Primex XR 72MHz Synchronized Time Solution

14000 Series Transmitter - Internal Antenna

Install & User Guide

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Primex, Inc.

Primex is a leading provider of synchronized time and environmental monitoring solutions. Our solutions automate and maintain facility compliance, increase efficiencies, enhance safety and reduce risk for organizations in the healthcare, education, manufacturing and government vertical markets.

Worldwide Headquarters

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Regulatory Compliance

Federal Communications Commission (FCC) / Industry Canada (IC)

License Requirements

- Operation of the Transmitter requires a FCC/IC operating license, which must be obtained prior to operation.
- FCC licenses must be renewed every 10 years and the IC licenses must be renewed annually.
- As a service, Primex will file the license application if the end-user desires it. An end-user that does not want Primex to file for the original site license will be required to complete a waiver form, file the required application, and receive a valid license from the FCC/IC prior to use. If you have any questions or need any assistance, please contact Primex Technical Support.
- Primex requires a copy of the licenses in order to complete the factory presets.

Product Compliance

- This device complies with Part 90 and Part 15 of the FCC rules and RSS-210 of Industry Canada.
- Operation of this device is subject to the following two conditions:

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

Radio Frequency (RF) Exposure

To comply with FCC/IC RF exposure requirements for mobile transmitting devices, the Transmitter is only to be used or installed in locations where there are at least 20 cm (approximately eight in.) separation distance between the antenna of the Transmitter and all persons.

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Important Safety Instructions

READ ALL INSTRUCTIONS BEFORE INSTALLATION, OPERATION, OR MAINTENANCE OF PRODUCT.

Some of the following information may not apply to your particular product model; however, as with any electronic product, precautions should be observed during installation, operation, and maintenance.

- Never operate the Transmitter without the antenna being properly connected to the Transmitter. Operating the Transmitter without an antenna can lead to permanent damage of the Transmitter and poses a safety risk.
- Do not touch any of the antennas while broadcasting.
- Standard acceptance procedures must be followed prior to operating this equipment in the proximity of life support systems.
- Do not operate the Transmitter outdoors, in wet areas were there is standing water, or in areas where there is condensation or the risk of condensation. Use in any of these environments will damage the Transmitter and void the warranty.
- Do not open the Transmitter to alter the internal elements in any way. This will void the warranty and could lead to unsafe conditions, malfunction, and violations of FCC/IC regulations.

Primex disclaims any liability or responsibility for the results of improper or unsafe installation practices.

Contents

GPS Managed Time Overview - 14000 Series Transmitter

Architecture

The Primex GPS Managed Time solution consists of a single 14000 Series Transmitter, GPS Receiver, 14000 Series Repeater (Satellite) Transmitter (optional), and system clocks, bells and other devices in a single building, to a campus wide deployment.

Time Synchronization

Once a 14000 Series Transmitter has received its time from a GPS Receiver it sets its internal clock. It then transmits time information or schedules via a wireless radio signal to the wireless clocks, bells, and other devices in the system. As a result, the system devices are precisely synchronized to each other and all time, schedules, and events are kept current.

Time Source: Transmitter time is synchronized from a GPS Receiver and then broadcasts that time and event schedules to the system clocks and other devices.

Broadcast (Transmit) Schedule Transmitter with Internal Antenna: broadcasts its synchronized time continuously to the system clocks and devices.

Broadcast (Transmit) Schedule Transmitter with External Antenna: broadcasts its synchronized time to the system clocks and devices from the 39th to the 6th minute of the next hour and changes to a standby mode during the 7th to the 38th minute of the hour (standard broadcast schedule). During initial power-up, the Transmitter broadcasts for 8 consecutive hours. After the 8 hour power-up period, the Transmitter reverts to its timed broadcast schedule.

System components

Transmitter: operates on channels with 20kHz bandwidths and 72MHz frequency and is preset to one of the channels licensed by the FCC/IC to minimize interference on these frequencies and channels.

GPS Receiver: the Global Positioning System (GPS) Receiver has a sensitive antenna that receives the Coordinated Universal Time (UTC) from the GPS satellite transmission. The GPS Receiver then sends the time to the Transmitter. The GPS Receiver is required to have an unobstructed "view of the sky" to receive the signal.

GPS/Transmitter Extension Cable (optional): a specially designed low-resistance data cable can be used to extend the distance between the GPS Receiver and the Transmitter. The GPS Receiver continuously sends the precise time through the cable to the Transmitter.

Repeater (Satellite) Transmitter (optional): optional unit used to supplement and extend signal coverage.

14000 Series Specifications - System Components

This section provides the specifications of the 14000 Series Transmitter and its components.

14000 Series Transmitter Specifications

Parameter	Specification
Operating Frequency Range	72MHz
Channels	16 channels available (pre-programmed prior to shipping)
Dimensions	16.0”L x 12.0”W x 1.9”D (40.6 cm x 30.5 cm x 4.8 cm)
Maximum Transmission	1 Watt (at Transmitter)
Radio Technology	Narrowband FM
Weight	9 lbs
Settings	Time Zone, LAN/Local, 30 min offset, serial/USB/Ethernet connectivity
Daylight Saving Time	Bypass switch
LCD Display	Time, date, and signal verification
Power Supply	Input: 120 VAC, 50/60 Hz, 0.4 Amp Output: 9 VDC, 2.0 Amp 6 ft (1.82 m) cord
Operating Range	32° to 158° F (0°to 70° C), non-condensing environment

GPS Receiver Specifications

A GPS Receiver draws time information from the U.S. Government Satellites, providing the system with Coordinated Universal Time (UTC).

- Mounted to rooftop, pole, or window (not a Low-E glass window).
- GPS Receiver sends UTC time to the Transmitter via the NMEA 0183 standard protocol.
- Optional GPS extension cable. A specially designed low-resistance cable to extend the distance between GPS Receiver and Transmitter. The maximum total length of the cable cannot exceed 200 ft. (60.96 m).

Parameter	Specification
Cable	10 ft. (3.05 m) cable 50, 100 and 200 ft. (15.24 m, 30.48 m and 60.69 m) extensions available. The maximum total length of the cable cannot exceed 200 ft. (60.96 m).
Dimensions	2.5 inches W x .75 inches H (6.35 cm x 1.91 cm)
Mounting Bracket	3.5 inches W x 1.4 inches H x 4.5 inches D (8.89 cm x 3.56 cm x 11.43 cm) Included for rooftop or window installation.
Weight	0.75 lb (.34 kg)
Operating Range	-32° to 158° F (-30° to 70° C)

Install 14000 Series Transmitter - Internal Antenna

Installation and Configuration Overview

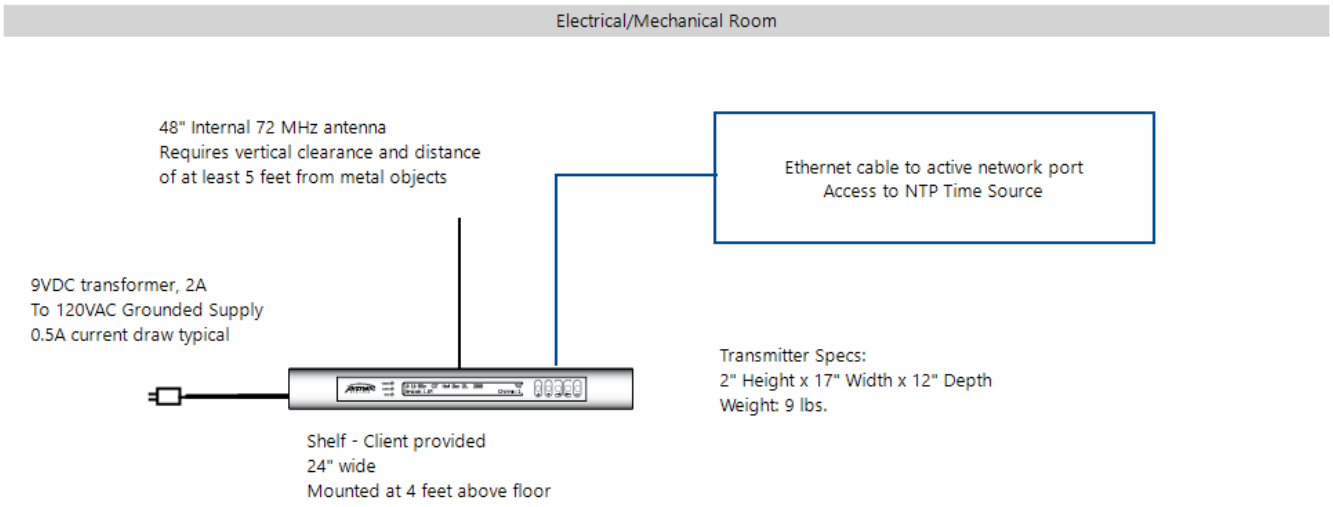
- Review the Installation Guidelines and identify the installation location of the Transmitter and system components.
- Inspect system components to verify packaging includes all supplied parts for each system component and verify no damage has occurred during shipping.
- Do not install or attempt to set the system wireless clocks or devices until the Transmitter and its components are installed and configured, the Transmitter is powered, its time source is configured, and the Transmitter is fully operational.

Installation overview

Listed below is a summary of the order the Transmitter and its components are to be installed and configured.

1. Install GPS Receiver.
2. Configure Switch Settings
3. Establish Connections
4. Verify System is Operational

Typical System Setup - Transmitter with Internal Antenna



GPS Receiver Installation Location Guidelines

Determine a suitable location for the GPS Receiver unit. Location is extremely important to ensure the best operation of the system.

- GPS Receiver must be mounted where it has a "clear view of the sky" to receive a GPS signal 24 hours a day.
- Typical mounting locations of the GPS Receiver unit include the inside of a window (not a Low-E glass window), to an exterior pole, or on a rooftop.
- GPS Receiver unit should be kept away from large metal objects.
- GPS Receiver unit and cable must be mounted above any potential standing water, snow depth, leaves or other obstructions and is protected from the weather.
- Maximum total distance of the GPS cable to the Transmitter cannot exceed 200 feet (60.96 m).
- If the GPS cable is located outdoors, the use of a GelWrap splice enclosure is strongly recommended.

Tools and Equipment Required

To complete installation, the following tools and equipment are required.

Transmitter equipment

- 1 Watt Transmitter Rack 18 GA metal, epoxy coated (optional)
- Surge protector and battery backup system (recommended)

GPS Receiver installation required tools and equipment

- Standard or hammer drill
- 5/8 inch concrete drill bit, 18 inches (45.7 cm) long
- Silicone caulk for GPS cable penetration
- Phillips screwdriver
- Flat head screwdriver

Install GPS Receiver

A GPS Receiver is required when a Transmitter is set to use GPS as its time source.

Specifications

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GPS Receiver mounting kit contents

Part	Quantity
Mounting bracket	1
GPS 18 LVC and connector	1
M3 x 0.5 x 6 mm pan head screws	2
#6 x 3/8 sheet metal screw	3
Suction cups	3
U-bolt with nuts for mounting on 1 inch (2.54 cm) pole	1

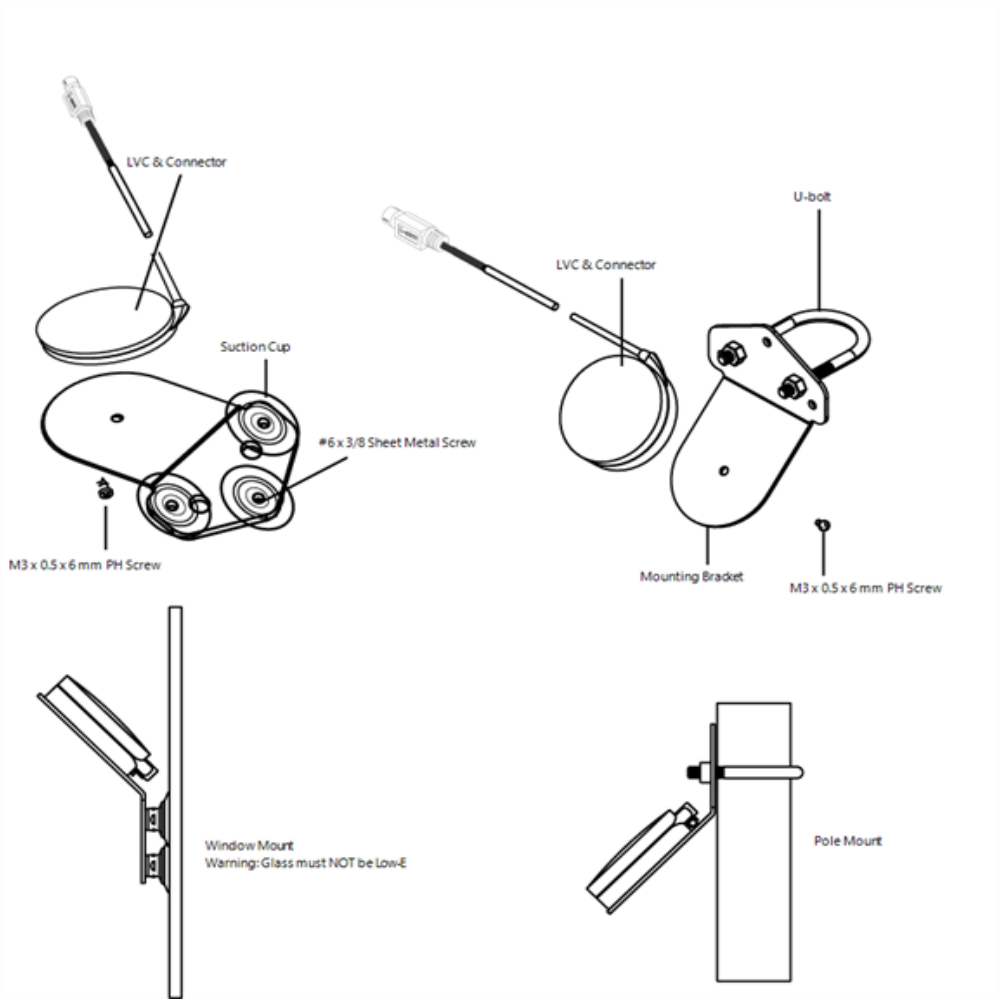
How to mount a GPS Receiver

1. Verify the kit contents and the installation location meets the installation guidelines.
2. From the outside of the building, route the GPS cable.

   Internal antenna Transmitter: route through a 5/8 inch drilled hole into the building.
3. Assemble and mount the GPS Receiver unit to either the inside of a window (not Low-E glass) or to an outside pole or rooftop. The mounting location is required to have a clear view of the sky.

   > NOTE
   >
   > Be sure to follow local building code requirements when attaching the GPS unit to the inside of a window. Clean the windowpane before using the suction cups for attachment.
4. Route GPS cable and connect to Transmitter GPS connection.

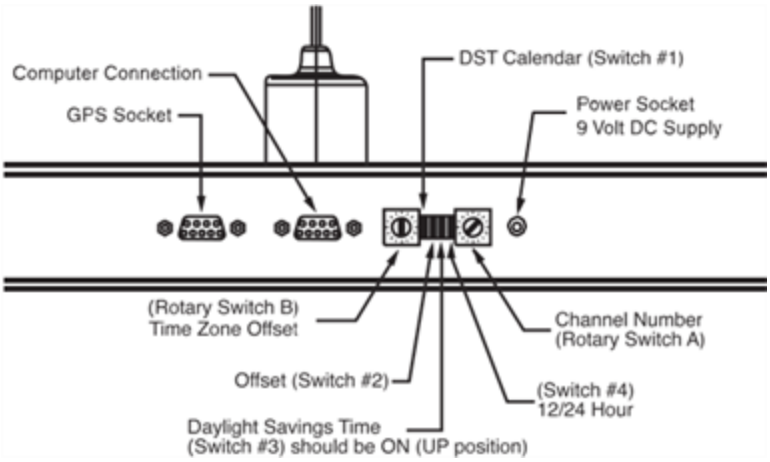
GPS Receiver installation components and illustration



Configure Switch Settings

The switch preferences are located on the back side of the 14000 Series Transmitter. The switches set the Time Zone, channel number, 12- or 24-hour display, and the observance of Daylight Saving Time. The Transmitter continually checks the position of the switches.

14000 Transmitter - connections and switch settings



Switch

Rotary Switch A (channel selection)

> WARNING
>
> Do NOT adjust the channel switch. It is only to be set to the frequency specified on the FCC/IC application.

Factory preset to the FM frequency on which the Transmitter will broadcast.

There are 16 available channels. The chart below explains which switch positions correspond to which channel numbers.

Switch No.	Channel No.	Switch No.	Channel No.
0	16	8	8
1	1	9	9
2	2	A	10
3	3	B	11
4	4	C	12
5	5	D	13
6	6	E	14
7	7	F	15

Switch
Rotary Switch B Sets the Time Zone. Use a small slotted screwdriver to adjust the rotary switch. “4” for Atlantic Time Zone “5” for Eastern Time Zone “6” for Central Time Zone “7” for Mountain Time Zone “8” for Pacific Time Zone “9” for Alaska Time Zone “A” for Hawaii Time Zone
Switch #1 Sets the Daylight Saving Time Calendar. Up to automatically change to the new Daylight Saving Time calendar in 2007. Down to abide by the old schedule in 2007.
Switch #2 Sets the direction of UTC offset. Up for U.S. and Canada Down for Europe
Switch #3 Sets the automatic Daylight Saving Time adjustment. Up for automatic Daylight Saving Time changes Down to bypass Daylight Saving Time adjustments

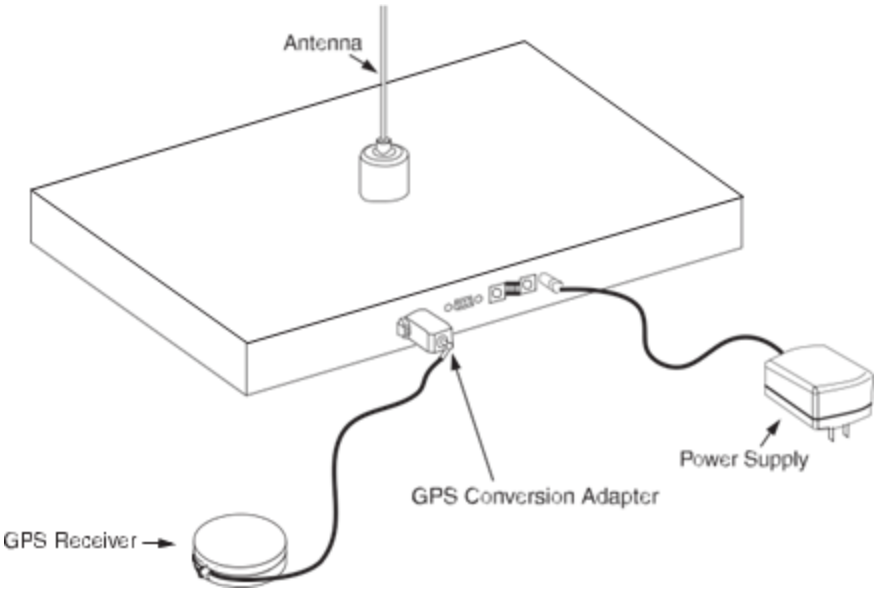
Switch
Switch #4 Sets the clock display on the Transmitter. Up for 12-hour display Down for 24-hour display

Establish Connections

1. Carefully screw the Transmitter antenna onto the Transmitter. Turn the antenna clockwise, being careful to avoid cross-threading the antenna. The antenna must be snug and flat against the case.

   > NOTE
   >
   > Do not over-tighten the antenna. Hand-tighten only.

2. Plug the included DB9/RJ45 GPS conversion adapter into the GPS socket located in the back of the Transmitter.



3. Plug the GPS cable into the GPS conversion adapter.
4. Plug the supplied 9 Volt 2.0 Amp DC power supply (transformer) into the Transmitter.
5. Plug the power supply (transformer) into a 120 VAC outlet.

Verify System is Operational

The final step is to verify the 14000 Series Transmitter is operating and functional.

1. Verify a GPS signal has been received.
2. Verify the Time and Date are correct.
3. Verify the Channel Number is set correctly.

Transmitter Operation

Learn about the operation of a 14000 Series Transmitter.

Transmitter Operation

Power-on sequence

1. Initially display its time as 12:00:00 and software version.
2. Transmitter checks the position of the switches on the rear of the Transmitter and stores the settings in its memory.
3. Transmitter sends information to the GPS Receiver and waits for time information from the GPS Receiver. The red LED light flashes until the Transmitter receives a valid time signal from the GPS Receiver.
4. The time on its front display increments once each second until the GPS Receiver sends the Transmitter a valid time.

   The GPS Receiver needs to see three satellites in the sky above before it will send a time signal to the Transmitter. This may take up to 15 minutes for a GPS Receiver that has a 360° view of the sky. The length of time is dependent on the location, weather conditions, time of day. In areas where the unit does not have a full view of the sky, it may take up to several hours for the Transmitter to receive a valid time signal.
5. The GPS Communication indicator appears when the Transmitter is receiving a signal from the satellite through the GPS Receiver. If the symbol is not displayed, see Troubleshooting.
6. Once the Transmitter receives a valid time signal from the GPS Receiver, sets its internal clock to the time received and displays the correct time and date on its front display. The Transmitter then begins to broadcast its internal time once every second.

> NOTE
>
> The Transmitter does not broadcast time to system devices until it has received valid time information from the GPS Receiver.

GPS time source

The Transmitter continually monitors the GPS Receiver and updates its internal clock with the time data it receives. If the Transmitter does not receive valid time data from the GPS Receiver for 48 hours, its red LED on the right side of its front display will flash.

Transmitting Channel Number (FCC/IC license)

The number located on right side of its front display is the channel number to which the Transmitter will be transmitting the time signal.

The channel number must be the same as the channel number specified on the site FCC/IC license. If not, you must immediately adjust the channel to the number that corresponds to the FCC/IC license.

Daylight Saving Time

The Transmitter is pre-programmed to automatically make adjustments for Daylight Saving Time.

- The letters "DT" (Daylight Saving Time) or "ST" (Standard Time) is displayed when adjustment for Daylight Saving Time is active (switch #3 in the up position).
- If neither "DT" nor "ST" is displayed, then switch #3 is in the down position and the Transmitter does not adjust for Daylight Saving Time.
- The adjustment to Daylight Saving Time and back to Standard Time take place 2:01 AM on the day of change.

> NOTE
>
> The GPS signal does not encode information about Daylight Saving Time. In the spring when the Transmitter changes to Daylight Saving Time, the system clocks adjust by advancing faster than their normal speed to make the adjustment and then return to normal operation. In the fall when the Transmitter returns to Standard Time, the system clocks make the time adjustment and then return to normal operation.

Time Zone

The Time Zone of your location is not shown on the display. However, when the Transmitter has received a valid time from the GPS Receiver, the correct Time Zone can be checked by verifying the correct hour is displayed. The Transmitter can be set for all 24 time zones around the world and 1/2-hour time zones.

12-Hour or 24-Hour Time

The 12/24-Hour option only affects the Transmitter LCD display. If AM or PM is on the display, then the 12-hour option is selected with switch #4. If neither AM nor PM is on the display, then the 24-hour option is selected.

- Analog System Clocks are 12-hour clocks.
- Digital Clocks have a selectable jumper option to display either 12-hour or 24-hour time regardless of the Transmitter 12/24 option setting.

GPS Receiver Communication

The status of the GPS Receiver is indicated by the GPS Communication indicator.

- When the "Y"-like symbol is displayed, the GPS Receiver is connected to the Transmitter and there is proper communication between the GPS Receiver and the Transmitter.
- When the Transmitter is receiving valid time data from the GPS Receiver, the three parentheses sequence in a motion pattern. If these symbols are not displayed, see Troubleshooting.

Power Failure

The system has a fail-safe design. If the failure of a system component or power loss to a component occurs, all downstream components continue normal operations using their own internal time base. If after a specified period, communication has not been restored, a visual that indicates a loss of communication appears and remains until communication is restored.

Red flashing LED on the Transmitter; flashing colons on LED digital clocks; double stepping of second hand on analog clocks.

Support

To obtain additional technical documentation for Primex products, visit the Support area on our website at www.primexinc.com

You may require Technical Support when you have questions about product features, system configuration, or troubleshooting. Support services are delivered in accordance with your organization's support agreement, end user licenses agreements, and warranties, either with a Primex Certified Sales and Service Partner or directly with Primex.

Support through Primex Certified Sales and Service Partners

Ensuring our customers experience excellent service is of utmost importance to Primex. Our network of Certified Sales and Service Partners offer technical support services for Primex products.

If you have purchased Primex products or have a service agreement with a Primex Partner, they are your primary contact for all Technical Support inquires.

When contacting Primex Technical Support

Make sure you have satisfied the system requirements listed in your product documentation. Also, you should be at the computer or device on which the problem occurred, in case it's necessary to replicate the problem.

When you contact Primex Technical Support, please have the following information available:

- Customer ID/Account Name
- Problem description/error messages
- Device hardware information
- Troubleshooting performed before contacting Primex

Primex Technical Support

Hours: 8:00 a.m. to 5:00 p.m CST | Monday through Friday

Phone: 1-262-729-4860

Email: techservices@primexinc.com | Web: www.primexinc.com/support

Five Year Limited Warranty

Primex, Inc. warrants this product to be free from defects in materials and workmanship for a standard of five (5) years from the date of purchase* from an authorized reseller or directly from Primex. Primex, Inc. will at its sole option, repair or replace any components that fail in normal use. Such repairs or replacements will be made at no charge to the customer for replacement parts. The customer will be responsible for any transportation costs. This warranty does not cover failures due to misuse, abuse, accidental or unauthorized alterations or repairs.

The warranties and remedies contained herein are exclusive and in lieu of all other warranties express or implied or statutory, including any liability arising under any warranty or merchantability or fitness for a particular purpose, implied, statutory or otherwise. In no event shall Primex, Inc. be liable for any incidental, special, indirect or consequential damages, whether resulting from the use, misuse or inability to use this product or from defects in the product. Some states do not allow this exclusion or limitation of incidental or consequential damages so the above limitations or exclusion may not apply to you.

To obtain warranty service: If after following the instructions in the product guide, you are certain the product is defective, contact Primex Technical Support to assist with troubleshooting the issue. If the issue cannot successfully be resolved and the product is under warranty, a RMA (Return Material Authorization) will be generated. The RMA form will be provided via email with detailed instructions for the return. All merchandise returned must be shipped to Primex, Inc. Attn: Returns Dept., N3211 County Road H, Lake Geneva, WI 53147.

Primex, Inc. retains the exclusive right to repair or replace the unit at its sole discretion. Such shall be your sole exclusive remedy for any breach of warranty.

* applies to products sold on or after June 1, 2018.