



Highlights

- Comprehensive, modular I/O system for all signal types and fieldbus systems
- Universal product range optimised for EtherCAT
- High investment security: Mature I/O technology based on more than 20 years of success in the field

Fieldbus Components

I/Os for all common fieldbus systems

► www.beckhoff.com/FieldbusComponents

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Fieldbus Box

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Infrastructure Components

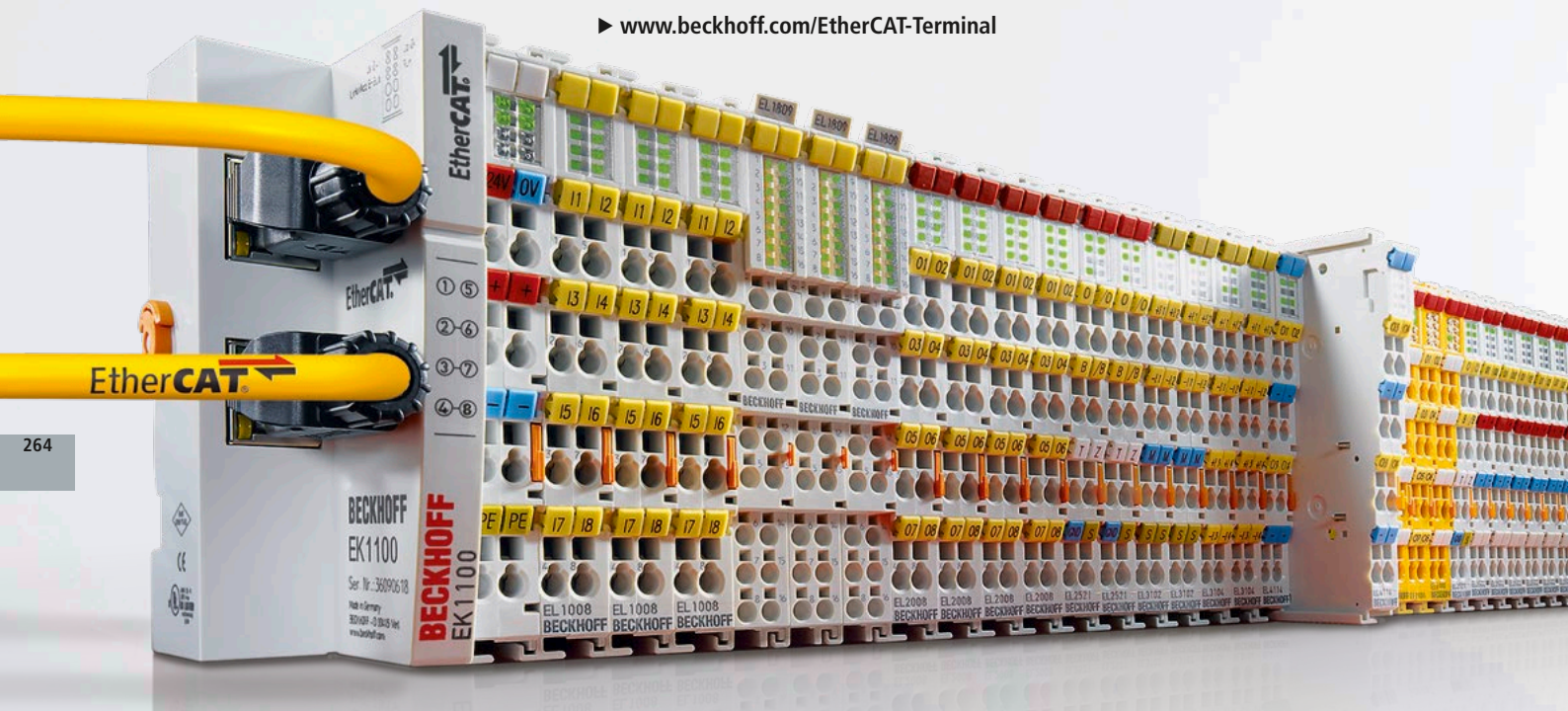
I/O

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EtherCAT Terminals 274

- IP 20 EtherCAT I/O system
- Real-time Ethernet performance retained into each terminal
- Integration of highly precise measurement technology, condition monitoring, drive technology and process technology
- Electronic overcurrent protection
- Gateways for subordinate fieldbus systems
- TwinSAFE PLC and safety I/Os

► www.beckhoff.com/EtherCAT-Terminal



EtherCAT Box 282

- IP 67 EtherCAT I/O system
- High performance for harsh environments
- Compact and robust
- Can be mounted directly on machines, outside of control cabinets and terminal boxes
- Integrated sensor/actuator supply directly via EtherCAT P

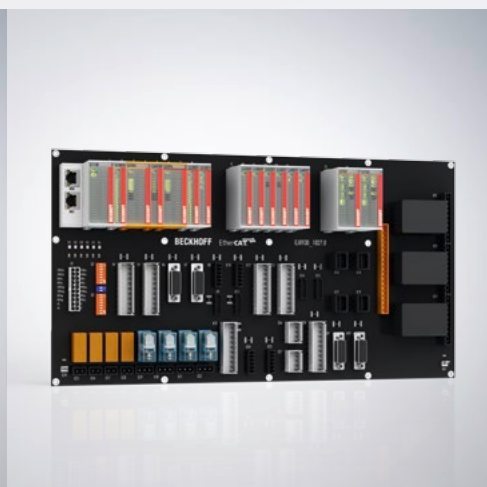
► www.beckhoff.com/EtherCAT-Box
 ► www.beckhoff.com/EtherCAT-P-Box



EtherCAT Plug-in Modules 290

- Very compact EtherCAT I/O system in IP 20 for plug-in into a circuit board (signal distribution board)
- Optimised for high-volume production
- Application-specific connector interface
- Use of cable harnesses avoids wiring errors.

► www.beckhoff.com/EtherCAT-Plug-in-Modules



Bus Terminals 292

- Open, fieldbus-neutral IP 20 I/O system
- More than 400 different Bus Terminals
- Support for more than 20 fieldbus systems
- Gateways for subordinate bus systems
- System-integrated safety I/O terminals available

► www.beckhoff.com/BusTerminal



The I/O Company

Beckhoff supplies a complete range of fieldbus components for all common I/O and bus systems. With Bus Terminals offering IP 20 protection and Fieldbus Box modules in IP 67, a comprehensive range of devices is available for a wide variety of signal types and fieldbus systems. In addition to components for conventional bus systems, Beckhoff offers an integrated product range optimised for EtherCAT. Invented by Beckhoff, this real-time Ethernet solution for industrial automation has global acceptance and is characterised by outstanding performance and simple handling. The result is high-precision machine and plant control and significantly increased production efficiency.

► www.beckhoff.com/IO

► www.beckhoff.com/EtherCAT

Fieldbus Box 302

- Open, fieldbus-neutral IP 67 I/O system
- 12 fieldbus systems, 24 signal types
- Compact and robust
- Can be mounted directly on machines, outside of control cabinets and terminal boxes while reducing machine footprint
- IO-Link box modules for inexpensive point-to-point connections

► www.beckhoff.com/FieldbusBox

Infrastructure Components 305

- PC cards for all common fieldbus systems
- Industrial Ethernet switches
- EtherCAT junctions and media converters in IP 20 and IP 67 ratings

► www.beckhoff.com/Infrastructure-components



- Comprehensive, modular I/O system for all signal types and fieldbus systems
- Universal product range optimised for EtherCAT
- High investment security: Mature I/O technology based on more than 20 years of success in the field
- Beckhoff is the I/O pioneer, developing the Bus Terminal concept and EtherCAT.

Modular I/O system for all signal types and fieldbus systems

Beckhoff supplies a complete range of fieldbus components for all common I/O and bus systems. With Bus Terminals offering IP 20 protection and Fieldbus Box modules in IP 67, a comprehensive range of devices is available for a wide variety of signal types and fieldbus systems. In addition to components for conventional bus systems, Beckhoff offers an integrated product range optimised for EtherCAT. Invented by Beckhoff, this real-time Ethernet solution for industrial automation has global acceptance and is characterised by outstanding performance and simple handling. The result is high-precision machine and plant control and significantly increased production efficiency.

EtherCAT

EtherCAT (Ethernet Control Automation Technology) is the Ethernet solution for industrial automation, characterised by outstanding performance and particularly simple handling.

Ethernet

The advantages of Ethernet, such as high data transmission rates, easy methods of integration into existing networks, and a wide range of services and interfaces are also found in the Beckhoff Ethernet products.

Lightbus

This well proven fibre optics bus system from Beckhoff is characterised by particularly good immunity to EMI, easy installation and a very fast, cyclic and deterministic data flow.

PROFIBUS

PROFIBUS is widely used as a fast bus for decentralised peripheral components (PROFIBUS DP). In addition to PROFIBUS DP and FMS, Beckhoff also supports the standard for drive communication, PROFIBUS MC.

PROFINET

PROFINET is the open Industrial Ethernet standard of the PNO (PROFIBUS users organisation). Internationally established IT standards such as TCP/IP are used for communication.

EtherNet/IP

EtherNet/IP is the Industrial Ethernet standard of the ODVA (Open DeviceNet Vendor Association). Ethernet/IP is based on Ethernet TCP/IP and UDP/IP.

CANopen

The effective utilisation of the bus bandwidth allows CANopen to achieve a short system reaction time at comparatively low data rates. The typical advantages of CAN, such as high data security and multi-master capability are retained.

DeviceNet

DeviceNet is a sensor/actuator bus system that originated in the USA, but which meanwhile is increasingly being used in Europe and Asia. DeviceNet is CAN-based (Controller Area Network).

SERCOS

SERCOS was originally developed as a fast fibre optic bus system for drives. Thanks to the Beckhoff SERCOS Bus Coupler, the advantages such as high data rate and short cycle times can now be provided for the I/O peripherals too.

Modbus RTU

Modbus RTU is an open, serial communications protocol based on the master/slave architecture. Since it is extremely easy to implement on all kinds of serial interfaces, it has gained wide acceptance.

Modbus TCP

Due to its open standards Modbus TCP is common for the use of Ethernet in the fields of automation. Modbus TCP has a so called "Well known port (Port 502)", which makes it routable via the Internet.

RS232/RS485

The classic serial interfaces, RS232 and RS485, continue in wide use. The Beckhoff RS485/RS232 I/O modules use a simple, published serial communication protocol that is easy to implement.

IO-Link

IO-Link serves to connect sensors and actuators to the control level by means of an inexpensive point-to-point connection. As an open interface, IO-Link can be integrated in all common fieldbus systems.

EnOcean

EnOcean enables the battery-free transmission of switching signals and measured values and is mainly used in building automation.

BACnet/IP

BACnet (Building Automation Control Network) is a standardised, manufacturer-independent communication protocol for building automation, based on Ethernet. Areas of application include HVAC, lighting control, safety and fire alarm technology.

AS-Interface

AS-Interface connects sensors and actuators with the higher control level via a simple and low-priced wiring method. AS-Interface is internationally standardised through EN 50295 and IEC 62026-2.

DALI

In building automation DALI is a standard for digital control of electronic ballasts for lighting.

EIB/KNX

The local two-wire bus system EIB/KNX for the connection of sensors and actuators has its main area of use in building automation, since it is well suited for implementation in various functionalities.

LON

LON (Local Operating Network) is a multi-network-capable communication system for distributed applications. It is predominately used for automation applications in commercial buildings.

DMX

As bus system for professional lighting equipment DMX (Digital Multiplexing) controls dynamic lighting in stage- and event-business as well as lighting of exclusive displays of light and color in high-profile buildings.

MP-Bus

As simple sensor/actuator bus for HVAC systems the MP-Bus (Multi Point Bus) serves to control flaps and volumetric flow rate controllers alongside valves and window ventilation systems.

SMI

Standard Motor Interface (SMI) is a standard interface for the control of electronic drives for sun blinds and roller shutters e.g. via bus topologies used in building automation.

M-Bus

The M-Bus (Metering Bus) is used as a standardised system for reading energy and consumption meters or other end devices in buildings and properties with a large number of end users (see EN 13757).

IEEE 1588 PTP

The Precision Time Protocol (PTP) secures the synchronicity of the time settings of several devices in a network and is defined in IEEE 1588 as the protocol standard for the synchronisation of distributed clocks in networks.

ControlNet

ControlNet is an open, standardised fieldbus system. The protocol allows both cyclic and acyclic data to be exchanged over the bus without affecting each other.

CC-Link

CC-Link (Control & Communication Link) is an open bus system for communication between the control and fieldbus level. It is predominately used in Asia.

EtherCAT®

Ethernet TCP/IP

LIGHTBUS

LON

DeviceNet™

PROFI®
NET

DMX

EtherNet/IP™

EtherCAT®

ControlNet™

RS232
RS485

INTERBUS

IO-Link

ASI
INTERFACE

sercos
the automation bus

CC-Link

SM

PTP/IEEE 1588

Modbus

DALI

MP-BUS®
MP-BUS COMPATIBLE

M-Bus

enocean®












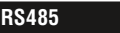
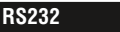




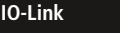





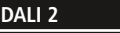
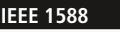




BACnet/IP

CANopen

PROFI®
BUS

EIB/KNX

Product overview fieldbus systems

Fieldbus	EtherCAT Terminal	EtherCAT Box	EtherCAT Plug-in Modules	Bus Terminal		Fieldbus Box	
	Couplers/Gateways	Modules		Bus Couplers/ PLC Master term. (IEC 61131-3)		Compact Box	Coupler Box
 EtherCAT	EK1xxx, EKM1xxx	EPxxxx	EJxxxx	BK1120			IL230x-B110
	EL6695 bridge	ERxxxx		BK1150			
		EQxxxx		BK1250			
 EtherCAT P	EK13xx	EPPxxxx					
		EP1312					
 LIGHTBUS	EL6720 master			BK20x0		IPxxxx-B200	IL230x-B200
 PROFIBUS	EK3100			BK3xx0	BC31x0	IPxxxx-B31x	IL230x-B31x
	EL6731 master/slave			LC3100	BX3100		
 INTERBUS	EL6740 slave			BK40x0		IPxxxx-B400	IL230x-B400
 CANopen	EL6751 master/slave			BK51xx	BC5150	IPxxxx-B51x	IL230x-B51x
				LC5100	BX5100		
 DeviceNet	EL6752 master/slave			BK52x0	BC5250	IPxxxx-B52x	IL230x-B52x
				LC5200	BX5200		
 ControlNet				BK7000			
 CC-Link				BK7150			
 Modbus				BK73x0	BC7300	IPxxxx-B730	IL230x-B730
 sercos				BK7520			
 RS485	EL6021, EL6022	EP600x	EJ6002	BK8000	BC8050	IPxxxx-B800	IL230x-B800
		EPP600x		KL6021	BX8000		
				KL6041			
 RS232	EL6001, EL6002	EP600x	EJ6002	BK8100	BC8150	IPxxxx-B810	IL230x-B810
		EPP600x		KL6001	BX8000		
				KL6031			
 Ethernet TCP/IP	EK9000			BK9xx0	BC9xxx		IL230x-B90x
	EL6601, EL6614				BX9000		
	switch port						
 PROFINET	EK9300	EP9300		BK9xx3			IL230x-B903
	EL6631 RT controller/device						
	EL6632 IRT controller						
 EtherNet/IP	EK9500			BK9xx5			IL230x-B905
	EL6652 master/slave						
 AS-Interface	EL6201			KL62x1			
 IO-Link	EL6224	EP622x,	EJ6224	KL6224			
	master	EPP6228	master	master			
		master					
 EIB/KNX				KL6301			
 LON				KL6401			
 MP-Bus				KL6771			
 M-Bus				KL6781			
 DALI/DSI				KL6811			
 DALI 2				KL6821			
 IEEE 1588	EL6688						
 DMX	EL6851						
 EnOcean				KL658x			
 SMI				KL68x1			
 BACnet	EL6861						

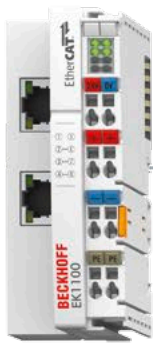
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Product overview signal types

Signal	EtherCAT Terminal		EtherCAT Box		
			Industrial housing	Zinc die-cast housing	Stainless steel housing
Digital input					
5/12/48/60 V DC	EL1xxx				
24 V DC	EL1xxx		EP1xxx	ER1xxx	EQ1xxx
120 V AC/DC	EL1712				
230 V AC	EL17x2				
Safety	EL19xx		EP19xx		
NAMUR					
Thermistor	EL1382				
Counter	EL15x2		EP1518	ER1518	
Digital output					
5 V DC/12 V DC	EL2x24				
24 V DC	EL2xxx		EP2xxx	ER2xxx	EQ2xxx
30 V AC/DC	EL27xx		EP2624	ER2624	
125 V AC/DC					
230 V AC	EL2xxx				
400 V AC					
Safety	EL29xx				
PWM	EL25xx				
Digital combi					
24 V DC	EL1859 EL1259		EP23xx	ER23xx	EQ23xx
Safety					
Analog input					
Multi-function	EL3751				
±10 V, ±20 mA, NAMUR NE43	EL3174				
0...2 V, ±2 V					
0...10 V	EL3x6x		EP31xx	ER31x4	EQ3174
±10 V	EL3x0x		EP31xx	ER31x4	EQ3174
0...20 mA	EL3xxx		EP31xx	ER31x4	EQ3174
4...20 mA	EL3xxx		EP31xx	ER31x4	EQ3174
Resistance thermometer	EL32xx		EP32xx	ER3204	EQ3204
Thermocouple/mV	EL331x		EP3314	ER3314	EQ3314
Measurement bridge	EL335x		EP3356		
Potentiometer	EL3255				
Power meas./Condition Monitor.	EL3xxx	ELM3xxx			
Pressure measurement	EM37xx		EP3744		
Analog output					
0...10 V	EL4x0x		EP4x74	ER4x74	
±10 V	EL4x3x		EP4x74	ER4x74	
24 V DC			EP4378-1022		
0...20 mA	EL4x1x		EP4x74	ER4x74	
4...20 mA	EL4x2x		EP4x74	ER4x74	
Special functions					
SSI sensor interface	EL500x		EP5001		
EnDat 2.2 interface	EL5032				
Incremental encoder interface	EL51xx		EP51x1	ER51x1	
RS232, RS485, TTY, IO-Link	EL60xx		EP6xxx	ER600x	
Motion Control	EL7xxx		EP7xxx	ER7x4x	
Overcurrent protection	EL922x				
Multi-functional			EP8309	ER8309	

	EtherCAT P Box	EtherCAT Plug-in Modules	Bus Terminal		Fieldbus Box	
	Industrial housing		Bus Terminal	Terminal Modules	Compact Box, Coupler/ PLC Box, Extension Box	IO-Link box (industrial/ zinc die-cast housing)
	EPP1xxx	EJ1128 EJ1xxx	KL1124 KL1xxx KL1712 KL17x2 KL1904 KL1352 KL1382 KL15xx	KM1xxx	IP10xx-Bxxx, IE10xx	EPI1xxx, ERI1xxx
	EPP1518	EJ19xx			IP1502-Bxxx, IE1502	
	EPP2xxx EPP2624	EJ2xxx	KL2124 KL2xxx KL27xx KL2612 KL2xxx KL2631 KL2904 KL25xx	KM20xx KM2xxx	IP20xx-Bxxx, IE2xxx	EPI2xxx, ERI2xxx
		EJ29xx			IP2512-Bxxx, IE2512	
	EPP23xx	EJ1859 EJ1957	KL1859		IP/IL23xx-Bxxx, IE23xx IL230x-Cxxx	EPI23xx, ERI23xx
	EPP31x4 EPP31x4 EPP31x4 EPP31x4 EPP3204 EPP3314	EJ3104 EJ3x0x EJ30x8 EJ3318	KL31x2 KL3x6x KL3xxx KL3xxx KL32xx KL331x KL335x		IP3102-Bxxx, IE3102 IP3102-Bxxx, IE3102 IP3112-Bxxx, IE3112 IP3112-Bxxx, IE3112 IP3202-Bxxx, IE3202 IP3312-Bxxx, IE3312	EPI3174, ERI3174 EPI3174, ERI3174 EPI3174, ERI3174 EPI3174, ERI3174
	EPP3744		KL3xxx KM37xx			
	EPP4x74 EPP4x74	EJ4002 EJ413x	KL4x0x KL4xxx	KM4602	IP4132-Bxxx, IE4132 IP4132-Bxxx, IE4132	EPI4374, ERI4374 EPI4374, ERI4374
	EPP4x74 EPP4x74	EJ4018	KL4x1x KL402x		IP4112-Bxxx, IE4112 IP4112-Bxxx, IE4112	EPI4374, ERI4374 EPI4374, ERI4374
		EJ5002	KL50x1		IP5009-Bxxx, IE5009	
	EPP51x1 EPP6xxx EPP7xxx	EJ5101 EJ6xxx EJ7xxx	KL51xx KL60x1 KL25x1		IP5109-Bxxx, IE5109 IP60x2-Bxxx, IE60x2	

System overview EtherCAT I/O



EK EtherCAT Coupler series



EtherCAT Coupler with integrated digital I/Os



Bus Coupler (e.g. PROFIBUS) for EtherCAT Terminals



Embedded PC series CX, further Embedded PCs see page 184

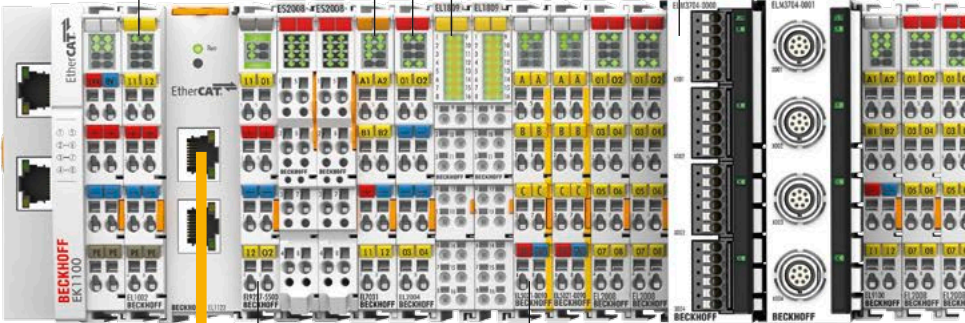
Free mix of signals:
more than 200 different
EtherCAT Terminals enable
connection of all common
sensors and actuators.

Motion terminals
for stepper, servo
or DC motors or
hydraulic valves

EtherCAT Terminals
in 1-, 2-, 4-, 8- and
16-channel modularity

HD EtherCAT Terminals
(high-density) with
16 connection points
offer high packing
density on 12 mm.

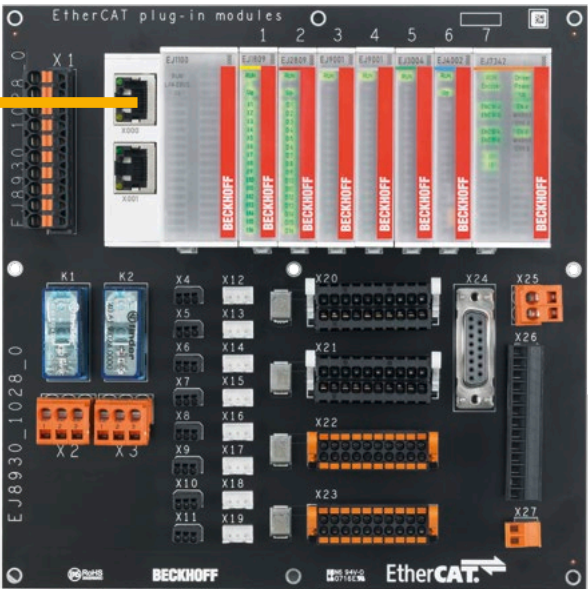
High-end
measurement
technology with
attractive pricing
through series
production, seam-
lessly integrated
into the automa-
tion system.



100 m
Industrial
Ethernet cable
(100BASE-TX)

Integrated electronic
overcurrent protection for
safeguarding of potential
groups incl. monitoring
function

With the aid of the TwinSAFE SC
technology it is possible to make
use of standard signals for safety
tasks in any network or fieldbus.



EtherCAT plug-in
modules: very
compact EtherCAT
I/O system in IP 20
for plug-in into a
circuit board (signal
distribution board)

TwinSAFE: safety I/Os and compact Safety PLC for up to 212 safety-relevant bus devices

Ultra-fast I/O terminals for I/O response times < 100 µs for fast I/O, oversampling and timestamp

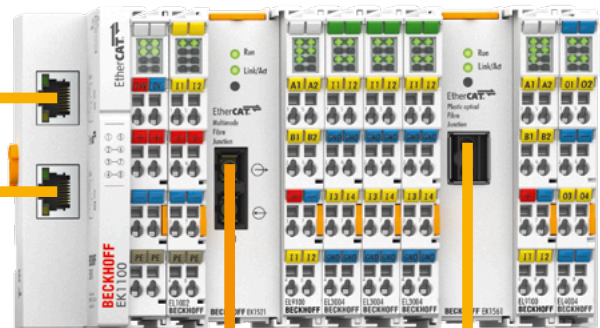
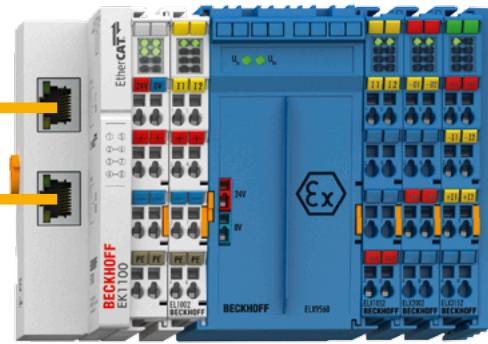
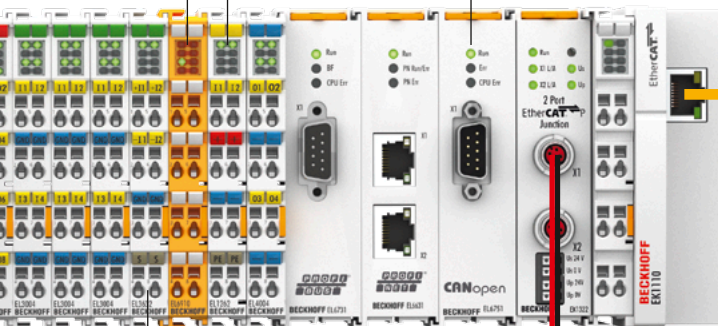
Optional fieldbus integration via decentralised fieldbus master/slave terminals

ELX terminals: direct connection of intrinsically safe sensors and actuators

2000/20,000 m fibre optic (100BASE-FX)

50 m Plastic Optical Fibre (100BASE-FX POF)

High-speed measurement, high-precision measurement, Condition Monitoring, energy monitoring



IP 67
EtherCAT P
Box



IP 67
EtherCAT
Box



IP 69K EtherCAT Box
(stainless steel)



IP 67
EtherCAT Box
(die-cast zinc)

Product overview EtherCAT Terminals



EtherCAT Couplers

EtherCAT Couplers E-bus

EK1100	EK1000 Ethernet/TSN	EK1300 EtherCAT P	EK1101 ID switch	EKM1101 ID switch and diagnostics
EK1101-0080 ID switch, Fast Hot Connect	EK1100-0008 M8 connection	EK1501 ID switch, multimode fibre optic	EK1501-0010 ID switch, singlemode fibre optic	EK1501-0100 ID switch, multimode fibre optic to RJ45
EK1541 ID switch, POF				

EtherCAT Couplers E-bus with integrated digital I/Os

EK1814 4 inputs + 4 outputs	EK1818 8 inputs + 4 outputs	EK1828 4 inputs + 8 outputs	EK1828-0010 8 outputs
EK1914 4 inputs + 4 outputs, 2 safe inputs + 2 safe outputs	EK1960 20 safe inputs + 24 safe outputs		

EtherCAT Couplers K-bus

BK1120	BK1150 "Compact"	BK1250 between E-bus and K-bus terminals
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Bus Couplers (for ELxxxx)

EK3100 PROFIBUS	EK9000 Modbus TCP/UDP	EK9160 IoT	EK9300 PROFINET RT	EK9500 EtherNet/IP
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Extension system and junctions

EK1110 extension end terminal	EK1110-0008 extension end terminal, M8	EK1122 2-port junction	EK1122-0008 2-port junction, M8	EK1122-0080 2-port junction, Fast Hot Connect
EK1310 EtherCAT P extension with feed-in	EK1322 EtherCAT P junction with feed-in	EK1521 multimode fibre optic junction	EK1521-0010 singlemode fibre optic junction	EK1561 POF junction

EtherCAT Terminal | Digital input 24 V DC: EL1xxx/ES1xxx

Signal	2-channel	4-channel	8-channel	16-channel
Filter 3.0 ms	EL1002 type 3	EL1004 type 3	EL1004-0020 > 2500 V	EL1008 type 3, 1-wire
		EL1104 with sensor supply, type 3	EL1804 8 x 24 V, 4 x 0 V, type 3, 3-wire	EL1808 8 x 24 V DC, type 3, 2-wire
		EL1084 ground switching	EL1024 type 2	EL1852 type 3, 8 inputs, 8 outputs, $I_{\max} = 0.5 \text{ A}$, flat ribbon cable
			EL1859 type 3, 8 inputs, 8 outputs, $I_{\max} = 0.5 \text{ A}$	EL1862 flat-ribbon cable, type 3
			EL1088 ground switching	EL1862-0010 flat-ribbon cable, ground switching
Filter 10 μs	EL1012 type 3	EL1014 type 3	EL1034 potential-free inputs, type 1	EL1819 type 3
		EL1114 with sensor supply, type 3	EL1814 8 x 24 V, 4 x 0 V, type 3, 3-wire	EL1872 flat-ribbon cable, type 3
			EL1094 ground switching	EL1872-0010 flat-ribbon cable, ground switching
XFC: $T_{\text{ON}}/T_{\text{OFF}} \text{ } 1 \mu\text{s}$	EL1202 fast input, type 3		EL1258 multi-timestamping	
	EL1252 timestamp, type 3		EL1259 8 multi-timestamping inputs and outputs	
	EL1262 type 3, oversampling			
Counter	EL1502 type 1, 100 kHz, 32 bit			
	EL1512 type 1, 1 kHz, 32 bit			
Safe input		EL1904 TwinSAFE, 4 safe inputs	EL2911 TwinSAFE Logic, 4 safe inputs, 1 safe output	EL1918 TwinSAFE Logic, 8 safe inputs

EtherCAT Terminal | Digital input: EL1xxx/ES1xxx/ELX1xxx

Signal	2-channel	4-channel
5 V DC		EL1124 filter 0.05 μs , type 1
12 V DC		EL1144
48 V DC		EL1134 filter 10 μs , type 1
120 V AC/DC	EL1712 power contacts	
120 V DC	EL1712-0020 power contacts	
120...230 V AC	EL1702 power contacts	EL1722 no power contacts
220 V DC	EL1702-0020 power contacts	
Thermistor	EL1382	
NAMUR	EL1052	EL1054
Ex i, NAMUR	ELX1052	

The standard EtherCAT Terminals (ELxxxx) can be optionally ordered as ESxxxx with pluggable wiring level.

EN 61131-2 specification ► www.beckhoff.com/EN61131-2

EtherCAT Terminal | Digital output 24 V DC: EL2xxx/ES2xxx/ELX2xxx

Signal	1-channel	2-channel	4-channel	8-channel	16-channel
I_{max} = 0.5 A		EL2002	EL2004	EL2008	EM2042 D-sub connection
			EL2014 with diagnostics	EL2878-0005 flat-ribbon cable, with diagnostics	EL2872 flat-ribbon cable
				EL2808 8 x 0 V	EL2809
				EL1852 type 3, 8 inputs, 8 outputs, I _{max} = 0.5 A, flat ribbon cable	EL2819 with diagnostics
			EL2084 ground switching	EL2088 ground switching	EL2889 ground switching
				EL1859 8 inputs, 8 outputs, filter 3.0 ms, type 3	EL2872-0010 flat-ribbon cable, ground switching
I_{max} = 2.0 A		EL2022	EL2024	EL2828	
		EL2032 with diagnostics	EL2034 with diagnostics		
I_{max} = ∑ 8.0 A		EL2042 2 x 4.0 A, 1 x 8.0 A			
XFC: T_{ON}/T_{OFF} 1 μs		EL2202 push-pull outputs	EL2212 overexcitation, multi-timestamping	EL1259 8 multi-timestamping inputs and outputs	
		EL2252 timestamp	EL2262 oversampling	EL2258 multi-timestamping	
Ex i		ELX2002			
Safe output	EL2911 TwinSAFE Logic, 4 safe inputs, 1 safe output		EL2904 TwinSAFE, 4 safe outputs		

EtherCAT Terminal | Digital output: EL2xxx/ES2xxx

Signal	2-channel	4-channel	8-channel
5 V DC		EL2124 I _{max} = ±20 mA	
12 V DC		EL2024-0010 I _{max} = 2.0 A	
30 V AC/DC (I_{max} = 2.0 A)		EL2784 EL2794 potential-free	EL2788 EL2798 potential-free
Relay (up to 230 V AC)	EL2602 I _{max} = 5.0 A, make contact, power contacts	EL2622 I _{max} = 5.0 A, make contact, no power contacts	EL2612 I _{max} = 2.0 A, change-over, no power contacts
	EL2602-0010 I _{max} = 5.0 A, make contact, power contacts, contact- protecting switching	EL2622-0010 I _{max} = 5.0 A, make contact, no power contacts, contact- protecting switching	EL2652 I _{max} = 1.0 A, change-over, no power contacts

The standard EtherCAT Terminals (ELxxxx) can be optionally ordered as ESxxxx with pluggable wiring level.

EtherCAT Terminal | Digital output: EL2xxx/ES2xxx

Signal	1-channel	2-channel		
Triac (12...230 V AC)		EL2712 $I_{max} = 0.5 \text{ A}$, power contacts	EL2722 $I_{max} = 1.0 \text{ A}$, mutually locked outputs	EL2732 $I_{max} = 0.5 \text{ A}$, no power contacts
PWM		EL2502 24 V DC, $I_{max} = 0.5 \text{ A}$		
Frequency output	EL2521 1-channel AB, 0...500 kHz, RS422	EL2522 2-channel AB, 1-channel ABC, 0...4 MHz		
	EL2521-0024 1-channel AB, 0...500 kHz, 24 V DC			
Current control	EL2595 LED constant current terminal	EL2535 24 V DC, $I_{max} = \pm 50 \text{ mA}$, $\pm 1 \text{ A}$ or $\pm 2 \text{ A}$	EL2545 50 V DC, $I_{max} = \pm 3.5 \text{ A}$	

EtherCAT Terminal | Analog input: EL3xxx/ES3xxx/ELM3xxx/ELX3xxx

Signal	1-channel		2-channel		4-channel		5-/6-/8-channel
$\pm 10 \text{ V}$	EL3001 single-ended, 12 bit		EL3002 single-ended, 12 bit		EL3004 single-ended, 12 bit		EL3008 single-ended, 12 bit
	EL3101 differential input, 16 bit		EL3102 differential input, 16 bit	EL3602 differential input, 24 bit	EL3104 differential input, 16 bit		
			EL3702 differential input, 16 bit, oversampling				
0...10 V	EL3061 12 bit	EL3161 16 bit	EL3062 12 bit	EL3162 16 bit	EL3064 12 bit	EL3164 16 bit	EL3068 12 bit
0...30 V			EL3062-0030 12 bit				
$\pm 30 \text{ V}...$ $\pm 20 \text{ mV}$			ELM3002 24 bit, 20 ksps, push-in		ELM3004 24 bit, 10 ksps, push-in		
$\pm 200 \text{ mV}$			EL3602-0002 differential input, 24 bit				
$\pm 75 \text{ mV}$			EL3602-0010 differential input, 24 bit				
$\pm 10 \text{ V}/0...$ 20 mA					EL3174 16 bit, NAMUR NE43	EL3174-0002 16 bit, electrically isolated, NAMUR NE43	
					EL3174-0032 16 bit, electrically isolated, NAMUR NE43, $\pm 3 \text{ V}$	EL3174-0090 16 bit, NAMUR NE43, TwinSAFE SC	
			ELM3142 24 bit, 1 ksps, push-in		ELM3144 24 bit, 1 ksps, push-in		ELM3146 24 bit, 1 ksps, push-in
							ELM3148 24 bit, 1 ksps, push-in

EtherCAT Terminal | Analog input: EL3xxx/ES3xxx/ELM3xxx/ELX3xxx

Signal	1-channel		2-channel		4-channel		5-/6-/8-channel
0...20 mA	EL3041 single-ended, 12 bit	EL3141 single-ended, 16 bit	EL3042 single-ended, 12 bit	EL3142 single-ended, 16 bit	EL3044 single-ended, 12 bit	EL3144 single-ended, 16 bit	EL3048 single-ended, 12 bit
	EL3011 differential input, 12 bit	EL3111 differential input, 16 bit	EL3742 differential input, 16 bit, oversampling	EL3012 differential input, 12 bit	EL3014 differential input, 12 bit	EL3114 differential input, 16 bit	
			EL3112 differential input, 16 bit	EL3612 differential input, 24 bit			
4...20 mA	EL3051 single-ended, 12 bit	EL3151 single-ended, 16 bit	EL3052 single-ended, 12 bit	EL3152 single-ended, 16 bit	EL3054 single-ended, 12 bit	EL3154 single-ended, 16 bit	EL3058 single-ended, 12 bit
	EL3021 differential input, 12 bit	EL3121 differential input, 16 bit	EL3022 differential input, 12 bit	EL3122 differential input, 16 bit	EL3024 differential input, 12 bit	EL3124 differential input, 16 bit	
		EL3621-0020 differential input, 24 bit	EL3182 single-ended, 16 bit, HART			EL3124-0090 16 bit, TwinSAFE SC	
Ex i, 0/4...20 mA	ELX3181 4...20 mA, single-ended, 16 bit, HART		ELX3152 single-ended, 16 bit	ELX3152-0090 single-ended, 16 bit, TwinSAFE SC			
±20 mA			EL3112-0011 differential input, 16 bit	ELM3102 24 bit, 20 ksp, NAMUR NE43	ELM3104 24 bit, 10 ksp, NAMUR NE43		
±10 mA			EL3142-0010 single-ended, 16 bit				
Multi-function	EL3751 24 bit, 10 ksp		ELM3702 24 bit, 10 ksp, push-in		ELM3704 24 bit, 10 ksp, push-in	ELM3704-0001 24 bit, 10 ksp, LEMO	
Thermo- couple/mV	EL3311 16 bit		EL3312 16 bit		EL3314 16 bit	EL3314-0090 16 bit, TwinSAFE SC	EL3318 16 bit
					EL3314-0002 24 bit, electrically isolated		
Ex i, thermo- couple/mV			ELX3312 16 bit	ELX3312-0090 16 bit, TwinSAFE SC	ELX3314 16 bit	ELX3314-0090 16 bit, TwinSAFE SC	
Resistance thermometer (RTD)	EL3201 16 bit		EL3202 16 bit		EL3204 2-wire, 16 bit	EL3204-0200 16 bit, universal input for RTD	EL3208 16 bit
					EL3214 3-wire, 16 bit	EL3214-0090 16 bit, TwinSAFE SC	
Ex i, resistance thermometer (RTD)			ELX3202 16 bit	ELX3202-0090 16 bit, TwinSAFE SC	ELX3204 2-wire, 16 bit	ELX3204-0090 2-wire, 16 bit, TwinSAFE SC	
Measurement bridge (SG)	EL3351	EL3356 self-calibration	ELM3502 24 bit, 20 ksp		ELM3504 24 bit, 10 ksp		
	EL3356-0010 24 bit, 10 ksp	EL3356-0090 TwinSAFE SC					
Ex i, measurement bridge (SG)	ELX3351 16 bit	ELX3351-0090 16 bit, TwinSAFE SC					

The standard EtherCAT Terminals (ELxxxx) can be optionally ordered as ESxxxx with pluggable wiring level.

EtherCAT Terminal | Analog input: EL3xxx/ES3xxx/ELM3xxx/ELX3xxx

Signal	1-channel	2-channel	4-channel	5-channel
Measurement technology	EL3681 digital multimeter terminal, 18 bit	EL3692 resistance measurement, 10 mΩ...10 MΩ		EL3255 potentiometer measurement, 5-channel
Condition Monitoring/ IEPE		EL3632 16 bit, 50 ksp/s	ELM3602 24 bit, 50 ksp/s	ELM3604 24 bit, 20 ksp/s
Pressure measuring	EM3701 differential pressure, ±100 hPa	EM3702 relative pressure, 7500 hPa	EM3712 relative pressure, ±1000 hPa	

EtherCAT Terminal | Analog input 3-phase power measurement terminal: EL3xxx

Signal	≤ 500 V					> 500 V	
Power measurement	EL3403 500 V AC, 1 A	EL3423 480 V AC/DC, 1 A, Economy	EL3433 500 V AC, 10 A	EL3443 480 V AC/DC, 1 A, extended functionality	EL3443-0010 480 V AC/DC, 5 A, extended functionality	EL3413 690 V AC, 5 A	EL3453 690 V AC, 5 A, extended functionality
	EL3483 480 V AC/DC, mains monitor						
Power monitoring	EL3773 500 V AC/DC, 10 ksp/s					EL3783 690 V AC, 20 ksp/s	

EtherCAT Terminal | Analog output: EL4xxx/ES4xxx/ELX4xxx

Signal	1-channel	2-channel	4-channel	8-channel		
0...10 V	EL4001 12 bit	EL4002 12 bit	EL4102 16 bit	EL4004 12 bit	EL4104 16 bit	EL4008 12 bit
±10 V	EL4031 12 bit	EL4032 12 bit	EL4132 16 bit	EL4034 12 bit	EL4134 16 bit	EL4038 12 bit
		EL4732 16 bit, oversampling				
0...20 mA	EL4011 12 bit	EL4012 12 bit	EL4112 16 bit	EL4014 12 bit	EL4114 16 bit	EL4018 12 bit
		EL4712 16 bit, oversampling				
4...20 mA	EL4021 12 bit	EL4022 12 bit	EL4024 12 bit	EL4028 12 bit		
		EL4122 16 bit	EL4124 16 bit			
Ex i, 0/4...20 mA	ELX4181 16 bit, HART					
±10 mA		EL4112-0010 16 bit				

EtherCAT Terminal | Position measurement: EL5xxx/ES5xxx/ELX5xxx

Signal	1-channel			2-channel	
Absolute encoder	EL5001 SSI encoder interface	EL5001-0011 SSI monitor terminal	EL5001-0090 SSI encoder interface, TwinSAFE SC	EL5002 SSI encoder interface	EL5032 EnDat 2.2 interface
				EL5032-0090 EnDat 2.2 interface, TwinSAFE SC	EL5042 BiSS-C interface, unidirectional
Incremental encoder	EL5151 incremental encoder interface 24 V DC	EL5151-0021 incremental encoder interface 24 V DC, parameterisable 24 V DC output	EL5151-0090 incremental encoder interface 24 V DC, TwinSAFE SC	EL5152 incremental encoder interface 24 V DC	
	EL5101 incremental encoder interface, RS422, 4 million increments/s	EL5101-0010 incremental encoder interface, RS422, 20 million increments/s	EL5101-0011 incremental encoder interface, RS422, oversampling	EL5101-0090 incremental encoder interface, RS422, TwinSAFE SC	
	EL5021 SinCos encoder interface, 1 V _{PP}	EL5021-0090 SinCos encoder interface, 1 V _{PP} , TwinSAFE SC			
Ex i, incremental encoder	ELX5151 incremental encoder interface NAMUR	ELX5151-0090 incremental encoder interface NAMUR, TwinSAFE SC			

EtherCAT Terminal | Communication: EL6xxx/ES6xxx

Signal	1-channel			2-channel		4-channel
System	EL6090 display terminal	EL6070 license key terminal	EL6080 memory terminal 128 kbyte			
Serial	EL6001 RS232, 115.2 kbaud	EL6021 RS422/RS485, 115.2 kbaud		EL6002 RS232, 115.2 kbaud, D-sub	EL6022 RS422/RS485, 115.2 kbaud, D-sub	
EtherCAT/ Ethernet	EL6601 switch port	EL6688 IEEE 1588 master/slave		EL6692 EtherCAT bridge	EL6695 EtherCAT bridge, high performance	EL6614 switch port
Master	EL6201 AS-Interface	EL6631 PROFINET RT	EL6632 PROFINET IRT			EL6224 IO-Link
	EL6652 EtherNet/IP	EL6720 Lightbus	EL6731 PROFIBUS			EL6224-0090 IO-Link, TwinSAFE SC
	EL6751 CANopen	EL6752 DeviceNet	EL6851 DMX			
	EL6861 BACnet, MS/TP, RS485					
Slave	EL6631-0010 PROFINET RT	EL6652-0010 EtherNet/IP	EL6731-0010 PROFIBUS			
	EL6740-0010 Interbus	EL6751-0010 CANopen	EL6752-0010 DeviceNet			
	EL6851-0010 DMX					
Safety	EL6910 TwinSAFE Logic	EL6900 TwinSAFE Logic	EL6930 TwinSAFE Logic and PROFIsafe gateway			

The standard EtherCAT Terminals (ELxxxx) can be optionally ordered as ESxxxx with pluggable wiring level.

EtherCAT Terminal | Motion: EL7xxx/ES7xxx/EM7xxx

	< 3 A	3...5 A	> 5 A
Servomotor	EL7201-9014 $I_{rms} = 2.8 \text{ A}$, 50 V DC, OCT, STO	EL7211-9014 $I_{rms} = 4.5 \text{ A}$, 50 V DC, OCT, STO	EL7221-9014 $I_{rms} = 7...8 \text{ A}$ with ZB8610, 50 V DC, OCT, STO
	EL7201-0010 $I_{rms} = 2.8 \text{ A}$, 50 V DC, OCT	EL7211-0010 $I_{rms} = 4.5 \text{ A}$, 50 V DC, OCT	ZB8610 fan cartridge for EtherCAT and Bus Terminals
	EL7201 $I_{rms} = 2.8 \text{ A}$, 50 V DC, resolver	EL7211 $I_{rms} = 4.5 \text{ A}$, 50 V DC, resolver	
Stepper motor	EL7031 $I_{max} = 1.5 \text{ A}$, 24 V DC	EL7041 $I_{max} = 5.0 \text{ A}$, 50 V DC, incremental encoder	
	EL7031-0030 $I_{max} = 2.8 \text{ A}$, 24 V DC, 2 AI	EL7041-0052 $I_{max} = 5.0 \text{ A}$, 50 V DC	
	EL7037 $I_{max} = 1.5 \text{ A}$, 24 V DC, incremental encoder, vector control	EL7047 $I_{max} = 5.0 \text{ A}$, 50 V DC, incremental encoder, vector control	
		EL7047-9014 $I_{max} = 5.0 \text{ A}$, 50 V DC, incremental encoder, vector control, STO	
DC motor output stage	EL7332 $I_{max} = 1.0 \text{ A}$, 24 V DC	EL7342 $I_{max} = 3.5 \text{ A}$, 50 V DC, incremental encoder	
		EL7411-9014 $I_{rms} = 4.5 \text{ A}$, 50 V DC, STO	
4-axis interface	EM7004 4 incremental encoders, 32 digital I/Os 24 V DC, 4 analog outputs $\pm 10 \text{ V}$		

EtherCAT Terminal | System terminals: EL9xxx/ES9xxx/ELM9xxx/ELX9xxx

Signal	System				
Components for system bus	EL9011 bus end cover	EL9012 bus end cover for power and E-bus contacts	ELM9012 bus end cover for ELMxxxx, black	ELX9012 bus end cover for ELXxxxx, blue	EL9195 shield terminal
	EL9070 shield terminal	EL9080 isolation terminal			
Potential distribution	EL9180 2 clamping units per power contact	EL9181 2 x 8 terminal points	EL9182 8 x 2 terminal points	EL9183 1 x 16 terminal points	EL9184 8 x 24 V DC, 8 x 0 V DC
	EL9185 4 clamping units at 2 power contacts	EL9186 8 x 24 V DC	EL9187 8 x 0 V DC	EL9188 16 x 24 V DC	EL9189 16 x 0 V DC
Potential supply, 24 V DC	EL9100	EL9110 diagnostics	EL9200 with fuse	EL9210 diagnostics, with fuse	EL9520 AS-Interface potential supply with filter
Potential supply, 120...230 V AC	EL9150 with LED	EL9160 diagnostics	EL9190	EL9250 with fuse, with LED	EL9260 diagnostics, with fuse
	EL9290 with fuse				
Overcurrent protection, 24 V DC	EL9221 1-channel	EL9222 2-channel	EL9227 2-channel, extended functionalities		
Power supply	EL9410 input 24 V DC, output 5 V DC/2 A	ELM9410 input 24 V DC, output 5 V DC/2 A	ELX9410 input 24 V DC, output 5 V DC/1 A	EL9505 input 24 V DC, output 5 V DC/0.5 A	EL9508 input 24 V DC, output 8 V DC/0.5 A
	EL9510 input 24 V DC, output 10 V DC/0.5 A	EL9512 input 24 V DC, output 12 V DC/0.5 A	EL9515 input 24 V DC, output 15 V DC/0.5 A	EL9560 input 24 V DC, output 24 V DC/0.1 A with electrical isolation	ELX9560 power supply, 24 V DC, electrically isolated
Filtering and smoothing	EL9540 surge filter terminal for field supply	EL9550 surge filter terminal for system/field supply	EL9576 brake chopper terminal, up to 72 V DC, 155 μF	ZB8110 external braking resistor	

Product overview

EtherCAT Box



EtherCAT Box Digital I/O						
Input		8 x M8	16 x M8	4 x M12	8 x M12	Other
24 V DC	8-channel filter 3.0 ms	EP1008-0001 ER1008-0001		EP1008-0002 ER1008-0002 EQ1008-0002	EP1008-0022 ER1008-0022	
	8-channel filter 10 µs	EP1018-0001 ER1018-0001		EP1018-0002 ER1018-0002		
	8-channel filter 10 µs, ground switching	EP1098-0001 ER1098-0001				
	8-channel 2-channel timestamp	EP1258-0001 ER1258-0001		EP1258-0002 ER1258-0002		
	8-channel multi-function input			EP1518-0002 ER1518-0002		
	16-channel filter 3.0 ms		EP1809-0021 ER1809-0021		EP1809-0022 ER1809-0022 EQ1809-0022	
	16-channel filter 10 µs		EP1819-0021 ER1819-0021		EP1819-0022 ER1819-0022	
	16-channel filter 10 µs, D-sub, 25-pin					EP1816-0008 EP1816-1008 EP1816-3008 acceleration sensor
Safety	8-channel TwinSAFE, 8 safe inputs			EP1908-0002		
Output		8 x M8	16 x M8	4 x M12	8 x M12	Other
24 V DC	8-channel $I_{max} = 0.5 A$	EP2008-0001 ER2008-0001		EP2008-0002 ER2008-0002 EQ2008-0002	EP2008-0022 ER2008-0022	
	8-channel $I_{max} = 2 A, \Sigma 4 A$	EP2028-0001 ER2028-0001		EP2028-0002 ER2028-0002		
	8-channel $I_{max} = 2.8 A, \Sigma 16 A$				EP2028-0032 ER2028-1032	
	8-channel $I_{max} = 2 A, \Sigma 4 A$, with diagnostics	EP2038-0001 ER2038-0001		EP2038-0002 ER2038-0002		
	16-channel $I_{max} = 0.5 A, \Sigma 4 A$		EP2809-0021 ER2809-0021		EP2809-0022 ER2809-0022 EQ2809-0022	
	16-channel $I_{max} = 0.5 A, \Sigma 4 A$					EP2816-0008 D-sub, 25-pin EP2816-0010 2 x D-sub, 9-pin EP2816-0004 M16, 19-pin EP2816-0003 IP 20 plug
	24-channel $I_{max} = 0.5 A$					EP2817-0008 D-sub, 25-pin
	4-channel relay output			EP2624-0002 ER2624-0002		
25 V AC/ 30 V DC						

EPxxxx: industrial housing in IP 67, ERxxxx: zinc die-cast housing in IP 67, EQxxxx: stainless steel housing in IP 69K

EtherCAT Box Digital I/O						
Combi		8 x M8	16 x M8	4 x M12	8 x M12	Other
24 V DC	8-channel 4 inputs + 4 outputs, filter 3.0 ms, $I_{\max} = 0.5 \text{ A}$	EP2308-0001 ER2308-0001		EP2308-0002 ER2308-0002		
	8-channel 4 inputs + 4 outputs, filter 10 μs , $I_{\max} = 0.5 \text{ A}$	EP2318-0001 ER2318-0001		EP2318-0002 ER2318-0002		
	8-channel 4 inputs + 4 outputs, filter 3.0 ms, $I_{\max} = 2 \text{ A}$	EP2328-0001 ER2328-0001		EP2328-0002 ER2328-0002		
	8-channel 8 inputs/outputs, filter 10 μs , $I_{\max} = 0.5 \text{ A}$	EP2338-0001 ER2338-0001		EP2338-0002 ER2338-0002		
	8-channel 8 inputs/outputs, filter 3.0 ms, $I_{\max} = 0.5 \text{ A}$	EP2338-1001 ER2338-1001		EP2338-1002 ER2338-1002		
	16-channel 16 inputs/outputs, filter 3.0 ms, $I_{\max} = 0.5 \text{ A}$, $\Sigma 4 \text{ A}$		EP2339-0021 ER2339-0021		EP2339-0022 ER2339-0022 EQ2339-0022	
	16-channel 16 inputs/outputs, filter 10 μs , $I_{\max} = 0.5 \text{ A}$, $\Sigma 4 \text{ A}$		EP2349-0021 ER2349-0021		EP2349-0022 ER2349-0022	
	16-channel 8 inputs + 8 outputs, filter 10 μs , $I_{\max} = 0.5 \text{ A}$					EP2316-0008 D-sub, 25-pin EP2316-0003 IP 20 plug
Safety	12-channel TwinSAFE Logic, 8 safe inputs, 4 safe outputs				EP1957-0022	

EtherCAT Box | Analog I/O

Input		M8	M12	Other
±10 V, ±20 mA	2-channel parameterisable, with galvanic isolation, single-ended, 16 bit		EP3162-0002	
±10 V, 0/4...20 mA	4-channel parameterisable, differential inputs, 16 bit		EP3174-0002 ER3174-0002 EQ3174-0002 EP3174-0092 TwinSAFE SC	
	2-channel 2 analog inputs, parameterisable, single-ended, 16 bit, 2 digital control outputs (sink/source type), 24 V DC, short-circuit proof		EP3182-1002	
	4-channel parameterisable, single-ended, 16 bit		EP3184-0002 ER3184-0002 EP3184-1002 2 channels per socket ER3184-1002 2 channels per socket	
Resistance thermometer (RTD)	4-channel PT100, PT200, PT500, PT1000, Ni100, Ni120, Ni1000, 16 bit		EP3204-0002 ER3204-0002 EQ3204-0002	
Thermo-couple/mV	4-channel type J, K, L, B, E, N, R, S, T, U, 16 bit		EP3314-0002 ER3314-0002 EQ3314-0002	
Measuring bridge (SG)	1-channel 24 bit, self-calibration		EP3356-0022	
Condition Monitoring/ IEPE	2-channel	EP3632-0001		
Accelerometers	2-channel 2 x 3 axes			EP3752-0000
Pressure measuring	4-channel differential/absolute pressure measurement, 6 digital inputs, 2 digital outputs	EP3744-0041 4 pressure inputs -1...1 bar (differential pressure to fifth connection) EP3744-1041 4 pressure inputs 0...7 bar (differential pressure to fifth connection)		
Output		M8	M12	Other
±10 V, 0/4...20 mA	4-channel parameterisable, 16 bit		EP4174-0002 ER4174-0002	
Combi		M8	M12	Other
±10 V, 0/4...20 mA	8-channel 4 inputs + 4 outputs, U/I parameterisable per channel, 8 digital I/Os, 24 V DC/3.0 ms		EP4378-1022	
	4-channel 2 inputs + 2 outputs, parameterisable, 16 bit		EP4374-0002 ER4374-0002	

EPxxxx: industrial housing in IP 67, ERxxxx: zinc die-cast housing in IP 67, EQxxxx: stainless steel housing in IP 69K

EtherCAT Box | Special functions

Function		M8	M12	Other
Position measurement	SSI encoder interface 1 MHz, 32 bit		EP5001-0002	
	Incremental encoder interface RS422 32/16 bit, 5 V DC sensor supply		EP5101-0002 ER5101-0002	EP5101-0011 D-sub, 4 million increments/s EP5101-2011 D-sub, 20 million increments/s
	Incremental encoder interface RS422 32/16 bit, 24 V DC sensor supply		EP5101-1002 ER5101-1002	
	Incremental encoder interface 24 V DC 32/16 bit		EP5151-0002 ER5151-0002	
Communication	Serial interface 1-channel, RS232, RS422/RS485, 5 V DC/1 A		EP6001-0002 ER6001-0002	
	Serial interface 2-channel, RS232, RS422/RS485		EP6002-0002 ER6002-0002	
	IO-Link master 4 ports		EP6224-2022 Class A EP6224-3022 Class B	
	IO-Link master 8 ports		EP6228-0022 Class A EP6228-3032 Class B	
Motion	Servomotor module $I_{\text{rms}} = 4.5 \text{ A}$, 50 V DC, OCT, STO			EP7211-9034
	Stepper motor module $I_{\text{max}} = 1.5 \text{ A}$, 50 V DC, incremental encoder		EP7041-1002 ER7041-1002	
	Stepper motor module $I_{\text{max}} = 5 \text{ A}$, 50 V DC, incremental encoder		EP7041-0002 ER7041-0002 EP7041-2002 ER7041-2002 EP7041-3002 ER7041-3002 EP7041-3102	
	DC motor output stage $I_{\text{max}} = 3.5 \text{ A}$, 50 V DC		EP7342-0002 ER7342-0002	
Special functions	Multi-functional I/O box 8 digital inputs/outputs, 2 x tachometer input, 2 x 0/4...20 mA input, 1 x 0/4...20 mA output, 1 x 1.2 A PWM output		EP8309-1022 ER8309-1022	
System	EtherCAT Box 3 decimal ID switches	EP1111-0000		
	EtherCAT junction 2-channel	EP1122-0001		
	EtherCAT P junction 2 ports	EP1312-0001		
	EtherCAT junction 8 ports	EP9128-0021		
	Power distribution 4/4-channel			EP9214-0023 7/8" plug, 7/8" socket
	Power distribution with current measurement/data logging 4/4-channel			EP9224-0023 7/8" plug, 7/8" socket
	1-channel power distribution box ENP to EtherCAT P			EP9221-0057 ENP B17 plug, ENP B17 socket
	4-channel power distribution box ENP to EtherCAT P			EP9224-0037 ENP B17 plug, ENP B17 socket
	PROFINET RT EtherCAT Box EtherCAT Box interface with PROFINET RT		EP9300-0022	
	EtherCAT media converter fibre optic 1-channel			EP9521-0020

Product overview EtherCAT P Box



EtherCAT P Box | Digital I/O

Input		4 x M8	8 x M8	16 x M8	4 x M12	8 x M12	Other
24 V DC	4-channel filter 3.0 ms	EPP1004-0061					
	8-channel filter 3.0 ms		EPP1008-0001		EPP1008-0002	EPP1008-0022	
	8-channel filter 10 µs		EPP1018-0001		EPP1018-0002		
	8-channel 2-channel timestamp		EPP1258-0001		EPP1258-0002		
	8-channel multi-function input				EPP1518-0002		
	16-channel filter 3.0 ms			EPP1809-0021		EPP1809-0022	
	16-channel filter 10 µs			EPP1819-0021		EPP1819-0022	
	16-channel filter 10 µs, D-sub, 25-pin						EPP1816-0008 EPP1816-3008 acceleration sensor
Output		4 x M8	8 x M8	16 x M8	4 x M12	8 x M12	Other
24 V DC	8-channel $I_{max} = 0.5 A, \Sigma 3 A$		EPP2008-0001		EPP2008-0002	EPP2008-0022	
	8-channel $I_{max} = 2 A, \Sigma 3 A$		EPP2028-0001		EPP2028-0002		
	8-channel $I_{max} = 2 A, \Sigma 3 A$, with diagnostics		EPP2038-0001		EPP2038-0002		
	16-channel $I_{max} = 0.5 A, \Sigma 3 A$			EPP2809-0021		EPP2809-0022	
	16-channel $I_{max} = 0.5 A, \Sigma 3 A$						EPP2816-0008 D-sub, 25-pin EPP2816-0010 2 x D-sub, 9-pin EPP2816-0004 M16, 19-pin
	24-channel $I_{max} = 0.5 A$						EPP2817-0008 D-sub, 25-pin
25 V AC/ 30 V DC	4-channel relay output				EPP2624-0002		

EtherCAT P Box Digital I/O							
Combi		4 x M8	8 x M8	16 x M8	4 x M12	8 x M12	Other
24 V DC	4-channel 4 inputs/outputs, filter 10 μ s, $I_{\max} = 0.5$ A, Σ 3 A	EPP2334-0061					
	8-channel 4 inputs + 4 outputs, filter 3.0 ms, $I_{\max} = 0.5$ A		EPP2308-0001		EPP2308-0002		
	8-channel 4 inputs + 4 outputs, filter 10 μ s, $I_{\max} = 0.5$ A		EPP2318-0001		EPP2318-0002		
	8-channel 4 inputs + 4 outputs, filter 3.0 ms, $I_{\max} = 2$ A, Σ 3 A		EPP2328-0001		EPP2328-0002		
	8-channel 8 inputs/outputs, filter 10 μ s, $I_{\max} = 0.5$ A, Σ 3 A		EPP2338-0001		EPP2338-0002		
	8-channel 8 inputs/outputs, filter 3.0 ms, $I_{\max} = 0.5$ A, Σ 3 A		EPP2338-1001		EPP2338-1002		
	16-channel 16 inputs/outputs, filter 3.0 ms, $I_{\max} = 0.5$ A, Σ 3 A			EPP2339-0021		EPP2339-0022	
	16-channel 16 inputs/outputs, filter 10 μ s, $I_{\max} = 0.5$ A, Σ 3 A			EPP2349-0021		EPP2349-0022	
	16-channel 8 inputs + 8 outputs, filter 10 μ s, $I_{\max} = 0.5$ A, Σ 3 A						EPP2316-0008 D-sub, 25-pin EPP2316-0003 IP 20 plug

EtherCAT P Box Analog I/O			
Input		M8	M12
±10 V, 0/4...20 mA	4-channel parameterisable, differential input, 16 bit		EPP3174-0002
	4-channel parameterisable, single-ended, 16 bit		EPP3184-0002
Resistance thermometer (RTD)	4-channel PT100, PT200, PT500, PT1000, Ni100, Ni120, Ni1000, 16 bit		EPP3204-0002
Thermo- couple/mV	4-channel type J, K, L, B, E, N, R, S, T, U, 16 bit		EPP3314-0002
Condition Monitoring/ IEPE	2-channel	EPP3632-0001	
Pressure measuring	4-channel differential/absolute pressure measurement, 6 digital inputs, 2 digital outputs	EPP3744-0041 4 pressure inputs -1...1 bar (differential pressure to fifth connection) EPP3744-1041 4 pressure inputs 0...7 bar (differential pressure to fifth connection)	
Output		M8	M12
±10 V, 0/4...20 mA	4-channel parameterisable, 16 bit		EPP4174-0002
	4-channel 2 inputs + 2 outputs, parameterisable, 16 bit		EPP4374-0002

EtherCAT P Box Special functions				
Function		M8	M12	Other
Position measurement	Incremental encoder interface RS422 32/16 bit, 5 V DC sensor supply		EPP5101-0002	EPP5101-0011 D-sub, 4 million increments/s
	Incremental encoder interface RS422 32/16 bit, 24 V DC sensor supply		EPP5101-1002	
	Incremental encoder interface 24 V DC 32/16 bit		EPP5151-0002	
Communication	Serial interface 1-channel, RS232, RS422/RS485, 5 V DC/1 A		EPP6001-0002	
	Serial interface 2-channel, RS232, RS422/RS485		EPP6002-0002	
	IO-Link master Class A, 8 ports		EPP6228-0022	
Motion	Stepper motor module $I_{max} = 1.5 \text{ A}$, 50 V DC, incremental encoder		EPP7041-1002	
	Stepper motor module $I_{max} = 5.0 \text{ A}$, 50 V DC, incremental encoder		EPP7041-3002	
	DC motor output stage $I_{max} = 3.5 \text{ A}$, 50 V DC		EPP7342-0002	
System	EtherCAT P Box 3 decimal ID switches	EPP1111-0000		
	EtherCAT P junction 3 ports, with feed-in	EPP1322-0001		
	EtherCAT P junction 3 ports, with refresh	EPP1332-0001		
	EtherCAT P junction 3 ports	EPP1342-0001		
	EtherCAT P Box EtherCAT P/EtherCAT connector with power transmission	EPP9001-0060		
	EtherCAT P Box 4 x diagnostics (U_s , U_r , I_s , I_r)	EPP9022-0060		

Product overview EtherCAT Plug-in Modules



EtherCAT Couplers

EtherCAT Couplers E-bus	EJ1100	EJ1101-0022 external: connectors, power supply module and optional ID switches
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EtherCAT Plug-in Modules | Digital input 24 V DC: EJ1xxx

Signal	4-channel	8-channel	16-channel
Filter 10 μ s			EJ1819 type 3
Filter 3.0 ms		EJ1008 type 3 EJ1859 type 3, 8 inputs, 8 outputs	EJ1809 type 3 EJ1889 ground switching
Safe input	EJ1914 TwinSAFE Logic, 4 safe inputs	EJ1918 TwinSAFE Logic, 8 safe inputs EJ1957 TwinSAFE Logic, 8 safe inputs, 4 safe outputs	

EtherCAT Plug-in Modules | Digital input: EJ1xxx

Signal	8-channel
5 V DC/ 3.3 V DC	EJ1128

EtherCAT Plug-in Modules | Digital output 24 V DC: EJ2xxx

Signal	1-channel	2-channel	4-channel	8-channel	16-channel
$I_{max} = 0.5$ A				EJ2008 EJ1859 type 3, 8 inputs, 8 outputs	EJ2809 EJ2889 ground switching
Safe output			EJ2914 TwinSAFE Logic, 4 safe outputs EJ1957 TwinSAFE Logic, 8 safe inputs, 4 safe outputs	EJ2918 TwinSAFE Logic, 8 safe outputs	
PWM	EJ2521-0224 24 V DC, 1 A	EJ2502 24 V DC, 0.5 A			

EtherCAT Plug-in Modules | Digital output: EJ2xxx

Signal	8-channel
5 V DC/ 3.3 V DC	EJ2128

EtherCAT Plug-in Modules | Analog input: EJ3xxx

Signal	2-channel	4-channel	8-channel
± 10 V		EJ3004 single-ended, 12 bit EJ3104 differential input, 16 bit	EJ3108 6 x differential inputs, 2 x single-ended, 16 bit
0...20 mA			EJ3048 single-ended, 12 bit
4...20 mA			EJ3058 single-ended, 12 bit
Thermocouple			EJ3318 type J, K, L...U, 16 bit
Resistance thermometer (RTD)	EJ3202 16 bit	EJ3214 16 bit	

EN 61131-2 specification ► www.beckhoff.com/EN61131-2

EtherCAT Plug-in Modules | Analog output: EJ4xxx

Signal	2-channel	4-channel	8-channel
0...10 V	EJ4002 12 bit		
±10 V	EJ4132 16 bit	EJ4134 16 bit	
0...20 mA			EJ4018 12 bit

EtherCAT Plug-in Modules | Position measurement: EJ5xxx

Signal	1-channel	2-channel
Absolute encoder		EJ5002 SSI encoder interface
Incremental encoder	EJ5101 incremental encoder interface RS422	

EtherCAT Plug-in Modules | Communication: EJ6xxx

Signal	1-channel	2-channel	4-channel
Master		EJ6002 serial interface RS232, RS485 or RS422	EJ6224 IO-Link EJ6224-0090 IO-Link, TwinSAFE SC
Safety	EJ6910 TwinSAFE Logic		

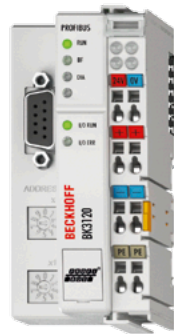
EtherCAT Plug-in Modules | Motion: EJ7xxx

	< 3 A	3...5 A
Servomotor		EJ7211-0010 $I_{ms} = 4.5 \text{ A}$, 50 V DC, OCT EJ7211-9414 $I_{ms} = 4.5 \text{ A}$, 50 V DC, OCT, STO, TwinSAFE SC
Stepper motor	EJ7031 $I_{max} = 1.5 \text{ A}$, 24 V DC	EJ7041-0052 $I_{max} = 5.0 \text{ A}$, 50 V DC EJ7047 $I_{max} = 5.0 \text{ A}$, 50 V DC, incremental encoder, vector control
DC motor output stage		EJ7342 $I_{max} = 3.5 \text{ A}$, 50 V DC, incremental encoder

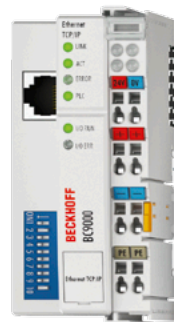
EtherCAT Plug-in Modules | System: EJ9xxx

Signal	Power supply and accessories
Power supply	EJ9400 input 24 V DC, E-bus power supply, 2.5 A EJ9505 input 24 V DC, output 5 V DC, 0.5 A EJ9404 input 24 V DC, E-bus power supply, 12 A
Filtering and smoothing	EJ9576 brake chopper module, up to 72 V DC, 155 µF
System	System EJ9001 placeholder module

System overview fieldbus I/O



Bus Coupler series BK, the link between Bus Terminals and fieldbus



Bus Terminal Controller series BC with integrated IEC 61131-3 PLC



Bus Terminal Controller series BX with integrated IEC 61131-3 PLC and extended interfaces



Embedded PC series CX, further Embedded PCs see page 184

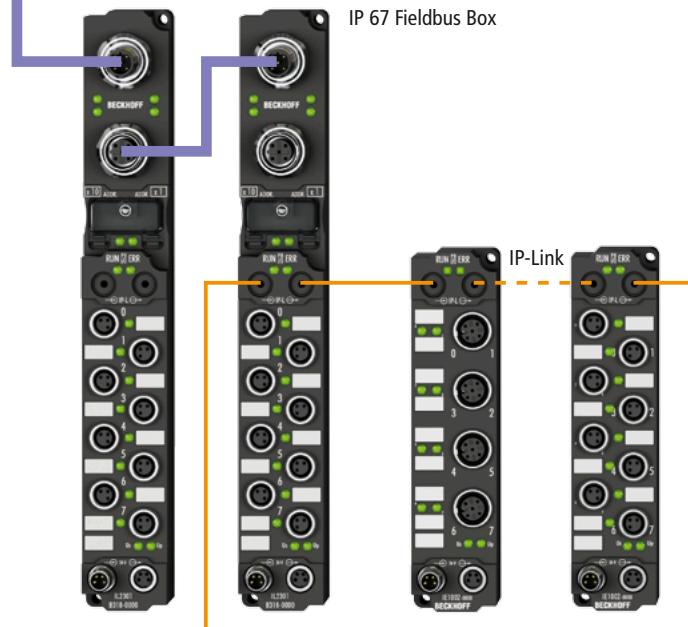
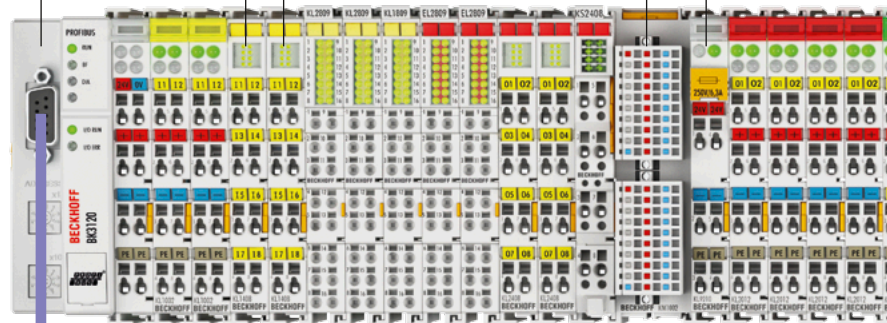
The head station of the Bus Terminals: from Bus Coupler with fieldbus interface to Embedded PC

Free mix of signals: about 400 different Bus Terminals for connection to all common sensors and actuators

Potential feed terminals enable configuration of different potential groups.

Bus Terminals in 1-, 2-, 4-, 8- and 16-channel modularity

The terminal modules with plug-in wiring combine 16, 32 or 64 digital I/Os within a very small space and with high packing density.



IP 67 Fieldbus Box

Compact Box

Coupler Box/
PLC Box

Extension Box modules

3-phase power measurement capability enables all relevant electrical data of the supply network to be measured.

Communication terminals enable the integration of subsystems such as AS-Interface, RS232 and RS485.

Integrated safety: the TwinSAFE Bus Terminals enable the connection of all common safety sensors and actuators.

Bus Terminals with a maximum measurement error of $\pm 0.01\%$

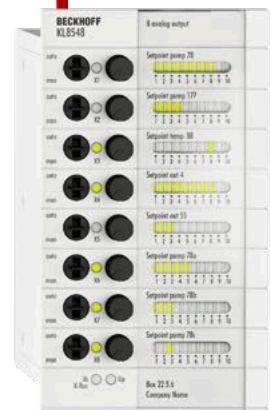
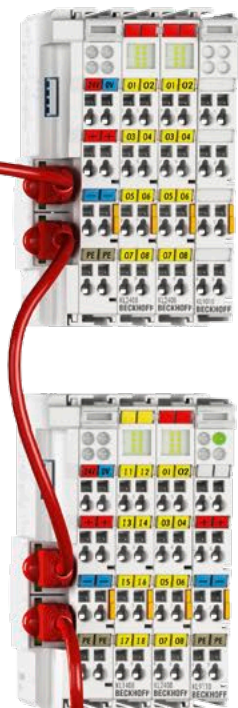
IO-Link box modules



Bus end terminal







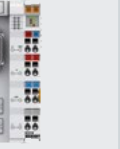









The terminal bus extension enables the connection of up to 255 Bus Terminals (instead of 64) to a single station.



Manual operating modules enable switching, controlling and monitoring of digital and analog signals as well as setting and reading of data and values in the event of a controller failure. Process data connection via K-bus interface with K-bus extension (up to 31 modules). Signal connection via KL9309.

System overview Bus Couplers





	Bus Coupler					PLC		
	Low Cost LCxx00	Economy BKxx10	Standard BKxx00	Economy plus BKxx20	Compact BKxx5x	Controller BCxx00	BCxx50	BCxx20
								
Fieldbus function	fieldbus slave	fieldbus slave	fieldbus slave	fieldbus slave	fieldbus slave	fieldbus slave	fieldbus slave	fieldbus slave
Integrated IEC 61131-3 PLC for	–	–	–	–	–	TwinCAT 2	TwinCAT 2	TwinCAT 2
Performance qualities	–	–	–	–	–	–	–	–
Program memory	–	–	–	–	–	32/96 kbyte	48 kbyte	128 kbyte
Main memory	–	–	–	–	–	–	–	–
Current supply K-bus	500 mA	500 mA	1750 mA	1750 mA	1000 mA	1750 mA	1000 mA	1750 mA
Fieldbus connection technology	direct to the spring-loaded terminals	plug depending on fieldbus	plug depending on fieldbus	plug depending on fieldbus	plug depending on fieldbus	plug depending on fieldbus	plug depending on fieldbus	plug depending on fieldbus
Supported Bus Terminals	all digital I/Os except KL15xx, KL25xx, KL2692, KL27x1	all digital I/Os except KL15xx, KL25xx, KL2692, KL27x1	all	all	all	all	all	all
Max. number of Bus Terminals	64	64	64	255 with terminal bus extension	255 with terminal bus extension	64	255 with terminal bus extension	255 with terminal bus extension
Electrical isolation	PROFIBUS: yes, CANopen and DeviceNet: no	between fieldbus/ power contacts/ supply voltage	between fieldbus/ power contacts/ supply voltage	between fieldbus/ power contacts/ supply voltage	between fieldbus/ power contacts/ supply voltage	between fieldbus/ power contacts/ supply voltage	between fieldbus/ power contacts/ supply voltage	between fieldbus/ power contacts/ supply voltage

		Embedded PC				
BC9191-xxxx	BXxx00	CX80xx	CX81xx	CX9020	CX51xx	
						
Room Controller	fieldbus slave	integrated fieldbus master/slave	integrated fieldbus master/slave	optional fieldbus master/slave	optional fieldbus master/slave	
TwinCAT 2	TwinCAT 2	TwinCAT 2	TwinCAT 3	TwinCAT 2, TwinCAT 3	TwinCAT 2, TwinCAT 3	
Building Automation, integrated I/Os	–	–	–	Motion Control, visualisation	Motion Control, visualisation	
48/128 kbyte	256 kbyte	–	–	–	–	
–	–	64 Mbyte DDR2 RAM	512 Mbyte DDR3 RAM	1 Gbyte DDR3 RAM	2 or 4 Gbyte DDR3 RAM	
200 mA	1450 mA	2000 mA	2000 mA	2000 mA	2000 mA	
2 x RJ45 (switched)	plug depending on fieldbus	plug depending on fieldbus	plug depending on fieldbus	optional, plug depending on fieldbus	optional, plug depending on fieldbus	
all	all	all	all	all	all	
255 with terminal bus extension	255 with terminal bus extension	255 with terminal bus extension	255 with terminal bus extension	255 with terminal bus extension	255 with terminal bus extension	
between mains supply and internal 24 V power supply	between fieldbus/ power contacts/ supply voltage	between supply voltage and fieldbus	between supply voltage and fieldbus	between supply voltage and fieldbus	between supply voltage and fieldbus	

Further Embedded PCs see page 184

Product overview Bus Couplers



Bus Coupler						PLC		
Fieldbus slave	Low Cost	Economy	Standard	Economy plus	Compact	Controller for TwinCAT 2 (IEC 61131-3)		
	only digital I/Os	only digital I/Os				Program memory 32/96 kbyte	Program memory 48 kbyte	Program memory 128 kbyte
EtherCAT 				BK1120	BK1150			
					BK1250			
LIGHTBUS		BK2010	BK2000	BK2020				
PROFI BUS 		BK3010 1.5 Mbaud						
	LC3100 12 Mbaud	BK3110 12 Mbaud	BK3100 12 Mbaud	BK3120 12 Mbaud	BK3150 12 Mbaud	BC3100 12 Mbaud	BC3150 12 Mbaud	
				BK3520 12 Mbaud, fibre optic				
INTERBUS 			BK4000	BK4020				
CANopen	LC5100	BK5110		BK5120	BK5150		BC5150	
					BK5151			
DeviceNet	LC5200	BK5210	BK5200	BK5220	BK5250		BC5250	
ControlNet			BK7000					
CC-Link					BK7150			
Modbus			BK7300		BK7350	BC7300	BC8050	
							BC8150	
sercos the automation bus				BK7520				
RS485			BK8000				BC8050	
RS232			BK8100				BC8150	
Ethernet TCP/IP			BK9000		BK9050	BC9000	BC9050	BC9020
			BK9100 2-channel switch			BC9100 2-channel switch	BC9191 Room Controller	BC9191-0100 Room Controller
								BC9120 2-channel switch
PROFI NET 			BK9103 2-channel switch		BK9053			
EtherNet/IP			BK9105 2-channel switch		BK9055			



		Embedded PC															
Program memory 256 kbyte		CX80xx		CX81xx		CX9020		CX1010		CX50xx		CX51xx		CX1020, CX1030		CX20xx	
		CX8010	200	CX8110	208	optional ⁽²⁾				optional ⁽²⁾		optional ⁽²⁾				optional ⁽²⁾	
								optional ⁽¹⁾						optional ⁽¹⁾			
		CX8030	200			optional ⁽²⁾		optional ⁽¹⁾		optional ⁽²⁾		optional ⁽²⁾		optional ⁽¹⁾		optional ⁽²⁾	
	BX3100 12 Mbaud	CX8031	201			optional ⁽²⁾		optional ⁽¹⁾		optional ⁽²⁾		optional ⁽²⁾		optional ⁽¹⁾		optional ⁽²⁾	
	BX5100	CX8050	201			optional ⁽²⁾		optional ⁽¹⁾		optional ⁽²⁾		optional ⁽²⁾		optional ⁽¹⁾		optional ⁽²⁾	
		CX8051	201			optional ⁽²⁾		optional ⁽¹⁾		optional ⁽²⁾		optional ⁽²⁾		optional ⁽¹⁾		optional ⁽²⁾	
	BX5200																
				optional ⁽³⁾		optional ⁽³⁾		optional ⁽³⁾		optional ⁽³⁾		optional ⁽³⁾		optional ⁽³⁾		optional ⁽³⁾	
	BX8000	CX8080	202	CX8180	208	optional ⁽²⁾		optional ⁽²⁾		optional ⁽²⁾		optional ⁽²⁾		optional ⁽²⁾		optional ⁽²⁾	
	BX8000	CX8080	202	CX8180	208	optional ⁽²⁾		optional ⁽²⁾		optional ⁽²⁾		optional ⁽²⁾		optional ⁽²⁾		optional ⁽²⁾	
	BX9000	CX8090	202	CX8190	208	CX9020	210	CX1010	214	CX5010	220	CX5120	224	CX1020	232	CX2020	246
										CX5020	220	CX5130	226	CX1030	234	CX2030	246
												CX5140	228			CX2040	246
																CX2042	250
																CX2062	250
																CX2072	250
		CX8093	203			optional ⁽²⁾		optional ⁽³⁾		optional ^(2, 3)		optional ^(2, 3)		optional ⁽³⁾		optional ^(2, 3)	
		CX8095	203			optional ⁽²⁾		optional ⁽³⁾		optional ^(2, 3)		optional ^(2, 3)		optional ⁽³⁾		optional ^(2, 3)	

⁽¹⁾ via modular fieldbus interface, ⁽²⁾ via hardware, ⁽³⁾ via software library

Product overview Bus Terminals



Bus Terminal Digital input: KL1xxx/KS1xxx						KM1xxx
Signal	2-channel	4-channel	8-channel	16-channel	4-/16-/32-/64-ch.	
5 V DC		KL1124				
24 V DC (filter 3.0 ms)	KL1002 type 3	KL1104 type 3	KL1304 type 2	KL1408 type 3	KL1809 type 3	
	KL1302 type 2	KL1402 type 3	KL1154 positive/ground switching	KL1184 ground switching	KL1488 ground switching	KL1862 flat-ribbon cable, type 3
	KL1052 positive/ground switching	KL1352 NAMUR	KL1404 4 x 2-wire connection, type 3	KL1804 8 x 24 V, 4 x 0 V, type 3	KL1808 8 x 24 V DC, type 3	KL1889 ground switching
	KL1212 short-circuit protected sensor supply, type 1	KL1362 break-in alarm		KL1859 8 inputs, 8 outputs, type 3, I _{max} = 0.5 A	KL1862-0010 flat-ribbon cable, type 3, ground switching	KL1862 flat-ribbon cable, type 3
24 V DC (filter 0.2 ms)	KL1012 type 3	KL1312 type 2	KL1114 type 3	KL1314 type 2	KL1418 type 3	KL1819 type 3
		KL1412 type 3	KL1164 positive/ground switching	KL1194 ground switching	KL1498 ground switching	KL1872 flat-ribbon cable, type 3
			KL1414 4 x 2-wire connection, type 3	KL1434 4 x 2-wire connection, type 2		
			KL1814 8 x 24 V, 4 x 0 V, type 3			
24 V DC	KL1232 pulse expansion	KL1382 thermistor	KL1904 TwinSAFE, 4 safe inputs			
≥ 48 V DC	KL1032 filter 3.0 ms	KL1712-0060				
120 V AC/DC	KL1712					
230 V AC	KL1702	KL1722 no power contacts	KL1704			
Counter (24 V DC)	KL1501 type 1, 100 kHz, 32 bit	KL1512 type 1, 1 kHz, 16 bit				

Bus Terminal Digital output: KL2xxx/KS2xxx						KM2xxx
Signal	2-channel	4-channel	8-channel	16-channel	16-/32-/64-channel	
5 V DC		KL2124				
24 V DC (I _{max} = 0.5 A)	KL2012	KL2114	KL2408	KL2809		
				KL2819 with diagnostics		KL2809 type 3
	KL2032 reverse voltage protection	KL2184 ground switching	KL2488 ground switching	KL2889 ground switching		KL2819 type 3
		KL2134 reverse voltage protection	KL2808 8 x 0 V	KL2872 flat-ribbon cable		KL2889 type 3
	KL2212 diagnostics, protected sensor supply	KL2404 4 x 2-wire	KL1859 8 inputs, 8 outputs, filter 3.0 ms, type 3	KL2872-0010 flat-ribbon cable, ground switching		KL2872 flat-ribbon cable

The standard Bus Terminals (KLxxxx) can be optionally ordered as KSxxxx with pluggable wiring level.
EN 61131-2 specification ► www.beckhoff.com/EN61131-2

Bus Terminal Digital output: KL2xxx/KS2xxx					KM2xxx
Signal	1-channel	2-channel	4-channel	8-channel	2-/4-channel
24 V DC ($I_{\max} = 2.0 \text{ A}$)		KL2022	KL2424 4 x 2-wire	KL2828 8 x 2-wire	
30 V AC/DC ($I_{\max} = 2.0 \text{ A}$), solid state relay			KL2784		
			KL2794 potential-free	KL2798 potential-free	
24 V DC		KL2442 2 x 4 A/1 x 8 A	KL2904 TwinSAFE, 4 safe outputs		
Relay > 100 V AC	KL2631 400 V AC, make contact	KL2612 125 V AC, change-over			
230 V AC	KL2641 relay, make contact, manual operation, $I_{\max} = 16 \text{ A}$	KL2602 relay, make contact, $I_{\max} = 5 \text{ A}$	KL2622 relay, make contact, no power contacts, $I_{\max} = 5 \text{ A}$	KL2634 relay, make contact, 250 V AC/30 V DC	KM2604 relay, $I_{\max} = 16 \text{ A}$, 4-channel
	KL2751 universal dimmer, 300 W	KL2602-0010 relay, make contact, $I_{\max} = 5 \text{ A}$, contact- protecting switching	KL2622-0010 relay, make contact, no power contacts, $I_{\max} = 5 \text{ A}$, contact-protecting switching		KM2614 relay, $I_{\max} = 16 \text{ A}$, 4-channel, manual operation
	KL2761 universal dimmer, 600 W	KL2652 relay, change-over, $I_{\max} = 5 \text{ A}$	KL2702 solid state relay, $I_{\max} = 0.3 \text{ A}$		KM2774 triac outputs, $I_{\max} = 1.5 \text{ A}$
	KL2701 solid state relay, $I_{\max} = 3 \text{ A}$	KL2712 triac	KL2722 triac, mutually locked outputs		KM2642 relay, $I_{\max} = 6 \text{ A}$, manual/automatic operation, relay state readable
		KL2732 triac, mutually locked outputs, no power contacts	KL2692 cycle monitoring (watchdog)		KM2652 relay, $I_{\max} = 6 \text{ A}$, manual/automatic operation, switch and relay state readable
PWM		KL2502 24 V DC, $I_{\max} = 0.1 \text{ A}$	KL2512 24 V DC, $I_{\max} = 1.5 \text{ A}$, ground switching		
		KL2535 $I_{\max} = \pm 1 \text{ A}$, 24 V DC, current-controlled	KL2545 $I_{\max} = \pm 3.5 \text{ A}$, 50 V DC, current-controlled		
Frequency output	KL2521				

Bus Terminal Motion: KL2xxx/KS2xxx		
	< 3 A	3...5 A
Stepper motor	KL2531 $I_{\max} = 1.5 \text{ A}$, 24 V DC	KL2541 $I_{\max} = 5.0 \text{ A}$, 50 V DC, incremental encoder
DC motor output stage	KL2532 $I_{\max} = 1.0 \text{ A}$, 24 V DC	KL2552 $I_{\max} = 5.0 \text{ A}$, 50 V DC, incremental encoder
	KL2284 reverse switching, $I_{\max} = 2.0 \text{ A}$, 0...24 V DC	
AC motor speed controller	KL2791 230 V AC, 200 VA, 1-phase AC motor	

Bus Terminal Analog input: KL3xxx/KS3xxx, KM3xxx					
Signal	1-channel		2-channel		4-channel
0...2 V, 0...500 mV			KL3172 0...2 V, 16 bit, 0.05 %	KL3172-0500 0...500 mV, 16 bit, 0.05 %	
±2 V				KL3182 16 bit, 0.05 %	
0...10 V	KL3061 single-ended, 12 bit		KL3062 single-ended, 12 bit	KL3162 16 bit, 0.05 %	KL3064 single-ended, 12 bit
					KL3464 single-ended, 12 bit
					KL3468 single-ended, 12 bit
±10 V	KL3001 differential input, 12 bit		KL3002 differential input, 12 bit	KL3102 differential input, 16 bit	KL3404 single-ended, 12 bit
				KL3132 16 bit, 0.05 %	KL3408 single-ended, 12 bit
0...20 mA	KL3011 differential input, 12 bit	KL3041 with sensor supply, 12 bit	KL3012 differential input, 12 bit	KL3112 differential input, 16 bit	KL3044 single-ended, 12 bit
			KL3042 with sensor supply, 12 bit	KL3142 16 bit, 0.05 %	KL3444 single-ended, 12 bit
4...20 mA	KL3021 differential input, 12 bit	KL3051 with sensor supply, 12 bit	KL3022 differential input, 12 bit	KL3122 differential input, 16 bit	KL3054 single-ended, 12 bit
			KL3052 with sensor supply, 12 bit	KL3152 16 bit, 0.05 %	KL3454 single-ended, 12 bit
Resistance thermometer (RTD)	KL3201 PT100...1000, Ni100, 16 bit		KL3202 PT100...1000, Ni100, 16 bit	KL3222 PT100, 4-wire connection, high-precision	KL3204 PT100...1000, Ni100...1000, 2-wire connection
					KL3214 PT100...1000, Ni100...1000, KTY, 3-wire connection
					KL3208-0010 PT1000, Ni1000, NTC 1.8... 100 k, potentiom. 1, 5, 10 kΩ
					KL3228 PT1000, Ni1000
Thermo- couple/mV	KL3311 type J, K, L...U, 16 bit		KL3312 type J, K, L...U, 16 bit		KL3314 type J, K, L...U, 16 bit
Measurement bridge (SG)	KL3351 strain gauge, 16 bit	KL3356 strain gauge, 16 bit, self-calibration			
Oscilloscope	KL3361 ±16 mV		KL3362 ±10 V		
Measurement technology	KL3681 digital multimeter, 18 bit		KL3403 power measurement, 3-phase, 1 A	KL3403-0010 power measurement, 3-phase, 5 A	
Pressure measuring	KM3701 differential pressure, -100...+100 hPa	KM3701-0340 differential pressure, up to 340 hPa	KM3702 relative pressure, 7500 hPa	KM3712 relative pressure, -1000...+1000 hPa	

Bus Terminal Analog output: KL4xxx/KS4xxx					KM4xxx
Signal	1-channel	2-channel	4-channel	8-channel	2-channel
0...10 V	KL4001 12 bit, potential-free output	KL4002 12 bit	KL4004 12 bit, no power contacts		KM4602 12-bit manual/automatic operation
			KL4404 12 bit	KL4408 12 bit	
±10 V	KL4031 12 bit, potential-free output	KL4032 12 bit	KL4034 12 bit, no power contacts		
		KL4132 16 bit	KL4434 12 bit	KL4438 12 bit	
			KL4494 12 bit, 2 x input, 2 x output		
0...20 mA	KL4011 12 bit	KL4012 12 bit	KL4414 12 bit	KL4418 12 bit	
		KL4112 16 bit			
4...20 mA	KL4021 12 bit	KL4022 12 bit	KL4424 12 bit	KL4428 12 bit	

The standard Bus Terminals (KLxxxx) can be optionally ordered as KSxxxx with pluggable wiring level.

Bus Terminal | Special functions: KL5xxx/KS5xxx, KL6xxx/KS6xxx, KL8xxx

Signal				Signal	
Position measurement	KL5001	KL5051	KL5121	Safety	KL6904
	SSI encoder interface	SSI encoder interface, bidirectional	incremental encoder interface with programmable outputs		TwinSAFE Logic Bus Terminal, 4 safe outputs
	KL5101	KL5151	KL5152		
	incremental encoder interface RS422	incremental encoder interface 24 V DC, 1-channel, 32 bit	incremental encoder interface 24 V DC, 2-channel, 32 bit	Manual operation	KL8519
	KL5111				16-channel digital input signal module
	incremental encoder interface 24 V DC				KL8524
Communication	KL6001	KL6031	KL6011	Power terminals	4 x 2-channel digital output, 24 V DC, 0.5 A
	serial interface RS232, 19.2 kbaud	serial interface RS232, 115.2 kbaud	serial interface TTY, 20 mA current loop		KL8528
	KL6051	KL6021	KL6041		8-channel digital output, 24 V DC, 0.5 A
	data exchange terminal, 32 bit	serial interface RS422/RS485, 19.2 kbaud	serial interface RS422/RS485, 115.2 kbaud		KL8548
	KL6023	KL6021-0023	KL6201		8-channel analog output, 0...10 V
	wireless adapter for EnOcean radio technology	RS485 interface for EnOcean signals	AS-Interface master terminal		
	KL6211	KL6224	KL6301		
	AS-Interface master terminal with power contacts	IO-Link master	EIB/KNX Bus Terminal		
	KL6401	KL6581	KL6583	Power terminals	KL8001
	LON Bus Terminal	EnOcean master	EnOcean transmitter/receiver		switching capacity 5.5 kW, nominal current 0.9...9.9 A, connection mechanism for Siemens contactors (Sirius 3R series)
	KL6771	KL6781	KL6811		
	MP-Bus master terminal	M-Bus master terminal	DALI/DSI master and power supply terminal		
	KL6821	KL6831	KL6841		
	DALI 2 multi-master and power supply terminal	SMI terminal, LoVo	SMI terminal, 230 V AC		

Bus Terminal | System terminals: KL9xxx/KS9xxx

Signal	System		Signal	Potential supply	Power supply and accessories
System	KL9010	KL9070	24 V DC	KL9100	KL9400
	bus end terminal	shield terminal			K-bus power supply, 2 A
	KL9020	KL9050		KL9110	KL9505
	terminal bus extension end terminal	terminal bus extension coupler terminal		diagnostics	output 5 V DC, 0.5 A
	KL9060	KL9309		KL9200	KL9508
	adapter terminal for power terminal KL8xxx	adapter terminal for KL85xx manual operating modules		with fuse	output 8 V DC, 0.5 A
	KL9080	KL9195		KL9210	KL9510
	isolation terminal	shield terminal		diagnostics, with fuse	output 10 V DC, 0.5 A
Potential distribution terminals	KL9180	KL9181			KL9512
	2 terminal points per power contact	2 x 8 terminal points			output 12 V DC, 0.5 A
	KL9182	KL9183			KL9515
	8 x 2 terminal points	1 x 16 terminal points			output 15 V DC, 0.5 A
	KL9184	KL9185		KL9520	KL9528
	8 x 24 V DC, 8 x 0 V DC	only 2 power contacts		AS-Interface potential supply	AS-Interface power supply terminal
	KL9186	KL9187			KL9560
	8 x 24 V DC	8 x 0 V DC			output 24 V DC, 0.1 A
	KL9188	KL9189			
	16 x 24 V DC	16 x 0 V DC	50 V DC		KL9570
	KL9380				buffer capacitor terminal, 500 µF
	mains filter, approx. 1 µF		120... 230 V AC	KL9150	
Filter	KL9540	KL9550		KL9160	
	surge filter terminal for field supply	surge filter terminal for system/field supply		diagnostics	
	KL9540-0010			KL9250	
	surge filter field supply for analog terminals			with fuse	
	KL9300	KL9302	Up to 400 V AC	KL9260	
	4 diodes, potential-free	7 diodes, common anode		diagnostics, with fuse	
Diode array	KL9301			KL9190	
	7 diodes, common cathode			with fuse	

Product overview Fieldbus Box



Fieldbus Box	Compact Box		Coupler Box		PLC Box	
Fieldbus	Fieldbus Box without IP-Link interface		Fieldbus Box with IP-Link interface		Controller for TwinCAT 2 (IEC 61131-3) with IP-Link interface	
EtherCAT			IL230x-B110			
LIGHTBUS	IPxxxx-B200		IL230x-B200			
PROFINET	IPxxxx-B310	IPxxxx-B318 with integrated tee-connector	IL230x-B310	IL230x-B318 with integrated tee-connector	IL230x-C310	IL230x-C318 with integrated tee-connector
INTERBUS	IPxxxx-B400		IL230x-B400			
CANopen	IPxxxx-B510	IPxxxx-B518 with integrated tee-connector	IL230x-B510	IL230x-B518 with integrated tee-connector		
DeviceNet	IPxxxx-B520	IPxxxx-B528 with integrated tee-connector	IL230x-B520	IL230x-B528 with integrated tee-connector		
Modbus	IPxxxx-B730		IL230x-B730			
RS485	IPxxxx-B800		IL230x-B800			
RS232	IPxxxx-B810		IL230x-B810		IL230x-C810	
Ethernet TCP/IP			IL230x-B900	IL230x-B901	IL230x-C900	
PROFINET			IL230x-B903			
EtherNet/IP			IL230x-B905			

Fieldbus Box Compact Box and Extension Box: Digital I/O				
Input		8 mm	M8	M12
24 V DC	8-channel filter 3.0 ms	IP1000-Bxxx, IE1000	IP1001-Bxxx, IE1001	IP1002-Bxxx, IE1002
	8-channel filter 0.2 ms	IP1010-Bxxx, IE1010	IP1011-Bxxx, IE1011	IP1012-Bxxx, IE1012
Counter	2-channel up/down counter 24 V DC, 100 kHz			IP1502-Bxxx, IE1502
Output		8 mm	M8	M12
24 V DC	8-channel $I_{max} = 0.5 A$	IP2000-Bxxx, IE2000	IP2001-Bxxx, IE2001	IP2002-Bxxx, IE2002
	8-channel $I_{max} = 2 A, \sum 4 A$	IP2020-Bxxx, IE2020	IP2021-Bxxx, IE2021	IP2022-Bxxx, IE2022
	8-channel $I_{max} = 2 A, \sum 12 A$	IP2040-Bxxx, IE2040	IP2041-Bxxx, IE2041	IP2042-Bxxx, IE2042
	16-channel $I_{max} = 0.5 A, \sum 4 A, D\text{-sub}$			IE2808 IE2808-0001
PWM	2-channel PWM, 24 V DC, $I_{max} = 2.5 A$			IP2512-Bxxx, IE2512

Fieldbus Box | Compact Box, Coupler Box, PLC Box and Extension Box: Digital I/O

Combi		8 mm	M8	M12	Other
24 V DC	8-channel 4 inputs + 4 outputs, filter 3.0 ms, $I_{max} = 0.5$ A	IL2300-Bxxx IL2300-Cxxx IP2300-Bxxx IE2300	IL2301-Bxxx IL2301-Cxxx IP2301-Bxxx IE2301	IL2302-Bxxx IL2302-Cxxx IP2302-Bxxx IE2302	
	8-channel 4 inputs + 4 outputs, filter 0.2 ms, $I_{max} = 0.5$ A	IP2310-Bxxx IE2310	IP2311-Bxxx IE2311	IP2312-Bxxx IE2312	
	8-channel 4 inputs + 4 outputs, filter 3.0 ms, $I_{max} = 2$ A, Σ 4 A	IP2320-Bxxx IE2320	IP2321-Bxxx IE2321	IP2322-Bxxx IE2322	
	8-channel 4 inputs + 4 outputs, filter 0.2 ms, $I_{max} = 2$ A, Σ 4 A	IP2330-Bxxx IE2330	IP2331-Bxxx IE2331	IP2332-Bxxx IE2332	
	16-channel combi inputs/outputs, filter 3.0 ms, $I_{max} = 0.5$ A	IP2400-Bxxx IE2400	IP2401-Bxxx IE2401		IE2403 IP 20 plug

Fieldbus Box | Compact Box and Extension Box: Analog I/O

Input		M12
±10 V	4-channel differential inputs, 16 bit	IP3102-Bxxx, IE3102
0/4...20 mA	4-channel differential inputs, 16 bit	IP3112-Bxxx, IE3112
Resistance thermometer	4-channel PT100, PT200, PT500, PT1000, Ni100, 16 bit	IP3202-Bxxx, IE3202
Thermocouple/mV	4-channel type J, K, L, B, E, N, R, S, T, U, 16 bit	IP3312-Bxxx, IE3312
Output		M12
±10 V	4-channel 16 bit	IP4132-Bxxx, IE4132
0/4...20 mA	4-channel 16 bit	IP4112-Bxxx, IE4112

Fieldbus Box | Compact Box and Extension Box: Special functions

Function		M12	M23
Position measurement	1-channel SSI encoder interface		IP5009-Bxxx, IE5009
	1-channel incremental encoder interface, 1 MHz		IP5109-Bxxx, IE5109
	1-channel SinCos encoder interface		IP5209-Bxxx (1 V _{pp}) IP5209-Bxxx-1000 (11 μA _{pp})
Communication	1-channel serial interface, RS232	IP6002-Bxxx, IE6002	
	1-channel serial interface, 0...20 mA (TTY)	IP6012-Bxxx, IE6012	
	1-channel serial interface, RS422/RS485	IP6022-Bxxx, IE6022	



Fieldbus Box | IO-Link box: Digital I/O

Input		8 x M8	16 x M8	4 x M12	8 x M12
24 V DC	8-channel filter 3.0 ms	EPI1008-0001 ERI1008-0001		EPI1008-0002 ERI1008-0002	
	16-channel filter 3.0 ms		EPI1809-0021 ERI1809-0021		EPI1809-0022 ERI1809-0022
Output		8 x M8	16 x M8	4 x M12	8 x M12
24 V DC	8-channel $I_{max} = 0.5 A$	EPI2008-0001 ERI2008-0001		EPI2008-0002 ERI2008-0002	
	16-channel $I_{max} = 0.5 A, \Sigma 4 A$		EPI2809-0021 ERI2809-0021		EPI2809-0022 ERI2809-0022
Combi		8 x M8	16 x M8	4 x M12	8 x M12
24 V DC	8-channel 8 inputs/outputs, filter 3.0 ms, $I_{max} = 0.5 A$	EPI2338-0001 ERI2338-0001		EPI2338-0002 ERI2338-0002	
	16-channel 16 inputs/outputs, filter 3.0 ms, $I_{max} = 0.5 A, \Sigma 4 A$		EPI2339-0021 ERI2339-0021		EPI2339-0022 ERI2339-0022

Fieldbus Box | IO-Link box: Analog I/O

Input		M12
±10 V, 0/4...20 mA	4-channel parameterisable, differential input, 16 bit	EPI3174-0002 ERI3174-0002
Output		M12
±10 V, 0/4...20 mA	4-channel 2 inputs + 2 outputs, parameterisable, 16 bit	EPI4374-0002 ERI4374-0002

EPIxxxx: industrial housing in IP 67, ERIxxxx: zinc die-cast housing in IP 67

Product overview Infrastructure Components



Ethernet components

	1 Gbit/s	10/100 Mbit/s
Switches	CU2208 8 x RJ45, IP 20	CU2008 8 x RJ45, IP 20
		CU2608 8 x M12 (D-coded), IP 67
		CU2016 16 x RJ45, IP 20
		CU2005 5 x RJ45, IP 20
Port multiplier	CU2508 1 x RJ45 (+ 8 x RJ45: 100 Mbit/s)	
PCI	FC9024-0000 4 x RJ45	FC9004-0000 4 x RJ45
	FC9022-0000 2 x RJ45	FC9002-0000 2 x RJ45
	FC9011-0000 1 x RJ45	FC9001-0010 1 x RJ45
Mini PCI	FC9151-0000 1 x RJ45	FC9051-0000 1 x RJ45

EtherCAT components

	IP 20	IP 67
Junctions	CU1123 3 x RJ45, IP 20	
	CU1124 4 x RJ45, IP 20	
	CU1128 8 x RJ45, IP 20	EP9128-0021 8 x M8, IP 67
Media converters	CU1521-0000 multimode, IP 20	EP9521-0020 multimode, IP 67
	CU1521-0010 singlemode, IP 20	
	CU1561 POF, IP 20	
Slave (PCI)	FC1100 1-channel, IP 20	
	FC1121 1-channel, PCIe, IP 20	

PC Fieldbus Cards

	PCI			Mini PCI	
LIGHTBUS	FC2001-0000 1-channel	FC2002-0000 2-channel			
PROFINET	FC3101-0000 1-channel	FC3101-0002 1-channel, 32 kbyte NOVRAM	FC3121 1-channel, PCIe	FC3151-0000 1-channel	FC3151-0002 1-channel, 128 kbyte NOVRAM
	FC3102-0000 2-channel	FC3102-0002 2-channel, 32 kbyte NOVRAM	FC3122 2-channel, PCIe		
CANopen	FC5101-0000 1-channel	FC5101-0002 1-channel, 32 kbyte NOVRAM	FC5121 1-channel, PCIe	FC5151-0000 1-channel	FC5151-0002 1-channel, 128 kbyte NOVRAM
	FC5102-0000 2-channel	FC5102-0002 2-channel, 32 kbyte NOVRAM	FC5122 2-channel, PCIe		
DeviceNet	FC5201-0000 1-channel	FC5201-0002 1-channel, 32 kbyte NOVRAM		FC5251-0000 1-channel	FC5251-0002 1-channel, 128 kbyte NOVRAM
	FC5202-0000 2-channel	FC5202-0002 2-channel, 32 kbyte NOVRAM			
sercos the automation bus	FC7501-0000 1-channel	FC7502-0000 2-channel		FC7551-0000 1-channel	FC7551-0002 1-channel, 128 kbyte NOVRAM
PROFINET	FC9321-0010 1-channel, IRT device, PCIe	FC9361-0010 1-channel, IRT device, PCIe, compact			