nexa™ by WATTS

User Guide

Pressure Sensor

Contents

⚠ WARNING

Read this Manual BEFORE using this equipment.

Failure to read and follow all safety and use information can result in death, serious personal injury, property damage, or damage to the equipment.

Keep this Manual for future reference.

Nexa™ Pressure Sensor

Nexa Pressure Sensor remotely monitors the line pressure of gases, vapors, or liquids and reports pressure value in pounds per square inch (PSI) at a user-defined time interval or heartbeat to the Nexa cloud platform. If pressure is detected outside of the range setting, Nexa sends an alert by text message or email.

The pressure sensor is a gauge sensor, meaning that the pressure the sensor measures is relative to atmospheric pressure and is pressure over and above the atmospheric pressure. This sensor combines a piezoresistive pressure transducer with 1% full scale accuracy and a corrosion resistant, NEMA 4X (IP66), 316L stainless steel housing interfaced to a Nexa wireless radio. Pressure is measured from 0 to 300 PSIG.

Sensor Features

- An Industry-leading 25-month NIST certification available on the sensors
- Wireless range of 2,000+ feet through 18+ walls*
- Frequency-hopping Spread Spectrum (FHSS)
- Best-in-class interference immunity
- Best-in-class power management for longer battery life**
- Encrypt-RF® Security (Diffie-Hellman Key Exchange + Advanced Encryption Standard (AES)-128 Cipher Block Chaining (CBC) for sensor data messages)
- Sensor capable of logging 2,000 to 4,000 readings if the gateway connection is lost (non-volatile flash, persists through power cycling):
  - 10-minute heartbeats = ~22 days worth of data
  - 2-hour heartbeats = ~266 days worth of data
- Automatic over-the-air updates of sensor firmware (future-proof)

Applications

- Domestic hot water pipes, risers, and branches
- Cold water lines
- Boiler and chiller supply and return
- Ambient temperature
- Additional applications

* Actual range may vary depending on the environment and gateway.
** Battery life is determined by the sensor reporting frequency and other variables.

Installation, Operation, Servicing, and Maintenance

⚠ WARNING

Protection from Impact. In placing the sensor, be aware that the sensor has a **mechanical impact rating of IK06,** meaning that the housing protects the sensor from a mechanical impact of one Joule, which is roughly equivalent to dropping a solid metal sphere weighing 500 grams from twenty centimeters on the respective housing. **The sensor is not rated for greater mechanical impacts and it is not recommended greater mechanical impacts be applied.**

NOTICE

The pressure sensor must be installed in a location where it is protected and sheltered from all sunlight and other luminaries emitting light at UV wavelengths. Additionally, the sensor housing is made of ABS plastic with two nylon labels adhering to it, which may present a potential for electrostatic discharge. The sensor must be installed roughly 3 feet (1000 mm) from a potential electrostatic source, such as a conveyor belt, moving machinery, or pipe. (Electrostatic Discharge (ESD) is a surge of electric current, sometimes visible as a spark, between two conductive objects with different electrostatic potentials, occurring as the objects become physically close.)

⚠ WARNING

Potential Electrostatic Charging Hazard. Electrostatic charging of plastic components can lead to electrostatic discharge events, sparking, and explosions. Whenever the sensor is in a hazardous location where an explosive atmosphere of gas or dust is or potentially present, the surface of the sensor must first be wiped with a clean, slightly damp cloth before touching the sensor to prevent electrostatic discharge. Do not dry clean the surfaces.

Avoid friction on the surfaces of the sensor. Keep ambient relative humidity above 25%. The sensor must not be used in high-charge generating processes, such as in the presence of mechanical friction, in the presence of separation processes, or mounted in a pneumatic conveying flow. If, relative to the sensor, a potential electrostatic source exists with which a potential difference of 30 kV or higher may be created, an electrostatic expert must evaluate the electrostatic risk and the distance from the electrostatic source to the sensor.

⚠ WARNING

It is the responsibility of the user to enforce the country regulation and the specific environment regulation.

This product is not certified for use in hazardous locations (HAZLOC) where there is a risk of explosions.

IF THE SENSOR IS USED IN A MANNER NOT SPECIFIED BY THE MANUFACTURER, THE PROTECTION PROVIDED BY THE EQUIPMENT MAY BE IMPAIRED. Do not disassemble the product; any mark of tampering will void the warranty. We recommend following the instructions of this user guide for correct setup and use of the product. Handle the product with care, avoiding any dropping and contact with the internal circuit board as electrostatic discharges may damage the product.

⚠ WARNING

The pressure sensor must only be installed, operated, serviced, and maintained by qualified personnel. All qualified personnel involved in the aforementioned activities must meet the following requirements.

- All qualified personnel involved in any of the foregoing activities must first familiarize themselves with the pressure sensor, its functionality, and components before attempting to engage in any such activities.
- All qualified personnel must be familiar with and adhere to the relevant laws, regulations, and or other rules promulgated by any legal authorities with jurisdiction where the sensor is to be installed, operated, serviced, and maintained.

⚠ WARNING

The pressure sensor must be installed, operated, serviced, and maintained in accordance with the following standards, instructions, and requirements.

- Relevant laws, regulations, and other rules promulgated by authorities in the jurisdiction where the sensor will be in operation must be followed.
- All safety warnings and product instructions in this manual must be strictly followed.

NOTICE

Affix the sensor housing securely to the surface area of the deployment location to prevent impact from the sensor being dropped and falling which may impact the operation of the product. Avoid mounting the sensor enclosure with magnets.

In installing the sensor, qualified personnel must follow all applicable rules set forth in IEC 60079-14 and in IEC 60079-17.

Firmware Updates

All firmware updates are received remotely. Personnel need not interact within a hazardous area to perform these functions, with the exception of power cycling the sensor. Instructions in the Repair section must be followed to power cycle the sensor correctly.

Maintenance and Cleaning

Keep layers of dust and contaminants from accumulating on the pressure sensor. Wipe the surfaces of the sensor regularly with a clean, slightly damp cloth at the installation point. Avoid using a dry cloth which might produce scratches.

Repair

Many repairs can be undertaken remotely by adjusting and setting parameters or by updating firmware. If such attempts are unsuccessful, determine on your own or with Nexa Support whether a power cycle is required, a battery replacement or product return is needed, or if the unit needs to be removed. To power cycle the sensor, remove and reinsert the battery.

Sensor Placement

For the best signal transmissions, locate sensors in areas free of obstacles, such as a lot of metal or concrete, which can cause cellular communication to be spotty.

Nexa sensors are not designed for wet environments, environments with fluctuating or excessive humidity, or in locations with exposure to corrosive or deoxidizing gas or vapor (such as chlorine gas, hydrogen sulfide gas, ammonia gas, sulfuric acid gas, or nitric oxide gas). Avoid placing sensors in excessively dusty locations; areas with saltwater, oils, chemical liquids, or organic solvents; low- or high-pressure environments, or locations where excessively strong vibrations occur.

⚠ WARNING

Never place Nexa pressure sensors where they can be exposed to volatile or flammable gas. Deploy the sensor where it is protected from operating temperatures outside specification range. Nexa sensors are not recommended for use in fridges and freezers, where an industrial sensor is recommended.

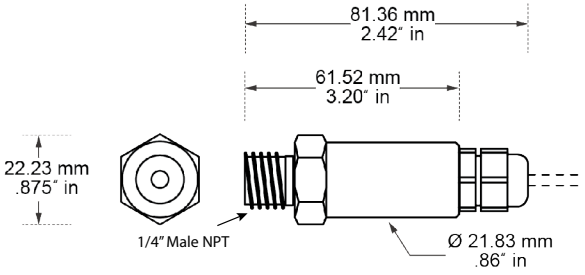
Installing the Sensor

Tools Required

Use these recommended tool for installations:

- Small Phillips screwdriver (for battery covers)
- Small Phillips screwdriver (to attach the enclosure to a wall)
- Double-sided Velcro or tape (commercial/industrial strength) to attach enclosures to walls
- Other applicable safety equipment

Installing the Pressure Sensor



NPT Male Sensor

NOTICE

Installation of the pressure sensor requires a skilled, licensed plumbing professional. If necessary, contact your Nexa Customer Success Manager for assistance in identifying a local professional.

1. Identify if there are pressure gauges installed within the plumbing system in the desired locations for new digital sensors.
2. If yes, use fittings that accept the ¼" NPT male transmitter. Fitting types can be determined by examining the existing installation location and hardware.
3. If the analog gauge is still required, install a "T" fitting to accommodate both the new sensor and the existing gauge. If the gauge is not required, a straight fitting is sufficient.
4. If cutting pipe is required for installation, contact a skilled, licensed plumbing professional.
5. Locate ball valves to isolate installation area if ball valves are not present. Coordinate with facility staff if a water shutdown is required.

Installing the Enclosure

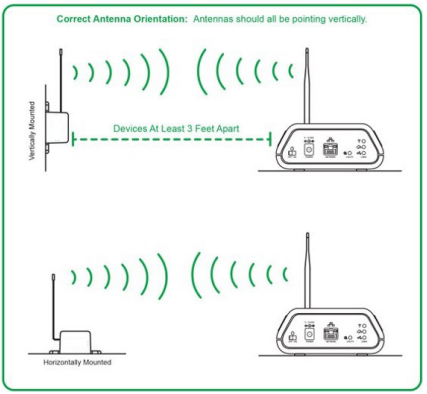
Sensor and Gateway Distance

The strength of the signal between a sensor and a gateway can vary depending on the antenna equipped. Sensors that transmit long distances can sometimes have more difficulty up close. The nearer the sensor to the gateway, depending on the strength of the signal, the more garbled the signal can be.

Sensors need at least 3 feet between them and the gateways for effective close transmission. This distance is important during setup when the sensors are trying to connect initially with the gateway. The sensors start scanning to contact the gateway the moment the battery is inserted or the sensor powered on.

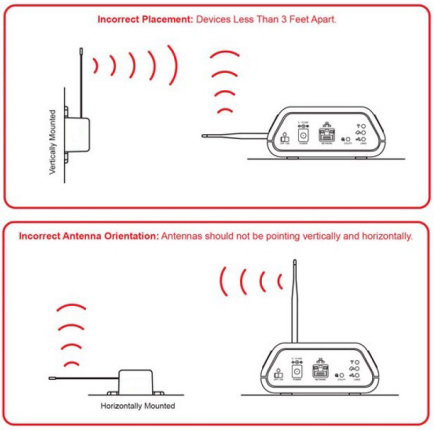
Correct Antenna Orientation

The antennas must all point vertically. Avoid pointing the antennas both vertically and horizontally in a mixed orientation.



Incorrect Antenna Orientation

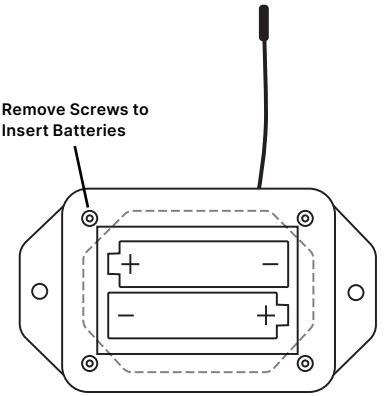
Avoid mounting sensors high and wireless gateways low. The devices need to be at least 3 feet apart but not on completely different planes. Also, avoid positioning sensors or gateways on the floor.



Install the Batteries

Be sure the Nexa Dual Gateway or Ethernet Gateway is set up before you install the included AA batteries into the transceiver box. When the transceiver is powered on, it automatically attempts to pair with the nearest gateway.

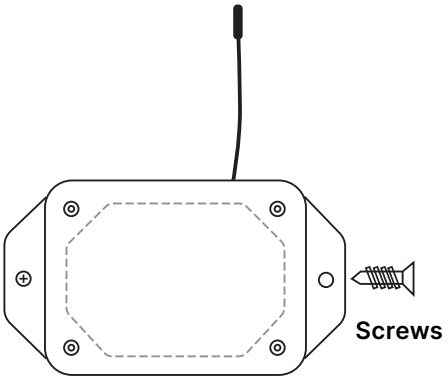
Use a #1 Phillips screwdriver to detach the cover of the transceiver box. Install the AA batteries as marked and reattach the cover. Use replacement screws provided in the kit accessory, as necessary.



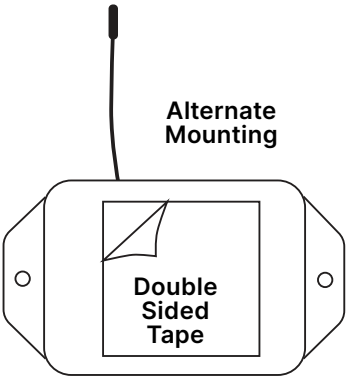
Mount the Enclosure

The enclosure features mounting flanges and can be attached to most surfaces using the included mounting screws or double-sided tape. For a wooden surface, a metallic surface, or drywall, the included double-sided tape (use two pieces) or the two included screws may be used.

For masonry, use the included double-sided tape. If the included screws are not available, use two #7, 7/16" (0.4375) screws. If the included double-sided tape is not available, use one or more pre-cut, double-sided foam squares of dimensions 1/32" x 3/4" x 3/4" (such as ULINE® model S-11695).



Front of Enclosure

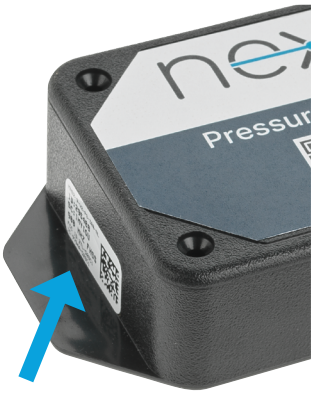


Back of Enclosure

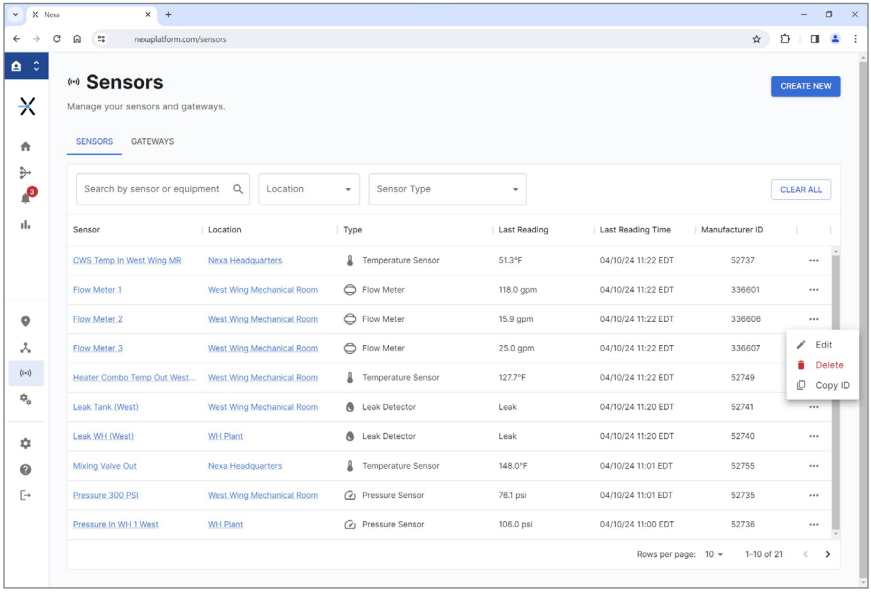
Connecting to Nexa

Now that your gateway(s) and sensors have been successfully installed, you need to contact your dedicated Customer Success Manager (CSM) to register you and your team on the Nexa platform. Your CSM connects your system data to the cloud, creates a system map, sets alerts, and assumes responsibility for fully onboarding your team, providing visibility and generating valuable insights.

To complete the registration, your Customer Success Manager will need some important information. Every gateway and sensor has a unique identification number (ID) and security code (SC) located on the side of the communications enclosure. Record and relay that information along with the precise location and related equipment within the facility. Those location names are how you will be able to identify critical data for each sensor within the Nexa platform.



As shown here, for each sensor registered on the platform, the record includes sensor name, sensor location, sensor type, last sensor reading, last reading time, and manufacturer ID. For future reference, tap the 3-dot menu on the right end of a row to edit or delete the sensor record or to copy the ID.



FAQs/Troubleshooting

Who should I reach out to in case of any issues?

Reach out to your dedicated Nexa Customer Success Manager, who can then directly assist or connect you with the right resource to resolve the issue.

What if my gateway is not all green?

- Ensure that the gateway is in an area with strong cellular signal.
- Perform a reset on the gateway by performing the following steps:
  - Power off the gateway.
  - Press and hold the Utility button for 20 seconds (keep holding while powering on).
  - After the start-up test, in which the LEDs all flash alternating red and green, release the button.
  - Press and hold the Utility button for 15 seconds or so until the LEDs go dark from top to bottom. A restart of the gateway follows.

What if some parts are missing?

Reach out to your dedicated Nexa Customer Success Manager, who can then ship out any missing or replacement parts to you.

What if my sensor won't connect?

- Contact your dedicated Nexa Customer Success Manager for support.
- Sensors may not connect because the distance from gateway is too great (particularly if signal is obstructed by barriers), or because of issues with a specific sensor. Follow the specification for distance and location area. If further assistance is needed, your Nexa Customer Success Manager will work with you to diagnose the root cause and develop a solution.
- If gateway signal is too weak, you may need to deploy an additional gateway closer to the sensor to ensure more consistent signal.
- If a specific sensor has issues, the Nexa team will ship a replacement sensor to you. Depending on the complexity of the installation, the Nexa team can remotely support you to replace the sensor, or schedule a service visit for the Nexa team to replace the sensor.

What if I put a device in the wrong location?

- Contact your Nexa Customer Success Manager, and share the device ID, current location, and intended location.
- With the preceding information, the Customer Success Manager, will then update the location on the Nexa platform for you.

What if I want to add more sensors?

Reach out to your dedicated Nexa Customer Success Manager, who will work with you to confirm additional sensor counts, pricing, install logistics, and other aspects of your configuration.

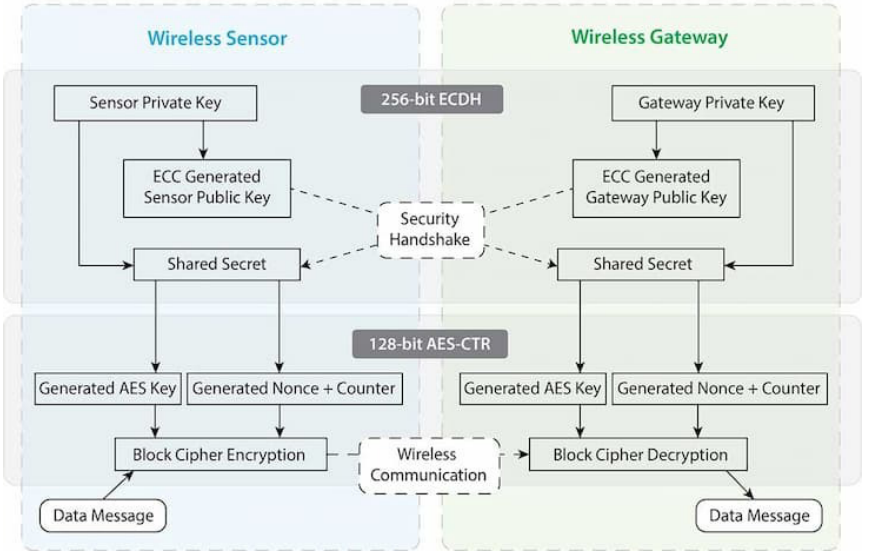
Security Protocols

Data Security

Nexa works to ensure your data security is handled with the utmost care. The same methods used by financial institutions to transmit data are also used in the Nexa security infrastructure. Security features from sensors to gateways include tamper-proof network interfaces, data encryption, and high-grade security. The Nexa proprietary sensor protocol uses low power and specialized radio equipment to transmit application data. Wireless devices listening on open communication protocols cannot eavesdrop on sensors. Packet-level encryption and verification is key to ensuring data traffic is not altered between sensors and gateways. Paired with a best-in-class wireless range and power consumption protocol, all data is transmitted securely from your devices, ensuring a smooth, worry-free experience.

Sensor Communication Security

The Nexa sensor-to-gateway, secure wireless tunnel, Encrypt-RF, is generated using ECDH-256 (Elliptic Curve Diffie-Hellman) public key exchange to generate a unique symmetric key between each pair of devices. Sensors and gateways use this link-specific key to process packet-level data with hardware-accelerated 128-bit AES encryption, which minimizes power consumption to provide better battery life. Thanks to this combination, Nexa offers robust high-grade security at every level.



Certifications

United States FCC

This equipment has been tested and found to comply with the limits for a Class B digital devices, 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 instruction manual, 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 more of the following 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.

⚠ WARNING

Changes or modifications not expressly approved by Nexa could void the user authority to operate the equipment.

⚠ WARNING

RF Exposure. To satisfy FCC RF exposure requirements for mobile transmitting devices, the antenna used for this transmitter must not be co-located in conjunction with any antenna or transmitter. Additionally, a separation distance of 8.7 in. (22 cm) or more should be maintained between this device and persons during device operation.

Nexa and Nexa Sensors

This equipment complies with the radiation exposure limits prescribed for an uncontrolled environment for fixed and mobile use conditions. This equipment should be installed and operated with a minimum distance of 9 in. (23 cm) between the radiator and the body of the user or nearby persons.

All Nexa Sensors Contain FCC ID: ZTL-G2SC1 Approved Antennas

Nexa devices have been designed to operate with one of the approved antennas listed below and have a maximum gain of 14 dBi. Antennas having a gain greater than 14 dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

- Xianzi XQZ-900E (5 dBi Dipole Omni directional)
- HyperLink HG908U-PRO (8 dBi Fiberglass Omni directional)
- HyperLink HG8909P (9 dBd Flat Panel Antenna)
- HyperLink HG914YE-NF (14 dBd Yagi)
- Specialized Manufacturing MC-ANT-20/4.0C (1 dBi 4" whip)

Canada (IC)

English

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum(or lesser) gain approved for the 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.I.R.P.) is not more than that necessary for successful communication.

The radio transmitters (IC: 9794A-RFSC1, IC: 9794A-G2SC1, IC: 4160a-CNN0301, IC: 5131A-CE910DUAL, IC: 5131A-HE910NA, IC: 5131A-GE910 and IC: 8595A2AGQN4NNN) have been approved by Industry Canada to operate with the antenna types listed on previous page with the maximum permissible gain and required antenna impedance for each antenna type 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.

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.

Français

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 Èquivalente (P.I.R.È) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent émetteurs radio (IC: 9794A-RFSC1, IC: 9794A-G2SC1, IC: 4160a-CNN0301, IC: 5131A-CE910DUAL, IC: 5131A-HE910NA, IC: 5131A-GE910 et IC: 8595A2AGQN4NNN) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne figurant sur la page précédente et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

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, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, méme si le brouillage est susceptible d'en compromettre le fonctionnement.

⚠ WARNING

RF Exposure. To satisfy IC RF exposure requirements for mobile transmitting devices, the antenna used for this transmitter must not be co-located in conjunction with any antenna or transmitter. Additionally, a separation distance of 12.6 in. (32.1 cm) or more should be maintained between this device and persons during device operation.

Limited Warranty: Watts Regulator Co. (the "Company") warrants each product to be free from defects in material and workmanship under normal usage for a period of one year from the date of original shipment. In the event of such defects within the warranty period, the Company will, at its option, replace or recondition the product without charge.

THE WARRANTY SET FORTH HEREIN IS GIVEN EXPRESSLY AND IS THE ONLY WARRANTY GIVEN BY THE COMPANY WITH RESPECT TO THE PRODUCT. THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED. THE COMPANY HEREBY SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

The remedy described in the first paragraph of this warranty shall constitute the sole and exclusive remedy for breach of warranty, and the Company shall not be responsible for any incidental, special or consequential damages, including without limitation, lost profits or the cost of repairing or replacing other property which is damaged if this product does not work properly, other costs resulting from labor charges, delays, vandalism, negligence, fouling caused by foreign material, damage from adverse water conditions, chemical, or any other circumstances over which the Company has no control. This warranty shall be invalidated by any abuse, misuse, misapplication, improper installation or improper maintenance or alteration of the product.

Some States do not allow limitations on how long an implied warranty lasts, and some States do not allow the exclusion or limitation of incidental or consequential damages. Therefore the above limitations may not apply to you. This Limited Warranty gives you specific legal rights, and you may have other rights that vary from State to State. You should consult applicable state laws to determine your rights. **SSO FAR AS IS CONSISTENT WITH APPLICABLE STATE LAW, ANY IMPLIED WARRANTIES THAT MAY NOT BE DISCLAIMED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF ORIGINAL SHIPMENT.**

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by WATTS

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