IB 6.1.2.8-1B

INSTRUCTIONS FOR MPS-C 2000 ELECTRONIC TRIP CONTROL UNIT

MPS-C 2000

ABB

CONTENTS

NOTE: This Instruction Book is provided solely for the convenience of the purchaser, and does not purport to cover all details or variations in equipment nor to provide contingency to be met in connection with installation, operation, or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the nearest Sales Representative.

ABB

INTRODUCTION

The electronic trip control unit described in this publication is a solid state, microprocessor controlled unit, used in conjunction with a power circuit breaker to protect power systems. The power circuits being protected are typically 3-phase, with and without a neutral connection, 50 or 60 Hz with AC RMS voltages between 208 and 600 volts and continuous currents as high as 4200 amps, while ground currents may not exceed 1200 amps.

The primary function of the electronic trip control unit is the coordination in the opening of circuit breakers to protect equipment in the event of a fault that produces short circuit currents of up to 130 KA.
The MPS-C 2000 trip control unit measures current to an accuracy of within 1% of the cicuit breaker rating.
The Voltage Interface Module (VIM) option measures voltage to an accuracy of within 1% of the circuit breaker rating, and power to within 2% of the circuit breaker rating.

The trip unit is completely self-powered, taking the the tripping energy from the current through the breaker without any auxiliary power supply.

The complete control of the circuit breaker is achieved by a system comprising: (a) current sensors, (b) an electronic trip control unit, and (c) a magnetic latch trip device.

The sensors, the electronic trip control device and magnetic latch are mounted as an integral part of the circuit breaker to provide complete protection for overcurrent, short circuit and ground faults. Internal diagnostic circuitry is provided to determine and visually identify the cause of circuit breaker tripping, either as overload, short circuit or ground fault.

1. FUNCTIONS.

The electronic trip control device provides the following four basic functions:

1.1 Protection Function

Four basic trip elements within the unit perform the protective functions:
Long time, short time, instantaneous and ground.

1.2 Information Function

An indicator (target) and an LCD screen display information for the tripping functions. The indicator shows if the device has issued a trip command and the LCD can be polled to determine the type of trip. The LCD and keypad buttons are used to determine the settings of the unit. A red LED indicates self-monitoring functions.

1.3 Test Functions

The unit can be connected to an external test set to check functions and settings.

1.4 Communication Functions

The unit can be connected to switchgear mounted devices which are connected to ABB INCOM Protocol.

2. SETTINGS.

2.1 Range Selection

The range selector provides the primary amperage used as the base for the unit. It is either set for the 1 X or 0.5 X the breaker rating: Default is 1 X.

2.2 Long Time Function

2.2.1 Threshold (pickup)settings- The range of settings is: 0.5 to 1.0 in steps of 0.1. Multipliers are used in conjunction with sensor rating and the range selector. Multipliers are selected by keypad input and displayed on the LCD. Default is 1.0.

2.2.2 Trip Time - Time is defined by long time overcurrent curves (graph) and intermediate values between band limits. Default is MAX.

2.2.3 Reset Time - Real time is counted up if the current exceeds the function threshold and counted down if the current drops below the function threshold. Real time is set to zero if the current drops below the power supply threshold.

2.3. Short Time Function

2.3.1 Threshold (pickup) settings - 2 3 4 5 6 7 8 9 10 DISABLED. The settings are multiples of the sensor ratings and the range selector. Settings are made by the keypad and the LCD display. If the INST function is disabled, the short time unit cannot be disabled. Default is DISABLED.

2.3.2 Trip time - Time is defined by the short time overcurrent curves (graph). I^2t function is selectable. I^2t curves are fixed and do not vary with pickup settings. I^2t is operational only from 2X to 4X. Trip times with I^2t out are defined as follows: Default is maximum with I^2t in.

Maximum = 0.350 - 0.500 sec

Intermediate = 0.20 - 0.320 sec

Minimum = 0.080 - 0.170 sec

2.3.3 Reset time - Real time is counted up if the current exceeds the function threshold and counted down if the current drops below the function threshold.

2.4 **Instantaneous Function**

2.4.1 Threshold (pickup) settings - 3 4 5 6 7 8 9 10 11 12 DISABLED. The settings are multiples of the range selector setting and are made via the keypad and the LCD screen. If the short time unit is disabled, the instantaneous unit cannot be disabled. Default is 12.

2.4.2 Trip time - There is no intentional delay in the instantaneous function.

2.4.3 The instantaneous unit includes a jumper on the circuit board which eliminates the possibility of instantaneous and short time being simultaneously disabled.

2.5 **Ground Function**

2.5.1 Threshold (pickup) settings - These settings are made via the keypad and the LCD screen. This function may also be disabled. Default is 1200 A.

SENSOR RATINGS	SETTINGS
200 600 800	100,200,300, 600,900,& 1200A
1600 2000 2500	300,400,600, 800,1000,& 1200A
3000 3200 4000 4200	500,600,800, 900,1000, & 1200A

2.5.2 Trip time - The time is defined by the overcurrent curves (graph). I²t function is selectable. I²t curves are fixed and do not vary with pickup settings. If the I²t function is out, the trip times are defined as follows: Default is Maximum with I²t in.

DELAY SETTING	SENSORS 100 - 800A	SENSORS 1600 - 2500A	SENSORS 3000 - 4200A
MAX	5.2 - 9.5 SEC	0.59 - 1.2 SEC	0.35 - 0.50 SEC
INT	2.1 - 4.2 SEC	0.24 - 0.47 SEC	0.20 - 0.32 SEC
MIN	0.68 - 1.3 SEC	0.07 - 0.18 SEC	0.05 - 0.17 SEC

2.5.3 Reset time - Real time is counted up if the current exceeds the function threshold and counted down if the current drops below the function threshold. Real time is set to zero when the curent drops below the power pickup point.

2.5.4 Residual ground current - In a three phase, four wire system the ground fault functions can discriminate between a ground fault and a neutral current.

2.5.5 Ground fault summing - The reset technique used for long-time and short-time function is applied. i.e, real time is counted up if the current exceeds the function threshold and counted down if the current drops below the function threshold. The ground function includes arcing ground summation for tripping. This feature allows arcing grounds occurring sufficiently close together to be summed so that their magnitude will exceed the threshold setting of the ground element.

2.6 Current Unbalance

2.6.1 Pickup settings - 5% to 50% in increments of 1% and DISABLED. These changes can be made either via the keypad and LCD or the NIM communications unit. Default is DISABLED. The current unbalance function is only available for systems with VIM attached.

2.7 Current Sensor Thresholds

2.7.1 Long time - 0.5X to 1.0X of sensor rating in increments of 0.1.

Short time - 2X to 10X of sensor rating in increments of 1.

Instantaneous - 3X to 12X of sensor rating in increments of 1.

Ground - 100 amps to 1200 amps
300 amps to 1200 amps
500 amps to 1200 amps
Depending on sensor rating. See section 2.5.1

2.8 Information Function

2.8.1 The information function consists of an LCD screen, a mechanical target, a light emitting diode (LED) and six keypad buttons.

2.8.2 The mechanical target provides indication that the unit has caused a circuit breaker opening. Further information about the function such as the type of trip, LT, ST, INST, GND, I UNB, V UNB, or UV and the fault current is displayed when any keypad button in depressed after a trip has occurred, or can be found in the records menu.

2.8.3 The target resets automatically when the unit is re-energized. Reset occurs in 2 seconds.

2.8.4 The red LED blinks once per second to indicate that the MPS-C 2000 unit is powered up and functioning normally. (self monitor light).

2.8.5 The red self monitor light blinks five times per second to indicate long-time pickup and continues to do so until reset or the breaker trips.

2.8.6 When the unit is powered up and the settings table has timed out, the LCD screen will display metering information provided that the unit has enough line current to power up or is externally powered.

3. TEST FUNCTIONS

3.1 The unit continuously monitors the condition of the microprocessor and is reported by a flashing LED on the front panel. Upon failure, the LED will glow steadily.

3.2 The unit is compatible with the 607 test set.

4. VOLTAGE INTERFACE MODULE (VIM)

4.1 The VIM performs the following functions:

a. Provides the phase voltage for remote display.

b. Houses the electronics for performing the power, power factor and frequency processing based on current data from the MPS-C 2000 box.

c. Performs calculations to determine voltage unbalance and undervoltage faults.

4.2 If a VIM device is installed the MPS-C 2000 unit must be connected to a NIM communications unit.

4.3 If a VIM is installed in the unit, a cable connects the unit to the potential transformer located on the rear of the MPS-C 2000 mounting plate and plugs directly into the VIM board.

4.4 **Settings**

4.4.1 Voltage unbalance

4.4.1.1 Pickup - 5% to 50% in increments of 1% and DISABLED. Set via the front panel or the NIM communication unit. Default is DISABLED. Connection to a NIM is necessary for this function to be enabled.

4.4.1.2 Trip time - 0.1 to 25.0 seconds in increments of 1 second. Set via the front panel or the NIM communications unit. Default is 25.0 seconds.

4.4.2 Undervoltage trip

4.4.2.1 Pickup - 1 to 600 volts in increments of 1 and DISABLED. Set via the front panel or the NIM communications unit. Default is DISABLED. Connection to a NIM is necessary for this function to be enabled.

4.4.2.2 Trip time - 0.1 to 25.0 seconds in increments of 1 second. Set via the front panel or the NIM communications unit. Default is 25.0 seconds.

5. MPS-C 2000 SETUP INSTRUCTIONS

5.1 **General Instructions**

5.1.1 The front panel keypad consists of four directional arrow keys, a cancel key, an enter key, and an LCD window.

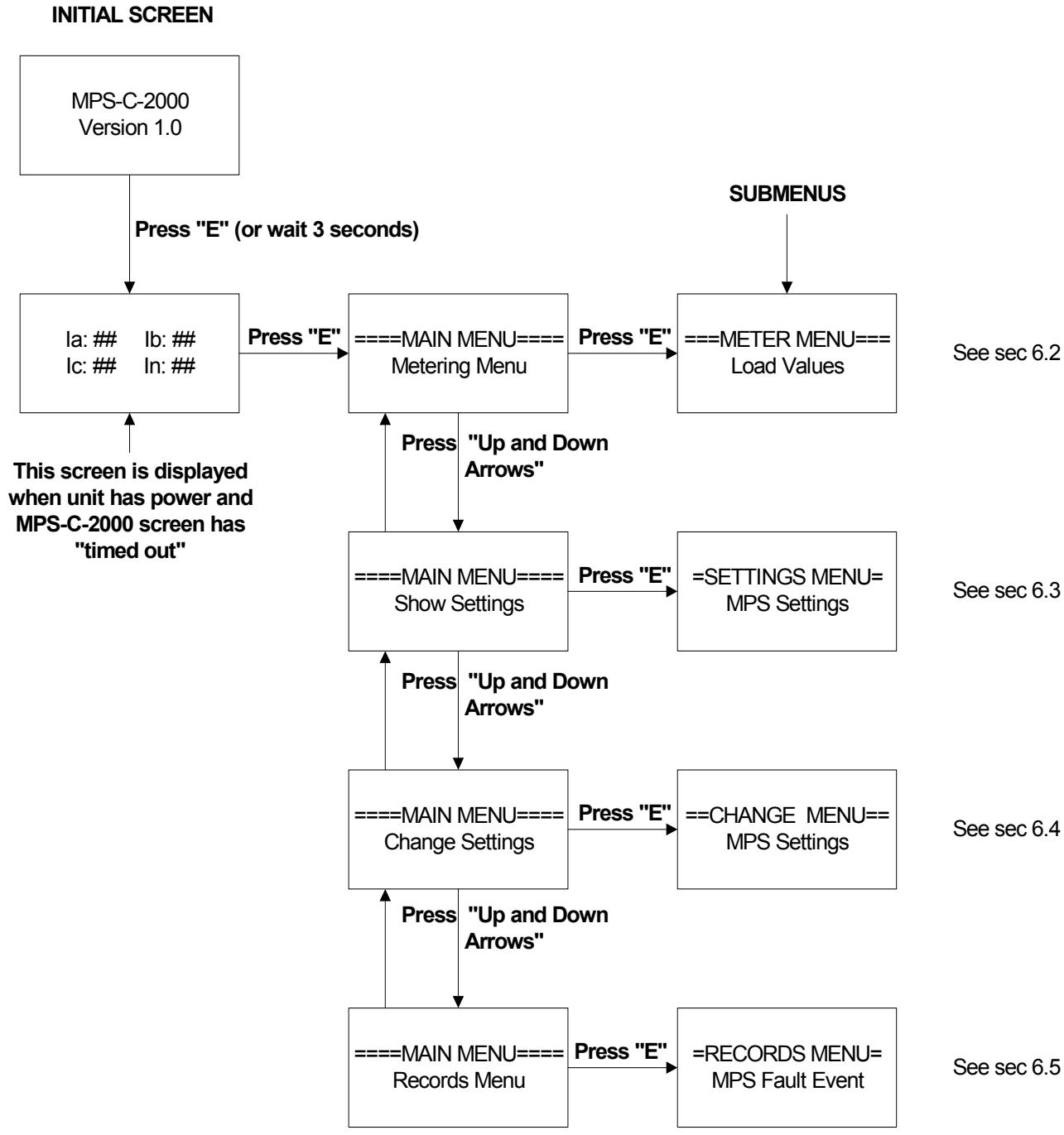
5.1.2 When the MPS-C 2000 unit is connected to a power source, an initial title screen is displayed in the LCD window.
This screen display is replaced after approximately three seconds by a setup screen.
Subsequent Main Menu screens are accessed by pressing the “E” key and the up and down keys. See section 6.

5.1.3 Each Main Menu has a Submenu, used for entering and displaying values. These are accessed by pressing the “E” key while in the Main Menu. The up and down keys are used in the submenus to display the desired type of values or settings and the “E” key is pressed again to access these. The up and down keys are then used to scroll through the settings.

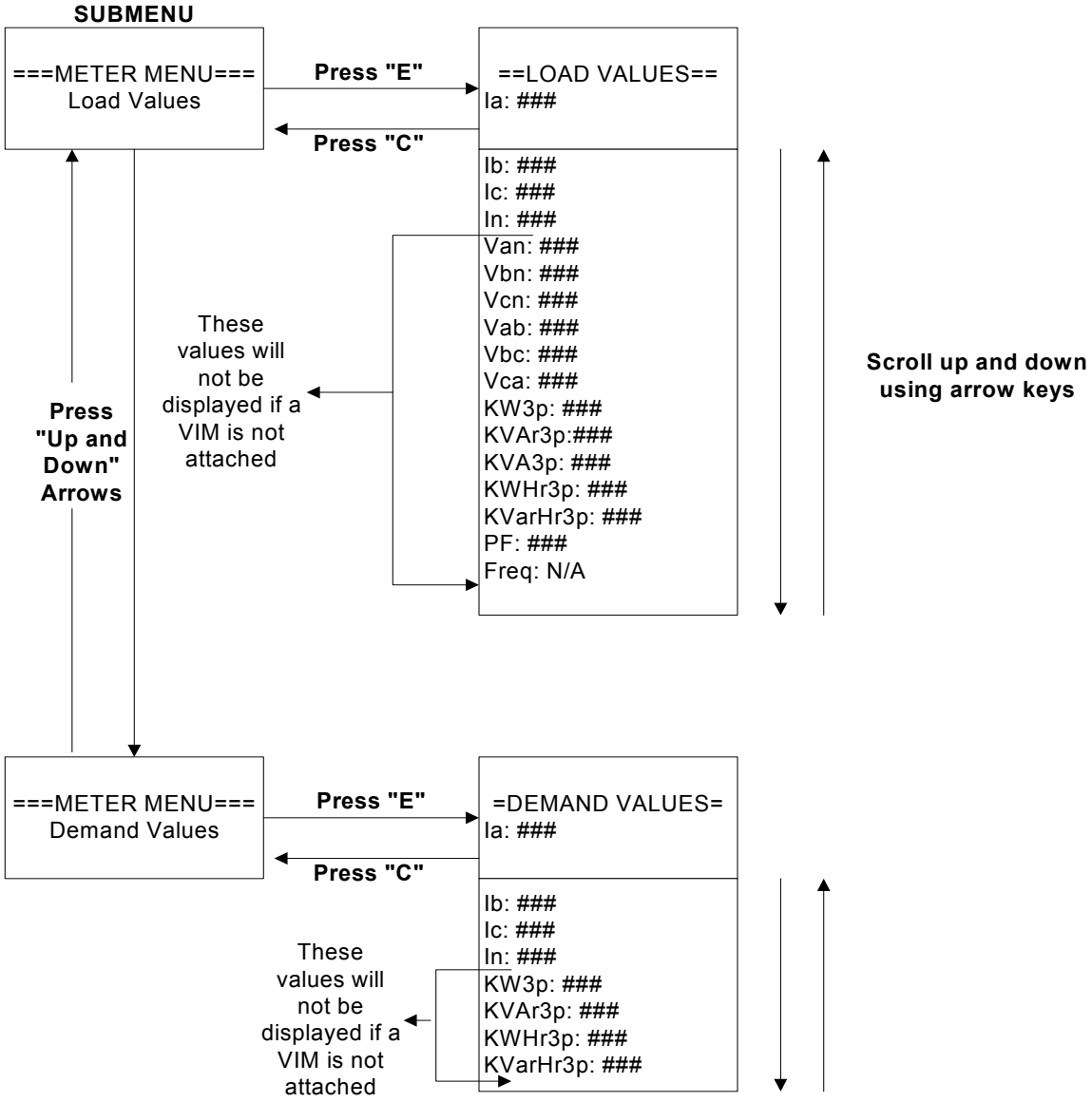
5.1.4 Pressing the “C” key in any screen will back up the display to the previous screen.

6. MENU LAYOUT

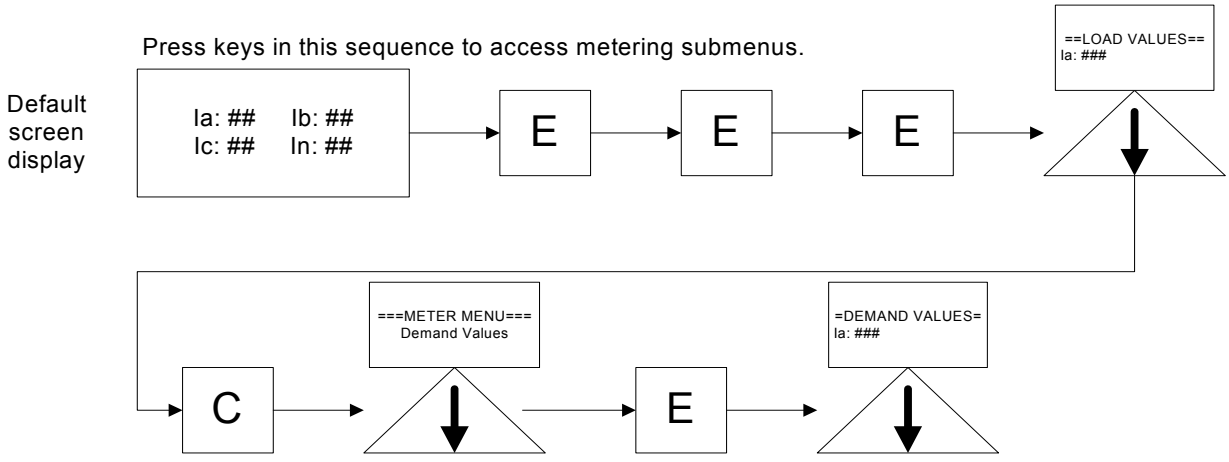
6.1 The following layout shows the Main Menus and submenus accessed by pressing the “E” key and the up and down arrows. To exit the submenus to return to the Main Menu, the “C” key should be pressed.
For layouts of the submenus, refer to sections 6.2 through 6.5.



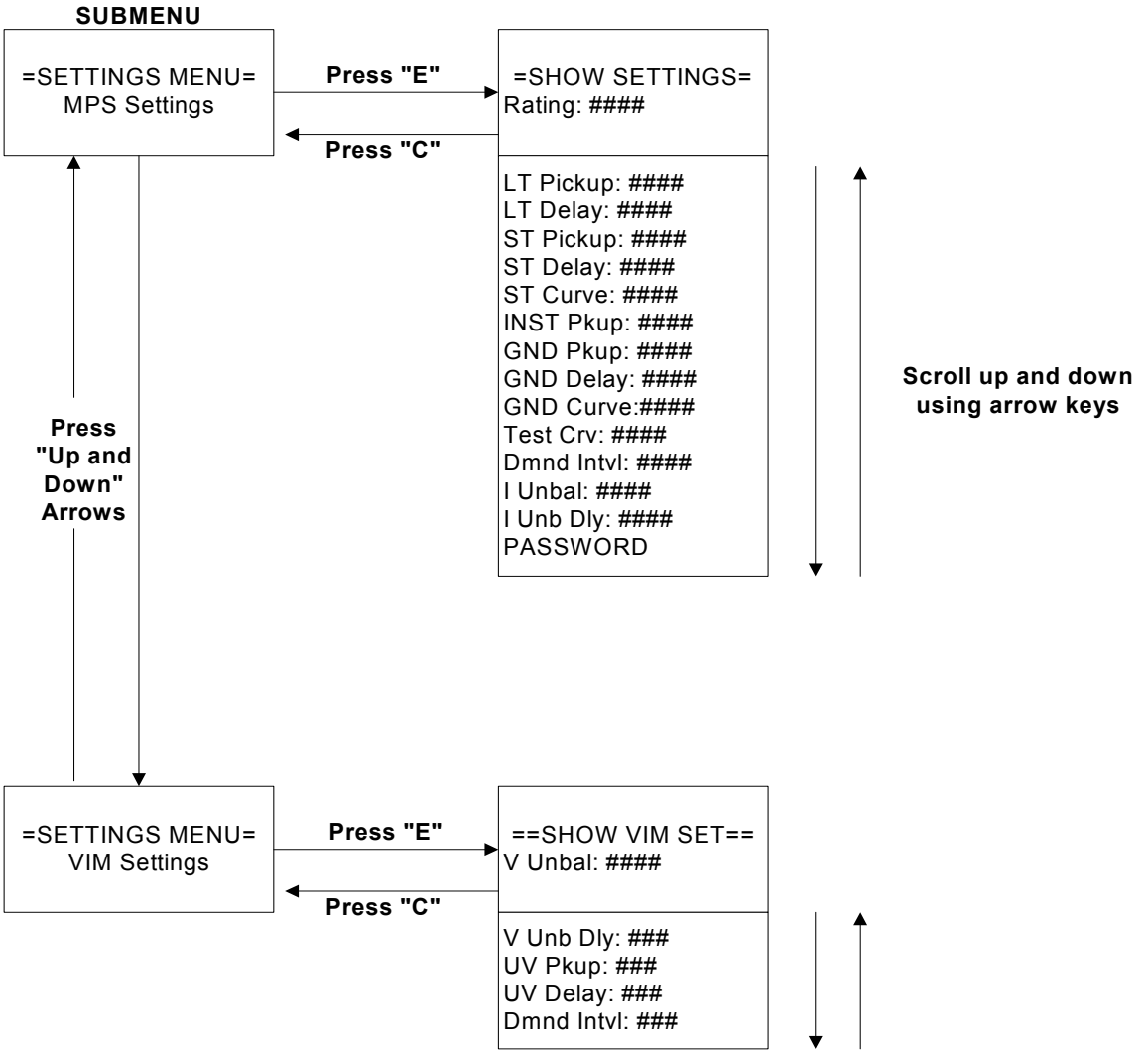
6.2 METERING SUBMENU



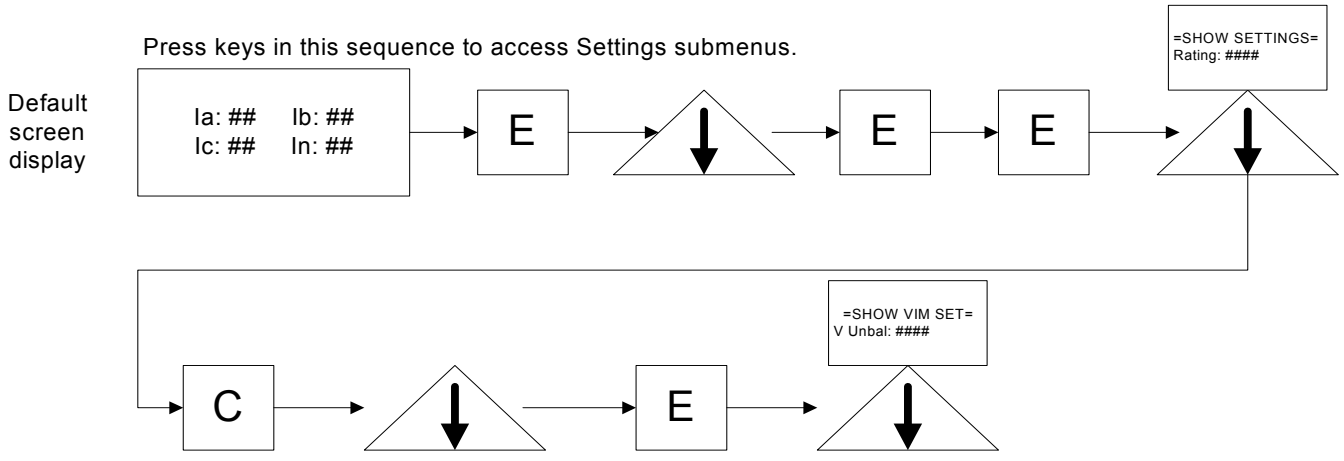
KEYPAD INPUT SEQUENCE FOR METERING SUBMENU



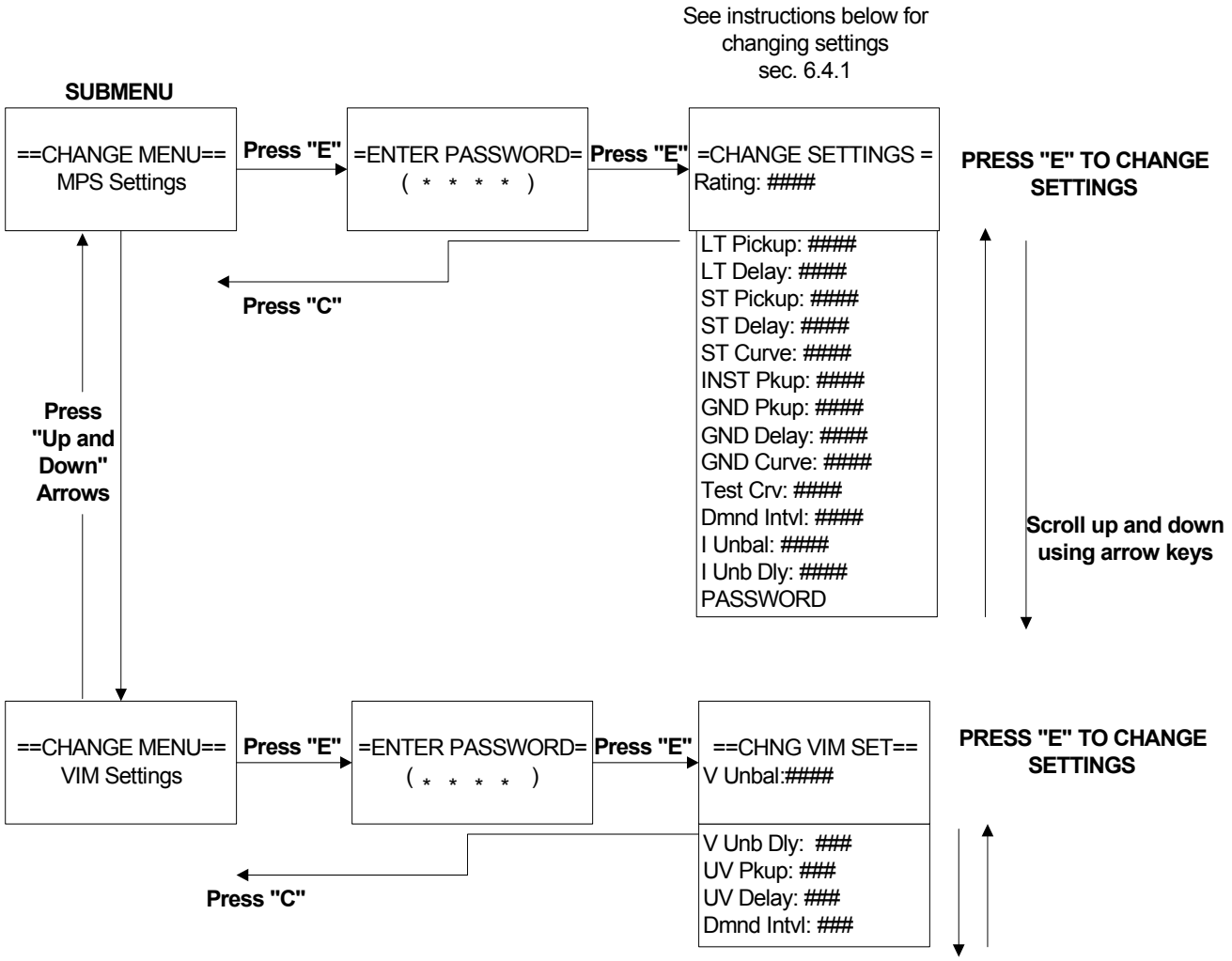
6.3 SETTINGS SUBMENU



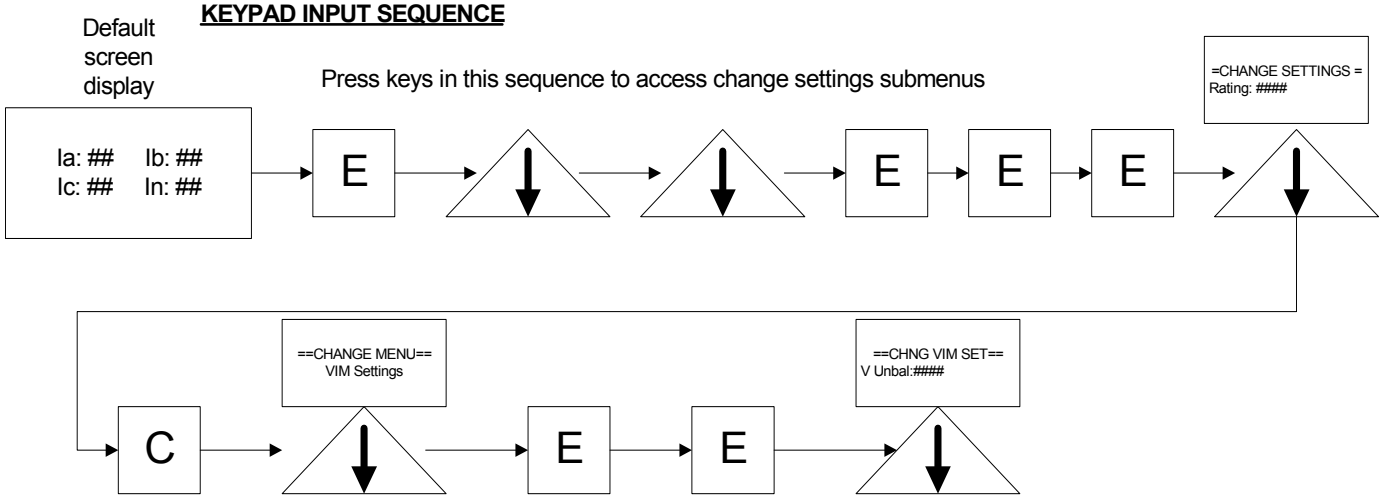
KEYPAD INPUT SEQUENCE FOR SETTINGS SUBMENU



6.4 CHANGE SETTINGS SUBMENU



6.4.1 To change settings PRESS ""E", (an asterisk will appear after the setting) TOGGLE BETWEEN SETTINGS USING LEFT AND RIGHT ARROW KEYS, PRESS "E" TO ACCEPT, THEN PRESS "C".



6.4.2 **Available Settings**

The following is a list of choices for each setting in the **CHANGE SETTINGS** Submenu:

MPS SETTINGS

LT PICKUP: 0.5X, 0.6X, 0.7X, 0.8X, 0.9X, 1.0X Sensor rating.

LT DELAY: MIN, INT, MAX

ST PICKUP: 2X, 3X, 4X, 5X, 6X, 7X, 8X, 9X, 10X, 11X, 12X Sensor rating, and DISABLED.

ST DELAY: MIN, INT, MAX

ST CURVE: DEF, IIT

INST PICKUP: 3X, 4X, 5X, 6X, 7X, 8X, 9X, 10X, 11X, 12X Sensor rating, and DISABLED if INST disable jumper is not blocked.
GND PICKUP: See ground sensor table, section 2.5.1

GND DELAY: MIN, INT, MAX

GND CURVE: DEF, IIT

TEST CURVE: LT, ST, INST, GND

DEMAND INTERVAL: 15, 30, and 60 minutes

CURRENT UNBALANCE: 5 to 50 percent, in increments of 1%

CURRENT UNBALANCE DELAY: .10 to 25.0 seconds in increments of .1% and DISABLED

VIM SETTINGS

VOLTAGE UNBALANCE: 5 to 50 percent in increments of 1%

VOLTAGE UNBALANCE DELAY: .10 to 25.0 seconds in increments of .1% and DISABLED

UNDERVOLTAGE PICKUP: 1 to 600 Volts in increments of 1 volt

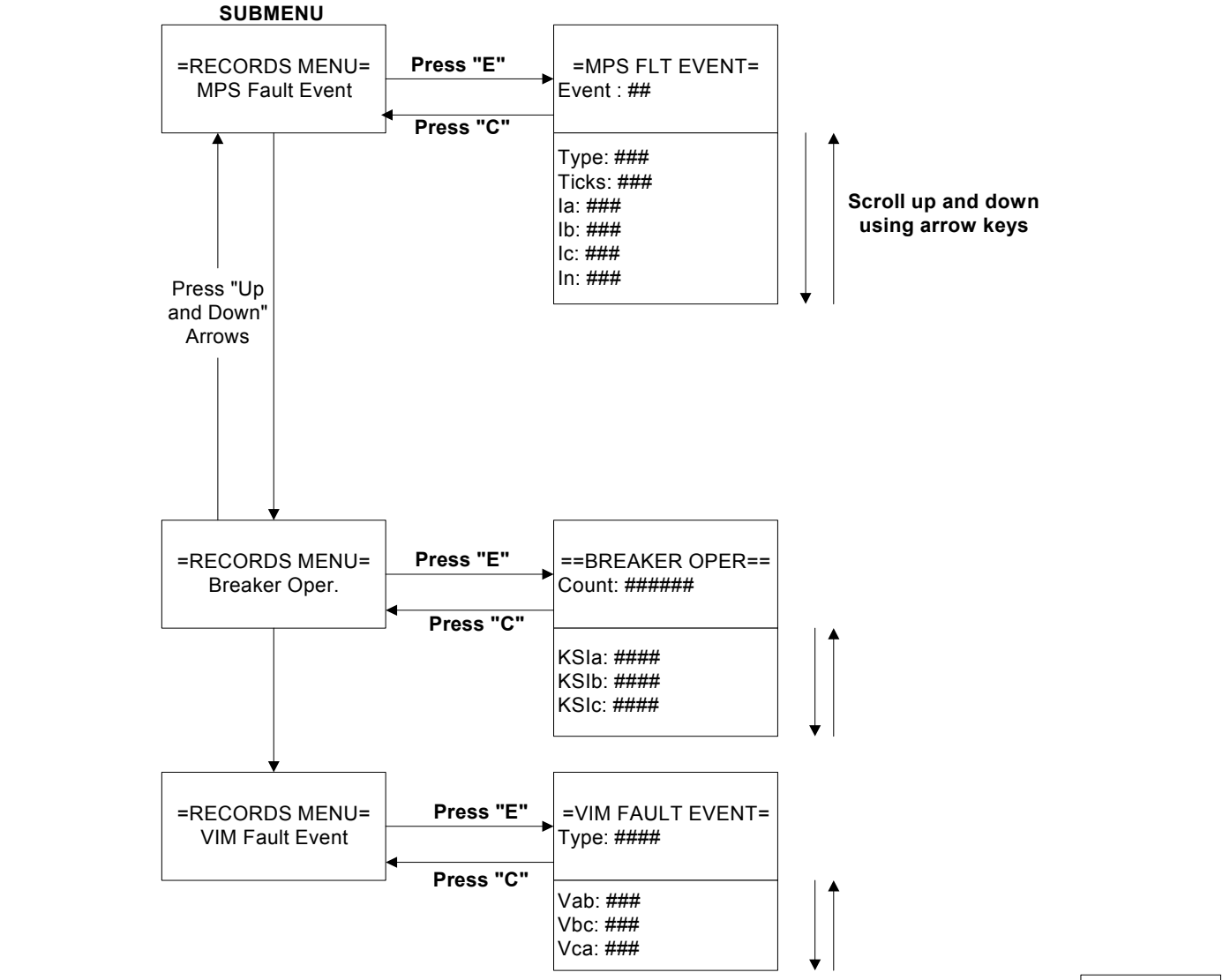
UNDERVOLTAGE DELAY: .10 to 25.0 seconds in increments of .1% and DISABLED

DEMAND INTERVAL: 15, 30, and 60 minutes

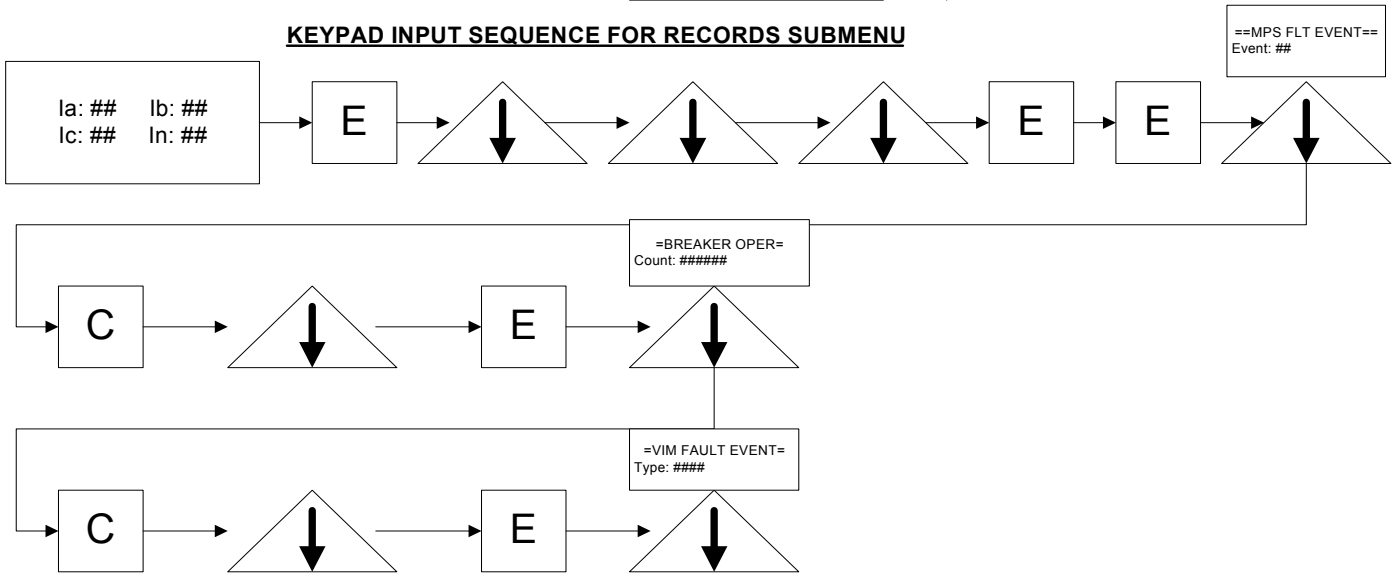
6.4.3 **Password Protection**

If a password has not been programmed into the unit, the PASSWORD screen can be bypassed simply by pressing “E”. To enter a password, scroll down to the PASSWORD screen in the CHANGE SETTINGS Submenu, press “E”, using the UP and DOWN keys, scroll up or down to the desired letter or number, press the RIGHT arrow key to move to the next space and select the desired letter or number, repeat for the remaining two spaces and then press “E”. You will be asked to verify the password change. Retype the password to verify and press “E”.
It will be necessary to enter this password to gain access to the CHANGE SETTINGS submenu from this point.
To change the password just repeat the above instructions. To erase the password, thereby defaulting back to the original unit setting, program blank spaces in the CHANGE PASSWORD screen.
If a password is lost or unknown, call your local service center for further instructions.

6.5 RECORDS SUBMENU



KEYPAD INPUT SEQUENCE FOR RECORDS SUBMENU



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