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Innovative Circuit Technology Ltd.



Distribution Series 3 Dual Bus DC Load Distribution Panels

INSTRUCTION MANUAL

855-351-000

Model ICT200DF-20BRC 10/10 Intelligent GMT Fuse Panel

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 **WARNING**

Risk of serious personal injury or damage to equipment and property! Always observe the following:

- Shut off or disconnect all dc power sources before connecting or disconnecting wiring
- Use wire and connectors rated for the maximum load current and size of circuit breaker, and keep cable lengths as short as practical
- Carefully observe wiring polarity when making input and output connections
- Securely tighten all connections
- Do not attempt to service any internal parts. Refer all product service to ICT or an authorized ICT Service Provider

 **CAUTION**

Risk of personal injury or damage to equipment! Always observe the following:

- Install unit in a restricted access location (such as an equipment rack) to limit unintentional contact with terminals and wiring
- Ensure the total power consumption of the loads does not exceed the 100 amperes rated capacity of each power bus
- Ensure load current through each output channel does not exceed 20 amperes
- Do not block air inlet or outlet openings in the panel sides
- Remove all fuses before connecting or disconnecting wiring

NOTE:

Due to the fuse detection circuitry internal to the distribution panel, it may be possible to measure a voltage on the output terminal(s) even if that output's fuse is open (with no load connected). This is normal operation. The detection circuitry is a high-impedance circuit, and while a voltage may be present on the output terminal, it is purely a signal voltage and does not support loading. Any load device connected to the output will immediately pull this voltage to zero volts.

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Contents

- PRODUCT DESCRIPTION.....4**
- INSTALLATION4**
- OPERATION7**
 - LCD Display..... 8
 - Status Indicators and Alarms 11
- TCP/IP WEB BASED UTILITY11**
 - Status and Control 13
 - Device Setup..... 14
 - Bus Setup 16
 - Output Setup..... 17
 - Network setup..... 19
 - E-mail Setup 22
 - Alarm setup..... 23
 - User Setup..... 24
 - Maintenance 24
- MOBILE WEB APP25**
- PASSWORD RESET26**
- ROUTER CONFIGURATION26**
- TEXT MESSAGE ALARM NOTIFICATIONS28**
- TROUBLESHOOTING.....29**
- PRODUCT SPECIFICATIONS31**
- LIMITED WARRANTY33**

PRODUCT DESCRIPTION

The ICT Dual Bus Distribution Panel provides two 100 amperes (peak) bus inputs with 10 independently controlled and monitored output channels per bus in a compact 1U high chassis for 19 inch rack mounting. All channels are individually protected by GMT type fuses that are rated up to 20 amperes each. These fuses are located on the front of the panel for easy monitoring and replacement.

Each bus can accommodate a supply voltage from 20 volts DC to 60 volts DC, either positive or negative polarity, with a peak input current of 100 amperes to be distributed through up to 10 output channels rated at 16 amperes continuous per channel. Each channel has independent current sensing, over current protection, alarms, and output on/off control.

Remote monitoring and control is available through the integrated Ethernet communications port on the back of the panel. The unit has a secure built-in web server with an embedded web-based graphical user interface (GUI) that can be accessed using any standard commercial web browser, such as Google Chrome. The web server displays all panel information, allows full access to channel configuration settings, provides remote channel on/off control, and can be set up to send an alarm to user-defined email accounts in the event where a fault occurs. Automatic load-shedding can be configured to shed non-critical loads to preserve battery run-time, and the Network Watchdog feature will ping assigned I.P. addresses and power-cycle specified outputs in order to maintain connectivity and site continuity.

The web server can also be used to configure and download a data log of up to 30 days of time-stamped event information. Full monitoring and control is also available using an SNMP (v3) based management system.

System voltage, system current, output channel current, fuse status, and alarm input status can also be monitored onsite through the front panel LCD display. Fuse trip status is displayed by an LED indicator located under each fuse. Form-C alarm output contacts (C/NO/NC) are provided on the back panel for each bus to indicate all distribution panel alarms, while five additional alarm inputs can be used to monitor other dry-contact site sensors such as door/window opening, smoke alarms, water detectors etc.

INSTALLATION

Inspect the distribution panel to ensure it was not damaged in shipping, and has all the provided accessories:

- Two clear snap on covers in insulate main dc power connections (shipped on unit)
- Two seven-pin alarm output, remote sensor input connector plugs (shipped on unit)
- This instruction Manual

To complete the installation, install GMT fuses appropriately sized for the connected load devices.

CAUTION

Risk of personal injury or damage to equipment! Always observe the following:

- Install unit in a restricted access location (such as an equipment rack) to limit unintentional contact with terminals and wiring
- Ensure the total power consumption of the loads does not exceed the 100 amperes (continuous) rated capacity of each power bus
- Channel output fuses must not exceed 20 amperes maximum rating (16 amperes continuous)
- Do not block air inlet or outlet openings in the panel sides

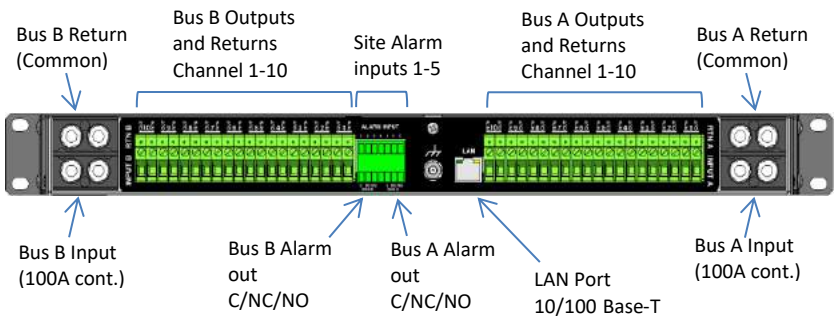


Figure 1: Back Panel Connections

Mount the Dual Bus Distribution Panel in a 19 inch equipment rack, using standard rack mounting hardware. (Not provided)

Install appropriately rated fuse in desired channel locations by carefully inserting a 3 pin GMT fuse, where the side of the fuse that has the two pins closest is facing upwards. Fuse only fits in one direction, do not force wrong orientation.

 **WARNING**

Risk of serious personal injury or damage to equipment and property! Always observe the following:

- Shut off or disconnect all dc power sources before connecting or disconnecting wiring
 - Use wire and connectors rated for the maximum load current and size of fuse, and keep cable lengths as short as practical
 - Carefully observe wiring polarity when making input and output connections
 - Securely tighten all connections
-

Bond the panel chassis to the rack system ground, connecting a ground wire with ring tongue to the back panel ground stud. (8-32 thread)

Connect Bus A loads to each output channel using suitably rated wire (10 AWG maximum) sized for the fuse installed on the channel, stripping 10-11mm of insulation and firmly clamping in the Bus A channel 1 to 10 output connectors. Note which load is connected to each channel, for future reference.

Repeat for the Bus B loads if required. The unit may be operated with either Bus A or Bus B powered, or both.

NOTE!

All channel RTN lines, and the main high power Bus A and Bus B RTN terminals are common and tied to a single internal Return bus. Bus A and Bus B inputs can be wired to a different dc voltage (20 to 60 volts DC) of either polarity, but must share a common RTN voltage, normally at earth potential.

Connect the main Bus A RTN line to an external DC power supply return using suitably sized wire and dual hole lug connector rated for up to 100 amperes continuous current. Connect the lug to the dual ¼-20 thread **Bus A RTN** studs, and then securely fasten with the supplied hardware. Connect the Input lug to the dual ¼-20 thread **Bus A Input** studs, then securely fasten with the supplied hardware. Snap the clear cover on to the Bus A input connector to help prevent accidental contact with the input stud connections.

If the Bus B outputs are to be used, please configure Bus B the same as Bus A.

Connect the two form-C relay bus alarm outputs to an external monitoring system if needed, by stripping and terminating 16-28AWG alarm wiring in the Alarm

seven-pin connector plug (lower), and installing in the rear panel. Each Bus Alarm output will trigger for any fuse open, or other alarm related to any channel on that bus (Factory Default). Most alarm conditions can be masked off so that they will not trigger the Alarm output if required, using the web-based graphical interface.

Bus Alarm Connector:

Alarm Pin (Bus A or B)	Function
C	Alarm Output common (0.5 ampere 65 volts DC maximum)
NC	Alarm Output normally closed for alarm condition
NO	Alarm Output normally open for alarm condition

Connect up to five dry contact type site sensors (such as door/window sensors, smoke alarm, water detectors etc.) by stripping and terminating 16-28AWG alarm wiring and connecting to the five Site Alarm Inputs on the seven-pin removable Alarm Input Plug Connector, if desired. These inputs may be configured to activate the panel Alarm outputs, or send an alarm e-mail on network connected units. The external sensor contacts must be voltage free, as a small sense current is supplied from the panel Alarm Input pins to detect the external contact open or closed state. Refer to the Web Based Utility section for information on how to configure, name, and use the five Site Alarm inputs.

Site Alarm Inputs:

Pin (L-R)	Site Alarm Input Function
1	Input 1
2	Input 2
3	Input 3
4	Input 4
5	Input 5
GND	Common
GND	Common

Connect a standard 10/100 Base-T Ethernet cable to the RJ-45 LAN port on the back panel to establish Ethernet connectivity to the network or if reconfiguring the panel settings from the factory defaults is required.

OPERATION

Ensure the correct fuses are installed in each channel location that will be used to power a load.

Energise each bus by closing the main external breaker or disconnect device on the bus input lines. Check that the Distribution Panel LCD display powers up, the internal channel relays close after a short delay, and the connected loads are energised.

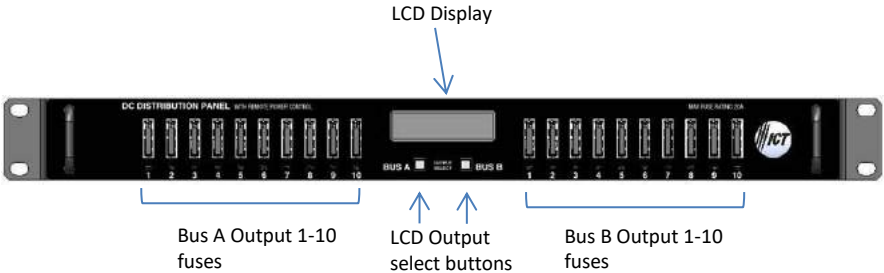


Figure 3: Front Panel

LCD Display

At power up the LCD will be displaying the Bus A main screen showing the voltage of that bus, and total current through the bus. Press the **Bus A Output Select** button to cycle through the Network status page, the channel output screens for that bus, (showing on/off status, voltage, and current for each output channel on the bus selected) and the five Site Alarm input status screens (if alarm inputs are enabled).

Pressing the **Bus B Output Select** button will switch the display to the Bus B home screen. Press the button to cycle through the Network status page, each channel output screen for that bus, and the five Site Alarm input status screens (if the alarm inputs are enabled).

Holding either **Output Select** button for two seconds will return the display to the main screen for that bus. Holding either **Output Select** button for 20 seconds will reset the password to the factory default (see **Password Reset** section).

The LCD backlight will activate when pressing either Output Select button, and will turn off after approximately 15 minutes of inactivity.

The LCD menu screens display the data as described below, in the sequence shown in Figure 4, LCD Display Screens.

Main Screen

- Line 1: The name of the panel (user configurable via the web based graphic interface, default is “**ICT Dual Bus Panel**”)
- Line 2: Displays the bus being monitored, Bus A or Bus B
- Line 3: The system voltage (voltage will blink if the voltage exceeds the Under-voltage or Over-voltage alarm thresholds)
- Line 4: Total bus current (current will blink if the bus current exceeds the Over-current alarm threshold)

Network Screen

- Line 1: Network Status (**Network Connected, No Network**)
- Line 2: Connection type (**100Base-T, 10Base-T**)
- Line 3: IP address assigned to the panel
- Line 4: MAC address of the panel

Output Screen (1A to 10A or 1B to 10B)

- Line 1: Channel number, and name of load (User configurable, default is channel number only)
- Line 2: Channel output status (**ENABLED, DISABLED** to indicate internal relay state or **FUSE OPEN** if the fuse for the channel has tripped)
- Line 3: Output voltage (voltage will blink if it exceeds the Over or Under-voltage alarm thresholds)
- Line 4: Channel Output current (current will blink if it exceeds the Over, or Under-current alarm threshold for that channel)

Each output channel may be given a unique name to describe the actual load connected using the Output Setup section of the web-based interface.

Site Alarm Input Screen (1 to 5)

The alarm screens are displayed only if the alarm input has been enabled using the Alarm Setup section of the web based graphic interface

- Line 1: Alarm input number (1 to 5)
- Line 2: Name of the alarm (if configured, default is blank)
- Line 4: Alarm Status (**ALARM** if alarm is triggered, **READY** when not triggered)

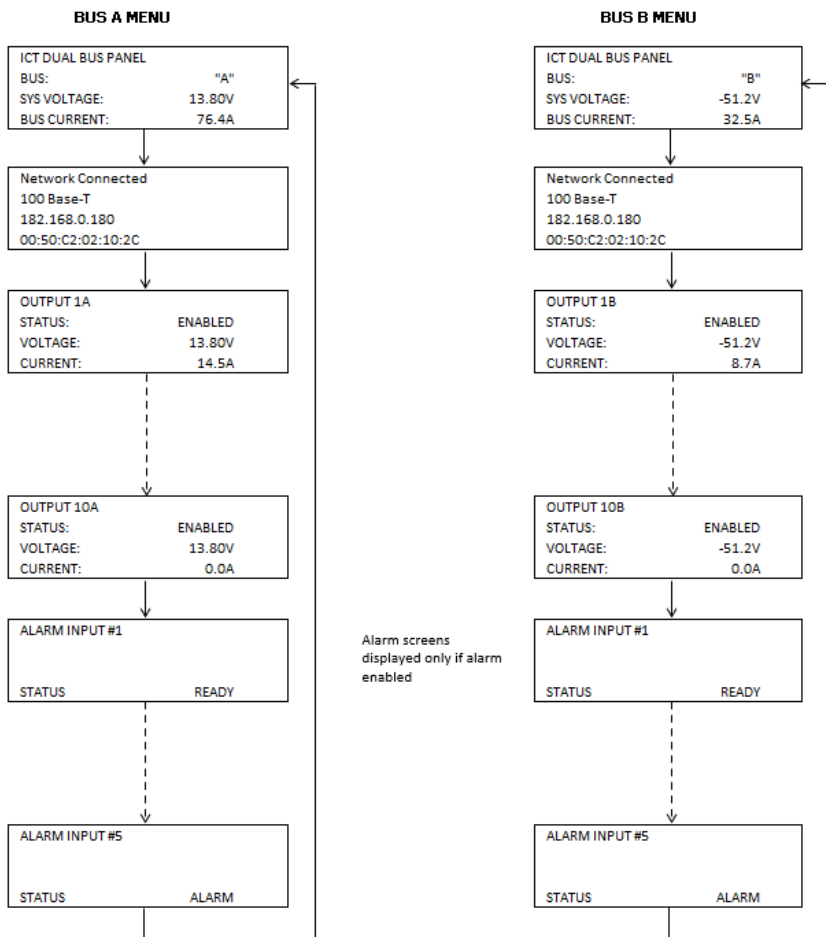


Figure 4: LCD Display Screens

Status Indicators and Alarms

The Bus Alarm LEDs on the front panel and the Form-C Bus Alarm contacts on the back are used to indicate an alarm condition.

Alarm	Trigger Condition	Channel Output	Bus Alarm LED ¹	Bus Alarm Contact ¹
Fuse Off	Fuse is open	Off	On	On
Bus Under-voltage	Bus voltage drops below UV threshold	No change	On	On
Bus Over-voltage	Bus voltage rises above the OV threshold	No change	On	On
Bus Over-current	Bus current exceeds the OC threshold (default 100 amperes)	No change	On	On
Output Over-current	Channel output current exceeds OC threshold	Off ²	On	On
No power to Unit	Loss of bus input power source	Off	Off	On
Site Alarm Input	Alarm contact on input 1 to 5	No change	On	On ³

The unit may also be configured to send an alarm e-mail to multiple user set e-mail addresses for any of the alarm conditions, by enabling the e-mail function on each alarm setup page on the web-based interface. (No alarm e-mails will be sent if the unit completely loses input power.)

TCP/IP WEB-BASED UTILITY

These panels are equipped with a built-in web server to enable full remote monitoring and control using any standard web browser, such as Microsoft Edge, Microsoft Internet Explorer, Google Chrome, or Mozilla Firefox. To connect with a network-connected panel, do the following:

¹ The Bus Alarm LED and Bus Alarm contact are enabled for Fuse alarms as the factory default setting; all other alarms must be enabled in the appropriate setup page of the web utility by selecting the "Activate Alarm Form C Contact" check box for each alarm.

² The channel may be user configured to disable the output for an Over-current Alarm

³ Use the web interface to configure each alarm input to trigger either Bus A, B or both alarm contacts

1. Launch a web browser.
2. Enter the IP address of the panel in the address field of the browser as shown.

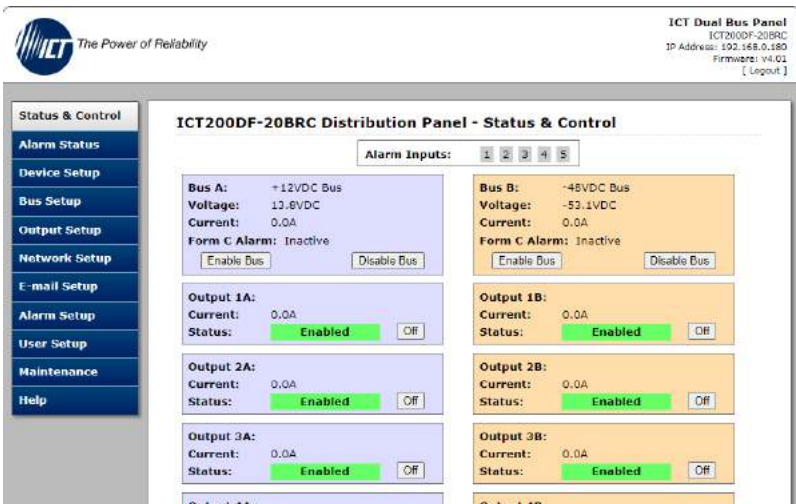


If the panel is connected to a network with a DHCP server, the panel will be assigned an IP address automatically. To find the current address of the panel check the Network screen, line three, on the unit's front panel LCD display. (see Fig. 4) Otherwise the panel will use the factory default IP address of **192.168.0.180**, as shown above.

3. Enter a username and password. The default Administrator username is **admin**, with no password.

A screenshot of a web-based "User Authentication" form. At the top left is the ICT logo with the tagline "The Power of Reliability". The form has a title "User Authentication" and two input fields: "User Name:" with the text "admin" entered, and "Password:". Below the fields is a "Log In" button.

Once a browser is connected to the unit, the Status and Control page for the panel will be displayed, as shown. See the following section for descriptions on how to use the various monitoring, configuration, and control features available through the panel's graphical web interface.



Click on any one of the blue buttons in the menu bar on the left side of the screen to select the desired page.

To log out, click on the Logout link on the top right of the browser window. The system will also automatically log off the user after 20 minutes of inactivity.

Status and Control

This page provides information on the voltage, current, and alarm status for each bus, along with the status of each channel output and the current being provided to each load. Each bus, or an individual output may be manually enabled or disabled by using the on-screen push buttons.

The status of any of the five Input Alarms for alarms that have been enabled (see **Alarm Setup** page) will be shown in the Alarm Input box. A grey Alarm Input indicator box shows that the sensor input is ready; a red box indicates that that external sensor is in an alarm condition.

Enable Bus Button: This button will close the six channel relays on that bus, applying power to the external loads. The outputs will be enabled in a timed sequence if the **power-on sequencing** is enabled on the **Device Setup** page.

Disable Bus Button: This button will open the six channel relays on that bus, cutting power to the loads.

Output On/Off Buttons: Each button will toggle the internal relay for that channel, enabling or disabling the power to the load on that output. The status of each

output channel is shown with a red (Disabled) or green (Enabled) bar next to the ON/OFF button, along with an ammeter indicating the current through that channel.

Alarm

This page displays the status of currently active alarms as well as the alarm history.

Device Setup

Use this page to configure the panel settings. Click on the **Save Settings** button when finished to save and implement all new changes.

Device Info

Site Name: Enter a custom descriptive name for the panel

Model: Displays the ICT model number for the panel

Hardware: Displays the hardware version of the panel

Date and Time Settings

Current System Time: Displays the date and time used in the panel's internal clock for time stamping data entries in the data logs. This clock may be set manually, or synchronized with a remote NTP Time Server over the Internet (recommended).

Synchronize with NTP Server: Check this box to select automatic synchronization with the external server. (recommended)

NTP Server: Enter the name or IP address of the NTP Server used for date and time synchronization, such as "*pool.ntp.org*".

Time Zone: Select the appropriate time zone relative to GMT for the unit so that the NTP server time can be converted to the local time zone.

Set Time Manually: Checking this box will allow the unit's clock and calendar to be set manually by entering date and time in MM/DD/YY and HH:MM:SS format.

Power-On Sequencing/Cycling

Sequence/Cycle Delay: Entering a time delay in this field (0 to 60 seconds) will cause the outputs on each bus to be enabled in sequence (1 to 10) with the set delay time between each step, when the **Enable Bus** button for that bus is pressed on the **Status and Control** page. This helps reduce the turn-on surge that can occur when all connected loads are energized simultaneously. Setting this time to zero or leaving the box blank will cause all outputs to always be enabled simultaneously. (Factory default)

Note the **Sequence Delay** time will also be used as the **Power Cycling** time delay for each output that has the **Power Cycling** feature enabled on the **Output Setup** page.

Reverse Sequence Order: Checking this box will cause the power on sequence to run in reverse order with output channel 10 on first, ending with output 1, when the **Enable Bus** button is clicked on the **Status and Control** page.

Network Watchdog:

Select a Watchdog to edit: Select one of the six independent Watchdogs to configure. Each Watchdog, if enabled, will cause the unit to periodically ping up to two remote IP addresses to verify the network connection status. If there is no response from either address the unit will cycle the power on all outputs that are configured in the **Cycle Outputs** setting below. This feature is useful for re-booting a modem or other network device that is powered by one of the distribution panel outputs, to help recover the network IP connection when one of these devices has crashed. A delay time must be entered in the **Sequence/Cycle Delay** field for this function to work. Power for a cycled channel will be held in the off state for the duration set by the Sequence/Cycle delay time, then will be turned back on.

Watchdog Enabled: Check this box to enable the selected Watchdog. **Primary IP Address:** Enter the remote IP address for the selected Watchdog to monitor. If left blank the unit will monitor the Gateway IP address listed in the Network Setup page.

Secondary IP Address: Enter an optional second IP address that the unit can monitor to verify network status. The Network Watchdog will only trigger if both the Primary and Secondary IP addresses fail to respond.

Cycle Outputs: This sets which output(s) to power cycle when the Network Watchdog triggers.

Watchdog Timeout: Enter the time (1 to 80 minutes) that the remote IP address must stop responding to ping requests from the panel, before the Network Watchdog will trigger an output power cycle. Ensure this time is greater than the normal start-up time for the network hardware to prevent nuisance power cycle events at system start up.

Maximum Cycle Attempts: This setting will limit the maximum number of times the panel can attempt to cycle power to the output(s) before giving up, if the remote IP address continues to be unresponsive. Set Maximum Cycle Attempts to zero for no limit.

Data Logging:

Data Logging rate: Enable this feature to keep a running record the bus voltage, bus current, channel output currents, fuse status, and alarm inputs at a rate of up to one sample per minute. View this Comma Separated Values (CSV) format log by clicking the **Download Log** button, and open in any Spreadsheet software, such as Microsoft Excel. The log will store up to 30 days of data, with the oldest entries at the top of the file, newest at the bottom.

Log Start Date: Shows the date/time the most recent log began.

Bus Setup

Use this page to configure each bus. Select Bus A, or Bus B in the **Select a Bus to Edit** box to call up the settings for that bus. Click on the **Save Settings** button at the bottom of the page to save any changes.

Bus A/B Settings:

Bus Name: Enter a descriptive name for the selected bus if desired

Bus A/B Under Voltage Alarm:

Under-Voltage Threshold: Enter the bus under voltage value. Bus voltage dropping below this level will trigger a Bus Under-Voltage alarm.

Under-Voltage Recovery: Enter the bus voltage required to reset the alarm. Bus voltage rising above this level will clear the alarm.

Activate Form-C Contact: Checking this box will cause the Alarm relay to trigger for an under-voltage condition. (default)

Send E-mail: Checking this box will cause the unit to send a Bus Under-Voltage alarm e-mail to the assigned address entered on the **E-mail Setup** page.

Bus A/B Over Voltage Alarm:

Over-Voltage Threshold: Enter the bus over-voltage value. Bus voltage rising above this level will trigger a Bus Over Voltage alarm.

Activate Form-C Contact: Checking this box will cause the Alarm relay to trigger for an over voltage condition. (default)

Send E-mail: Checking this box will cause the unit to send a Bus Over-Voltage alarm e-mail to the assigned address entered on the **E-mail Setup** page.

Bus A/B Over-Current Alarm:

Over-Current Threshold: Enter the maximum total current level for the bus. Current exceeding this level will trigger the Over-Current alarm.

Activate Form-C Contact: Checking this box will cause the Alarm relay to trigger for an over-current condition. (default)

Send E-mail: Checking this box will cause the unit to send a Bus Over-Current alarm e-mail to the assigned address entered on the **E-mail Setup** page

Output Setup

Use this page to configure the settings for each output channel on Bus A and Bus B. Select the output to be edited in the **Select an Output to Edit** box. Make any required changes, and then click on the **Save Settings** button at the bottom of the page to save any edits. Click on the **Copy Settings to All** button, to copy the settings of the selected output to all other outputs on both buses.

Output Settings:

Output Label: Enter a descriptive label for the selected output channel if desired.

Output State After Panel Reset: Sets the state for the output after an input power failure, or soft reset of the panel. Select one of the following:

- **Restore last State:** Will return the output contactor to the state prior to the reset event (default)
- **Enable Output:** Will enable the output contactor, regardless of its previous state
- **Disable Output:** Will disable the output contactor, regardless of its previous state

Ignore Fuse Status: If this box is checked, the panel will not monitor the status of the fuse for the selected output.

Enable Power Cycling: Check this box to enable output power cycling for the selected output, so that the output will automatically be re-enabled after the **Sequence/Cycle Delay** time whenever the output is disabled using the **Output Off** button on the **Status and Control** page, or when the **Network Watchdog** is triggered. This feature is useful for remotely resetting power to hardware required for the network connectivity of the panel.

The **Sequence/Cycle Delay** time must be set on the **Device Setup** page with duration long enough for the connected network hardware to fully reset for this function to be effective. Multiple outputs that are disabled using Power Cycling will be re-enabled in sequence.

Output Load Shedding:

Enable Load Shedding: Check this box to disable this output when the bus voltage drops below the load-shedding threshold for at least 30 seconds. This feature can be used to disconnect less critical loads to preserve back-up battery power as the battery voltage drops.

Load-Shedding Threshold: Enter the voltage level at which the selected output will be disconnected.

Load-Shedding Auto Recovery: Check this box to allow the output to be automatically reconnected when the bus voltage is above the **Auto Recovery Threshold** for at least 60 seconds. The output must be manually re-enabled using the **Output ON** button on the Status and Control page if the **Auto Recovery** function is not enabled.

Auto Recovery Threshold: Enter the voltage level at which the selected output will automatically be reconnected. This value must be at least 0.5 volt above the **Load-Shedding Threshold** voltage.

NOTE:

Outputs that have been disabled on the Status and Control Page will reconnect automatically if Load-Shedding Auto Recovery is enabled for that output. To prevent this, ensure that Load-Shedding Auto Recovery is not enabled.

Output Over-Current Alarm:

Over-Current Threshold: Enter the over-current level. Output current above this level for at least five seconds will trigger the Over-Current Alarm, and disable the output (if feature enabled). Disable this alarm by setting the threshold to zero amperes.

Activate Form-C Contact: Checking this box will cause the Alarm relay to trigger for an over-current condition.

Send E-mail: Checking this box will cause the unit to send an output Over-Current alarm e-mail to the assigned address entered on the **E-mail Setup** page.

Disable This Output: Check this box to automatically disable the output for an Over-Current condition on the selected output. This function may be used as an electronic circuit breaker which can then be remotely reset by clicking the **Output ON** button on the Status and Control page.

Network setup

Use this page to configure the network settings for the panel. Click on the Save Settings button at the bottom of the page to save any changes and re-boot the panel.

NOTE:

Saving any changes to the network settings will cause the panel to re-boot, cycling power to all outputs.

Network:

MAC Address: Displays the MAC address assigned to the panel. It is also shown on line four of the LCD Network Status screen.

Enable DHCP: Turn on this setting if the network uses a DHCP server to automatically assign IP addresses. (Enabled as default setting). To manually assign a static IP address to the unit uncheck this box, then set the following parameters.

IP Address: Specify a unique IP address for the unit.

Subnet Mask: Specify the mask for the subnet the panel is located on

Gateway: Specify the IP address of the default router (Gateway) used for connecting attached devices to different networks.

Primary DNS: Specify the IP address of the Primary DNS Server for the network.

Secondary DNS: Specify the IP address of the Secondary DNS Server for the network.

Web Server:

CAUTION:

Changing the web server port numbers may cause loss of communication with the panel

The following ports may be changed within a range of 1 to 65565, if required.

HTTP Port: This port is used for HTTP traffic between the panel and the browser. The default HTTP port is **80**. If this is changed, the new HTTP Port

number must be appended to the URL used to access the panel. (e.g. use URL **http://192.168.0.180:8000** for IP address **192.168.0.180**, port **8000**)

HTTPS Port: The HTTPS (HTTP Secure) protocol uses encrypted data transfer between web browsers and servers for higher security. The default HTTPS port is **443**. Append any changed HTTPS port to the end of the URL for the panel.

To access the panel through a secure HTTPS connection, use **https://** at the start of the units URL. (e.g. **https://192.168.0.180:8888** for IP address **192.168.0.180**, HTTPS port **8888**)

UDP Port: This port is used when applying firmware upgrades to the panel. The default UDP port is **9393**.

SNMP:

Configure these settings to use SNMP-based monitoring. SNMP (Simple Network Management Protocol) is an industry standard protocol for network management software. Enabling the SNMP function on the panel will allow standard SNMP management software to connect to the SNMP agent running on the panel and read real time system information such as bus voltage, and channel currents. The panel can send SNMP traps to the external management software when an alarm or fault occurs.

The information available from the SNMP agent is described in a MIB (Management Information Base) file, which can be downloaded from the panels **Help** page. The unique panel MIB file must then be imported into an external SNMP management software.

Enable SNMP: Check this box to enable the SNMP agent

SNMP Version: Sets the SNMP version (**v1/v2c**, **v3**, or **All**) supported by the panel SNMP agent. If **All** is selected, all SNMP versions will be supported simultaneously. The appropriate settings for the selected SNMP version will need to be configured.

Enable SNMP Write Access: Turning on this setting will allow users to enable or disable DC power to individual outputs through SNMP. If this box is unchecked, all information available from the SNMP agent will be read-only.

SNMP Control Access: Sets the level of device control that is allowed through SNMP. This setting is only available if Enable SNMP Write Access is enabled.

- **Output Control:** Allows DC power to individual outputs to be enabled or disabled through SNMP. No other settings can be configured through SNMP.

- **Full Device Control:** Allow SNMP clients to set all device settings through SNMP. MIB files for full SNMP device control can be downloaded from the ICT Website:
<https://www.ict-power.com/tools-utilities/>

SNMP Contact Information: Assign contact information, such as an operator name and phone number for the panel, which can be read via SNMP queries. (This information is optional)

SNMPv1/v2c Settings:

Read Community: Enter the community string/password here for read-only SNMP access. The default read community string is “public”.

Write Community: Enter the community string/password here for read/write SNMP access. The default write community string is “write”.

It is recommended to change the community strings before enabling SNMP, as the defaults are well known.

SNMPv3 Settings:

User Name: Enter the username for SNMPv3 access.

Authentication Protocol: Select the SNMPv3 authentication protocol (**None, MD5, or SHA**).

Authentication Password: If an authentication protocol is selected, enter the authentication password.

Privacy Protocol: Select the SNMPv3 privacy protocol (**None, or AES**).

Privacy Password: If a privacy protocol is selected, enter the privacy password.

SNMP Trap Settings:

Trap Community: Enter the community string/password that is sent with all traps. Some trap receivers are able to filter on trap community.

Trap IP Addresses: Enter the IP addresses for up to two devices that will receive SNMP traps from the panel.

E-mail Setup

Configure these settings to enable automatic e-mail notifications directly from the panel. The information required for this is available from a Network Administrator, or Internet Service Provider. (ISP)

E-mail:

SMTP Server: Enter the name or the IP address of the SMTP server used for sending outgoing e-mail. (e.g. "smtp.gmail.com")

SMTP Port: Enter the port used by the SMTP server. (Normally 25)

SMTP Server requires SSL: Check this box if the SMTP server requires an encrypted SSL connection.

This box should normally be checked if the SMTP port used by the SMTP server is 465.

If the SMTP server uses STARTTLS (normally port 587), this box should be unchecked.

Sender E-mail Address: Enter an e-mail address that will appear as the sender for all e-mail notifications sent from the panel.

Recipient E-mail Addresses: Enter one or more e-mail addresses that are to receive all e-mail notifications from the panel. Use commas to separate multiple addresses. This field can also be used to send a text message notification to a phone; see the **Text Message Alarm Notifications** section for further information.

SMTP User Name: Enter an SMTP username here, if required by the SMTP server. Leave this field blank if the server does not require authentication.

SMTP Password: Enter an SMTP password here, if required by the SMTP server. Leave this field blank if the server does not require authentication.

Minimum E-mail Interval: Specify a minimum interval required between e-mail notifications. (Default is one minute, range 0 to 60 minutes) This time interval is used to prevent an un-intended flood of e-mail alarm notifications that could occur when an alarm limit is incorrectly configured, for example.

General E-mail Notifications:

Select these options to receive an e-mail when one or more of these events occurs:

The Distribution Panel restarts: Check this box to receive an e-mail notification when the panel restarts after a power failure or a soft reset.

Load-Shedding is activated: Check this box to receive an e-mail notification when any of the outputs are disabled or enabled due the voltage crossing one of the load-shed settings configured on the **Output Setup** page.

The Network Watchdog triggers: Check this box to receive an e-mail notification after the Network Watchdog triggers due to a loss of the network connection and the network has comes back online.

Alarm setup

Use this page to configure the set points of alarms to be monitored, and set the required actions when an alarm is triggered. Click on the **Save Settings** button at the bottom of the page to save any changes.

Fuse Alarm:

Activate Alarm Form-C Contact: Check this box to have the bus A alarm output trigger for any fuse on channel 1A to 10A opening, and have the bus B alarm output trigger for any fuse on channel 1B to 10B opening.

Send E-mail: Check this box to cause an e-mail notification to be sent when a fuse opens on any of the output channels, stating which channel is affected. Note that the e-mail settings must be fully configured on the **E-mail Setup** page for this to occur.

Alarm Input #1 to #5: Configure the five Site Monitor inputs to enable the panel to monitor external contact closure events on door and window sensors, smoke alarms, etc.;

Alarm Name: Enter a descriptive name for the external contact being monitored. This will be used in e-mail and front panel alarm messages.

Contact Type: Select if the external alarm contact input is to be used, and what contact type is connected to each input. Choose “Normally Open” contact, “Normally Closed” contact, or “Not Used”.

Activate Alarm Form-C Contact: Check this box to have both bus alarm relay outputs indicate a fault for an alarm condition on that input.

Send E-mail: Check this box to have an email notification sent when one of the enabled alarm inputs is triggered, stating which input was affected. Note that

the e-mail settings must be fully configured on the **E-mail Setup** page for this to occur.

User Setup

Use this page to configure passwords for up to 10 users, with the ability to limit who has access to the panel settings. Click on the **Save Settings** button at the bottom of the page to save any password changes.

The unit has no password assigned by default. For security reasons, an Administrator password should be assigned to the panel as soon as possible to prevent unauthorized access.

NOTE:

Record the new password for future access! If the Administrator password is lost the unit must be reset to return the password to the blank default setting, causing loss of all other user settings. See the **Password Reset** section for more details.

Select a User to Edit: Choose which of the user accounts to edit. Set the access level to be appropriate for the amount of control each user requires.

Administrator: This level has full access to the panel settings, and can set up users and change passwords (“admin” is the default user)

Control: User has read-only access to the panel, but can enable or disable the outputs, and change some of the basic settings.

View-Only: User can only view status, cannot change any settings.

New Password: Use these fields to change the password of the selected user.

New Password: Enter the new password for the chosen user.

Confirm New Password: Re-enter the new password to confirm the entry.

Confirm Changes: Enter the current **Administrator Password** to confirm the new password changes, prior to saving the settings.

Maintenance

Use this page to reset the panel (soft reset), restore the panel default settings, or send a test e-mail to verify e-mail functionality.

Reset Distribution Panel: Clicking the **Reset** button will restart the panel. Channel output states will be restored according to the **Output State after Panel Reset**

setting for each output on the **Output Setup** page. All other settings are maintained during the reset.

Restore Factory Default Settings: Clicking the Restore button will restore **ALL** settings to the original factory default values, including the user passwords. To only restore the network settings and passwords see the **Password Reset** section.

Send Test E-mail: Click the **Send Test E-mail** button to send a test e-mail to the listed e-mail recipients using the e-mail settings on the **E-mail Setup** page.

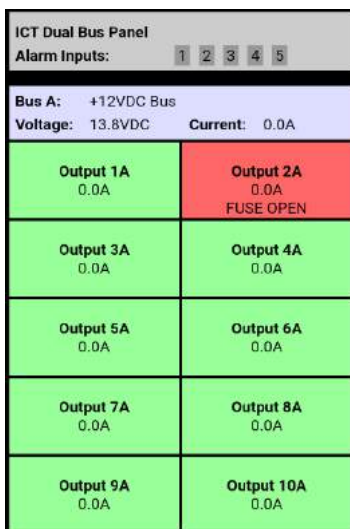
Ping Diagnostics Tool: Use this feature to verify connectivity of any network connected device. Enter the hostname or IP address of the target device, and then click the **Ping** button.

MOBILE WEB APP

Use the mobile version of the **Status and Control** page to monitor and control the panel with a smartphone web browser.

Access the Mobile Web App by entering the address of the panel in the address field of the browser, followed by **"/m"**. (e.g. **https://192.168.0.180/m**). Enter a username and password, and the display will show the **Status and Control** screen:

For improved security, use a secure HTTPS connection when assessing the panel over the Internet with the Mobile Web App, or use a Virtual Private Network (VPN) connection.



The screenshot displays the 'ICT Dual Bus Panel' mobile web app interface. At the top, it shows 'Alarm Inputs' with five numbered buttons (1-5). Below this, a light blue header displays 'Bus A: +12VDC Bus' with 'Voltage: 13.8VDC' and 'Current: 0.0A'. The main area consists of a 5x2 grid of output status boxes. Output 2A is highlighted in red and shows '0.0A' and 'FUSE OPEN'. All other outputs (1A, 3A, 4A, 5A, 6A, 7A, 8A, 9A, 10A) are highlighted in green and show '0.0A'.

ICT Dual Bus Panel	
Alarm Inputs: 1 2 3 4 5	
Bus A: +12VDC Bus	
Voltage: 13.8VDC Current: 0.0A	
Output 1A 0.0A	Output 2A 0.0A FUSE OPEN
Output 3A 0.0A	Output 4A 0.0A
Output 5A 0.0A	Output 6A 0.0A
Output 7A 0.0A	Output 8A 0.0A
Output 9A 0.0A	Output 10A 0.0A

Mobile Web App

The Mobile Web App (shown above) provides information on bus voltage, bus current, input alarm status, and the status and current level of each of the bus output channels. Tapping on an output cell will enable or disable that output. (if logged in using an Administrator or Control account) The cell will be green when enabled, red when disabled.

PASSWORD RESET

Reset the Administrator password, the network, and web server settings to the original factory default values by doing the following: (the standard User password and other settings are not affected)

1. Press and hold either **Output Select** button on the front panel for approximately 20 seconds until **Resetting** is shown on the LCD.
2. Release the button
3. Press and release one of the outputs select buttons once to view the Network Status screen on the LCD. The factory default IP address for the panel will be displayed.

ROUTER CONFIGURATION

Use this section to set up a Distribution Panel with remote Internet access when located behind a router.

A router allows multiple PCs to share a single Internet connection, and must be configured correctly to forward incoming remote data to the local IP address of the panel.

Example configuration using a Linksys WRT54G router: (others will be similar)

1. Log into the router and go to the port forwarding screen. In the example Linksys WRT54G router, this is located in the Applications and Gaming tab. The location of the port forwarding fields may be different on other routers (consult the router manual for instructions).
2. Configure HTTP forwarding:
 - a. Enter a unique name in the **Application** field
 - b. Enter the HTTP port number that the panel is using in the **Start** and **End** fields. The default HTTP port for the panel is **80**.

- c. Select **Both** under **Protocol** (TCP and UDP)
- d. Enter the local IP address of the panel (e.g. 192.168.0.180) in the **IP address** field. (see step 2 of the **TCP/IP Web Based Utility** section to verify the panel IP address)
- e. Check the **Enable** box, and then click on **Save Settings**

NOTE:

Many ISP's block access to port 80. If port 80 is blocked, change the HTTP port the panel uses from 80 to another value, such as 8000 (valid port numbers are in the range of 1 to 65535). See the **Network Setup** section for information on assigning new network ports.

It is important to change the panel's HTTP port from 80 if the local network has another device (such as a panel, or web server) already using port 80.

3. Configure HTTPS forwarding by repeating steps 2a to 2e with the HTTPS port number that the panel is using. The default HTTPS port number is **443**.
4. Set up the router to allow remote firmware upgrades to the panel by repeating steps 2a to 2e with the UDP port number the panel is using. (default UDP port is **9393**) This step is optional if firmware upgrades are to be done locally.

The screenshot shows the 'Port Range Forwarding' configuration page on a Wireless-G Broadband Router (WRT54G). The page has a navigation bar with tabs for Setup, Wireless, Security, Access Restrictions, Applications & Gaming, Administration, and Status. The 'Applications & Gaming' tab is active, and the 'Port Range Forwarding' sub-tab is selected. Below the navigation bar, there is a table with the following columns: Application, Start, End, Protocol, IP Address, and Enable. The table contains three rows of port forwarding rules:

Application	Start	End	Protocol	IP Address	Enable
http	80	80	Both	192.168.0.180	<input checked="" type="checkbox"/>
https	443	443	Both	192.168.0.180	<input checked="" type="checkbox"/>
udp	9393	9393	Both	192.168.0.180	<input checked="" type="checkbox"/>
	0	0	Both	192.168.0.0	<input type="checkbox"/>
	0	0	Both	192.168.0.0	<input type="checkbox"/>
	0	0	Both	192.168.0.0	<input type="checkbox"/>
	0	0	Both	192.168.0.0	<input type="checkbox"/>
	0	0	Both	192.168.0.0	<input type="checkbox"/>
	0	0	Both	192.168.0.0	<input type="checkbox"/>
	0	0	Both	192.168.0.0	<input type="checkbox"/>

At the bottom of the page, there are two buttons: 'Save Settings' and 'Cancel Changes'. On the right side, there is a text box titled 'Port Range Forwarding:' which explains that certain applications may require specific ports to be opened for correct functionality. It provides examples like servers and online games and advises that for security, port forwarding should be limited to only the necessary ports and the 'Enable' checkbox should be checked after configuration.

Router Port Forwarding Screen

- Determine the WAN IP address of the router assigned by the ISP. With the example router this information is on the **Status** tab, listed as **IP Address**.

NOTE:

When using a dynamic IP address the router's WAN IP address may change from time to time without warning, depending on the ISP. In this case, obtain a Static IP address from the ISP (it will not change) which will ensure more predictable access to the panel from a remote location. If a static IP address is not available, use a Dynamic DNS service such as Dyn (www.dyn.com) to provide a stable address for the router.

- To access the panel over the internet type the WAN IP address of the router in the location/address field of the browser, followed by a colon and the HTTP port number the panel is using. (e.g. **http://209.123.10.33:8000** for a router address **209.123.10.33**, port **8000**)



Panel Access With Router Address

TEXT MESSAGE ALARM NOTIFICATIONS

The panel can send alarm notifications as text messages to a cell phone by configuring the alarm e-mails to be sent to a mobile phone service provider. On the **E-mail Setup** page of the web-based utility enter the address of a phone in the **Recipient E-mail Address** field.

Example with an AT&T phone: enter the recipient address **cellnumber@txt.att.net**, replacing **cellnumber** with the 10-digit cell phone number which will be used to receive messages.

Cell address formats for some common North American mobile phone providers:

AT&T	<i>cellnumber@txt.att.net</i>
Verizon	<i>cellnumber@vtext.com</i>
T-Mobile	<i>cellnumber@tmomail.net</i>
Virgin Mobile	<i>cellnumber@vmobl.com</i>
Nextel	<i>cellnumber@messaging.nextel.com</i>
Bell Mobility	<i>cellnumber@txt.bell.ca</i>
Rogers	<i>cellnumber@pcs.rogers.com</i>

TROUBLESHOOTING

I am unable to access the web-based configuration utility:

- Check the correct IP address for the panel by pressing an **Output Select** button on the front panel to view the **Network Status** screen on the LCD. The IP address may have been changed if DHCP is enabled.
- If the **Network Status** screen on the LCD shows **Network Not Connected** check the network cable connections to the panel and the network.
- Confirm the use of an industry standard “crossover” type of network cable if directly connecting a computer to the panel, and a “straight-through” type of cable to connect the panel to a network.
- Ensure the network card settings on the computer are configured for accessing the IP address of the panel. To access a panel with the default IP address of 192.168.0.180 the typical network settings for the computer are:
 - IP Address: 192.168.0.180
 - Subnet Mask: 255.255.255.0
 - Gateway: 192.168.0.1
- If the HTTP port of the panel has been changed, the new port number must be appended to the URL used to access the panel (see the **Network Setup** section). See the **Password Reset** section for details on how to reset the port number to the factory default value.
- If the network switch allows users to manually configure port speed and duplex settings, turn-on “**Auto Negotiation**” for the switch port that the panel is connected to.

I forgot my password:

- See the Password Reset section of the manual

I am not receiving e-mails from the panel:

- Verify that the **Send-E-mail** checkboxes are ticked for any alarm conditions for which you wish to receive e-mail notifications.
- Verify e-mail settings by going to the **Maintenance** page on the panel's web utility and clicking on the **Send Test E-mail** button, to send a test message to a designated recipient addresses. The **Send Test E-mail** page will show an error message if the panel is unable to send the e-mail.
- Check on the **E-mail Setup** page and ensure the **SMTP Server** field is the correct address for your e-mail provider, and the **SMTP Port** is correct. (Port should be 25 for most servers)
- If the SMTP server requires SSL encryption, ensure the **SMTP Server requires SSL** checkbox is ticked. Otherwise leave blank.
- If the SMTP server requires authentication ensure that the **SMTP User Name** and **SMTP Password** fields are correctly entered.

PRODUCT SPECIFICATIONS

Operating Voltage (either bus): 20VDC to 60VDC, or -20VDC to -60VDC

Current Rating: 100A max, continuous Bus A
100A max, continuous Bus B
20A max, 16A continuous per output

NOTE: Fuse should normally be operated continuously at no more than 80% of their nominal current rating

Meter Accuracy, Voltage: Bus voltage readings +/-1%

Meter Accuracy, Current: Channel current readings +/- 3%

Power Consumption: < 52 W (all outputs disabled)
< 6 W (all outputs enabled)

Alarm Form-C Contacts: 1 output per bus, 1A 60VDC max

Alarm Sensor Inputs: Five external dry contact alarm inputs, configurable for NC or NO contacts. Applied voltage 3.3V, 0.4mA for contact closure detection

Ethernet: 10Base-T/100Base-T, RJ45 Connector

SNMP: SNMP v1/v2c/v3 supported

Network Security: Password protection, SSL encryption for HTTPS and SMTP (TLS 1.2)

Input Connector: Dual ¼-20 thread studs 0.625" c-c (50 in-lbs. 5.6 N·m max)

Output Connector: 20 position cage clamp type per bus
10-22AWG, 5.22in-lb

Alarm Connectors: Removable plug cage clamp type
16 – 28 AWG, 1in-lb screw torque

Operating Temperature: -20°C to +60°C (Derate max bus current by 2% per degree C above 50°C)

Weight: 9.5 lbs (4.3kg)
Warranty: 2 years
Dimensions: 19.0" x 9.4" x 1.7"
483mm x 236mm x 45mm

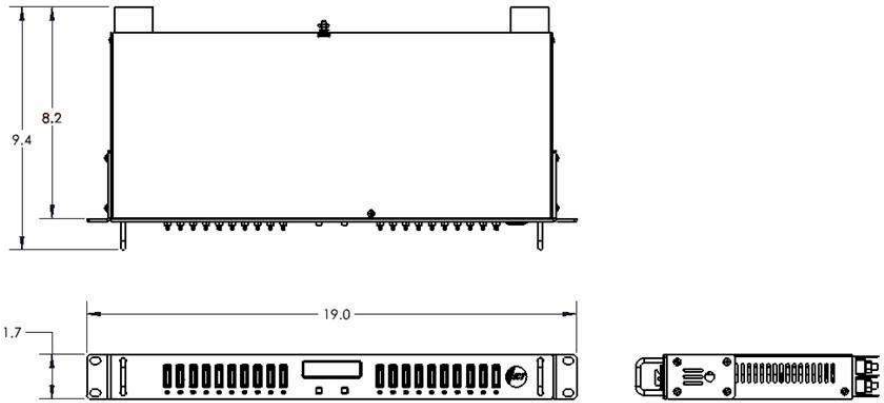


Figure 5: Mechanical Dimensions

ICT LIMITED WARRANTY

The warranty period on ICT products is two (2) years from date of purchase from an authorized ICT reseller or OEM with valid proof of purchase, or from date of shipment from the ICT manufacturing facility. The warranty period for a repaired product or part is ninety (90) days or the remainder of the unexpired term of the new product warranty period, whichever is greater. Repair or replacement of a defective product or part does not extend the original warranty coverage period.

ICT Limited Warranty is only intended for the benefit of the original purchaser and user of this product. This Warranty is not transferable or assignable without the prior written permission of ICT. ICT's sole obligation and liability under this warranty is limited to either repairing or replacing defective products at the sole discretion of ICT. When repairing or replacing the products, ICT may use products or parts that are new, equivalent to new or re-conditioned. Parts repaired or replaced during the warranty period will be under warranty for the remainder of the warranty period.

No claim will be accepted unless written notice of the claim is received by ICT in accordance with ICT's Return Material Authorization (RMA) procedure, as soon as reasonably possible after the defect is discovered. A valid product serial number must be provided with the RMA claim to prove eligibility. The RMA procedure is available on the ICT website at www.ict-power.com/support/warranty-repair/.

The Purchaser shall at their own risk and cost return the defective product to ICT's factory or designated repair center once an RMA is issued by ICT. Return of the products to the customer after repair is completed shall be prepaid by ICT unless otherwise mutually agreed between the parties. Products shipped to ICT which have incurred freight damage will not be covered by this Warranty and any repairs or replacement parts, components or products needed will be invoiced in the full current price amount and returned freight collect to Purchaser. It is the Purchaser's responsibility to check the product upon receipt for any damage during shipping and to contact the carrier or shipper regarding such damage. Product that is returned as defective, which is determined to operate within published specifications will be returned to the Purchaser freight collect.

ICT assigns to Purchaser any warranties which are made by manufacturers and suppliers of components of, or accessories for, the ICT product and which are assignable. ICT makes no representations as to the effectiveness or extent of such warranties, assumes no responsibility for any matters which may be warranted by such manufacturers or suppliers and extends no additional coverage under this Warranty to such components or accessories.

In no event shall ICT be liable for any special, indirect or consequential damages such as, but not limited to, loss of use, business or goodwill, loss of revenue, or loss of profits, which may result, either directly or indirectly, from defects in products provided by ICT.

This Warranty will be void if the product has been subjected to misuse, neglect, accident, exposure to environmental conditions not conforming to the products' limits of operation, improper installation or maintenance, improper use of an electrical source, defects caused by sharp items or by impact pressure, a force majeure event, has been modified or repaired by anyone other than ICT or its authorized representative, has been subjected to unreasonable physical, thermal or electrical stress, improper maintenance, or causes external to the unit including but not limited to general environmental conditions such as rust, corrosive atmospheres, sustained temperatures outside the specified operating range of the equipment, exposure to power surges and/or electrical surges, improper grounding, mold or dust, animal or insect damage, water damage or immersion in liquid of any kind, or if the serial number has been altered, defaced, or removed.

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