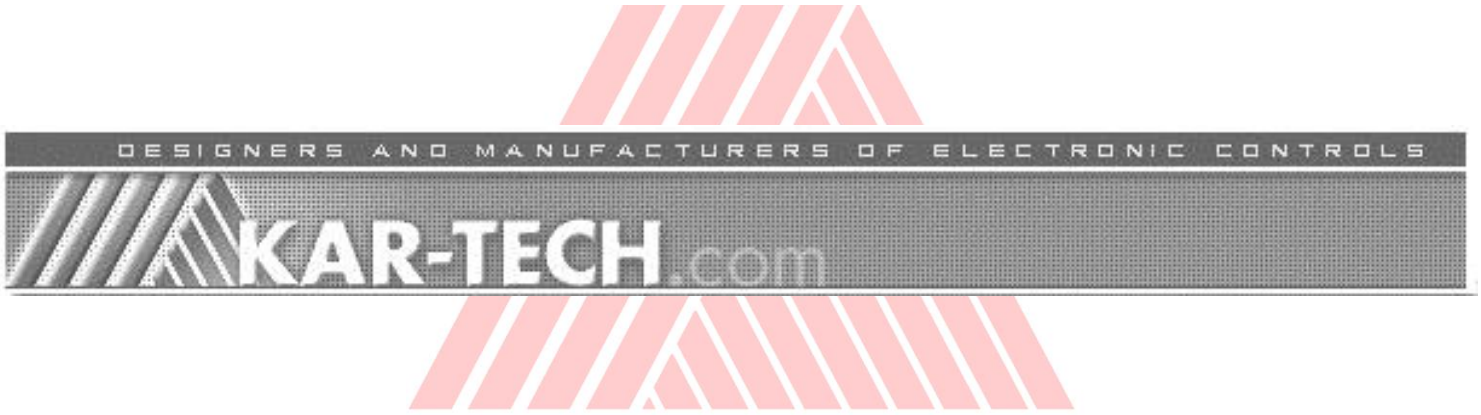

MEGA REMOTE

RADIO REMOTE CONTROL SYSTEM

-PRELIMINARY-

INSTALLATION AND OPERATION MANUAL

NORWOOD
3A2481CJ.doc
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DESCRIPTION

The MEGA REMOTE is a state of the art microprocessor based Radio Frequency (RF) control system. It will provide the operator the ability to remotely operate equipment. The operator is required to follow all OSHA www.osha.gov safety standards when operating the equipment.

This system is designed with Frequency Hopping Spread Spectrum (FHSS) and Phase Lock Loop (PLL) technology for the optimum performance in radio remote products.

To save battery life, the transmitter is designed with an auto shut down feature. This feature turns the transmitter off when the receiver is off and none of buttons are used for period of 15 minutes. The user must then press power button to turn transmitter power back on.

The remote control system consists of two modules: the radio transmitter, receiver module, and associated optional equipment such as wiring harnesses and Palm™ interface tools.

The transmitter is equipped with pushbutton switches for various functions. It includes 2 AA internal batteries. Pressing the POWER pushbutton will turn on the transmitter. To turn the transmitter off press and hold until the red and green lights go off.

The system's radio receiver has ON/OFF outputs and one current-regulated output to accommodate the functions available on the transmitter. All outputs are current-sourcing.

TRANSMITTER AND RECEIVER SYNCHRONIZATION

Each radio transmitter is preprogrammed with a unique radio ID code. Each receiver is programmed to respond only to the radio transmitter with the ID code for which it is set. This feature allows multiple systems to work in close proximity to one another without interference. In the event that a transmitter becomes damaged and a new one is needed, the receiver can be reprogrammed to respond to the new radio transmitter. To teach the ID code to the receiver, use the following procedure:

1. Turn the transmitter and receiver off
2. Press and hold the POWER button for more than 10 seconds. LEDs should toggle at this point
3. Apply power to the receiver. Green LED stays on when teaching is in progress and it turns off when teaching is complete
4. Teach complete

CLONING TRANSMITTERS

In case a back up transmitter is needed, a second transmitter can be cloned to operate the receiver. To clone a second transmitter, use the following procedure.

Please note that at no time should both transmitters used to operate the unit simultaneously.

1. Check to make sure batteries are good in both transmitters.
2. Turn receiver, and both transmitters off.
3. On the teacher unit, press and hold GATE 1 OPEN, GATE 1 CLOSE simultaneously and then press and hold POWER button. After couple of seconds release all switches. LED's will start blinking.
4. On the backup transmitter, press and hold GATE 2 OPEN, GATE 2 CLOSE and hold the POWER button.
5. When cloning is complete the LED's on the cloned transmitter will stop blinking.
6. Turn off the teacher transmitter to exit cloning mode
7. Clone process complete

INDICATOR LEDs

The transmitter has two indicators, the red BATTERY indicator and the green TRANSMIT indicator. The green TRANSMIT indicator flashes rapidly whenever there is communication between the transmitter and the receiver. The red BATTERY indicator starts blinking once every second when the battery voltage is low and the batteries require replacement or charging

(inductive charging models only – see manual B20151AJ).

The receiver module can identify problems with the system in the form of an error code. Check the red indicator or display window on the receiver to diagnose system problems. Then, refer to the ERROR CODE CHART in this manual for explanation of the error codes. The green LED indicator will blink on the receiver during normal operation.

OUTPUTS

Each of the outputs from the receiver module is designed with built-in short circuit and overload protection. The outputs can also detect a no-load or broken wire condition.

These error conditions are evident by the red LED indicator or alphanumeric display on the receiver module *or* the HISTOGRAM page on the optional Palm Pilot™.

The ON/OFF outputs will indicate an error under no load or broken wire status if NOT activated, and will detect a short IF activated. The proportional output will detect a no-load or short condition WHEN activated.

INSTALLATION

Refer to the WIRING CHART in this manual for hookup of the harness.

To install the receiver module, use the two mounting holes provided on the enclosure.

Please take extra caution not to damage internal components while installing. For high vibration applications, use shock absorbing mounts. It is advised to mount the receiver as high as possible with no metal obstructions in the vicinity of the antenna which might affect RF performance. Antenna extension cables are available from Kar-Tech to aid in this, if needed.

The main power to the receiver should be connected through a switched, fused line capable of 20A. For best results, connect the receiver main power connections to the auxiliary terminal of the ignition switch, PTO switch, or ignition relay.

All connections must be properly insulated to protect against shorts.

Seal all connections with a non-conductive silicone grease to prevent corrosion.

BEFORE APPLYING POWER!

- Check power and ground for proper polarity.
- Check the wiring harness for possible shorts before connecting to output devices (i.e. valves and relays) by checking each mating pin terminal.
- Verify that the transmitter battery is fully charged. If the unit runs on disposable batteries, make sure they are fresh.
- Read the rest of this manual

USING THE OPTIONAL PALM™ INTERFACE

The Patented Palm Pilot™ interface, US patent No. 6,907,302, software is a very useful tool for troubleshooting the control system.

To use this tool, connect the Palm™ serial cable to the serial connector on the receiver control harness or adaptor, and apply power to the system.

Main Page

Use the Palm's stylus pen and tap the icon `Norwood 1.1` to launch the application.

DIAGNOSTIC

Tap the `Diagnostic` button to see the diagnostic screens, which shows the present state of remote communications, and system I/O.

RF Communications Page

When the round circle next to a label is dark, the corresponding ON/OFF input or output is sensed to be active or ON.

Digital Inputs Page

Tap the `Next Page` button to switch between pages of inputs. Tap the button labeled `Outputs` to view output screens.

ON/OFF Outputs Page

Histogram Page

HISTOGRAM

Tap the `Histogram` icon to see a set of screens that show which error codes are active and how many times the specific error code has been active.

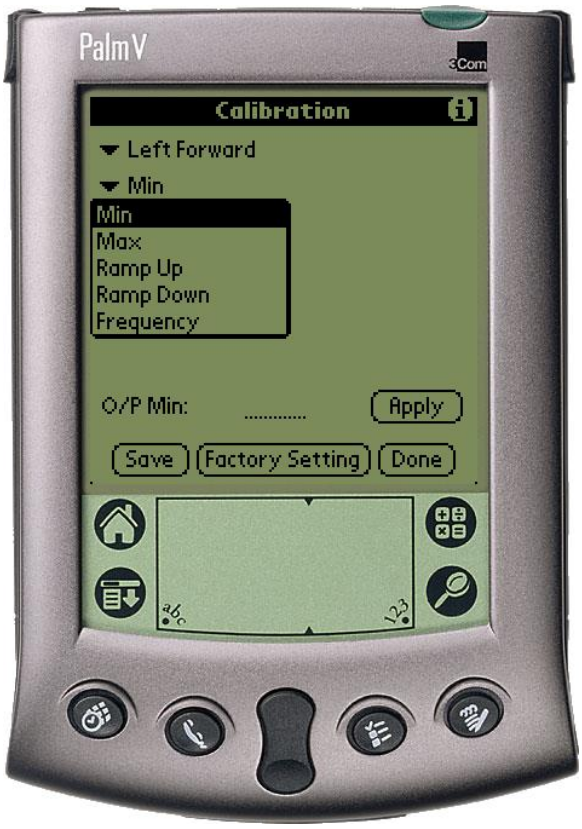
This feature can be used to troubleshoot machine wiring and other problems. Tapping the `Reset` button resets the error code counts. The password to reset error codes is 1262. Tapping `Next` and `Back` allows access to all the histogram pages. Tap the `Done` button to return to the main menu.

FILE TRANSFER

Tap the `File Transfer` button to send new program files from the Palm to the receiver. New programs are uploaded to the Palm via the Palm™ desktop as a *.pdb file using HotSync™.

File Transfer Page

This is only used for software updates to the receiver. Tap the 'i' icon for more information on this procedure.



Calibration parameters menu

Tap the `Factory Setting` button to return all outputs to standard values. Tap `Save` to send these settings to memory. Tap `Done` and `Exit` to quit configuration and return to the main menu.

WIRING

NO	COLOR	FUNCTION
1	RED	POWER
2	BLACK	GROUND
3	BLUE	TANK GATE 1 OPEN
4	ORANGE	TANK GATE 1 CLOSE
5	YELLOW	TANK GATE 2 OPEN
6	BROWN	TANK GATE 2 CLOSE
7	RED/BLACK	TANK GATE 3 OPEN
8	BLUE/BLACK	TANK GATE 3 CLOSE
9	ORANGE/BLACK	TANK GATE 4 OPEN
10	YELLOW/BLACK	TANK GATE 4 CLOSE
11	BROWN/BLACK	CONVEYOR LIFT
12	BLACK/RED	CONVEYOR LOWER
13	BLUE/RED	CONVEYOR SWING CW
14	ORANGE/RED	CONVEYOR SWING CCW
15	YELLOW/RED	CONVEYOR ON
16	BROWN/RED	ENGINE THROTTLE UP
17	BLACK/BLUE	ENGINE THROTTLE DOWN
18	RED/BLUE	ENGINE START
19	ORANGE/BLUE	ENGINE STOP

CABLE TWO

NO	COLOR	FUNCTION
1	BLACK	TANK GATE 5 OPEN
2	RED	TANK GATE 5 CLOSE
3	WHITE	AUX OPEN
4	GREEN	AUX CLOSE

ROUTINE MAINTENANCE

Clean transmitter regularly with a damp cloth and mild detergent.

Inspect electrical wiring for wear points or other damage. Repair as required.

Inspect all connections for looseness or corrosion. Tighten and/or "seal" as necessary.

MAINTENANCE PRECAUTIONS

When performing any inspection or maintenance work on the remote system, always exercise care to prevent injury to yourself and others or damage to the equipment. The following are general precautions, which should be closely followed in carrying out any maintenance work.

Do not have hydraulic power available to the valves when performing electrical tests.

Never operate or test any function if any person is in an area where they could be hurt by being hit or squeezed by the hydraulic equipment.

Turn power off before connecting or disconnecting valve coils or other electrical loads.

TROUBLESHOOTING

This next section provides basic operator level troubleshooting for the MEGA REMOTE system. If, after following these instructions, the system still does not function, contact your KAR-

TECH representative for further instructions or servicing.

TROUBLESHOOTING CHART

PROBLEM	SOLUTION
1. No functions work	1. Check that transmitter power is on 2. Check that receiver power is on 3. Check system wiring for power into the system 4. Check LED status display for system status 5. Check for proper grounding of system's electrical circuit 6. Check system's hydraulic system
2. Certain functions do not work	1. Check the wiring connection from the system to the valve coil for the output function that does not work 2. Check LED status display for possible fault or error indication 3. Check system's hydraulic system 4. Check system's electrical system
3. Functions operate intermittently	1. Loose connector at the valve coil 2. Check LED status display for system status 3. Check receiver antenna for any damage and proper connection 4. Check system's hydraulic system

ERROR CODES

EC	POSSIBLE CAUSE	EC	POSSIBLE CAUSE
1	NO COMMUNICATION	14	CONVEYOR SWING CW
2	WRONG RF ID	15	CONVEYOR SWING CCW
3	LOW TRUCK BATTERY	16	CONVEYOR ON
4	GATE 1 OPEN	17	ENGINE THROTTLE UP
5	GATE 1 CLOSE	18	ENGINE THROTTLE DOWN
6	GATE 2 OPEN	19	ENGINE START
7	GATE 2 CLOSE	20	ENGINE STOP
8	GATE 3 OPEN	21	GATE 5 OPEN
9	GATE 3 CLOSE	22	GATE 5 CLOSE
10	GATE 4 OPEN	23	AUX 1 OUTPUT
11	GATE 4 CLOSE	24	AUX 2 OUTPUT
12	CONVEYOR LIFT	25	NOT IN NEUTRAL MODE
13	CONVEYOR LOWER		

Error code explanations:

1 Transmitter is off
Transmitter went to sleep mode
Interference in RF communication link

2 Transmitter and receiver are not synchronized

3 Truck Battery is below 10.5 volts

4-24 Short or open load/coil on output

25 Transmitter did not start in neutral mode

NOTE: Error codes 21-24 are disabled

PARTS LIST

PART NUMBER	DESCRIPTION
3A2482B	RADIO TRANSMITTER
3A2483C	RADIO RECEIVER
3A2489A	RADIO TRANSMITTER

There are no user-serviceable parts inside the transmitter or the receiver. Return the units for service.

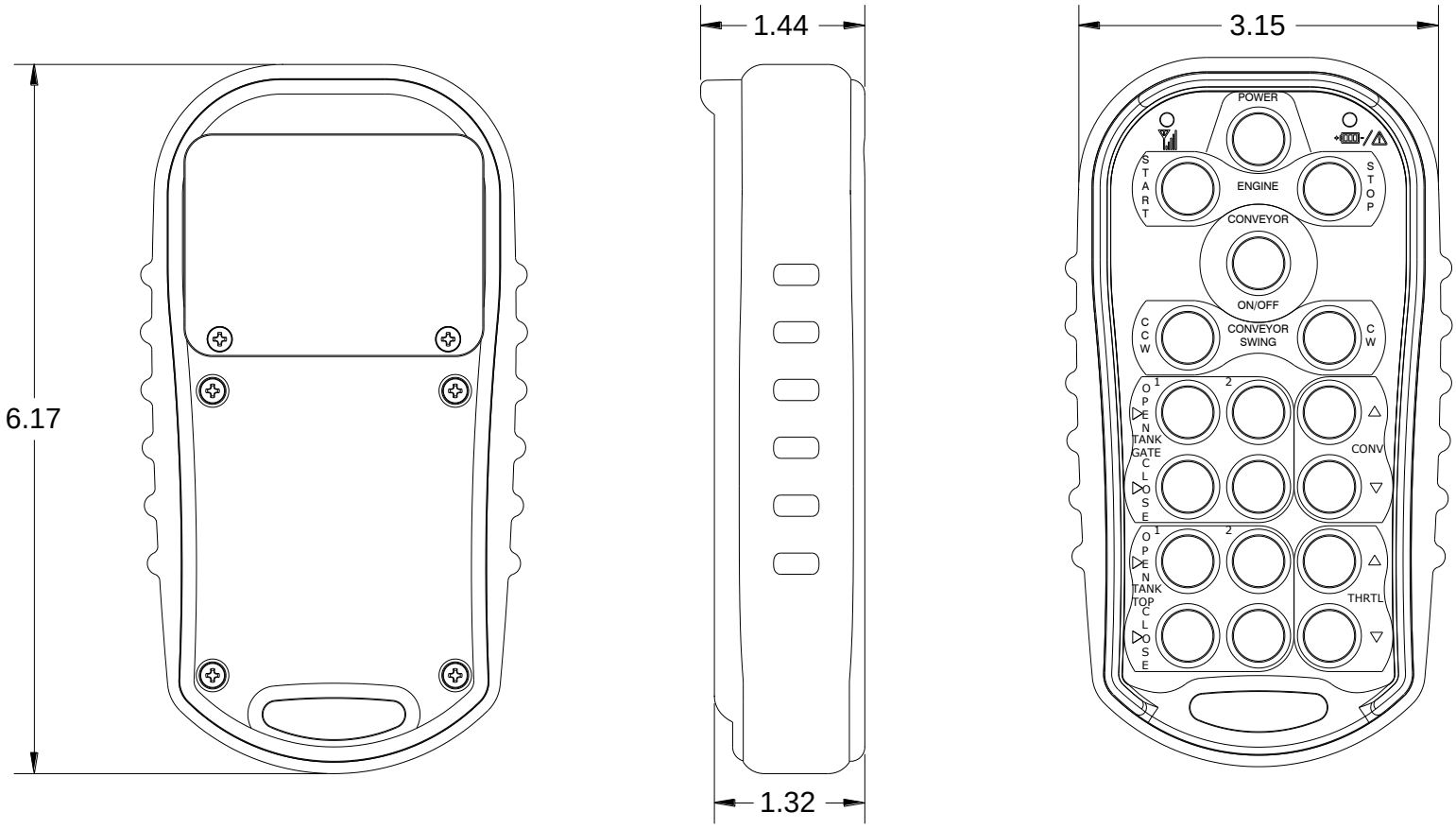
Note: For operation with negative ground systems only.

WARNING:

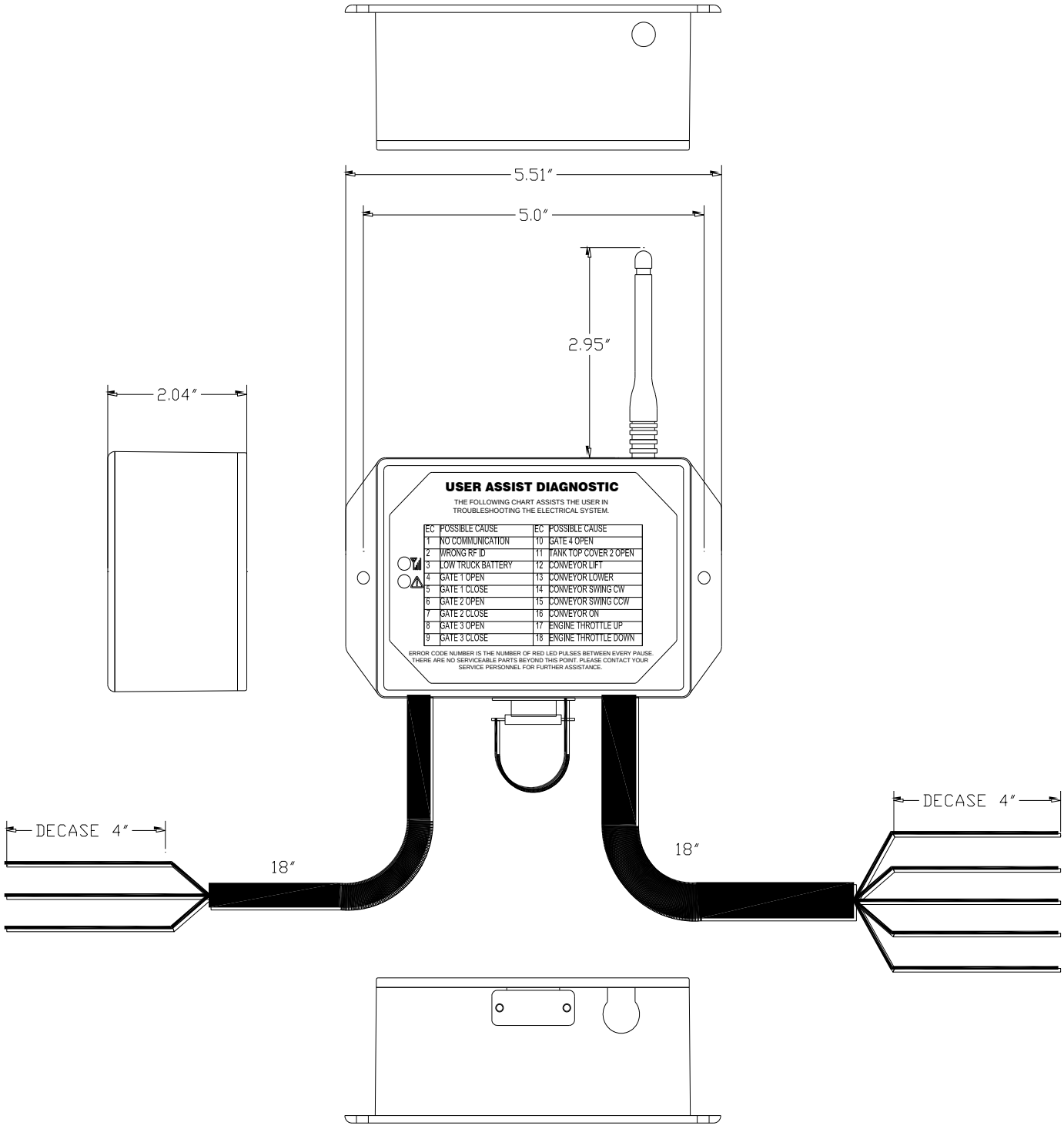
The MEGA REMOTE must be operated in compliance with all applicable safety regulations, rules, and practices. Failure to follow required safety practices may result in death or serious injury.

The information, specifications, and illustrations in this manual are those in effect at the time of printing. We reserve the right to change specifications or design at any time without notice.

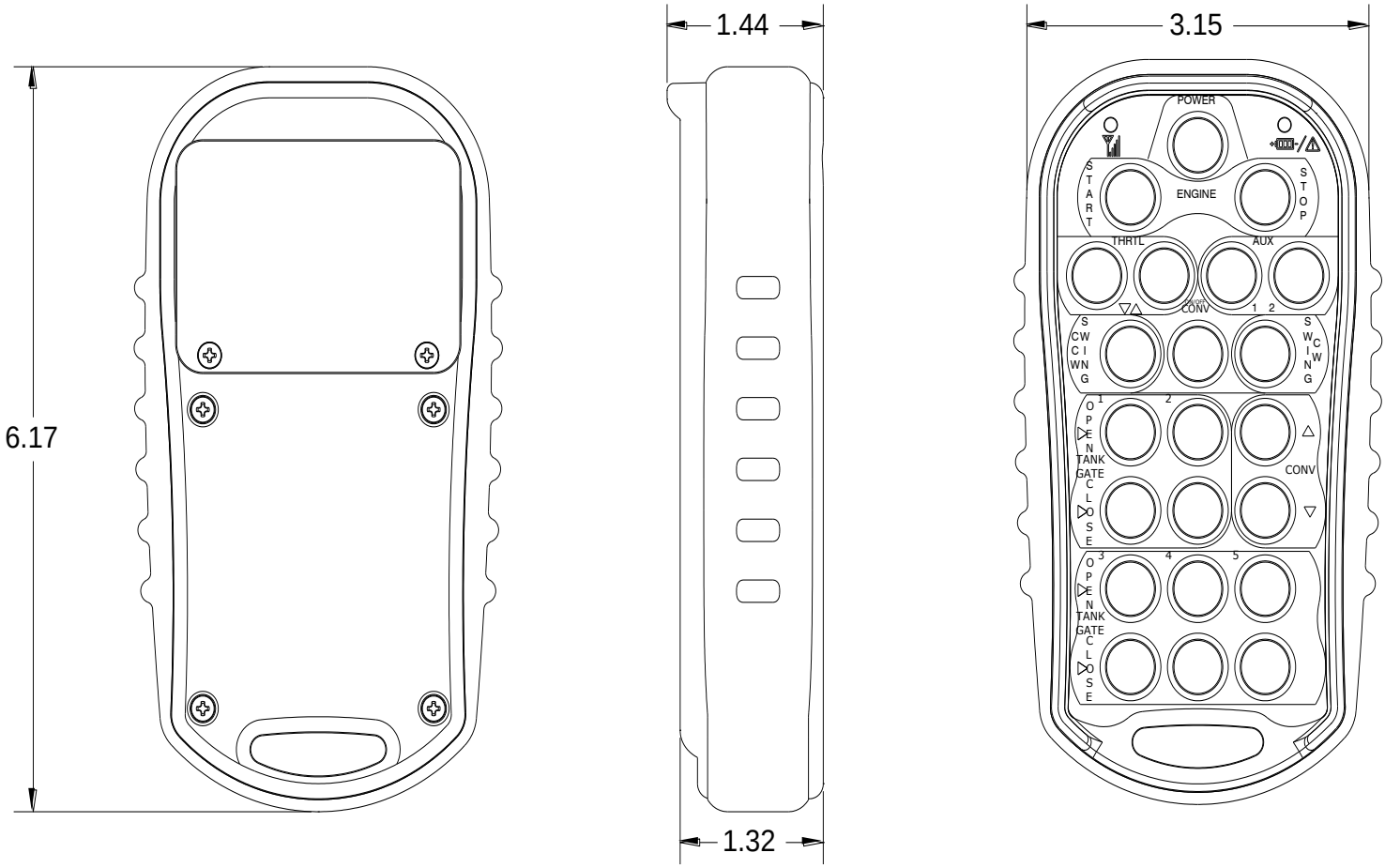
TRANSMITTER PICTORIAL
3A2482B



RECEIVER PICTORIAL



TRANSMITTER PICTORIAL
3A2489A



SPECIFICATIONS

FCC ID: P4U-VRTS
Industry Canada Certification Number: 4534A-VRTS
EQUIPMENT CLASS: PART 15 SPREAD SPECTRUM TRANSMITTER

TRANSMITTER

Power supply ..... 2xAA alkaline battery
Operating temperature - Radio ..... -40˚C to +85˚C
Storage temperature ..... -40˚C to +100˚C
RF Frequency ..... 902-928 MHz
RF Transmit power (EIRP) ..... 33 mW
Vibration ..... 3G to 200Hz
Shock 50G
NEMA IP-65/NEMA 4

RECEIVER

Power supply voltage..... 9-30VDC
Operating temperature ..... -40˚C to +85˚C
Storage temperature ..... -40˚C to +100˚C
Outputs ..... 5.0A max each, sourcing
RF Frequency ..... 902-928 MHz
RF Transmit power (EIRP) ..... 33 mW
Vibration ..... 3G to 200Hz
Shock 100G
NEMA IP-65/NEMA 4

INSTRUCTION TO THE USER

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 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.

* Consult the dealer or an experienced radio/TV technician for help.

* The machine operator must follow OSHA and other applicable standards when operating the equipment. Do not use high power radio devices in close proximity of this product.

This equipment has been certified to comply with the limits for a class B computing device, pursuant to FCC Rules. In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this

equipment.