SECTION 1
GENERAL INFORMATION
 RF GENERATOR

1.1 Introduction
1.1.1 This manual contains information for the installation, operation, and maintenance of the Aurora series AX2500 RF Generator. This generator is designed for operation at 2, 13.56, 27.12, 40.68 or 60 MHz and at power levels from 100 to 2500 Watts.

1.2 Cautions and Safety
1.2.1 Follow all warnings and instructions marked on or supplied with the product.

Symbology:

HIGH VOLTAGE

CAUTION

RADIO FREQUENCY ENERGY HAZARD

PROTECTIVE GROUND

WARNING
THE CURRENTS AND VOLTAGES IN THIS EQUIPMENT IS DANGEROUS. PERSONNEL MUST OBSERVE SAFETY REGULATIONS AT ALL TIMES.
1.2.2 This manual is intended as a general guide for trained and qualified personnel who are aware of the dangers inherent in handling potentially dangerous electrical and electronic circuits. It is not intended to contain a complete statement of all safety precautions which should be observed by personnel in using this or other electronic equipment.

1.2.3 The installation, operation, maintenance, and service of this equipment involves risks both to personnel and equipment. It must be performed only by qualified personnel exercising due care. QEI Corporation shall not be responsible for injury or damage resulting from improper procedures or from the use of improperly trained or inexperienced personnel performing such tasks.

1.2.4 It is recommended that when installing, maintaining, or servicing this equipment there be two trained individuals present.

1.2.5 During installation and operation of this equipment, all applicable building codes and fire protection codes must be observed.

1.2.6 Do not remove, short-circuit, or tamper with interlock switches. Keep away from live circuits. Know your equipment and don’t take chances

1.2.7 These RF generators are water and air-cooled. DO NOT OPERATE THE RF GENERATOR WITHOUT ADEQUATE WATER AND AIR FLOW.

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**WARNING**

DAMAGE CAUSED TO THE GENERATOR BY INADEQUATE AIR FLOW OR WATER FLOW IS NOT COVERED BY WARRANTY. DO NOT RESTRICT THE EXHAUST IN ANY WAY. DO NOT VENT THE EXHAUST WHERE WIND, OR OTHER FORCES CAN CAUSE BACK PRESSURE.

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**WARNING**

EVEN THOUGH THIS SOLID STATE GENERATOR DOES NOT USE HIGH VOLTAGE, YOU CAN STILL BE SERIOUSLY INJURED OR KILLED BY THE 120 OR 220 VAC LINE. IN ADDITION, SINCE THE REGULATED LOW VOLTAGE SUPPLY IS CAPABLE OF SUPPLYING VERY HIGH CURRENT. ANY METALLIC OBJECT WHICH SHORTS THE SUPPLY WILL VAPORIZE OR HEAT TO VERY HIGH TEMPERATURES WHICH CAN CAUSE SERIOUS BURNS OR EYE DAMAGE. USE EXTREME CARE WHEN WORKING ON ANY HIGH POWER ELECTRICAL EQUIPMENT.
1.2.8 The generator utilizes high current in PA. When working on the generator be sure to remove all mains power. Never work on this equipment when alone or when fatigued.

1.2.9 It is recommended that communications (preferably a hardwire telephone) be near and operating when maintenance is being performed.

1.2.10 It is recommended that all personnel have basic first aid training including knowledge of cardiopulmonary resuscitation (CPR), first aid for electrocution, first aid for shock, etc.

1.2.12 Unplug or disconnect this equipment from the Radio Frequency and DC power sources before cleaning, re-configuring or performing maintenance operations.

1.2.13 Do not use this equipment near water, wet locations, or outdoors.

1.2.14 Do not place this equipment on an unstable cart, stand, or table. The Aurora Series RF Generator may fall, causing personal injury or damage to the RF Generator.

1.2.15 To avoid electric shock, this unit must be connected to the power source in compliance with the National Electrical Code ANSI C1 and/or any other codes applicable to the user. Improper installation may result in a shock or fire hazard.

1.2.16 It is the responsibility of the installer to provide a proper protective ground from the Aurora Series RF Generator to earth ground, in accordance with local and national electrical codes, and any other codes applicable to the user.

1.2.17 The Aurora Series RF Generator should be operated from the type of power source indicated by the ratings plate. If you are not sure of the type of power available, consult the system integrator, an electrician, or your local power company.

1.2.18 Do not allow anything to rest on the power cable, RF cables, or other interconnecting cables. Do not locate the Aurora Series RF Generator where persons will step on the power, RF, or interconnecting cables.

1.2.19 Be sure that the Aurora Series RF Generator is positioned so that it is not difficult to operate the circuit breaker on the rear panel.

1.2.20 Slots and Openings in the equipment’s chassis are provided for ventilation. To ensure reliable operation of the Aurora Series RF Generator, these openings must not be blocked, covered, or restricted. Restricting the air inlets or exhaust will cause the unit to overheat. Sustained over temperature conditions may degrade or damage

1.2.21 Never push objects of any kind into the slots and openings of the Aurora Series RF Generator enclosure. They may touch dangerous voltage points or short out parts, which could result in a fire or electric shock.

1.2.22 Never spill liquid of any kind on or into the Aurora Series RF Generator.

1.2.23 Never remove covers or guards that require a tool for removal. There are no operator serviceable areas within these covers. Refer servicing to qualified service personnel.
1.3 Physical Description

1.3.1 The amplifier is housed in a single 9.5"W x 24"D x 7"H (24.1cm x 61cm x 17.8cm) chassis. AC power input and circuit breaker are located on the rear of the chassis. The RF Output is on the rear of the chassis. A fan is mounted behind the front panel. Air flow in from the side of the unit and exhausted through the rear.

1.3.2 The rear panel contains the Analog Input connector (DB25 female), Serial connector (DB9 female), AUX (BNC female), CEX IN (BNC female), CEX OUT (BNC female), Match (4-pin male), and RF OUTPUT (type ‘N’ female).

1.3.3 The front panel contains a 5.4” (13.7cm) TFT touchscreen display. All of the generator set-up, local controls, readings, etc. are performed from the display.

1.4 Electrical Description

1.4.1 The generator requires a single phase power source of 180 to 250 VAC, 50/60 Hz. A high efficiency DC switching regulator is used to provide regulated 48 VDC to the RF devices.

1.4.2 The Controller section generates the RF signal. It also communicates with the appropriate I/O (front panel, serial, analog) to generate all RF functionality. The
controller section also supplies feedback as to control settings and status (digital and analog) of the generator.

1.4.3 The RF Amplifier section consists of 4 stages. The amplifier takes the output of the controller and amplifiers to the specified power output.

1.5 Specifications

1.5.1 General

Power Output:
AX2500 ......................................................................................................................... 2500 Watts
Frequency ........................................................................................................ 13.56 MHz
Frequency Stability ......................................................................................... +/- 0.005%
Power Linearity .................................................................................................. Monotonic
Power Accuracy .................................................................................................. better than 2%
Power Repeatability ......................................................................................... +/- 1% of setpoint into a 50 Ohm load
FWD/REF Power Monitoring ..............................................................................0-10V = full scale
Output Connector .............................................................................................. Type “HN” female
Harmonics ......................................................................................................... better than -40 dBC
Spurious Emissions .......................................................................................... better than -60 dBC
Reflected Power Limit ........................................................................................ 200 Watts
Pulsing .................................................................................................................. 0-10 KHz
Cooling ................................................................................................................. Water and Air cooled
Water Flow ........................................................................................................... 2 GPM (7.6 LPM) minimum

1.5.2 Electrical/Mechanical

AC Power Requirement:
Line Voltage ......................................................................................................... 180-250 VAC, 50/60 Hz, single phase
Efficiency AC-RF .................................................................................................... 65%
Interface Connectors: Serial: DB9; Analog DB25
Display .................................................................................................................... TFT resistive touchscreen
Operating Temperature .......................................................................................... 15°C to 35°C
Maximum Altitude: .............................................................................................. 6,561 feet (2000 Meters) AMSL
Operating Relative Humidity: ............................................................................... 10-90% non-condensing
Dimensions:
AX25000 .................................................................................................................. 9.5"W (24.1 cm) x 24" D (61 cm) x 7" H (17.8 cm)
Weight:
AX2500 .................................................................................................................. 37 pounds (16.8 kg)
Compliance .............................................................................................................. CE (EMC and Safety)
1.6 **Equipment Identification**

1.6.1 The generator is identified by a Model Number and Serial Number located on the top of the chassis. All correspondence to the factory should reference the complete Model and Serial Numbers. A sample serial tag for the AX2500 is shown below.

<table>
<thead>
<tr>
<th>Model</th>
<th>AX2500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial</td>
<td>AX25K0716R0002</td>
</tr>
<tr>
<td>Line Voltage</td>
<td>180~265 VAC, 10/5 AMPS 50/60 Hz</td>
</tr>
<tr>
<td>Software</td>
<td>2.10</td>
</tr>
<tr>
<td>Frequency</td>
<td>13.56 MHz</td>
</tr>
<tr>
<td>Power</td>
<td>600 Watts</td>
</tr>
<tr>
<td>Date of Manufacture</td>
<td>June 2016</td>
</tr>
</tbody>
</table>

Manufactured in the United States of America by:

QEI Corporation
Williamstown, New Jersey
www.qei-rf.com

1.7 **QEI Contact Information**

1.7.1 For service on any QEI Products, contact:

QEI Corporation
603 Airport Drive
P.O. Box 805
Williamstown, NJ 08094
USA

Telephone: +856-728-2020
Fax: +856-629-1751
e-mail: service@qei-rf.com
web: www.qei-rf.com

1.7.2 Please contact QEI for a Return Material Authorization (RMA) before returning any products to QEI. Any products returned without a proper RMA may have a delay in service.
SECTION 2  INSTALLATION

2.1 Initial Inspection

2.1.1 Carefully inspect the generator for any evidence of shipping damage. This inspection should include observing all sides of the chassis for physical damage. Observe the front panel. If the display shows any scratches or alignment problem, it may indicate that the generator was handled roughly or dropped. Check the shipping documents against the received material to insure that the shipment is complete. **NOTIFY THE SHIPPING CARRIER AND QEI IMMEDIATELY OF ANY DAMAGE OR MISSING MATERIAL.**

2.2 Environmental Requirements

2.2.1 The generator must be located in a clean, dry environment. Adequate external heat must be provided to keep the temperature above 32°F (0°C). Sufficient ventilation or air conditioning should be provided to keep the building temperature below 95°F (35°C) when all equipment in the building is operating at full power. If ventilation is used, it is suggested that an adequately sized blower and filter be used to pressurize the building. Using this arrangement instead of an exhaust fan will minimize dust and dirt infiltration. However, the building intake air filters must be serviced regularly. If an exhaust fan is used, it is important that an adequate air supply is allowed into the building. This air intake should also be filtered. **DO NOT COVER THE TOP OR SIDES OF THE CHASSIS OR RESTRICT AIR FLOW IN ANY MANNER.**

2.3 Mechanical Requirements

2.3.1 The generator must be placed in a sturdy rack or shelf which can safely support the weight of the unit. Adequate space should be provided on all sides of the chassis for proper air flow.

2.4 Electrical Requirements

2.4.1 The AX2500 Generator require a 180-250 VAC single phase 50/60 Hz main power supply. It is suggested that the wiring to the generator be capable of handling a load of at least 2 times the power output of the generator. The power must be routed through a fused disconnect switch or circuit breaker which can be used to remove all power from the generator. **THIS IS AN IMPORTANT SAFETY REQUIREMENT.**

**NOTE**

IT IS THE RESPONSIBILITY OF THE CUSTOMER TO CHECK AND ADHERE TO ALL LOCAL AND NATIONAL ELECTRICAL CODES REGULATING THE INSTALLATION OF THIS EQUIPMENT.
2.5 System Connections

2.5.1 Primary Power

2.5.1.1 Determine the Main Power supply voltage. Insure that the Mains Power is proper for the generator.

2.5.1.2 OPEN THE MAIN DISCONNECT. VERIFY THAT THE MAINS POWER IS OFF.

2.5.1.3 Plug the line cord from the chassis into the appropriate AC power source.

2.5.1.4 When needed use the circuit breaker to apply AC power to the generator power supplies.

2.5.2 RF Output

2.5.2.1 Connect an appropriate 50 ohm coaxial cable to the RF output connection on the rear of the generator and a suitable load. Depending on the output power rating of the generator, load configuration, and application, several coaxial cable types can be used. Contact QEI Corporation to help select the cable appropriate for your application. Be sure to install the guard over the RF output connector to insure the RF output interlock is closed. If the guard is not in place properly, the interlock will be open and the generator will not operate.

![WARNING]

Do not enable mains power or operate the RF Generator without connecting a suitable load to the RF Output. Operating without a suitable load connected to the RF Output may be hazardous.

2.5.3 Water Connections

2.5.3.1 The AX2500 generator is water cooled. As such the unit is shipped with a water flow sensor to ensure there is sufficient water flow when the generator RF is turned on. The minimum water flow required for operations is 2 GPM (7.56 LPM). Additionally, there is a water flow switch the will turn the water on when the generator RF turns on and turn the water off when the RF is off. The sensor and the valve are pre-connected at the factory and the wire harness to the ‘Valve’ connector is attached. These functions are automatically controlled by the generator from input information on the ‘Valve’ connector. When RF is turned on, the water flow switch will open. If
the water flow sensor does not have proper flow within 1 second, the RF will shut down and a water flow fault will be indicated. A picture of the rear of the AX2500 with the water flow sensor and switch is show in figure 2.1.

2.5.3.2 The water in and water out connectors on the AX2500 are 3/8” NPT connectors. Connect the water sensor and water flow switch combination to the ‘Water In’ connector. Use “teflon” tape and tighten as needed.

2.5.3.3 Connect a suitable hose from your water system to the Water flow switch which has a 3/8” NPT connector. Use “teflon” tape and tighten as needed.

2.5.3.4 Connect a suitable hose from your water system to the 3/8” NPT ‘Water Out’ connector on the generator. Use “teflon” tape and tighten as needed.

2.5.3.5 Before continuing, test the entire water system for leaks. Adjust any connections as necessary to ensure system does not leak.

2.5.4 Other rear panel connections (Figure 2.2)

2.5.4.1 AC Power Connector & Circuit Breaker – Used to connect AC mains power to the generator. The circuit breaker is protection against severe overload of the generator and also used to switch the generator on/off.

2.5.4.2 CEX In – Input from an external RF source. The generator uses this signal as the frequency source when the generator is configured for ‘slave’ operation in a multiple RF source system.

2.5.4.3 CEX Out – RF output to be used by other equipment. This signal can be used as the ‘master’ frequency signal in a multiple RF source system.
2.5.4.4 Match – This is a 4-pin connector used with the QEI supplied cable to connect to a QEI Helios Series matching network.

2.5.4.5 Valve – 4-pin connector used to connect the electrical output of the water flow valve and water flow switch.

2.5.4.6 Analog – Input/Output (I/O) connector for remotely operating the generator. Signal levels are 0-10 VDC. See 2.5.4 for description.

2.5.4.7 Serial – RS232/RS484 serial I/O. See 2.5.5 for description.

2.5.4.8 Ground – Stud to connect generator chassis ground.

2.5.5 Analog connector description:
2.5.5.1 The analog connector is a DB25 female located on the rear panel of the generator. Control and status signals are available at this connector for remote operation of the generator. The generator responds to inputs from this connector when generator ‘Settings’ are set to ‘Remote’.
2.5.5.2 Below are detailed pin descriptions for this connector.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MI-1</td>
<td>Optional AC mains interlock. On units equipped with this feature, a contact closure must be made between pin 1 and pin 14 for the AC mains to be applied to the internal power supply.</td>
</tr>
</tbody>
</table>
| 2   | INTLK-1 | External Interlock. A contact closure is required between pin 2 and pin 15 before the RF output can be enabled. This may also be a TTL level applied to pin 2. A TTL low at pin 2 will close this interlock.  
   An open circuit or TTL high applied to pin 2 while the RF is enabled will cause the RF to turn off.  
   **WARNING:** The external interlock operates in all modes (Local, Remote, and Serial) |
| 3   | RFON  | RF Output Enable/Disable.  
   A contact closure between pin 3 and pin 16 or a TTL low signal at pin 3 will enable the RF Output.  
   An open circuit between pin 3 and pin 16 or a TTL high signal at pin 3 will disable the RF Output. |
| 4   | P/V   | Power or Voltage leveling mode.  
   A open circuit or TTL high applied to pin 4 selects the generator internal power sensor for power regulation  
   A contact closure between pin 4 and pin 16 or a TTL low at pin 4 selects power regulation based on an external feedback signal (FB signal – pin 12 and pin 24). |
| 5   | Slave | Selects internal oscillator or external oscillator (Slave) as frequency source for operation.  
   A contact closure between pin 5 and pin 17 or a TTL low at pin 5 selects external frequency source (Slave) operation. The external frequency source is connected to ‘CEX IN’ on the rear panel.  
   An open circuit or TTL high at pin 5 selects the generators internal oscillator as the frequency source (Master). |
| 6   | CW/P  | Selects Continuous Wave (CW) or Pulse mode.  
   A contact closure between pin 6 and pin 18 or a TTL low at pin 6 selects pulse mode. Apply the external pulse train to pin 7.  
   A open circuit or TTL high at pin 6 selects the CW mode. |
| 7   | GATE  | External pulse input. – Changes the output power between the setpoint and 0 Watts.  
   An open circuit or TTL high will hold the RF output at the
<table>
<thead>
<tr>
<th>Pin</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>RF ENABLED</td>
<td>Output indicating status of RF output. Open collector output that will be low (0 Volts) for RF on condition and open for RF off.</td>
</tr>
<tr>
<td>9</td>
<td>GND</td>
<td>Chassis ground. Connect to external system controller common or ground reference.</td>
</tr>
<tr>
<td>10</td>
<td>FWD MON</td>
<td>Forward power monitor output signal. Analog output 0-10 VDC (or 0-5 VDC) range. Output is linearly proportional from 0 to maximum power output of the generator.</td>
</tr>
<tr>
<td>11</td>
<td>REF MON</td>
<td>Reflected power monitor output signal. Analog output 0-10 VDC (or 0-5 VDC) range. Output is linearly proportional from 0 to maximum power output of the generator.</td>
</tr>
<tr>
<td>12</td>
<td>FB</td>
<td>External feedback voltage. Analog input 0-10 VDC. The generator will automatically adjust its output power to maintain the FB signal magnitude at the same level as the SETPT signal magnitude. The external feedback signal can be derived from a DC voltage probe in the matching network. <strong>WARNING:</strong> Feedback voltage range must not be greater than +10 VDC or less than ground.</td>
</tr>
<tr>
<td>13</td>
<td>SETPT</td>
<td>Power or Voltage setpoint input. High impedance input with 0-10 VDC (or 0-5 VDC) range. <strong>WARNING:</strong> Ground return (pin 16, 17, 18, and 21) MUST be referenced to the common or ground of the system controller or the RF output may behave erratically.</td>
</tr>
<tr>
<td>14</td>
<td>MI-2</td>
<td>Optional AC mains interlock. On units equipped with this feature, a contact closure must be made between pin 1 and pin 14 for the AC mains to be applied to the internal power supply.</td>
</tr>
<tr>
<td>15</td>
<td>INTLK-RTN</td>
<td>Ground return for external interlock (pin 2).</td>
</tr>
<tr>
<td>Pin</td>
<td>Name</td>
<td>Description</td>
</tr>
<tr>
<td>-----</td>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td>16</td>
<td>GND</td>
<td>Chassis ground return for pins 3,4,5,6,7,8,13, and 19.</td>
</tr>
<tr>
<td>17</td>
<td>GND</td>
<td>Chassis ground return for pins 3,4,5,6,7,8,13, and 19.</td>
</tr>
<tr>
<td>18</td>
<td>GND</td>
<td>Chassis ground return for pins 3,4,5,6,7,8,13, and 19.</td>
</tr>
</tbody>
</table>
| 19  | RLIN | Remote Limit In.  
Analog input 0-10 VDC can be used in multiple generator systems to reduce the generator power output if reflected power is detected by another generator in the system. Output power lowers in response to an external voltage applied to this input. |
| 20  | Not Used | |
| 21  | Not Used | |
| 22  | GND  | Forward power return for pin 10. |
| 23  | GND  | Reflected power and RLOUT return for pins 11 and 20. |
| 24  | Not Used | |
| 25  | Not Used | |

2.5.6 Serial connector pin description

2.5.6.1 The serial connector is a DB9 female located on the rear panel of the generator. Serial control and status signals are available at this connector for operation of the generator. The generator responds to inputs from this connector when the generator ‘Settings’ are set to ‘Serial’.

2.5.6.2 Follows are detailed pin descriptions for this connector.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No Connection</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>TX– RS232</td>
<td>Transmit Data</td>
</tr>
<tr>
<td>3</td>
<td>RX– RS232</td>
<td>Receive Data</td>
</tr>
<tr>
<td>4</td>
<td>No Connection</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>COM</td>
<td>Common Return (ground)</td>
</tr>
<tr>
<td>6</td>
<td>RX- (+)RS435</td>
<td>Receive Data (+)</td>
</tr>
<tr>
<td>7</td>
<td>RX- (-) RS485</td>
<td>Receive Data (-)</td>
</tr>
<tr>
<td>8</td>
<td>TX- (+)RS485</td>
<td>Transmit Data (+)</td>
</tr>
<tr>
<td>9</td>
<td>TX- (-) RS485</td>
<td>Transmit Data (-)</td>
</tr>
</tbody>
</table>
2.5.7  Serial Commands - All serial commands must be terminated with an "ENTER" key. This key is the ASCII character code for Carriage Return. It is a decimal value "13", or and 8-bit value of "00001101".

<table>
<thead>
<tr>
<th>Command</th>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>***</td>
<td></td>
<td>Serial Control</td>
</tr>
<tr>
<td>+P</td>
<td></td>
<td>Enable Pulsing</td>
</tr>
<tr>
<td>-P</td>
<td></td>
<td>Disable Pulsing</td>
</tr>
<tr>
<td>0?</td>
<td></td>
<td>Get DCV Feedback</td>
</tr>
<tr>
<td>ANALOG</td>
<td></td>
<td>Analog Control</td>
</tr>
<tr>
<td>DL</td>
<td></td>
<td>Forward Leveling</td>
</tr>
<tr>
<td>DR</td>
<td></td>
<td>DC Leveling</td>
</tr>
<tr>
<td>DU</td>
<td></td>
<td>Disable Ramping</td>
</tr>
<tr>
<td>ECHO</td>
<td></td>
<td>Enable Echo</td>
</tr>
<tr>
<td>EL</td>
<td></td>
<td>Load Leveling</td>
</tr>
<tr>
<td>EU</td>
<td></td>
<td>Enable Ramping</td>
</tr>
<tr>
<td>FX</td>
<td></td>
<td>Disable Frequency Tuning</td>
</tr>
<tr>
<td>G</td>
<td></td>
<td>RF ON</td>
</tr>
<tr>
<td>IR</td>
<td></td>
<td>Local Control Mode</td>
</tr>
<tr>
<td>LVL?</td>
<td></td>
<td>Request Leveling Mode</td>
</tr>
<tr>
<td>M</td>
<td>Integer (0-2500 in W)</td>
<td>Set Max Power</td>
</tr>
<tr>
<td>M?</td>
<td></td>
<td>Request Max Power</td>
</tr>
<tr>
<td>MST</td>
<td></td>
<td>Master CEX Mode</td>
</tr>
<tr>
<td>SLV</td>
<td></td>
<td>Slave CEX Mode</td>
</tr>
<tr>
<td>NOECHO</td>
<td></td>
<td>Disable Echo</td>
</tr>
<tr>
<td>PANEL</td>
<td></td>
<td>Local Control Mode</td>
</tr>
<tr>
<td>Q</td>
<td></td>
<td>System information [Long]</td>
</tr>
<tr>
<td>R</td>
<td></td>
<td>System information [Short]</td>
</tr>
<tr>
<td>R?</td>
<td></td>
<td>Request Reflected Power</td>
</tr>
<tr>
<td>Command</td>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td>R?W?R</td>
<td></td>
<td>Request Reflected Power, Forward Power, and short System information</td>
</tr>
<tr>
<td>S</td>
<td></td>
<td>RF OFF</td>
</tr>
<tr>
<td>QSET</td>
<td></td>
<td>Query Setpoint</td>
</tr>
<tr>
<td>VX</td>
<td></td>
<td>Enable Frequency Tuning</td>
</tr>
<tr>
<td>W?</td>
<td></td>
<td>Request Forward Power</td>
</tr>
<tr>
<td>CF</td>
<td>Integer [in Hz]</td>
<td>Frequency Tuning Coarse Step [in Hz]</td>
</tr>
<tr>
<td>CR</td>
<td>Integer [in %]</td>
<td>Frequency Tuning Coarse Threshold [in %]</td>
</tr>
<tr>
<td>D</td>
<td>Integer [in %]</td>
<td>Pulse Duty Cycle [in %]</td>
</tr>
<tr>
<td>DN</td>
<td>Integer [0-3600 S]</td>
<td>Ramp Down Time</td>
</tr>
<tr>
<td>FF</td>
<td>Integer [in Hz]</td>
<td>Frequency Tuning Fine Step [in Hz]</td>
</tr>
<tr>
<td>FQ</td>
<td>Integer [MIN – MAX Hz]</td>
<td>Set Frequency [in Hz]</td>
</tr>
<tr>
<td>FT</td>
<td>Integer [in Hz]</td>
<td>Frequency Tuning Fine Threshold [in Hz]</td>
</tr>
<tr>
<td>MAXVF</td>
<td>Integer [MIN – 14.56 MHz in Hz]</td>
<td>Frequency Tuning Maximum [in Hz]</td>
</tr>
<tr>
<td>MINVF</td>
<td>Integer [12.56 MHz – MAX in Hz]</td>
<td>Frequency Tuning Minimum [in Hz]</td>
</tr>
<tr>
<td>PR</td>
<td>Integer [in Hz]</td>
<td>Pulse Frequency [in Hz]</td>
</tr>
<tr>
<td>W</td>
<td>Integer [in W]</td>
<td>Set Setpoint [in W]</td>
</tr>
<tr>
<td>SF</td>
<td>Integer [MIN – MAX in Hz]</td>
<td>Strike Frequency [in Hz]</td>
</tr>
<tr>
<td>UP</td>
<td>Integer [0-3600 S]</td>
<td>Ramp Up Time</td>
</tr>
<tr>
<td>WG</td>
<td>Integer [0 – MAX W]</td>
<td>Set Setpoint and then RF ON</td>
</tr>
<tr>
<td>WS</td>
<td></td>
<td>Set Setpoint to 0 and then RF OFF</td>
</tr>
<tr>
<td>ALM</td>
<td>&lt;0,1&gt;</td>
<td>0 to Clear Alarm, 1 to Read Information</td>
</tr>
<tr>
<td>GMI</td>
<td></td>
<td>Get Metering Information</td>
</tr>
<tr>
<td>RMO</td>
<td>Integer [in W]</td>
<td>Ramp Stop Power</td>
</tr>
<tr>
<td>RMA</td>
<td>Integer [in W]</td>
<td>Ramp Start Power</td>
</tr>
<tr>
<td>RFT</td>
<td></td>
<td>RF Elapsed Time</td>
</tr>
<tr>
<td>CXL</td>
<td>Integer [0 – 1023]</td>
<td>CEX Level</td>
</tr>
</tbody>
</table>
### Command Parameter Description

<table>
<thead>
<tr>
<th>Command</th>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CXP</td>
<td>Integer [0 – 360 degrees]</td>
<td>CEX Phase</td>
</tr>
<tr>
<td>SCM</td>
<td>&lt;0,1&gt;</td>
<td>Serial Computer Mode (1 to enable, 0 to disable)</td>
</tr>
<tr>
<td>V</td>
<td>Integer [0 – 1000 V]</td>
<td>Set Setpoint [in V]</td>
</tr>
</tbody>
</table>
SECTION 3
OPERATION

3.1 Controls and Connectors

3.1.1 Rear Panel

3.1.1.1 AC power cable. Connect to main power source.
3.1.1.2 Circuit breaker/switch for generator.
3.1.1.3 CEX In – BNC female connector used to connect RF input from an external source.
3.1.1.4 CEX Out – BNC female connector used to connect low level RF output of generator to another generator.
3.1.1.5 RF Out – ‘N’ female connector for RF output to load. The RF output shield must be in place and depressing the interlock switch to operate the generator.
3.1.1.6 Match – 4-pin male connector used to connect the generator to a Helios Series matching network.
3.1.1.7 Valve – 4-pin connector used for connection to water flow sensor and water switch.
3.1.1.8 Analog – DB25 female connector used for analog I/O.
3.1.1.9 Serial – DB9 male connector used for RS232 serial communications.
3.1.1.10 Ground – Stud for external connection to the generator chassis.

**WARNING**

EVEN IF THE MAIN CIRCUIT BREAKER IS TURNED OFF, AC POWER IS STILL WITHIN THE CHASSIS. THE CUSTOMER MUST SUPPLY AN EXTERNAL DISCONNECT WHICH CAN BE USED TO REMOVE ALL POWER FROM THE GENERATOR.

3.1.2 Front Panel

3.1.2.1 DS1 – 5.4” TFT resistive touchscreen display used to accomplish all set-up functions and operating parameters of the generator.

3.2 Display Operation

3.2.1 When the generator is first turned on, the front panel display will go through a start up routine. When completed, the status screen will appear.
3.2.1.1 This screen will be a general display of all of the operating parameters of the generator.

3.2.1.2 The Forward an Reflected Power will be continuously displayed.

3.2.1.3 When in ‘Local’ mode to adjust the set point, simply touch the set point window. A keypad will appear on the screen. Enter the set point (in Watts) on the keypad and press ‘Enter’. The keypad will disappear. The set point will change to this value and if the RF is turned on, the RF output will change to this value.

3.2.1.4 The ‘Exciter’ readout will be green and read “Master” if the internal frequency generator is in use. The readout will be red and read “Slave” if the operating frequency is from an external source.

3.2.1.5 The ‘Pulsing’ readout will be green and read “Enabled” if pulsing is enabled from the Pulsing screen. The readout will be red and read “Disabled” if pulsing is off.

3.2.1.6 The ‘Ramping’ readout will be green and read “Enabled” if ramping is enabled from the Ramping screen. The readout will be red and read “Disabled” if ramping is off.

3.2.1.7 The ‘Freq Tuning’ readout will be green and read “Enabled” if frequency tuning is enabled from the Frequency Tuning screen. The readout will be red and read “Disabled” if frequency tuning is off.

3.2.1.8 The ‘Arc Sup’ readout will be green and read “Enabled” if arc suppression is enabled from the Arc Suppression screen. The readout will be red and read “Disabled” if arc suppression is off.

3.2.1.9 The ‘Low Pwr’ readout will be green and read “Enabled” if low power mode is enabled from the Low Power screen. The readout will be red and read “Disabled” if low power mode is off.

3.2.1.10 When in ‘Local’ mode, the RF On/Off button is used to turn the RF on or off. When RF is on, The RF button will turn red. The border color of all screens will also be red. This is an indicator from...
3.2.1.11 The Last button will take you to the previous application screen viewing.

3.2.1.12 Touch the Home button to go to the Main menu screen.

3.2.2 Local navigation for all of the RF generator functions are made through this screen.

3.2.3 A detailed explanation of the use and function of each of the menu screens follows.

3.2.4 Frequency – By tapping this icon the Frequency screen appears.
3.2.4.1 This screen allows you to set the generator in frequency tuning mode and set the parameters to use while in this mode.

3.2.4.2 Tap the ‘Automatic Tuning’ button to turn frequency tuning on. The button will turn green and read “Enabled” when on. Tap the ‘Automatic Tuning’ button again to turn frequency tuning off. The button will turn red and read “Disabled”. When automatic tuning is disabled, you can still adjust the frequency manually.

3.2.4.3 Tap the ‘Min Frequency’ button and the keypad will appear. Enter the minimum frequency in Hz for tuning. Tap ‘Enter’ on the keypad to store this value.

3.2.4.4 Tap the ‘Max Frequency’ button and the keypad will appear. Enter the maximum frequency in Hz for tuning. Tap ‘Enter’ on the keypad to store this value.

3.2.4.5 Tap the ‘Strike Frequency’ button and the keypad will appear. Enter the frequency in Hz where you want the frequency tuning to start. Tap ‘Enter’ on the keypad to store this value.

3.2.4.6 Tap the ‘Course Threshold’ button and the keypad will appear. Enter the value in percent of reflected power at the output of the generator to switch from coarse tuning to fine tuning. When reflected power is lower than the number entered, the generator will automatically switch to fine tuning mode. Tap ‘Enter’ on the keypad to store this value.

3.2.4.7 Tap the ‘Course Step Size’ button and the keypad will appear. Enter the frequency step in Hz. This will move the frequency this amount each time until the reflected power drops below the coarse threshold value set in 3.2.4.6. Tap ‘Enter’ on the keypad to store this value.

3.2.4.8 Tap the ‘Fine Threshold’ button and the keypad will appear. Enter the reflected power in Watts where you want the frequency tuning to stop. When
the reflected power drops below this value, frequency tuning will stop. Tap ‘Enter’ on the keypad to store this value.

3.2.4.9 Tap the ‘Fine Step Size’ button and the keypad will appear. Enter the frequency step in Hz. This will move the frequency this amount each time until the reflected power drops below the fine threshold value set in 3.2.4.8. Tap ‘Enter’ on the keypad to store this value.

3.2.4.10 If frequency tuning is disabled, the generator frequency is shown in the ‘Frequency’ window. If frequency is disabled, tapping the ‘Frequency’ button and the keypad will appear. Enter the frequency you want to operate. Tap ‘Enter’ on the keypad to store this value.

3.2.4.11 By tapping the Home Icon to the RF Power page. If the RF is on you will be returned to the Main Menu.

3.2.5 Pulsing – By tapping the Pulsing icon the following screen appears.

![](image.png)

3.2.5.1 This screen allows you to set the generator in pulsing mode and set the parameters to use while in this mode.

3.2.5.2 Tap the ‘Pulsing’ button to turn pulsing on. The button will turn green and read “Enabled” when on. Tap the ‘Pulsing’ button again to turn pulsing off. The button will turn red and read “Disabled” when off.

3.2.5.3 Tap the ‘Pulse Frequency’ button and the keypad will appear. Enter the frequency in Hz that you want pulsing to occur (repetition rate). The maximum value is 20000. Tap ‘Enter’ on the keypad to store this value.
3.2.5.4 Tap the ‘Duty Cycle’ button and the keypad will appear. Enter the duty cycle (pulse width) of the pulse in percent. This value can be from 2-99. Tap ‘Enter’ on the keypad to store this value.

3.2.5.5 Tap either ‘Pulsing Source’ button and select either Internal or External as the pulsing source. If you select ‘Internal’ the button will turn green and read “Internal”. Pulsing parameters are specified via this menu. If you select ‘External’ the button will turn red and read “External”. The generator will respond to a TTL level pulse stream via a pin on the analog interface (Gate) or optional BNC connector.

3.2.5.6 By tapping the Home Icon, if the RF is on you will be returned to the RF Power page. If the RF is off, you will be returned to the Main Menu.

3.2.6 Ramping – By tapping this icon the Ramping screen appears.

3.2.6.1 This screen allows you to set the generator in ramping mode and set the parameters to use while in this mode.

3.2.6.2 Tap the ‘Ramping’ button to turn ramping on. The button will turn green and read “Enabled” when on. Tap the ‘Ramping’ button again to turn ramping off. The button will turn red and read “Disabled” when off.

3.2.6.3 Tap the ‘Start Power’ button and the keypad will appear. Enter the power output in Watts. Ramp up will begin at the ‘Start’ power.
3.2.6.4 Tap the ‘Ramp Up Time’ button and the keypad will appear. Enter the time in seconds that you want the power output to change linearly from start power to setpoint power.

3.2.6.5 Tap the ‘Stop Power’ button and the keypad will appear. Enter the power output in Watts. Ramp down will begin at setpoint power and stop at ‘Stop’ power. RF will then turn off. If RF is commanded off a second time (local or serial operations) it will turn off immediately.

3.2.6.6 Tap the ‘Ramp Down Time’ button and the keypad will appear. Enter the time in seconds that you want the power output to change linearly from setpoint power to ‘Stop Power’.

3.2.6.6 By tapping the Home Icon, if the RF is on you will be returned to the RF Power page. If the RF is off, you will be returned to the Main Menu.

3.2.7 Arc Suppress – By tapping this icon the Arc Suppression screen appears.

![Diagram](image-url)
3.2.7.1 This screen allows you to set the generator in arc management mode and set the parameters to use while in this mode.

3.2.7.2 Tap the ‘Arc Suppression’ button to turn arc suppression on. The button will turn green and read “Enabled” when on. Tap the ‘Arc Suppression’ button again to turn arc suppression off. The button will turn red and read “Disabled” when off.

3.2.7.3 Tap the ‘Reflected Threshold’ button and the keypad will appear. Enter the reflected power in watts that will cause the RF to turn off due to a probable arc.

3.2.7.4 Tap the ‘Delay Time’ button and the keypad will appear. Enter the time in microseconds before reflected power above the threshold is considered an arc to be extinguished.

3.2.7.5 By tapping the Home Icon, if the RF is on you will be returned to the RF Power page. If the RF is off, you will be returned to the Main Menu.

3.2.8 Exciter – By tapping this icon the Exciter screen will appear.

![Exciter Screen]

3.2.8.1 This screen allows you to set the generator in CEX mode and set the parameters to use while in this mode.

3.2.8.2 Tap the ‘Exciter’ button to make the internal exciter of this generator as Master. The button will turn green and read “Master” when on. Tap the ‘Exciter’ button again to make this generator a Slave. The button will turn red and read “Slave” when off.
3.2.8.3 Tap the ‘CEX Output Level’ button and the keypad will appear. Enter the CEX Output Level in percent (%). 100% is approximately +15 dBm.

3.2.8.4 Tap the ‘CEX Output Phase’ button and the keypad will appear. Enter the CEX Output Phase in degrees.

3.2.8.5 By tapping the Home Icon, if the RF is on you will be returned to the RF Power page. If the RF is off, you will be returned to the Main Menu.

3.2.9 Metering – By tapping this icon the Metering screen will appear.

3.2.9.1 This screen has no input functions. It displays the current operating parameters of the generator. The specific screen shown above is for the AX600.

3.2.9.2 By tapping the Home Icon, if the RF is on you will be returned to the RF Power page. If the RF is off, you will be returned to the Main Menu.

3.2.10 Matching – By tapping this icon the Matching screen will appear.
3.2.10.1 The ‘Tune’ and ‘Load’ indicators perform a dual function. If in automatic mode the ‘Tune’ and ‘Load’ indicators will give the position of the tune capacitor and the load capacitor as a percentage of full value. If in the manual mode, by tapping the ‘Tune’ or ‘Load’, button the keypad will appear. Enter your value as % of full value for the tune and load capacitors.

3.2.10.2 The “Forward’ and ‘Reflected’ reading come directly from the generator.

3.2.10.3 In the lower ‘Tune’ section, the ‘Mode’ button can be used to change the tune capacitor from automatic mode to manual mode. If the ‘Mode’ button is green and reads “Auto” it is in automatic mode. Tap the ‘Mode’ button again and it will turn red and read “Manual”. This will mean tuning is in the manual mode.

3.2.10.4 Tap the preset button and the keypad will appear. Enter the preset position of the tune capacitor as a percentage (%) of full value and press ‘Enter’.

3.2.10.5 In the lower ‘Load’ section, the ‘Mode’ button can be used to change the tune capacitor from automatic mode to manual mode. If the ‘Mode’ button is green and reads “Auto” it is in automatic mode. Tap the ‘Mode’ button again and it will turn red and read “Manual”. This will mean tuning is in the manual mode.

3.2.10.6 Tap the preset button and the keypad will appear. Enter the preset position of the load capacitor as a percentage (%) of full value and press ‘Enter’.

3.2.10.7 The lower ‘Controls’ section is used to make selections for control operations.

3.2.10.8 Tap the ‘Analog’ button to enable analog controls. If analog control is enabled the button will be green and read “Enabled”. Tap the ‘Analog’ button again and the button will be red and read “Disabled”.
3.2.10.9 Tap the ‘Preset’ button to rotate through 3 modes of preset. They are ‘Off’, ‘Internal’, and ‘External’.

3.2.10.10 The remaining indicators are readings from the match input. The phase and magnitude are always present when using a match. The DCV (DC Voltage), RFV (RF Voltage), and RFC (RF Current) can only be used when a probe is installed in the match to supply these readings.

3.2.10.11 By tapping the Home Icon, if the RF is on you will be returned to the RF Power page. If the RF is off, you will be returned to the Main Menu.

3.2.11 Settings – By tapping this icon the following screen will appear.

![Settings Screen]

- **Setpoint Source**: Local
- **Protocol**: RS232
- **RF On Source**: Local
- **Link Status**: Disabled
- **Leveling Mode**: Forward
- **Baud Rate**: 19200
- **Low Power**: Disabled
- **DC Bias Display**: Leveling
- **Monitor Range**: 5 V
- **DC Bias Source**: Serial
- **Analog Set Range**: 5 V
- **Max Power**: 2500

3.2.11.1 By tapping the ‘Setpoint Source’ button, you can rotate through selections of Local, Remote, and Serial. This can only be changed when RF is off.

3.2.11.2 By tapping the ‘RF On Source’ button, you can rotate through selections of Local, Remote, and Serial. This can only be changed when RF is off.

3.2.11.3 By tapping the ‘Leveling Mode’ button, you can rotate through selections of Forward, Load, and DC Volts. This can only be changed when RF is off.

3.2.11.4 By tapping the ‘Low Power’ button, you can enable the low power mode and the button will be green and read “Enabled”. By tapping the ‘Low Power’ button again you can disable the low power mode and the button will be red and read “Disabled”. This can only be changed when RF is off.

3.2.11.5 By tapping the ‘Monitor Range’ button you can switch between 5 VDC full scale and 10 VDC full scale.
3.2.11.6 By tapping the ‘Analog Set Range’ button you can switch between 5 VDC full scale and 10 VDC full scale.

3.2.11.7 By tapping the ‘Max Power’ button the keypad will appear. Enter the maximum power for the generator in Watts and press ‘Enter’. This will limit the maximum output power of the generator to this level. NOTE: You cannot set the maximum power of the generator above the maximum rated power.

3.2.11.8 Tap the ‘Link Status’ to enable the link status feature. The button will be green and read “Enabled”. When link status is enabled and the RF is on, you must have serial data received by the generator every few seconds. If there is no serial data present for a period of 10 seconds, the RF will be turned off. This function acts as a watchdog timer to insure the serial link is operating properly. Tap the ‘Link Status’ button again to disable the link status feature. The button will turn red and read “Disabled”.

3.2.11.9 By tapping the ‘Baud Rate’ button, you can rotate through baud rate selections of 9600, 19200, and 38400.

3.2.11.10 By tapping the Home Icon, if the RF is on you will be returned to the RF Power page. If the RF is off, you will be returned to the Main Menu.

3.2.12 Service – By tapping this icon the keypad will appear. You must have the proper password to continue. This icon is not normally changed by anyone other then the factory.

3.2.13 QEI About – By tapping this icon the following screen will appear. This screen will give information about the specific generator.

3.2.13.1 This screen will give information about the specific generator.

3.2.13.2 By tapping the “X” in the top right corner, if the RF is on you will be returned to the RF Power page. If the RF is off, you will be returned to the Main Menu.

3.2.14 Match Settings Screen:

3.2.14.1 The HX Series Matching Networks use a Phase and Magnitude detector to determine the speed and direction of the Tune and Load capacitors. The larger the Phase or Magnitude error signals, the faster the capacitors will move to...
correct them when in automatic tuning mode. When the unit is matched, the error signals should read close to zero. Depending on the load impedance, and match topology, the appropriate error signal for each capacitor may change. Both capacitors can be set to ‘chase’ the error signal and polarity that best suits the application. Normally this FORWARD mode will result in fast and precise automatic tuning. In some cases the match may be starting from a position, and running into a load, that causes one or both of the capacitors to be misguided. In the event that a capacitor runs to the end of its range, it will change to BACKWARD mode and chase the selected backward mode error signal. Usually the opposite polarity of the forward mode error. Each capacitor has a DEADGAP threshold for movement. This is the error signal absolute value that must be exceeded before the capacitor will try to tune.

3.2.14.2 Tune Settings:
3.2.14.2.1 Forward Tune Direction - Displays the error signal to be pursued by the Tune capacitor in the forward direction. This setting can be touched to toggle through the following settings: PHASE+, PHASE-, MAG+, MAG-.

3.2.14.2.2 Backward Tune Direction - Displays the error signal to be pursued by the Tune capacitor when the forward direction fails to zero the selected error signal and the capacitor reaches a limit. This setting can be touched to toggle through the following settings: PHASE+, PHASE-, MAG+, MAG-.

3.2.14.2.3 Tune DeadGap - Displays the threshold of error signal, below which the capacitor will stop tuning. For example, if the Tune capacitor is chasing phase +, and has a Deadgap of 40mV, the Tune capacitor will consider itself matched and stop moving when the phase error returns a value under ±40 mV. When touched, this value can be set through the popup keypad.

3.2.14.3 Load Settings:

3.2.14.3.1 Forward Load Direction - Displays the error signal to be pursued by the Load capacitor in the forward direction. This setting can be touched to toggle through the following settings: PHASE+, PHASE-, MAG+, MAG-.

3.2.14.3.2 Backward Load Direction - Displays the error signal to be pursued by the Load capacitor when the forward direction fails to zero the selected error signal and the capacitor reaches a limit. This setting can be touched to toggle through the following settings: PHASE+, PHASE-, MAG+, MAG-.

3.2.14.3.3 Load DeadGap - Displays the threshold of error signal, below which the capacitor will stop tuning. For example, if the Load capacitor is chasing mag +, and has a Deadgap of 40mV, the Load capacitor will consider itself matched and stop moving when the phase error returns a value under ±40 mV. When touched, this value can be set through the popup keypad.

3.2.14.4 Match Settings:
3.2.14.4.1 Monitor Setting - Displays and sets the full scale setting for the Tune and Load position analog monitor voltages. Tapping this setting will toggle between 5V and 10V full scale.

3.2.14.4.2 Probe Setting - Displays and sets the active probe for feedback to the generator.

3.2.14.4.3 Reflected Threshold - Displays and sets the threshold value for which the match should be satisfied with the reflected power, in auto tuning mode. When touched, this value can be set through the popup keypad, and will increase or decrease the maximum reflected power for the match to stop tuning.

3.2.14.4.4 Phase/Mag Zero - Resets the phase and mag zero location to the current position of the two readings. The matching network should be manually tuned to a reference of zero watts of reflected power before zeroing the error signals. **NOTE:** This button should **ONLY** be pressed while RF is ON and reflected is as close to 0 as possible.

### 3.3 Initial Turn On Procedure

**WARNING**

EVEN THOUGH THIS SOLID STATE GENERATOR DOES NOT USE HIGH VOLTAGE, YOU CAN STILL BE SERIOUSLY INJURED OR KILLED BY THE AC LINE. IN ADDITION, SINCE THE POWER SUPPLY IS CAPABLE OF SUPPLYING VERY HIGH CURRENT, ANY METALLIC OBJECT WHICH SHORTS THE SUPPLY WILL VAPORIZE OR HEAT TO VERY HIGH TEMPERATURES WHICH CAN CAUSE SERIOUS BURNS OR EYE DAMAGE. USE EXTREME CARE WHEN WORKING ON ANY HIGH POWER ELECTRICAL EQUIPMENT.
3.3.1 Confirm that AC power is disconnected from the generator (Customer installed AC disconnect is in the OFF position).

### NOTE

FOLLOW THIS PROCEDURE EXACTLY WHEN PLACING THE GENERATOR IN OPERATION FOR THE FIRST TIME. THE PROCEDURE IS DESIGNED TO FIND INSTALLATION PROBLEMS BEFORE ANY DAMAGE OCCURS TO THE GENERATOR. IF AT ANY STEP IN THE PROCEDURE, THE REQUIRED RESPONSE IS INCORRECT, STOP AND FIND THE PROBLEM BEFORE CONTINUING.

3.3.2 Installation Checkout

3.3.2.1 Recheck all electrical and mechanical details for conformance to requirements set out in Section 2.

3.3.2.2 Insure that all covers are in place on the chassis.

3.3.2.3 Check that all air intake and exhaust areas are clear from obstructions.

3.3.3 Initial Turn On Procedure

3.3.3.1 Recheck that the AC Power to the generator is correct. Turn OFF the customer-supplied external disconnect.

3.3.3.2 Recheck that the RF transmission line and load are properly connected.

### CAUTION

IT IS PRESUMED THAT THE GENERATOR IS TO BE OPERATED ON THE FREQUENCY AND AT THE POWER LEVEL FOR WHICH IT WAS OPTIMIZED AT THE FACTORY. CONSULT QEI TECHNICAL SUPPORT NOW IF ANY CHANGES ARE REQUIRED.
3.3.3.3 Be sure the RF Output of the generator is connected.

3.3.3.5 Apply AC Power to the generator (turn external customer supplied disconnect ON). Turn the power switch on the rear of the generator on. The front panel display will go through a loading procedure. The generator is now ready for operation.

3.4 NORMAL OPERATION

3.4.1 Local Control – Use the front panel display for operation in this mode.

3.4.2 Remote Control – Use the Analog Input on the rear panel for operation in this mode. Refer to section 2.5.4 for details.

3.4.3 Serial Control - Use the Serial Input on the rear panel for operation in this mode. Refer to section 2.5.5 and 2.5.6 for details.