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Elite™ 3 Active Isolation Workstation/ Active Isolation Module Instruction Manual





OPERATOR'S MANUAL

Newport

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Notes:

Elite™ 3 Active Isolation Workstation/
Active Isolation Module Instruction Manual

© Newport Corporation
Irvine, California, USA
Part No. 23666, Rev D
IN-12971 (10-98)

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Warranty

Newport Corporation warrants the active isolators and controller to be free of defects in materials and workmanship for a period of two years from date of shipment. In the case of OEM applications, this warranty period is extended to twenty-six (26) months to allow time for integration of the isolation system into the OEM's product and shipment to the final end user. Workstation frames are warranted to be free from defects in material and workmanship for a period of one year from the date of shipment. In addition, the laminated honeycomb tops have a lifetime performance and delamination warranty under normal use and proper handling. If found to be defective during the warranty period, the product will either be repaired or replaced at Newport's option.

To exercise this warranty, write or call your local Newport representative or contact Newport headquarters in Irvine, California. You will be given prompt assistance and return instructions.

Repaired or replaced products are warranted for the balance of the original warranty period or 90 days, which ever is longer.

This warranty does not apply to defects resulting from modifications or improper use of the system or its component parts.

This warranty is in lieu of all other warranties, expressed or implied, including any implied warranty of merchantability or fitness for a particular use. Newport Corporation shall not be liable for any indirect, special, or consequential damages.

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Section 1 — General Information

1.0 Specifications

System Includes:	**Active Isolation Workstation** (AIW): Frame with independent leveling feet for each leg, three (or four) Active Isolation Modules with selection of load range, DSP (Digital Signal Processor) controller and power supply, and a selection of table tops and work surfaces. **Active Isolation Modules** (AIM): Three or four Active Isolation Modules with selection of load range and DSP controller and power supply.
Isolator Performance	Vertical: Active Isolation. Transmissibility better than –15 dB at 1 Hz, –30 dB at 10 Hz, –20 dB at 15 to 35 Hz, –30 dB at frequencies over 40 Hz. Active vertical isolator travel ±0.0004 inches. Horizontal: Passive Isolation. Natural frequency 1.0 Hz. Transmissibility 0 dB at ≤ 1.6 Hz rolling off at –40 dB per decade above 1.6 Hz to –30 dB or better. Passive horizontal isolator travel ±0.125 inches.
Maximum Floor Motion	Vertical floor motion: Less than 20 microns peak to peak from DC to 200 Hz. Horizontal floor motion: Less than 500 microns peak to peak at any frequency.
Power Requirements	90-250 vac, 50-60 Hz, 4 amps max
Recommended Operating Load	Load must be matched to isolators for optimum performance.
Standard Load	25–250 lb. (11–120 kg) per isolator.
Heavy Load	250–500 lb. (114–227 kg) per isolator.
Docking System Control Options	Push button from controller front panel. TTL level interface from customer system controller through sync connector on rear panel.
Docking Accuracy	< ±0.002 inches (0.05 mm)

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Dock/Undock time	< 0.75 sec to actuate. Settling time after undock is a function of system leveling. Time is < 100 ms seconds for a perfectly leveled system.
Shipping Locks	Integral with Isolation Modules. $^{3}/_{16}$ inch Allen wrench implementation. Rated at >1 g horizontal with maximum per isolator load of 500 lb. (227 kg).
Vertical deflection under changing loads	Less than 0.0002 inches per lb. of load change at nominal operating load.
Isolator Module Size	12.00 high x 4.00 x 4.00 inches nominal overall. See figure 1.1.
Controller Size	11.13 wide x 6.50 high x 16.82 deep
Controller Mounting	On edge within the AIW frame, rack mount, or bench mount as customer requires.
Front Panel Controls	On/Off, System Reset, Dock/Undock
Front Panel Indicators	Power on, Fault, Docked. See Section 4, Troubleshooting, for complete indicator definition.
Technician Interface	Through RS232 Interface using terminal software supplied with each system. See Sections 3.3 and 3.3.1. Dock/Undock is customer controllable through both the TTL Sync interface, Section 3.4, and the front panel switch. The system responds to whichever signal is the last sensed
Operating Environment	Temperature 5-40˚C humidity 90% RH, noncondensing.
Storage Environment	Temperature -10-60˚C Humidity 90% RH, noncondensing

1.1 Introduction

The AIW Series Active Isolation Workstation and AIM Series Active Isolation Modules combine the best features of active and passive vibration isolation systems. In the vertical direction geophones sense the motion of the isolator modules. The resulting velocity signal is compensated as a function of frequency by the DSP based controller and fed back through a high voltage amplifier to a
piezo-electric actuator which lengthens or shortens as required to cancel ground motion. Maximum gain of the active system is at about 20 Hz. Mounted between the geophone and the payload is a passive elastomer isolator with a natural frequency of about 20 Hz depending on payload weight. As the ground vibration frequency increases above 28 Hz, the elastomer isolator provides increasing isolation at the rate of –40 dB per decade. Thus, as the active system effectiveness decreases as frequency increases over 28 Hz, the passive isolator compensates to provide very good overall system isolation performance.

In contrast to active isolation systems based on pneumatic isolators to support the payload weight, the AIM/AIW Isolation system offers two primary advantages:

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- The system is relatively immune to oscillation caused by mechanical resonances in the payload. The elastomer isolator effectively filters out most on-board vibration before it can be sensed by the geophone.
- The isolated payload is very stiff vertically. Changes in load center of gravity have little effect on the levelness of the payload during or after stage movement. There is no added complexity of air isolators and air control systems.

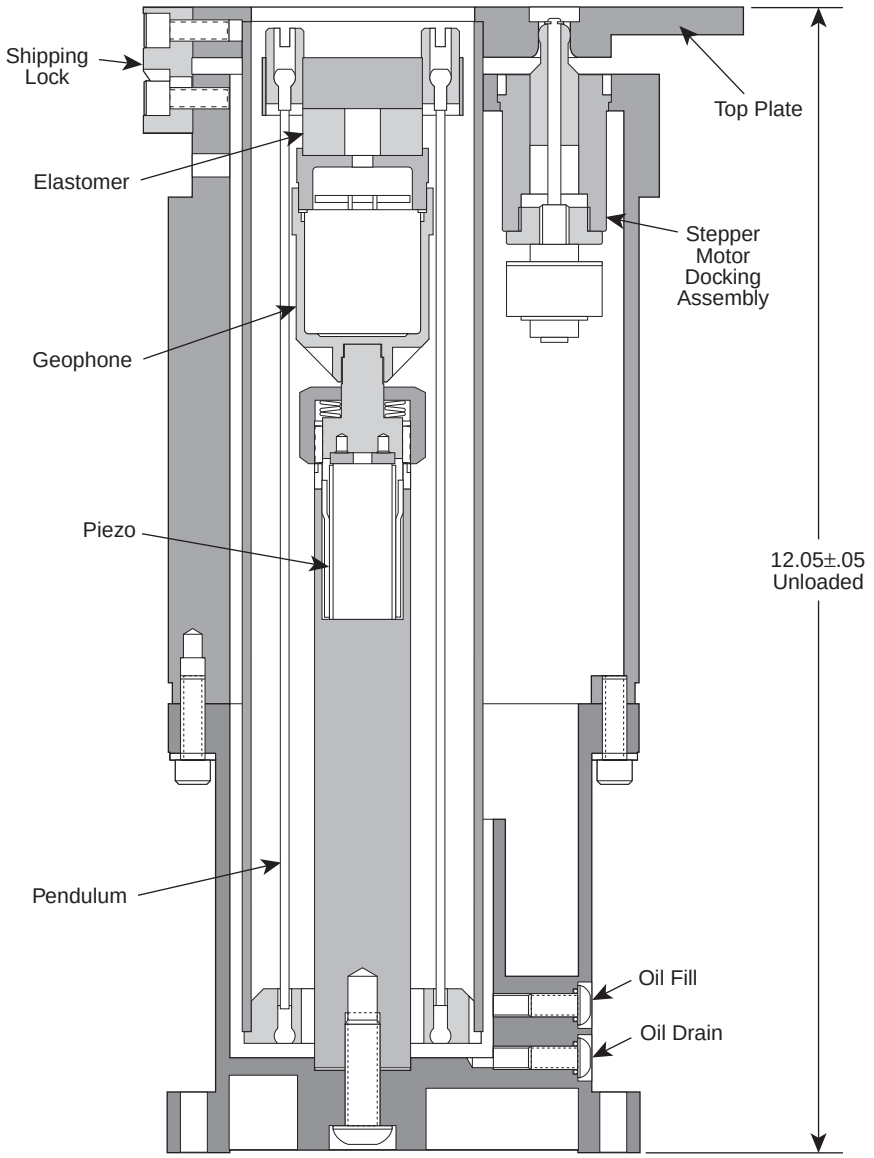


Figure 1.1 — Isolator Module

In the horizontal plane isolation is provided by a 1 Hz passive damped pendulum system. Isolation starts at 1.4 Hz. Since most applications are more sensitive to vertical vibration than horizontal vibration, this system provides economical isolation suitable for most applications. Because the pendulum has a relatively large horizontal travel, ±0.125 inches, it is well suited for use on the upper floors of multi-story buildings where the horizontal floor motion may be many times the vertical floor motion.

For industrial applications where there is robotic transfer of parts from a

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non-isolated base to isolated fab or inspection stations, the AIM and AIW offer electronically controlled docking. This system restrains the payload horizontally, under manual or software control, during the time parts are placed on or picked up from the isolated platform.

The Active Isolation Workstation provides an ideal working platform for vibration influenced devices such as interferometers, microscopes, and balances. Because of its extraordinary very low frequency isolation capability (–15 dB @ 1 Hz) it is particularly well suited for scanning profiling microscopy applications. Sensitive instruments such as these will show significant improvements in resolution and repeatability when isolated from floor motion by the AIW Active Isolation System. This versatile workstation is available in a broad range of sizes, working surfaces, isolator capacities, and accessory options.

Special care was taken to ensure excellent performance in the 20–50 Hz floor vibration frequency range corresponding to dominant ambient vibration frequencies, especially those common to multifloor buildings. The modular isolators provide excellent protection against both vertical and horizontal floor motions. They can be removed for service from the Active Isolation Workstation without removing the customer payload if provision is made to support the payload when the isolators are removed.

These workstations integrate Newport's rigid, laminated honeycomb panel technology and active isolation systems to provide a custom configurable isolation system for a variety of applications. The system accommodates high center of gravity loads with exceptional stability. Equipped with optional casters, the system is easy to move without heavy equipment and may be safely lifted by building elevators.

It is possible to tailor the system to a wide variety of applications using the range of sizes and available working surfaces.

1.2 Getting Started

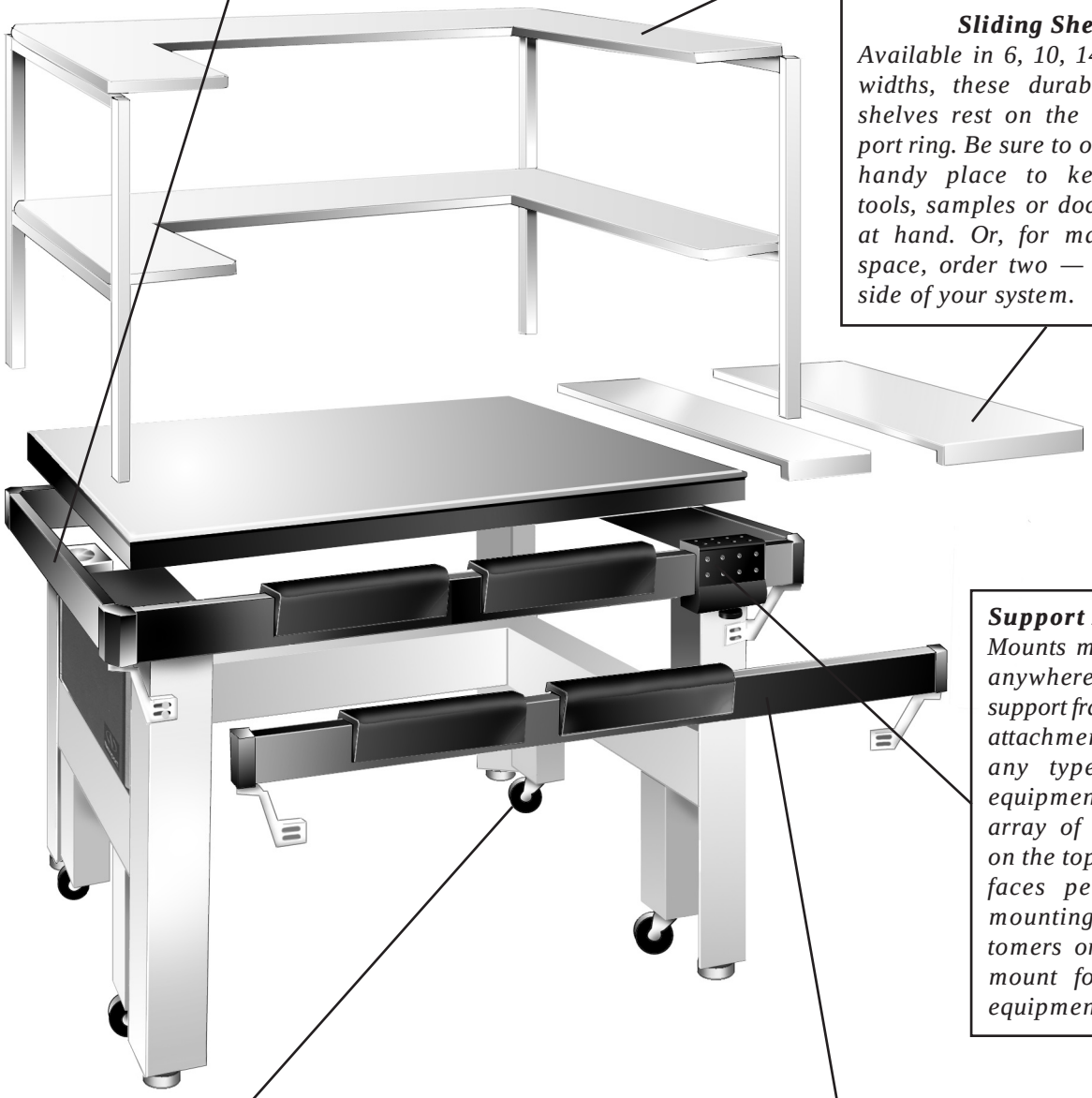
Please read and understand this instruction manual thoroughly before beginning the assembly of the AIW Series Workstation. The components have been partially assembled at the factory and only require final assembly and performance adjustment tasks. A bubble level is provided to aid in leveling the system.

The Active Isolation Systems on Workstations integrated at Newport Corporation are set to a nominal gain level which is suitable for the majority of applications. Small footprint systems where the payload is very high may require gain adjustment to optimize performance. See Section 3.3.1.

1.3 Unpacking and Inspection

The AIW Series Workstation and AIM Active Isolation Module components are packed in labeled boxes. Make sure the total number of delivered boxes equals the total number listed on the labels. The components are also labeled for better identification during assembly. Go over the assembly orientation diagram (figure 1.2) while unpacking and verify the presence of all ordered parts. Carefully inspect all components for any damage that may have occurred during shipping. Report any such damage to the shipping agent at once.

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Support Ring with Armrests
The support ring encircles the top, providing a mounting surface for shelves and support ring mounts. Two armrests are included with the support ring.

Equipment Shelves
One or two equipment shelves attach to the optional support ring, providing extra storage space without transmitting vibrations to the work surface.

Sliding Shelves
Available in 6, 10, 14 and 21-inch widths, these durable laminated shelves rest on the optional support ring. Be sure to order one for a handy place to keep essential tools, samples or documents close at hand. Or, for maximum shelf space, order two — one on each side of your system.

Support Ring Mounts
Mounts may be moved anywhere around the support frame for secure attachment for virtually any type of special equipment. A generous array of tapped holes on the top and side surfaces permits secure mounting. Many customers order an extra mount for last-minute equipment additions.

Casters
With these heavy-duty casters, a workstation can be quickly and easily moved by one person. Elite 3 is also compact enough to fit in most elevators.

Front Support Bar
Includes two armrests for comfortable all-day operation of equipment. Also allows attachment of movable support ring mount. [Note: Back support bar without armrests also available.]

Figure 1.2 — Assembly Orientation

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1.4 Safety Terms

The following safety terms are used in this manual.

The term **"Warning"** used in the text indicates dangers that could result in personal injury.

The term **"Caution"** indicates situations that may result in damage to the AIM or AIW components.

The following International Symbols are used on the Elite 3 controllers.

Power on



Power off



Protective ground



Caution- refer to accompanying documentation



Alternating current

1.5 Workstation Placement

To ensure optimal performance from the AIW Series Workstation it is necessary to consider where you place it. Attempt to locate the unit on as level a surface as possible. Placement on an uneven floor may make proper frame leveling more difficult. If the unit will be located on floors other than the ground floor, attempt to place it near primary vertical building structures such as exterior walls or support columns. This will minimize the possibility of lower frequency floor motion affecting the isolation performance. The active vertical isolation system may interact with floor resonances in the 20 Hz range and may not deliver satisfactory isolation performance. It is also advisable to avoid locations adjacent to major sources of floor vibration such as operating machinery.

The AIW only minimally attenuates vibrations which originate on the isolated platform. Mechanical disturbances, such as cooling fans in equipment mounted on the isolated platform, will reduce the apparent performance of the AIW. Likewise, because sound pressure waves impinging on the isolated platform will degrade isolation quality. Very noisy environments should be avoided.

WARNING

If installation site is susceptible to earthquakes it is recommended that the legs be securely fastened to the floor. The Newport Earthquake Restraint Kit can be used for this purpose. Instructions are included with the Earthquake Restraint Kit.

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1.6 Warranty Information

Warranty information may be found on the page preceding the Table of Contents of this manual. Should it be necessary to exercise the warranty, contact your Newport representative to determine the correct course of action. Newport Corporation maintains offices in the United States and worldwide. Check the back cover of this manual for the addresses and phone numbers of these offices.

1.7 Options and Accessories

Options and Accessories for the AIW Series Workstations include the following:

Controller Support Bracket	Figure 2.5
Support Ring with Armrests	Figures 1.2 & 1.3
Support Ring Mounts	Figure 1.2
Equipment Shelves	Figures 1.2 & 1.3
Sliding Shelves	Figure 1.2
Casters	Figures 1.2 & 1.4
Clamp Kit	Not Shown
Earthquake Restraint Kit	Not shown
Elite Cleat (P/N 25177-01)	Not shown
Cable Manager	Figure 2.6
Monitor Arm	Section 2.6
Ground Strap	Figure 2.7

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1. P/N 20387 Front uprights
2. P/N 20385 Mount brackets
3. P/N 21252 Brace
4. P/N 20657 H-shaped rear frame
5. P/N 20380 Shelf assembly
6. P/N 20305 Support arm corners
7. P/N 20306 Support ring tubes
8. P/N 3847-BA-252 Cup pt. set
9. P/N 20389-01 Washer, neoprene
10. P/N 3664-BA-244 Screw, button HD
11. P/N 20308 Support arm bracket
12. P/N 3941-JO-0905-060 Flat washer
13. P/N 3751-AF-248 Hex head screw
14. P/N 3941-0829-048 Flat washer
15. P/N 17054-03 Screw, hex head (thread cutting)

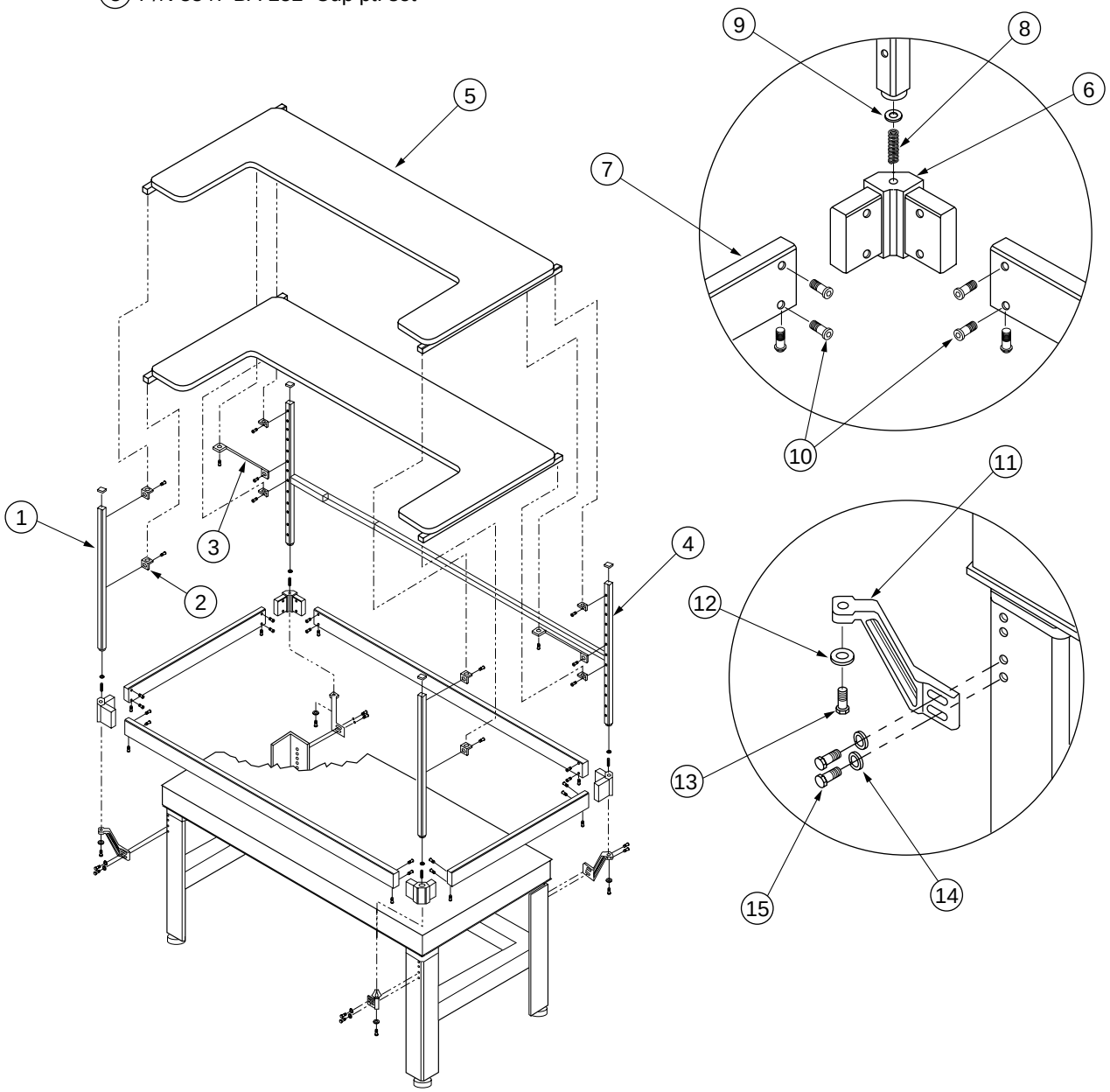


Figure 1.3 — Workstation Shelves and Support Ring

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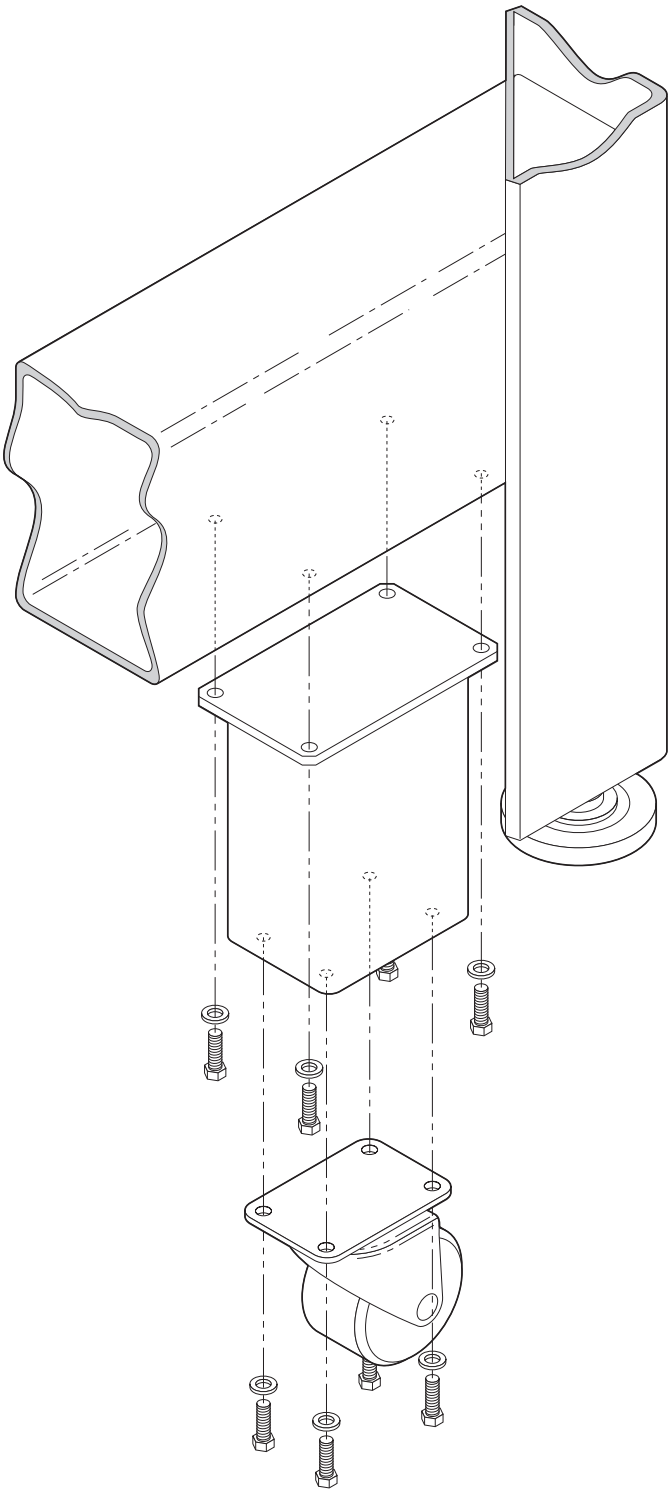


Figure 1.4 — Caster Installation

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Section 2 — System Assembly

2.1 AIW Frame Installation

Adjust the leveling pads on the bottoms of the legs as shown in figure 2.1. Rotate the pads until approximately 3/8 inch (9 mm) of thread remains outside the leg and jam nut.

If casters have been ordered, extend the leveling pads to provide floor clearance and fasten the caster assemblies to the frame legs at the pre-drilled and tapped locations on the lower legs (figure 1.4) using the supplied hardware. Transfer the load to the casters by simply retracting the leveling pads into the legs once assembly is completed. Before operating the workstation, adjust the leveling feet as described above.

2.2 Installing the Table Top or Customer Payload

WARNING

The unloaded table top can weigh as much as 250 lb. (114 kg) and customer payloads as much as 1500 lb. (680 kg). It is important to ensure that adequate personnel are available when installing the table top or employ the use of a forklift or hoist

Lift the table top and carefully place it on the frame. Use a ruler to ensure that the top is approximately centered on the frame . The AIW and AIM horizontal isolators do not incorporate a self centering device so it is necessary to keep the shipping locks engaged when placing the table top or payload to ensure all isolators are centered and work together.

As total payload weight approaches the specified limit per isolator (250 or 500 lbs), it is critical that the payload be positioned so that the isolators are equally loaded. In four isolator systems, the payload should be centered over the four isolators. In three isolator systems, the payload must be positioned off-center towards the two-isolator side of the triangle formed by the three isolators. If any of the isolators are overloaded, the system may drag and isolate poorly.

CAUTION

If the Isolation modules contain the docking feature, additional procedures must be followed to insure correct docking alignment. See section 3.5 procedures

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Customer payloads which are designed to be shipped in place on top of the isolators may be secured in place using the Clamp Kit, P/N 24704-01. The combination of Clamps and Shipping locks is designed to secure the Top or payload to the frame and Isolators under inertial loading of at least 1g at 500 pounds static load per isolator.

2.3 Leveling the Frame

For optimum performance the AIW Frame must be leveled so that payload or table top is horizontal. The bubble level included with the system is generally accurate enough. If the system is not leveled, isolator horizontal travel may be limited.

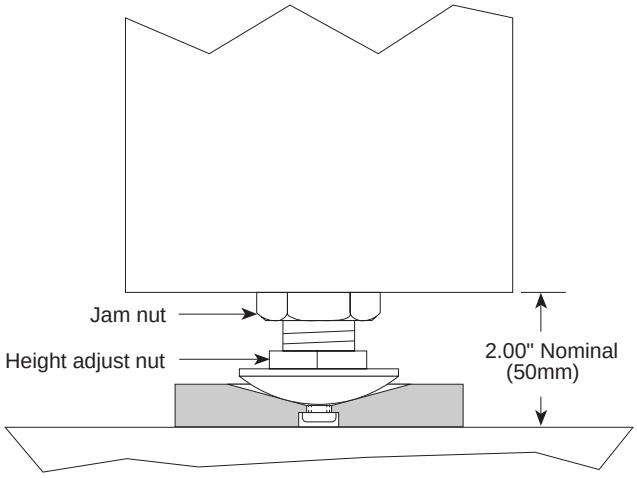


Figure 2.1 — Leveling Pad Adjustment

2.3.1 For three isolator systems, release the shipping locks. Adjust the four frame leveling pads (figure 2.1) until the table top is as level as can be determined with the bubble level. Ensure that the frame does not rock and that all four leveling pads contact the floor approximately equally. Then, tighten the leveling pad jam nuts.

2.3.2 Four isolator systems are more critical and difficult to setup. It is critical that the tops of the isolator modules all contact the table top or payload at the same time and that the frame legs all contact the floor and the frame is not twisted. Newport integrated systems consisting of frame, isolation modules, and table top will be produced to ensure these conditions are met when the system is manufactured. In custom customer applications adjust the base frame leveling feet so that they all contact the floor equally and the frame is not twisted or torqued. Then, slowly lower the payload using screw jacks until it is just above the isolator tops. Use a 0.010 inch feeler gage to ensure that the payload will contact all four isolators equally. Shims may be installed on top of or under the isolators to compensate for non-coplanar conditions.

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2.3.3 Tighten all armrest and accessory support bolts. See Section 2.6.

Release the shipping locks. The shipping locks store by sliding them down and securing them to the isolator bodies with the two screws in the lower two holes. The slotted hole in the shipping lock goes at the bottom. See Figure 2.2. Ensure that the table top is level using the standard bubble level provided or equivalent, making any necessary further adjustments to the four leveling pads. Ensure that the payload moves freely in all horizontal directions. If you cannot feel free horizontal travel in all directions, first confirm that the payload is horizontal and relevel the system if necessary. If travel is still limited, replace all the shipping locks, jacking the payload slightly off each isolator in turn to ensure that the shipping lock can re-center the isolator. After the jack is removed, release the shipping locks and recheck for free travel.

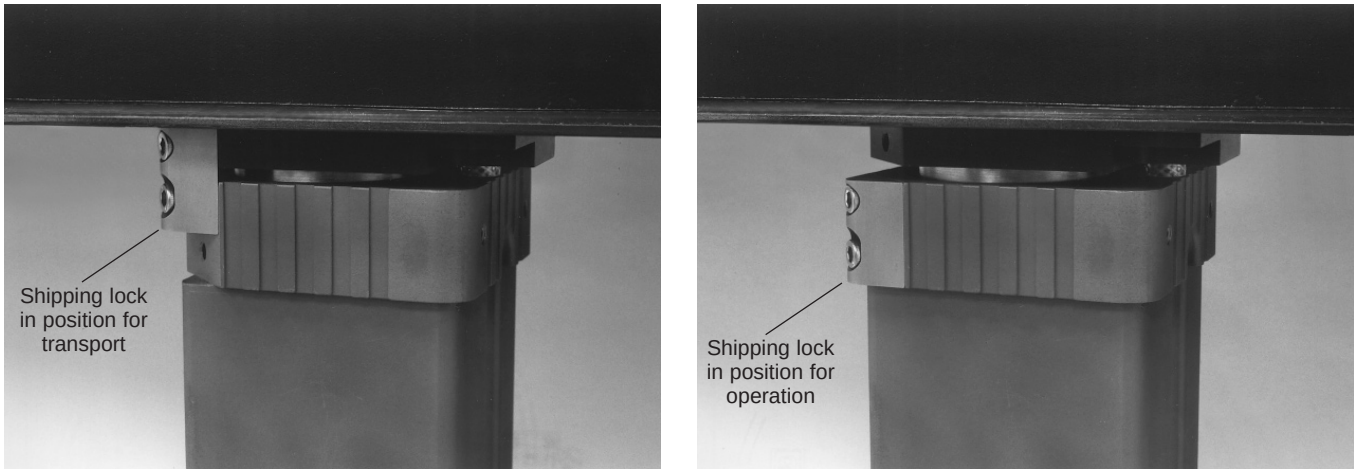


Figure 2.2 — Shipping Locks

2.3.4 Recheck that neither the frame nor the top can be rocked. If any rocking is detected, the system must be re-leveled.

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2.4 Installing the Horizontal Damping Oil

High vapor pressure damping oil, P/N 23627-01, one bottle per isolator, is used to damp the system horizontal motion. Remove the upper “fill” plug in the isolator body and squirt all of the oil in the plastic bottle into the isolator. Replace the “fill” plug. See figure 2.3. Systems integrated at Newport Corporation will generally be shipped with the damping oil installed.

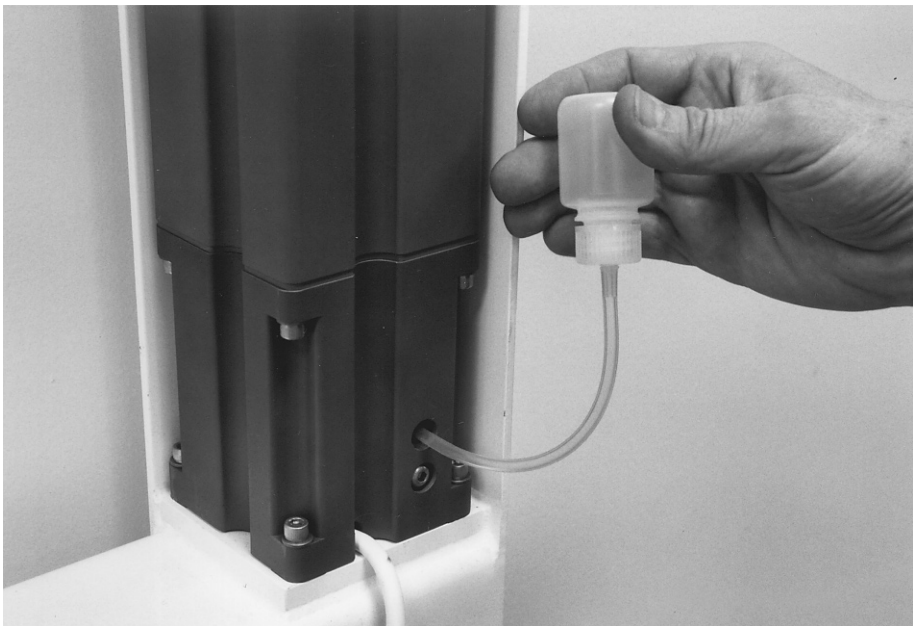


Figure 2.3 — Horizontal Damping Oil Installation

2.5 Installing the Controller and Cabling

CAUTION

To avoid damage to the controller, keep obstructions at least 2 inches (5cm) away from air ventilation slots.

CAUTION

Hazardous voltage up to 420 volts exits in the cables connecting the isolator modules to the controller. Route these away from traffic areas or possible damage.

Install the Controller on the frame using the optional Controller Mounting Bracket (see Figure 2.5) or mount the Controller at another convenient location. Do not mount the Controller on the isolated Table Top or payload

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as its fans and cables will greatly degrade isolation performance.See figure 2.4. Save the isolator cable shorting plugs in case the isolators need to be disconnected at a future time. Connect each isolation module to the controller using the supplied cables. Attach the cables to the frame using the supplied self adhesive pads. Neatly coil up any excess cable and secure it in an out of the way location. The optional controller mounting bracket is designed to facilitate storing the cables. See Figure 2.5. Newport integrated systems will have the Isolators identified 1 through 4 at final test. Connect their cables to the respective connectors on the controller. Isolator connectors numbered 1 and 2 on the rear panel are equipped to drive the docking system. Isolators with docking, generally the two front isolators, ***must*** be plugged into these connectors if they are to function. The docking lock, in docking equipped isolators, can be seen by looking down through the .375" diameter or slotted hole in the top plate. Other than this restriction, the isolator numbering system is not critical. Merely select a numbering convention and continue to use it.

The Elite 3 system is equipped with a high voltage interlock which disables the high voltage power supply if an isolator cable is unplugged or cut. on three isolator systems the supplied jumper plug must be plugged into the “MOD 4” rear panel connector to avoid disabling the high voltage power supply.

See Section 3 for setup of the active isolation system.

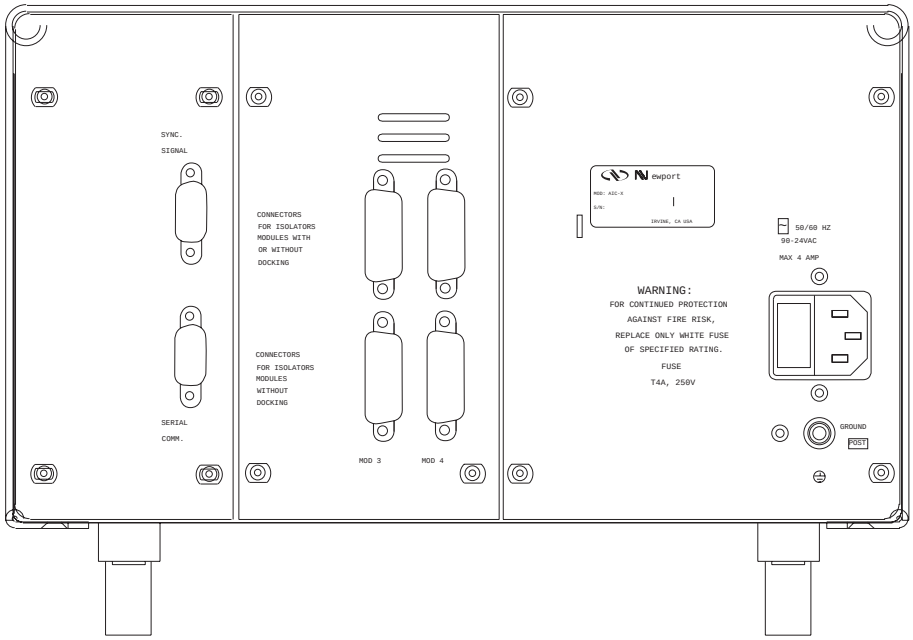


Figure 2.4 – Elite 3 – Controller Rear Panel

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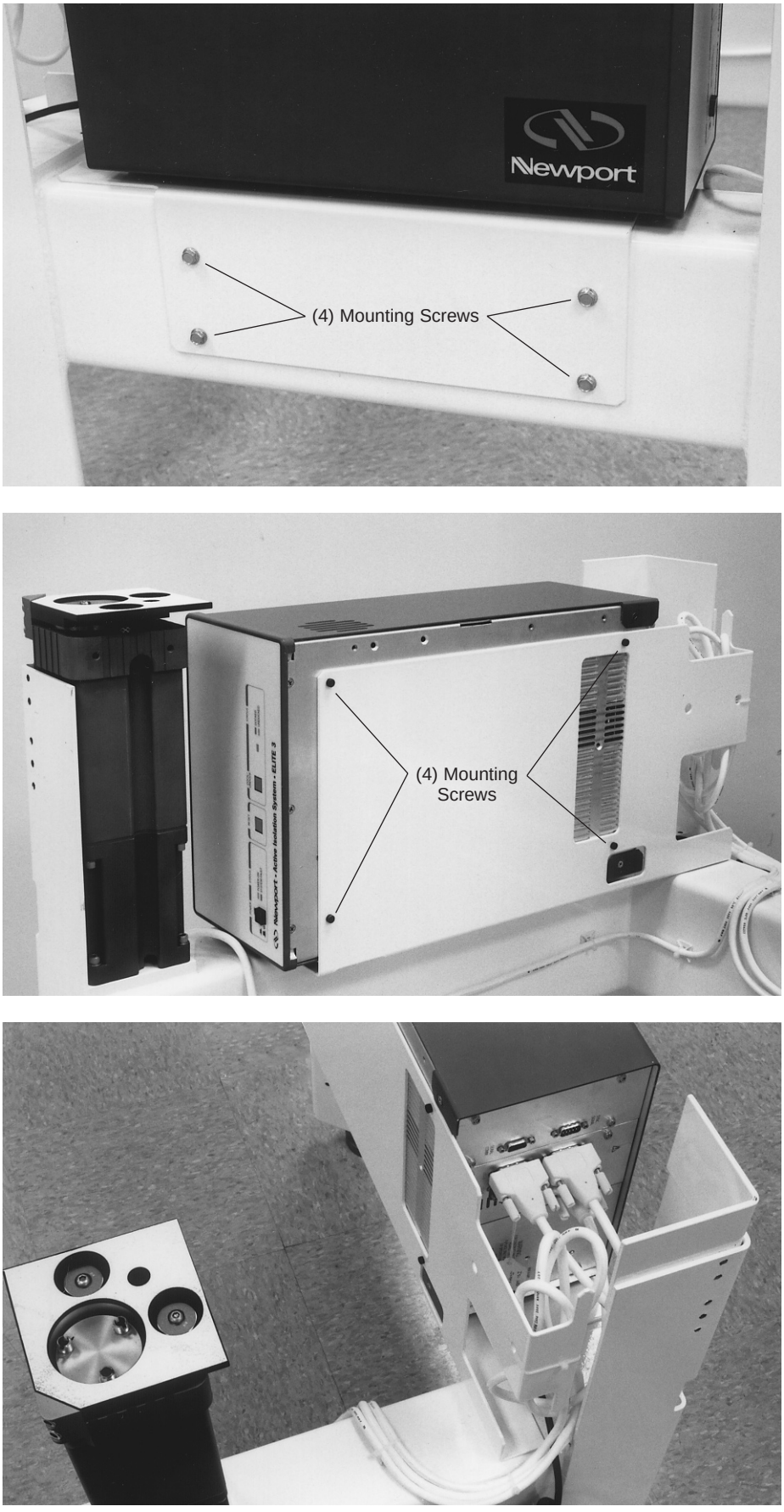


Figure 2.5 — Installing the Controller and Cabling

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2.6 Options Installation

These additional assembly steps are necessary to install optional items you may have ordered for your workstation.

Support Ring

WARNING

Install the support ring only after installing the table top or payload. (see Section 2.2)

See figure 1.3.

Place the four support ring tubes (P/N 20306) in a rectangle on the floor or workbench with the holes in the ends facing up and to the inside of the rectangle. Slide the support arm corners (P/N 20305) into the ends of the support tubes making sure that the three through-holes in the ends of the tubes and the threaded holes in the corners are aligned. Install six $^{5}/_{16}$-18 x $^{1}/_{2}$-inch long button-head screws (P/N 3664-BA-244) in each corner.

Install the four support arm brackets (P/N 20308), which connect the Active Isolation Workstation's frame to the support ring assembly. Each bracket is mounted to the frame with two $^{1}/_{4}$-20 x $^{3}/_{4}$ -inch long hex-head screws (P/N 17054-02). A set of five threaded holes in the frame enables the support ring to be mounted at the level of 1", 2" or 4" thick work surfaces. Use the following list to determine which of the four threaded holes to use:

4" thick work surface	Install the bolts finger-tight in the first and second holes, counting from the top.
2" thick work surface	Install the bolts finger-tight in the third and fourth holes, counting from the top.

WARNING

Two people are required to install the support ring safely. Damage or personal injury may result from attempting to install the support ring alone.

Turn the support ring assembly over so that the button head screw in each corner faces down (see Figure 1.3), position each support arm corner over a bracket, and install a 1-inch long $^{5}/_{16}$-18 hex bolt (P/N 3751-AF-248) and washer through the bracket and into the support arm corner.

Position the support ring over the frame and tighten the eight bolts (with washers) that connect the support brackets and the Active Isolation Workstation frame. Place armrests (P/N 20012) on top of the support ring.

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Equipment Shelves

Attach the supplied mount brackets (P/N 20385) to the two front uprights (P/N 20387) and the H-shaped rear frame (P/N 20657) at the desired shelf height. Place the shelves in the uprights and attach to the mount brackets. Attach the corner braces (P/N 21252) between the rear uprights and the top shelf, using the Phillips-head screw already installed on the underside of the shelf to attach the corner brace (see Figure 1.3). Install the plastic covers in the top of each of the uprights.

WARNING

Two people are required to install equipment shelves safely. Damage or personal injury may result from attempting to install shelves alone.

Install the $^{5}/_{16}$-inch threaded studs in the corners of the support ring, then place a rubber washer over each. Place the equipment shelf so that the uprights cover the studs and rest on the rubber washers on the tops of the support rail corners.

Monitor Arm and Base Clamp

The monitor arm includes a base clamp to attach it to the workstation support rail or ring. To install a base clamp on the support ring, loosen the hex screw on the front face and remove the retainer bar and knob by sliding out of the side of the base clamp. To reinstall the clamp, place it over the rail, center the retainer bar and reinstall the hex screw. Position the clamp on the rail and then tighten the knob to lock it in place.

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Cable Manager

The cable manager is used to minimize the vibrations transmitted by electrical and supply cables to isolated equipment. Mount the cable manager on the support rail or ring using a base clamp. Place cables and supply lines between the jaws of the cable manager, maintaining as much slack as possible on both sides of the Cable Manager. See Figure 2.6

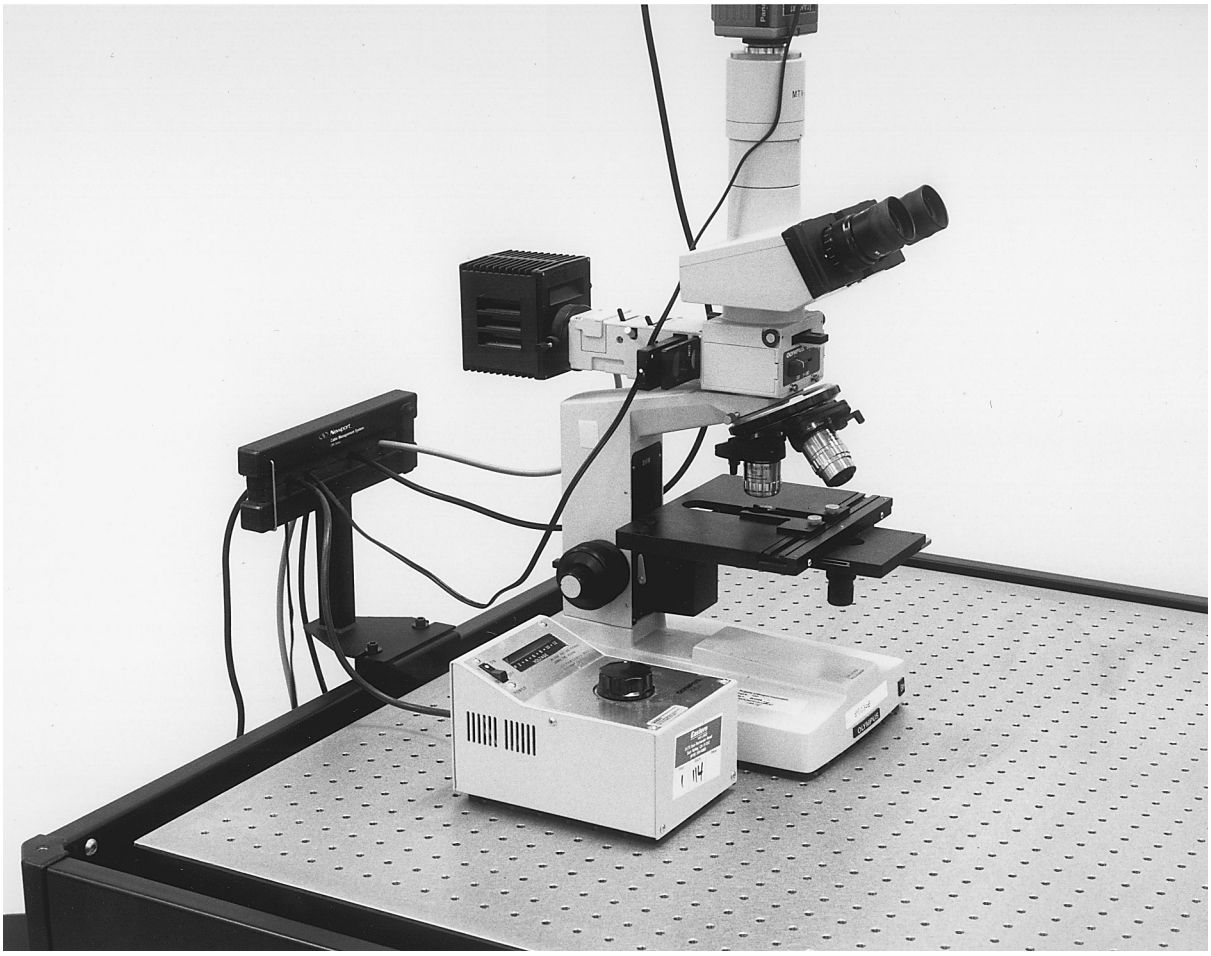


Figure 2.6 — Cable Manager Installation

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Static Dissipative Table Tops

Figure 2.7 indicates how to attach the special ground strap hardware to your Active Isolation Workstation if it includes the static dissipative table top.

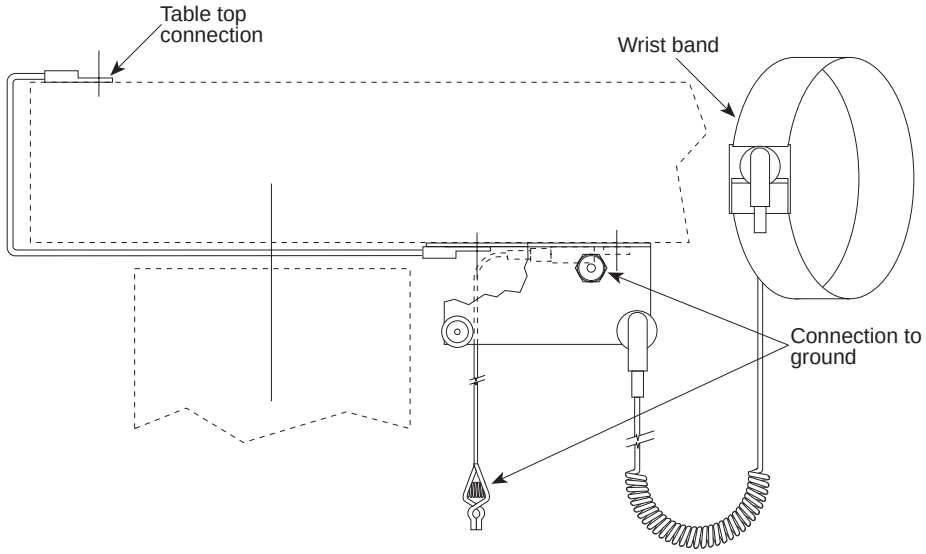


Figure 2.7 — Ground Strap Attachment

2.7 Retrofitting the AIM Active Isolation Module to the VH IsoStation

Retrofitting the AIM Active Isolation Module to the VH IsoStation

Newport model VH IsoStation with no vibration isolation or passive isolation can be readily retrofitted with the AIM active isolation modules. Only conventional hand tools (screw drivers and wrenches) are required. For specific instructions on performing the retrofit, please see the instructions packaged with the retrofit kit.

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Section 3 — Operation

WARNING

The possibility of electric shock may exist if the controller and isolator modules are not grounded. All electrical plug receptacles in the vicinity of this system should be of the grounding type and properly polarized. Contact your electrician to check the receptacles used to power the controller.

CAUTION

There are no user serviceable parts inside the controller. Contact Newport Corporation if servicing is required

CAUTION

Do not connect or disconnect isolator module cables while power is applied.

3.1 Power Up: Systems Integrated by Newport Corporation

Note: The power supply in the Elite 3 Controller will adjust automatically for 110 or 220 volt AC operation.

Those Active Isolation Workstations integrated by Newport will isolate effectively as they are delivered in almost all cases. Simply level the system, remove the shipping locks, ensure that there is free horizontal travel in all directions, plug the controller in, and turn it on. See figure 3.1. After about 35 seconds a green “Power” light will indicate that the system is functioning properly. If the red “Power” light appears refer to Section 4, Troubleshooting, and Section 3.2, Power Up — Systems Integrated By the Customer.

The Elite 3 Controller is electrically protected by fuses. See Section 4- Troubleshooting, for specific fuse types and location.

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3.2 Power Up: Systems Integrated By the Customer

If a red “Power” light appears, or if the system is being integrated by the customer, system gains must be set by the customer. This is done through the “Technician Interface” through the RS232 serial port, labeled “SERIAL COMM,” on the rear panel.

The following equipment is required:

- PC (Pentium with Windows 95 minimum).
- Communication and Setup software and RS 232 Cable are included with the system.

Install the software in a directory or folder of your choice. Follow the disk label instructions and the prompts..

3.3 Controller Front Panel Controls

Three function are controlled from the Elite 3 front panel buttons. The system status is shown by the combination of colors of the power and the Dock/Undock indicator lights as defined in section 4.1

“Power” button	Turns on or off AC line power to the Elite 3 system. Either a red or a green light indicates power on.
“Reset” button	Re-initializes the controller DSP and re-starts system. Power indicator light will turn red for about 35 seconds while the system measures and corrects electronic offsets and ramps up isolation loop gains.
“Dock/Undock” button	Pressing the “Dock/Undock” button toggles the system between docked and undocked states. A green indicator light signifies undocked. A red indicator light signifies docked.

CAUTION

Do not activate the “Dock/Undock” function more often than once every five seconds to avoid exceeding the allowable mechanism duty cycle.

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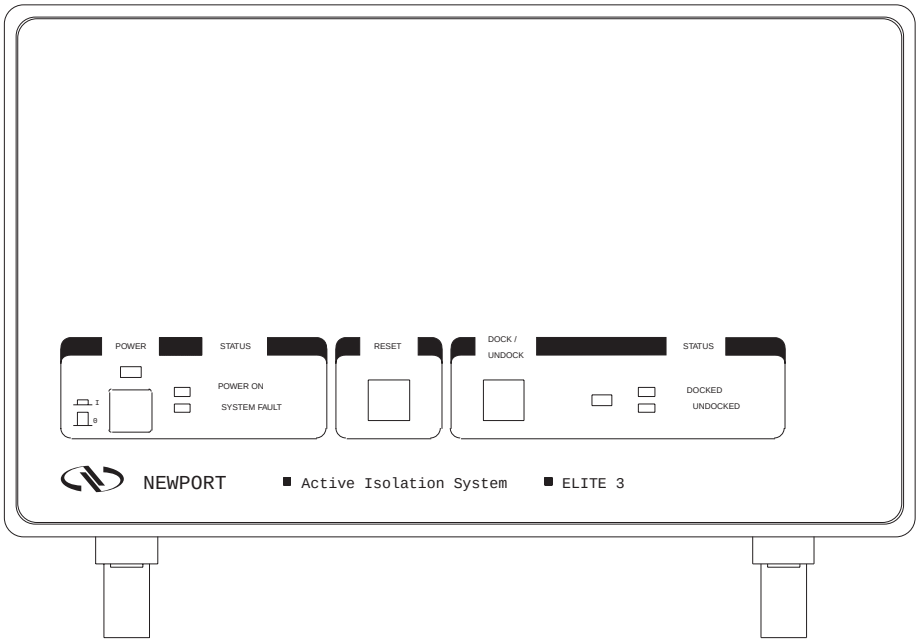


Figure 3.1 – Elite 3 Front Panel Controls

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3.4 Technician Interface to Controller

Open the terminal program “Elite 3” by running the Elite 3.EXE program. The system control functions are accessed by clicking on the buttons in the upper left screen corner.

Button functions:

“Exit”	Exits the Elite3 terminal and returns to Windows
“Lightning Bolt”	Downloads new control software to flash memory on the DSP card. Software may be supplied on diskette or by e-mail. Download instructions are supplied with the software files.
“G”	Sets system gains and isolation saturation (system overload) recovery parameters. See section 3.3.1, Setting system gains.
“Arrow”	Run. Exits the controller maintenance mode and starts the isolation software. Screen status bar reads, “Elite 3 Running.” In this mode the controller is running the isolation algorithm and the system is isolating vibration.
“Reset”	Stops the isolation software and re-initializes the DSP. Gain changes may be made now or the system can just be restarted with the Run button. Places system in maintenance mode. Screen status bar reads, “Elite 3 ready for data.”

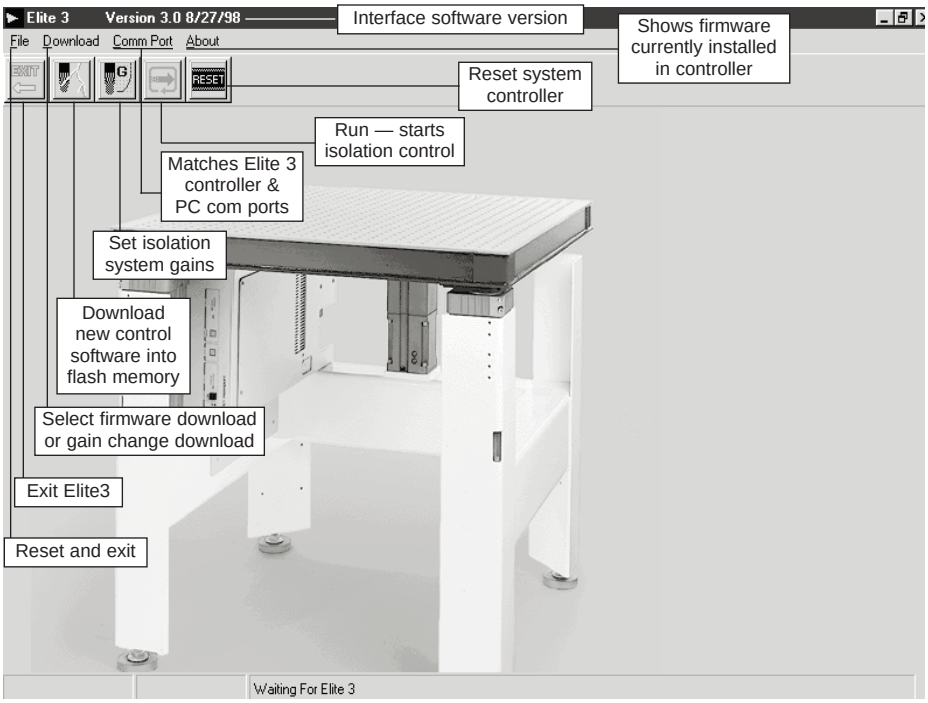


Figure 3.2 — Interface Software — Main Screen

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3.4.1 Setting system gains

The same gain settings are not appropriate for all payloads and environments. To maximize isolation performance, the system gains can be set to the highest level at which the system is stable and does not oscillate. In practice, gains should be set at least 25% below the point at which oscillation or unstable operation occurs and isolation will be near optimum. Benign environments — those with moderate floor motion and minimal acoustic disturbances — combined with low center-of-gravity payloads enable the use of higher gains. Noisy environments and very high c-g payloads promote system oscillation and the gains must be set lower. Acceptable system gains range from 0.001 (essentially 0, or a passive isolation system) to 0.99. System gains are nominally set at 0.25 on all isolator channels at the factory. These settings will yield specified isolation performance in a typical light manufacturing area. You can assess the effects of gain changes on your process by observing the changes in your process as the gains are changed. Alternatively, you can measure the Elite system transmissibility (isolated payload motion/floor motion) with a dual channel spectrum analyzer and a pair of seismic accelerometers or geophones.

To set the system gains click on the “Reset” button to put the controller in maintenance mode. When the status bar reads “Elite 3 ready for data,” click on the “G” button and merely change the gains on the “Transfer Gains” screen. It is recommended that all gains be set identically except on three isolator systems where gain number four is not used. In this case, gain number four is set to 0.00. Non-identical gain settings are generally appropriate only for systems with asymmetric loading and have to be determined on an individual system basis. Set the ramp time to approximately 100 times the highest gain setting. Click the “Transfer Values” button to download the new gain settings. Exit the maintenance mode with the “Run” button on the main menu to restart the isolation algorithm.

The computer may be disconnected at this time if desired.

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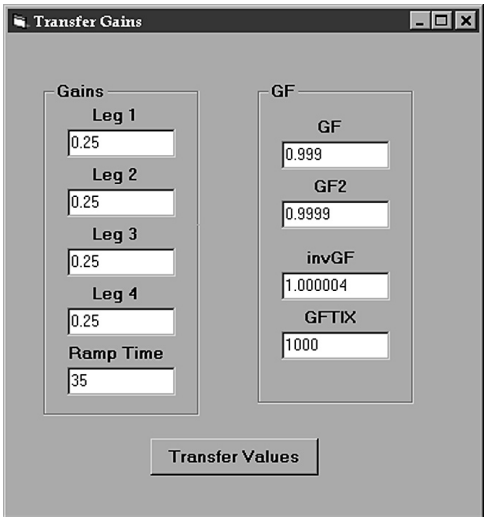


Figure 3.3 — Interface Software — Gain Setting Screen

The “GF” values control how the Elite recovers from transient shocks which may overload the geophone amplifier or DSP ADC. These values are generally changed only by a factory technician. Nominal values are:

GF	0.9999
GF2	0.99999
invGF	1.000004
GFTIX	1000.

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3.5 Interface Connections

The Active Isolation Module docking function is synchronized with customer equipment through the “SYNC. SIGNAL” connector on the controller rear panel. Signals are TTL compatible. Pin outs and commands are as follows:

Pin	Function	Interpretation
1	Isolation status	Floating output = Elite not isolating Vmax= 30v Low = Isolation functioning Imax= 50mm (See Figure 3.4)
6	Not used	
2	Docking enable input	High input enables docking system
7	Dock / Undock input	High causes system to dock Low causes system to un-dock
3	Logic ground	
8	Not used	
4	Not used	
9	Not used	
5	Not used	

If system power is interrupted, the docking system will remain in the current docking condition when the power is interrupted.

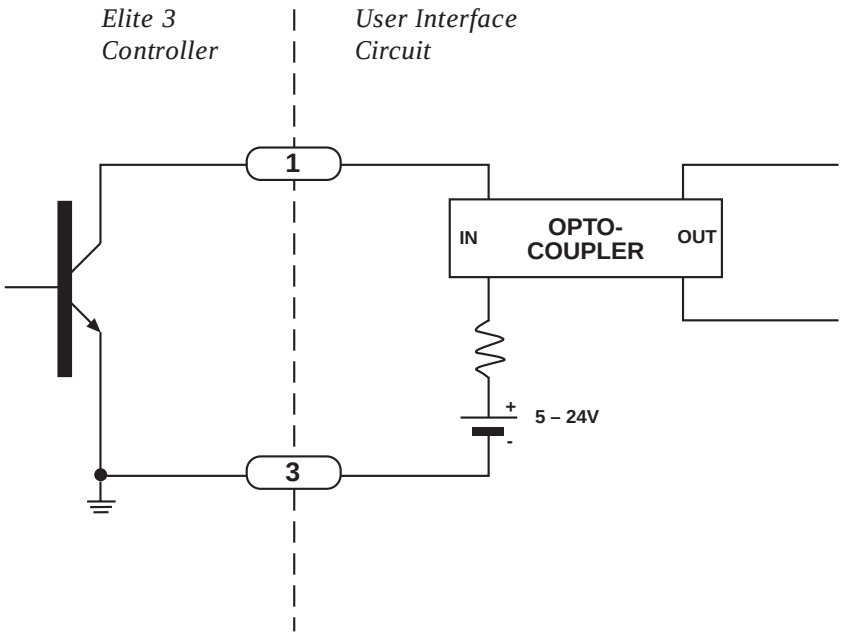


Figure 3.4 Isolation status output – recommended user interface circuit

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3.6 High Voltage Safety Interlock

A high voltage safety interlock is incorporated into the isolation module cables. If any of the cables are unplugged the Elite 3 controller will turn off the 420 volt high voltage power supply. In three isolator systems, the supplied jumper plug must be plugged into the unused module connector (generally connector number 4) for the system to function. When the high voltage power supply is disabled, the rest of the system is still functional although it will not actively isolate.

3.7 Serial Communication Connector Pin Connections

The serial communication port on the controller rear panel, see figure 2.4, is an RS232 port. Pin connections are as follows:

Pin	Signal Name	Function
1	DCD	Data Carrier Detect
2	TXD	Transmit Data
3	RXD	Receive Data
4	PC_DTR	Data Terminal Ready - Toggling this line to high causes SBC32 to reset for remote reset.
5	GND	Ground
6	DSR	Data Set Ready
7	CTS	Clear To Set
8	RTS	Request To Send
9	Ring in	Ring Indicator

3.8 Docking Feature Alignment Procedure

To insure correct docking alignment, the payload must be lifted and reinstalled while the two docking mechanisms are engaged. Other non docking modules should have their shipping locks temporarily installed during this procedure so as not to lose their initial alignment. The docking modules should also have their shipping locks attached in the up position, with screws finger tight to prevent Isolator top plate rotation.

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Section 4 — Troubleshooting

4.1 Interpretation of Indicator Lights

There are two lights on the front panel. Each has four conditions: off, red, green, and amber. Light definition is as follows:

Power Status Light	Dock/Undock Status Light	Light Combination Definition
OFF	OFF	System power off
GREEN	GREEN	System operating, undocked
GREEN	RED	System operating, docked
RED	OFF	FAULT
RED	RED	FAULT
RED	AMBER	FAULT
RED	GREEN	FAULT

4.2 Troubleshooting Tips

4.2.1 Verify that the mechanical system setup is correct, see Section 2. Ensure that all four frame feet contact the floor firmly. If one or more feet are not firmly seated against the floor, the system will oscillate.

4.2.1 Ensure that the system is on a stiff floor (slab on grade or resonant frequency higher than 25 Hz). The active system will not function correctly on “soft” or wooden floors.

4.2.3 If you must operate the system on a carpeted floor, order the Elite Cleat, P/N 25177-01, to penetrate the carpet and make a solid connection between the frame and the floor.

4.2.4 Confirm that all cables are properly plugged in and that the jumper plug is plugged into the “MOD 4”connector on three isolator systems.

4.2.5 Confirm that the isolator gains are properly set. See Section 3.3.1.

4.2.6 Confirm That The AC Line Fuses Have Not Blown

The Elite 3 is protected by AC line fuses located in the line cord connected on the controller rear panel. See figure 2.4. Replace the fuses with those of the same type and rating.

4.2.6.1 Elite 3 User Serviceable Fuses

AC line fuse, 2 required	Time lag (Slo-Blo) fuse, 4 amp., Type T4A, 250 V., 5 x 20 mm.

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4.2.6.2 Elite 3 Non-User Serviceable Fuses

Internation power supplies, mounted on power line PCB, 2required
Time lag (Slo-Blo) fuse, 3 amp., Type T3A, 250 V., 5 x 20 mm.

High voltage “Pacifitek” power supply, 2 required
Time lag (Slo-Blo) fuse, 0.5 amp., Type T0.5A, 250 V., 5 x 20 mm.

4.2.7 Communications Ports

Confirm that the Elite 3 Terminal Program used to communicate with the Elite 3 AIC Controller is configured to communicate through an available Com Port. The Elite 3 AIC is normally configured to communicate through Com Port 1. The Com Port can be changed with the “Com Port” pull down menu. See figure 3.2 (Elite 3 Terminal Programs earlier than Version 3.0 are configured to communicate through Com Port 1 only).

4.2.8 Call your Newport Technical Service Representative, 1-949-863-3144.

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Section 5 — Service and Maintenance

WARNING

If the power cord or the isolator module cables show signs of wear they should be replaced as soon as possible

5.1 Factory Service

To obtain information concerning factory service, contact Newport Corporation or your Newport representative at 1-714-863-3144. Please have the following information available.

1. Model number.
2. Purchase order number.
3. Complete description of the problem.

If components are to be returned to Newport Corporation, you will be given a Return Number, which you should reference in your shipping documents.

Please fill out the service form on the next page and have the information ready when contacting Newport Corporation. Include the completed service form with any parts or components that are returned.

CAUTION

Remove the horizontal damping oil from thee isolator modules through the lower drain hole, see figure 2.3, before returning them to Newport. Alternatively, package the isolator modules vertically on a palletized crate prior to shipping.

5.2 Service Form

Please include a completed Service Form with all equipment returned to Newport Corporation for service.

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5.3 Cleaning

To clean any of the optional work surfaces (either 400 series stainless steel or high pressure laminate) spray household cleaner, such as “409” or “Fantastic”, on a clean cloth and wipe down. Avoid using abrasive cleaners since they will foul the mounting holes and also damage the laminate tops.

Powder coated frames may be cleaned in the same manner as the work surfaces.

Do not spray liquid cleaners on the controller. If it is necessary to clean the controller, un-plug it and wipe it with a rag dampened (not dripping) with household cleaner. Remove the cleaner with a clean rag dampened (not dripping) with water.

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5.2 Service Form

Newport Corporation
U.S.A. Office: 714/863-3144
FAX: 714/253-1800

Name _____ **RETURN AUTHORIZATION #** _____

Company _____ **(Please obtain prior to return of item)**

Address _____

Country _____ Date _____

P.O. Number _____ Phone Number _____

Item(s) Being Returned:

Model # _____ Serial # _____

Description _____

Reason for return of goods (please list any specific problems) _____

Please complete the below, as appropriate.

Describe problem _____

(Attach additional sheets as necessary).

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Section 6 — Spare Parts

6.1 Spare Parts List

Isolators:

Standard load, non-docking	22971-03
Standard load, docking — with round docking hole in top plate	22971-01
Standard load, docking — with slotted docking hole in top plate	22971-05
High load, non-docking	22971-04
High load, docking — with round docking hole in top plate	22971-02
High load, docking — with slotted docking hole in top plate	22971-06
Horizontal damping oil, 1 bottle per isolator	23627-01

Controller:

3 Isolator system	AIC-3	(23670-01)
4 Isolator system	AIC-4	(23670-02)

Cables:

Power line cord		04583-00
Technician interface, RS232 serial communication		25101-01
Isolator cable extension —	18"	24456-01
	36"	24456-02
	54"	24456-03

Accessories:

Caster Kit	25271-01
Cleat Kit	25177-01

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Section 7 - Elite 3 Firmware and Software

7.1 Scope

This manual section describes the firmware version 2.0 and software version 3.0. Any future revisions will be described in the "Read me" files included on the diskettes supplied with the Elite 3 system. Firmware and software enhancements and revisions will be described in detail in "Read me" files included on any upgrade diskettes.

7.2 Firmware and Software Installation into PC

A PC and RS 232 cable as described in Section 3.2 are required.

The Elite 3 firmware and software are provided on two 3.5" diskettes. To install, follow the instructions on the disks' labels. Before installation of new software rename the directory where existing Elite 3 interface software resides. Make sure new software is installed in a different directory to avoid over writing prior versions. The setup program will install the software and firmware in the default directory C:\ProgramFiles\Elite3 or other user defined directory. The directory will contain two groups of files:

Windows Utility Interface Software version 3.0

Elite3.exe

Imghook.dll

Install.log

Unwise.exe

Firmware version 2.0

2_0fr212.a0

2_0fs220.a0

2_0std21.a0

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7.3 Firmware Selection

Elite 3 controllers are factory programmed with the standard firmware (file 2_0std21.a0) and fully operational as received. It is not necessary to download any firmware prior to operation.

Firmware files provided on the diskettes offer different control algorithms which may be downloaded by the user. The different control algorithms may improve the system isolation performance depending on the type of vibration environment in which the system operates.

Below are the guidelines for selecting the firmware file (control algorithm) applicable to your operating environment:

2_0std21.a0 - "standard" algorithm downloaded at the factory. This control algorithm provides best isolation performance under most typical floor conditions.

2_0fr212.a0 - "fast recovery" algorithm. This firmware provides improved stability and faster recovery time from large disturbances caused by excessive floor motion or payload disturbances. It is most suitable for environments containing large low frequency (=< 3Hz) floor displacements. These large amplitude low frequency motions may exceed the allowable floor motion level (see Section 1.0) and overdrive the system. This firmware reduces the chance of overdriving the system and provides faster recovery from such events than the standard firmware. In terms of isolation performance, this firmware is almost identical to the standard one. There is less than 5 dB performance degradation at one Hz.

2_0fs220.a0 - "fast settling" algorithm. This algorithm provides the shortest settling time after large disturbances. It is the most robust firmware of the three provided and is suitable for floor environments where large disturbances exceeding the maximum allowable floor displacement or large disturbances induced by the payload (such as stage motion) are common. The short settling time results in about 5 dB of isolation degradation at about 1Hz. The actual loss of isolation at these low frequencies depends on the system gain settings for each isolator. Higher gain (approximately 0.5) results in less loss of isolation at low frequencies. Lower gain, necessary in very high vibration environments, results in better immunity to large disturbances, but will result in greater loss of isolation. In choosing appropriate gain, please follow the instructions in Section 3.4.1.

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7.4 Firmware Downloading

Follow the instructions in Section 3.4 and launch the Windows Utility Interface terminal program "Elite 3". The software will automatically reset the controller and the message "Elite waiting for Data" will appear on the status bar at the bottom of the window. If the message on the status bar says, "Elite running," reset the controller by clicking on the RESET button on the tool bar.

Click on the "Lightning Bolt" button on the tool bar (Load New Firmware to Flash) or choose "Firmware" from the "Download" pull-down menu.

Select appropriate firmware *.a0 file and click "Open".

Confirm you want to download the selected firmware when asked, "Last chance to exit - Continue?". Click "OK."

Controller will start erasing the Flash and downloading the file. Download progress will be reported by a display bar graph. After about a minute or two the file download will be complete. The "Flash burned" message will appear. Click "OK."

The "Resetting Elite" message will appear. After the message window disappears and the reset procedure is completed the message on the bottom bar on the screen will read "Elite3 ready for Data".

Confirm the proper version of firmware is loaded by clicking on "About." A Window displaying the version of the firmware (eg. "2.0 STD 21 8/14/98" for 2_0std21 firmware file) will appear. Click "OK."

Click "Run" ("Arrow" button). "Elite 3 Running" message window will appear. Click "OK." "Elite 3 running" message should appear on the bottom bar of the screen.

The controller isolation firmware will now be running. Both lights on the front panel should be green. If either light remains red more than two minutes, refer to Section 4.

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7.5 Firmware and Software Upgrading

Upgrade Procedure: If it is necessary to upgrade either the firmware or the user interface software care must be taken to maintain compatible revision levels during the upgrade. The procedure is a follows:

Power up the Elite controller and access it from your PC using the user interface software supplied with the controller. See Section 3.4.

Download new firmware into flash memory. See section 7.4.

Exit old revision user interface.

Launch new revision user interface compatible with new firmware.

When installing a new user interface version in your PC be sure to assign it to different directory from prior versions to avoid over writing the prior versions. See Section 7.2 and the "read me" files.

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Tel: 01 60916868
Fax: 01 60916869

GERMANY
Tel: 06151 3621 0
Fax: 06151 362150

ITALY
Tel: 02 924 5518
Fax: 02 923 2448

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Fax: 030 6592120

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Fax: 886 (2) 2769-9638

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