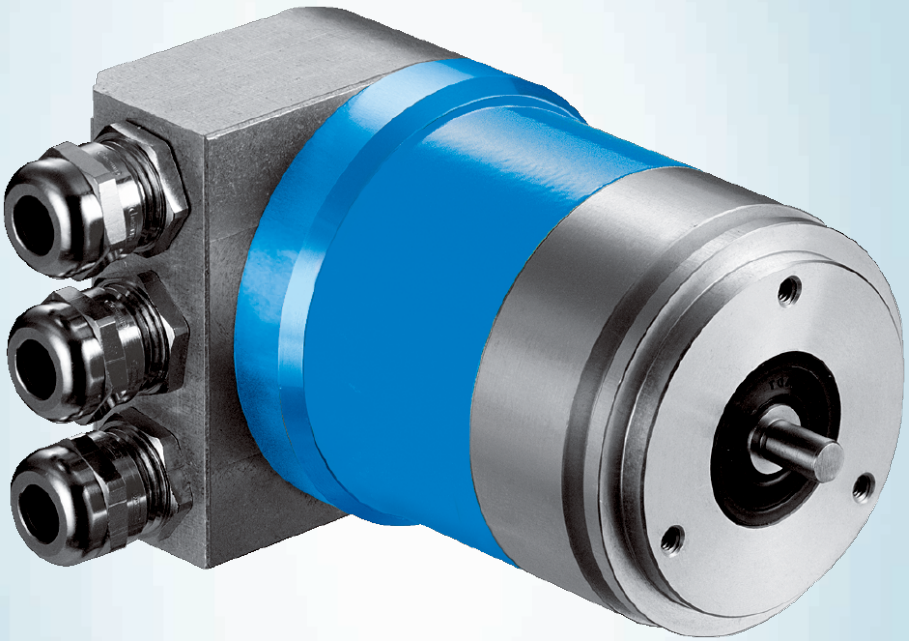
Data sheet



# ATM60-P1H13X13

ATM60

**ABSOLUTE ENCODERS**

SICK
Sensor Intelligence.

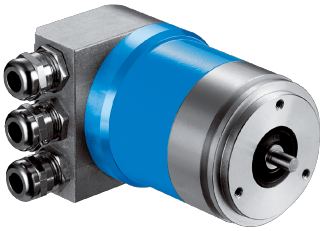


Illustration may differ

## Ordering information

| Type | part no. |
|---|---|
| ATM60-P1H13X13 | 1030014 |

Other models and accessories ➜ www.sick.com/ATM60

## Detailed technical data

### Safety-related parameters

| | |
|---|---|
| **$MTTF_D$ (mean time to dangerous failure)** | 150 years (EN ISO 13849-1) [1] |

[1] This product is a standard product and does not constitute a safety component as defined in the Machinery Directive. Calculation based on nominal load of components, average ambient temperature 40 °C, frequency of use 8760 h/a. All electronic failures are considered hazardous. For more information, see document no. 8015532.

### Performance

| | |
|---|---|
| **Number of steps per revolution (max. resolution)** | 8,192 (13 bit) |
| **Number of revolutions** | 8,192 (13 bit) |
| **Max. resolution (number of steps per revolution x number of revolutions)** | 13 bit x 13 bit (8,192 x 8,192) |
| **Measuring step** | 0.043° |
| **Error limits G** | ± 0.25° [1] |
| **Repeatability standard deviation $\sigma_r$** | 0.1° [2] |

[1] In accordance with DIN ISO 1319-1, position of the upper and lower error limit depends on the installation situation, specified value refers to a symmetrical position, i.e. deviation in upper and lower direction is the same.
[2] In accordance with DIN ISO 55350-13; 68.3% of the measured values are inside the specified area.

### Interfaces

| | |
|---|---|
| **Communication interface** | PROFIBUS DP |
| **Communication Interface detail** | DPV0 |
| **Data protocol** | Profile for encoders (07hex) – Class 2 |
| **Address setting** | 0 ... 127, DIP switches or protocol |
| **Data transmission rate (baud rate)** | 9.6 kBaud ... 12 MBaud, automatic detection |
| **Initialization time** | 1,250 ms [1] |
| **Position forming time** | 0.25 ms |
| **Status information** | LED green (operation), LED red ( bus activity) |
| **Bus termination** | DIP switch [2] |

[1] Valid positional data can be read once this time has elapsed.
[2] Should only be connected in the final device.

| | |
|---|---|
| **Set (electronic adjustment)** | Via PRESET push button or protocol |

[1] Valid positional data can be read once this time has elapsed.
[2] Should only be connected in the final device.

## Electronics

| | |
|---|---|
| **Connection type** | Bus adapter [1] |
| **Supply voltage** | 10 ... 32 V |
| **Power consumption** | ≤ 2 W (without load) |
| **Reverse polarity protection** | ✓ |

[1] Order bus adapter separately.

## Mechanics

| | |
|---|---|
| **Mechanical design** | Solid shaft, Servo flange |
| **Shaft diameter** | 6 mm |
| **Shaft length** | 10 mm |
| **Weight** | 0.59 kg [1] |
| **Shaft material** | Stainless steel |
| **Flange material** | Aluminum |
| **Start up torque** | 2.5 Ncm (+20 °C), with shaft seal<br>0.5 Ncm (+20 °C), without shaft seal [2] |
| **Operating torque** | 1.8 Ncm (+20 °C), with shaft seal<br>0.3 Ncm (+20 °C), without shaft seal [2] |
| **Permissible shaft loading** | 300 N (radial)<br>50 N (axial) |
| **Operating speed** | ≤ 6,000 $min^{-1}$ [3] |
| **Moment of inertia of the rotor** | 35 $gcm^2$ |
| **Bearing lifetime** | 3.6 x $10^9$ revolutions |
| **Angular acceleration** | ≤ 500,000 $rad/s^2$ |

[1] Based on encoder with male connector.
[2] If the shaft seal has been removed by the customer.
[3] Allow for self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

## Ambient data

| | |
|---|---|
| **EMC** | According to EN 61000-6-2 and EN 61000-6-3 |
| **Enclosure rating** | IP67, with shaft seal (IEC 60529) [1]<br>IP43, without shaft seal, on encoder flange not sealed (IEC 60529) [1]<br>IP66, without shaft seal, on encoder flange sealed (IEC 60529) [1] |
| **Permissible relative humidity** | 98 % |
| **Operating temperature range** | –20 °C ... +85 °C |
| **Storage temperature range** | –40 °C ... +100 °C, without package |
| **Resistance to shocks** | 100 g, 6 ms (EN 60068-2-27) |
| **Resistance to vibration** | 20 g, 10 Hz ... 2,000 Hz (EN 60068-2-6) |

[1] With mating connector fitted.

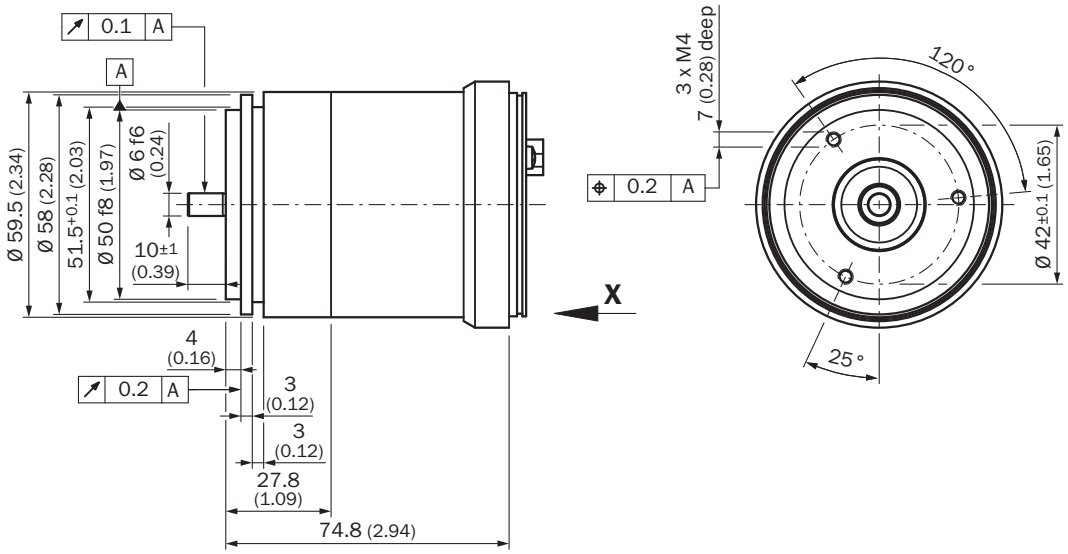
## Certificates

| | |
|---|---|
| **EU declaration of conformity** | ✓ |
| **UK declaration of conformity** | ✓ |
| **ACMA declaration of conformity** | ✓ |
| **Moroccan declaration of conformity** | ✓ |
| **China RoHS** | ✓ |
| **cULus certificate** | ✓ |

## Classifications

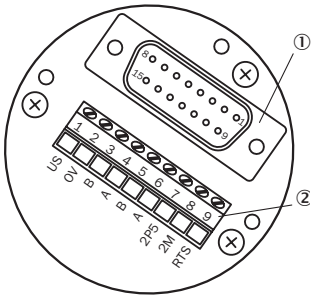
| | |
|---|---|
| **ECLASS 5.0** | 27270502 |
| **ECLASS 5.1.4** | 27270502 |
| **ECLASS 6.0** | 27270590 |
| **ECLASS 6.2** | 27270590 |
| **ECLASS 7.0** | 27270502 |
| **ECLASS 8.0** | 27270502 |
| **ECLASS 8.1** | 27270502 |
| **ECLASS 9.0** | 27270502 |
| **ECLASS 10.0** | 27270502 |
| **ECLASS 11.0** | 27270502 |
| **ECLASS 12.0** | 27270502 |
| **ETIM 5.0** | EC001486 |
| **ETIM 6.0** | EC001486 |
| **ETIM 7.0** | EC001486 |
| **ETIM 8.0** | EC001486 |
| **UNSPSC 16.0901** | 41112113 |

## Dimensional drawing



Dimensions in mm (inch)

## PIN assignment




① Internal plug connector to encoder
② external connection to the bus

**Encoders with a PROFIBUS connection adapter have screw connections (metric/PG) for connecting the bus and supply cables. The bus adapter from the complete device is screwed on to connect the cables. The adjacent figure shows the pin assignment within the bus adapter.**

| Terminal strip | Connector 4-pin | Connector 5-pin | Female connector 5 pin | Signal | Explanation |
|---|---|---|---|---|---|
| 1 | 1 | - | - | $U_S$ (24 V) | Operating voltage 10 ... 32 V |
| 2 | 3 | - | - | 0 V (GND) | Ground (0 V) |
| 3 | - | - | 4 | B | B-cable PROFIBUS DP (out) |
| 4 | - | - | 2 | A | A-cable PROFIBUS DP (out) |
| 5 | - | 4 | - | B | B-cable PROFIBUS DP (out) |
| 6 | - | 2 | - | A | A-cable PROFIBUS DP (out) |
| 7 | - | - | 1 | 2P5[1)] | + 5 V (potential free) |
| 8 | - | - | 3 | 2M[1)] | 0 V (potential free) |
| - | 2 | 1 | - | N.C. | - |
| - | 4 | 3 | - | N.C. | - |
| - | - | 5 | 5 | Screen | Housing potential |

[1)] Use for external bus terminations or to supply the sender/receiver with a optical fiber transmission

## Recommended accessories

Other models and accessories ➜ www.sick.com/ATM60

| | Brief description | Type | part no. |
|---|---|---|---|
| connectors and cables | | | |
|  | • **Description:** Unshielded<br>• **Connection type head A:** Female connector, M12, 4-pin, straight, A-coded<br>• **Connection systems:** Screw-type terminals<br>• **Permitted cross-section:** ≤ 0.75 mm² | DOS-1204-G | 6007302 |
|  | • **Description:** PROFIBUS DP, shielded<br>• **Connection type head A:** Flying leads<br>• **Connection type head B:** Flying leads<br>• **Signal type:** PROFIBUS DP<br>• **Items supplied:** By the meter<br>• **Cable:** 2-wire, PUR | LTG-2102-MW | 6021355 |
|  | • **Description:** PROFIBUS DP, shielded<br>• **Connection type head A:** Male connector, M12, 5-pin, straight, B-coded<br>• **Signal type:** PROFIBUS DP<br>• **Connection systems:** Screw-type terminals<br>• **Permitted cross-section:** ≤ 0.75 mm² | STE-1205-GQ | 6021354 |
|  | • **Description:** PROFIBUS DP, shielded<br>• **Connection type head A:** Female connector, M12, 5-pin, straight, B-coded<br>• **Signal type:** PROFIBUS DP<br>• **Connection systems:** Screw-type terminals<br>• **Permitted cross-section:** ≤ 0.75 mm² | DOS-1205-GQ | 6021353 |
|  | • **Connection type head A:** Female connector, M12, 5-pin, straight, B-coded<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Fieldbus, PROFIBUS DP<br>• **Cable:** 12 m, 2-wire, PUR, halogen-free<br>• **Description:** Fieldbus, twisted pair, shielded, PROFIBUS DP<br>• **Connection systems:** Flying leads<br>• **Application:** Zones with oils and lubricants | DOL-1205-G12MQ | 6032636 |
|  | • **Description:** Sensor/actuator cable, unshielded<br>• **Connection type head A:** Female connector, M12, 4-pin, straight, A-coded<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Sensor/actuator cable<br>• **Cable:** 5 m, 4-wire, PVC<br>• **Application:** Uncontaminated zones, Zones with chemicals | YF2A14-050VB3XLEAX | 2096235 |
|  | • **Connection type head A:** Male connector, M12, 2-pin, straight, B-coded<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Fieldbus, PROFIBUS DP<br>• **Cable:** 15 m, 2-wire, PUR, halogen-free<br>• **Description:** Fieldbus, shielded, PROFIBUS DP<br>• **Application:** Drag chain operation, Zones with oils and lubricants | YM2B22-150P-B1XLEAX | 2106276 |
|  | • **Connection type head A:** Male connector, M12, 2-pin, straight, B-coded<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Fieldbus, PROFIBUS DP<br>• **Cable:** 5 m, 2-wire, PUR, halogen-free<br>• **Description:** Fieldbus, shielded, PROFIBUS DP<br>• **Application:** Drag chain operation, Zones with oils and lubricants | YM2B22-050P-B1XLEAX | 2106270 |
|  | • **Connection type head A:** Male connector, M12, 2-pin, straight, B-coded<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Fieldbus, PROFIBUS DP<br>• **Cable:** 10 m, 2-wire, PUR, halogen-free<br>• **Description:** Fieldbus, shielded, PROFIBUS DP<br>• **Application:** Drag chain operation, Zones with oils and lubricants | YM2B22-100P-B1XLEAX | 2106271 |
|  | • **Connection type head A:** Female connector, M12, 2-pin, straight, B-coded<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Fieldbus, PROFIBUS DP<br>• **Cable:** 10 m, 2-wire, PUR, halogen-free<br>• **Description:** Fieldbus, shielded, PROFIBUS DP<br>• **Application:** Drag chain operation, Zones with oils and lubricants | YF2B22-100P-B1XLEAX | 2106269 |
| | • **Connection type head A:** Female connector, M12, 2-pin, straight, B-coded<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Fieldbus, PROFIBUS DP<br>• **Cable:** 15 m, 2-wire, PUR, halogen-free<br>• **Description:** Fieldbus, shielded, PROFIBUS DP | YF2B22-150P-B1XLEAX | 2106272 |

| | Brief description | Type | part no. |
|---|---|---|---|
| | • **Application:** Drag chain operation, Zones with oils and lubricants | | |
| | • **Connection type head A:** Female connector, M12, 2-pin, straight, B-coded<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Fieldbus, PROFIBUS DP<br>• **Cable:** 20 m, 2-wire, PUR, halogen-free<br>• **Description:** Fieldbus, shielded, PROFIBUS DP<br>• **Application:** Drag chain operation, Zones with oils and lubricants | YF2B22-200P-B1XLEAX | 2106273 |
|  | • **Connection type head A:** Female connector, M12, 2-pin, straight, B-coded<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Fieldbus, PROFIBUS DP<br>• **Cable:** 5 m, 2-wire, PUR, halogen-free<br>• **Description:** Fieldbus, shielded, PROFIBUS DP<br>• **Application:** Drag chain operation, Zones with oils and lubricants | YF2B22-050P-B1XLEAX | 2121936 |
| integration modules and adapters | | | |
|  | | AD-ATM60-KA3PR | 2029225 |
|  | | AD-ATM60-SR3PR | 2031985 |
| shaft adaptation | | | |
|  | • **Product segment:** Shaft adaptation<br>• **Product:** Shaft couplings<br>• **Description:** Bellows coupling, shaft diameter 6 mm / 6 mm, maximum shaft offset: radial ± 0.25 mm, axial ± 0.4 mm, angular +/- 4°; max. speed 10,000 rpm, –30 °C to +120 °C, max. torque 120 Ncm; material: stainless steel bellows, aluminum hub | KUP-0606-B | 5312981 |
|  | • **Product segment:** Shaft adaptation<br>• **Product:** Shaft couplings<br>• **Description:** Bellows coupling, shaft diameter 6 mm / 10 mm, maximum shaft offset: radial ± 0.25 mm, axial ± 0.4 mm, angular +/- 4°; max. speed 10,000 rpm, –30 °C to +120 °C, max. torque 120 Ncm; material: stainless steel bellows, aluminum hub | KUP-0610-B | 5312982 |
|  | • **Product segment:** Shaft adaptation<br>• **Product:** Shaft couplings<br>• **Description:** Spring washer coupling, shaft diameter 6 mm / 10 mm, Maximum shaft offset: radial +/- 0.3 mm, axial +/- 0.4 mm, angular +/- 2.5°; max. speed 12,000 rpm, –10° to +80 °C, max. torque 60 Ncm; material: aluminum flange, glass fiber-reinforced polyamide membrane and hardened steel coupling pin | KUP-0610-F | 5312985 |
| Mounting systems | | | |
|  | • **Description:** Mounting bell for encoder with servo flange, 50 mm spigot<br>• **Items supplied:** Mounting kit included | BEF-MG-50 | 5312987 |
|  | • **Description:** Half-shell servo clamps (2 pcs.) for servo flanges with a 50 mm centering hub | BEF-WG-SF050 | 2029165 |
|  | • **Description:** Servo clamps, large, for servo flange (clamps, eccentric fastener), 3 pcs, without mounting material<br>• **Items supplied:** Without mounting hardware | BEF-WK-SF | 2029166 |

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We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

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