Instruction Booklet **IL131033EN** Effective April 2021

Instructions for the use, operation, and maintenance of type VCP-W complex electrical ground and test device (CEG&TD)

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Powering Business Worldwide

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⚠ WARNING

READ AND UNDERSTAND THESE INSTRUCTIONS BEFORE ATTEMPTING TO USE THIS DEVICE. IMPROPER USE CAN RESULT IN DEATH, BODILY INJURY, AND/OR PROPERTY DAMAGE. INSTALLATION OR MAINTENANCE SHOULD BE ATTEMPTED ONLY BY QUALIFIED PERSONNEL.

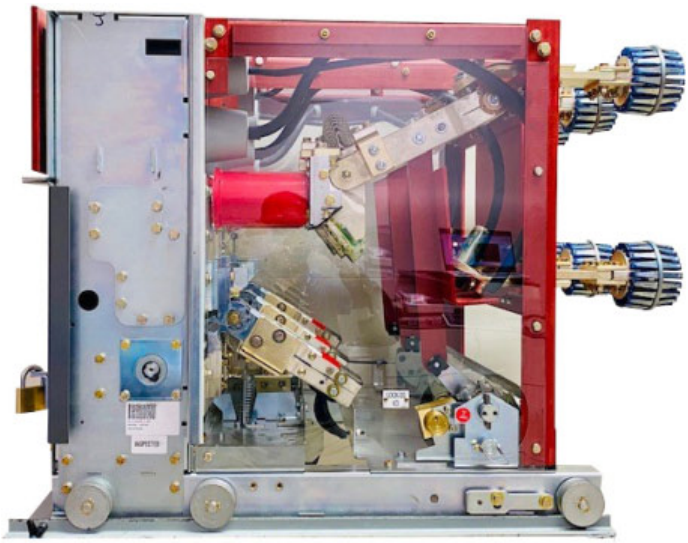
⚠ CAUTION

BECAUSE OF THE UNIQUE APPLICATION AND VAST VARIETY OF SYSTEM AND USER REQUIREMENTS, SPECIFIC OPERATING PROCEDURES MUST BE DEVELOPED BY THE USER. FAILURE TO DEVELOP THESE PROCEDURES COULD LEAD TO IMPROPER USE OR OTHER MORE SERIOUS CONSEQUENCES. ALL SAFETY CODES, SAFETY STANDARDS, AND/OR REGULATIONS AS THEY MAY BE APPLIED TO THIS TYPE OF EQUIPMENT MUST BE STRICTLY ADHERED TO.

1 Purpose

The VCP-W complex electrical ground and test device (CEG&TD) is designed for insertion into a VacClad-W metal-clad switchgear compartment (see **Figure 1**) to provide a safe and convenient means to:

1. Ground and test medium voltage circuits.
2. Perform cable testing by applying test voltage.
3. Perform phasing checks.



A: Type VCP-W complex electrical ground and test device (CEG&TD) – side view.

B: Type VCP-W complex electrical ground and test device (CEG&TD) - front view.

Figure 1. VCP-W CEG&TD – ungrounded state with all interlocks/padlocks engaged.

2 Description

The Eaton 5/15 kV Type VacClad-W Metal-clad switchgear housing assembly provides centralized control and protection of medium voltage power equipment and circuits in industrial, commercial, and utility installations involving generators, motors, and feeder circuits. Several built-in interlocks and safety features are provided.

The construction of the 5/15 kV type VacClad-W metal-clad switchgear allows for the placement of circuit breakers in the upper or lower positions. Breakers may be constructed as direct roll-in breakers or non-direct roll-in breakers. The design of the VCP-W direct roll-in breaker is constructed by adding a wheel kit to the standard VCP-W breaker. The upper position can be populated with any combination of auxiliary/auxiliary or a direct roll-in breaker.

If a lineup of switchgear is supplied with direct roll-in circuit breakers, both the upper and lower circuit breakers are supplied with direct roll-in wheel kits.

In the lower compartment, the top terminals normally connect to the main bus and the bottom terminals normally connect to the incoming line or outgoing feeders. In an upper compartment, the opposite normally holds true, i.e. the top terminals connect to the incoming line or outgoing feeders and the bottom terminals connect to the main bus (see **Figure 2**). **THIS MUST BE VERIFIED FOR EACH APPLICATION.**

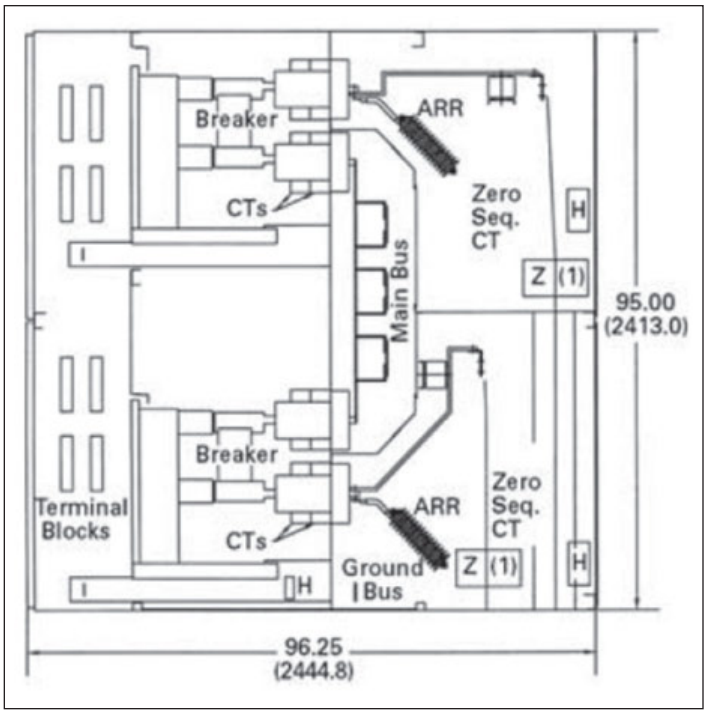
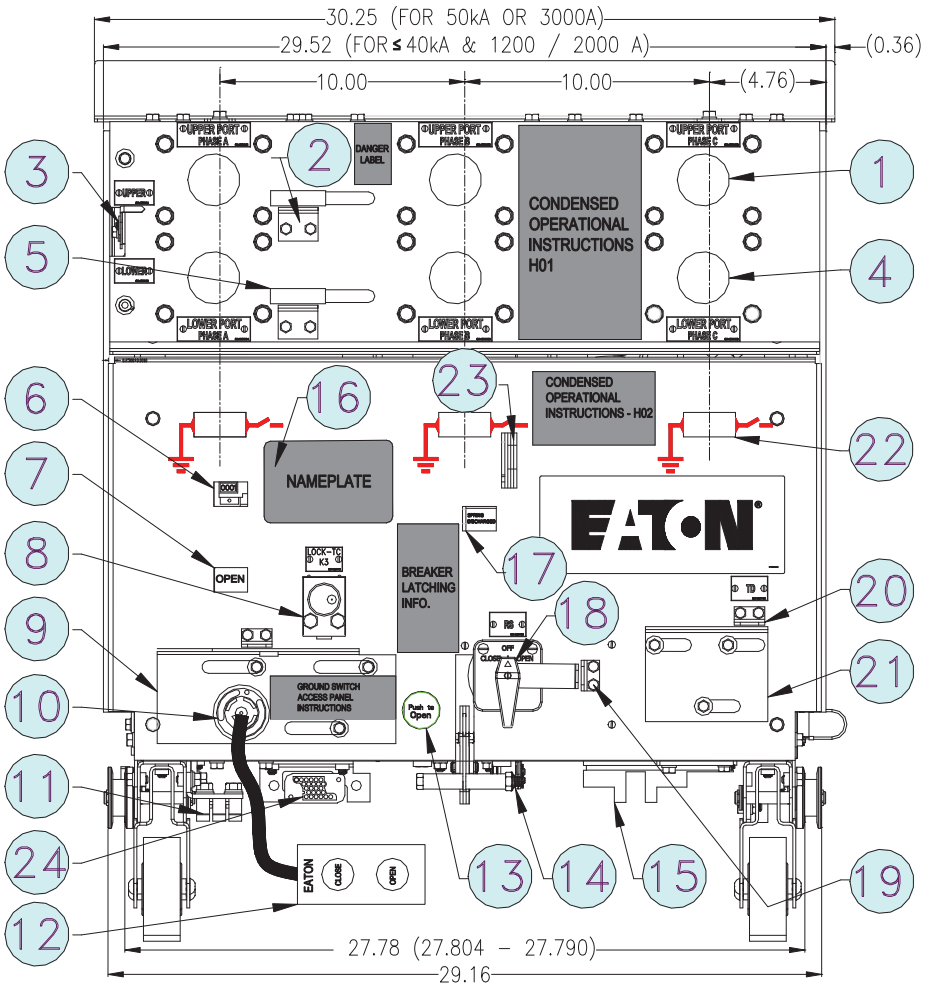


Figure 2. VacClad-W metal-clad switchgear (typical breaker over breaker configuration).

Because of this two-high arrangement, the bus and the line positions of the ground and test device (G&TD) terminals and test ports will vary depending upon whether the device is used in an upper or lower compartment. Therefore, the VCP-W complex electrical ground and test device (CEG&TD) terminal set and selector switch positions are referred to as "UPPER TERMINAL SET" and "LOWER TERMINAL SET". Therefore, the test ports are labeled "UPPER TERMINAL SET" and "LOWER TERMINAL SET", as per **Figure 3**.

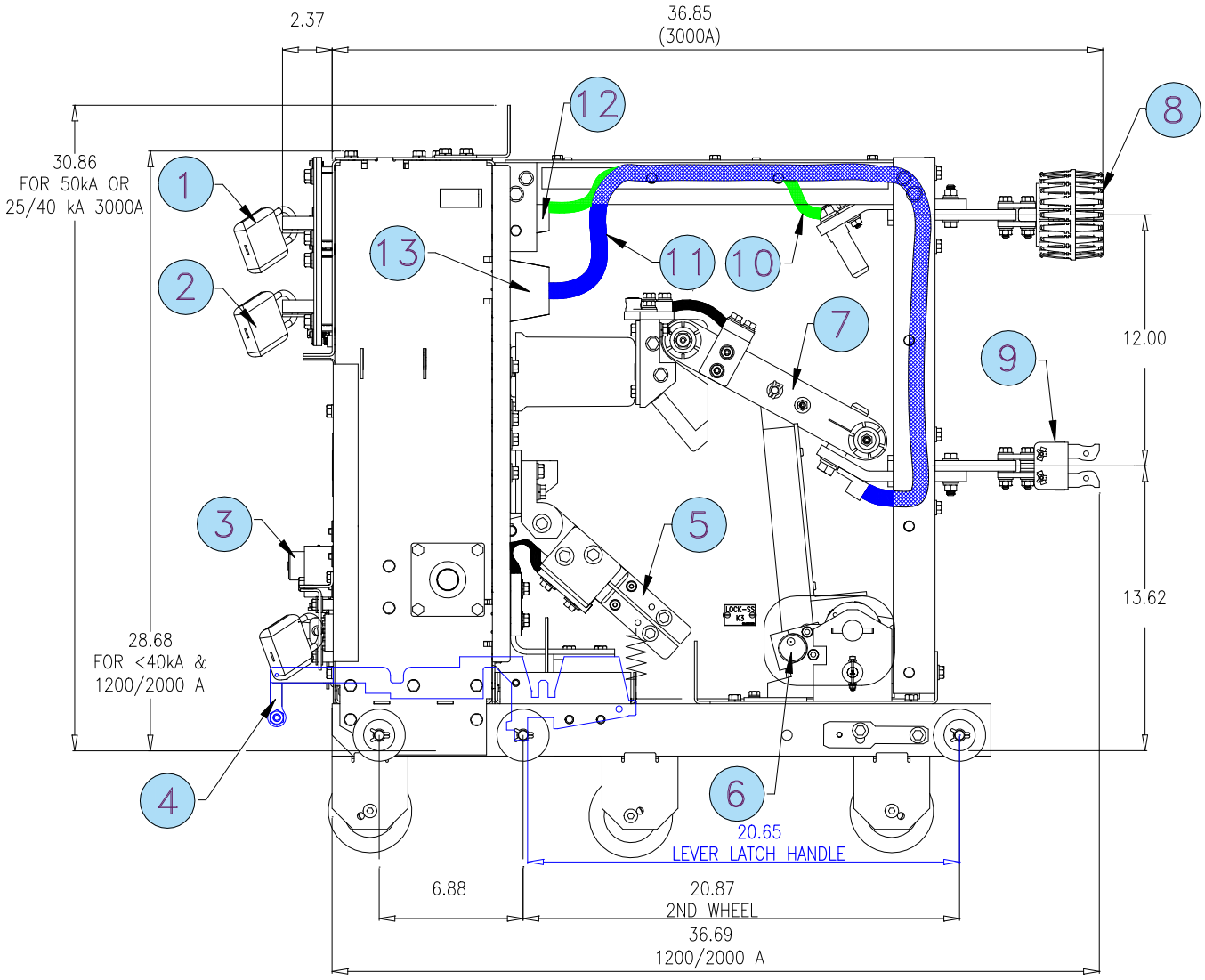


1. Upper terminal test ports
2. **Upper padlock** – Upper terminal test ports padlock (customer provided padlock)
3. Terminal selector switch position indicator
4. Lower terminal test ports
5. **Lower padlock** – Lower terminal test ports padlock (customer provided padlock)
6. Operation counter
7. Grounding switch position indicator
8. **Lock-TC** – Grounding switch operation key interlock (Operated by key **K3**)
9. Grounding switch access panel
10. Remote control switch receptacle
11. Ground contact
12. Remote control switch
13. Manual open button
14. Open floor tripper
15. Code plate
16. Nameplate
17. Spring charge/discharge indicator
18. Rotary selector (RS) switch
19. Rotary selector (RS) switch padlock
20. Timer delay relay panel padlock
21. Timer delay access panel
22. Ground switch blade direct view window
23. Manual charge socket
24. Secondary disconnect

Figure 3. VCP-W CEG&TD - front view.

This device is longer than the standard VCP-W breaker by 7 in. (177.8 mm) (see **Figure 4**). Therefore:

1. The CEG&TD must be handled with extreme care while loading it on or removing it from the extension rails.
2. The extension rails cannot be engaged or disengaged with the device in the "TEST "position – the device must be either removed or in the "CONNECTED" position to engage or disengage the extension rails.
3. The device cannot be stored in a VacClad-W breaker compartment. It can only be stored in a storage compartment.
4. The same holds true for the roll-on floor (ROF) type CEG&TD.



1. **Upper Padlock** – Upper terminal test ports padlock (customer provided padlock)
2. **Lower Padlock** – Lower terminal test ports padlock (customer provided padlock)
3. **Lock-TC** – Grounding switch operation access cover key interlock (Operated by key **K3**) [a]
4. Lift/pull "T" handle
5. Grounding switch blades
6. **Lock-SS** – Key interlock with Lock-TC (Operated by key K3)
7. Terminal selector switch
8. Upper terminal set (3000A shown as ref)
9. Lower terminal set (1200/2000A shown as ref)
10. Upper test port cables
11. Lower test port cables
12. Upper test ports
13. Lower test ports

Figure 4. VCP-W CEG&TD - side view.

The stored energy closing mechanism for the power grounding switch is the same as used in type VCP-W breakers. (Please refer to the IB131006EN for more information on the mechanism). It is capable of:

1. Applying the ground against a "live" circuit if operations has not cleared the circuit properly (Close & Latch test per C37.20.6-2015 section 7.3.4);
2. Remaining closed for 10 cycles under 3-phase short circuit current (Momentary test per C37.20.6-2015 section 7.3.3); and
3. Remaining closed under short circuit current for two seconds under single-phase conditions (Short time test per C37.20.6-2015 section 7.3.2).

However, in such a case, the relaying protection at the source of power is expected to cause the source interrupter to clear the fault circuit **as this device has no interrupting capability**.

2.1 Power grounding switch

2.1.1 Closing

For safety reasons, **the device can only be closed electrically.**

The grounding switch can be closed by first inserting key K3 into ***LOCK-TC*** and/or removing the customer furnished padlock if provided. Next, slide the ground switch access panel to the left, plug in the remote control switch (see **Figure 5**) and turn the rotary selector (RS) switch (see **Figure 6**) to the "CLOSE" position on the front cover. Finally, the operator should use the remote control switch at the end of a 50 ft. (15.2 m) long cable (supplied with the device) outside the arc flash boundary. The remote control switch has two buttons: "CLOSE" and "OPEN". Upon pressing the "CLOSE" button, the CEG&TD will charge and close immediately.

Once the ground switch is closed, it can be locked in the closed position by removing the remote control cable from the receptacle on the device, sliding the ground switch access panel to the right and locking it with ***LOCK-TC*** or customer furnished padlock. The ground switch access panel permits access to the receptacle and manual "Push to Open" button as detailed in **Figure 5**.

A. Grounding switch access panel padlocked and kirk interlocked (LOCK-TC using key K3).

B. Sliding cover free to slide left exposing receptacle plug and manual "Push to Open" button.

Figure 5. Sliding cover for receptacle.

A. Rotary selector (RS) switch at "OFF" position and padlocked. CEG&TD cannot be electrically operated.

B. Rotary selector (RS) switch set to "CLOSE" position. CEG&TD can be closed electrically. It cannot be opened electrically.

C. Rotary selector (RS) switch set to "OPEN" position. CEG&TD can be opened electrically. It cannot be closed electrically.

Figure 6. Rotary selector (RS) switch positions.

2.1.2 Opening

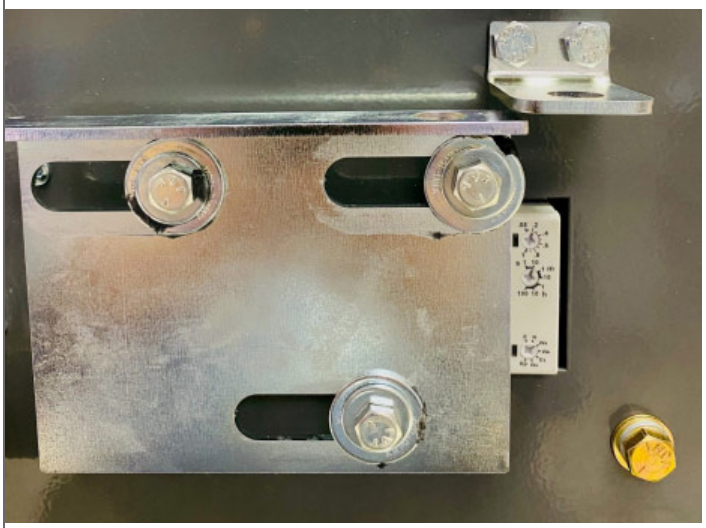
The grounding switch can be opened by first inserting key K3 into ***LOCK-TC*** and/or removing the customer furnished padlock if provided. Next, slide the ground switch access cover to the left and plug in the remote control switch and turn the rotary selector (RS) switch (see **Figure 6**) to the "OPEN" position on the front cover. Finally, the operator should use the remote control switch at the end of a 50 ft. (15.2 m) long cable (supplied with the device) outside the arc flash boundary. The remote control switch has two buttons: "CLOSE" and "OPEN". Upon pressing the "OPEN" button, the CEG&TD will open immediately provided the time delay relay has expired. Alternatively, the "Push to Open" button that is beside the remote control switch plug could be depressed to open the grounding switch. The time delay relay must be expired in order to open the grounding switch.

Once the ground switch is opened, it can be locked in the open position by removing the remote control cable from the receptacle on the device, sliding the ground switch access panel to the right, and locking it with ***LOCK-TC*** or customer furnished padlock. The ground switch access panel that permits access to the receptacle and manual "Push to Open" button are detailed in **Figure 5**.

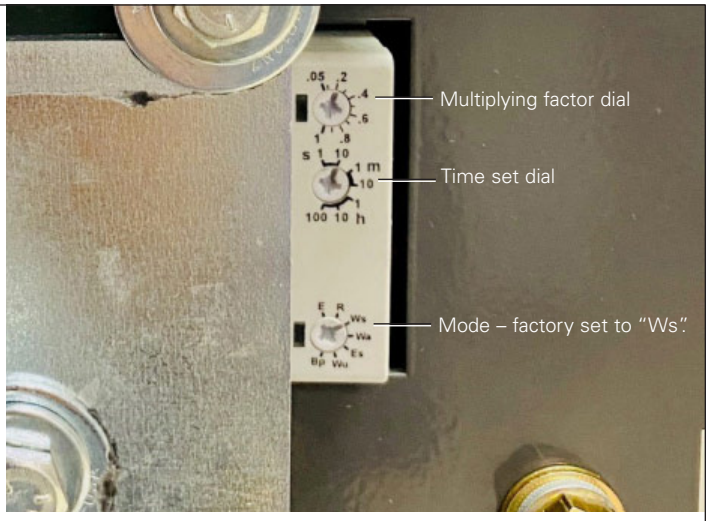
The receptacle and manual "Push to Open" button are accessible only when the terminal selector switch is set to either UPPER or LOWER terminal position due to ***LOCK-SS*** and ***LOCK-TC*** interlocking scheme unless the customer padlocking provisions are being utilized. The opening operation is electrically interlocked with rotary selector switch (RS) on the front panel. CEG&TD can only be opened electrically when the rotary selector switch is set to "OPEN" position, as shown in **Figure 6**.

For safety reason, the switch is prevented from opening less than two seconds after closing (as factory default setting). This timing can be adjusted on the timer relay (TD). This relay is protected by a cover on the front panel and optionally padlocked. For more details, see **Figure 7**.

A. Timer delay access panel padlocked.



B Timer delay access panel free to slide left exposing TD delay timer for setting new timer delay.



C. TD timer front control.

TD timer setting instructions: **DO NOT** change the bottom setting of mode of the timer. **The mode of the timer must always be set to Ws.**

The upper dialer is the "multiplying factor" from 0.05 to 1.00. The middle dialer is the "time set" and can be set from 1 sec to 100 hrs. Select the timer knobs appropriately.

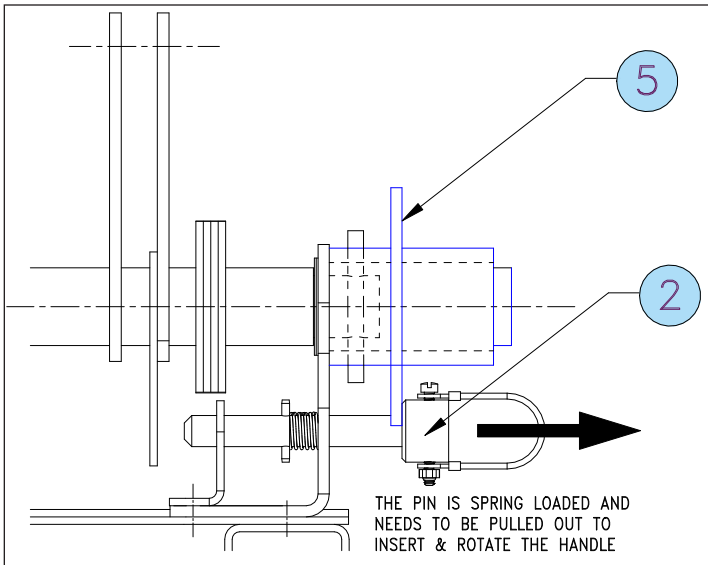
Thus, delay timer actual time = multiplying factor X time set.

Figure 7. Timer delay access panel for delay timer.

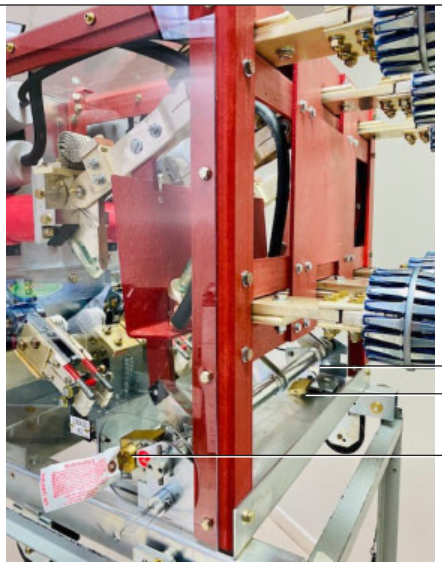
2.2 Terminal selector switch

The terminal selector switch and ground switch are enclosed in the clear polycarbonate sheets on the sides and on the top to permit viewing their positions when the device is not in the breaker compartment. The terminal selector switch is operated by inserting the removable operating handle onto the terminal selector switch shaft located on the right-hand side of the switch (see **Figure 8 A and B**). In addition, the padlocking hasp is provided on the terminal selector switch operating shaft, as per **Figure 8 C and D**. In order to change position of the selector switch:

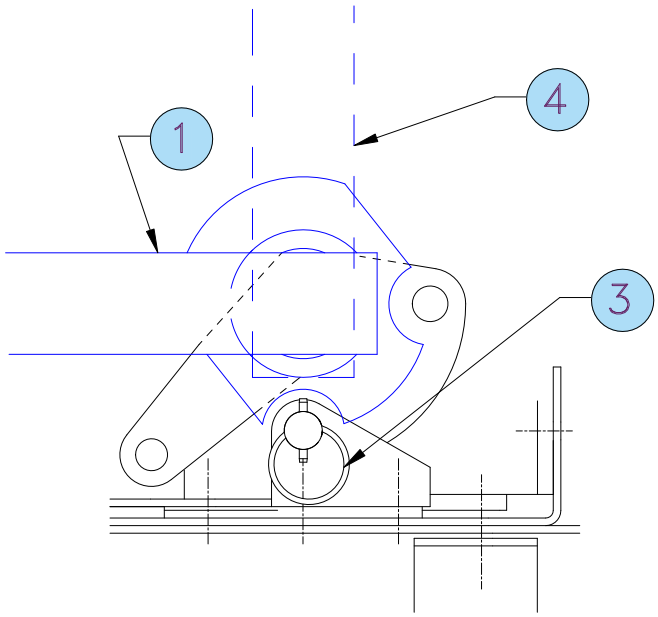
1. Make sure the ***LOCK-SS*** has the key K3 captured and the kirk lock bolt is withdrawn. This will enable the terminal selector switch position to be changed (see **Figure 9**).
2. Insert the handle from the right side (see **Figure 8**).
3. Pull and hold the latch pin out, then
4. Turn the handle 90 degrees:
   A. Clockwise to change from the lower terminals to the upper terminals, or
   B. Counterclockwise to change from the upper terminals to the lower terminals.
3. Release the latch pin. The pin is spring loaded and will latch only when the terminal selector switch is in a fully engaged position. The handle is not removable if the terminal selector switch blades are in an intermediate position. Make certain that the pin is latched. The upper test ports are always connected to the upper terminals while lower test ports are always connected to the lower terminals, permanently, as shown in **Figure 4**.
4. The terminal selector switch interlock plates have two distinctive slots for locking the switch at either the upper or lower positions. Rotate the key K3 to extend ***LOCK-SS*** lock bolt to interlock the terminal selector switch operating shaft. The key K3 can now be removed from ***LOCK-SS***.



A. Front view of operating handle engagement (handle shown in blue).



C. ISO rear view showing the padlock and LOCK-SS scheme on terminal selector switch operating shaft (CEG&TD set to upper terminals).

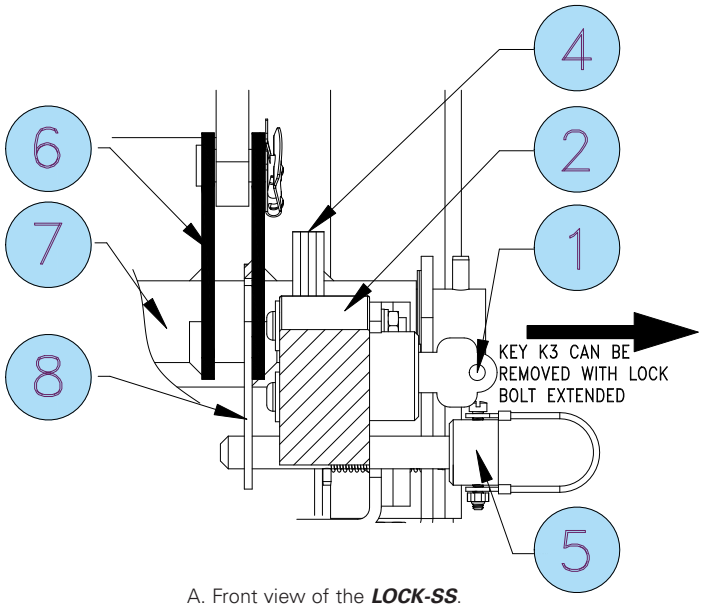


B. Side view of operating handle engagement (handle shown in blue).

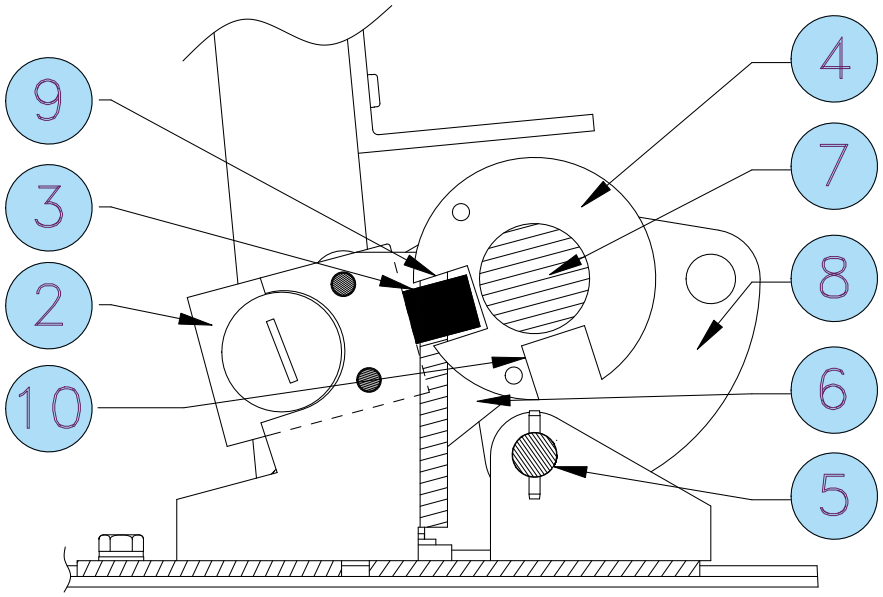
D. ISO rear view showing the padlock and LOCK-SS scheme on terminal selector switch operating shaft (CEG&TD set to lower terminal).

1. Terminal selector switch operating handle engaged (switch connected with lower terminals – **Figure 8B** only).
2. Spring loaded terminal selector switch position latch pin.
   - Pull to engage selector switch handle.
   - Release after removing handle.
3. Spring loaded terminal selector switch position latch pin operating ring.
4. Handle position showing selector switch engaged with lower terminal (**Figure 8B**).
5. Operating handle engagement hub.

Figure 8. Selector switch operating procedure.



A. Front view of the ***LOCK-SS***.



B. Right hand view of the ***LOCK-SS***.

1. K3 – interlock key K3.
   - Removable only when terminal selector switch is locked either the lower or upper terminal position
   - With key removed the terminal selector switch position cannot be changed.
2. SS – terminal selector switch key interlock.
3. Key interlock bolt (shown locking terminal selector switch in lower position).
4. Terminal selector switch interlock plates.
5. Spring loaded terminal selector switch position latch pin.
6. Terminal selector switch operating lever (switch engaged with lower terminals).
7. Terminal selector switch operating shaft.
8. Terminal selector switch position latch pin interlock plate.
9. Slot on interlock plate – lower terminal set position.
10. Slot on interlock plate – upper terminal set position.

Note: The key K3 can only be removed out of ***LOCK-SS***, when the bolt is extended i.e.: the terminal selector switch is locked at either the lower or upper position.

Figure 9. Terminal selector switch interlock (SS).

3. Interlocks and safety features

The device is designed to provide as many interlocks and safety features as practical for the person performing any of the operations described earlier.

3.1 Levering interlock

If the CEG&TD is closed in the "TEST" position, then as the levering-in crank is pushed in to gain access to the hex drive nut on the levering system, the CEG&TD will trip open automatically.

If the CEG&TD is closed as the levering-in crank is engaged to move the CEG&TD from the "CONNECTED" to the "TEST" position, the CEG&TD will do one of the following:

1. Breaker position indicator (BPI) and Non BPI pan assembly: Shown in **Figure 10**. If the CEG&TD is closed in the "CONNECTED" position, then as levering-in crank is pushed in to gain access to the hex drive nut on the levering system, the CEG&TD will trip open automatically.
2. Automatic/manual hybrid secondary: It will function the same as the Non-BPI pan assembly above.

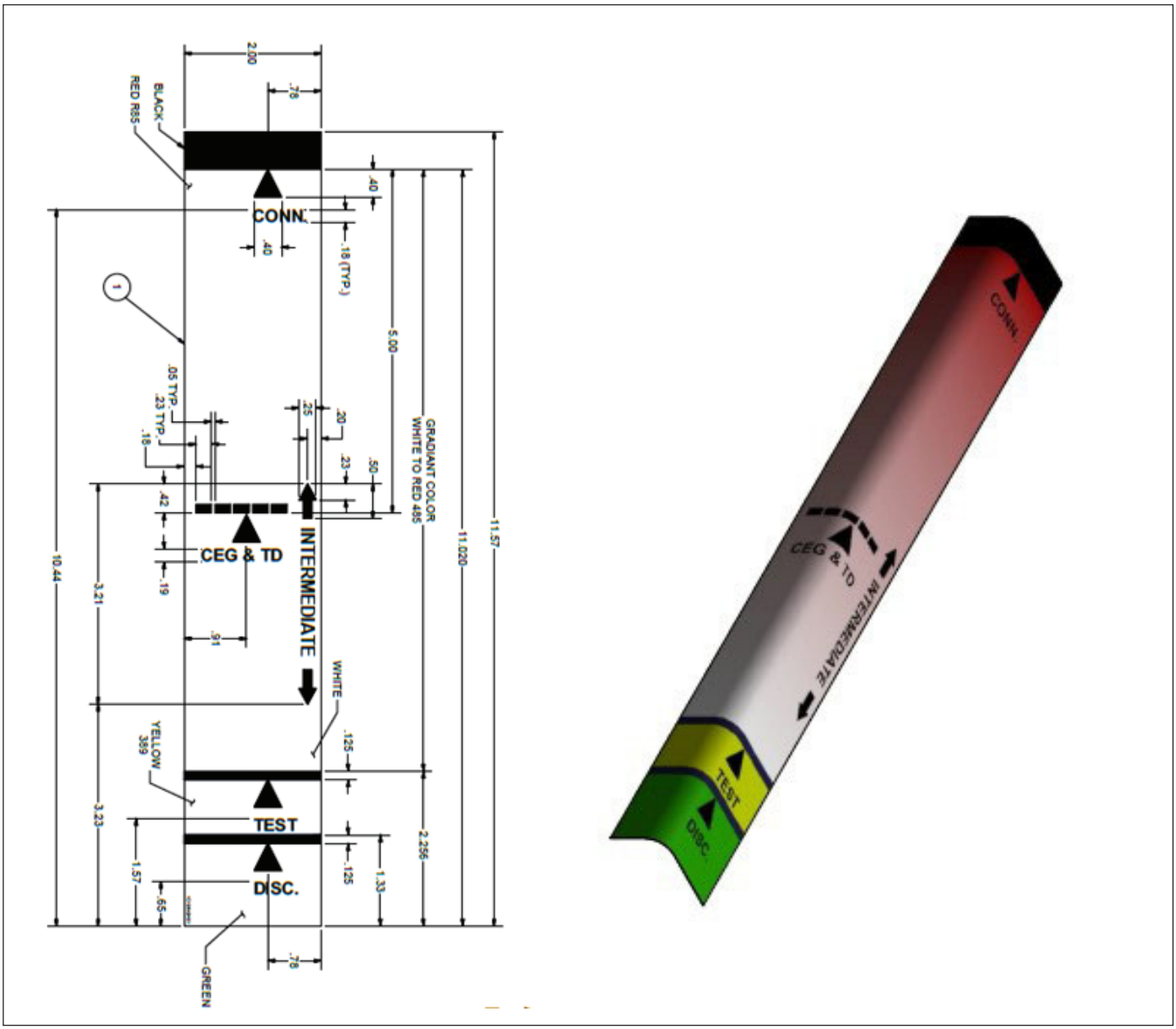


Figure 10. Breaker position indicator (BPI) pan label.

3.2 Position withdrawal interlock

This interlock prevents the CEG&TD from being racked out of the "CONNECT" position when engaged.

3.3 Extension rail interlock

The extension rail interlock prevents the CEG&TD from being withdrawn out of its compartment unless the extension rails or the CEG&TD lifter are properly engaged to the fixed cell rails, or the lower cell is configured for a direct roll-in CEG&TD.

1. The device cannot be placed into the breaker compartment with the terminal selector switch operating handle in place. The handle interferes with the picture frame in the breaker compartment.
2. The device cannot be placed into the breaker compartment with the terminal selector switch in an intermediate position since the operating handle is not removable with the terminal selector switch in an intermediate position.
3. The CEG&TD should never be inserted into the breaker compartment unless it is in an open state. An indicator on the front panel shows the status of the ground switch blades – "OPEN or CLOSED" (see **Figure 3**).
4. Likewise, the overall status of the CEG&TD is displayed on the front cover via see-through windows covered with transparent polycarbonate, through which the operator can see the moving blades of the grounding switch. The roller and the moving blade assembly that is visible from the see-through window has reflective red tape, which illuminates when a light source is focused on it. This provides positive direct indication that the CEG&TD is in the "CLOSED" or grounded state, as shown in **Figure 11** or **Figure 12**.

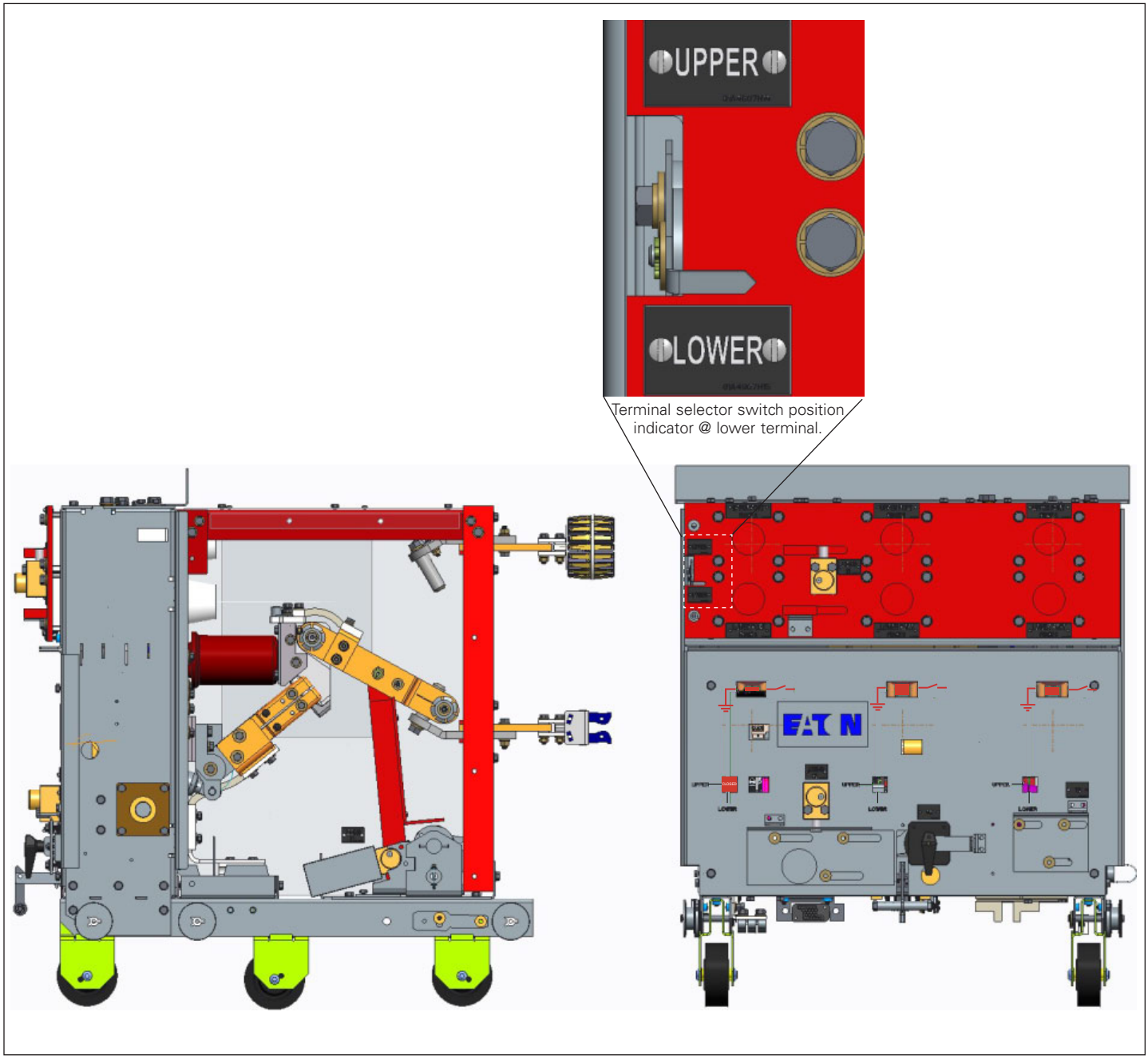


Figure 11. CEG&TD set with lower terminals and grounded.

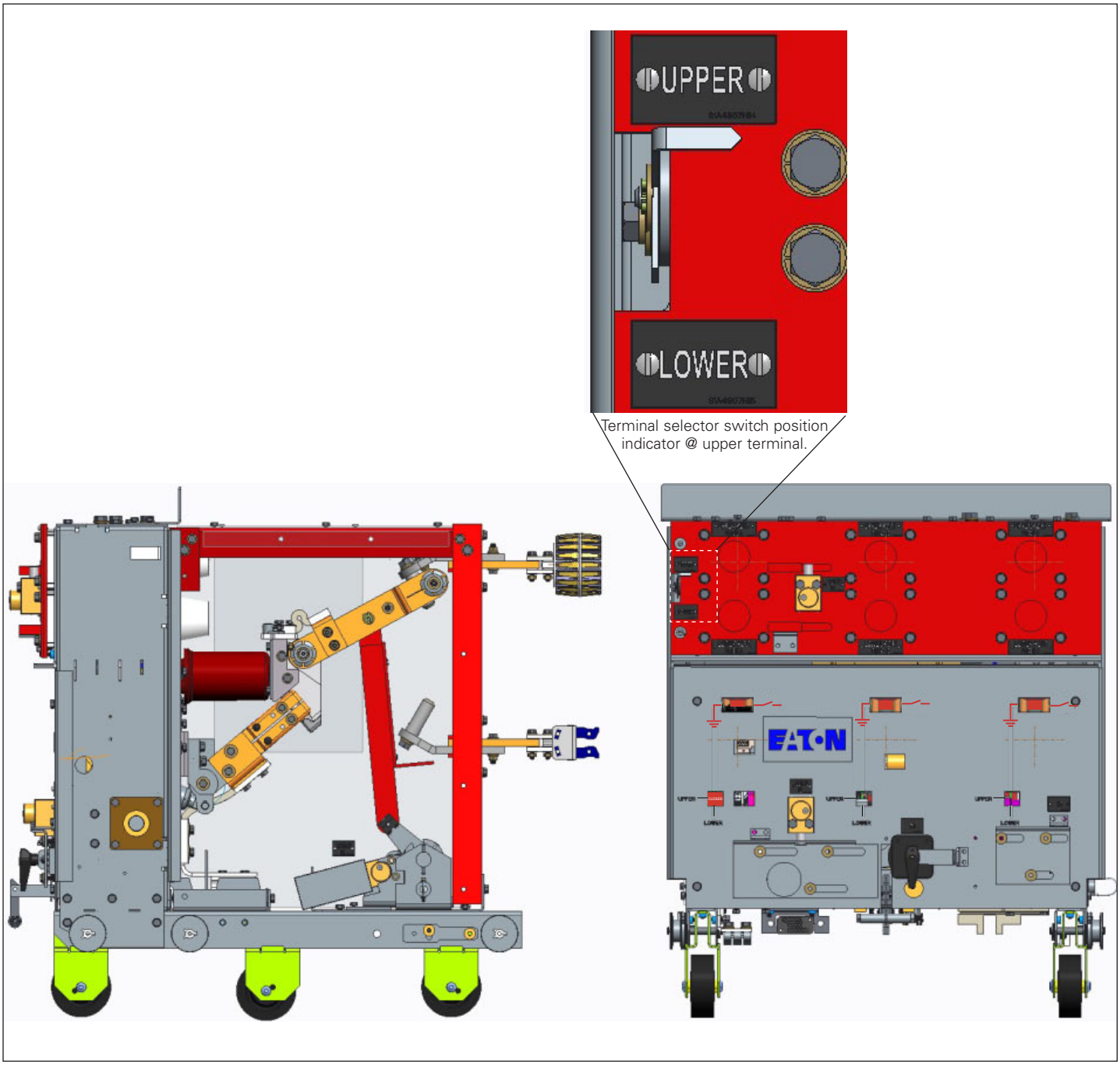


Figure 12. CEG&TD set with upper terminals and grounded.

5. The grounding switch can be locked closed with a key interlock (***LOCK-TC*** – using key K3) or customer padlock. This is accomplished by locking the sliding grounding access panel on the device front panel to prevent access to the manual "Push to Open" button and remote control cable receptacle as shown in **Figure 3** and **Figure 5**. Thus, CEG&TD cannot be opened manually or electrically.
6. The terminal selector switch ***LOCK-SS*** and ***LOCK-TC*** are interlocked and are operated by the same key K3. Thus, the ground switch access cover can only be opened (to either insert the remote control switch plug or manually trip the device) when the ***LOCK-SS*** is locking the terminal selector switch operating shaft either in the UPPER or LOWER terminal position. The key K3 is captured in the ***LOCK-SS***, if the terminal selector switch is in intermediate position. The key K3 can ONLY be removed from the ***LOCK-SS*** when the terminal selector switch is either secured at UPPER or LOWER terminal positions and ***LOCK-SS*** bolt is extended.
7. The grounding switch can be manually charged but cannot be closed manually. Access to the manual close button is blocked by the device front panel, as per **Figure 3** .
8. The grounding switch can only be closed electrically by remote control switch at the end of 50 ft. (15.2 m) cable supplied with the device.
9. The power to operate the grounding switch in this device is obtained through the secondary disconnect (SD) in the breaker compartment (Pin SD-1 & SD-24 only) as shown in the wiring schematic **Figure 13**.

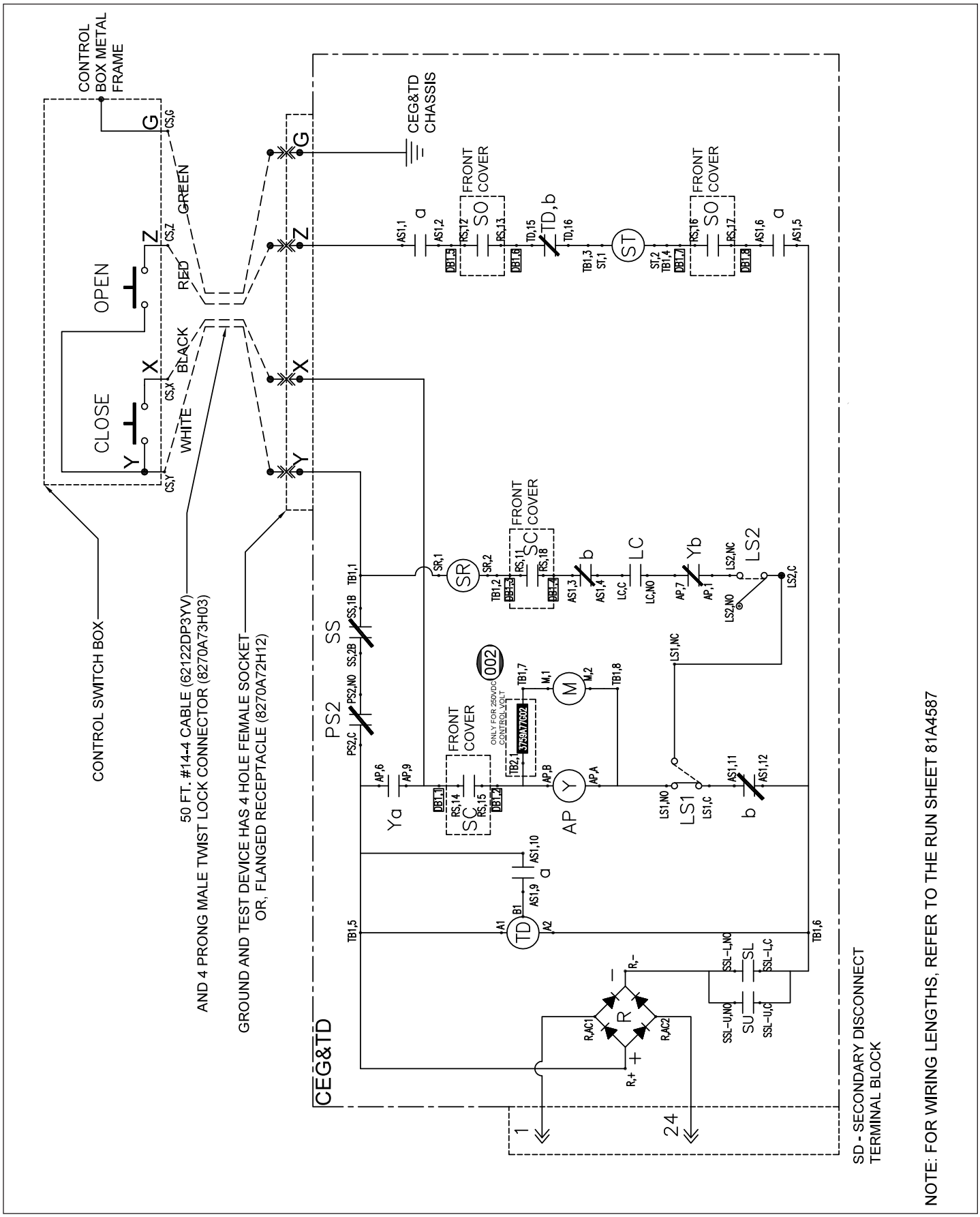


Figure 13. Control scheme – wiring diagram.

LEGENDS

SD = SECONDARY DISCONNECT

AS1 = AUXILIARY SWITCH # 1 ("a": NORMALLY OPEN CONTACT, OPEN WHEN GROUND CONTACTS ARE OPEN, "b": NORMALLY CLOSED CONTACTS, CLOSED WHEN GROUND CONTACTS ARE OPEN)

PS = POSITION SWITCH (PS2 = POSITION SWITCH # 2: PREVENTS CHARGING BETWEEN "TEST" AND "CONNECT" POSITIONS)

AP = SEAL IN RELAY (Y – RELAY COIL, Ya – "a" TYPE CONTACT, Yb – "b" TYPE CONTACT).
Ya : THESE NORMALLY OPEN CONTACTS CLOSE ONLY WHEN CURRENT PASSES VIA Y COIL.
Yb : THESE NORMALLY CLOSED CONTACTS CLOSE ONLY WHEN NO CURRENT PASSING VIA Y COIL.

R = BRIDGE RECTIFIER

LS = MOTOR CUT–OFF SWITCH (LS1 & LS2)

LC = LATCH CHECK SWITCH

TB1 = TERMINAL BLOCK # 1

TB2 = TERMINAL BLOCK # 2 (ONLY FOR 250V CONTROL APPLICATION)

SR = SPRING RELEASE COIL

ST = SHUNT TRIP (OPEN) COIL

M = CHARGING MOTOR

TD = TIME DELAY RELAY: SEALS IN AFTER CHARGING & CLOSING. 2 SECONDS DELAY ON DROP OUT, BLOCKS TRIPPING FOR 2 SECONDS AFTER CLOSING. (FACTORY SET). REFER IL 131033EN FOR CHANGING TD DELAY VALUE. TD,b = NORMALLY CLOSED CONTACT, OPENS ONLY WHEN THE TD COIL RECEIVES THE DELAY TRIGGER, REMAINS OPEN FOR DELAY VALUE BEFORE CLOSING.

DB1 = DISCONNECT BLOCK # 1

RS = ROTARY ELECTRO–SWITCH
VERTICAL : "OFF" NO CIRCUIT (SPRING RETURN POSITION).
CW : OPEN (SO – OPEN CONTACTS: THESE CONTACTS CLOSE WHEN RS SET TO"OPEN").
CCW : CLOSE (SC – CLOSE CONTACTS: THESE CONTACTS CLOSE WHEN RS SET TO "CLOSE")

CS = RECEPTACLE

SS = KIRK INTERLOCK SWITCH

Figure 14. Control scheme – wiring diagram legend.

10. The remote control switch cable is connected to the device with a twist lock connector.
11. The selector switch operating handle can be removed only when the terminal selector switch contact blades are fully engaged with either the upper or lower terminals.
12. The terminal selector switch operating handle CANNOT be inserted when the device is in the breaker compartment.
13. The terminal selector switch mechanism has a spring-loaded latch pin which holds the blades latched either to the UPPER or LOWER terminals.
14. An indicator at the upper left front of the device shows the status of the terminal selector switch contact connection: UPPER terminals or LOWER terminals, per **Figure 11**, **Figure 12**, **Figure 15**, and **Figure 16**.

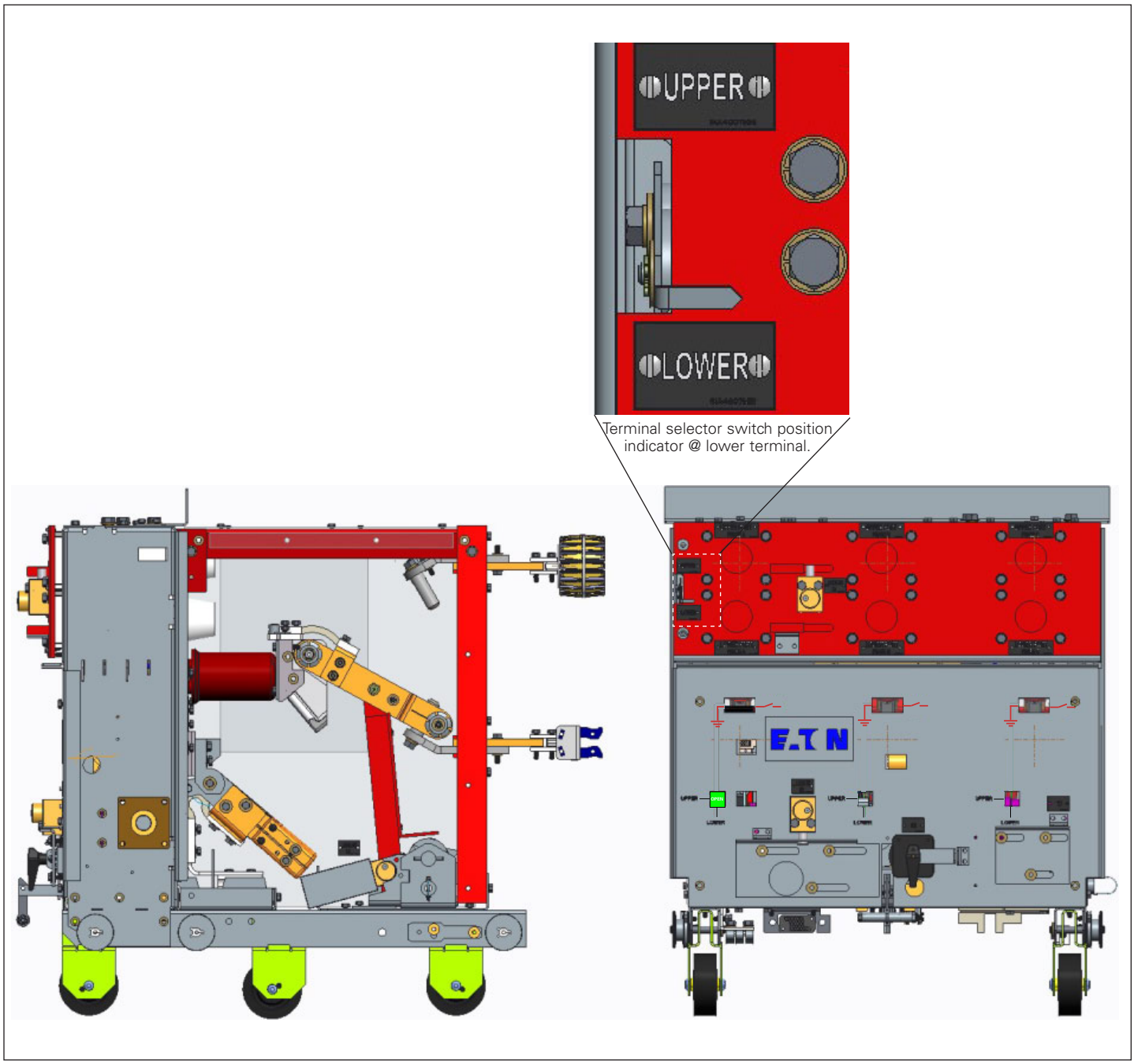


Figure 15. CEG&TD set with lower terminals and ungrounded.

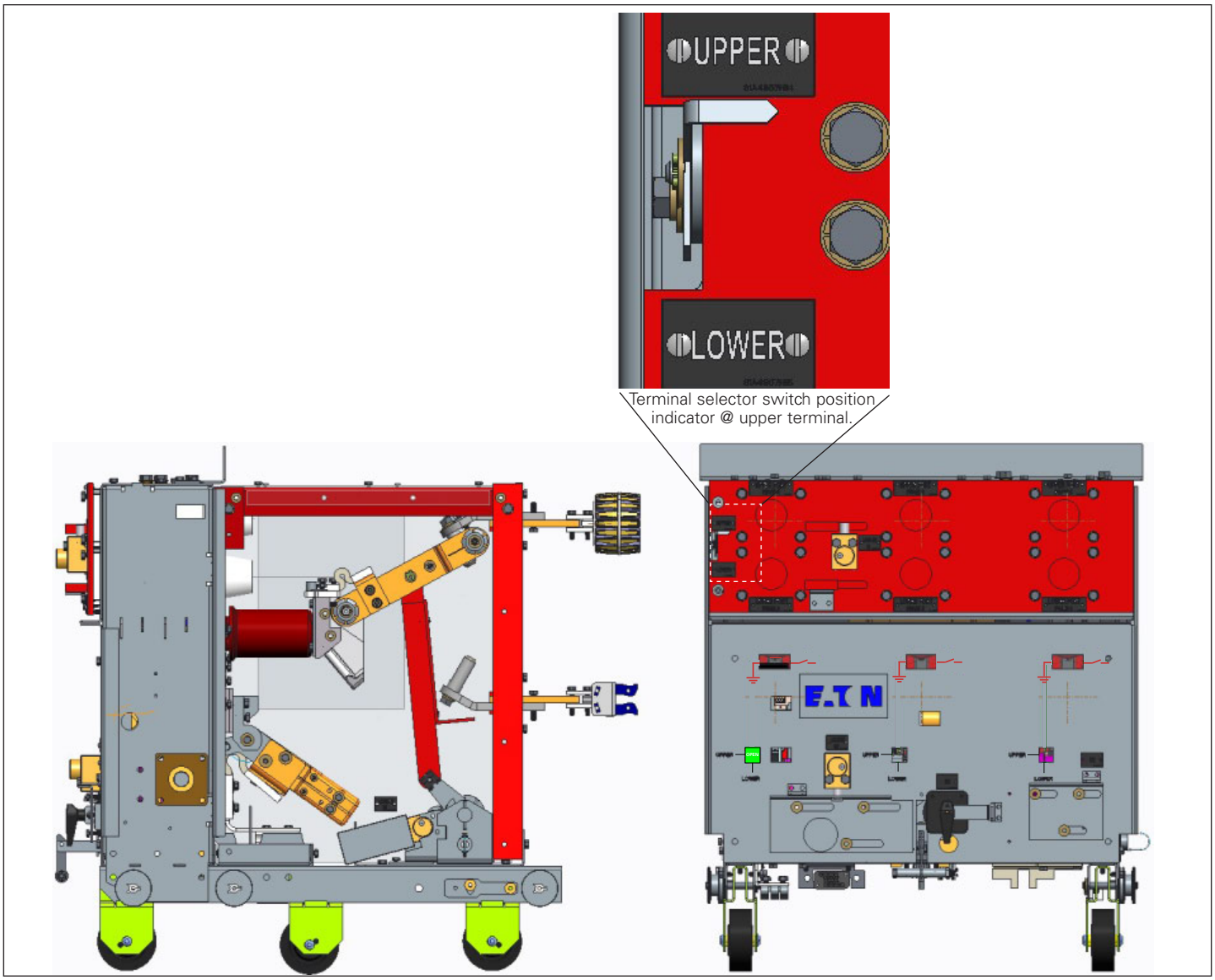


Figure 16. CEG&TD set with upper terminals and ungrounded.

15. The terminal selector switch can be locked either in the lower position or in the upper position using:

    A. A key interlock LOCK-SS as shown in **Figure 9** using key K3, and

    B. Padlock as shown in **Figure 8**.

    This can be done only when the device is outside the breaker compartment.

16. The grounding switch cannot be opened electrically in less than two seconds (as factory default setting) after closing, per **Figure 7** and **Figure 13**. This feature permits the source breaker to clear a fault if the CEG&TD is inadvertently closed on an energized circuit as the CEG&TD has no interrupting capability.
17. The upper test ports are permanently connected to the upper terminals, per **Figure 4**.
18. The upper test ports are always available for voltage checking of the upper terminals only.
19. The upper test ports can be padlocked in the closed position.
20. The lower test ports are permanently connected to the lower terminals, as shown in **Figure 4**.
21. The lower test ports are always available for voltage checking of the lower terminals only.
22. The lower test ports can be padlocked in the closed position.
23. The CEG&TD does not operate the TOC operator switch in the switchgear. This feature can be used by the control room to differentiate between the breaker and the CEG&TD in the "CONNECT" position.
24. The CEG&TD is provided with a rotary selector (RS) switch on the front panel that can be operated in three positions, namely OFF (can be padlocked at this position), "OPEN", and "CLOSE", as shown in **Figure 6**.

A. The CEG&TD can neither be closed nor opened electrically when the RS switch is set to the "OFF" position (**Figure 6-A**).

B. The CEG&TD can be closed electrically only when the RS switch is set to the "CLOSE" position (**Figure 6-B**).

C. The CEG&TD can be opened electrically only when RS switch is set to the "OPEN" position (**Figure 6-C**). However, the device can be opened manually (by pressing "Push to Open" button), irrespective of the RS switch position.

4. Operation

4.1 Safe practices

⚠ WARNING

A GROUND AND TEST DEVICE IS SAFETY RELATED DEVICE. IT MUST BE RECOGNIZED THAT IMPROPER USE CAN RESULT IN DEATH, SERIOUS PERSONAL INJURY, OR PROPERTY DAMAGE. THAT IS WHY IT IS MOST IMPORTANT THAT THE USER DEVELOP SPECIFIC AND SAFE OPERATION PROCEDURES FOR THEIR USE.

The following general safe practices are recommended:

- The CEG&TD cannot be stored in a VACCLAD-W breaker compartment. It can only be stored in a storage compartment.
- Store the CEG&TD in a clean, dry area free from dust, dirt, moisture, etc.
- Keep all insulating surfaces, which include primary support insulation and insulation barriers, clean, dry, and dust-free.
- Lubricate the terminal selector switch contacts and the grounding switch contacts with Magnalube-G Teflon grease (Eaton style: 53701AI) every 12 months.
- Check all primary circuit connections to make certain that they are clean and tight.
- Permit only authorized person to operate this device.
- Take extreme care while using this device to avoid contacting "Live" or "Hot" (energized) terminals.
- Do not remove the CEG&TD front panel while using this device.
- Always operate the CEG&TD electrically from outside the arc flash boundary with the remote-control switch.
- Before inserting the CEG&TD into the compartment, correctly identify line and bus terminals for the breaker compartment and visually make certain that the terminal selector switch is connected to the desired terminal. The four distinct states of the CEG&TD are shown in **Figure 11**, **Figure 12**, **Figure 15**, and **Figure 16**.

Always, make sure that the appropriate code plates are installed before inserting the device into the breaker compartment.

Typical procedures for use of this device are as follows.

4.2 Grounding

The grounding procedure is explained as follows.

1. Make sure the CEG&TD is in a discharged and ungrounded (OPEN) state and securely padlocked and interlocked, as per **Figure 1**:
   A. Obtain key K3 from the secure utility box in the equipment room if the key is not in the CEG&TD.
   B. Verify that the terminal selector switch is set to either the UPPER or LOWER terminal positions as desired and locked by the LOCK-SS and an optional padlock. If not, insert key K3 into LOCK-SS, retract the bolt, install the operator handle onto the terminal selector switch, pull out the terminal selector switch position latch pin, rotate the terminal selector switch to the desired position, and remove the handle from the terminal selector switch. The terminal selector switch latch pin will automatically snap back into place when the terminal selector switch reaches the proper positions.
   C. The CEG&TD MUST be in the ungrounded (OPEN) and discharged state.
   D. Upper and lower test port shutters should be closed and padlocked. For safety reason, if the probes are not inserted, these test port shutters should NOT be accessible to the user.
   E. The grounding switch access panel should be closed and secured by key interlock LOCK-TC and an optional padlock. The remote control switch receptacle and the manual "PUSH TO OPEN" button should not be accessible.
   F. The Timer delay (TD) access panel should be closed and secured by an optional padlock.
   G. The rotary selector switch (RS) should be at "OFF" position and secured by an optional padlocked.
2. With the CEG&TD outside the breaker compartment, set the terminal selector switch to desired terminals:
   A. Unlock the LOCK-SS using key K3, as in **Figure 9**.
   B. Remove the optional padlock that locks the terminal selector switch operating shaft. The terminal selector switch is now ready to be rotated to upper or lower terminals.
   C. Insert the terminal selector switch operating handle and pull the spring loaded terminal selector switch latch pin out as shown in **Figure 8**.
   D. Rotate the handle to set the terminal selector switch to the UPPER or LOWER terminal, as desired (see **Figure 8**).
   E. When the terminal selector switch reaches the desired position, the spring-loaded latch pin locks the terminal selector switch in that position. Now the handle can be removed.
   F. Lock the terminal selector switch in the desired position by rotating key K3 and removing it out of LOCK-SS, and optionally padlocking the terminal selector switch shaft from the rear of the CEG&TD,

⚠ CAUTION

DO NOT ATTEMPT TO OPERATE THE SELECTOR SWITCH WHEN IT IS ON THE EXTENSION RAILS. FAILURE TO COMPLY COULD RESULT IN THE DEVICE COMING OFF THE RAILS CAUSING BODILY INJURY AND/OR EQUIPMENT DAMAGE.

3. Lift the CEG&TD and load it on to the extension rails of the breaker compartment with extreme care. Alternatively, the CEG&TD with ROF wheels can be directly pushed into the breaker compartment.
4. Push the CEG&TD into the "DISCONNECT" position for the BPI pan assembly or the "DISCONNECT/TEST" position for the non-BPI assembly until the CEG&TD "T" handle latches over the moving block on the levering screw assembly.
5. Rotate the levering-in crank in a clockwise direction until the torque limiter on the levering-in crank "breaks free". As a position verification;

   BPI pan assembly: the CEG&TD cover plate MUST align with the black line associated with the "CONNECTED" position, location shown on the BPI label (**Figure 10**).

   Non-BPI pan assembly: the red indicator on the levering system as shown through the window below the levering-in crank on the front of the levering system.
6. Unlock and open the desired test ports, and test for "de-energized" circuit using correctly rated voltage testing equipment. As a minimum the following steps should be followed:
   A. Verify the test equipment senses voltage on a known energized source.
   B. Verify the desired terminal set is de-energized.
   C. Verify the test equipment senses voltage on a known energized source.
7. Insert key K3 into LOCK-TC and remove the optional padlock. Then move the ground switch access panel to the left.

8. Connect the remote control switch cable. Key K3 may be taken out at this stage or left in place.
9. Remove the padlock from the rotary selector (RS) switch and rotate the rotary selector switch (RS) to the "CLOSE" position.
10. Close the grounding switch from outside the arc flash boundary on the desired terminal set that was checked in Step 6 by pressing the "CLOSE" button on the remote control switch.
11. Lock the ground switch closed by disconnecting the remote control cable and sliding ground the switch access panel to the right. It may be locked by LOCK-TC and removing key K3 or using the optional padlock.

4.3 Ungrounding

1. Move the ground switch access panel to the left by unlocking LOCK-TC using key K3 or removing the optional padlock.
2. Connect the remote control switch cable. Key K3 may be taken out at this stage or left in place.
3. Remove padlock from rotary selector (RS) switch and rotate it to the "OPEN" position.
4. Open grounding switch from outside the arc flash boundary by pressing the "OPEN" button on the remote control switch.
5. Lock the ground switch open by disconnecting the remote control cable and sliding the ground switch access panel to the right. It may be locked by LOCK-TC and removing key K3 or using the optional padlock.
6. Note that there is a time delay between consecutive closing and opening operations, set by the delay timer (TD) which has a default setting of two seconds. Refer to **Figure 7** for detailed procedure on how to change the time delay setting.
7. Rotate the rotary selector (RS) switch to the "OFF" position and if desired lock it in place using an optional padlock.

4.4 Cable testing

The cable testing procedure assumes that the CEG&TD is still in the "CONNECT" position, the CEG&TD is in the ungrounded (ground switch is OPEN) state and the circuit being tested is deenergized. Proceed with the steps that follow to perform cable testing.

1. Make sure the device is in the discharged and in the ungrounded (OPEN) state and securely padlocked and interlocked, as per **Figure 1**. The following steps assume that the terminal selector switch has been set to the correct position prior to being inserted into the switchgear breaker cubicle.
   A. Key K3 should be secured in the utility box thus ensuring that the ground switch access cover is locked closed or it should be secured with the optional padlock.
   B. The rotary selector switch (RS) should be at "OFF" position and secured with the optional padlock.
2. Unlock and open the desired test ports, and test for "de-energized" circuit using correctly rated voltage testing equipment. As a minimum the steps that follow should be followed.
   A. Verify the test equipment senses voltage on a known energized source.
   B. Verify the desired terminal set is de-energized.
   C. Verify the test equipment senses voltage on a known energized source.
3. Insert the insulated test probes into the de-energized test ports and apply the test voltage to the cables via the insulated test probes.
4. Once testing is complete, remove the insulated test probes and padlock the test port shutters closed.

4.5 Phase checking

The phase checking procedure assumes that the CEG&TD is still in the "CONNECT" position and the CEG&TD is in the ungrounded (ground switch is OPEN) state. Proceed with the steps that follow to perform phase checking:

1. Key K3 should be secured in the utility box, thus ensuring that the ground switch access cover is locked closed or it should be secured with the optional padlock.
2. Make sure the device is discharged and in the ungrounded (OPEN) state and securely padlocked and interlocked, as per **Figure 1**. The position of the terminal selector switch does not matter when performing the phase checking process. Both the upper and lower terminal sets are available at the base of their associated test ports.
3. Upper and lower port shutters should be closed and padlocked.
4. The timer delay (TD) access panel should be closed and locked with an optional padlock.
5. The rotary selector (RS) switch should be in the "OFF" position and secured with an optional padlock.
6. Unlock and open both the upper and lower test port shutters. In the "CONNECT" position, rated voltage will be available at the bottom of the test ports.
7. Use the appropriate phase checking tool procedure described in the customer's work practices.

A. Default padlocked configuration: Upper and lower terminal test ports are padlocked.

B. Grounding and cable testing configuration: Upper terminal test ports padlocked and lower terminal test ports are accessible after removing the padlock. (Grounding switch access panel locked by LOCK-TC and/or padlock. Key K3 is in the utility box or with the maintenance personnel).

C. Phase checking configuration: Upper terminal test ports and lower terminal test ports are accessible after removing the padlocks. (Grounding switch access panel locked by LOCK-TC and/or padlock. Key K3 is in the utility box or with the maintenance personnel).

Figure 17. Upper and lower test ports operation.

Appendix A: Codeplates guide

					Left (seen from front)					Right (seen from front)					
					CC rating		Breaker position	Not assigned	Volt	CC rating		Breaker position	Not assigned	Cycle	
Volt rating (kV)	Position coding	SC rating (kA)	CC rating (A)	82B4556	L1	L2	L3	L4	L5	R1	R2	R3	R4	R5	Code plate designation
5	Upper cell only	25/40	1200/2000	H01	1	1	1	0	2	1	1	0	0	0	Code plate 11102 - 11000
			3000	H02	2	0	1	0	2	1	1	0	0	0	Code plate 20102 - 11000
		50	1200/2000	H03	1	1	1	0	2	1	0	0	0	0	Code plate 11102 - 10000
			3000	H04	2	0	1	0	2	1	0	0	0	0	Code plate 20102 - 10000
	Lower cell only	25/40	1200/2000	H05	1	1	0	0	2	1	1	1	0	0	Code plate 11002 - 11100
			1000	H06	2	0	0	0	2	1	1	1	0	0	Code plate 20002 - 11100
		50	1200/2000	H07	1	1	0	0	2	1	0	1	0	0	Code plate 11002 - 10100
			3000	H08	2	0	0	0	2	1	0	1	0	0	Code plate 20002 - 10100
15	Upper cell only	25/40	1200/2000	H09	1	1	1	0	0	1	1	0	0	0	Code plate 11100 - 11000
			3000	H10	2	0	1	0	0	1	1	0	0	0	Code plate 20100 - 11000
		50	1200/2000	H11	1	1	1	0	0	1	0	0	0	0	Code plate 11100 - 10000
			3000	H12	2	0	1	0	0	1	0	0	0	0	Code plate 20100 - 10000
	Lower cell only	25/40	1200/2000	H13	1	1	0	0	0	1	1	1	0	0	Code plate 11000 - 11100
			1000	H14	2	0	0	0	0	1	1	1	0	0	Code plate 20000- 11100
		50	1200/2000	H15	1	1	0	0	0	1	0	1	0	0	Code plate 11000 - 10100
			3000	H16	2	0	0	0	0	1	0	1	0	0	Code plate 20000 - 10100

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Instructions for the use, operation, and maintenance of type VCP-W complex electrical ground and test device (CEG&TD)

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