

CUBE20 MODULAR I/O STATION IP20

- High channel density due to compact design
- Modular structure
- I/O connections with maintenance-free terminals

INNOVATIVE INSTALLATION TECHNOLOGY

Cube20 is an expandable modular fieldbus I/O system for control cabinets. It can be operated as a stand-alone unit or with a Cube67. Cube20 is consistently designed for the requirements of modern control cabinet wiring. High costs due to handling of many individual components can be reduced to a minimum with Cube20.



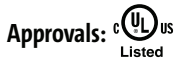
Cube20 I/O Modules

 <p>Bus nodes</p> <ul style="list-style-type: none"> • PROFIBUS DP • PROFINET IO • EtherNet/IP <p><i>Page 4.2.1</i></p>	 <p>System connection to Cube67</p> <p><i>Page 4.2.3</i></p>
 <p>Digital inputs</p> <p><i>Page 4.2.5</i></p>	 <p>Digital inputs/outputs</p> <p><i>Page 4.2.5</i></p>
 <p>Digital outputs</p> <p><i>Page 4.2.6</i></p>	 <p>Analog inputs</p> <p><i>Page 4.2.8</i></p>
 <p>Analog outputs</p> <p><i>Page 4.2.10</i></p>	

CUBE20

Bus Nodes

– Digital inputs



Cube20 BN-P DI8

PROFIBUS DP



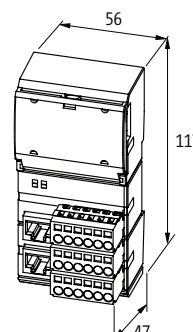
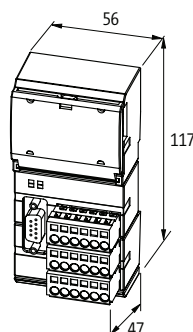
Cube20 BN-PNIO DI8

PROFINET IO



Order Data	Art-No.	Art-No.
PROFIBUS DP	56001	
PROFINET IO		56006
Connections		
Fieldbus	PROFIBUS 12 Mbit/s; SUB-D9	Ethernet 10/100 Mbit/s; 2 × RJ45 (female)
Sensor-system/actuator supply	4 × Spring clamp plug-in terminals, max. 2.5 mm ² (max. 12 A)	
Internal system connection	4 × Spring clamp plug-in terminals, max. 2.5 mm ² (max. 12 A)	
I/O ports	8 × Spring clamp plug-in terminals, max. 2.5 mm ²	
Module Supply		
Operating voltage	24 V DC (EN 61131-2)	
Current consumption	max. 150 mA	
PROFIBUS		
Addressing	Rotary switch 0...99	–
PROFINET		
Addressing	–	DCP
Specification	–	V2.2, Conformance Class B
Cube system		
Module capacity	max. 15	
I/O capacity	max. 244 Byte (Input), max. 244 Byte (Output)	max. 1024 Byte (Input), max. 1024 Byte (Output)
Machine Option Management	yes	
Input		
Sensor supply US	24 V DC (EN 61131-2), max. 700 mA per module	
Type	PNP (EN 61131-2)	
Input filter	1 ms	
Galvanic isolation	500 V DC between I/O and system electronics	
Parameterization		
Terminal row X2 (4 channels)	Input	
Terminal row X3 (4 channels)	Input	
Diagnostic		
Communication status	via LED and BUS	
Diagnostic via LED	per module	
Diagnostic via BUS	per module and channel	
Monitoring - under voltage	yes	
Monitoring - no voltage	no	
Short circuit and overload	yes	
General data		
Protection	IP20	
Mounting method	DIN-rail mountable (EN 60715)	
Temperature range	0...+55 °C (storage temperature -20...+85 °C)	

Dimension drawing




CUBE20

Bus Nodes

– Digital inputs

EtherNet/IP

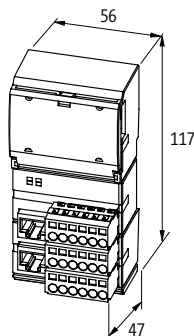
Approvals:  Listed

Cube20 BN-E DI8

EtherNet/IP



Order Data	Art-No.
EtherNet/IP	56005
Connections	
Fieldbus	Ethernet 10/100 Mbit/s; 2 × RJ45 (female)
Sensor-system/actuator supply	4 × Spring clamp plug-in terminals, max. 2.5 mm ² (max. 12 A)
Internal system connection	4 × Spring clamp plug-in terminals, max. 2.5 mm ² (max. 12 A)
I/O ports	8 × Spring clamp plug-in terminals, max. 2.5 mm ²
Module Supply	
Operating voltage	24 V DC (EN 61131-2)
Current consumption	max. 150 mA
EtherNet/IP	
Addressing	DHCP, BOOTP or IP address by rotary switch
Cube system	
Module capacity	max. 15
I/O capacity	max. 504 Byte (Input), max. 500 Byte (Output)
Input	
Sensor supply US	24 V DC (EN 61131-2), max. 700 mA per module
Type	PNP (EN 61131-2)
Input filter	1 ms
Galvanic isolation	500 V DC between I/O and system electronics
Parameterization	
Terminal row X2 (4 channels)	Input
Terminal row X3 (4 channels)	Input
Diagnostic	
Communication status	via LED and BUS
Diagnostic via LED	per module
Diagnostic via BUS	per module and channel
Monitoring - under voltage	yes
Monitoring - no voltage	no
Short circuit and overload	yes
General data	
Protection	IP20
Mounting method	DIN-rail mountable (EN 60715)
Temperature range	0...+55 °C (storage temperature -20...+85 °C)
Dimension drawing	



Notes

CUBE20

Cube20/67-Interface

– Digital inputs/outputs
(multifunctional)

– Cube67

Approvals: UL_{us}
Listed

Cube20 BN-67 DIO8

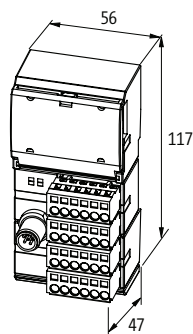
Power external



Cube20 BN-67 DIO8

M12 Power
via internal system connection

Order Data	Art-No.	Art-No.
Cube67 system connection	56450	564501
Connections		
Fieldbus	M12 (male) 6-pole	M12 (female) 6-pole
Sensor-system/actuator supply	4 × Spring clamp plug-in terminals, max. 2.5 mm ² (max. 12 A)	via internal system connection (max. 2×4 A)
I/O ports	8 × Spring clamp plug-in terminals, max. 2.5 mm ²	
Module Supply		
Operating voltage	24 V DC (EN 61131-2)	
Current consumption	max. 100 mA	
Cube system		
Module capacity	max. 3	
Input		
Sensor supply US	24 V DC (EN 61131-2), max. 700 mA per module, short-circuit and overload protected	
Type	PNP (EN 61131-2)	
Input filter	1 ms	
Galvanic isolation	500 V DC between I/O and system electronics	
Output		
Actuator supply UA	24 V DC (EN 61131-2), max. 12 A	24 V DC (EN 61131-2), max. 4 A
Switching current per output	max. 0.5 A (short-circuit and overload protected)	
Galvanic isolation	500 V DC between I/O and system electronics	
Lamp load	10 W	
Parameterization		
Terminal row X2 (4 channels)	Input/Output	
Terminal row X3 (4 channels)	Input/Output	
Diagnostic		
Communication status	via LED	
Diagnostic via LED	per module and channel (only outputs)	
Diagnostic via BUS	per module and channel	
Monitoring - under voltage	yes	
Monitoring - no voltage	no	
Short circuit and overload	yes	
General data		
Protection	IP20	
Mounting method	DIN-rail mountable (EN 60715)	
Temperature range	0...+55 °C (storage temperature -20...+85 °C)	
Dimension drawing		



Notes

CUBE20

Cube20/67-Interface

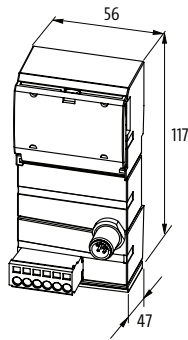
– Cube67

Approvals:  UL US
Listed

Cube20/67-Interface



Order Data	Art-No.
Cube67 system connection	56140
Connections	
Fieldbus	M12 (female) 6-pole
Sensor-system/actuator supply	4 × Spring clamp plug-in terminals, max. 2.5 mm ² (max. 12 A)
I/O ports	8 × Spring clamp plug-in terminals, max. 2.5 mm ²
Module Supply	
Operating voltage	24 V DC (EN 61131-2)
Current consumption	max. 25 mA
Cube system	
Module capacity	max. 15
Sensor supply US	24 V DC (18...30.2 V DC) EN 61131-2, max. 4 A
Actuator supply UA	24 V DC (18...30.2 V DC) EN 61131-2, max. 4 A
Diagnostic	
Communication status	via LED
General data	
Protection	IP20
Mounting method	DIN-rail mountable (EN 60715)
Temperature range	0...+55 °C (storage temperature -20...+85 °C)
Dimension drawing	



Notes

CUBE20

Digital inputs/outputs

Cube20 DI32 E
Expansion module

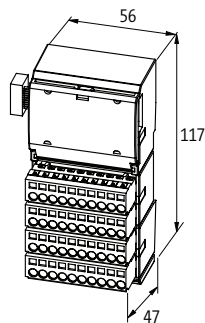


Cube20 DI16 DO16 E
Expansion module



Order Data	Art-No.	Art-No.
DI32 - (E)	cULus	56112
DI16/DO16 - (E)		56168
Internal communication		
Module Supply	via system connection	
Current consumption	max. 25 mA	
Connections		
Fieldbus	Ribbon cable connection	
Sensor-system/actuator supply	8 × Spring clamp plug-in terminals, max. 2.5 mm ² (max. 12 A)	
I/O ports	32 × Spring clamp plug-in terminals, max. 2.5 mm ²	
Input		
Sensor supply US	24 V DC (EN 61131-2), max. 700 mA per module	
Type	PNP (EN 61131-2)	
Input filter	1 ms	
Galvanic isolation	500 V DC between inputs and internal communication	
Output		
Actuator supply UA	–	24 V DC (EN 61131-2), max. 12 A
Galvanic isolation	–	500 V DC between outputs and internal communication
Switching current per output	–	max. 0.5 A (short-circuit and overload protected)
Lamp load	–	10 W
Diagnostic		
Communication status	via LED	
Diagnostic via LED	per module	per module and channel (only outputs)
Diagnostic via BUS	per module and channel	
Monitoring - under voltage	yes	
Monitoring - no voltage	no	
Short circuit and overload	yes	
General data		
Protection	IP20	
Mounting method	DIN-rail mountable (EN 60715)	
Temperature range	0...+55 °C (storage temperature -20...+85 °C)	

Dimension drawing



Notes

CUBE20

Digital outputs

Cube20 DO16 E - 2 A

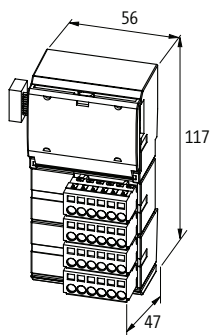
Expansion module



Approvals:  Listed

Order Data	Art-No.
DO16 - 2 A (E)	56117
Internal communication	
Module Supply	via system connection
Current consumption	max. 25 mA
Connections	
Fieldbus	Ribbon cable connection
Sensor-system/actuator supply	8 × Spring clamp plug-in terminals, max. 2.5 mm ² (max. 12 A)
I/O ports	16 × Spring clamp plug-in terminals, max. 2.5 mm ²
Output	
Actuator supply UA	24 V DC (EN 61131-2), max. 12 A
Switching current per output	max. 2 A
Galvanic isolation	500 V DC between outputs and internal communication
Lamp load	40 W
Diagnostic	
Communication status	via LED
Diagnostic via LED	per module and channel
Diagnostic via BUS	per module and channel
Monitoring - under voltage	yes
Monitoring - no voltage	no
Short circuit and overload	yes
General data	
Protection	IP20
Mounting method	DIN-rail mountable (EN 60715)
Temperature range	0...+55 °C (storage temperature -20...+85 °C)

Dimension drawing



Notes

CUBE20

Digital outputs

Cube20 DO32 E

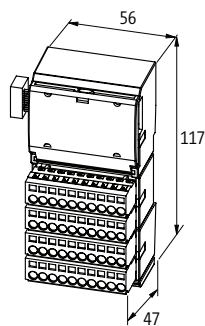
Expansion module



Approvals:  UL
Listed

Cube20

Order Data		Art-No.
DO32 - (E)		56118
Internal communication		
Module Supply	via system connection	
Current consumption	max. 25 mA	
Connections		
Fieldbus	Ribbon cable connection	
Sensor-system/actuator supply	8 × Spring clamp plug-in terminals, max. 2.5 mm ² (max. 12 A)	
I/O ports	32 × Spring clamp plug-in terminals, max. 2.5 mm ²	
Output		
Actuator supply UA	24 V DC (EN 61131-2), max. 12 A	
Switching current per output	max. 0.5 A (short-circuit and overload protected)	
Galvanic isolation	500 V DC between outputs and internal communication	
Lamp load	10 W	
Diagnostic		
Communication status	via LED	
Diagnostic via LED	per module and channel	
Diagnostic via BUS	per module and channel	
Monitoring - under voltage	yes	
Monitoring - no voltage	no	
Short circuit and overload	yes	
General data		
Protection	IP20	
Mounting method	DIN-rail mountable (EN 60715)	
Temperature range	0...+55 °C (storage temperature -20...+85 °C)	
Dimension drawing		



Notes	
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CUBE20

Analog inputs

– Voltage/current

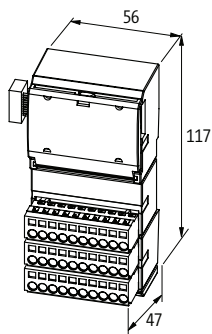
Cube20 AI4 E

Expansion module
Voltage/current



Approvals:  UL US
Listed

Order Data	Art-No.
AI4 - (E)	56200
Internal communication	
Module Supply	via system connection
Current consumption	max. 25 mA from system, max. 60 mA externally (UI)
Connections	
Fieldbus	Ribbon cable connection
Sensor-system/actuator supply	4 × Spring clamp plug-in terminals, max. 2.5 mm ² (max. 12 A)
I/O ports	24 × Spring clamp plug-in terminals, max. 2.5 mm ²
Input	
Conversion time (analog)	max. 2 ms (per channel)
Resolution (analog)	15 Bit + sign
Accuracy	max. 0.3%
Connection	Differential voltage/current input
Voltage inputs	
Input resistor	min. 1 MOhm, (EN 61131-2)
Input range	±10 V DC, 0...10 V DC
Current input signals	
Load	max. 300 Ohm (20 mA), (EN 61131-2)
Input range	0...20 mA, 4...20 mA
Diagnostic	
Communication status	via LED
Diagnostic via LED	per module
Diagnostic via BUS	per module and channel
Monitoring - under voltage	yes
Monitoring - no voltage	no
Short circuit and overload	yes
Wire break upper/lower limit overload	per channel via LED and BUS
General data	
Protection	IP20
Mounting method	DIN-rail mountable (EN 60715)
Temperature range	0...+55 °C (storage temperature -40...+85 °C)
Dimension drawing	



Notes

CUBE20

Analog inputs

– Temperature converter

Cube20 AI4 E RTD


Expansion module
for resistors and temperature



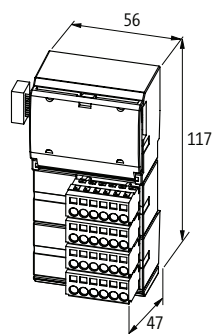
Cube20 AI4 E TH

Expansion module
for thermo elements



Approvals:  Listed

Order Data	Art-No.	Art-No.
AI4 - (E) RTD	56230	
AI4 - (E) TH		56240
Internal communication		
Module Supply	via system connection	
Current consumption	max. 25 mA from system, max. 70 mA externally (UI)	max. 25 mA from system, max. 45 mA externally (UI)
Connections		
Fieldbus	Ribbon cable connection	
Sensor-system/actuator supply	4 × Spring clamp plug-in terminals, max. 2.5 mm ² (max. 12 A)	
I/O ports	16 × Spring clamp plug-in terminals, max. 2.5 mm ²	12 × Spring clamp plug-in terminals, max. 2.5 mm ²
Input		
Conversion time (analog)	max. 600 ms (per channel)	max. 300 ms (per channel)
Type	Pt100, 200, 500; Ni100, 120, 200, 500, 1000, R 0...3000 Ohm	K, N, E, J, R
Resolution (analog)	15 Bit + sign	
Accuracy	0.7...1.4%	max. ±2%, cold junction compensation
Connection	2-wire input: +Rx, -Rx / 3-wire input: +Rx, RLx, -Rx	2-wire input; TH+x, TH-x
Diagnostic		
Communication status	via LED	
Diagnostic via LED	per module	
Diagnostic via BUS	per module and channel	
Monitoring - under voltage	yes	
Monitoring - no voltage	no	
Short circuit and overload	yes	
Wire break upper/lower limit overload	per channel via LED and BUS	
General data		
Protection	IP20	
Mounting method	DIN-rail mountable (EN 60715)	
Temperature range	0...+55 °C (storage temperature -20...+85 °C)	
Dimension drawing		



Notes

CUBE20

Analog outputs

– Voltage/current

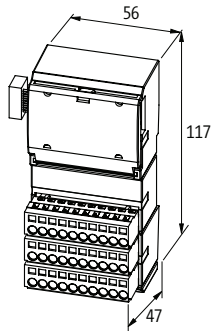
Cube20 AO4 E

Expansion module
Voltage/current



Approvals:  UL US
Listed

Order Data	Art-No.
AO4 - (E) U/I	56220
Internal communication	
Module Supply	via system connection
Current consumption	max. 25 mA from system, max. 90 mA externally (UI), idle load
Connections	
Fieldbus	Ribbon cable connection
Sensor-system/actuator supply	4 × Spring clamp plug-in terminals, max. 2.5 mm ² (max. 12 A)
I/O ports	24 × Spring clamp plug-in terminals, max. 2.5 mm ²
Output	
Conversion time (analog)	max. 1 ms (per channel)
Resolution (analog)	15 Bit + sign
Accuracy	max. 0.5%
Galvanic isolation	500 V DC between inputs and internal communication
Voltage output signals	
Load	min. 1 kOhm, (EN 61131-2)
Input range	±10 V DC, 0...10 V DC
Current outputs	
Load	max. 60 Ohm, (EN 61131-2)
Input range	0...20 mA, 4...20 mA
Diagnostic	
Communication status	via LED
Diagnostic via LED	per module and channel
Diagnostic via BUS	per module and channel
Monitoring - under voltage	yes
Monitoring - no voltage	no
Short circuit and overload	yes
Actuator warning	per channel via LED and BUS
Wire break upper/lower limit overload	per channel via LED and BUS
General data	
Protection	IP20
Mounting method	DIN-rail mountable (EN 60715)
Temperature range	0...+55 °C (storage temperature -20...+85 °C)
Dimension drawing	



Notes

Connection accessories			Art-No.
	Bus Connection Plug 90° SUB-D9 (male), screw terminals	PROFIBUS	55762
	SUB-D9 (female), screw terminals	CANopen	55760
	Bus Connection Plug 180° SUB-D9 (male), IDC terminals, rigid cable	PROFIBUS	55584
	SUB-D9 (male), IDC terminals, flexible cable	PROFIBUS	55583
	Bus Connection Plug 90° SUB-D9 (male), IDC terminals, rigid cable	PROFIBUS	55585
	SUB-D9 (male), IDC terminals, flexible cable	PROFIBUS	55587
	Bus Connection Plug 90° SUB-D9 (male), IDC terminals, rigid cable, programming device conn.	PROFIBUS	55586
	SUB-D9 (male), IDC terminals, flexible cable, programming device conn.	PROFIBUS	55588
	Bus Connection Plug 90° SUB-D9 (male); M12 x 1, B-coded	PROFIBUS	7000-99441-000000
	Label-sheet Quantity: 40 pcs.		56113
	Potential terminal block gray/gray/brown/blue		56078
	gray/gray/yellow/blue		56079
	yellow/blue/yellow/blue		56080
	brown/blue/brown/blue		56081
	blue/yellow/brown/blue		56111
	gray/gray/gray/gray		56084
	blue/blue/blue/blue		56085
	brown/brown/brown/brown		56077
	brown/brown/blue/blue		56109
blue/yellow		56110	

CUBE20

Connection accessories

Art-No.



Potential terminal block

Multi color

56083



Potential terminal block

Slim Line

56082

Cube20