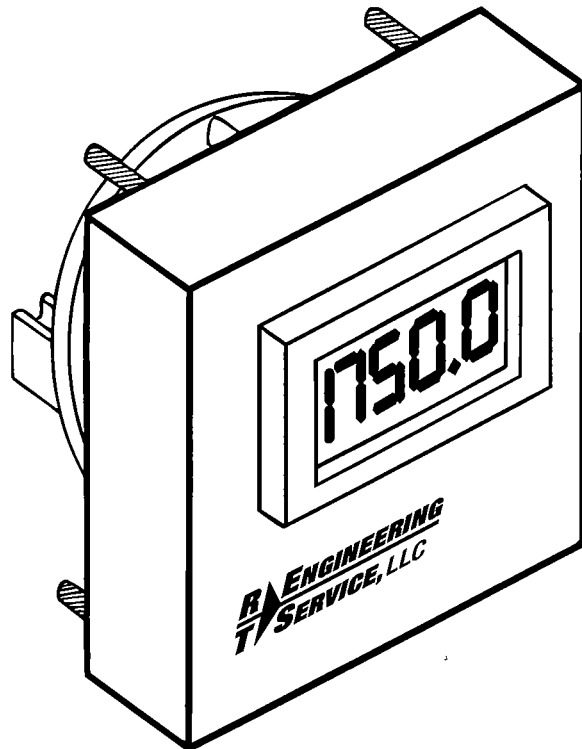


Universatile™

DIGITAL PANEL METERS



INSTALLATION, WIRING & CALIBRATION

FOR THE

DPM45B

PANEL METERS

R ENGINEERING
T SERVICE, LLC



(800) 343-1182

www.rteng.com

The R.T. Engineering series DPM45B panel meter is a uniquely versatile instrument. It is designed to fit in the same mounting cutouts as a standard 4 1/2 inch analog meter, yet will accept a wide range of voltage and current inputs from a wide variety of input signal devices. The unit can be very simply calibrated, via two (2) twenty-five turn pots in rear, to read out any 3 1/2 digit parameter required from .000 to 1999, with a bias capacity of 0 to 1000. The units have user selectable decimal points at three locations.

The DPM-45B has four input voltages ranges within which it can handle input signal levels of 50mvDC/100mvAC (F.S.) to 500/VDC480VAC (F.S.) and milliamps inputs of 4-20ma or 5-50ma.

SPECIFICATIONS

Input Ranges (The minimum voltage required to make the meter read full scale)	-(A) 50 millivolts DC (100 millivolts AC) (B) .5 volt DC (1 volt AC) (C) 5 volts DC (10 volts AC) (D) 50 volts DC (100 volts AC)
Bias Range	0-10000
Scale Range	-0 to full scale (19999) A shunt resistor must be added for current measurement, 50 ohms to 600 ohms inclusive.
Maximum input and overvoltage	-1000% of range or 500 volts DC (480 volts AC) whichever is less
Accuracy	-.5% linear +1 digit full scale
Input resistance at nominal scale values	-20K ohms per volt DC 9K ohms/volt AC
Current input	-Equals resistance of shunt being utilized
A.C. voltage frequency response	-40 Hz to 500 Hz (consult factory if less than 40 Hz is required)
Response time, zero to full scale	-5 seconds

Power requirement	-115 volts AC (+10 volts), 50/60 Hz, 2 watts, (230 volts AC, 50/60 Hz optional)
Operating temperature	-5° C to 50° C
Display	-4 1/2 active digits (0 to 1.9999) .5 inch LED with optional decimal points at locations 1.8.8.8.8 are user selectable
Overrange	-Indication is by flashing zeros
Weight	-1 pound
Typical signal inputs	-A.C. or D.C. signals from: line voltage, reference voltage, tachometer, force transducers (load cells), shunts, current transformers, pressure and flow transducers

CAUTION: The common mode voltage present between the input terminals and ground (case) should never exceed 600 volts

INSTALLATION AND CALIBRATION

A) Installation:

If this meter is to replace an existing 4 1/2" panel meter, all that should be required is to pull out the old meter and insert the DPM45B in its place. If the meter being replaced has nonstandard dimensions, or if the DPM45B is a new meter addition, see the attached layout for proper cutout dimensions. Insert meter in cutouts and tighten retaining nuts.

B) Wiring:

Connect 115VAC power to "115VAC" terminals. Meter is internally fused. Connect input signal from source to terminals marked "input" if input is a D.C. signal note polarity connection.* Low voltage signals relating to a reference or feedback for a drive system should be run in shielded cable to minimize any noise pickup from the cable run. The shield should be floating and insulated via electrical tape or other means. For a milliamp input a shunt resistor (50 ohms to 600 ohms, 1/2 watt) must be placed in parallel with the input terminals. Care must be taken to properly connect the polarity of the input to the indicated terminals.

* Although this unit has been tested for peak operational voltage insulation integrity both between input terminals and input to case, we recommend that on input voltages greater than 200 volts RMS a 100K 1/2 watt metalfilm resistor be placed in series with each leg of the input signal wires. This is solely for protection of the signal device in the event of a fault to ground or short within the meter itself.

C) Calibration:

1. Calibration Procedure for Milliamp Inputs

As shipped the range selection jumper is installed on the "B" scale which will accommodate milliamp inputs. The meter is also shipped with a burden resistor installed across the signal input terminals for milliamp applications.

There are two adjustments through which the meter is calibrated. These are the 1. Bias, 2. Readout Scale. The setting of these adjustments are as follows (with the burden resistor in place).

Step 1. Apply input of 4 MA.

Step 2. Set the readout to the desired value (0-10000) by adjusting the bias potentiometer

Step 3. Apply input of 20 MA.

Step 4. Set the readout to desired value by adjusting the readout scale potentiometer.

Step 5. Repeat step 1 through 4 until the desired readouts are achieved. This is due to the interaction of the two adjustments.

2) Calibration Procedure for Voltage Offset Applications:

The DPM45B can be utilized as an offset meter where a readout from (0-10000) is desired when the input signal equals zero, and the display is linear from that preloaded offset value up to full scale (19999). For this application the burden resistor across the input terminals is not required. Care must be taken in selecting the proper jumper range. The meter is shipped with the jumper on scale "B", this is the normal range for milliamp inputs. For a voltage input the jumper position must be determined by the method below.

Install jumper (J1) on the range scale "D". Apply maximum signal and adjust the "readout scale" potentiometer located on the back of the meter until the approximate desired readout is obtained. If this readout cannot be obtained remove the signal input and move the jumper (J1) down on range to scale "C". Reapply input signal again adjusting the "readout scale" potentiometer to the desired readout. If necessary repeat above on the next lower range scale until desired readout is obtained.

After the proper scale selections have been chosen the offset and final calibration can be made through these two adjustments 1. Bias, 2. Readout Scale.

Step 1. Apply zero or lowest input signal.

Step 2. Set the readout for the desired offset value (0 to 1000) by adjusting the Bias potentiometer. (P3)

Step 3. Apply maximum input.

Step 4. Set the readout for the desired value by adjusting the "readout scale" potentiometers.

Step 5. Repeat steps 1 through 4 until the desired parameters are achieved.

NOTE: Several adjustments may be required before the desired readouts are achieved. This is due to the interaction of the two adjustments.

INSTALLATION AND CALIBRATION

This meter is shipped with all decimal points displayed, to eliminate the decimal points not desired please locate J2, just below the terminal strip on the back of the meter and cut the jumpers where the decimal points are not desired.

NOTE: If the jumper is just cut and separated a small amount, a new selection can easily be made in the future simply by moving the ends together and tack soldering.

E) Service Notes:

1. A display of 1 on the left hand digit followed by an unlit display indicates an overscale reading and requires recalibration via the "readout scale" potentiometer and/or a new range selection.
2. With the meter installed, wired, power applied and with no signal input, the display should be adjustable through a bias range of 0 to 1000 plus or minus a count. If this is not the case, remove the signal input leads and install a short jumper between the signal input terminals and check for zero readings as above. If zero is now obtained this indicates a "noise" signal is being induced via the signal input cable. This can be corrected with shielded cable (see wiring notes on page 2, section B). If a zero reading cannot be obtained with the input shorted please consult the factory.
3. A display of "0000" may indicate reversed polarity of the input signal or a zero input signal
4. The input signal stage of the meter will accept a voltage up to 10 times the rated value or 500 volts whichever is less (eg. range "C" is rated. 5VDC, 10VAC and will accept up to 50VDC, 100VAC).

5. As with any piece of electronic equipment, care is recommended in handling and applying voltages. For further information or service contact:

R.T. Engineering Service, Inc.
P.O. Box 520
65 Maple Street
Mansfield, MA 02048
1-800-372-2123 (MA)
1-800-434-1182 (OUTSIDE MA)

E) Warranty:

R.T. Engineering Service, Inc. (R.T.E.) warrants this equipment against defects in materials or workmanship for a period of two years from date of shipment.

Standard products manufactured by R.T.E. are warranted to be free from defects in workmanship and material for a period of two years from date of shipment, and products which are defective in workmanship or material will be repaired or replaced, at the option of R.T.E., at no charge to the buyer. Final determination as to whether a product is actually defective rests with R.T.E.

Any product found to be defective should be returned, transportation prepaid by buyer, to R.T.E. at the above address. This warranty will not apply to any product which has been subjected to misuse, negligence, or accident; or misapplied; or modified or repaired by unauthorized persons; or improperly installed. R.T.E. cannot assume responsibility or accept invoices for unauthorized repairs to its components, even though defective. Any modification made internal or external to the meter may void this warranty as will opening the meter enclosure.

The foregoing warranty is exclusive and in lieu of all other warranties expressed or implied, including, but not limited to any warranty of merchantability or of fitness for a particular purpose. R.T. Engineering shall not be liable for consequential damages of any kind.

The aforementioned provisions do not extend the original warranty period of any article which as been either repaired or replaced by R.T. Engineering.

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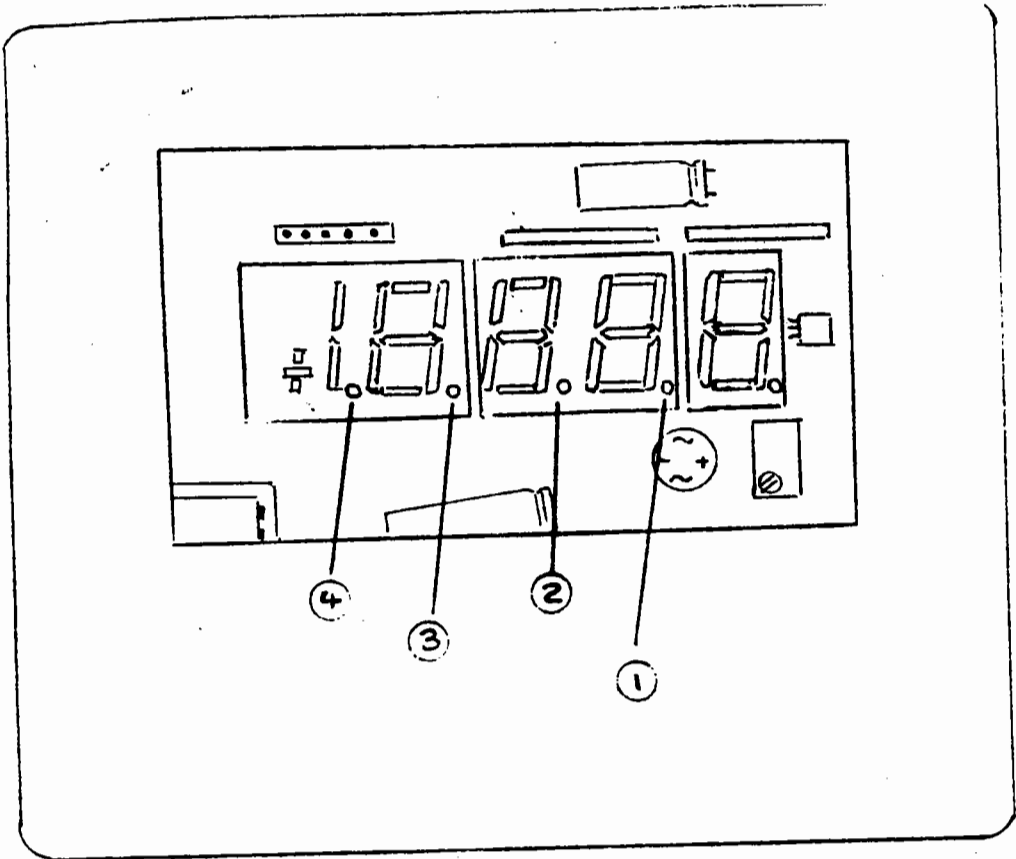
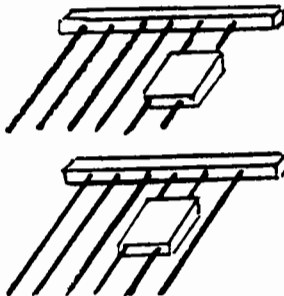


DIAGRAM "B"

DECIMAL POINT SELECTION

Slide off the jumper clip, and place in one of these locations to light the corresponding decimal point

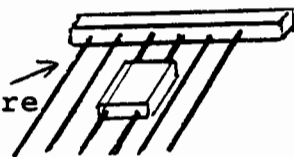


①

The decimal point may be selected to indicate in one of four places by moving the small blue jumper to the appropriate position. Once a selection has been made, the decimal point will always light in that position until you move the jumper to another position.

②

This position is used to store the clip, and does not light a decimal.



③



④

*Decimal point selection only effects the display. And does not effect operation or calibration of the meter.

DPM-45B BIAS POT ADJUSTMENT

(FRONT OF METER)

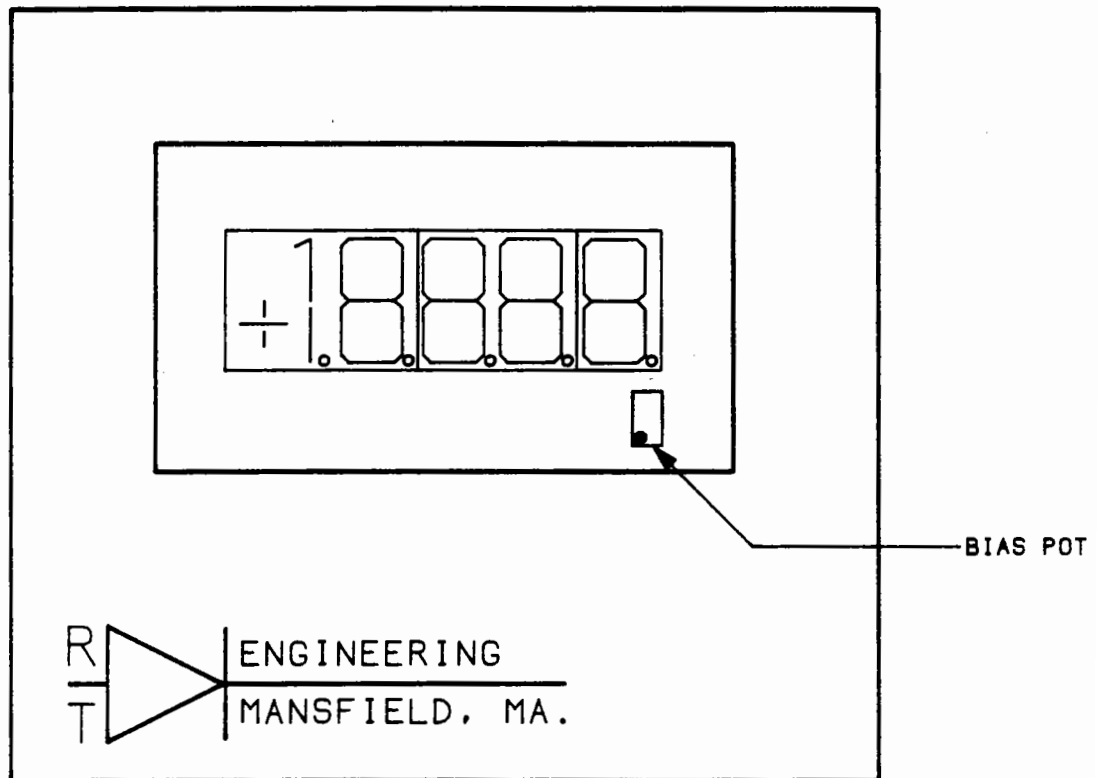


FIGURE 1

DPM-45B CONNECTION DIAGRAM

(REAR OF METER)

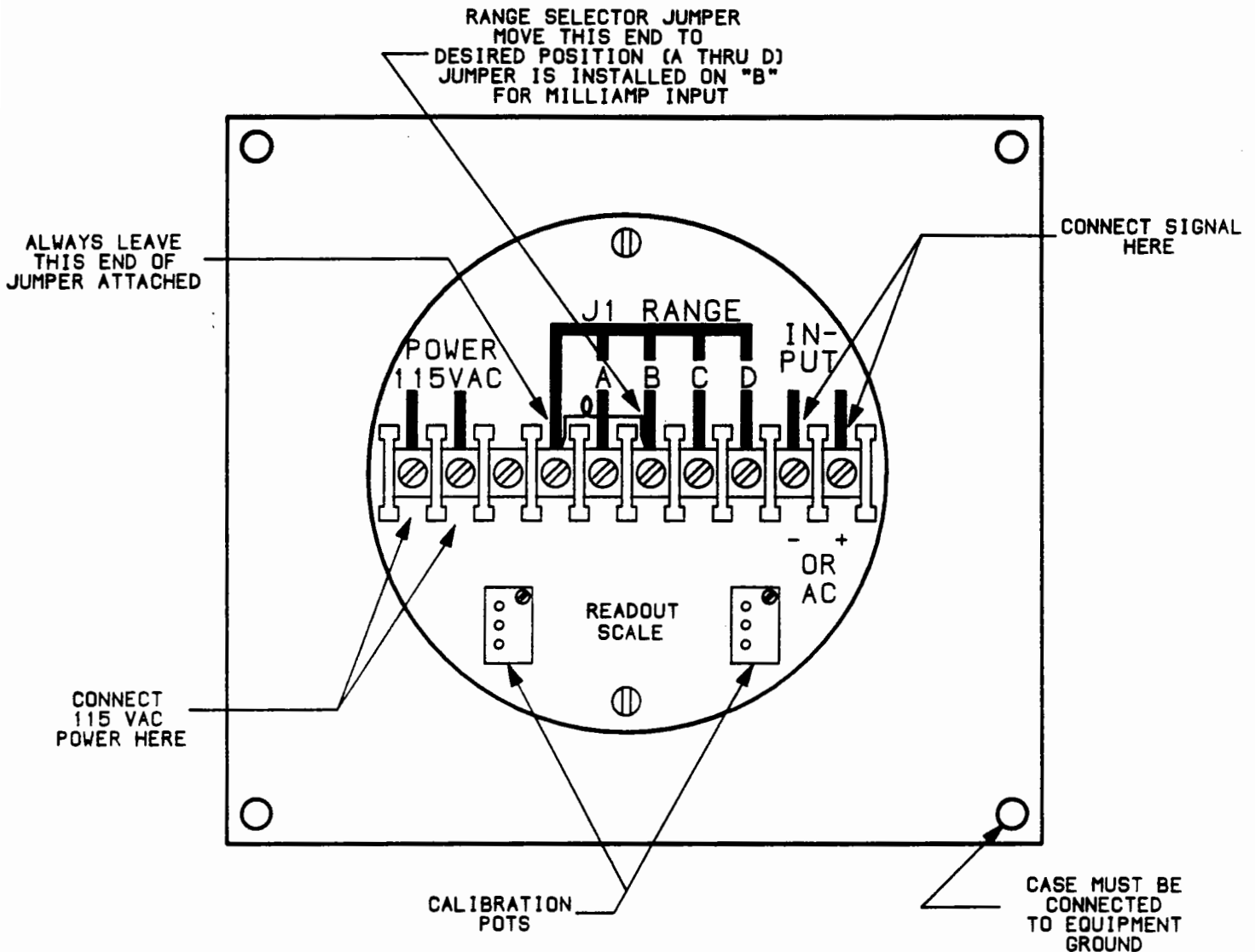


FIGURE 2

* Input ranges (J1) are:

A = 50m VDC, 100m VAC

B = 5 VDC, 10 VAC

C = 50 VDC, 100 VAC

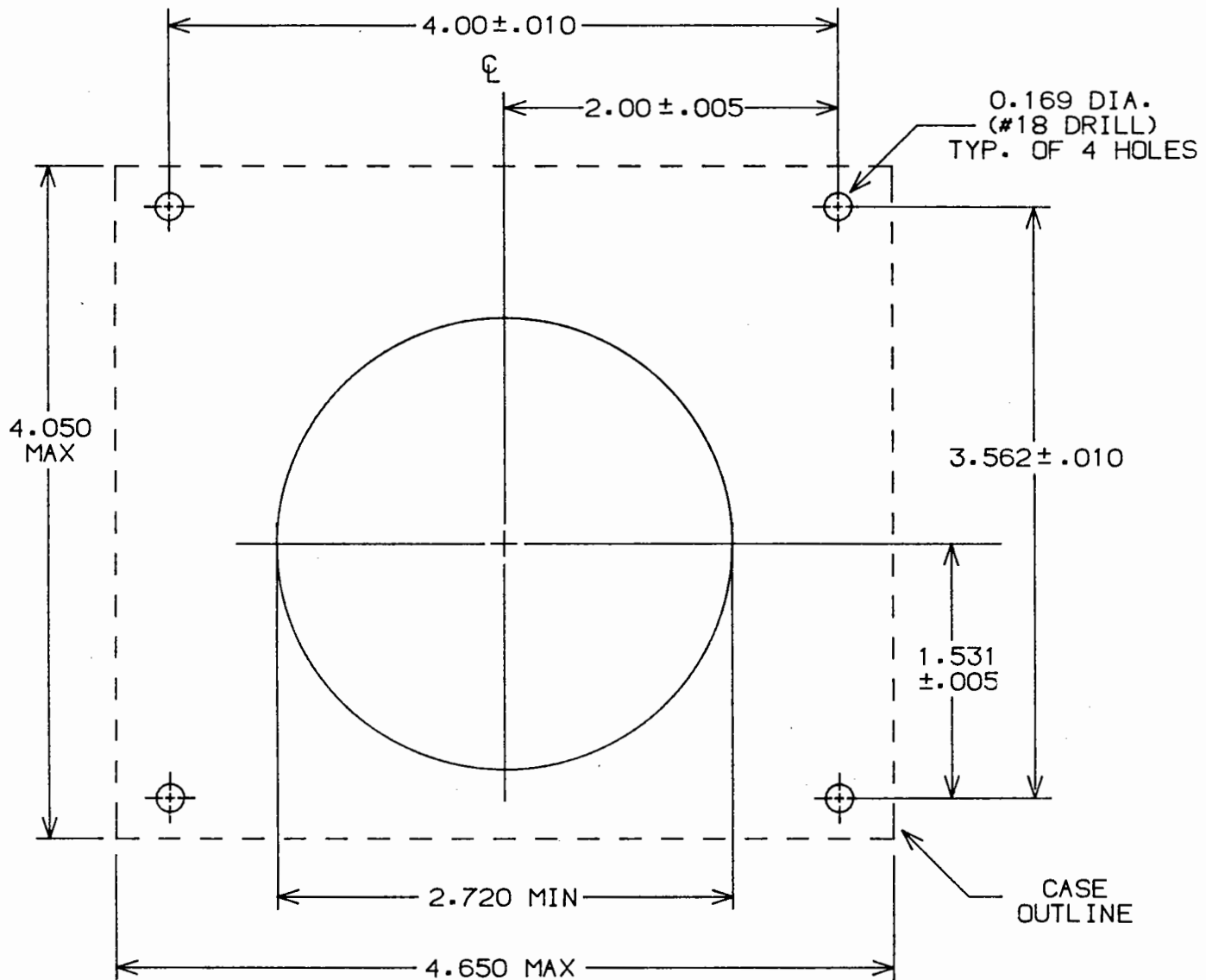
D = 300 VDC, 250 VAC

Note: The "D" scale will handle up to
500 VDC, 480 VAC.

* These rated values represent minimum voltages necessary to read "19999" (full scale). "Readout Scale" may be adjusted to accept higher voltages than the minimum values or to scale the readout from "0" to "19999".

Maximum input voltage for each range is 10 times the rated value or 500 volts, whichever is less.

MOUNTING LAYOUT



NOTES:

- 1) ALL DIMENSIONS ARE IN INCHES.
- 2) TOLERANCE ON FRACTIONAL DIMENSIONS IS $\pm 1/32$.
- 3) THIS IS NOT A TEMPLATE.