

REMCO RATE CONTROLLER

Operational and Installation Guidelines



RRC PUMP CONTROLS:

15 AMP - RRC15-XX

35 AMP - RRC35-XX

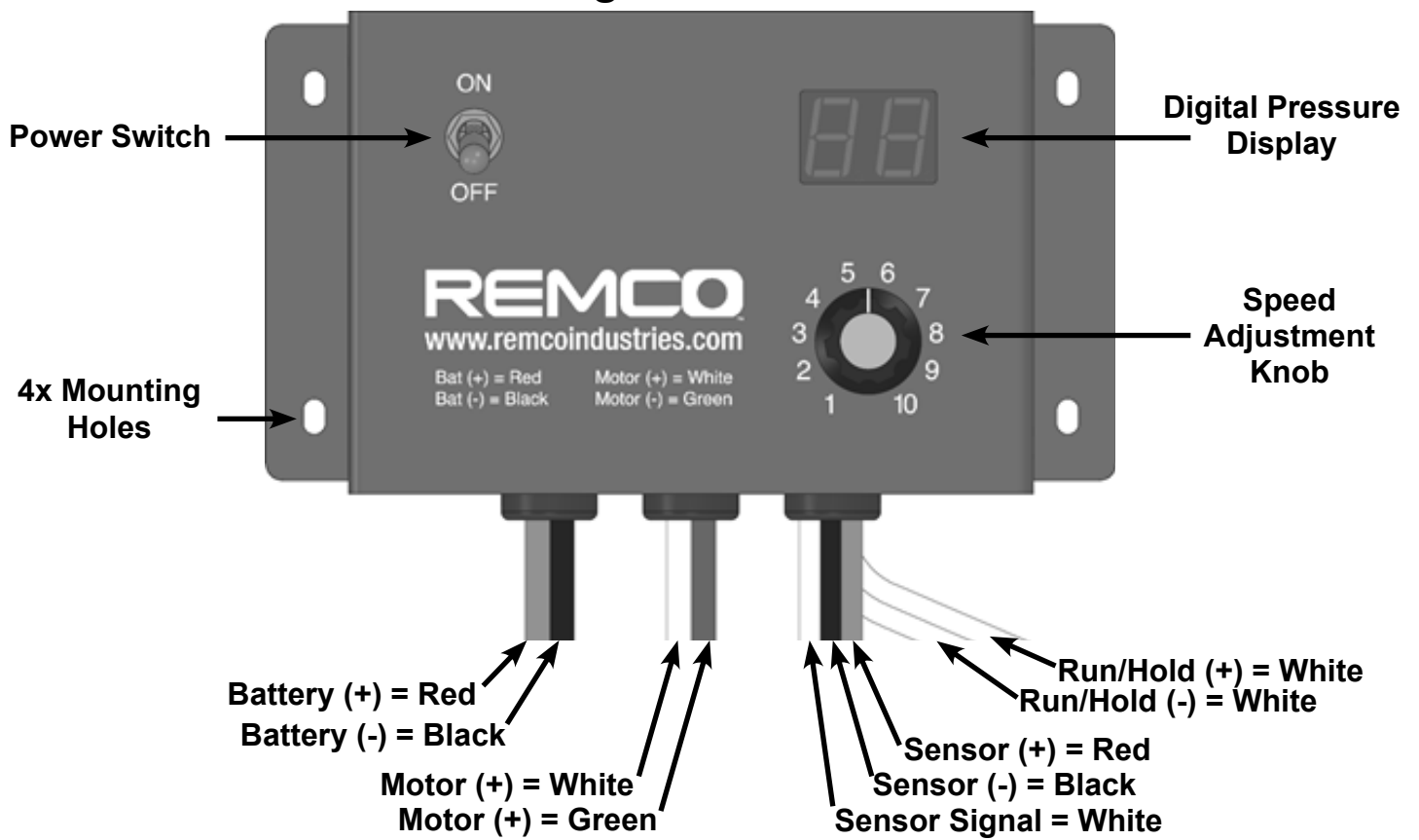
Notes

- DO NOT operate the controller without a fuse.
- DO NOT use a fuse with a current rating that is higher than the full load current specification of the controller. The controller is supplied with an inline fuse that matches the full load current specification.
- DO NOT use a battery charger to power the controller. The battery charger may become damaged and/or prevent the controller from functioning properly.
- Verify that the pump's maximum current draw is less than or equal to the controller's rated full load current. The maximum current draw specification is typically printed on the pump's label.
- DO NOT mount the unit near other devices that generate a large amount of heat or are sensitive to higher temperatures. Continuous operation at high load current will cause the aluminum case to get very warm. It is recommended to mount the unit horizontally and to provide adequate airflow around the unit.

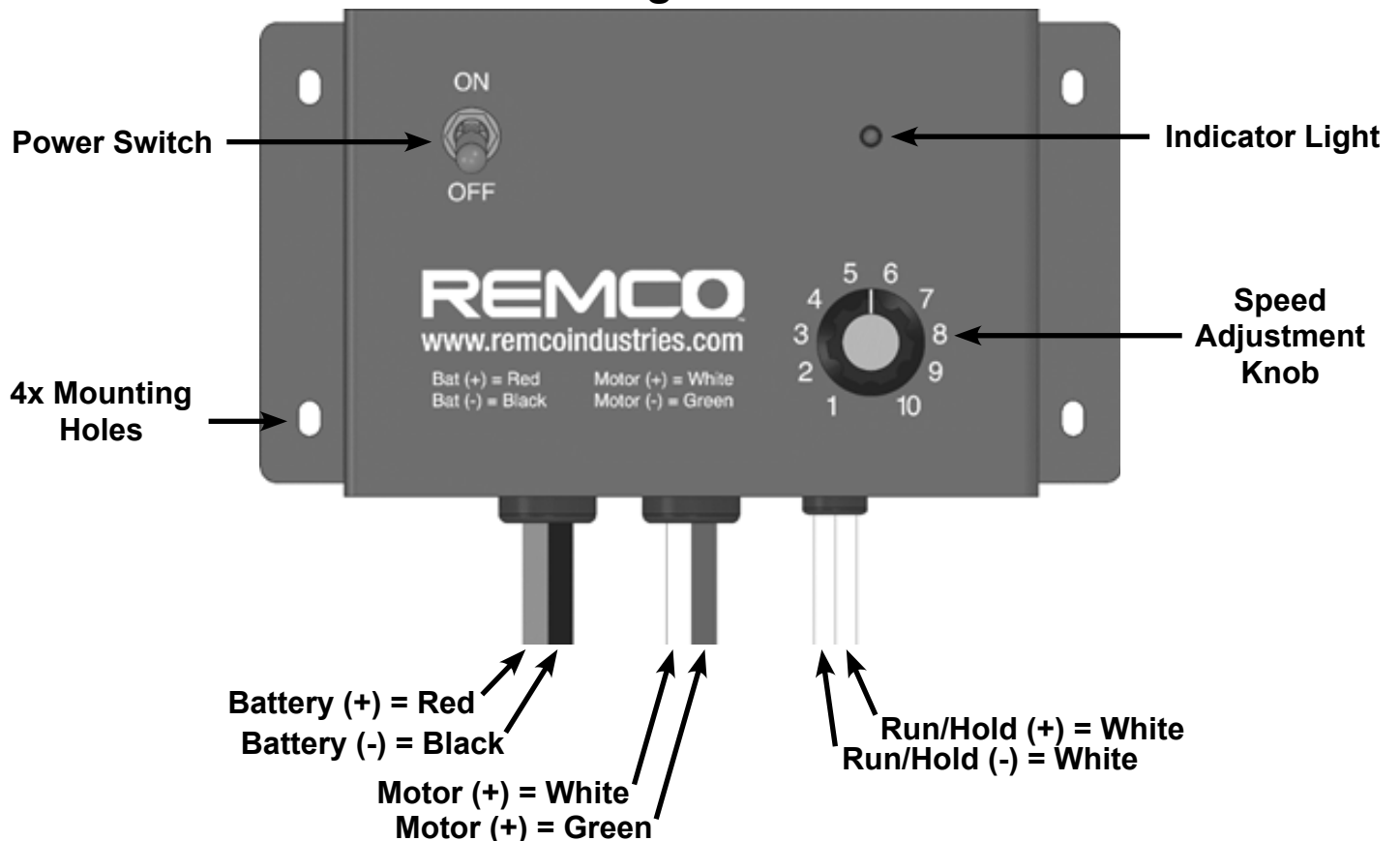
Installation and Operations

1. Mount the controller in a location where the power switch, speed adjustment knob, and indicator light or digital pressure display can be easily accessed or viewed from inside the cabin of the vehicle. Use four pan head screws to securely mount the controller on a flat surface using the four mounting holes on the case.
2. Connect the **Black (-)** wire to negative battery and the **Red (+)** wire to positive battery. For the full load current with wire lengths up to 20 feet use a minimum of 14 AWG (12 AWG recommended) wire for the 15 Amp model and a minimum of 10 AWG for the 35 Amp model. If the power wires are connected backwards the reverse polarity protection will cause the inline fuse to blow.
3. Connect the **White (+)** controller wire to the Remco pump **Red (+)** wire and the **Green (-)** controller wire to the Remco pump **Black (-)** wire. For the full load current with wire lengths up to 20 feet, use a minimum of 14 AWG (12 AWG recommended) wire for the 15 Amp model and a minimum of 10 AWG wire for the 35 Amp model. DO NOT connect the **Green (-)** controller wire to negative battery! It must only be connected to the pump negative wire.
4. The Run/Hold feature allows a connected implement switch to enable or disable the pump when the implement is raised or lowered. When the implement switch is closed the controller motor output is enabled. The indicator light on the Non-Digital models will be on. The pressure display on the Digital models will be on and showing the transducer pressure. When the implement switch is open the controller motor output is disabled. The indicator light on the Non-Digital models will be continuously flashing two times per second. The pressure display on the Digital models will be continuously flashing the transducer pressure two times per second.
 - a.) If using a Hall-effect sensor, disconnect the dummy plug and connect the Hall-effect sensor plug to the controller.
 - b.) If using a normally open whisker switch, cut the wire loop on the dummy plug and connect the whisker switch wires to the dummy plug wires. It is recommended to use 18-20 AWG wire for these low current signal wires. DO NOT connect either of these wires to negative battery! These wires must only be connected to an electrically isolated switch.
5. The Digital models feature a digital pressure display that shows the pressure in psi transmitted by a pressure transducer.
 - a.) Install the pressure transducer into a female ¼" NPT port on the output line of the pump.
 - b.) Connect the wiring harness plug to the pressure transducer.
 - c.) Route the wiring harness to the controller and connect the wiring harness to the 3-pin connector.
 - d.) Connect the 3-pin connector to the controller pressure transducer connector.
6. Lift up on the actuator of the locking toggle power switch and move it to the on position to enable the controller. The indicator light will illuminate on the Non-Digital models, and the digital pressure display will illuminate and show the pressure in psi transmitted by the pressure transducer on the Digital models.
7. Turn the speed adjustment knob clockwise to increase the speed of the connected motor. The maximum clockwise setting of 10 results in the maximum motor speed. The minimum counter-clockwise setting of 1 results in the minimum motor speed.
8. If a fault condition occurs during startup or operation of the controller a fault code will be shown by flashing the indicator light a specific number of times on the Non-Digital models or by displaying numeric fault codes on the Digital models. If there are multiple active faults the controller will continuously cycle through the faults codes until the power switch is cycled off and back on.

Digital Model



Non-Digital Model



Troubleshooting Guidelines

Issue/Condition	Solution
<ul style="list-style-type: none"> Power switch is on but indicator light or display is not on 	<ul style="list-style-type: none"> Verify the inline fuse is installed in the inline fuse holder and is not blown. Replace with the appropriately rated fuse if necessary. Verify that the Battery (+) voltage is between 8-18VDC. Verify the wiring/connections between the controller and the battery: Red = Battery (+), Black = Battery (-).
<ul style="list-style-type: none"> Motor will not operate and the indicator light or display is continuously flashing 	<ul style="list-style-type: none"> Verify the Run/Hold connection. A closed switch should enable the motor output and turn the indicator light on or the display on. An open switch should disable the motor output and flash the indicator light or the display
<ul style="list-style-type: none"> Motor will not operate with lower speed adjustment settings 	<ul style="list-style-type: none"> Larger pump motors or pumps preloaded with a high pressure require a larger amount of current to start spinning. This is considered normal operation. Set the speed adjustment knob to a higher setting at startup and reduce the setting as necessary once the motor is operating.
<ul style="list-style-type: none"> Display does not show a changing value 	<ul style="list-style-type: none"> Verify that the pressure transducer port is free of debris. Verify that the Sensor (+) voltage is between 9-16V. If voltage is below 9V check Sensor (+) and Sensor (-) wiring for breaks in the copper conductor and repair/replace as necessary. Verify that the pressure transducer signal voltage varies proportionally from 0.5V at 0 psi to 4.5V at 100 psi. If the voltage does not vary proportionally to the output pressure, then replace the pressure transducer. Verify the wiring/connections between the controller and the pressure transducer: Red = Sensor (+), Black = Sensor (-), White = Sensor signal
<ul style="list-style-type: none"> Pressure transducer voltage out of range Digital Pressure display: E1 Non-Digital indicator light: 1 slow flash 	<ul style="list-style-type: none"> Verify that the Sensor (+) voltage is between 9-16V. If the voltage is below 9V check Sensor (+) and Sensor (-) wiring for breaks in the copper conductor and repair/replace as necessary. Verify that the pressure transducer signal voltage is above 0.36V at 0 psi and below 4.64V at 100 psi. Replace the pressure transducer if the signal voltages are out of range. Verify the wiring/connections between the controller and the pressure transducer: Red = Sensor (+), Black = Sensor (-), White = Sensor signal. Repair/replace the wiring/connections as necessary.
<ul style="list-style-type: none"> Pump motor short duration over current or short circuit Digital Pressure display: E2 Non-Digital indicator light: 2 slow flashes 	<ul style="list-style-type: none"> Verify that the motor connections are not shorted to Battery (+) or Battery (-). Repair/replace the wiring/connections as necessary. Verify that the motor is not starting up into a very high-pressure load. This condition can cause the motor to draw a high current pulse that triggers the short circuit fault.
<ul style="list-style-type: none"> Pump motor open circuit Digital Pressure display: E3 Non-Digital indicator light: 3 slow flashes 	<ul style="list-style-type: none"> Verify that the motor connections are not open circuit. Repair/replace the wiring/connections as necessary. Verify that the Motor (+) is not shorted to Battery (+). The pump motor will be running in this condition whether the controller is on or off. Remove the short circuit condition.
<ul style="list-style-type: none"> Battery voltage under 8V (shutdown) Digital Pressure display: E4 Non-Digital indicator light: 4 slow flashes 	<ul style="list-style-type: none"> Verify that the Battery (+) voltage is above 9VDC. Recharge or replace the battery if necessary. Verify the wiring/connections between the controller and the battery: Red = Battery (+), Black = Battery (-). Operating at high currents causes large voltage drops over even small amounts of resistance. Repair/replace the wiring/connection as necessary.
<ul style="list-style-type: none"> Battery voltage over 18V (shutdown) Digital Pressure display: E5 Non-Digital indicator light: 5 slow flashes 	<ul style="list-style-type: none"> Verify that the Battery (+) voltage is below 16VDC. Replace the battery if necessary. Verify that the pump motor is not allowed to freewheel when quickly reducing the speed adjustment. A free spinning motor can act as a generator and temporarily pump up the Battery (+) voltage and trigger the over voltage fault. Verify the wiring/connections between the controller and the battery: Red = Battery (+), Black = Battery (-). Operating at high currents causes large voltage drops over even small amounts of resistance. Repair/replace the wiring/connection as necessary

Troubleshooting Guidelines

Issue/Condition	Solution
<ul style="list-style-type: none"> • Pump motor current over 20A or 40A (shutdown) • Digital Pressure display: E6 • Non-Digital indicator light: 6 slow flashes 	<ul style="list-style-type: none"> • Verify that the motor connections are not shorted to Battery (+). Repair/replace the wiring/connections as necessary. • Verify that the motor is not starting up or continuously operating into a very high-pressure load. This condition can cause the motor to draw a continuous high current that triggers the over current fault.
<ul style="list-style-type: none"> • Internal temperature over 110C (motor output is disabled until internal temperature falls below 85C) • Digital Pressure display: E7 • Non-Digital indicator light: 7 slow flashes 	<ul style="list-style-type: none"> • The controller requires time to cool down before the motor output is re-enabled. • Verify that the controller is not near other devices generating large amounts of heat and that there is adequate airflow around the unit to allow the enclosure to dissipate heat. • When operating at continuous full load current the ambient temperature should be below 50C (122F) for 15A models and below 30C (86F) for 35A models to reduce the chance of triggering the thermal protection.
<ul style="list-style-type: none"> • Device type unknown • Digital Pressure display: E8 • Non-Digital indicator light: 8 slow flashes 	<ul style="list-style-type: none"> • The internal device type setting is invalid/corrupted. Contact the manufacturer for further support.
<ul style="list-style-type: none"> • Other error • Digital Pressure display: E9 • Non-Digital indicator light: 9 slow flashes 	<ul style="list-style-type: none"> • Contact the manufacturer for further support.
<ul style="list-style-type: none"> • Cycling the power switch off and back on does not clear the fault 	<ul style="list-style-type: none"> • Disconnect power from the controller and turn the power switch on to discharge the internal capacitance. Turn the power switch off and reconnect power to the controller. Turn the power switch on. • The fault condition is still active. Follow the suggestions for clearing the specific fault. • Contact the manufacturer for further support if the troubleshooting suggestions did not clear the fault

WARNING: USE OF THIS PRODUCT FOR ANY PURPOSES OTHER THAN ITS ORIGINAL INTENT, ABUSE OF THE PRODUCT, AND/OR MODIFICATION TO THE ORIGINAL PRODUCT IS STRICTLY PROHIBITED BY REMCO INDUSTRIES. REMCO INDUSTRIES RESERVES THE RIGHT TO DENY WARRANTY OR LIABILITY CLAIMS IN ANY/ALL SITUATIONS INVOLVING MISUSE, ABUSE OR MODIFICATION. FAILURE TO FOLLOW THIS NOTICE MAY RESULT IN SERIOUS INJURY AND/OR PROPERTY DAMAGE AND WILL VOID THE PRODUCT WARRANTY.

Warranty

REMCO warrants its products to be free from defects in material and workmanship on all products sold by REMCO for resale or for use in purchasers' own business or original equipment manufacturer. Under normal use, maintenance and service (rental use excluded) the following terms apply: For all REMCO products, the warranty will last for a period of one year from date of manufacture, or (1) year use with proof of purchase, not to exceed (2) years in any event. REMCO's obligation under this warranty shall be limited to replacing or repairing at REMCO's discretion, any such product or part which must be returned to REMCO's factory with a Return Material Authorization Number (RMA), transportation charges approved by REMCO or prepaid, and which upon examination, is found to REMCO's satisfaction to have been defective under the terms of this warranty. No credit will be allowed against future purchases for items returned as defective under the terms of REMCO's warranty. This warranty does not extend to any products, which have been altered or modified outside the REMCO factory, to any products that have not been properly maintained, nor does it apply to units that are returned in an unassembled condition. Furthermore, the warranty does not extend to pumps that are non-compliance with REMCO's Engineering Standards. This includes, but is not limited to, pumps ordered without an integral pressure control mechanism. The warranty guarantees that products will perform to REMCO's flow and pressure specifications throughout the life of the warranty. The warranty does not cover wear, appearance, misuse, abuse, misapplication or external water damage. If the returned product is found not to be

defective under the conditions of this warranty, a charge will be made for repair or replacement. Brush wear may be limited to 1000 hours or less.

This is a Limited Warranty. It covers the product only and the extent of the coverage is limited to the cost of the product. As the manufacturer has no control over shipping, handling and installation, the warranty cannot cover water damage, or any other damage, caused by a leak or other malfunction.

THIS WARRANTY IS IN LIEU OF ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING IMPLIED WARRANTIES OR WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE. NO PERSON IS AUTHORIZED TO GIVE ANY OTHER WARRANTY OR ASSUME OBLIGATION OR LIABILITY ON REMCO'S BEHALF. REMCO SHALL NOT BE LIABLE FOR ANY INDIRECT, INCIDENTAL, PUNITIVE OR CONSEQUENTIAL DAMAGES OF ANY KIND INCURRED BY THE REASON OF THE USE OR SALE OF ANY DEFECTIVE PRODUCT AND PART. THIS WARRANTY SHALL BE GOVERNED BY THE LAWS OF THE STATE OF MINNESOTA, WITH ANY DISPUTE OR CLAIM VENUED OR HEARD IN THE STATE OF MINNESOTA.



WARNING: this product can expose you to chemicals including "carbon black", which is known to the state of California to cause cancer. For more information go to www.P65Warnings.ca.gov