

Desigo™ Room Automation

## Room Automation Station, BACnet/IP, AC 24 V

DXR2.E17C...



**For buildings with room pressurization and fume hood control applications, leveraging the functionality and flexibility of Desigo Room Automation applications.**

- Compact, programmable room automation stations for pressurized room or fume hood control, lighting, and shading
- BACnet/IP communications
- KNX PL-Link bus to connect sensors, actuators, and operator units (including bus power)
- 2-port Ethernet switch
- USB interface
- Operating voltage AC 24 V
- Mounted on standard rails or on the wall
- Plug-in terminal blocks
- Dedicated SCOM communication for fast and high resolution sensor input

### Programmable

The DXR2... automation stations provide the infrastructure for system and application-specific functions and can be programmed.

### Compact series

The compact build permits mounting in narrow spaces and on standardized DIN rails, and is particularly well suited for compact panels or plants with integrated panel.

### Plug-in terminal blocks

Plug-in terminal blocks to easily exchange room automation stations.

- Desigo Room Automation applications combine multiple disciplines (HVAC for pressurized rooms and fume hoods, lighting and shading) into one comprehensive solution.
- Desigo Room Automation offers the highest level of flexibility for energy-optimized solutions while satisfying requirements for pressurization, ventilation and comfort using standard tools and established workflows.
- Desigo Room Automation applications can be enhanced with lighting and blinds via KNX PL-Link.

### Preloaded applications

- Pressurized rooms and fume hoods
  - Application works self-contained or distributed across multiple automation stations.
  - 1 room segment control (30 data points)
    - operates one supply and one extract terminal or one fume hood, as well as coordinates operation between multiple room segments.
  - 2 room segment control in single automation station (60 data points)
    - operates two supply and two extract terminals or one fume hood, as well as coordinates operation between multiple room segments.
- Variable (VAV) and constant volume flow
  - with 2-stage electric heating
  - with hot water
  - with hot water and flow temperature control
  - with hot water and thermal power control
- Chilled beam active or passive cooling (2-pipe) or cooling/heating (2-pipe) or cooling/heating (4-pipe)
- Radiant ceiling: Cooling, cooling and heating (2-pipe), or cooling/heating (4-pipe)
- Radiator: Hot water, steam (2 or 4-pipe) or electric stepped controlled
- Light: Up to 4 separate zones
- Blinds: 1 or 2 motors
- Fume hood

### Application options

- Separate temperature and volume setpoints for all 4 operating modes.
- Supply and extract air flow tracking
- Room pressure cascade control
- Accepts external demand control ventilation signal
- Chilled water and hot water valve

The selected application and its parameters as well as input and output configuration determine the room automation station's functionality.

A detailed description of functionality is available in the ABT (Automation Building Tool) online help.

### Communication

- In pressurized rooms with fume hood control the automation stations have to use only one port with star topology to one industrial Ethernet switch
- In pressurized rooms without fume hood control the second port can be used with line topology
- USB connection for service and commissioning, firmware download, and LAN access
- SCOM (sensor communication) for fast and high resolution communication with a pressure sensor and sash open area module (SOAM). Up to 5 devices are supported
- The following functions are available with the KNX PL-Link bus:
  - Communication with room operator units, operator display panels, switches, sensors, actuators, and luminaires
  - Plug-and-play connection of Siemens field devices with KNX PL-Link
  - Integration of KNX S-Mode devices (ETS engineering required)

User Interface	Color	LED function	Status
RUN	Green	Steady ON	Device is ready for operation
		Steady OFF	Device is not powered
		Regular flashing	Start-up or the program is stopped
	Red	Steady OFF	OK
		Steady ON	Program error Communications error (KNX PL-Link) Hardware fault
		Rapid flashing	Wrong or corrupt software No application loaded
SCOM	Green	Blinking per wink command	Physical device identification
		OFF	No application configured
		Flashing	Communication with at least one device

### Service button (SVC)

Physical identification on the network.

### Voltage supply

The supply provides controlled voltages for inputs and outputs. The room automation stations also supply AC 24 V and DC 24 V field supply. The supply is located in the device to simplify wiring and diagnostics.

The processor controls voltage supply. This ensures clean conditions for the field devices connected to the I/Os during startup, shutdown, and undervoltage.

## Bus power supply

The room automation station includes the bus power for KNX PL-Link. The bus power is switched on by default, but can be switched off via a web interface or configuration in the Automation Building Tool (ABT).

The internal KNX PL-Link supply cannot be operated parallel to external power supplies. The internal KNX PL-Link power must be switched off during the engineering phase for external power. This is typically the case if the 50 mA from the internal supply is not enough to supply all devices connected on the KNX PL-Link bus.

## Type summary

### Order numbers Worldwide (without US and Canada)

Type	Stock number	Applications	Inputs	Outputs
DXR2.E17C-103A (Version with 30 data points)	S55376-C134	Variable airflow, pressurized room control, radiant ceiling, radiator, 4 luminaires & 2 blinds or fume hood control, 1 luminaire	3 DI, 4 UI, 2 resistive inputs, SCOM	4 triacs, 4 AO
DXR2.E17CX-103A (Version with 60 data points)	S55376-C150	Variable airflow, pressurized room control with 2 segments, radiant ceiling, radiator, 4 luminaires & 2 blinds or fume hood control, 1 luminaire	3 DI, 4 UI, 2 resistive inputs, SCOM	4 triacs, 4 AO

### Order numbers USA and Canada

Type	Stock number	Applications	Inputs	Outputs
DXR2.E17C-103B (Version with 30 data points)	S55376-C136	Variable airflow, pressurized room control, radiant ceiling, radiator, 4 luminaires & 2 blinds or fume hood control, 1 luminaire	3 DI, 4 UI, 2 resistive inputs, SCOM	4 triacs, 4 AO
DXR2.E17CX-103B (Version with 60 data points)	S55376-C149	Variable airflow, pressurized room control with 2 segments, radiant ceiling, radiator, 4 luminaires & 2 blinds or fume hood control, 1 luminaire	3 DI, 4 UI, 2 resistive inputs, SCOM	4 triacs, 4 AO

## Accessories, lab specific

Type	Stock number	Designation	Datapoint count
DXA.S04P1	S55376-C139	Airflow Pressure Sensor	1
DXA.S04P1-B	S55376-C140	Airflow Pressure Sensor with IP54 enclosure	1
QMX3.P87-1WSC	S55624-H111	Fume Hood Operating Display (QMX3.P87)	3
QMX3.P88-1WSC	S55624-H112	Fume Hood Operating Display (QMX3.P88)	3
DXA.S12C	S55376-C138	Sash Open Area Module	1
DXA.B130	S55376-C158	Cable Sash Sensor (1300mm/50in)	1
DXA.B200	S55376-C159	Cable Sash Sensor (2000mm/80in)	1
DXA.H180	S55376-C120	Terminal cover for DXR.. 180 mm, 2 pieces	n/a


Topic	Title	Document ID:
Installation, cable length, topology	Desigo TRA installation guide	CM111043
Engineering and commissioning, workflow	ABT online help	n/a
Commissioning	Desigo TRA - Setup and Service Assistant	CA111050
Product environmental declaration	Product environmental declaration	CM1E9205

Related documents such as environmental declarations, CE declarations, etc., can be downloaded at the following Internet address:

<http://siemens.com/bt/download>

Notes

Safety

	<p><b>⚠ CAUTION</b></p>
	<p><b>National safety regulations</b></p> <p>Failure to comply with national safety regulations may result in personal injury and property damage</p> <ul style="list-style-type: none"> <li>• Observe national provisions and comply with the appropriate safety regulations.</li> </ul>

Engineering

**Identification**

Each device has a unique serial number to ensure efficient commissioning. It is provided on the adhesive barcode label. The serial number can be read directly into the engineering tool using a barcode reader.

**Wiring**

Wiring must be sufficiently insulated to the available rated voltage. Sizing and fusing of the wiring depends on the connected load.

**Triac outputs AC 24 V**

Individual triac outputs may have a max. load of 12 VA,  $24\text{ V} \cdot 0.5\text{ A} = 12\text{ VA}$ . The following possibilities are permitted:

- Slow floating control actuators.
- Multiple motorized actuators with a total of max. 12 VA.
- 1 thermal actuator with 6 VA start load in a cold state.
- 2 thermal actuators with 12 VA start load each in a cold state.

For transformer design (voltage drop), each thermal actuator must be counted at the full start load, since the triac outputs can be freely controlled.

The heating sequence and cooling sequence are not normally active at the same time (Exception: Downdraft compensation).

The sum total of the base load, bus power, field supply, and triacs will not exceed 66 VA at AC 24 V.

See Section **Power data**.

### DC 0...10 V outputs

The DC 0...10 V outputs supply max. 1 mA.

### AC 24 V supply for field devices (V~)

Actuators (valves, dampers) and active sensors are supplied directly by the device. Separate AC 24 V power supply is only required if field devices consume more than 5 VA.

### DC 24 V power supply for field devices (V+)

Actuators (valves, dampers) and active sensors are supplied directly by the device. A separate DC 24 V field supply is only required if field devices use more than 2.4 W.

### Digital inputs

Digital inputs are not suitable for operating lighting or blinds. Use the KNX PL-Link pushbutton.

## Mounting

The room automation stations can be snapped onto standard DIN rails or screwed onto a flat surface.



### ⚠ CAUTION

#### Risk of overheating for failure to comply with ambient temperature

Burning and damage to the device

- Ensure sufficient ventilation to comply with the permissible ambient temperature within the panel or installation box. The temperature must be 10° C (18° F) lower outside the installation box.

### Mounting position

Ambient temperature -5...45 °C (23...113°F)	Ambient temperature -5...50 °C (23...122°F)
<ol style="list-style-type: none"><li>1. Overhead</li><li>2. Wall, vertically<ul style="list-style-type: none"><li>– From top to bottom</li><li>– From bottom to top</li></ul></li><li>3. On a horizontal surface</li></ol>	<ul style="list-style-type: none"><li>• Wall, horizontal<ul style="list-style-type: none"><li>– From left to right</li><li>– From right to left</li></ul></li></ul>

## Installation



### ⚠ WARNING

Risk of fire and injury due to short circuits!

- Adapt as per local regulations the wiring cross section to the rated value of the installed fuse.

### Strain relief

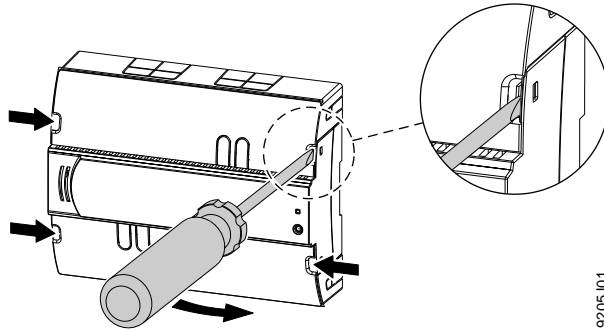
Strain relief protects flexible electrical wiring against mechanical stress.

The wiring must be fixed using cable binders to the tabs on the housing base.

### Terminal cover

Break off the cable inlets to insert the cables to the room automation station.

To take off the terminal cover:



### Operation

The outputs have no electricity when power fails.

USB communications that does not work points to improper grounding of AC 24 V operating voltage (connection  $\perp$  must be grounded).

### Disposal



The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage.

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

### Warranty

Technical data on specific applications are valid only together with Siemens products listed under **Accessories, lab specific**. Siemens rejects any and all warranties in the event that third-party products are used.

## Technical data

### Housing

Color	RAL 7035 (light-gray)
Dimensions	See Dimensions
Weight DXR2.E17C.. Terminal cover Packaging	ca. 350 g ca. 80 g ca. 40 g

### Function data

Processor	Texas Instruments AM3352, 600 MHz
RAM Flash	512 MB SDRAM (DDR3) 512 MB NAND Flash
A/D and D/A Resolution Analog inputs X Analog inputs B (resistance) Analog Outputs (Y10-Y40)	16 bit 14 bit 10 bit

### Power data

Power supply	
Operating voltage	AC 24 V -15%/+20%
Frequency	50/60 Hz
Power consumption including connected field devices DXR2.E17C DXR2.E17CX	Max. 66 VA at AC 24 V 30 data points 60 data points
Internal fuse	4 A irreversible
Transformer with secondary current limitation of max. 10 A or external secondary current fuse Non-renewable fuse Circuit breakers	Max. 10 A, (Class 2, 4A) Max. 13 A, characteristic B, C, D as per EN 60898

Apparent power (VA) for transformer design						
	Base load including I/O without load by field devices	Max. output load triac at 500 mA each	Max. load for AC 24 V field supply at 200 mA	Max. load KNX PL-Link at 50 mA	Max. load for DC 24 V field supply at 100 mA	Power consumption including connected field devices
DXR2.E17C	8 VA	4 x 12 = 48	5	2	3	66
DXR2.E17CX	8 VA	4 x 12 = 48	5	2	3	66



## Inputs

The inputs are protected against incorrect wiring AC 24 V.

Inputs: Overview	
Type	Inputs
DXR2.E17C...	3 DI, 4 UI, 2 resistive inputs, SCOM

Resistance sensor, analog (inputs X...)		
Type	Range (over range)	Resolution
AI 1000 Ohm *)	1 k $\Omega$ (0...1.05 k $\Omega$ )	10 $\Omega$

Resistance sensor, analog (inputs B...)		
Type	Range (over range)	Resolution
AI 10 kOhm *)	10 k $\Omega$ (0...10.5 k $\Omega$ )	50 $\Omega$

Temperature measurement, analog (inputs R1K...)		
Type	Range (over range)	Resolution
AI PT1K 375 *)	-40...70 °C (-45...75 °C) -40...158 °F (-49...167 °F)	25 mK 0.045 °F
AI PT1K 385 *)	-40...70 °C (-45...75 °C) -40...158 °F (-49...167 °F)	25 mK 0.045 °F
AI Ni1000 *)	-40...70 °C (-45...75 °C) -40...158 °F (-49...167 °F)	25 mK 0.045 °F
AI Ni1000 DIN *)	-40...70 °C (-45...75 °C) -40...158 °F (-49...167 °F)	25 mK 0.045 °F
AI T1 (PTC) *)	-40...70 °C (-45...75 °C) -40...158 °F (-49...167 °F)	10 mK 0.18 °F
AI NTC10K	-40...70 °C (-45...75 °C) -40...158 °F (-49...167 °F)	10 mK (25 °C) 0.045 °F (77 °F)
AI NTC100K	-40...70 °C (-40...158 °C) -40...158 °F (-40...316 °F)	25 mK (25 °C) 0.045 °F (77 °F)

\*) A fixed value of 1  $\Omega$  is calibrated to correct line resistance.

Voltage measurement, analog (inputs X...)		
Type	Range (over range)	Resolution
AI 0...10 V	0...10 V (-1...11 V)	1 mV
AI 0...10 V standard	0...100% (-10...110%)	1 mV
Open connection: Negative voltage -3.0 V, 108 $\mu$ A (line failure detection)		

Current measurement, analog inputs (inputs X...)		
Type	Range (over range)	Resolution
AI 120	4...20 mA (-1...11 V)	13 $\mu$ A
Open connection can be detected. Supports 0...20 mA input range, with signal voltages >10 V. Use AI type U10 instead with an external resistor.		

Digital input (inputs X...)	
Contact query voltage	Universal input: 18 V Digital input: 21 V
Contact query current	Universal input: 1.2 mA; 7.4 mA initial current Digital input: 1.6 mA; 9.4 mA initial current
Contact resistance for closed contacts	Max. 100 $\Omega$
Contact resistance for open contacts	Min. 50 k $\Omega$

## Outputs

The outputs are protected against short circuiting and incorrect wiring AC 24 V.

Outputs: Overview	
Type	Outputs
DXR2.E17C...	4 triacs, 4 AO

Analog (outputs Y10...Y40)			
Type	Range (over range)	Resolution	Output current
AO 0-10 V	0...10 V (0...10.5 V)	11 mV	Max. 1 mA
AO 0-10 V standard	0...100% 0% = 0 V, 100% = 10 V (0...10.5 V)	2 mV	Max. 1 mA

Switching outputs triac (outputs Y1...Y4)	
Type	High side The triac closes the contact to AC 24 V
Switching voltage	AC 24 V
Permissible load	500 mA / 12 VA per output (cos phi 0.4)
Protection	Short-circuit proof

Power supply for field devices (outputs V~)	
Output voltage	AC 24 V
Permissible load DXR2.x17C...	200 mA / 5 VA overall
Protection against overload	Short-circuit proof

Power supply for field devices (output V+)	
Output voltage	DC 24 V
Permissible load	100 mA / 2.4 W
Protection against overload	Short-circuit proof

## Connections

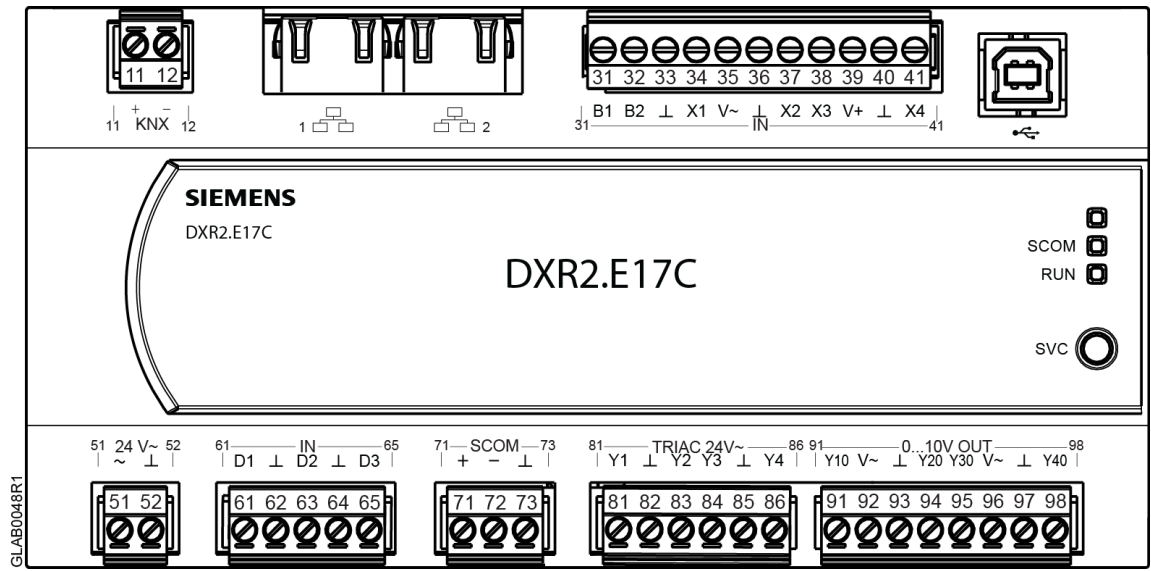
Interfaces	
Ethernet	Plugs: 2 x RJ45, screened Interface type: 10Base-T/100BASE-TX, IEEE 802.3 compatible Bitrates: 10/100 Mbps, autosensing Protocol: BACnet over UDP/IP
USB (2.0)	Plug: Type B Data rate: 12 Mbps
KNX	Type: KNX TP1 PL-Link, galvanic isolation Baud rate: 9.6 kbps Bus power: 50 mA Short-circuit proof protection against faulty wiring at max. AC 24 V
SCOM	Interface type: RS485 Baud rate: 115200 Short-circuit proof protection against faulty wiring at max. AC 24 V

Wiring connections	
Pluggable screw terminals	Copper wire or copper stranded wire with connector sleeves 1 x 0.6 mm $\varnothing$ to 2.5 mm <sup>2</sup> (22 to 14 AWG) or 2 x 0.6 mm $\varnothing$ to 1 mm <sup>2</sup> (22 to 18 AWG) Copper stranded wire without connector sleeves 1 x 0.6 mm $\varnothing$ to 2.5 mm <sup>2</sup> (22 to 14 AWG) or 2 x 0.6 mm $\varnothing$ to 1.5 mm <sup>2</sup> (22 to 16 AWG)
Stripping length	6...7.5 mm (0.24...0.29 in)
Slotted screws	Size 1, tightening torque 0.6 Nm (0.44 lb-ft)
Wiring lengths for signals	KNX PL-Link 80 m (260 ft) with internal bus power or 300 m (990 ft) with external power supply Ethernet 100 m (330 ft) SCOM RS-485 80 m (262 ft) Termination 120 $\Omega$ required > 30 m (100 ft) Signal lines 80 m (260 ft) For inputs AI 100 kOhm, AI NTC10K, AI NTC100K, AI NTC3K: 30 m (100 ft) or 80 m (260 ft), if shielded

Ambient conditions and protection classification	
Classification per IEC/EN 60730 Function of automatic control devices Pollution degree Overvoltage category	Type 1 2 III
Design type	Device suited for use with equipment of safety classes I and II
Degree of protection of housing to IEC EN 60529 Room automation station With terminal cover	IP20 IP30
Enclosure rating	NEMA Type I
Climatic ambient conditions <ul style="list-style-type: none"> <li>Transport (packaged for transport) as per IEC EN 60721-3-2</li> <li>Operation as per IEC/EN 60721-3-3</li> </ul>	<ul style="list-style-type: none"> <li>Class 2K3 Temperature -25...70 °C (-13... 158 °F) Air humidity 5...95% (non-condensing)</li> <li>Class 3K5 Temperature -5...45 °C (23... 113 °F)/ -5...50 °C (23... 122 F) See Mounting Air humidity 5...95% (non-condensing)</li> </ul>
Mechanical ambient conditions Transport as per IEC/EN 60721-3-2 Operation as per IEC/EN 60721-3-3	Class 2M2 Class 3M2
Operation in trains	Class 5M2, 5C1
Operation on ships	Class 6M2, 6C1

Standards, directives and approvals	
Product standard	IEC/EN 60730-1 Automatic electronic controls for household and similar use
Product family standard	EN 50491-2, EN 50491-3, EN 50491-5 General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS)
Electromagnetic compatibility	For residential, commercial, and industrial environments
EU conformity (CE)	EU declaration of conformance DXR2... AC 24 V, see CM1T9204xx_2
RCM conformity	RCM declaration of conformance DXR2... see CM1T9204xx_C1
EAC compliance	Eurasian compliance for all DXR2.xxx-xxxA variants
UL Approval Federal Communications Commission	UL as per UL916, <a href="http://ul.com/database">http://ul.com/database</a> cUL as per CSA – C22.2 No. 205 FCC CFR 47 Part 15 Class B
Environmental compatibility	The product environmental declaration contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal). See Section <b>Product documentation</b> .
Quality	ISO 9001 (Quality)

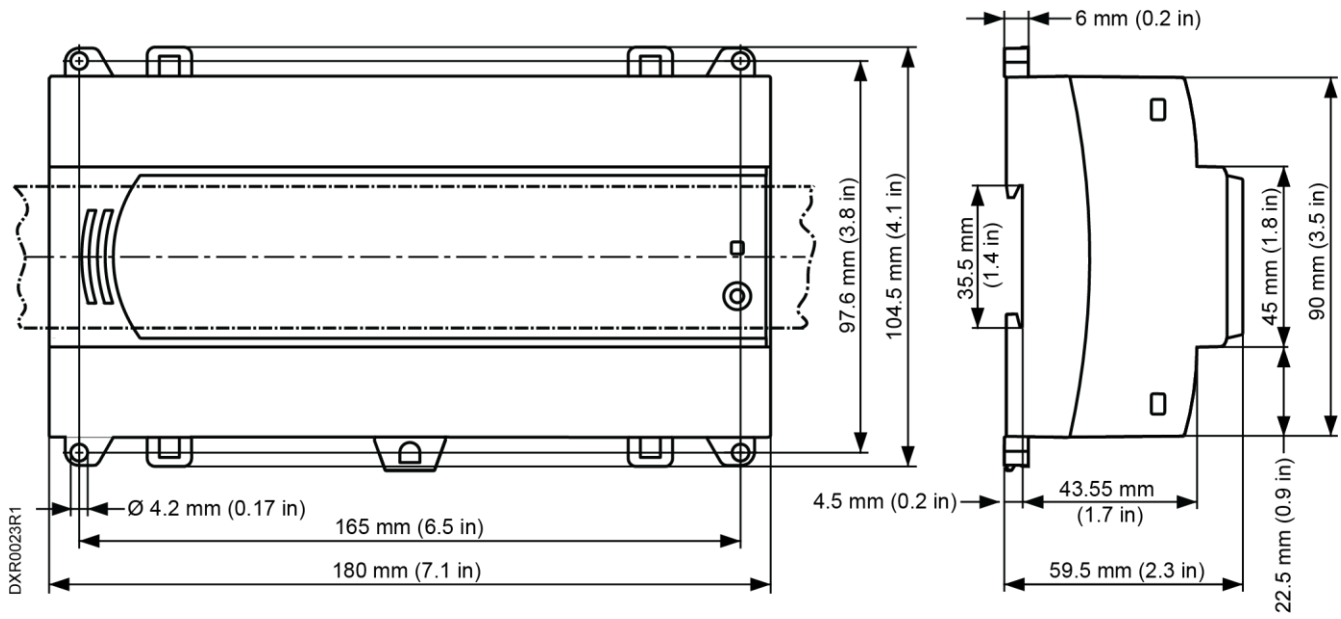
DXR2.E17C and DXR2.E17CX



GLAB004BR1

Pin	Description	Terminal	Module	Channel
1, 2 Ethernet	2 x RJ45 interface for 2-port Ethernet switch			
11, 12 KNX	KNX connection	+, -		
31...41 inputs	10K Resistance input	B1, B2	1	9...10
	Universal input	X1...X4	1	5...8
	System neutral	⊥		
	Field supply AC 24 V for active sensors	V~		
	Field supply DC 24 V for active sensors	V+		
USB	USB interface			
51...52 power 24V~	Power supply SELV / PELV AC 24 V	V~		
	System neutral	⊥		
61...65 inputs	Digital input	D1, D2, D3	1	1...3
	System neutral	⊥		
71...73	SCOM	+, -		
	System neutral	⊥		
81...86 triacs	Switching output AC 24 V	Y1...Y4	11	1...4
	System neutral	⊥		
91...98 analog outputs	Positioning output DC 0...10 V	Y10...Y40	21	1...4
	System neutral	⊥		
	Field supply AC 24 V	V~		
Service	Service button	SVC		
Display	Operation LED	RUN		
	Active communication LED	SCOM		

## Dimensions



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