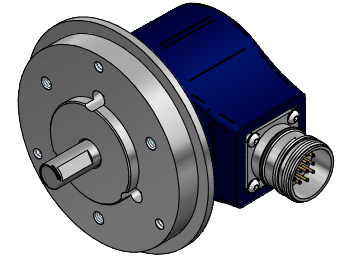


MAIN FEATURES

Industry standard multiturn absolute encoder for factory automation applications.

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

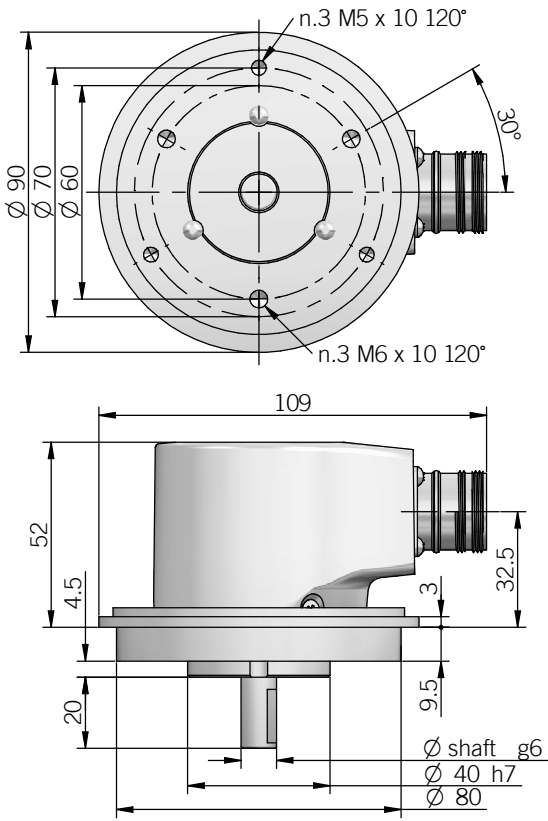


| ORDERING CODE BIT PARALLEL | EAMR | 90A | 12 / 12 | G | 8/30 | P | P | X | 10 | X | PE | R | .XXX |
|---|------|-----|---------|---|------|---|---|---|----|---|----|---|------|
| SERIES multiturn absolute encoder EAMR | | | | | | | | | | | | | |
| MODEL synchronous flange \varnothing 40 mm 90A REO-444 flange 115A | | | | | | | | | | | | | |
| MULTITURN RESOLUTION bit from 1 to 12 | | | | | | | | | | | | | |
| SINGLETURN RESOLUTION bit from 1 to 13 | | | | | | | | | | | | | |
| CODE TYPE binary B gray G | | | | | | | | | | | | | |
| POWER SUPPLY 8 ... 30 V DC 8/30 | | | | | | | | | | | | | |
| ELECTRICAL INTERFACE push-pull P | | | | | | | | | | | | | |
| LOGIC negative N positive P | | | | | | | | | | | | | |
| OPTIONS to be reported if not used X latch L reset ZE latch / reset LZE | | | | | | | | | | | | | |
| SHAFT DIAMETER (mod. 90) 3/8" - mm 9,52 mm 10 (mod. 115) mm 11 | | | | | | | | | | | | | |
| ENCLOSURE RATING IP 65 shaft side / IP67 cover side X IP 67 S | | | | | | | | | | | | | |
| OUTPUT TYPE (up to 13 bit as total resolution) 16 cores cable (standard length 1,5 m) PD (from 14 to 25 bit as total resolution or options) 32 cores cable (standard length 1,5 m) PE (up to 13 bit as total resolution) 19 pin MIL connector MA (from 14 to 25 bit as total resolution) 32 pin MIL connector ME female connector included, without female please add 162 as variant code | | | | | | | | | | | | | |
| DIRECTION TYPE radial R | | | | | | | | | | | | | |
| VARIANT custom version XXX | | | | | | | | | | | | | |

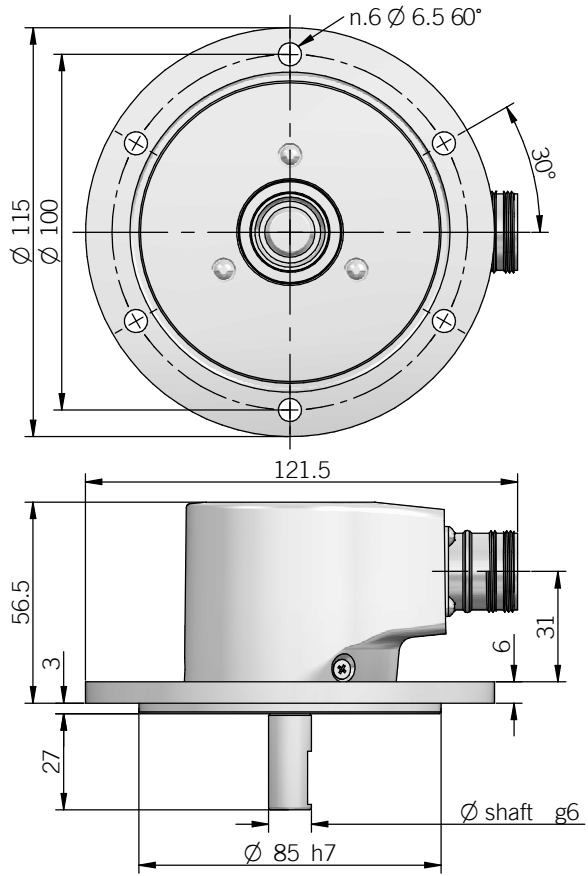
| ORDERING CODE SSI | EAMR | 90A | 12 / 13 | G | 8/30 | S | X | 2048 | RS | 10 | X | MC | R | .XXX |
|---|------|-----|---------|---|------|---|---|------|----|----|---|----|---|------|
| SERIES multiturn absolute encoder EAMR | | | | | | | | | | | | | | |
| MODEL synchronous flange ø 40 mm 90A REO-444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

only with additional incremental output

90 A



115 A



fixing clamps not included, please refer to Accessories section

dimensions in mm

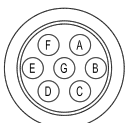
BIT PARALLEL CONNECTIONS

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

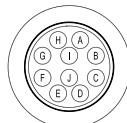
SSI CONNECTIONS

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

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



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



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



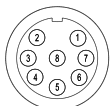
MA connector (19 pin)
Amphenol 621N 12E 14-19 P
solder side view FV



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



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



ELECTRICAL SPECIFICATIONS

| | |
|---|--|
| Multiturn resolution | 12 / 14 / 15 bit please directly contact our offices for other pulses |
| Singleturn resolution | P = from 1 to 13 bit S = preferred combinations 12 multiturn / 13 singleturn 14 multiturn / 18 singleturn 15 multiturn / 25 singleturn please directly contact our offices for other pulses |
| Power supply | +7,6 ... +30 V DC (reverse polarity protection) |
| Power draw without load | < 1 W |
| Max load current | 20 mA / channel |
| Output type | P = push pull* S = RS-422 compatible |
| Incremental A / B electrical interface | L = HTL differential (active short circuit protection)* P = Push-Pull (active short circuit protection)* RS = RS-422 |
| Max incremental output frequency | 128 kHz |
| Auxiliary inputs (U/D - Reset - Latch) | active high (+V DC) connect to 0 V if not used / Reset - Latch t_{min} 150 ms |
| Max frequency | 50 kHz LSB (Bit Parallel) clock input: 100 kHz ... 1 MHz (SSI) |
| Code type | binary or gray |
| Logic | SSI = positive Bit parallel = positive or negative |
| SSI monostable time (Tm) | 20 μ s |
| SSI pause time (Tp) | > 35 μ s |
| SSI frame | tree format (MSB ... LSB) up to 12 bit multiturn = length 25 bit (12MT + 13ST) 14 bit multiturn = length 32 bit (14MT + 18ST) 15 bit multiturn = length 40 bit (15MT + 25ST) |
| SSI status and parity bit | on request |
| Counting direction | decreasing clockwise (shaft view) |
| Start-up time | 700 ms |
| Accuracy | \pm 250 arc-sec |
| Electromagnetic compatibility | according to 2004/108/EC directive |
| RoHS | according to 2011/65/EU directive |
| UL / CSA | certificate n. E212495 |

* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

MECHANICAL SPECIFICATIONS

| | |
|---|--|
| Shaft diameter | \varnothing 9,52 (3/8") / 10 / 11 mm |
| Enclosure rating IEC 60529 | X = IP 65 shaft side / IP67 cover side S = IP 67 |
| Max rotation speed | see table |
| Max shaft load | 80 N radial / 40 N axial (TBD) |
| Shock | 50 G, 11 ms (IEC 60068-2-27) |
| Vibration | 10 G, 10 ... 2000 Hz (IEC 60068-2-6) |
| Moment of inertia | 1,5 x 10 ⁻⁶ kgm ² (36 x 10 ⁻⁶ lbf ²) |
| Starting torque (at +20°C / +68°F) | < 0,03 Nm (4,25 Ozin) |
| Body material | EN-AW 2011 aluminum |
| Shaft material | 1.4305 / AISI 303 stainless steel |
| Housing material | painted aluminium / mild steel |
| Bearings | 2 ball bearings |
| Bearings life | 10 ⁹ revolutions |
| Operating temperature Bit parallel | -20° ... +85°C (-4° ... +185°F) |
| Operating temperature SSI | -40° ... +100°C (-40° ... +212°F) -20° ... +100°C (-4° ... +212°F) with cable output -30° ... +85°C (-22° ... +185°F) with M12 connector |
| Storage temperature | -20° ... +85°C (-4° ... +185°F) |
| Weight | approx 350 g (12,35 oz) |

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 |

BIT PARALLEL CONNECTOR OR CABLE CHOICE

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

EXAMPLE 1

Singleturn = 8 bit = 8 connections
Multiturn = 5 bit = 5 connections
Total connections 13

EXAMPLE 2

Singleturn = 12 bit = 12 connections
Multiturn = 12 bit = 12 connections
Total connections 24

From 1 to 13 connections a 16 cores cable (PD) or a 19 pin connector (MA) have to be considered.

From 14 to 25 connections a 32 cores cable (PE) or a 32 pin connector (ME) have to be considered.

With LATCH option a 32 cores cable or a 32 pin connector is required; RESET option is available with PE 32 cores cable output or 19 pin (MA) / 32 pin (ME) connector.