1071-4842-114

MONARCH INSTRUMENT

Instruction Manual

CE

ACT-1B, ACT-1B-10, ACT-1B-60
Panel Tachometers

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Safeguards and Precautions

1. **Read and follow all instructions in this manual carefully, and retain this manual for future reference.**
2. **Do not use this instrument in any manner inconsistent with these operating instructions or under any conditions that exceed the environmental specifications stated.**
3. **Be sure the power supplied to this instrument matches the specification indicated on the rear panel of the instrument.**
4. **Be sure all power is removed before making or removing any connections to or from this instrument.**
5. **For full compliance with CE specifications, be sure the appropriate ground connection is made.**
6. **This instrument is not user serviceable. For technical assistance, contact the sales organization from which you purchased the product or Monarch Instrument directly.**

LIMITED WARRANTY

SELLER warrants hardware products to be free from any defect in materials or workmanship for a period of one (1) year from date of shipment to BUYER. SELLER's entire liability and BUYER's sole and exclusive remedy resulting from any defect in workmanship or material in the hardware product covered by this limited warranty shall be limited to and fully discharged by the SELLER's option of replacement or repair of such item without charge. The limited warranty provided in this clause is in lieu of all other warranties, expressed or implied, arising by law or otherwise. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXCLUDED. This limited warranty shall not be modified except by an arrangement signed by both parties specifically referencing this clause.

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IN NO EVENT SHALL SELLER BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR PUNITIVE LOSSES OR DAMAGES (INCLUDING, BUT NOT LIMITED TO, LOSSES OR DAMAGES FOR ANY LOST PROFITS OR LOST DATA) AS THE RESULT OF ANY BREACH OR DEFAULT BY SELLER WITH RESPECT TO THE HARDWARE OR SOFTWARE, EVEN IF SELLER HAS BEEN ADVISED OR MADE AWARE OF THE POSSIBILITY OF ANY SUCH LOSSES OR DAMAGES AND REGARDLESS OF WHETHER THE CLAIM IS BASED ON CONTRACT, TORT, STRICT LIABILITY, OR OTHER THEORY OF LIABILITY.

This limited warranty does not extend or apply to consumables (including, but not limited to, lamps and batteries, if applicable) or equipment, instruments or accessories which are warranted separately by the original manufacturer of these items.

DECLARATION OF CONFORMITY

As Manufacturer:

Monarch Instrument
Division of Monarch International Inc.
15 Columbia Drive, Amherst NH 03031 USA
declares under Monarch's sole responsibility that the product:

Name: **ACT - Panel Tachometer**
Models: **ACT-1B, ACT-1B-10, ACT-1B-60**

to which this declaration relates is in conformity with the following standards:

EMC: **EN50082-1:1997**
EN50082-2:1995
EN55011:1991 Group 1 Class B

and therefore conforms with the requirements of Council Directive 89/336/EEC relating to electromagnetic compatibility. The testing of this product was performed by Retlif Testing Laboratories, NH, in October of 1999 (File R-351 4N2).

8th October 1999
Manufacturer (Amherst,NH)

Alan Woolfson, VP Engineering (Authorized Signature)

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SPECIFICATIONS

Range: 5 to 99,999 RPM
Accuracy: ±1 RPM or 0.005% of reading
Resolution: 1 RPM
Display: 5 digit, 0.56" (14 mm) high red LED
Display Update: Twice per second above 120 RPM
Dimensions: 1/8 DIN by 4.5" (114 mm) deep
Power Supply: Standard: 115 Vac or 230 Vac ±10%, 50/60 Hz (Specified when ordering)
Optional: 12 Vdc to 15 Vdc, 1.75 Watts
Inputs: Universal input for optical, proximity, two wire or three wire magnetic, infrared or laser Sensors
TTL input or 1.5 Vac to 50 Vac input
Standard inputs are 1, 10 or 60 pulses per revolution depending on the model. Contact factory to order customized pulses per revolution.
Sensor Excitation: 8 Vdc at 5 mA for proximity sensors
5 Vdc at 75 mA for all other sensors
Recommended Sensors:
Optical - Monarch ROS-5W
Proximity - Monarch P5-11
Magnetic - Monarch M-190W or MT-190W
Infrared - Monarch IRS-5W
Laser - Monarch RLS-5W
IO Option: 4 to 20 mA, see page 7 for maximum load calculation
Full scale RPM settings as specified when ordered
12 bit resolution, 4096 steps over the range specified
AO Option: 0 to 5 Vdc, 5 mA maximum load
Full scale RPM settings as specified when ordered
12 bit resolution, 4096 steps over the range specified
PO Option: 0 to 5 V TTL pulse, non-inverting, one pulse out for each pulse in

ACCESSORIES / SENSORS

ROS-5W: Remote Optical Sensor

T-5: Reflective Tape - 5 foot (1.5 m) roll, 0.5 inch (10 mm) wide

P5-11: Proximity Sensor

M-190W: Magnetic Sensor

MT-190W: Magnetic Sensor with Amplifier Module

IRS-5W: Infrared Sensor

RLS-5W: Laser Sensor

NOTE: Standard cable length is 8 feet (2.5 m) on all sensors. Longer cable lengths of 15, 30, 50 or 100 feet (4.6, 9.2, 15 or 30.5 m) are optional.

OPTIONS

IO: 4 to 20 mA current output

AO: 0 to 5 Vdc analog output

NOTE: Full scale RPM must be specified for the above options when ordering.

PO: 0 to 5 V TTL compatible pulse output

NOTE: Pulses out per revolution equal pulses in per revolution.

CAL-N.I.S.T. N.I.S.T. Traceable Certificate of Calibration

OVERVIEW

ACT-1B Digital Tachometers display rotational speed directly in RPM on a 5 digit red LED display using a speed sensor providing a single pulse per revolution (Model ACT-1B), 10 pulses per revolution (Model ACT-1B-10) or 60 pulses per revolution (Model ACT-1B-60). Power may be either 115 Vac or 230 Vac (50/60 Hz), or optionally, 12 Vdc to 15 Vdc. The ACT-1B Series accepts input signals from optical, proximity, magnetic, infrared or laser sensors, or direct TTL or external ac inputs. All models are suitable for panel mounting or bench top, with convenient screw terminal connections on the rear panel of the instrument.

If specified at time of order placement, the ACT-1B may be equipped with either an optional 4 to 20 mA current output (IO) or 0 to 5 Vdc analog output (AO) proportional to speed, and/or a TTL pulse repeater output (PO).

INSTALLATION and POWER

The ACT-1B enclosure is a standard 1/8 DIN size requiring a 3.58” wide by 1.74” high (91x44 mm) mounting hole.

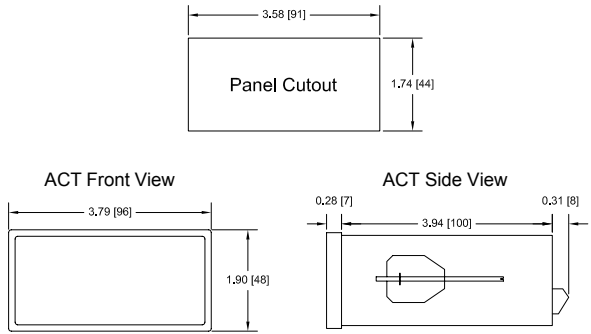

Figure 1 Dimensions in Inches (mm)

Installation

Remove the mounting clips, if fitted, and install the unit into the panel from the front. From the rear of the unit, install the mounting clips on each side and tighten the mounting screws against the rear of the panel.

WARNING: Do not over tighten the mounting screws.

Power

Power to the unit is connected to the terminals under the section labeled **POWER** on the rear panel. Be sure the power supplied matches the specification indicated on the rear panel. Refer to Figure 2 below.

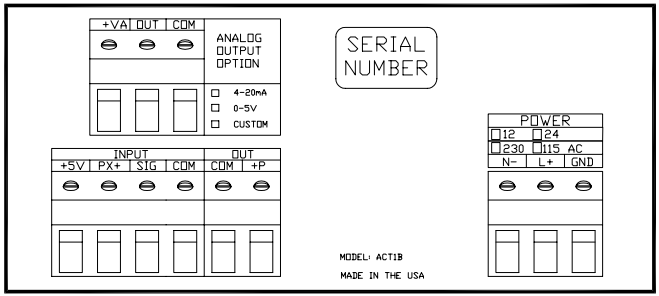

Figure 2 ACT-1B Rear Panel

If the unit is **ac powered** (115 Vac or 230 Vac), connect the Live (Hot) wire to the terminal marked **L+** and the Neutral (Return) wire to the terminal marked **N-**. Connect the Ground (Earth) wire to the terminal marked **GND**.

NOTE: For full compliance with CE specifications, the Ground (**GND**) connection must be made.

Analog Output Option (AO)

The analog output is 0 to 5 Vdc.

Connect the Positive side of the signal to the terminal marked **OUT**, and the Return side of the signal to the terminal marked **COM**.

NOTE: If your ACT-1B is equipped with either a current output or an analog output, the full-scale output has been factory preset to the speed range specified at the time of purchase. The output is linear in 4096 discrete steps over its designated range.

Pulse Repeater Output Option (PO)

The Pulse Repeater output provides a conditioned TTL positive going 5 V pulse out for each pulse in.

Connect the Positive signal wire (+5 V pulse) to terminal marked **+P** and the Return to the terminal marked **COM** in the rear panel section labeled **OUT**.

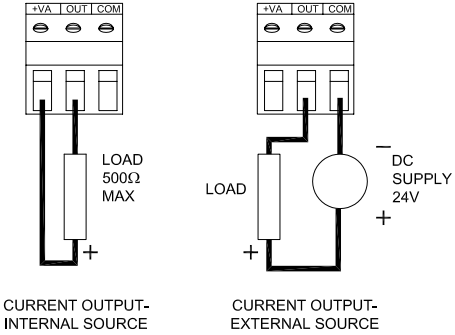

Figure 4 Current Output Option Connections

NOTE: The voltage source you use will determine the maximum resistance of the load. This voltage is referred to as the compliance voltage and must be equal to the maximum current through the load (20 mA) multiplied by the load resistance, plus 4 Vdc. For example, if the load is 1000 ohms, the external voltage source must be:

(1000 ohms x 0.020 A) + 4 Vdc = 24 Vdc

Thus, for an external source voltage of 24 Vdc, the maximum loop load (the sum of all resistances in the loop) is 1000 ohms. 24 Vdc is, in fact, a recommended voltage. The voltage supplied by an external source should **NEVER** exceed 40 Vdc. The ACT-1B 15 Vdc internal voltage source (**+VA**) permits a maximum load resistance of 500 ohms.

If the unit is **dc powered**, connect the dc supply Positive to the terminal marked **L+** and the dc supply Negative or Common to the terminal marked **N-**.

NOTE: On dc powered units, no connection is required to the terminal marked **GND**.

SENSOR CONNECTIONS

A speed sensor (not included) is connected to the terminals under the section labeled **INPUT** on the rear panel. Refer to Figure 2 and 3.

Connections and their functions are as follows:

+5V Positive +5 Vdc to provide power to optical, laser, infrared or amplified magnetic sensors. Maximum load is 75 mA dc.

PX+ Positive +8 Vdc supply for use with two wire proximity sensors. Maximum load for proper operation with two wire sensors is 5 mA.

SIG Positive input signal from the speed sensor. Accepts TTL pulses or ac signals, unipolar and bipolar, from 1.5 Vac to 50 Vac. (Contact the factory for increased sensitivity.) Connect the signal wire from three wire sensors or the positive side of two wire magnetic sensors to this terminal. Typical input impedance is 10 Kohms.

COM Common or Negative connection for both signal and power from most sensors.

Refer to Figure 3 for connection of Monarch standard sensors. The connections are typical for these types of sensors.

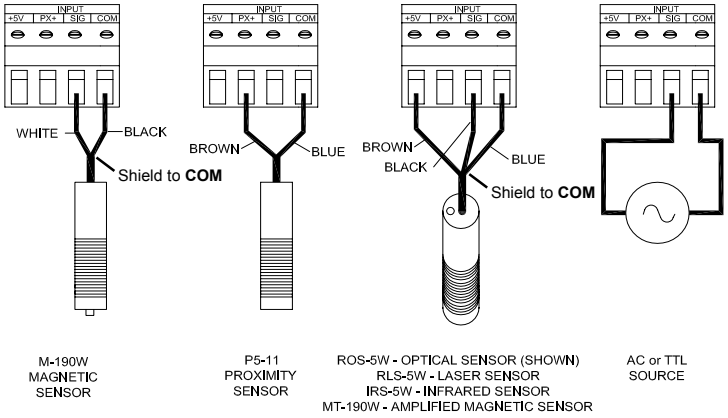

Figure 3 Sensor Connections

OUTPUT OPTIONS

The ACT-1B may be equipped with either a Current Output (IO) ***or*** an Analog Output (AO), ***and/or*** a TTL Pulse Output (PO).

NOTE: Full scale RPM settings must have been specified when ordered; these options are not field programmable.

The Current or Analog Outputs are connected to the terminals in the section labeled **ANALOG OUTPUT OPTION** on the rear panel. The Pulse Output is connected to the terminals under the section labeled **OUT** on the rear panel.

CAUTION: The IO or AO **COM** is ***NOT*** isolated from the other **COM** connections.

Current Output Option (IO)

The current output is 4 to 20 mA. This output is a current sink and requires a source voltage. A 15 Vdc internal source is provided at the terminal marked **+VA**. When using an external voltage source, the current from that source is regulated by the ACT-1B.

Typical connections are as follows: (See Figure 4.)

When using the ACT-1B internal +15 Vdc source, connect the Positive side of the load to the terminal marked **+VA** and the other side of the load to the terminal marked **OUT**.

When using an external voltage source, connect the Negative side of the external source to the terminal marked **COM**, the Positive side of the supply to the Positive side of the load, and the other side of the load to the terminal marked **OUT**.