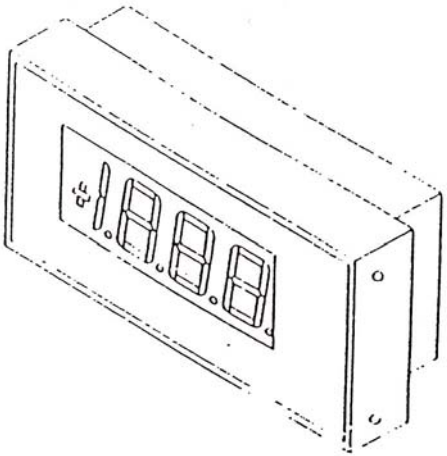
A-705-20 LOOP CURRENT METER

Specifications - Installation and Operating Instructions



MODEL NUMBER	RANGE
A-705-20	4-20mA

UNIT DESCRIPTION

The A-705-20 digital panel meter is a dual range, unipolar, 3 1/2 digit, LCD current meter. It is powered by the current loop being measured and has selectable full scale ranges of 4-20mA and 10-50mA. This unit is designed with a small case size and easy calibration from the right side of the meter.

DWYER INSTRUMENTS, INC.
P.O. BOX 373 • MICHIGAN CITY, IN 46361, U.S.A.
Phone: 219/879-8000 www.dwyer-inst.com
Fax: 219/872-9057 e-mail: info@dwyer-inst.com

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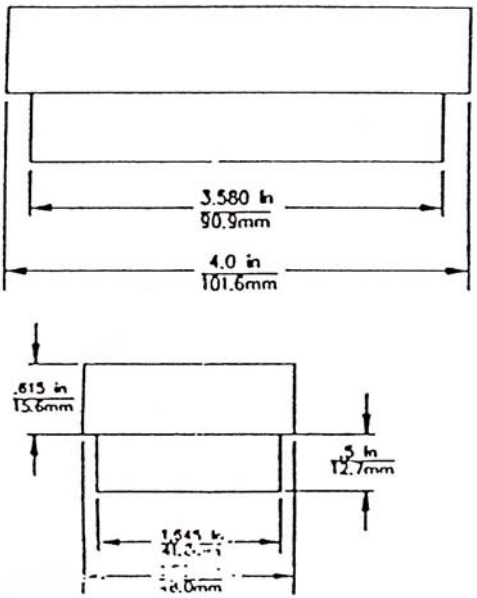
SPECIFICATIONS

- **Power requirements— None Required Power is derived from current source being monitoring with a voltage drop of less than 3.2V(with a 20mA input)**
- **Range— ±1999**
- **Accuracy— ±0.1% Rdg., ± 1digit**
- **Settling Time— Under 1 sec. typical**
- **Operating Temperature— 0°C to +50°C**
- **Storage— -20°C to +70°C, 72 hrs., -10°C to +60°C, Indefinite.**
- **Humidity— 80% RH @ 40°C max., 70% RH @ 50°C max.**
- **Decimal Points— set by internal jumper, 1.XXX, 1X.XX, 1XX.X, 1XXX.**
- **Polarity— negative count; minus sign at left, positive count, plus sign at left.**
- **Tempco— 100ppm/°C typical**
- **Weight— approx. 2 oz.**
- **Display— 0.6˝ high LCD**
- **Recalibration Schedule— 1 yr. within rated accuracy**
- **Overrange Indication— Positive overrange; Negative overrange; -1; other digits blank.**
- **Size— See outline dimensions.**

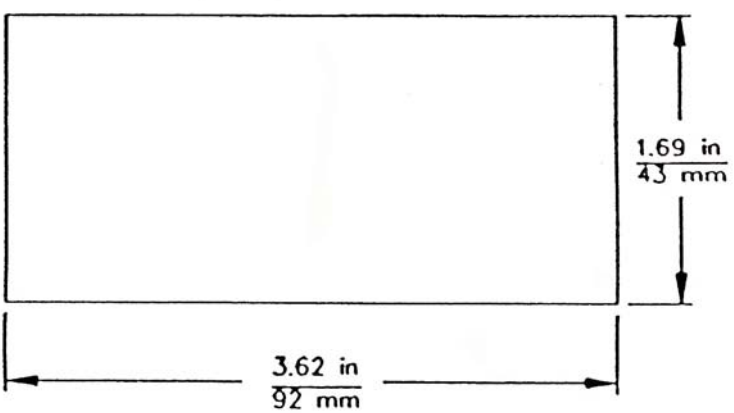
Mechanical Installation

The figure below shows a pictorial view and overall dimensions.



Panel Preparation

Prepare a panel cut-out as shown below at the desired location



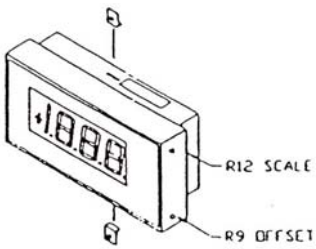
DPM Installation

- Insert meter in panel cutout from the front.

- From rear, place short side of mounting clips in slots at top and bottom of case. Face short side of clips to rear.

- Thread the screws into the clips and tighten against panel.
  If it is necessary to remove lens, grasp the sides of the meter and press in until lens bows out. Pull out lens at center.

NOTE: Shorting BC6 will change the function of J-5 to “loop - (50mA)”. This allows the option of switching the meter between 4-20mA and 10-50mA with a jumper rather than rewiring the installation see page 10 for reference.



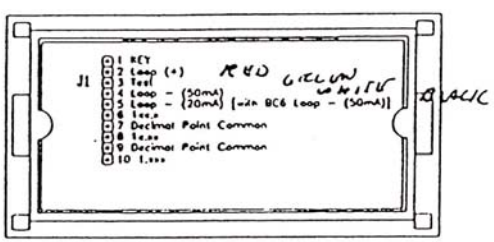
CONNECTIONS AND
CONFIGURATION
Electrical Connections

The model A-705-20 accepts a 10 pin mating connector at the rear for decimal point and signal inputs. The figure below shows the pinout configuration and the location on the rear of the meter.

OPERATION

Signal Inputs: apply between pin 2 (Hi) and pin 5 (Lo 20mA) or pin 4 (Lo 50mA).

Decimal Point Selection: activation requires the placement of a jumper from J1 pin 7 to pin 6 from J1 pin 8 to pin 9 (or pin 7), or from J1 pin 10 to pin 9. The factory setting is for a 20mA meter with selection of 1X.XX. To use other selections, remove jumper and reinstall on the appropriate pin combination for the decimal



METER REAR
PINOUT LOCATION

CALIBRATION

Allow 5 minutes warm-up with signal of 20mA. The number displayed on the A-705-20 readout is determined by the equation: D = S * I + O where "D" is the count being displayed, "S" is a constant scale factor having the dimensions of counts per milliampere, "O" is a constant scale factor having the dimensions of counts, and "I" is the input current to the A-705-20.

Example:

Consider the case in which inputs of 4mA and 20mA yield displays of 000 and 100 respectively. Solving the equation for "S" and "O" gives

$$S = \frac{D_H - D_L}{I_H - I_L} \qquad O = D_L - (S \bullet I_L)$$

Where I_H is the higher value of current input in milliamperes

I_L is the lower value of current input in milliamperes

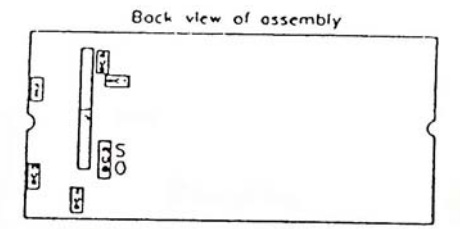
D_H is the display value corresponding to I_H

D_L is the display value corresponding to I_L

$$\text{Scale} = \frac{\text{Display High - Display Low}}{\text{Input High - Input Low}} \qquad \text{"S"} = \frac{100 - 000}{20 - 4} = 6.25 \text{ counts per mA}$$

Substituting in the equation for "O" gives: "O"= 000 - 6.25 x 4 = -25 counts
The basic equation for the volume displayed is D = 6.25 I - 25.9

After the value for "S" and "O" have found, the A-705-20 can be programmed to respond in accordance with the basic equation. Programming involves placing two of four internal jumpers. NOTE: first the decimal point location must be determined. For the example above, we will choose a decimal point location of 1XX.X. The decimal point location in the following tables has been adjusted accordingly.



"S" In Counts/mA	BC1	BC2
0 to 5.7	Shorted	Open
6.2 to 8.8	Open	Open
8.3 to 14.0	Open	Shorted

Since "S" in the example (6.25) falls in the range 5.2 to 8.8, both BC1 and BC2 should be open.
The settings of BC4 and BC5 depend on the value of O and the ranges of O are listed in the table below.

O (offset) in Counts	BC4	BC5
+199.9 to 57.9	Shorted	Open
+61.6 to -60.8	Open	Open
-56.5 to -199.9	Open	Shorted

Since O in the example (-25.0) falls in the range +61.6 to -60.8, both BC4 and BC5 should be open.

After BC1 , 2, 4, and 5 have been set, the potentiometers R9 and R12 (behind the front panel) need to be recalibrated for an accurate reading. The procedure is as follows:

1. Connect the positive input lead (current going into the meter) from a current standard to Pin2 of J1 at the rear of the meter. The negative lead attached to pin 5 of J1.
2. Short BC3 in the “O” position.
3. Adjust the current standard to approximately ten milliamperes (the value is not critical for this step).
4. Adjust R9 until the display shows the correct offset value (“O”). (-25.0 in the example).
5. Move BC3 jumper to the “S” position.
6. Set the current standard to 10mA.
7. Adjust R12 until the display shows the correct scale factor value X 10. (6.25 X 10 = 62.5 for the example).
8. Remove the BC3 jumper.
9. Verify that the display shows the correct value for 4mA & 20mA inputs (000 & 100.0 respectively for the example).

The following four sets of tables are for the different decimal point location as noted.

DECIMAL POINT LOCATION 1.XXX (JUMPER J1 PIN 9 TO J1 PIN 10)		
“S” In Counts/mA	BC1	BC2
0 to .057	Shorted	Open
.052 to .088	Open	Open
.083 to .140	Open	Shorted

DECIMAL POINT LOCATION 1.XXX (JUMPER J1 PIN 9 TO J1 PIN 10)		
O (offset) In Counts	BC4	BC5
+1.999 to +.579	Shorted	Open
+.616 to -.608	Open	Open
-.565 to -1.999	Open	Shorted

DECIMAL POINT LOCATION 1X.XX (JUMPER J1 PIN 8 TO J1 PIN 7 OR 9)		
"S" In Counts/mA	BC1	BC2
0 to .57	Shorted	Open
.52 to .88	Open	Open
.83 to 1.40	Open	Shorted

DECIMAL POINT LOCATION 1X.XX (JUMPER J1 PIN 8 TO J1 PIN 7 OR 9)		
O (offset) In Counts	BC4	BC5
+19.99 to +5.79	Shorted	Open
+.616 to -.608	Open	Open
-5.65 to -19.99	Open	Shorted

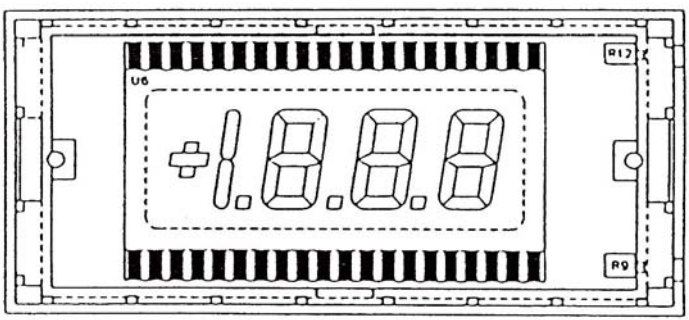
DECIMAL POINT LOCATION 1XX.X (JUMPER J1 PIN 6 TO J1 PIN 7)		
"S" In Counts/mA	BC1	BC2
0 to 5.7	Shorted	Open
5.2 to 8.8	Open	Open
8.3 to 14.0	Open	Shorted

DECIMAL POINT LOCATION 1XX.X (JUMPER J1 PIN 6 TO J1 PIN 7)		
O (offset) In Counts	BC4	BC5
+199.9 to +57.9	Shorted	Open
+61.6 to -60.8	Open	Open
-56.5 to -199.9	Open	Shorted

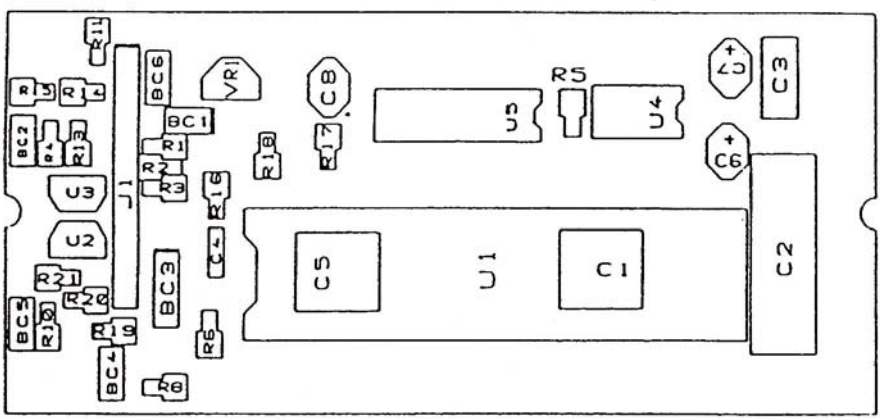
DECIMAL POINT LOCATION 1XXX (NO JUMPERS)		
"S" In Counts/mA	BC1	BC2
0 to 57	Shorted	Open
52 to 88	Open	Open
83 to 140	Open	Shorted

DECIMAL POINT LOCATION 1XXX (NO JUMPERS)		
O (offset) In Counts	BC4	BC5
+1999 to +579	Shorted	Open
+616 to -608	Open	Open
-565 to -1999	Open	Shorted

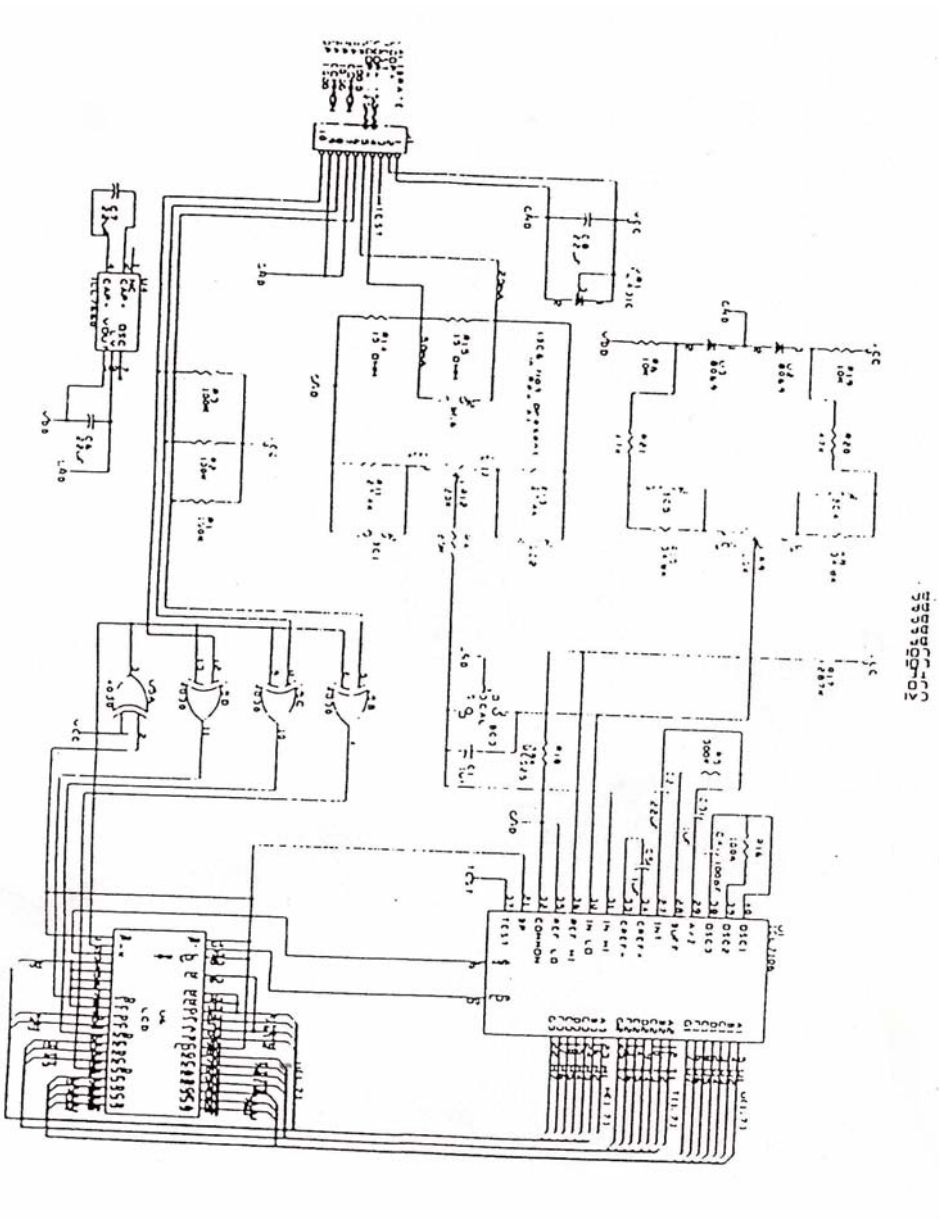
Electronic Assembly



Back view of assembly



Electronic Assembly



 Printed In U.S A 10/94

Dwyer Instruments, Inc.

P.O. Box 373, Michigan City, Indiana 46361, U.S.A.
Phone: 219/879-98000 Fax: 219/872-9057