

## Module 6 Troubleshooting

Block #	Title	Text/Narration
6.2.1	<b>Troubleshooting Index</b>	You may observe a fault as you are conducting operations. Or, you may be alerted to a problem when a fault light on the MA panel or ECU Enclosure comes on when an alarm message is displayed at the RU enclosure. When a fault occurs, you should always consult the troubleshooting index to determine the proper action to take.

Block #	Title	Text/Narration
6.2.2		<p>The troubleshooting index arranges symptoms and faults in alphabetical order by system. Once your fault is found in the index, you will be provided with a Procedure or Recommended Action (RA) to take.</p> <p><b>NOTIFY MAINTENANCE</b></p> <p>If “Notify Maintenance” is listed, the fault will prevent operations from continuing. Notify your supervisor and/or maintenance immediately. When “Notify Maintenance” is required, leave the MIRCS in power on condition if possible. This will enable maintenance personnel to troubleshoot and correct problems more efficiently and result in bringing the MIRCS back into operation more rapidly. If power cannot be left on, operator personnel should record the condition or fault for later reference.</p> <p><b>Perform FAULT PROCEDURE XX.</b></p> <p>If a fault procedure is listed, proceed directly to the referenced work package to start the troubleshooting process. Within each work package there are several fault procedures that are laid out in numerical order. Should any one malfunction/symptom require more than one fault procedure to arrive at the most likely fault, a reference will be made within the starting procedure to lead you to subsequent procedures until successful fault isolation or disposition is achieved.</p>

Block #	Title	Text/Narration
6.2.3		<p>When a fault occurs, you should:</p> <ol style="list-style-type: none"><li>1) Make note of the condition, fault light, or alarm message.</li><li>2) Consult the troubleshooting index and find the fault title that best matches you problem.</li><li>3) Find the fault procedure or recommended action for the fault.</li><li>4) Go to the work package and fault procedure and perform the procedures.</li></ol>

Block #	Title	Text/Narration
6.2.4		<p>Each FAULT PROCEDURE consists of a step or series of steps to that will help you find, and in some cases, fix the problem. For each step, there are single or multiple actions that must be performed. Steps are numbered or lettered.</p> <p>After the action step, there is a question that is asked. This is listed as the <b>Condition/Indication</b>. For each <b>Condition/Indication</b>, there is a <b>Response</b> required that is normally answered <b>Yes</b> or <b>No</b>. The <b>Yes</b> or <b>No</b> response will then lead to another action. Possible actions are:</p> <ul style="list-style-type: none"><li>• Go to another troubleshooting step.</li><li>• Got to another fault procedure.</li><li>• Notify maintenance.</li><li>• Return to normal operation, or</li><li>• Perform a specific corrective action.</li></ul>

Block #	Title	Text/Narration
6.2.5	<b>General Troubleshooting Information – Circuit Breakers</b>	<p>There are times during troubleshooting that you may need to access the inside of the ECU electrical enclosure or water system junction box to check for a tripped circuit breaker or overload relay. Remember that information regarding the circuit breaker locations, functions, and ratings can be found inside the door of each enclosure <b>[Click to Review]</b>.</p> <p>If a circuit breaker is tripped, the lever will be pointing down. If the overload relay is tripped, the indicator will be visible.</p> <p>If you need to get inside an enclosure, remember to put that high voltage is present. The MIRCS must be shut-down and turned off at the ECU enclosure Main Disconnect Switch before you go inside the enclosure. Remember to put the RU into engine mode before removing electrical power so that the RSU stays cold.</p> <p>Also, remember to close and secure the doors on the enclosures after you are done. This will make it safe for others who follow you and will keep rain, dust, and sand out of the electrical circuits and components.</p>

Block #	Title	Text/Narration
6.2.6	<b>General Troubleshooting Information - RU Alarms</b>	<p>When an alarm occurs on the RU, a message or alarm code will be displayed. The alarm can be silenced and the message can be cleared in two ways.</p> <p>First if power is removed from the RU, the fault condition is corrected, and power is re-applied to the RU, the alarm and fault message should be cleared.</p> <p>Second, the operator can press the FUNCTION key until the ALARM CLR option is shown at the display. The operator then presses the UNIT DATA key to clear the alarm.</p> <p>If the alarm condition is still present and has not been corrected, the alarm will sound again and the message will reappear.</p>
6.2.7	<b>Troubleshooting Example #1: Electrical and Control</b>	<p>When an operator starts-up the MIRCS, the VENTILATION FAN switch should be turned on and air flow should be verified. The operator should notice that the fans are not on because they will not hear or feel air movement.</p> <p>While consulting the Troubleshooting Index, the operator will find a listing under the ECU FAULTS titled "VENTILATION FANS DO NOT TURN ON WHEN POWER IS APPLIED". The Troubleshooting Index provides the guidance to perform FAULT PROCEDURE 9 in work package WP 0015.</p>

Block #	Title	Text/Narration
6.2.8	<b>Troubleshooting Example #1: Electrical and Control</b>	<p>The operator should proceed to <b>FAULT PROCEDURE 9</b> and perform the outlined steps as follows:</p> <p>For STEP 1: The operator should check the switch position, observe that the switch is on, respond YES, then go to the next step.</p> <p>For STEP 2: The operator should check external power, observe that the generator is running and the main contactor is CLOSED, respond YES, then go to the next step.</p> <p>For STEP 3: The operator should check the Voltage and Frequency settings, observe that they are 208 volts and 60 Hz, respond YES, then go to the next step.</p> <p>For STEP 4: The operator should check the main disconnect position, observe that the switch is on, respond YES, then go to the next step.</p> <p>For STEP 5: The operator should put the RU in engine mode and shutdown the MIRCS, including positioning the main disconnect switch to off.</p>
6.2.9	<b>Troubleshooting Example #1: Electrical and Control</b>	<p>For STEP 6: The operator open the ECU enclosure door, find circuit breakers CB140 and CB170, observe that CB140 is not tripped but that CB170 is tripped, respond YES, then goes to the next step.</p> <p>For STEP 7: The operator should reset CB170, close and secure the enclosure door, position the main disconnect to on, position the ventilation fans switch to on, observe that the fans are running, respond YES, then return to normal operation.</p>

Block #	Title	Text/Narration
6.2.10	<b>Troubleshooting Example #2: RU Operation</b>	<p>While the RU is operating an RAS OUT alarm is displayed at the RU control. The operator should hear the alarm and view the displayed message, then clear the alarm.</p> <p>While consulting the Troubleshooting Index, the operator will find a listing under the RU FAULTS titled "RAS OUT". The Troubleshooting Index provides the guidance to perform FAULT PROCEDURE 35 in work package WP 0020.</p>
6.2.11	<b>Troubleshooting Example #2: RU Operation</b>	<p>The operator should proceed to <b>FAULT PROCEDURE 35</b> and perform the outlined steps as follows:</p> <p>For STEP 1: The operator should verify that all four RSU doors are closed and latched, observe that one door is opened, respond NO, close the door then go to the next step.</p> <p>For STEP 2: The operator should allow the RU to run, periodically observe RU operation and status of the control panel over ½ hour, observe that the RU is running normally and no additional alarms occur, respond YES, then return to normal operation.</p>
6.2.12	<b>Troubleshooting Example #3: Water System Operation</b>	<p>When an operator attempts to use sink water on trickles out of the faucet.</p> <p>While consulting the Troubleshooting Index the operator will find a listing under the WATER SYSTEM FAULTS titled "NO WATER FLOW TO SINK OR UTILITY HOSE". The Troubleshooting Index provides the guidance to perform FAULT PROCEDURE 38 in work package WP 0021.</p>

Block #	Title	Text/Narration
6.2.13	<b>Troubleshooting Example #3: Water System Operation</b>	<p>The operator should proceed to <b>FAULT PROCEDURE 38</b> and perform the outlined steps as follows:</p> <p>For STEP 1: The operator should push down on the foot switch, open the hot and cold levers on the sink faucet, observe that there is no water flow, respond NO, release the foot switch, close the faucet levers, then go to the next step.</p> <p>For STEP 2: The operator should press the UTILITY HOSE switch, open the lever on the hose faucet, attempt to spray water out of the hose, observe that there is no water flow, respond NO, release the spray nozzle, close the faucet lever, then go to the next step.</p> <p>For STEP 3: The operator should check the water supply at the water source, observe that it is full of water, respond NO, then go to the next step.</p> <p>For STEP 4: The operator should verify that the water hose is connected between the water source and water pump, observe that the hose is properly connected, respond YES, then go to the next step.</p>

Block #	Title	Text/Narration
6.2.14	<b>Troubleshooting Example #3: Water System Operation</b>	<p>For STEP 5: The operator should verify that the water hose is connected between the water pump and the MIRCS, observe that the hose is properly connected, respond YES, then go to the next step.</p> <p>For STEP 6: The operator should verify that the electrical cable is connected between the water pump and the MIRCS, observe that the cable is not properly connected at the pump, respond NO, then properly connect the electrical cable and return to normal operation.</p>