



WC30i Wireless Pressure Sensor

User & Reference Manual



Part Number: LUM0084AA

Revision: Mar-2018

Safety Information

The products described in this manual can fail in a variety of modes due to misuse, age, or malfunction and is not designed or intended for used in systems requiring fail-safe performance, including life safety systems. Systems with the products must be designed to prevent personal injury and property damage during product operation and in the event of product failure.



Warning! Remove power before connecting or disconnecting the interface or RF cables.

FreeWave Technologies, Inc. warrants the FreeWave® WC30i Wireless Pressure Sensor (Product) that you have purchased against defects in materials and manufacturing for a period of three years from the date of shipment, depending on model number. In the event of a Product failure due to materials or workmanship, FreeWave will, at its discretion, repair or replace the Product. For evaluation of Warranty coverage, return the Product to FreeWave upon receiving a Return Material Authorization (RMA). The replacement product will remain under warranty for 90 days or the remainder of the original product warranty period, whichever is longer.

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1. If Product repair, adjustments, or parts replacements are required due to accident, neglect, or undue physical, electrical, or electromagnetic stress.
2. If Product is used outside of FreeWave specifications as stated in the Product's data sheet.
3. If Product has been modified, repaired, or altered by Customer unless FreeWave specifically authorized such alterations in each instance in writing.

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Table of Contents

Preface	5
1. Overview	7
2. Equipment	8
2.1. Included Equipment	8
2.2. User-supplied Equipment	8
3. WC30i Wireless Pressure Sensor Connections	9
3.1. Internal Connections	9
3.2. Power Connection	11
4. WC Toolkit Installation	13
5. WC Toolkit Update	20
6. Configuration	23
7. Mounting, Battery Replacement, Cleaning	29
7.1. Mount the WC30i Wireless Pressure Sensor	30
7.2. Internal Lithium Battery Replacement	30
7.3. Cleaning Instructions	30
8. Battery Life Estimates	31
8.1. Battery Discharge / Alarm Threshold	32
8.2. Battery Life Estimate Calculator	32
8.2.1. View the Battery Life Estimator	32
8.3. WC30i Wireless Pressure Sensor Battery Life Estimates	34
9. WC Toolkit Software Environment	35
9.1. Device Configuration window	36
9.1.1. Settings area	39
9.1.2. Scaling area	41
9.1.3. Alarm Threshold Settings area	42
10. WAVECONTACT Network Frequencies	43
10.1. Radio Network Group Selection: 0, 1, 2, or 3	44
10.2. Radio Network Group Selection: 4, 5, 6, or 7	45
10.3. Radio Network Group Selection: 8, 9, 10, 11	46
10.4. Radio Network Group Selection: 12, 13, 14, 15	47
10.5. Radio Network Group Selection: 16, 17, 18, or 19	48
10.6. Radio Network Group Selection: 20, 21, 22, 23	49
10.7. Radio Network Group Selection: 24, 25, 26, 27	50
10.8. Radio Network Group Selection: 28 or 29	51
Appendix A: Technical Specifications	52
Appendix B: Control Drawing: 960-0081-02	54
Appendix C: Remote Modbus Registers	55
Appendix D: Connection Troubleshooting	57

Appendix E: LEDs	58
Appendix F: Available Accessories	59
Appendix G: FreeWave Legal Information	60

Preface

Contact FreeWave Technical Support

For up-to-date troubleshooting information, check the **Support** page at www.freewave.com.

FreeWave provides technical support Monday through Friday, 8:00 AM to 5:00 PM Mountain Time (GMT -7).

- Call toll-free at 1-866-923-6168.
- In Colorado, call 303-381-9200.
- Contact us through e-mail at moreinfo@freewave.com.

Other WAVECONTACT Information



Use the FreeWave <http://support.freewave.com/> website to download the latest version of these documents.

Registration is required to use this website.

Document	Description	FreeWave Part Number
User Manual	The User Manual provides setup, configuration, and safety information for the WC30i.	LUM0084AA
Quick Start Guide	The Quick Start Guide provides the out-of-the-box setup of the WC30i.	QSG0034AA
Application Note	Intrinsically Safe Installation	LAN5509AA
Application Note	Battery Life Estimates	LAN5511AA

Document Styles

This document uses these styles:

- Parameter setting text appears as: **[Page=radioSettings]**
- File names appear as: **configuration.cfg**.
- File paths appear as: **C:\Program Files (x86)\FreeWave Technologies**.
- User-entered text appears as: **xxxxxxxxxx**.



Caution: Indicates a situation that **MAY** cause damage to personnel, the radio, data, or network.

Example: Provides example information of the related text.

FREEWAVE Recommends: Identifies FreeWave recommendation information.

Important!: Provides crucial information relevant to the text or procedure.

Note: Emphasis of specific information relevant to the text or procedure.



Tip Provides time saving or informative suggestions about using the product.



Warning! Indicates a situation that **WILL** cause damage to personnel, the radio, data, or network.

1. Overview

Thank you for purchasing the WC30i Wireless Pressure Sensor.

The WC30i is an intrinsically safe wireless pressure sensor with these features:

- AES 128-bit Encryption
- Standard pressure ranges.
- Compact and simple to install and maintain.
- Powers integrated pressure sensor and radio for years with an internal battery.
- Push-button or remote zeroing.
- Rapid pressure sampling with configurable alarms and report by exception.
- Sends data to a WAVECONTACT Buffered WC45i-Gateway.

Note: See [Available Accessories \(on page 59\)](#) for additional equipment.

Note: The terms node and Endpoint are used interchangeably in this document.

2. Equipment

2.1. Included Equipment

The WC30i package contains one of these Wireless Pressure Sensors and the Quick Start Guide:

Included Equipment		
FreeWave Part #	Qty	Description
WC30i-PSI-1	1	0 to 1 psi Wireless Pressure Sensor
WC30i-PSI-20	1	0 to 20 psi Wireless Pressure Sensor
WC30i-PSI-100	1	0 to 100 psi Wireless Pressure Sensor
WC30i-PSI-500	1	0 to 500 psi Wireless Pressure Sensor
WC30i-PSI-1K	1	0 to 1000 psi Wireless Pressure Sensor
WC30i-PSI-3K	1	0 to 3000 psi Wireless Pressure Sensor
WC30i-PSI-5K	1	0 to 5000 psi Wireless Pressure Sensor
WC30i-PSI-10K	1	0 to 10,000 psi Wireless Pressure Sensor
QSG0034AA	1	Quick Start Guide

2.2. User-supplied Equipment

- 4-pin to USB programming cable (FreeWave Part #: WC-USB-4PIN).
- Computer for WAVECONTACT device configuration.

Note: See [Available Accessories \(on page 59\)](#) for additional equipment.

3. WC30i Wireless Pressure Sensor Connections

- [Internal Connections \(on page 9\)](#)
- [Power Connection \(on page 11\)](#)

3.1. Internal Connections

These are the WC30i connections shown in [Figure 1](#):

WC30i Wireless Pressure Sensor - Connections		
Item #	Title	Description
1	Check-in button	Press the Check-in button to have the WC30i take a reading from the integrated pressure sensor and send the data to the Gateway.
2	Zero button	The Zero button allows the pressure sensor to be zeroed. <ul style="list-style-type: none"> • Hold the Zero button down for 3 seconds to zero the pressure sensor. • The Status LED will come on and blink twice to indicate that the sensor has been zeroed.
3	Config / Debug connector	This is the connection for the 4-pin to USB programming cable (FreeWave Part #WC-USB-4PIN).
4	Internal Lithium Battery connection	The Internal Lithium Battery connection is the connection for the internal battery cable.
5	Internal Lithium Battery Pack	This is the location of the Internal Lithium Battery Pack.
6	Radio LEDs	See LEDs (on page 58) for detailed information.

3. WC30i Wireless Pressure Sensor Connections

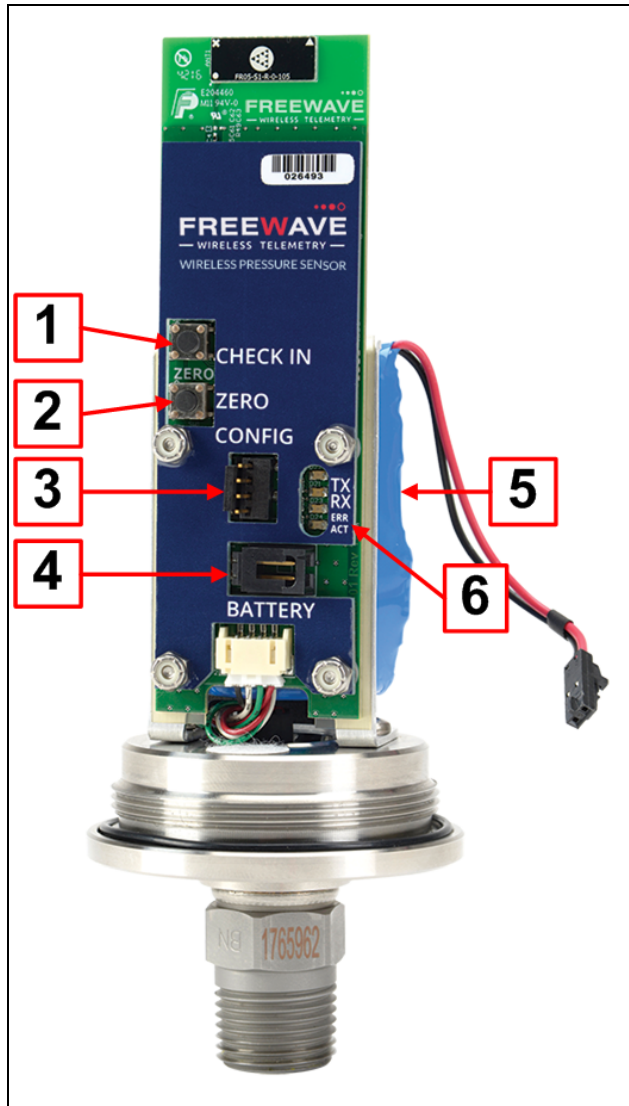


Figure 1: WC30i Wireless Pressure Sensor Connections

3.2. Power Connection

Important! Verify the items listed in [Equipment \(on page 8\)](#) are available before starting this procedure.

It is assumed that the reader and installer have completed the FreeWave WC30i installation and setup training to follow the procedures in this document.

Procedure

1. All wiring should be neat and orderly.
2. Unscrew the cover from the WC30i base.
3. Connect the battery cable to the **Internal Lithium Battery** connection (**see #4** of [Figure 1 of Internal Connections \(on page 9\)](#)).
4. Connect the 4-pin to USB programming cable to the **RS232 Config / Debug** connector (**see #3** of [Figure 1 of Internal Connections \(on page 9\)](#)).
5. Connect the USB end of the 4-pin to USB programming cable to the computer.

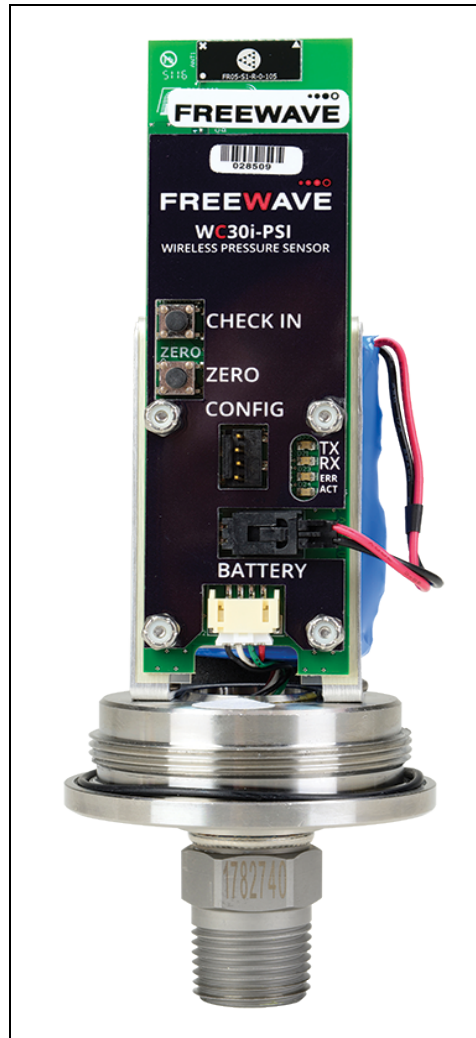


Figure 2: WC30i Battery Cable connection

6. If this is the first time the WC30i is installed, wait for the drivers to install.

Important! Depending on the computer and connection, the driver installation can take 3-6 minutes.

7. Continue with:
 - [WC Toolkit Installation \(on page 13\)](#)
 - [Configuration \(on page 23\)](#)

4. WC Toolkit Installation

Note: The images in this procedure are for Windows® 7 and/or Firefox®. The dialog boxes and windows may appear differently on each computer.

1. Click <http://support.freewave.com/>. The **FreeWave Support** site opens.

Important!: Registration is required to use this website.

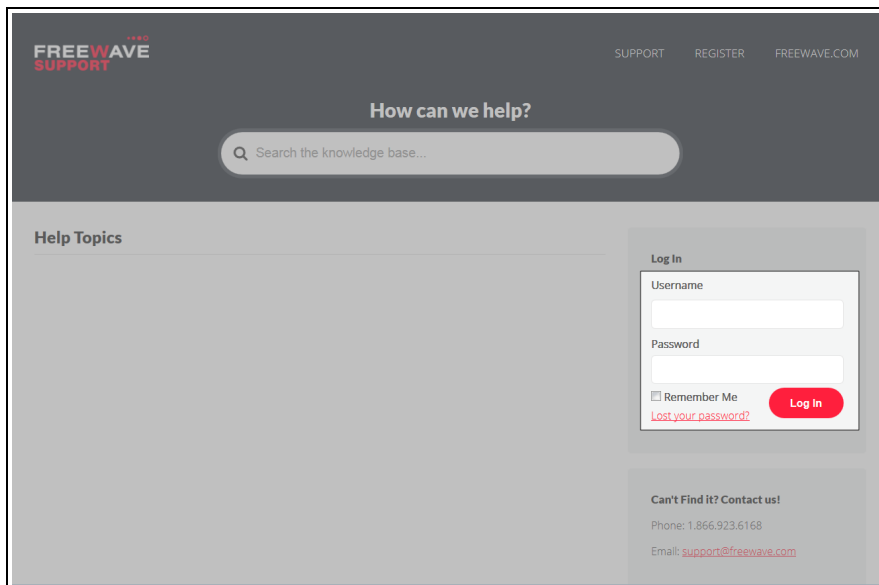
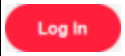


Figure 3: FreeWave Login window

2. Enter the **User Name** and **Password**.

4. WC Toolkit Installation

3. Click .
A successful Login message briefly appears.
The **Help Topics** window opens.
4. Click the **Software** link.

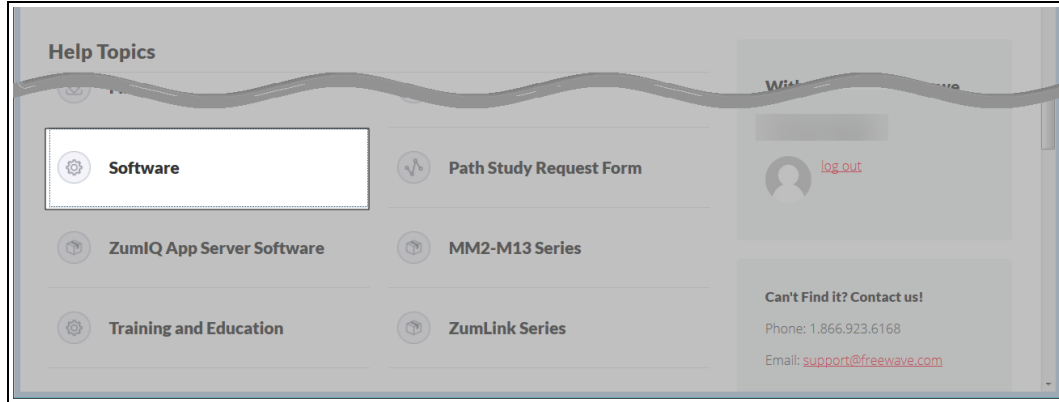


Figure 4: Help Topics window

The **Software** window opens.

5. Click the **WAVECONTACT Toolkit** link.

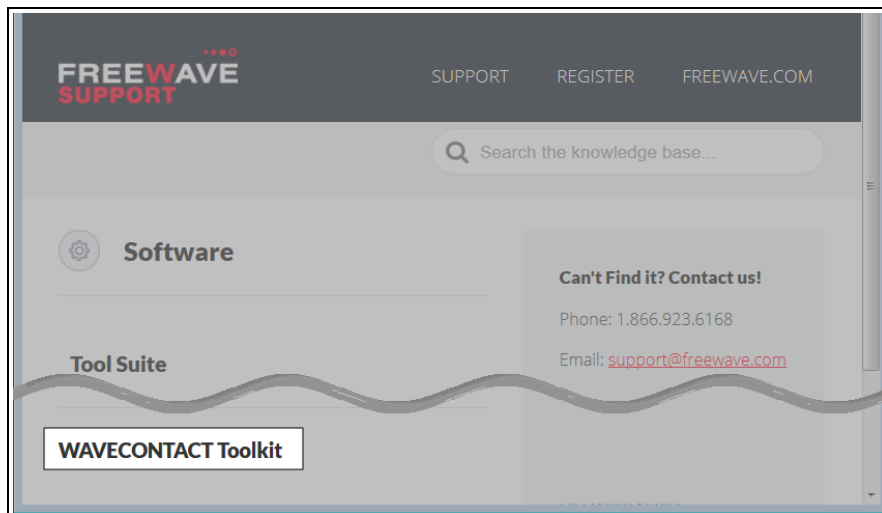


Figure 5: Software window

The available software appears in the window.

6. Select and click the attachment.

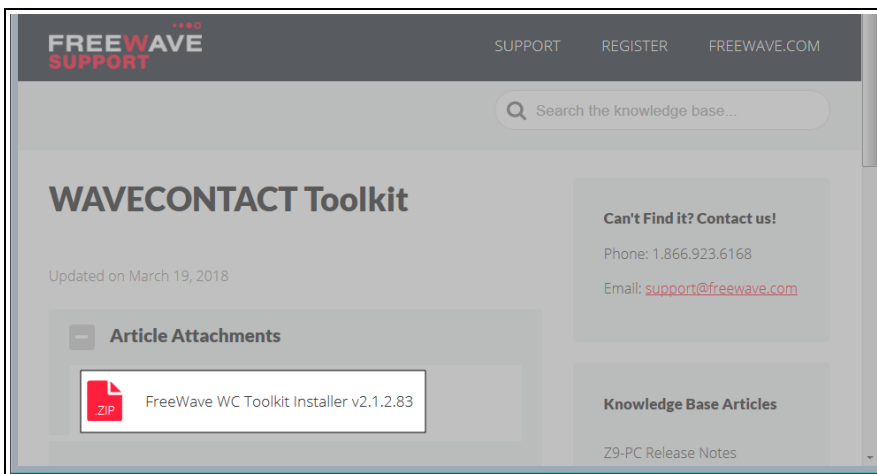


Figure 6: WAVECONTACT Toolkit window

The **Opening** dialog box opens.

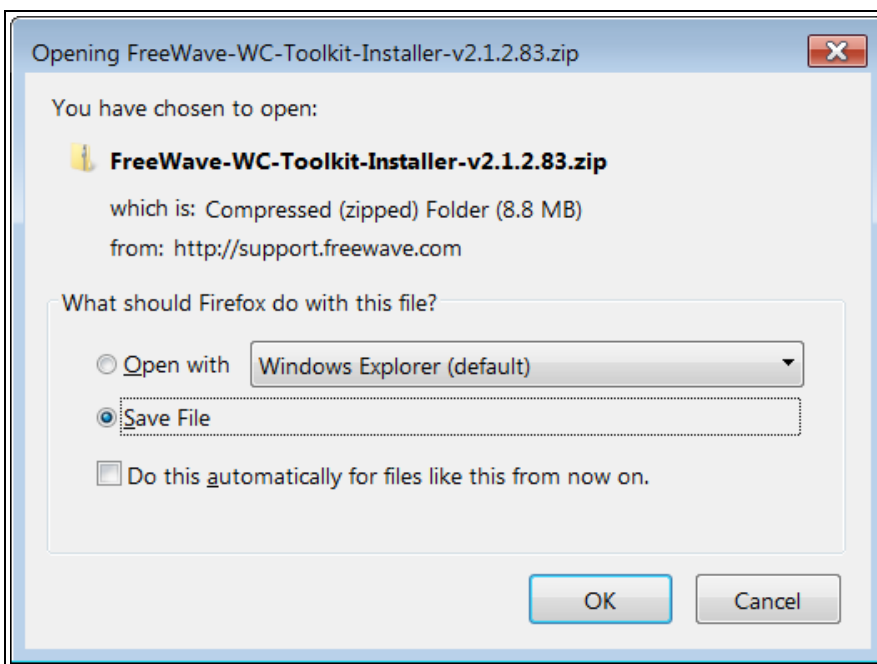


Figure 7: WC Toolkit Opening dialog box

Note: This procedure shows Firefox® dialog boxes. Other browsers will have different dialog boxes and procedures.

7. Click **OK**.
The **Enter name of file to save to** dialog box opens.

4. WC Toolkit Installation

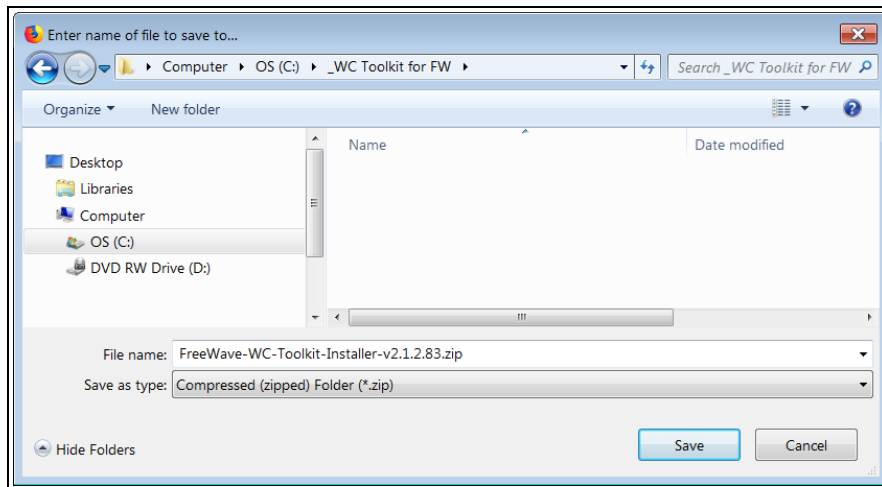


Figure 8: Enter name of file to save to dialog box

8. Search for and select a location to save the **.zip** file to and click **Save**. The **Enter name of file to save to** dialog box closes.
9. Open a Windows® Explorer window and find the location where the **.zip** file was saved.
10. Double-click the **.zip** file.
11. Extract the **.exe** file from the **.zip** file into a parent location.
12. Double-click the **.exe** file to run the WC Toolkit installer. The **Open File - Security Warning** dialog box opens.

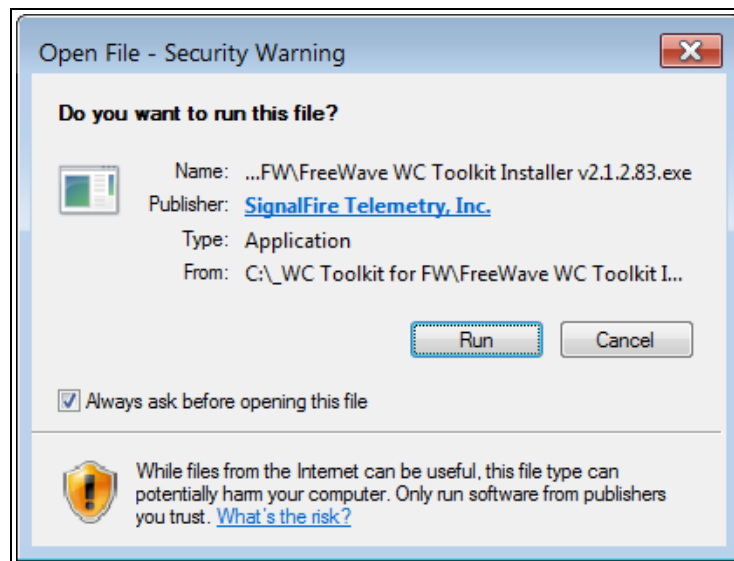


Figure 9: Open File - Security Warning dialog box

13. Click **Run**. The **User Account Control** dialog box opens.

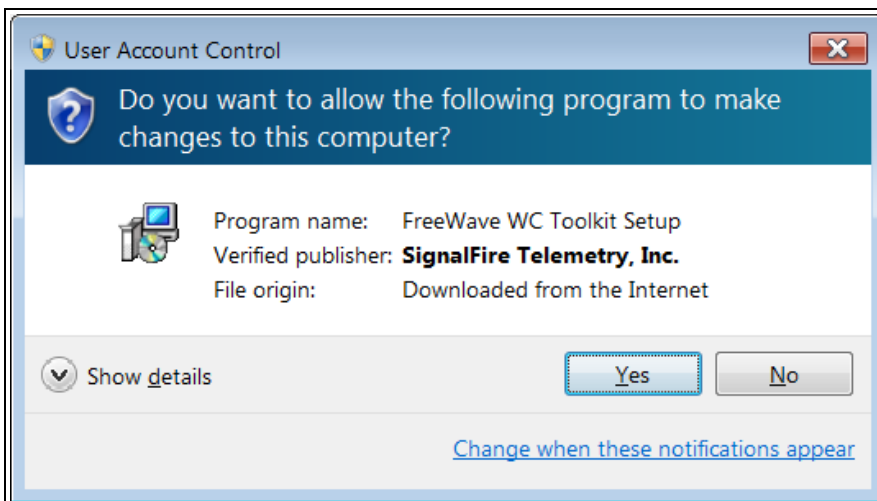


Figure 10: User Account Control dialog box

14. Click **Yes**.
The **WC Toolkit Setup Wizard** starts.

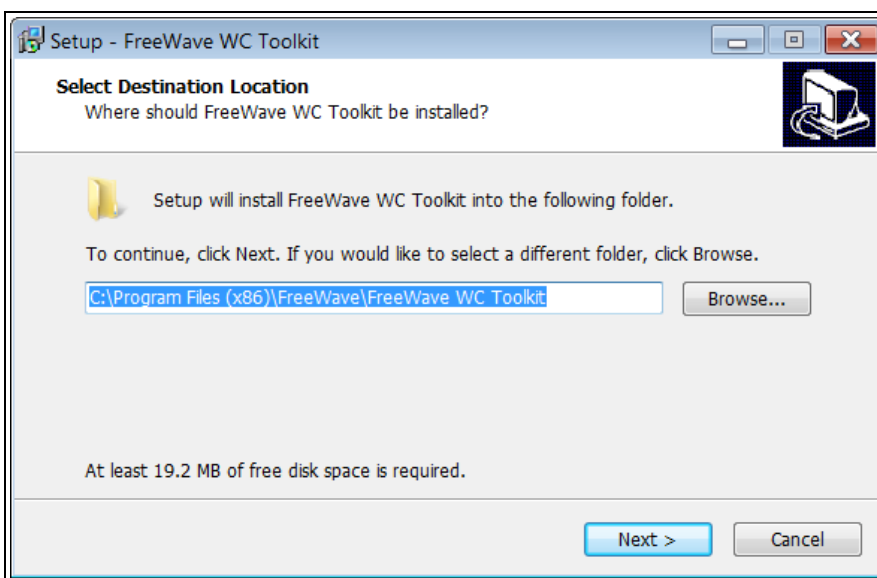


Figure 11: WC Toolkit Setup Wizard - Select Destination Location window

15. Click **Next** to continue.
The **Ready to Install** window opens.

4. WC Toolkit Installation

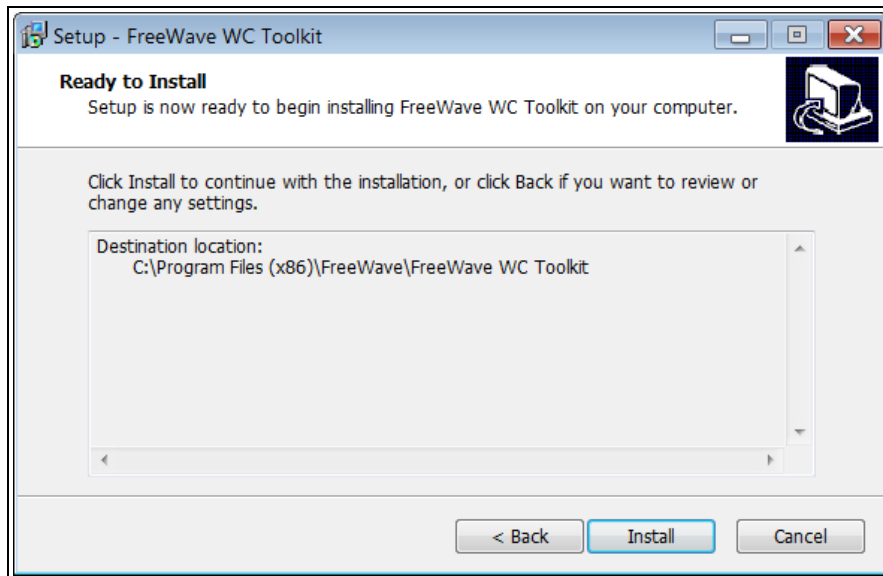


Figure 12: WC Toolkit Setup Wizard - Ready to Install window

16. Click **Install**.
The install process is very quick.
The **Installation Complete** window opens.

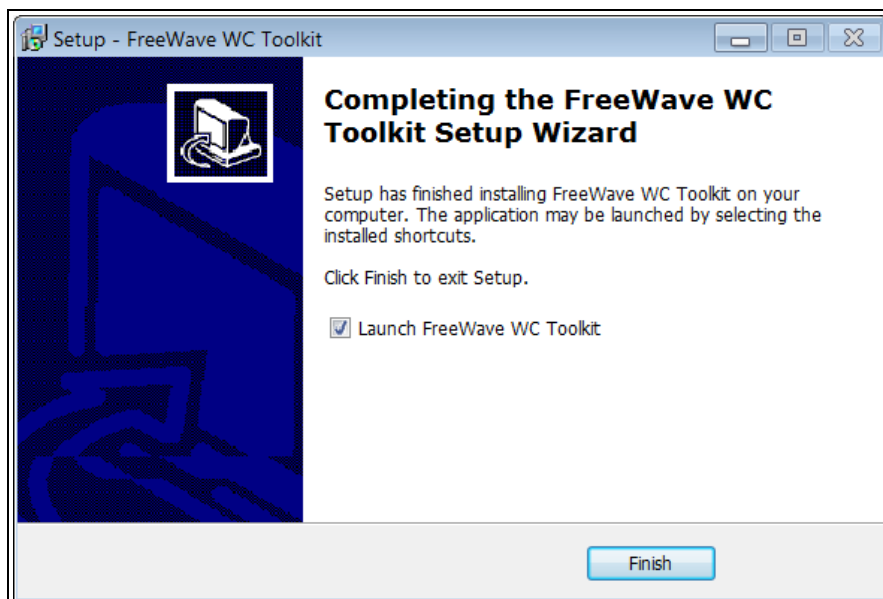


Figure 13: WC Toolkit Setup Wizard - Installation Complete window

17. Click **Finish** to open WC Toolkit.
An **Update** message appears in the WC Toolkit window if an update is available.



Figure 14: WC Toolkit - Update Available message

18. Continue with the [WC Toolkit Update \(on page 20\)](#) procedure.

5. WC Toolkit Update

If the WAVECONTACT device is connected to the internet, WC Toolkit automatically searches for an update for either the WC Toolkit itself or the connected device's firmware.

An **Update Available** message appears if an update is available.

Note: An **Update Available** message also appears in the [Device Configuration window](#) (on page 36) for any connected WAVECONTACT device when an update is available for that device. The update procedure is the same for the device and WC Toolkit.

1. Open the **WC Toolkit** software.

The **Update Available** message appears in the window. ([Figure 15](#))

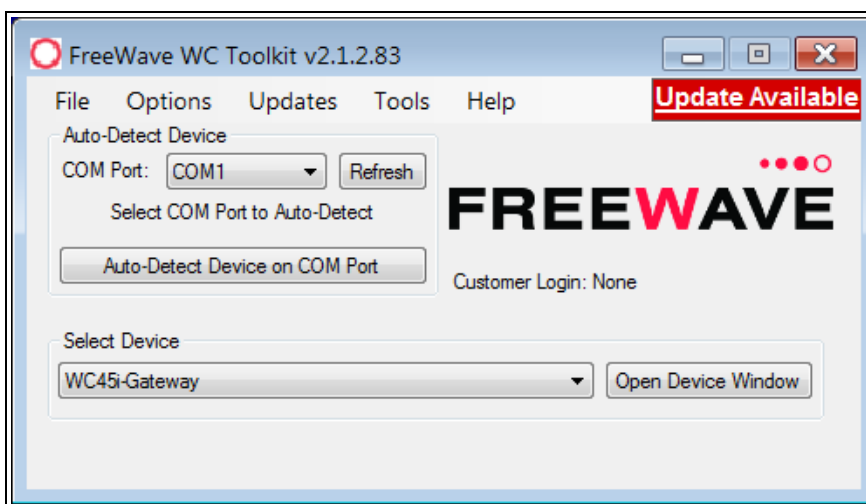


Figure 15: WC Toolkit - Update Available message

5. WC Toolkit Update

2. Click the **Update Available** message link.



Figure 16: Click the Update Available message link

The **Open File - Security Warning** dialog box opens.

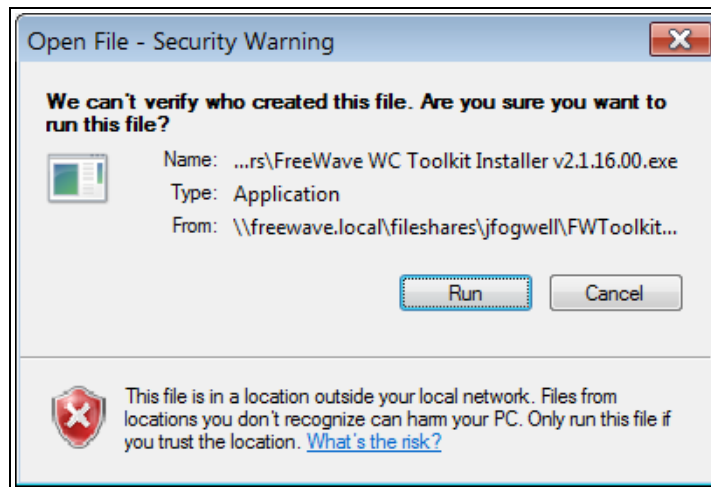


Figure 17: Open File - Security Warning dialog box

3. Click **Run**.
The **User Account Control** dialog box opens.

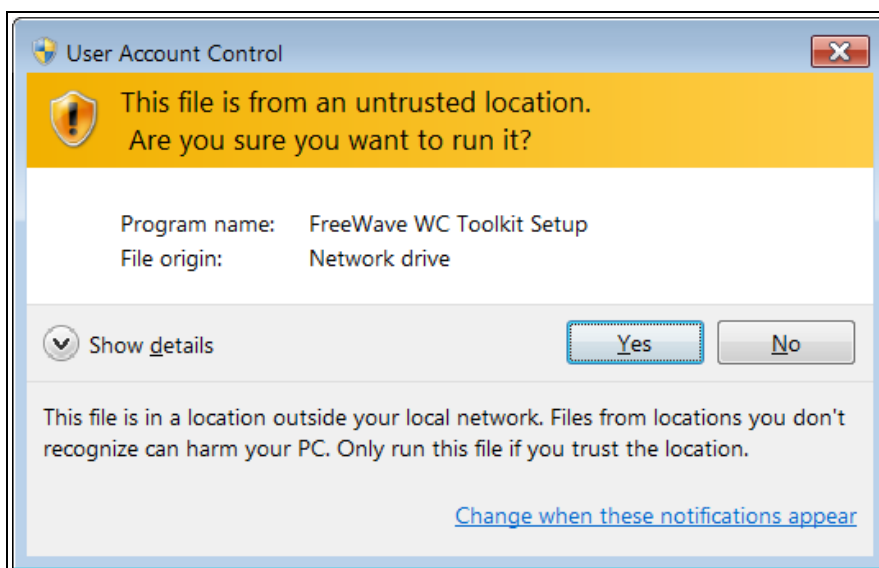


Figure 18: User Account Control dialog box

4. Click **Yes**.
 The WC Toolkit update process is very quick.
 When the update is completed, WC Toolkit re-opens the **Select Device** window showing the updated software version in the WC Toolkit window. (Figure 19)

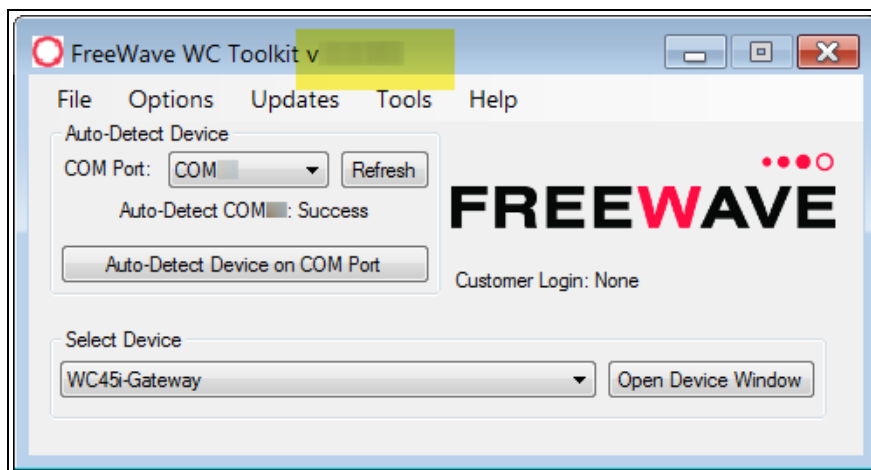


Figure 19: Select Device window

5. Continue with Configuration of the WC30i Wireless Pressure Sensor.

6. Configuration

Note: The terms node and Endpoint are used interchangeably in this document.

FREEWAVE Recommends: Install and configure the **WC45i** Gateway before any Endpoints to ensure the Endpoints have connectivity after installation.



Warning! Perform the Configuration steps in a safe location only.

AVERTISSEMENT: Suivez les étapes de cette section (Configuration) dans un endroit sûr uniquement.

The WC30i Wireless Pressure Sensor **MUST BE** set up for correct operation **before** it is placed in the field.

Configurable items include:

- Check-in period selection
- Modbus Slave ID setting
- Network selection
- Network Group selection
- Radio Mode selection
- Optional: Alarm thresholds and scaling

Important!: The WC30i Wireless Pressure Sensor is configured using the **WC Toolkit**. Download the **WC Toolkit** software from <http://support.freewave.com/>.

6. Configuration



Warning! Debug and configuration information is available if the 4-pin to USB programming cable is connected to the **RS232 Config / Debug** connector using the debug port on the main board.

The USB converter cable (FreeWave Part #WC-USB-4PIN) must be used for this interface. Debug and configuration is done using the WC Toolkit.



Warning! Only connect to the Config / Debug connector port in a safe area!

AVERTISSEMENT: Branchez le port de débogage que dans une zone secure.

Procedure

Note: The screenshots are examples only.
The dialog boxes and windows appear differently on each computer.

1. Verify the WC Toolkit software is installed on the computer connected to the WC30i.

Note: See [WC Toolkit Installation \(on page 13\)](#) and [WC Toolkit Update \(on page 20\)](#).

2. Verify the Gateway is installed and configured before continuing with the Endpoint configuration.
3. Connect the WC-USB-4PIN - 4-pin to USB programming cable to the computer and the WC30i.
4. Open the **WC Toolkit** software.
The **Select Device** window opens. ([Figure 20](#))

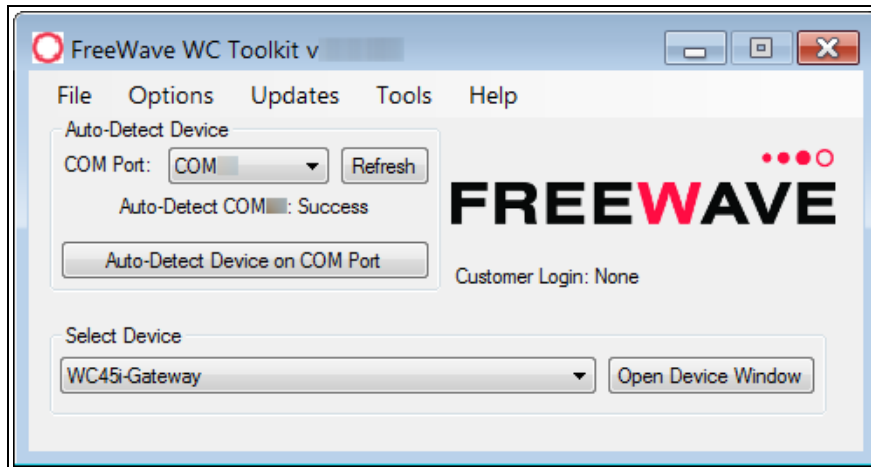


Figure 20: Select Device window

5. Click the **Refresh** button to have WC Toolkit search for and list the available COM ports reported by Windows and connected devices in the **COM Port** list box.
6. Click the **COM Port** list box arrow and select the COM port on the computer associated with the connected WC30i Wireless Pressure Sensor.
7. Click the **Auto-Detect Device on COM Port** button to have WC Toolkit connect the device to the COM Port selected in the **COM Port** list box.

Note: Optional: Click the **Select Device** list box arrow and select the connected WC30i device.

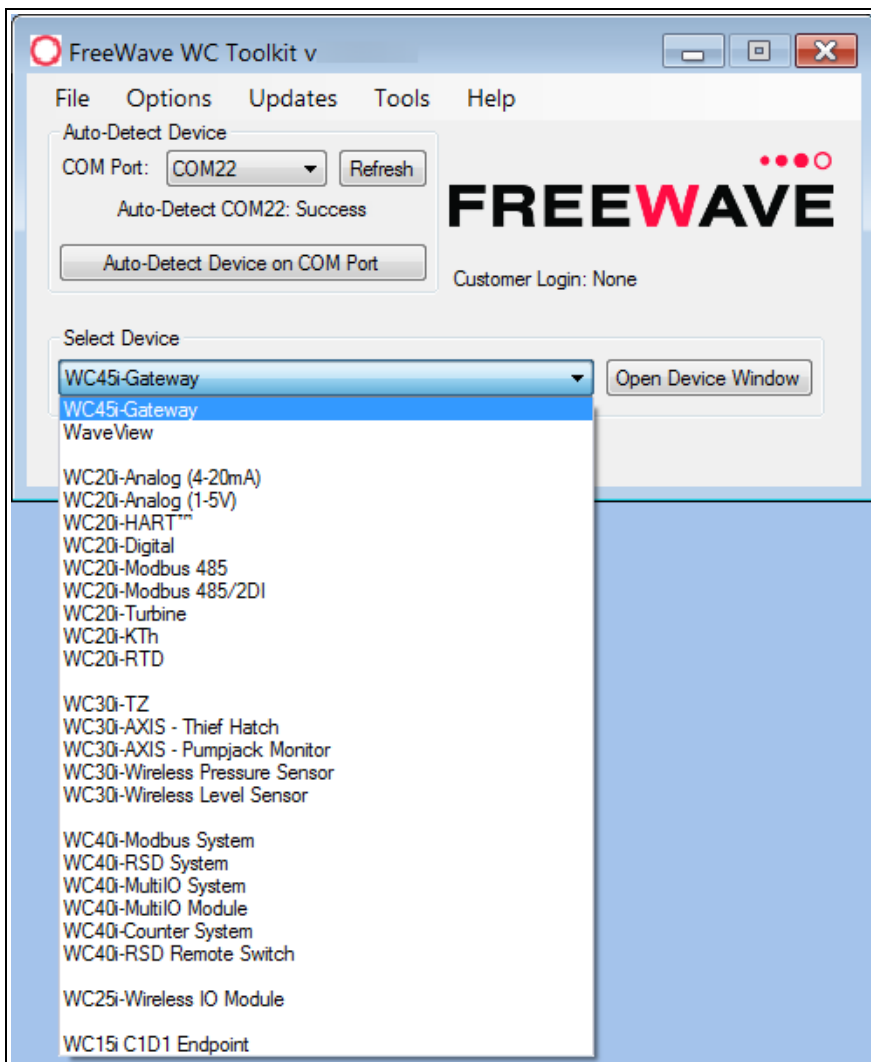


Figure 21: Select Device list box

The **Device Configuration** window opens for the selected device.

Note: See [Device Configuration window \(on page 36\)](#) for detailed information.

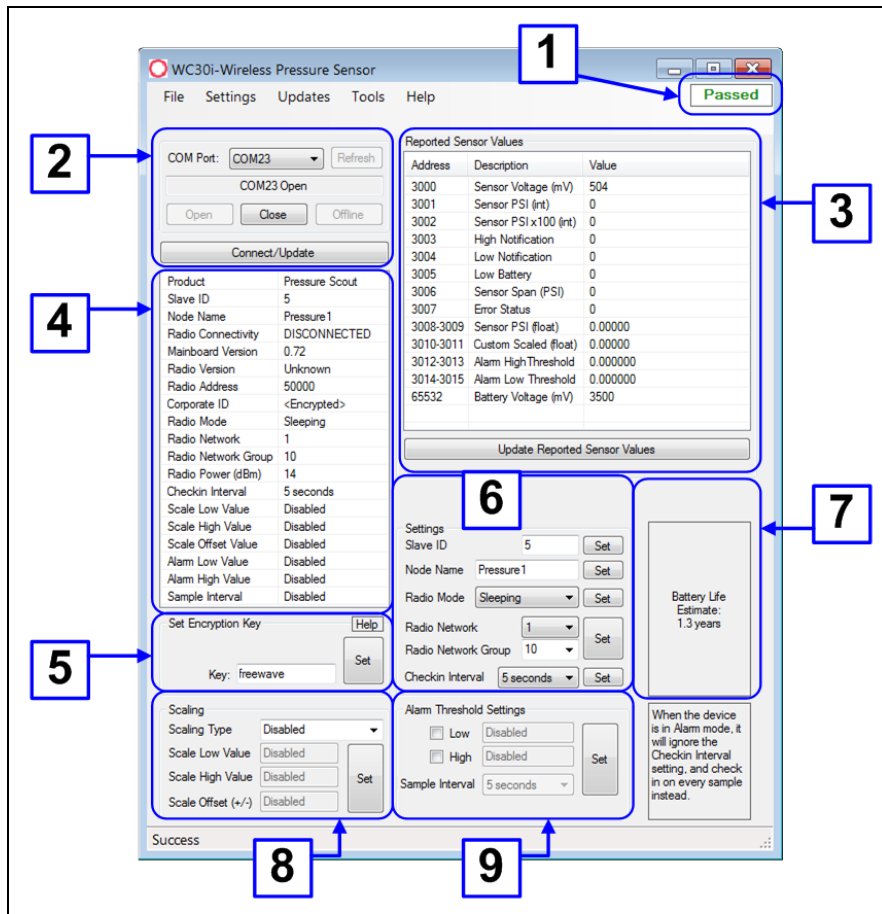


Figure 22: Device Configuration window: WC30i

8. In the **Set Encryption Key** area (#5), change these settings:
 - a. In the **Key** text box, enter the encryption key for the device using 6 to 16 characters.
 - b. Click the **Set** button to save the information.

Important! A Key CANNOT contain spaces or angle brackets.
The Gateway and Endpoints only communicate if they are configured with the same **Key**.
When setting up a new network, use this same encryption Key on all the devices.

Note: When the WC30i drops its network, it attempts to join networks using the same encryption **Key**.



Caution: It is possible to hide the encryption **Key** so it cannot be read.
This is the most secure option, but if the **Key** is forgotten, there is **no way to recover it**.
The **Key** must be reset on every device on the network.

9. Optional: Click the **Settings** menu and select **Set Encryption Key Unrecoverable** to permanently hide the key.
10. In the **Settings** area (#6), change these settings:

Note: The **Network** settings are used to create separate networks using multiple Gateways (that are in close proximity to one another).

Important! The **Radio Network** and **Radio Network Group** settings are selected by the user but **MUST MATCH** the existing Gateway network for successful communication between the Gateway and Endpoint.
See [WAVECONTACT Network Frequencies \(on page 43\)](#) for additional information.

- a. In the **Slave ID** column / text box, enter the remote source Endpoint Modbus Slave ID.

Note: Each remote device connected to the Gateway **MUST** have a unique Modbus Slave ID (1-240).
See [Remote Modbus Registers \(on page 55\)](#) for Modbus details.

Important! Verify there are no duplicate Slave IDs in a given network.
The Gateway only caches one set of data for each Slave ID.
A duplicate is overwritten.

- b. Click the **Set** button to save the information.
c. In the **Node Name** text box, enter a name for the Endpoint using a maximum of 10 characters.
d. Click the **Set** button to save the information.
e. Click the **Radio Mode** list box arrow and select either **Sleeping** or **Non-Sleeping**.



Caution: Do NOT use the **Non-Sleeping** option with the WC30i because of rapid depletion of battery life.

- f. Click the **Set** button to save the information.
g. Click the **Radio Network** list box arrow and select 0 (zero) to 7 for the assigned number.
h. Click the **Set** button to save the information.
i. Click the **Radio Network Group** list box arrow and select 0 (zero) to 29 for the network group assigned number.
j. Click the **Set** button to save the information.
k. Click the **Checkin Interval** list box arrow and select how often the Endpoint wakes up, reads the sensor values, and transmits the data to the Gateway.
l. Click the **Set** button to save the information.
11. Optional: In the **Scaling** area (#8), customize the reported pressure using any range of numbers.
- a. Click the **Scaling Type** list box arrow and select the measurement unit to report the pressure sensor data in.




Example: Scaling can be used to scale PSI to inches of H2O.

6. Configuration

- b. In the **Scale Low Value** text box, manually enter the sensor's lower range value.
 - c. In the **Scale High Value** text box, manually enter the sensor's upper range value.
 - d. In the **Scale Offset (+/-)** text box, enter an offset to add to or subtract from the reported scaled value.
 - e. Click the **Set** button to save the information.
12. Optional: In the **Alarm Threshold Settings** area (#9), define the pressure alarm threshold and interval time.

Note: The **Low** and **High Alarm Thresholds** are enabled individually. When above the high alarm threshold or below the low alarm threshold is crossed, the WC30i checks in immediately at the selected **Sample Interval** time.

- a. Select the **Low** check box and, in the **Low** text box, enter the pressure below which a low alarm is triggered.
 - b. Select the **High** check box and, in the **High** text box, enter the pressure above which a high alarm is triggered.
 - c. Click the **Sample Interval** list box arrow and select either 5 or 15 seconds as the rapid pressure interval.
 - d. Click the **Set** button to save the information.
13. On the , press the **Check-in** button to .
14. Verify the Gateway is communicating with the Endpoints.

Note: A successful connection on the WAVECONTACT Endpoint is indicated with Green blinking  TX and ACT lights and a Red blinking  light for RX. If the connection is NOT successful, a Green blinking  TX light appears for 10 seconds.

FREEWAVE Recommends: Install and configure the **WC45i** Gateway before any Endpoints to ensure the Endpoints have connectivity after installation.

15. Close the WC Toolkit software.
16. Remove the WC-USB-4PIN 4-pin to USB programming cable from the computer and the WC30i.
17. Screw the cover back onto the WC30i base.
18. Use the ½" male MNPT process fitting to mount the WC30i directly to the pressure source.

FREEWAVE Recommends: It is strongly recommended to mount the WC30i Wireless Pressure Sensor so it is vertically orientated with the pressure fitting facing down.

Note: See [Control Drawing: 960-0081-02 \(on page 54\)](#) for additional information.

7. Mounting, Battery Replacement, Cleaning

- The WC30i:
 - has an integrated pressure sensor with a ½” male MNPT process fitting.
 - is mounted directly to the pressure source.
 - [Mount the WC30i Wireless Pressure Sensor \(on page 30\)](#)
 - [Internal Lithium Battery Replacement \(on page 30\)](#)
 - [Cleaning Instructions \(on page 30\)](#)

Note: See [Available Accessories \(on page 59\)](#) for additional equipment.

7.1. Mount the WC30i Wireless Pressure Sensor

Use the ½” male MNPT process fitting to mount the WC30i directly to the pressure source.

FREEWAVE Recommends: It is strongly recommended to mount the WC30i Wireless Pressure Sensor so it is vertically orientated with the pressure fitting facing down.

7.2. Internal Lithium Battery Replacement

Warning! Use of any battery other than the WAVECONTACT Internal Lithium Battery Pack (FreeWave Part # WC-1BAT-IS) will impair the protection provided by the equipment.



AVERTISSEMENT: L'utilisation d'une pile autre que la référence WAVECONTACT Internal Lithium Battery Pack (FreeWave Part # WC-1BAT-IS) compromettra la protection fournie par l'équipement.

Note: See [Available Accessories \(on page 59\)](#) for the FreeWave Part # to order the correct replacement battery.

Note: Battery Packs can be changed with the Endpoint in place.

1. Unscrew the cover from the WC30i base.
2. Depress the locking clip on the **Internal Lithium Battery** connection and unplug the battery from the PCB.
3. Remove and replace the battery.
4. Connect the battery to the PCB battery connector.
5. Screw the cover back onto the WC30i base.

7.3. Cleaning Instructions

The outside of the enclosure may be cleaned with water, mild soap, and a damp cloth as needed.



Caution: High pressure washing is NOT recommended.

Warning! Electrostatic Discharge Hazard!

Care must be taken to avoid the potential of creating a charge on the enclosure or antenna. Do NOT wipe with a dry cloth.



Do NOT brush against the enclosure with clothing or gloves.

AVERTISSEMENT: Risque de décharge électrostatique! Il faut veiller à éviter tout risque de changement de l'enceinte ou de l'antenne.

Ne pas essuyer avec un chiffon sec.

Ne pas broser contre l'enceinte avec des vêtements ou des gants.

8. Battery Life Estimates

The WC20i and WC30i wireless Endpoints and WC30i-TZ Wireless Flow Totalizer contain an intrinsically safe battery pack.

The batteries in this pack:

- contain lithium thionyl chloride batteries with IS protection circuits.
- have high power density with extended temperature range operation.

Two main parameters factor into the battery life:

- the interval selection made in the **Checkin Interval** list box.
- the amount of time entered in the **Sensor On Time (sec)** text box.

This section includes:

- [Battery Discharge / Alarm Threshold \(on page 32\)](#)
- [Battery Life Estimate Calculator \(on page 32\)](#)
- [View the Battery Life Estimator \(on page 32\)](#)
- [WC30i Wireless Pressure Sensor Battery Life Estimates \(on page 34\)](#)

The vast majority of the battery capacity is used to power the attached sensor. It is important to minimize the sensor on time (warm up time) and use the longest update interval practical for the application.

FREEWAVE Recommends: Sensors requiring rapid update rates or long sensor on-times are best served with a WC20i-Solar kit.

See the WAVECONTACT Accessories Data Sheet for WC20i-Solar kit details.



Caution: Having the **Sensor Always On** selected is useful for rapid data collection on a sensor that has a long warm-up time. However, it will shorten the battery life **dramatically** unless a **Solar Powered WC20i** is used.

8.1. Battery Discharge / Alarm Threshold

The WC20i, WC30i, and WC30i-TZ batteries exhibit a flat discharge curve, with a sharp voltage fall off at the end of their life.

Important! Carefully monitor the battery voltage to determine when a battery is nearing end of life. The WC20i, WC30i, and WC30i-TZ report their battery voltage (which it measures with sensor powered) at each check-in interval.

FREEWAVE Recommends: A battery alarm threshold of 3.1V to 3.0V. For critical measurements, a regular battery replacement schedule as preventive maintenance is recommended.

8.2. Battery Life Estimate Calculator

The WC Toolkit provides a battery life estimator, which updates whenever an operational parameter is changed.

Note: The WC Toolkit battery life estimator may be used offline when not connected to a WC20i or WC30i.

8.2.1. View the Battery Life Estimator

1. Verify the WC Toolkit software is installed on the computer connected to the WC30i.

Note: See [WC Toolkit Installation \(on page 13\)](#) and [WC Toolkit Update \(on page 20\)](#).

2. Verify the Gateway is installed and configured before continuing with the Endpoint configuration.
3. Connect the WC-USB-4PIN - 4-pin to USB programming cable to the computer and the WC30i.
4. Open the **WC Toolkit** software.
The **Select Device** window opens. ([Figure 23](#))

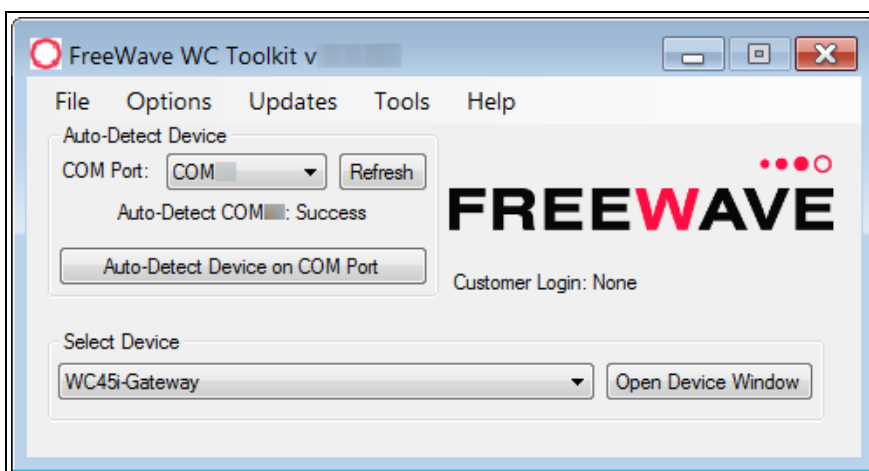


Figure 23: Select Device window

4. Click the **Refresh** button to have WC Toolkit search for and list the available COM ports reported by Windows and connected devices in the **COM Port** list box.
5. Click the **COM Port** list box arrow and select the COM port on the computer associated with the connected WC30i Wireless Pressure Sensor.
6. Click the **Auto-Detect Device on COM Port** button to have WC Toolkit connect the device to the COM Port selected in the **COM Port** list box.

The **Device Configuration** window opens for the selected device.

7. Click the **Checkin Interval** list box arrow and select how often the Endpoint wakes up, reads the sensor values, and transmits the data to the Gateway.
8. Click the **Set** button to save the information.
9. On a WC30i Wireless Pressure Sensor, in the **Alarm Threshold Settings** area (#9 of [Figure 24](#)):
 - a. Select the **Low** check box and, in the **Low** text box, enter the pressure below which a low alarm is triggered.
 - b. Select the **High** check box and, in the **High** text box, enter the pressure above which a high alarm is triggered.
 - c. Click the **Sample Interval** list box arrow and select either 5 or 15 seconds as the rapid pressure interval.

The calculated estimated battery life appears in area #7 of [Figure 24](#).

8. Battery Life Estimates

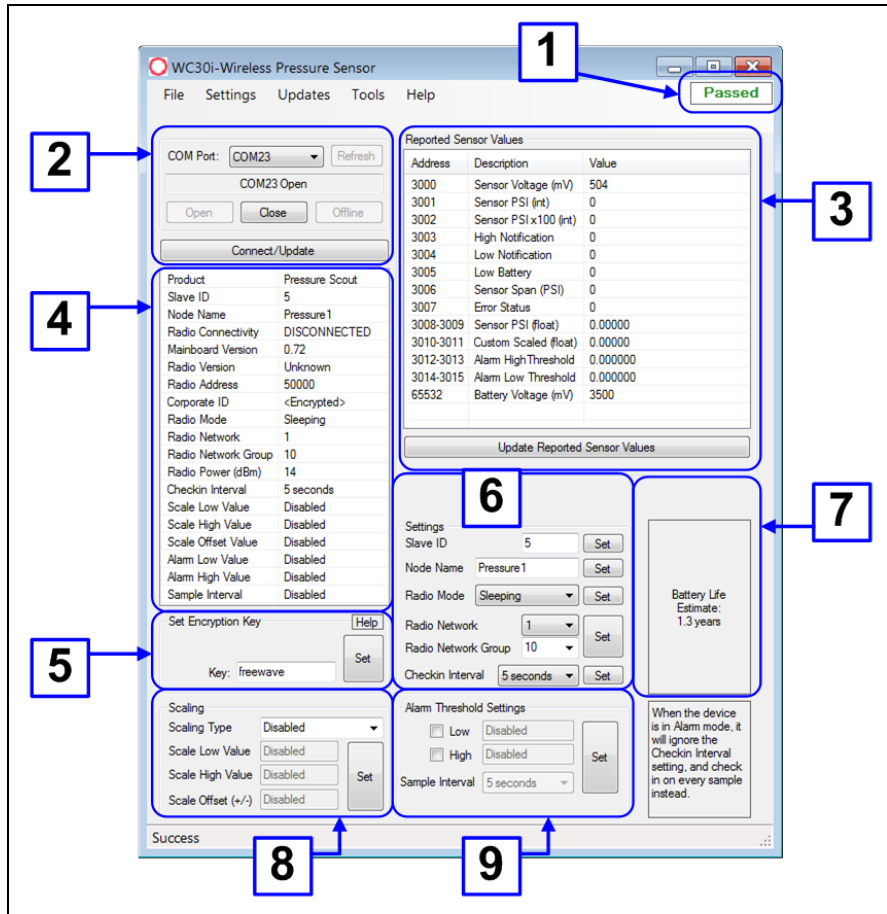


Figure 24: Device Configuration window: WC30i

Important! The area shows **ONLY an estimate** of how much longer the battery charge is expected to last based on a new battery.

8.3. WC30i Wireless Pressure Sensor Battery Life Estimates

Note: For the WC30i, all **Check-in Interval** settings of 1 minute or more **without Alarm Sampling** enabled are 10+ years.

WC30i Wireless Pressure Sensor									
	Selection made in the Checkin Interval list box								
	5 sec	15 sec	1 min	2 min	4.5 min	10 min	15 min	30 min	60 min
Seconds entered in the Sensor On Time (sec) text box	Battery Life Estimates (years)								
5	1.3	2.8	6.7	10+	10+	10+	10+	10+	10+
15	N/A	3.3	9.2	10+	10+	10+	10+	10+	10+

9. WC Toolkit Software Environment

The WC Toolkit software environment uses these windows to configure all WAVECONTACT devices:

- [Device Configuration window \(on page 36\)](#)

9.1. Device Configuration window

The **Device Configuration** window is used to configure the settings on the WC30i Wireless Pressure Sensor.

Access and Window Description

1. Verify the WC Toolkit software is installed on the computer connected to the WC30i.

Note: See [WC Toolkit Installation \(on page 13\)](#) and [WC Toolkit Update \(on page 20\)](#).

2. Verify the Gateway is installed and configured before continuing with the Endpoint configuration.
3. Connect the WC-USB-4PIN - 4-pin to USB programming cable to the computer and the WC30i.
4. Open the **WC Toolkit** software.
The **Select Device** window opens. (Figure 25)

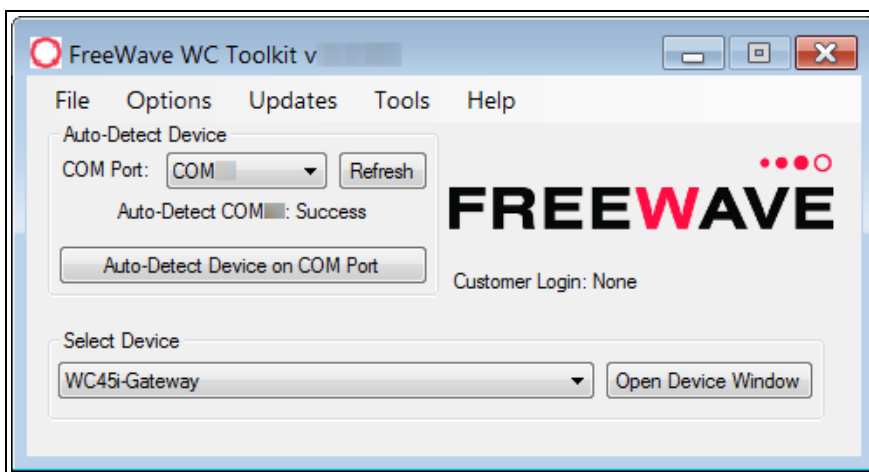


Figure 25: Select Device window

3. Click the **Refresh** button to have WC Toolkit search for and list the available COM ports reported by Windows and connected devices in the **COM Port** list box.
4. Click the **COM Port** list box arrow and select the COM port on the computer associated with the connected WC30i Wireless Pressure Sensor.
5. Click the **Auto-Detect Device on COM Port** button to have WC Toolkit connect the device to the COM Port selected in the **COM Port** list box.

Note: Optional: Click the **Select Device** list box arrow and select the connected WC30i device.

The **Device Configuration** window opens for the selected device.

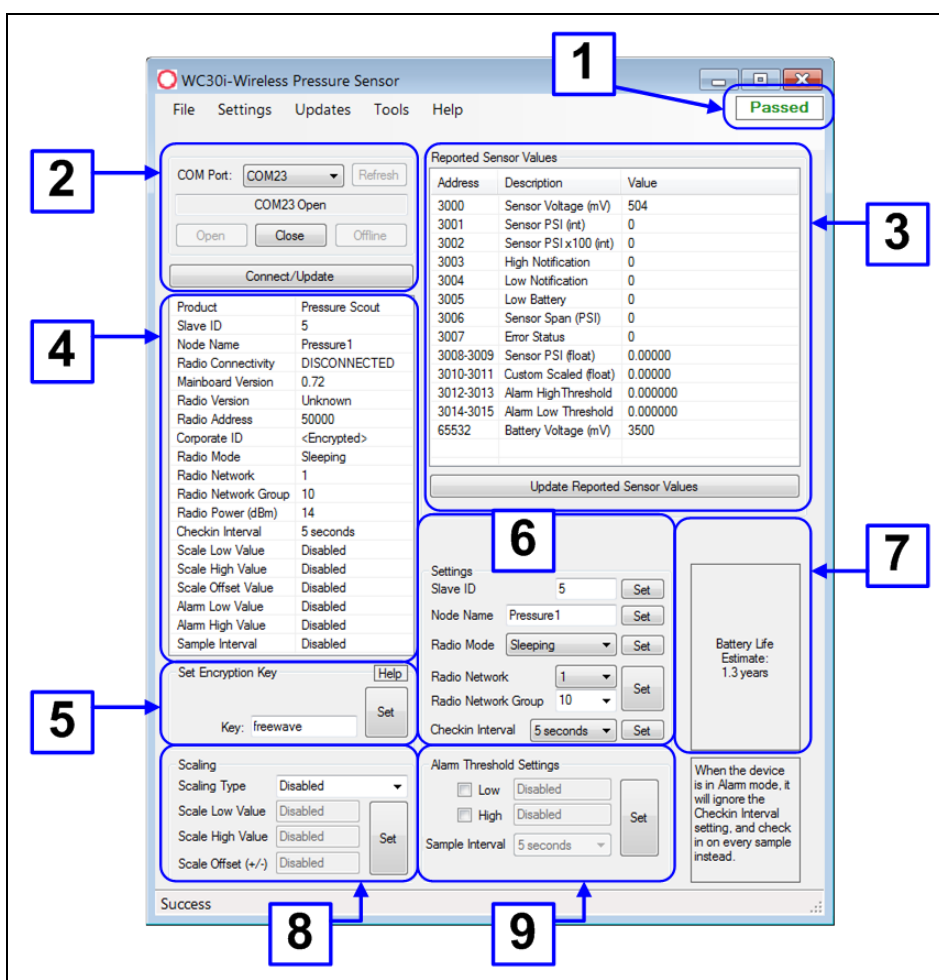


Figure 26: Device Configuration window: WC30i

Device Configuration window: WC30i		
Control Area	Control Title	Control Description
1 - Status of Last Operation text box		<p>The Status of Last Operation text box indicates whether the last command from the WC Toolkit to the connected device is Active or has Passed.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Note: A Firmware Update Available message appears in this text box when the WC Toolkit has detected that a newer version of firmware is available for download than what is installed on the device.</p> </div> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Note: This information is read-only.</p> </div>
2 - Serial Port Settings area		<p>The Serial Port Settings area shows the connected COM port and is used to re-connect to the COM port if the connection is lost.</p>


Device Configuration window: WC30i		
Control Area	Control Title	Control Description
2 - Serial Port Settings area	COM Port list box	Click the COM Port list box arrow and select the COM port on the computer associated with the connected WC30i Wireless Pressure Sensor.
2 - Serial Port Settings area	Refresh button	Click the Refresh button to have WC Toolkit search for and list the available COM ports reported by Windows and connected devices in the COM Port list box.
2 - Serial Port Settings area	COM text box	The COM text box shows the COM port the WAVECONTACT device is connected to. Note: This information is read-only.
2 - Serial Port Settings area	Open button	Click the Open button to re-connect the WAVECONTACT device to the COM port.
2 - Serial Port Settings area	Close button	Click the Close button to disconnect the WAVECONTACT device from the COM port.
2 - Serial Port Settings area	Offline button	Click the Offline button to disconnect the WAVECONTACT device from the COM port but continue to configure the device offline.
2 - Serial Port Settings area	Connect / Update button	Click the Connect / Update button to re-connect to the COM port of the WAVECONTACT device. Note: When the connection is made to the IP Address, full access to the Gateway is available as if a direct serial connection is used. This includes full remote configuration capability.
3 - Reported Sensor Values area		The Reported Sensor Values area shows the reported data values from the attached sensor. Note: This information is read-only.
4 - WC30i Information area		The Information area of the Device Configuration window shows connection information about the connected WAVECONTACT device. Note: This information is read-only.
5 - Set Encryption Key area		The Set Encryption Key area is used to activate and define the encryption key for the WAVECONTACT device.
5 - Set Encryption Key area	Help button	Click to open the Encryption Help message.

Device Configuration window: WC30i		
Control Area	Control Title	Control Description
5 - Set Encryption Key area	Key text box	In the Key text box, enter the encryption key for the device using 6 to 16 characters. Important! A Key CANNOT contain spaces or angle brackets. The Gateway and Endpoints only communicate if they are configured with the same Key .
5 - Set Encryption Key area	Set button	Click the Set button to save the information.
6 - Settings area		The Settings area is used to define the radio mode and radio network. Note: See the Settings area (on page 39) for detailed information about the settings.
7 - Battery Life Estimate area		The Battery Life Estimate area shows ONLY an estimate of how long a fully charged battery is expected to last. Note: This information is read-only.
8 - Scaling area		In the Scaling area (#8), customize the reported pressure using any range of numbers. Note: See the Scaling area (on page 41) for detailed information about the settings.
9 - Alarm Threshold Settings area		In the Alarm Threshold Settings area (#9), define the pressure alarm threshold and interval time. Note: See the Alarm Threshold Settings area (on page 42) for detailed information about the settings.

9.1.1. Settings area

The **Settings** area is used to define the radio mode and radio network.

Device Configuration window: Settings area	
Control Title	Control Description
Set button	Click the Set button to save the information.

Device Configuration window: Settings area	
Control Title	Control Description
Slave ID text box	<p>In the Slave ID column / text box, enter the remote source Endpoint Modbus Slave ID.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Important! Verify there are no duplicate Slave IDs in a given network. The Gateway only caches one set of data for each Slave ID. A duplicate is overwritten.</p> </div>
Node Name text box	Optional: In the Node Name text box, enter a name for the Endpoint using a maximum of 10 characters.
Radio Mode list box	<p>Click the Radio Mode list box arrow and select either Sleeping or Non-Sleeping.</p> <ul style="list-style-type: none"> • Sleeping: Select Sleeping to reduce power consumption and to use the designated Checkin Interval list box to connect with the Gateway. • Non-Sleeping: Select Non-Sleeping to always be in communication with the Gateway. <div style="border: 1px solid orange; padding: 5px; margin-top: 10px;"> <p> Caution: Do NOT use the Non-Sleeping option with the WC30i because of rapid depletion of battery life.</p> </div> <div style="border: 1px solid gray; padding: 5px; margin-top: 10px;"> <p>Note: The default value is Sleeping.</p> </div>
Radio Network list box	<p>Click the Radio Network list box arrow and select 0 (zero) to 7 for the assigned number.</p> <div style="border: 1px solid gray; padding: 5px; margin-top: 10px;"> <p>Note: The default value is 1.</p> </div> <div style="border: 1px solid gray; padding: 5px; margin-top: 10px;"> <p>Important! The Radio Network and Radio Network Group settings are selected by the user but MUST MATCH the existing Gateway network for successful communication between the Gateway and Endpoint. See WAVECONTACT Network Frequencies (on page 43) for additional information.</p> </div>
Radio Network Group list box	<p>Click the Radio Network Group list box arrow and select 0 (zero) to 29 for the network group assigned number.</p> <div style="border: 1px solid gray; padding: 5px; margin-top: 10px;"> <p>Note: The default value is 10.</p> </div> <div style="border: 1px solid gray; padding: 5px; margin-top: 10px;"> <p>Important! The Radio Network and Radio Network Group settings are selected by the user but MUST MATCH the existing Gateway network for successful communication between the Gateway and Endpoint. See WAVECONTACT Network Frequencies (on page 43) for additional information.</p> </div>

Device Configuration window: Settings area	
Control Title	Control Description
Checkin Interval list box	Click the Checkin Interval list box arrow and select how often the Endpoint wakes up, reads the sensor values, and transmits the data to the Gateway. The options are: <ul style="list-style-type: none"> • 5 seconds • 15 seconds • 1 minute • 2 minutes • 4.5 minutes • 10 minutes • 15 minutes • 30 minutes • 60 minutes <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> Note: The default value is 5 seconds. </div>


9.1.2. Scaling area

In the **Scaling** area (#8), customize the reported pressure using any range of numbers.

Example: For a 0-1000 PSI sensor, set the **Scale Low Value** list box to 0 (zero) and the **Scale High Value** list box to 1000.

The scaled value is shown in the **Device Configuration** window and reported to the Gateway as a floating point number.

Device Configuration window: Scaling area	
Control Title	Control Description
Scaling Type list box	Click the Scaling Type list box arrow and select the measurement unit to report the pressure sensor data in. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> Note: The default value is Disabled. </div> The options are: <ul style="list-style-type: none"> • Disabled - When Disabled is selected, no Scaling options are available for the WC30i. • Custom - Select Custom to specify the data from a sensor with a unique scaling measurement. • Bar - Select Bar to report the pressure information in Bar. • Kpa - Select Kpa to report the pressure information in Kpa. • in H2O - Select in H2O to report the pressure information in inches of water. • ft H2O - Select ft H2O to report the pressure information in feet of water.
Scale Low Value list box	In the Scale Low Value text box, manually enter the sensor's lower range value.

Device Configuration window: Scaling area	
Control Title	Control Description
Scale High Value list box	In the Scale High Value text box, manually enter the sensor's upper range value.
Scale Offset (+/-) list box	Optional: In the Scale Offset (+/-) text box, enter an offset to add to or subtract from the reported scaled value. <div style="border: 1px solid gray; padding: 5px; display: inline-block;">  This can be used to convert from gauge pressure to absolute pressure. </div>

9.1.3. Alarm Threshold Settings area

In the **Alarm Threshold Settings** area (#9), define the pressure alarm threshold and interval time.

Device Configuration window: Alarm Threshold Settings area	
Control Title	Control Description
Low check box and text box	Select the Low check box and, in the Low text box, enter the pressure below which a low alarm is triggered.
High check box and text box	Select the High check box and, in the High text box, enter the pressure above which a high alarm is triggered.
Sample Interval list box	Click the Sample Interval list box arrow and select either 5 or 15 seconds as the rapid pressure interval.
Set button	Click the Set button to save the information.

10. WAVECONTACT Network Frequencies

The frequencies used by the WAVECONTACT network vary depending on the **Radio Network** and **Radio Network Group** selected in the [Device Configuration window \(on page 36\)](#).

Example: Using the [Radio Network Group Selection: 0, 1, 2, or 3 \(on page 44\)](#) table, the **Radio Network** and **Radio Network Group** settings of 0 (zero) and 0 (zero) (respectively) uses the frequencies between 908.20 and 918.20.

The **Radio Network** and **Radio Network Group** settings of 0 (zero) and 2 (respectively) uses 905.00 to 915.00.

- [Radio Network Group Selection: 0, 1, 2, or 3 \(on page 44\)](#)
- [Radio Network Group Selection: 4, 5, 6, or 7 \(on page 45\)](#)
- [Radio Network Group Selection: 8, 9, 10, 11 \(on page 46\)](#)
- [Radio Network Group Selection: 12, 13, 14, 15 \(on page 47\)](#)
- [Radio Network Group Selection: 16, 17, 18, or 19 \(on page 48\)](#)
- [Radio Network Group Selection: 20, 21, 22, 23 \(on page 49\)](#)
- [Radio Network Group Selection: 28 or 29 \(on page 51\)](#)

10.1. Radio Network Group Selection: 0, 1, 2, or 3

In the [Device Configuration window \(on page 36\)](#), these are the **High** and **Low Frequencies** when the **Radio Network Group** list box selection is 0, 1, 2, or 3.

Radio Network selection	Radio Network Group selection: 0 or 1	Low Frequency	High Frequency	Radio Network selection	Radio Network Group selection: 2 or 3	Low Frequency	High Frequency
0	0	908.20	918.20	0	2	905.00	915.00
1	0	908.40	918.40	1	2	905.20	915.20
2	0	908.60	918.60	2	2	905.40	915.40
3	0	908.80	918.80	3	2	905.60	915.60
4	0	909.00	919.00	4	2	905.80	915.80
5	0	909.20	919.20	5	2	906.00	916.00
6	0	909.40	919.40	6	2	906.20	916.20
7	0	909.60	919.60	7	2	906.40	916.40
0	1	909.80	919.80	0	3	906.60	916.60
1	1	910.00	920.00	1	3	906.80	916.80
2	1	910.20	920.20	2	3	907.00	917.00
3	1	910.40	920.40	3	3	907.20	917.20
4	1	910.60	920.60	4	3	907.40	917.40
5	1	910.80	920.80	5	3	907.60	917.60
6	1	911.00	921.00	6	3	907.80	917.80
7	1	911.20	921.20	7	3	908.00	918.00

10.2. Radio Network Group Selection: 4, 5, 6, or 7

In the [Device Configuration window \(on page 36\)](#), these are the **High** and **Low Frequencies** when the **Radio Network Group** list box selection is 4, 5, 6, or 7.

Radio Network selection	Radio Network Group selection: 4 or 5	Low Frequency	High Frequency	Radio Network selection	Radio Network Group selection: 6 or 7	Low Frequency	High Frequency
0	4	908.20	918.20	0	6	905.00	915.00
1	4	908.40	918.40	1	6	905.20	915.20
2	4	908.60	918.60	2	6	905.40	915.40
3	4	908.80	918.80	3	6	905.60	915.60
4	4	909.00	919.00	4	6	905.80	915.80
5	4	909.20	919.20	5	6	906.00	916.00
6	4	909.40	919.40	6	6	906.20	916.20
7	4	909.60	919.60	7	6	906.40	916.40
0	5	909.80	919.80	0	7	906.60	916.60
1	5	910.00	920.00	1	7	906.80	916.80
2	5	910.20	920.20	2	7	907.00	917.00
3	5	910.40	920.40	3	7	907.20	917.20
4	5	910.60	920.60	4	7	907.40	917.40
5	5	910.80	920.80	5	7	907.60	917.60
6	5	911.00	921.00	6	7	907.80	917.80
7	5	911.20	921.20	7	7	908.00	918.00

10.3. Radio Network Group Selection: 8, 9, 10, 11

In the [Device Configuration window \(on page 36\)](#), these are the **High** and **Low Frequencies** when the **Radio Network Group** list box selection is 8, 9, 10, or 11.

Radio Network selection	Radio Network Group selection: 8 or 9	Low Frequency	High Frequency	Radio Network selection	Radio Network Group selection: 10 or 11	Low Frequency	High Frequency
0	8	908.20	918.20	0	10	905.00	915.00
1	8	908.40	918.40	1	10	905.20	915.20
2	8	908.60	918.60	2	10	905.40	915.40
3	8	908.80	918.80	3	10	905.60	915.60
4	8	909.00	919.00	4	10	905.80	915.80
5	8	909.20	919.20	5	10	906.00	916.00
6	8	909.40	919.40	6	10	906.20	916.20
7	8	909.60	919.60	7	10	906.40	916.40
0	9	909.80	919.80	0	11	906.60	916.60
1	9	910.00	920.00	1	11	906.80	916.80
2	9	910.20	920.20	2	11	907.00	917.00
3	9	910.40	920.40	3	11	907.20	917.20
4	9	910.60	920.60	4	11	907.40	917.40
5	9	910.80	920.80	5	11	907.60	917.60
6	9	911.00	921.00	6	11	907.80	917.80
7	9	911.20	921.20	7	11	908.00	918.00

10.4. Radio Network Group Selection: 12, 13, 14, 15

In the [Device Configuration window \(on page 36\)](#), these are the **High** and **Low Frequencies** when the **Radio Network Group** list box selection is 12, 13, 14, or 15.

Radio Network selection	Radio Network Group selection: 12 or 13	Low Frequency	High Frequency	Radio Network selection	Radio Network Group selection: 14 or 15	Low Frequency	High Frequency
0	12	908.20	918.20	0	14	905.00	915.00
1	12	908.40	918.40	1	14	905.20	915.20
2	12	908.60	918.60	2	14	905.40	915.40
3	12	908.80	918.80	3	14	905.60	915.60
4	12	909.00	919.00	4	14	905.80	915.80
5	12	909.20	919.20	5	14	906.00	916.00
6	12	909.40	919.40	6	14	906.20	916.20
7	12	909.60	919.60	7	14	906.40	916.40
0	13	909.80	919.80	0	15	906.60	916.60
1	13	910.00	920.00	1	15	906.80	916.80
2	13	910.20	920.20	2	15	907.00	917.00
3	13	910.40	920.40	3	15	907.20	917.20
4	13	910.60	920.60	4	15	907.40	917.40
5	13	910.80	920.80	5	15	907.60	917.60
6	13	911.00	921.00	6	15	907.80	917.80
7	13	911.20	921.20	7	15	908.00	918.00

10.5. Radio Network Group Selection: 16, 17, 18, or 19

In the [Device Configuration window \(on page 36\)](#), these are the **High** and **Low Frequencies** when the **Radio Network Group** list box selection is 16, 17, 18, or 19.

Radio Network selection	Radio Network Group selection: 16 or 17	Low Frequency	High Frequency	Radio Network selection	Radio Network Group selection: 18 or 19	Low Frequency	High Frequency
0	16	908.20	918.20	0	18	905.00	915.00
1	16	908.40	918.40	1	18	905.20	915.20
2	16	908.60	918.60	2	18	905.40	915.40
3	16	908.80	918.80	3	18	905.60	915.60
4	16	909.00	919.00	4	18	905.80	915.80
5	16	909.20	919.20	5	18	906.00	916.00
6	16	909.40	919.40	6	18	906.20	916.20
7	16	909.60	919.60	7	18	906.40	916.40
0	17	909.80	919.80	0	19	906.60	916.60
1	17	910.00	920.00	1	19	906.80	916.80
2	17	910.20	920.20	2	19	907.00	917.00
3	17	910.40	920.40	3	19	907.20	917.20
4	17	910.60	920.60	4	19	907.40	917.40
5	17	910.80	920.80	5	19	907.60	917.60
6	17	911.00	921.00	6	19	907.80	917.80
7	17	911.20	921.20	7	19	908.00	918.00

10.6. Radio Network Group Selection: 20, 21, 22, 23

In the [Device Configuration window \(on page 36\)](#), these are the **High** and **Low Frequencies** when the **Radio Network Group** list box selection is 20, 21, 22, or 23.

Radio Network selection	Radio Network Group selection: 20 or 21	Low Frequency	High Frequency	Radio Network selection	Radio Network Group selection: 22 or 23	Low Frequency	High Frequency
0	20	908.20	918.20	0	22	905.00	915.00
1	20	908.40	918.40	1	22	905.20	915.20
2	20	908.60	918.60	2	22	905.40	915.40
3	20	908.80	918.80	3	22	905.60	915.60
4	20	909.00	919.00	4	22	905.80	915.80
5	20	909.20	919.20	5	22	906.00	916.00
6	20	909.40	919.40	6	22	906.20	916.20
7	20	909.60	919.60	7	22	906.40	916.40
0	21	909.80	919.80	0	23	906.60	916.60
1	21	910.00	920.00	1	23	906.80	916.80
2	21	910.20	920.20	2	23	907.00	917.00
3	21	910.40	920.40	3	23	907.20	917.20
4	21	910.60	920.60	4	23	907.40	917.40
5	21	910.80	920.80	5	23	907.60	917.60
6	21	911.00	921.00	6	23	907.80	917.80
7	21	911.20	921.20	7	23	908.00	918.00

10.7. Radio Network Group Selection: 24, 25, 26, 27

In the [Device Configuration window \(on page 36\)](#), these are the **High** and **Low Frequencies** when the **Radio Network Group** list box selection is 24, 25, 26, or 27.

Radio Network selection	Radio Network Group selection: 24 or 25	Low Frequency	High Frequency	Radio Network selection	Radio Network Group selection: 26 or 27	Low Frequency	High Frequency
0	24	908.20	918.20	0	26	905.00	915.00
1	24	908.40	918.40	1	26	905.20	915.20
2	24	908.60	918.60	2	26	905.40	915.40
3	24	908.80	918.80	3	26	905.60	915.60
4	24	909.00	919.00	4	26	905.80	915.80
5	24	909.20	919.20	5	26	906.00	916.00
6	24	909.40	919.40	6	26	906.20	916.20
7	24	909.60	919.60	7	26	906.40	916.40
0	25	909.80	919.80	0	27	906.60	916.60
1	25	910.00	920.00	1	27	906.80	916.80
2	25	910.20	920.20	2	27	907.00	917.00
3	25	910.40	920.40	3	27	907.20	917.20
4	25	910.60	920.60	4	27	907.40	917.40
5	25	910.80	920.80	5	27	907.60	917.60
6	25	911.00	921.00	6	27	907.80	917.80
7	25	911.20	921.20	7	27	908.00	918.00

10.8. Radio Network Group Selection: 28 or 29

In the [Device Configuration window \(on page 36\)](#), these are the **High** and **Low Frequencies** when the **Radio Network Group** list box selection is 28 or 29.

Radio Network selection	Radio Network Group selection: 28 or 29	Low Frequency	High Frequency
0	28	908.20	918.20
1	28	908.40	918.40
2	28	908.60	918.60
3	28	908.80	918.80
4	28	909.00	919.00
5	28	909.20	919.20
6	28	909.40	919.40
7	28	909.60	919.60
0	29	909.80	919.80
1	29	910.00	920.00
2	29	910.20	920.20
3	29	910.40	920.40
4	29	910.60	920.60
5	29	910.80	920.80
6	29	911.00	921.00
7	29	911.20	921.20

Appendix A: Technical Specifications

Warning! Use of this equipment in a manner not specified by the manufacturer may impair the protection provided by the equipment.

The use of any parts not supplied by the manufacturer violates the safety rating of the equipment.



AVERTISSEMENT: L'utilisation de cet équipement d'une manière non spécifiée par le fabricant peut nuire à la protection fournie par l'équipement.

L'utilisation de pièces non fournies par le fabricant est contraire à la cote de sécurité de l'équipement.

Note: See the [Control Drawing: 960-0081-02 \(on page 54\)](#) for requirements when used in a Class I Division 1 area.

Reportez-vous à l'illustration de contrôle [Control Drawing: 960-0081-02 \(on page 54\)](#) pour connaître les exigences lorsqu'elle est utilisée dans une zone de classe I division 1.

Technical Specification: WC30i Wireless Pressure Sensor	
Specification	Description
Transmitter	
Frequency	902-928 MHz, FHSS, license-free ISM band compliant with FCC Part 15
Range	Maximum of ½ mile
Data Update Rates	<ul style="list-style-type: none"> User selectable 5 seconds to 1 hour, typical
Networks	Maximum of 65,520 separate networks

Technical Specification: WC30i Wireless Pressure Sensor	
Specification	Description
Receiver	
Sensitivity	-109dB
Interfaces	
Data Interface	Wireless data and diagnostics available as Modbus registers at Gateway
Internal Diagnostics	<ul style="list-style-type: none"> • Battery voltage • Signal Strength • Error conditions
Data Transmission	
Report by Exception	Configurable alarm pressure thresholds, pressure sample rate 5 seconds (min).
Power Requirements	
Battery Pack	1 X D Lithium battery pack, field replaceable. <ul style="list-style-type: none"> • FreeWave Part #: WC-1BAT-IS <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note: C1D1 certified when used in a FreeWave system. In-situ replacement does NOT require a work ticket.</p> </div>
Battery Life	Up to 10 years, depending on the reporting frequency.
Radio Power	40mW
General Information	
Operating Temperature	-40°C to +80°C
Humidity	0% - 100% condensing
Enclosure Size	7.75" tall × 2.75" diameter
Safety Rating	<ul style="list-style-type: none"> • Intrinsically Safe • Class I Division 1 Groups C & D • Temp Code T3 • Conforms to UL Std. 913 • Certified to Can/CSA Std C22.2 No. 157

Appendix B: Control Drawing: 960-0081-02

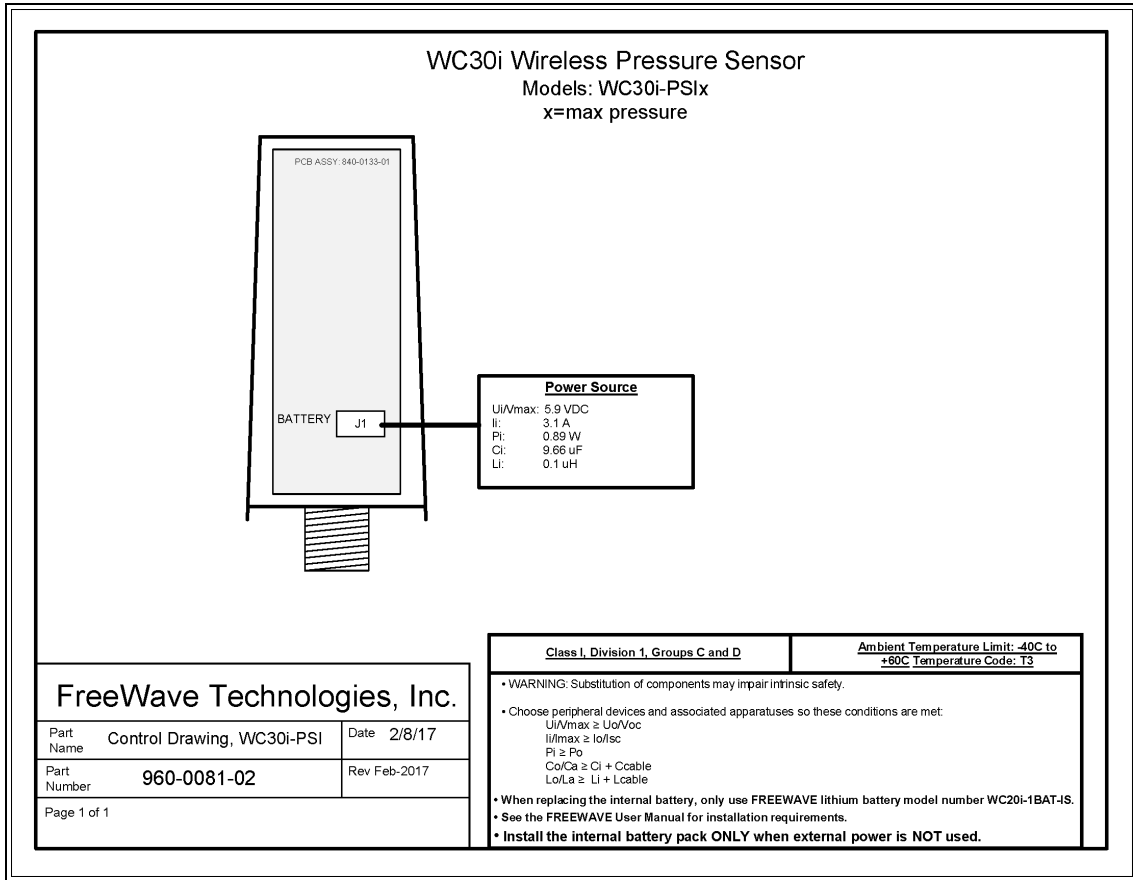


Figure 27: Control Drawing: WC30i Wireless Pressure Sensor

Appendix C: Remote Modbus Registers

The WC30i sends data to a WC45i-Gateway.

Every check-in period, the sensors are read and data is sent to the Gateway. The Gateway saves the data under the set Modbus ID in 16-bit registers.

- The data sent to the Gateway is available at the Gateway in registers where it is read by a Modbus RTU master device.
- The Endpoint must have a unique (to the network it is in) Modbus Slave ID.
 - The Gateway uses this Slave ID to store its unique data.

Note: The terms node and Endpoint are used interchangeably in this document.

WC30i Wireless Pressure Sensor Modbus Registers		
Register Number	Register Address (Offset)	Description
43001	3000	Sensor Voltage (mV) <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> Note: 500mV to 2500mV is the normal range. </div>
43002	3001	Sensor PSI Reading (int)
43003	3002	Sensor PSI Reading x 100 (int) <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> Important!: Only valid for pressures up to 650psi. </div>

WC30i Wireless Pressure Sensor Modbus Registers		
Register Number	Register Address (Offset)	Description
43004	3003	High Alarm Notification <ul style="list-style-type: none"> • 0 = no alarm • 1 = high alarm active
43005	3004	Low Alarm Notification <ul style="list-style-type: none"> • 0 (zero) = no alarm • 1 = low alarm active
43006	3005	Low Battery Alarm <ul style="list-style-type: none"> • 0 (zero) = battery above 3.0V • 1 = battery below 3.0V
43007	3006	Sensor Span (PSI)
43008	3007	Sensor Error Status <ul style="list-style-type: none"> • 0 (zero) =no errors • 1=sensor out of range low • 2=sensor out of range high
43009-43010	3008-3009	Sensor PSI Reading (float)
43011-43012	3010-3011	Custom Scaled Sensor Reading (float)
43013-43014	3012-3013	Alarm High Threshold Setting (float)
43015-43016	3014-3015	Alarm Low Threshold Setting (float)
49988	9987 or 65524	Major revision number for the mainboard.
49989	9988 or 65525	Minor revision number for the mainboard.
49990	9989 or 65526	Major revision number for the radio.
49991	9990 or 65527	Minor revision number for the radio.
49992	9991 or 65528	High 16-bits of the Endpoint address.
49993	9992 or 65529	Low 16-bits of the Endpoint address (the radio ID).
49994	9993 or 65530	Slave ID read back.
49995	9994 or 65531	Received signal strength of the last packet from the slave.
49996	9995 or 65532	Battery voltage of the Modbus client, in millivolts
49997	9996 or 65533	Minutes until this slave will time out unless new data is received.
49998	9997 or 65534	Number of registers cached for this slave device.
49999	9998 or 65535	Remote device type.






Appendix D: Connection Troubleshooting

Verify the connection between the Gateway and Endpoint:

- Check the LEDs on the Endpoint.
 - If LEDs don't indicate linked, double check radio settings.
 - See [LEDs \(on page 58\)](#).
- If the Endpoint is linking, use the 4-pin to USB programming cable to connect to Gateway and examine the Endpoints reporting to that Gateway.
- If the Endpoints are reporting in, double check that the Modbus IDs and registers are correct in the Modbus master.

Appendix E: LEDs

These are the WC30i LEDs available for field diagnostics.

WC30i LEDs	
Radio LEDs	Description
	<ul style="list-style-type: none"> The Radio TX LED Flashes green  each time a radio packet is sent. This LED is rapidly Green blinking  while searching for the radio network and at bootup. The Radio RX LED is Red blinking  for each received radio packet.
Status LEDs	
	<ul style="list-style-type: none"> The STATUS LED blinks green () when the pressure sensor is sampled. The ERROR LED Red blinking  to indicate an error condition.
Check-in button	
	Press the Check-in button to have the WC30i take a reading from the integrated pressure sensor and send the data to the Gateway.
Zero button	
	<p>The Zero button allows the pressure sensor to be zeroed.</p> <ul style="list-style-type: none"> Hold the Zero button down for 3 seconds to zero the pressure sensor. The Status LED will come on and blink twice to indicate that the sensor has been zeroed.

Appendix F: Available Accessories

These accessories are available from FreeWave for the WAVECONTACT products.

Available Accessories	
FreeWave Part #	Description
WC-USB-4PIN	4-pin to USB programming cable
WC-1BAT-IS	Replacement Battery for WC30i Wireless Pressure Sensor

Appendix G: FreeWave Legal Information

Export Notification

FreeWave Technologies, Inc. products may be subject to control by the Export Administration Regulations (EAR) and/or the International Traffic in Arms Regulations (ITAR). Export, re-export, or transfer of these products without required authorization from the U.S. Department of Commerce, Bureau of Industry and Security, or the U.S. Department of State, Directorate of Defense Trade Controls, as applicable, is prohibited. Any party exporting, re-exporting, or transferring FreeWave products is responsible for obtaining all necessary U.S. government authorizations required to ensure compliance with these and other applicable U.S. laws. Consult with your legal counsel for further guidance.

FCC Notifications

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.

The content of this guide covers FreeWave Technologies, Inc. models sold under FCC ID: W8V-PS.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of these measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Notification of Power Warning

The WC30i Wireless Pressure Sensor covered in this document has a maximum transmitted output power of +14dBm.

The antennas used MUST provide a separation distance of at least 20 cm from all persons and MUST NOT be co-located or operate in conjunction with any other antenna or transmitter.

IC Notifications

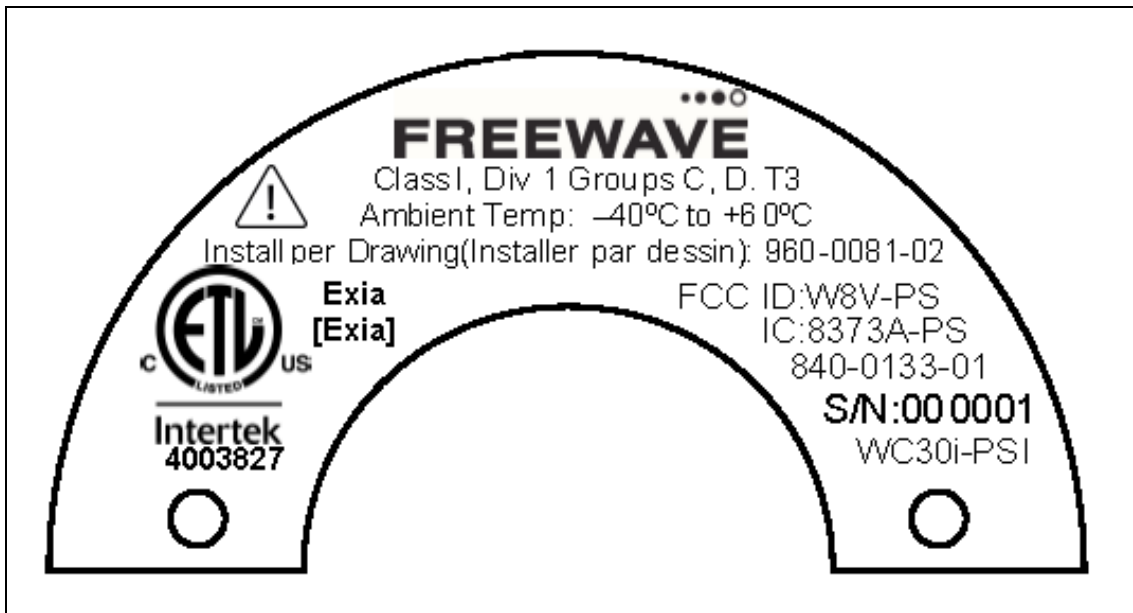
Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a maximum (or lesser) gain approved for this transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.r.i.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

This device complies with Industry Canada license-exempt RSS standard(s). 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.

Ce dispositif est conforme aux normes permis-exemptes du Canada RSS d'industrie. L'opération est sujette aux deux conditions suivantes : (1) ce dispositif peut ne pas causer l'interférence, et (2) ce dispositif doit accepter n'importe quelle interférence, y compris l'interférence qui peut causer le fonctionnement peu désiré du dispositif.

Important!: This label MUST BE visible when the WAVECONTACT product is installed.



WC30i Wireless Pressure Sensor ETL-FCC-IC C1D1

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Warning! Electrostatic Discharge Hazard!

Care must be taken to avoid the potential of creating a charge on the enclosure or antenna.

Do NOT wipe with a dry cloth.

Do NOT brush against the enclosure with clothing or gloves.



AVERTISSEMENT: Risque de décharge électrostatique! Il faut veiller à éviter tout risque de changement de l'enceinte ou de l'antenne.

Ne pas essuyer avec un chiffon sec.

Ne pas brosser contre l'enceinte avec des vêtements ou des gants.

...
FREEWAVE