

SERIES AX70/AX71 HENGSTLER

Optical Absolute Encoder

Key Features

- Up to 22 bit of Singleturn, 12 bit of True Multiturn Absolute Positioning
- ATEX Certification for Explosion Proof Requirements
- Ingress Protection up to IP67
- Stainless Steel or Aluminum Housing
- Multiple Communication Options

HAZ
Hazardous Duty



EN61326-1



Class I, Zone 1, AEx d IIC T4 Gb*



Ex D II C T6/T4

SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS:

Code: Absolute, Optical

Absolute Accuracy: $\pm 35''$ (BiSS/SSI)

Linearity:

BiSS/SSI: $\pm 1/2$ LSB (± 1 LSB for resolution > 13 Bit)

CANopen: $\pm 1/2$ LSB (± 1 LSB for resolution 13, 14, 25, 26 Bit)

Profibus: $\pm 1/2$ LSB (± 1 LSB for resolution 13, 14, 25, 26 Bit)

DeviceNet: $\pm 1/2$ LSB (± 1 LSB for resolution 13, 14, 25, 26 Bit)

ELECTRICAL:

Connection: Cable, axial and radial

Noise Immunity: Tested to EN61326-1

Electrical Immunity: Tested to EN61326-1

Interface: BiSS/SSI/ SSI Programmable

Input Power: 10-30 VDC

Current Consumption:

BiSS/ SSI: 220 mA (ST) / 250 mA (MT)

SSI Programmable: max. 250 mA (ST / MT)

Line/Drivers: Clock and Data RS422

Output Code: Binary or Gray

Resolution Single-turn:

BiSS/ SSI: 10-22 Bit

SSI Programmable: 10-17 Bit

Resolution Multi-turn: 12 Bit

Programmable (with WIN SSI): Resolution, Code Type, Direction, Output Format, Warning, Alarm, Preset Values

Control Input:

BiSS/ SSI: Direction

SSI Programmable: Direction, Preset 1, Preset 2

Alarm Output: Alarm bit

Interface: Profibus

Input Power: 10-30 VDC

Current Consumption: 220 mA (ST) / 250 mA (MT)

Protocol: Profibus DP with encoder profile

CLASS C2 (parameterizable)

Output Code: Binary

Resolution Single-Turn: 10-14 Bit

Resolution Multi-turn: 12 Bit

Frequency Response (Baud Rate): Is automatically

set within a range of 9.6 Kbit/s through 12Mbit/s

Bus Terminating Resistor: External Mounting

Device Address: Set via Bus

Integrated Special Functions: Speed, Acceleration, Operating Time

Programmable: Resolution, Preset, Direction

Interface: CANopen

Input Power: 10-30 VDC

Current Consumption: 250 mA (ST, MT)

Protocol: CANopen according to DS 301 with encoder profile DSP 406

Output Code: Binary

Resolution Single-Turn: 10-16 Bit

Resolution Multi-turn: 12 Bit

Frequency Response (Baud Rate): set via bus within a range of 10 to 1000 Kbit/s (Standard setting for baud rate is 800 Kbit/s ex works)

Bus Terminating Resistor: External Mounting

Node ID: Set via Bus

Integrated Special Functions: Speed, Acceleration, Rotary Axis, Limited Values, Operating Time

Programmable: Resolution, Preset, Direction

Interface: DeviceNet

Input Power: 10-30 VDC

Current Consumption: 220 mA (ST) / 250 mA (MT)

Protocol: DeviceNet according to Rev. 2.0, programmable encoder

Output Code: Binary

Resolution Single-Turn: 10-14 Bit

Resolution Multi-turn: 12 Bit

Frequency Response (Baud Rate): 500KBaud

Bus Terminating Resistor: Activated

Mac-ID: =1

Programmable: Resolution, Preset, Direction

MECHANICAL

Shaft Diameter: 10 mm (Solid shaft)

Mounting: Clamping flange

Max. Shaft Load: Axial= 40 N, Radial= 100 N

Max. Shaft Speed: T4= 10 000 rpm; T6= 6000 rpm

Starting Torque: ≤ 1 Ncm

Moment of Inertia: approx. 20 gcm²

Housing Material: AX 70= Aluminum;

AX 71= Stainless Steel

Shaft Material: Stainless Steel

Disc Material: Glass

Weight: AX 70= approx. 1.4 kg; AX 71= approx. 4.8 kg

ENVIRONMENTAL

Ambient temperature: T4= -40°C to +60°C;

T6= -40°C to +40°C

Operating Temperature:

Operating temperature correlating with Ex-requirements, please see page 2 showing allowed ambient temperature in relation to different conditions

Storage Temperature: -25°C to +85°C

Shock (DIN EN 60068-2-27): 1000 m/s² (6 ms)

Vibration (DIN EN 60068-2-6): 100 m/s² (10 to 500 Hz)

Humidity: Up to 75%, (No Condensation Allowed)

Enclosure Rating:

Housing: (EN 60529/ A1:2000-02): T4: IP65 or

IP67; T6: IP65

Shaft: (EN 60529/ A1:2000-02) T4: IP64 or IP67 ; T6: IP64

No standing water allowed at the shaft entrance or cable entrance or at the ball bearing.

*ETL marking available by Special Request

HENGSTLER SERIES AX70/AX71

MAXIMUM SPEED VS TEMPERATURE CLASS

Interface	Protection Class	Max. Speed	Ambient Temperature	Temperature Class
SSI / BiSS	IP64	1000 rpm	-40 °C ... +60 °C	T6
		10000 rpm	-40 °C ... +40 °C	T6
		10000 rpm	-40 °C ... +60 °C	T4
	IP67	1000 rpm	-40 °C ... +60 °C	T6
		6000 rpm	-40 °C ... +60 °C	T4
		10000 rpm	-40 °C ... +55 °C	T4
Profibus CANopen DeviceNet SSI-P	IP64	1000 rpm	-40 °C ... +60 °C	T6
		6000 rpm	-40 °C ... +50 °C	T6
		10000 rpm	-40 °C ... +60 °C	T4
	IP67	1000 rpm	-40 °C ... +55 °C	T6
		3000 rpm	-40 °C ... +40 °C	T6
		6000 rpm	-40 °C ... +60 °C	T4
		10000 rpm	-40 °C ... +40 °C	T4

T6 = Highest permissible surface temperature +85°C (max. speed = 6000 /min⁻¹)
 T4 = Highest permissible surface temperature +130°C (max. speed = 10,000 /min⁻¹)

ELECTRICAL CONNECTIONS — SSI-P

Wire Color	Pin No.	SSI-P Function
White 0.14 mm	6	RS232 RxD
Brown 0.14 mm	5	RS232 TxD
Green	10	Clock
Yellow	9	Clock
Gey	8	Data
Pink	7	Data
Blue	3	Direction
Black	4	0 V signal output
Red	1	Preset 1
Violet	2	Preset 2
Brown 0.5 mm	11	0 V supply voltage
White 0.5 mm	12	DC 10 ...30 V
Screen	—	Screen connected to encoder housing

ELECTRICAL CONNECTIONS — SSI/BiSS

Wire Color	Pin No.	SSI Function
White 0.25 mm	12	Vcc 10 to 30VDC
Brown 0.25 mm	11	0 V Gnd.
Green	10	Clock
Yellow	9	Clock
Gey	8	Data
Pink	7	Data
Blue	3	Direction
Black	4	0 V Gnd.

ELECTRICAL CONNECTIONS — Profibus

Wire Color	Profibus Function
Yellow	B in
Green	A in
Pink	B out
Grey	A out
Blue	GND1 (M5V ¹)
Brown	VCC1 (P5V ¹)
White 0.5 mm	DC 10 - 30 V
Brown 0.5 mm	0 V
Screen	Connected to encoder housing

¹ used for power supply for an external bus termination resistor

SSI / SSI-P RECOMMENDED DATA TRANSFER RATE (bei SSI)

Cable length	Frequency
<50 m	<400 kHz
<100 m	<300 kHz
<200 m	<200 kHz
<400 m	<100 kHz

The max. data transfer rate depends on the cable length.

For Clock /Clock and Data /Data please use twisted pairs. Use shielded cable.

ORDERING INFORMATION SSI / BiSS To order, complete the model number with code numbers from the table below:

Code 1: Model	Code 2: Resolution ¹	Code 3: Voltage	Code 4: Mounting	Code 5: Protection Class	Code 6: Shaft Size	Code 7: Interface	Code 8: Connection	Code 9: Cable Length
Ordering Information								
AX70	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AX70 Heavy Duty Absolute encoder, Aluminum Housing	0010 10 ST 0012 12 ST 0013 13 ST 0014 14 ST 0017 17 ST 0019 19 ST 0022 22 ST	E 10-30VDC	K Clamping Flange	4 IP64 7 IP67 ^{2,3}	2 10mm	BI BiSS-B BE BiSS-C SB SSI-Binary SG SSI-Gray	A Axial Cable B Radial Cable	FO 5 m KO 10 m PO 15 m UO 20 m VO 25 m WO 30 m XO 40 m YO 50 m
AX71 Stainless Steel Housing	1212 12 MT +12 ST 1213 12 MT +13 ST 1214 12 MT +14 ST 1217 12 MT +17 ST 1219 12 MT +19 ST 1222 12 MT +22 ST							

Notes:

¹When resolution > 14 Bit: max. clock frequency 178 kHz

²Only with temperature class 4; IP67 is necessary for use in areas with cloud of dust

³Dust explosion-proof certification (D) only for IP67

SERIES AX70/AX71



ORDERING INFORMATION SSI - PROGRAMMABLE To order, complete the model number with code numbers from the table below:

Code 1: Model	Code 2: Resolution	Code 3: Voltage	Code 4: Mounting	Code 5: Protection Class	Code 6: Shaft Size	Code 7: Interface	Code 8: Connection	Code 9: Cable Length
Ordering Information								
AX70	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> •	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AX70 Heavy Duty Absolute encoder, Aluminum Housing	0010 10 ST 0012 12 ST 0013 13 ST 0014 14 ST 0017 17 ST 1212 12 MT +12 ST 1213 12 MT +13 ST 1214 12 MT +14 ST	E 10-30VDC	K Clamping Flange	4 IP64 7 IP67 ^{1,2}	2 10mm	SP SSI-Programmable	A Axial Cable B Radial Cable	FO 5 m KO 10 m PO 15 m UO 20 m VO 25 m WO 30 m XO 40 m YO 50 m
AX71 Stainless Steel Housing	1217 12 MT +17 ST							

Notes:

¹ IP67 only with temperature class 4

² Dust explosion-proof certification (D) only for IP67

ORDERING INFORMATION Profibus, CANopen, DeviceNet

Code 1: Model	Code 2: Resolution	Code 3: Voltage	Code 4: Mounting	Code 5: Protection Class	Code 6: Shaft Size	Code 7: Interface	Code 8: Connection	Code 9: Cable Length
Ordering Information								
AX70	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> •	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AX70 Heavy Duty Absolute encoder, Aluminum Housing	0010 10 ST 0012 12 ST 0013 13 ST 0014 14 ST 1212 12 MT +12 ST 1213 12 MT +13 ST 1214 12 MT +14 ST	E 10-30VDC	K Clamping Flange	4 IP64 7 IP67 ^{1,2}	2 10mm	DP Profibus OL CANopen VD DeviceNet	A Axial Cable B Radial Cable	FO 5 m KO 10 m PO 15 m UO 20 m VO 25 m WO 30 m XO 40 m YO 50 m
AX71 Stainless Steel Housing	Available only for CANopen 0016 16 ST							

Notes:

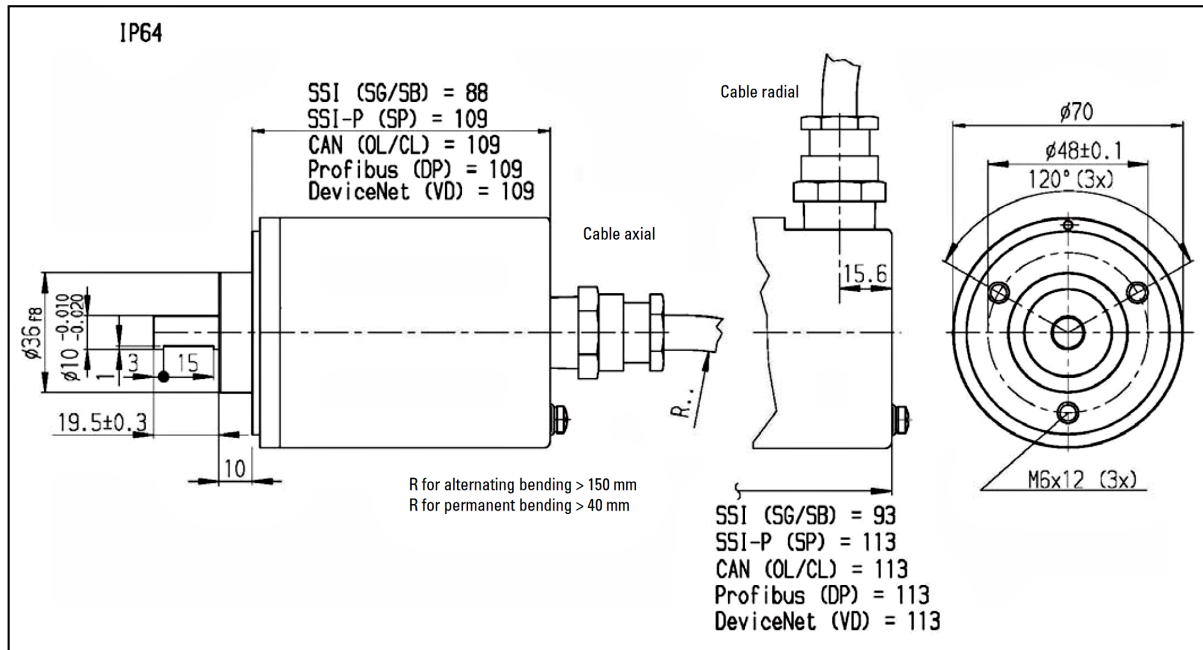
¹ IP67 only with temperature class 4

² Dust explosion-proof certification (D) only for IP67

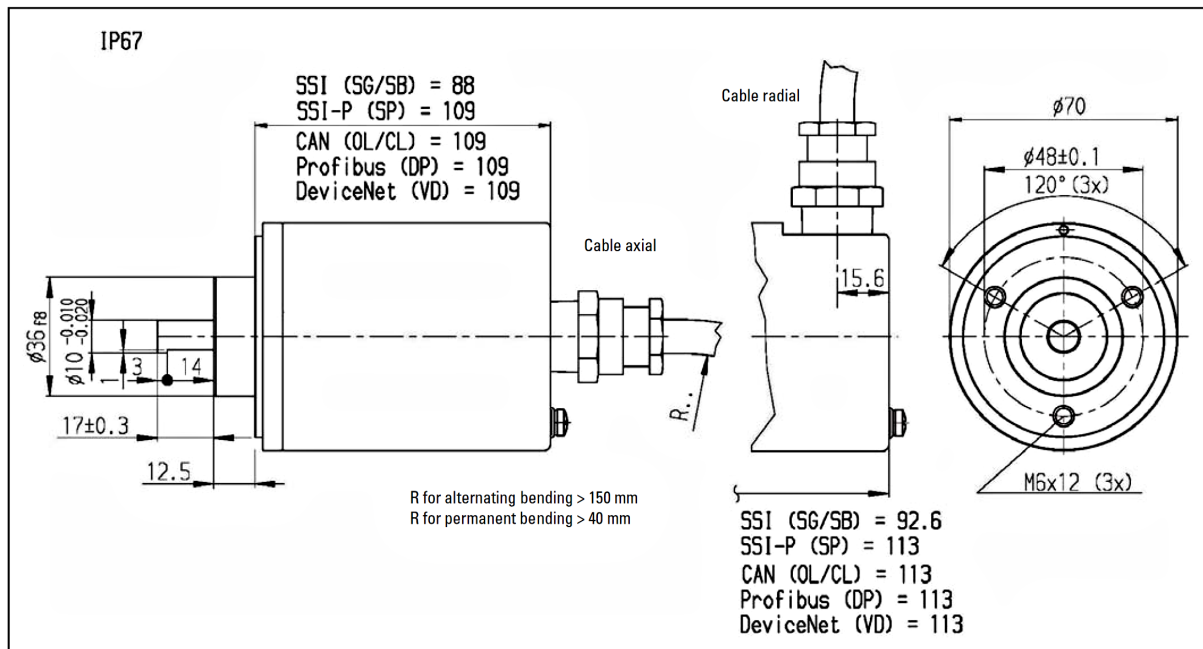
HENGSTLER SERIES AX70/AX71

DIMENSIONS mm

WITH IP64



WITH IP67



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