SEREN

INDUSTRIAL POWER SYSTEMS INC.

MCRS and PSRS
REMOTE DISPLAY PANEL
ACCESSORY

OPERATOR'S MANUAL

Revision: 1.04
Standard Configuration

Document Number 600040000

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Introduction

Thank you for purchasing your new SEREN IPS product. Seren products are designed to provide the best value, ease of operation, and reliability for plasma processing and industrial RF systems. This manual covers specifications, installation, and operation of the Seren IPS Inc. model MCRS and model PSRS Remote Display Panels.

Information

To get answers for any questions you might have regarding your plasma or processing system, please contact your system vendor first. Your system vendor knows the intimate details of how your equipment interfaces and operates with the MCRS or PSRS Remote Display Panel and related equipment and can efficiently resolve system related problems.

For questions directly related to the MCRS or PSRS Remote Display Panel, you may call us, Monday through Friday, 8:00am to 5:00pm, United States Eastern Time, at:

1-856-205-1131

Service

For Remote Display Panels purchased with a processing system, or covered under a service contract from your system vendor, please contact the system vendor to arrange for service.

For after-market or end user customers, a SEREN IPS customer service representative will arrange for service. Call us, Monday through Friday, 8:00am to 5:00pm, United States Eastern Time, at: **1-856-205-1131**

Please note: Equipment returned to us without prior authorization or without a Return Materials Authorization (RMA) number visible on the outside of the package will be refused.

How to Contact Us

Our address, telephone, and fax numbers are listed below.

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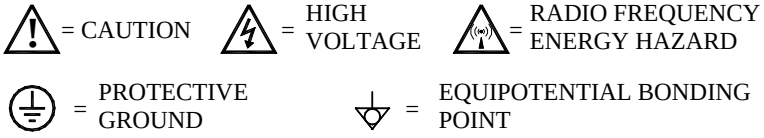
Safety Notes

Seren IPS Inc. accessory products have been designed and tested to meet strict safety requirements. These include independent lab examination and approval, and compliance to established standards. Please read the following instructions carefully before operating the MCRS or PSRS Remote Display Panels and refer to them as needed to ensure the continued safe operation of the Remote Display Panel.

If the MCRS or PSRS Remote Display Panel accessories are used in a manner not specified herein or if unauthorized modifications are performed to the MCRS or PSRS Remote Display Panel accessory, the safety protections built into the Remote Display Panel accessory may be impaired.

Follow all warnings and instructions marked on or supplied with the product.

Symbology:



Unplug or disconnect this equipment from the power source before cleaning or re-configuring the AC mains voltage.

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

Do not place this equipment on an unstable cart, stand, or table. The Remote Display Panel may fall, causing personal injury or damage to the Remote Display Panel.

This product is equipped with a power cord and grounding type plug. This is a safety feature. 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.

It is the responsibility of the installer to provide a proper protective ground from the Remote Display Panel to earth ground, in accordance with local and national electrical codes, and any other codes applicable to the user.

The Remote Display Panel 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 an electrician or your local power company.

The power supply cord and plug is the disconnect device for this equipment. If the plug is removed from the cord and the power cord is hard wired to the power source, it is the responsibility of the installer to provide a disconnect device.

Do not allow anything to rest on the power cord or interconnecting cables. Do not locate the Remote Display Panel where persons will step on the power or interconnecting cables.

Slots and Openings in the equipment's chassis are provided for ventilation. To ensure reliable operation of the Remote Display Panel, 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 the unit.

Never push objects of any kind into the slots and openings of the Remote Display Panel's enclosure. They may touch dangerous voltage points or short out parts, which could result in a fire or electric shock.

Never spill liquid of any kind on or into the Remote Display Panel.

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.

For SEMI S2 compliance, the system power distribution panel, system integrator, or end-user must supply an over-current protection device (fuse or circuit breaker) with a minimum interrupting capacity of 5,000A (5,000AIC).

For SEMI S8 compliance, the Remote Display Panel must be mounted with the centerline of the front panel display per the chart below:

Use Class	Description	Height above the floor
Frequent	Used in processing or job cycle at least once per hour.	37.0 inches (93.9 cm) to 50.0 inches (127.0 cm)
Infrequent	Used in processing or job cycle less frequently than once per hour.	33.0 inches (83.8 cm) to 64.5 inches (163.8 cm)
Very Infrequent	Used less often than once every 24 hours.	0.0 inches (0.0 cm) to 64.5 inches (163.8 cm)



CAUTION!



ELECTRICAL SHOCK HAZARD PRESENT INSIDE UNIT, AND AT THE MAINS INPUT CONNECTOR.
DO NOT REMOVE COVERS.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

MCRS and PSRS Remote Display Panel Features

Seren IPS Inc. Remote Display Panels are intended for use with compatible Seren ATS-Series Matching Networks and HR-Series radio frequency (RF) power supplies.

The **MCRS** Remote Display Panel is designed for use with Seren IPS Inc. **ATS-Series** automatic impedance matching networks. ATS-Series matching networks are embedded devices with an internal controller. Being an embedded device, the ATS-Series matching network is operated by the user's system controller and has no operator controls. The MCRS Remote Display Panel provides operator controls similar to a Seren MC2 Matching network controller.

Note: The MCRS Remote Display Panel does not provide power to the ATS-Series matching network and is not powered by the ATS-Series matching network.

The **PSRS** Remote Display Panel is designed for use with Seren IPS Inc. **HR-Series** RF power supplies. HR-Series RF power supplies are embedded devices without operator controls. Being an embedded device with only a few status indicator lights on the front panel, the HR-Series RF power supply is operated by the user's system controller. The PSRS Remote Display Panel provides operator controls similar to a Seren R/LX01-Series RF power supply.

Note: The PSRS Remote Display Panel does not provide power to the HR-Series RF Power Supply and is not powered by the HR-Series RF Power Supply.

Other Remote Display Panel features:

- Small ½ Rack, 2U High Package, suitable for permanent installation or for use as a portable configuration/service tool.
- Flexible AC Mains voltage:
  90-264VAC operating range, universal input, no transformer taps to configure.
- Easy to read 4 Line Vacuum Fluorescent display.
- Provides a human-mode interface to embedded ATS-Series matching networks and HR-Series RF power supplies.
- Provides access to internal features and programming environments on the ATS-Series and HR-Series products.

Scope:

This manual covers the installation and basic use of the MCRS and PSRS Remote Display Panels. This manual does not discuss the operation of ATS-Series Matching Networks or HR-Series RF power supplies. Operational details of the ATS-Series matching networks and HR-Series RF power supplies connected to remote display panels are discussed in their respective operator's manuals.

Installation:

Recommended mounting:

Seren IPS Inc. Remote Display Panels are designed for mounting within an equipment rack or tabletop use in a clean, dry environment. Environment type: Pollution Degree 2. The system enclosure, equipment rack, or table must be capable of supporting the full weight of the unit. The system enclosure or equipment rack must be constructed in such a manner as to provide sufficient shielding and AC mains filtering for RFI/EMC regulatory concerns.



Seren IPS MCRS and PSRS Remote Display Panels are designed for operation in a clean, dry environment (Pollution Degree 2). Operation in dirty/dusty/wet/ harsh environments (Pollution Degree 3 or greater) may result in damage to the Remote Display Panel's internal components and is not covered under warranty.

MCRS and PSRS Remote Display Panels are supplied with Rack Mounting Ears. The mounting ears are for securing the Remote Display Panels to the equipment rack rail. The user is responsible for providing mounting hardware. The MCRS/PSRS Remote Display Panel weighs 3.0 lbs (1.36kg).

Note: For **SEMI S8 Compliance**, the Remote Display Panel Accessory must be mounted with the centerline of the front panel display located per the chart below:

Use Class	Description	Height above the floor
Frequent	Used in processing or job cycle at least once per hour.	37.0 inches (93.9 cm) to 50.0 inches (127.0 cm)
Infrequent	Used in processing or job cycle less frequently than once per hour.	33.0 inches (83.8 cm) to 64.5 inches (163.8 cm)
Very Infrequent	Used less often than once every 24 hours.	0.0 inches (0.0 cm) to 64.5 inches (163.8 cm)

Mounting Options for ½-Rack Remote Display Panels:

One (1) Remote Display Panel may be mounted in a 9.5" (1/2-rack width) rack or custom enclosure.

One (1) Remote Display Panel may be mounted in a 19" equipment rack with the use of an *optional* single rack mount kit.

Two (2) Remote Display Panels be mounted in a 19" equipment rack, side-by-side, with the use of an *optional* dual rack mount kit.

Supplied Accessories:

Remote Display Panels are supplied with rack mounting ears and a power cord. The Remote Display Panel is universal input, and is supplied with a power cord appropriate for the AC mains voltage specified by the user at time of purchase. Detailed information is located in the Technical Information section of this manual.

Recommended Optional Accessories:

MCRS/PSRS Remote Panel Interconnect Cable DB9F/NSC3M, 10 ft. (304.8 cm) length
Seren Part Number 9100420120

(Other cable lengths available, consult Seren factory or your local Seren Representative for part numbers and ordering information.)

Ventilation:

The Remote Display Panel is convection cooled and requires ventilation. When the Remote Display panel is installed in a system enclosure, equipment rack or other suitable enclosure, ensure there is adequate fresh (cool) air circulated through the enclosure.



Placing the Remote Display Panel in an unventilated or sealed enclosure will create an "oven" effect and may force the unit to shut down. Continued operation under conditions of poor ventilation may degrade or damage the Remote Display Panel. Maximum ambient air temperature is +40°C

Emergency Off (EMO):

The MCRS and PSRS Remote Display Panels are accessory devices and are not equipped with an Emergency Off (EMO) device. It is recommended that the MCRS or PSRS Remote Display Panel connected to an external, user-supplied, AC mains distribution panel that provides EMO function by disabling AC mains power to the MCRS or PSRS Remote Display Panel.

Disabling AC mains power under an emergency (EMO) condition will not adversely affect the MCRS remote display paned (and it associated ATS-Series matching network) or the PSRS Remote Display Panel (and its associated HR-Series RF power supply). The remote display panel accessory will shut off and communications with the ATS matching network (model MCRS) or HR-Series RF Power Supply (model PSRS) will cease.

When AC mains power is restored to the MCRS remote display panel and its associated ATS-Series matching network, the ATS-Series matching network returns to its previous state. (The ATS-Series matching network is a passive device and does not produce power on its own.)

When AC mains power is restored to the PSRS display panel and its associated HR-Series RF power supply, both will power-up, but the RF power supply will not deliver RF output power. For safety reasons, the HR-Series RF Power supply's RF output must be re-enabled by remote communication to the RF power supply or an operator via the PSRS Remote Display Panel.

Note: HR-Series RF power supplies are equipped with an external interlock signal function on the Analog Interface connector ("Standard" interface configuration) or the Interlock and Feedback connector ("DeviceNet" interface configuration). This is not an EMO connection/function.

The HR-Series RF power supply's Analog Interface connector (or Interlock & Feedback connector) external interlock must be satisfied in order to enable RF output. If the external interlock is tripped while the RF output is "on", AC mains power remains on, and the RF output is disabled.

When the HR-Series RF power supply's Analog Interface connector (or Interlock & Feedback connector) external interlock is reset, the RF output will not be automatically re-enabled. A remote communication or operator intervention (using an optional Remote Display Panel) is required to re-enable the RF output.

The HR-Series RF power supply's Analog Interface connector and Feedback connector signals are discussed in detail in the Rear Panel Controls and Connections section of the HR-Series RF Power Supply Operator's Manual, Seren IPS Document Number 6100240000.

If AC Mains power to the MCRS or PSRS remote display panel is disabled but the power to the ATS-Series matching network or HR-Series RF power supply remains active, the Remote Display Panel accessory will shut off and communications between the associated ATS-Series matching network or HR-Series RF power supply will cease. The ATS-Series Matching network or HR-Series RF Power supply will continue to operate.

When AC Mains power to the Remote Display Panel accessory is restored, the Remote Display Panel accessory will re-establish communication with the associated ATS-Series Matching network or HR-Series RF power supply and display current operational status. Re-establishing AC Mains power to the Remote Display Panel accessory has no effect on the operation of the associated ATS-Series Matching network or HR-Series RF power supply.

Connection to AC Mains:

BEFORE connecting the Remote Display Panel to the AC mains, verify the AC Mains voltage marked on the ratings plate, located on the bottom panel of the Remote Display Panel, is compatible with your AC Mains voltage. If the AC Mains voltage on the ratings plate is not compatible with your AC Mains voltage, contact a Seren IPS Inc. service depot for assistance.



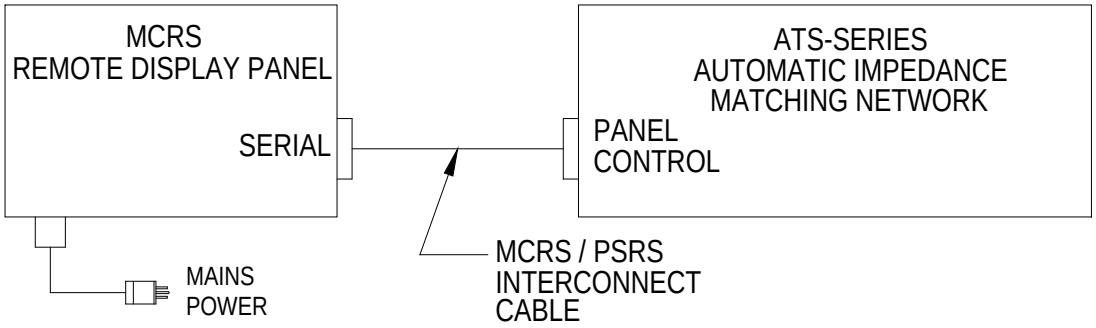
CAUTION: CHECK YOUR MAINS VOLTAGE AND THE MAINS VOLTAGE SPECIFIED ON THE RATINGS PLATE OR CONSULT A QUALIFIED ELECTRICIAN BEFORE CONNECTING THE REMOTE DISPLAY PANEL TO MAINS POWER. CONNECTING THE REMOTE DISPLAY PANEL TO THE WRONG MAINS VOLTAGE MAY DAMAGE THE REMOTE DISPLAY PANEL AND VOID THE WARRANTY.

Connect the power cord to the power inlet connector located on the rear panel of the Remote Display Panel.

Plug the power cord into a grounded AC mains power socket.

Connection to ATS-Series Matching Networks *(model MCRS only)*

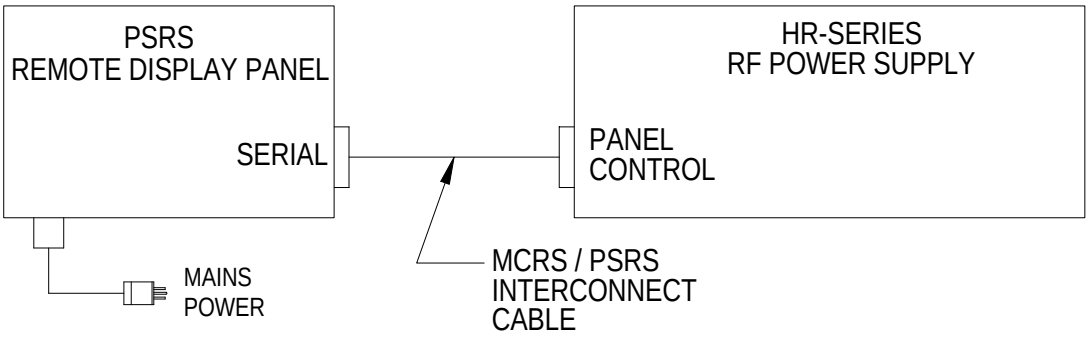
Connect the *optional* MCRS/PSRS Interconnect Cable's 9-Pin Female "D" connector to the MCRS Remote Display Panel's "SERIAL" connector. Connect the MCRS/PSRS Interconnect Cable's 3-Pin Micro-Circular connector to the ATS-Series matching network's "PANEL CONTROL" connector.



Note: The ATS-Series matching network *does not* supply power to the MCRS Remote Display Panel accessory. The MCRS Remote Display Panel Accessory *does not* supply power to the ATS-Series matching network.

Connection to HR-Series RF Power Supplies *(model PSRS only)*

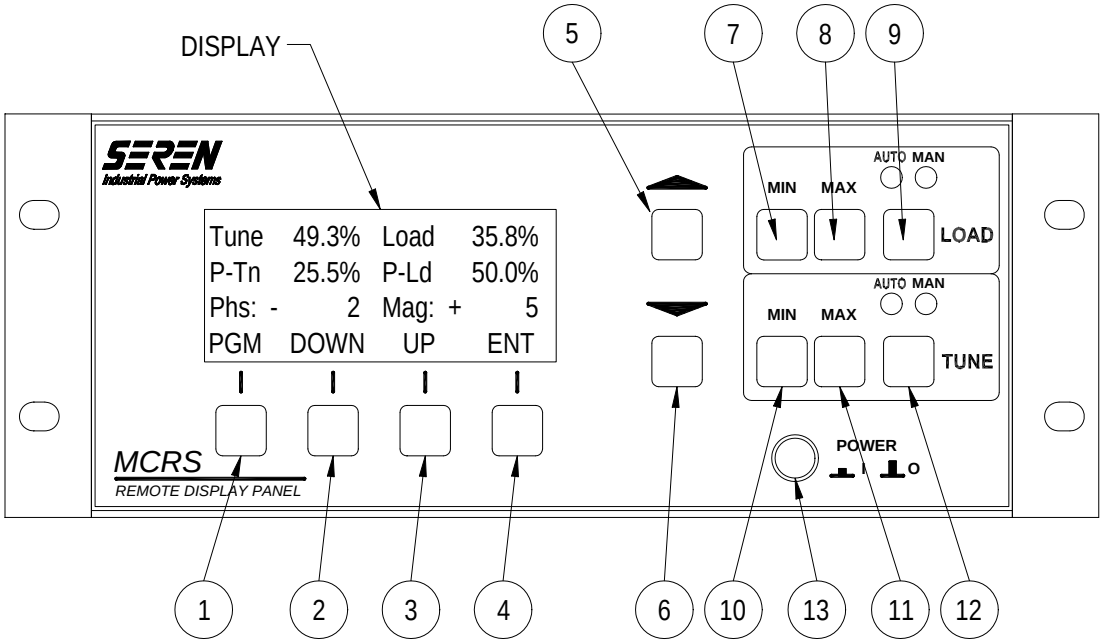
Connect the *optional* MCRS/PSRS Interconnect Cable's 9-Pin Female "D" connector to the PSRS Remote Display Panel's "SERIAL" connector. Connect the MCRS/PSRS Interconnect Cable's 3-Pin Micro-Circular connector to the HR-Series RF power supply's "PANEL CONTROL" connector.



Note: The HR-Series RF power supply *does not* supply power to the PSRS Remote Display Panel accessory. The PSRS Remote Display Panel Accessory *does not* supply power to the HR-Series RF power supply.

Front Panel Controls and Indicators

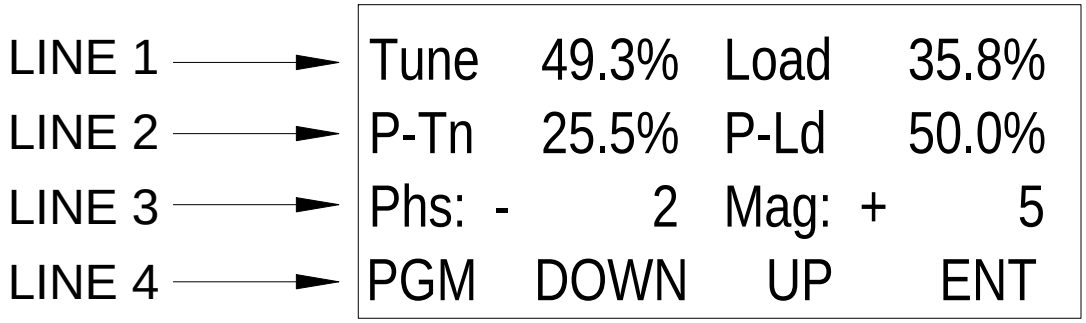
MCRS Remote Panel Controls and Display:



MCRS Remote Display Panel Buttons		
Item	**Name**	**Description**
1	Program/Run	Toggles the ATS-Series matching network's internal controller between the RUN mode and PROGRAM mode. In Program mode, display line 3 changes to show Programmable Menu Entry Options. The button legend changes from "PGM" to "RUN" when in the Program mode.
2	Down	Moves down the programming menu
3	Up	Moves up the programming menu
4	Enter	Programs (saves) changes made to a parameter
5	Value Up	Changes Parameter Value - Increment
6	Value Down	Changes Parameter Value - Decrement
7	Load Min	Manually positions Load cap towards minimum capacitance
8	Load Max	Manually positions Load cap towards maximum capacitance
9	Load Mode	Selects Load capacitor automatic or manual mode
10	Tune Min	Manually moves Tune cap to minimum capacitance
11	Tune Max	Manually moves Tune cap to maximum capacitance
12	Tune Mode	Selects Tune capacitor automatic or manual mode
13	Power Switch	AC Mains power Enable/Disable (MCRS Remote Display Panel only, Does not control power to the ATS-Series matching network)

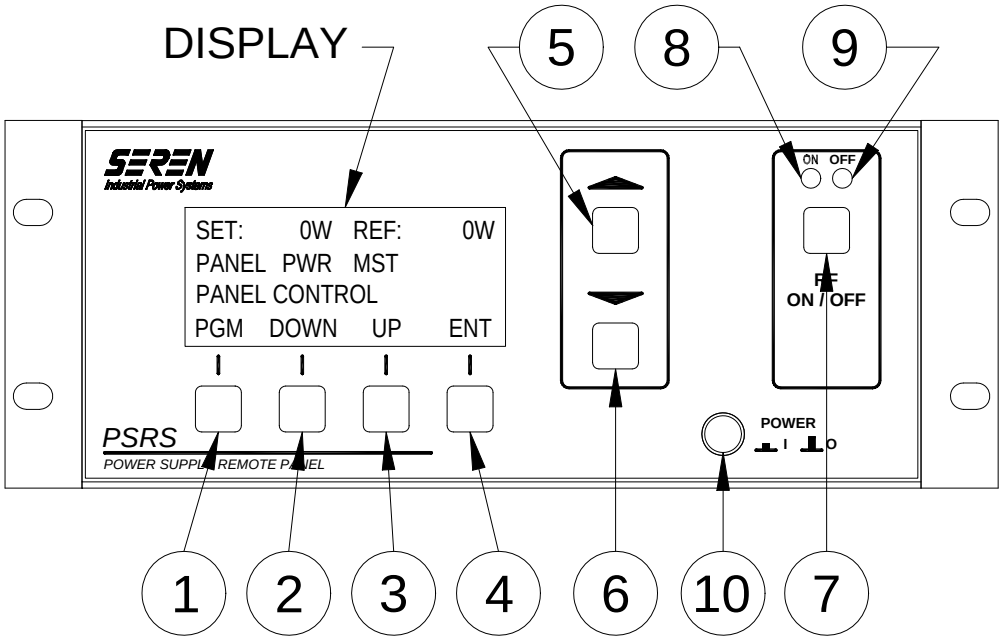
MCRS Remote Display Panel Detail

The MCRS Remote Display Panel shows the operational status of the ATS-Series matching network and provides legends for the keypad.



MCRS Display Lines	
Line	**Description**
1	Tune and Load Capacitor positions 0.0 to 100%.
2	User Configurable Display Line Displays Tune Capacitor Preset Point, Load Capacitor Preset Point (User enabled or disabled) Displays Phase and MAGnitude error signal Voltage (User enabled or disabled) Displays DC Voltage Probe or RF Voltage Probe output (User enabled or disabled)
3	User Configurable Display Line In RUN mode: Displays Tune Capacitor Preset Point, Load Capacitor Preset Point (User enabled or disabled) Displays Phase and MAGnitude error signal Voltage (User enabled or disabled) Displays DC Voltage Probe or RF Voltage Probe output (User enabled or disabled) In PROGRAM mode: Displays a programmable parameter and its current setting.
4	Keypad Menu – button legends change depending on mode

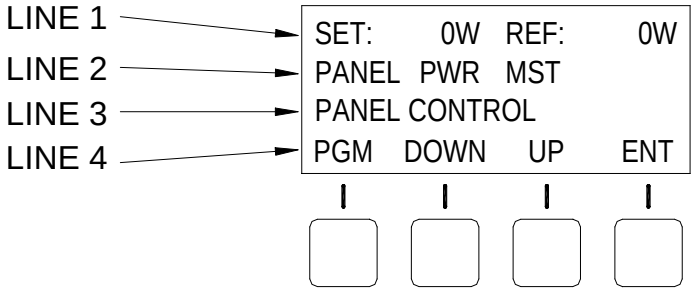
PSRS Remote Panel Controls and Display:



PSRS Remote Display Panel Buttons		
Item	**Name**	**Description**
1	Program/Run	Toggles the RF Power Supply between the RUN mode and PROGRAM mode. In Program mode, display line 3 changes to show Programmable Menu Entry Options. The button legend changes from "PGM" to "RUN" when in the Program mode.
2	Down	Moves down the programming menu
3	Up	Moves up the programming menu
4	Enter	Programs (saves) changes made to a parameter
5	Value Up	Changes Parameter Value – Increment
6	Value Down	Changes Parameter Value – Decrement
7	RF ON/OFF	Enables/Disables the RF output when in "panel" mode, disables the RF output in any operational mode.
8	RF ON Indicator Lamp	Glows RED when the RF Output is enabled (on).
9	RF OFF Indicator Lamp	Glows BLUE when the RF output is disabled (off)
10	Power Switch	AC Mains power enable/disable (PSRS Remote Display Panel only, does not control the HR-Series RF power supply's AC Mains power)

PSRS Remote Panel Display Detail

The PSRS Remote Display Panel shows the operational status of the RF Power Supply and provides legends for the keypad.



PSRS Display Lines	
Line	**Description**
1	Power Display Line Displays power setpoint and reflected power when the RF Output is disabled. Displays forward power (or load power) and reflected power when the RF output is enabled
2	Status Display Line Displays the current control source, power control mode, exciter mode and operational alarms. Operational alarms are displayed on the extreme right side of the line (see the problem solving section of the HR-Series RF Power Supply Operator's manual for alarm details). **[CONTOL SOURCE] [POWER CONTROL MODE] [EXCITER MODE] [ALARM]** Control Source: Panel = Front Panel Control Analog = Analog Interface Serial = Serial Interface Power Control Mode: PWR = Forward Power Leveling (internal power sensor) PLS = Pulsing Enabled (internal power sensor) VLT = Voltage Control (external feedback) Exciter Mode: MST = Master (internal frequency source) SLV = Slave (external frequency source)
3	User Configuration Display Line In RUN mode: Blank In PROGRAM mode: Displays a programmable parameter and its current setting.
4	Keypad Menu – button legends change depending on mode

Operation

ATS-Series Automatic Impedance Matching Networks and HR-Series RF Power Supplies are designed for embedded applications within processing systems and do not have operator-accessible front panel controls to operate the unit. In most applications, the system controller operates the ATS-Series marching network or HR-Series RF power supply. In simple systems without a system controller or if a service operator wishes to directly control the equipment, the Remote Display Panel accessory may be used. Nearly all of the ATS-Series matching network's and HR-Series RF power supply's functions and configurable parameters are accessible via the Remote Display Panel accessory.

The details of operating the ATS-Series matching network or HR-Series RF power supplies are not discussed in this manual. Please refer to the ATS-Series Matching Network Operator's Manual or HR-Series RF Power Supply Operator's Manual for operational details.

Refer to the MCRS and PSRS Remote Display Panel illustrations on the previous pages for item references.



Before operating the ATS-Series matching network or HR-Series RF power supply, ensure the matching network and/or RF power supply is properly installed and connected per their respective operator's manuals and local codes.



If the MCRS or PSRS Remote Display Panel accessories are used in a manner not specified herein or if unauthorized modifications are performed to the MCRS or PSRS Remote Display Panel accessory, the safety protections built into the Remote Display Panel accessory may be impaired.

Operating the Remote Display Panel accessory

1. Press the Remote Display Panel's front panel POWER switch to enable mains power. The display will illuminate, momentarily display the startup message and sequence-test the LED indicator lights on the front panel.

   Note: The Remote Panel Display's power switch only controls power for the Remote Display Panel accessory. The front panel power switch does not control power to the ATS-Series matching network or HR-Series RF Power supply.

2. The Remote Display Panel will briefly display "Connecting…" on the fourth line of the display while it establishes communication with the ATS-Series matching network or HR-Series RF power supply

3. After establishing communication, the Remote Display Panel displays the ATS-Series matching network's or HR-Series RF power supply's operating screen and is ready for use.

   If the Remote Display Panel continues to display "Connecting…." for more than 1 minute after power-on:

   a. Ensure the MCRS/PSRS Interconnect Cable is properly connected to the Remote Display Panel's "SERIAL" connector and to the ATS-Series matching network's or HR-Series RF power supply's "PANEL CONTROL" connector.
   b. Ensure power is connected to the ATS-Series matching network or HR-Series RF power supply and enabled.

4. Operate the ATS-Series Matching network or HR-Series RF power supply as needed.

5. Press the Remote Display Panel's front panel POWER switch to disable mains power.

   Note: When the Remote Display Panel accessory is powered off or disconnected from the ATS-Series matching network, the matching network will continue to operate.

   Note: When the Remote Display Panel accessory is powered off or disconnected from the HR-Series RF power supply, the RF power supply will continue to operate.



WARNING!

ELECTRICAL SHOCK AND RF BURN HAZARD

The Remote Panel Display's power switch only controls power for the Remote Display Panel accessory. The front panel power switch does not control power to the ATS-Series matching network or HR-Series RF Power supply.

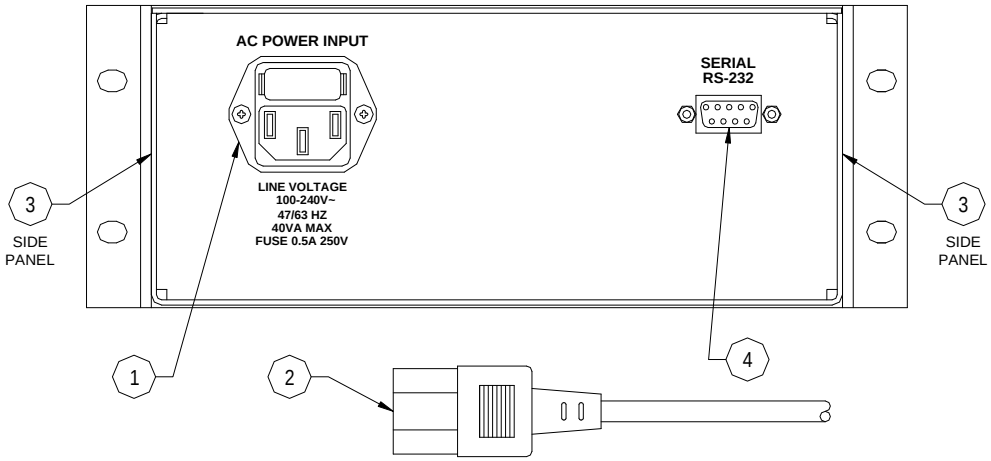
Always disable and disconnect AC Mains power to the ATS-Series matching network and HR-Series RF power supply before servicing the matching network, RF power supply or other system components.

Operational Notes

- The Remote Display Panel's front panel power switch does not control power to the ATS-Series matching network or HR-Series RF Power Supply.
- When the Remote Display Panel accessory is powered off or disconnected from the ATS-Series matching network or HR-Series RF power supply, the matching network or RF power supply continues to operate.
- The ATS-Series matching network or HR-Series RF power supply does not require the Remote Display Panel to operate.
- The Remote Display Panel accessory can be connected to or disconnected from the ATS-Series matching network or HR-Series RF supply while the Remote Display Panel is powered-on. Connecting or disconnecting the Remote Display Panel will not change the operational state of the ATS-Series Matching network or HR-Series RF power supply.
- The Remote Display Panel accessory can be connected to or disconnected from the ATS-Series matching network or HR-Series RF supply while the matching network or RF power supply is powered-on and/or operating. Connecting or disconnecting the Remote Display Panel will not change the operational state of the ATS-Series Matching network or HR-Series RF power supply.

Rear Panel Controls and Connections

Models MCRS, PSRS:



Rear Panel, Models MCRS and PSRS

1. AC Mains Power Inlet

   Power Inlet Connector: IEC60320 type male, filtered and fused
   Mating Cord Connector: IEC60320-C13
   Fuses: 0.5A 250V, Time Delay, 5mm x 20mm

   Connect the AC Mains power cord to the power inlet. The Remote Display Panel is universal input. There are no transformer taps to set or voltage selector switches to configure. The Remote Panel Display operates on 90-264VAC, 47Hz to 63Hz.

   Fuse Replacement Procedure:

   1. Disable AC mains power and disconnect the power cord from the Remote Display Panel accessory.
   2. Insert a small, flat blade screwdriver into the slot at the left slot of the fuse drawer, depress the plastic retainer clip, and gently pry the fuse drawer away from the rear panel.
   3. Insert a small, flat blade screwdriver into the slot at the right side of the fuse drawer, depress the plastic retainer clip, and gently pry the drawer away from the rear panel.
   4. Pull the fuse drawer out of the power inlet.
   5. Replace the fuses and slide the fuse drawer into the power inlet.
   6. Press the fuse drawer firmly into the power inlet – the retainer clips will engage and hold the fuse drawer in place.
   7. Re-connect the power cord and enable AC Mains power.



CAUTION: If replacing the fuses do not correct the problem or if fuses must be repeatedly replaced, discontinue use, disconnect the Remote Display Panel from AC Mains power and contact a Seren IPS service depot or service representative for assistance.

2. Power Cord

Before connecting to AC Mains power, verify the AC Mains voltage marked on the ratings plate, located on the bottom panel of the Remote Display Panel, is compatible with your AC Mains voltage. If the AC Mains voltage on the ratings plate is not compatible with your AC Mains voltage, contact a Seren IPS Inc. service depot for assistance.



CAUTION: CHECK YOUR MAINS VOLTAGE AND THE MAINS VOLTAGE SPECIFIED ON THE RATINGS PLATE OR CONSULT A QUALIFIED ELECTRICIAN BEFORE CONNECTING THE REMOTE DISPLAY PANEL TO MAINS POWER. CONNECTING TO THE WRONG MAINS VOLTAGE MAY DAMAGE THE REMOTE DISPLAY PANEL AND VOID THE WARRANTY.

The Remote Display Panel is universal input and operates on 90-264VAC. The power cord and power plug supplied with the Remote Display Panel is configured for the mains voltage specified at time of order.

3. Air Vents

The Remote Display Panel is convection cooled. Air vents are located on the sides of the unit. Keep air vents free of obstructions, dust and dirt.



When the Remote Display Panel is mounted in an enclosure or equipment rack, ensure there is an adequate air circulation within the enclosure or equipment rack. Operating the Remote Display Panel at elevated temperatures or reduced cooling for long periods of time may degrade its reliability and/or void the warranty.

4. Serial Connector

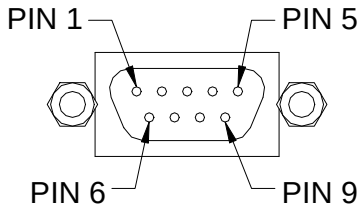
The serial connector communicates control signals and display information between the Remote Display Panel accessory and the ATS-Series Matching Network (model MCRS) or HR-Series RF Power Supply (model PSRS).

An *optional* MCRS/PSRS Interconnect Cable is required to connect the Remote Display Panel accessory to an ATS-Series matching network or HR-Series RF power supply. The interconnect cable is Seren IPS part number 9100420120 (other 910042XXXX series interconnect cables are available – consult your local Seren representative for other cable options).

Connect the interconnect cable's 9-pin "D" connector to the Remote Display Panel's "SERIAL" connector. Connect the interconnect cable's 3-pin micro-circular connector the "PANEL CONTROL" connector on the ATS-Series matching network or HR-Series RF power supply.

Note: The Remote Display Panel uses RS-232 serial protocol to communicate with the Seren IPS ATS-Series matching network or the HR-Series RF power supply. The communications parameters are fixed / non-configurable on the Remote Display Panel, the ATS-Series Matching Network, and the HR-Series RF Power Supply.

Connector Type: 9 Pin "D" Male

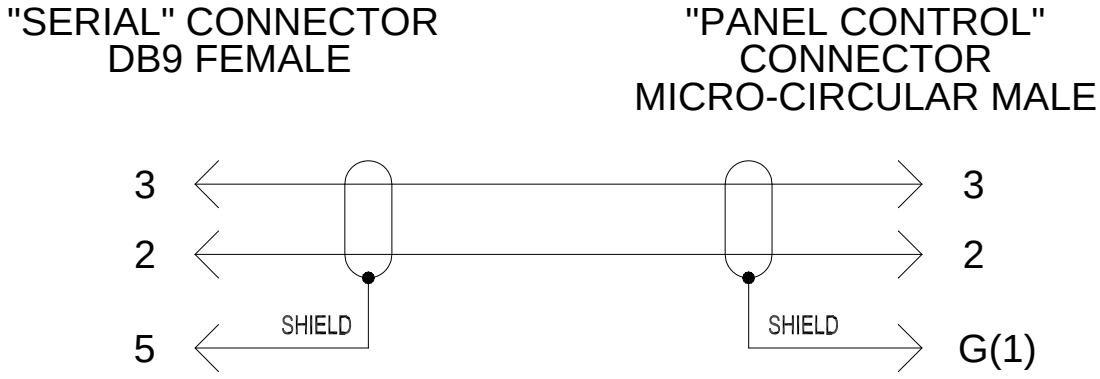


SERIAL CONNECTOR PIN LIST		
Pin	**Signal**	**Description**
1	No Connection	No Connection
2	RXB-232	RS-232 Receive Data
3	TXB-232	RS-232 Transmit Data
4	No Connection	No Connection
5	Common	Common / Ground
6	No Connection	No Connection
7	No Connection	No Connection
8	No Connection	No Connection
9	No Connection	No Connection

Remote Display Panel Interconnect Cable Wiring

Seren IPS strongly recommends the use of shielded cable when connecting the Remote Display Panel accessory to the ATS-Series Matching Network or HR-Series RF power supply. The use of unshielded cable may result in data errors and other communications problems. The *optional* MCRS/PSRS Interconnect Cable, Seren IPS part number 9100420120 is shielded and recommended for use with the Remote Display Panel.

Typical MCRS/PSRS interconnect wiring is diagrammed below.



MCRS/PSRS Interconnect Cable Wiring Diagram

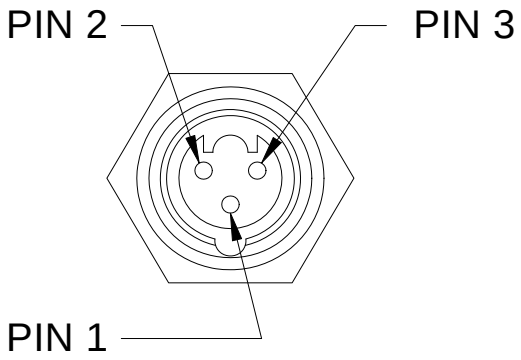
ATS-Series / HR-Series PANEL CONTROL Connector (Reference)

The "PANEL CONTROL" connector used on the ATS-Series matching network and HR-Series RF power supply is diagrammed below, for reference information purposes. The "PANEL CONTROL" connector is not part of the Remote Display Panel accessory.

The PANEL CONTROL connector only provides data signals to and from the Remote Display Panel – it does not provide power to operate the Remote Display Panel.

The Remote Display Panel can be connected to or disconnected from the ATS-Series matching network or HR-Series RF power supply at any time, with power on or off.

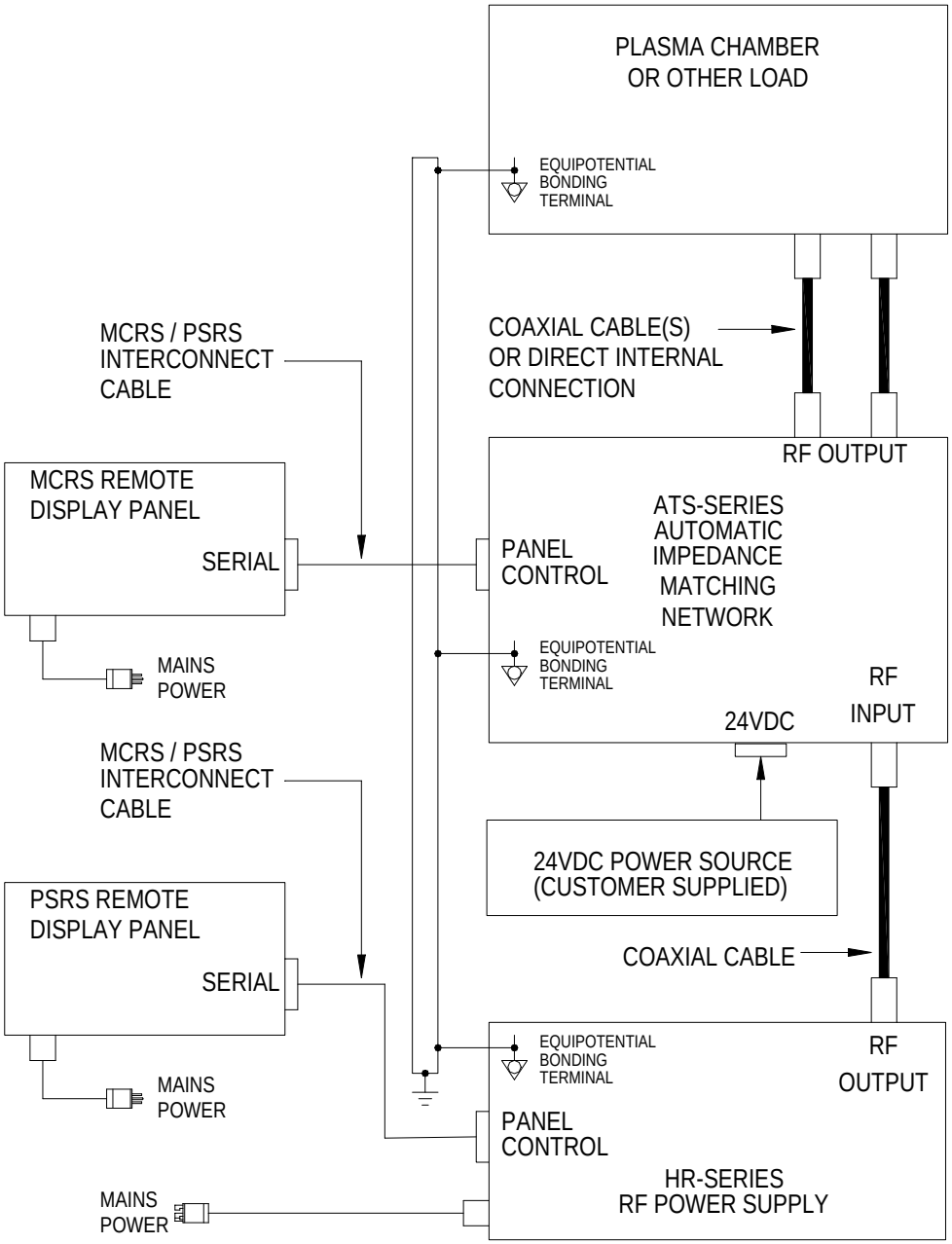
Connector Type: 3-Pin Mini Circular Female, Locking
Mating Connector: 3-Pin Mini Circular Male, Locking, Neutrik type NSC3M



PANEL CONTROL Connector Pin List		
Pin	**Signal**	**Description**
1	GND	Common. Internally connected to chassis ground
2	XMIT	Transmit Data Output
3	RCV	Receive Data Input

Typical System Configuration

A basic plasma processing system configuration is diagrammed below. Other system configurations are possible. For assistance with system configuration issues, contact the Seren IPS Inc. customer service department or a Seren IPS Inc. service depot. Coaxial cables, control cables, interconnect cables, matching networks, RF power supplies, 24VDC power supplies and plasma system equipment are not supplied with the MCRS or PSRS Remote Display Panels.



Typical Configuration – Basic Plasma Processing System

Maintenance

Seren IPS Inc MCRS and PSRS Remote Display Panels are designed to be maintenance free. There are no user-maintainable assemblies inside the unit. No routine maintenance is required.

The MCRS and PSRS Remote display Panels are designed for use in a clean, dry environment. Environment type: Pollution Degree 2. Periodically check the chassis air vents for accumulation of dust and debris. Clean the air vents with a vacuum cleaner if they appear dirty or clogged.



Restricting or blocking the air vents, or installing the Remote Display Panel Supply in a dusty environment may impact the long-term reliability of the RF Power Supply.



Seren IPS MCRS and PSRS Remote Display Panels are designed for operation in a clean, dry environment (Pollution Class 2). Operation in dirty/dusty/wet/harsh environments (Pollution Degree 3 or greater) may result in damage to the Remote Display Panel's internal components and is not covered under warranty.

Periodic Maintenance Tasks:

Periodically check the chassis air vents for accumulation of dust and debris. Clean the air vents with a vacuum cleaner if they appear dirty or clogged. Minimum inspection interval: 1 year.

Cleaning:

DO NOT clean the Remote Display Panel when AC Mains power is applied to the unit or when the unit is connected to the AC mains. The exterior of the Remote Display Panel may be cleaned with a soft cloth, dampened with soap and water or a mild solvent, such as alcohol. Allow time for the Remote Display Panel to dry before re-connecting to AC Mains power.

Lifting:

The Remote Display Panel accessory weighs 3.0 Lbs (1.36kg). No special lifting equipment or lifting procedure is required.

Servicing the MCRS or PSRS Remote Display Panel Accessory

If you are experiencing trouble with the Remote Display Panel accessory, consult the Problem Solving section first. Common problems and their resolutions are listed in the troubleshooting chart. If the problem persists, please contact Seren IPS Inc. customer service or a Seren IPS Inc. service representative for assistance.

There are no user-serviceable assemblies or components inside the MCRS or PSRS Remote Display Panel accessory. If there is an internal problem with the MCRS or PSRS Remote Display Panel accessory, the Remote Display Panel accessory must be removed from the system and returned to an authorized Seren IPS Inc. service depot for service.

Removing the MCRS or PSRS Remote Display Panel for Service:

Follow the steps below to remove the MCRS or PSRS Remote Display Panel from the system:

1. Shut down the system per the system manufacturer's instructions and lock out access to the system controls.
2. Disable and lock out AC mains power to the system and to the MCRS or PSRS Remote Display Panel accessory.
3. Discharge any hazardous energy sources in the system per the system manufacturer's instructions.
4. Unplug the MCRS or PSRS Remote Display Panel accessory's power cord from AC mains power. If the power plug has been removed and the power cord and the power cord is hard-wired to AC mains power, disconnect the power cord from the rear panel AC Mains power inlet.
5. Disconnect the power cord form the rear panel AC Mains Power inlet.
6. Disconnect the remote panel interconnect cable from the rear panel "SERIAL RS232" connector.
7. Remove the MCRS or PSRS Remote Display Panel accessory from the system.

Disposal of the MCRS or PSRS Remote Display Panel Accessory

MCRS or PSRS Remote Display Panel accessories which are no longer desired or have no further use must be properly recycled or disposed of in accordance with appropriate local and national directives.

The MCRS and PSRS Remote Display Panel accessories consists mainly of the following materials: Metals - aluminum, copper, brass, steel; Plastics; Others.

There are no batteries used in this product.

Problem Solving

Problem Solving Chart
Remote Display Panel Indicators and Alarm Messages

The following chart lists common problems and alarm messages related to the operation of the MCRS and PSRS Remote Display Panels that may occur, and the recommended solutions. The chart does not discuss problems and alarm messages related to the operation of ATS-Series matching networks and HR-Series RF Power Supplies. Consult the ATS-Series Matching Network operator's manual (for MCRS) or the HR-Series RF Power Supply operator's manual (for PSRS) for detailed information on problems and alarm messages not listed below.

Note: The ATS-Series Matching Networks and HR-Series RF Power supplies will operate properly if the Remote Display Panel accessory is disconnected or powered down during use, or if the Remote Display Panel is not connected.

Follow the suggested solutions until the problem is corrected. If the problem persists, please contact Seren IPS Inc. customer service or a Seren IPS Inc. service representative for assistance.

MCRS / PSRS Troubleshooting Chart	
Condition	**Suggested Solution**
The front panel display does not illuminate	1. Check the AC mains power source. Ensure the AC mains power is the proper voltage/frequency, and is enabled/on. 2. Ensure the unit's power plug (if equipped) is properly connected to the power source. 3. Verify the power cord is firmly seated in the rear panel power inlet connector. 4. Verify the front panel power switch is in the "1" (on) position. 5. Check/replace the fuses in the AC Mains power inlet. Refer to the fuse replacement procedure in the Rear Panel Controls and Connections section.
The text "Connecting…." is shown on line 4 of the remote panel's display	The Remote Panel Interconnect Cable may not be properly connected: 1. Verify the cable is securely connected to the Remote Panel Display's rear panel "Serial" connector.

MCRS / PSRS Troubleshooting Chart	
Condition	**Suggested Solution**
	2. Verify the cable is securely connected to the "Panel Control" connector on the ATS-Series Matching Network or HR-Series RF Power Supply. The power to the ATS-Series Matching Network or HR-Series RF Power Supply may be disabled or disconnected. 1. Verify the power source for the ATS-Series Matching Network or HR-Series RF Power Supply is enabled and properly connected to the unit. 2. HR-Series RF Power supplies only: Ensure the RF power supply's circuit breaker is in the "On" or "1" position (enabled).

Technical Data

Specifications and other technical data are listed by model type, and where applicable, by Seren IPS Inc. part number.

Remote Display Panel Identification

Seren IPS Inc. manufactures multiple variations of its products. Variations include AC mains voltage, and OEM specific hardware and software features. Detailed information about the Remote Display Panel is listed on the ratings plate located on the bottom panel.

The following configuration information is located on the ratings plate:

- Model Type
- Manufacture Date
- Seren IPS Inc. Part Number (10-digit)
- Serial Number
- Customer Part Number (CPN) (optional)
- AC Mains Voltage, AC Mains Frequency, AC Mains Current
- AC Mains Phase, AC Mains Input Power
- Firmware Version

MCRS and PSRS Specifications

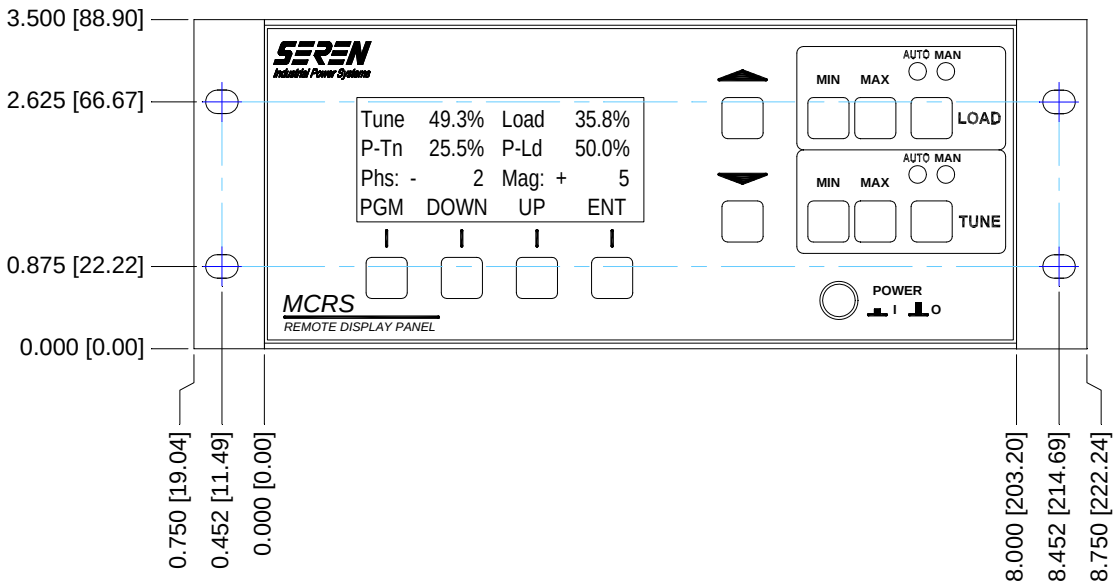
AC Mains Input Power	Rated Voltage: 100-240V (universal input), Single Phase. Operating Voltage Range: 90-264V There are no transformer voltage taps to configure. AC mains voltage specified at time of order determines supplied power cord connector type. Frequency: 47-63 HZ Current: 0.5A Maximum. Power required: 40VA Maximum	
	Over-current Protection:	Fuses, (contained in power inlet connector) 2x 0.5A, 5mm x 20mm, time-delay fuses.
	Short Circuit Current Rating (SCCR)	5KA
	Note: For SEMI S2 compliance, the system power distribution panel or system integrator must supply an over-current protection device (Fuse or circuit breaker) with a minimum interrupting capacity of 2,000A (5,000AIC).	
	Power Inlet: Type IEC60320-C13	
Power Cord and Power Connector	120V Nominal Configuration:	18/3 Type SJT, 2m length, with NEMA 5-15P plug. Seren Part Number 4500680000
	220V Nominal Configuration:	18/3 Type SJT, 2m length, with NEMA L6-15P plug. Seren Part Number 4500740000
Environment:	Operating Temperature Ambient:	0 to +40°C
	Operating Relative Humidity:	10% to 90%, non-condensing
	Atmospheric Pressure, Operating:	683 mBar minimum (approx 3000m above sea level)
	Atmospheric Pressure, Storage:	585 mBar minimum (approx 4000m above sea level)
	Atmospheric Pressure, Transporting:	480 mBar minimum (approx 5000m above sea level)

MCRS and PSRS Specifications

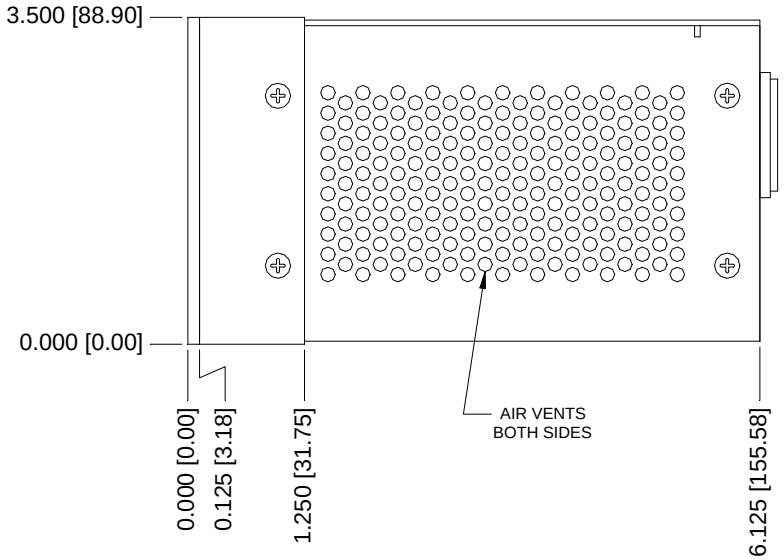
	Pollution Degree:	2
Cooling:	Convection	Vents in sides of unit. Observe specified panel clearances and mounting instructions.
Interface Connections:	Serial	9 Pin Male D-Sub Connector
Labels:	Safety:	Per customer requirements. Labels may include Hazardous Voltage, Heavy Object
	Identification:	Seren IPS Inc. part number, serial number, and customer part number (optional)
Supplied Accessories:	Power Cord ½-Rack-Mount Ears (attached) Product Information CD-ROM	
Optional Accessories:	MCRS/PSRS Remote Panel Interconnect Cable DB9F/NSC3M, 10 ft. length Seren Part Number 9100420120 (Other cable lengths available, consult Seren factory or your local Seren Representative for part numbers and ordering information.)	
Dimensions inch (mm):	3.50 (88.90) High x 9.50 (241.30) Wide x 6.13 (155.58) Deep. Width includes ½-Rack Mounting Brackets. Width without ½-Rack Mounting Brackets: 8.00 (203.2)	
Weight:	3.0 Lbs (1.36kg)	

Physical Dimensions

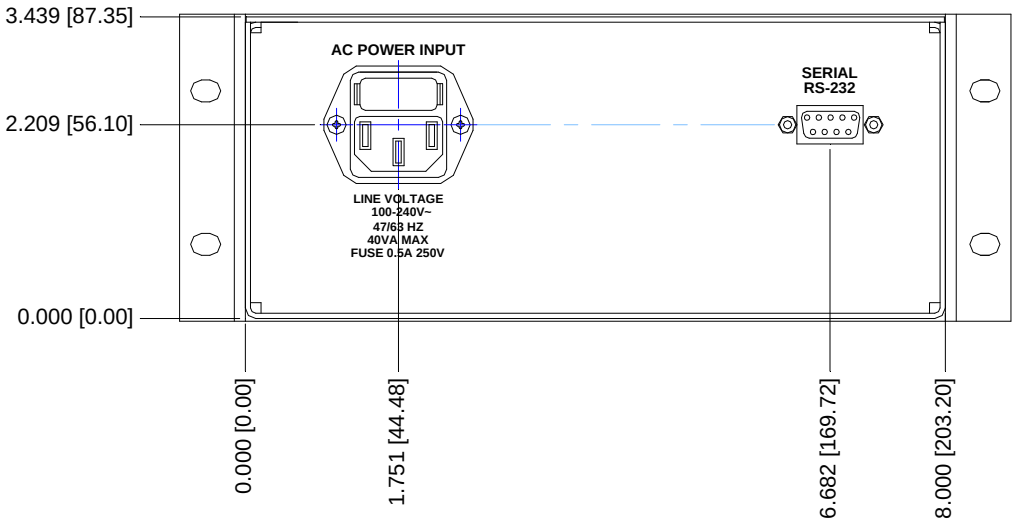
Models MCRS, PSRS



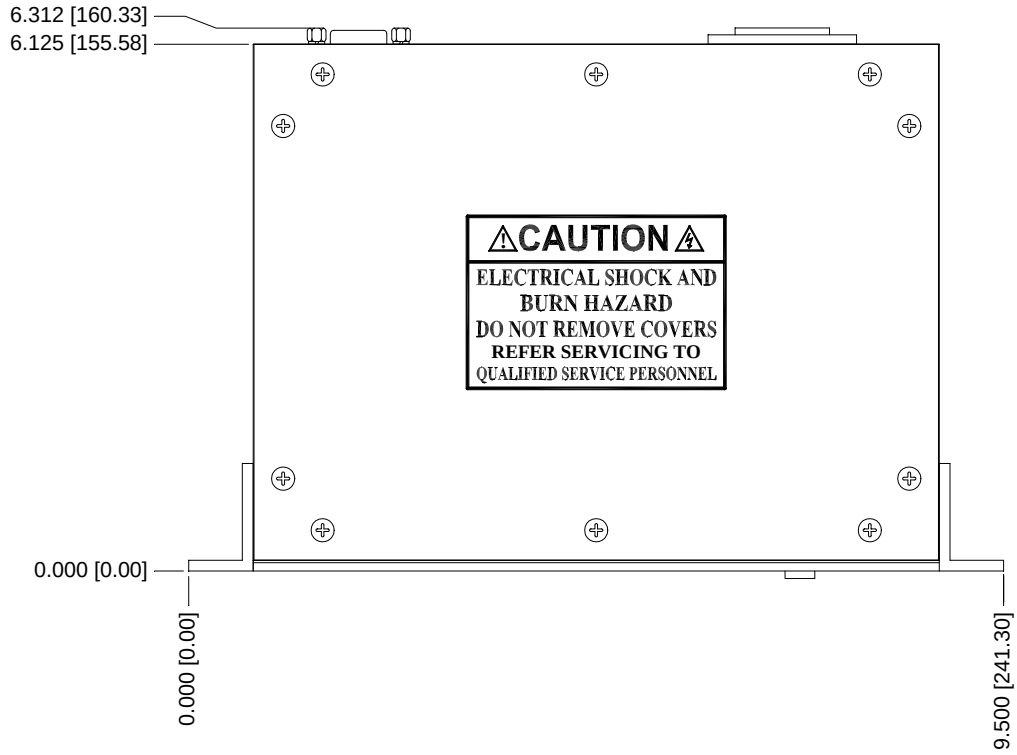
Front View, Remote Display Panel (model MCRS Shown)
Dimensions in Inch [mm]



Side View, Remote Display Panel
Dimensions in Inch [mm]



Rear View, Remote Display Panel
Dimensions in Inch [mm]



Top View, Remote Display Panel
Dimensions in Inch [mm]

SEREN 1 Year Limited Warranty

SEREN IPS Inc. products are warranted to the original purchaser against defects in material and workmanship for a period of one year from the date of delivery.

SEREN IPS Inc. will repair or replace, at its option, all defective products returned freight prepaid during the warranty period, without charge, provided that there is no evidence the product has been mishandled, abused, or misapplied. Our liability under this warranty is limited to servicing, repairing, or replacing any defective products for a period of one year after delivery to the original purchaser.

If warranty service is required, the equipment must be returned, transportation charges prepaid, to our factory or authorized service depot. In the case of misuse, abnormal operating conditions, or other non-warranty work, a repair cost estimate will be submitted for approval before work is started.

WHAT THE WARRANTY DOES NOT COVER:

This warranty covers only defects in materials and workmanship provided by SEREN IPS and does not cover equipment damage or malfunction from misuse, abuse, accident, act of God, non-SEREN IPS modification or upgrade. Improper return shipping, packaging, or shipping damage is not covered. SEREN IPS will not be liable for any incidental or consequential damages resulting from your use or inability to use your Remote Display Panel accessory.

IF YOU HAVE A PROBLEM

The first step is to contact your system vendor. Consult with your system vendor to determine the nature of the problem. Your system vendor knows the intimate details of how your processing system interfaces and operates with the Remote Display Panel and can efficiently resolve system related problems.

If it is determined that the Remote Display Panel has a problem, contact our customer service department at **1-856-205-1131**. Before you call, please be ready to provide the model of your Remote Display Panel, its serial number, date of manufacture, a description of the problem, and the model and manufacturer of the processing system it is used on.

HOW IS WARRANTY SERVICE OBTAINED?

Our customer service representative will explain how to obtain service under this warranty. Please save the original packing materials in order to facilitate shipment.

Glossary of Terms

A	Amperes, a measurement unit of current
AC	Alternating Current
ANLG	Abbreviation, "Analog"
Chamber	Industry term for a vacuum chamber used in plasma processing equipment.
Common Exciter (CEX)	A method of using an external frequency source to synchronize the outputs of RF Power Supplies in a multi-power supply system.
CPU	Central Processing Unit: computer
DC	Direct Current
D-Sub	Industry term for D-Subminiature connector
Equipotential Bond Equipotential Bonding	Equipotential bonding (often referred to as grounding) is used to control RF circulating currents within a system. For regulatory purposes, it is not a "Protective Earth" or "Safety Ground", even though it may be bonded to the "Protective Earth" or "Safety Ground" within the equipment or user's facility.
Exciter	A Radio Frequency source. RF Power Supplies amplify a RF signal source. The RF frequency signal source may be internally generated or externally supplied. (see Common Exciter).
Forward Power Leveling	Using the internal Forward Power sensor as the feedback source for power leveling (regulation).
FWD	Abbreviation, "FORWARD"
KHz	Kilo Hertz, a measurement unit of frequency (1000 Hertz)
KVA	Kilo Volt-Amperes
Load (net) Power Leveling	(Forward Power) – (Reflected Power) = Net Power Using the calculated Net Power as the feedback source for power leveling (regulation).
Matchbox	Industry term for an impedance matching network
MHz	Mega Hertz, a measurement unit of frequency (1,000,000 Hertz)
mV	Milli-Volts, a measurement unit of Voltage, equal to 1/1000 of a Volt.
Net Power	The difference between forward power and reflected power.

Glossary of Terms

Non-Volatile Storage	Also know as non-volatile memory. Computer memory that retains its data after power has been removed.
RF	Radio Frequency
RF Generator	Industry term for Radio Frequency Power Supply
SEMI	Industry standards organization: Semiconductor Equipment and Materials International
TTL	Transistor-Transistor Logic
Tuner	Industry term for an impedance matching network
VAC	Volts, Alternating Current
VDC	Volts, Direct Current
VFT	Variable Frequency Tuning. The RF power supply's CPU monitors the reflected power and adjusts the RF output frequency to minimize the reflected power. This often eliminates the need for an expensive external automatic impedance matching network. An inexpensive matching transformer (sold separately) and a VFT-capable RF power supply can be combined to form a cost-effective system solution.
VLT	Abbreviation, "VOLTAGE"
Voltage Control	Using an external DC voltage derived from the processing system as a feedback signal for power leveling (regulation)
W	Watts

Revision History:

Revision	Date	Revision Description
0.01	8/18/10	Preliminary draft.
1.00	8/23/10	Issued.
1.01	2/27/12	Updated AC Mains voltage rating.
1.02	3/16/12	Added SCCR rating.
1.03	5/16/12	Added intended use precaution.
1.04	5/24/12	Added maintenance information, EMO statement, Recommended Optional Accessories, mounting height, disposal statement.

Notes: