

Euro-NEAT®

Non-Redirective Energy Absorbing Terminal



A Non-Redirective Crash Cushion End Treatment



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Saving Lives By Design

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Installation Manual

Euro-NEAT®

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Important Introductory Notes

Proper installation of the Euro-NEAT System is essential to assure maximum performance. Take the time to review the installation instructions and product limitations thoroughly before performing the necessary work. Do not attempt to install any crash cushion without the proper plans and installation manual from the manufacturer.

If you need additional information, or have questions about the Euro-NEAT System, please call Energy Absorption Systems' Customer Service Department.

System Overview

The Euro-NEAT® System is a non-redirective, energy absorbing terminal. It is used as an end treatment solution for temporary work zones and as a unidirectional cushion installed in permanent applications. The Euro-NEAT System can be attached to the ends of Jersey-shaped Portable Concrete Median Barrier, and the moveable QuickChange® Barrier. The Euro-NEAT cartridge is constructed of a series of aluminum cells of various sizes and thicknesses wrapped in an aluminum skin. These cells, when impacted at the end by an errant vehicle, crush upon impact to absorb the energy. The backup hardware, Transition Panels and support structures are designed such that they can be installed using only simple hand tools in a matter of minutes. After most impacts, removal of the cartridge requires only the pulling of four pins.

Crash Performance

The Euro-NEAT System has successfully passed EN 1317-3 Test Level 80/1 tests with both the 900 kg vehicle and the 1300 kg vehicle. It meets the EN 1317-3 TC 2.1.80 and TC 1.2.80 test criteria for non-redirective crash cushions.

RETURN GOODS POLICY

Before returning any goods for credit please contact Energy Absorption Systems Inc. Customer Service Department or your local distributor for proper instructions.

Euro-NEAT®

Installation

Required Tools

For PCMB Application:

1. 1/2" ratchet wrench with 5" extension
2. 1/2" drive sockets: 9/16", 3/4", 1 1/8"
3. 5/16" allen wrench
4. (2) 3/4" open end or box end wrenches
5. (2) 2m [6'] long steel pry bars
6. 10 mm [3/8"] thick piece of steel shim roughly 100mm x 300mm [4"x12"], or larger.
7. 1/2" torque wrench
(27 to 270 N-m [20 to 200 ft-lbs])
8. Large block of wood or several smaller blocks roughly totaling 250mm x 250mm x 250mm [10" x 10" x 10"]
9. Measuring tape
10. 3 lb. sledge hammer
11. Gloves

For QMB Application:

1. Rotohammer or similar tool for drilling in concrete with 7/8" diameter concrete drill bit and compressed air
2. 1/2" ratchet with 5" extension
3. 1/2" drive sockets: 9/16", 1 1/8", 1 1/4", and 1 5/16".
4. 1 1/8" open/box end or crescent wrench.
5. 2 m [6'] long steel pry bar
6. 1/2" torque wrench
(20 to 270 N-m [15 to 200 ft-lbs])
7. 5/16" Hex wrench
8. Measuring tape
9. 3 lb. sledge hammer
10. Gloves

Note: The above list of tools is a general recommendation. Additional tools may be required for certain site installations.

Site Preparation/Foundation

The Euro-NEAT System should be mounted to a fully cured 27.6 MPa (4000 psi) concrete PCMB (New Jersey Type) or QMB barrier end with approximate dimensions of 610mm (24") wide by 810mm (32") high. The Euro-NEAT System may be positioned over concrete, asphalt or soil surface conditions having a cross slope of less than 8% and varying less than 1% over the system length.

Inspect Shipment

Before installing the Euro-NEAT System, check the received parts against the shipping list supplied with the System. Make sure all parts have been received before beginning installation.

Euro-NEAT®

Installation (cont'd.)

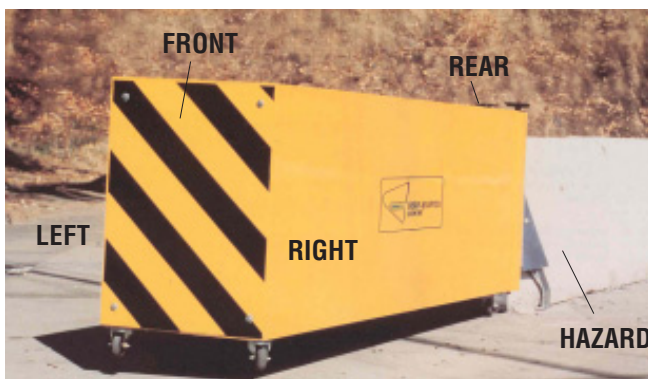
Note: The drawing package supplied with the Euro-NEAT System must be used with these instructions for proper assembly and should take precedence over these general instructions.

Unpacking

Care should be taken to avoid damaging the sides of the Euro-NEAT® cartridge when removing the shipping container and completing the system assembly. As soon as possible, place the Euro-NEAT cartridge onto its swivel wheels to facilitate handling. To minimize risk of injury to yourself or the cartridge, avoid sitting on or placing tools onto the cartridge. Check the inventory of parts received against the parts list supplied with the system and make sure all parts have been received. Should any touch-up painting be required, use "Highway Safety Yellow" colored paint. If any problems are encountered, we encourage you to contact our Customer Service Department.

How to Determine Left/Right and Front/Rear

To determine left from right when installing the Euro-NEAT System or when ordering parts, stand facing the hazard to be protected. Your left is the system's left and your right is the system's right. The front of the fully assembled system will be nearest you and the rear of the system will be attached to the hazard.



Installation Procedures for PCMB Applications

For standard New Jersey pin and loop PCMB, Energy Absorption Systems, Inc. has developed a quick and easy method of attaching the Euro-NEAT Cartridge utilizing only simple hand tools.

Installation Summary

The PCMB is first lifted, and then shimmed such that the Lower Support Strap can be slipped under the end and bolted into place. Next, the Cartridge Support Structure is placed onto the end of the PCMB and tightened down. The Euro-NEAT cartridge is then rolled and pinned into place, and the shim is removed. Then the left and right transition panels are bolted into place.

Step 1: Lifting the PCMB (see Figure 1)

WARNING!

Be careful when placing the shim under the PCMB. Your fingers and/or hands can be severely injured!

Begin the PCMB installation by lifting the end of the PCMB section. This can be accomplished by using a large block of wood and a 2 m [6'] long pry bar. Place the block of wood near the bottom loop of the PCMB and use it as a fulcrum. Then place one end of the pry bar under the bottom loop of the PCMB and push down to lift the PCMB as shown in Figure 1. One person can lift the end of a 3m [10'] long section of PCMB.

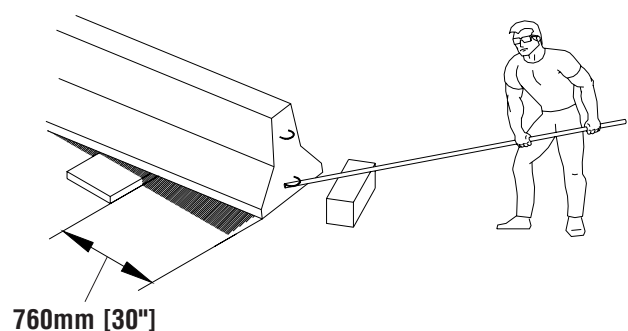


Figure 1
Lifting the PCMB

Euro-NEAT®

Installation for PCMB Applications (cont'd.)

Step 2: Installing the Support Strap (see Figure 2)

Slide the Lower Support Strap so that its edge is about 305mm [12"] back from the end of the PCMB. Next, straddle the Upper Support Strap over the PCMB and align with the Lower Support Strap. Insert the 3/4 inch diameter bolts starting with the upper strap through to the lower strap and place the nuts on the end of the bolts. **HAND TIGHTEN ONLY!**

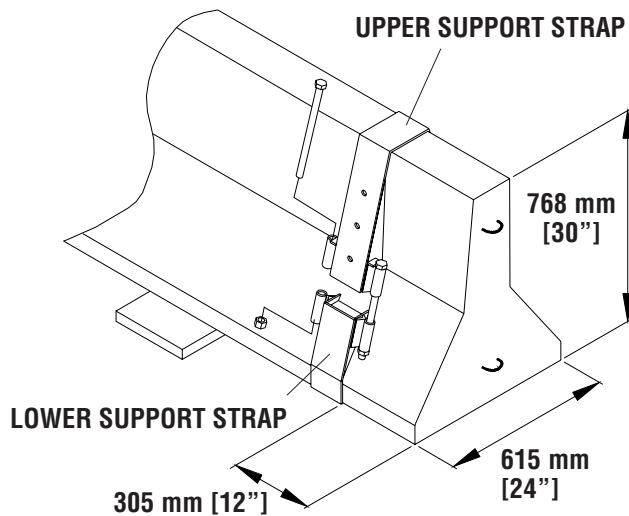


Figure 2
Support Strap Installation

Step 3: Support Structure (see Figure 3)

- Position the Support Frame so that the shorter tubes are on top. Place the flat side (that is the side opposite the tubes) onto the end of the PCMB such that the PCMB's loops protrude through the slots.
- Place a Backup Attachment Bracket over each of the two protruding loops of the PCMB such that the bracket nests into the slot of the Support Frame, and the bracket's flanges face outward. The bottom of the Support Frame should be flush with the bottom of the CMB.
- Insert the Wedges through the Backup Attachment Brackets and into the loops, one from the top and one from the bottom, as shown in Figure 3. Place a nut on top end of the 762 mm (30") long threaded 1/2" diameter rod and insert it through the upper and lower wedges. Place nut on bottom of threaded rod so that rod does not protrude past bottom of CMB. Align the bottom of the Support Frame with the bottom and centered left to right on the PCMB section. Torque to 80 N-m [60 ft-lbs].

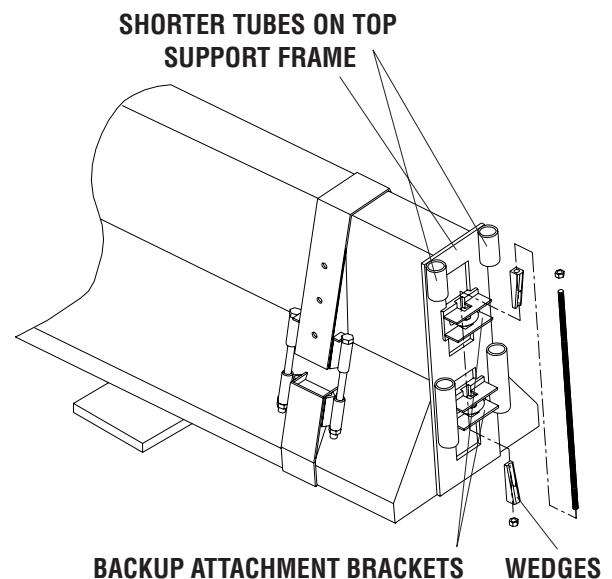


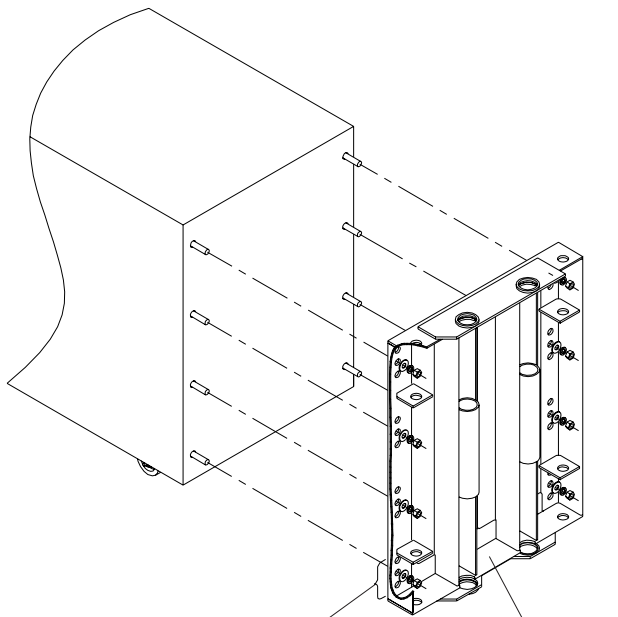
Figure 3

Euro-NEAT®

Installation for PCMB Applications (cont'd.)

Step 4: Backup Attachment (see Figure 4)

The Backup is attached to the rear of the Euro-NEAT® Cartridge. It is attached so the tubes are on the side away from the cartridge and the flange with the cut-out is at the bottom. There are three sets of mounting holes on the Backup. Choose the set of holes such that the bottom edge of the Cartridge will be 100mm [4"] off the ground. In the majority of cases, the middle set of holes will result in proper cartridge height. Place the Backup onto the the rear end of the Euro-NEAT Cartridge, and fasten the eight 1/2" inch nuts with their flat washers and lockwashers into place. Torque to 122 N-m [90 ft-lbs].



CHOOSE SET OF HOLES WHICH
WILL POSITION CARTRIDGE
100 mm [4"] OFF THE GROUND

CUT-OUT GOES
ON THE BOTTOM

Figure 4

Step 5: Cartridge/Backup to Support Structure Attachment (see Figure 5)

Roll the Cartridge with the attached Backup against the Support Frame until the tubes on the Backup nest with the tubes on the Support Frame. It may be necessary to lift the rear end of the Cartridge so that the tubes can nest. Place the two large 38mm [1 1/2"] diameter by 900 mm [35"] long pins into the two sets of nested tubes to hold the Cartridge into place. To get the pins to fall into place, it may be necessary to align the tubes on the Backup and Support Frame. This can be easily done by carefully lifting the front end of the N-E-A-T Cartridge with a pry bar. (Be careful not to damage the Cartridge when doing so--protect the Cartridge with a piece of scrap lumber.)

WARNING!

To avoid straining your back, use the pry bar to lift the end of the cartridge!

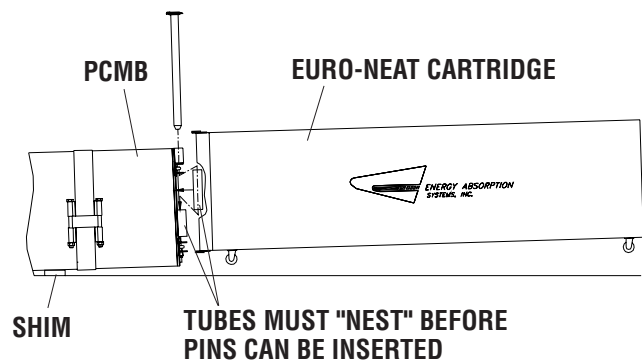


Figure 5

Euro-NEAT®

Installation for PCMB Applications (cont'd.)

Step 6: Transition Panel Installation (see Figure 6)

The Transition Panels can now be installed. Take one of the panels and place it up against the PCMB such that the holes in the forward tabs nest with the holes on the tabs on the Euro-NEAT Cartridge's Backup. When the holes are aligned, insert the 900 mm [35"] long by 25 mm [1"] diameter pins which will hold the panel into place. Repeat this step on the other side.

Insert the three 1/2" x 1 1/4" long allen head socket bolts with their 1/2" x 1 3/8" washers into the holes on the Transition Panels but do not tighten. It may be necessary to move the Strap assembly forward or rearward to align the holes on the Transition Panel with the corresponding holes on the Strap assembly. Once all the bolts are in place, they should be torqued to 81 N-m [60 ft-lbs] with the 5/16 inch allen wrench.

Now tighten the four 3/4" bolts that hold the Support Straps together. They can be accessed from below using the 1 1/8" socket and the 6" extension, torque the nuts to 250 N-m [185 ft-lbs].

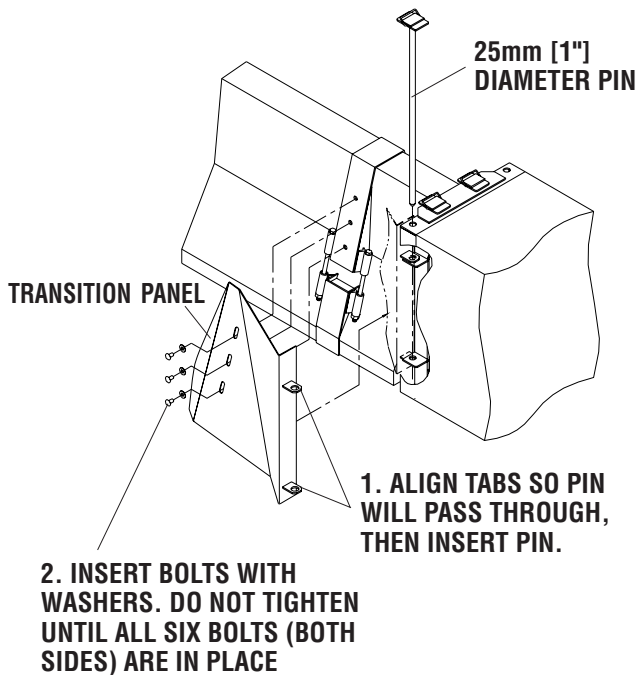


Figure 6

Step 7: Nose Plate Installation/Removal (see Figure 7)

See Figure 25 and the accompanying instructions for installation of the optional plastic nose.

Remove the four 3/8" bolts on the front of the Cartridge using the 9/16" socket. Install the desired nose plate and tighten the 3/8" bolts to 20 Nm [15 ft-lbs].

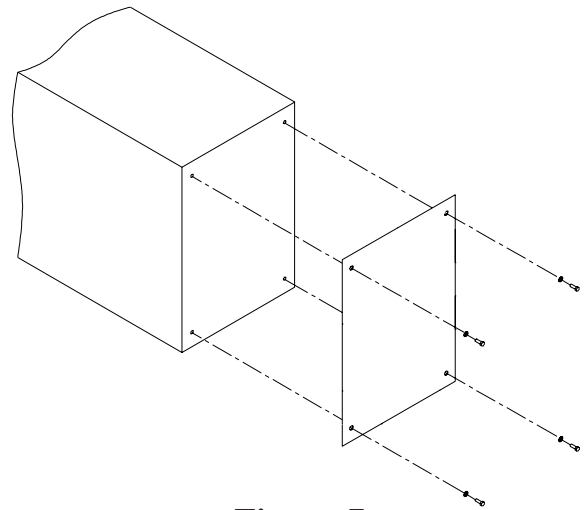
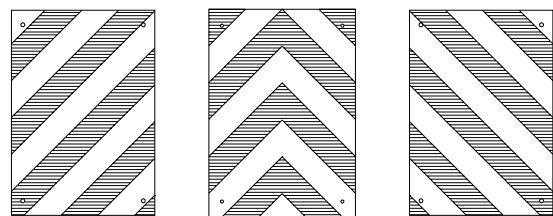
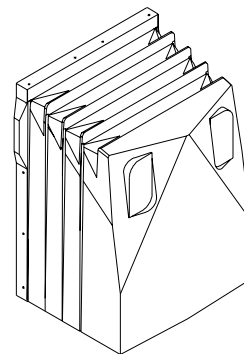


Figure 7



Detail 7a
Optional Nose Covers

Euro-NEAT®

Installation for PCMB Applications (cont'd.)

Step 8: Checking Installation Height (see Figure 8)

Now it is possible to remove the 10 mm [3/8"] thick shim from under the PCMB. This can be done by using the pry bar and the block of wood, this time lifting from under the backup frame.

CAUTION: Do not use the pry bar on the cartridge itself. Severe damage to the cartridge will result.

With the PCMB resting directly on the ground, measure how high the bottom of the Cartridge is from the grade. It should be 100 mm [4"] off the ground, and not vary by more than 25 mm [1"] over the length of the Cartridge.

If height adjustments are necessary, the following changes can be made:

- One of the remaining two hole patterns on the Backup can be used to raise or lower the Cartridge. The hole patterns are 38 mm [1 1/2"] apart. This adjustment method requires unpinning the cartridge from the Support Frame, removing the eight nuts from the Backup and repositioning up or down as necessary.
- It is also possible to raise or lower the Support Frame. This requires unpinning the Cartridge from the Support Frame and rolling it out of the way, loosening a Wedge tension nut, and then raising the Support Frame to the desired height before tightening the tension nut.

Moving the PCMB to Another Site

Should it be necessary to move the PCMB, first unpin the Euro-NEAT® Cartridge and Transition Panels from the PCMB and roll the Euro-NEAT Cartridge out of the way. Now, either the PCMB is moved to its new location or Support Frame is mounted on a PCMB at the new site. Either way, the Euro-NEAT Cartridge is rolled into place and then repinned. (A second Support Structure may be favorable).

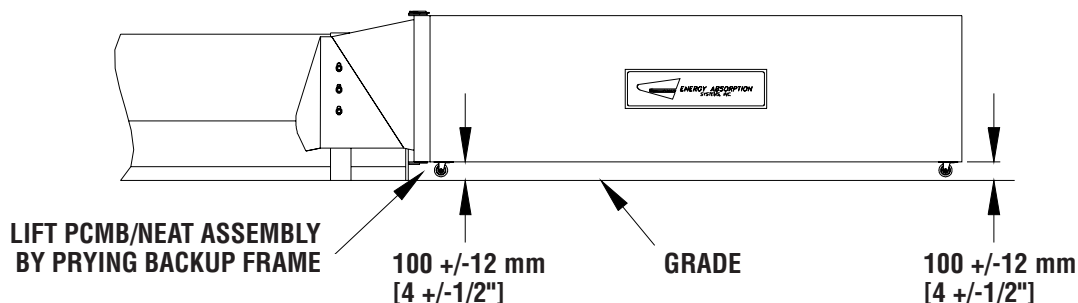


Figure 8

Euro-NEAT®

Installation for QMB Applications

Installation Procedures for QMB Applications

Installation Summary

QMB installations first require the removal of the existing brackets on the front and the upper nuts on the rear of the end section, allowing the Support Frame and Transition Support to be bolted into place. Next the rear portions of the Transition Panels are pinned into place and the Backup is pinned to the forward support structure. The Transition Panels are then pinned to the Backup. Some drilling will be required for the first time installation of the system. Backup is then removed, and the Cartridge is attached to the Backup, and the MP-3 Anchor Bolts are installed through the top of the Transition support. Backup and Cartridge are then pinned to the Support Frame and Transition Panels. Details of each step follow below:

Step 1: Removal of Existing QMB Brackets (see Figure 9)

Using a 1 5/16" socket remove the existing nuts, lock washers and brackets from the end of the QMB to which the Euro-NEAT will be attached. On the opposite end, pull out the pin connecting the QMB to the rest of the barrier. You may need to pry or tap this pin in order to get it out. Using the pry bar, pry the end section out about 125 mm [5"] from its neighbor. Remove the nuts and lockwashers from the top bracket only, leaving the bracket in place. Save all removed nuts and lock washers.

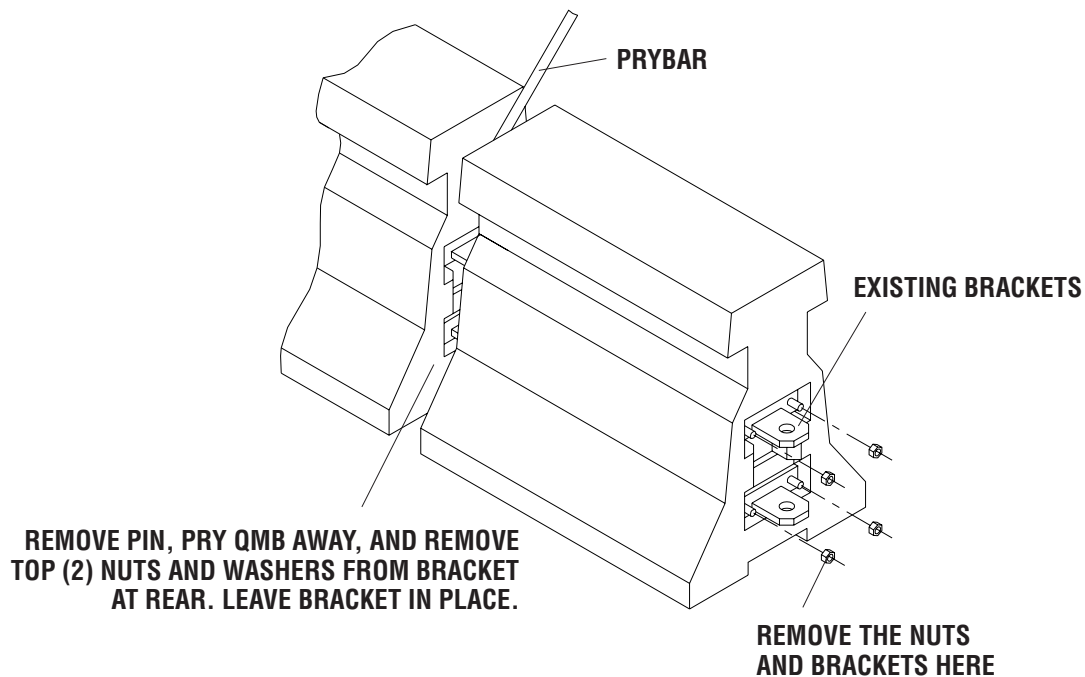


Figure 9

Euro-NEAT®

Installation for QMB Applications (cont'd.)

Step 2: Install Euro-NEAT® QMB Support Frame (see Figure 10)

Place the Support Frame onto the QMB's four exposed 7/8" studs on the forward end such that the shorter tubes are on top and facing away from the QMB. Place the four nuts and their lockwashers onto the studs and using the 1 5/16" socket torque to 270 N-m [200 ft-lbs].

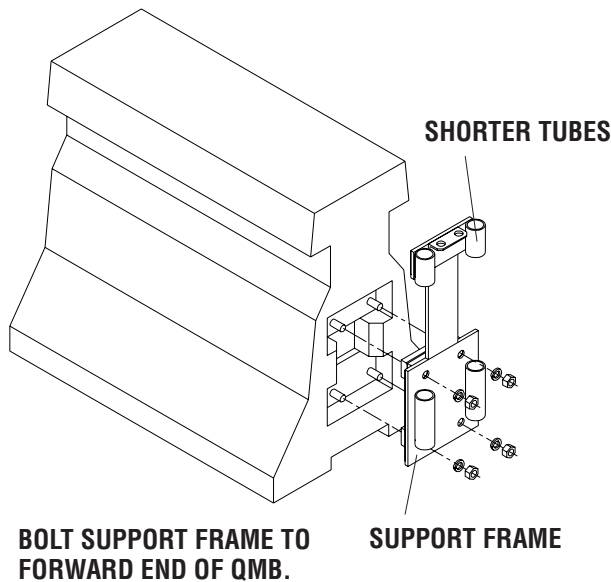


Figure 10

Step 3: Install Euro-NEAT QMB TRANSITION SUPPORT (see Figure 11)

Fit the Euro-NEAT Transition Support over the existing bracket and studs at the rear of the QMB. The studs fit through the holes. The longitudinal strap will fit lengthwise over the top of the QMB. Replace the nuts and lock washers on the rear studs and hand tighten. The lock washers may be positioned as shims, under the Transition Support, as necessary for best fit (Due to irregularities in QMB).

Next place the 3/4" diameter bolts, nuts, washers and lockwashers through the forward end of the strap, connecting the strap to the Support Frame. (Finger tight at this time). Torque nuts attaching rear of Transition Support to QMB to 270 N-m [200 ft-lbs]. Torque fasteners attaching Transition Support to Support Frame to 250 N-m [185 ft-lbs].

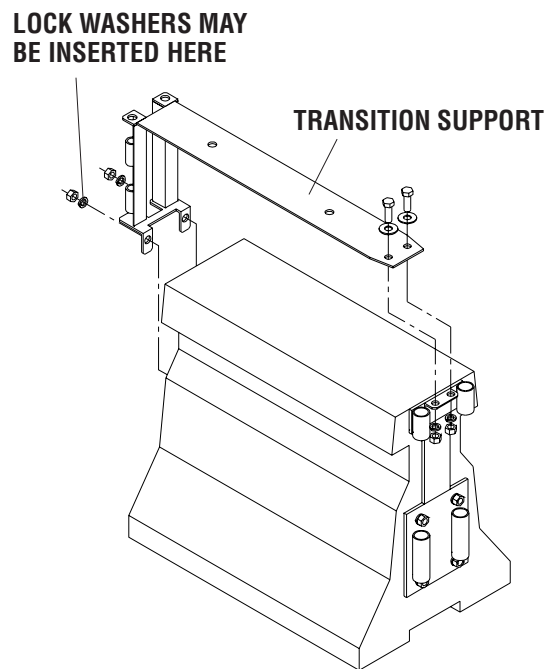


Figure 11

Euro-NEAT®

Installation for QMB Applications (cont'd.)

Step 4: Install Transition Panel (See Figure 12)

Take one of the Transition Panels and place it against the QMB such that the tubes on the rear of the panel nest with the tubes on the rear bracket. When aligned, insert the 25 mm [1"] diameter by 355 mm [14"] long pins into the hole to hold the Transition Panel in place. Repeat on the other side of the QMB.

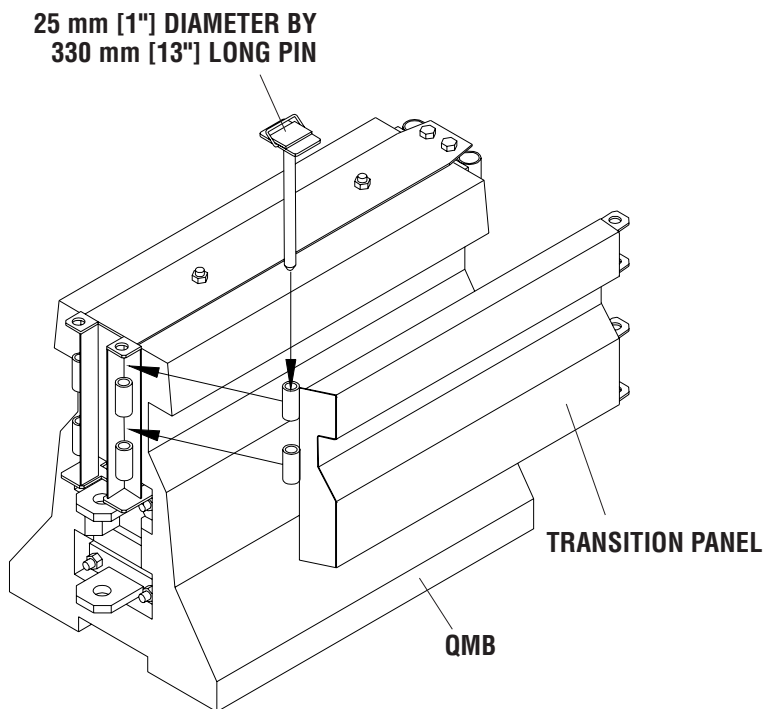


Figure 12

Euro-NEAT®

Installation for QMB Applications (cont'd.)

Step 5: Attach Backup to Support Frame and Transition Panels (See Figures 13 & 14)

Loosely attach Deflectors to Backup using 1/2" allen screws and washers. Place Backup up against the Support Frame until the tubes on the Backup nest with the tubes on the Support Frame. Orient the backup so that the flange with the cutout is at the bottom. Place the two large 40mm [1 1/2"] diameter by 900 mm [35"] long pins into the two sets of nested tubes to hold the Backup in place. (A coating of waterproof grease on the pins will ease the installation.)

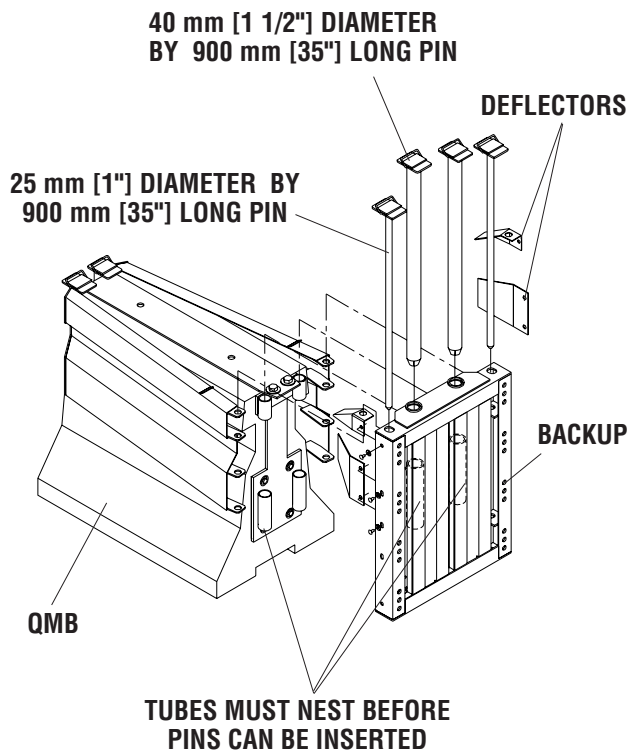


Figure 13
ISOMETRIC VIEW

Next, insert the 900mm [35"] long by 25 mm [1"] diameter pins into the holes on the outside of the Backup to fix the Transition Panels in place. Align deflectors and tighten all allen bolts. If there is interference between the Transition Panels and the Backup, remove the Transition Panels and the Transition Support. Then add additional 7/8" lockwashers under the Transition Support as described in step 3 and shown in Fig. 11. Additional 7/8" washers are included with the Euro-NEAT system. Repeat the assembly described in steps 3, 4, and 5 until an adequate fit is obtained.

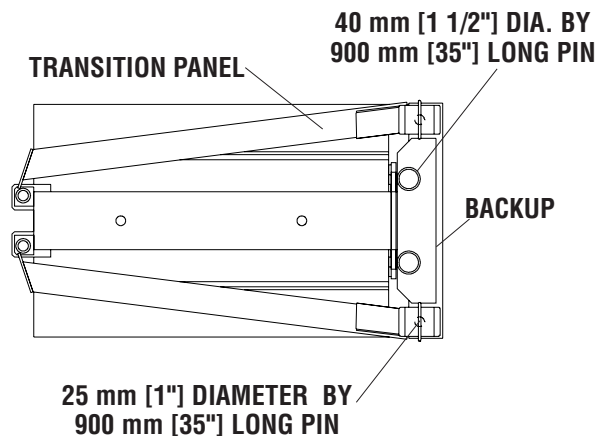


Figure 14
TOP VIEW

Euro-NEAT®

Installation for QMB Applications (cont'd.)

Step 6: Remove Backup and install MP-3 Studs in top of QMB (See Figure 15)

Remove Backup. Two studs must be installed through the two holes in the longitudinal strap into the top of the QMB barrier. Use a concrete roto-hammer equipped with a 7/8" diameter bit to drill through the strap's holes to a depth of approximately 125 mm [5"]. Take care to drill the holes perpendicular to the surface. Install the 3/4"X6 1/2" long high strength anchor bolts in the holes using the MP-3® Anchoring System supplied. Follow the MP-3 Polyester Anchoring System installation procedures found elsewhere in this manual. Once the grout has hardened, per the MP-3 instructions, torque the nuts to 160 N-m [120 ft-lbs].

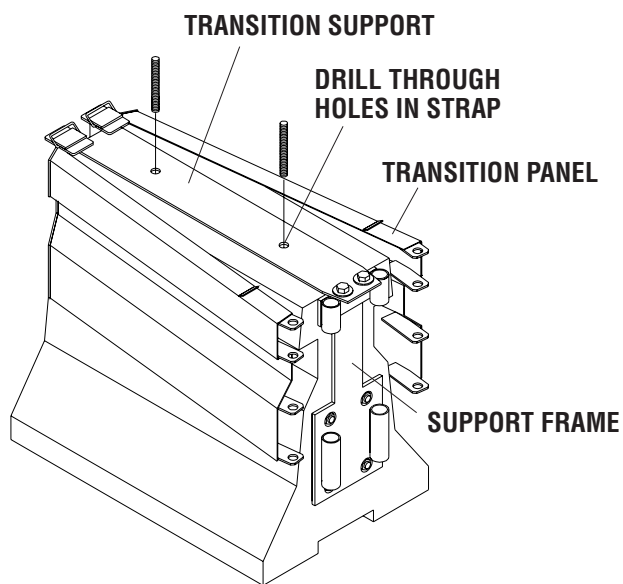


Figure 15

Step 7: Re-pin QMB to Wall (See Figure 16)

Using the pry bar on the front end of the barrier, move the end section back to its former position. Resecure it to the other barrier, using the new pin supplied with the Euro-NEAT® System--the one with the hook on top.

CAUTION: Do not use the original pin, it will be extremely difficult to remove!

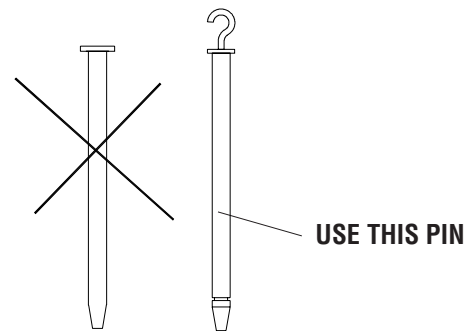


Figure 16

Euro-NEAT®

Installation for QMB Applications (cont'd.)

Step 8: Attach Backup to Cartridge. (See Figure 17)

Attach the Backup to the rear end of the Euro-NEAT Cartridge. It is attached with the tubes on the side away from the Cartridge and the flange with the cut-out at the bottom. There are three sets of mounting holes in the Backup. Choose the set of holes such that the bottom of the Cartridge will be 100 mm [4"] off the ground. In the majority of cases, the middle set of holes will result in proper Cartridge height. Place the Backup onto the rear end of the Euro-NEAT Cartridge, and fasten the eight 1/2" nuts with their flat washers and lockwashers into place. Torque to 80 N-m [60 ft-lbs].

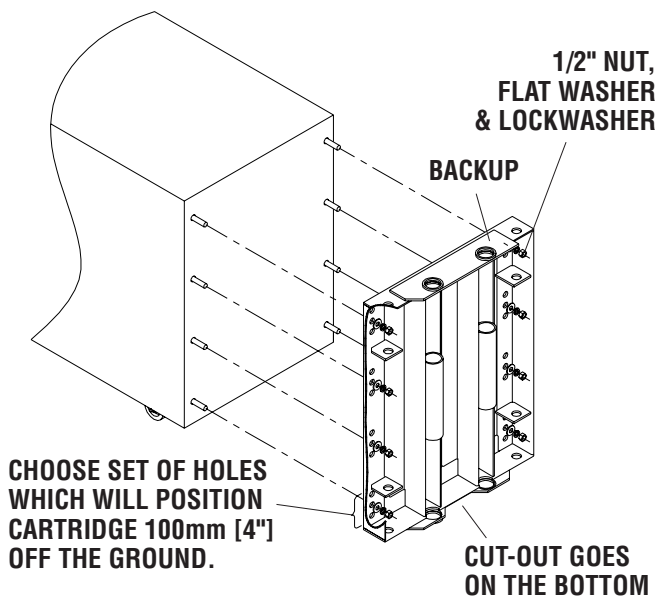


Figure 17

Step 9: Cartridge/Backup to Support Frame Attachment (See Figure 18)

Roll the Cartridge with the attached Backup up against the Support Frame until the tubes on the Backup nest with the tubes on the Support Frame. It may be necessary to lift the rear end of the Cartridge so that the tubes can nest. Re-insert the two large 40mm [1 1/2"] diameter by 900 mm [35"] long pins into the two sets of nested tubes to hold the Cartridge into place. To get the pins to fall into place, it may be necessary to align the tubes on the Backup and Support Frame. This can be easily done by carefully lifting the front end of the Euro-NEAT Cartridge with a pry bar. (Be careful not to damage the Cartridge when doing so. Protect the Cartridge with a piece of scrap lumber.) Next, re-insert the 25 mm [1"] diameter by 900mm [35"] long pins into the holes on the outside of the Backup to fix the Transition Panels into place. See Fig. 17. (Ref. Fig. 13)

CAUTION: Use the pry bar to lift the end of the cartridge, to protect your back!

Step 10: Nose Plate Installation/Removal (See Figure 19)

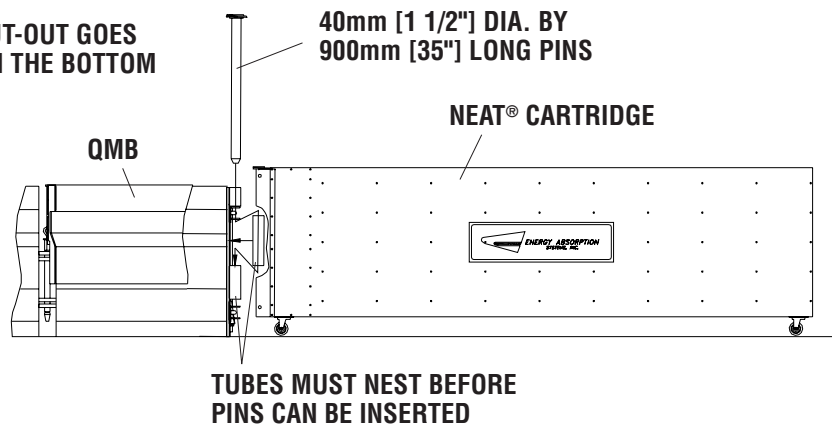


Figure 18

Euro-NEAT®

Installation for QMB Applications (cont'd.)

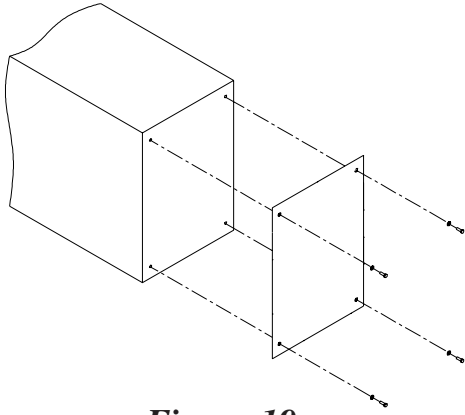
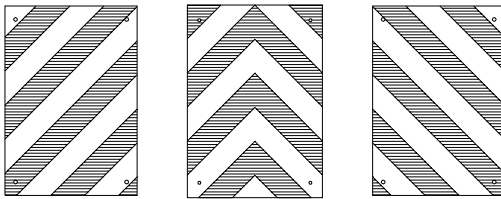
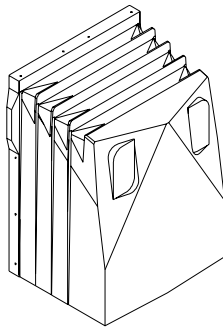


Figure 19



Detail 19a
Optional Nose Covers

Remove the four 3/8" bolts on the front of the Cartridge using the 9/16" socket.

See Figure 25 and the accompanying instructions for installation of the optional plastic nose.

Step 11: Checking Installation Height (See Figure 20)

Measure how high the bottom of the Cartridge is from the grade. It should be 100 mm [4"] off the ground, and not vary by more than 25 mm [1"] over the length of the Cartridge. If a height adjustment is necessary, the following change can be made:

- One of the remaining two hole patterns on the Backup can be used to raise or lower the Cartridge. The hole patterns are 40 mm [1 1/2"] apart. This adjustment method requires unpinning the Cartridge from the Support Frame and Transition Panels, removing the eight nuts from the Backup and repositioning the backup up or down as necessary.

CAUTION: Do not use the cartridge as a lever to reposition the barrier. Severe damage to the cartridge may result.

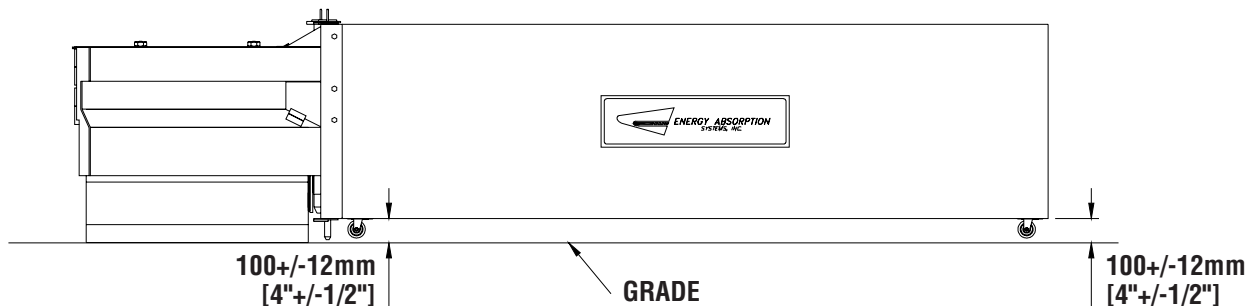


Figure 20

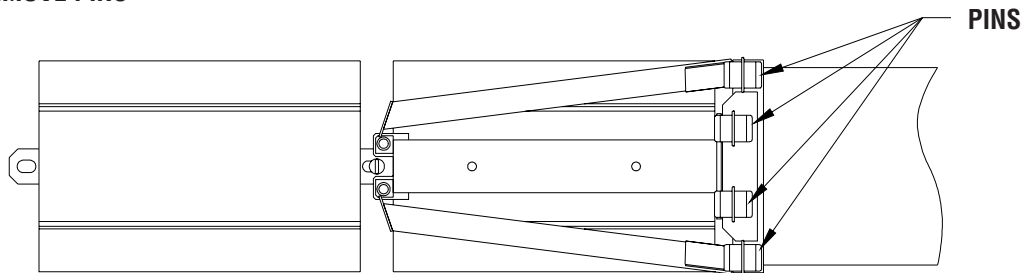
Euro-NEAT®

Installation for QMB Applications (cont'd.)

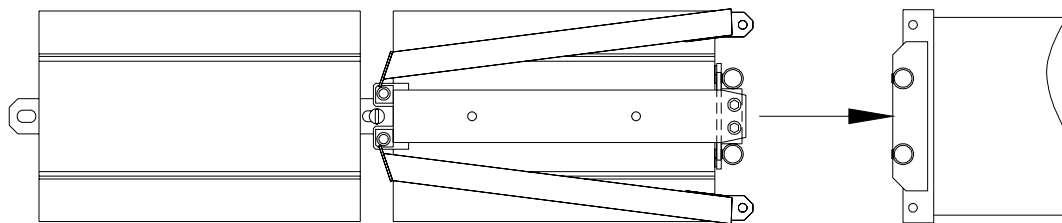
Moving the QMB

Prior to moving the QMB with the Transport and Transfer Vehicle (TTV), the Euro-NEAT® Cartridge must be unpinned and rolled out of the way. Next, the Transition Panels are closed onto the QMB barrier, see Figure 21. This allows the TTV's pick-up wheels to easily ride over this section of QMB and move it as any other QMB section. Once the QMB is in its new position, the Transition Panels are opened and the Euro-NEAT Cartridge is rolled up and pinned into place. See Step 9, Page 14.

STEP 1) REMOVE PINS



STEP 2) ROLL CARTRIDGE AWAY



STEP 3) CLOSE TRANSITION PANELS ONTO QMB.

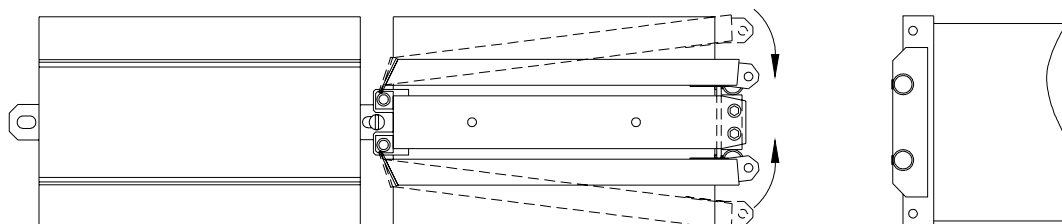


Figure 21

Euro-NEAT®

Optional Nose Assembly Installation

Step 1 Place nose onto cartridge as shown.

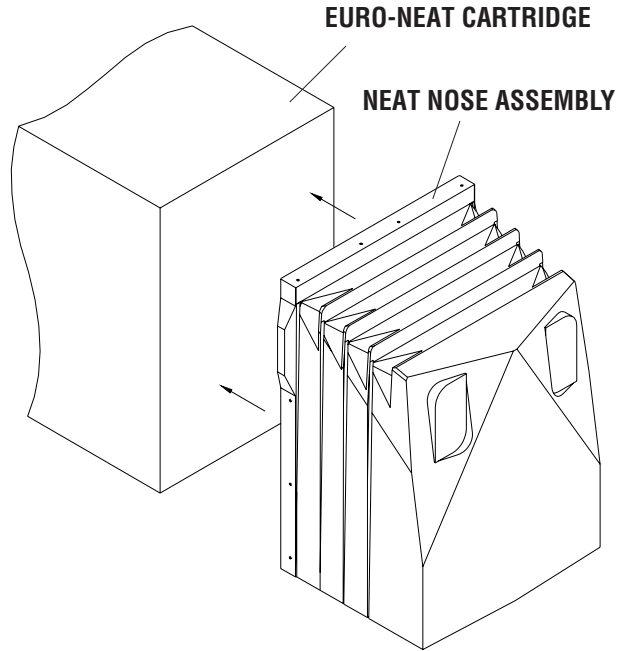


Figure 24

Step 2 Match drill 1/8" diameter holes (10 places) using nose as a template.

Step 3 Drive screw (Part no. 2706441-0000) through nose, into cartridge as shown (10 places).

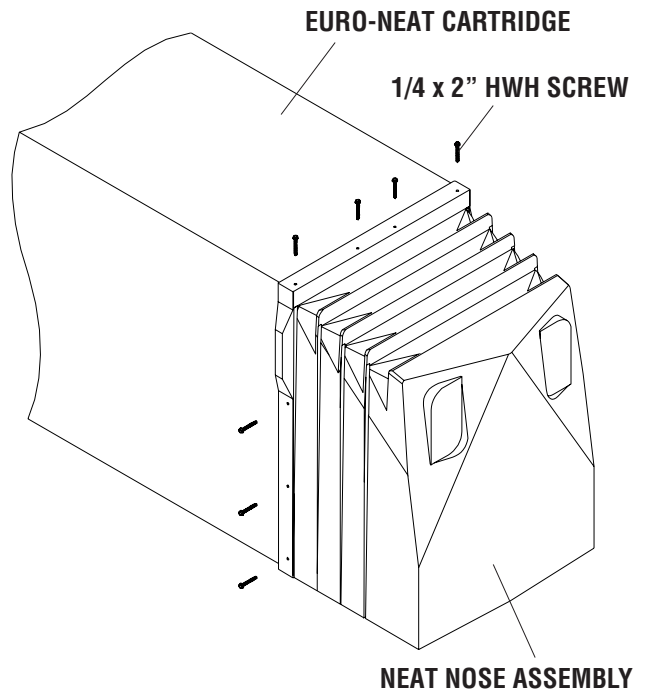


Figure 25

Euro-NEAT®

MP-3® Polyester Anchoring System

The MP-3 Polyester Anchoring System is a quick and easy way to securely anchor crash cushions and other common highway devices. MP-3 features high pullout strength, superior vibration resistance, and exceptional durability.

Each MP-3 kit contains a can of MP-3 resin, hardener, cold weather promotor, studs, washers, and a complete safety sheet. The cold weather promotor shortens hardening time by as much as seven hours. Both vertical and horizontal installations are possible using the MP-3 System.

Vertical Installations

Note: Read MP-3 Instructions before starting.

1) Prepare the concrete pad

WARNING!

Do not allow the MP-3 Resin or Hardener to contact skin or eyes. See material safety data sheet supplied with the MP-3 kit for first-aid procedures. Use only in well-ventilated area. Do not use near open flame.

WARNING!

Wear safety goggles and gloves during installation.

The anchor bolts (Studs) that anchor the QuadGuard® System to the concrete pad must be those shipped in the kit or of high strength steel (830 MPa [120,000 psi] minimum tensile strength or equal.) These Studs must be set in minimum 28 MPa [4000 psi] concrete. Allow the concrete to cure a minimum of 7 days before installing MP-3.

2) Drill holes

Use the part that is to be anchored as a drilling template. Drill the holes 3 mm [1/8"] larger than the stud diameter to the recommended depth, using a rotary percussive drill. Full strength will not be achieved if a diamond drill is used. Refer to the MP-3 installation instructions provided with your kit. Check to be sure all the holes are drilled to the proper depth and aligned with the part to be anchored. Refer to Table A.

Table A: MP-3 Anchoring Information

Stud size	Concrete bit size	Minimum Depth	Recommended Torque
3/4" x 6 1/2"	22 mm [7/8"]	125 mm [5"]	165 Nm [120 ft-lbs]
3/4" x 7"	22 mm [7/8"]	140 mm [5 1/2"]	165 Nm [120 ft-lbs]
3/4" x 7 1/2"			
3/4" x 8 1/2"			
3/4" x 18"	22 mm [7/8"]	420 mm [16 1/2"]	<15 Nm [<10 ft-lbs]

3) Clean the holes

Blow the concrete dust from the hole, using oil-free compressed air. Thoroughly brush it with a stiff-bristled brush, and then blow it out again. If the hole is wet, completely flush it with water while brushing. Then blow it clean, using oil-free compressed air.

4) Mix the resin and hardener

Wearing gloves and safety goggles, remove the lids from the MP-3 Part A-Resin and Part B-Hardener containers. Pour Part B into Part A, then mix vigorously for 30 seconds to form MP-3 grout (an anchor stud may serve as a stirring rod).

5) Add cold weather promotor (in cold weather)

For faster hardening in cold weather, Promotor may be used. Add the entire contents of the partially filled Promotor container to the MP-3 grout; then mix for an additional 30 seconds. Use immediately because the MP-3 grout will thicken quickly. Refer to Table B for hardening times.

6) Pour grout into holes

WARNING!

Do not use Promotor when the temperature is above 15 degrees Celsius (60 degrees Fahrenheit). Grout will harden too quickly.

Euro-NEAT®

MP-3® Polyester Anchoring System (cont'd.)

Crimp the mouth of the can to form a spout, and pour the MP-3® grout mixture down into the hole through the part. Fill the hole 1/3 to 1/2 full.

Caution: Do not overfill or underfill the hole. If the hole is overfilled, there will not be enough grout to use all of the anchor studs/kit. If hole is underfilled the grout may not develop the required pull out strength.

7) Add the washers and nuts

Place a flat washer onto the stud; then thread a nut on until **1 or 2 threads of the NUT** are left exposed.

8) Insert Studs in holes and wait for grout to harden

Push the stud down through the part to be anchored and into the hole. Give the stud several twists in the MP-3 to wet the threads.

Caution: Do not disturb or load the stud until the MP-3 material has hardened (see Table B for hardening times).

9) Torque the nuts

Once the grout has hardened, torque the nut to the recommended values. (See Table A.) Now no threads of the nut should be exposed.

Table B: Approximate Hardening Times (hrs)

Temperature		No	With
(C)	(F)	Promoter	Promoter
>26	>80	1/2	N/R*
22-26	70-79	1	N/R*
16-21	60-69	2	N/R*
10-15	50-59	4	3/4
4-9	40-49	8	1
-1-3	30-39	N/R*	1 1/2
<-1	<30	N/R*	N/R*

* Not recommended. Contact Energy Absorption Systems Inc.'s Customer Service Department for more information.

Horizontal Installations

The horizontal MP-3 kit is the same as the vertical kit except that a cartridge for a standard caulking gun is supplied in the horizontal kits and the resin for the horizontal kits is a thixotropic (TX) resin. The TX-Resin is a gelled resin designed to keep the grout in place in horizontal holes during installation.

When using the horizontal MP-3 kits follow the vertical instructions with the following exceptions:

1) Thread dispensing tip onto dispenser

Prior to mixing the grout, carefully thread the dispensing tip onto the dispenser.

2) Pour mixed grout into dispenser

Once the grout is mixed crimp the mouth of the can to form a spout, and pour the MP-3 grout into the open end of the dispenser (use mixing stud to scrape out the portion remaining in the can). You may use the box to hold the dispenser upright. Close the box lid and poke the dispenser tip into the top of it. Seal the dispenser with the plunger provided.

3) Place dispenser in caulking gun and dispense grout

Cut off the small end of the dispenser tip. Place the dispenser into a caulking gun and dispense until MP-3 TX grout reaches the tip of the dispenser, then release pressure. Push the dispenser tip through the part to the bottom of the hole and dispense while slowly withdrawing the tip.

Caution: Do not overfill or underfill the hole. Fill hole approximately 1/3 to 1/2 full. If the hole is overfilled, there will not be enough grout to use all of the anchor studs/kit. If hole is underfilled the grout may not develop the required pull out strength.

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MP-3® Polyester Anchoring System (cont'd.)

4) Add the washers and nuts

Put washer and nut on stud leaving nut flush with end of stud. See figure 76.

5) Insert Studs into holes

Push stud through part to be anchored and into hole. Twist the stud in the MP-3® grout to wet the threads.

Note: In Horizontal Applications the stud should be flush with the top of the nut. Torque to 165 Nm [120 ft-lbs.].

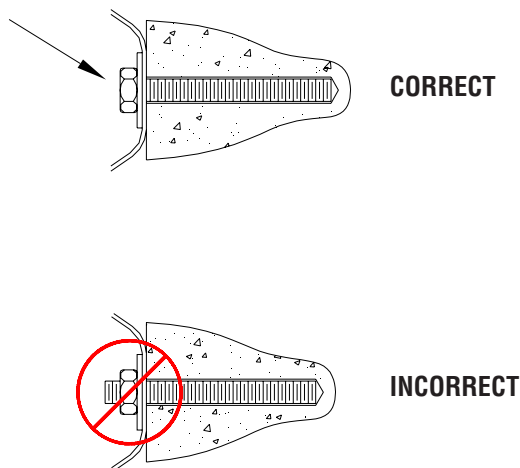


Figure 26
MP-3 Horizontal Installation

MP-3® Installation Cautions

1) Shelf life

If the shelf life of the MP-3 has expired (see MP-3 kit for expiration information), mix a small amount of MP-3 in the proportions of one part A to two parts B by volume. If the material does not set according to the instructions, contact Energy Absorption Systems, Inc. for guidance.

WARNING!

Do not use the MP-3 if the material fails to set up, Part A-Resin has gelled (for vertical applications), or TX-Resin is NOT gelled (for horizontal applications).

2) Steel rebar

If steel rebar is encountered while drilling an MP-3 anchor bolt hole, apply one of the following solutions:

- A. Using a diamond core drill or rebar drilling tool, drill through the rebar only, then switch back to the concrete bit and drill into the underlying concrete until the proper hole depth is reached.

Caution: Do not drill through rebar without first obtaining permission to do so from the local project engineer.

- B. Drill a new hole down at an angle past the rebar to the proper depth. Anchor the stud by completely filling both holes with MP-3.

Euro-NEAT®

Maintenance and Repair

A slow drive-by visual inspection of the Euro-NEAT® System is often all that is required. If the drive by inspection indicates that maintenance is required, a walk-up inspection is necessary. Important items to check for are listed below:

1. Has the system been hit? The Euro-NEAT Cartridge is disposable and cannot be repaired. Even a minor hit resulting in a light buckling of the nose section will reduce the capacity of the system to absorb energy in the event of a full design impact. Always replace a damaged Cartridge with a new one.
2. Is the Cartridge too high or too low? Proper alignment of the Cartridge is four inches off the ground, front and rear. This is critical for the Cartridge to function properly by preventing vehicle vaulting or nose-diving.
3. Are any of the pins missing? Missing or damaged pins due to tampering or vandalism must be replaced if the Cartridge is to function properly during an impact.

Euro-NEAT®

Limitations and Warnings

The Euro-NEAT System has been tested and successfully evaluated per the EN 1317-3 guidelines for Test Level 80/1, non-redirective crash cushions. The impact conditions recommended in this guideline are intended to encompass the majority, but not all, of the possible in-service collisions.

Properly installed and maintained, the Euro-NEAT System is capable of performing its function of containing, and providing controlled trajectory of the test vehicles in a predictable and safe manner under the nominal EN 1317-3 80/1 non-redirective crash cushion impact conditions of:

Vehicle Mass:

900 kg and 1300 kg

Speed:

80 km/h

Impact Angle:

900 kg vehicle - 0° 1/4W offset

1300 kg vehicle - 0° Centered

The above conditions are expected worst case conditions. However, combinations different from those tested above may result in different crash results than those encountered in testing. Furthermore, impacts in excess of EN 1317-3 impact severity or the existence of curbs or cross slopes in excess of 5% may result in unacceptable crash performance as described in EN 1317-3 relative to structural adequacy, occupant risk and vehicle trajectory factors.

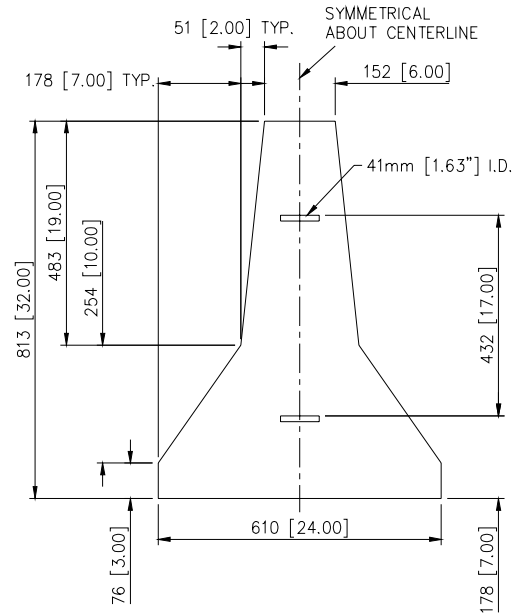


Figure 22

PORTABLE CONCRETE MEDIAN BARRIER (PCMB)*

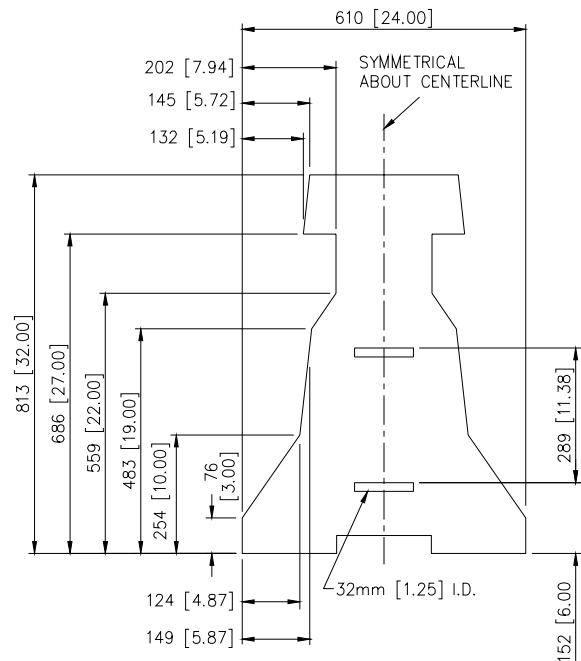


Figure 23

QUICK-CHANGE MOVEABLE BARRIER (QMB)*

***UNITS OF MEASURE ARE IN MILLIMETERS [INCHES] UNLESS OTHERWISE NOTED.**

Euro-NEAT®

Notes



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