KRAMBLE INDUSTRIES INC.

Wireless Full Bin Alarm

Installation and Operating Manual

The Wireless Full Bin Alarm is designed to provide the ultimate in convenience and safety to perform tasks remotely. It is a radio frequency (RF) sensing device that helps prevent overfilling of grain bins by activating an alarm when the grain Sensor Probe is activated. The Sensor Probe, which operates at 915.8 MHz FM, transmits securely encoded information to the Receiver, which then decodes the information and alerts the user that the bin is full. The Sensor Probe and Receiver are designed to operate within 300' but actual range is dependent on operating environment.

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Specifications

Sensor:

Power:	9 Volt DC Battery
Frequency:	915.8 MHz
Modulation:	FM (Frequency Modulation)
Indicators:	Internal System/Battery Test
Case Size:	3” dia x 13” long
Range:	300’ + (depending on environment)
Antenna:	External 3.15” Flexible Tuned
Security Code:	Preprogrammed Unique Identifier
Environment:	Weatherproof

Receiver:

Power in:	12 VDC
Standby Current:	40mA
Alarm Current	200mA
Case Size:	8” x 4.8” x 2.5”
Power Input:	15’ 16ga 2 conductor wire with plug and lock connectors
Indicators:	Power On Red LED
	Transmitter Low Battery Level Green LED
	Alarm LED Indicator
	95db Audible Siren
Antenna:	3.15” Flexible Tuned, Internal

NOTE: THE GRANTEE IS NOT RESPONSIBLE FOR ANY CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE. SUCH MODIFICATIONS COULD VOID THE USER’S AUTHORITY TO OPERATE THE EQUIPMENT.

FCC

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 or 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.

Industry Canada

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.

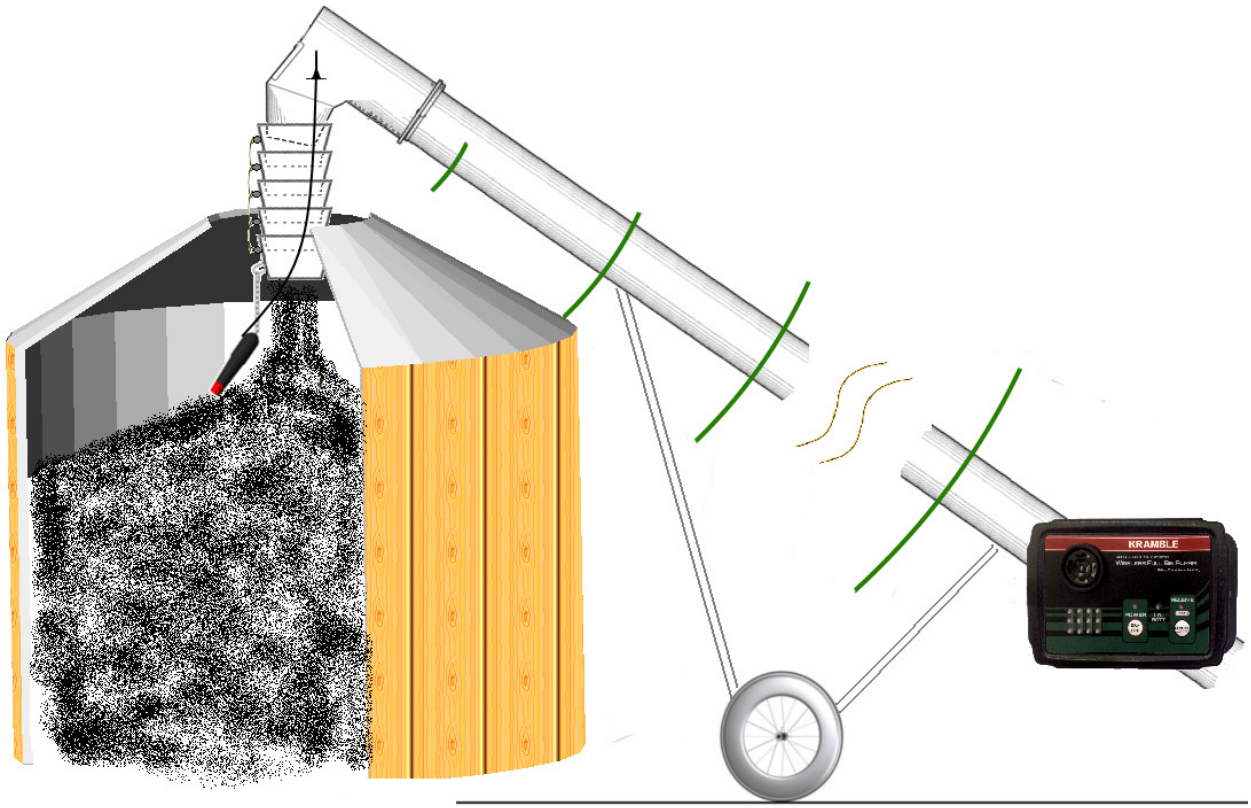
Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Kramble Industries Inc.
102-2750 Faithfull Ave.
Saskatoon, SK S7K 6M6
306-933-2655
alan@kramble.net
www.kramble.net

Overview

The Full Bin Alarm is an auger-mounted monitoring system that indicates when the grain level in the bin is reaching its maximum. The system consists of a Receiver Console with audible and visible alarms, a Sensor Probe that hangs into the grain bin suspended from the spout of an auger, and an antenna that connects to the sensor probe and is mounted at the top of the auger. The battery-powered Sensor Probe is fully sealed and communicates wirelessly via radio frequency (RF) to the Receiver Console. When the grain level becomes high enough that the grain comes in contact with the Sensor Probe tilting it beyond 30° for 3 seconds, the sensor will send an RF signal that tells the receiver to activate the alarm.

Figure 1 Full Bin Alarm



Mechanical Installation

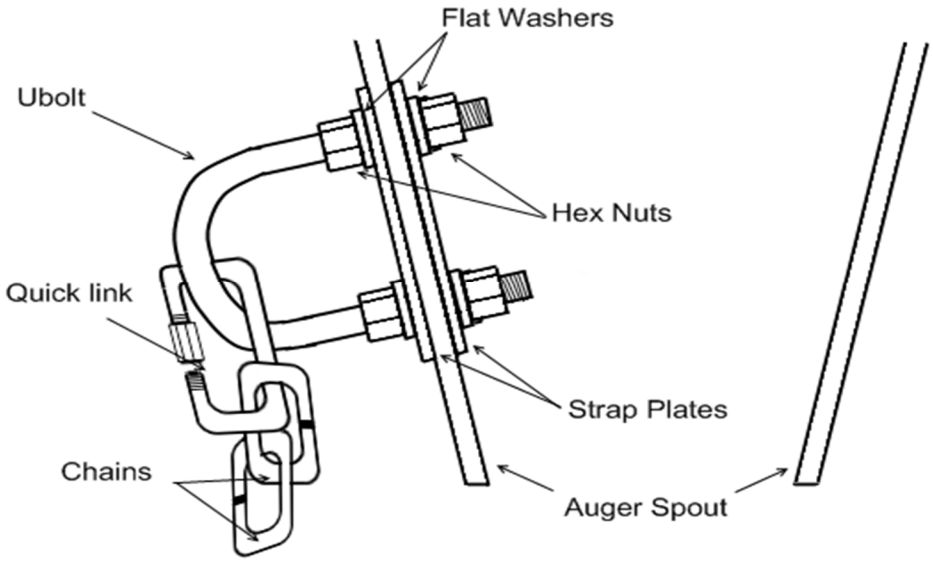
Receiver Console

The Full Bin Alarm Receiver Console attaches easily to any metal surface using a pair of magnets located on the console back.

Sensor Probe

The transmitter mounting kit contains a 12” chain, a U-bolt, two strap plates, four hex nuts, four flat washers, and two quick link connectors. Drill two ¼” holes 1-3/8” apart in the spout and attach the U-bolt as shown in the following figure. Use a quick link to attach the chain to the U-bolt and the second quick link to attach the chain to the Sensor Probe. The U-bolt may be mounted on the inside of the spout if space is limited.

Figure 2 U-Bolt Instructions



Electrical Installation

Receiver Console

Connect +12VDC and ground to the Power Input wires as marked. The polarity must be as follows: +12V on the white wire, and GROUND on the black wire. When power to the Receiver is turned on, the Red LED indicator light should be ON indicating normal operation. Press the “ON/OFF” button on the Receiver label to turn the power On and Off.

Sensor Probe

To install/change the battery, simply unscrew the top half off the Sensor Probe to reveal the circuit board and battery assembly. Unclip the battery connector and slide the battery out of the cable ties to remove. Insert the new battery in and clip the connector on. Perform the self-test described on page 7. Reassemble.

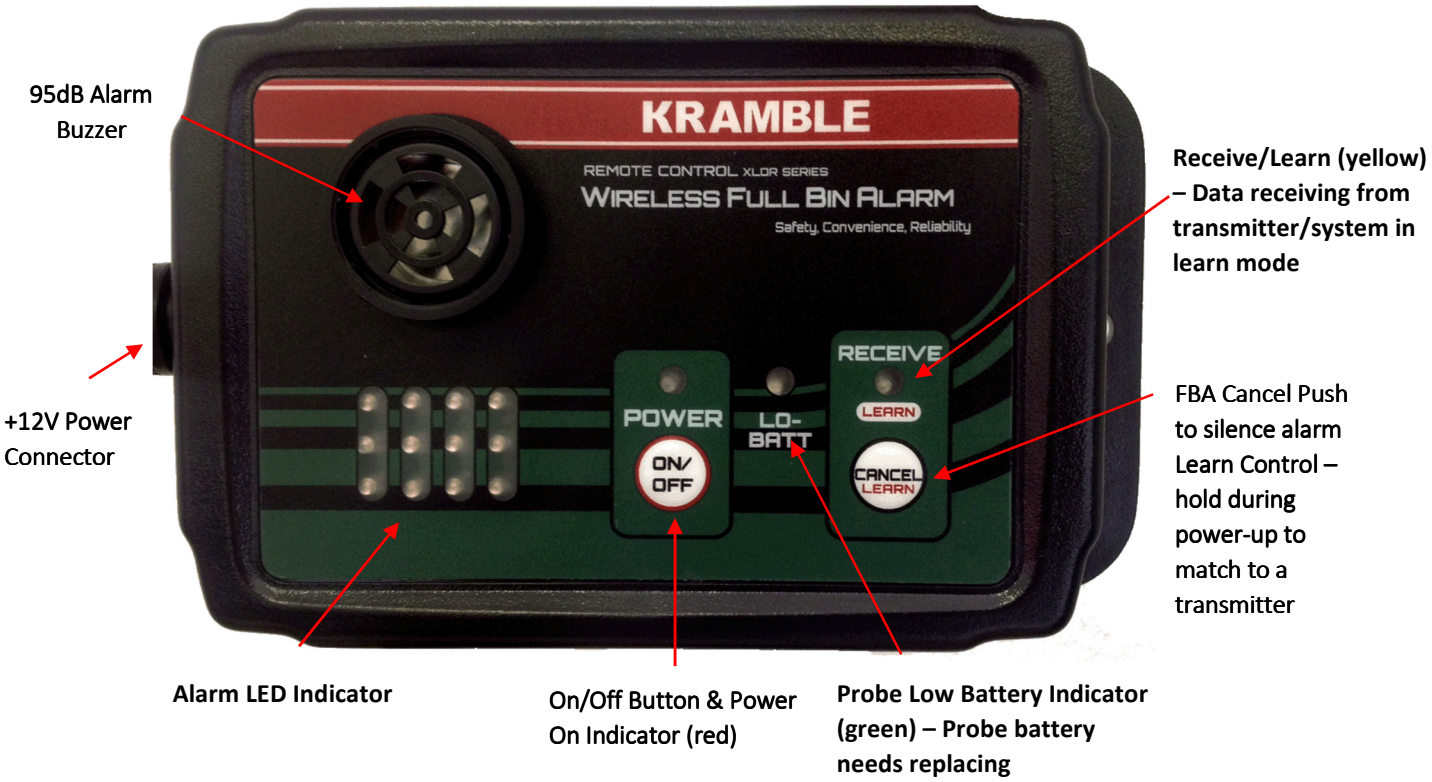
Antenna Mounting

The sensor probe connects to an external antenna to be mounted at the top of the auger outside of the bin. Included are two options for mounting the antenna: a #10 self-drilling screw for attaching the antenna bracket directly to the auger or a magnet on the antenna bracket. Mount the antenna bracket in the best position possible such that the antenna has a direct line of sight to the receiver. Do not point the antenna at the receiver – reception will be better when the antenna's side faces the receiver.

General Operation

Receiver Console

The Receiver Console is powered by 12 volts DC and is equipped with a Power On/Off button and a Cancel Alarm (CAN) button on the front of the case. When the Power On/Off button is pressed, the red LED will light indicating normal operation. Press the Power On/Off button again to turn power off.



Kramble Industries Inc. is not responsible or liable for indirect, special, or consequential damages arising out of or in connection with the use or performance of the product or other damage with respect to any economic loss, loss of property, loss of revenue or profit, or costs of removal, installation, or reinstallation.

The yellow LED indicates that the Console is receiving a valid RF transmission directed to the Bin Alarm. In normal operation, when the Sensor Probe is tilted more than its threshold angle (set at manufacture to 30°) from vertical it transmits an alarm signal, which causes the Yellow "receive" LED to light and the alarm to activate. The alarm signal is both an array of LED lights and audible beeper acting simultaneously.

The Receiver Console activates the alarm when the alarm signal is received. The alarm remains on for ten seconds or until the Cancel button is pressed. If the Sensor Probe remains activated the alarm will continue for 60 seconds unless cancelled. While the alarm is active but has been cancelled, the alarm can be reactivated by pressing the cancel button a second time. If ten seconds pass without receiving an alarm signal and the alarm has been cancelled, the receiver will automatically reset to normal mode and sound the alarm again should the sensor subsequently transmit the alarm signal.

Low Battery LED

The green LED illuminates when the sensor sends a Low Battery signal, indicating that the Sensor Probe battery needs to be replaced. Once activated, the green LED will remain on until the receiver is powered off.

FBA Receiver Console Self-Test

To test the Receiver Console alarm light and siren, hold the cancel button for six seconds while the Full Bin Alarm is powered on. Once tested, the alarm will shut off when the cancel button is released.

The Receiver power may be turned off when not in use to prevent undesired operation.

Probe/Receiver Matching

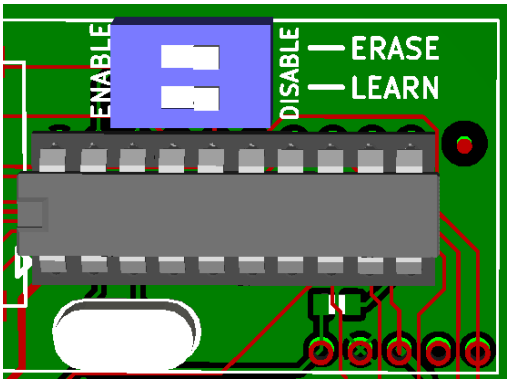
The Receiver is matched to a Sensor Probe by "learning" the probe's unique security code so that the receiver will accept commands from that probe. A factory default system already has its probe matched to the receiver.

To match a probe to a receiver, first turn the receiver power switch OFF. Hold the button marked LEARN on the receiver and press the receiver power ON, then release the two buttons. The Receive/LEARN light is then lit to indicate that the receiver is waiting for a signal from the transmitter to be learned. Tilt the probe to send a signal and the receiver will read the probe's security code and store it in memory. The Receive/LEARN light will flash three times to indicate that the transmitter has been successfully learned, and the Receive/LEARN light will turn off and receiver will then enter normal operating mode. Up to eight probes can be learned by a receiver. If eight unique probe have already been learned by a receiver and it is instructed to learn another probe, the oldest-learned probe's security code will be overwritten and forgotten. The buzzer and light are disabled for ten seconds after learning a sensor probe's security code in order to prevent unwanted activation of the alarm.

To erase all stored security codes, turn the receiver power ON while holding the LEARN button, and continue holding the button until the Receive/LEARN light begins to rapidly flash. Release the button, and the light will flash more slowly for three seconds, then turn off to indicate that the erase operation has succeeded. If the LEARN button is pressed while the Receive/LEARN light is slowly flashing, the erase operation is aborted and the receiver retains the stored transmitter security codes.

The Receiver is equipped with a two-position switch to enable or disable the learn and erase functions. To enable or disable a function, open the case and locate the switch as illustrated below. The switches and their positions are labeled on the circuit board. Factory default systems are set by default so that the Learn function is Enabled and the Erase function is Disabled.

Figure 3 Learn/Erase Function



Sensor Probe

The Sensor Probe is powered by one 9v battery. If the battery voltage falls below 7 volts, the transmitter will transmit a Low Battery signal approximately once per hour, which will illuminate the green LED on the receiver to indicate that the Sensor Probe battery needs replacing. If the battery voltage falls below 2.0 volts, the sensor will be unable to transmit.

The Sensor Probe contains no external buttons or switches. When the Sensor Probe is vertical, it is in very low-power sleep mode, waking every two seconds to check the tilt angle. A tilt angle greater than 30° will cause the sensor to remain awake and begin alarm transmission if the angle remains above the threshold for more than three seconds.

While active, the Sensor Probe sends the alarm signal periodically. This is indicated by a blink of the yellow “receive” LED on the console. If the Sensor Probe remains tilted greater than the threshold angle for more than one minute, transmission will cease and the Sensor Probe will return to low-power sleep mode. Only when the Sensor Probe is returned to the vertical position, will it resume normal operation.

Sensor Self-Test

To test the battery level and threshold angle of the sensor, access the circuit board by unscrewing the top half and separating the two halves of the assembly. The circuit board and battery are mounted on the black sensor mounting plate. With the battery attached, hold the WHITE test button on the circuit board until the yellow LED lights up. If the yellow LED begins flashing, the battery is low and needs to be replaced. If the yellow LED stays on, the battery is good and it is always on while self-testing. To test the threshold angle the red LED will light up when the circuit board is tilted beyond the threshold. To exit test mode, hold the button again until the yellow LED remains off. The Full Bin Alarm Sensor Probe will not transmit a signal while in test mode. Ensure that the LEDs are not lit before reassembling the sensor.

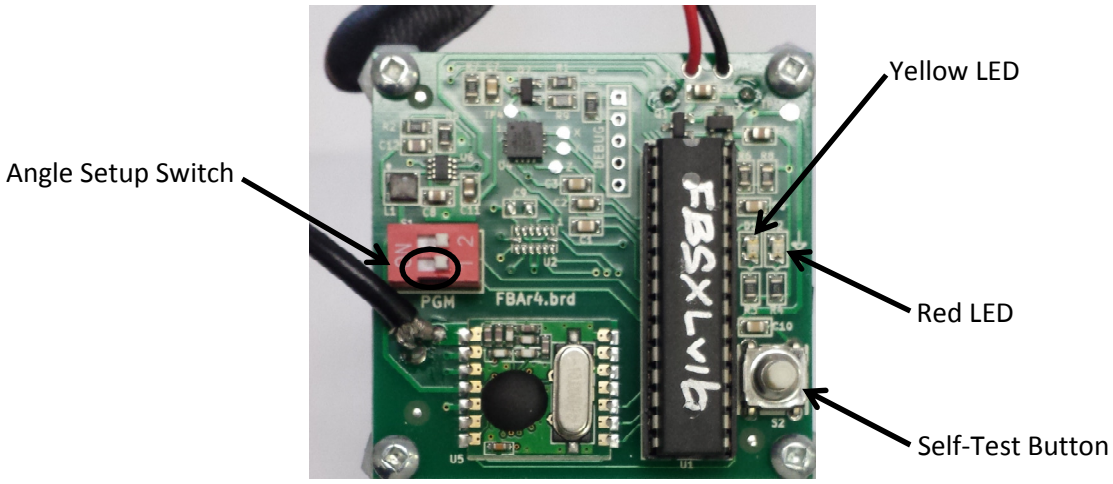
Up to eight Sensor Probes can communicate to the same Receiver Console as long as the Receiver Console has "learned" the probes' security codes.

Sensor Angle Setup

The FBA Sensor utilizes a 3-axis accelerometer to determine its angle with respect to the ground. The trip angle of the sensor, at which it transmits the signal to activate the alarm light and horn, is preset to 30° tilt at the time of manufacture. This angle is programmable, and while not normally required, may be changed by the customer to optimize the sensor's response in the customer's application.

There are two steps to set the threshold angle of the probe; first, set the 0° reference angle. Second, set the desired threshold angle. Do following steps to complete the setup.

1. Open the Sensor case by unthreading the top from the bottom.
2. Slide the Angle Program Switch (shown below in its rightward position) to the leftward position.



3. Find a flat surface (parallel to the ground) and then stand the probe straight up. This will be the zero-angle reference.
4. Press and hold (do not release) the white self-test button until the yellow LED illuminates. This stores the zero angle in the probe.
5. Tilt the sensor probe to the desired angle and, holding the probe steadily, release the button. This sets the probe's trip angle and you may slide the Angle Program Switch back to the rightward position.
6. Test the sensor probe by tilting it back and forth to ensure proper operation. The red LED should illuminate when the threshold angle of the probe is reached.
7. To exit the self-test mode, hold the white self-test button unti both yellow and red LED lights go out. Before the probe will transmit to the receiver, you must EXIT the self-test mode.
8. To test the probe with the receiver, power ON the FBA standalone console, tilt the sensor probe over the threshold angle. Within 3-4 seconds the audio and visual alarms should activate.

Limited Warranty

Customer satisfaction is a fundamental policy at Kramble Industries Inc. All customers can rely upon and expect to receive prompt, efficient and courteous service on all Kramble Industries Inc. manufactured equipment from each and every employee of the organization.

Kramble Industries Inc. with its office at 102-2750 Faithfull Avenue, Saskatoon, SK warrants:

To the Original Purchaser/User, each product manufactured by Kramble Industries Inc. to be free from defective material and workmanship, under normal use and service, for a period of 12 months subject to conditions outlined below. The obligation under this warranty is limited to repair, or replacement with a similar genuine company part, for any part of the product of the company's manufacture that is found to be defective.

Warranty period begins the day of purchase. During the first (1st) through the twelfth (12th) month, Kramble will furnish without charge, F.O.B. its plant, a similar genuine part to replace any part of a product of the company's manufacture which proves to be defective, in normal use and service, during this time. Labor to install or repair such parts will be absorbed by Kramble Industries Inc. If this work is to be done other than Kramble personnel, prior approval must be given by Kramble Industries Inc. as to rate and time.

This warranty shall bind the company only as follows:

1. The warranty shall be limited to the repair or replacement of defective parts, all other damage, loss, cost or obligation and claim whatsoever, statutory or otherwise, are hereby waived by the original purchaser\user, and again, the warranty hereby given covers only those labor charges specifically authorized by the company in advance.

Kramble Industries Inc. is not responsible or liable for indirect, special, or consequential damages arising out of or in connection with the use or performance of the product or other damage with respect to any economic loss, loss of property, loss of revenue or profit, or costs of removal, installation, or reinstallation.

2. The warranty shall not apply to any failure, or damage incurred through neglect, lack of maintenance, misuse, abuse, accident, improper installation, re-designing of assemblies, ignorance, or through any other cause beyond the control of the company.
3. The warranty does not cover products of other manufacturers beyond such warranty as may be made by such manufacturer.
4. The warranty shall not apply to normal maintenance services, or to deterioration of appearance of items due to normal use and exposure.
5. The warranty shall not apply when the original purchaser/user has allowed repair and/or service work to be conducted on the product without authorization from the company.

IMPORTANT NOTE:

Before any warranty work is done, contact Kramble Industries Inc. for authorization. Failure to do so may result in denial of warranty.