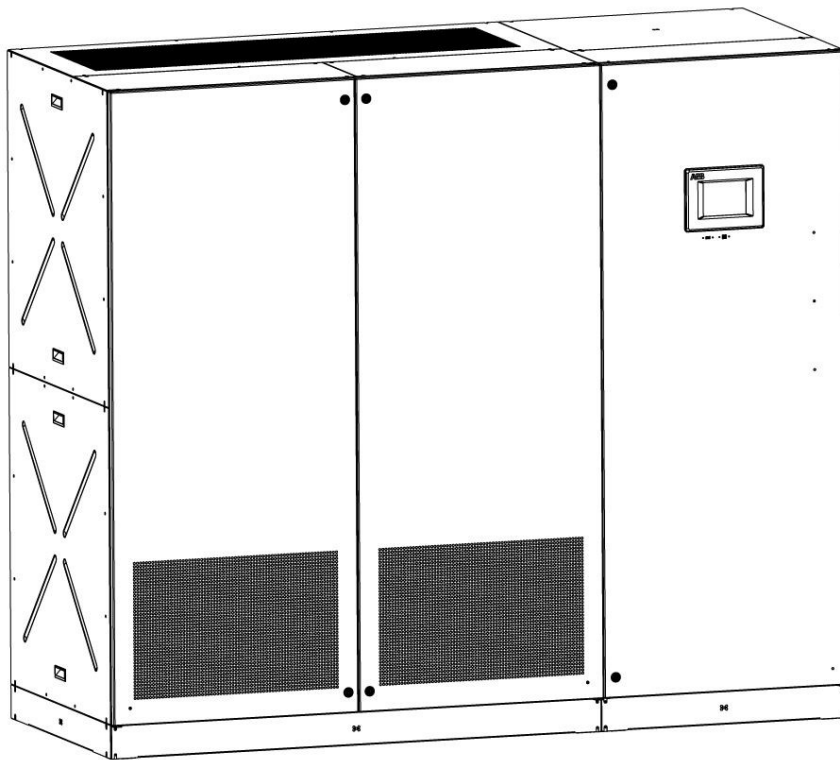—

USER MANUAL

TruFit™ Power Distribution Unit
750/850/950kVA

The ABB TruFit™ PDU offers the most reliable and flexible power distribution product on the market today with almost unlimited configurations of panelboards and sub-feed breakers to meet every load requirement.

For a comprehensive overview of publications available for the ABB TruFit™ PDU product line, refer to the inside cover of this publication. Web link and QR code references are also included.

The Company

We are an established world force in the design and manufacture of power electronics and power protection equipment.

As a part of ABB, a world leader in electrical technology, we offer customers application expertise, service, and support worldwide. We are committed to teamwork, high quality manufacturing, advanced technology and unrivalled service and support.

The quality, accuracy and performance ABB's products result from over 100 years of experience, combined with a continuous program of innovative design and development to incorporate the latest technology.

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Quality control

To ensure that we meet our responsibilities and obligations to our customers, our people, our partners, our suppliers and to our shareholders, we are committed to deliver on-time and on-quality products, systems and services that meet or exceed our customers' expectations.

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For more information

Further publications for the TruFit™ Power Distribution Unit and accessories are available for download from http://new.abb.com/ups/power-distribution or by scanning the QR code below.

Contacting ABB for support

To contact ABB for general information call 800-637-1738 or preventative and remedial services in the United States, call 800-292-3739. ABB offers a complete range of start-up services, repair services, preventive maintenance plans and service contracts.

For repair or maintenance service outside the 48 contiguous United States, contact ABB, if available in your area.

Please provide the following information for customer service when you contact the ABB service center:

Equipment	
Part number	
Serial number	
Voltage rating	
Current rating	
Purchase date	
Installation date	
Location	

To get important information on all equipment warranties, please contact the ABB service center or request service follow-up or by scanning the QR code below.

1 Important safety instructions

1.1 Using this manual

TruFit™ Power Distribution Unit, henceforth referred as PDU, is a high-energy device. The following safety instructions must be observed when working with the device. Refer to the unit's nameplate for the specific model designation and operating parameters.

This manual is provided to aid the user in the installation, operation, and maintenance of the PDU, manufactured by ABB. Read and understand the procedures described to ensure trouble-free installation and operation. Read through each procedure before beginning the procedure. Perform only those procedures that apply to the PDU cabinet being installed or operated.

> # Read all safety and operating instructions before operating the PDU. Adhere to all warnings on the unit and in this manual.

1.1.1 List of symbols

These symbols may appear on your PDU or on labels inside the PDU. Most international safety agents accept them. Everyone in your organization who works with your system should understand the meaning of these symbols:

⚠	**SAFETY ALERT SYMBOL** This is the safety alert symbol. It is used to alert you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.
⚠ DANGER	**DANGER** Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	**WARNING** Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	**CAUTION** Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	**NOTICE** Is used to address situations not related to physical injury but could result in property damage.
⚡	**ELECTRICAL HAZARD SYMBOL** Indicates the presence of an electrical hazard.

⚠️	**ARC FLASH HAZARD SYMBOL** Indicates the presence of an arc flash hazard.
i	**IMPORTANT INFORMATION SYMBOL** This symbol indicates operator tips and/or important information for the use of the product. This symbol is not used to indicate information regarding potential hazards or property damage.
♺	**RECYCLE SYMBOL**
🗑	**DO NOT DISCARD SYMBOL** Indicates that you should not discard waste electrical or electronic equipment (WEEE) in the trash. For proper disposal, contact your local recycling/reuse or hazardous waste center.

1.2 Safety rules

Save these instructions!

The power distribution unit operates with high currents and voltages. The properly installed system is grounded to earth and IP 20 rated against electrical shock and foreign objects when all dead fronts are in place. Equipment start-up and service must be performed by a manufacturer's qualified technician or a certified service partner.

General

- Move the PDU in an upright position in its original package to the installation location.

  To lift the cabinets, use a forklift with fork extensions of at least 60".

  Refer to installation manual for recommended forklift tine placement under cabinet.
- Check for sufficient floor and elevator loading capacity.
- Check the integrity of the PDU equipment carefully.

  If you notice visible damage, do not install or start the PDU.

  Contact your ABB Service Center immediately.
- WARNING! RISK OF ELECTRICAL SHOCK!

  Do not remove covers, there are no user serviceable parts inside.

  This should be performed by qualified service personnel.
- This PDU contains potentially hazardous voltages.
- End user must follow applicable regional occupational safety codes/regulations during installation, operation, and equipment maintenance. This may require additional field marking or labelling defining appropriate level of PPE (Personal Protection Equipment) to reduce the risk of arc-flash related injuries.

Contact our ABB Service Center for product specific information.

Installation

- This PDU must be installed and connected only by trained personnel. Refer to Installation Manual 94-1100-00002878 for detailed instructions.
- Verify accurately during commissioning and maintenance of the PDU, for the following:

  Damaged components, squeezed wires and cables, or improperly inserted plugs.
- After removing the sidewalls of the PDU, make sure that all earth connections are properly reattached when reassembling.
- This PDU is intended for use in a controlled indoor environment free of conductive contaminants and protected against animal intrusion.
- WARNING! HIGH LEAKAGE CURRENT TO GROUND:

  Ground connection is essential before connecting to AC input!
- Switching OFF the unit does not isolate the PDU from the utility.
- Do not install the PDU in an excessively humid environment or near water.
- Avoid spilling liquids on or dropping any foreign object into the PDU.
- The PDU must be placed in a sufficiently ventilated area; the ambient temperature should not exceed 104°F (40°C).
- It is important that air can move freely around and through the PDU. Do not block the air vents.
- Avoid locations in direct sunlight or near heat sources.

Storage

- Store the PDU in a dry location; storage temperature must be within -13°F (-25°C) to 131°F (+55°C).

1.3 Safety precautions

The PDU contains hazardous voltages that are present regardless of the mode of operation. Before making any connection(s) to the PDU, ensure that any/all power sources are de-energized and locked out.

As lethal voltages are present within the PDU during all modes of operation, maintenance shall only be performed by authorized service personnel.

ABB neither recommends nor knowingly sells this product for use with life support applications or other FDA designed critical applications.

All wiring should be performed by qualified electricians and in the accordance with local and national electrical safety codes. Before placing the unit into service, a thorough inspection and supervised start-up should be performed by a qualified service technician.

This PDU is designed for operation from a three (3) phase, three (3) wire power source. Refer to the unit's nameplate for the specific model designation, operating voltage, and input power configuration. Input over-current protection is to be supplied by the user in accordance with nameplate ratings, in applications where the PDU has no main breaker.

1.4 Safety considerations

The TruFit™ PDU is designed for commercial applications and should be handled with appropriate care, following these guidelines:

- Keep surroundings clean and free from excess moisture.
- Do not operate the PDU system close to gas or electric heat sources.
- The system is not intended for outdoor use.
- The operating environment should be maintained within the parameters stated in the manual.
- Keep the cabinet doors closed and locked to ensure proper cooling airflow and to protect personnel from dangerous voltages inside the unit.

⚠ CAUTION Only authorized service personnel should perform maintenance on or service the PDU system.

If service or routine maintenance is required:

- Ensure all power is disconnected before performing maintenance.
- Ensure the area around the PDU is clean and uncluttered.
- Observe all DANGER, CAUTION and WARNING notices affixed to the inside and outside of the equipment.

⚠ WARNING To provide sufficient isolation protection when working upstream of the PDU, open the respective source feeder breakers contained within the PDU. Prescribing to this maintenance method reduces the risk of electric shock due to backfeed.

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2 General

2.1 Cybersecurity

2.1.1 Disclaimer

This product is designed to be connected to and to communicate information and data via a network interface. It is the customer's sole responsibility to provide and continuously ensure a secure connection between the product and customer network or any other network (as the case may be). The customer shall establish and maintain any appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc.) to protect the product, the network, its system, and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information. ABB Ltd and its affiliates are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

We recommend connecting the system in private network, if not the case additional hardware that provide increased security controls/measures such as firewalls should be implemented.

2.1.2 Ports used by this product

Port	Service	Purpose
22/tcp	SSH	Valid for SSH
502/tcp	Modbus/TCP	Valid for Modbus TCP
25/tcp	Email	Valid of Email
110/tcp	Email	Valid of Email
143/tcp	Email	Valid of Email
465/tcp	Email	Valid of Email
587/tcp	Email	Valid of Email
993/tcp	Email	Valid of Email
995/tcp	Email	Valid of Email
69/udp	TFTP	Valid for Software Upgrade
123/udp	NTP	Valid for Network Time Products

3 Operation (850/950kVA)

This section is for the operation of 850/950kVA variants only. For 750kVA variant operational guide, proceed to section 4.

3.1 Initial Start-up (850/950kVA)

This procedure must be performed by authorized personnel for the first start-up following installation. Prior to beginning this procedure, verify that the PDU and site are in the following starting conditions:

- Upstream breakers, including those for the external control power source, have been locked & tagged out. Recommend placing any upstream UPS's in bypass.
- Downstream equipment has been locked & tagged out, preventing potential back feed of the PDU.
- All PDU input/output connections have been made correctly, all panels have been installed, and all pre-check procedures have been completed.

Additionally, the PDU should be put into the following state before starting:

a. Closed Breakers/Switches:
   i. None

b. Open Breakers/Switches:
   NOTE: Check PDU oneline drawing to confirm which breakers are included in the unit
   i.   Main Circuit Breaker 1 (MCB01)
   ii.   SPD Switch (SW01)
   iii. Control Circuit Disconnect Switch (SW02)
   iv.   Distribution Meter Disconnect Switch (SW03)
   v.   Reduced Energy Let-Thru Switch (RELT SW)
   vi.   Feeder Circuit Breaker 1 (FCB01)
   vii. Feeder Circuit Breaker 2 (FCB02)
   viii. Feeder Circuit Breaker 3 (FCB03)
   ix.   Feeder Circuit Breaker 4 (FCB04)

3.1.1 Logic Power-up

a. Unlock and close external control power breaker.
   i.   At this time, the display and system logic should power up.
   ii. Verify system logic completely initializes before proceeding – approximately 1.5 minutes. Mimic and Navigation Bar shown in Section 5, Figure 5.1 must be displayed on the Graphical User Interface for complete initialization.
b. Place MCB01 in Reduced Energy Let-Thru (RELT) mode.
   i.   See Section 3.3 for more information on RELT mode.

3.1.2 Transformer Energization

a. Unlock and close upstream breaker feeding the PDU.
b. Close SW02 to connect internal control power and voltage metering circuits.
c. Verify the correct secondary phase-to-phase and phase-to-neutral voltage, without any external load applied, by using PowerView's voltage metering function. See Section 7 for more information.
   i.   If the secondary voltage is not the desired voltage, the Compensation Tap Adjustment procedure, section 3.2, should be completed at this time.
   ii. Otherwise, proceed to 3.1.3.

3.1.3 Surge Protection and Distribution Bus Power-up

a. Unlock and close MCB01.
b. Close SW03 to connect distribution voltage metering circuit.

c. Verify the correct distribution phase-to-phase and phase-to-neutral voltage, without any external load applied, by using PowerView's voltage metering function. See Section 7 for more information.
d. Close SW01 to connect the SPD to the system.
    i. Verify that the "A", "B", and "C" indicators are illuminated green and are not blinking.
    ii. Verify that the alarm does not sound.
    iii. If either of the above conditions is not met, contact ABB Technical Support, and do not proceed further.

Figure 3-1: Surge Protection Indicators
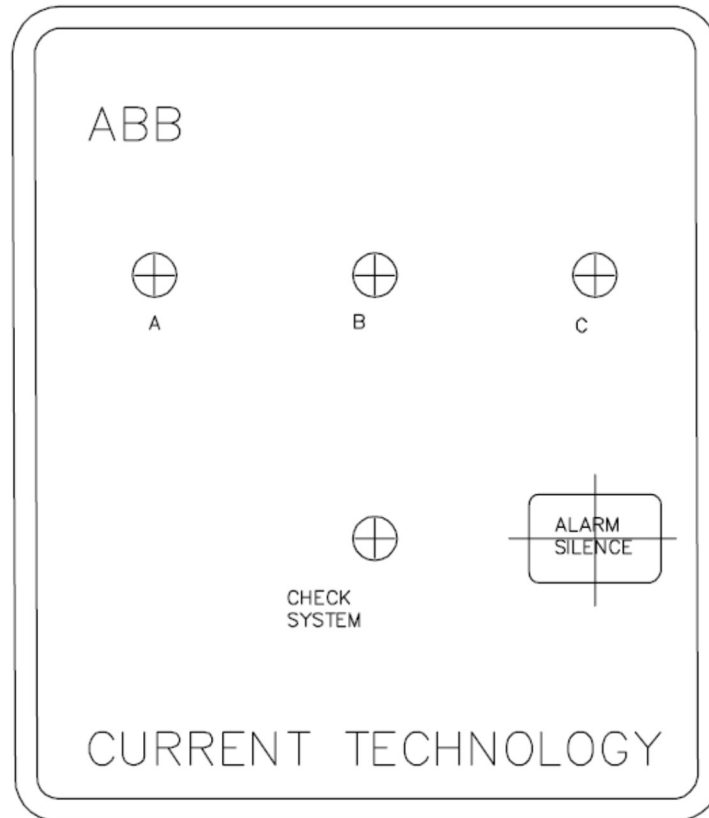
3.1.4 Load Energization

⚠CAUTION	This will energize the load. Observe caution due to potential inrush current or downstream faults.

a. To energize the load, close the appropriate feeder circuit breaker.
b. Close downstream load circuit breakers or switches as desired.
c. With the desired loads energized, MCB01 can be taken out of RELT mode, if so desired.
    i. See Section 3.3 for more information on RELT mode.

Your TruFit™ PDU is now distributing power to your connected load. The next section is dedicated to assisting you in adjusting your compensation taps for optimum secondary voltage. Please take a moment to familiarize yourself with this unique feature found on your TruFit™ PDU.

3.2   Compensation Tap Adjustment (850/950kVA)

⚠ WARNING	This procedure shall be performed by authorized personnel when it is determined that adjustments to the PDU's transformer compensation taps are required to adjust the secondary voltage

Prior to beginning this procedure, verify that the PDU and site are in the following starting conditions:

- Upstream breaker feeding the PDU transformer, has been locked & tagged out. Recommend placing any upstream UPS's in bypass.
- Downstream equipment has been locked & tagged out, preventing potential backfeed of the PDU.
- The external control power breaker has been closed and that the display and system logic has been powered on and completely initialized.

Additionally, the PDU should be put into the following state before starting:

a.   Place MCB01 in Reduced Energy Let-Thru Switch (RELT) mode, per Section 3.3

b.   Open Breakers/Switches:
    NOTE: Check PDU oneline drawing to confirm which breakers are included in the unit
    i.   Main Circuit Breaker 1 (MCB01)
    ii.   SPD Switch (SW01)
    iii.   Secondary Control Circuit Disconnect Switch (SW02)
    iv.   Distribution Meter Disconnect Switch (SW03)
    v.   Feeder Circuit Breaker 1 (FCB01)
    vi.   Feeder Circuit Breaker 2 (FCB02)
    vii.   Feeder Circuit Breaker 3 (FCB03)
    viii.   Feeder Circuit Breaker 4 (FCB04)

3.2.1   Starting Voltage Measurement

a.   Unlock and close upstream breaker feeding the PDU.
b.   Close SW02 to connect internal control power and voltage metering circuits.
c.   Record the secondary phase-to-phase and phase-to-neutral voltage, without any external load applied, by using PowerView's voltage metering function.
    i.   Determine the % difference from the desired secondary voltages.
d.   Open, lock, and tag out the upstream breaker feeding the PDU.
e.   Open Internal Control Circuit Disconnect Switch (SW02).

3.2.2   Transformer Tap Adjustment

a.   Open the lower 2 front panels of the transformer cabinet.
b.   Verify the transformer cabinet is free from hazardous voltage by checking for phase-to-phase and phase-to-ground voltage on each phase of both the primary and secondary.
    i.   If voltage is present on any phase, contact ABB Technical Support and do not proceed further.
    ii.   Otherwise proceed to c. below.
c.   Record the existing tap configuration.

    *If applicable to unit configuration

d.   Using the labels found on the top of the transformer core, reconnect the compensation taps on the front of the transformer to the configuration that most closely matches the measured % difference.
    i.   Ensure all hardware is accounted for and properly re-installed.
        i.   If there is any hardware missing, or has fallen into the transformer windings, contact ABB Technical Support and do not proceed further.
    ii.   Tighten connections in accordance with the torque specifications found in Section 9.1.
    iii.   Record the new tap configuration.
e.   Verify all tools and equipment have been removed from the inside of the transformer cabinet.
f.   Replace the lower 2 front panels.

3.2.3 Adjustment Verification Voltage Measurement

a.   Unlock and close upstream breaker feeding the PDU.
b.   Close SW02 to connect internal control power and voltage metering circuits.
c.   Record the secondary phase-to-phase and phase-to-neutral voltage, without any external load applied, by using PowerView's voltage metering function.
   i.   If the adjusted secondary voltage requires further optimization, perform the following steps:
         i.   Open, lock, and tag out the upstream breaker feeding the PDU.
         ii.   Open SW02.
         iii. Repeat Section 3.2.2

Your TruFit™ PDU is now configured for optimum system voltage. The next section is dedicated to assisting you with placing the main circuit breaker (MCB01) in/out of Reduced Energy Let-Thru (RELT) mode. Please take a moment to familiarize yourself with this unique feature found on your TruFit™ PDU.

3.3 Reduced Energy Let-Thru (RELT) Mode (850/950kVA)

This procedure shall be performed by authorized personnel when it is determined that the main circuit breaker (MCB01) should be set to RELT mode. RELT mode, also known as maintenance mode, is a feature provided with MCB01 that allows for the use of programmable instantaneous overcurrent protection settings, known as Second I (2I) settings, when activated. RELT mode can be enabled whenever the display and system logic are powered-up.

⚠ WARNING	The RELT (Reduced Energy Let-Thru) feature MAY REDUCE but DOES NOT ELIMINATE the risk of arcing.
	An arc flash study should be used to determine arc flash hazard.
	The LED light indicates that the trip unit is in RELT mode.

Figure 3-2: MCB Deadfront

Electrical Hazard Indicator
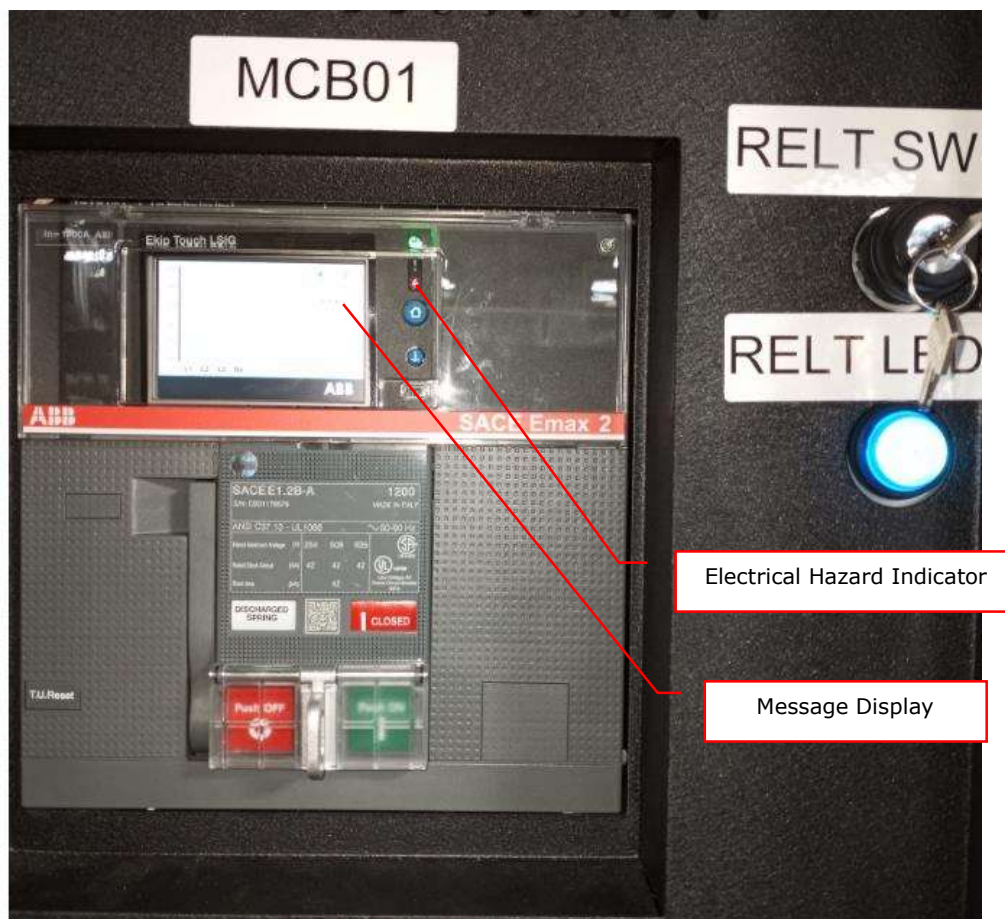
Message Display

3.3.1 RELT Mode activation

a.   Turn the key switch to the "ON" Position.
   i.   Verify the blue pilot LED indicator is on.
   ii.   Verify MCB01 trip unit's red electrical hazard indicator is on, and that the message "2I Protection Active" is displayed.
   iii.   If either of the above conditions is not met, contact ABB Technical Support, and do not proceed further.

3.3.2 RELT Mode deactivation

a.   Turn the key switch to the "OFF" Position.
    i.   Verify the blue pilot LED indicator is off.
    ii.   Verify MCB01 trip unit's red electrical hazard indicator is off, and that the message "2I Protection Active" is no longer displayed.
    iii.   If either of the above conditions is not met, contact ABB Technical Support, and do not proceed further.

You are now able to place MCB01 of your TruFit™ PDU in/out of RELT mode. The next sections are dedicated to assisting you in operating your display/monitoring system. Please take a moment to familiarize yourself with this important procedure for your TruFit™ PDU.

3.4 Complete PDU Shutdown (850/950kVA)

This procedure shall be performed by authorized personnel only, in order to provide an orderly shutdown and isolation of the TruFit™ PDU.

3.4.1 Load De-energization

a.   Place MCB01 in Reduced Energy Let Thru (RELT) mode.
    i.   See Section 3.3 for more information on RELT mode.
b.   Disconnect all downstream equipment. Open, lock, and tag out downstream circuit breakers to prevent potential backfeed of the PDU.
c.   Sequentially open all feeder circuit breakers. Lock and tag out at this time if desired.

3.4.2 Surge Protection Shutdown

a.   Open SW01 to disconnect the SPD from the system.
    i.   Verify that the "A", "B", and "C" indicators are not illuminated or blinking.
        i. If these indicators are still illuminated or the SPD alarm sounds, contact ABB Technical Support, and do not proceed further.
b.   Lock and tag out SW01 at this time if desired.

3.4.3 Distribution Bus Shutdown

a.   Open MCB01 to disconnect voltage from the distribution bus. Lock and tag out at this time if desired.
b.   Confirm the absence of distribution bus phase-to-phase and phase-to-neutral voltage, by using PowerView's voltage metering function.
    i.   If voltage is present on any phase, contact ABB Technical Support and do not proceed further.
c.   Open SW03 to disconnect the distribution voltage metering circuit.

3.4.4 Transformer De-energization

a.   Open, lock, and tag out the upstream breaker feeding the PDU.
b.   Confirm the absence of secondary phase-to-phase and phase-to-neutral voltage, by using PowerView's voltage metering function.
    i.   If voltage is present on any phase, contact ABB Technical Support and do not proceed further.
c.   Open SW02 to disconnect internal control power and secondary voltage metering circuits.

3.4.5 Logic Shutdown

a.   Open, lock, and tagout the external control power breaker.
b.   Verify the display and system logic shutdown after a few seconds.
    i.   If the display or system logic remain powered-up, contact ABB Technical Support, and do not proceed further.

⚠ WARNING	Prior to starting any work, authorized personnel shall carry out all required safety procedures and verification of isolation from all hazardous voltages in the unit. EPMS/PowerView metering should never be used to verify if the PDU is in a safe state for servicing. An OSHA approved device, such as an absence of voltage tester, should be used, along with proper isolation and verification procedures.

Your TruFit™ PDU has now been shut down and should be verified for absence of any hazardous voltage by trained, authorized personnel, according to OSHA and site requirements.

4 Operation (750kVA)

4.1 Initial Start-up (750kVA)

This procedure must be performed by authorized personnel for the first start-up following installation. Prior to beginning this procedure, verify that the PDU and site are in the following starting conditions:

- Upstream breakers, including those for the external control power source, have been locked & tagged out. Recommend placing any upstream UPS's in bypass.
- Downstream equipment has been locked & tagged out, preventing potential back feed of the PDU.
- All PDU input/output connections have been made correctly, all panels have been installed, and all pre-check procedures have been completed.

Additionally, the PDU should be put into the following state before starting:

a. Closed Breakers/Switches:
  i. None

b. Open Breakers/Switches:
  NOTE: Check PDU oneline drawing to confirm which breakers are included in the unit
  i. Main Circuit Breaker 1 (MCB01)
  ii. SPD Switch (SW01)
  iii. Primary Control Circuit Disconnect Switch (SW02)
  iv. Distribution Meter Disconnect Switch (SW03)
  v. Reduced Energy Let-Thru Switch (RELT SW)
  vi. Feeder Circuit Breaker 1 (FCB01)
  vii. Feeder Circuit Breaker 2 (FCB02)
  viii. Feeder Circuit Breaker 3 (FCB03)
  ix. Feeder Circuit Breaker 4 (FCB04)
  x. Feeder Circuit Breaker 5 (FCB05)
  xi. Feeder Circuit Breaker 6 (FCB06)
  xii. Feeder Circuit Breaker 7 (FCB07)
  xiii. Feeder Circuit Breaker 8 (FCB08)
  xiv. Feeder Circuit Breaker 9 (FCB09)
  xv. Feeder Circuit Breaker 10 (FCB010)

4.1.1 Logic Power-up

a. Unlock and close external control power breaker.
  i. At this time, the display and system logic should power up.
  ii. Verify system logic completely initializes before proceeding – approximately 1.5 minutes. Mimic and Navigation Bar shown in Section 5, Figure 5.1 must be displayed on the Graphical User Interface for complete initialization.
b. Place MCB01 in Reduced Energy Let-Thru (RELT) mode.
  i. See Section 4.3 for more information on RELT mode.

4.1.2 Transformer Energization

a. Unlock and close upstream breaker feeding the PDU.
b. Close SW02 to connect internal control power and primary side voltage metering circuits.
c. Verify the correct primary phase-to-phase voltage, without any external load applied, by using PowerView's voltage metering function. See Section 7 for more information.
d. Unlock and close MCB01.
e. Close SW03 to connect secondary side voltage metering circuits.
f. Verify the correct secondary phase-to-phase and phase-to-neutral voltage, without any external load applied, by using PowerView's voltage metering function. See Section 7 for more information.

i. If the secondary voltage is not the desired voltage, the Compensation Tap Adjustment procedure, section 4.2, should be completed at this time.
  ii. Otherwise, proceed to 4.1.3.

4.1.3 Surge Protection and Distribution Bus Power-up

  a. Verify the correct distribution phase-to-phase and phase-to-neutral voltage, without any external load applied, by using PowerView's voltage metering function. See Section 7 for more information.
  b. Close SW01 to connect the SPD to the system.
  iv. Verify that the "A", "B", and "C" indicators are illuminated green and are not blinking.
  v. Verify that the alarm does not sound.
  vi. If either of the above conditions is not met, contact ABB Technical Support, and do not proceed further.

Figure 4-1: Surge Protection Indicators
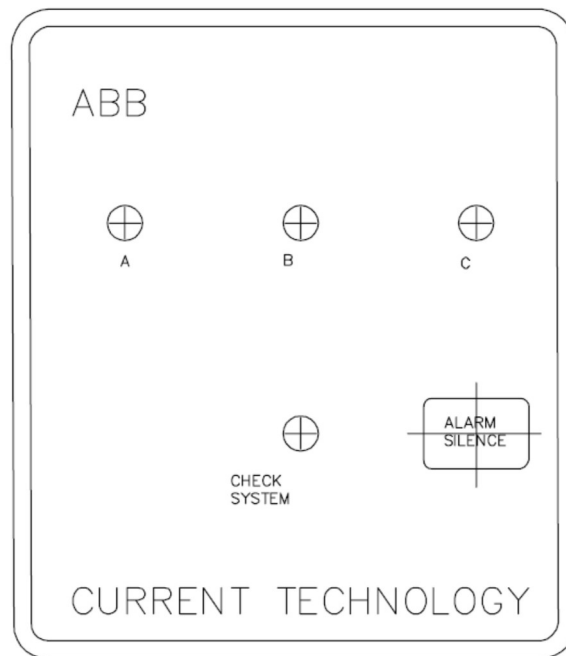
4.1.4 Load Energization

⚠CAUTION	This will energize the load. Observe caution due to potential inrush current or downstream faults.

  a. To energize the load, close the appropriate feeder circuit breaker.
  b. Close downstream load circuit breakers or switches as desired.
  c. With the desired loads energized, MCB01 can be taken out of RELT mode, if so desired.
  ii. See Section 4.3 for more information on RELT mode.

Your TruFit™ PDU is now distributing power to your connected load. The next section is dedicated to assisting you in adjusting your compensation taps for optimum secondary voltage. Please take a moment to familiarize yourself with this unique feature found on your TruFit™ PDU.

4.2   Compensation Tap Adjustment (750kVA)

⚠ WARNING	This procedure shall be performed by authorized personnel when it is determined that adjustments to the PDU's transformer compensation taps are required to adjust the secondary voltage

Prior to beginning this procedure, verify that the PDU and site are in the following starting conditions:

- Upstream breaker feeding the PDU transformer, has been locked & tagged out. Recommend placing any upstream UPS's in bypass.
- Downstream equipment has been locked & tagged out, preventing potential backfeed of the PDU.
- The external control power breaker has been closed and that the display and system logic has been powered on and completely initialized.

Additionally, the PDU should be put into the following state before starting:

a.   Place MCB01 in Reduced Energy Let-Thru Switch (RELT) mode, per Section 4.3

b.   Open Breakers/Switches:
     NOTE: Check PDU oneline drawing to confirm which breakers are included in the unit
   i.   Main Circuit Breaker 1 (MCB01)
   ii.   SPD Switch (SW01)
  iii.   Secondary Control Circuit Disconnect Switch (SW02)
  iv.   Distribution Meter Disconnect Switch (SW03)
   v.   Feeder Circuit Breaker 1 (FCB01)
  vi.   Feeder Circuit Breaker 2 (FCB02)
 vii.   Feeder Circuit Breaker 3 (FCB03)
viii.   Feeder Circuit Breaker 4 (FCB04)
  ix.   Feeder Circuit Breaker 5 (FCB05)
   x.   Feeder Circuit Breaker 6 (FCB06)
  xi.   Feeder Circuit Breaker 7 (FCB07)
 xii.   Feeder Circuit Breaker 8 (FCB08)
xiii.   Feeder Circuit Breaker 9 (FCB09)
xiv.   Feeder Circuit Breaker 10 (FCB010)

4.2.1   Starting Voltage Measurement

a.   Unlock and close upstream breaker feeding the PDU.
b.   Close SW02 to connect internal control power and primary side voltage metering circuits.
c.   Unlock and close MCB01.
d.   Close SW03 to connect secondary side voltage metering circuits.
a.   Record the primary and secondary phase-to-phase and phase-to-neutral voltage, without any external load applied, by using PowerView's voltage metering function.
   i.   Determine the % difference from the desired secondary voltages.
b.   Open, lock, and tag out the upstream breaker feeding the PDU.
c.   Open, lock, and tag out MCB01.
d.   Open Internal Control Circuit Disconnect Switches (SW02 and SW03).

4.2.2   Transformer Tap Adjustment

a.   Open the lower 2 front panels of the transformer cabinet.
b.   Verify the transformer cabinet is free from hazardous voltage by checking for phase-to-phase and phase-to-ground voltage on each phase of both the primary and secondary.
   i.   If voltage is present on any phase, contact ABB Technical Support and do not proceed further.
  ii.   Otherwise proceed to c. below.
c.   Record the existing tap configuration.

    *If applicable to unit configuration

d. Using the labels found on the top of the transformer core, reconnect the compensation taps on the front of the transformer to the configuration that most closely matches the measured % difference.
  i. Ensure all hardware is accounted for and properly re-installed.
    i. If there is any hardware missing, or has fallen into the transformer windings, contact ABB Technical Support and do not proceed further.
  ii. Tighten connections in accordance with the torque specifications found in Section 9.1.
  iii. Record the new tap configuration.
e. Verify all tools and equipment have been removed from the inside of the transformer cabinet.
f. Replace the lower 2 front panels.

4.2.3 Adjustment Verification Voltage Measurement

a. Unlock and close upstream breaker feeding the PDU.
b. Unlock and close MCB01.
c. Close SW02 and SW03 to connect internal control power and voltage metering circuits.
d. Record the secondary phase-to-phase and phase-to-neutral voltage, without any external load applied, by using PowerView's voltage metering function.
  i. If the adjusted secondary voltage requires further optimization, perform the following steps:
    i. Open, lock, and tag out the upstream breaker feeding the PDU.
    ii. Open, lock, and tag out MCB01.
    iii. Open SW02 and SW03.
    iv. Repeat Section 4.2.2

Your TruFit™ PDU is now configured for optimum system voltage. The next section is dedicated to assisting you with placing the main circuit breaker (MCB01) in/out of Reduced Energy Let-Thru (RELT) mode. Please take a moment to familiarize yourself with this unique feature found on your TruFit™ PDU.

4.3   Reduced Energy Let-Thru (RELT) Mode (750kVA)

This procedure shall be performed by authorized personnel when it is determined that the main circuit breaker (MCB01) should be set to RELT mode. RELT mode, also known as maintenance mode, is a feature provided with MCB01 that allows for the use of programmable instantaneous overcurrent protection settings, known as Second I (2I) settings, when activated. RELT mode can be enabled whenever the display and system logic are powered-up.
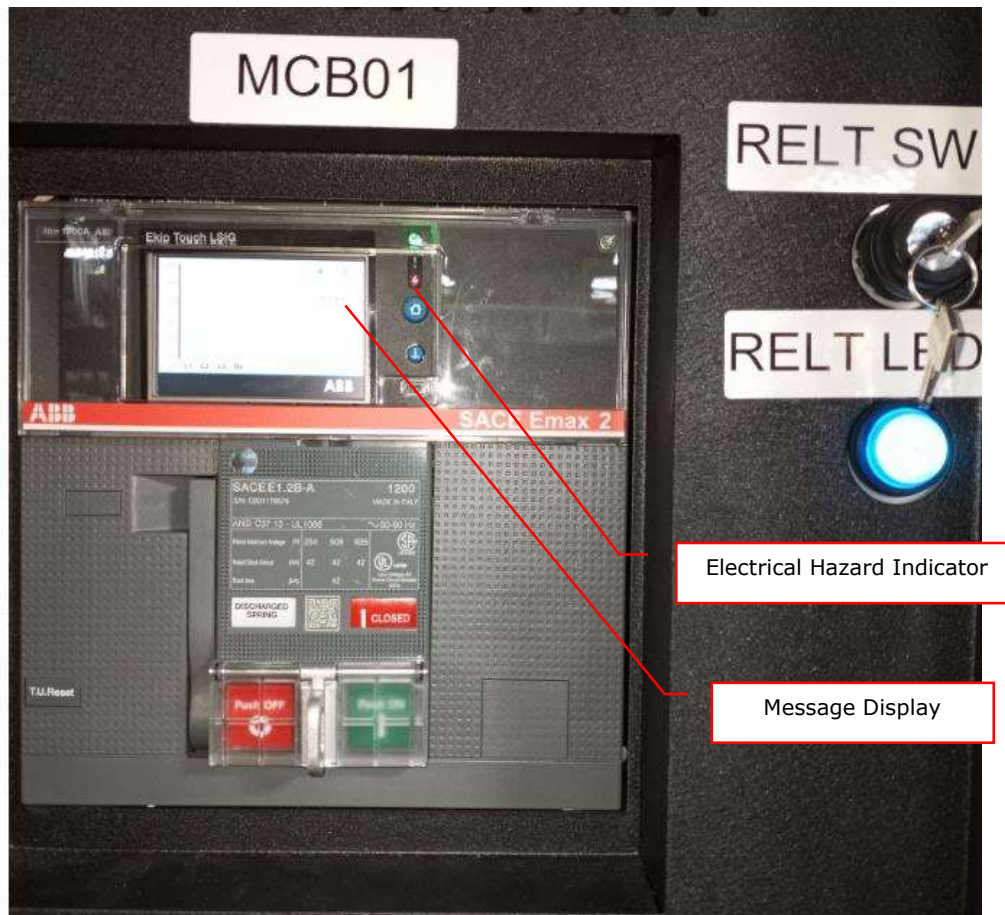
⚠ WARNING	The RELT (Reduced Energy Let-Thru) feature MAY REDUCE but DOES NOT ELIMINATE the risk of arcing.
	An arc flash study should be used to determine arc flash hazard.
	The LED light indicates that the trip unit is in RELT mode.

Figure 4-2: MCB Deadfront

4.3.1   RELT Mode activation

a.   Turn the key switch to the "ON" Position.
   i.   Verify the blue pilot LED indicator is on.
   ii.   Verify MCB01 trip unit's red electrical hazard indicator is on, and that the message "2I Protection Active" is displayed.
   iii.   If either of the above conditions is not met, contact ABB Technical Support, and do not proceed further.

4.3.2   RELT Mode deactivation

a.   Turn the key switch to the "OFF" Position.
    i.   Verify the blue pilot LED indicator is off.
    ii.   Verify MCB01 trip unit's red electrical hazard indicator is off, and that the message "2I Protection Active" is no longer displayed.
    iii.   If either of the above conditions is not met, contact ABB Technical Support, and do not proceed further.

You are now able to place MCB01 of your TruFit™ PDU in/out of RELT mode. The next sections are dedicated to assisting you in operating your display/monitoring system. Please take a moment to familiarize yourself with this important procedure for your TruFit™ PDU.

4.4   Complete PDU Shutdown (750kVA)

This procedure shall be performed by authorized personnel only, in order to provide an orderly shutdown and isolation of the TruFit™ PDU.

4.4.1   Load De-energization

a.   Place MCB01 in Reduced Energy Let Thru (RELT) mode.
    i.   See Section 4.3 for more information on RELT mode.
b.   Disconnect all downstream equipment. Open, lock, and tag out downstream circuit breakers to prevent potential backfeed of the PDU.
c.   Sequentially open all feeder circuit breakers. Lock and tag out at this time if desired.

4.4.2   Surge Protection Shutdown

a.   Open SW01 to disconnect the SPD from the system.
    i.   Verify that the "A", "B", and "C" indicators are not illuminated or blinking.
        i. If these indicators are still illuminated or the SPD alarm sounds, contact ABB Technical Support, and do not proceed further.
b.   Lock and tag out SW01 at this time if desired.

4.4.3   Transformer De-energization

a.   Open MCB01 to disconnect voltage to the transformer. Lock and tag out at this time if desired.
b.   Confirm the absence of secondary bus phase-to-phase and phase-to-neutral voltage, by using PowerView's voltage metering function.
    i.   If voltage is present on any phase, contact ABB Technical Support and do not proceed further.
c.   Open SW03 to disconnect distribution voltage metering circuit.

4.4.4   PDU De-energization

a.   Open, lock, and tag out the upstream breaker feeding the PDU.
b.   Confirm the absence of primary input phase-to-phase voltage, by using PowerView's voltage metering function.
    i.   If voltage is present on any phase, contact ABB Technical Support and do not proceed further.
c.   Open SW02 to disconnect internal control power and primary voltage metering circuits.

4.4.5   Logic Shutdown

a.   Open, lock, and tagout the external control power breaker.
b.   Verify the display and system logic shutdown after a few seconds.

a. If the display or system logic remain powered-up, contact ABB Technical Support, and do not proceed further.

	Prior to starting any work, authorized personnel shall carry out all required safety procedures and verification of isolation from all hazardous voltages in the unit. EPMS/PowerView metering should never be used to verify if the PDU is in a safe state for servicing. An OSHA approved device, such as an absence of voltage tester, should be used, along with proper isolation and verification procedures.

Your TruFit™ PDU has now been shut down and should be verified for absence of any hazardous voltage by trained, authorized personnel, according to OSHA and site requirements.

5   Graphical User Interface (GUI)

The user interface is a touchscreen LCD. It shows all system status as well as providing a means to set the unit up and control it. This is done through buttons, checkboxes, radio buttons, pull-down menus, and text entry screens.

The GUI display/control panel displays system status as monitored by the PowerView monitoring system. Monitoring details can be found in Section 7.

The GUI display/control panel is surrounded by a ring light, which displays green, yellow, or red, depending on operating status and active alarms, as described in Section 6.3.

Each PDU unit has a User Interface Board (UIB), which is provided for the user's connections.

External monitoring systems, e.g., Building Management Systems, can be used to poll the PDU units using Modbus RTU (on an RS-485 bus) or Modbus/TCP. Each unit connected in the Modbus network shall be configured with a unique Modbus ID.

The operation of the display module is based on the Navigation Bar.

Figure 5-1: Home screen with Navigation bar highlighted (actual mimic may vary)
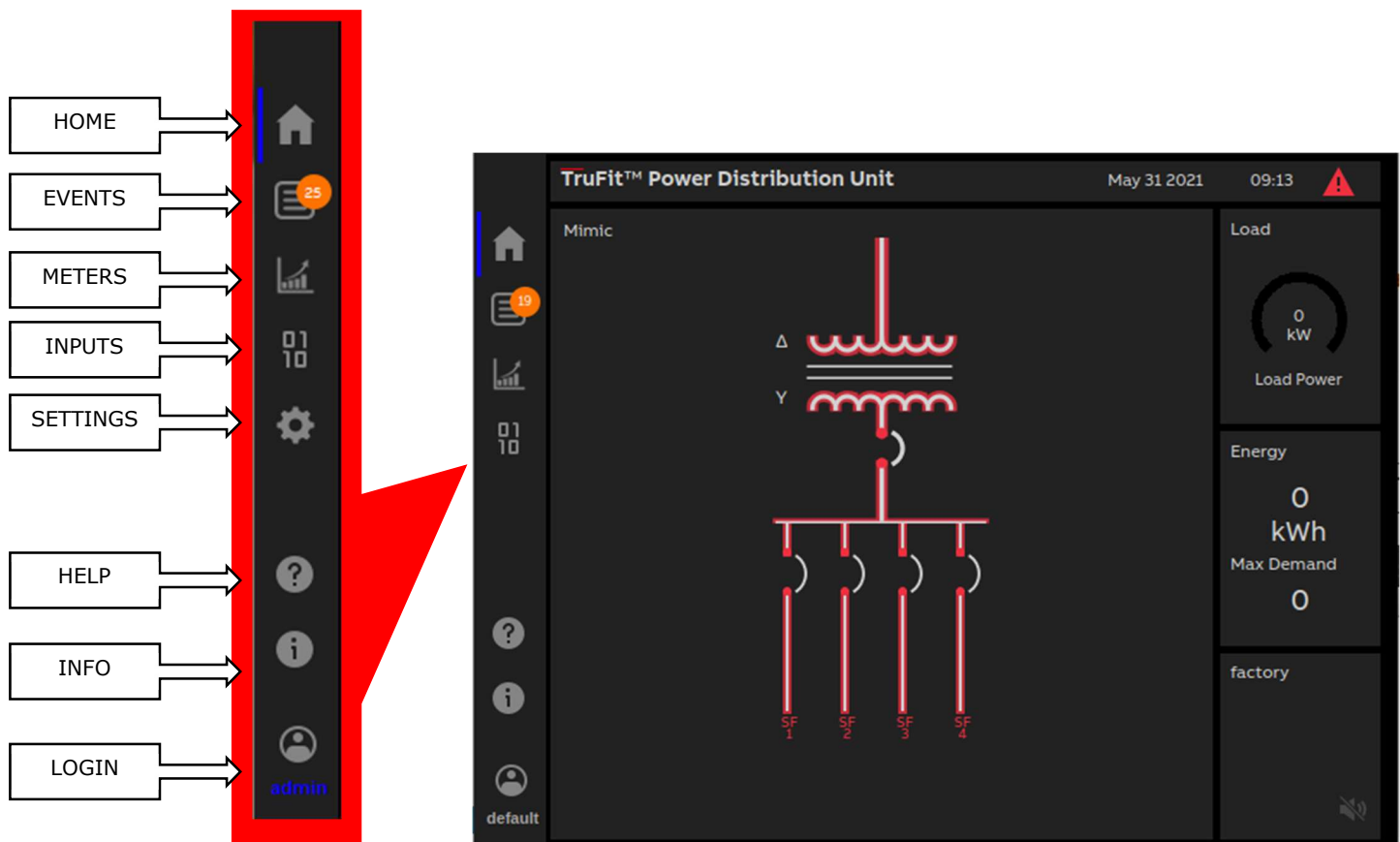
5.1 Display module

The graphic user interface is shown on the display module. The display module is also surrounded by a ring light, whose color will change depending on the alarm or warning that is currently in need of attention. Details on alarms and warning are described in Section 6.

USB DEVICE is configured as the Service Port.

Figure 5-2: Display module - Front view as mounted on door
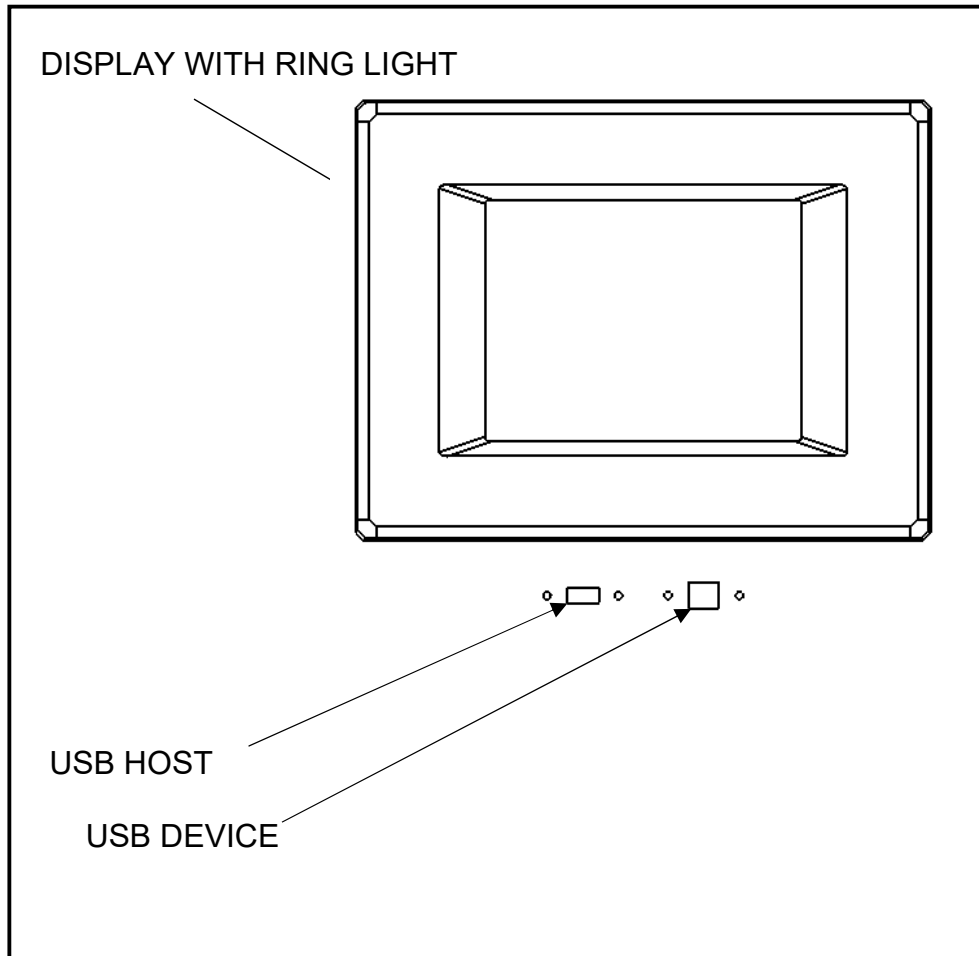
Figure 5-3: Display module - Rear view

5.2 Menu tree

LEVEL 1 | **LEVEL 2** | **LEVEL 3** | **LEVEL 4**

HOME

EVENT LOG
- FILTER
- ACK ALL

METERING
- METERING OVERVIEW
  - PDU
    - OUTPUT
      - GRAPHICAL
      - TABLE VIEW
      - THERMAL VIEW
      - SETTINGS
      - WAVEFORM
    - INPUT
      - GRAPHICAL
      - TABLE VIEW
      - THERMAL VIEW
      - SETTINGS
      - WAVEFORM
  - PANEL
    - PANEL METERING
      - GRAPHICAL
      - TABLE VIEW
      - SETTINGS
      - WAVEFORM
    - BRANCH METERING
      - BRANCH METERING
      - BRANCH CONFIGURATIONS
      - WAVEFORMS
  - SUBFEED
    - GRAPHICAL
    - TABLE VIEW
    - SETTINGS
    - WAVEFORM

INPUT SENSORS
- DIGITAL INPUT
- THERMAL SCREENS
  - SLOT
    - TEMPERATURE
    - CONFIGURATIONS
- REGISTERS VIEWS

SETTINGS
- NETWORK
- PROTOCOL
- EMAIL
- GENERAL
- DISPLAY

SERVICE
- REPORT
- UPGRADE
- RESET

INFO
- SYSTEM
- SOFTWARE

HELP

LOGIN
- LOGIN
- LOGOUT
- MANAGE PASSWORD

☐ - DEFAULT, USER
🟩 - ADMIN & Above
🟨 - SERVICE & Above

5.3 Security

5.3.1 Login and logout

To login into a security level, select User icon 👤. The below screen should appear.

Figure 5-4: Security Login screen
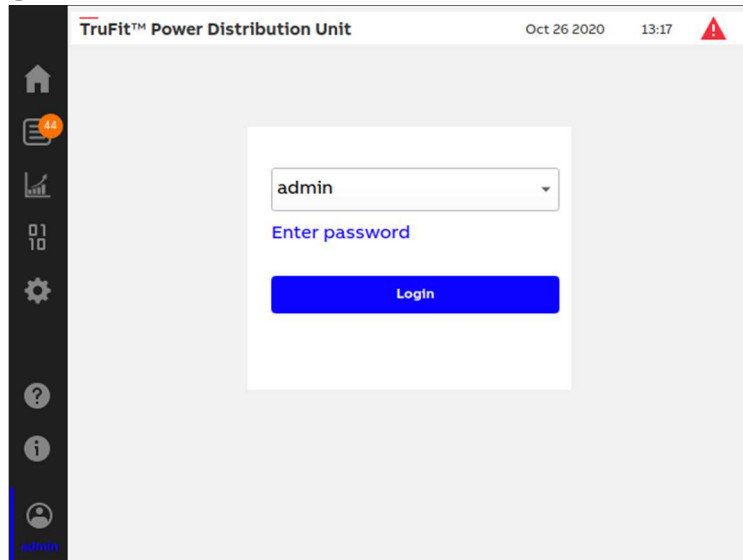
Select the proper "User Name" from the pull-down list.

Click "Enter Password" for the keyboard to appear, as shown below. Click the letters to enter the password, then click the keyboard icon in the lower right to close the keyboard.

Click the blue "Login" button to complete login.

Figure 5-5: Password Keyboard
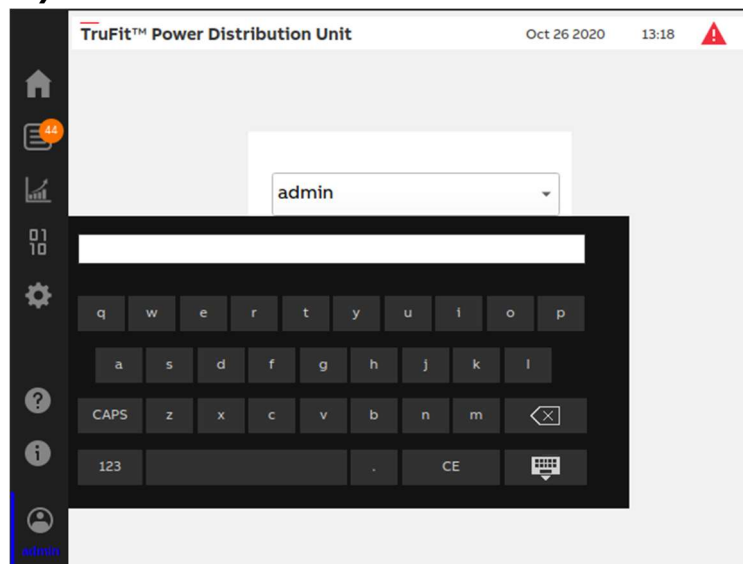
This will login the user to the appropriate security level.

The unit provides three layers of secured login access in the GUI.

Table 5-1: Default login passwords

Login Name	Password
Default	
User	Switch
Admin	Filter
Service	<reserved for service>

On a successful/unsuccessful login, the screen will automatically navigate to the home screen.

To logout, select "Logout". Once the user logs out, the screen will automatically navigate to the Home screen, and the items in the menus for opening these windows will be hidden for security purposes.

Each login name can change their own password. We recommend changing the passwords immediately after initial system installation. A login table has been inserted in this section to keep record of any password modification.

Login Name	Password	Date of modification

5.4 System setup

Under the Settings icon ⚙ on the menu bar, the user can configure the unit as shown below. The user must be logged in as 'admin' (or higher) to access the items under "Settings".

Figure 5-6: The "Settings" submenu

5.4.1 Network Settings screen

The Network Settings screen is used to configure the IP, gateways & subnet address of the system.

Figure 5-7: Network Settings screen (Dynamic)
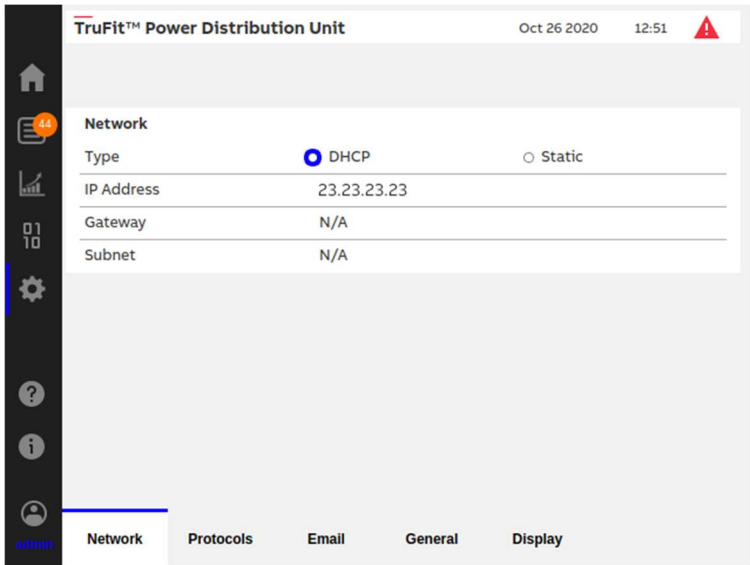
Figure 5-8: Network Settings screen (Static)
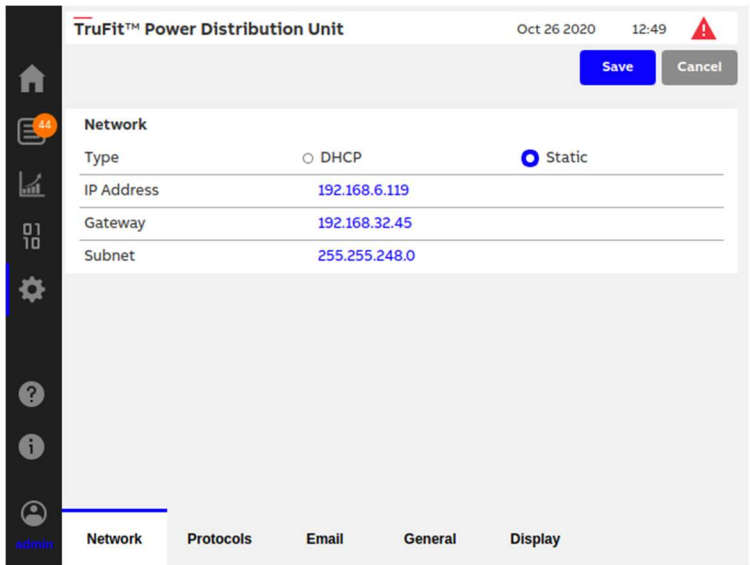
The Protocol Settings screen is used to configure the upstream access parameters.

E.g.: SSH (Secured Shell), Modbus TCP, Modbus RTU & TFTP settings.

Figure 5-9: Protocol Settings screen
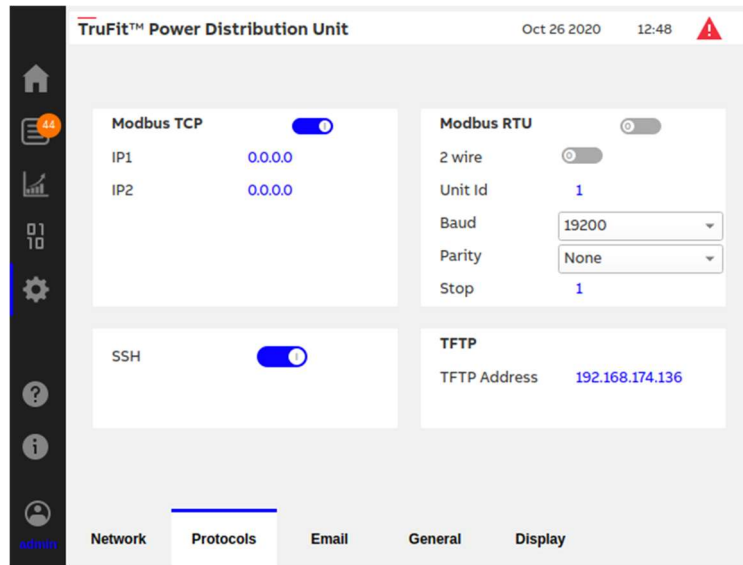
5.4.2.1 Modbus TCP configuration:

Figure 5-10: Modbus TCP configuration
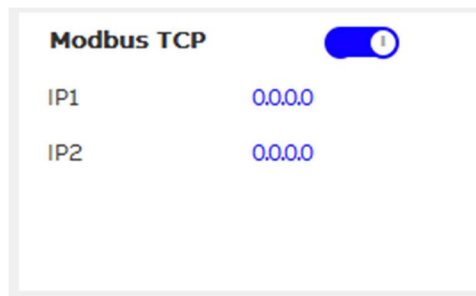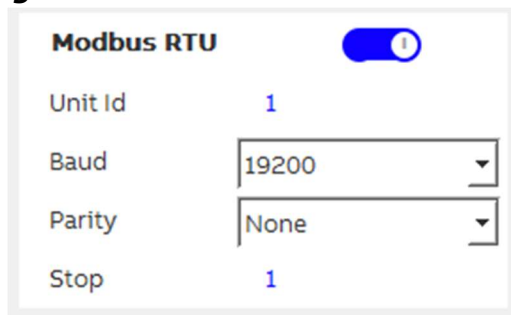
Modbus TCP can be configured from this tile.

- The on/off toggle slider is used to enable/disable this feature.
- IP1 & IP2 are the IP address of the polling device.
   - If IP1 & IP2 are 0.0.0.0 any device can poll
   - If either IP1/IP2 is set, only the IP address that is entered can poll the unit.
     ego: If IP1 is 192.168.5.4 & IP2 is 0.0.0.0 only IP1 can poll the device.

5.4.2.2 Modbus RTU configuration

Figure 5-11: Modbus RTU configuration
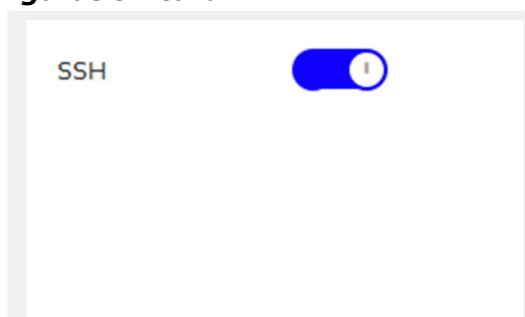
The Modbus RTU feature can be configured from this:

- The ON/OFF toggle switch is used to enable/disable the feature.
- Unit id can be configured from 1-250
- Baud rates can be configured as 9600,19200,38400 & 57600
- Parity can be configured as None, Even & Odd
- Stop bit can be set to 1 or 2.

5.4.2.3 Secured Shell

Figure 5-12: Secure Shell configuration card
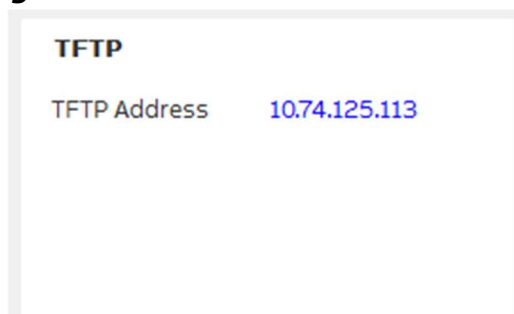
The Secure Shell (SSH) service can be enabled/disabled via the toggle button.

5.4.2.4 TFTP Server Address:

Figure 5-13: TFTP Server configuration tile

The TFTP server can be configured in the above tile. This TFTP server is used for upgrade & report generation.

5.4.3 Email Settings screen

The Email Settings screen is used to configure the system email parameters.

> e.g.: Email server, Port, Email address & Content.

Figure 5-14: Email Settings screen
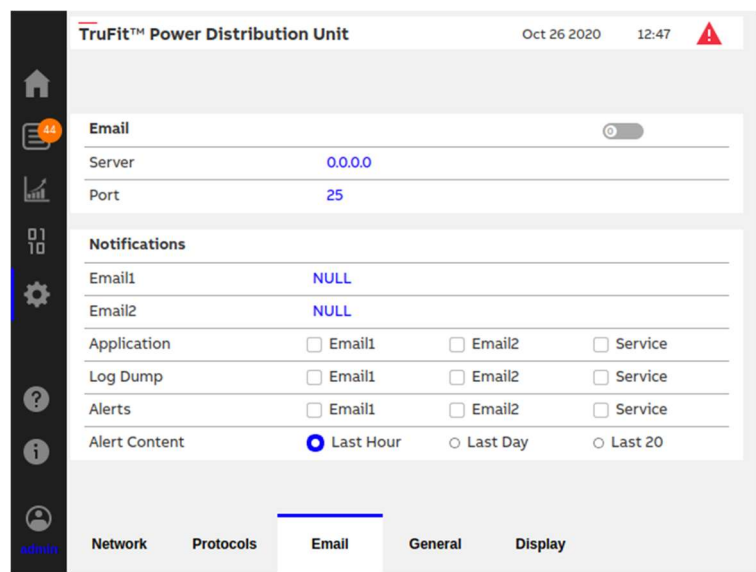
5.4.4 General Settings screen

The following parameters can be configured in this screen. They can be changed by clicking on the parameter to enable editing.

Date & Time

1. Time

2. Date

3. Time Zone

4. NTP

System Settings

1. Audible Alarm

2. Security

3. Manual Restart

4. Temperature Scale

Figure 5-15: General Settings screen
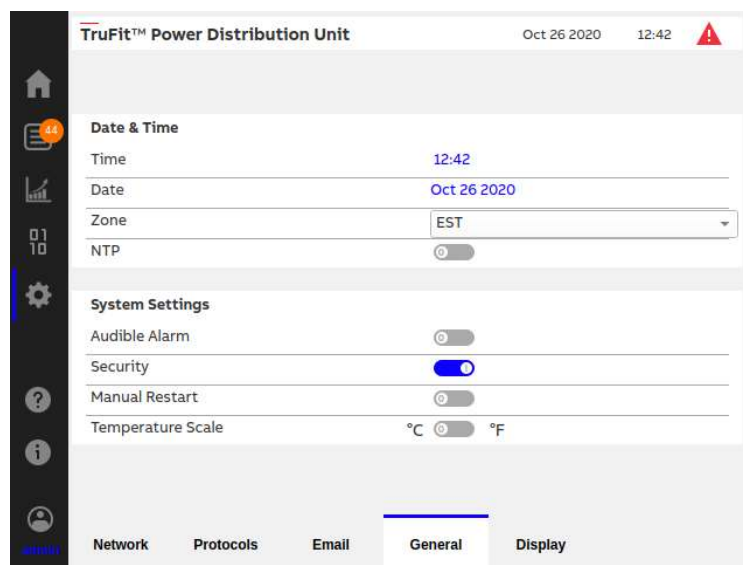
5.4.5   Display Settings screen

The System Display screen helps the user to configure the screen saver and display contrast.

The screen saver can be enabled or disabled by the on/off toggle button.

When screen saver is enabled, the system turns off the backlight and logs off the user after the number of minutes entered for Timeout.

When the screen saver is disabled, the user will not be automatically logged out of the system.

The screen saver setting is retained through power down /up cycles.

The screen contrast is also set via this screen.

Figure 5-16: Display Settings screen
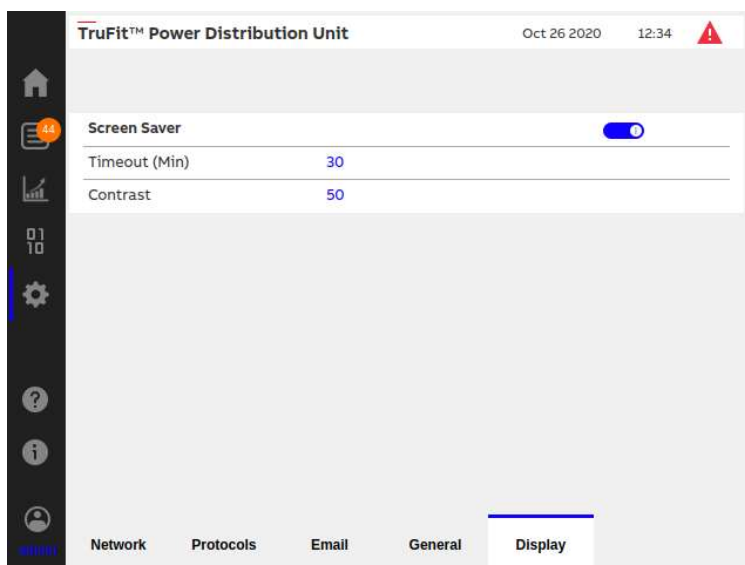
5.4.6 Information screen

The system information screen can be viewed from the About Icon

5.4.6.1 System information

Figure 5-17: System Information screen
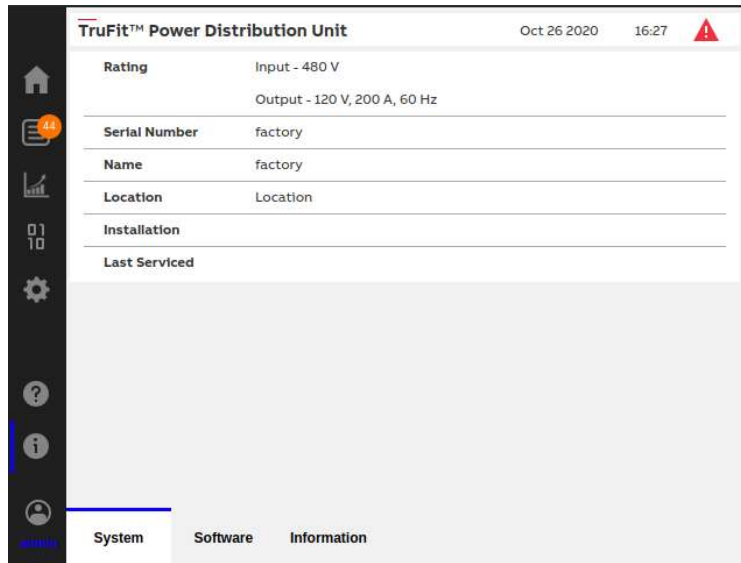
The system information screen is shown above. This screen contains the rating, serial number, name, location, installation & last serviced information.

5.4.6.2 System software information
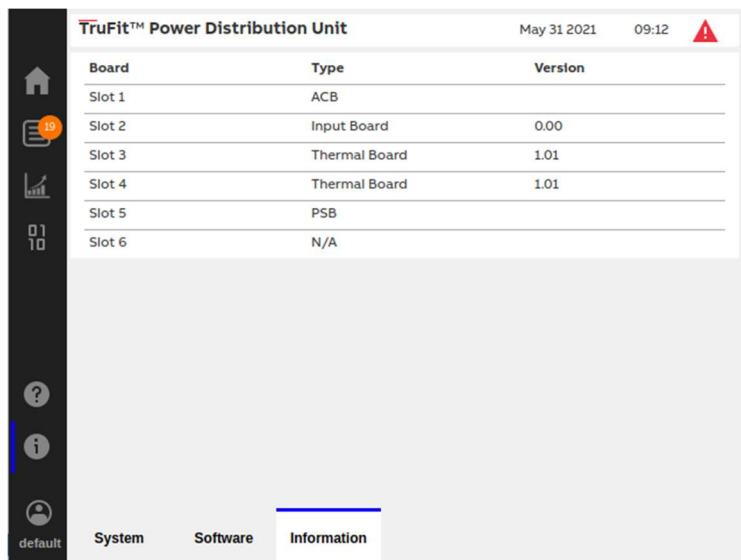
Figure 5-18: System Software screen
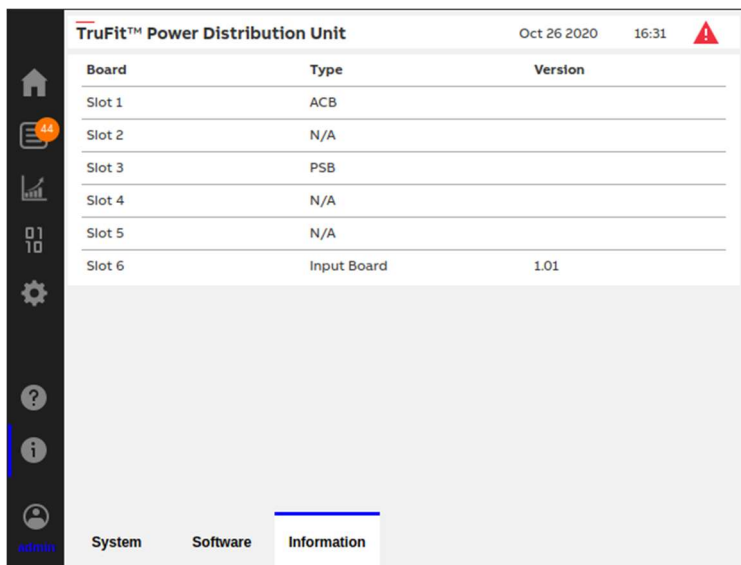
The system software information is shown above. This screen contains all the software versions of the meter modules & display modules. Note that the versions shown in Figure 5-18 may not be the most recent or what is loaded on your unit. Software upgrades can only be performed by authorized ABB service personnel. Contact ABB if there is interest in upgrading to the latest software revision.

5.4.6.3 Slot Information

Figure 5-19: Slot Information screen

The system slot information is shown above. This screen contains information on the type of daughter card installed in each PowerView slot. The number of slots displayed will depend on whether the unit has a 2 slot or 6 slot PowerView system. Daughter card additions or changes can only be performed by authorized ABB service personnel. Contact ABB if there is interest in upgrading the PowerView system.

5.4.7   User-Interface Board (UIB)

The User-Interface Board (UIB) provides an interface for connecting the PDU to external monitoring and control equipment. See **TruFit™ PDU Installation Guide** for more details.

6 Alarms and Events

All referenced voltages and currents are based on the standard 480 -208/120VAC units. See as built documents and/or unit nameplate for unit specific voltages.

6.1 Overview

Alarms and events are conveyed to the user through the display module's graphical user interface and audible alarm. Alarm and warning threshold levels are configured in the installed PowerView metering module. PowerView will monitor various voltages & currents in a power distribution panel, will also compute various other parameters such as power, energy, demand, frequency, power factor, etc. Additionally, PowerView provides the Modbus connection to interface with a building management system.

6.2 Product description

The PowerView metering module will acquire the voltage & current signals from an analog signal conditioning board. It will calculate energy and power quality parameters. These parameters are passed to the display board/PC for display and data logging. It will also receive control/command/system parameter data from display board or a third-party display module.

6.3 Event Log and alarm/warning

6.3.1 Overview

System events are logged in the Event Log. Each event contains the following attributes:

1. Timestamp
2. Severity of event (⚠ Information, ⚠ Warning, ⚠ Alarm).
3. Active state (🔒)
4. Acknowledgement state (❗)
5. Event description

Some events remain active in the Event Log if the event status is true. The event becomes inactive only when the condition is cleared. For example, an event triggered by a metered value that exceeds a high limit will remain active until that metered value falls back below the high limit.

Some alarm/warning events also require acknowledgement from the user after they become inactive. This will be discussed below. Other types of alarm/warning events do not require acknowledgement.

6.3.2 Viewing events

The events can be viewed in the Event Log by clicking the Event icon 🗏 .

The Event Log displays the number of active events.
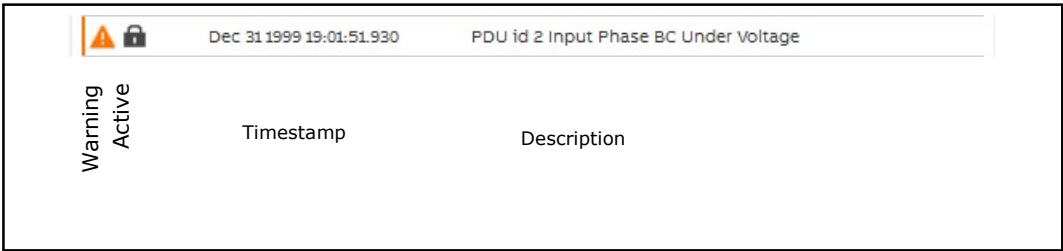
Figure 6-1: Event Log
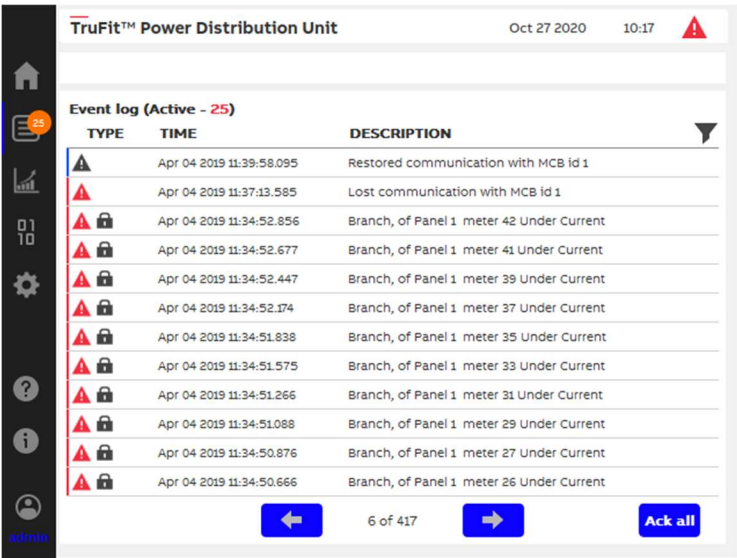
By clicking the back ⬅ and next ➡ buttons the user can navigate to next page of the events.

Figure 6-2: Event Log with active warning

6.3.3 Acknowledging events

The 'Ack all' button is to acknowledge all the events in the Event Log. An example screenshot of the Event Log, when 'Ack all' is clicked, is shown below. Once the 'Ack all' event is pressed, the buzzer stops, and unacknowledged event sign goes away.

Figure 6-3: Event Log with active alarm & un-acknowledged

Figure 6-4: Event 'Ack all' is pressed

6.3.4   Event filtering

The events displayed in the Event Log can be filtered via the 'Filters' window as shown below. This feature is activated by selecting Filter icon ▼ in the Event Log. After selecting the filter criteria and clicking the "Apply" button, the filtered list of events will appear in the Event Log and the filter criteria will appear at the top of the Event Log.   The filters can be cleared by clicking on the filter criteria on the top of the Events Log or by clicking the "Clear Filter" button in the 'Filters' window.

Figure 6-5: Event Filters window

Figure 6-6: Event screen with ''Alarm' and 'Warning' filters enabled

Figure 6-7: Event screen showing the filter criteria

6.3.5 Alarm/warning annunciation (Local)

The PDU display unit annunciates alarms/warnings locally by the following two different means.

- Alarm/warning ring light
- Audible alarm

6.3.5.1 The alarm/warning ring light:

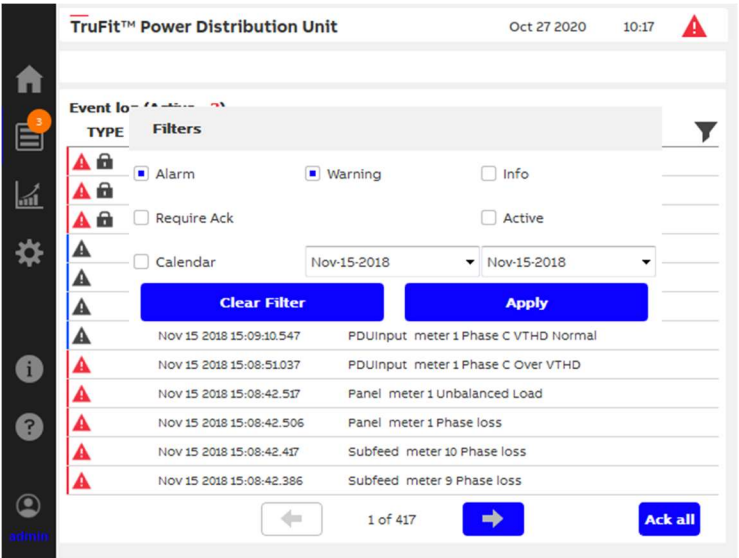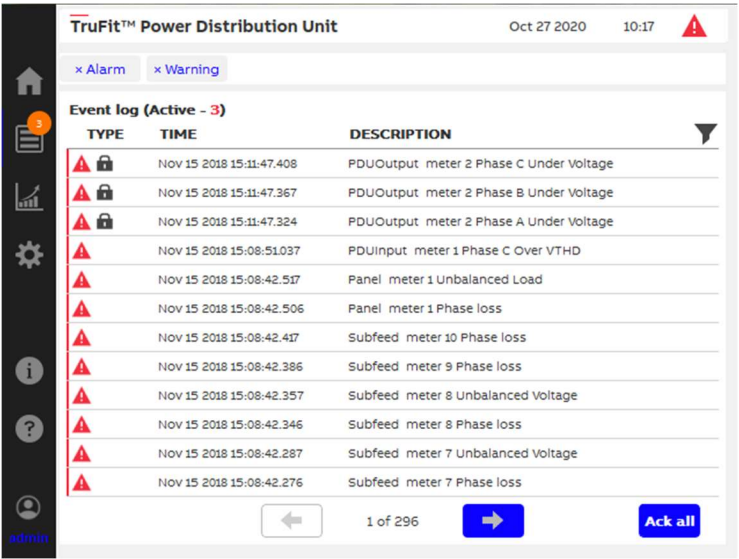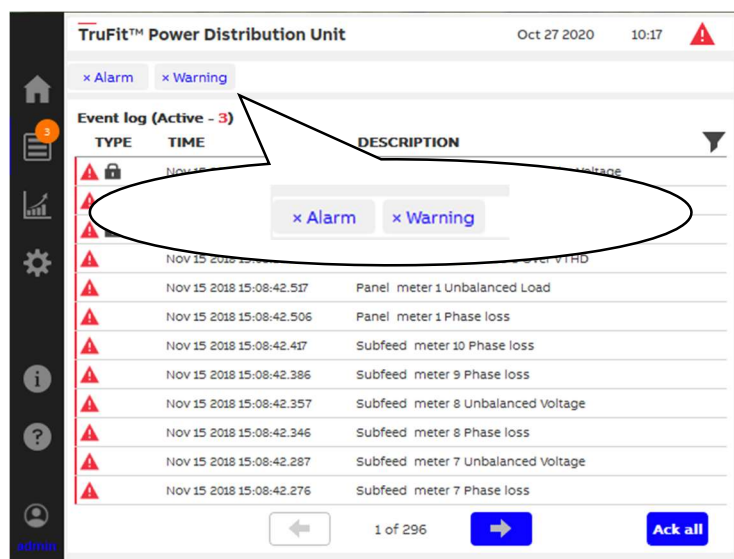The alarm/warning ring light, which is located under the LCD display, can be in any of the following three states:

Ring light state	Description
Green (Solid)	Normal operating condition. No active alarms or warnings are present.
Yellow (Blinking)	One or more active warnings are present.
Red (Blinking)	One or more active alarms are present.

The alarm/warning ring light states (above) are non-latching. For example, the ring light will automatically change from red to green if a warning condition disappears and there are no other active alarms or warnings present.

See **Display Module** section for detailed location of ring light.

6.3.5.2 The audible alarm:

When logged in as 'admin' (or higher), the user can enable or disable the audible alarm as mentioned in Section 5.4.4. When using this method, the new setting is permanently saved in flash memory.

The audible alarm operates independently of the alarm/warning ring light. The audible alarm sounds only if there is one or more alarm/warning event(s) in the log that require(s) acknowledgement, in addition to the other caveats mentioned below. (Note that not all alarm/warning events require acknowledgement.) Therefore, it is possible for the audible alarm to be sounding while the alarm/warning ring light is green and for the audible alarm to be silent while the alarm/warning ring light is red.

Note that alarm and warning events from the PowerView do not require acknowledgement and will not cause the audible alarm to sound.

6.3.6   Alarm/warning annunciation (Remote)

The PDU can annunciate alarms/warning remotely via two sets of Form-C alarm relay contacts. (See Section 5.4.6.3 for the wiring details.) These relay contacts are designated as follows:

– Summary Alarm Contacts
– Unacknowledged Events Contacts

6.3.6.1 The Summary Alarm contacts:

The Summary Alarm contacts will be in the alarm state if there are one or more active warnings or alarms present. The Summary Alarm contact follows the state of the alarm/warning ring light, i.e., they should be in the alarm state when the alarm/warning ring light is red (solid or blinking) and should be in the normal state when the alarm/warning ring light is green.

6.3.6.2 The Unacknowledged Events contacts:

The Unacknowledged Events contacts will be in the alarm state only when there are one or more alarm/warning events in the log that require acknowledgement. The Unacknowledged Events contacts should be in the alarm state when the audible alarm is sounding. See the caveats about the audible alarm above in Section 6.3.5. Also note that disabling the audible alarm does not disable the Unacknowledged Events contacts.

Note that both sets of alarm contacts will be in the normal state if power is lost to the equipment.

6.3.7   Group Fault

The Group Fault occurs when there are connectivity problems in a daughter board. Connectivity is monitored in two groups of daughter boards, assigned by slot depending on chassis type.

Table 6-1: Group Fault slot assignment

Chassis	Group 1	Group 2
6 slots	Slots 1,2 and 3	Slots 4,5 and 6
2 slots	Slot 1	Slot 2

Users are alerted to Group Fault in the following ways:

- Alerted with both the ring light and buzzer, as described in Section 6.3.5.
- Noted in the event log with the description "MCB [ID] ACB Group [ID] Fault, with the ID's related to the MCB or ACB Group where the fault occurs
- Meter readings on the GUI will stop updating

The Group Fault needs to be resolved by ABB Service. If this fault occurs, please contact ABB Service for resolution.

7 Metering and Monitoring

7.1 Overview

The PowerView metering module will be used to monitor various voltages & currents in a power distribution panel or remote power panel. The meter will also compute various other parameters such as power, energy, demand, frequency, power factor, etc. Specific parameters for transformers, branches and sub-feeds are shown in Section 7.5.

> **i** This unit is equipped with ABB's PowerView monitoring system. Instructions regarding monitoring can be found in **PowerView Manual 94-1100-00002861**. The reader is expected to know the fundamentals of electricity, wiring, electrical components, and electrical schematic symbols.

7.2 Product description

The Metering module board will acquire the voltage & current signals from an analog signal conditioning board. It will calculate energy and power quality parameters. PowerView can also monitor discrete or thermocouple inputs. These parameters are passed to the display board/PC for display and data logging. It will also receive control/command/system parameter data from display board or a third-party display module.

Refer to schematics and/or single-line drawings supplied with your equipment for details.

7.3 Features

The following are standard features of this TruFit™ PDU:

a. Surge protection device (SPD) fault indication. This indication could mean that there is a fault with the SPD
b. Transformer over temperature warning and alarm.
c. Remote Emergency Power Off contacts (REPO).
d. Breaker open/closed/tripped status indication.
e. Field wiring temperature monitoring
f. Redundant control power supplies fed by both internal and external sources.

7.4 Modbus

The PowerView with HMI acts as a Modbus slave, and can be accessed by the Modbus master using either Modbus RTU (via RS-485) or Modbus TCP through customer connection on the UIB Modbus port. The PowerView with HMI is identified by a unique slave ID=1 by the master. The default Modbus RTU settings are as follows.

Baud rate: 19200

Parity: None

Stop bits: 1

7.5 Metering screens
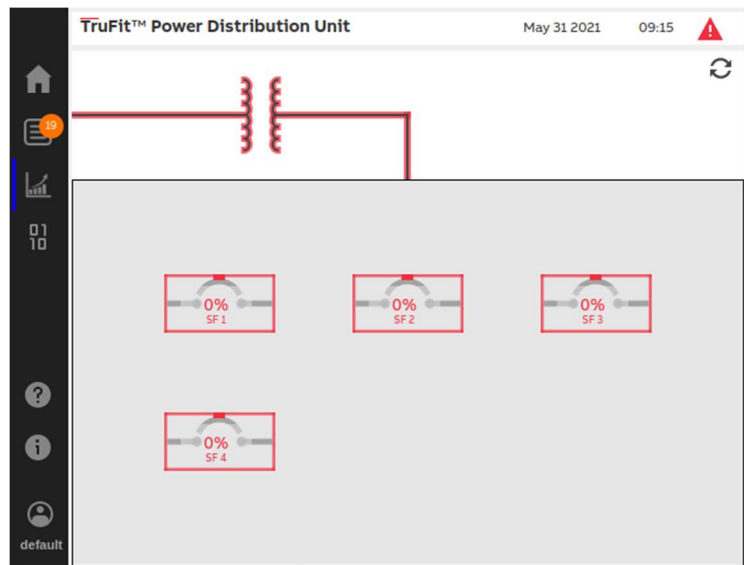
7.5.1 Metering Overview screen

By clicking on the Meters icon , the Metering Overview screen will be shown, with a graphic showing the monitored system components. The user clicks the icon of a component to open screens with further monitoring information on that component.

Users with ADMIN access need to click the specific panel, branch, or sub-feed to change settings or parameters for that component. For more details on changing parameters and settings, see Section 7.6 and Section 7.5.5.1.

RPPs do not have transformers, so that that icon will not be available.

Events associated with the displayed screen are shown with triangles (⚠ Information, ⚠ Warning, ⚠ Alarm). Event details can be accessed by clicking on the triangle icons. For more information on events and alarms, see Section 6.

Figure 7-1: Metering Overview screen

7.5.2 PDU metering

7.5.2.1 PDU graphical view

When the user clicks the Metering Overview screen's transformer icon, the PDU Graphical screen opens, showing metering in bar graph format. By default, the metering shown is from the transformer's output side, as noted by the blue bar under the small transformer icon shown in Figure 7-2. To switch to metering on the input side, the user will click that transformer icon, and results will be as shown in Figure 7-3.

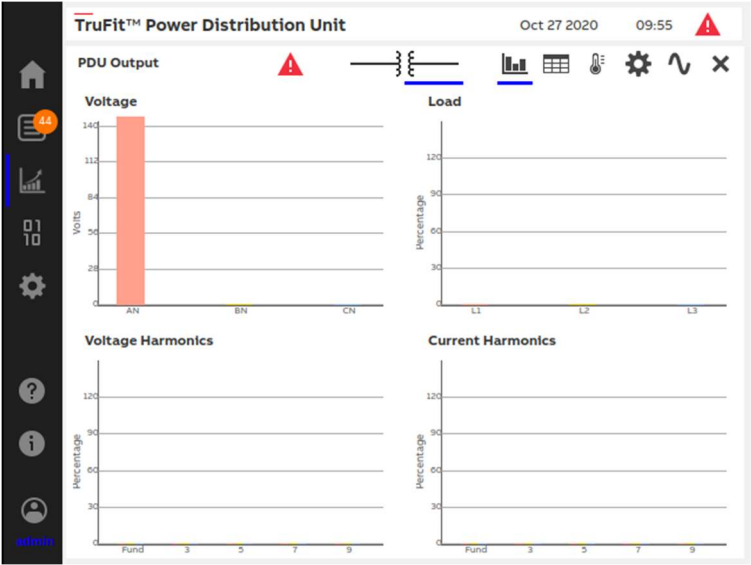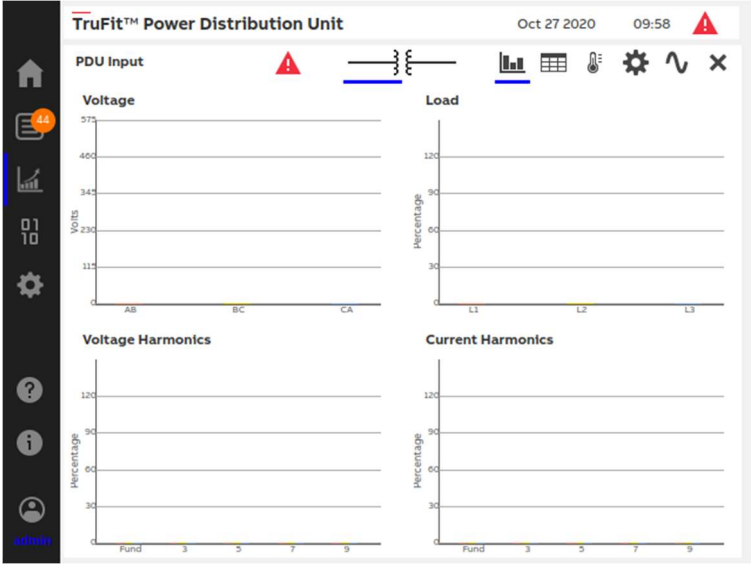**Figure 7-2: PDU Graphical screen - Output side**

Figure 7-3: PDU Graphical screen - Input side

7.5.2.2 PDU Meter Tabular View

When the user clicks the tabular icon ▦ , even more detailed meters in a tabular structure will be shown. Four screens show prevailing metering information regarding voltage, current, frequency and power.

Click the blue arrows ← → to move through the screens.

The transformer icon continues to identify whether the metering information is from the input or output side.

Min and Max values are since the last reset. Averages are over the duration noted in the settings. Changing settings and resetting values requires ADMIN access.
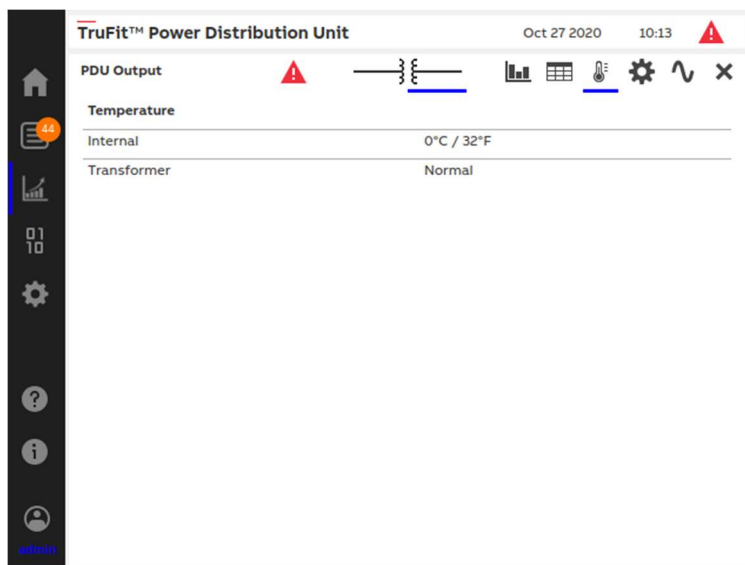
Figure 7-4: PDU Tabular screens
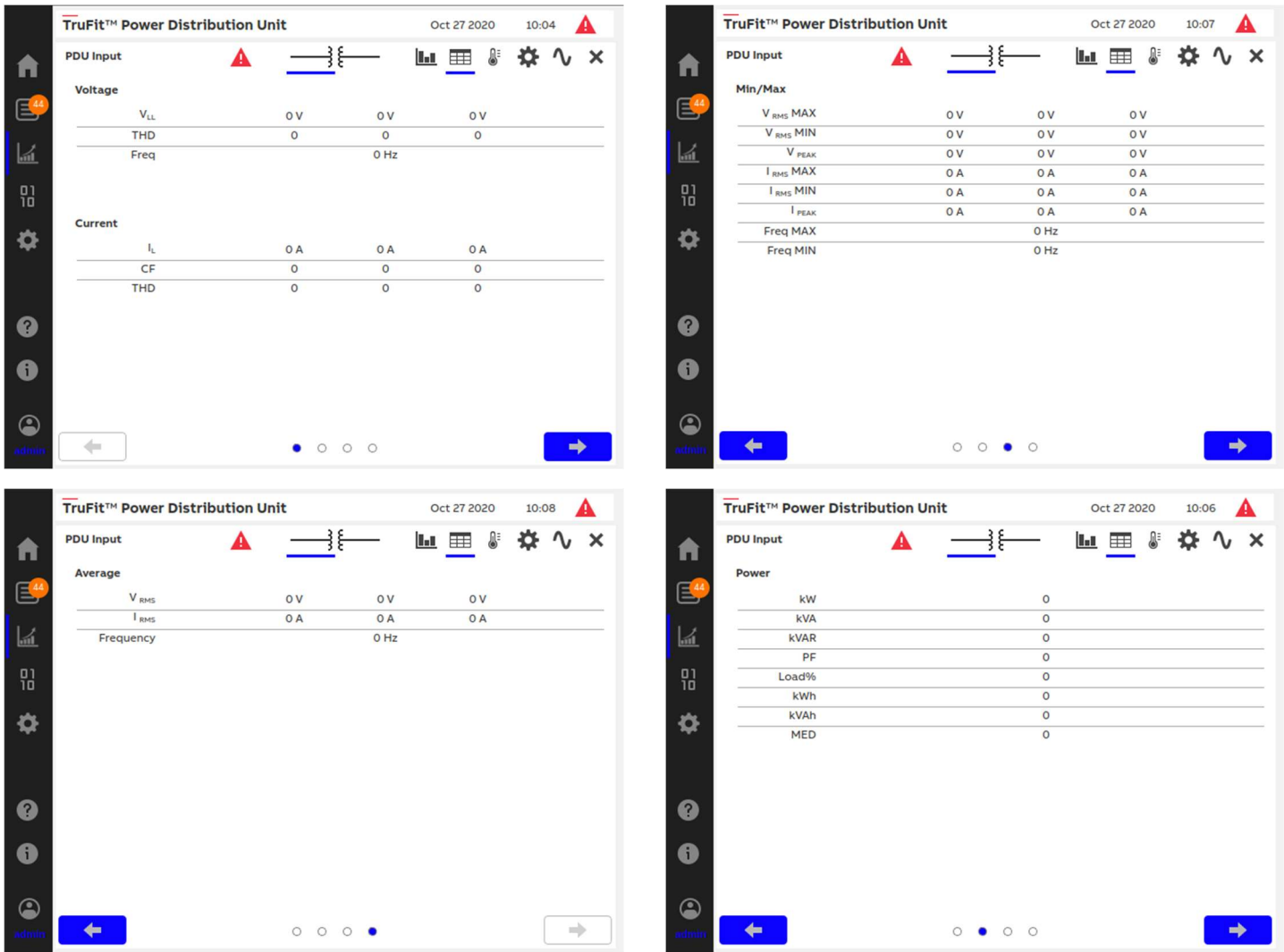
7.5.2.3 PDU Thermal View

Select the thermometer icon to view temperature information regarding the internal PCA's and the main transformer.
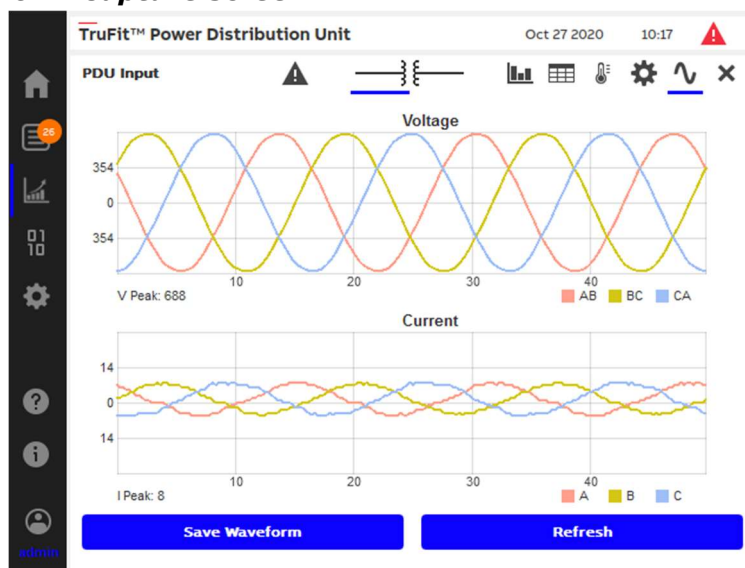
Figure 7-5: PDU Thermal screen

7.5.2.4 PDU Waveform screen

Select the waveform icon to view waveform from the main transformer's primary or secondary side, captured at the instant of selection.
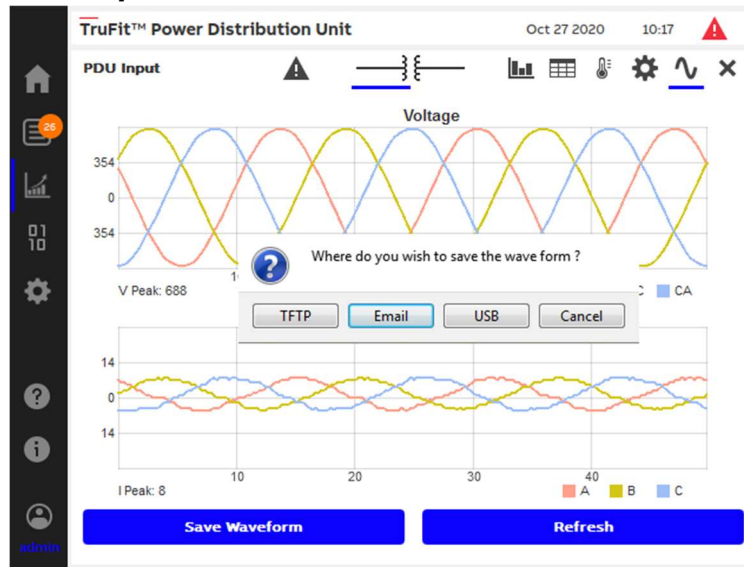
Pressing the [Refresh] will update to a new waveform capture.

Figure 7-6: PDU Waveform Capture screen

A waveform capture can be saved to an output drive, by pressing **Save Waveform** and selecting as shown below. Output file is in .csv format.

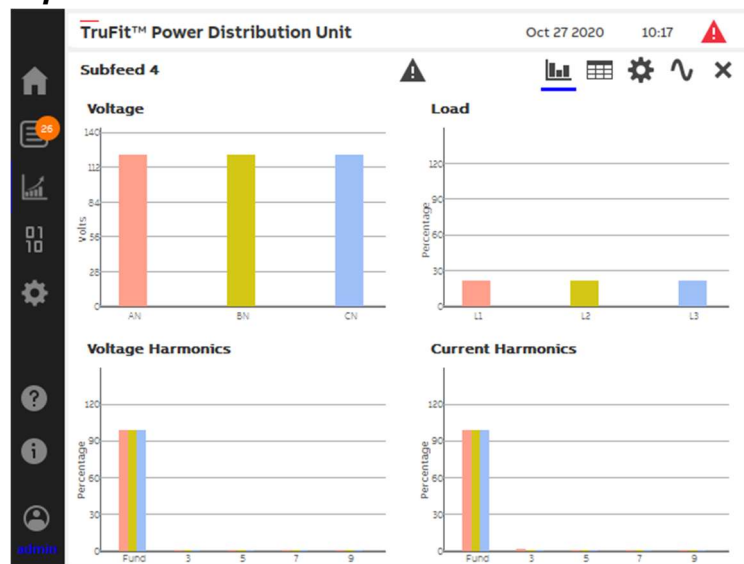***Figure 7-7: PDU Waveform Capture Save screen***

7.5.3 Sub-feed Metering screens

7.5.3.1 Sub-feed Graphical View

When the user clicks one of the sub-feed icons on the Metering Overview screen, the Sub-feed Graphical screen for that sub-feed opens, showing metering in bar graph format.

***Figure 7-8: Sub-feed Graphical screen***

7.5.3.2 Sub-feed Tabular View

Four screens show present metering information regarding voltage, current, frequency and power for the sub-feed noted in the upper left corner.

Click the blue arrows ⬅ ➡ to move through the screens.

Min and Max values are since the last reset. Averages are over the duration noted in the settings. Changing settings and resetting values requires ADMIN access.

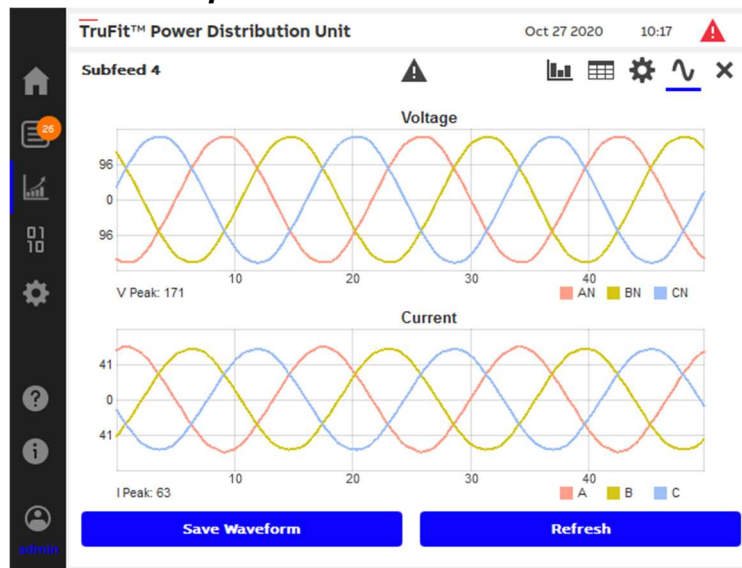**Figure 7-9: Sub-feed Tabular screens**
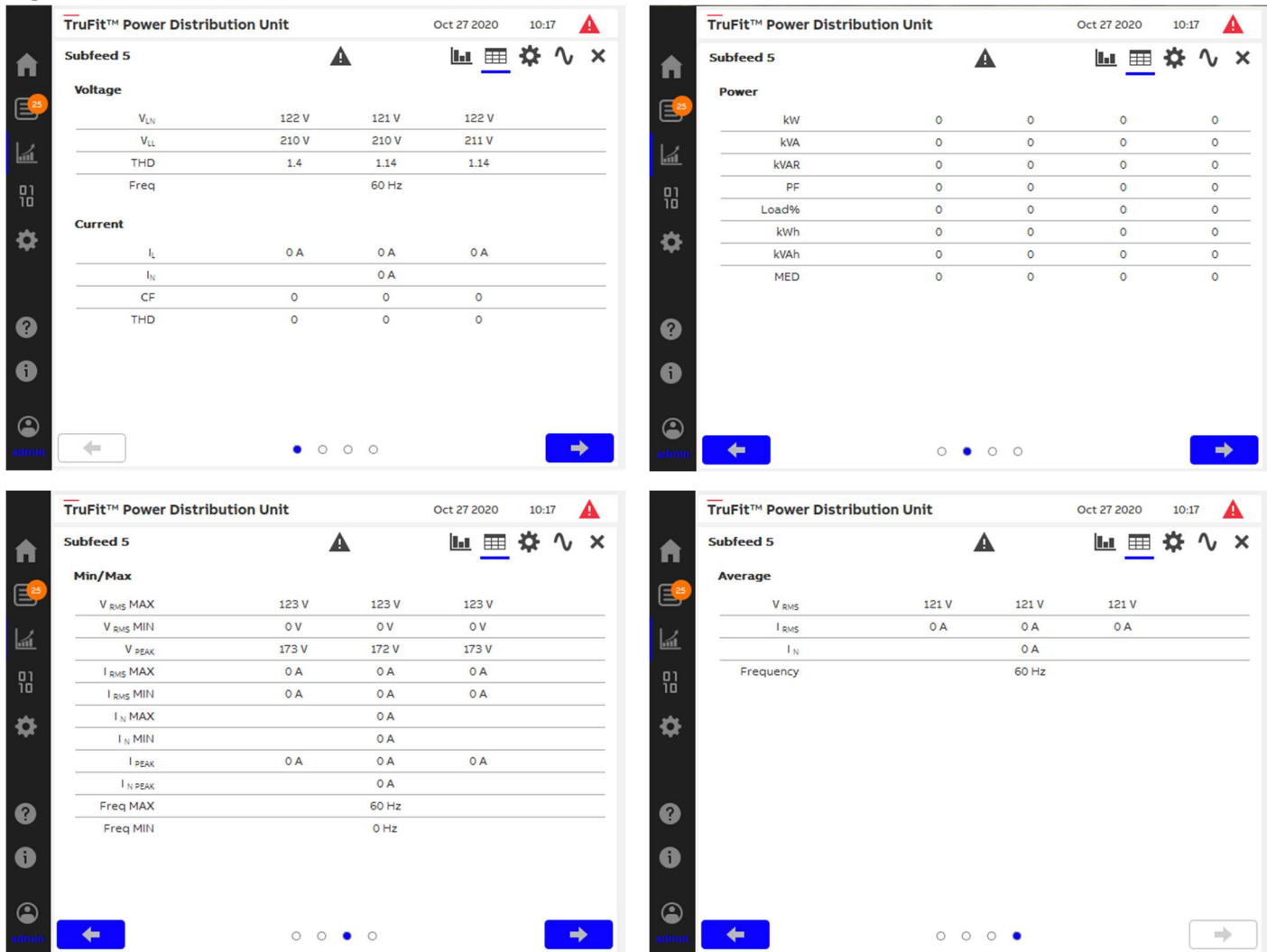
7.5.3.3 Sub-feed Waveform view

Select the waveform icon to view waveform from the noted sub-feed, captured at the instant of selection. Pressing the [Refresh] will update to a new waveform capture.

Figure 7-10: Sub-feed Waveform Capture screen

A waveform capture can be saved to an output drive, by pressing [Save Waveform] and selecting as shown below. Output file is in .csv format.

Figure 7-11: Sub-feed Waveform Capture Save screen
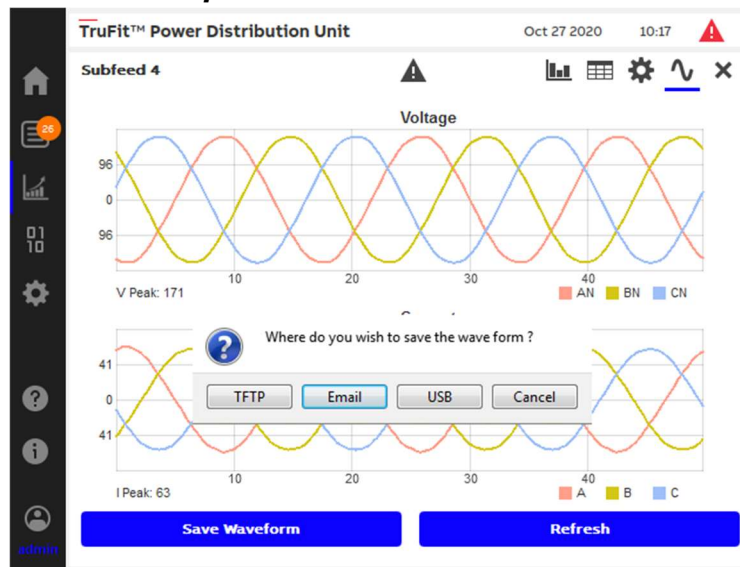
7.5.4 Custom Groups

PowerView allows the users to create up to 50 custom groups of sub-feeds, panels, or branches. Groups are created during configuration.

When custom groups have been configured the Metering Overview screen has the Groups icon shown below in Figure 7-12.

Figure 7-12: Metering Overview screen with groups
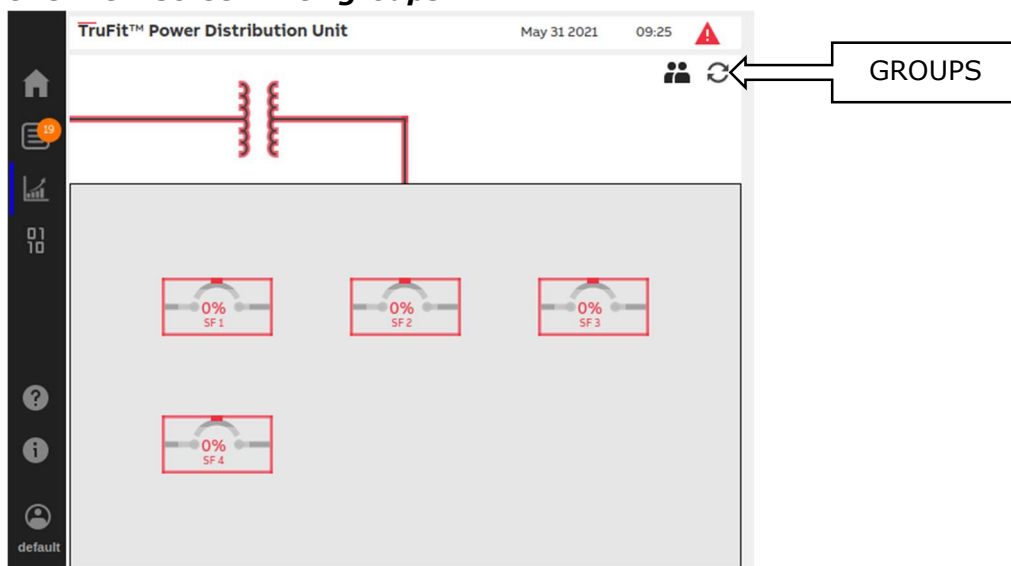
Clicking on the icon opens the screen with all custom groups as shown in Figure 7-13.

Figure 7-13: Groups of Meters screen

Clicking on a specific group opens the custom group screen. This screen displays a view of the group, showing number of included meters, as shown in Figure .

Figure : Custom Group screen - Sub-feeds
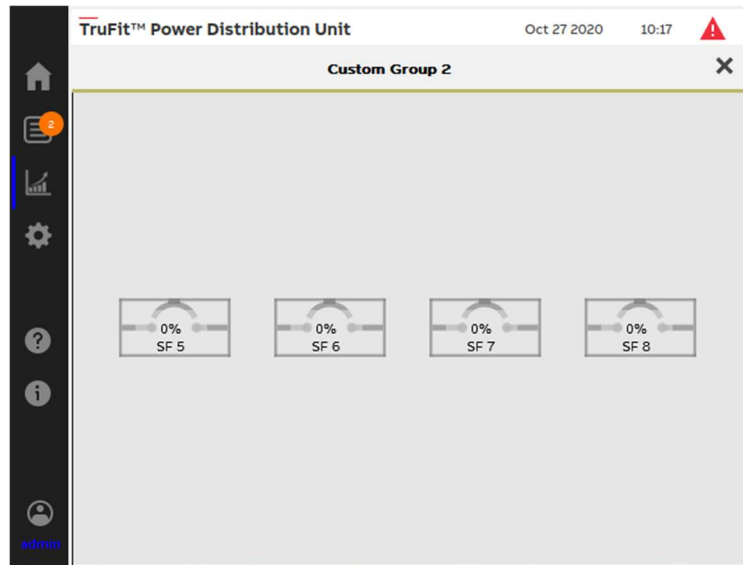
Clicking on an icon takes the operator to a view of the included sub-feed, branches, or panels. Click on a specific branch or panel to display the metering information.

7.5.5 Input Status screens

When a Discrete Input Board (DIB) or Thermocouple Input Board (TIB) are installed in PowerView, the Input Icon [01 10] will display in the main menu. By clicking on the Input icon, the Input Status screen will be shown.

7.5.5.1 Input Status screen

This screen displays a table of each input sensor, and its status. Status is typically open or closed.

Clicking on the ⬇ icon returns to the input sensor screen

Click the blue arrows [←] [→] to move through the screens.

Figure 7-14: Input Status screen

7.5.5.2 Thermocouple screens

A TIB icon ![icon] will be displayed when a Thermocouple Input Board is installed in PowerView. Click on the icon to go to the Thermocouple Input screen. This screen displays a table of each thermal sensor's current temperature, the maximum and minimum temperature since the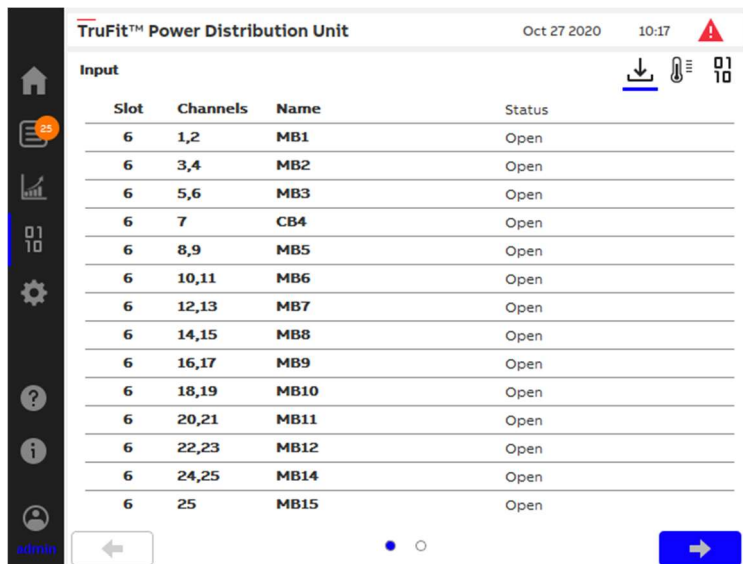 last system reset, and its status. Status is compared to the alert and warning temperatures from the settings discussed in Section 7.6.3.

Please contact ABB service for more information regarding system reset.

Click the blue arrows ![left arrow] ![right arrow] to move through the screens.

Figure 7-15: Thermocouple Input Screen
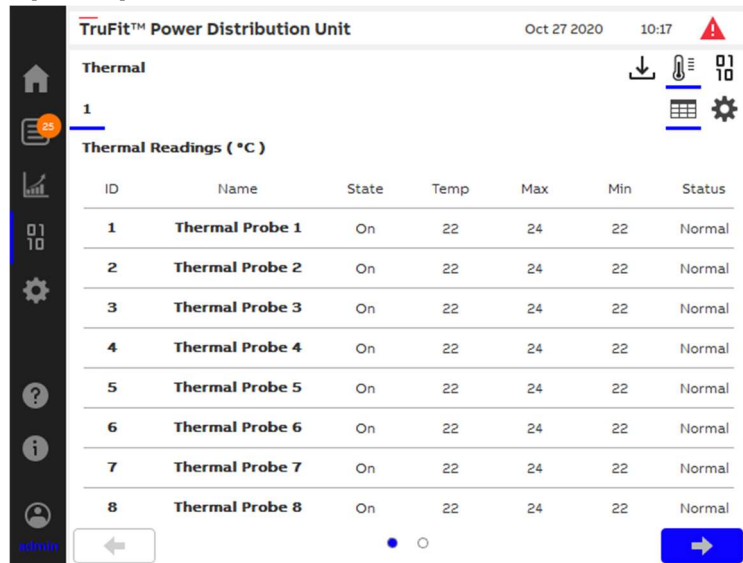
7.5.5.3 Registers screen

By clicking on the Register icon ![icon], the Input Register screen will be shown. This screen displays a table of each input sensor, and the register status.

Figure 7-16: Input Register screen
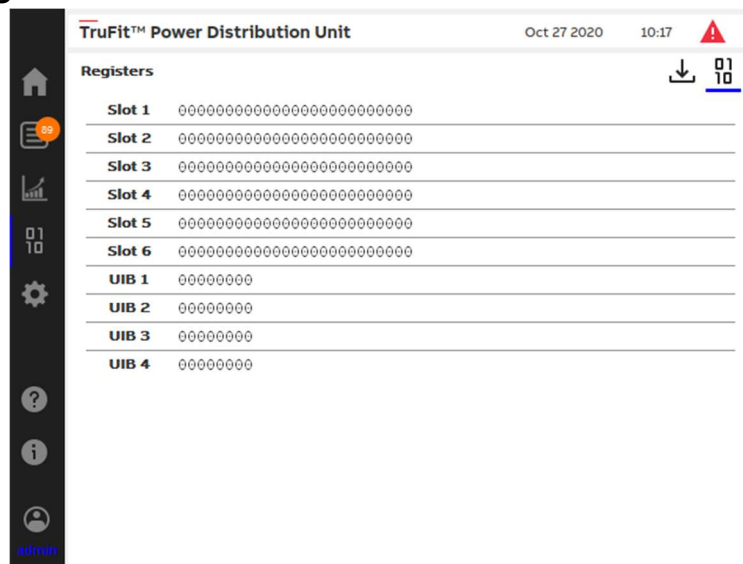
7.6   Setting alarm/warning limits and ratings

This section shows the PowerView configuration screens for the PDU, panel, branch and sub-feed circuits and shows the range of adjustments that are possible using these screens.

Note: Only 'ADMIN' or higher can access these screens. The changes made are not saved until you select the "Save" option.

⚠️**CAUTION**   Use caution when making configuration changes. In some cases, the GUI may not limit you from making unwise changes that could cause the equipment to malfunction.

The settings pages can be configured/viewed by navigating to the panel through the settings icon (⚙).

Any value on a settings screen that is blue can be changed. To change a value, click on that value. A keyboard sub-window will open, as shown in Figure 7-17. Click on the numerals or letters to enter the new value. Click on the keyboard icon the sub-window's lower right to close the window and set the new value.

Figure 7-17: Edit Settings keyboard
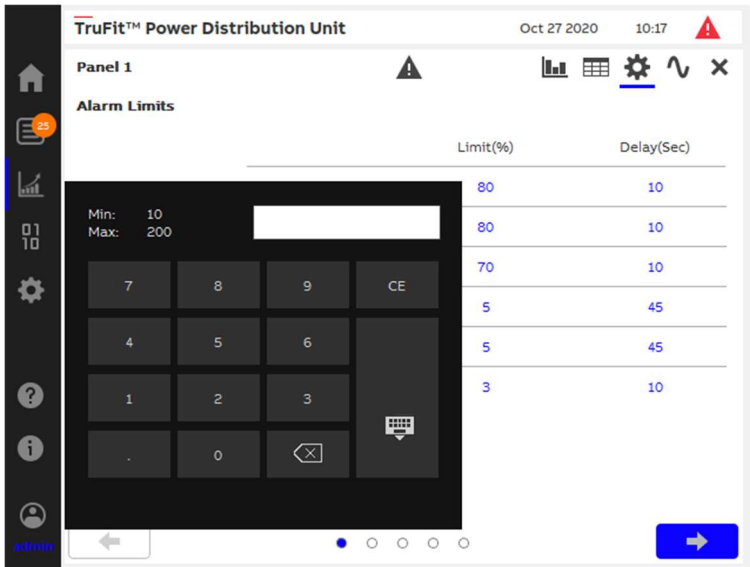
Click **Save** to save changes.

Click **Cancel** to exit the screen without changes being implemented.

7.6.1   PDU configuration settings

The PDU's ratings and limits for voltage and current can be viewed or changed on the PDU's Settings screens, which are opened by selecting the setting icon (⚙) under the PDU's submenu. The user needs to be logged in as ADMIN to change values in these screens. The values can be viewed with USER access.

Figure 7-18: PDU's submenu options with 'Settings' icon

Click the blue arrows ← → to move through the screens.

By default, the configurations shown is from the transformer's output side, as noted by the blue bar under the small transformer icon shown in Figure 7-19. To switch to configuration on the input side, the user will click that transformer icon.

7.6.1.1 PDU Alarm Limits Settings screens

The over/under voltage and over-current alarm /warning limit settings can set in the PDU Limits Configuration screen (shown below).

Figure 7-19: PDU Limits Settings screens
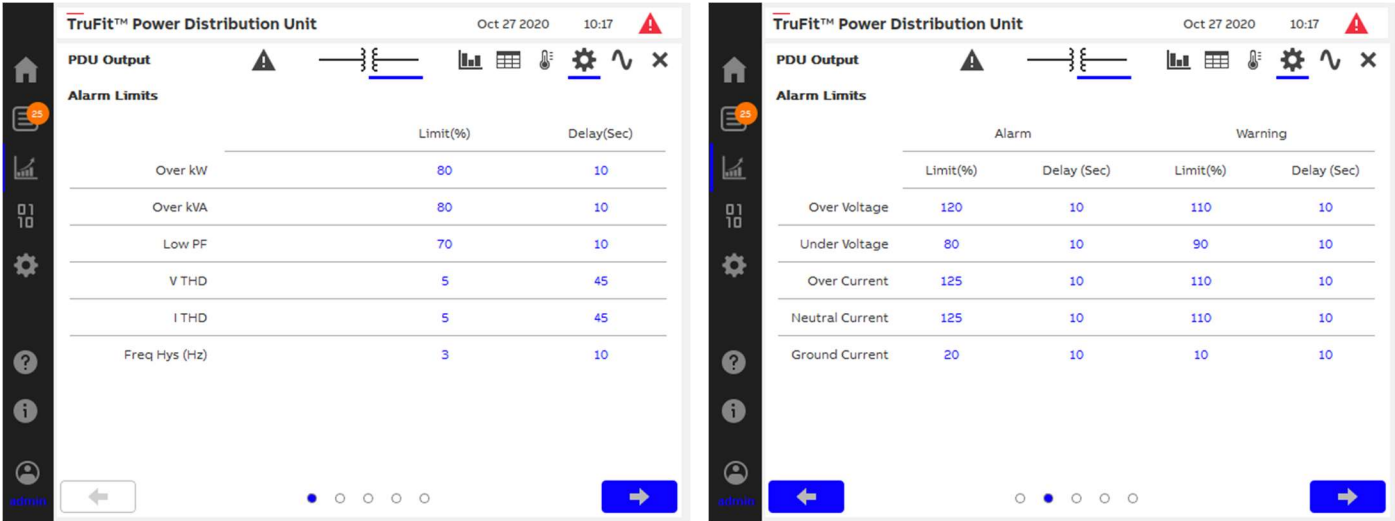
Table 7-1 shows the defaults and the minimum and maximum set point values that can be set using the PDU Configuration Limit screen above.

Table 7-1: PDU alarm/warning limit settings

Description	Min	Default	Max	Units
Input OV Alarm Limit	115	115	125	%
Input OV Warning Limit	105	110	115	%
Input UV Warning Limit	85	95	95	%
Input UV Alarm Limit	75	85	85	%
Output OV Alarm Limit	115	115	125	%
Output OV Warning Limit	105	110	115	%
Output UV Warning Limit	85	95	95	%
Output UV Alarm Limit	75	85	85	%
Output OC Alarm Limit	125	125	150	%
Output OC Warning Limit	100	115	125	%
Neutral Current Limit	0.1	125	150	%
Ground Current Limit	5	20	50	A
Frequency	0.1	0.5	4	Hz

7.6.1.2 PDU Duration Settings screen

Some metering parameters for the PDU are averaged over time. The duration for averaging these parameters is set on the duration screen, shown below.

Figure 7-20: PDU Duration Settings screen
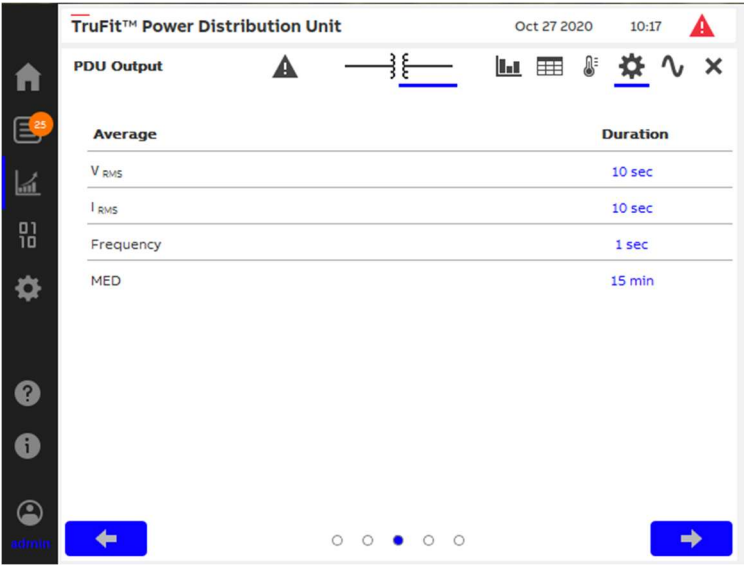
7.6.1.3 PDU Ratings screen

The PDU's voltage, current, and frequency ratings and CT information are shown in this screen. These settings cannot be configured; they are set by the factory and are read only.

Figure 7-21: PDU Ratings Settings screen

7.6.1.4 PDU Parameter Reset screen

Some metering parameters for the PDU have maximum and minimum values logged over time. The logging of these values can be reset to start over, as shown below.

To reset a value, click on that value, then click the blue RESET button.

Figure 7-22: PDU Reset screen
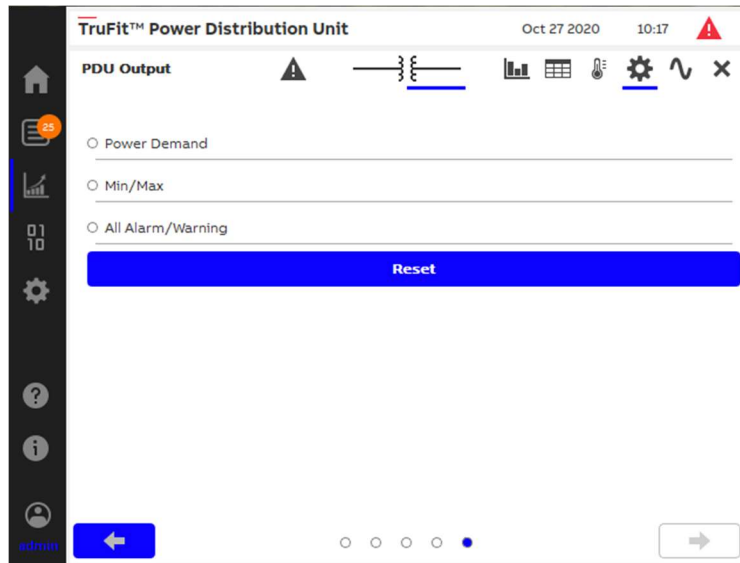
7.6.2   Sub-feed configuration settings

The ratings and limits for a selected sub-feed can be viewed or changed on the sub-feed's Settings screens, which are opened by selecting the setting icon (⚙) under the sub-feed's submenu after selecting a sub-feed on the Metering Overview screen. The user needs to be logged in as ADMIN to change values in these screens. The values can be viewed with USER access.

Figure 7-23: Sub-feed's submenu options with 'Settings' icon

Click the blue arrows ← → to move through the screens.

7.6.2.1 Sub-feed Alarm Limits Settings screen

The alarm /warning limit settings for power, voltage and current for the selected sub-feed can be set in the Sub-feed Configuration Limits screens (shown below). The selected sub-feed is noted in the screen's upper left corner.

Figure 7-24: Sub-feed Alarm Limits Settings screens

Screen 1 (left):

TruFit™ Power Distribution Unit   Oct 27 2020   10:17

Subfeed 5

Alarm Limits

	Limit(%)	Delay(Sec)
Over kW	80	10
Over kVA	80	10
Low PF	70	10
V THD	5	45
I THD	5	45
Freq Hys (Hz)	3	10

Screen 2 (right):

TruFit™ Power Distribution Unit   Oct 27 2020   10:17

Subfeed 5

Alarm Limits

	Alarm		Warning	
	Limit(%)	Delay (Sec)	Limit(%)	Delay (Sec)
Over Voltage	120	10	110	10
Under Voltage	80	10	90	10
Over Current	125	10	110	10
Under Current	1	10		
Neutral Current	125	10	110	10

7.6.2.2 Sub-feed Duration Settings screen

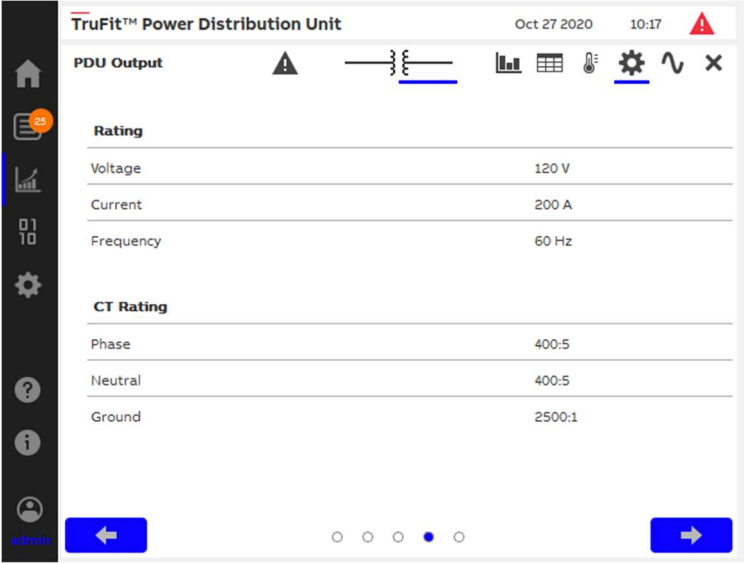Some metering parameters for the selected sub-feed are averaged over time. The duration for averaging these parameters is set on the duration screen, shown below. The selected sub-feed is noted in the screen's upper left corner.

Figure 7-25: Sub-feed Duration Settings screen
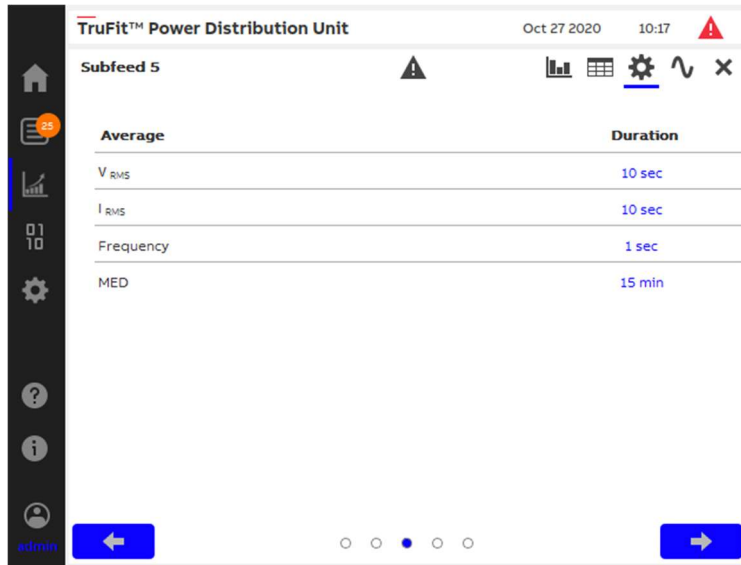
7.6.2.3 Sub-feed Ratings screen

The selected sub-feed's voltage, current, frequency and CT information are shown in this screen. These settings cannot be changed by the customer; they are set by the factory or ABB Service and are read only. The selected sub-feed is noted in the screen's upper left corner.

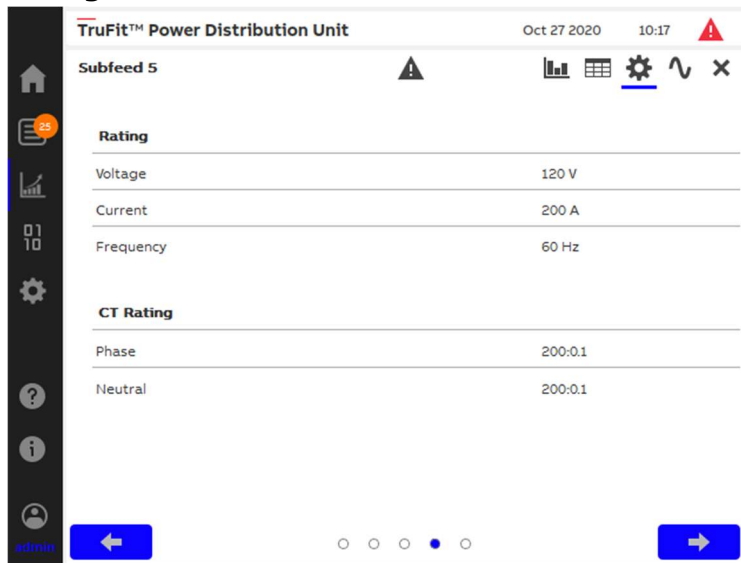**Figure 7-26: Sub-feed Ratings screen**

7.6.2.4 Sub-feed Parameter Reset screen

Some metering parameters for the selected sub-feed have maximum and minimum values logged over time. The logging of these values can be reset to start over, as shown below. The selected sub-feed is noted in the screen's upper left corner.

To reset a value, click on that value, then click the blue RESET button.

Figure 7-27: Sub-feed Parameter Reset screen
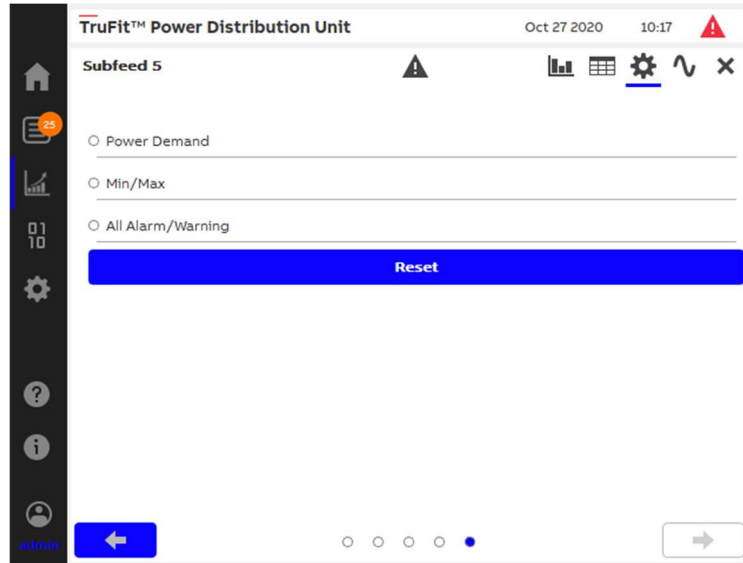
7.6.3 Thermocouple configuration settings

The name, state, limits, and delays for a selected thermal sensor can be viewed or changed on the Thermocouple Settings screens, which are opened by selecting the setting icon (⚙) under the Thermocouple submenu. The user needs to be logged in as ADMIN to change values in these screens. The values can be viewed with USER access.

Click the blue arrows ← → to move through the screens to access more sensors.

Figure 7-28: Thermocouple configuration screen
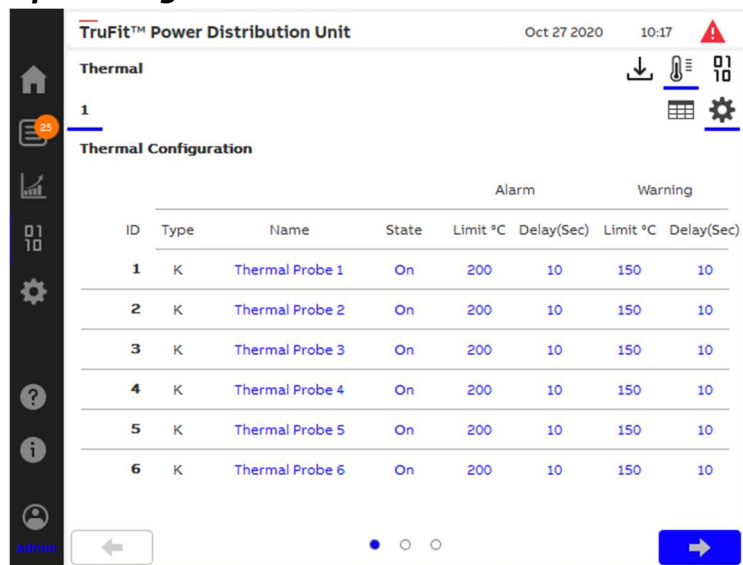
8 Specifications

8.1 Standards

The PDU is compliant with the applicable requirements of:

– Listed by ETL to Underwriters Laboratories (UL) 891 Standard for Switchboards

Sub-components are compliant to standards listed:

– Electromagnetic Compatibility (EMC): FCC compliant (part 15)
– Enclosure: NEMA 1
– ANSI/NFPA 70 (2017)
– NEMA ST-20: Dry type transformers
– NEMA AB3-2001: Molded-case Circuit Breakers
– NEMA 250: Enclosures for Electrical Equipment
– Underwriters Laboratories (UL) 50: Cabinets & Boxes
– Underwriters Laboratories (UL) 489: Molded Case Circuit Breakers and Enclosures
– Underwriters Laboratories (UL) 840 for PCB spacing
– ANSI C37 / Underwriters Laboratories (UL) 1066: Low-Voltage AC and DC Power Circuit Breakers
– Used in Enclosures
– IEEE 587 (ANSI C 62.41): Surge/Noise Suppression

8.2 Electrical characteristics

Table 8-1: Nominal electrical characteristics

Rated kVA	750kVA	850kVA	950kVA
Frequency	60Hz	60Hz	60Hz
Primary Voltage	480VAC	480VAC	480VAC
Primary Configuration	3 Phase, 3 Wire + PE, Delta	3 Phase, 3 Wire + PE, Delta	3 Phase, 3 Wire + PE, Delta
Primary Current	903A	1024A	1143A
Secondary Voltage	415 Y/240VAC	415 Y/240VAC	415 Y/240VAC
Secondary Configuration	3 Phase, 4 Wire + PE, Wye	3 Phase, 4 Wire + PE, Wye	3 Phase, 4 Wire + PE, Wye
Secondary Current	1045A	1183A	1322A
Neutral Current Rating	100% of phase current	100% of phase current	100% of phase current

8.3 Environmental characteristics

The PDU has the capability of withstanding any combinations of environmental conditions listed below without mechanical or electrical damage or degradation of operation.

- Operating ambient temperature: 0 to 40° C
- Non-operating and storage ambient temperature: -25 to 55° C
- Noise level, Per NEMA ST-20:
    - <50dbA
- Barometric pressure: At elevations up to 3300 feet above sea level
- Equipment is designated for indoor use in a clean (dust-free), temperature and humidity-controlled environment

9 System maintenance

Annual preventative maintenance of the unit is recommended. As with all electrical distribution components, this system should be regularly inspected for electrical connection integrity, signs of excessive temperature, accumulation of dirt, and proper system operation. Daily walk-throughs are recommended to confirm there are no atypical sounds or smells and that the unit's display is functioning properly with no alarms. Vacuuming the unit's ventilation in addition to the surrounding area is recommended to be performed semi-annual/quarterly.

As with any electronic devices, critical circuits are subject to normal life cycle effects. ABB offers various service plan levels to keep your equipment in peak operating condition as the unit ages. Contact ABB Service Sales at ric_servicesales@us.abb.com or go to https://new.abb.com/ups/service-ups-and-power-conditioning to learn more.

⚠ WARNING	– Only qualified service personnel should perform maintenance on the PDU. – Exercise extreme care to avoid equipment damage or injury to personnel. – Lethal voltages exist inside the unit during normal operation.

9.1 Tightening torques

Recommended tightening torque for all nuts and bolts is listed in the table below. As applicable, torque seal has been utilized to indicate bolt torquing.

Table 9-1: Recommended tightening torque

Thread Size Inch	SAE Grade 5 120,000 psi Medium Carbon Heat T. Lb-ft	N-M
1/4	6	8
5/16	11	15
3/8	20	27
1/2	48	65

All internal bolts are SAE Grade 5.

Note bolt head markings above to distinguish between grades.

All internal machine screws are Grade 2.

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