

WESTLOCK
CONTROLS CORPORATION

WIRELESS VALVE MONITORING SYSTEM STARTER KIT MANUAL

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1 Introduction

This document is a quick guide on the Westlock Wireless Valve Monitoring System. Its main goal is to help you experience a successful start before moving into more powerful features of the system. For better understanding it is required that readers have good knowledge of industrial field devices, valve automation and information technology.

After reading this document you will be able to identify, install, configure and use the basic components and functions of the Westlock Wireless Valve Monitoring System. For more information and detailed manuals please visit www.westlockcontrols.com.

1.1 Definitions, abbreviations, acronyms and terms

- ACK – Acknowledgement Message
- Wireless Gateway – An industrial computer running the WMS Server
- WMS – Wireless Management System
- EUI – Extended Unique Identifier
- HMI – Human Machine Interface
- WH – Wireless Handheld
- WG – Wireless Gateway
- WD – Wireless Device
- WR – Wireless Router
- OPC DA – OLE for Process Control Data Access
- PLC – Programmable Logic Controller
- Connectivity Server – a ruggedized industrial computer for I/O integration
- SCADA – Supervisory Control and Data Acquisition
- TCP/IP - Internet protocol suite (Transmission Control Protocol (TCP)/ Internet Protocol (IP))
- GUI - Graphical User Interface

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1.2 Warnings



Misuse of this equipment can cause bodily harm. Operations not performed as per the instructions in this document are done at the user's own risk and liability.

To prevent bodily harm or damage to equipment, only trained, authorized personnel should install, maintain and repair the equipment.



To prevent damage to equipment, through electrostatic charge on plastic surface of the WD always wipe the surface with a wet cloth.



Carefully read the safety information contained in this section, and throughout this user guide, before installing, operating, or performing any maintenance task on the equipment.



The equipment contains communication devices. Any changes or modifications made to the equipment without the written consent of WESTLOCK, and its resellers or distributors, can nullify the user's authority to operate this equipment.

The user assumes all risks associated with the use and handling of the equipment, and specifically acknowledges that WESTLOCK, and its resellers or distributors, will not be liable for any damages of any kind, including personal injury or property damages resulting from use of the equipment.

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1.3 Product certifications and approvals

- Electro Magnetic Compatibility (EMC) (2004/108/EC): the Westlock Wireless Valve Monitoring System complies with the EMC directives.
- Radio and Telecommunications Terminal Equipment Directive (R&TTE) (1999/5/EC): the Westlock Wireless Valve Monitoring System complies with the EMC directives.
- CE EMC marking: the Westlock Wireless Valve Monitoring System complies with the European Union marking directives.

1.4 FCC Compliance

The Westlock Wireless Valve Monitoring System complies with Part 15 of FCC Rules and other local regulations like IC/CE/RTTE/ANATEL. 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.

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 in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with these instructions, 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/her own expense.

Intentional or unintentional changes or modifications must not be made to the WD or other components unless under the express consent of the party responsible for compliance. Any such modifications could void the user's authority to operate the equipment and will void the manufacturer's warranty.

1.5 Items needed to get started

- ✓ (1) Computer with Windows OS and WMS Standalone installed (WMS18015).
- ✓ (1) WH (Wireless Handheld) with USB cable (WHZ00011).
- ✓ (1) WG (Wireless Gateway) with ETHERNET cable and power supply (WRG00036).
- ✓ (1) WD (Wireless Device) (suggested 114WRBYS0ZEB1AAA-0R1).

Except for the computer, all the other items are included in the Starter Kit (MS30004).

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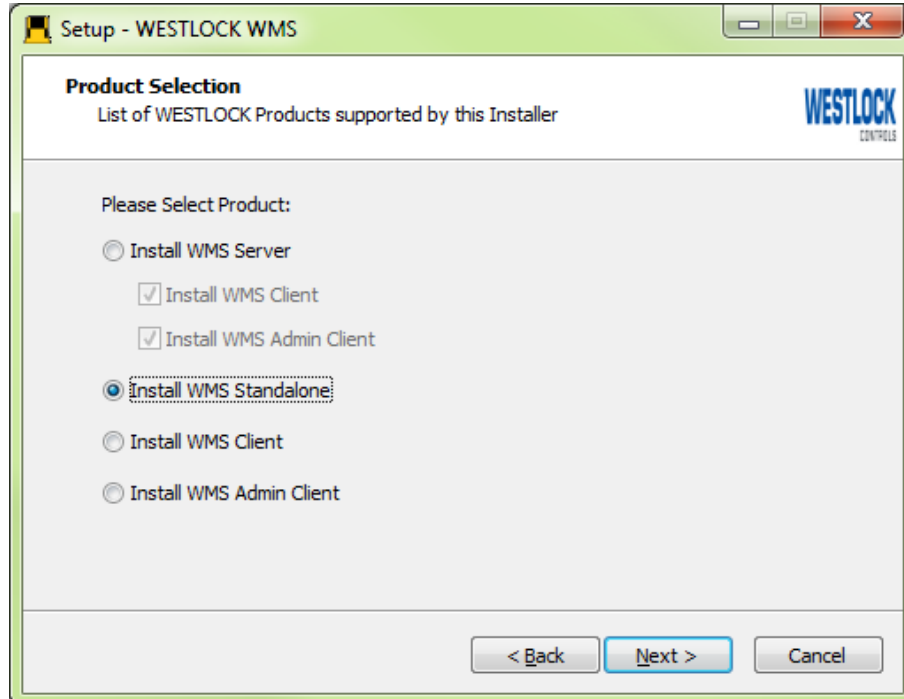
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2. To launch the installer double-clicking the file, then click Next:



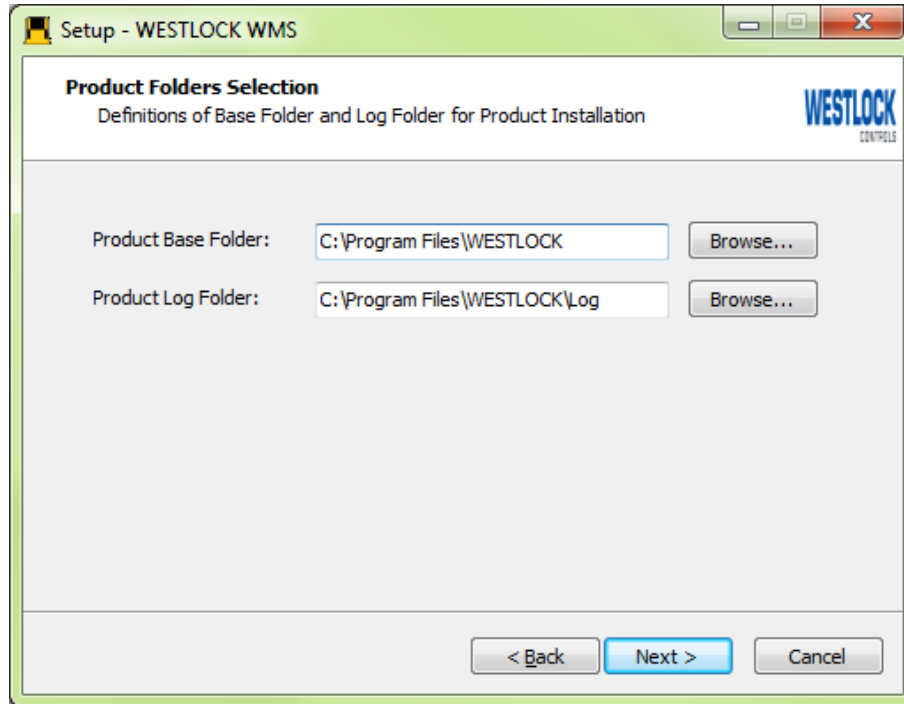
3. Follow the instructions until the screen displays below information. Select "**Install WMS Standalone**" and press "Next"



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4. Select the installation folder or leave the default as shown:

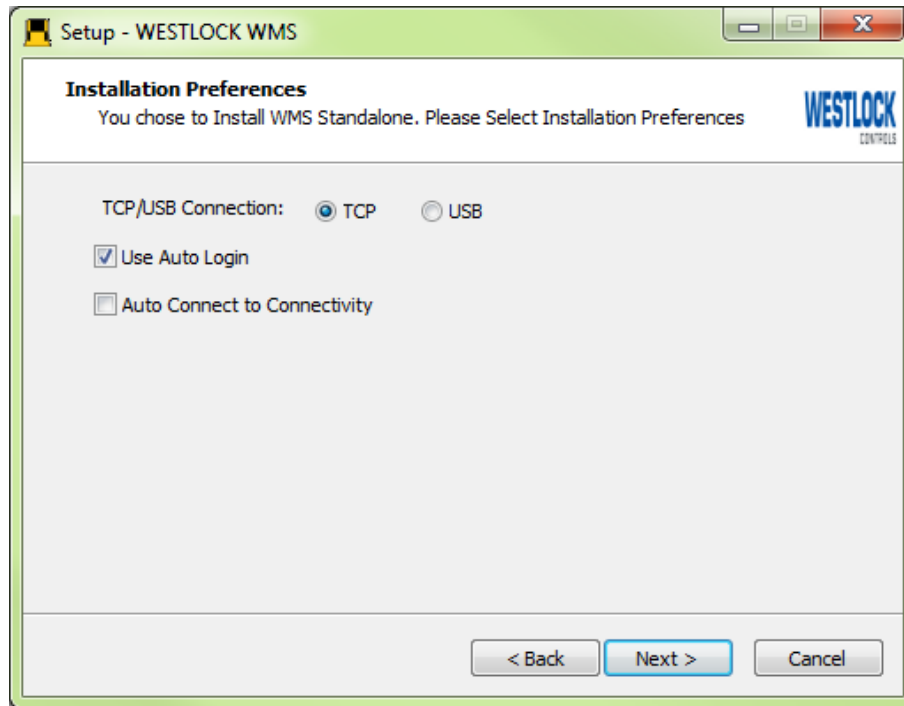


5. Select TCP (ETHERNET cable). It is not recommended to use USB due to the power management policies of Windows. Make sure the option "**Use Auto Login**" is checked.

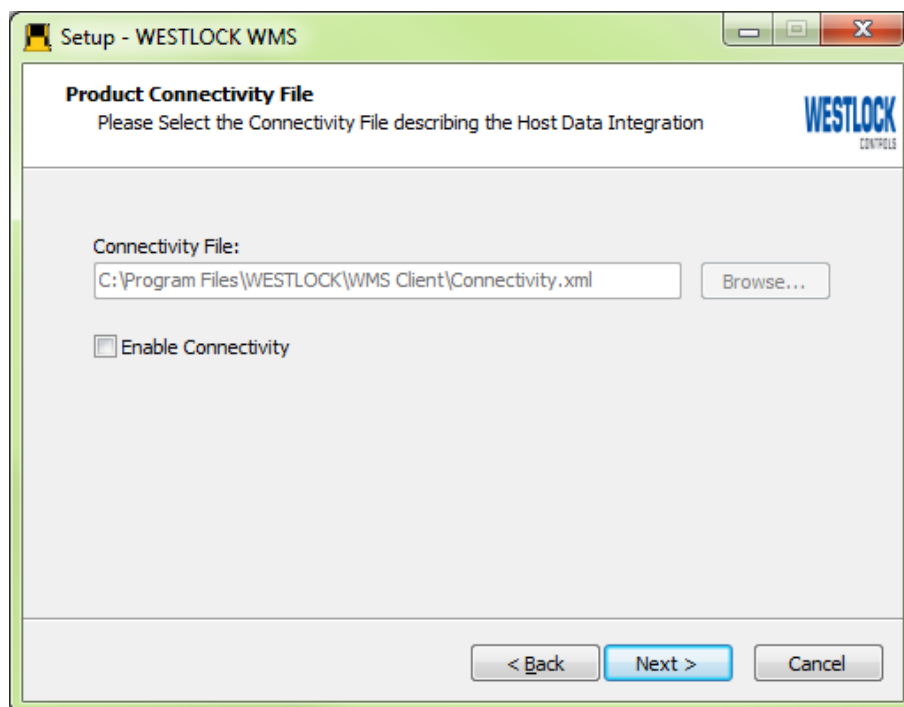
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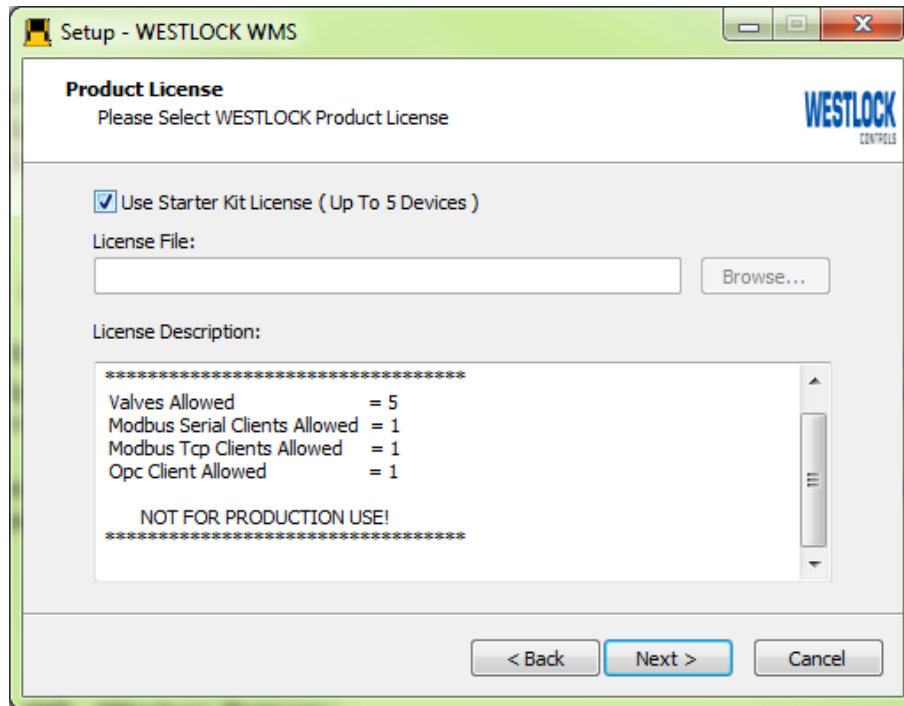
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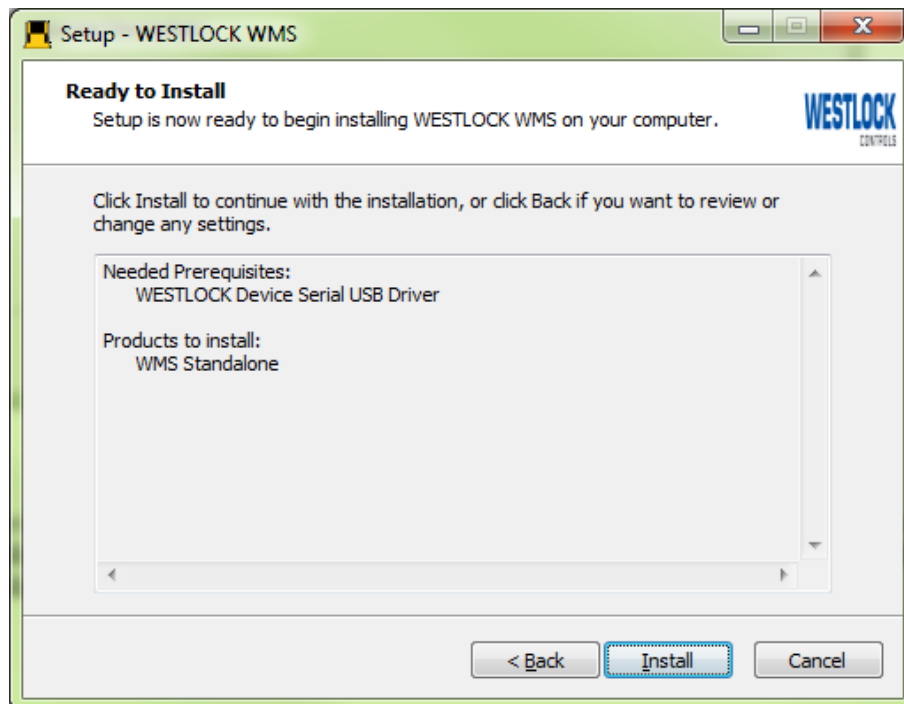
6. Keep the next window as shown below:



7. On the next screen, check the option "**Use Starter Kit License (Up to 5 Devices)**":



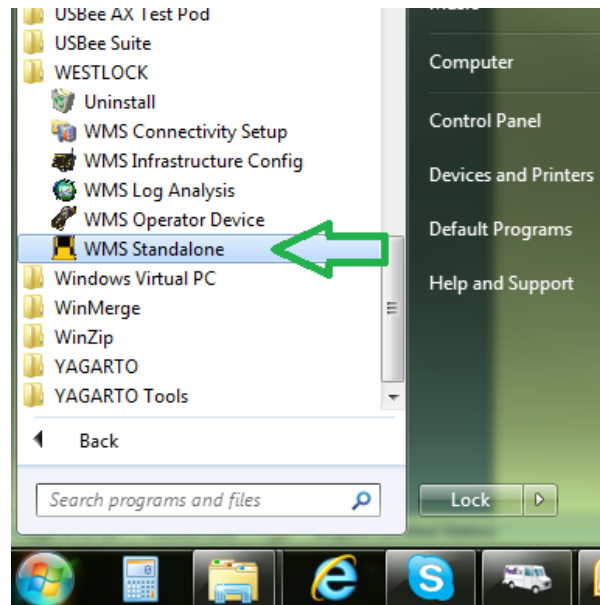
8. Press "**Install**" to begin installation.



9. After the installation is complete, press "**Finish**".



10. Check Windows Start menu to confirm that WMS has been successfully installed. Do not launch the application yet. If you did, please close WMS until the installation of the Wireless Gateway is done in the next section.



2.2 The WH (Wireless Handheld)

The WH (Wireless Handheld) is used to power on/off all devices in the system (WG, WR, WD), calibrate, configure, commission, monitor, diagnostic problems and several other important functions in the system.

The WH is a battery operated device. It can be recharged using any USB power supply or host (PC, Laptop, Connectivity Server etc) with its companion cable. If the light "Low

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Bat" is no or the WH does not react, recharge it for at least 5 hours before attempting to use it again.

1. Press button <Log In> to power up WH. The LCD will display as shown below:



2. Press <ENTER>. The message "**WD Mode**" blinks on the LCD.
3. Press <Device NetKey> button until it shows "**WR Mode**" on the LCD.



4. Press <Log Out> and <ENTER> to turn it off. the WH will be used in the next section to power on the WG.

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2.3 The WG (Wireless Gateway)

The WG communicates the WDs with the WMS database. It allows for multiple redundant paths automatically and has back-up batteries to work in the absence of main DC power.



The WG allows two connection methods to the WMS: using USB or ETHERNET. If the WG has both cables, remember that ETHERNET is disabled by hardware whenever the USB cable is connected to the Host.

In the case the WG does not have any cable installed consult the specific WG IOM for more details on how to connect to one of two options. The manual can be found at www.westlockcontrols.com/wireless/download.

There is also a device called WR (Wireless Router) that looks identical to the WG but without the USB/ETH internal connectors. The WR is used as a repeater or range extender. The WR is not covered in this guide.

For more information visit www.westlockcontrols.com/wireless.

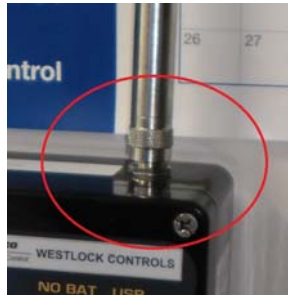
For safety reasons the WG is shipped in a deep sleep state. Follow the steps below to turn the WG on:

1. Make sure the antenna is firmly attached to the WG connector located on the right upper corner of the enclosure:

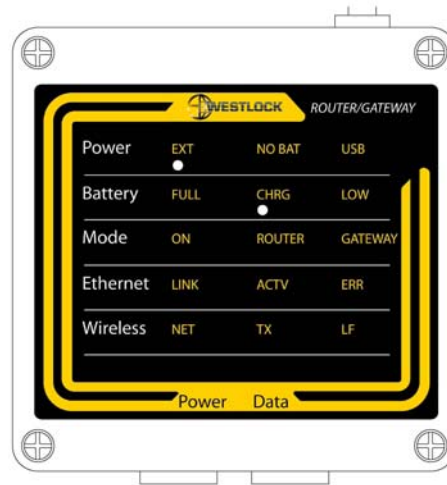
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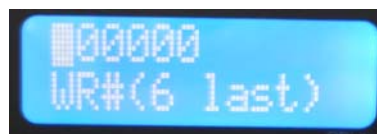
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2. Connect the WG power supply (7-30VDC/10W). The front panel light Power EXT and Battery CHRG/FULL/LOW will be on as in the figure below:



3. On the WH, press <Log In> then press <ENTER>.
4. Press <Device NetKey> until you read "**WR Mode**" on the LCD, then press <ENTER>. The LCD will display:



5. Place the WH in front of the WG (10-30 cm for best results), as shown in the photo below:

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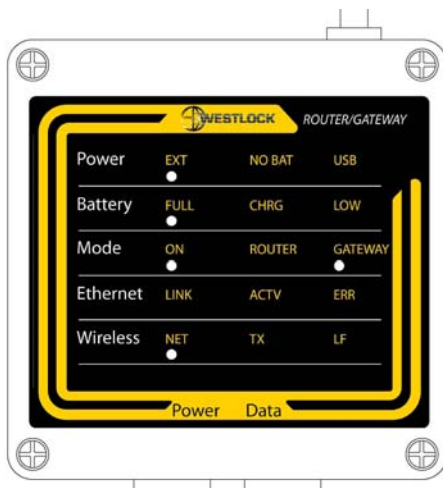
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6. Press <Join> button. The message "**Join all**" will blink on the LCD, then press <ENTER>.



7. The LCD will blink the text "**DEMO**", then press <ENTER>. The WH will send a LF (Low Frequency) command to the WG to wake it up.
8. Notice on the WG the MODE ON light will turn on. Then the MODE TVDR light will turn on a few seconds later. Now the WG is ready to connect to the WMS.



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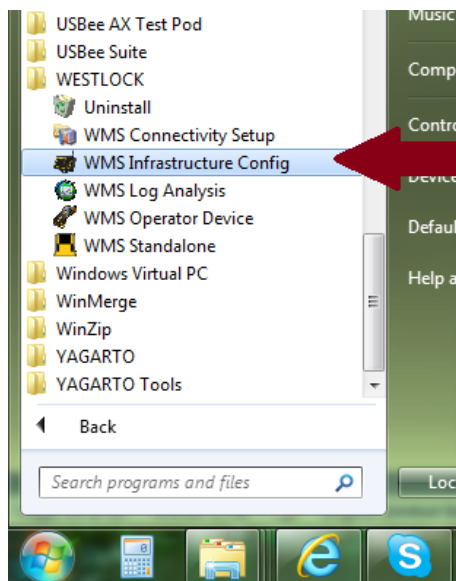
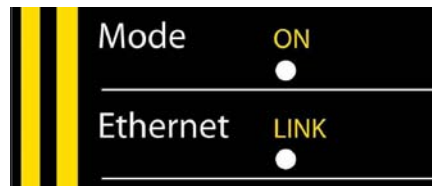
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2.3.1 Connecting WG to WMS using ETHERNET

During WMS installation, if TCP was selected then proceed in this chapter. If you unintentionally selected the wrong option during installation, go back and reinstall the WMS with the TCP option.

1. Connect the ETHERNET cable to the ETHERNET/LAN port of your computer. If the LAN card is very old it is possible that you will need an ETHERNET HUB or SWITCH to connect them, however, most of the new LAN cards accept a direct connection to the WG using a straight or cross cable.
2. Notice that ETHERNET LINK light will turn on after a few seconds.
3. Make sure your ETHERNET/LAN adapter has a valid fixed IP address, preferably in the range **192.168.5.x**.
4. Go to the Start menu/Westlock and launch the application "WMS Infrastructure Config". This application configures the TCP connection parameters of the WG:

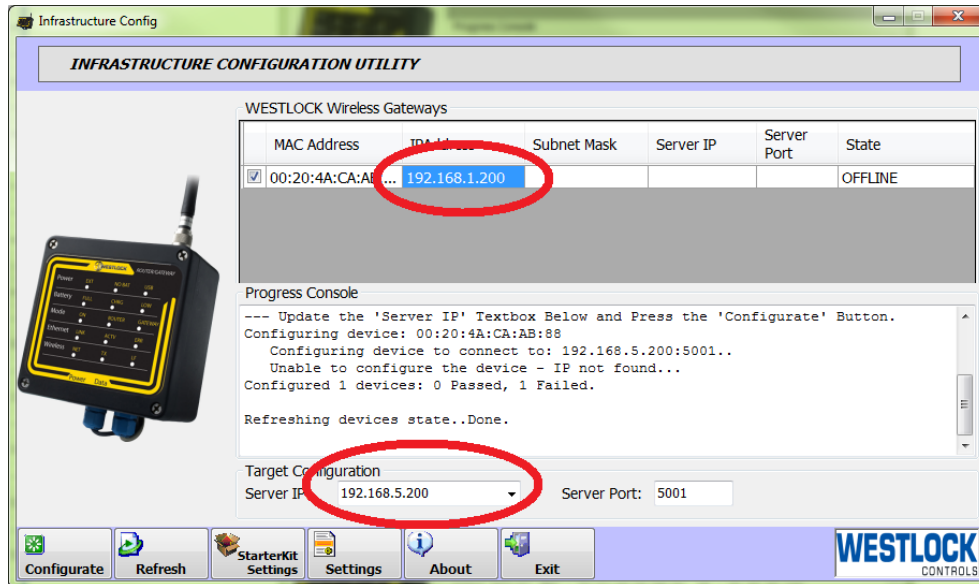


5. The application searches for all WG's connected to the machine. Make sure the application is allowed in the Windows Firewall.
6. Make sure the WG and computer are in the same IP subnet. If not, change the IP or subnet mask on the computer accordingly.

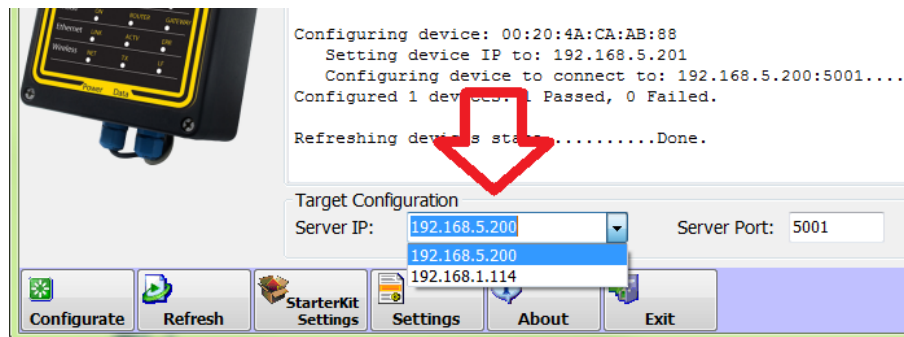
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7. Select the WG clicking on the check box, then click on Starter Kit Settings.
8. Make sure the box Server IP is showing the IP of your machine. If the computer has more than 1 LAN card, e.g., 1 Wi-Fi and 1 ETHERNET/LAN, select the IP address of the port that is physically connected to the WG, as shown in the example below:

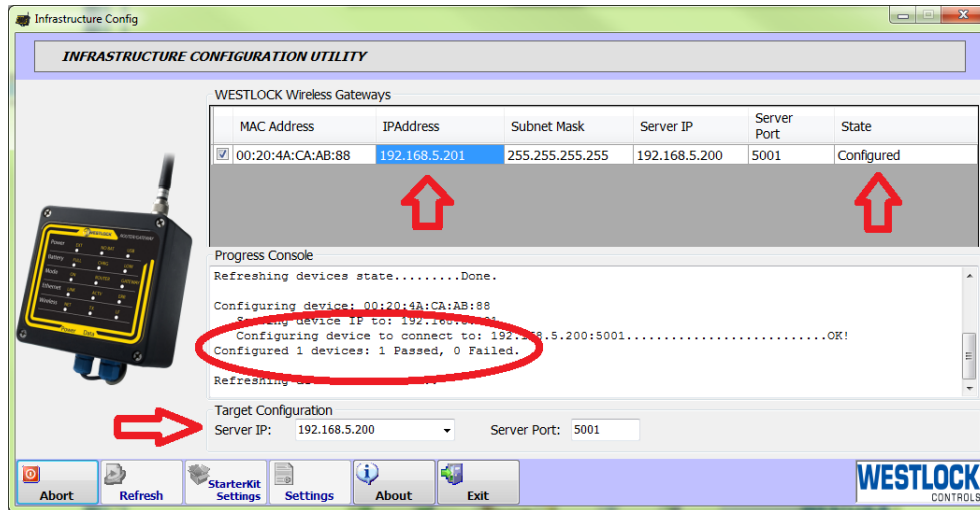


9. Click on Configure. The application will configure WG's TCP parameters to access WMS in this computer. At the end of the configuration it will refresh the status and show the WG is Online, as shown below:

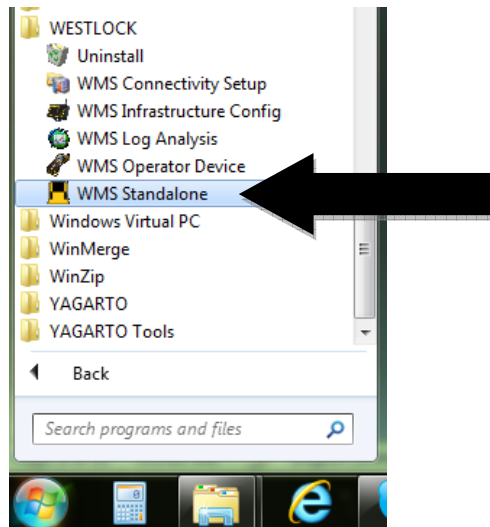
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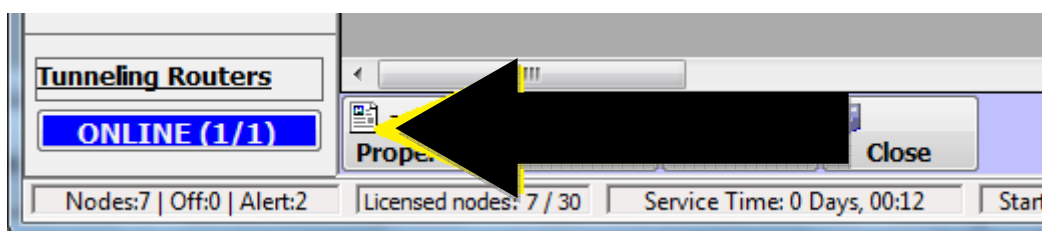
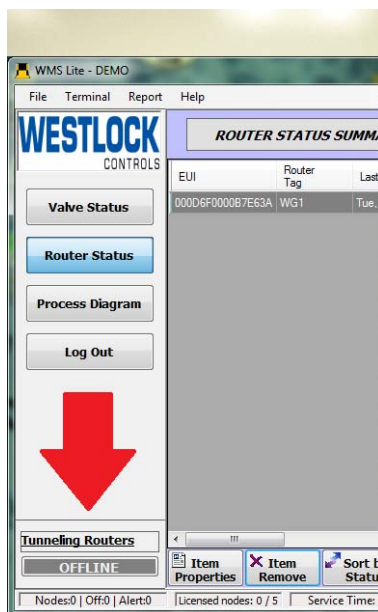
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10. After the WG is configured, close the Infrastructure utility and launch WMS application from Start menu:



11. The WMS application will start and after a few seconds (up to 1 minute) it will show that the WG status (on WMS left bottom corner) will change from OFFLINE to ONLINE(1/1), as shown in the screenshot below:



12. Check on the WG front panel if the MODE TVDR light is on. This is very important, light on means that the WMS is communicating with the WG and the Wireless network will then be created.

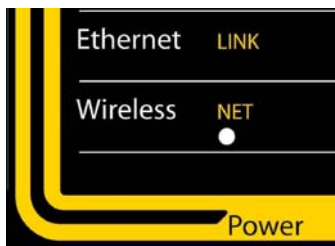


13. Wait a few seconds (up to 1 minute) for the WIRELESS NET light to start blinking and then to turn solid. This means the ZigBee network has been created and we can add WDs to the network.

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2.4 Connecting WH to the newly formed wireless network

Once the WG is connected to the WMS and the wireless network has been formed the WH should be connected to the wireless network to continue the installation:

1. On the WH, press <Log In> then press <ENTER>.
2. Press <Device NetKey> until you read "**Network**" on the LCD, then press <ENTER>.
3. The message "**Network OFF Line**" will be shown on the LCD.
4. **Press and hold** the <Ident> button until the text "**Searching...**" appears.



5. After a few seconds it will show the network name blinking Ex: "**DEMO (25)**". The number "25" is the ZigBee channel that has been allocated by WMS for this network.
6. Press <ENTER> and after a few seconds the LCD will show the message "**Network ON Line**".
7. Press <Log Out> and <ENTER> to turn WH off.
8. The WH is now connected to the same network as the WG. Proceed to the next section to include the WD's to the wireless network.

2.5 The WD (Wireless Device)

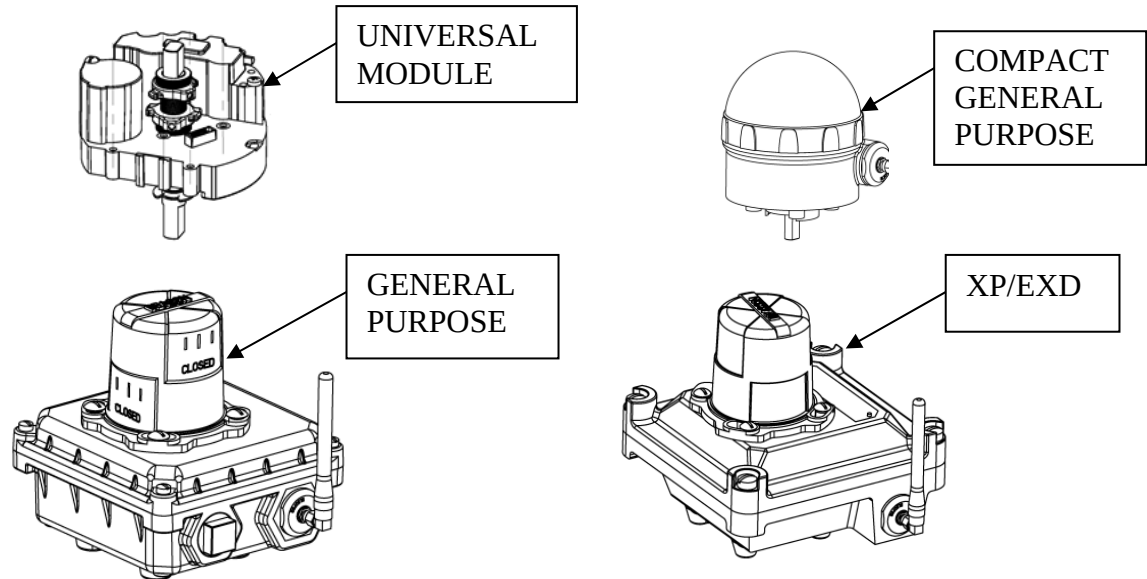
The Wireless Device module fits in several different Westlock enclosures, depending on the application, ranging from light-weight ultra-compact internal antenna to stainless-steel

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explosion-proof severe service enclosures. Regardless of the enclosure, the module and its operation is always the same.



Now that the WG is connected to the WMS, the wireless network has been formed and the WH is also connected to the wireless network, finally the WD can be added to the network to monitor the valve position. Follow the steps below:

1. It is recommended to remove the enclosure cover so the LED's in the WD module can be seen.
2. For safety reasons the WD is shipped in a deep sleep state. Therefore the first thing to do is to turn it on using the Wireless Handheld.
3. On the WH, press <Log In> then press <ENTER>.
4. If needed, press <Device NetKey> until you read "**WD Mode**" on the LCD, then press <ENTER>.
5. Place the WH in front of the WD (10-50 cm for best results), see photo below:



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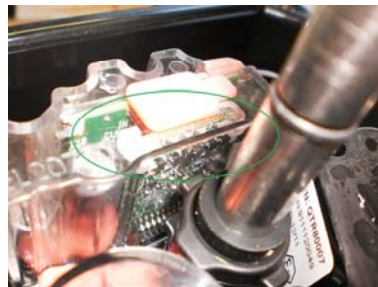
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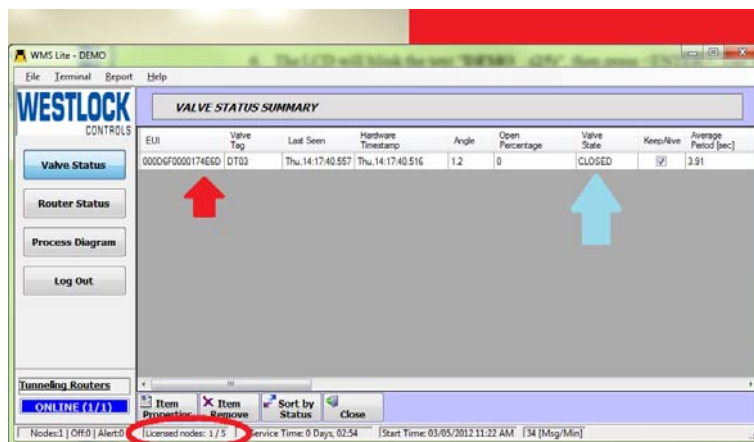
6. Press <Join> button. The message "**Join all**" will blink on the LCD, then press <ENTER>.



7. The LCD will blink the text "**DEMO (25)**", then press <ENTER>. The WH will send a LF (Low Frequency) command to the WD to wake it up and join in the same network as the WG and WH.
8. Look at the LED's that are visible through the clear cover. You will notice there are 4 LED's that will blink as the WD wakes up and join the network.



9. Check on WMS screen that after a few seconds (up to 1 minute) the WD is in the Valve Status list. Notice the EUI is the ZigBee address of the WD. It can be confirmed by looking at the label inside the clear enclosure.



10. Move the stem/shaft and notice the field Angle will change accordingly. Move the WD away from the WG and see if it still reports the stem/shaft movement. The range is

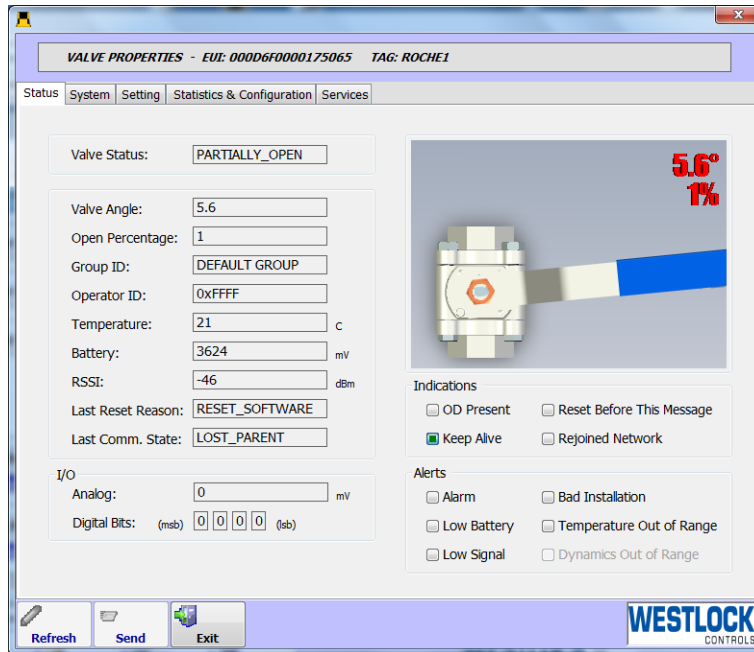
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typically 25 meters in a very obstructed area, but it can reach up to 70 meters in open space.

11. Double click on device EUI to see valve properties window:



12. Move the stem/shaft and see the animation follows the movement, practically real time. The delay is typically less than 1 second. Notice the valuable information of the WD on the screen like battery voltage, temperature, open percentage, RSSI among some alerts and indications.

For more information visit our website www.westlockcontrols.com.

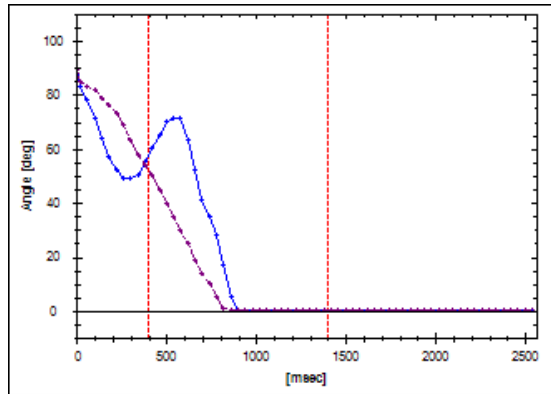
3 Additional features

- WMS Server: WMS Server is the Client/Server version of the WMS Standalone. It allows a Client/Server architecture where a single WMS Server database concentrates the communication traffic for all valves, gateways and routers in the plant, while multiple WMS Clients can access this database for monitoring, configuration, diagnostics and so on.

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- Log Analysis: allows the user to visualize all information logged in the WMS database, either Standalone or Server.
- Connectivity Server: allows the integration of the Wireless Valve Monitoring System with control systems via standard protocols like MODBUS RTU/TCP and OPC DA.

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