SIEMENS

Desigo™ Room Automation

Compact actuating room automation stations, BACnet/IP and BACnet/SC, 24 V

DXR2.E10PL-102B, DXR2.E10PLX-102B



Combination room automation station and actuator for buildings with increased demands placed on functionality and flexibility in Room Automation applications, VAV, Dual Duct and FPB applications.

- Compact, programmable room automation station combination actuator for HVAC, lighting, and shading
- Integrated with actuator for ease of installation
- BACnet/IP communications (BTL certified)
- 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
- Built-in 10 Nm actuator mounted directly on the damper shaft
- Internal 0...500 Pa (0…2 in WC) differential pressure sensor
- Plug-in terminal blocks

Features

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 directly on the damper shaft, and is designed for VAV and FPB.

Plug-in terminal blocks

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

Integrated actuator

The actuator gear base is integrated into the housing of the actuating DXR. For dampers requiring up to 88 lb-in (10 Nm) of torque.

Use

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

Preinstalled applications

- Variable (VAV), Fan Powered Box (FPB) and constant volume flow
  - with staged electric heating
  - with modulating hot water with room or supply temperature control
- Dual duct VAV, cold duct, hot duct or VAV with dedicated ventilation duct
- Chilled beam active or passive cooling (2-pipe) or cooling/heating (2-pipe) or cooling/heating (4-pipe)
- Radiator: Hot water, steam or electric stepped or modulated controlled

Application options

- Separate temperature and ventilation volume setpoints for all 4 operating modes
- Separate minimum and maximum cooling and heating flow setpoints
- Single-stage, multiple-stage or variable fan control (fan powered box)
- Chilled water and hot water valve
- Radiant ceiling: Cooling, cooling and heating (2-pipe), or cooling/heating (4-pipe)
- Extract air volume measuring and control
- Light: Up to 4 separate zones
- Blinds: 1 or 2 motors

Functions

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

- 2-Port Ethernet switch for cost-effective cabling via line topology.
- USB connection for service and commissioning, firmware download, and LAN access.
- The following functions are available with the KNX PL-Link bus:
  - Communication with room operator units, switches, sensors, actuators, and luminaires.
  - Plug-and-play connection of Siemens field devices with KNX PL-Link.
  - Integration of common devices using KNX S-Mode (ETS engineering required).

LED indication

LED	Color	Activity	Function
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
		Blinking per wink command	Physical device identification
SVC (Service button)	--	Short press	Physical identification on the network
	--	Factory reset	1. Power off the device. 2. Power on the device. 3. Wait until the RUN LED lights up and turns off again, then press the Service button. 4. Keep the Service button pressed until the RUN LED lights up, then release the button. The device restarts. 5. Wait until the device has fully started – unconfigured (green RUN LED on, flashes red)

Technical design/mechanical design

Power supply

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

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

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 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.

Mechanical design

The housing consists of an actuator gear base and the device housing, which will accommodate the main circuit board. A mounting bracket is included.

Type summary

Type	Order number	Inputs	Outputs
DXR2.E10PL-102B (Version with 30 data points)	S55376-C145	1 DI, 2 UI, 1 ΔP sensor	4 DOs, 1 AO.
DXR2.E10PLX-102B (Version with 60 data points)	S55376-C146	1 DI, 2 UI, 1 ΔP sensor	4 DOs, 1 AO.

Product documentation

Topic	Title	Document ID:
Installation, cable length, topology	Desigo Room Automation installation guide	CM111043
Engineering and commissioning, workflow	ABT online help	n.a.
Commissioning	Desigo Room Automation Setup & Service Assistant (SSA)	CA111050
Installation Instruction	Mounting instructions	A6V11260017
Product environmental declaration	Product environmental declaration 24V	

Related documents such as the environmental declarations, declarations of conformity, etc., can be downloaded from the following Internet address:

www.siemens.com/bt/download

Notes

Security

⚠ CAUTION	
	**National safety regulations** Failure to comply with national safety regulations may result in personal injury and property damage. ● Observe national regulations and comply with the appropriate safety regulations.

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 12VA. The following possibilities are permitted:

- Internal floating control actuator.
- One or two motorized actuators with 6 VA each.
- 1 to 4 binary outputs with 12 VA load each.
- 1 or two thermal actuator(s) with 6 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 63 VA @ 24VAC and 80 VA @32VAC.

See Section **Power data**.

DC 0…10 V output

The DC 0…10 V output supply max. 1 mA.

Digital inputs

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

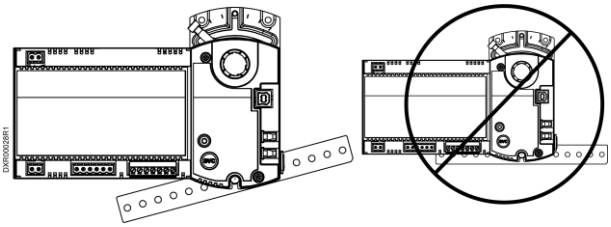
Differential pressure input

On board differential pressure input for 0… 500 Pa (0…2 in WC)

Mounting

The DXR2.x10… is mounted directly on a damper shaft.

The mounting bracket must be installed with enough clearance for device rotation.



See the installation instruction for detailed information.

Installation

Applies to devices with supply output (24 VAC or mains voltage) such as triac output or output to supply a field device.

⚠ WARNING	
	**No internal line protection for supply lines to external consumers** Risk of fire and injury due to short circuits ● Adapt the line diameters as per local regulations to the rated value of the installed fuse.

Operation

The outputs have no electricity when power fails.

USB communications failure can be caused by weak or incorrect grounding at DXR 24 V power termination. (The power terminal labeled ⊥ must be connected to earth ground.)

Disposal

	The device is considered an electronics device for disposal in terms of European Directive 2012/19/EU 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 only valid together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

Technical data

Housing

Color	RAL 7035 (light-gray)
Dimensions	201 mm (7.91 in) x 136.94 mm (5.39 in) x 81.72 mm (3.22 in)
Weight DXR2.x10… Packaging	 ca. 831 g (29.3 oz) ca. 200 g (7.05 oz)

See also

Dimensions [13]

Function data

Processor	Texas Instruments AM3352, 300 MHz
RAM	128 MByte SDRAM (DDR3) 512 MByte NAND Flash
Communication A/D Resolution (analog in) D/A Resolution (analog out)	 14 Bits 12 Bits

Actuator	
Torque	88 lb-in (10 Nm)
Runtime for 90°opening or closing Nominal angle of rotation Maximum angular rotation	90 sec. (50 Hz or 60 Hz) 90° 95°
Shaft size	3/8…5/8 inch (8…16 mm) Dia. 1/4…1/2 inch (6…13 mm) Dia.
Minimum shaft length	3/4 inch (20 mm)

Power data

Power supply	
Operating voltage	AC 24 V -15%/+20%
Frequency	50/60 Hz
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.E10P…	11	4 x 12 = 48	-	4	-	63

NOTE:
To calculate the total VA, add the Base Load + the number of Triacs + field supplies+ KNX PL-Link devices.
This cannot exceed the maximum power consumption. See the *Wiring Guidelines* for more information.

Inputs

Resistance sensor, analog (inputs X...)		
Type	Range (over range)	Resolution
AI 1000 Ohm *)	1 kΩ (0...1.05 kΩ)	1 Ω
AI 2500 Ohm *)	2.5 kΩ (0...2.625 kΩ)	2.5 Ω
AI 10 kOhm *)	10 kΩ (0...10.5 kΩ)	10 Ω
AI 100 kOhm *)	100 kΩ (0...105 kΩ)	100 Ω

Temperature measurement, analog (inputs X...)		
Type	Range (over range)	Resolution
AI PT1K 375 (NA) *)	-40...70 °C (-45...75 °C) -40...158 °F (-49...167 °F)	0.025 K 0.045 °F
AI PT1K 385 (EU) *)	-40...70 °C (-45...75 °C) -40...158 °F (-49...167 °F)	0.025 K 0.045 °F
AI (LG-)Ni1000 *)	-40...70 °C (-45...75 °C) -40...158 °F (-49...167 °F)	0.025 K 0.045 °F
AI Ni1000 DIN *)	-40...70 °C (-45...75 °C) -40...158 °F (-49...167 °F)	0.025 K 0.045 °F
AI T1 (PTC) *)	-40...70 °C (-45...75 °C) -40...158 °F (-49...167 °F)	0.100 K 0.18 °F
AI NTC10K (Type II)	-40...70 °C (-45...75 °C) -40...158 °F (-49...167 °F)	0.025 K (@ 25 °C) 0.045 °F (@ 77 °F)
AI NTC100K	-10...70 °C (-15...75 °C) 14...158 °F (5...167 °F)	0.025 K (@ 25 °C) 0.045 °F (@ 77 °F)

*) A fixed value of 1 Ω 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)	2 mV
AI 0...10 V standard	0...100% (-10...110%)	2 mV
Open connection: Negative voltage -1.5 V, 8 µA (line failure detection)		

Digital input (inputs X... or D...)	
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 Ω
Contact resistance for open contacts	Min. 50 kΩ

Differential pressure sensor (inputs P1+, P1-)	
Connections (nipple diameter)	5.2 mm
Measuring range	0...500 Pa (0…2 in WC)
Overload range	0...100 kPa
Measuring range accuracy Zero point accuracy Resolution	4.5% 0.2 Pa 12 Bit

Outputs

Analog (output Y10)			
Type	**Range (over range)**	**Resolution**	**Output current**
AO 0-10 V	0...10 V (0…10.5 V)	2 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 Y3...Y6)	
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
Protection	Short-circuit proof

Connections

Interfaces	
Ethernet	Plugs: 2 x RJ45, screened Interface type: 10Base-T/100BASE-TX, IEEE 802.3 compliant 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

Wiring connections	
Pluggable screw terminals	Copper wire or copper stranded wire with connector sleeves 1 x 0.6 mm ø to 2.5 mm^2 (22 to 14 AWG) or 2 x 0.6 mm ø to 1 mm^2 (22 to 18 AWG) Copper stranded wire without connector sleeves 1 x 0.6 mm ø to 2.5 mm^2 (22 to 14 AWG) or 2 x 0.6 mm ø to 1.5 mm^2 (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) Signal lines 80 m (260 ft) For inputs AI 100 kOhm, AI NTC10K, AI NTC100K: 30 m (100 ft) or 80 m (260 ft), if shielded.

KNX/PL-Link Network and Power Wriring.*	
Cable configuration	1 or 2 twisted pair - Pair 1 red/black - Pair 2 yellow/white
Gauge	20 AWG (solid copper)
Twists per foot	4 Minimum
Capacitance	30 pF/foot or less
Shields	100% foil with drain wire
UL type	300Vrms, CMP (75 °C or higher)
CSA type	300Vrms, FT6 (75 °C or higher)

* Alternative 18 AWG STP CMP (Belden 6320FE 8771000)

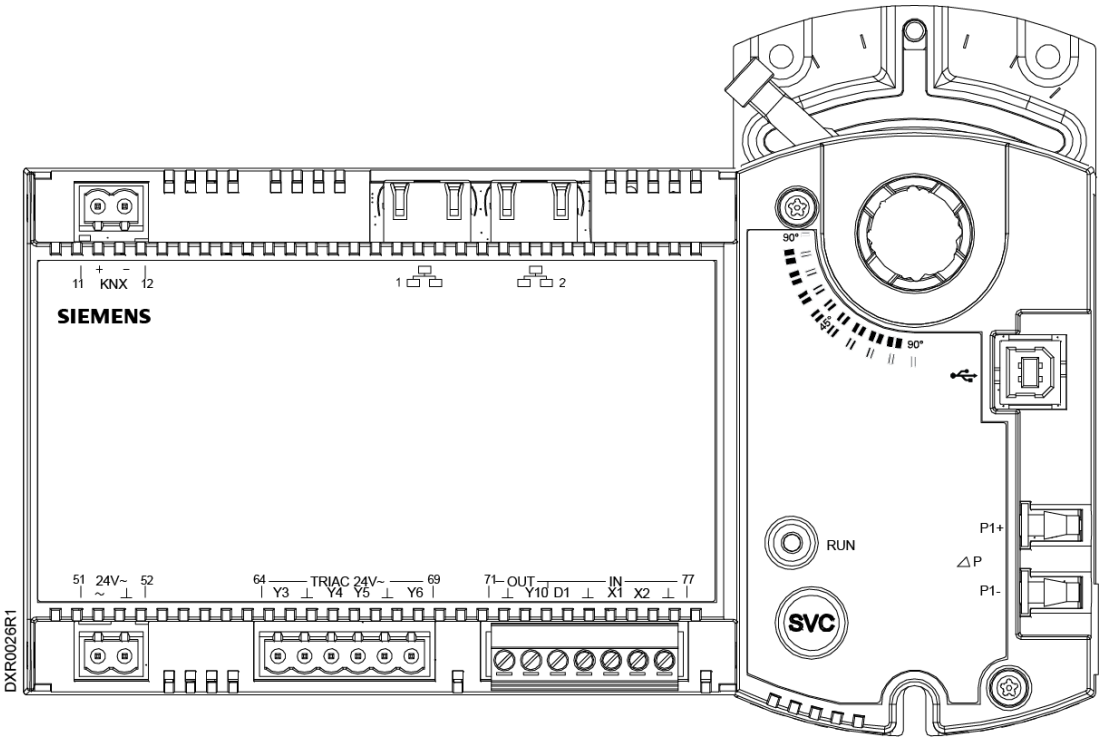
Conformity

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	 IP20 IP30
Climatic ambient conditions ● Transport (packaged for transport) as per IEC EN 60721-3-2 ● Operation as per IEC/EN 60721-3-3	 ● Class 2K3 Temperature -25...70 °C (-13... 158 °F) Air humidity 5...95% (non-condensing) ● Class 3K5 Temperature -5...50 °C (23... 122 °F) Air humidity 5...95% (non-condensing)
Mechanical ambient conditions Transport as per IEC/EN 60721-3-2 Operation as per IEC/EN 60721-3-3	 Class 2M2 Class 3M2

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	Eurasien compliance for all DXR2.xxx-xxxB variants
UL Approbation Federal Communications Commission	UL as per UL864, http://ul.com/database UL1995 94v flammability cUL as per CSA – C22.2 No. 205 FCC CFR 47 Part 15 Class B

Standards, directives and approvals	
BACnet	BTL-AAC BACnet Protocol Revision 13
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 **Product documentation**.
Quality	ISO 9001 (Quality)

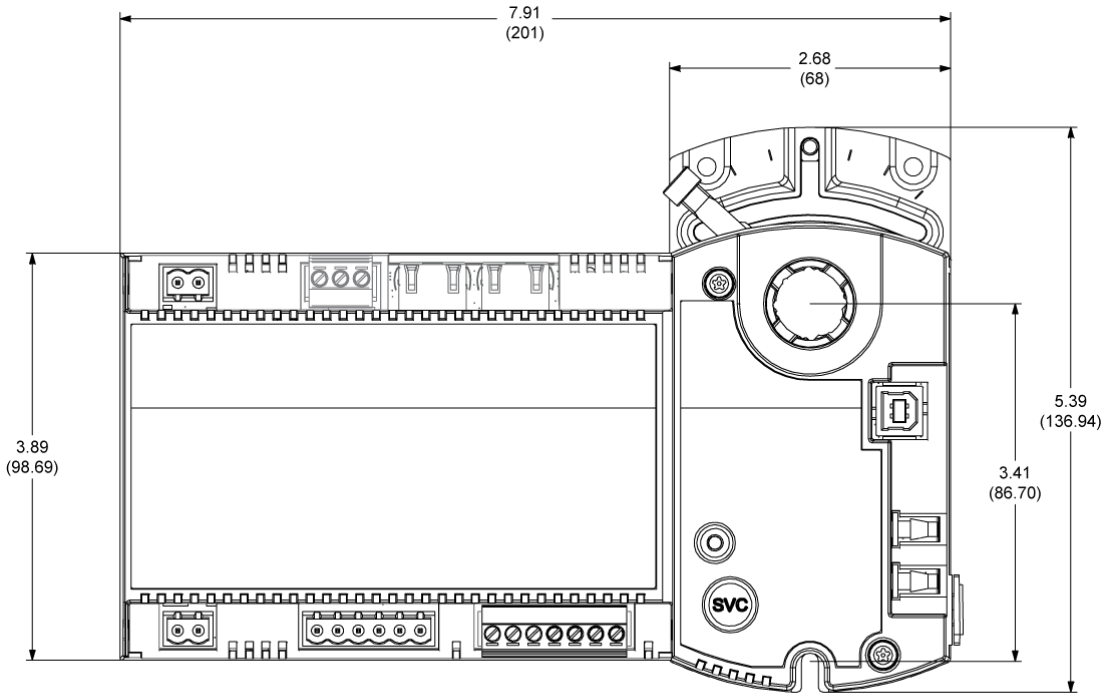
Connection terminals

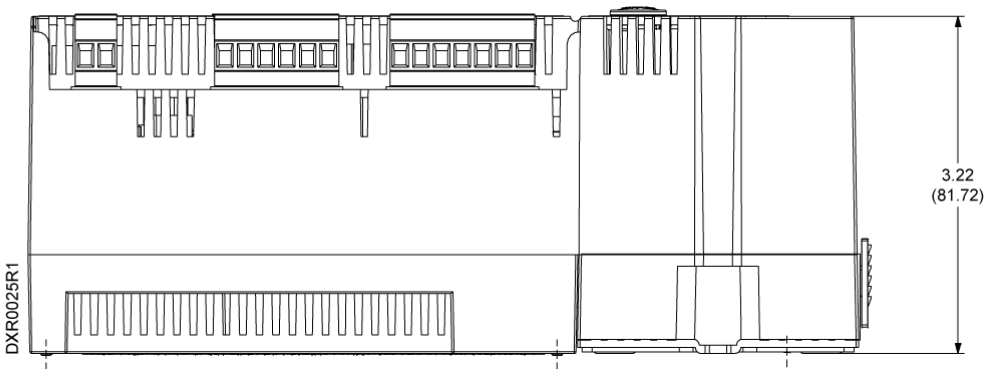


Pin	Description	Terminal	Module	Channel
1, 2 Ethernet	2 x RJ45 interface for 2-port Ethernet switch			
11, 12 KNX	KNX connection	+, -		
USB	USB interface			
51...52 power 24V~	Power supply SELV / PELV AC 24V	V~		
	System neutral	⊥		
64...69 Triac outputs 71 Digital output	Switching output AC 24V	Y3…Y6	11	3…6
	Positioning output DC 0...10 V	Y10	21	1, 2
	System neutral	⊥		
73…77	Digital Input	D1	1	1
	Universal inputs	X1, X2	1	5, 6

Pin	Description	Terminal	Module	Channel
	System neutral	⊥		
ΔP differential pressure detector	Connected to the higher pressure	P1+	31	1
	Connected to the lower pressure	P1-	31	1
Motor Control Outputs	Shaft turns clockwise (CW)		11	2
	Shaft turns counter clockwise (CCW)		11	1
Service	Service button	SVC		
Display	Operation LED	RUN		

Dimensions





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