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### Important Note

The information shown in these documents is for guidance only. No liability is accepted for any errors or omissions. The designer or user is solely responsible for the safe and proper application of the parts, assemblies or equipment described.

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# Absolute Shaft Encoders Type AX 70 / 71

## Explosion proof



Version AX 70 - Aluminium



Version AX 71 - Stainless steel

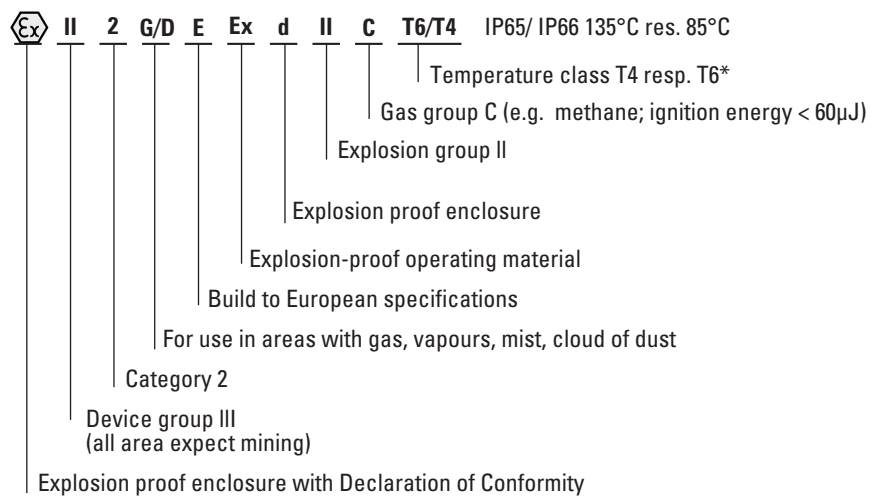
- ATEX certification for gas and dust explosion proof
- Same electrical performance as ACURO industry
- Protection class up to IP67
- Diameter only 70 mm
- Robust design
- Also available with stainless steel
- Resolution up to 29 Bit (17 Bit ST, 12 Bit MT)
- Applications:
  - enamelling production line
  - petro chemistry
  - bottling machines
  - mixers
  - silo works, mills
- Interfaces: SSI, SSI programmable, Profibus, CANopen



ATEX

### EX-CLASSIFICATION

The absolute shaft encoder line ACURO is available in explosion proof design with explosion proof enclosure "d" under AX 70 and AX 71 (stainless steel). The PTB has assured with the Declaration of Conformity that the AX 70 / 71 meets the requirements of safety and health according to EN 50014 and EN 50018. Therefore it is approved in explosive areas, code „Ex II 2 G/D E Ex d II C T4/T6 IP65/ IP66 135°C resp. 85°C“. For applications under tough environmental conditions and food industry the stainless steel version AX 71 is available.



T6 = Highest permissible surface temperature +85°C (max. speed = 6000 U/min<sup>-1</sup>)  
 T4 = Highest permissible surface temperature +130°C(max. speed = 10000 U/min<sup>-1</sup>)

# Absolute Shaft Encoders

# Type AX 70 / 71

## Explosion proof

### TECHNICAL DATA mechanical (for all interfaces)

	Temperature class T4	Temperature class T6
Housing diameter	70 mm	70 mm
Shaft diameter	10 mm	10 mm
Protection class housing	IP67 or IP65	IP65
Protection class shaft	IP67 or IP64	IP64
Max. speed	10000 min <sup>-1</sup>	6000 min <sup>-1</sup>
Torque	≤ 1 Ncm	≤ 1 Ncm
Moment of inertia	approx. 20 gcm <sup>2</sup>	approx. 20 gcm <sup>2</sup>
Max. shaft load	axial 40 N/ radial 100 N	axial 40 N/ radial 100 N
Vibration resistance (IEC 68-2-6)	100 m/s <sup>2</sup> (10 - 500 Hz)	100 m/s <sup>2</sup> (10 - 500 Hz)
Shock resistance (IEC 68-2-27)	1000 m/s <sup>2</sup> (6 ms)	1000 m/s <sup>2</sup> (6 ms)
Operating temperature	-40 ...+60°C	-40 ...+40°C
Storage temperature	-25...+80°C	-25...+80°C
Material shaft / housing	Aluminium (AX70) Stainless steel (AX71)	Aluminium (AX70) Stainless steel (AX71)
Weight approx. ST/MT	1 000 g (AX 70) 1 900 g (AX 71)	1 000 g (AX 70) 1 900 g (AX 71)

### TECHNICAL DATA ELECTRICAL Profibus, CANopen

	Profibus	CANopen
Supply voltage	DC 10-30 V	DC 10-30 V
Max. current w/o load ST/MT	220 mA/ 250 mA	max. 250 mA
Profile/ Protocol	Profibus DP with encoder profile class C2 (programmable)	CANopen according DS 301 with encoder profile DSP 406
Output code	binary	binary
Resolution singleturn	10 - 14 Bit	10 - 14 Bit
Resolution multiturn		12 Bit
Baud rate	is automatically set within a range of 9.6 Kbit/s through 12Mbit/s	set via DIP-switches
Bus terminating resistor	external mounting	external mounting
Device address	set via Bus	-
Node ID	-	set via Bus
Integrated special functions	Speed, acceleration, operating time	Speed, acceleration, round axis, limit values operating time
Programmable	Resolution, Preset, Direction	Resolution, Preset, Limit value, Direction
Connection	Cable axial	Cable axial

### PIN ASSIGNMENT Profibus, CANopen

Color	Profibus	CANopen
yellow	B in	CAN in+
green	A in	CAN in -
pink	B out	CAN out+
grey	A out	CAN out -
blue	GND1 (M5V <sup>1</sup> )	CAN GND in
brown	VCC1 (P5V <sup>1</sup> )	CAN GND out
white 0.5 mm	DC 10 ... 30 V	UB in
brown 0.5 mm	0 V	0 V in
Screen	Screen connected to encoder housing	

<sup>1</sup> used for power supply for an external bus termination resistor

# Absolute Shaft Encoders **Type AX 70 / 71**

## Explosion proof

### TECHNICAL DATA ELECTRICAL SSI, SSI PROGRAMMABLE

	SSI	SSI programmable
Supply voltage	DC 10-30 V	DC 10-30 V
Max. current w/o load ST/MT	220 mA/ 250 mA	max. 250 mA
Lines / Drivers	clock and data RS422	clock and data RS422
Output code	binary or gray	binary or gray
Resolution singleturn	10 - 17 Bit	9 - 22 Bit
Resolution multiturn	12 Bit	12 Bit
Programmable (with ACURO soft + appropriate hardware)	code type, direction, warning, alarm	-
Programmable (with WIN SSI)	-	code type, direction, output code, warning, alarm
Control input	<u>Direction</u>	Direction, Preset 1, Preset 2
Alarm output	Alarm bit	Alarm bit
Connection	Cable axial	Cable axial

### PIN ASSIGNMENT SSI, SSI programmable

Color	No.	SSI	SSI programmable
white 0.14 mm	6	DC 10 ... 30 V	RS232 RxD
brown 0.14 mm	5	0 V supply voltage	RS232 TxD
green	10	<u>Clock</u>	<u>Clock</u>
yellow	9	Clock	Clock
grey	8	<u>Data</u>	<u>Data</u>
pink	7	Data	Data
blue	3	<u>Direction</u>	Direction
black	4	0 V signal output	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 the housing	

### RECOMMENDED DATA TRANSFER RATE WITH SSI

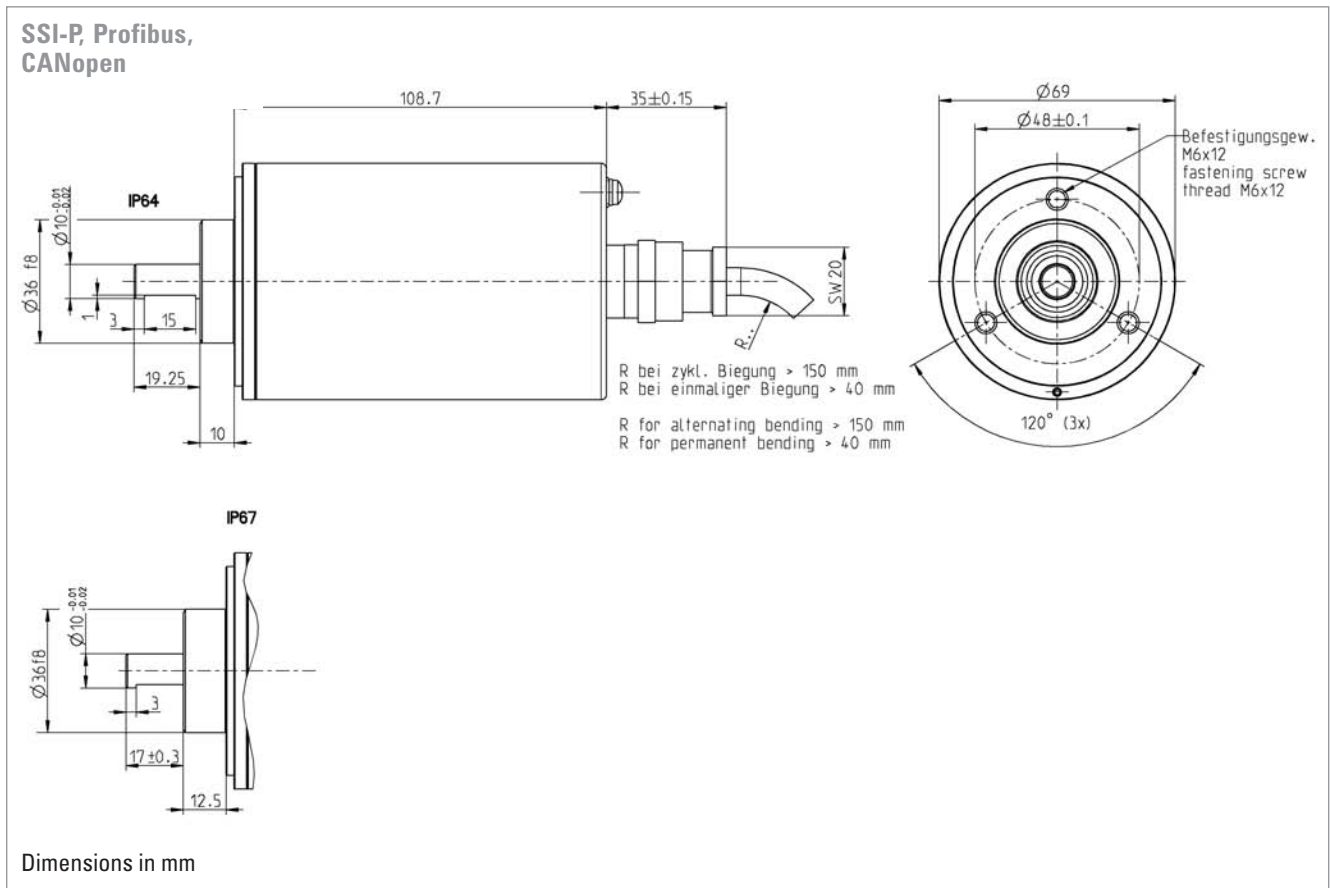
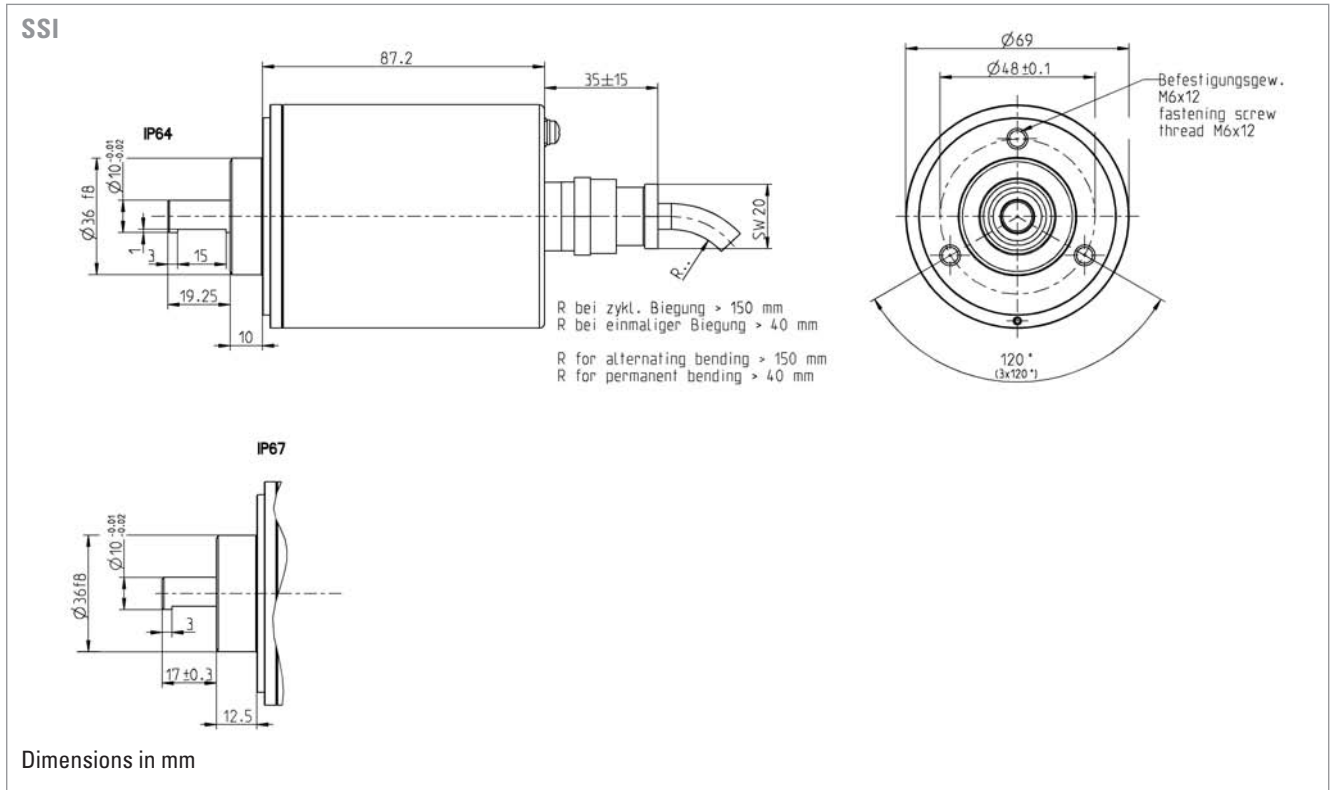
The max. data transfer rate depends on the cable length.  
For Clock/ Clock and Data/ Data please use twisted pairs. Use shielded cable.

Lead length	Baud rate
< 50 m	< 400 kHz
< 100 m	< 300 kHz
< 200 m	< 200 kHz
< 400 m	< 100 kHz

# Absolute Shaft Encoders Type AX 70 / 71

## Explosion proof

### DIMENSIONAL DRAWINGS



# Absolute Shaft Encoders Type AX 70 / 71

## Explosion proof

### ACCESSORIES

<b>SSI</b>	
Software ACURO soft	on request
<b>SSI programmable</b>	
Technical Manual German	2 565 287 (or homepage)
Technical Manual English	2 565 289 (or homepage)
Software Win SSI	on request
<b>Profibus</b>	
GSD-file as download from our homepage	www.hengstler.com
Technical Manual German	2 565 090 (or homepage)
Technical Manual English	2 565 255 (or homepage)
<b>CANopen</b>	
EDS-file as download from our homepage	www.hengstler.com
Technical Manual German	2 565 250 (or homepage)

### ORDERING INFORMATION

ACURO industry with SSI

Type	Resolution	Supply voltage	Flange, Protection, Shaft	Output	Connection
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>AX70-</b> Aluminum <b>AX71-</b> Stainless steel	<b>0010</b> 10 Bit ST <b>0012</b> 12 Bit ST <b>0013</b> 13 Bit ST <b>0014</b> 14 Bit ST <b>0017</b> 17 Bit ST ** <b>0360</b> 360 Incr. ST <sup>1</sup> <b>0720</b> 720 Incr. ST <sup>2</sup> <b>1212</b> 12 Bit MT+12 Bit ST <b>1213</b> 12 Bit MT+13 Bit ST higher resolutions on request	<b>E</b> DC 10 - 30 V	<b>K.42</b> Clamping flange, IP64, 10x19.5 mm <b>K.72*</b> Clamping flange, IP67, 10x19.5 mm	<b>SB</b> SSI Binary <b>SG</b> SSI Gray	<b>A-F0</b> Cable axial 5 m <b>A-K0</b> Cable axial 10 m
* only with temperature class 4; IP67 is necessary for use in areas with clouds of dust ** When resolution > 14 Bit → max. clock frequency 178 kHz <sup>1</sup> with Offset 76 (value range 76...435) <sup>2</sup> with Offset 152 (value range 152...871)					

### ORDERING INFORMATION

ACURO industry with SSI programmable

Type	Resolution	Supply voltage	Flange, Protection, Shaft	Output	Connection
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>AX70-</b> Aluminum <b>AX71-</b> Stainless steel	<b>0010</b> 10 Bit ST <b>0012</b> 12 Bit ST <b>0013</b> 13 Bit ST <b>0014</b> 14 Bit ST <b>0017</b> 17 Bit ST <b>1212</b> 12 Bit MT+12 Bit ST <b>1213</b> 12 Bit MT+13 Bit ST <b>1214</b> 12 Bit MT+14 Bit ST <b>1217</b> 12 Bit MT+17 Bit ST higher resolutions on request	E DC 10 - 30 V	<b>K.42</b> Clamping flange, IP64, 10x19.5 mm <b>K.72*</b> Clamping flange, IP67, 10x19.5 mm	<b>SP</b> SSI programmable	<b>A-F0</b> Cable axial 5 m <b>A-K0</b> Cable axial 10 m

\* only with temperature class 4; IP67 is necessary for use in areas with clouds of dust

### ORDERING INFORMATION

ACURO industry with Profibus

Type	Resolution	Supply voltage	Flange, Protection, Shaft	Output	Connection
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>AX70-</b> Aluminum <b>AX71-</b> Stainless steel	<b>0010</b> 10 Bit ST <b>0012</b> 12 Bit ST <b>0013</b> 13 Bit ST <b>0014</b> 14 Bit ST <b>1212</b> 12 Bit MT+12 Bit ST <b>1213</b> 12 Bit MT+13 Bit ST <b>1214</b> 12 Bit MT+14 Bit ST	E DC 10 - 30 V	<b>K.42</b> Clamping flange, IP64, 10x19.5 mm <b>K.72*</b> Clamping flange, IP67, 10x19.5 mm	<b>DP</b> Profibus	<b>A-F0</b> Cable axial 5 m <b>A-K0</b> Cable axial 10 m

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### ORDERING INFORMATION

ACURO industry with CANopen

Type	Resolution	Supply voltage	Flange, Protection, Shaft	Output	Connection
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>AX70-</b> Aluminum <b>AX71-</b> Stainless steel	<b>0010</b> 10 Bit ST <b>0012</b> 12 Bit ST <b>0013</b> 13 Bit ST <b>0014</b> 14 Bit ST <b>1212</b> 12 Bit MT+12 Bit ST <b>1213</b> 12 Bit MT+13 Bit ST <b>1214</b> 12 Bit MT+14 Bit ST	E DC 10 - 30 V	<b>K.42</b> Clamping flange, IP64, 10x19.5 mm <b>K.72*</b> Clamping flange, IP67, 10x19.5 mm	<b>OL</b> CANopen	<b>A-F0</b> Cable axial 5 m <b>A-K0</b> Cable axial 10 m

\* only with temperature class 4; IP67 is necessary for use in areas with clouds of dust