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Valves, controls + systems

EN

Electromotive actuator
„Aktor M ST L Modbus“, 24 V, (DN 10-32)
Operating instructions

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1. General information

The original operating instructions were drafted in German.

The operating instructions in other languages were translated from German.

1.1 Validity of the operating instructions

These operating instructions are valid for the electromotive actuator
“Aktor M ST L Modbus”, 24 V, for Cocon QTZ.

1.2 Type plate

The type plate is located below the cable connections.

1.3 Extent of supply

- Electromotive actuator “Aktor M ST L Modbus”, 24 V
- Operating instructions

1.4 Contact

Address

OVENTROP GmbH & Co. KG

Paul-Oventrop-Straße 1

59939 Olsberg

GERMANY

Technical service

Phone: +49 (0) 29 62 82-234

1.5 EU Declaration of conformity

Oventrop GmbH & Co. KG hereby declares that this product complies with the basic requirements and other relevant provisions of the EC Directives concerned.

The declaration of conformity can be obtained from the manufacturer.

1.6 Used symbols

	Highlights important information and further explanations.
▶	Action required
•	List
1. 2.	Fixed order. Steps 1 to X.
▷	Result of action

2. Safety-related information

2.1 Correct use

Safety in operation is only guaranteed if the product is used correctly.

The actuator may be used in indoor heating, ventilation and air conditioning systems in combination with the pressure independent control valves “Cocon QTZ” PN 16/25.

Any other use of the product will be considered incorrect use.

Claims of any kind against the manufacturer and/ or his authorised representatives, due to damages caused by incorrect use cannot be accepted.

The observance of the operating instructions is part of the compliance terms.

2.2 Warnings

Each warning contains the following elements:

Warning symbol SIGNAL WORD
Type and source of danger! Possible consequences if the danger occurs or the warning is ignored. ► Possibilities of avoiding the danger.

The signal words identify the severity of the danger arising from a situation.

DANGER
Indicates an imminent danger with high risk. The situation will lead to death or serious injury if not avoided.

WARNING
Indicates a possible danger with moderate risk. The situation may lead to death or serious injury if not avoided.

CAUTION
Indicates a possible danger with lower risk. The situation may lead to minor and reversible injury if not avoided.

NOTICE
Indicates a situation that may lead to damage to property if not avoided.

2.3 Safety notes

We have developed this product in accordance with current safety requirements.

Please observe the following notes concerning safe use.

2.3.1 Danger in case of inadequate personnel qualification

Any work on this product must only be carried out by qualified tradespeople.

As a result of their professional training and experience as well as their knowledge of the relevant legal regulations, qualified tradespeople are able to carry out any work on the described product professionally.

User

The user has to be informed by the qualified tradespeople as to the operation.

2.3.2 Risk of burns due to hot components and surfaces

- ► Allow the product to cool down before working on it.
- ► Wear suitable protective clothing to avoid unprotected contact with hot system components and fittings.

2.3.3 Availability of the operating instructions

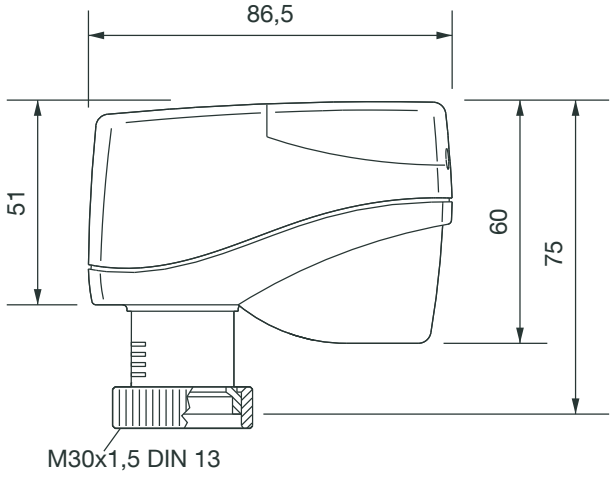
These operating instructions and all other valid documents have to be read and applied by any person working on the product.

The operating instructions have to be kept at the installation location.

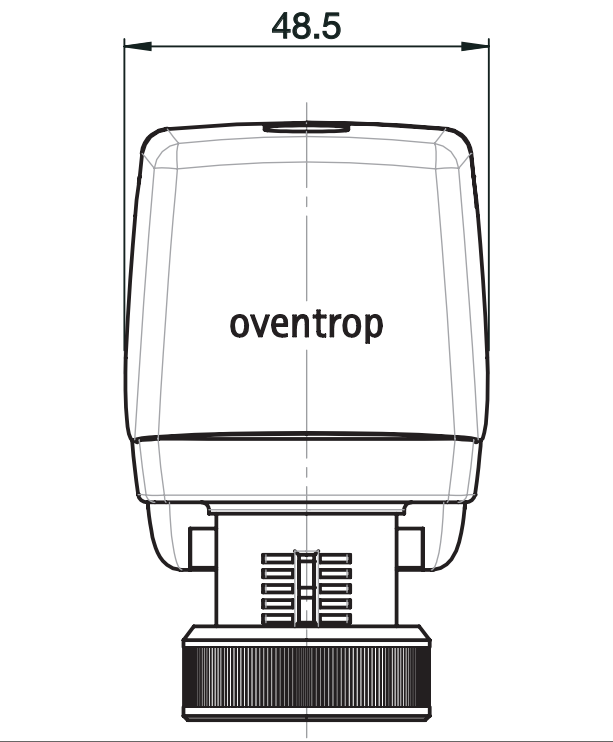
- ► Hand these operating instructions and all other valid documents over to the user.

3. Technical description

3.1 Construction



Illust. 1: Side view



Illust. 2: Front view

3.2 Functional description

The full range of functions will only be available after parametrization of the Modbus.

Mini actuator Modbus for steady control in heating, ventilation and air conditioning systems.

Control is carried out via Modbus RTU communication (RTU: Remote Terminal Unit).

Apart from the communication on the Modbus, two universal inputs (binary and analogue) are available. One of the inputs can be used as analogue output. The inputs are suitable for internal functions and for further processing of data in an automation station (Modbus master).

3.2.1 Basic functions

Automatic recognition of neutral point

The neutral point is detected during the initialisation run. A cyclical reinitialization is performed during operation.

Positioning

The actuator is operated with steady control. The control signal (0..100%) is transmitted via Modbus communication.

The current position (0..100%) can be queried via Modbus.

Valve anti-blocking function

The actuator features a valve anti-blocking function which can be activated. The cycle time can be configured via the Modbus parametrization.

If the value is zero, this function is deactivated.

The valve anti-blocking function will prevent sticking of the stem if the valve is not activated over a longer period.

Setting of valve characteristic lines

Different valve types with their characteristic lines can be selected via the Modbus parametrization. A minimum and a maximum volume flow are defined on the basis of these characteristic lines.

Configuration of the hydronic balancing values

A maximum volume flow (hydronic balancing) for the heating and cooling mode can be defined via the Modbus parametrization.

Temperature detection

The temperatures of the supply and return pipe can be detected via two connected temperature sensors and can be queried via Modbus.

Flushing function

The actuator features an automatic flushing function. During flushing, the valve is temporarily fully open. The cycle time can be configured via the Modbus parametrization.

If the value is zero, this function is deactivated.

3.2.2 Calculation functions

Calculation of the volume flow

In combination with a pressure independent control valve “Cocon QTZ”, the current volume flow is calculated on the basis of the set valve characteristic line and the current position of the actuator and can be queried via Modbus.

Calculation of the thermal output

The current thermal output is calculated on the basis of the calculated volume flow and the temperature difference between the supply and return pipe and can be queried via Modbus.

3.2.3 Limitation function

Return temperature limitation (register 315)

Return temperature limitation is carried out on the basis of the limit value configured via Modbus and the current measured return temperature. When exceeded or undercut, the volume flow will be reduced until the limit value is reached again.

Limitation of the thermal output (register 314)

Limitation of the thermal output is carried out on the basis of the limit value configured via Modbus and the calculated current output. When exceeded, the volume flow will be reduced until the limit value is reached again.

3.2.4 Control function

Output control (registers 130, 200, 301, 310, 311, 410)

Control to a defined output value can be carried out on the basis of the calculated current output.

Room temperature control (registers 131, 200, 300, 310, 311, 403)

Room temperature control is carried out on the basis of the nominal temperature configured via Modbus and the transmitted current room temperature.

Return temperature control (registers 130, 200, 302, 310, 311, 404, 405)

Return temperature control is carried out on the basis of the nominal temperature configured via Modbus and the current measured return temperature.

3.2.5 System monitoring

Leakage detection

A possible internal leakage is detected on the basis of the measured flow and return temperature with the valve closed.

A leakage is detected if the measured temperature difference exceeds 8 K for at least 6 hours with the valve closed.

Operating and fault messages

All data registered by the actuator can be queried via Modbus. The state of the hydraulics can be assessed on the basis of these data and possible errors and failures can be detected at an early stage.

Bus monitoring

The bus failure detection can be parametrized via Modbus (see section 6.2 on page 12).

3.3 Technical data

Technical data	
Operating voltage	24 V AC ±10 %, 50/60 Hz; 3.8 VA 24 V DC ±10 %; 1.9 W
Power consumption	Dimensioning: - 4.2 VA (24 V AC) - 2.2 W (24 V DC) nominal: - 3.8 VA (24 V AC) - 1.9 W (24 V DC)
Start up load	- 24 V DC; 5.0 A; 0.025 A^2s - 24 V AC; 7.2 A; 0.052 A^2s
Interface	RS485 Modbus RTU slave; max. 1000 m depending on the baud rate
Control	Directly via Modbus via automation station or gateway
Inputs and outputs	2 universal in- or outputs (P1, P2) independently parametrizable via Modbus as: - binary input, volt free max. 500 Ohm, 1 mA; 13 V DC - analogue input, see table "sensor types" - analogue output 0..10 V DC only P2
Connection	Two pre-assembled cables 1.5 m; 2 x 2 x 0.5 mm^2 shielded and 1.5 m; 4 x 0.5 mm^2
Display	LED display for operating voltage and status
Motor deactivation	Drive stem: extending = load-dependent retracting = travel-dependent
Travel noise	<31 dB (A)
Piston stroke	max. 9 mm
Floating time	22 s/mm
Operating power	Nominal 150 N
Position indicator	Stroke scale
Permissible fluid temperature in the valve	0 -120 °C
Ambient temperature	0 - 50 °C
Ambient humidity	In operation: 0 - 85 % r.h., not condensing Out of operation: 0 - 85 r.h., not condensing
Overvoltage category	Degree of protection
Pollution degree	2
Protection class	IP54 ***NOTICE*** **Short circuit due to dripping water** ▶ Do not feed the cable in from the top.
Protective system	III according to EN 60730
Installation position	360°
Maintenance	Maintenance-free
Weight	350 g

Bus communication		
Interface	EIA-485 / RS-485	
Type of transmission	Modbus RTU slave	
Supported baud rates	9.600, 19.200, 38.400 (factory setting), 57.600, 115.200 bps	
Start/stop bits	8N1, 8N2 (factory setting)	
Number of bus participants	Up to 32 recommended, max. 64	
Bus load	1/8 unit load	
Termination	Switchable in the appliance, 120 Ohm	
Bias network	To be set in the master	
Recommended line	Twisted pair cable with shield (characteristic impedance about 120 Ohm)	
Bus topology with 115.200 baud	Recommended max. line length 500 m	
Bus topology with 38.400 / 57.600 baud	Recommended max. line length 750 m	
Bus topology with 9.600/19.200 baud	Recommended max. line length 1000 m	
Stub lines	Max. line length 2 m	
Supported Modbus function codes	Code	Function
	0x03	Read holding register
	0x06	Write holding register
	0x03	Read holding multiple
	0x10	Write holding multiple

Sensor types	
0..10 V	0..100 %
KP10	-50..+150 °C
Ni1000 (DIN)	-50..+150 °C
Ni1000 (L&G)	-50..+150 °C
PT1000	-50..+150 °C

4. Transport and storage

Temperature range	0 °C - +50 °C
Relative air humidity	max. 85%
Particles	Store dry and free from dust
Mechanical influences	Protected from mechanical agitation
Weather influences	Do not store outdoors
	Protect from direct sunlight
Chemical influences	Do not store together with aggressive fluids

5. Installation

On delivery, the actuator is in the mounting position.

In the mounting position, the stem is fully retracted and the DIP switches (Bit 1 bis 6) are set to "OFF" (see section 5.3.1 on page 12).

5.1 Fitting of the actuator

Make sure that there is enough space for the installation of the actuator.

The actuator must only be connected to the power supply after installation!

CAUTION

Risk of burns due to hot components

An unprotected contact with hot components may lead to burns.

- ▶ Before starting work, allow the valve to cool down.
- ▶ Wear safety gloves.

1. Fit the actuator to the connection thread of the valve.
2. Hand tighten the collar nut.

Avoid cross threading.

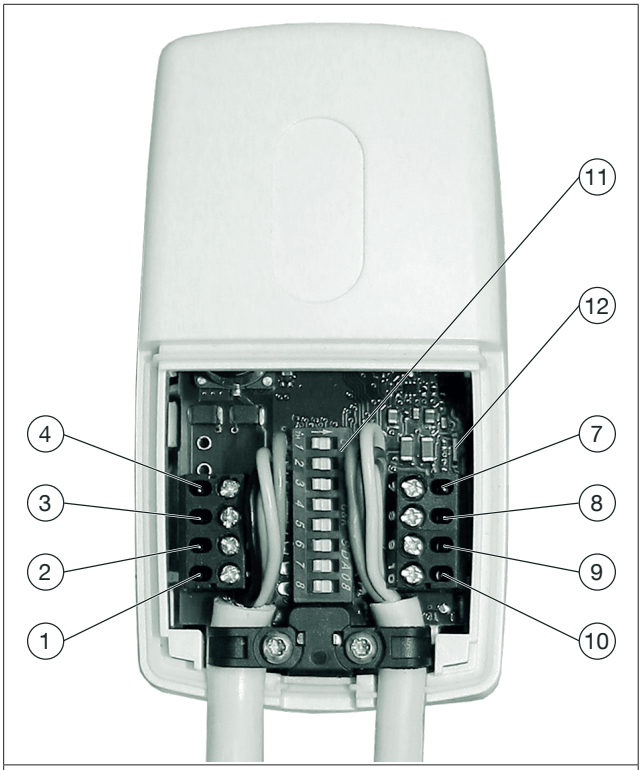
NOTICE

Damage to the actuator when tightening the collar nut with excessive torque

The actuator can be damaged and its be function impaired if the collar nut is over-tightened.

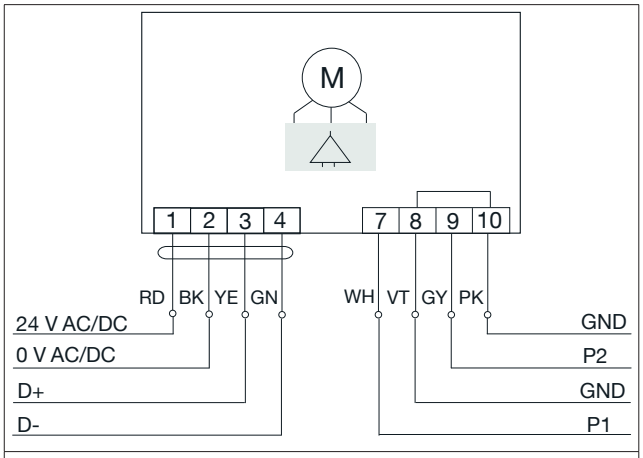
- ▶ Hand tighten the collar nut.

5.2 Electrical connections



Illust. 3: Electrical connections, DIP switches and status LED

(1)	Red (RD)	24 V AC/DC	
(2)	Black (BK)	0 V AC/DC	
(3)	Yellow (YE)	D+	Data line
(4)	Green (GN)	D-	Data line
(7)	White (WH)	P1	Universal input 1
(8)	Violet (VT)	GND	Universal input 1 earth
(9)	Grey (GY)	P2	Universal input 2
(10)	Pink (PK)	GND	Universal input 2 earth
(11)	DIP switch panel		
(12)	Status LED		



Illust. 4: Connection diagram

NOTICE

Short circuit due to dripping water

▶ Do not feed the cable in from the top.

1. Remove the casing cover.
2. Connect the data lines for the Modbus and, if required, the lines for the universal inputs according to the assignment in Illust. 4 on page 11.
3. Connect the lines for the power supply according to the assignment in Illust. 4 on page 11 an.
4. Connect the power supply.

▷ The LED will flash green quickly.

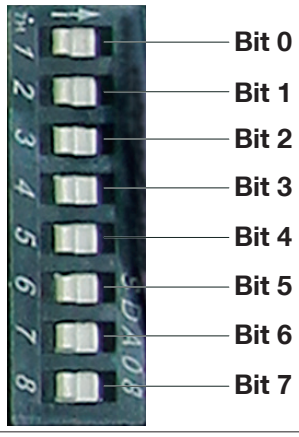
5.3 Configuration of the DIP switches

Address 00 is always occupied by the Modbus master.

The terminal resistance (120 Ohm) between the two data lines (D+ and D-) is inactivated ("OFF") or activated ("ON") via DIP switch 8.

▶ Make sure that both ends of the bus are terminated by a terminal resistance.

1. Remove the casing cover.
2. Configure the DIP switches according to the desired Modbus address.



Illust. 5: DIP switch panel

5.3.1 Assignment

Function	Switch position	
	OFF	ON
BIT 0	0	1
BIT 1	0	1
BIT 2	0	1
BIT 3	0	1
BIT 4	0	1
BIT 5	0	1
BIT 6	The baud rate is reset to 38.400,8,N,2 by switching back and forth	
BIT 7 Terminal resistance	Inactive	Active

5.3.2 Address configuration

Address	BIT 5 [32]	BIT 4 [16]	BIT 3 [8]	BIT 2 [4]	BIT 1 [2]	BIT 0 [1]
1	0	0	0	0	0	1
2	0	0	0	0	1	0
3	0	0	0	0	1	1
4	0	0	0	1	0	0
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
63	1	1	1	1	1	1

▶ Set the addresses of your actuators as desired. (Modbus topology see section 10.1 on page 15).

Each address must only be used once in a Modbus network.

▷ The actuator will automatically perform an initialisation run after setting of the Modbus addresses.

▷ After completion of the initialisation run and commissioning of the Modbus interface, the actuator will follow the control signals.

6. Operation

6.1 Status LED

The status LED is located under the casing cover above the terminal on the right hand side and displays the operating status of the actuator.

The status LED is visible even when the cover is closed.

Status LED	Meaning
Lit green	Normal operation
Flashing green quickly	Mounting position switch position 0 (switches 1 to 6 set to OFF)
Flashing green	Initialisation run
Flickering green	Modbus communication
Flashing yellow	Manual setting (stem fully extended)
Lit red	Valve adaptation error (initialisation run without valve)
Off	Operating voltage interrupted

6.2 Parametrization of the bus failure detection via Modbus

Register address	Name	Bus communication	Values
133	Bus failure function	Configuration	See register address 133 in section 10.2 on page 15.
134	Emergency position	Configuration	0..100%

If the value 3 has been configured in the register address 133, the valve emergency position (0-100 %) configured in the register address 134 will be approached in case of a bus failure (no query by the Modbus Master for 120s).

Once the bus communication has been restored, the valve will again be controlled automatically according to the set operating mode.

6.3 Initialisation run

6.3.1 By address change

The actuator will perform an initialisation run if the Modbus address is changed (see section 5.3.2 on page 12).

6.3.2 Via the Modbus parametrization

Register address	Name	R/W	Values
138	Command	r/w	0: Normal operation 1: Valve adaptation/initialisation run 2: Test run: manual flushing function (once), after that the valve will again be controlled according to the set operating mode 3: Sync: manual flushing function (once), after that the valve will again be controlled according to the set operating mode 4: Error reset: Each incoming error will generate an error message in register 318. The error message can be reset with the help of the Error Reset. In case of permanent errors, the error message will be generated again immediately. 5: Baud rate change. The currently set parameters of the register addresses 105...107 are applied.

6.4 Manual operation

The manual mode is only intended for mounting and test purposes.

In manual mode, the stem can be extended and retracted manually with the help of a magnet.

CAUTION

Risk of scalding due to hot fluids

In manual mode the actuator might not close fully.

There is a risk of scalding due to the unintentional discharge of hot water.

- ▶ Only carry out work when the system is depressurised.
- ▶ Allow the system to cool down.
- ▶ Wear safety goggles.

Illust. 6: Manual operation

(1)	Magnet

6.4.1 Extending the drive stem

1. Move the actuator into the mounting position (DIP switches (Bit 1 to 6) set to “OFF”).

▷ The drive stem will be retracted.

▷ The LED will flash green quickly.

2. Stroke along the right side of the actuator with the magnets (position (1) in Illust. 6 on page 8).

▷ The drive stem will be extended.

▷ The LED will flash yellow.

6.4.2 Retracting the drive stem

1. Stroke along the right side of the actuator with the magnets (position (1) in Illust. 6 on page 8) again.

▷ The drive stem will be retracted (mounting position).

▷ The LED will flash green quickly.

	The function "extending the drive stem" or "retracting the drive stem" can only be triggered again when the actuator has reached the final position. The operating time depends on the valve.

7. Maintenance

The actuator is maintenance-free.

8. Removal

 **CAUTION**	
	Risk of burns due to hot components An unprotected contact with hot components may lead to burns. ► Before starting work, allow the valve to cool down. ► Wear safety gloves.

1. Move the actuator into the mounting position (DIP switch (Bit 1 to 6) set to “OFF”).

▷ The LED will flash green quickly.

2. Disconnect the power supply.
3. Disconnect all electrical connections.
4. Unscrew the collar nut.
5. Remove the actuator from the valve.

9. Disposal

Guideline 2012/19/EU WEEE:

	Waste electrical and electronic equipment (WEEE) must not be disposed of with domestic waste, but must be dropped off at a collection point for the recycling of electrical and electronic appliances.

NOTICE	
	Risk of environmental pollution Incorrect disposal (for instance with the domestic waste) may lead to environmental damage. ► Packaging material is to be disposed of in an environmentally friendly manner. ► Components are to be disposed of professionally.

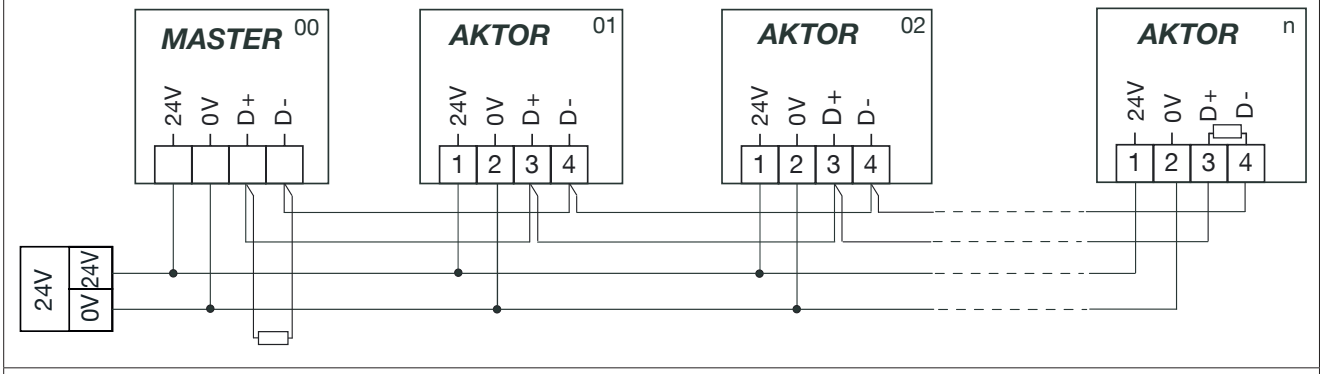
If no return or disposal agreement has been made, the product has to be disposed of.

► If possible, the components are to be recycled.

► Components, which cannot be recycled, are to be disposed of according to the local regulations. Disposal with the domestic waste is inadmissible.

10. Appendix

10.1 Modbus topology



Illust. 7: Modbus topology

NOTICE

Disturbances during signal transmission in the bus system

If the Modbus is not terminated correctly, communication disturbances between the components may occur.

- ▶ Install a terminal resistance (120 Ohm) at the beginning and the end of the Modbus between the data lines D+ and D-.

10.2 Data point list

Register address	Data type	Name	R/W	Values
0	uint16	Type	r	**1**: Aktor
1	uint16	FW version	r	e.g. 123 = version 1.23
2	uint16	HW identifier	r	e.g. 0x00F1
3	uint16	SerNum1	r	0-65535
4	uint16	SerNum2	r	0-65535
5	uint16	SerNum3	r	0-65535
101	uint16	Time hour	r/w	0-23 to be set manually (no battery buffered RTC)
102	uint16	Time minute	r/w	0-59 to be set manually (no battery buffered RTC)
105	uint16	RS485 Baud rate	r/w	0: default (38400,N,8,2) ; 1: 9.600 ; 2: 19.200 ; 3: 38.400 ; 4: 57.600 ; 5: 115.200
106	uint16	RS485 Stop bits	r/w	1, 2
107	uint16	RS485 Parity	r/w	0: none ; 1: even ; 2: odd
110	uint16	Selection of the current valve characteristic line	r/w	0: linear 1: Cocon QTZ DN10/DN15 PN25 30-210 l/h 2: Cocon QTZ DN10/DN15 PN25 150-700 l/h 3: Cocon QTZ DN15 PN25 200-1300 l/h 4: Cocon QTZ DN20 PN25 250-1800 l/h 5: Cocon QTZ DN25 PN25 400-2500 l/h 6: Cocon QTZ DN32 PN25 600-4800 l/h 7: Cocon QTZ DN10/DN15 PN16 30-210 l/h 8: Cocon QTZ DN10/DN15 PN16 90-450 l/h 9: Cocon QTZ DN15/20 PN16 150-1050 l/h 10: Cocon QTZ DN20 PN16 180-1300 l/h 11: Cocon QTZ DN25 PN16 300-2000 l/h 12: Cocon QTZ DN32 PN16 600-3600 l/h

113	uint16	Maximum volume flow of the selected valve	r	In l/h, is set when selecting the valve characteristic line
114	uint16	Volume flow limitation heating (hydronic balancing)	r/w	Adjustment value in l/h, can be set between min/max of the valve
115	uint16	Volume flow limitation cooling (hydronic balancing)	r/w	Adjustment value in l/h, can be set between min/max of the valve
119	uint16	Fluid energy constant	r/w	Default 1162 mW per kg*Kelvin, can be exceeded
123	uint16	Sensor type P1	r/w	0: Off 1: Binary input 2: 0..10V Input 3: KP10 4: NI1000_DIN 5: NI1000_LG 6: PT1000
124	uint16	Inversion P1	r/w	0: = normal ; 1: = inverse
125	int16	Correction factor/offset P1	r/w	V*100, K*10
126	uint16	I/O type P2	r/w	0: Off 1: Binary input 2: 0..10V input 3: KP10 4: NI1000_DIN 5: NI1000_LG 6: PT1000 8: Y output 0..10V (register 426) 9: Y feedback 0..10V (register 401) 10: Change-over output (0V = cooling, 5V = shut-off, 10V = heating)
127	uint16	Inversion P2 (input)	r/w	0: = normal ; 1: = inverse
128	int16	Correction factor/offset P2 (input)	r/w	V*100 ; K*10
129	uint16	Inversion P2 (output)	r/w	0: = normal, 1: = inverse
130	uint16	Configuration of the sources for differential temperature calculation	r/w	0: Flow and return temperature: bus register value 1: Flow: P1, Return: P2 2: Flow: P2, Return: P1 3: Flow: P1, Return: bus 4: Flow: P2, Return: bus 5: Flow: bus, Return: P1 6: Flow: bus, Return: P2
131	uint16	Configuration of the sources for room temperature	r/w	0: Bus register ; 1: P1 ; 2: P2
133	uint16	Bus failure function	r/w	0: No monitoring 1: CLOSED in case of timeout (120s) 2: OPEN in case of timeout (120s) 3: Position in register "emergency position" in case of timeout

134	uint16	Emergency position	r/w	0..10000 = 0..100.0%
135	uint16	Flushing timer	r/w	Value in minutes, 0: = inactive (smallest interval 60 minutes)
136	uint16	Valve anti-blocking timer	r/w	Value in hours, 0: = inactive (smallest interval 24 hours)
138	uint16	Command	r/w	0: Normal operation 1: Valve adaptation / initialisation run 2: Test run 3: Sync 4: Error reset 5: Acceptance of the transmission parameters (Baud rate, parity & stop bits)
200	uint16	Operating mode	r/w	0: Control via nominal value 1: Open 2: Closed 3: Min pos 5: Max pos 6: Temperature control according to register "room temperature" 7: Output control according to register "thermal output" 8: Temperature control according to register "return temperature" 9: Temperature control according to register “differential temperature”
201	uint16	Change-over mode	r/w	0: Shut-off 1: Heating 2: Cooling 3: Automatic according to flow temperature
300	uint16	Nominal value room temperature	r/w	°C*10
301	uint16	Nominal value thermal output	r/w	kW*10
302	uint16	Nominal value return temperature	r/w	°C*10
303	uint16	Nominal value differential temperature	r/w	°C*10
307	uint16	PI_TNOMINAL	r	Current nominal value for PI controller
308	uint16	PI_TACTUAL	r	Actual value for PI controller, source see setting "operating mode"
310	uint16	PI_XP	r/w	Proportional value Xp*10
311	uint16	PI_TN	r/w	Reset time Tn in seconds
312	uint16	Travel limit in % min	r/w	0..10000 = 0..100.0%
313	uint16	Travel limit in % max	r/w	0..10000 = 0..100.0%
314	uint16	Thermal output limit	r/w	kW*10; 0 = inaktiv
315	uint16	Return temperature limit	r/w	°C*10; 0 = inactive
316	uint16	Differential temperature limit	r/w	°C*10; 0 = inactive (difference between supply and return)

318	uint16	Operating status / Error	r	0x0000: Normal operation, no message 0x0001: Disturbance internal memory 0x0002: Disturbance internal AD conversion 0x0004: Disturbance valve adaptation 0x0008: Disturbance internal motor function 0x0010: P1 range excess 0x0020: P2 range excess 0x0040: Disturbance calculation/control functions 0x0080: Permanent blocking of the valve 0x0100: Command execution test run/adaptation active
319	uint16	Current flushing timer	r	Minutes remaining until flushing
320	uint16	Current valve anti-blocking timer	r	Minutes remaining until valve anti-blocking
321	uint32	Operating time	r	Seconds
323	uint32	Travel counter	r	mm
400	uint16	Nominal value volume flow (control signal)	r/w	0..10000 = 0..100%
401	uint16	Actual value volume flow	r	0..10000 = 0..100%
402	uint16	Current calculated volume flow	r	l/h
403	int16	Room temperature	r(w)	°C*10 (write protected in case of assigned source P1 or P2)
404	int16	Flow temperature	r/(w)	Current flow temperature in °C*10 (write protected in case of assigned source P1 or P2)
405	int16	Return temperature	r/(w)	Current return temperature in °C*10 (write protected in case of assigned source P1 or P2)
406	int16	Differential temperature	r	Calculated difference from flow/return temperature register in K*10
407	uint16	Leakage warning	r	0: No warning; 1: Leakage detected (valve closed for more than 6h, differential temperature exceeding 8 K)
408	uint16	Digital contact 1	r	0/1
409	uint16	Digital contact 2	r	0/1
410	uint16	Current calculated thermal output	r	kW*10 (display in cooling and heating mode without signs.)
411	uint16	Energy since 0 a.m.	r	kWh*10
412	uint16	Energy last 24h	r	kWh*10
413	uint16	Change-over status	r	0: Shut-off ; 1: Heating ; 2: Cooling
414	uint16	Current maximum volume flow	r	Current value in l/h
415	uint16	Initial value PI controller	r	0..100%
418	uint16	Nominal position	r	mm*10
419	uint16	Actual position	r	mm*10
420	uint16	Learned total travel	r	mm*10
424	int16	Sensor input P1	r	V*100,°C*10; 0/1
425	int16	Sensor input P2	r	V*100,°C*10; 0/1
426	uint16	Y output P2	r/w	Voltage value 0..1000 for output signal 0..10V (for configuration I/O type P2: 8: Y output 0..10V)

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