



Product Information

Gateway

For Connecting
EnDat Encoders
to PROFINET IO

PROFINET gateway

For connecting EnDat encoders

Encoders with EnDat interface for connection via gateway

Absolute encoders from HEIDENHAIN with **EnDat interface** are suitable for PROFINET IO. The encoders are electrically connected through a **gateway**. The complete interface electronics are integrated in the gateway, as well as a voltage converter for supplying EnDat encoders with DC 5 V \pm 5 %. This offers a number of benefits:

- Easy connection of the fieldbus cables
- Encoder dimensions remain small
- No temperature restrictions for the encoder. All temperature-sensitive components are in the gateway
- No bus interruption when an encoder is exchanged

Besides the EnDat encoder connector, the gateway provides connections for PROFINET and the power supply.

Since the gateway is connected as a bus member, the cable to the encoder does not act as a stub line although it can be up to 40 meters long.

PROFINET IO

PROFINET IO is the open Industrial Ethernet standard for industrial communication. It builds on the field-proven functional model of PROFIBUS DP but employs fast Ethernet technology as its physical transmission medium and is thus tailored to the fast transmission of I/O data. At the same time, this standard offers the capability of transmitting demand data, parameters, and IT functions.

Physical-layer characteristics

HEIDENHAIN encoders and the gateway are connected to PROFINET in accordance with 100BASE-TX (IEEE 802.3, Clause 25) over one shielded, twisted wire pair in each direction. The data transfer rate is 100 Mbit/s (Fast Ethernet).

PROFINET profile

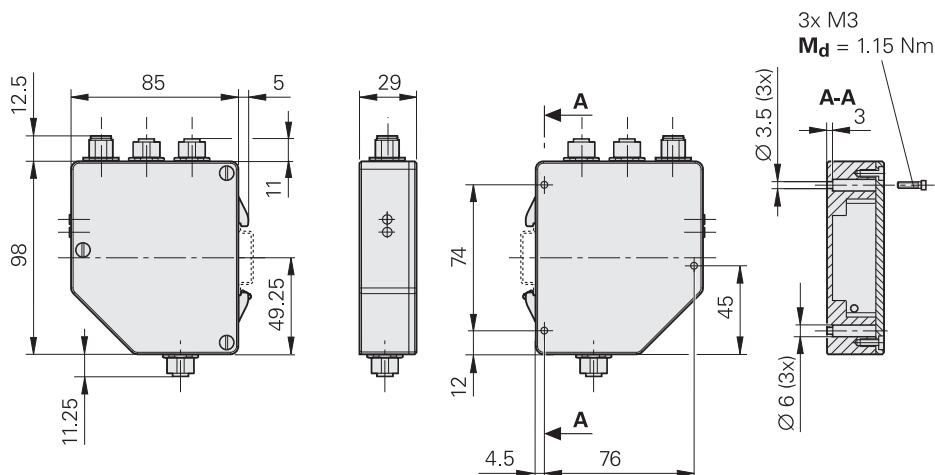
HEIDENHAIN encoders and gateways satisfy the definitions as per Profile 3.162, Version 4.1. This device profile describes the functionality of the rotary encoder. Rotary encoders support the functions of Class 4 (full scaling and preset functionality). The functions supported by the gateway vary depending on the connected encoder. More information about PROFINET can be ordered from the PROFIBUS user organization (PNO).

Commissioning

In order for an encoder with the PROFINET interface to be put into operation, a general station description (GSDML) file must be downloaded and imported into the configuration software. The GSDML file contains the execution parameters required for a PROFINET IO device.

Encoders or gateway with PROFINET

The encoders with integrated PROFINET interface or the gateway are incorporated directly into the network. Addresses are automatically assigned via a protocol integrated into PROFINET. Within a network, a PROFINET IO field device is addressed via its physical device MAC address. The encoders feature two double-color LEDs for bus and device diagnostics.



mm

Tolerancing ISO 8015
ISO 2768 - m H
 $\leq 6 \text{ mm: } \pm 0.2 \text{ mm}$

Specifications	PROFINET IO gateway
Input	For absolute linear, angle, and rotary encoders with the ordering designation EnDat22—except LC xx3 (multiturn rotary encoders with buffer battery backup are not supported)
Connection	8-pin M12 flange socket (female)
Cable length	≤ 40 m (with HEIDENHAIN cable), greater lengths upon request
Power supply (encoder)	DC 5 V ±5 % (max. 400 mA)
Output	PROFINET IO Functions as per Profile 3.162, Version 4.2 (see separate table)
Operating status displays	Integrated LED displays: <ul style="list-style-type: none"> • “Module” ≙ Gateway status • “Bus” ≙ PROFINET status
Bus connection (PORT 1, PORT 2, U _P)	Three 4-pin M12 Speedcon connecting elements
Supply voltage	DC 9 V to 36 V
Power consumption	Maximum: 9 V: ≤ 5.3 W; 36 V: ≤ 5.3 W (residual ripple included) Typical: 2.4 W + P _{encoder} × 1.33
Operating temperature	−40 °C to +80 °C
Vibration 50 Hz to 2000 Hz Shock 11 ms	≤ 100 m/s ² (EN 60068-2-6) ≤ 300 m/s ² (EN 60068-2-27)
Protection EN 60529	IP65
Mass	Approx. 400 g
Dimensions	Approx. 150 mm x 90 mm x 30 mm
Fastening	Top-hat rail mounting

Supported functions

Supported functions	Class	Rotary encoders		Linear encoders
		Singleturn	Multiturn	
Position value	3, 4	✓	✓	✓
Isochronous mode	4	✓	✓	✓
Functions of Class 4	4	✓	✓	✓
Scaling function	4	✓	✓	–
Measuring units per revolution	4	✓	✓	–
Total measuring range	4	✓	✓	–
Cyclic operation (binary scaling)	4	✓	✓	–
Acyclic operation	4	✓	✓	–
Preset	4	✓	✓	✓
Code sequence	4	✓	✓	✓
Preset control G1_XIST1	4	✓	✓	✓
Compatibility mode (encoder profile V.3.1)	3, 4	✓	✓	✓
Operating time	3, 4	✓	✓	✓
Speed	3, 4	✓	✓	✓
Profile version	3, 4	✓	✓	✓
Continuous storage of the offset value	4	✓	✓	✓
Identification & maintenance (I & M)		✓	✓	✓
External firmware upgrade		✓	✓	✓

Electrical connection

PROFINET

Connection

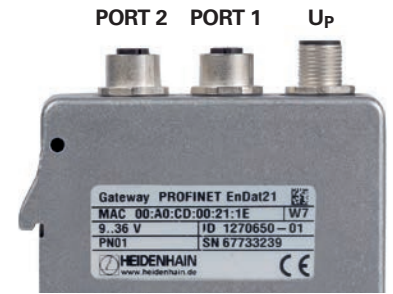
PROFINET and the power supply line are connected via M12 connecting elements. The following mating connectors are required:

PORT 1 and PORT 2

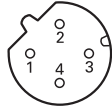
4-pin D-coded M12 coupling (male)

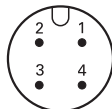
Power supply

4-pin A-coded M12 connector (female)



Pin layout

PORT 1 and PORT 2 4-pin M12 connector (female) D-coded 					
	Position values				
	1	2	3	4	Housing
PORT 1/2	Tx+	Rx+	Tx-	Rx-	Shield

Power supply 4-pin M12 coupling (male) A-coded 				
	1	3	2	4
	Up	0V	Secondary Up	0V

Power should be supplied via the Up pin. The secondary Up pin can be used for a secondary power supply (normally not to be assigned, not suitable for looping through of Up).


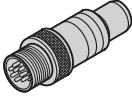





Further information:

For detailed descriptions of all available interfaces, as well as general electrical information, please refer to the *Interfaces of HEIDENHAIN Encoders* brochure (ID 1078628-xx).

Encoders with EnDat interface

Mating connector:
8-pin M12 coupling (male)

	Power supply				Serial data transmission			
	8	2	5	1	3	4	7	6
	U_P	Sensor U_P	0V	Sensor 0V	DATA	DATA	CLOCK	CLOCK
	Brown/Green	Blue	White/Green	White	Gray	Pink	Violet	Yellow

Cable shield connected to housing; **U_P** = Power supply voltage

Sensor: The sense line is connected in the encoder with the corresponding power supply line.

Vacant pins or wires must not be used.

HEIDENHAIN

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This Product Information document supersedes all previous editions, which thereby become invalid. The basis for ordering from HEIDENHAIN is always the Product Information document edition valid when the order is made.



Further information:

Comply with the requirements described in the following documents to ensure correct and intended operation:

- Brochure: *Rotary Encoders* 349529-xx
- Brochure: *Encoders for Servo Drives* 208922-xx
- Brochure: *Angle Encoders with Integral Bearing* 951109-xx
- Brochure: *Linear Encoders for Numerically Controlled Machine Tools* 571470-xx
- Brochure: *Cables and Connectors* 1206103-xx