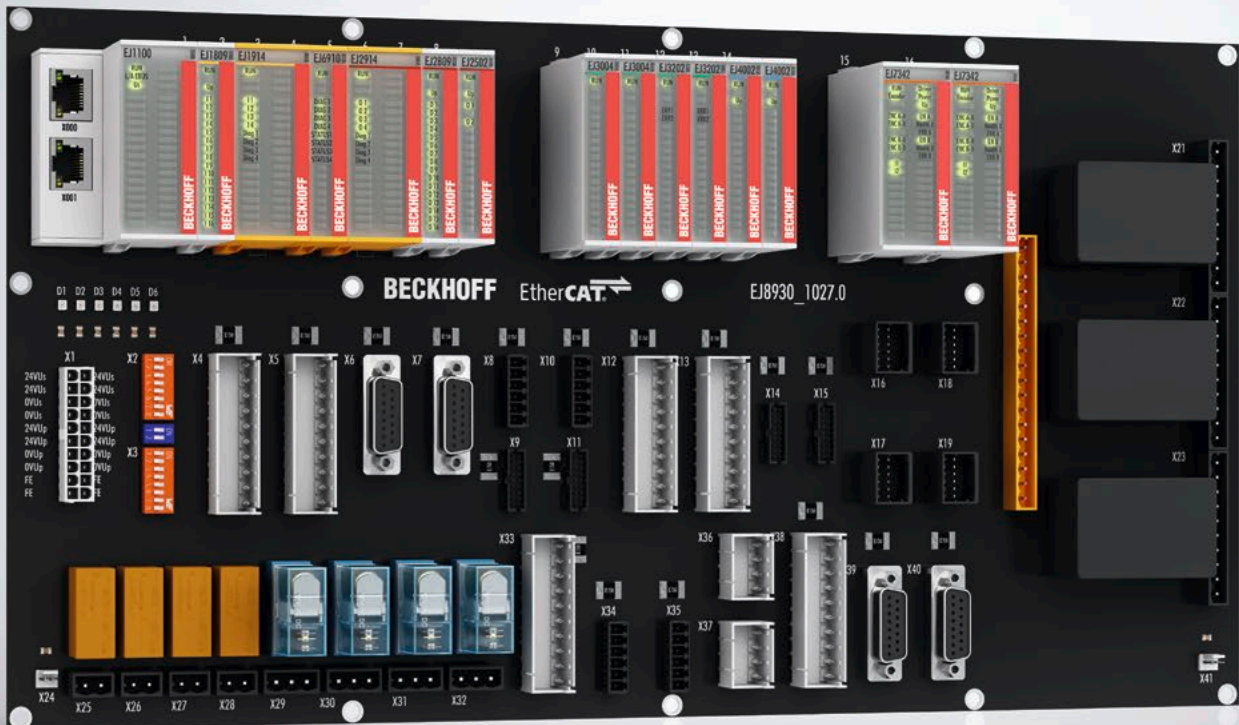


EtherCAT®



Highlights

- 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

EtherCAT Plug-in Modules

Bus Terminals for circuit boards

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

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|-------|-----------------|
| 1 542 | TwinSAFE |
|-------|-----------------|

Product overview EtherCAT Plug-in Modules

EtherCAT Couplers

| | | | | |
|--|--------|-----|-------------|-----|
| EtherCAT Couplers E-bus | EJ1100 | 371 | EJ1101-0022 | 371 |
| external: connectors, power supply module and optional ID switches | | | | |

EtherCAT Plug-in Modules | Digital input 24 V DC: EJ1xxx

| Signal | 4-channel | 8-channel | 16-channel |
|---------------|--|--|-----------------------------|
| Filter 10 µs | | | EJ1819 type 3 373 |
| Filter 3.0 ms | | EJ1008 type 3 372 | EJ1809 type 3 372 |
| | | EJ1859 type 3, 8 inputs, 8 outputs 373 | EJ1889 ground switching 373 |
| Safe input | EJ1914 TwinSAFE Logic, 4 safe inputs 375 | EJ1918 TwinSAFE Logic, 8 safe inputs 375 | |
| | | EJ1957 TwinSAFE Logic, 8 safe inputs, 4 safe outputs 375 | |

EtherCAT Plug-in Modules | Digital input: EJ1xxx

| Signal | 8-channel |
|---------------------|------------|
| 5 V DC/ 3.3 V DC | EJ1128 374 |

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 376 | EJ2809 376 |
| | | | | EJ1859 type 3, 8 inputs, 8 outputs 373 | EJ2889 ground switching 377 |
| Safe output | | | EJ2914 TwinSAFE Logic, 4 safe outputs 379 | EJ2918 TwinSAFE Logic, 8 safe outputs 379 | |
| | | | EJ1957 TwinSAFE Logic, 8 safe inputs, 4 safe outputs 379 | | |
| PWM | EJ2521-0224 24 V DC, 1 A 377 | EJ2502 24 V DC, 0.5 A 377 | | | |

EtherCAT Plug-in Modules | Digital output: EJ2xxx

| Signal | 8-channel |
|---------------------|------------|
| 5 V DC/ 3.3 V DC | EJ2128 378 |

EtherCAT Plug-in Modules | Analog input: EJ3xxx

| Signal | 2-channel | 4-channel | 8-channel |
|------------------------------|-------------------|---------------------------------------|--|
| ±10 V | | EJ3004 single-ended, 12 bit 380 | |
| | | EJ3104 differential input, 16 bit 380 | EJ3108 6 x differential inputs, 2 x single-ended, 16 bit 380 |
| 0...20 mA | | | EJ3048 single-ended, 12 bit 381 |
| 4...20 mA | | | EJ3058 single-ended, 12 bit 381 |
| Thermocouple | | | EJ3318 type J, K, L...U, 16 bit 383 |
| Resistance thermometer (RTD) | EJ3202 16 bit 382 | EJ3214 16 bit 382 | |

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 | 384 | |
| ±10 V | EJ4132 16 bit | 384 EJ4134 16 bit | 384 |
| 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 | 387 |

EtherCAT Plug-in Modules | Communication: EJ6xxx

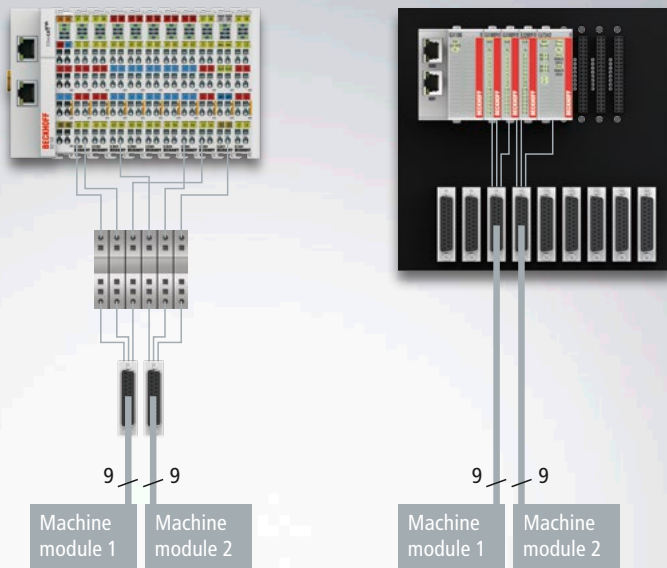
| Signal | 1-channel | 2-channel | 4-channel |
|--------|--------------------------|--|-------------------------------------|
| Master | | EJ6002 serial interface RS232, RS485 or RS422 | EJ6224 IO-Link |
| Safety | EJ6910 TwinSAFE Logic | 388 | EJ6224-0090 IO-Link, TwinSAFE SC |

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 |
| Filtering and smoothing | EJ9576 brake chopper module, up to 72 V DC, 155 µF |
| | System |
| System | EJ9001 placeholder module |



Signal distribution via
single-core wiring

Signal distribution via
signal distribution board

EtherCAT plug-in modules

The EtherCAT I/O plug-in modules are based electronically on the well-known EtherCAT Terminals, and they provide the same broad variety of signals, including functional safety (TwinSAFE). Their electromechanical design enables them to be plugged directly into an application-specific signal distribution board. This routing board distributes signals and power supply to machine modules via prefabricated cables with application-specific plug connectors. The main advantage of the signal distribution board is the highly automated production process, from the manufacture of the circuit board and its assembly through to the inspection. All connector interfaces can be placed on the circuit board according to customer specifications. The connector level, which is matched to the application, considerably optimises the wiring procedure, for example with the use of prefabricated cables and coded plug connectors.

The manufacturing process can be accelerated as far as possible and the risk of wiring errors is minimised. This saves working time and thus costs. It allows production at different worldwide locations with a minimum of risk, since errors are avoided through automation and coding.

The EtherCAT plug-in modules offer an alternative to conventional point-to-point wiring in control cabinets, since they simplify wiring, and reduce the system installation

time and testing costs where machines are manufactured in high numbers.

Compact design for an optimised machine footprint

Similar to the EtherCAT Terminal system, a module strand consists of a Bus Coupler and any desired I/O modules. In contrast to the EtherCAT Terminals, however, the EtherCAT plug-in modules have no spring-loaded contacts, since the wiring level is implemented differently: for communication, signal distribution and the supply of power to the modules plug connectors on the back side of the modules and the conductive tracks of the signal distribution board are used.

Measuring just 12 x 55 x 66 mm, the EJ modules are extremely compact; compared to the EtherCAT Terminals they are almost 50 % smaller in relation to volume. In conjunction with coding holes in the signal distribution board, coding pins on the underside of the EJ modules ensure protection against incorrect plug insertion. Thus, the risk of errors can be minimised during assembly and service.

The EtherCAT plug-in modules and the plug level for sensors and actuators can be placed flexibly on the signal distribution board. The signal distribution board is developed either by the user or as custom solution by Beckhoff.

I/O solution for standard applications

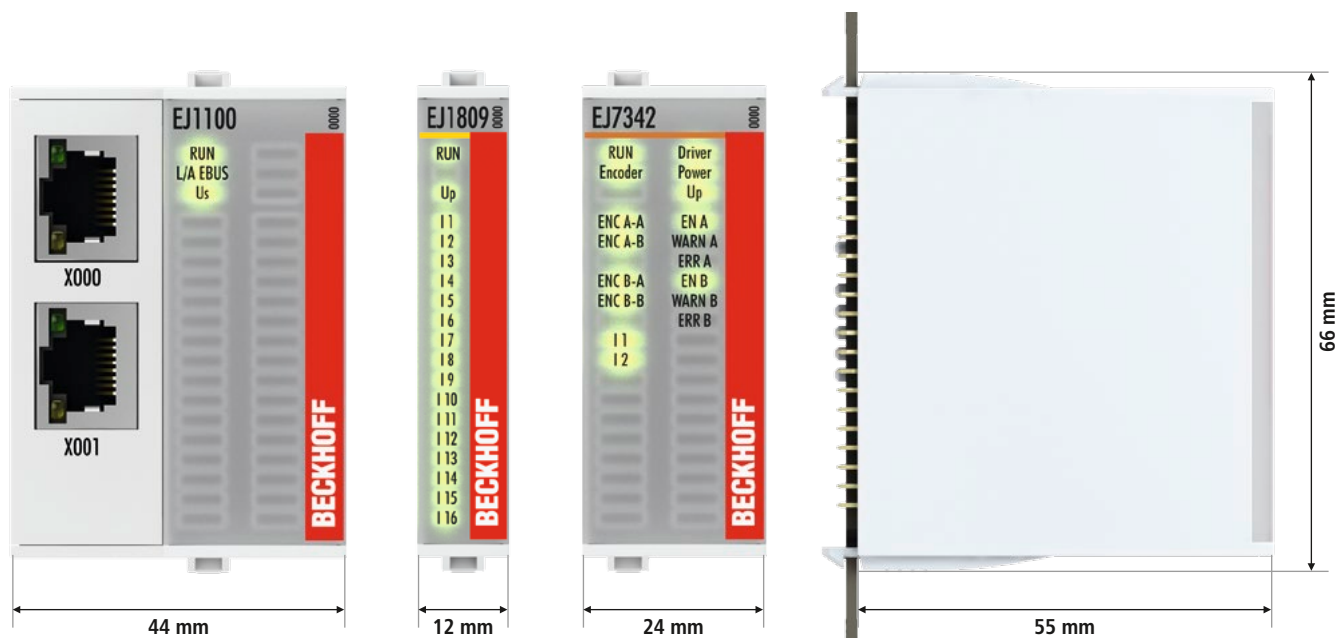
The EJ system supplements the modular Beckhoff I/O portfolio for controllers used in medium to high-volume production of standard machines. It is also suitable for applications where the reduction of error probability is critical for the exact replication of a machine. In general, the use of the EJ system is recommended for machine manufacturers who want to create a platform of common parts across their product range.

In addition, the EJ system directly addresses projects with a shortage of skilled workers. Especially when production facilities are distributed across various locations with different skill levels, the risk of errors increases along with the complexity of the machines. With the combination of I/O modules, signal distribution board and prefabricated cables, the EJ system offers efficient "Plug & Work" solutions for machine controllers.

Signal distribution board

The EtherCAT plug-in modules can be directly attached to a PCB. This application-specific PCB (signal distribution board) distributes signals and power supply to individual application-specific plug connectors, in order to connect the controller to further machine modules.

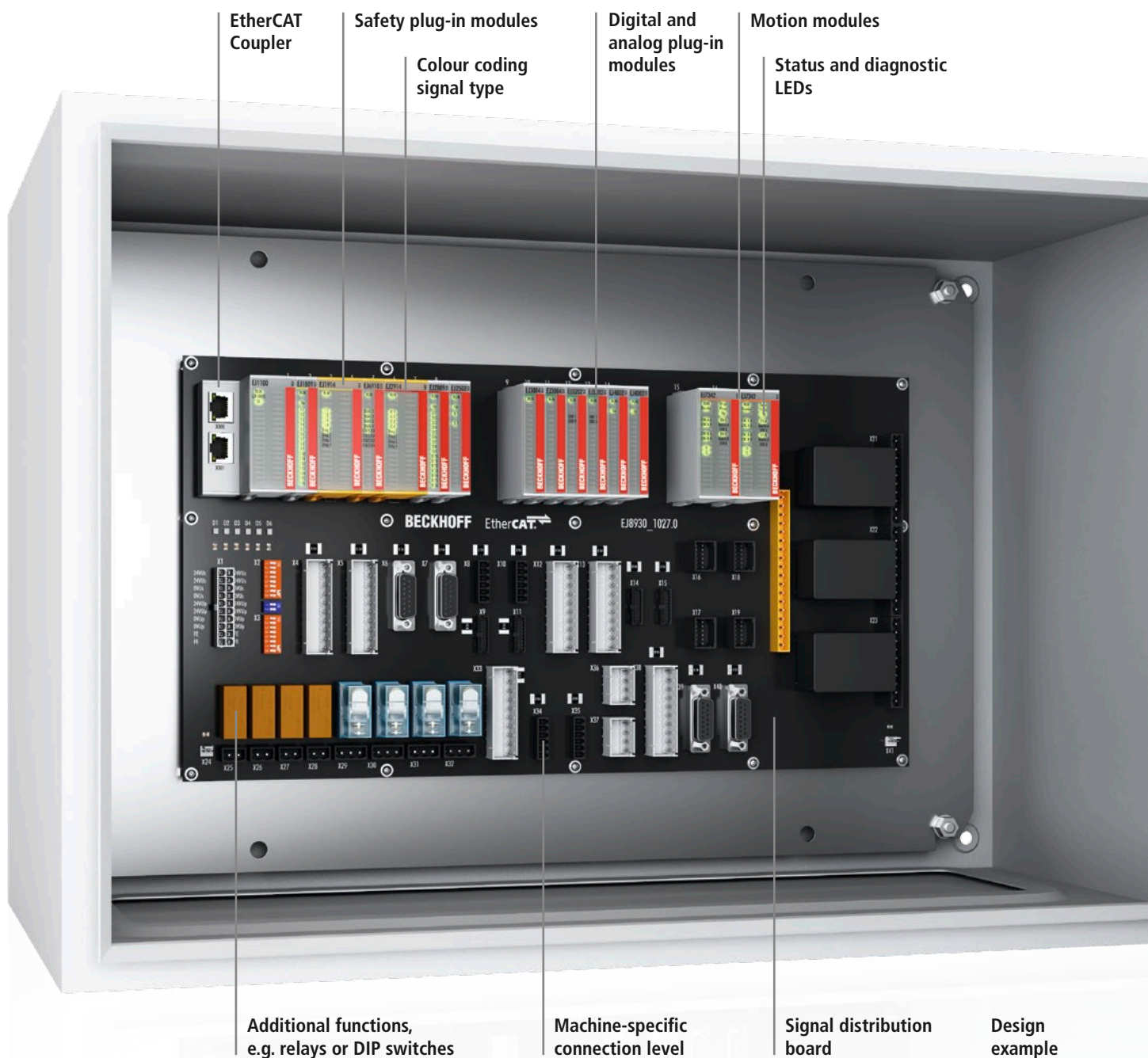
Technical data – EtherCAT plug-in modules



| Technical data | EJ1100 coupler | 12 mm EJ module | 24 mm EJ module |
|--|---|-----------------------|-----------------------|
| Design form | EtherCAT I/O plug-in module | | |
| Material | polycarbonate | | |
| Installation | on signal distribution board | | |
| Mechanical coding | EJ plug-in module: signal-specific coding pins on the housing, signal distribution board: holes in the printed circuit board | | |
| Locking | latching lug in circuit board cut-out | | |
| Connection method | field wiring: application-specific wiring level on the signal distribution board, EJ plug-in module: 2 x 20-pin socket strip | | |
| EtherCAT connection | direct | via EJ11xx coupler | via EJ11xx coupler |
| Electrical isolation | 500 V (E-bus/field potential) | | |
| Supply voltage electronics | 24 V DC (via distribution board) | depending on module | depending on module |
| Supply voltage power | depending on module | | |
| Current supply E-bus | 2200 mA | – | – |
| Bus interface | 2 x RJ45 | – | – |
| Dimensions (W x H x D) | 44 mm x 66 mm x 55 mm | 12 mm x 66 mm x 55 mm | 24 mm x 66 mm x 55 mm |
| Operating/storage temperature | 0...+55 °C/-25...+85 °C | | |
| Relative humidity | 5...95 %, no condensation | | |
| Vibration/shock resistance | conforms to EN 60068-2-6/EN 60068-2-27 | | |
| EMC immunity/emission | conforms to EN 61000-6-2/EN 61000-6-4 (with corresponding signal distribution board) | | |
| Protection class/ installation position | EJ module: IP 20/horizontal, EJ system: depending on signal distribution board and housing | | |

EtherCAT Plug-in Modules

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



EtherCAT Couplers

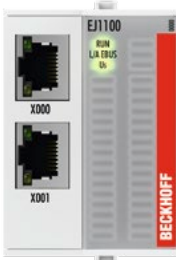
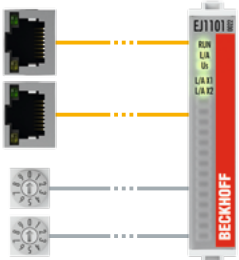
The EJ1100 and EJ1101-0022 couplers connect EtherCAT with the EtherCAT plug-in modules (EJxxxx). They convert the passing telegrams from Ethernet 100BASE-TX to E-bus signal representation.

The couplers are connected to the network via the upper Ethernet interface. The lower RJ45 socket may be used to connect further EtherCAT devices in the same strand.

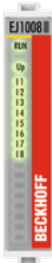

The external RJ45 sockets of the EJ1101-0022 can be installed directly on the signal distribution board. In combination with the external power supply modules EJ9400 (2.5 A) and EJ9404 (12 A), many configurations can be implemented (cabinet feed-throughs, built-in solutions, etc.).



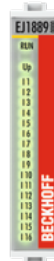
With the EJ1101-0022 a unique ID can be assigned to a group of EtherCAT components via external ID switches. This group can then be located at any position within the EtherCAT network. Variable topologies are therefore easily implementable.

EJ94xx | Power supply plug-in modules see page [395](#)

| | EtherCAT Coupler | EtherCAT Coupler with external connectors, power supply module and optional ID switches |
|---|--|---|
| Technical data | EJ1100 | EJ1101-0022 |
| Task within EtherCAT system | coupling of EtherCAT plug-in modules (EJxxxx) to 100BASE-TX EtherCAT networks | |
| Data transfer rates | 100 Mbaud | |
| |  |  |
| Bus interface | 2 x RJ45 | 2 x RJ45 (external) |
| Type/number of peripheral signals | max. 4.2 GB addressable I/O points | max. 4.2 GB addressable I/O points |
| Data transfer medium | Industrial Ethernet cable (min. Cat. 5), shielded | Industrial Ethernet/EtherCAT cable (min. Cat. 5), shielded |
| Current consumption from U _s | 70 mA + (Σ E-bus current/4) | – |
| Current consumption from U _e | load | – |
| Distance between stations | max. 100 m (100BASE-TX) | max. 100 m (100BASE-TX) |
| Delay | typ. 1 μs | typ. 1 μs |
| Power supply | 24 V DC (-15 %/+20 %) | 24 V DC (-15 %/+20 %) |
| Current consumption E-bus | – | typ. 310 mA |
| Current supply E-bus | 2200 mA | – |
| Operating temperature | 0...+55 °C | 0...+55 °C |
| Approvals | CE, UL | CE, UL |
| Further information | www.beckhoff.com/EJ1100 | www.beckhoff.com/EJ1101-0022 |

Digital input | 24 V DC

| | | |
|------------------------------|--|---|
| | 8-channel digital input, 24 V DC, 3 ms, type 1/3 | 16-channel digital input, 24 V DC, 3 ms, type 1/3 |
| Technical data | EJ1008 | EJ1809 |
| Specification | EN 61131-2, type 1/3 | |
| Input filter | typ. 3.0 ms | |
| Number of inputs | 8 | 16 |
| |  <p>The EJ1008 digital input acquires the binary control signals from the process level and transmits them, in an electrically isolated form, to the higher-level automation unit.</p> |  <p>The EJ1809 digital input acquires the binary control signals from the process level and transmits them, in an electrically isolated form, to the higher-level automation unit.</p> |
| Nominal voltage | 24 V DC (-15 %/+20 %) | 24 V DC (-15 %/+20 %) |
| Current consumption E-bus | typ. 80 mA | typ. 80 mA |
| Distributed clocks | — | — |
| Special features | standard input module for bouncing signals (filter 3 ms) | standard input module with high number of channels (filter 3 ms) |
| Operating temperature | 0...+55 °C | 0...+55 °C |
| Approvals | CE, UL | CE, UL |
| Further information | www.beckhoff.com/EJ1008 | www.beckhoff.com/EJ1809 |



| | | | |
|--|--|---|--|
| | 16-channel digital input, 24 V DC, 10 µs, type 1/3 | 8-channel digital input + 8-channel digital output, 24 V DC, 3 ms, type 1/3 | 16-channel digital input, 24 V DC, 3 ms, ground switching |
| | EJ1819 | EJ1859 | EJ1889 |
| | | | ground switching "0": 18...30 V DC, "1": 0...7 V DC, typ. 3 mA input current |
| | typ. 10 µs | typ. 3.0 ms | |
| | 16 | 8 inputs + 8 outputs | 16 |
| |  <p>The EJ1819 digital input acquires the binary control signals from the process level and transmits them, in an electrically isolated form, to the higher-level automation unit.</p> |  <p>The EJ1859 EtherCAT plug-in module combines eight digital inputs and eight digital outputs in one device.</p> |  <p>The EJ1889 digital input acquires the binary control signals from the process level and transmits them, in an electrically isolated form, to the higher-level automation device. The reference point for all inputs of the EJ1889 is the 24 V field voltage.</p> |
| | 24 V DC (-15 %/+20 %) | 24 V DC (-15 %/+20 %) | 24 V DC (-15 %/+20 %) |
| | typ. 80 mA | typ. 90 mA | typ. 80 mA |
| | — | — | — |
| | standard input module with high number of channels (filter 10 µs) | combi module, 8 x output 24 V DC, max. output current 0.5 A, load type: ohmic, inductive, lamp load, reverse voltage protection | ground switching |
| | 0...+55 °C | 0...+55 °C | 0...+55 °C |
| | CE, UL | CE, UL | CE, UL |
| | www.beckhoff.com/EJ1819 | www.beckhoff.com/EJ1859 | www.beckhoff.com/EJ1889 |

Digital input | 5 V DC/3.3 V DC

The EJ1128 EtherCAT plug-in module acquires the binary 5 V DC/3.3 V DC control signals and transmits them, in an electrically isolated form, to the higher-level automation unit. The inputs feature HCT CMOS technology, i.e. the resulting switching thresholds allow the use of sensors with HC CMOS outputs as well as TTL outputs.

The power for the module (5 V DC) can be supplied via the EJ9505 power supply module.

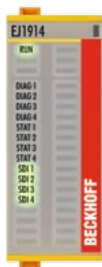


8-channel digital input,
5 V DC/3.3 V DC

| Technical data | |
|---|---|
| |  EJ1128 |
| Specification | "0": < 0.8 V DC, "1": > 2.4 V DC, typ. 50 µA |
| Input filter | typ. 0.05 µs |
| Number of inputs | 8 |
|  | |
| | |
| | |
| | |
| | |
| | |
| | |
| Nominal voltage | 5 V DC/3.3 V DC |
| Current consumption E-bus | typ. 80 mA |
| Distributed clocks | – |
| Electrical isolation | 500 V (E-bus/field potential) |
| Special features | fast CMOS input |
| Operating temperature | 0...+55 °C |
| Approvals | CE |
| Further information | www.beckhoff.com/EJ1128 |





For availability status see Beckhoff website at: www.beckhoff.com/EJ1128

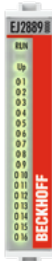


Digital input | 24 V DC, TwinSAFE

| | | | |
|----------------------------------|---|--|--|
| | TwinSAFE Logic, 4 safe inputs | TwinSAFE Logic, 8 safe inputs | TwinSAFE Logic, 8 safe inputs, 4 safe outputs |
| Technical data | EJ1914 | EJ1918 | EJ1957 |
| Connection technology | distribution board | | |
| Input specification | for sensors (24 V DC) with floating contacts | | |
| Number of inputs | 4 | 8 | 8 |
| Output specification | — | — | for actuators |
| Number of outputs | — | — | 4 |
| Max. output current | — | — | 0.5 A |
| |  |  |  |
| Nominal voltage | 24 V DC (-15 %/+20 %) | 24 V DC (-15 %/+20 %) | 24 V DC (-15 %/+20 %) |
| Current consumption E-bus | typ. 260 mA | typ. 290 mA | typ. 330 mA |
| Safety standard | EN ISO 13849-1:2015 (Cat. 4, PL e) and EN 61508:2010 (SIL 3) | EN ISO 13849-1:2015 (Cat. 4, PL e) and EN 61508:2010 (SIL 3) | EN ISO 13849-1:2015 (Cat. 4, PL e) and EN 61508:2010 (SIL 3) |
| Approvals | CE, TÜV SÜD | CE, TÜV SÜD | CE, TÜV SÜD |
| Weight | approx. 45 g | approx. 60 g | approx. 64 g |
| Further information | www.beckhoff.com/EJ1914 | www.beckhoff.com/EJ1918 | www.beckhoff.com/EJ1957 |

For further safety-relevant features of the TwinSAFE system and the TwinSAFE products see page **1** 542

Digital output | 24 V DC



| | | |
|----------------------------|--|---|
| | 8-channel digital output, 24 V DC, 0.5 A | 16-channel digital output, 24 V DC, 0.5 A |
| Technical data | EJ2008 | EJ2809 |
| Load type | ohmic, inductive, lamp load | |
| Max. output current | 0.5 A (short-circuit proof) per channel | |
| Switching times | typ. T _{ON} : 60 µs, typ. T _{OFF} : 300 µs | typ. T _{ON} : 60 µs, typ. T _{OFF} : 300 µs |
| Number of outputs | 8 | 16 |
| |  <p>The EJ2008 digital output connects the binary control signals from the automation unit on to the actuators at the process level with electrical isolation.</p> |  <p>The EJ2809 digital output connects the binary control signals from the automation unit on to the actuators at the process level with electrical isolation.</p> |
| Nominal voltage | 24 V DC (-15 %/+20 %) | 24 V DC (-15 %/+20 %) |
| Current consumption E-bus | typ. 90 mA | typ. 110 mA |
| Distributed clocks | — | — |
| Base frequency | — | — |
| Duty factor | — | — |
| Resolution | — | — |
| Breaking energy | < 150 mJ/channel | < 150 mJ/channel |
| Reverse voltage protection | yes | yes |
| Short-circuit current | typ. < 2 A | typ. < 2 A |
| Special features | — | — |
| Operating temperature | 0...+55 °C | 0...+55 °C |
| Approvals | CE, UL | CE, UL |
| Further information | www.beckhoff.com/EJ2008 | www.beckhoff.com/EJ2809 |

| | | | |
|--|--|---|--|
| | 16-channel digital output, 24 V DC, 0.5 A, ground switching | 2-channel pulse width output, 24 V DC, 0.5 A | 1-channel pulse train output, 24 V DC, 1 A |
| | EJ2889 | EJ2502 | EJ2521-0224 |
| | | | ohmic, opto-coupler, differential inputs |
| | | | 1 A |
| | typ. T _{ON} : 50 µs, typ. T _{OFF} : 200 µs | T _{ON} : > 750 ns, T _{OFF} : > 500 ns | T _{ON} : > 750 ns, T _{OFF} : > 500 ns |
| | 16 | 2 | 1 channel (2 outputs A, B) |
| |  |  |  |
| | The EJ2889 digital output connects the binary control signals from the automation unit on to the actuators at the process level with electrical isolation. | The EJ2502 output modulates the pulse width of a binary signal and outputs it electrically isolated from the E-bus. | The EJ2521-0224 digital output emits a digital frequency signal via two 24 V tracks (A/B). The signal can be used to control motor drivers or other signal receivers, which are controlled by single cycles. The pulse sequence and the pulse frequency or number of pulses are specified directly via the process data. |
| | 24 V DC (-15 %/+20 %) | 24 V DC (-15 %/+20 %) | 24 V DC (-15 %/+20 %) |
| | typ. 130 mA | typ. 110 mA | typ. 135 mA |
| | — | — | yes |
| | — | 1...20 kHz, 250 Hz default | 0...500 kHz, 50 kHz default |
| | — | 0...100 % | 0...100 % |
| | — | 9...15 bit | max. 15 bit (16 bit + sign) |
| | < 100 mJ/channel | — | — |
| | yes | yes | yes |
| | typ. < 7 A | typ. < 1.5 A | short-circuit proof |
| | ground switching | separate frequency can be set for each channel | different modes, ramp function, travel distance control |
| | 0...+55 °C | 0...+55 °C | 0...+55 °C |
| | CE, UL | CE, UL | CE, UL |
| | www.beckhoff.com/EJ2889 | www.beckhoff.com/EJ2502 | www.beckhoff.com/EJ2521-0224 |

Digital output | 5 V DC/3.3 V DC

The EJ2128 digital output switches the binary control signals of an automation system to the actuators at the process level in an electrically isolated manner and generates load currents via short-circuit and overload-protected outputs. The EtherCAT plug-in module has eight channels, with a rated load voltage of either 5 V DC or 3.3 V DC.

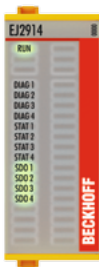

8-channel digital output,
5 V DC/3.3 V DC

| Technical data |  EJ2128 |
|---|--|
| Load type | ohmic, lamp load |
| Max. output current | ±20 mA (short-circuit proof) per channel, type CMOS output/push-pull |
| Switching times | typ. T_{ON} : < 1 µs, T_{OFF} : < 1 µs |
| Number of outputs | 8 |
|  | |
| | |
| | |
| | |
| | |
| | |
| Nominal voltage | 5 V DC/3.3 V DC |
| Current consumption E-bus | typ. 130 mA |
| Distributed clocks | – |
| Operating temperature | 0...+55 °C |
| Approvals | CE |
| Further information | www.beckhoff.com/EJ2128 |






For availability status see Beckhoff website at: www.beckhoff.com/EJ2128

Digital output | 24 V DC, TwinSAFE



| | | | |
|----------------------------------|--|---|--|
| | TwinSAFE Logic, 8 safe inputs, 4 safe outputs | TwinSAFE Logic, 4 safe outputs | TwinSAFE Logic, 8 safe outputs |
| Technical data | EJ1957 | EJ2914 | EJ2918 |
| Connection technology | distribution board | | |
| Input specification | for sensors (24 V DC) with floating contacts | — | |
| Number of inputs | 8 | — | — |
| Output specification | for actuators | for actuators | for actuators |
| Number of outputs | 4 | 4 | 8 |
| Max. output current | 0.5 A | 0.5 A | 0.5 A |
| |  |  |  |
| Nominal voltage | 24 V DC (-15 %/+20 %) | 24 V DC (-15 %/+20 %) | 24 V DC (-15 %/+20 %) |
| Current consumption E-bus | typ. 330 mA | typ. 260 mA | typ. 310 mA |
| Safety standard | EN ISO 13849-1:2015 (Cat. 4, PL e) and EN 61508:2010 (SIL 3) | EN ISO 13849-1:2015 (Cat. 4, PL e) and EN 61508:2010 (SIL 3) | EN ISO 13849-1:2015 (Cat. 4, PL e) and EN 61508:2010 (SIL 3) |
| Approvals | CE, TÜV SÜD | CE, TÜV SÜD | CE, TÜV SÜD |
| Weight | approx. 64 g | approx. 47 g | approx. 62 g |
| Further information | www.beckhoff.com/EJ1957 | www.beckhoff.com/EJ2914 | www.beckhoff.com/EJ2918 |

For further safety-relevant features of the TwinSAFE system and the TwinSAFE products see page **1** 542



Analog input | -10...+10 V

| | | | |
|-------------------------------------|---|--|--|
| | 4-channel analog input, -10...+10 V, 12 bit, single-ended | 4-channel analog input, -10...+10 V, 16 bit, differential input | 8-channel analog input, -10...+10 V, 16 bit, 6 differential and 2 single-ended inputs |
| Technical data | EJ3004 | EJ3104 | EJ3108 |
| Resolution | 12 bit (16 bit presentation) | 16 bit (incl. sign) | 16 bit |
| Conversion time | typ. 0.625 ms (default setting: 50 Hz filter) | ~ 100 µs | min. cycle time 1 ms |
| Number of inputs | 4 (single-ended) | 4 (differential) | 6 (differential) + 2 (single-ended) |
| |  <p>The EJ3004 analog input processes signals in the range between -10 and +10 V.</p> |  <p>The EJ3104 analog input processes signals in the range between -10 and +10 V.</p> |  <p>The EJ3108 analog input processes signals in the range between -10 and +10 V.</p> |
| Signal type | -10...+10 V | -10...+10 V | -10...+10 V |
| Measuring error | < ±0.3 % (relative to full scale value) | < ±0.3 % (relative to full scale value) | < ±0.3 % (relative to full scale value) |
| Current consumption E-bus | typ. 120 mA | typ. 175 mA | typ. 300 mA |
| Distributed clocks | – | yes | – |
| Sensor types | – | – | – |
| Measuring range | -10...+10 V | -10...+10 V | -10...+10 V |
| Internal resistance | > 130 kΩ | > 200 kΩ | differential: typ. 20 MΩ, single-ended: typ. 10 MΩ |
| Input filter limit frequency | 1 kHz | typ. 200 Hz | typ. 200 Hz |
| Special features | standard and compact process image, switchable measuring data representation, activatable FIR/IIR filters, limit value monitoring, overload display in the process data | standard and compact process image, switchable measuring data representation, activatable FIR/IIR filters, limit value monitoring | switchable measuring data representation, limit value monitoring, overload display in the process data |
| Operating temperature | 0...+55 °C | 0...+55 °C | 0...+55 °C |
| Approvals | CE, UL | CE, UL | CE, UL |
| Further information | www.beckhoff.com/EJ3004 | www.beckhoff.com/EJ3104 | www.beckhoff.com/EJ3108 |

Analog input | 0/4...20 mA, 12 bit, single-ended

| | | |
|-------------------------------------|--|--|
| | 8-channel analog input, 0...20 mA, 12 bit, single-ended | 8-channel analog input, 4...20 mA, 12 bit, single-ended |
| Technical data | EJ3048 | EJ3058 |
| Resolution | 12 bit (16 bit presentation incl. sign) | |
| Conversion time | 1.25 ms default setting, configurable | |
| Number of inputs | 8 (single-ended) | 8 (single-ended) |
| |  <p>The EJ3048 analog input processes signals in the range between 0 and 20 mA.</p> |  <p>The EJ3058 analog input processes signals in the range between 4 and 20 mA.</p> |
| Signal type | 0/4...20 mA | 0/4...20 mA |
| Measuring error | < ±0.3 % (relative to full scale value) | < ±0.3 % (relative to full scale value) |
| Current consumption E-bus | typ. 120 mA | typ. 130 mA |
| Distributed clocks | — | — |
| Sensor types | — | — |
| Measuring range | 0...20 mA | 4...20 mA |
| Internal resistance | typ. 85 Ω | typ. 85 Ω |
| Input filter limit frequency | 1 kHz | 1 kHz |
| Special features | standard and compact process image, activatable FIR/IIR filters, limit value monitoring | standard and compact process image, activatable FIR/IIR filters, limit value monitoring |
| Operating temperature | 0...+55 °C | 0...+55 °C |
| Approvals | CE, UL | CE, UL |
| Further information | www.beckhoff.com/EJ3048 | www.beckhoff.com/EJ3058 |


Temperature measurement | RTD, PT100, PT1000

| | | |
|------------------------------|--|--|
| | 2-channel analog input, PT100 (RTD), 16 bit | 4-channel analog input, PT100 (RTD), 16 bit |
| Technical data | EJ3202 | EJ3214 |
| Resolution | 0.1 °C per digit | |
| Conversion time | approx. 85 ms default setting, 2...800 ms configurable | approx. 170 ms default setting |
| Number of inputs | 2 | 4 |
| |  <p>The EJ3202 analog input allows resistance sensors to be connected directly.</p> |  <p>The EJ3214 analog input allows resistance sensors to be connected directly in 3-wire connection.</p> |
| Signal type | RTD | RTD |
| Measuring error | < ±0.5 °C for PT sensors | < ±0.5 °C for PT sensors, 4 x 3-wire connection |
| Current consumption E-bus | typ. 165 mA | typ. 160 mA |
| Distributed clocks | – | – |
| Sensor types | PT100, PT200, PT500, PT1000, Ni100, Ni120, Ni1000 resistance measurement (e.g. potentiometer, 10 Ω...1.2/4 kΩ), KTY sensors (types see documentation) | PT100, PT200, PT500, PT1000, Ni100, Ni120, Ni1000 resistance measurement (e.g. potentiometer, 10 Ω...1.2/4 kΩ), KTY sensors (types see documentation) |
| Measuring range | -200...+850 °C (PT sensors); -60...+250 °C (Ni sensors) | -200...+850 °C (PT sensors); -60...+250 °C (Ni sensors) |
| Internal resistance | – | – |
| Input filter limit frequency | typ. 1 kHz | typ. 1 kHz |
| Special features | integrated digital filter, limit value monitoring, variable connection technology | integrated digital filter, limit value monitoring, variable connection technology |
| Operating temperature | 0...+55 °C | 0...+55 °C |
| Approvals | CE, UL | CE, UL |
| Further information | www.beckhoff.com/EJ3202 | www.beckhoff.com/EJ3214 |




Temperature measurement | Thermocouple, mV measurement

The EJ3318 analog input allows the direct connection of eight thermocouples and is therefore particularly well suited to compact applications on the signal distribution board. The EtherCAT plug-in module's circuit can operate thermocouple sensors using the 2-wire technique. A microprocessor handles linearisation across the whole temperature range, which is freely selectable. The error LEDs indicate a broken wire. The compensation for the cold junction is done by two RTDs (PT1000), which can be placed anywhere on the signal distribution board. The EJ3318 can also be used for mV measurements.

8-channel analog input,
thermocouple, 16 bit

| Technical data | EJ3318 |
|------------------------------|---|
| Resolution | 0.1 °C per digit |
| Conversion time | approx. 5 s up to 40 ms, depending on configuration and filter setting, default: approx. 500 ms |
| Number of inputs | 8 x TC, 2 x PT1000 (compensation for the cold junction) |
| |  |
| Measuring error | < ±0.3 % (relative to full scale value) |
| Current consumption E-bus | 190 mA |
| Distributed clocks | — |
| Measuring range | in the range defined in each case for the sensor (default setting: type K; -200...+1370 °C); mV measurement: ±30 mV...±75 mV |
| Input filter limit frequency | typ. 1 kHz; depending on sensor length, conversion time, sensor type |
| Special features | open-circuit recognition, error recognition of the external cold junction compensation (CJC) |
| Operating temperature | 0...+55 °C |
| Approvals | CE, UL |
| Further information | www.beckhoff.com/EJ3318 |


Analog output | ± 10 V/0...10 V, 12/16 bit

| | | | |
|-----------------------------|---|--|--|
| | 2-channel analog output, 0...10 V, 12 bit | 2-channel analog output, -10...+10 V, 16 bit | 4-channel analog output, -10...+10 V, 16 bit |
| Technical data | EJ4002 | EJ4132 | EJ4134 |
| Signal voltage | 0...10 V | -10...+10 V | |
| Resolution | 12 bit | 16 bit (incl. sign) | 16 bit |
| Conversion time | ~ 150 μ s | ~ 40 μ s | ~ 200 μ s (0...100 %) |
| Number of outputs | 2 | 2 | 4 |
| |  <p>The EJ4002 analog output generates signals in the range between 0 and 10 V.</p> |  <p>The EJ4132 analog output generates signals in the range between -10 and +10 V.</p> |  <p>The EJ4134 analog output generates signals in the range between -10 and +10 V.</p> |
| Load | > 5 k Ω (short-circuit proof) | > 5 k Ω (short-circuit proof) | > 5 k Ω (short-circuit proof) |
| Current consumption E-bus | typ. 90 mA | typ. 185 mA | typ. 90 mA |
| Distributed clocks | yes | yes | yes |
| Distributed clock precision | – | << 1 μ s | << 1 μ s |
| Output error | < ± 0.1 % (relative to end value) | < 0.1 % (relative to end value) | < ± 0.1 % (relative to end value) |
| Special features | Optional watchdog: user-specific output value with ramp; user synchronisation can be activated. | Watchdog parameterisable; user synchronisation can be activated. | Watchdog parameterisable; user synchronisation can be activated. |
| Operating temperature | 0...+55 °C | 0...+55 °C | 0...+55 °C |
| Approvals | CE, UL | CE, UL | CE, UL |
| Further information | www.beckhoff.com/EJ4002 | www.beckhoff.com/EJ4132 | www.beckhoff.com/EJ4134 |

Analog output | 0...20 mA, 12 bit

The EJ4018 analog output generates signals in the range between 0 and 20 mA. The current is supplied to the process level with a resolution of 12 bit and is electrically isolated. The output stages are powered by the 24 V supply. The EJ4018 combines eight channels in one housing.

8-channel analog output,
0...20 mA, 12 bit

| Technical data | EJ4018 |
|--|---|
| Signal voltage | 0...20 mA |
| Resolution | 12 bit |
| Conversion time | ~ 400 µs |
| Number of outputs | 8 |
|  | |
| Load | < 150 Ω |
| Current consumption E-bus | typ. 80 mA |
| Current consumption periphery | max. typ. 60 mA |
| Distributed clocks | yes |
| Distributed clock precision | << 1 µs |
| Output error | < ±0.1 % (relative to end value) |
| Special features | Optional watchdog: user-specific output value with ramp; user synchronisation can be activated. |
| Operating temperature | 0...+55 °C |
| Approvals | CE, UL |
| Further information | www.beckhoff.com/EJ4018 |


Absolute encoder | SSI encoder

The EJ5002 plug-in module allows the direct connection of two SSI encoders. The data is transmitted to the controller synchronously with the clock cycle dictated by the EJ5002. Various parameters make it possible to flexibly adapt the EJ5002 to the respective application. Different parameters can be set and analysed like operation mode, SSI transfer rate, coding and data length. Furthermore, an additional bit can be displayed in the process image.

The 24 V power supply for the encoder can be provided directly via the feed-in on the signal distribution board. For optional 5 V power, the EJ9505 power supply module can be used.

The EJ5002 supports distributed clocks. Cyclic reading of the SSI encoder can thus be started with high precision, enabling detailed dynamic analysis of the axis in the control system.

SSI encoder interface

| Technical data | EJ5002 |
|--|--|
| Technology | SSI encoder interface |
| Number of channels | 2 |
|  | |
| Encoder connection | D+, D-, CI+, CI- |
| Current consumption | typ. 20 mA without encoder |
| Input voltage | 24 V DC (-15 %/+20 %) |
| Current consumption E-bus | typ. 120 mA |
| Data transfer rates | variable up to 1 MHz, 250 kHz default |
| Data direction | read |
| Distributed clocks | yes |
| Signal input (data) | difference signal (RS422) |
| Signal output (pulse) | difference signal (RS422) |
| Special features | adjustable baud rate, coding and data length |
| Operating temperature | 0...+55 °C |
| Approvals | CE, UL |
| Further information | www.beckhoff.com/EJ5002 |

Incremental encoder | RS422



The EJ5101 EtherCAT plug-in module is an interface for the direct connection of incremental encoders with differential inputs (RS422). A 32/16 bit counter with a quadrature decoder and a 32/16 bit latch for the zero pulse can be read, set or enabled. Incremental encoders with alarm outputs can be connected at the interface's status input. Interval and frequency measurement with a resolution of up to 100 ns is possible. The gate input allows the counter to be halted. The counter state is taken over with a rising or trailing edge at the latch input.

Due to the optional interpolating micro-increment function, the EJ5101 can supply even more precise axis positions for dynamic axes. In addition, it supports the synchronous reading of the encoder value together with other input data in the EtherCAT system via high-precision EtherCAT distributed clocks (DC). Optionally, the time stamp of the last-registered increment edge based on the distributed clocks system can be output.

For further information on XFC
see page **52**



1-channel incremental
encoder interface, RS422


| Technical data | EJ5101 |
|--|--|
| Technology | incremental encoder interface |
| Number of channels | 1 |
|   | |
| Encoder connection | A, A (inv), B, B (inv), C, C (inv) (RS422, differential inputs), single-ended connection possible, status input 5 V DC, gate/latch input 24 V DC |
| Input frequency | max. 4 million increments/s with 4-fold evaluation, equivalent to 1 MHz |
| Input voltage | 24 V DC (-15 %/+20 %) |
| Sensor supply | 5 V DC, 0.5 A |
| Current consumption E-bus | typ. 130 mA |
| Distributed clocks | yes |
| Current consumption | typ. 20 mA without encoder |
| Special features | wire breakage detection, latch and gate function, period duration and frequency measurement, microincrements, timestamping of edges, filters |
| Operating temperature | 0...+55 °C |
| Approvals | CE, UL |
| Further information | www.beckhoff.com/EJ5101 |

Communication | Serial interfaces RS232/RS485

The EJ6002 serial interface enables the connection of devices with two RS232, RS485 or RS422 interfaces. Apart from the convenient selection of the communication standard (RS232, RS485 or RS422) using the TwinCAT software, various operation modes can be set for the termination of connection cables. The devices connected to the EJ6002 EtherCAT plug-in module communicate with the automation device via the coupler. The active communication channel operates independently of the higher-level EtherCAT system in full duplex mode with 300 baud up to 256 kbaud. The serial interfaces guarantee high immunity to interference through electrically isolated signals. In conjunction with the TwinCAT Virtual Serial COM Driver, the EJ6002 can be used as a normal Windows COM interface.



2-channel serial interface
RS232, RS485 or RS422


| Technical data | EJ6002 |
|---------------------------|---|
| Technology | serial interface |
| Interfaces | individual selectable RS232, RS485 or RS422 |
| Data transfer rates | 300...256,000 baud (individual free configurable) |
| Providing external supply | 2 x 5 V/100 mA, out of E-bus supply, galvanic isolated, short-circuit proof |
| |  |
| Data buffer | 864 bytes receive buffer, 128 bytes transmit buffer |
| Power supply | 24 V DC (-15 %/+20 %) |
| Current consumption E-bus | 190 mA |
| Operating temperature | 0...+55 °C |
| Approvals | CE, UL |
| Further information | www.beckhoff.com/EJ6002 |

Master | IO-Link

The EJ6224 IO-Link master enables the connection of up to four IO-Link devices. IO-Link devices can be actuators, sensors or a combination of both. A point-to-point connection is used between the EtherCAT plug-in module and the device. The EJ6224 is parameterised via the EtherCAT master. IO-Link is designed as an intelligent link between the fieldbus level and the sensor, with parameterisation information being exchanged bi-directionally via the IO-Link connection. The IO-Link device is parameterised with service data from TwinCAT via ADS or very conveniently using the integrated IO-Link commissioning tool. Among other things the tool enables automatic scanning of IO-Link devices, comfortable editing of sensor parameters and an integrated online search for sensor description files.



IO-Link master

| Technical data | EJ6224 |
|---|---|
| Specification version | IO-Link V1.1 |
| IO-Link interfaces | 4 |
| Data transfer rates | 4.8 kbaud, 38.4 kbaud and 230.4 kbaud |
|  | |
| Cable length | max. 20 m |
| Supply current for devices | 500 mA per device |
| Current consumption E-bus | typ. 110 mA |
| Special features | IO-Link configuration tool integrated in TwinCAT: IO-Link sensor scan, comfortable sensor parameter handling, sensor description file finder |
| Operating temperature | 0...+55 °C |
| Approvals | CE, UL |
| Further information | www.beckhoff.com/EJ6224 |
| Further variants | EJ6224-0090 |
| Distinguishing features | TwinSAFE SC |


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Communication | TwinSAFE




The EJ6910 TwinSAFE Logic can establish up to 212 connections to other TwinSAFE devices. Several EJ6910 can be cascaded in a TwinSAFE network with up to 65,535 TwinSAFE devices. The EJ6910 EtherCAT plug-in module features certified safety function blocks, which are configured according to the application. Safety functions such as emergency stop, safety door monitoring, two-hand control, etc. can thus easily be selected and linked. All blocks can be freely connected among each other and are complemented by operators such as AND, OR, etc.

For further safety-relevant features of the TwinSAFE system and the TwinSAFE products see page **1 542**



TwinSAFE Logic

| Technical data | EJ6910 |
|---|--|
| Specification | link unit between safe input and output signals |
| Connection technology | distribution board |
|  <p>The TwinSAFE Logic can establish 212 connections to other TwinSAFE devices.</p> | |
| Nominal voltage | 24 V DC (-15 %/+20 %) |
| Current consumption E-bus | typ. 222 mA |
| Safety standard | EN ISO 13849-1:2015 (Cat. 4, PL e) and EN 61508:2010 (SIL 3) |
| Approvals | CE, TÜV SÜD |
| Weight | approx. 27 g |
| Further information | www.beckhoff.com/EJ6910 |

Motion | Stepper motor modules

| | | | |
|-------------------------------------|--|--|--|
| | Stepper motor module 24 V DC, 1.5 A | Stepper motor terminal 50 V DC, 5 A | Stepper motor module 50 V DC, 5 A, with incremental encoder, vector control |
| Technical data | EJ7031 | EJ7041-0052 | EJ7047 |
| Technology | Compact Drive Technology | | |
| Load type | stepper motors (uni- or bipolar) | 2-phase stepper motor (uni-/bipolar) | |
| Number of outputs | 1 x stepper motor (2 phases) | 1 x stepper motor | 1 x stepper motor, 1 x brake (configurable, 0.5 A) |
| Number of inputs | 2 | 2 x end position | 2 x end position, 1 x encoder |
| Connection method | direct motor connection | direct motor connection | direct motor connection + feedback |
| |  |  |  |
| Output current | 1.5 A | max. 5.0 A | max. 5.0 A |
| Supply voltage power | 24 V DC (via distribution board) | 8...50 V DC (via distribution board) | 8...50 V DC (via distribution board) |
| Auxiliary power current | typ. 30 mA + motor current | typ. 50 mA | typ. 70 mA (via distribution board) |
| Current consumption E-bus | typ. 140 mA | typ. 140 mA | typ. 140 mA |
| Distributed clocks | yes | yes | yes |
| Step frequency | configurable up to 8000 full steps/s | configurable up to 8000 full steps/s | configurable up to 16,000 full steps/s |
| Step pattern | 64-fold micro stepping | 64-fold micro stepping | 64-fold micro stepping |
| Current controller frequency | approx. 25 kHz | approx. 30 kHz | approx. 30 kHz |
| Control resolution | approx. 5000 positions in typ. applications (per revolution) | approx. 5000 positions in typ. applications (per revolution) | approx. 5000 positions in typ. applications (per revolution) |
| Encoder input signal | – | – | 5...24 V DC, typ. 5 mA, single-ended |
| Encoder operating voltage | – | – | 24 V DC |
| Input frequency | – | – | max. 400,000 increments/s (with 4-fold evaluation) |
| Special features | travel distance control | travel distance control | travel distance control, encoder input, vector control |
| Operating temperature | 0...+55 °C | 0...+55 °C | 0...+55 °C |
| Approvals | CE, UL | CE | CE, UL |
| Further information | www.beckhoff.com/EJ7031 | www.beckhoff.com/EJ7041-0052 | www.beckhoff.com/EJ7047 |


Motion | Servomotor modules

| | | |
|-------------------------------------|---|---|
| | Servomotor module with OCT, STO and TwinSAFE SC, 50 V DC, 4.5 A (I_{rms}) | Servomotor module for OCT, 50 V DC, 4.5 A (I_{rms}) |
| Technical data | EJ7211-9414 | EJ7211-0010 |
| Technology | Compact Drive Technology | |
| Load type | permanent magnet-excited three-phase synchronous motor | |
| Number of outputs | 1 x servomotor, 1 x motor brake | 1 x servomotor, 1 x motor brake |
| Number of inputs | 2 x end position, 1 x feedback, 1 x STO | 2 x end position, 1 x feedback |
| Connection method | direct motor connection with OCT | direct motor connection with OCT |
| |  |  |
| Output current (rms) | 4.5 A | 4.5 A |
| Peak current (rms) | max. 9.0 A for 1 s | max. 9.0 A for 1 s |
| Frequency range | 0...599 Hz | 0...599 Hz |
| PWM clock frequency | 16 kHz | 16 kHz |
| Current controller frequency | 32 kHz | 32 kHz |
| Supply voltage electronics | 24 V DC (via distribution board) | 24 V DC (via distribution board) |
| Supply voltage power | 8...50 V DC (via distribution board) | 8...50 V DC (via distribution board) |
| Current consumption E-bus | typ. 130 mA | typ. 130 mA |
| Distributed clocks | yes | yes |
| Special features | compact and system-integrated, absolute feedback, One Cable Technology (OCT), plug and play, STO (Safe Torque Off), TwinSAFE SC | compact and system-integrated, absolute feedback, One Cable Technology (OCT), plug and play |
| Stop functions | Safe Torque Off (STO), Safe Stop 1 (SS1) | – |
| Operating temperature | 0...+55 °C | 0...+55 °C |
| Approvals | CE, UL, TÜV SÜD | CE, UL |
| Further information | www.beckhoff.com/EJ7211-9414 | www.beckhoff.com/EJ7211-0010 |



Motion | DC motor module

The EJ7342 EtherCAT plug-in module enables direct operation of two DC motors. It is galvanically isolated from the E-bus. The speed or position is specified by the automation device via a 16 bit value. Connection of an incremental encoder enables a simple servo axis to be realised. The output stage is protected against overload and short-circuit, the common thermal overload warning applies to both output stages together. The EJ7342 has two channels that indicate their signal state via light emitting diodes. The LEDs enable quick local diagnosis.

2-channel DC motor output stage 50 V DC, 3.5 A

| Technical data | EJ7342 |
|---|--|
| Technology | Compact Drive Technology |
| Load type | DC brush motor, inductive |
| Number of outputs | 1 x DC motor per channel |
| Number of inputs | 1 x end position, 1 x encoder per channel |
| Connection method | direct motor connection |
|  | |
| Output current | max. 3.5 A per channel |
| Supply voltage electronics | 24 V DC (via distribution board) |
| Supply voltage power | 8...50 V DC (via distribution board) |
| Current consumption E-bus | typ. 160 mA |
| Distributed clocks | yes |
| PWM clock frequency | 32 kHz with 180° phase shift each |
| Duty factor | 0...100 % (voltage-controlled) |
| Control resolution | max. 10 bit current, 16 bit speed |
| Encoder input signal | 5...24 V DC, typ. 5 mA, single-ended |
| Input frequency | max. 400,000 increments/s (with 4-fold evaluation) |
| Special features | travel distance control, encoder input |
| Operating temperature | 0...+55 °C |
| Approvals | CE, UL |
| Further information | www.beckhoff.com/EJ7342 |




System | Placeholder, brake chopper

| | | |
|------------------------------|---|--|
| | Placeholder module | Brake chopper module, 72 V, 155 µF |
| Technical data | EJ9001 | EJ9576 |
| Technology | placeholder module | brake chopper |
| Diagnostics | — | temperature on board, over-/undervoltage |
| |  <p>The placeholder modules can be plugged into unused slots on the signal distribution board. The slots reserved in such a way can be equipped with functional modules when the range of functions is extended.</p> |  <p>The EJ9576 buffers the connected voltage via its integrated capacitors and connects the external brake resistor if the preset threshold of the internal voltage is exceeded.</p> |
| Nominal voltage | — | arbitrary up to 72 V |
| Current consumption E-bus | typ. 60 mA | typ. 85 mA |
| Capacity | — | 155 µF |
| Ripple current (max.) | — | 10 A |
| Internal resistance | — | < 5 mΩ |
| Chopper voltage | — | adjustable |
| Recommended braking resistor | — | 10 Ω, typ. 100 W (dependent on application) |
| Overvoltage control range | — | typ. 1 V, parameterisable by CoE data |
| Braking resistor clock rate | — | load-dependent, max. 100 µs, 2-point control |
| Electrical isolation | 500 V (E-bus/field potential) | 1500 V (E-bus/field potential) |
| Special features | placeholder module for subsequent functional extensions | adjustable threshold |
| Operating temperature | 0...+55 °C | 0...+55 °C |
| Approvals | CE, UL | CE, UL |
| Further information | www.beckhoff.com/EJ9001 | www.beckhoff.com/EJ9576 |

System | Power supply for E-bus and power transmission

The EJ94xx and EJ95xx module series are designed for the modified feeding of the operating voltage into the module strand. The EJ9400 and EJ9404 EtherCAT plug-in modules are used in combination with the EJ1101-0022 EtherCAT Coupler to supply the E-bus with power. Data is exchanged between the EtherCAT Coupler and the plug-in module over the E-bus. Each EtherCAT plug-in module draws a certain amount of current from the E-bus (see technical data: current consumption E-bus). This current is fed into the E-bus by the power supply plug-in module. To supply the E-bus with power, two performance classes are available: 2.5 A (EJ9400) and 12 A (EJ9404). The power supply is selected according to the number of EtherCAT plug-in modules that must be supplied.

The EJ9505 power supply module generates an output voltage of 5 V DC from the (24 V DC) input voltage. This output voltage can be used to supply power to EtherCAT plug-in modules or external sensors. The power LEDs indicate the module's operating state; the error LED indicates short circuit or overcurrent. The input voltage and the output voltage are not electrically isolated.

| | Power supply plug-in module for E-bus, 2.5 A | Power supply plug-in module for E-bus, 12 A | Power supply plug-in module, 5 V DC, with diagnostics |
|----------------------------------|---|---|---|
| Technical data | EJ9400 | EJ9404 | EJ9505 |
| Technology | power supply module for E-bus | | power supply module |
| Diagnostics in the process image | — | | yes |
| |  |  |  |
| Input voltage | 24 V DC (-15 %/+20 %) | 24 V DC (-15 %/+20 %) | 24 V DC (-15 %/+20 %) |
| Output voltage | — | — | 5 V DC ±1 % |
| Input current | approx. 10 mA + (E-bus/6.25) | approx. 10 mA + (E-bus/6.25) | load-dependent |
| Max. output current | 2.5 A | 12 A | 0.5 A |
| Short-circuit proof | — | — | yes |
| Current consumption E-bus | — | — | typ. 70 mA |
| Electrical isolation | — | — | — |
| Special features | E-bus supply in combination with the EJ1101-0022 EtherCAT Coupler | E-bus supply in combination with the EJ1101-0022 EtherCAT Coupler | stabilised output voltage |
| Operating temperature | 0...+55 °C | 0...+55 °C | 0...+55 °C |
| Approvals | CE, UL | CE, UL | CE, UL |
| Further information | www.beckhoff.com/EJ9400 | www.beckhoff.com/EJ9404 | www.beckhoff.com/EJ9505 |