

($\pm Wh$); or *leading or lagging reactive ($\pm varh$)*. The procedure for specifying the *energy per pulse* is described in *section 4.10.9*.

Each pulse that arrives at the pulse counter indicates that the specified energy has been consumed by the monitored system. The frequency and spacing of these pulses represent the energy consumption pattern of the monitored system.

Because the energy represented corresponds to the energy at the *secondary* winding of the PTs and CTs, the CT and PT ratios must be taken into account when specifying the *energy per pulse* value. An example of how to specify the *energy per pulse* value is given below.

Example:

System Configuration

CT = 1400:5

PT = 2:1

Desired value to monitor

Watt-hours

System parameters

Assume the IQ 200 is monitoring a constant system power of 16,800 Watts.

Step 1: Calculate the CT and PT ratios

CT ratio = $1400/5 = 280$

PT ratio = $2/1=2$

Step 2: Calculate the power at the secondary of the CTs and PTs

power at secondaries = $16,800 \text{ Watts} / (\text{CT ratio} \times \text{PT ratio})$

power at secondaries = $16,800 \text{ Watts} / (280 \times 2)$

power at secondaries = $16,800 \text{ Watts} / 560$

power at secondaries = 30 Watts (or 30 Watt-hours in 1 hour)

Step 3: Specify the energy per pulse as desired

Specify secondary energy per pulse = 1 Watt-hour per pulse;

then, each pulse represents system energy of:

$(1400/5) \times (2/1) \times 1$; or 560 Watt-hours per pulse

or

Specify secondary energy per pulse = 7 Watt-hours per pulse;

then, each pulse represents system energy of:

$(1400/5) \times (2/1) \times 7$; or 3,920 Watt-hours per pulse

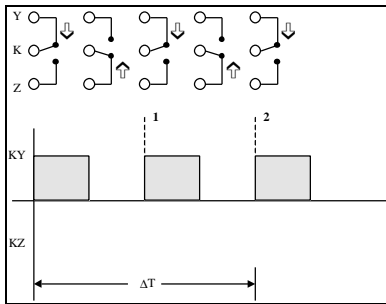


Figure 3.16 2-Terminal (K-Y) Configuration

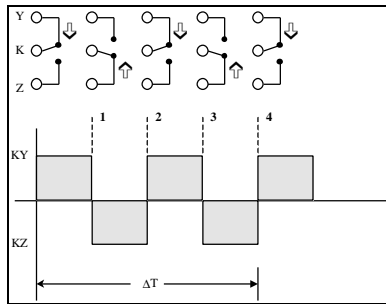


Figure 3.17 3-Terminal (K-Y-Z) Configuration

SECTION 4: OPERATION

4.1 GENERAL

The IQ 200 Display Module provides both local display of system values and a method of assigning an IMPACC network address to the IQ 200.

The IQ 200 Display Module allows the user to view information and to specify or change the functions of the IQ 200 system. These items include system and phase data, min/max data, setpoints, and screen contrast.

It also provides a method of assigning a network address and communication baud rate to the IQ 200 should it be networked to an IMPACC master device.

All functions of the IQ 200 are available through *menus* visible on the screen of the IQ 200 Display Module Operator Panel. Choice of menu and selection of menu options is accomplished by pressing the buttons on the face of the Operator Panel.

The menus provide access to the following values and functions:

- System Data
- Phase Data
- Min/Max Data
- View Setpoints
- Edit Setpoints (with optional password protection)
- Reset Values (with optional password protection)
- Contrast Adjust
- Diagnostics
- Exit Menu

4.2 BUTTONS

There are four buttons on the Operator Panel: *Menu*, up and down *Scroll*, and *Enter*. Their functions are described in the following table.

Button	Function
Menu	Displays the nine different screen menus; displays the immediately preceding screen
Scroll	Navigates the on-screen <i>selection arrow</i> (u) through menu items <i>and</i> through system values to be displayed
Enter	Confirms the option, value, or screen currently selected

4.3 CONTRAST

The contrast of the screen can be adjusted without entering the Contrast Adjust menu by holding in the *Enter* button while pressing the *Scroll* up arrow button (to decrease contrast) or the *Scroll* down arrow button (to increase contrast).

4.4 DISPLAYED SIGN CONVENTIONS

The IQ 200 not only displays system values, but also indicates whether factors are lagging or leading by displaying the following symbols:

Display	Indication
Lg	lagging (inductive)
Ld	leading (capacitive)
^l g	lagging net var hours
^l d	leading net var hours

The IQ 200 is shipped with lagging vars and power factor represented by negative values at the load, conforming to the *mathematical sign convention*. To change to the *power engineer convention*, which assumes positive values at the load, the IQ 200 must be connected to an IMPACC™ network and programmed accordingly. Note that the choice of *mathematical* or *power engineer convention* has no effect on the unsigned leading and lagging energy displays, but will reverse the sign of net energy displays.

The following relationships apply:

Convention	Load	var Values	Power Factor Values
Mathematic	inductive	negative	negative (lagging PF)
Mathematic	capacitive	positive	positive (leading PF)
Power Engineer	inductive	positive	positive (lagging PF)
Power Engineer	capacitive	negative	negative (leading PF)

The relationships among system power values are shown schematically in figure 4.1.

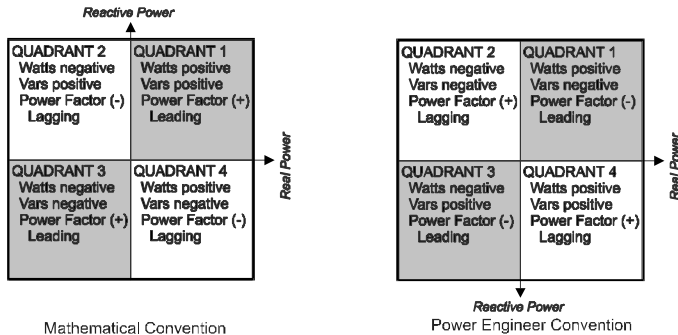


Figure 4.1 System Power Values Relationships

4.5 USING THE OPERATOR PANEL

When the IQ 200 is first powered on, the Operator Panel screen displays a brief initialization message identifying the product and version. The screen then displays the System Power screen. (At this point, pressing the *Scroll* arrows will display system data as described in section 4.6 System Data Display Mode.)

Press the *Menu* button to proceed. The *main menu items* display four at once, as shown in figure 4.2. Every menu item can be displayed by using the *Scroll* button arrows. The item currently selected is indicated by the selection arrow to its left.

The presence of additional items is indicated by “ and/or ” at the right edge of the screen.

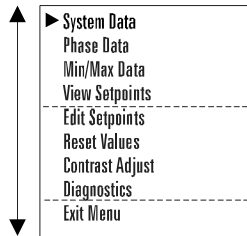


Figure 4.2 Main Menu

Keep in mind that the *values* displayed under several menu items depend on whether the system being monitored is 3 or 4 wire, and require that the appropriate configuration be selected under the Edit Setpoints menu. Menu descriptions cover both 3 and 4 wire systems where appropriate.

Note: the lagging or leading indicator and any signs may be the opposite of that shown in the sample screens.

4.6 SYSTEM DATA DISPLAY MODE

The System Data menu provides access to System information monitored by the IQ 200.

Press *Menu* to display the list of available items.

Position the selection arrow next to the System Data *menu* item and press *Enter*. The screens shown in figure 4.3 display as the *Scroll* down arrow is pressed.

4.6.1 3 Wire System and 4 Wire System

System Data screens, figure 4.3, are the same for 3 and 4 wire systems.

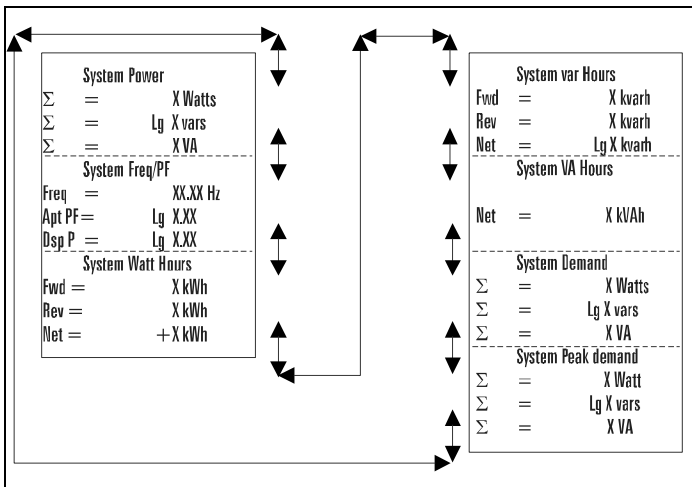


Figure 4.3 System Display 3 and 4 Wire Systems

4.7 PHASE DATA DISPLAY MODE

The Phase Data menu provides access to all Phase information monitored by the IQ 200.

Press *Menu* to display the list of available items.

Position the selection arrow next to the Phase Data menu item and press *Enter*.

4.7.1 3 Wire System

The *four* screens shown in figure 4.4 display as the *Scroll* down arrow is pressed.

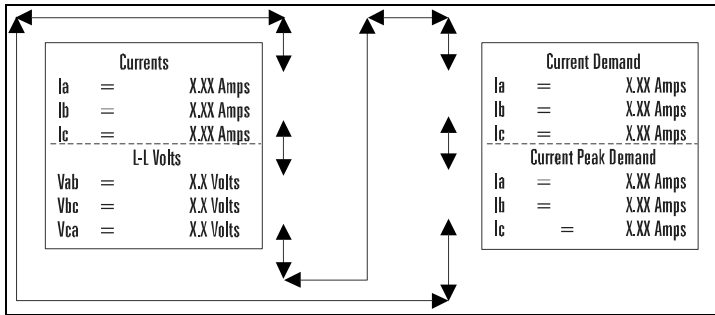


Figure 4.4 Phase Display 3 Wire Systems

4.7.2 4 Wire System

The 10 screens shown in figure 4.5 display as the *Scroll* down arrow is pressed.

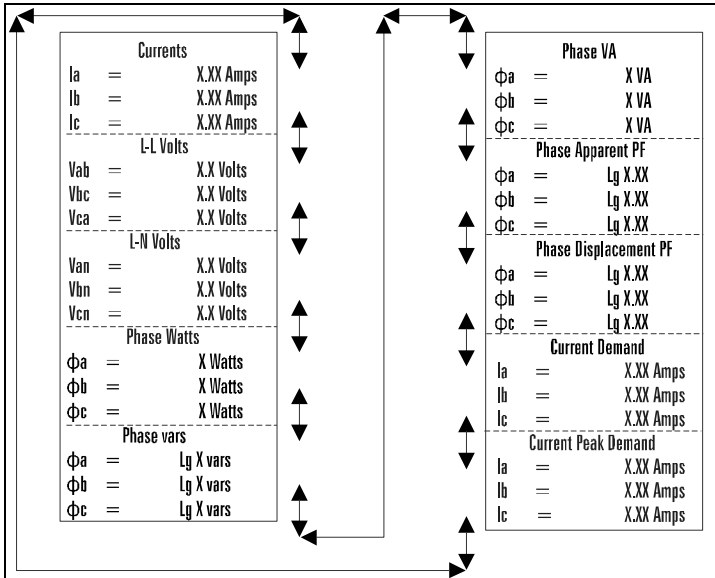


Figure 4.5 Phase Display 4 Wire Systems

4.8 MIN/MAX DATA DISPLAY MODE

4.8.1 3 Wire System

These screens, shown in figure 4.6, display the minimums and maximums of values monitored by the IQ 200.

Press *Menu* to display the list of available items.

Position the selection arrow next to Min/Max Data and press *Enter*.

The *ten screens* shown below display as the *Scroll* down arrow is pressed.

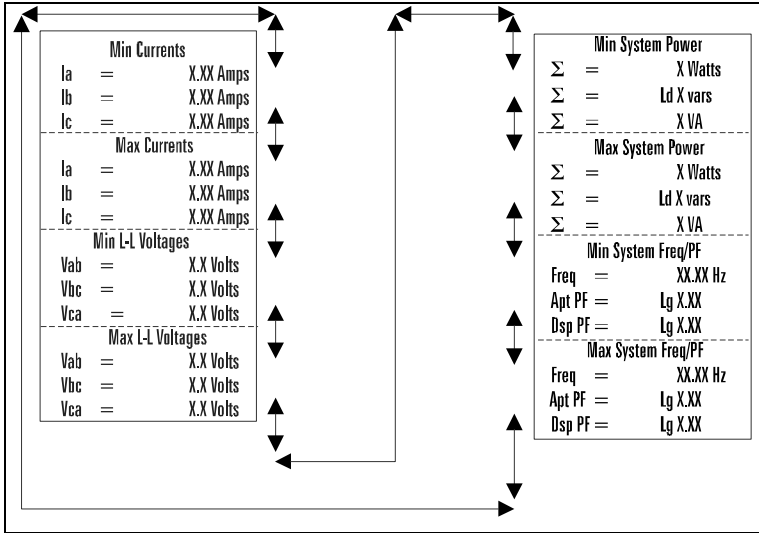


Figure 4.6 Min/Max Data Display, 3 Wire System

4.8.2 4 Wire System

These screens, shown in figure 4.7, display the minimums and maximums of values monitored by the IQ 200.

Press *Menu* to display the list of available items.

Position the selection arrow next to Min/Max Data and press *Enter*.

The *10 screens* shown below display as the *Scroll* down arrow is pressed.

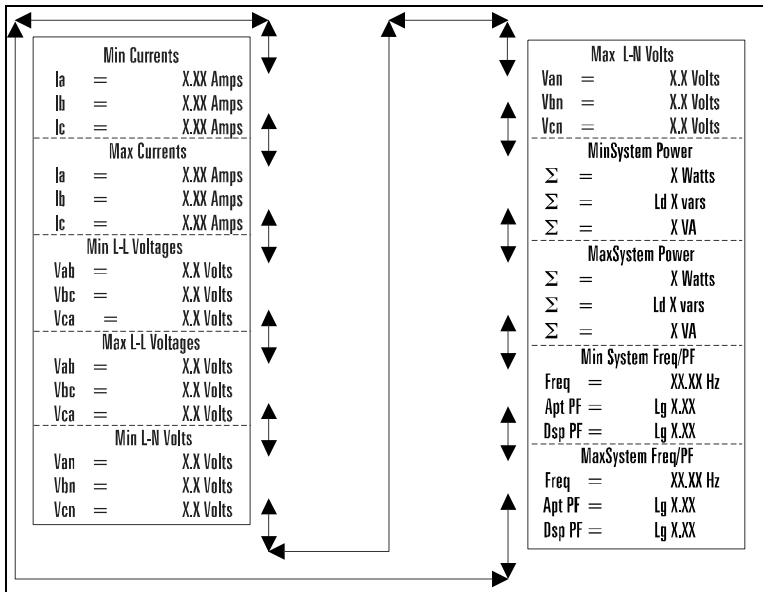


Figure 4.7 Min/Max Data Display, 4 Wire System

4.9 VIEW SETPOINTS (3 and 4 wire systems)

This *menu* selection permits the user to *view* but *not change* all of the IQ 200 setpoints and system parameters. To *change* these values, proceed to *section 4.10 Edit Setpoints*.

Press *Menu* to display the list of available items.

Position the selection arrow next to View Setpoints and press *Enter*.

The following screens display:

4.9.1 View All

This *menu* item displays all of the setpoints described in *sections 4.9.2 through 4.9.10*. To view only one setpoint, follow the steps under the appropriate section. Selecting the View All *menu* item displays the *10 screens* shown below as the *Enter* button is pressed.

Position the selection arrow next to View All and press *Enter*.

4.9.2 Password Setup

Position the selection arrow next to Password Setup and press *Enter*. One of two screens will display.

One screen, figure 4.7, indicates that *no password* is necessary to change the IQ 200 setpoints or system parameters. The other screen, figure 4.8, indicates that *a password is required* to change setpoints or system parameters.

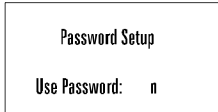


Figure 4.8 No Password Required

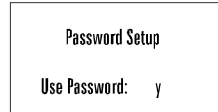


Figure 4.9 Password Required

4.9.3 INCOM™ Setup

Position the selection arrow next to INCOM™ Setup and press *Enter*.

This screen, shown in figure 4.10, indicates the baud rate at which the IQ 200 will communicate over the INCOM™ network, and indicates the network address (in hexadecimal) assigned to the IQ 200. The baud rate and the address must be set to the values required by the INCOM™ network for network communication to occur.

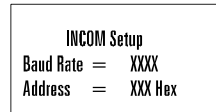


Figure 4.10 INCOM™ Setup

4.9.4 System Frequency

Position the selection arrow next to System Frequency and press *Enter*.

This screen, shown in figure 4.11, indicates the frequency selected as the frequency of the system being monitored. The screen will display *either* 50 Hz or 60 Hz. If the frequency displayed is *not* correct, proceed to *section 4.10 Edit Setpoints*.

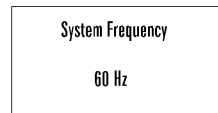


Figure 4.11 System Frequency

4.9.5 Wiring Configuration

Position the selection arrow next to Wiring Configuration and press *Enter*.

This screen, shown in figure 4.12, indicates the wiring configuration selected as the configuration of the system being monitored. The screen will display *either* 3 Wire or 4 Wire. If the wiring configuration displayed is *not* correct, proceed to *section 4.10 Edit Setpoints*.

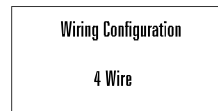


Figure 4.12 Wiring Configuration

4.9.6 CT Ratio

Position the selection arrow next to CT Ratio and press *Enter*.

This screen, shown in figure 4.13, indicates the current transformer ratio selected as the ratio of the current transformers being used with the IQ 200. If the ratio displayed is *not* correct, proceed to *section 4.10 Edit Setpoints*.

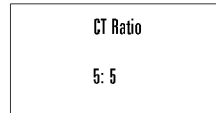


Figure 4.13 CT Ratio

4.9.7 PT Ratio

Position the selection arrow next to PT Ratio and press *Enter*.

This screen, shown in figure 4.14, indicates the potential transformer ratio selected as the ratio of the potential transformers being used with the IQ 200. If the ratio displayed is *not* correct, proceed to *section 4.10 Edit Setpoints*.

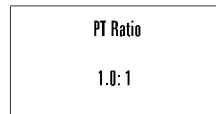


Figure 4.14 PT Ratio

4.9.8 Demand Window

Position the selection arrow next to Demand Window and press *Enter*.

This screen, shown in figure 4.15, indicates the time window over which demand parameters are measured. If the time displayed is *not* correct, proceed to *section 4.10 Edit Setpoints*.

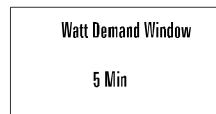


Figure 4.15 Demand Window

4.9.9 KYZ Setup

Position the selection arrow next to KYZ Setup and press *Enter*.

This screen, shown in figure 4.16, indicates the system value which the IQ 200 will monitor, or Track. It also indicates the *energy per pulse* Rate over which energy demand (consumption) is measured. If the values displayed are *not* correct, proceed to *section 4.10 Edit Setpoints*.

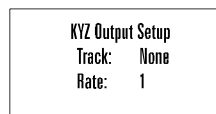


Figure 4.16 KYZ Setup

4.9.10 Exit

Pressing *Enter* when this menu item is selected returns the display to the main menu.