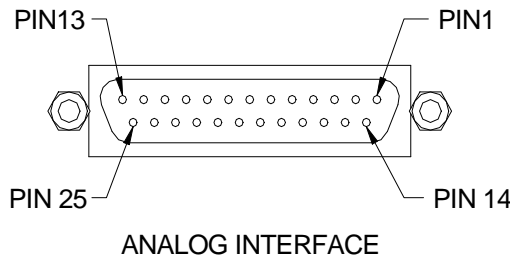


## R/Lx01-Series RF Power Supply (Generator) Analog Interface Connections

The analog interface connector is located on the rear panel of the Radio Frequency Power Supply. Control and status signals for the RF Power Supply are available on this connector. See the table below for descriptions of the interface connector signals.

The 25-pin R/Lx01-Series Analog Interface is pin-compatible with the 25-pin Analog Interface used on the Seren IPS HR-Series and M-Series RF power supplies, however not all features and functions of the R/LX01-Series Analog Interface are available/supported on the HR-Series or M-Series RF power supplies. Likewise, not all features and functions of the HR-Series or M-Series RF power supplies are available/supported on R/Lx01-Series RF power supplies..

### Analog Interface Connector Pin List – 25-Pin Female Analog Interface



Pin Locations, 25-Pin Analog Interface Connector

PIN LIST: R/Lx01-SERIES 25-PIN ANALOG INTERFACE CONNECTOR		
PIN	SIGNAL NAME	DESCRIPTION
1	PSYNC R101MKII, L101MKII, R301MKII L301MKII, R/L601, R/L1001, R/L2001, R/L3001, R5001, R8001, R10001, R15001	<p>Pulse Synchronization Output. TTL-compatible output, with an internal pull-up resistor.</p> <p>Outputs a pulse train from the internal pulse train generator when internal pulsing is selected and active.</p> <p>Outputs the pulse train from the Gate signal (pin 7) when external pulsing is selected.</p> <p>A TTL high state corresponds to RF output at SETPOINT level or “High Power Pulse” level, a TTL low state corresponds to 0 Watts or “Low Power Pulse” level. Refer to the pulsing parameters in the programmable parameters section of the operator’s manual for operational details.</p> <p><b>NOTE:</b> Applicable to models R101MKII, L101MKII, R301MKII L301MKII, R/L601, R/L1001, R/L2001, R/L3001, R5001, R8001 R10001 and R15001.</p>

PIN LIST: R/Lx01-SERIES 25-PIN ANALOG INTERFACE CONNECTOR		
PIN	SIGNAL NAME	DESCRIPTION
2	INTERLOCK	<p>External Interlock. TTL – compatible input, active low, with an internal pull-up resistor.</p> <p>A contact closure between pin 2 and pin 15 or a TTL “low” signal applied to pin 2 is required before RF output can be enabled.</p> <p>An open circuit or a TTL “high” signal applied to pin 2 while the RF output is enabled, will cause the RF output to turn off.</p> <p>An open circuit or a TTL “high” signal applied to pin 2 while the RF output is off, will prevent the RF output from being enabled.</p> <p>This signal is active in Panel, Analog, or Serial control modes</p>
3	RFON*	<p>RF Output Enable/Disable. TTL – compatible input, active low, edge triggered, with an internal pull-up resistor.</p> <p>A contact closure between pin 3 and pin 16 or a TTL signal transition from “high” to “low” applied to pin 3 enables the RF output, provided Pin 2 is at TTL “low” state.</p> <p>An open circuit between pin 3 and pin 16 or a TTL signal transition from “low” to “high” applied to pin 3 disables the RF output.</p> <p>This signal is active only in “Analog” control mode.</p>
4	PWR/VLT*	<p>Power or Voltage leveling mode select. TTL – compatible input with internal pull-up resistor.</p> <p>An open circuit or TTL “high” signal applied to pin 4 selects the power supply’s internal power sensor for power regulation.</p> <p>A contact closure between pin 4 and pin 16 or a TTL “low” signal applied to pin 4 selects forward power regulation based on an external feedback signal (FEEDBACK signal - Pin 12).</p> <p>Refer to the controls section of the operator’s manual for detailed instructions on how to configure and use this mode.</p> <p>This signal is active only in “Analog” control mode.</p>
5	SLAVE*	<p>Selects internal oscillator/exciter or external oscillator/exciter (Slave Mode) as frequency source operation. TTL – compatible input with an internal pull-up resistor.</p> <p>A contact closure between pin 5 and pin 17 or applying a TTL “low” signal to pin 5 selects external frequency source (Slave Mode) operation. The external frequency source is connected to the “CEX IN” connector on the rear panel.</p> <p>An open circuit or TTL “high” applied to pin 5 selects the power supply’s internal oscillator/exciter as the frequency source.</p> <p>This signal is active only in “Analog” control mode.</p>
6	GATEN*	<p>Selects Continuous Wave (CW) or Pulse Operation. TTL – compatible input with an internal pull-up resistor.</p> <p>A contact closure between pin 6 and pin 17 or applying a TTL “low” signal to pin 6 selects pulse operation. Apply the external pulse train to Pin 7.</p> <p>Applying a logic level high to this pin or allowing this pin to float selects continuous wave (CW) operation.</p>

Summary of product specifications - consult operator's manual, local Seren IPS representative, or factory for full detail.

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PIN LIST: R/Lx01-SERIES 25-PIN ANALOG INTERFACE CONNECTOR		
PIN	SIGNAL NAME	DESCRIPTION
7	GATE	<p>External Pulse Train input. Toggles output power between setpoint value and 0 Watts. TTL - compatible input with internal pull-up resistor.</p> <p>An open circuit or TTL “high” signal applied to pin 7 holds the RF output to the setpoint level.</p> <p>A contact closure between pin 7 and pin 17 or a TTL “low” signal applied to pin 7 switches the RF output power to 0 Watts.</p> <p>Active when pin 6 (GATEN*) is in a TTL “low” state.</p>
8	RFENABLED*	<p>RF output status signal. Active low, open collector output. 24VDC, 15mA maximum current sink, 150mW maximum power dissipation.</p> <p>Signal output is 0V (low) for an RF on condition; signal output is “open” for an RF off condition.</p> <p>The RFENABLED* signal can also indicate the presence of excessive reflected power by changing from a “low” state to a “high” state when the RF output is enabled. Refer to “Reflected Power Alarm ON/OFF” and “Reflected Alarm Threshold” in the Programmable Parameters section for details.</p> <p>The RFENABLED* output signal may also be used to pre-position Seren IPS Inc. AT-Series Matching Networks. Refer to “Matching Network Preset Mode”, “Tune Capacitor Preset Position”, and “Load Capacitor Preset Position” in the Programmable Parameters section. Requires +5VDC pull-up enabled.</p> <p><b>NOTE:</b> For units manufactured on or before July 30, 2005, this pin is internally pulled up to +5VDC. For unit manufactured on August 1, 2005 and later, this pin may be configured as internally pulled up to +5VDC (factory default configuration) or without a +5VDC pull-up. (OEM custom configurations). Configuration is set at the factory. Use pin 18 for a reference return.</p>
9	GND	Internally connected to chassis ground. Connect to system controller common or ground reference.
10	FWD MON	<p>Forward power monitor output signal. Analog output, selectable 0 to +5VDC or 0 to +10VDC range via front panel controls.</p> <p>Output is linearly proportional to 0 to 100% of rated forward power.</p> <p>Refer to the Power Monitor Scaling subsection in the appropriate model specification for forward power monitor scaling details.</p> <p>The forward power monitor output signal may also be used to pre-position Seren IPS Inc. AT-Series Matching Networks. Refer to “Matching Network Preset Mode”, “Tune Capacitor Preset Position”, and “Load Capacitor Preset Position” in the Programmable Parameters section.</p> <p>Measure monitor voltage with respect to pin 22 (FWDRET).</p>

Summary of product specifications - consult operator's manual, local Seren IPS representative, or factory for full detail.

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PIN LIST: R/Lx01-SERIES 25-PIN ANALOG INTERFACE CONNECTOR		
PIN	SIGNAL NAME	DESCRIPTION
11	REFP MON	<p>Reflected power monitor output signal. Analog output, selectable 0 to +5VDC or 0 to +10VDC range via front panel controls.</p> <p>Refer to the Power Monitor Scaling subsection in the appropriate model specification for reflected power monitor scaling details.</p> <p>The reflected power monitor output signal may also be used to pre-position Seren IPS Inc. AT-Series Matching Networks. Refer to "Matching Network Preset Mode", "Tune Capacitor Preset Position", and "Load Capacitor Preset Position" in the Programmable Parameters section.</p> <p>Measure monitor voltage with respect to pin 23 (REFRET).</p>
12	FEEDBACK	<p>External feedback voltage signal. Analog input, 0 to +10.0VDC . Use pin 16 or 17 or (GNDI) for return reference.</p> <p>The RF Power Supply will automatically adjust its output power to maintain the FEEDBACK signal's magnitude at the same level as the SETPOINT signal magnitude. The PROBE voltage will be displayed on the front panel. The PROBE attenuation factor can be configured from the front panel.</p> <p>The external feedback signal is derived from a voltage probe (RF or DC) located elsewhere in the plasma or process system. Refer to the controls section for detailed instructions on how to configure and use this mode.</p> <p>Note: The feedback voltage polarity must match the setpoint input's (pin 13) polarity for proper operation of voltage control mode. The RF Power Supply's external feedback circuitry is not designed to function with Negative (-) polarity signals applied to this pin.</p>
13	SETPPOINT	<p>Power or Voltage setpoint input. Analog, high-impedance, differential input with selectable 0 to +5.0VDC or 0 to +10.0VDC range via front panel controls.</p> <p>Refer to the controls section of the operator's manual for detailed instructions on how to configure and use this mode</p> <p>NOTE: SETRET (pin 25) <b>MUST</b> be referenced to common or ground at the setpoint voltage source (system controller) or the RF output power will behave erratically.</p> <p>Refer to the Analog Setpoint Sensitivity subsection of the appropriate model specification for setpoint sensitivity details.</p> <p>NOTE: Feedback voltage range and polarity must match setpoint voltage range and polarity for proper operation in voltage control mode.</p> <p>Pin 13 is the positive (+) input of the differential setpoint amplifier.</p> <p>Active only in ANALOG control mode.</p>

Summary of product specifications - consult operator's manual, local Seren IPS representative, or factory for full detail.

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PIN LIST: R/Lx01-SERIES 25-PIN ANALOG INTERFACE CONNECTOR		
PIN	SIGNAL NAME	DESCRIPTION
14	No Connection R101MKII, L101MKII, R301MKII L301MKII, R/L601, R/L1001, R/L2001, R/L3001, R5001, R8001, R10001, R15001	No Connection  <b>Note:</b> Applicable to models R101MKII, L101MKII, R301MKII, L301MKII, R/L601, R/L1001, R/L2001, R/L3001, R5001, R8001, R10001, and R15001
15	INTERLOCK-RTN	Ground return for External Interlock (pin 2)
16	GNDI	Ground return for pins 3,4,5,6,7,19. Internally connected to chassis ground. Connect to system controller common or ground reference
17	GNDI	Ground return for pins 3,4,5,6,7,19. Internally connected to chassis ground. Connect to system controller common or ground reference
18	RFENABLED RET	Ground return for pin 8 (RFENABLED* signal). For units manufactured on or before July 30, 2005, this pin is internally connected to chassis ground (GNDI). For unit manufactured on August 1, 2005 and later, this pin may be configured as internally connected to chassis ground (GNDI) (factory default configuration) or isolated from chassis ground (OEM custom configurations). Configuration is set at the factory. Connect to system controller common or ground reference.
19	RL-IN	Remote Limit input. Analog input, 0 to +5VDC range. Use pin 16 or 17 (GNDI) for return reference. Used in dual-bias or multiple power supply systems to fold-back the power supply's output power if reflected power is detected by another power supply in the system. Output power folds back in response to an external voltage applied to this input. Foldback threshold is factory preset at +5.00VDC (Disabled). Consult factory for assistance.
20	RL-OUT	Remote Limit Output. Analog output, 0 to +10VDC range. Buffered, high-speed, non-linearized directional coupler reflected power signal. Return reference is pin 23. Used on dual-bias or multiple power supply systems. Consult factory for assistance.

Summary of product specifications - consult operator's manual, local Seren IPS representative, or factory for full detail.

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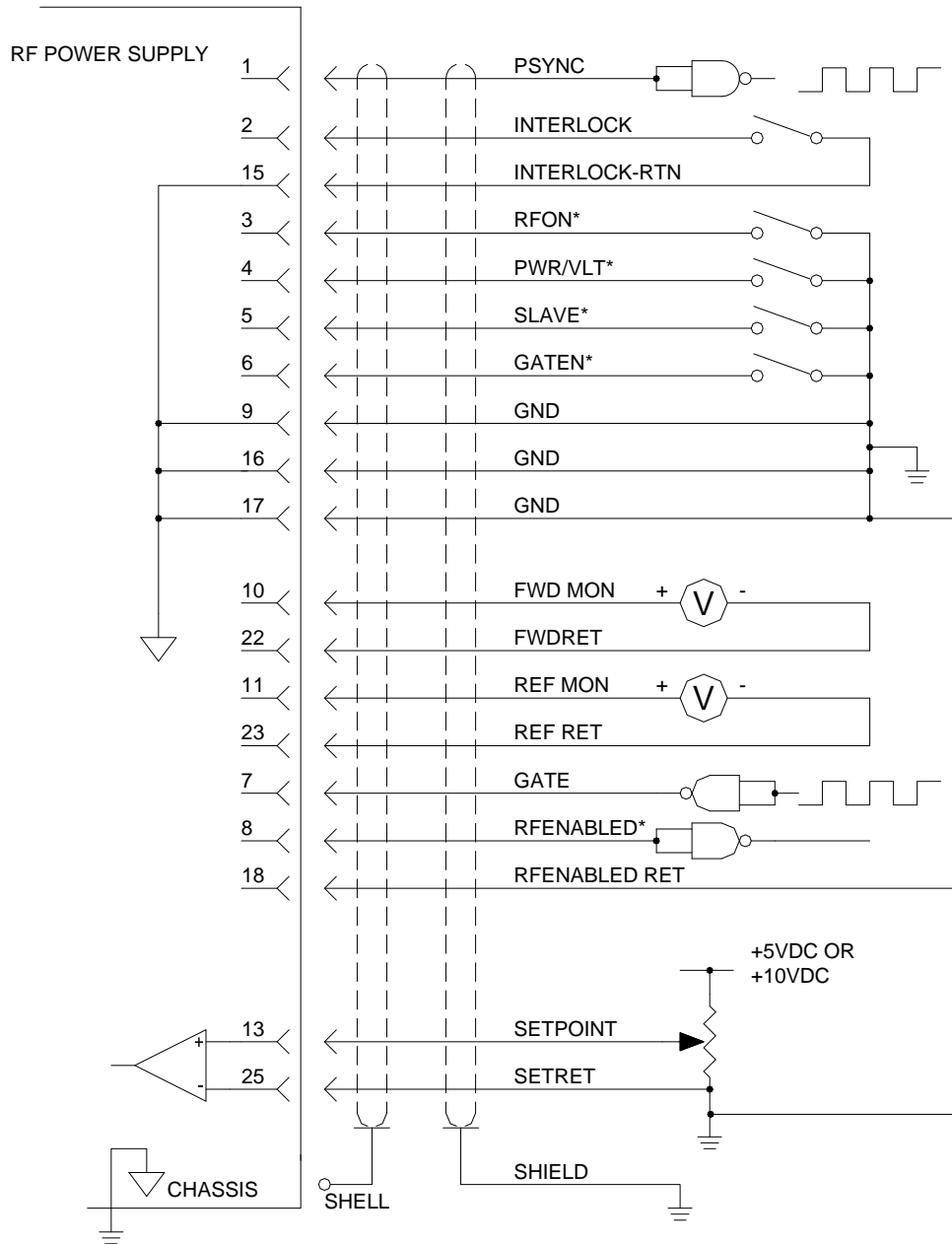
PIN LIST: R/Lx01-SERIES 25-PIN ANALOG INTERFACE CONNECTOR		
PIN	SIGNAL NAME	DESCRIPTION
21	PHASE	<p>External Phase Sensor Input. Analog Input, -10.0VDC to +10.0VDC range.</p> <p>Used in conjunction with the Variable Frequency Tuning (VFT) feature. On VFT-enabled units with VFT Feedback Mode set to "PHASE TUNE MODE +" or "PHASE TUNE MODE -" the voltage signal from an external phase detector is used to steer the RF output's frequency.</p> <p>The external phase detector's output is applied to the PHASE input signal. When the PHASE signal is 0.00VDC, the RF Power Supply assumes reflected power is at minimum and stops the tuning process.</p>
22	FWDRET	Forward Power Monitor return. Analog output. For pin 10.
23	REFRET	Return reference for Reflected Power Monitor and Remote Limit output signals. Analog output. For pins 11 and 20.
24	No Connection	<p>No Connection</p> <p><b>NOTE:</b> Applicable to: Models R101MKII, L101MKII, R301MKII L301MKII with software version 9.0J3 or greater, <b><i>with or without</i></b> rear panel "DCP" connector installed. Models R101, L101, R301, L301 <b><i>without</i></b> rear panel "DCP" connector installed. Models R/L601, R/L1001, R/L2001, R/L3001, R5001, R8001, R10001, and R15001</p>
	FEEDBACK R101, L101 R301, L301 R101MKII, L101MKII, R301MKII L301MKII Models only	<p><b>Note:</b> This pin function is not supported on units with software version 9.0J3 or greater because the user can route the inverted probe signal to pin 12 via a selection in the programming menu.</p> <p>External feedback voltage signal. Analog input, 0 to +10.0VDC. Internally connected to pin 12.</p> <p>Use pin 16 or 17 (GNDI) for return reference.</p> <p>The RF Power Supply will automatically adjust its output power to maintain the FEEDBACK signal's magnitude at the same level as the SETPOINT signal magnitude. The PROBE voltage will be displayed on the front panel. The PROBE attenuation factor can be configured from the front panel.</p> <p>The external feedback signal is derived from a voltage probe (RF or DC) located elsewhere in the plasma or process system. Refer to the controls section for detailed instructions on how to configure and use this mode.</p> <p>Note: The feedback voltage polarity must match the setpoint input's (pin 13) polarity for proper operation of voltage control mode.</p> <p><b>Note:</b> Applicable <b><i>only</i></b> to models R101, L101, R301, L301, R301MKII, L301MKII with software version 9.0J2 or less, with optional "DCP" connector installed on the rear panel.</p>

PIN LIST: R/Lx01-SERIES 25-PIN ANALOG INTERFACE CONNECTOR		
PIN	SIGNAL NAME	DESCRIPTION
25	SETRET	<p>Setpoint Return. Analog differential input (-). Note: This pin <b><i>must</i></b> be connected to a ground reference or the unit's output will behave erratically</p> <p><b>NOTE:</b> Applicable to: Models R101MKII, L101MKII, R301MKII, and L301MKII with software version 9.0J3 or greater, <b><i>with or without</i></b> rear panel "DCP" connector installed. Models R101, L101, R301, L301 <b><i>without</i></b> rear panel "DCP" connector installed. Models R/L601, R/L1001, R/L2001, R/L3001, R5001, R8001, R10001, R15001</p>
	INVPROBE R101, L101 R301, L301 R101MKII, L101MKII, R301MKII L301MKII Models only	<p><b>Note:</b> This pin function is not supported on units with software version 9.0J3 or greater because the user can route the inverted probe signal to pin 12 via a selection in the programming menu.</p> <p>Inverted Probe Output. Analog output, 0 to +10.0VDC. Inverted polarity signal derived from the optional rear panel "DCP" BNC connector. Magnitude of the signal remains identical, polarity changed from negative (at the PROBE connector) to positive. Connect to pin 24 (if required) when using external feedback to regulate RF output level.</p> <p><b>Note:</b> Applicable <b><i>only</i></b> to models R101, L101, R301, L301, R301MKII, L301MKII with software version 9.0J2 or less, with optional "DCP" connector installed on the rear panel.</p>



Typical Analog Interface Connections (Analog Control)

There are many possible analog interface wiring schemes. Basic analog interface connections are diagrammed below. Refer to the Analog Interface Connector pin list in the Rear Panel Controls and Connections section of the operator's manual for signal details. Use shielded cable for all interconnections.



Typical Analog Interface Connections



Notes:

- The information in this document is provided as a convenience. For detailed information, consult the product's Operator's Manual.
- For assistance with technical matters, contact your local Seren IPS Inc. representative or the factory.
- All features or functions may not be supported on all models or with all firmware versions. All features or functions may not be supported on OEM and custom-configured products.
- In the event of a discrepancy between this document and the product Operator's Manual, the Operator's Manual is the prevailing authority.
- Specifications and information in this document subject to change without notice.