For technical assistance call the Strategic Products number on the back cover.

Features

- Single-turn
- Short circuit proof
- Multiturn
- Opto-ASIC
- Parallel, tristate
- INTERBUS-S
- SSI

BA 58 - Absolute Shaft Encoder

Electrical Characteristics

Output	Parallel, serial (SSI), Interbus-S (ENCOM-profile K2)
Resolution	
Parallel	360 increments (optional), 1024 increments (10-bit), 4,096 increments (12-bit),16384 increments (14-bit)
Serial	8192 increments (13-bit),1,024 increments (10-bit), 4,096 increments (12-bit), 4,096 increments/256 turns (20-bit), 8192 increments/4096 turns (25-bit), 4,096 increments/4,096 turns (24-bit)
Interbus-S	1,024 increments (10-bit), 4,096 increments (12-bit), 4,096 increments/4,096 turns (24-bit)
Type of Code	
Parallel	Gray, Gray excess (optional), Binary
Serial	Gray, Binary
Interbus-S	Binary
Sense of Direction When Turning Clockwise	
Parallel	$\overline{\text{Direction}}$ = H: ascending code values, $\overline{\text{Direction}}$ = L: descending code values
Serial	Direction = H: ascending code values, $\overline{\text{Direction}}$ = L: descending code values
Interbus-S	Ascending code values
Supply Voltage	
Parallel	5 VDC, 10-30 VDC***
Serial	10-30 VDC***
Interbus-S	10-30 VDC***
Power Consumption	
Parallel	140 mA (5V), 80 mA (24 V)
Serial	Max. 2W
Interbus-S	Max. 2W
Code Switching Frequency	Max. 100 kHz
Inputs	
Parallel	Direction, latch, Tristate
Serial	Direction
Output Load	
Parallel	30 mA, short circuit proof
Serial	RS 422
Interbus-S	RS 485
Alarm Output	
Parallel	NPN O.C. 10 mA
Serial	Programmable
Parity Bit	
Parallel	—
Serial	Programmable
Linearity	±1/2 LSB
Maximum Cable Lengths	
Parallel	100 m
Serial	400 m
Interbus-S	50 m

Environmental Characteristics

Operating Temperature Range	-10°C to +60°C
Storage Temperature Range	-25°C to +85°C
Vibration Performance (IEC 68-2-6)	100 ms^2 (10-500 Hz)
Shock Resistance (IEC 68-2-27)	1.000 ms^2 (3 ms)

Mechanical Characteristics

Shaft Diameter	6mm (synchro flange), 10mm (clamping flange)
Maximum Shaft Load	6mm: Axial 60 N (13 lbs.), radial 110 N (24 lbs.); 10mm: Axial 107 N (24 lbs.), radial 160 N (35 lbs.)
Maximum Speed	10,000 rpm (short term), 6,000 rpm (continuous duty)
Torque	1 Ncm
Moment of Inertia	14 gcm² according to design
Enclosure Class (to DIN 40050)	IP 65*
General Design	As per DIN VDE 0160
Connection, Axial or Radial	1.5-m cable** or flange box
Housing	Aluminum
Flange	S = synchro flange, K = clamping flange
Weight	300g approx.
Bearing Life	1 X 10^9 revolutions (typ.) at 35% of full rated shaft load 1 X 10^8 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 with a 13 lb. radial load (10mm or 9.52 mm shaft)

*Other specifications available on request
**Other lengths of cable available on request
***Pole protection
Specifications are subject to change without notice.

BA 58 - Absolute Shaft Encoder

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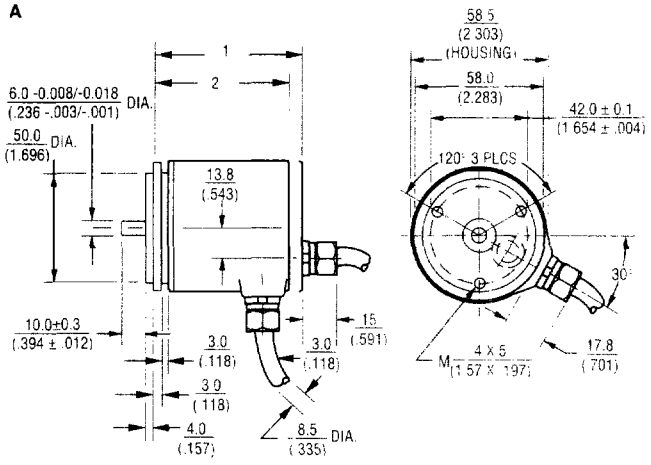
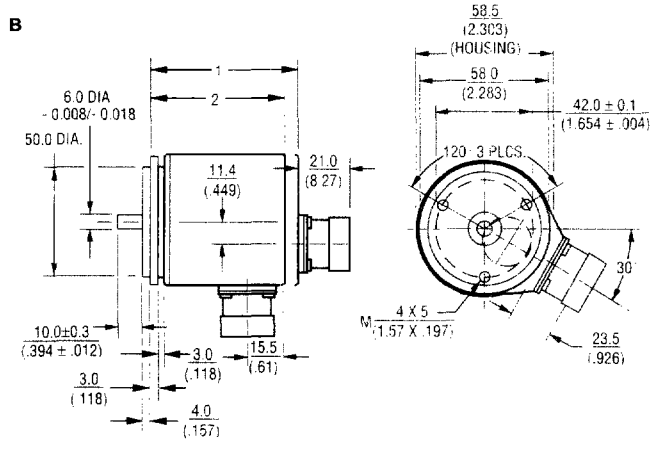
Synchro Flange

A

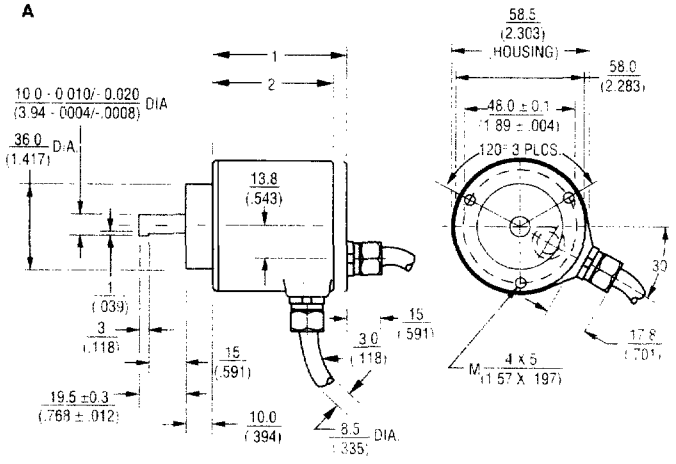


B

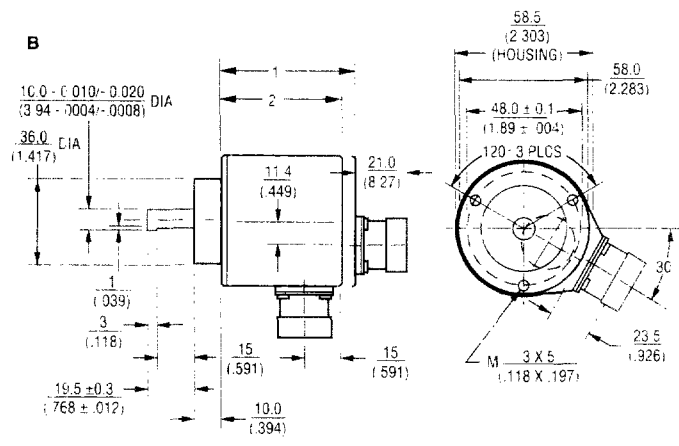


Clamping Flange

A



B



Tolerances Except Where Noted (DIN 7168):

0 - 6	±0.1
(0 - .236	±0.004)
6-30	±0.2
(.236 - 1.181	±0.008)
30-120	±0.3
(1.181 - 4.724	±0.0118)

Drawing	Connection	Length ST	Length MT
A	Cable Axial	1 = 62mm	1 = 80.5mm
A	Cable Radial	2 = 56.5mm	2 = 75.5mm
B	Flange Box Axial	1 = 58mm	1 = 85.5mm
B	Flange Box Radial	2 = 56.5mm	2 = 80.5mm

Drawing	Connection	Length ST	Length MT
A	Cable Axial	1 = 57mm	1 = 75.5mm
A	Cable Radial	2 = 51.5mm	2 = 70.5mm
B	Flange Box Axial	1 = 53mm	1 = 80.5mm
B	Flange Box Radial	2 = 51.5mm	2 = 75.5mm

BA 58 - Absolute Shaft Encoder

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The SSI-interface can be used for single-turn and for multiturn encoders with Gray Code or Binary Code. By programming M1 and M0, special bits (Alarm, Parity) can be joined to the data bits. Standard M1 and M0 are 1, which means Alarm bit is available.

The SSI-interface supports multiple transaction as well as single transaction. On multiple transaction (the stored value is read out several times successively), a fixed clock rate per transaction is to be kept (for single-turn 13 resp. 14 clocks, for multiturn 25 resp. 26 clocks).

When the last special bit is output ("0", Alarm or Parity), the data output logically is at "0" for 20 µs, then it is logically at "1". Subsequently, actual encoder data can be read out again.

Mode		Data Single-turn						Special Bits	
M1	M0	T1	...	T9	T10	T11	T12	T13	T14
1	0	S9	...	S1	S0	0	0	0	(0)
1	1	S9	...	S1	S0	0	0	A	(St)
0	0	S9	...	S1	S0	0	0	P	(0)
0	1	S9	...	S1	S0	0	0	A	P(0)

Mode		Data Single-turn						Special Bits	
M1	M0	T1	...	T9	T10	T11	T12	T13	T14
1	0	S11	...	S3	S2	S1	S0	0	(0)
1	1	S11	...	S3	S2	S1	S0	A	(St)
0	0	S11	...	S3	S2	S1	S0	P	(0)
0	1	S11	...	S3	S2	S1	S0	A	P(0)

Mode		Data Multiturn				Data Single-turn						Special bits	
M1	M0	T1	T2	...	T12	T13	...	T21	T22	T23	T24	T25	T26
1	0	M11	M10	...	M0	S9	...	S1	S0	0	0	0	(0)
1	1	M11	M10	...	M0	S9	...	S1	S0	0	0	A	(St)
0*	0	M11	M10	...	M0	S9	..	S1	S0	0	0	P	(0)
0*	1	M11	M10	...	M0	S9	...	S1	S0	0	0	A	P(0)

Mode		Data Multiturn				Data Single-turn						Special bits	
M1	M0	T1	T2	...	T12	T13	...	T21	T22	T23	T24	T25	T26
1	0	M11	M10	...	M0	S11	...	S3	S2	S1	0	0	(0)
1	1	M11	M10	...	M0	S11	..	S3	S2	S1	0	A	(St)
0*	0	M11	M10	...	M0	S11	...	S3	S2	S1	0	P	(0)
0*	1	M11	M10	...	M0	S11	...	S3	S2	S1	0	A	P(0)

*Not available for multiturn encoder with Gray Code.
'S0...S9/S11: Data bits for resolution per turn. M0...M11: Data bits for number of turns (multiturn only).
A: Alarm bit. P: Parity bit.
(St): Standard. (0): Option.
NB: For 25 bit multiturn encoder there are no special bits (Alarm or parity bits) available.
For 13/14 bit single turn encoders there are no special bits available.

BA 58 - S / 0010 E S - 4 1 K B P B

Model

Output Configuration
- S = Single-turn
- M = Multiturn

Resolution
- 0360 = 360 incr. (S) option
- 0010 = 10-bit (S)
- 0012 = 12-bit (S)
- 0013 = 13-bit (S)
- 0014 = 14-bit (S)
- 0412 = 16-bit(M)[1]
- 0812 = 20-bit (M)[1]
- 1212 = 24-bit (M)
- 1213 = 25 bit (M)[3]

Supply Voltage
- A = 5 VDC
- E = 10-30 VDC[2]

Type of Flange
- K = Clamping Flange (10mm shaft)
- S = Synchro Flange (6mm shaft)

Enclosure Class
- 4 = IP 65

Shaft Diameter
- 1 = 6mm (S)
- 2 = 10mm (K)

Output
- K = Push-pull, surge-proof
- T = RS 422/485

Type of Connection
- A = Cable, Axial
- B = Cable, Radial
- C = Flange Box 12-pin Axial Clockwise
- D = Flange Box 12-pin Radial Clockwise
- G = Flange Box 12-pin Axial Counter-clockwise
- H = Flange Box 12-pin Radial Counter-clockwise
- U = Flange Box 17-pin Axial Counter-clockwise
- V = Flange Box 17-pin Radial Counter-clockwise
- W = Flange Box 17-pin Axial Clockwise
- Y = Flange Box 17-pin Radial Clockwise

Interface
- P = Parallel (Output K)
- S = SSI (Output T)
- I = INTERBUS-S (Output T)

Code
- B = Binary
- G = Gray

1) For Parallel Interface Only
2) Multiturn always 10-30 VDC
3) For SSI interface only

BA 58 - Absolute Shaft Encoder

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Connection Diagram Parallel Interface With Cable

Color	9-Bit/360 Incr.	10-Bit	12-Bit
Brown/Grey	N.C.	N.C.	D0 (LSB)
Red/Blue	N.C.	N.C.	D1
Violet	N.C.	D0 (LSB)	D2
White/Brown	D0 (LSB)	D1	D3
White/Green	D1	D2	D4
White/Yellow	D2	D3	D5
White/Grey	D3	D4	D6
White/Pink	D4	D5	D7
White/Blue	D5	D6	D8
White/Red	D6	D7	D9
White/Black	D7	D8	D10
Brown/Green	D8 (MSB)	D9 (MSB)	D11 (MSB)
Yellow	Tristate D0...D8	Tristate D0...D9	Tristate D0...D11
Pink	Latch (binary only)	Latch (binary only)	Latch (binary only)
Green	Direction	Direction	Direction
Black	0 V	0 V	0 V
Red	5 V/10...30 VDC	5 V/10...30 VDC	5 V/10...30 VDC
Brown	Alarm	Alarm	Alarm

Connection Diagram Parallel Interface With Flange Box, 17-pin (code)

Color	9-Bit/360 Incr.	10-Bit	12-Bit
1	D0 (LSB)	D0 (LSB)	D0 (LSB)
2	D1	D1	D1
3	D2	D2	D2
4	D3	D3	D3
5	D4	D4	D4
6	D5	D5	D5
7	D6	D6	D6
8	D7	D7	D7
9	D8 (MSB)	D8	D8
10	N.C.	N.C.	D9
11	N.C.	N.C.	D10
12	Tristate D0...D8	Tristate D0...D9	D11 (MSB)
13	Latch (binary only)	Latch (binary only)	Latch (binary only)
14	Direction	Direction	Direction
15	0 V	0 V	0 V
16	5 V/10...30 VDC	5 V/10...30 VDC	5 V/10...30 VDC
17	Alarm	Alarm	Alarm

Connection Diagram Interbus-S Interface

CABLE	FLANGE BOX	SIGNAL
Brown	1	DO2
Red	2	DO2
Pink	3	DI2
Yellow	4	DI2
Green	5	DO1
Blue	6	DO1
Violet	7	DI1
Grey	8	DI1
White	9	RBST
Brown (0.5mm²)	10	0 V
Black	11	Signal Ground
White (0.5mm²)	12	10...30 VDC

Connection Diagram SSI-Interface

CABLE	FLANGE BOX	SIGNAL
Brown (0.5mm²)	1	0 V
Pink	2	Data
Yellow	3	Clock
	4	N.C.
Blue	5	Direction
Red	6	NC
Violet	7	NC
White (0.5mm²)	8	10...30 VDC
	9	N.C.
Grey	10	Data
Green	11	Clock
Black	12	Signal Ground

INTERBUS-S (2-wire remote bus)

Data Output	5 V differential signals (RS 485) ENCOM-profile K2, 32-bit process data binary right adjust. readable only. without control/status bit
Data Transfer Format (According to F. Phoenix)	Sμpi-address 0 1 2 3 Byte-No. 3 2 1 0
ID-Code	236H

Encoder Data Format

Byte 3								Byte 2								
31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	Bit-No.
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10-Bit Encoder
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12-Bit Encoder
0	0	0	0	0	0	0	0	0	0	M11	M10	M9	M8	M7	M6	22-Bit Encoder
0	0	0	0	0	0	0	0	M11	M10	M9	M8	M7	M6	M5	M4	24-Bit Encoder
Byte 1								**Byte 0**								
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Bit-No.
0	0	0	0	0	0	S9	S8	S7	S6	S5	S4	S3	S2	S1	S0	10-Bit Encoder
0	0	0	0	S11	S10	S9	S8	S7	S6	S5	S4	S3	S2	S1	S0	12-Bit Encoder
M5	M4	M3	M2	M1	M0	S9	S8	S7	S6	S5	S4	S3	S2	S1	S0	22-Bit Encoder
M3	M2	M1	M0	S11	S10	S9	S8	S7	S6	S5	S4	S3	S2	S1	S0	24-Bit Encoder