

Rotary Joint || BN 637421


Contactless Data Transmission



637421 – Standard outline

The contactless data channels, realized by rotating capacitive couplers, offer improved lifetime without the need for maintenance.

The real-time ethernet contactless data types are protocol independent (only using OSI-Layer 1) and suitable for nearly all 100BASE-TX based industrial ethernet standards.

- ETHERNET 
POWERLINK
 PROFINET
 EtherCAT
 SERCOS III
 EtherNet/IP
 VARAN
 IEEE-1588 v2 (PTP)

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Available Configurations

Type	
1	1000BASE-T Ethernet
3	CAN-Channel (Repeater 500 kbps)
4	1 Channel ethernet for real-time applications 100BASE-TX, full duplex
5	1 Channel ethernet for real-time applications 100BASE-TX, half duplex
7	2 Channel ethernet (multiplexed) for real-time applications 100BASE-TX, full duplex
8	2 Channel ethernet (multiplexed) for real-time applications 100BASE-TX, half duplex
9	PROFIBUS DP according to IEC 61158, 500 kbps
10	PROFIBUS DP according to IEC 61158, 12 Mbps
11	Protocol combination of type 4 and type 10 (multiplexed)

Transmission Type 1:

1000BASE-T Ethernet-Channel	One contactless coupler for one channel
Supported Ethernet Standards	10BASE-T (IEEE802.3 Clause 14) 100BASE-TX (IEEE802.3 Clause 25) 1000BASE-T (IEEE802.3 Clause 40) Auto negotiation provided to select Ethernet-Standard and full/ half duplex mode automatically
OSI Layer operation	Layer 1 - 2
Supported Protocols	Not for real-time ethernet applications
Ethernet Frame Loss Ratio According to RFC2544	$\leq 1 \times 10^{-9}$ Measured for 800s with 64 byte frames at 99% channel utilization, corresponds to BER $\leq 1 \times 10^{-12}$
Data Interface Connection	Cat.6A S/FTP 4x2xAWG26/7 (PiMF) at Body and Hollow shaft side (or special cable type according to specific circuit diagram)

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Transmission Type 3:

CAN-Channel	One contactless coupler for one channel
Supported CAN Standards	ISO 11898-1:2003
CAN-functionality	Repeater (fast mode)
Data Rate, max.	500 kbps
Alarm Signal	Open Collector output $V_{CE} \leq 40V, I_C < 10mA$ Active if no failure detected Current has to be limited externally
Data and Alarm Signal Connection	Cat.6A S/FTP 4x2xAWG26/7 (PiMF) at Body and Hollow shaft side (or special cable type according to specific circuit diagram)

Transmission Type 4 + Type 5:

100BASE-TX Ethernet Channel	One signal channel provided	
	Type 4	Type 5
Supported Ethernet Standards	100BASE-TX (IEEE802.3 Clause 25), autonegotiation (full duplex only)	100BASE-TX (IEEE802.3 Clause 25), autonegotiation (half duplex only)
Supported Protocols	Real-time ethernet protocols	
OSI Layer operation	Layer 1 (physical)	
Ethernet Frame Loss Ratio According to RFC2544	$\leq 1 \times 10^{-9}$ Measured for 8000s with 64 byte frames at 99% channel utilization, corresponds to BER $\leq 1 \times 10^{-12}$	
Data Interface Connection	Cat.6A S/FTP 4x2xAWG26/7 (PiMF) at Body and Hollow shaft side (or special cable type according to specific circuit diagram)	

Transmission Type 7 + Type 8:

100BASE-TX Ethernet Channel	Two signal channels over one contactless transmission channel, signals are multiplexed, no redundancy	
	Type 7	Type 8
Supported Ethernet Standards	100BASE-TX (IEEE802.3 Clause 25), autonegotiation (full duplex only)	100BASE-TX (IEEE802.3 Clause 25), autonegotiation (half duplex only)
Supported Protocols	Real-time ethernet protocols	
OSI Layer operation	Layer 1 (physical)	
Multiplexer	Time Domain Multiplexing	
Ethernet Frame Loss Ratio According to RFC2544	$\leq 1 \times 10^{-9}$ Measured for 8000s with 64 byte frames at 99% channel utilization, corresponds to BER $\leq 1 \times 10^{-12}$	
Data Interface Connection	Cat.6A S/FTP 4x2xAWG26/7 (PiMF) at Body and Hollow shaft side (or special cable type according to specific circuit diagram)	

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Transmission Type 9 + Type 10:

Supported PROFIBUS Standard	PROFIBUS DP according to IEC 61158	
Signal Channel Characteristics	PROFIBUS DP, RS-485, Half duplex	
	Type 9	Type 10
Data Rate	500 kbps	12 Mbps
Data Format	UART (11 Bit, NRZ)	
Termination	Internal, permanently terminated	
Bit Delay	< 2 Bit	
Bit Distortion, Input	500 kbps ± 3.5%	12 Mbps ± 3.5%
Bit Distortion, Output	< 1%; Bit-Retiming	
Data Interface Connection	PROFIBUS cable 7.8 mm outer diameter at stator and rotor side; Shielded twisted pair 1x2xAWG24/19; 150Ω ± 10% impedance; (or special cable type according to specific circuit diagram)	

Operating condition

External Power Supply	Power Supply has to be a SELV type acc. to IEC60950-1 The current must be externally limited to 4 A
Input Voltage Range	21.6 V to 28.8 V DC; 0 V is connected to Case Ground internally
Current Consumption, typ. / max.	0.33 A / 0.5 A @ 24 V Supply Voltage
Inrush Current	3 A (duration 2 ms)
Power Consumption, typ. / max.	8 W/ 12 W
Supply Voltage Connection	2 x 0.25 mm ² LiYCY cable, shielded, outer diameter ~3.9 mm, at Body and Hollow shaft side (or special cable type according to specific circuit diagram)

Standards and directives

Applicable EU Directive	EMC Directive 2014/30/EU	
Applied standards	DIN EN 55032 (Class B)	Radio disturbance characteristics
	DIN EN 55024	Immunity characteristics

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Mechanical data

Rotating speed, max.	1000 rpm
Acceleration, max.	1500 rad/s ² (239 rounds/s ²)
Life, min.	200 x 10 ⁶ revolutions
MTBF	300 000 h
Torque (room / min. temperature), max.	0.2 Nm / 0.5 Nm @ start-up 0.2 Nm / 0.5 Nm @ rotation
Interface loads, max.	no loads allowed
Case material	Aluminum alloy
Case surface finish	Chromate conversion coat
Weight, approx.	1.5 kg
Marking	Adhesive label

Environmental conditions

Operation	
Ambient temperature range	-30 °C to +71 °C
Relative humidity, max.	95% (non-condensing)
Shock	30 g / 11 ms half sine, 3 shocks in each direction of 3 orthogonal axes
Vibration	20-50 Hz, PSD of 0,02 g ² /Hz falling to 0,001 g ² /Hz at 500 Hz in each of 3 orthogonal axes. Duration: 15 min/axis.
IP protection level	IP60 per EN 60529 (all interfaces connected with appropriate gaskets)
Maintenance	Not required
Storage	
Ambient temperature range	-40 °C to +85 °C
Relative humidity, max.	95% (non-condensing)

Applicable documents

Circuit Diagram	637421CXXXX-CD (XXXX according to ordering number)
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Ordering information

Order number	Drawing	Type	Contactless data interface				Power supply interface			
			Body	L1* / mm	Hollow shaft	L2* / mm	Body	L3* / mm	Hollow shaft	L4* / mm
637421C0001	Standard outline	1	Connector RJ45	1400	Connector RJ45	1400	Flying leads	1400	Flying leads	1400
637421C0003	Standard outline	3	Flying leads	1400	Flying leads	1400	Flying leads	1400	Flying leads	1400
637421C0004	Standard outline	4	Connector RJ45	1400	Connector RJ45	1400	Flying leads	1400	Flying leads	1400
637421C0005	Standard outline	5	Connector RJ45	1400	Connector RJ45	1400	Flying leads	1400	Flying leads	1400
637421C0007	Standard outline	7	Connector RJ45	1400	Connector RJ45	1400	Flying leads	1400	Flying leads	1400
637421C0008	Standard outline	8	Connector RJ45	1400	Connector RJ45	1400	Flying leads	1400	Flying leads	1400
637421C0009	Standard outline	9	Flying leads	1400	Flying leads	1400	Flying leads	1400	Flying leads	1400
637421C0010	Standard outline	10	Flying leads	1400	Flying leads	1400	Flying leads	1400	Flying leads	1400
637421C0100	Standard outline	4	Flying leads	2000	Flying leads	12000	Flying leads	1400	Flying leads	1400
637421C0101	Standard outline	4	Connector M8	1700	Connector M8	1700	Flying leads	1700	Flying leads	1700
637421C0109	637421C0109-0E	9	Flying leads	1400	Flying leads	1400	Flying leads	1400	Flying leads	1400
637421C0500	637421C0500-0E	4	Flying leads	1400	Flying leads	1400	Flying leads	1400	Flying leads	1400
637421C0501	Standard outline	11	Flying leads	1400	Flying leads	1400	Flying leads	1400	Flying leads	1400
637421C0502	Standard outline	1	Flying leads	1400	Flying leads	3000	Flying leads	1400	Flying leads	3000
637421C8007	637421C8007-0E	7	Connector RJ45	1400	Connector RJ45	1400	Flying leads	1400	Flying leads	1400

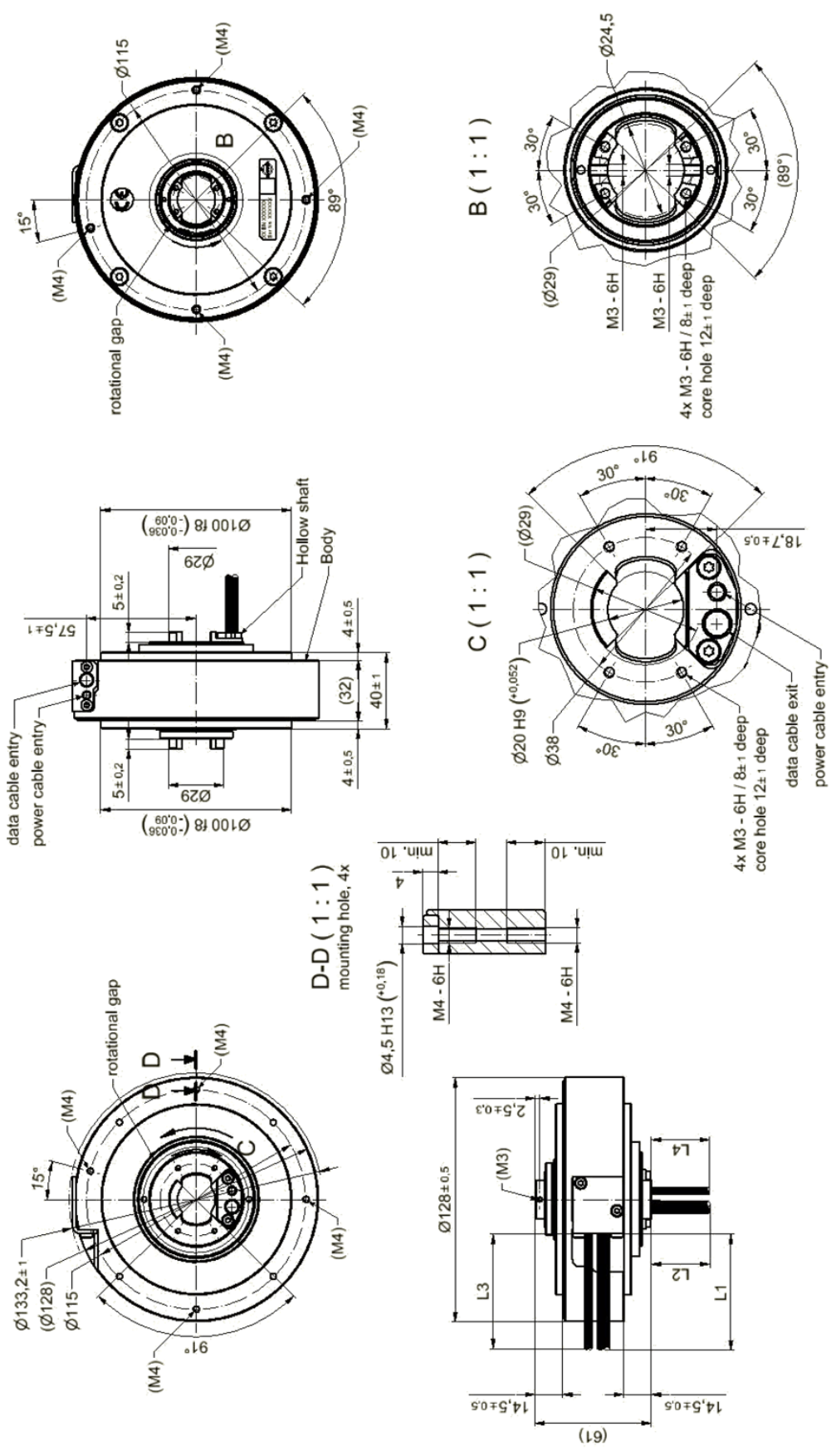
*Cable length tolerance $\pm 5\%$

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Standard outline (all dimensions in millimeter)



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