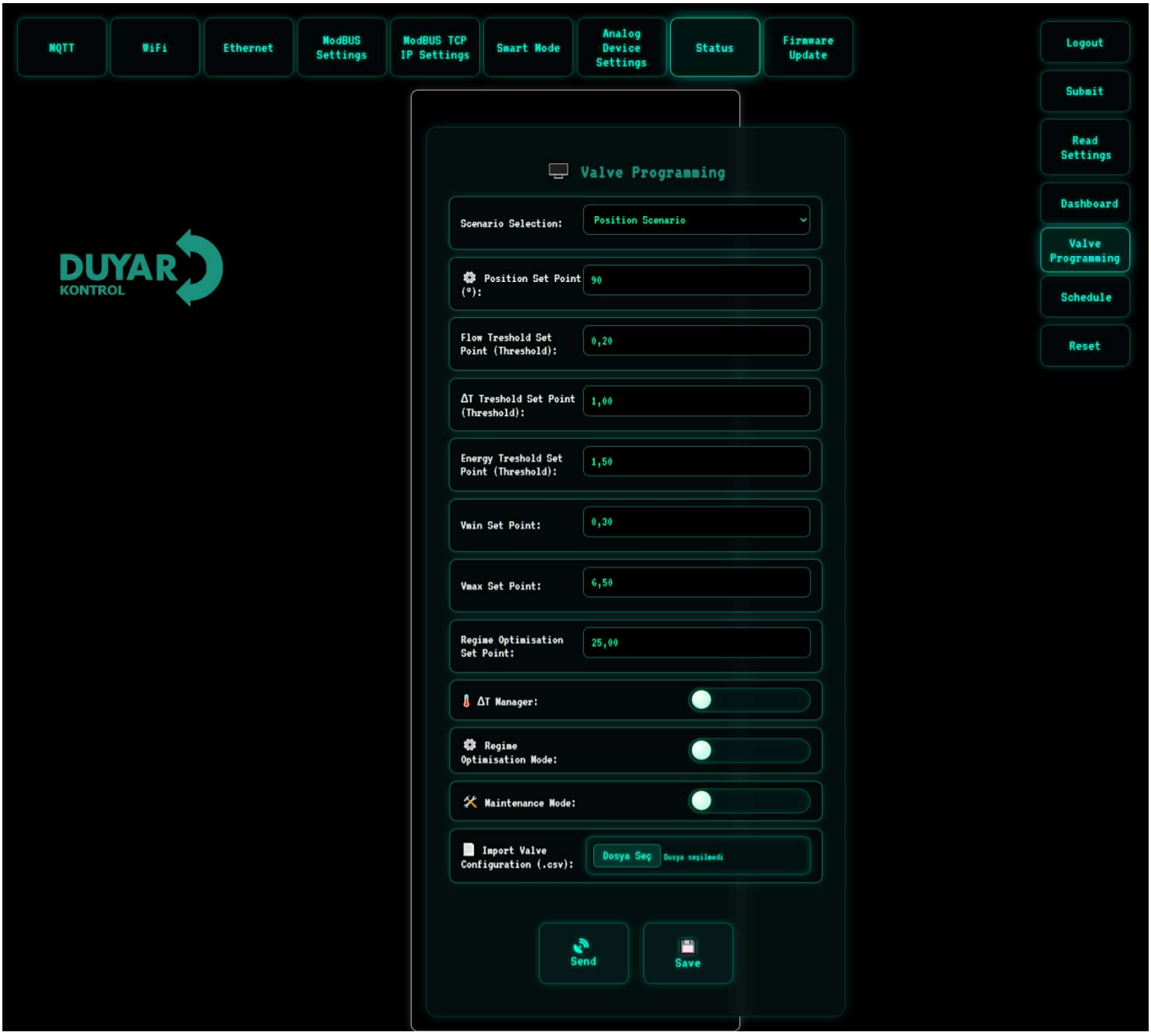
Valve Data Line (Valve Data Display)

The **Valve Data Display** provides the user with a detailed view of the system's real-time operating status and measurement values.

- **Valve Live Position:**
  Displays the current opening angle/state of the valve in degrees (°), ranging from 0 to 90°.
- **Total Energy Data:**
  Shows the total energy consumption measured over the entire system operation, in kWh.
- **Energy Data (Instantaneous Energy):**
  Indicates the instantaneous energy consumption value in kW.
- **Flow Data:**
  Displays the instantaneous flow rate through the pipeline in m^3/h.
- **Total Cubic Data (Total Volume):**
  Presents the total volume of fluid that has passed through the system in m^3.
- **Hot Temperature Data:**
  Shows the temperature of the inlet (hot) line in °C.
- **Cold Temperature Data:**
  Shows the temperature of the outlet (cold) line in °C.

- **ΔT Temperature Data:**
  Calculates and displays the temperature difference (ΔT) between the inlet and outlet in °C.
- **Maintenance Cooldown:**
  Indicates the remaining time until the next maintenance period in seconds.

Valve Situation:
Valve Open: Vana fully open **Valve Control:** Valve In Moving **Valve Closed:** Valve fully closed



Valve Programming

This screen allows configuration of the Smart Valve's operating scenarios, threshold values, and control parameters. Users can program the valve behavior in detail according to system requirements.

Settings and Parameters

• **Scenario Selection**

Defines which operating scenario will be used for valve control (e.g., Position Scenario).

• **Position Set Point**

Specifies the target valve opening position as a 0-90°.

• **Flow Threshold Set Point**

Defines the lower and/or upper control limits for flow rate. System responses can be configured when the flow value falls below or exceeds these thresholds.

• **ΔT Threshold Set Point**

Sets the threshold value for the temperature difference (ΔT) between supply and return temperatures.

• **Energy Threshold Set Point**

Defines the threshold value used for control and optimization based on energy consumption.

• **Vmin Set Point (Minimum Flow)**

Specifies the minimum allowable flow rate at which the system can operate.

• **Vmax Set Point (Maximum Flow)**

Specifies the maximum allowable flow rate at which the system can operate.

• **Regime Optimisation Set Point**

A reference value used for regime optimization to improve overall system efficiency.

Control Modes

• **ΔT Manager**

Enables automatic valve control based on the temperature difference (ΔT).

• **Regime Optimisation Mode**

Activates an automatic optimization algorithm to improve energy and flow efficiency.

• **Maintenance Mode**

When Maintenance Mode is enabled, it is automatically activated if the valve remains stationary for an extended period. Within this mode, the valve is periodically moved to a predefined position for a short duration and then returned to its previous position.

Benefits:

- Prevents sticking and seizure risks caused by prolonged inactivity
- Supports healthy operation of mechanical components
- Extends valve service life and reduces maintenance requirements
- Enhances system reliability and continuity

Configuration Management

• **Import Valve Configuration (.csv)**

This feature allows previously created valve settings to be imported into the device via a .csv file. Once the settings are loaded, the device operates according to the imported configuration without requiring additional setup.

Control Buttons

• **Send**

Transmits the configured settings to the device.

• **Save**

Stores the settings permanently in memory.

Regime Optimisation

Regime optimisation is a control function designed to ensure that the system reaches the desired operating regime as quickly and efficiently as possible.

Heating Mode

In heating mode, as long as the return water temperature remains below the defined Regime Optimisation Set Point, the valve operates in the fully open position. This allows the system to reach the operating regime rapidly.
Once the return water temperature reaches or exceeds the set point, the system is considered to have entered the regime, and valve control is automatically transferred to the previously active scenario (Energy, ΔT, or Energy + ΔT Manager).

Cooling Mode

In cooling mode, as long as the return water temperature remains above the defined Regime Optimisation Set Point, the valve operates in the fully open position.
After the system reaches the cooling regime, valve control returns to the active scenario (Energy, ΔT, or Energy + ΔT Manager), and normal operation continues according to that scenario.

a. Position Scenario

In the Position Scenario, the Smart Valve moves to the angle entered via the Smart Valve IoT Interface (Set Position Set Point) and stops once the specified position is reached.
This scenario is used to learn the characteristics of the connected system and to perform adjustments based on the valve opening position.

b. Delta T Scenario
ΔT Manager Disabled

1. The Smart Valve reads the temperature differences within the connected system during each control cycle.
   The valve opening position is adjusted according to the measured temperature difference.
   Additionally, the system continuously monitors the Vmin (set minimum flow rate in m^3/h) and Vmax (set maximum flow rate in m^3/h) limits.

ΔT Manager Enabled

2. The valve movement is directly controlled based on the configured ΔT set value.
   - If the measured ΔT value is below the set ΔT value, the valve moves proportionally toward the closed position.
   - If the measured ΔT value is above the set ΔT value, the valve moves toward the open position.
   - If the measured ΔT value is equal to or within the defined threshold of the set value, the valve maintains its current position.

   The system also continuously observes the Vmin (set minimum flow rate in m^3/h) and Vmax (set maximum flow rate in m^3/h) constraints.

c. Flow Scenario (EPICV – Electronic Pressure Independent Control Valve)

In this scenario, the system flow rate corresponding to the fully open valve position (90°), which is defined in the Position Scenario, is determined.
This represents the maximum achievable flow rate of the Smart Valve within the piping system. Based on this reference value, the operating adjustment range is defined.
According to the configured flow set point, the valve operates independently of pressure variations.
If the measured flow rate reaches or is equal to the defined threshold of the set flow value, the valve stops and maintains its position.
In this mode, the Smart Valve operates as an **EPICV (Electronic Pressure Independent Control Valve)** and demonstrates EPICV performance characteristics.

d. Energy Scenario

In this scenario, energy is calculated using the formula *($\dot{m} \times C \times \Delta T$)*.

The valve controls the flow rate in order to maintain the configured energy set point.

- If the measured energy value is below the set energy value, the flow rate is increased.
- If the measured energy value is above the set energy value, the flow rate is reduced, provided that the defined Vmin value is not violated.

The system continuously monitors the Vmin (set minimum flow rate in m^3/h) and Vmax (set maximum flow rate in m^3/h) limits.

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1. ΔT Manager Disabled

The Smart Valve regulates the flow rate to maintain the configured energy set point.

- If the measured energy value is below the set energy value, the valve increases its opening position to raise the flow rate.
- If the measured energy value is above the set energy value, the valve reduces its opening position to decrease the flow rate.
- If the measured energy value is equal to or within the defined threshold of the energy set point, the valve stops and maintains its current position.

The system continues to observe the Vmin (set minimum flow rate in m^3/h) and Vmax (set maximum flow rate in m^3/h) constraints.

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2. ΔT Manager Enabled

The Smart Valve regulates the flow rate to maintain the configured energy set point.

- If the measured energy value is below the set energy value, the valve increases its opening position to raise the flow rate.
- If the measured energy value is above the set energy value, the valve reduces its opening position to decrease the flow rate.
- If the measured energy value is equal to or within the defined threshold of the energy set point, the valve stops and maintains its current position.

If the measured ΔT value is below or above the configured ΔT set point, the Energy Scenario is temporarily overridden and the system automatically switches to Delta T mode.Once the configured ΔT set value is achieved, control is reassigned to the Energy Scenario.
Throughout operation, the system continuously monitors the Vmin (set minimum flow rate in m^3/h) and Vmax (set maximum flow rate in m^3/h) limits.

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(IP65 Optional)
	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:

- Characterized 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

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.

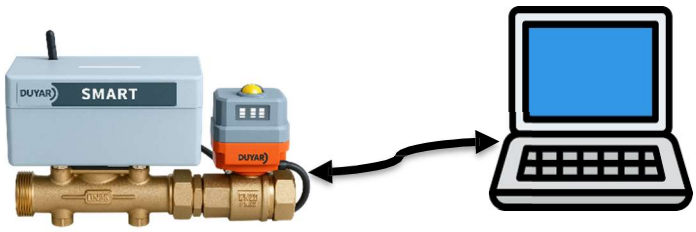
Closing the Valve

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.

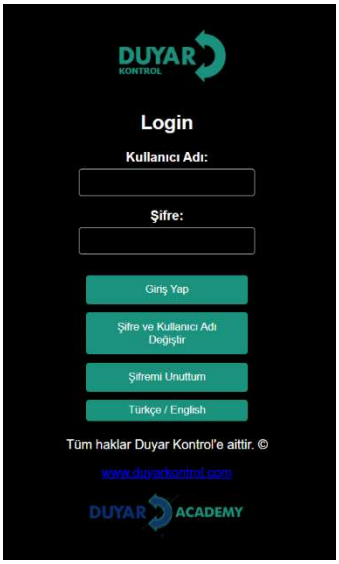
Communication Customization can be performed via the internal web server (RJ45 connection via web browser) or through Wi-Fi.
Additional information regarding the internal web server can be found in the separate documents provided.

"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 and delta T 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.

Scenario Operation: Smart Valve Control Modes
The smart valve operates according to predefined scenarios.

---

a. Position Scenario
In this scenario, the Smart Valve moves to the angle entered in the **Set Position Set Point** via the IoT Interface and stops once the specified angle value is reached.
This scenario is used to **learn the characteristics of the connected system** and to perform adjustments on the **valve opening position**.

---

b. Delta T Scenario

DELTA T CONTROLLER OFF

1. The smart valve reads the temperature differences within the connected system during a cycle. The valve opening position changes according to the difference between the measured temperature values.

Additionally, the valve observes the requirements of:

- **Vmin** (configured minimum flow rate (m^3/h))
- **Vmax** (configured maximum flow rate (m^3/h))

DELTA T CONTROLLER ON

2. The valve movement is controlled according to the **configured Delta T value**.

- If the measured **Delta T** value is **below the set Delta T**, the valve moves **proportionally towards closing**.
- If the measured **Delta T** value is **above the set Delta T**, the valve moves **towards opening**.
- If the measured **Delta T** value is **equal to or within the defined threshold**, the valve **maintains its current position**.

Additionally, the valve monitors:

- **Vmin** (configured minimum flow rate (m^3/h))
- **Vmax** (configured maximum flow rate (m^3/h))

c. FLOW SCENARIO

(EPICV – Electronic Pressure Independent Control Valve)

In the connected system, the **maximum flow rate** is obtained when the valve is at the **fully open position (90°)** defined in the **Position Scenario**.

Thus, the maximum flow rate that can be achieved from the system through the smart valve is determined. Based on this value, the **control adjustment range** is defined.

According to the **set flow rate value**, the valve operates **independently of pressure**. When the measured flow rate reaches the **threshold range of the set flow rate or becomes equal**, the valve stops and maintains its position.

In this scenario, the valve demonstrates the performance of an **EPICV – Electronic Pressure Independent Control Valve**.

---

d. Energy Scenario

In this scenario, **energy measurement** is calculated using:

Energy = m × C × ΔT

To maintain the defined **energy set value**, the valve controls the **flow rate**.

- If the **measured energy value is below the set energy value**, the **flow rate is increased**.
- If the **measured energy value is above the set energy value**, the **flow rate is reduced**, provided that the defined **Vmin value is not violated**.

Additionally, the valve monitors:

- **Vmin** (configured minimum flow rate (m^3/h))
- **Vmax** (configured maximum flow rate (m^3/h))

---

1. When DELTA T CONTROLLER is OFF

The smart valve adjusts the **flow rate** in order to maintain the **defined energy set point value**.

- If the **measured energy value is below the set energy value**, the valve **increases the opening degree** to increase the flow rate.
- If the **measured energy value is above the set energy value**, the valve **reduces the opening degree** to decrease the flow rate.
- If the **measured energy value is equal to or within the threshold of the energy set point**, the valve **stops and maintains its current position**.

Additionally, the valve monitors:

- **Vmin** (configured minimum flow rate (m^3/h))
- **Vmax** (configured maximum flow rate (m^3/h))

---

2. When DELTA T CONTROLLER is ON

The smart valve adjusts the **flow rate** in order to maintain the **defined energy set point value**.

- If the **measured energy value is below the set energy value**, the valve **increases the opening degree** to increase the flow rate.
- If the **measured energy value is above the set energy value**, the valve **reduces the opening degree** to decrease the flow rate.
- If the **measured energy value is equal to or within the threshold**, the valve **maintains its current position**.

If the **measured Delta T value deviates from the configured Delta T value (below or above)**, the system **automatically overrides the Energy Scenario and switches to Delta T Mode**.

Once the **configured Delta T value is achieved again**, the system **returns to the Energy Scenario**.

Additionally, the valve monitors:

- **Vmin** (configured minimum flow rate (m^3/h))
- **Vmax** (configured maximum flow rate (m^3/h))

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 / Blue: 0V

Yellow - Green : Ground

Output Signals:

1: RS485 - A + ModBUS RTU

2: RS485 - B - ModBUS RTU

3: OUT 1 - 2 - IN VCC Input

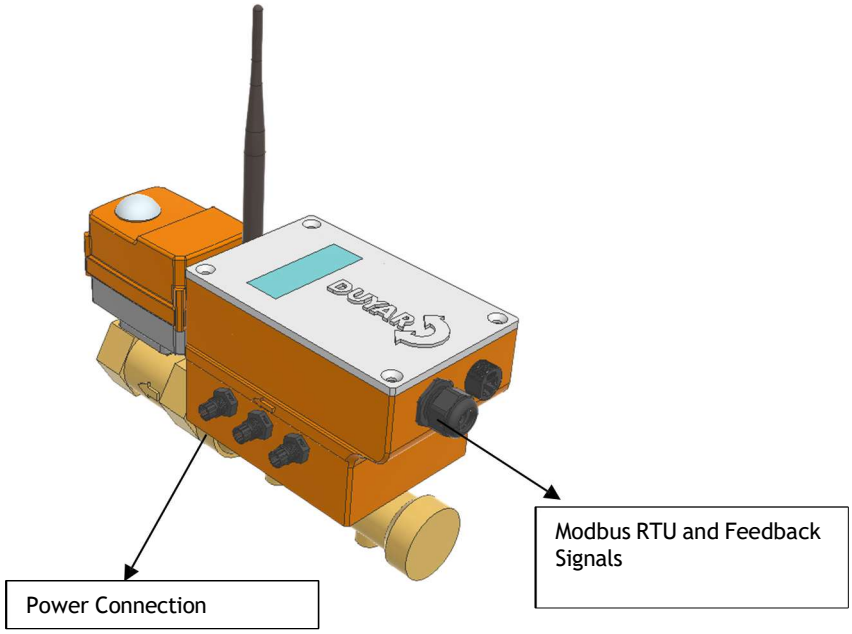
4: OUT 1 - Feedback Dry Contact

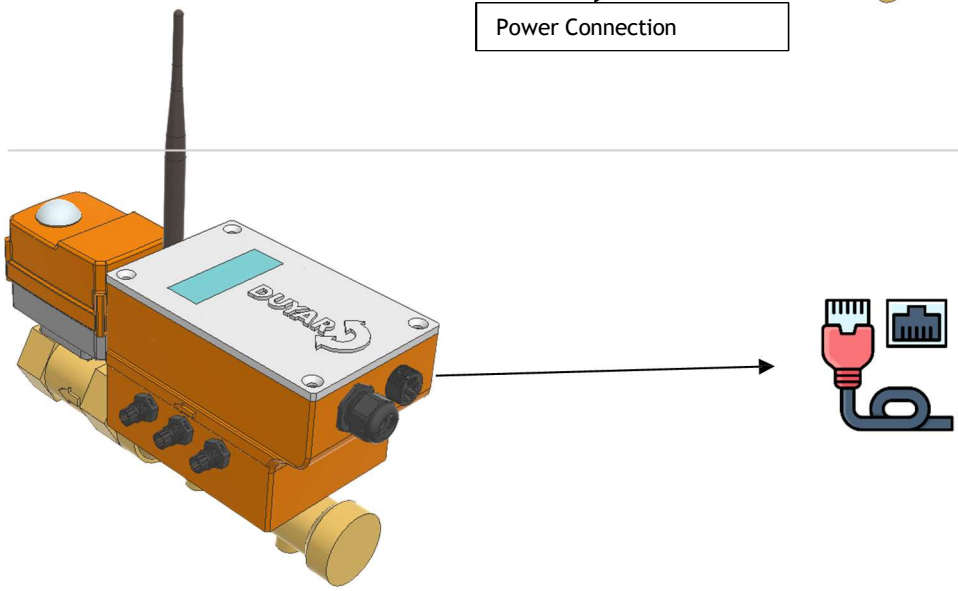
5: OUT 2 - Feedback Dry Contact

6: Analog Feedback - VCC 24VDC

7: Analog Feedback - OUT Output Signal

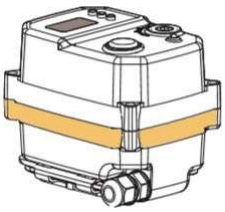
8: Analog Feedback - 0V

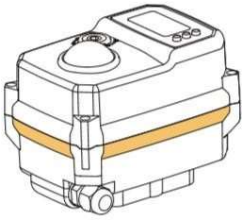


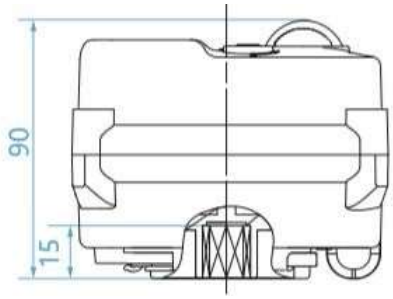


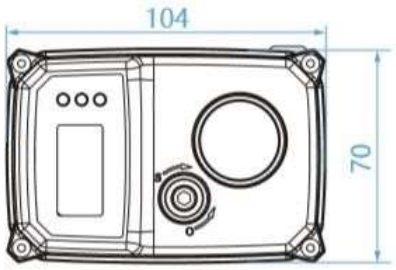
The RJ45 socket input enables ModBUS TCP/IP communication or the device's internet connection.

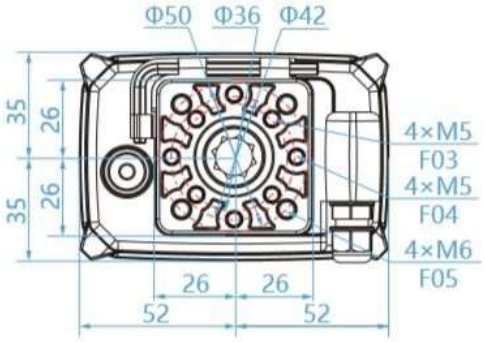
Actuator Information Section



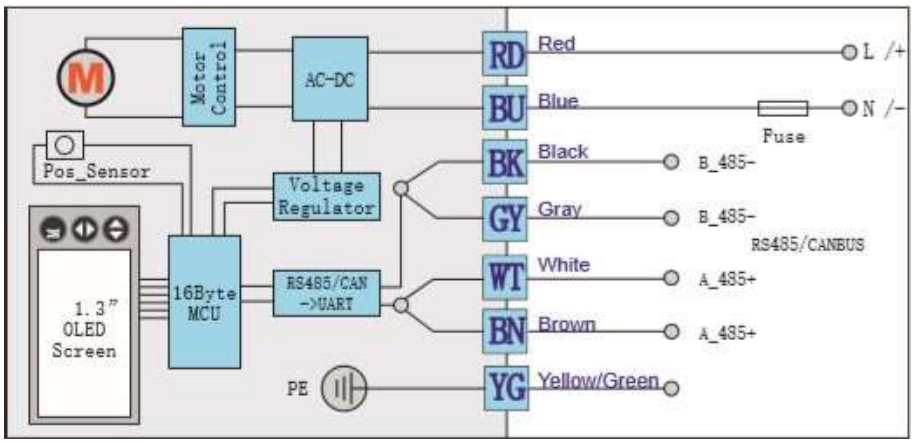


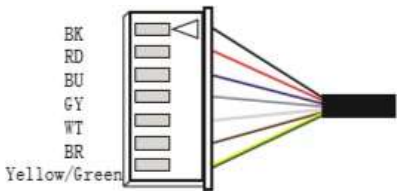






Electrical Wiring Diagram





Actuator Information

User Parameters

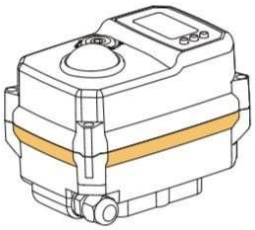
The necessary adjustments can be made from the screen interface on the actuator. These settings are set as factory default for the Smart Valve. **It is not recommended to make these adjustments** . This section only describes the parameter settings that can be made if the actuator is selected for use.

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.

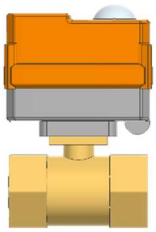


ALLDV: All devices on serial port
U0DEV: device serial port 0 – ModBUS data
U1DEV: device serial port 1 – Bluetooth data transfer
ON: The command for the actuator to fully open the valve is processed.
OFF: The command for the actuator to completely close the valve is processed.
KEEP: Let the actuator 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.

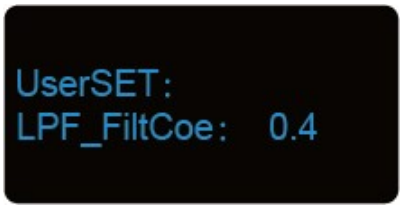


LPF_Filtcoe : Low- Pass Filter) means Filter .

• 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

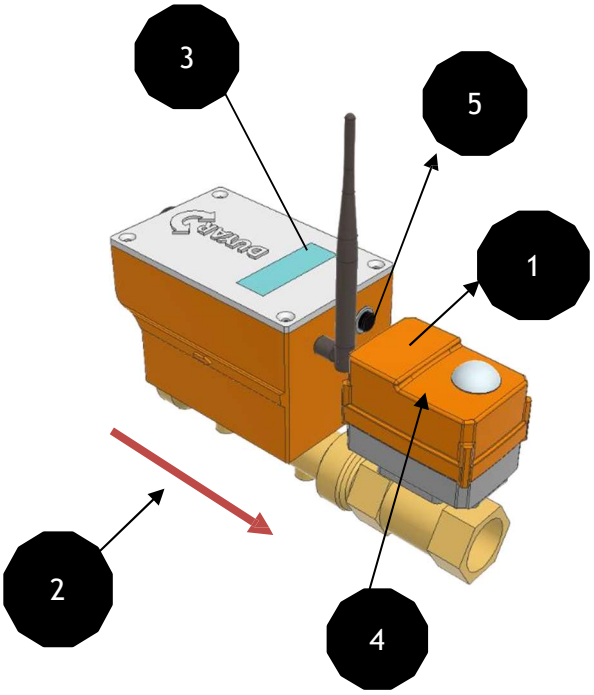
Manual Mode:

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

Operating controls And indicators

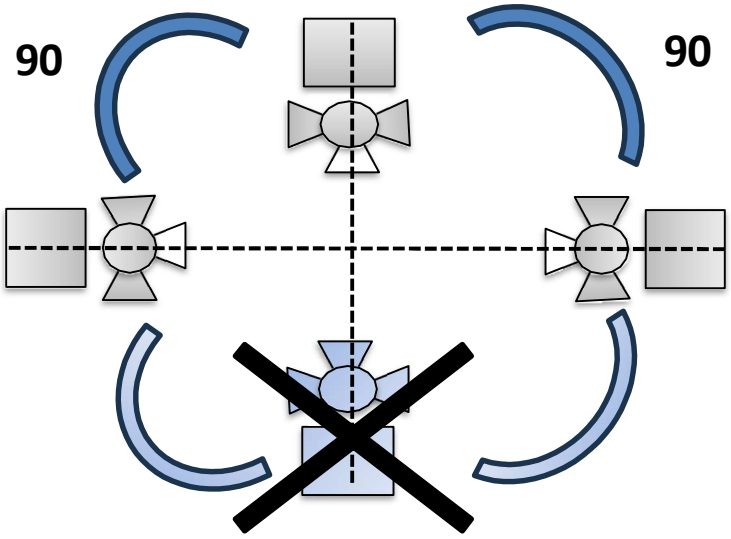
1. **LCD indicator : Valve Live Position Indicator and Settings**
2. **Flow direction**
3. **Proximity communication interface: Displays Energy, Flow Rate, Inlet-Outlet Temperature, and Difference. Press button number**
4. **By hand intervention element button**

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.

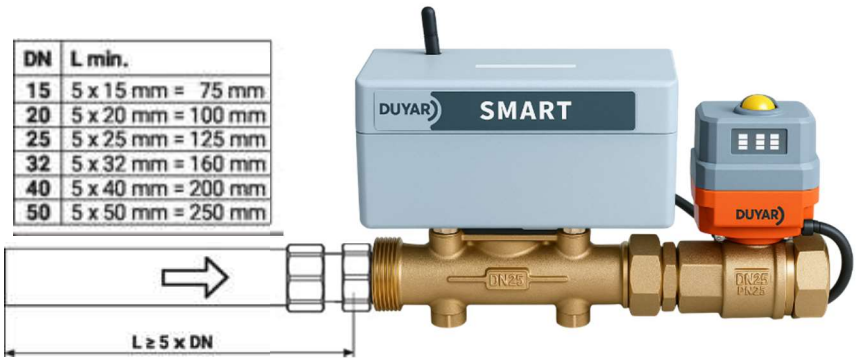
Stress Prevention

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

Inlet Section

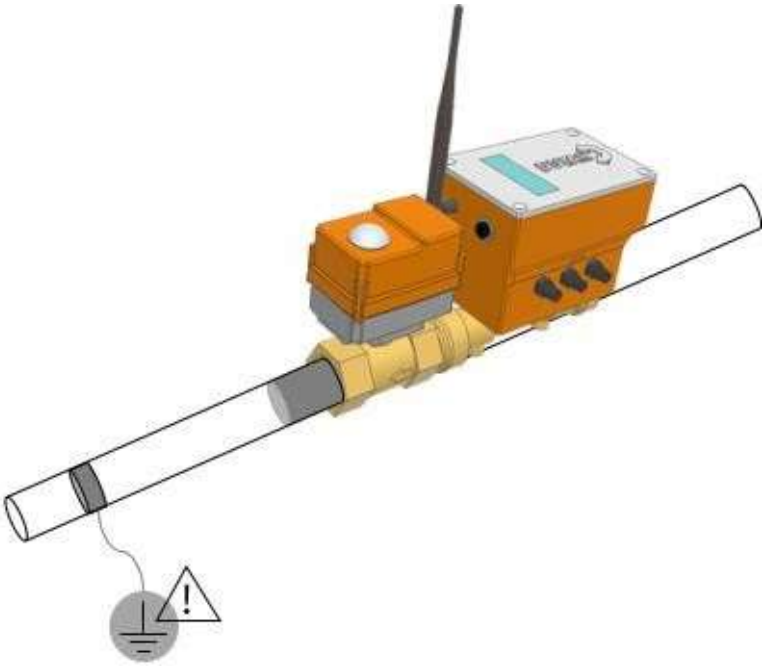
To achieve the specified measurement accuracy, a flow stabilization section or an inlet section must be created downstream of the flow sensor in the direction of flow. Its dimensions should be at least 5 x DN

DN	L min.
15	5 x 15 mm = 75 mm
20	5 x 20 mm = 100 mm
25	5 x 25 mm = 125 mm
32	5 x 32 mm = 160 mm
40	5 x 40 mm = 200 mm
50	5 x 50 mm = 250 mm



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.



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