3.1 INTRODUCTION

This section describes the operator panel of the IQ DP-4000. The discussion of the operator panel contains the following sections:

- pushbuttons
- display window
- LEDs

The operator panel is shown in Figure 3.1

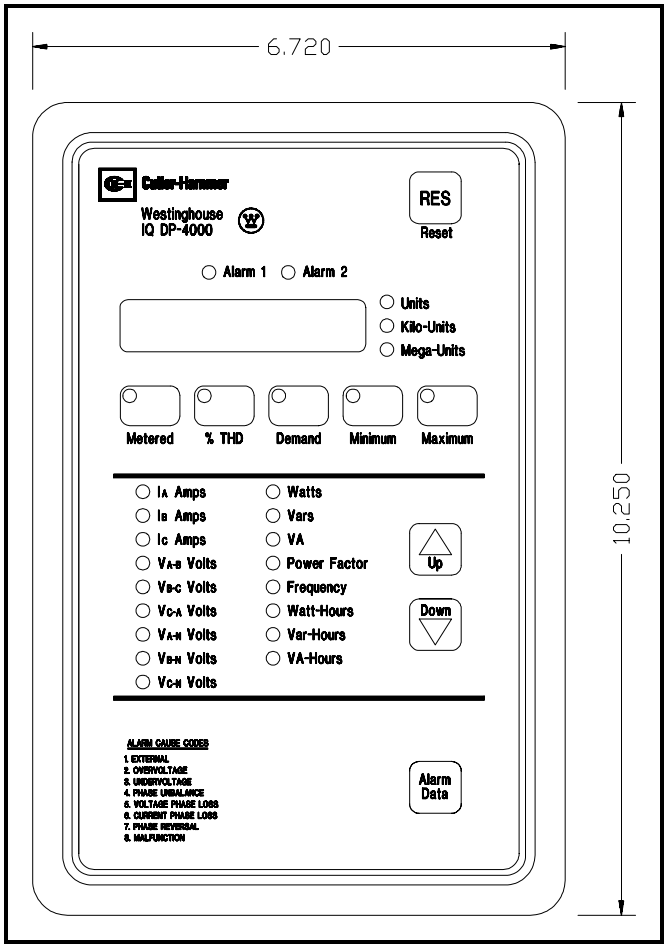

Figure 3.1 Operator Panel

3.1.1 Pushbuttons

The operator panel has nine membrane pushbuttons. They are:

- Reset. After an alarm event, the Reset pushbutton allows you to reset the alarms. The Reset pushbutton is the red button marked RES, located in the upper right-hand corner of the faceplate.

- Up/Down Step Display. The Up/Down pushbuttons step through the items that the IQ DP-4000 monitors. If you press the Up and the Down buttons at the same time, the INCOM network address for your unit appears in the Display Window. It monitors the following items:

  - I_A Amps
  - I_B Amps
  - I_c Amps
  - V_{A-B} Volts
  - V_{B-C} Volts
  - V_{C-A} Volts
  - V_{A-N} Volts
  - V_{B-N} Volts
  - V_{C-N} Volts
  - Watts
  - Vars
  - VA
  - Power Factor (apparent and displacement)
  - Frequency
  - Watt-Hours
  - Var-Hours
  - VA-Hours

  Each time you press the Up or Down pushbuttons, the LED to the left of the selected item illuminates. At the same time, the present operating value corresponding to that item is in the display window.

- Alarm Data pushbutton. The Alarm Data pushbutton, located on the bottom right of the operator panel, allows you to toggle between Alarm 1, Alarm 2, and presently metered values. A blinking LED indicates you are viewing the snapshot (data saved at the time an alarm condition occurred for that particular alarm. An LED that is constantly illuminated indicates an active alarm condition for that particular alarm.(Please note that the Alarm LED will always blink when being viewed, even for an active alarm).

  If you press the Alarm Data button before there has been an alarm condition, no light appears beside the Alarm.

- Monitor pushbuttons. The Monitor pushbuttons, located in a row just below the LED display window are:

- Metered. The Metered pushbutton displays the metered values for all the parameters on the Operator Panel.
- %THD. This button displays Percent Total Harmonic Distortion for the amps and volts for each phase.
- Demand. The Demand button displays the demand current for each phase, as well as the demand Watts, Vars, and VA.
- Minimum. This button displays the minimum values for all currents and voltages as well as Watts, Vars, VA, Power Factor (apparent and displacement) and Frequency. You can view and reset this value from the faceplate.
- Maximum. This button displays the maximum values for all currents and voltages as well as Watts, Vars, VA, Power Factor (apparent and displacement) and Frequency. You can view and reset this value from the faceplate.

Note: The Metered, %THD, and Demand pushbuttons can work with the Minimum and Maximum pushbuttons to display minimum and maximum metered values, maximum % THD, and maximum peak demand.

- Pushbutton combinations.
  - Reset and Metered. Holding the Reset and Metered pushbuttons simultaneously for three to four seconds will reset minimum and maximum values for all metered parameters. This will cause the display to blank, and the Metered LED to blink. When the display is restored, the Metered Min/Max values have been reset.
  - Reset and %THD. Holding the Reset and the %THD pushbuttons simultaneously for three to four seconds will reset maximum values for all %THD parameters. This will cause the display to blank, and the %THD LED to blink. When the display is restored, the Maximum %THD values have been reset.
  - Reset and Demand. Holding the Reset and the Demand pushbuttons simultaneously for three to four seconds will reset maximum values for all Demand parameters. This will cause the display to blank, and the Demand LED to blink. When the display is restored, the Maximum Demand values have been reset.
  - Stepup and Stepdown. Holding the Stepup and Stepdown pushbuttons will display the INCOM address(only if the PONI module is attached and communication has been established with Series III).
  - Minimum and Maximum pushbuttons. Holding the Maximum and Minumum pushbuttons simultaneously will display the version of firmware the device is currently using. This is useful when troubleshooting the device.

3.1.2 Display Window

The IQ DP-4000 has a large, easy to read 6-digit LED display window that shows the value for the associated Monitor pushbuttons, the values for the protective functions and the alarm cause codes. The display window is at the top of the faceplate, just below the Alarm LEDs.

3.1.3 LEDs

The Operator Panel LEDs are divided into four types:

- Monitor LEDs
- Parameter LEDs
- Units LEDs
- Alarm LEDs

3.1.3.1 Monitor LEDs

At any given time, one or more of the LEDs associated with a Monitor pushbutton is illuminated. Each one identifies which monitor item is currently displayed. The Monitor LEDs are part of the Monitor pushbuttons and are labeled:

- Metered
- %THD
- Demand
- Minimum
- Maximum

3.1.3.2 Parameter LED's:

The LEDs that monitor the following conditions will blink in response to several monitoring situations:

Note: The following examples assume that the unit is using the mathematic sign convention.

- Watts, Vars and/or Power Factor. The selected LEDs blink when viewing reverse power flow, lagging (negative) Power Factor, and negative Vars. The LEDs do not blink if the values are positive (leading). Refer to Figures 3.2, 3.3, 3.4 and 3.5 for further explanation.
- Induction Motor Loads. Typically when monitoring induction motor loads the power flow is in Quadrant 4. The Watts are positive and the Power Factor is lagging. By definition, the Power Factor and Vars are negative and the LEDs will blink for these two values. Refer to Figure 3.2.
- Power Factor Correction Capacitors. When monitoring a load that also has Power Factor correction capacitors and/or leading Power Factor synchronous motors so that the new load is capacitive, then the power flow is in Quadrant 1. In this case, none of the LED's will blink.
- Power Distribution. Typically you will encounter three conditions when monitoring power distribution (Refer to Figure 3.5):
    1. Breakers A and B are closed and C is open. Power flow is in Quadrant 4. The Power Factor and Vars will be negative and the respective LED's will blink.
    2. Breakers A and C are closed and B is open. Power flow for Breaker A and C is in Quadrant 4. The Power Factor and Vars will be negative, and the LED's will blink for Power Factor and Vars readings.
    3. Breakers B and C are closed and A is open. The power flow for Breaker B is in Quadrant 4 and the metering condition is the same as Conditions 1 and 2. However, the power flow for Breaker C is reversed and is in Quadrant 2. Only the Watts LED and Power Factor LED will blink.

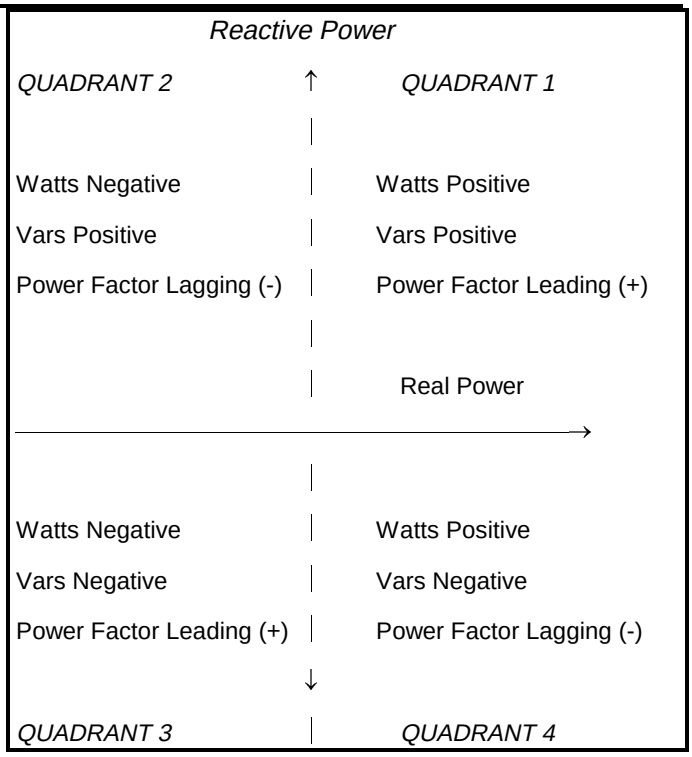

Figure 3.2 Power Quadrants, Mathematical

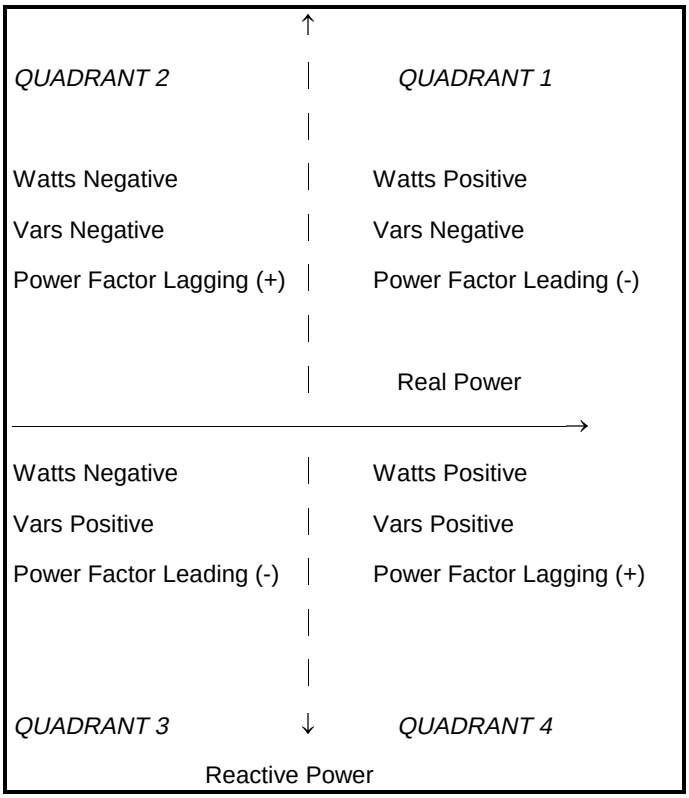

Figure 3.3 Power Quadrants, Power Engineer's Sign Convention

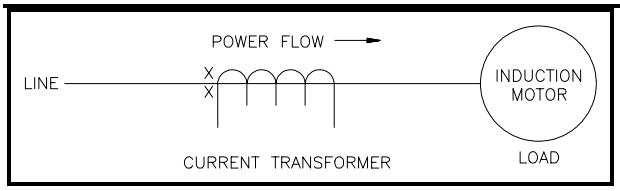

Figure 3.4 Induction Motor Load

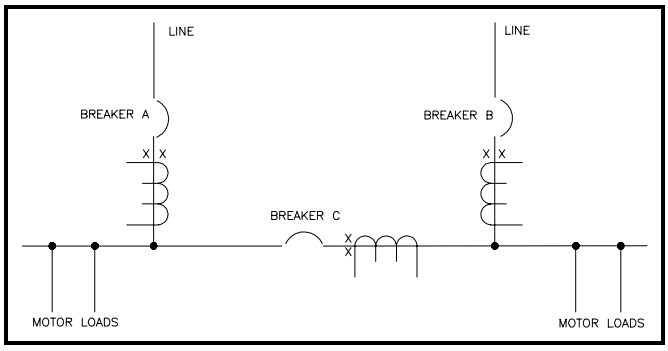

Figure 3.5 Power Distribution

Note: Refer to section 5.11 VAR/Power Factor Sign Convention Setpoint for more information about + and - values.

3.1.3.3 Units LEDs: Auto Range Units for Monitoring

The units for monitoring are Units, Kilo-Units, and Mega-Units. Figure 3.1 shows the location of these LEDs to the right of the display window. These units are fixed, based on your selection for PT and CT ratios so that the display is consistent with the PT and CT sizes. They let you know the measurement unit for the displayed function.

3.1.3.4 Alarm LED's

The Alarm LEDs, (Alarm 1, Alarm 2) when continuously lit, indicate that an alarm condition exists. If there is an alarm condition when you press the Alarm Data button, the corresponding LED blinks and the display window shows a digit, from 1 to 8. This digit represents the specific type of alarm condition that is occurring for the selected alarm. The alarm cause codes are listed at the bottom of the faceplate for easy reference. Table 3.A describes the alarm codes by number.

Alarm Cause Code	Operator Panel Designation	Description
1	External	Remote device initiates alarm
2	Overvoltage	An alarm condition occurs
3	Undervoltage	
4	Phase Unbalance	
5	Voltage Phase Loss	
6	Current Phase Loss	
7	Phase Reversal	
8	Malfunction	Internal

Table 3.A Alarm Codes