Absolute Shaft Encoders — Type AC 58

ACURO industry — BiSS / SSI

Synchro flange

- Compact design:50 mm length for single or multi turn
- Aids for start up and operation: diagnostic LED, preset key with optical response, status information
- Interfaces: Standard SSI, expanded SSI mode, parallel interface or BiSS
- Use of sine / cosine signals for fast control tasks possible

Hollow shaft

TECHNICAL DATA
mechanical

Housing diameter	58 mm
Protection shaft input	IP 64 or IP 67
Protection housing	IP 67[1)]
Flange	Synchro flange, clamping flange, spring plate
Shaft diameter	Full shaft 6 mm, 10 mm; hollow shaft 10 mm, 12 mm
Max. speed	Continuous: 10,000 min^{-1}, short term: 12,000 min^{-1}
Starting torque	≤ 0.01 Nm
Inertia of rotor	3.8 x 10^{-6} kgm^2
Spring tether (hollow shaft)	
Tolerance axial	± 1.5 mm
Tolerance radial	± 0.2 mm
Max. shaft load	axial 40 N, radial 60 N Ø 6 mm axial 60 N (13 lbs), radial 110 N (24 lbs) Ø 10 mm axial 107 N (24 lbs), radial 160 N (35 lbs)
Bearing life	1 x 10^{10} revolutions (typ.) at 35% of full rated shaft load 1 x 10^9 revolutions (typ.) at 75% of full rated shaft load 1 x 10^8 revolutions (typ.) at 100% of full rated shaft load For example 30,000 h at 6,000 RPM
Shock resistance DIN EN 60068-2-27	1,000 m/s^2 (6 ms)
Vibration resistance DIN EN 60068-2-6	100 m/s^2 (10 ... 2,000 Hz)
Operating temperature	- 40 ... 100 °C
Storage temperature	- 40 ... 85 °C
Weight ST / MT	approx. 260 g / 310 g

TECHNICAL DATA
electrical

Supply voltage	5 V, -5% / + 10 % or 10-30 V
Intrinsic current consumption ST/MT	50 mA / 100 mA
Interface	Standard SSI or BiSS
Lines / Drivers	Clock and data / RS422
Output code	Binary or Gray, parameterization with ACURO soft
Resolution single turn	10-17 Bit, depend. on version, max. 13 Bit in SSI-MT, Gray Excess: 360, 720 steps
Resolution multi turn	12 Bit
Incremental signals, optional	Sine / cosine 1 Vpp
Number of increments	2048
3dB limiting frequency	500 kHz
Absolute accuracy	±35"
Repeatability	±7"
Connections	Cable or flange connector Conin axial or radial
Parameterization	Resolution, code type, direction, warning, alarm
Control input	Direction
Reset key	Latch via parameterization
Alarm output	Alarm bit (SSI option), warning bit and alarm bit (BiSS)
Status LED	Green = OK, red = alarm

[1)] Closed housing, no preset key + LED

DIMENSIONAL DRAWING

See chapter "Absolute Encoders – Dimensional drawings".

RECOMMENDED DATA TRANSFER RATE WITH SSI

The max. data transfer rate depends on the lead length.
For clock / $\overline{\text{clock}}$ and data / $\overline{\text{data}}$ please use twisted lead pairs. Use screened cable.

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

DATA FORMAT

Single turn encoder [1]								
Resolution	Data bits							
	T1	...	T9	T10	T11	T12	T13	T14
9 Bit [2]	**S8**	**...**	**S0**	**0**	**0**	**0**	**A**	**0**
10 Bit [2]	**S9**	**...**	**S1**	**S0**	**0**	**0**	**A**	**0**
12 Bit [2]	**S11**	**...**	**S3**	**S2**	**S1**	**S0**	**A**	**0**
13 Bit	**S12**	**...**	**S4**	**S3**	**S2**	**S1**	**S0**	**0**
14 Bit	**S13**	**...**	**S5**	**S4**	**S3**	**S2**	**S1**	**S0**

Multi turn encoder [1]												
Resolution	Data bits											
	T1	**T2**	**...**	**T12**	**T13**	**...**	**T21**	**T22**	**T23**	**T24**	**T25**	**T26**
24 Bit [2]	**M11**	**M10...**		**M0**	**S11**	**...**	**S3**	**S2**	**S1**	**S0**	**A**	**0**
25 Bit	**M11**	**M10...**		**M0**	**S12**	**...**	**S4**	**S3**	**S2**	**S1**	**S0**	**0**
26 Bit	**M11**	**M10...**		**M0**	**S13**	**...**	**S5**	**S4**	**S3**	**S2**	**S1**	**S0**

[1] S0, S1, ... : data bits for resolution per revolution
M0, M1, ... ; data bits for number of revolutions (only for multi turn)
A: alarm bit

[2] Options (parity bit, alarm and parity bit, zero bit) on request and only possible with resolution 9, 10, 12 and 24 Bits

Alarm bit: is set to "1" when over temperature, under temperature, disc breakage and defect LED
Parity bit: (Option) Even Parity (the parity bit expands the data bits to an even number of 1-bits)

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SYNCHRONOUS-SERIAL TRANSFER (SSI)

Synchronous readout of the encoder data is according to the clock rate given by the SSI-counterpart.
The number of clock rates is determined by the type of encoder (singleturn resp. multiturn) and the configuration of the special Bits as defined.
For multiple transactions (the stored value is readout several times successively) a fixed clock rate per transaction must be kept (for singleturn 13 resp. 14 clocks, for multiturn 25 resp. 26 clocks).

- In the rest position, when the last clock brush has passed by more than 30µs, the data output is logically at "1".
- With the first descending clock edge the encoder data and the special bits are loaded in the shift register of the encoder interface.
- With each ascending clock edge the data bits are serially readout, beginning with the MSB.
- At the end of the data transfer the data output is set to logically "0" for approx. 20µs.
  If within these 20µs a further clock brush reaches the encoder interface, the already transferred data is readout once again.
  This multiple transfer of the same data makes it possible to recognize transfer errors.
- After the 20µs the data output goes to its rest position, logically "1". Subsequently new encoder data can be readout.

CONNECTIONS
Conin & Kabel

Cable	Flange connector	Signal
brown (0.25 mm²)	1	0 V (supply voltage)
pink	2	Data
yellow	3	Clock
	4	N.C.
blue	5	$\overline{\text{Direction}}$ [1]
red	6	N.C.
violet	7	N.C.
white (0.25 mm²)	8	5/10 ... 30 VDC
	9	N.C.
grey	10	$\overline{\text{Data}}$
green	11	$\overline{\text{Clock}}$
black	12	0 V-signal output [2]

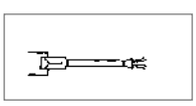
[1] $\overline{\text{Direction}}$: + U_B or unconnected = ascending code values with rotation cw
0 V = descending code values with rotation cw

[2] Connected with 0 V in the encoder. Use this output to lay Direction on logical "0" if required.

PIN ASSIGNMENT

M12 Plug-in connector, 8 pole		
Farbe / Colour	Pin	Signal
ws	1	10...30 Volt
br	2	0 Volt
	3	N.C.
gn	4	$\overline{\text{Clock}}$
rs	5	Data
ge	6	Clock
bl	7	Direction
gr	8	$\overline{\text{Data}}$

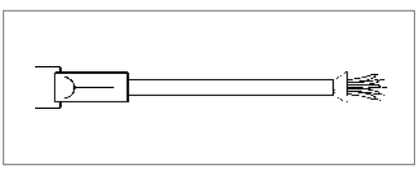
M 12 Plug
Art.No. 3 539 597



Extension cable with plug	
3 m	Art.No. 1 565 313
5 m	Art.No. 1 565 314
10 m	Art.No. 1 565 315

ACCESSORIES

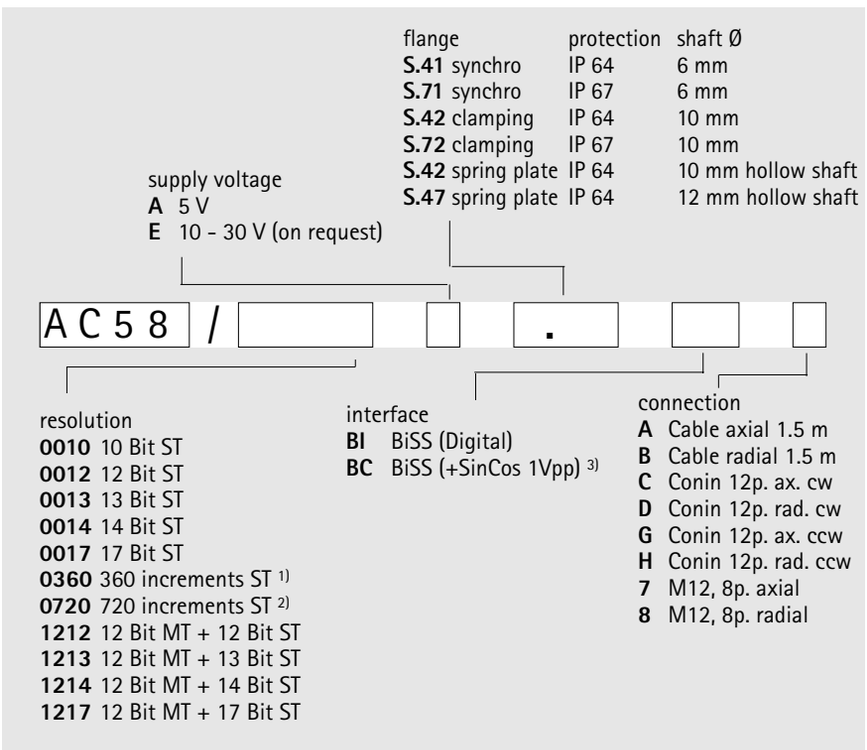
Mating connector: 12 pin Conin		**Cable**	
Turning right		Art.No. 3 539 202	Art.No. 3 280 220
Turning left		Art.No. 3 539 229	
Extension cable with plug			
Turning right	3 m	Art.No. 1 542 003	
	5 m	Art.No. 1 542 004	
	10 m	Art.No. 1 542 005	
Turning left	3 m	Art.No. 1 542 010	
	5 m	Art.No. 1 542 011	
	10 m	Art.No. 1 542 012	



Position Indication signo 727-SSI	See chapter "Accessories"
For mounting	**Art.-No.**
Mounting eccentric for synchronous flange	0 070 655
Diaphragm coupling (hub 6/6 mm)	3 520 081
Diaphragm coupling (hub 10/10 mm)	3 520 088

	Art.-No.
ACURO soft, PC connecting cable, incl. power pack 230 VA, for CONIN 12 pole, CCW (suited for supply voltage E and connection G or H)	1 565 053

ORDERING DATA
ACURO industry BiSS



1) with Offset 76 (value range 76 ... 435)
2) with Offset 152 (value range 152 ... 871)
3) not with connection "7" / "8"

ORDERING DATA
ACURO industry BiSS