Standard Industrial Types - Absolute

AC 58 - BiSS / SSI, Parallel

- Compact design for single or multiturn
- Aids for start-up and operation: diagnostic LED, preset key with optical response
- Interfaces: standard SSI, expanded SSI mode or BiSS
- Use of sine / cosine signals for fast control tasks possible

Type	AC 58 - BiSS / SSI	AC 58 - Parallel
Technical Data - mechanical		
Housing diameter	58 mm	58 mm
Shaft diameter	6 mm ... 10 mm (Solid shaft) 10 mm ... 12 mm (Hub shaft)	6 mm ... 10 mm (Solid shaft) 10 mm ... 12 mm (Hub shaft)
Flange (Mounting of housing)	Synchro flange, Clamping flange, Tether, Square flange	Synchro flange, Clamping flange, Tether, Square flange
Protection class shaft input	IP64 or IP67	IP64 or IP67
Protection class housing	IP64 or IP67	IP64 or IP67
Shaft load axial / radial	40 N / 60 N	40 N / 60 N
Max. speed	max. 12000 rpm	max. 12000 rpm
Vibration resistance	100 m/s² (10 ... 2000 Hz)	100 m/s² (10 ... 2000 Hz)
Shock resistance	1000 m/s² (6 ms)	1000 m/s² (6 ms)
Operating temperature	-40 °C ... +100 °C	-40 °C ... +100 °C
Connection	Cable / M23 / M12	Cable / M23 / Sub-D
Technical Data - electrical		
Supply voltage	-5%/ 10% DC 5 V / DC 10-30 V	DC 10-30 V
Max. current w/o load	max. 100 mA	max. 300 mA
Resolution singleturn	10 - 17 Bit Gray Excess: 360, 720 increments	10 - 14 Bit Gray Excess: 360, 720 increments
Resolution multiturn	12 Bit	12 Bit
Output code	Binary, Gray	Binary, Gray, Gray Excess
Parametrization	Code type, Direction, Warning, Alarm	
Output current		30 mA per Bit, short-circuit-proof
Control inputs	$\overline{\text{Direction}}$	$\overline{\text{Latch}}$, $\overline{\text{Direction}}$, $\overline{\text{Tristate}}$ with ST, Tristate with MT
Reset key	Disable via parameterization	
Alarm output	Alarm bit (SSI Option), warning and alarm bit (BiSS)	NPN-O.C., max. 5 mA
Status LED	Green = ok, red = alarm	Green = ok, red = alarm
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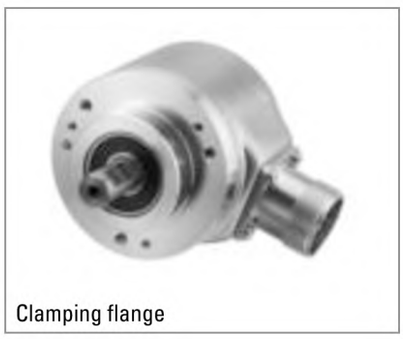
Clamping flange

- Compact design: 50 mm length for single or multiturn
- Aids for start up and operation: diagnostic LED, preset key with optical response, status information
- Use of sine/ cosine signals for fast control task possible
- Control input: Direction
- Resolution up to 29 Bit

TECHNICAL DATA
mechanical

Housing diameter	58 mm
Shaft diameter	6 mm / 10 mm (Solid shaft) 10 mm / 12 mm (Hub shaft)
Flange (Mounting of housing)	Synchro flange, Clamping flange, Tether, Square flange
Protection class shaft input (EN 60529)	IP64 or IP67
Protection class housing (EN 60529)	IP64 or IP67
Shaft load axial / radial	40 N / 60 N
Axial endplay of mounting shaft (hubshaft)	± 1.5 mm
Radial runout of mating shaft (hubshaft)	± 0.2 mm
Max. speed	max. 10 000 rpm (continuous), max. 12 000 rpm (short term)
Torque	0.01 Ncm
Moment of inertia	ca. 3.8 x 10^{-6} kgm²
Vibration resistance (DIN EN 60068-2-6)	100 m/s² (10 ... 2000 Hz)
Shock resistance (DIN EN 60068-2-27)	1000 m/s² (6 ms)
Operating temperature	-40 °C ... +100 °C
Storage temperature [1]	-25 °C ... +85 °C
Weight	approx. 260 g (ST) / 310 g (MT)
Connection	Cable, axial or radial M23 connector (Conin), 12 pole, axial or radial M12-connector, 8 pole, axial or radial

[1] due to packaging

TECHNICAL DATA
electrical

Supply voltage	± 10% DC 5 V or DC 10 - 30 V
Max. current w/o load	50 mA (ST), 100 mA (MT)
Resolution singleturn	10 - 17 Bit Gray Excess: 360, 720 increments
Resolution multiturn	12 Bit
Output code	Binary, Gray
Drives	Clock and Data / RS422
Linearity	± ½ LSB (± 1 LSB for resolution > 13 Bit)

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Absolute BiSS/SSI

TECHNICAL DATA electrical (continued}

Incremental signals optional	Sinus-Cosinus 1 Vpp
Number of pulses	2048
3dB limiting frequency	500 kHz
Absolute accuracy	±35"
Repeatability	±7"
Parametrization	Code type, Direction, Warning, Alarm
Control inputs	Direction
Reset key	Disable via parameterization
Alarm output	Alarm bit (SSI Option}, warning and alarm bit (BiSS)
Status LED	Green = ok, red = alarm

RECOMMENDED DATA TRANSFER RATE bei SSI

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

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

DATA FORMAT Singleturn

Resolution	**Data Bits**										
	T1 ... T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19
9 Bit 1	S8 ... SO	0	0	0	0	0	W_2				
10 Bit 1	S9 ... S1	SO	0	0	0	0	W_2				
11 Bit 1	S10 ... S2	S1	SO	0	0	0	W 2				
12 Bit 1	S11... S3	S2	S1	SO	0	0	W 2				
13 Bit 1	S12 ... S4	S3	S2	S1	SO	0	W_2				
14 Bit 1	S13 ... S5	S4	S3	S2	S1	SO	0	W_2			
15 Bit 1	S14 ... S6	S5	S4	S3	S2	S1	SO	0	W_2		
16 Bit 1	S15 ... S7	S6	S5	S4	S3	S2	S1	SO	0	W_2	
17 Bit 1	S16 ... S8	S7	S6	S5	S4	S3	S2	S1	SO	0	W_2

Examples for data format 9 Bit and 13 Bit with the optional bits alarm und parity

Resolution	**Data Bits**										
	T1 ... T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19
9 Bit+P 3	S8...S0	0	0	0	P	**0**	W 2				
9 Bit+A 4	S8 ...SO	0	0	0	A	0	W 2				
9 Bit+P 3+A 4	S8 ...SO	0	0	0	A	P	0	W 2			
9 Bit + P_3	S12 ... S4	S3	S2	S1	SO	P	0	W 2			
9 Bit + A 4	S12 ... S4	S3	S2	S1	SO	A	0	W 2			
9 Bit+P 3+A 4	S12 ...S4	S3	S2	S1	SO	A	P	0	W 2		

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DATA FORMAT Multiturn

Resolution	Data bits							
	T1 ... T12	T13 ... T21	T22	T23	T24	T25		
24 Bit [1]	M11 ... M0	S11 ... S2	S1	S0	0	W [2]		
25 Bit [1]	M11 ... M0	S12 ... S3	S2	S1	S0	0	W [2]	
26 Bit [1]	M11 ... M0	S13 ... S4	S3	S2	S1	S0	0	W [2]
Example for data format 24 Bit with the optional bits alarm und parity								
24 Bit + P [3]	M11 ... M0	S11 ... S2	S1	S0	P	0	W [2]	
24 Bit + A [4]	M11 ... M0	S11 ... S2	S1	S0	A	0	W [2]	
24 Bit + P [3] + A [4]	M11 ... M0	S11 ... S2	S1	S0	A	P	0	W [2]

S0 ... S16 Data bits for resolution per revolution

M0 ... M11 Data bits for number of revolutions (only for multiturn)

[1] Options (Parity bit, alarm and parity bit, zero bit) on request

[2] W: from this data bit on the data iteration for multiplex starts

[3] Parity bit: Even Parity (The parity bit expands the data bits to an even nummber of 1-bits).
(Option)

[4] Alarm bit: is set to "1" when over temperature, under temperature, disc breakage and defect LED

SYNCHRONOUS-SERAL 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.

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Absolute BiSS/SSI

ELECTRICAL CONNECTIONS
M23 connector (Conin), 12 pole / cable
Interface BI, SB, SG

Cable	M23 (Conin)	Signal
brown [3]	[1]	[0] V (supply voltage)
pink	2	Data
yellow	3	Clock
	4	N.C.
blue	5	Direction '
red	6	N.C.
violet	7	N.C.
white [3]	8	DC 5/10 - 30 V
	9	N.C.
grey	10	Data
green	11	Clock
black	12	0 V-signal output [2]

[1] Direction: +UBor 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.

[3] use only thin wires (0 = 0.14 mm)

ELECTRICAL CONNECTIONS
M23 connector (Conin), 12 pole / cable
Interface SC, BC

Cable	M23 (Conin)	Signal
brown [2]	[1]	[0] V (supply voltage)
pink	2	Data
yellow	3	Clock
white/green	4	A+
blue	5	Direction [1]
red/blue	6	B+
brawn/green	7	A-
white [2]	8	DC 5/10 - 30 V
grey/pink	9	B-
grey	10	Data
green	11	Clock
black	12	Sense

1Direction : +UBor unconnected = ascending code values with rotation cw
0 V = descending code values with rotation cw

[2] use only thin wires (0 = 0.14 mm)