



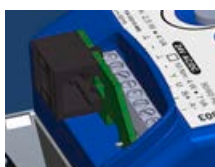
Control components

XM0-J6

Bus interface Modbus RTU



X-AIRCONTROL Modbus
zone module

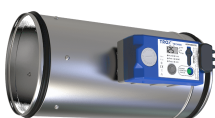


RJ12 socket

Control component with dynamic transducer and Modbus RTU interface for X-AIRCONTROL

Compact device for VAV terminal unit TVE and TVE-Q

- Controller, dynamic differential pressure transducer and actuator in one casing
- Use in ventilation and air conditioning systems, only with clean air
- Simple RJ12 connection socket for supply voltage and network
- Compatible with the X-AIRCONTROL zone module Modbus
- Volume flow rates q_{vmin} and q_{vmax} are pre-set in the factory and saved in the controller as variable parameters
- High data transparency via standardised bus communication Modbus RTU, RS485
- Setpoint value settings, override controls, parameter adjustment via Modbus register
- Integrated display for volume flow rate display, operating status display and setting of operating parameters
- Service access for manual adjustment devices and PC configuration software



Control component for type
TVE



Control component for type
TVE

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General information

Application

All-in-one control devices for VAV terminal units types TVE and TVE-Q

Dynamic differential pressure transducer, electronic controller and actuator are combined in one casing

For clean air in ventilation and air conditioning systems

- The standard filtration enables use in the supply air without additional dust protection measures

- Application examples: Offices and classrooms

In the event of a strong occurrence of dust, install appropriate extract air filters upstream, as a partial volume flow is routed through the transducer for volume flow rate measurement.

If the air is heavily contaminated with dust, fluff, or sticky and moist components, an attachment with a static differential pressure transducer must be used, e.g. XS0-J6

- Application examples: Extract air from changing areas and showers, hospital bedrooms

Various control options based on setpoint value default setting

Suitable for X-AIRCONTROL room control, Modbus zone module

Control circuits for e.g. temperature, humidity, and air quality control the variable volume flow by specifying setpoint values via the communication interface

Simple connection for supply voltage and network with one shared RJ12 terminal socket

Override control for activating q_{vmin} , q_{vmax} , shut-off, OPEN position, possible via the Modbus register

The actual volume flow rate value is available as a network data point

The damper blade position is available as a network data point

Control strategy

The volume flow controller works independently of the duct pressure

Differential pressure fluctuations do not result in permanent volume flow rate changes

- To prevent the control from becoming unstable, a dead zone (hysteresis) is maintained, in which the damper blade is not moved

- The flow rate range for the controller is set in the factory (q_{vmin} : minimum volume flow rate, q_{vmax} : maximum volume flow rate)

- Operating parameters are defined by the order code and parameterised at the factory

Operating modes

- Modbus (M): setpoint value specification via X-AIRCONTROL

Communication interface

- Modbus RTU, RS 485
- Data point list see Modbus register list

Parts and characteristics

- Transducer based on dynamic measuring principle. It can only be used with clean air, as a partial volume flow is passed through the transducer
- Overload-proof actuator
- RJ12 connection socket with cover
- Display and control elements for easy menu navigation
- Menu navigation allows for adjusting operating parameters and communication interface
- Service interface

Construction

- TR0VM-024T-05I-DD15-MB with RJ12 connection socket
- Can only be used for type TVE and TVE-Q

Commissioning

- As the volume flow rates are factory-set, the control units have to be installed at the specified locations only
- Network integration requires commissioning steps
- Operating parameters can be adjusted on site (using the display, an adjustment device, or the Modbus register)

Useful additions

- Adjustment device type GUIV3-M (order code AT-VAV-G3)
- Room control X-AIRCONTROL with zone module Modbus type X-AIR-ZMO-MOD

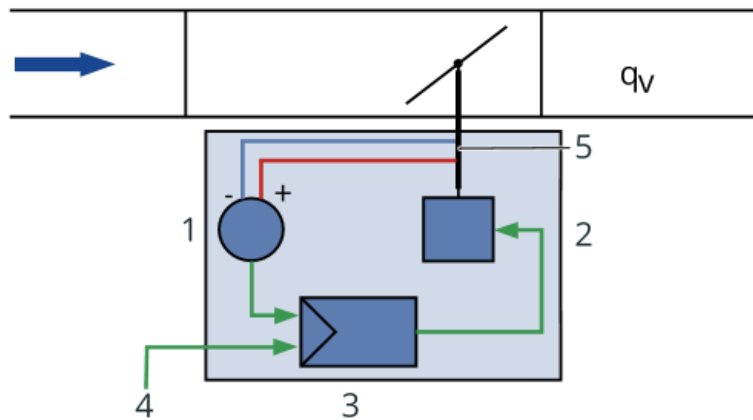
Function

Volume flow controllers are characterised by a closed control loop for controlling the volume flow, i.e. measuring - comparing - adjusting.

The volume flow rate is obtained by measuring a differential pressure. This is effected via a differential pressure sensor. The integrated differential pressure transducer converts the differential pressure into a voltage signal. The actual volume flow value is available as a data point. Due to the factory-set values, 100% always equals the nominal volume flow rate (q_{vnom}).

The volume flow setpoint is specified by a higher-level controller (e.g. room temperature controller, air quality controller, management and control equipment). Variable volume flow control can be set between q_{vmin} and q_{vmax} . It is possible to override the room temperature control by override control, e.g. by a shut-off.

The controller compares the volume flow setpoint with the current actual value and adjusts the internal actuator, according to the control deviation.



- 1 Differential pressure transducer
- 2 Actuator
- 3 Volume flow controller
- 4 Setpoint value via Modbus
- 5 Shaft with effective pressure channel

Specification text

This specification text describes the general properties of the product.

Category

Compact controller for volume flow rate

Application

Control of a constant or variable volume flow rate setpoint.

Electronic controller for the connection of a reference value and reading of an actual value for integration into a Modbus-management and control equipment. The actual value relates to the nominal volume flow rate so that commissioning and subsequent adjustment are simplified

Supply voltage

24 V AC/DC

Actuator

Integrated; slow-running (runtime 100 s for 90°)

Installation orientation

As needed

Interface/signalling

Modbus RTU (RS485) factory-activated

Connection

RJ12 connection socket, with rubber cap cover; suitable for TROX X-AIRCONTROL zone module X-AIR-ZMO-MOD connection terminals can be used as an option

Interface information

- Modbus: includes writing and reading of volume flow setpoint and actual value signal, damper position, override control

Special functions

- Clearly visible external indicator light for signalling the functions: Set, not set, and power failure
- Display for actual values, parameterisation and for test functions
- Activation of q_{vmin} , q_{vmax} , Closed, Open, by means of:
 - Modbus commands (Modbus operating mode)

Parameter setting

- Specific parameters for VAV terminal unit are factory-set
- Operating values: q_{vmin} , q_{vmax} interface type: Modbus factory parameterised; Subsequent adjustment via display and control element directly on the device or with optional tools:
- Adjustment device, PC software (cable connection in each case)
- in Modbus mode also via Modbus register access

Factory condition

- Electronic controller factory-mounted on the control unit
- factory-set parameters
- Functional test under air; certified with sticker

System connections

- Modbus connection for optional expansions, e.g. TROX X-AIRCONTROL zone module Modbus



Order code

TVE – D – P1 – FL / 4 / G2 / XM0-J6 / M / 11.77 – 206.12 [cfm]
1 2 3 4 5 6 7 8 10

1 Type

TVE VAV terminal unit

2 Acoustic cladding

No entry: without acoustic cladding

D with acoustic cladding

3 Material

No entry: Galvanised sheet steel

P1 Surface powder-coated, RAL 7001 (silver grey)

A2 Stainless steel construction

4 Air duct connection

No entry: Push-fit end, suitable for air ducts according to EN 1506; with groove for optional seal

FL Flanges on both ends

5 Nominal size [in.]

Order example: TVE-D-P1-FL/4/G2/XM0-J6/M/11.77-206.12[cfm]

Type

Acoustic cladding

Material

Air duct connection

Nominal size [in.]

Accessories

Attachment (control component)

4, 5, 6, 8, 10, 12, 16

6 Accessories

No entry: without accessories

D2 Double lip seal both ends (only for push-fit end with groove)

G2 Matching flange for every flange (only with FL)

7 Attachment (control component)

XM0-J6 Volume flow controller with dynamic transducer, display, Modbus RTU interface, RJ12 socket (for X-AIRCONTROL)

8 Operating mode

M Modbus RTU interface, variable operation (default setpoint value via Modbus register)

10 Operating values for factory setting

Volume flow rate [cfm]

$q_{v\ min} - q_{v\ max}$

TVE – VAV terminal unit

with acoustic cladding

Surface powder-coated, RAL 7001 (silver grey)

Flanges on both ends

4

Matching flange for each flange

Volume flow controller with dynamic transducer, display, interface

Modbus RTU, RJ12 socket (for X-AIRCONTROL)

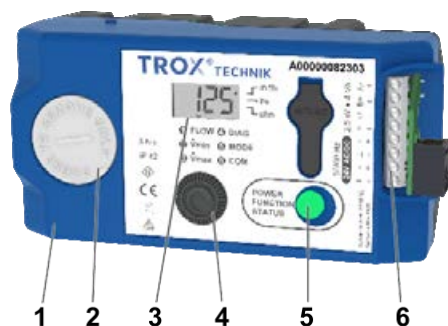
Modbus RTU interface, variable operation (default setpoint value via

Modbus register)

11.77 – 206.12 [cfm]

Variants

Compact controller XM0-J6 for TVE and TVE-Q



Compact controller XM0-J6 for TVE and TVE-Q (with attached terminal cover)



- 1 Compact controller
- 2 Damper blade position indicator and release button
- 3 Display
- 4 Rotary selector switch - Selection of options/setting values
- 5 LED button - Selection of menu entry
- 6 Connection socket RJ12

- 1 Cover for connection socket (part of the supply package)

Technical data

Compact controller for VAV terminal units

Part number	Type of installation component	VAV terminal units
A00000082303	TR0VM-024T-05I-DD15-MB	TVE, TVE-Q



Compact controller TR0VM-024T-05I-DD15-MB with RJ12 connection socket

Type of measurement/installation orientation	Dynamic measurements, any installation orientation
Supply voltage (AC)	24 V AC, $\pm 20\%$, 50/60 Hz
Supply voltage (DC)	24 V DC $\pm 20\%$
Power rating (AC)	NW 4 – 6: maximum 4 VA NW 8 – 16: maximum 6 VA TVE-Q up to height 8: maximum 4 VA TVE-Q from height 12: maximum 6 VA
Power rating (DC)	NW 4 – 6: maximum 2.5 W NW 8 – 16: maximum 3 W TVE-Q up to height 8: maximum 2.5 W TVE-Q from height 12: maximum 3 W
Power consumption (when running/when idle)	1 W
Run time for 90°	100 s
IEC protection class	III (Protective extra-low voltage)
Protection level	IP 42 (with attached terminal cover)
EC conformity	EMC to 2014/30/EU
Bus connection	Modbus RTU, RS485
Number of nodes (bus participants)	128
Adjustable communication parameters for Modbus RTU	Baud rate adjustable: 1200, 2400, 4800, 9600, 19200, 38400, 76800, 115200 baud Start bit: 1 Data bits: 8 Stop bits adjustable: 1 or 2 Parity: adjustable: None, Even, Odd
Setpoint / actual value interface (Modbus)	Via X-AIRCONTROL/Modbus register list
Cable termination	externally required (120 Ω)

**Interface configuration of the control component**

The communication interface for the control component is pre-set to Modbus at the factory for use with the X-AIRCONTROL zone module. Only the Modbus address must be set by the customer, depending on the use in the supply air and extract air. For other applications, data transmission speed and format must be adapted on site according to the network environment.

XM0-J6	Setpoint value default setting via:	Actual values via:	order code option	Configuration via display (MODE, COM)
Analogue operation *	analogue 0 - 10 V	analogue 0 - 10 V	V or F	CA0
Analogue operation *	analogue 2 - 10 V	analogue 2 - 10 V	V or F	CA2
Modbus operation	Modbus register setpoint	Modbus register actual value or analogue 2 - 10 V	M	CB

* It is not possible to use the analogue interface in combination with the RJ12 connection socket provided for the XM0-J6 variant. Therefore, the configuration register 122 (interface mode) must not be changed on site. To use an analogue interface, variant XM0 must be installed.

Commissioning

Commissioning

After installation, wiring and connection of the supply voltage

Set Modbus communication parameters via the integrated menu, then the air terminal unit is ready for operation

Setpoint specification via Modbus register from X-AIRCONTROL zone module

Remove terminal cover of the control component only briefly during wiring

Observe volume flow control ranges

TVE: 4 - 100 % of q_{vnom}

TVE-Q: 10 - 100 % of q_{vnom}

In particular, do not set values below the minimum volume flow of the control unit

Interface configuration of the control component

Depending on the setting, the Modbus communication interface or the analogue interface for the setpoint value specification of volume flows are available here. The so-called interface mode is preset at the factory according to the order key and can be adjusted on site by setting via the menu navigation or the Modbus registers.

Setting options / service tools

Function	Display menu	Modbus register	Adjustment device	PC-Tool
Adjustment operating range q_{vmin} - q_{vmax}	R, W	R, W	R, W	R, W
Setting channel for setpoint specification (bus or analogue signal)	R, W	R, W	R, W	R, W
Setting communication parameters e.g. baud rate	R, W	R, W	R, W	R, W
Modbus subscriber address setting	R, W	R, W	R, W	R, W
Trend display	–	–	–	R, W
Implement override control	R, W	R, W	R, W	R, W
de-energised parameterisation	–	–	R, W	R, W

R,W = register readable and writeable.

– = register is not available for the service tool

Note: The nominal volume flow rate q_{vnom} cannot be adapted on site.

Display function

Range of display functions

Display functions

Actual volume flow rate (unit optionally m³/h, l/s, cfm)

Displayed on a 3-character display with labelling of the digit value and volume flow unit

Status and error display for various operating states, including display of activated override control, display of nominal volume flow, firmware version and diagnostics function

Parameter settings

Adjustment option for the unit of the volume flow rate display m³/h, l/s, cfm

Adjustment option for the operating range q_{vmin} , q_{vmax}

Selection of the signal source for setpoint specification (interface mode)

- Setpoint value specification via Modbus

Setting option for communication parameters for Modbus operation:

Address, baud rate, stop bits, parity

Diagnostics functions

Activation of a test run

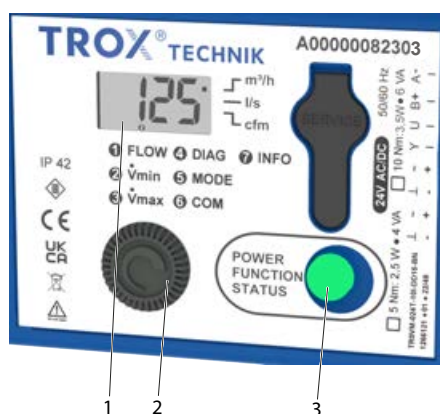
Activation of override controls Open, Closed, q_{vmin} , q_{vmax} , motor stop (observe prioritisation)

Display of the voltage value at the analogue input and analogue output

Use and description of the display

Menu items 1 - 7 are selected in sequence by pressing the LED button (< 3 s). The selected menu item can be changed by pressing the LED push button for more than 3 s. Changing is done with the rotary selector switch. Pressing the LED push button again (< 3 s) confirms the selected value. If no entry is made for ≥ 60 s, the system returns to menu item 1.

Section of the control elements



1: Display

2: Rotary selector switch

3: LED button

Table 1: Description of the menu items

1 Flow	Display of actual values or operating states. Setting of Volume flow unit m³/h, l/s, cfm
2 Vmin	Setting of q_{vmin}
3 Vmax	Setting of q_{vmax}
4 DIAG	Display of control signal and feedback signal alternately in [V], Activation of override controls for testing and diagnosis: tst = test drive oP = damper open cL = damper closed Lo = q_{vmin} Hi = q_{vmax} St = motor stop oFF = override control off
5 MODE	Signal source selection (interface mode) CA0 = Setpoint specification and actual value return via Analogue interface (0 – 10 V) CA2 = Setpoint specification and actual value return via Analogue interface (2 – 10 V) Cb2 = Write setpoint and read actual value via bus interface; additional actual value signal analogue 2 - 10 V DC
6 COM	Setting the bus address and communication parameters Device address ▪ Modbus: Address 1 – 247 Selection of protocol and communication settings: Communication parameter set b1 to b32: Modbus RTU protocol with 32 different parameter sets for baud rate, parity, stop bits Communication parameters (detailed description): Description of b1 - b32 see register 568
7 Info	Pos = Fan request signal corresponds to Damper blade position in percent. ¹ qno = nominal volume flow rate Fir = Display of the firmware version of the control component ¹ Compared to standard controllers such as TVR, the TVE and TVE-Q controllers use restricted damper opening angles in order to realise the measurement of the volume flow with the damper. A damper position of 100 % therefore does not correspond to a damper opening angle of 90°.

Note on MODE setting:

For the control component XM0-J6 or XS0-J6, only the mode setting CB2 is useful, as setpoint input and actual value return as analogue signal are not available on the RJ12 connection socket of these control components.

Description of status LEDs and error messages

LED flashing signal	Status	Display
	no power supply connected	
	Service tool plugged in. On-site network connection deactivated. Forced controls from the service tool have priority	
	Undervoltage detected. Supply voltage outside the tolerance range. Control function not guaranteed	
	TROX service technicians provide information. Incomplete parameterisation was detected during power-on/reset *	
	Drive overload detected (block) *	
	Synchronisation drive after Power Up *	
	Test mode enabled *	
	Overpressure sensor (Overpressure) *	
	Setpoint or forced control position not yet reached (display changes between e.g. Hi = high and actual value) *	
	Forced control position reached (display changes between e.g. Hi = High and actual value) *	
	Offset: Is signalled as long as the drive does not rotate to readjust the setpoint value *	

Notes:

The flashing signal always describes a 2-second interval. 1 = LED lights up, 0 = LED does not light up.

For service tool plugged in (display: Pc) and undervoltage detected (display: Lou), no special flashing signal appears on the LED button. Instead, one of the operating states marked with an asterisk (*) is displayed.

Modbus interface

Modbus operation

For smooth data exchange in the on-site Modbus RTU network, it is necessary to set the communication parameters and the participant address for the Modbus interface.

The interface offers standardised Modbus register access to the available data points via the functions ReadHoldingRegister (3) and WriteSingleRegister (6).

Setpoint value setting

For setpoint value specification via Modbus, the signal source in register 122 must be set to the value 1 or 2

In Modbus mode, the setpoint value is only specified by setting the volume flow rate setpoint [%] in Modbus register 0

The transferred percentage value refers to the volume flow range specified by $q_{vmin} - q_{vmax}$

Volume flow rate range $q_{vmin} - q_{vmax}$ is parameterised at the factory according to the order code specification

Subsequent adjustment of q_{vmin} or q_{vmax} possible in the setting menu on the display, with adjustment device, or via Modbus interface

Actual value as feedback

The current volume flow rate value can be retrieved via the display, adjustment device, or X-AIRCONTROL

In addition to the actual volume flow rate value, further information can be obtained via X-AIRCONTROL

Override control options

For specific operating situations, the volume flow controller can be set to a special operating mode (override control)

Possible modes: Control q_{vmin} , control q_{vmax} , damper blade in the OPEN position or damper blade CLOSED.

Override control through bus failure monitoring

If Modbus communication fails for a specified period of time, a predefined operating state q_{vmin} , q_{vmax} , OPEN or CLOSED can be activated.

The override control to be activated in case of bus failure is defined via register 108

The determination after which bus failure time the override control is activated, is made via register 109

Any Modbus communication resets the bus failure monitoring timeout

The bus failure monitoring timeout is reset by a setpoint change (register 0) or an override control command (register 1)

Override control via the Modbus

Specifications are made via Modbus register 1.

Override controls for diagnostic purposes

Activation via the diagnostics menu on the controller display or via X-AIRCONTROL.

Prioritisation of different override control options

Service tool settings have priority over Modbus settings.

Highest priority: settings via the service connector (adjustment device, PC software) for testing purposes

Lowest priority: settings via Modbus register 1 or the diagnostics menu on the controller

Note:

Cyclic writing to registers with storage in the EEPROM is not permitted. This applies in particular to basic setting parameters for the operating range q_{vmin} (registers 105 and 120), q_{vmax} (registers 106 and 121), the definition of the interface type (register 122) and all other registers from number 100 onwards. See also notes on writeability on the end of the Modbus register description.

Communication interface Modbus RTU (operating mode M)

Register	Meaning	Access right	Storage
0	Volume flow setpoint [%] Reference: $q_{vmin} - q_{vmax}$ Resolution: 0 – 10000 Volume flow setpoint: 0.00 – 100.00%	R, W	RAM
1	Activation of an override control; 0 = none; 1 = open; 2 = closed; 3 = q_{vmin} ; 4 = q_{vmax}	R, W	RAM
2	Command triggering 0 = none; 1 = adaptation; 2 = test run; 4 = controller reset	R, W	RAM
4	Current damper blade position: [%] Resolution: 0 – 10000 Damper blade position: 0.00 - 100.00 % (0 % = closed 100 % = maximum open)	R	RAM
5	Current damper blade position [°] Reference: without decimal places Note: With a TVE or TVE-Q control device, 100 % opening does not correspond to a damper blade angle of approx. 90° as with conventional control devices, as the damper blade does not exceed a certain angle of attack due to its design. The damper position in per cent in register 4 must therefore always be used for ventilation optimisation	R	RAM
6	Current actual volume flow [%] Reference: q_{vnom} Resolution: 0 – 10000 Actual volume flow rate: 0.00 - 100.00 %	R	RAM
7	Actual volume flow rate in volume flow rate unit [m³/h], [l/s], [cfm] according to register 201	R	RAM
8	Voltage at analogue input Y [mV]	R	RAM
20	Volume flow setpoint in volume flow unit [m³/h], [l/s], [cfm] according to Register 201	R, W	RAM
103	Firmware version	R	Flash
104	Status information Bit 5 mechanical overload Bit 8 internal activity e.g. test run, adaptation Bit 10 bus timeout monitoring triggered	R	RAM
105	Upper limitation of operating range: Operating parameters q_{vmin} [%] Reference: q_{vnom} Resolution: 0 – 10000 q_{vmin} : 0.00 – 100.00 %	R, W	EEPROM
106	Upper limitation of operating range: Operating parameters q_{vmax} [%] Reference: q_{vnom} Resolution: 0 – 10000 q_{vmax} : 0.00 – 100.00 %	R, W	EEPROM
108	Behaviour in case of bus failure (bus time-out); 0 = nothing; 1 = closed; 2 = open; 3 = q_{vmin} ; 5 = q_{vmax}	R, W	EEPROM
109	Setting bus time-out [s]	R, W	EEPROM
120	Definition of operating range: Operating parameters q_{vmin} in volume flow unit [m³/h], [l/s], [cfm] according to register 201	R, W	EEPROM
121	Definition of working range: Operating parameters q_{vmax} in volume flow unit [m³/h], [l/s], [cfm] according to register 201	R, W	EEPROM
122	Definition of signal source for setpoint value specification (interface mode); see separate table for assignment	R, W	EEPROM
130	Subscriber address (bus communication); factory parameterisation: address 1	R, W	EEPROM

Register	Meaning	Access right	Storage
201	Volume flow rate unit 0 = l/s; 1 = m³/h; 6 = cfm	R, W	EEPROM
231	Setting of mode: Bit 0 defines the characteristic of the analogue interface: Bit 0 = 0 characteristic: 0 – 10 V Bit 0 = 1 characteristic: 2 – 10 V Bit 4 defines the actual value signal as an actual volumetric flow value or damper blade position: Bit 4 = 0 Actual volume flow rate	R, W	EEPROM
233	Nominal flow rate [m³/h] q _{vnom} of the terminal unit	R	EEPROM
568	Parameter set for bus communication (protocol, baud rate, etc.); see separate table for description	R, W	EEPROM
569	Modbus communication settings: Modbus Response Time = 10 ms + delay; with delay= 3 ms × register value 0 - 255	R, W	EEPROM

R = register readable

R,W = register readable and writeable

RAM = register value volatile

EEPROM = register value not volatile, but permanently stored (maximum 1 million write operations)

FLASH = unchangeable programme memory

Note:

All registers with storage in the EEPROM are **not** designed for cyclical write access, e.g. by the MCE. Cyclic write operations are only permitted on registers with storage in RAM.

Detailed information on register 122 - Specification of signal source for setpoint specification (interface mode)

Interface mode		
Register value	Signal input	Feedback signal
0	Setpoint value specification via analogue input Y (0) 2 – 10 V DC ¹	(0)2 – 10 V
1	Setpoint value specification via Modbus register 0	(0)2 – 10 V
2	Setpoint value specification via Modbus register 0	Modbus register 10
3	Setpoint value specification via analogue input Y (0) 2 – 10 V DC ¹	Modbus register 10

¹Setting characteristic curve 0 - 10 V or 2 - 10 V separately with register 231

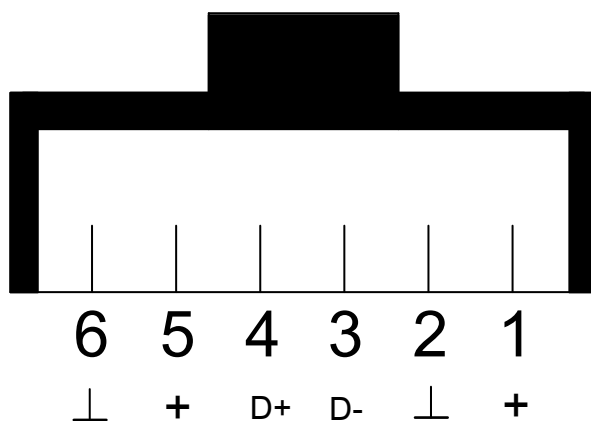


Detailed information on register 568 (Modbus communication parameters/display setting in the COM menu)

Register value	Display setting value	Baud rate	Parity	Stop bits
0	b1	1200	None	2
1	b2	1200	even	1
2	b3	1200	odd	1
3	b4	2400	None	2
4	b5	2400	even	1
5	b6	2400	odd	1
6	b7	4800	None	2
7	b8	4800	even	1
8	b9	4800	odd	1
9	b10	9600	None	2
10	b11	9600	even	1
11	b12	9600	odd	1
12	b13	19200	None	2
13	b14	19200	even	1
14	b15	19200	odd	1
15¹	b16	38400	None	2
16	b17	38400	even	1
17	b18	38400	odd	1
18	b19	1200	None	1
19	b20	2400	None	1
20	b21	4800	None	1
21	b22	9600	None	1
22	b23	19200	None	1
23	b24	38400	None	1
24	b25	76800	None	1
25	b26	115200	None	1
26	b27	76800	None	2
27	b28	76800	even	1
28	b29	76800	odd	1
29	b30	115200	None	2
30	b31	115200	even	1
31	b32	115200	odd	1

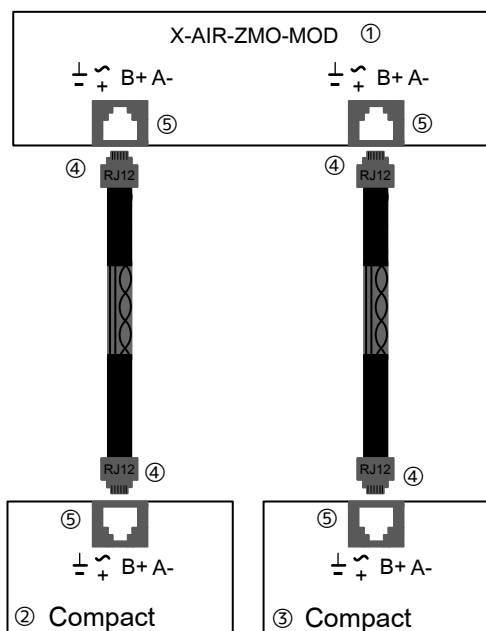
¹ Factory setting: Modbus communication parameters

Pin assignment RJ12 connection socket



- 1 ⊥, - = Ground, Zero
- 2 ~, + = Supply voltage 24 V
- 3 B+ = Modbus RTU
- 4 A- = Modbus RTU
- 5 ⊥, - = Ground, Zero
- 6 ~, + = Supply voltage 24 V

Modbus RTU connections in conjunction with X-AIRCONTROL



⊥, – = Ground, zero

~, + = 24 V supply voltage

B+ = Modbus RTU

A- = Modbus RTU

1 TROX X-AIRCONTROL Modbus-RTU-Zone module for easy system integration

2 Compact controller with built-in RJ12 connection socket, e.g. for room supply air

3 Compact controller with built-in RJ12 connection socket, e.g. for room extract air

4 RJ12 plug for easy plug-in connection (plug & play)

5 RJ12 plug for easy plug-in connection (plug-and-play)

Note:

Supply and bus connections are *not* galvanically isolated

Voltage supply: Make sure that all devices on the bus have the same GND reference point

Use bus terminating resistors at the ends of the bus line

Nomenclature

q_{vNom} [m³/h]; [l/s]; [CFM]

Nominal flow rate (100 %): The value depends on product type, nominal size and control component (attachment). Values are published on the internet and in technical leaflets and defined in the Easy Product Finder design programme. Reference value for calculating percentages (e.g. q_{vmax}). Upper limit of the setting range and maximum volume flow rate setpoint value for the VAV terminal unit.

$q_{vmin Unit}$ [m³/h]; [l/s]; [CFM]

Technical minimum volume flow: The value depends on product type, nominal size and control component (attachment). Values are defined in the Easy Product Finder design programme Lower limit of the setting range and minimum volume flow rate setpoint value for the VAV terminal unit. Setpoint values below $q_{vmin unit}$ (if q_{vmin} equals zero) may result in unstable control or shut-off.

q_{vmax} [m³/h]; [l/s]; [CFM]

Adjustable by others at upper limit of the operating range for the VAV terminal unit: q_{vmax} can be set to less than or equal to q_{vnom} on the terminal unit. In case of analogue control of volume flow controllers (typically used), the maximum value of the setpoint signal (10 V) is assigned to the set maximum value (q_{vmax}) (see characteristics).

q_{vmin} [m³/h]; [l/s]; [CFM]

Adjustable by others at lower limit of the operating range for the VAV terminal unit: q_{vmin} should be set to less than or equal to q_{vmax} . q_{vmin} to less than $q_{vmin unit}$, as the control may become unstable or the damper blade may close. q_{vmin} may equal zero. In case of analogue control of volume flow controllers (typically used), the minimum value of the setpoint signal (0 or 2 V) is assigned to the set minimum value (q_{vmin}) (see characteristics).

q_v [m³/h]; [l/s]; [CFM]

Volume flow rate

Volume flow controller

Consists of a basic unit with an attached control component.

Basic unit

Unit for controlling volume flow rates without an attached control component. The main components include the casing with sensor(s) to measure the differential pressure and the damper blade to restrict the volume flow. The basic unit is also referred to as a VAV terminal unit. Important distinguishing features: Geometry or unit shape, material and connection variants, acoustic characteristics (e.g. optional acoustic cladding or integrated silencers), range of volume flow.

Control component

Electronic unit(s) mounted on the basic unit to control the volume flow rate, or the duct pressure, or the room pressure by adjusting the damper blade position. The electronic unit essentially consists of a controller with differential pressure transmitter (integrated or external) and an integrated actuator (Easy and Compact controller).

Important distinguishing features:

- Transmitter: dynamic transmitter for clean air or static transmitter for contaminated air
- Actuator: Standard actuator, slow-running
- Interface technology: analogue interface or digital bus interface for connecting and recording signals and data

MCE

Management and control equipment (MCE)