SIEMENS

8188

TX-I/O™

Digital input and relay module

TXM1.4D3R

- **4 digital inputs, each with a three-color status LED (green/yellow/red)**
  Inputs can be individually configured as:
  – Status signals
  – Status pulses (with a memory function)
  – Counter pulses (up to 10 Hz)
- **3 volt-free relay outputs, each with a three-color status LED (green/yellow/red)**
  Outputs can be individually configured as:
  – Maintained contact or pulse
  – Three-position control output with stroke algorithm
- **Mixed voltages (AC 250 V mains voltage and SELV/PELV 24 V) as well as mixed phases are permitted on adjacent I/O points of the module**
- **Compact DIN format, small footprint**
- **Separate terminal base and plug-in I/O module for convenient handling**
  – Self-establishing bus connection for maximum ease of installation
  – Terminal isolation function for fast commissioning
  – I/O module replaceable in seconds, without rewiring and without affecting the full functioning of the remaining I/O modules
- **All terminals are directly on the I/O modules, allowing direct connection of field devices without additional terminal strips. However, terminal strips are required to connect N and PE of the field devices**
- **Simple display strategy**
  – I/O status LED for each I/O point
  – LEDs for fast diagnostics
- **Double-sided labels for identification of all I/O points**

Functions

The module supports the following I/O functions:

Signal type	Description
BI NO **BI NC**	Status indication (maintained contact), volt-free, interrogation, N/O contact, N/C contact
BI Pulse NO **BI Pulse NC**	Status pulse, volt-free, interrogation, N/O / N/C contact
MI Switch	Multistate input, 2...4-stage, volt-free, interrogation
CI Mech (10/25Hz)	Counter pulses, volt-free, interrogation, N/O contact (max. 10 Hz)
BO Relay NO 250V **BO Relay NC 250V**	Maintained contact relay, changeover contact, N/O, N/C contact
BO Pulse On-Off	On/off pulse With self-latching and 2 channels With dual-winding switch
BO Pulse	Pulse
MO Steps	Multistate maintained contact, 1…3-stage mutually exclusive electronic relay interlock
MO Pulse	Multistate pulse, 1…2-stage mutually exclusive electronic relay interlock
BO 3-Pos Relay	Pulse, control signal, three-position output, internal algorithm for stroke running time

For a detailed description of these functions, please refer to document CM110561, "TX-I/O™ functions and operation".

Compatibility

Support of signal types and functions in different building automation and control systems: see TX-I/O Engineering and installation manual, CM110562

Type summary

Type	SSN	Description
TXM1.4D3R	S55661-J124	Digital input and relay module

Delivery

The terminal base and the plug-in I/O module are interconnected and delivered in the same box.

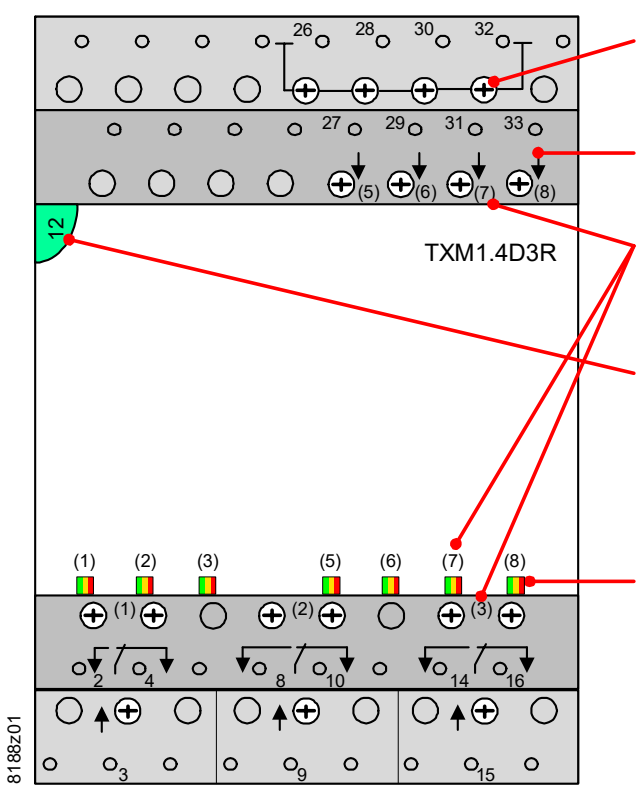
Accessories

The available accessories include address keys, label sheets, and spare transparent label holders. Refer to data sheet CM2N8170.

Technical and mechanical design

For a description of the features common to all TX-I/O™ modules, please refer to the TX-I/O™ Engineering and installation manual, document CM110562.

Indicators controls



Connection terminals (No. 1 screwdriver for slotted or recessed-head screws)
with test pickup (for 1.8...2 mm pins) and terminal number

Signal designation

I/O point numbers

Address key and module status LED

I/O status LEDs colors
(can be configured, green / yellow / red)

I/O status LEDs

- The I/O status LEDs indicate the status of the I/O points
- The LEDs are three-colored. If the I/O function supports it, the module can display Alarm = red and Service = yellow, besides Normal = green.
- The LEDs are also used for diagnostics

Module status LEDs

- The module status LED illuminates the transparent address key
- The (green) LED shows the module status as a whole (as opposed to the I/O points)
- It is also used for diagnostics

Address key

- The module operates only with the address key inserted
- The module address is mechanically encoded in the address key
- When replacing the plug-in I/O module, the address key must be swiveled outward. It remains plugged into in the terminal base.

Terminals

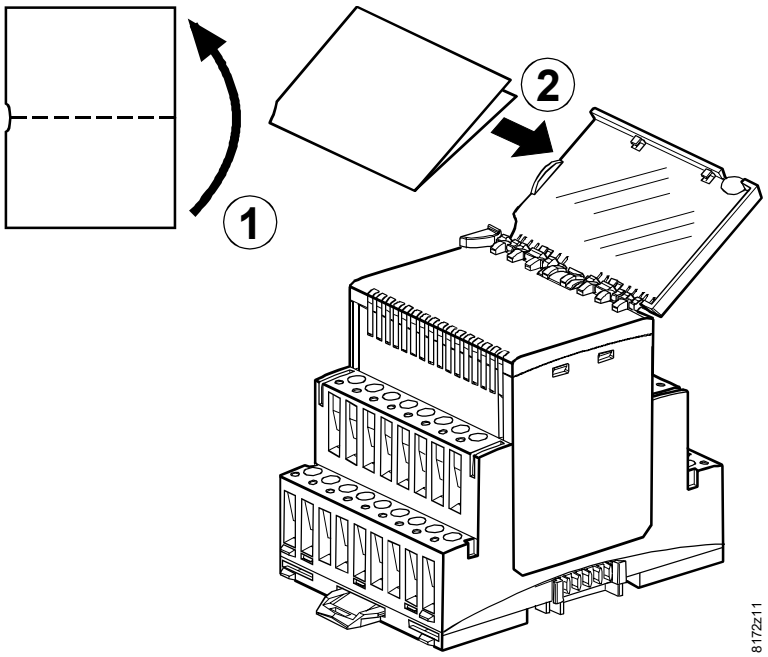
- The relay contacts of the individual I/O points are volt-free, and are not interconnected. The switched voltage must be provided separately for each I/O point.
- Mixed voltages (AC 250 V mains voltage and SELV/PELV 24 V) as well as mixed phases are permitted on adjacent I/O points of the module

Caution!

- For protection against electrical shock, use terminal covers or install the device in a lockable cabinet.

Module labeling

The plug-in I/O module has a removable transparent cover (the label holder) for insertion of a label.



Disposal

The devices are considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the devices through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Engineering, mounting, installation

Please refer to the following documents

Document	Number
TX-I/O™ functions and operation	CM110561
TX-I/O™ Engineering and installation manual	CM110562

Mounting

Permitted orientation

The TX-I/O™ devices can be installed in any orientation:

It is important to provide adequate ventilation so that the admissible ambient temperature (max. 50°C) is not exceeded.

Technical data

Supply (bus connector on side)	Operating voltage range	DC 21.5 ... 26 V (SELV / PELV) or DC 24 V class 2 (US)
	Max. power consumption (for the sizing of power supplies, see CM110562)	1.0 W (42 mA)
Protection	All input terminals (26..33) of the module	Protection against shortcut and incorrect wiring with AC / DC 24 V
	Bus connector on side	No protection against shortcut and incorrect wiring with AC / DC 24 V
Field devices		
Insulation resistance	The insulation strength against mains voltage of the field devices connected to inputs must comply with the requirements for safety extra-low voltage (SELV) or protective extra-low voltage (PELV) as per HD 384.	
Measuring cables	Cable material	Solid or stranded copper wire
	Cable cross section	See manual CM110562
	Permitted cable length	max. 300 m
Digital inputs / counter inputs	Digital inputs are not electrically separated from the system electronics. Mechanical contacts must be volt-free Electronic switches must comply with SELV / PELV standards.	
	Contact sensing voltage	DC 21.5 ...25 V
	Contact sensing current	1.6 mA (initial current 10 mA)
	Contact resistance with contacts closed	Max. 200Ω
	Insulation resistance with contacts open	Min. 50kΩ

	Min. closing / opening time [ms] including bouncing	Max. bounce time [ms]	Max. Counting frequency (symmetric)
Maintained contact	80	40	
Pulse contact	50	30	
Counter	40	20	10 Hz

	Counter memory	0 ... 4.3 x 10^9 (32 bit counter)
Switching outputs	Number of switching outputs	3 (changeover contact)
	External fuse protection for incoming cable	
	• Slow blow fusible link	Max. 10 A
	• Circuit breaker	Max. 13 A
	Circuit breaker tripping characteristic	Type B, C or D to EN 60898
Contact data for AC	Voltage range	min. AC 12 V max. AC 250 V
	Current, resistive load	max. 4 A
	Current, inductive load (cos phi ≥ 0.6)	max. 3 A
	Switching current	min. 1 mA at AC 250 V min. 10 mA at AC 12 V
	Current on make	max. 20 A during max. 10 ms max. 10 A during max. 1 s
	For UL applications	4 A resistive, 3 A general purpose
Contact data for DC	Voltage range	min. DC 12 V, max. DC 30 V
	Current, resistive load	max. 3 A at DC 30 V min. 10 mA at DC 12 V
	Current on make	max. 3 A
Service life of contact for AC 250 V	With 0.1 A resistive	8 million switching operations
	With 0.5 A resistive	2 million switching operations
	With 4.0 A resistive (N/O)	0.2 million switching operations
	Reduction factor with inductive load (cos phi ≥ 0.6)	0.6 (max. 3 A inductive)

Insulation resistance	Reinforced insulation between relay outputs and system electronics	AC 3750 V, to EN 60730-1
	Mixed voltages (AC 250 V mains voltage and SELV/PELV 24 V) as well as mixed phases are permitted on adjacent I/O points of the module	
Connection terminals	Mechanical design	Cage clamp terminals
	Solid conductors	1 x 0.5 mm^2 to 4mm^2 or 2 x 0,6 mm∅ to 1.5 mm^2
	Stranded conductors without connector sleeves	1 x 0.5 mm^2 to 2.5 mm^2 or 2 x 0,6 mm∅ to 1.5 mm^2
	Stranded conductors with connector sleeves (DIN 46228/1)	1 x 0.25 mm^2 to 2.5 mm^2 or 2 x 0,6 mm∅ to 1.5 mm^2
	Screwdriver	No. 1 Screwdriver for slotted or recessed-head screws *with shaft diameter ≤ 4.5 mm*
	Max. tightening torque	0.6 Nm
Test pickups (terminals)	For pin diameter	1 x 1.8 … 2.0 mm
Classification to EN 60730	Mode of operation of automatic electrical controls	Type 1
	Pollution degree	2
	Overvoltage category	III
	Protection class	Devices are suitable for use in equipment with protection class I and II
Housing protection standard	Protection standard to EN 60529	
	Front-parts in DIN cut-out	IP30
	Terminal base	IP20
Ambient conditions	Operation	To IEC 60721-3-3
	Climatic conditions	Class 3K22
	Temperature	-5...50 °C (23...122°F)
	Humidity	5…95 % rh
	Mechanical conditions	Class 3M11
	Storage / Transport	To IEC 60721-3-2
	Climatic conditions	Class 2K21
	Temperature	-45…70 °C (-49...158 °F)
	Humidity	5…95 % rh
	Mechanical conditions	Class 1M11
Standards, directives and approvals	Product standard EN 60730-1	Automatic electrical controls for household and similar use
	Electromagnetic compatibility (Applications)	For use in residential, commercial and industrial environments
	EU conformity (CE)	T10870xx *)
	RCM conformity (EMC)	T10870en_C1 *)
	UL certification	UL916; http://ul.com/database
	CSA certification	C22.2, https://www.csagroup.org/services-industries/product-listing/
	EAC compliance	Eurasian compliance
Environmental compatibility	The product environmental declaration contains data on RoHS compliance, materials composition, packaging, environmental benefit, disposal)	A6V11671098 *)
Color	Terminal base and plug-in I/O module	RAL 7035 (light gray)
Dimensions	Housing to DIN 43 880, see "Dimensions"	
Weight	Without / with packaging	202 / 220 g

*) The documents can be downloaded from http://siemens.com/bt/download.

Connection diagrams for digital inputs (examples)

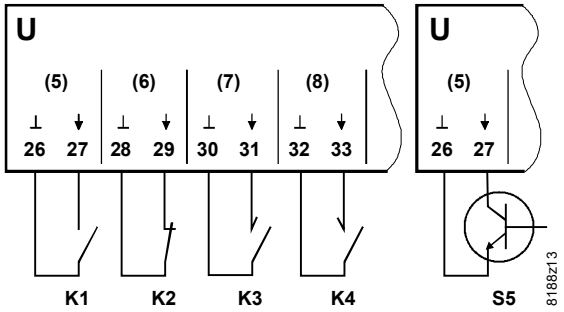
Terminal layout

I/O point	TXM1.4D3R (5)	(6)	(7)	(8)
System neutral ⊥ (–) [1]	26	28	30	32
Input (+)	27	29	31	33

[1] Terminals 26, 28, 30, 32 are system neutral terminals

- They are interconnected, not in the terminal base but in the plug-in I/O module. This means that when the I/O module is removed, there is no connection.
- The system neutral of a digital input can be connected to any system neutral terminal

For wiring details refer to the TX-I/O™ Engineering and installation manual, CM110562.



U Module

K1 Status contact (N/O)
K2 Status contact (N/C)
K3 Pulse contact (N/O)
K4 Pulse contact (N/C)
S5 Electronic switch

Connection diagrams for relays (examples)

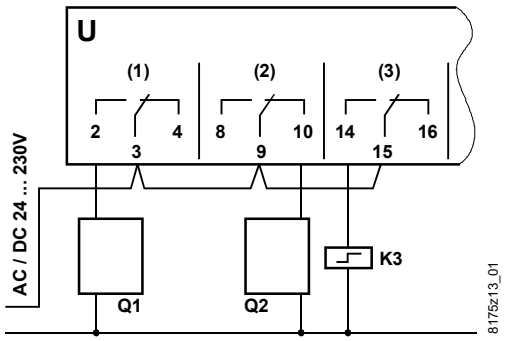
Terminal layout

I/O point	TXM1.4D3R (1)	(2)	(3)
Supply	3	9	15
N/O contact	2	8	14
N/C contact	4	10	16

For functions with **several I/O points:**

- Always use adjacent I/O points
- Each function must be confined to one module only
- The I/O points have a fixed sequence within the function, e.g. the first I/O point is for switch-off.

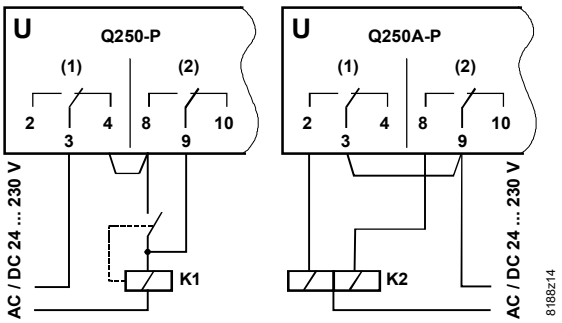
Maintained contact
BO Relay NO 250V
BO Relay NC 250V



U Module

Q1 Switched load (N/O contact)
Q2 Switched load (N/C contact)
K3 Step switch / pulse switch / bistable relay

On/off pulse
BO Pulse On-Off
Self-latching and 2 channels (Q250-P)
Dual-winding switch (Q250A-P)

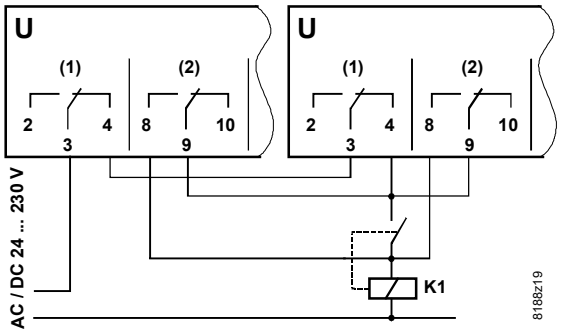


U Module

K1 Power contactor, self-latching
K2 Dual-winding stepping switch, bistable relay
Pulse on I/O point (2) = K1 ON
Pulse on I/O point (1) = K1 OFF

Pulse on I/O point (2) = K2 ON
Pulse on I/O point (1) = K2 OFF

Pulse control for single-stage load with control from two separate control loops of equal status
BO Pulse On-Off



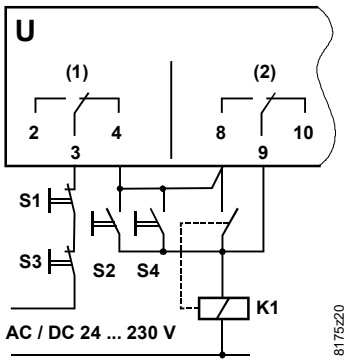
U Module

K1 Power contactor, self-latching

Control circuit 1:
Pulse on I/O point (2) = ON
Pulse on I/O point (1) = OFF

Control circuit 2:
Pulse on I/O point (2) = ON
Pulse on I/O point (1) = OFF

Pulse control for single-stage load with control of equal status from two remote switching locations
BO Pulse On-Off



U Module

K1 Power contactor, self-latching

Control circuit 1:
Pulse on I/O point (2) = ON
Pulse on I/O point (1) = OFF

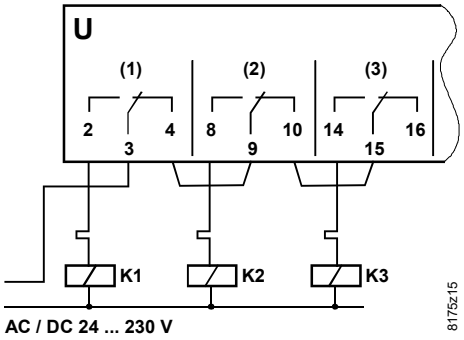
External control location A:
S1 OFF button
S2 ON button

External control location B:
S3 OFF button
S4 ON button

Pulse, 1-stage

Use BO Pulse

Maintained contact, 3-stage
MO Steps

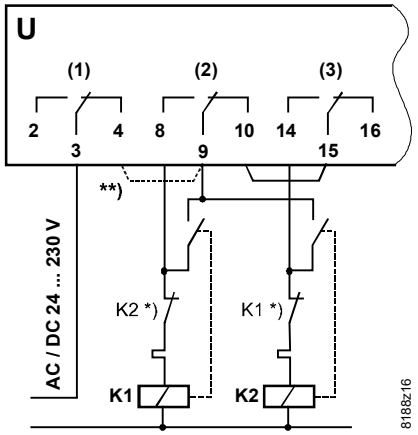


U Module

K1, K2, K3 Contactors for Stages 1…3

I/O point (1) ON = Stage 1
I/O point (2) ON = Stage 2
I/O point (3) ON = Stage 3

Pulse, 2-stage
MO Pulse



U Module

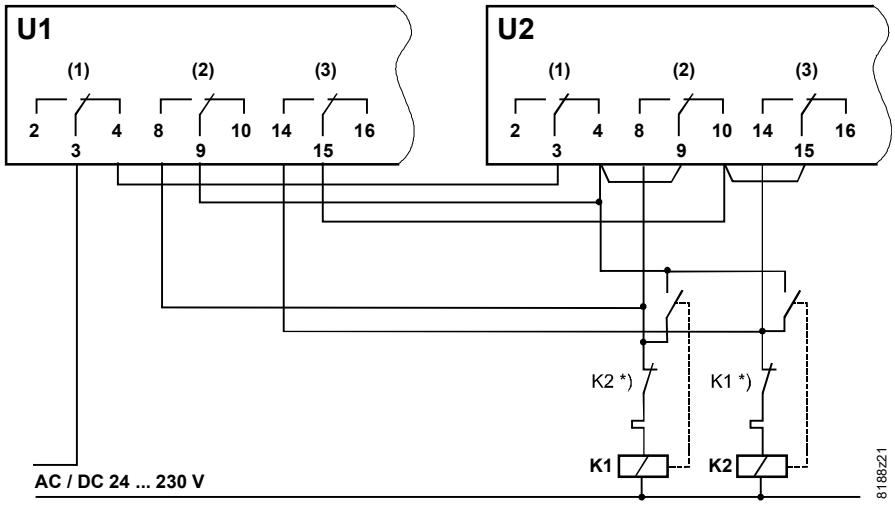
K1, K2 Contactors with self-latching feature for Stages 1...2

Pulse on I/O point (1) = OFF
Pulse on I/O point (2) = Stage 1
Pulse on I/O point (3) = Stage 2

*) External self-latching is optional

**) For other means of control, replace bridge with external circuit

Pulse control for a 2-stage load with control from two control loops of equal status
MO Pulse



U1, U2 Modules

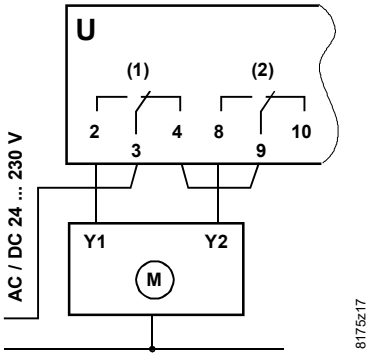
K1, K2 Contactors with self-latching feature for Stages 1 and 2

*) External self-latching is optional

Control loop 1:
U1 Pulse on I/O point (1) = OFF
U1 Pulse on I/O point (2) = Stage 1
U1 Pulse on I/O point (3) = Stage 2

Control loop 2:
U2 Pulse on I/O point (1) = OFF
U2 Pulse on I/O point (2) = Stage 1
U2 Pulse on I/O point (3) = Stage 2

Control signal, three-position output
BO 3-Pos Relay

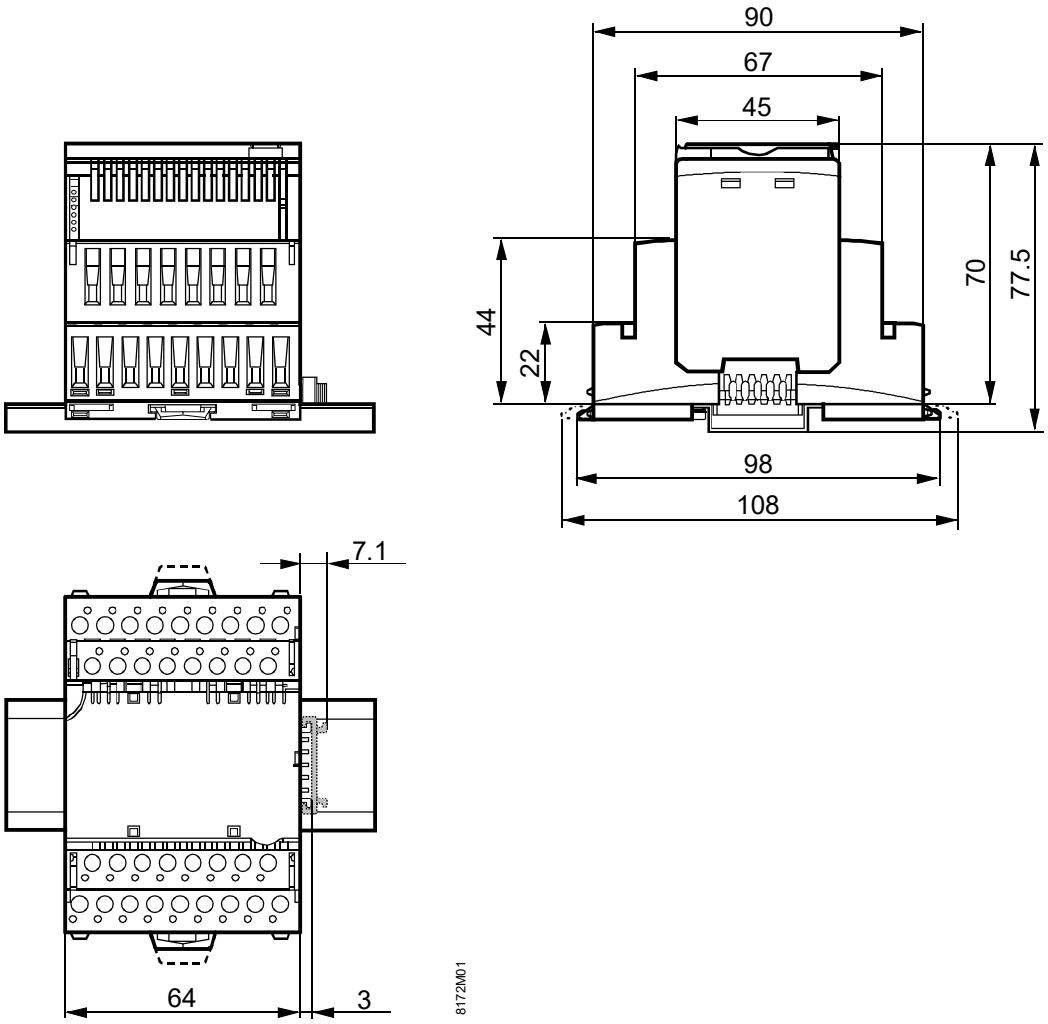


U Module

Y1 Control signal OPEN
Y2 Control signal CLOSE

Dimensions

Dimensions in mm



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