Manual Part # 99905114

SIII Telescopic Crane Radio Remote System

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SECTION 1: Transmitter and Receiver Identification

Fully Proportional Control System	
Non-gated or Left Gated Joystick Transmitter w/o Horn or On/Off Switches2)
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Fully Proportional Control System

For these systems go to Section 3.

Fully Proportional Control System Non Gated Joystick – Without Horn or On/Off Switch

> Transmitter IMT P/N: 70734559



Fully Proportional Control System Left Gated Joystick - Without Horn or On/Off Switch

> Transmitter IMT P/N: 70734713



Receiver IMT P/N: 70734560



For these systems go to Section 4.

Fully Proportional Control System Non Gated Joystick - With Horn and On/Off Switch

> Transmitter IMT P/N: 70734761



Fully Proportional Control System Left Gated Joystick - With Horn and On/Off Switch



Receiver IMT P/N: 70734763



Single Proportional Control System

For this system go to Section 5.

Single Proportional Control System With Horn and On/Off Switch

Transmitter IMT P/N: 70734748



Receiver IMT P/N: 70734750



CAN Connection – Radio & Battery Elimination Cable



Transmitter Cable Backup Connector



SECTION 2: System Properties and Statement – Applies to all Systems in this Manual

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Safety Precautions

- Read and follow all instructions.
- Failure to abide by Safety Precautions may result in equipment failure, loss of authority to operate the equipment, and personal injury.
- Use and maintain proper wiring. Follow equipment manufacturer instructions. Improper, loose, and frayed wiring can cause system failure, equipment damage, and intermittent operation.
- Changes or modifications made to equipment not expressly approved by the manufacturer will void the warranty.
- Owner/operators of the equipment must abide by all applicable Federal, State, and Local laws concerning installation and operation of the equipment. Failure to comply could result in penalties and could void user authority to operate the equipment.
- Make sure that the machinery and surrounding area is clear before operating. Do not activate the remote control system until certain that it is safe to do so.
- Turn off the transmitter remote and remove power from the receiver before attempting any maintenance. This will prevent accidental operation of the controlled machinery.
- Power is removed from the Receiver by detaching the 12-pin cable from the receiver connector P1 and P2, or by removing the source power from the circuit.
- Use a damp cloth to keep units clean. Remove mud, concrete, dirt, etc. after use to prevent obstructing or clogging the buttons, levers, wiring, and switches.
- Do not intentionally allow liquid to enter the transmitter or receiver enclosures. Do not use high pressure equipment to clean the transmitter remote or receiver.
- Operate and store units only within the specified operation and storage temperatures defined in this document.

NOTE:

Disconnect the radio receiver before welding on the body or chassis, or any component sitting on work bench or in vise. Failure to disconnect the receiver may result in destruction of or damage to the receiver.

RoHS Compliance Statement

This system complies with the requirements of **Restriction of Hazardous Substances** (**RoHS/WEEE**) **Specification** based on in-house practice and declaration of compliance from the vendors. For additional information concerning RoHS compliance, please contact IMT.

Iowa Mold Tooling Co., Inc.

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> This product may contain material that may be hazardous to human health and the environment. In compliance with EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE):

- / Do not dispose of the product as unsorted municipal waste.
- This product should be recycled in accordance with local regulations. Contact local authorities for detailed information.
- This product may be returnable to the distributor for recycling. Contact your distributor for details.

FCC Statements

15.19 - Two Part Warning

This device complies with Part 15 of the 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.

15.21 – Unauthorized Modification

NOTICE: The manufacturer is not responsible for any unauthorized modifications to this equipment made by the user. Such modifications could void the user's authority to operate the equipment.

15.105(b) - Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Industry Canada Statement

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This device complies with Canadian RSS-210.
The installer of this radio equipment must ensure that the antenna is
located or pointed such that it does not emit RF field in excess of Health
Canada limits for the general population; consult Safety Code 6, obtainable
from Health Canada's website www.hc-sc.gc-ca/rpb.
```

LIST OF EQUIPMENT

	QTY	PART NUMBER	DESCRIPTION
TRANSMITTERS	1	70734559	Transmitter, 2.4 GHz, Piston Grip, Green, fully proportional non-gated joy sticks w/o Horn or On/Off switches
	1	70734713	Transmitter, 2.4 GHz, Piston Grip, Green, fully proportional left-gated joy stick w/o Horn or On/Off switches
	1	70734761	Transmitter, 2.4 GHz, Piston Grip, Green, fully proportional non-gated joy sticks with Horn and On/Off switches
	1	70734762	Transmitter, 2.4 GHz, Piston Grip, Green, fully proportional left-gated joy stick with Horn and On/Off switches
	1	70734748	Transmitter, 906-924 MHz, Pistol Grip, Green, Single Proportional Trigger
RECEIVERS	1	70734560	Receiver, 2.4 GHz, fully proportional 16 FET CH, 2 Analog CH, Internal Antenna. Use with 70734559 or 70734713 trans.
	1	70734763	Receiver, 2.4 GHz, fully proportional 16 FET CH, 2 Analog CH, Internal Antenna Use with 70734761 or 70734762 trans.
	1	70734750	Receiver, 906-924 MHz, 16 FET CH, 2 Analog CH, Internal Antenna. Use with 70734748 trans.
	3-7	77041917	Toggle Switch
	1	77041918	E-Stop Switch
	1 OR 2	70734731	Joystick, non-gated
	1	70734725	Joystick, gated (for left joystick)
	1	70399458	Decal, faceplate, for 70734559 transmitter
	1	70399505	Decal, faceplate, for 70734713 transmitter
	1	70399513	Decal, faceplate, for 70734748 transmitter
DADTO	1	70399514	Decal, faceplate, for 70734761 transmitter
PARIS	1	77441552	Cap & Chain Asm for Radio/Bat Elimination Cable
	1	77344540	Cover, battery compartment
	1	70399502	rigger switch asm w/springs, set screw, and dowel pin
	1	71415460	Magnet, disc, for handle (screws included)
	1	77344541	Faceplate, 2 joysticks, 3 toggles, machined
	1	77344543	Faceplate, 2 joysticks, 3 toggles, molded
	1	77041967	Handle guard with thread inserts GRN CERVIS

Transmitter Battery Installation

This transmitter unit is powered by four size AA batteries. When installing batteries, be sure to observe proper polarity as marked on the inside of the compartment to avoid damaging the unit.

To replace or install batteries in the transmitter:

- 1. Loosen the four captive battery compartment cover screws on the rear of the remote and lift the cover from the transmitter.
- 2. Install (or replace with) four (4) fresh size AA batteries. Observe the proper polarity by positioning the batteries as shown in Figure 3.
- 3. Replace the compartment cover and tighten the four screws. These screws should not be overtightened, but **they must be tight enough to assure the gasket provides a proper environmental seal**.

NOTE: Be sure to observe proper polarity when placing batteries in the transmitter battery compartment.



Transmitter Battery Installation

✓ **Note:** Cover screws must be tightened enough to assure the sealing gasket is compressed. Do not over-tighten the screws.

NOTE

Receiver is sealed. Do Not Open! Equipment damage may result.

Hardware Configuration Details

Receiver Hardware Configuration Details

Characteristic	Interface Description	Notes
Control Power	7-32 VDC	Control/Supply Voltage
Number of I/O Channels	16 Digital /2 Analog	Fully Proportional
Number of I/O	18	Single Proportional
Output Composition	FET	2 A/Channel
RF, Antenna Option	2.4GHz, INTERNAL	Fully Proportional
Antenna Option	906-924 MHz @ 10mW (max) Internal	Single Proportional
Dither Freq. Dither Amplitude	4070 Hz - 55 Hz optimal See valve spec sheet:	Fully Proportional
PWM Frequency	150 Hz	Single Proportional
Digital Input Voltage Range	<1V Active, >3V Inactive	
Analog Input Range	4-20mA = 0-5000psi	Intended to interface to a Wika MH-2 pressure sensor

Safety Link

Receiver Safety Link

Receiver Safety Link		
x		
ENABLED	DISABLED	
When any of the following occurs:	When any of the following occurs:	
Machine Stop is pressed	Machine Stop is pressed	
Transmitter unit goes out of range	Transmitter unit goes out of range	
 Transmitter unit deactivates due to loss of power, Inactivity timeout, or deliberate deactivation (off switch) 	 Transmitter unit deactivates due to loss of power, Inactivity timeout, or deliberate deactivation (off switch) 	
Then, all latched outputs unlatch and all momentary outputs that are active deactivate. Upon activation of the HH, no outputs are allowed to be activated until all switches (unless masked) are first centered or returned to their neutral state.	Then all latched outputs remain latched but all momentary commands that are active deactivate. Note: If transmitter unit is powered on and a momentary command that was deactivated due to range, is still active when the transmitter returns in range the output will immediately be active again.	

Receiver Mounting





Receiver Mounting Dimensions

Transmitter Specifications

Item	Description	
Power	Vin	+1.6V to +3.2VDC
	Batteries	Four (4) AA
	Battery Life	175 to 200 hours (ADJUSTED)
	Low V Shutdown	1.6VDC
	Auto-shutdown	10 min. of button inactivity
Environment	Operating Temp	-20°C to 55°C
		(-4°F to 131°F)
	Storage Temp	-40°C to 55°C
		(-40°F to 131°F)
	Humidity	0 to 100%
Radio	Frequency	2405-2480MHz
	RF Power	2mW
	License	License free
	Modulation	DSSS
	Antenna	Internal
Enclosure	Dimensions	mm: 230.6x133.9x146.9 inch: 9.1 x 5.3 x 5.8
	Total Weight	3 lbs
	Durability	High Impact Glass Filled Polymer case
	Faceplate	Aluminum or Polycarbonate
Indicators (5)	LEDs	
	тх	Blinking- transmitting, no switch active
		Solid- transmitting, switch active
	RX	Blinking- receiving, no output of interest active
		Solid- receiving, output of interest active
	BATT	Low battery indication
	ERR	Indicates error with transmitter
Control Switches	Toggle	3 momentary
	(2) dual axis joysticks	Proportional controls
	Mushroom	Oversized Machine Stop

Receiver Specifications

Receiver Specifications				
POWER	Vin	+7 to +32VDC		
RADIO	Frequency	2405 – 2480MHz		
	2.4GHz RF Power	2mW		
	License	License Free		
	Modulation	DSSS		
	Antenna	Internal		
ENVIRONMENT	Operating Temp	See Derating Curve chart below for details		
	Storage Temp	-40°C to 85°C (-40°F to 185°F)		
	Humidity	0 to 100%		
	Vibration/Shock	IEC60068-2-6		
		10Hz to 150Hz @ 1.0g peak acceleration		
		10.0 <i>g</i> peak shock acceleration		
INDICATORS (11)	+V1	OK when active solid		
	+V2	OK when active solid		
	+V3	OK when active solid		
	D1 - Health	OK when active blinking		
	D2 – RF TX	Blinking when transmitting		
	D3 – RF RX	Solid when receiving		
	D4 - Out	Solid when active		
	D5 - In	Solid when active		
	D6 – CAN TX	Blinking when transmitting		
	D7 – CAN RX	Solid when receiving		
	D8 - Error	Solid while error occurring		
ENCLOSURE	Dimensions	119mm x 133mm x 36mm (5.24" x 4.69" x 1.42")		
	Durability	High Impact Polymer		
	Mounting Holes	7.4mm (0.29") dia.		
		102mm center-to-center (4" center-to-center)		
	Digital Channels			
	Sixteen	FET—Open Drain		
	Output Current	4A per channel		
		15A Max. total		
	Input Voltage	<1V Inactive, >3V Active		
	Analog Channels			
	Тwo	4-20mA Input		
	Input Impedance	165Ω		

Output Current De-rating Curve



Transmitter Output Current Derating Curve

LOADING CONDITIONS TRANSMITTER LOAD INDICATOR LED'S (Applies only to Fully Proportional Transmitters)



LOADING DESCRIPTION

- At 0-79% of the cranes capacity, the display will indicate the percent of capacity using the 20%, 40%, and 60% LED's. These LED's will be GREEN.
- Snubbing is active at 80% to 99%. You will see a 50% reduction in the speed of all crane functions while in snubbing mode. At, and above 80% of capacity, the 80% LED will be YELLOW.
- To deactivate snubbing, you must go below 80% of load AND return the joystick to neutral.
- At 90% of capacity, the 90% LED will be RED.
- At 100% of capacity, the 90% LED will flash RED.
- Once the crane reaches 100% capacity, BOOM DOWN, EXTENSION OUT, and WINCH UP functions will stop.
- To deactivate overload, you must use BOOM UP, WINCH DOWN or EXTEND IN to get below 100% of capacity AND return the joystick to neutral.

Receiver Troubleshooting Guide

Indication	Suggestions
Power LED (+V1,+ V2, +V3)	✓ Is +VDC input power present?
not active	 Check input power polarity.
Health LED steady ON	✓ Indicates an internal component failure.
TY/DY not optime	 Check for obstructions preventing line-of-sight transmission.
I A/RA not active	\checkmark Check that the transmitter is active.
	\checkmark Re-associate the transmitter to the receiver.
CTX/CRX not active	✓ Check CAN connection.
Out LED not active	 Check that the transmitter LEDs are active when the appropriate buttons are pushed.
	✓ Check the outputs for loose wiring, etc.
	✓ Over-temperature channel indication.
Error LED active	✓ Over-current channel indication.
	✓ Error condition exists. Active channel current consumption less than 1A typical. (This is not a problem in cases where less then 1A draw is a normal condition.)
In LED not active when expected	✓ Check that the input signal is referenced to P1:12.

Receiver Troubleshooting

Receiver Display Messages

Receiver Display Messages

A2B	A2B Fault	A2B switch is active
STOP	STOP ACTIVE	Stop switch is active
OVLD	CRANE OVERLOAD	90% of setpoint* reached
SNUB	CRANE SNUBBING	80% of setpoint* reached
BMDN	BOOM DWN FAULT	No connection
BMUP	BOOM UP FAULT	No connection
BMRT	BOOM RET FAULT	No connection
BMEX	BOOM EXT FAULT	No connection
WNDN	WINCH DWN FAULT	No connection
WNUP	WINCH UP FAULT	No connection
RCW	ROT CW FAULT	No connection
RCCW	ROT CCW FAULT	No connection
ESRT	ENG START FAULT	No connection
ESPD	ENG SPEED FAULT	No connection
ESTP	ENG STOP FAULT	No connection
COMP	COMPRESSOR FAULT	No connection
TRAN	TRANSDUCER FAULT	No connection
NORF	NO RADIO COMMS	Loss of Link
LBAT	+ VDC LOWA2B	Input voltage <8V

* Setpoint is 3500psi for BOOM DOWN motion only. Setpoint is 3100psi for any other motion.

SECTION 3: Fully Proportional Control System w/o Horn or ON/OFF Switches

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Switch/LED	Function
Red E-Stop Button	 E-Stop, the transmitter powers off immediately. If depressed during normal crane operation, Engine Stop command is sent to chassis or auxiliary power engine; all hydraulic functions stop. Normal operating position; transmitter may be powered up.
Switch 1 UP DOWN	AIR ON AIR OFF
Switch 2 UP DOWN	ENGINE START ENGINE STOP
Switch 3 UP DOWN	THROTTLE FAST THROTTLE SLOW
Joystick 1	(+Y) Boom Down (-Y) Boom Up (+X) Boom CW (-X) Boom CCW
Joystick 2	 (+Y) Winch Down (-Y) Winch Up (+X) Boom Extend (-X) Boom Retract
Trigger	Proportional Enable – Must be pressed in conjunction with joystick movement.
тх	Green
RX	Red
BATT	Amber
ERR	Amber

Transmitter Switch and LED Description 70734559 Transmitter Switch & LED Description



Transmitter Diagnostic LEDs

Transmitter Operational LED Diagnostic Information				
LED Information	Condition	Color		
TX rapid blinking	Transmitter is transmitting	Groop		
TX solid	Switch active on transmitter	Gleen		
RX blinking (indication of RF signal integrity)	Receiver messages received	Amber		
RX solid	Output on receiver is active			
BATT slow blinking	Low battery	Red		
ERR solid	Switch fault at power-up			
ERR blinking slowly (1/sec)	Machine Stop depressed at power-up	Amber		

Transmitter Operation

Turn ON the Unit

This remote is powered **ON** by releasing the large Red mushroom-style STOP button and activating the **ENGINE START** toggle switch.

Turn OFF the Unit

During normal operation, you do not need to do anything to power down the radio remote transmitter. The transmitter will automatically power down after 15 minutes of inactivity.

IMPORTANT NOTE: The primary function of the red E-Stop button is an emergency stop. If the red E-Stop button is pushed when the vehicle engine or auxiliary power unit is running, and the crane is powered up, the transmitter will send an "Engine Stop" command to the engine or power unit and shut down immediately thereby stopping all hydraulic powered functions.

Pushing the E-Stop when the vehicle engine or power unit is not running, or the crane does not have electrical power, will shut the radio transmitter off immediately without affecting the vehicle engine or power unit.

Proportional Control

The dual axis proportional joysticks are used for proportional control of crane functions Winch, Telescope, Elevation and Rotation. Joysticks will have a "Deadband" from center position and joystick control is programmable via the configuration set-up features. See Transmitter Adjustments (Adjust Mode).

Toggle Switches SW1 through SW3

Toggle switches SW1 through SW3 are three position momentary with latched commands (where necessary) in software. These switches are used for digital control and for various setup and adjustment functions. See Transmitter Adjustments (Adjust Mode).

Fully Proportional Radio Remote (w/o Horn and ON/OFF Switches)

Handshake (Association) - Note: You must have a direct line-of-sight with between the transmitter and receiver.

- 1. Power off transmitter and receiver (pto and/or ignition switch off)
- 2. Release the STOP button on the handheld by twisting it clockwise.
- 3. Push and hold the switches for AIR OFF (down) and ENGINE START (up) All LED's will turn on (TX, RX, BATT, WARNING).
- 4. When the RX LED goes out, turn on the power to the receiver (pto and/or ignition switch).
- 5. Release the switches on the transmitter.
- 6. Both TX and RX LED's on the transmitter should be blinking rapidly. If not, repeat steps 1 8.



Setting Parameters:

- 1. HYDRAULICS OFF (Turn on ignition and pto switches, but do not start engine).
- 2. Turn transmitter on (receiver should be on).
- 3. Push and hold the switches for AIR OFF (down) and ENGINE SPEED LOW (down/turtle).
- 4. On the receiver display you will see "L-xx" (xx=number). Release switches. The transmitter is ready to set the LOW SIDE parameters.
- 5. Push and hold the function joystick you wish to change. Use the ENGINE SPEED switch to raise or lower the setting. Observe the display on the receiver for the number change.
- 6. Once you have the new set value, push ENGINE START (up) to store it. Release the joystick.
- 7. Repeat steps 5 & 6 for each function.
- 8. Push and hold the switches for AIR OFF (down) and ENGINE SPEED HIGH (up/rabbit).
- 9. On the receiver, you will see "H-xx" (xx=number). Release switches. The transmitter is now ready to set the high side parameters.
- 10. Push and hold the function joystick you wish to change. Use the ENGINE SPEED switch to raise or lower the setting. Make sure to watch the receiver for the number change.
- 11. Once you have the new set value, push ENGINE START to store it. Release the joystick.
- 12. Repeat steps 10 & 11 for each function.
- 13. To exit calibration mode, push E-STOP or RPM or just wait for the programming mode to time out.

These are the IMT recommended starting parameters. You may tune your transmitter to your personal preferences.

IMT does recommend setting the Low above 32 for best slow resolution. IMT does not recommend setting the HIGH setting below 50.

Function	Low	High
BOOM DOWN	30	62
BOOM UP	30	60
ROTATE CW	20	50
ROTATE CCW	20	50

Function	Low	High
WINCH DOWN	30	60
WINCH UP	30	60
BOOM EXTEND	28	55
BOOM RETRACT	28	55

Transmitter Configuration Details

- Inactivity timer 15 minutes
- 20, 40, 60, 80, 90 LED values:
 - \circ 0 3500psi → 0 100% when BOOM DOWN ONLY
 - 0 3100psi → 0 100% if any proportional function other than BOOM DOWN is engaged. This applies even if BOOM DOWN is engaged when another function is used simultaneously.



Transmitter PSI Level LEDs

Receiver Channel Configuration

Channel #	Channel Type	Output Style	Channel Logic
BOOM EXTEND M1	PWM	Momentary	BOOM EXTEND (AND NOT BOOM RETRACT) If cranes load input is within 20% of overload condition reduces output by 50%.
BOOM RETRACT M2	PWM	Momentary	BOOM RETRACT (AND NOT BOOM EXTEND) If cranes load input is within 20% of overload condition reduces output by 50%.
Boom Rotate CCW M3	PWM	Momentary	ROTATE CCW (AND NOT ROTATE CW) If cranes load input is within 20% of overload condition reduces output by 50%.
Boom Rotate CW M4	PWM	Momentary	ROTATE CCW (AND NOT ROTATE CW) If cranes load input is within 20% of overload condition reduces output by 50%.
BOOM UP M5	PWM	Momentary	BOOM UP (AND NOT BOOM DOWN) If cranes load input is within 20% of overload condition reduces output by 50%.
BOOM DOWN M6	PWM	Momentary	BOOM DOWN (AND NOT BOOM UP) If cranes load input is within 20% of overload condition reduces output by 50%.
WINCH IN M7	PWM	Momentary	WINCH IN (AND NOT WINCH OUT) If cranes load input is within 20% of overload condition reduces output by 50%.
WINCH OUT M8	PWM	Momentary	WINCH OUT (AND NOT WINCH IN) If cranes load input is within 20% of overload condition reduces output by 50%.
ENGINE SPEED		Latched ON	ENGINE SPEED HIGH OR AIR ON
M9	Level	Latched OFF	ENGINE SPEED LOW OR AIR OFF
ENGINE START M10	Level	Momentary	ENGINE START (AND NOT ENGINE STOP)
ENGINE STOP M11	Level	Momentary	ENGINE STOP (AND NOT ENGINE START)
AIR		Latched ON	AIR ON
M12	Level	Latched OFF	AIR OFF
STOP/LINK/HOUR		Latched ON	RF LINK
METER M13	Level	Latched OFF	LOSS OF RF LINK
A2B INPUT M14	Digital Input	Momentary	FROM NORMALLY CLOSED SWITCH: ACTIVE

Receiver Channel Configuration

Receiver Channel Configuration

Channel #	Channel Type	Output Style	Channel Logic
UNUSED M15			
UNUSED M16			
UNUSED Al1			
LOAD INPUT Al2	Pressure Transducer Input	4-20mA	[4mA,20mA] →[0,5000psi]

Cable Wiring Information



Receiver P1 and P2 Pinout

Receiver Wiring Table

Pin	Signal Name	Pin	Signal Name
P1:1	+VDC	P2:1	M5: BOOM UP
P1:2	AI1: NOT USED	P2:2	M6: BOOM DOWN
P1:3	M9: ENGINE SPEED	P2:3	M7: WINCH IN
P1:4	M10: ENGINE START	P2:4	M8: WINCH OUT
P1:5	M11: ENGINE STOP	P2:5	CANH: See 0
P1:6	M12: AIR COMPRESSOR ON	P2:6	UMBILICAL PWR (+5V): See 0
P1:7	M13: STOP/HOUR METER	P2:7	+VDC
P1:8	M14: A2B INPUT LOW	P2:8	CANL: See 0
P1:9	M15: NOT USED	P2:9	M1: EXTEND
P1:10	M16: NOT USED	P2:10	M2: RETRACT
P1:11	AI2: 4-20mA LOAD INPUT	P2:11	M3: CCW
P1:12	-VDC, UMBILICAL COM: See 2.4	P2:12	M4: CW

SECTION 4: Fully Proportional Control System with Horn and ON/OFF Switches

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Transmitter Switch & LED Description				
Switch/LED	Function			
Switch 1 UP DOWN	AIR ON/OFF RPM HI/LO			
Switch 2 UP DOWN	HORN/TX ON TX OFF			
Switch 3 UP DOWN	ENGINE START ENGINE STOP			
Joystick 1	(+Y) Boom Down (-Y) Boom Up (+X) Boom CW (-X) Boom CCW			
Joystick 2	 (+Y) Winch Down (-Y) Winch Up (+X) Boom Extend (-X) Boom Retract 			
Trigger	Proportional Enable – Must be pressed in conjunction with joystick movement. Hour Meter			
тх	Green			
RX	Red			
BATT	Amber			
ERR	Amber			

Transmitter Switch and LED Description



Transmitter Diagnostic LEDs

Transmitter Operational LED Diagnostic Information

LED Information	Condition	Color	
TX rapid blinking	Transmitter is transmitting	Crean	
TX solid	Switch active on transmitter	Green	
RX blinking (indication of RF signal integrity)	Receiver messages received	Amber	
RX solid	Output on receiver is active		
BATT slow blinking	Low battery	Red	
ERR solid	Switch fault at power-up	Amber	
ERR blinking slowly (1/sec)	Machine Stop depressed at power-up		

Transmitter Operation

Turn ON the Unit

This remote is powered **ON** by releasing the large Red mushroom-style STOP button and activating the **TX ON/OFF** toggle switch.

Turn OFF the Unit

During normal operation, you do not need to do anything to power down the radio remote transmitter. The transmitter will automatically power down after 15 minutes of inactivity. You may also toggle the **TX ON/OFF** switch at any time to shut off the transmitter.

IMPORTANT NOTE: The primary function of the red E-Stop button is an emergency stop. If the red E-Stop button is pushed when the vehicle engine or auxiliary power unit is running, and the crane is powered up, the transmitter will send an "Engine Stop" command to the engine or power unit and shut down immediately thereby stopping all hydraulic powered functions.

Pushing the E-Stop when the vehicle engine or power unit is not running, or the crane does not have electrical power, will shut the radio transmitter off immediately without affecting the vehicle engine or power unit.

Proportional Control

The dual axis proportional joysticks are used for proportional control of crane functions Winch, Telescope, Elevation and Rotation. Joysticks will have a "Deadband" from center position and joystick control is programmable via the configuration set-up features. See Transmitter Adjustments (Adjust Mode).

Toggle Switches SW1 through SW3

Toggle switches SW1 through SW3 are three position momentary with latched commands (where necessary) in software. These switches are used for digital control and for various setup and adjustment functions. See Transmitter Adjustments (Adjust Mode).

Fully Proportional Radio Remote (w/Horn and ON/OFF Switches)

Handshake (Association) – Note: You must have a direct line-of-sight with between the transmitter and receiver

- 1. Power off transmitter and receiver (pto and/or ignition switch off)
- 2. Release the STOP button on the handheld by twisting it clockwise.
- 3. Push and hold the switches for ENGINE STOP (down) and TX ON (up) All LED's will turn on (TX, RX, BATT, WARNING).
- 4. Once the RX LED goes out, turn on the power to the receiver (pto and/or ignition switch).
- 5. Release the switches on the transmitter.
- 6. Both TX and RX LED's on the transmitter should be blinking rapidly.
- 7. If not, repeat steps 1 7.



Setting Parameters:

- 1. HYDRAULICS OFF (Turn on ignition and pto switches, but do not start engine)
- 2. Turn transmitter on (receiver should be on).
- 3. Push and hold the switches for RPM (down) and TX ON (up).
- 4. On the receiver display you will see "L-xx" (xx=number). Release switches. The transmitter is ready to set the LOW SIDE parameters.
- 5. Push and hold the function joystick you wish to change. Use the AIR/RPM switch raise or lower the setting. Observe the display on the receiver for the number change.
- 6. Once you have the new set value, push TX ON (up) to store it. Release the joystick.
- 7. Repeat steps 6 & 7 for each function.
- 8. Push and hold the switches for AIR (up) and ENGINE START (up).
- 9. On the receiver, you will see "H-xx" (xx=number). Release switches. The transmitter is now ready to set the high side parameters.
- 10. Push and hold the function joystick you wish to change. Use the AIR/RPM switch raise or lower the setting. Make sure to watch the receiver for the number change.
- 11. Once you have the new set value, push TX ON (up) to store it. Release the joystick.
- 12. Repeat steps 10 & 11 for each function
- 13. To exit calibration mode, push E-STOP or RPM or just wait for the programming mode to time out.

These are the IMT recommended starting parameters. You may tune your transmitter to your personal preferences.

IMT does recommend setting the Low above 32 for best slow resolution. IMT does not recommend setting the HIGH setting below 50.

Function	Low	High	Function	Low	High
BOOM DOWN	30	62	WINCH DOWN	30	60
BOOM UP	30	60	WINCH UP	30	60
ROTATE CW	20	50	BOOM EXTEND	28	55
ROTATE CCW	20	50	BOOM RETRACT	28	55

Transmitter Configuration Details

- Inactivity timer 15 minutes
- Overload condition is indicated when LED 90 (Red) blinks.
- 20, 40, 60, 80, 90 LED values:
 - \circ 0 − 3500psi → 0 − 100% when BOOM DOWN ONLY
 - 0 3100psi → 0 100% if any proportional function other than BOOM DOWN is engaged. This applies even if BOOM DOWN is engaged when another function is used simultaneously.



Transmitter PSI Level LEDs

Receiver Channel Configuration

Channel #	Channel Type	Output Style	Channel Logic
BOOM EXTEND M1	PWM	Momentary	BOOM EXTEND (AND NOT BOOM RETRACT) If cranes load input is within 20% of overload condition reduces output by 50%.
BOOM RETRACT M2	PWM	Momentary	BOOM RETRACT (AND NOT BOOM EXTEND) If cranes load input is within 20% of overload condition reduces output by 50%.
Boom Rotate CCW M3	PWM	Momentary	ROTATE CCW (AND NOT ROTATE CW) If cranes load input is within 20% of overload condition reduces output by 50%.
Boom Rotate CW M4	PWM	Momentary	ROTATE CCW (AND NOT ROTATE CW) If cranes load input is within 20% of overload condition reduces output by 50%.
BOOM UP M5	PWM	Momentary	BOOM UP (AND NOT BOOM DOWN) If cranes load input is within 20% of overload condition reduces output by 50%.
BOOM DOWN M6	PWM	Momentary	BOOM DOWN (AND NOT BOOM UP) If cranes load input is within 20% of overload condition reduces output by 50%.
WINCH IN M7	PWM	Momentary	WINCH IN (AND NOT WINCH OUT) If cranes load input is within 20% of overload condition reduces output by 50%.
WINCH OUT M8	PWM	Momentary	WINCH OUT (AND NOT WINCH IN) If cranes load input is within 20% of overload condition reduces output by 50%.
ENGINE SPEED		Latched ON	ENGINE SPEED HIGH OR AIR ON
M9		Latched OFF	ENGINE SPEED LOW OR AIR OFF
ENGINE START M10	Level	Momentary	ENGINE START (AND NOT ENGINE STOP)
ENGINE STOP M11	Level	Momentary	ENGINE STOP (AND NOT ENGINE START)
AIR	Level	Latched ON	AIR ON
M12		Latched OFF	AIR OFF
STOP/LINK/HOUR METER M13		Latched ON	RF LINK
	Level	Latched OFF	LOSS OF RF LINK
A2B INPUT M14	Digital Input	Momentary	FROM NORMALLY CLOSED SWITCH: ACTIVE

Receiver Channel Configuration

Channel #	Channel Type	Output Style	Channel Logic
WARNING 1 OUT/HORN M15	Level	Momentary	AI2 > (Pressure Input > 80%)*
WARNING 2 OUT/HORN M16	Level	Momentary	Ai2 > (Pressure Input > 100%)*
UNUSED Al1			
LOAD INPUT Al2	Pressure Transducer Input	4-20mA	[4mA,20mA] →[0,5000psi]

Receiver Channel Configuration

*Current dependent on motion function Boom Down/Non-Boom Down/Snubby/Overload characteristics.

Note: Air compressor stays on with signal loss – loss of link – and the engine runs at high idle.

Note: Machine Stop latches off all functions and will activate Engine STOP output for 10 seconds.

Cable Wiring Information



Figure 9: Receiver P1 and P2 Pinout

Pin	Signal Name	Pin	Signal Name			
P1:1	+VDC	P2:1	M5: BOOM UP			
P1:2	AI1: NOT USED	P2:2	M6: BOOM DOWN			
P1:3	M9: ENGINE SPEED	P2:3	M7: WINCH IN			
P1:4	M10: ENGINE START	P2:4	M8: WINCH OUT			
P1:5	M11: ENGINE STOP	P2:5	CANH: See 2.7			
P1:6	M12: AIR COMPRESSOR ON	P2:6	UMBILICAL PWR (+5V): See 2.7			
P1:7	M13: STOP/HOUR METER	P2:7	+VDC			
P1:8	M14: A2B INPUT LOW	P2:8	CANL: See 2.7			
P1:9	M15: WARNING 1/HORN	P2:9	M1: EXTEND			
P1:10	M16: WARNING 2/HORN	P2:10	M2: RETRACT			
P1:11	AI2: 4-20mA LOAD INPUT	P2:11	M3: CCW			
P1:12	-VDC, UMBILICAL COM: See 2.4	P2:12	M4: CW			

Receiver Wiring Table

SECTION 5: Single Proportional Control System with Horn and ON/OFF Switches

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Transmitter Details





Transmitter Switch and LED Description

Switch Location	י ו	Label	Switch Style
Stop		MACHINE STOP	Maintained
Trigger		(none)	Momentary
S1	UP SHIFT + UP DOWN	HORN ENGINE START ENGINE STOP	Momentary
S2	UP DOWN	BOOM DOWN BOOM UP	Momentary
S3	UP DOWN	WINCH DOWN WINCH UP	Momentary
S4	UP DOWN	EXTEND IN EXTEND OUT	Momentary
S5	UP DOWN	ROTATE CCW ROTATE CW	Momentary
S6	UP DOWN	TX ON/OFF SHIFT	Momentary
S7	UP SHIFT + UP DOWN SHIFT + DOWN	AIR ON RPM HI AIR OFF RPM LO	Momentary

Transmitter Switch Description

Transmitter LED Diagnostic Information

LED Information	Condition	Color
TX rapid blinking	Transmitter is transmitting	Green
TX solid	Switch active on transmitter	
RX blinking (indication of RF signal integrity)	Receiver messages received	Amber
RX solid	Output on receiver is active	
BATT slow blinking	Low battery	Red
ERR solid	Switch fault at power-up	Arabar
ERR blinking slowly (1/sec)	Machine Stop depressed at power-up	AIIDEI

Transmitter Operation

Turn ON the Unit

This remote is powered **ON** by releasing the large Red mushroom-style STOP button and activating the **TX ON/OFF** toggle switch.

Turn OFF the Unit

During normal operation, you do not need to do anything to power down the radio remote transmitter. The transmitter will automatically power down after 15 minutes of inactivity. You may also toggle the **TX ON/OFF** switch at any time to shut off the transmitter.

IMPORTANT NOTE: The primary function of the red E-Stop button is an emergency stop. If the red E-Stop button is pushed when the vehicle engine or auxiliary power unit is running, and the crane is powered up, the transmitter will send an "Engine Stop" command to the engine or power unit and shut down immediately thereby stopping all hydraulic powered functions.

Pushing the E-Stop when the vehicle engine or power unit is not running, or the crane does not have electrical power, will shut the radio transmitter off immediately without affecting the vehicle engine or power unit.

Proportional Control

The single axis proportional trigger and crane movement momentary toggle switches are used for proportional control of crane functions Winch, Telescope, Elevation and Rotation. The trigger is programmable via the configuration set-up features. See Transmitter Adjustments (Adjust Mode).

Toggle Switches SW1 through SW3

Toggle switches SW1 through SW3 are three position momentary with latched commands (where necessary) in software. These switches are used for digital control and for various setup and adjustment functions. See Transmitter Adjustments (Adjust Mode).

SINGLE PROPORTIONAL RADIO REMOTE

Handshake (Association) - Note: You must have a direct line-of-sight between the transmitter and receiver.

- 1. Power off transmitter and receiver (pto and/or ignition switch off)
- 2. Release the STOP button on the handheld by twisting it clockwise.
- 3. Push and hold the switches for COMPRESSOR ON (up) and TX ON/OFF (up) All LED's will turn on (TX, RX, BATT, WARNING).
- 4. Once all LED's turn off, except TX, turn on the power to the receiver (pto and/or ignition switch).
- 5. Release switches on the transmitter.
- 6. Both TX and RX LED's on the transmitter should be blinking rapidly



7. If not, repeat steps 1 through 7

Setting Parameters

- 1. HYDRAULICS OFF (Turn on ignition and pto switches, but do not start engine)
- 2. Turn transmitter on (receiver should be on).
- 3. Push and hold the switches for COMPRESSOR OFF (down) and TX ON/OFF (up). On the receiver, you will see "CAL" in the display on the receiver. Release switches. The transmitter is now ready to set the proportional parameters (note: you have (10) ten seconds to start step (4) four.
- 4. Push and hold the switch for BOOM DOWN.
- 5. Pull the proportional trigger fully The radio receiver will show the current low setting in the display window.

- 6. To change the LOW setting:
 - A. Release trigger fully.
 - B. While holding the BOOM DOWN switch, pull the trigger. You can set the parameter by slowing moving the trigger to the number desired (IMT recommends "20" for the low side).
 - C. Once you determine the new setting, hold the trigger in that position and toggle the COMPRESSOR OFF (down) switch.
- 7. Release BOOM DOWN switch and trigger. The receiver automatically switches to HIGH SIDE setting mode.
- 8. To change the HIGH setting:
 - A. While hold the BOOM DOWN switch, pull the proportional trigger fully The radio receiver will show the current high setting in the display window.
 - B. Release the trigger fully.
 - C. While holding the BOOM DOWN switch, pull the trigger. You can set the parameter by slowing moving the trigger to the number desired (IMT recommends "65" for the high side).
 - D. Once you determine the new setting, hold the trigger in that position and toggle the COMPRESSOR OFF (down) switch.
- 9. To exit calibration mode, push E-STOP or just wait for mode to time out.

Receiver Channel Configuration

Channel #	Channel Type	Output Style	Channel Logic
M1: BOOM EXTEND	Level	Momentary	BOOM EXTEND (AND NOT BOOM RETRACT) if cranes load input is within 20% of overload condition reduces output by 50%
M2: BOOM RETRACT	Level	Momentary	BOOM RETRACT (AND NOT BOOM EXTEND) if cranes load input is within 20% of overload condition reduces output by 50%
M3: BOOM ROTATE CCW	Level	Momentary	ROTATE CCW (AND NOT ROTATE CW) if cranes load input is within 20% of overload condition reduces output by 50%
M4: BOOM ROTATE CW	Level	Momentary	ROTATE CW (AND NOT ROTATE CCW) if cranes load input is within 20% of overload condition reduces output by 50%
M5: BOOM UP	Level	Momentary	BOOM UP (AND NOT BOOM DOWN) if cranes load input is within 20% of overload condition reduces output by 50%
M6: BOOM DOWN	Level	Momentary	BOOM DOWN (AND NOT BOOM UP) if cranes load input is within 20% of overload condition reduces output by 50%
M7: WINCH IN	Level	Momentary	WINCH IN (AND NOT WINCH OUT) if cranes load input is within 20% of overload condition reduces output by 50%
M8: WINCH OUT	Level	Momentary	WINCH OUT (AND NOT WINCH IN) if cranes load input is within 20% of overload condition reduces output by 50%
M9: ENGINE SPEED	Level	Latched ON	ENGINE SPEED HIGH OR AIR ON
	20101	Latched OFF	ENGINE SPEED LOW OR AIR OFF
M10: ENGINE START	Level	Momentary	ENGINE START (AND NOT ENGINE STOP)
M11: ENGINE STOP	Level	Momentary	ENGINE STOP (AND NOT ENGINE START)
M12: AIR	Loval	Latched ON	AIR ON
COMPRESSOR	Level	Latched OFF	AIR OFF
M13: HOUR METER	l evel	Latched ON	TRIGGER ON
	20101	Latched OFF	TRIGGER OFF
M14: A2B INPUT	Digital Input	Momentary	FROM NORMALLY CLOSED SWITCH; ACTIVE LOW
M15: WARNING 1 OUT/HORN	Level	Momentary	M18 > (Pressure Input > 80%)*
M16: WARNING 2 OUT/HORN	Level	Momentary	M18 > (Pressure Input > 100%)*
M17: PROP TRIGGER	PWM	Momentary	TRIGGER
M18: LOAD INPUT	Pressure Transduc er Input	4-20mA	(4mA-20mA) → (0-5000PSI)

*Current dependent on motion function Boom Down/Non Boom Down/Snubbing/Overload Characteristics.

 $\sqrt{}$ Note: Air Compressor stays ON with signal loss – loss of link – and the engine runs at high speed.

 $\sqrt{}$ Note: Machine Stop latches OFF all functions and will activate Engine STOP output for 10 seconds.

 $\sqrt{}$ **Note:** Transmitter shuts down (OFF) after 15 minutes of inactivity.

Cable Wiring Information



Receiver Wiring Table

Pin	Signal Name	Pin	Signal Name
P1:1	+VDC	P2:1	M5: BOOM UP
P1:2	M17:PROP TRIGGER	P2:2	M6: BOOM DOWN
P1:3	M9: ENGINE SPEED	P2:3	M7: WINCH IN
P1:4	M10: ENGINE START	P2:4	M8: WINCH OUT
P1:5	M11: ENGINE STOP	P2:5	CANH HIGH
P1:6	M12: AIR COMPRESSOR ON	P2:6	UMBILICAL PWR (+5V)
P1:7	M13: HOUR METER	P2:7	+VDC
P1:8	M14: A2B INPUT	P2:8	CAN LOW
P1:9	M15: WARNING 1/HORN	P2:9	M1: EXTEND
P1:10	M16: WARNING 2/HORN	P2:10	M2: RETRACT
P1:11	M18: 4-20mA LOAD INPUT	P2:11	M3: CCW
P1:12	-VDC, UMBILICAL COM	P2:12	M4: CW



Iowa Mold Tooling Co., Inc.