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 (propietary 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

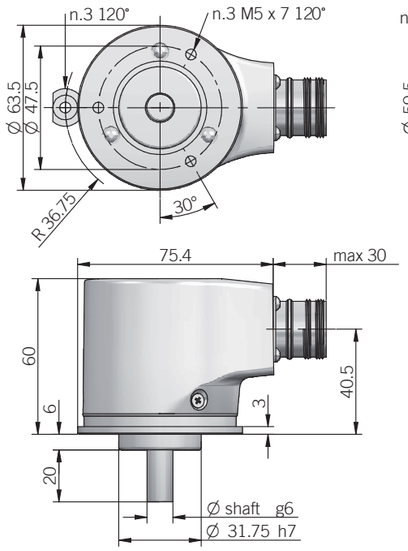
OUTPUT TYPE
cable (standard length 1,5 m) PC
(without reset option) 7 pin MIL connector MC
(with reset option) 10 pin MIL connector MD
12 pin M23 connector HA
8 pin M12 connector M12
female connector included, without female please add 162 as variant code

DIRECTION TYPE
radial R

VARIANT
custom version XXX

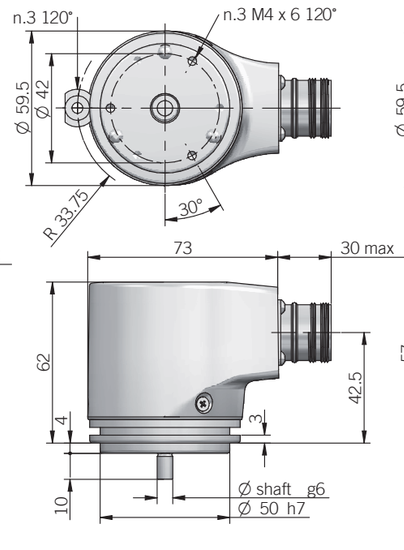
only with additional incremental output

63 A



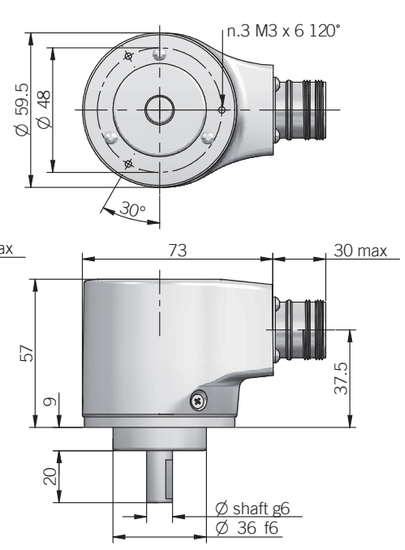
fixing clamps not included, please refer to Accessories

58 B

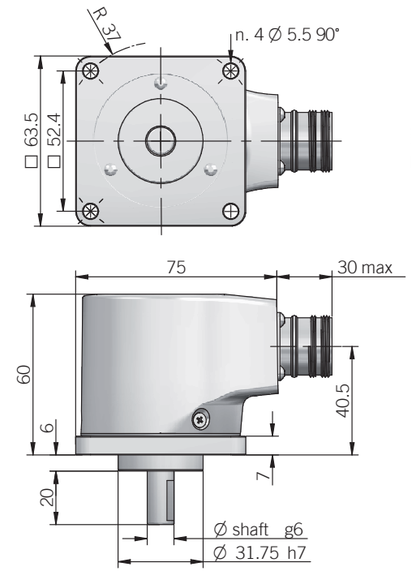


fixing clamps not included, please refer to Accessories

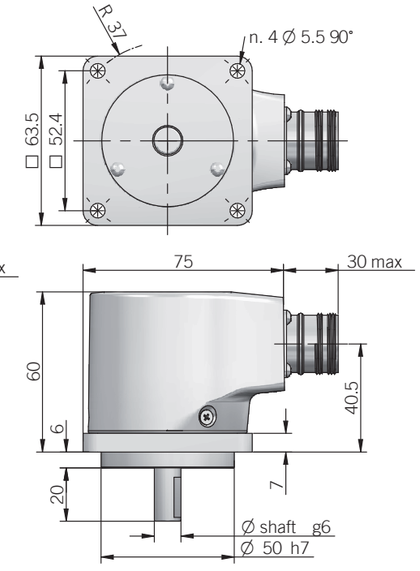
58 C



63 D



63 E



dimensions in mm

BIT PARALLEL CONNECTIONS

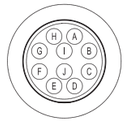
Function	Binary / Gray	Cable PD	Cable PE	19 pin MA
bit 1 (LSB)	B^0 / G^0	green	green	A
bit 2	B^1 / G^1	yellow	yellow	B
bit 3	B^2 / G^2	blue	blue	C
bit 4	B^3 / G^3	brown	brown	D
bit 5	B^4 / G^4	orange or pink	orange or pink	E
bit 6	B^5 / G^5	white	white	F
bit 7	B^6 / G^6	grey	grey	G
bit 8	B^7 / G^7	purple	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

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

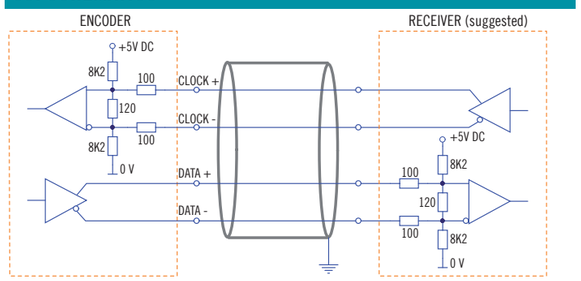
ME connector (32 pin)
Glenair IPT 02 A 18-32 P F6
solder side view FV

M12 connector (8 pin)
M12 A coded
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 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 (propietary 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

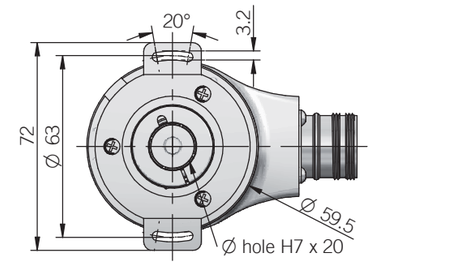
OUTPUT TYPE
cable (standard length 1,5 m) PC
(without reset option) 7 pin MIL connector MC
(with reset option) 10 pin MIL connector MD
12 pin M23 connector HA
8 pin M12 connector M12
female connector included, without female please add 162 as variant code

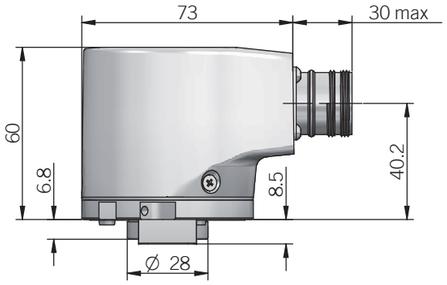
DIRECTION TYPE
radial R

VARIANT
custom version XXX

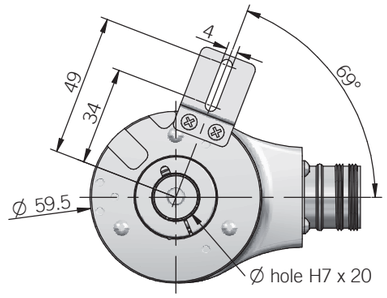
[ ] only with additional incremental output

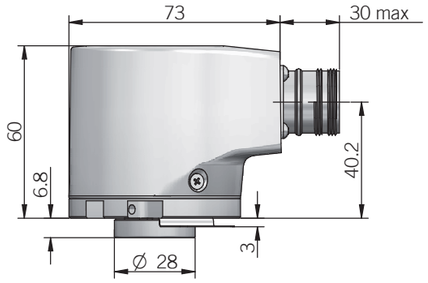
58 F





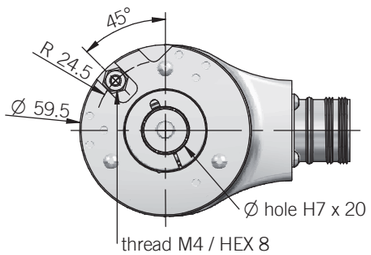
63 F

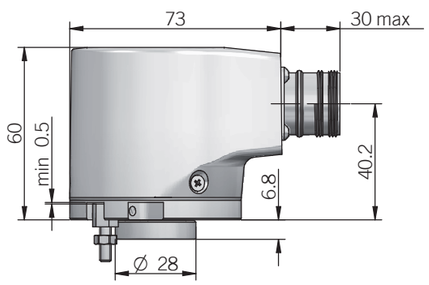




for torque pin please refer to Accessories

63 G





torque pin is included

dimensions in mm

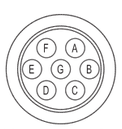
BIT PARALLEL CONNECTIONS

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

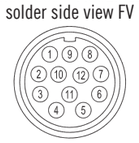
Function	Cable PC	7 pin MC	10 pin MD	12 pin HA	12 pin HA	8 pin M12
+ V DC	red	G	G	8	8	8
0 V	black	F	F	1	1	5
DATA +	green	C	C	2	2	3
DATA -	brown	D	D	10	10	2
CLOCK +	yellow	A	A	3	3	4
CLOCK -	orange or pink	B	B	11	11	6
A+	grey	/	/	/	6	/
A-	blue	/	/	/	7	/
B+	purple	/	/	/	9	/
B-	white / green	/	/	/	12	/
U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



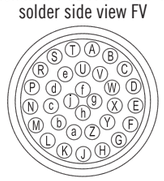
MD connector (10 pin)
Amphenol MS3102-E-18-1P
solder side view FV

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

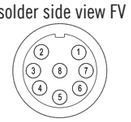


MA connector (19 pin)
Amphenol 62IN 12E 14-19 P
solder side view FV

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



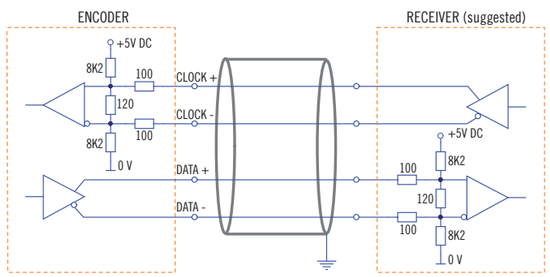
M12 connector (8 pin)
M12 A coded
solder side view FV



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} kgm² (119 x 10^{-6} lbft²)
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 (propietary 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 RE0-444 flange

ORDERING CODE BIT PARALLEL

EAR | 90A | 12 | G | 8/30 | P | P | X | 10 | X | PD | R | .XXX

SERIES
singleturn absolute encoder EAR

MODEL
synchronous flange ø 40 mm 90A
REO-444 flange 115A

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

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

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

ELECTRICAL INTERFACE
push-pull P

LOGIC
negative N
positive P

OPTIONS
to be reported if not used X
latch 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

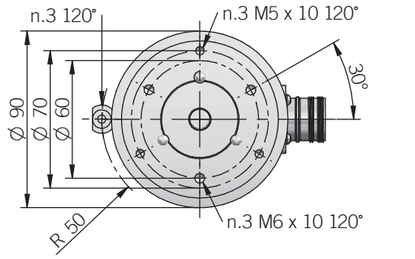
OUTPUT TYPE
cable (standard length 1,5 m) PC
(without reset option) 7 pin MIL connector MC
(with reset option) 10 pin MIL connector MD
12 pin M23 connector HA
8 pin M12 connector M12
female connector included, without female please add 162 as variant code

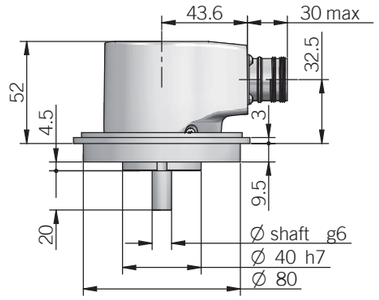
DIRECTION TYPE
radial R

VARIANT
custom version XXX

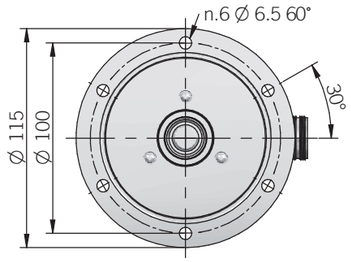
[ ] only with additional incremental output

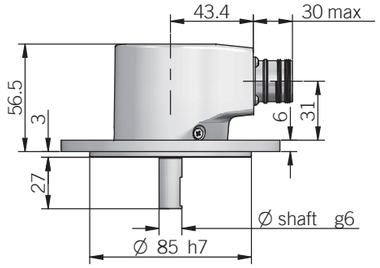
90 A



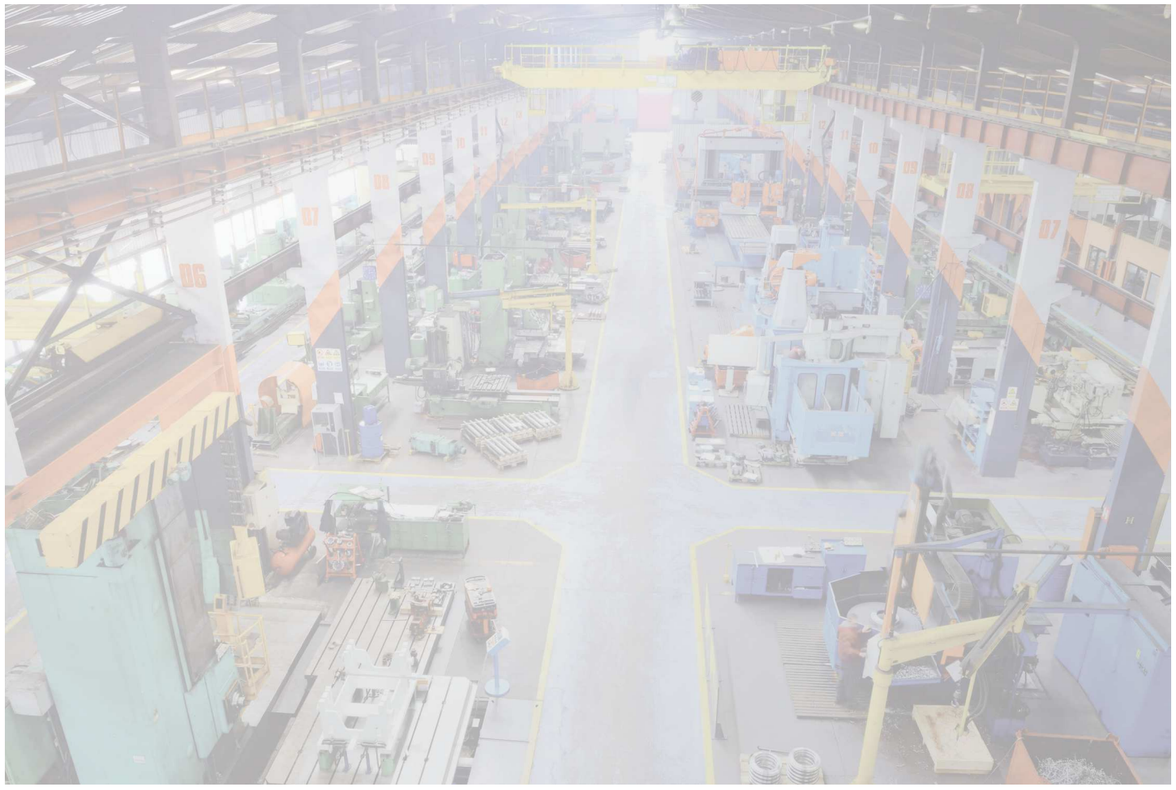


115 A





for fixing clamps please refer to Accessories
dimensions in mm



BIT PARALLEL CONNECTIONS

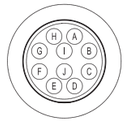
Function	Binary / Gray	Cable PD	Cable PE	19 pin MA
bit 1 (LSB)	B^0 / G^0	green	green	A
bit 2	B^1 / G^1	yellow	yellow	B
bit 3	B^2 / G^2	blue	blue	C
bit 4	B^3 / G^3	brown	brown	D
bit 5	B^4 / G^4	orange or pink	orange or pink	E
bit 6	B^5 / G^5	white	white	F
bit 7	B^6 / G^6	grey	grey	G
bit 8	B^7 / G^7	purple	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

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

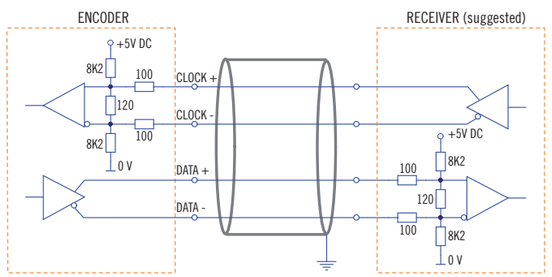
ME connector (32 pin)
Glenair IPT 02 A 18-32 P F6
solder side view FV

M12 connector (8 pin)
M12 A coded
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

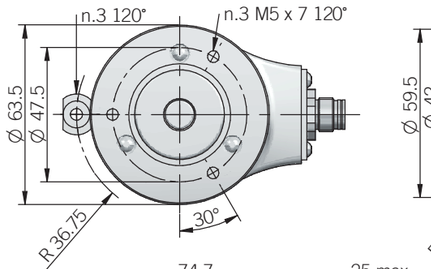
ENCLOSURE RATING
IP 65 shaft side / IP67 cover side X
IP 67 S

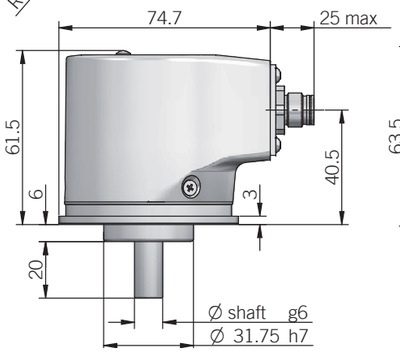
OUTPUT TYPE
cable (standard length 1,5 m) P
M12 connector M12
female connector included, without female please add 162 as variant code

DIRECTION TYPE
radial R

VARIANT
custom version XXX

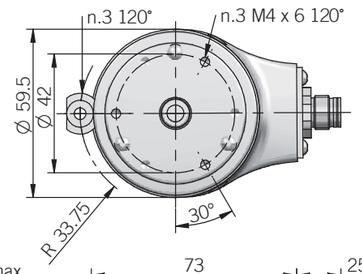
63 A

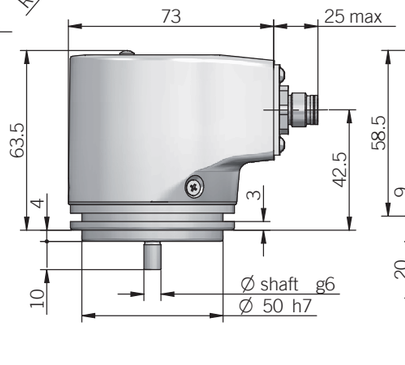




for fixing clamps please refer to Accessories

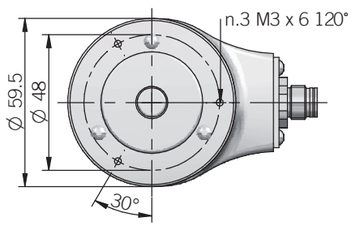
58 B

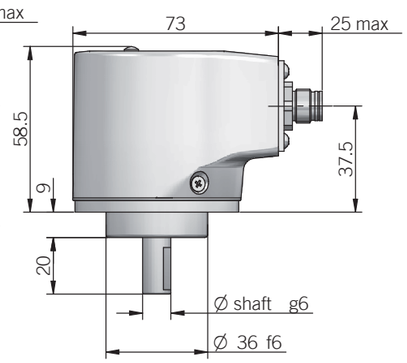




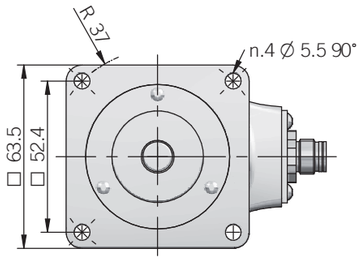
for fixing clamps please refer to Accessories

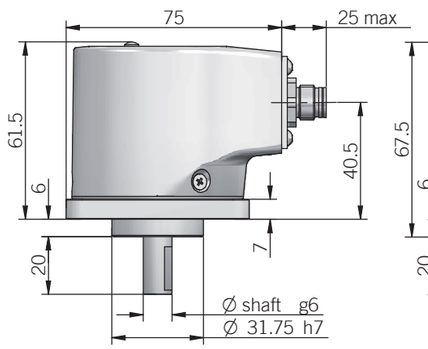
58 C



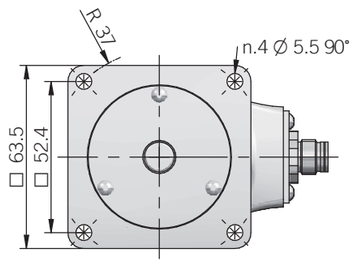


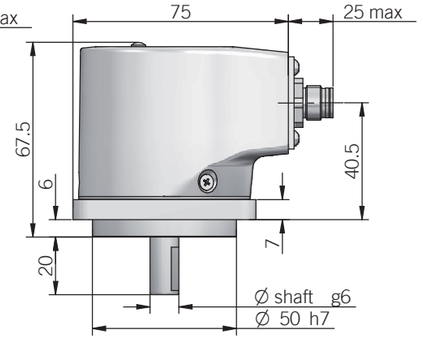
63 D





63 E





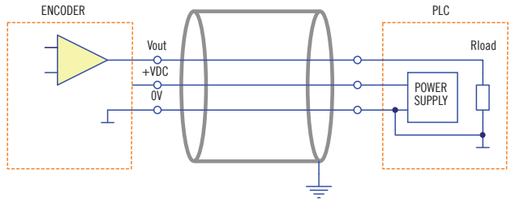
dimensions in mm

ELECTRICAL SPECIFICATIONS

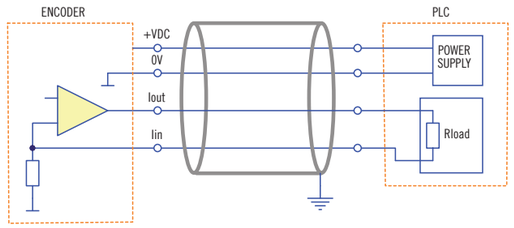
Resolution	16 bit
Output DAC resolution	16 bit
Minimum angle	22,5°
Power supply[1]	11,4 ... 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Electrical interface[2]	voltage (0 ... 5 V / 0 ... 10 V) current (0 ... 20 mA / 4 ... 20 mA)
Auxiliary inputs (BEGIN - END)	active high (+V DC) 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

ELECTRICAL INTERFACE

Voltage output



Current output



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

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 6 / 9,52 (3/8") / 10 mm
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see below table
Max shaft load[3]	200 N axial / 70 N radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10^{-6} kgm² (36 x 10^{-6} lbft²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature[4, 5]	-20° ... +85°C (-4° ... +185°F)
Storage temperature[5]	-20° ... +85°C (-4° ... +185°F)
Weight	approx 350 g (12,35 oz)

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

ROTATION SPEED / TEMPERATURE TABLE

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

CONNECTIONS

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

* with Q current ouput

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

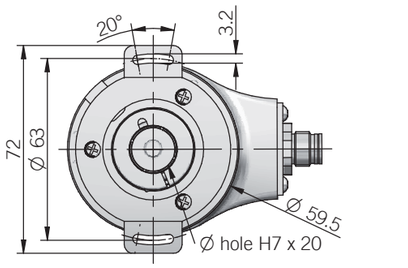
ENCLOSURE RATING
IP 65 shaft side / IP67 cover side X
IP 67 S

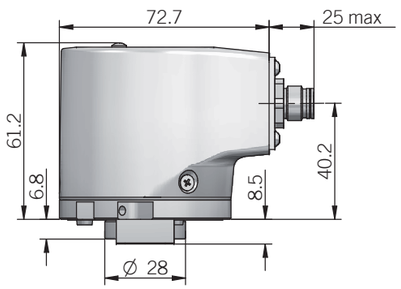
OUTPUT TYPE
cable (standard length 1,5 m) P
M12 connector M12
female connector included, without female please add 162 as variant code

DIRECTION TYPE
radial R

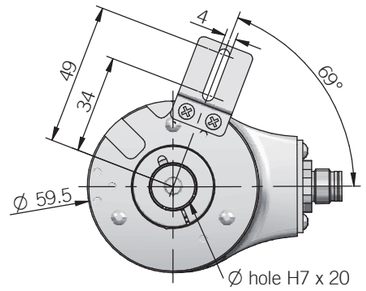
VARIANT
custom version XXX

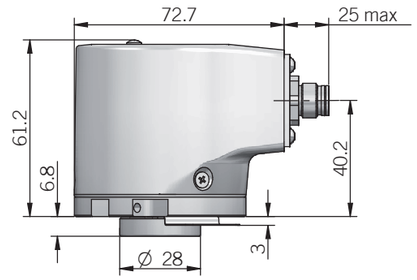
58 F





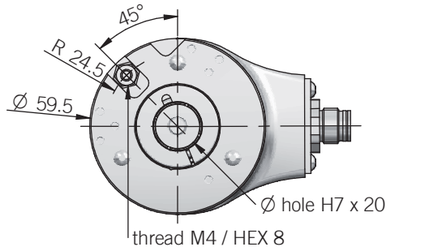
63 F

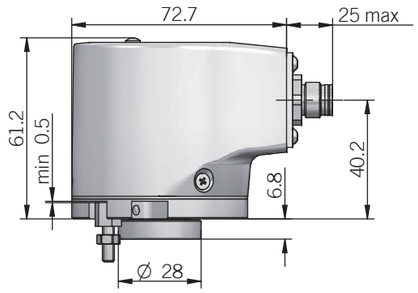




for torque pin please refer to Accessories

63 G





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

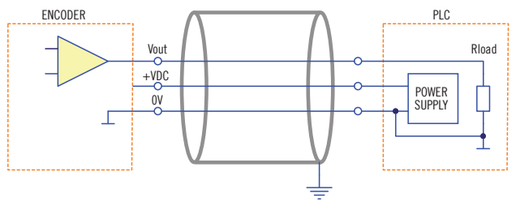
MECHANICAL SPECIFICATIONS

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} kgm² (119 x 10^{-6} lbft²)
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)

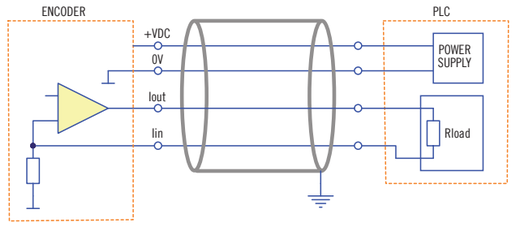
[1] as measured at the transducer without cable influences
[2] for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
[3] maximum load for static usage
[4] measured on the transducer flange
[5] condensation not allowed

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

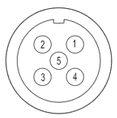
	Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
IP65	up to +70 (+158)	9000	6000
	+70 ... +85 (+158 ... +185)	6000	3000
IP67	up to +70 (+158)	8000	4000
	+70 ... +85 (+158 ... +185)	4000	2000

CONNECTIONS

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

* with Q current ouput

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



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

EAL 90 - 115 A ANALOGUE

SOLID SHAFT SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard singleturn absolute encoder for factory automation applications.

- Optical sensor technology (OptoASIC)
- Programmable measuring range via teach-in function (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 RE0-444 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
RE0-444 flange 115A

OUTPUT DAC RESOLUTION
16 bit 16B

POWER SUPPLY
12 ... 30 V DC 12/30

ELECTRICAL INTERFACE
voltage V
current I

OUTPUT RANGE
0 ... 5 V 05
0 ... 10 V 010
0 ... 20 mA 020
4 ... 20 mA 420

OPTIONS
to be reported with voltage output / 3 wires current output X
4 wires current output Q

SHAFT DIAMETER
(mod. 90) 3/8"- mm 9,52
mm 10
(mod. 115) mm 11

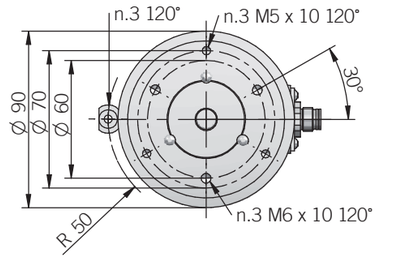
ENCLOSURE RATING
IP 65 shaft side / IP67 cover side X
IP 67 S

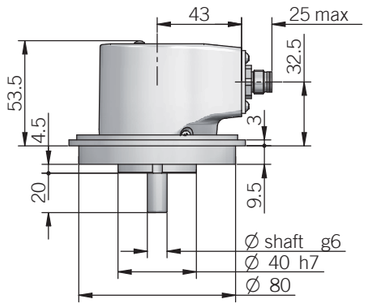
OUTPUT TYPE
cable (standard length 1,5 m) P
M12 connector M12
female connector included, without female please add 162 as variant code

DIRECTION TYPE
radial R

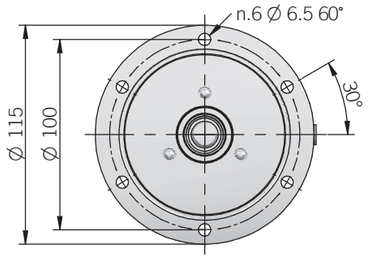
VARIANT
custom version XXX

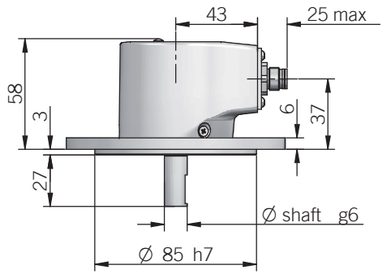
90 A



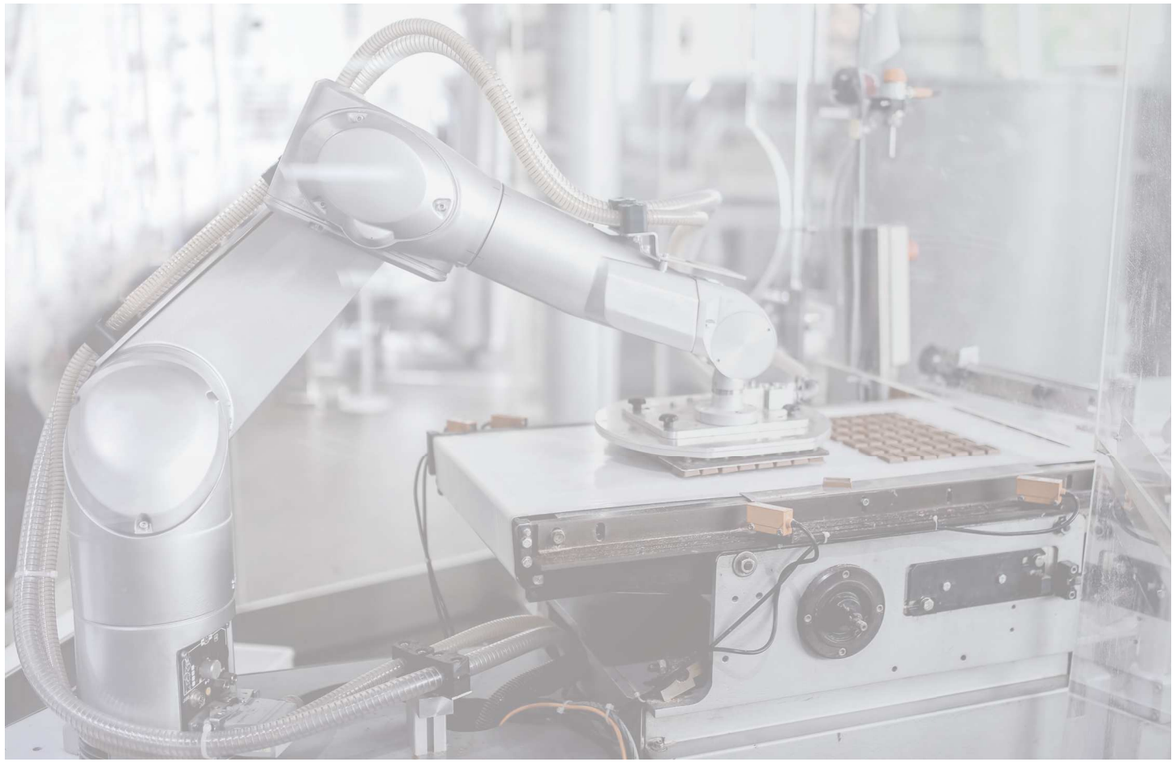


115 A





for fixing clamps please refer to Accessories
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

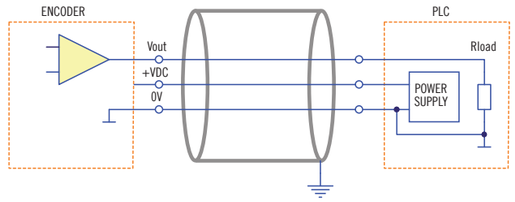
MECHANICAL SPECIFICATIONS

Shaft diameter	ø 9,52 (3/8") / 10 / 11 mm
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see below table
Max shaft load[3]	200 N axial / 70 N radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10^{-6} kgm² (36 x 10^{-6} lbft²)
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)

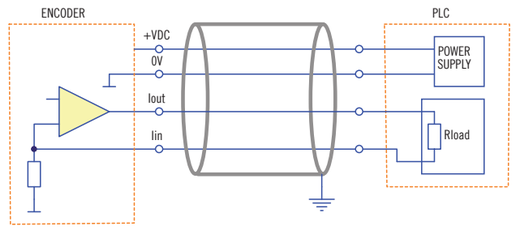
[1] as measured at the transducer without cable influences
[2] for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
[3] maximum load for static usage
[4] measured on the transducer flange
[5] condensation not allowed

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

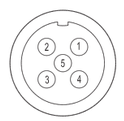
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 ... +85 (+158 ... +185)	8000	5000

CONNECTIONS

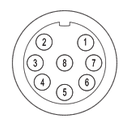
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
V_{out} / I_{out}	green	1	1
I_{in}	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
⏚	shield	housing	housing

* with Q current ouput

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 | FXX | 10 | X | 6 | P3R | .XXX

SERIES
singleturn absolute encoder EA

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
ppr 4096 / 8192

CODE TYPE
binary B

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

ELECTRICAL INTERFACE
PROFIBUS DP V0 CLASS 2 FXX

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

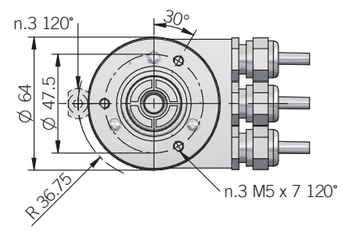
ENCLOSURE RATING
IP 54 X
IP 66 S

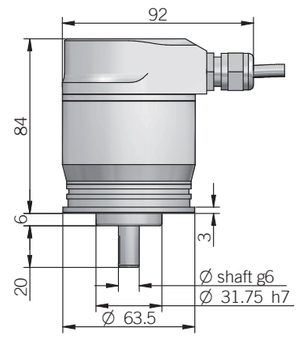
MAX ROTATION SPEED
(IP 66) 3000 rpm 3
(IP 54) 6000 rpm 6

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

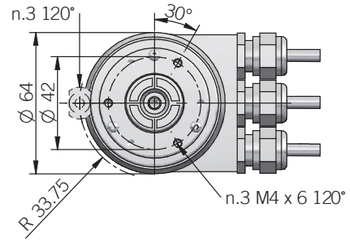
63 A

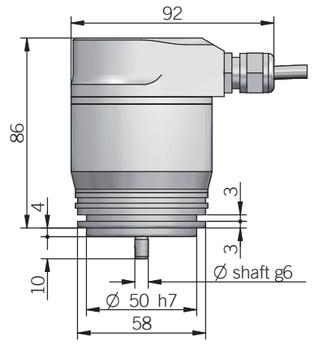




fixing clamps not included, please refer to Accessories

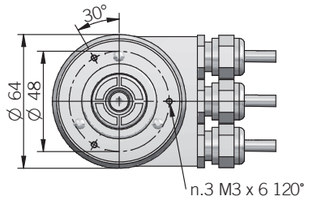
58 B

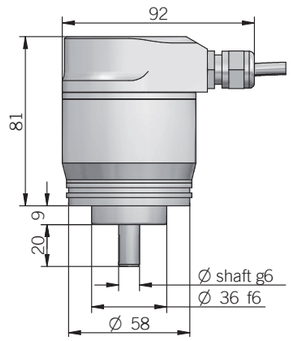




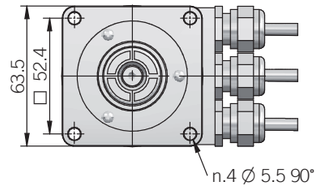
fixing clamps not included, please refer to Accessories

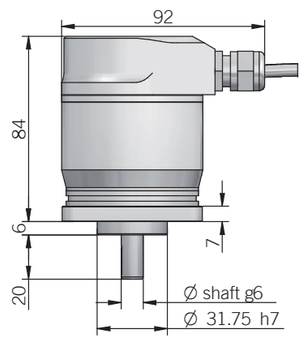
58 C



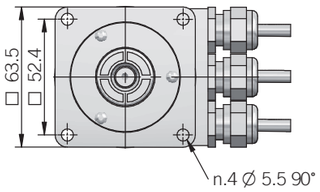


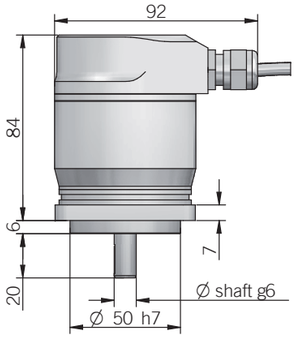
63 D





63 E





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

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} lbft^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

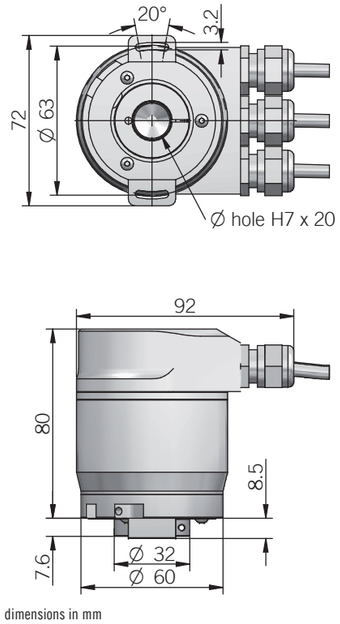
ENCLOSURE RATING
IP 54 X

MAX ROTATION SPEED
3000 rpm 3

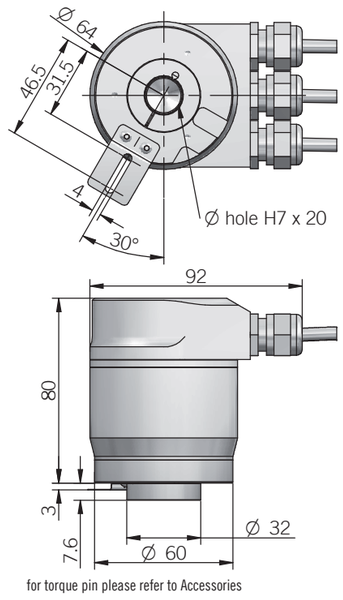
OUTPUT TYPE
terminal box - radial cable glands P3R
radial M12 connectors M12R
mating connectors included, without mating connectors please add 162 as variant code

VARIANT
custom version XXX

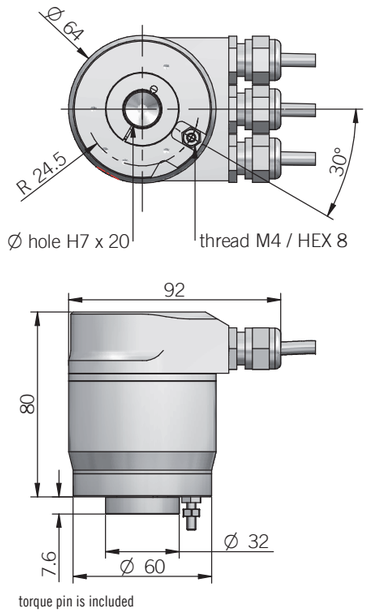
58 F



63 F



63 G



dimensions in mm

for torque pin please refer to Accessories

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

MECHANICAL SPECIFICATIONS

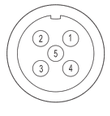
Bore diameter	ø 8* / 9,52 (3/8")* / 10* / 12* / 14 / 15 mm * with supplied shaft adapter
Enclosure rating	IP 54 (IEC 60529)
Max rotation speed	3000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	5 x 10^{-6} kgm^2 (119 x 10^{-6} lbft^2)
Starting 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

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

EA 90 A - 115 A PROFIBUS

SOLID SHAFT SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard singleturn absolute encoder for factory automation applications.

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

ORDERING CODE

EA | 90A | 4096 | B | 12/28 | 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

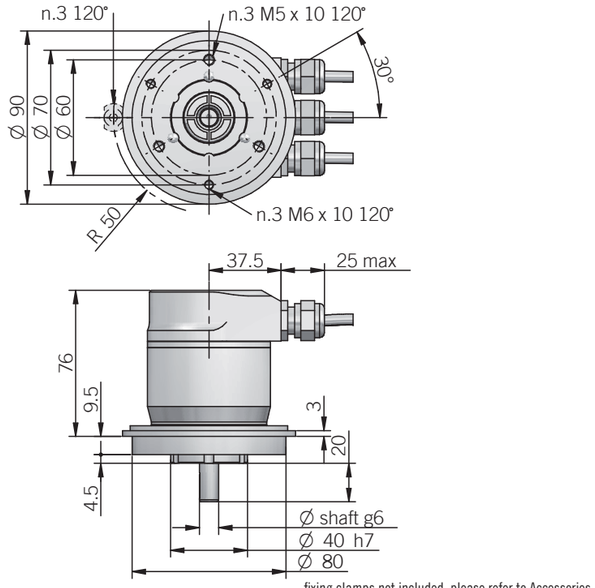
ENCLOSURE RATING
IP 54 X
(mod. 90) IP 66 S

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

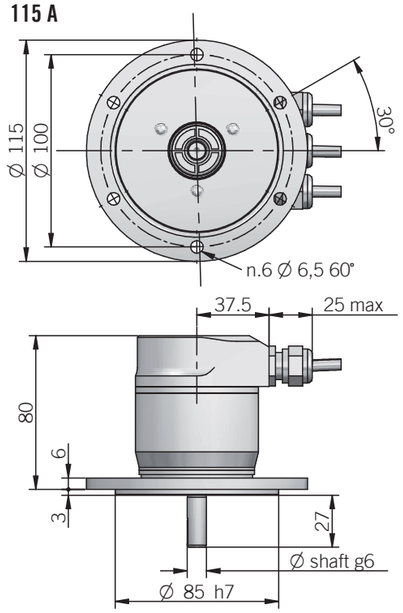
OUTPUT TYPE
terminal box - radial cable glands P3R
radial M12 connectors M12R
mating connectors included, without mating connectors please add 162 as variant code

VARIANT
custom version XXX

90 A



115 A



fixing clamps not included, please refer to Accessories

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

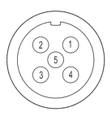
Function	POWER	LINE OUT	LINE IN
+ V DC	2		
0 V	4		
A		2	
B		4	
A			2
B			4

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} lbft^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 syncronous or centering square flange

EX CLASSIFICATION

It has been assured with EC-TYPE Examination Certifcate 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

SERIES
singleturn absolute flameproof encoder EAX

MODEL
synchronous flange ø 40 mm 80A
centering square flange ø 40 mm 80D

RESOLUTION
ppr 360 / 720 / 1440 / 2880 / 3600 / 4096 / 8192
please directly contact our offices for other pulses

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

POWER SUPPLY
8 ... 28 V DC 8/28

ELECTRICAL INTERFACE
Serial Synchronous Interface - SSI S

LOGIC
to be reported X

OPTIONS
to be reported if not used X
reset ZE

SHAFT DIAMETER
mm 10

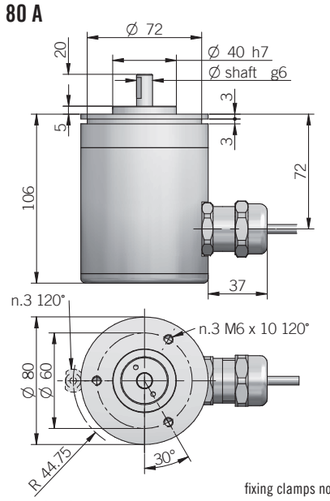
ENCLOSURE RATING
IP 65 X

MAX ROTATION SPEED
3000 rpm 3

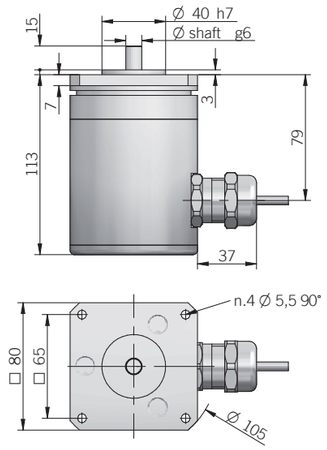
OUTPUT TYPE
radial cable (standard length 1,5 m) PR

VARIANT
custom version XXX

80 A



80 D



fixing clamps not included, please refer to Accessories

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

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[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

Eltra® focused on motion

EMA 22 A SSI

MAGNETIC SINGLETURN ABSOLUTE KIT ENCODER

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

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

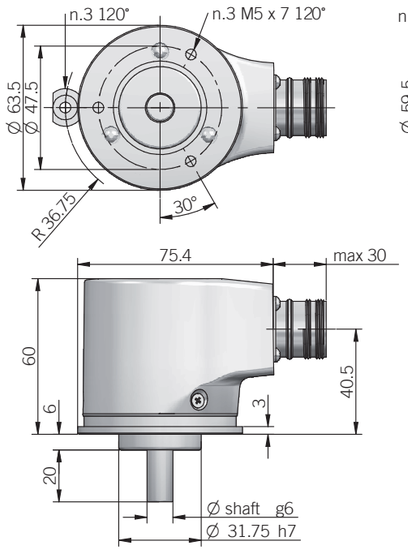
OUTPUT TYPE
cable (standard length 1,5 m) PC
(without reset option) 7 pin MIL connector MC
(with reset option) 10 pin MIL connector MD
12 pin M23 connector HA
8 pin M12 connector M12
female connector included, without female please add 162 as variant code

DIRECTION TYPE
radial R

VARIANT
custom version XXX

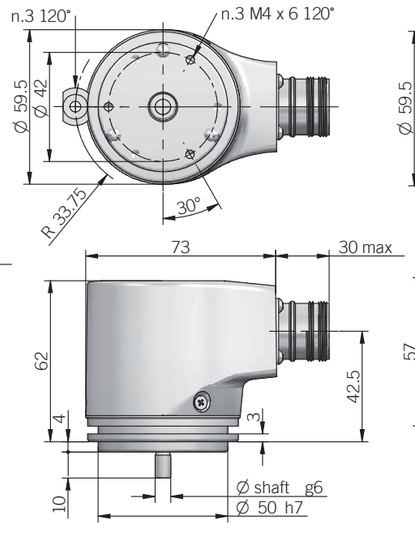
only with additional incremental output

63 A



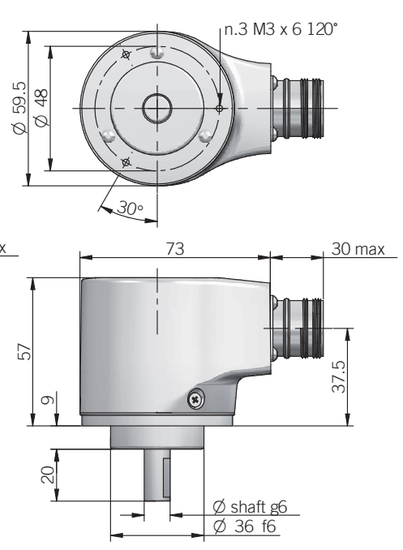
for fixing clamps please refer to Accessories

58 B

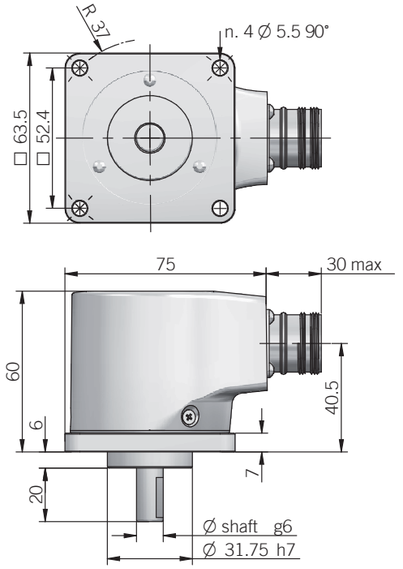


for fixing clamps please refer to Accessories

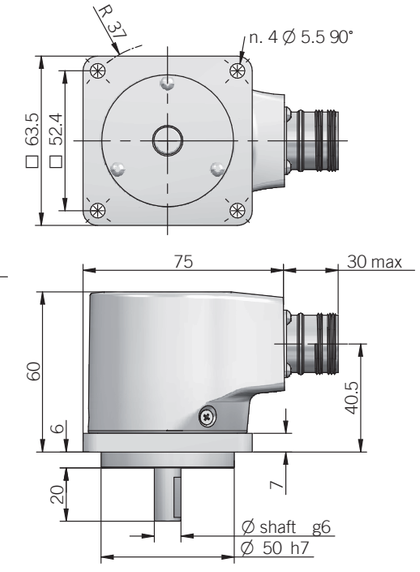
58 C



63 D



63 E



dimensions in mm

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

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

M12 connector (8 pin)
M12 A coded
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
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

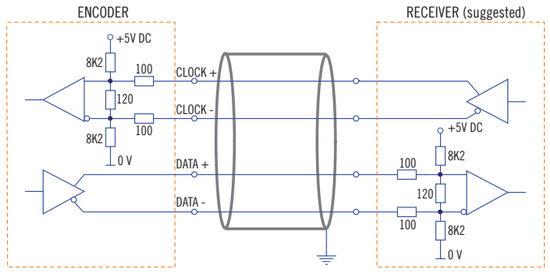
Shaft diameter	ø 6 / 9,52 (3/8") / 10 mm
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load[3]	200 N axial / 70 N radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10^{-6}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

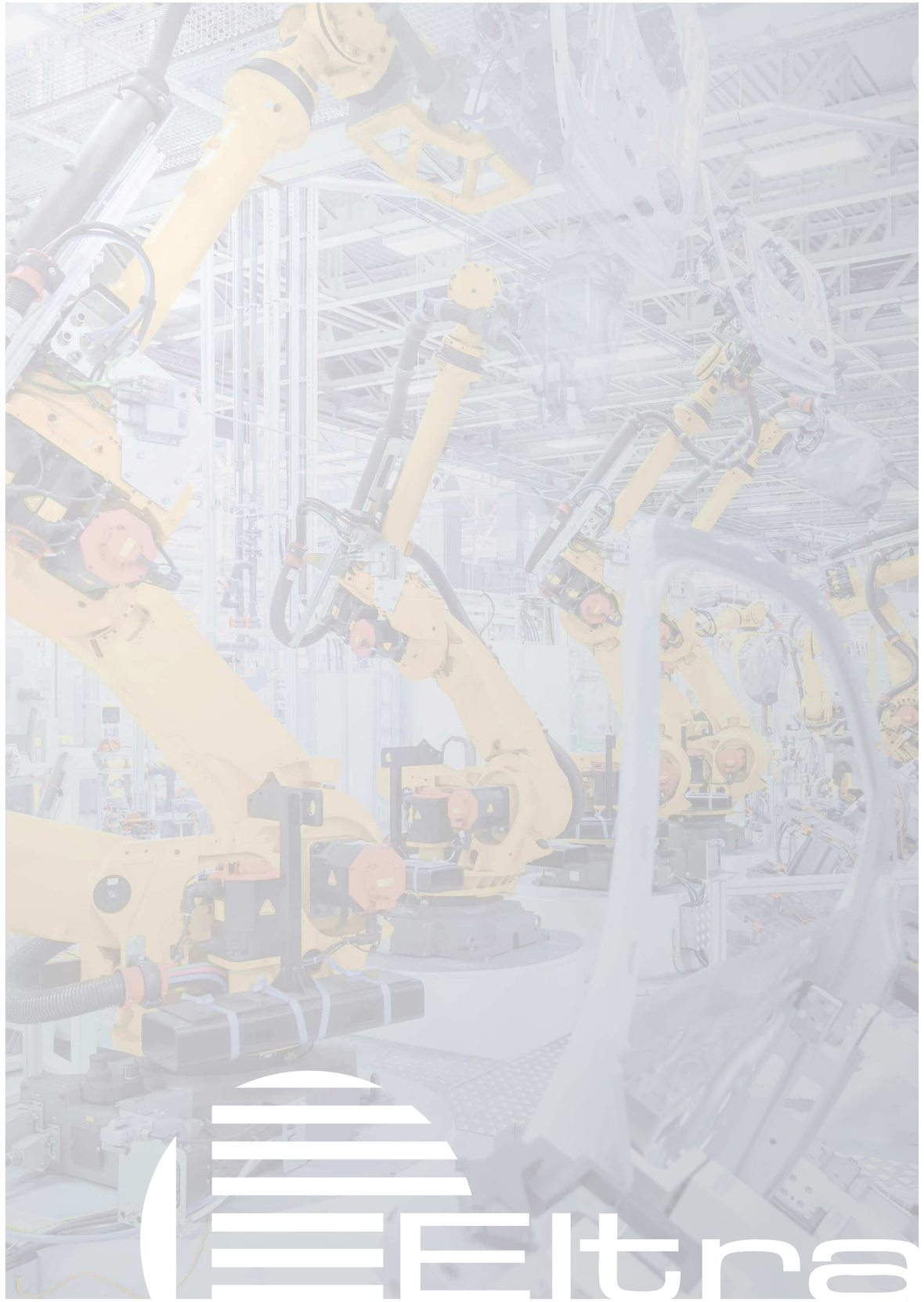
[1] as measured at the transducer without cable influences
[2] for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
[3] maximum load for static usage
[4] measured on the transducer flange
[5] condensation not allowed

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

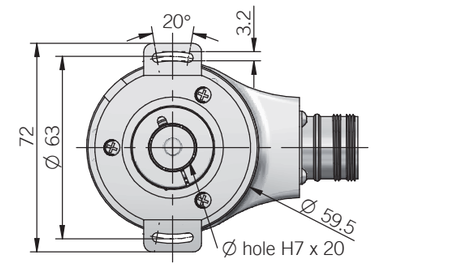
OUTPUT TYPE
cable (standard length 1,5 m) PC
(without reset option) 7 pin MIL connector MC
(with reset option) 10 pin MIL connector MD
12 pin M23 connector HA
8 pin M12 connector M12
female connector included, without female please add 162 as variant code

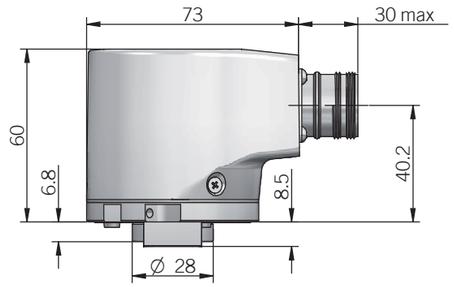
DIRECTION TYPE
radial R

VARIANT
custom version XXX

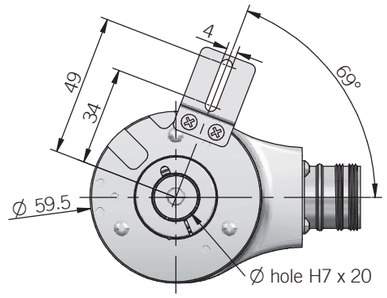
[ ] only with additional incremental output

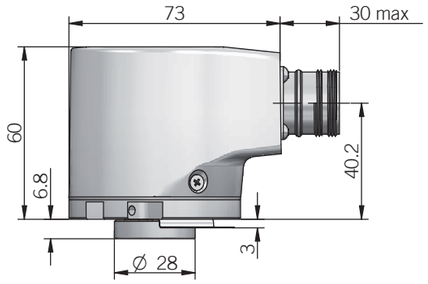
58 F





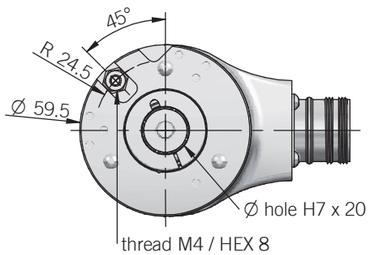
63 F

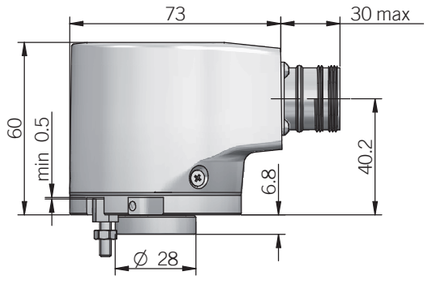




for torque pin please refer to Accessories

63 G





torque pin is included

dimensions in mm

BIT PARALLEL CONNECTIONS

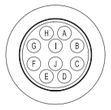
Function	Binary / Gray	Cable PD	Cable PE	19 pin MA	32 pin ME
bit 1 (LSB)	B^0 / G^0	green	green	A	A
bit 2	B^1 / G^1	yellow	yellow	B	B
bit 3	B^2 / G^2	blue	blue	C	C
bit 4	B^3 / G^3	brown	brown	D	D
bit 5	B^4 / G^4	orange or pink	orange or pink	E	E
bit 6	B^5 / G^5	white	white	F	F
bit 7	B^6 / G^6	grey	grey	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

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

M12 connector (8 pin)
M12 A coded
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
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

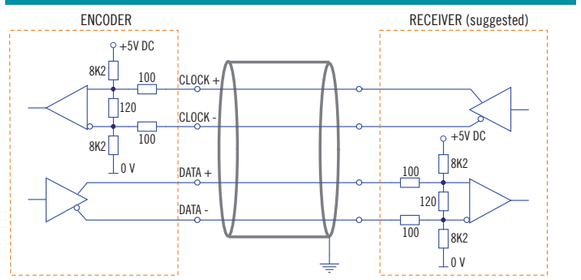
Bore diameter	ø 8* / 9,52 (3/8")* / 10* / 12* / 14 / 15 mm * with optional shaft adapter, please refer to Accessories
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load[3]	200 N axial / 60 N radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	5 x 10^{-6} kgm² (119 x 10^{-6} lbft²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	EN-AW 2011 aluminum
Shaft material	1.4305 / AISI 303 stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature Bit parallel[4, 5]	-20° ... +85°C (-4° ... +185°F)
Operating temperature SSI[4, 5]	-40° ... +85°C (-40° ... +185°F) -20° ... +85°C (-4° ... +185°F) with cable output -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature[5]	-20° ... +85°C (-4° ... +185°F)
Weight	approx 350 g (12,35 oz)

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

ROTATION SPEED DERATING TABLE

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

SSI SCHEMATICS



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

MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

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

ORDERING CODE BIT PARALLEL

EAMR | 90A | 12 / 12 | G | 8/30 | P | P | X | 10 | X | PE | R | .XXX

SERIES
multiturn absolute encoder EAMR

MODEL
synchronous flange ø 40 mm 90A
REO-444 flange 115A

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. 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
(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 | 90A | 12 / 13 | G | 8/30 | S | X | 2048 | RS | 10 | X | HA | R | .XXX

SERIES
multiturn absolute encoder EAMR

MODEL
synchronous flange ø 40 mm 90A
REO-444 flange 115A

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. 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

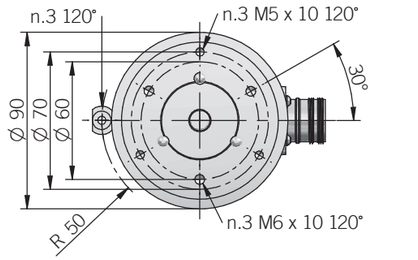
OUTPUT TYPE
cable (standard length 1,5 m) PC
(without reset option) 7 pin MIL connector MC
(with reset option) 10 pin MIL connector MD
12 pin M23 connector HA
8 pin M12 connector M12
female connector included, without female please add 162 as variant code

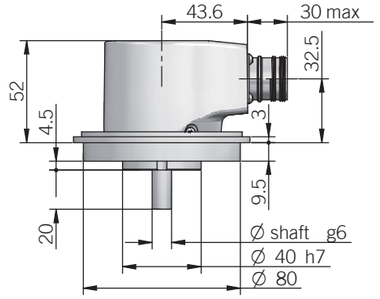
DIRECTION TYPE
radial R

VARIANT
custom version XXX

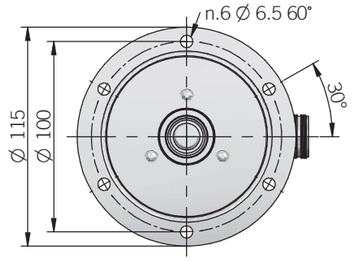
only with additional incremental output

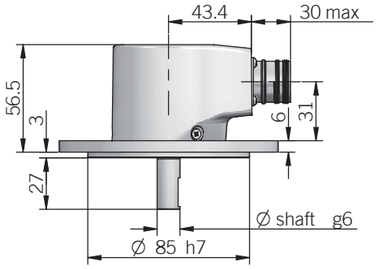
90 A





115 A





for fixing clamps please refer to Accessories
dimensions in mm

BIT PARALLEL CONNECTIONS

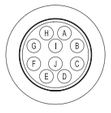
Function	Binary / Gray	Cable PD	Cable PE	19 pin MA	32 pin ME
bit 1 (LSB)	B^0 / G^0	green	green	A	A
bit 2	B^1 / G^1	yellow	yellow	B	B
bit 3	B^2 / G^2	blue	blue	C	C
bit 4	B^3 / G^3	brown	brown	D	D
bit 5	B^4 / G^4	orange or pink	orange or pink	E	E
bit 6	B^5 / G^5	white	white	F	F
bit 7	B^6 / G^6	grey	grey	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

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

M12 connector (8 pin)
M12 A coded
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
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

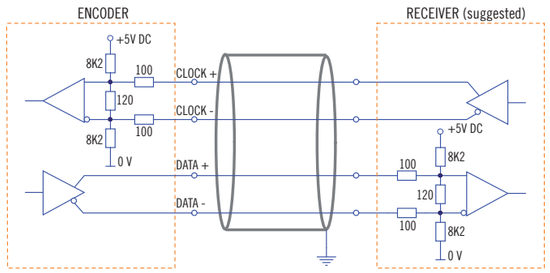
Shaft diameter	ø 9,52 (3/8") / 10 / 11 mm
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load[3]	200 N axial / 70 N radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10^{-6}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

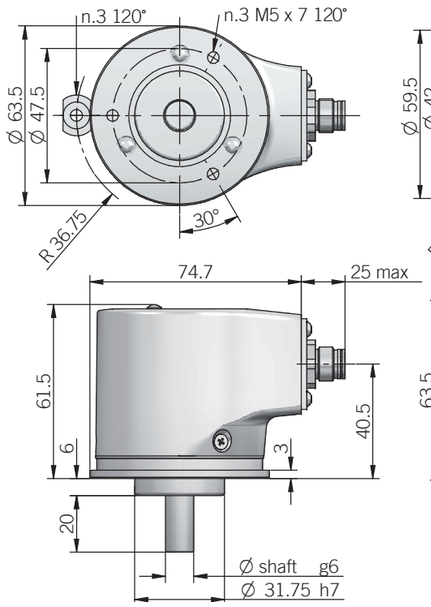
ENCLOSURE RATING
IP 65 shaft side / IP67 cover side X
IP 67 S

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

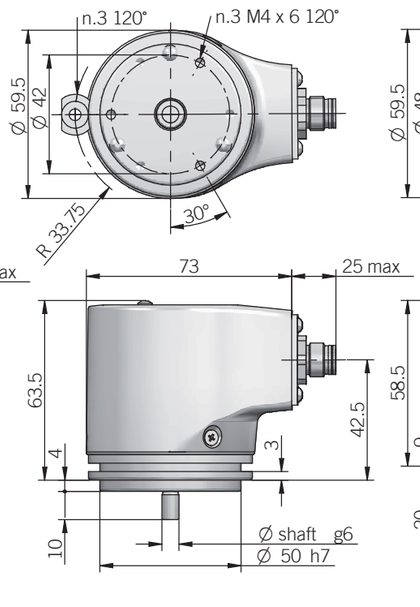
VARIANT
custom version XXX

63 A



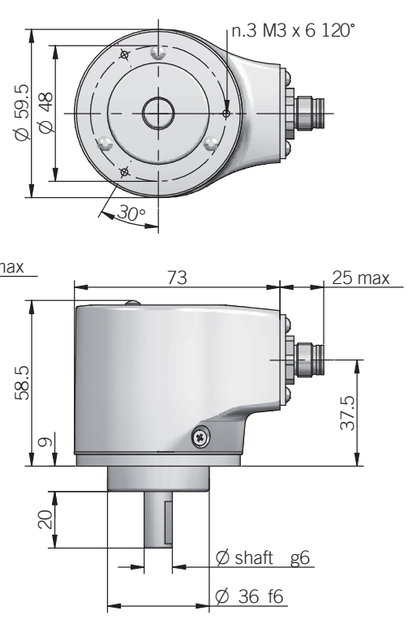
for fixing clamps please refer to Accessories

58 B

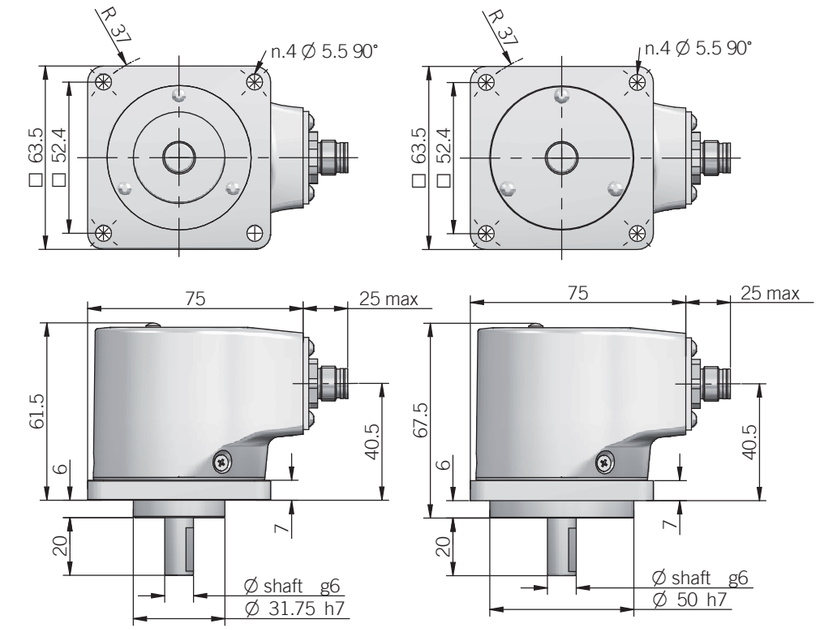


for fixing clamps please refer to Accessories

58 C



63 D



63 E

dimensions in mm

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

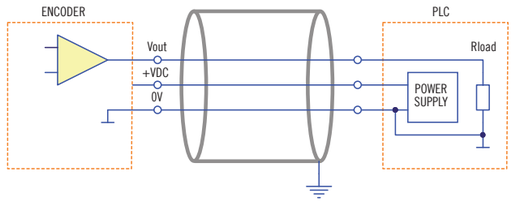
MECHANICAL SPECIFICATIONS

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} kgm² (36 x 10^{-6} lbft²)
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)

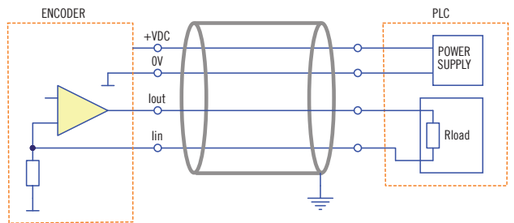
[1] as measured at the transducer without cable influences
[2] for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
[3] maximum load for static usage
[4] measured on the transducer flange
[5] condensation not allowed

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

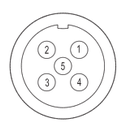
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 ... +85 (+158 ... +185)	8000	5000

CONNECTIONS

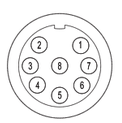
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
V_{out} / I_{out}	green	1	1
I_{in}	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
⏚	shield	housing	housing

* with Q current ouput

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

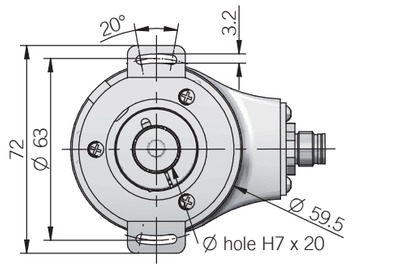
ENCLOSURE RATING
IP 65 shaft side / IP67 cover side X
IP 67 S

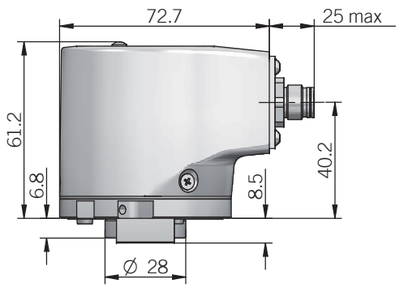
OUTPUT TYPE
cable (standard length 1,5 m) P
M12 connector M12
female connector included, without female please add 162 as variant code

DIRECTION TYPE
radial R

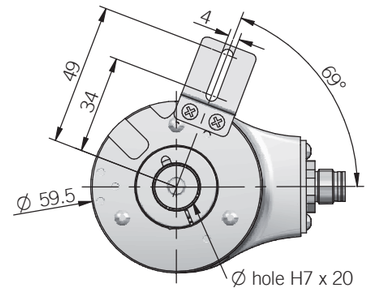
VARIANT
custom version XXX

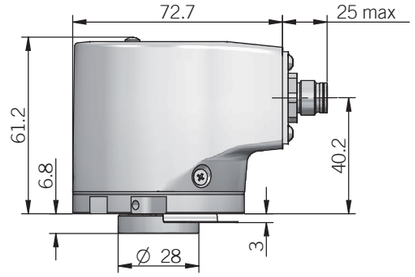
58 F





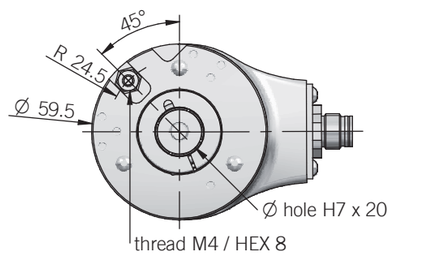
63 F

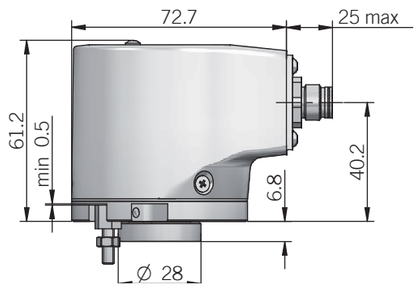




for torque pin please refer to Accessories

63 G





torque pin is included

dimensions in mm

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

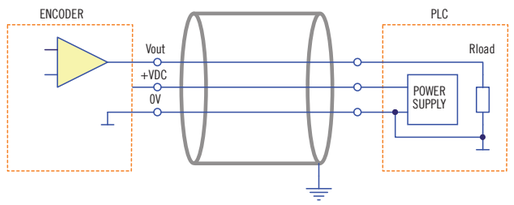
MECHANICAL SPECIFICATIONS

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} kgm² (119 x 10^{-6} lbft²)
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)

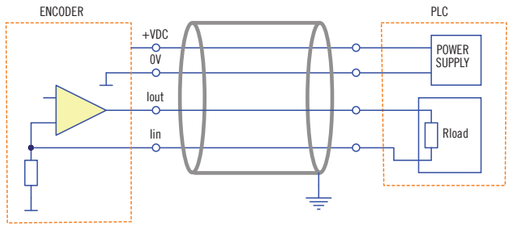
[1] as measured at the transducer without cable influences
[2] for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
[3] maximum load for static usage
[4] measured on the transducer flange
[5] condensation not allowed

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

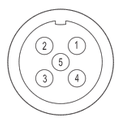
	Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
IP65	up to +70 (+158)	9000	6000
	+70 ... +85 (+158 ... +185)	6000	3000
IP67	up to +70 (+158)	8000	4000
	+70 ... +85 (+158 ... +185)	4000	2000

CONNECTIONS

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

* with Q current ouput

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



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

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 RE0-444 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
RE0-444 flange 115A

OUTPUT DAC RESOLUTION
16 bit 16B

POWER SUPPLY
12 ... 30 V DC 12/30

ELECTRICAL INTERFACE
voltage V
current I

OUTPUT RANGE
0 ... 5 V 05
0 ... 10 V 010
0 ... 20 mA 020
4 ... 20 mA 420

OPTIONS
to be reported with voltage output / 3 wires current output X
4 wires current output Q

SHAFT DIAMETER
(mod. 90) 3/8"- mm 9,52
mm 10
(mod. 115) mm 11

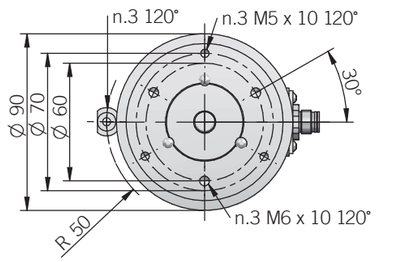
ENCLOSURE RATING
IP 65 shaft side / IP67 cover side X
IP 67 S

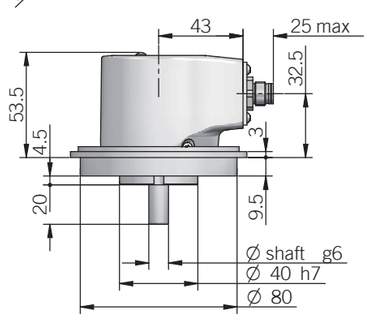
OUTPUT TYPE
cable (standard length 1,5 m) P
M12 connector M12
female connector included, without female please add 162 as variant code

DIRECTION TYPE
radial R

VARIANT
custom version XXX

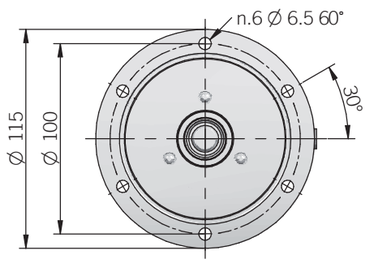
90 A

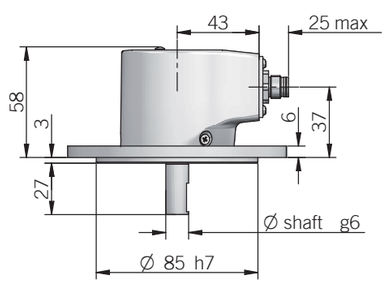




for fixing clamps please refer to Accessories

115 A





dimensions in mm

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

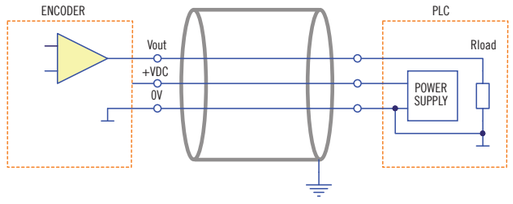
MECHANICAL SPECIFICATIONS

Shaft diameter	ø 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} kgm² (36 x 10^{-6} lbft²)
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)

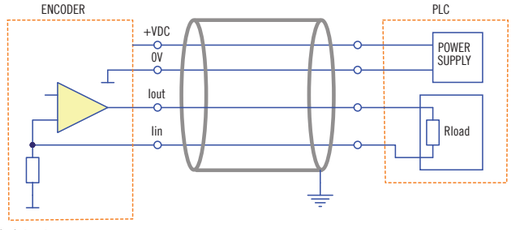
[1] as measured at the transducer without cable influences
[2] for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
[3] maximum load for static usage
[4] measured on the transducer flange
[5] condensation not allowed

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

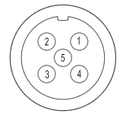
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 ... +85 (+158 ... +185)	8000	5000

CONNECTIONS

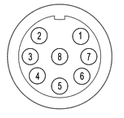
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
V_{out} / I_{out}	green	1	1
I_{in}	yellow	/	6
BEGIN	white	4	4
END	brown	5	5
⏚	shield	housing	housing

* with Q current ouput

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



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



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

SOLID SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

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

ORDERING CODE	EAM	63A	R	4096 / 4096	B	12/28	FXX	10	X	6	P3R	. XXX

SERIES
multiturn absolute encoder EAM

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

rev. 2.0 R

MULTITURN RESOLUTION
turns 4096

SINGLETURN RESOLUTION
ppr 4096 / 8192

CODE TYPE
binary B

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

ELECTRICAL INTERFACE
PROFIBUS DP V0 CLASS 2 FXX

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

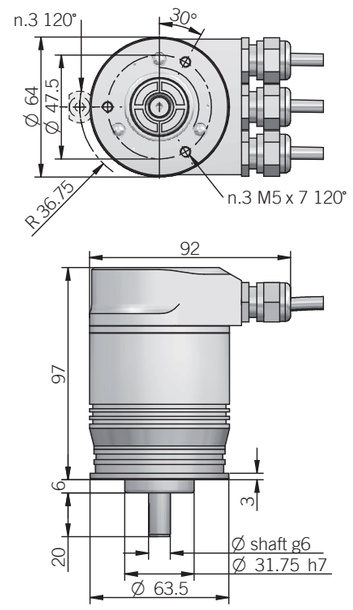
ENCLOSURE RATING
IP 54 X
IP 66 S

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

OUTPUT TYPE
terminal box - radial cable glands P3R
radial M12 connectors M12R
mating connectors included, without mating connectors please add 162 as variant code

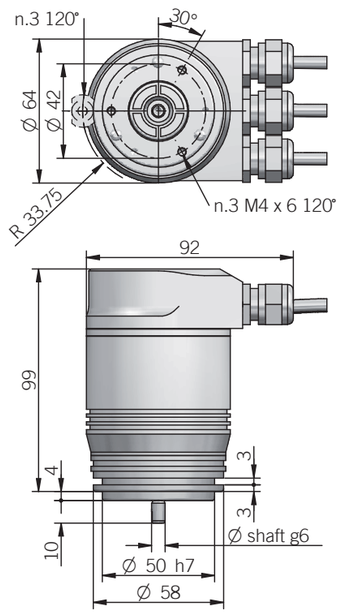
VARIANT
custom version XXX

63 A



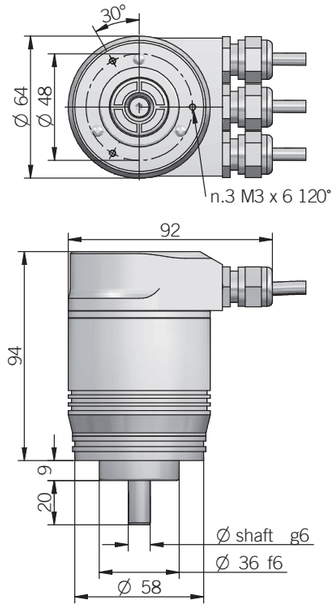
fixing clamps not included, please refer to Accessories

58 B

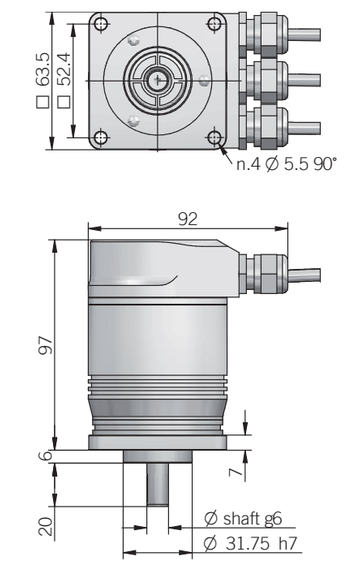


fixing clamps not included, please refer to Accessories

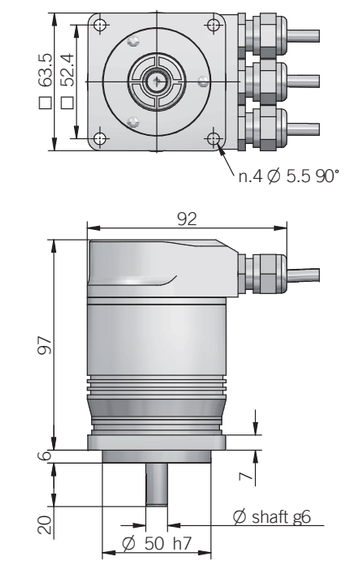
58 C



63 D



63 E



dimensions in mm

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

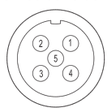
Function	POWER	LINE OUT	LINE IN
+ V DC	2		
0 V	4		
A		2	
B		4	
A			2
B			4

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} lbft^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

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

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

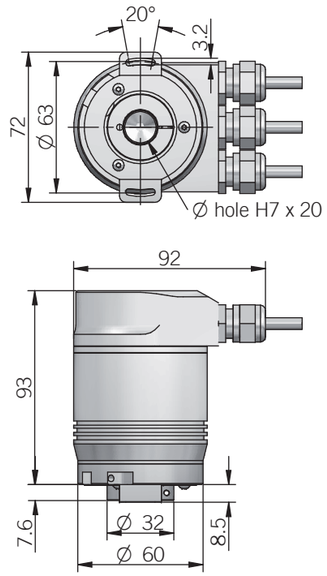
ENCLOSURE RATING
IP 54 X

MAX ROTATION SPEED
3000 rpm 3

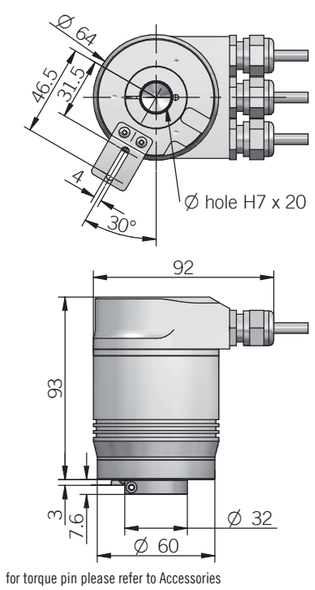
OUTPUT TYPE
terminal box - radial cable glands P3R
radial M12 connectors M12R
mating connectors included, without mating connectors please add 162 as variant code

VARIANT
custom version XXX

58 F

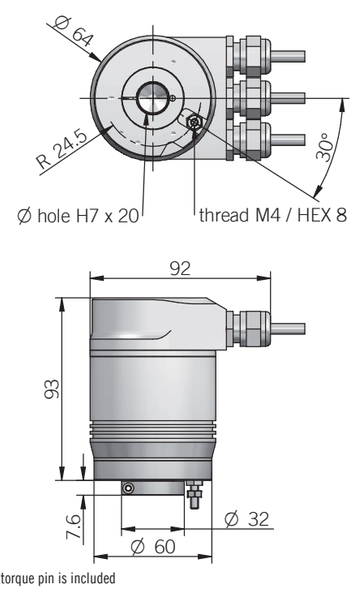


63 F



for torque pin please refer to Accessories

63 G



torque pin is included

dimensions in mm

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

MECHANICAL SPECIFICATIONS

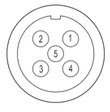
Bore diameter	ø 8* / 9* / 10* / 12* / 14 / 15 mm * with supplied shaft adapter
Enclosure rating	IP 54 (IEC 60529)
Max rotation speed	3000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	5 x 10^{-6} kgm^2 (119 x 10^{-6} lbft^2)
Starting torque (at +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

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

EAM 90 A -115 A PROFIBUS

SOLID SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

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

ORDERING CODE

EAM 90A R 4096 / 4096 B 12/28 FXX 8 X 6 P3R .XXX

SERIES
multiturn absolute encoder EAM

MODEL
synchronous flange ø 40 mm 90A
REO444 flange 115A

rev. 2.0 R

MULTITURN RESOLUTION
turns 4096

SINGLETURN RESOLUTION
ppr 4096 / 8192

CODE TYPE
binary B

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

ELECTRICAL INTERFACE
PROFIBUS DP V0 CLASS 2 FXX

SHAFT DIAMETER
(mod. 90) (3/8") 9,52 mm 9
mm 10
(mod. 115) mm 11

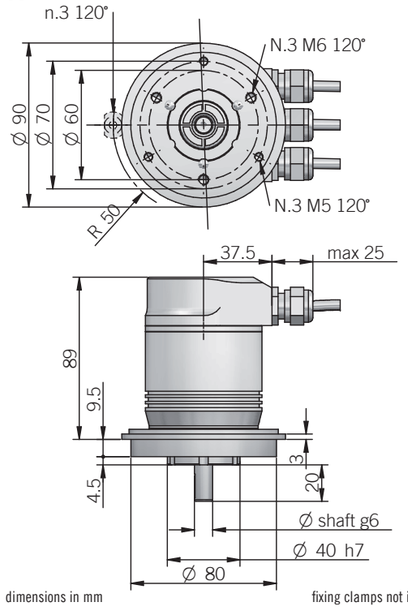
ENCLOSURE RATING
IP 54 X
(mod. 90) IP 66 S

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

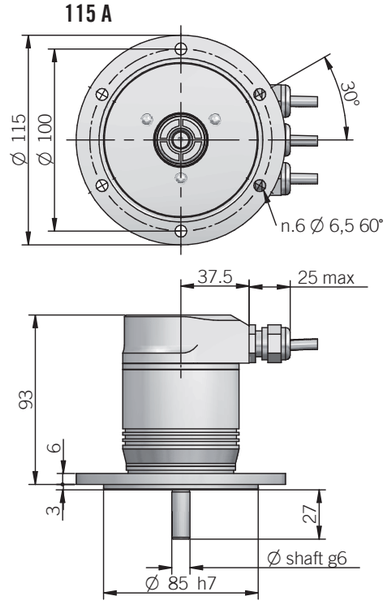
OUTPUT TYPE
terminal box - radial cable glands P3R
radial M12 connectors M12R
mating connectors included, without mating connectors please add 162 as variant code

VARIANT
custom version XXX

90 A



115 A



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

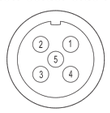
Function	POWER	LINE OUT	LINE IN
+ V DC	2		
0 V	4		
A		2	
B		4	
A			2
B			4

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} lbft^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

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 multiturn 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

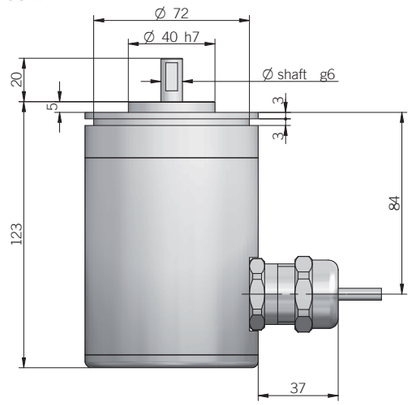
ENCLOSURE RATING
IP 65 X

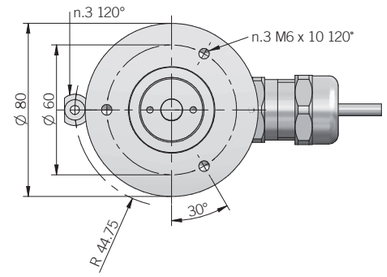
OPTIONS
to be reported X

OUTPUT TYPE
radial M12 connectors M12R

VARIANT
without mating connectors 162

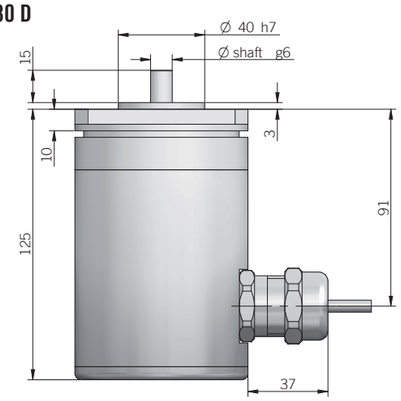
80 A

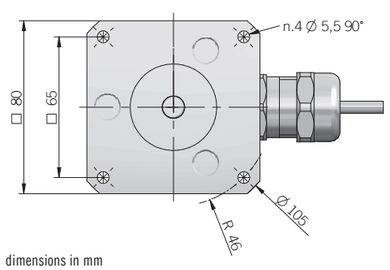




fixing clamps not included, please refer to Accessories

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

EAM 36 B
SSI
SOLID SHAFT MAGNETIC MULTITURN ABSOLUTE ENCODER

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 syncronous 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
syncronous 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

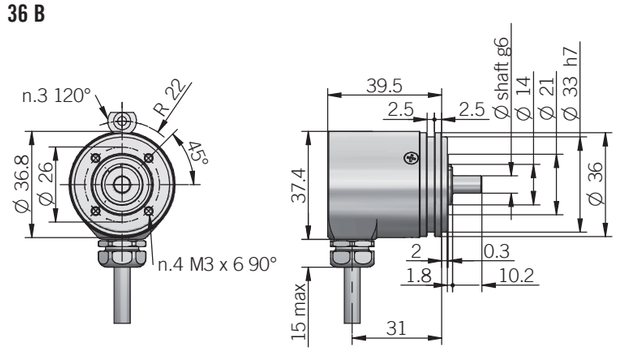
ENCLOSURE RATING
IP 67 cover side / IP 65 shaft side X

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 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 (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

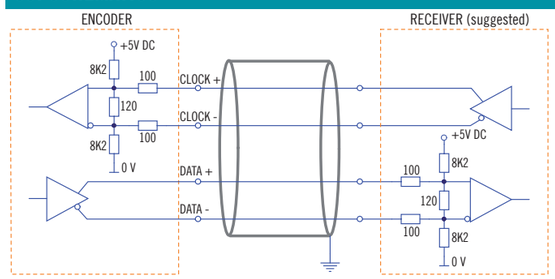
Function	Cable	8 pin M12
+ V DC	red	8
0 V	black	5
DATA +	green	3
DATA -	brown	2
CLOCK +	yellow	4
CLOCK -	orange	6
U / D	red / blue	7
RESET	white	1
⏚	shield	housing

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 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} kgm² (0,02 x 10^{-6} lbft²)
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

SSI SCHEMATICS



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

EAM 36 F / G
SSI
BLIND HOLLOW SHAFT MAGNETIC MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Miniaturized multiturn absolute encoder for limited size applications.

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

ORDERING CODE

EAM 36F 12 / 13 G 8/30 S P X 10 X 8 PR . XXX

SERIES
magnetic multiturn absolute encoder EAM

MODEL
blind hollow shaft with stator coupling 36F
blind hollow shaft with torque pin 36G

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

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

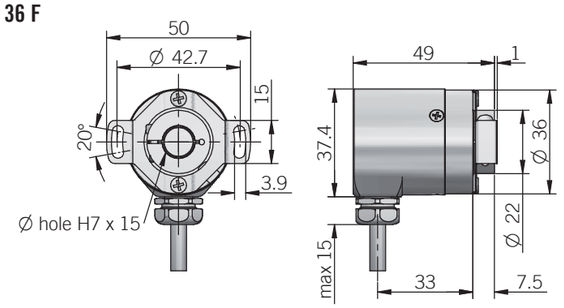
MAX ROTATION SPEED
8000 rpm 8

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

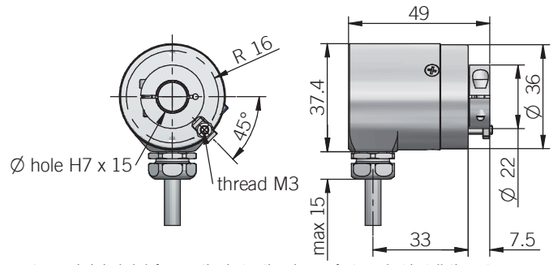
eltra@eltra.it

36 F



dimensions in mm

36 G



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

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 (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

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

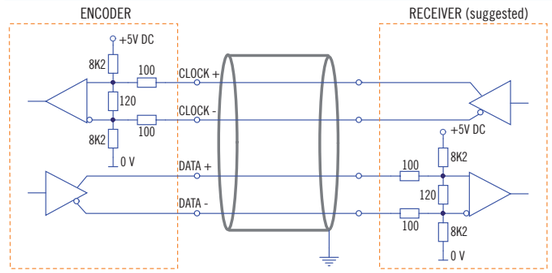
CONNECTIONS

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

MECHANICAL SPECIFICATIONS

Bore diameter	ø 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} kgm² (0,02 x 10^{-6} lbft²)
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 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



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