Instruction manual
MTL Industrial Network Solutions

June 2023
INM 9479-ET(G)-CSL Rev 4

9479-ET(G)-CSL

CSL Intrinsically Safe Gigabit Ethernet WLAN AP / Bridge

Powering Business Worldwide

DECLARATION OF CONFORMITY

A printed version of the Declaration of Conformity has been provided separately within the original shipment of goods. However, you can find a copy of the latest version at -

http://www.mtl-inst.com/certificates

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GENERAL SAFETY INFORMATION

Safety instructions for installation and operating personnel

The operating instructions provided here contain **essential safety instructions** for installation personnel and those engaged in the operation, maintenance and servicing of the equipment.

WARNING	**WARNING !** A 'WARNING' marked in this way is provided for operator and plant safety and MUST be followed.

CAUTION !

A Caution is provided to prevent damage to the instrument.

NOTE

These are used to guide the user in the operation of the instrument.

Before commencing installation or commissioning:

- Read and understand the contents of this manual
- Ensure installation and operating personnel have received adequate training for this task
- Ensure that any operating instructions are fully understood by the personnel responsible.
- Observe national and local installation and mounting regulations (e.g. IEC 60079-14).

WARNING	**WARNING !** These assemblies may not be used in explosion-hazard area applications if they have been used previously in general electrical installations.

WARNING	**WARNING !** The responsibility for planning, installation, commissioning, operation and maintenance, particularly with respect to applications in explosion-hazard areas, lies with the plant operator.

During operation:

- Make the relevant instructions available at all times to the operating personnel.
- Observe safety instructions.
- Observe national safety and accident prevention regulations.
- Operate the equipment within its published specification.
- Servicing, maintenance work or repairs not described in this manual must not be performed without prior agreement with the manufacturer.
- Any damage to this equipment may render its explosion protection null and void.
- No changes to any of the components that might impair their explosion protection are permitted.

If any information provided here is not clear:
Contact **Eaton's MTL product line** or an authorised distributor or sales office.

NOTE

Improper installation and operation of the enclosure can result in the invalidation of the guarantee.

1 FEATURE

- Intrinsically Safe ATEX / UKEX / IECEx North America ($MET_{c/us}$) approval
- Dual Band 2.4GHz / 5GHz WLAN Support
- Dual Antenna 802.11n MIMO 2T2R
- Access Point (AP) Mode or Client/Bridge Mode
- Dual Port Switch 10/100/1000MB LAN (daisy-chain capability)
- Versions: 2x Gigabit LAN Ports (-ETG), or 2x 10/100 LAN/PoEx* Ports (-ET)
- CPU Management Feature via Web Pages
- Compact dimensions (W: 42 x H: 160 x D: 140 mm)
- Ex ia IIB T4 Ga, Ex ia [ia Da] IIIC T135ºC Db (non-mining),
  Ex ia I Ma (M1 mining)- ETG version
- Ex ia IIC T4 Ga, Ex ia [ia Da] IIIC T135ºC Db (non-mining),
  Ex ia I Ma (M1 mining)- ET version
- Ta -40ºC to 70ºC
- Zone 1 / Zone 21 mounting
- (Zone 0 / Zone 20 with a suitable Ex ia Power Supply)

**Note – PoEx is a simple adaptation of the IEEE 802.3af Power over Ethernet (PoE) standard to bring the benefits to the 9400 Range of Hazardous Area devices. This allows two spare pairs in the existing Cat5e cable to distribute the power supply from a 9476 Ethernet Switch (Power Sourcing Equipment – PSE) to each of the devices connected to its five ports (PD – Powered Device). This adaptation is necessary due to restrictions for Hazardous Area use. It is not implied that the device conforms to the 802.3af (PoE) standard.*

2 DESCRIPTION

The 9479-ET(G)-CSL is an Intrinsically Safe (IS) WLAN AP/Bridge Module suitable for Zone 1 / Zone 21 mounting, (Zone 0 / Zone 20 with a suitable Ex ia Power Supply).

It may be configured as either an AP or Client/Bridge. Also supporting either 2.4GHz or 5GHz operation further extends its range of applications.

There are 2x RJ45 (LAN) ports that support 10/100/1000 IS Ethernet connections – these can allow 'daisy-chaining' of units together.

Power (12V DC) is supplied to the module either locally or using Power over Ethernet (PoEx) from the LAN port - This requires the PoEx output to be wired to the Supply Input terminals by the user (-ET version only).

The compact and cost effective design makes it the ideal choice for many applications:

Petrochem

Process Monitoring & Control...

Mining

Underground Communication Links, PLC and Machine Monitoring…

Electrical connections are via cage-clamp and/or screw type plug/socket terminals along with RJ45 type connectors for the Ethernet LAN ports.

3 CONNECTIONS

3.1 DATA & POWER TERMINALS

Power + External IP Rated LEDs (CON1)

Pin	Function	Pin	Function
1	Power In +12V#	**2**	Power In 0V#
3	LAN1 PoEx +12V#	**4**	LAN1 PoEx 0V#
5	LAN2 PoEx +12V#	**6**	LAN2 PoEx 0V#
7		**8**	
9		**10**	
11	0V	**12**	0V
13	LAN1 LED	**14**	LAN2 LED
15	WLAN LED	**16**	
17		**18**	

#Connect LAN1 OR LAN2 PoEx terminals to Power In terminals to use this function
External IP66 rated LEDs wire down to 0V
Power Ui = 15.4V

3.2 LAN (RJ45) 10/100/1000 BASE-T Ethernet

Pin	10/100 Function	Gigabit Function
1	Tx +	BI_DA+
2	Tx-	BI_DA-
3	Rx +	BI_DB+
4	PoEx +12V*	BI_DC+
5	PoEx +12V*	BI_DC-
6	Rx-	BI_DB-
7	PoEx 0V*	BI_DD+
8	PoEx 0V*	BI_DD-

*Note - PoEx only on LAN1-2 ports when 10/100 (-ET version only)
PoEx not available on Gigabit ports

3.3 LED indicators

	OFF	FLASH	ON
PWR (green)	Power Fail	N/A	Power OK
WDG (green)	Fault	Green- Healthy (10Hz)	Fault
STAT (green)	Initialising or Fault	N/A	Healthy
RJ45 ACT (yellow)	Ethernet link disconnected	Ethernet link activity	Ethernet link connected
RJ45 1000 (green)	10/100Mbps	N/A	1000Mbps
WLAN ACT (blue)	No Link	Data	Linked
LAN1 – LAN2 EXT LED	Ethernet link disconnected	Ethernet link activity	Ethernet link connected
WLAN EXT LED	No Link	Data	Linked

4 ORDERING INFORMATION

Part Number	Description	Comments
9479-ETG-CSL	**Gigabit WLAN AP / Bridge**	**Standard**
9479-ET-CSL	WLAN AP / Bridge (10/100 PoEx)	Special Order (Subject to MOQ)

Note: 2x Antenna required (not included) these need to be ordered separately

Accessories

Part Number	Description
ANTSMA94	**Antenna SMA Plug, length 150mm Gain, 3dBi**
ANT94	**Antenna TNC Plug, length 150mm Gain, 3dBi**
ANT94RA	**Stubby Antenna TNC 90° Plug, length 80mm, Gain 2dBi**
CSL-RG316-SMA-1000	**SMA Bulkhead Socket ⇔ SMA Plug, length 1000mm RG316 Cable Assembly**
CSL-RG316-TNC-SMA-1000	**TNC Bulkhead Socket ⇔ SMA Plug, length 1000mm RG316 Cable Assembly**

5 DIMENSIONS

Width	42mm
Height	160mm
Depth	140mm
Weight	1500g
Mounting	Din Rail

6 ENVIRONMENTAL

Operating Temperature
-40°C…+70°C

Storage Temperature
-40°C…+70°C

Humidity
0…95% RH, non-condensing

Ingress Protection
Select enclosure to suit application, see certificates for information

7 WASTE REMOVAL INFORMATION

The electronic equipment within must not be treated as general waste. By ensuring that this product is disposed of correctly you will be helping to prevent potentially negative consequences for the environment and human health, which could otherwise be caused by incorrect waste handling of this product. For more detailed information about the take-back and recycling contact Controlled Systems Ltd

8 INSTALLATION

WARNING	**WARNING !** See Special Conditions of Safe Use in the folllowing section regarding ATEX, UKEX & IECEx & $MET_{C/US}$ Approval Information before installation

The 12V supply to the module connects via screw terminals 1 + 2 as shown above.

If the unit is being powered using Power over Ethernet (PoEx), it is required that you connect the relevant PoEx power terminals (Con1) to the main power supply pins (Con1), see connections section.

As the 9479 supports Auto MDI/MDI-X, a straight connected RJ45 Cat5e cable is used to connect to any device.

It is recommended that Cat5e cables for Hazardous Area Zone 1 use are 'Blue' in colour and are of good quality (see accessories section), the Safe Area cables being a colour other than blue to aid identification.

The operating parameters must not exceed those as detailed on the certificate.

This apparatus must only be installed or replaced by a competent person who must ensure that existing IS segregation is maintained.

NOTE: For North America, also see Control Drawing 947X-MET included at the end of this manual.

9 ATEX, UKEX & IECEx & $MET_{C/US}$ APPROVAL INFORMATION

The following information is in accordance with the Essential Health and Safety Requirements (Annex II) of the EU Directive 2014/34/EU [the ATEX Directive- safety of apparatus] and SI 2016 No.1107 [UKEX Statutory Requirements] and is provided for those locations where the ATEX Directive and/or UKEX requirements are applicable.

General

a) This equipment must only be installed, operated and maintained by competent personnel. Such personnel shall have undergone training, which included instruction on the various types of protection and installation practices, the relevant rules and regulations, and on the general principles of area classification. Appropriate refresher training shall be given on a regular basis. [See clause 4.2 of EN 60079-17].

b) This equipment has been designed to provide protection against all the relevant additional hazards referred to in Annex II of the directive, such as those in clause 1.2.7. This equipment has been designed to meet the requirements of intrinsically safe electrical apparatus in accordance with EN 60079-0 and EN 60079-11.

Installation

a) Reference to the IEC code of practice IEC 60079-14. In addition particular industries or end users may have specific requirements relating to the safety of their installations and these requirements should also be met. For the majority of installations the Directive 1999/92/EC [the ATEX Directive- safety of installations] is also applicable.

b) Unless already protected by design this equipment must be protected by a suitable enclosure against

   i) mechanical and thermal stresses in excess of those noted in the certification documentation and the product specification.

   ii) aggressive substances excessive dust moisture and other contaminants

c) This apparatus is intrinsically safe electrical apparatus and is normally mounted in a hazardous area.

Inspection and maintenance

a) Inspection and maintenance should be carried out in accordance with European, national and local regulations which may refer to the IEC standard IEC 60079-17. In addition specific industries or end users may have specific requirements which should also be met.

b) Access to the internal circuitry must not be made during operation.

Repair

This product cannot be repaired by the user and must be replaced with an equivalent certified product.

NOTE: For North America, also see Control Drawing 947X-MET included at the end of this manual.

Specific Conditions of Use (Special Conditions)

The following conditions relate to safe installation and/or use of the equipment.

8.1 For Group I, the modules shall each be mounted within an enclosure providing a degree of protection of at least IP54.
This shall be in accordance with EN 60529, and the modules installed in a manner that does not impair the existing creepage and clearance distances. The enclosure shall also comply with the appropriate requirements of Clauses 7.4.2 and 7.5, or 8.2 of EN 60079-0.

8.2 For Group II, the RJ45 connectors shall be fitted with either a plug or blanking plug.Alternatively, the module shall be mounted in an enclosure providing a degree of protection of at least IP20.
This shall be in accordance with EN 60529, and the modules installed in a manner that does not impair the existing creepage and clearance distances. The enclosure shall also comply with the appropriate requirements of Clauses 7.4.2 and 7.5, or 8.3 of EN 60079-0.

8.3 For Group III, the module shall be mounted inside a suitably certified enclosure which provides a minimum degree of protection of at least IP54. The module shall be installed in a manner that does not impair the existing creepage and clearance distances.

8.4 The supply to the modules must be derived from a suitably certified, intrinsically safe supply.

8.5 The values of Co and Lo shall apply when one of the two conditions below is given:

- The total Li of the external circuit (excluding the cable) is < 1% of the Lo value, or
- The total Ci of the external circuit (excluding the cable) is < 1% of the Co value.

The above parameters are reduced to 50% when both of the two conditions below are given:

- The total Li of the external circuit (excluding the cable) > 1% of the Lo, and
- The total Ci of the external circuit (excluding the cable) > 1% of the Co.

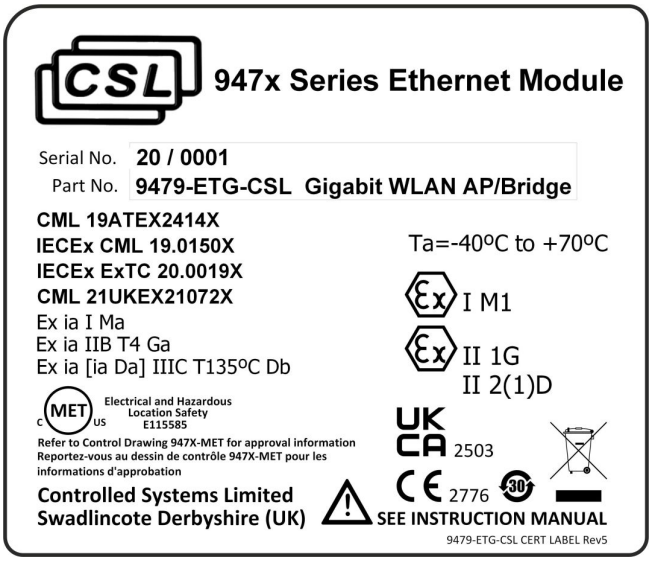
Note: the reduced capacitance of the external circuit (including cable) shall not be greater than 1μF for Group I and IIB/III and 600 nF for IIC.

8.6 The equipment shall be mounted on an earthed metal bracket or housing.

Marking

Each device is marked in accordance with the Directive/Statutory Requirements and CE and UKCA marked with the Notified/Approved Body Identification Number.

9479-ETG-CSL Product Label



10 Specification

Power supplies

12VDC IS Power Supply Input
PoEx™ (Power over IS Ethernet)
Typically 12V @ 300mA (Inrush < 200mA)
Ui =15.4V
9492-PS-PLUS recommended

Ethernet

Intrinsically Safe 10/100/1000Base-T

Connector

RJ45 (x2)

Cable Length

Up to 100m Cat5e

WLAN

TX Output – 802.11n

2.4GHz: 18 to 20.5 dBm
5GHz: 15 to 18 dBm
(per antenna output in 2T/2R mode)

RX Sensitivity – 802.11n

2.4GHz: -92 to -73 dBm
5GHz: -96 to -72 dBm

Data Rates

802.11n : up to 300Mbps (2T/2R)
802.11a/h : 6 to 54Mbps
802.11b : 1 to 11Mbps
802.11g : 1 to 54Mbps

Security – AP Mode

WEP, WPA-PSK, WPA2-PSK, WPA/WPA2,
SSID visibility status

Security – Client/Bridge Mode

WEP, WPA-PSK, WPA2-PSK, WPA/WPA2,
AES/TKIP/WEP by hardware encryption

ANTENNA CONNECTIONS

Connector (Top Port MAIN, Bottom Port AUX)

SMA (MAIN)
SMA (AUX)

11 APPROVALS

Location of Unit

Zone 1, IIBT4 hazardous area (9479-ETG)
Zone 1, IICT4 hazardous area (9479-ET)

Certification Code

Ex ia IIBT4 Ga (9479-ETG)
Ex ia IICT4 Ga (9479-ET)
Ex ia [ia Da] IIIC T135°C Db (non-mining)
Ex ia I Ma (M1 mining)
Ta =-40°C to +70°C

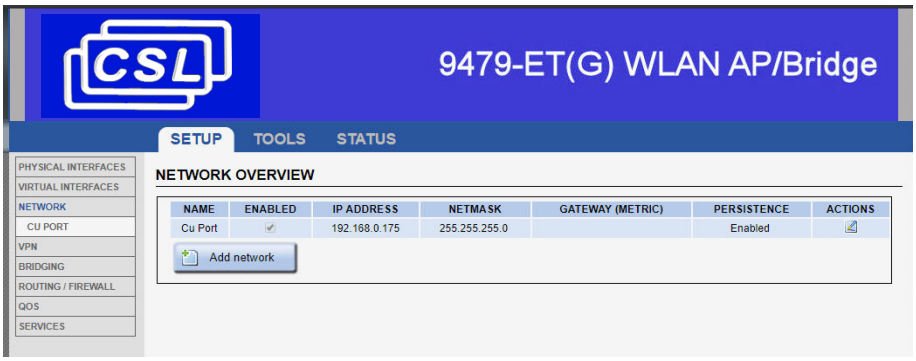
Certificate numbers

ATEX (CML 19ATEX2414X)
IECEx (IECEx CML 19.0150X)
QLD (IECEx ExTC 20.0019X)
UKEX (CML 21UKEX21072X)

See certificates for further information

12 Network Setup

To begin configuring the unit, the Default IP Address is 192.168.1.253



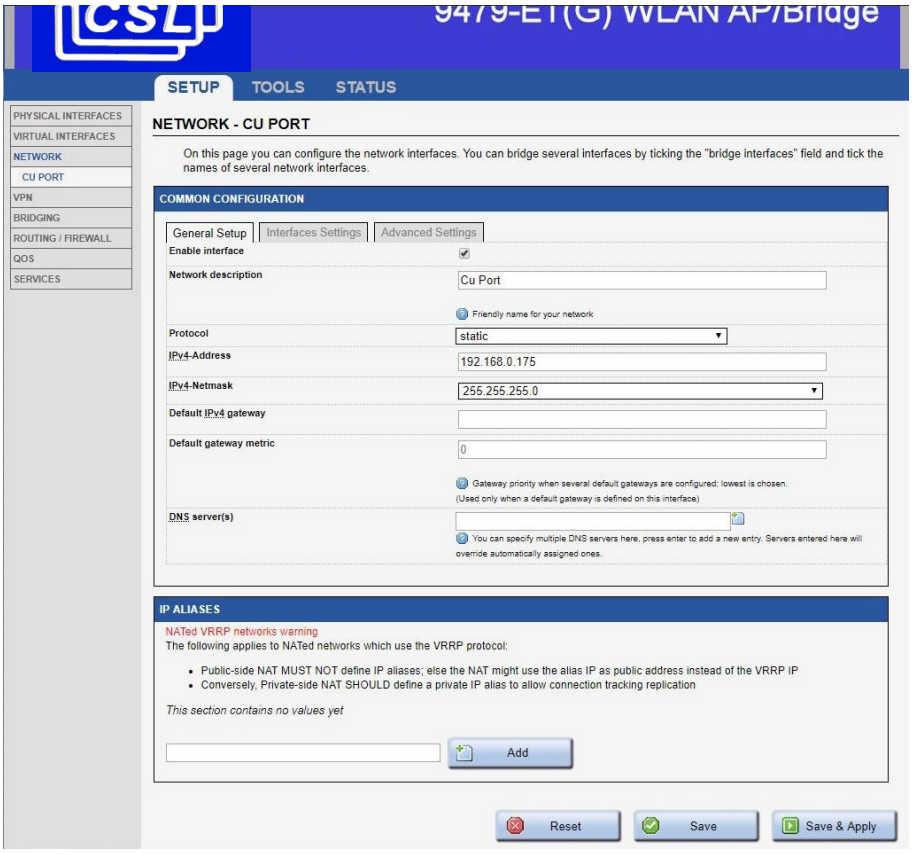
This page displays the current network configuration.

Click the **ADD NETWORK** button to create a new IP network.

Click the **REMOVE** button under the 'action' heading to remove the selected network.

Click the **EDIT** button under the 'action' heading to open the network configuration page.

12.1 Network Configuration



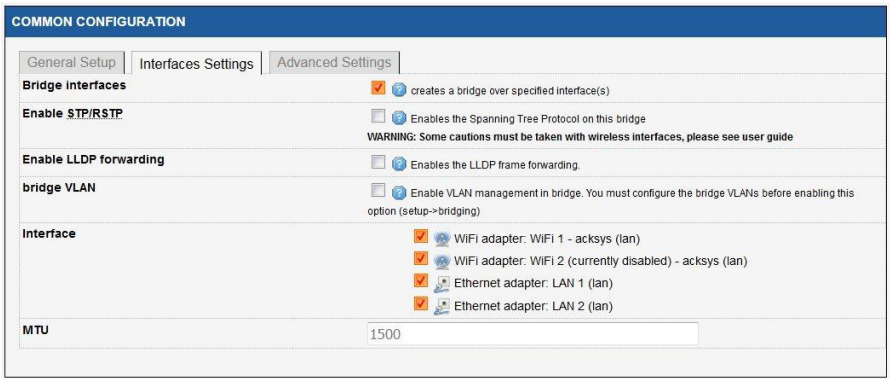
Once you have clicked the EDIT button, you will see the network configuration page, here you can set all the information about your network.

General Setup:

Enable Interface: Tick this box to enable the selected network interface.
Network Description: This entry is to provide an identification to your network
Protocol: Choose DHCP if you have a DHCP server in the network and you want to assign an IP address to the AP. Choose Static if you do not have a DHCP server in the network or if you need a fixed address to the interface.
***Note** – You cannot choose DHCP if you have enabled the DHCP server option on the DHCP page; the AP cannot be both a DHCP client and a DHCP server.
IPv4 Address: Only available in static mode. The IP address of the AP on the local network. Assign any unused IP address in the range of IP addresses available for the LAN
IPv4 Netmask: The subnet mask of the LAN
Default IPv4 gateway: The IP address of the router on the local area network.
DNS Server(s): The IP addresses of the DNS server(s) you want to use.

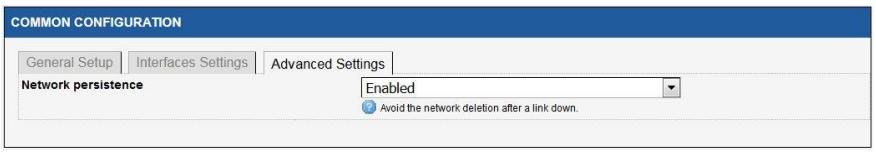
If you selected the DHCP protocol, you can choose to use the value defined in the menu TOOLS/System, or you can define a new HOSTNAME, specific to this network.

Interfaces Setting:



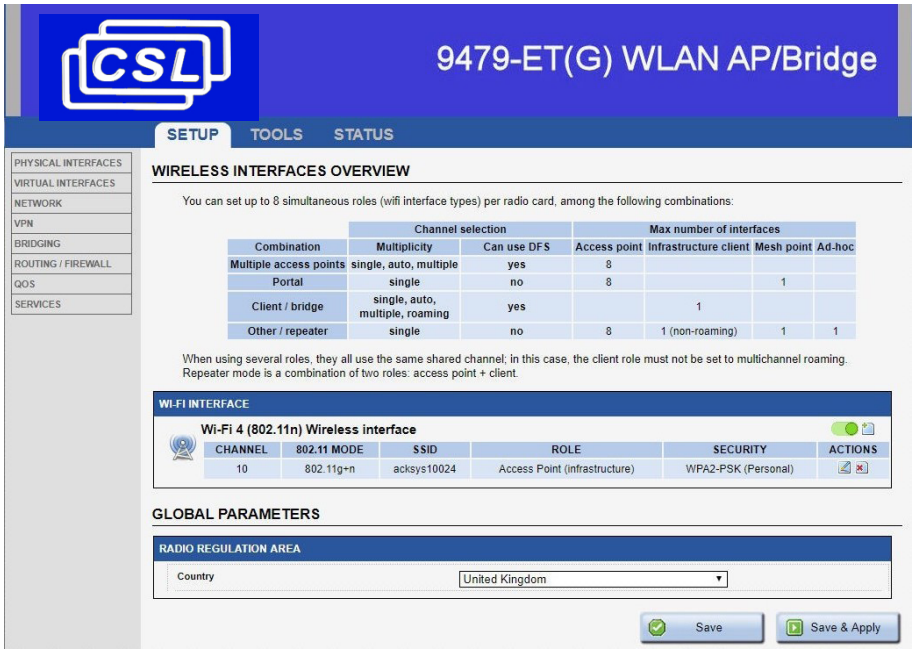
Bridge Interfaces: If checked, all interfaces in this network are linking with the software equivalent of an Ethernet switch.
Enable STP/RSTP: If checked the STP/RSTP will be activated on this bridge. If you choose to not use STP/RSTP, you have to set up your devices to avoid network loops, by yourself.
Enable LLDP Forwarding: Check this box if the internal bridge must forward the LLDP multicast frame.
Bridge VLAN: Enable VLAN management in the bridge.
Interface: This is the list of available network interfaces. Disabled (greyed) interfaces are already used in another network. For Bridge networks, select all the interfaces you want to bridge together in to the LAN being configured. For simple networks, select the one interface to configure.

Advanced Settings:

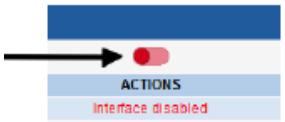


Network Persistence: When this option is enabled, the IP setting (routes, gateway, virtual interfaces) remains persistent when the physical interface loses its connection. Default value is enabled for static IP, and disabled for DHCP.

13 Wi-Fi Setup



This page allows the user to configure the wireless network settings, by default the radio will be disabled and you will need to turn in on.



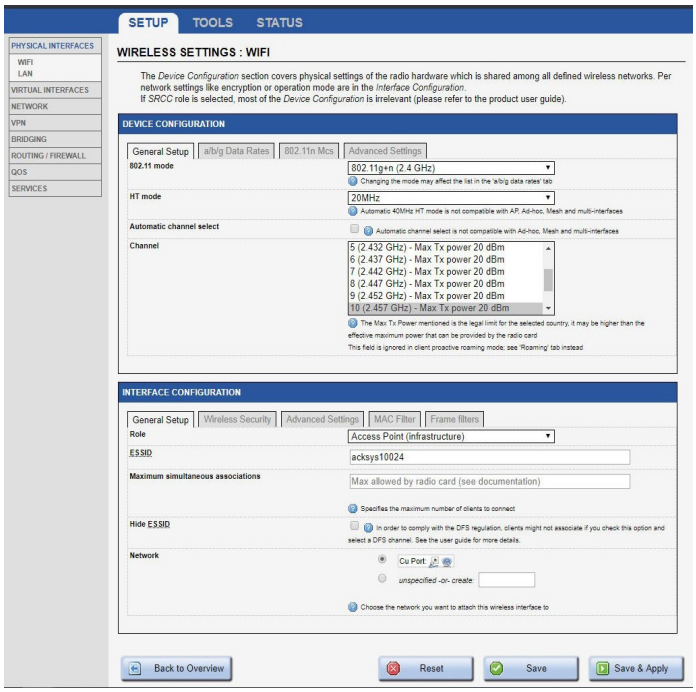
Country: The regulation rules of the selected country will determine the channels and transmission powers you can use. Additionally, in the client role, the product will use the country provided by the AP in its beacons.

Under the 'actions' heading, you can click the buttons 'EDIT' and 'REMOVE'.

Click REMOVE to remove the selected SSID.

Click EDIT to open the radio windows and edit this SSID's Properties.

Device Configuration:



General Setup:

This selection gathers all the settings that are common to each SSID you may create on this radio.

Enable Device: If this box is checked, the radio card is enabled and is able to communicate. Uncheck it to disable the radio.

802.11 Mode:

The 802.11g+n mode operates in the 2.4GHz band and is compatible with 802.11g and 802.11n devices.

The 802.11a+n mode operates in the 5GHz band and is compatible with 802.11a/h and 802.11n devices.

The 802.11ac+n mode operates in the 5GHz band and is compatible with 802.11ac, 802.11a/h and 802.11n devices.

*Note – A unit configured in 802.11ac+n/802.11a+n cannot communicate with another one configured in 802.11g+n mode because they are using different frequency ranges.

HT (high throughput) mode: In HT mode, you can aggregate adjacent channels (2 in 802.11n, 2 or 4 in 802.11ac) in order to increase bandwidth. One of the channels is the one selected in the channel section (see below). The second one may be the one directly below or directly above. If you choose 20MHz, only one channel will be used at a time.

Automatic channel select (ACS): Depending on the unit role, the channel can be selected automatically;

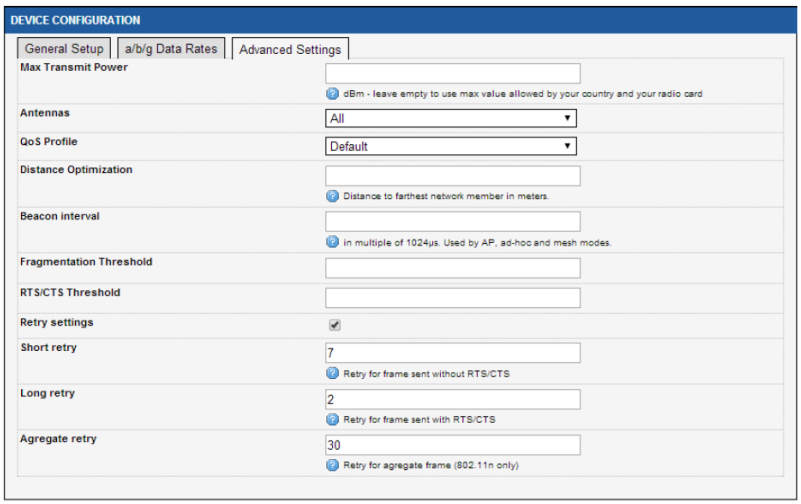
AP Role: At start up, the AP will select the channel among all the ones allowed in your country. In order to limit the choice to specific channels, do not check ACS, but use the channels multi-selection box instead.

Client Role: The client will scan all channels allowed in your country. In order to limit the channel scan list, do not check ACS, but use the channels multi-selection box instead. If the client is set in roaming mode, this channel list is superseded by the one in the roaming tab.

Other Roles: The other roles, (mesh portal, ad-hoc) support only one channel, this parameter is not available and you must select a channel in the dropdown box.

Channel: According the selected 802.11 mode and the regulation rules of the selected country, a list of channels is available for selection. This is not used for infrastructure client modes, as they use all the allowed channels for scanning.
In some cases, a single radio card can handle multiple Wi-Fi roles simultaneously. In this case and 'client' function must be set to only scan the common channel.
You can select several channels so that the AP will select the cleanest one and will be able to switch to another if a radar is detected on the current one. To select multiple channels, use Ctrl + click.

Advanced Settings



Max Transmit Power: The transmit power is normally set automatically based on the regulation rules for the given channel and the capabilities of the radio card. This option sets an upper bound on the transmit power. The transmit power is distributed between the configured antennas.

Antennas: NOTE: Improved RX signal strength and full TX power is achieved only buy using two antennas and selecting "All" for this option. Both are also required for 802.11n MIMO mode. For single antenna use select "Only #1" and connect the antenna to the AUX socket, however performance will be reduced with a single antenna.

Qos Profile: This option allows choosing between the two Qos profiles.

Distance optimization: Use this option if your link covers a long distance, it will update the internal timeouts.

Beacon interval: This option allows configuring the interval between two beacon frames.

Fragmentation threshold: This option configures the maximum 802.11 frame size in 802.11a/b/g mode in bytes. Frames that exceed this threshold are fragmented.

RTS/CTS threshold: The Wi-Fi standard uses the RTS/CTS protocol to avoid collision in the air; this option defines the size of the frames subject to this protection. Use RTS/CTS when you have interference on your channel or a poor performance on the Wi-Fi.

Retry settings: Unicast data frames are normally acknowledged. If the transmitter does not receive the acknowledgment, it must resend the frame. In 802.11n mode, several frames can be aggregated into one big frame called an A-MPDU. Independent frames are acknowledged by an individual ACK frame, while A-MPDU frames are acknowledged by a single 'Block acknowledge' frame containing one acknowledgment for each subframe in the A-MPDU. When you check this option, you can set the number of retries.

Short Retry: This is the number of retries for a physical data frame.
Long Retry: This is the number of retries for a physical data frame sent with the RTS/CTS protocol
Aggregate Retry: This option configures the number of retries for a frame aggregated into an A-MPDU.

Interface Configuration:

This section is duplicated for each SSID; settings only apply to the selected SSID.

General setup:

Role: The unit has the following supported roles;

- Access Point
- Isolating access point
- Client (connecting at an access point)
- Mesh 802.11s
- Point to multipoint station (ad-hoc)
- SRCC

ESSID: This is the Wireless network name.

Maximum association: Specifies the maximum number of clients allowed to connect on the Access Point.

Hide ESSID: This option allows you to not broadcast the SSID on the network. This means that your clients will need to know the SSID beforehand, since scanning will not real this SSID on the AP.

Network: This option allows selecting the network where the interface is added.

Mesh ID (only in mess mode): This option replaces the ESSID when the Mesh mode is selected.

General setup client mode:

Multiple ESSIDs: When this is checked, a multi-selection field, (Wireless network nicknames), replaces the single ESSID field. You can select several SSIDs with their security parameters and the client will associate to any AP advertising one of the combination. In case several matching APs are in range, you can prioritize the SSIDs.

When using multiple ESSIDs, the roaming features are not available; the security is defined together with the corresponding ESSID in a separate menu.

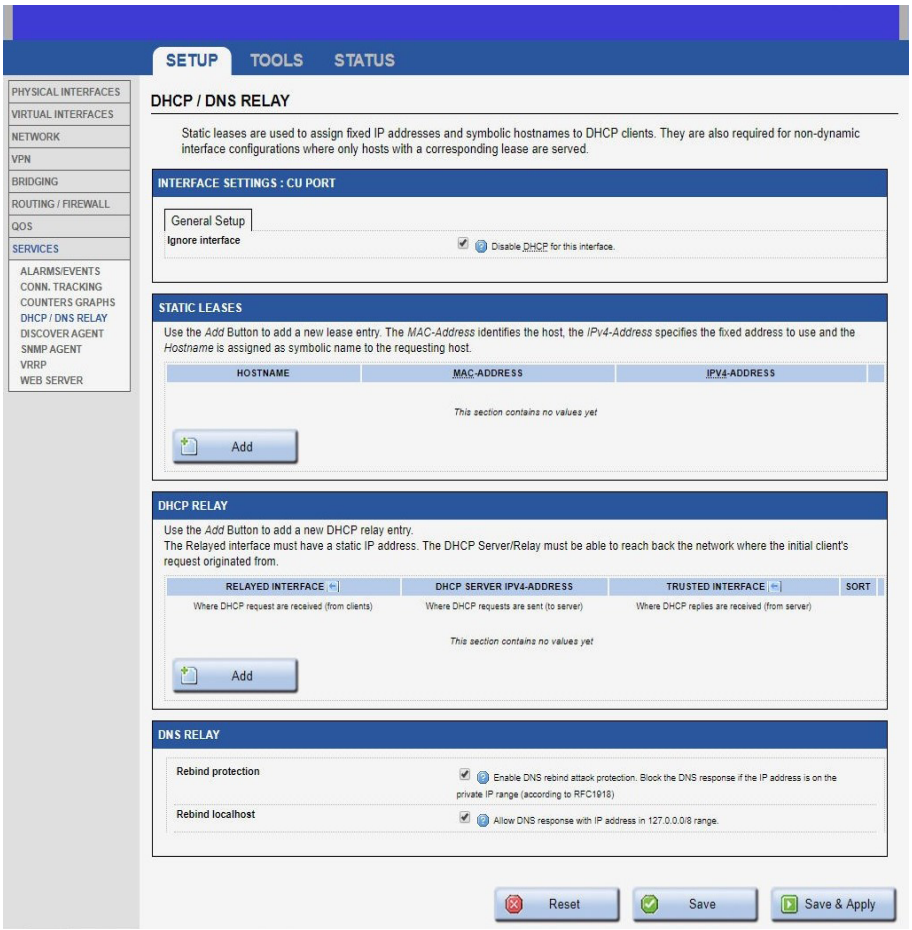
Wireless Security:

This menu allows you to choose the type of wireless security you want to apply on this SSID. The different security schemes are;

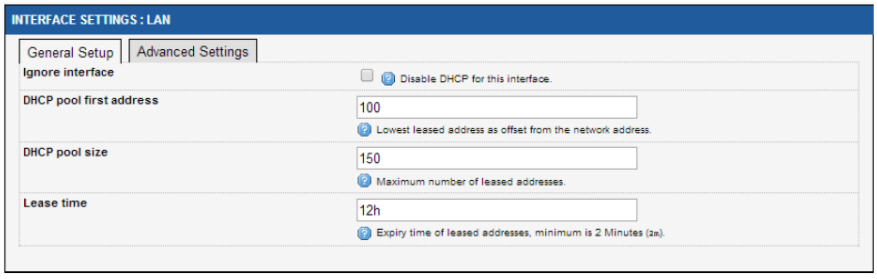
- No Encryption
- WEP Open System
- WEP Shared Key
- WPA-PSK
- WPA2-PSK
- WPA-PSK/WPA2-PSK Mixed Mode
- WPA-EAP
- WPA2-EAP
- WPA-LEAP
- WPA2-LEAP

Depending on which security option you choose, a range of options will appear that you must configure.

14 DHCP Server



General Setup:



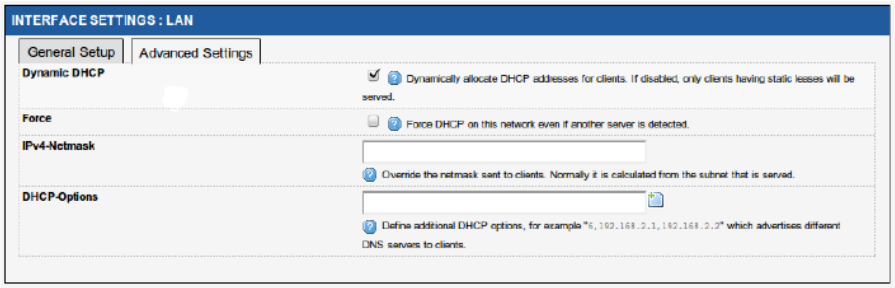
Ignore interface: If checked, the DHCP server will be disabled on the selected interface.

DHCP pool first address (if enabled): First IP Address of the DHCP pool. This is interpreted as an offset relative to network address.

DHCP pool size (if enabled): Maximum number of leased addresses.

Lease time (if enabled): This represents the time during which a given IP Address remains valid. After that time, the client needs to renew his lease.

Advanced Settings



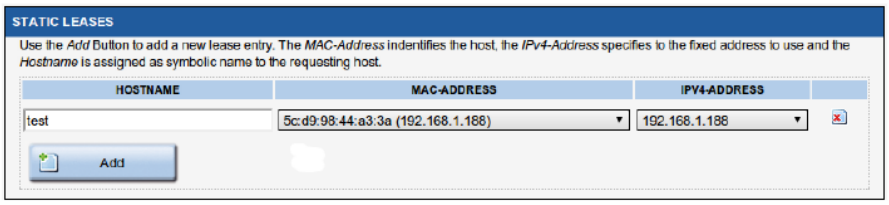
Dynamic DHCP: If unchecked, only static leases will be authorized.

Force: By default, the DHCP service doesn't start if it detects the presence of another DHCP server on the network. If this option is checked, the DHCP server wont check for another server before start.

IPv4 Netmask: This option override the default netmask value sent to DHCP clients.

DHCP Options: This field allows you to enter an additional DHCP option (enclosed into quotes). Syntax depends on the option itself.

Static Lease:



This option allows to always give the same predefined IP Address according to the MAC address.

15 System Status

15.1 Device information

The Device Information page allows a quick overview of the unit's useful information and the currently installed firmware information.

15.2 Network Interfaces

This Page shows a summary of the currently configured network interfaces and displays the transmitted and received packets.

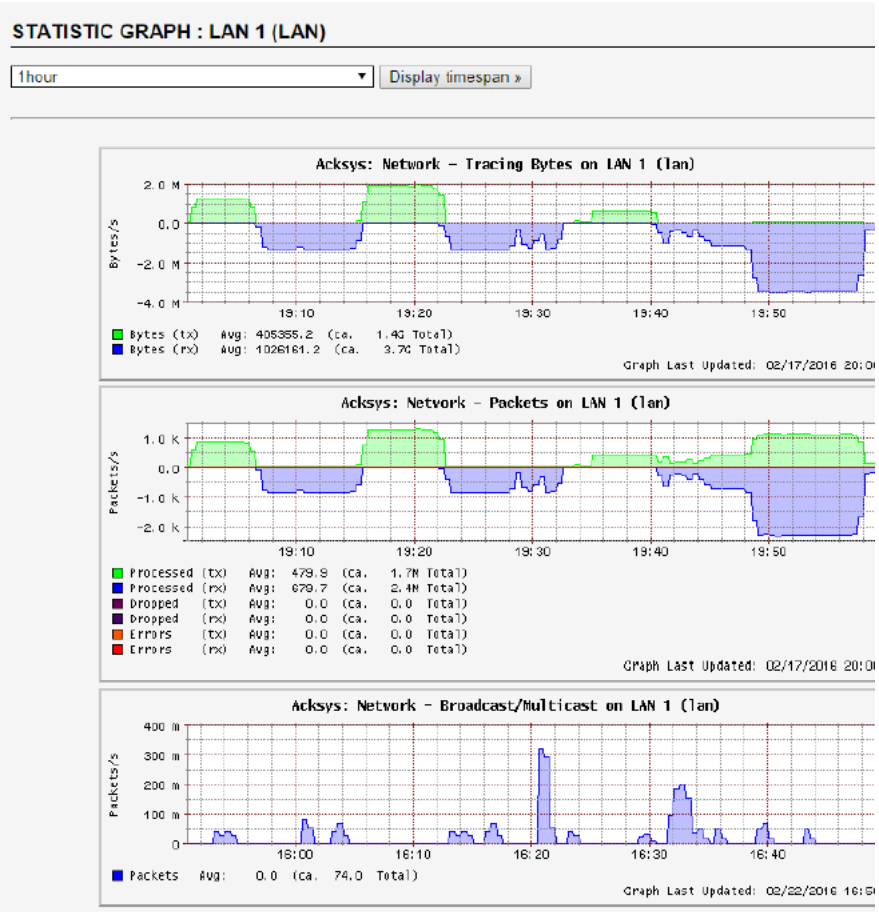
GRAPH	PHYSICAL INTERFACE
	LAN
	WiFi

Pressing the Graph button will present a history graph of the selected interface, the following information will be available;

Tracing Bytes graph: Displays the number of bytes of transmission and reception on the interface

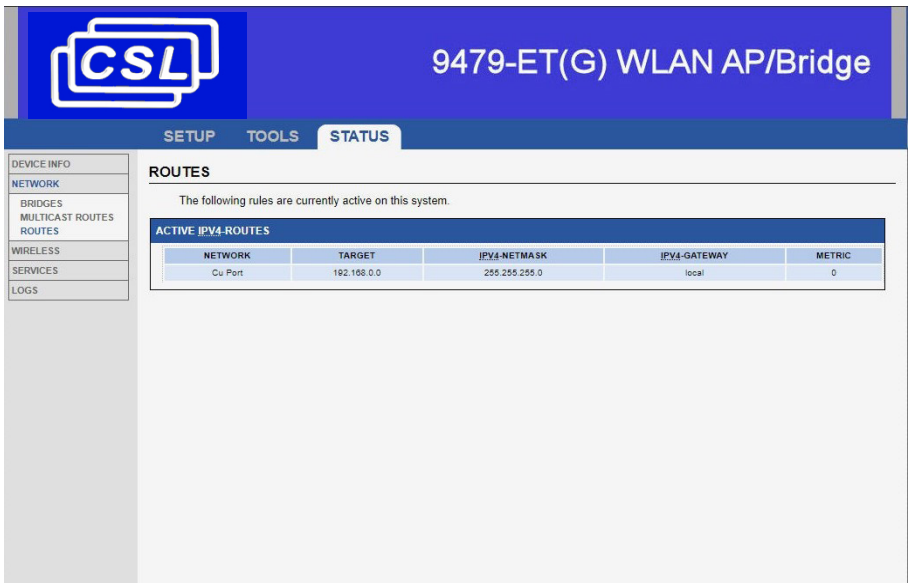
Packets graph: Displays the number of processed, dropped and error packets of transmission and reception on the interface

Broadcast/Multicast graph: Displays the number of Broadcast/ Multicast Packets on the interface

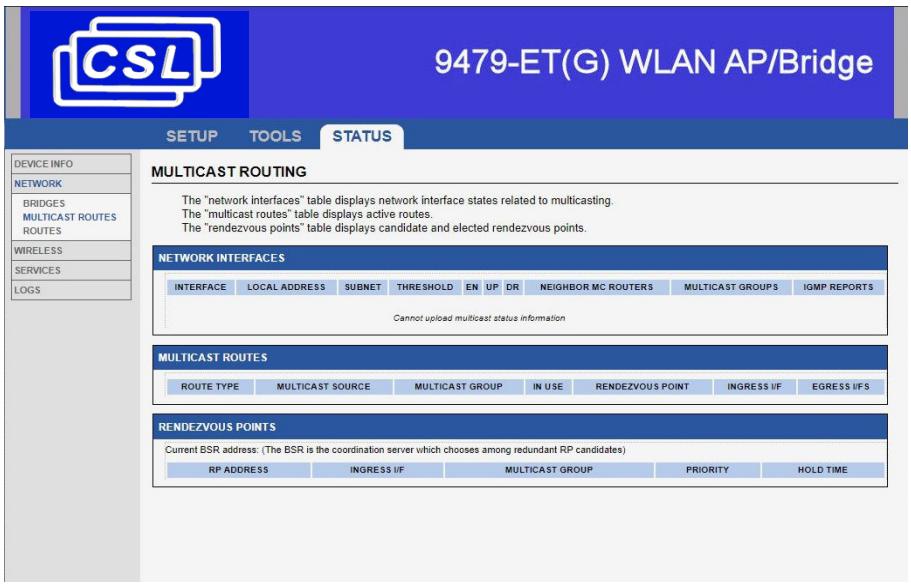


You can also configure the display duration to the following; 10 minutes, 1 hour, 1 day, 1 week and 1 month.

16 Routes



This Page shows all of the active IPV4 Routes on the unit.



This page displays all the available information about the running instance of the PIM multicast router.

Network interface:

Interface: The Network number referred to in the ingress/egress columns.

Local Address: Unicast IP address assigned to the network in the setup/Network Page

Subnet: The subnet that this interface connects to and the number of subnet bits.

Threshold: Minimum TTL required to forward data to this interface.

EN: Multicasting is enabled on this interface.

UP: This interface is available (e.g the RJ45 connector is plugged in)

DR: This router is designated for this network.

Neighbour MC Router: Other PIM routers directly connected to this network.

Multicast Groups: PIM-SSM groups handled on this interface.

IGMP reports: list of groups for which receivers send join request on this local network.

Multicast routes section:

Route type: (*,G) for any source to group, (S,G) for specific source to group.

Multicast source: Source requested by the receiver: any or a specific IP Address.

Multicast group: The group concerned by the route entry.

In Use: This entry is actively used to forward date.

Rendezvous Point: The IP Address that was computed for the group.

Ingress I/F: Interface where the multicast data is expected to arrive.

Egress I/F: Interface list where the multicast data must be forwarded.

Rendezvous Point:

RP Address: The IP Address of the rendezvous point for this block of groups

Ingress I/F: Interface toward the RP, where data comes in.

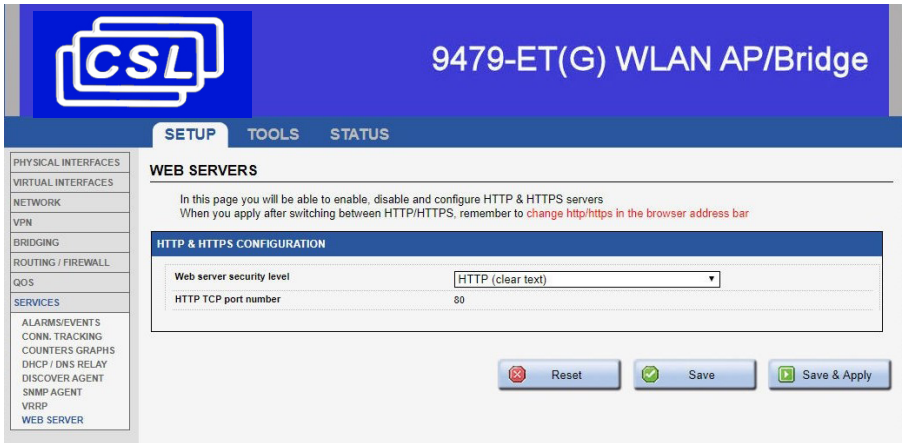
Multicast Group: The block of groups associated to this RP.

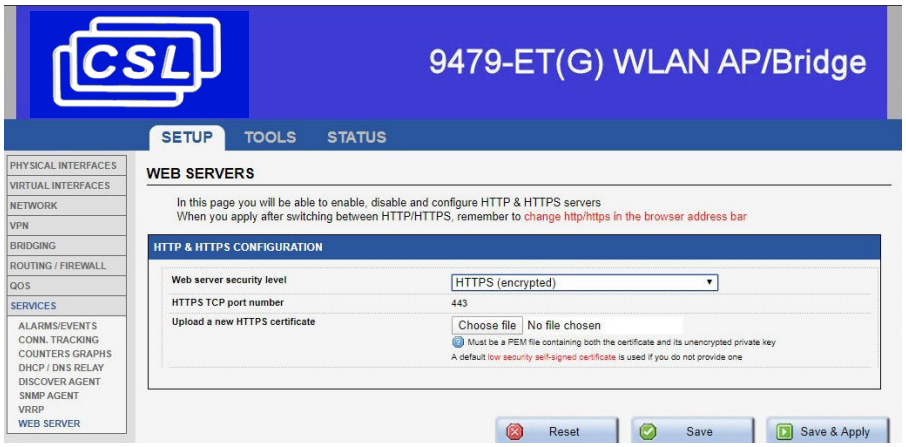
Priority: Priority of the RP for elections. Locally configured groups have a priority of 1.

Hold Time: The delay after which this entry will become invalid if not refreshed in the meantime.

*Note – There will always be an entry for the IP Address 169.254.0.1, which is used internally to manage the SSM Routing.

17 HTTP/HTTPS

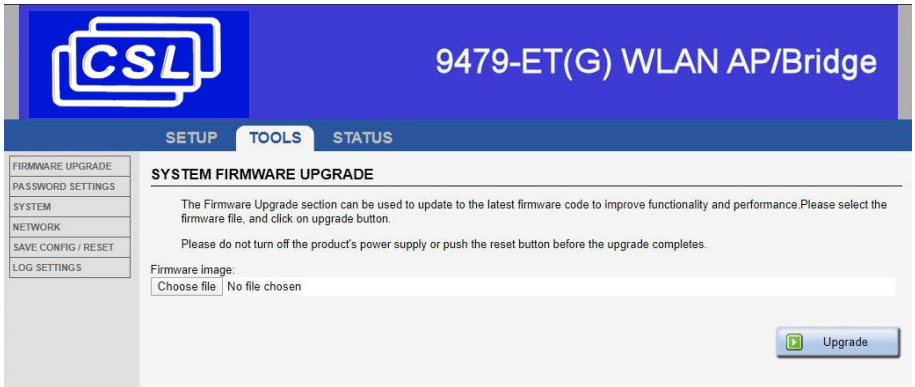




These pages allow you to configure whether the web pages use HTTP or HTTPS. HTTPS offers a more secure encrypted option. If you choose to use HTTPS, you can upload a web certificate file. If you choose not to, it will default to a low security self-signed certificate but this may not be accepted by all browers

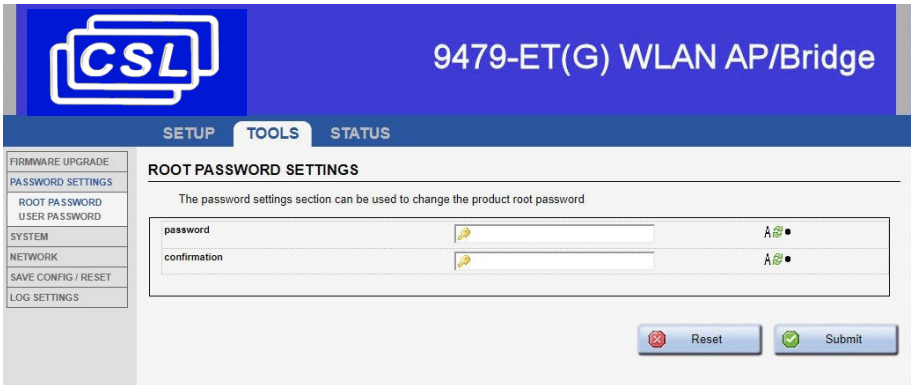
We strongly recommend the use of HTTPS so that the data between browser and 9479 is encrypted

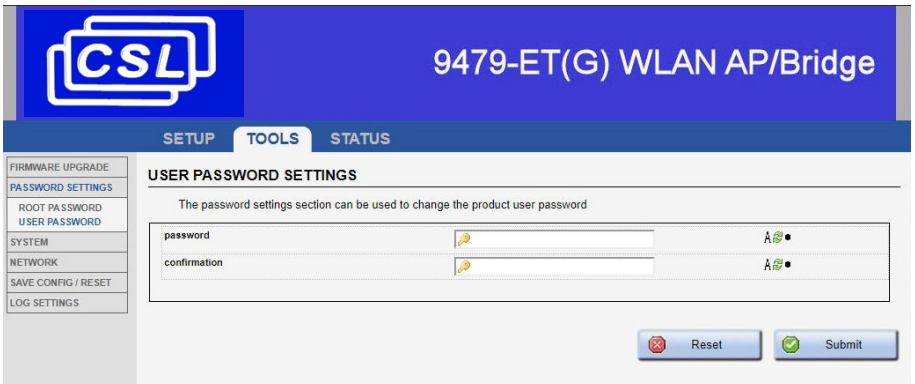
18 Firmware



This page allows you to upgrade the firmware in the unit. All previous configuration changes will be left unchanged.

19 Password



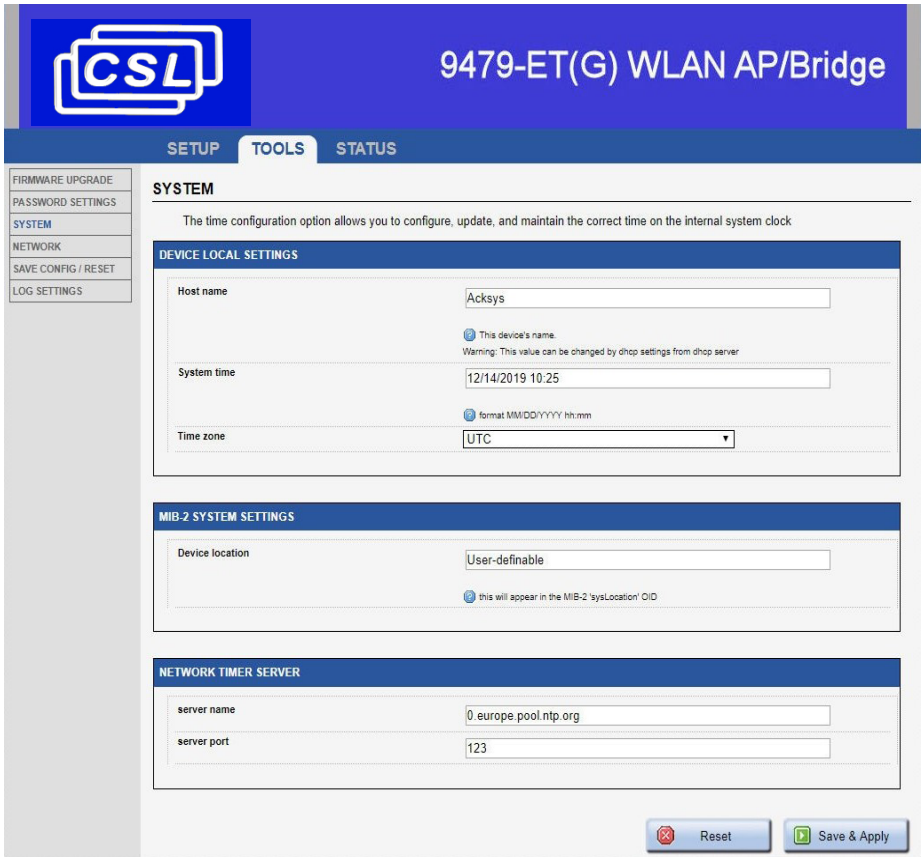


These Pages allow you to change the Password on both the Root and the user accounts.

On initial power up, both passwords are set empty, this will allow you to enter the unit and configure the unit, as you require.

It is recommended that a strong password be set to prevent unauthorised access

20 System



Host Name: This is a user definable Host Name for the device.

System Time: This is the current system time. Local time is lost on a reboot, use an NTP server if required

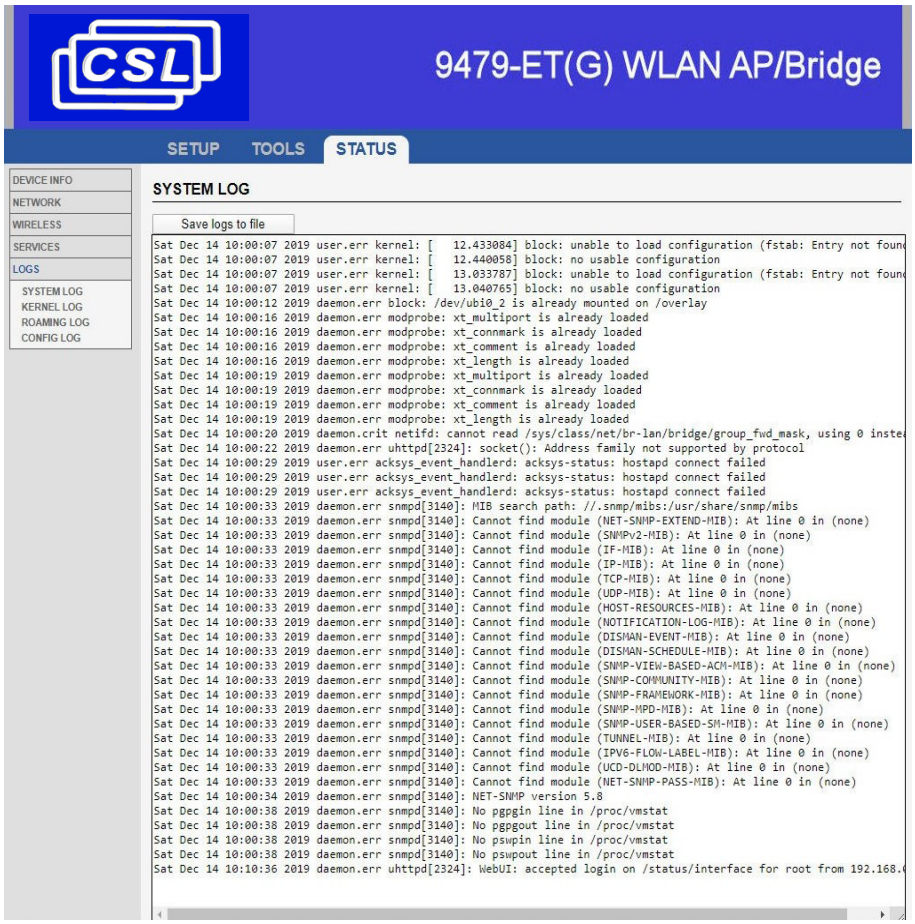
Time Zone: This allows you to set the time zone you are in.

Device Location: This is a user definable device location field.

Server name: If there is a NTP server reachable on the network, the unit can use it to configure its local time. You can use either an IP Address or the domain name, but the domain name requires configuring one or more DNS server addresses.

Server Port: This entry is for the port number of the NTP Server

21 System Log

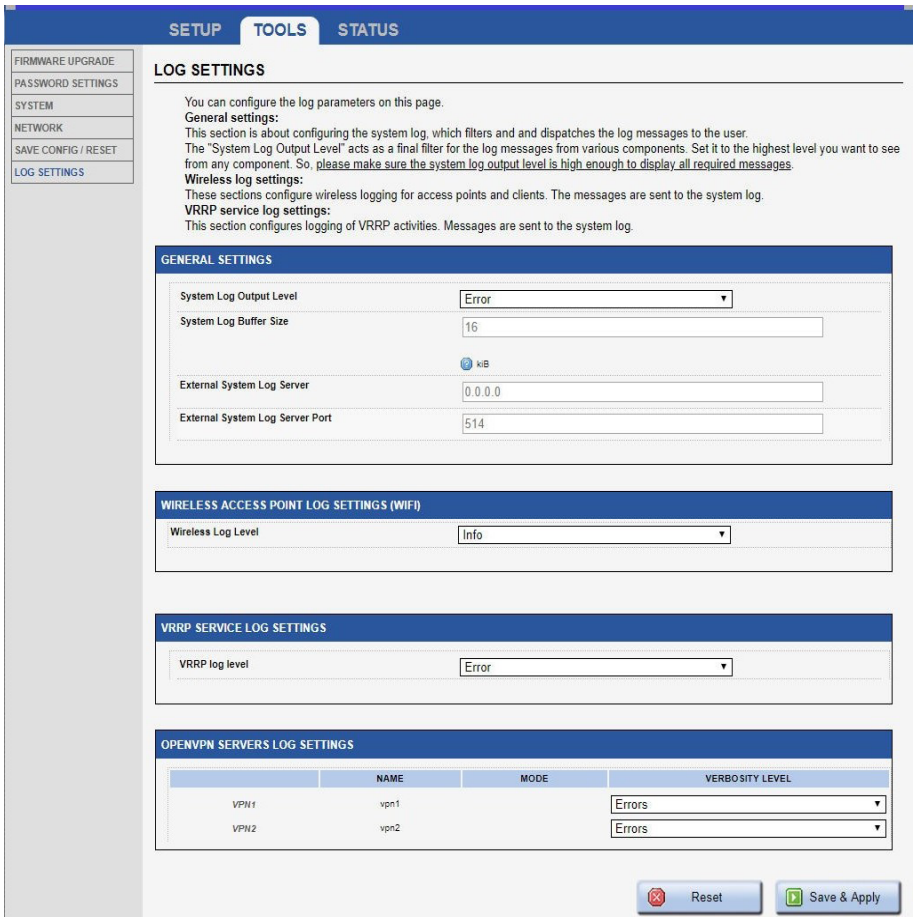


This panel allows for the visualization of the units logs.

Config Log: This log displays a summary of the units configuration

Kernal Log: This log displays messages from the Linux kernel only.

System Log: This log displays messages from both the kernel and from the running services. The messages in this log are limited to the importance levels configured in the Log Settings page.



This is the log settings page, it allows you to configure the system logs.

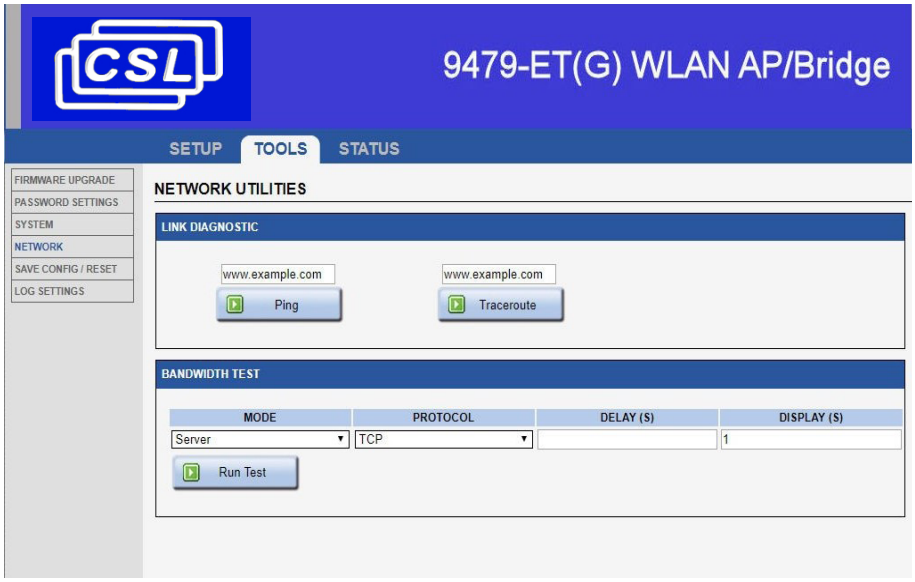
Systems Log Out Level: This sets the minimum level of a message to allow its insertion in the system log.

External System Log server and port: Optional remote log server configuration. IP Address and UDP port where the log messages will be sent using the syslog protocol. Leave empty to disable.

Log Settings: These sections are used to configure logging for various services, the messages are sent to the system log if their seriousness is above the configured level.

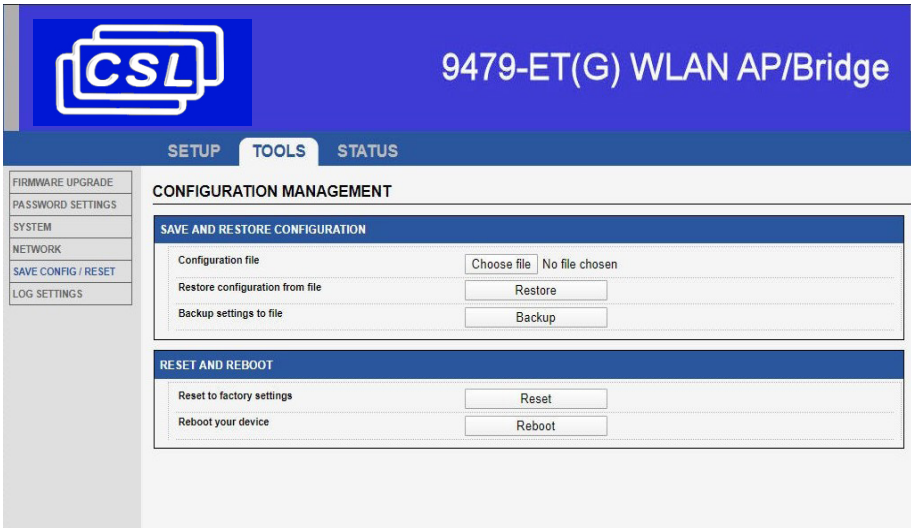
The messages go through two rounds of filtering: once in the specific service and one in the syslog service. Please make sure the system log output level is high enough to display all required messages.

22 Network Utilities



This panel provides two standard UNIX tools: ping and traceroute. Place the argument in the text field above the corresponding button and then click the button. The results will be displayed in a frame below.

23 Save Config / Reset



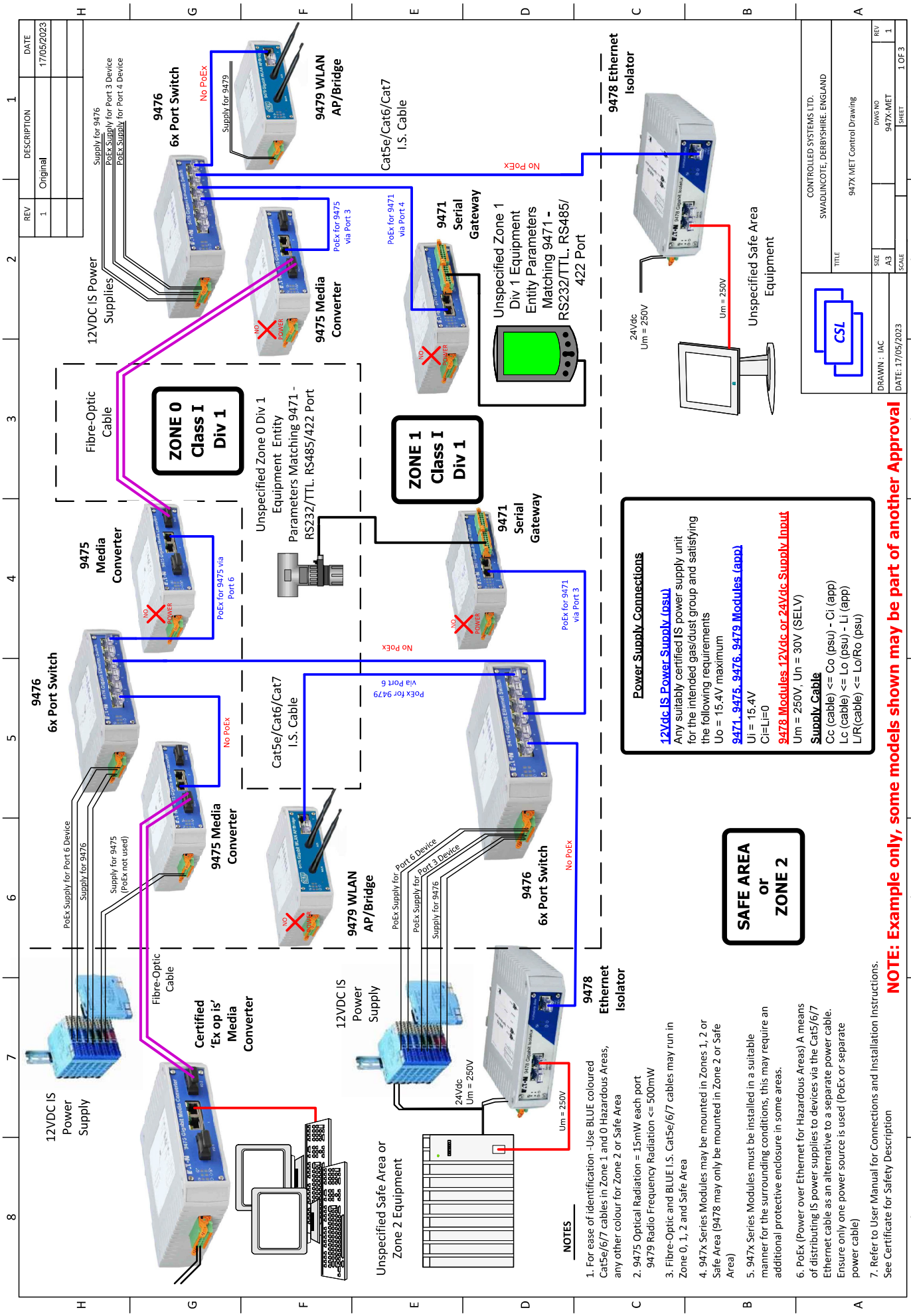
The Save and restore configuration section allows you to backup the units current settings to a file. You are then able to restore the previously saved file, back into the unit. This will load up all of its previous settings

Reset: Clicking this button will restore its factory default settings. There is also a hardware push button that can be accessed through the small hole in front panel near the LEDs, its operation is as follows -

Short push, anytime (Reboot)
Long push (>2secs)
- while operating (Restore factory defaults)
- while in Emergency Upgrade mode (Restore factory settings)
- at startup (Enter Emergency Upgrade mode)

Reboot: Click this button to reboot the unit

24 APPENDIX A 947X-MET CONTROL DRAWING



9471-ET(G) : Serial Gateway

12Vdc POWER IN (CON1, Pin 1 wrt Pin 2 (0V))

Group	Ui	Ci	Li
IIC/IIIC IIB/IIIB IIA/IIIA I	15.4Vdc	0	0

PoEx OUT (CON1, Pin 3 wrt Pin 4 (0V) OR Pin 5 wrt Pin 6 (0V))

Group	Uo	Co	Lo
IIC/IIIC IIB/IIIB IIA/IIIA I	Same as power supply connected to LAN1 or LAN2 PoEx connections	Same as power supply connected to LAN1 or LAN2 PoEx connections minus 0.48µF internal capacitance	Same as power supply connected to LAN1 or LAN2 PoEx connections

Note: PoEx OUT (CON1 pins 3+4 OR pins 5+6) may be linked to 12Vdc POWER IN (CON1 pins 1+2) when power is via the LAN1 or LAN2 port

RS485/RS422 COMMS (CON3, Pin1 to 4 and 9 to 12 wrt Pin 6,8,14,16 (0V) – Ports 1 and 2),
RS485/RS422 COMMS (CON4, Pin1 to 4 and 9 to 12 wrt Pin 6,8,14,16 (0V) – Ports 3 and 4)
(Values shown are for each pair)

Group	Ui	Uo	Io	Po	Ci	Li
IIC/IIIC IIB/IIIB IIA/IIIA I	7.2V	6.88V	77mA	11.1mW	0	0

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the load connected to the output terminals must not exceed the following values:

Group	Capacitance (µF)	Inductance (mH)	or	L/R Ratio (µH/Ohm)
IIC	43	6.0		314
IIB/III	1000	24.0		1256
IIA	1000	48.0		2513
I	1000	78.7		4123

The above figures are based on the output parameters only and may need to be recalculated based on the input parameters.

RS232/TTL COMMS (CON3, Pin 5, 13 (TX) wrt Pin 6,8,14,16 (0V) – Ports 1 and 2)
RS232/TTL COMMS (CON4, Pin 5,13 (TX) wrt Pin 6,8,14,16 (0V) Ports 3 and 4)

Group	Ui	Uo	Io	Po	Ci	Li
IIC/IIIC IIB/IIIB IIA/IIIA I	12.8V	5.88V	6mA	8mW	0	0

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the load connected to the output terminals must not exceed the following values:

Group	Capacitance (µF)	Inductance (mH)	or	L/R Ratio (µH/Ohm)
IIC	43	685		4051
IIB/III	1000	3661		15186
IIA	1000	7301		30230
I	1000	12963		52810

RS232/TTL COMMS (CON3, Pin 7, 15 (RX) wrt Pin 6,8,14,16 (0V) –Ports 1 and 2)
RS232/TTL COMMS (CON4, Pin 7, 15 (RX) wrt Pin 6,8,14,16 (0V) – Ports 3 and 4)

Group	Ui	Uo	Io	Po	Ci	Li
IIC/IIIC IIB/IIIB IIA/IIIA I	12.8V	5.18V	6mA	8mW	0	0

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the load connected to the output terminals must not exceed the following values:

Group	Capacitance (µF)	Inductance (mH)	or	L/R Ratio (µH/Ohm)
IIC	1000	685		4051
IIB/III	1000	3661		15186
IIA	1000	7301		30230
I	1000	12963		52810

The above figures are based on the output parameters only and may need to be recalculated based on the input parameters.

EXTERNAL LEDS (CON1, Pin13 to 18 wrt Pin 11,12 (0V))
(Values shown are for each output)

Group	Ui	Uo	Io	Po	Ci	Li
IIC/IIIC IIB/IIIB IIA/IIIA I	5.88V	5.88V	52mA	76mW	0	0

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the load connected to the output terminals must not exceed the following values:

Group	Capacitance (µF)	Inductance (mH)	or	L/R Ratio (µH/Ohm)
I	1000	172		6105
IIA	1000	105		3721
IIB/III	1000	62		2198
IIC	43	13		460

LAN Port 1 or LAN Port 2 (10/100 and Gigabit 10/100/1000 Ethernet) (SK1/SK2 – RJ45)
(Values for all pins combined)

Group	Ui	Uo	Io	Ci	Li
IIC/IIIC IIB/IIIB IIA/IIIA I	15.4V	5.88V	2.18A (10/100) or 4.36A (Gigabit)	0.48µF	0

Note 1. Io = 2.18A is the total for the four Ethernet lines (each line 545mA). 4.36A is the total for the eight Ethernet lines (Gigabit 10/100/1000 Ethernet versions)

Note 2. Ci = 0.48uF is given as worse case (8 line) Gigabit 10/100/1000 Ethernet

Note 3. Gigabit 10/100/1000 Ethernet versions are not suitable for Gas Group IIC

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the load connected to the output terminals must not exceed the following values:

10/100 Ethernet Ports

Group	Capacitance (µF)	Inductance (µH)	or	L/R Ratio (µH/Ohm)
IIC	43	7.5		11
IIB/III	1000	29.9		44
IIA	1000	59.9		89
I	1000	98.2		146

Gigabit 10/100/1000 Ethernet Ports

Group	Capacitance (µF)	Inductance (µH)	or	L/R Ratio (µH/Ohm)
IIB/III	1000	7.5		22
IIA	1000	15.0		44
I	1000	24.5		73

If PoEx is used, then the parameters of the PoEx power supply must also be considered
(The above capacitance figures are based on 5.88V)

The 10/100 or 10/100/1000 (gigabit) Ethernet ports may be connected to any other equipment having appropriate Entity parameters.

9475-ET(G) : Media Converter

12Vdc POWER IN (CON1, Pin 1 wrt Pin 2 (0V))

Group	Ui	Ci	Li
IIC/IIIC IIB/IIIB IIA/IIIA I	15.4Vdc	0	0

PoEx OUT (CON1, Pin 3 wrt Pin 4 (0V) OR Pin 5 wrt Pin 6 (0V))

Group	Uo	Co	Lo
IIC/IIIC IIB/IIIB IIA/IIIA I	Same as power supply connected to LAN1 or LAN2 PoEx connections	Same as power supply connected to LAN1 or LAN2 PoEx connections minus 0.48µF internal capacitance	Same as power supply connected to LAN1 or LAN2 PoEx connections

Note: PoEx OUT (CON1 pins 3+4 OR pins 5+6) may be linked to 12Vdc POWER IN (CON1 pins 1+2) when power is via the LAN1 or LAN2 port.

EXTERNAL LEDS (CON1, Pin13 to 18 wrt Pin 11,12 (0V))
(Values shown are for each output)

Group	Ui	Uo	Io	Po	Ci	Li
IIC/IIIC IIB/IIIB IIA/IIIA I	5.88V	5.88V	52mA	76mW	0	0

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the load connected to the output terminals must not exceed the following values:

Group	Capacitance (µF)	Inductance (mH)	or	L/R Ratio (µH/Ohm)
I	1000	172		6105
IIA	1000	105		3721
IIB/III	1000	62		2198
IIC	43	13		460

FIBRE OPTIC PORTS (CON1 & CON2)

Group	Po (optical)
IIC/IIIC IIB/IIIB IIA/IIIA I	10mW each

LAN Port 1 or LAN Port 2 (10/100 and Gigabit 10/100/1000 Ethernet) (SK1/SK2 – RJ45)
(values for all pins combined)

Group	Ui	Uo	Io	Ci	Li
IIC/IIIC IIB/IIIB IIA/IIIA I	15.4V	5.88V	2.18A (10/100) or 4.36A (Gigabit)	0.48µF	0

Note 1. Io = 2.18A is the total for the 4 Ethernet lines (each line 545mA). 4.36A is the total for the 8 Ethernet lines (Gigabit 10/100/1000 versions).

Note 2. Ci = 0.48uF is given as worse case (8 line) Gigabit Ethernet

Note 3. Gigabit 10/100/1000 versions are not suitable for Gas Group IIC

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the load connected to the output terminals must not exceed the following values:

10/100 Ethernet Ports

Group	Capacitance (µF)	Inductance (µH)	or	L/R Ratio (µH/Ohm)
IIC	43	7.5		11
IIB/III	1000	29.9		44
IIA	1000	59.9		89
I	1000	98.2		146

Gigabit 10/100/1000 Ethernet Ports

Group	Capacitance (µF)	Inductance (µH)	or	L/R Ratio (µH/Ohm)
IIB/III	1000	7.5		22
IIA	1000	15.0		44
I	1000	24.5		73

If PoEx is used, then the parameters of the PoEx power supply must also be considered
(The above capacitance figures are based on 5.88V)

The 10/100 or Gigabit 10/100/1000 Ethernet ports may be connected to any other equipment having appropriate Entity parameters.

9476-ET(G) : Ethernet Switch

12Vdc POWER IN (CON1, Pin 1 wrt Pin 2 (0V))

Group	Ui	Ci	Li
IIC/IIIC IIB/IIIB IIA/IIIA I	15.4Vdc	0	0

PoEx IN - PORT 3 (CON1, Pin 3 wrt Pin 4 (0V))
PoEx IN - PORT 4 (CON1, Pin 5 wrt Pin 6 (0V))
PoEx IN - PORT 5 (CON1, Pin 7 wrt Pin 8 (0V))
PoEx IN - PORT 6 (CON1, Pin 9 wrt Pin 10 (0V))

Group	Ui	Ci	Li
IIC/IIIC IIB/IIIB IIA/IIIA I	15.4Vdc	0.48µF	0

EXTERNAL LEDS (CON1, Pin13 to 18 wrt Pin 11,12 (0V))
(Values shown are for each output)

Group	Ui	Uo	Io	Po	Ci	Li
IIC/IIIC IIB/IIIB IIA/IIIA I	5.88V	5.88V	52mA	76mW	0	0

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the load connected to the output terminals must not exceed the following values:

Group	Capacitance (µF)	Inductance (mH)	or	L/R Ratio (µH/Ohm)
IIC	43	13		460
IIB/III	1000	62		2198
IIA	1000	105		3721
I	1000	172		6105

LAN Port 1 to LAN Port 5 (10/100 and Gigabit 10/100/1000 Ethernet) (SK1/SK2 – RJ45)
(values for all pins combined)

Group	Ui	Uo	Io	Ci	Li
IIC/IIIC IIB/IIIB IIA/IIIA I	15.4V	5.88V (or PoEx power supply Uo parameter when connected)	2.18A (10/100) or 4.36A (Gigabit)	0.48µF	0

Note 1. Io = 2.18A is the total for the four 10/100 Ethernet lines (each line 545mA). 4.36A is the total for the 8 Ethernet lines (Gigabit 10/100/1000 versions).

Note 2. Ci = 0.48uF is given as worse case (8 line) Gigabit Ethernet

Note 3. Gigabit 10/100/1000 versions are not suitable for Gas Group IIC

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the load connected to the output terminals must not exceed the following values:

10/100 Ethernet Ports

Group	Capacitance (µF)	Inductance (µH)	or	L/R Ratio (µH/Ohm)
IIC	43	7.5		11
IIB/III	1000	29.9		44
IIA	1000	59.9		89
I	1000	98.2		146

Gigabit 10/100/1000 Ethernet Ports

Group	Capacitance (µF)	Inductance (µH)	or	L/R Ratio (µH/Ohm)
IIB/III	1000	7.5		22
IIA	1000	15.0		44
I	1000	24.5		73

If PoEx is used, then the parameters of the PoEx power supply must also be considered
(The above capacitance figures are based on 5.88V)

The 10/100 or Gigabit 10/100/1000 Ethernet ports may be connected to any other equipment having appropriate Entity parameters.

9479-ET(G) : WLAN AP/Bridge

12Vdc POWER IN (CON1, Pin 1 wrt Pin 2 (0V))

Group	Ui	Ci	Li
IIC/IIIC IIB/IIIB IIA/IIIA I	15.4Vdc	0	0

PoEx OUT (CON1, Pin 3 wrt Pin 4 (0V) OR Pin 5 wrt Pin 6 (0V))

Group	Uo	Co	Lo
IIC/IIIC IIB/IIIB IIA/IIIA I	Same as power supply connected to LAN1 or LAN2 PoEx connections	Same as power supply connected to LAN1 or LAN2 PoEx connections minus 0.48µF internal capacitance	Same as power supply connected to LAN1 or LAN2 PoEx connections

Note: PoEx OUT (CON1 pins 3+4 OR pins 5+6) may be linked to 12Vdc POWER IN (CON1 pins 1+2) when power is via the LAN1 or LAN2 port.

EXTERNAL LEDS (CON1, Pin13 to 18 wrt Pin 11,12 (0V))
(Values shown are for each output)

Group	Ui	Uo	Io	Po	Ci	Li
IIC/IIIC IIB/IIIB IIA/IIIA I	5.88V	5.88V	52mA	76mW	0	0

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the load connected to the output terminals must not exceed the following values:

Group	Capacitance (µF)	Inductance (mH)	or	L/R Ratio (µH/Ohm)
IIC	43	13		460
IIB/III	1000	62		1861
IIA	1000	105		3721
I	1000	175		6196

WLAN ANTENNA (CON5 - SMA)

Group	Po (RF)
IIC/IIIC IIB/IIIB IIA/IIIA	300mW each

Note: The type and length of any antenna cable and the antenna itself are classified as simple apparatus and are not restricted by the output parameters.

LAN Port 1 or LAN Port 2 (10/100 and Gigabit 10/100/1000 Ethernet) (SK1/SK2 – RJ45)
(values for all pins combined)

Group	Ui	Uo	Io	Ci	Li
IIC/IIIC IIB/IIIB IIA/IIIA I	15.4V	5.88V	2.18A (10/100) or 4.36A (Gigabit)	0.48µF	0

Note 1. Io = 2.18A is the total for the 4 Ethernet lines (each line 545mA). 4.36A is the total for the 8 Ethernet lines (Gigabit 10/100/1000 versions).

Note 2. Ci = 0.48uF is given as worse case (8 line) Gigabit Ethernet

Note 3. Gigabit 10/100/1000 versions are not suitable for Gas Group IIC

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the load connected to the output terminals must not exceed the following values:

10/100 Ethernet Ports

Group	Capacitance (µF)	Inductance (µH)	or	L/R Ratio (µH/Ohm)
IIC	43	7.5		11
IIB/III	1000	29.9		44
IIA	1000	59.9		89
I	1000	98.2		146

10/100 and Gigabit 10/100/1000 Ethernet Ports

Group	Capacitance (µF)	Inductance (µH)	or	L/R Ratio (µH/Ohm)
IIB/III	1000	7.5		22
IIA	1000	15.0		44
I	1000	24.5		73

If PoEx is used, then the parameters of the PoEx power supply must also be considered
(The above capacitance figures are based on 5.88V)

The 10/100 or Gigabit 10/100/1000 Ethernet ports may be connected to any other equipment having appropriate Entity parameters.

Equivalent Groups for Zones and Divisions:

IIC = Groups A, B, C, D
IIB = Groups C, D
IIA = Group D
IIIC = Groups E, F, G

CSL

CONTROLLED SYSTEMS LTD.
SWADLINCOTE, DERBYSHIRE. ENGLAND

TITLE
947X MET Control Drawing

DRAWN : IAC	SIZE A3	DWG NO 947X-MET	REV 1
DATE: 17/05/2023	SCALE	SHEET 2 OF 3	

General

The installation must be in accordance with the National Electrical Code (NEC), ANSI/ NFPA 70, Articles 504 and 505, the Canadian Electric Code (CEC), Part 1, Appendix F and ANSI/ISA-RP12.6.

Tamb = -40°C to +70°C

9471-ET(G) : Serial Gateway, 9476-ET(G) : Ethernet Switch, 9479-ET(G) : WLAN AP/Bridge

US / Canada (Zones)

For use in Class I, Zone 0, Group IIC*/IIB* Hazardous Locations (*Group IIC or IIB depending on model) when installed in accordance with Control Drawing 947X-MET

- AEx ia IIC T4 Ga / Ex ia IIC T4 Ga
- AEx ia IIB T4 Ga / Ex ia IIB T4 Ga

For use in Class II, Zone 21, Group IIIC Hazardous Locations and providing Intrinsically Safe outputs for Class II, Zone 20 or Class II, Zone 21 Group IIIC Hazardous Locations when installed in accordance with Control Drawing 947X-MET

- AEx ia [ia Da] IIIC T135°C Db / Ex ia [ia Da] IIIC T135°C Db

US / Canada (Divisions)

For use in Class I, Division 1, Groups A-D*, T4 Hazardous Locations (*Groups A,B,C,D depending on model) when installed in accordance with Control Drawing 947X-MET

For use in Class II, Division 1, Groups E-G*, T135°C Hazardous Locations (*Groups E,F,G depending on model) when installed in accordance with Control Drawing 947X-MET

9475-ET(G) : Media Converter

US / Canada (Zones)

For use in Class I, Zone 0, Group IIC*/IIB* Hazardous Locations (*Group IIC or IIB depending on model) when installed in accordance with Control Drawing 947X MET

- AEx ia op is IIC T4 Ga / Ex ia op is IIC T4 Ga
- AEx ia op is IIB T4 Ga / Ex ia op is IIB T4 Ga

For use in Class II, Zone 21, Group IIIC Hazardous Locations and providing Intrinsically Safe outputs for Class II, Zone 20 or Class II, Zone 21 Group IIIC Hazardous Locations when installed in accordance with Control Drawing 947X MET

- AEx ia [ia op is Da] IIIC T135°C Db / Ex ia [ia op is Da] IIIC T135°C Db

US / Canada (Divisions)

For use in Class I, Division 1, Groups A-D*, T4 Hazardous Locations (*Groups A,B,C,D depending on model) when installed in accordance with Control Drawing 947X-MET

For use in Class II, Division 1, Groups E-G*, T135°C Hazardous Locations (*Groups E,F,G depending on model) when installed in accordance with Control Drawing 947X-MET

CSL	CONTROLLED SYSTEMS LTD. SWADLINCOTE, DERBYSHIRE. ENGLAND		
	TITLE: 947X MET Control Drawing		
DRAWN : IAC	SIZE: A3	DWG NO: 947X-MET	REV: 1
DATE: 17/05/2023	SCALE	SHEET: 3 OF 3	

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