

ABSOLUTE ENCODER

NO NEED TO BE RESET

Absolute encoders are capable to provide the correct data after a power-down event without needing to be reset to the zero point.

Thanks to these specifications and the possibility to transfer data over a field

bus, absolute encoders are nowadays used more frequently in various application fields.

Max singleturn resolution
25 bit (33'554'432 ppr)

Max number of turns
40 bit (1'099'511'627'776 turns)

Supported output interfaces are:
Bit parallel, Analogue, SSI, Profibus, Profinet and Ethercat.

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

MAIN FEATURES

Industry standard singleturn absolute encoder for factory automation applications.

- Optical sensor 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

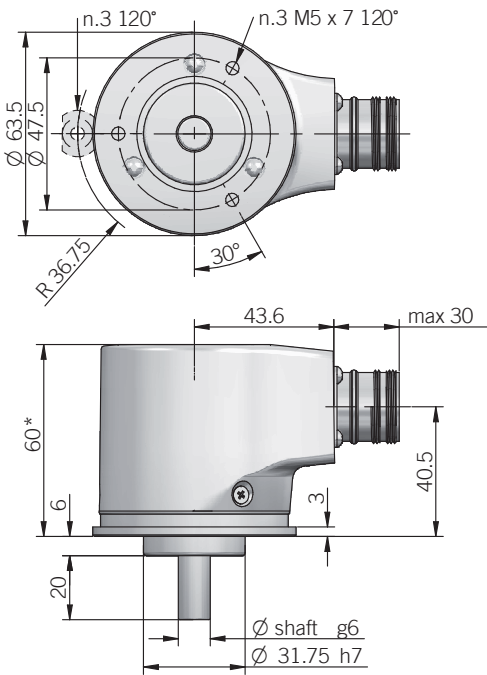


ORDERING CODE BIT PARALLEL	EAR	63A	12	G	8/30	P	P	X	10	X	MA	R	.162	+XXX
<div><div>SERIES</div><div>singleturn absolute encoder EAR</div></div> <div><div>MODEL</div><div>synchronous flange ø 31.75 mm 63A synchronous flange ø 50 mm 58B clamping flange ø 36 mm 58C centering square flange ø 31.75 mm 63D centering square flange ø 50 mm 63E</div></div> <div><div>RESOLUTION</div><div>bit from 1 to 13 (multiples and submultiples of 360) ppr from 90 to 3600</div></div> <div><div>CODE TYPE</div><div>binary B gray G (no powers of 2) binary offset code (0-XXX) BC (no powers of 2) gray offset code (0-XXX) GC</div></div> <div><div>POWER SUPPLY</div><div>8 ... 30 V DC 8/30</div></div> <div><div>ELECTRICAL INTERFACE</div><div>push-pull P</div></div> <div><div>LOGIC</div><div>negative N positive P</div></div> <div><div>OPTIONS</div><div>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</div></div> <div><div>SHAFT DIAMETER</div><div>(mod. 58 B) mm 6 (mod. 63 A / D) 3/8"- mm 9,52 (mod. 58 C - 63 A / D / E) mm 10</div></div> <div><div>ENCLOSURE RATING</div><div>IP 65 shaft side / IP67 cover side X IP 67 S</div></div> <div><div>OUTPUT TYPE</div><div>(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 male connector MA</div></div> <div><div>DIRECTION TYPE</div><div>radial R</div></div> <div><div>MATING CONNECTOR</div><div>mating connector not included .162 to be reported only with connector output (eg. MAR.162), for mating connector see Accessories</div></div> <div><div>VARIANT</div><div>custom version XXX</div></div>														

OPTICAL SINGLETURN ABSOLUTE ENCODERS | EAR 58 B / C - 63 A / D / E PAR - SSI

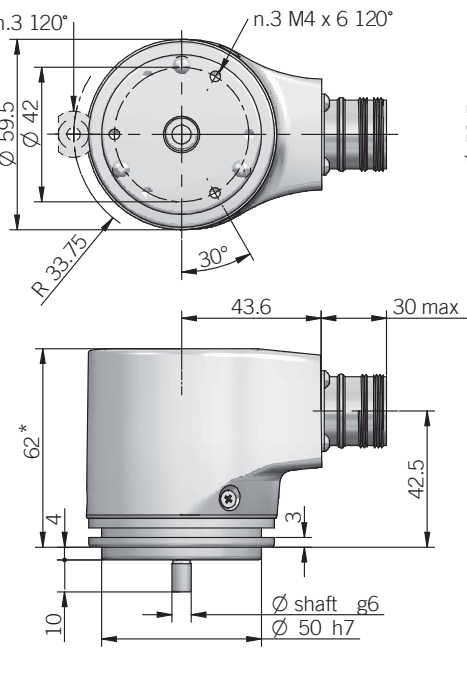
SSI ORDERING CODE		EAR	63A	13	G	8/30	S	X	2048	RS	10	X	HA	R	.162	+XXX
SERIES																
singleturn absolute encoder		EAR														
MODEL																
synchronous flange ø 31.75 mm		63A														
synchronous flange ø 50 mm		58B														
clamping flange ø 36 mm		58C														
centering 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 PC 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)																
(without reset option) 7 pin MIL male connector		MC														
(with reset option) 10 pin MIL male connector		MD														
12 pin M23 male connector		HA														
8 pin M12 male connector		M12														
DIRECTION TYPE																
radial		R														
MATING CONNECTOR																
mating connector not included		.162														
to be reported only with connector output (eg. HAR.162), for mating connector see Accessories																
to be added with incremental output																

63 A



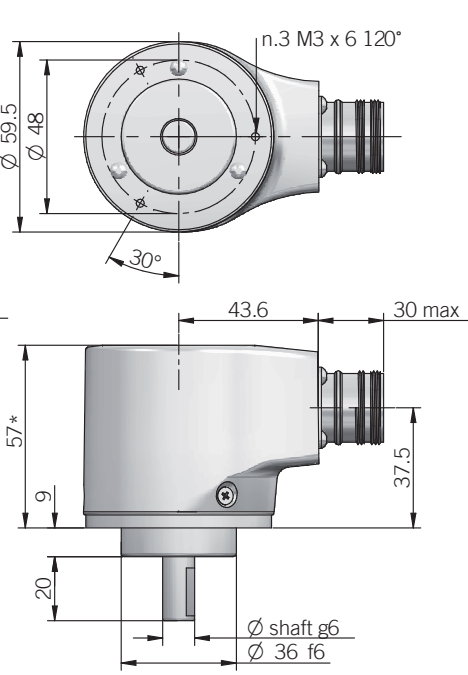
fixing clamps not included, please refer to Accessories

58 B

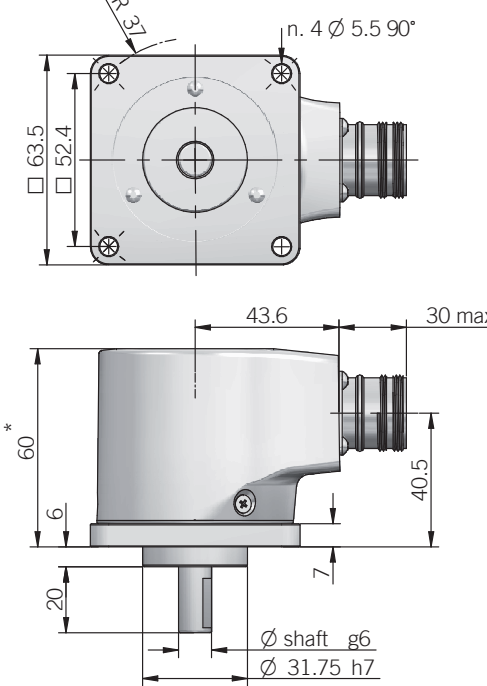


fixing clamps not included, please refer to Accessories

58 C

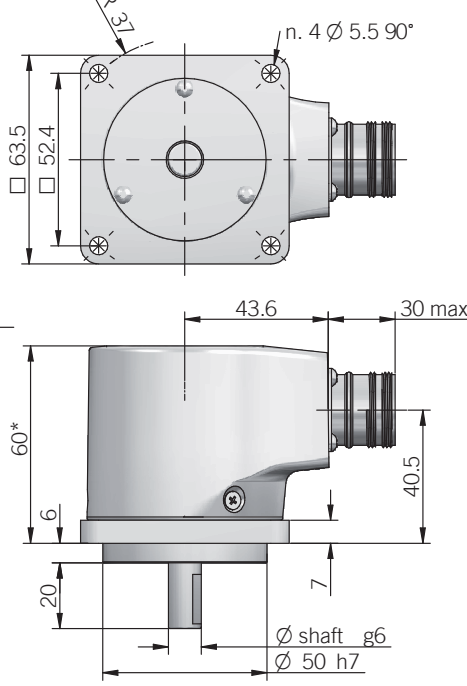


63 D



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

63 E



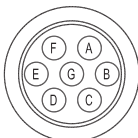
BIT PARALLEL CONNECTIONS

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

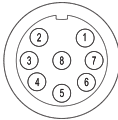
SSI CONNECTIONS

Function	Cable PC	7 pin MC	10 pin MD	12 pin HA	12 pin HA	8 pin M12
+ V DC	red	G	G	8	8	8
0 V	black	F	F	1	1	5
DATA +	green	C	C	2	2	3
DATA -	brown	D	D	10	10	2
CLOCK +	yellow	A	A	3	3	4
CLOCK -	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	E	E	5	5	7
RESET	white	/	H	4	4	1
⏏	shield	housing	housing	9	housing	housing

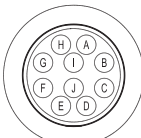
MC connector (7 pin)
Amphenol MS3102-E-16-S
solder side view FV



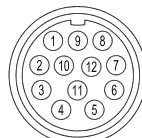
M12 connector (8 pin)
M12 A coded
solder side view FV



MD connector (10 pin)
Amphenol MS3102-E-18-1P
solder side view FV



HA connector (12 pin)
M23 CCW Hummel
7.410.000000 - 7.002.912.603
solder side view FV



MA connector (19 pin)
Amphenol 62IN 12E 14-19 P
solder side view FV



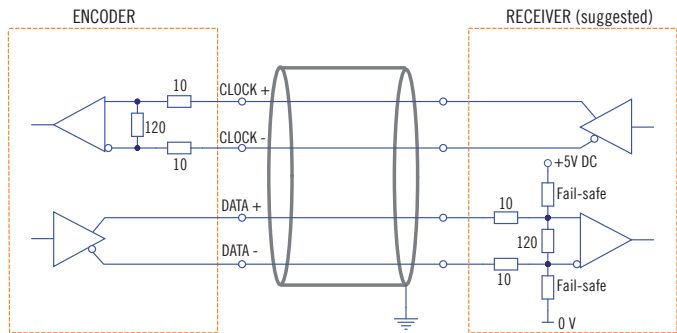
ME connector (32 pin)
Glenair IPT 02 A 18-32 P F6
solder side view FV



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 equivalent)
Incremental electrical interface ²	L = HTL diff. (AEIC-7272, active short circuit protection) P = Push-Pull (AEIC-7272, active short circuit protection) RS = RS-422 (AELT-5000 or equivalent)
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	50 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	decreasing clockwise (shaft view)
Start-up time	700 ms
Accuracy	± 250 arc-sec
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

SSI SCHEMATICS



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 ³	200 N axial / 70 N 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 kgm ² (36 x 10 ⁻⁶ lbft ²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature Bit parallel ^{4, 5}	-20° ... +85°C (-4 ... +185°F)
Operating temperature SSI ^{4, 5}	-40° ... +100°C (-40° ... +212°F) -20° ... +100°C (-4° ... +212°F) with cable output -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature ⁵	-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 maximum load for static usage

⁴ measured on the transducer flange

⁵ 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



EAR 58 F - 63 F / G
BIT PARALLEL - SSI
BLIND HOLLOW SHAFT SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard singleturn absolute encoder for factory automation applications.

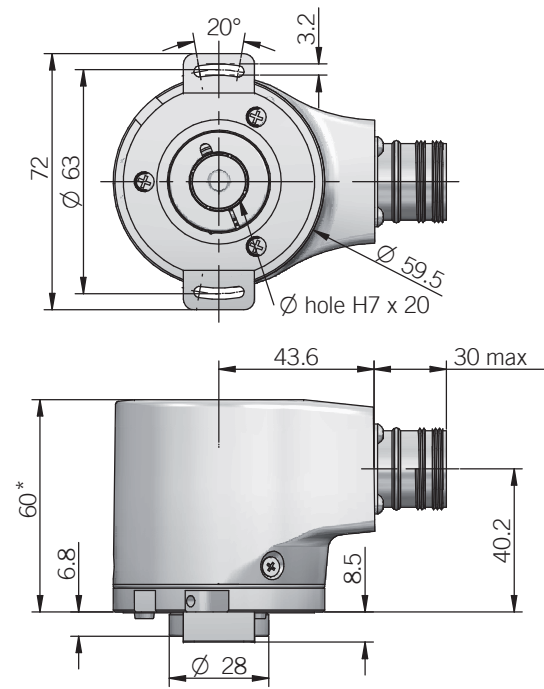
- Optical sensor technology (proprietary OptoASIC)
- Resolution up to 25 bit
- Power supply up to +30 VDC with Bit Parallel or SSI as electrical interface
- Cable or connector output
- Blind hollow shaft up to 15 mm
- Mounting by stator coupling, torque stop slot or torque pin



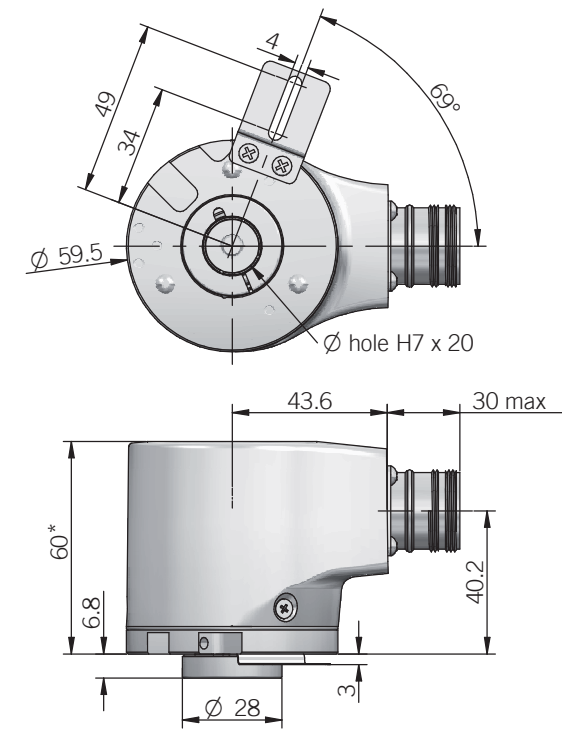
ORDERING CODE BIT PARALLEL	EAR	58F	12	G	8/30	P	P	X	15	X	MA	R	.162	+XXX
SERIES singleturn absolute encoder EAR														
MODEL blind hollow shaft with stator coupling 58F blind hollow shaft with torque stop slot 63F blind hollow shaft with torque pin 63G														
RESOLUTION bit from 1 to 13 (multiples 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														
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 (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 male connector MA														
DIRECTION TYPE radial R														
MATING CONNECTOR mating connector not included .162 to be reported only with connector output (eg. MAR.162), for mating connector see Accessories														
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 PC 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) (without reset option) 7 pin MIL male connector MC (with reset option) 10 pin MIL male connector MD 12 pin M23 male connector HA 8 pin M12 male connector M12																							
DIRECTION TYPE radial R																							
MATING CONNECTOR mating connector not included .162 to be reported only with connector output (eg. HAR.162), for mating connector see Accessories																							
<div></div> to be added with incremental output																							
VARIANT custom version XXX																							

58 F

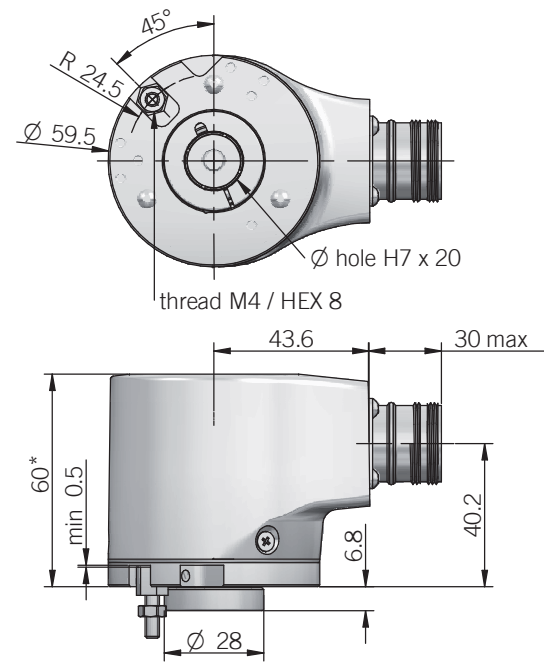


63 F



for torque pin please refer to Accessories

63 G



torque pin is included

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

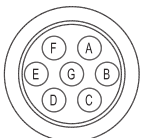
BIT PARALLEL CONNECTIONS

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	7 pin MC	10 pin MD	12 pin HA	12 pin HA	8 pin M12
+ V DC	red	G	G	8	8	8
0 V	black	F	F	1	1	5
DATA +	green	C	C	2	2	3
DATA -	brown	D	D	10	10	2
CLOCK +	yellow	A	A	3	3	4
CLOCK -	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	E	E	5	5	7
RESET	white	/	H	4	4	1
≡	shield	housing	housing	9	housing	housing

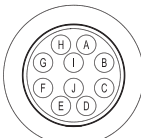
MC connector (7 pin)
Amphenol MS3102-E-16-S
solder side view FV



M12 connector (8 pin)
M12 A coded
solder side view FV



MD connector (10 pin)
Amphenol MS3102-E-18-1P
solder side view FV



HA connector (12 pin)
M23 CCW Hummel
7.410.000000 - 7.002.912.603
solder side view FV



MA connector (19 pin)
Amphenol 62IN 12E 14-19 P
solder side view FV



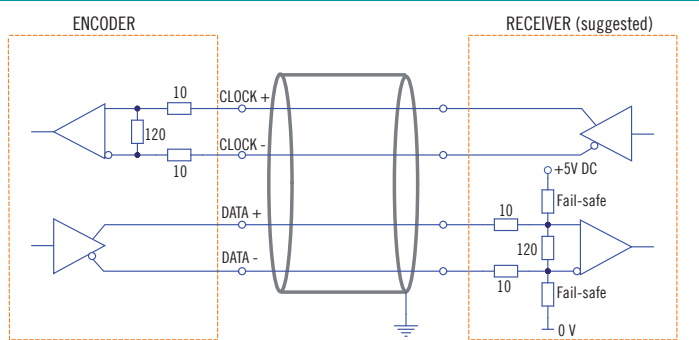
ME connector (32 pin)
Glenair IPT 02 A 18-32 P F6
solder side view FV



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 equivalent)
Incremental electrical interface ²	L = HTL diff. (AEIC-7272, active short circuit protection) P = Push-Pull (AEIC-7272, active short circuit protection) RS = RS-422 (AELT-5000 or equivalent)
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	50 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	decreasing clockwise (shaft view)
Start-up time	700 ms
Accuracy	± 250 arc-sec
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

SSI SCHEMATICS



MECHANICAL SPECIFICATIONS

Bore diameter	ø 14 / 15 mm ø 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 load ³	200 N axial / 60 N radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	5 x 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	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature Bit parallel ^{4, 5}	-20° ... +85°C (-4 ... +185°F)
Operating temperature SSI ^{4, 5}	-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 temperature ⁵	-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 maximum load for static usage

⁴ measured on the transducer flange

⁵ 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



EAR 90 - 115 A
BIT PARALLEL - SSI
SOLID SHAFT SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard singleturn absolute encoder for factory automation applications.

- Optical sensor 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 11 mm
- Mounting by synchronous or REO-444 flange

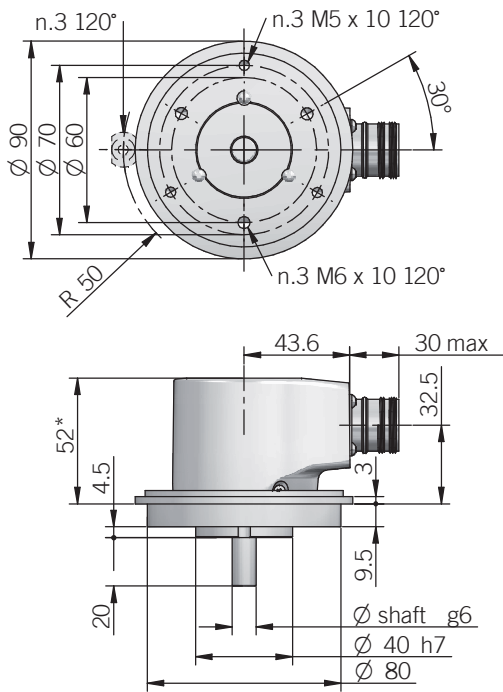


ORDERING CODE BIT PARALLEL	EAR	90A	12	G	8/30	P	P	X	10	X	MA	R	.162	+XXX
SERIES singleturn absolute encoder EAR		MODEL synchronous flange ø 40 mm 90A REO-444 flange 115A	RESOLUTION bit from 1 to 13 (multiples and submultiples of 360) ppr from 90 to 3600	CODE TYPE binary B gray G (no powers of 2) binary 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. 90) 3/8" - mm 9,52 mm 10 (mod. 115) mm 11	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 male connector MA	DIRECTION TYPE radial R	MATING CONNECTOR mating connector not included .162 to be reported only with connector output (eg. MAR.162), for mating connector see Accessories	VARIANT custom version XXX

ORDERING CODE SSI	EAR	90A	13	G	8/30	S	X	2048	RS	10	X	HA	R	.162	+XXX
SERIES singleturn absolute encoder EAR		MODEL synchronous flange ø 40 mm 90A REO-444 flange 115A	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 PC or HA output type line driver HTL L push pull P line driver RS-422 RS	SHAFT DIAMETER (mod. 90) 3/8" - mm 9,52 mm 10 (mod. 115) mm 11	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) (without reset option) 7 pin MIL male connector MC (with reset option) 10 pin MIL male connector MD 12 pin M23 male connector HA 8 pin M12 male connector M12	DIRECTION TYPE radial R	MATING CONNECTOR mating connector not included .162 to be reported only with connector output (eg. HAR.162), for mating connector see Accessories	VARIANT custom version XXX

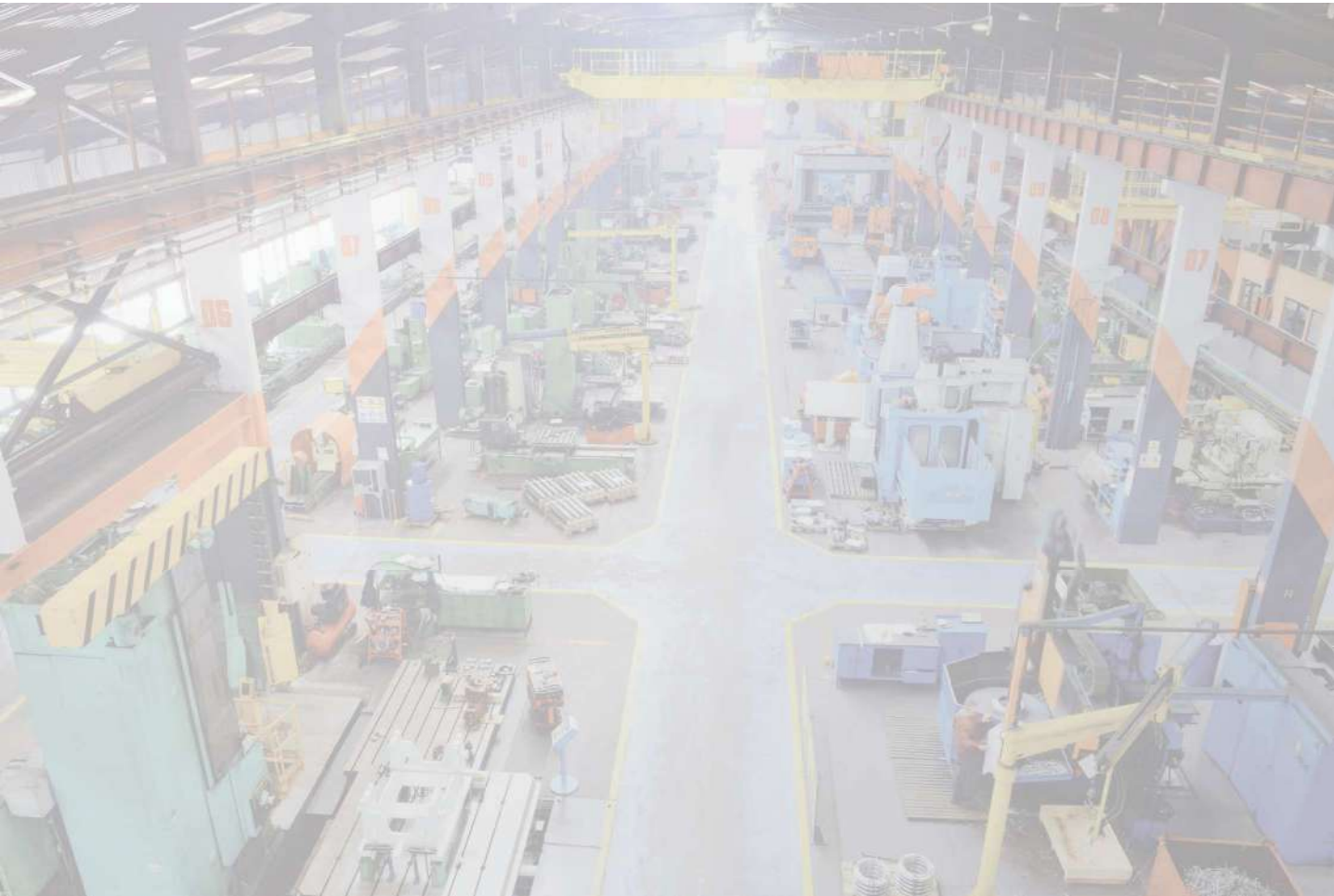
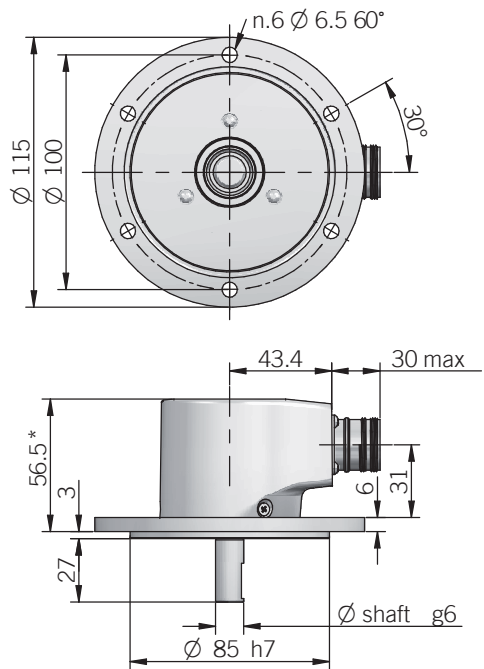
to be added with incremental output

90 A



for fixing clamps please refer to Accessories
* with option ZP +1,5 mm
recommended mating shaft tolerance H7
dimensions in mm

115 A



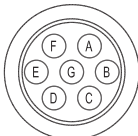
BIT PARALLEL CONNECTIONS

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

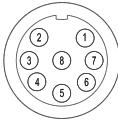
SSI CONNECTIONS

Function	Cable PC	7 pin MC	10 pin MD	12 pin HA	12 pin HA	8 pin M12
+ V DC	red	G	G	8	8	8
0 V	black	F	F	1	1	5
DATA +	green	C	C	2	2	3
DATA -	brown	D	D	10	10	2
CLOCK +	yellow	A	A	3	3	4
CLOCK -	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	E	E	5	5	7
RESET	white	/	H	4	4	1
⏏	shield	housing	housing	9	housing	housing

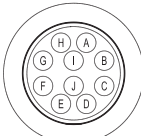
MC connector (7 pin)
Amphenol MS3102-E-16-S
solder side view FV



M12 connector (8 pin)
M12 A coded
solder side view FV



MD connector (10 pin)
Amphenol MS3102-E-18-1P
solder side view FV



HA connector (12 pin)
M23 CCW Hummel
7.410.000000 - 7.002.912.603
solder side view FV



MA connector (19 pin)
Amphenol 62IN 12E 14-19 P
solder side view FV



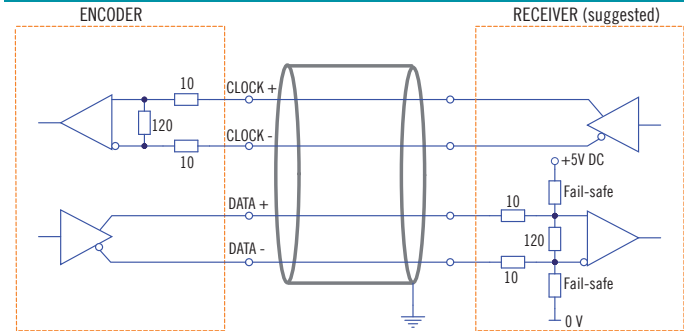
ME connector (32 pin)
Glenair IPT 02 A 18-32 P F6
solder side view FV



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 equivalent)
Incremental electrical interface ²	L = HTL diff. (AEIC-7272, active short circuit protection) P = Push-Pull (AEIC-7272, active short circuit protection) RS = RS-422 (AELT-5000 or equivalent)
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	50 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	decreasing clockwise (shaft view)
Start-up time	700 ms
Accuracy	± 250 arc-sec
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

SSI SCHEMATICS



MECHANICAL SPECIFICATIONS

Shaft diameter	ø 9,52 (3/8") / 10 / 11 mm
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load ³	200 N axial / 70 N 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 kgm ² (36 x 10 ⁻⁶ lbft ²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature Bit parallel ^{4, 5}	-20° ... +85°C (-4 ... +185°F)
Operating temperature SSI ^{4, 5}	-40° ... +100°C (-40° ... +212°F) -20° ... +100°C (-4° ... +212°F) with cable output -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature ⁵	-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 maximum load for static usage

⁴ measured on the transducer flange

⁵ 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



EAL 58 B / C - 63 A / D / E
ANALOGUE
SOLID SHAFT SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard singleturn absolute encoder for factory automation applications.

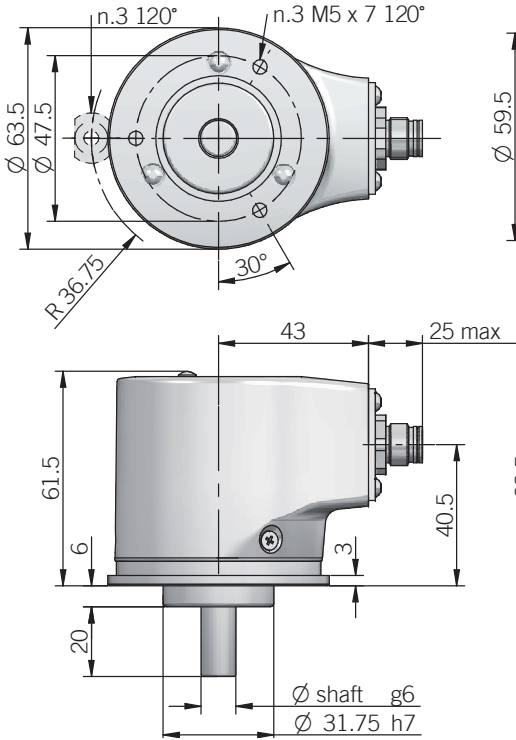
- Optical sensor technology (OptoASIC)
- Programmable measuring range via teach-in function (external inputs or cover button)
- Power supply up to +30 VDC with analogue (voltage or current) electrical interface
- Cable or M12 connector output
- Solid shaft diameter up to 10 mm
- Mounting by synchronous, clamping or centering 2,5" square flange



ORDERING CODE

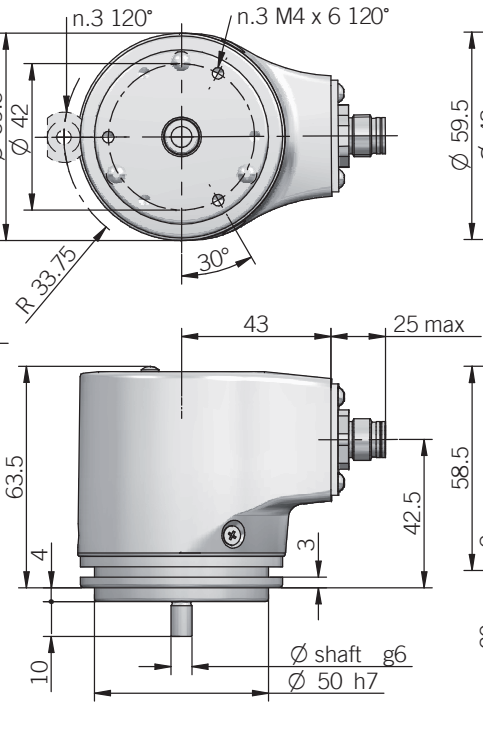
EAL	63A	16B	12/30	V	05	X	10	X	M12	R	.162	+XXX
SERIES												
analogue singleturn absolute encoder EAL												
MODEL												
synchronous flange ø 31.75 mm 63A												
synchronous flange ø 50 mm 58B												
clamping flange ø 36 mm 58C												
centering square flange ø 31.75 mm 63D												
centering square flange ø 50 mm 63E												
OUTPUT DAC RESOLUTION												
16 bit 16B												
POWER SUPPLY												
12 ... 30 V DC 12/30												
ELECTRICAL INTERFACE												
voltage V												
current I												
OUTPUT RANGE												
0 ... 5 V 05												
0 ... 10 V 010												
0 ... 20 mA 020												
4 ... 20 mA 420												
OPTIONS												
to be reported with voltage output / 3 wires current output X												
4 wires current output Q												
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) P												
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)												
M12 male connector M12												
DIRECTION TYPE												
radial R												
MATING CONNECTOR												
mating connector not included .162												
to be reported only with connector output (eg. M12R.162), for mating connector see Accessories												
VARIANT												
custom version XXX												

63 A



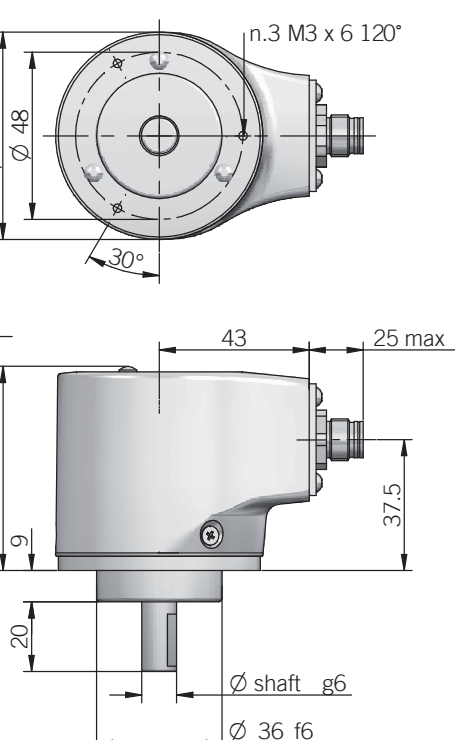
for fixing clamps please refer to Accessories

58 B

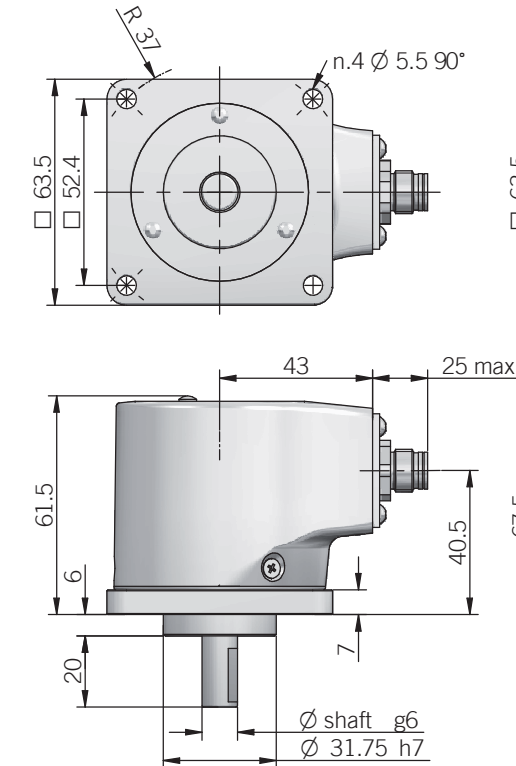


for fixing clamps please refer to Accessories

58 C

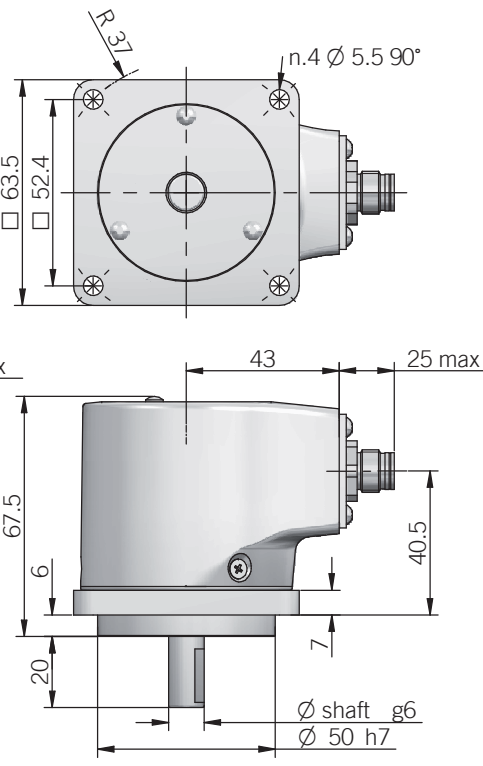


63 D



recommended mating shaft tolerance H7
dimensions in mm

63 E



ELECTRICAL SPECIFICATIONS

Resolution	16 bit
Output DAC resolution	16 bit
Minimum angle	22,5°
Power supply ¹	11,4 ... 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Electrical interface ²	voltage (0 ... 5 V / 0 ... 10 V) current (0 ... 20 mA / 4 ... 20 mA)
Auxiliary inputs (BEGIN - END)	active high (+V DC) connect to 0 V if not used / t _{min} 150 ms
Load	R _{min} = 1 kΩ (voltage output) R _{max} = (V DC - 2) / 0,02 (current output)
Output update frequency	16 kHz
Signal pattern	auto teaching according to commissioning
Start-up time	700 ms
Linearity error	± 250 arc-sec
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

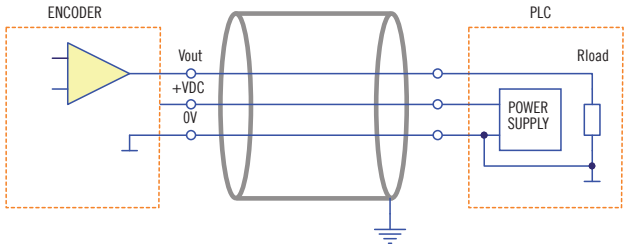
MECHANICAL SPECIFICATIONS

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 below table
Max shaft load ³	200 N axial / 70 N 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 kgm ² (36 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{4,5}	-20° ... +85°C (-4° ... +185°F)
Storage temperature ⁵	-20° ... +85°C (-4° ... +185°F)
Weight	approx 350 g (12,35 oz)

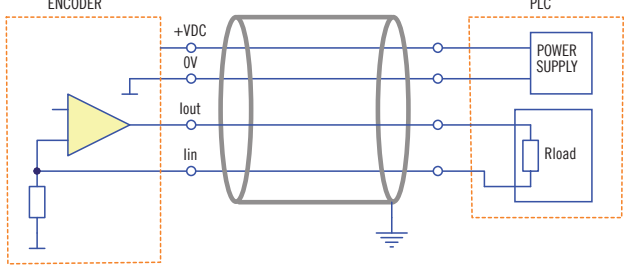
¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ maximum load for static usage
⁴ measured on the transducer flange
⁵ condensation not allowed

ELECTRICAL INTERFACE

Voltage output



Current output



3 / 4 wire source
with 3 wires interface Iin is internally connected to 0V

ROTATION SPEED / TEMPERATURE TABLE

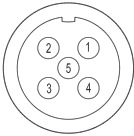
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 ... +85 (+158 ... +185)	8000	5000

CONNECTIONS

Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
Vout / Iout	green	1	1
Iin	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
≡	shield	housing	housing

* with Q current output

M12 connector (5 pin)
M12 A coded
solder side view FV



M12 connector (8 pin)
M12 A coded
solder side view FV



EAL 58 F - 63 F / G
ANALOGUE

BLIND HOLLOW SHAFT SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

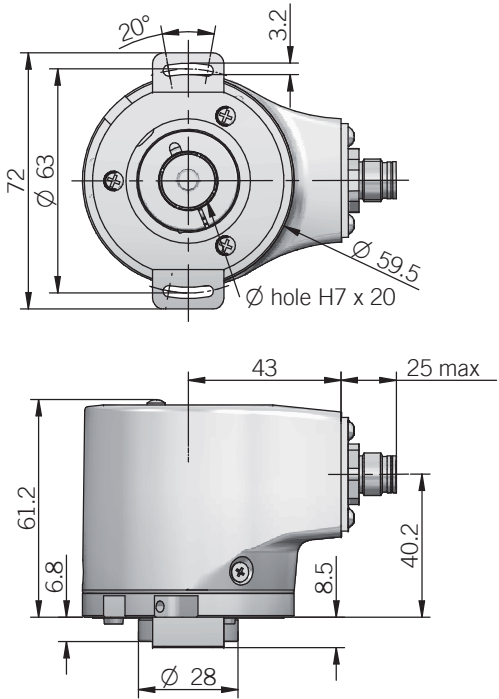
Industry standard singleturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC)
- Programmable measuring range via teach-in function (external inputs or cover button)
- Power supply up to +30 VDC with analogue (voltage or current) electrical interface
- Cable or M12 connector output
- Blind hollow shaft up to 15 mm
- Mounting by stator coupling, torque stop slot or torque pin

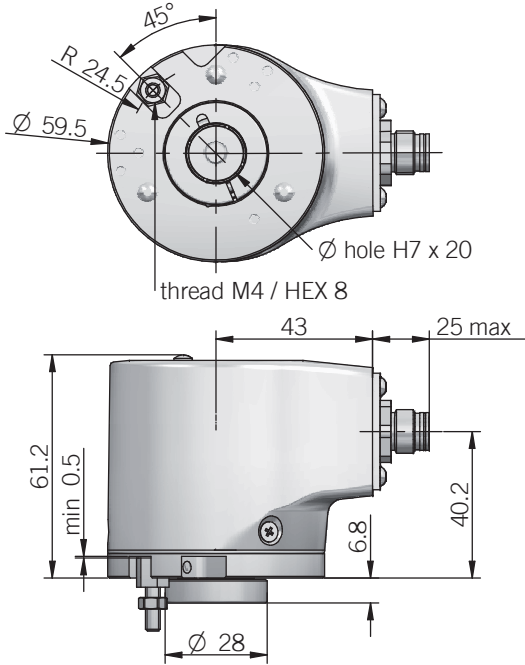


ORDERING CODE														EAL 58F 16B 12/30 V 05 X 15 X M12 R .162 +XXX	
SERIES															
analogue singleturn absolute encoder EAL															
MODEL															
blind hollow shaft with stator coupling 58F															
blind hollow shaft with torque stop slot 63F															
blind hollow shaft with torque pin 63G															
OUTPUT DAC RESOLUTION															
16 bit 16B															
POWER SUPPLY															
12 ... 30 V DC 12/30															
ELECTRICAL INTERFACE															
voltage V															
current I															
OUTPUT RANGE															
0 ... 5 V 05															
0 ... 10 V 010															
0 ... 20 mA 020															
4 ... 20 mA 420															
OPTIONS															
to be reported with voltage output / 3 wires current output X															
4 wires current output Q															
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) P															
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)															
M12 male connector M12															
DIRECTION TYPE															
radial R															
MATING CONNECTOR															
mating connector not included .162															
to be reported only with connector output (eg. M12R.162), for mating connector see Accessories															
VARIANT															
custom version XXX															

58 F

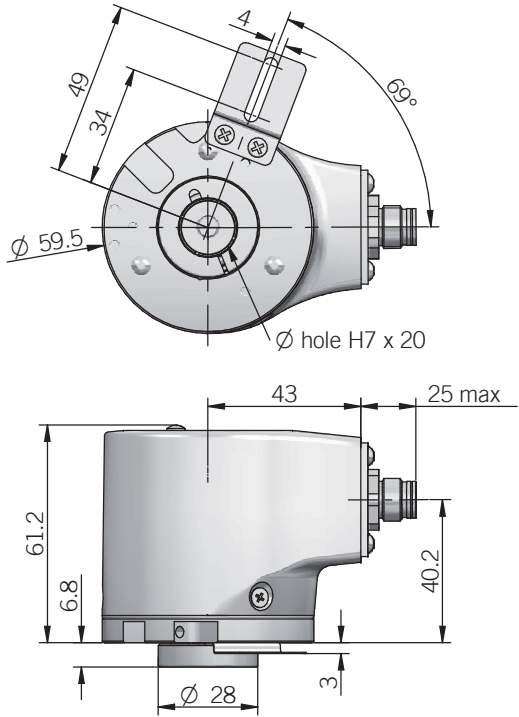


63 G



torque pin is included
recommended mating shaft tolerance g6
dimensions in mm

63 F



for torque pin please refer to Accessories

ELECTRICAL SPECIFICATIONS

Resolution	16 bit
Output DAC resolution	16 bit
Minimum angle	22,5°
Power supply ¹	11,4 ... 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Electrical interface ²	voltage (0 ... 5 V / 0 ... 10 V) current (0 ... 20 mA / 4 ... 20 mA)
Auxiliary inputs (BEGIN - END - U/D)	active high (+V DC) connect to 0 V if not used / t _{min} 150 ms
Load	R _{min} = 1 kΩ (voltage output) R _{max} = (V DC - 2) / 0,02 (current output)
Output update frequency	16 kHz
Signal pattern	auto teaching according to commissioning
Start-up time	700 ms
Linearity error	± 250 arc-sec
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

MECHANICAL SPECIFICATIONS

Bore diameter	ø 14 / 15 mm ø 6* / 8* / 9,52 (3/8")* / 10* / 11* / 12* mm * 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 load ³	200 N axial / 60 N radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	5 x 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	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painting aluminium
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{4, 5}	-20° ... +85°C (-4° ... +185°F)
Storage temperature ⁵	-20° ... +85°C (-4° ... +185°F)
Weight	approx 350 g (12,35 oz)

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

³ maximum load for static usage

⁴ measured on the transducer flange

⁵ condensation not allowed

ROTATION SPEED / TEMPERATURE TABLE

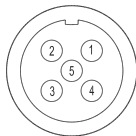
	Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
IP65	up to +70 (+158)	9000	6000
	+70 ... +85 (+158 ... +185)	6000	3000
IP67	up to +70 (+158)	8000	4000
	+70 ... +85 (+158 ... +185)	4000	2000

CONNECTIONS

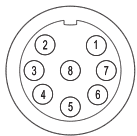
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
V _{out} / I _{out}	green	1	1
I _{in}	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
⏏	shield	housing	housing

* with Q current ouput

M12 connector (5 pin)
M12 A coded
solder side view FV



M12 connector (8 pin)
M12 A coded
solder side view FV



EAL 90 - 115 A
ANALOGUE
SOLID SHAFT SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard singleturn absolute encoder for factory automation applications.

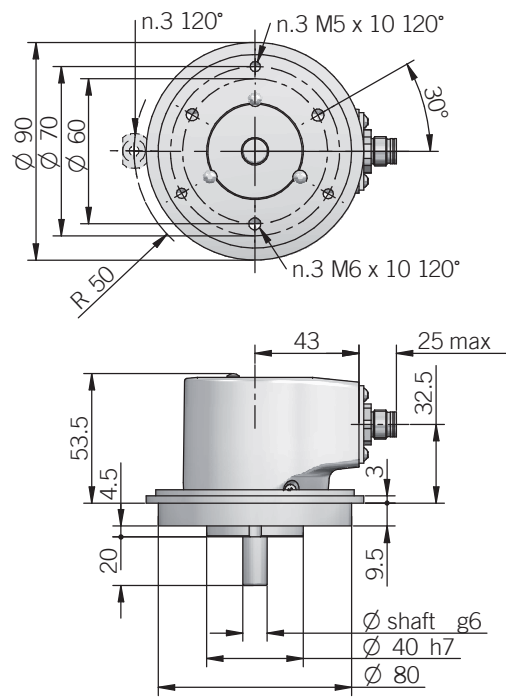
- Optical sensor technology (OptoASIC)
- Programmable measuring range via teach-in function (external inputs or cover button)
- Power supply up to +30 VDC with analogue (voltage or current) electrical interface
- Cable or M12 connector output
- Solid shaft diameter up to 11 mm
- Mounting by synchronous or REO-444 flange



ORDERING CODE

EAL	90A	16B	12/30	V	05	X	10	X	M12	R	.162	+XXX
SERIES analogue singleturn absolute encoder EAL												
MODEL synchronous flange ø 40 mm 90A REO-444 flange 115A												
OUTPUT DAC RESOLUTION 16 bit 16B												
POWER SUPPLY 12 ... 30 V DC 12/30												
ELECTRICAL INTERFACE voltage V current I												
OUTPUT RANGE 0 ... 5 V 05 0 ... 10 V 010 0 ... 20 mA 020 4 ... 20 mA 420												
OPTIONS to be reported with voltage output / 3 wires current output X 4 wires current output Q												
SHAFT DIAMETER (mod. 90) 3/8"- mm 9,52 mm 10 (mod. 115) mm 11												
ENCLOSURE RATING IP 65 shaft side / IP67 cover side X IP 67 S												
OUTPUT TYPE cable (standard length 1,5 m) P preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) M12 male connector M12 female connector included, without female please add 162 as variant code												
DIRECTION TYPE radial R												
MATING CONNECTOR mating connector not included .162 to be reported only with connector output (eg. M12R.162), for mating connector see Accessories												
VARIANT custom version XXX												

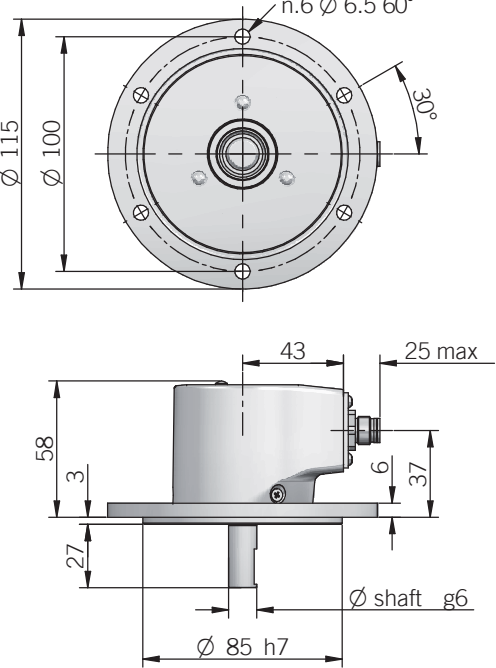
90 A



for fixing clamps please refer to Accessories
recommended mating shaft tolerance H7
dimensions in mm



115 A



ELECTRICAL SPECIFICATIONS

Resolution	16 bit
Output DAC resolution	16 bit
Minimum angle	22,5°
Power supply ¹	11,4 ... 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Electrical interface ²	voltage (0 ... 5 V / 0 ... 10 V) current (0 ... 20 mA / 4 ... 20 mA)
Auxiliary inputs (BEGIN - END - U/D)	active high (+V DC) connect to 0 V if not used / t _{min} 150 ms
Load	R _{min} = 1 kΩ (voltage output) R _{max} = (V DC - 2) / 0,02 (current output)
Output update frequency	16 kHz
Signal pattern	auto teaching according to commissioning
Start-up time	700 ms
Linearity error	± 250 arc-sec
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

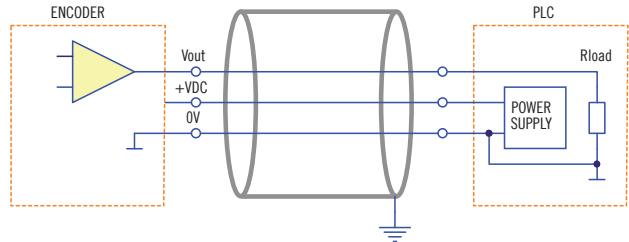
MECHANICAL SPECIFICATIONS

Shaft diameter	Ø 9,52 (3/8") / 10 / 11 mm
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see below table
Max shaft load ³	200 N axial / 70 N 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 kgm ² (36 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{4,5}	-20° ... +85°C (-4° ... +185°F)
Storage temperature ⁵	-20° ... +85°C (-4° ... +185°F)
Weight	approx 350 g (12,35 oz)

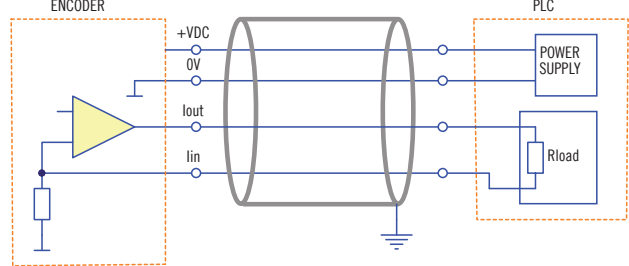
¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ maximum load for static usage
⁴ measured on the transducer flange
⁵ condensation not allowed

ELECTRICAL INTERFACE

Voltage output



Current output



3 / 4 wire source
with 3 wires interface I_{in} is internally connected to 0V

ROTATION SPEED / TEMPERATURE TABLE

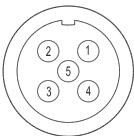
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 ... +85 (+158 ... +185)	8000	5000

CONNECTIONS

Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
Vout / Iout	green	1	1
Iin	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
≡	shield	housing	housing

* with Q current output

M12 connector (5 pin)
M12 A coded
solder side view FV



M12 connector (8 pin)
M12 A coded
solder side view FV



EA 58 B / C - 63 A / D / E PROFIBUS

SOLID SHAFT SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard singleturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC)
- Resolution up to 13 bit (8192 ppr)
- Power supply up to +28 V DC with Profibus DP as electrical interface
- Cable gland or M12 connector output
- Solid shaft diameter up to 10 mm
- Mounting by synchronous, clamping or centering 2,5" square flange

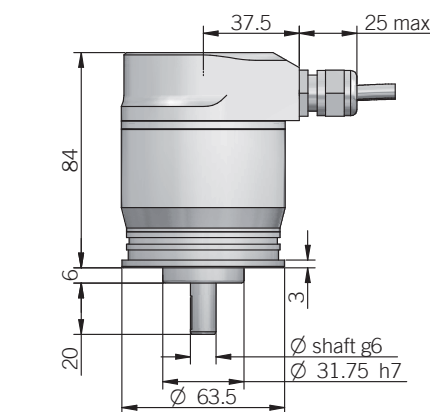
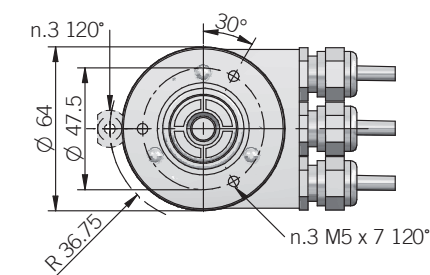


ORDERING CODE

EA	63A	4096	B	12/28	FX	10	X	6	M12R	.162	+XXX
SERIES singleturn absolute encoder EA											
MODEL synchronous flange \varnothing 31.75 mm 63A synchronous flange \varnothing 50 mm 58B clamping flange \varnothing 36 mm 58C centering square flange \varnothing 31.75 mm 63D centering square flange \varnothing 50 mm 63E											
RESOLUTION ppr 4096 / 8192											
CODE TYPE binary B											
POWER SUPPLY 12 ... 28 V DC 12/28											
ELECTRICAL INTERFACE PROFIBUS DP V0 CLASS 2 FX											
SHAFT DIAMETER (mod. 58 B) mm 6 (mod. 63 A / D) (9,52mm 3/8") mm 9 (mod. 58 C - 63 A / D / E) mm 10											
ENCLOSURE RATING IP 54 X IP 66 S											
MAX ROTATION SPEED (IP 66) 3000 rpm 3 (IP 54) 6000 rpm 6											
OUTPUT TYPE terminal box - radial cable glands P3R radial M12 connectors M12R											
MATING CONNECTORS mating connectors not included .162 to be reported only with connector output (eg. M12R.162), for mating connectors see Accessories											
VARIANT custom version XXX											

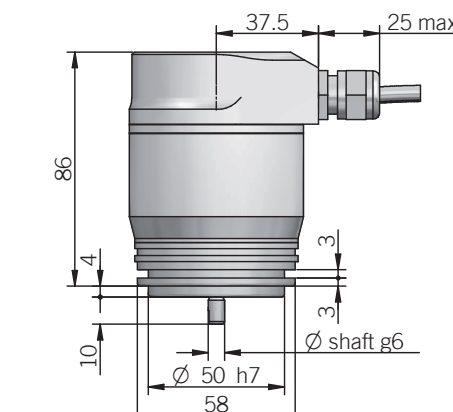
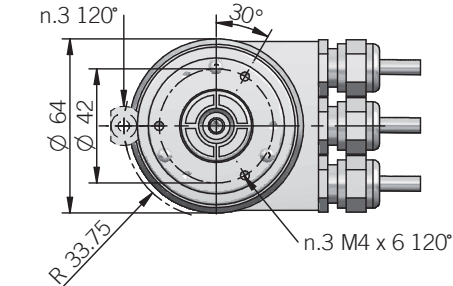
OPTICAL SINGLETURN ABSOLUTE ENCODERS | EA 58 B / C - 63 A / D / E PROFIBUS

63 A



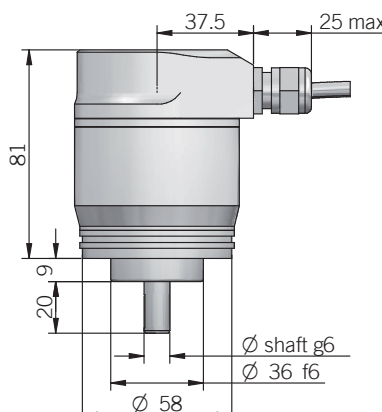
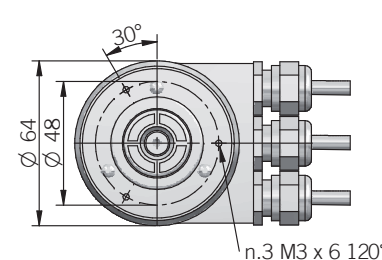
fixing clamps not included, please refer to Accessories

58 B

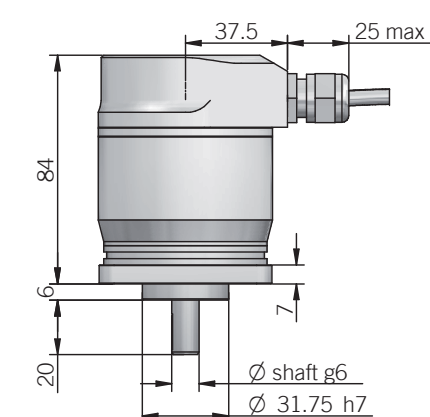
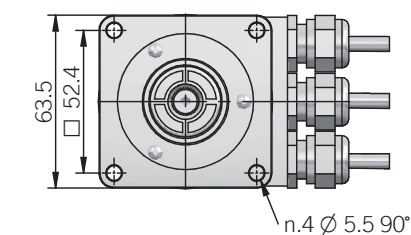


fixing clamps not included, please refer to Accessories

58 C

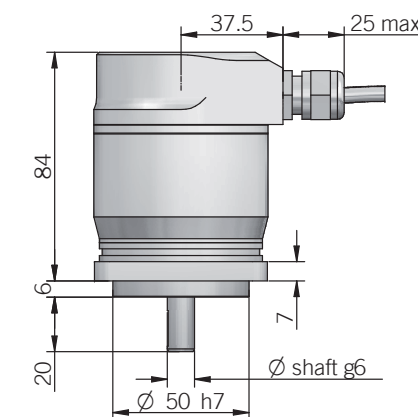
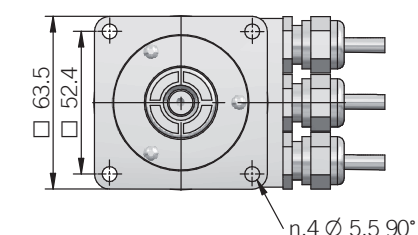


63 D



recommended mating shaft tolerance H7
dimensions in mm

63 E



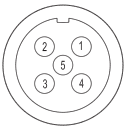
ELECTRICAL SPECIFICATIONS

Resolution	2 ... 4096 / 2 ... 8192 ppr programmable during commissioning
Power supply ¹	11,4 ... 29,4 V DC (reverse polarity protection)
Current consumption without load	300 mA
Electrical interface ²	RS 485 galvanically isolated
Max bus frequency	12 Mbaud
Diagnostic features	frequency warning position warning / alarm please refer to installation manual for more informations
Max frequency	max 25 kHz LSB
Code type	binary
Counting direction	programmable during commissioning
Start-up time	500 ms
Accuracy	± 1/2 LSB
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

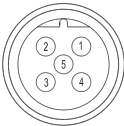
CONNECTIONS

Function	POWER	BUS OUT	BUS IN
+ V DC	2		
0 V	4		
A		2	
B		4	
A			2
B			4

POWER connector (5 pin)
M12 A coded
view solder side FV



BUS OUT - female (5 pin)
M12 B coded
solder side view FV



BUS IN - male (5 pin)
M12 B coded
solder side view MV



MECHANICAL SPECIFICATIONS

Shaft diameter	ø 6 / 9,52 (3/8") / 10 mm
Enclosure rating	X = IP 54 (IEC 60529) S = IP 66 (IEC 60529)
Max rotation speed	IP 54 - 6000 rpm IP 66 - 3000 rpm
Max shaft load ³	10 N axial / 20 N radial with ø6 shaft 100 N axial / 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 kgm ² (36 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) IP 54 < 0,06 Nm (8,50 Ozin) IP 66
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{4, 5}	0° ... +60°C (+32° ... +140°F)
Storage temperature ⁵	-15° ... +70°C (+5° ... +158°F)
Weight	650 g (22,93 oz)

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

³ maximum load for static usage

⁴ measured on the transducer flange

⁵ condensation not allowed



EA 58 F - 63 F / G
PROFIBUS

BLIND HOLLOW SHAFT SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard singleturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC)
- Resolution up to 13 bit (8192 ppr)
- Power supply up to +28 V DC with Profibus DP as electrical interface
- Cable gland or M12 connector output
- Blind hollow shaft diameter up to 15 mm
- Mounting by stator coupling, torque stop slot or torque pin



ORDERING CODE

EA 58F 4096 B 12/28 FXX 15 X 3 M12R .162 +XXX

SERIES
singleturn absolute encoder EA

MODEL
blind hollow shaft with stator coupling 58F
blind hollow shaft with torque stop slot 63F
blind hollow shaft with torque pin 63G

RESOLUTION
ppr 4096 / 8192

CODE TYPE
binary B

POWER SUPPLY
12 ... 28 V DC 12/28

ELECTRICAL INTERFACE
PROFIBUS DP V0 CLASS 2 FXX

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 54 X

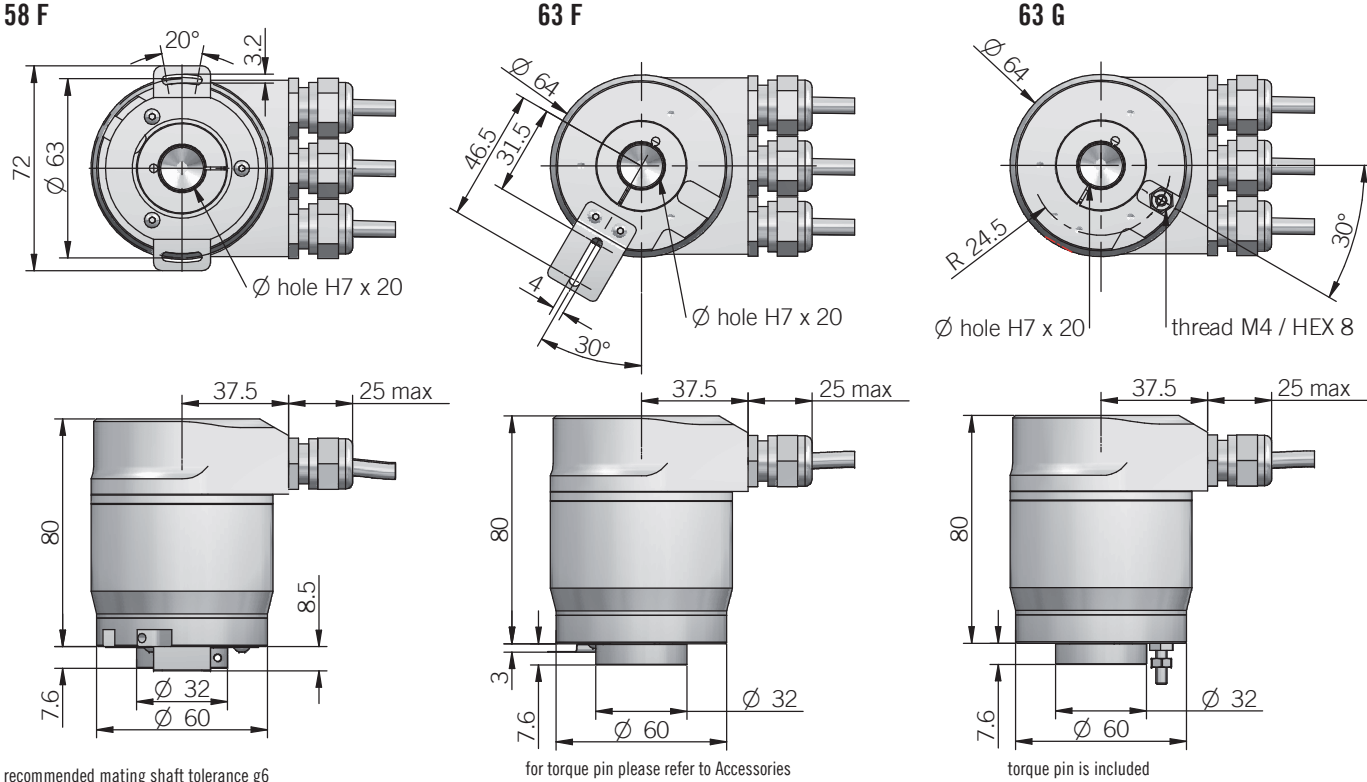
MAX ROTATION SPEED
3000 rpm 3

OUTPUT TYPE
terminal box - radial cable glands P3R
radial M12 connectors M12R

MATING CONNECTORS
mating connectors not included .162

to be reported only with connector output (eg. M12R.162), for mating connectors see Accessories

VARIANT
custom version XXX



ELECTRICAL SPECIFICATIONS

Resolution	2 ... 4096 / 2 ... 8192 ppr programmable during commissioning
Power supply ¹	11,4 ... 29,4 V DC (reverse polarity protection)
Current consumption without load	300 mA
Electrical interface ²	RS 485 galvanically isolated
Max bus frequency	12 Mbaud
Diagnostic features	frequency warning position warning / alarm please refer to installation manual for more informations
Max frequency	max 25 kHz LSB
Code type	binary
Counting direction	programmable during commissioning
Start-up time	500 ms
Accuracy	± 1/2 LSB
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

CONNECTIONS

Function	POWER	BUS OUT	BUS IN
+ V DC	2		
0 V	4		
A		2	
B		4	
A			2
B			4

MECHANICAL SPECIFICATIONS

Bore diameter	Ø 14 / 15 mm Ø 6* / 8* / 9,52 (3/8")* / 10* / 11* / 12* * with optional shaft adapter, please refer to Accessories
Enclosure rating	IP 54 (IEC 60529)
Max rotation speed	3000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	5 x 10 ⁻⁶ kgm ² (119 x 10 ⁻⁶ lbft ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin)
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Shaft adapter material	CuSn12 / CC483K bronze
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{3,4}	0° ... +60°C (+32° ... +140°F)
Storage temperature ⁴	-15° ... +70°C (+5° ... +158°F)
Fixing torque for collar clamping	1,5 Nm (212 Ozin) recommended
Weight	650 g (22,93 oz)

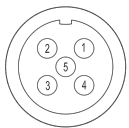
¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

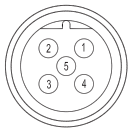
³ measured on the transducer flange

⁴ condensation not allowed

POWER connector (5 pin)
M12 A coded
view solder side FV



BUS OUT - female (5 pin)
M12 B coded
solder side view FV



BUS IN - male (5 pin)
M12 B coded
solder side view MV



EA 90 A - 115 A
PROFIBUS
SOLID SHAFT SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard singleturn absolute encoder for factory automation applications.

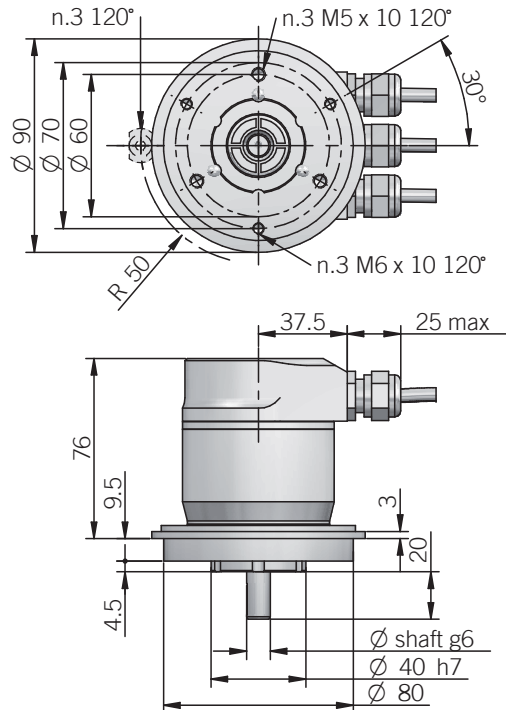
- Optical sensor technology (OptoASIC)
- Resolution up to 13 bit (8192 ppr)
- Power supply up to +28 V DC with Profibus DP as electrical interface
- Cable gland or M12 connector output
- Solid shaft diameter up to 11 mm
- Mounting by synchronous or REO-444 flange



ORDERING CODE

EA	90A	4096	B	12/28	FX	10	X	6	M12R	.162	+XXX
SERIES		singleturn absolute encoder EA									
MODEL		synchronous flange Ø 40 mm 90A REO-444 flange 115A									
RESOLUTION		ppr 4096 / 8192									
CODE TYPE		binary B									
POWER SUPPLY		12 ... 28 V DC 12/28									
ELECTRICAL INTERFACE		PROFIBUS DP V0 CLASS 2 FX									
SHAFT DIAMETER		(mod. 90) (3/8") 9,52 mm 9 mm 10 (mod. 115) mm 11									
ENCLOSURE RATING		IP 54 X (mod. 90) IP 66 S									
MAX ROTATION SPEED		(IP 66) 3000 rpm 3 (IP 54) 6000 rpm 6									
OUTPUT TYPE		terminal box - radial cable glands P3R radial M12 connectors M12R									
MATING CONNECTORS		mating connectors not included .162 to be reported only with connector output (eg. M12R.162), for mating connectors see Accessories									
VARIANT		custom version XXX									

90 A

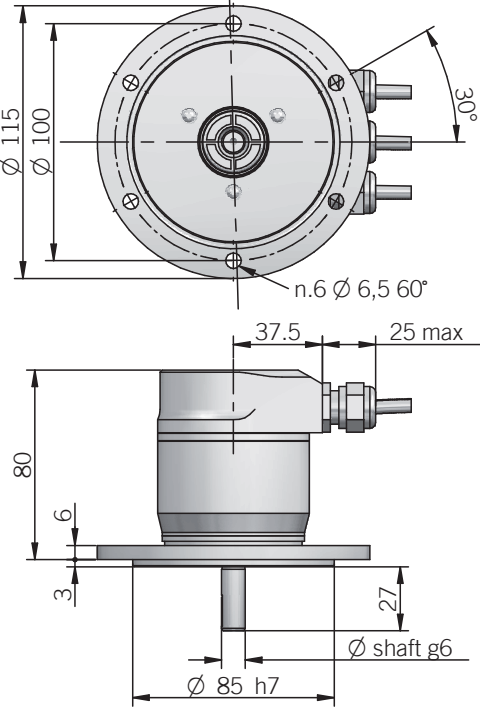


recommended mating shaft tolerance H7
dimensions in mm

ELECTRICAL SPECIFICATIONS	
Resolution	2 ... 4096 / 2 ... 8192 ppr programmable during commissioning
Power supply ¹	11,4 ... 29,4 V DC (reverse polarity protection)
Current consumption without load	300 mA
Electrical interface ²	RS 485 galvanically isolated
Max bus frequency	12 Mbaud
Diagnostic features	frequency warning position warning / alarm please refer to installation manual for more informations
Max frequency	max 25 kHz LSB
Code type	binary
Counting direction	programmable during commissioning
Start-up time	500 ms
Accuracy	± 1/2 LSB
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

CONNECTIONS			
Function	POWER	BUS OUT	BUS IN
+ V DC	2		
0 V	4		
A		2	
B		4	
A			2
B			4

115 A



MECHANICAL SPECIFICATIONS	
Shaft diameter	ø 9,52 (3/8") / 10 / 11 mm
Enclosure rating	X = IP 54 (IEC 60529) S = IP 66 (IEC 60529)
Max rotation speed	IP 54 - 6000 rpm IP 66 - 3000 rpm
Max shaft load ³	100 N axial / 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 kgm ² (36 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) IP 54 < 0,06 Nm (8,50 Ozin) IP 66
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{4, 5}	0° ... +60°C (+32° ... +140°F)
Storage temperature ⁵	-15° ... +70°C (+5° ... +158°F)
Weight	750 g (26,46 oz)

¹ as measured at the transducer without cable influences

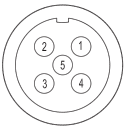
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

³ maximum load for static usage

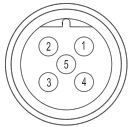
⁴ measured on the transducer flange

⁵ condensation not allowed

POWER connector (5 pin)
M12 A coded
view solder side FV



BUS OUT - female (5 pin)
M12 B coded
solder side view FV



BUS IN - male (5 pin)
M12 B coded
solder side view MV



MAIN FEATURES

Explosion proof encoder for applications within hazardous areas.

- Optical sensor technology (OptoASIC)
- Resolution up to 13 bit (8192 ppr)
- Power supply up +28 V DC with SSI as electrical interface
- Code reset for easy setup
- 10mm solid shaft diameter
- Cable output
- Mounting by synchronous or centering square flange

EX CLASSIFICATION

It has been assured with EC-TYPE Examination Certificate CESI 04 ATEX 082 that the EAX 80 comply with essential health and safety requirements according to

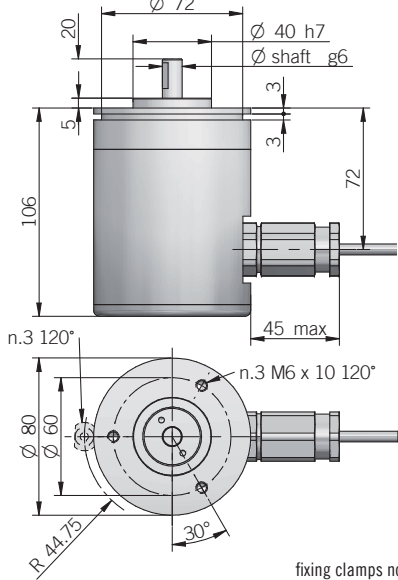
- EN 60079-0:2012+A11:2013
- EN 60079-1:2014
- EN 60079-31:2014

The UE declaration is available on www.eltra.it

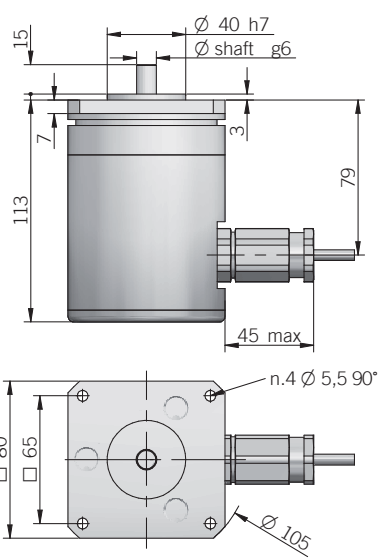


ORDERING CODE	EAX	80A	256	G	8/28	S	X	X	10	X	3	PR	.XXX
SERIES singleturn absolute flameproof encoder EAX													
MODEL synchronous flange ø 40 mm 80A centering square flange ø 40 mm 80D													
RESOLUTION ppr 360 / 720 / 1440 / 2880 / 3600 / 4096 / 8192 please directly contact our offices for other pulses													
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 ... 28 V DC 8/28													
ELECTRICAL INTERFACE Serial Synchronous Interface - SSI S													
LOGIC to be reported X													
OPTIONS to be reported if not used X reset with external input ZE													
SHAFT DIAMETER mm 10													
ENCLOSURE RATING IP 65 X													
MAX ROTATION SPEED 3000 rpm 3													
OUTPUT TYPE radial cable (standard length 1,5 m) PR preferred cable lengths 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PDR5)													
VARIANT custom version XXX													

80 A



80 D



ELECTRICAL SPECIFICATIONS

Resolution	from 360 to 8192 ppr
Power supply ¹	7,6 ... 29,4 V DC (reverse polarity protection)
Current consumption without load	100 mA
Electrical interface ²	RS-422 compatible
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET tmin 150 ms
Clock frequency	100 kHz ... 1 MHz
SSI monostable time (Tm)	18 µs
SSI pause time (Tp)	> 35 µs
SSI frame	(MSB ... LSB) 13 bit data length
Counting direction	decreasing clockwise (shaft view)
Start-up time	700 ms
Accuracy	± 1/2 LSB
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

³ maximum load for static usage

⁴ measured on the transducer flange

⁵ condensation not allowed

CONNECTIONS

Function	Cable
+ V DC	red
0 V	grey
DATA +	green
DATA -	brown
CLOCK +	yellow
CLOCK -	pink
U / D	blue
RESET	white
⏏	shield

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 10 mm
Enclosure rating	IP 65 (IEC 60529)
Max rotation speed	3000 rpm
Max shaft load ³	200 N axial / 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 kgm ² (36 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,06 Nm (8,50 Ozin)
Bearing stage material	anodized aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	anodized aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{4, 5}	0° ... +50°C (+32° ... +122°F)
Storage temperature ⁵	-15° ... +70°C (+5° ... +158°F)
Weight	1200 g (42,33 oz)

EPL MARKING

 II 2GD
Ex db IIC T6 Gb
Ex tb IIIC T85°C Db
IP 65

II 2GD

II: group II: different than mines

2: category 2: high level of protection

GD: areas containing gas (G) and dust (D)

Ex db IIC T6 Gb

Ex db: flameproof enclosure for explosive atmospheres with gases, vapours and mists

IIC: group of gas IIC

T6: max surface temperature +85°C of the device for atmospheres with gas

Gb: product with a high level of protection

Ex tb IIIC T85°C Db

Ex tb: flameproof enclosure safety type

IIIC: group of dust combustibles IIIC

T85°C: max surface temperature +85°C of the device in the presence of dust

Db: product with a high level of protection

MAIN FEATURES

EM series encoders are suitable for several application fields like electric motors, textile machines, wood-working, paper-working, glass working, marble-working machinery and, more generally, automation and process control fields.

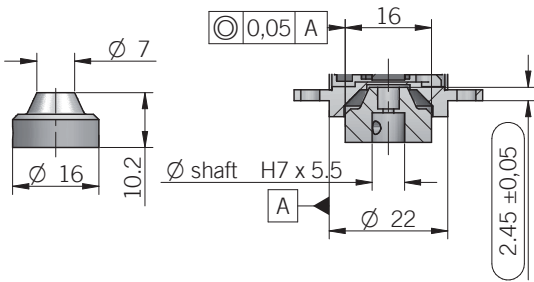
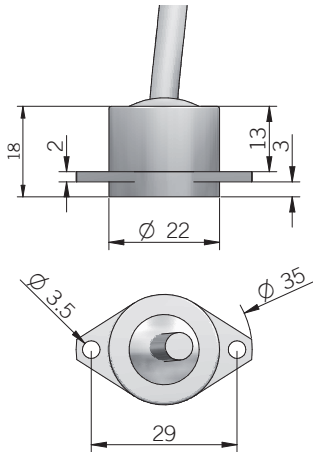
- Resolution up to 13 bit (8192 ppr) with SSI as electrical interface
- Cable output, connectors available on cable end
- No wear due to no contact magnetic technology
- Bore shaft diameter up to 10 mm
- IP 67 enclosure rating
- Wide operating temperature -40° ... +125°C (-40° ... +257°F)



ORDERING CODE

EMA	22A	1024	B	5	S	P	X	6	S	10	P	R	.XXX
SERIES magnetic singleturn absolute encoder EMA													
MODEL clamping flange ø 22 mm 22A for anodized version please directly contact our offices													
RESOLUTION ppr from 8 to 8192 refer to the available pulses list													
CODE TYPE binary B gray G													
POWER SUPPLY 5 V DC 5													
ELECTRICAL INTERFACE Serial Synchronous Interface - SSI S													
LOGIC positive P													
OPTIONS to be reported X													
BORE DIAMETER (MAGNET ACTUATOR) mm 6 mm 8 (3/8") 9,52 mm 9,52 mm 10													
ENCLOSURE RATING IP 67 S													
MAX ROTATION SPEED 10000 rpm 10													
OUTPUT TYPE cable (standard length 0,5 m) P preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)													
DIRECTION TYPE axial A radial R													
VARIANT custom version XXX													

22 A with axial cable output

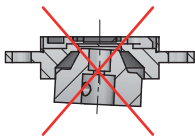
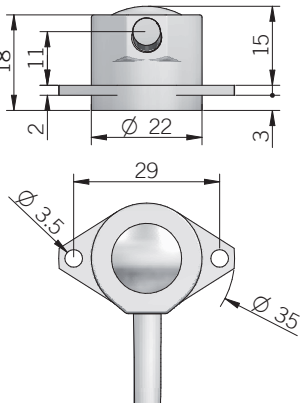


ELECTRICAL SPECIFICATIONS	
Resolution	from 8 to 8192 ppr
Power supply ¹	4,75 ... 5,25 V DC
Current consumption without load	100 mA max
Electrical interface ²	RS-422 (SN65LBC179Q or equivalent)
Code type	binary or gray
Clock frequency	100 kHz ... 1 MHz
SSI monostable time (Tm)	20 µs
SSI frame	(MSB ... LSB) 13 bit data length
Counting direction	decreasing clockwise (magnet actuator view)
Accuracy	± 0,35° typical / ± 0,50° max
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ measured on the transducer flange
⁴ condensation allowed

CONNECTIONS	
Function	Cable
+ V DC	red
0 V	black
DATA +	green
DATA -	brown or grey
CLOCK +	yellow
CLOCK -	orange
⏏	shield

22 A with radial cable output



recommended mating shaft tolerance g6
dimensions in mm

MECHANICAL SPECIFICATIONS	
Bore diameter (magnet-actuator)	ø 6 / 8 / 9,52 (3/8") / 10 mm
Enclosure rating	IP 67 (IEC 60529)
Max rotation speed	10000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia (magnet-actuator)	0,1 x 10 ⁻⁶ kgm ² (2,4 x 10 ⁻⁶ lbft ²)
Bearing stage material	EN-AW 2011 aluminum
Housing material	EN-AW 2011 aluminum
Magnet-actuator material	EN-AW 2011 aluminum
Operating temperature ^{3,4}	-40° ... +125°C (-40° ... +257°F)
Storage temperature ⁴	-25° ... +85°C (-13° ... +185°F)
Weight	30 g (1,06 oz)
Magnet actuator mounting tolerances (to get best electrical performances)	± 0,2 mm (axial) ± 0,1 mm (radial)

RESOLUTIONS	
8 - 16 - 25 - 32 - 40 - 50 - 64 - 80 - 100 - 125 - 128 - 160 - 200 - 250 - 256 - 320 - 400 - 500 - 512 - 800 - 1000 - 1024 - 1600 - 2000 - 2048 - 4096 - 8192	



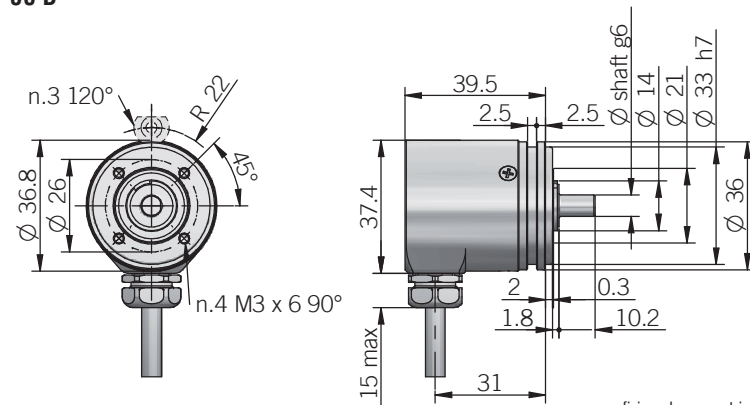
MAIN FEATURES

Miniaturized singleturn absolute encoder for limited size applications.

- Magnetic sensor technology without contact (Magnetic ASIC)
- Up to 15 bit as singleturn resolution
- Power supply up to +30 V DC with SSI as electrical interface
- Code reset for easy setup
- Cable or M12 output, other connectors available on cable end
- 6 mm diameter solid shaft
- Mounting by synchronous flange



ORDERING CODE		EMA	36B	13	G	8/30	S	P	X	6	X	8	M12R	.162	+XXX
SERIES		magnetic singleturn absolute encoder													
MODEL		synchronous flange ø 33 mm													
RESOLUTION		from 1 to 15 bit													
		360 / 720 ppr													
		please directly contact our offices for other pulses													
CODE TYPE		binary B													
		gray G													
POWER SUPPLY		5 V DC 5													
		8 ... 30 V DC 8/30													
ELECTRICAL INTERFACE		Serial Synchronous Interface - SSI S													
LOGIC		positive P													
OPTIONS		to be reported if not used X													
		reset with external input ZE													
SHAFT DIAMETER		mm 6													
ENCLOSURE RATING		IP 67 cover side / IP 65 shaft side X													
MAX ROTATION SPEED		8000 rpm 8													
OUTPUT TYPE		radial cable (standard length 0,5 m) PR													
		preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)													
		8 pin M12 radial male connector M12R													
MATING CONNECTOR		mating connector not included .162													
		to be reported only with connector output (eg. M12R.162), for mating connector see Accessories													
VARIANT		custom version XXX													




recommended mating shaft tolerance H7
dimensions in mm

fixing clamps not included, please refer to Accessories

ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 15 bit 360 / 720 ppr
Power supply¹	5 = 4,75 ... 5,25 V DC 8/30 = 7,6 ... 30 V DC (reverse polarity protection)
Power draw without load	< 400 mW
Electrical interface²	RS-422 (THVD1451 or equivalent)
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET t _{min} 150 ms
Clock frequency	100 kHz ... 1 MHz
Code type	binary or gray
SSI monostable time (T_m)	20 μs
SSI pause time (T_p)	> 35 μs
SSI frame	(MSB ... LSB) up to 13 bit = length 13 bit 14 to 15 bit = length 15 bit
SSI status and parity bit	on request
Counting direction	decreasing clockwise (shaft view)
Start-up time	150 ms
Accuracy	± 0,35° max
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

CONNECTIONS

Function	Cable	8 pin M12
+ V DC	red	8
0 V	black	5
DATA +	green	3
DATA -	brown or grey	2
CLOCK +	yellow	4
CLOCK -	orange	6
U / D	red / blue	7
RESET	white	1
	shield	housing

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 6 mm
Enclosure rating	IP 67 cover side / IP 65 shaft side (IEC 60529)
Rotation speed	8000 rpm continuous / 10000 rpm max
Max shaft load³	20 N axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,001 x 10 ⁻⁶ kgm ² (0,02 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin)
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	1.0503 / AISI 1045 chrome plated steel
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4, 5}	-30° ... +100°C (-22° ... +212°F) -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature⁵	-25° ... +85°C (-13° ... +185°F)
Weight	150 g (5,29 oz)

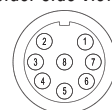
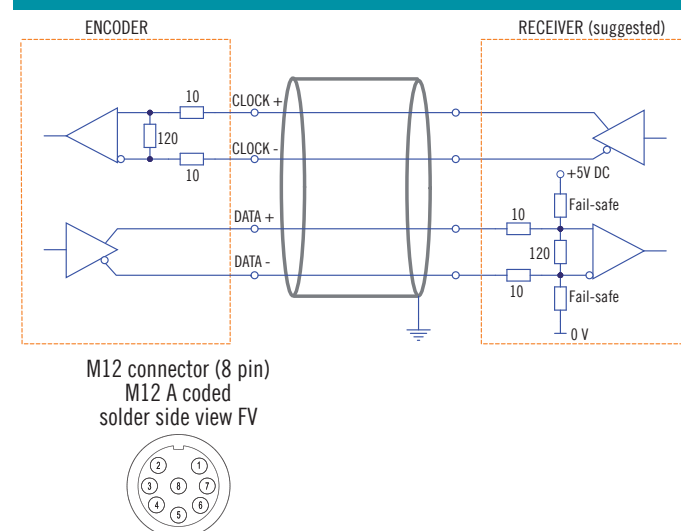
¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

³ maximum load for static usage⁴ measured on the transducer flange

⁵ condensation not allowed

SSI SCHEMATICS



BLIND HOLLOW SHAFT MAGNETIC SINGLETURN ABSOLUTE ENCODER

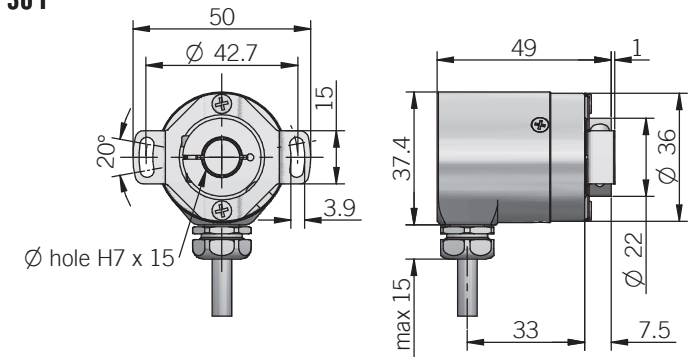
MAIN FEATURES

Miniaturized singleturn absolute encoder for limited size applications.

- Magnetic sensor technology without contact (Magnetic ASIC)
- Up to 15 bit as singleturn resolution
- Power supply up to +30 V DC with SSL as electrical interface
- Code reset for easy setup
- Cable or M12 output, other connectors available on cable end
- Blind hollow shaft up to 10 mm diameter
- Mounting by stator coupling or torque pin

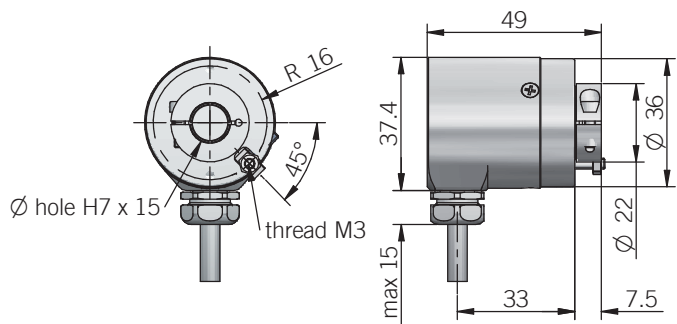
**ORDERING CODE**[illegible]

36 F



recommended mating shaft tolerance g6
dimensions in mm

36 G



torque pin is included, for mounting instruction please refer to product installation notes

ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 15 bit 360 / 720 ppr
Power supply¹	5 = 4,75 ... 5,25 V DC 8/30 = 7,6 ... 30 V DC (reverse polarity protection)
Power draw without load	< 400 mW
Electrical interface²	RS-422 (THVD1451 or equivalent)
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET t _{min} 150 ms
Clock frequency	100 kHz ... 1 MHz
Code type	binary or gray
SSI monostable time (T_m)	20 µs
SSI pause time (T_p)	> 35 µs
SSI frame	(MSB ... LSB) up to 13 bit = length 13 bit 14 to 15 bit = length 15 bit
SSI status and parity bit	on request
Counting direction	decreasing clockwise (shaft view)
Start-up time	150 ms
Accuracy	± 0,35° max
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

³ maximum load for static usage

⁴ measured on the transducer flange

⁵ condensation not allowed

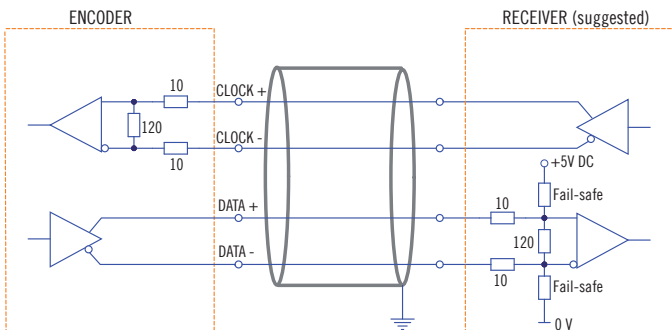
CONNECTIONS

Function	Cable	8 pin M12
+ V DC	red	8
0 V	black	5
DATA +	green	3
DATA -	brown	2
CLOCK +	yellow	4
CLOCK -	orange	6
U / D	red / blue	7
RESET	white	1
⏏	shield	housing

MECHANICAL SPECIFICATIONS

Bore diameter	ø 9,52 (3/8") / 10 mm ø 4* / 5* / 6* / 6,35 (1/4")* / 8* mm * with optional shaft adapter, please refer to Accessories
Enclosure rating	IP 67 cover side / IP 65 shaft side (IEC 60529)
Rotation speed	8000 rpm continuous / 10000 rpm max
Max shaft load³	20 N axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,001 x 10 ⁻⁶ kgm ² (0,02 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin)
Bearing stage material	EN-AW 2011 aluminium
Shaft material	1.4305 / AISI 303 stainless steel
Shaft adapter material	CuSn12 / CC483K bronze
Housing material	1.0503 / AISI 1045 chrome plated steel
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4, 5}	-30° ... +100°C (-22° ... +212°F) -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature⁵	-25° ... +85°C (-13° ... +185°F)
Weight	150 g (5,29 oz)

SSI SCHEMATICS



M12 connector (8 pin)
M12 A coded
solder side view FV



EMA 50 A / B BIT PARALLEL - SSI

SOLID SHAFT MAGNETIC SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Singleturn absolute magnetic encoder size 50 mm with solid shaft

- Resolution up to 13 bit (8192 ppr)
- Power supply up to +30 V DC with SSI or Bit Parallel as electrical interface
- Code reset for easy setup
- Cable or M12 output, other connectors available on cable end
- Sturdy construction (separated chambers)
- Solid shaft diameter up to 10 mm
- IP 67 enclosure rating
- Mounting by synchronous flange

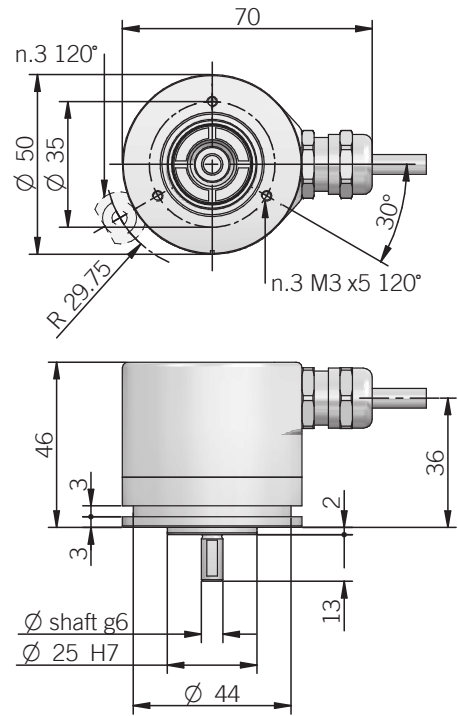


ORDERING CODE

EMA	50B	1024	G	8/30	N	N	X	6	X	3	M12	R	.162	+XXX
<p>SERIES magnetic singleturn absolute encoder EMA</p> <p>MODEL synchronous flange ø 25 mm 50A synchronous flange ø 30 mm 50B for anodized version please directly contact our offices</p> <p>RESOLUTION (N / C / R / U / P interface) ppr from 2 to 4096 (S interface) ppr from 2 to 8192</p> <p>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</p> <p>POWER SUPPLY 5 V DC 5 8 ... 30 V DC 8/30</p> <p>ELECTRICAL INTERFACE NPN N NPN open collector C PNP P PNP open collector U push pull P Serial Synchronous Interface - SSI S</p> <p>LOGIC negative N positive P</p> <p>OPTIONS to be reported if not used X reset with external input ZE (with binary code) strobe S (with binary code) strobe and reset with external input SIZE</p> <p>SHAFT DIAMETER (mod. 50A) mm 6 (mod. 50B) mm 8 (mod. 50B) mm 10</p> <p>ENCLOSURE RATING IP 65 X IP 67 S</p> <p>MAX ROTATION SPEED 3000 rpm 3</p> <p>OUTPUT TYPE cable (standard length 0,5 m) P preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) (S interface) M12 male connector M12</p> <p>DIRECTION TYPE axial A radial R</p> <p>MATING CONNECTOR mating connector not included .162 to be reported only with connector output (eg. M12R.162), for mating connector see Accessories</p>														

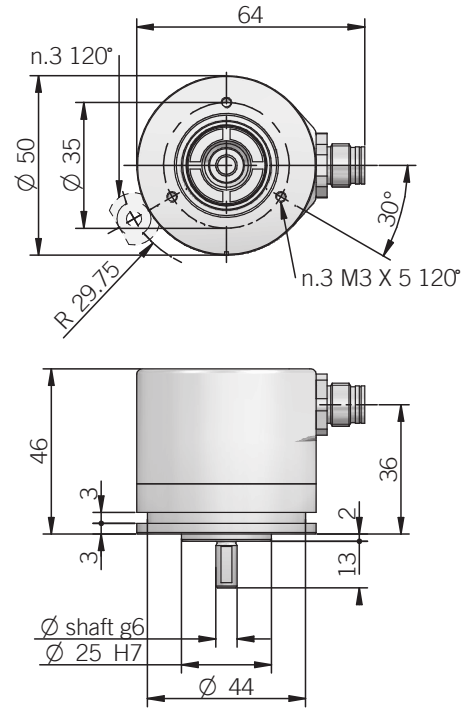
VARIANT
custom version **XXX**

50 A
radial cable output



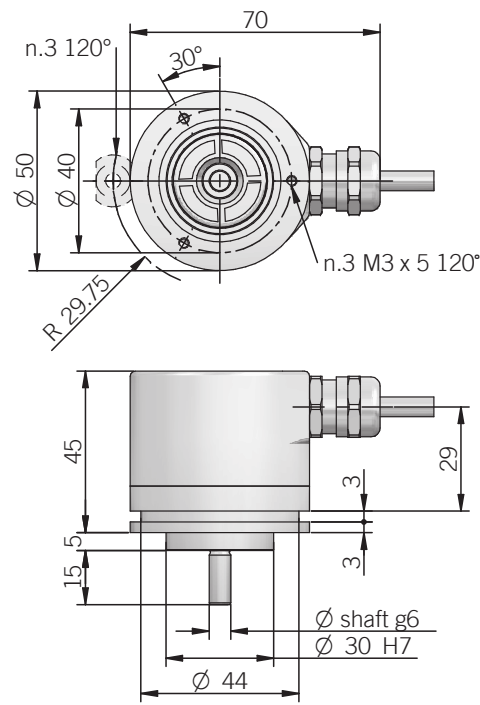
fixing clamps not included, please refer to Accessories

50 A
radial M12 output



fixing clamps not included, please refer to Accessories

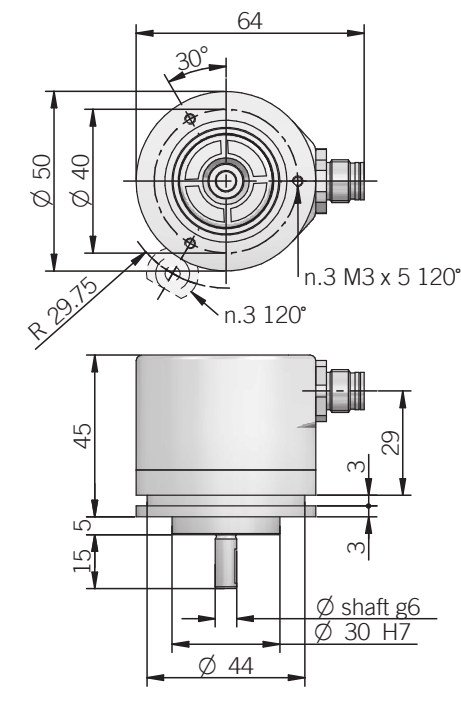
50 B
radial cable output



fixing clamps not included, please refer to Accessories

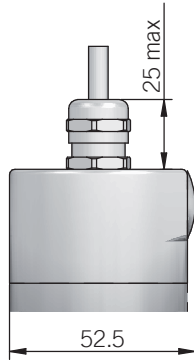
recommended mating shaft tolerance H7
dimensions in mm

50 B
radial M12 output



fixing clamps not included, please refer to Accessories

Axial output



ELECTRICAL SPECIFICATIONS

Resolution	from 2 to 4096 ppr (N / C / P / R / U interface) from 2 to 8192 ppr (S interface)
Power supply¹	5 = 4,5 ... 5,5 V DC 8/30 = 7,6 ... 31,5 V DC (reverse polarity protection)
Current consumption without load	< 100 mA
Max load current	P = 20 mA / channel N / C / R / U = 40 mA / channel
Electrical interface²	NPN / NPN open collector (ULN2003A) PNP / PNP open collector (TD62783) push pull (ic-DL) RS-422 (LTC1690 or equivalent)
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET tmin 150 ms
Max frequency	output: 25 kHz LSB (Bit parallel) clock input: 100 kHz ... 1 MHz (SSI)
Code type	binary or gray
SSI monostable time (Tm)	20 µs
SSI pause time (Tp)	> 35 µs
Strobe time	20 µs
SSI frame	(MSB ... LSB) 13 bit data length
Counting direction	decreasing clockwise (shaft view)
Start-up time	150 ms
Accuracy	± 0,35° typical
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

³ maximum load for static usage

⁴ measured on the transducer flange

⁵ condensation not allowed

BIT PARALLEL CONNECTIONS

Function	Gray / Binary	Cable
bit 1 (LSB)	G ⁰ / B ⁰	green
bit 2	G ¹ / B ¹	yellow
bit 3	G ² / B ²	blue
bit 4	G ³ / B ³	brown
bit 5	G ⁴ / B ⁴	orange or pink
bit 6	G ⁵ / B ⁵	white
bit 7	G ⁶ / B ⁶	grey
bit 8	G ⁷ / B ⁷	violet
bit 9	G ⁸ / B ⁸	grey / pink
bit 10	G ⁹ / B ⁹	white / green
bit 11	G ¹⁰ / B ¹⁰	brown / green
bit 12	G ¹¹ / B ¹¹	white / yellow
0 V	/	black
+ V DC	/	red
U / D	/	red / blue
RESET	/	yellow / brown
STROBE	/	white / grey
≡	/	shield

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 6 / 8 / 10 mm
Enclosure rating	X = IP 65 (IEC 60529) S = IP 67 (IEC 60529)
Max rotation speed	3000 rpm continuous / 5000 rpm instantaneous
Max shaft load³	30 N axial / 50 N radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,5 x 10 ⁻⁶ kgm ² (12 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	EN-AW 2011 aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	-25° ... +85°C (-13° ... +185°F)
Storage temperature⁵	-25° ... +85°C (-13° ... +185°F)
Weight	200 g (7,05 oz)

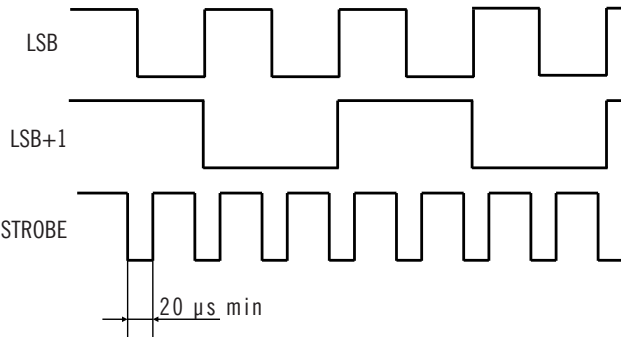
SSI CONNECTIONS

Function	Cable	8 pin M12
+ V DC	red	8
0 V	black	5
DATA +	green	3
DATA -	brown or grey	2
CLOCK +	yellow	4
CLOCK -	orange or pink	6
U / D	red / blue	7
RESET	white	1
≡	shield	housing

M12 connector (8 pin)
M12 A coded
solder side view FV



STROBE TIMING



MAIN FEATURES

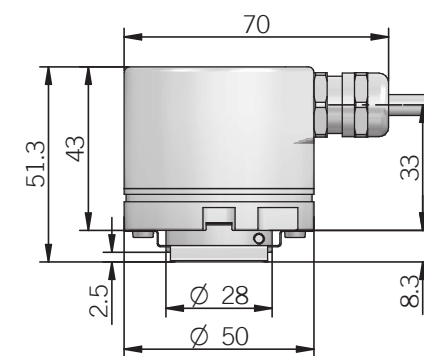
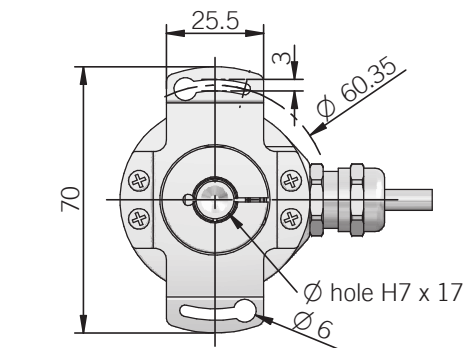
Singleturn absolute magnetic encoder size 50 mm with blind hollow shaft

- Resolution up to 13 bit (8192 ppr)
- Power supply up to +30 V DC with SSI or Bit Parallel as electrical interface
- Code reset for easy setup
- Cable or M12 output, other connectors available on cable end
- Sturdy construction (separated chambers)
- Blind hollow shaft diameter up to 15 mm
- IP 67 enclosure rating
- Mounting by stator coupling or torque pin

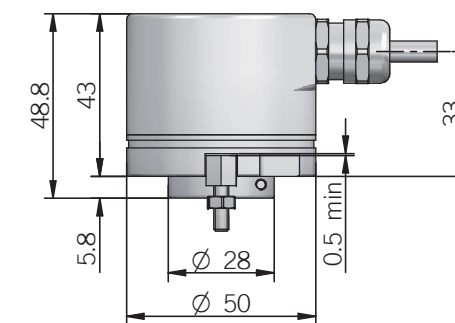
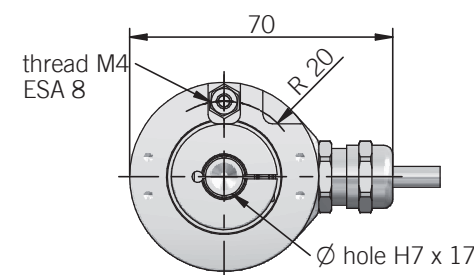


ORDERING CODE	EMA	50F	1024	G	8/30	N	N	X	15	X	3	M12	R	.162	+XXX
<div><div>SERIES</div><div>magnetic singleturn absolute encoder EMA</div></div>															
<div><div>MODEL</div><div>blind hollow shaft with stator coupling 50F blind hollow shaft with torque pin 50G</div></div>															
<div><div>RESOLUTION</div><div>(N / C / R / U / P interface) ppr from 2 to 4096 (S interface) ppr from 2 to 8192</div></div>															
<div><div>CODE TYPE</div><div>binary B gray G (no powers of 2) binary offset code (0-XXX) BC (no powers of 2) gray offset code (0-XXX) GC</div></div>															
<div><div>POWER SUPPLY</div><div>5 V DC 5 8 ... 30 V DC 8/30</div></div>															
<div><div>ELECTRICAL INTERFACE</div><div>NPN N NPN open collector C PNP R PNP open collector U push pull P Serial Synchronous Interface - SSI S</div></div>															
<div><div>LOGIC</div><div>negative N positive P</div></div>															
<div><div>OPTIONS</div><div>to be reported if not used X reset with external input ZE (with binary code) strobe S (with binary code) strobe and reset with external input SIZE</div></div>															
<div><div>BORE DIAMETER</div><div>mm 14 mm 15 diameters 5 / 6 / 8 / 10 / 12 mm with optional shaft adapter, see Accessories</div></div>															
<div><div>ENCLOSURE RATING</div><div>IP 65 X IP 67 S</div></div>															
<div><div>MAX ROTATION SPEED</div><div>3000 rpm 3</div></div>															
<div><div>OUTPUT TYPE</div><div>cable (standard length 0,5 m) P preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) (S interface) M12 male connector M12</div></div>															
<div><div>DIRECTION TYPE</div><div>axial A radial R</div></div>															
<div><div>MATING CONNECTOR</div><div>mating connector not included .162 to be reported only with connector output (eg. M12R.162), for mating connector see Accessories</div></div>															
VARIANT custom version XXX															

50 F
radial cable output



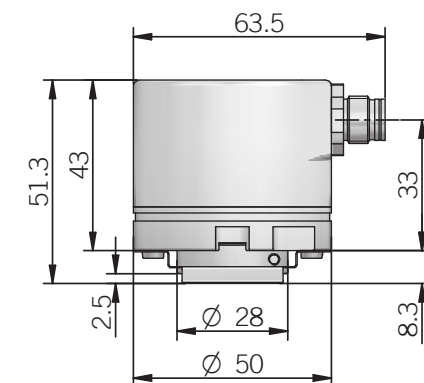
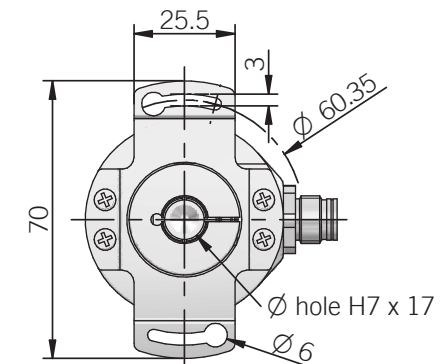
50 G
radial cable output



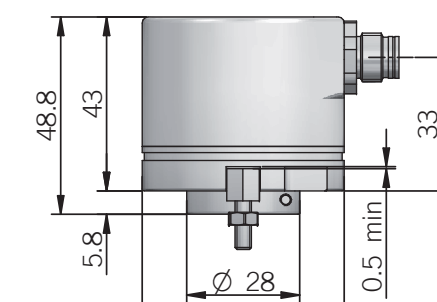
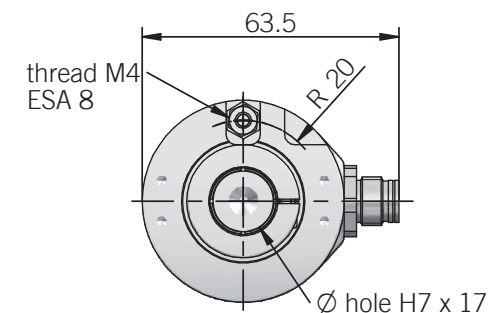
torque pin is included in model G, for mounting instruction please refer to product installation notes

recommended mating shaft tolerance g6
dimensions in mm

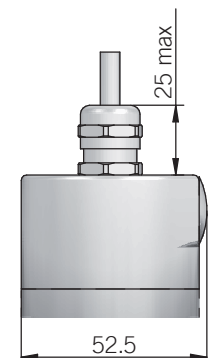
50 F
radial M12 output



50 G
radial M12 output



Axial output



ELECTRICAL SPECIFICATIONS

Resolution	from 2 to 4096 ppr (N / C / P / R / U interface) from 2 to 8192 ppr (S interface)
Power supply ¹	5 = 4,5 ... 5,5 V DC 8/30 = 7,6 ... 31,5 V DC (reverse polarity protection)
Current consumption without load	< 100 mA
Max load current	P = 20 mA / channel N / C / R / U = 40 mA / channel
Electrical interface ²	NPN / NPN open collector (ULN2003A) PNP / PNP open collector (TD62783) push pull (ic-DL) RS-422 (LTC1690 or equivalent)
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET tmin 150 ms
Max frequency	output: 25 kHz LSB (Bit parallel) clock input: 100 kHz ... 1 MHz (SSI)
Code type	binary or gray
SSI monostable time (Tm)	20 µs
SSI pause time (Tp)	> 35 µs
Strobe time	20 µs
SSI frame	(MSB ... LSB) 13 bit data length
Counting direction	decreasing clockwise (shaft view)
Start-up time	150 ms
Accuracy	± 0,35° typical
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

¹ as measured at the transducer without cable influences² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section³ maximum load for static usage⁴ measured on the transducer flange⁵ condensation not allowed

BIT PARALLEL CONNECTIONS

Function	Gray / Binary	Cable
bit 1 (LSB)	G ⁰ / B ⁰	green
bit 2	G ¹ / B ¹	yellow
bit 3	G ² / B ²	blue
bit 4	G ³ / B ³	brown
bit 5	G ⁴ / B ⁴	orange or pink
bit 6	G ⁵ / B ⁵	white
bit 7	G ⁶ / B ⁶	grey
bit 8	G ⁷ / B ⁷	violet
bit 9	G ⁸ / B ⁸	grey / pink
bit 10	G ⁹ / B ⁹	white / green
bit 11	G ¹⁰ / B ¹⁰	brown / green
bit 12	G ¹¹ / B ¹¹	white / yellow
0 V	/	black
+ V DC	/	red
U / D	/	red / blue
RESET	/	yellow / brown
STROBE	/	white / grey
⏏	/	shield

MECHANICAL SPECIFICATIONS

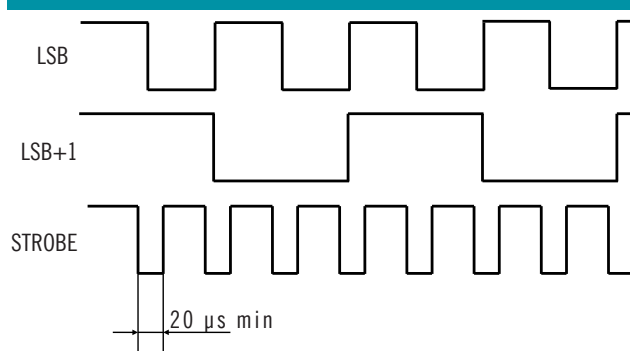
Bore diameter	ø 14 / 15 mm ø 5 / 6* / 8* / 10* / 12* mm * with optional shaft adapter, please refer to Accessories
Enclosure rating	X = IP 65 (IEC 60529) S = IP 67 (IEC 60529)
Max rotation speed	3000 rpm continuous
Max shaft load ³	30 N axial / 50 N radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	4 x 10 ⁻⁶ kgm ² (95 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	EN-AW 2011 aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{4, 5}	-25° ... +85°C (-13° ... +185°F)
Storage temperature ⁵	-25° ... +85°C (-13° ... +185°F)
Fixing torque for collar clamping	1 Nm (142 Ozin) recommended
Weight	200 g (7,05 oz)

SSI CONNECTIONS

Function	Cable	8 pin M12
+ V DC	red	8
0 V	black	5
DATA +	green	3
DATA -	brown or grey	2
CLOCK +	yellow	4
CLOCK -	orange or pink	6
U / D	red / blue	7
RESET	white	1
⏏	shield	housing

M12 connector (8 pin)
M12 A coded
solder side view FV

STROBE TIMING



MAIN FEATURES

Singleturn absolute magnetic encoder size 50 mm with solid shaft

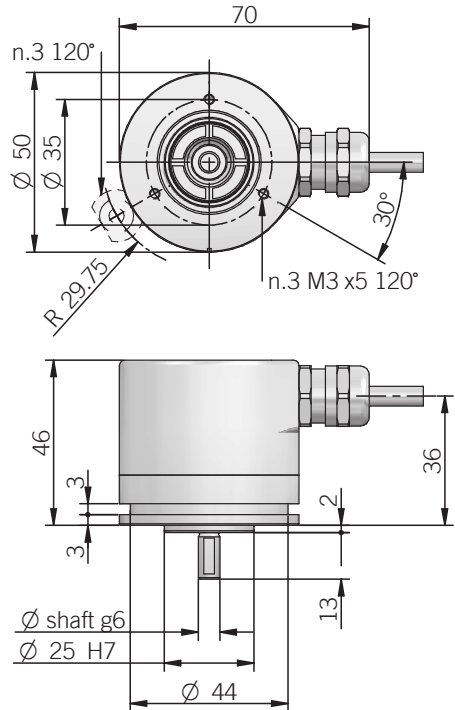
- Resolution 12 bit
- Power supply up to +28 V DC with analogue (voltage or current) electrical interface
- Code reset for easy setup
- Cable or M12 output, other connectors available on cable end
- Sturdy construction (separated chambers)
- Solid shaft diameter up to 10 mm
- IP 67 enclosure rating
- Mounting by synchronous flange



ORDERING CODE

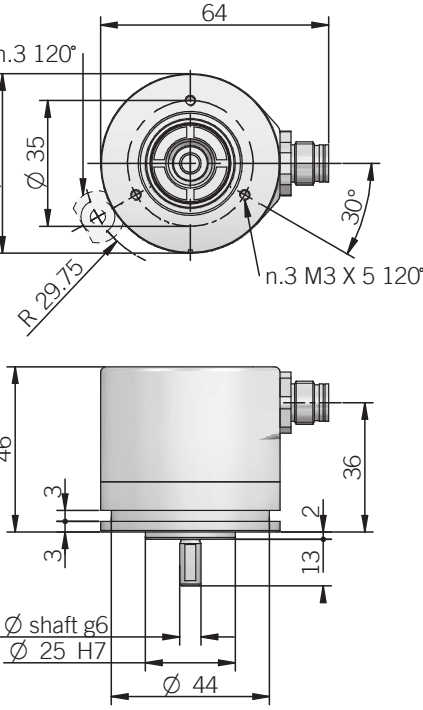
ORDERING CODE	EML	50A	360	X	12/28	V	05	X	6	X	3	M12	R	.162	+XXX
magnetic singleturn absolute encoder	SERIES EML	MODEL 50A synchronous flange ø 25 mm 50B synchronous flange ø 30 mm													
		for anodized version please directly contact our offices													
		ACTIVE ANGLE degrees 360 degrees 270 degrees 180 degrees 90													
		OPTION to be reported if not used X reset with external input ZE													
		POWER SUPPLY 12 ... 28 V DC 12/28													
		ELECTRICAL INTERFACE voltage V current I													
		OUTPUT RANGE 0 ... 5 V 05 0 ... 10 V 010 0 ... 20 mA 020 4 ... 20 mA 420													
		OPTIONS to be reported with voltage output / 3 wires current output X 4 wires current output Q													
		SHAFT DIAMETER (mod. 50A) mm 6 (mod. 50B) mm 8 (mod. 50B) mm 10													
		ENCLOSURE RATING IP 65 X IP 67 S													
		MAX ROTATION SPEED 3000 rpm 3													
		OUTPUT TYPE cable (standard length 0,5 m) P preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) M12 male connector M12													
		DIRECTION TYPE axial A radial R													
		MATING CONNECTOR mating connector not included .162 to be reported only with connector output (eg. M12R.162), for mating connector see Accessories													
		VARIANT custom version XXX													

50 A
radial cable output



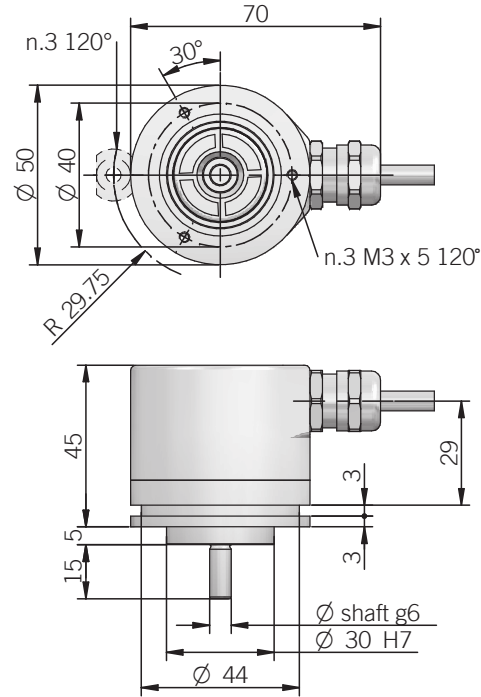
fixing clamps not included, please refer to Accessories

50 A
radial M12 output



fixing clamps not included, please refer to Accessories

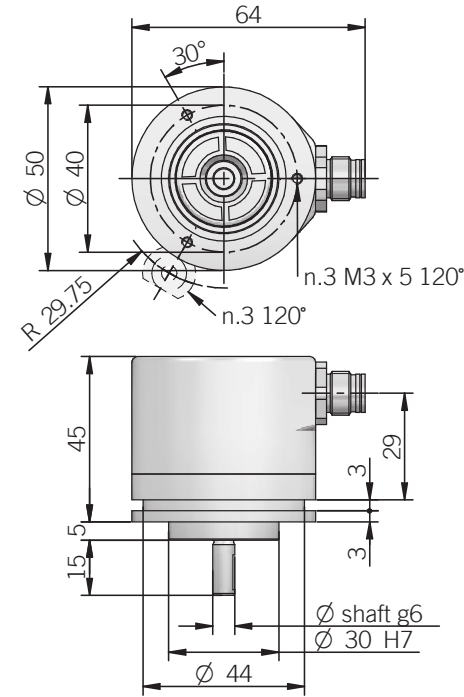
50 B
radial cable output



fixing clamps not included, please refer to Accessories

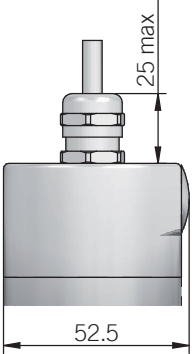
recommended mating shaft tolerance H7
dimensions in mm

50 B
radial M12 output



fixing clamps not included, please refer to Accessories

Axial output



ELECTRICAL SPECIFICATIONS

Resolution	12 bit
Output DAC resolution	12 bit
Active angle	90 ... 360 mechanical degrees
Power supply ¹	11,4 ... 29,4 V DC (reverse polarity protection)
Current consumption without load	40 mA max
Electrical interface ²	voltage (0 ... 5 V / 0 ... 10 V) current (0 ... 20 mA / 4 ... 20 mA)
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET tmin 150 ms
Load	R _{min} = 1 kΩ (voltage output) R _{max} = (V _{DC} - 2) / 0.02 (current output)
Output update frequency	100 kHz
Signal pattern	decreasing clockwise (shaft view)
Start-up time	150 ms
Linearity error	< 1 %
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

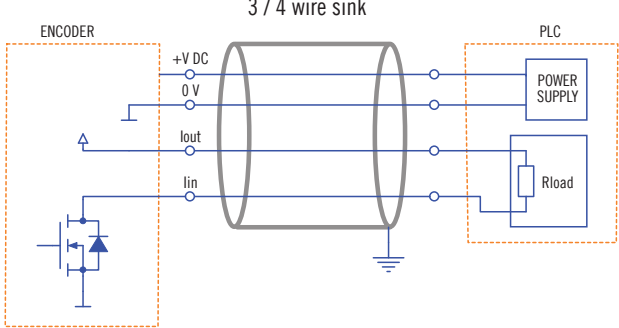
³ maximum load for static usage

⁴ measured on the transducer flange

⁵ condensation not allowed

ELECTRICAL INTERFACE

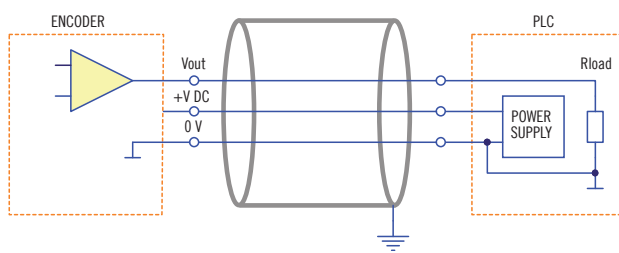
Current output



with 3 wires interface I_{out} is internally connected to +V DC

where $R_{LOAD\ max} = (V_{DC} - 2) / 0.02$

Voltage output



where $R_{LOAD\ min} = 1\ k\Omega$

MECHANICAL SPECIFICATIONS

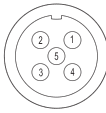
Shaft diameter	ø 6 / 8 / 10 mm
Enclosure rating	X = IP 65 (IEC 60529) S = IP 67 (IEC 60529)
Max rotation speed	3000 rpm continuous / 5000 rpm peak
Max shaft load ³	30 N axial / 50 N radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,5 x 10 ⁻⁶ kgm ² (12 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	EN-AW 2011 aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{4,5}	-25° ... +85°C (-13° ... +185°F)
Storage temperature ⁵	-25° ... +85°C (-13° ... +185°F)
Weight	200 g (7,05 oz)

CONNECTIONS

Function	Cable (voltage)	Cable (current)	5 pin M12	8 pin M12*
+ V DC	red	red	2	8
0 V	black	black	4	5
V _{out}	green	/	3	/
I _{in}	/	yellow	3	3
I _{out}	/	green	/	2
U / D	blue	blue	5	7
RESET	white	white	1	1
≡	shield	shield	housing	housing

* with Q current output

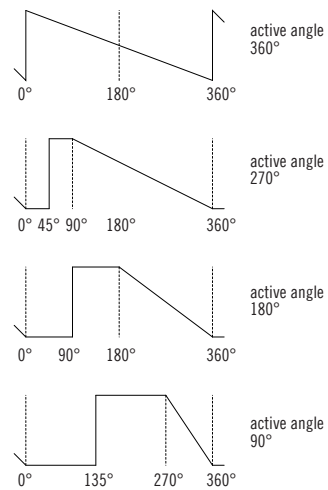
M12 connector (5 pin)
M12 A coded
solder side view FV



M12 connector (8 pin)
M12 A coded
solder side view FV



SIGNAL PATTERN (decreasing CW)



MAIN FEATURES

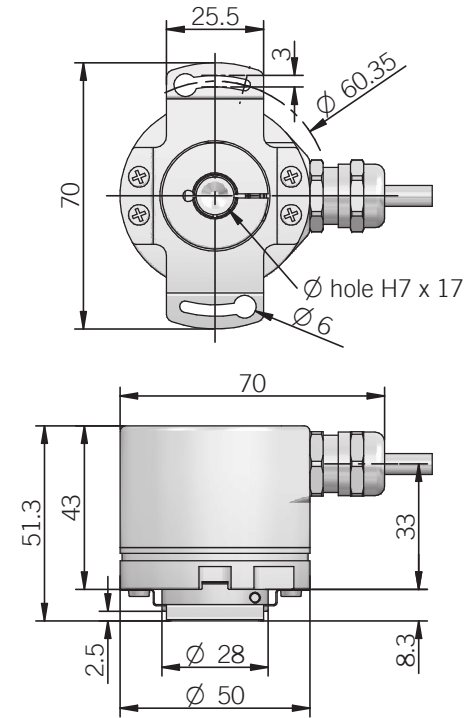
Singleturn absolute magnetic encoder size 50 mm with blind hollow shaft

- Resolution 12 bit
- Power supply up to +28 V DC with analogue (voltage or current) electrical interface
- Code reset for easy setup
- Cable or M12 output, other connectors available on cable end
- Sturdy construction (separated chambers)
- Blind hollow shaft diameter up to 15 mm
- IP 67 enclosure rating
- Mounting by stator coupling or torque pin

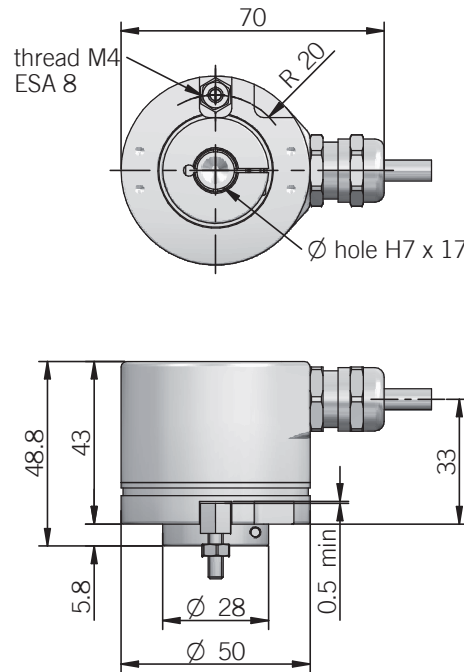


ORDERING CODE	EML	50F	360	X	12/28	V	05	X	15	X	3	M12	R	.162	+XXX
SERIES magnetic singleturn absolute encoder EML															
MODEL blind hollow shaft with stator coupling 50F blind hollow shaft with torque pin 50G															
ACTIVE ANGLE degrees 360 degrees 270 degrees 180 degrees 90															
OPTION to be reported if not used X reset with external input ZE															
POWER SUPPLY 12 ... 28 V DC 12/28															
ELECTRICAL INTERFACE voltage V current I															
OUTPUT RANGE 0 ... 5 V 05 0 ... 10 V 010 0 ... 20 mA 020 4 ... 20 mA 420															
OPTIONS to be reported with voltage output / 3 wires current output X 4 wires current output Q															
BORE DIAMETER mm 14 mm 15 diameters 5 / 6 / 8 / 10 / 12 mm with optional shaft adapter, see Accessories															
ENCLOSURE RATING IP 65 X IP 67 S															
MAX ROTATION SPEED 3000 rpm 3															
OUTPUT TYPE cable (standard length 0,5 m) P preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5) M12 male connector M12 female connector included, without female please add 162 as variant code															
DIRECTION TYPE axial A radial R															
MATING CONNECTOR mating connector not included .162 to be reported only with connector output (eg. M12R.162), for mating connector see Accessories															
VARIANT custom version XXX															

50 F
radial cable output



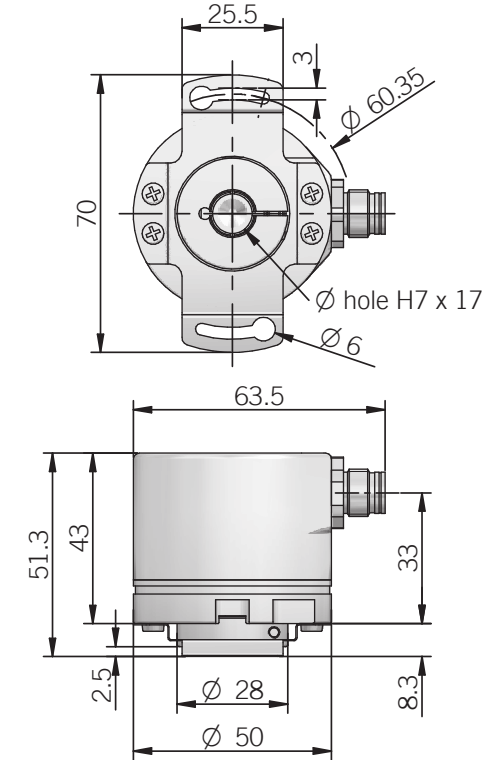
50 G
radial cable output



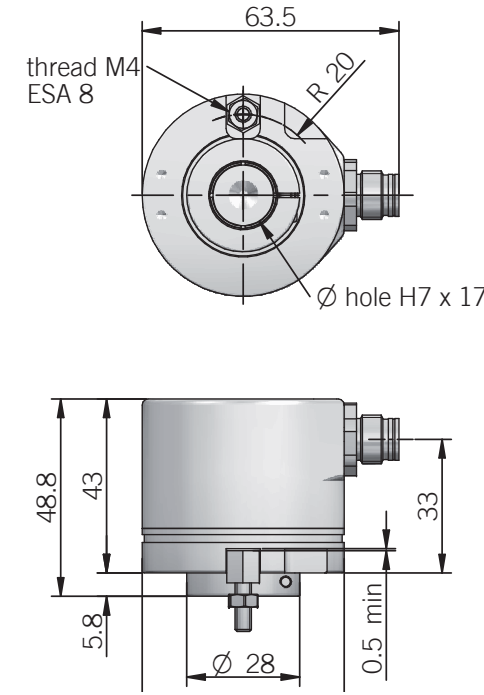
torque pin is included in model G, for mounting instruction please refer to product installation notes

recommended mating shaft tolerance g6
dimensions in mm

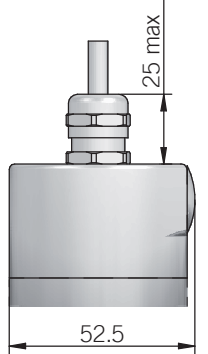
50 F
radial M12 output



50 G
radial M12 output



Axial output



ELECTRICAL SPECIFICATIONS

Resolution	12 bit
Output DAC resolution	12 bit
Active angle	90 ... 360 mechanical degrees
Power supply ¹	11,4 ... 29,4 V DC (reverse polarity protection)
Current consumption without load	40 mA max
Electrical interface ²	voltage (0 ... 5 V / 0 ... 10 V) current (0 ... 20 mA / 4 ... 20 mA)
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET tmin 150 ms
Load	R _{min} = 1 kΩ (voltage output) R _{max} = (V _{DC} - 2) / 0.02 (current output)
Output update frequency	100 kHz
Signal pattern	decreasing clockwise (shaft view)
Start-up time	150 ms
Linearity error	< 1 %
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

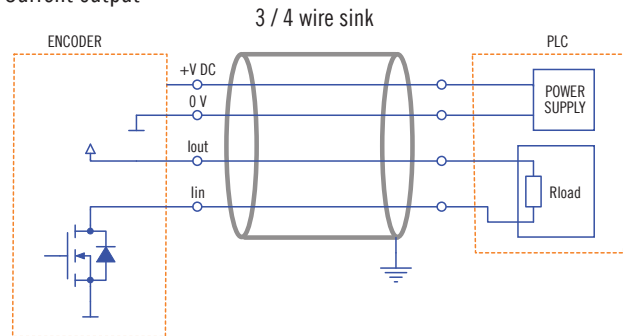
³ maximum load for static usage

⁴ measured on the transducer flange

⁵ condensation not allowed

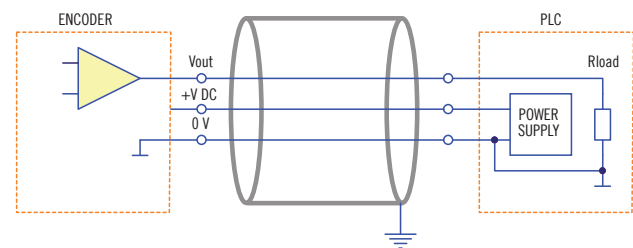
ELECTRICAL INTERFACE

Current output


with 3 wires interface I_{out} is internally connected to +V DC

where $R_{LOAD\ max} = (V_{DC} - 2) / 0.02$

Voltage output


where $R_{LOAD\ min} = 1\ k\Omega$

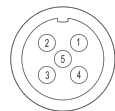
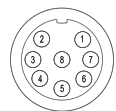
MECHANICAL SPECIFICATIONS

Bore diameter	ø 14 / 15 mm ø 5 / 6* / 8* / 10* / 12* mm * with optional shaft adapter, please refer to Accessories
Enclosure rating	X = IP 65 (IEC 60529) S = IP 67 (IEC 60529)
Max rotation speed	3000 rpm continuous
Max shaft load ³	30 N axial / 50 N radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	4 x 10 ⁻⁶ kgm ² (95 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Shaft adapter material	CuSn12 / CC483K bronze
Housing material	EN-AW 2011 aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{4,5}	-25° ... +85°C (-13° ... +185°F)
Storage temperature ⁵	-25° ... +85°C (-13° ... +185°F)
Fixing torque for collar clamping	1 Nm (142 Ozin) recommended
Weight	200 g (7,05 oz)

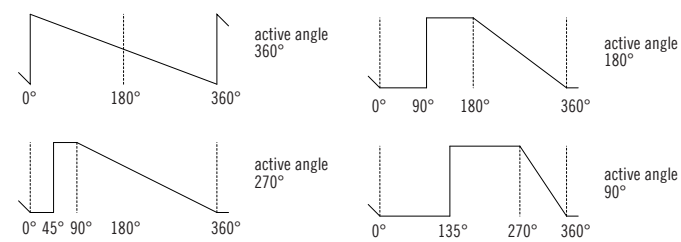
CONNECTIONS

Function	Cable (voltage)	Cable (current)	5 pin M12	8 pin M12*
+ V DC	red	red	2	8
0 V	black	black	4	5
V _{out}	green	/	3	/
I _{in}	/	yellow	3	3
I _{out}	/	green	/	2
U / D	blue	blue	5	7
RESET	white	white	1	1
⊥	shield	shield	housing	housing

* with Q current output

M12 connector (5 pin)
M12 A coded
solder side view FV

M12 connector (8 pin)
M12 A coded
solder side view FV


SIGNAL PATTERN (decreasing CW)



MAIN FEATURES

EM series encoders are suitable for several application fields like electric motors, textile machines, wood-working, paper-working, glass working, marble-working machinery and, more generally, automation and process control fields.

- Resolution up to 13 bit (8192 ppr) with SSI as electrical interface
- Cable or M12 output, other connectors available on cable end
- No wear due to no contact magnetic technology
- Bore shaft diameter up to 10 mm
- Enclosure rating up to IP67
- Wide operating temperature -40° ... +100°C (-40° ... +212°F)



ORDERING CODE

SERIES
magnetic singleturn absolute encoder **EMA**

MODEL
fixing holes ø 48 mm **55A**
for anodized version please directly contact our offices

RESOLUTION
ppr from 8 to 8192
refer to the available pulses list

CODE TYPE
binary **B**
gray **G**

POWER SUPPLY
5 V DC **5**
8 ... 30 V DC **8/30**

ELECTRICAL INTERFACE
Serial Synchronous Interface - SSI **S**

LOGIC
positive **P**

OPTIONS
to be reported **X**

BORE DIAMETER (MAGNET ACTUATOR)
mm **6**
mm **8**
(3/8") 9,52 mm **9,52**
mm **10**

ENCLOSURE RATING
IP 65 **X**
IP 67 **S**

MAX ROTATION SPEED
10000 rpm **10**

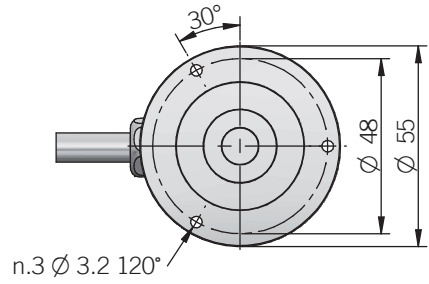
OUTPUT TYPE
cable (standard length 0,5 m) **P**
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)
M12 male connector **M12**

DIRECTION TYPE
axial **A**
radial **R**

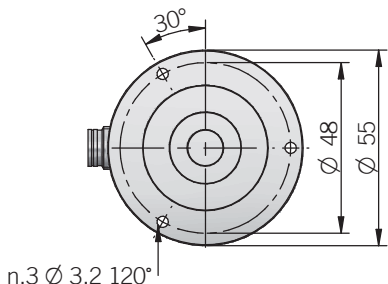
MATING CONNECTOR
mating connector not included **.162**
to be reported only with connector output (eg. M12R.162), for mating connector see Accessories

VARIANT
custom version **XXX**

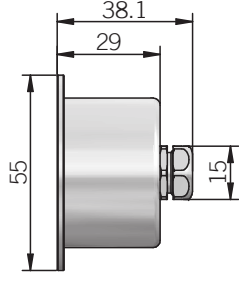
55 A radial cable output



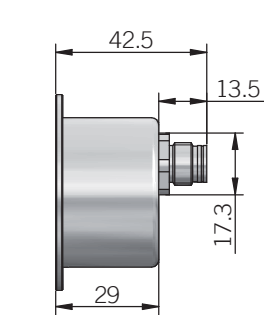
55 A radial M12 output



55 A axial cable output



55 A axial M12 output



recommended mating shaft tolerance g6
dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 8 to 8192 ppr
Power supply ¹	5 = 4,75 ... 5,25 V DC 8/30 = 7,6 ... 31,5 V DC (reverse polarity protection)
Power draw without load	800 mW max
Electrical interface ²	RS-422 (SN65LBC179Q or equivalent)
Clock frequency	100 kHz ... 1 MHz
Code type	binary or gray
SSI monostable time (Tm)	20 µs
SSI frame	(MSB ... LSB) 13 bit data length
Counting direction	decreasing clockwise (flange view)
Accuracy	± 0,35° typical / ± 0,50° max
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

³ measured on the transducer flange

⁴ condensation not allowed

CONNECTIONS

Function	Cable	8 pin M12
+ V DC	red	8
0 V	black	5
DATA +	green	3
DATA -	brown or grey	2
CLOCK +	yellow	4
CLOCK -	orange or pink	6
⏏	shield	housing

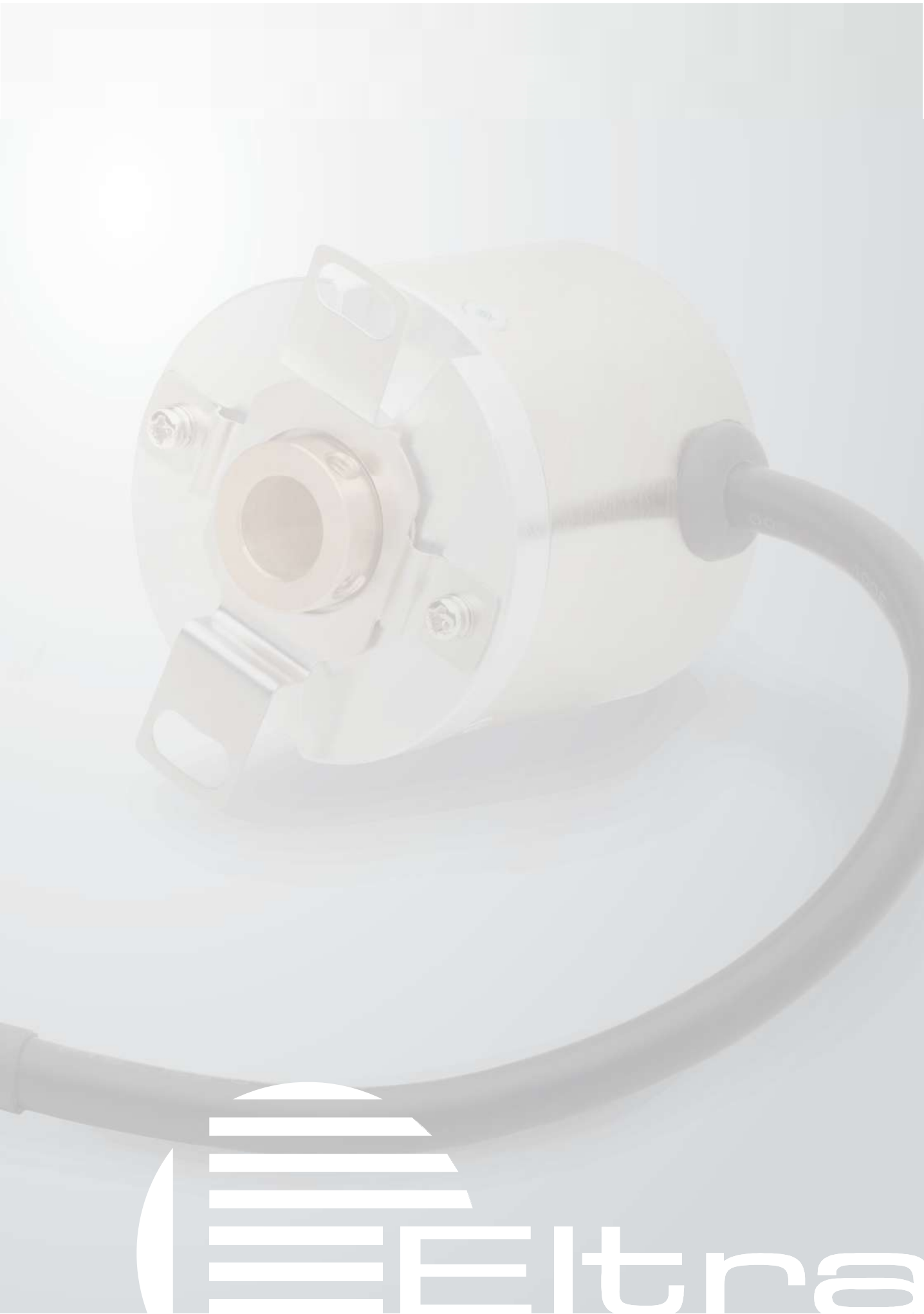
MECHANICAL SPECIFICATIONS

Bore diameter (magnet actuator)	ø 6 / 8 / 9,52 (3/8") / 10 mm
Enclosure rating	X = IP 65 (IEC 60529) S = IP 67 (IEC 60529)
Max rotation speed	10000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia (magnet actuator)	0,1 x 10 ⁻⁶ kgm ² (2,4 x 10 ⁻⁶ lbft ²)
Bearing stage material	EN-AW 2011 aluminum
Housing material	painted aluminium
Magnet actuator material	EN-AW 2011 aluminum
Operating temperature ^{3, 4}	-40° ... +100 °C (-40° ... +212°F) -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature ⁴	-25° ... +85 °C (-13° ... +185°F)
Weight	150 g (5,29 oz)
Magnet actuator mounting tolerances (to get best electrical performances)	± 0,2 mm (axial) ± 0,1 mm (radial)

RESOLUTIONS

8 - 16 - 25 - 32 - 40 - 50 - 64 - 80 - 100 - 125 - 128 - 160 - 200 - 250 - 256 - 320 - 400 - 500 - 512 - 800 - 1000 - 1024 - 1600 - 2000 - 2048 - 4096 - 8192

M12 connector (8 pin)
M12 A coded
solder side view FV



MAIN FEATURES

Miniaturized optical multitrans absolute encoder for high end application. Thanks to BiSS-C interface and high resolution it can be used in robotics, motor feedback and CNC machines.

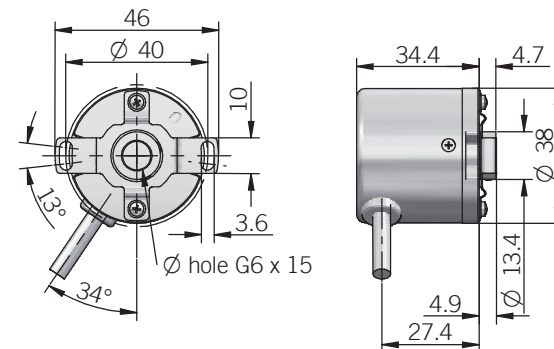
- Optical sensor technology (OptoASIC + Energy Harvesting)
- 39 bit total resolution (23 bit single turn + 16 bit multitrans)
- Power supply +5 VDC with BiSS-C as electrical interface
- Cable output
- Blind hollow shaft diameter up to 8 mm
- Mounting by stator coupling
- Operating temperature -20° ... +105°C (-4° ... +221°F)



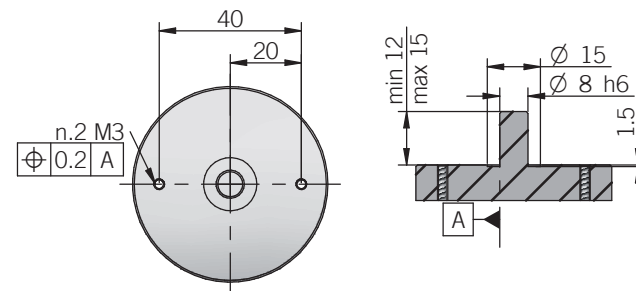
ORDERING CODE

AAM	38F	16	/	23	B	5	B	8	X	X	PR	.XXX
<p>SERIES absolute multitrans encoder AAM</p> <p>MODEL blind hollow shaft with stator coupling 38F</p> <p>MULTITURN RESOLUTION bit 16</p> <p>SINGLETURN RESOLUTION bit 23</p> <p>CODE TYPE binary B</p> <p>POWER SUPPLY 5 V DC 5</p> <p>ELECTRICAL INTERFACE BiSS-C B</p> <p>BORE DIAMETER mm 6 (1/4") mm 6,35 mm 8</p> <p>ENCLOSURE RATING IP 50 X</p> <p>OPTIONS to be reported X</p> <p>OUTPUT TYPE radial cable (standard length 0,2m) PR</p> <p>VARIANT custom version XXX</p>												

AAM 38 F



RECOMMENDED INTERFACE FLANGE DESIGN



dimensions in mm

ELECTRICAL SPECIFICATIONS

Multitrans resolution	16 bit
Singleturn resolution	23 bit
Fault status	8 bit
CRC	8 bit
Power supply¹	4,75 ... 5,25 V DC
Current consumption without load	< 120 mA
Output type²	BiSS-C (SN65LBC179Q)
Code type	binary
Clock frequency (MA)	80 kHz ... 10 MHz
Position Calculation Time	Refer to BiSS-C T _{busy} time
Counting direction	decreasing clockwise (shaft view)
Start-up time	500 ms
Accuracy	± 80 arc-sec
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive

CONNECTIONS

Function	Cable
+ V DC	red
GROUND	black
SERIAL DATA (SLO) +	orange
SERIAL DATA (SLO) -	blue
SERIAL CLOCK (MA)+	brown
SERIAL CLOCK (MA) -	white

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 6 / 6,35 (1/4") / 8 mm
Enclosure rating	IP 50 (IEC 60529)
Max rotation speed	6000 rpm continuous
Shock	200 G, 6 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Shaft material	brass
Housing material	steel
Bearing stage material	aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{3,4}	-20° ... +105°C (-4° ... +221°F)
Storage temperature⁴	-20° ... +105°C (-4° ... +221°F)
Shaft radial play allowed	± 0,05 mm
Shaft axial play allowed	± 0,1 mm
Fixing torque for shaft grains	1 Nm recommended
Fixing torque for spring screws	0,35 Nm recommended for M3 screws (not provided)
Weight	150 g (5,29 oz)

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

³ measured on the transducer flange

⁴ condensation not allowed

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

MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (proprietary OptoASIC + Energy Harvesting)
- Resolution up to 65 bit (25 bit single turn + 40 bit multiturn)
- 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

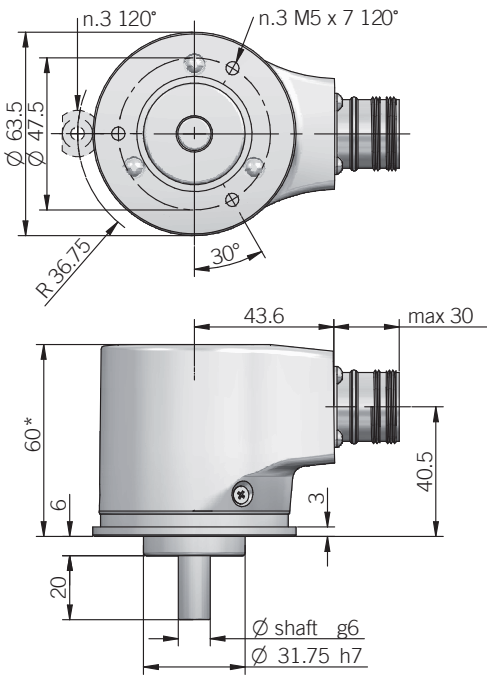


ORDERING CODE BIT PARALLEL	EAMR	63A	12 / 12	G	8/30	P	P	X	10	X	MA	R	.162	+XXX
SERIES multiturn absolute encoder EAMR														
MODEL synchronous flange ø 31.75 mm 63A synchronous flange ø 50 mm 58B clamping flange ø 36 mm 58C centering square flange ø 31.75 mm 63D centering square flange ø 50 mm 63E														
MULTITURN RESOLUTION bit from 1 to 12														
SINGLETURN RESOLUTION bit from 1 to 13														
CODE TYPE binary B gray G														
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 L reset with external input ZE latch / reset with external inputs LZE														
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 (up to 13 bit as total resolution, without reset option) 16 cores cable (standard length 1,5 m) PD (from 14 to 25 bit as total resolution or options) 32 cores cable (standard length 1,5 m) PE preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PDR5) (up to 13 bit as total resolution, without reset option) 19 pin MIL male connector MA (from 14 to 25 bit as total resolution) 32 pin MIL male connector ME														
DIRECTION TYPE radial R														
MATING CONNECTOR mating connector not included .162 to be reported only with connector output (eg. MAR.162), for mating connector see Accessories														
VARIANT custom version XXX														

ORDERING CODE		EAMR	63A	12 / 13	G	8/30	S	X	2048	RS	10	X	HA	R	.162	+XXX
SSI																
SERIES																
multiturn absolute encoder		EAMR														
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														
MULTITURN RESOLUTION																
bit		12 / 14 / 15														
see table for preferred combinations																
SINGLETURN RESOLUTION																
bit		13 / 18 / 25														
see table for preferred combinations																
CODE TYPE																
binary		B														
gray		G														
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 PC 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)																
(without reset option) 7 pin MIL male connector		MC														
(with reset option) 10 pin MIL male connector		MD														
12 pin M23 male connector		HA														
8 pin M12 male connector		M12														
DIRECTION TYPE																
radial		R														
MATING CONNECTOR																
mating connector not included		.162														
to be reported only with connector output (eg. HAR.162), for mating connector see Accessories																
only with additional incremental output																
VARIANT																
custom version		XXX														

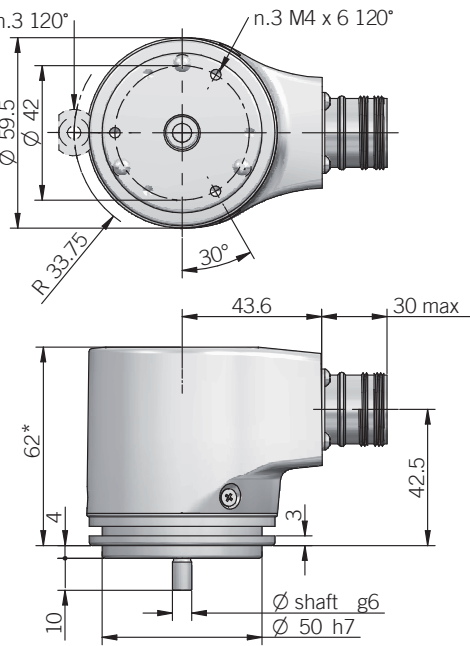
only with additional incremental output

63 A



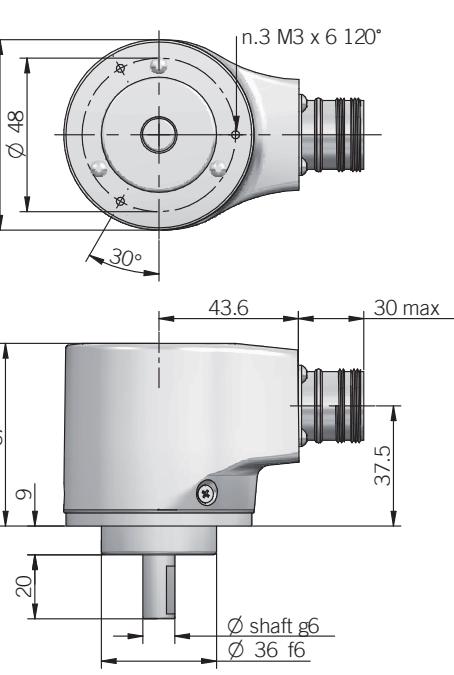
for fixing clamps please refer to Accessories

58 B

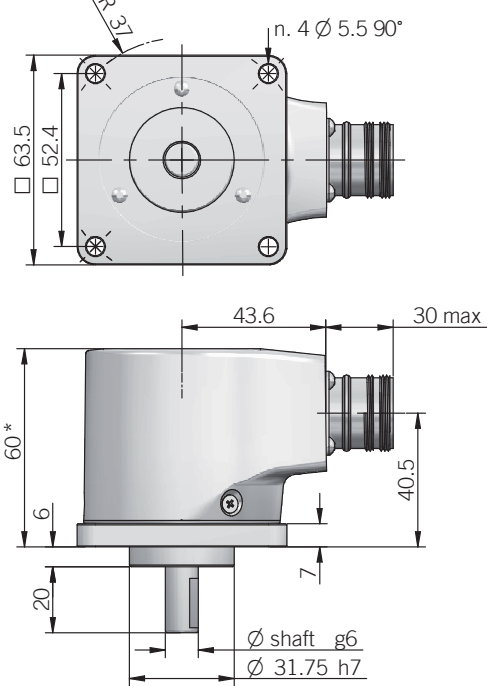


for fixing clamps please refer to Accessories

58 C

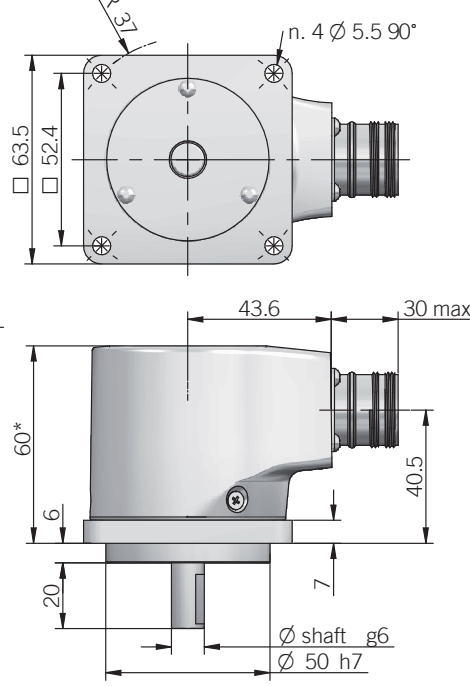


63 D



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

63 E



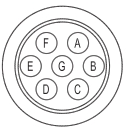
BIT PARALLEL CONNECTIONS

Function	Binary / Gray	Cable PD	Cable PE	19 pin MA	32 pin ME
bit 1 (LSB)	B ⁰ / G ⁰	green	green	A	A
bit 2	B ¹ / G ¹	yellow	yellow	B	B
bit 3	B ² / G ²	blue	blue	C	C
bit 4	B ³ / G ³	brown	brown	D	D
bit 5	B ⁴ / G ⁴	orange or pink	orange or pink	E	E
bit 6	B ⁵ / G ⁵	white	white	F	F
bit 7	B ⁶ / G ⁶	grey	grey	G	G
bit 8	B ⁷ / G ⁷	purple	purple	H	H
bit 9	B ⁸ / G ⁸	grey / pink	grey / pink	J	J
bit 10	B ⁹ / G ⁹	white / green	white / green	K	K
bit 11	B ¹⁰ / G ¹⁰	brown / green	brown / green	L	L
bit 12	B ¹¹ / G ¹¹	white / yellow	white / yellow	M	M
bit 13	B ¹² / G ¹²	yellow / brown	yellow / brown	N	N
bit 14	B ¹³ / G ¹³	/	white / grey	/	P
bit 15	B ¹⁴ / G ¹⁴	/	grey / brown	/	R
bit 16	B ¹⁵ / G ¹⁵	/	white / pink	/	S
bit 17	B ¹⁶ / G ¹⁶	/	pink / brown	/	T
bit 18	B ¹⁷ / G ¹⁷	/	white / blue	/	U
bit 19	B ¹⁸ / G ¹⁸	/	brown / blue	/	V
bit 20	B ¹⁹ / G ¹⁹	/	white / red	/	W
bit 21	B ²⁰ / G ²⁰	/	brown / red	/	X
bit 22	B ²¹ / G ²¹	/	white / black	/	Y
bit 23	B ²² / G ²²	/	brown / black	/	Z
bit 24	B ²³ / G ²³	/	grey / green	/	a
bit 25	B ²⁴ / G ²⁴	/	yellow / pink	/	b
LATCH	/	/	yellow / grey	R	e
0 V	/	black	black	T	j
U / D	/	red / blue	red / blue	U	g
RESET	/	/	pink / green	/	f
+ V DC	/	red	red	V	h
⏏	/	shield	shield	S	housing

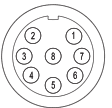
SSI CONNECTIONS

Function	Cable PC	7 pin MC	10 pin MD	12 pin HA	12 pin HA	8 pin M12
+ V DC	red	G	G	8	8	8
0 V	black	F	F	1	1	5
DATA +	green	C	C	2	2	3
DATA -	brown	D	D	10	10	2
CLOCK +	yellow	A	A	3	3	4
CLOCK -	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	E	E	5	5	7
RESET	white	/	H	4	4	1
⏏	shield	housing	housing	9	housing	housing

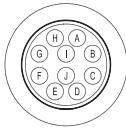
MC connector (7 pin)
Amphenol MS3102-E-16-S
solder side view FV



M12 connector (8 pin)
M12 A coded
solder side view FV



MD connector (10 pin)
Amphenol MS3102-E-18-1P
solder side view FV



HA connector (12 pin)
M23 CCW Hummel
7.410.000000 - 7.002.912.603
solder side view FV



MA connector (19 pin)
Amphenol 62IN 12E 14-19 P
solder side view FV



ME connector (32 pin)
Glenair IPT 02 A 18-32 P F6
solder side view FV



ELECTRICAL SPECIFICATIONS

Multiturn resolution	12 / 14 / 15 bit please directly contact our offices for other pulses
Singleturn resolution	P = from 1 to 13 bit S = preferred combinations 12 multiturn / 13 singleturn 14 multiturn / 18 singleturn 15 multiturn / 25 singleturn please directly contact our offices for other pulses
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 equivalent)
Incremental electrical interface ²	L = HTL diff. (AEIC-7272, active short circuit protection) P = Push-Pull (AEIC-7272, active short circuit protection) RS = RS-422 (AELT-5000 or equivalent)
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	50 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 (T _m)	20 µs
SSI pause time (T _p)	> 35 µs
SSI frame	tree format (MSB ... LSB) up to 12 bit multiturn = length 25 bit (12MT + 13ST) 14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST)
SSI status and parity bit	on request
Counting direction	decreasing clockwise (shaft view)
Start-up time	700 ms
Accuracy	± 250 arc-sec
Electromagnetic compatibility	according to 2014/30/EC directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

BIT PARALLEL CONNECTOR OR CABLE CHOICE

According to the resolution and the chosen number of turns is possible to calculate the connections required by the connector or the cable.
See below examples:

EXAMPLE 1	EXAMPLE 2
Singleturn = 8 bit = 8 connections	Singleturn = 12 bit = 12 connections
Multiturn = 5 bit = 5 connections	Multiturn = 12 bit = 12 connections
Total connections 13	Total connections 24

From 1 to 13 connections a 16 cores cable (PD) or a 19 pin connector (MA) is required.

From 14 to 25 connections a 32 cores cable (PE) or a 32 pin connector (ME) is required.

With LATCH option a 32 cores cable (PE) or a 19 pin connector (MA) or a 32 pin connector (ME) is required.

With RESET option a 32 cores cable (PE) or a 32 pin connector (ME) is required.

MECHANICAL SPECIFICATIONS

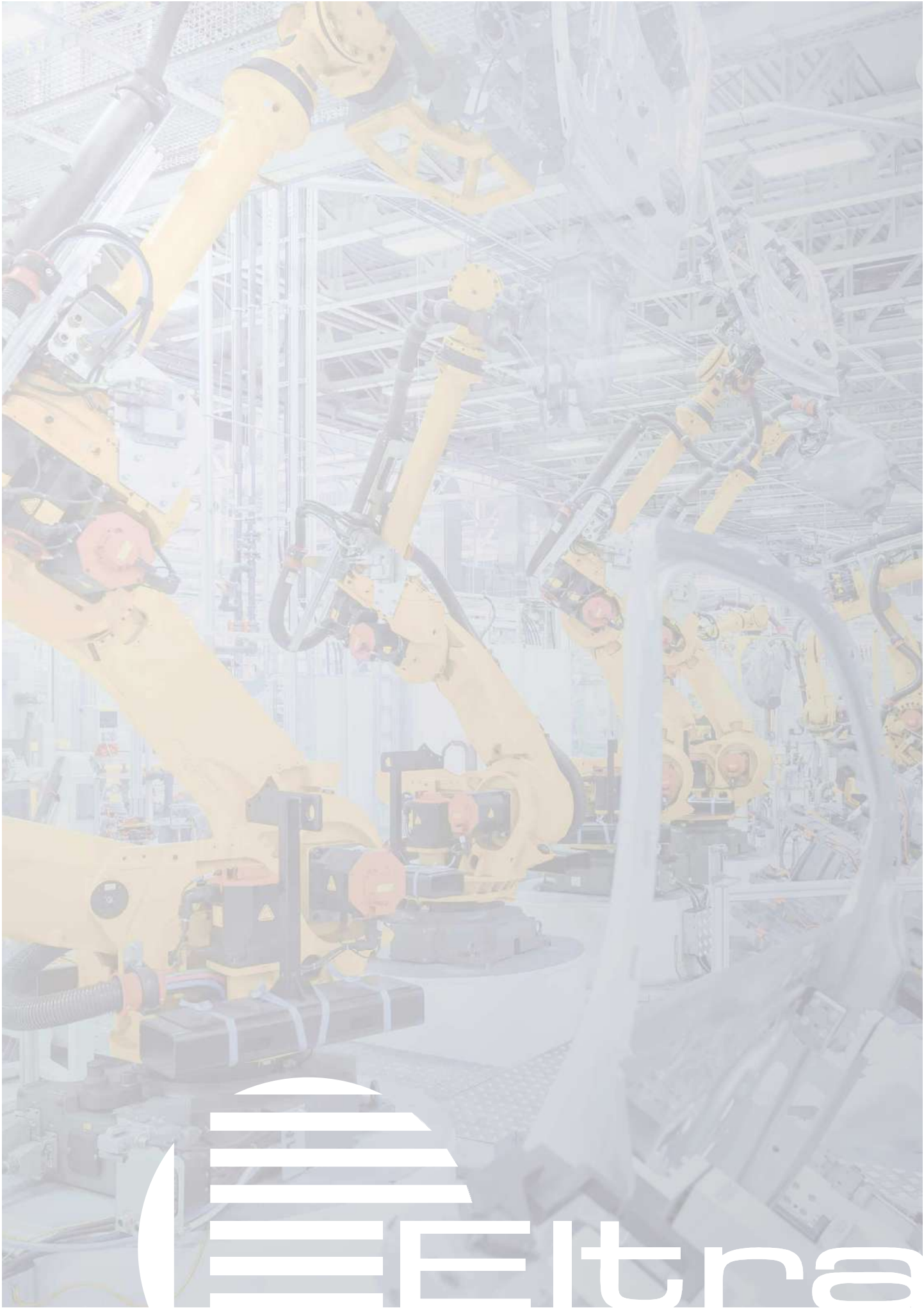
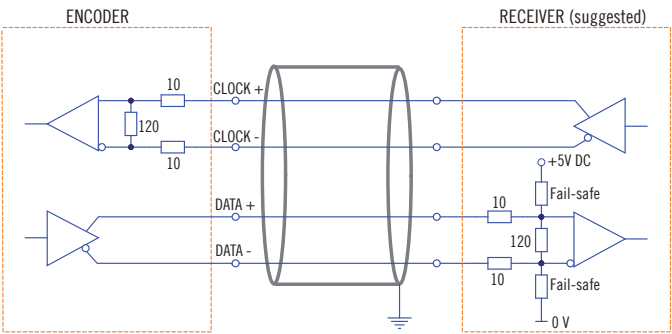
Shaft diameter	ø 6 / 9,52 (3/8") / 10 mm
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load ³	200 N axial / 70 N radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10 ⁻⁶ kgm ² (36 x 10 ⁻⁶ lbft ²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature Bit parallel ^{4, 5}	-20° ... +85°C (-4 ... +185°F)
Operating temperature SSI ^{4, 5}	-40° ... +100°C (-40° ... +212°F) -20° ... +100°C (-4° ... +212°F) with cable output -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature ⁵	-20° ... +85°C (-4° ... +185°F)
Weight	approx 350 g (12,35 oz)

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ maximum load for static usage
⁴ measured on the transducer flange
⁵ 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 SCHEMATICS



EAMR 58 F - 63 F / G
BIT PARALLEL - SSI
BLIND HOLLOW SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (proprietary OptoASIC + Energy Harvesting)
- Resolution up to 65 bit (25 bit single turn + 40 bit multiturn)
- 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

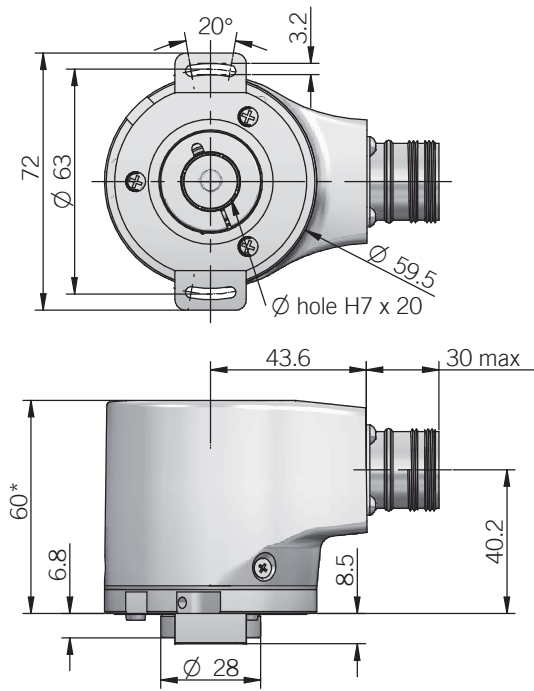


ORDERING CODE BIT PARALLEL	EAMR	58F	12 / 12	G	8/30	P	P	X	15	X	MA	R	.162	+XXX
<div><div>SERIES</div><div>multiturn absolute encoder EAMR</div></div> <div><div>MODEL</div><div>blind hollow shaft with stator coupling 58F blind hollow shaft with torque stop slot 63F blind hollow shaft with torque pin 63G</div></div> <div><div>MULTITURN RESOLUTION</div><div>bit from 1 to 12</div></div> <div><div>SINGLETURN RESOLUTION</div><div>bit from 1 to 13</div></div> <div><div>CODE TYPE</div><div>binary B gray G</div></div> <div><div>POWER SUPPLY</div><div>8 ... 30 V DC 8/30</div></div> <div><div>ELECTRICAL INTERFACE</div><div>push-pull P</div></div> <div><div>LOGIC</div><div>negative N positive P</div></div> <div><div>OPTIONS</div><div>to be reported if not used X latch with external input L reset with external input ZE latch / reset with external inputs LZE</div></div> <div><div>BORE DIAMETER</div><div>mm 14 mm 15</div></div> <div><div>ENCLOSURE RATING</div><div>IP 65 shaft side / IP67 cover side X IP 67 S</div></div> <div><div>OUTPUT TYPE</div><div>(up to 13 bit as total resolution, without reset option) 16 cores cable (standard length 1,5 m) PD (from 14 to 25 bit as total resolution or options) 32 cores cable (standard length 1,5 m) PE preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PDR5) (up to 13 bit as total resolution, without reset option) 19 pin MIL male connector MA (from 14 to 25 bit as total resolution) 32 pin MIL male connector ME</div></div> <div><div>DIRECTION TYPE</div><div>radial R</div></div> <div><div>MATING CONNECTOR</div><div>mating connector not included .162 to be reported only with connector output (eg. MAR.162), for mating connector see Accessories</div></div> <div><div>VARIANT</div><div>custom version +XXX</div></div>														

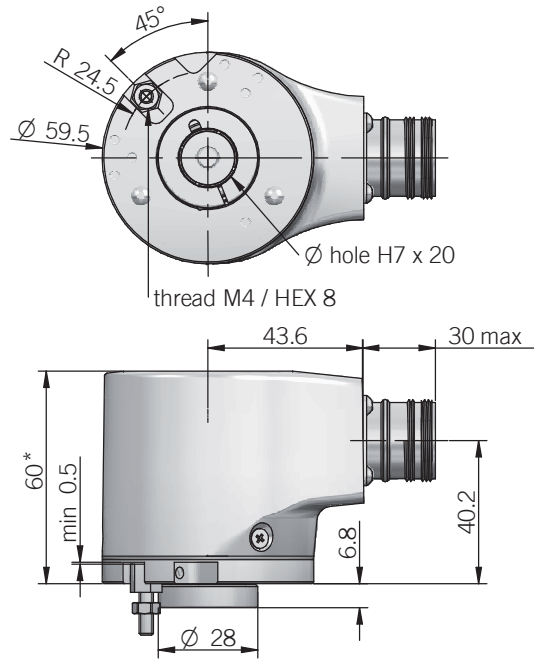
ORDERING CODE SSI	EAMR	58F	12 / 12	G	8/30	S	X	2048	RS	15	X	HA	R	.162	+XXX
<div><div>SERIES</div><div>multiturn absolute encoder EAMR</div></div> <div><div>MODEL</div><div>blind hollow shaft with stator coupling 58F</div><div>blind hollow shaft with torque stop slot 63F</div><div>blind hollow shaft with torque pin 63G</div></div> <div><div>MULTITURN RESOLUTION</div><div>bit 12 / 14 / 15</div><div>see table for preferred combinations</div></div> <div><div>SINGLETURN RESOLUTION</div><div>bit 13 / 18 / 25</div><div>see table for preferred combinations</div></div> <div><div>CODE TYPE</div><div>binary B</div><div>gray G</div></div> <div><div>POWER SUPPLY</div><div>8 ... 30 V DC 8/30</div></div> <div><div>ELECTRICAL INTERFACE</div><div>Serial Synchronous Interface - SSI S</div></div> <div><div>OPTION</div><div>to be reported if not used X</div><div>reset with external input ZE</div><div>reset on cover or with external input ZP</div></div> <div><div>INCREMENTAL RESOLUTION</div><div>(powers of 2) ppr from 128 to 8192</div></div> <div><div>INCREMENTAL ELECTRICAL INTERFACE</div><div>available with PC or HA output type</div><div>line driver HTL L</div><div>push pull P</div><div>line driver RS-422 RS</div></div> <div><div>BORE DIAMETER</div><div>mm 14</div><div>mm 15</div><div>diameters 6 / 8 / 9,52 (3/8") / 10 / 11 / 12 mm with optional shaft adapter, see Accessories</div></div> <div><div>ENCLOSURE RATING</div><div>IP 65 shaft side / IP67 cover side X</div><div>IP 67 S</div></div> <div><div>OUTPUT TYPE</div><div>cable (standard length 1,5 m) PC</div><div>preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PCR5)</div><div>(without reset option) 7 pin MIL male connector MC</div><div>(with reset option) 10 pin MIL male connector MD</div><div>12 pin M23 male connector HA</div><div>8 pin M12 male connector M12</div></div> <div><div>DIRECTION TYPE</div><div>radial R</div></div> <div><div>MATING CONNECTOR</div><div>mating connector not included .162</div><div>to be reported only with connector output (eg. HAR.162), for mating connector see Accessories</div></div> <div><div>VARIANT</div><div>custom version XXX</div></div>															

to be added with incremental output

58 F

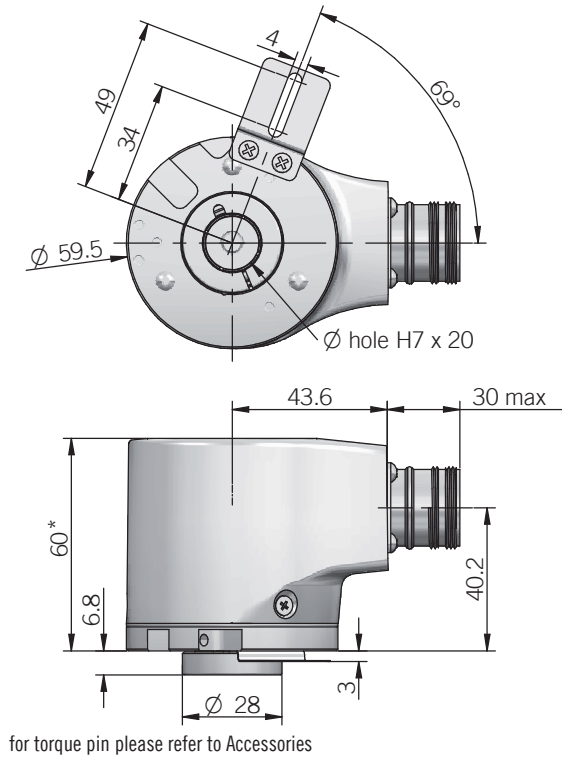


63 G



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

63 F



for torque pin please refer to Accessories

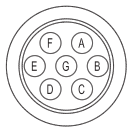
BIT PARALLEL CONNECTIONS

Function	Binary / Gray	Cable PD	Cable PE	19 pin MA	32 pin ME
bit 1 (LSB)	B ⁰ / G ⁰	green	green	A	A
bit 2	B ¹ / G ¹	yellow	yellow	B	B
bit 3	B ² / G ²	blue	blue	C	C
bit 4	B ³ / G ³	brown	brown	D	D
bit 5	B ⁴ / G ⁴	orange or pink	orange or pink	E	E
bit 6	B ⁵ / G ⁵	white	white	F	F
bit 7	B ⁶ / G ⁶	grey	grey	G	G
bit 8	B ⁷ / G ⁷	purple	purple	H	H
bit 9	B ⁸ / G ⁸	grey / pink	grey / pink	J	J
bit 10	B ⁹ / G ⁹	white / green	white / green	K	K
bit 11	B ¹⁰ / G ¹⁰	brown / green	brown / green	L	L
bit 12	B ¹¹ / G ¹¹	white / yellow	white / yellow	M	M
bit 13	B ¹² / G ¹²	yellow / brown	yellow / brown	N	N
bit 14	B ¹³ / G ¹³	/	white / grey	/	P
bit 15	B ¹⁴ / G ¹⁴	/	grey / brown	/	R
bit 16	B ¹⁵ / G ¹⁵	/	white / pink	/	S
bit 17	B ¹⁶ / G ¹⁶	/	pink / brown	/	T
bit 18	B ¹⁷ / G ¹⁷	/	white / blue	/	U
bit 19	B ¹⁸ / G ¹⁸	/	brown / blue	/	V
bit 20	B ¹⁹ / G ¹⁹	/	white / red	/	W
bit 21	B ²⁰ / G ²⁰	/	brown / red	/	X
bit 22	B ²¹ / G ²¹	/	white / black	/	Y
bit 23	B ²² / G ²²	/	brown / black	/	Z
bit 24	B ²³ / G ²³	/	grey / green	/	a
bit 25	B ²⁴ / G ²⁴	/	yellow / pink	/	b
LATCH	/	/	yellow / grey	R	e
0 V	/	black	black	T	j
U / D	/	red / blue	red / blue	U	g
RESET	/	/	pink / green	/	f
+ V DC	/	red	red	V	h
⏏	/	shield	shield	S	housing

SSI CONNECTIONS

Function	Cable PC	7 pin MC	10 pin MD	12 pin HA	12 pin HA	8 pin M12
+ V DC	red	G	G	8	8	8
0 V	black	F	F	1	1	5
DATA +	green	C	C	2	2	3
DATA -	brown	D	D	10	10	2
CLOCK +	yellow	A	A	3	3	4
CLOCK -	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	E	E	5	5	7
RESET	white	/	H	4	4	1
⏏	shield	housing	housing	9	housing	housing

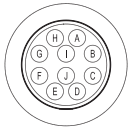
MC connector (7 pin)
Amphenol MS3102-E-16-S
solder side view FV



M12 connector (8 pin)
M12 A coded
solder side view FV



MD connector (10 pin)
Amphenol MS3102-E-18-1P
solder side view FV



HA connector (12 pin)
M23 CCW Hummel
7.410.000000 - 7.002.912.603
solder side view FV



MA connector (19 pin)
Amphenol 62IN 12E 14-19 P
solder side view FV



ME connector (32 pin)
Glenair IPT 02 A 18-32 P F6
solder side view FV



ELECTRICAL SPECIFICATIONS

Multiturn resolution	12 / 14 / 15 bit please directly contact our offices for other pulses
Singleturn resolution	P = from 1 to 13 bit S = preferred combinations 12 multiturn / 13 singleturn 14 multiturn / 18 singleturn 15 multiturn / 25 singleturn please directly contact our offices for other pulses
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 equivalent)
Incremental electrical interface ²	L = HTL diff. (AEIC-7272, active short circuit protection) P = Push-Pull (AEIC-7272, active short circuit protection) RS = RS-422 (AELT-5000 or equivalent)
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	50 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	tree format (MSB ... LSB) up to 12 bit multiturn = length 25 bit (12MT + 13ST) 14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST)
SSI status and parity bit	on request
Counting direction	decreasing clockwise (shaft view)
Start-up time	700 ms
Accuracy	± 250 arc-sec
Electromagnetic compatibility	according to 2014/30/EC directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

BIT PARALLEL CONNECTOR OR CABLE CHOICE

According to the resolution and the chosen number of turns is possible to calculate the connections required by the connector or the cable.
See below examples:

EXAMPLE 1	EXAMPLE 2
Singleturn = 8 bit = 8 connections	Singleturn = 12 bit = 12 connections
Multiturn = 5 bit = 5 connections	Multiturn = 12 bit = 12 connections
Total connections 13	Total connections 24

From 1 to 13 connections a 16 cores cable (PD) or a 19 pin connector (MA) is required.

From 14 to 25 connections a 32 cores cable (PE) or a 32 pin connector (ME) is required.

With LATCH option a 32 cores cable (PE) or a 19 pin connector (MA) or a 32 pin connector (ME) is required.

With RESET option a 32 cores cable (PE) or a 32 pin connector (ME) is required.

MECHANICAL SPECIFICATIONS

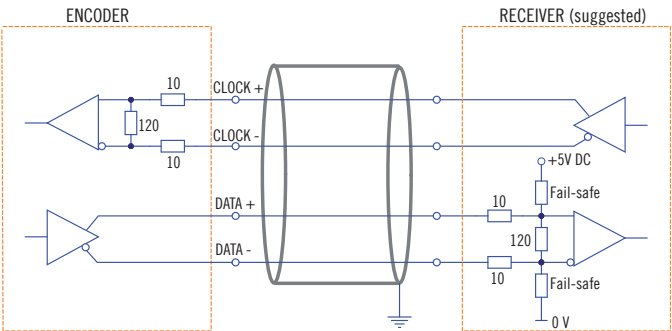
Bore diameter	ø 14 / 15 mm ø 6 / 8* / 9,52 (3/8")* / 10* / 11* / 12* mm * with optional shaft adapter, please refer to Accessories
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load ³	200 N axial / 60 N radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	5 x 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	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature Bit parallel ^{4, 5}	-20° ... +85°C (-4° ... +185°F)
Operating temperature SSI ^{4, 5}	-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 temperature ⁵	-20° ... +85°C (-4° ... +185°F)
Weight	approx 350 g (12,35 oz)

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ maximum load for static usage
⁴ measured on the transducer flange
⁵ 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

SSI SCHEMATICS



EAMR 90 - 115 A
BIT PARALLEL - SSI
SOLID SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (proprietary OptoASIC + Energy Harvesting)
- Resolution up to 65 bit (25 bit single turn + 40 bit multiturn)
- Power supply up to +30 VDC with Bit Parallel or SSI as electrical interface
- Cable or connector output
- Solid shaft diameter up to 11 mm
- Mounting by synchronous or RE0-444 flange

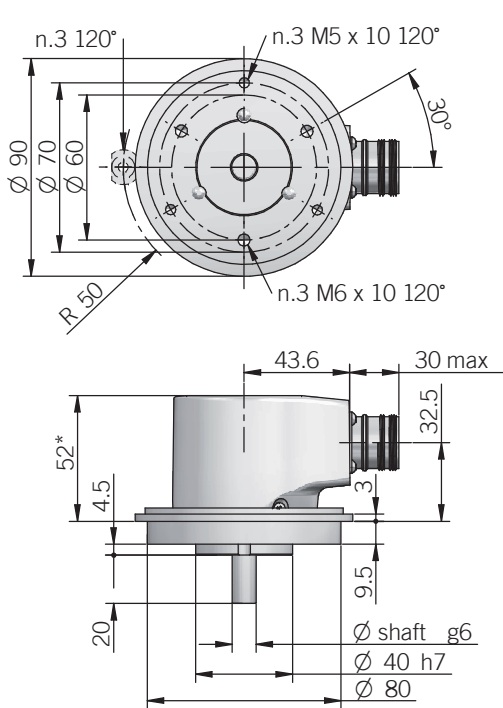


EAMR	90A	12 / 12	G	8/30	P	P	X	10	X	MA	R	.162	+XXX
<div><div>SERIES</div><div>multiturn absolute encoder EAMR</div></div>													
<div><div>MODEL</div><div>synchronous flange ø 40 mm 90A RE0-444 flange 115A</div></div>													
<div><div>MULTITURN RESOLUTION</div><div>bit from 1 to 12</div></div>													
<div><div>SINGLETURN RESOLUTION</div><div>bit from 1 to 13</div></div>													
<div><div>CODE TYPE</div><div>binary B gray G</div></div>													
<div><div>POWER SUPPLY</div><div>8 ... 30 V DC 8/30</div></div>													
<div><div>ELECTRICAL INTERFACE</div><div>push-pull P</div></div>													
<div><div>LOGIC</div><div>negative N positive P</div></div>													
<div><div>OPTIONS</div><div>to be reported if not used X latch with external input L reset with external input ZE latch / reset with external inputs LZE</div></div>													
<div><div>SHAFT DIAMETER</div><div>(mod. 90) 3/8" - mm 9,52 mm 10 (mod. 115) mm 11</div></div>													
<div><div>ENCLOSURE RATING</div><div>IP 65 shaft side / IP67 cover side X IP 67 S</div></div>													
<div><div>OUTPUT TYPE</div><div>(up to 13 bit as total resolution, without reset option) 16 cores cable (standard length 1,5 m) PD (from 14 to 25 bit as total resolution or options) 32 cores cable (standard length 1,5 m) PE preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PDR5) (up to 13 bit as total resolution, without reset option) 19 pin MIL male connector MA (from 14 to 25 bit as total resolution) 32 pin MIL male connector ME</div></div>													
<div><div>DIRECTION TYPE</div><div>radial R</div></div>													
<div><div>MATING CONNECTOR</div><div>mating connector not included .162 to be reported only with connector output (eg. MAR.162), for mating connector see Accessories</div></div>													
<div><div>VARIANT</div><div>custom version XXX</div></div>													

ORDERING CODE SSI	EAMR	90A	12 / 13	G	8/30	S	X	2048	RS	10	X	HA	R	.162	+XXX
<div><div>SERIES</div><div>multiturn absolute encoder EAMR</div></div>															
<div><div>MODEL</div><div>synchronous flange ø 40 mm 90A RE0-444 flange 115A</div></div>															
<div><div>MULTITURN RESOLUTION</div><div>bit 12 / 14 / 15 see table for preferred combinations</div></div>															
<div><div>SINGLETURN RESOLUTION</div><div>bit 13 / 18 / 25 see table for preferred combinations</div></div>															
<div><div>CODE TYPE</div><div>binary B gray G</div></div>															
<div><div>POWER SUPPLY</div><div>8 ... 30 V DC 8/30</div></div>															
<div><div>ELECTRICAL INTERFACE</div><div>Serial Synchronous Interface - SSI S</div></div>															
<div><div>OPTION</div><div>to be reported if not used X reset with external input ZE reset on cover or with external input ZP</div></div>															
<div><div>INCREMENTAL RESOLUTION</div><div>(powers of 2) ppr from 128 to 8192</div></div>															
<div><div>INCREMENTAL ELECTRICAL INTERFACE</div><div>available with PC or HA output type line driver HTL L push pull P line driver RS-422 RS</div></div>															
<div><div>SHAFT DIAMETER</div><div>(mod. 90) 3/8" - mm 9,52 mm 10 (mod. 115) mm 11</div></div>															
<div><div>ENCLOSURE RATING</div><div>IP 65 shaft side / IP67 cover side X IP 67 S</div></div>															
<div><div>OUTPUT TYPE</div><div>cable (standard length 1,5 m) PC preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PCR5) (without reset option) 7 pin MIL male connector MC (with reset option) 10 pin MIL male connector MD 12 pin M23 male connector HA 8 pin M12 male connector M12</div></div>															
<div><div>DIRECTION TYPE</div><div>radial R</div></div>															
<div><div>MATING CONNECTOR</div><div>mating connector not included .162 to be reported only with connector output (eg. HAR.162), for mating connector see Accessories</div></div>															
<div><div>VARIANT</div><div>custom version XXX</div></div>															

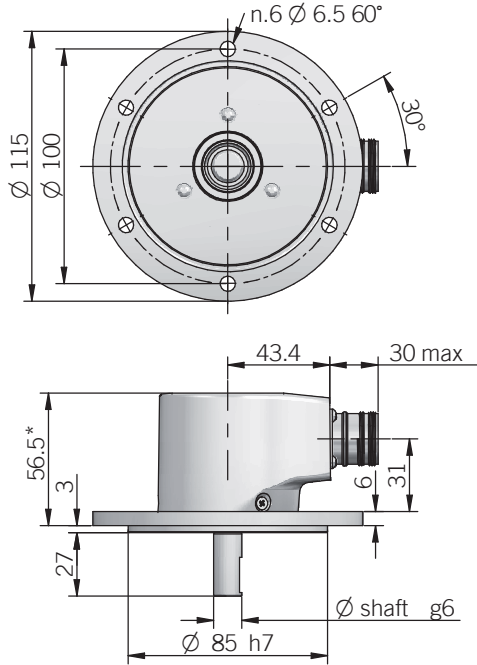
to be added with incremental output

90 A



for fixing clamps please refer to Accessories
* with option ZP +1,5 mm
recommended mating shaft tolerance H7
dimensions in mm

115 A



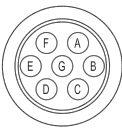
BIT PARALLEL CONNECTIONS

Function	Binary / Gray	Cable PD	Cable PE	19 pin MA	32 pin ME
bit 1 (LSB)	B ⁰ / G ⁰	green	green	A	A
bit 2	B ¹ / G ¹	yellow	yellow	B	B
bit 3	B ² / G ²	blue	blue	C	C
bit 4	B ³ / G ³	brown	brown	D	D
bit 5	B ⁴ / G ⁴	orange or pink	orange or pink	E	E
bit 6	B ⁵ / G ⁵	white	white	F	F
bit 7	B ⁶ / G ⁶	grey	grey	G	G
bit 8	B ⁷ / G ⁷	purple	purple	H	H
bit 9	B ⁸ / G ⁸	grey / pink	grey / pink	J	J
bit 10	B ⁹ / G ⁹	white / green	white / green	K	K
bit 11	B ¹⁰ / G ¹⁰	brown / green	brown / green	L	L
bit 12	B ¹¹ / G ¹¹	white / yellow	white / yellow	M	M
bit 13	B ¹² / G ¹²	yellow / brown	yellow / brown	N	N
bit 14	B ¹³ / G ¹³	/	white / grey	/	P
bit 15	B ¹⁴ / G ¹⁴	/	grey / brown	/	R
bit 16	B ¹⁵ / G ¹⁵	/	white / pink	/	S
bit 17	B ¹⁶ / G ¹⁶	/	pink / brown	/	T
bit 18	B ¹⁷ / G ¹⁷	/	white / blue	/	U
bit 19	B ¹⁸ / G ¹⁸	/	brown / blue	/	V
bit 20	B ¹⁹ / G ¹⁹	/	white / red	/	W
bit 21	B ²⁰ / G ²⁰	/	brown / red	/	X
bit 22	B ²¹ / G ²¹	/	white / black	/	Y
bit 23	B ²² / G ²²	/	brown / black	/	Z
bit 24	B ²³ / G ²³	/	grey / green	/	a
bit 25	B ²⁴ / G ²⁴	/	yellow / pink	/	b
LATCH	/	/	yellow / grey	R	e
0 V	/	black	black	T	j
U / D	/	red / blue	red / blue	U	g
RESET	/	/	pink / green	/	f
+ V DC	/	red	red	V	h
⏏	/	shield	shield	S	housing

SSI CONNECTIONS

Function	Cable PC	7 pin MC	10 pin MD	12 pin HA	12 pin HA	8 pin M12
+ V DC	red	G	G	8	8	8
0 V	black	F	F	1	1	5
DATA +	green	C	C	2	2	3
DATA -	brown	D	D	10	10	2
CLOCK +	yellow	A	A	3	3	4
CLOCK -	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	E	E	5	5	7
RESET	white	/	H	4	4	1
⏏	shield	housing	housing	9	housing	housing

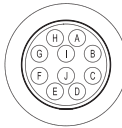
MC connector (7 pin)
Amphenol MS3102-E-16-S
solder side view FV



M12 connector (8 pin)
M12 A coded
solder side view FV



MD connector (10 pin)
Amphenol MS3102-E-18-1P
solder side view FV



HA connector (12 pin)
M23 CCW Hummel
7.410.000000 - 7.002.912.603
solder side view FV



MA connector (19 pin)
Amphenol 62IN 12E 14-19 P
solder side view FV



ME connector (32 pin)
Glenair IPT 02 A 18-32 P F6
solder side view FV



ELECTRICAL SPECIFICATIONS

Multiturn resolution	12 / 14 / 15 bit please directly contact our offices for other pulses
Singleturn resolution	P = from 1 to 13 bit S = preferred combinations 12 multiturn / 13 singleturn 14 multiturn / 18 singleturn 15 multiturn / 25 singleturn please directly contact our offices for other pulses
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 equivalent)
Incremental electrical interface ²	L = HTL diff. (AEIC-7272, active short circuit protection) P = Push-Pull (AEIC-7272, active short circuit protection) RS = RS-422 (AELT-5000 or equivalent)
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	50 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 (T _m)	20 µs
SSI pause time (T _p)	> 35 µs
SSI frame	tree format (MSB ... LSB) up to 12 bit multiturn = length 25 bit (12MT + 13ST) 14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST)
SSI status and parity bit	on request
Counting direction	decreasing clockwise (shaft view)
Start-up time	700 ms
Accuracy	± 250 arc-sec
Electromagnetic compatibility	according to 2014/30/EC directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

BIT PARALLEL CONNECTOR OR CABLE CHOICE

According to the resolution and the chosen number of turns is possible to calculate the connections required by the connector or the cable.
See below examples:

EXAMPLE 1	EXAMPLE 2
Singleturn = 8 bit = 8 connections	Singleturn = 12 bit = 12 connections
Multiturn = 5 bit = 5 connections	Multiturn = 12 bit = 12 connections
Total connections 13	Total connections 24

From 1 to 13 connections a 16 cores cable (PD) or a 19 pin connector (MA) is required.

From 14 to 25 connections a 32 cores cable (PE) or a 32 pin connector (ME) is required.

With LATCH option a 32 cores cable (PE) or a 19 pin connector (MA) or a 32 pin connector (ME) is required.

With RESET option a 32 cores cable (PE) or a 32 pin connector (ME) is required.

MECHANICAL SPECIFICATIONS

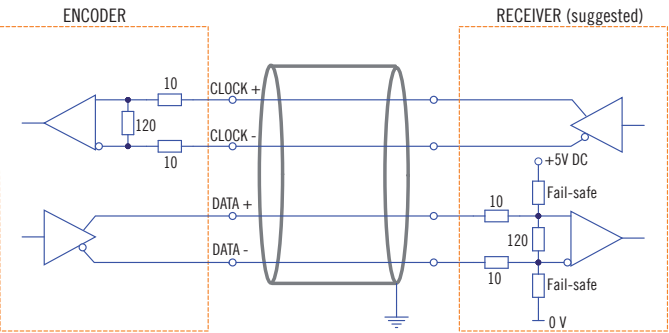
Shaft diameter	ø 9,52 (3/8") / 10 / 11 mm
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load ³	200 N axial / 70 N radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10 ⁻⁶ kgm ² (36 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature Bit parallel ^{4, 5}	-20° ... +85°C (-4° ... +185°F)
Operating temperature SSI ^{4, 5}	-40° ... +100°C (-40° ... +212°F) -20° ... +100°C (-4° ... +212°F) with cable output -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature ⁵	-20° ... +85°C (-4° ... +185°F)
Weight	approx 350 g (12,35 oz)

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ maximum load for static usage
⁴ measured on the transducer flange
⁵ 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 SCHEMATICS



EAML 58 B / C - 63 A / D / E
ANALOGUE
SOLID SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

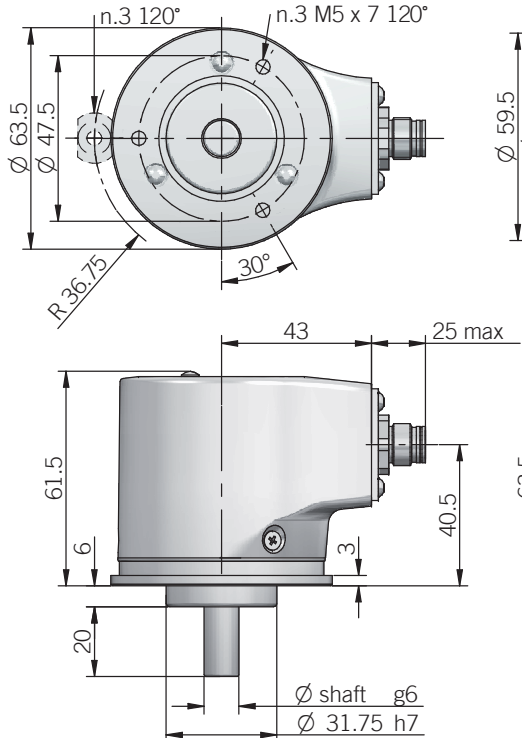
- Optical sensor technology (OptoASIC + Energy Harvesting)
- Programmable measuring range via teach-in function (external inputs or cover button)
- Power supply up to +30 VDC with analogue (voltage or current) electrical interface
- Cable or M12 connector output
- Solid shaft diameter up to 10 mm
- Mounting by synchronous, clamping or centering 2,5" square flange



ORDERING CODE

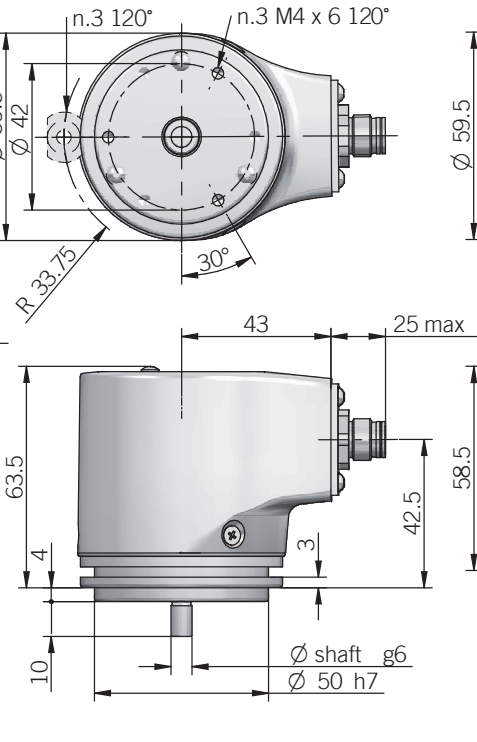
EAML	63A	16B	12/30	V	05	X	10	X	M12	R	.162	+XXX
SERIES												
analogue multiturn absolute encoder EAML												
MODEL												
synchronous flange ø 31.75 mm 63A												
synchronous flange ø 50 mm 58B												
clamping flange ø 36 mm 58C												
centering square flange ø 31.75 mm 63D												
centering square flange ø 50 mm 63E												
OUTPUT DAC RESOLUTION												
16 bit 16B												
POWER SUPPLY												
12 ... 30 V DC 12/30												
ELECTRICAL INTERFACE												
voltage V												
current I												
OUTPUT RANGE												
0 ... 5 V 05												
0 ... 10 V 010												
0 ... 20 mA 020												
4 ... 20 mA 420												
OPTIONS												
to be reported with voltage output / 3 wires current output X												
4 wires current output Q												
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) P												
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)												
M12 male connector M12												
DIRECTION TYPE												
radial R												
MATING CONNECTOR												
mating connector not included .162												
to be reported only with connector output (eg. M12R.162), for mating connector see Accessories												
VARIANT												
custom version XXX												

63 A



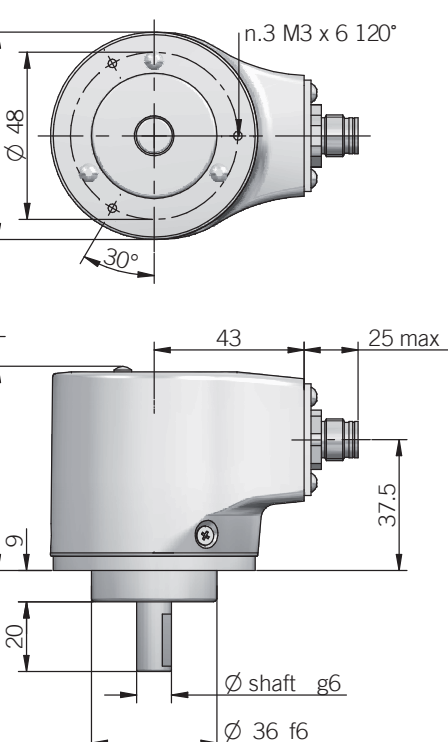
for fixing clamps please refer to Accessories

58 B

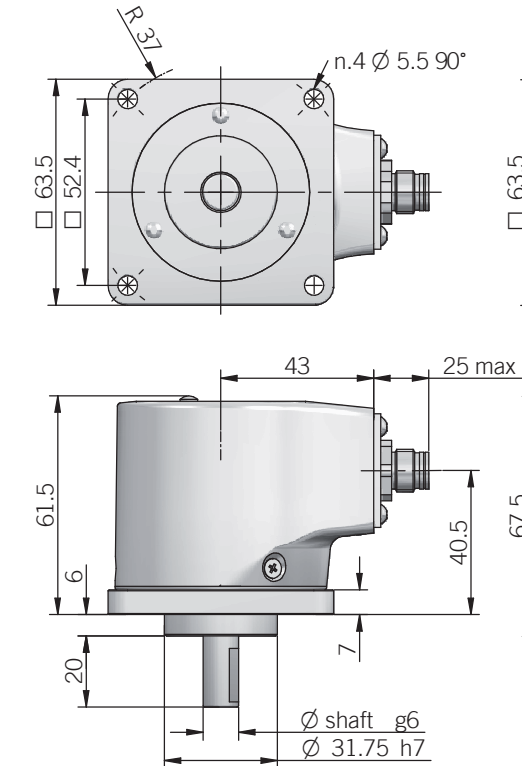


for fixing clamps please refer to Accessories

58 C

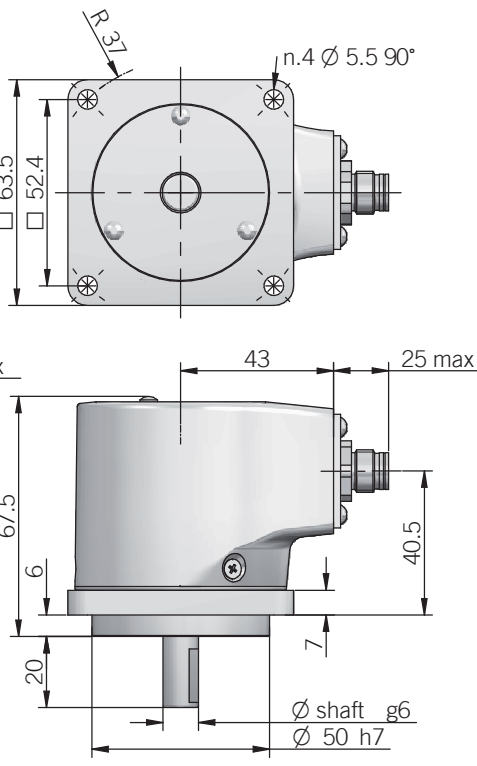


63 D



recommended mating shaft tolerance H7
dimensions in mm

63 E

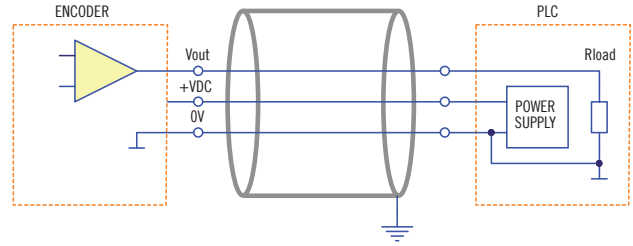


ELECTRICAL SPECIFICATIONS

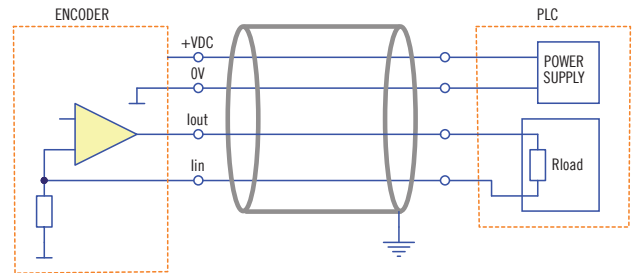
Multiturn resolution	16 bit max
Singleturn resolution	16 bit max
Output DAC resolution	16 bit
Minimum angle	22,5°
Power supply ¹	11,4 ... 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Electrical interface ²	voltage (0 ... 5 V / 0 ... 10 V) current (0 ... 20 mA / 4 ... 20 mA)
Auxiliary inputs (BEGIN - END)	active high (+V DC) connect to 0 V if not used / t _{min} 150 ms
Load	R _{min} = 1 kΩ (voltage output) R _{max} = (V DC - 2) / 0,02 (current output)
Output update frequency	16 kHz
Signal pattern	auto teaching according to commissioning
Start-up time	700 ms
Linearity error	± 250 arc-sec
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

ELECTRICAL INTERFACE

Voltage output



Current output



3 / 4 wire source
with 3 wires interface I_{in} is internally connected to 0V

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 below table
Max shaft load ³	200 N axial / 70 N 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 kgm ² (36 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{4,5}	-20° ... +85°C (-4° ... +185°F)
Storage temperature ⁵	-20° ... +85°C (-4° ... +185°F)
Weight	approx 350 g (12,35 oz)

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

³ maximum load for static usage

⁴ measured on the transducer flange

⁵ condensation not allowed

ROTATION SPEED / TEMPERATURE TABLE

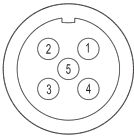
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 ... +85 (+158 ... +185)	8000	5000

CONNECTIONS

Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
V _{out} / I _{out}	green	1	1
I _{in}	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
⊥	shield	housing	housing

* with Q current output

M12 connector (5 pin)
M12 A coded
solder side view FV



M12 connector (8 pin)
M12 A coded
solder side view FV



EAML 58 F - 63 F / G ANALOGUE

BLIND HOLLOW SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

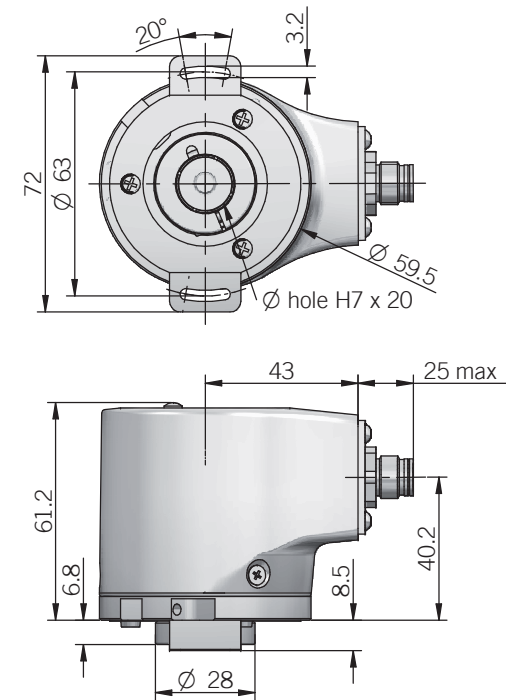
- Optical sensor technology (OptoASIC + Energy Harvesting)
- Programmable measuring range via teach-in function (external inputs or cover button)
- Power supply up to +30 VDC with analogue (voltage or current) electrical interface
- Cable or M12 connector output
- Blind hollow shaft up to 15 mm
- Mounting by stator coupling, torque stop slot or torque pin



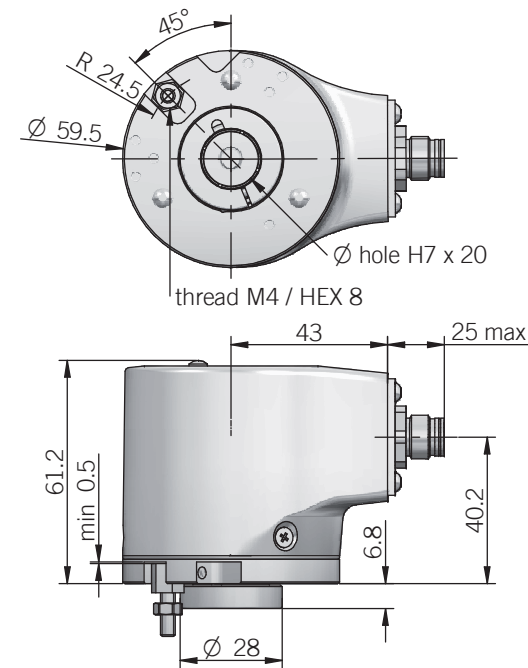
ORDERING CODE EAML 58F 16B 12/30 V 05 X 15 X M12 R .162 +XXX

ORDERING CODE													
EAML 58F 16B 12/30 V 05 X 15 X M12 R .162 +XXX													
SERIES													
analogue multiturn absolute encoder EAML													
MODEL													
blind hollow shaft with stator coupling 58F													
blind hollow shaft with torque stop slot 63F													
blind hollow shaft with torque pin 63G													
OUTPUT DAC RESOLUTION													
16 bit 16B													
POWER SUPPLY													
12 ... 30 V DC 12/30													
ELECTRICAL INTERFACE													
voltage V													
current I													
OUTPUT RANGE													
0 ... 5 V 05													
0 ... 10 V 010													
0 ... 20 mA 020													
4 ... 20 mA 420													
OPTIONS													
to be reported with voltage output / 3 wires current output X													
4 wires current output Q													
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) P													
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)													
M12 male connector M12													
DIRECTION TYPE													
radial R													
MATING CONNECTOR													
mating connector not included .162													
to be reported only with connector output (eg. M12R.162), for mating connector see Accessories													
VARIANT													
custom version XXX													

58 F



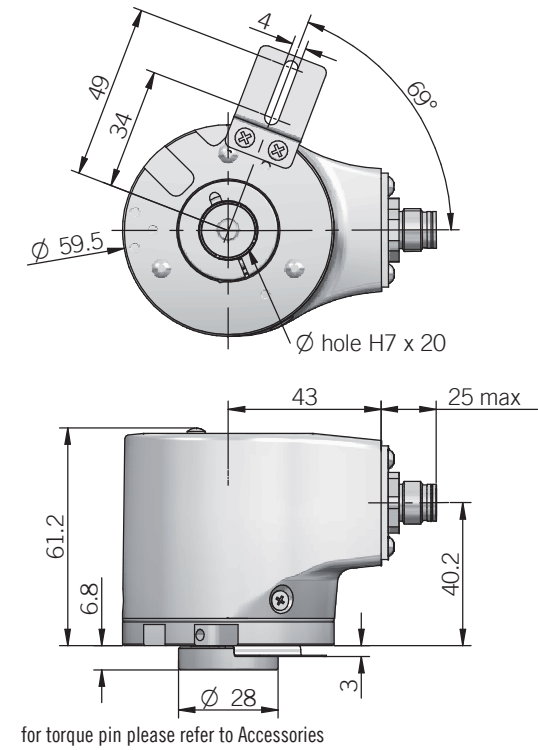
63 G



torque pin is included
recommended mating shaft tolerance g6
dimensions in mm

OPTICAL MULTITURN ABSOLUTE ENCODERS | EAML 58 F - 63 F / G ANALOGUE

63 F



for torque pin please refer to Accessories

ELECTRICAL SPECIFICATIONS

Multiturn resolution	16 bit max
Singleturn resolution	16 bit max
Output DAC resolution	16 bit
Minimum angle	22,5°
Power supply ¹	11,4 ... 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Electrical interface ²	voltage (0 ... 5 V / 0 ... 10 V) current (0 ... 20 mA / 4 ... 20 mA)
Auxiliary inputs (BEGIN - END - U/D)	active high (+V DC) connect to 0 V if not used / t _{min} 150 ms
Load	R _{min} = 1 kΩ (voltage output) R _{max} = (V DC - 2) / 0,02 (current output)
Output update frequency	16 kHz
Signal pattern	auto teaching according to commissioning
Start-up time	700 ms
Linearity error	± 250 arc-sec
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

MECHANICAL SPECIFICATIONS

Bore diameter	ø 14 / 15 mm ø 6* / 8* / 9,52 (3/8")* / 10* / 11* / 12 mm * 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 load ³	200 N axial / 60 N radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	5 x 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	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painting aluminium
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{4,5}	-20° ... +85°C (-4° ... +185°F)
Storage temperature ⁵	-20° ... +85°C (-4° ... +185°F)
Weight	approx 350 g (12,35 oz)

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

³ maximum load for static usage

⁴ measured on the transducer flange

⁵ condensation not allowed

ROTATION SPEED / TEMPERATURE TABLE

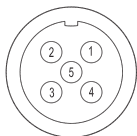
	Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
IP65	up to +70 (+158)	9000	6000
	+70 ... +85 (+158 ... +185)	6000	3000
IP67	up to +70 (+158)	8000	4000
	+70 ... +85 (+158 ... +185)	4000	2000

CONNECTIONS

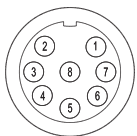
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
V _{out} / I _{out}	green	1	1
I _{in}	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
⏏	shield	housing	housing

* with Q current outpu

M12 connector (5 pin)
M12 A coded
solder side view FV



M12 connector (8 pin)
M12 A coded
solder side view FV



EAML 90 - 115 A
ANALOGUE
SOLID SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

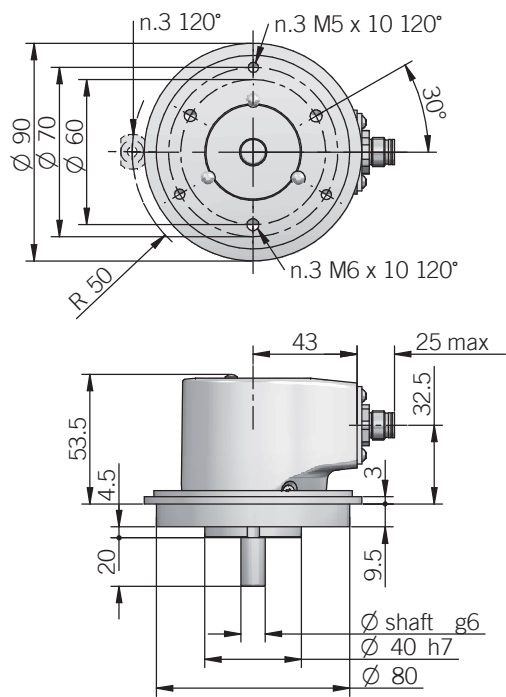
- Optical sensor technology (OptoASIC + Energy Harvesting)
- Programmable measuring range via teach-in function (external inputs or cover button)
- Power supply up to +30 VDC with analogue (voltage or current) electrical interface
- Cable or M12 connector output
- Solid shaft diameter up to 11 mm
- Mounting by synchronous or RE0-444 flange



ORDERING CODE

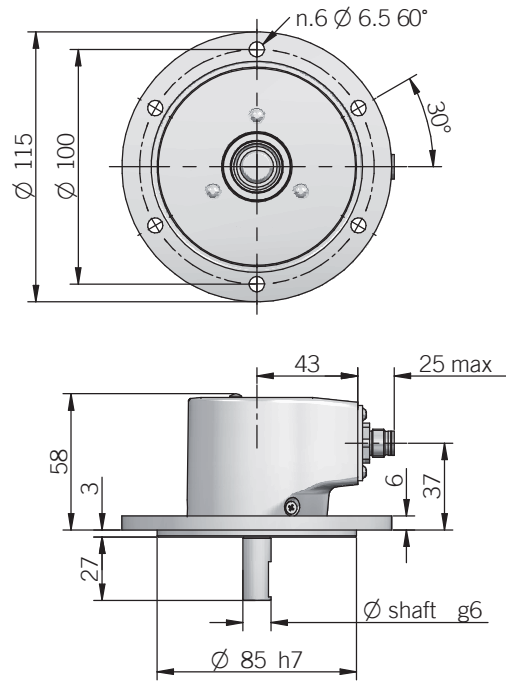
EAML	90A	16B	12/30	V	05	X	10	X	M12	R	.162	+XXX
analogue multiturn absolute encoder EAML												
MODEL												
synchronous flange ø 40 mm 90A												
RE0-444 flange 115A												
OUTPUT DAC RESOLUTION												
16 bit 16B												
POWER SUPPLY												
12 ... 30 V DC 12/30												
ELECTRICAL INTERFACE												
voltage V												
current I												
OUTPUT RANGE												
0 ... 5 V 05												
0 ... 10 V 010												
0 ... 20 mA 020												
4 ... 20 mA 420												
OPTIONS												
to be reported with voltage output / 3 wires current output X												
4 wires current output Q												
SHAFT DIAMETER												
(mod. 90) 3/8" - mm 9,52												
mm 10												
(mod. 115) mm 11												
ENCLOSURE RATING												
IP 65 shaft side / IP67 cover side X												
IP 67 S												
OUTPUT TYPE												
cable (standard length 1,5 m) P												
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)												
M12 male connector M12												
DIRECTION TYPE												
radial R												
MATING CONNECTOR												
mating connector not included .162												
to be reported only with connector output (eg. M12R.162), for mating connector see Accessories												
VARIANT												
custom version XXX												

90 A



for fixing clamps please refer to Accessories
recommended mating shaft tolerance H7
dimensions in mm

115 A



ELECTRICAL SPECIFICATIONS

Multiturn resolution	16 bit max
Singleturn resolution	16 bit max
Output DAC resolution	16 bit
Minimum angle	22,5°
Power supply ¹	11,4 ... 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Electrical interface ²	voltage (0 ... 5 V / 0 ... 10 V) current (0 ... 20 mA / 4 ... 20 mA)
Auxiliary inputs (BEGIN - END)	active high (+V DC) connect to 0 V if not used / t_{min} 150 ms
Load	R_{min} = 1 k Ω (voltage output) R_{max} = (V DC - 2) / 0,02 (current output)
Output update frequency	16 kHz
Signal pattern	auto teaching according to commissioning
Start-up time	700 ms
Linearity error	\pm 250 arc-sec
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

MECHANICAL SPECIFICATIONS

Shaft diameter	\varnothing 9,52 (3/8") / 10 / 11 mm
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see below table
Max shaft load ³	200 N axial / 70 N 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 kgm ² (36 x 10 ⁻⁶ lbft ²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{4,5}	-20° ... +85°C (-4° ... +185°F)
Storage temperature ⁵	-20° ... +85°C (-4° ... +185°F)
Weight	approx 350 g (12,35 oz)

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

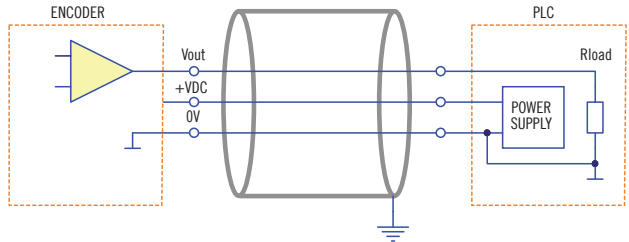
³ maximum load for static usage

⁴ measured on the transducer flange

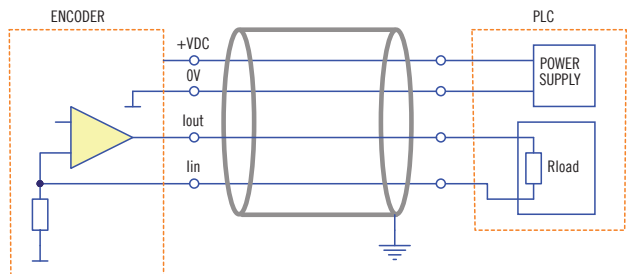
⁵ condensation not allowed

ELECTRICAL INTERFACE

Voltage output



Current output



3 / 4 wire source
with 3 wires interface I_{in} is internally connected to 0V

ROTATION SPEED / TEMPERATURE TABLE

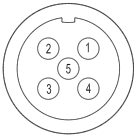
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 ... +85 (+158 ... +185)	8000	5000

CONNECTIONS

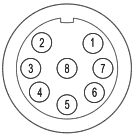
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
Vout / Iout	green	1	1
Iin	yellow	/	6
BEGIN	white	4	4
END	brown	5	5
≡	shield	housing	housing

* with Q current output

M12 connector (5 pin)
M12 A coded
solder side view FV



M12 connector (8 pin)
M12 A coded
solder side view FV



EAM 58 B / C - 63 A / D / E PROFIBUS

SOLID SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC + gears)
- 25 bit total resolution (13 bit single turn (8192 ppr) + 12 bit multiturn (4096 turns))
- Power supply up to +28 V DC with Profibus DP as electrical interface
- Intelligent status leds
- Terminal box or M12 connector for fast setup
- Solid shaft diameter up to 10 mm
- Mounting by synchronous, clamping or centering 2,5" square flange



ORDERING CODE EAM 63A R 4096 / 4096 B 12/28 FXX 10 X 6 M12R .162 +XXX

SERIES
multiturn absolute encoder EAM

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

rev. 2.0 R

MULTITURN RESOLUTION
turns 4096

SINGLETURN RESOLUTION
ppr 4096 / 8192

CODE TYPE
binary B

POWER SUPPLY
12 ... 28 V DC 12/28

ELECTRICAL INTERFACE
PROFIBUS DP V0 CLASS 2 FXX

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

ENCLOSURE RATING
IP 54 X
IP 66 S

MAX ROTATION SPEED
(IP 66) 3000 rpm 3
(IP 54) 6000 rpm 6

OUTPUT TYPE
terminal box - radial cable glands P3R
radial M12 connectors M12R

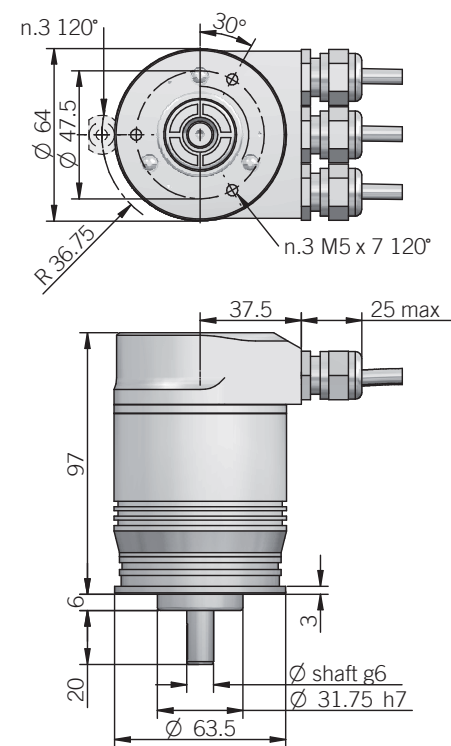
MATING CONNECTORS
mating connectors not included .162

to be reported only with connectors output (eg. M12R.162), for mating connectors see Accessories

VARIANT
custom version XXX

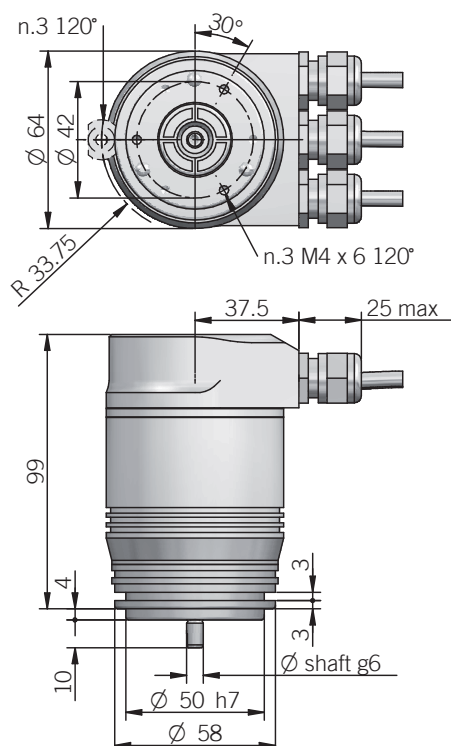
OPTICAL MULTITURN ABSOLUTE ENCODERS | EAM 58 B / C - 63 A / D / E PROFIBUS

63 A



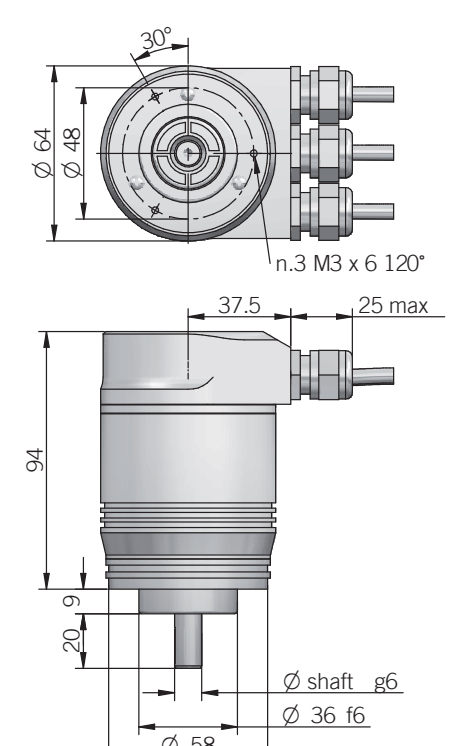
fixing clamps not included, please refer to Accessories

58 B

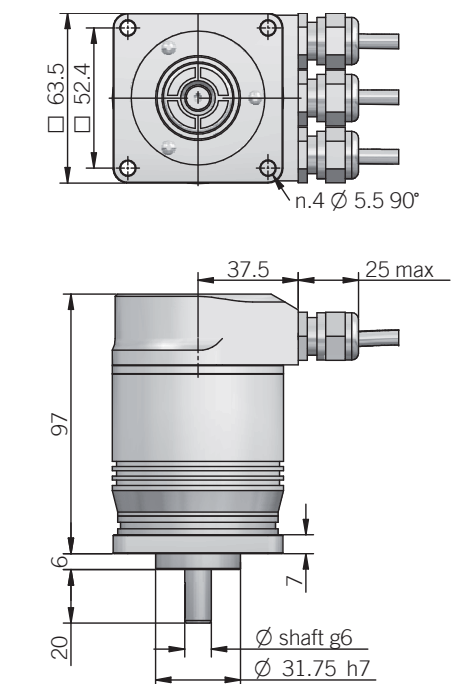


fixing clamps not included, please refer to Accessories

58 C

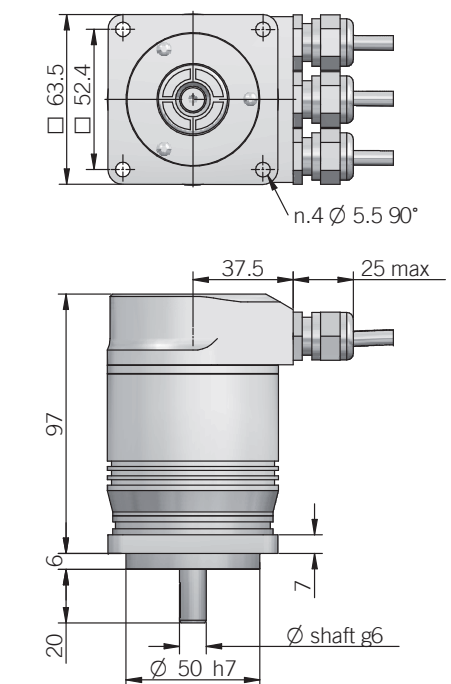


63 D



recommended mating shaft tolerance H7
dimensions in mm

63 E

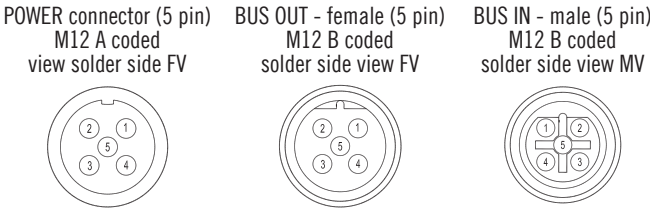


ELECTRICAL SPECIFICATIONS	
Multiturn resolution	1 ... 4096 turns programmable during commissioning
Singleturn resolution	2 ... 4096 / 2 ... 8192 ppr programmable during commissioning
Power supply ¹	11,4 ... 29,4 V DC
Current consumption without load	300 mA
Electrical interface ²	RS 485 galvanically isolated
Max bus frequency	12 Mbaud
Diagnostic features	frequency warning position warning / alarm please refer to installation manual for more informations
Max frequency	max 25 kHz LSB
Code type	binary
Counting direction	programmable during commissioning
Start-up time	500 ms
Accuracy	± 1/2 LSB
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

CONNECTIONS			
Function	POWER	BUS OUT	BUS IN
+ V DC	2		
0 V	4		
A		2	
B		4	
A			2
B			4

MECHANICAL SPECIFICATIONS	
Shaft diameter	ø 6 / 9,52 (3/8") / 10 mm
Enclosure rating	X = IP 54 (IEC 60529) S = IP 66 (IEC 60529)
Max rotation speed	IP 54 - 6000 rpm IP 66 - 3000 rpm
Max shaft load ³	10 N axial / 20 N radial with ø6 shaft 100 N axial / 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 kgm ² (36 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) IP 54 < 0,06 Nm (8,50 Ozin) IP 66
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{4, 5}	0° ... +60°C (+32° ... +140°F)
Storage temperature ⁵	-15° ... +70°C (+5° ... +158°F)
Weight	650 g (22,93 oz)

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ maximum load for static usage
⁴ measured on the transducer flange
⁵ condensation not allowed



EAM 58 F - 63 F / G
PROFIBUS

BLIND HOLLOW SHAFT MULTITURN ABSOLUTE ENCODER

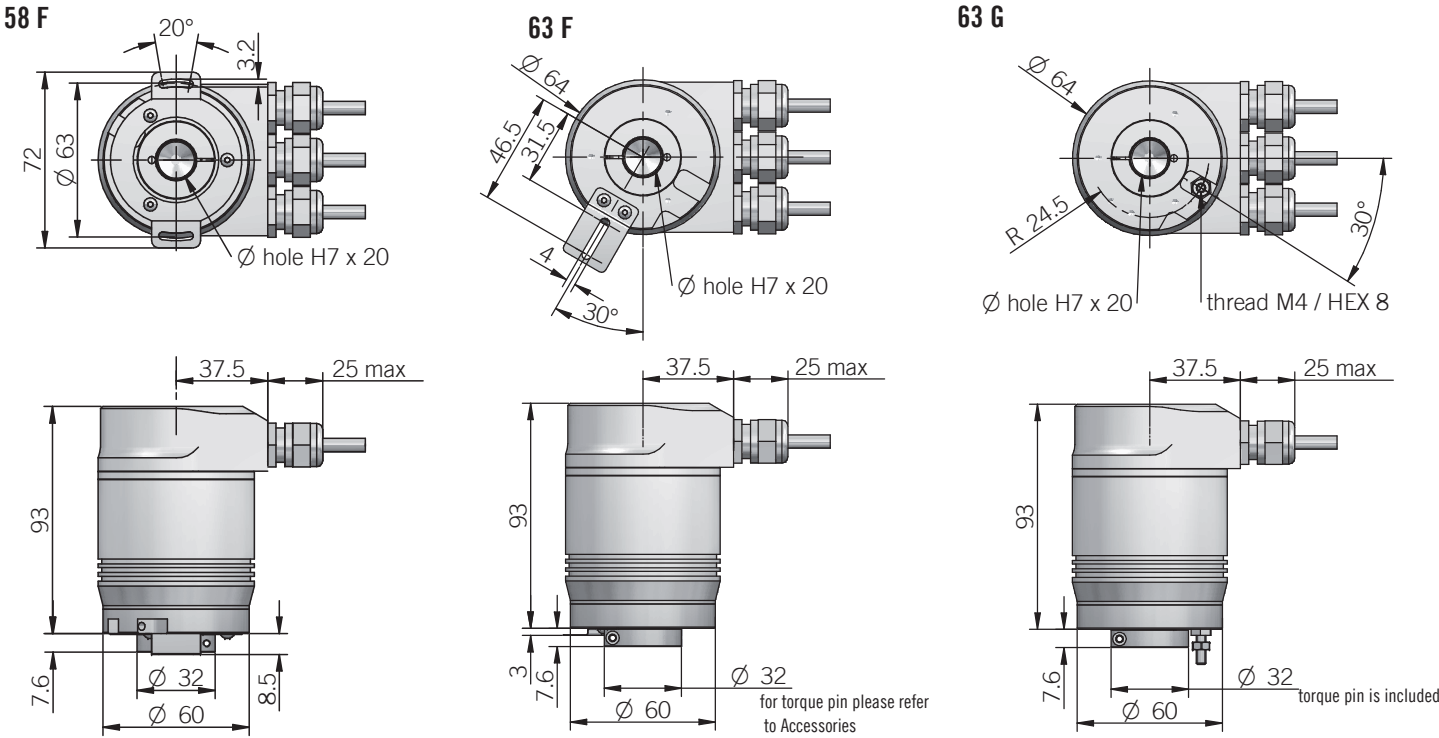
MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC + gears)
- 25 bit total resolution (13 bit single turn (8192 ppr) + 12 bit multiturn (4096 turns))
- Power supply up to +28 V DC with Profibus DP as electrical interface
- Intelligent status leds
- Terminal box or M12 connector for fast setup
- Blind hollow shaft up to 15 mm diameter
- Mounting by stator coupling, torque stop slot or torque pin



ORDERING CODE													
EAM		63F	R	4096 / 4096	B	12/28	FXX	15	X	3	M12R	.162	+XXX
SERIES													
multiturn absolute encoder													
MODEL													
blind hollow shaft with stator coupling													
blind hollow shaft with torque stop slot													
blind hollow shaft with torque pin													
rev. 2.0													
MULTITURN RESOLUTION													
turns													
SINGLETURN RESOLUTION													
ppr													
CODE TYPE													
binary													
POWER SUPPLY													
12 ... 28 V DC													
ELECTRICAL INTERFACE													
PROFIBUS DP V0 CLASS 2													
BORE DIAMETER													
mm													
mm													
diameters 6 / 8 / 9,52 (3/8") / 10 / 11 / 12 mm with optional shaft adapter, see Accessories													
ENCLOSURE RATING													
IP 54													
MAX ROTATION SPEED													
3000 rpm													
OUTPUT TYPE													
terminal box - radial cable glands													
radial M12 connectors													
MATING CONNECTORS													
mating connectors not included													
to be reported only with connectors output (eg. M12R.162), for mating connectors see Accessories													
VARIANT													
custom version													



ELECTRICAL SPECIFICATIONS

Multiturn resolution	1 ... 4096 turns programmable during commissioning
Singleturn resolution	2 ... 4096 / 2 ... 8192 ppr programmable during commissioning
Power supply ¹	11,4 ... 29,4 V DC
Current consumption without load	300 mA
Electrical interface ²	RS 485 galvanically isolated
Max bus frequency	12 Mbaud
Diagnostic features	frequency warning position warning / alarm please refer to installation manual for more informations
Max frequency	max 25 kHz LSB
Code type	binary
Counting direction	programmable during commissioning
Start-up time	500 ms
Accuracy	± 1/2 LSB
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

CONNECTIONS

Function	POWER	BUS OUT	BUS IN
+ V DC	2		
0 V	4		
A		2	
B		4	
A			2
B			4

MECHANICAL SPECIFICATIONS

Bore diameter	Ø 14 / 15 mm Ø 6* / 8* / 9,52 (3/8")* / 10* / 11* / 12 mm * with optional shaft adapter, please refer to Accessories
Enclosure rating	IP 54 (IEC 60529)
Max rotation speed	3000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	5 x 10 ⁻⁶ kgm ² (119 x 10 ⁻⁶ lbft ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin)
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Shaft adapter material	CuSn12 / CC483K bronze
Housing material	painting aluminium
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{3,4}	0° ... +60°C (+32° ... +140°F)
Storage temperature ⁴	-15° ... +70°C (+5° ... +158°F)
Fixing torque for collar clamping	1,5 Nm (212 Ozin) recommended
Weight	650 g (22,93 oz)

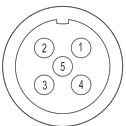
¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

³ measured on the transducer flange

⁴ condensation not allowed

POWER connector (5 pin) M12 A coded view solder side FV BUS OUT - female (5 pin) M12 B coded solder side view FV BUS IN - male (5 pin) M12 B coded solder side view MV



EAM 90 A -115 A PROFIBUS
SOLID SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC + gears)
- 25 bit total resolution (13 bit single turn (8192 ppr) + 12 bit multiturn (4096 turns))
- Power supply up to +28 V DC with Profibus DP as electrical interface
- Intelligent status leds
- Terminal box or M12 connector for fast setup
- Solid shaft diameter up to 11 mm
- Mounting by synchronous or REO-444 flange

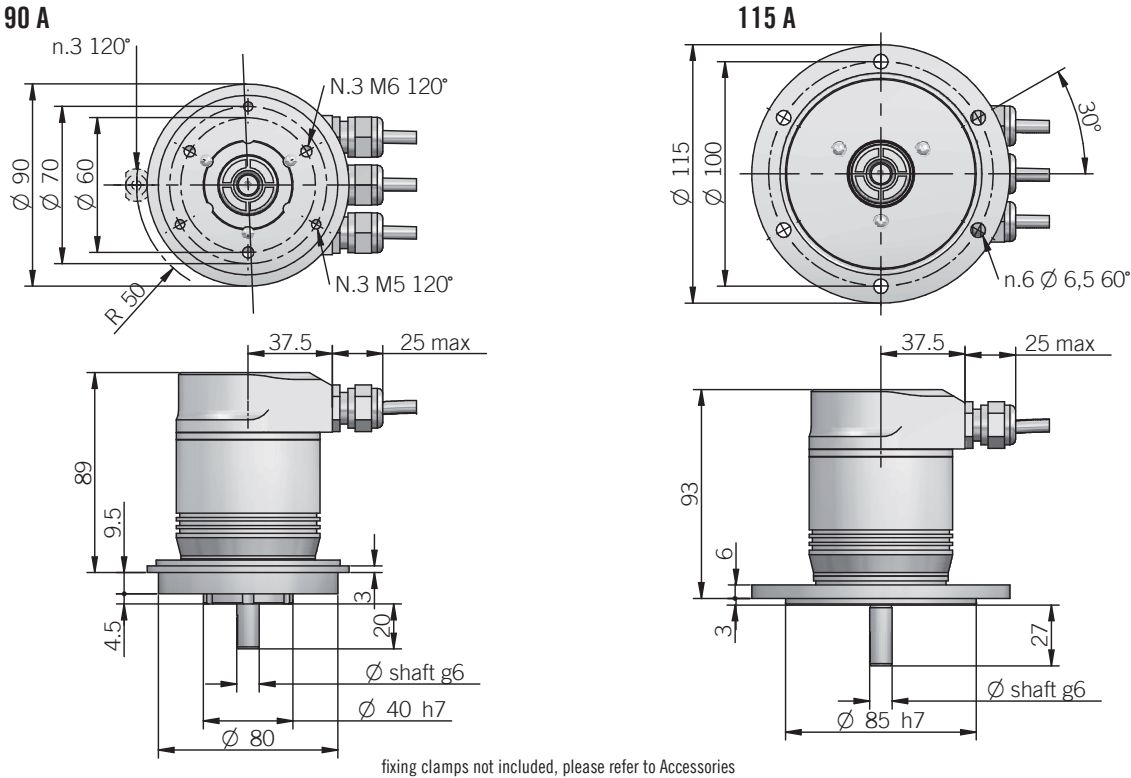


ORDERING CODE

EAM	90A	R	4096 / 4096	B	12/28	FX	10	X	6	M12R	.162	+XXX
SERIES multiturn absolute encoder EAM												
MODEL synchronous flange Ø 40 mm 90A REO444 flange 115A												
rev. 2.0 R												
MULTITURN RESOLUTION turns 4096												
SINGLETURN RESOLUTION ppr 4096 / 8192												
CODE TYPE binary B												
POWER SUPPLY 12 ... 28 V DC 12/28												
ELECTRICAL INTERFACE PROFIBUS DP V0 CLASS 2 FX												
SHAFT DIAMETER (mod. 90) (3/8") 9,52 mm 9 mm 10 (mod. 115) mm 11												
ENCLOSURE RATING IP 54 X (mod. 90) IP 66 S												
MAX ROTATION SPEED (IP 66) 3000 rpm 3 (IP 54) 6000 rpm 6												
OUTPUT TYPE terminal box - radial cable glands P3R radial M12 connectors M12R												
MATING CONNECTORS mating connectors not included .162												
to be reported only with connectors output (eg. M12R.162), for mating connectors see Accessories												

VARIANT

custom version XXX

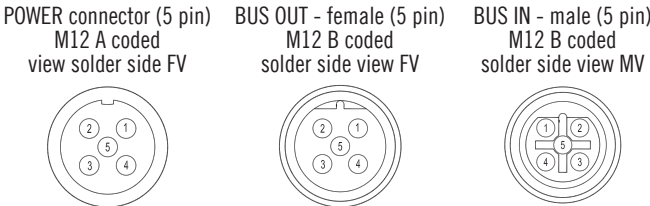


ELECTRICAL SPECIFICATIONS	
Multiturn resolution	1 ... 4096 turns programmable during commissioning
Singleturn resolution	2 ... 4096 / 2 ... 8192 ppr programmable during commissioning
Power supply ¹	11,4 ... 29,4 V DC
Current consumption without load	300 mA
Electrical interface ²	RS 485 galvanically isolated
Max bus frequency	12 Mbaud
Diagnostic features	frequency warning position warning / alarm please refer to installation manual for more informations
Max frequency	max 25 kHz LSB
Code type	binary
Counting direction	programmable during commissioning
Start-up time	500 ms
Accuracy	± 1/2 LSB
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

CONNECTIONS			
Function	POWER	BUS OUT	BUS IN
+ V DC	2		
0 V	4		
A		2	
B		4	
A			2
B			4

MECHANICAL SPECIFICATIONS	
Shaft diameter	Ø 9,52 / 10 / 11 mm
Enclosure rating	X = IP 54 (IEC 60529) S = IP 66 (IEC 60529)
Max rotation speed	IP 54 - 6000 rpm IP 66 - 3000 rpm
Max shaft load ³	100 N axial / 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 kgm ² (36 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,02 Nm (2,83 Ozin) IP 54 < 0,06 Nm (8,50 Ozin) IP 66
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{4, 5}	0° ... +60°C (+32° ... +140°F)
Storage temperature ⁵	-15° ... +70°C (+5° ... +158°F)
Weight	750 g (26,46 oz)

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ maximum load for static usage
⁴ measured on the transducer flange
⁵ condensation not allowed



AAM 58 B / C PROFINET

SOLID SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

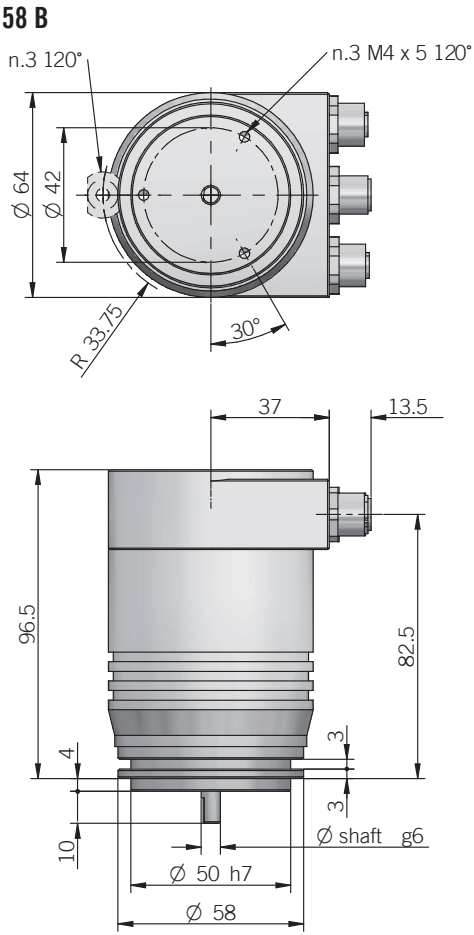
Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC + gears)
- 25 bit total resolution (13 bit single turn + 12 bit multiturn)
- Power supply up to +30 V DC with Profinet IO as electrical interface
- Intelligent status leds
- M12 connector for fast setup
- Solid shaft diameter up to 10 mm
- Mounting by synchronous or clamping flange
- Operating temperature -40° ... +80°C (-40° ... +176°F)



ORDERING CODE

AAM	58B	12	/	13	B	10/30	PFN	6	X	X	M12R	.162											
SERIES absolute multiurn encoder AAM		MODEL synchronous flange ø 50 mm 58B clamping flange ø 36 mm 58C		MULTITURN RESOLUTION bit 12		SINGLETURN RESOLUTION bit 13		CODE TYPE binary B		POWER SUPPLY 10 ... 30 V DC 10/30		ELECTRICAL INTERFACE PROFINET IO PFN		SHAFT DIAMETER (mod. 58B) mm 6 (mod. 58C) mm 10		ENCLOSURE RATING IP 65 X		OPTIONS to be reported X		OUTPUT TYPE radial M12 connectors M12R		MATING CONNECTORS mating connectors not included .162 for mating connectors see Accessories	

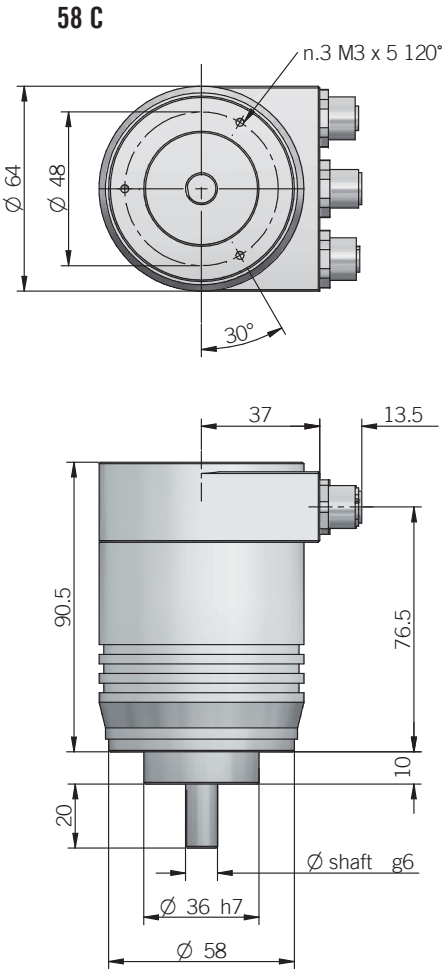


fixing clamps not included, please refer to Accessories
recommended mating shaft tolerance H7
dimensions in mm

ELECTRICAL SPECIFICATIONS

Multiturn resolution	1 ... 12 bit programmable during commissioning
Singleturn resolution	1 ... 13 bit programmable during commissioning
Power supply ¹	10 ... 30 V DC (reverse polarity protection)
Current consumption without load	< 200 mA
Electrical interface ²	PROFINET IO RT Class 1 / Conformance Class B
Hardware features	Ertec 200 auto-negotiation auto-polarity auto-crossover diagnostic LEDs
Code type	binary
Max bus frequency	100 Mbit/s
Cycle time	≤ 1 ms
Accuracy	± 0,04°
Start-up time	500 ms
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU (01/09/2020) directive

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ maximum load for static usage
⁴ measured on the transducer flange
⁵ condensation not allowed



MECHANICAL SPECIFICATIONS

Shaft diameter	ø 6 mm (mod. 58B) ø 10 mm (mod. 58C)
Enclosure rating	IP 65 (IEC 60529)
Max rotation speed	6000 rpm
Max shaft load ³	80 N radial / 40 N axial
Starting torque (at +20°C / +68°F)	< 0,05 Nm
Moment of inertia	approx 1,8 x 10 ⁻⁶ kgm ²
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Bearings life	10 ⁹ revolutions
Bearings	n.2 ball bearings
Shaft material	1.4305 / AISI 303 stainless steel
Bearing stage / cover material	EN-AW 2011 aluminium
Housing material	painted aluminium
Operating temperature ^{4, 5}	-40° ... +80°C (-40° ... +176°F)
Storage temperature ⁵	-40° ... +85°C (-40° ... +185°F)
Weight	600 g (21 oz)

CONNECTIONS

	Pin	Function
PORT 1 Connector	1	Tx D+
	2	Rx D+
	3	Tx D-
	4	Rx D-
POWER connector	1	+V DC
	2	/
	3	0 V
	4	/
PORT 2 Connector	1	Tx D+
	2	Rx D+
	3	Tx D-
	4	Rx D-

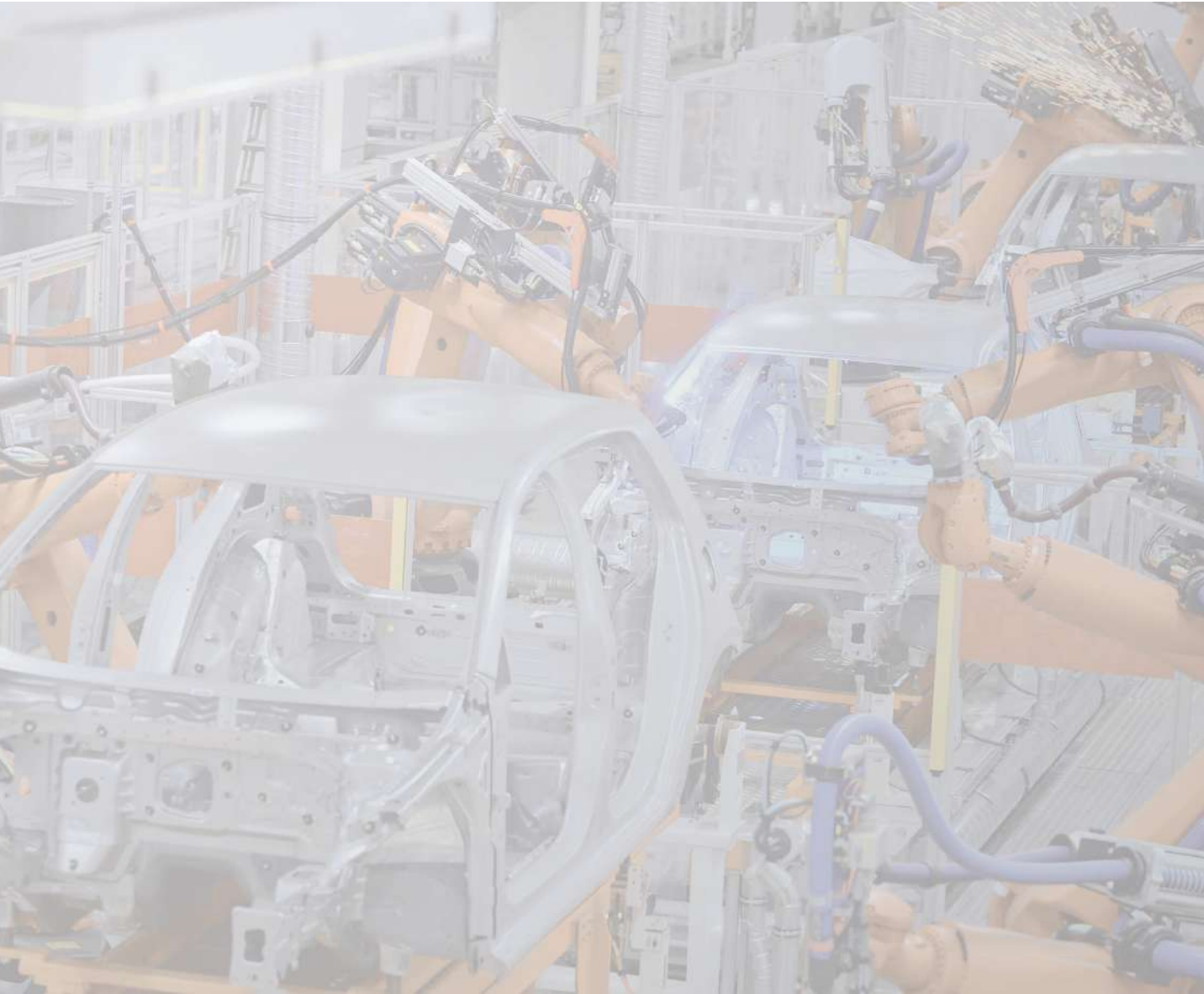
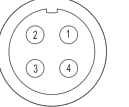
female connectors not included, please refer to Accessories



PORT 1 / 2 connector (4 pin)
M12 D coded
solder side view MV



POWER connector (4 pin)
M12 A coded
solder side view FV



MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

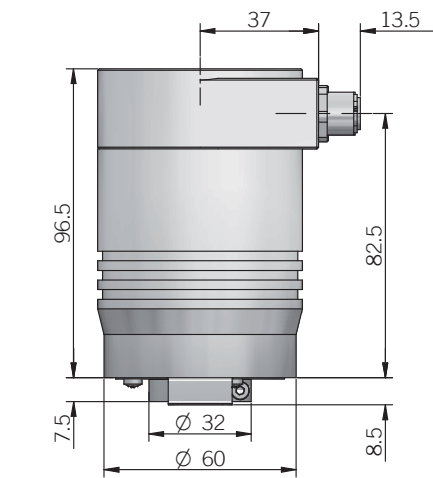
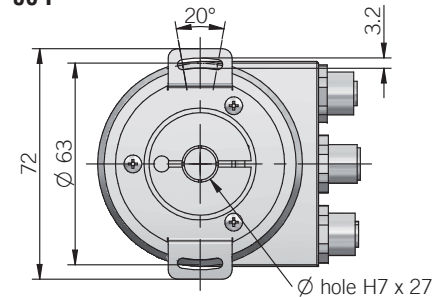
- Optical sensor technology (OptoASIC + gears)
- 25 bit total resolution (13 bit single turn + 12 bit multiturn)
- Power supply up to +30 V DC with Profinet IO as electrical interface
- Intelligent status leds
- M12 connector for fast setup
- Blind hollow shaft diameter up to 15 mm
- Mounting by stator coupling
- Operating temperature -40° ... +80°C (-40° ... +176°F)



ORDERING CODE

AAM	58F	12	/	13	B	10/30	PFN	15	X	X	M12R	.162
SERIES absolute multiurn encoder AAM												
MODEL blind hollow shaft with stator coupling 58F												
MULTITURN RESOLUTION bit 12												
SINGLETURN RESOLUTION bit 13												
CODE TYPE binary B												
POWER SUPPLY 10 ... 30 V DC 10/30												
ELECTRICAL INTERFACE PROFINET IO PFN												
BORE DIAMETER mm 15 diameters 10 / 12 mm with optional shaft adapter, see Accessories												
ENCLOSURE RATING IP 65 X												
OPTIONS to be reported X												
OUTPUT TYPE radial M12 connectors M12R												
MATING CONNECTORS mating connectors not included .162 for mating connectors see Accessories												

58 F



recommended mating shaft tolerance g6
dimensions in mm

CONNECTIONS

	Pin	Function
PORT 1 Connector	1	Tx D+
	2	Rx D+
	3	Tx D-
	4	Rx D-
POWER connector	1	+V DC
	2	/
	3	0 V
	4	/
PORT 2 Connector	1	Tx D+
	2	Rx D+
	3	Tx D-
	4	Rx D-

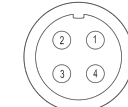


PORT 1 POWER PORT 2

PORT 1 / 2 connector (4 pin)
M12 D coded
solder side view MV



POWER connector (4 pin)
M12 A coded
solder side view FV



female connectors not included, please refer to Accessories

ELECTRICAL SPECIFICATIONS

Multiturn resolution	1 ... 12 bit programmable during commissioning
Singleturn resolution	1 ... 13 bit programmable during commissioning
Power supply ¹	10 ... 30 V DC (reverse polarity protection)
Current consumption without load	< 200 mA
Electrical interface ²	PROFINET IO RT Class 1 / Conformance Class B
Hardware features	Ertec 200 auto-negotiation auto-polarity auto-crossover diagnostic LEDs
Code type	binary
Max bus frequency	100 Mbit/s
Cycle time	≤ 1 ms
Accuracy	± 0,04°
Start-up time	500 ms
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU (01/09/2020) directive

MECHANICAL SPECIFICATIONS

Bore diameter	ø 15 mm ø 12* / 10* mm * with optional shaft adapter, please refer to Accessories
Enclosure rating	IP 65 (IEC 60529)
Max rotation speed	6000 rpm
Max shaft load ³	80 N radial / 40 N axial
Starting torque (at +20°C / +68°F)	< 0,05 Nm
Moment of inertia	approx 1,8 x 10 ⁻⁶ kgm ²
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Bearings life	10 ⁹ revolutions
Bearings	n.2 ball bearings
Shaft material	1.4305 / AISI 303 stainless steel
Bearing stage / cover material	EN-AW 2011 aluminium
Housing material	painted aluminium
Flange material	EN-AW 2011 aluminium
Operating temperature ^{4,5}	-40° ... +80°C (-40° ... +176°F)
Storage temperature ⁵	-40° ... +85°C (-40° ... +185°F)
Weight	600 g (21 oz)

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

³ maximum load for static usage

⁴ measured on the transducer flange

⁵ condensation not allowed

AAM 58 B / C ETHERCAT

SOLID SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC + gears)
- 25 bit total resolution (13 bit single turn + 12 bit multiturn)
- Power supply up to +30 V DC with EtherCAT as electrical interface
- Intelligent status leds
- M12 connector for fast setup
- Solid shaft diameter up to 10 mm
- Mounting by synchronous or clamping flange
- Operating temperature -40° ... +80°C (-40° ... +176°F)

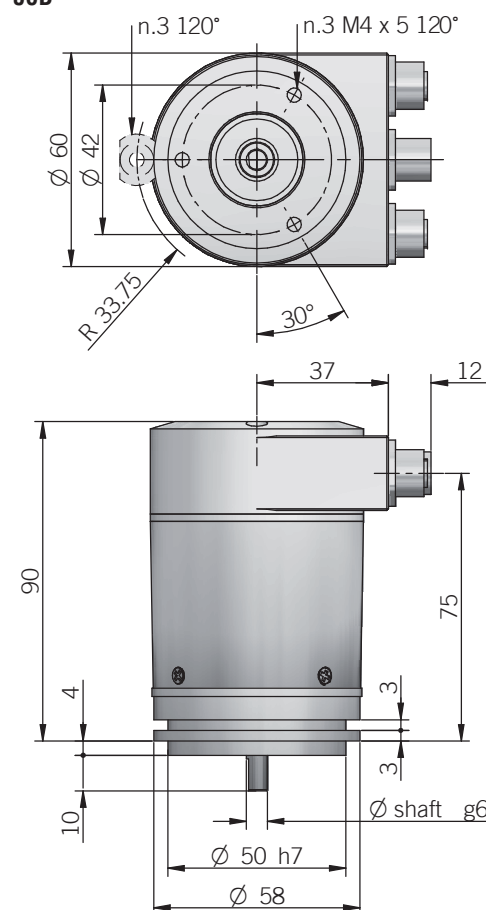
EtherCAT



ORDERING CODE

SERIES	MODEL	REVISION	MULTITURN RESOLUTION	SINGLETURN RESOLUTION	CODE TYPE	POWER SUPPLY	ELECTRICAL INTERFACE	SHAFT DIAMETER	ENCLOSURE RATING	OPTIONS	OUTPUT TYPE	MATING CONNECTORS
absolute multiurn encoder AAM	synchronous flange ø 50 mm 58B clamping flange ø 36 mm 58C	to be reported R	bit 12	bit 13	binary B	10 ... 30 V DC 10/30	ETHERCAT ETC	(mod. 58B) mm 6 (mod. 58C) mm 10	IP 65 X	to be reported X	radial M12 connectors M12R	mating connectors not included .162 for mating connectors see Accessories

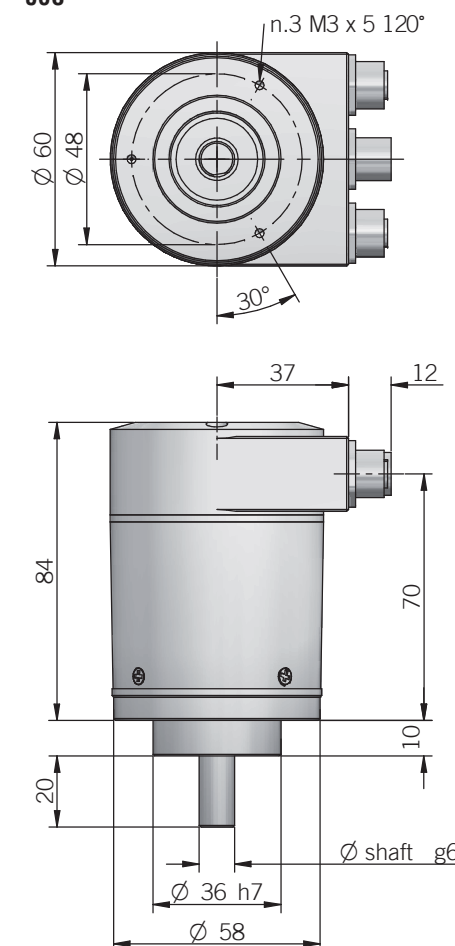
58B



for fixing clamps please refer to Accessories

recommended mating shaft tolerance H7
dimensions in mm

58C



ELECTRICAL SPECIFICATIONS

Multiturn resolution	1 ... 12 bit programmabile during commissioning
Singleturn resolution	1 ... 13 bit programmabile during commissioning
Power supply ¹	10 ... 30 V DC (with reverse polarity protection)
Current consumption without load	< 200 mA
Electrical interface ²	Ethercat
Profile	CoE (CANopen over EtherCAT, DS-301+DS-406)
Programming functions	Resolution Preset Counting direction
Code type	binary
Max bus frequency	100 Mbit/s
Cycle time	≥ 62,5 µs
Accuracy	± 0,04°
Start-up time	500 ms
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU (01/09/2020) directive

¹ as measured at the encoder without cable influences

² for further details refer to TECHNICAL BASICS section

³ maximum load for static usage

⁴ measured on encoder flange

⁵ condensation not allowed

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 6 mm (mod. 58B) ø 10 mm (mod. 58C)
Enclosure rating	IP 65 (IEC 60529)
Max rotation speed	6000 rpm
Max shaft load ³	80 N radial / 40 N axial
Starting torque (at +20°C / +68°F)	< 0,05 Nm
Moment of inertia	approx 1,8 x 10 ⁻⁶ kgm ²
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Bearings life	10 ⁹ revolutions
Bearings	2 ball bearings
Shaft material	1.4305 / AISI 303 stainless steel
Bearing stage and cover material	EN-AW 2011 aluminium
Housing material	EN-AW 6060 aluminium
Operating temperature ^{4,5}	-40° ... +80°C (-40° ... +176°F)
Storage temperature ⁵	-40° ... +85°C (-40° ... +185°F)
Weight	600 g (21 oz)

	Pin	Function
ECAT IN connector	1	Tx D+
	2	Rx D+
	3	Tx D-
	4	Rx D-
POWER connector	1	+V DC
	2	/
	3	0 V
	4	/
ECAT OUT connector	1	Tx D+
	2	Rx D+
	3	Tx D-
	4	Rx D-

ECAT IN POWER ECAT OUT

A diagram of a circular connector with four pins. The pins are arranged in a square pattern and are labeled 1, 2, 3, and 4. Pin 1 is at the top right, pin 2 is at the top left, pin 3 is at the bottom left, and pin 4 is at the bottom right. The connector has a central pin and a ground ring.

A large, yellow industrial robotic arm is the central focus, positioned on a metal platform. The arm is extended, and its joints are visible. In the background, other similar robotic arms are visible, working on different parts of the factory floor. The environment is a large, well-lit industrial space with high ceilings and various structural elements.

MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC + gears)
- 25 bit total resolution (13 bit single turn + 12 bit multiturn)
- Power supply up to +30 V DC with EtherCAT as electrical interface
- Intelligent status leds
- M12 connector for fast setup
- Blind hollow shaft diameter up to 15 mm
- Mounting by stator coupling
- Operating temperature -40° ... +80°C (-40° ... +176°F)

EtherCAT®



AAM 58F R 12 / 13 B 10/30 ETC 15 X X M12R .162

MODEL
blind hollow shaft with stator coupling 58F

REVISION
to be reported **F**

MULTITURN RESOLUTION
bit 12

SINGLETURN RESOLUTION
bit 13

CODE TYPE
binary B

POWER SUPPLY
10 ... 30 V DC 10/30

ELECTRICAL INTERFACE
ETHERCAT ETC

BORE DIAMETER
mm 15

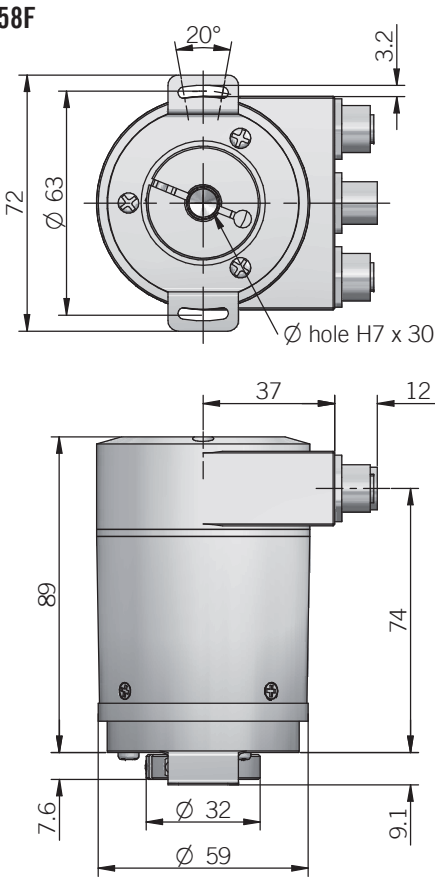
diameters 10 / 12 mm with optional shaft adapter, see Accessories

ENCLOSURE RATING
IP 65 X

OPTIONS
be reported **X**

OUTPUT TYPE
radial M12 connectors **M12R**

MATING CONNECTORS
mating connectors not included .162
for mating connectors see Accessories



recommended mating shaft tolerance g6
dimensions in mm

CONNECTIONS

	Pin	Function
ECAT IN connector	1	Tx D+
	2	Rx D+
	3	Tx D-
	4	Rx D-
POWER connector	1	+V DC
	2	/
	3	0 V
	4	/
ECAT OUT connector	1	Tx D+
	2	Rx D+
	3	Tx D-
	4	Rx D-

female connectors not included, please refer to Accessories

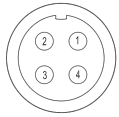


ECAT IN POWER ECAT OUT

ECAT IN / OUT connector (4 pin)
M12 D coded
solder side view MV



POWER connector (4 pin)
M12 A coded
solder side view FV



OPTICAL MULTITURN ABSOLUTE ENCODERS | AAM 58 F ETHERCAT

ELECTRICAL SPECIFICATIONS

Multiturn resolution	1 ... 12 bit programmable during commissioning
Singleturn resolution	1 ... 13 bit programmable during commissioning
Power supply ¹	10 ... 30 V DC (with reverse polarity protection)
Current consumption without load	< 200 mA
Electrical interface ²	Ethercat
Profile	CoE (CANopen over EtherCAT, DS-301+DS-406)
Programming functions	Resolution Preset Counting direction
Code type	binary
Max bus frequency	100 Mbit/s
Cycle time	≥ 62,5 μs
Accuracy	± 0,04°
Start-up time	500 ms
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU (01/09/2020) directive

MECHANICAL SPECIFICATIONS

Bore diameter	ø 15 mm ø 12* / 10* mm * with optional shaft adapter, please refer to Accessories
Enclosure rating	IP 65 (IEC 60529)
Max rotation speed	6000 rpm
Max shaft load ³	80 N radial / 40 N axial
Starting torque (at +20°C / +68°F)	< 0,05 Nm
Moment of inertia	approx 1,8 x 10 ⁻⁶ kgm ²
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Bearings life	10 ⁹ revolutions
Bearings	n° 2 ball bearings
Shaft material	1.4305 / AISI 303 stainless steel
Bearing stage and cover material	EN-AW 2011 aluminium
Housing material	EN-AW 6060 aluminium
Operating temperature ^{4,5}	-40° ... +80°C (-40° ... +176°F)
Storage temperature ⁵	-40° ... +85°C (-40° ... +185°F)
Fixing torque for collar clamping	1,5 Nm (212 Ozin) recommended
Weight	600 g (21 oz)

¹ as measured at the encoder without cable influences

² for further details refer to TECHNICAL BASICS section

³ maximum load for static usage

⁴ measured on encoder flange

⁵ condensation not allowed

EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.



EAMX 80 A / D
SSI

EXPLOSION PROOF ATEX MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Explosion proof encoder for applications within hazardous areas.



- Optical sensor technology (OptoASIC + gears)
- Resolution up to 27 bit (13 bit single turn (8192 ppr) + 14 bit multiturn (16384 turns))
- Power supply up to +28 V DC with SSI as electrical interface
- Cable output
- Solid shaft diameter up to 10 mm
- Mounting with synchronous or centering square flange

EX CLASSIFICATION

It has been assured with EC-TYPE Examination Certificate CESI 04 ATEX 082 that the EAMX 80 comply with essential health and safety requirements according to

- EN 60079-0:2012+A11:2013
- EN 60079-1:2014
- EN 60079-31:2014

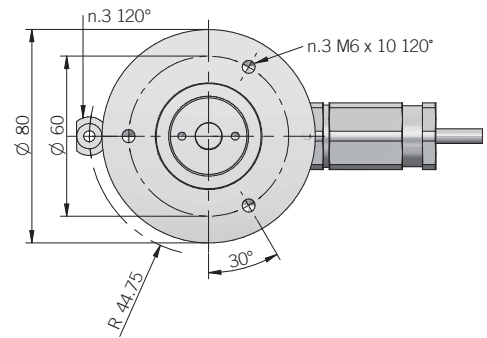
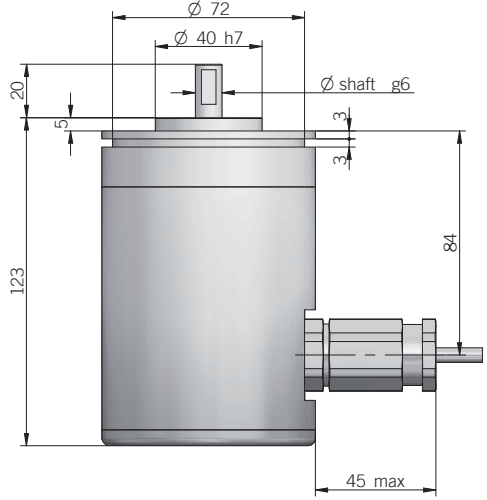
The UE declaration is available on www.eltra.it



ORDERING CODE

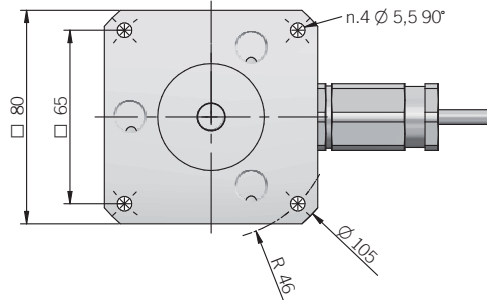
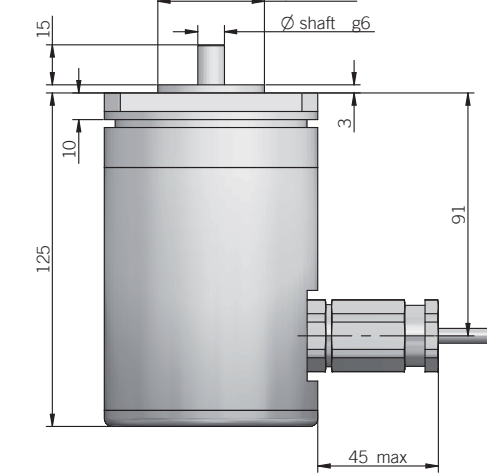
EAMX	80A	4096 / 4096	G	8/28	S	X	X	10	X	3	PR	.XXX
multiturn absolute explosion proof encoder EAMX												
SERIES synchronous flange ø 40 mm 80A centering square flange ø 40 mm 80D												
MODEL MULTITURN RESOLUTION (powers of 2) turns from 2 to 16384 SINGLETURN RESOLUTION ppr 4096 / 8192												
CODE TYPE binary B gray G												
POWER SUPPLY 8 ... 28 V DC 8/28												
ELECTRICAL INTERFACE Serial Synchronous Interface - SSI S												
LOGIC to be reported X												
OPTION to be reported X												
SHAFT DIAMETER mm 10												
ENCLOSURE RATING IP 65 X												
MAX ROTATION SPEED 3000 rpm 3												
OUTPUT TYPE radial cable (standard length 1,5 m) PR preferred cable lengths 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)												
VARIANT custom version XXX												

80 A



fixing clamps not included, please refer to Accessories

80 D



recommended mating shaft tolerance H7
dimensions in mm

ELECTRICAL SPECIFICATIONS

Multiturn resolution	from 2 to 16384 turns
Singleturn resolution	4096 / 8192 ppr
Power supply ¹	7,6 ... 29,4 V DC (reverse polarity protection)
Current consumption without load	100 mA
Max load current	20 mA / channel
Electrical interface ²	RS-422 compatible
Auxiliary input (U/D)	active high (+V DC) connect to 0 V if not used
Clock frequency	100 kHz ... 1 MHz
SSI monostable time (Tm)	18 µs
SSI pause time (Tp)	> 35 µs
SSI frame	Tree format (MSB ... LSB) up to 12 bit multiturn = length 25 bit (12MT + 13ST) 13 to 14 bit multiturn = length 27 bit (14MT + 13ST)
Counting direction	decreasing clockwise (shaft view)
Start-up time	700 ms
Accuracy	± 1/2 LSB
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 10 mm
Enclosure rating	IP 65 (IEC 60529)
Max rotation speed	3000 rpm
Max shaft load ³	200 N axial / 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 kgm ² (36 x 10 ⁻⁶ lbft ²)
Starting torque (at +20°C / +68°F)	< 0,06 Nm (8,50 Ozin)
Bearing stage material	anodized aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	anodized aluminum
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{4, 5}	0° ... +50°C (+32° ... +122°F)
Storage temperature ^{4, 5}	-15° ... +70°C (+5° ... +158°F)
Weight	1200 g (42,33 oz)

¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ maximum load for static usage
⁴ measured on the transducer flange
⁵ condensation not allowed

EPL MARKING

II 2GD
Ex db IIC T6 Gb
Ex tb IIIC T85°C Db
IP 65

II 2GD

II: group II: different than mines
2: category 2: high level of protection
GD: areas containing gas (G) and dust (D)
Ex db IIC T6 Gb
Ex db: flameproof enclosure for explosive atmospheres with gases, vapours and mists
IIC: group of gas IIC
T6: max surface temperature +85°C of the device for atmospheres with gas
Gb: product with a high level of protection
Ex tb IIIC T85°C Db
Ex tb: flameproof enclosure safety type
IIIC: group of dust combustibles IIIC
T85°C: max surface temperature +85°C of the device in the presence of dust
Db: product with a high level of protection

CONNECTIONS

Function	Cable
+ V DC	red
0 V	grey
DATA +	green
DATA -	brown
CLOCK +	yellow
CLOCK -	pink
U / D	blue
≡	shield



MAIN FEATURES

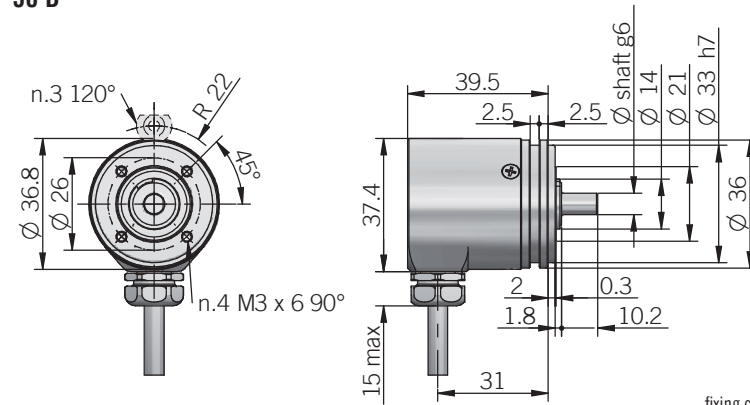
Miniaturized multiturn absolute encoder for limited size applications.

- Magnetic sensor technology without contact (Magnetic ASIC + Patented Energy Harvesting)
- Up to 55 bit as total resolution (15 bit single turn + 40 bit multiturn)
- Power supply up to +30 V DC with SSI as electrical interface
- Code reset for easy setup
- Cable or M12 output, other connectors available on cable end
- 6 mm diameter solid shaft
- Mounting by synchronous flange



ORDERING CODE	EAM	36B	12 / 13	G	8/30	S	P	X	6	X	8	M12R	.162	+XXX
<p>SERIES magnetic multiturn absolute encoder EAM</p> <p>MODEL synchronous flange ø 33 mm 36B</p> <p>MULTITURN RESOLUTION turns from 1 to 17 bit</p> <p>SINGLETURN RESOLUTION from 1 to 15 bit</p> <p>CODE TYPE binary B gray G</p> <p>POWER SUPPLY 5 V DC 5 8 ... 30 V DC 8/30</p> <p>ELECTRICAL INTERFACE Serial Synchronous Interface - SSI S</p> <p>LOGIC positive P</p> <p>OPTIONS to be reported if not used X reset with external input ZE</p> <p>SHAFT DIAMETER mm 6</p> <p>ENCLOSURE RATING IP 67 cover side / IP 65 shaft side X</p> <p>MAX ROTATION SPEED 8000 rpm 8</p> <p>OUTPUT TYPE radial cable (standard length 0,5 m) PR preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5) 8 pin M12 radial male connector M12R</p> <p>MATING CONNECTOR mating connector not included .162 to be reported only with connector output (eg. M12R.162), for mating connector see Accessories</p> <p>VARIANT custom version XXX</p>														

36 B



recommended mating shaft tolerance H7
dimensions in mm

fixing clamps not included, please refer to Accessories

ELECTRICAL SPECIFICATIONS

Multiturn resolution	1 to 17 bit for multiturn resolution > 17 bit please contact our offices
Singleturn resolution	1 to 15 bit
Power supply¹	5 = 4,75 ... 5,25 V DC 8/30 = 7,6 ... 30 V DC (reverse polarity protection)
Power draw without load	< 400 mW
Electrical interface²	RS-422 (THVD1451 or equivalent)
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET t _{min} 150 ms
Clock frequency	100 kHz ... 1 MHz
Code type	binary or gray
SSI monostable time (Tm)	20 µs
SSI pause time (Tp)	> 35 µs
SSI frame	Tree format (MSB ... LSB) up to 12 bit multiturn = length 25 bit (12MT + 13ST) 13 to 14 bit multiturn = length 27 bit (14MT + 13ST) 15 to 17 bit multiturn = length 32 bit (17MT + 15ST)
SSI status and parity bit	on request
Counting direction	decreasing clockwise (shaft view)
Start-up time	150 ms
Accuracy	± 0,35° max
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

CONNECTIONS

Function	Cable	8 pin M12
+ V DC	red	8
0 V	black	5
DATA +	green	3
DATA -	brown	2
CLOCK +	yellow	4
CLOCK -	orange	6
U / D	red / blue	7
RESET	white	1
≡	shield	housing

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 6 mm
Enclosure rating	IP 67 cover side / IP 65 shaft side (IEC 60529)
Rotation speed	8000 rpm continuous / 10000 rpm max
Max shaft load³	20 N axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,001 x 10 ⁻⁶ kgm ² (0,02 x 10 ⁻⁶ lbft ²)
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin)
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	1.0503 / AISI 1045 chrome plated steel
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4,5}	-30° ... +100°C (-22° ... +212°F) -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature⁵	-25° ... +85°C (-13° ... +185°F)
Weight	150 g (5,29 oz)

¹ as measured at the transducer without cable influences

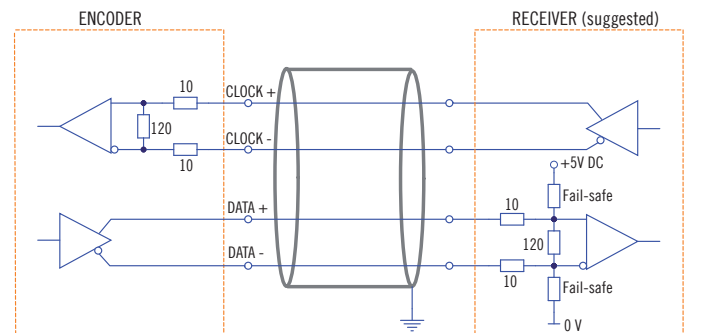
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

³ maximum load for static usage

⁴ measured on the transducer flange

⁵ condensation not allowed

SSI SCHEMATICS



M12 connector (8 pin)
M12 A coded
solder side view FV



MAIN FEATURES

Miniaturized multiturn absolute encoder for limited size applications.

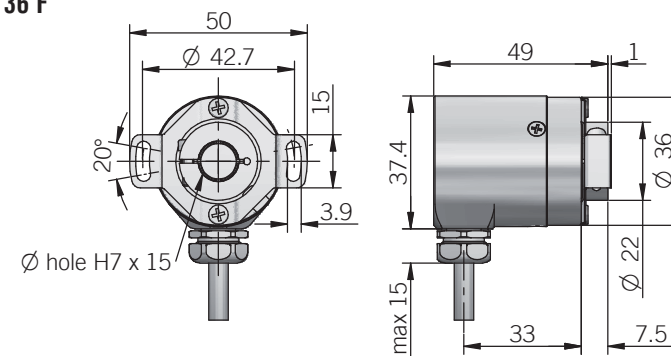
- Magnetic sensor technology without contact (Magnetic ASIC + Patented Energy Harvesting)
- Up to 55 bit as total resolution (15 bit single turn + 40 bit multiturn)
- Power supply up to +30 V DC with SSI as electrical interface
- Code reset for easy setup
- Cable or M12 output, other connectors available on cable end
- Blind hollow shaft up to 10 mm diameter
- Mounting by stator coupling or torque pin



ORDERING CODE

EAM	36F	12 / 13	G	8/30	S	P	X	10	X	8	M12R	.162	+XXX
<p>SERIES magnetic multiturn absolute encoder EAM</p> <p>MODEL blind hollow shaft with stator coupling 36F blind hollow shaft with torque pin 36G</p> <p>MULTITURN RESOLUTION turns from 1 to 17 bit</p> <p>SINGLETURN RESOLUTION from 1 to 15 bit</p> <p>CODE TYPE binary B gray G</p> <p>POWER SUPPLY 5 V DC 5 8 ... 30 V DC 8/30</p> <p>ELECTRICAL INTERFACE Serial Synchronous Interface - SSI S</p> <p>LOGIC positive P</p> <p>OPTIONS to be reported if not used X reset with external input ZE</p> <p>BORE DIAMETER (3/8") mm 9,52 mm 10 diameters 4 / 5 / 6 / 6,35 (1/4") / 8 mm with optional shaft adapter, see Accessories</p> <p>ENCLOSURE RATING IP 67 cover side / IP 65 shaft side X</p> <p>MAX ROTATION SPEED 8000 rpm 8</p> <p>OUTPUT TYPE radial cable (standard length 0,5 m) PR preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PCR5) 8 pin M12 radial male connector M12R</p> <p>MATING CONNECTOR mating connector not included .162 to be reported only with connector output (eg. M12R.162), for mating connector see Accessories</p> <p>VARIANT custom version XXX</p>													

36 F



recommended mating shaft tolerance g6
dimensions in mm

ELECTRICAL SPECIFICATIONS

Multiturn resolution	1 to 17 bit for multiturn resolution > 17 bit please contact our offices
Singleturn resolution	1 to 15 bit
Power supply¹	5 = 4,75 ... 5,25 V DC 8/30 = 7,6 ... 30 V DC (reverse polarity protection)
Power draw without load	< 400 mW
Electrical interface²	RS-422 (THVD1451 or equivalent)
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET t _{min} 150 ms
Clock frequency	100 kHz ... 1 MHz
Code type	binary or gray
SSI monostable time (Tm)	20 µs
SSI pause time (Tp)	> 35 µs
SSI frame	Tree format (MSB ... LSB) up to 12 bit multiturn = length 25 bit (12MT + 13ST) 13 to 14 bit multiturn = length 27 bit (14MT + 13ST) 15 to 17 bit multiturn = length 32 bit (17MT + 15ST)
SSI status and parity bit	on request
Counting direction	decreasing clockwise (shaft view)
Start-up time	150 ms
Accuracy	± 0,35° max
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive
UL / CSA	certificate n. E212495

¹ as measured at the transducer without cable influences

² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

³ maximum load for static usage

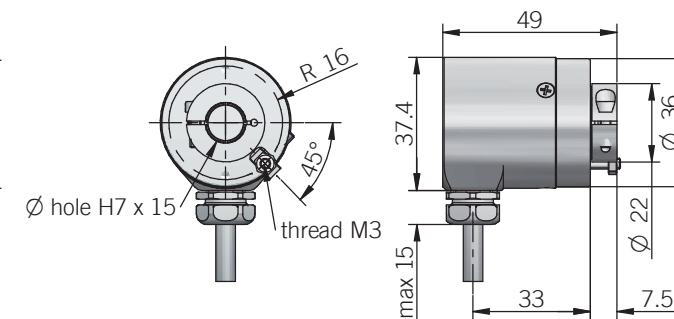
⁴ measured on the transducer flange

⁵ condensation not allowed

CONNECTIONS

Function	Cable	8 pin M12
+ V DC	red	8
0 V	black	5
DATA +	green	3
DATA -	brown	2
CLOCK +	yellow	4
CLOCK -	orange	6
U / D	red / blue	7
RESET	white	1
≡	shield	housing

36 G

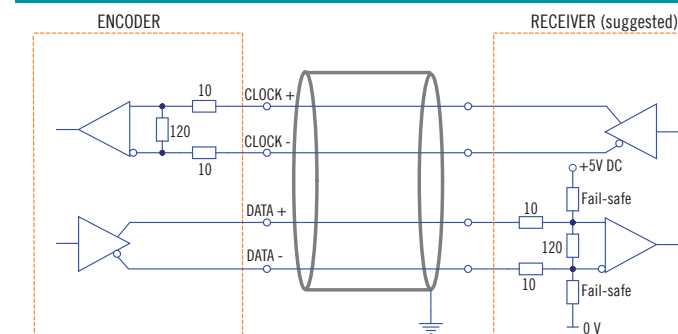


torque pin is included, for mounting instruction please refer to product installation notes

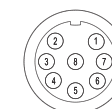
MECHANICAL SPECIFICATIONS

Bore diameter	ø 9,52 (3/8") / 10 mm ø 4* / 5* / 6* / 6,35 (1/4")* / 8* mm * with optional shaft adapter, please refer to Accessories
Enclosure rating	IP 67 cover side / IP 65 shaft side (IEC 60529)
Rotation speed	8000 rpm continuous / 10000 rpm max
Max shaft load³	20 N axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,001 x 10 ⁻⁶ kgm ² (0,02 x 10 ⁻⁶ lbf ²)
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin)
Bearing stage material	EN-AW 2011 aluminium
Shaft material	1.4305 / AISI 303 stainless steel
Shaft adapter material	CuSn12 / CC483K bronze
Housing material	1.0503 / AISI 1045 chrome plated steel
Bearings	n.2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4, 5}	-30° ... +100°C (-22° ... +212°F) -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature⁵	-25° ... +85°C (-13° ... +185°F)
Weight	150 g (5,29 oz)

SSI SCHEMATICS



M12 connector (8 pin)
M12 A coded
solder side view FV



AAM 36 B
CANOPEN
SOLID SHAFT MAGNETIC MULTITURN ABSOLUTE ENCODER

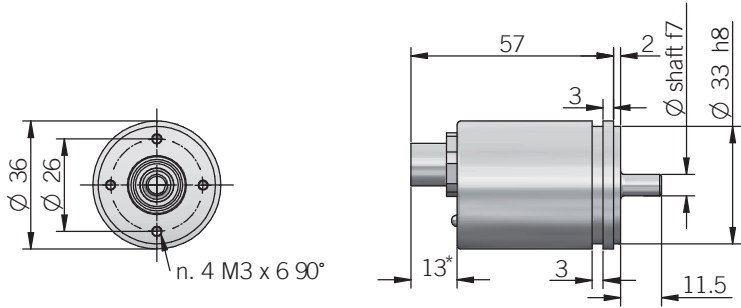
MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Magnetic sensor technology without contact (magnetic ASIC + Energy Harvesting)
- Sturdy construction thanks to separated chambers
- Power supply up to +32 VDC with CANopen interface
- Cable or M12 connector axial output
- 6 mm diameter solid shaft
- Mounting by synchronous flange



AAM 36B



recommended mating shaft tolerance H7
dimensions in mm

* with cable output + 7mm

ORDERING CODE													AAM	36B	24 / 14	B	10/30	CNP	6	X	X	M12A	.162	+XXX
SERIES													magnetic multiturn absolute encoder series AAM											
MODEL													synchronous flange ø 33 mm 36B											
MULTITURN RESOLUTION													bit 24											
SINGLETURN RESOLUTION													bit 14											
CODE TYPE													binary B											
POWER SUPPLY													10 ... 30 V DC 10/30											
ELECTRICAL INTERFACE													CANopen CNP											
SHAFT DIAMETER													mm 6											
ENCLOSURE RATING													IP67 cover side / IP 65 shaft side X											
OPTIONS													to be reported X											
OUTPUT TYPE													axial cable (standard length 2 m) PA2 5 pin M12 axial male connector M12A											
MATING CONNECTOR													mating connector not included .162 to be reported only with connector output (eg. M12A.162), for mating connector see Accessories											
VARIANT													custom version XXX											

ELECTRICAL SPECIFICATIONS

Multiturn resolution	24 bit programmable during commissioning
Singleturn resolution	14 bit programmable during commissioning
Power supply ¹	+10 ... 32 V DC (with reverse polarity protection)
Power draw without load	0,5 W
Electrical interface ²	CAN
Protocol	CANopen Communication profile CiA 301 Encoder profile CiA 406 V3.2 class C2
Node number	1 ... 127 (default 127) programmable during commissioning
Baud rate	10 kBaud ... 1 Mbaud with automatic bit rate detection
LSS protocol	according to CiA 305
CAN transmission modes	programmable (Synchronous and Asynchronous)
LED error messages	according to CiA 303-3
Code type	binary
Position update rate	≤ 600 µs
Start-up time	< 1,5 s
Accuracy	± 0,35°
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive

CONNECTIONS

Function	5 pin M12
+ V DC	2
0 V	3
CAN_H	4
CAN_L	5
CAN_GND (shield)	1
⏏	shield connected to encoder housing

MECHANICAL SPECIFICATION

Shaft diameter	ø 6 mm
Enclosure rating IEC 60529	IP 67 cover side / IP65 shaft side
Max rotation speed	12000 rpm
Max shaft load ³	80 N radial / 50 N axial
Shock	100 G, 6 ms (IEC 60068-2-27)
Vibrations	30 G, 10 ... 2000 Hz (IEC 60068-2-6)
Starting torque (at +20°C / +68°F)	< 0,002 Nm (0,28 Ozin)
Bearing stage material	aluminium
Shaft material	stainless steel
Housing material	chromium plated steel
Bearings	2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature ^{4,5}	-40° ... +85°C (-40° ... +185°F)
Storage temperature ⁵	-40° ... +100°C (-40 ... +212°F)
Weight	110 g (3,88 oz) approx

¹ as measured at the transducer without cable influences

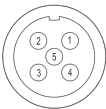
² for further details refer to TECHNICAL BASICS section

³ maximum load for static usage

⁴ measured on the transducer flange

⁵ condensation not allowed

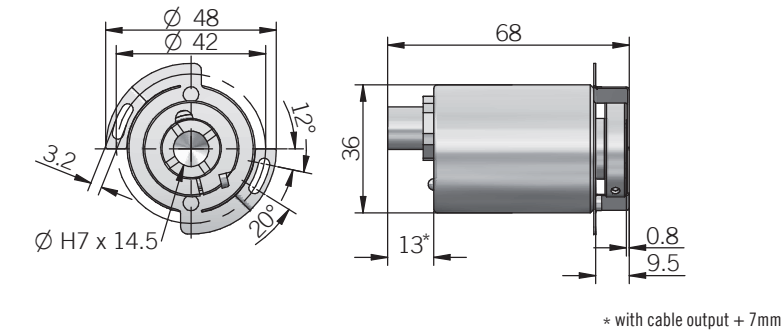
M12 connector(5 pin)
M12 A coded
solder side view FV



MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Magnetic sensor technology without contact (magnetic ASIC + Energy Harvesting)
- Sturdy construction thanks to separated chambers
- Power supply up to +32 VDC with CANopen interface
- Cable or M12 connector axial output
- 8 or 10 mm blind hollow shaft
- Mounting by stator coupling



recommended mating shaft tolerance g6
dimensions in mm

ORDERING CODE	AAM	36F	24 / 14	B	10/30	CNP	10	X	X	M12A	.162	+XXX
SERIES												
magnetic multiturn absolute encoder series	AAM											
MODEL												
blind hollow shaft with stator coupling	36F											
MULTITURN RESOLUTION												
bit	24											
SINGLETURN RESOLUTION												
bit	14											
CODE TYPE												
binary	B											
POWER SUPPLY												
10 ... 30 V DC	10/30											
ELECTRICAL INTERFACE												
CANopen	CNP											
BORE DIAMETER												
mm	8											
mm	10											
ENCLOSURE RATING												
IP67 cover side / IP 65 shaft side	X											
OPTIONS												
to be reported	X											
OUTPUT TYPE												
axial cable (standard length 2 m)	PA2											
5 pin M12 axial male connector	M12A											
MATING CONNECTOR												
mating connector not included	.162											
to be reported only with connector output (eg. M12A.162), for mating connector see Accessories												
VARIANT												
custom version XXX												

ELECTRICAL SPECIFICATIONS

Multiturn resolution	24 bit programmable during commissioning
Singleturn resolution	14 bit programmable during commissioning
Power supply¹	+10 ... 32 V DC (with reverse polarity protection)
Power draw without load	0,5 W
Electrical interface²	CAN
Protocol	CANopen Communication profile CiA 301 Encoder profile CiA 406 V3.2 class C2
Node number	1 ... 127 (default 127) programmable during commissioning
Baud rate	10 kBaud ... 1 Mbaud with automatic bit rate detection
LSS protocol	according to CiA 305
CAN transmission modes	programmable (Synchronous and Asynchronous)
LED error messages	according to CiA 303-3
Code type	binary
Position update rate	≤ 600 µs
Start-up time	< 1,5 s
Accuracy	± 0,35°
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU (01/09/2020) directive

MECHANICAL SPECIFICATION


Bore diameter	ø 8 / 10 mm
Enclosure rating IEC 60529	IP 67 cover side / IP65 shaft side
Max rotation speed	6000 rpm
Max shaft load³	80 N radial / 50 N axial
Shock	100 G, 6 ms (IEC 60068-2-27)
Vibrations	30 G, 10 ... 2000 Hz (IEC 60068-2-6)
Starting torque (at +20°C / +68°F)	< 0,002 Nm (0,28 Ozin)
Bearing stage material	aluminium
Shaft material	stainless steel
Housing material	chromium plated steel
Bearings	2 ball bearings
Bearings life	10 ⁹ revolutions
Operating temperature^{4, 5}	-40° ... +85°C (-40° ... +185°F)
Storage temperature⁵	-40° ... +100°C (-40 ... +212°F)
Weight	110 g (3,88 oz) approx

¹ as measured at the transducer without cable influences

² for further details refer to TECHNICAL BASICS section

³ maximum load for static usage⁴ measured on the transducer flange⁵ condensation not allowed

CONNECTIONS

Function	5 pin M12
+ V DC	2
0 V	3
CAN_H	4
CAN_L	5
CAN_GND (shield)	1
	shield connected to encoder housing

M12 connector(5 pin)
M12 A coded
solder side view FV

