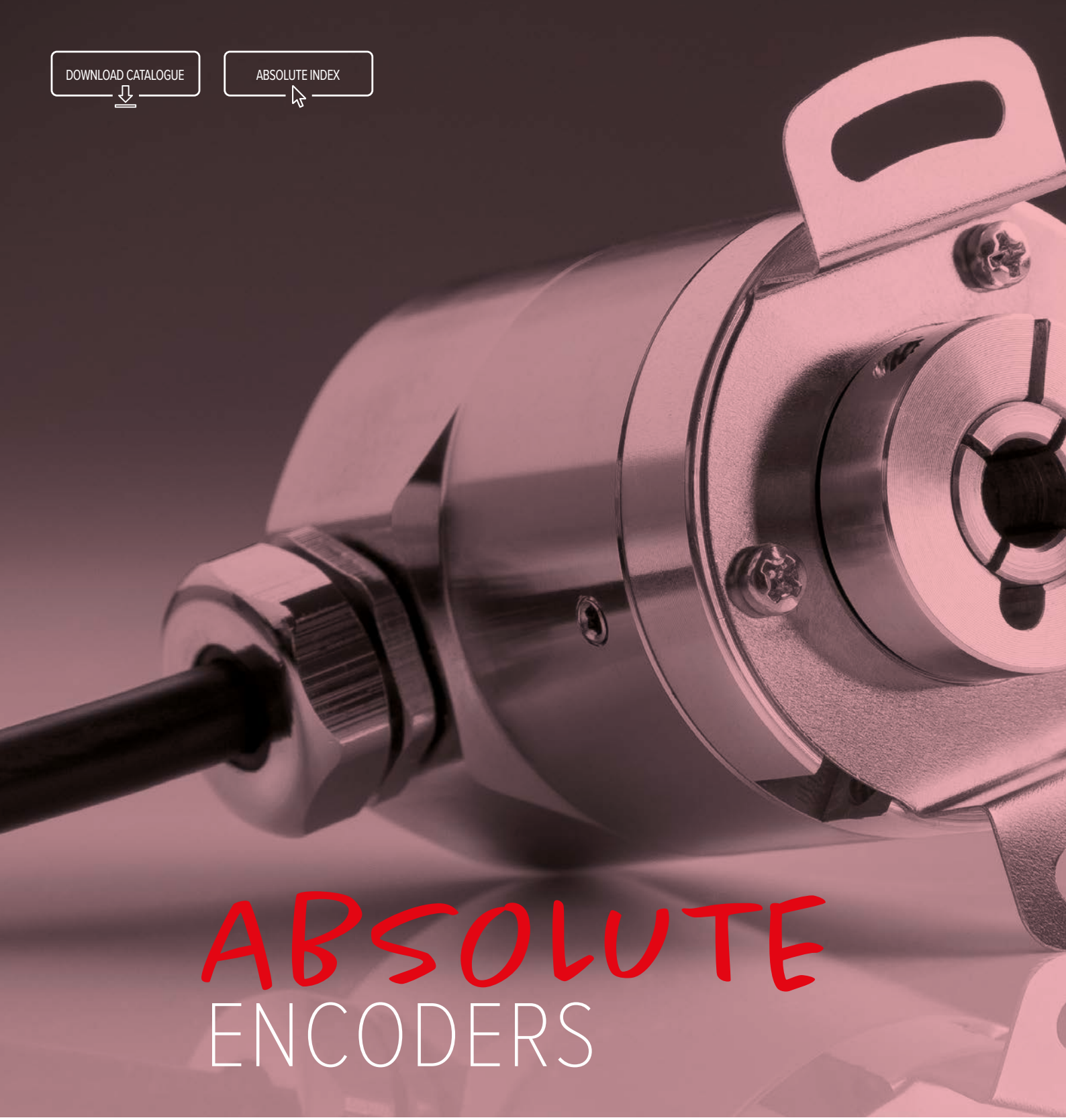

ABSOLUTE ENCODERS

No need to be reset

Absolute encoders can provide accurate data even after a power-down event without requiring a reset to the zero point. Due to these specifications and the ability to transfer data over a field bus, absolute encoders are now commonly used in various applications.
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, Modbus RTU, SSI, BiSS, Canopen, Profinet and Ethercat.

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DOWNLOAD CATALOGUE

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

MAIN FEATURES

Industry standard singleturn absolute encoders for factory automation applications.

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

ORDERING CODE BIT PARALLEL

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

SERIES
singleturn absolute encoder EAR

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

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

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

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

ELECTRICAL INTERFACE
push-pull P

LOGIC
negative N
positive P

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

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

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

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

DIRECTION TYPE
radial R

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

VARIANT
custom version XXX

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

SERIES
singleturn absolute encoder EAR

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

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

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

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

ELECTRICAL INTERFACE
Serial Synchronous Interface - SSI S

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

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

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

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

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

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

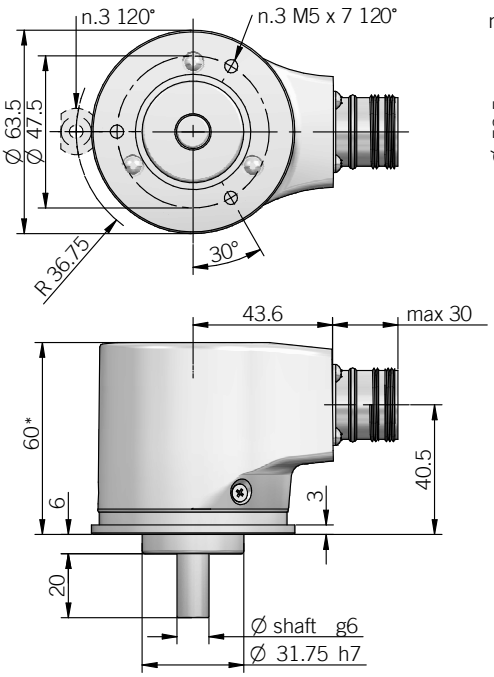
DIRECTION TYPE
radial R

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

VARIANT
custom version XXX

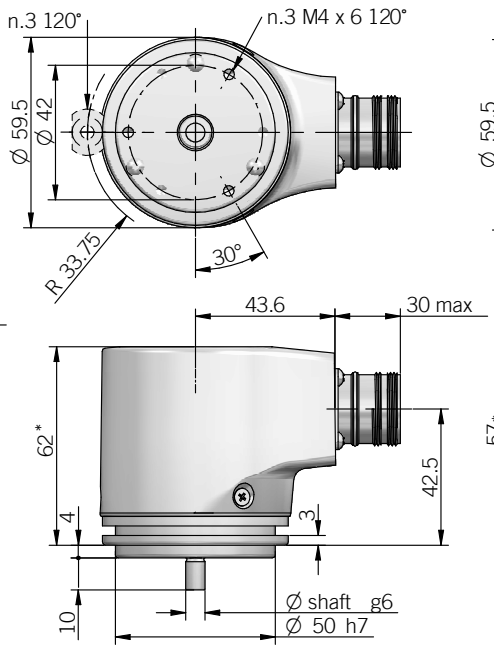
[ ] to be added with incremental output

63A



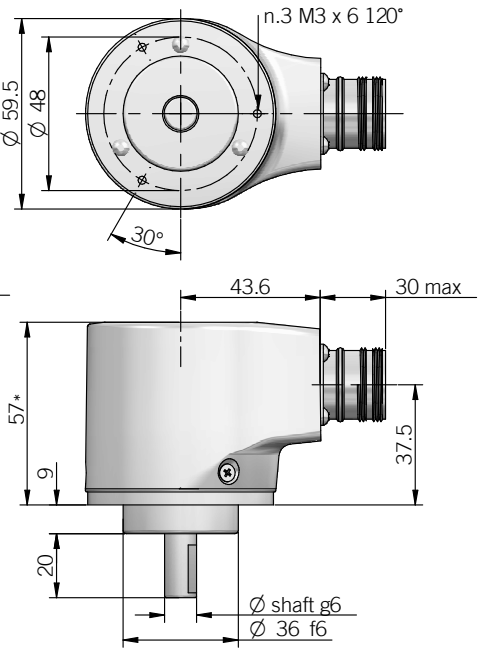
fixing clamps not included, please refer to Accessories

58B

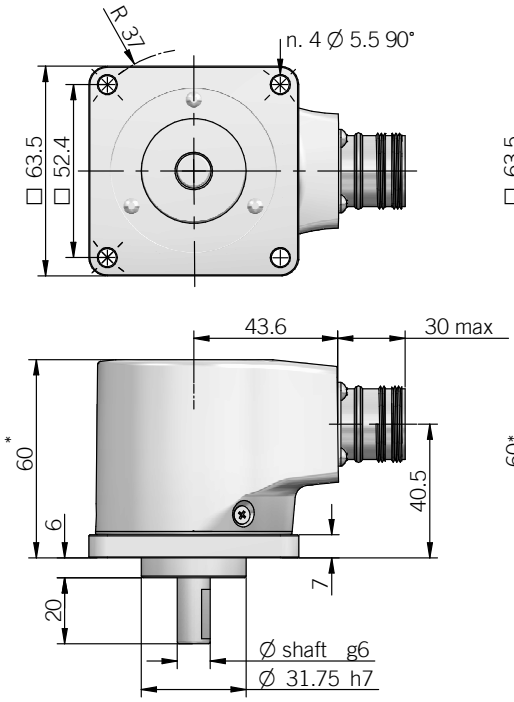


fixing clamps not included, please refer to Accessories

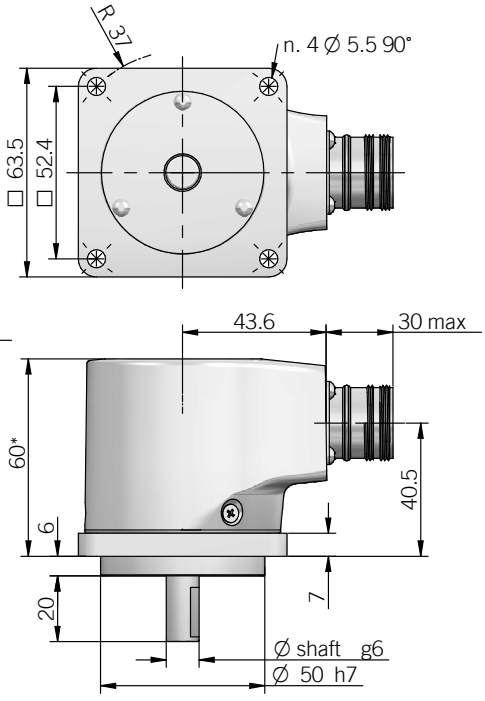
58C



63D



63E



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

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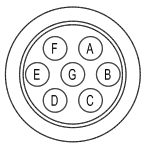
BIT-PARALLEL CONNECTIONS

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

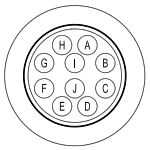
SSI CONNECTIONS

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

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

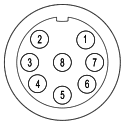


MD connector (10 pin)
Amphenol MS3102-E-18-1P
front view

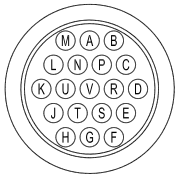


HA connector (12 pin) - M23 CCW
Hummel 7.410.000000 - 7.002.912.603
front view

M12 connector (8 pin)
M12 A coded
front view



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



ELECTRICAL SPECIFICATIONS

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

MECHANICAL SPECIFICATIONS

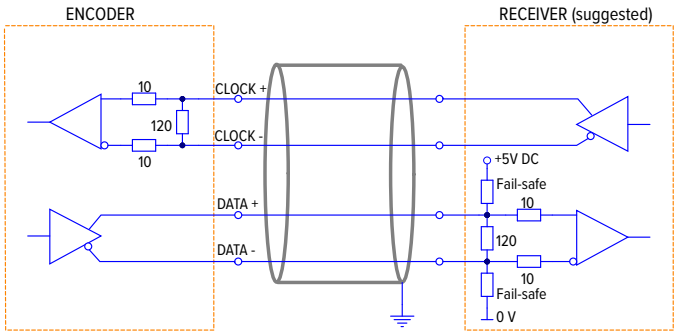
Shaft diameter	ø 6 / 9,52 (3/8") / 10 mm
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load[4]	200 N (45 lbs) axial / 70 N (15,74 lbs) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of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

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

ROTATION SPEED DERATING TABLE

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

SSI ELECTRICAL INTERFACE



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

MAIN FEATURES

Industry standard singleturn absolute encoders for factory automation applications.

- Optical sensing 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	MA	R	.162	+XXX

SERIES
singleturn absolute encoder EAR

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

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

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

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

ELECTRICAL INTERFACE
push-pull P

LOGIC
negative N
positive P

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

BORE DIAMETER
mm 14
mm 15
diameters 6 / 8 / 9,52 (3/8") / 10 / 11 / 12 mm with optional shaft adapter, see Accessories

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

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

DIRECTION TYPE
radial R

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

VARIANT
custom version XXX

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ORDERING CODE SSI	EAR	58F	13	G	8/30	S	X	2048	RS	15	X	HA	R	.162	+XXX

SERIES
singleturn absolute encoder EAR

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

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

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

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

ELECTRICAL INTERFACE
Serial Synchronous Interface - SSI S

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

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

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

BORE DIAMETER
mm 14
mm 15
diameters 6 / 8 / 9,52 (3/8") / 10 / 11 / 12 mm with optional shaft adapter, see Accessories

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

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

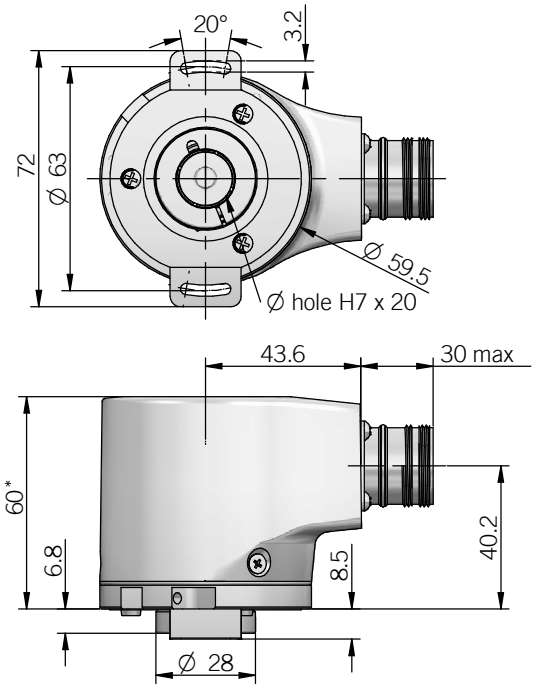
DIRECTION TYPE
radial R

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

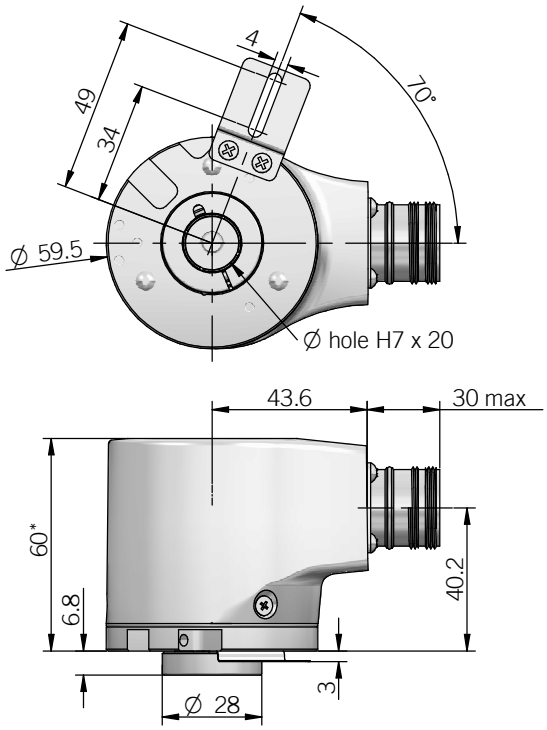
VARIANT
custom version XXX

[ ] to be added with incremental output

58F

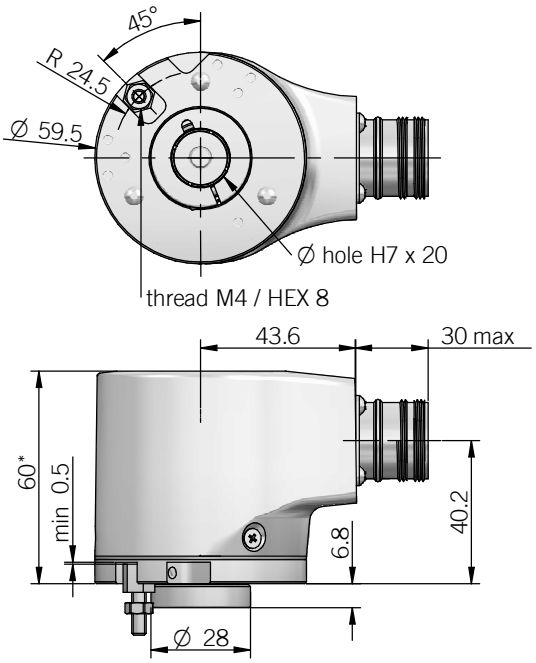


63F



for torque pin please refer to Accessories

63G



torque pin is included

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

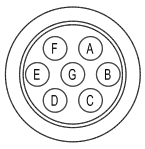
BIT-PARALLEL CONNECTIONS

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

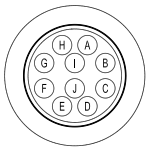
SSI CONNECTIONS

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

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

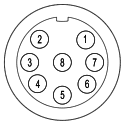


MD connector (10 pin)
Amphenol MS3102-E-18-1P
front view

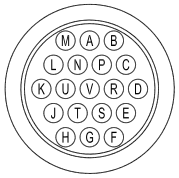


HA connector (12 pin) - M23 CCW
Hummel 7.410.000000 - 7.002.912.603
front view

M12 connector (8 pin)
M12 A coded
front view



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



ELECTRICAL SPECIFICATIONS

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

MECHANICAL SPECIFICATIONS

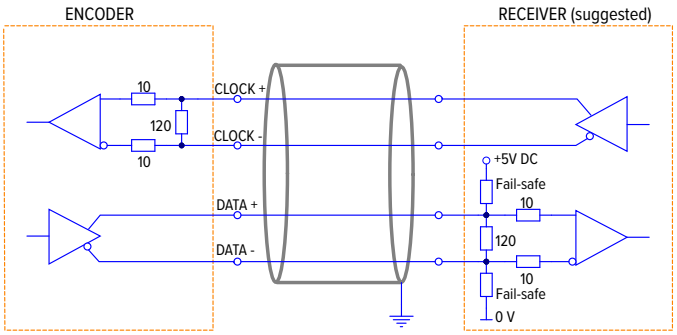
Bore diameter	ø 14 / 15 mm ø 6* / 8* / 9,52 (3/8")* / 10* / 11* / 12* * with optional shaft adapter, please refer to Accessories
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load[4]	200 N (45 lbs) axial / 60 N (13,49 lbs) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	5 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	aluminum
Shaft material	stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature Bit-parallel[5, 6]	-20° ... +85°C (-4 ... +185°F)
Operating temperature SSI[5, 6]	-40° ... +85°C (-40° ... +185°F) -20° ... +85°C (-4° ... +185°F) with cable output -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature[6]	-20° ... +85°C (-4° ... +185°F)
Weight	approx 300 g (10,58 oz)

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

ROTATION SPEED DERATING TABLE

	Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
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 ELECTRICAL INTERFACE



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ABSOLUTE INDEX

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

MAIN FEATURES

Industry standard singleturn absolute encoders for factory automation applications.

- Optical sensing 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 or RE0-444 flange

ORDERING CODE BIT PARALLEL

EAR	90A	12	G	8/30	P	P	X	10	X	MA	R	.162	+XXX

SERIES
singleturn absolute encoder EAR

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

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

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

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

ELECTRICAL INTERFACE
push-pull P

LOGIC
negative N
positive P

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

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

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

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

DIRECTION TYPE
radial R

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

VARIANT
custom version XXX

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ORDERING CODE SSI	EAR	90A	13	G	8/30	S	X	2048	RS	10	X	HA	R	.162	+XXX

SERIES
singleturn absolute encoder EAR

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

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

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

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

ELECTRICAL INTERFACE
Serial Synchronous Interface - SSI S

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

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

INCREMENTAL ELECTRICAL INTERFACE
available with PD 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

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

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

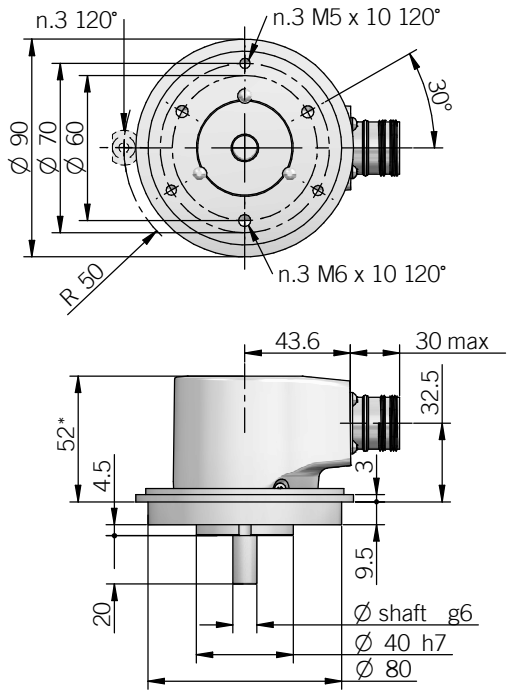
DIRECTION TYPE
radial R

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

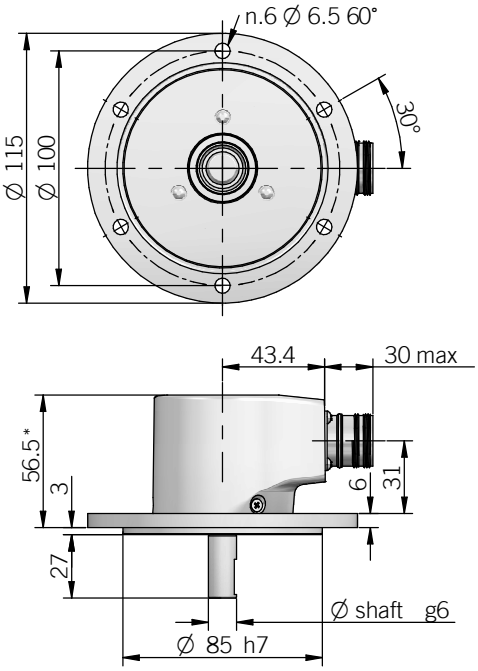
VARIANT
custom version XXX

to be added with incremental output

90A



115A



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

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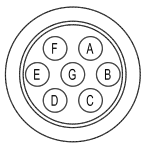
BIT-PARALLEL CONNECTIONS

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

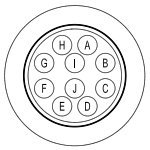
SSI CONNECTIONS

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

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

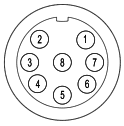


MD connector (10 pin)
Amphenol MS3102-E-18-1P
front view

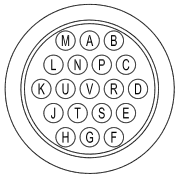


HA connector (12 pin) - M23 CCW
Hummel 7.410.000000 - 7.002.912.603
front view

M12 connector (8 pin)
M12 A coded
front view



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



ELECTRICAL SPECIFICATIONS

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

MECHANICAL SPECIFICATIONS

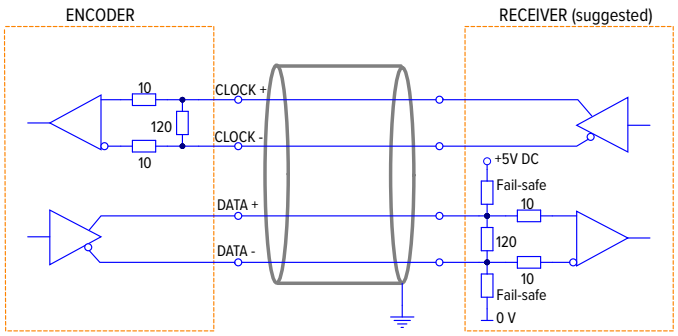
Shaft diameter	ø 9,52 (3/8") / 10 mm
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load[4]	200 N (45 lbs) axial / 70 N (15,74 lbs) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia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

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

ROTATION SPEED DERATING TABLE

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

SSI ELECTRICAL INTERFACE



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ABSOLUTE INDEX

EAL 58 B / C - 63 A / D / E ANALOGUE

SOLID SHAFT SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard singleturn absolute encoders for factory automation applications.

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

ORDERING CODE	EAL	63A	16B	12/30	V	05	X	10	X	M12	R	.162	+XXX

SERIES
analogue singleturn absolute encoder EAL

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

OUTPUT DAC RESOLUTION
16 bit 16B

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

ELECTRICAL INTERFACE
voltage V
current I

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

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

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

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

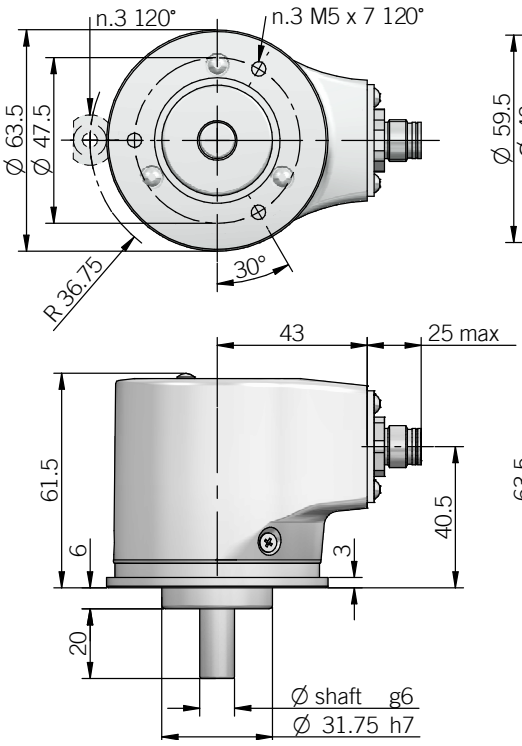
OUTPUT TYPE
cable (standard length 1,5 m) P
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)
M12 plug connector M12

DIRECTION TYPE
radial R

SOCKET
socket not included .162
to be reported only with connector output (eg. M12R.162), for socket see Accessories

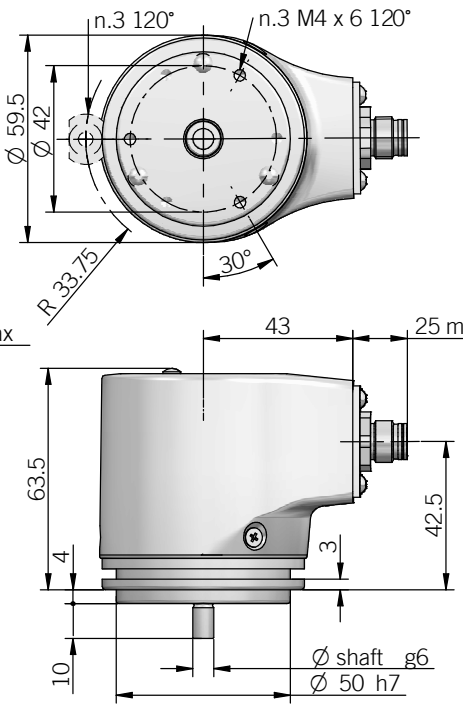
VARIANT
custom version XXX

63A



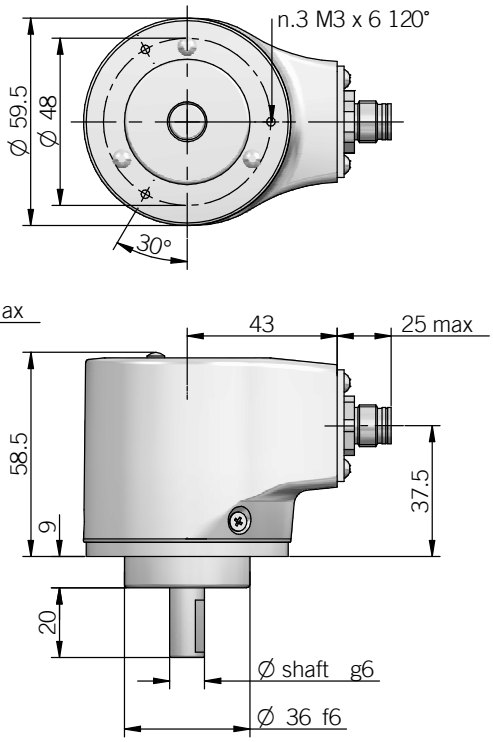
for fixing clamps please refer to Accessories

58B

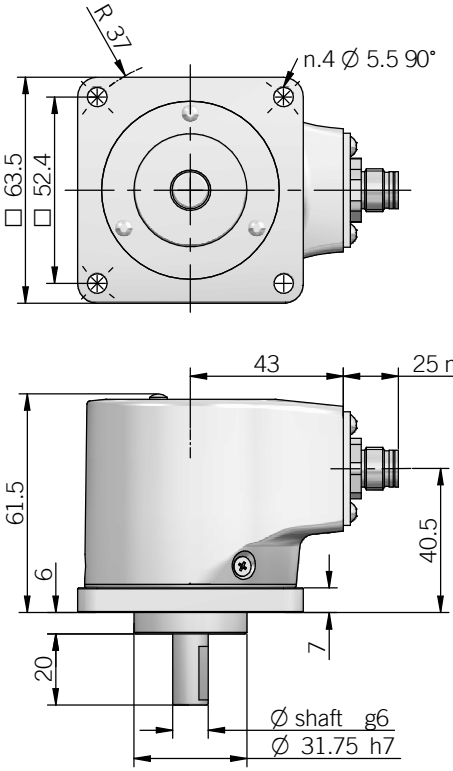


for fixing clamps please refer to Accessories

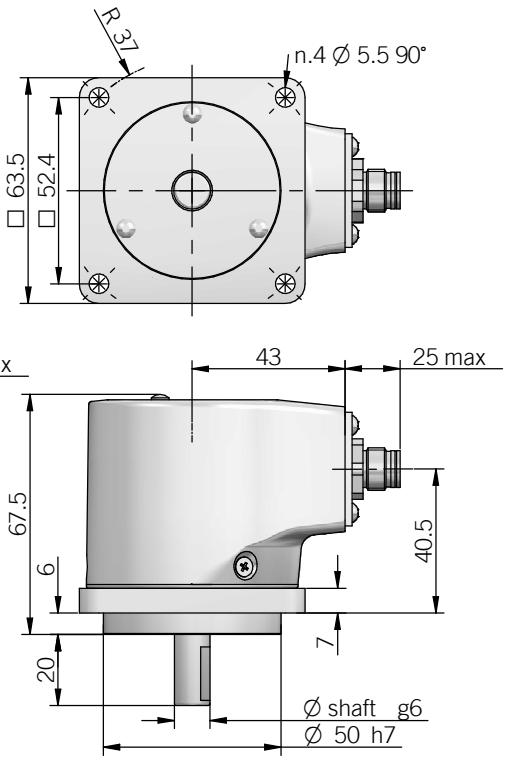
58C



63D



63E



recommended mating shaft tolerance H7
dimensions in mm

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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	Rmin= 1 kΩ (voltage output) Rmax= (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	± 0,069°
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	215 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type	shielded - fixed installation conductors section 0,22 mm^2 / AWG 24 bending radius min 60 mm
Electromagnetic compatbility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

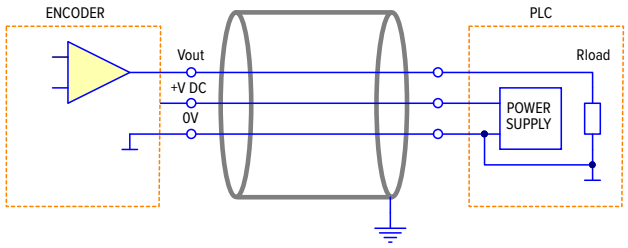
MECHANICAL SPECIFICATIONS

Shaft diameter	ø 6 / 9,52 (3/8") / 10 mm
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load[4]	200 N (45 lbs) axial / 70 N (15,74 lbs) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10^{-6} kgm² (36 x 10^{-6} lbft²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature[5, 6]	-20° ... +85°C (-4° ... +185°F)
Storage temperature[6]	-20° ... +85°C (-4° ... +185°F)
Weight	approx 350 g (12,35 oz)

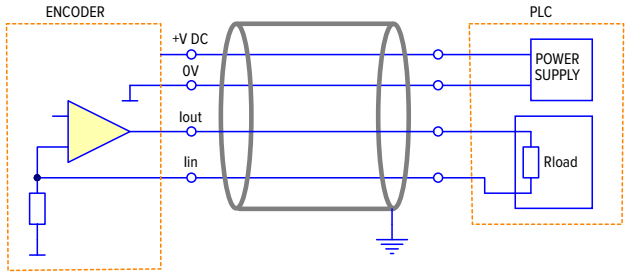
[1] as measured at the transducer without cable influences
[2] for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
[3] this product is not a safety component, for further details refer to TECHNICAL BASICS section
[4] maximum load for static usage
[5] measured on the transducer flange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

ELECTRICAL INTERFACE

VOLTAGE OUTPUT



CURRENT OUTPUT



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

ROTATION SPEED / TEMPERATURE TABLE

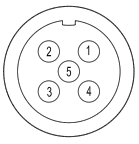
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 ... +85 (+158 ... +185)	8000	5000

CONNECTIONS

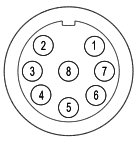
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
Vout / Iout	green	1	1
Iin	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
⏚	shield	housing	housing

* with Q current ouput

M12 connector (5 pin)
M12 A coded
front view



M12 connector (8 pin)
M12 A coded
front view



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ABSOLUTE INDEX

EAL 58 F - 63 F / G ANALOGUE

BLIND HOLLOW SHAFT SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard singleturn absolute encoders for factory automation applications.

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

ORDERING CODE

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

SERIES
analogue singleturn absolute encoder EAL

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

OUTPUT DAC RESOLUTION
16 bit 16B

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

ELECTRICAL INTERFACE
voltage V
current I

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

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

BORE DIAMETER
mm 14
mm 15
diameters 6 / 8 / 9,52 (3/8") / 10 / 11 / 12 mm with optional shaft adapter, see Accessories

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

OUTPUT TYPE
cable (standard length 1,5 m) P
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)
M12 plug connector M12

DIRECTION TYPE
radial R

SOCKET
socket not included .162
to be reported only with connector output (eg. M12R.162), for socket see Accessories

VARIANT
custom version XXX

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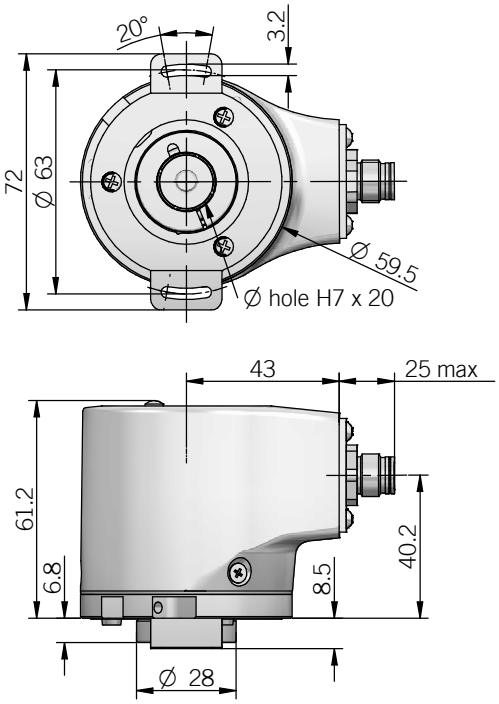
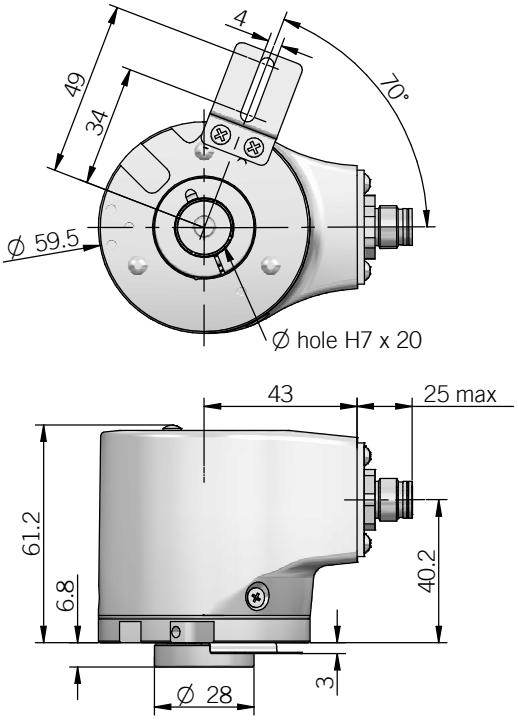
58F

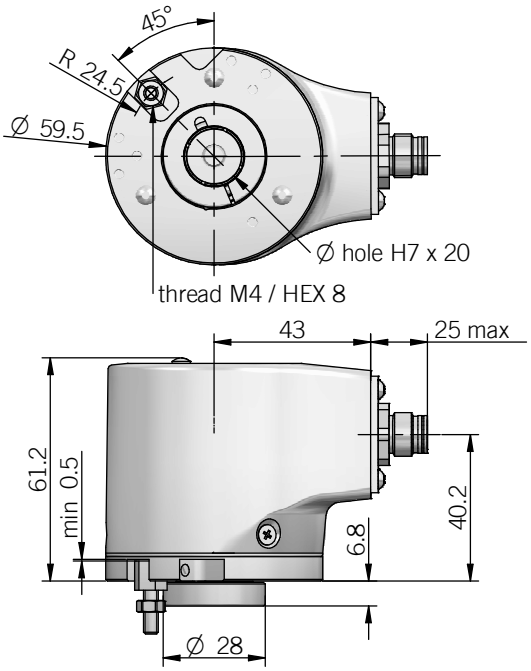


63F



for torque pin please refer to Accessories

63 G



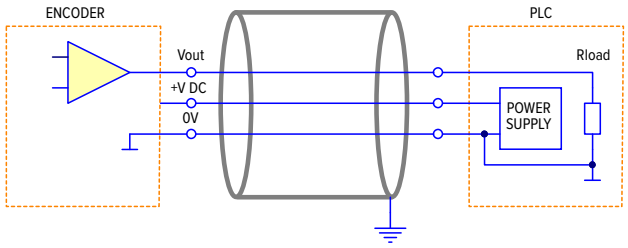
torque pin is included
recommended mating shaft tolerance g6
dimensions in mm

ELECTRICAL SPECIFICATIONS

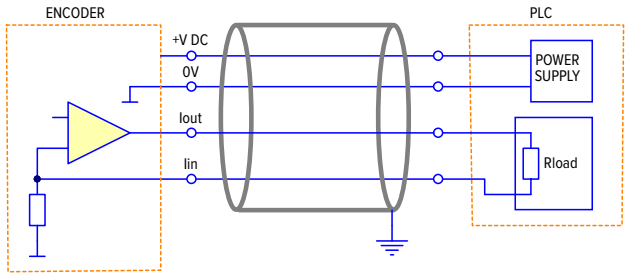
Resolution	16 bit
Output DAC resolution	16 bit
Minimum angle	22,5°
Power supply[1]	11,4 ... 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Electrical interface[2]	voltage (0 ... 5 V / 0 ... 10 V) current (0 ... 20 mA / 4 ... 20 mA)
Auxiliary inputs (BEGIN - END)	active high (+V DC) connect to 0 V if not used / t_{min} 150 ms
Load	Rmin= 1 kΩ (voltage output) Rmax= (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	± 0,069°
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	215 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type	shielded - fixed installation conductors section 0,22 mm² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

ELECTRICAL INTERFACE

VOLTAGE OUTPUT



CURRENT OUTPUT



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

MECHANICAL SPECIFICATIONS

Bore diameter	ø 14 / 15 mm ø 6* / 8* / 9,52 (3/8")* / 10* / 11* / 12* mm * with optional shaft adapter, please refer to Accessories
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load[4]	200 N (45 lbs) axial / 60 N (13,49 lbs) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	5 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	aluminum
Shaft material	stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature[5, 6]	-20° ... +85°C (-4° ... +185°F)
Storage temperature[6]	-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] this product is not a safety component, for further details refer to TECHNICAL BASICS section
[4] maximum load for static usage
[5] measured on the transducer flange
[6] condensation not allowed

ROTATION SPEED / TEMPERATURE TABLE

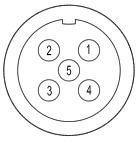
	Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
IP65	up to +70 (+158)	9000	6000
	+70 ... +85 (+158 ... +185)	6000	3000
IP67	up to +70 (+158)	8000	4000
	+70 ... +85 (+158 ... +185)	4000	2000

CONNECTIONS

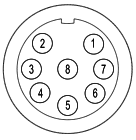
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
Vout / Iout	green	1	1
Iin	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
⏚	shield	housing	housing

* with Q current ouput

M12 connector (5 pin)
M12 A coded
front view



M12 connector (8 pin)
M12 A coded
front view



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ABSOLUTE INDEX

EAL 90 - 115 A ANALOGUE

SOLID SHAFT SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard singleturn absolute encoders for factory automation applications.

- Optical sensing technology (OptoASIC)
- Programmable measuring range via teach-in function (external inputs or cover button)
- Power supply up to +30 VDC with analogue (voltage or current) electrical interface
- Cable or M12 connector output
- Solid shaft diameter up to 10 mm
- Mounting by synchronous or RE0-444 flange

ORDERING CODE	EAL	90A	16B	12/30	V	05	X	10	X	M12	R	.162	+XXX

SERIES
analogue singleturn absolute encoder EAL

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

OUTPUT DAC RESOLUTION
16 bit 16B

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

ELECTRICAL INTERFACE
voltage V
current I

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

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

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

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

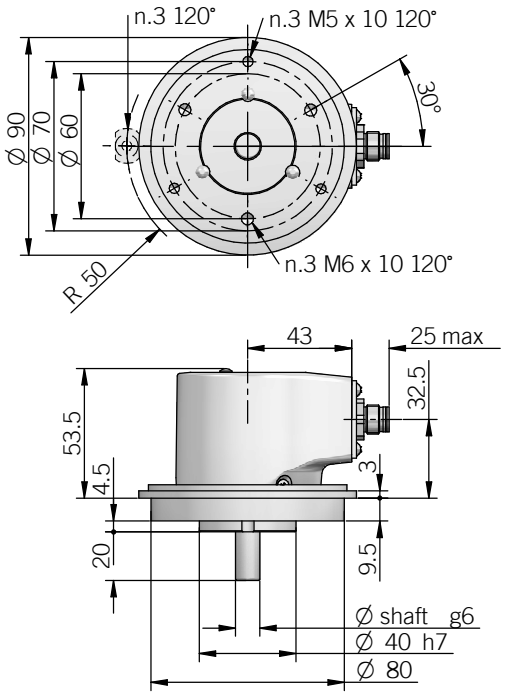
OUTPUT TYPE
cable (standard length 1,5 m) P
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)
M12 plug connector M12
socket connector included, without socket please add 162 as variant code

DIRECTION TYPE
radial R

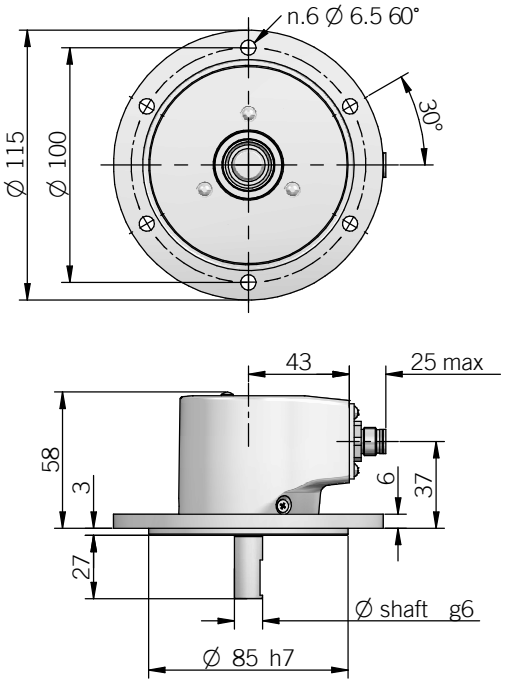
SOCKET
socket not included .162
to be reported only with connector output (eg. M12R.162), for socket see Accessories

VARIANT
custom version XXX

90A



115A



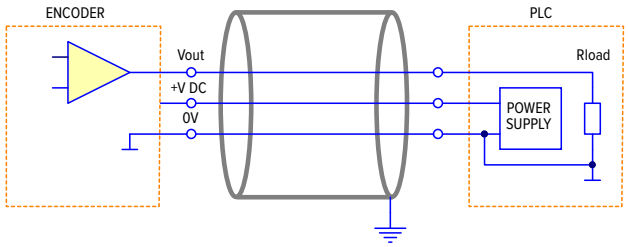
for fixing clamps please refer to Accessories
recommended mating shaft tolerance H7
dimensions in mm

ELECTRICAL SPECIFICATIONS

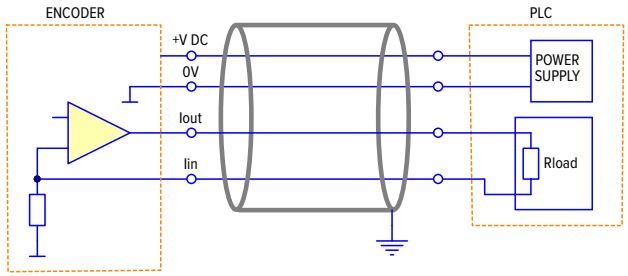
Resolution	16 bit
Output DAC resolution	16 bit
Minimum angle	22,5°
Power supply[1]	11,4 ... 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Electrical interface[2]	voltage (0 ... 5 V / 0 ... 10 V) current (0 ... 20 mA / 4 ... 20 mA)
Auxiliary inputs (BEGIN - END)	active high (+V DC) connect to 0 V if not used / t_{min} 150 ms
Load	Rmin= 1 kΩ (voltage output) Rmax= (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	± 0,069°
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	215 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type	shielded - fixed installation conductors section 0,22 mm² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

ELECTRICAL INTERFACE

VOLTAGE OUTPUT



CURRENT OUTPUT



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

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 9,52 (3/8") / 10 mm
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load[4]	200 N (45 lbs) axial / 70 N (15,74 lbs) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10^{-6} kgm² (36 x 10^{-6} lbft²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature[5, 6]	-20° ... +85°C (-4° ... +185°F)
Storage temperature[6]	-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] this product is not a safety component, for further details refer to TECHNICAL BASICS section
[4] maximum load for static usage
[5] measured on the transducer flange
[6] condensation not allowed

ROTATION SPEED / TEMPERATURE TABLE

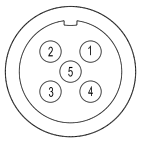
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 ... +85 (+158 ... +185)	8000	5000

CONNECTIONS

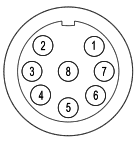
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
Vout / Iout	green	1	1
Iin	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
⏚	shield	housing	housing

* with Q current ouput

M12 connector (5 pin)
M12 A coded
front view



M12 connector (8 pin)
M12 A coded
front view



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ABSOLUTE INDEX

EAX 80 A / D SSI

EXPLOSION PROOF ATEX SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Explosion proof encoders designed to operate in hazardous and explosive environments.

- Optical sensing technology (propietary OptoASIC)
- Resolution up to 25 bit
- Power supply up to +30 VDC with SSI as electrical interface
- Code reset for easy setup
- 10 mm 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 EAX 80 is compliant with essential health and safety requirements according to

- EN IEC 60079-0:2018
- EN 60079-1:2014
- EN 60079-31:2014

The UE declaration is available on www.eltra.it

ORDERING CODE

EAX	80A	13	G	8/30	S	X	10	X	PR	. XXX

SERIES
singleturn absolute flameproof encoder EAX

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

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

OPTIONS
to be reported if not used X
reset with external input ZE

SHAFT DIAMETER
mm 10

ENCLOSURE RATING
IP 65 X

OUTPUT TYPE
radial cable (standard length 1,5 m) PR
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PDR5)

VARIANT
custom version XXX

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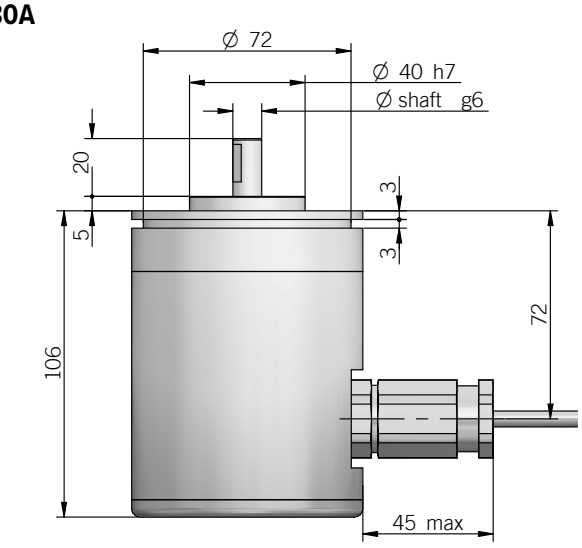
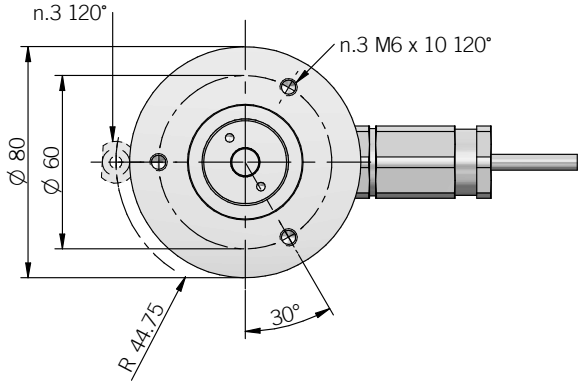
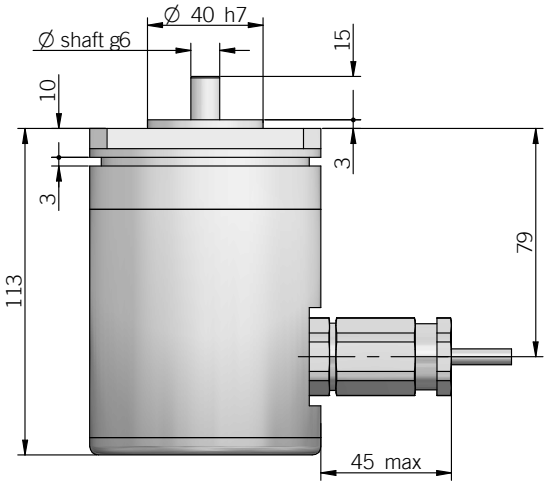
80A

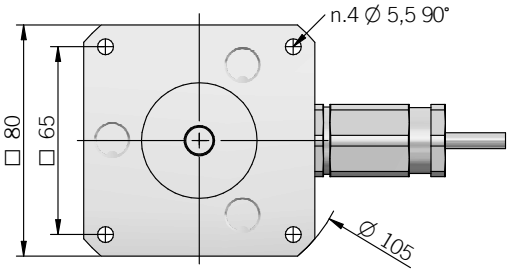




fixing clamps not included, please refer to the Accessories

80D





recommended mating shaft tolerance H7
dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 360 ppr to 25 bit
Power supply[1]	7,6 ... 30 V DC (reverse polarity protection)
Current consumption without load	100 mA max
Absolute electrical interface[2]	RS-422 (THVD1451 or similar)
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET t_{min} 150 ms
Max frequency	clock input 100 kHz ... 1 MHz
Code type	binary or gray
Logic	positive
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	± 0,069°
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	214 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type	shielded - fixed or flexible installation conductors section min 0,14 mm^2 / AWG 26 bending radius min 35 mm (fixed) / min 60 mm (flexible)
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 10 mm
Enclosure rating	IP 65 (IEC 60529)
Max rotation speed	3000 rpm
Max shaft load[4]	200 N (45 lbs) 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	stainless steel
Housing material	anodized aluminum
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature[5, 6]	0° ... +50°C (+32° ... +122°F)
Storage temperature[6]	-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] this product is not a safety component, for further details refer to TECHNICAL BASICS section
[4] maximum load for static usage
[5] measured on the transducer flange
[6] condensation not allowed

EPL MARKING

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

II 2GD

II: group II: different than mines
2: category 2: high level of protection
GD: areas containing gas (G) and dust (D)

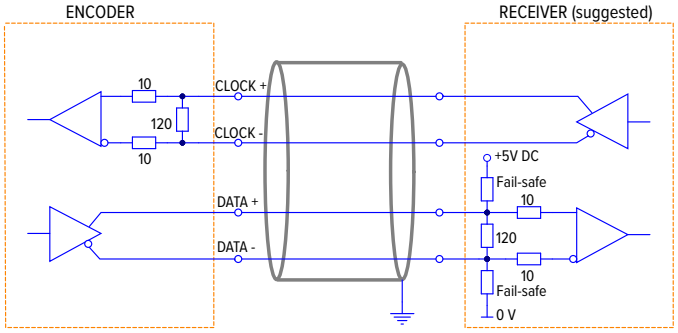
Ex db IIC T6 Gb

Ex db: flameproof enclosure for explosive atmospheres with gases, vapours and mists
IIC: group of gas IIC
T6: max surface temperature +85°C of the device for atmospheres with gas
Gb: product with a high level of protection

Ex tb IIIC T85°C Db

Ex tb: flameproof enclosure safety type
IIIC: group of dust combustibles IIIC
T85°C: max surface temperature +85°C of the device in the presence of dust
Db: product with a high level of protection

SSI ELECTRICAL INTERFACE



CONNECTIONS

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

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EMA 36 B
SSI
SOLID SHAFT MAGNETIC SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Miniaturised singleturn absolute encoder for applications with limited space.

- Contactless magnetic sensing technology (magnetic ASIC)
- Up to 18 bit as singleturn resolution
- Power supply up to +30 V DC with SSI as electrical interface
- Code reset for easy setup
- Cable or M12 output, other connectors available at cable end
- 6 mm diameter solid shaft
- Mounting by syncronous flange

ORDERING CODE	EMA	36B	13	G	8/30	S	P	X	6	X	8	M12R	.162	+XXX

SERIES
magnetic singleturn absolute encoder EMA

MODEL
syncronous flange ø 33 mm 36B

RESOLUTION
from 1 to 18 bit
please directly contact our offices for other pulses

CODE TYPE
binary B
gray G

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

ELECTRICAL INTERFACE
Serial Synchronous Interface - SSI S

LOGIC
positive P

OPTIONS
to be reported if not used X
reset with external input ZE

SHAFT DIAMETER
mm 6

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

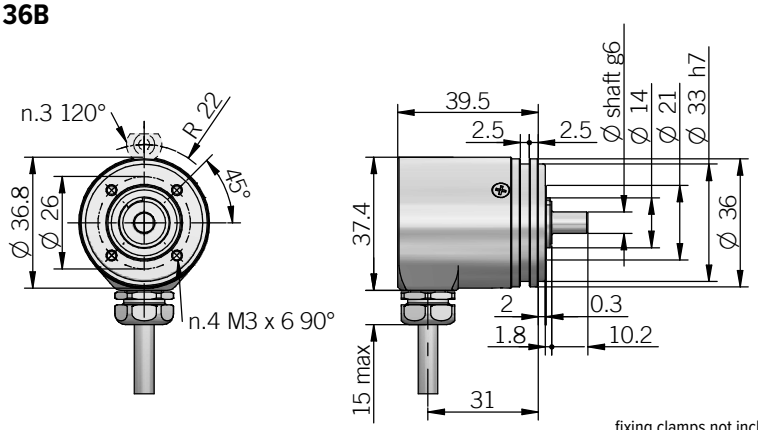
MAX ROTATION SPEED
8000 rpm 8

OUTPUT TYPE
radial cable (standard length 0,5 m) PR
preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)
8 pin M12 radial plug connector M12R

SOCKET
socket not included .162
to be reported only with connector output (eg. M12R.162), for socket see Accessories

VARIANT
custom version XXX

36B



recommended mating shaft tolerance H7
dimensions in mm

fixing clamps not included, please refer to Accessories

ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 18 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	< 0,4 W
Electrical interface[2]	RS-422 (THVD1451 or similar)
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	left aligned format MSB ... LSB up to 13 bit = length 13 bit 14 to 18 bit = length 18 bit
SSI status and parity bit	on request
Counting direction	decreasing clockwise (shaft view)
Start-up time	150 ms
Accuracy (at +20°C / +68°F)	± 0,20°
Mean time to dangerous failure ($MTTF_d$)[3] according to EN ISO 13849-1	230 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type	shielded - fixed installation conductors section 0,14 mm² / AWG 26 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

CONNECTIONS

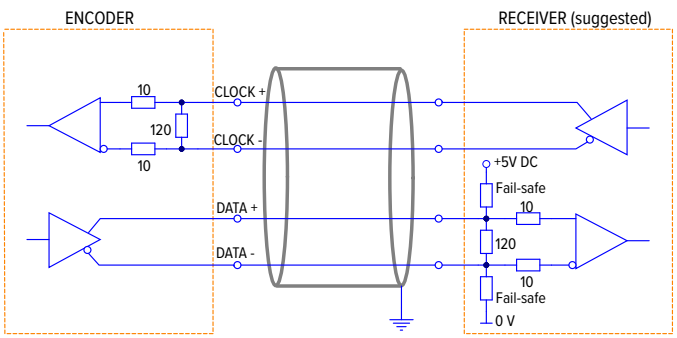
Function	Cable	8 pin M12
+ V DC	red	8
0 V	black	5
DATA +	green	3
DATA -	brown or grey	2
CLOCK +	yellow	4
CLOCK -	orange	6
U / D	red / blue	7
RESET	white	1
⏚	shield	housing

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 6 mm
Enclosure rating	IP 67 cover side / IP 65 shaft side (IEC 60529)
Rotation speed	8000 rpm continuous / 10000 rpm max
Max shaft load[4]	20 N (4,5 lbs) 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	aluminum
Shaft material	stainless steel
Housing material	chrome plated steel
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature[5, 6]	-30° ... +100°C (-22° ... +212°F) -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature[6]	-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] this product is not a safety component, for further details refer to TECHNICAL BASICS section
[4] maximum load for static usage
[5] measured on the transducer flange
[6] condensation not allowed

SSI ELECTRICAL INTERFACE



M12 connector (8 pin)
M12 A coded
front view

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DOWNLOAD CATALOGUE

ABSOLUTE INDEX

EMA 36 F / G
SSI
BLIND HOLLOW SHAFT MAGNETIC SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Miniaturised singleturn absolute encoders for applications with limited space.

- Contactless magnetic sensing technology (magnetic ASIC)
- Up to 18 bit as singleturn resolution
- Power supply up to +30 V DC with SSI as electrical interface
- Code reset for easy setup
- Cable or M12 output, other connectors available at cable end
- Blind hollow shaft up to 10 mm diameter
- Mounting by stator coupling or torque pin

ORDERING CODE	EMA	36F	13	G	8/30	S	P	X	10	X	8	M12R	.162	+XXX

SERIES
magnetic singleturn absolute encoder EMA

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

RESOLUTION
from 1 to 18 bit
please directly contact our offices for other pulses

CODE TYPE
binary B
gray G

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

ELECTRICAL INTERFACE
Serial Synchronous Interface - SSI S

LOGIC
positive P

OPTIONS
to be reported if not used X
reset with external input ZE

BORE DIAMETER
(3/8") mm 9,52
mm 10
diameters 4 / 5 / 6 / 6,35 (1/4") / 8 mm with optional shaft adapter, see Accessories

ENCLOSURE RATING
IP 67 cover side / IP 66 shaft side X

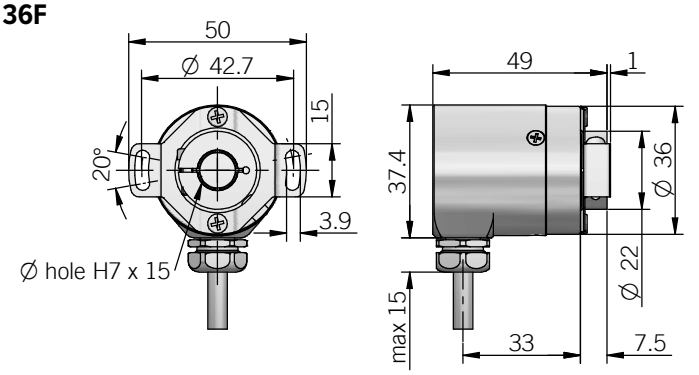
MAX ROTATION SPEED
8000 rpm 8

OUTPUT TYPE
radial cable (standard length 0,5 m) PR
preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PDR5)
8 pin M12 radial plug connector M12R

SOCKET
socket not included .162
to be reported only with connector output (eg. M12R.162), for socket see Accessories

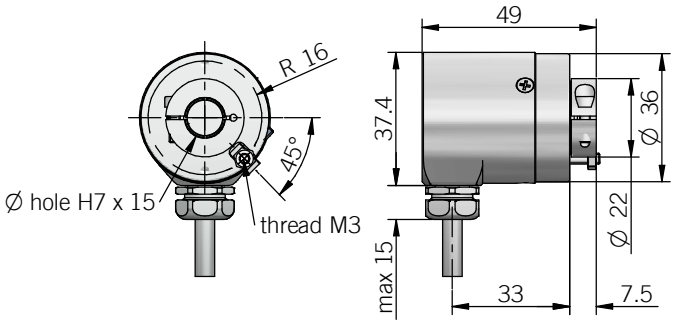
VARIANT
custom version XXX

36F



recommended mating shaft tolerance g6
dimensions in mm

36G



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

ELECTRICAL SPECIFICATIONS

Resolution	from 1 to 18 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	< 0,4 W
Electrical interface[2]	RS-422 (THVD1451 or similar)
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	left aligned format MSB ... LSB up to 13 bit = length 13 bit 14 to 18 bit = length 18 bit
SSI status and parity bit	on request
Counting direction	decreasing clockwise (shaft view)
Start-up time	150 ms
Accuracy (at +20°C / +68°F)	± 0,20°
Mean time to dangerous failure ($MTTF_d$)[3] according to EN ISO 13849-1	230 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type	shielded - fixed installation conductors section 0,14 mm² / AWG 26 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

CONNECTIONS

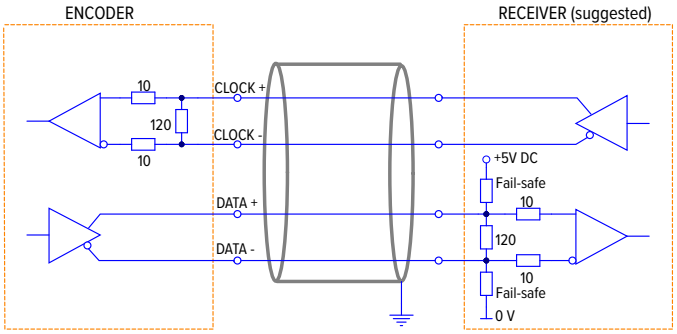
Function	Cable	8 pin M12
+ V DC	red	8
0 V	black	5
DATA +	green	3
DATA -	brown or grey	2
CLOCK +	yellow	4
CLOCK -	orange	6
U / D	red / blue	7
RESET	white	1
⏚	shield	housing

MECHANICAL SPECIFICATIONS

Bore diameter	ø 9,52 (3/8") / 10 mm ø 4* / 5* / 6* / 6,35 (1/4")* / 8* mm * with optional shaft adapter, please refer to Accessories
Enclosure rating	IP 67 cover side / IP 66 shaft side (IEC 60529)
Rotation speed	8000 rpm continuous / 10000 rpm max
Max shaft load[4]	20 N (4,5 lbs) 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	aluminum
Shaft material	stainless steel
Housing material	chrome plated steel
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature[5, 6]	-30° ... +100°C (-22° ... +212°F) -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature[6]	-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] this product is not a safety component, for further details refer to TECHNICAL BASICS section
[4] maximum load for static usage
[5] measured on the transducer flange
[6] condensation not allowed

SSI ELECTRICAL INTERFACE



M12 connector (8 pin)
M12 A coded
front view

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EMA 50 A / B
BIT-PARALLEL - SSI
SOLID SHAFT MAGNETIC SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Singleturn absolute magnetic encoders with solid shaft, 50 mm size

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

ORDERING CODE	EMA	50B	1024	G	8/30	N	N	X	6	X	3	M12	R	.162	+XXX

SERIES
magnetic singleturn absolute encoder EMA

MODEL
synchronous flange ø 25 mm 50A
synchronous flange ø 30 mm 50B
for anodized version please directly contact our offices

RESOLUTION
(N / C / R / U / P interface) ppr from 2 to 4096
(S interface) ppr from 2 to 8192

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

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

ELECTRICAL INTERFACE
NPN N
NPN open collector C
PNP R
PNP open collector U
push pull P
Serial Synchronous Interface - SSI S

LOGIC
negative N
positive P

OPTIONS
to be reported if not used X
reset with external input ZE
(with binary code) strobe S
(with binary code) strobe and reset with external input SZE

SHAFT DIAMETER
(mod. 50A) mm 6
(mod. 50B) mm 8
(mod. 50B) mm 10

ENCLOSURE RATING
IP 65 X
IP 67 S

MAX ROTATION SPEED
3000 rpm 3

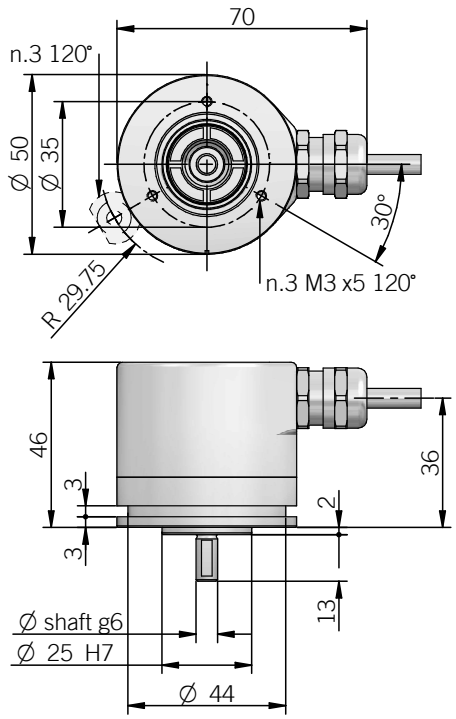
OUTPUT TYPE
cable (standard length 0,5 m) P
preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)
(S interface) M12 plug connector M12

DIRECTION TYPE
axial A
radial R

SOCKET
socket not included .162
to be reported only with connector output (eg. M12R.162), for socket see Accessories

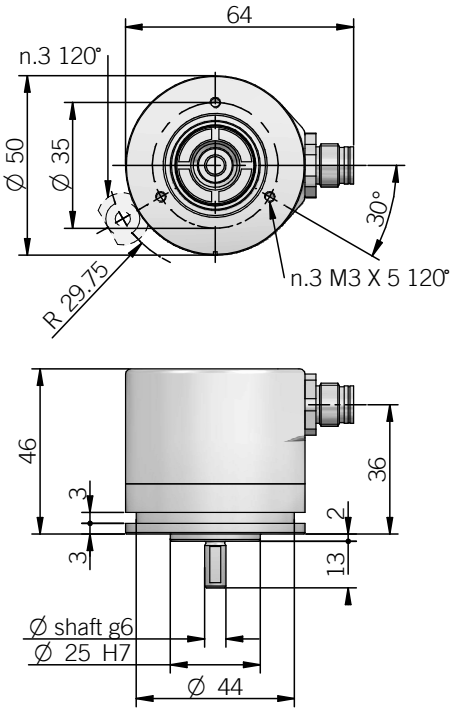
VARIANT
custom version XXX

50A WITH RADIAL CABLE OUTPUT



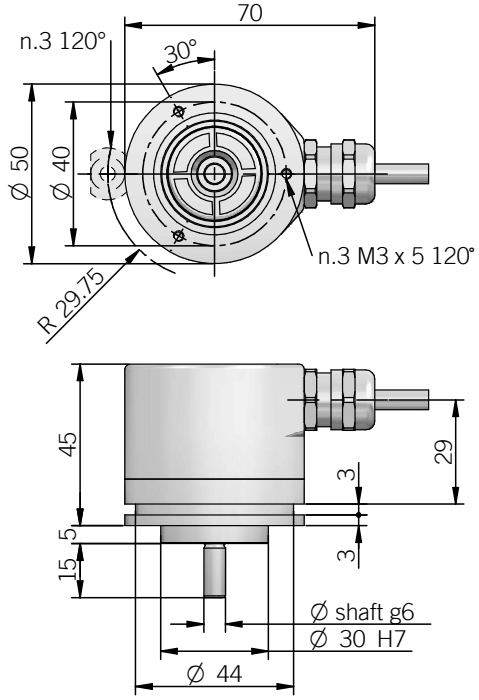
fixing clamps not included, please refer to Accessories

50A WITH RADIAL M12 OUTPUT



fixing clamps not included, please refer to Accessories

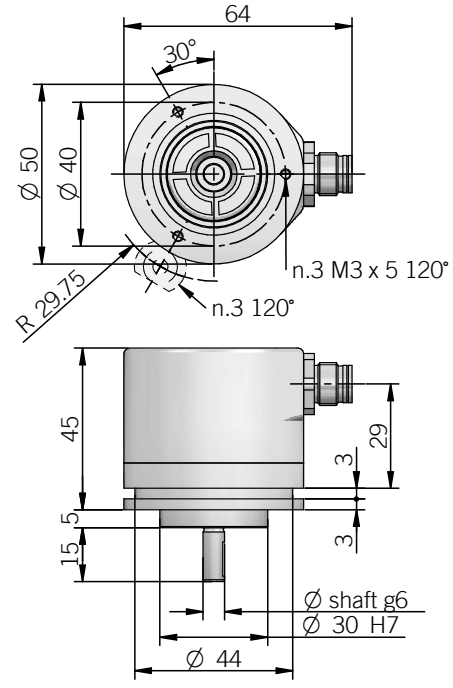
50B WITH RADIAL CABLE OUTPUT



fixing clamps not included, please refer to Accessories

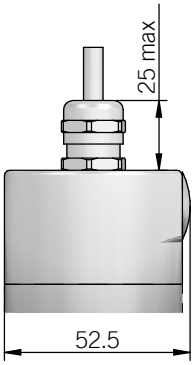
recommended mating shaft tolerance H7
dimensions in mm

50B WITH RADIAL M12 OUTPUT



fixing clamps not included, please refer to Accessories

DIMENSIONS WITH AXIAL OUTPUT



ELECTRICAL SPECIFICATIONS

Resolution	from 2 to 4096 ppr (N / C / P / R / U interface) from 2 to 8192 ppr (S interface)
Power supply[1]	5 = 4,5 ... 5,5 V DC 8/30 = 7,6 ... 31,5 V DC (reverse polarity protection)
Current consumption without load	< 100 mA
Max load current	P = 20 mA / channel N / C / R / U = 40 mA / channel
Electrical interface[2]	NPN / NPN open collector (ULN2003A) PNP / PNP open collector (TD62783) push pull (iC-DL) RS-422 (LTC1690 or similar)
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET tmin 150 ms
Max frequency	25 kHz LSB (Bit-parallel) clock input 100 kHz ... 1 MHz (SSI)
Code type	binary or gray
SSI monostable time (Tm)	20 µs
SSI pause time (Tp)	> 35 µs
Strobe time	20 µs
SSI frame	MSB ... LSB 13 bit data length
Counting direction	decreasing clockwise (shaft view)
Start-up time	150 ms
Accuracy	± 0,35° typical
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	149 years with BIT-PARALLEL output 160 years with SSI output
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type SSI	shielded - fixed installation conductors section 0,22 mm² / AWG 24 bending radius min 60 mm
Cable type Bit Parallel	shielded - fixed installation conductors section 0,14 mm² / AWG 26 bending radius min 50 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

BIT-PARALLEL CONNECTIONS

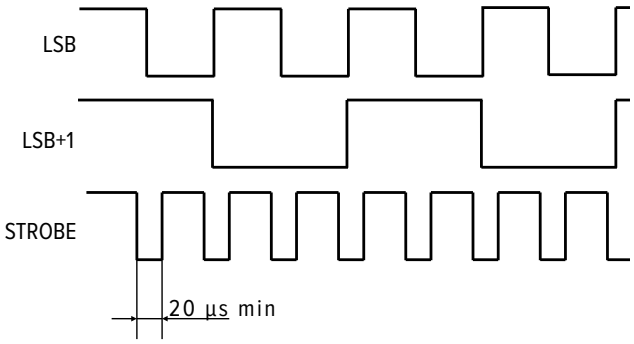
Function	Gray / Binary	Cable
bit 1 (LSB)	G^0 / B^0	green
bit 2	G^1 / B^1	yellow
bit 3	G^2 / B^2	blue
bit 4	G^3 / B^3	brown
bit 5	G^4 / B^4	orange or pink
bit 6	G^5 / B^5	white
bit 7	G^6 / B^6	grey
bit 8	G^7 / B^7	violet
bit 9	G^8 / B^8	grey / pink
bit 10	G^9 / B^9	white / green
bit 11	G^{10} / B^{10}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

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 6 / 8 / 10 mm
Enclosure rating IEC 60529	X = IP 65 S = IP 67
Max rotation speed	3000 rpm continuous / 5000 rpm istantaneous
Max shaft load[4]	30 N (6,74 lbs) axial / 50 N (11,24 lbs) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,5 x 10^{-6} kgm² (12 x 10^{-6} lbft²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	painted aluminum
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature[5, 6]	-25° ... +85°C (-13° ... +185°F)
Storage temperature[6]	-25° ... +85°C (-13° ... +185°F)
Weight	200 g (7,05 oz)

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

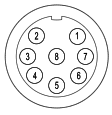
STROBE TIMING



SSI CONNECTIONS

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

M12 connector (8 pin)
M12 A coded
front view



EMA 50 F / G
BIT-PARALLEL - SSI
BLIND HOLLOW SHAFT MAGNETIC SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Singleturn absolute magnetic encoders with blind hollow shaft, 50 mm size

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

ORDERING CODE	EMA	50F	1024	G	8/30	N	N	X	15	X	3	M12	R	.162	+XXX

SERIES
magnetic singleturn absolute encoder EMA

MODEL
blind hollow shaft with stator coupling 50F
blind hollow shaft with torque pin 50G

RESOLUTION
(N / C / R / U / P interface) ppr from 2 to 4096
(S interface) ppr from 2 to 8192

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

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

ELECTRICAL INTERFACE
NPN N
NPN open collector C
PNP R
PNP open collector U
push pull P
Serial Synchronous Interface - SSI S

LOGIC
negative N
positive P

OPTIONS
to be reported if not used X
reset with external input ZE
(with binary code) strobe S
(with binary code) strobe and reset with external input SZE

BORE DIAMETER
mm 14
mm 15
diameters 5 / 6 / 8 / 10 / 12 mm with optional shaft adapter, see Accessories

ENCLOSURE RATING
IP 65 X
IP 67 S

MAX ROTATION SPEED
3000 rpm 3

OUTPUT TYPE
cable (standard length 0,5 m) P
preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)
(S interface) M12 plug connector M12

DIRECTION TYPE
axial A
radial R

SOCKET
socket not included .162
to be reported only with connector output (eg. M12R.162), for socket see Accessories

VARIANT
custom version XXX

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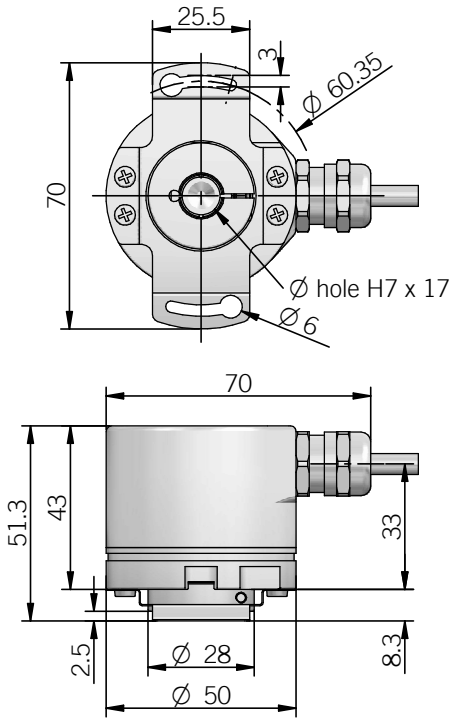
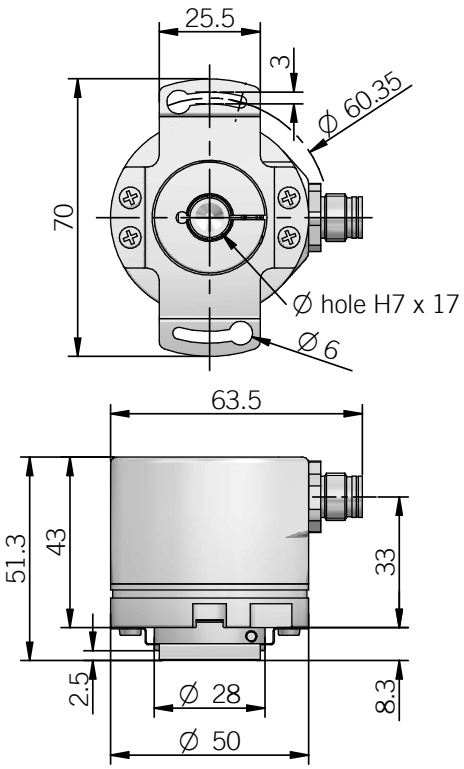
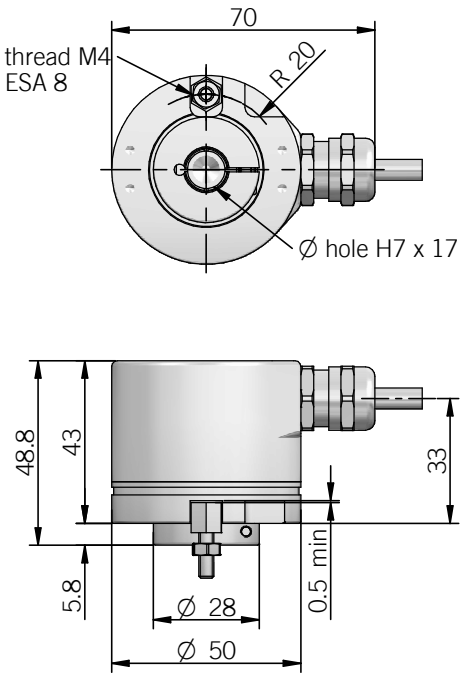
50F WITH RADIAL CABLE OUTPUT



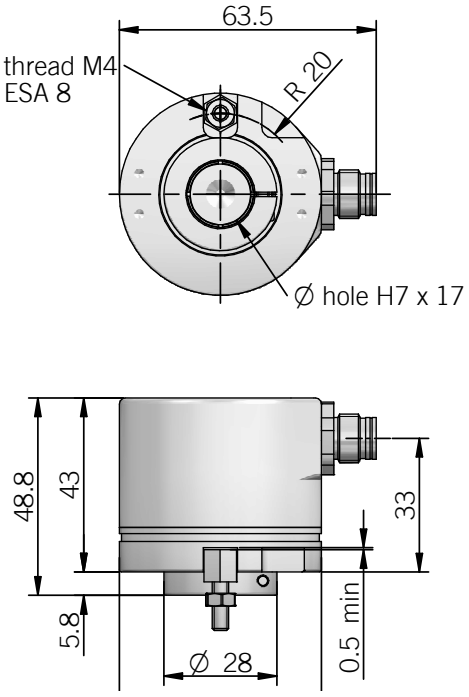
50F WITH RADIAL M12 OUTPUT



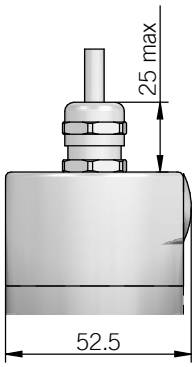
50G WITH RADIAL CABLE OUTPUT



50G WITH RADIAL M12 OUTPUT



DIMENSIONS WITH AXIAL OUTPUT



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

recommended mating shaft tolerance g6
dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	from 2 to 4096 ppr (N / C / P / R / U interface) from 2 to 8192 ppr (S interface)
Power supply[1]	5 = 4,5 ... 5,5 V DC 8/30 = 7,6 ... 31,5 V DC (reverse polarity protection)
Current consumption without load	< 100 mA
Max load current	P = 20 mA / channel N / C / R / U = 40 mA / channel
Electrical interface[2]	NPN / NPN open collector (ULN2003A) PNP / PNP open collector (TD62783) push pull (iC-DL) RS-422 (LTC1690 or similar)
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET tmin 150 ms
Max frequency	25 kHz LSB (Bit-parallel) clock input 100 kHz ... 1 MHz (SSI)
Code type	binary or gray
SSI monostable time (Tm)	20 µs
SSI pause time (Tp)	> 35 µs
Strobe time	20 µs
SSI frame	MSB ... LSB 13 bit data length
Counting direction	decreasing clockwise (shaft view)
Start-up time	150 ms
Accuracy	± 0,35° typical
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	149 years with BIT-PARALLEL output 160 years with SSI output
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type SSI	shielded - fixed installation conductors section 0,22 mm²/ AWG 24 bending radius min 60 mm
Cable type Bit Parallel	shielded - fixed installation conductors section 0,14 mm²/ AWG 26 bending radius min 50 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

BIT-PARALLEL CONNECTIONS

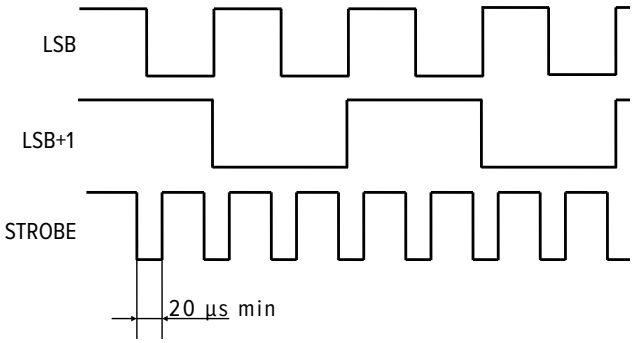
Function	Gray / Binary	Cable
bit 1 (LSB)	G^0 / B^0	green
bit 2	G^1 / B^1	yellow
bit 3	G^2 / B^2	blue
bit 4	G^3 / B^3	brown
bit 5	G^4 / B^4	orange or pink
bit 6	G^5 / B^5	white
bit 7	G^6 / B^6	grey
bit 8	G^7 / B^7	violet
bit 9	G^8 / B^8	grey / pink
bit 10	G^9 / B^9	white / green
bit 11	G^{10} / B^{10}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

MECHANICAL SPECIFICATIONS

Bore diameter	ø 14 / 15 mm ø 5 / 6* / 8* / 10* / 12* mm * with optional shaft adapter, please refer to Accessories
Enclosure rating IEC 60529	X = IP 65 S = IP 67
Max rotation speed	3000 rpm continuous
Max shaft load[4]	30 N (6,74 lbs) axial / 50 N (11,24 lbs) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	4 x 10^{-6} kgm² (95 x 10^{-6} lbft²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	painted aluminum
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature[5, 6]	-25° ... +85°C (-13° ... +185°F)
Storage temperature[6]	-25° ... +85°C (-13° ... +185°F)
Weight	200 g (7,05 oz)

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

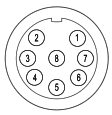
STROBE TIMING



SSI CONNECTIONS

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

M12 connector (8 pin)
M12 A coded
front view



EML 50 A / B ANALOGUE

SOLID SHAFT MAGNETIC SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Singleturn absolute magnetic encoders with solid shaft, 50 mm size

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

ORDERING CODE	EML	50A	360	X	12/28	V	05	X	6	X	3	M12	R	.162	+XXX

SERIES
magnetic singleturn absolute encoder EML

MODEL
synchronous flange ø 25 mm 50A
synchronous flange ø 30 mm 50B
for anodized version please directly contact our offices

ACTIVE ANGLE
degrees 360
degrees 270
degrees 180
degrees 90

OPTION
to be reported if not used X
reset with external input ZE

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

ELECTRICAL INTERFACE
voltage V
current I

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

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

SHAFT DIAMETER
(mod. 50A) mm 6
(mod. 50B) mm 8
(mod. 50B) mm 10

ENCLOSURE RATING
IP 65 X
IP 67 S

MAX ROTATION SPEED
3000 rpm 3

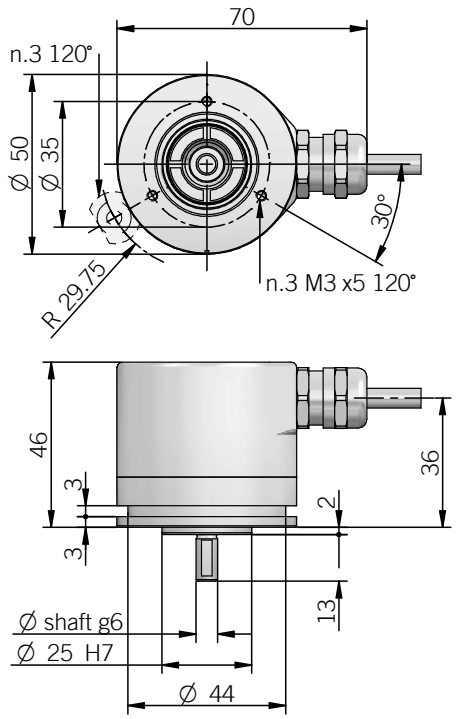
OUTPUT TYPE
cable (standard length 0,5 m) P
preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)
M12 plug connector M12

DIRECTION TYPE
axial A
radial R

SOCKET
socket not included .162
to be reported only with connector output (eg. M12R.162), for socket see Accessories

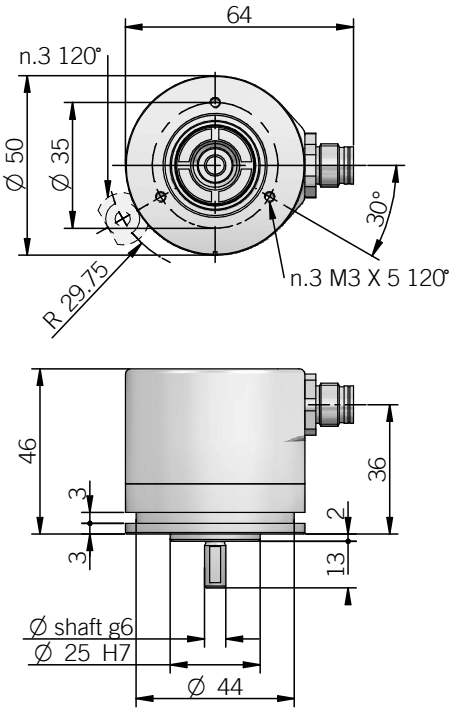
VARIANT
custom version XXX

50A WITH RADIAL CABLE OUTPUT



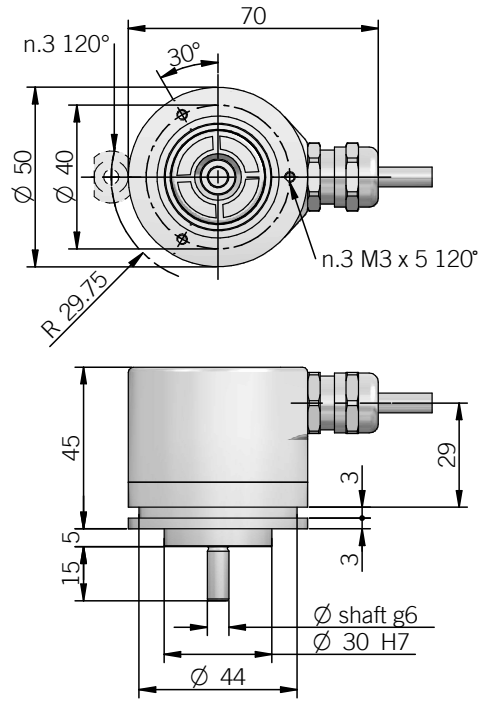
fixing clamps not included, please refer to Accessories

50A WITH RADIAL M12 OUTPUT



fixing clamps not included, please refer to Accessories

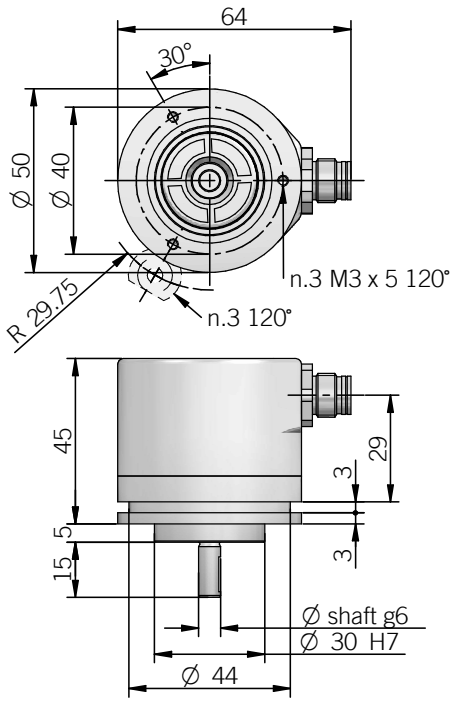
50B WITH RADIAL CABLE OUTPUT



fixing clamps not included, please refer to Accessories

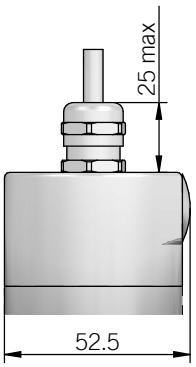
recommended mating shaft tolerance H7
dimensions in mm

50B WITH RADIAL M12 OUTPUT



fixing clamps not included, please refer to Accessories

DIMENSIONS WITH AXIAL OUTPUT



ELECTRICAL SPECIFICATIONS

Resolution	12 bit
Output DAC resolution	12 bit
Active angle	90 ... 360 mechanical degrees
Power supply[1]	11,4 ... 29,4 V DC (reverse polarity protection)
Current consumption without load	40 mA max
Electrical interface[2]	voltage (0 ... 5 V / 0 ... 10 V) current (0 ... 20 mA / 4 ... 20 mA)
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET tmin 150 ms
Load	R_{min} = 1 kΩ (voltage output) R_{max} = (V DC - 2) / 0,02 (current output)
Output update frequency	100 kHz
Signal pattern	decreasing clockwise (shaft view)
Start-up time	150 ms
Linearity error	< 1 %
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	153 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type	shielded - fixed installation conductors section 0,22 mm² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

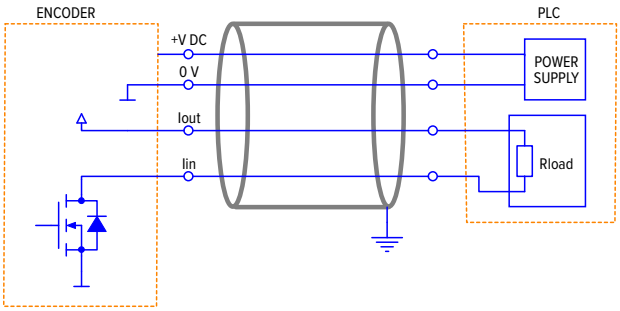
Shaft diameter	ø 6 / 8 / 10 mm
Enclosure rating IEC 60529	X = IP 65 S = IP 67
Max rotation speed	3000 rpm continuous / 5000 rpm istantaneous
Max shaft load[4]	30 N (6,74 lbs) axial / 50 N (11,24 lbs) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,5 x 10^{-6} kgm² (12 x 10^{-6} lbft²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	painted aluminum
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature[5, 6]	-25° ... +85°C (-13° ... +185°F)
Storage temperature[6]	-25° ... +85°C (-13° ... +185°F)
Weight	200 g (7,05 oz)

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

ELECTRICAL INTERFACE

CURRENT OUTPUT

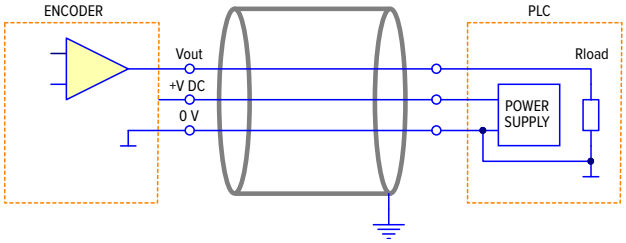
3 / 4 wire sink



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

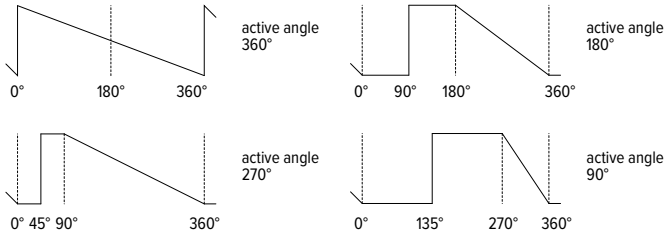
where R_{LOAD} max = (V_{DC} - 2) / 0,02

VOLTAGE OUTPUT



where R_{LOAD} min = 1 kΩ

SIGNAL PATTERN (decreasing CW)

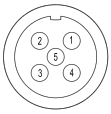


CONNECTIONS

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

* with Q current ouput

M12 connector (5 pin)
M12 A coded
front view



M12 connector (8 pin)
M12 A coded
front view

EML 50 F / G ANALOGUE

BLIND HOLLOW SHAFT MAGNETIC SINGLETURN ABSOLUTE ENCODER

MAIN FEATURES

Singleturn absolute magnetic encoders with blind hollow shaft, 50 mm size

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

ORDERING CODE	EML	50F	360	X	12/28	V	05	X	15	X	3	M12	R	.162	+XXX

SERIES
magnetic singleturn absolute encoder EML

MODEL
blind hollow shaft with stator coupling 50F
blind hollow shaft with torque pin 50G

ACTIVE ANGLE
degrees 360
degrees 270
degrees 180
degrees 90

OPTION
to be reported if not used X
reset with external input ZE

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

ELECTRICAL INTERFACE
voltage V
current I

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

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

BORE DIAMETER
mm 14
mm 15
diameters 5 / 6 / 8 / 10 / 12 mm with optional shaft adapter, see Accessories

ENCLOSURE RATING
IP 65 X
IP 67 S

MAX ROTATION SPEED
3000 rpm 3

OUTPUT TYPE
cable (standard length 0,5 m) P
preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)
M12 plug connector M12

DIRECTION TYPE
axial A
radial R

SOCKET
socket not included .162
to be reported only with connector output (eg. M12R.162), for socket see Accessories

VARIANT
custom version XXX

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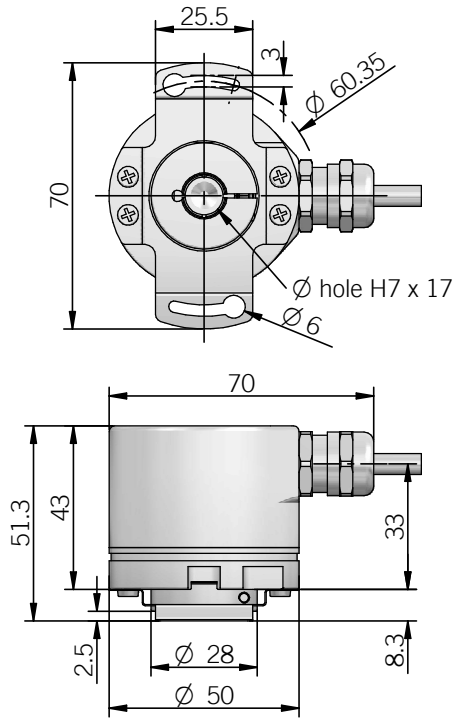
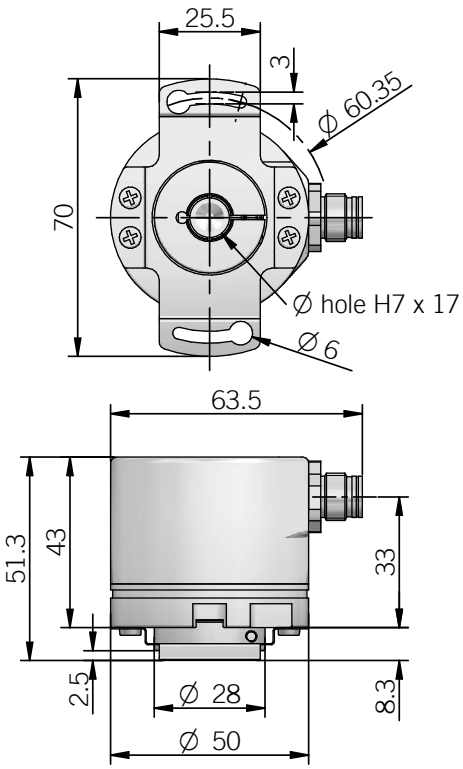
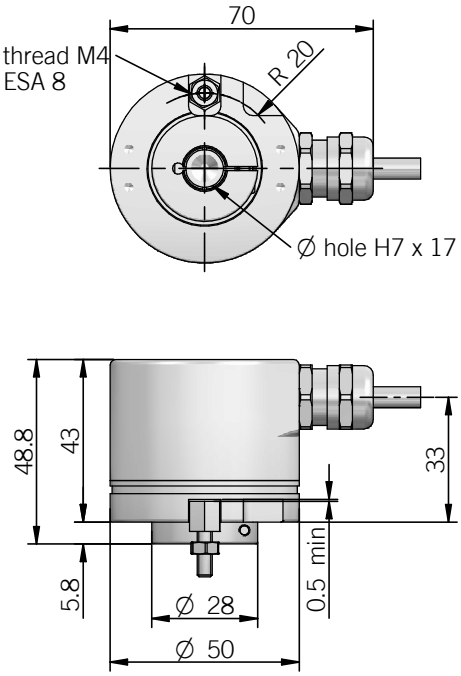
50F WITH RADIAL CABLE OUTPUT



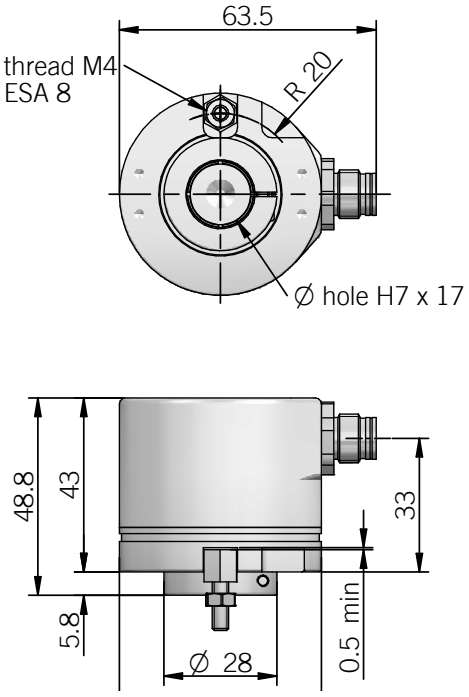
50F WITH RADIAL M12 OUTPUT



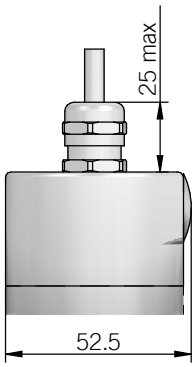
50G WITH RADIAL CABLE OUTPUT



50G WITH RADIAL M12 OUTPUT



DIMENSIONS WITH AXIAL OUTPUT



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

recommended mating shaft tolerance g6
dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	12 bit
Output DAC resolution	12 bit
Active angle	90 ... 360 mechanical degrees
Power supply[1]	11,4 ... 29,4 V DC (reverse polarity protection)
Current consumption without load	40 mA max
Electrical interface[2]	voltage (0 ... 5 V / 0 ... 10 V) current (0 ... 20 mA / 4 ... 20 mA)
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET tmin 150 ms
Load	R_{min} = 1 kΩ (voltage output) R_{max} = (V DC - 2) / 0,02 (current output)
Output update frequency	100 kHz
Signal pattern	decreasing clockwise (shaft view)
Start-up time	150 ms
Linearity error	< 1 %
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	153 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type	shielded - fixed installation conductors section 0,22 mm² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

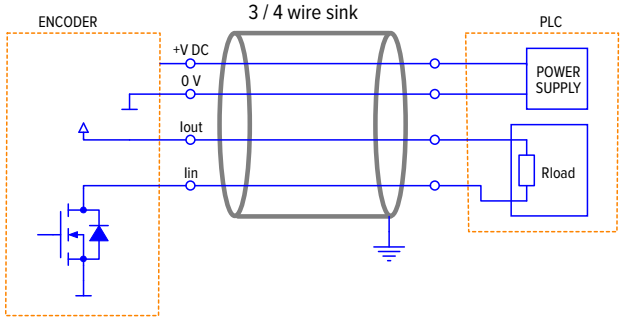
MECHANICAL SPECIFICATIONS

Bore diameter	ø 14 / 15 mm ø 5 / 6* / 8* / 10* / 12* mm * with optional shaft adapter, please refer to Accessories
Enclosure rating IEC 60529	X = IP 65 S = IP 67
Max rotation speed	3000 rpm continuous
Max shaft load[4]	30 N (6,74 lbs) axial / 50 N (11,24 lbs) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	4 x 10^{-6} kgm² (95 x 10^{-6} lbft²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	painted aluminum
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature[5, 6]	-25° ... +85°C (-13° ... +185°F)
Storage temperature[6]	-25° ... +85°C (-13° ... +185°F)
Weight	200 g (7,05 oz)

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

ELECTRICAL INTERFACE

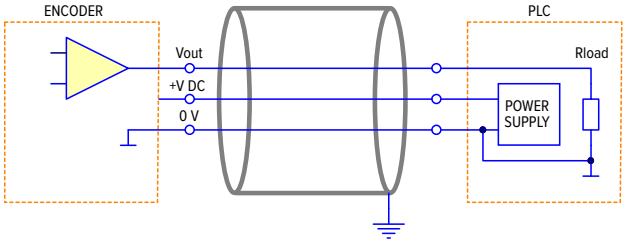
CURRENT OUTPUT



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

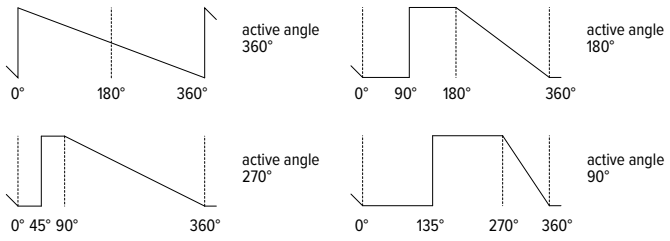
where R_{LOAD} max = (V_{DC} - 2) / 0,02

VOLTAGE OUTPUT



where R_{LOAD} min = 1 kΩ

SIGNAL PATTERN (decreasing CW)

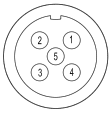


CONNECTIONS

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

* with Q current ouput

M12 connector (5 pin)
M12 A coded
front view



M12 connector (8 pin)
M12 A coded
front view

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AAM 38 F BISS

BLIND HOLLOW SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

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

- Optical/magnetic (optoASIC + energy harvesting) sensor technology
- 39 bit total resolution (23 bit singleturn + 16 bit multiturn)
- Power supply +5 VDC with BiSS-C as electrical interface
- Cable output
- Blind hollow shaft diameter up to 8 mm
- Mounting by stator coupling
- Operating temperature -20° ... +105°C (-4° ... +221°F)

ORDERING CODE

AAM	38F	16	/	23	B	5	B	8	X	X	PR	.XXX

SERIES
absolute multiturn encoder AAM

MODEL
blind hollow shaft with stator coupling 38F

MULTITURN RESOLUTION
bit 16

SINGLETURN RESOLUTION
bit 23

CODE TYPE
binary B

POWER SUPPLY
5 V DC 5

ELECTRICAL INTERFACE
BiSS-C B

BORE DIAMETER
mm 6
(1/4") mm 6,35
mm 8

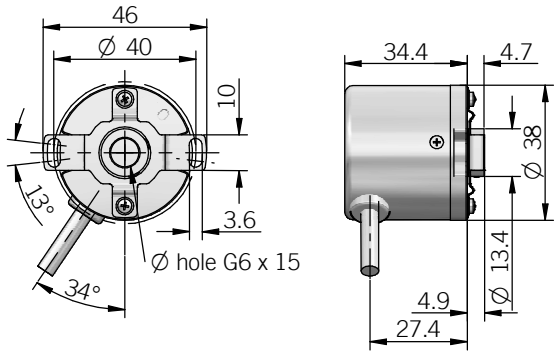
ENCLOSURE RATING
IP 50 X

OPTIONS
to be reported X

OUTPUT TYPE
radial cable (standard length 0,2m) PR

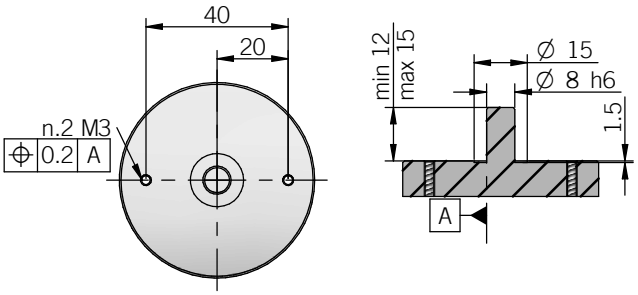
VARIANT
custom version XXX

AAM 38F



dimensions in mm

RECOMMENDED INTERFACE FLANGE DESIGN



ELECTRICAL SPECIFICATIONS

Multiturn resolution	16 bit
Singleturn resolution	23 bit
Fault status	8 bit
CRC	8 bit
Power supply[1]	4,75 ... 5,25 V DC
Current consumption without load	< 120 mA
Output type[2]	BiSS-C (SN65LBC179Q or similar)
Code type	binary
Clock frequency (MA)	80 kHz ... 10 MHz
Position calculation Time	Refer to BiSS-C $T_{busy\ time}$
Counting direction	decreasing clockwise (shaft view)
Start-up time	500 ms
Accuracy	± 0,02°
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	481 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive

CONNECTIONS

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

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 6 / 6,35 (1/4") / 8 mm
Enclosure rating	IP 50 (IEC 60529)
Max rotation speed	6000 rpm continuous
Shock	200 G, 6 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Shaft material	brass
Housing material	steel
Bearing stage material	aluminum
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature[4, 5]	-20° ... +105°C (-4° ... +221°F)
Storage temperature[5]	-20° ... +105°C (-4° ... +221°F)
Shaft radial play allowed	± 0,05 mm
Shaft axial play allowed	± 0,1 mm
Fixing torque for shaft grains	1 Nm (142 Ozin) recommended
Fixing torque for spring screws	0,35 Nm (49,5 Ozin) recommended for M3 screws (not provided)
Weight	150 g (5,29 oz)

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

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ABSOLUTE INDEX

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

MAIN FEATURES

Industry standard multiturn absolute encoders for factory automation applications.

- Optical/magnetic (proprietary optoASIC + energy harvesting) sensor technology
- Resolution up to 65 bit (25 bit singleturn + 40 bit multiturn)
- Power supply up to +30 VDC with Bit-parallel or SSI as electrical interface
- Cable or connector output
- Solid shaft diameter up to 10 mm
- Mounting by synchronous, clamping or centering 2,5” square flange

ORDERING CODE BIT PARALLEL	EAMR	63A	12	/	12	G	8/30	P	P	X	10	X	MA	R	.162	+XXX

SERIES
multiturn absolute encoder EAMR

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

MULTITURN RESOLUTION
bit from 1 to 12

SINGLETURN RESOLUTION
bit from 1 to 13

CODE TYPE
binary B
gray G

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

ELECTRICAL INTERFACE
push-pull P

LOGIC
negative N
positive P

OPTIONS
to be reported if not used X
latch L
reset with external input ZE
latch / reset with external inputs LZE

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

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

OUTPUT TYPE
(up to 13 bit as total resolution, without reset option) 16 cores cable (standard length 1,5 m) PD
(from 14 to 25 bit as total resolution or options) 32 cores cable (standard length 1,5 m) PE
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PDR5)
(up to 13 bit as total resolution, without reset option) 19 pin MIL plug connector MA
(from 14 to 25 bit as total resolution) 32 pin MIL plug connector ME

DIRECTION TYPE
radial R

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

VARIANT
custom version XXX

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ORDERING CODE SSI	EAMR	63A	12 / 13	G	8/30	S	X	2048	RS	10	X	HA	R	.162	+XXX

SERIES
multiturn absolute encoder EAMR

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

MULTITURN RESOLUTION
bit 12 / 14 / 15
see table for preferred combinations

SINGLETURN RESOLUTION
bit 13 / 18 / 25
see table for preferred combinations

CODE TYPE
binary B
gray G

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

ELECTRICAL INTERFACE
Serial Synchronous Interface - SSI S

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

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

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

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

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

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

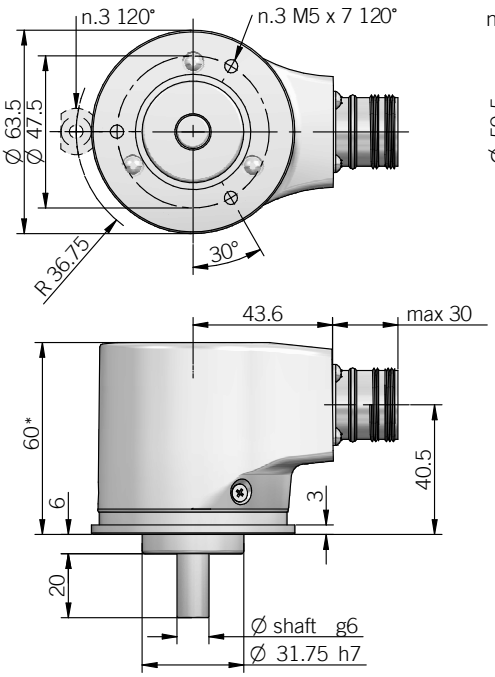
DIRECTION TYPE
radial R

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

VARIANT
custom version XXX

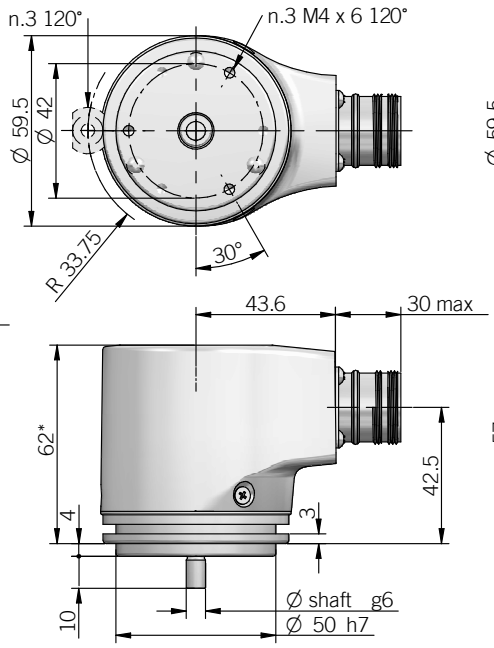
only with additional incremental output

63A



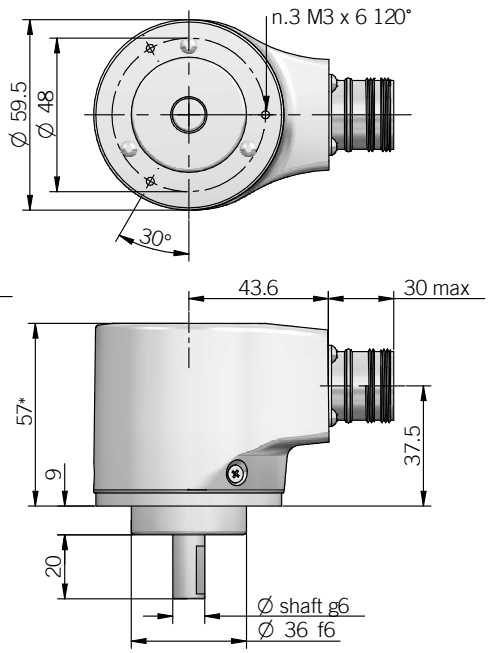
for fixing clamps please refer to Accessories

58B

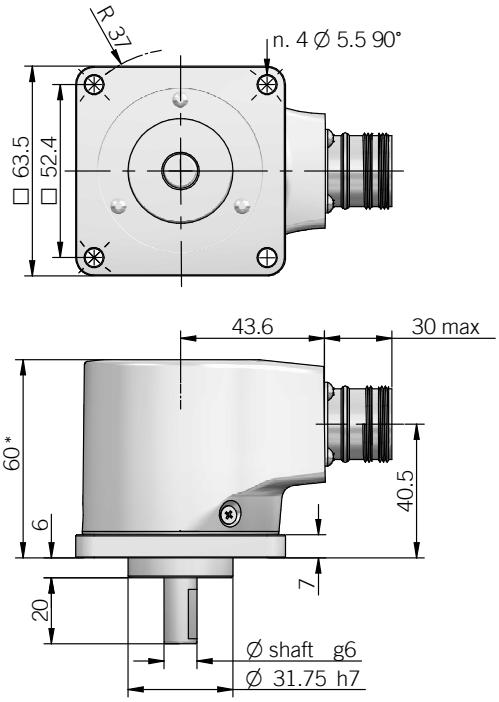


for fixing clamps please refer to Accessories

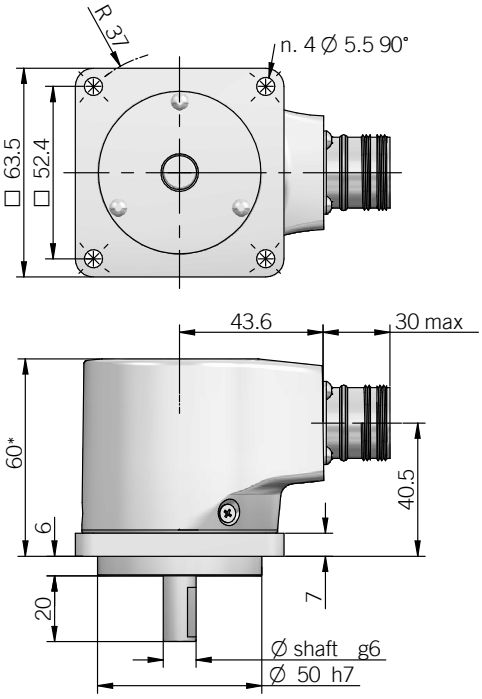
58C



63D



63E



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

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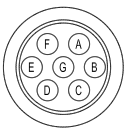
BIT-PARALLEL CONNECTIONS

Function	Binary / Gray	Cable PD	Cable PE	19 pin MA	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

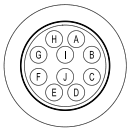
SSI CONNECTIONS

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

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

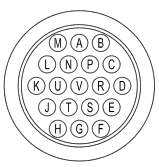


MD connector (10 pin)
Amphenol MS3102-E-18-1P
front view

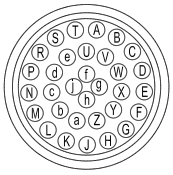


HA connector (12 pin) - M23 CCW
Hummel 7.410.000000 - 7.002.912.603
front view

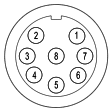
MA connector (19 pin)
Amphenol 62IN 12E 14-19 P
front view



ME connector (32 pin)
Glenair IPT 02 A 18-32 P F6
front view



M12 connector (8 pin)
M12 A coded
front view



ELECTRICAL SPECIFICATIONS

Multiturn resolution	12 / 14 / 15 bit please directly contact our offices for other pulses
Singleturn resolution	P = from 1 to 13 bit S = preferred combinations 12 multiturn / 13 singleturn 14 multiturn / 18 singleturn 15 multiturn / 25 singleturn please directly contact our offices for other pulses
Power supply[1]	7,6 ... 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Max load current	20 mA / channel
Absolute electrical interface[2]	P = push pull (iC-DL) S = RS-422 (THVD1451 or similar)
Incremental electrical interface[2]	L = HTL differential (AEIC-7272 or similar) P = Push-Pull (AEIC-7272 or similar) RS = RS-422 (AELT-5000 or similar)
Max incremental output frequency	128 kHz
Auxiliary inputs (U/D - RESET - LATCH)	active high (+V DC) connect to 0 V if not used / RESET - LATCH t_{min} 150 ms
Max frequency	25 kHz LSB (Bit-parallel) clock input 100 kHz ... 1 MHz (SSI)
Code type	binary or gray
Logic	SSI = positive Bit-parallel = positive or negative
SSI monostable time (Tm)	20 µs
SSI pause time (Tp)	> 35 µs
SSI frame	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	SSI output = decreasing clockwise (shaft view) incremental output = A leads B clockwise (shaft view)
Start-up time	700 ms
Accuracy	± 0,069°
Mean time to dangerous failure ($MTTF_d$)[3] according to EN ISO 13849-1	156 years with BIT-PARALLEL output 186 years with SSI/INCREMENTAL output
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type PC	shielded - fixed installation conductors section 0,22 mm^2 / AWG 24 bending radius min 60 mm
Cable type PD	shielded - fixed installation conductors section 0,14 mm^2 / AWG 26 bending radius min 50 mm
Cable type PE	shielded - fixed installation conductors section 0,14 mm^2 / AWG 26 bending radius min 50 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

ROTATION SPEED DERATING TABLE

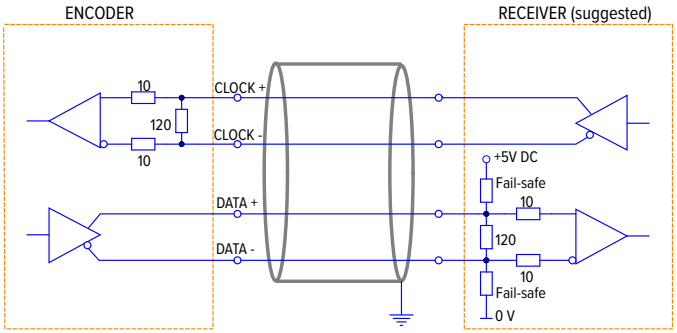
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 ... +85 (+158 ... +185)	8000	5000
+85 ... +100 (+185 ... 212)	5000	3000

MECHANICAL SPECIFICATIONS

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

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

SSI ELECTRICAL INTERFACE



BIT-PARALLEL CONNECTOR OR CABLE CHOICE

Depending on the resolution and the number of turns selected, it is possible to calculate the connections required by the connector or 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.

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

MAIN FEATURES

Industry standard multiturn absolute encoders for factory automation applications.

- Optical/magnetic (proprietary optoASIC + energy harvesting) sensor technology
- Resolution up to 65 bit (25 bit singleturn + 40 bit multiturn)
- Power supply up to +30 VDC with Bit-parallel or SSI as electrical interface
- Cable or connector output
- Blind hollow shaft up to 15 mm
- Mounting by stator coupling, torque stop slot or torque pin

ORDERING CODE BIT PARALLEL	EAMR	58F	12 / 12	G	8/30	P	P	X	15	X	MA	R	.162	+XXX

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 with external input L
reset with external input ZE
latch / reset with external inputs LZE

BORE DIAMETER
mm 14
mm 15
diameters (6 / 8 / 9,52 (3/8") / 10 / 11 / 12 mm) with optional shaft adapter, see Accessories

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

OUTPUT TYPE
(up to 13 bit as total resolution, without reset option) 16 cores cable (standard length 1,5 m) PD
(from 14 to 25 bit as total resolution or options) 32 cores cable (standard length 1,5 m) PE
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PDR5)
(up to 13 bit as total resolution, without reset option) 19 pin MIL plug connector MA
(from 14 to 25 bit as total resolution) 32 pin MIL plug connector ME

DIRECTION TYPE
radial R

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

VARIANT
custom version XXX

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ORDERING CODE SSI	EAMR	58F	12 / 12	G	8/30	S	X	2048	RS	15	X	HA	R	.162	+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 with external input ZE
reset on cover or with external input ZP

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

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

BORE DIAMETER
mm 14
mm 15
diameters 6 / 8 / 9,52 (3/8") / 10 / 11 / 12 mm with optional shaft adapter, see Accessories

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

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

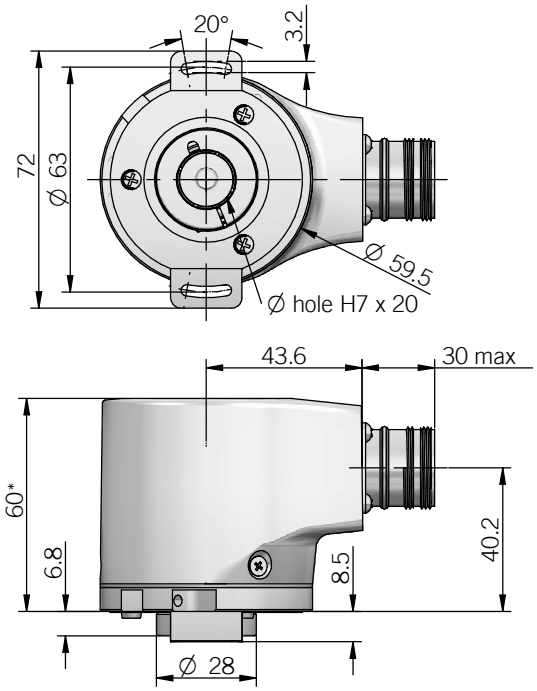
DIRECTION TYPE
radial R

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

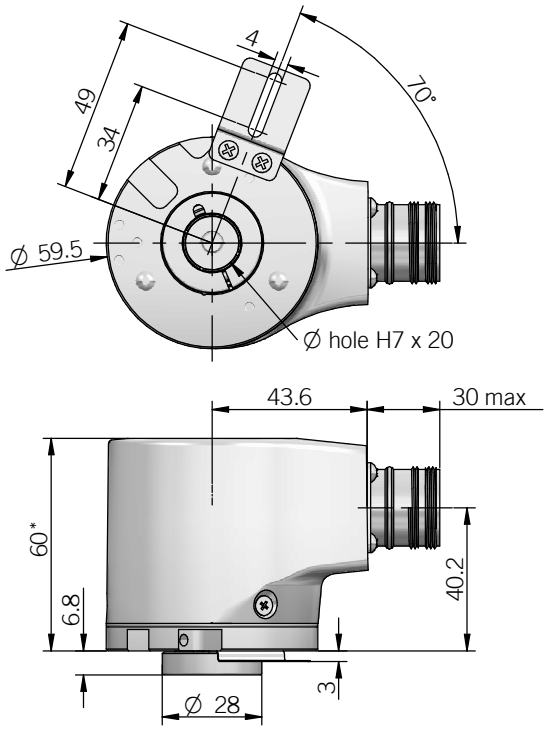
VARIANT
custom version XXX

to be added with incremental output

58F

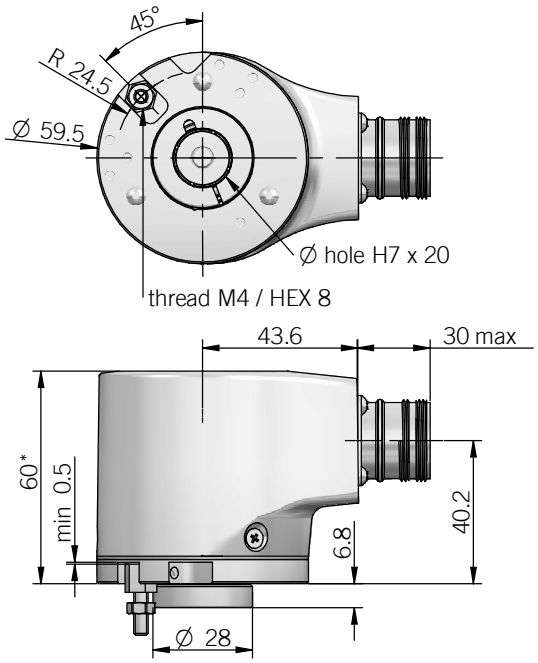


63F



for torque pin please refer to Accessories

63G



torque pin is included

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

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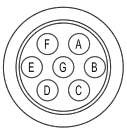
BIT-PARALLEL CONNECTIONS

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

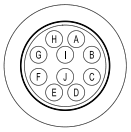
SSI CONNECTIONS

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

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

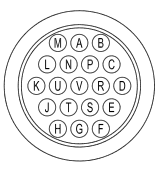


MD connector (10 pin)
Amphenol MS3102-E-18-1P
front view

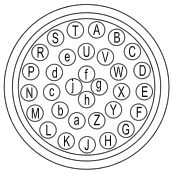


HA connector (12 pin) - M23 CCW
Hummel 7.410.000000 - 7.002.912.603
front view

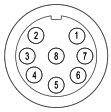
MA connector (19 pin)
Amphenol 62IN 12E 14-19 P
front view



ME connector (32 pin)
Glenair IPT 02 A 18-32 P F6
front view



M12 connector (8 pin)
M12 A coded
front view



ELECTRICAL SPECIFICATIONS

Multiturn resolution	12 / 14 / 15 bit please directly contact our offices for other pulses
Singleturn resolution	P = from 1 to 13 bit S = preferred combinations 12 multiturn / 13 singleturn 14 multiturn / 18 singleturn 15 multiturn / 25 singleturn please directly contact our offices for other pulses
Power supply[1]	7,6 ... 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Max load current	20 mA / channel
Absolute electrical interface[2]	P = push pull (iC-DL) S = RS-422 (THVD1451 or similar)
Incremental electrical interface[2]	L = HTL differential (AEIC-7272 or similar) P = Push-Pull (AEIC-7272 or similar) RS = RS-422 (AELT-5000 or similar)
Max incremental output frequency	128 kHz
Auxiliary inputs (U/D - RESET - LATCH)	active high (+V DC) connect to 0 V if not used / RESET - LATCH t_{min} 150 ms
Max frequency	25 kHz LSB (Bit-parallel) clock input 100 kHz ... 1 MHz (SSI)
Code type	binary or gray
Logic	SSI = positive Bit-parallel = positive or negative
SSI monostable time (Tm)	20 µs
SSI pause time (Tp)	> 35 µs
SSI frame	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	SSI output = decreasing clockwise (shaft view) incremental output = A leads B clockwise (shaft view)
Start-up time	700 ms
Accuracy	± 0,069°
Mean time to dangerous failure ($MTTF_d$)[3] according to EN ISO 13849-1	156 years with BIT-PARALLEL output 186 years with SSI/INCREMENTAL output
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type PC	shielded - fixed installation conductors section 0,22 mm^2 / AWG 24 bending radius min 60 mm
Cable type PD	shielded - fixed installation conductors section 0,14 mm^2 / AWG 26 bending radius min 50 mm
Cable type PE	shielded - fixed installation conductors section 0,14 mm^2 / AWG 26 bending radius min 50 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

ROTATION SPEED DERATING TABLE

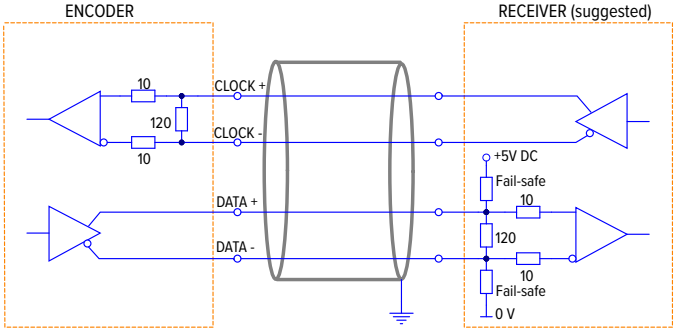
	Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
IP65	up to +70 (+158)	9000	6000
	+70 ... 85 (+158 ... +185)	6000	3000
IP67	up to +70 (+158)	8000	6000
	+70 ... +85 (+158 ... +185)	4000	2000

MECHANICAL SPECIFICATIONS

Bore diameter	ø 14 / 15 mm ø 6 / 8* / 9,52 (3/8")* / 10* / 11* / 12* mm * with optional shaft adapter, please refer to Accessories
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load[4]	200 N (45 lbs) axial / 60 N (13,49 lbs) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	5 x 10^{-6} kgm^2 (119 x 10^{-6} $lbft^2$)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature Bit-parallel[5, 6]	-20° ... +85°C (-4° ... +185°F)
Operating temperature SSI[5, 6]	-40° ... +85°C (-40° ... +185°F) -20° ... +85°C (-4° ... +185°F) with cable output -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature[6]	-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] this product is not a safety component, for further details refer to TECHNICAL BASICS section
[4] maximum load for static usage
[5] measured on the transducer flange
[6] condensation not allowed

SSI ELECTRICAL INTERFACE



BIT-PARALLEL CONNECTOR OR CABLE CHOICE

Depending on the resolution and the number of turns selected, it is possible to calculate the connections required by the connector or 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.

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

MAIN FEATURES

Industry standard multiturn absolute encoders for factory automation applications.

- Optical/magnetic (proprietary optoASIC + energy harvesting) sensor technology
- Resolution up to 65 bit (25 bit singleturn + 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 or RE0-444 flange

ORDERING CODE BIT PARALLEL

EAMR	90A	12 / 12	G	8/30	P	P	X	10	X	MA	R	.162	+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 with external input L
reset with external input ZE
latch / reset with external inputs LZE

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

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

OUTPUT TYPE
(up to 13 bit as total resolution, without reset option) 16 cores cable (standard length 1,5 m) PD
(from 14 to 25 bit as total resolution or options) 32 cores cable (standard length 1,5 m) PE
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PDR5)
(up to 13 bit as total resolution, without reset option) 19 pin MIL plug connector MA
(from 14 to 25 bit as total resolution) 32 pin MIL plug connector ME

DIRECTION TYPE
radial R

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

VARIANT
custom version XXX

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ORDERING CODE SSI	EAMR	90A	12 / 13	G	8/30	S	X	2048	RS	10	X	HA	R	.162	+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 with external input ZE
reset on cover or with external input ZP

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

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

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

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

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

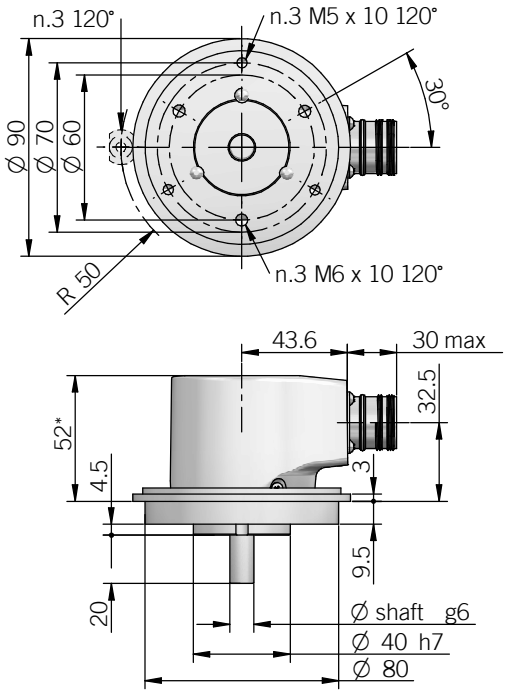
DIRECTION TYPE
radial R

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

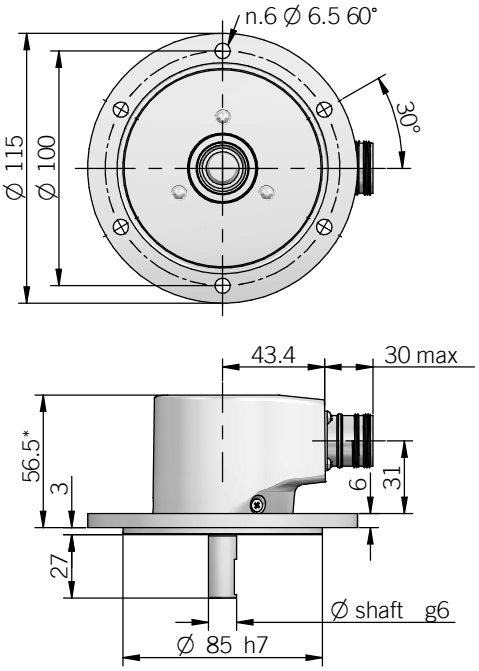
VARIANT
custom version XXX

[ ] to be added with incremental output

90A



115A



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

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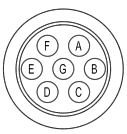
BIT-PARALLEL CONNECTIONS

Function	Binary / Gray	Cable PD	Cable PE	19 pin MA	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

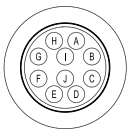
SSI CONNECTIONS

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

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

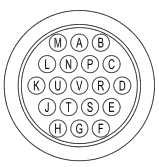


MD connector (10 pin)
Amphenol MS3102-E-18-1P
front view

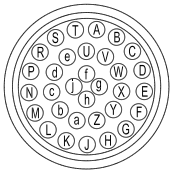


HA connector (12 pin) - M23 CCW
Hummel 7.410.000000 - 7.002.912.603
front view

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



ME connector (32 pin)
Glenair IPT 02 A 18-32 P F6
front view



M12 connector (8 pin)
M12 A coded
front view

ELECTRICAL SPECIFICATIONS

Multiturn resolution	12 / 14 / 15 bit please directly contact our offices for other pulses
Singleturn resolution	P = from 1 to 13 bit S = preferred combinations 12 multiturn / 13 singleturn 14 multiturn / 18 singleturn 15 multiturn / 25 singleturn please directly contact our offices for other pulses
Power supply[1]	7,6 ... 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Max load current	20 mA / channel
Absolute electrical interface[2]	P = push pull (iC-DL) S = RS-422 (THVD1451 or similar)
Incremental electrical interface[2]	L = HTL differential (AEIC-7272 or similar) P = Push-Pull (AEIC-7272 or similar) RS = RS-422 (AELT-5000 or similar)
Max incremental output frequency	128 kHz
Auxiliary inputs (U/D - RESET - LATCH)	active high (+V DC) connect to 0 V if not used / RESET - LATCH t_{min} 150 ms
Max frequency	25 kHz LSB (Bit-parallel) clock input 100 kHz ... 1 MHz (SSI)
Code type	binary or gray
Logic	SSI = positive Bit-parallel = positive or negative
SSI monostable time (Tm)	20 µs
SSI pause time (Tp)	> 35 µs
SSI frame	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	SSI output = decreasing clockwise (shaft view) incremental output = A leads B clockwise (shaft view)
Start-up time	700 ms
Accuracy	± 0,069°
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	156 years with BIT-PARALLEL output 186 years with SSI/INCREMENTAL output
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type PC	shielded - fixed installation conductors section 0,22 mm^2 / AWG 24 bending radius min 60 mm
Cable type PD	shielded - fixed installation conductors section 0,14 mm^2 / AWG 26 bending radius min 50 mm
Cable type PE	shielded - fixed installation conductors section 0,14 mm^2 / AWG 26 bending radius min 50 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

ROTATION SPEED DERATING TABLE

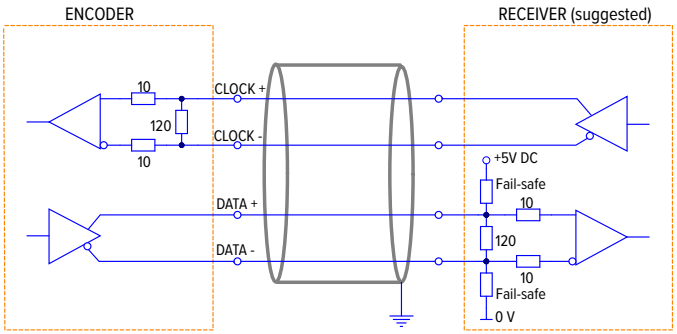
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 ... +85 (+158 ... +185)	8000	5000
+85 ... +100 (+185 ... 212)	5000	3000

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[4]	200 N (45 lbs) axial / 70 N (15,74 lbs) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10^{-6} kgm² (36 x 10^{-6} lbft²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature Bit-parallel[5, 6]	-20° ... +85°C (-4 ... +185°F)
Operating temperature SSI[5, 6]	-40° ... +100°C (-40° ... +212°F) -20° ... +100°C (-4° ... +212°F) with PC cable output -20° ... +85°C (-4° ... +185°F) with PD cable output -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature[6]	-20° ... +85°C (-4° ... +185°F)
Weight	approx 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] this product is not a safety component, for further details refer to TECHNICAL BASICS section
[4] maximum load for static usage
[5] measured on the transducer flange
[6] condensation not allowed

SSI ELECTRICAL INTERFACE



BIT-PARALLEL CONNECTOR OR CABLE CHOICE

Depending on the resolution and the number of turns selected, it is possible to calculate the connections required by the connector or 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.

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DOWNLOAD CATALOGUE

ABSOLUTE INDEX

EAML 58 B / C - 63 A / D / E ANALOGUE

SOLID SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoders for factory automation applications.

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

ORDERING CODE	EAML	63A	16B	12/30	V	05	X	10	X	M12	R	.162	+XXX

SERIES
analogue multiturn absolute encoder EAML

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

OUTPUT DAC RESOLUTION
16 bit 16B

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

ELECTRICAL INTERFACE
voltage V
current I

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

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

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

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

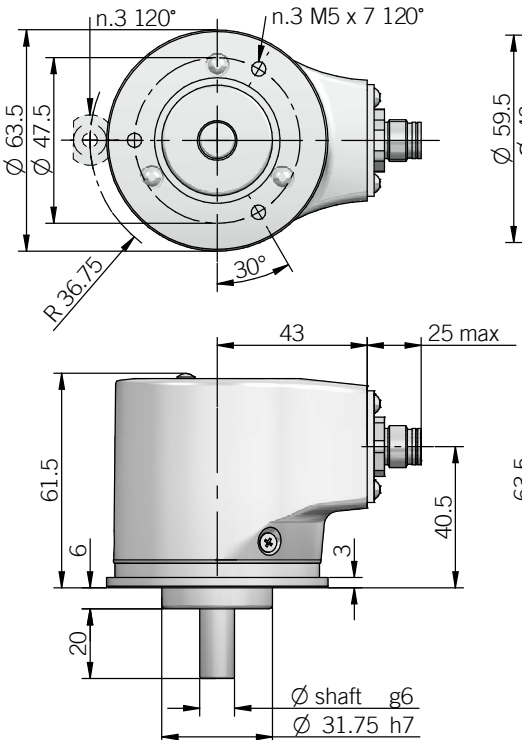
OUTPUT TYPE
cable (standard length 1,5 m) P
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)
M12 plug connector M12

DIRECTION TYPE
radial R

SOCKET
socket not included .162
to be reported only with connector output (eg. M12R.162), for socket see Accessories

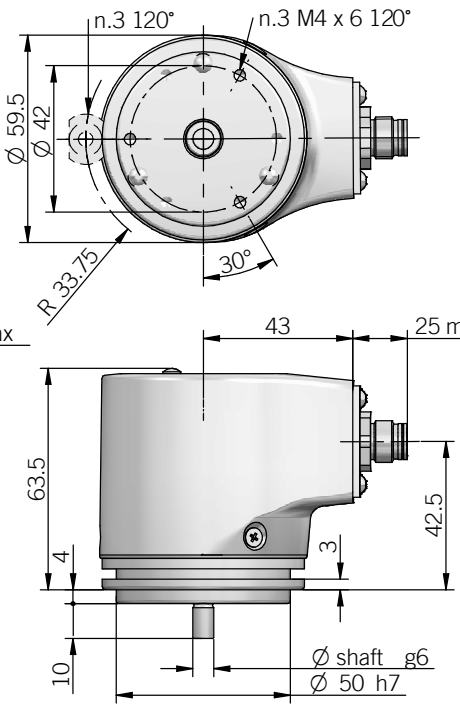
VARIANT
custom version XXX

63A



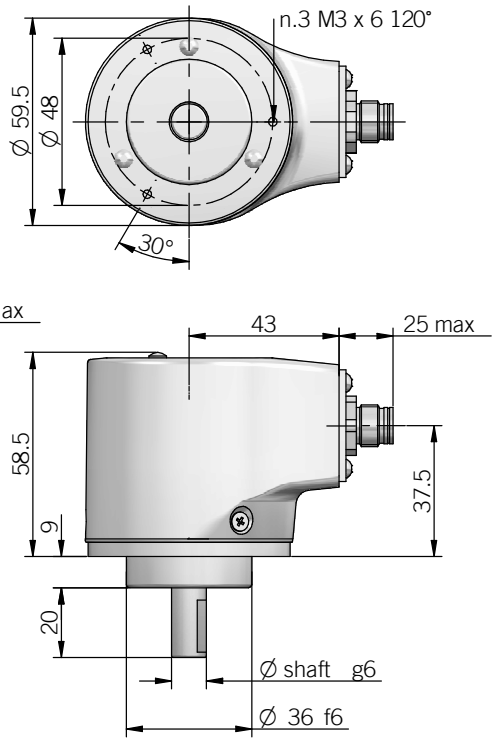
for fixing clamps please refer to Accessories

58B

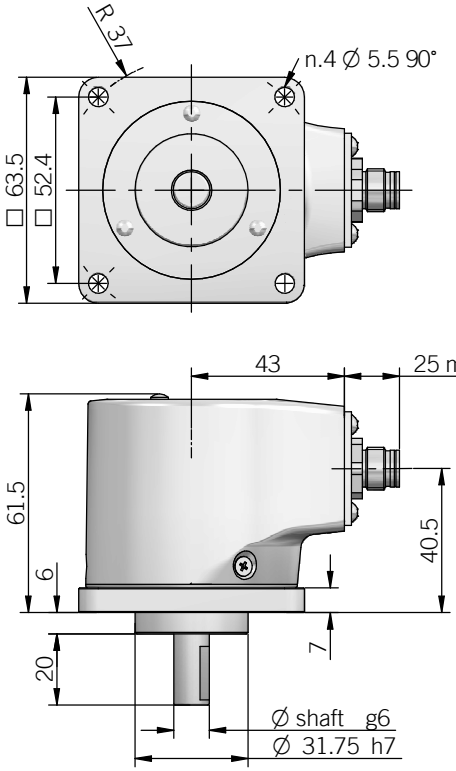


for fixing clamps please refer to Accessories

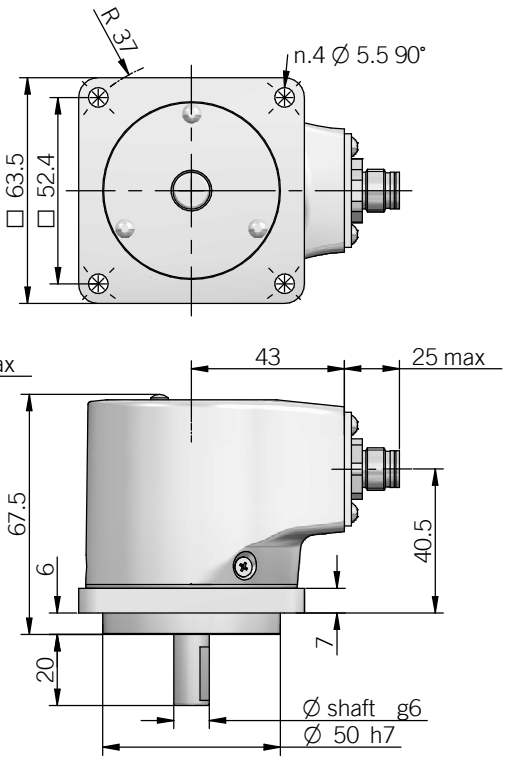
58C



63D



63E



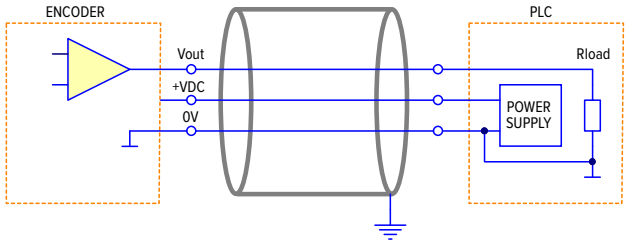
recommended mating shaft tolerance H7
dimensions in mm

ELECTRICAL SPECIFICATIONS

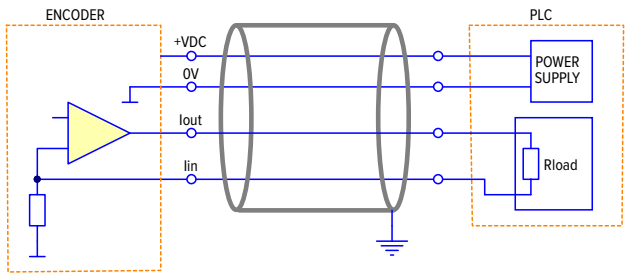
Multiturn resolution	16 bit max
Singleturn resolution	16 bit max
Output DAC resolution	16 bit
Minimum angle	22,5°
Power supply[1]	11,4 ... 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Electrical interface[2]	voltage (0 ... 5 V / 0 ... 10 V) current (0 ... 20 mA / 4 ... 20 mA)
Auxiliary 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	± 0,069°
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	186 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type	shielded - fixed installation conductors section 0,22 mm² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

ELECTRICAL INTERFACE

VOLTAGE OUTPUT



CURRENT OUTPUT



3 / 4 wire source
with 3 wires interface Iin 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 table
Max shaft load[4]	200 N (45 lbs) axial / 70 N (15,74 lbs) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10^{-6} kgm² (36 x 10^{-6} lbft²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature[5, 6]	-20° ... +85°C (-4 ... +185°F)
Storage temperature[6]	-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] this product is not a safety component, for further details refer to TECHNICAL BASICS section
[4] maximum load for static usage
[5] measured on the transducer flange
[6] condensation not allowed

ROTATION SPEED / TEMPERATURE TABLE

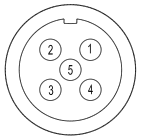
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 ... +85 (+158 ... +185)	8000	5000

CONNECTIONS

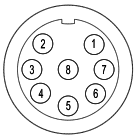
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
V_{out} / I_{out}	green	1	1
I_{in}	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
⏚	shield	housing	housing

* with Q current ouput

M12 connector (5 pin)
M12 A coded
front view



M12 connector (8 pin)
M12 A coded
front view



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ABSOLUTE INDEX

EAML 58 F - 63 F / G ANALOGUE

BLIND HOLLOW SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoders for factory automation applications.

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

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

SERIES
analogue multiturn absolute encoder EAML

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

OUTPUT DAC RESOLUTION
16 bit 16B

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

ELECTRICAL INTERFACE
voltage V
current I

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

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

BORE DIAMETER
mm 14
mm 15
diameters 6 / 8 / 9,52 (3/8") / 10 / 11 / 12 mm with optional shaft adapter, see Accessories

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

OUTPUT TYPE
cable (standard length 1,5 m) P
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)
M12 plug connector M12

DIRECTION TYPE
radial R

SOCKET
socket not included .162
to be reported only with connector output (eg. M12R.162), for socket see Accessories

VARIANT
custom version XXX

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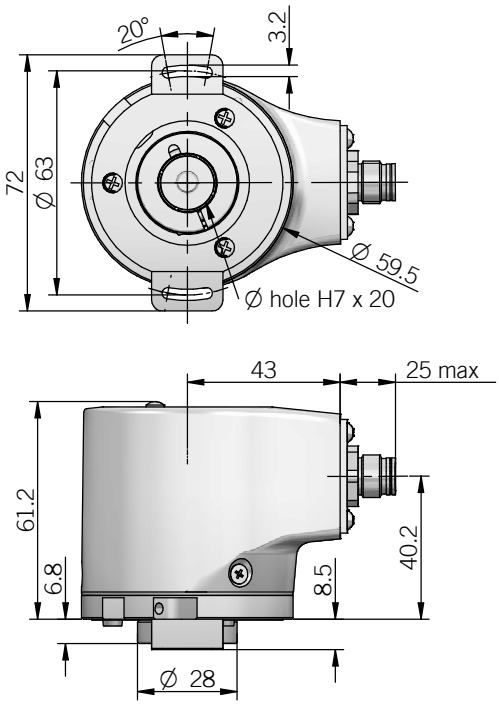
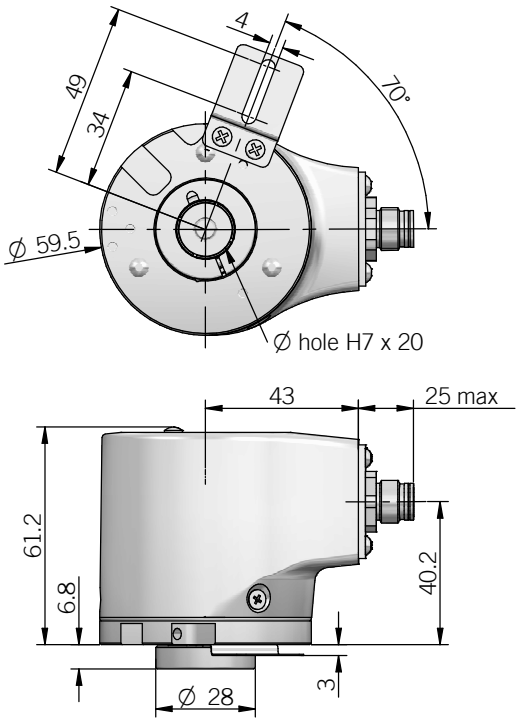
58F

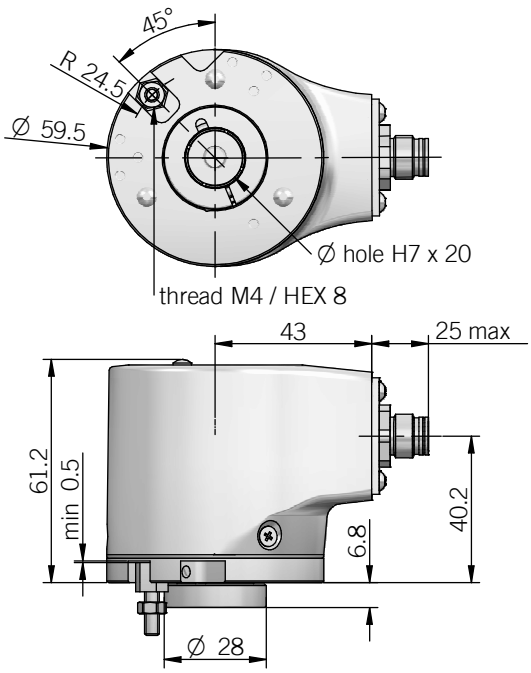


63F



for torque pin please refer to Accessories

63G



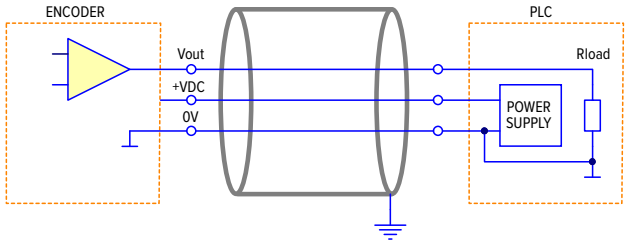
torque pin is included
recommended mating shaft tolerance g6
dimensions in mm

ELECTRICAL SPECIFICATIONS

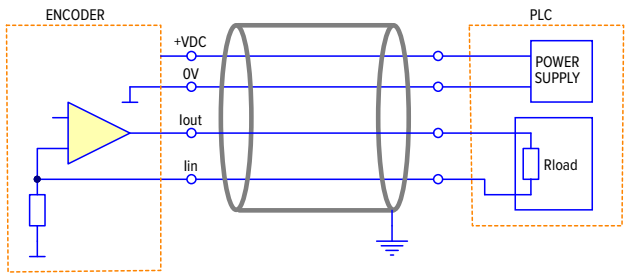
Multiturn resolution	16 bit max
Singleturn resolution	16 bit max
Output DAC resolution	16 bit
Minimum angle	22,5°
Power supply[1]	11,4 ... 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Electrical interface[2]	voltage (0 ... 5 V / 0 ... 10 V) current (0 ... 20 mA / 4 ... 20 mA)
Auxiliary 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	± 0,069°
Mean time to dangerous failure ($MTTF_d$)[3] according to EN ISO 13849-1	186 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type	shielded - fixed installation conductors section 0,22 mm² / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

ELECTRICAL INTERFACE

VOLTAGE OUTPUT



CURRENT OUTPUT



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

MECHANICAL SPECIFICATIONS

Bore diameter	ø 14 / 15 mm ø 6 / 8* / 9,52 (3/8")* / 10* / 11* / 12* mm * with optional shaft adapter, please refer to Accessories
Enclosure rating IEC 60529	X = IP 65 shaft side / IP67 cover side S = IP 67
Max rotation speed	see table
Max shaft load[4]	200 N (45 lbs) axial / 60 N (13,49 lbs) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	5 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	aluminum
Shaft material	stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature [5, 6]	-20° ... +85°C (-4° ... +185°F)
Storage temperature[6]	-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] this product is not a safety component, for further details refer to TECHNICAL BASICS section
[4] maximum load for static usage
[5] measured on the transducer flange
[6] condensation not allowed

ROTATION SPEED / TEMPERATURE TABLE

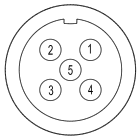
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 ... +85 (+158 ... +185)	8000	5000

CONNECTIONS

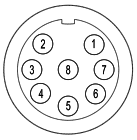
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
V_{out} / I_{out}	green	1	1
I_{in}	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
⏚	shield	housing	housing

* with Q current ouput

M12 connector (5 pin)
M12 A coded
front view



M12 connector (8 pin)
M12 A coded
front view



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ABSOLUTE INDEX

EAML 90 - 115 A ANALOGUE

SOLID SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoders for factory automation applications.

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

ORDERING CODE	EAML	90A	16B	12/30	V	05	X	10	X	M12	R	.162	+XXX

SERIES
analogue multiturn absolute encoder EAML

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

OUTPUT DAC RESOLUTION
16 bit 16B

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

ELECTRICAL INTERFACE
voltage V
current I

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

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

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

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

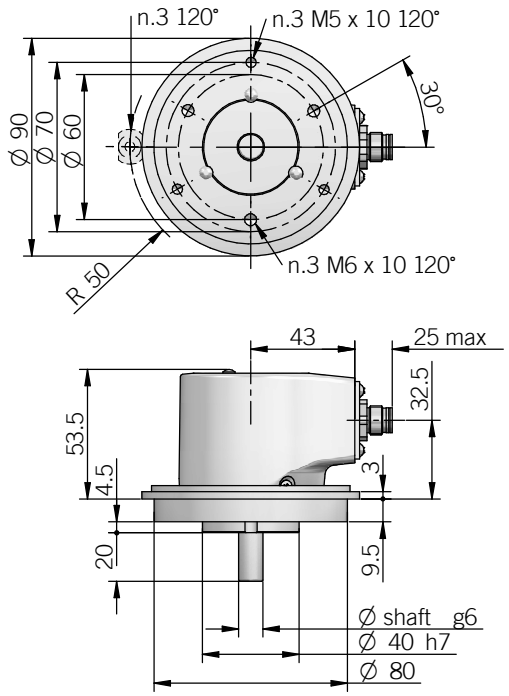
OUTPUT TYPE
cable (standard length 1,5 m) P
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)
M12 plug connector M12

DIRECTION TYPE
radial R

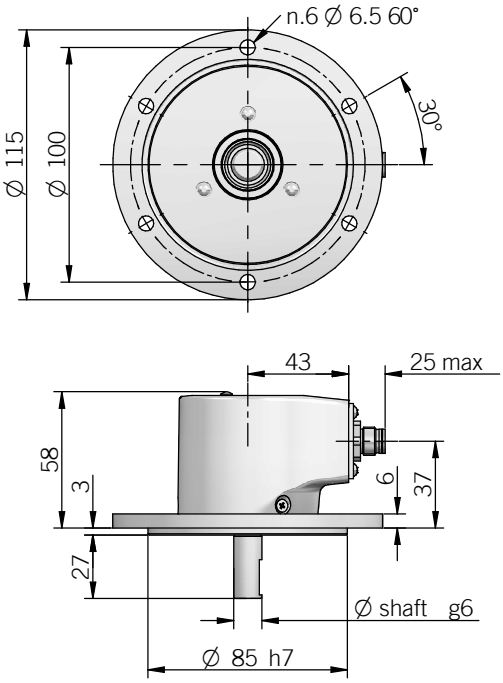
SOCKET
socket not included .162
to be reported only with connector output (eg. M12R.162), for socket see Accessories

VARIANT
custom version XXX

90A



115A



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

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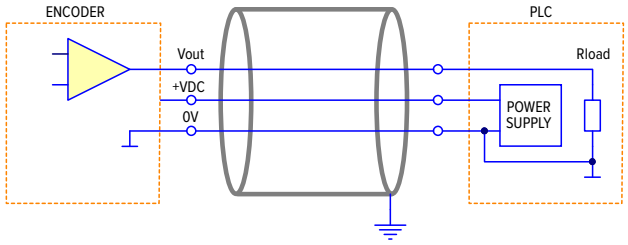
ELECTRICAL SPECIFICATIONS

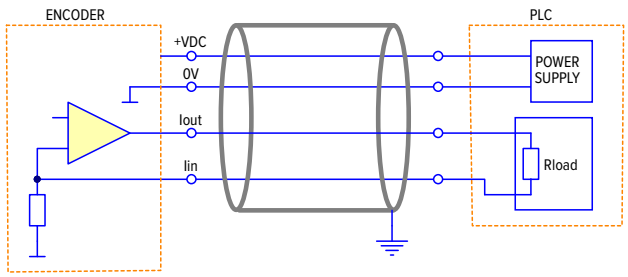
Multiturn resolution	16 bit max
Singleturn resolution	16 bit max
Output DAC resolution	16 bit
Minimum angle	22,5°
Power supply[1]	11,4 ... 30 V DC (reverse polarity protection)
Power draw without load	< 1 W
Electrical interface[2]	voltage (0 ... 5 V / 0 ... 10 V) current (0 ... 20 mA / 4 ... 20 mA)
Auxiliary 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	± 0,069°
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	186 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type	shielded - fixed installation conductors section 0,22 mm²/AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

ELECTRICAL INTERFACE

VOLTAGE OUTPUT



CURRENT OUTPUT



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

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[4]	200 N (45 lbs) axial / 70 N (15,74 lbs) radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	1,5 x 10^{-6} kgm² (36 x 10^{-6} lbft²)
Starting torque (at +20°C / +68°F)	< 0,03 Nm (4,25 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	painted aluminium
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature[5, 6]	-20° ... +85°C (-4 ... +185°F)
Storage temperature[6]	-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] this product is not a safety component, for further details refer to TECHNICAL BASICS section
[4] maximum load for static usage
[5] measured on the transducer flange
[6] condensation not allowed

ROTATION SPEED / TEMPERATURE TABLE

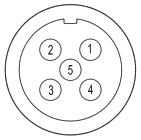
Temperature °C (°F)	Max speed (rpm)	Max continuous speed (rpm)
up to +70 (+158)	10000	8000
+70 ... +85 (+158 ... +185)	8000	5000

CONNECTIONS

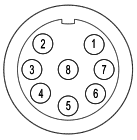
Function	Cable	5 pin M12	8 pin M12*
+ V DC	red	2	2
0 V	black	3	3
V_{out} / I_{out}	green	1	1
I_{in}	yellow	/	6
BEGIN	white	4	4
END	brown or grey	5	5
⏚	shield	housing	housing

* with Q current ouput

M12 connector (5 pin)
M12 A coded
front view



M12 connector (8 pin)
M12 A coded
front view



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ABSOLUTE INDEX

AAM 58 B / C PROFINET

SOLID SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoders for factory automation applications.

- Optical sensing technology (OptoASIC + gears)
- 25 bit total resolution (13 bit singleturn + 12 bit multiturn)
- Power supply up to +30 V DC with Profinet IO as electrical interface
- Intelligent status leds
- M12 connector for quick 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	R	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

REVISION
to be reported R

MULTITURN RESOLUTION
bit 12

SINGLETURN RESOLUTION
bit 13

CODE TYPE
binary B

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

ELECTRICAL INTERFACE
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

SOCKETS
sockets not included .162
for sockets see Accessories

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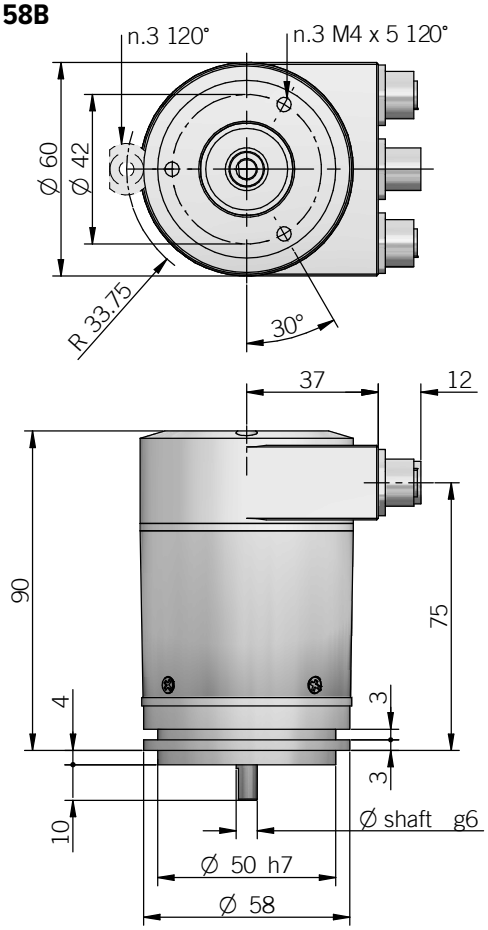
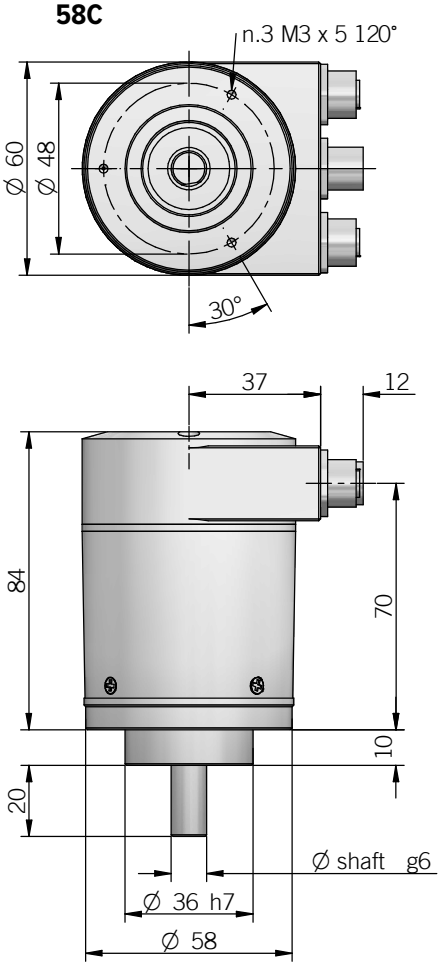
58B



58C



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

ELECTRICAL SPECIFICATIONS

Multiturn resolution	1 ... 12 bit programmabile during commissioning
Singleturn resolution	1 ... 13 bit programmabile during commissioning
Power supply[1]	10 ... 30 V DC (reverse polarity protection)
Current consumption without load	< 200 mA
Electrical interface[2]	PROFINET IO RT Class 1 / Conformance Class B
Hardware features	Ertec 200P auto-negotiation auto-polarity auto-crossover diagnostic LEDs
Code type	binary
Max bus frequency	100 Mbit/s
Cycle time	≤ 1 ms
Accuracy	± 0,04°
Start-up time	500 ms
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	121 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 6 mm (mod. 58B) ø 10 mm (mod. 58C)
Enclousure rating	IP 65 (IEC 60529)
Max rotation speed	6000 rpm
Max shaft load[3]	80 N (17,98 lbs) radial / 40 N (9 lbs) axial
Starting torque **(at +20°C / +68°F)**	< 0,05 Nm (7 Ozin)
Moment of inertia	approx 1,8 x 10^{-6} kgm^2
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Bearings life	10^9 revolutions
Bearings	n.2 ball bearings
Shaft material	stainless steel
Bearing stage / cover material	aluminium
Housing material	painted aluminium
Operating temperature[4, 5]	-40° ... +80°C (-40° ... +176°F)
Storage temperature[5]	-40° ... +85°C (-40° ... +185°F)
Weight	600 g (21 oz)

[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

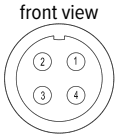
	Pin	Function
PORT 1 Connector	1	Tx D+
	2	Rx D+
	3	Tx D-
	4	Rx D-
POWER connector	1	+V DC
	2	/
	3	0 V
	4	/
PORT 2 Connector	1	Tx D+
	2	Rx D+
	3	Tx D-
	4	Rx D-

socket connectors not included, please refer to Accessories

PORT 1 POWER PORT 2

PORT 1 / 2 connector (4 pin)
M12 D coded
front view

POWER connector (4 pin)
M12 A coded
front view



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ABSOLUTE INDEX

AAM 58 F PROFINET

BLIND HOLLOW SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

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

ORDERING CODE	AAM	58F	R	12	/	13	B	10/30	PFN	15	X	X	M12R	.162

SERIES
absolute multiturn encoder AAM

MODEL
blind hollow shaft with stator coupling 58F

REVISION
to be reported R

MULTITURN RESOLUTION
bit 12

SINGLETURN RESOLUTION
bit 13

CODE TYPE
binary B

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

ELECTRICAL INTERFACE
PROFINET IO PFN

BORE DIAMETER
mm 15
diameters 10 / 12 mm with optional shaft adapter, see Accessories

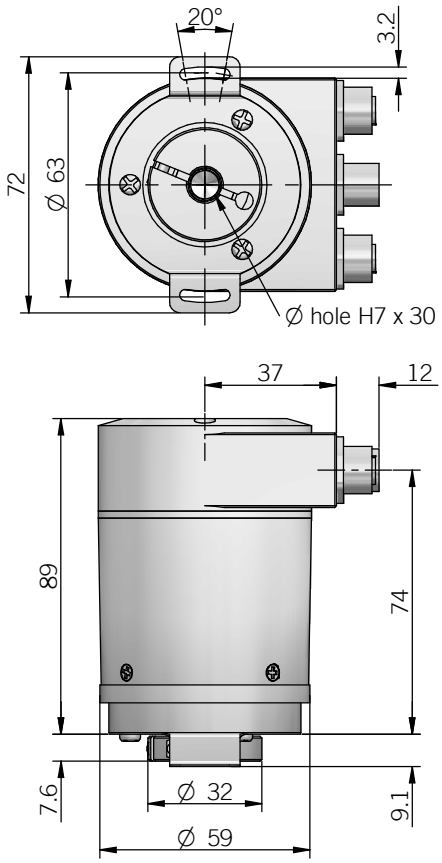
ENCLOSURE RATING
IP 65 X

OPTIONS
to be reported X

OUTPUT TYPE
radial M12 connectors M12R

SOCKETS
sockets not included .162
for sockets see Accessories

58F



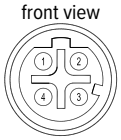
recommended mating shaft tolerance g6
dimensions in mm

CONNECTIONS

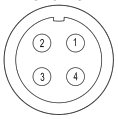
	Pin	Function
PORT 1 Connector	1	Tx D+
	2	Rx D+
	3	Tx D-
	4	Rx D-
POWER connector	1	+V DC
	2	/
	3	0 V
	4	/
PORT 2 Connector	1	Tx D+
	2	Rx D+
	3	Tx D-
	4	Rx D-

socket connectors not included, please refer to Accessories

PORT 1 / 2 connector (4 pin)
M12 D coded
front view



POWER connector (4 pin)
M12 A coded
front view



ELECTRICAL SPECIFICATIONS

Multiturn resolution	1 ... 12 bit programmabile during commissioning
Singleturn resolution	1 ... 13 bit programmabile during commissioning
Power supply[1]	10 ... 30 V DC (reverse polarity protection)
Current consumption without load	< 200 mA
Electrical interface[2]	PROFINET IO RT Class 1 / Conformance Class B
Hardware features	Ertec 200P auto-negotiation auto-polarity auto-crossover diagnostic LEDs
Code type	binary
Max bus frequency	100 Mbit/s
Cycle time	≤ 1 ms
Accuracy	± 0,04°
Start-up time	500 ms
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	121 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive

MECHANICAL SPECIFICATIONS

Bore diameter	ø 15 mm ø 12* / 10* mm * with optional shaft adapter, please refer to Accessories
Enclousure rating	IP 65 (IEC 60529)
Max rotation speed	6000 rpm
Max shaft load[3]	80 N (17,98 lbs) radial / 40 N (9 lbs) axial
Starting torque (at +20°C / +68°F)	< 0,05 Nm (7 Ozin)
Moment of inertia	approx 1,8 x 10^{-6} kgm^2
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Bearings life	10^9 revolutions
Bearings	n.2 ball bearings
Shaft material	stainless steel
Bearing stage / cover material	aluminium
Housing material	painted aluminium
Operating temperature[4, 5]	-40° ... +80°C (-40° ... +176°F)
Storage temperature[5]	-40° ... +85°C (-40° ... +185°F)
Weight	600 g (21 oz)

[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

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ABSOLUTE INDEX

AAM 58 B / C ETHERCAT

SOLID SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoders for factory automation applications.

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

EtherCAT Conformance tested

RoHS

CE

ORDERING CODE	AAM	58B	R	12	/	13	B	10/30	ETC	6	X	X	M12R	.162

SERIES
absolute multiturn encoder AAM

MODEL
synchronous flange ø 50 mm 58B
clamping flange ø 36 mm 58C

REVISION
to be reported R

MULTITURN RESOLUTION
bit 12

SINGLETURN RESOLUTION
bit 13

CODE TYPE
binary B

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

ELECTRICAL INTERFACE
ETHERCAT ETC

SHAFT DIAMETER
(mod. 58B) mm 6
(mod. 58C) mm 10

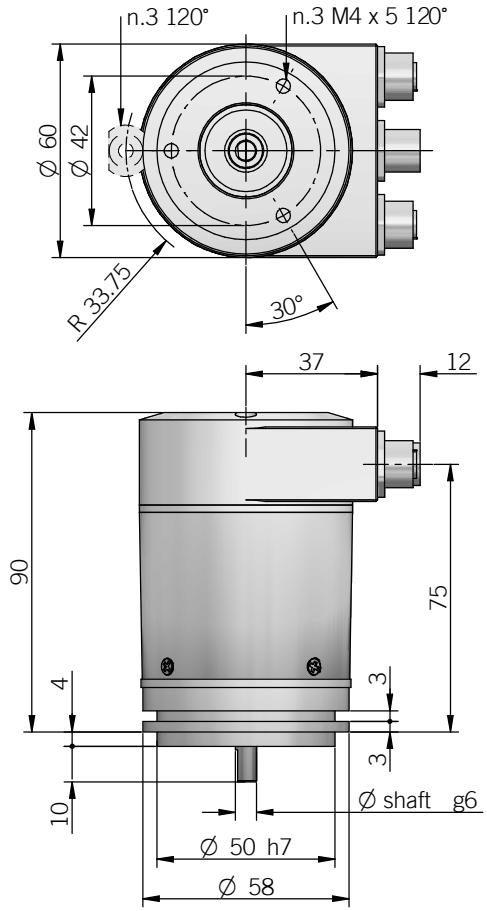
ENCLOSURE RATING
IP 65 X

OPTIONS
to be reported X

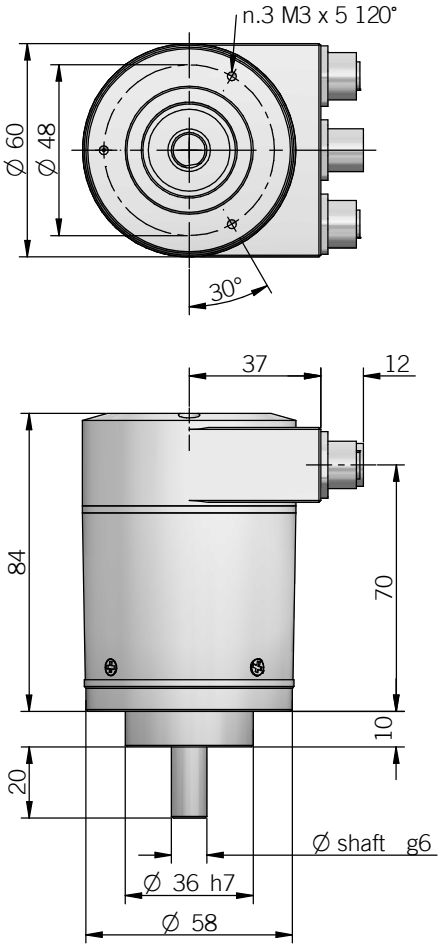
OUTPUT TYPE
radial M12 connectors M12R

SOCKETS
sockets not included .162
for sockets see Accessories

58B



58C



for fixing clamps please refer to Accessories

recommended mating shaft tolerance H7
dimensions in mm

ELECTRICAL SPECIFICATIONS

Multiturn resolution	1 ... 12 bit programmabile during commissioning
Singleturn resolution	1 ... 13 bit programmabile during commissioning
Power supply[1]	10 ... 30 V DC (reverse polarity protection)
Current consumption without load	< 200 mA
Electrical interface[2]	Ethercat
Profile	CoE (CANopen over EtherCAT, DS-301+DS-406)
Programming functions	Resolution Preset Counting direction
Code type	binary
Max bus frequency	100 Mbit/s
Cycle time	≥ 62,5 µs
Accuracy	± 0,044°
Start-up time	500 ms
Mean time to dangerous failure ($MTTF_d$)[3] according to EN ISO 13849-1	121 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 6 mm (mod. 58B) ø 10 mm (mod. 58C)
Enclousure rating	IP 65 (IEC 60529)
Max rotation speed	6000 rpm
Max shaft load[3]	80 N (17,98 lbs) radial / 40 N (9 lbs) axial
Starting torque (at +20°C / +68°F)	< 0,05 Nm (7 Ozin)
Moment of inertia	approx 1,8 x 10^{-6} kgm^2
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Bearings life	10^9 revolutions
Bearings	2 ball bearings
Shaft material	stainless steel
Bearing stage / cover material	aluminium
Housing material	aluminium
Operating temperature[4, 5]	-40° ... +80°C (-40° ... +176°F)
Storage temperature[5]	-40° ... +85°C (-40° ... +185°F)
Weight	600 g (21 oz)

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

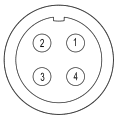
CONNECTIONS

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

socket connectors not included, please refer to Accessories

ECAT IN / OUT connector (4 pin)
M12 D coded
front view

POWER connector (4 pin)
M12 A coded
front view



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ABSOLUTE INDEX

AAM 58 F ETHERCAT

BLIND HOLLOW SHAFT MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

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

EtherCAT Conformance tested

RoHS

CE

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

SERIES
absolute multiturn encoder AAM

MODEL
blind hollow shaft with stator coupling 58F

REVISION
to be reported R

MULTITURN RESOLUTION
bit 12

SINGLETURN RESOLUTION
bit 13

CODE TYPE
binary B

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

ELECTRICAL INTERFACE
ETHERCAT ETC

BORE DIAMETER
mm 15
diameters 10 / 12 mm with optional shaft adapter, see Accessories

ENCLOSURE RATING
IP 65 X

OPTIONS
to be reported X

OUTPUT TYPE
radial M12 connectors M12R

SOCKETS
sockets not included .162
for sockets see Accessories

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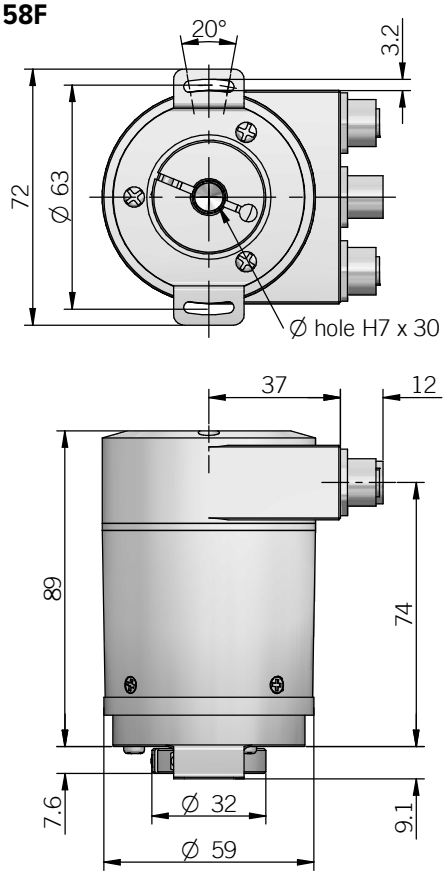
58F



recommended mating shaft tolerance g6
dimensions in mm

CONNECTIONS

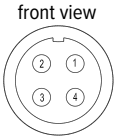
	Pin	Function
ECAT IN connector	1	Tx D+
	2	Rx D+
	3	Tx D-
	4	Rx D-
POWER connector	1	+V DC
	2	/
	3	0 V
	4	/
ECAT OUT connector	1	Tx D+
	2	Rx D+
	3	Tx D-
	4	Rx D-

socket connectors not included, please refer to Accessories

ECAT IN POWER ECAT OUT

ECAT IN / OUT connector (4 pin)
M12 D coded
front view

POWER connector (4 pin)
M12 A coded
front view



ELECTRICAL SPECIFICATIONS

Multiturn resolution	1 ... 12 bit programmabile during commissioning
Singleturn resolution	1 ... 13 bit programmabile during commissioning
Power supply[1]	10 ... 30 V DC (reverse polarity protection)
Current consumption without load	< 200 mA
Electrical interface[2]	Ethercat
Profile	CoE (CANopen over EtherCAT, DS-301+DS-406)
Programming functions	Resolution Preset Counting direction
Code type	binary
Max bus frequency	100 Mbit/s
Cycle time	≥ 62,5 µs
Accuracy	± 0,044°
Start-up time	500 ms
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	121 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Electromagnetic compatibility	according to 2014/30/EU directive
RoHs	according to 2011/65/EU directive

MECHANICAL SPECIFICATIONS

Bore diameter	ø 15 mm ø 12* / 10* mm * with optional shaft adapter, please refer to Accessories
Enclousure rating	IP 65 (IEC 60529)
Max rotation speed	6000 rpm
Max shaft load[3]	80 N (17,98 lbs) radial / 40 N (9 lbs) axial
Starting torque **(at +20°C / +68°F)**	< 0,05 Nm (7 Ozin)
Moment of inertia	approx 1,8 x 10^{-6} kgm^2
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Bearings life	10^9 revolutions
Bearings	n° 2 ball bearings
Shaft material	stainless steel
Bearing stage / cover material	aluminium
Housing material	aluminium
Operating temperature[4, 5]	-40° ... +80°C (-40° ... +176°F)
Storage temperature[5]	-40° ... +85°C (-40° ... +185°F)
Fixing torque for collar clamping	1,5 Nm (212 Ozin) recommended
Weight	600 g (21 oz)

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

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ABSOLUTE INDEX

EAMX 80 A / D SSI

EXPLOSION PROOF ATEX MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Explosion proof encoders designed to operate in hazardous and explosive environments.

- Optical/magnetic (proprietary optoASIC + energy harvesting) sensor technology
- Resolution up to 65 bit (25 bit singleturn + 40 bit multiturn)
- Power supply up to +30 VDC with SSI as electrical interface
- Cable output
- Solid shaft diameter up to 10 mm
- Mounting with syncronous or centering square flange

EX CLASSIFICATION

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

- EN IEC 60079-0:2018
- EN 60079-1:2014
- EN 60079-31:2014

The UE declaration is available on www.eltra.it

ORDERING CODE

EAMX 80A 12 / 13 G 8/30 S X 10 X PR . XXX

SERIES
multiturn absolute explosion proof encoder
EAMX

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

MULTITURN RESOLUTION
bit 12 / 14 / 15
see table for preferred combinations

SINGLETURN RESOLUTION
bit 13 / 18 / 25
see table for preferred combinations

CODE TYPE
binary B
gray G

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

ELECTRICAL INTERFACE
Serial Synchronous Interface - SSI S

OPTION
to be reported if not used X
reset with external input ZE

SHAFT DIAMETER
mm 10

ENCLOSURE RATING
IP 65 X

OUTPUT TYPE
radial cable (standard length 1,5 m) PR
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)

VARIANT
custom version XXX

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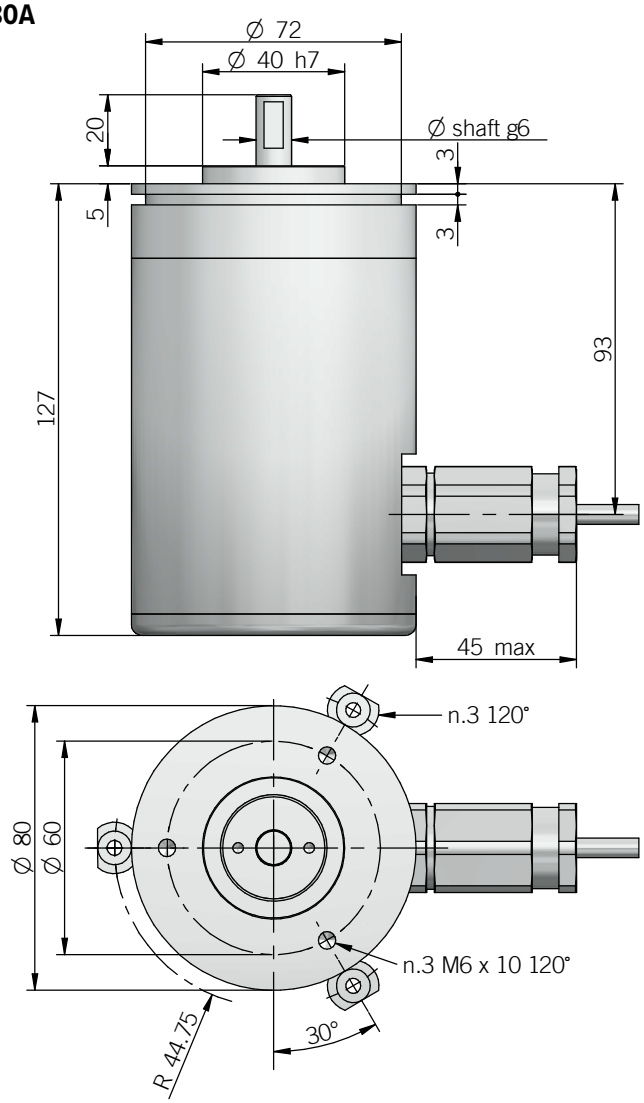
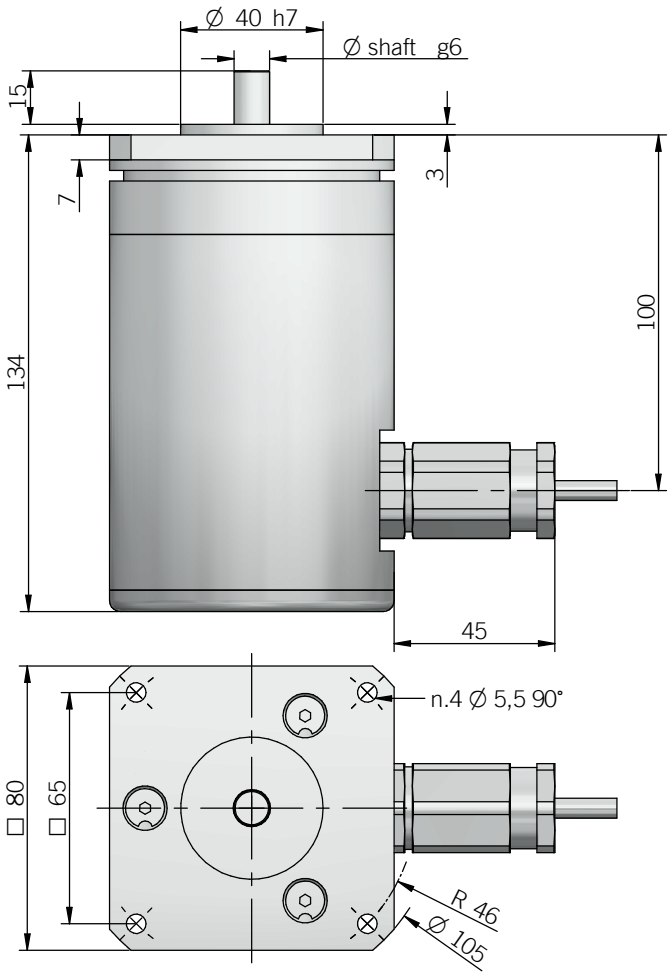
80A



80D



fixing clamps not included, please refer to Accessories
recommended mating shaft tolerance G6
dimensions in mm

EPL MARKING

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

II 2GD

II: group II: different than mines
2: category 2: high level of protection
GD: areas containing gas (G) and dust (D)

Ex db IIC T6 Gb

Ex db: flameproof enclosure for explosive atmospheres with gases, vapours and mists
IIC: group of gas IIC
T6: max surface temperature +85°C of the device for atmospheres with gas
Gb: product with a high level of protection

Ex tb IIIC T85°C Db

Ex tb: flameproof enclosure safety type
IIIC: group of dust combustibles IIIC
T85°C: max surface temperature +85°C of the device in the presence of dust
Db: product with a high level of protection

ELECTRICAL SPECIFICATIONS

Multiturn resolution	12 / 14 / 15 bit please directly contact our offices for other pulses
Singleturn resolution	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)
Current consumption without load	100 mA max
Electrical interface[2]	RS-422 (THVD1451 or similar)
Auxiliary inputs (U/D - RESET)	active high (+V DC) connect to 0 V if not used / RESET t_{min} 150 ms
Max frequency	clock input 100 kHz ... 1 MHz
Code type	binary or gray
Logic	positive
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	± 0,069°
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	186 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type	shielded - fixed or flexible installation conductors section min 0,14 mm² / AWG 26 bending radius min 35 mm (fixed) / min 60 mm (flexible)
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

CONNECTIONS

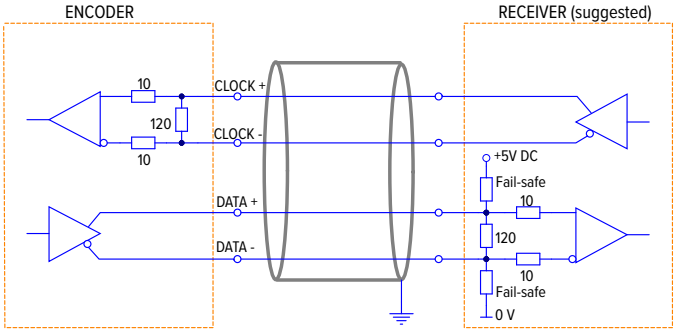
Function	Cable
+ V DC	red
0 V	grey
DATA +	green
DATA -	brown
CLOCK +	yellow
CLOCK -	pink
U / D	blue
RESET	white
⏚	shield

MECHANICAL SPECIFICATIONS

Shaft diameter	ø 10 mm
Enclosure rating	IP 65 (IEC 60529)
Max rotation speed	3000 rpm
Max shaft load[4]	200 N (45 lbs) 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} kgm² (36 x 10^{-6} lbft²)
Starting torque (at +20°C / +68°F)	< 0,06 Nm (8,50 Ozin)
Bearing stage material	anodized aluminum
Shaft material	stainless steel
Housing material	anodized aluminum
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature[5, 6]	0° ... +50°C (+32° ... +122°F)
Storage temperature[6]	-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] this product is not a safety component, for further details refer to TECHNICAL BASICS section
[4] maximum load for static usage
[5] measured on the transducer flange
[6] condensation not allowed

SSI ELECTRICAL INTERFACE



EAM 36 B
SSI
SOLID SHAFT MAGNETIC MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Miniaturised multiturn absolute encoder for applications with limited space.

- Non-contact proprietary magnetic sensing technology (ASIC + energy harvesting)
- Up to 58 bit as total resolution (18 bit singleturn + 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 at 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	M12R	.162	+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 18 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 with external input ZE

SHAFT DIAMETER
mm 6

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

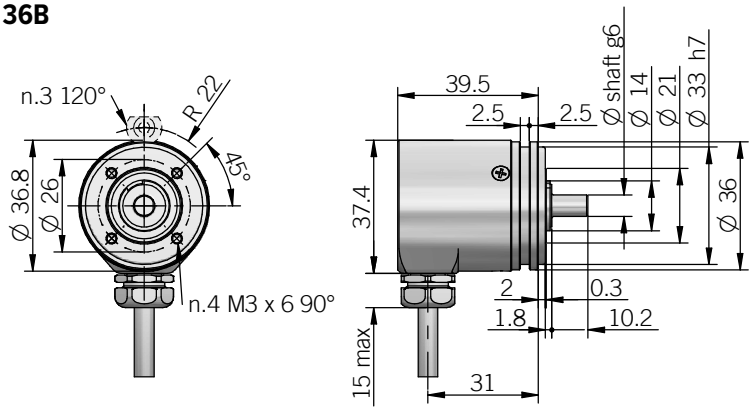
MAX ROTATION SPEED
8000 rpm 8

OUTPUT TYPE
radial cable (standard length 0,5 m) PR
preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PR5)
8 pin M12 radial plug connector M12R

SOCKET
socket not included .162
to be reported only with connector output (eg. M12R.162), for socket see Accessories

VARIANT
custom version XXX

36B



recommended mating shaft tolerance H7
dimensions in mm

fixing clamps not included, please refer to Accessories

ELECTRICAL SPECIFICATIONS

Multiturn resolution	1 to 17 bit for multiturn resolution > 17 bit please contact our offices
Singleturn resolution	1 to 18 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	< 0,4 W
Electrical interface[2]	RS-422 (THVD1451 or similar)
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) 14 bit multiturn = length 32 bit (14MT + 18ST) 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 (at +20°C / +68°F)	± 0,20°
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	183 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type	shielded - fixed installation conductors section 0,14 mm² / AWG 26 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

CONNECTIONS

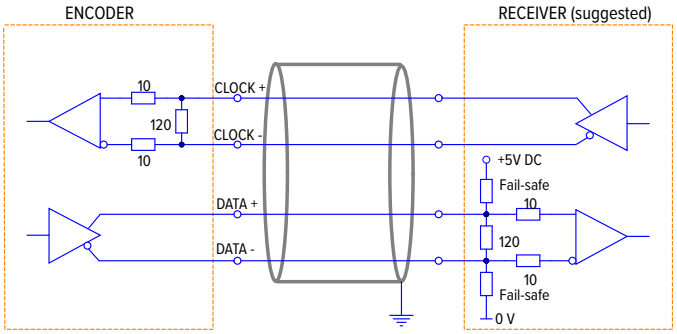
Function	Cable	8 pin M12
+ V DC	red	8
0 V	black	5
DATA +	green	3
DATA -	brown or grey	2
CLOCK +	yellow	4
CLOCK -	orange	6
U / D	red / blue	7
RESET	white	1
⏚	shield	housing

MECHANICAL SPECIFICATIONS

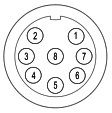
Shaft diameter	ø 6 mm
Enclosure rating	IP 67 cover side / IP 65 shaft side (IEC 60529)
Rotation speed	8000 rpm continuous / 10000 rpm max
Max shaft load[4]	20 N (4,5 lbs) axial / radial
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,001 x 10^{-6} kgm² (0,02 x 10^{-6} lbft²)
Starting torque (at +20°C / +68°F)	< 0,01 Nm (1,42 Ozin)
Bearing stage material	aluminum
Shaft material	stainless steel
Housing material	chrome plated steel
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature[5, 6]	-30° ... +100°C (-22° ... +212°F) -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature[6]	-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] this product is not a safety component, for further details refer to TECHNICAL BASICS section
[4] maximum load for static usage
[5] measured on the transducer flange
[6] condensation not allowed

SSI ELECTRICAL INTERFACE



M12 connector (8 pin)
M12 A coded
front view



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EAM 36 F / G SSI

BLIND HOLLOW SHAFT MAGNETIC MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Miniaturised multiturn absolute encoders for applications with limited space.

- Non-contact proprietary magnetic sensing technology (ASIC + energy harvesting)
- Up to 58 bit as total resolution (18 bit singleturn + 40 bit multiturn)
- Power supply up to +30 V DC with SSI as electrical interface
- Code reset for easy setup
- Cable or M12 output, other connectors available on cable end
- Blind hollow shaft up to 10 mm diameter
- Mounting by stator coupling or torque pin

ORDERING CODE	EAM	36F	12	/	13	G	8/30	S	P	X	10	X	8	M12R	.162	+XXX

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 18 bit

SINGLETURN RESOLUTION
from 1 to 18 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 with external input ZE

BORE DIAMETER
(3/8") mm 9,52
mm 10
diameters 4 / 5 / 6 / 6,35 (1/4") / 8 mm with optional shaft adapter, see Accessories

ENCLOSURE RATING
IP 67 cover side / IP 66 shaft side X

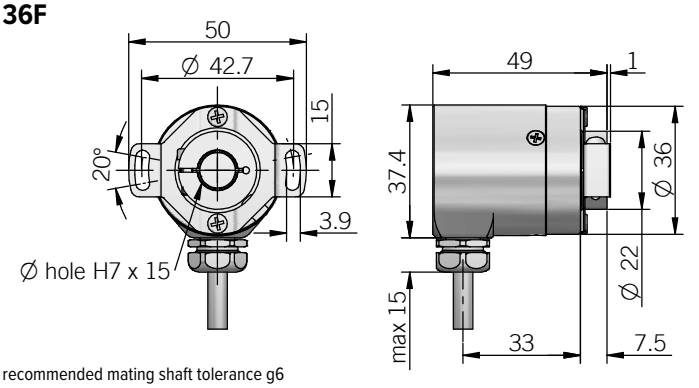
MAX ROTATION SPEED
8000 rpm 8

OUTPUT TYPE
radial cable (standard length 0,5 m) PR
preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after OUTPUT TYPE (eg. PCR5)
8 pin M12 radial plug connector M12R

SOCKET
socket not included .162
to be reported only with connector output (eg. M12R.162), for socket see Accessories

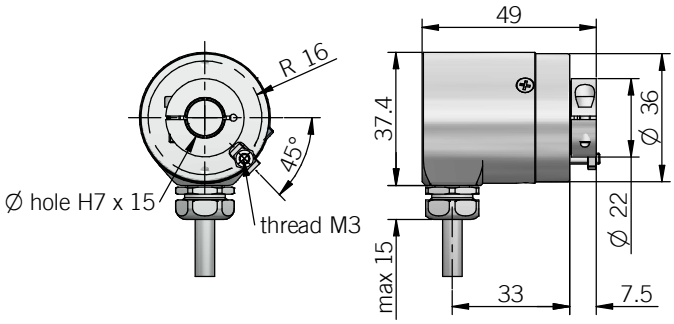
VARIANT
custom version XXX

36F



recommended mating shaft tolerance g6
dimensions in mm

36G



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 18 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	< 0,4 W
Electrical interface[2]	RS-422 (THVD1451 or similar)
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) 14 bit multiturn = length 32 bit (14MT + 18ST) 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 (at +20°C / +68°F)	± 0,20°
Mean time to dangerous failure ($MTTF_d$)[3] according to EN ISO 13849-1	183 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type	shielded - fixed installation conductors section 0,14 mm² / AWG 26 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

CONNECTIONS

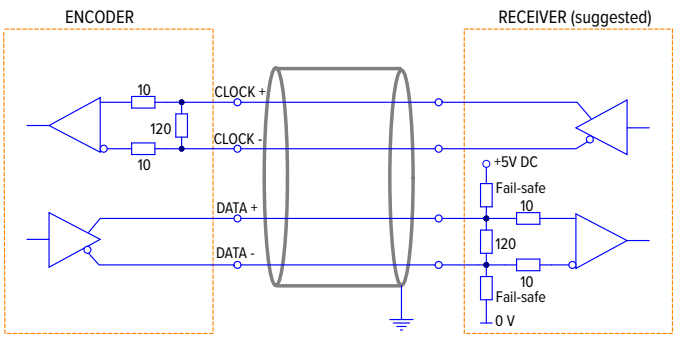
Function	Cable	8 pin M12
+ V DC	red	8
0 V	black	5
DATA +	green	3
DATA -	brown or grey	2
CLOCK +	yellow	4
CLOCK -	orange	6
U / D	red / blue	7
RESET	white	1
⏚	shield	housing

MECHANICAL SPECIFICATIONS

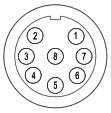
Bore diameter	ø 9,52 (3/8") / 10 mm ø 4* / 5* / 6* / 6,35 (1/4")* / 8* mm * with optional shaft adapter, please refer to Accessories
Enclosure rating	IP 67 cover side / IP 66 shaft side (IEC 60529)
Rotation speed	8000 rpm continuous / 10000 rpm max
Max shaft load[4]	20 N (4,5 lbs) axial / radial
Shock	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	aluminum
Shaft material	stainless steel
Housing material	chrome plated steel
Bearings	n.2 ball bearings
Bearings life	10^9 revolutions
Operating temperature[5, 6]	-30° ... +100°C (-22° ... +212°F) -25° ... +85°C (-13° ... +185°F) with M12 connector
Storage temperature[6]	-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] this product is not a safety component, for further details refer to TECHNICAL BASICS section
[4] maximum load for static usage
[5] measured on the transducer flange
[6] condensation not allowed

SSI ELECTRICAL INTERFACE



M12 connector (8 pin)
M12 A coded
front view



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AAM 36 B CANOPEN

SOLID SHAFT MAGNETIC MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Non-contact magnetic sensing technology (magnetic ASIC + energy harvesting)
- Sturdy construction thanks to separated chambers
- Power supply up to +32 VDC with CANopen interface
- Cable or M12 connector axial output
- 6 mm diameter solid shaft
- Mounting by syncronous flange

ORDERING CODE	AAM	36B	24 /	14	B	10/30	CNP	6	X	X	M12A	.162	+XXX

SERIES
magnetic multiturn absolute encoder series AAM

MODEL
syncronous flange ø 33 mm 36B

MULTITURN RESOLUTION
bit 24

SINGLETURN RESOLUTION
bit 14

CODE TYPE
binary B

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

ELECTRICAL INTERFACE
CANopen CNP

SHAFT DIAMETER
mm 6

ENCLOSURE RATING
IP67 cover side / IP 65 shaft side X

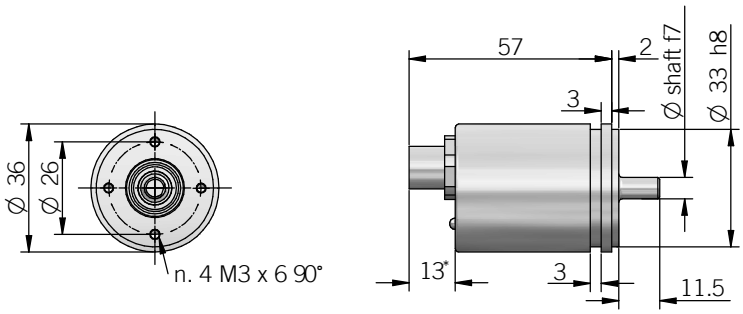
OPTIONS
to be reported X

OUTPUT TYPE
axial cable (standard length 2 m) PA2
5 pin M12 axial plug connector M12A

SOCKET
socket not included .162
to be reported only with connector output (eg. M12A.162), for socket see Accessories

VARIANT
custom version XXX

36B



* with cable output + 7mm

recommended mating shaft tolerance H7
dimensions in mm

ELECTRICAL SPECIFICATIONS

Multiturn resolution	24 bit programmable during commissioning
Singleturn resolution	14 bit programmable during commissioning
Power supply[1]	10 ... 32 V DC (reverse polarity protection)
Power draw without load	0,5 W
Electrical interface[2]	CAN
Protocol	CANopen Communication profile CiA 301 Encoder profile CiA 406 V3.2 class C2
Node number	1 ... 127 (default 127) programmable during commissioning
Baud rate	10 kBaud ... 1 Mbaud with automatic bit rate detection
LSS protocol	according to CiA 305
CAN transmission modes	programmable (Synchronous and Asynchronous)
LED error messages	according to CiA 303-3
Code type	binary
Position update rate	≤ 600 µs
Start-up time	< 1,5 s
Accuracy	± 0,35°
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	1000 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type	shielded - fixed or flexible installation conductors section 0,25 mm^2 / AWG 24 bending radius min 35 mm (fixed installation) bending radius min 95 mm (flexible installation)
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive

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

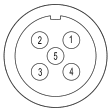
MECHANICAL SPECIFICATION

Shaft diameter	ø 6 mm
Enclosure rating IEC 60529	IP 67 cover side / IP65 shaft side
Max rotation speed	12000 rpm
Max shaft load[3]	80 N (17,98 lbs) radial / 50 N (11,24 lbs) axial
Shock	100 G, 6 ms (IEC 60068-2-27)
Vibrations	30 G, 10 ... 2000 Hz (IEC 60068-2-6)
Starting torque (at +20°C / +68°F)	< 0,002 Nm (0,28 Ozin)
Bearing stage material	aluminium
Shaft material	stainless steel
Housing material	chromium plated steel
Bearings	2 ball bearings
Bearings life	10^9 revolutions
Operating temperature[4, 5]	-40° ... +85°C (-40° ... +185°F)
Storage temperature[5]	-40° ... +100°C (-40 ... +212°F)
Weight	110 g (3,88 oz) approx

CONNECTIONS

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

M12 connector (5 pin)
M12 A coded
front view



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ABSOLUTE INDEX

AAM 36 F CANOPEN

BLIND HOLLOW SHAFT MAGNETIC MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

- Non-contact magnetic sensing technology (magnetic ASIC + energy harvesting)
- Sturdy construction thanks to separated chambers
- Power supply up to +32 VDC with CANopen interface
- Cable or M12 connector axial output
- 8 or 10 mm blind hollow shaft
- Mounting by stator coupling

ORDERING CODE	AAM	36F	24 /	14	B	10/30	CNP	10	X	X	M12A	.162	+XXX

SERIES
magnetic multiturn absolute encoder series
AAM

MODEL
blind hollow shaft with stator coupling 36F

MULTITURN RESOLUTION
bit 24

SINGLETURN RESOLUTION
bit 14

CODE TYPE
binary B

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

ELECTRICAL INTERFACE
CANopen CNP

BORE DIAMETER
mm 8
mm 10

ENCLOSURE RATING
IP67 cover side / IP 65 shaft side X

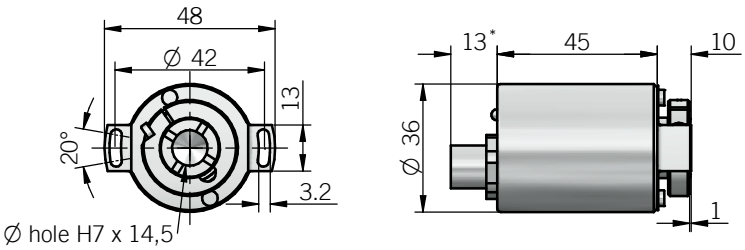
OPTIONS
to be reported X

OUTPUT TYPE
axial cable (standard length 2 m) PA2
5 pin M12 axial plug connector M12A

SOCKET
socket not included .162
to be reported only with connector output (eg. M12A.162), for socket see Accessories

VARIANT
custom version XXX

AAM 36F



* with cable output + 7mm

recommended mating shaft tolerance g6
dimensions in mm

ELECTRICAL SPECIFICATIONS

Multiturn resolution	24 bit programmable during commissioning
Singleturn resolution	14 bit programmable during commissioning
Power supply[1]	10 ... 32 V DC (reverse polarity protection)
Power draw without load	0,5 W
Electrical interface[2]	CAN
Protocol	CANopen Communication profile CiA 301 Encoder profile CiA 406 V3.2 class C2
Node number	1 ... 127 (default 127) programmable during commissioning
Baud rate	10 kBaud ... 1 Mbaud with automatic bit rate detection
LSS protocol	according to CiA 305
CAN transmission modes	programmable (Synchronous and Asynchronous)
LED error messages	according to CiA 303-3
Code type	binary
Position update rate	≤ 600 µs
Start-up time	< 1,5 s
Accuracy	± 0,35°
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	1000 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Cable type	shielded - fixed or flexible installation conductors section 0,25 mm^2 / AWG 24 bending radius min 35 mm (fixed installation) bending radius min 95 mm (flexible installation)
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive

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

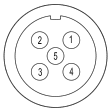
MECHANICAL SPECIFICATION

Bore diameter	ø 8 / 10 mm
Enclosure rating IEC 60529	IP 67 cover side / IP65 shaft side
Max rotation speed	6000 rpm
Max shaft load[3]	80 N (17,98 lbs) radial / 50 N (11,24 lbs) axial
Shock	100 G, 6 ms (IEC 60068-2-27)
Vibrations	30 G, 10 ... 2000 Hz (IEC 60068-2-6)
Starting torque (at +20°C / +68°F)	< 0,002 Nm (0,28 Ozin)
Bearing stage material	aluminium
Shaft material	stainless steel
Housing material	chromium plated steel
Bearings	2 ball bearings
Bearings life	10^9 revolutions
Operating temperature[4, 5]	-40° ... +85°C (-40° ... +185°F)
Storage temperature[5]	-40° ... +100°C (-40 ... +212°F)
Weight	110 g (3,88 oz) approx

CONNECTIONS

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

M12 connector (5 pin)
M12 A coded
front view



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ABSOLUTE INDEX

EAM 110M

BLIND HOLLOW SHAFT MAGNETIC MULTITURN ABSOLUTE ENCODER

MAIN FEATURES

Magnetic multiturn absolute encoder with a buffer battery and Modbus RTU communication.
It is design for installation, for example, on 050/063 series gearmotors.

- Total resolution 25 bit (9 bit singleturn + 16bit multiturn)
- Power supply up to +30 VDC, battery life up to 10 years
- Radial cable or metallic M12 connector output
- IP65 enclosure rating
- Mounting in kit without bearings, hub for 12 mm diameter shaft
- Battery activation via dip-switch

ORDERING CODE	EAM	110M	16	9	B	10/30	RS485	12	T	X	M12R	.162	+XXX

SERIES
magnetic multiturn absolute encoder series EAM

MODEL
050/063 flange 110M

MULTITURN RESOLUTION
bit 16

SINGLETURN RESOLUTION
bit 9

CODE TYPE
binary B

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

ELECTRICAL INTERFACE
RS-485 RS485

BORE DIAMETER
mm 12

LINE TERMINATION
with termination resistor T
without termination resistor X

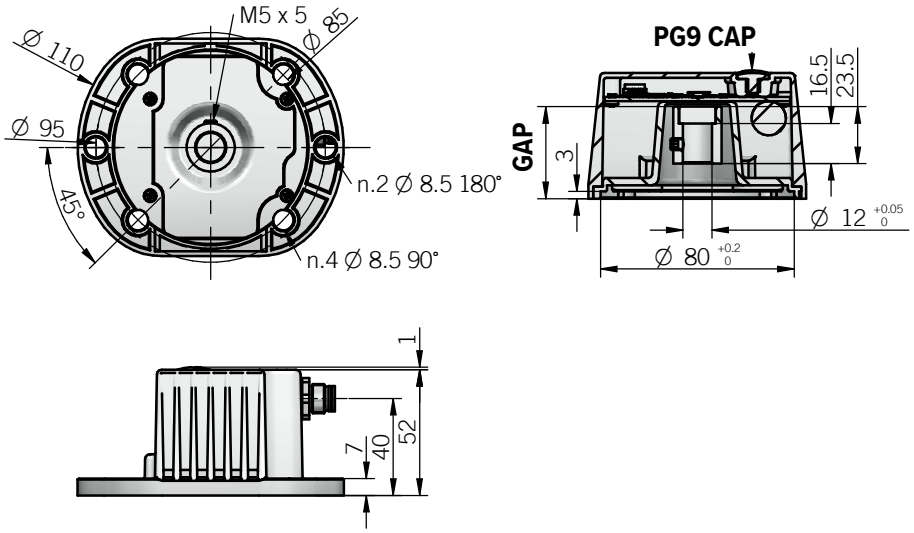
ENCLOSURE RATING
IP 65 X

OUTPUT TYPE
radial cable (standard length 0,5 m) PR
preferred cable lengths 1,5 / 2 / 3 / 5 / 10 m, to be added after DIRECTION TYPE (eg. PR5)
M12 radial connector M12R

SOCKET
socket not included .162
to be reported only with connector output (eg. M12R.162), for socket see Accessories

VARIANT
custom version XXX

110M



dimensions in mm

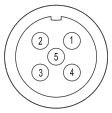
ELECTRICAL SPECIFICATIONS

Sensing principle	Magnetic asic
Singleturn resolution	9 bit
Multiturn resolution	16 bit (battery buffered)
Power supply[1]	+10 ... 30 V DC (reverse polarity protection)
Current consumption without load	30 mA
Battery life (at +20°C / +68°F)	10 years (depending on the usage)
Electrical interface	RS-485
Code type	binary
Communication protocol	Modbus RTU
Maximum permissible electrical acceleration	100 rad/s²
Counting direction	decreasing clockwise (shaft view)
Start-up time	150 ms with main power
Accuracy	± 0,75°
Cable type	shielded - fixed installation conductors section 0,22 mm2 / AWG 24 bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive

CONNECTIONS

Function	Cable	M12 5 pin
+V DC	red	1
0 V	black	3
A	green	2
B	yellow	4
NC	/	5
⏚	shield	/

M12 connector (5 pin)
M12 A coded
front view

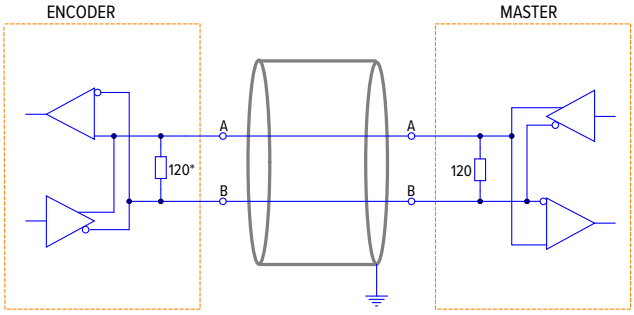


MECHANICAL SPECIFICATION

Bore diameter	ø 12 mm
Magnet positioning (GAP)	31,5 ... 38 mm
Enclosure rating	IP 65 (IEC 60529) when properly installed
Max rotation speed	6000 rpm
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibrations	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Moment of inertia	0,1 x 10^{-6} kgm² (2,4 x 10^{-6} lbft²)
Magnet hub material	PA66 glass fiber reinforced
Housing material	PA66 glass fiber reinforced
Operating temperature[2,3]	-20° ... +70°C (-4° ... +158°F)
Storage temperature[2,3]	-20° ... +70°C (-4° ... +158°F)
Weight	160 g (5,64 oz)

[1] as measured at the transducer without cable influences
[2] measured on the transducer flange
[3] condensation not allowed

RS-485 ELECTRICAL INTERFACE



* with line termination (T ordering code)

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