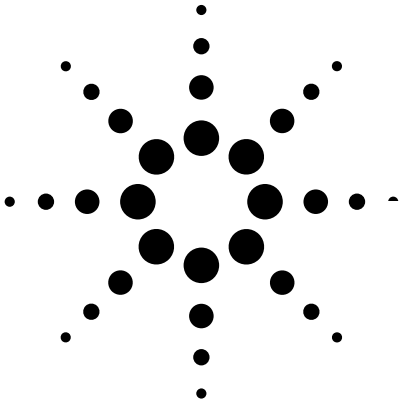


# Agilent AEAS-71AC-xxxxB Absolute Encoder Data Sheet



## Description

The AEAS-71AC-xxxxB absolute encoder is a feedback device that has the capability to generate a unique binary 'word' for each encoder shaft position. The AEAS-71AC-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-71AC-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

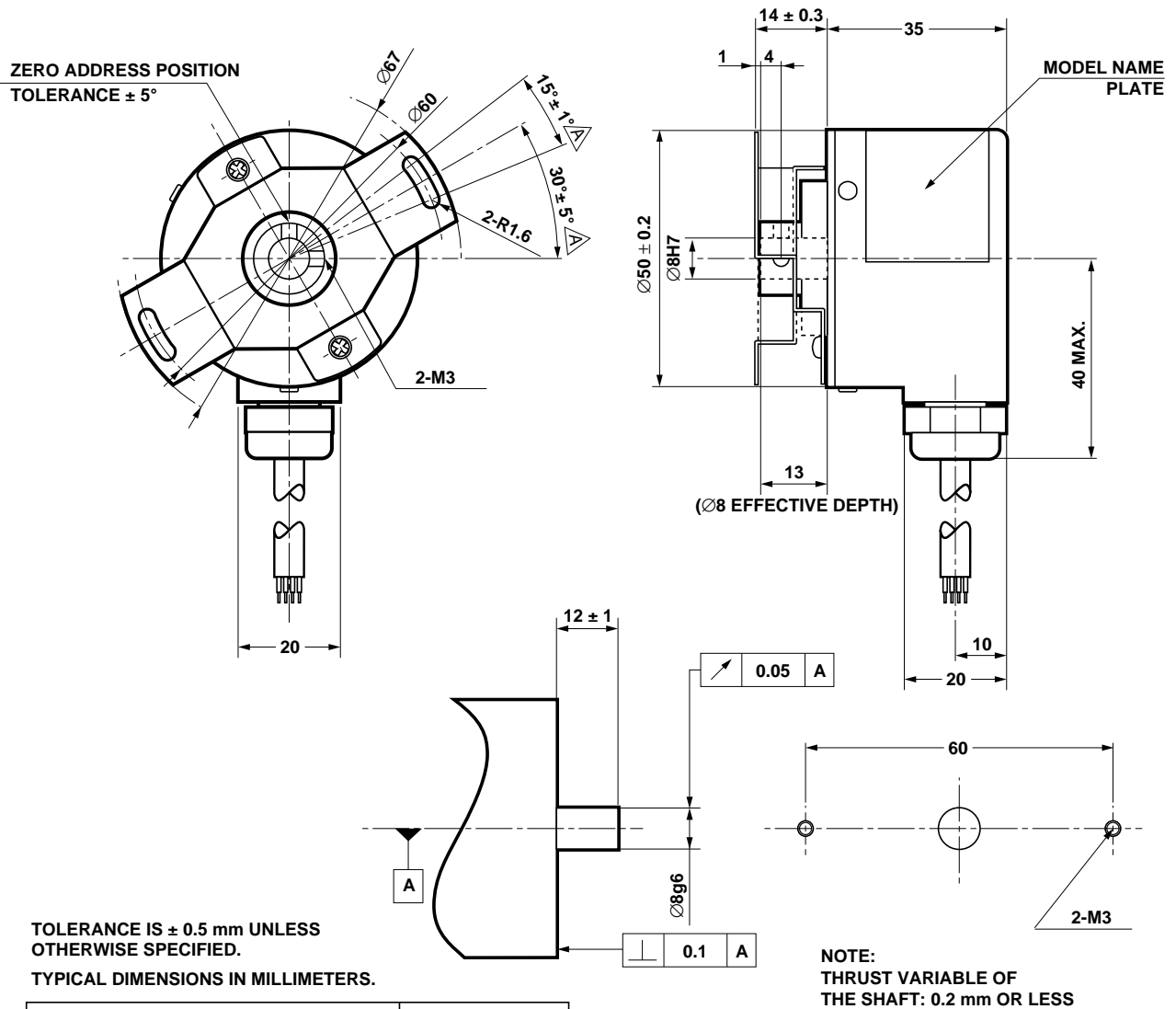
- Gray or binary code options
- High or low power source options
- IP 65 rating
- 50 mm package diameter
- 8 bits and 10 bits resolution
- Hollow shaft with 8 mm inside diameter
- The package comes with 2 m long cable

## 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  $\pm 0.5$  mm UNLESS OTHERWISE SPECIFIED.  
TYPICAL DIMENSIONS IN MILLIMETERS.

JIS (JAPANESE INDUSTRIAL STANDARD)	DEFINITION (mm)
8H7	$8^{+0.015}$ $8^{-0}$
8g6	$8^{+0.005}$ $8^{-0.014}$

NOTE: INFORMATION FROM JIS B0401(1999)

## ATTACHED DIMENSIONS OF SHAFT AND INTERNAL THREADS

 <b>Agilent Technologies</b> ABSOLUTE ENCODER PART No: AEAS-71AC-XXXAB SERIAL No: XX-XXX MADE IN JAPAN 	CONNECTIONS			
	RED +~*V	BLU	24	
	BLK 0V.COM	VLT	25	
	BRN 2 <sup>0</sup>	GRA	26	
	ORN 2 <sup>1</sup>	WHT	27	
	YEL 2 <sup>2</sup>	SHIELD FG		
	GRN 2 <sup>3</sup>			

8 BIT SPEC

 <b>Agilent Technologies</b> ABSOLUTE ENCODER PART No: AEAS-71AC-XXXBB SERIAL No: XX-XXX MADE IN JAPAN 	CONNECTIONS			
	RED +~*V	BLU	24	
	BLK 0V.COM	VLT	25	
	BRN 2 <sup>0</sup>	GRA	26	
	ORN 2 <sup>1</sup>	WHT	27	
	YEL 2 <sup>2</sup>	PNK	28	
	GRN 2 <sup>3</sup>	SKY	29	
		SHIELD FG		

10 BIT SPEC

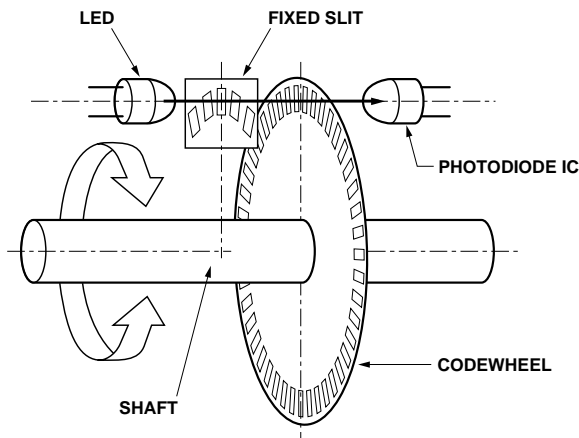
### Theory of Operation

The AEAS-71AC-xxxxB is a single-turn, low-cost, and compact absolute encoder which uses optical technology to provide absolute positioning information.

The AEAS-71AC-xxxxB consists of a LED, Fixed Slit, Codewheel (Rotating Disc) and Photodiode IC. By using these four main components, the AEAS-71AC-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) (notes: V <sub>CC</sub> 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 <sup>2</sup> with 11ms at X, Y, Z directions

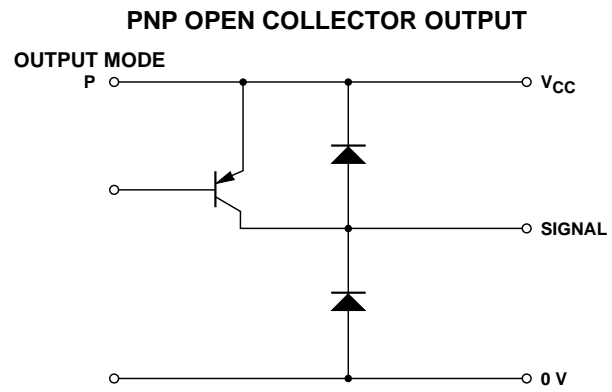
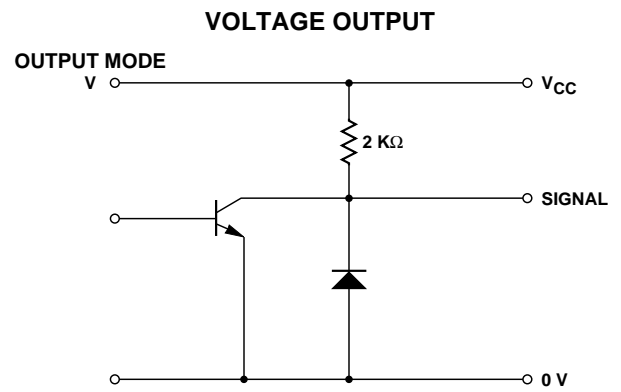
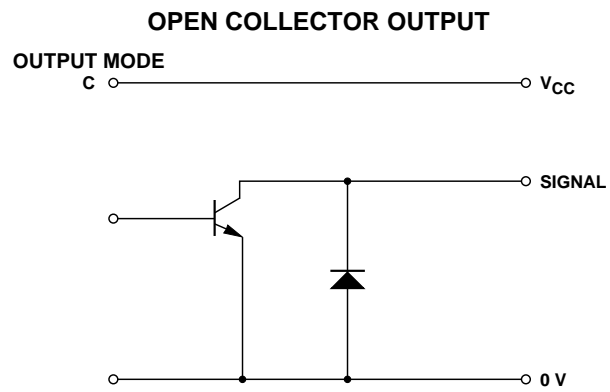
**Electrical Characteristics** (over recommended operating conditions. Typically at 25°C)

Parameter	Symbol	Maximum	Units
Current Consumption (without load)	I <sub>CC</sub>	100m (max.)	A
High Level Output Voltage	V <sub>OH</sub>	V <sub>CC</sub> - 1 V (for output mode = V)	V
Low Level Output Voltage	V <sub>OL</sub>	0.5 or less	V
Rise Time	t <sub>r</sub>	2	μs
Fall Time	t <sub>f</sub>	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 x 10 <sup>-3</sup> (max. at 25°C)	Nm
Angular Acceleration		1 x 10 <sup>5</sup>	rad/s <sup>2</sup>
Shaft Loading	Axial Thrust	49	N
	Radial	78.4	N
Moment of Inertia		30	g.cm <sup>2</sup>
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)

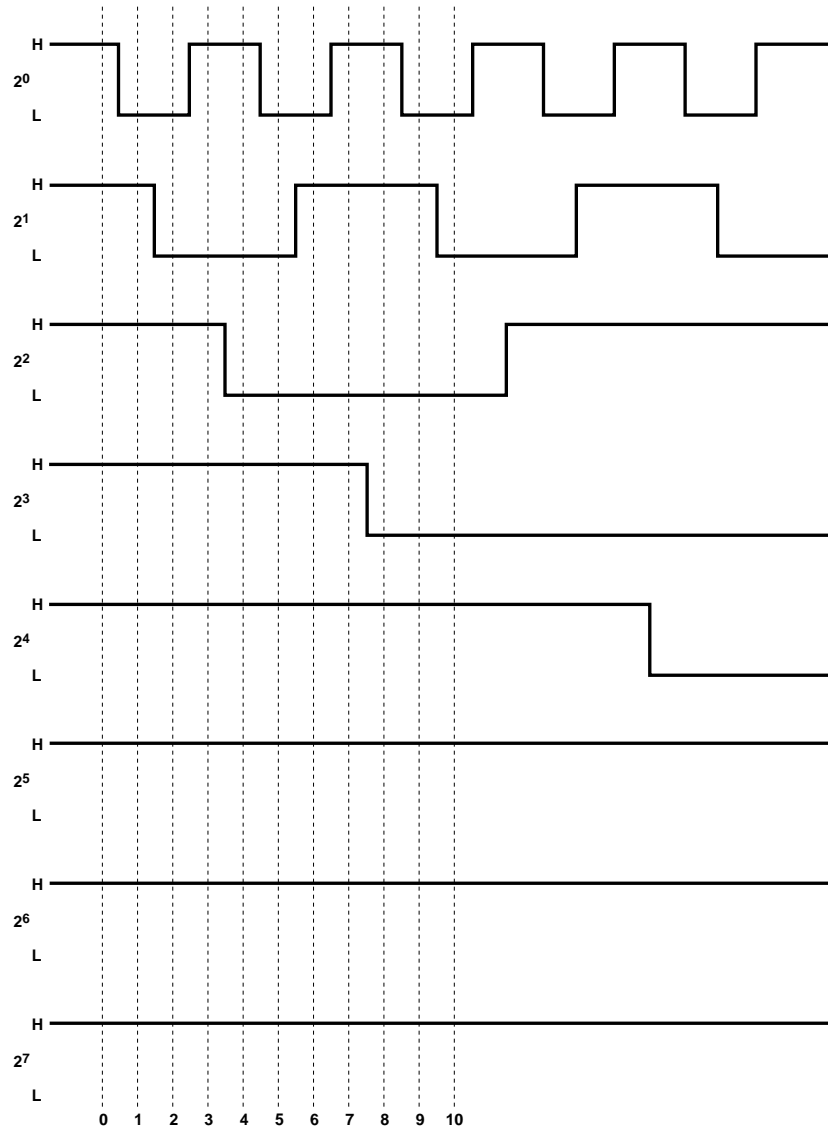
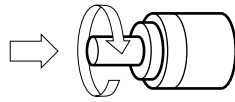
## Electrical Interface



**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 <sup>0</sup>
Orange	Signal 2 <sup>1</sup>
Yellow	Signal 2 <sup>2</sup>
Green	Signal 2 <sup>3</sup>
Blue	Signal 2 <sup>4</sup>
Purple	Signal 2 <sup>5</sup>
Gray	Signal 2 <sup>6</sup>
White	Signal 2 <sup>7</sup>
Pink	Signal 2 <sup>8</sup> Only available for 1024 split type
Sky Blue	Signal 2 <sup>9</sup> Only available for 1024 split type
Shielding Braid	FG

## Ordering Information

AEAS-71AC-□□□□ 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-71AC-HACAB  
AEAS-71AC-HACBB  
AEAS-71AC-HGCAB  
AEAS-71AC-HGCBB  
AEAS-71AC-HGPAB  
AEAS-71AC-HGPBB  
AEAS-71AC-LACAB  
AEAS-71AC-LACBB  
AEAS-71AC-LAVAB  
AEAS-71AC-LAVBB  
AEAS-71AC-LGCAB  
AEAS-71AC-LGCBB  
AEAS-71AC-LGVAB  
AEAS-71AC-LGVBB

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Data subject to change.

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