

SECTION 6: PROGRAMMING

6-1 Introduction



CAUTION

SELECTED OR ALTERED SETTINGS ARE NOT SAVED UNTIL “ENTER” IS PRESSED. THE F4 FUNCTION PUSHBUTTON ACTS AS THE ENTER BUTTON AND IS IDENTIFIED AS SUCH ON THE APPROPRIATE SCREENS. SETTINGS ARE NOT PERMANENTLY SAVED IN EEPROM UNTIL THE EXIT OF PROGRAM MODE. THE SAVE PROCESS OCCURS IN THE BACKGROUND AND MAY TAKE AS LONG AS 20 SECONDS.

The IQ Analyzer is fully programmable from the device’s faceplate or through the communications port. Programming is password protected whether the programming function is being performed directly from the faceplate or through a remotely located computer.

To simplify programming, settings are organized by category. Categories not pertinent to the application at hand may be ignored. Categories are selected by the F1-F4 Function Pushbuttons. These four pushbuttons take on their own unique identity in the Program Mode as indicated directly above each pushbutton in the IQ Analyzer display window. In addition, immediate programming assistance is available through the use of the Help Pushbutton and associated Help Screens. Refer to Paragraph 3-4 for more information about the F1-F4 Function and Help Pushbuttons (Figure 2-1).

The complete programming function is comprised of a number of programming screens for 10 different programming categories (Table 6.1).

Programming within each individual category follows a screen hierarchy (screens tree) starting with the top level screen in the hierarchy (Level 1) and proceeding down through the remaining screens. The number of different screens or levels in the hierarchy depends upon the specific category being programmed.

The rest of this section presents the programming function by:

1. Discussing the general requirements and steps associated with programming, no matter which category is being programmed. In many instances, this is all the information that will be required to perform a number of programming steps. Refer to paragraph 6-2 entitled “Common Programming Procedures.”

2. Taking the operator through a programming example. The example will cover most of the situations encountered during programming. Refer to paragraph 6-3 entitled “Programming Example.”
3. Outlining the specifics within each programming category in terms of its own specific screen hierarchy (screens tree). Although programming within different categories is similar, the specific fields encountered in each category are presented. This will prepare the operator for the types of information that will be necessary to program any or all categories. Refer to paragraph 6-4 entitled “Programming Categories.”

NOTICE

If more detailed information is needed about a specific programming category before actually beginning the programming process, refer to paragraph 5-4 entitled “Programming Mode” for a more in depth discussion of what each category is and what it offers.

6-2 Common Programming Procedures

Once the operator becomes familiar with the operator panel and the logical sequence of repetitive steps associated with programming, the IQ Analyzer can be programmed quickly and easily (Figure 2-1 and Section 3).

Table 6.1 Programming Categories

Categories	References	
	Paragraph	Figure
General Setup	5-5	6-4
Analog Input Settings	5-6.2	6-5
Analog Output Settings	5-6.3	6-6
Discrete Input Settings	5-6.1	6-7
Event Trigger Settings	5-7.2	6-8
Relay Output Settings	5-6.4	6-9
Demand Settings	5-7.4	6-10
Display Manager	5-2.3	6-11
Trend Settings	5-11.3	6-12
Time of Use Settings	5-13.2	6-13

6-2.1 Entering Program Mode

The Program Mode can be entered at any time the IQ Analyzer is in operation by pressing the Program Pushbutton. At the top of the unit, the Program LED will be continuous red and the Normal LED blinking green. The top level program screen will be displayed (Figure 6-1). The active parameter in the display blinks while other parameters are constant. Just as with other mode screens, the operator is required to make Program Mode decisions as instructed by the active menu driven display.

6-2.2 Password Entry

The initial top level screen, which is a “go” or “no go” screen, includes the software version, time/date of last programming and password entry fields (Figure 6-1). The correct password must be entered to proceed beyond this point. The password entry field contains five digits that can be changed. Default passwords **10000** or **44444** can be used on initial powerup and until a new password is programmed by the user. Establishing a new password is accomplished in the General Setup portion of programming (Figure 6-4). The F1-F4 Pushbuttons have their specific functions for this screen defined directly above in the IQ Analyzer display (Table 6.2). If the correct password is not entered, the IQ Analyzer automatically exits the Program Mode and returns to the Meter Menu. If the correct password is entered, the IQ Analyzer moves to the next sequential screen and programming can continue. The next two screens (Program Mode Top Level Menu) display the eight available programming categories previously outlined in Table 6.1 and discussed in paragraph 6-4.

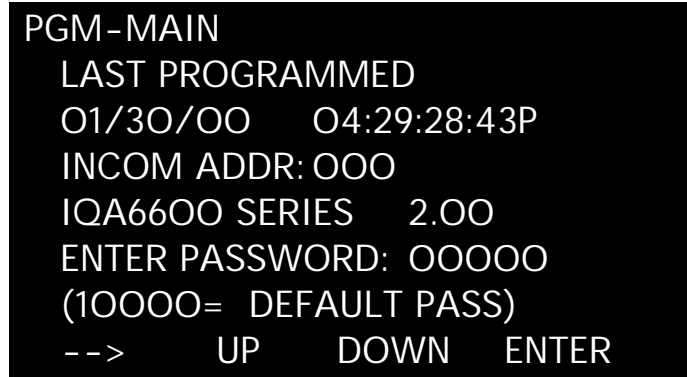


Figure 6-1. Top Level Screen Showing Password Entry Field


6-2.3 View Only Password

If the five digit password entered is all zeros, viewing of all existing (previously programmed) programming category setpoints is permitted. An asterisk (*) appears next to all previously chosen settings to clearly indicate how the unit is presently programmed. Existing setpoints cannot, however, be altered with the all zero password entered into the password field. In addition, the “View Only” message flashes in the display to remind the user that any changes made will not be saved.

6-2.4 Movement to Previous Levels

During programming, use of the Previous Level Pushbutton moves the display back one level at a time. Use of the Home Pushbutton moves the display all the way back to the Program Mode Top Level Menu, no matter where the operator is in the programming process.

Table 6.2 F1-F4 Pushbutton Functions During Password Entry

Display		UP	Down	Enter
Function Pushbutton	F1	F2	F3	F4
Defined Function	Makes Next Digit to Right Active (Blinking) Digit	Increases Blinking Digit	Decreases Blinking Digit	Enters Password

NOTICE

Care should be exercised not to inadvertently exit Programming by pressing Previous Level one too many times.

6-2.5 Exiting Program Mode

The Program Mode is exited in five different ways:

1. Press and release Program Pushbutton.
2. Press and release Reset Pushbutton.
3. Press and release Home or Previous Level Pushbuttons while in top level program screen.
4. Enter incorrect password in Program Mode top level screen and return automatically to Main Meter Menu.
5. Perform no programming activity for a user defined timeout period and return automatically to Main Meter Menu. The default timeout period is 15 minutes.

6-3 PROGRAMMING EXAMPLE

The programming example will take the operator through steps in several programming categories. It is intended to familiarize the operator with pushbutton operation and the types of screens encountered during programming. The example is presented as a Flow Chart with Supporting Screens (Figure 6-2). Since IQ Analyzer programming is a simple and logical sequence of repetitive steps, the Flow Chart Example, in many instances, provides enough familiarity to begin actual programming. If after completing the programming example the operator feels more information is required to be at an acceptable comfort level, additional programming details are offered in paragraph 6-4 entitled "Programming Categories."

To Facilitate Programming:

- Gather all necessary data to fill in the "Startup Settings Sheets" (Appendix A) ahead of time.
- Review the material presented in Paragraph 6-2 entitled "Common Programming Procedures."
- If necessary, review the setting possibilities for individual programming categories presented in Appendix A.

For this example, parameters in the General Setup (Figure 6-4), Discrete Inputs (Figure 6-7), Event

Triggers (Figure 6-8) and Relay Outputs (Figure 6-9) Categories will be programmed. The example will begin by entering the Program Mode from the Main Meter Menu and exit back to the Main Meter Menu upon completion.

Programming Reminders:

1. Using the Enter Pushbutton enters (programs) a parameter and returns the display to the most recent previous level where programming can continue.
2. The Previous Level Pushbutton is used to move back one screen at a time. Remember, this pushbutton will exit programming once at the top level of the Program Mode.
3. Depending upon the function being performed at a given time, the F1-F4 Function Pushbuttons will have one of two sets of definitions (Table 6.3).
4. A blinking parameter indicates which parameter is active for a decision. The decision will be to accept the blinking parameter, change the blinking parameter or establish a new active (blinking) parameter.
5. A screen's top line description indicates which screen in the programming screens trees is being viewed.
6. An asterisk (*) appears next to a chosen setting to clearly indicate what is presently programmed.

NOTICE

Before programming an IQ Analyzer, review Potential Transformer in the glossary, whether or not the system uses potential transformers.

6-3.1 Programming Example Input

This example will show how to set up an IQ Analyzer to:

- Meter a typical load on a 480 volt, 3 phase 3 wire (ABC phase rotation), 60 hertz system with 1200/5 CTs, 50/5 ground CTs and no PTs.

NOTICE

If there are no PTs, the PT ratio must be programmed as 120:120, a ratio of unity.

- Record an event of 10% or more %THD (Total Harmonic Distortion) on phase A with a 2 second time delay
- Activate a relay to shed a peak demand of 1000A.

Excerpts from the Startup Settings Sheets (Appendix A) showing the data necessary for programming the IQ Analyzer for this application example are shown in Table 6.4.

6-4 Programming Categories

Once a password has been accepted, the IQ Analyzer advances automatically to the next level displaying the Program Mode Top Level Menu (Figure 6-3). Keep in mind that the Help Pushbutton is functional in the Program Mode.

Programming Categories are presented as a series of Screens Trees which identify all the available


programming selections within each programming category (Paragraph 6-4.2 and Figures 6-4 through 6-11). Some of the Screens Trees are simple with only one level of selections, while other trees cover as high as five levels of selections. The most important aspect to understand about Screens Trees during programming is - they only differ in size. The category with the largest Screens Tree is programmed in exactly the same manner as the category with the smallest Screens Tree.

Any programming category not applicable to a particular application can be easily by-passed. Advancing past all of the programming categories will return the display back to the first category.

6-4.1 Use of F1-F4 Pushbuttons

The F1-F4 Function Pushbuttons are the key tools to the programming process. Their exact functions during programming are always identified directly above in the

Table 6.3 F1-F4 Pushbutton Functions During Programming

Display 1 Entering a Setpoint Value					
Display	UP	UP	Down	PGDN®	Top
Function Pushbutton	F1	F2	F3	F4	F4
Defined Function	Select a Blinking Parameter	Moves Up List of Previous Parameters	Moves Down List of Additional Parameters	Moves To Next Screen of Parameters	Top Moves Back to Previous Screen
Display 2 Parameter Selection					
Display		UP	Down	Enter	
Function Pushbutton	F1	F2	F3	F4	
Defined Function	Makes Next Digit to Right Active (Blinking) Digit	Increases Blinking Digit	Decreases Blinking Digit	Enters Password	

① “PGDN” will appear in the display only if there are too many parameters for one screen. “PGDN” will move directly to the next screen to eliminate the need for stepping through individual displayed parameters.

- Note:**
1. F1, F2 and F3 pushbuttons will continuously wrap around if held depressed.
 2. Sometimes the F1 or F2 pushbuttons are not defined in the display. This only means they have no function for that particular screen, and do nothing if pushed and released.

IQ Analyzer display and direct the operator’s actions. The four pushbuttons as a group can have two different defined functions during this process (Table 6.3). The first defined function for pushbuttons F1-F4 is parameter selection from a list of parameters. The second defined function for pushbuttons F1-F4 is the entering of a specific setpoint value. If a particular Function Pushbutton is not defined in the display, it only means that particular pushbutton has no function for that screen.

6-4.2 Programming Category Screens Trees

Each programming category takes the form of a screens tree (screen hierarchy) with a number of different descending levels and selections. Use of the F1-F4 pushbuttons as defined in the display moves the operator through the selected category tree and programmable parameters. Figures 6-4 through 6-11 show the actual screens tree for each of the eight programming categories.

Parameters of the same level are displayed at the same time, although it may take more than one screen to display one entire level of parameters. For example, all Level 1 parameters appear at the same time and a selection is made from all the displayed Level 1 parameters. Level 2 parameters are displayed next followed by Level 3.

To ensure there is a complete understanding of the Screens Tree concept, additional details are offered in the next paragraph (6-4.3).

6-4.3 Screens Tree Details

Appendix A highlights the available setpoint selections. This information is helpful in three respects:

1. It further defines the Screens Trees shown in Figures 6-4 through 6-11.
2. It assists with completing the “Startup Settings Sheets” of Appendix A.
3. The entire programming process is facilitated when exact programming information is collected and recorded on the “Startup Settings Sheets” prior to actually programming the IQ Analyzer.

Table 6.4 Startup Settings Sheets Excerpts

Programming Example Setpoints	Programming Category Display	Selected Setpoints
General Setup Setpoints (Figure 6-4)		
1	Choose Type of System	3 phase/3 wire
2	Phase Rotation	ABC Phase Rotation
3	Choose Frequency	60Hz
4	Set Incoming L-L Voltage	480 Volts
5	Set PT Primary Rating	120:120
6	Set CT Primary Rating	1200A:5
7	Communication Mode	IQA6400/6600
Discrete Inputs Setpoints (Figure 6-7)		
1	Discrete Inputs	Sync. Input
Event Triggers Setpoints (Figure 6-8)		
1	% THD	IA
2	Trigger Threshold	10%
3	Delay Time	2 seconds
Relay Outputs Setpoints (Figure 6-9)		
1	Demand Amps	1000A

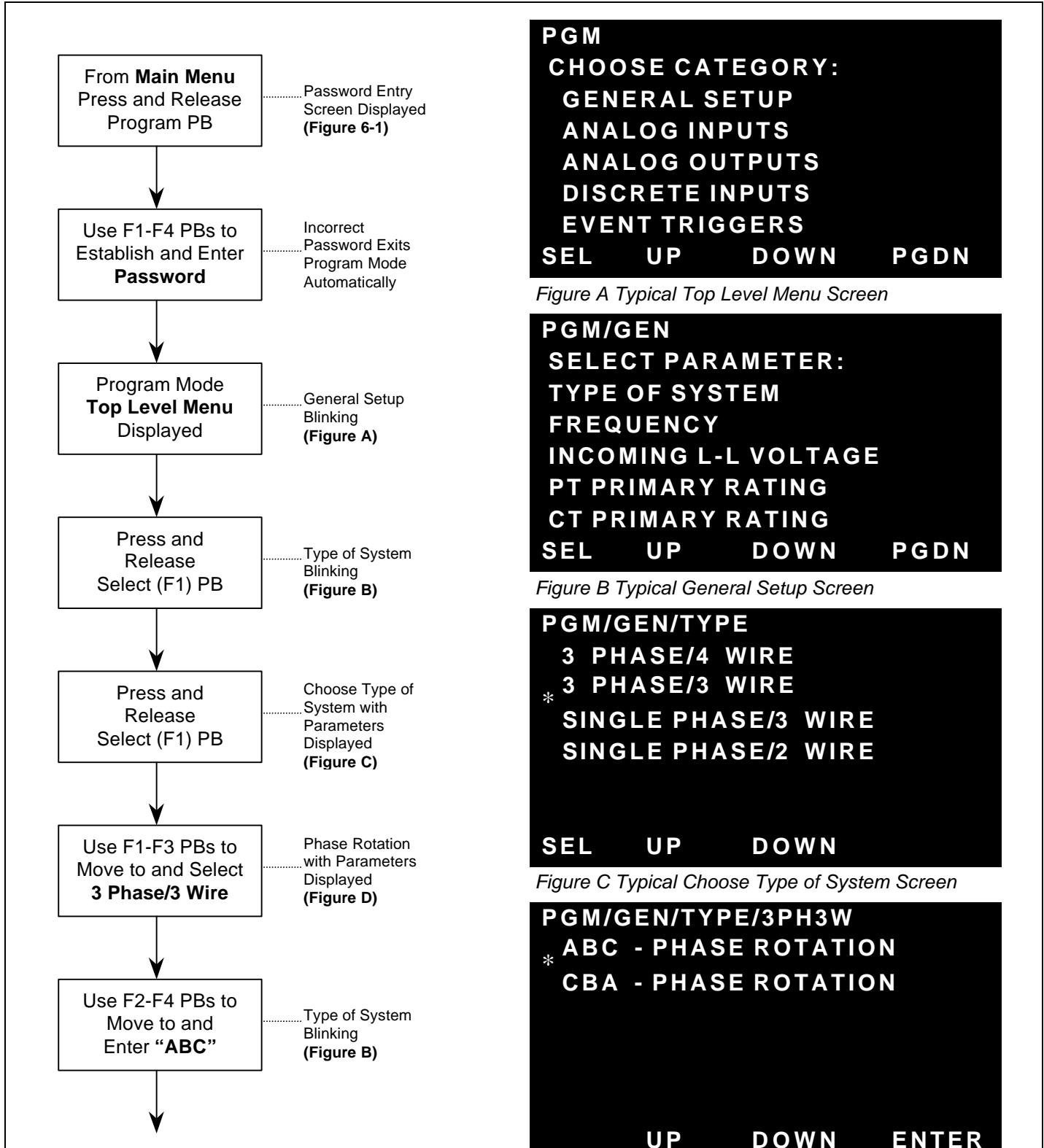


Figure 6-2. Programming Example Flow Chart

Figure D Typical Phase Rotation Screen

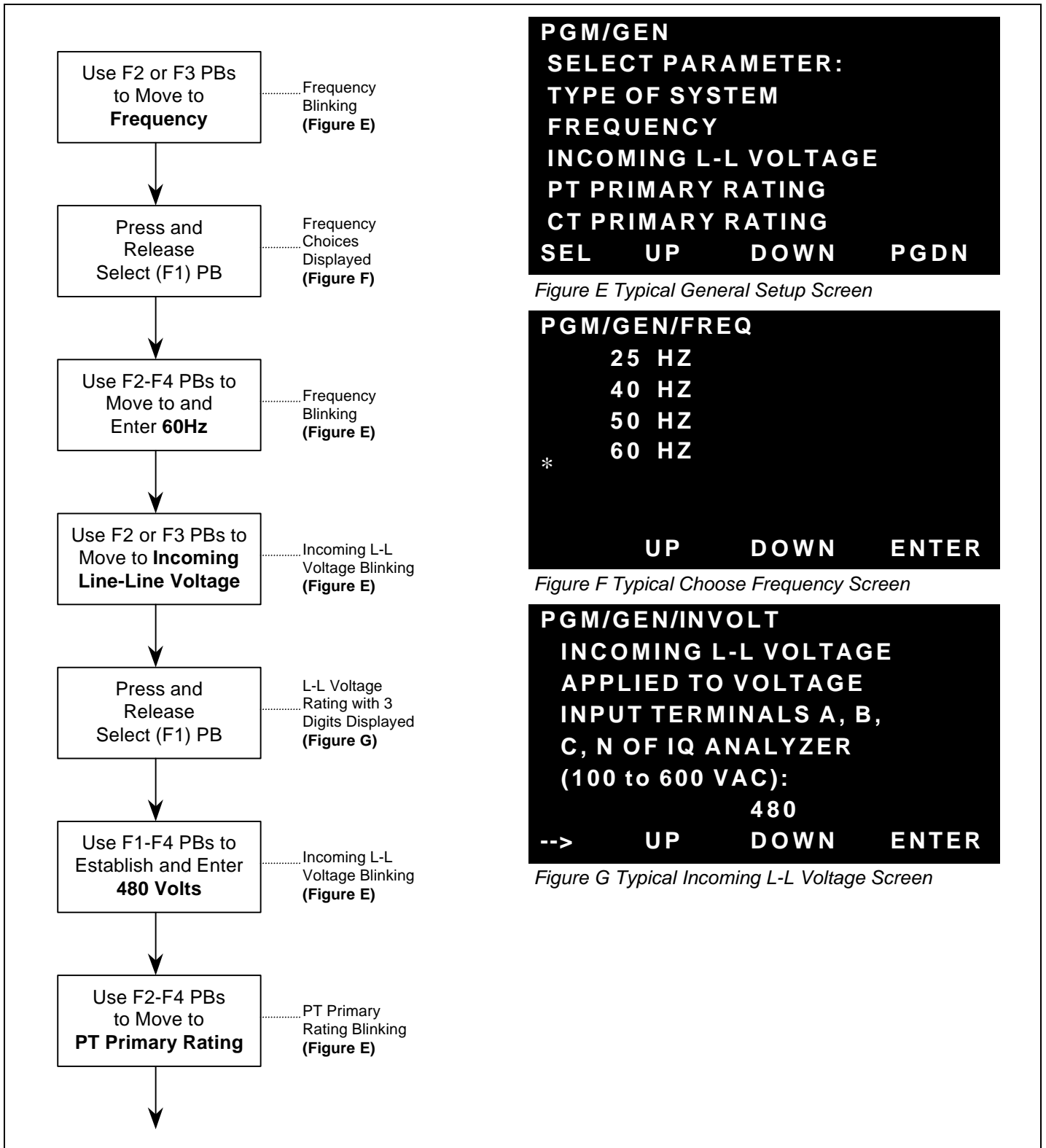


Figure 6-2. Programming Example Flow Chart (continued from previous page)

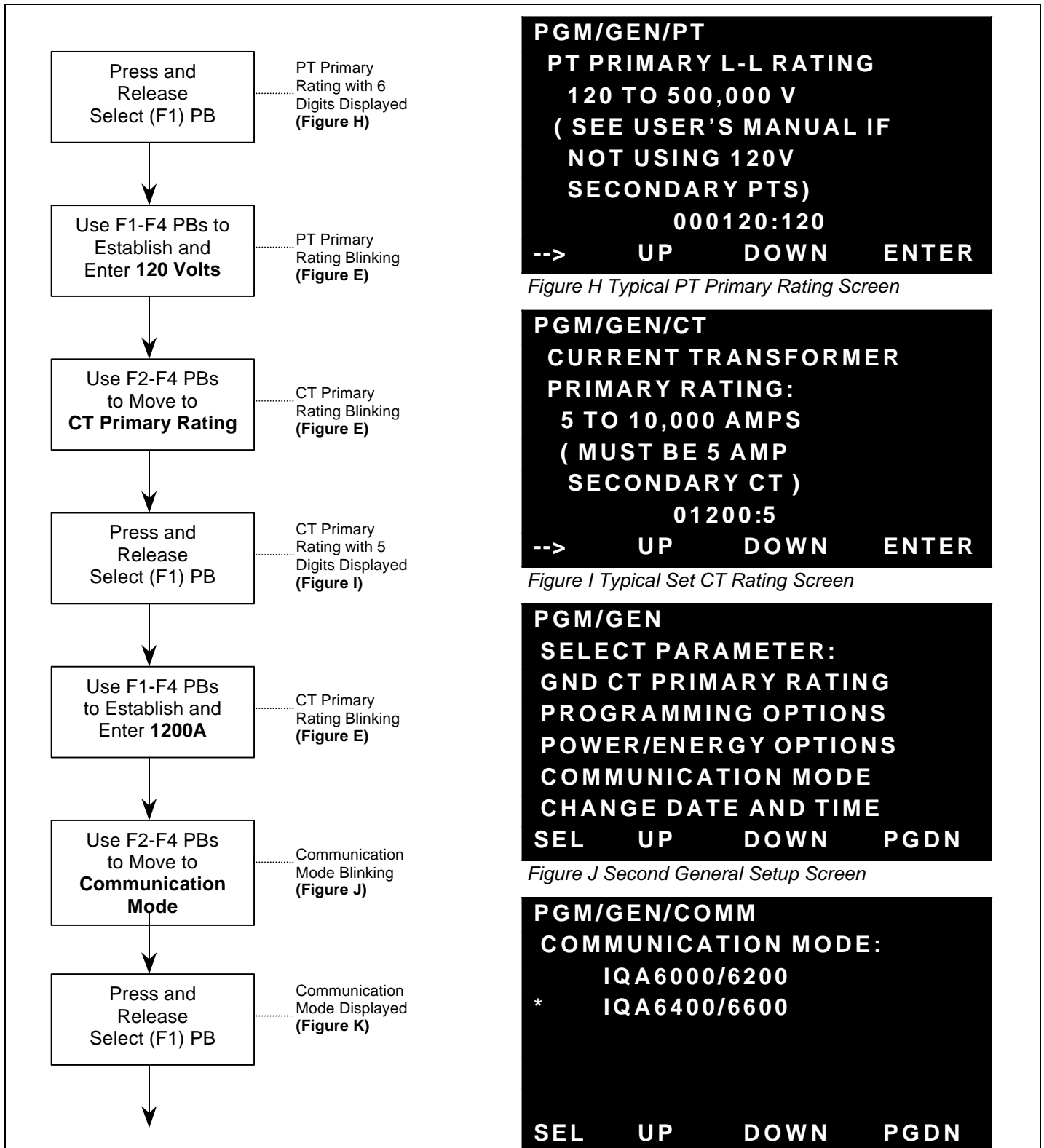


Figure 6-2. Programming Example Flow Chart (continued from previous page)

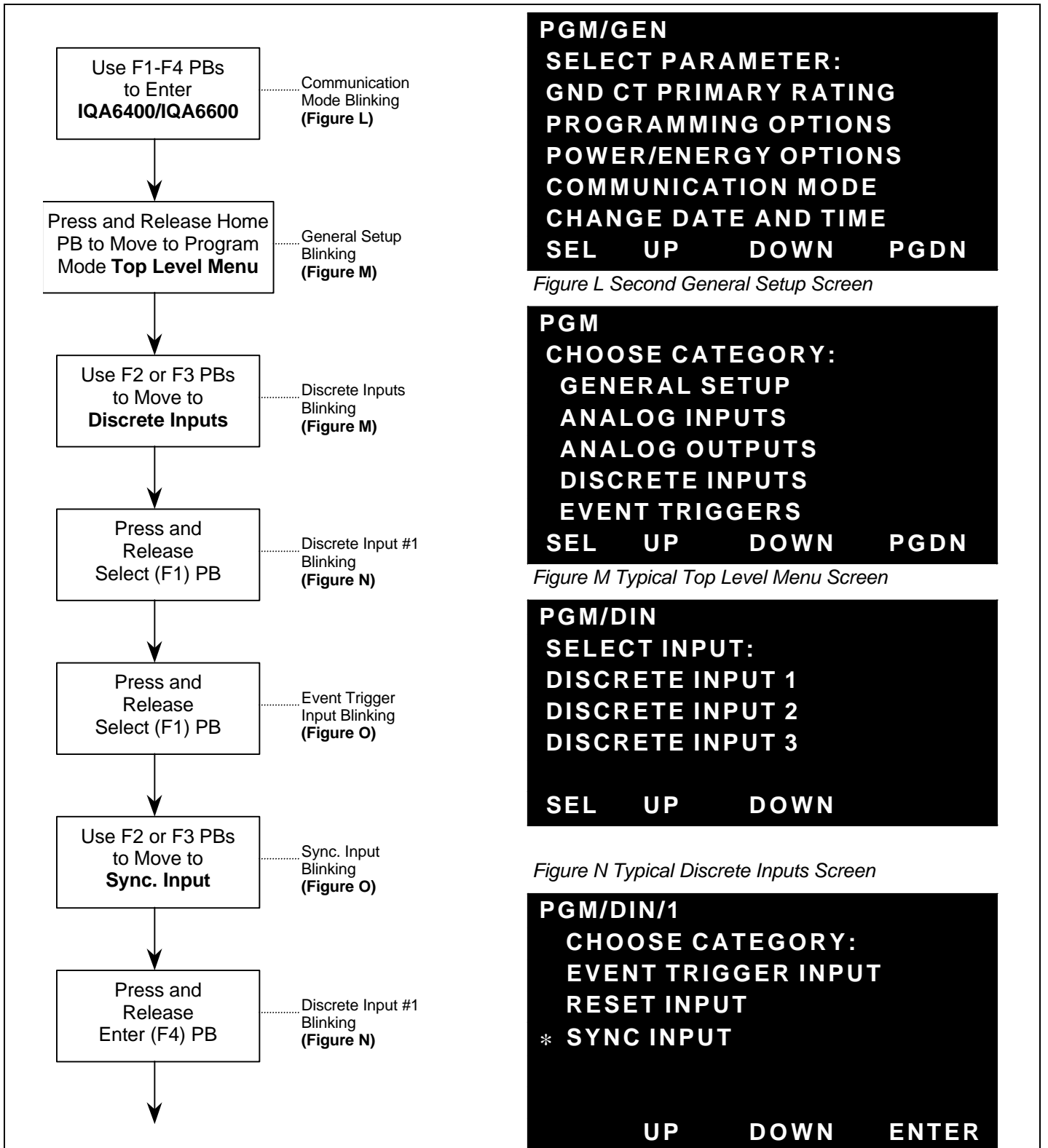
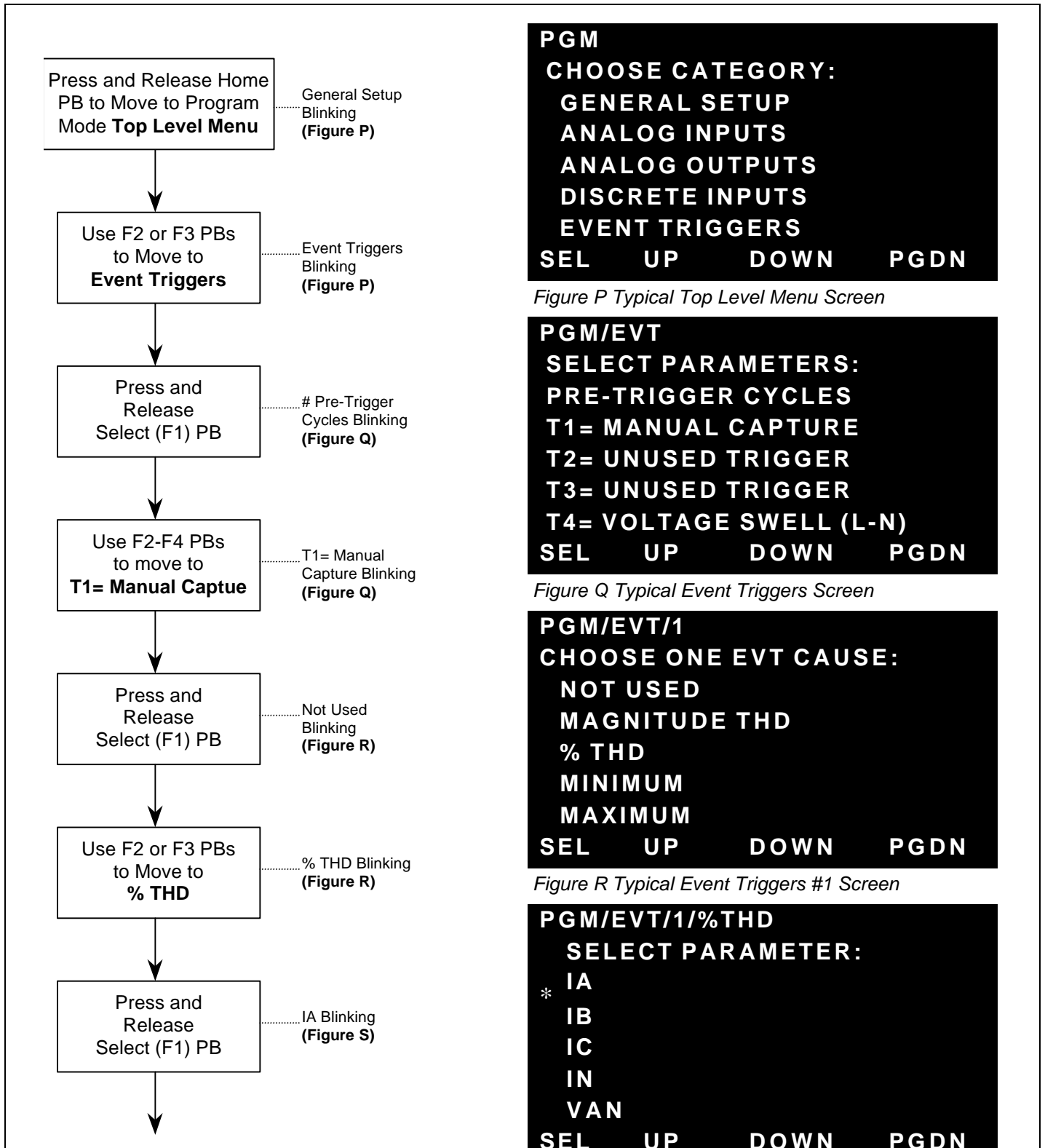


Figure 6-2. Programming Example Flow Chart (continued from previous page) Discrete Input #1 Screen



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PGM
CHOOSE CATEGORY:
GENERAL SETUP
ANALOG INPUTS
ANALOG OUTPUTS
DISCRETE INPUTS
EVENT TRIGGERS
SEL  UP  DOWN  PGDN
  
```

Figure P Typical Top Level Menu Screen

```

PGM/EVT
SELECT PARAMETERS:
PRE-TRIGGER CYCLES
T1= MANUAL CAPTURE
T2= UNUSED TRIGGER
T3= UNUSED TRIGGER
T4= VOLTAGE SWELL (L-N)
SEL  UP  DOWN  PGDN
  
```

Figure Q Typical Event Triggers Screen

```

PGM/EVT/1
CHOOSE ONE EVT CAUSE:
NOT USED
MAGNITUDE THD
% THD
MINIMUM
MAXIMUM
SEL  UP  DOWN  PGDN
  
```

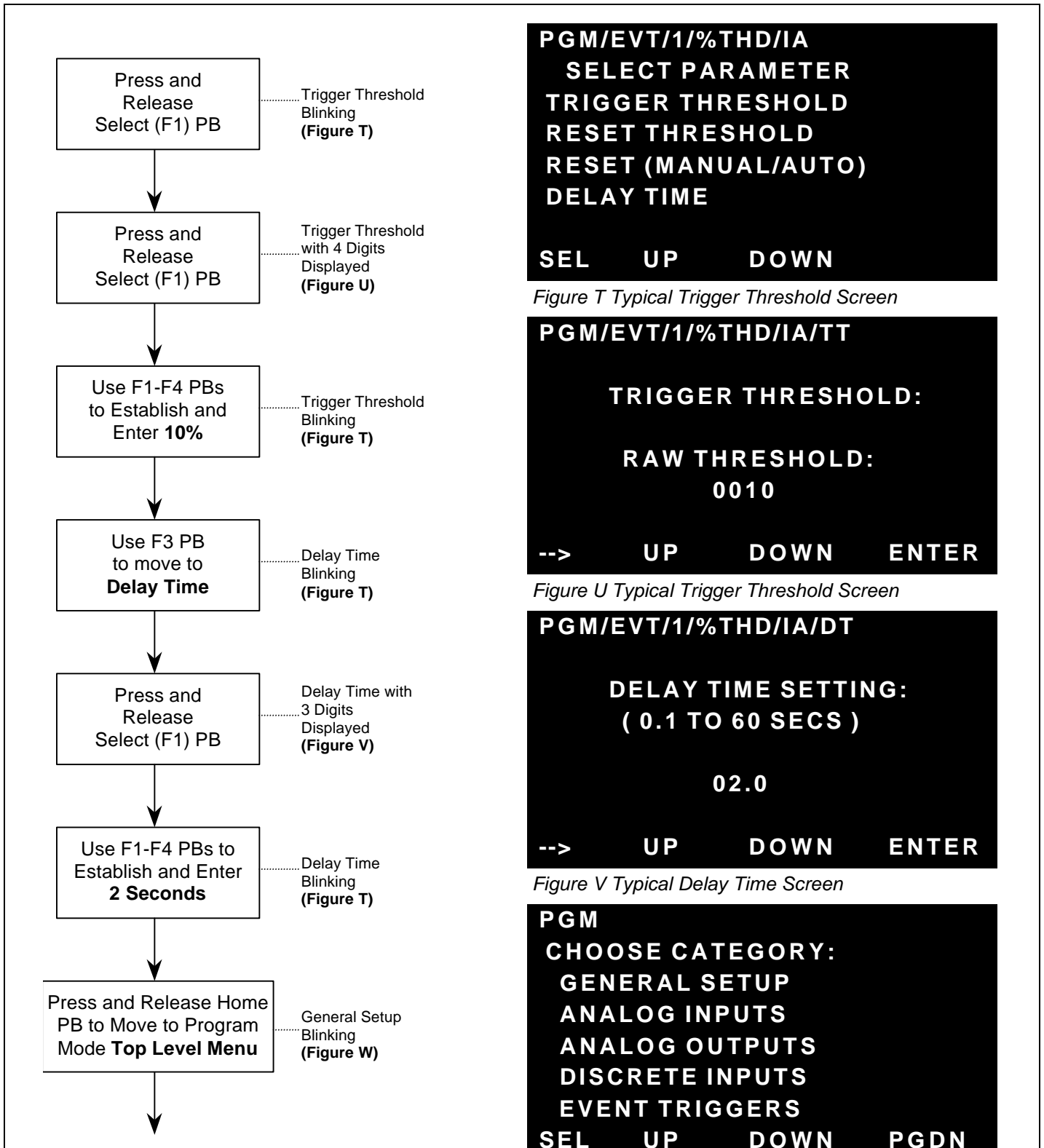
Figure R Typical Event Triggers #1 Screen

```

PGM/EVT/1/%THD
SELECT PARAMETER:
* IA
  IB
  IC
  IN
  VAN
SEL  UP  DOWN  PGDN
  
```

Figure S Typical % THD Screen

Figure 6-2. Programming Example Flow Chart (continued from previous page)



```

    PGM/EVT/1/%THD/IA
    SELECT PARAMETER
    TRIGGER THRESHOLD
    RESET THRESHOLD
    RESET (MANUAL/AUTO)
    DELAY TIME

    SEL    UP    DOWN
  
```

Figure T Typical Trigger Threshold Screen

```

    PGM/EVT/1/%THD/IA/TT
    TRIGGER THRESHOLD:

    RAW THRESHOLD:
    0010

    -->    UP    DOWN    ENTER
  
```

Figure U Typical Trigger Threshold Screen

```

    PGM/EVT/1/%THD/IA/DT
    DELAY TIME SETTING:
    ( 0.1 TO 60 SECS )

    02.0

    -->    UP    DOWN    ENTER
  
```

Figure V Typical Delay Time Screen

```

    PGM
    CHOOSE CATEGORY:
    GENERAL SETUP
    ANALOG INPUTS
    ANALOG OUTPUTS
    DISCRETE INPUTS
    EVENT TRIGGERS

    SEL    UP    DOWN    PGDN
  
```

Figure W Typical Top Level Menu Screen

Figure 6-2. Programming Example Flow Chart (continued from previous page)

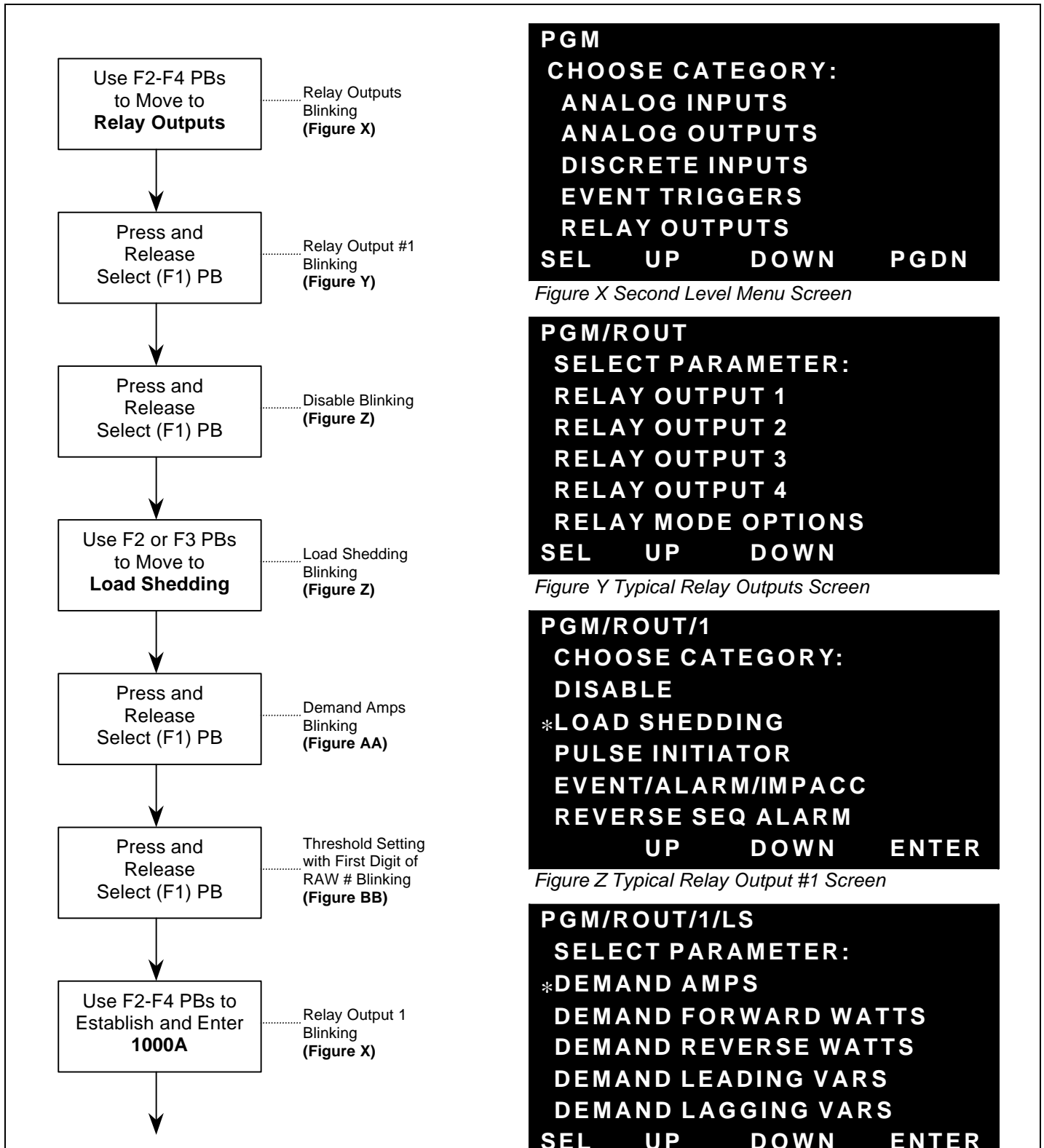


Figure 6-2. Programming Example Flow Chart (continued from previous page)

Figure AA Typical Load Shedding Screen

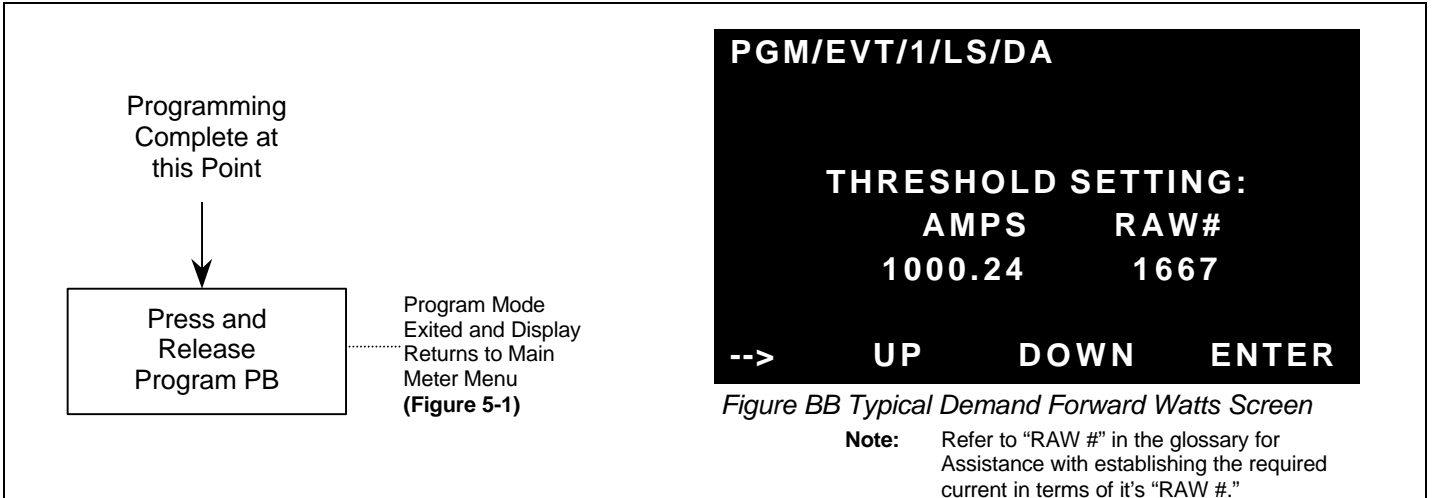


Figure 6-2 Programming Example Flow Chart (continued from previous page)

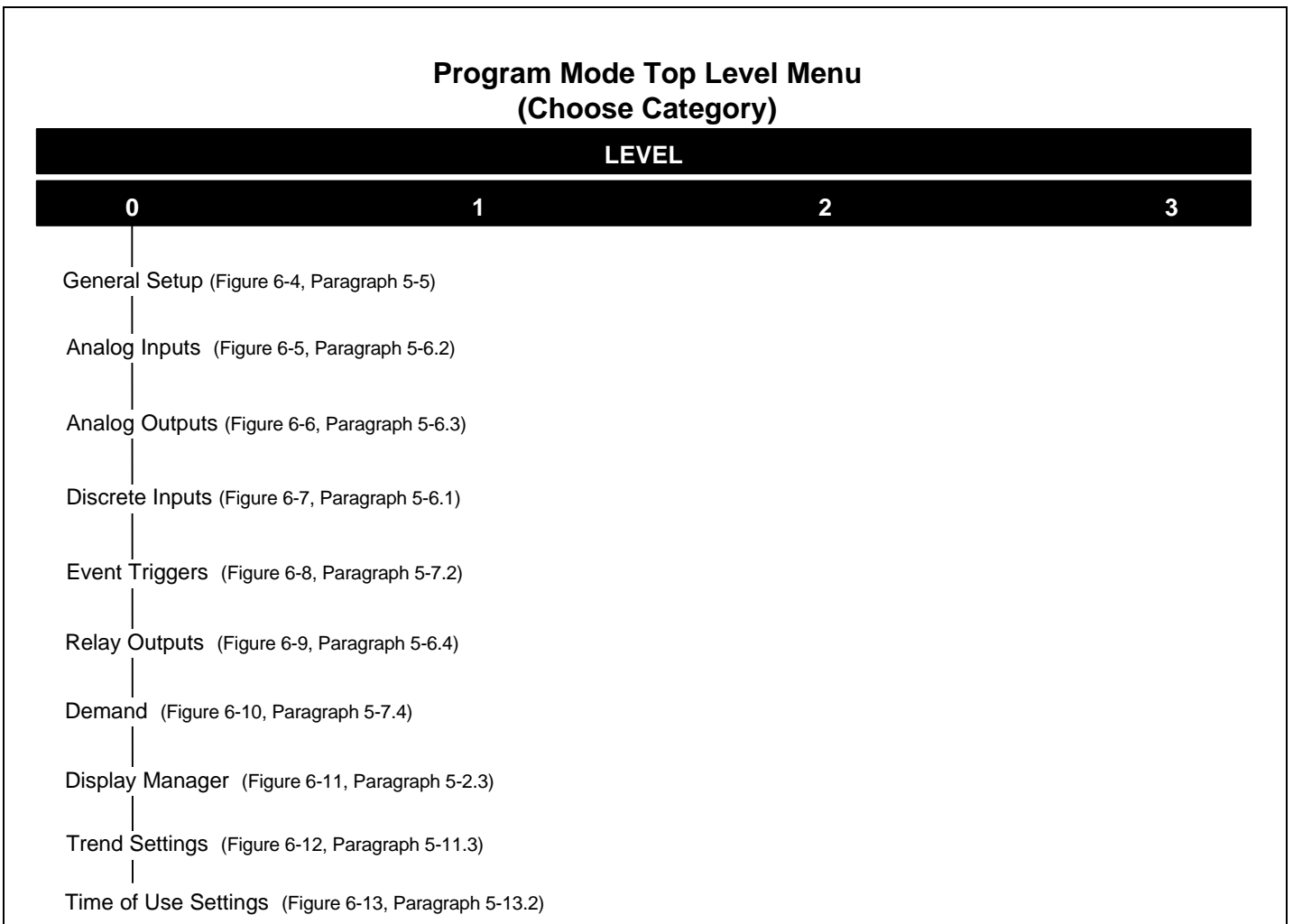


Figure 6-3. Programming Mode Top Level Menu (Choose Category)

General Setup

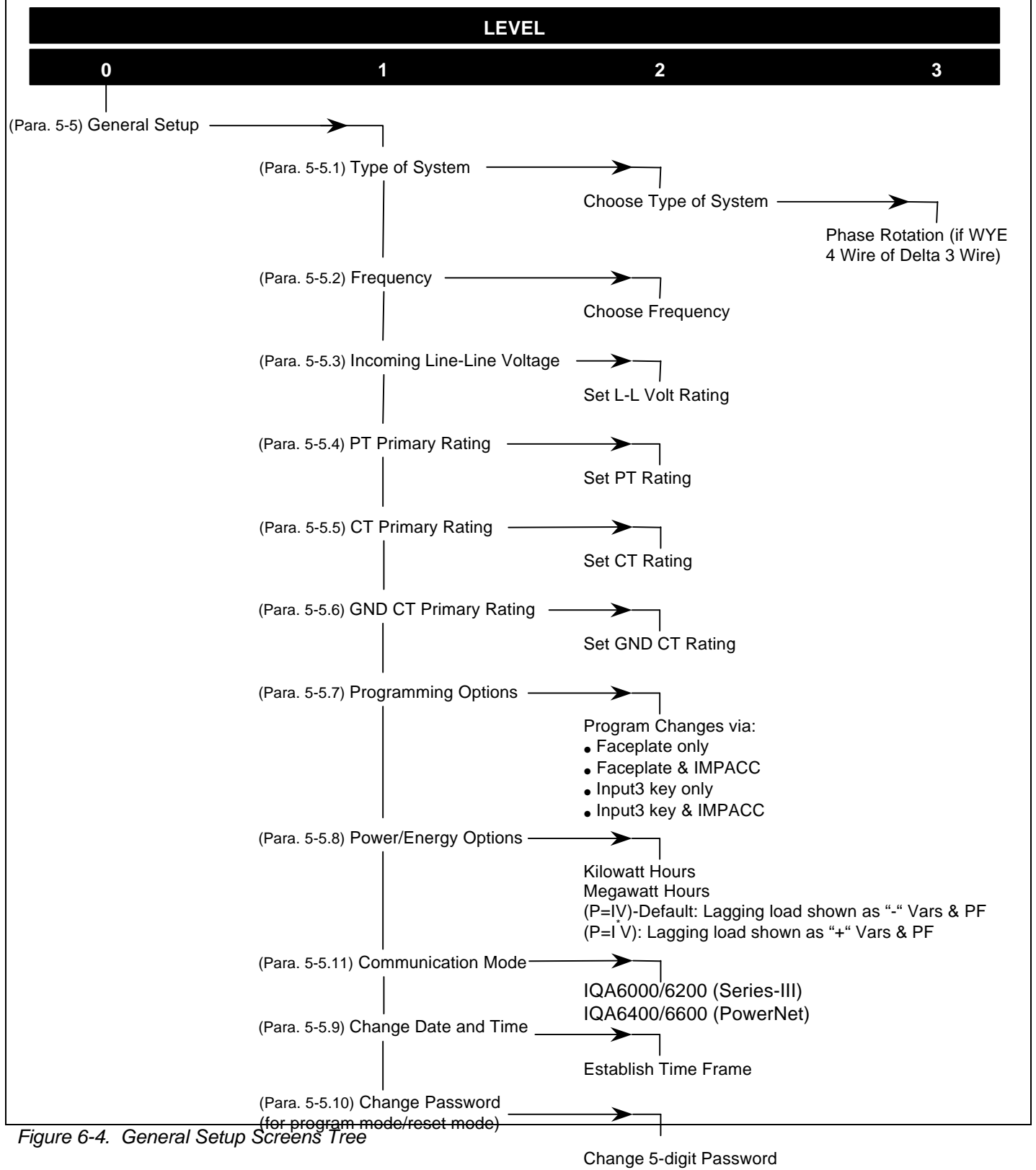


Figure 6-4. General Setup Screens Tree

Change 5-digit Password

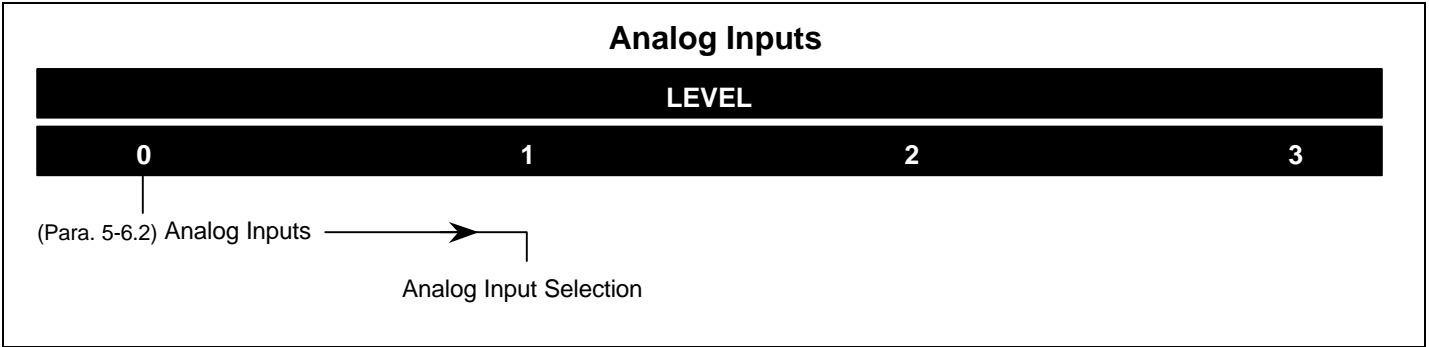


Figure 6-5. Analog Inputs Screens Tree

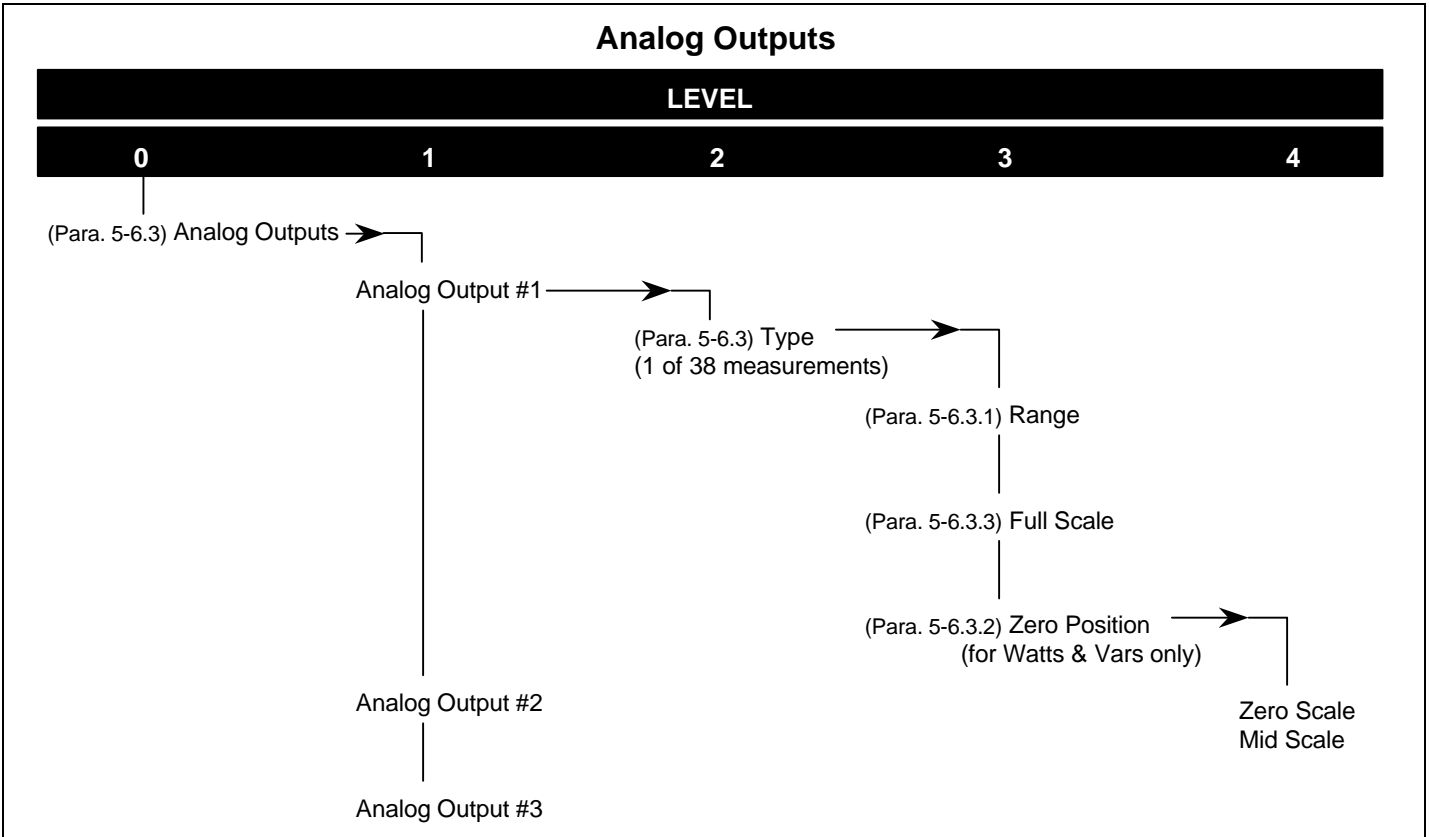


Figure 6-6. Analog Outputs Screens Tree

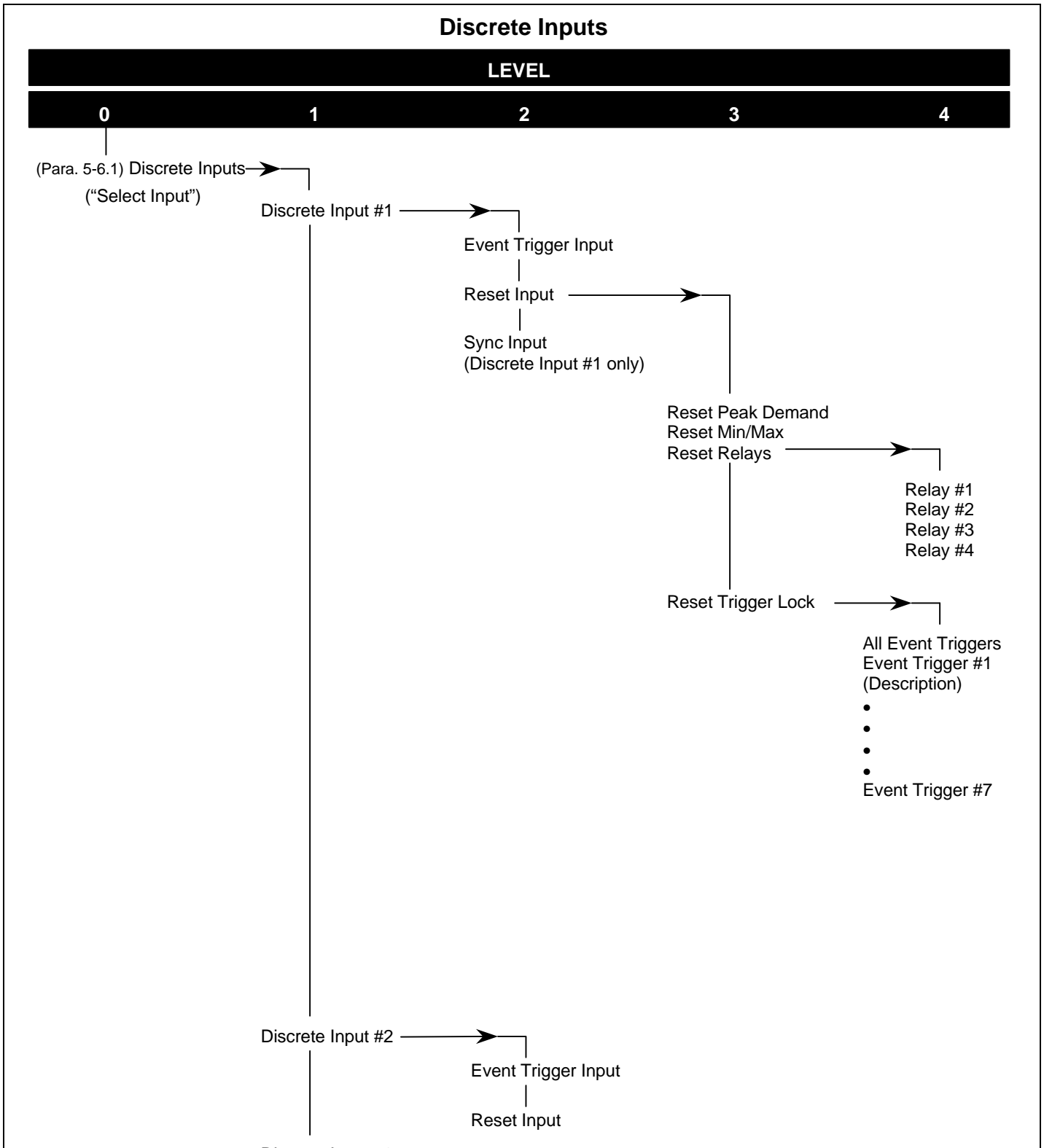


Figure 6-7. Discrete Inputs Screens Tree
 Discrete Input #3
 (Same as Discrete Input #2)

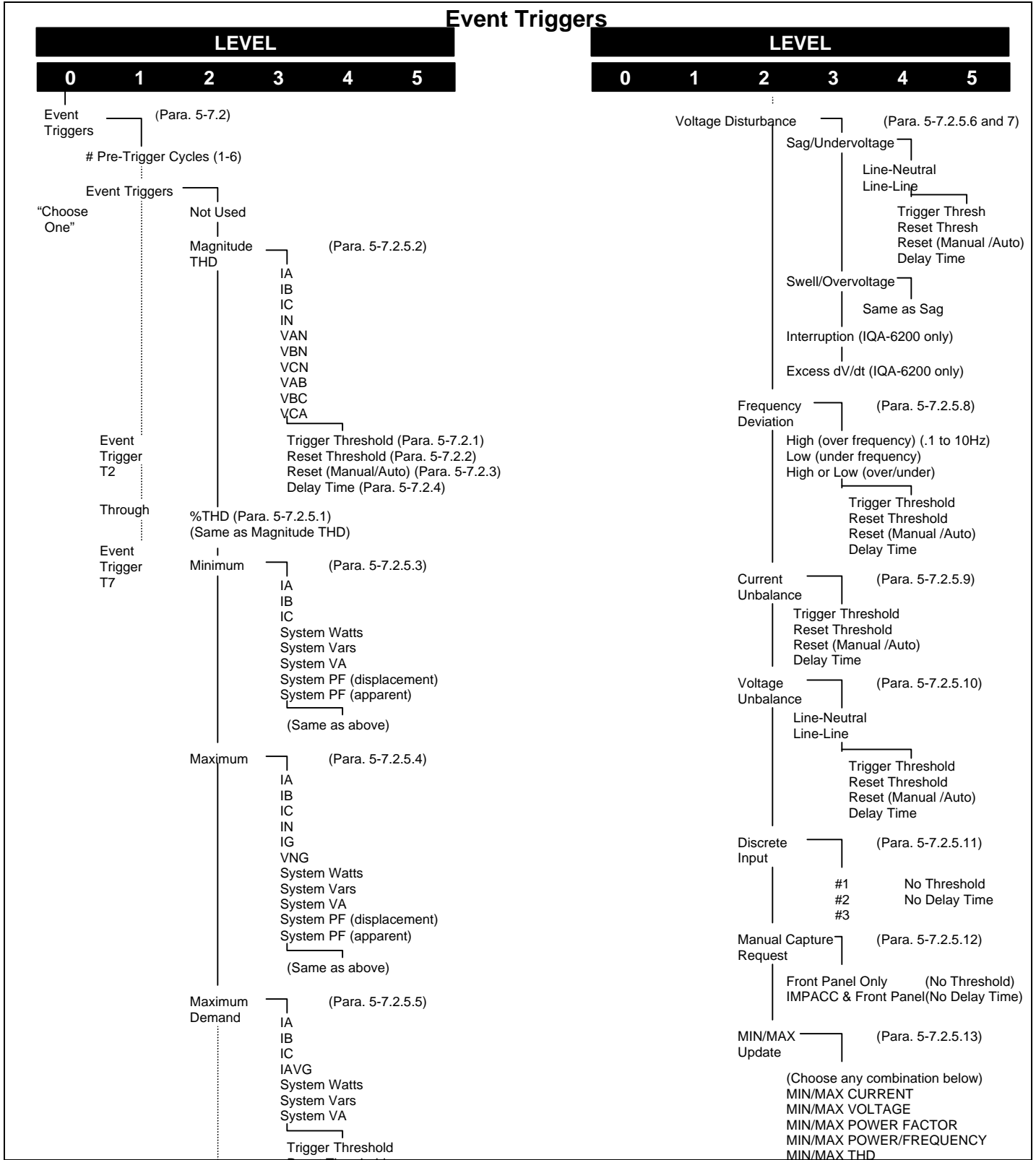


Figure 6-8. Event Triggers Screens Tree
(Continued in Next Column)

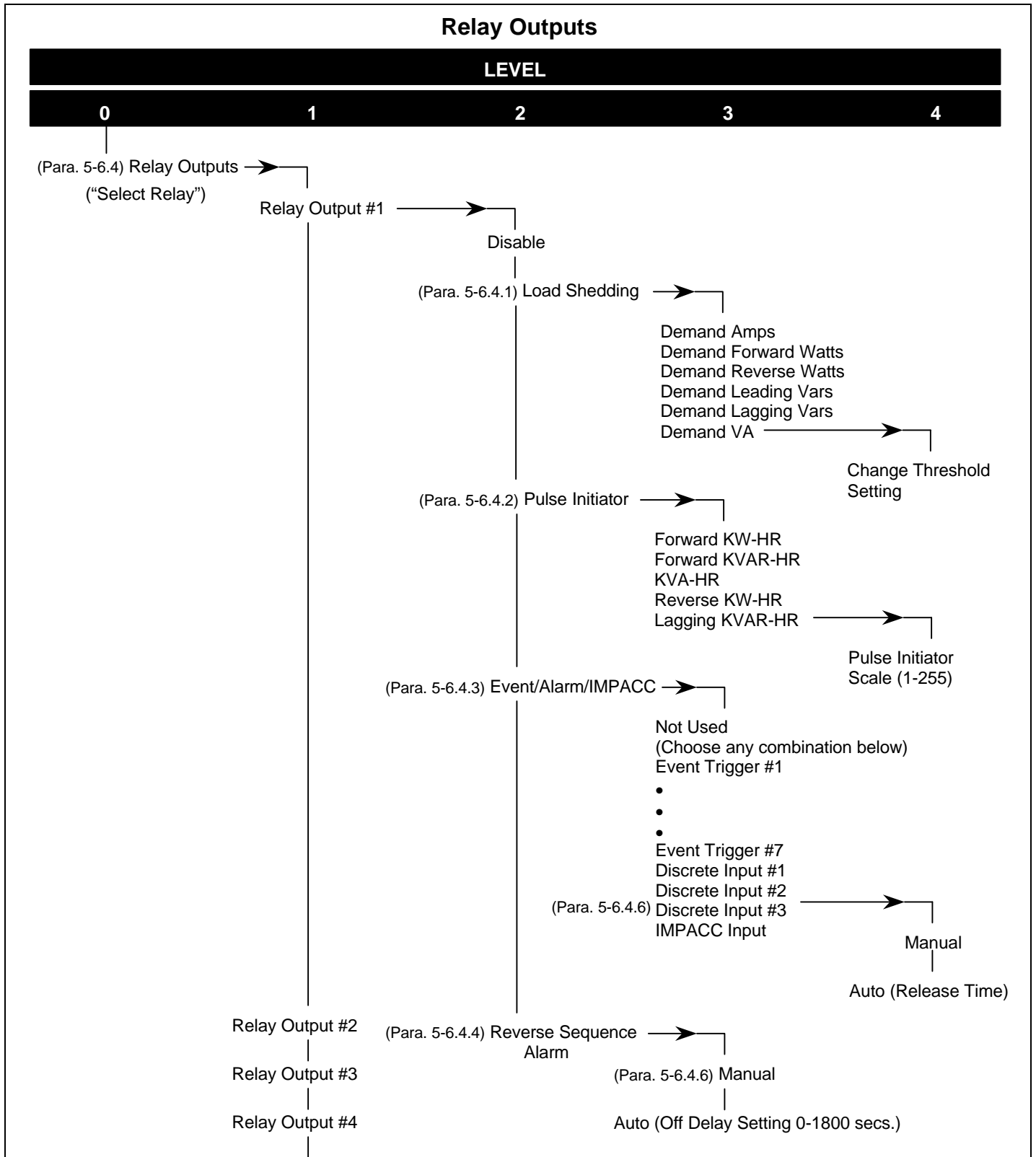


Figure 6-9. Relay Outputs Screen Relay Mode Options





Figure 6-10. Demand Screens Tree

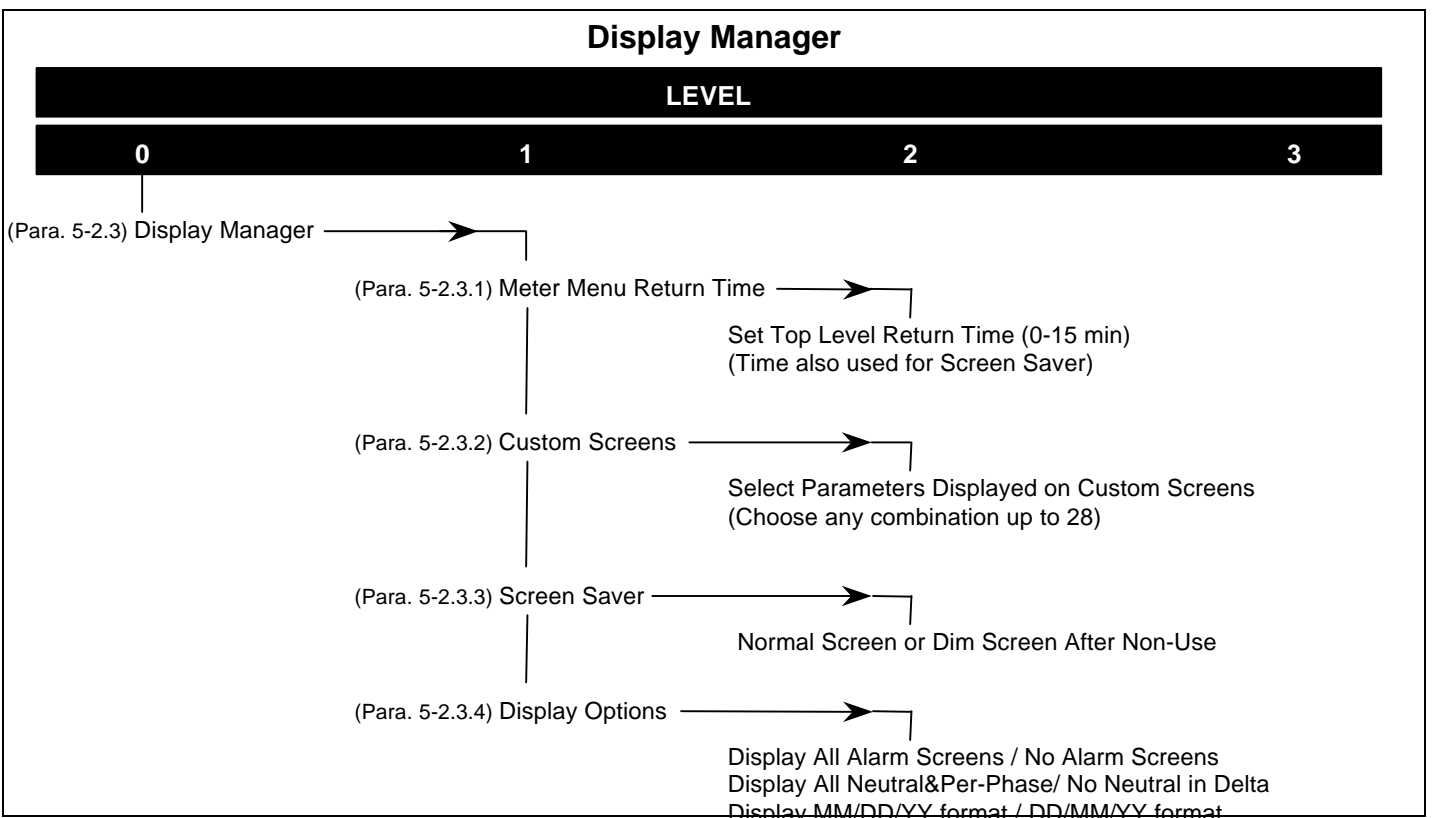


Figure 6-11. Display Manager Screens Tree

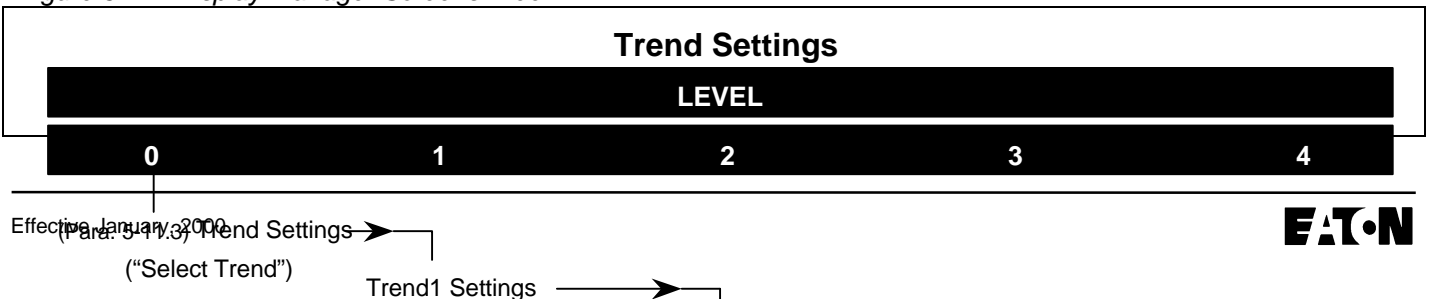


Figure 6-12. Trend Settings Screens Tree

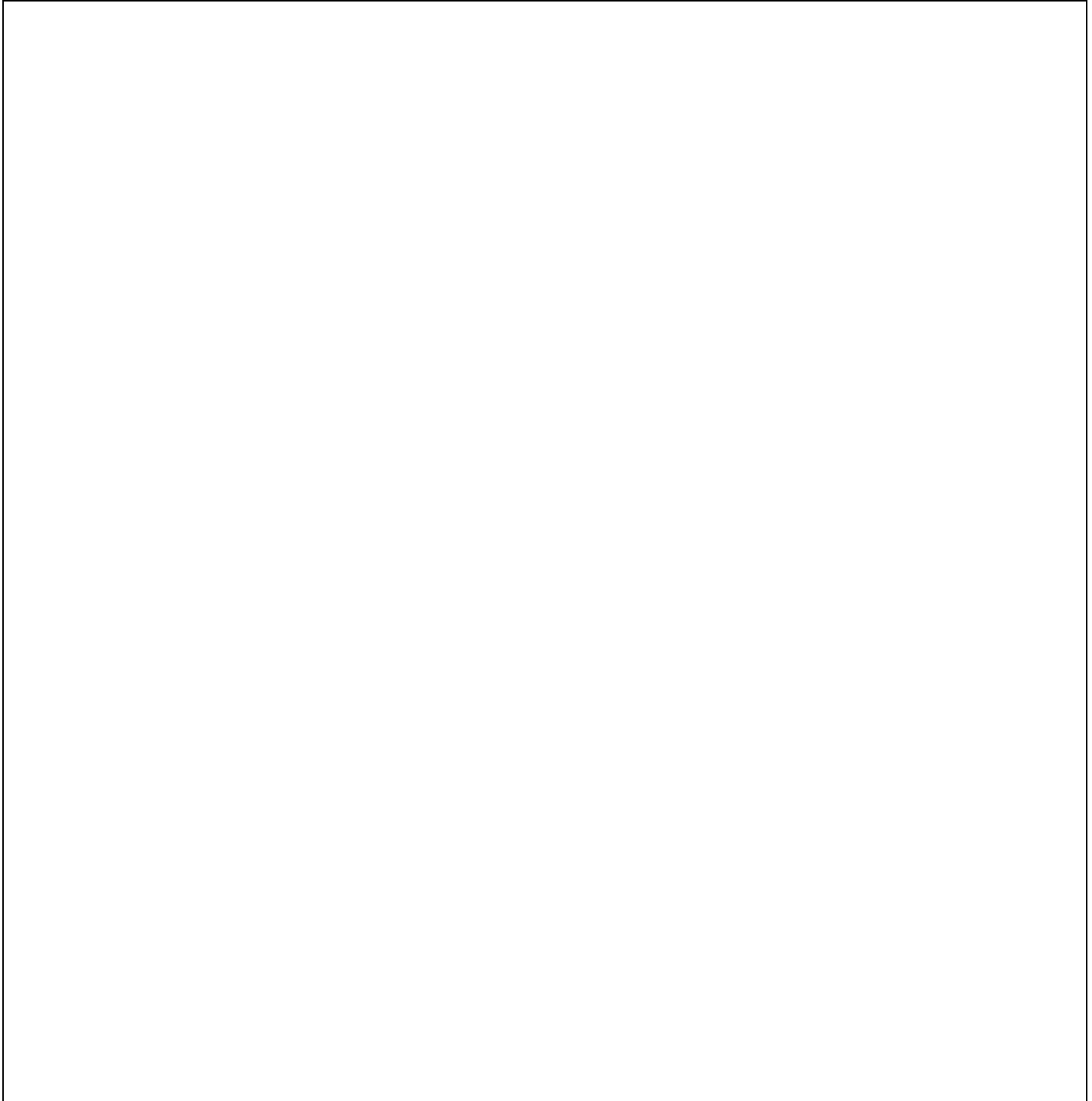


Figure 6-12. Trend Settings Screens Tree

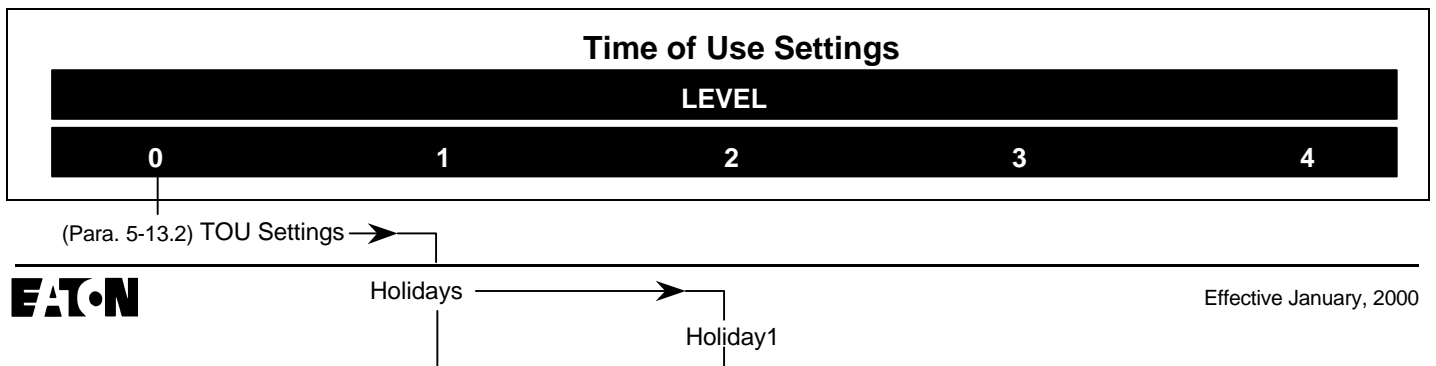




Figure 6-13. Time of Use Settings Screens Tree

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