

## FEATURES

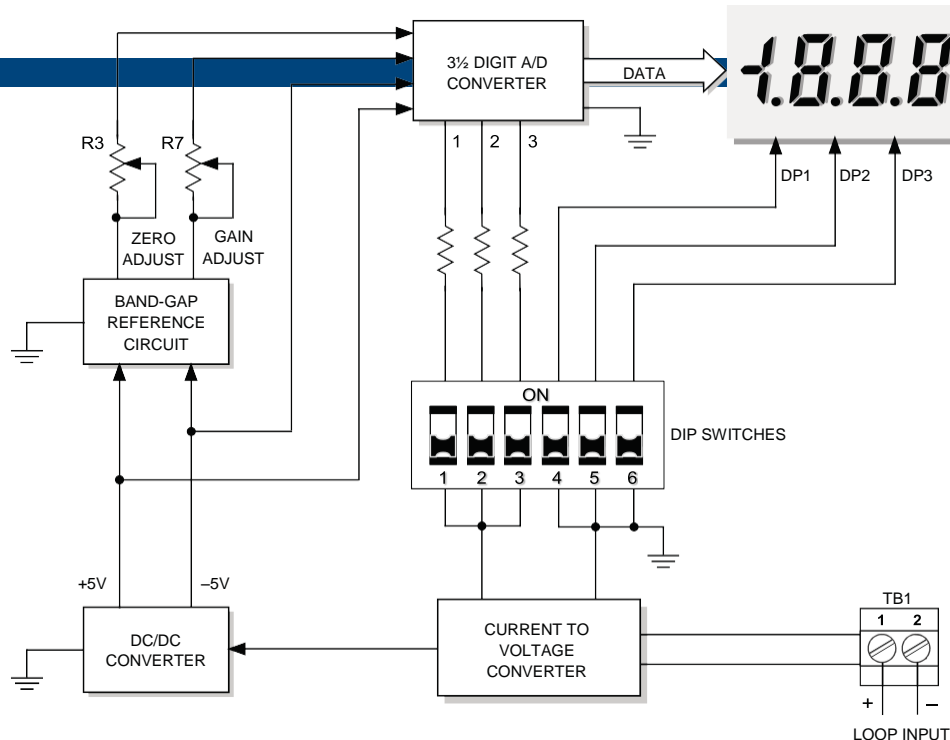
- Super-low loop drop: 1.8V typical, 2.0V max.
- Self-powered, no separate supply required
- Unipolar, Bipolar, and Positive Reading Models
- Subminiature package—Less than 0.90" behind-the-panel depth
- Large, 0.37"/9.4mm high, sunlight-viewable LCD display
- Non-interacting gain (span) and offset (zero) 20-turn potentiometers
- DIP-switch selectable range and decimal points
- Hundreds of different input/readout combinations
- Vibration-resistant package; reliable screw-terminal input connections

The DMS-20LCD-4/20 Series produces the lowest loop voltage-drop of any comparably priced, 4-20mA input, 3½ digit LCD-display process monitors: 1.8V typical, 2.0V max. This super-low drop means its nominal loop resistance (burden) is less than 100 Ohms! All operating power is derived solely from the 4-20mA loop current—no separate power source is required! The simple 2-wire hookup allows the DMS-20LCD-4/20 Series to be connected anywhere in the loop

All decimal-point and range-change selections are made via a six-position DIP switch featuring vibration-resistant, gold-plated contacts—there are no jumpers or solder gaps to ever open or close. Both gain (span) and offset (zero) adjustments are performed with precision, 20-turn potentiometers. Three different models are available for unipolar, bipolar, and positive display reading applications. The DMS-20LCD-4/20's DIP switch and adjustment potentiometers can accommodate literally hundreds of different input-current/output-reading combinations. And, connections to the current loop are made via a reliable, two-position, screw-type terminal block.

The DMS-20LCD-4/20 Series' subminiature package houses a large, 0.37"/9.4mm high digits, LCD display that can be read in virtually all lighting conditions—including direct sunlight. An optional bezel assembly, featuring screw fasteners and a rubber seal, simplifies panel mounting and provides excellent resistance to environmental dust and moisture. All these outstanding features combine to make the DMS-20LCD-4/20 Series the perfect meters for OEM 4-20mA current-loop process monitoring instrumentation.

## SIMPLIFIED SCHEMATIC DIAGRAM



## Performance/Functional Specifications

Typical at  $T_A = +25^\circ\text{C}$ , unless otherwise noted.

| Current Loop Inputs                           | Min.  | Typ.       | Max.      | Units                  |
|---|---|------------|-----------|------------------------|
| Full Scale Input Range ①                      | +3.8  | –          | +20.4     | mA                     |
| Input Impedance ②                             | –   | 80         | 100       | $\wedge$               |
| Voltage Drop ②                                | –   | 1.8        | 2.0       | Volts                  |
| Overvoltage Protection ①                      | –   | –          | $\pm 40$  | mA                     |
| Performance                                   |   |            |           |                        |
| Sampling Rate                                 | 2.5 reading per second                                      |            |           |                        |
| Accuracy (1 minute warm-up):                  | $\pm 0.05\% \text{FS} \pm 1 \text{ Count}$                  |            |           |                        |
| Temperature Drift ( $0 = +60^\circ\text{C}$ ) | –   | $\pm 0.15$ | $\pm 0.3$ | Cnts/ $^\circ\text{C}$ |
| Display                                       |   |            |           |                        |
| Display Type and Size                         | 3½ digit, 0.37"/9.4mm high LCD                              |            |           |                        |
| Polarity Indication                           | "–" for negative readings                                   |            |           |                        |
| Over range Indication                         | "–1____" for negative inputs<br>"1____" for positive inputs |            |           |                        |
| Physical/Environmental                        |   |            |           |                        |
| Operating Temperature                         | 0   | –          | +60       | $^\circ\text{C}$       |
| Storage Temperature                           | –20   | –          | +75       | $^\circ\text{C}$       |
| Humidity (non-condensing)                     | 0   | –          | 95        | %                      |
| Case Material                                 | Polycarbonate   |            |           |                        |
| Weight  | 0.6 ounces (17 grams)                                       |            |           |                        |

- ① The DMS-20LCD-4/20, using any of the DIP-switch settings described above, can withstand over currents, including those resulting from accidental reverse-polarity connections, up to  $\pm 40\text{mA}$  without sustaining any damage.
- ② Because DMS-4/20 loop-powered meters employ active circuitry to convert the loop current into a voltage, the meters' effective series impedance varies in a manner that maintains the loop voltage drop constant over the full 4-to-20mA current range. Listed impedance specification applies at 20mA.

## Ordering Information

**DMS-20LCD-4/20S-C** Unipolar reading, loop-powered LCD meter

## OPERATING AND SETUP INSTRUCTIONS

### DMS-20LCD-4/20S (Unipolar Reading Model)

As shipped, the DMS-20LCD-4/20S is factory calibrated to read "000" for a 4mA input and "1000" for a 20mA input. The following worst-case procedure assumes the DMS-20LCD-4/20S is completely misadjusted, i.e., both potentiometers and the DIP switches are randomly set. When

performing DIP-switch settings, be sure the DIP switch's small actuators are firmly engaged in their fully-ON or fully-OFF positions.

- Set R7 (full scale span/gain adjust) and R3 (zero/offset adjust) fully clockwise, roughly 22 turns, and place SW1-SW6 to OFF.
- Select DIP switch setting #2.
- Set R7 (full scale span/gain adjust) and R3 (zero/offset adjust) fully clockwise, roughly 22 turns, and place SW1-SW6 to OFF.
- Select DIP switch setting #2.
- Apply a precision 4mA input, with proper polarity, and adjust R3 until the meter's display reads "000".
- Apply a precision 20mA input and adjust R7 until the meter's display reads "1000". Repeat steps 3 and 4 to make sure the adjustments do not affect one another.
- Select the appropriate decimal point by setting SW4, SW5 or SW6 to ON (DP1, DP2 or DP3 respectively).

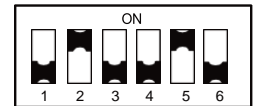
**NOTE:** If a display reading other than "000" to "1000" is desired, refer to DIP-Switch Settings Table 1 for SW1–SW3 settings.

### Examples (DMS-20LCD-4/20S-Unipolar Model)

1. Desired display readings are:

$$4\text{mA} = "0.00"$$

$$20\text{mA} = "6.00"$$

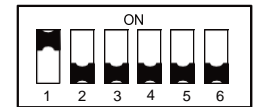


Use DIP-switch setting #3 in Table 1 and enable decimal point DP2 via SW5. Apply 4mA and adjust R3 so the display reads "0.00". Apply 20mA and adjust R7 so the display reads "6.00".

2. Desired display readings are:

$$4\text{mA} = "000"$$

$$20\text{mA} = "800"$$

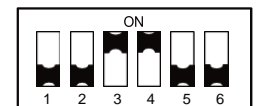


Use DIP-switch setting #2 in Table 1. Apply 4mA and adjust R3 so the display reads "000". Apply 20mA and adjust R7 so the display reads "800". For these display readings, no decimal points are used. Set SW4, SW5 and SW6 to OFF.

3. Desired display readings are:

$$4\text{mA} = ".000"$$

$$12\text{mA} = ".250"$$



This example is not as straightforward as the previous two. Notice that 12mA is exactly halfway between 4mA and 20mA. If we assume that the input could go up to 20mA, the display reading would then be:  $2 \times .250$  or ".500". From Table 1 we can now select DIP-switch setting #4 and enable DP1 via SW4. Apply 4mA and adjust R3 so the display reads ".000". Apply 12mA and adjust R7 so the display reads ".250".