MODEL A36R - ABSOLUTE THRU-BORE / BLIND HOLLOW BORE ENCODER

Ø36 mm

FEATURES

Single turn/multi-turn absolute encoder (22 Bit ST / 24 Bit MT)
High resolution, high accuracy, high performance
BiSS C or SSI communication protocols
Up to 10 mm thru-bore or blind hollow bore
Optional extended temperature range -40° C to 120° C
Internal temperature sensor (with BiSS C protocol)
Optional battery/backup power interface for data retention in the absence of primary power

This high-performance thru-bore absolute encoder offers BiSS C or SSI communication protocols in a compact mechanical package. Reflective optical technology guarantees high performance and accuracy. The Model A36R includes customer-accessible non-volatile memory for storing motor name plate data in servo applications. The XXL multi-turn option adds a low power turns-counting circuit offering a variety of backup options including EPC's embedded battery cable, which has a long-life battery built directly into the controller-end of the cable. The number of possible configurations makes this 36 mm thru-bore or blind hollow bore absolute encoder versatile for many applications.

COMMON APPLICATIONS

Robotics, Servo and Stepper Motors, Autonomous Guided Vehicles, Telescopes, Antennas, Wind Turbines, Medical Scanners, Elevators, Lifts, Rotary and X/Y Positioning Tables, Linear Actuators

MODEL A36R ORDERING GUIDE

Blue type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.

Mechanical | **Electrical** | **Optional Features** (Leave blank for standard options)

A36R _ _	10	SC	22	24L	CW	SB	V3	RMH				

MODEL
- **TB** Thru-bore
- **HB** Blind hollow bore

BORE SIZE
- **04** 4 mm
- **05** 5 mm
- **06** 6 mm
- **08** 8 mm
- **10** 10 mm
- **A3** 3/16", 0.1875"
- **A4** 1/4", 0.2500"
- **A5** 5/16", 0.3125"
- **A6** 3/8", 0.3750"

MOUNTING
- **SA** 1.812" (46 mm) Two-hole flex mount
- **SB** 1.142" (29 mm) Slotted flex mount
- **SC** 1.2795" (32.5 mm) Slotted flex mount
- **SD** 1.575" (40 mm) Slotted flex mount
- **SF** 1.812" (46 mm) Slotted flex mount

SINGLE TURN RESOLUTION
- **01 to 22** Bit

MULTI-TURN RESOLUTION
- **00N** Single turn only
- **XXN** XX = Multi-turn Bits (01-24), and N = Normal power consumption[1]
- **XXL** XX = Multi-turn Bits (01-24), and L = Low power circuit for long term battery backup[2]

COUNT DIRECTION[3]
- **CW** Clockwise

COMMUNICATION PROTOCOL
- **SG** SSI Gray Code[4]
- **SB** SSI Binary[4]
- **BC** BiSS C[4]

INPUT VOLTAGE[5]
- **V3** 5-24 VDC

CONNECTOR TYPE
- **RMH** Radial mount header (no cable)[6]
- **F00** Fixed cable in feet[6]
- **M00** Fixed cable in meters[7]

BATTERY OPTION
- No battery (Std)
- **EB** Fixed embedded battery cable[7]

TEMP RANGE
- -20° to 85° C (Std)
- **T6** -40° to 100° C
- **T7** -40° to 120° C

SEALING
- IP50 (Std)
- **S1** IP64[8]

CERTIFICATION
- None (Std)
- **CE** CE Marked[9]

NOTES:

1 The Normal power option is intended for applications where multi-turns counting data does not need to be retained after a power interruption. This option does not include the low power circuit required to maintain turns counting during a power interruption. Turns counting data is retained when a back-up or UPS power source is available to power the entire encoder. Please refer to the A36R Technical Reference Manual for detailed information.

2 The Low power option includes a low power circuit inside the encoder to track and maintain the turns counting data during power interruptions. A small battery or power source, external to the encoder maintains turns counting data.

3 The count direction must be specified at time of order and may not be changed later.

4 Please refer to the A36R Technical Reference Manual at encoder.com

5 See Input Voltage under Specifications (next page) for max temperature ratings.

6 For fixed cable lengths, enter F (feet) or M (meters) plus cable length. Example: F02 = 2 feet of cable or M02 = 2 meters of cable. For mating connectors, cables, and cord sets see Model A36R at encoder.com.

7 The fixed embedded battery cable is only available for Low power circuit encoders. Minimum total cable length for EB option is 30 cm (1 foot).

8 Only available for blind hollow bore Model A36RHB with fixed cable. Not available for RMH connector.

9 Please refer to Technical Bulletin TB-100: When to Choose the CE Mark at encoder.com.

MODEL A36R - ABSOLUTE THRU-BORE / BLIND HOLLOW BORE ENCODER

MODEL A36R SPECIFICATIONS

Electrical

Input Voltage ..... 4.75-24 VDC max for temp up to 85° C
4.75-20 VDC max for temp up to 100° C
4.75-5.5 VDC max for temp > 100° C
Input Current ≤ 100 mA at No Load

Power Consumption ..... 2.0 W max

Electrical Protection ..... Transient Overvoltage, Reverse, and Short Circuit

Code ..... Gray or Binary for SSI; Binary for BISS C

Resolution (Single) ..... 01 to 22 bit

Resolution (Multi) ..... 01 to 24 bit, and battery backed option

Position Sensor Update ..... ≤ 5 µs

Sensing Method ..... Optical

Internal Temp. Sensor (TJ) ..... -40° to 140° C (not accessible with SSI protocol)

NV Memory ..... 4096 Bytes for customer motor name plate data, etc.

Accuracy ..... Better than 45 ArcSec from True Position

Repeatability ..... 20 ArcSec between repeat moves to any position

CE/EMC ..... Immunity tested per EN 61000-6-2:2019
Emissions tested per EN 61000-6-4:2019

Battery (XXL only)

Battery supply voltage (at V_{BAT+})[1] ..... 3.05 - 5.5 V

Battery supply current, no +VDC ..... 7 µA with no shaft movement
>7 µA with shaft movement[2]

Battery supply current, with +VDC ..... <10 nA

Recommended min battery capacity ..... 800 mAh

[1] 3.6V recommended. Voltage at V_{BAT+} ≤ 3.15 V will trigger a battery warning, ≤3.05 V will trigger a battery error and cause the encoder to lose MT count. Battery monitoring only active while suitable +VDC supply is present.

[2] Current draw with shaft movement dependent on shaft speed. See manual for details.

SSI Protocol

SSI stands for Synchronous Serial Interface. SSI is an RS 422 serial interface widely used with absolute encoders and controllers in a master slave configuration. SSI encoders offer an all-digital, unidirectional point-to-point connection. For more detailed information see the A36R Technical Reference Manual at encoder.com.

BiSS C Interface

BiSS C stands for Bidirectional Serial Synchronous, Continous mode interface. BiSS C is similar to SSI and can be used uni-directionally like SSI; however, BiSS C also supports bidirectional communication and operates at speeds up to 10 Mbits/sec. BiSS C can address internal registers in the encoder that can be read and written to by the master, allowing configuration and monitoring of the encoder not possible with uni-directional communication. Reads and writes can be performed by the master on demand, without interfering with real-time operation. This communication protocol is used by industrial automation devices and a common high speed reliable digital solution between absolute encoders and motion controllers. For more detailed information see the A36R Technical Reference Manual at encoder.com

Mechanical

Max Shaft Speed ..... 8,000 RPM; higher speeds may be achievable, contact Customer Service.

User Shaft Radial Runout ..... 0.13 mm [0.005"]

User Shaft Axial Endplay ..... 0.76 mm [0.030"]

Starting Torque ..... IP50 Blind Hollow Bore: 0.0007 N-m [0.1 oz-in]
IP50 Thru-Bore: 0.0021 N-m [0.3 oz-in]
IP64 Blind Hollow Bore: 0.0014 N-m [0.2 oz-in]

Weight ..... 50 g (1.8 oz typical)

Shaft Type ..... Up to 10 mm thru-bore or blind hollow bore

Moment of Inertia ..... 4.2 gm-cm² (5.9 x 10^{-5} oz-in-sec²)

Environmental

Operating Temp ..... -40° to 120° C (see Input Voltage for limitations)

Storage Temp ..... -20° to 85° C

Humidity ..... 98% RH non-condensing

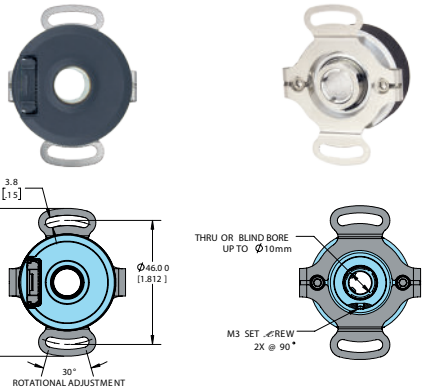
Vibration ..... 20 g, 10 to 2000 Hz (according to IEC 60068-2-6)

Shock ..... 100 g @ 11 ms duration
(according to MIL-STD-202G 213B)

Sealing ..... IP50 (DIN EN 60529); IP64 optional

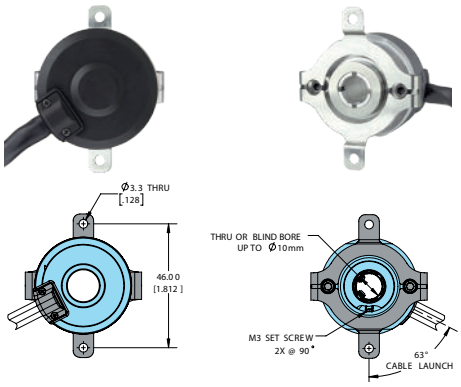
MODEL A36R 1.812" (46 MM) SLOTTED FLEX MOUNT (SF)

Shown with RMH connector



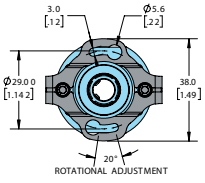
MODEL A36R 1.812" (46 MM) TWO-HOLE FLEX MOUNT (SA)

Shown with Fixed Cable

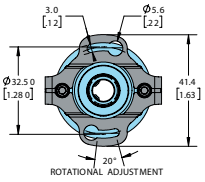


MODEL A36R SMALL DIAMETER SLOTTED FLEX MOUNTS

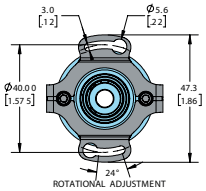
SB Mount



SC Mount



SD Mount



Encoder length and diameter are the same as SF and SA mounts detailed above.

Primary dimensions are in mm, secondary dimensions SI units [inches] in brackets for reference only. All dimensions have a tolerance of ±0.25mm unless otherwise specified.

MOUNTING AND INSTALLATION KIT

*Order appropriate no charge Mounting and Installation Kit for SB, SC, or SD option. Each kit contains 10 screws for mounting 5 encoders.

176150-01 Installation Kit, 4-40 buttonhead screws with 0.062" shortened hex wrench
176149-01 Installation Kit, M2.5 buttonhead screws with 1.5 mm shortened hex wrench

MODEL A36R - ABSOLUTE THRU-BORE / BLIND HOLLOW BORE ENCODER

WIRING TABLES

Single turn or multi-turn N (Normal Power)

Header Pin #	Function	Wire Color
1	NC	--
2	NC	--
3	+VDC	White
4	Com	Violet
5	Position Preset	Brown
6	Shield**	Bare
7	Data -	Orange
8	Data +	Blue
9	Clock -	Yellow
10	Clock +	Green

Multi-turn L (Low Power)

Header Pin #	Function	Wire Color
1	VBAT +	Red†
2	VBAT -*	Black†
3	+VDC	White
4	Com*	Violet
5	Position Preset	Brown
6	Shield**	Bare
7	Data -	Orange
8	Data +	Blue
9	Clock -	Yellow
10	Clock +	Green

*Pins are electrically connected within encoder.
†For Single turn and Normal power multi-turn encoders, the external power wires (red and black) are not used.
**CE Option: Cable shield (bare wire) is connected to internal case.

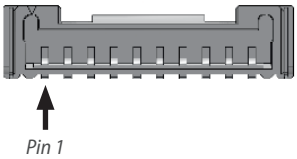
CONNECTORS

Radial Mount Header (RMH option, shown)

Molex part # 5055671031

Mating Connector

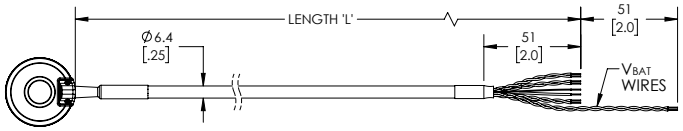
Molex part # 5055651001



CABLE OPTIONS

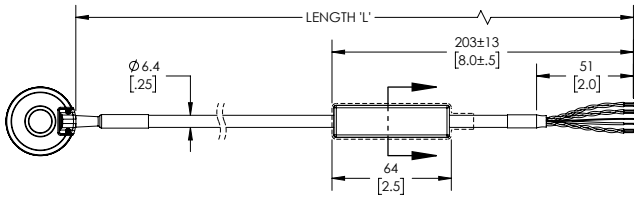
Power-ready cable

For multi-turn low power (L) option, user supplies external power.



Embedded battery cable

For multi-turn low power (L) option with Embedded Battery Cable option (EB), battery supplies external power.



Battery notes:

1. The battery section of the cable is rigid and non-flexible.

2. Battery is located close to the customer end of the cable, and is housed in a protective enclosure secured directly to the cable.

3. Maximum rated battery operating temperature is 85° C.

4. Minimum total cable length for EB option is 30 cm (1 foot).