akribis

USER GUIDE

# HS 2.2-M

Produal

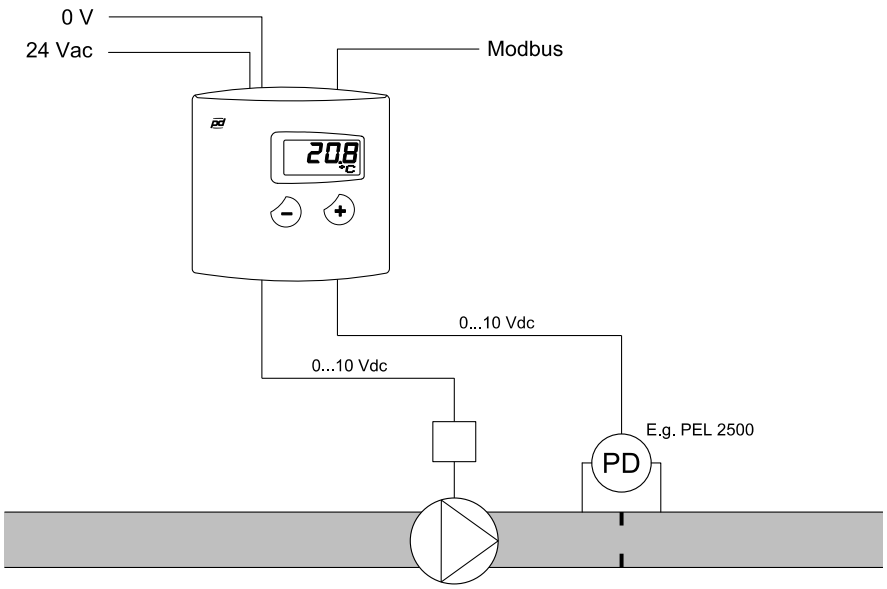
Distributed by AKRIBIS



This user guide is for controllers with the software version 2.0.0 or newer.

## APPLICATIONS

The controller can control 0...10 V controlled actuators and thermal actuators or 3-point actuators. See the following figure for an application example.

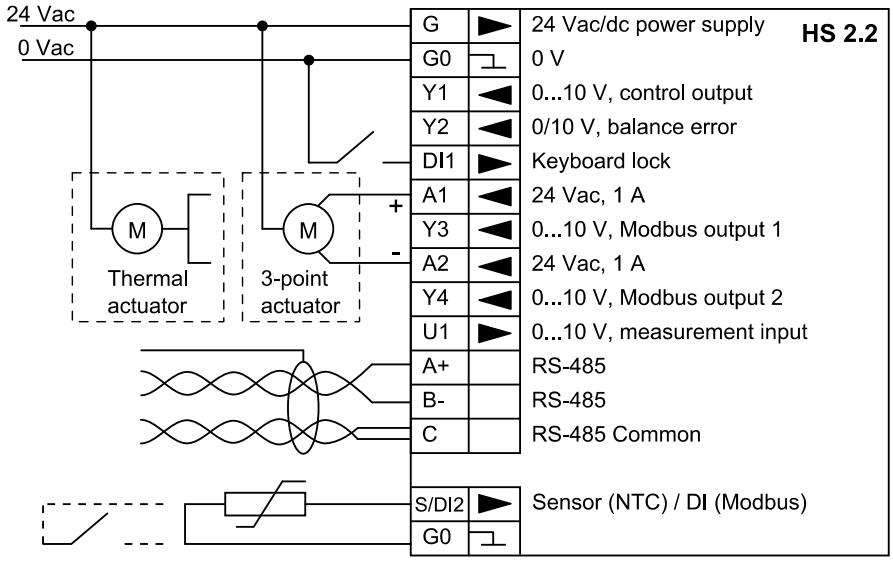



## COMMISSIONING

### WIRING

Caution

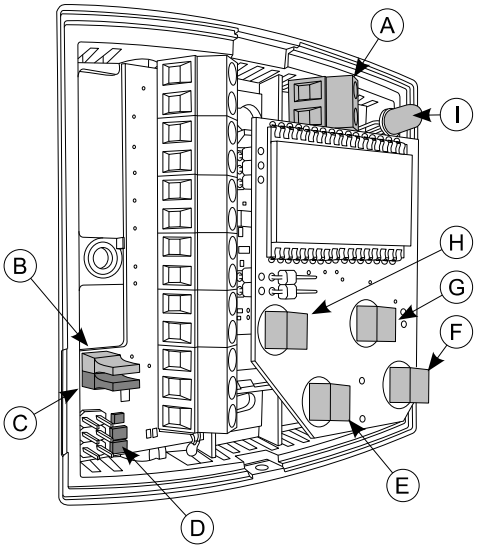
Device wiring and commissioning can only be carried out by qualified professionals. Always make the wirings while the power is switched off.




**NOTE:** The 3-point actuators are controlled to the extreme position when the power is switched on. The procedure takes few minutes to complete.

**NOTE:** The S/DI2 information (temperature measurement / digital input) can only be read via Modbus. Accordingly, the Y3 and Y4 outputs can only be controlled via Modbus.

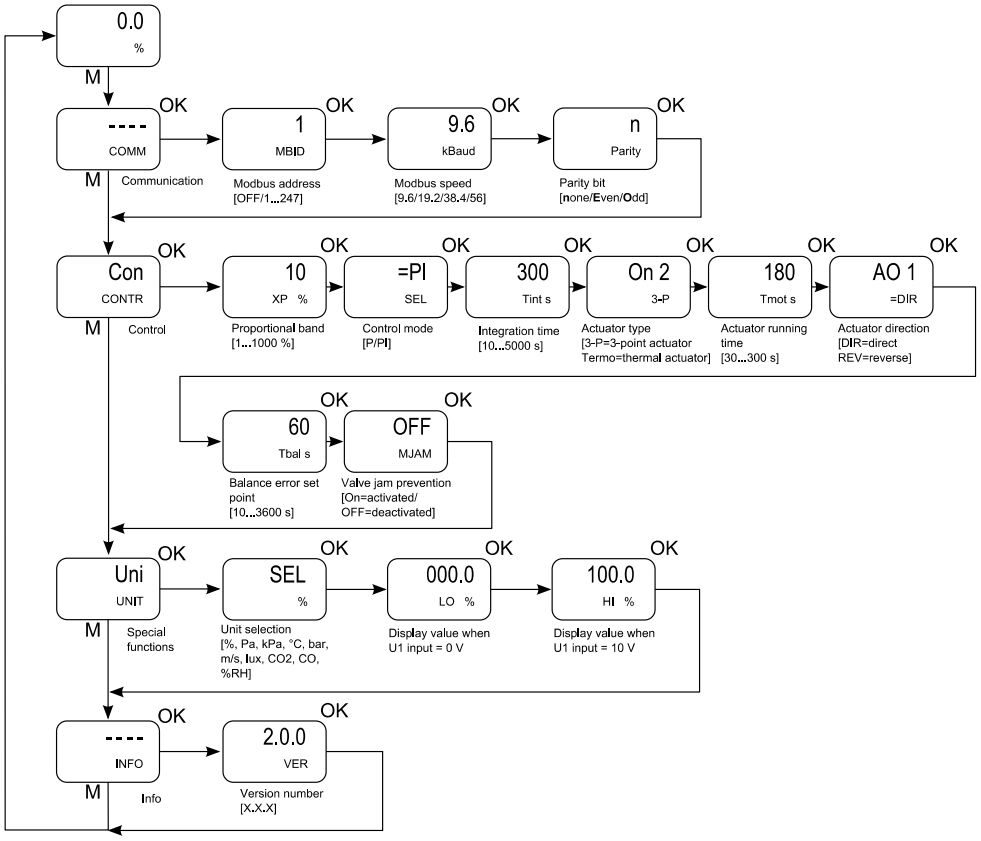

Information is subject to change without prior notice.




A. Terminals for NTC 10 sensor or DI contact
B. Bus termination (120 Ω)
   - o closed = terminated
   - o open = no termination
C. Configuration mode selector
   - o closed = configuration mode
   - o open = user mode (factory setting)
D. Indicator lights
   - o green PWR = supply OK
   - o yellow TX = transmission from controller
   - o yellow RX = bus activity
E. M button
F. OK button
G. + button
H. - button
I. Indicator light
   - o green = OK
   - o red = alarm

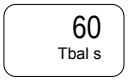
## Menu

Menu is activated by setting the configuration mode selector to the closed position. You can proceed in the menu by touching the “M” and “OK” buttons. The values can be changed with the “-“ and “+” buttons. The value is accepted with the “OK” button. The following menu structure contains the factory settings.




## Balance error

The balance error output (Y2) activates (-> 10 V) if the controller doesn’t reach the balance during the set time. The balance error time set point (10…3600 s) can be adjusted with the Tbal s parameter. The default value is 60 s.





Information is subject to change without prior notice.

### Selecting the unit

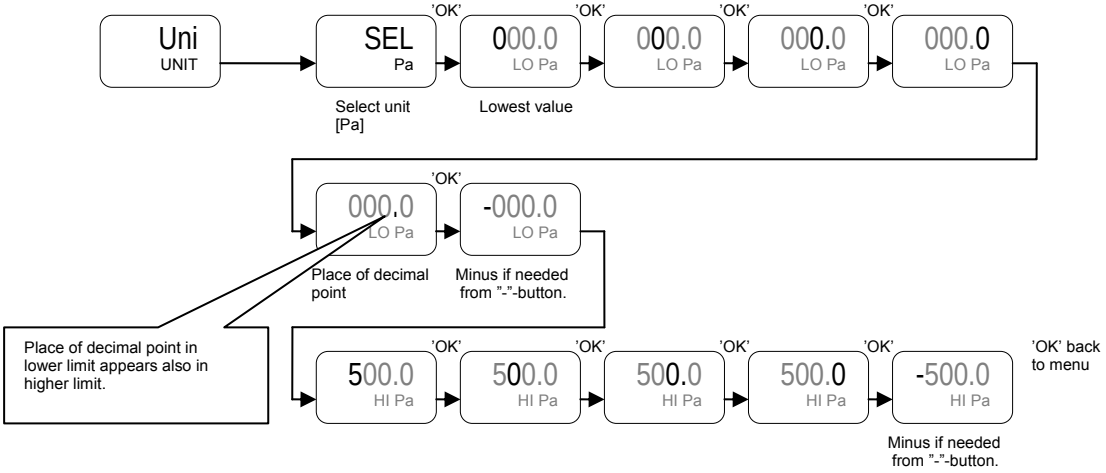
0...10 V input signal is possible to scale according to the different units. Default unit is a percent [%], but can be scaled to following units; Pa, kPa, ºC, bar, m/s, lx, $CO_2$, CO and % rH.

Internal measuring range of the controller is 1000 and single step is one. The minimum and maximum of measuring range can be adjusted [-9999...9999].

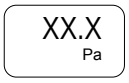
**NOTE:** Single step is different if measuring range is scaled.

**Example: Using a differential pressure transmitter (e.g. Produal PEL 2500) with HS 2.2-M**

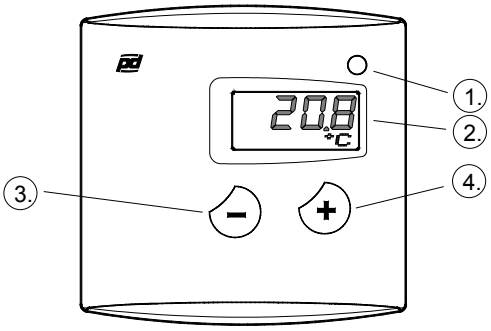
The differential pressure transmitter measuring range is set to 0...500 Pa.




Selected unit appears as follows:




### USER MODE




1. Status LED
   - Green = normal
   - Red = Balance error
2. LCD display
   Displays the U1 input that is scaled for the wanted unit.
3. Setpoint adjustment
4. Setpoint adjustment


Information is subject to change without prior notice.

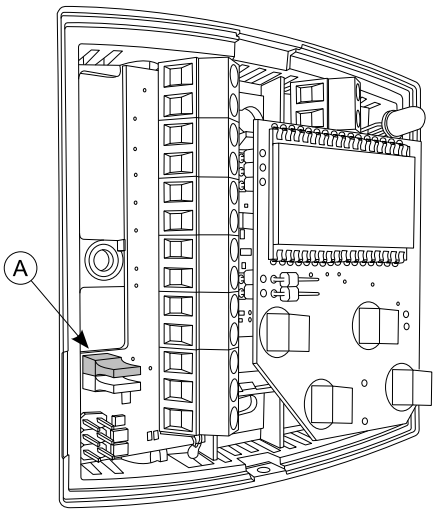
## MODBUS

### Bus properties

| | |
|---|---|
| Protocol | RS-485 Modbus RTU |
| Bus speed | 9600/19200/38400/56000 bit/s |
| Data bits | 8 |
| Parity | none/odd/even |
| Stop bits | 1 |
| Network size | up to 247 devices per segment |

### Bus termination

The Modbus can be terminated by placing the Modbus termination jumper.




A. Modbus termination jumper

### Supported Modbus functions

| | |
|---|---|
| 0x01 | Read Coils |
| 0x02 | Read Discrete Inputs |
| 0x03 | Read Holding Registers |
| 0x04 | Read Input Registers |
| 0x05 | Write Single Coil |
| 0x06 | Write Single Register |
| 0x0F | Write Multiple Coils |
| 0x10 | Write Multiple Registers |
| 0x17 | Read/Write Multiple Registers |

### Modbus registers

Data type:

| | |
|---|---|
| bit | = 0 or 1 |
| unsigned | = unsigned integer (0…65535) |
| signed | = integer (-32768…32767) |

**NOTE:** The memory durability is 1000000 write cycles.

The controls marked with * are stored in the volatile memory. These controls are returned to factory defaults after a power failure.


Information is subject to change without prior notice.

Coils (read / write)

| Register | Parameter description | Data type | Value | Range | Default |
|---|---|---|---|---|---|
| **1** | *Controller output overdrive enable (Y1) | bit | 0…1 | 0=off, 1=on | 0 |
| **2** | *Balance error output overdrive enable (Y2) | bit | 0…1 | 0=off, 1=on | 0 |
| **3** | *Actuator output overdrive enable (A1/A2) | bit | 0…1 | 0=off, 1=on | 0 |
| **4** | *Controller operating mode (PI/P) | bit | 0…1 | 0=PI, 1=P | 0 |
| **5** | Valve jam prevention function | bit | 0…1 | 0=off, 1=on | 0 |
| **6** | Actuator operating mode (Thermal/3-point) | bit | 0…1 | 0 = thermal actuator,<br>1 = 3-point actuator | 1 |
| **7** | Actuator direction reversed | bit | 0…1 | 0=off, 1=on | 0 |

Discrete inputs (read only)

| Register | Parameter description | Data type | Value | Range |
|---|---|---|---|---|
| 1000**1** | Display lock status | bit | 0…1 | 0=no, 1=yes |
| 1000**2** | DI2 input status | bit | 0…1 | 0=off, 1=on |

Input registers (read only)

| Register | Parameter description | Data type | Value | Range |
|---|---|---|---|---|
| 3000**1** | Discrete inputs (16 - 1) | unsigned | 16 bits | 16 bits |
| 3000**2** | Coils (16 - 1) | unsigned | 16 bits | 16 bits |
| 3000**3** | Ambient temperature | signed | -600…600 | -60.0…60.0 °C *) |
| 3000**4** | External temperature measurement (S/DI2) | signed | -600…600 | -60.0…60.0 °C *) |
| 3000**5** | U1 input value | signed | 0…1000 | 0…10.00 V |

Holding registers (read / write)

| Register | Parameter description | Data type | Value | Range | Default |
|---|---|---|---|---|---|
| 4000**1** | Set point | signed | 0…1000 | 0.0…100.0 % | 500 |
| 4000**2** | *Controller output overdrive by Modbus (Y1) | signed | 0…1000 | 0…10.00 V | 0 |
| 4000**3** | *Balance error overdrive by Modbus (Y2) | signed | 0…1000 | 0…10.00 V | 0 |
| 4000**4** | *Voltage output value (Y3) | signed | 0…1000 | 0…10.00 V | 0 |
| 4000**5** | *Voltage output value (Y4) | signed | 0…1000 | 0…10.00 V | 0 |
| 4000**6** | *Actuator output value (A1/B1) | signed | 0…1000 | 0.0…100.0 % | 0 |
| 4000**7** | Proportional band | signed | 0…1000 | 0…1000 % | 10 |
| 4000**8** | Integration time | signed | 10…5000 | 10…5000 s | 300 |
| 4000**9** | Actuator running time | signed | 30…300 | 30…300 s | 180 |
| 4001**0** | Display unit | signed | 0…9 | 0 = %<br>1 = Pa<br>2 = kPa<br>3 = °C<br>4 = bar<br>5 = m/s<br>6 = lux<br>7 = $CO_2$<br>8 = CO<br>9 = % rH | 0 |
| 4001**1** | Display scaling, U1 = 0 V | signed | -9999…9999 | -9999…9999 | 0 |
| 4001**2** | Display scaling, U1 = 10 V | signed | -9999…9999 | -9999…9999 | 1000 |
| 4001**3** | Numbers after decimal point | signed | 0…3 | 0…3 | 1 |
| 4001**4** | Balance error set point | signed | 10…3600 | 10…3600 s | 600 |

*) Normal operating range


Information is subject to change without prior notice.