

# ERS2010

# ERSW2010

Seismic Restraint System



\* Table and legs sold separately

## Users Manual



**Newport**  
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## Warranty

Newport Corporation warrants that this product will be free from defects in material and workmanship and will comply with Newport's published specifications at the time of sale for a period of one year from date of shipment. 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 office or representative, or contact Newport headquarters in Irvine, California. You will be given prompt assistance and return instructions. Send the product, freight prepaid, to the indicated service facility. Repairs will be made and the instrument returned freight prepaid. Repaired products are warranted for the remainder of the original warranty period or 90 days, whichever first occurs.

### Limitation of Warranty

The above warranties do not apply to products that have been repaired or modified without Newport's written approval, or products subjected to unusual physical, thermal or electrical stress, improper installation, misuse, abuse, accident or negligence in use, storage, transportation or handling. This warranty also does not apply to fuses, batteries, or damage from battery leakage.

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Part No. 90047850 Rev. C

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# 1 Section 1 – General Information

## 1.1 Introduction

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The Newport Model ERS2010 Earthquake Restraint system is designed to restrict the motion of Newport Optical Tables in the event of an earthquake. The Restraint is illustrated in Figure 1. Each ERS2010 is rated for seismic forces generated by a maximum of 2000 pounds (908 Kg.) of combined table and payload weight per restraint. Please refer to Table 1 and Figure 2 for detailed specifications of maximum loads. However, in order to prevent possible tipping of a table during or after an earthquake, three or more ERS2010 Restraints - located as far apart as possible at the perimeter of the table system - must be used even though the load per ERS2010 is less than the specified maximum. Installation schematics are shown in Figure 2 (see Section 3).

The earthquake loads due to movement of the table and payload are transferred into the concrete floor by eight (8) anchor bolts per Earthquake Restraint. The anchor bolts (Hilti HIT RE500 SD per ICC ESR2322, 3/8 in. dia bolts and HIS-N inserts embedded 4-3/8”) are designed for use in concrete floors at least 6 inches (150 mm) thick constructed of 2,500 psi (17.3 megapascal) minimum normal-weight concrete in an uncracked condition. If any of these conditions are not met, additional analysis and detailing by a structural engineer will be required.

The earthquake loads are distributed into the optical table bottom skin by eight (8) M6-1.0 socket head cap screws.

The installation kit, as well as the dispenser, can be purchased from Newport separately, see parts list below.

The ERS2010 is designed to withstand the earthquake loads corresponding to, or lower than, the 2018 IBC seismic accelerations  $S_s=2.50$ ,  $S_1=1.0$ . The design of the Restraint is in compliance with 2018 International Building Code (IBC) and 2019 California Building



	1	90047889 Template, Floor Interface
	1	90047888 Template, Table Interface
1 ea. per order		ERS2010 Installation Kit.

#### ERS2010 Installation Kit Contents:

Model Number (as ordered)	Qty				
	HILTI HIT-RE 500-SD Epoxy Adhesive	HILTI HIS 3/8 Threaded sleeve	Hex bolts 3/8"	Washers for 3/8" bolts	HILTI Instruction Manual
ERS2010-4-KT	1	32	32	32	1
ERS2010-3-KT	1	24	24	24	1
ERS2010-1-KT-A	1	8	8	8	1
ERS2010-1-KT-B	-	8	8	8	-

*Report any shipping damage immediately to Newport and the shipping company.*

## 1.4 Safety Considerations

The following terms are used in this manual that relate to your safety.



### WARNING

Warning is used to indicate dangers that could result in personal injury.



### CAUTION

Caution is used to indicate situations that may result in damage to components of your Newport Vibration Control System.

## 1.5 Warranty Information

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

## 2 Section 2 – Assembly

### 2.1 Tools and Hardware Required

- 5mm Allen hex wrench (For M6 SHCS.)
- 9/16” wrench for 3/8” concrete anchor bolts.
- Electric Drill.
- Drill bit - US #9 (0.196 inch or 4.978 mm) diameter suitable for drilling mild steel.
- Drill bit - 11/16 inch carbide tipped (for concrete). Must drill 4.63 inches (118 mm) deep minimum.
- M6-1.0 tap.
- Tap Wrench.
- Center Punch (For starting drill in bottom of table.)
- Hammer.
- Masking Tape.
- Cutting Oil (For use drilling and tapping the table.)
- Eye Protection (Safety glasses, goggles, or mask.)
- Dust Mask (For protection from concrete dust.)

### 2.2 Installation Hardware

Hardware for anchoring the restraints to the floor can be ordered from Newport in kits listed in Section 1.3 above, or ordered separately. The following specifications should be maintained:

Item	Specification
Epoxy adhesive	HILTI HIT-RE 500-SD
Threaded sleeve	HILTI HIS 3/8 4.375” long
Bolts, 3/8”	Hex head 0.375-16 x 1.25 x 1 Zinc coated, per ASTM A307
Washers, 3/8”	FLAT, HARDENED, TYPE 1 ASTM F346



## 2.3 Restraint Assembly

The ERS2010 Earthquake Restraints are shipped assembled with the Restraining Plate bolted into the Base Assembly. Verify that the three Centering Clips are installed. See Figure 1 for the assembly drawing.

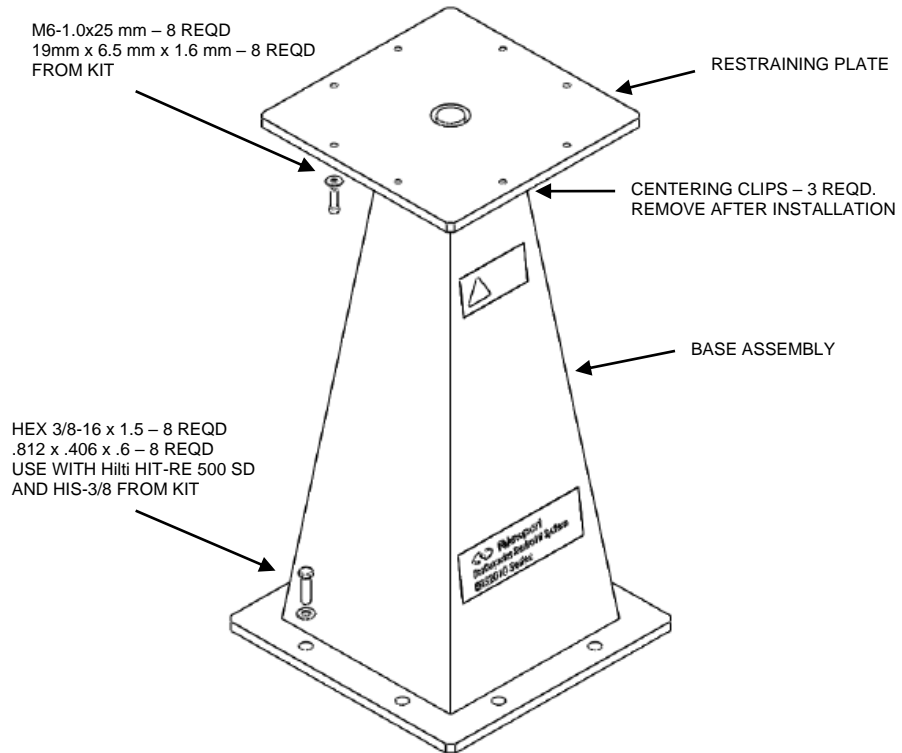



Figure 1: ERS2010 Assembly

Turn off the air supply to the table isolators. Position the assembled Earthquake Restraints under the table. When the table is not floating, there should be 0.875 to 1.125 inches (22 to 28 mm) clearance between the Restraining Plate and the bottom of the table.

## 2.4 Earthquake Restraint Installation


Verify if the concrete is 2,500 psi (17.3 megapascal) minimum normal-weight concrete in an uncracked condition. If any of these conditions are not met, additional analysis and detailing by a structural engineer will be required.

### 2.4.1 Tables Drilled by Newport


	<p style="text-align: center;"><b>WARNING</b></p> <p><b>Pinch point hazard exists between top plate and bottom base. Keep hand and fingers clear during operation and installation</b></p>
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1. Position the Earthquake Restraints with installed Centering Clips under the drill holes in the table bottom. Attach the Restraining Plate to the table with one bolt per each side. Mark the anchor bolt locations by tracing through the attachment holes or trace around the Base Assembly and use the supplied Hole Template to locate the holes. Ensure that the Earthquake restraint does not rock on the floor. If necessary use grout or shims to ensure that the Earthquake Restraint does not rock.
2. Remove the Earthquake Restraint.
3. Install anchors inserts in compliance with ICC ESR 2322. Use HILTI installation instructions included with HIT-RE 500-SD for reference.
4. After allowing for appropriate curing time, re-install the Earthquake restraint and install/tighten the anchor bolts (refer to HILTI installation instructions and ESR 2322).
5. Install and tighten the Restraining Plate bolts to 120 in-lbs (13.5 m-N) torque.
6. Remove the three Centering Clips. Float the table. Ensure that the table floats freely and that the Restraining Plate and Base Assembly do not contact each other.


#### 2.4.2 Tables Drilled in the Field.

	<p style="text-align: center;"><b>WARNING</b></p> <p><b>Pinch point hazard exists between top plate and bottom base. Keep hand and fingers clear during operation and installation</b></p>
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1. Position the Earthquake Restraints with Centering Clips installed under the table bottom. See Figure 1 for installation schematics. Ensure that the Earthquake restraint does not rock on the floor. If necessary use grout or shims to ensure that the Earthquake Restraint does not rock. **Caution:** Newport tuned table dampers are located within an area approximately 12 inches (305 mm) square at each corner of the table. Do not drill into the table in these areas.

	<p style="text-align: center;"><b>CAUTION</b></p> <p>Newport tuned table dampers are located within an area approximately 12 inches (305 mm) square at each corner of the table. Do not drill into the table in these areas.</p>
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2. Hold the Restraining Plate firmly against the table bottom. Spacers may be used to support the Restraining Plate above the Base Assembly if desired. Mark the Restraining Plate location on the table bottom. Tape placed on the table bottom around the Restraining Plate edges will provide an easily seen locating mark. Remove the Earthquake Restraint.
3. Tape the Hole Template, Table, to the bottom of the table. Use the center punch and hammer to mark each bolt hole. Remove the Hole Template.
4. Drill the holes using the #9 drill. **Warning:** Use eye protection. Wear a long sleeve shirt to avoid being burned by hot steel chips from the table. Tap the holes using the M6-1.0 tap.

	<p style="text-align: center;"><b>WARNING</b></p> <p>Use eye protection. Wear a long sleeve shirt to avoid being burned by hot steel chips from the table. Tap the holes using the M6-1.0 tap.</p>
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5. Reinstall the Earthquake Restraint. Attach the Restraining Plate to the table with one bolt per each side. Mark the anchor bolt locations by tracing through the attachment holes or trace around the Base Assembly and use the supplied Hole Template to locate the holes.

6. Remove the Earthquake Restraint.
7. Install anchors inserts in compliance with ICC ESR 2322. Use HILTI installation instructions included with HIT-RE 500-SD for reference.
8. After allowing for appropriate curing time, re-install the Earthquake restraint and install/tighten the anchor bolts (refer to HILTI installation instructions and ESR 2322).
9. Install and tighten the Restraining Plate bolts to 120 in-lbs (13.5 m-N) torque.
10. Remove the three Centering Clips. Float the table. Ensure that the table floats freely and that the Restraining Plate and Base Assembly do not contact each other.

## 3 Section 3 – References

Further information about the design loads for structures in earthquake prone areas and the installation of Hilti concrete anchors are available from the following:

1. 2018 International Building Code
2. 2019 California Building Code
3. International Code Council Evaluation Service Report #2322  
HILTI HIT RE500 SD Adhesive Anchors in Concrete.

Equipment location	Concrete anchors per side/baseplate	
	(2)/(8)	
	Non-hazardous	Hazardous <sup>1)</sup>
At grade <sup>2)</sup>	2,110	1,408
Mid-height floor <sup>2) 3) 4)</sup>	1,140	762
Top floor <sup>2) 3) 4)</sup>	780	522

Notes:

- 1) Installations involving quantities of toxic or explosive substances sufficient to be dangerous to the public or exceeding quantities per IBC Table 307.1.(2). IBC Occupancy Category III, Importance Factor I=1.50.
- 2) Uniform-thickness slab assumed.
- 3) Elevated floors poured on corrugated deck may provide insufficient embedment depths; further reductions or additional structural measures may be required.
- 4) Normal-weight concrete assumed - floors constructed of light-weight concrete may require further reductions or additional structural measures.
- 5) Maximum weights are shown for the tallest ERS2010 model, 28 in. Higher weight loads may be admissible for other models. Consult a structural engineer for additional analysis.
- 6) Central position of the CG is assumed. See Figures 1 and 2 for additional information.

**Table 1: Maximum combined weight of the table and equipment (lbs) tributary to each Earthquake Restraint**

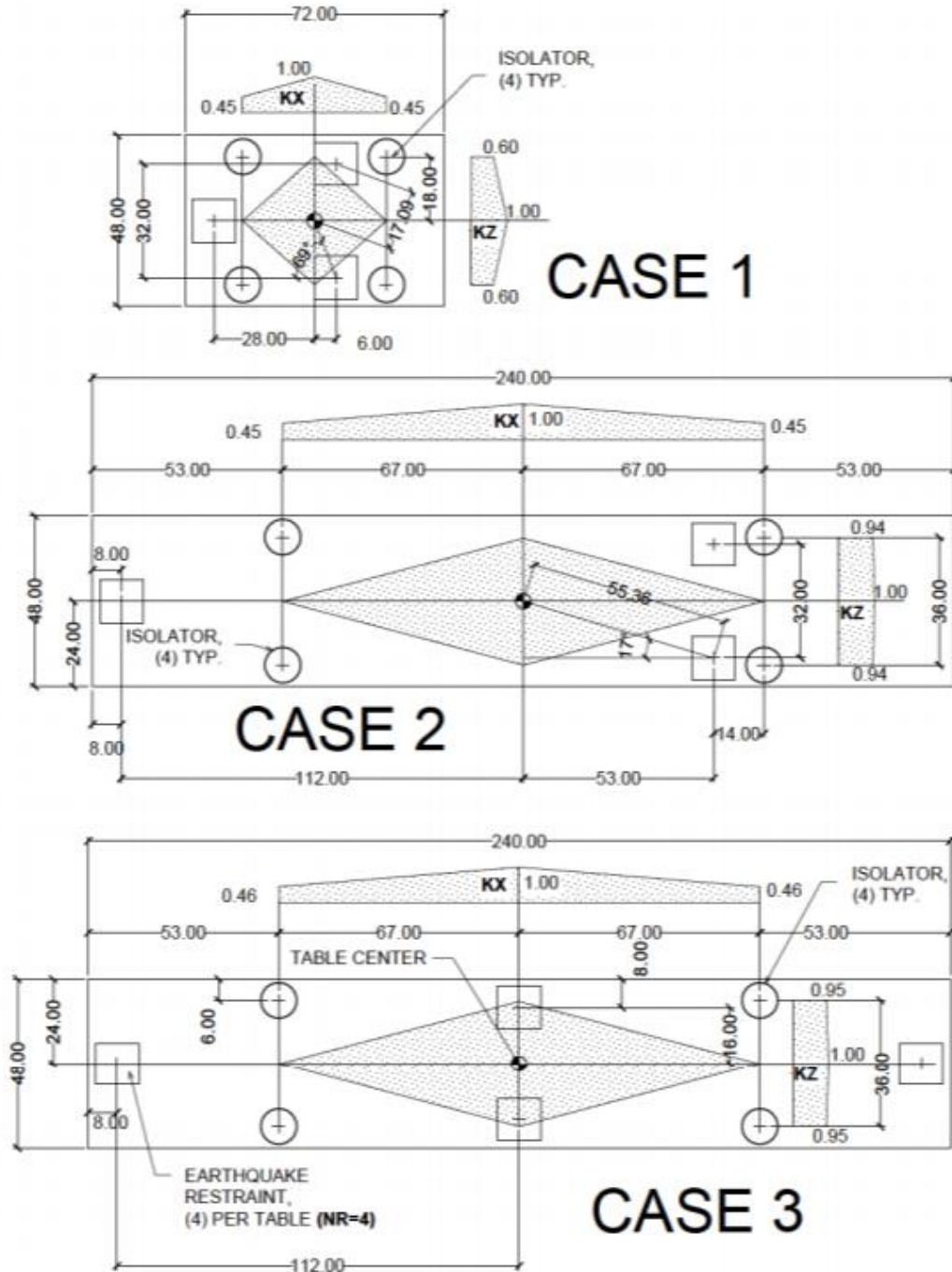


TABLE LOCATION FLOOR	HAZARDOUS CONTENTS	
	NO	YES
GROUND	2,112	1,689
MID-HEIGHT	1,143	915
TOP	784	627

**NOTE:**

WTR PROVIDED FOR CASES WHEN THE CENTERS OF GRAVITY OF THE PAYLOAD AND TABLE ARE LOCATED AT THE CENTER OF THE TABLE (REFER TO SHEET SD-2).

FOR OTHER CASES, USE REDUCED VALUES

$$WTR1 = WTR * K1 * K2$$

MAXIMUM TRIBUTARY WEIGHT OF TABLE AND PAYLOAD "WTR", LBS. PER RESTRAINT

Figure 2: Typical configuration of Earthquake Restraints and weight restrictions.

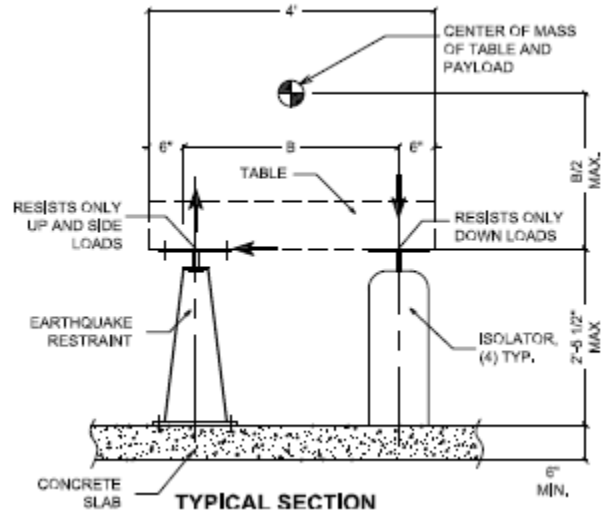


Figure 3: Restrictions on the height of the system.

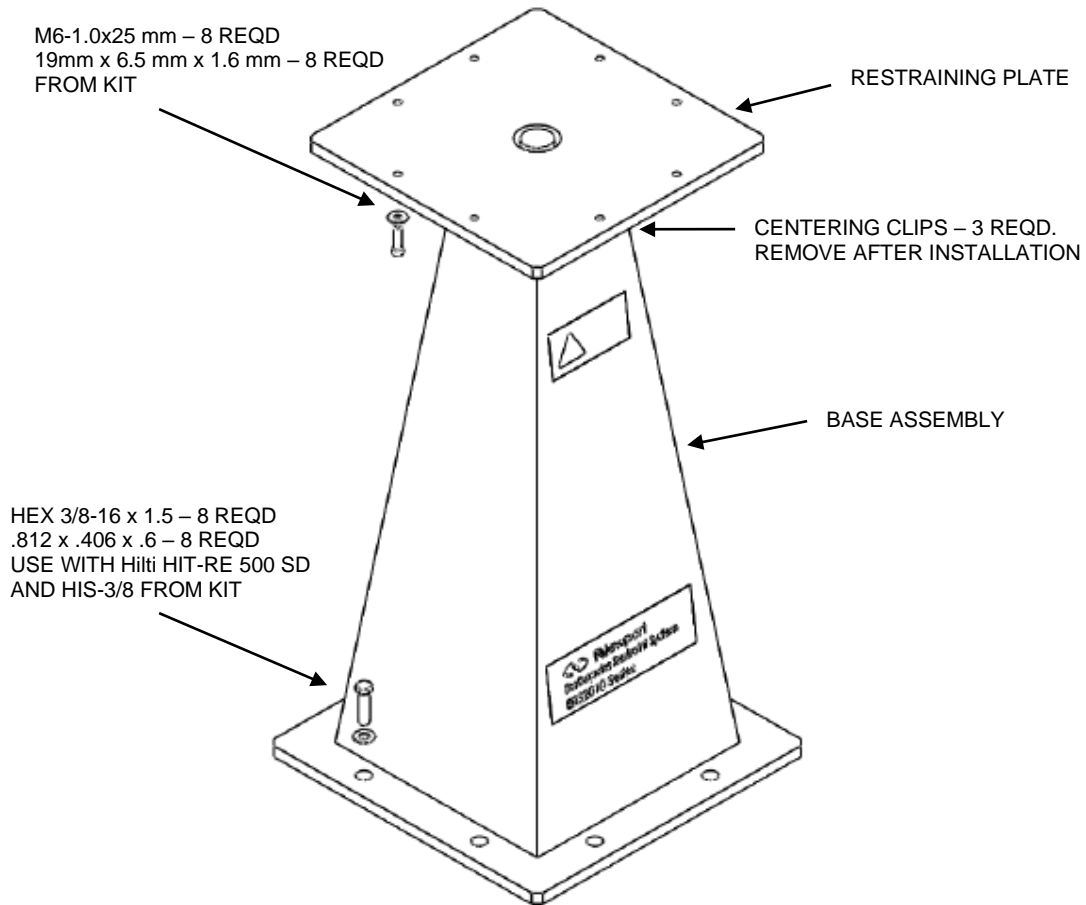


Figure 4: ERS2010 assembly

