

Enrange CHTX Transmitter

Remote Equipment Control



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Your New Radio Remote

Thank you for your purchase of Magnetek's Enrange® brand CHTX Radio Remote Equipment Control. Magnetek has set a whole new standard in radio-remote performance, dependability, and value with this unique new line of radio transmitters.

If your product ever needs modification or service, please contact one of our representatives at the following locations:

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1.0 INTRODUCTION

Thank you for your purchase of Magnetek's Enrange® brand CHTX Radio Remote Equipment Control.

These instructions are to be used as a reference for personnel operating the Enrange® brand CHTX Radio Remote Equipment Control and the equipment that this Enrange® brand CHTX Radio Remote Equipment Control is attached to.

The user of these instructions should have basic knowledge in the handling of electronic equipment.

1.1 PRODUCT MANUAL SAFETY INFORMATION

Magnetek, Inc. (Magnetek) offers a broad range of radio remote control products, control products and adjustable frequency drives, and industrial braking systems for overhead material handling applications. This manual has been prepared by Magnetek to provide information and recommendations for the installation, use, operation and service of Magnetek's material handling products and systems (Magnetek Products). Anyone who uses, operates, maintains, services, installs or owns Magnetek Products should know, understand and follow the instructions and safety recommendations in this manual for Magnetek Products.

The recommendations in this manual do not take precedence over any of the following requirements relating to proper equipment operation:

- Instructions, manuals, and safety warnings of the manufacturers of the equipment where the radio system is used,
- Plant safety rules and procedures of the employers and the owners of facilities where the Magnetek Products are being used,
- Regulations issued by the Occupational Health and Safety Administration (OSHA),
- Applicable local, state or federal codes, ordinances, standards and requirements, or
- Safety standards and practices for the specific industry.

This manual does not include or address the specific instructions and safety warnings of these manufacturers or any of the other requirements listed above. It is the responsibility of the owners, users and operators of the Magnetek Products to know, understand and follow all of these requirements. It is the responsibility of the owner of the Magnetek Products to make its employees aware of all of the above listed requirements and to make certain that all operators are properly trained. **No one should use Magnetek Products prior to becoming familiar with and being trained in these requirements.**

WARRANTY INFORMATION

FOR INFORMATION ON MAGNETEK'S PRODUCT WARRANTIES BY PRODUCT TYPE, PLEASE VISIT WWW.MAGNETEKMOBILEHYDRAULIC.COM.

1.2 WARNINGS AND CAUTIONS

Throughout this document WARNING and CAUTION statements have been deliberately placed to highlight items critical to the protection of personnel and equipment.

WARNING – A warning highlights an essential operating or maintenance procedure, practice, etc. which, if not strictly observed, could result in injury or death of personnel, or long term physical hazards. Warnings are highlighted as shown below:



CAUTION – A caution highlights an essential operating or maintenance procedure, practice, etc. which if not strictly observed, could result in damage to, or destruction of equipment, or loss of functional effectiveness. Cautions are highlighted as shown below:



WARNINGS and CAUTIONS SHOULD NEVER BE DISREGARDED.

The safety rules in this section are not intended to replace any rules or regulations of any applicable local, state, or federal governing organizations. Always follow your local lockout and tagout procedure when maintaining any radio equipment. The following information is intended to be used in conjunction with other rules or regulations already in existence. It is important to read all of the safety information contained in this section before installing or operating the Radio Control System.

2.0 CRITICAL INSTALLATION CONSIDERATIONS



WARNING

PRIOR TO INSTALLATION AND OPERATION OF THIS EQUIPMENT, READ AND DEVELOP AN UNDERSTANDING OF THE CONTENTS OF THIS MANUAL AND THE OPERATION MANUAL OF THE EQUIPMENT OR DEVICE TO WHICH THIS EQUIPMENT WILL BE INTERFACED. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN SERIOUS INJURY OR DEATH AND DAMAGE TO EQUIPMENT.

FOLLOW YOUR LOCAL LOCKOUT TAGOUT PROCEDURE BEFORE MAINTAINING ANY REMOTE CONTROLLED EQUIPMENT. ALWAYS REMOVE ALL ELECTRICAL POWER FROM THE CRANE, HOIST, LIFTING DEVICE OR SIMILAR EQUIPMENT BEFORE ATTEMPTING ANY INSTALLATION PROCEDURES. DE-ENERGIZE AND TAGOUT ALL SOURCES OF ELECTRICAL POWER BEFORE TOUCH-TESTING ANY EQUIPMENT. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN SERIOUS INJURY OR DEATH AND DAMAGE TO EQUIPMENT.

THE DIRECT OUTPUTS OF THIS PRODUCT ARE NOT DESIGNED TO INTERFACE DIRECTLY TO TWO STATE SAFETY CRITICAL MAINTAINED FUNCTIONS, I.E., MAGNETS, VACUUM LIFTS, PUMPS, EMERGENCY EQUIPMENT, ETC. A MECHANICALLY LOCKING INTERMEDIATE RELAY SYSTEM WITH SEPARATE POWER CONSIDERATIONS MUST BE PROVIDED. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN SERIOUS INJURY OR DEATH OR DAMAGE TO EQUIPMENT.

2.1 GENERAL

Radio controlled equipment operates in several directions. Quite frequently, the equipment is operated in areas where people are working in close proximity to the material handling equipment. **The operator must exercise extreme caution at all times.** Workers must constantly be alert to avoid accidents. The following recommendations have been included to indicate how careful and thoughtful actions may prevent injuries, damage to equipment, or even save a life.

2.2 PERSONS AUTHORIZED TO OPERATE RADIO CONTROLLED MACHINERIES

Only properly trained persons designated by management should be permitted to operate radio controlled equipment.

Radio controlled equipment should not be operated by any person who cannot read or understand signs, notices, and operating instructions that pertain to the equipment.

Radio controlled equipment should not be operated by any person with insufficient eyesight or hearing or by any person who may be suffering from a disorder or illness, is taking any medication that may cause loss of equipment control, or is under the influence of alcohol or drugs.

2.3 SAFETY INFORMATION AND RECOMMENDED TRAINING FOR RADIO CONTROLLED EQUIPMENT OPERATORS

Anyone being trained to operate radio controlled equipment should possess as a minimum the following knowledge and skills before using the radio controlled equipment.

The operator should:

- have knowledge of hazards pertaining to equipment operation
- have knowledge of safety rules for radio controlled equipment
- have the ability to judge distance of moving objects
- know how to properly test prior to operation
- be trained in the safe operation of the radio transmitter as it pertains to the equipment being operated
- have knowledge of the use of equipment warning lights and alarms
- have knowledge of the proper storage space for a radio control transmitter when not in use
- be trained in transferring a radio control transmitter to another person
- be trained how and when to report unsafe or unusual operating conditions
- test the transmitter emergency stop and all warning devices prior to operation; testing should be done on each shift, without a load
- be thoroughly trained and knowledgeable in proper and safe operation of the equipment that utilizes the radio control
- know how to keep the operator and other people clear of hazardous points
- know and follow the local lockout and tagout procedures when servicing radio controlled equipment
- know and follow all applicable operating and maintenance manuals, safety procedures, regulatory requirements, and industry standards and codes

The operator shall not:

- operate the equipment if the direction of travel or function engaged does not agree with what is indicated on the controller
- operate any damaged or malfunctioning equipment
- change any settings or controls without authorization and proper training
- remove or obscure any warning or safety labels or tags
- leave power on the radio controlled equipment when the equipment is not in operation
- operate any equipment using a damaged controller because the unit may be unsafe
- operate manual motions with other than manual power
- operate radio controlled equipment when low battery indicator is on



WARNING

THE OPERATOR SHOULD NOT ATTEMPT TO REPAIR ANY RADIO CONTROLLER. IF ANY PRODUCT PERFORMANCE OR SAFETY CONCERNS ARE OBSERVED, THE EQUIPMENT SHOULD IMMEDIATELY BE TAKEN OUT OF SERVICE AND BE REPORTED TO THE SUPERVISOR. DAMAGED AND INOPERABLE RADIO CONTROLLER EQUIPMENT SHOULD BE RETURNED TO MAGNETEK FOR EVALUATION AND REPAIR. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN SERIOUS INJURY OR DEATH AND DAMAGE TO EQUIPMENT.

2.4 TRANSMITTER UNIT

Transmitter switches should never be mechanically blocked ON or OFF. When not in use, the operator should turn the transmitter OFF. A secure storage space should be provided for the transmitter unit, and the transmitter unit should always be placed there when not in use. This precaution will help prevent unauthorized people from operating the material handling equipment.

Spare transmitters should be stored in a secure storage space and only removed from the storage space after the current transmitter in use has been turned OFF, taken out of the service area and secured.

2.5 PRE-OPERATION TEST

At the start of each work shift, or when a new operator takes control of the equipment, operators should do, as a minimum, the following steps before operation of equipment:

Test all warning devices.

Test all direction and speed controls.

Test all functions

Test the transmitter emergency stop.

2.6 HANDLING BATTERIES



KNOW AND FOLLOW PROPER BATTERY HANDLING, CHARGING AND DISPOSAL PROCEDURES. IMPROPER BATTERY PROCEDURES CAN CAUSE BATTERIES TO EXPLODE OR DO OTHER SERIOUS DAMAGE. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN SERIOUS INJURY OR DEATH AND DAMAGE TO EQUIPMENT.

Use only batteries approved by Magnetek for the specific product.

Do not dispose of a battery pack in fire; it may explode.

Do not attempt to open the battery pack.

Do not short circuit the battery.

Keep the battery pack environment cool during storage (i.e., not in direct sunlight or close to a heating source).

2.7 OPTIONAL RECHARGEABLE BATTERY CHARGING

For those transmitters equipped with rechargeable batteries and battery chargers, all users shall be familiar with the instructions of the charger before attempting to use.

Do not attempt to charge non-rechargeable battery packs in the charger.

Avoid charging partially discharged rechargeable batteries to help prolong battery cycle life.

Do not charge batteries in a hazardous environment.

Keep the battery pack environment cool during charging (i.e., not in direct sunlight or close to a heating source).

Do not short the charger.

Do not attempt to charge a damaged battery.

Use only Magnetek approved chargers for the appropriate battery pack.

Do not attempt to use a battery that is leaking, swollen or corroded.

Charger units are not intended for outdoor use. Only use charger units indoors.

2.8 BATTERY DISPOSAL

Before disposing of batteries consult local and governmental regulatory requirements for proper disposal procedure.

3.0 CHTX TRANSMITTER STANDARD CONFIGURATION AND OPERATION



WARNING

BEFORE OPERATING THE TRANSMITTER, FAMILIARIZE YOURSELF WITH ALL SAFETY INFORMATION IN THIS MANUAL, THE CORRESPONDING RECEIVER SYSTEM MANUAL, APPROPRIATE MANUAL SUPPLEMENTS AND ANY OTHER LOCAL, STATE, OR FEDERAL RULES OR REGULATIONS ALREADY IN EXISTENCE. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN SERIOUS INJURY OR DEATH AND DAMAGE TO EQUIPMENT.

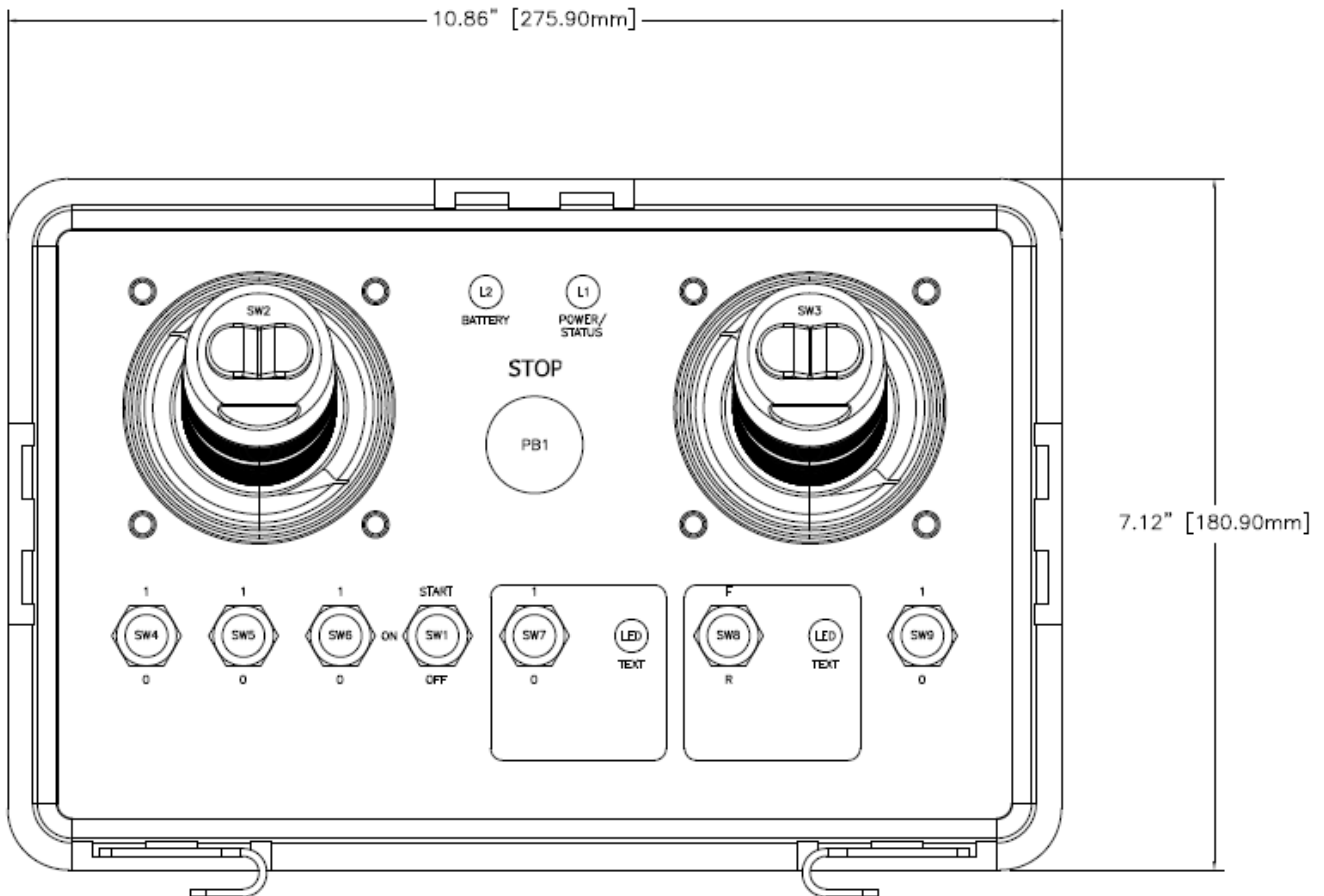


Figure 1: Typical CHTX Configuration

3.1 INSTALLING THE CHEST PLATE

The CHTX comes with a removable chest plate that is designed to be easy to install and remove. The CHTX chest plate is installed by using a slotted screwdriver and the four slotted screws that are on the chest plate brackets located on the back of the CHTX enclosure (see Figure 2 for details). The chest plate is installed by lining up the mounting holes with the threaded holes on the CHTX chest plate bracket (remove the screws first if they are already in the brackets) and threading all four screws by hand. Tighten the screws down using a slotted screwdriver. Attach the shoulder straps for the CHTX to the metal eyelets located on the bottom back corners of the CHTX.

NOTE: The shoulder straps are recommended to be installed so they crisscross the operators back. The left strap should hook onto the right eyelet and the right strap should hook onto the left eyelet.

Removal of the chest plate is performed by reversing the installation steps.



Figure 2: Chest Plate Installation

3.2 INSTALLING THE BATTERY PACK

Prior to utilizing the CHTX transmitter, the battery pack must be installed (unless the unit is being utilized with the optional tethered feature; then the battery pack is optional).

3.2.1 Alkaline Battery Pack (BT127)

The CHTX comes standard with a battery pack (BT127) that holds three disposable AA alkaline batteries.



Figure 3: BT127 Battery Pack

To change the alkaline batteries in the battery pack, separate the inner tray from the outer housing (see Figure 4) and replace all the batteries with new ones.



Figure 4: Separated Alkaline Battery Pack

When reinserting the tray into the outer housing, make sure the grooves in the inner tray align with the slides in the outer housing. When placing the battery pack into the CHTX battery pocket, orient the battery pack so that the sticker is facing down (see Figure 5).



Figure 5: Installation of Battery Pack into CHTX transmitter

After installing the battery pack, install the battery cover over the battery and secure by tightening the thumbscrews at each end of the battery cover (see Figure 6).

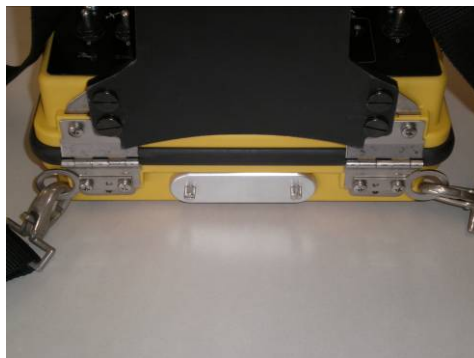


Figure 6: Installation of Battery Cover

NOTE: For the battery level indicator on the CHTXs equipped with either the standard status LED or the optional graphic user interface, the battery type dip switch settings need to be set for the battery pack being used in order to display the correct low battery level indication. See Section 3.2.3 for details on setting the battery type dip switches.

3.2.2 Optional NiMH Rechargeable Battery Pack (BT126)

NOTE: If using the optional rechargeable battery pack BT126, review and become familiar with the rechargeable battery charger manual prior to use.

The rechargeable battery pack BT126 is a sealed battery pack that has no user serviceable components within the battery pack.



Figure 7: BT126 Battery Pack

The rechargeable battery pack BT126 is shipped from the factory with a minimal charge and will need to be charged prior to use for the first time with the specified charger.

NOTE: When utilizing the optional tether mode on the CHTX transmitter, the battery packs will not be recharged from the tether power feed. The rechargeable battery pack only can be recharged using the specified charger.

When placing the battery pack into the CHTX battery pocket, orient the battery pack so that the sticker is facing down (see Figure 5).

After installing the battery pack, install the battery cover over the battery and secure by tightening the thumbscrew at the end of the battery cover (see Figure 6).

NOTE: For the battery level indicator on the CHTXs equipped with the standard status LED or the optional graphic user interface, the battery type dip switch settings need to be set for the battery pack being used in order to display the correct low battery level indication. See Section 3.2.3 for details on setting the battery type dip switches.

3.2.3 Setting Battery Type Dip Switches

For proper indication of the battery level on the CHTX transmitters, the battery type dip switch settings need to be set for the battery pack being used in the transmitter.

NOTE: The dip switch settings are set at the factory for the battery type ordered with the system. These settings will need to be changed only if the battery type changes.

The dip switch block is accessed by opening the CHTX housing and flipping the CPU board over (see Figure 8). To do this, remove the three clamps found on the front and the sides of the housing. Unplug the ribbon cable from the CPU board and remove the CPU board from the support structure on the housing by removing the four Phillips head screws in the corners of the CPU board (set the screws aside for reassembly).

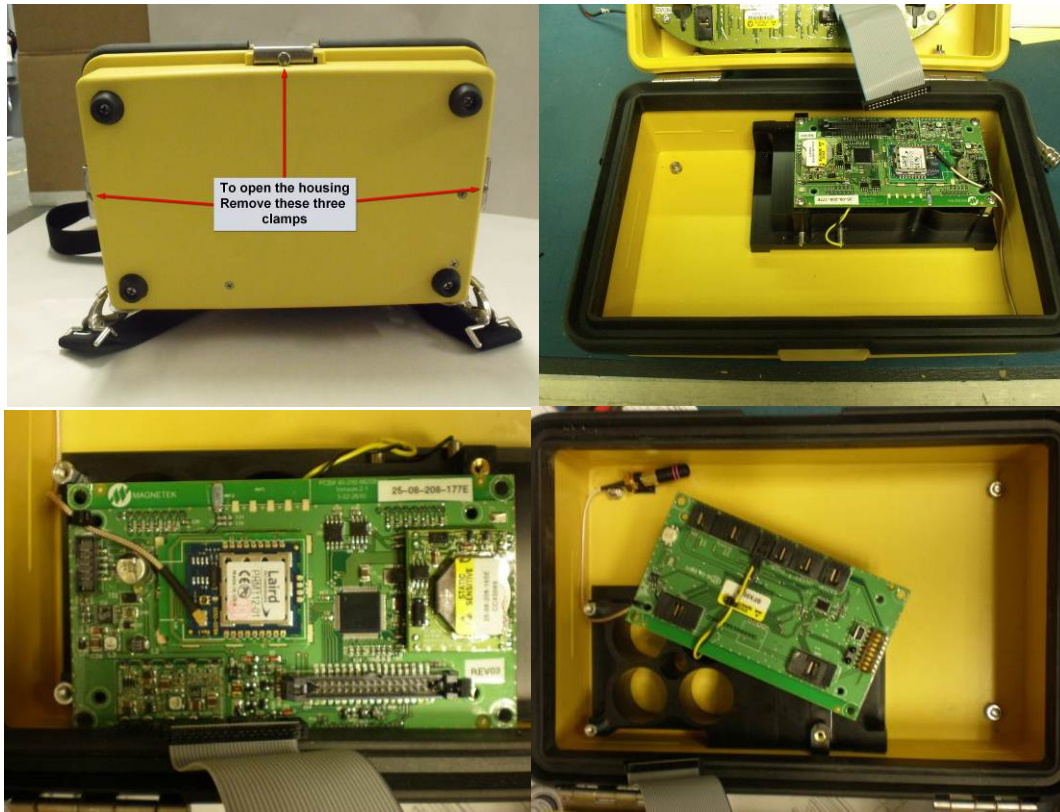


Figure 8: CPU Board Removal and Dip switch Block Location

Use the following table to properly set the dip switches for the correct battery type (see Figure 9 for dip switch view):

Battery P/N	Battery Type	Dip switch 1	Dip switch 2
BT127-0	4.5V Alkaline	Off	Off
BT126-0	3.6V NiMH	Off	On

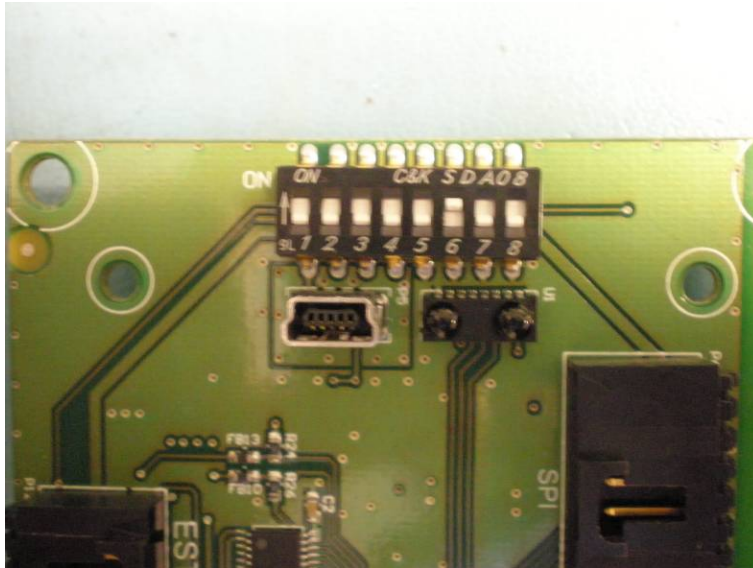


Figure 9: Dip switch block as viewed on the bottom of the CHTX CPU board

NOTE: The dip switch block switches are oriented so that the OFF position is next to the number designator and the ON position is up or away from the number designator.

Once the dip switch board has been set for the proper battery type, the CPU board must be re-installed in the CHTX housing. Flip the CPU board over and secure it to the support structure using the four Phillips head screws that originally held it in place. Once the CPU board is secured, plug the ribbon back in and close the CHTX housing and secure the front and side clamps.

3.3 TURNING THE TRANSMITTER ON AND OFF

The CHTX uses both a three position toggle switch labeled OFF-ON-START and a Machine Stop switch to turn the transmitter on or off.



Figure 10: Machine Stop Switch and OFF-ON-START toggle

3.3.1 Turning On the Transmitter (with Standard Status LED Indicator(s))

3.3.1.1 Transmitters Equipped with Separate Power/Status and Battery LED Indicators

First, the Machine Stop switch must be in the raised position (pulled out). Next, push the OFF-ON-START toggle switch to the START position and release it once the Power/Status LED lights up as a solid green color. Following the Power/Status LED turning on and illuminating, the unit will perform a routine initialization.

During initialization, the CHTX scans for any switches or motions that may be on during power up. If any switches or motions are on, the failure will be displayed as a solid red Battery LED, and then the CHTX will power itself down.

After a successful initialization, the CHTX will enter normal operation mode and display the normal operating status LED indications. See Section 3.7 for more information on the normal operation mode with standard status LED.

3.3.1.2 Transmitters Equipped with Single Status/Battery LED Indicator

First, the Machine Stop switch must be in the raised position (pulled out). Next, push the OFF-ON-START toggle switch to the START position and release it immediately. The unit will perform a routine initialization.

During initialization, the CHTX scans for any switches or motions that may be on during power up. If any switches or motions are on, the failure will power the CHTX down.

NOTE: There will be no LED indication of the failure on the Single LED equipped transmitters. If the Battery Status LED does not go into slow blinking mode (as detailed in Section 3.7) after 15 seconds, reboot the transmitter by turning the OFF the transmitter and then turning the transmitter back ON.

After a successful initialization, the CHTX will enter normal operation mode and display the normal operating status LED indications. See Section 3.7 for more information on the normal operation mode with standard status LED.

3.3.2 Turning On the Transmitter (with Optional Graphic User Interface Screen)

First, the Machine Stop switch must be in the raised position (pulled out). Next, push the OFF-ON-START toggle switch to the START position and release it once the Magnetek logo appears on the LCD screen. Following the logo screen, the unit will perform a routine initialization.

During initialization, the CHTX scans for any switches or motions that may be on during power up. If any switches or motions are on, the failure will be displayed on the screen, and then the CHTX will power itself down.

After a successful initialization, the CHTX will enter the Normal Operation Mode and display the normal operating screen. See Section 3.8 for more information on the Normal Operation Mode with Optional Graphic User Interface.

NOTE: Holding the OFF-ON-START toggle in the START position for more than 5 seconds will put the device into Setup Mode. For normal use release the START toggle once the Magnetek logo appears. See Section 4.2 for more information on the Setup Mode.

3.3.3 Pulling In the Machine Stop Relay

Once the CHTX has been turned on (as described in Sections 3.3.1 or 3.3.2) and in the Normal Operating Mode, the Machine Stop relay in the receiver can be pulled in by pushing the OFF-ON-START toggle switch to the START position and then releasing.

NOTE: You must release the OFF-ON-START switch to the ON position after the unit is powered up, then push to the START position a second time to pull in the Machine Stop relay.

3.3.4 Turning Off the Transmitter

The transmitter can be turned off by pressing the OFF-ON-START toggle switch down to the OFF position. Once turned off, the Machine Stop relay in the receiver is immediately opened.

NOTE: If the unit has a standard status LED, it will illuminate solid red during the transmitter's power down process. Once the power down process is complete, the transmitter will turn off and the status LED will not be on.

NOTE: Depressing the Machine Stop switch will also turn the transmitter off and open the Machine Stop relay in the receiver. See Section 3.4 for more information on the Machine Stop switch.

3.4 MACHINE STOP SWITCH (FOR EMERGENCY STOPPING ONLY)

When the Machine Stop switch is depressed, the Machine Stop relay in the receiver is immediately opened.

Under normal operating conditions, the Machine Stop switch must be in the raised position or the transmitter and system will not operate.

NOTE: The Machine Stop Switch is to be used for emergency stopping only, not for normal system shut down.

3.5 POWER/STATUS AND BATTERY LED

The standard CHTX transmitter includes a Power/Status LED to let the operator know that the unit is functioning and Battery LED to indicate that the battery level is low (see Section 3.7.1 for LED indication definitions)

NOTE: Single Status/Battery LED equipped units will indicate that the transmitter is on and the battery level from the single LED (see section 3.7.2 for LED indication definitions)

3.6 OPTIONAL GRAPHIC USER INTERFACE

The optional LCD screen located at the center of the device provides visual information during the operation of the CHTX transmitter. It is used to change configuration settings, confirm commands being operated, provide two-way feedback, and display transmitter diagnostic information such as battery life and signal strength.

The optional graphic user interface replaces the standard status LED when ordered.

3.7 NORMAL OPERATING MODE WITH STANDARD STATUS LED(S)

In normal operating mode, the CHTX utilizes the Power/Status and Battery LED(s) to communicate the watch dog timer within the CPU of the transmitter, the machine stop relay status, and when the battery level is low.

3.7.1 Transmitters Equipped with Separate Power/Status and Battery LED Indicators

3.7.1.1 Watch Dog Indicator (Steady Slow Blinking Green Power/Status LED)

The blinking Power/Status LED represents the watch dog timer within the CPU of the unit. This indicates that the transmitter is powered on.

NOTE: The Power/Status LED should be continuously blinking at all times. If the LED is not blinking, the transmitter will need to be rebooted to operate properly.

3.7.1.2 Machine Stop Relay Indicator (Rapidly Green Blinking Power/Status LED)

When the receiver is online with the transmitter and the machine stop relay is successfully pulled in, the Power/Status LED will rapidly blink green.

NOTE: If the receiver inactivity timer times out, the transmitter will revert back to the watch dog indicating status (steady slow blinking Green Power/Status LED). Following the procedure for pulling in the Machine Stop relay in Section 3.3.3 will resume rapidly blinking the green Power/Status LED if the machine stop relay is successfully pulled in.

NOTE: This LED function is only available on the 2.4GHz and 900 MHz equipped transmitters. On 433 MHz equipped transmitters, the watch dog indicator function in Section 3.7.1.1 continues to operate after the Machine Stop relay is pulled in.

3.7.1.3 Low Battery Level Indicator (Blinking Red Battery LED)

The battery LED will rapidly flash red when the battery level drops below 10%. The Power/Status LED will continue blinking for the watch dog indicator and machine stop relay indicator status.

NOTE: If using an optional battery pack from what the unit was shipped from the factory with, the low battery level indicator will be inaccurate unless the dip switch settings are set to the correct battery type being used. See Section 3.2.3 for details to properly set the dip switches.

3.7.1.4 Shutdown Sequence Initiated Indicator (Solid Red Battery LED)

When the transmitter is turned off or if the machine stop is depressed, the transmitter will begin its shut down sequence. During the sequence, the red battery LED will illuminate solid.

NOTE: When the shutdown sequence is completed, all LEDs will turn off

3.7.2 Transmitters Equipped with Single Status/Battery LED Indicator

NOTE: For specific LED function details, always refer to the transmitter drawings provided with the system.

3.7.2.1 Watch Dog Indicator (Steady Slow Blinking Red Status/Battery LED)

The slow blinking Battery/Status LED represents the watch dog timer within the CPU of the unit. This indicates that the transmitter is powered on.

NOTE: The Status/Battery LED should be continuously blinking at all times. If the LED is not blinking the transmitter will need to be rebooted to operate properly.

3.7.2.2 Low Battery Level Indicator (Rapidly Blinking Red Status/Battery LED)

The Status/Battery LED will rapidly flash red when the battery level drops below 10%.

NOTE: If using an optional battery pack from what the unit was shipped from the factory with, the low battery level indicator will be inaccurate unless the dip switch settings are set to the correct battery type being used. See Section 3.2.3 for details to properly set the dip switches.

3.7.2.3 Shutdown Sequence Initiated Indicator (Solid Red Battery LED)

When the transmitter is turned off or if the machine stop is depressed, the transmitter will begin its shut down sequence. During the sequence, the red Status/Battery LED may illuminate solid.

NOTE: If the shutdown sequence is started when the LED is not illuminated, the LED will stay in the OFF state during the shutdown process.

NOTE: When the shutdown sequence is completed, all LEDs will turn off.

3.8 NORMAL OPERATING MODE WITH OPTIONAL GRAPHIC USER INTERFACE

In normal operating mode, the CHTX displays real time information relating to the operation of the transmitter on the graphic user interface. Information may include Command Confirmation, Battery Life, Signal Strength, Two-Way Feedback, etc.

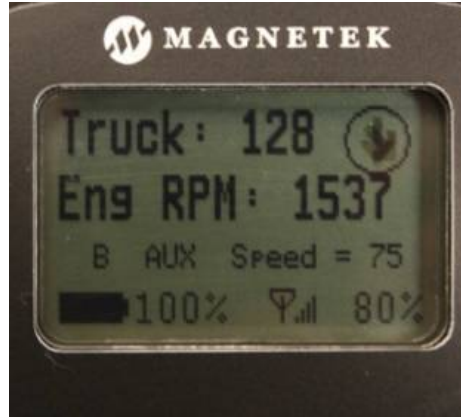


Figure 11: Normal operating screen on graphic user interface

3.8.1 Watch Dog Indicator (Spinning Arrow)

The spinning arrow represents the watch dog timer within the CPU of the unit.

NOTE: The arrow should be continuously spinning at all times. If the arrow is not spinning, the transmitter needs to be rebooted to operate properly.

3.8.2 Command Confirmation

Each time the user operates a control on the transmitter, a message will be displayed on the graphic user interface screen confirming what is being operated.

For example, if the second paddle is moved to its 4th position in the UP direction the display will show 'MTN2 D1 SP=4'. This translates to 'Motion 2, Direction 1, Speed 4'.

3.8.3 Battery Life Indicator

Remaining battery life is displayed in the bottom left hand corner of the graphic user interface screen.

Battery life is displayed in 5% increments.

NOTE: If using an optional battery pack from what the unit was shipped from the factory with, the battery life indicator will be inaccurate unless the dip switch settings are set to the correct battery type being used. See Section 3.2.3 for details to properly set the dip switches.

3.8.4 Signal Strength Indicator

The Signal Strength Indicator shows the radio signal strength at the receiver.

The Signal Strength Indicator is only available in systems equipped for Two-Way feedback (systems utilizing the 433 MHz frequency band do not have Two-Way feedback available). For such systems, Signal Strength is displayed at the bottom right hand corner of the graphic user interface screen.

Signal Strength is displayed in 5% increments.

NOTE: On 433 MHz systems, the signal strength indicator will show minimum signal strength regardless of the actual signal strength (systems utilizing the 433 MHz frequency band do not have Two-Way feedback).

3.8.5 Two-Way Feedback System

This option allows the user to view various parameters that may be important to the operation of the equipment on the graphic user interface display screen.

Parameters such as engine RPM, the torque or speed of a drive, temperature, current, or any other useful values can be sent from the receiver and displayed on the transmitter.

NOTE: Systems utilizing the 433 MHz frequency band do NOT have Two-Way feedback available.

3.9 JOYSTICKS AND PADDLES/LEVERS

To activate the desired motor functions, operate the Joystick or Paddle/Lever that corresponds to the desired motion.

To activate higher speed functions for those transmitter models so equipped, operate the Joystick or Paddle/Lever further to activate the desired speed.

3.10 ROTARY SELECTOR SWITCH

The rotary selector switch can be used to select various modes of operation.

A rotary switch can have 2 to 12 positions to select from.

3.11 AUXILIARY SWITCHES

These switches activate special function relays that control items such as grab attachments, magnets, lights, etc.

The auxiliary switches can be momentary or latched.

4.0 TRANSMITTER SETUP

The transmitter may have settings changed one of two ways.

For units without the optional graphic user interface, the built-in dip switch block can adjust the RF channel and battery type. All other settings can only be changed at the factory.

For units with the optional graphic user interface, the Setup Mode can be used to edit configuration settings such as: Access Code, Channel Select, User Code, Transmitter Time Out, Backlight Time Out, Password Enable, Change Password, and more.

4.1 TRANSMITTER SETUP SETTINGS WITH STANDARD STATUS LED

There are two settings that can be adjusted using the dip switch block. The first setting is the battery life indication, which can be set for the appropriate battery type using dip switch positions 1 through 2. This is detailed in Section 3.2.3.

The second setting is the RF channel setting. This dip switch block is the same block used for the battery life indication and is on the bottom of the CHTX CPU board (see Figure 12).

NOTE: Refer to Section 3.2.3 Setting Battery Type Dip switches for instructions on how to access the bottom of the CHTX CPU board to adjust the RF Channel setting.

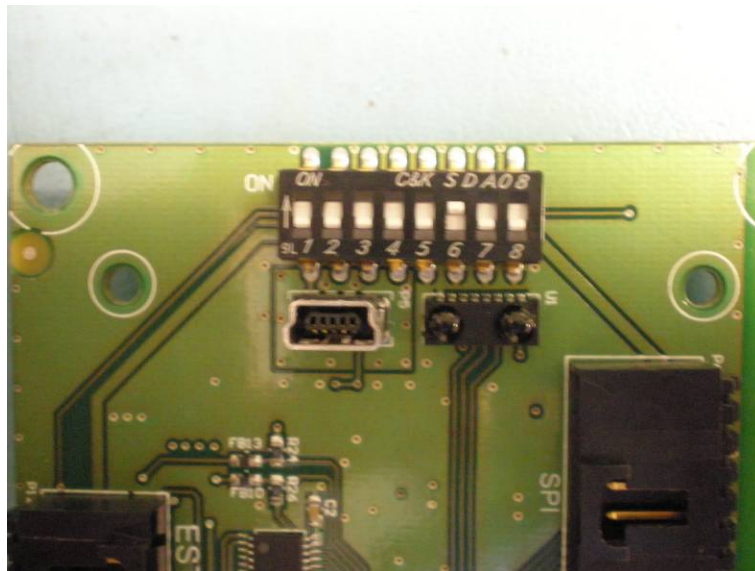


Figure 12: Dip switch block as viewed on the bottom of the CHTX CPU board

NOTE: The dip switch block switches are oriented so that the OFF position is next to the number designator and the ON position is up or away from the number designator.

Regardless of which radio frequency the transmitter was equipped with the RF channel dip switch settings are the same. Refer to Sections 5.2 and 5.3 for details on the specific RF channel details for the radio frequency that the transmitter is equipped with.

Figure 13 details the dip switch positions for each RF channel.

SWITCH POSITIONS

CHANNEL	SW4	SW5	SW6	SW7	SW8
1	DOWN	DOWN	DOWN	DOWN	DOWN
2	UP	DOWN	DOWN	DOWN	DOWN
3	DOWN	UP	DOWN	DOWN	DOWN
4	UP	UP	DOWN	DOWN	DOWN
5	DOWN	DOWN	UP	DOWN	DOWN
6	UP	DOWN	UP	DOWN	DOWN
7	DOWN	UP	UP	DOWN	DOWN
8	UP	UP	UP	DOWN	DOWN
9	DOWN	DOWN	DOWN	UP	DOWN
10	UP	DOWN	DOWN	UP	DOWN
11	DOWN	UP	DOWN	UP	DOWN
12	UP	UP	DOWN	UP	DOWN
13	DOWN	DOWN	UP	UP	DOWN
14	UP	DOWN	UP	UP	DOWN
15	DOWN	UP	UP	UP	DOWN
16	UP	UP	UP	UP	DOWN
17	DOWN	DOWN	DOWN	DOWN	UP
18	UP	DOWN	DOWN	DOWN	UP
19	DOWN	UP	DOWN	DOWN	UP
20	UP	UP	DOWN	DOWN	UP
21	DOWN	DOWN	UP	DOWN	UP
22	UP	DOWN	UP	DOWN	UP
23	DOWN	UP	UP	DOWN	UP
24	UP	UP	UP	DOWN	UP
25	DOWN	DOWN	DOWN	UP	UP
26	UP	DOWN	DOWN	UP	UP
27	DOWN	UP	DOWN	UP	UP
28	UP	UP	DOWN	UP	UP
29	DOWN	DOWN	UP	UP	UP
30	UP	DOWN	UP	UP	UP
31	DOWN	UP	UP	UP	UP
32	UP	UP	UP	UP	UP

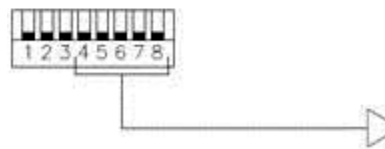


Figure 13: Dip switch positions for RF channel selection

The dip switch settings will take effect upon the next power cycle of the transmitter.

NOTE: Dip switch position 3 must be in the DOWN position for the dip switch channel setting to be properly read by the transmitter.

NOTE: The transmitters equipped with the optional graphic user interface will read channel settings from memory and will not respond to dip switch changes for the channel setup. Only the dip switches for the battery life indication are functional on graphic user interface equipped transmitters.

4.2 USING THE TRANSMITTER IN SETUP MODE (WITH OPTIONAL GRAPHIC USER INTERFACE)

NOTE: The Setup Mode is only accessible on transmitters equipped with the optional graphic user interface. The units equipped with the standard status LED can only have the settings of the transmitter changed at the factory.

The Setup Mode can be used to edit configuration settings such as: Access Code, Channel Select, User Code, Transmitter Time Out, Backlight Time Out, Password Enable, Change Password, and more.

NOTE: No parameter changes will take effect until the user has selected 'Save and Exit' from the Setup Mode.

4.2.1 Entering Setup Mode

To enter the Setup Mode, first make sure the unit is OFF and the Machine Stop switch is raised. Next, push the OFF-ON-START toggle switch to the START position and hold it in the START position for more than 5 seconds until the setup screen appears.

The user will see a prompt for a four digit password if the password feature is enabled. If no password is enabled, then the adjustments in Section 4.2.2 will be available with no further input required from the user.

NOTE: The password feature is enabled by default from the factory.

Use the Joystick/Paddle to increment/decrement the value and toggle to the START position when finished. If the password is entered correctly, the device will enter Setup Mode. If it is entered incorrectly, the device will power down.

NOTE: The factory default password to get into the setup menu is 0000.

4.2.2 Adjusting Settings in Setup Mode

To navigate through Setup Mode, the Joystick/Paddle designated (MTN 1) and OFF-ON-START switch are used. The Joystick/Paddle cycles through the menus and is also used to change parameters within the menus. Pushing the OFF-ON-START switch to the START position will toggle between the menu and its parameter(s). When adjusting larger values, the speed is dependent on how far the Joystick/Paddle is depressed.

NOTE: No parameter changes will take effect until the user has selected 'Save and Exit' from the Setup Mode.

4.2.2.1 Access Code

The Access Code determines which receiver will be controlled by the transmitter.

The Access Code in the CHTX transmitter must match the receiver Access Code or dip switches.

If the Access Codes settings on the receiver and transmitter do not match, no communication will occur.

The Access Code is a 20-bit binary value with a decimal equivalent of 0 - 1048575. It will be displayed as binary or decimal depending on the application.

4.2.2.2 Channel Select

The Channel Select setting determines the frequency that the CHTX is operating on.

The user can select channels 1 through 32, which correspond to the frequencies in Sections 5.2 and 5.3.

4.2.2.3 User Code

The User Code setting is a unique identifier that allows the user to select multiple modes when using the same channel. The receiver can be tuned to only 'hear' messages sent from a transmitter with the same user code.

4.2.2.4 Transmitter Timeout

This setting controls the amount of time that the transmitter can be inactive before it automatically shuts off.

The Timeout time can be set from 1 to 60 minutes.

When the unit times out, the transmitter will turn off.

Setting Timeout to 0 disables transmitter timeout.



4.2.2.5 Backlight Timeout

The Backlight Timeout setting controls the amount of time that the backlight will stay on after a command is pressed before it automatically shuts off.

Backlight Timeout can be set from 1 to 30 seconds.

Setting Time-Out to disable will disable the backlight.

Setting Time-Out to "always on" sets the backlight to be on continuously while the transmitter is on and active.

NOTE: Leaving the backlight on longer will decrease the battery run time and will require more frequent battery replacement (or recharges for optional rechargeable battery packs).

4.2.2.6 Password Enable

This setting enables or disables the requirement of entering a password into the transmitter to enter setup mode.

When the disabled setting is selected the user will go directly into setup mode without being prompted to enter a password.

Magnetek strongly recommends enabling the setup mode password setting to prevent unauthorized or accidental changes to parameters.

NOTE: The unit is shipped with the password requirement enabled and utilizing the factory default password.

4.2.2.7 Change Password

This allows the user to change the password needed to enter the setup mode.

The password must consist of 4 digits.

4.2.2.8 Exit Without Save

If the user does not wish to save any of the configuration changes made, the Exit Without Save option can be selected.

NOTE: None of the changes will be saved upon selection of this option. The transmitter will start up with the last saved configuration settings.

4.2.2.9 Exit With Save

Selection of this option saves all changes and exits the Setup Mode.

Upon exit, the device will start up with the new configuration settings.

5.0 TRANSMITTER RF CHANNEL CONFIGURATION

The RF channel can be set via the setup mode on systems equipped with the optional graphic user interface, or by using the dip switch block on systems not equipped with the optional graphic user interface. The following Sections 5.2 and 5.3 show the channels and protocols available for each transmitter radio frequency option.

NOTE: On transmitters equipped with the standard status LED, the channel can only be changed using the dip switch block as detailed in Section 4.1.

5.1 FCC STATEMENTS

Compliance Statement (Part 15.19)

This device complies with Part 15 of 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.

Warning (Part 15.21)

Changes or modifications not expressly approved by the party responsible for compliance should void the user's authority to operate the equipment.

This portable transmitter with its antenna complies with FCC's RF exposure limits for general population/uncontrolled exposure.

5.2 CHANNEL AND FREQUENCY DESIGNATIONS BY COUNT

433 MHz: TMS and TDMA

Channel Count	Channel Designator	Actual Frequency
01)	01	433.000 MHz
02)	02	433.050 MHz
03)	03	433.100 MHz
04)	04	433.150 MHz
05)	05	433.200 MHz
06)	06	433.250 MHz
07)	07	433.300 MHz
08)	08	433.350 MHz
09)	09	433.400 MHz
10)	10	433.450 MHz
11)	11	433.500 MHz
12)	12	433.550 MHz
13)	13	433.600 MHz
14)	14	433.650 MHz
15)	15	433.700 MHz
16)	16	433.750 MHz
17)	17	433.800 MHz
18)	18	433.850 MHz
19)	19	433.900 MHz
20)	20	433.950 MHz
21)	21	434.000 MHz
22)	22	434.050 MHz
23)	23	434.100 MHz
24)	24	434.150 MHz
25)	25	434.200 MHz
26)	26	434.250 MHz
27)	27	434.300 MHz
28)	28	434.350 MHz
29)	29	434.400 MHz
30)	30	434.450 MHz
31)	31	434.500 MHz
32)	32	434.550 MHz

Table 1.A

900 MHz: TMS and TDMA

Channel Count	Channel Designator	Actual Frequency
01)	1	903.30 MHz
02)	2	906.30 MHz
03)	3	907.80 MHz
04)	4	909.30 MHz
05)	5	912.30 MHz
06)	6	915.30 MHz
07)	7	919.80 MHz
08)	8	921.30 MHz
09)	A	902.30 MHz
10)	B	904.10 MHz
11)	C	904.30 MHz
12)	D	905.10 MHz
13)	E	905.50 MHz
14)	F	905.70 MHz
15)	G	906.60 MHz
16)	H	908.70 MHz
17)	I	908.90 MHz
18)	J	909.10 MHz
19)	K	910.10 MHz
20)	L	910.70 MHz
21)	M	911.00 MHz
22)	N	911.20 MHz
23)	O	912.00 MHz
24)	P	914.20 MHz
25)	Q	914.40 MHz
26)	R	914.60 MHz
27)	S	914.80 MHz
28)	T	915.80 MHz
29)	U	917.40 MHz
30)	V	923.20 MHz
31)	W	927.00 MHz
32)	X	927.30 MHz

Table 1.B

5.3 OPTIONAL FREQUENCIES AND CHANNELS

5.3.1 900 MHz: FHSS

Channel sets are designated between 1 and 32. The frequency range is between 902 and 928 MHz. The frequency hopping protocol does not use one particular frequency to transmit a message. Messages are transmitted over multiple frequencies in a predefined sequence or channel set. In doing so, this protocol is able to compensate for interference that may be present on a single frequency by sending the message across multiple frequencies.

5.3.2 2.4 GHz: FHSS

Channel sets are designated between 1 and 32. The frequency range is between 2402 and 2478 MHz. The frequency hopping protocol does not use one particular frequency to transmit a message. Messages are transmitted over multiple frequencies in a predefined sequence or channel set. In doing so, this protocol is able to compensate for interference that may be present on a single frequency by sending the message across multiple frequencies.

6.0 OPTIONAL CAN BUS TETHER FEATURE

The CHTX transmitter can be ordered with an optional CAN bus tether feature. This feature allows for the operation of the transmitter as a wired transmitter with no wireless radio transmission. If the CHTX transmitter was ordered with the CAN bus tether feature, this section applies to features and operation of the transmitter in tether mode.

6.1 INSTALLATION OF TETHER CABLE

The tether cable is attached to the CAN connector on the transmitter by lining up the alignment groove and inserting the plug into the CAN connector receptacle. Twist the locking ring on the CAN plug clockwise to tighten it down and prevent accidental disengagement.

6.2 OPERATION OF TRANSMITTER IN TETHER MODE

With the tether cable attached, turn on the transmitter following the start-up sequence as outlined in Section 3.3.

During the start-up sequence the transmitter will automatically recognize that the tether cable is attached and communicating and switch into tether mode. Tether mode turns off the wireless transmitter and sends all command signals through the tether cable.

If the transmitter has the optional graphic user interface screen installed, visual verification of the transmitter being in tether mode can be observed on the screen.

NOTE: The transmitter must go through the start-up initialization sequence with the tether cable attached to activate tether mode.

All controls on the transmitter will operate the same, regardless of whether the transmitter is in tether mode or wireless mode.

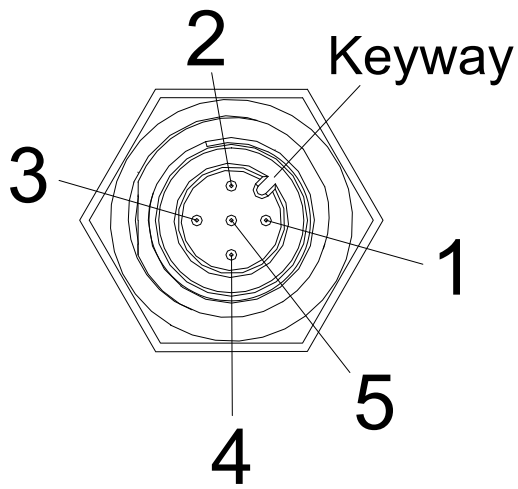
NOTE: While the tether cable provides power to the transmitter when connected, it will not recharge batteries in the transmitter. To recharge batteries, you must only use the Magnetek approved chargers for the appropriate battery pack.

6.3 RETURNING TRANSMITTER TO WIRELESS MODE

To return the transmitter to wireless mode, power down the unit and disconnect the tether cable. Following the start up sequence from Section 3.3, restart the transmitter. The transmitter will automatically sense that it is no longer connected to the tether cable and start the unit in its normal wireless mode.

6.4 CAN CONNECTOR RECEPTACLE PIN-OUT DETAILS

The CAN connector receptacle located on the transmitter has specific pin assignments. It is very critical that these pin assignments are matched in the CAN cable assembly.



CONNECTOR PINOUT (MALE PIN CONNECTOR)	
5-PIN CONNECTOR	FUNCTION
PIN 1	SHIELD
PIN 2	+12/24VDC
PIN 3	-12/-24VDC (common)
PIN 4	CAN-H
PIN 5	CAN-L

Figure 14: CAN Connector Pin Out details

7.0 TROUBLESHOOTING

7.1 GENERAL TROUBLESHOOTING

Problems	Possible Reasons	Suggestions
Transmitter will not turn on	Batteries are dead or installed backwards; battery holder is damaged.	Replace the batteries and confirm they are installed according to the polarity marking in the battery pack. Inspect all battery pack contacts for damage. When installing the battery pack into the CHTX, confirm it is installed with the label facing down.
	Transmitter is failing switch scan	Be sure all switches and motions are in the off position on startup. See Section 3.3 for more info.
	Transmitter Machine Stop switch is down or pressed	Be sure the Machine Stop switch is pulled up.
Transmitter will not respond with the receiver	Incorrect system RF channel	Make sure the transmitter and receiver unit are both set to the same RF channel. See Section 4.2.2.
	Incorrect system access code	Make sure the transmitter and receiver both have the same access code. See Section 4.2.1.
	System out of range	Make sure that the startup procedure is initiated within 300 feet from the receiver location. If equipped with the Signal Strength Indicator, make sure the level is greater than 0%.
	The antenna on the receiver is missing, damaged, or improperly installed.	Inspect the antenna on the receiver for damage and try to locate the antenna in a location that is visible when operating the equipment at all times.

7.2 OPTIONAL TETHER OPERATION TROUBLESHOOTING

Problems	Possible Reasons	Suggestions
Transmitter will not turn on	Connecting tether cable is not installed, installed improperly, or is damaged.	Inspect the tether cable and confirm that it is installed and secured correctly. Inspect all connectors, connector contacts and cable jacket for damage.
	Transmitter is failing switch scan	Be sure all switches and motions are in the OFF position on startup. See Section 3.3 for more info.
	Transmitter machine stop switch is down or pressed	Be sure the Machine Stop switch is pulled up.
Transmitter will not respond with the receiver in tether mode	System is not in tether mode	Make sure that the startup procedure is initiated with the tether cable attached. Ensure that all tether cable connections are secure prior to startup.
	The tether cable or connectors are damaged	Inspect the tether cable and connectors for damage.
	CAN settings are incorrect	Verify that CAN settings match project-specific CAN bus document
Transmitter will not respond with the receiver in wireless mode	System not in wireless mode	Make sure that the startup procedure is initiated with the tether cable detached. Ensure that the startup procedure is initiated within 300 feet from the receiver location.

7.3 ASSEMBLY AND REPLACEMENT PARTS

If your transmitter ever needs repair, we always recommend that you have Magnetek perform the repair. If you need to refer to a parts list, refer to your transmitter's drawing that was included in the shipment of your transmitter. Please contact Magnetek's service department at 1.866.MAG.SERV for information regarding parts and service.