R30D RVDTs

DC-Operated Rotary Variable Differential Transformers

DESCRIPTION

RVDTs incorporate a proprietary noncontact design that dramatically improves long term reliability when compared to other traditional rotary devices such as syncros, resolvers and potentiometers. This unique design eliminates assemblies that degrade over time, such as slip rings, rotor windings, contact brushes and wipers, without sacrificing accuracy.

High reliability and performance are achieved through the use of a specially shaped rotor and wound coil that together simulates the linear displacement of a Linear Variable Differential Transformer (LVDT). Rotational movement of the rotor shaft results in a linear output signal that shifts ±60 (120 total) degrees around a factory preset null position. The phase of this output signal indicates the direction of displacement from the null point. Noncontact electromagnetic coupling of the rotor provides infinite resolution, thus enabling absolute measurements to a fraction of a degree.

Although capable of continuous rotation, most RVDTs are calibrated over a range of ±30 degrees, with nominal nonlinearity of less than ±0.25% of full scale (FS). Extended range operation up to a maximum of ±90 degrees is possible with compromised linearity.

R30D

The R30D RVDT is a DC operated noncontacting rotary transducer. Integrated signal conditioning enables the R30D to operate from a bipolar ±15 VDC source with a high level DC output that is proportional to the full range of the device. Calibrated for operation to ±30 degrees, the R30D provides a constant scale factor of 125 mVDC/degree. Nonlinearity error of less than ±0.25% FS is achieved while maintaining superior thermal performance over -18°C to 75°C.

The DC excitation is internally converted to an AC carrier signal which excites the transducer's primary coil. An integrated demodulator amplifier and filter convert the differential secondary output into a smooth, high level, DC output signal that is linear with the shaft angle position. Resolution is infinite enabling measurements to a fraction of a degree.

The R30D features a rugged aluminum size 11 housing making this rotary transducer ideal for applications where integrated signal conditioning and small size are required. Typical applications include hydraulic pump control, rotary actuator feedback, and throttle lever position feedback.

specifications

Full Range	±30°
Input Voltage (nom)	±15 Vin DC
Scale Factor	0.125 V/°
Output Voltage (nom)	±3.75 VDC
Input Current (max)	35 mA
Output Current (max)	5 mA
Output Impedance	<10 Ohms
Frequency Response	500 Hz @ -3 dB
Linearity Error	±0.25% of full scale output
Storage Temperature	
Range	-65°F to 250°F (-55°C to 125°C)
Operating Temperature	
Range	0°F to 170°F (-18°C to 75°C)
Temperature	
Coefficient of FS	±0.02% of FS/20°F to 160°F
	(±0.04% of FS/-5°C to 70°C)
Lead Wires	28 AWG, Teflon® insulation,
	4 wire, minimum 12" long
Torque	0.12 in-oz (8 gm-cm)
Weight	1.9 oz (53 gm)
Mounting	Size 11 servo mount BU-ORD
Bearings	Shielded ABEC 3 precision
Shaft Diameter	3/16 in (4.76 mm)
Axial Shaft Bearing	
Load Capability	10 lbs (4.54 kg)
Radial Shaft Bearing	
Load Capability	8 lbs (3.6 kg)
Casing Material	Aluminum

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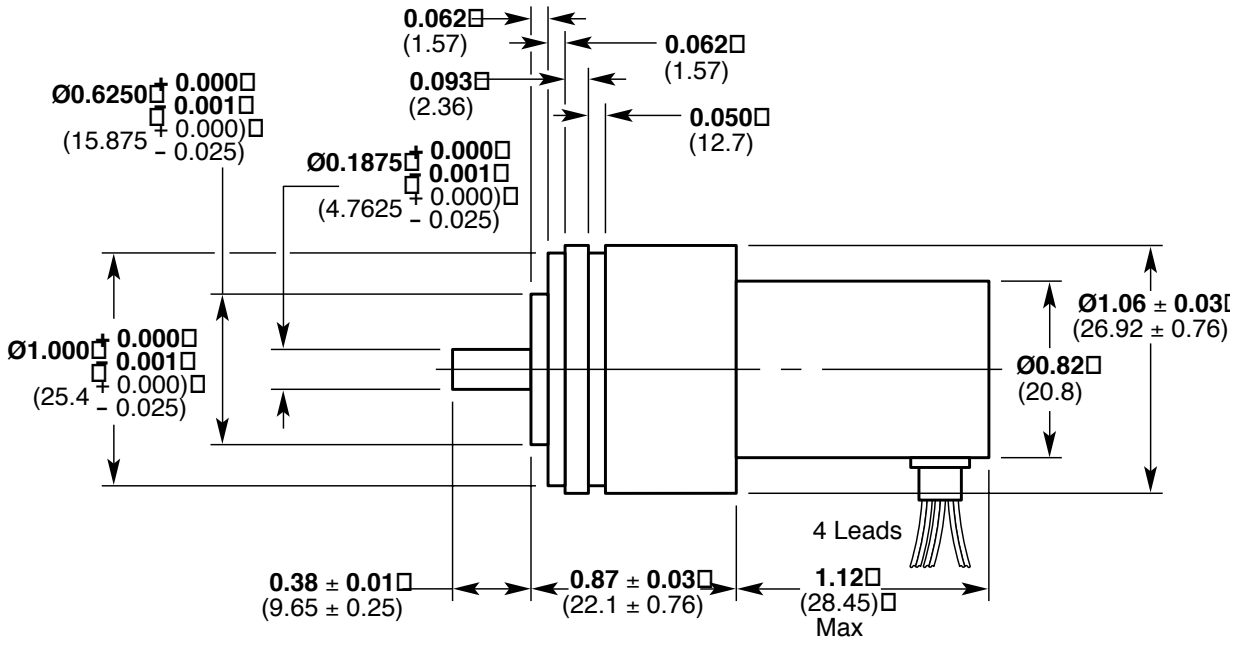
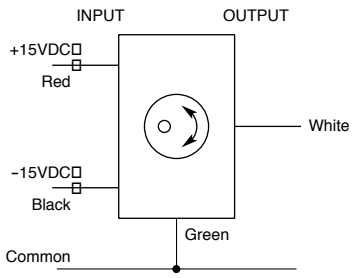
R30D RVDTs

dimensions

in (mm)



wiring



ordering information

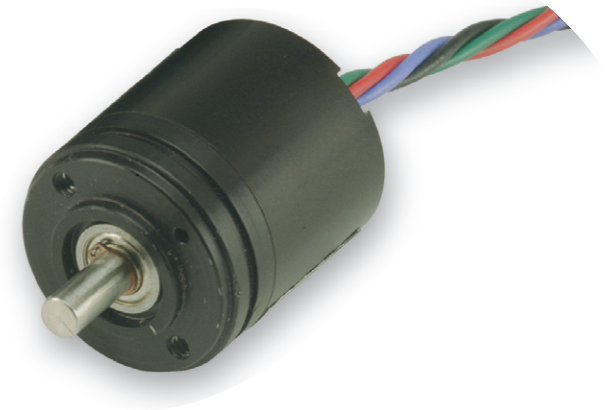
Specify by model number. R-Flex coupler available separately.

Model Number	Size	Range
R30D	11	±30°

R60D RVIT

DC-Operated Rotary Variable Inductance Transducer

DESCRIPTION



RVIT's are DC operated noncontact rotary transducers. The RVIT proprietary design incorporates a set of printed circuit coils and a conductive spoiler to achieve superior performance and low cost. During operation, the conductive spoiler rotates with the transducer shaft, altering the magnetic field generated by the printed circuit coils. The resulting unbalance is precisely measured using a patented autoplexing circuit. This signal is then converted to a linear DC output signal that is directly proportional to the angle of the rotor shaft. The predominantly digital circuit is very resistant to environmental disturbances and is ideally compatible for use with most digital electronics.

RVITs are available with a choice of standard face mounting or optional four hole flange mounting. A shaft seal is available with flange mounting for applications where contamination is critical. RVITs offer wide operating temperature range, infinite resolution, and a virtually infinite rotational life.

R60D

The R60D rotary transducer is a shorter version of the R30D. Calibrated for use over ±60 degrees, the R60D offers improved range without sacrificing other performance parameters.

The R60D also has improved resistance to electromagnetic disturbances and built in voltage regulation for guaranteed operation in applications where high noise environments exist. Typical applications include ball valve position feedback, throttle and position level feedback and actuation feedback.

specifications

Full Range	±60°
Input Voltage (nom)	±15 Vin DC
Scale Factor	0.125 V/°
Output Voltage (nom)	±7.5 VDC
Input Current (max)	21 mA
Output Current (max)	5 mA
Output Impedance	<1 Ohms
Frequency Response	200 Hz @ -3 dB
Linearity Error	±0.50% of full scale output
Nonrepeatability & Hysteresis (max)	0.1% of full scale range output maximum
Storage Temperature Range	-65°F to 250°F (-55°C to 125°C)
Operating Temperature Range	-13°F to 185°F (-25°C to 85°C)
Temperature Coefficient of FS	±0.02% of FS/20°F to 160°F (±0.04% of FS/-5°C to 70°C)
Lead Wires	24 AWG, PVC insulation, 4 wire, minimum 12" long
Torque	0.12 in-oz (8 gm-cm)
Weight	1.2 oz (34 gm)
Mounting	Size 11 servo mount BU-ORD
Bearings	Matched and preloaded ABEC 3
Shaft Diameter	3/16 in (4.76 mm)
Axial Shaft Bearing Load Capability	10 lbs (4.54 kg)
Radial Shaft Bearing Load Capability	10 lbs (4.54 kg)
Casing Material	Aluminum

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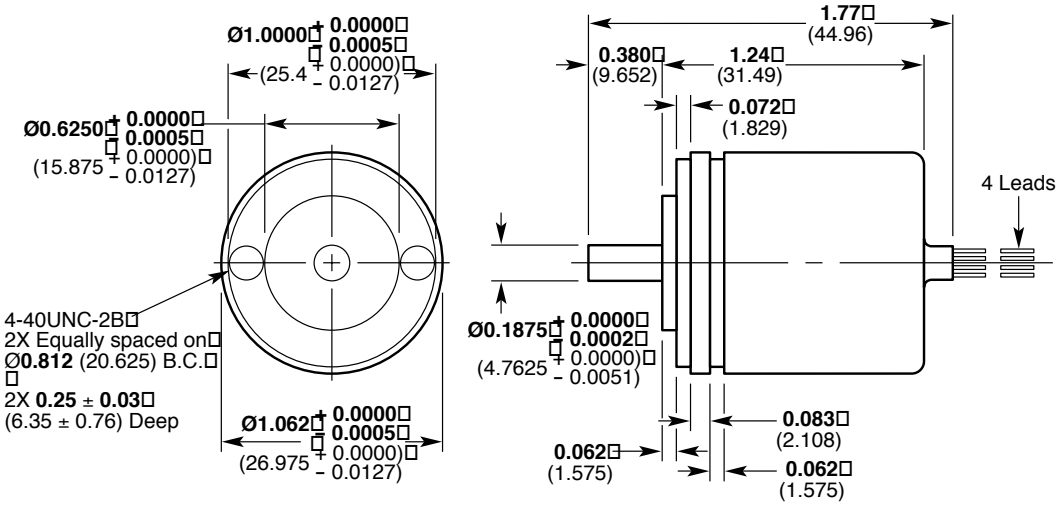
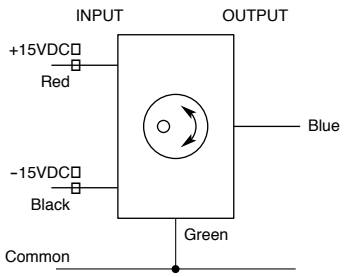
R60D RVIT

dimensions

in (mm)



wiring



ordering information

Specify by model number. R-Flex coupler available separately.

Model Number	Size	Range
R60D	11	±60°

R120LC Series

DC-Operated Rotary Variable Inductance Transducer (RVIT)

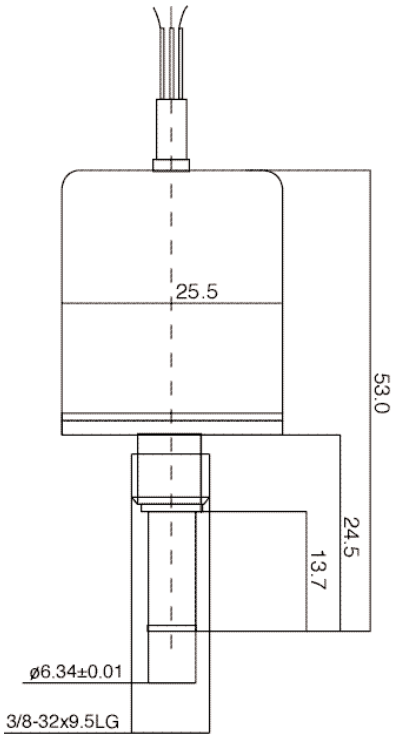
DESCRIPTION

The R120LC Series is a DC operated non-contact rotary transducers. The R120LC proprietary design incorporates a set of printed circuit coils and a conductive spoiler to achieve superior performance and low cost. The predominantly digital circuit is very resistant to environmental disturbances and ideally suited to most industrial applications. The R120LC utilizes non-contacting technology, and does not suffer the wear problems experienced by potetiometers

FEATURES

- ✦ Offer Wide Operating Temperature Range
- ✦ Infinite Resolution
- ✦ Virtually Infinite Rotational Life

dimensions



specifications

Full Range	±60°
Input Voltage (nom)	4.75-5.25V
Output Voltage (nom)	0.5-4.5
Input Current (max)	21 mA
Output Current (max)	5 mA
Output Impedance	<10 Ohms
Frequency Response	200 Hz @ -3 dB
Linearity Error	±0.5% of full scale output
Nonrepeatability & Hysteresis (max)	0.1% of full scale range output maximum
Storage Temperature Range	-65°F to 250°F (-55°C to 125°C)
Operating Temperature Range	-40°F to 185°F (-40°C to 85°C)
Temperature Coefficient of FS	±0.03% (10°C)
Lead Wires	24 AWG, PVC insulation, 4 wire, minimum 12" long

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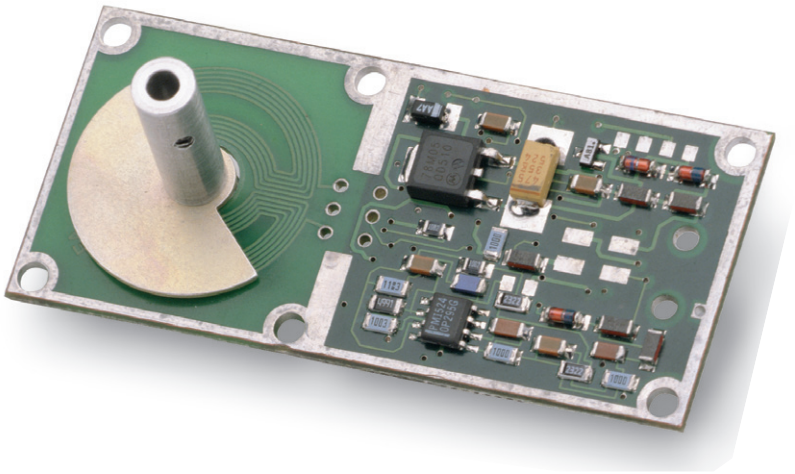
RVIT-Z Series

Low Profile Design for OEM Applications



DESCRIPTION

The RVIT-Z series is the first in the series developed from Schaevitz® of flat non-contact rotary displacement sensors. The unique design of the RVIT-Z incorporates the proprietary RVIT (Rotary Variable Inductive Transformer) technology and signal conditioning circuitry on a single PCB. The RVIT-Z provides an ultra low profile, high accuracy solution for rotary and angular measurements in OEM applications. The lack of wipers, brushes, slip rings or magnetic materials eliminates wear, static friction, hysteresis and electrical noise.

Measuring a fraction the size of other rotary positioning sensors, the RVIT-Z is ideal for space critical rotary sensing applications; it is smaller, flatter and lighter than conventional rotary sensors.

Capable of absolute rotary measurement over ±60°, and extended operation up to ±75° (with compromised linearity), the RVIT-Z provides unsurpassed performance over an extended operating temperature range of -40°C to 125°C. Factory calibration and automated testing assures a nonlinearity error of less than ±0.5% of full scale.

The RVIT-Z provides a high degree of design flexibility for custom designs. For applications where remote sensing is required, the RVIT-Z can be tailored allowing the rotary sensing element to remain separated from the electronic circuitry by -up to 12 inches.

FEATURES

- ✦ OEM Modular Design
- ✦ Low Cost
- ✦ Contactless, No Brushes to Wear
- ✦ Absolute Rotary Measurements
- ✦ Linear Range of ±60° or 0° to 120°
- ✦ Capability for Various Inputs/Outputs
- ✦ Extremely Light Weight
- ✦ Flat Surface Mount Design
- ✦ Thin Profile

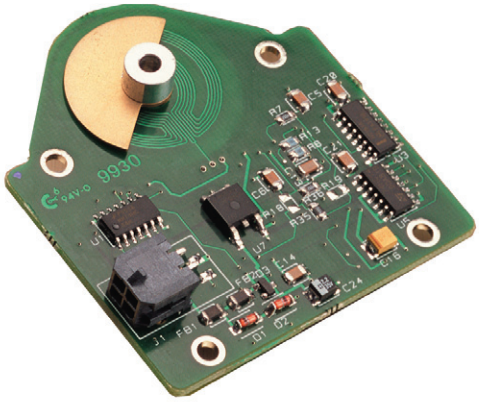
APPLICATIONS

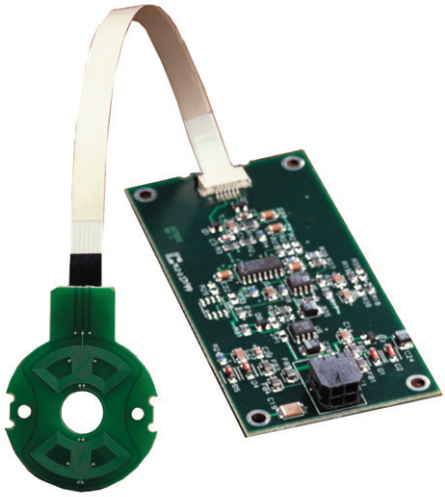
Industrial

- ✦ Valve Position
- ✦ Pump Swash Plate Controls
- ✦ Robotics
- ✦ HVAC, Vane Position Control
- ✦ Potentiometer Replacement

Automotive

- ✦ Pedal/Throttle Position Sensor
- ✦ Automatic Suspension
- ✦ Transmission Position Switch
- ✦ Potentiometer Replacement





measurement SPECIALTIES

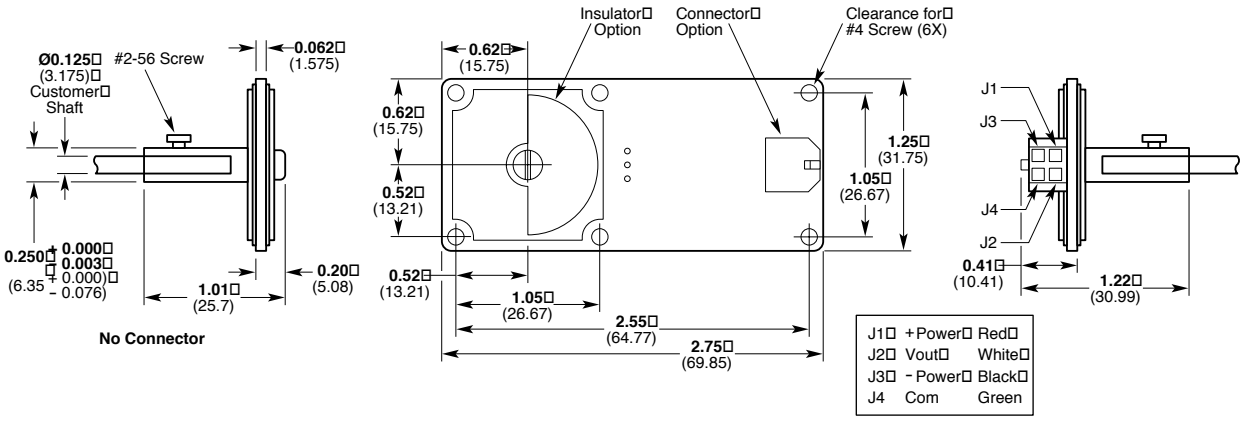
RVIT-Z Series

specifications

Nonlinearity	±0.5% of FS (max)
Scale Factor	Factory adjustable
Input Voltage	+5, +10 to +28, ±15 VDC
Output Voltage	Factory scalable (consult factory)
Input/Output Options:	
+5 VDC Regulated	
Single Rail	Unipolar output (ie. 1 to 4 VDC, 0°set at 2.500 VDC)
	Bipolar output (ie. ±2.5 VDC, 0°set at 0.000 VDC)
+10 to +28 VDC,	
Unregulated Single Rail	Unipolar output (ie. 1 to 4 VDC, 0°set at 2.500 VDC)
	Bipolar output (ie. ±2.5 VDC, 0°set at 0.000 VDC)
±15 VDC Unregulated	
Single Rail	Unipolar output (ie. 1 to 4 VDC, 0°set at 2.500 VDC)
	Bipolar output (ie. ±10 VDC, 0°set at 0.000 VDC)
PWM (Pulse Width Modulation) Output	Mark/space ratio PWM output, TTL load capable
Input Current	18 mA max
Temperature Range	-25°C to 85°C
Temperature Coefficient	
of Full Scale	±0.02% of FS/°C
Connections	3 or 4 wire, 26 AWG cable, Teflon insulated
Connector	Molex 43045-0406, keyed with lock. Mating connector sold
separately	
Mounting	6 x #4-40 screws
Bearing	Consult factory for bearing options

dimensions

in (mm)



Universal configuration shown. For other configurations, consult factory.

ordering information

RVIT-Z OEM sample quantities are available in the universal configuration to qualified customers.

RVIT-15-60/RVIT-15-120I RVITs

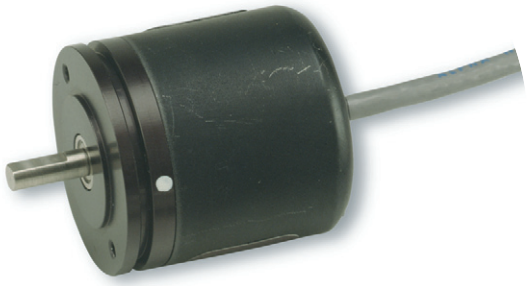
DC-Operated Rotary Variable Inductance Transducers

DESCRIPTION

RVITs are DC operated noncontact rotary transducers. The RVIT proprietary design incorporates a set of printed circuit coils and a conductive spoiler to achieve superior performance and low cost. During operation, the conductive spoiler rotates with the transducer shaft, altering the magnetic field generated by the printed circuit coils. The resulting unbalance is precisely measured using a patented autoplexing circuit. This signal is then converted to a linear DC output signal that is directly proportional to the angle of the rotor shaft.

The predominantly digital circuit is very resistant to environmental disturbances and is ideally compatible for use with most digital electronics. For original equipment manufacturers who desire a microprocessor interface, a pulse width modulated output can be supplied as a special order option. Other specialized options for volume applications include, regulated single or bipolar excitation, extended operating ranges, and custom calibration.

RVITs are available with a choice of standard face mounting or optional four hole flange mounting. A shaft seal is available with flange mounting for applications where contamination is critical. RVITs offer wide operating temperature range, infinite resolution, and a virtually infinite rotational life.



RVIT-15-60 and RVIT-15-120I

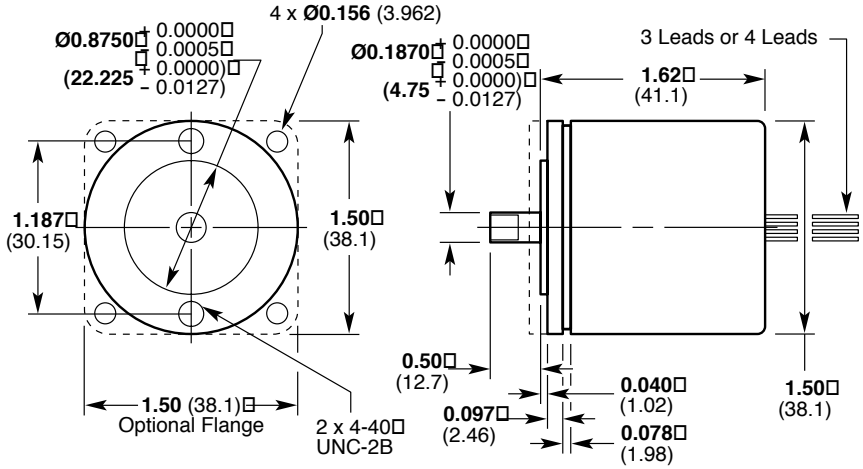
The RVIT-15-60 and RVIT-15-120I rotary transducers are available in a variety of versions which provide a range of supply and output configurations.

Calibrated outputs of ±3 VDC and 4-20 mA offer ideal flexibility for specialized OEM designs where unique power supply and interfacing requirements exist. Other specialized ranges, internal regulation and custom calibrated outputs are available for special order.

The standard RVIT 15-60 transducer emulates a potentiometer in that any change in input voltage results in a proportional change in output voltage. Although this output is ratiometric, the RVIT-15-60 offers a considerably higher scale factor of 50 mV per degree over an extended range of ±60 degrees. In addition, the noncontact design of the RVIT provides virtually infinite rotational life and extremely high accuracy of ±0.25% FS.

dimensions

in (mm)

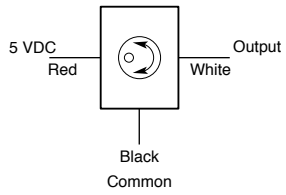


RVIT-15-60/RVIT-15-120I RVITs

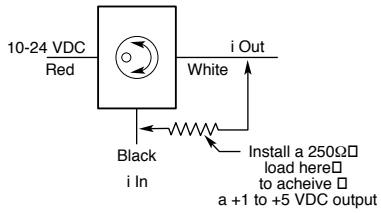
specifications	RVIT-15-60	RVIT15-120I
Full Range	±60°	0 to 120°
Input Voltage (nom)	+5 VDC	10-24 VDC
Scale Factor	0.050	0.13 mA/°
Output Voltage (nom)	±3 VDC	+1 to +5 VDC (with 25Ω load)
Input Current (max)	14 mA	41 mA
Output Current (max)	5 mA	4-20 mA
Output Impedance	<1 Ohms	<250 Ohms
Frequency Response	25 Hz @ -3 dB	25 Hz @ -3 dB
Linearity Error	±0.25% of full scale output	±0.25% of full scale output
Nonrepeatability & Hysteresis (max)	±0.1% of full scale range output	±0.1% of full scale range output
Storage Temperature Range	-65°F to 250°F (-55°C to 125°C)	-13°F to 185°F (-25°C to 85°C)
Operating Temperature Range	-13°F to 185°F (-25°C to 85°C)	-13°F to 185°F (-25°C to 85°C)
Temperature Coefficient of FS	±0.02% of FS/20°F to 160°F	±0.02% of FS/20°F to 160°F
	(±0.04% of FS/-5°C to 70°C)	(±0.04% of FS/-5°C to 70°C)
Lead Wires	26 AWG, PVC insulation, PVC jacket,	26 AWG, PVC insulation, PVC jacket,
	3 or 4 wire depending on configuration,	3 or 4 wire depending on configuration,
	minimum 12 inch long	minimum 12 inch long
Torque	0.12 in-oz (8 gm-cm)	0.12 in-oz (8 gm-cm)
Weight	2.47 oz (70 gm)	2.47 oz (70 gm)
Mounting	Size 15 servo or flange mount BU-ORD	Size 15 servo or flange mount BU-**ORD**
Bearings	Matched and preloaded ABEC 3	Matched and preloaded ABEC 3
Shaft Diameter	3/16 in (4.76 mm)	3/16 in (4.76 mm)
Axial Shaft Bearing Load Capability	10 lbs (4.54 kg)	10 lbs (4.54 kg)
Radial Shaft Bearing Load Capability	10 lbs (4.54 kg)	10 lbs (4.54 kg)
Casing Material	Aluminum	Aluminum

wiring

RVIT-15-60



RVIT-15-120I



ordering information

Specify by model number. R-Flex coupler available separately.

Model Number	Size	Range
RVIT-15-60	15	±60°
RVIT-15-120I	15	0 to 120°