

ERGO VERSA REMOTE™

WIRELESS REMOTE CONTROL SYSTEM

OPERATIONS AND INSTALLATION MANUAL

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DESCRIPTION:

VERSA REMOTE is a state of the art microprocessor based Radio Frequency (RF) remote control system designed to provide the machine operator with the ability to remotely operate equipment. The machine operator is still required to follow OSHA and other applicable standards when operating the equipment.

This system is designed with Frequency Hopping Spread Spectrum (FHSS) technology, two-way communication technology and Digital Phase Lock Loop technology to eliminate the RF interference problems in radio remote products.

The remote control system consists of two major modules, the ergonomically designed "Ergo" hand-held transmitter and the radio control receiver.

Three different models of remote control systems are available. They include a 5 function, a 7 function, and a 9 function system. Therefore the transmitter is available in a two toggle switch (five function), a three toggle switch (7 function), and a four toggle switch (9 function) model. See the parts list in this manual

for the part number of all the available remote control models.

All three models function in relatively the same way, they just include more functions and outputs. All three models include a red push-button power switch and a red "twist-to-release" E-STOP switch. The two-switch model includes toggle switches for ENGINE INCREASE/DECREASE and MATERIAL START/STOP. The three-switch model adds a switch and two outputs for MATERIAL INCREASE/DECREASE. The four-switch model adds yet one more switch and two outputs for SEED HOPPER ON/OFF. All functions are momentary in this remote control system with the exception of the E-STOP operation. Pressing the E-STOP switch will turn off any operating function and turn on the E-STOP output. This output will stay on until power to the receiver is turned off and then back on.

Pressing and holding the red power switch to turn on the power and then operating any switch will activate the remote transmitter.

The receiver is designed with 5, 7, or 9 solid state on/off outputs (depending on which model

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system was purchased), red error code LED for diagnostics and green communication LED. Turning on the receiver power and operating the transmitter operates the remote control system.

Each transmitter is pre-programmed with a special radio ID code. The receiver is programmed to respond only to the transmitter with the ID code for which it is set. This feature allows the equipment to work in wireless mode in close vicinity of each other without interfering with each other. In the event that a transmitter becomes damaged and a new one is needed, the receiver can be reprogrammed to respond to a new transmitter. Please refer to TRANSMITTER AND RECEIVER ID CODE PROGRAMING section of this manual for additional information.

The “Ergo” hand-held transmitter has two LED indicators, the **BATTERY/ERROR** and the **TRANSMIT** indicators. The green TRANSMIT indicator flashes whenever the pendant is transmitting information to the receiver. The green TRANSMIT light blinks when the transmitter is transmitting to the receiver.

The red BATTERY/ERROR indicator has several functions to

it. It acts as an error code LED similar to the red LED on the radio receiver. This LED will flash the current active receiver error code, if any, and only when the receiver power is on. If the BATTERY/ERROR LED blinks when there is no error code on the receiver, this is a sign of low battery. Turn off the receiver and check the transmitter LED. It will start blinking every 30 seconds if the transmitter battery voltage drops to 6 volts. Blinking speed increases while the voltage is decreases from 6 to 4.9 volts.

The red BATTERY/ERROR indicator also flashes when a button is pressed while the transmitter power is off. This is to tell the operator that the transmitter power is off and the receiver will not respond to it.

The transmitter power switch turns the power to the transmitter on and off. When the transmitter power is off, pressing and holding the power switch until both red and green lights glow will turn on the transmitter power. When the power is on, the operator must press and hold the power switch for 3 seconds to turn off the transmitter power. This is to prevent accidental transmitter power turn-off.

A 9 Volt alkaline battery powers

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the transmitter. Both frequency and duration of use determine the operation time of the battery. Minimal power is being used any time the transmitter is on. Nominal power is being used any time any of the transmitter switches are activated. To prolong the battery life and efficiency, the pendant should be turned off whenever it is not used

To save battery life, the transmitter is designed with an auto shut down feature. This feature turns the transmitter off after 10 minutes when none of the switches are activated.

OUTPUTS:

The receiver is designed with 5, 7, or 9 on/off outputs (depending on which model system was purchased) that supply battery voltage when a transmitter switch is activated. Each output is designed with built-in short circuit and overload protection. The on/off outputs are also designed with no load or broken wire status and individual LED status indicator. These output statuses are reported to the machine operator via the red

error code LED in the receiver or the red BATTERY/ERROR LED on the transmitter. Refer to error code chart for a list of error codes. The output status in conjunction with individual output LEDs determines the condition of fault. If an individual output LED is dimly on while function is not activated, there is a “no load” condition. If an individual output led is off while function is activated, there is an overload condition or the output is shorted to ground.

RECEIVER LEDES:

Each receiver is designed with 2 LED's displaying status. They are visible from the outside of the receiver. The green data reception LED will flash when the receiver is in contact with the correct transmitter pendant by radio and there is good data received from a transmitter. The red error code LED blinks when there is a problem with the system. Refer to the error code chart for additional information.

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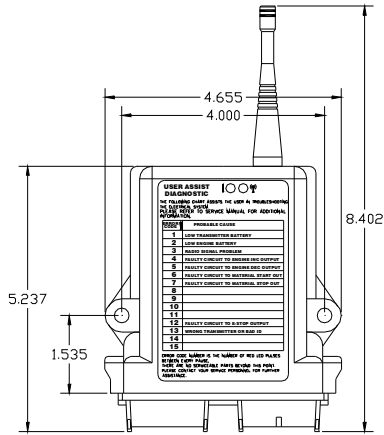


FIGURE 1: 5 OUTPUT RECEIVER

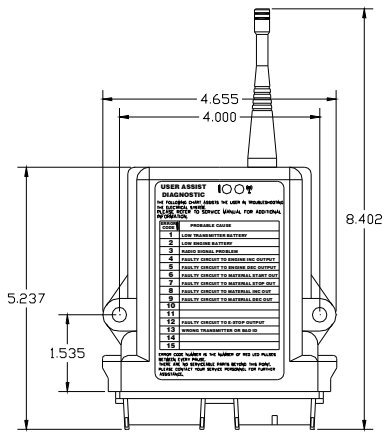


FIGURE 2: 7 OUTPUT RECEIVER

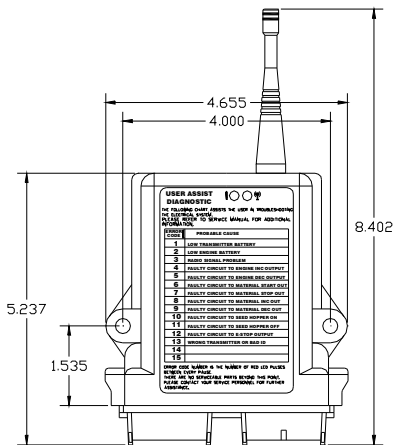


FIGURE 3: 9 OUTPUT RECEIVER

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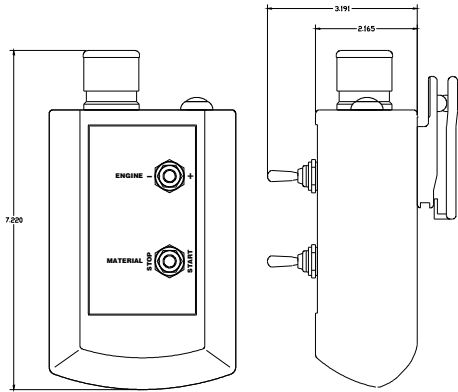


FIGURE 4: 5 FUNCTION TRANSMITTER

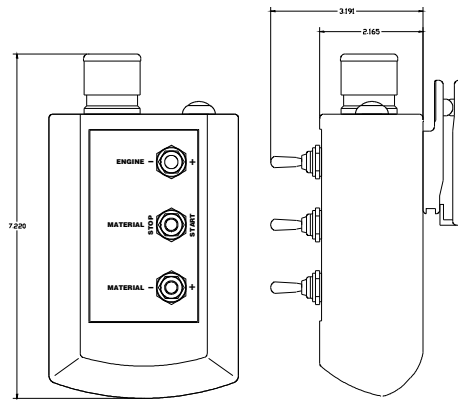


FIGURE 5: 7 FUNCTION TRANSMITTER

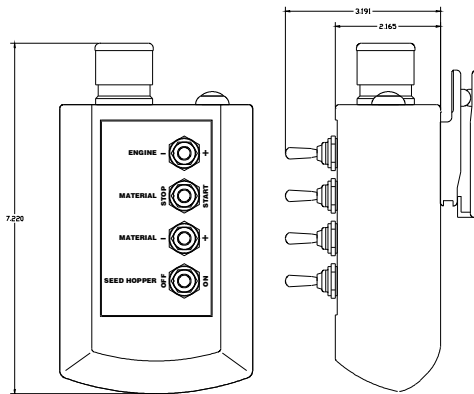


FIGURE 6: 9 FUNCTION TRANSMITTER

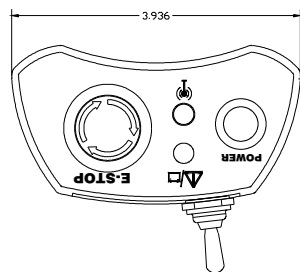


FIGURE 7: TRANSMITTER TOP

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INSTALLATION:

1. Refer to the wiring chart in this manual for wiring connections.
2. The receiver should be mounted on shock absorbing mounts. The receiver is best mounted in a protected location.
3. When installing the unit, the main power should run from the battery, through a 20 amps fast blow fuse, to a power switch or relay; then into the receiver unit. For best results connect receiver main power connections to the auxiliary terminal of the ignition switch, PTO switch, or ignition relay. Use 18 gauge or heavier wire.
4. All connections must be properly insulated to protect against shorts.
5. Seal all connections with a non-conductive silicone grease to prevent against corrosion.

BEFORE APPLYING POWER:

1. Check power and ground polarity.
2. Check wiring harness for possible shorts before connecting remote control to output devices (i.e., valves, and relays) by checking each mating pin terminal.
3. Check transmitter battery for proper operation or any leakage from the battery. Always remove battery if the transmitter is to be stored for a long period of time.
4. Read the rest of this manual.

TRANSMITTER AND RECEIVER ID CODE PROGRAMMING:

The receiver is programmed to respond only to the transmitter with the ID code for which it is set. This feature allows the equipment to work in wireless mode in close vicinity of each other without interfering with one another. In the event that a transmitter becomes damaged and a new one is needed, the receiver can be reprogrammed to respond to a new transmitter ID. A receiver ID code reset is done by executing the following procedure:

- 1.) Shut down machine and turn the receiver power off.
- 2.) With the transmitter power off, press in the transmitter E-STOP button. Then operate and hold the ENGINE DECREASE and MATERIAL START switches. Turn the transmitter power back on while holding the switches for about 1 second, then release the switches. The transmitter LEDs should begin to toggle back and forth when toggle switches are released. Then twist and release the transmitter E-STOP button.
- 3.) Turn on receiver power.
- 4.) When receiver turns on, the LEDs on the

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transmitter should stop toggling and stay on solid for a couple of seconds. When the LEDs on the transmitter turn off, and the green LED starts to flicker, then the transmitter is synchronized with the receiver.

PALM DIAGNOSTICS:

All of the inputs and outputs of the system, as well as the error codes, can be seen in real time through use of an optional Palm Pilot™, loaded with the patented Kar-Tech Palm Pilot™ application, connected to the receiver. The Palm Pilot™ is a useful tool for troubleshooting the system if there is a problem, or changing logic through a field program download (file transfer). On the patented Palm Pilot™ application, there are four buttons.

The EXIT button will take the user back to the Palm Pilot™ home screen.

The DIAGNOSTIC button takes the user to a set of diagnostic screens. These screens show the current state of the inputs and outputs of the system. This can be a useful tool when trying to setup or troubleshoot the equipment. When the round button is dark, the corresponding input or output

is sensed to be active. These screens also show the currently read values for the radio frequency signal quality, strength and power setting. The machine battery voltage is also shown on this page. Press the button labeled INPUT or OUTPUT to switch between input and output screens. Press DONE to go to the main menu. Press the 'i' icon on Palm Pilot for more information.

HISTOGRAM:

The HISTOGRAM button on the main menu will take the user to 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 problem areas. Press the RESET button to reset the error code counts next to each error code display line.

FILE TRANSFER:

The FILE TRANSFER button is used to receive new program files from PC and transfer the file to the receiver. This is only used for software updates to the receiver. Press the 'i' icon on Palm Pilot for more information.

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WIRING CHART

RECEIVER WIRING

CONNECTOR: DEUTSCH DTM13-12PA 12 PIN (GRAY)

| <u>PIN#</u> | <u>OPTIONAL HARNESS WIRE COLOR</u> | <u>INTERCONNECT TERM. STRIP PIN#</u> | <u>FUNCTION</u> |
|-------------|--|--|-------------------------------------|
| 1 | WHITE | TERMINAL RING | RECEIVER GROUND |
| 2 | | | N/C |
| 3 | | | N/C |
| 4 | | | N/C |
| 5 | | | N/C |
| 6 | | | N/C |
| 7 | | | N/C |
| 8 | | | N/C |
| 9 | | | N/C |
| 10 | | | N/C |
| 11 | | | N/C |
| 12 | RED | 1 | RECEIVER POWER (+12/+24VDC NOMINAL) |

CONNECTOR: DEUTSCH DTM13-12PB 12 PIN (BLACK)

| <u>PIN#</u> | <u>OPTIONAL HARNESS WIRE COLOR</u> | <u>INTERCONNECT TERM. STRIP PIN#</u> | <u>FUNCTION</u> |
|-------------|--|--|--|
| 1 | WHITE | 3 | ENGINE INCREASE OUTPUT |
| 2 | BLACK | 4 | ENGINE DECREASE OUTPUT |
| 3 | ORANGE | 6 | MATERIAL START OUTPUT |
| 4 | YELLOW | 5 | MATERIAL STOP OUTPUT |
| 5 | BROWN | 2 | E-STOP OUTPUT |
| 6 | BLACK | 7 | MATERIAL INC. OUTPUT (7 and 9 function receivers only) |
| 7 | WHITE | 8 | MATERIAL DEC. OUTPUT (7 and 9 function receivers only) |
| 8 | BLACK | 9 | SEED HOPPER ON OUTPUT (9 function receivers only) |
| 9 | WHITE | 10 | SEED HOPPER OFF OUTPUT (9 function receivers only) |
| 10 | | | N/C |
| 11 | | | N/C |
| 12 | | | N/C |

VERSA REMOTE™**ROUTINE MAINTENANCE:**

1. Clean transmitter and receiver regularly with a damp cloth and mild detergent.
 2. Periodically check receiver antenna for tightness.
 3. Inspect electrical wiring for wear points or other damage. Repair as required.
 4. Inspect all connections for looseness or corrosion. Tighten and/or "seal" as necessary.
3. Turn power off before connecting or disconnecting valve coils or other electrical loads.

TROUBLESHOOTING:

This section provides basic operator level troubleshooting for the VERSA REMOTE system. If, after following these instructions, the system still does not function, check the hydraulic system then contact your KAR-TECH representative for further instructions or servicing.

MAINTENANCE PRECAUTIONS:

When performing any inspection or maintenance work on the VERSA 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.

1. Do not have hydraulic power available to the valves when performing electrical tests.
2. 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.

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TROUBLE SHOOTING CHART

| PROBLEM | SOLUTION |
|---|--|
| <p>1. No operation of all functions when a function switch is activated.</p> | <ol style="list-style-type: none"> 1. Check that transmitter power is on. 2. Check that receiver power is on. 3. Check vehicle wiring for power into the system. 4. Check LED status display for system status. 5. Check for proper grounding of vehicle's electrical circuit. 6. Check vehicle's hydraulic system |
| <p>2. Certain functions do not work</p> | <ol style="list-style-type: none"> 1. Check the wiring connection from the system to the valve coil or the output function that does not work. 2. Check LED status display for system status. 3. Check vehicle's hydraulic system 4. Check vehicle's electrical system |
| <p>3. Function operates intermittently.</p> | <ol style="list-style-type: none"> 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 vehicle's hydraulic system |

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ERROR CODE CHART

| | | |
|------|---|---|
| EC01 | - | Low transmitter battery. |
| EC02 | - | Low engine battery. |
| EC03 | - | Radio signal problem. |
| EC04 | - | Short or open connection at ENGINE INCREASE output. |
| EC05 | - | Short or open connection at ENGINE DECREASE output. |
| EC06 | - | Short or open connection at MATERIAL START output. |
| EC07 | - | Short or open connection at MATERIAL STOP output. |
| EC08 | - | Short or open connection at MATERIAL INCREASE output. |
| EC09 | - | Short or open connection at MATERIAL DECREASE output. |
| EC10 | - | Short or open connection at SEED HOPPER ON output. |
| EC11 | - | Short or open connection at SEED HOPPER OFF output. |
| EC12 | - | Short or open connection at E-STOP output. |
| EC13 | - | Signal received from transmitter with wrong ID code. |

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PARTS LIST

| PART NUMBER | DESCRIPTION |
|--------------|--|
| 3A0562A | 5 FUNCTION RADIO REMOTE TRANSMITTER |
| 3A0563A | 5 FUNCTION RADIO REMOTE RECEIVER |
| 3A0564A | 5 FUNCTION RADIO RECEIVER WIRING HARNESS |
| 3A0568A | 7 FUNCTION RADIO REMOTE TRANSMITTER |
| 3A0569A | 7 FUNCTION RADIO REMOTE RECEVIER |
| 3A056GA | 7 FUNCTION RADIO RECEIVER WIRING HARNESS |
| 3A056BA | 9 FUNCTION RADIO REMOTE TRANSMITTER |
| 3A056CA | 9 FUNCTION RADIO REMOTE RECEIVER |
| 3A056HA | 9 FUNCTION RADIO RECEIVER WIRING HARNESS |
| 003-010-0901 | ANTENNA, 900MHz QUARTER WAVE |

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

Note: For operation with negative ground vehicles only.

WARNING:

The KAR-TECH VERSA 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. KAR-TECH reserves the right to change specifications or design at any time without notice.

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SPECIFICATIONS

FCC ID: P4U-VRTS

Industry Canada Certification Number: 4534A-VRTS

EQUIPMENT CLASS: PART 15 SPREAD SPECTRUM TRANSMITTER

TRANSMITTER

| | |
|-------------------------------------|--------------------------|
| Power supply | 9 Volt Alkaline battery. |
| Operating temperature - Radio | -40° C to +85° C |
| Storage temperature..... | -40° C to +100° C |
| RF Frequency..... | 903-926.5 MHz |
| RF Transmit power (EIRP) | 33 mW |

RECEIVER

| | |
|-------------------------------------|----------------------------------|
| Power supply voltage | 12V nominal, 9V to 35V transient |
| Operating temperature - Radio | -40° C to +85° C |
| Storage temperature..... | -40° C to +100° C |
| On/Off outputs..... | 5.0 Amp. (Protected) |
| RF Frequency..... | 903-926.5 MHz |
| RF Transmit power (EIRP) | 33 mW |
| Vibration | 3G to 2000Hz |
| Shock | 100G |
| NEMA..... | 4X |

VERSA REMOTE™**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, 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.
- * Consult the dealer or an experienced radio/TV technician for help.

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.

The term "IC:" before the certification/registration number only signifies that the Industry Canada technical specifications were met.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.