Model EOS-902 UHV Ion Pump Controller
Technical Manual

Table of Contents **Page**

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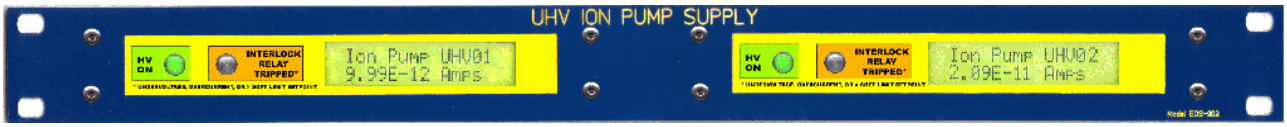
1.0 Introduction

Thank you for purchasing the EOS-902 Ultra-High Vacuum Ion Pump Controller. The EOS-902 provides the highest current sensitivity of any ion pump power supply on the market. In clean (baked) vacuum systems, pump currents below 2nA are routinely observed with measurable resolution of 10pA.

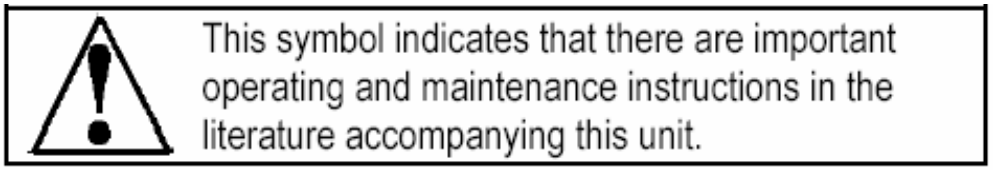


Front

Rear

1.1 General Description

The EOS-902 contains two highly sensitive current monitoring ion pump power supplies that provides an adjustable 0 to 7kV to any ion pump. The supply can sustain an ion pump of any size from 2 l/s to over 500 l/s if the vacuum system is in ultra-high vacuum (UHV) conditions. Digitally controlled trip setpoints may be set anywhere in the measurement range from 50 picoAmps to 100microAmps, which makes this supply ideal for fast interlock protection systems. RS-232 data acquisition rates up to 30 readings per second are supported. Visit http://www.eyeonscience.com for additional information and casehistories.



1.2 Safety Warning

WARNING

THE EOS-902 produces up to 7000 volts at a maximum sustained current of 500 micro-amps. While this current is generally accepted as being non-lethal there are circumstances where a lethal charge could be obtained if a user were to place the device on a system with a large capacitance (extreme coaxial cable lengths). Installation and service should only be performed by qualified personnel. While there is no harm to the unit if the KINGS connector is disconnected live, users should be aware that this leaves the cable to the pump in a potentially dangerous charged state. It is therefore

recommended that the power be removed from the unit for at least 10 seconds before unplugging the high voltage cable. Do not operate the unit near water or without a proper electrical ground path. While the shield of a properly terminated coaxial cable is normally sufficient for a ground return path for this unit, users should be aware of the potential hazard if the shield is broken and a second ground wire is not attached. A ground lug is provided on the rear of the unit for attaching another system ground wire.

1.3 Purpose of EOS-902

The EOS-902 serves several purposes:

1. It acts as a normal holding supply to keep an ion pump energized and pumping.
2. It allows the ion pump to behave as a sensitive relative vacuum gauge well into the UHV and approaching Extreme High Vacuum (XHV) regime.
3. It allows users to produce more simple and reliable vacuum systems. With the EOS-902, the ion pump alone can be used for relative vacuum quality measurement and in many cases eliminate the potential leaks of additional ports required for RGA's, Extractor Gauges, etc. By using the EOS-902 in lieu of additional vacuum metrology, a substantial cost savings can be realized.

2.0 Unpacking and Inspection

For each EOS-902 purchased you will receive:

2 ea. 18VDC Power Adapter
1 ea. 6-foot Communications Cable (RJ-11 6 Conductor Cord)
1 ea. 5-inch Communications Jumper Cable (RJ-11 6 Conductor Cord)
1 ea. 12-inch Communications Jumper Cable
1 ea. RJ-11 to DB9 Serial Port Adapter

Inspect the shipment for shortages. If any shortages are discovered, contact Eye On Science for replacement. If shipment is damaged, a claim should be filed with the carrier and a copy should be forwarded to Eye On Science. If equipment needs to be returned to Eye On Science for inspection or repair, authorization must be obtained in the form of a RMA number by contacting sales@eyeonscience.com

Rear of EOS-902 Ultra-High Vacuum Ion Pump Power Supply

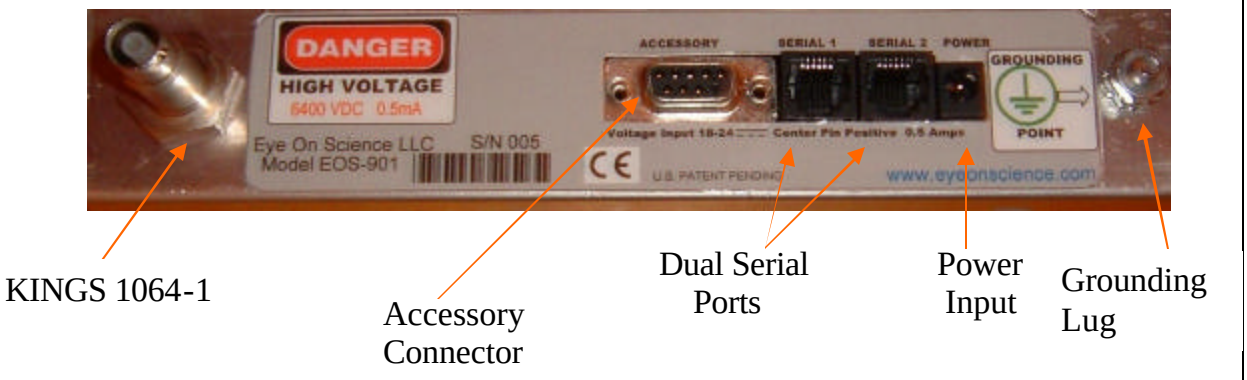


Figure 1

3.0 Quick Start

The EOS-902 can be placed on your system by performing the following procedures:

3.1 Quick Start Data Acquisition (DAQ) Test

Without attaching an output connector to the KINGS 1064-1 output:

A. Plug the power adapter in to a suitable wall outlet.
B. Plug the power connector in to the rear of the unit.
C. Observe the following:
   - A startup message shows the software build date and the software trip limit. After the startup message, the display of figure 2 is shown.
   - The Unit address is displayed preceded by the letters UHV.
   - The ion pump current is displayed. The reading is updated approximately once per second.
   - There will be a (^) symbol flashing next to the current reading on the left supply (address UHV01). This flashing symbol indicates that the unit is in active broadcast mode.

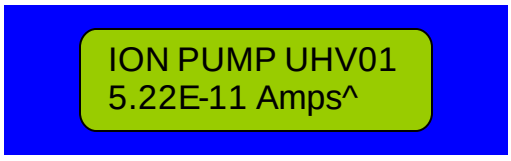


Figure 2

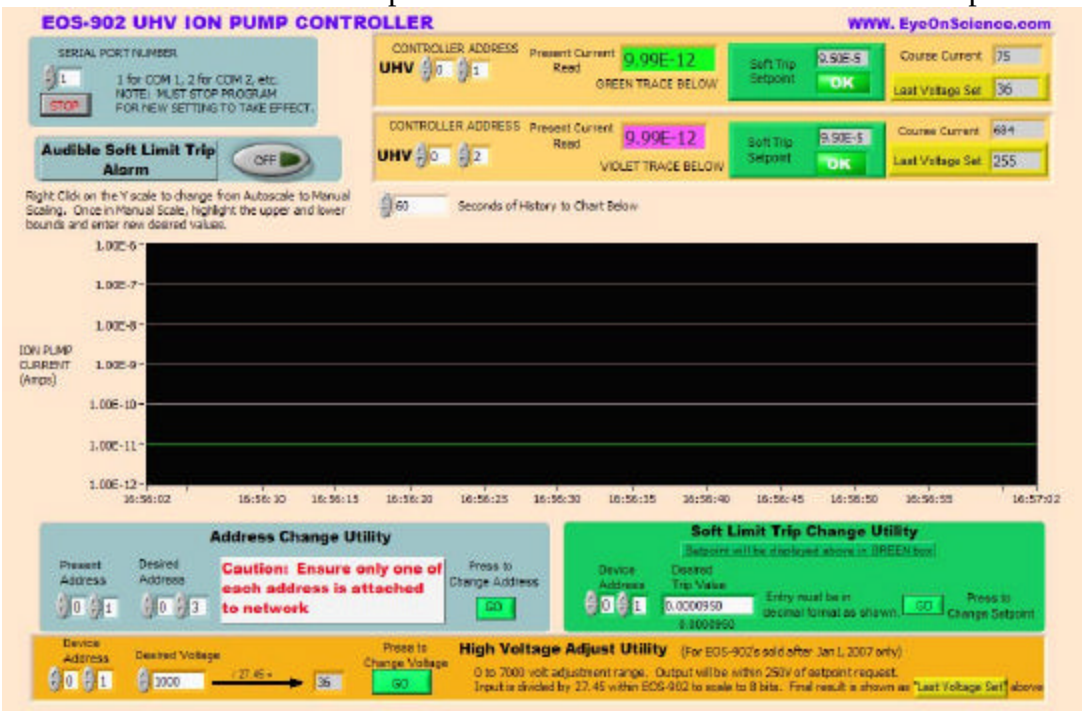
D. Broadcast mode is a mode that sends a report over the serial port about twice per second. This allows the unit to be quickly placed on a serial port where data can be imported to a program (like the free Terra-Term

program) without any user intervention. To check the serial output, perform the following:

1. Open a terminal program and set it for 9600 baud, 8 data bits, 1 stop bit, No parity.
2. Plug the 9 pin serial connector in to the open serial port on your computer.
3. Plug the long 6 conductor RJ-11 cable in to the serial connector and either the "serial 1" or the "serial 2" connector on the rear of the EOS-902.
4. The data should appear on the terminal program. Many terminal programs allow this data to be saved to a file if desired.

3.2 DAQ Software

A program called EOS902.exe is provided on the EyeOnScience.com web site. The program allows all features of the EOS-902 to be tested in a convenient graphical user interface. This program requires the installation of a labview runtime engine, also provided. The runtime engine needs to be installed only if the user does not have a complete version of labview loaded on the computer.



EOS902.exe software screen shot.

Most users develop custom communication programs for networking of multiple units on their chosen DAQ system. The communication protocol is quite simple and is explained in detail in chapter 6.
There are several other programs available to perform the basic read functions. You may download a few other simple programs from
http://www.eyeonscience.com/software_updates

3.3 Quick Start on a Vacuum System.

Please refer to Figure 1.

A. Plug the power adapter in to a suitable wall outlet.
B. Plug the KINGS connector in to your ion pump cable and insure that the ground return path is present. The voltage set from the factory is 6000V. If you desire a different voltage before placing it on your system you must adjust it using the software interface.
C. Plug in the power connector to the rear of the unit. The "HV ON" will illuminate green.

Note: If your vacuum is poor and ion pump current exceeds 100uA, the red "Interlock Relay Tripped" will illuminate and the displayed current will indicate a fixed 1.00E-03 Amps. This abnormally high display warns of the overload condition on a remotely located data acquisition display. If your vacuum system is below 100uA, you will observe the real ion current displayed on the front panel and the reported RS-232 value.

4.0 Display Characteristics

4.1 Normal Display

As shown in Figure 2, the normal display shows the unit address on the top line. The factory default addresses are UHV01 and UHV02. The bottom line displays the Ion pump current in amps. Display is shown in scientific notation. When the RS-232 communications are set to "Broadcast" mode, a [^] symbol will flash on the LCD readout to the right of the current display.

4.2 Alarm Conditions

The Factory Default Soft limit setpoint is 9.50E-05 Amps. This limit may be changed and set to any value following the procedure described in section 6.5. "Soft Limit Trip" will flash on the display if the measured ion pump current exceeds the setpoint entered and a user relay will open.

4.3 Fault Conditions

When monitoring the quality of a vacuum system using an Ion pump, there are two conditions that should trigger a fault and open an alarm relay. These conditions are:

1. Overcurrent
   A fault condition will appear if the current drawn by the ion pump exceeds 100uA. The "Interlock Relay Tripped" LED will illuminate bright RED. . **There is no harm to the EOS-902 if left in an overload condition. Ion pumping will still occur, but at a current limited rate. An internal 5 Meg Ohm resistance will also drop output voltage as current load**

increases. Operators may wish to switch the Ion pump cable to a higher current supply while correcting the condition that caused the poor vacuum.

2. Loss of High voltage
   A fault condition will appear if the internal high voltage DC-DC converter were to fail. If the DC-DC converter draws little or no current, the GREEN "HV ON" LED will not illuminate and the Interlock Relay will Trip.

5.0 Redundancy of Fault Conditions

There are two separate systems in the EOS-902 that monitor the overall system health. One is hardware driven and the other is software driven. Refer to Figure 3.

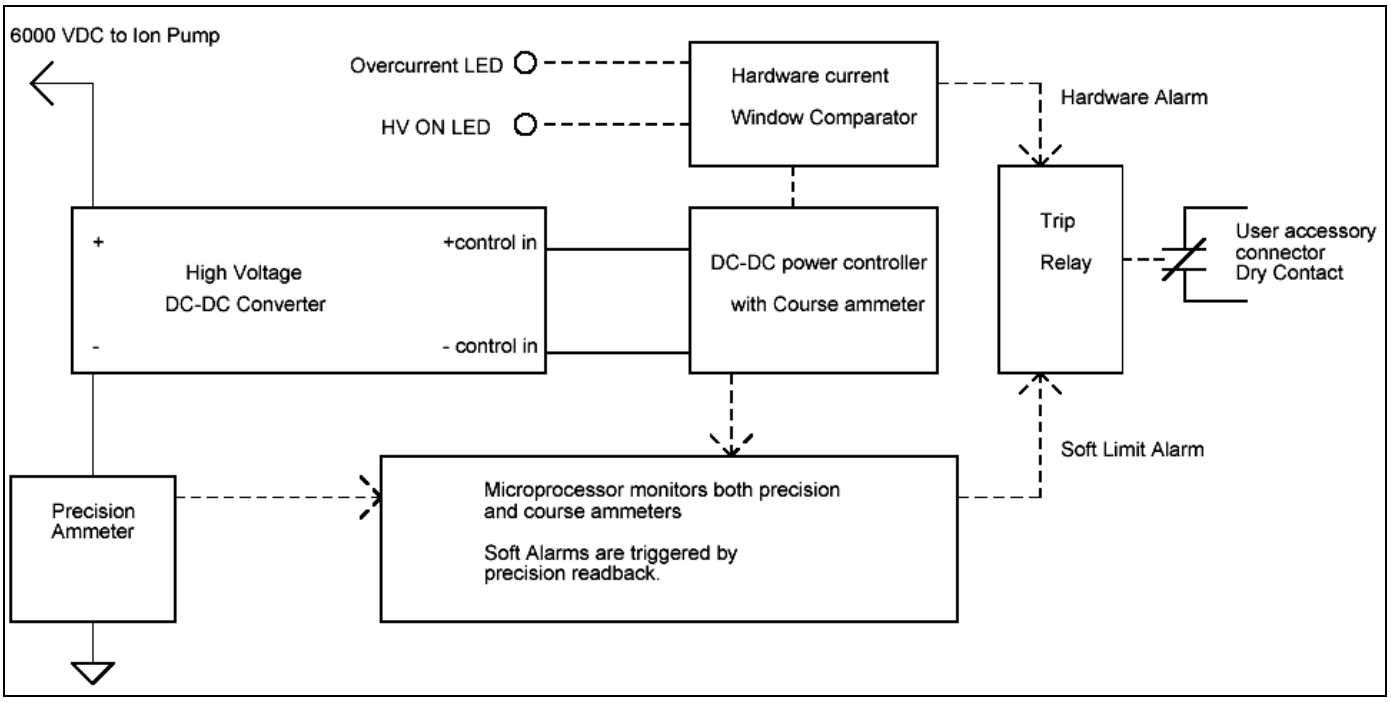


Figure 3

5.1 Hardware Driven Fault Conditions.

In the Hardware current window comparator, the current drawn by the control input of the high voltage DC-DC converter is monitored. This measurement checks the nominal current drawn by the high voltage power supply. If the current drawn is too low or too high, a fault is generated in the form of lighted indicators on the front panel and a hardware relay contact is opened. Three possible conditions follow that would occur:

Current too low: The green "HV ON" LED will not be illuminated and relay opens. The Interlock Relay Tripped indicator will illuminate.

Current too high: The red "Interlock Relay Tripped" indicator will light and relay opens.
Loss of all power: Relay opens and the rest of the unit is off.

5.2 Software Driven Fault Conditions.

The microprocessor-controlled analog to digital converter reads both the precision ammeter section and the current drawn by the control input of the high voltage DC-DC converter. There are two types of software trip.

1. When the microprocessor senses that the current drawn by the control input to the DC-DC converter is out of the normal operation window, it sets the front panel display and causes the reported RS-232 data to report an abnormally high level. (See section 6.3 for detailed information.)

2. The microprocessor continuously compares the precision ammeter reading with a value that has been entered as a "Soft Limit Trip". When the measured precision current exceeds the soft limit trip, the front panel LCD indicates the trip by flashing between normal display and the words "Soft Limit Trip". The "Interlock Relay Tripped" will also illuminate.

Note: There is no indication given via RS-232 when a Soft Limit is exceeded. An assumption is made that users will still want perform normal data logging beyond the soft limit, so communications are not interrupted.

6.0 Computer Communication

There are no control buttons on the EOS-902. All operations are performed through software control. The unit address can be changed to any value between 00 and 99. Special high impedance RS-232 interface chips are used that allow multiple units to be networked onto a single port. If the end user computer system has no RS-232 ports, there are several options available which can resolve the problem.

These options include:

- USB to RS-232
- Ethernet to RS-232
- Bluetooth to RS-232
- 802.11 Wireless to RS-232.

If you are in need of any of these converters, contact support@eyeonscience.com

6.1 RS-232 port setup

The port needs to be set to 9600 baud, 8 Data bits, 1 Stop bit, No parity. (9600-N-8-1)

6.2 Broadcast Mode

Broadcast mode is a mode where the EOS-902 constantly broadcasts the measured ion pump current over the serial port at a rate of approximately 2 readings per second.
As mentioned in section 3.1.D, this mode allows one to quickly check the integrity of the serial connection by using a terminal program to receive the ion pump current reading without the need to implement bi-directional communication. Once communication is verified, one can issue commands to the EOS-902 to stop broadcast mode, change address, change soft trip level, etc.

Incoming data string: When set to broadcast mode the EOS-902 is writing an output string in the following format: data followed by a carriage return.

2.13E-10<CR>

To kill the broadcast mode: Broadcast is killed if a question mark (hex 3F) is written at any time through the serial connection. When a question mark is sent, the EOS-902 or another unit on the network is being queried. **Networkedunits cannot be left in broadcast mode or data collisions would occur. They must be queried and read in sequence by issuing a separate address for each device.**

To set the broadcast mode:
If the broadcast mode is desired it can be enabled by typing UHV followed by the unit address and a ^ (hex 5E) symbol.
Example: **UHV##^** *(Note: replace ## with unit address.)*

Note: The setting of broadcast mode is written to non-volatile memory and will be maintained through any power cycling of the unit.

6.3 Query Commands

There are several query commands, but by far the most important is the command to obtain the present reading of ion pump current. This data can be retrieved as fast as 30 readings per second or as slow as desired by the data acquisition system.

Get ion pump current reading:
Send: **UHV##?** *Note: replace ## with unit address.*
Receive will come in the following format: data followed by a carriage return.

2.13E-10<CR>

Get present setting of soft trip limit:
Send: **UHV##D** *Note: replace ## with unit address.*
Receive will come in the following format: data followed by a carriage return.

9.50E-05<CR>

Get present setting of High Voltage Supply:

Send: **UHV##H** *Note: replace ## with unit address.*

Receive will come in the following format: data followed by a carriage return.

245<CR>

The byte received will be representative of the high voltage setpoint. To convert to voltage, this number is multiplied by 27.45, so a reading of 255 corresponds to a high voltage setpoint of 7000V. Actual voltage delivered to an ion pump under UHV conditions will be within 250V of this setpoint.

Get present value of course current monitor:

Send **UHV##F** *Note: replace ## with unit address.*

Receive will come in the following format: data followed by a carriage return.

553<CR>

Reading will be an integer value between 0 and 1023

This reading should normally fall between the range of 35 and 950 and is constantly monitored by the microprocessor to verify health of the DC-DC converter hardware.

If the readings fall below 35, the DC-DC converter is not drawing the expected current for producing the high voltage. The microprocessor forces the reported RS-232 value and LCD display to 2.00E-03 and trips the user relay.

If the reading is above 950, the hardware is drawing a high current that indicates an overload. This triggers the microprocessor to force the reported RS-232 value and LCD display to 1.00E-03 and trips the user relay. There is hysteresis on this trip point. It will trip when the reading exceeds 950 and it will reset when the reading falls below 920.

The actual reading obtained depends on several variables, but generally if the unit is connected to an ion pump under UHV conditions and the voltage is set to 6000V, the reading will be near 550. Detailed readings are provided on the factory calibration sheet.

6.4 Changing Unit Address

The factory default addresses are UHV01 and UHV02. **If several units are going to be networked on to a single RS-232 port, then the unit addresses must be different for each.** To change the address:

Send: **UHV##!**

The unit will reply in two ways.

1. The front panel LCD display will print “Waiting for new address”
2. The RS-232 will send out: new 2 digit addr?<CR>

The unit is then waiting for two integers between 0 and 9 followed by a carriage return. Address can be 00 to 99. If a valid address is received, the unit display

will show the new address and resume normal operation using the new address. Nothing will be reported on the RS-232 line. If an invalid address is received (containing letters or symbols), the unit will reply over the serial line with:

Not Valid Change Ignored<CR>

The unit will then revert back to the original address and resume normal operation. Address changes are written to non-volatile memory.

6.5 Changing Soft Trip Limit

The factory default Soft Trip Limit setpoint of 9.50E-5 amps can be changed to any value chosen by the end user. To initiate a change of the Soft Trip Limit:

Send: **UHV##S**

The LCD display will print "Waiting for New Alarm Level"

The RS-232 will print: Enter Alarm Limit<CR>

The EOS-901 is now waiting for a floating point number to be entered. **It will not properly accept a number in scientific notation.** If a trip level of 3.50E-08 is desired, it must be entered as: 0.0000000350 followed by a carriage return.

The unit will reply with the value entered, however, it will convert the readback to scientific notation. If the value was entered above, the reply from the unit would be as follows: new limit = 3.50E-08<CR>

Note: Due to roundoff errors in the conversion of floating point to scientific notation you will occasionally see the number differ from the entered number by 1/100th. If this occurs and you want the exact number, simply enter an extra digit to force the roundoff up or down.

Trip settings are written to non-volatile memory.

The Trip setpoint has a digital hysteresis of 3% to prevent cycling of the trip relay at the setpoint.

6.6 Changing High Voltage Setpoint

The factory default High Voltage setpoint of 6000 Vdc can be changed to any value between 0 and 7000 V. This is convenient for users to secure voltage to check system response and raise voltage high to "strike an arc" in the pump.

Note: Due to the sensitive nature of the picoammeter readback, it is recommended that the setpoint remain at or below 6000 V to limit the potential for cable or connector breakdown which could disturb the low end sensitivity.

To initiate a change of the High voltage:

Send: **UHV##K**

The LCD display will print "Waiting for New Voltage"

The RS-232 will print: new voltage?<CR>

The EOS-902 is now waiting for an integer number between 0 and 7000 followed by a carriage return. Once the number is entered, the value is interpreted by the internal microprocessor to convert it to a byte between 0 and 255. The conversion is input / 27.45 = stored byte. The value is immediately stored in non-volatile

memory and will recover to this setpoint after a power failure. The value written can be verified using the UHV##H query as described in section 6.3.

Note: If you use a resistive load to check current and voltage, you need to remember that there is a 5Meg Ohm internal load resistor. If you use a 1GigOhm load, then this internal resistance is negligible and the current will report 1uA for each kiloVolt supplied. If you use a 100Meg load, then perform all calculations as if you were loading a power supply with 105MegOhms.

6.7 NetworkingMultipleUnits

Each unit on the EOS-902 has two serial ports. They are both identical and it doesn't matter which one is used. The presence of two ports allows one to bring the serial line into one unit and then use the short serial jumper to bring the serial back out to another as shown in figure 4. This process can continue as you add more units. Eye On Science has linked up to 10 units in a network, but this is by no means the limit. The special high input impedance RS-232 receivers and floating drivers should fundamentally allow up to 100 units on a single RS-232 port if they are properly addressed 00 through 99. The true EIA-232 Standard states that the receive line shall be terminated with 5K ohms. Eye On Science has empirically determined that this termination is not required for communication with multiple units at the 9600 baud rate. If communication errors start to occur when large numbers of devices are networked, a termination plug can be placed in the "last" controller in the chain to terminate the RS-232 receive line to 5K ohms. Contact support@eyeonscience.com for more information.

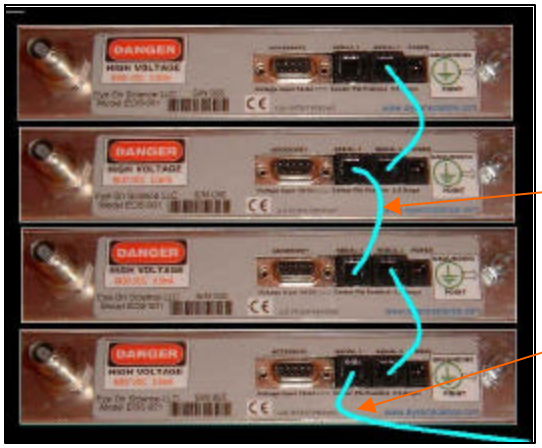


Figure 4

6.8 Reserved Commands for Optional Accessories

A "smart" relay chassis will be available as a future accessory. When the relay chassis is used with the EOS-902 it will provide an automatic switchover to a higher current supply if the 100uA overload current is exceeded. The EOS-902 will digitally communicate with this relay chassis through the accessory connector. Users of the EOS-902 will then be able to monitor and control ion pumps through their entire operating range from rough vacuum to UHV.
The technical manual provided with the smart relay chassis will describe the command protocols for access through the EOS-902 serialconnection.

6.9 Customer firmware uploading

When future improvements are implemented in the microprocessor code, the end user can upload the new software via the serial port connector. These updates will be posted at http://www.eyeonscience.com/software_updates, along with complete instructions on how to perform the upload.

7.0 Accessory Connector Pinout

Pin 1 - End User dry relay contact 1
Pin 2 - End User dry relay contact 2
Pin 3 - Auxiliary power input (+18 – 26 VDC) or peripheral power output
Pin 4 - Analog output
Pin 5 - Chassis Common
Pin 6 - No connection (plugged)
Pin 7 - +5 VDC peripheral power output
Pin 8 - Microprocessor analog input (0 to 2.5 vdc) or communication line.
Pin 9 - Microprocessor communication line with 5V pullup

7.1 Precaution

Pin 6 of this connector has been plugged to prevent users from accidentally plugging in a normal serial cable to this connector. Users connecting an interface connector will need to remove pin 6 from their connector to allow connection to the chassis. Users should use caution when accessing this connector because of the possibility of damaging the microprocessor or shorting out power on the peripheral power pins.

End users should only connect to:

Pins 1&2 -for the normally open dry relay contacts

Pins 4&5 -for Analog output
Pins 3&5 -if they wish to power up the chassis via the accessory connector with their own power supply instead of using the supplied 18VDC power adapter.

7.2 Analog readout

The accessory connector on the rear of the EOS-902 provides user access to the analog output of the precision ammeter. This output is 0.75 to 9.5 VDC for the scale selected. The EOS-902 autoscales at 9.5 Volts to the next higher range, so a chart recorder would subsequently drop to .95 Volts. The EOS-902 drops scale at .75 volts and the chart recorder would jump up to 7.5 volts. This could be confusing on a strip chart, but the option to use it is at the discretion of the end user. Eye On Science recommends that all data acquisition be performed via the serial port. Several customers have expressed an interest in using this analog output for a "faster" interlock. The internal microprocessor is running at 20Mhz. If the soft limit trip setpoint is assigned a value slightly higher than the normal readings obtained on a particular system, then the interlock will trip within a few milliseconds of the vacuum event. It is unlikely that an analog solution could obtain a faster response because the time lag is inherent to the RC time constant created by the 5 MegOhm output impedance and the capacitance of the users cable.

7.3 Relay Contact Ratings

It is recommended that the relay contact perform only pilot duty to switch a second relay in the end users control system. The relay contacts are normally closed when in the normal operation and will open if any of the following conditions occur:

1. Loss of system power
2. Loss of high voltage
3. Current exceeds 100uA to the ion pump.
4. Current exceeds the soft limit trip setpoint entered by the end user.

Do not exceed the following ratings:
Max power switching: 5 Watts
Max Voltage switching: 100V
Max current switching: 250mA

7.4 Optional Accessories

There are several optional accessories planned for the EOS-902. These accessories will utilize the available microprocessor pin connections on the accessory connector for communication over the existing serial port. These accessories include:

1. A high power current supply and automatic switchover relay chassis.
2. A setpoint controlled relay control chassis that allows users to expand the process controls with several high and low vacuum level trip setpoints.

8.0 Specifications

Output voltage - nominally 6000 VDC Output current – 100uA max displayed. (500uA max sourced in overload) Output power – 3 Watts High voltage output impedance – 5 MegOhms Current measurement range: 50 pA to 100 uA Current measurement resolution: 10 pA Input voltage: 18 to 26 VDC Input current: 500mA max Mechanical characteristics: - Size: 19'' rack-mount 1U chassis (6" depth) - Kings 1064-1 (10KV) high voltage output connector - Weight 1.5 lbs (.68 Kg)	*General specifications:* -Storage temperature: From -20 to 55°C (non-condensing) -Operation temperature: From 15 to 35°C -Operation Humidity: 0 to 80% RH (non-condensing) -Warming up time: <1min * *(If the unit has been unpowered for an extended period, it may require several hours of operation to "burn off" moisture before the ultra-sensitive readings can be obtained. The unit may be placed in operation immediately, but it may produce a false high reading until all moisture is burned off.) Power Adapter: -Voltage: 100 - 240V AC -47 – 63 Hz -Output 18 VDC @ 0.83A max -UL/CE rated

9.0 Cleaning the chassis

Chassis shall be removed from its power source prior to cleaning.
Chassis shall only be cleaned with light pressure rubbing from a paper or cloth tissue soaked with a 50% solution of Isopropyl (Rubbing) Alcohol and water. LCD display should not be touched. If it becomes dirty it should be gently cleaned with cotton tipped swabs wetted with the Isopropyl Alcohol solution. Cleanliness of the high voltage connector is also important for high sensitivity. With Power off, wiping the outer section of the inner ceramic with an alcohol soaked cotton swab is recommended if leakage is observed with the cable unplugged. Allow all alcohol to evaporate before applying power to the unit.

10.0 CE Conformity

The EOS-902 conforms to the provisions of the following EC Directives when installed and operated in accordance with the installation instructions contained within this technical manual:

73/23/EEC *Low Voltage Directive as amended by 93/68/EEC*
89/336/EEC *EMC Directive as amended by 92/31/EEC and 93/68/EEC*

Due to the fact that EOS-902 is only a component to be used in a finished fixed system provided by the end user, it is the ultimate responsibility of the end user to ensure that the installation as a whole complies with the Essential Requirements of the EMC Directive concerning electromagnetic disturbances. Such disturbances could be caused by an arcing ion pump or loss of proper shielding on the users pump cables. If a problem is discovered, secure the equipment immediately and verify integrity of all cables. If the problem is tracked to the EOS-902, contact Eye On Science LLC immediately for further instructions.

The following Safety standards have been applied during design and manufacturing:

IEC61010-1 second edition 2001-2002 Safety requirements for electrical equipment for measurement, control, and laboratory use. Part 1 - General requirements

11.0 Warranty

Notwithstanding any provision to the contrary, Seller's sole and exclusive obligations to the Customer for any Product (other than Software, as defined and warranted below) made by Seller and sold hereunder are to repair returned Product or provide a replacement Product, at Seller's sole option, for any Product which has been returned to Seller under the RMA procedure (below) and which in the reasonable opinion of Seller is determined to be defective in workmanship, material or not in compliance with the mutually agreed written applicable specifications and has in fact failed under normal use on or before one (1) year from the date of original shipment of the Product. All Products, which are experimental Products, prototypes or Products used in field trials, are not warranted. All third parties' Products (including software) sold by Seller carry only the original manufacturer's warranty applicable to Customer. Seller will only accept for repair, replacement or credit under warranty Products made by third parties if expressly authorized to do so by the relevant third party. Any Product repaired or replaced under warranty is only warranted for the period of time remaining in the original warranty for the Product. Seller reserves the right, at its sole option, to issue a credit note for any defective Product as an alternative to repair or replacement. The warranty provided herein shall extend to any Product which has proved defective and has failed through normal use, but excludes and does not cover any Product or parts thereof which has been accidentally damaged, disassembled, modified, misused, used in applications which exceed the Product specifications or ratings, neglected, improperly installed or otherwise abused or is used in hazardous activities. Customer must claim under the warranty in writing not later than thirty (30) days after the claimed defect is discovered. The Customer must make all claims under this warranty and no claim will be accepted from any third party.

12.0 Return Material Authorization Procedures

Seller will only accept Products returned under the Seller's Return Material Authorization process ("RMA"). Customer shall obtain a RMA number from Seller prior to returning any Product and return the Product prepaid and insured to Seller to the FCA

point. Any Product which has been returned to Seller but which is found to meet the applicable specification for the Product and not defective in workmanship and material, shall be subject to Seller's standard examination charge in effect at the time which shall be charged to the Customer. Where any Product is returned without an itemized statement of claimed defects, Seller will not evaluate the Product but will return it to the Customer at the Customer's expense.