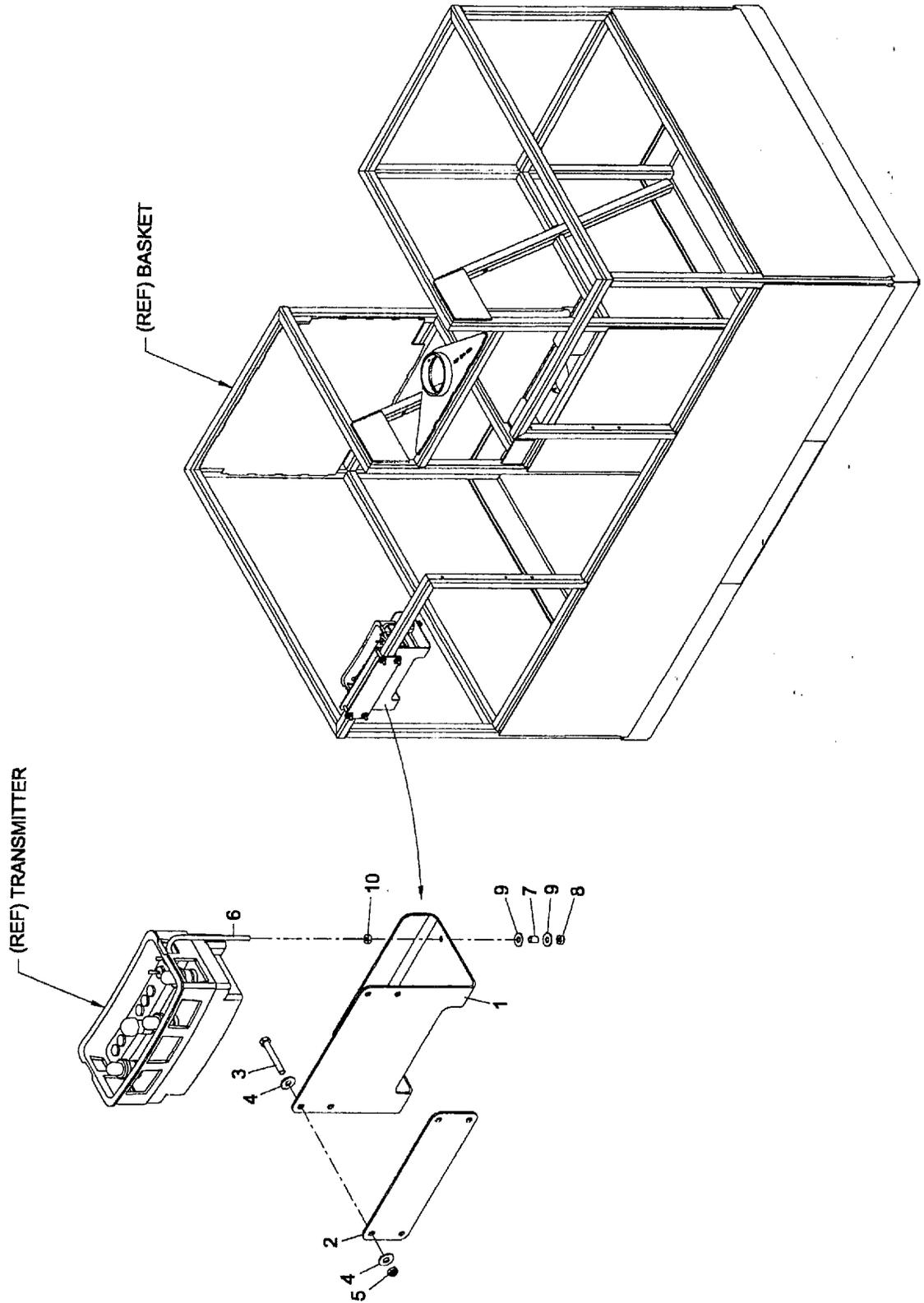


EXAMPLE
OF
PLATFORM
REMOTE CONTROLS

OPTION GROUP (TRANSMITTER HOLDER)



09/13/01
04/14/03

995001383	995001435	995001474	995001522	995001523
995000967	995000970	995001188	995001187	995001189
995001190	995001200	995001201	995001264	995001186

TRANSMITTER

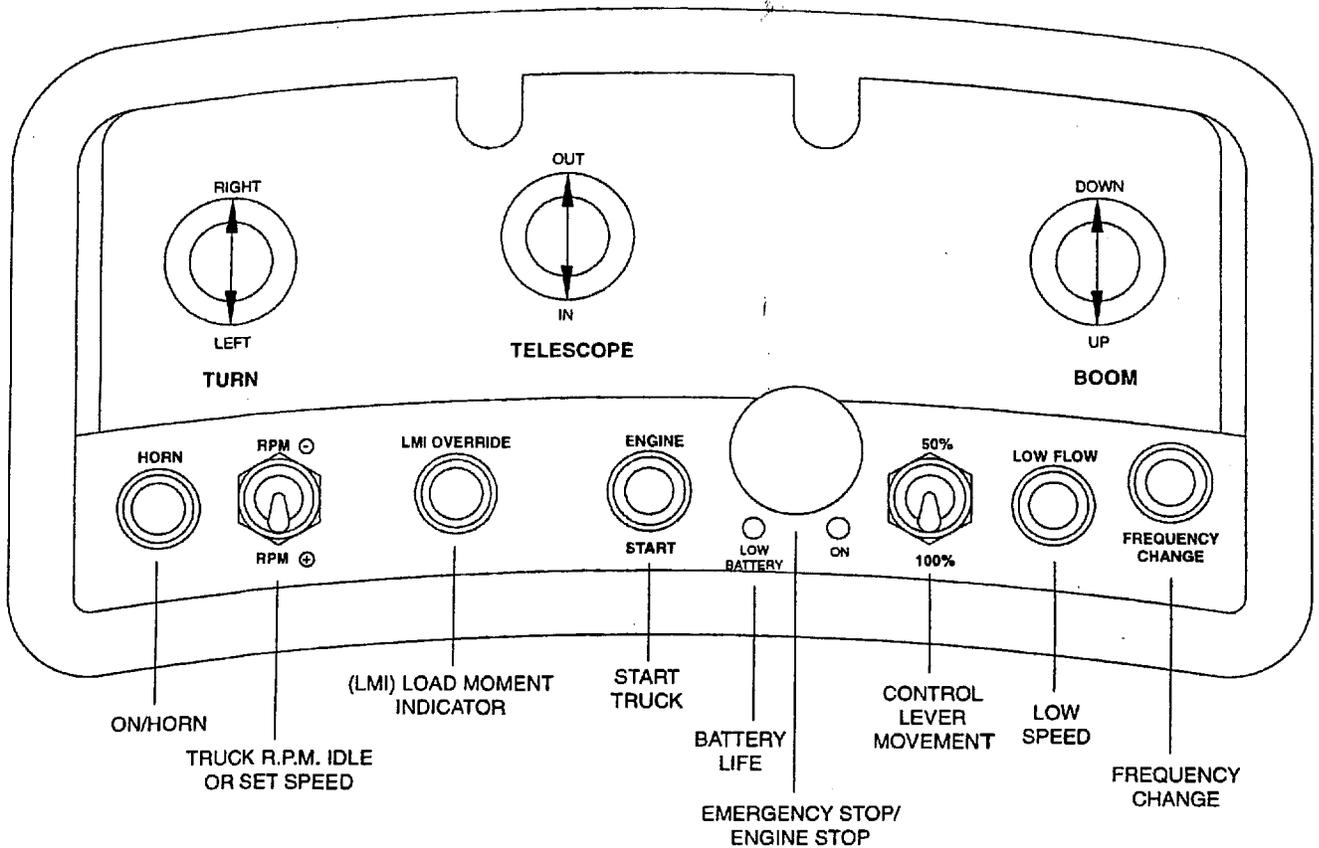
Never expose the transmitter to a high pressure cleaning jet. The insulation class of the transmitter is IP65. The IP65 rating allows for exposure to normal environmental conditions.

Crane and Option Function Joysticks: The transmitter is equipped with three single axis joysticks for the main crane functions (lift, turn, and telescope). When the joystick is in the center (neutral) position the function is inactive. Moving the joystick from the center position initiates function movement. The speed of the function is increased by moving the joystick farther from the center position.

The speed of the function is decreased by moving the joystick back towards the center position. The function direction is reversed by moving the joystick away from the center position in the opposite direction. For smooth crane operation slowly meter the joystick away from and towards the center position. Multiple functions can be operated simultaneously with this system.

The three main crane function operation directions are shown on the transmitter. Refer to the drawing, below, of the transmitter faceplate for further function direction definition.

TRANSMITTER FACEPLATE



NBB REMOTES

SAFETY

OPERATION

DANGER ELECTROCUTION HAZARD



This crane is not insulated. The remote control provides no protection against the electrocution hazard. Do not operate near live electrical power lines. All warnings in the Safety & Operation Section of this manual and on the crane relative to operating and safety procedures and power line clearances must be observed when using the crane remote controls.

DANGER REMOTE START HAZARD



Before attempting to start truck with remote control make sure the drive train is in neutral.

ADDITIONAL SAFETY PRECAUTIONS

A regular function check of the radio remote control system is necessary to maintain operational safety. The function check should include verifying that all safety features are operational before using this system.

The radio remote control system offers an excellent solution to safety, speed and ease of use, less downtime, and overall maneuverability. Like any device, there are precautions and common sense that work hand in hand to assure safe and reliable operations.

Never allow any operation until the operator has read all instructions and has become completely familiar with the total system. Should any unexplained, unpredicted, or incorrect operation occur, immediately shut down the complete system and investigate! This includes shutting down all electronics, hydraulics, power take-offs, and engines. Never resume operation until the problem has been corrected!

When not using the remote control, switch the transmitter off by pressing the Emergency Stop button on the transmitter so that the button is locked down. Then disconnect power to the remote control system by selecting the off position for the remote switch located inside the crane cab. This will prevent inadvertent operation of the crane if the hand control is operated. Protect and monitor the hand control unit to prevent damage and unplanned operation.

SYSTEM DESCRIPTION

The radio remote system consists of a transmitter, a receiver with antenna and mounting bracket, a wire harness, two batteries, and a 12 VDC battery charger. The radio remote system is used in conjunction with solenoid valves, which are installed in the cab joystick control circuit, to operate the crane remotely.

The remote system can be calibrated such that full throw of the transmitter's joystick shifts the spool, internal to the valve, for a particular work section on the valve any distance from the spool's neutral position to the full travel distance of the spool. This feature allows a specific function to operate very slow or at full system speed, as desired by the crane operator, with the full movement of the transmitter's joystick. When using an SLP or SLPR (self-leveling-platform or self-leveling-platform-rotating) in combination with this remote option, the lift function will not work in the slow or creep mode. This occurs because the SLP requires 1.5 GPM (5.7 LPM) to operate the leveling system. The loss of this oil from the oil flow when in the slow or creep mode prevents the remotes from operating the lift function. The calibration of the crane can be changed quickly so the remote system can be adapted to the operator's preference or particular job at hand.

The radio remote system allows the crane operator to function the three main crane functions. The radio remote system also allows the crane operator to optimize the crane performance by selecting the setting for three different function operating speed options. The transmitter in this system provides the ability to kill the truck engine by pushing the large red emergency stop button. The emergency stop button will lock down when pushed. The cap on the emergency stop button contains a key that is required to release the emergency stop button. The emergency stop button can be depressed and the key removed to restrict operation of the remote system. The transmitter also provides the crane operator a button that will sound the horn for an audible alert. The transmitter will allow the truck to be started remotely. The transmitter is also equipped with a battery life indicator to inform the operator of the battery's remaining charge. The receiver has four LED's on the front panel which are used to indicate the operating condition of the receiver.

A license is not required to operate this system.

Control Lever Movement Switch: Set this switch to 50%, the full range of the transmitter joystick will move the control valve spool 50 percent of the full movement. Note: With this switch set at 50%, this option does not necessarily provide half speed of the function. Set this switch to 100%, the full range of transmitter joystick will move the control valve spool 100 percent of the fully calibrated movement.

An operator can toggle back and forth between these two option settings depending on whether the crane is loaded or unloaded and the proximity of the crane to other objects. This remote option can be selected to reduce the function operating speeds for close in operation.

Truck R.P.M. – Idle or Set Speed Switch: This is a momentary switch that returns to the center position when released. The engine will be at its factory idle setting when the truck is initially started for remote operation. If the switch is pushed towards the RPM “+” side and released, the truck engine will operate at a speed set by the throttle pedal in the crane cab. If the switch is pushed back towards the RPM “-” side and released, the truck engine will operate at its set idle speed again.

An operator can toggle back and forth between these two option settings depending on if the crane is loaded or unloaded and proximity of the crane to other objects. This remote option can be selected to reduce the function operating speeds for close in operation.

On/Horn Button: This button is used for several different functions.

The first time the horn button is pushed communication is initialized between the transmitter and receiver. This communication is comprised of a code that is used to tell the receiver the signal it is receiving is from the matching transmitter. Note: If all the joysticks are not in the neutral position the horn button will not initialize communication between the transmitter and receiver and the horn will not sound.

Also, when the horn button is pushed a 12 VDC signal is supplied to the ignition system of the truck. The horn button is used in the start truck procedure (see Remote Control Operating Instructions).

When in the program mode, the horn button is used to store the setting of each function (see Calibration Procedures).

The horn button is also used in the frequency change procedure (see Frequency Change Procedure).

The horn button also provides the crane operator a means to sound the horn for an audible alert.

LMI Override Button: This is a momentary button which deactivates the overload/anti-two block protection. This button can be used to release pressure trapped in lift cylinder at full extension.

Never use this button to either overload the crane or operate in a range not permissible.

Start Truck Button: Read Warning Decal on transmitter before using this button. This button is used to start the truck's engine in the start truck procedure (see Remote Control Operating Instructions). The start truck button is to be made operational only on trucks that are equipped with a switch (referred to as a neutral safety switch) that prevents the engine from being started while the transmission is in gear. Do not install the remote start relay on any truck that can be started while the transmission is in gear.

On a truck that is not equipped with the remote start relay, the operator must start the truck from the truck's cab after initializing the remote start procedure (see Remote Control Operating Instructions).

Emergency Stop Button: Push this button down to kill the truck's engine. When the emergency stop button is pushed down completely, it locks itself in the depressed state. To release the emergency stop button, turn the button clockwise and the button will pop back up allowing the transmitter to operate again.

The emergency stop button is also used to turn the transmitter on and off. The battery life indicator should be lit if the transmitter is turned on and a charged battery is installed in the transmitter. When remote operation is finished, push the emergency stop button to turn the transmitter off.

The cap of the emergency stop button contains a key. The key is used to release the emergency stop button and turn the transmitter on. The emergency stop button can be pressed down until it locks. Then the cap can be removed to prevent unauthorized use of the remote system.

The transmitter should be turned off when not in use. Shutting the transmitter off will help to prevent inadvertent operation of the crane if the hand control is operated. Shutting the transmitter off will also help to maintain a charged transmitter battery and may prevent discharge of the truck's battery.

Low Speed Button: This button reduces the pump flow through the valve for fine meterability of the functions. A beacon on the crane sub-base will be flashing when this mode is active (reduced flow). Pressing this button toggles this option on and off.

An operator can toggle back and forth between these two option settings depending on if the crane is loaded or unloaded and the proximity of the crane to other objects. This remote option can be selected to reduce the function operating speeds for close in operation.

Frequency Change Button: This button is used to change the frequency at which the receiver/transmitter is operating (see Frequency Change Procedure). The radio system will automatically shut off if the receiver does not continually receive a synchronizing code from the transmitter. Change the operation frequency if the system is shutting off.

When in the program mode, the frequency change button is used to initialize the calibration of each function (see Calibration Procedures).

Battery Life Indicator: This display is used to indicate the condition of the battery and if the transmitter is on or off. The operating period with a charged battery is approximately 8 hours with the transmitter in continuous use. When a battery has been discharged from use it should be placed in the charger to help ensure that a charged battery is always available.

No light indicates that the transmitter is not turned on (Emergency Stop button is depressed) or no battery is installed.

A *flashing green* light will appear if the transmitter is on and the battery has sufficient charge.

A *flashing green light and a red* light indicate that the battery is getting low. When red indicator lamp lights up, the battery is nearing complete discharge. The transmitter can be operated for approximately 15 minutes more in this condition. When the red light comes on, maneuver the crane to a safe position to install a new battery in the transmitter.

A *flashing red* light indicates that the battery is too low to function.

RECEIVER

Never expose the receiver to a high pressure cleaning jet. The insulation class of the receiver is IP65. The IP65 rating allows for exposure to normal environmental conditions only.

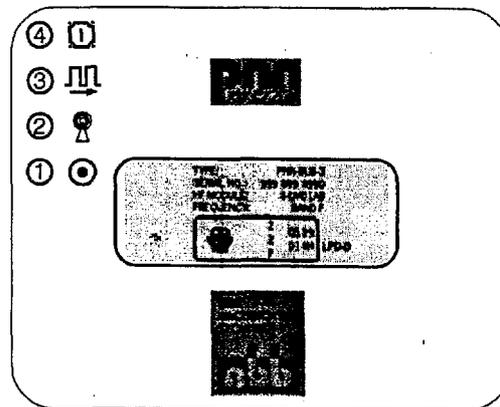
During welding work on the unit to be controlled, disconnect the receiver from the current supply! Otherwise there is a risk of damage to the receiver's electronic system.

The receiver comes equipped with a quick release mounting bracket and a pin and socket connector. The quick release mounting bracket and connector allow the receiver to be quickly removed from the crane for storage or when a high pressure cleaning jet is used to clean the crane. The mating pin and socket connector on the wire harness should be sealed when the radio is removed to prevent moisture from entering the connector. Always ensure that both sides of the connector are dry before connecting them together. Moisture in the connector may cause an electric short which will dam-

age the remote system. The receiver can be removed by pressing the orange release lever on the back of the receiver while lifting the receiver up and away from the mounting bracket.

The receiver should always be mounted with the antenna in a straight up vertical position.

The receiver has four LEDs located in the upper left corner. These four LEDs are used to indicate the operating condition of the receiver and whether the receiver is energized.



LED1 (green): When this LED is on, power is being supplied to the receiver.

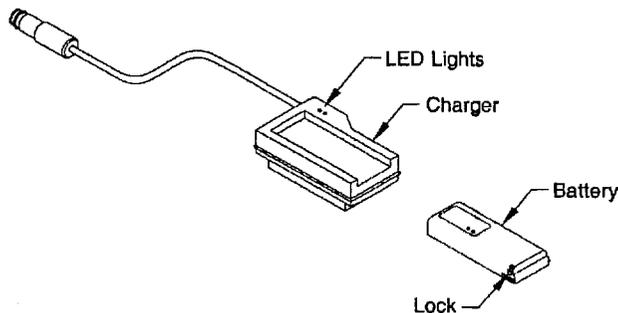
LED2 (yellow): When the transmitter is turned on and the high frequency (HF) signal is present this LED light is steady. When the transmitter is turned off this LED flashes irregularly.

LED3 (green): This LED flashes evenly during fault-free operation. Irregular flashing means that the HF channel is probably at fault and another channel should be selected (see Frequency Change Procedure).

LED4 (red): When this LED is on, the HF channel is at fault (see Frequency Change Procedure). When the transmitter is turned off this LED flashes irregularly.

BATTERY CHARGER

The battery charger supplied with this system was designed to work in a 12 VDC system. The cord attached to the charger is fitted with a plug that will work in an auxiliary power outlet or cigarette lighter in the truck's cab. To charge a battery, plug the charger's cord into the truck's electrical system and then slide the battery into the charger until the lock clicks. The battery should be oriented such that the metal charging terminals on the charger intersect the metal conductors on the battery. To remove the battery from the charger, simply depress the orange lock release pin on the corner of the battery while sliding the battery out of the charger.



The charger has a red and a green LED light to help indicate the charge state of the battery:

A *steady green* light indicates that the battery charger is connected to a power source and the charger is ready for use. Place the battery in the charger.

A *slow flashing red* light indicates that the battery is totally discharged and the battery is in the precharging state.

A *steady red* light indicates that the battery is charging.

A *fast flashing red* light indicates that the charging process is complete.

Leaving the battery in the charger beyond the required charging period will not harm the battery. The battery should be removed once the charging cycle is seen to be complete.

Do not use the charger other than in dry rooms having a min/max temperature range of 32-100 F! A charged battery is a concentrated energy source. Never store a charged battery in a toolbox or similar place where it could be short circuited by metal components (even a key in your trouser pocket can cause a short circuit) and as a result cause a burn or even start a fire.

If the radio remote system is not used for a long period of time, it is recommended that the batteries be charged every 4 weeks. The periodic charging of the

batteries will prevent deep discharges and prolong the batteries useful life. The battery should be removed from the transmitter too, during long periods of storage.

Remote control operating instructions:

1. Position crane at job site, set park brake, and shift transmission to neutral.
2. Start truck from inside truck cab.
3. Engage P.T.O.
4. Set outriggers.
5. Turn Hydraulic Capacity Alert/LMI and Remotes/SLP power switches "ON" - in truck cab.
6. Turn the Emergency Stop button on the transmitter clockwise to turn the transmitter "ON".
7. Push the horn button to initialize communication between transmitter and receiver — on transmitter.
8. Starting truck for remote operation:
 - If the truck is equipped with the remote start relay (see warning before installing start relay), then push the start button on the transmitter to start the truck.
 - If the truck is not equipped with the remote start relay; verify that the transmission is in neutral, then start truck with the ignition switch in the truck cab.
9. Set function operating speed options (Throttle, 50%/100% and Low Flow) as desired — on transmitter.
10. Slowly move joystick, in the desired function direction, until the desired speed is obtained.
11. Slowly move joystick back to the neutral (center) position to decrease the function's operating speed.
12. Stow crane when operation is finished.
13. Depress the Emergency Stop button to shut off transmitter — on transmitter.
14. Turn Hydraulic Capacity Alert/LMI and Remotes/SLP power switches "OFF" - in truck cab.
15. Start truck from inside truck cab.
16. Stow outriggers.
17. Disengage P.T.O.

Frequency Change Procedures:

1. Press and hold the "On/Horn" button
2. Press the "Frequency Change" button
3. Release the "On/Horn" button when the horn sounds

When the receiver locks into the new frequency, a horn signal is given and the unit to be controlled is ready for operation again.

SERVICE AND MAINTENANCE

Never expose the transmitter to a high pressure cleaning jet. The insulation class of the transmitter is IP65. The IP65 rating allows for exposure to normal environmental conditions.

Never expose the receiver to a high pressure cleaning jet. The insulation class of the receiver is IP65. The IP65 rating allows for exposure to normal environmental conditions.

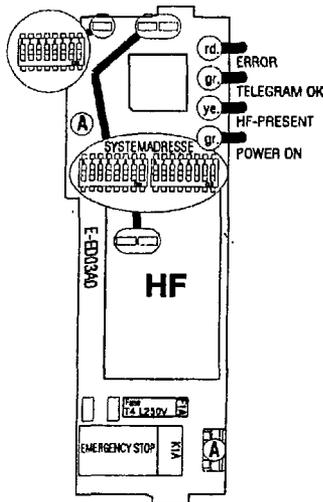
During welding work on the unit to be controlled, disconnect the receiver from the current supply! The receiver can be disconnected from the current supply by unplugging the Deutsch connector between the receiver and wireharness otherwise there is a risk of damage to the receiver's electronic system.

FUNCTION CHECK

To maintain operational safety, a regular function check of the radio remote system is necessary. The radio remote system should be checked each shift or by each new operator. Check that all functions operate correctly. Start by verifying that the emergency stop button is working properly. Before conducting any checks verify that nobody is in a danger area.

DIP SWITCH SETTINGS

Each radio transmitter is given its own address code. A transmitter and a receiver must have a matching address code in order for the two to communicate. The address code is set by sixteen dip switches found inside the receiver, on the same card as the external LEDs, and sixteen dip switches inside the transmitter. A sticker can be found on the back of the receiver cover indicating the original factory setting.



FUSES

The radio receiver contains eight fuses. The main fuse is located on the card with the external LEDs. If this fuse is blown all receiver functions will be stopped.

Five fuses are found on the function card. When these fuses blow a particular function is lost.

The other two fuses are located on the power converter card.

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	995001383	995001264	995001186	995001270	995001271		
03/08/00	995001435	990417	990513	995000967	995000970	995001187	
09/13/00	995001474	995001188	995001189	995001190	995001200	995001201	

SPECIFICATIONS

Operating ambient temperature
-4F to 150F (-20C to 65C)
Insulation Class - Protection
IP 65

TRANSMITTER

The use of synthesizer technology permits frequencies to be selected in accordance with the appropriate waveband for the country of use.

Transmission frequency range
400-477 MHz, 25mW FM
Low frequency modulation
FSK signal to CCITT V.23
Data repetition rate
about 60ms
Baud rate
1200 baud (bits per sec)
Range
1000 up to 3250 ft (300 up to 1000m)
Power input
60-100 mA
RF output
< or = 10mW
Weight (w/o battery)
2.2 lbs (1kg)

RECEIVER

Reception frequency range
400-477 MHz

Data security:

- Generates a CRC code with a Hamming distance = 4
- Generates a neutral position
- Addressing of each transmitter with its own, unique combination (max. 2¹⁶ possible combinations)

Data reception security:

- Diversity evaluators, CRC, Emergency stop and neutral position bits.

BATTERY CHARGING UNIT

12 VDC

BATTERY

7.2v/0.6Ah

APPROVALS AND CERTIFICATES

Federal Approvals Office for Telecommunications of the Federal Republic of Germany

Approval Certificate

No.G120912F S-DE96AO 05.10.1995

Type -Examination Certificate

No.G129014H S-EMO1AO 26.08.1996

Other approvals

USA K9VPOC90 T001/K9VMOV90 T001/
K9VPNN3-5ROO1

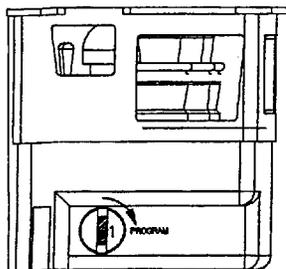
INSTALLATION

TRUCK INSTALLATION

1. Locate and install radio receiver mounting bracket following the installation print.
2. Connect the radio receiver's wire harness to the remote solenoid valves on remote control valve and the solenoid valve on the sub-base following the diagram supplied in the parts pages and the markings on the harness. The connectors simply snap onto the end of the solenoid valve if positioned correctly. In order to remove these connectors, press the wire detent and pull the connector away from the solenoid valve. Note: Not all remote solenoid valve connectors will be used in all systems. Any unused connectors should be wire tied to the harness.
3. Install the radio receiver bracket.
4. Connect the radio receiver to the bracket and connect the pin and socket connector between the receiver and wire harness.
5. Secure the harness to the crane using wire ties as required.
6. Connect the cords running to the crane cab to the weather pack connectors on the radio receiver.
7. Route the cords to the crane cab securing them with wire ties as required. Keep the cords away from any moving parts.
8. Install the crane cab wiring according to the parts pages and the schematic provided.
9. Calibrate the remote system following the instructions provided.

Calibration Procedures:

1. Read all of the following procedures before starting.
2. Set the crane up and unstow the boom following the Operating Procedures in this manual.
3. Position the boom so that it can be operated in all directions without contacting obstructions.
4. Start the crane following the procedures found in the "Remote control operating instructions."
5. Toggle the Truck RPM switch to the RPM "+" side.
6. Insert the programming key into the switch on the end of the transmitter and turn the key to the "Program" position.



7. Press the "On/Horn" button to activate the programming mode.
8. To signal which function is to be programmed, move the selected function's joystick briefly to the full throw position.
9. Select the 50% setting for the "Control Lever Movement" switch.
10. Move the joystick to be calibrated to its initial desired start position and press the "On/Horn" button to save this setting. For the smoothest function meter in characteristic, move the joystick until slight function movement is detected, then back joystick off until function stops movement and set this as the start position.
11. Select the 100% setting for the "Control Lever Movement" switch.
12. Move the same joystick to be calibrated to its maximum desired speed position and press the "On/Horn" button to save this setting. In order to minimize the dead band in the joystick, move the joystick to full throw and then back the joystick off until a slight speed reduction is noticed and set this as the full joystick position.
13. The opposite direction of this joystick can now be calibrated, repeating steps 9-12.
14. After both directions of a joystick are calibrated, the "Frequency Change" button must be pressed once before starting to calibrate the next function.
15. Repeat steps 8-14 for each function to be remotely activated.
16. When all functions are calibrated press the emergency stop button, turn off the programming switch and pull out the programming key to avoid unintentional programming.

Note: By pressing and holding the "Frequency Change" key it is possible to change to the working mode to check the programmed values. When the "Frequency Change" button is released the programming mode is activated again.