Control Chief Corporation
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Advantage Series
LJ45 Transmitter

Owner's Manual

Failure to return the Warranty Registration document (enclosed) to Control Chief within 30 days of purchase will void any warranty responsibilities on behalf of Control Chief Corporation

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Control Chief Corporation, a world leader in wireless radio and infrared remote control products has developed and expanded upon this powerful technology. More than three decades of experience in designing, manufacturing and installing state-of-the-art remote communication systems emphasize Control Chief's mission.

Our systems are tailored to virtually any environment or application. Control Chief provides training, technical support, and comprehensive system design to maximize performance. It is our honor to uphold this reputation of innovative engineering and superior product performance.

MADE IN AMERICA

Certified ISO 9001 : 2000 by BVQi

Installation Questions?

Technical assistance is available from Control Chief.

Please call us at 814-362-6811 or email the Service Department at prodserv@controlchief.com

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Function of the Switch Lever Guard

The primary function of the transmitter switch guard (refer to photo below) is to prevent accidental activation of the motor levers. A secondary function is to facilitate operator ergonomics. The guard should not be used as a "handle" while performing a remote control operation with the transmitter. Consider the following scenario: the operator has completed a task and is walking away from the crane grasping the transmitter by the switch guard. If the unit is still ON and a hand accidentally moves one of the levers, the result could be an unintentional crane motion.

To prevent this type of scenario, Control Chief provides a fitted harness with each transmitter for the operator to use during operations. The harness enables the operator to carry the unit around while performing their tasks, thereby preventing an accidental switch lever actuation due to handling.

Recommended Practices

1. Always wear a harness when performing remote control tasks with the transmitter. These components are designed to work together to provide the safest operational performance for the operator and the task he / she must perform.

2. When the operator has completed a shift or is about to take a break - the transmitter power switch must be turned off and the key removed. A transmitter should not be left unattended without being secured to prevent unauthorized operation.

10 PRODUCT SUPPORT AND SPARE PARTS

Product Support

When contacting Control Chief Product Service please have the following information ready.

- Serial number: Located on the transmitter.
- Status of LED indicators on the crane mounted receiving unit.
- Description of the problem and its associated operational conditions/situation.

Returning Equipment to Control Chief for Repair

To return your transmitter to Control Chief for repair, please call Product Service to request a Return Material Authorization (RMA) number. The RMA number must be included on the shipping label and all correspondence related to the transmitter.

Contacting Control Chief

Control Chief
P.O. Box 141, 200 Williams Street
Bradford, PA 16701
PHONE: (814) 362-6811
FAX: (814) 368-4133
Toll Free: (800) 233-3016

Web Page:http://www.controlchief.com
E-mail: prodserv@controlchief.com

Spare Parts and Accessories

If you require troubleshooting or help in part number identification, contact our Product Service group for assistance (as noted above).

If you require additional battery packs, a replacement vest, or other components please contact our Customer Service department.

Part Number	Description
90-10-3-004	Battery, Li-Ion, Clip Style, 7.4VDC
90-10-2-011	Battery Charger, Li-Ion, Clip Style, 7.4VDC
0800-0290	Harness – Shoulder
0800-0650	Harness – Vest
10-15-0-005	Stepped Joystick Assembly
10-15-0-008	Stepless Joystick Assembly
91-04-0-xxx	Case, Bottom Assembly
91-04-0-079	Case, Top & Middle Assy w/ Labels
10-05-3-003	Switch, Keylock, 2pos on/off
10-05-9-004	Switch, E-stop mini 2pole
0067-xxxx *	Toggle switches, Auxiliary Functions
91-01-0-xxx *	PWB Logic Assy, RF

* Contact Control Chief for correct item for your application.

1 Radio Warranty

Warranty

Control Chief Corporation guarantees that this equipment meets its published specifications at the time of shipment from the factory. This equipment will perform as described if installed properly. However, Control Chief cannot guarantee that operation of remote control system is absolutely error-free, or without interruption.

Warranty Period

This equipment is warranted against defects in materials and workmanship for a period of two (2) years from the date of shipment. Friction elements such as joysticks, buttons and mechanical relays have a warranty period of 90 days. During the warranty period, Control Chief is responsible for necessary repairs/replacement as long as the product can be proven defective.

Warranty Service

For warranty service or repair, this equipment must be returned to Control Chief Corporation. Customer is responsible for shipping charges to Control Chief. Control Chief's warranty covers only parts and factory labor. No on-site in and out charges are covered under this warranty.

Excluded Parts

This warranty does not include consumable parts such as batteries, fuses, and slings/harnesses. Also, this warranty does not cover defects caused by improper installation, improper/insufficient maintenance, unauthorized modification, improper operation, abuse, ignorance of environmental specifications, and/or improper software/interfacing.

Remarks

No other warranty is expressed or implied, except for the above mentioned. The remedies provided herein are the buyers' sole and exclusive remedies. Control Chief shall not be liable for any direct/indirect, special, incidental, or consequential damage. Consult Control Chief's general warranty for further information.

2 Safety

Safety Considerations

The safety guidelines in this manual are not intended to replace any rules or regulations or any applicable local, state, or federal governing laws. The following information is intended to be used in conjunction with other rules and regulations already in existence. It is important to read all safety information before operating any wireless radio remote control system.

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

Wireless radio controlled equipment should not be operated by any person with insufficient eyesight or hearing nor by any person who may be suffering from a disorder or illness or is taking any medication that may impair judgment or the ability to operate equipment.

Any person operating wireless radio controlled equipment should possess the following knowledge and/or skills:

- Knowledge of hazards pertaining to equipment operation
- Knowledge of safety rules for radio controlled equipment
- Knowledge of standard methods of hand and/or non-verbal signaling
- Knowledge of the radio transmitter
- Limit-switch test procedure
- Proper clearance of all moving parts on the radio controlled equipment
- Proper storage space for radio control transmitter when not in use
- Transferring radio control transmitter to another person
- Reporting unsafe or unusual operating conditions
- Remote controlled equipment capacity and limitations
- Procedures for testing controlled equipment

Aisles between equipment, stock, etc., should be free of obstructions so the radio control operator can move freely. These aisles should meet local regulations.

Radio controlled operators should always position themselves for the best view of the equipment they are controlling. The equipment should never be operated blindly. The operator should always remain at a safe distance, without losing line of sight with the equipment.

Transmitter switches should never be mechanically blocked ON or OFF for any equipment motion. When not in use turn the transmitter off (STOP).

The equipment operator should keep all body parts away from any moving parts and should never be positioned under a lifted load. Do not make a lift or move a load if anyone is in a location where they could be struck by the crane/equipment or the load.

If the equipment fails to respond properly, the crane/equipment operator should stop operation & turn the transmitter off (STOP). The operator should immediately report the condition to his/her supervisor.

The crane/equipment operator should turn off the transmitter and take it with him/her when and if boarding the equipment.

Remote control operation should NEVER be used for "people moving" applications. Never use remote operation if there are people aboard the controlled equipment. The remote control operator should NEVER "ride" on the controlled equipment.

WARNING:
ALWAYS PLACE CRANE/EQUIPMENT IN MANUAL OPERATION AND SECURE THE WIRELESS REMOTE CONTROL TRANSMITTER PRIOR TO PERFORMING ANY MAINTENANCE.

NOTE:
IN AN EMERGENCY, PUSH "E-STOP" TO STOP RADIO REMOTE CONTROLLED EQUIPMENT.

9 LITHIUM-ION BATTERY CARE & MAINTENANCE

Battery Pack

The power source for the LJ45 is a rechargeable 7.4 V Lithium-Ion battery pack. The battery pack is designed to provide 12-hours of continuous operation.

The battery pack is installed in the back of the transmitter. Do not allow any metal (tools, pocket change, etc) to come in contact with the contact pads of the battery pack. If the battery contact pads do become shorted the internal protection mechanism will cause the battery to open circuit. If an open circuit battery is placed in the LJ45 transmitter, the LJ45 is going to either not function or report a dead battery. Set the pack aside for a few moments to allow the protection circuit to reset.

Advantages of Lithium-Ion batteries:

- None of the memory effects of Ni-Cd batteries.
- Higher energy density than Ni-Cd or Ni-MH batteries.

To summarize the proper care of the battery

- DO NOT incinerate.
- DO NOT disassemble.
- DO NOT short connection pads.
- DO NOT expose to extreme temperatures (>140F/80C).
- DO NOT subject the battery to physical abuse, such as, dropping it or placing it on hot objects.
- DO dispose per appropriate state and local regulations.

Charging Batteries

- Connect charger to a 120VAC outlet with the supplied wall adapter. Power indicator should be illuminated.
- Secure battery pack in charger.
- Depending on the status of the battery:
  - The FAST charge indicator will illuminate if the battery is less than 85% charged.
  - TOP OFF indicator will illuminate if the battery charge is over 85%.
  - Neither FAST nor TOP OFF illuminates if battery is fully charged.
- If the ERROR indicator should illuminate, remove the battery and unplug the charger for at least 1 minute (to ensure the charger circuit resets) and repeat the above steps.
  - If the FAULT persists remove the battery pack from service and replace it with another battery.
- Charging is complete when all indicators turn off except POWER.
  - Battery pack can remain in charger.
  - Charger will restart the charging process when battery drops below recharge voltage threshold.

8 TROUBLESHOOTING AND MAINTENANCE

Introduction

This section is specific to the LJ45 transmitter.

For system troubleshooting information, please refer to the primary system manuals.

If your attempts are not successful in correcting a problem with your transmitter contact Control Chief Technical Support for assistance. Please refer to Contacting Control Chief on page 12 contact information.

Switch Maintenance

Switch and joystick replacement can be accomplished by a qualified electronics technician. For general switch replacement, please refer to the layout and wiring drawings supplied with your transmitter.

Replace transmitter switches only with authorized Control Chief parts.

Radio Maintenance

The radio module incorporated in the LJ45 transmitter is synthesizer based, and therefore, does not have any tuning or calibration requirements.

General Troubleshooting

Basic troubleshooting techniques should be employed when diagnosing an LJ45 transmitter. The technician should have the specific transmitter layout and wiring prints as a reference when analyzing and repairing a transmitter problem.

Radio Troubleshooting

If you suspect the primary transmitter is not transmitting an RF signal, the most effective means to evaluate this problem is to place a spare transmitter into service. If the spare transmitter works, the primary is indeed the problem, and should be returned to Control Chief for service.

WARNINGS:

1. Read this manual carefully before operating and installing this product.
2. Due to the complex nature of equipment, it is necessary to read the entire manual before installation.
3. Only authorized personnel should service this equipment. Unauthorized work on this unit will void the warranty.
4. This manual is for reference only; please call your distributor or Control Chief if further assistance is required.
5. The equipment has been tested for correct operation before delivery from the factory. However, it must not be used in critical or hazardous operation where incorrect operation may cause personal or equipment damage.
6. The crane/machine should be equipped with mainline contactor, limit switches, and other required safety devices as dictated by CMAA, OSHA, or all other applicable governing regulations.
7. The GND (ground) of receiver must be connected to ground of crane/machine, or electrical shock can occur.
8. Do not use this device during electrical storms or under conditions of electrical interference.
9. Ensure transmitter batteries are in good condition and power for receiver is correct.
10. Installation and maintenance should be done only while the crane/machine's main power and receiver's power are off and locked out to prevent electrical shock.
11. After daily operation, please shut off main power in crane/machine, the power to the receiver, and remove transmitter key.
12. Transmitter should be placed in a safe place when not in use to avoid accidental pressing of buttons.
13. Contents of the manual may be amended by the manufacturer without notice.

USA/CANADA WARNINGS:

This device is certified under FCC and Industry Canada for operation. Changes or modifications made without express permission from the manufacturer may void the user's authorization for operation.

A separation distance of at least 2cm must be maintained between the antenna and the body of the user.

This device is for occupational use only. Occupational users are those persons who are exposed as a consequence of their employment, provided these persons are fully aware of and exercise control over their exposure.

3 GENERAL INFORMATION

Scope

The purpose of this document is to provide the user with the information required to operate and maintain the LJ45 transmitter.

System Description

A remote control system consists of a portable transmitter and a crane mounted control package. Peripheral support equipment includes battery charger, rechargeable batteries, surge suppressors and transmitter carrying harness.

Transmitter

Implementing a remote controlled crane in an industrial environment requires equipment that is durable, reliable, comfortable for the operator, and adaptable to a broad range of applications. The Control Chief Advantage Series LJ45 transmitter encompasses all of these needs while setting a new standard for lightness and ease of use.

The remaining sections of this manual describe the features of the transmitter, installation considerations, operation, and maintenance.

Recommended Practices

Wear the Harness: Always wear the harness when performing remote control tasks with the transmitter. The harness is designed to provide the safest operational performance for the task an operator must perform.

Remove the Key: When the operator has completed a shift or is about to take a break – the transmitter power switch must be turned off and the key removed. To prevent unauthorized operation a transmitter should not be left unattended without being secured.

Emergency Shutdown

The LJ45 transmitter is designed to provide intuitive methods to accommodate an operator reaction to an emergency situation.

- Pushing the E-STOP switch in will disengage the Main Line Contactor, thus removing power to the crane motor circuits.
- Hands Off - Crane motions are disengaged when the operator releases the joysticks. This does not disengage any auxiliary commands that are latched ON.
- Turn OFF the transmitter. The operator turns off the transmitter's power by turning the POWER switch to OFF or removing the battery. A loss of RF signal from the transmitter will cause the receiver to disengage the Main Line Contactor.

Spare Transmitter

LJ45 transmitters are used in industrial areas, which are subject to physical abuse and environmental extremes. The LJ45 is designed to resist such hazards but it is not indestructible. If you have a critical process that cannot tolerate turn around time for transmitter service then a spare transmitter should be standing by.

The spare transmitter acts as the backup unit to the primary transmitter. The spare transmitter is an exact duplicate of the switch configuration and operation, including address and frequency assignments.

WARNING:

Primary, Spare and Universal transmitters that are NOT being used shall have the power switch key removed. The unit should then be secured in a locked cabinet to prevent accidental operation of the crane by unauthorized personnel.

Universal Transmitter

The Universal Transmitter is an extension of a dedicated spare by providing backup support for multiple crane systems. The exact number of systems will be defined in the Application Documentation Package at the System Configuration section.

The typical Universal Transmitter has an additional keyswitch used for selecting the equipment to be controlled. However, because of the various user requirements and configurations, please refer to the System Configuration section of your Application Package for specific operation and setup of a Universal Transmitter.

Note: To prevent unintentional interference, before placing the Universal Transmitter into operation it is recommended to remove the key from the selector switch to prevent re-selection during operation.

7 OPERATOR INSTRUCTION

Introduction

The operation of an LJ45 transmitter with an Advantage system requires trained and qualified personnel. Operating personnel should be familiar with basic crane handling, including safety regulations, and production tasks before attempting to operate a remote controlled crane.

The remote control system is designed to provide the operator with an operational advantage resulting in improved safety and production efficiency.

Transmitter Operation

Transmitters are secured with a keyed power On/Off switch. The key can be removed in the OFF position to prevent unauthorized use.

To operate the crane, the following steps are to be followed:

(For Universal Transmitter operation, please refer to the *Universal Transmitter* section on page 9.)

1. Turn POWER key switch to "ON".
2. Check the battery operating capacity by noting the BTRY indicator (Orange LED).
   - Off — Battery at sufficient capacity to support transmitter operation.
   - Steady — Weak battery; 10 minutes of service remaining

CAUTION:

Depending on how your installer wired the receiver controller, the next step (3) may or may not engage the Main Line Contactor. Control Chief's intention is for the system to be enabled by a two-step process requiring BOTH steps 3 and 4 to enable radio remote control of the equipment.

3. Pull out the E-STOP switch. This enables the Main Line Contactor control circuit in the receiver.
4. Press the WARNING/START/RESET button. Pressing this switch will engage the Main Line Contactor. Once the Main Line Contactor is activated, the crane is ready for motion and auxiliary commands.
5. Further actuation of the Warning/Start/Reset pushbutton will activate any warning devices, which may be utilized on the crane.
6. A Green LED on the transmitter top (labeled PWR) indicates:
   - Steady — Transmitter ready
   - Slow Flash — Transmitting
   - Fast Flash — E-STOP commanded

If the crane is not responding to transmitter commands refer to TROUBLESHOOTING AND MAINTENANCE on page 10.

4 LJ45 TRANSMITTER SPECIFICATIONS

WARNING:

CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY CONTROL CHIEF® CORPORATION COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

Frequency	450-470 MHz.
Channel Spacing	12.5 kHz
Frequency Stability	±2ppm.
Modulation	Frequency Modulation Class F1D
RF Output Power	45.7 mW (into 50-Ohm impedance)
Antenna Type	Internal
Communication Security	Each transmitter is assigned an operating frequency and address specific to the crane system it is to control.
Data Security	16 Bit CRC
Operating Range	1000 feet (305m) typical.
Temperature Range	-20 to +140 F (-30 to +60 C).
Power Supply	Li-Ion Smart Pack
Battery Life	12 hours minimum @ continuous operation.
Transmitter Diagnostics	LED indicators for Power and Battery voltage status. See page 8.
Environmental Conditioning	Sealed against dust. Crane Service Class-E (severe service)

Due to Control Chief Corporation's commitment to ongoing product improvements, the above specifications are subject to change without notice.

5 INSTALLATION

Introduction

Your LJ45 transmitter is ready to be placed into service once a fully charged battery has been installed. Refer to Chapter 9 for Battery Charging and Maintenance.

(If your transmitter has been customized for your particular application, please refer to the Configuration Cover Sheet and System Print package for additional details.)

Typically, the only transmitter installation concern is the placement of the battery charger and the establishment of a battery usage schedule. Additionally, the supervisor should establish procedures for the operators and maintenance personnel to secure transmitters to prevent unauthorized use.

Battery Charger Placement

Battery chargers should be installed indoors, where access to 120VAC power is available, and the temperature does not exceed 75°F (24°C). If the charger is placed in an area with exposure to higher temperatures while charging, the daily life expectancy of the battery pack will be degraded.

Securing the Transmitter

Most operating sites have safety regulations which require machine controls to be secured to prevent operation by unauthorized personnel. The LJ45 transmitter uses a keylock power switch. Only authorized personnel should be given access to the transmitter. When not in use, remove the transmitter power key or secure the transmitter in a locked cabinet.

6 TRANSMITTER OVERVIEW

Introduction

The LJ45 transmitter is specifically designed to meet the demanding CMAA Crane Service Classification E (Severe Service). This service class essentially requires continuous operation, and therefore subjects the transmitter to the probability of abuse due to the nature of some environments.

To meet this Crane Service class the transmitter is designed with the following features.

Mechanical Features

The unit is housed in a lightweight enclosure specifically fabricated for the end user's application. The material used in the fabrication of the transmitter unit is ABS. This type of material is ideal because of its light weight and durability.

Contamination entering the transmitter enclosure is minimized by the use of sealed switches or the use of switch covers. This also provides a measure of protection from water spray.

Security Features

- Power On/Off Keylock switch: Secures the unit for operation by authorized personnel. The key is removable in the OFF position only.
- E-Stop Switch: Controls the Main Line Contactor.
- Switch Guard: Designed to prevent accidental activation of the motor levers due to handling.

Motion and Auxiliary Switch Features

- Motion Levers: Dual-axis joysticks with heavy-duty "deadman" springs to return joysticks to center (neutral) position.
- Auxiliary Function switches: Various crane functions (e.g. rotate, grab, magnet on/off, Start, Stop) can be accommodated with toggle or pushbutton switches.

Other Features

- Battery LED: Charge status of the state-of-the-art Lithium-Ion battery pack is displayed by an LED on the transmitter control panel. See next page, Transmitter Operation.
- Harness Clip Brackets: Provide an attachment anchor for the harness clips.