EAR 58 B / C - 63 A / D / E
BIT-PARALLEL - SSI
SOLID SHAFT SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard singleturn absolute encoders for factory automation applications.

- Optical sensing technology (proprietary OptoASIC)
- Resolution up to 25 bit
- Power supply up to +30 VDC with bit-parallel or SSI as electrical interface
- Cable or connector output
- Solid shaft diameter up to 10 mm
- Mounting by synchronous, clamping or centering 2,5” square flange

ORDERING CODE BIT PARALLEL

EAR	63A	12	G	8/30	P	P	X	10	X	MA	R	.162	+XXX

SERIES
singleturn absolute encoder EAR

MODEL
synchronous flange ø 31.75 mm 63A
synchronous flange ø 50 mm 58B
clamping flange ø 36 mm 58C
centering square flange ø 31.75 mm 63D
centering square flange ø 50 mm 63E

RESOLUTION
bit from 1 to 13
(multiples and submultiples of 360) ppr from 90 to 3600

CODE TYPE
binary B
gray G
(no powers of 2) binary offset code (0-XXX) BC
(no powers of 2) gray offset code (0-XXX) GC

POWER SUPPLY
8 ... 30 V DC 8/30

ELECTRICAL INTERFACE
push-pull P

LOGIC
negative N
positive P

OPTIONS
to be reported if not used X
latch with external input L
(with binary code) strobe S
reset with external input ZE
latch / reset with external inputs LZE
(with binary code) strobe / reset with external input SZE

SHAFT DIAMETER
(mod. 58 B) mm 6
(mod. 63 A / D) 3/8”- mm 9,52
(mod. 58 C - 63 A / D / E) mm 10

ENCLOSURE RATING
IP 65 shaft side / IP67 cover side X
IP 67 S

OUTPUT TYPE
(without options) cable (standard length 1,5 m) PD
cable (standard length 1,5 m) PE
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PDR5)
(without reset option) 19 pin MIL plug connector MA

DIRECTION TYPE
radial R

SOCKET
socket not included .162
to be reported only with connector output (eg. MAR.162), for socket see Accessories

VARIANT
custom version XXX

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ORDERING CODE SSI	EAR	63A	13	G	8/30	S	X	2048	RS	10	X	HA	R	.162	+XXX

SERIES
singleturn absolute encoder EAR

MODEL
synchronous flange ø 31.75 mm 63A
synchronous flange ø 50 mm 58B
clamping flange ø 36 mm 58C
centering square flange ø 31.75 mm 63D
centering square flange ø 50 mm 63E

RESOLUTION
bit 13 / 16 / 17 / 18 / 21 / 25
ppr 360 / 720 / 1440 / 2880 / 3600

CODE TYPE
binary B
gray G
(no powers of 2) binary offset code (0-XXX) BC
(no powers of 2) gray offset code (0-XXX) GC

POWER SUPPLY
8 ... 30 V DC 8/30

ELECTRICAL INTERFACE
Serial Synchronous Interface - SSI S

OPTION
to be reported if not used X
reset with external input ZE
reset on cover or with external input ZP

INCREMENTAL RESOLUTION
(powers of 2) ppr from 128 to 8192

INCREMENTAL ELECTRICAL INTERFACE
available with PD or HA output type
line driver HTL L
push pull P
line driver RS-422 RS

SHAFT DIAMETER
(mod. 58 B) mm 6
(mod. 63 A / D) 3/8"- mm 9,52
(mod. 58 C - 63 A / D / E) mm 10

ENCLOSURE RATING
IP 65 shaft side / IP67 cover side X
IP 67 S

OUTPUT TYPE
cable (standard length 1,5 m) PC
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PCR5)
cable (standard length 1,5 m) PD
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PCR5)
(without reset option) 7 pin MIL plug connector MC
(with reset option) 10 pin MIL plug connector MD
12 pin M23 plug connector HA
8 pin M12 plug connector M12

DIRECTION TYPE
radial R

SOCKET
socket not included .162
to be reported only with connector output (eg. HAR.162), for socket see Accessories

VARIANT
custom version XXX

[ ] to be added with incremental output

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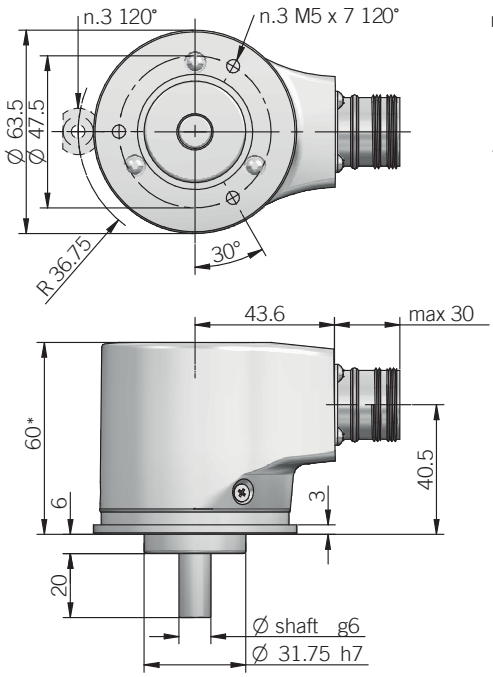
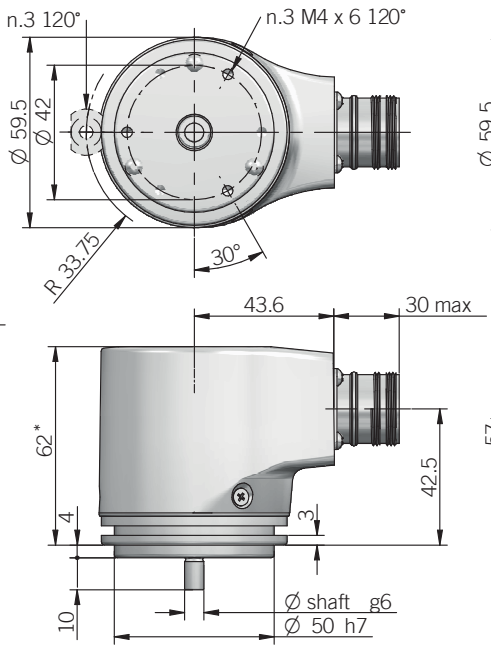
63A



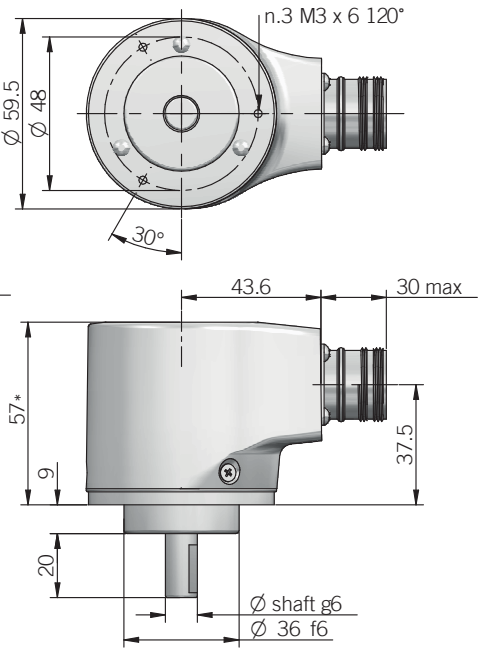
fixing clamps not included, please refer to Accessories

58B

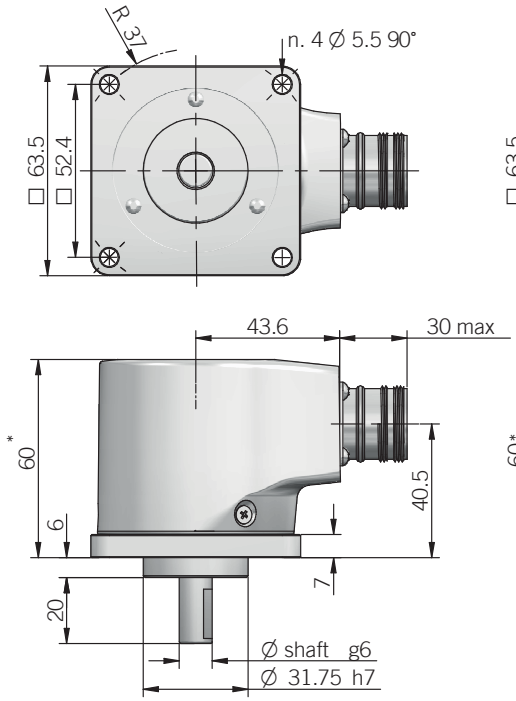


fixing clamps not included, please refer to Accessories

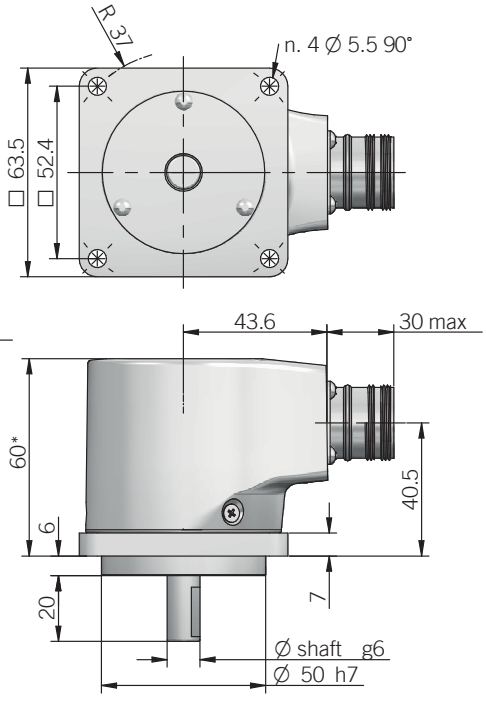
58C



63D



63E



* with option ZP +1,5 mm
recommended mating shaft tolerance H7
dimensions in mm

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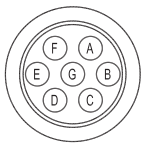
BIT-PARALLEL CONNECTIONS

Function	Binary / Gray	Cable PD	Cable PE	19 pin MA
bit 1 (LSB)	B^0 / G^0	green	green	A
bit 2	B^1 / G^1	yellow	yellow	B
bit 3	B^2 / G^2	blue	blue	C
bit 4	B^3 / G^3	brown	brown	D
bit 5	B^4 / G^4	orange or pink	orange or pink	E
bit 6	B^5 / G^5	white	white	F
bit 7	B^6 / G^6	grey	grey	G
bit 8	B^7 / G^7	purple	purple	H
bit 9	B^8 / G^8	grey / pink	grey / pink	J
bit 10	B^9 / G^9	white / green	white / green	K
bit 11	B^{10} / G^{10}	brown / green	brown / green	L
bit 12	B^{11} / G^{11}	white / yellow	white / yellow	M
bit 13	B^{12} / G^{12}	yellow / brown	yellow / brown	N
STROBE	/	/	green / blue	P
LATCH	/	/	yellow / grey	R
0 V	/	black	black	T
U / D	/	red / blue	red / blue	U
RESET	/	/	pink / green	/
+ V DC	/	red	red	V
⏚	/	shield	shield	S

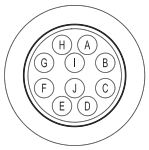
SSI CONNECTIONS

Function	Cable PC	Cable PD	7 pin MC	10 pin MD	12 pin HA	12 pin HA	8 pin M12
+ V DC	red	red	G	G	8	8	8
0 V	black	black	F	F	1	1	5
DATA +	green	green	C	C	2	2	3
DATA -	brown	brown	D	D	10	10	2
CLOCK +	yellow	yellow	A	A	3	3	4
CLOCK -	orange or pink	orange or pink	B	B	11	11	6
A+	/	grey	/	/	/	6	/
A-	/	blue	/	/	/	7	/
B+	/	purple	/	/	/	9	/
B-	/	white / green	/	/	/	12	/
U / D	red / blue	red / blue	E	E	5	5	7
RESET	white	white	/	H	4	4	1
⏚	shield	shield	housing	housing	9	housing	housing

MC connector (7 pin)
Amphenol MS3102-E-16-S
front view



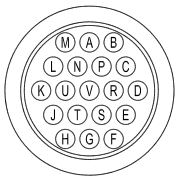
MD connector (10 pin)
Amphenol MS3102-E-18-1P
front view



HA connector (12 pin) - M23 CCW
Hummel 7.410.000000 - 7.002.912.603
front view

M12 connector (8 pin)
M12 A coded
front view

MA connector (19 pin)
Amphenol 62IN 12E 14-19 P
front view



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ELECTRICAL SPECIFICATIONS

Resolution	P = from 90 ppr to 13 bit S = from 360 ppr to 25 bit
Power supply[1]	7,6 ... 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Max load current	20 mA / channel
Absolute electrical interface[2]	P = push pull (iC-DL) S = RS-422 (THVD1451 or similar)
Incremental electrical interface[2]	L = HTL differential (AEIC-7272 or similar) P = Push-Pull (AEIC-7272 or similar) RS = RS-422 (AELT-5000 or similar)
Max incremental output frequency	128 kHz
Auxiliary inputs (U/D - RESET - LATCH)	active high (+V DC) connect to 0 V if not used / RESET - LATCH t_{min} 150 ms
Max frequency	25 kHz LSB (Bit-parallel) clock input 100 kHz ... 1 MHz (SSI)
Code type	binary or gray
Logic	SSI = positive Bit-parallel = positive or negative
SSI monostable time (Tm)	20 µs
SSI pause time (Tp)	> 35 µs
SSI frame	left aligned format MSB ... LSB up to 13 bit = length 13 bit from 14 to 21 bit = length 21 bit from 22 to 25 bit = length 25 bit
SSI status and parity bit	on request
Counting direction	SSI output = decreasing clockwise (shaft view) incremental output = A leads B clockwise (shaft view)
Start-up time	700 ms
Accuracy	± 0,069°
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	173 years with BIT-PARALLEL output 214 years with SSI/INCREMENTAL output
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type PC	shielded - fixed installation conductors section 0,22 mm² / AWG 24 bending radius min 60 mm
Cable type PD	shielded - fixed installation conductors section 0,14 mm² / AWG 26 bending radius min 50 mm
Cable type PE	shielded - fixed installation conductors section 0,14 mm² / AWG 26 bending radius min 50 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

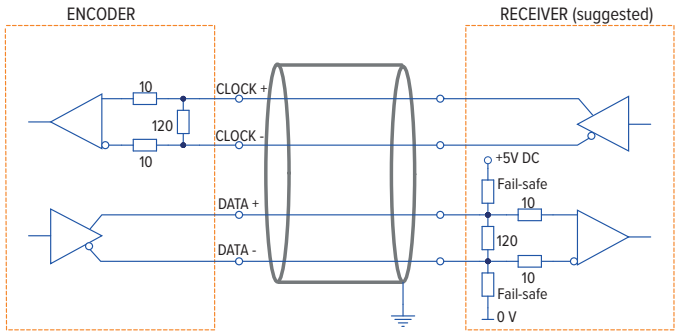
Shaft diameter	ø 6 / 9,52 (3/8") / 10 mm
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load[4]	200 N (45 lbs) axial / 70 N (15,74 lbs) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10^{-6} kgm² (36 x 10^{-6} lbft²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	aluminium
Shaft material	stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature Bit-parallel[5, 6]	-20° ... +85°C (-4 ... +185°F)
Operating temperature SSI[5, 6]	-40° ... +100°C (-40° ... +212°F) -20° ... +100°C (-4° ... +212°F) with PC cable output -20° ... +85°C (-4° ... +185°F) with PD cable output -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature[6]	-20° ... +85°C (-4° ... +185°F)
Weight	approx 300 g (10,58 oz)

[1] as measured at the transducer without cable influences
[2] for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
[3] this product is not a safety component, for further details refer to TECHNICAL BASICS section
[4] maximum load for static usage
[5] measured on the transducer flange
[6] condensation not allowed

ROTATION SPEED DERATING TABLE

Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 ... +85 (+158 ... +185)	8000	5000
+85 ... +100 (+185 ... +212)	5000	3000

SSI ELECTRICAL INTERFACE



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