

## SECTION I

### GENERAL INFORMATION

#### INTRODUCTION

The MDR-840 Radio Remote Control System is a microprocessor based control device which provides both relay and proportional command outputs. In designing the MDR-8410, Control Chief's engineers have combined over 2- years of industrial radio remote control experience with the advanced technology of proprietary software techniques and VLSI (Very Large Scale Integrated Circuit) hardware. The result is a digital radio remote control system where the signal is highly secure and the system is reliable and easily maintained.

#### SYSTEM DESCRIPTION

The MDR-8410 consists of a hand held battery powered command transmitter and a Receiver/Decoder/Interface unit. Peripheral support equipment include a battery charger, rechargeable batteries, surge suppressors and a transmitter carry harness.

#### TRANSMITTER

The MDR-8410 transmitter was designed to be comfortably carried and operated with one or two hands. Heavy duty "deadman" (spring return) motor control levers permits ease of operation for initiating crane motion commands to the crane mounted Receiver/Decoder/Interface unit. Industrial grade toggle and pushbutton switches are used for activating transmitter "on" and for activating peripheral auxiliary functions. Within the transmitter the operator generated commands are converted to a digitally coded serial data stream and modulated onto a carrier frequency within the 173-174 Mhz range. A rechargeable 12 volt (1.2 amp-hour) NICAD battery supplies power to the standard transmitter. Each transmitter is custom designed. The variables which determine how a transmitter is manufactured are frequency, engraving and number of motions-auxiliaries. By matching the transmitter to the exact user criteria CONTROL CHIEF CORPORATION provides a control device which is not only technically superior but also oriented to the specific user.

#### RECEIVER/DECODER/INTERFACE UNIT

The standard Receiver/Decoder/Interface unit is housed in a 24"Hx24"Wx10"D Nema 12 rated enclosure and operates from 120 volts AC. The major components of the Receiver/Decoder/Interface unit are.

1. Power supplies (5 and 12 volt)
2. Card Cage/Mother Board/Input-Output Terminal Strips
  - A. 173-174 Mhz /Receiver Card
  - B. Processor Card
  - C. I/O Relay Cards
  - D. Proportional (stepless) Output Cards
3. Transfer Switch (Manual/Remote)

## INSTALLATION

### INTRODUCTION

The installation of the MDR-8410 Receiver/Decoder/Interface unit must be performed in a prescribed manner for proper operation and overall system satisfaction. The personnel needed to properly install an MDR-8410 Receiver/Decoder/Interface unit are an electrician and a welder.

### RECEIVER/DECODER/INTERFACE MOUNTING

The Receiver/Decoder/Interface unit is equipped with a mounting flange on both top and bottom. After a suitable location is found, the enclosure may be bolted or welded to the support structure. Care must be taken to ensure ample space is provided to open the door (not less than 18" in front) and to permit conduit entrances at the lower right area of the enclosure.

The Receiver/Decoder/Interface unit's mounting location depends on several factors:

1. The receiver must be located at the same location as the crane's operating controls. If the crane controls are located on the bridge, then the Receiver/Decoder/Interface unit must be mounted on the bridge. If the crane controls are located on the trolley, then the Receiver/Decoder/Interface unit must be mounted on the trolley.
2. A source of single phase 120 VAC, 500 VA power must be available.
3. The unit should not be mounted where it will be subject to temperatures in excess of 40 degrees F.

### RECEIVER/DECODER/INTERFACE INTERCONNECTING WIRING

Included with each system is a set of system drawings (Output Circuit Schematic and Output Wiring Diagram) which will aid in interconnecting the Receiver/Decoder/Interface unit to the crane controllers. Wiring between the MDR-8410 output terminals to the crane controllers (magnetics) is a simple procedure and is comparable to wiring a manual control station (master switches or a pendant) to the crane magnetics. The manual controls already present on the system and the Receiver/Decoder/Interface outputs are wired in parallel. The following are guideline for proper installation:

The Receiver/Decoder/Interface unit's mounting location depends on several factors:

1. All interconnection and power supply wiring must enter the enclosure in the lower right corner. Interconnection wiring between the MDR-8410 and the crane controller should be a minimum #16 AWG and routed through rigid conduit or flexible conduit such as Sealtite.
2. For interconnecting the MDR-8410 to the existing crane controller, refer to the Output Circuit Schematic and the Output Wiring Diagram Included in the drawing package. The drawings show where to wire each output terminal.

**CAUTION:** Any device (magnet circuit) which will require power irrespective of the status of the Receiver/Decoder/Interface unit must be wired on the line side of the mainline contactor. This is necessary to prevent loss of power to the devices due to opening of the main line contactor (See Safety Features, Page 17).

## **SURGE SUPPRESSORS**

Supplied with each system is a quantity of surge suppressors. These are used to protect the electronic equipment from electrical line surges and to increase the life of the electrical contacts. The surge suppressors must be connected in parallel across all relay and contactor coils of the crane control circuits (at the coil location). In those cases where Control Chief has supplied an intermediate relay panel, the suppressors will already be installed on the coils of the relays.

## **ANTENNA PLACEMENT**

Included with each system is the receiving Antenna, an Antenna Mount with 25 feet of cable and the Receiver/Enclosure Cable Assembly. In order to obtain optimum system performance, it is essential the receiving antenna be properly located. Ideally, the antenna should be mounted on a vertical axis below the bottom of the bridge structure and be visible from any operational point on the floor. (See Figure 2.1, page 31)

## **STEPLESS CARD ALIGNMENT AND HOIST OFFSET**

The analog output from the Stepless I/O Relay Card is factory adjusted with a 600 ohm resistive load. Because of the different voltage/load requirements for each crane, minor initial adjustment may be required. See the Stepless I/O Relay Card alignment procedure in the maintenance section.

## **FINAL CHECKS**

The following system checks and guidelines must be adhered to prior to operating the system for the first time:

1. Ensure separate 120 VAC, 500 VA control transformer has been installed to supply power to the Receiver/Decoder/Interface unit. Check status of the AC power supplying collector shoes/festooning.
2. Ensure the transmitter battery is charged to full capacity.
3. Ensure surge suppressors are installed across ALL relay coils. The surge suppressors must be installed at the location of the controlled relay coil. The failure to install surge suppressors will cause unsatisfactory crane operation.
4. Ensure the person(s) operating the radio remote control have been properly trained and are qualified for both the safe operation of a radio remote control unit and the safe operation of an overhead industrial crane.
5. Ensure a main line contactor is employed on the crane and controlled by the MDR-8410 Receiver/Decoder/Interface units "Main On" (address) and "Warning Start" relay (See Safety Features Page 17). The main line contactor is vital for emergency crane shutdown.

Ensure a Fail-Safe braking mechanism is used on the bridge drive. OSHA rules and regulations Chapter 17, Para 1910.179, Section (f), (6)(iii) states "On all floor, remote and pulpit operated crane bridge drives, a brake or non-coasting mechanical drive shall be provided". The braking mechanism generally employed is an electrically operated, spring close type of brake.

Ensure a log book is maintained by the Maintenance Department. The log should include a list of assigned address codes and carrier frequencies cross referenced to the proper transmitter, Receiver/Decoder/Interface unit and crane.