



StageSmarts C12 Series User Manual

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Safety information

Warning! Read the following important safety information before connecting or using the StageSmarts C12. If you are in any doubt about how to use the unit safely or about the information in this user manual, contact StageSmarts for advice before applying power to the unit.

The following symbols are used to identify important safety information in this user manual:



Warning! Safety hazard. Risk of severe injury or death.



Warning! Hazardous voltage. Risk of lethal or severe electric shock.



Warning! See user manual for important safety information.



Warning! Fire hazard.

Follow the safety precautions listed below and observe all warnings in this user manual and printed on the StageSmarts C12. Keep this manual for future use. Before connecting or using the C12, visit the StageSmarts website at <http://www.stagesmarts.com> and make sure that you have the latest user documentation for the unit.

The C12 must be used only by professional persons with technical training and a thorough understanding of power distribution systems and their potential hazards. The unit presents risks of severe or lethal electric shock, physical injury or fire.

Respect all locally applicable laws, codes and regulations when operating the C12.

Do not attempt to carry out any repairs on the C12. Refer all repairs and any service operation not described in this manual to StageSmarts or one of its authorized service partners. Do not try to carry out any repairs or unauthorized service yourself, as doing so may involve serious or lethal safety hazards. It may also cause damage or malfunction and may void your product warranty.

Do not try to modify the C12 in any way not described in this user manual. Connect and operate the C12 only as directed in this user manual, or you may create a serious or lethal safety hazard. You may also cause damage that is not covered by product warranties.



Electrical safety

- Make sure that the Emergency Stop button on the C12 is easily accessible at all times so that it is possible to shut down power to the installation immediately in an emergency. Check that all professionals working on site know where the Emergency Stop button is located and that they can access the button.
- Do not expose the C12 to moisture or allow it to become wet. Do not use or store the C12 outdoors or in wet conditions.
- Use the C12 only in a location that is inaccessible to members of the public.

- Display notices with recognized warning symbols such as the ones used in this user manual around the C12 and the rest of the installation to give sufficient warning of the presence of high-voltage electrical hazards.
- Ensure that the C12 is electrically connected as described in this user manual to a protective earth (ground) that has been tested and complies with EN61439-1 or the local equivalent standard for temporary electrical installations.
- Use only a source of AC power that complies with local electrical codes and has overload protection.
- Make sure that all cables used for power input, throughput and output are of a suitable type for their application and have suitable electrical ratings for their load. Use only power cables that comply with EN61439-1 or the local equivalent standard for temporary electrical installations.
- Protect the C12 and all power cables from the possibility of damage. Locate them inside protective enclosures if necessary.
- Use only connectors of the types specified in this user manual.
- Before using the C12, check that all connectors are correctly engaged. If connectors have a locking mechanism, check that they are correctly locked.
- Before using the C12 – and at regular intervals – check that all power distribution equipment and cables are in perfect condition. Isolate the fixture from power immediately if any circuit breaker, cable, connector or other component appears to be damaged, defective, deformed, wet or showing signs of overheating. Contact StageSmarts for advice on having repairs carried out. Do not reapply power until repairs have been completed.
- Test the earth leakage protection on all outputs at least once per month as a scheduled safety routine.
- Test all temporary electrical installations on site immediately after assembly on site. Test installations at shows, exhibitions and similar events in accordance with IEC 60364-6-61.



Fire safety

- Ensure that there is free and unobstructed airflow around the C12. Provide a minimum clearance of 100 mm (4 in.) around all air vents.
- Do not use the C12 if the ambient temperature exceeds 45° C.
- Keep flammable materials well away from the unit.
- Do not modify the C12 in any way that is not described in this user manual.
- Do not install any parts in the C12 that are not supplied or authorized by StageSmarts.



Physical safety

- Observe all locally applicable workplace safety regulations.
- Use the C12 only when securely mounted in a 19-inch rack.

Introduction

The C12 series from StageSmarts is a range of rackmount power distribution units that represents the latest in event power distribution and is designed and manufactured to meet the latest EN norms and the highest standards.

The C12 series is available with (C12B) or without (C12A) an integrated webserver.

The C12 uses industrial grade (EN 60947-2) circuit breakers and is designed to withstand tough conditions. All circuit breakers (MCBs, RCBOs) are of the magnetic-hydraulic type, offering temperature-stable operation and superior reliability.

All internal circuits use halogen-free wiring and crimped or screwed connections. There is no soldering of high-current connections.

C12 range

The C12 range consists of the following models:

C12A – without webserver:

Model	Output sockets
C12A – 1#	2 x 19-pin Socapex-type, 6 channels per connector
C12A – 2#	2 x 16-pin Harting-type, 6 channels per connector
C12A – 5#	12 x Neutrik True1 connectors (1 per channel)
C12A – 7#	3 x 10-pin Harting-type, 4 channels per connector

C12B – with webserver:

Model	Output sockets
C12B – 1#	2 x 19-pin Socapex-type, 6 channels per connector
C12B – 2#	2 x 16-pin Harting-type, 6 channels per connector
C12B – 5#	12 x Neutrik True1 connectors (1 per channel)
C12B – 7#	3 x 10-pin Harting-type, 4 channels per connector

In the list of model names above, # indicates the type of auxiliary connector used for output 24 as follows:

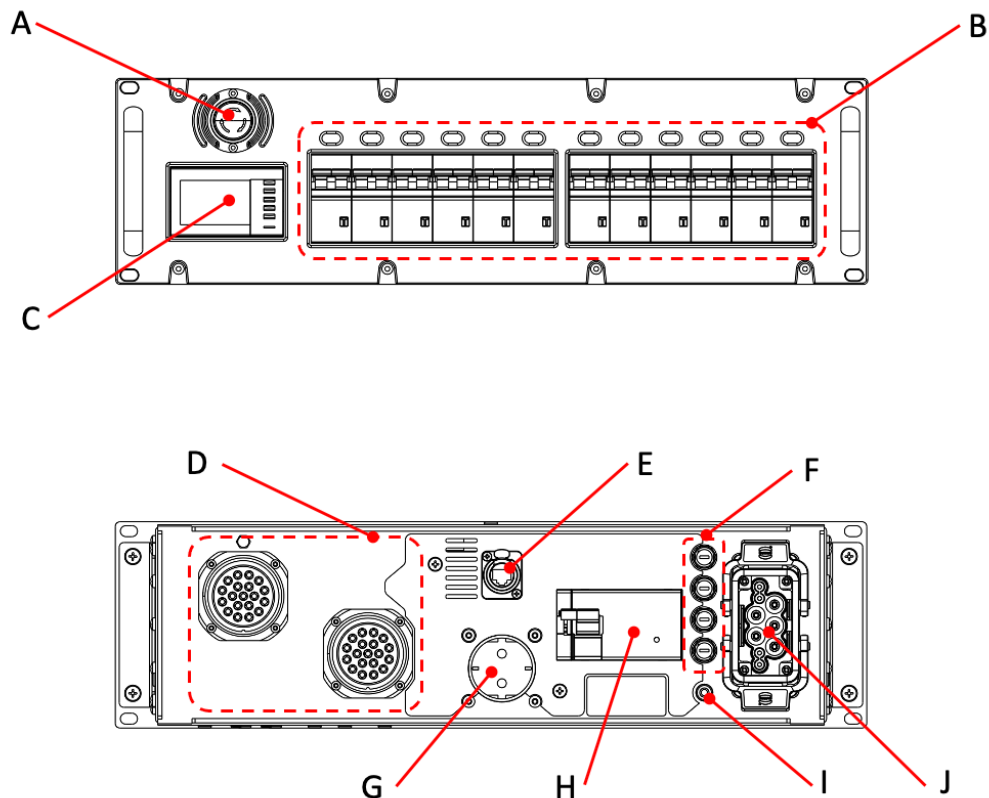
- 1 = German Schuko
- 2 = French Schuko (Type E)
- 3 = UK 13 A (BS 1363)
- 4 = Australian GPO
- 5 = Swiss (SEV 1011)

Preparing for use

Before you begin using the C12:

- Read the Safety information section of this user manual starting on page 5.
- Make sure that professionals working at the site will have good access, especially to the Emergency Stop button on the front panel.

Overview



- A Emergency Stop button: see page 9
- B Channel RCBO's and load status indicators: see page 13
- C Main Meter: see page 11
- D Main output connectors: see page 13
- E Network Connection Port (C12B only): see page 16
- F Electronics Fuses: see page 16
- G Channel 12 direct output connectors: see page 13
- H Switch Disconnecter: see page 10
- I External Protective Earth Connector: see page 9
- J Input power connector : see page 15

Emergency Stop

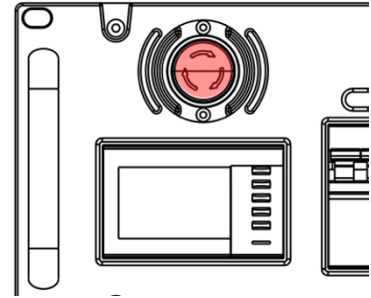


Warning! Make sure that the Emergency Stop button is easily accessible at all times.

The C12 has an Emergency Stop button on the top left of the front panel (see illustration on right). Pressing the button trips the switch disconnecter immediately, shutting down power to all of the C12's outputs.

To reapply power after an emergency stop:

1. Make sure that the installation is in a safe condition and that reapplying power presents no hazard.
2. Twist the Emergency Stop button clockwise to reset it.
3. Move the main switch disconnecter to the ON position.



Protective Earth bonding

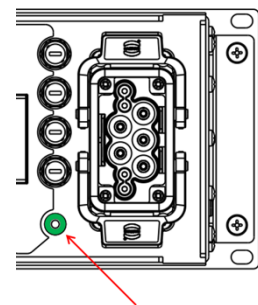


Warning! Connect the PE bonding terminal as directed below before applying power to the C12.

The C12 has a PE (Protective Earth) bonding terminal at the bottom of the rear panel (see illustration on right). The PE terminal is tied directly to the input and output PE connectors.

Before applying power to the C12, make the following connections to the PE bonding terminal:

- Connect the PE bonding terminal to an electrical earth (ground) that has been tested and complies with EN61439-1 or the local equivalent.
- Connect the PE bonding terminal to the equipotential bonding link that interconnects conductive materials in the installation (equipotential bonding is a legal requirement in some regions and is recommended in all cases to reduce the risk of electric shock).



Switch disconnecter

The C12 has a 4-pole (three Phases + Neutral) switch disconnecter that can be used as a power ON/OFF switch to shut down power at all of the outputs.

Important! Check that all RCBO's are switched off before shutting down or applying power at the switch disconnecter.

The switch disconnecter trips automatically in the following situations:

- Loss of Neutral line at the power input connector.
- Activation of the Emergency Stop.

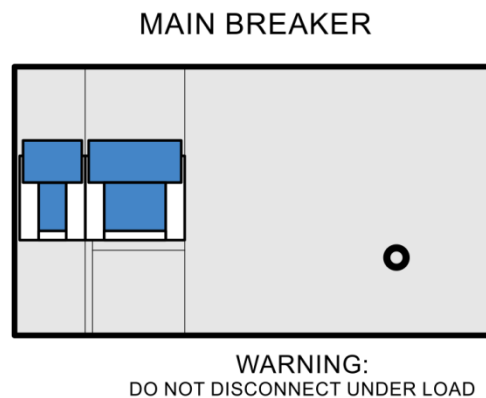


Figure 1. Main circuit breaker

Protection in case of loss of Neutral

The loss of the Neutral connection on the power input connector is a potentially disastrous situation since it causes Phase line voltages to lose their reference and depending on the load current balances, will move away rapidly from their nominal 230 V. This usually results in serious damage to a large portion of the connected equipment.

The C12 has a sensor that immediately trips the switch disconnecter in case of a lost Neutral line.

If the switch disconnecter trips because of a lost Neutral line, a full inspection of the wiring from the power source to the C12 must be performed and the fault must be corrected before the switch disconnecter is reset to the ON position. Inspection and repair must be undertaken by a qualified electrician only. If no fault is found in the power source or source wiring but the switch disconnecter still trips, contact StageSmarts for assistance.

Main meter

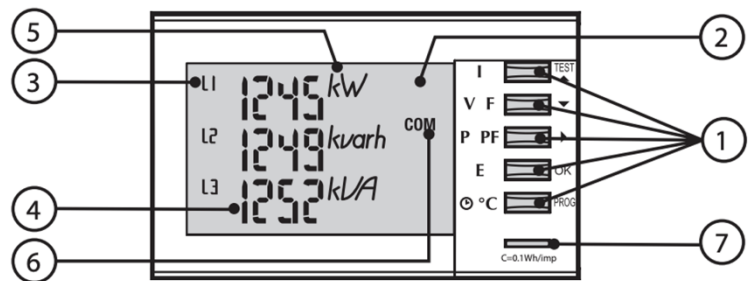
The main meter on the front panel displays all incoming voltages, currents (including Neutral current), main frequency, power factor etc.

When you connect the C12 to a power source, we strongly recommended that you check all voltages *before* you move the switch disconnector to ON. The meter allows you to carry out a voltage check before powering on, because voltage metering takes place prior to the switch disconnector.

Display readouts

The readouts in the meter's backlit LCD display are constantly updated.

1. Function Keys
2. Backlit LCD Display
3. Incoming Phases
4. Values
5. Unit
6. Communication indication
7. Energy Metering indication



See illustration above. The buttons on the control panel next to the display have the following functions:

Button I

- Press once to display the line currents on the three phases
- Press again to display the neutral current
- Press again to display the maximum currents on the three phases recorded since the C12 was last powered up
- Press again to display the maximum neutral current recorded since the C12 was last powered up
- Press again to display the average %THD (percent total harmonic distortion) of the currents on the three phases recorded since the C12 was last powered up
- Press again to exit

Button V F

- Press once to display the line voltages on the three phases
- Press again to display the AC frequency of the power at the input connector in Hz
- Press again to display the average %THD (percent total harmonic distortion) of the voltage on all three phases recorded since the C12 was last powered up
- Press again to exit

Button P PF

- Press once to display power in W/VAr/VA

- Press again to display average Power Factor
- Press again to display power demand in W/VA
- Press again to display power maximum demand in W/VA
- Press again to return the display to its original state

Button E

- Press once to display import energy at the panel drain input connectors
- Press again to display import reactive energy at the panel drain input connectors
- Press again to exit

Button °C

- Press once to XXXX
- Press again to display XXXX
- Press again to exit

The meter logs power consumption and displays a running total in kWh at the bottom row of the display. Disconnecting the C12 from power resets the power consumption counter to zero.

Besides having a display on the front panel, the meter is connected to the remote management system. This allows the status of all currents, voltages, mains frequencies and power factor to be viewed remotely.

The meter is powered from the L1 phase line and will handle a 400V connection.

Other meter settings

Display brightness

You can adjust the display brightness so that you can read the display in direct sunlight or keep the display low-key in a backstage environment, for example.

To adjust the display brightness:

1. Press the two center buttons (V/Hz and P) simultaneously.
2. Holding the two buttons pressed down varies the brightness level. Pressing the buttons once and releasing steps to the next level of brightness.

Output monitoring and breakers on the front panel

See Figure 2. Each of the 12 outputs is protected by a 2-pole RCBO (combined overcurrent and earth leakage circuit breaker) on the front panel. The breakers are labelled 1-12 to match the outputs.

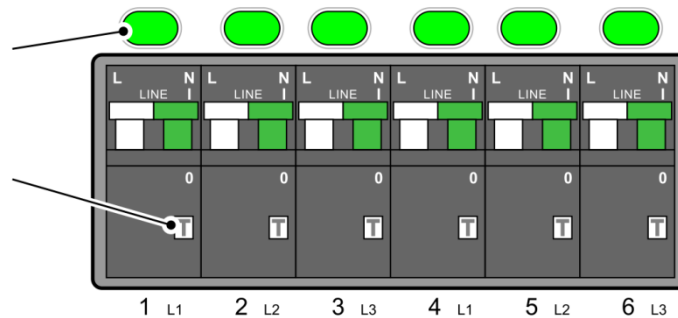


Figure 2. Output circuit breakers group

Breakers 1-12 monitor Main Outputs 1-12. Each breaker has a nominal trip current of 16A.

Breaker 1 will trip if the current draw at Main Output 1 exceeds 16A, and so on.

Because all the breakers are of the magnetic-hydraulic type, the outputs can be loaded at full (16A) capacity indefinitely and at all permissible operating temperatures. You do not need to factor in ambient temperature etc. and add a 'safety margin' to avoid nuisance tripping.

Any issues with earth leakage currents will only affect the output where there is earth leakage, not a group of outputs.

Output connector types

The C12 has 12 monitored main outputs labelled 1-12. Each output is rated 16A.

The main output connectors are situated on the rear panel. The output connector type fitted depends on model as follows:

Model	Output connectors
C12x – 1#	2 x 19-pin Socapex-type, 6 channels per connector
C12x – 2#	2 x 16-pin Harting-type, 6 channels per connector
C12x – 5#	12 x Neutrik True1 connectors (1 per channel)
C12x – 7#	3 x 10-pin Harting-type, 4 channels per connector

Load sensor LEDs

See Figure 2. Above each breaker on the front panel is an indicator LED. The LEDs light to indicate the presence of a connected load on that breaker's output:

- If the load is within the 16 A rating for the output, the LED indicates green.
- If a slight overload is detected, the LED flashes red slowly.
- If a serious overload is detected, the LED flashes red quickly. .

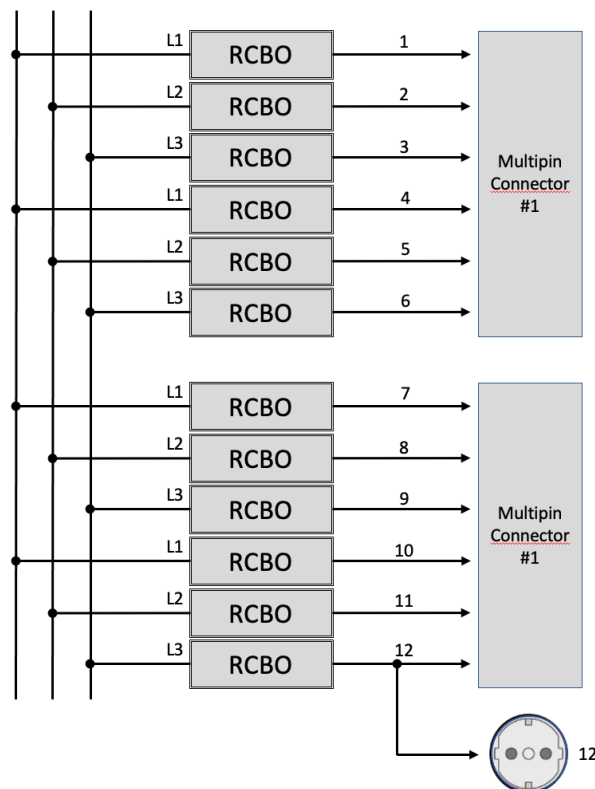
RCBO test buttons

See Figure 2. Each breaker on the front panel has a test button labelled **T** that lets you test earth leakage protection on that breaker's output. Pressing the button momentarily should immediately trip the breaker. Use the test buttons to make sure that earth leakage protection operates correctly each time you connect a load to an output. Test earth leakage protection on all outputs frequently – we recommend a check at least once per month – as a scheduled safety routine.

If at any time you press a breaker's test button while power is applied to the breaker and the breaker does not trip immediately, stop using that output. Have the C12 inspected and serviced by StageSmarts or an authorized StageSmarts service agent as soon as possible. Do not use the output until the problem has been resolved

RCBO circuit layout

Each of the C12's outputs is protected by a 16A rated RCBOs on the front panel. **Error! Reference source not found.** shows the allocation of phases and channels when two output connectors with six channels each are fitted. Channel 12 is also powering a 'domestic' type socket (here illustrated by German Schuko type) but the total load drawn on channel 12 remains 16A in total. Thus the combined load current drawn must be taken into consideration.



Connecting to incoming power

The C12 uses 63A-rated Harting-type connectors for power input.

You can obtain a suitable 2 meter power cable with CEE and Harting-type connectors or a loose Harting-type connector from StageSmarts distributors and retailers (or directly from StageSmarts) if you order the following items:

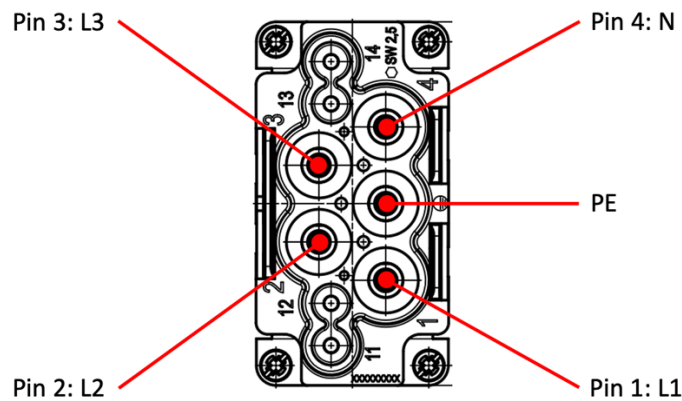
- C-CAB-63-2M – Power input cable, CEE 63A 5-pin male to Harting 63A, length 2m
- C-CON-F63A – Harting 63A connector, body, insert and M40 cable gland

Fitting a connector

If you need to fit a cable-mount 63 A female Harting-type connector on power cable, follow the instructions and respect the following pinout:

C-series incoming power – male connector

(as viewed from back of C12/C24)



Male (pin) insert; Harting p/n 09380082601

Female (socket) insert; Harting p/n 09380082701

Note: The four smaller, additional pins on the connector are not used.

Making power input connections

Before you make connections, visually inspect the connectors for wear or damage. While the connectors are designed for harsh use, they can be damaged due to misuse or overloading. A damaged connector can create a fire hazard due to heat buildup.

Meter and electronics fuses

Important! Remove the three meter fuses L1, L2 and L3 as well as the electronics fuse L1 at the top of the rear panel before performing a high-voltage insulation test.

See 'Overview' on page 8. Three 1AT (slow-blow) fuses L1, L2 and L3 are located in fuseholders at the top of the rear panel. Each fuse protects one of the three phases in the wiring to the main meter.

A single 1AT (slow-blow) fuse is also located in a fuseholder at the top of the rear panel. This fuse protects the unit's electronic systems.

If the meter stops working but you know that the C12 is connected to power, its fuse may have blown. To replace the meter fuse:

1. Disconnect the C12 from the mains supply and then open the fuseholder cap with a flat-bladed screwdriver.
2. Replace the fuse with a new one of the same type and rating.
3. Reinstall the fuseholder cap and reconnect the C12 to the mains supply

If the meter still does not work, the new fuse that you have just installed may have blown. Remove the fuse and test it for continuity to confirm whether it has blown again. A fuse that blows repeatedly indicates a problem. There may be overvoltage at a power input connector, or there may be a wiring fault. Disconnect the C12 from power and Investigate the problem. If you suspect that a C12 may be faulty, stop using it immediately and contact StageSmarts for assistance.

Network Connection & Webserver functionality

The C12 is available with or without an integrated webserver. **The following information applies only to the C12B series that has this functionality pre-installed.**

The C12B-xx version has a built in webserver that collects load current data from the 12 output channels, data about incoming voltages and main currents, temperature, power factor, the status of the emergency stop, the main disconnect switch and the loss-of-neutral sensor.

The data collected can be viewed by connecting a suitable device (laptop etc) to the C12's network connector situated at the back of the unit. It is labelled **C-SERIES INTERFACE** and is the common RJ45 network type.

Main window

See Figure 6. The top pane **A** gives an overview of all the smartPDUs that are connected to the network and indicates the current measured at each smartPDU's L1, L2, L3 and N panel drain connectors. Click on a smartPDU in the list to select it and display detailed data from that smartPDU in panes B, C and D below.

Pane **B** displays the name of the smartPDU selected in pane A. By default, smartPDUs are assigned numbers in the order that they are detected. Clicking on the pen icon next to a smartPDU lets you give it a name in the interface.

Pane **C** displays detailed overall status information for the smartPDU selected in pane A.

Pane D displays the current drawn at each of the 12 output channels in each main output group.

- Clicking on the pen icon next to a channel number opens a pop-up window where you can edit the label attached to any individual channel. See 'Editing channel names' on page 25.
- Clicking on the eye icon next to a channel number opens a pop-up window where you can set up channel supervision. See 'Channel supervision' on page 25.



Figure 6. Remote monitoring – main window

Editing channel names



Figure 7. Editing a channel name

To assign a custom name to an output channel, click on the pen icon next to the existing channel number or name in the main window. A pop-up window will open (see Figure 7). Enter your new text in the **Name** field and click on **Set name** to confirm.

Channel supervision

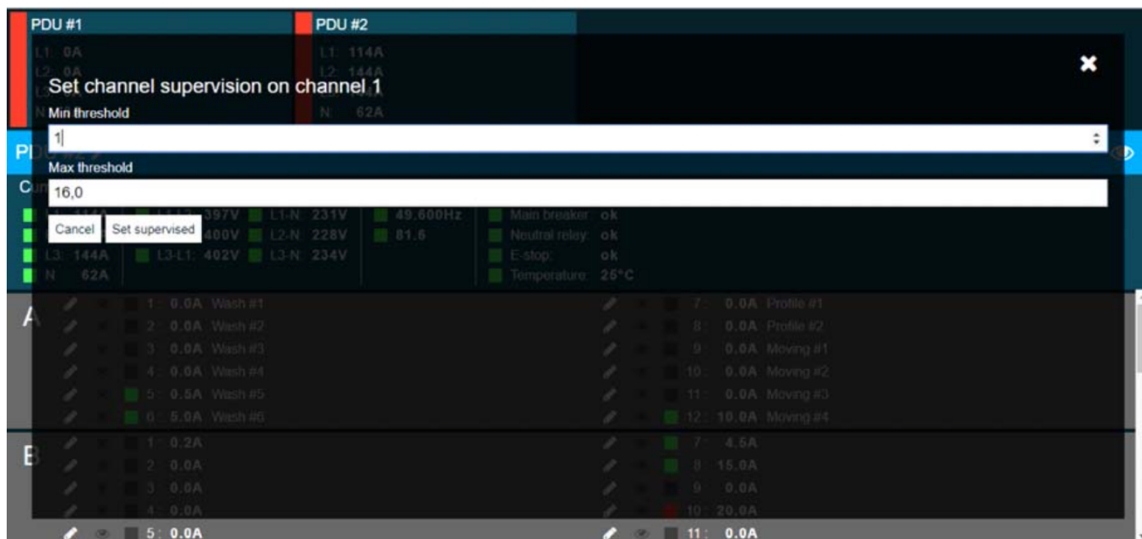


Figure 8. Setting channel supervision

To set up channel supervision, enter minimum and maximum current values for that channel. If the current draw measured at that channel's main output moves below the minimum or above the maximum values that you set, a warning triangle will appear next to that channel's smartPDU in Pane A, informing you of the need to investigate.

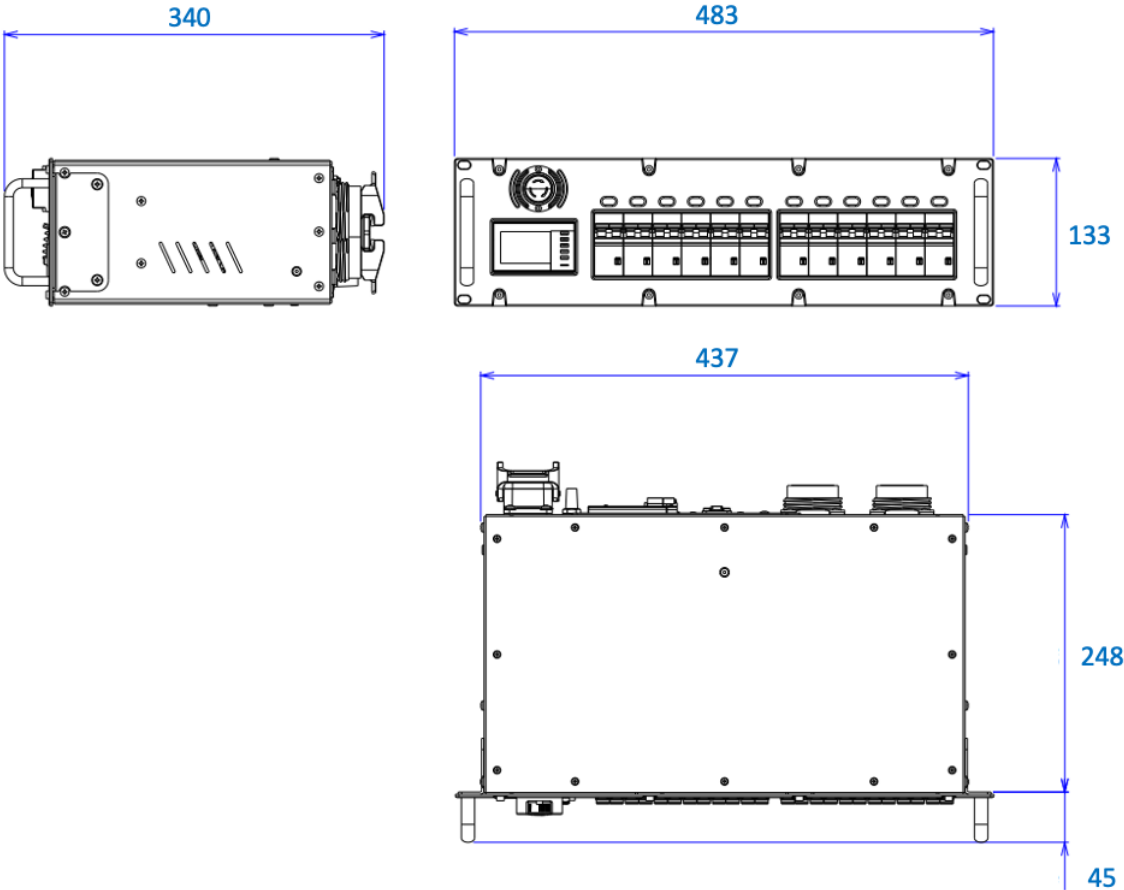
Safety checks and maintenance

Carry out the following scheduled safety tasks at these suggested intervals:

- Monthly: Check the correct operation of the RCBOs by pressing their Test buttons while power is applied to the C12. Check that pressing the Test button causes the breakers to trip immediately.
- Regularly: Check all components, connectors and cables for signs of damage or overheating.

Note: your country's health and safety regulations may stipulate more frequent and/or extensive testing. The above is our recommended minimum.

Dimensions



Dimensions given in millimetres

Specifications

Power input / throughput connectors

Harting HAN K4/4 (TN-S) 230/400 V

Main switch disconnecter

4-pole, 400 V, 63A

Immediate disconnect in case of lost Neutral connection or E-stop trip.

Master metering

Input voltage and current

All output voltages, currents (including Neutral), power factor and frequency

Output channels

Main output channels 1 - 12

C12x – 1#: 2 x 19-pin Socapex-type, 6 channels per connector

C12x – 2#: 2 x 16-pin Harting-type, 6 channels per connector

C12x – 5#: 12 x 3-pin Neutrik True1, 1 channel per connector

C12x – 7#: 3 x 10-pin Harting-type, 4 channels per connector

The # in the model name above indicates the type of the auxiliary connector installed at Output 12 as follows:

1 = German Schuko

2 = French Schuko (Type E)

3 = United Kingdom 13 amp (BS 1363)

4 = Australian GPO

5 = Swiss (SEV 1011)

Thermal

Maximum ambient temperature: 45° C

Minimum ambient temperature: 0° C

Certifications and compliance



EN 61439-1, EN 62368-1:2014, EN 61000-6-1:2007, EN 55015:2006+A2:2009, BS7671, BS7909

Accessories

C-CAB-63-2m Connection cable, CEE 63A 5-pole to Harting 63A, length 2m

C-CON-F63A Harting 63A connector, body, insert and M40 cable gland

Dimensions and weight

Dimensions: 19-inch rack, 3U

Weight: 17 kg

