NEC102

Node Adapter EtherCAT

The NEC102 node adapter maps the powerful and flexibly configurable M100 station to a standard EtherCAT interface. The operating modes of the M100 I/O modules are defined during the configuration and are available to both the Bachmann main device and also to main devices of other manufacturers. Thanks to distributed clocks on the EtherCAT stations, the implementation of short control intervals across the entire control system is given.

Features

- EtherCAT fieldbus IO node adapter
- 2x RJ45 connections (1x EtherCAT in, 1x EtherCAT out)
- Address configuration: automatic / SW
- Synchronization: Distributed clocks (DC)
- EtherCAT PDO/SDO, FoE
- Maximum process image / station: 14 506 bytes
- Minimum bus cycle time: 100 µs
- Integrated power supply unit for module supply: 20 W

Part type designation	Part number
NEC102	00041206-00
NEC102 EC	00041207-00

Common properties	
Basic function	EtherCAT fieldbus IO node adapter, integrated station power supply
System	Bachmann system M100
Module bus interface	
System	M100
Slot type	0/C
Network interface / bus interface	
Protocol standard	EtherCAT (SubDevice) according to Modular Device Profile
Protocol profiles	CoE PDO/SDO, FoE
Process data image per station (PDO)	14 506 bytes
Service data image per station (SDO)	Depending on configured mailbox size (max. 460 bytes)
Bus interface	2x RJ45 socket, "ECAT IN" / "ECAT OUT"
Physical layer standard	IEEE 802.3 - Ethernet MAC and PHY
Data transfer rate	100 Mbit/s
Cable specification	100BASE-TX: Cat.5, Cat.5e, Cat.7
Maximum cable length	100 m between stations (Cat.5)
Bus cycle time DC	100 µs to 10 ms
Bus cycle time	100 µs to 10 ms
Synchronization/clocks	
Distributed clocks	Yes
Time stamp format	64 bit in ns
Time resolution	10 ns
Time precision	25 ns within the station 100 ns via network (typ.) 1 µs via network (max.)
Synchronization functions	DC synchron FreeRun / SM synchron
Diagnostics	
Electronic type plate	Yes (application interface and in the engineering tool)
Machine readable type plate	Yes (QR code with type and part information and internet link)
Environmental conditions sensor	Integrated (temperature as SDO)
Diagnostics interface	USB-C socket
Operational indications	LED "MOD" (red/green) module status LED "RUN" (green) to indicate EtherCAT status, according to EtherCAT specification
Error indications	LED "ERR" (red) to indicate EtherCAT bus fault, Watchdog timeout, local error, configuration and boot error; blinking pattern according to EtherCAT specification
Energy supply	
Supply voltage, nominal	24 V DC
Supply voltage, range	18 V to 32 V DC
Supply voltage, short-term overload	40 V for 100 ms
Power consumption, continuous, max.	27 W
Input current, continuous, max.	1.5 A @ 18 V DC, T_a = 25 °C
Input current, inrush	46 A for < 1 ms (@ 24 V DC, T_a = 25 °C)
Input capacity	Typ. 220 µF
Maximum residual ripple	2.4 V_{ss} at 50 Hz, 60 Hz, 100 Hz and 120 Hz
Power output for modules/backplane	20 W

Energy supply	
Permitted voltage interruptions	PS1 according to IEC 61131-2
Reverse polarity protection	Yes, continuously (up to -32 V)
Limitation of supply / fusing	No internal protection External protection with circuit breaker characteristic: B, C, D, Z or K Max. nominal current 8 A DC for the supply forwarding
Parallel operation	Yes, with PSI135 modules (if galvanic isolation is required, the NEC102 module must not be supplied via the 24 V supply)
Power dissipation	4.5 W @ 24 V DC, T_a = 25 °C, P_{out} = 0 W 6.0 W @ 24 V DC, T_a = 25 °C, P_{out} = 20 W 5.3 W @ 32 V DC, T_a = 60 °C, P_{out} = 0 W 6.9 W @ 32 V DC, T_a = 60 °C, P_{out} = 20 W
Power consumption from backplane	4.5 W
Supply terminal block bridge	Yes, internal connection from 1+ to 2+ and 1- to 2-
Product safety	
Galvanic isolation	850 V AC
Degree of protection acc. IEC 60529	IP40, terminal block IP30
Protection class acc. IEC 61010-1, IEC 61010-2-201	III
Overvoltage category acc. IEC 61010-1	II
Environmental conditions	
Temperature range, operating	Standard: -30 °C to +60 °C Extended Climate: -30 °C to +70 °C
Temperature range, transport and storage	-40 °C to +85 °C
Installation altitude, max.	Up to 2000 m without temperature derating 2000 m to 4500 m: Reduction of the max. ambient temperature by 0.1 °C per 100 m elevation
Air pressure	106 kPa to 58 kPa (0 m to 4500 m)
Relative humidity, operation	Standard: 0 % to 100 % noncondensing Extended Climate: 0 % to 100 % with temporary condensation
Pollution degree acc. IEC 61010-1	Standard: 2, noncondensing Extended Climate: 2
Vibration	With BPS1nn: • 4 g (11.5 Hz to 500 Hz) • 7.5 mm amplitude (2 Hz to 11.5 Hz) • Test duration: 15 h With BPR1nn: • 4 g (IACS E10, IEC 61131-2)
Shock	45 g max. (test scope 18 shocks) 20 g permanently (test scope 6000 shocks)
Approvals/certificates	
Product safety	CE, UKCA cULus (NRAQ, NRAQ7)
Hazard area operation	ATEX: Ex II 3G Ex ec IIC Gc
Maritime	ABS, BV, DNV, KR, LR, NK, RINA: in preparation
Hazardous substances and waste treatment	RoHS, RoHS China, REACH, WEEE
Quality management	ISO 9001 for development and production
Engineering	
Configuration tool	SolutionCenter (≥ V2.75)

Engineering	
Firmware package update	Yes
Secure boot / root-of-trust	Yes
Mounting/installation	
Mounting type	Inserting and screwing onto the backplane with integrated M4 screw
Dimensions	
Number of slots	1
Size unpacked W × H × D	23.3 mm × 152.5 mm × 95.7 mm
Mass unpacked	294 g

Order data

Part type designation	Part number	Description
NEC102	00041206-00	Fieldbus – IO node adapter EtherCAT (SubDevice) for system M100 100 Mbit/s, 2x RJ45 socket (1x In, 1x Out), integrated power supply unit 20 W; without terminal block
NEC102 EC	00041207-00	Like NEC102 with Extended Climate Range

Accessories

Part type designation	Part number	Description
BPR1nn	00039235-nn	Backplane for DIN-rail mounting Active backplane system M100: BPR1nn with nn = 04 to 16 slots in increments of 1, as well as 20, 24, 28, 32 slots, for DIN-rail mounting; delivery without backplane slot covers and without mounting rail
BPR1nn EC	00039236-nn	Like BPR1nn; Extended Climate Range
BPS1nn	00039237-nn	Backplane for direct screw mounting Active backplane system M100: BPS1nn with nn = 04 to 16 slots in increments of 1, as well as 20, 24, 28, 32 slots, for direct screw mounting; delivery without backplane slot covers and without screws
BPS1nn EC	00039238-nn	Like BPS1nn; Extended Climate Range
TPI100_W4_P5.0_Cgy_Lsup		Supply terminal block Completely removable terminal block, push-in spring connector for system M100, 4-way/contacts, pitch 5.0 mm, female, conductors flexible 0.2 mm² to 2.5 mm² (24 to 14 AWG), solid 0.2 mm² to 1.5 mm² (24 to 16 AWG), with wire end ferrules 0.25 mm² to 1.5 mm² (24 to 16 AWG), stripping length: 10 mm, rating: 300 V / 8 A per contact, connector color: gray, push-release: yellow, labeling: 1+/1-/2+/2-
TKP106		Keying element Keying element for signal terminal blocks and supply terminal blocks TPI100 for system M100, plastic ring with 6 keying elements
TPI100_W4_Set [1)]	00042413-00	Terminal block set for M100 modules that only require the supply terminal block: • 1x TPI100_W4_P5.0_Cgy_Lsup • 1x TKP106

[1)] *All components of the set are also available in bulk packages.*