C-site User Manual

Version 1.1

Ex-CWTD-WRM-00009

Version history

Version	Date	Description	Author	Approver
1.0	23.2.2015	Approved version	KL	**TVä**
1.1	13.3.2015	IC certification numbers p. 9	TSo	

Contents

1 Introduction

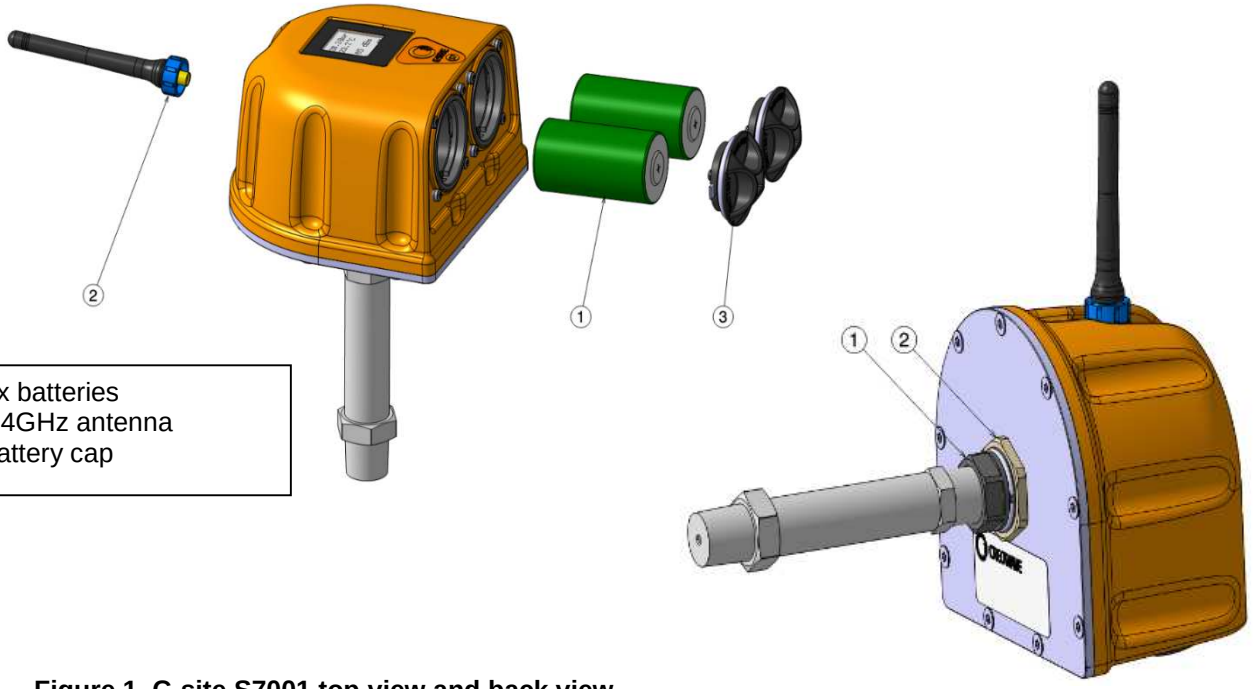
This user manual describes the practices to take the C-site remote monitoring system into use. Also guidance on how to operate and maintain the system is given. C-site remote monitoring system consists of C-site S7 sensor units as well as C-site R7 remote terminal units.

1.1 C-site units at a glance

1.1.1 C-site S7

C-site S7 is the sensor unit of the C-site Remote monitoring system. It reads data from the transducers and transfers the data wirelessly to the C-site R7 units.

C-site S7 has two different model options, C-site S7001 and C-site S7002. C-site S7001 is a sensor unit with integrated Keller pressure transducer. C-site S7002 is equipped with a connector that enables different type of sensors to be used with the sensor unit.



1. Ex batteries
2. 2.4GHz antenna
3. Battery cap

1. Rotation adapter SW 27 mm
2. Rotation lock nut SW 36 mm

Figure 1. C-site S7001 top view and back view.
(Note! Batteries ordered and delivered separately)

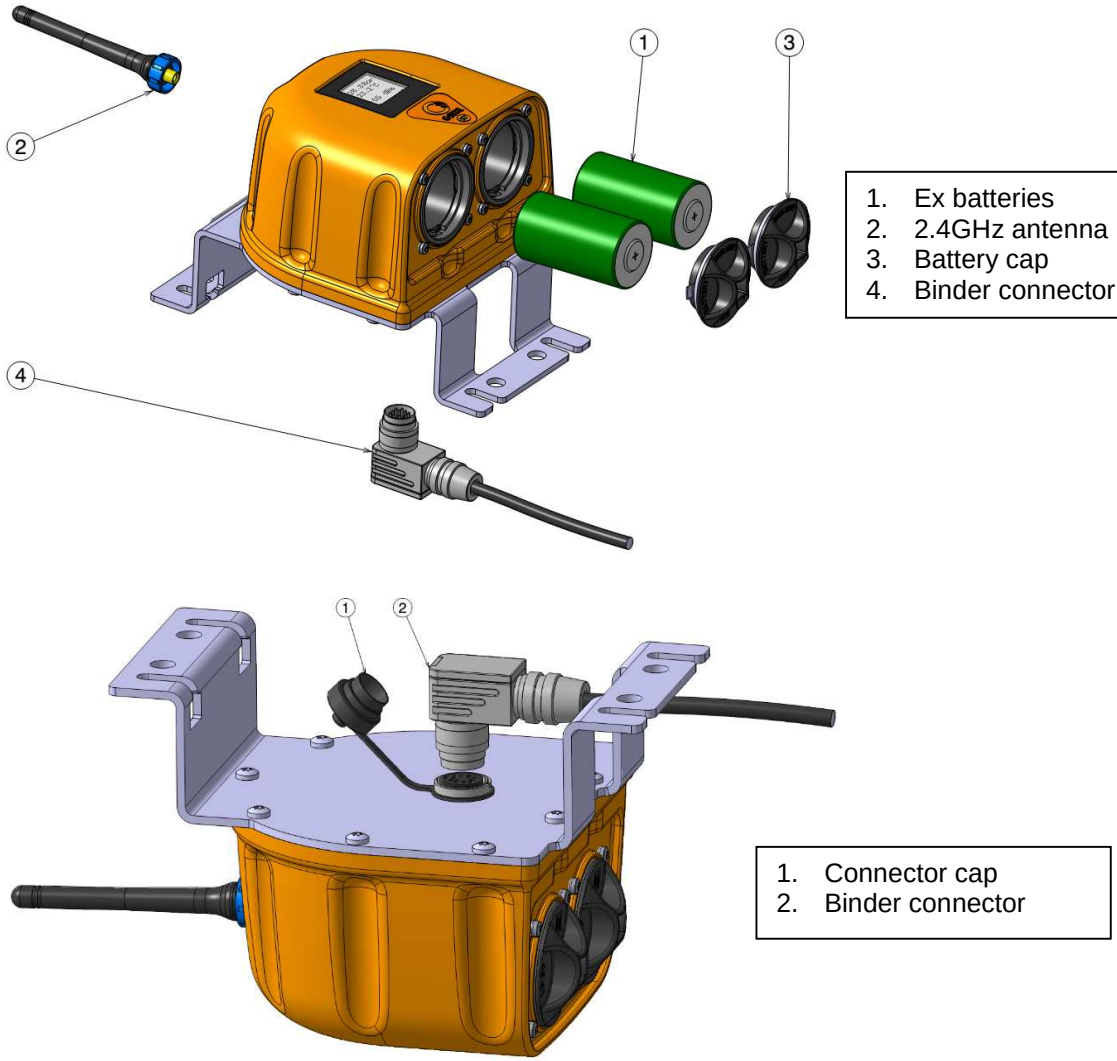


Figure 2. C-site S7002 top view and back view.
(Note! Cables and transmitters for Binder connector ordered separately)

1.1.1.1 C-site S7 screens

This section describes the different screen views the S7 unit can display during operation.

After power up, the S7 unit starts automatic scanning of available R7 units. Normally the scanning phase takes about 30 seconds.

1. Pressure
2. Temperature
3. Signal level
4. Battery level
5. Battery level

In normal operation, the screen shows the pressure (1), temperature (2), received signal strength (3) and battery levels (4 and 5).

In case the alarm sign is on, please check the alarm status and details alarm log on the R7 display.

In case of a low battery level, please replace the batteries in safe area. Only batteries delivered by Creowave is permitted.

1.1.2 C-site R7

C-site R7 is remote terminal unit of the C-site Remote monitoring system. C-site R7 collects data and information from multiple C-site S7 units and sends the information onwards to the system.

C-site R7 has three different model options, C-site R7-001, R7-101 and R7-201. Only difference between the models is the technology it uses – WLAN, GSM or TETRA.

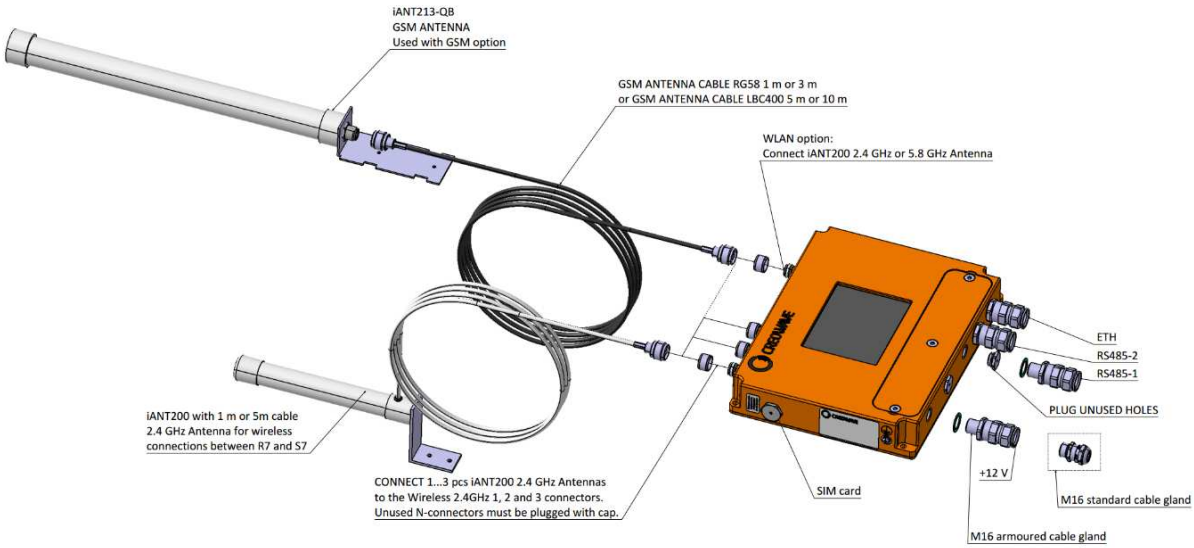
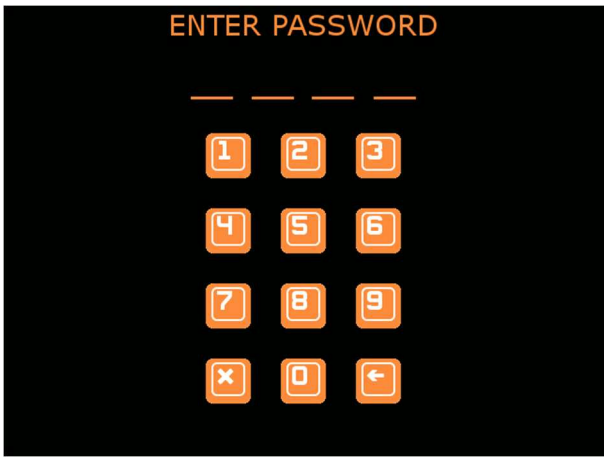


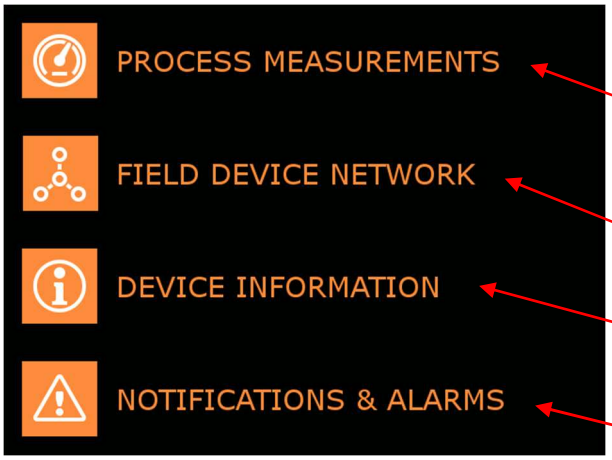
Figure 3 C-site R7 unit view with accessories.
(Note! Accessories ordered and delivered separately. Standard package includes plugs as well as one armored gland in the package, but not installed)

1.1.2.1 C-site R7 screens

This section describes the different screen views the R7 unit can display during operation.



When powering up, the R7 unit asks the user to enter a password *(default 2580).*



After password has been entered the normal screen view appears.

Process measurements – click to see the process measurement readings from S7 unit.

Field device network – click to see the connected devices.

Device information – click to see the R7 device information.

Notifications & alarms – click to see the notifications and alarms

2 Notes and wireless conditions

Before getting started, make sure you read this chapter thoroughly. The use of units is not permitted without going through the notes and wireless conditions for the specific unit.

2.1 All units (S7001, S7002, R7-001, R7-101)

The following notes and conditions concerns the following units: S7001, S7002, R7-001, R7-101.

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

These radio transmitters (S7001, S7002, R7-001, R7-002, R7-101, R7-102) have been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

C-site S7001, S7002 (IC: 12318A-S7) antenna: Bulgin PX407, gain 4.8 dBi
C-site R7-001, R7-002 (IC: 12318A-R7WLAN) antenna:

- 2.4GHz: Extronics iANT200-24-S-1, Gain 5 dBi
- 5GHz: Extronics iANT200-58-S-1, Gain 8 dBi. When operating within 5180-5220MHz the antenna cable shall be at least 1.5m (RG58)
- Dual band WiFi: Extronics iANT216, Gain 5 dBi @ 2.4-2.5GHz, 7 dBi @ 4.94-5.925GHz. When operating within 5180-5220MHz the antenna cable shall be at least 1m (RG58).

C-site R7-101, R7-102 (IC: 12318A-R73G) antenna:

- 2.4 GHz wireless:
  - Extronics iANT200-24-S-1, Gain 5 dBi
  - Aerial AV1433-24501, gain 2dBi
- GSM / 3G: Extronics iANT213QB, Gain 4 dBi @806-960MHz, 5 dBi @ 1710-2170MHz

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Ces émetteurs radio (S7001, S7002, R7-001, R7-002, R7-101, R7-102) ont été autorisés par Industry Canada à être utilisés avec les types d'antennes énumérés ci-dessous, avec le gain maximum autorisé indiqué. Il est strictement interdit d'utiliser des types d'antennes qui ne sont pas inclus dans cette liste, avec un gain supérieur au gain maximum autorisé indiqué pour ce type, avec cet appareil.

Antenne C-site S7001, S7002 (IC : 12318A-S7): Bulgin PX407, gain 4,8 dBi
Antenne C-site R7-001, R7-002 (IC : 12318A-R7WLAN):

- ***2,4 GHz : Extronics iANT200-24-S-1, gain 5 dBi***
- ***5 GHz : Extronics iANT200-58-S-1, gain 8 dBi. En cas de fonctionnement dans la bande 5180-5220 MHz, le câble de l'antenne doit mesurer au moins 1,5 m (RG58).***
- ***WiFi bi-bande : Extronics iANT216, gain 5 dBi à 2,4 - 2,5 GHz, 7 dBi à 4,94-5,925 GHz. En cas de fonctionnement dans la bande 5180-5220MHz, le câble de l'antenne doit mesurer au moins 1 m (RG58).***

Antenne C-site R7-101, R7-102 (IC : 12318A-R73G):

- ***2,4 GHz sans fil :***
  - ***Extronics iANT200-24-S-1, gain 5 dBi***
  - ***Aerial AV1433-24501, gain 2 dBi***
- ***GSM / 3G : Extronics iANT213QB, gain 4 dBi à 806-960MHz, 5 dBi à 1710-2170MHz***

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

(1) l'appareil ne doit pas produire de brouillage;
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Note! The grantee is not responsible for any changes or modifications not expressly approved by the party responsible for compliance. Such modifications could void the user´s authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Absolute minimum distance between the antennas is always 20 cm.
Minimum distance between the antennas and people is 50 cm for C-site R7 models and 20 cm for C-site S7 models.
Always install the antennas pointing upwards.

La distance minimale absolue entre les antennes est de 20 cm.
La distance minimale entre les antennes et les personnes est de 50 cm pour les modèles C-site R7 et de 20 cm pour les modèles C-site S7.
Toujours installer les antennes pointe vers le haut.

2.2 C-site R7-001

In addition to the notes in chapter 2.1, the following notes and conditions concerns the unit C-site R7-001.

(i) the device for operation in the band 5150-5250 MHz is **only for indoor use** to reduce the potential for harmful interference to co-channel mobile satellite systems.

(i) ***l'appareil destiné à fonctionner dans la bande 5150-5250 MHz est uniquement destiné à une utilisation intérieure afin de réduire les potentielles interférences nuisibles avec les systèmes satellites mobiles du même canal.***

Operating WLAN frequency bands of the R7-001:

- 2412-2462 MHz
- 5180-5220 MHz (indoor use)
- 5745-5825 MHz

DFS channes (ch 52-64, 5260-5320 MHz and ch 100-140, 5500-5700MHz) have been disabled by the firmware. The firmware of the WLAN transceiver is factory installed and cannot be modified by the

installer or end user by any means. In addition, ch 48 (5240 MHz) has been disabled to prevent disturbance within DFS channels.

The RF parameters of the WLAN connection are controlled by the FW. The only parameter that shall be modified by the installer is the channel list. By selecting country of operation the installer can select channels to be used from the channels that are allowed. Access to modify the WLAN settings is password protected.

3 Getting started

This chapter describes how to configure the R7 and S7 and how to take the system into use. **Before getting started, make sure you have read thoroughly the paragraph 2 "Notes and Wireless conditions".** The use of units is not permitted without going through the notes and wireless conditions for the specific unit.

What you need to get started:

- ***From Creowave:***
  - C-site Configuration toolkit *(ordered separately)*
    - PC with Ethernet port and Windows 7 or later operating system
    - Engineering tool software and license file from Creowave
    - 1 pc R7-001 for configuration use only
    - +12VDC/2A power supply with open-ended power cable 0,5-1,5 mm^2 (AWG20-14)
  - C-site Installation toolkit with installation hand tools *(ordered separately)*
  - C-site Spare part kit with spares for S7 and R7 *(ordered separately)*
  - Installation manuals
    - Ex-CWIM-WRM-00001_Installation_Manual_S7
    - Ex-CWIM-WRM-00002_Installation_Manual_R7

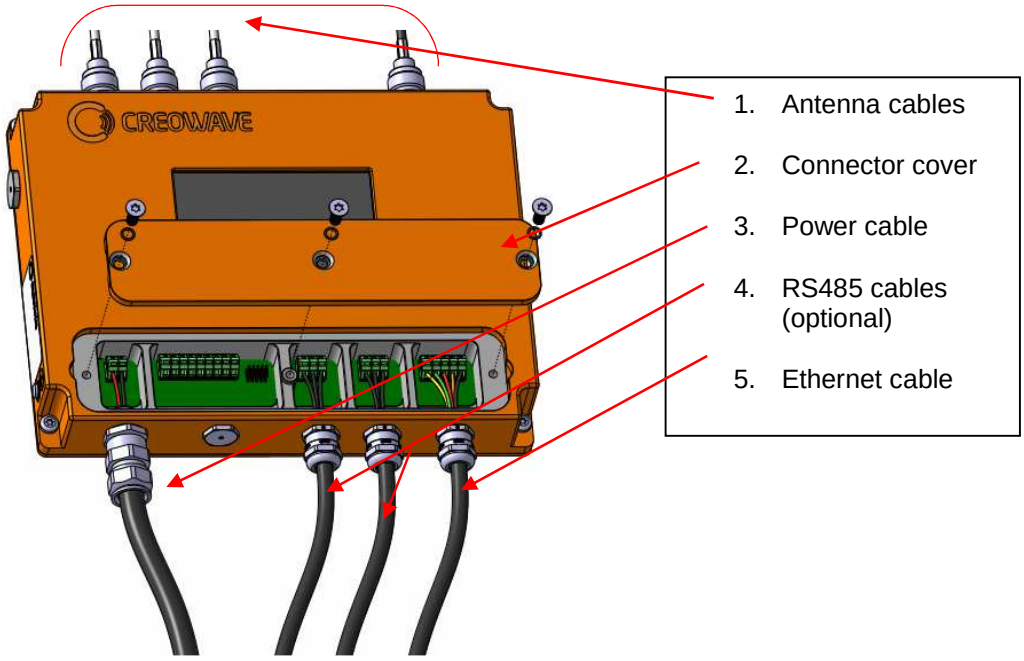
- ***From the network administrator:***
  - WLAN network name (SSID)
  - WLAN security mode
  - WLAN Pre-Shared key
  - 3G APN (Access Point Name)
  - 3G SIM card

3.1 Before R7 configuration

WARNING! Before getting started please read Installation Manual for R7 (Ex-CWIM-WRM-00002_Installation_Manual_R7)

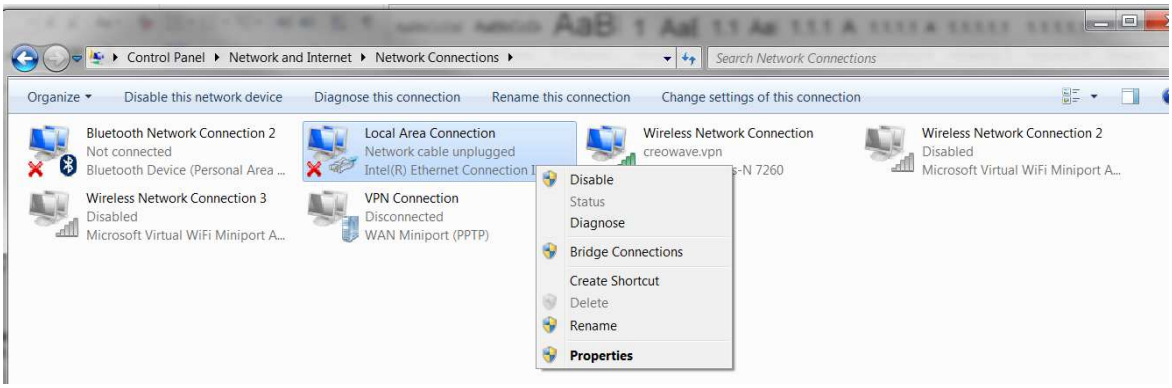
The following configuration procedures need to be done on safe zone.

1. Open connector cover
2. Connect power cable to Ex terminals (*see R7 Installation manual for detailed instructions*)
3. Connect Ethernet cable to Ex terminals (*see R7 Installation manual for detailed instructions*)
4. Connect antennas to R7 (*see R7 Installation manual for detailed instructions*)

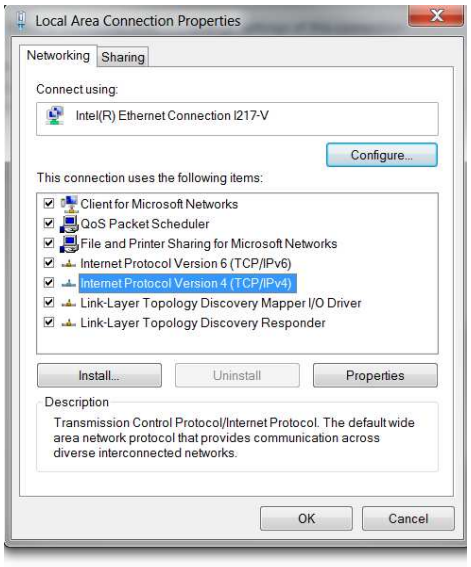


5. Install SIM-card (3G option) (*see R7 Installation manual for detailed instructions*)
6. Power up R7
7. On the R7 LCD screen type the password *(default 2580)*
8. On the screen tab **Device info** to check the R7 status. In case of alarms, please see Troubleshooting section no. 5.

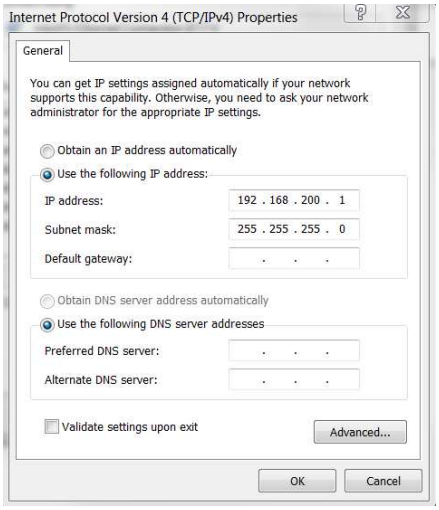
9. On PC, click Windows and on the search field type: Network and sharing center
10. Select **Network and Sharing Center**
11. In **Network and Sharing Centre** go to **Change adapter settings**
12. Select **Local Area Connection** and right mouse click **Properties**



13. On Item list select **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties**



14. Select **Use the following IP address** and type:
    a. IP Address: **192.168.200.1**
    b. Subnet mask: **255.255.255.0**
    c. Leave default gateway empty



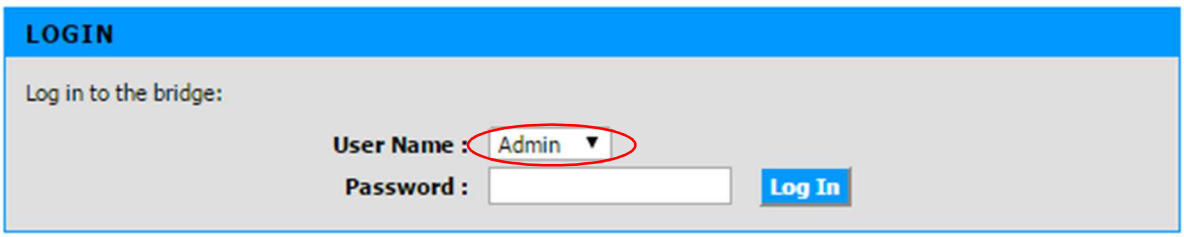
15. Now the connection between the R7 and the PC is ready.

3.2 R7 WLAN configuration

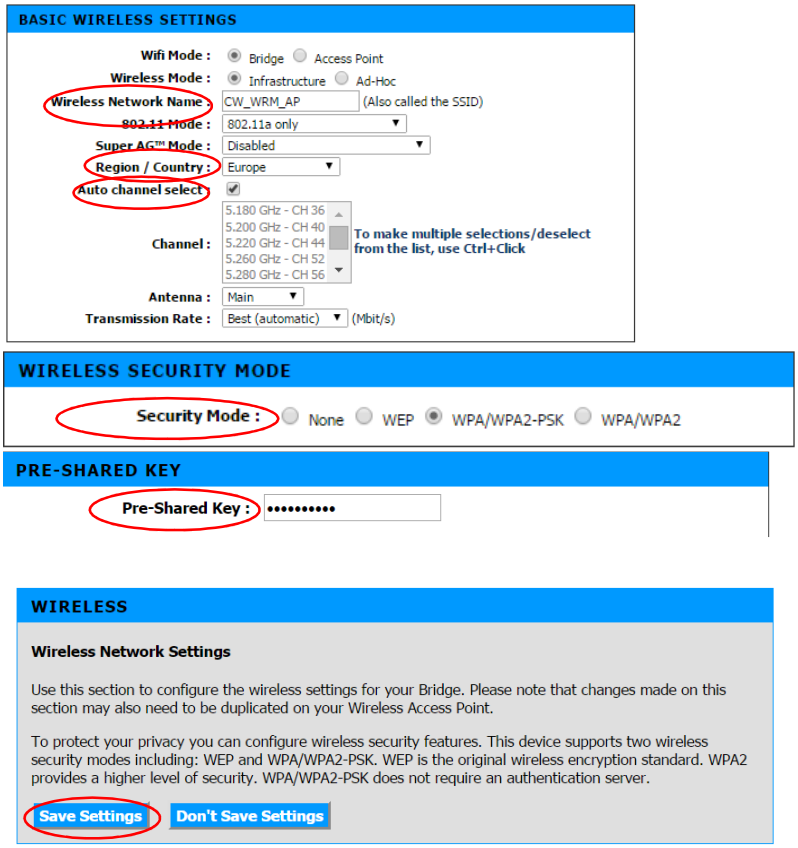
This section describes only the configuration for C-site R7 unit with WLAN option, model R7-001.

Please note, that you can login to configuration site as an admin or as a user. As an admin you can configure the R7 WLAN, as a user you can only view the settings. See more details from chapter 6.1. Please also note, that the firmware updates needs to be done by Creowave or assigned representative of Creowave.

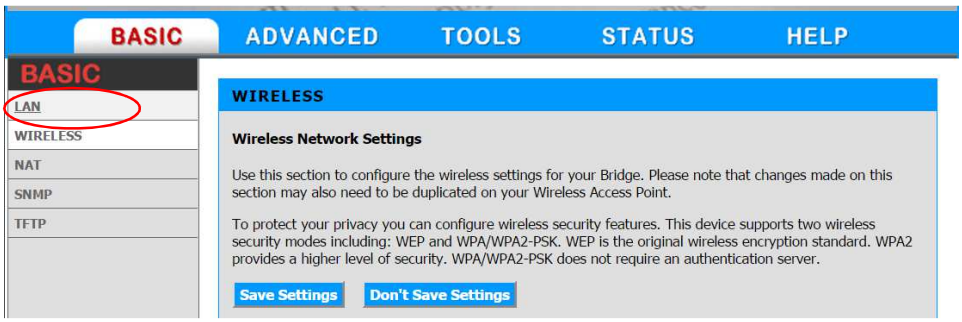
1. Open web browser
2. Enter web address: **192.168.200.102**
3. Enter **Username**: **admin.** Leave password blank.
   NOTE! Remember to change the username and password after configuration. Keep good care of your username and password, you are not able to recover those afterwards.



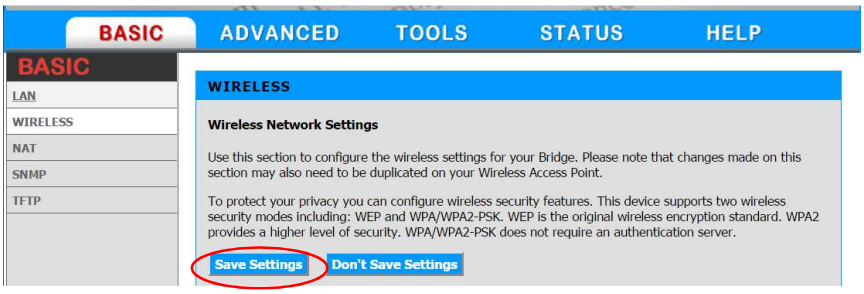
4. Click **Basic** and then **Wireless**
5. Under **Wireless** configure following:
    a. **Wireless Network Name** (the network you want to connect R7)
    b. **Region/Country**: change the country or region
    c. Check that **Auto channel select** is enabled
    d. **Wireless Security Mode** (according to network setup)
    e. Type the **Pre-Shared Key** (according to network setup)
    f. Click **Save settings** from the top of the page and then click **Continue**

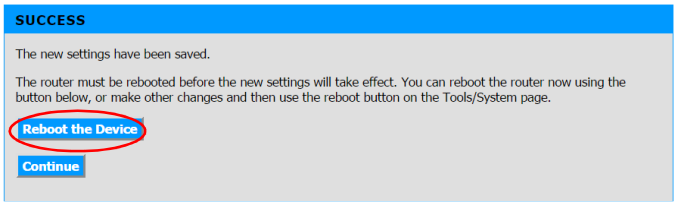


6. Go to **LAN settings**



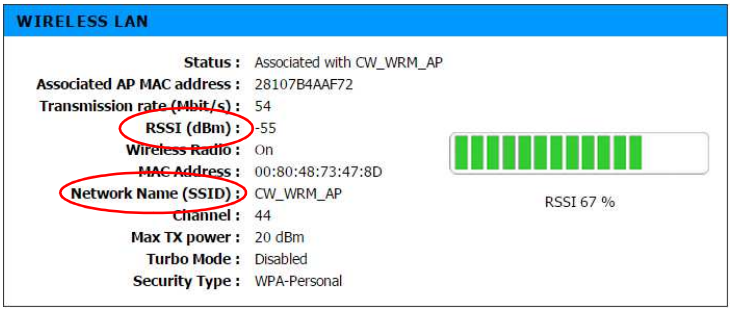
    a. Modify LAN settings according to the network if needed. Ask more information from the network administrator
    b. Click **Save settings** from the top of the page and then click **Reboot the Device**



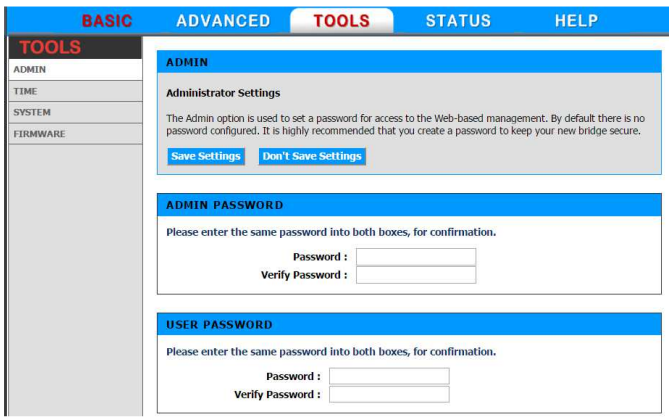


7. Wait for 60 seconds WLAN to reboot and open web browser
8. Re-enter web address **192.168.200.102**

9. Login and check from the front page the connection status:
   a. Network name
   b. RSSI level



10. Click **Tools** and under **Admin** to change the passwords



√ **WLAN/LAN connection to the site network is now ready**

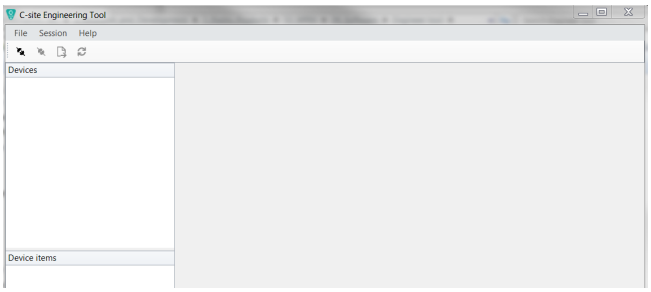
3.3 R7 3G configuration

This section describes only the configuration for C-site R7 unit with GSM option, model R7-101.

More detailed guidance is given in the User Manual for Engineering Tool *(document creation in process).* In case needed, contact Creowave for support at service@creowave.com.

1. Make sure that the Ethernet cable is connected to the R7 and to the PC.

2. Launch Engineering tool software.



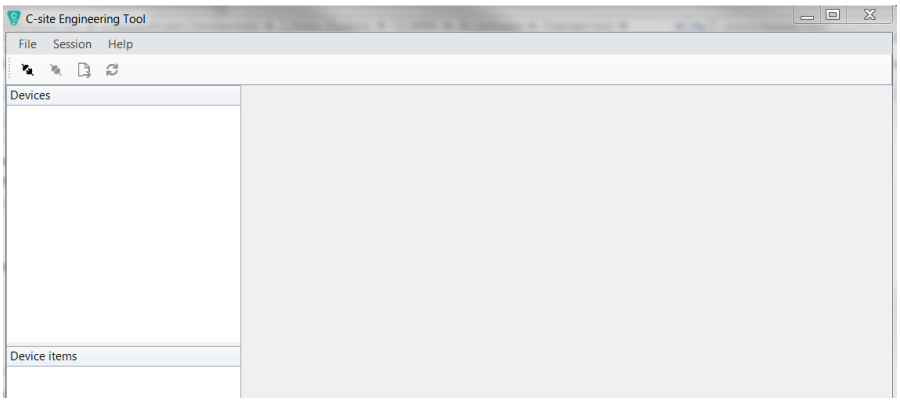
3. On the device list select R7
4. Modify **APN** settings according to the 3G network operator
5. Define
    a. **User name** and **Password** (optional)
    b. Define **Proxy address** (optional)
    c. Define **Proxy port** (optional)
    d. Define **Authentication type**: PAP/CHAP/None (optional)

4 Setting up the sensor network

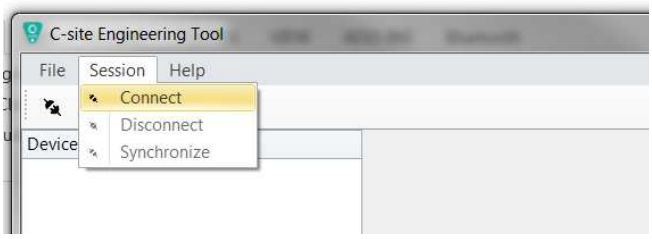
This section describes how to set up the sensor unit network. **This needs to be done on the safe zone, outside the hazardous area.**

More detailed guidance is given in the User Manual for Engineering Tool *(document creation in process)*. In case needed, contact Creowave for support at service@creowave.com.

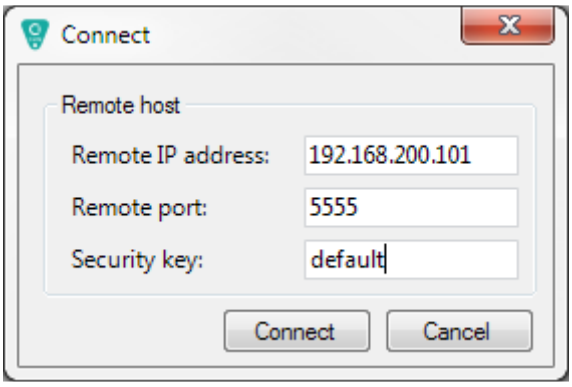
1. Make sure that the Ethernet cable is connected to the R7 and to the PC
2. Power up the R7
3. Launch the Engineering tool



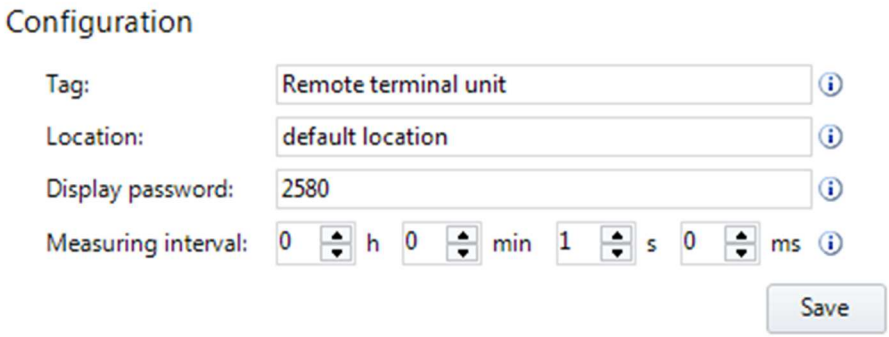
4. On the **Session** click **Connect.**



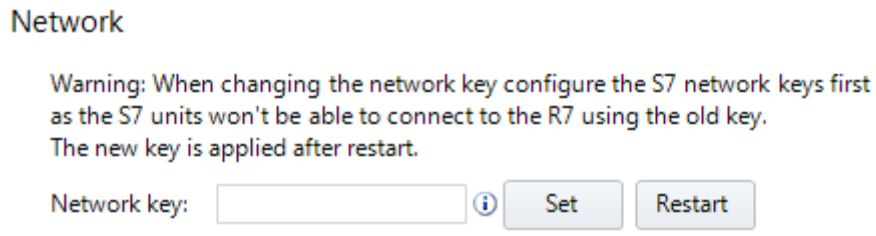
5. Type Remote **IP address 192.168.200.101.** The remote port has default port determined and don't need to be changed. The security key is "default".



6. Select R7 from the **Devices** list and configure:
   a. TAG
   b. Location
   c. Measurement interval for the diagnostics
   d. LCD screen password (default 2580)



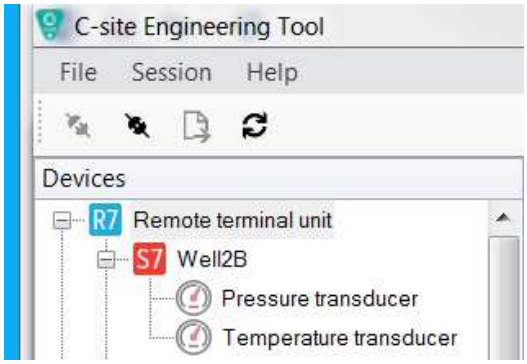
   e. Network key



   f. APN (3G option)

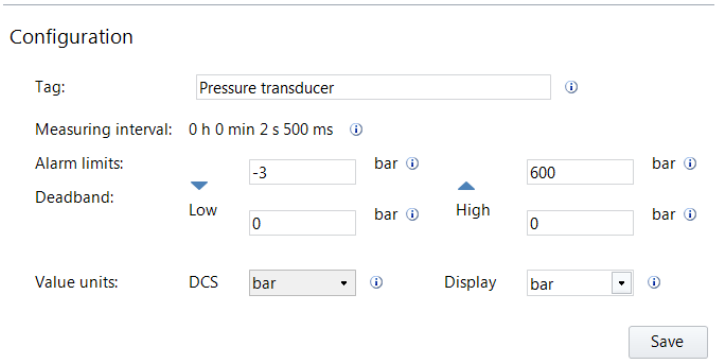
7. Insert batteries to the S7 units. Battery level indicators on the S7's LCD may show low battery levels at the start-up which is a normal situation. Battery level will normalize after few hours of operation.

8. S7's will appear on the **Devices** list after the connection is ready.

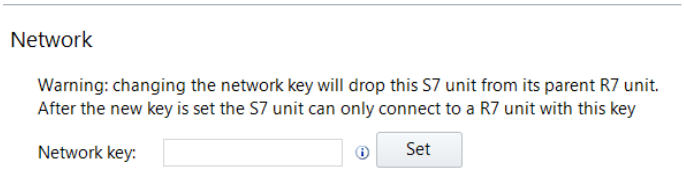


9. Select S7 from the **Devices** list and configure:
    a. TAG
    b. Location
    c. Heartbeat interval
    d. Measuring interval

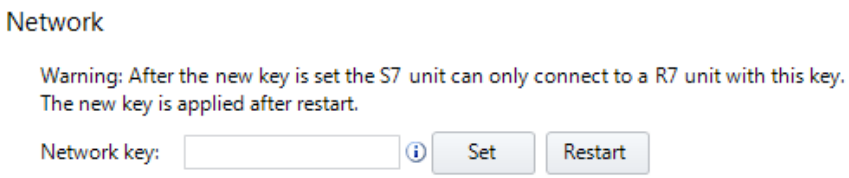
10. On the **Devices** list under S7 select transducer and configure:
    a. **TAG**
    b. **Low** and **High Alarm limits**
    c. **Deadband** for the alarm limits
    d. From the **Display** drop-down select the value unit (sets also the value unit for the S7 LCD screen)



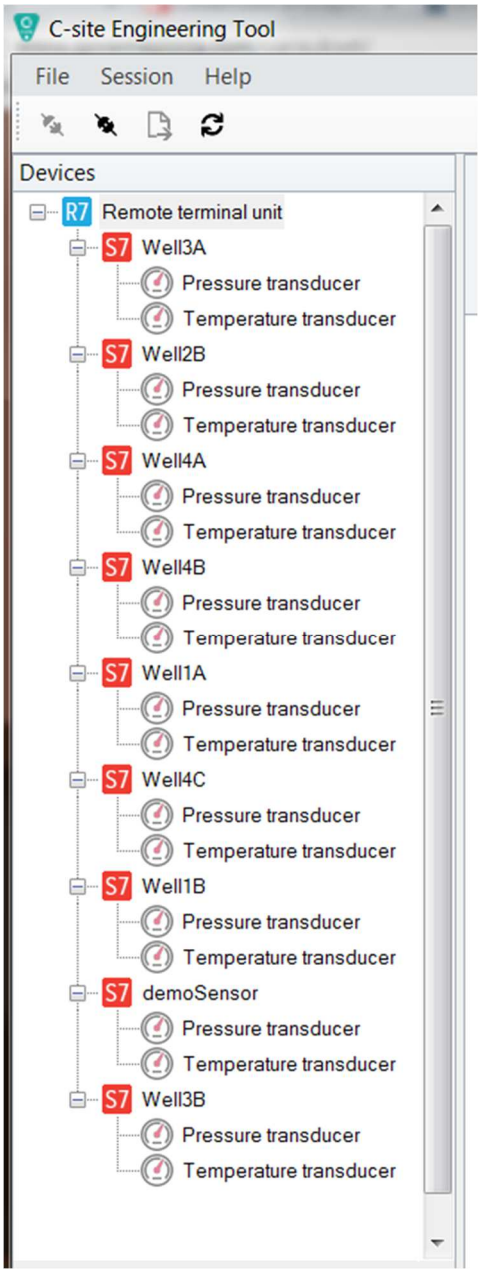
11. Click S7 on the **Devices** list set the **Network key**
    a. NOTE! After the **Network key** is changed the S7 will disconnect from the R7
    b. Make sure that all configurations are done before changing the **Network key**
    c. **Keep the Network key in secure place.** Note! After the key is set, the S7 unit can only connect to R7 unit with this key.



12. After all S7 are configured select R7 from the **Devices** list
13. Change the **Network key**



14. Now all S7s should appear on the **Devices** list after 2 minutes



15. Configure measurement intervals of the S7 units according the requirement
16. Select R7 and define the **Fixed IP address** or activate **DHCP** (R7 Ethernet port)
    a. If DHCP is used the new IP address can be seen on the R7's display

17. Units are now ready for the field installation
    a. NOTE: If the measurement interval is < 10 seconds it is recommended to remove batteries from the S7 units to save battery life
    b. WARNING: Batteries must be inserted outside the hazardous area!
    c. It is recommended to install R7 units first to the field
18. After the installation contact the system administrator to verify that all units are connected to the SCADA/DCS system.

5 Troubleshooting

If you are facing problems in configuration or use of the products, please have a look at this troubleshooting section. If more assistance is needed, contact your sales representative or Creowave at service@creowave.com.

C-site S7

Alarm sign is active on the S7 screen
• Check the alarm limit settings and process values from Engineering Tool
• Check the battery levels on the S7 display

S7 doesn't connect to the R7
• Check that the antenna is properly installed to the S7
• Check the battery levels on the S7 display
• Check that the R7 is powered on
• Check the sensor network antenna connection on the R7
• Check the alarm log from the R7 display
• Check that there is no big metal obstacles between the S7 and R7

S7 doesn't get data from the transducer
• Check the configuration of S7 from R7 or Engineering Tool that the right type of transducer has been installed
• Check the transducer connection

C-site R7

R7 doesn't power up
• Check the power switch
• Check the power cable connection

CAUTION!
BEFORE OPENING THE UNIT LID MAKE SURE THE EXTERNAL POWER SWITCH IS OFF.

R7 doesn't find S7 units
• Check that the S7 is not already connected to another R7
• Check the alarm log from the R7 screen
• Check the antenna connections
• Check that the network ID is correct
• Check that there are no big obstacles between the R7 and S7
• Check that the S7 units have been powered up

R7 doesn't connect to the monitoring system
• Check the network connection password
• Check the WLAN antenna connection
• Check that the monitoring system IP address is correct
• Check that a valid SIM card has been installed (3G)

R7 cannot be reached by Ethernet
• Check wiring
• Check the IP address of R7 from the R7 screen
• Check that your computer is in the same subnet as R7

6 Maintenance

Some special conditions of safe use for these Ex approved equipment has been set. Read these carefully before taking the equipment into use.

C-site S7 – Special conditions of safe use

1. The batteries shall not be removed or replaced in hazardous area.
2. The equipment shall not be opened in hazardous area.
3. Only batteries delivered by Creowave are permitted to be used in conjunction with this apparatus.
4. The RF output power of the sensor unit is set by the manufacturer and shall not be modified by the user by any means.
5. The end user shall ensure that the length of cable used to connect the transducer to the sensor unit determined by ensuring $C_i+C_c < C_o$ and $L_i + L_o$, where C_i = capacitance of transducer, C_c = capacitance of cable for required length, L_i = inductance of transducer, L_c = inductance of cable for required length, C_o and L_o see Table of entity parameters.

C-site R7 – Special conditions of safe use

1. The LCD screen shall be routinely inspected and replaced immediately if broken.
2. The battery pack or cells used to supply the RTU C-site R7 must be IECEx / ATEX approved and have a 12Vdc nominal voltage and a peak open circuit voltage that does not exceed 15 Vdc.
3. The Ethernet connection shall be made only through ATEX/IECEx certified Ethernet isolator e.g. MTL 9468-ET, part no. INM9468 or equivalent.
4. The RF output power of the RTU C-site R7 is set by the manufacturer and shall not be modified by the user by any means.
5. Do not open equipment while energized. Connection / disconnection to the input terminal J1 shall only be made while the supply is de-energized.

6.1 Security passwords

There are three role-based user accounts for the R7 configuration. Table 1 below describes the levels of access.

Role	User name	Access
User – for read-only access for R7 WLAN configuration	user	For WLAN read-only access
Maintenance - for R7 and sensor network configuration	maint	Configure communications between R7 and S7. No RF output power control. Configure RS485 baud rate Configure Ethernet of R7
Administrator – for R7 WLAN configuration	admin	All maintenance privileges Configure WLAN Configure Ethernet of the WLAN transceiver Set passwords

Table 1. Role Based User Accounts

Usernames and default passwords for the different user accounts are as follows:

Username: user
Leave password field blank

Username: maint
Password: default

Username: admin
Leave password field blank

7 Support

In case more support, please contact Creowave service at service@creowave.com