AL100 - AL110 • *Embedded Blue*®

Industrial Gigabit Ethernet Switch

Overview

The AL100 is a five to fifteen port industrial Gigabit Ethernet switch box. The self managed solution is provided with up to twelve M12-X connectors, and up to three RJ45 jacks. The AL100 is available for DIN rail or wall mount. The M12-A power input accepts 9-57VDC. As an option the box can be equipped with a terminal block power connector.

The AL100 is based on the Marvell® 88E6390 Ethernet switch. Supported speeds on the M12-X and RJ45 ports are 1000BASE-T, 100BASE-TX and 10BASE-T.

As AL110, the switch box is also available with a mezzanine CPU card (AC370) for additional protocol support such as AVB/TSN, and Wi-Fi wireless communication.

Technical Features

General

- 1000BASE-T Ethernet Switch box, for DIN rail mount or wall mount
- Intended for industrial use
- Self-managed operation
- Scalable 5 to 15 ports (stacked construction)
- Dimensions AL100: 30/60/90mm (W) x 140mm (H) x 70mm (D) w/o DIN rail brackets
- Dimensions AL110: 45mm (W) x 140mm (H) x 70mm (D) w/o DIN rail brackets
- Metal case
- M12-X Gigabit Ethernet connectors, 4 to 12 ports
- RJ45 Gigabit Ethernet connectors 1 to 3 ports
- M12-A Front power connector
- Terminal block power connector (option)
- Option desktop power adapter connector
- Wide DC power input operation 9-57V

Front Panel I/O

- M12-X front panel GbE receptacles, rail approved connector system, Cat6A, IEC 61076-2-109
- 1000BASE-T, 100BASE-TX, 10BASE-T compliant data transfer rate front ports
- Future proof investment into cabling infrastructure - up to 10Gbps with M12-X Cat6A
- M12 X-coded to RJ45 connector Cat6A cable assemblies available from several suppliers
- Additional RJ45 connector(s), for general usage
- M12-A 5-position male connector for DC power input
- Terminal block 3.5mm pitch 4-position screw lock (bottom of box) power input

AL110 only (CPU)

- M12-A five pin male power connector for DC power input
- USB 3 Type-A
- Gigabit Ethernet RJ45
- Micro SD Card
- USB 2.0 Type-B (Programming/Debug)
- RS-485 (option)
- 2 x SMA RF (Wi-Fi & Bluetooth)

Technical Features

Power Requirements

- DC Input, 9 - 57V (12VDC, 24VDC, 48VDC)
- Power consumption 3W/6W/9W max. (5 - 10 - 15 ports, AL100)
- Fast acting chip fuse (PCB soldered type - no replacement on-site)
- Protected against reverse polarity
- TVS ESD protection
- Common mode input filter
- M12-A 5-position male connector for DC power input
- Pigtail cable assemblies available M12-A 5-pos. female plug
- Option 4-position terminal block power connector, 3.50mm pitch, screw lock removable cable plug
- Option rear power connector (desktop supply 4-pos. circular connector)

Gigabit Ethernet Switch(es)

- Marvell® 88E6390 (Peridot) based Gigabit Ethernet switch(es)
- 1 to 3 switches for 5 - 10 - 15 front ports
- Switches connected via 2.5Gbps SERDES (mezzanine stacking connectors)
- In use 5 (10 - 15) x front port GbE MAC/PHY 1000BASE-T
- 1 (2 - 3) x RJ45 connector(s) w. integrated magnetics
- 4 (8 - 12) x M12 X-coded connectors (isolated by magmods)
- High performance, non-blocking, Gigabit Ethernet
- Support for up to 16K MAC addresses, 10KByte Jumbo Frames
- Supports 802.1 Audio Video Bridging (AVB) Gen 2*
- Time Sensitive Networking (TSN) Standards*, IEEE 1588v2 one-step PTP
- Synchronous Ethernet*
- Quality of Service (QoS) support with 8 traffic classes
- Supports 4096 802.1Q VLANs, three levels of 802.1Q security
- Unmanaged solution (protocol support with additional mezzanine CPU card)
- Up to two internal mezzanine stacking connectors for communication to adjacent internal switch (10 - 15 port solutions)
- Internal switch communication via SERDES 2.5Gbps ports
- Two and three internal switch versions (10 - 15 ports) are virtually combined into a single switch with aggregated performance
- Internal communication via SERDES 2.5Gbps port and MDIO to optional stacked processor (AL110, e.g. required for AVB/TSN*)
- AL110 Box available (AL100 with AC370 CPU for protocol support)

* AVB/TSN protocols require additional CPU support (AL110)
please refer also to AC370 product information

Technical Features

Applications

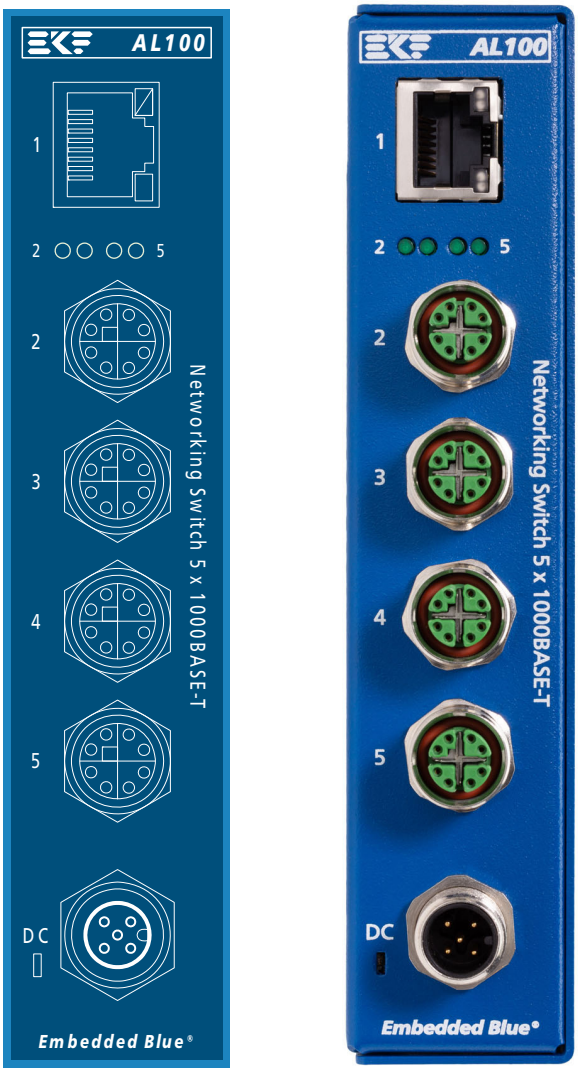
- Industrial networks - IIoT
- Rugged environments
- Transportation vehicles
- Construction and harvesting machinery
- Railway
- Customized design on request

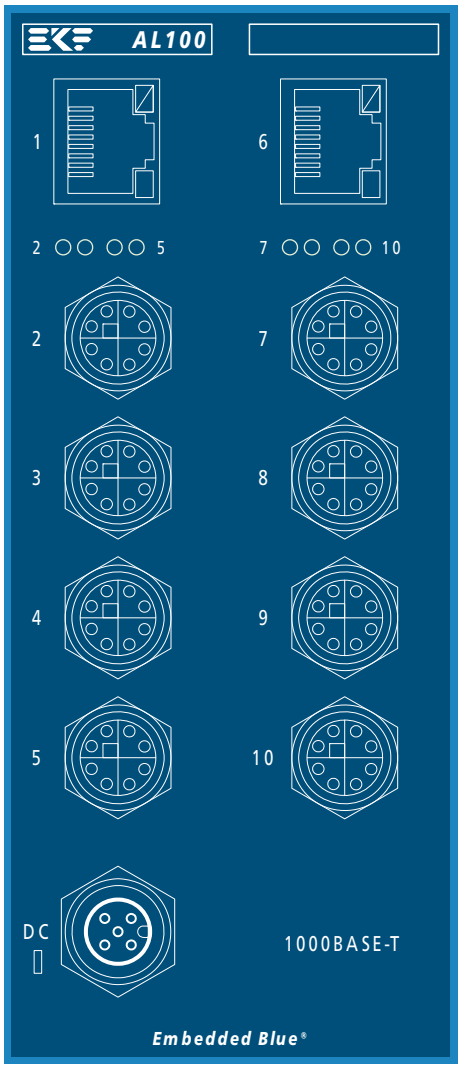
Environmental, Regulatory

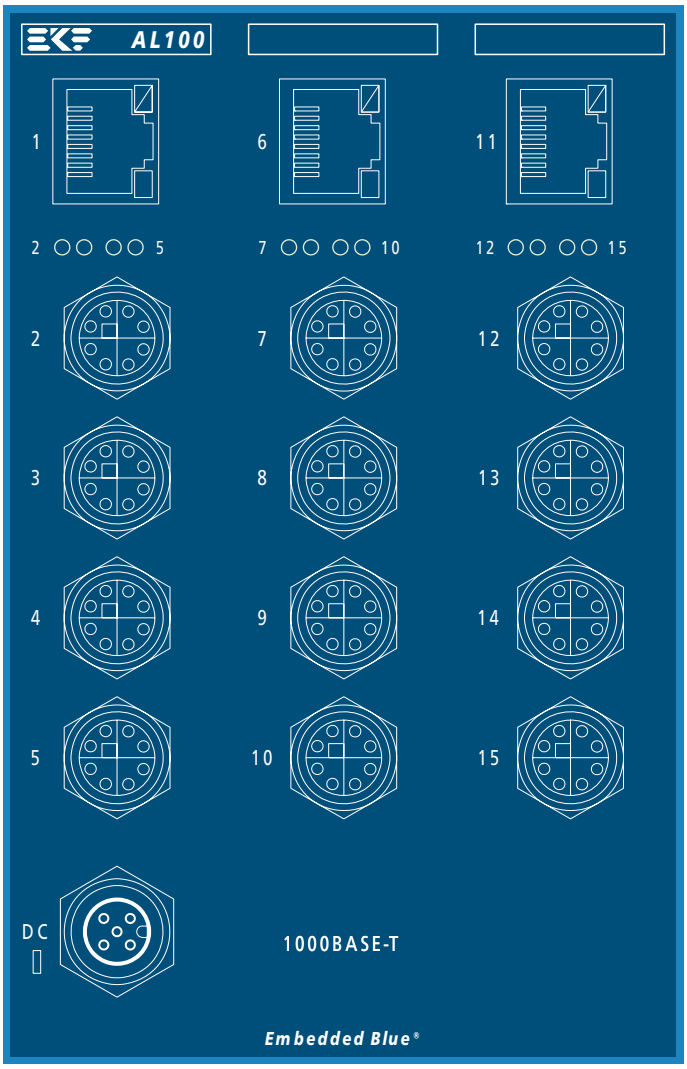
- Designed & manufactured in Germany
- ISO 9001 certified quality management
- Long term availability
- Rugged solution
- RoHS compliant
- Operating temperature -40°C to +85°C (industrial temperature range)
- Storage temperature -40°C to +85°C, max. gradient 5°C/min
- Humidity 5% ... 95% RH non condensing
- Altitude -300m ... +3000m
- Shock 15g 0.33ms, 6g 6ms
- Vibration 1g 5-2000Hz
- EC Regulatory EN55035, EN55032, EN62368-1 (CE)
- MTBF 216.8 years (AL100 5-port switch) MIL-HDBK-217F
- Weight 0.35kg

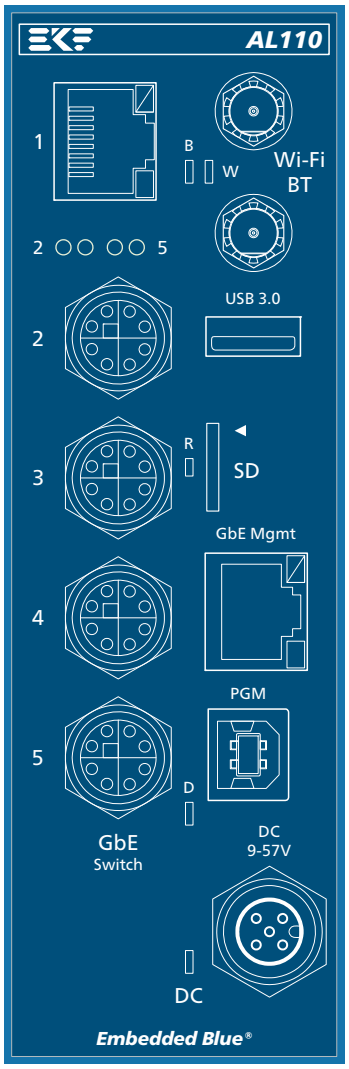
all items may be subject to technical changes w/o further notice
photos in this document may show a preliminary product

Front Panel


AL100
1
2
5
2
3
4
5
DC
Networking Switch 5 x 1000BASE-T
Embedded Blue®
AL100
1
2
5
2
3
4
5
DC
Networking Switch 5 x 1000BASE-T
Embedded Blue®


AL100
1
6
2 5
7 10
2
7
3
8
4
9
5
10
DC
1000BASE-T
Embedded Blue®


AL100
1
6
11
2 5
7 10
12 15
2
7
12
3
8
13
4
9
14
5
10
15
DC
1000BASE-T
Embedded Blue®


AL110
1
B
W
Wi-Fi
BT
2
5
USB 3.0
2
3
R
SD
GbE Mgmt
4
PGM
5
D
GbE
Switch
DC
9-57V
DC
Embedded Blue®


AL100
Embedded Blue®
AL100
Industrial GbE Switch
ekf.com
DC
9-57V
1000BASE-T
Embedded Blue®


AL100
Embedded Blue®
AL100
Industrial GbE Switch
ekf.com
DC
9-57V
1000BASE-T
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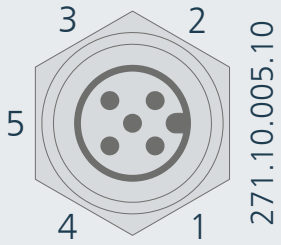
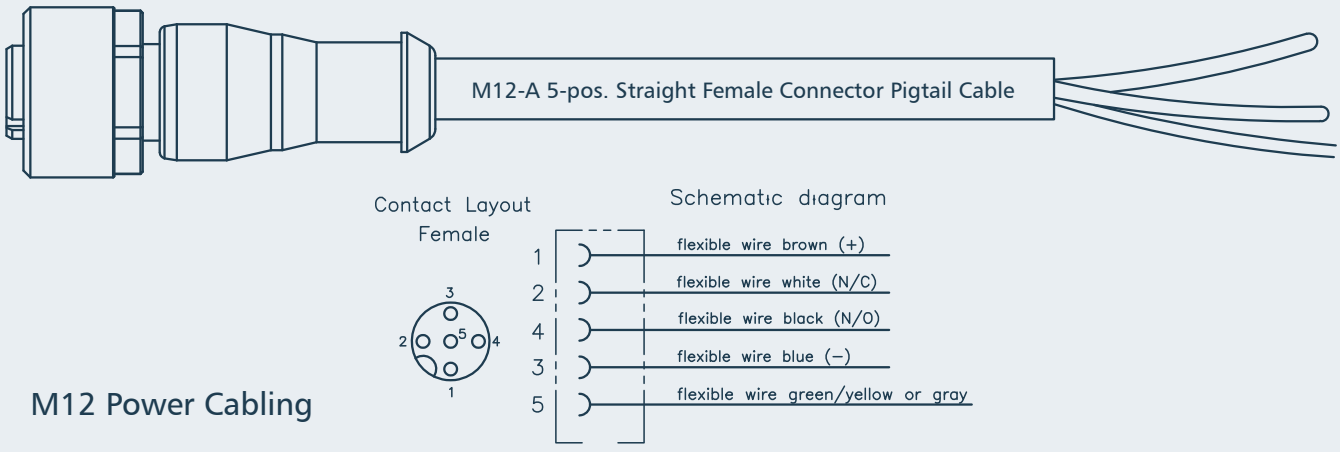
M12 Power Connector Pin Assignment

PCB Connector M12-A 5-Position Male 4A/Pin			
	+V=9-57VDC	1	+V
		2	RSV
		3	GND
		4	RSV
		5	FE (Shield)

Mating Pigtail Cable Assemblies 1.5m w. Female Straight Plug	
EKF	271.10.505.22.015
Phoenix Contact	1669822
Tyco (TE)	2273035-1

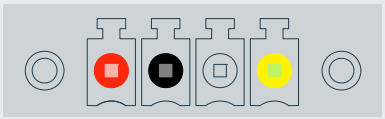


M12 Power Cabling

pre-assembled standard pigtail cables - wires #2 and #4 not in use (reserved)

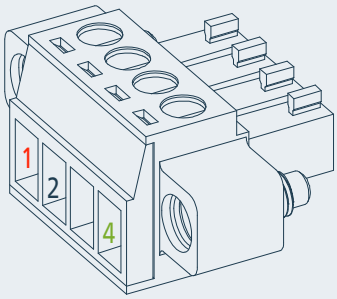
M12 Pigtail Cable

Option Terminal Block Power Connector Pin Assignment

3.50mm 4-Position Terminal Block 8A/Contact			
245.35.04.00  1 2 3 4	+V=9-57VDC pin assignment valid from PCB Rev. 2 off	1	+V
		2	GND
		3	RSV (GND PCB Rev. 1)
		4	FE (Shield)

Mating Plugs w. Screw Lock	
EKF	245.35.04.20
FCI Amphenol	20020000-C041B01LF
Molex	39504-0004
Phoenix Contact	1847071
Tyco	284510-4

Option Terminal Block Plug Power Cabling

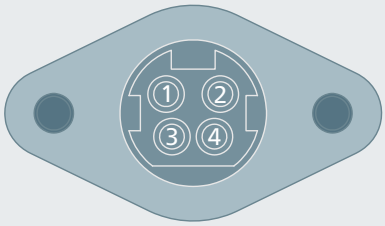


245.35.04.20

pin assignment valid from PCB Rev. 2 off

Mating DIN Rail Power Supply	
EKF	352.1.075.24.1
Meanwell	NDR-75-24, 75W 24VDC/3.2A

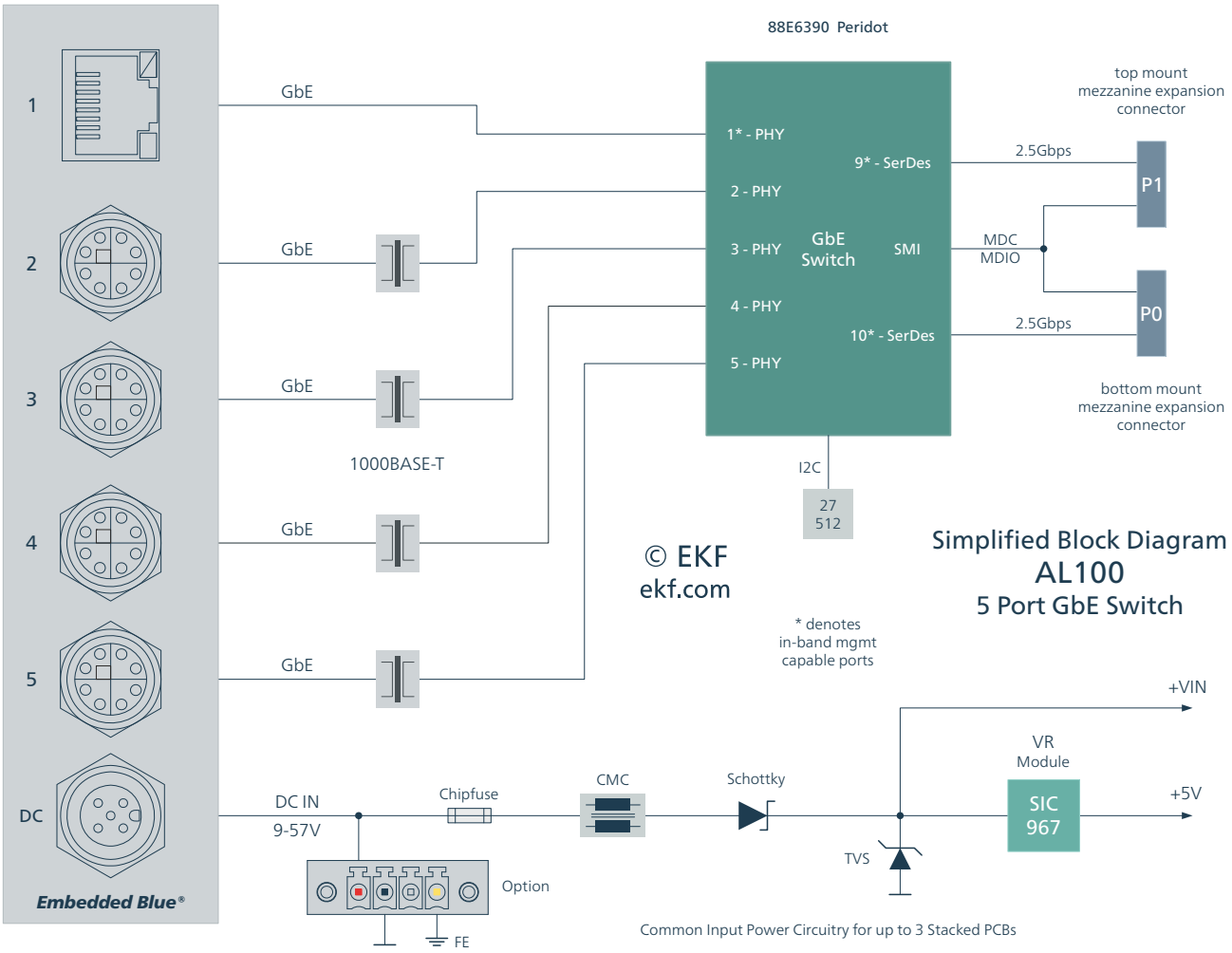
Option Rear Power Connector

Circular 4-Position Power Receptacle (7.5A/Pin)			
 271.04.004.10	+V=9-57VDC	1	+V
		2	+V
		3	-V (GND)
		4	-V (GND)
		Shield	Reserved *

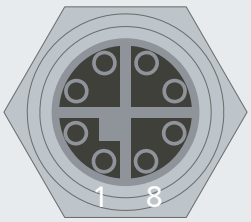
* power supply cable harness may connect GND to Shield

Mating Desktop Power Adapter w. Cable Assy	
EKF	353.1.120.24.1
FSP Technology	FSP120-AAAN3, 120W 24VDC/5A

Block Diagram



M12 X-Coded Receptacles

M12-X Receptacles • Gigabit Ethernet			
271.12.008.00  © EKF • ekf.com Draft - Do Not Scale F/P LEDs tbd	Ports 2-5 7-10 12-15	1	MDX0+
		2	MDX0-
		3	MDX1+
		4	MDX1-
		5	MDX3+
		6	MDX3-
		7	MDX2-
		8	MDX2+

The pin numbers of an M12 X-coded connector do not reflect the RJ45 Gigabit Ethernet signal assignment. For cross-over patch cables M12 to RJ45 please refer to the table below.

M12-X	Signal Colors T568B	RJ45
1	MDX0+ white/orange	1
2	MDX0- orange	2
3	MDX1+ white/green	3
4	MDX1- green	6
5	MDX3+ white/brown	7
6	MDX3- brown	8
7	MDX2- white/blue	5
8	MDX2+ blue	4

Mating Cable Assemblies
Gigabit Ethernet cable M12 to M12: #271.14.008.xx (xx=length/meter)
Gigabit Ethernet cable M12 to RJ-45: #271.15.008.xx (xx=length/meter)

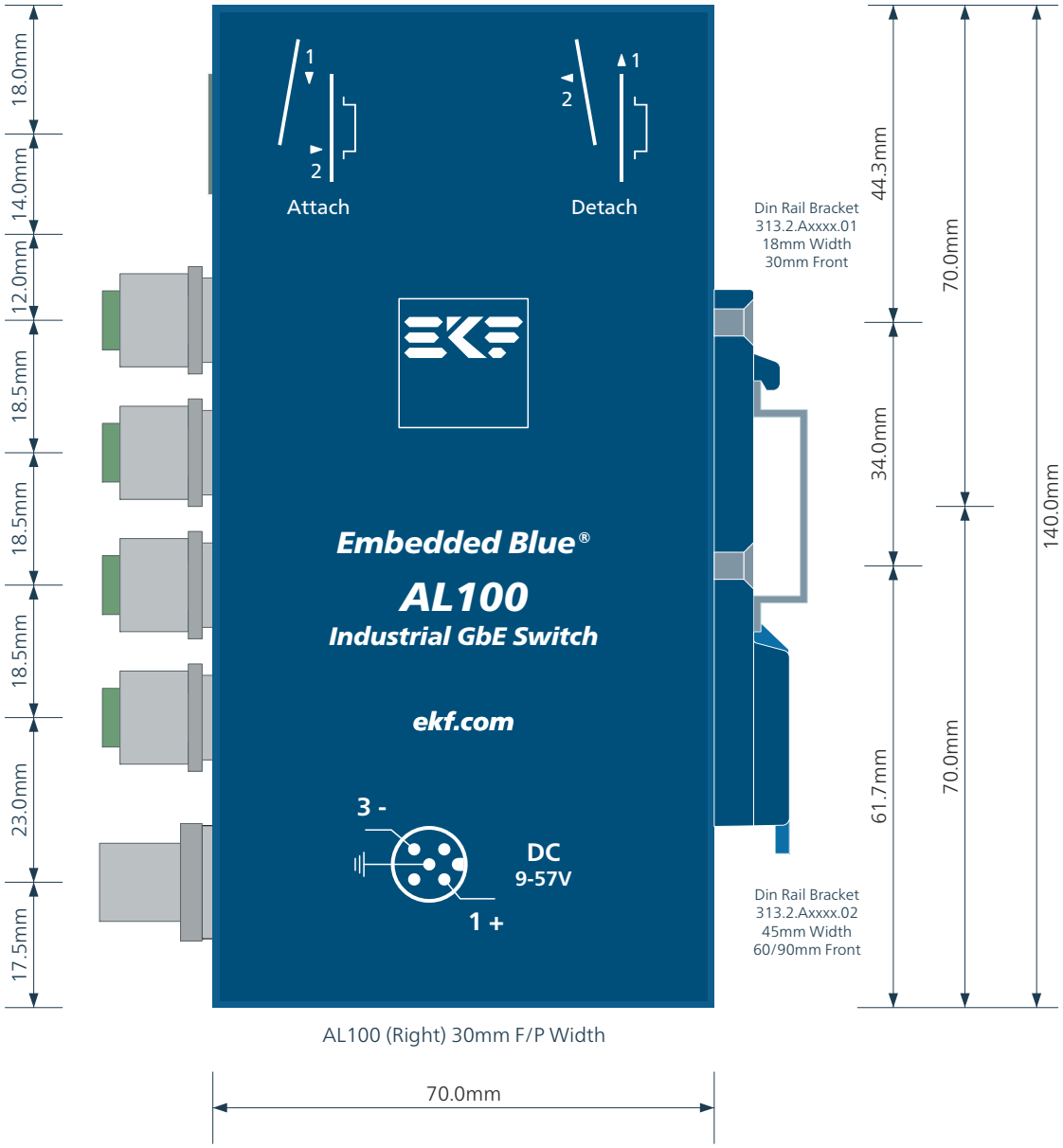
M12 to M12 Cable
Phoenix Contact

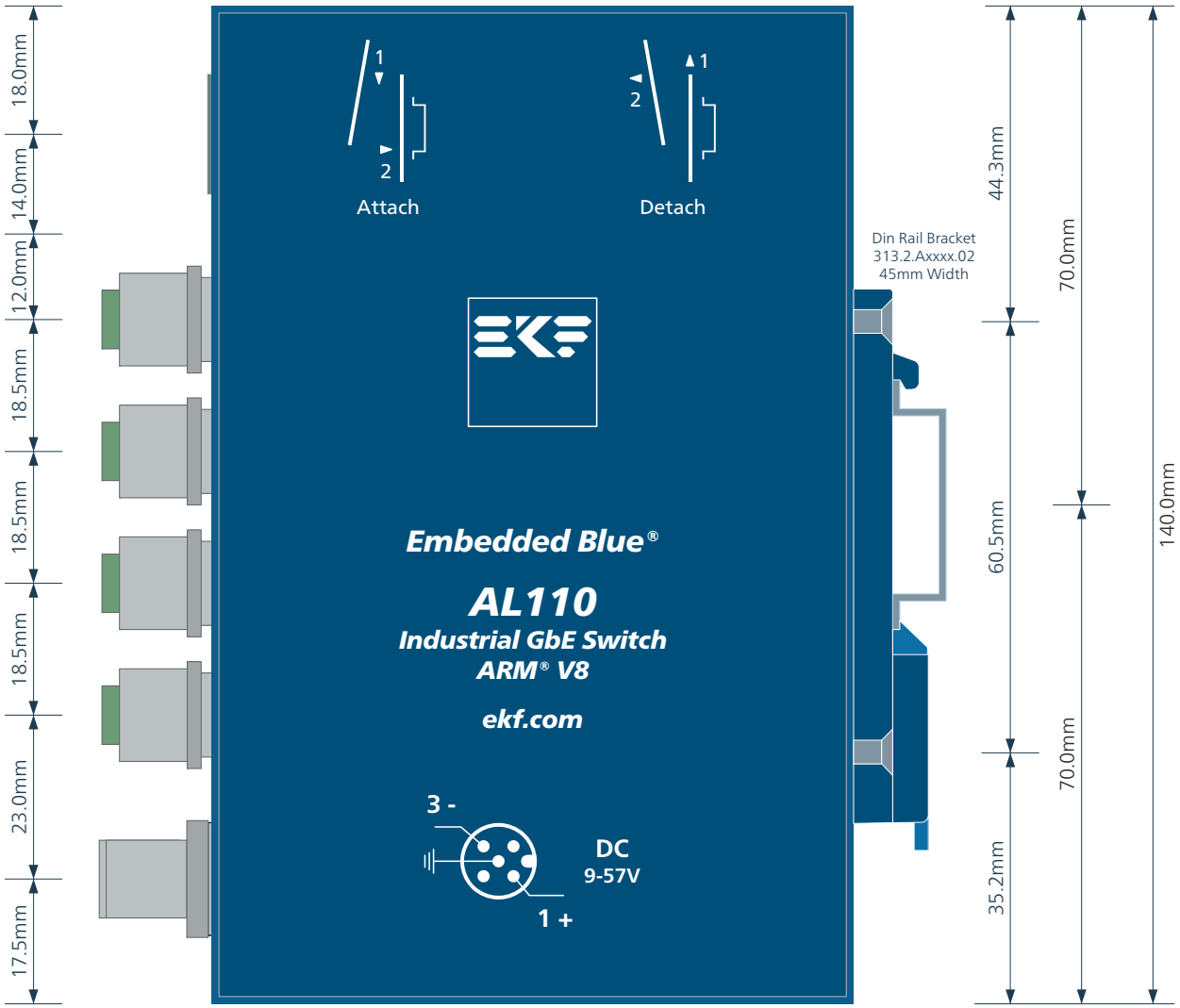
M12 Cable Connector
Phoenix Contact

M12 to RJ45 Cable
Phoenix Contact

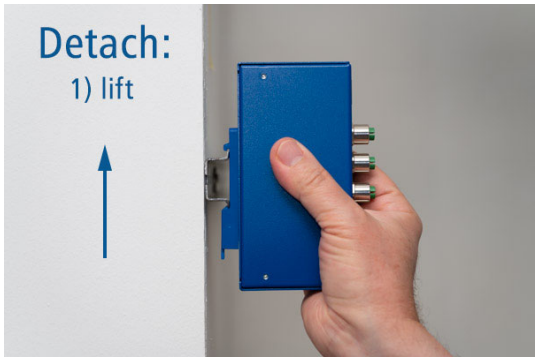
M12 Gigabit Ethernet Cable Assembly

Dimensions


18.0mm
14.0mm
12.0mm
18.5mm
18.5mm
18.5mm
23.0mm
17.5mm
1
2
Attach
1
2
Detach
Embedded Blue®
AL100
Industrial GbE Switch
ekf.com
3 -
DC
9-57V
1 +
Din Rail Bracket
313.2.Axxxx.01
18mm Width
30mm Front
Din Rail Bracket
313.2.Axxxx.02
45mm Width
60/90mm Front
44.3mm
34.0mm
61.7mm
70.0mm
70.0mm
140.0mm
AL100 (Right) 30mm F/P Width
70.0mm



AL110 (Right Side)



https://www.ekf.com/a/DIN_Rail_on_off_500x280.mp4

DIN Rail Mounting Option

Wall Mount Plate Option

Ordering Information

For popular AL100/AL110 SKUs please contact sales@ekf.de

Related Products

AC370	ARM® V8 Industrial Microcontroller
AL100	M12-X 5 to 15 port unmanaged GbE switch
AL110	M12-X 5 port GbE switch w. ARM® V8 CPU
AL200	RJ45 8 port unmanaged GbE switch
AL210	RJ45 8 port GbE switch w. ARM® V8 CPU
AL220	RJ45 8 port unmanaged PoE+ GbE switch
AL230	RJ45 8 port PoE+ GbE switch w. ARM® V8 CPU
AL600	Single Pair Ethernet switch 7x100BASE-T1 (IP20) 1x1000BASE-T
AL700	Single Pair Ethernet switch 5x100BASE-T1 (M8-Hybrid) 2x1000BASE-T

50 Years
1972 - 2022
boards. systems. solutions.

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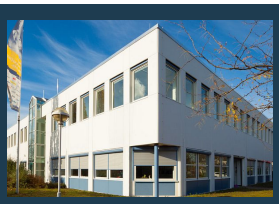
Germany



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