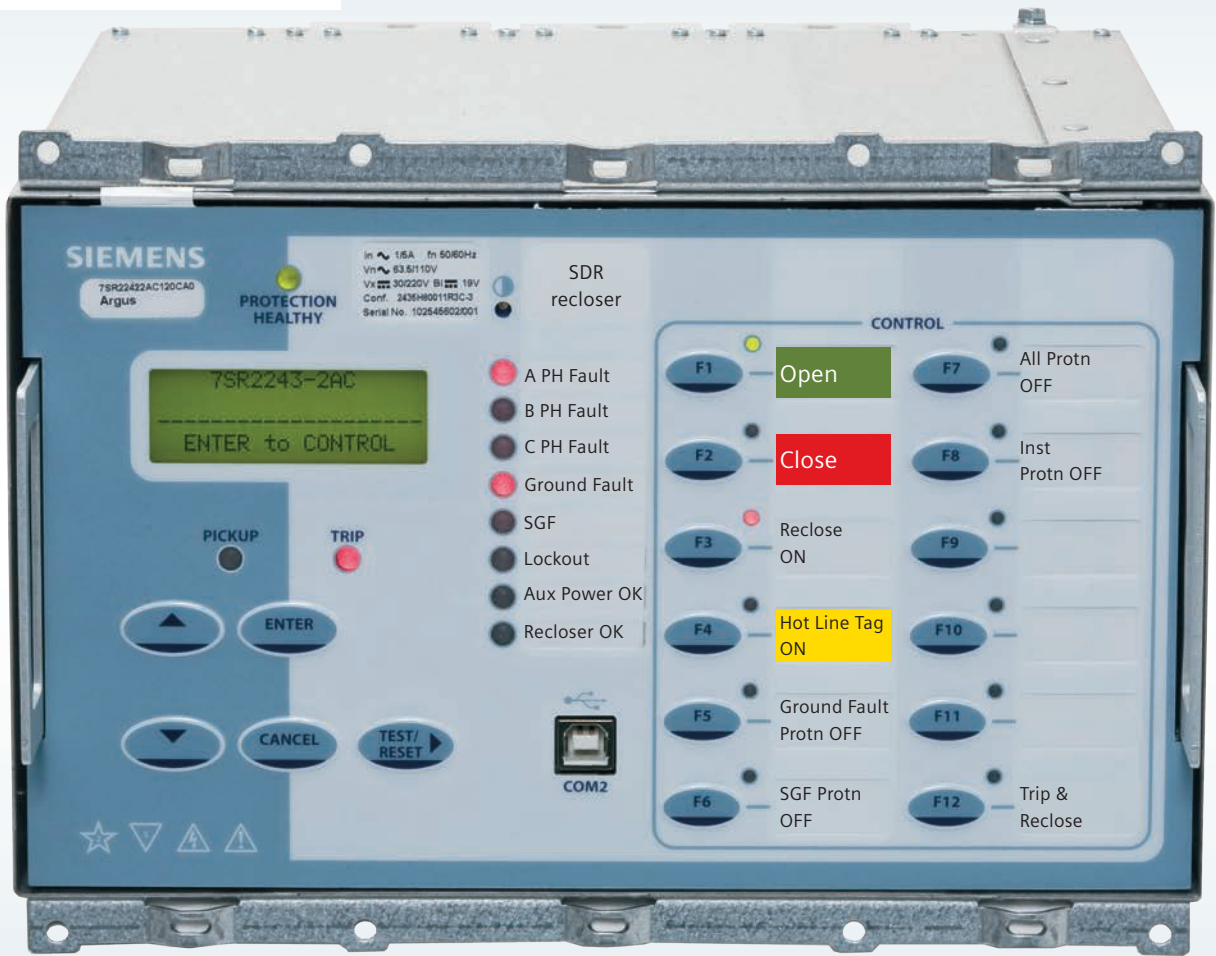


SIEMENS



[www.usa.siemens.com/reclosers](http://www.usa.siemens.com/reclosers)

# Training aid

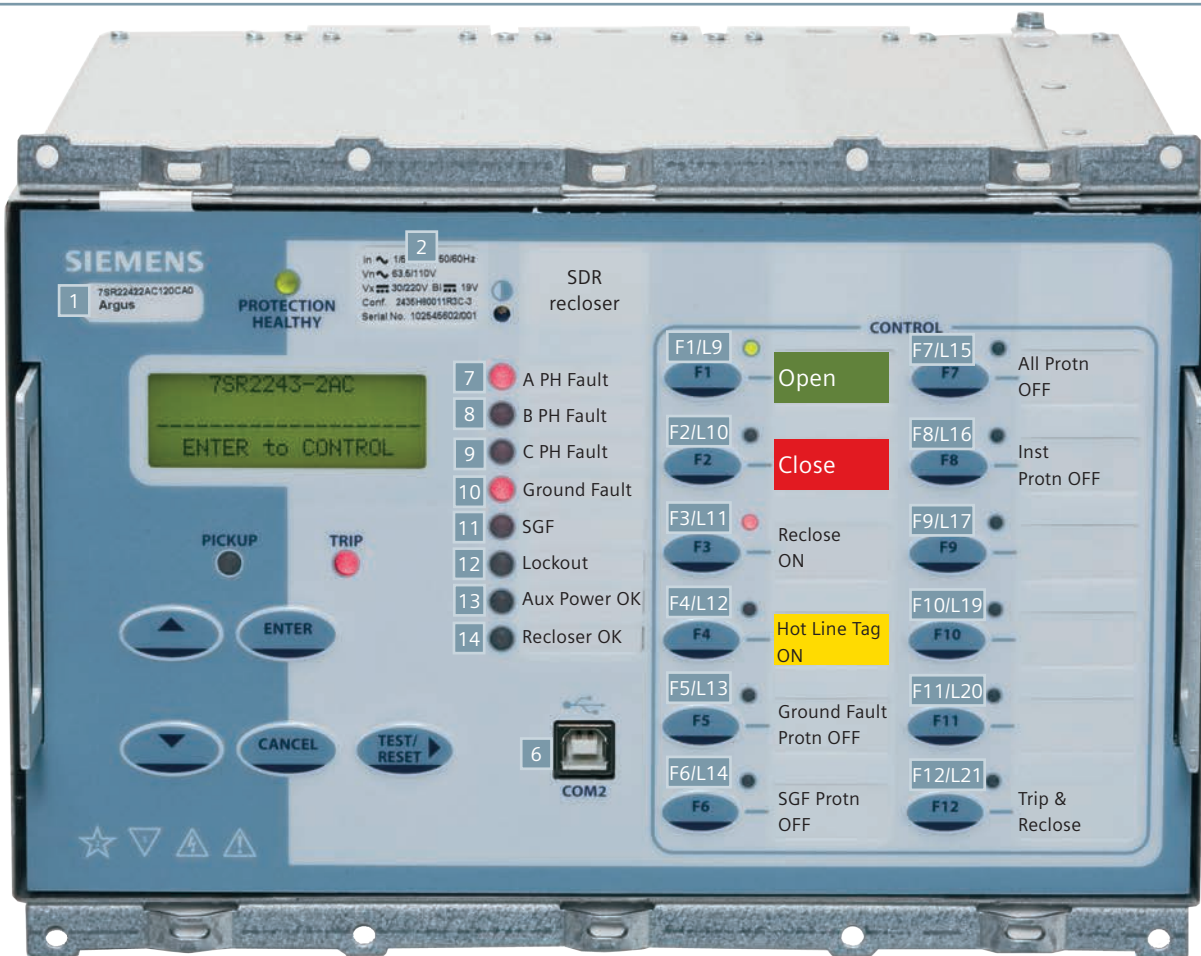
7SR224 three-phase control relay

Type SDR 15.5 kV to 38 kV three-phase distribution recloser

Answers for infrastructure.

## Table of contents

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1. MLFB number (model)

2. Ratings label

3. In = CT secondary current  
(In = 1A for type SDR recloser)  
frequency = 50/60 Hz  
(60 Hz for type SDR recloser)

4. Vn = voltage supplied to relay from voltage sensors  
(63.5 for type SDR recloser)

5. Vx = power supply voltage range (48 Vdc for type SDR recloser) and  
BI = voltage to activate a binary input (19 Vdc for type SDR recloser)

6. Programming port



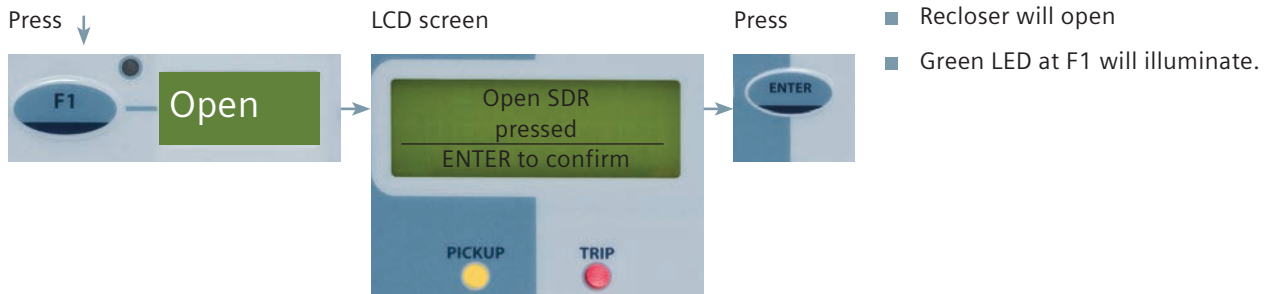
Item	Button and/or LED	If associated LED is lit
7	A PH fault	Phase A target
8	B PH fault	Phase B target
9	C PH fault	Phase C target
10	Ground fault	Ground fault target
11	SEF	Sensitive earth fault (SEF) target
12	Lockout	Recloser is locked out
13	Aux power OK	AC input power to control cubicle OK
14	Recloser OK	Capacitors charged and system ready to close or open

Item	Button and/or LED	If associated LED is lit
F1/L9	Push-to-open recloser	Recloser is OPEN
F2/L10	Push-to-close recloser	Recloser is CLOSED
F3/L11	Push-to-toggle reclose functionality On/Off	Reclose functionality is ON
F4/L12	Push-to-toggle hot line tag On/Off	Hot line tag is ON
F5/L13	Push-to-toggle ground fault protection On/Off	Ground fault protection is OFF
F6/L14	Push-to-toggle sensitive earth fault protection On/Off	SEF protection is OFF
F7/L15	Push-to-toggle all protection On/Off	All protection is OFF
F8/L16	Push-to-toggle instantaneous protection On/Off	Instantaneous protection is OFF
F9/L17	User defined	User defined
F10/L18	User defined	User defined
F11/L19	User defined	User defined
F12/L20	Push-to-trip and reclose recloser	----

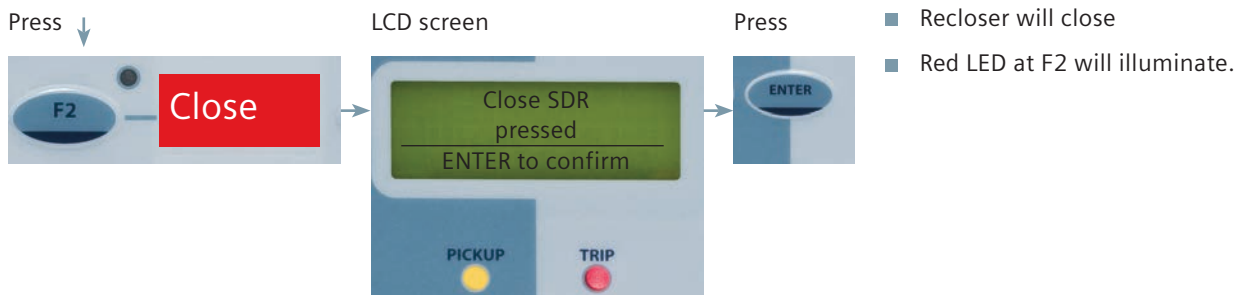
**Note:** If buttons are labeled differently than shown above, factory settings have been reprogrammed.

# Type 7SR224 protection and control relay operation exercises

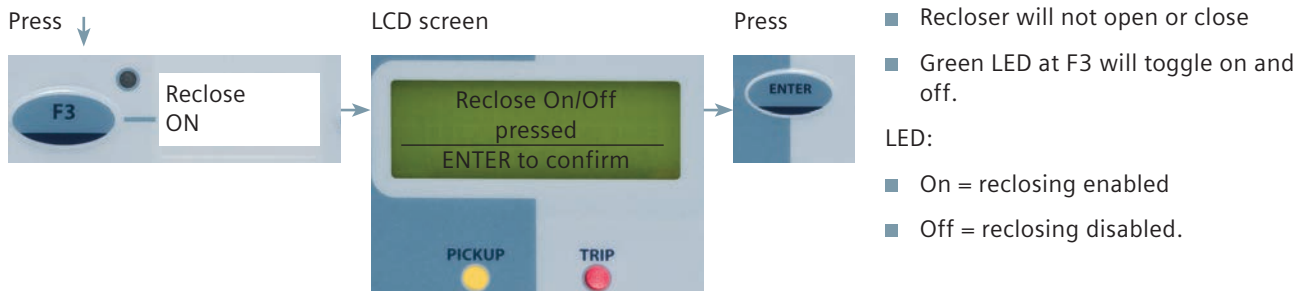
## Example 1: open recloser



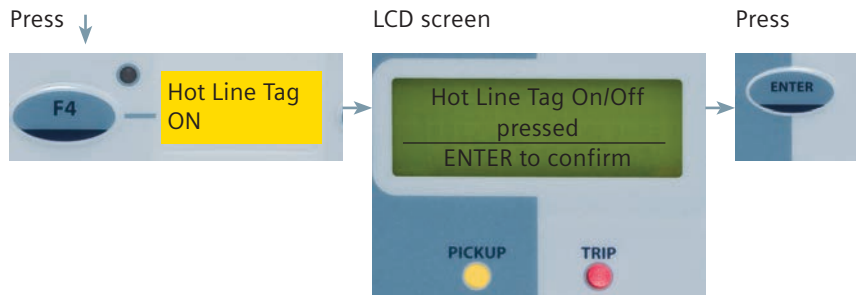
## Example 2: close recloser



## Example 3: toggle reclosing operation on and off

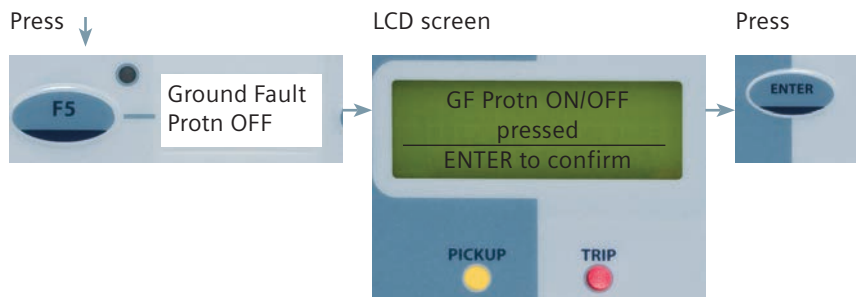


**Example 4: toggle hot line tag on and off**



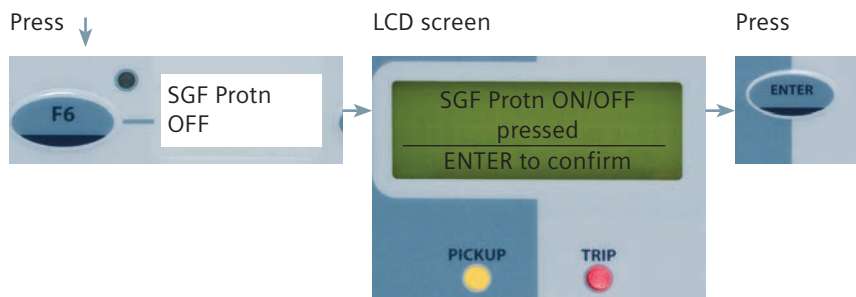
- Recloser will not open or close
  - Red LED at F4 will toggle on and off.
- LED:
- On = hot line tag enabled
  - Off = hot line tag disabled.

**Example 5: toggle ground fault protection on and off**



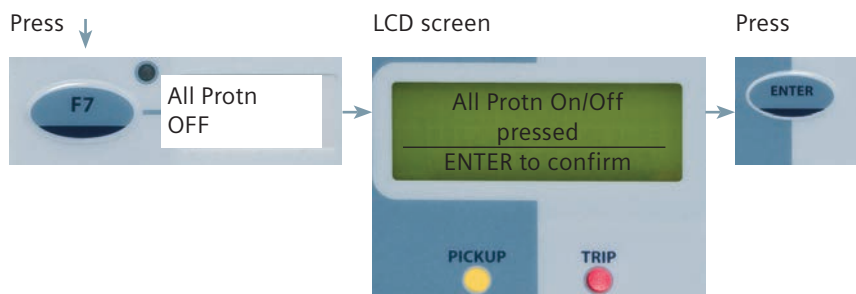
- Recloser will not open or close
  - Red LED at F5 will toggle on and off.
- LED:
- On = ground fault protection disabled
  - Off = ground fault protection enabled.

**Example 6: toggle SEF protection on and off**



- Recloser will not open or close
  - Red LED at F6 will toggle on and off.
- LED:
- On = SEF protection disabled
  - Off = SEF protection enabled.

**Example 7: toggle all protection on and off**



- Recloser will not open or close
  - Red LED at F7 will toggle on and off.
- LED:
- On = all protection disabled
  - Off = all protection enabled.

### Example 8: toggle instantaneous (fast) protection on and off

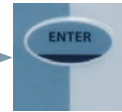
Press ↓



LCD screen



Press



- Recloser will not open or close
- Red LED at F8 will toggle on and off.

LED:

- On = INST (fast) protection disabled
- Off = INST (fast) protection enabled.

# Type 7SR224 protection and control relay navigation tree

The following pages will present the navigation tree of the relay settings tree using the navigation buttons.

For all arrows pointing →, press



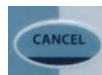
For all arrows pointing ↓, press



To scroll up ↑, press



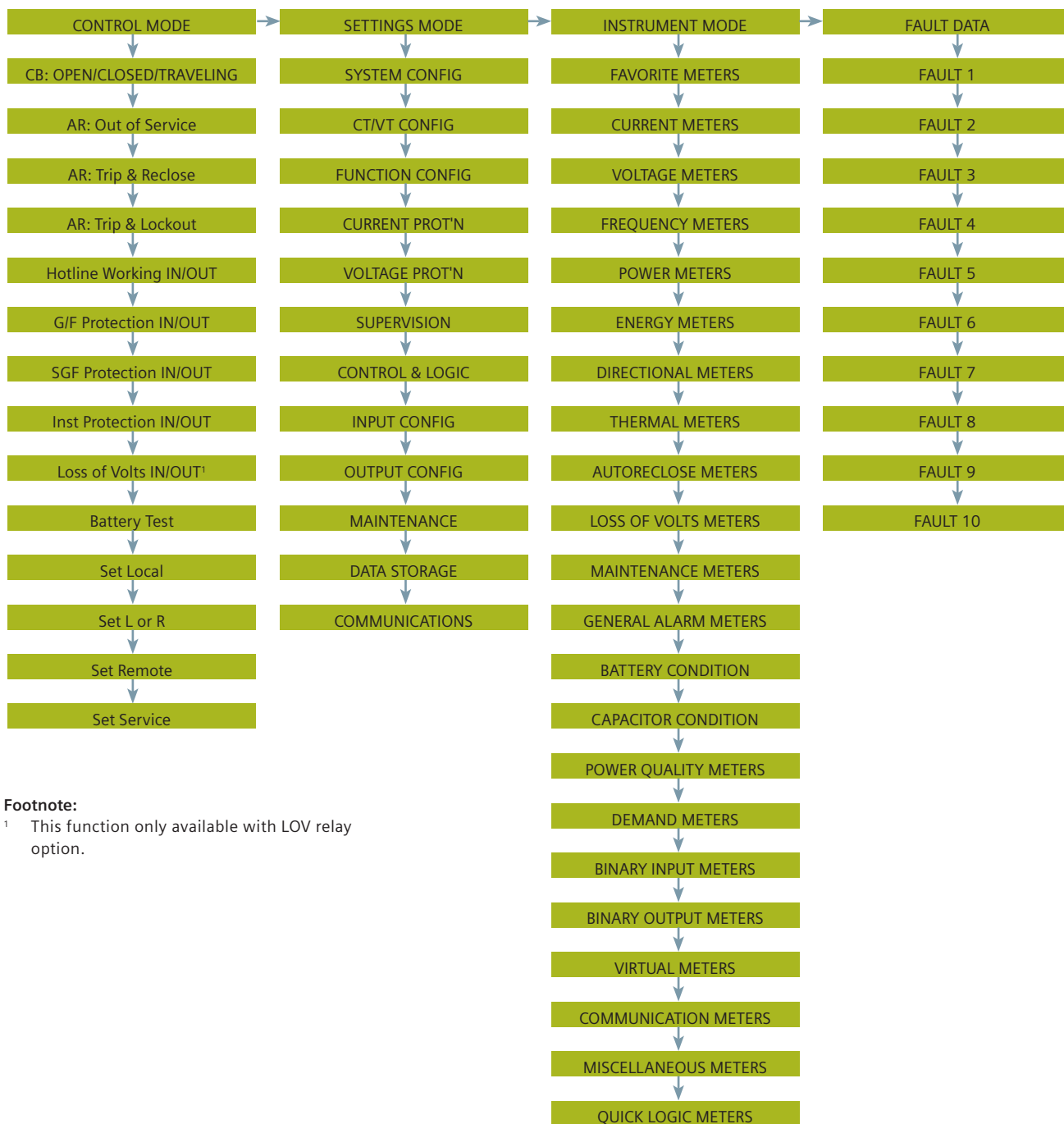
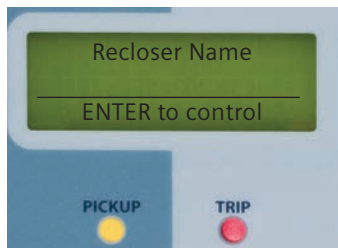
To go back one level, press



To select, press



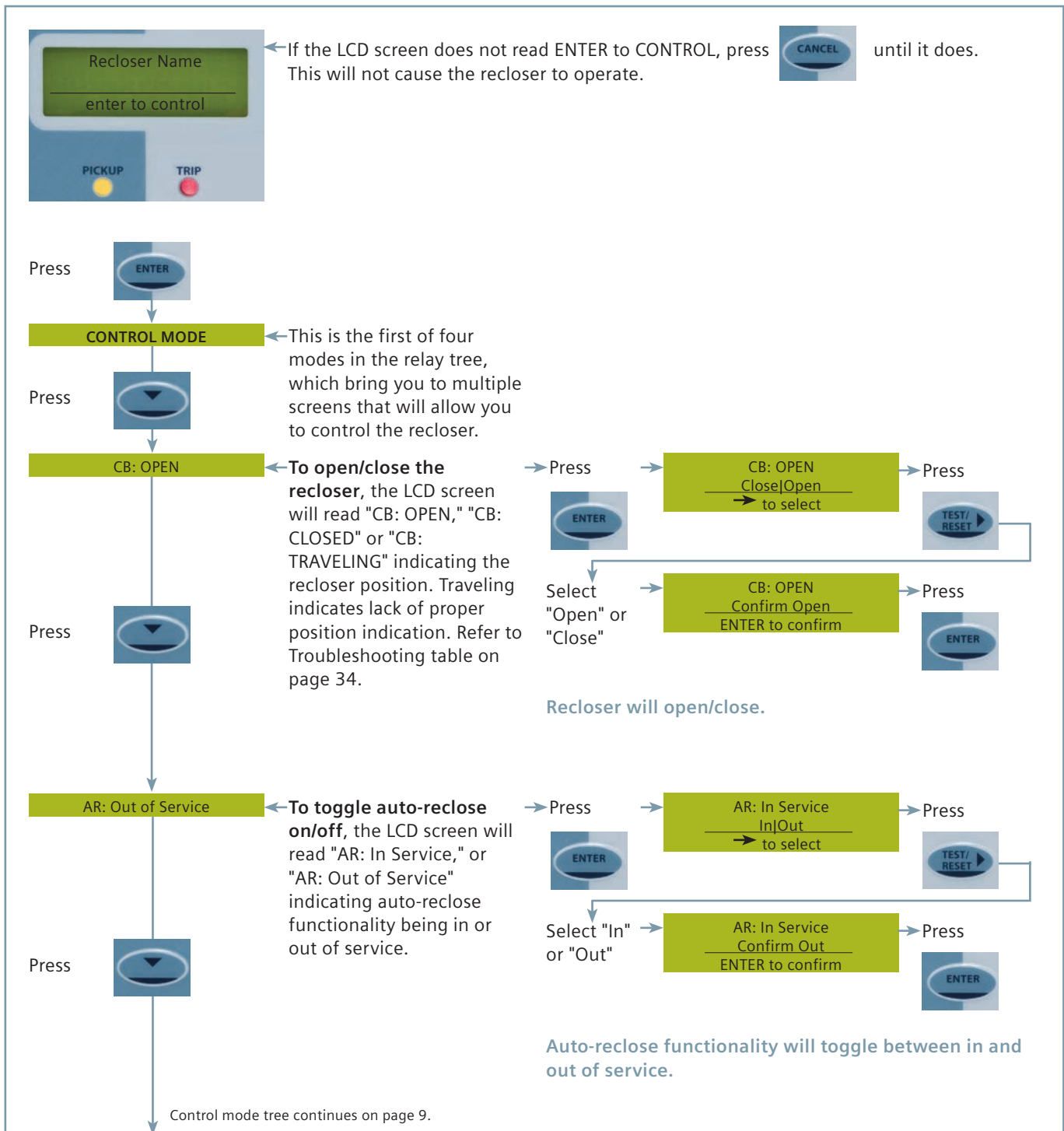
For detailed settings mode tree, please refer to page 12.



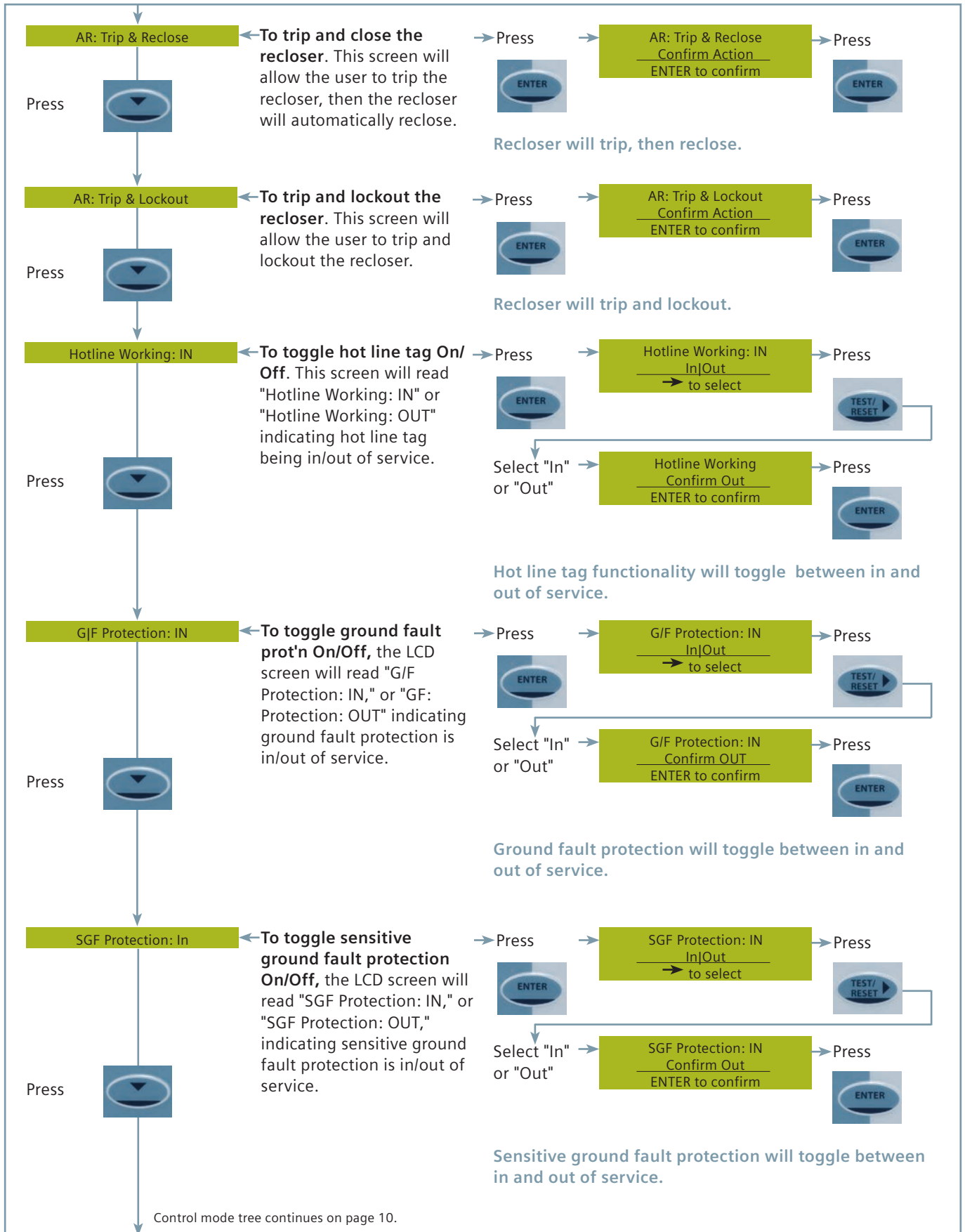
**Footnote:**

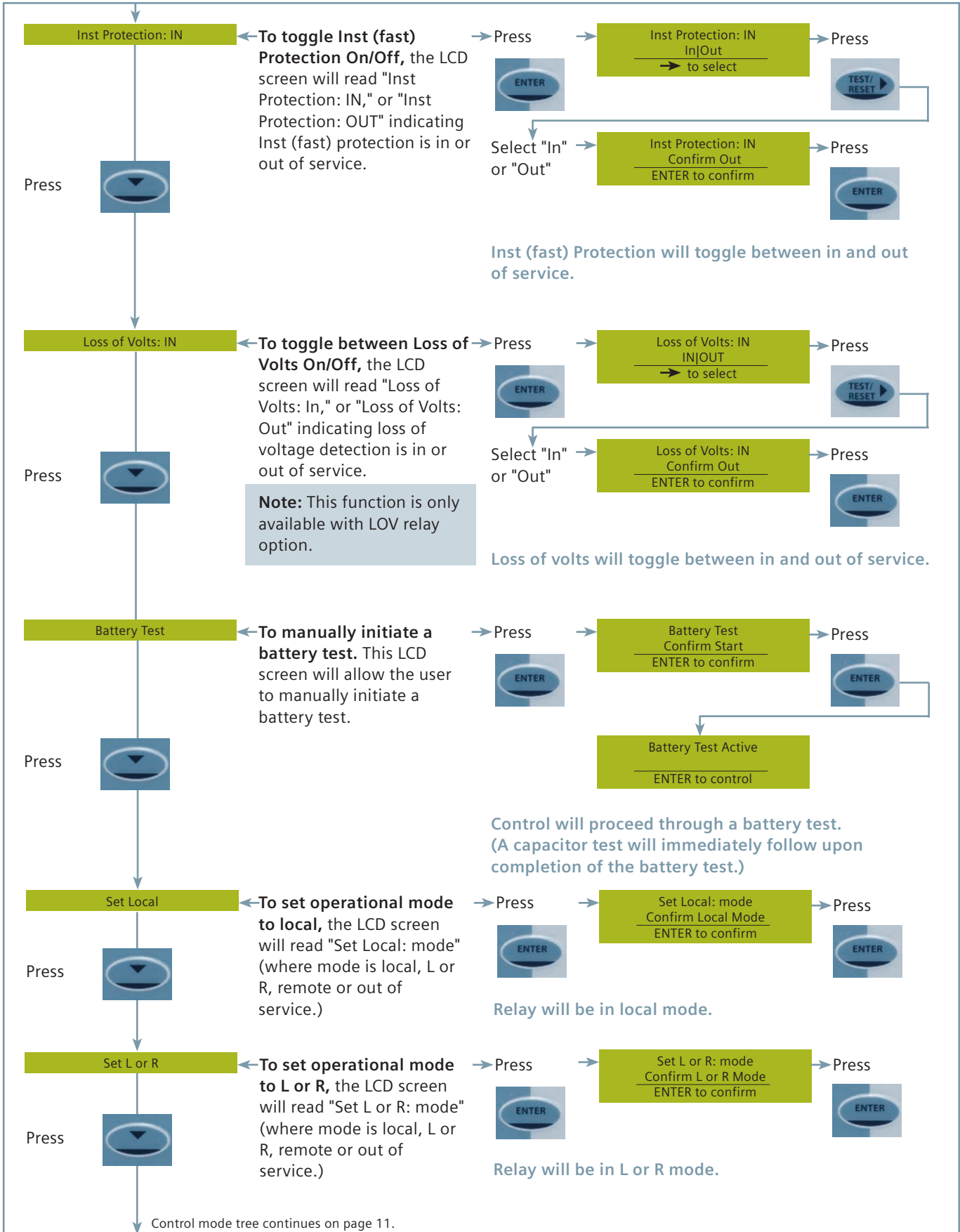
<sup>1</sup> This function only available with LOV relay option.

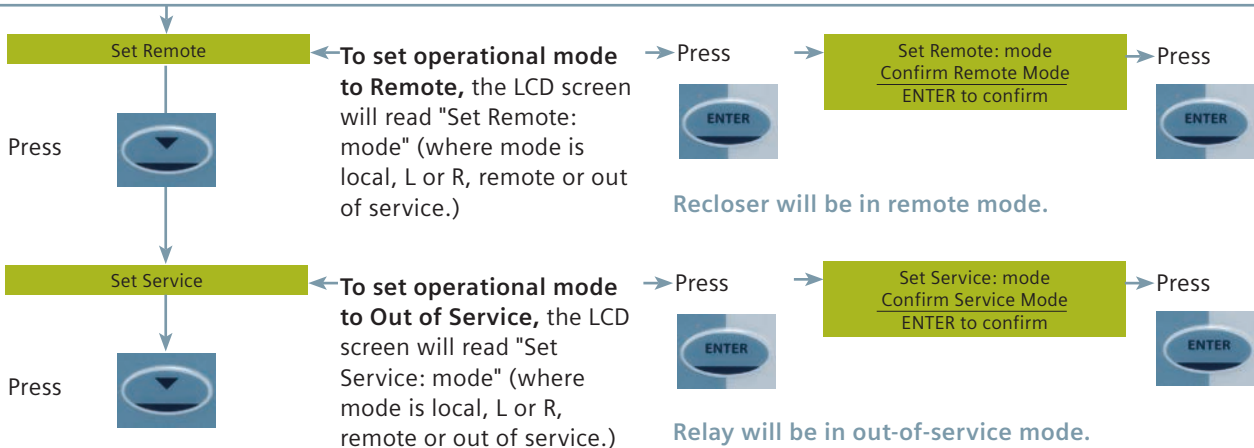
# Control mode tree





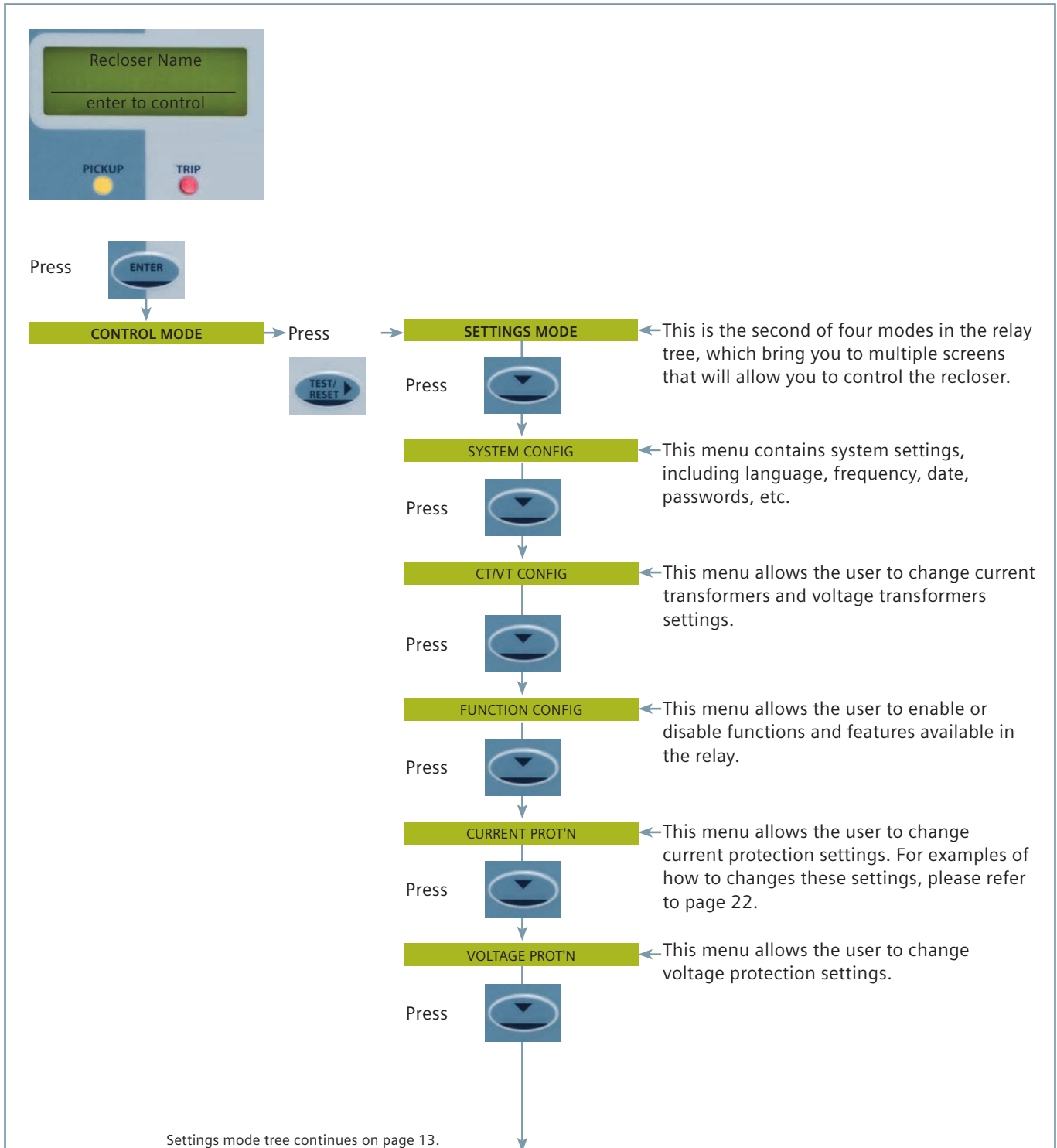


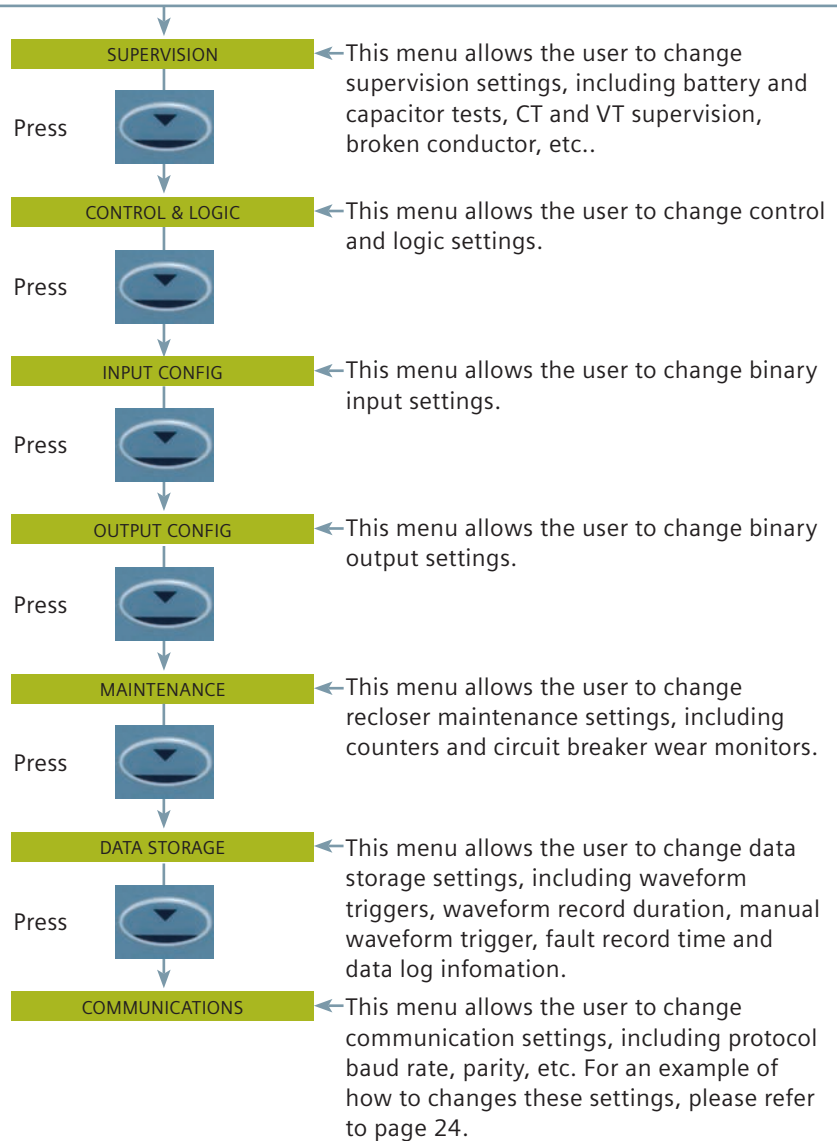




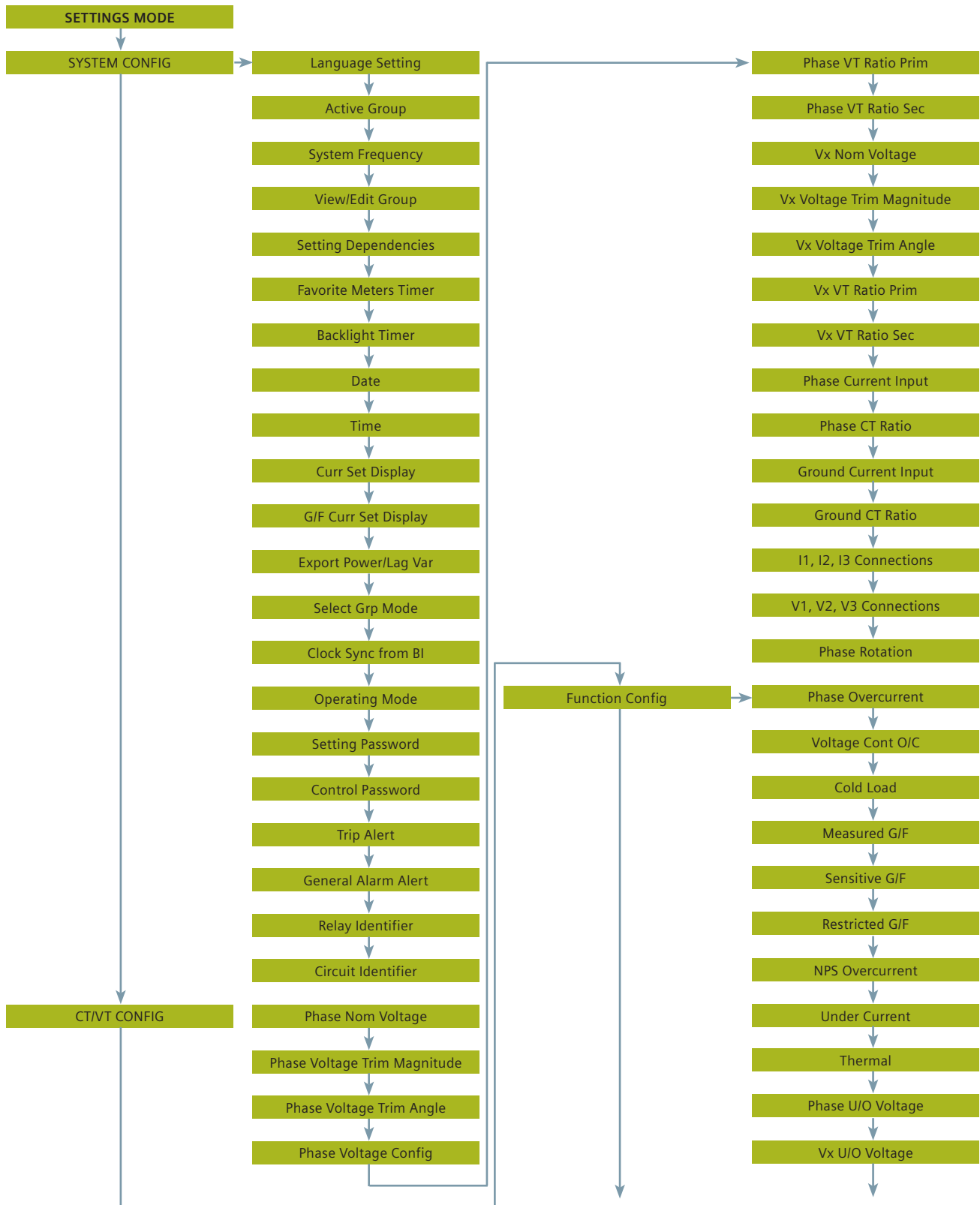
**Note:** The Out of Service mode will inhibit all local and remote control of relay. To regain local control, refer to Changing the Operating Mode from the settings tree on page 23.

# Settings mode tree





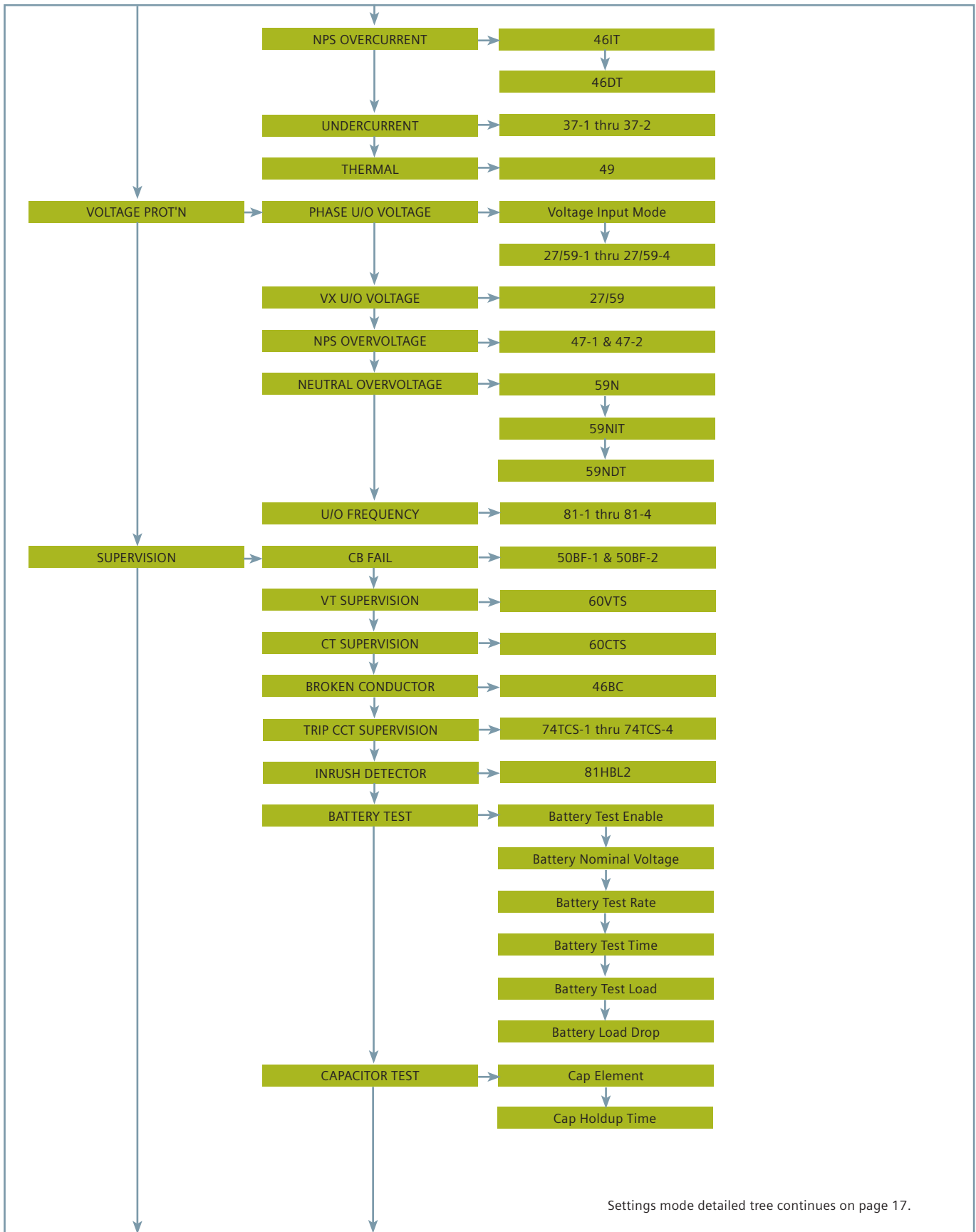
### Settings mode detailed tree structure



Settings mode detailed tree continues on page 15.

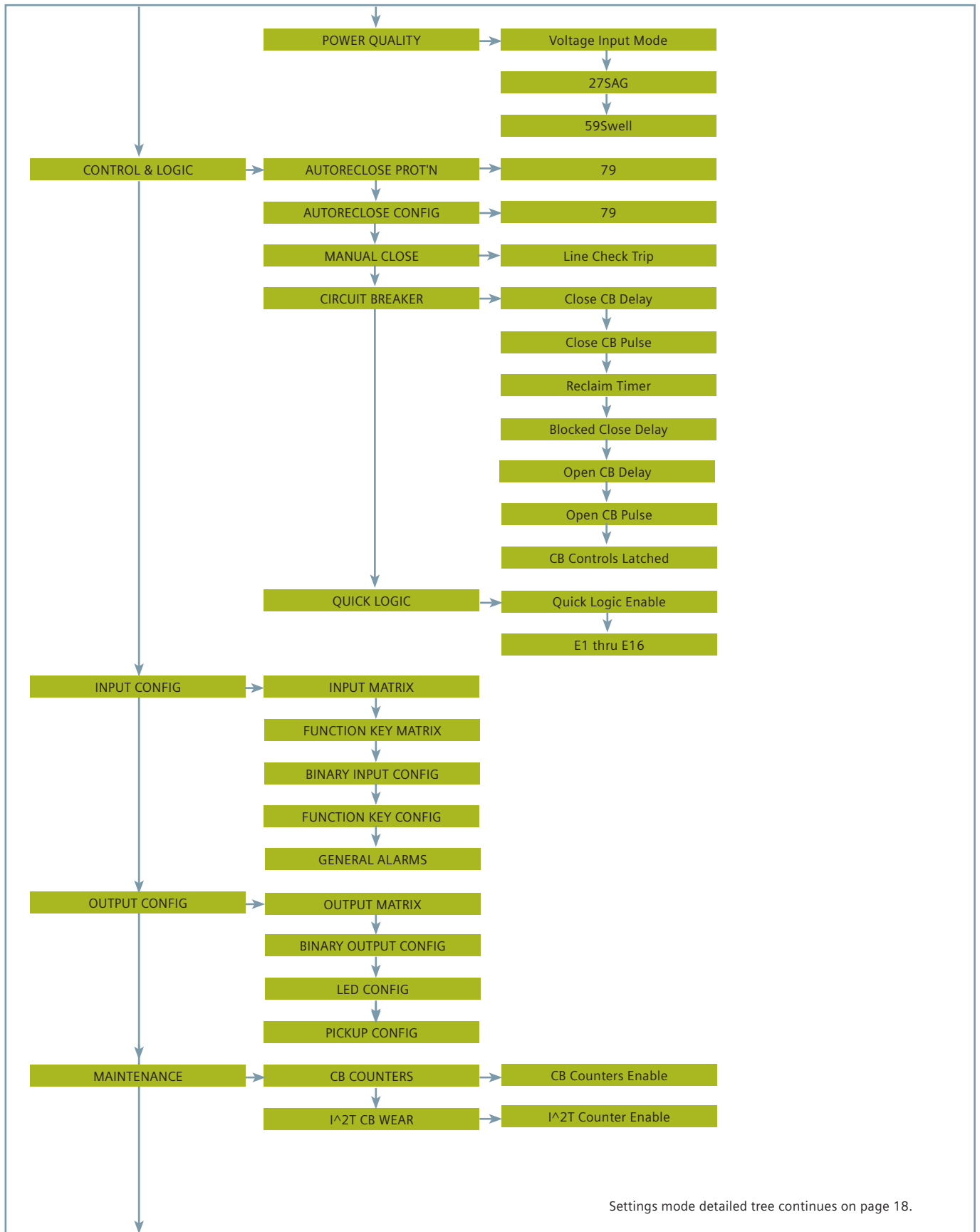


Settings mode detailed tree continues on page 16.

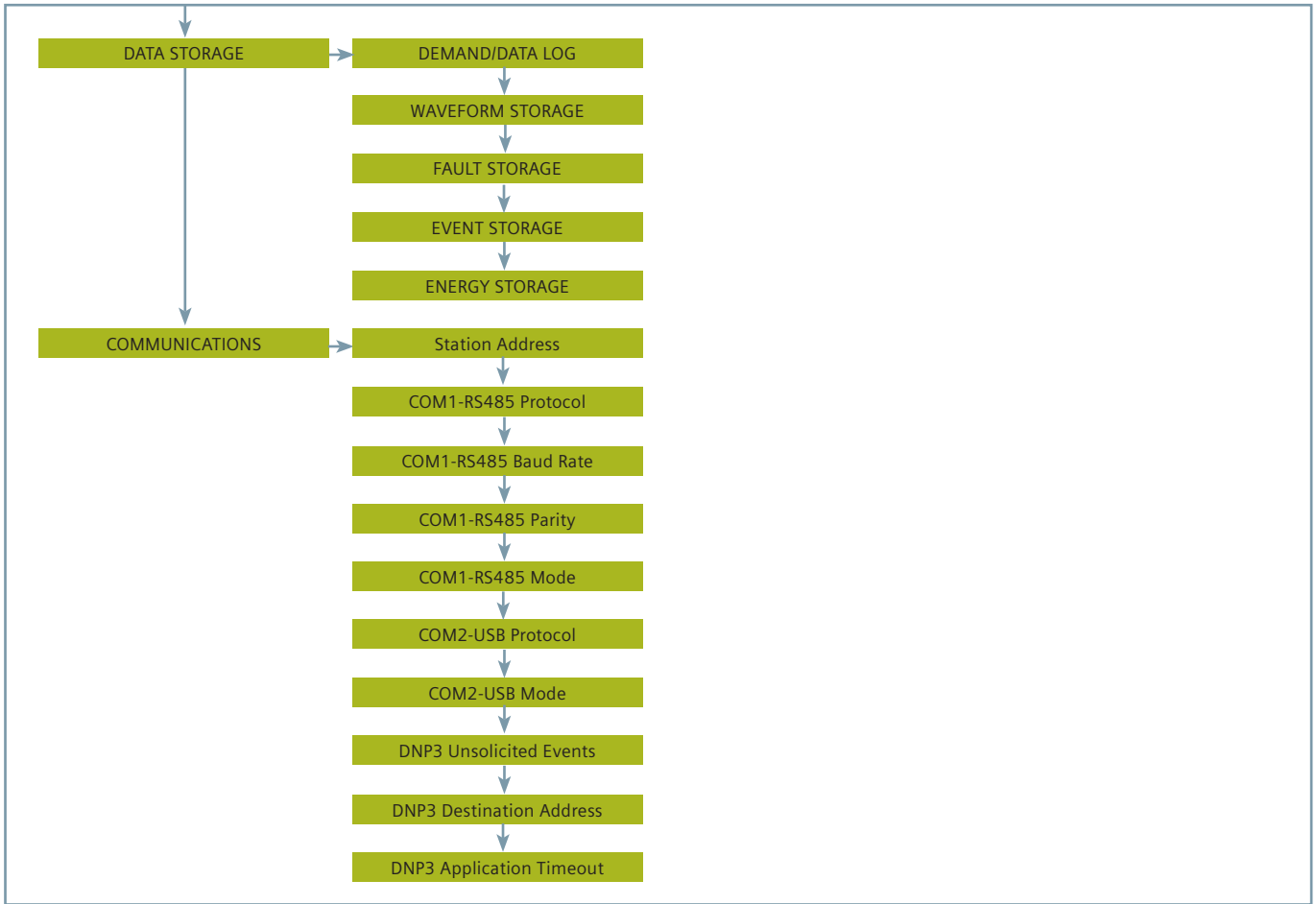


Settings mode detailed tree continues on page 17.



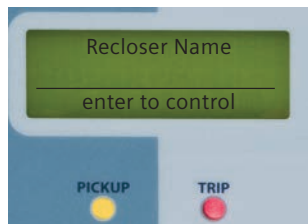



Settings mode detailed tree continues on page 18.

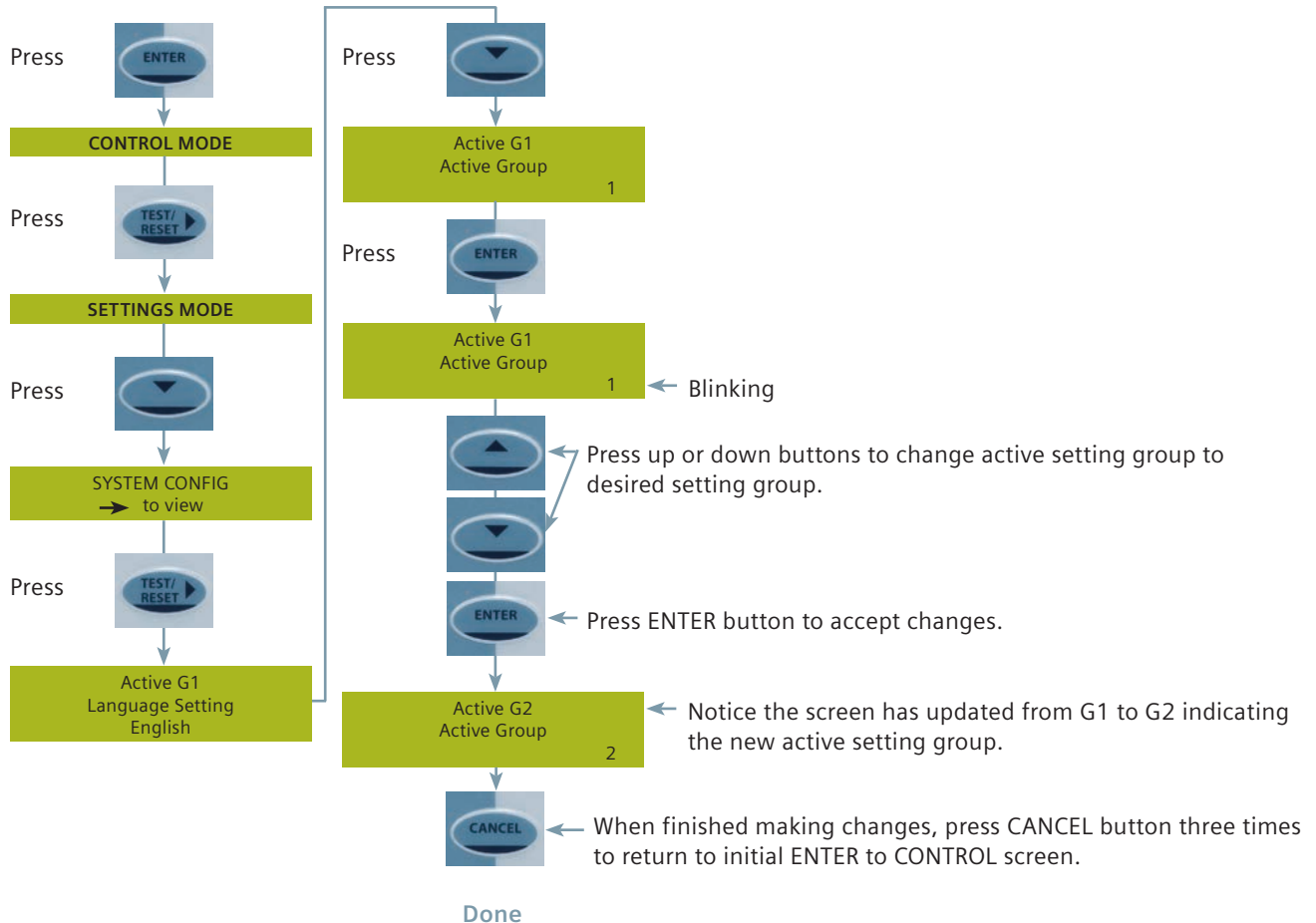


# Settings change examples

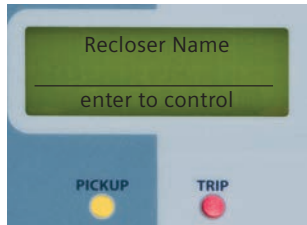
## Example 1: changing the active settings group




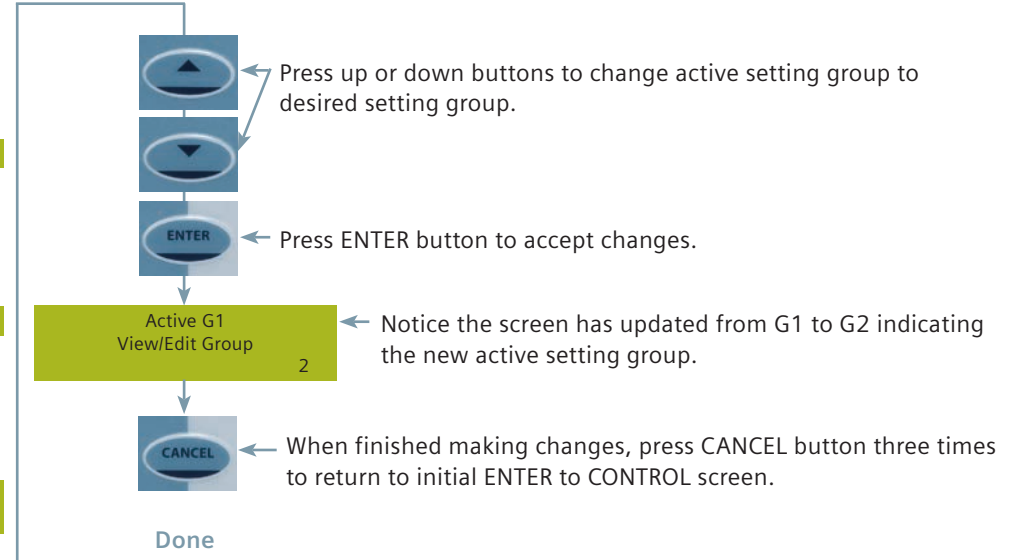
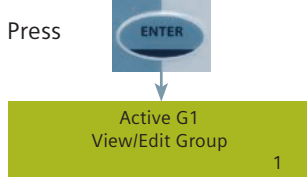
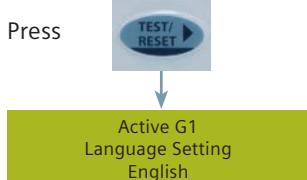
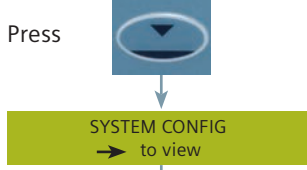
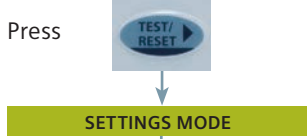
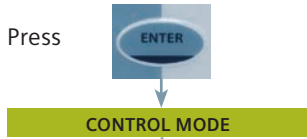
If the LCD screen does not read ENTER to CONTROL, press  until it does. This will not cause the recloser to operate.



Example 2: changing the settings group that you are viewing/editing

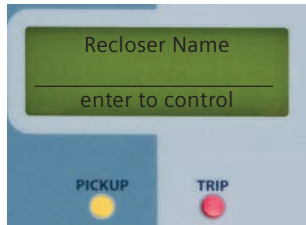



← If the LCD screen does not read ENTER to CONTROL, press  until it does. This will not cause the recloser to operate.

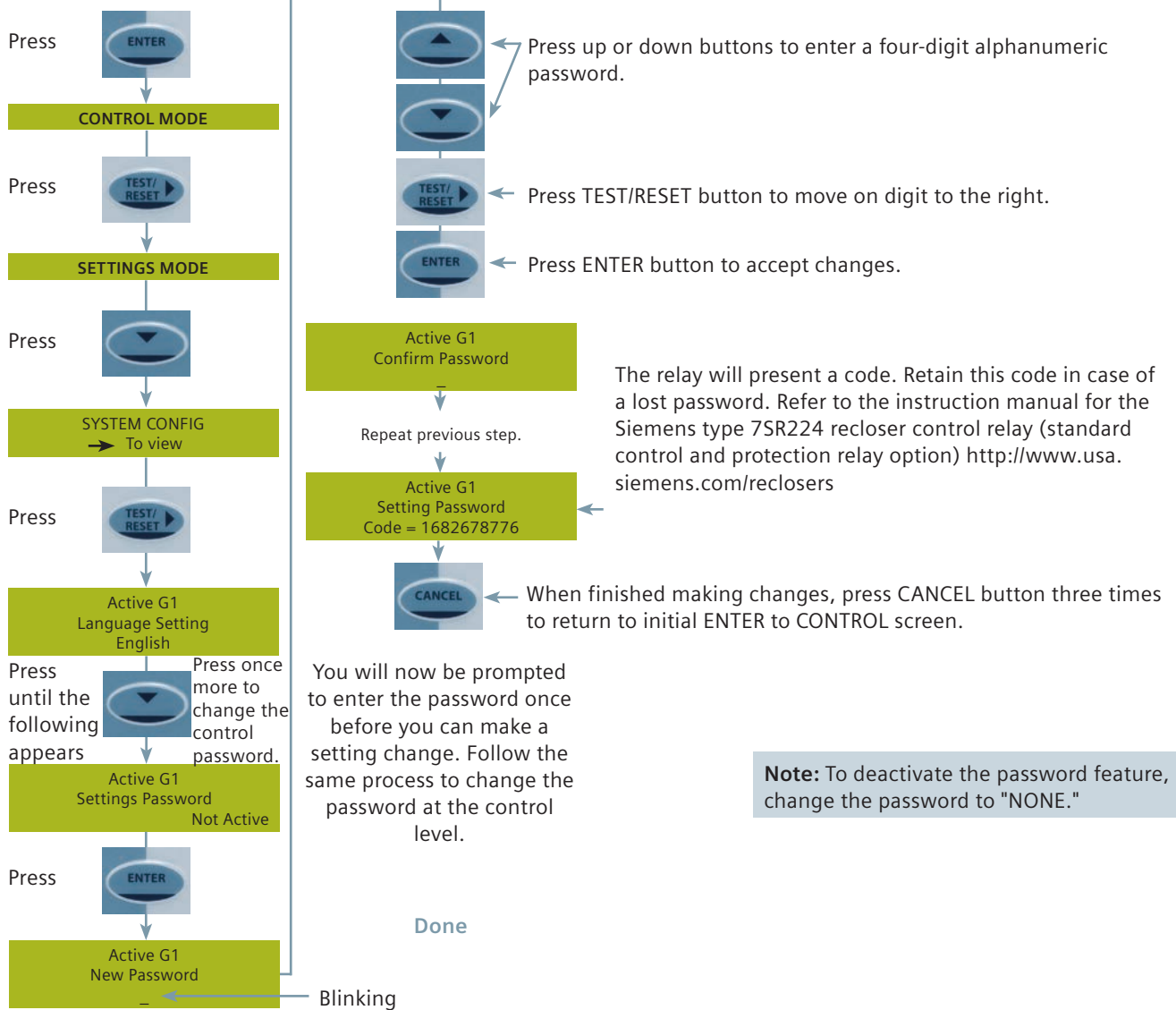


← Blinking

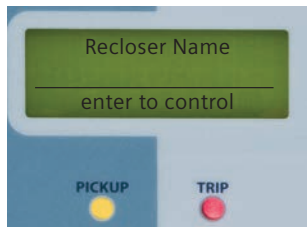
### Example 3: changing a password




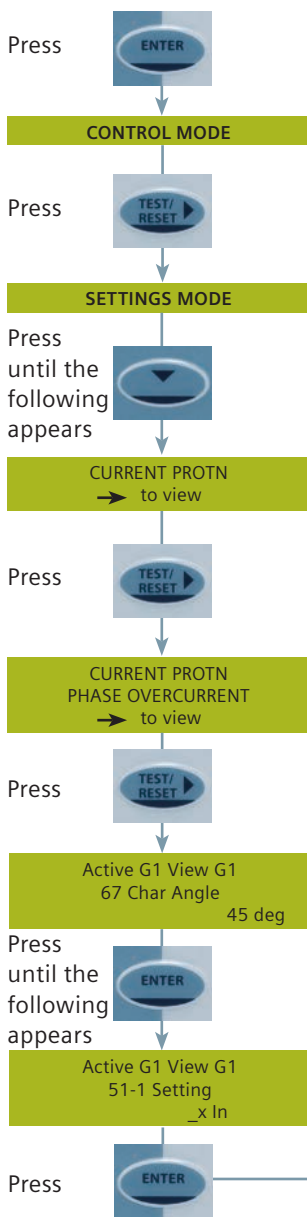
← If the LCD screen does not read ENTER to CONTROL, press  until it does. This will not cause the recloser to operate.



Example 4: changing the pickup level of phase overcurrent element 51-1



← If the LCD screen does not read ENTER to CONTROL, press  until it does. This will not cause the recloser to operate.



Active G1 View G1  
51-1 Setting  
\_x In

← Blinking



← Press up or down buttons to change desired pickup level to desired current level.

← Press ENTER button to accept changes.

Active G1 View G1  
51-1 Setting  
\_x In



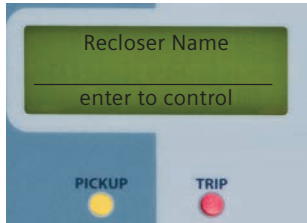
← When finished making changes, press CANCEL button four times to return to initial ENTER to CONTROL screen.


Done

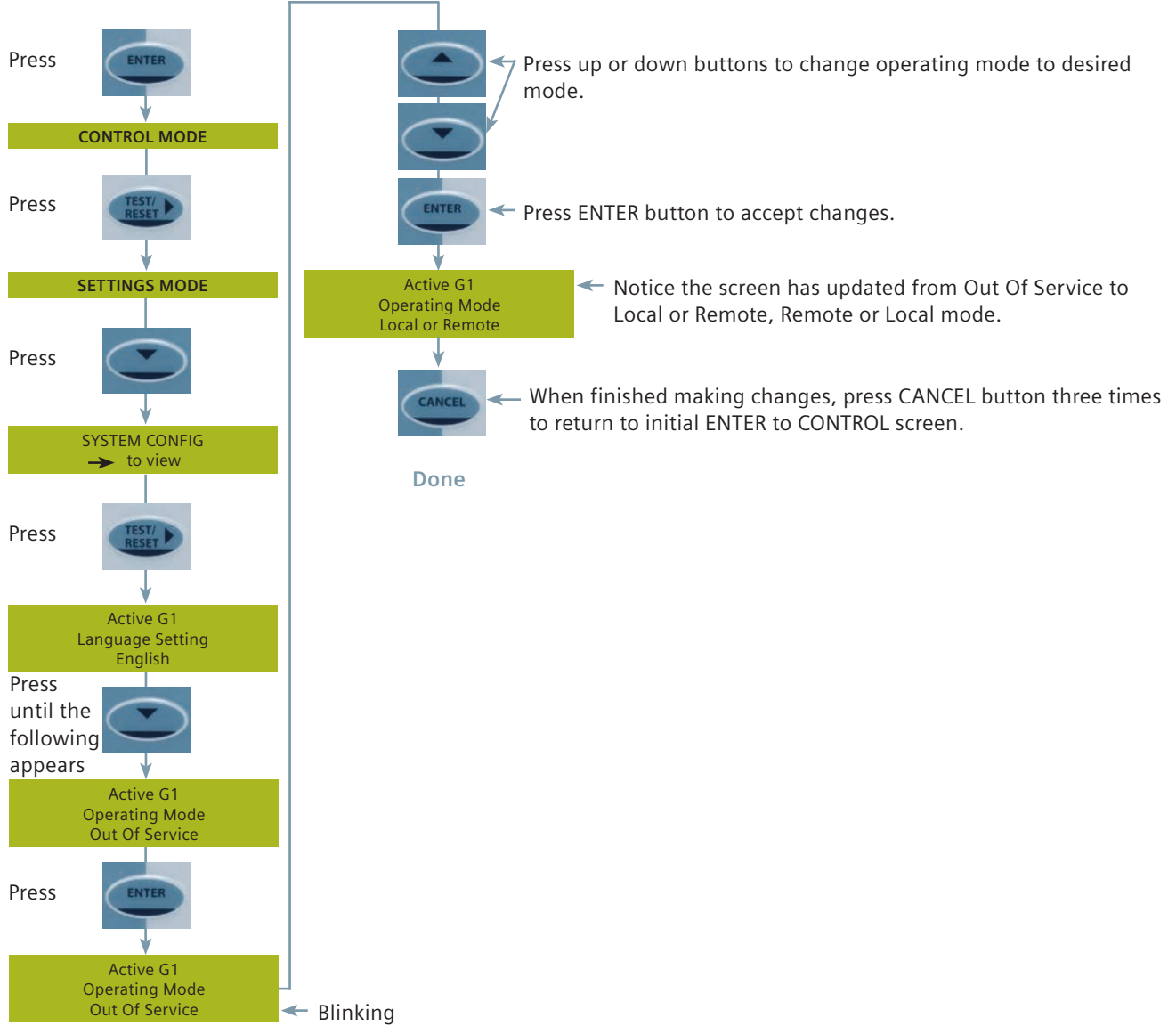
**Note:** "\_xIn" refers to the value times the nominal current that equals the trip setting. In = 800 A for type SDR reclosers.

**Note:** "Active G1 View G1" means that the active group settings group is group 1. If this is not the group you wish to edit, follow the instructions in Example 2 on page 19 to change the settings group.

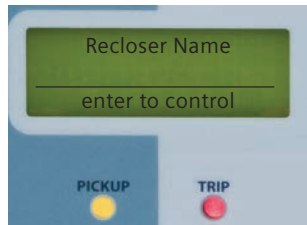
Example 5: changing the operating mode from the settings tree




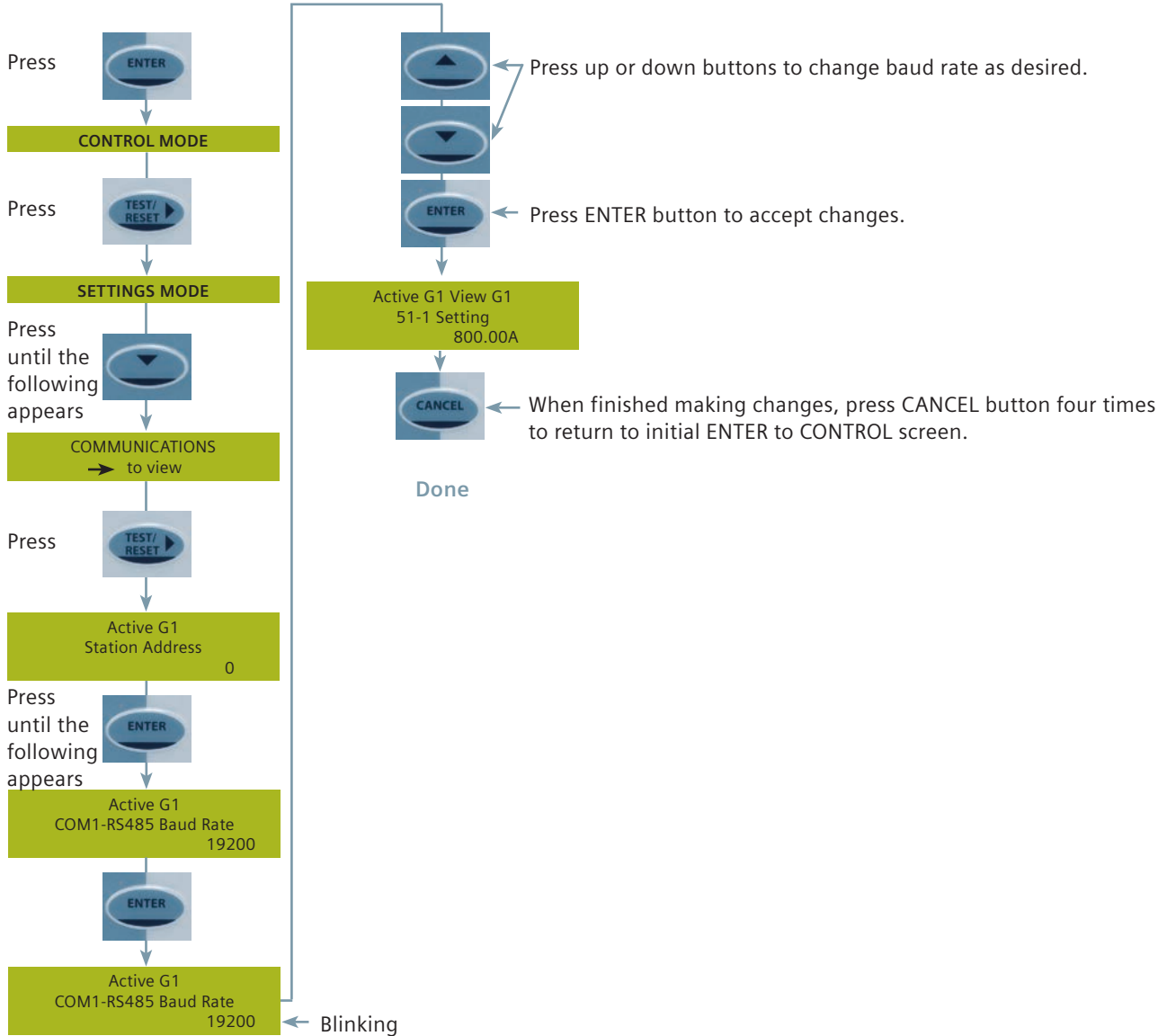
← If the LCD screen does not read ENTER to CONTROL, press  until it does. This will not cause the recloser to operate.



Example 6: changing the baud rate on COM1

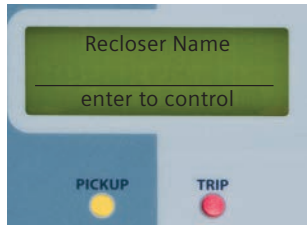


← If the LCD screen does not read ENTER to CONTROL, press  until it does. This will not cause the recloser to operate.





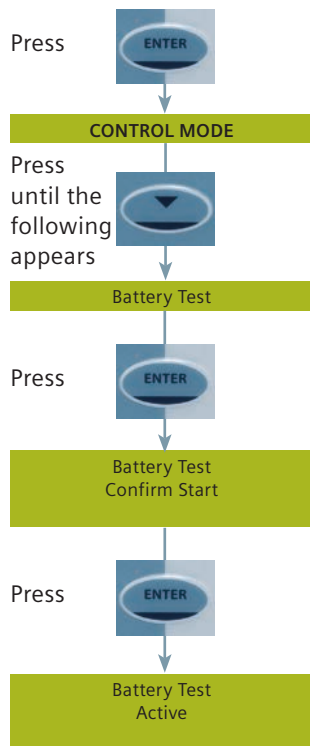
### Example 7: manually initiating the battery test



← If the LCD screen does not read ENTER to CONTROL, press  
This will not cause the recloser to operate.



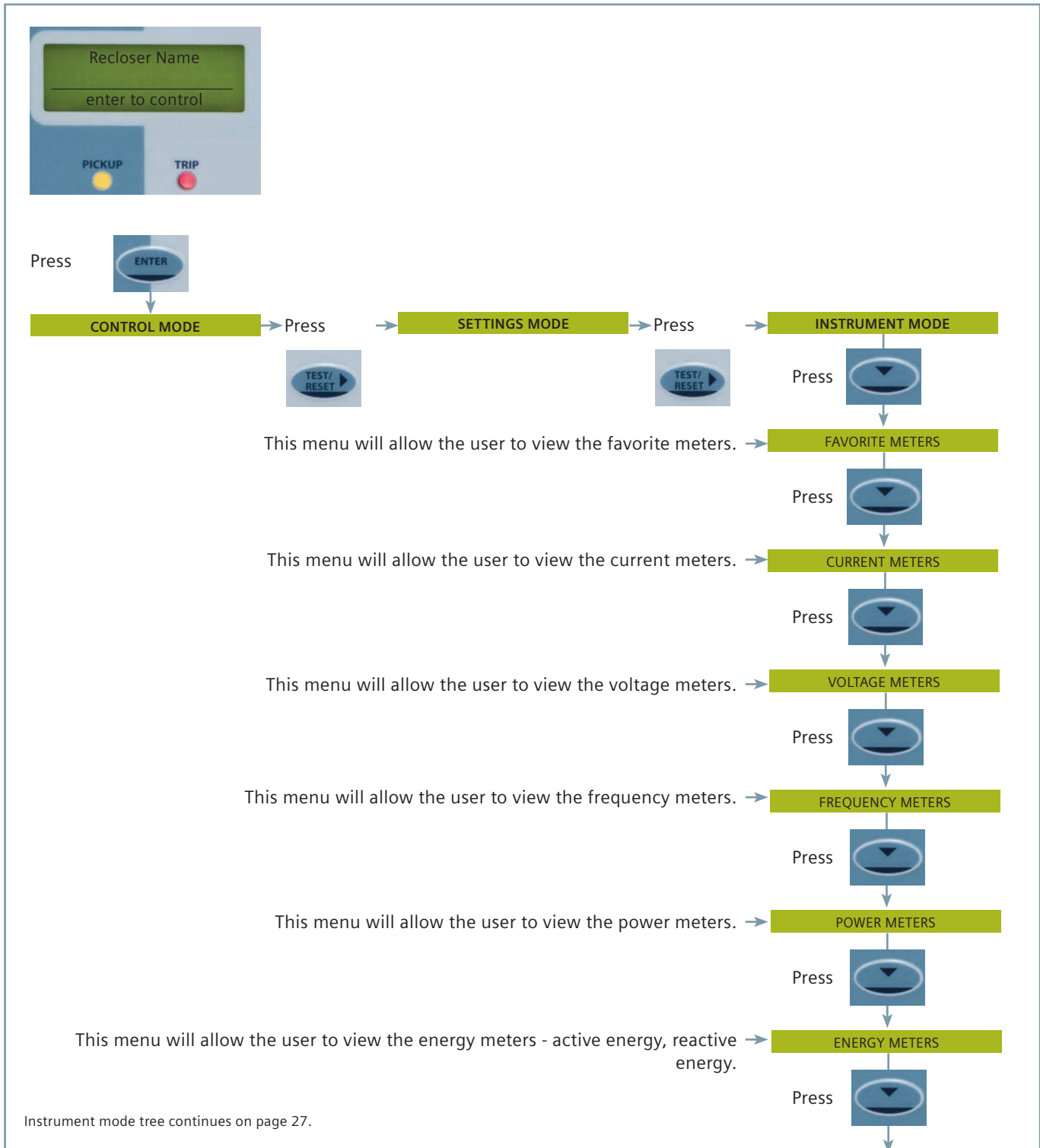
until it does.



**Note:** Result will be displayed at end of test.

Done

# Instrument mode tree



This menu will allow the user to view the directional meters if directional current elements are used.

DIRECTIONAL METERS

Press



This menu will allow the user to view the thermal meters.

THERMAL METERS

Press



This menu will allow the user to view the auto-reclose meters.

AUTORECLOSE METERS

Press



This menu will allow the user to view the loss-of-volts meters if loss-of-volts function is used. This is only available with the LOV relay option.

LOSS OF VOLTS METERS

Press



This menu will allow the user to view the maintenance meters - counters.

MAINTENANCE METERS

Press



This menu will allow the user to view the general alarm meters, which indicates which alarms are present.

GENERAL ALARM METERS

Press



This menu will allow the user to view the battery condition meters.

BATTERY CONDITION

Press



This menu will allow the user to view the capacitor condition meters.

CAPACITOR CONDITION

Press



This menu will allow the user to view the power quality meters: SIARFI, SMARFI, Interrupts, etc.

POWER QUALITY METERS

Press



This menu will allow the user to view the demand meters.

DEMAND METERS

Press



Instrument mode tree continues on page 28.

This menu will allow the user to view the binary input meters -  
\_ indicates status is low, 1 indicates status is high.

BINARY INPUT METERS

Press



This menu will allow the user to view the binary output meters -  
\_ indicates status is low, 1 indicates status is high.

BINARY OUTPUT METERS

Press



This menu will allow the user to view the virtual meters -  
\_ indicates status is low, 1 indicates status is high.

VIRTUAL METERS

Press



This menu will allow the user to view the communications meters.

COMMUNICATION METERS

Press



This menu will allow the user to view the miscellaneous meters:  
date, time, waveform records, fault records, event records and data log records.

MISCELLANEOUS METERS

Press

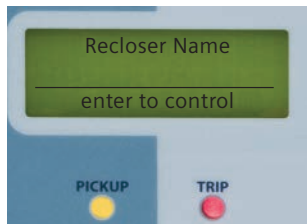



This menu will allow the user to view the quick logic meters -  
\_ indicates status is low, 1 indicates status is high.

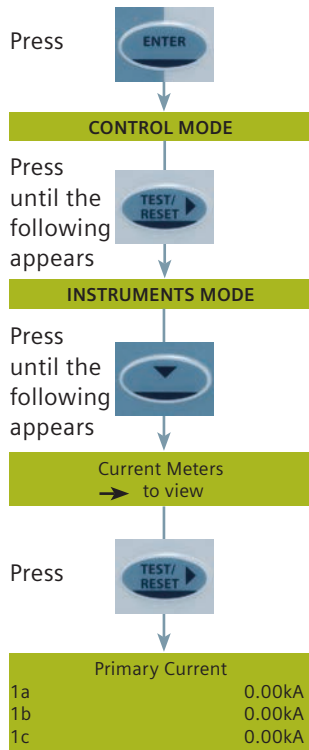
QUICK LOGIC METERS

# Viewing meter examples

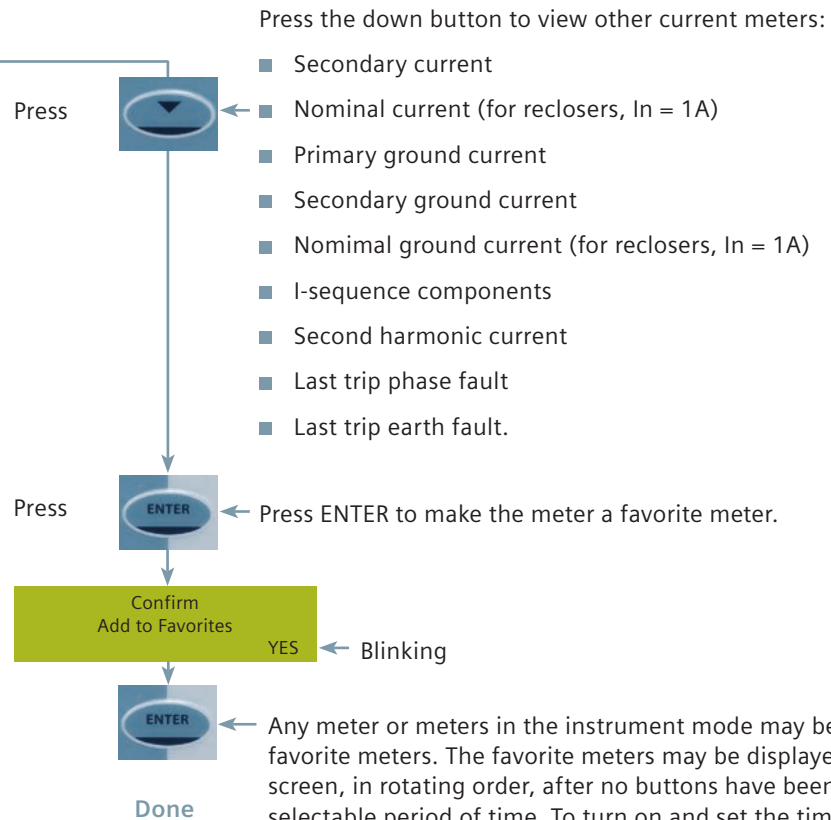
## Example 1: viewing the current meters and adding them to favorite meters



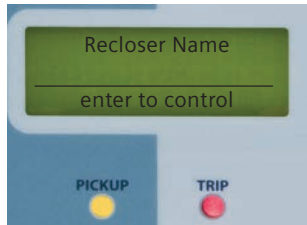
← If the LCD screen does not read ENTER to CONTROL, press  until it does. This will not cause the recloser to operate.




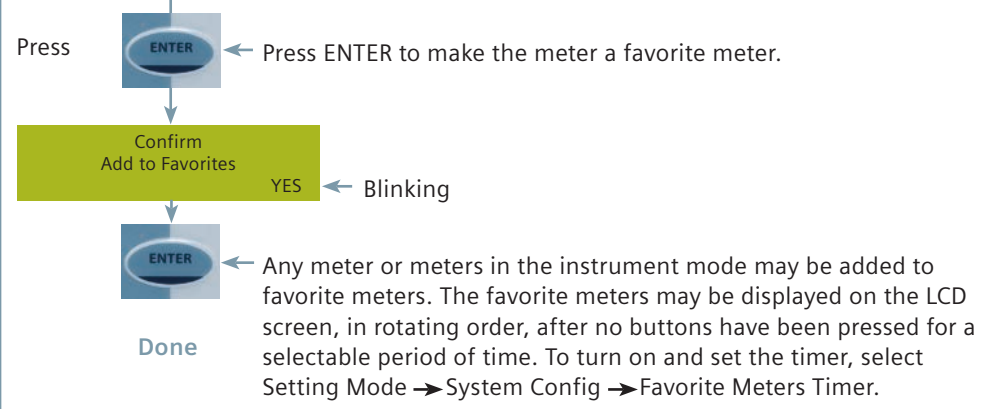
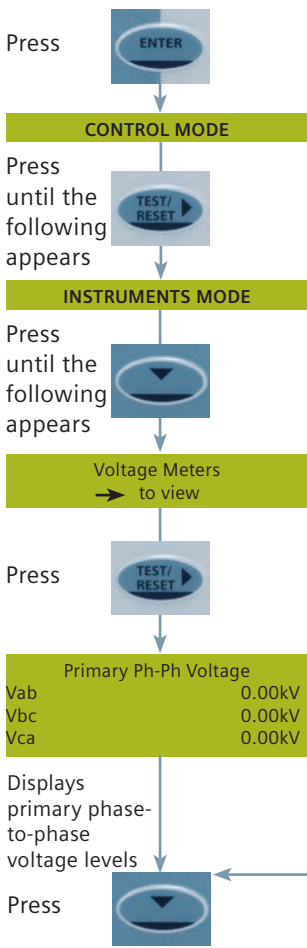
Displays primary current levels.



Example 2: viewing the voltage meters and adding them to favorite meters



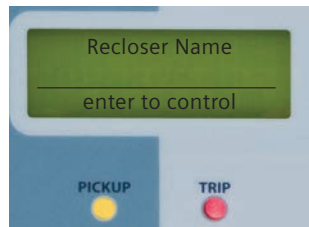
← If the LCD screen does not read ENTER to CONTROL, press  until it does. This will not cause the recloser to operate.




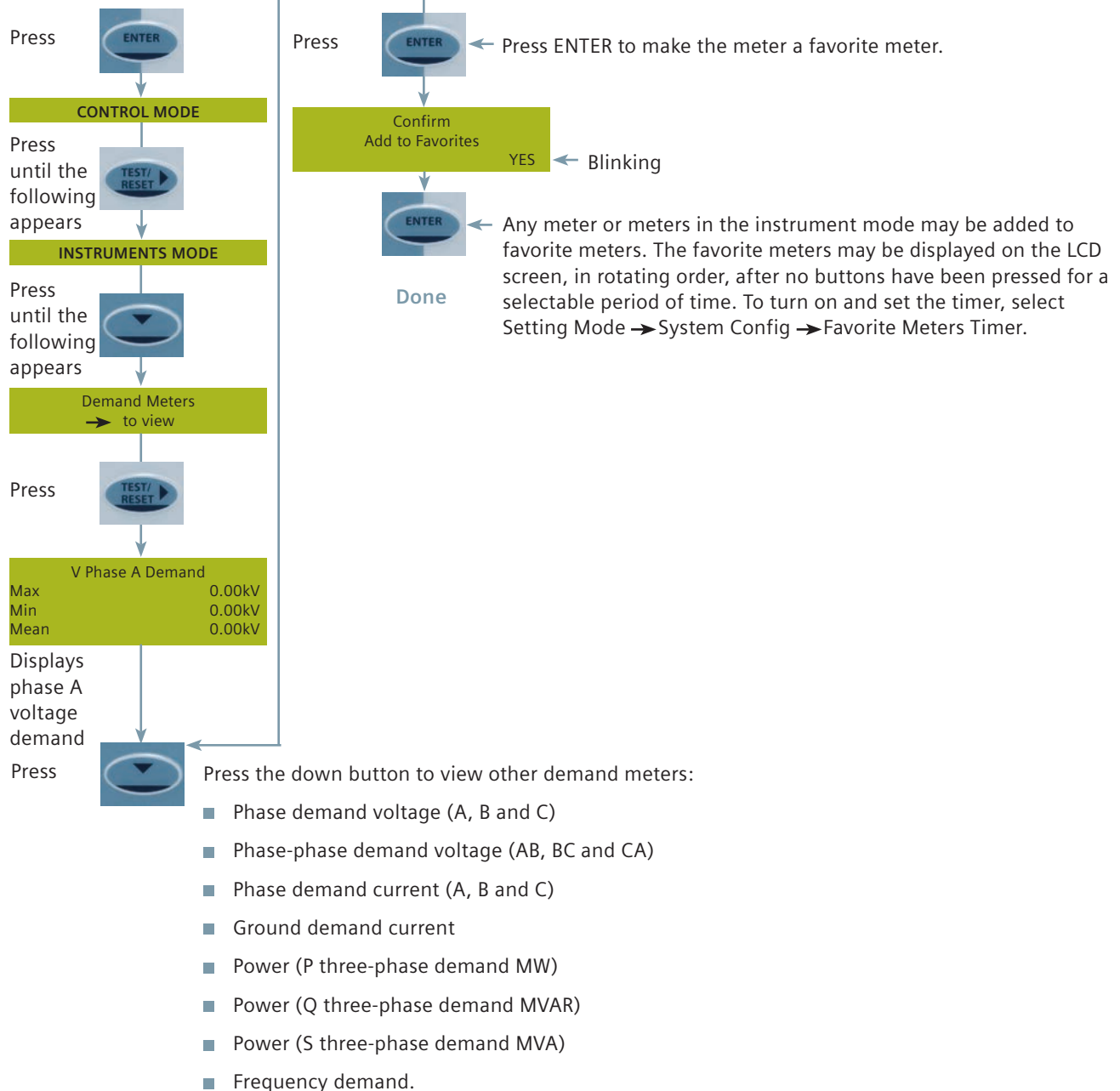
Press the down button to view other voltage meters:

- Secondary phase-phase voltage
- Nominal phase-phase voltage (for reclosers, Vn = 63.5 V)
- Primary phase-neutral voltage
- Secondary phase-neutral voltage
- Nominal phase-neutral voltage (for reclosers, Vn = 63.5 V)
- V-sequence components
- Calculated ground voltage
- CS/NVD voltage (VX)
- Last trip voltage.

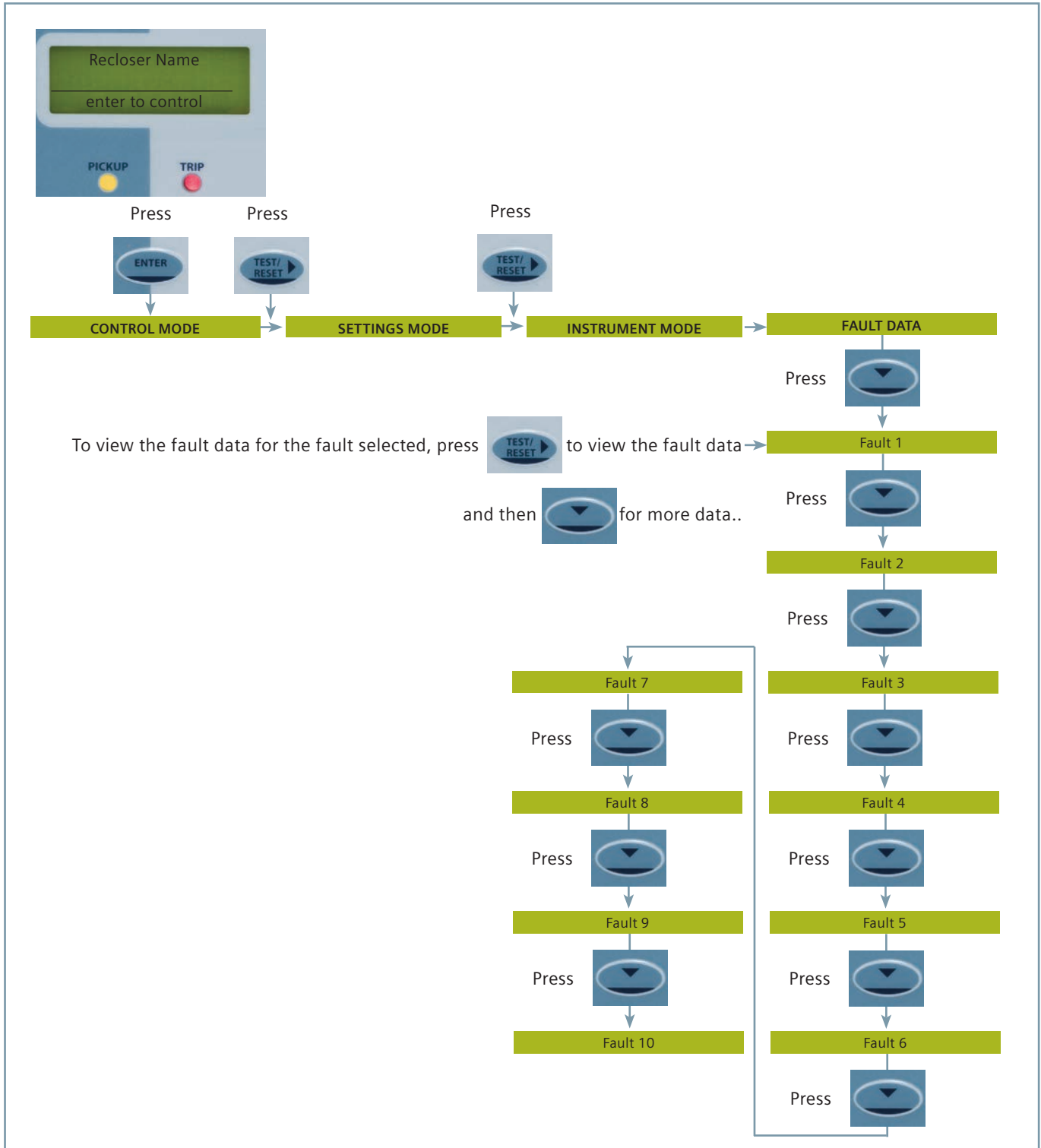
### Example 3: viewing the demand meters and adding them to favorite meters



If the LCD screen does not read ENTER to CONTROL, press  until it does. This will not cause the recloser to operate.



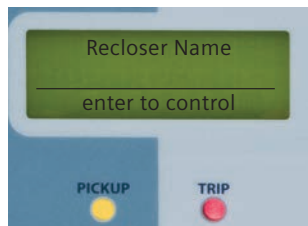
# Fault data mode tree






# Viewing fault data example

Example 1: fault data record 1



If the LCD screen does not read ENTER to CONTROL, press  until it does. This will not cause the recloser to operate.



CONTROL MODE

Press until the following appears

FAULT DATA MODE



Fault 1 03/04/09  
→ to view

Press TEST/RESET button

Fault 1 Page 1/6  
03/04/09  
14:57:28:00.300

Displays date and time of Fault 1.



Fault 1 Page 2/6  
G1 51G 46BC 50BF-1  
50-1 51-2

Displays elements that picked up during Fault 1.



Fault 1 Page 3/6  
Ia=0.304kA  
Ib=0.000kA

Displays Ia and Ib levels during Fault 1.



Fault 1 Page 4/6  
Ic=0.304kA  
In=0.060kA

Displays Ic and In levels during Fault 1.



Fault 1 Page 5/6  
Ig=0.060kA  
Va=0.000kV

Displays Ig and Va levels during Fault 1.

Fault 1 Page 6/6  
Vb=0.000kV  
Vc=0.000kV

Displays Vb and Vc levels during Fault 1.

Done

# Troubleshooting

Malfunction	Remedy
'AUX Power OK' LED not illuminated	<ol style="list-style-type: none"> <li>1. Check miniature circuit breaker CB1 and switch on if necessary.</li> <li>2. Check the status of the auxiliary power supply.</li> </ol>
'Recloser OK' LED not illuminated	Check the discharge switch on PCB2 circuit board and verify it is in the operating position.
Position indication shown as 'Travelling'	<p>Travelling' indicated that no position indication signals are received from the recloser or that both open and closed signals exist simultaneously.</p> <ol style="list-style-type: none"> <li>1. Check the recloser position.</li> <li>2. Check the control cable.</li> </ol>
Relay shows 'Out Of Service' and control mode and all buttons are not functional	Refer to example 5 on page 23 for instructions on returning the unit to desired operating mode.
Unit will not power up after a quick power cycle	Relay requires 10 seconds power down before rebooting. Remove power for this time interval and then restart.
A port error message is displayed	This error occurs when the relay chassis communications ports do not match the relay configuration. Replace the relay chassis with the proper model.
Relay does not appear to be responding as programmed	Verify that the 'Active' setting group matches the desired group number. Refer to examples 1 on page 19 and 2 on page 20.
Rear panel communications not functioning	Check the baud rate and parity settings for the selected communications port. Refer to example 6 on page 24.
Favorite meters do not display and scroll	Add desired meters to favorite meters and set favorite meters timer. Refer to Viewing Meter Examples beginning on page 29.

# Notes

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The information provided in this document contains merely general descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract.

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Order No.:  
E50001-F710-A410-X-4A00  
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