Interface Module BIN-D

- **Wall-mounting housing**
- **In-panel mounting housing**
- **Plug-in module**

1. Application

The BIN-D interface component is always used when the number of freely available digital inputs and outputs of an A. Eberle main component is not sufficient.

BIN-D modules can be connected to any A. Eberle main unit using the COM3 interface. In particular, these are:

- REG-D(A)
- PAN-D
- REG-DP(A)
- PQI-D
- EOR-D
- DMR-D

The BIN-D interface card is used as a digital input and output module.

The hardware implementation (digital inputs, relay, and/or LEDs) is controlled through the E feature.

There are two separate methods for the LED control. As standard, the LEDs are linked to the digital inputs or relay. In other words, the LED lights when a relay is triggered or there is a signal at a digital input. With this type of control the colour of all the LEDs can be selected when ordering. The colours available are red, green and orange.

If the BIN-D is used together with a REG-D(A) or a PAN-D, the LEDs can be controlled independently of the relay/digital inputs. The colour of the LED can then also be selected by software.

Each interface card also has its own intelligence (µP). In this way, it is possible to link signals directly to the module. As standard, this property is used for monitoring the communication with the main unit. The control/evaluation of the relay/digital inputs is, however, performed in the main unit.

The programming of the module is performed according to the customer's requirements ex-factory.

The voltage regulator REG-D(A) and the monitoring unit PAN-D enable the direct configuration of the relay/digital inputs of the BIN-D from the menu, the WinREG or the A. Eberle Toolbox. For this purpose the inputs or outputs of the BIN-D are assigned as additional inputs and outputs of the REG-D(A) or PAN-D (COM3 mapping).

2. BIN-D Features

- can be combined with any A. Eberle main components (master components)
- 8 freely programmable relay outputs
- 16 freely programmable digital inputs
- up to 16 LEDs, which can either be addressed together with the relay/digital inputs or can optionally be separately controlled*
- up to 16 BIN-D can be connected per master
- Computing power for quick scanning and/or links "on board"
- Wide-range input for auxiliary voltage
- Fail-Safe mode on communication failure
- all inputs and outputs are galvanically decoupled from each other

* separate control of the LEDs only possible with the REG-D(A) voltage regulators or PAN-D monitoring unit.

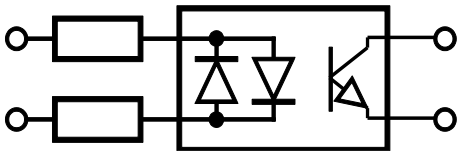
3. Technical specifications

Regulations and standards

- IEC 61010-1 / EN 61010-1
- CAN/CSA C22.2 No. 1010.1-92
- IEC 60255-22-1 / EN 60255-22-1
- IEC 61326-1 / EN 61326-1
- IEC 60529 / EN 60529
- IEC 60068-1 / EN 60068-1
- IEC 60688 / EN 60688
- IEC 61000-6-2 / EN 61000-6-2
- IEC 61000-6-4 / EN 61000-6-4

CE

Digital Inputs (BI), Characteristics E2, E4x, E5x, E6, E7x, E8x	
General	
Shape of the curve, permissible	Rectangular, sinusoidal
Signal frequency	DC, 40 ... 70 Hz
Potential isolation	Optocoupler; all inputs galvanically isolated from each other
Debouncing	Software filter with integrated 50 Hz filter
Characteristics E2, E4x - Inputs E1 ... E16	
Control signals U_{st}	in the AC/DC range 48 V ... 250 V
H - Level L - Level	≥ 48 V < 10 V
Input resistance	108 kΩ
Characteristics E6, E5x - Inputs E1 ... E16	
Control signals U_{st}	in the AC/DC range 10 V ... 50 V
H - Level L - Level	≥ 10 V < 5 V
Input resistance	6.8 kΩ
Characteristic E7x - Inputs E1 ... E16	
Control signals U_{st}	in the AC/DC range 80 V ... 250 V
H - Level L - Level	≥ 80 V < 40 V
Input resistance	108 kΩ
Characteristic E8x - Inputs E1 ... E16	
Control signals U_{st}	in the AC/DC range 190 V ... 250 V
H - Level L - Level	≥ 176 V < 88 V
Input resistance	108 kΩ



Simplified diagram of a binary input

Digital Outputs (BO), Characteristics E3, E9x	
max. switching frequency	≤ 1 Hz
Potential isolation	Isolated from all device-internal potentials
Contact load	AC: 250 V, 5 A (cos φ = 1.0) AC: 250 V, 3 A (cos φ = 0.4) Switching capacity max. 1250 V A DC: 30 V, 5 A resistive DC: 30 V, 3.5 A L/R=7 ms DC: 110 V, 0.5 A resistive DC: 220 V, 0.3 A resistive Switching capacity max. 150 W
Inrush current	250 V AC, 30 V DC 10 A for max. 4 s
Switching operations	≥ $5 \cdot 10^5$ electrical

Electrical safety	
Safety class	I
Degree of pollution	2

Operating voltages	
50 V	**230 V**
COM3, Digital inputs 10...50 V (Characteristics E6, E5x)	Auxiliary voltage, digital inputs, relay outputs

Electromagnetic compatibility	
EMC requirements	EN 61326-1 Equipment class A Continuous, unmonitored operation, industrial location and EN 61000-6-2 and EN 61000-6-4
Interference emissions	
Conducted and radiated emission	EN 61326 Table 3 EN 61000-6-4

Electromagnetic compatibility	
Harmonic currents	EN 61000-3-2
Voltage fluctuations and flicker	EN 61000-3-3
Disturbance immunity	EN 61326 Table A1 and EN 61000-6-2
ESD	IEC 61000-6-5 6kV/8kV contact/air
Electromagnetic fields	IEC 61000-4-3 80 – 2000 MHz: 10 V/m
Fast transient	IEC 61000-4-4 4 kV/2 kV
Surge voltages	IEC 61000-4-5 4 kV/2 kV

Electromagnetic compatibility	
Conducted HF signals	IEC 61000-4-6 150 kHz – 80 MHz: 10 V
Power-frequency magnetic fields	IEC 61000-4-8 100 A/m (50 Hz), continuous 1000 A/m (50 Hz), 1 s
Voltage dips	IEC 61000-4-11 30% / 20 ms, 60% / 1 s
Voltageinterruptions	IEC 61000-4-11 100% / 5s
Damped oscillations	IEC 61000-4-12, Class 3, 2.5 kV

Test voltages	Description	Test voltage / kV	Feedback control loops*
Auxiliary voltage	U_h	2.3	COM3
Auxiliary voltage	U_h	2.3	BI, BO
Digital inputs	BI	1.5	COM3
Binary outputs	BO	1.5	COM3

*Counter circuits are always on the module rack's potential All test voltages are AC voltage in kV should be applied for 1 minute.

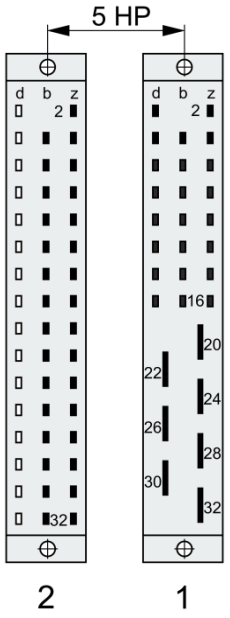
Auxiliary voltage		
Characteristic	**H1**	**H2**
AC Nom. Voltage range Total voltage range	 100 ... 240 V 90 … 264 V	-
DC	100 ... 300 V	20 ... 70 V
Power consumption AC	≤ 35 VA	-
Power consumption DC	≤ 25 W	≤ 25 W
Nominal frequency	50/60 Hz	-
Microfuse	T1 250 V	T2 250 V
Over voltage category	300V CAT II	150V CAT II
Isolation	reinforced	reinforced
Isolation test voltage	2.3kVAC, 5s	1.4kVAC, 5s

The following applies to all characteristics:
Voltage dips of ≤ 25 ms result neither in data loss nor malfunctions.

Ambient conditions	
Temperature range Function (Housing) Function (plug-in module) Transport and storage	 -10 °C ... +50°C -10°C ... +60 °C -25 °C ... +65°C
Dry cold	IEC 60068-2-1, - 10°C / 16 h
Dry heat	IEC 60068-2-2, + 55°C / 16 h
Humid heat constant	IEC 60068-2-78 + 40°C / 93% / 2 days
Humid heat cyclical	IEC 60068-2-30 12+12 h, 6 cycles +55°C / 93%
Drop and topple	IEC 60068-2-31 100 mm drop height, unpackaged
Vibration	IEC 60255-21-1, Class 1
Shock	IEC 60255-21-2, Class 1
Earthquake resistance	IEC 60255-21-3, Class 1

4. Mechanical design

Plug-in module	
Front panel	Plastic, RAL 7035 grey on aluminium frame or, when using LEDs, on a circuit board with integrated LEDs
Height	3 U (132.5 mm)
Width	8 HP (40.6 mm)
Printed circuit board	160 mm x 100 mm
Weight	≤ 0.5 kg
Protection type – Plug-in module – Female multipoint connector	 IP 00 IP 00
In-panel mounting	in conformity with DIN 41494 Part 5
Plug-in connector	DIN 41612

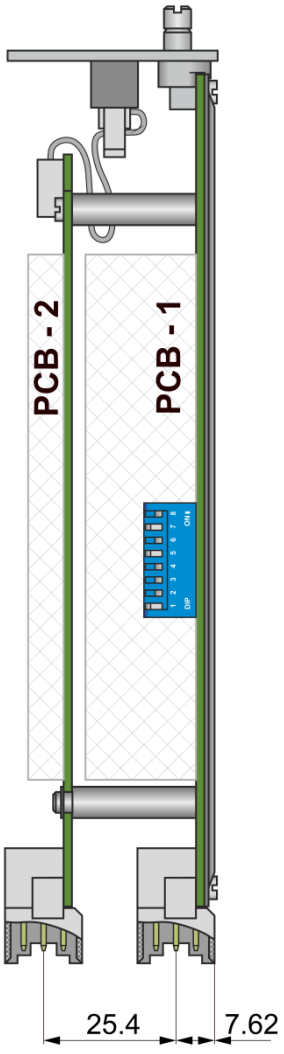


Position of the BIN-D female multipoint connectors

4.1 Position of the male or female multipoint connectors

The male multipoint connectors are firmly connected to the device's printed circuit board, meaning that the female multipoint connectors must be mounted in specific positions in the housing or the module rack. A specific position number determines the reference point for the mounting of the guide holders and the connection elements on the back of the module rack/housing.

Position numbers		
Female multipoint connector	1	2
PCB card guide	n	-
Screws	n	n+4



Position of the BIN-D multipole connectors

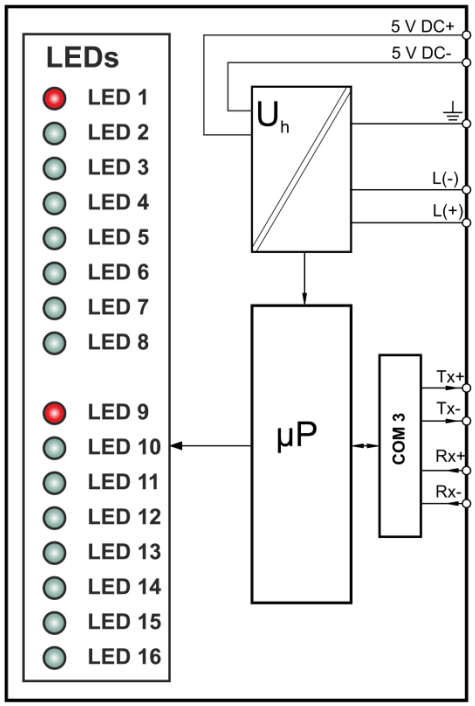
4.2 BIN-D pin connections

Female multipoint connector 3; *(measuring voltage, auxiliary voltage)*						
COM3	RX+	d2		RX-	b2	
	TX+	d4		TX-	b4	
DC output (max. 5 W)	+5V	d12, b12, z12		GND	d14, b14, z14	
Auxiliary voltage	L(+)	28	N(-)	30	PE	32

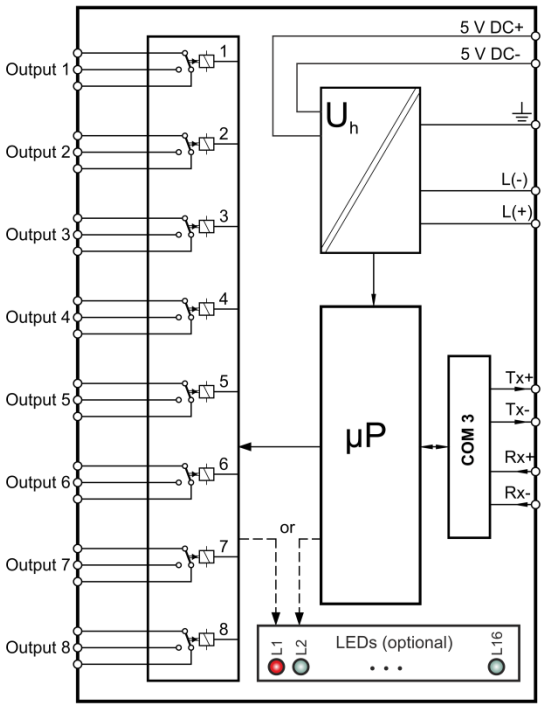
Female multipoint connector 2; *(digital outputs) Characteristics E3, E9.x*					
Freely programmable	R1	Pole	b2	NCC NOC	b4 z2
Freely programmable	R2	Pole	b6	NCC NOC	b8 z6
Freely programmable	R3	Pole	b10	NCC NOC	b12 z10
Freely programmable	R4	Pole	b14	NCC NOC	b16 z14
Freely programmable	R5	Pole	b18	NCC NOC	b20 z18
Freely programmable	R6	Pole	b22	NCC NOC	b24 z22
Freely programmable	R7	Pole	b26	NCC NOC	b28 z26
Freely programmable	R8	Pole	b30	NCC NOC	b32 z30

Female multipoint connector 2; (*digital inputs*) *Characteristics E2, E6, E4.x, E5.x, E7.x, E8.x*					
Freely programmable	E1	+	b2	-	z2
Freely programmable	E2	+	b4	-	z4
Freely programmable	E3	+	b6	-	z6
Freely programmable	E4	+	b8	-	z8
Freely programmable	E5	+	b10	-	z10
Freely programmable	E6	+	b12	-	z12
Freely programmable	E7	+	b14	-	z14
Freely programmable	E8	+	b16	-	z16
Freely programmable	E9	+	b18	-	z18
Freely programmable	E10	+	b20	-	z20
Freely programmable	E11	+	b22	-	z22
Freely programmable	E12	+	b24	-	z24
Freely programmable	E13	+	b26	-	z26
Freely programmable	E14	+	b28	-	z28
Freely programmable	E15	+	b30	-	z30
Freely programmable	E16	+	b32	-	z32

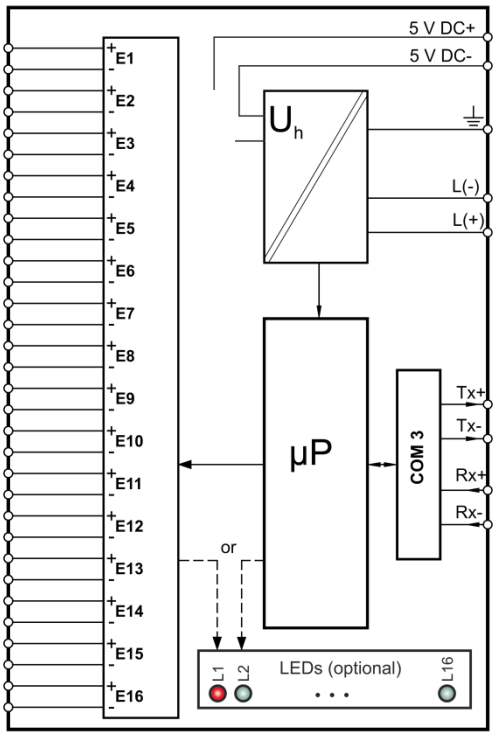
5. Block diagrams



BIN-D block diagram
Characteristic E1



BIN-D block diagram
Characteristics E3, E9x



BIN-D block diagram
Characteristics E2, E6, E4x, E5x, E7x, E8x

6. Housing technology

A. Eberle is also very flexible with regard to the housing technology. A few of the housing configurations are described below.
Most of the housings and module racks come with customer-specific wiring. The terminal configuration can be taken from the system-specific wiring diagrams. Please contact A. Eberle support if you do not have these diagrams (regsys-support@a-eberle.de, +49(0)911/628108-101).

6.1 In-panel/wall-mounting housing

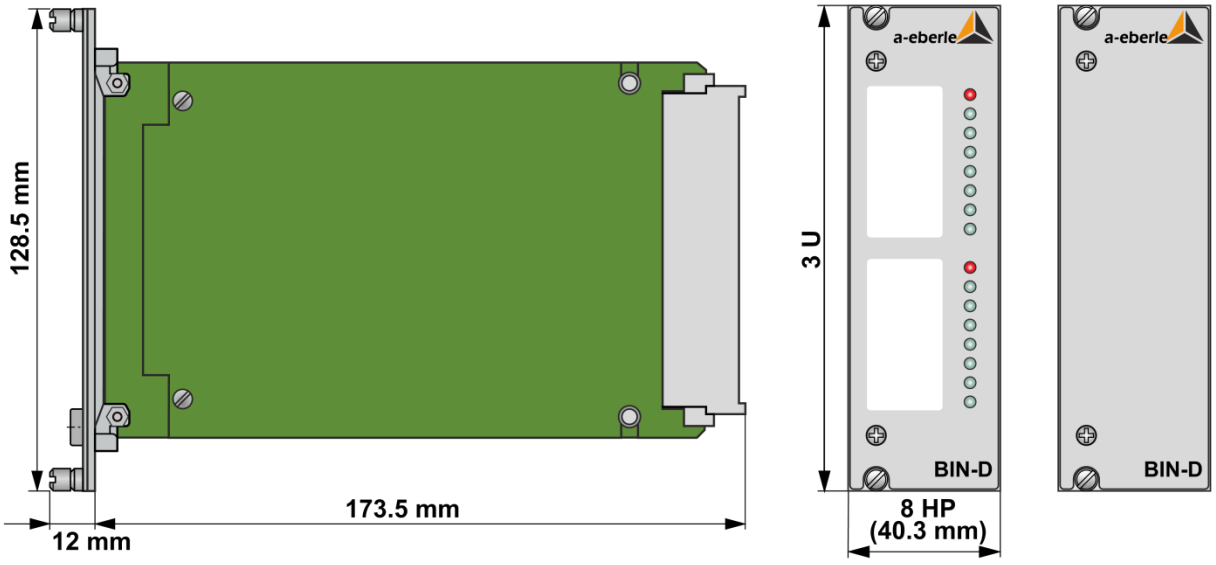
Material	Plastic
Protection type	Front panel IP 65
Weight	≤ 4 kg
Dimensions	see drawings
Housing width	20, 30 or 49 HP

Connection elements		Number of terminals
Characteristic B03, (30HP)	Phoenix screw-push terminals	32 * 48 **
Characteristic B03, (20HP)	Phoenix screw-push terminals	48 ***
Characteristic B09, (20HP)	Phoenix screw-push terminals	32 * 48 ** 48 ***
Characteristic B09, (30HP)	Phoenix screw-push terminals	32 * 48 ** 64 ***
Characteristic B09, (49HP)	Phoenix screw-push terminals	64 * 96 ** 96 ***

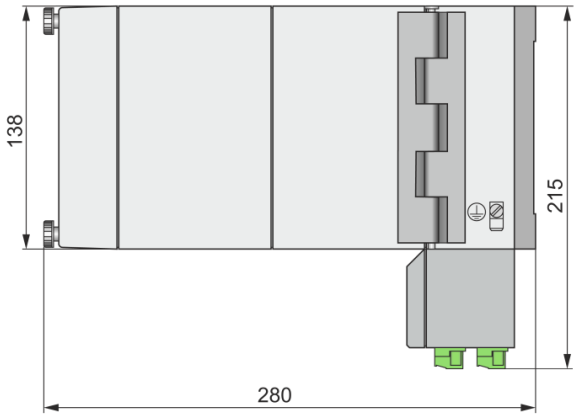
*max. Number of terminals with WAB with short terminal boxes
**max. Number of terminals with WAB with long terminal boxes
*** max. Number of terminals with switch panel housing

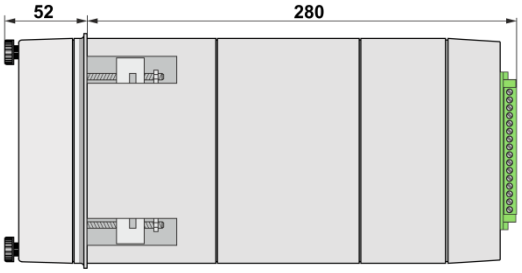
The cross-section of each terminal type can be found in Section 6.2.

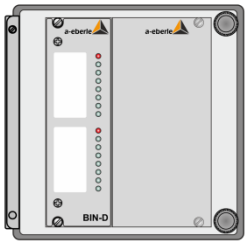
6.2 Illustrations and dimensions of the modules and housings

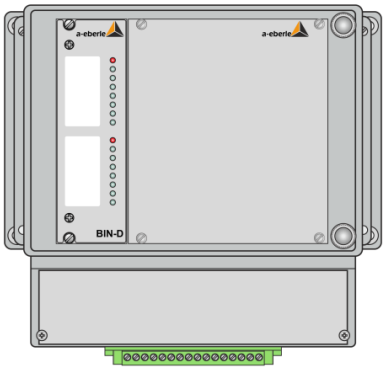


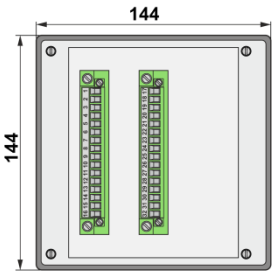
Plug-in module 8 HP - Characteristic B01

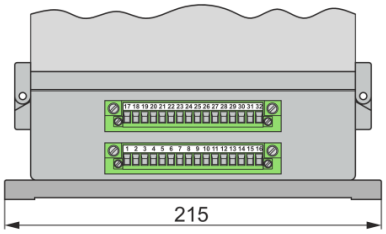


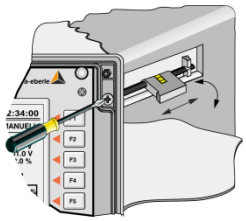


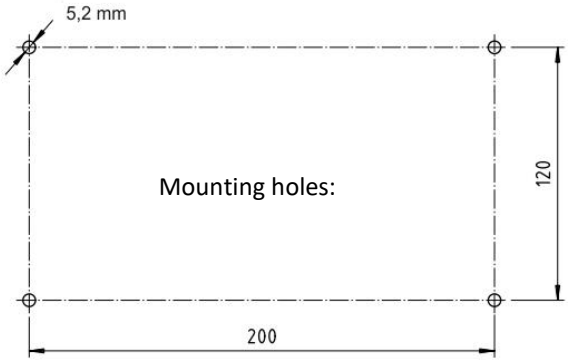


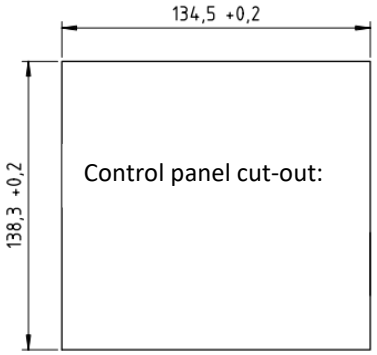












Cross-section of the terminals		
Connector, grid, application ex.	Conductor cross-section / mm²	
	flexible	solid
16-pole, 5 mm, BIs, relay	2.5	2.5

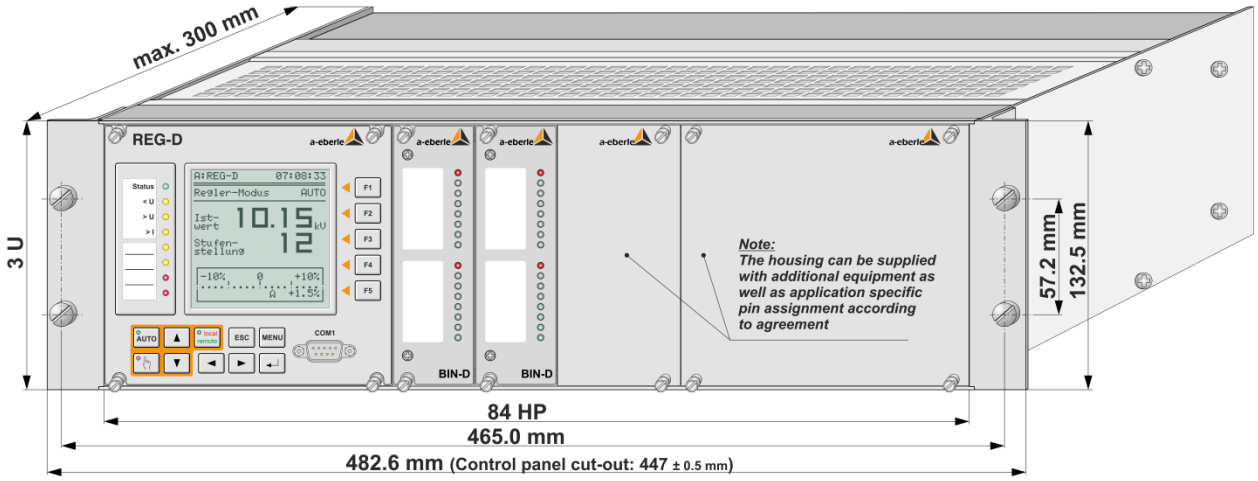
Plug-in module 30 HP - Characteristic B02

Dimensions in mm

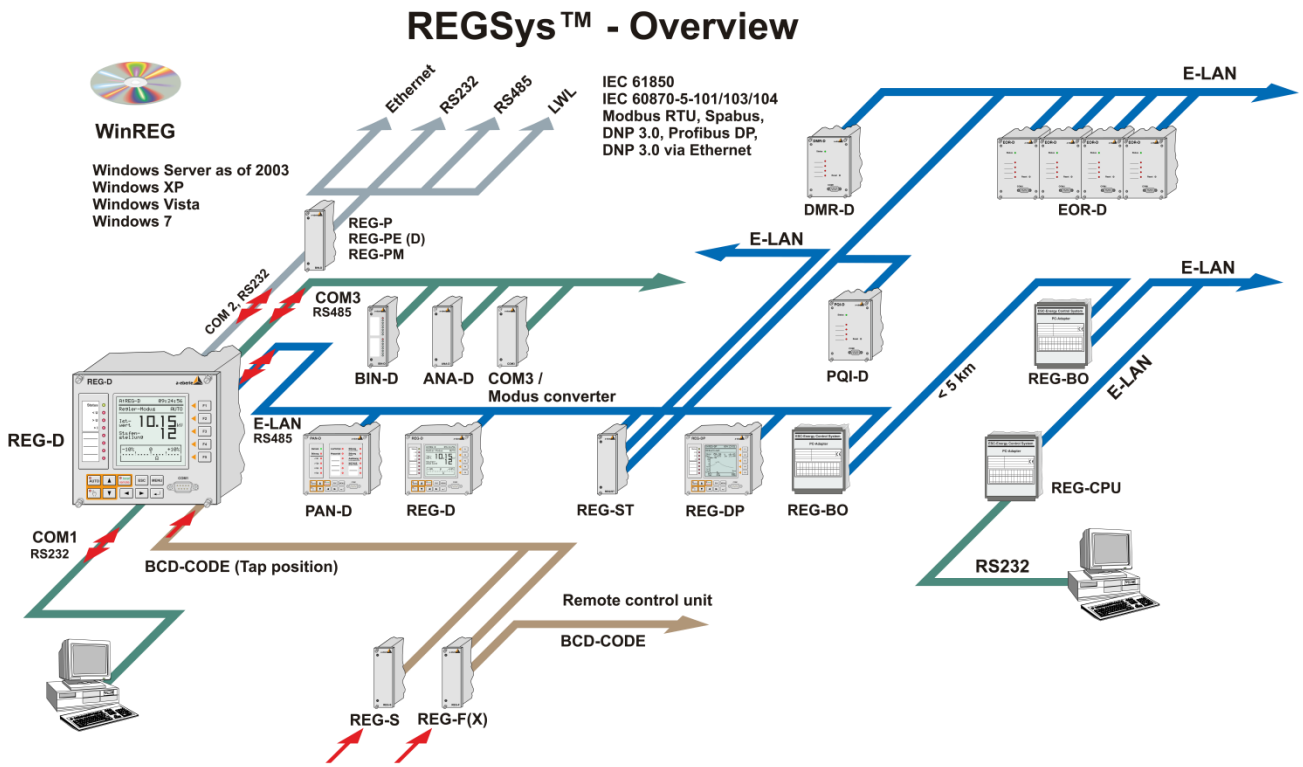
Cross-section of the terminals		
Connector, grid, application ex.	Conductor cross-section / mm²	
	flexible	solid
16-pole, 5 mm, BIs, relay	2.5	2.5

Plug-in module 20 HP - Characteristic B03

Dimensions in mm



Module rack 84 HP Front view - Characteristic B01 in 19“ voltage control system



7. Interfaces and Configuration

7.1 Serial interfaces

COM3 (peripheral interface)

The COM3 interfaces are used for connecting up to 16 interface modules (BIN-D, ANA-D) in any combination to any COM3 master unit (e.g. REG-D). COM3 is a 4-wire RS485 interface. Optionally, the COM3 can be implemented optically outside the housing/rack.

Optical transmitter

Product	Wave length	Fibre	Pmin [dBm] 1)	Pmax [dBm] 1)
Glass-ST	λ = 820 nm	50/125 µm NA=0.2	-19.8	-12.8
		62.5/125 µm NA=0.275	-16.0	-9.0
		100/140 µm NA=0.3	-10.5	-3.5
		200 µm HCS NA=0.37	-6.2	+1.8

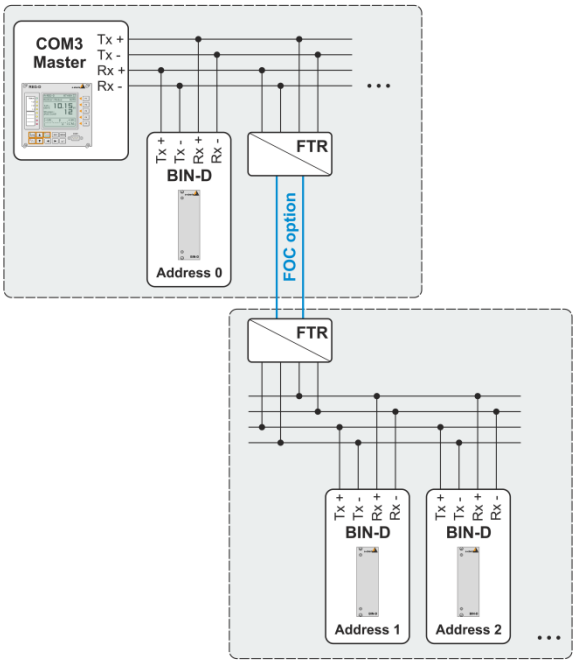
1) TA = 0..70°C, IF = 60 mA, measured after 1 m fibre optic cable

Optical receiver

Product	Wave length	Fibre	Pmin [dBm] 2)	Pmax [dBm] 2)
Glass-ST	λ = 820 nm	100/140 µm NA=0.3	-24.0	-10.8

2) TA = 0...70°C, VCC = 5 V±5%, output level LOW (active)

Example COM3 connection



7.2 Configuration

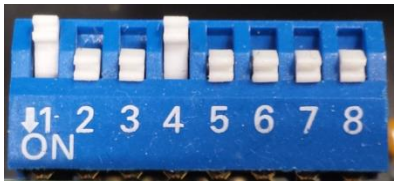
Addressing

The assignment of the COM3 address of the BIN-D module is digitally encoded via DIP switches on the BIN-D circuit board 1. The address assignment is arbitrary, but the address must be unique. Addresses in the range 0..15 can be assigned.

DIL 1 (1)	DIL 2 (2)	DIL 3 (4)	DIL 4 (8)	Address
ON	ON	ON	ON	0
OFF	ON	ON	ON	1
ON	OFF	ON	ON	2
				...
ON	OFF	OFF	OFF	14
OFF	OFF	OFF	OFF	15

(x) value of the DIL switch

The following illustration shows the setting for address 9.



Fail-Safe Mode (only characteristic E3, E9.x)

A relay watchdog enables the relay of the BIN-D to be switched to a defined state on a communication failure with the master device (min. 2 s no communication). Without the watchdog the relay stays as it was on a communication failure. With a watchdog it is de-energised.

DIP switch 7 = ON -> no watchdog
DIP switch 7 = OFF -> watchdog active

Simulation of the Relay and LEDs

The simulation for the relays and LEDs can be switched on with DIL switch 8. In this case, the DIL switches 1 to 8 encode the state of the relay/LEDs 1 to 8. So, if DIL switch 1 is OFF, relay 1 is on.

DIP switch 8 = ON -> no simulation

DIP switch 8 = OFF -> simulation

Use of the digital inputs and relays in the master unit (e.g. REG-D)

The BIN-D resources can be addressed from all master devices using the REG-L programming language. I.e. the'BIN-D is controlled by a background program.

An exception to this is using a BIN-D with 16 binary inputs, which must be mapped to digital inputs 17..32 of the REG-D(A). This function can be selected with DIL switch 7. Where:

DIP switch 7 = ON -> no transfer to E17..32
DIP switch 7 = OFF -> transfer to E17..32

Furthermore, the voltage regulator REG-D(A) and the monitoring unit PAN-D enable the direct configuration of the relay/digital inputs of the BIN-D from the menu or the WinREG. For this purpose the inputs or outputs of the BIN-D are assigned as additional inputs and outputs of the REG-D(A) or PAN-D. This specifies, for example, that relay 1 of the BIN-D with address 0 is associated with relay 11 of the REG-D. This so-called COM3 mapping is done before delivery by A. Eberle. It can also, however, be performed at any time with the WinREG.

8. Order specifications

- Only one unit can be ordered for codes with the same capital letter.
- When a code's capital letter is followed by the number 9, additional information may be required.
- When a code's capital letter is followed only by zeros, the code may be omitted.

CHARACTERISTIC	CODE
	BIN-D
Digital Interface BIN-D (8HP, 3U) with 8/16 programmable digital channels and COM 3 (RS 485) for communication with the central unit (e.g. REG-D or PAN-D)	BIN-D
Model	
● 19" plug-in module **Note:** If a fibre optic connection for the COM3 is needed, please select the according feature of the housing or rack or specify it with additional text on the order	B01
Power supply	
● external AC 100V ... 110V ... 240V / DC 100V ... 220V ... 300V	H1
● external DC 20V ... 60V ... 70V	H2
Digital Inputs or Outputs	
● with 16 signal LEDs	E1
● with 16 inputs (BI) (AC/DC 48V…250V)	E2
● with 16 inputs (BI) (AC/DC 10V…50V)	E6
● with 16 inputs and 16 signal LEDs (AC/DC 48V…250V), LEDs controlled from BIs	E4
● with 16 inputs and 16 signal LEDs (AC/DC 48V…250V), LEDs separately controlled	E41
● with 16 inputs and 16 signal LEDs (AC/DC 10V…50V), LEDs controlled from BIs	E5
● with 16 inputs and 16 signal LEDs (AC/DC 10V…20V), LEDs separately controlled	E51
● with 16 inputs and 16 signal LEDs (AC/DC 80V…250V), LEDs controlled from BIs	E7
● with 16 inputs and 16 signal LEDs (AC/DC 80V…250V), LEDs separately controlled	E71
● with 16 inputs and 16 signal LEDs (AC/DC 190V…250V), LEDs controlled from BIs	E8
● with 16 inputs and 16 signal LEDs (AC/DC 190V…250V), LEDs separately controlled	E81
● with 8 relay outputs	E3
● with 8 relay outputs and 8 LEDs, LEDs controlled by relay	E9
● with 8 relay outputs and 16 LEDs, LEDs controlled separately	E91
Operating instructions	
● German	G1
● English	G2

REG-Sys™ Accessories		ID-No.
Rack/Housing:		
Female multipoint connector 1	(Electrical connector block, model F, wire wrap)	582.0197
Female multipoint connector 1	(Electrical connector block, model F, 2.8 FASTON, 32 pins)	582.0213.01
Female multipoint connector 1	(Electrical connector block, model F, 2.8 FASTON, 48 pins)	582.0213
Female multipoint connector 2	(Current input with advanced contacts, 2 pole)	582.0258.10
Female multipoint connector 4	(Current input with advanced contacts, 6 pole)	582.0258.20
Female multipoint connector 3	(Mixed connector model F24 + H7, wire wrap)	582.0215
Female multipoint connector 3	(Mixed connector model F16 + H7, 6.3/2.8 FASTON)	582.0214
Female multipoint connector 3	(Mixed connector model F24 + H7, 6.3/2.8 FASTON)	582.0217
Dummy panel 28 HP		566.0028
Dummy panel 18 HP		566.0018
Dummy panel 14 HP		566.0014
Dummy panel 10 HP		566.0010
Dummy panel 8 HP		566.0008
Dummy panel 7 HP		566.0007
Dummy panel 6 HP		566.0006
Dummy panel 5 HP		566.0005
Dummy panel 4 HP		566.0004
Dummy panel 2 HP		566.0002
Fuses:		
1 pack microfuses T1 L 250 V, 1 A, for auxiliary voltage range H1		582.1002
1 pack microfuses T2 L 250 V, 2 A, for auxiliary voltage range H2		582.1019

Notes

Notes

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