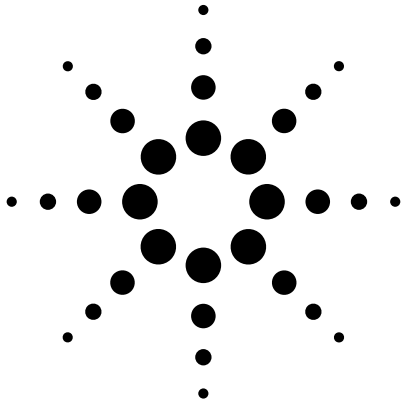


Agilent AEAS-72AC-xxxxB Absolute Encoder Data Sheet



Description

The AEAS-72AC-xxxxB absolute encoder is a feedback device that has the capability to generate a unique binary 'word' for each encoder shaft position. The AEAS-72AC-xxxxB also has the unique feature of being able to provide positional information upon power up without the need for codewheel movement, unlike incremental encoders, which need codewheel movement to provide positional information.

Each absolute encoder from the AEAS-72AC-xxxxB consists of a lensed LED (Light Emitting Diode)

source, an integrated circuit with detectors and output circuitry, and a special multi-track glass codewheel that rotates between the emitter and detector IC. These 3 main components are contained within a strong metal housing fitted with bearings to produce an IP rated encoder capable of working in very wet and dusty conditions. Models with IP65 ratings have sealed bearings.

Features

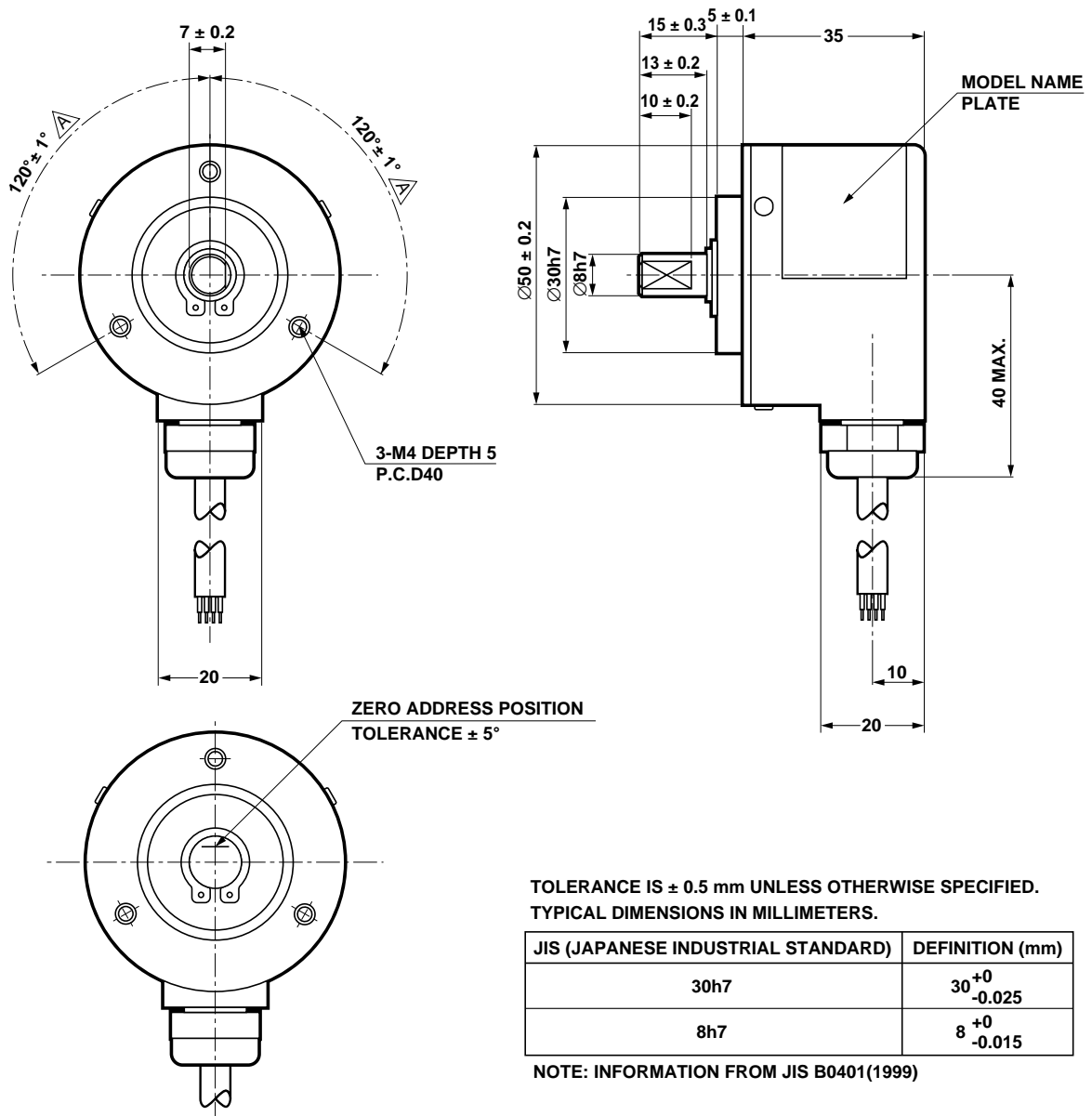
- Gray or binary code options
- High or low power source options
- IP 65 rating
- 50 mm package diameter
- 8 bits and 10 bits resolution
- 8 mm shaft diameter
- The package comes with 2 m long cable

Applications

- Tool changers and axis control for machine tools
- Robotics
- Telescopes and antennas
- Rotary and X - Y positioning tables
- Medical scanners



Package Dimensions



TOLERANCE IS ± 0.5 mm UNLESS OTHERWISE SPECIFIED.
TYPICAL DIMENSIONS IN MILLIMETERS.

| JIS (JAPANESE INDUSTRIAL STANDARD) | DEFINITION (mm) |
|------------------------------------|--------------------|
| 30h7 | $30^{+0}_{-0.025}$ |
| 8h7 | $8^{+0}_{-0.015}$ |

NOTE: INFORMATION FROM JIS B0401(1999)

| | | | |
|--|--------------------|-----------|----|
| <p>Agilent Technologies ABSOLUTE ENCODER PART No: AEAS-72AC-XXXAB SERIAL No: XX-XXX MADE IN JAPAN</p> | CONNECTIONS | | |
| | RED $+^+ \sim ^-V$ | BLU | 24 |
| | BLK 0V.COM | VLT | 25 |
| | BRN 20 | GRA | 26 |
| | ORN 21 | WHT | 27 |
| | YEL 22 | SHIELD FG | |
| | GRN 23 | | |

8 BIT SPEC

| | | | |
|--|--------------------|-----------|----|
| <p>Agilent Technologies ABSOLUTE ENCODER PART No: AEAS-72AC-XXXBB SERIAL No: XX-XXX MADE IN JAPAN</p> | CONNECTIONS | | |
| | RED $+^+ \sim ^-V$ | BLU | 24 |
| | BLK 0V.COM | VLT | 25 |
| | BRN 20 | GRA | 26 |
| | ORN 21 | WHT | 27 |
| | YEL 22 | PNK | 28 |
| | SKY | 29 | |
| | GRN 23 | SHIELD FG | |

10 BIT SPEC

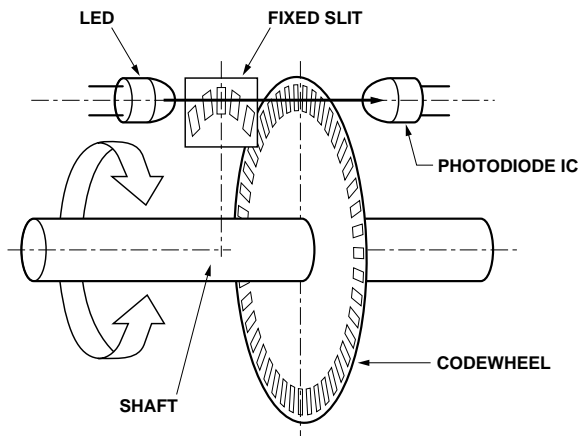
Theory of Operation

The AEAS-72AC-xxxxB is a single-turn, low-cost, and compact absolute encoder which uses optical technology to provide absolute positioning information.

The AEAS-72AC-xxxxB consists of a LED, Fixed Slit, Codewheel (Rotating Disc) and Photodiode IC. By using these four main components, the AEAS-72AC-xxxxB is able to produce signals in either binary or gray output form. These signals provide to the designer a unique code for each position that the codewheel is in.

As seen in the diagram, the encoder contains a single Light Emitting Diode (LED) as its light source.

The light is collimated into a parallel beam by means of a lens which is built into the LED housing. This parallel beam goes through the Fixed Slit that creates a certain light pattern, due to its pattern of slots, which will fall onto the code-wheel. The movement of the code-wheel between LED and Photo detector, causes the light pattern (from the Fixed Slit) to be further interrupted by the pattern of spaces and bars on the codewheel. This final light pattern from the codewheel is then detected by the Photodiode IC where its signals are fed through signal processing circuitry to produce 8 or 10 parallel signals in binary or gray output form.



Absolute Maximum Ratings

| | |
|-----------------------|---|
| Storage Temperature | -30°C to 85°C |
| Operating Temperature | -10°C to 60°C |
| Supply Voltage | DC4.5 V to 13.2 V (for output mode = V) DC4.5 V to 13.2 V; DC10.8 V to 26.4 V (for output mode = C) DC10.8 V to 26.4 V (for output mode = P) (note: V _{CC} ripple at 3% p-p max.) |
| Humidity | RH85% |
| Degree of Protection | (IP65): Totally protected against dust and protected against low-pressure jets of water from all directions; limited ingress permitted. |
| Shock | 980 m/s ² with 11ms at X, Y, Z directions |

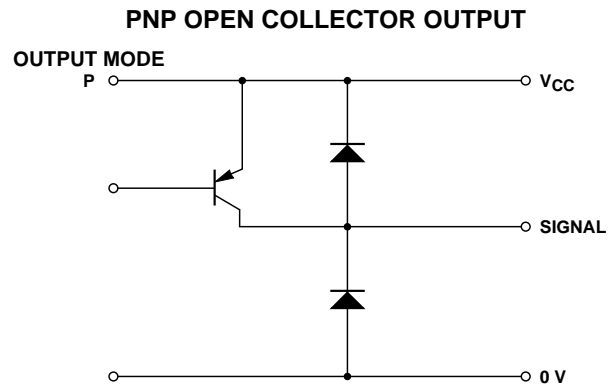
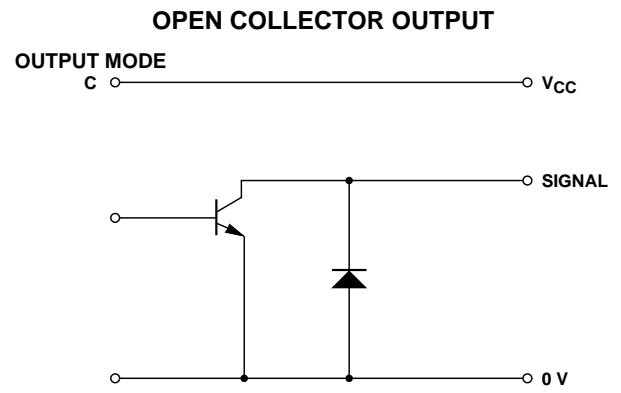
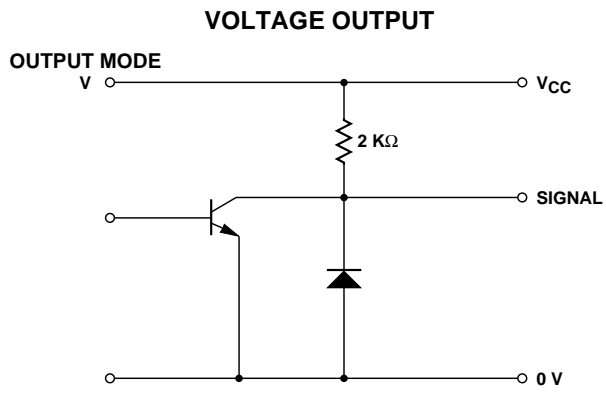
Electrical Characteristics (over recommended operating conditions. Typically at 25°C)

| Parameter | Symbol | Maximum | Units |
|------------------------------------|-----------------|---|-------|
| Current Consumption (without load) | I _{CC} | 100m (max.) | A |
| High Level Output Voltage | V _{OH} | V _{CC} - 1 V (for output mode = V) | V |
| Low Level Output Voltage | V _{OL} | 0.5 or less (for output mode V, C) | V |
| Rise Time | t _r | 2 | μs |
| Fall Time | t _f | 2 | μs |
| Response Frequency | f | 10K (for 8 bit resolution) 20K (for 10 bit resolution) | Hz |
| Angular Accuracy | | ±0.700° (max. for 8 bit resolution) ±0.175° (max. for 10 bit resolution) | deg |

Mechanical Ratings

| Parameter | | Maximum | Units |
|--|--------------|---------------------------------------|--------------------|
| Starting Torque | | 9.8 × 10 ⁻³ (max. at 25°C) | Nm |
| Angular Acceleration | | 1 × 10 ⁵ | rad/s ² |
| Shaft Loading | Axial Thrust | 49 | N |
| | Radial | 78.4 | N |
| Moment of Inertia | | 30 | g.cm ² |
| Speed | | 5000 | RPM |
| Net-Weight (without cable) | | 250 | g |
| Vibration (in X, Y, Z directions for 2 hrs.) | | 10 to 55 | Hz/1.5 mm (p-p) |

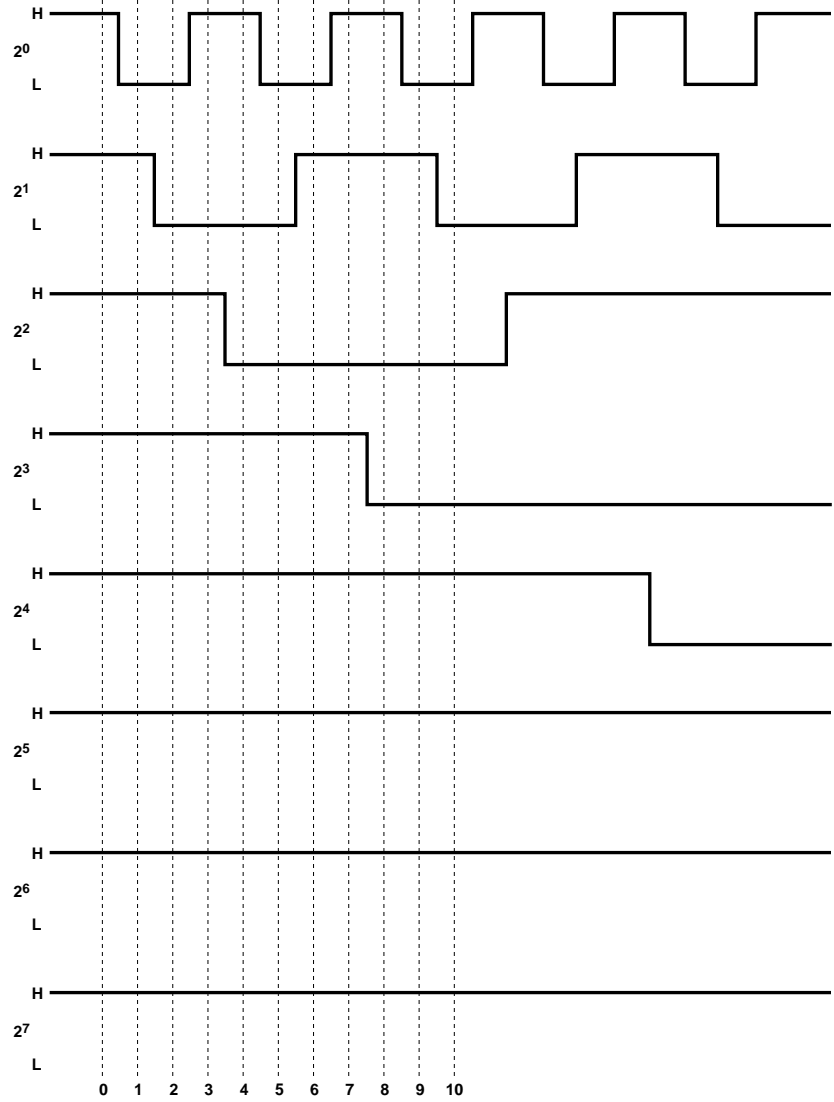
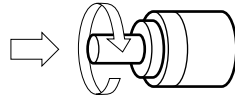
Electrical Interface



Output Waveforms Definition

Signals are extracted by rotating the shaft in clockwise direction as viewed from arrow angle.

The example signals shown are gray code output.



Electrical Connections

| Color of Lead Wire | Description |
|--------------------|--|
| Red | Power Source |
| Black | 0 V Common |
| Brown | Signal 2 ⁰ |
| Orange | Signal 2 ¹ |
| Yellow | Signal 2 ² |
| Green | Signal 2 ³ |
| Blue | Signal 2 ⁴ |
| Purple | Signal 2 ⁵ |
| Gray | Signal 2 ⁶ |
| White | Signal 2 ⁷ |
| Pink | Signal 2 ⁸ Only available for 1024 split type |
| Sky Blue | Signal 2 ⁹ Only available for 1024 split type |
| Shielding Braid | FG |

Ordering Information

AEAS-72AC-□□□□ B

Power Source

L = 5 to 12 V
H = 12 to 24 V

Output Code

G = Gray Code Negative Logic
A = Binary Code Negative Logic

Output Mode

C = Open Collector
P = PNP Open Collector, only available for option H of power source (12 to 24 V)
V = Voltage Out, only available for option L of power source (5 to 12 V)

Resolution

A = 8 bits
B = 10 bits

Part Numbers Currently Available:

AEAS-72AC-HACAB
AEAS-72AC-HACBB
AEAS-72AC-HGCAB
AEAS-72AC-HGCBB
AEAS-72AC-HGPAB
AEAS-72AC-HGPBB
AEAS-72AC-LACAB
AEAS-72AC-LACBB
AEAS-72AC-LAVAB
AEAS-72AC-LAVBB
AEAS-72AC-LGCAB
AEAS-72AC-LGCBB
AEAS-72AC-LGVAB
AEAS-72AC-LGVBB

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Japan: (+81 3) 3335-8152(Domestic/International), or 0120-61-1280(Domestic Only)

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Data subject to change.

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