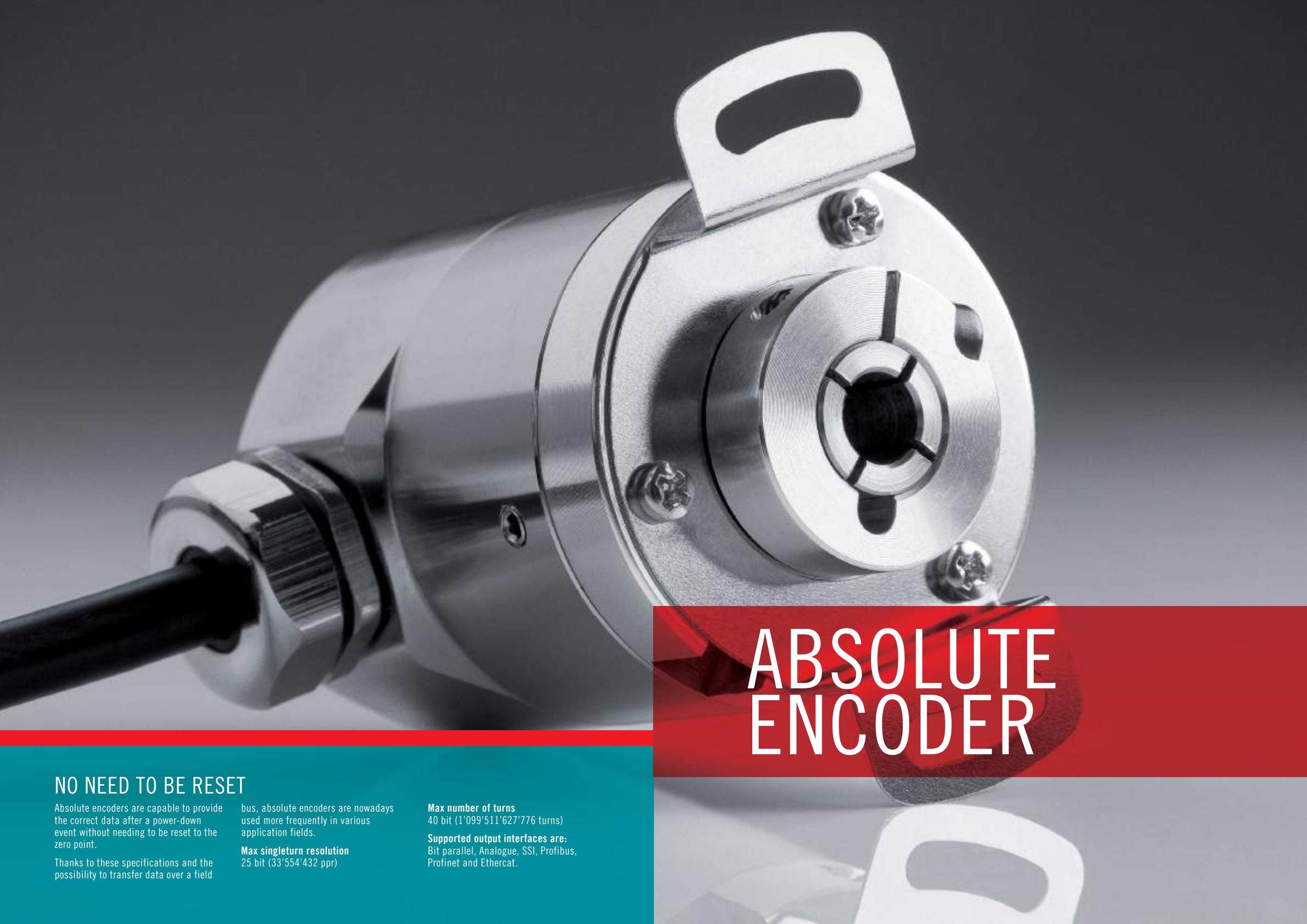




ABSOLUTE ENCODER

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

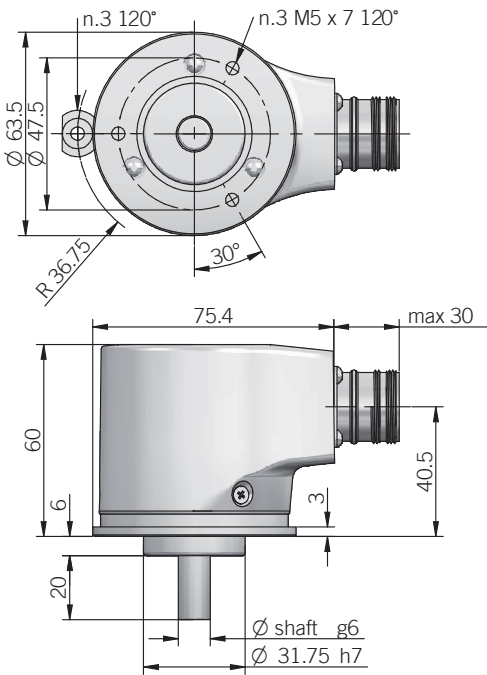


ORDERING CODE BIT PARALLEL	EAR	63A	12	G	8/30	P	P	X	10	X	PD	R	.XXX
SERIES singleturn absolute encoder EAR													
MODEL synchronous flange ø 31.75 mm 63A synchronous flange ø 50 mm 58B clamping flange ø 36 mm 58C centering square flange ø 31.75 mm 63D centering square flange ø 50 mm 63E													
RESOLUTION bit from 1 to 13 (multiples and submultiples of 360) ppr from 90 to 3600													
CODE TYPE binary B gray G (no powers of 2) binary offset code (0-XXX) BC (no powers of 2) gray offset code (0-XXX) GC													
POWER SUPPLY 8 ... 30 V DC 8/30													
ELECTRICAL INTERFACE push-pull P													
LOGIC negative N positive P													
OPTIONS to be reported if not used X latch L (with binary code) strobe S reset ZE latch / reset LZE (with binary code) strobe / reset SZE													
SHAFT DIAMETER (mod. 58 B) mm 6 (mod. 63 A / D) 3/8"- mm 9,52 (mod. 58 C - 63 A / D / E) mm 10													
ENCLOSURE RATING IP 65 shaft side / IP67 cover side X IP 67 S													
OUTPUT TYPE (without options) cable (standard length 1,5 m) PD cable (standard length 1,5 m) PE (without reset option) 19 pin MIL connector MA female connector included, without female please add 162 as variant code													
DIRECTION TYPE radial R													
VARIANT custom version XXX													

ORDERING CODE SSI	EAR	63A	13	G	8/30	S	X	2048	RS	10	X	HA	R	.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 ZE														
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 (without reset option) 7 pin MIL connector MC (with reset option) 10 pin MIL connector MD 12 pin M23 connector HA 8 pin M12 connector M12 female connector included, without female please add 162 as variant code														
DIRECTION TYPE radial R														
VARIANT custom version XXX														

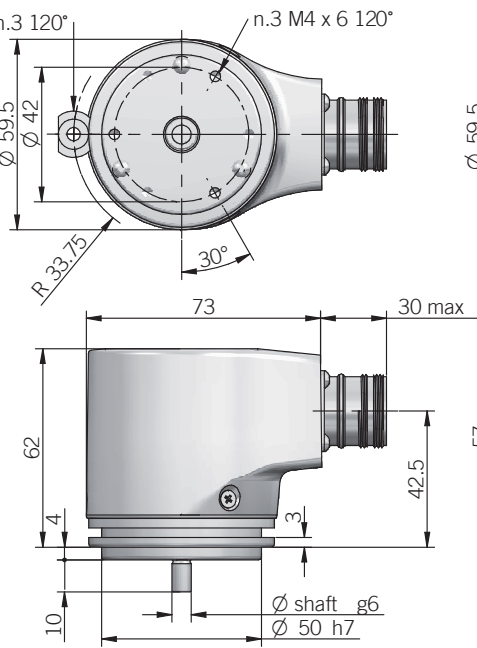
only with additional incremental output

63 A



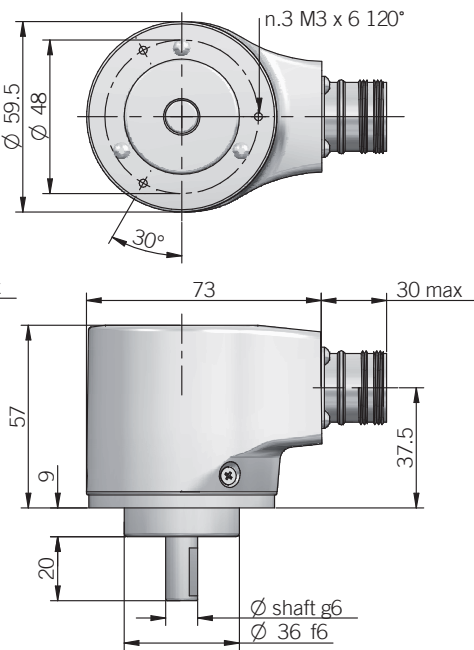
fixing clamps not included, please refer to Accessories

58 B

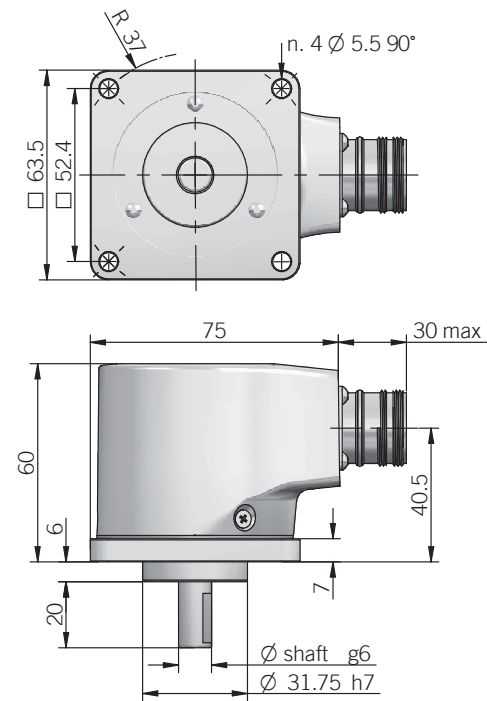


fixing clamps not included, please refer to Accessories

58 C

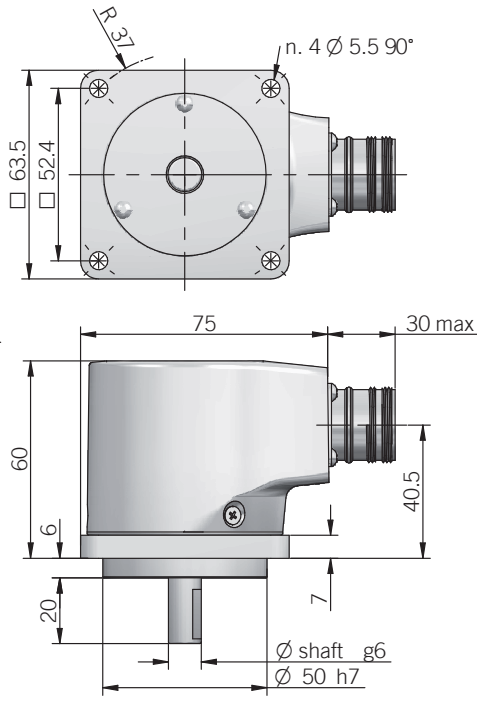


63 D



dimensions in mm

63 E



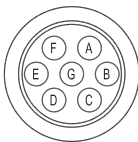
BIT PARALLEL CONNECTIONS

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

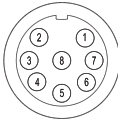
SSI CONNECTIONS

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

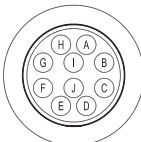
MC connector (7 pin)
Amphenol MS3102-E-16-S
solder side view FV



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



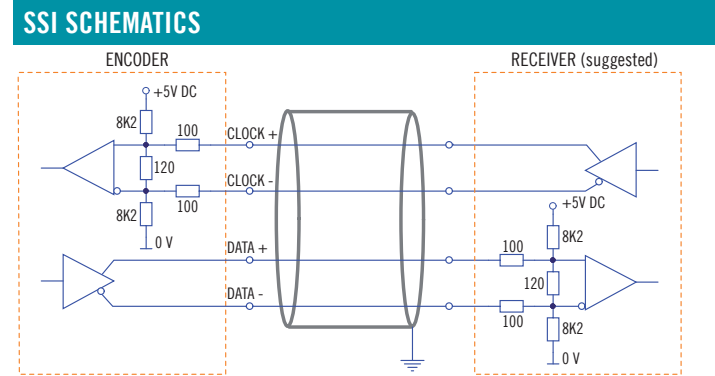
MA connector (19 pin)
Amphenol 62IN 12E 14-19 P
solder side view FV



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 (SN65LBC179Q 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 2015/863/EU 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 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

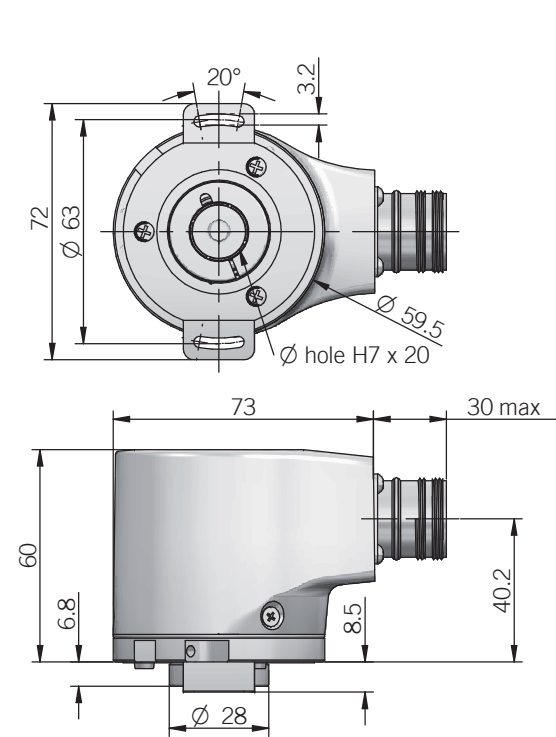


ORDERING CODE BIT PARALLEL	EAR	58F	12	G	8/30	P	P	X	15	X	PD	R	.XXX
SERIES singleturn absolute encoder EAR													
MODEL blind hollow shaft with stator coupling 58F blind hollow shaft with torque stop slot 63F blind hollow shaft with torque pin 63G													
RESOLUTION bit from 1 to 13 (multiples 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 L (with binary code) strobe S reset ZE latch / reset LZE (with binary code) strobe / reset SZE													
BORE DIAMETER mm 14 mm 15 other diameters with optional shaft adapter													
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 (without reset option) 19 pin MIL connector MA female connector included, without female please add 162 as variant code													
DIRECTION TYPE radial R													
VARIANT custom version XXX													

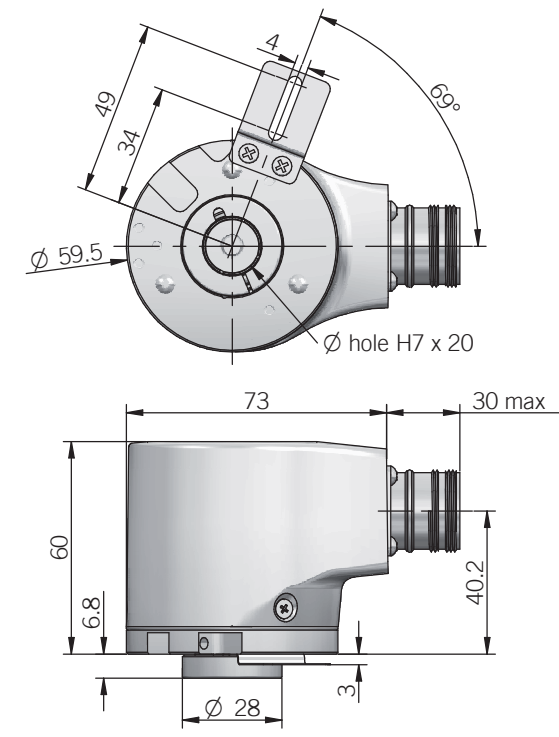
ORDERING CODE SSI	EAR	58F	13	G	8/30	S	X	2048	RS	15	X	HA	R	.XXX
SERIES singleturn absolute encoder EAR														
MODEL blind hollow shaft with stator coupling 58F blind hollow shaft with torque stop slot 63F blind hollow shaft with torque pin 63G														
RESOLUTION bit 13 / 16 / 17 / 18 / 21 / 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 ZE														
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 other diameters with optional shaft adapter														
ENCLOSURE RATING IP 65 shaft side / IP67 cover side X IP 67 S														
OUTPUT TYPE cable (standard length 1,5 m) PC (without reset option) 7 pin MIL connector MC (with reset option) 10 pin MIL connector MD 12 pin M23 connector HA 8 pin M12 connector M12 female connector included, without female please add 162 as variant code														
DIRECTION TYPE radial R														
VARIANT custom version XXX														

only with additional incremental output

58 F

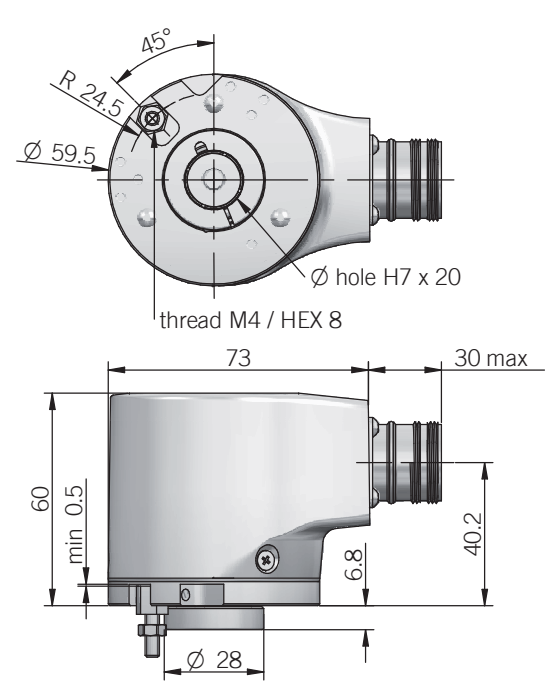


63 F



for torque pin please refer to Accessories

63 G



torque pin is included
dimensions in mm

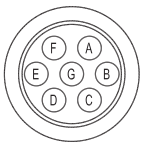
BIT PARALLEL CONNECTIONS

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

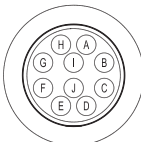
MC connector (7 pin)
Amphenol MS3102-E-16-S
solder side view FV



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



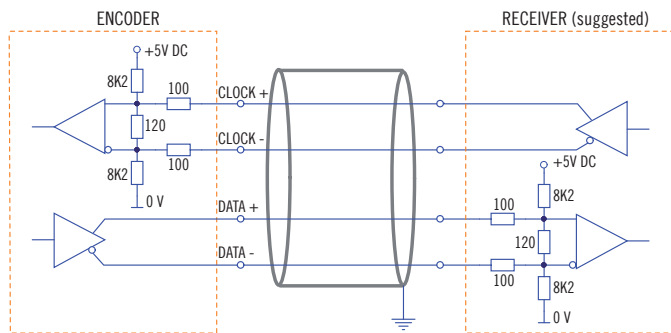
ME connector (32 pin)
Glenair IPT 02 A 18-32 P F6
solder side view FV



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 (SN65LBC179Q 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 2015/863/EU directive
UL / CSA	certificate n. E212495

SSI SCHEMATICS



MECHANICAL SPECIFICATIONS

Bore diameter	ø 8* / 9,52 (3/8")* / 10* / 12* / 14 / 15 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 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

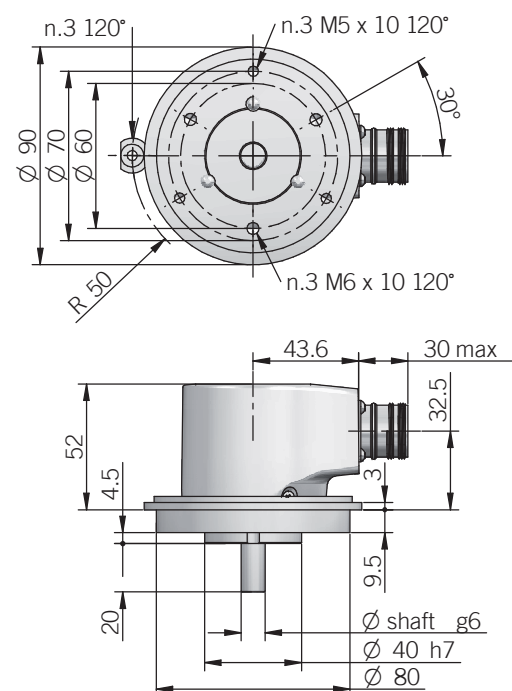


ORDERING CODE BIT PARALLEL	EAR	90A	12	G	8/30	P	P	X	10	X	PD	R	.XXX
singleturn absolute encoder	SERIES												
	MODEL												
	synchronous flange ø 40 mm	90A											
	REO-444 flange	115A											
	RESOLUTION												
	bit from 1 to 13												
	(multiples and submultiples of 360) ppr 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 L													
(with binary code) strobe S													
reset ZE													
latch / reset LZE													
(with binary code) strobe / reset 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													
(without reset option) 19 pin MIL connector MA													
female connector included, without female please add 162 as variant code													
DIRECTION TYPE													
radial R													
VARIANT													
custom version XXX													

ORDERING CODE SSI	EAR	90A	13	G	8/30	S	X	2048	RS	10	X	HA	R	.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 ZE	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 (without reset option) 7 pin MIL connector MC (with reset option) 10 pin MIL connector MD 12 pin M23 connector HA 8 pin M12 connector M12 female connector included, without female please add 162 as variant code	DIRECTION TYPE radial R	VARIANT custom version XXX	

only with additional incremental output

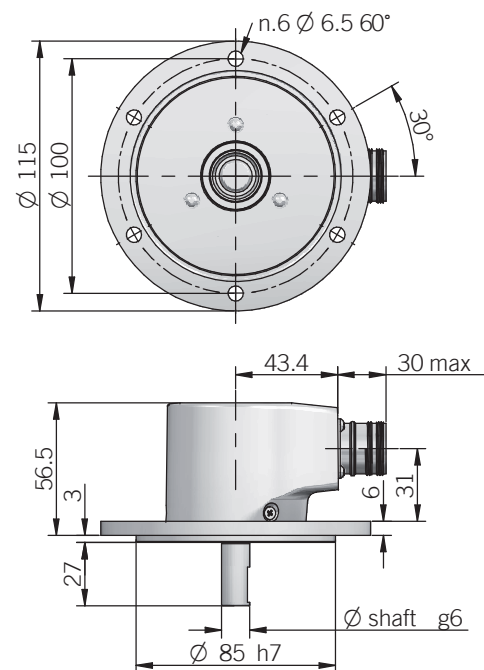
90 A



for fixing clamps please refer to Accessories
dimensions in mm



115 A



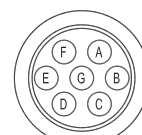
BIT PARALLEL CONNECTIONS

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

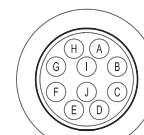
MC connector (7 pin)
Amphenol MS3102-E-16-S
solder side view FV



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



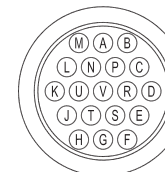
MD connector (10 pin)
Amphenol MS3102-E-18-1P
solder side view FV



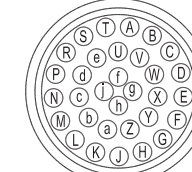
HA connector (12 pin)
M23 CCW Hummel
7.410.000000 - 7.002.912.603
solder side view FV



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



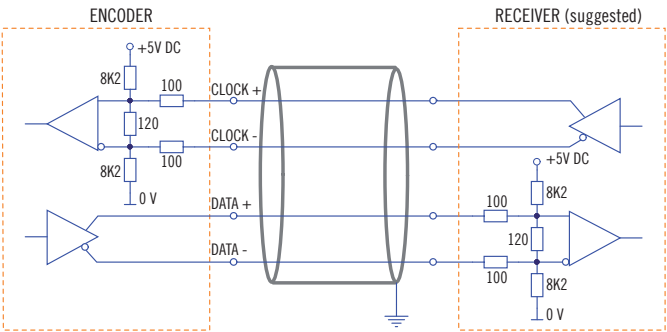
ME connector (32 pin)
Glenair IPT 02 A 18-32 P F6
solder side view FV



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 (SN65LBC179Q 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 2015/863/EU 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.

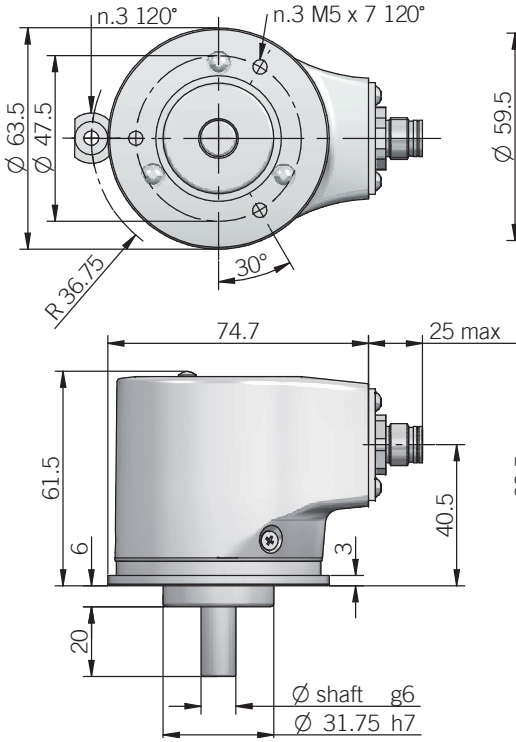
- Optical sensor technology (OptoASIC)
- Programmable measuring range via teach-in function (inputs or cover button)
- Power supply up to +30 VDC with analogue (voltage or current) as electrical interface
- Cable or M12 connector output
- Solid shaft diameter up to 10 mm
- Mounting by synchronous, clamping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



ORDERING CODE

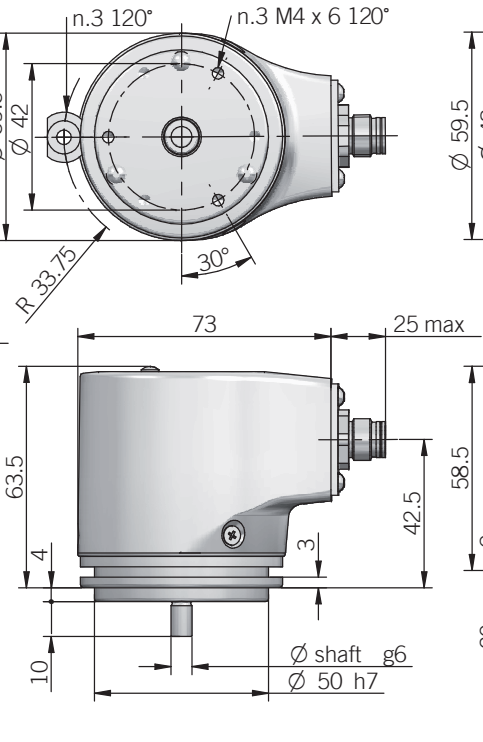
EAL	63A	16B	12/30	V	05	X	10	X	P	R	.XXX
SERIES analogue singleturn absolute encoder EAL											
MODEL synchronous flange ø 31.75 mm 63A synchronous flange ø 50 mm 58B clamping flange ø 36 mm 58C centering square flange ø 31.75 mm 63D centering square flange ø 50 mm 63E											
OUTPUT DAC RESOLUTION 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 M12 connector M12 female connector included, without female please add 162 as variant code											
DIRECTION TYPE radial R											
VARIANT custom version XXX											

63 A



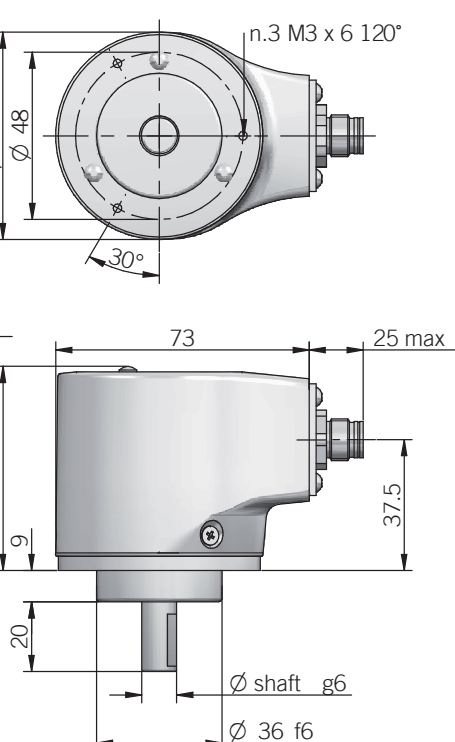
for fixing clamps please refer to Accessories

58 B

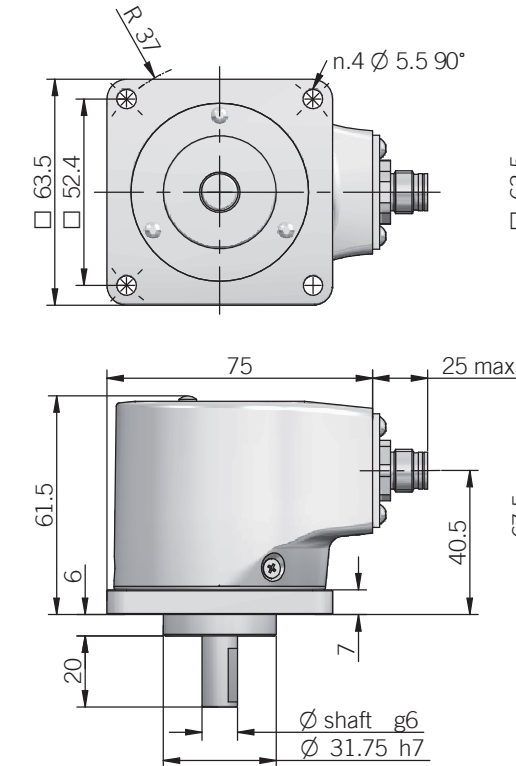


for fixing clamps please refer to Accessories

58 C

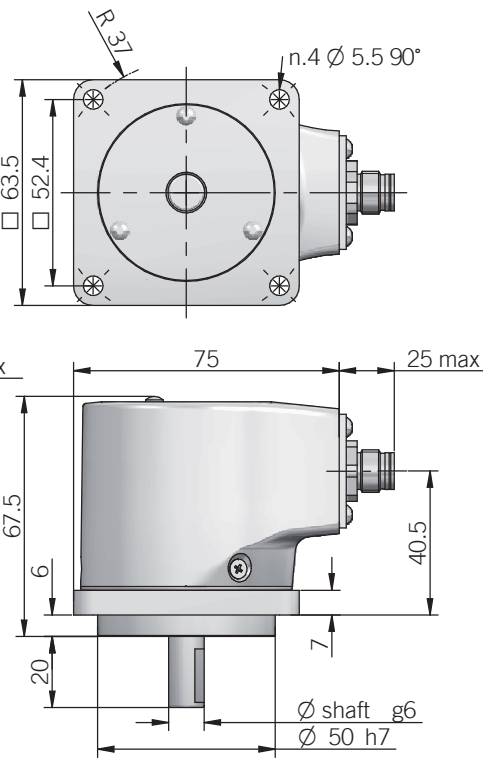


63 D



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 2015/863/EU directive
UL / CSA	certificate n. E212495

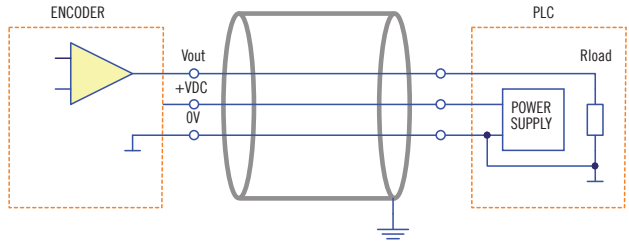
MECHANICAL SPECIFICATIONS

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 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)

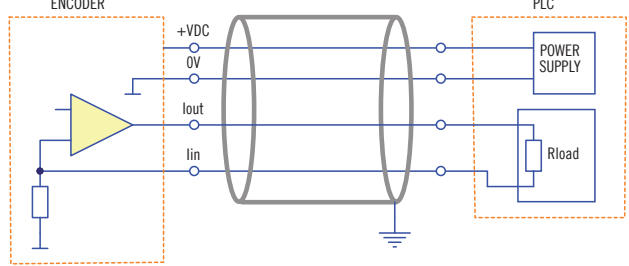
¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ maximum load for static usage
⁴ measured on the transducer flange
⁵ condensation not allowed

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

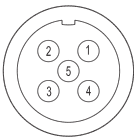
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 ... +85 (+158 ... +185)	8000	5000

CONNECTIONS

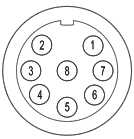
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
Vout / Iout	green	1	1
Iin	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
⊥	shield	housing	housing

* 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.

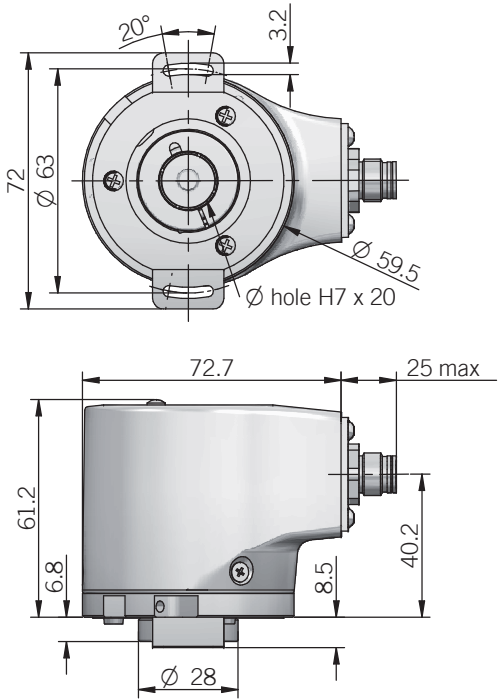
- Optical sensor technology (OptoASIC)
- Programmable measuring range via teach-in function (inputs or cover button)
- Power supply up to +30 VDC with analogue (voltage or current) as electrical interface
- Cable or M12 connector output
- Blind hollow shaft up to 15 mm
- Mounting by stator coupling,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



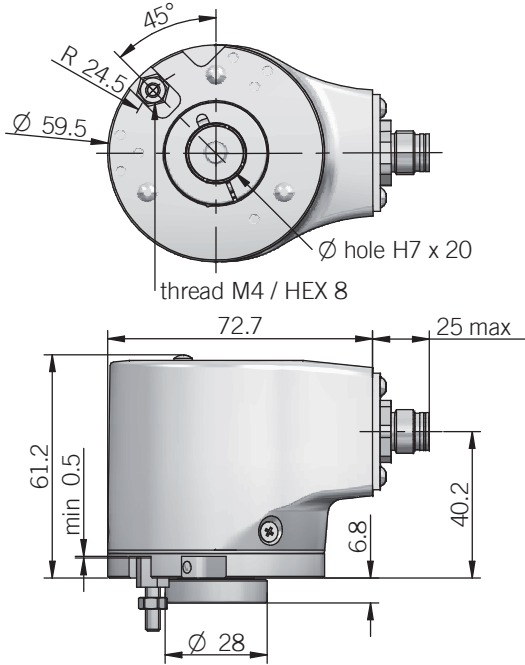
ORDERING CODE

EAL	58F	16B	12/30	V	05	X	15	X	P	R	.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 other diameters with optional shaft adapter											
ENCLOSURE RATING IP 65 shaft side / IP67 cover side X IP 67 S											
OUTPUT TYPE cable (standard length 1.5 m) P M12 connector M12 female connector included, without female please add 162 as variant code											
DIRECTION TYPE radial R											
VARIANT custom version XXX											

58 F

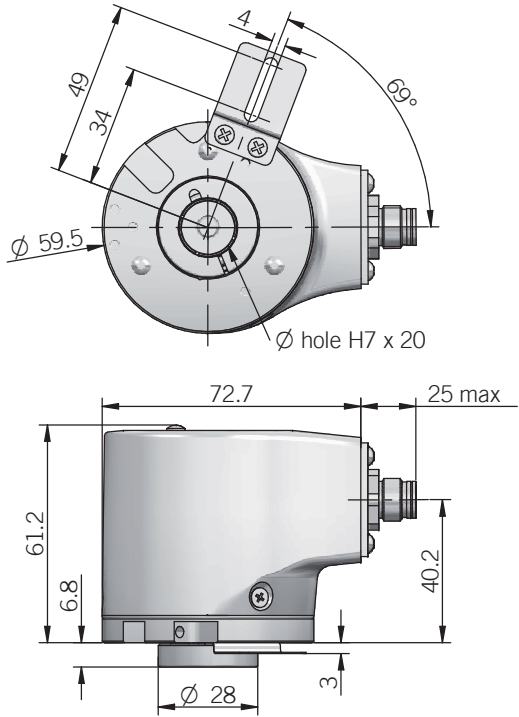


63 G



torque pin is included
dimensions in mm

63 F



for torque pin please refer to Accessories

63 F



torque pin is included
dimensions in mm

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 2015/863/EU directive
UL / CSA	certificate n. E212495

MECHANICAL SPECIFICATIONS

Bore diameter	ø 8* / 9,52 (3/8")* / 10* / 12* / 14 / 15 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 ^{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

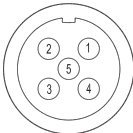
	Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
IP65	up to +70 (+158)	9000	6000
	+70 ... +85 (+158 ... +185)	6000	3000
IP67	up to +70 (+158)	8000	4000
	+70 ... +85 (+158 ... +185)	4000	2000

CONNECTIONS

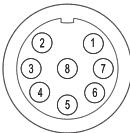
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
Vout / Iout	green	1	1
Iin	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
⏏	shield	housing	housing

* 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 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 (inputs or cover button)
- Power supply up to +30 VDC with analogue (voltage or current) as electrical interface
- Cable or M12 connector output
- Solid shaft diameter up to 11 mm
- Mounting by synchronous or REO-444 flange

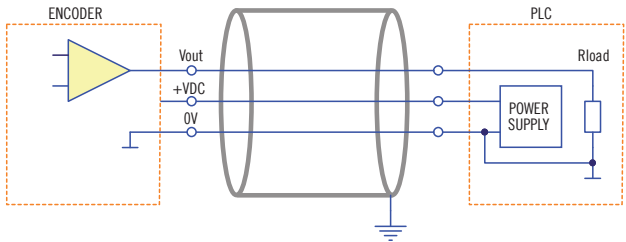


ORDERING CODE

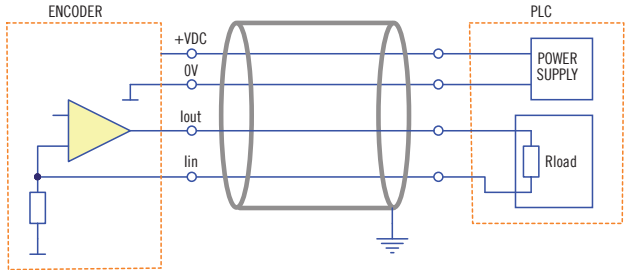
EAL	90A	16B	12/30	V	05	X	10	X	P	R	.XXX
SERIES analogue singleturn absolute encoder EAL											
MODEL synchronous flange ø 40 mm 90A REO-444 flange 115A											
OUTPUT DAC RESOLUTION 16 bit 16B											
POWER SUPPLY 12 ... 30 V DC 12/30											
ELECTRICAL INTERFACE voltage V current I											
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 M12 connector M12 female connector included, without female please add 162 as variant code											
DIRECTION TYPE radial R											
VARIANT custom version XXX											

ELECTRICAL INTERFACE

Voltage output

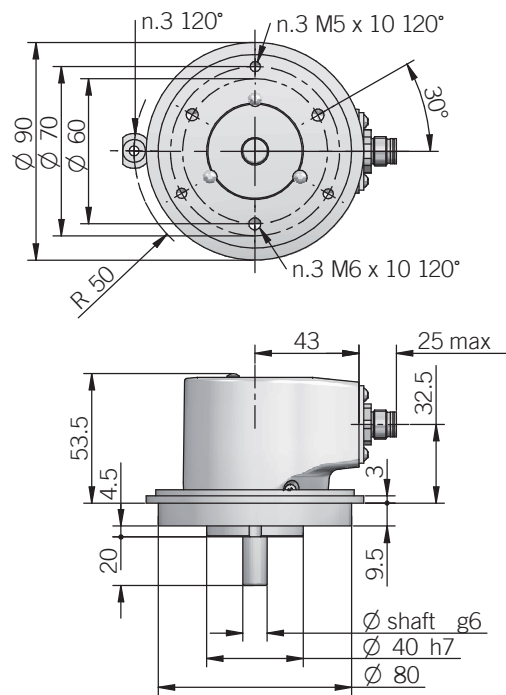


Current output

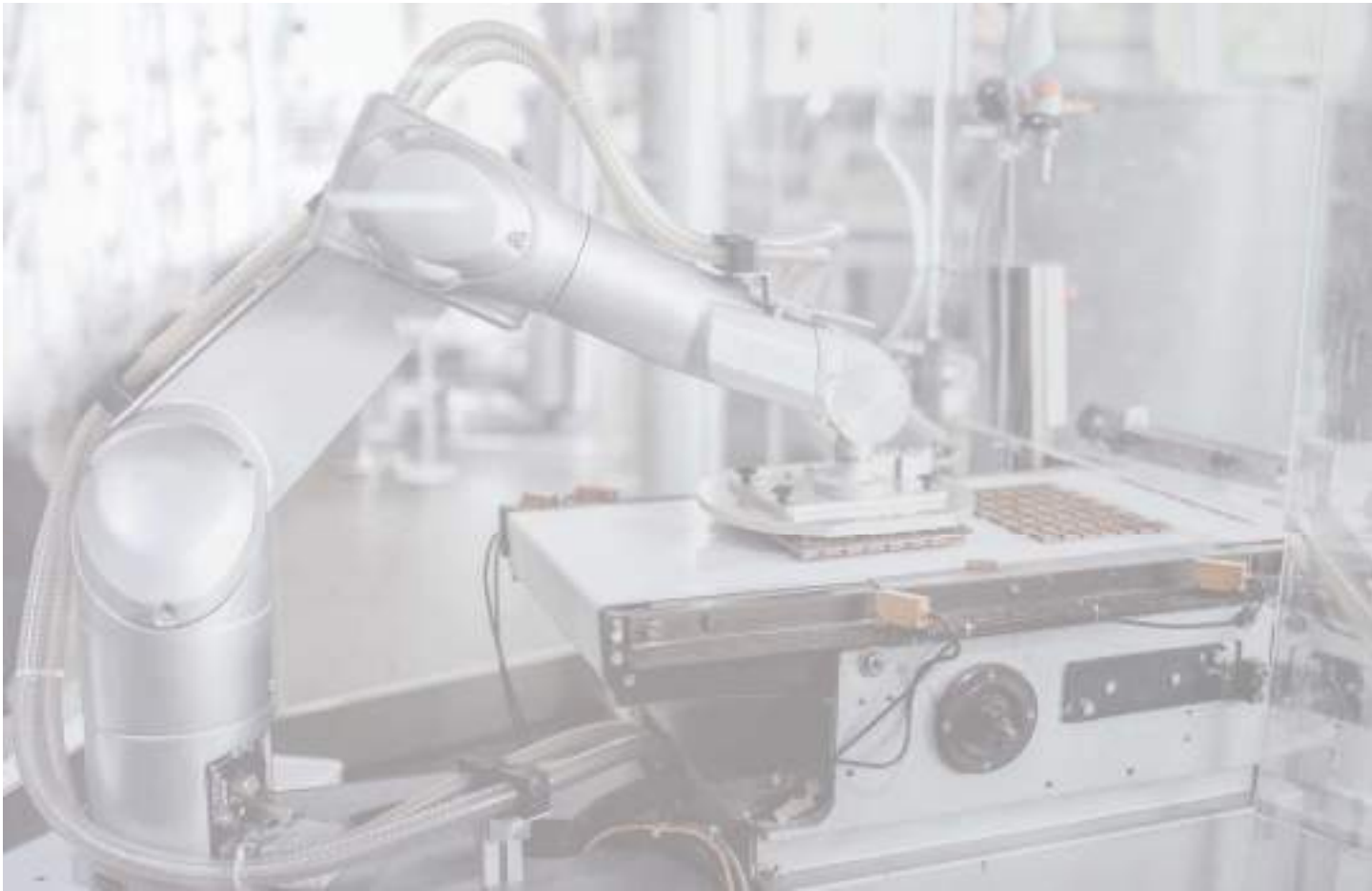


3 / 4 wire source
with 3 wires interface I_{in} is internally connected to 0V

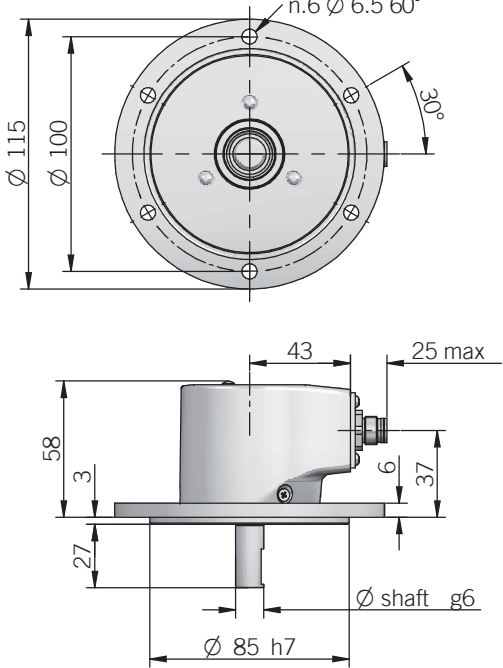
90 A



for fixing clamps please refer to Accessories
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 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 2015/863/EU 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 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

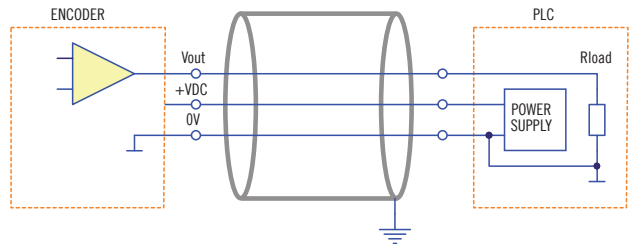
³ maximum load for static usage

⁴ measured on the transducer flange

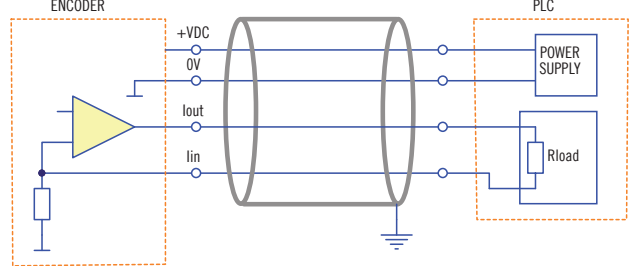
⁵ condensation not allowed

ELECTRICAL INTERFACE

Voltage output



Current output



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

ROTATION SPEED / TEMPERATURE TABLE

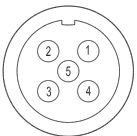
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 ... +85 (+158 ... +185)	8000	5000

CONNECTIONS

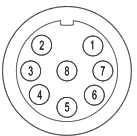
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
Vout / Iout	green	1	1
Iin	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
⏏	shield	housing	housing

* 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



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

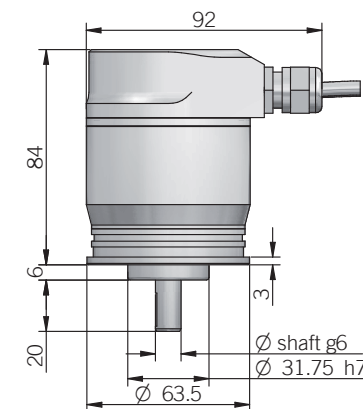
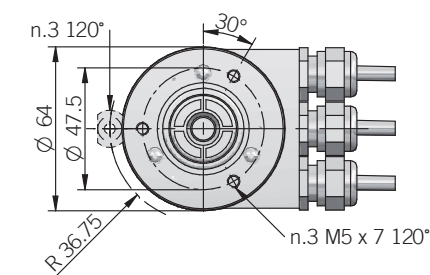


ORDERING CODE

EA	63A	4096	B	12/28	FX	10	X	6	P3R	.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 included, without mating connectors please add 162 as variant code VARIANT custom version XXX										

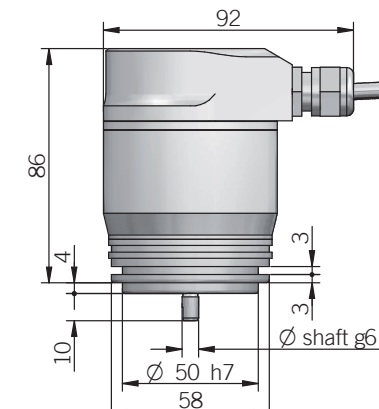
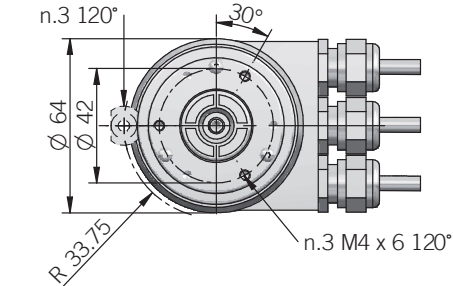
OPTICAL SINGLETURN ABSOLUTE ENCODERS | EA 58 B / C - 63 A / D / E PROFIBUS

63 A



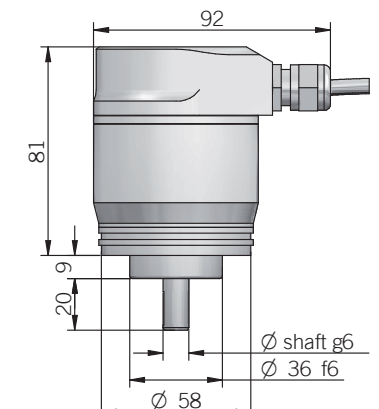
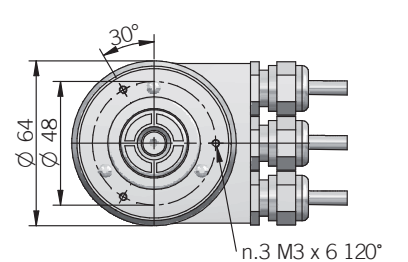
fixing clamps not included, please refer to Accessories

58 B

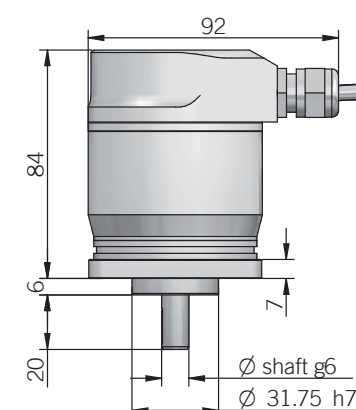
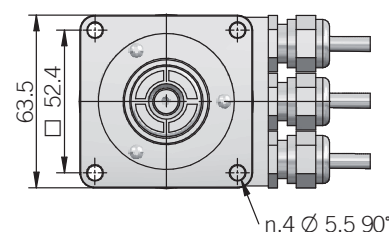


fixing clamps not included, please refer to Accessories

58 C

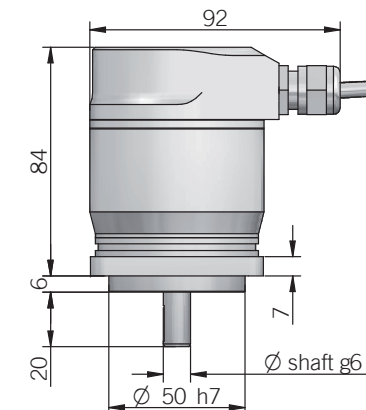
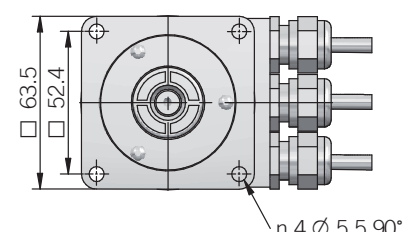


63 D



dimensions in mm

63 E



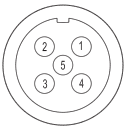
ELECTRICAL SPECIFICATIONS

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 2015/863/EU directive
UL / CSA	certificate n. E212495

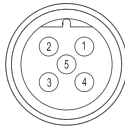
CONNECTIONS

Function	POWER	LINE OUT	LINE 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



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



LINE 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

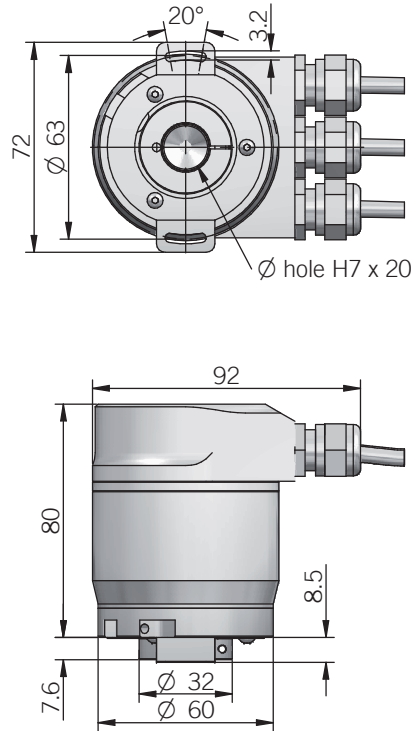


ORDERING CODE

EA	58F	4096	B	12/28	FXX	10	X	3	P3R	.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 8 (3/8") 9,52 mm 9 mm 10 mm 12 mm 14 mm 15										
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 included, without mating connectors please add 162 as variant code										
VARIANT custom version XXX										

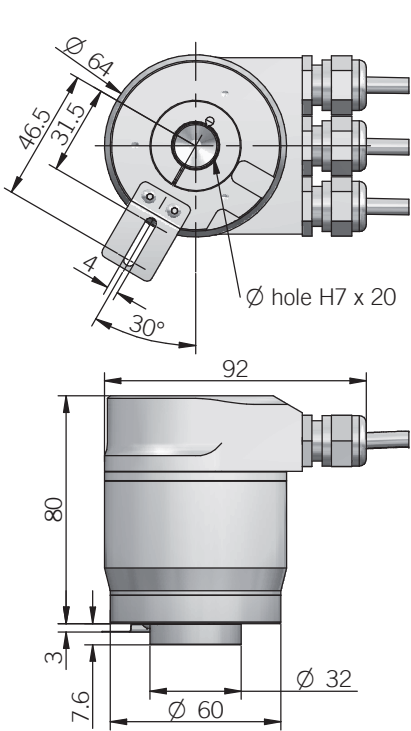


58 F



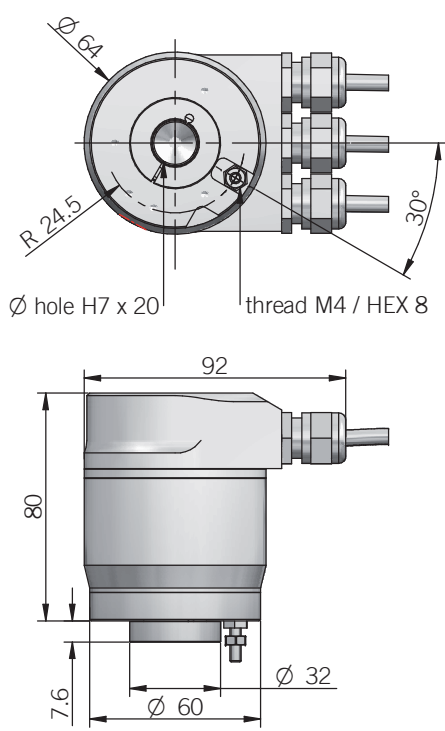
dimensions in mm

63 F



for torque pin please refer to Accessories

63 G



torque pin is included

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 2015/863/EU directive
UL / CSA	certificate n. E212495

CONNECTIONS

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

MECHANICAL SPECIFICATIONS

Bore diameter	Ø 8* / 9,52 (3/8")* / 10* / 12* / 14 / 15 mm * with supplied shaft adapter
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
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

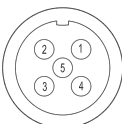
³ measured on the transducer flange

⁴ condensation not allowed

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

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

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



MAIN FEATURES

Industry standard singleturn absolute encoder for factory automation applications.

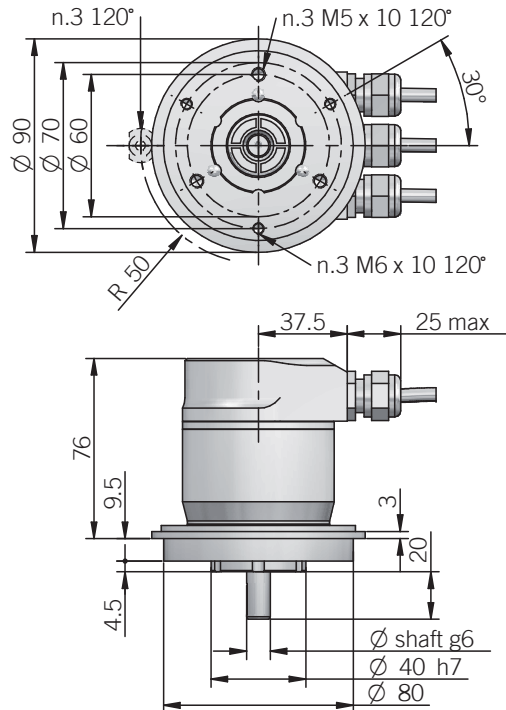
- Optical sensor technology (OptoASIC)
- Resolution up to 13 bit (8192 ppr)
- Power supply up to +28 V DC with Profibus DP as electrical interface
- Cable gland or M12 connector output
- Solid shaft diameter up to 11 mm
- Mounting by synchronous or REO-444 flange



ORDERING CODE

EA	90A	4096	B	12/28	FXX	10	X	6	P3R	.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 FXX										
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 included, without mating connectors please add 162 as variant code										
VARIANT custom version XXX										

90 A



dimensions in mm

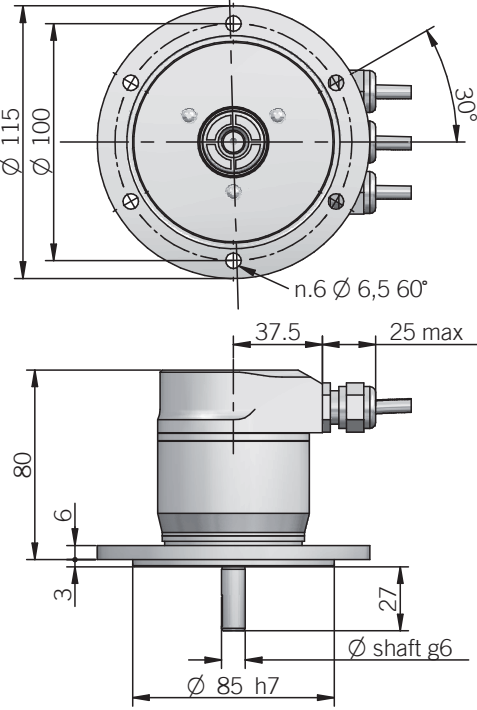
ELECTRICAL SPECIFICATIONS

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 2015/863/EU directive
UL / CSA	certificate n. E212495

CONNECTIONS

Function	POWER	LINE OUT	LINE 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 lbfm 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

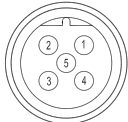
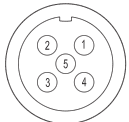
⁴ measured on the transducer flange

⁵ condensation not allowed

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

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

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



EAX 80 A / D
SSI

EXPLOSION PROOF ATEX SINGLETURN ABSOLUTE ENCODER

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 EX 80 comply with essential health and safety requirements according to

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

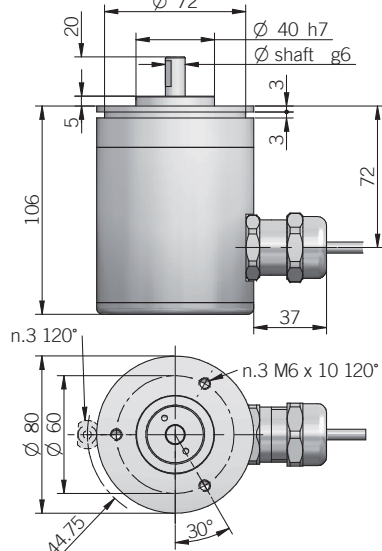
The UE declaration is available on www.eltra.it



ORDERING CODE

EAX	80A	256	G	8/28	S	X	X	10	X	3	PR	.XXX
singleturn absolute flameproof encoder EAX												
SERIES												
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 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												
VARIANT												
custom version XXX												

80 A



dimensions in mm

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 2015/863/EU 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

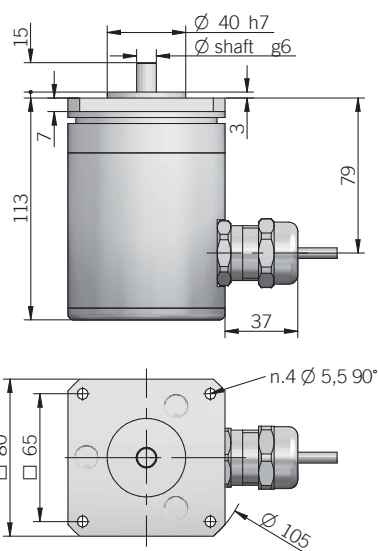
³ maximum load for static usage

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

80 D



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 d 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 d IIC T6 Gb

Ex d: 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

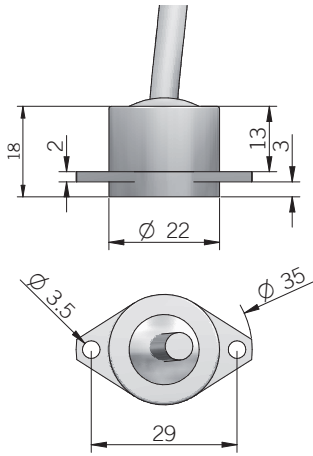
EM series encoders are suitable for several application fields like electric motors, textile machines, wood-working, paper-working, glass working, marble-working machinery and, more generally, automation and process control fields.

- Resolution up to 13 bit (8192 ppr) with SSI as electrical interface
- Cable output, connector 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)

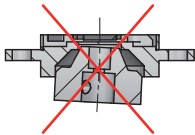
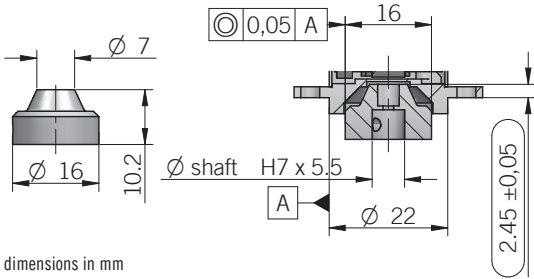
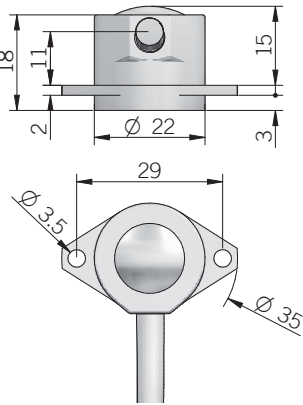


ORDERING CODE		EMA	22A	1024	B	5	S	P	X	6	S	10	P	R	.XXX
SERIES		magnetic singleturn absolute encoder EMA													
MODEL		clamping flange ø 22 mm 22A for anodized version please directly contact our offices													
RESOLUTION		ppr from 8 to 8192 refer to the available pulses list													
CODE 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 mm 10													
ENCLOSURE RATING		IP 67 S													
MAX ROTATION SPEED		10000 rpm 10													
OUTPUT TYPE		cable (standard length 0,5 m) P													
DIRECTION TYPE		axial A radial R													
VARIANT		custom version XXX													

22 A with axial cable output



22 A with radial cable output



dimensions in mm

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 2015/863/EU 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

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	



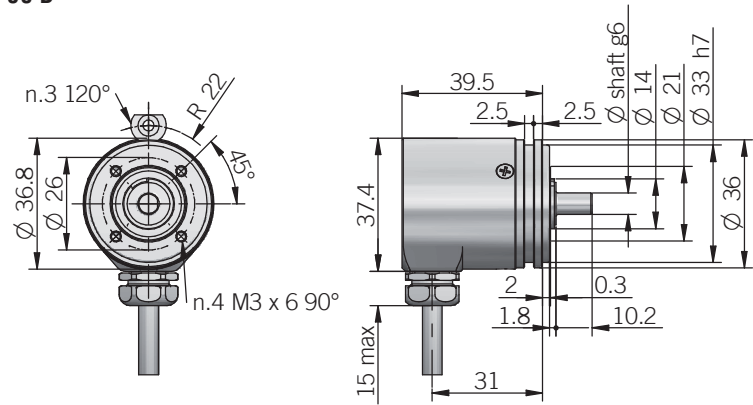
MAIN FEATURES

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	PR	.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 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												
		8 pin M12 radial connector M12R												
		female connector included, without female please add 162 as variant code												
VARIANT		custom version XXX												



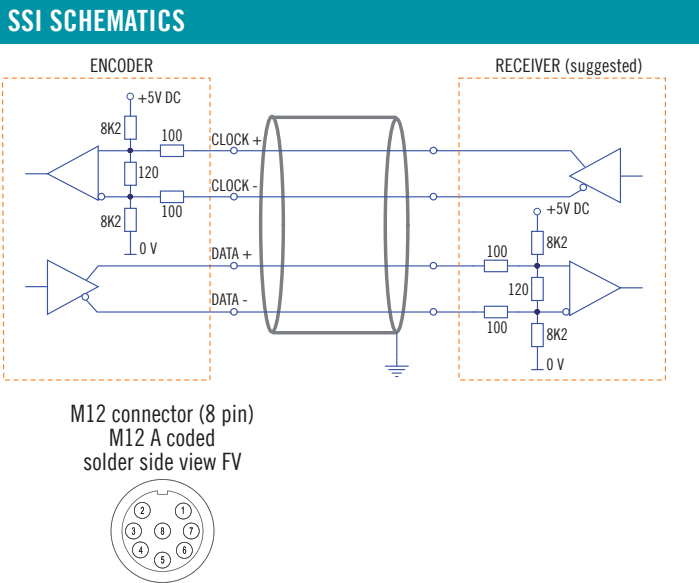
fixing clamps not included, please refer to Accessories
dimensions in mm

ELECTRICAL SPECIFICATIONS	
Resolution	from 1 to 15 bit 360 / 720 ppr
Power supply ¹	5 = 4,75 ... 5,25 V DC 8/30 = 7,6 ... 30 V DC (reverse polarity protection)
Power draw without load	< 400 mW
Electrical interface ²	RS-422 (SN65LBC179Q 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 2015/863/EU 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 load ³	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 temperature ⁵	-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



MAIN FEATURES

Miniaturized singleturn absolute encoder for limited size applications.

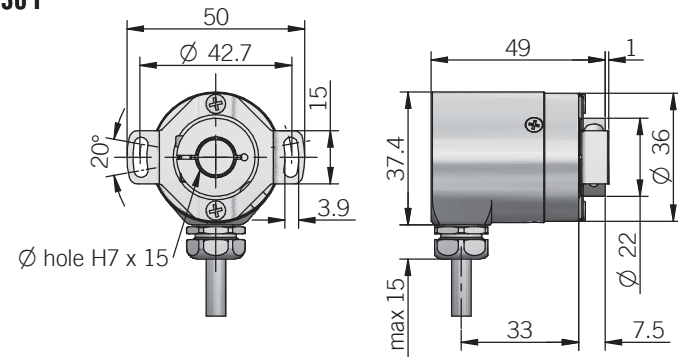
- Magnetic sensor technology without contact (Magnetic ASIC)
- Up to 15 bit as singleturn resolution
- Power supply up to +30 V DC with SSI as electrical interface
- Code reset for easy setup
- Cable or M12 output, other connectors available on cable end
- Blind hollow shaft up to 10 mm diameter
- Mounting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



ORDERING CODE	EMA	36F	13	G	8/30	S	P	X	6	X	8	PR	.XXX
magnetic singleturn absolute encoder	SERIES EMA	MODEL 36F blind hollow shaft with stator coupling 36G blind hollow shaft with torque pin	RESOLUTION from 1 to 15 bit 360 / 720 ppr	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 ZE	BORE DIAMETER mm 6 (1/4") mm 6,35 mm 8 (3/8") mm 9,52 mm 10	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 8 pin M12 radial connector M12R female connector included, without female please add 162 as variant code	VARIANT custom version XXX

SOLID SHAFT MAGNETIC SINGLETURN ABSOLUTE ENCODER

36 G



Technical drawing of the 3000 series ball valve, showing front and side views with dimensions.

Front View Dimensions:

- Top flange outer radius: R 16
- Top flange thickness: 45°
- Bottom flange thread: thread M3
- Bottom flange hole: Ø hole H7 x 15

Side View Dimensions:

- Overall length: 49
- Overall height: 37.4
- Top flange height: 36
- Top flange outer diameter: Ø 22
- Top flange inner diameter: Ø 7.5
- Bottom flange height: 15
- Bottom flange outer diameter: Ø 33



MECHANICAL 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 (SN65LBC179Q 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 μ s
SSI pause time (Tp)	> 35 μ s
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	$\pm 0,35^\circ$ max
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2015/863/EU directive
UL / CSA	certificate n. E212495

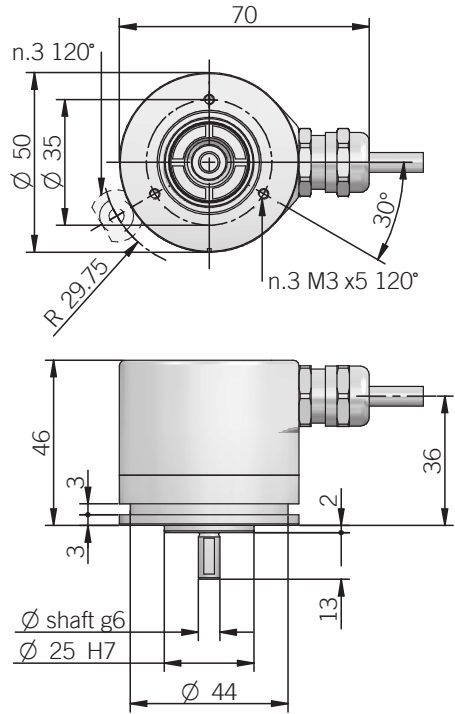
Bore diameter	ø 6* / 6,35 (1/4")* / 8* / 9,52 (3/8") / 10 mm * with supplied shaft adapter
Enclosure rating	IP 67 cover side / IP 65 shaft side (IEC 60529)
Rotation speed	8000 rpm continuous / 10000 rpm max
Max shaft load³	20 N axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 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
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)
Fixing torque for collar clamping	0,6 Nm (85 Ozin) recommended
Weight	150 g (5,29 oz)

The diagram illustrates a 1-wire interface between an **ENCODER** and a **RECEIVER (suggested)**. The encoder side features two comparators. The top comparator's non-inverting input is connected to a voltage divider consisting of an 8K2 resistor to +5V DC and a 100 resistor to the data line. Its inverting input is connected to another divider with an 8K2 resistor to 0 V and a 120 resistor to the data line. The output of this comparator is labeled **CLOCK +**. The bottom comparator's non-inverting input is connected to a divider with an 8K2 resistor to 0 V and a 100 resistor to the data line. Its inverting input is connected to another divider with an 8K2 resistor to +5V DC and a 120 resistor to the data line. The output of this comparator is labeled **CLOCK -**. The receiver side consists of a single comparator. Its non-inverting input is connected to a divider with a 100 resistor to +5V DC and an 8K2 resistor to the data line. Its inverting input is connected to another divider with a 100 resistor to 0 V and an 8K2 resistor to the data line. The output of the receiver comparator is labeled **DATA +**. The data line is a single wire that connects the **CLOCK +**, **CLOCK -**, and **DATA +** lines of the encoder to the **DATA +** line of the receiver. A ground symbol is shown at the bottom of the data line.

A diagram of a circular connector with 8 pins. The pins are numbered 1 through 8. Pin 1 is at the top right, pin 2 is at the top left, pin 3 is on the left, pin 4 is at the bottom left, pin 5 is at the bottom, pin 6 is at the bottom right, pin 7 is on the right, and pin 8 is in the center.

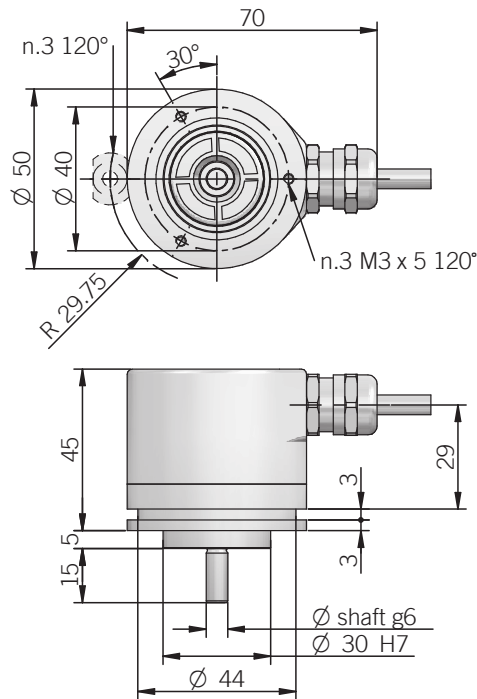
Function	Cable	8 pin M12
+ V DC	red	8
0 V	black	5
DATA +	green	3
DATA -	brown	2
CLOCK +	yellow	4
CLOCK -	orange	6
U / D	red / blue	7
RESET	white	1
	shield	housing

50 A
radial cable output



fixing clamps not included, please refer to Accessories

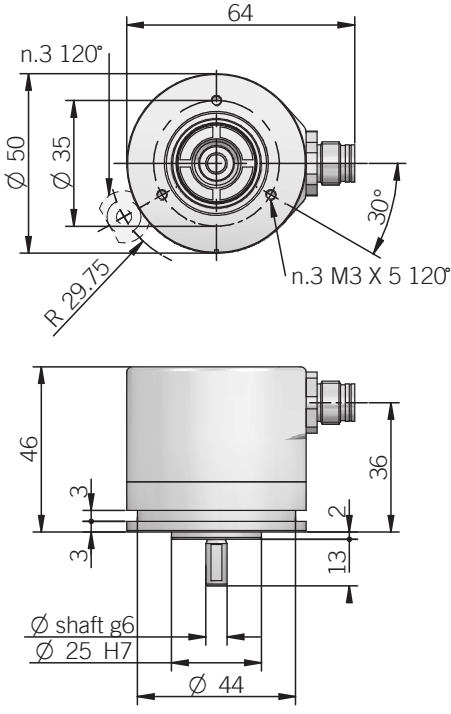
50 B
radial cable output



fixing clamps not included, please refer to Accessories

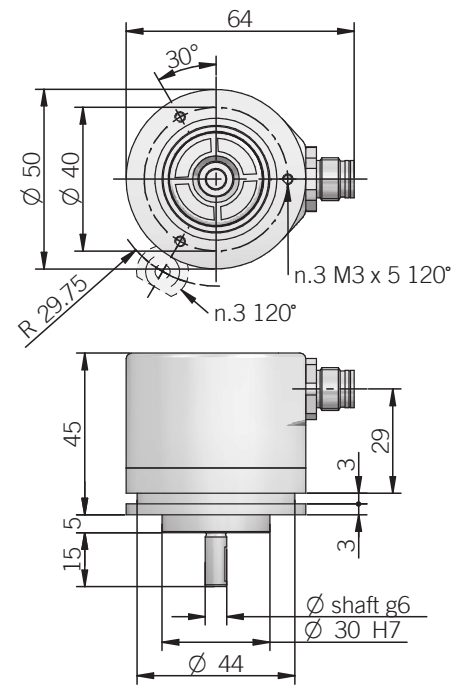
dimensions in mm

50 A
radial M12 output



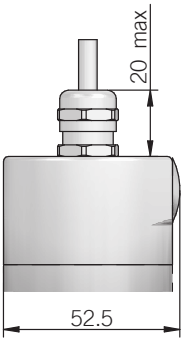
fixing clamps not included, please refer to Accessories

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 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 2015/863/EU 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 / 9,52 (3/8") / 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 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)

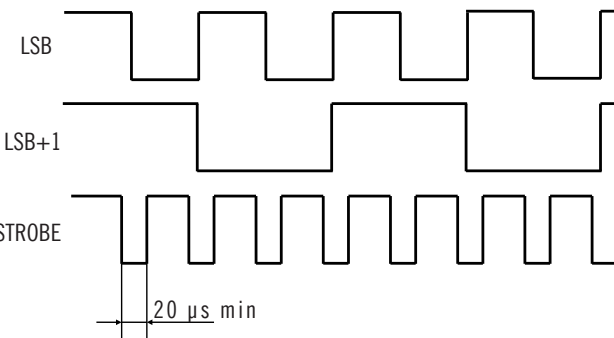
SSI CONNECTIONS

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

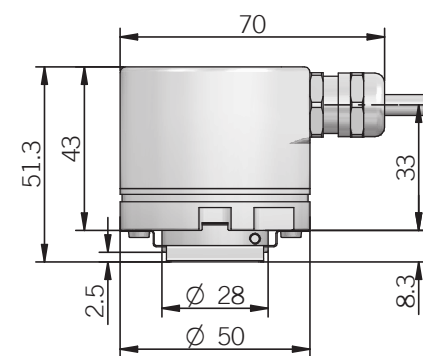
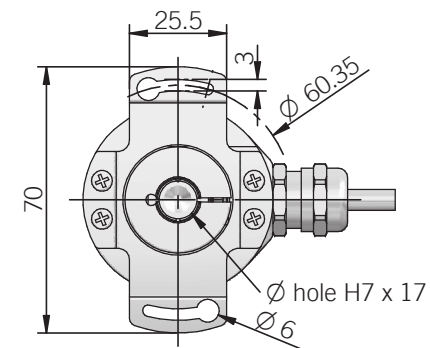
Singleturn absolute magnetic encoder size 50 mm with blind hollow shaft

- 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 connector 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

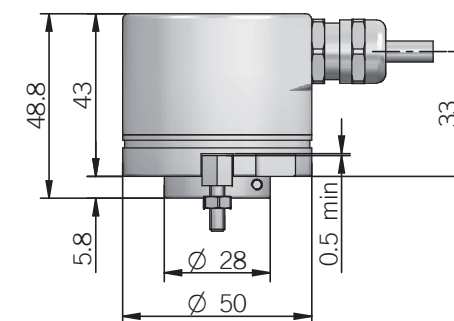
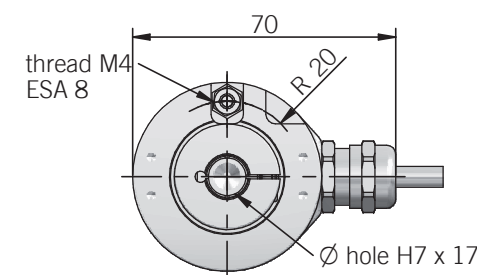


ORDERING CODE	EMA	50F	1024	G	8/30	N	N	X	6	X	3	P	R	.XXX
SERIES														
magnetic singleturn absolute encoder EMA														
MODEL														
blind hollow shaft with stator coupling 50F														
blind hollow shaft with torque pin 50G														
RESOLUTION														
(N / C / R / U / P interface) ppr from 2 to 4096														
(S interface) ppr from 2 to 8192														
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														
5 V DC 5														
8 ... 30 V DC 8/30														
ELECTRICAL INTERFACE														
NPN N														
NPN open collector C														
PNP R														
PNP open collector U														
push pull P														
Serial Synchronous Interface - SSI S														
LOGIC														
negative N														
positive P														
OPTIONS														
to be reported if not used X														
reset ZE														
(with binary code) strobe S														
(with binary code) strobe and code reset SIZE														
BORE DIAMETER														
mm 6														
mm 8														
(3/8") 9,52 mm 9														
mm 10														
mm 12														
mm 14														
mm 15														
ENCLOSURE RATING														
IP 65 X														
IP 67 S														
MAX ROTATION SPEED														
3000 rpm 3														
OUTPUT TYPE														
cable (standard length 0,5 m) P														
(S interface) M12 connector M12														
female connector included, without female please add 162 as variant code														
DIRECTION TYPE														
axial A														
radial R														
VARIANT														
custom version XXX														

50 F
radial cable output



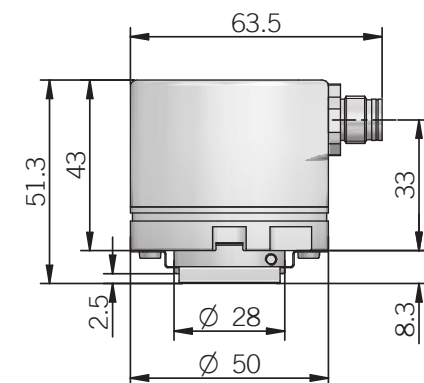
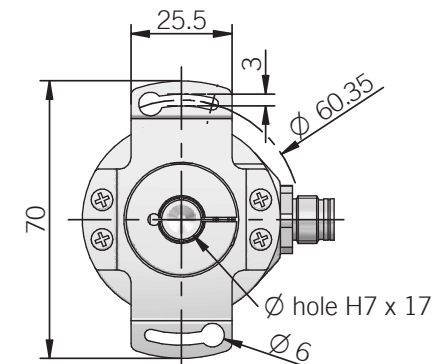
50 G
radial cable output



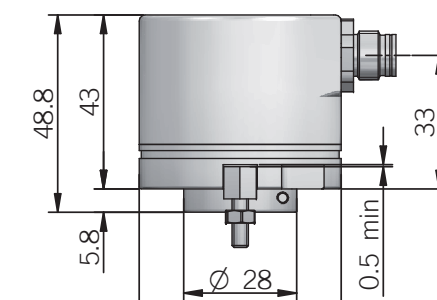
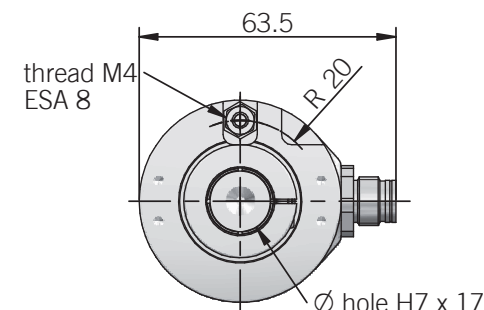
torque pin is included in model G, for mounting instruction please refer to product installation notes

dimensions in mm

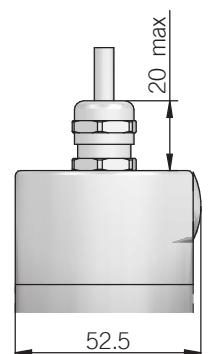
50 F
radial M12 output



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 2015/863/EU 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

Bore diameter	ø 6* / 8* / 9,52* (3/8") / 10* / 12* / 14 / 15 mm * with supplied shaft adapter
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 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	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)

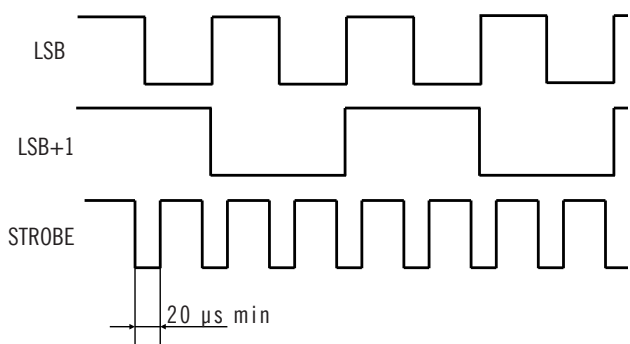
SSI CONNECTIONS

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

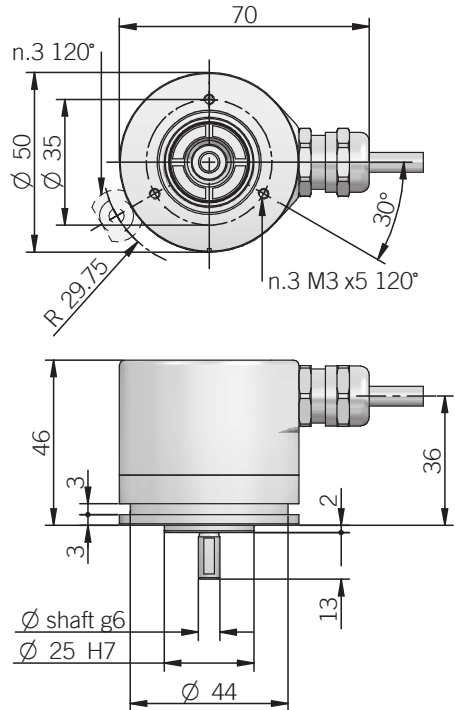
- Resolution 12 bit
- Power supply up to +28 V DC with analogue (voltage or current) as electrical interface
- Code reset for easy setup
- Cable or M12 output, other connector available on cable end
- Sturdy construction (separated chambers)
- Solid shaft diameter up to 10 mm
- IP 67 enclosure rating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



ORDERING CODE

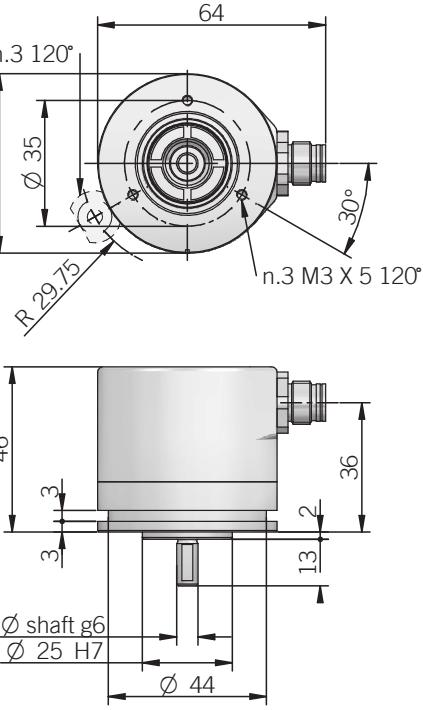
ORDERING CODE	EML	50A	360	X	12/28	V	05	X	6	X	3	P	R	.XXX
analogue magnetic singleturn absolute encoder	SERIES EML													
	MODEL synchronous flange ø 25 mm synchronous flange ø 30 mm for anodized version please directly contact our offices	50A 50B												
	ACTIVE ANGLE degrees 360 degrees 270 degrees 180 degrees 90													
	OPTION to be reported if not used reset ZE													
	POWER SUPPLY 12 ... 28 V DC	12/28												
	ELECTRICAL INTERFACE voltage V current I													
	OUTPUT RANGE 0 ... 5 V 0 ... 10 V 0 ... 20 mA 4 ... 20 mA	05 010 020 420												
	OPTIONS to be reported with voltage output / 3 wires current output 4 wires current output	X Q												
	SHAFT DIAMETER mm 6 mm 8 (3/8") 9,52 mm mm 10													
	ENCLOSURE RATING IP 65 IP 67	X S												
	MAX ROTATION SPEED 3000 rpm	3												
	OUTPUT TYPE cable (standard length 0,5 m) M12 connector	P M12												
	female connector included, without female please add 162 as variant code													
	DIRECTION TYPE axial radial	A R												
	VARIANT custom version	XXX												

50 A
radial cable output



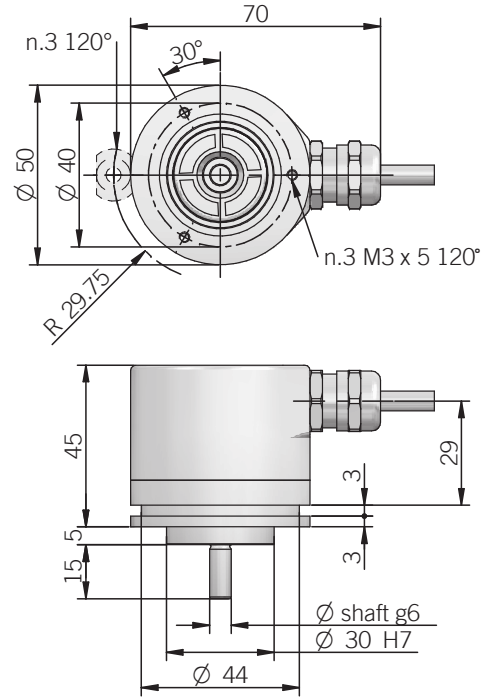
fixing clamps not included, please refer to Accessories

50 A
radial M12 output



fixing clamps not included, please refer to Accessories

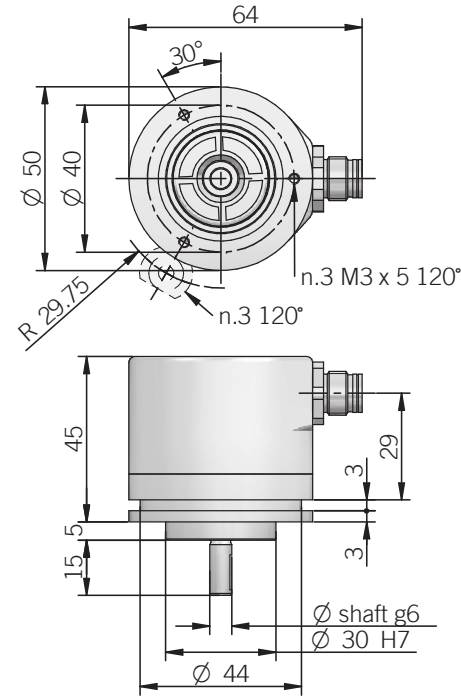
50 B
radial cable output



fixing clamps not included, please refer to Accessories

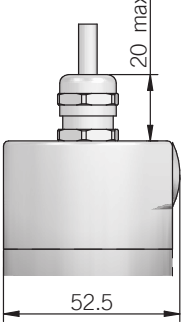
dimensions in mm

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 2015/863/EU 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

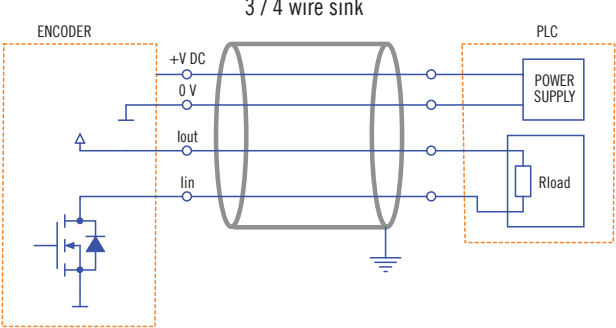
³ maximum load for static usage

⁴ measured on the transducer flange

⁵ condensation not allowed

ELECTRICAL INTERFACE

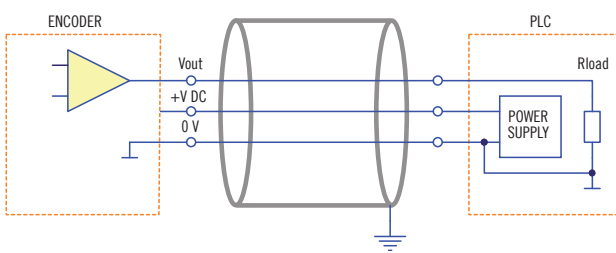
Current output



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

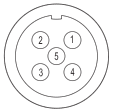
Shaft diameter	ø 6 / 8 / 9,52 (3/8") / 10 mm
Enclosure rating	X = IP 65 (IEC 60529) S = IP 67 (IEC 60529)
Max rotation speed	3000 rpm continuous / 5000 rpm peak
Max shaft load ³	30 N axial / 50 N radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	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

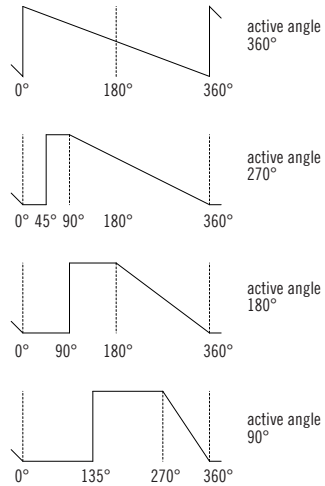
M12 connector (5 pin)
M12 A coded
solder side view FV



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



SIGNAL PATTERN (decreasing CW)



MAIN FEATURES

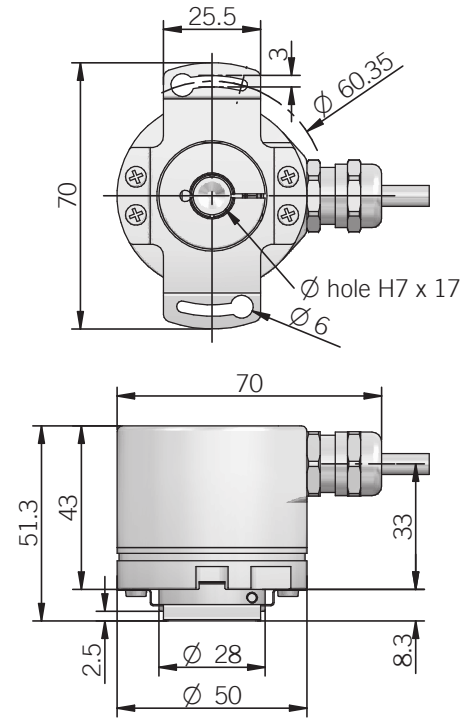
Singleturn absolute magnetic encoder size 50 mm with blind hollow shaft

- Resolution 12 bit
- Power supply up to +28 V DC with analogue (voltage or current) as electrical interface
- Code reset for easy setup
- Cable or M12 output, other connector 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

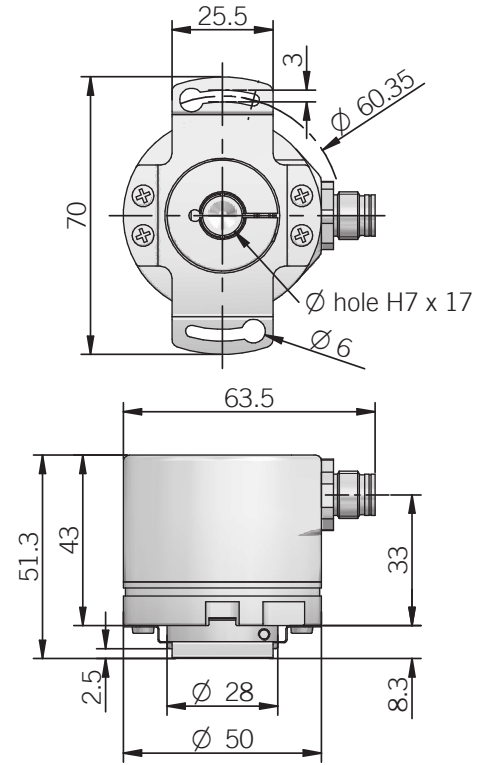


ORDERING CODE	EML	50F	360	X	12/28	V	05	X	6	X	3	P	R	.XXX
SERIES analogue magnetic singleturn absolute encoder EML														
MODEL blind hollow shaft with stator coupling 50F blind hollow shaft with torque pin 50G														
ACTIVE ANGLE degrees 360 degrees 270 degrees 180 degrees 90														
OPTION to be reported if not used X reset 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 6 mm 8 (3/8") 9,52 mm 9 mm 10 mm 12 mm 14 mm 15														
ENCLOSURE RATING IP 65 X IP 67 S														
MAX ROTATION SPEED 3000 rpm 3														
OUTPUT TYPE cable (standard length 0,5 m) P M12 connector M12 female connector included, without female please add 162 as variant code														
DIRECTION TYPE axial A radial R														
VARIANT custom version XXX														

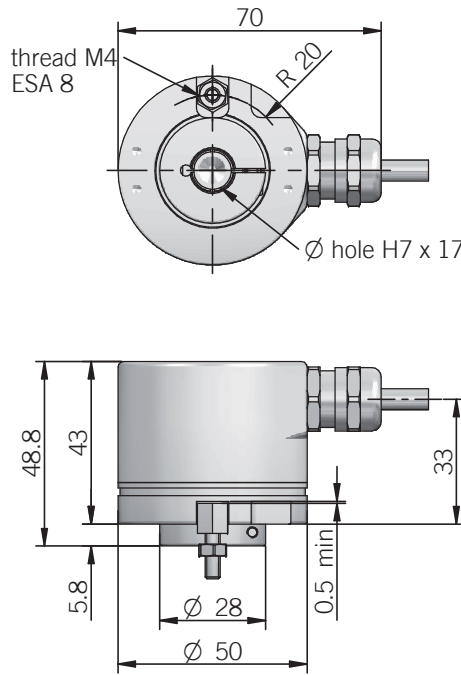
50 F
radial cable output



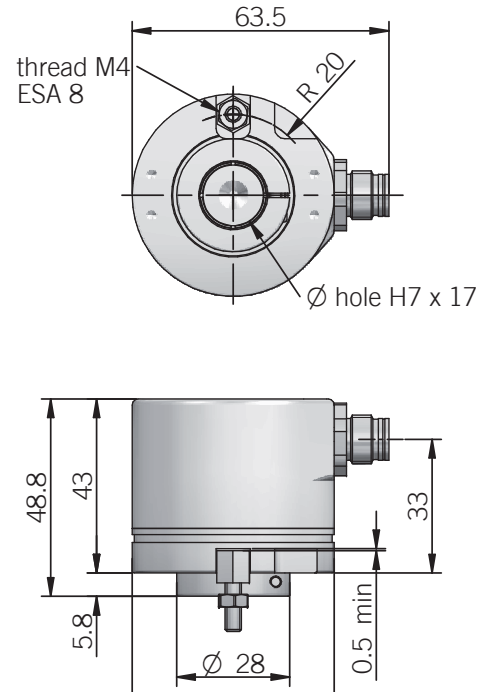
50 F
radial M12 output



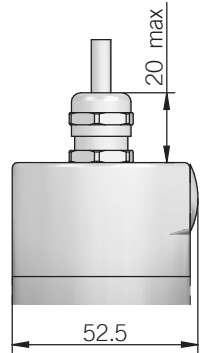
50 G
radial cable output



50 G
radial M12 output



Axial output



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

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 2015/863/EU 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

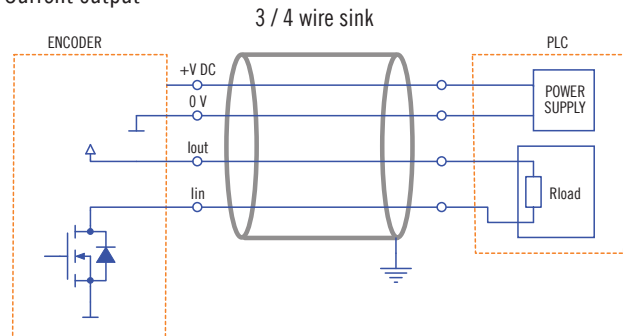
³ maximum load for static usage

⁴ measured on the transducer flange

⁵ condensation not allowed

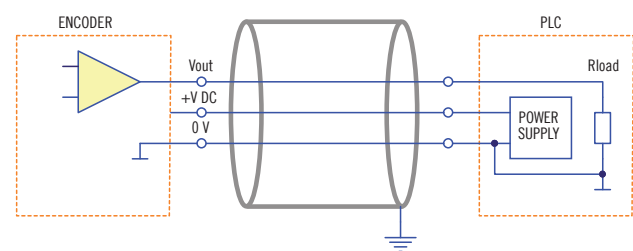
ELECTRICAL INTERFACE

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 kΩ

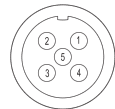
MECHANICAL SPECIFICATIONS

Bore diameter	ø 6* / 8* / 9,52* (3/8") / 10* / 12* / 14 / 15 mm * with supplied shaft adapter
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 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	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)

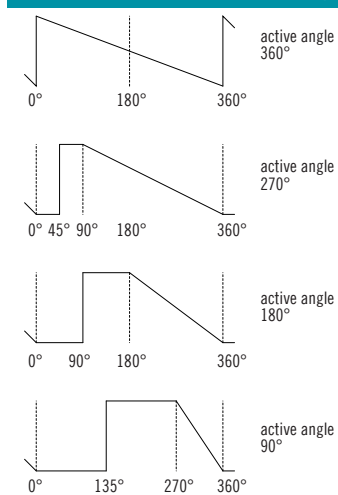
CONNECTIONS

Function	Cable (voltage)	Cable (current)	5 pin M12	8 pin M12*
+ V DC	red	red	2	8
0 V	black	black	4	5
Vout	green	/	3	/
Iin	/	yellow	3	3
Iout	/	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 connector 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)

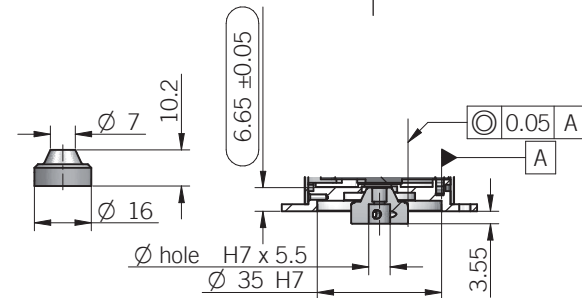
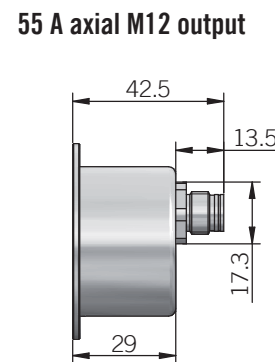


ORDERING CODE

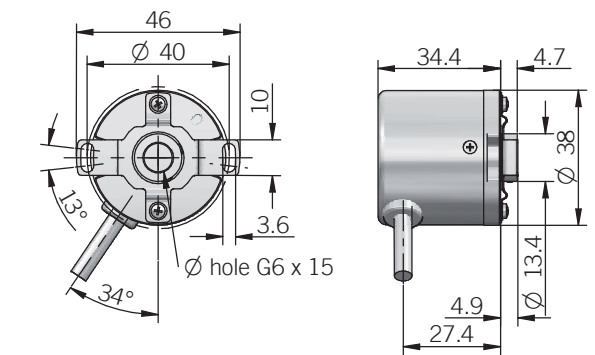
EMA	55A	1024	B	5	S	P	X	6	X	10	P	R	.XXX
SERIES magnetic singleturn absolute encoder EMA MODEL fixing holes ø 48 mm 55A for anodized version please directly contact our offices RESOLUTION ppr from 8 to 8192 refer to the available pulses list CODE TYPE binary B gray G POWER SUPPLY 5 V DC 5 8 ... 30 V DC 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 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 M12 connector M12 female connector included, without female please add 162 as variant code DIRECTION TYPE axial A radial R VARIANT custom version XXX													



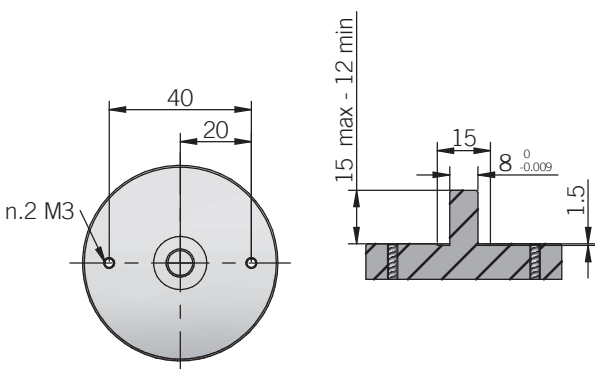
SERIES	absolute multiurn encoder	AAM
MODEL	blind hollow shaft with stator coupling	38F
MULTITURN RESOLUTION	bit	16
SINGLETURN RESOLUTION	bit	23
CODE TYPE	binary	B
POWER SUPPLY	5 V DC	5
ELECTRICAL INTERFACE	BiSS-C	B
BORE DIAMETER	mm	6
	(1/4") mm	6,35
	mm	8
ENCLOSURE RATING	IP 50	X
OPTIONS	to be reported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



AAM 38 F



RECOMMENDED INTERFACE FLANGE DESIGN



dimensions in mm

ELECTRICAL SPECIFICATIONS	
Multiturn resolution	16 bit
Singleturn resolution	23 bit
Fault status	8 bit
CRC	8 bit
Power supply ¹	4,75 ... 5,25 V DC
Current consumption without load	< 120 mA
Output type ²	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 2015/863/EU 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 temperature ⁴	-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

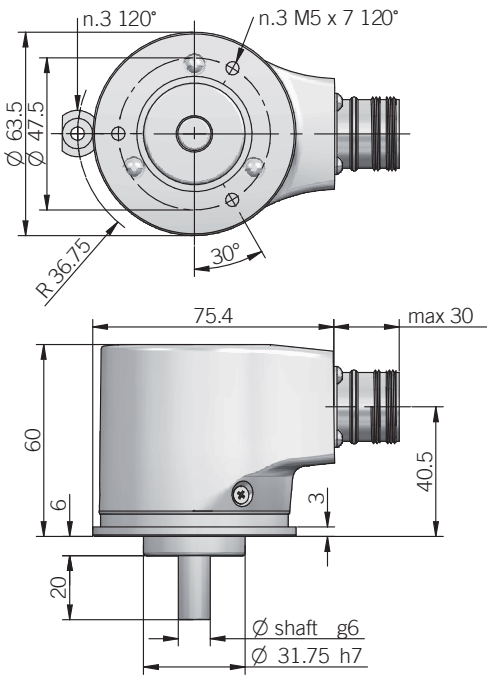


ORDERING CODE BIT PARALLEL	EAMR	63A	12 / 12	G	8/30	P	P	X	10	X	PE	R	.XXX
SERIES multiturn absolute encoder EAMR													
MODEL synchronous flange ø 31.75 mm 63A synchronous flange ø 50 mm 58B clamping flange ø 36 mm 58C centering square flange ø 31.75 mm 63D centering square flange ø 50 mm 63E													
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 ZE latch / reset 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 (up to 13 bit as total resolution, without reset option) 19 pin MIL connector MA (from 14 to 25 bit as total resolution) 32 pin MIL connector ME female connector included, without female please add 162 as variant code													
DIRECTION TYPE radial R													
VARIANT custom version XXX													

ORDERING CODE SSI	EAMR	63A	12 / 13	G	8/30	S	X	2048	RS	10	X	HA	R	.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 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 ZE														
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 (without reset option) 7 pin MIL connector MC (with reset option) 10 pin MIL connector MD 12 pin M23 connector HA 8 pin M12 connector M12 female connector included, without female please add 162 as variant code														
DIRECTION TYPE radial R														
VARIANT custom version XXX														

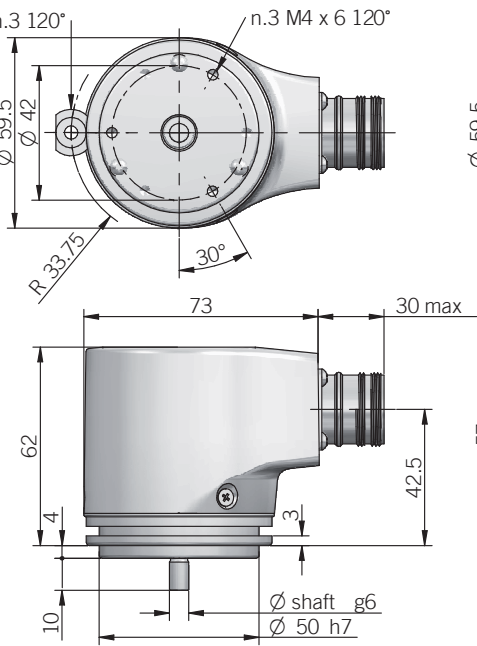
only with additional incremental output

63 A



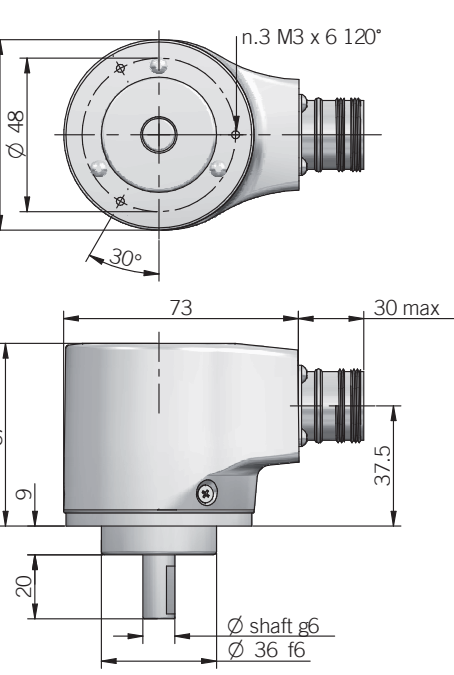
for fixing clamps please refer to Accessories

58 B

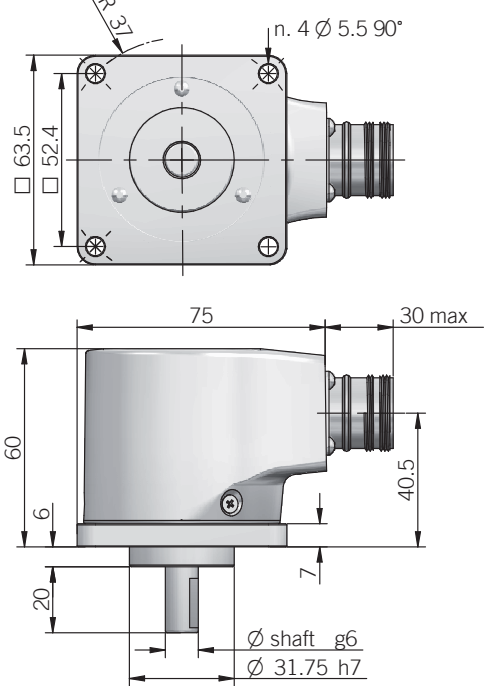


for fixing clamps please refer to Accessories

58 C

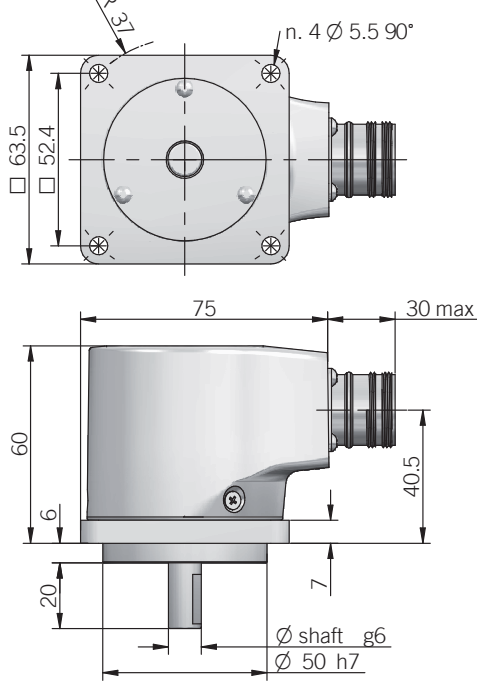


63 D



dimensions in mm

63 E



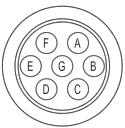
BIT PARALLEL CONNECTIONS

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 (SN65LBC179Q 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 = lenght 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 2015/863/EU 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

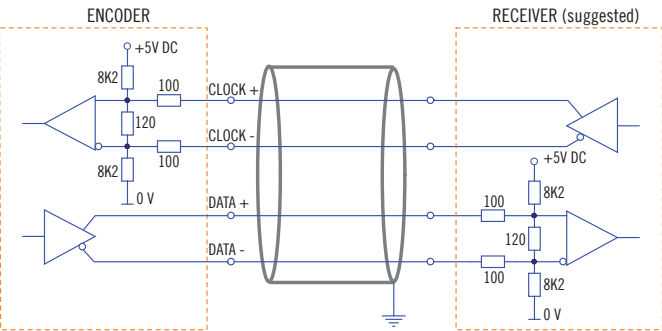
Shaft diameter	ø 6 / 9,52 (3/8") / 10 mm
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load ³	200 N axial / 70 N radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10 ⁻⁶ 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

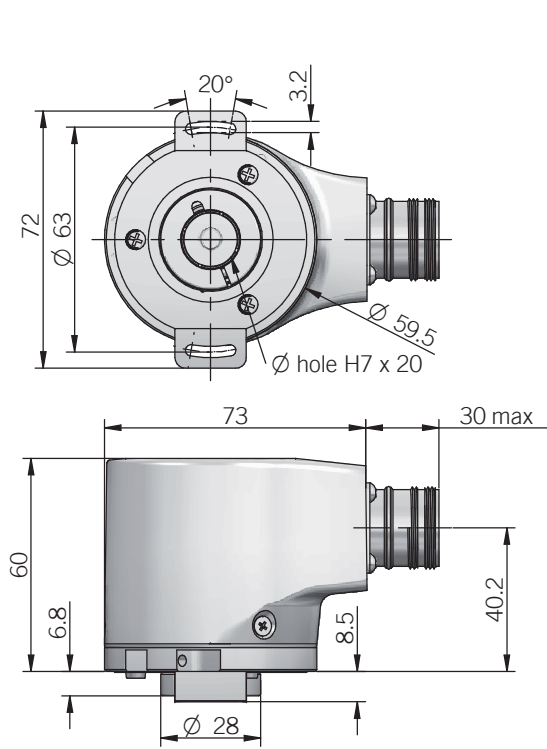


ORDERING CODE BIT PARALLEL	EAMR	58F	12 / 12	G	8/30	P	P	X	15	X	PE	R	.XXX
SERIES multiturn absolute encoder EAMR													
MODEL blind hollow shaft with stator coupling 58F blind hollow shaft with torque stop slot 63F blind hollow shaft with torque pin 63G													
MULTITURN RESOLUTION bit from 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 ZE latch / reset LZE													
BORE DIAMETER mm 14 mm 15 other diameters with optional shaft adapter													
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 (up to 13 bit as total resolution, without reset option) 19 pin MIL connector MA (from 14 to 25 bit as total resolution) 32 pin MIL connector ME female connector included, without female please add 162 as variant code													
DIRECTION TYPE radial R													
VARIANT custom version XXX													

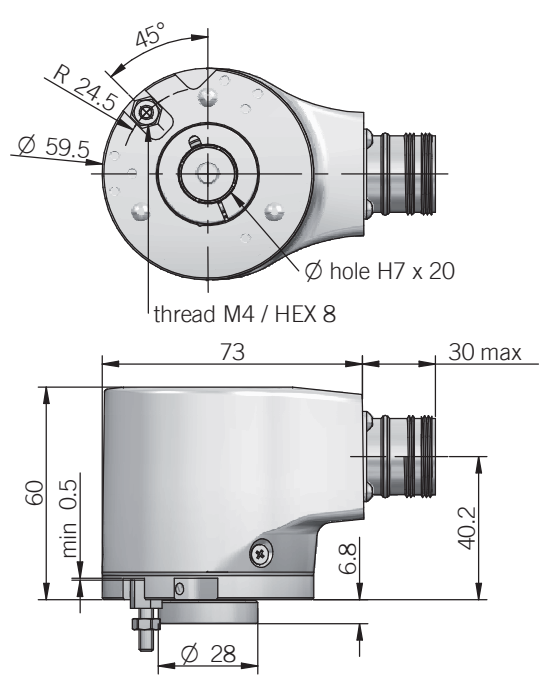
ORDERING CODE SSI	EAMR	58F	12 / 12	G	8/30	S	X	2048	RS	15	X	HA	R	.XXX
SERIES multiturn absolute encoder EAMR														
MODEL blind hollow shaft with stator coupling 58F blind hollow shaft with torque stop slot 63F blind hollow shaft with torque pin 63G														
MULTITURN RESOLUTION bit 12 / 14 / 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 ZE														
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 other diameters with optional shaft adapter														
ENCLOSURE RATING IP 65 shaft side / IP67 cover side X IP 67 S														
OUTPUT TYPE cable (standard length 1,5 m) PC (without reset option) 7 pin MIL connector MC (with reset option) 10 pin MIL connector MD 12 pin M23 connector HA 8 pin M12 connector M12 female connector included, without female please add 162 as variant code														
DIRECTION TYPE radial R														
VARIANT custom version XXX														

only with additional incremental output

58 F



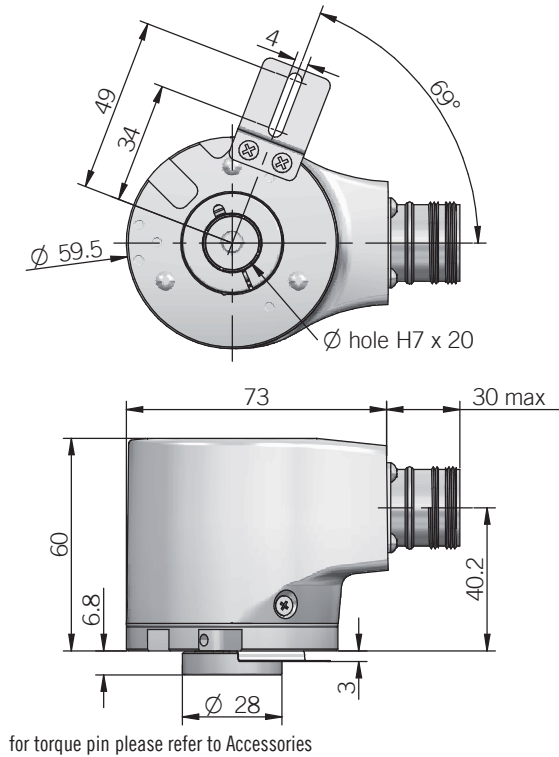
63 G



torque pin is included

dimensions in mm

63 F



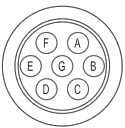
BIT PARALLEL CONNECTIONS

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

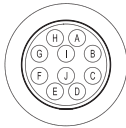
MC connector (7 pin)
Amphenol MS3102-E-16-S
solder side view FV



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 (SN65LBC179Q 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 2015/863/EU 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
Singleturn = 8 bit = 8 connections
Multiturn = 5 bit = 5 connections
Total connections 13

EXAMPLE 2
Singleturn = 12 bit = 12 connections
Multiturn = 12 bit = 12 connections
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 8* / 9,52 (3/8")* / 10* / 12* / 14 / 15 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

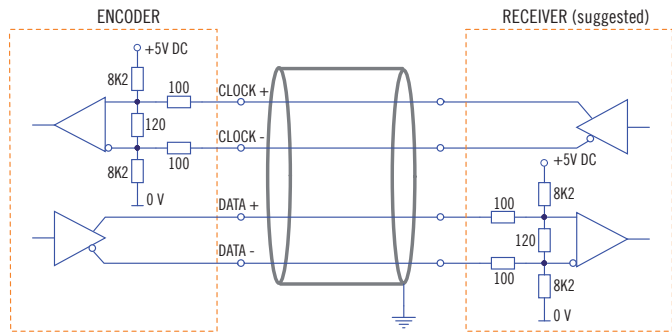
⁴ measured on the transducer flange

⁵ condensation not allowed

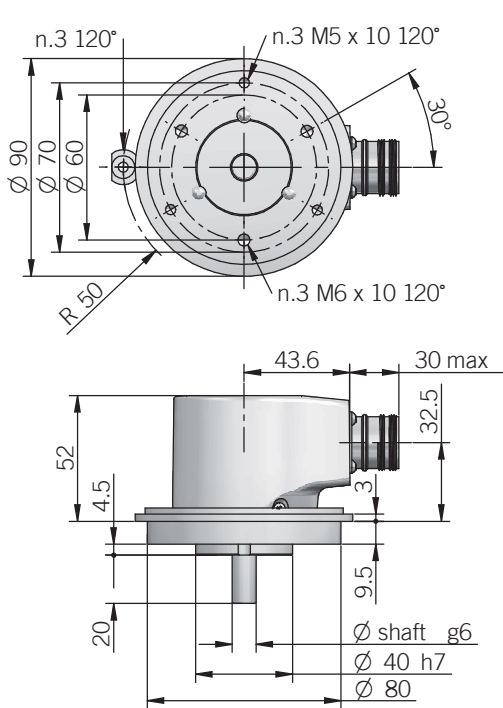
ROTATION SPEED DERATING TABLE

	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

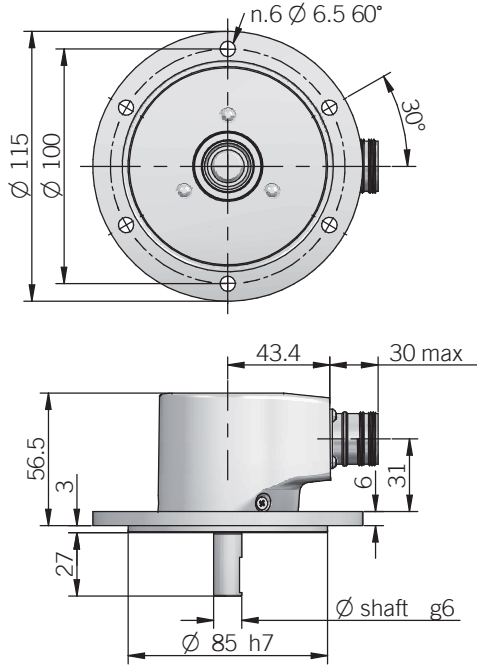


90 A



for fixing clamps please refer to Accessories
dimensions in mm

115 A



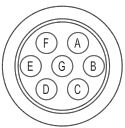
BIT PARALLEL CONNECTIONS

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

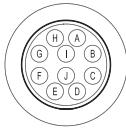
MC connector (7 pin)
Amphenol MS3102-E-16-S
solder side view FV



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 (SN65LBC179Q 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 = lenght 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 2015/863/EU 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

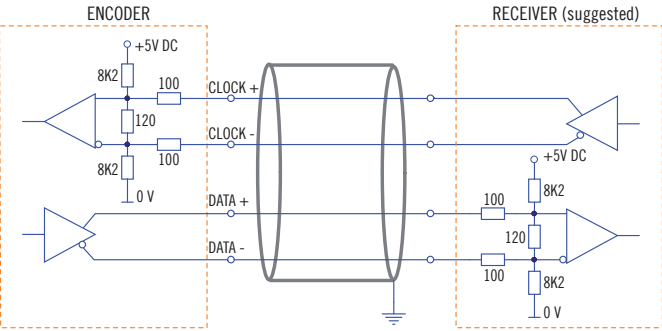
Shaft diameter	ø 9,52 (3/8") / 10 / 11 mm
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load ³	200 N axial / 70 N radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10 ⁻⁶ 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 (inputs or cover button)
- Power supply up to +30 VDC with analogue (voltage or current) as 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 P R .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

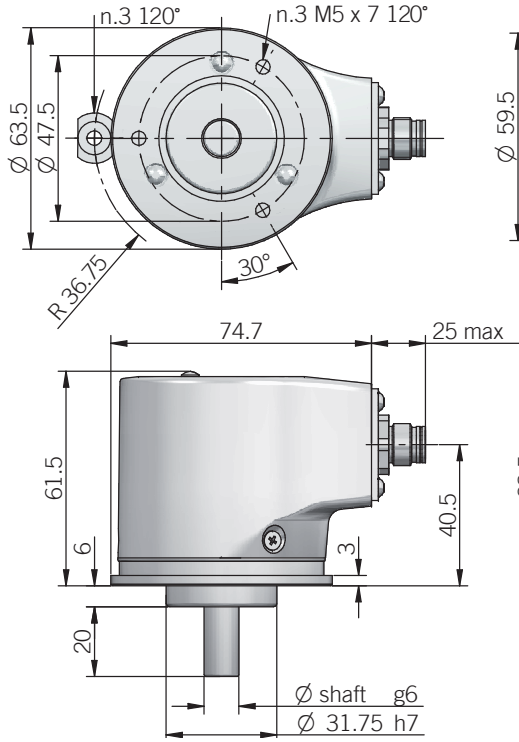
ENCLOSURE RATING
IP 65 shaft side / IP67 cover side X
IP 67 S

OUTPUT TYPE
cable (standard length 1,5 m) P
M12 connector M12
female connector included, without female please add 162 as variant code

DIRECTION TYPE
radial R

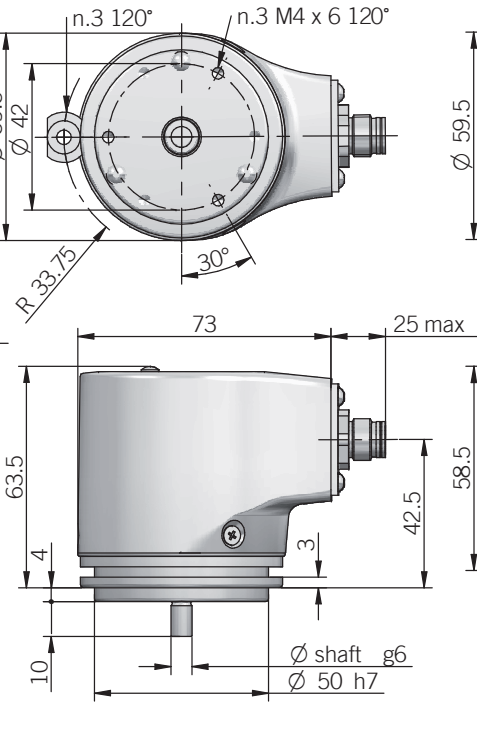
VARIANT
custom version XXX

63 A



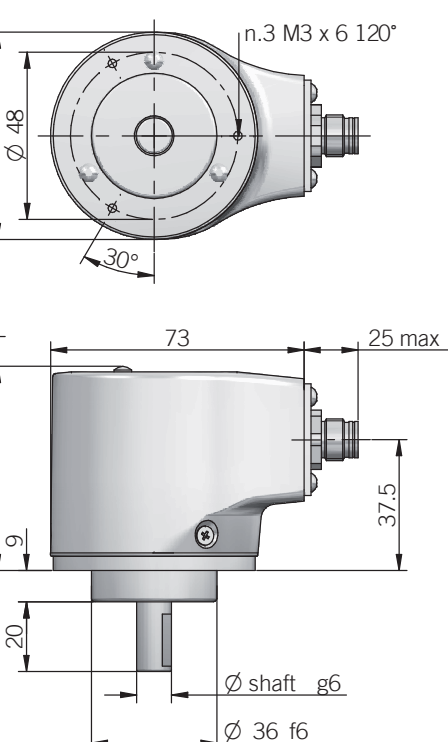
for fixing clamps please refer to Accessories

58 B

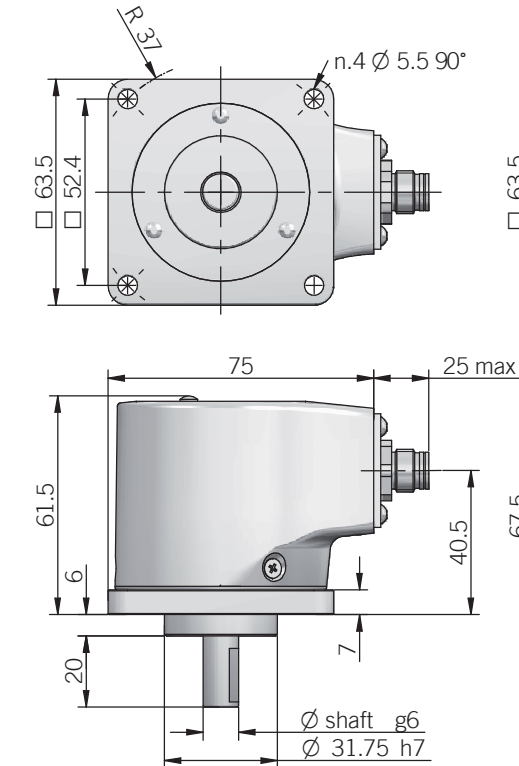


for fixing clamps please refer to Accessories

58 C

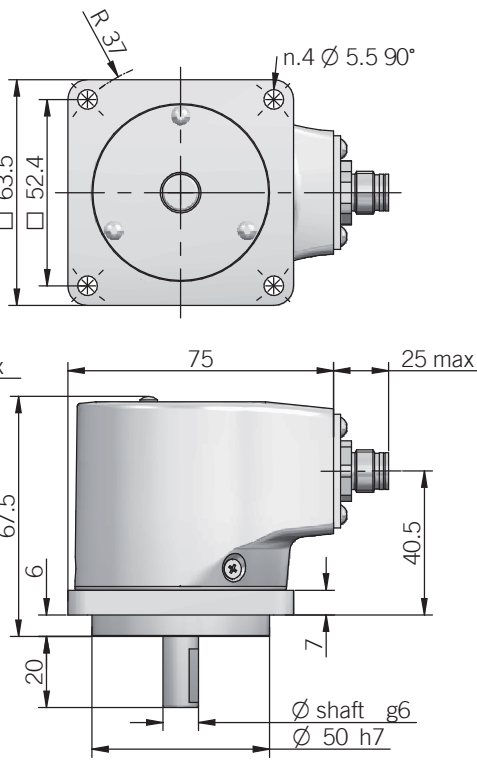


63 D



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 2015/863/EU directive
UL / CSA	certificate n. E212495

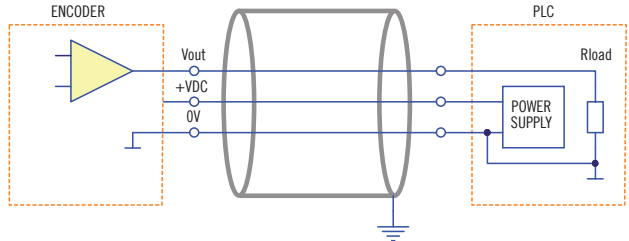
MECHANICAL SPECIFICATIONS

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)

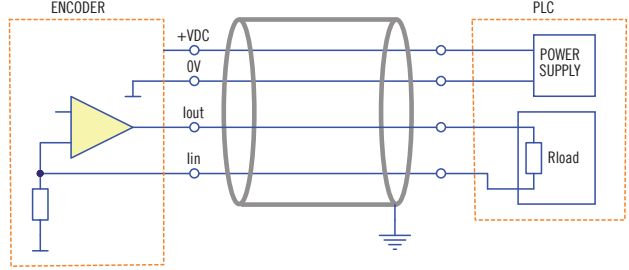
¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ maximum load for static usage
⁴ measured on the transducer flange
⁵ condensation not allowed

ELECTRICAL INTERFACE

Voltage output



Current output



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

ROTATION SPEED / TEMPERATURE TABLE

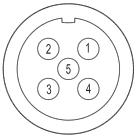
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 ... +85 (+158 ... +185)	8000	5000

CONNECTIONS

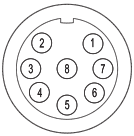
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
V _{out} / I _{out}	green	1	1
I _{in}	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
≡	shield	housing	housing

* 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.

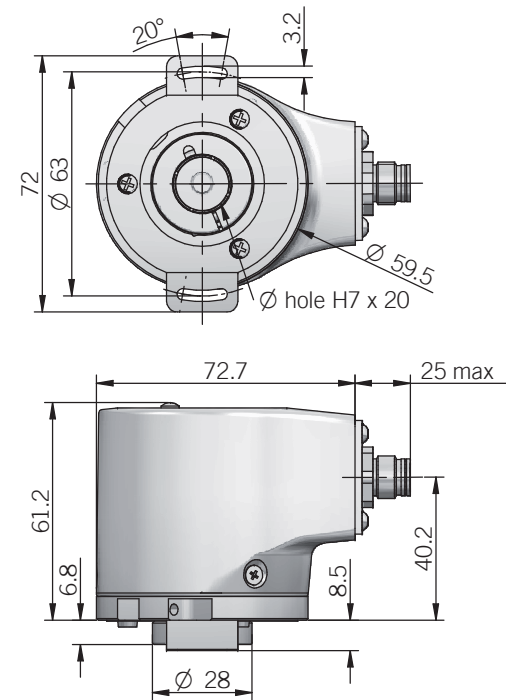
- Optical sensor technology (OptoASIC + Energy Harvesting)
- Programmable measuring range via teach-in function (inputs or cover button)
- Power supply up to +30 VDC with analogue (voltage or current) as electrical interface
- Cable or M12 connector output
- Blind hollow shaft up to 15 mm
- Mounting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



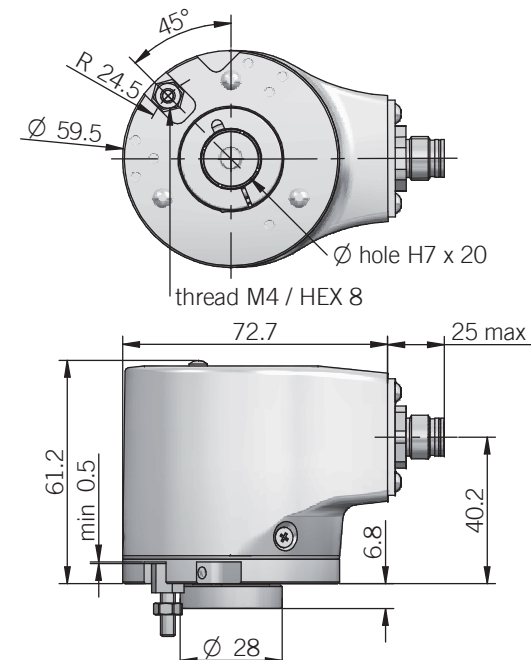
ORDERING CODE

EAML	58F	16B	12/30	V	05	X	15	X	P	R	.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 other diameters with optional shaft adapter											
ENCLOSURE RATING IP 65 shaft side / IP67 cover side X IP 67 S											
OUTPUT TYPE cable (standard length 1.5 m) P M12 connector M12 female connector included, without female please add 162 as variant code											
DIRECTION TYPE radial R											
VARIANT custom version XXX											

58 F

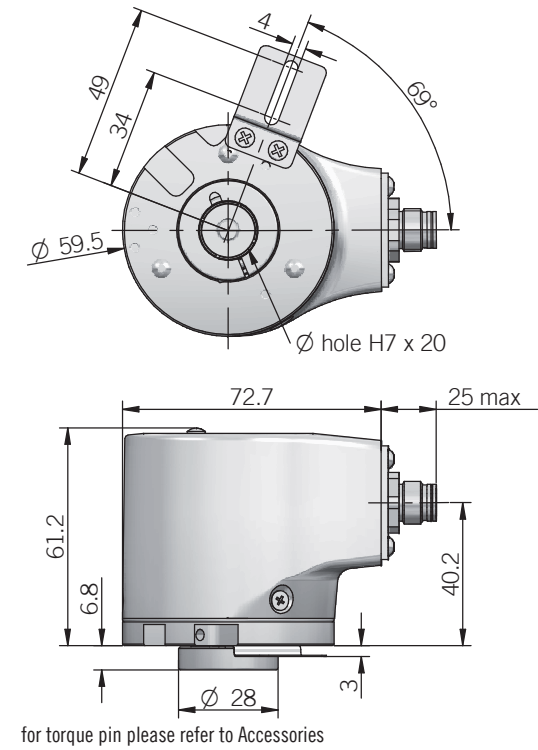


63 G



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

63 F



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 2015/863/EU directive
UL / CSA	certificate n. E212495

MECHANICAL SPECIFICATIONS

Bore diameter	ø 8* / 9,52 (3/8")* / 10* / 12* / 14 / 15 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 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

ROTATION SPEED / TEMPERATURE TABLE

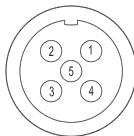
	Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
IP65	up to +70 (+158)	9000	6000
	+70 ... +85 (+158 ... +185)	6000	3000
IP67	up to +70 (+158)	8000	4000
	+70 ... +85 (+158 ... +185)	4000	2000

CONNECTIONS

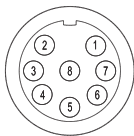
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
V _{out} / I _{out}	green	1	1
I _{in}	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
⏏	shield	housing	housing

* with Q current output

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 (inputs or cover button)
- Power supply up to +30 VDC with analogue (voltage or current) as electrical interface
- Cable or M12 connector output
- Solid shaft diameter up to 11 mm
- Mounting by synchronous or REO-444 flange



ORDERING CODE

EAML 90A 16B 12/30 V 05 X 10 X P R .XXX

SERIES
analogue multiturn absolute encoder EAML

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

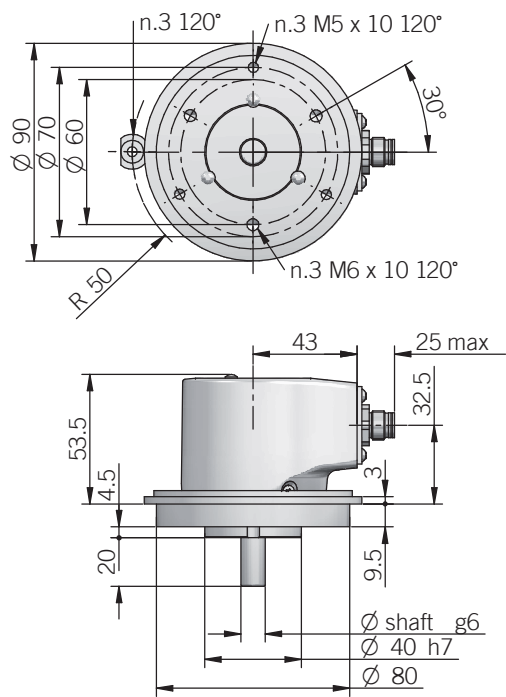
ENCLOSURE RATING
IP 65 shaft side / IP67 cover side X
IP 67 S

OUTPUT TYPE
cable (standard length 1,5 m) P
M12 connector M12
female connector included, without female please add 162 as variant code

DIRECTION TYPE
radial R

VARIANT
custom version XXX

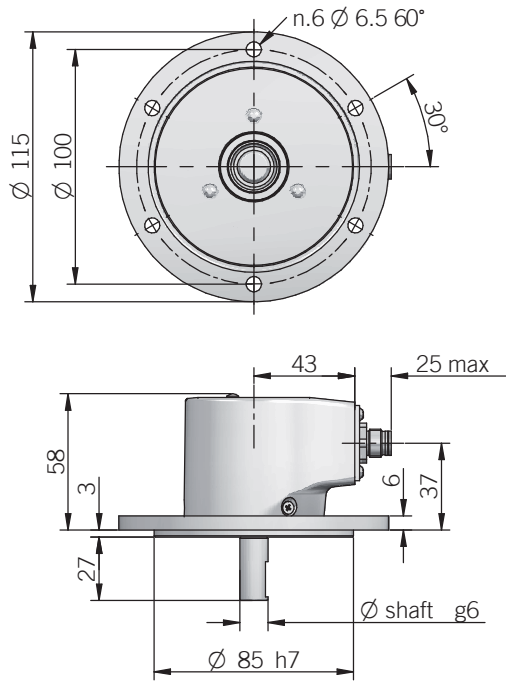
90 A



for fixing clamps please refer to Accessories
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	$R_{min} = 1 \text{ k}\Omega$ (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 2015/863/EU directive
UL / CSA	certificate n. E212495

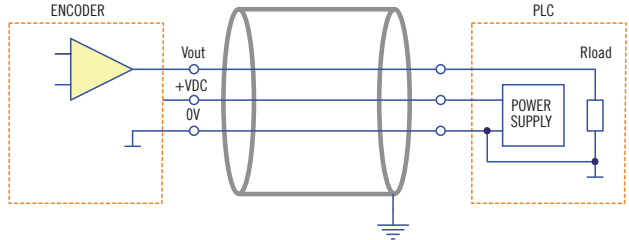
MECHANICAL SPECIFICATIONS

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	$1,5 \times 10^{-6} \text{ kgm}^2$ ($36 \times 10^{-6} \text{ lbft}^2$)
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)

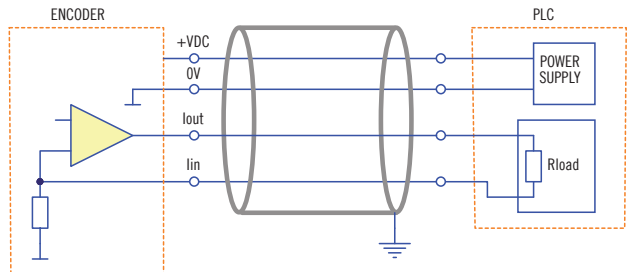
¹ as measured at the transducer without cable influences
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
³ maximum load for static usage
⁴ measured on the transducer flange
⁵ condensation not allowed

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

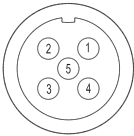
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 ... +85 (+158 ... +185)	8000	5000

CONNECTIONS

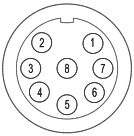
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
Vout / Iout	green	1	1
Iin	yellow	/	6
BEGIN	white	4	4
END	brown	5	5
≡	shield	housing	housing

* 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



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 2015/863/EU directive
UL / CSA	certificate n. E212495

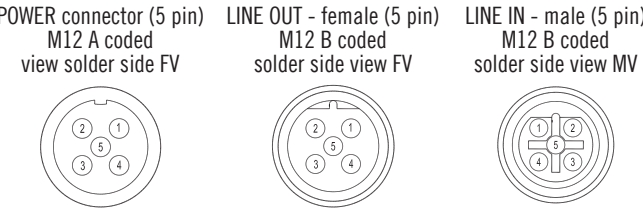
CONNECTIONS

Function	POWER	LINE OUT	LINE 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

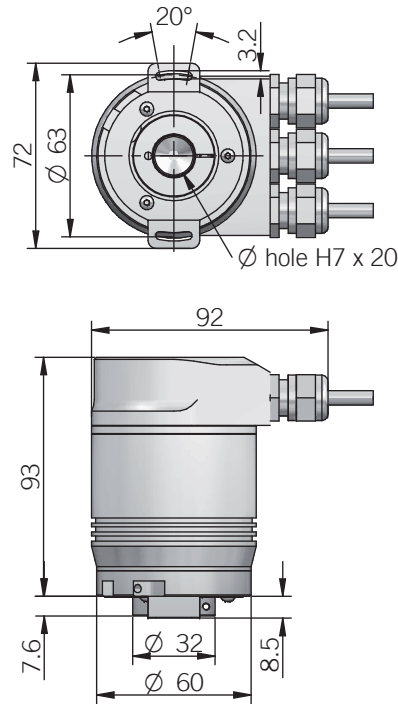


ORDERING CODE

EAM 63F R 4096 / 4096 B 12/28 FXX 8 X 3 P3R .XXX

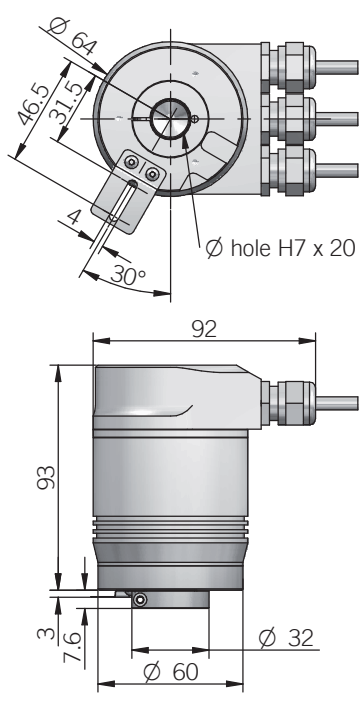
SERIES	multiturn absolute encoder EAM
MODEL	blind hollow shaft with stator coupling 58F blind hollow shaft with torque stop slot 63F blind hollow shaft with torque pin 63G
rev. 2.0 R	
MULTITURN RESOLUTION	turns 4096
SINGLETURN RESOLUTION	ppr 4096 / 8192
CODE TYPE	binary B
POWER SUPPLY	12 ... 28 V DC 12/28
ELECTRICAL INTERFACE	PROFIBUS DP V0 CLASS 2 FXX
BORE DIAMETER	mm 8 (3/8") 9,52 mm 9 mm 10 mm 12 mm 14 mm 15
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 included, without mating connectors please add 162 as variant code	
VARIANT	custom version XXX

58 F



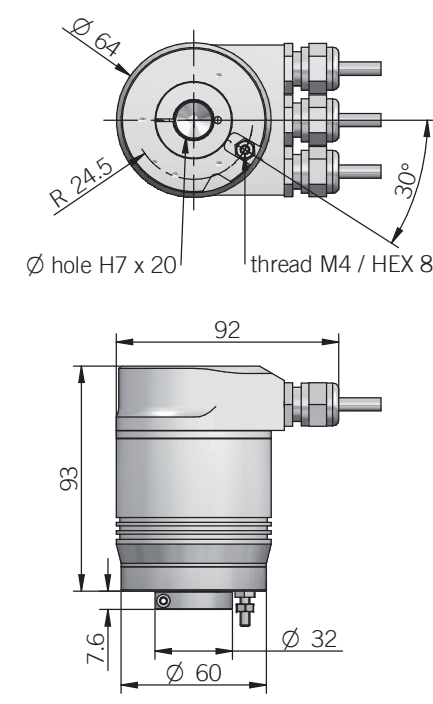
dimensions in mm

63 F



for torque pin please refer to Accessories

63 G



torque pin is included

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 2015/863/EU directive
UL / CSA	certificate n. E212495

CONNECTIONS

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

MECHANICAL SPECIFICATIONS

Bore diameter	Ø 8* / 9* / 10* / 12* / 14 / 15 mm * with supplied shaft adapter
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 lbf 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
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)

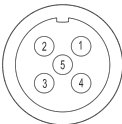
¹ as measured at the transducer without cable influences

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



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



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



MAIN FEATURES

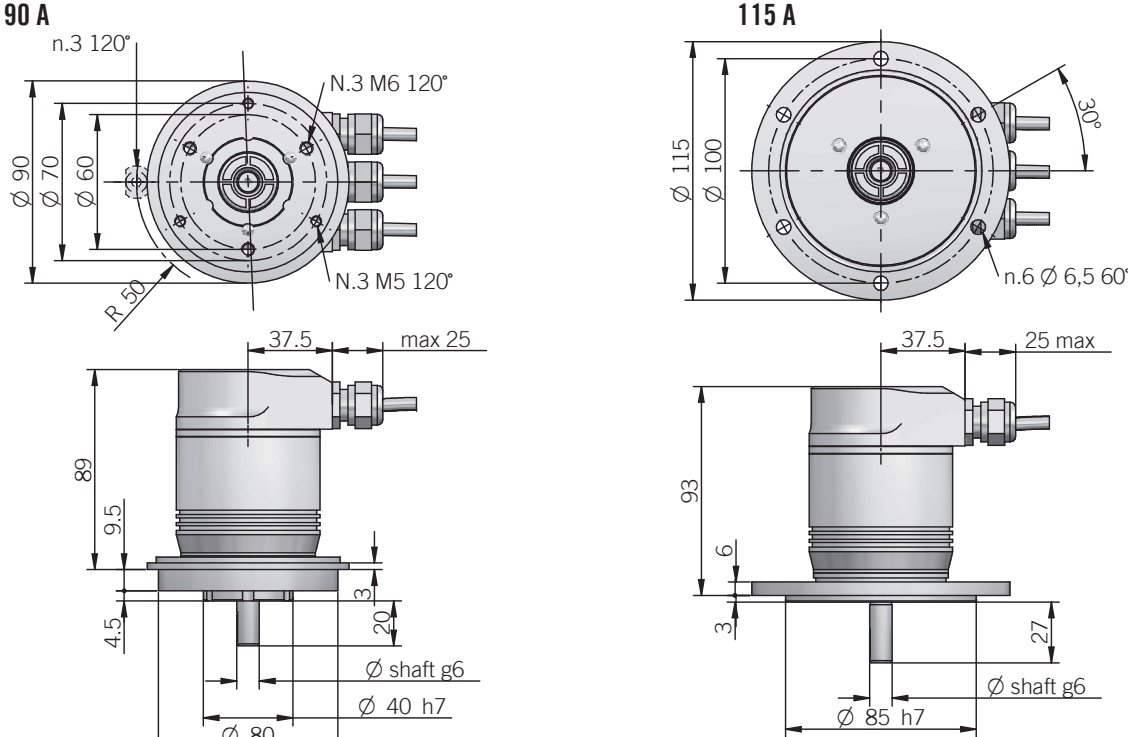
Industry standard multiturn absolute encoder for factory automation applications.

- 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	8	X	6	P3R	.XXX
SERIES multiturn absolute encoder EAM											
MODEL synchronous flange Ø 40 mm 90A RE0444 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 included, without mating connectors please add 162 as variant code											
VARIANT custom version XXX											



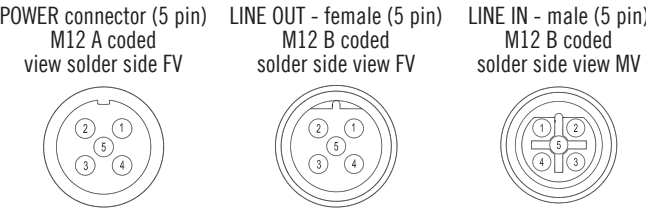
dimensions in mm fixing clamps not included, please refer to Accessories

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 2015/863/EU directive
UL / CSA	certificate n. E212495

CONNECTIONS			
Function	POWER	LINE OUT	LINE 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

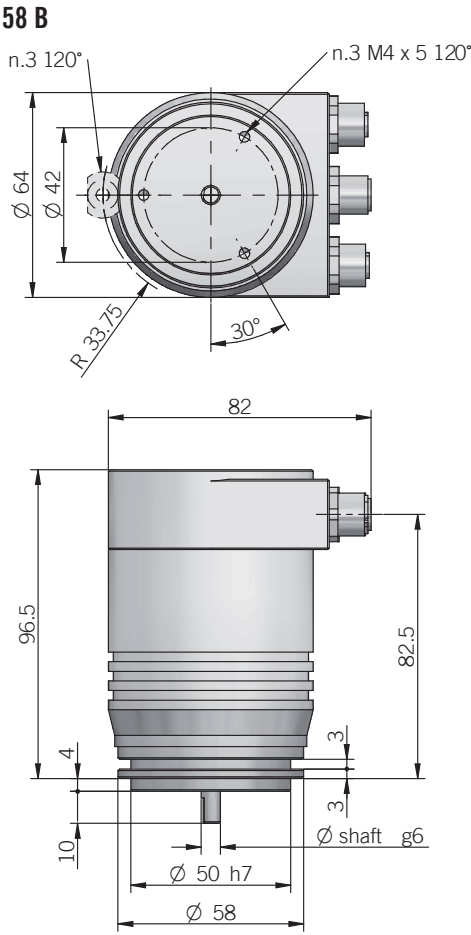
Industry standard multiturn absolute encoder for factory automation applications.

- 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											
VARIANT without mating connectors 162											



fixing clamps not included, please refer to Accessories

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 2015/863/EU directive

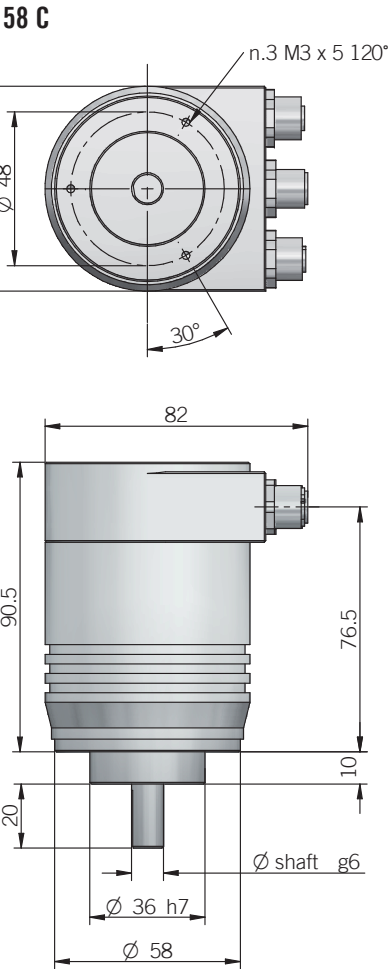
¹ as measured at the transducer without cable influences

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-

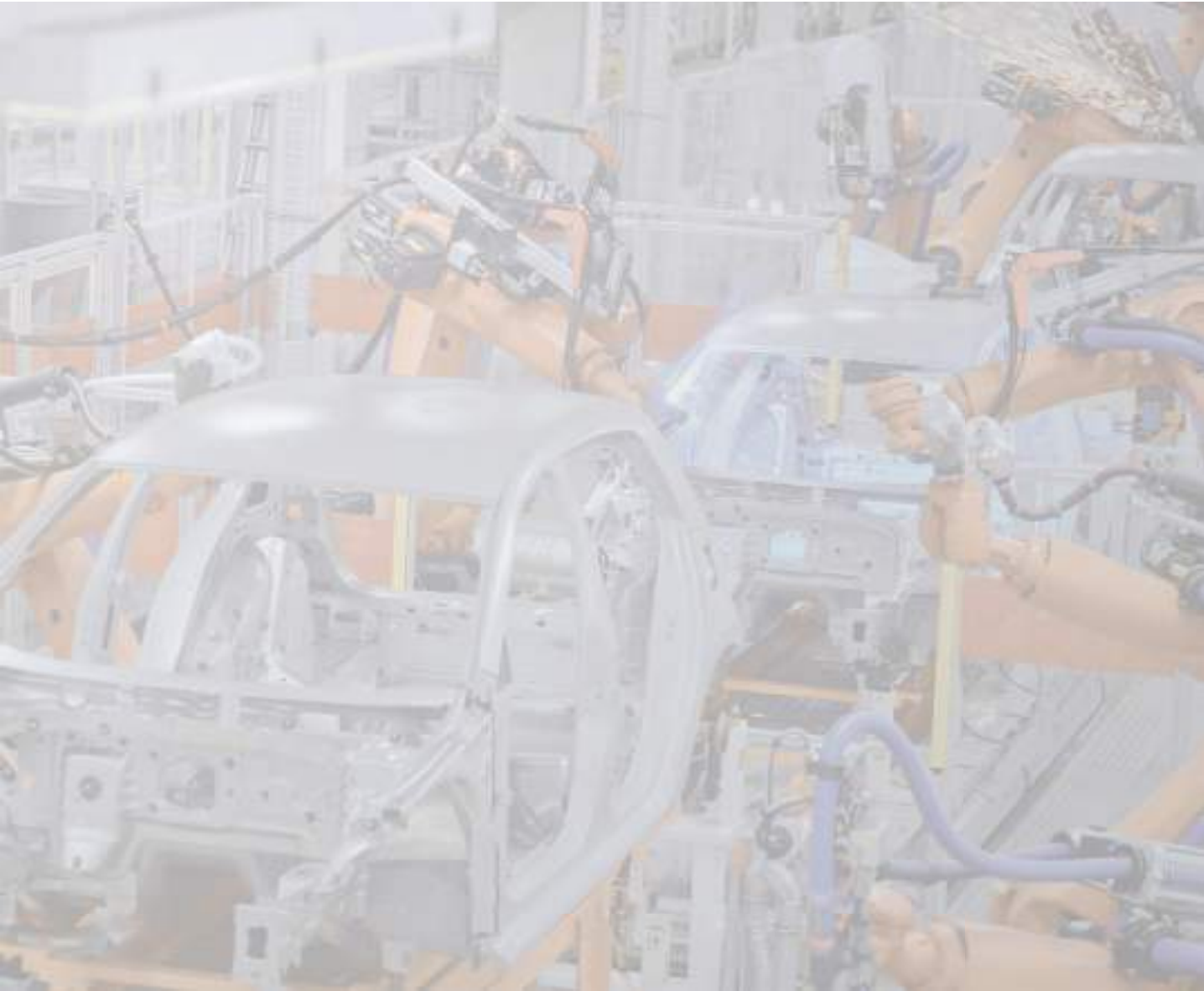
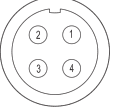
female connectors not included, please refer to Accessories



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



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



AAM 58 F PROFINET

BLIND HOLLOW SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

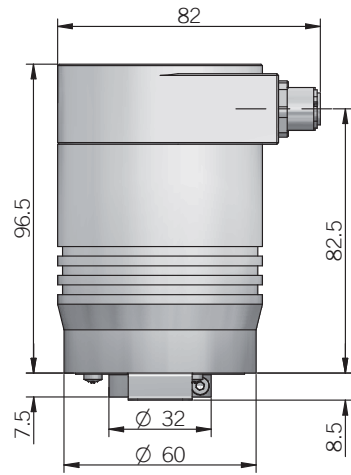
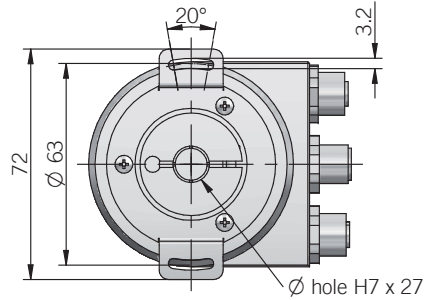
- Optical sensor technology (OptoASIC + gears)
- 25 bit total resolution (13 bit single turn + 12 bit multiturn)
- Power supply up to +30 V DC with Profinet IO as electrical interface
- Intelligent status leds
- M12 connector for fast setup
- Blind hollow shaft diameter up to 15 mm
- Mounting by stator 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 ø 12 / 10 mm available with optional shaft adapter										
ENCLOSURE RATING IP 65 X										
OPTIONS to be reported X										
OUTPUT TYPE radial M12 connectors M12R										
VARIANT without mating connectors 162										

58 F



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-

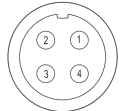


female connectors not included, please refer to Accessories

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



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



OPTICAL MULTITURN ABSOLUTE ENCODERS | AAM 58 F PROFINET

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 2015/863/EU directive

MECHANICAL SPECIFICATIONS

Bore diameter	ø 15 / 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)
Fixing torque for collar clamping	1,5 Nm (212 Ozin) recommended
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.

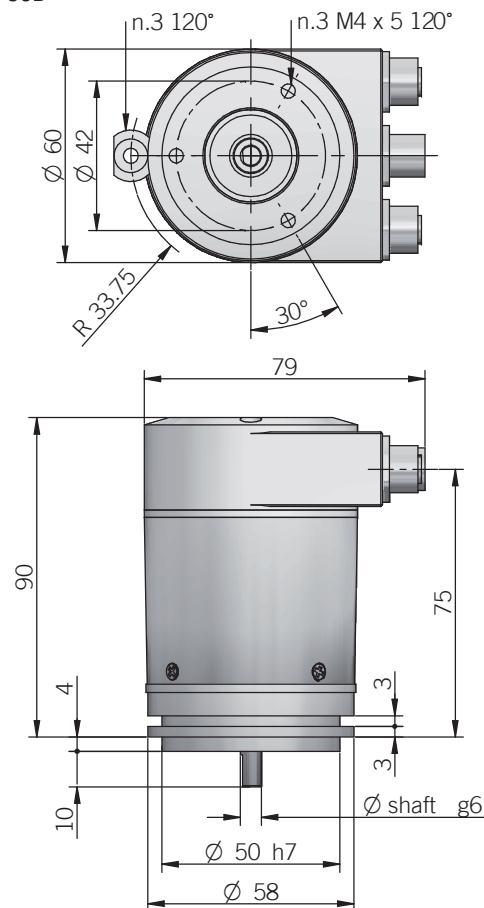
- Optical sensor technology (OptoASIC + gears)
- 25 bit total resolution (13 bit single turn + 12 bit multiturn)
- Power supply up to +30 V DC with EtherCAT as electrical interface
- Intelligent status leds
- M12 connector for fast setup
- Solid shaft diameter up to 10 mm
- Mounting by synchronous or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



ORDERING CODE

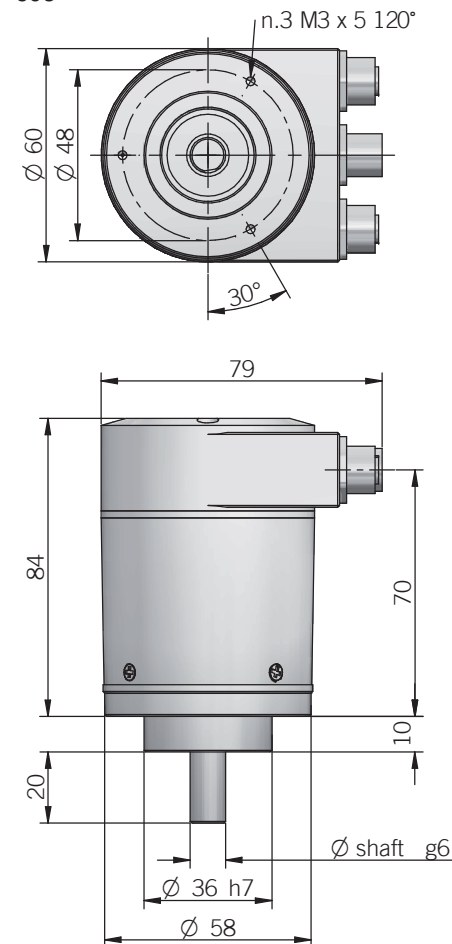
SERIES	MODEL	REVISION	MULTITURN RESOLUTION	SINGLETURN RESOLUTION	CODE TYPE	POWER SUPPLY	ELECTRICAL INTERFACE	SHAFT DIAMETER	ENCLOSURE RATING	OPTIONS	OUTPUT TYPE	VARIANT
absolute multiurn encoder AAM	synchronous flange ø 50 mm 58B clamping flange ø 36 mm 58C	to be reported R	bit 12	bit 13	binary B	10 ... 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	without mating connectors 162

58B



for fixing clamps please refer to Accessories
dimensions in mm

58C



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 2015/863/EU 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

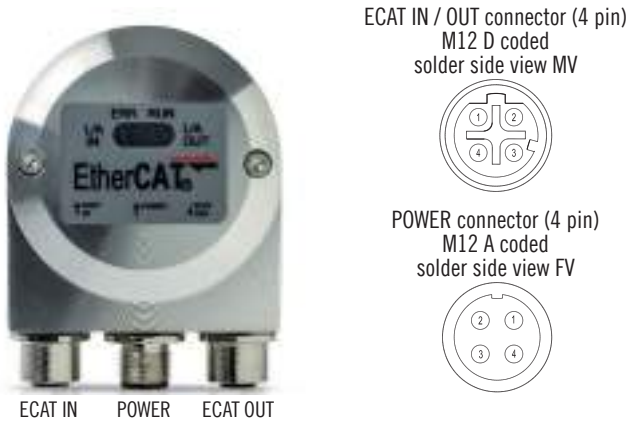
MECHANICAL SPECIFICATIONS

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)

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

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



MAIN FEATURES

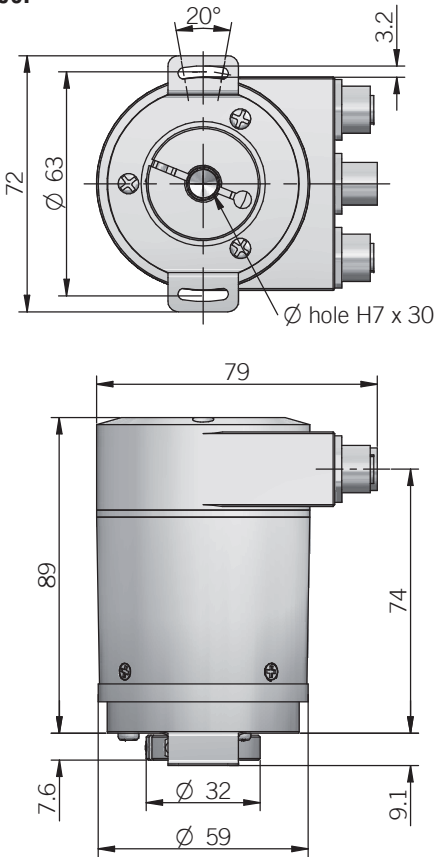
Industry standard multiturn absolute encoder for factory automation applications.

- 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)



ORDERING CODE	AAM	58F	R	12	/	13	B	10/30	ETC	15	X	X	M12R	.162
SERIES	absolute multiurn encoder	AAM												
MODEL	blind hollow shaft with stator coupling	58F												
REVISION	to be reported	R												
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												
ENCLOSURE RATING	IP 65	X												
OPTIONS	to be reported	X												
OUTPUT TYPE	radial M12 connectors	M12R												
VARIANT	without mating connectors	162												

58F



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

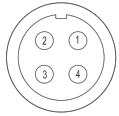


ECAT IN POWER ECAT OUT

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 2015/863/EU directive

MECHANICAL SPECIFICATIONS

Bore diameter	ø 15 / 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 EX 80 comply with essential health and safety requirements according to

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

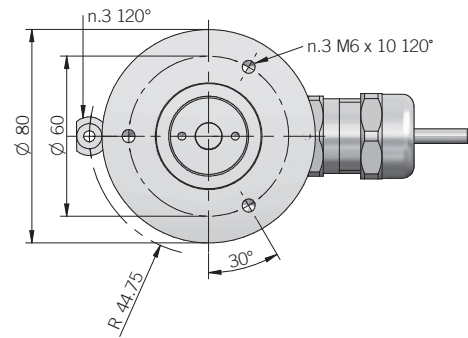
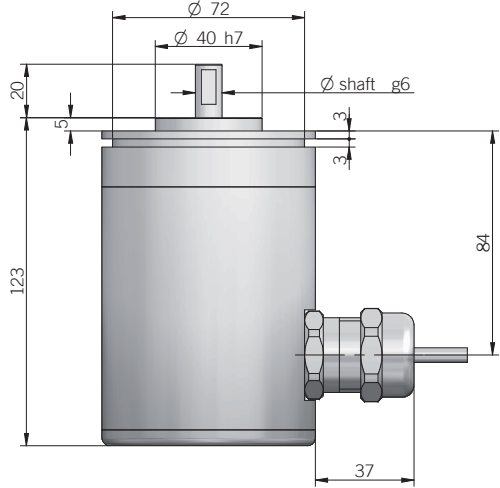
The UE declaration is available on www.eltra.it



ORDERING CODE

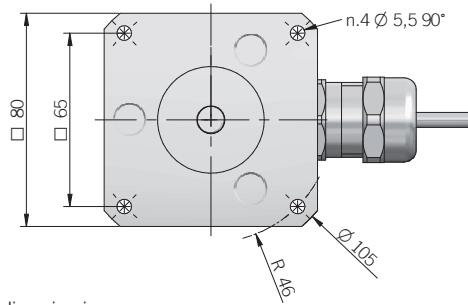
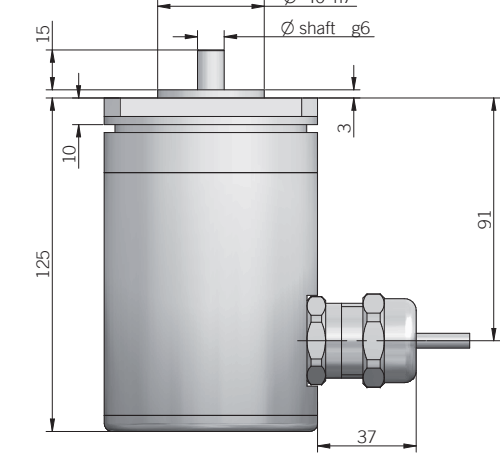
ORDERING CODE	EAMX	80A	4096 / 4096	G	8/28	S	X	X	10	X	3	PR	.XXX
multiturn absolute explosion proof encoder EAMX													
SERIES multiturn absolute explosion proof encoder EAMX													
MODEL synchronous flange ø 40 mm 80A centering square flange ø 40 mm 80D													
MULTITURN RESOLUTION (powers 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													
VARIANT custom version XXX													

80 A



fixing clamps not included, please refer to Accessories

80 D



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 2015/863/EU 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 d 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 d IIC T6 Gb

Ex d: 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

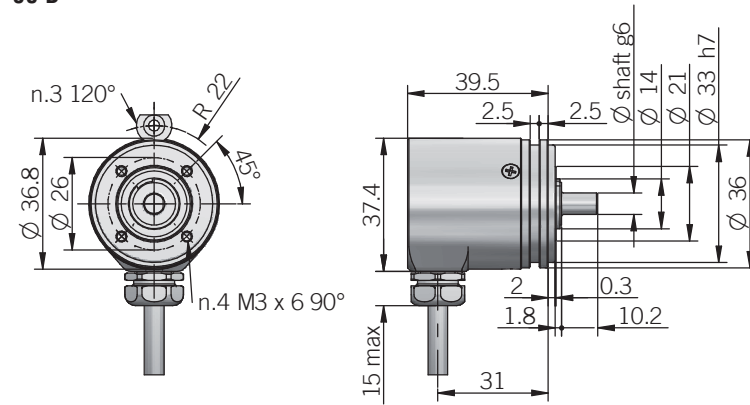
Miniaturized multiturn absolute encoder for limited size applications.

- 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	PR	.XXX
SERIES magnetic multiturn absolute encoder EAM MODEL synchronous flange ø 33 mm 36B MULTITURN RESOLUTION turns from 1 to 17 bit SINGLETURN RESOLUTION from 1 to 15 bit 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 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 8 pin M12 radial connector M12R female connector included, without female please add 162 as variant code VARIANT custom version XXX													

36 B



fixing clamps not included, please refer to Accessories
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 (SN65LBC179Q 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 2015/863/EU 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

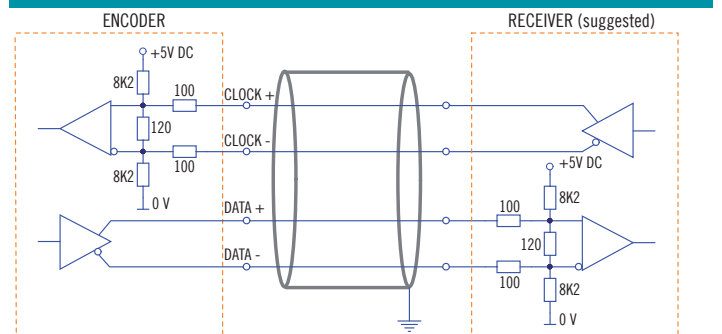
² for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section

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.

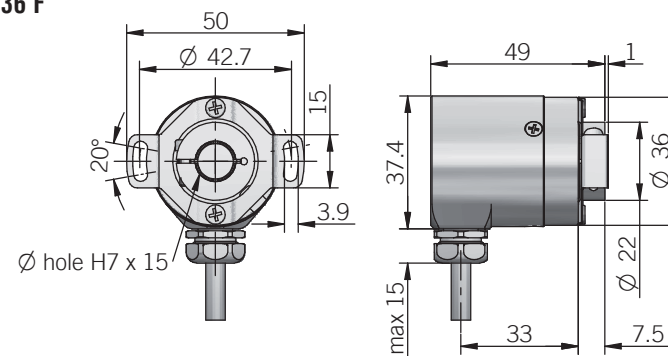
- Magnetic sensor technology without contact (Magnetic ASIC + Patented Energy Harvesting)
- Up to 55 bit as total resolution (15 bit single turn + 40 bit multiturn)
- Power supply up to +30 V DC with SSI as electrical interface
- Code reset for easy setup
- Cable or M12 output, other connectors available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



ORDERING CODE

SERIES	MODEL	MULTITURN RESOLUTION	SINGLETURN RESOLUTION	CODE TYPE	POWER SUPPLY	ELECTRICAL INTERFACE	LOGIC	OPTIONS	BORE DIAMETER	ENCLOSURE RATING	MAX ROTATION SPEED	OUTPUT TYPE	VARIANT
magnetic multiturn absolute encoder EAM	blind hollow shaft with stator coupling 36F blind hollow shaft with torque pin 36G	turns from 1 to 17 bit	from 1 to 15 bit	binary B gray G	5 V DC 5 8 ... 30 V DC 8/30	Serial Synchronous Interface - SSI S	positive P	to be reported if not used X reset ZE	mm 6 (1/4") mm 6,35 mm 8 (3/8") mm 9,52 mm 10	IP 67 cover side / IP 65 shaft side X	8000 rpm 8	radial cable (standard length 0,5 m) PR 8 pin M12 radial connector M12R	female connector included, without female please add 162 as variant code
													custom version XXX

36 F



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 supply ¹	5 = 4,75 ... 5,25 V DC 8/30 = 7,6 ... 30 V DC (reverse polarity protection)
Power draw without load	< 400 mW
Electrical interface ²	RS-422 (SN65LBC179Q 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	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 2015/863/EU 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

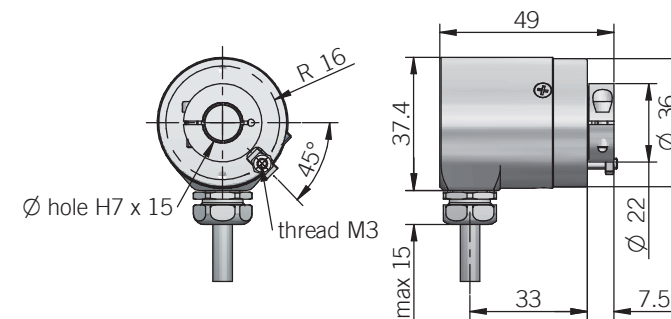
⁴ measured on the transducer flange

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

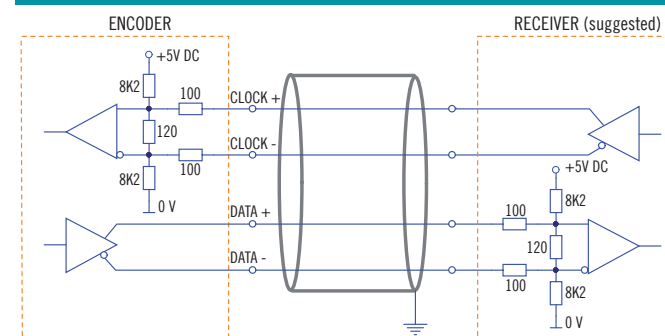


torque pin is included, for mounting instruction please refer to product installation notes

MECHANICAL SPECIFICATIONS

Bore diameter	Ø 6* / 6,35 (1/4")* / 8* / 9,52 (3/8") / 10 mm * with supplied shaft adapter
Enclosure rating	IP 67 cover side / IP 65 shaft side (IEC 60529)
Rotation speed	8000 rpm continuous / 10000 rpm max
Max shaft load ³	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
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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 temperature ⁵	-25° ... +85°C (-13° ... +185°F)
Fixing torque for collar clamping	0,6 Nm (85 Ozin) recommended
Weight	150 g (5,29 oz)

SSI SCHEMATICS



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

