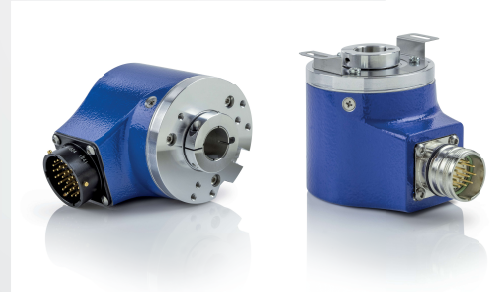


MAIN FEATURES

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
- Blind hollow shaft up to 15 mm
- Mounting by stator coupling, torque stop slot or torque pin



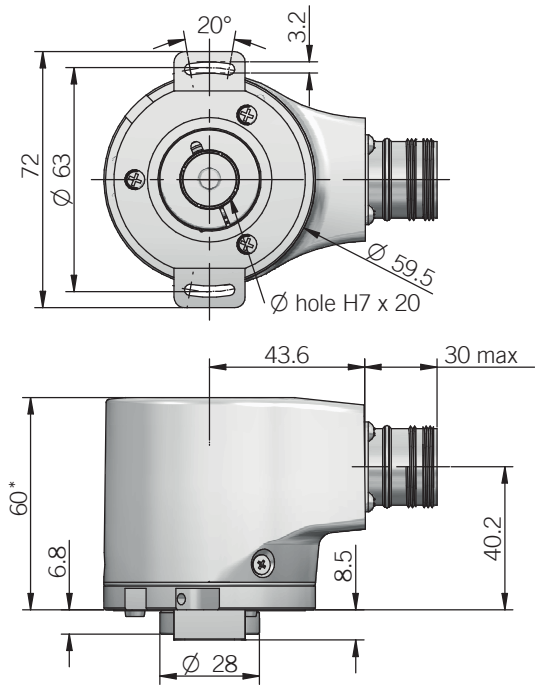
ORDERING CODE BIT PARALLEL	EAR	58F	12	G	8/30	P	P	X	15	X	MA	R	.162	+XXX
SERIES singleturn absolute encoder	EAR													
MODEL blind hollow shaft with stator coupling blind hollow shaft with torque stop slot blind hollow shaft with torque pin	58F	63F	63G											
RESOLUTION bit from 1 to 13 (multiples and submultiples of 360) ppr from 90 to 3600	12													
CODE TYPE binary gray (no powers of 2) binary offset code (no powers of 2) gray offset code	G	BC	GC											
POWER SUPPLY 8 ... 30 V DC	8/30													
ELECTRICAL INTERFACE push-pull	P													
LOGIC negative positive	N	P												
OPTIONS to be reported if not used latch with external input (with binary code) strobe reset with external input latch / reset with external inputs (with binary code) strobe / reset with external input	X	L	S	ZE	LZE	SZE								
BORE DIAMETER mm mm diameters 6 / 8 / 9,52 (3/8") / 10 / 11 / 12 mm with optional shaft adapter, see Accessories	14	15												
ENCLOSURE RATING IP 65 shaft side / IP67 cover side IP 67	X	S												
OUTPUT TYPE (without options) cable (standard length 1,5 m) cable (standard length 1,5 m) preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PDR5) (without reset option) 19 pin MIL plug connector	PD	PE	MA											
DIRECTION TYPE radial	R													
SOCKET socket not included to be reported only with connector output (eg. MAR.162), for socket see Accessories	.162													
VARIANT custom version	XXX													

ORDERING CODE SSI	EAR	58F	13	G	8/30	S	X	2048	RS	15	X	HA	R	.162	+XXX
SERIES singleturn absolute encoder EAR															
MODEL blind hollow shaft with stator coupling 58F blind hollow shaft with torque stop slot 63F blind hollow shaft with torque pin 63G															
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															
BORE DIAMETER mm 14 mm 15 diameters 6 / 8 / 9,52 (3/8") / 10 / 11 / 12 mm with optional shaft adapter, see Accessories															
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															
VARIANT custom version XXX															

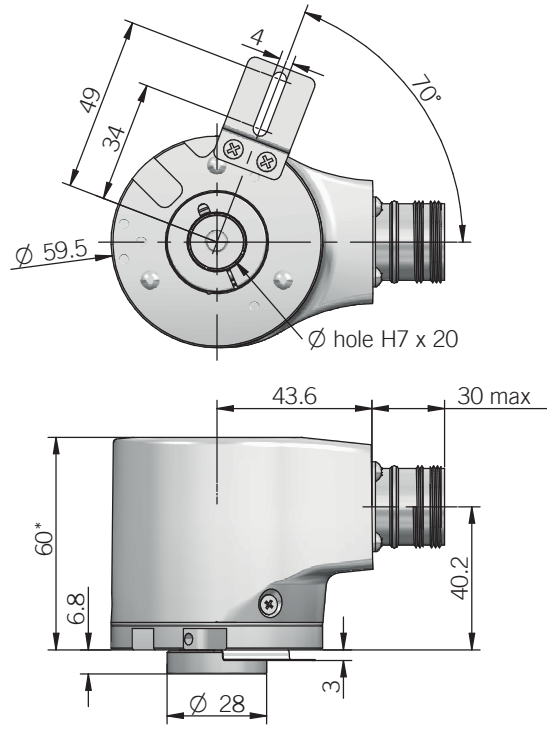
to be added with incremental output

to be reported only with connector output (eg. HAR.162), for socket see Accessories

58F

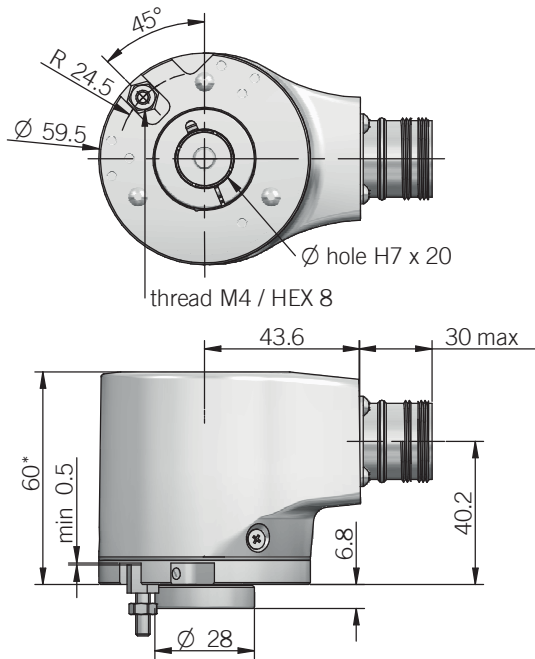


63F



for torque pin please refer to Accessories

63G



torque pin is included

* with option ZP +1,5 mm
recommended mating shaft tolerance g6
dimensions in mm

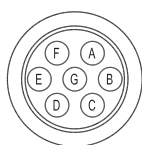
BIT-PARALLEL CONNECTIONS

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

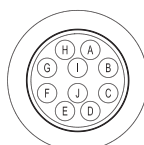
SSI CONNECTIONS

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

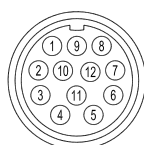
MC connector (7 pin)
Amphenol MS3102-E-16-S
front view



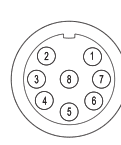
MD connector (10 pin)
Amphenol MS3102-E-18-1P
front view



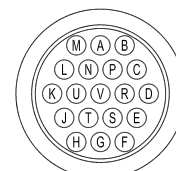
HA connector (12 pin) - M23 CCW
Hummel 7.410.000000 - 7.002.912.603
front view



M12 connector (8 pin)
M12 A coded
front view



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



ELECTRICAL SPECIFICATIONS	
Resolution	P = from 90 ppr to 13 bit S = from 360 ppr to 25 bit
Power supply¹	7,6 ... 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Max load current	20 mA / channel
Absolute electrical interface²	P = push pull (iC-DL) S = RS-422 (THVD1451 or similar)
Incremental electrical interface²	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 μ s
SSI pause time (Tp)	> 35 μ s
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	$\pm 0,069^\circ$
Mean time to dangerous failure (MTTF)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 mm ² / AWG 24 bending radius min 60 mm
Cable type PD	shielded - fixed installation conductors section 0,14 mm ² / AWG 26 bending radius min 50 mm
Cable type PE	shielded - fixed installation conductors section 0,14 mm ² / 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	
Bore diameter	\varnothing 14 / 15 mm \varnothing 6* / 8* / 9,52 (3/8")* / 10* / 11* / 12* * with optional shaft adapter, please refer to Accessories
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load⁴	200 N (45 lbs) axial / 60 N (13,49 lbs) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	5×10^{-6} kgm ² (119 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	aluminum
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° ... +85°C (-40° ... +185°F) -20° ... +85°C (-4° ... +185°F) with cable output -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature⁶	-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)
IP65	up to +70 (+158)	9000	6000
	+70 ... 85 (+158 ... +185)	6000	3000
IP67	up to +70 (+158)	8000	6000
	+70 ... +85 (+158 ... +185)	4000	2000

