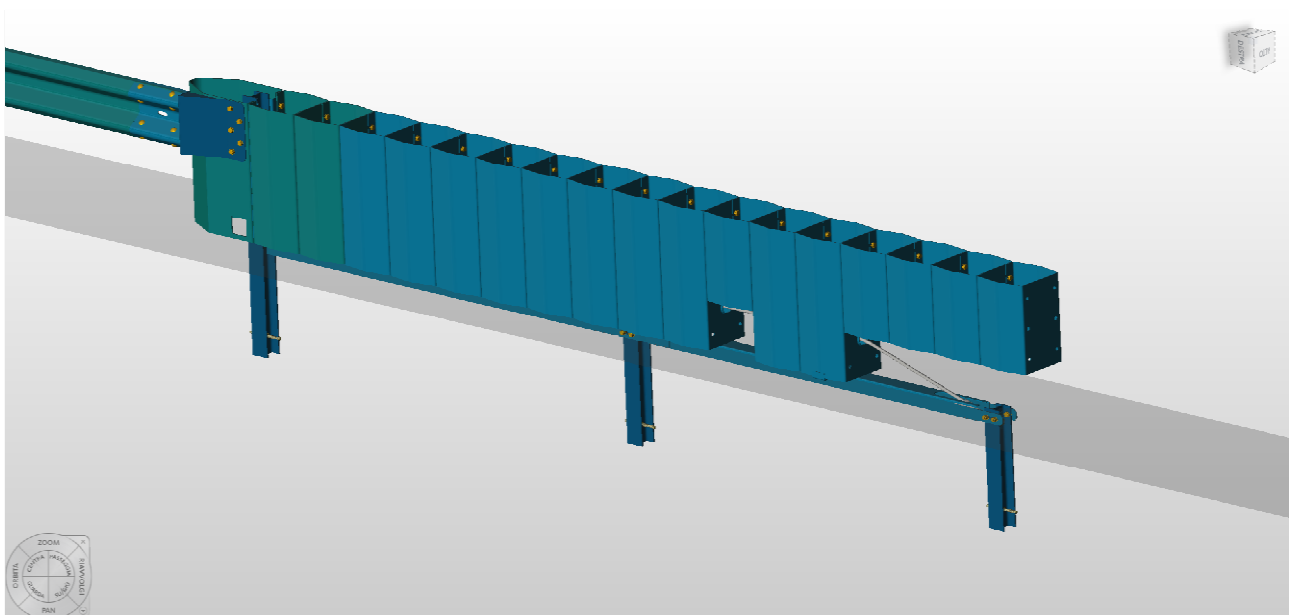


INSTALLATION MANUAL



OBEX MODULAR TERMINAL 18M TERMINAL CLASS P3

Title:	OBEX MT 18M – Installation Manual		
Author:	Marco Pasqualetto		
Date:	Revision Description (Section / page)	Rev No.:	Approved By:
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ANNEX

Configuration drawings list:

- Drawing n°891 – MT 18M-750 (2wave beam)
- Drawing n°892 – MT 18M-840 (3wave beam)
- Drawing n°875 - Transition terminal MT to safety barrier 2wave
- Drawing n°835 – Transition terminal MT to safety barrier 3wave

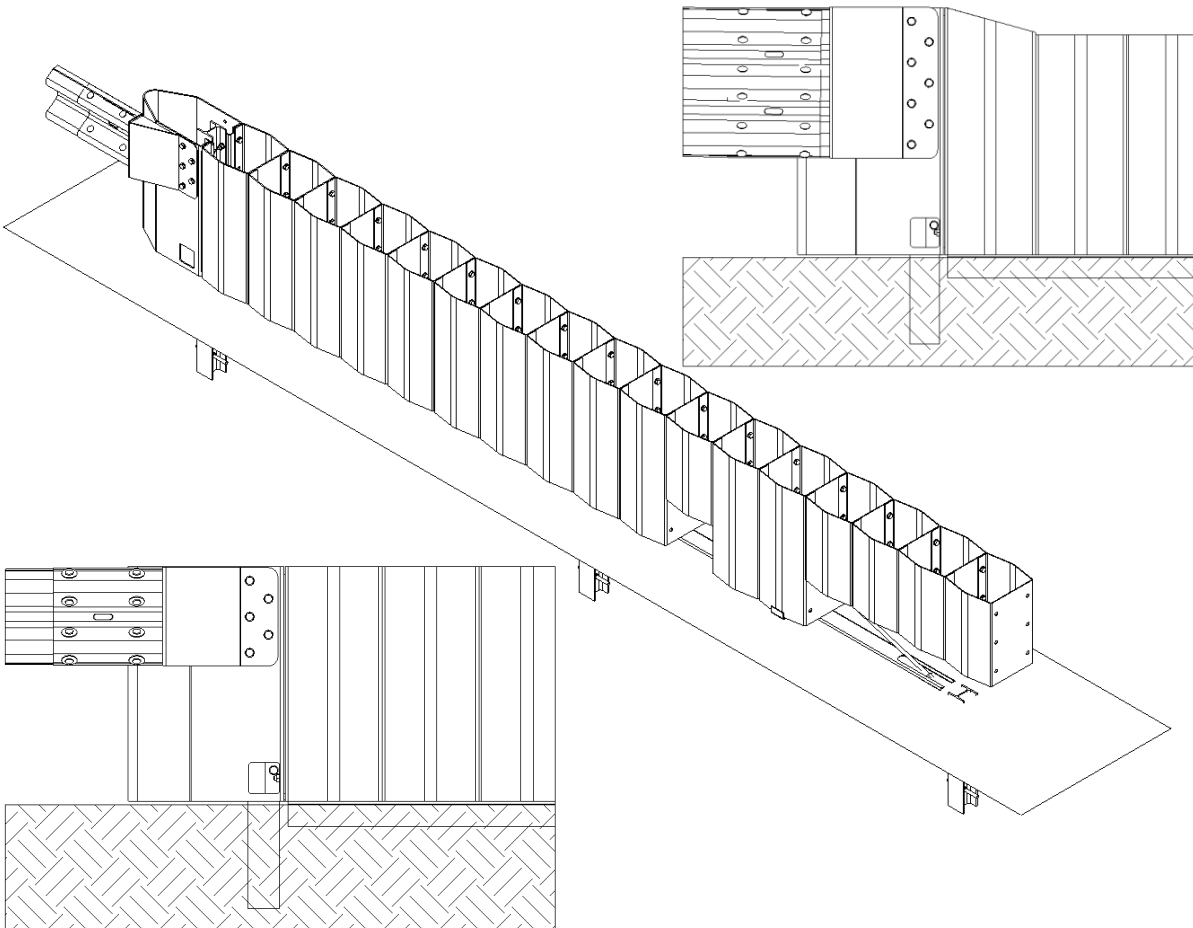
1. Scope

The purpose of this manual is to provide the user of the device “OBEX Modular Terminal 18M-750 (2wave version) & 18M-840 (3wave version)”, the main information needed for the correct installation and use of the device.

For more technical information, see configuration **drawing 891 (2wave version)** and **drawing 892 (3wave version)**

The function of this terminal is to provide adequate protection to the start and end sections of road safety barriers. In other words, anchor and properly terminate guardrail to meet the requirements of **ENV 1317 Part 4**.

DETAIL OF 3wave VERSION



DETAIL OF 2wave VERSION

2. Safety Issues

2.1. Safety Compliance

All work shall comply with the following:

- Health and Safety regulations.
- Project specific Site Safety requirements including inductions given by the Main Contractor.

2.2. Safety Management

All site operatives should be experienced in the installation of safety barriers. The nominated Site Manager and Installation Supervisor will ensure safe working practices are adhered to by installers during the duration of any on-site work.

2.3. Safety Training

All installers are to comply with relevant Site Safety Procedures as specified by the Main Contractor. All Plant operators should be trained and certified in the safe operation and use of the equipment they are utilising.

2.4. Personal Protective Equipment (PPE)

All personnel will wear the correct PPE for the task they are carrying out. High Visibility clothing, Safety Footwear and Hard Hats will be worn as a matter of course.

2.5. Safety on Site

All personnel will be given a copy of Method Statement and associated Risk Assessments prior to commencement of work.

2.6. Vehicle Access

Clear vehicular access must be provided for delivery trucks to load/unload material and for personnel vehicles to access the work site.

2.7. Other Operatives

No other trades should have access to work areas where installers are constructing the OBEX terminal unless otherwise agreed.

3. Part list

3.1. 2 wave version list

ITEM	DRW N°	CODE	DESCRIPTION	MATERIAL	QTY
1	84	10.00084	ELEMENT F H=750 mm TH. 6,00 mm	S355 JR	1
2	82	10.00082	ELEMENT E H=750 mm TH. 6,00 mm	S355 JR	2
3	51	10.00051	ELEMENT C H=750 mm TH. 4,00 mm	S235 JR	10
4	52	10.00052	ELEMENT D H=480 mm TH. 4,00 mm	S235 JR	5
5	46	11.00046	PROFILE HE100A L=1400 mm	S275 JR	1
6	85	11.00085	PROFILE HE100A L=650 mm	S275 JR	2
7	44	10.00044	PROFILE L85x65 TH. 4,00 mm L=700 mm	S235 JR	2
8	55	10.00055	SLIDING PROFILE L=2372,5 mm	S235 JR	1
9	889	10.00889	SLIDING PROFILE L=2240 mm	S235 JR	1
10	222	10.00222	SUPPORT SHAPED PLATE TH. 4 mm	S235 JR	1
11	890	31.00890	WIRE ROPE Ø _{nom} 18 L=5095 mm [18M] WITH n°2 HEX. NUT ISO 4032 - M24 - 8		1
12	95	10.00095	PLATE 90x50 mm TH. 5 mm	S235 JR	2
13	88	10.00088	CONNECTION TERMINAL FOR 2 WAVES BEAM	S275 JR	1
14		21.00145	HH SCREW ISO 4017 - M16 x 45 - 8.8	8.8	144
15		24.00118	THREADED BAR M16x200 4.6	4.6	3
16		22.00146	HEX. NUT ISO 4032 - M16 - 8	8	150
17		23.00147	WASHER ISO 7089 - 16 - 200 HV	200 HV	288

NOTE:

1. All steel parts are galvanized in according to ISO 1461.
2. All bolts are galvanized in according to ISO 10684

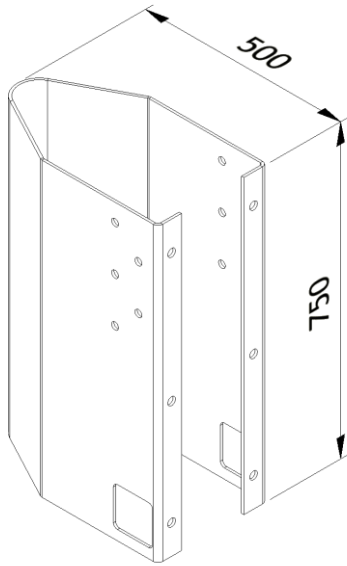
3.2. 3 wave version list

ITEM	DRW N°	CODE	DESCRIPTION	MATERIAL	QTY
1	97	10.00097	ELEMENT F H=840 mm TH. 6,00 mm	S355 JR	1
2	98	10.00098	ELEMENT G H=840 mm TH. 6,00 mm	S355 JR	1
3	82	10.00082	ELEMENT E H=750 mm TH. 6,00 mm	S355 JR	1
4	51	10.00051	ELEMENT C H=750 mm TH. 4,00 mm	S235 JR	10
5	52	10.00052	ELEMENT D H=480 mm TH. 4,00 mm	S235 JR	5
6	54	11.00054	PROFILE HE100A L=1500 mm	S275 JR	1
7	85	11.00085	PROFILE HE100A L=650 mm	S275 JR	2
8	48	10.00048	PROFILE L85x65 TH. 4,00 mm L=790 mm	S235 JR	2
9	55	10.00055	SLIDING PROFILE L=2372,5 mm	S235 JR	1
10	889	10.00889	SLIDING PROFILE L=2240 mm	S235 JR	1
11	222	10.00222	SUPPORT SHAPED PLATE TH. 4 mm	S235 JR	1
12	890	31.00890	WIRE ROPE Ø _{nom} 18 L=5095 mm [18M] WITH n°2 HEX. NUT ISO 4032 - M24 - 8		1
13	95	10.00095	PLATE 90x50 mm TH. 5 mm	S235 JR	2
14	89	10.00089	CONNECTION TERMINAL FOR 3 WAVES BEAM	S275 JR	1
15		21.00145	HH SCREW ISO 4017 - M16 x 45 - 8.8	8.8	148
16		24.00118	THREADED BAR M16x200 4.6	4.6	3
17		22.00146	HEX. NUT ISO 4032 - M16 - 8	8	154
18		23.00147	WASHER ISO 7089 - 16 - 200 HV	200 HV	296

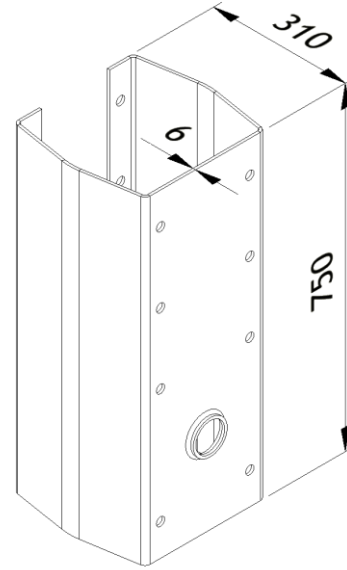
NOTE:

1. All steel parts are galvanized in according to ISO 1461.
2. All bolts are galvanized in according to ISO 10684

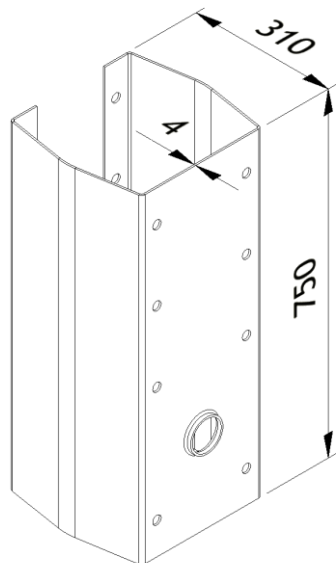
4. View of principal elements



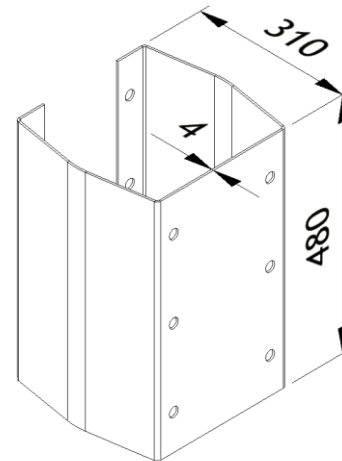
ITEM 1 – Element F (code 10.00084)



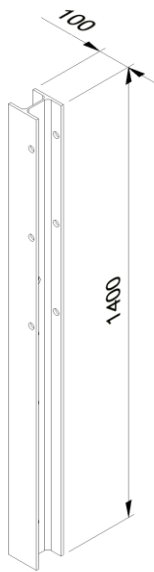
ITEM 2 – Element E (code 10.00082)



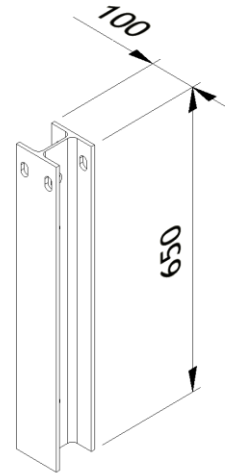
ITEM 3 – Element C (code 10.00051)



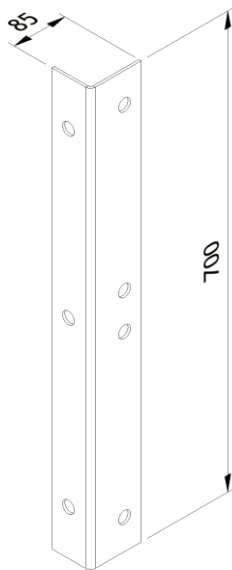
ITEM 4 – Element D (code 10.00052)



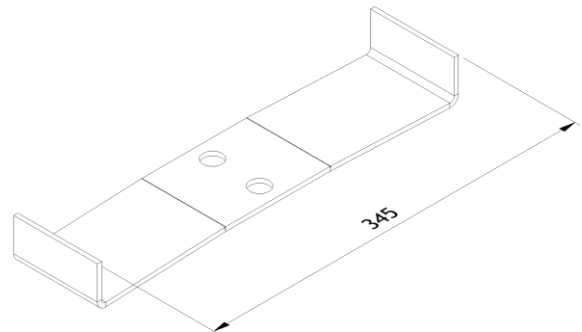
ITEM 5 – Post 1400 (code 11.00046)



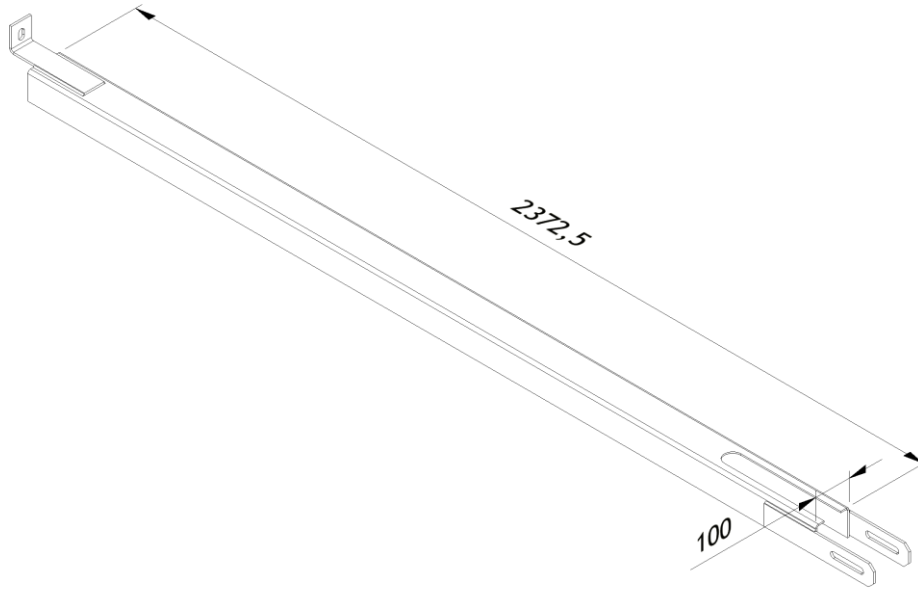
ITEM 6 – Post 650 (code 11.00085)



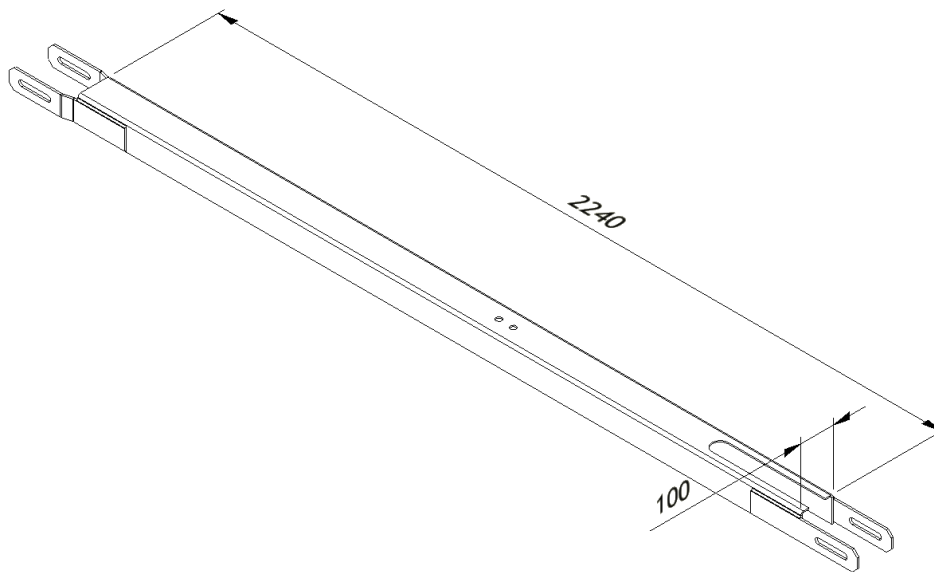
ITEM 7 – Profile L 700 (code 10.00044)



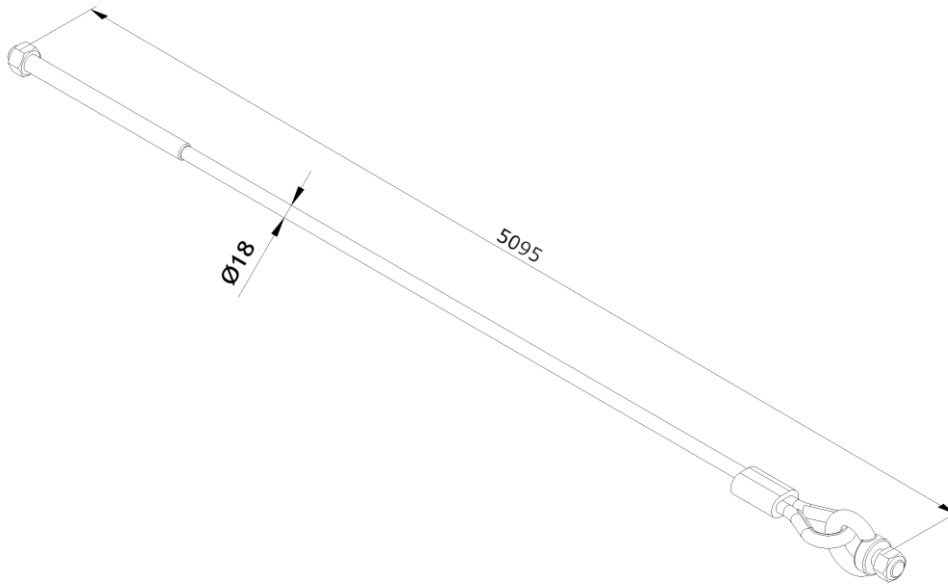
ITEM 10 – Support shaped plate (code 10.00222)



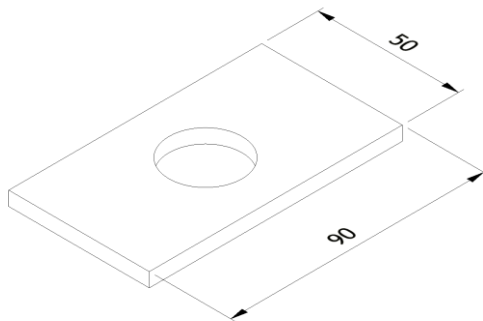
ITEM 8 – Sliding profile 2372,5 (code 10.00055)



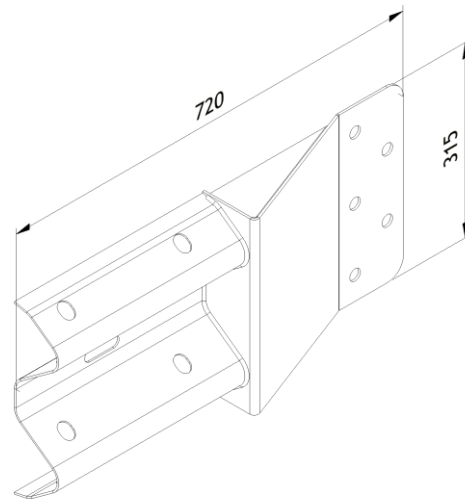
ITEM 9– Sliding profile 2240 (code 11.00889)



ITEM 11 - Wire rope $\text{Ø}18$ L=5095 mm (code 31.00890)

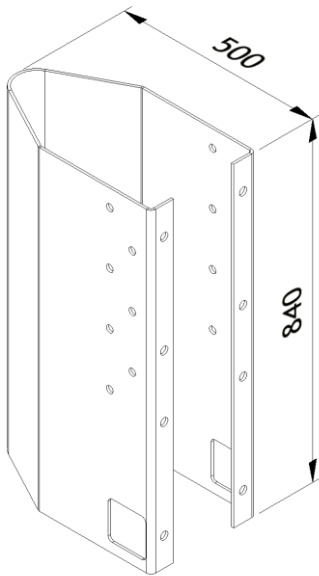


ITEM 12 - Plate 90x50 (code 10.00095)

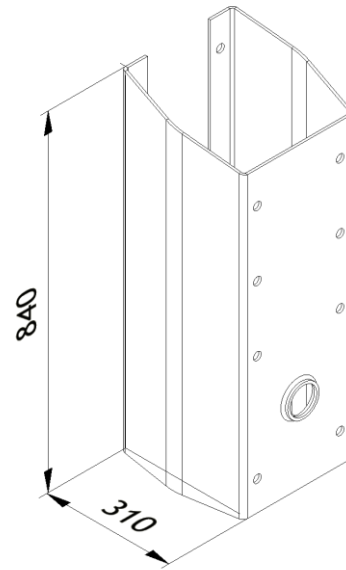


ITEM 13 - 2wave terminal
(code 10.00088)

Elements for only 3wave version



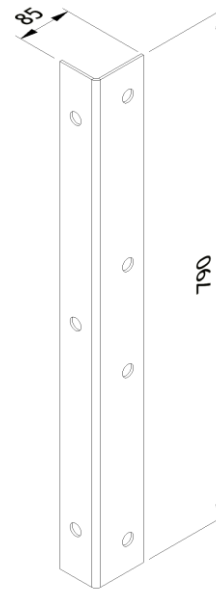
ITEM 1 – Element F 840 (code 10.00097)



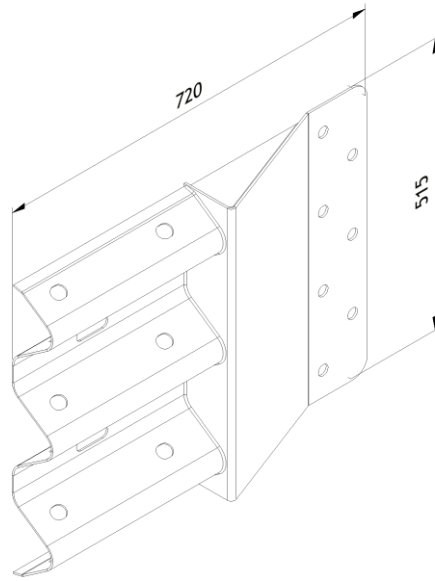
ITEM 2 – Element G 840 (code 10.00098)



ITEM 6 – Post HE 1500 (code 11.00054)



ITEM 8 – Profile L 790 (code 10.00048)



ITEM 14 – 3wave terminal
(code 10.00089)

5. Preparation

5.1. Preliminary phases

Before beginning construction, the contractor should get all available site information about the location of installation in regard to **underground services and the line of existing cables, pipes, wires etc.** Installation cannot proceed unless the installer is satisfied that underground services are not present or are re-diverted in accordance with relevant permission and instructions of the service authorities. The installer must satisfy himself that no other obstacles or hazards exist prior to digging or driving posts. All installation work must be undertaken with the provision of appropriate traffic management for the location in accordance with relevant standards and local authority requirements.

The system can be pre-assembled off site or assembled locally.

Prior to installation, the installation team **must be in possession of this manual, all necessary drawings and are suitably trained** for the installation. The installation contractor must also make sure that the use of the product is appropriate for its location and that **it can be correctly connected to the adjoining guardrail** as intended.

5.2. Tools required for installation

- CE marked tape measure
- Spirit level
- Post driver (HE100 mask)
- Chalk line
- Marking paint
- Torque wrench
- Spanners
- Podge bars
- Push / pull apparatus with current calibration certification

5.3. Bolt and torque

The bolt used to assemble the terminal are M16 and M24(only for the rope).

Tighten bolts M16 at 70 ± 20 Nm.

Don't tighten the threaded the cable rope to torque. The rope should be tightened until taut.

5.4. Ground Conditions.

OBEX MT P3 should be supported in firm ground appropriate for the anchorage of guardrail systems. **A push test is recommended if there is a concern about the capacity of the ground.** Apply 8000N to the H post at 0.75m from the ground level and measure the deflection value. If the deflection is less or equal to 75mm at 0.75 m from the ground level, the soil consistency is deemed acceptable. If the deflection is higher, option of localised compaction or the use of concrete foundations should be considered.

6. Installation Procedure

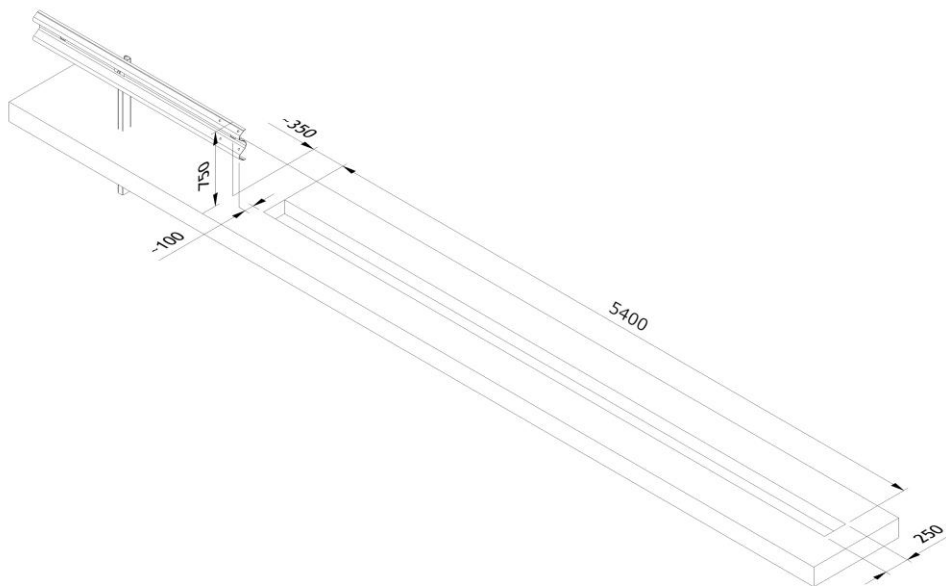
NOTE: this procedure describes the installation of 2wave version terminal. For 3wave version review the system drawing and component list to identify the requirement for a 3 wave connector plate and elements (item 14) together with items F & G and a 1500mm HE100A post.

6.1. Prepare the soil

- 6.1.1. Level and clean the installation area, removing any objects or rocks that could hinder the installation.
- 6.1.2. Mark the ground for the entire length of the device. Use a rope line for proper alignment with the guardrail. Make sure that the distance to the carriageway is in accordance with regulations and specifications
- 6.1.3. Carefully push the U-profile into the ground (flanges first and pointing down) using an appropriate pneumatic post-driving machine. so that the top of the web plate is flush with ground level. If the ground is soft on the surface the U-profile may be manually positioned. Alternatively, a small channel can be dug out and the U-profile back filled. The purpose of the U-profile is to provide a consistent surface for the modular components to slide along when impacted and negate any potential obstruction caused by uneven or broken ground. At all times the correct alignment to the road and height of the terminal should be observed.

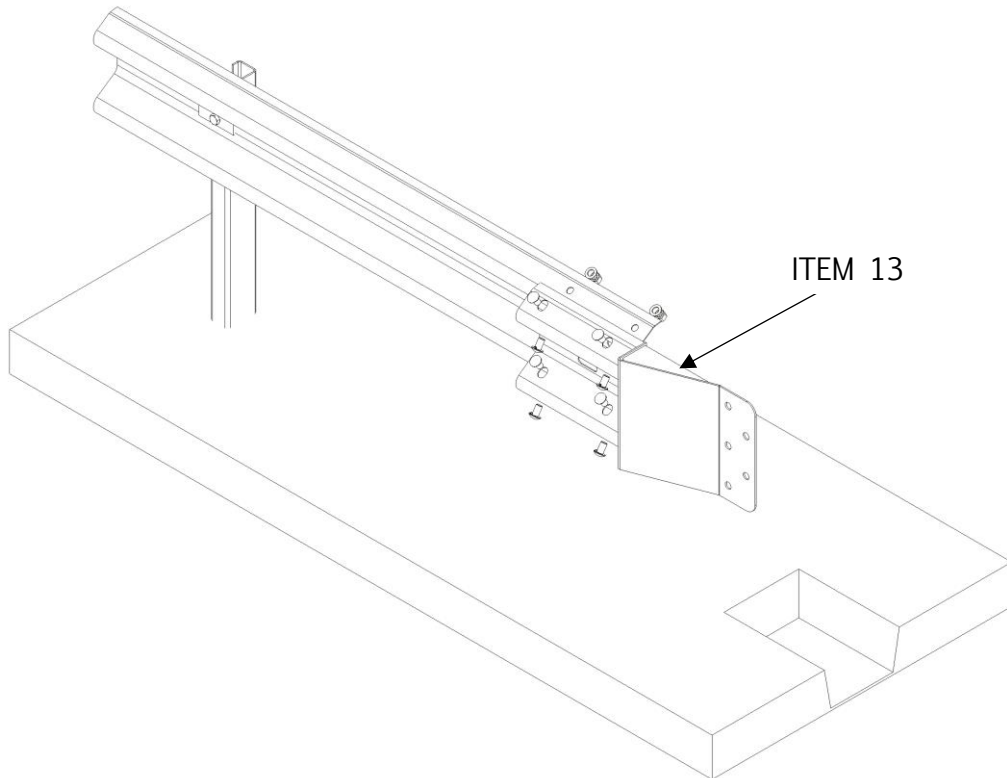
NOTE: Where a solid, level surface exists such as a concrete slab it may be appropriate to install without the U-profile.

- 6.1.4. If necessary the ground should be made up, compacted and levelled on each side of the U-profile. The U-profile should never sit proud of the soil.

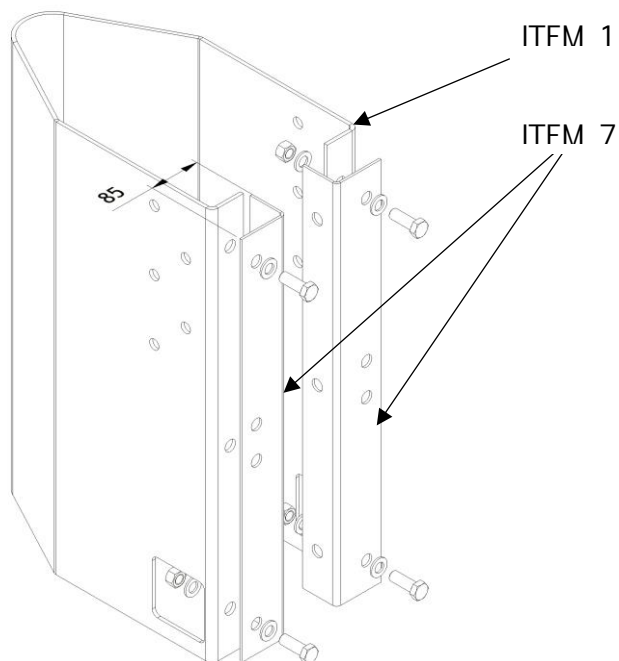


6.2. Position the first post

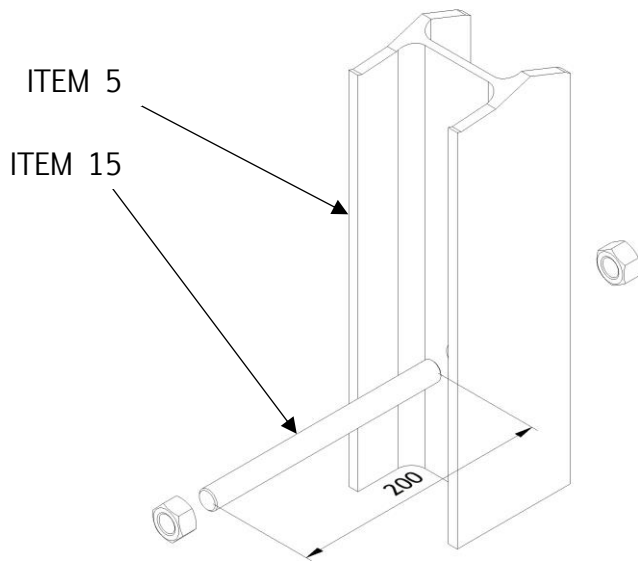
6.2.1. Install the 2wave terminal



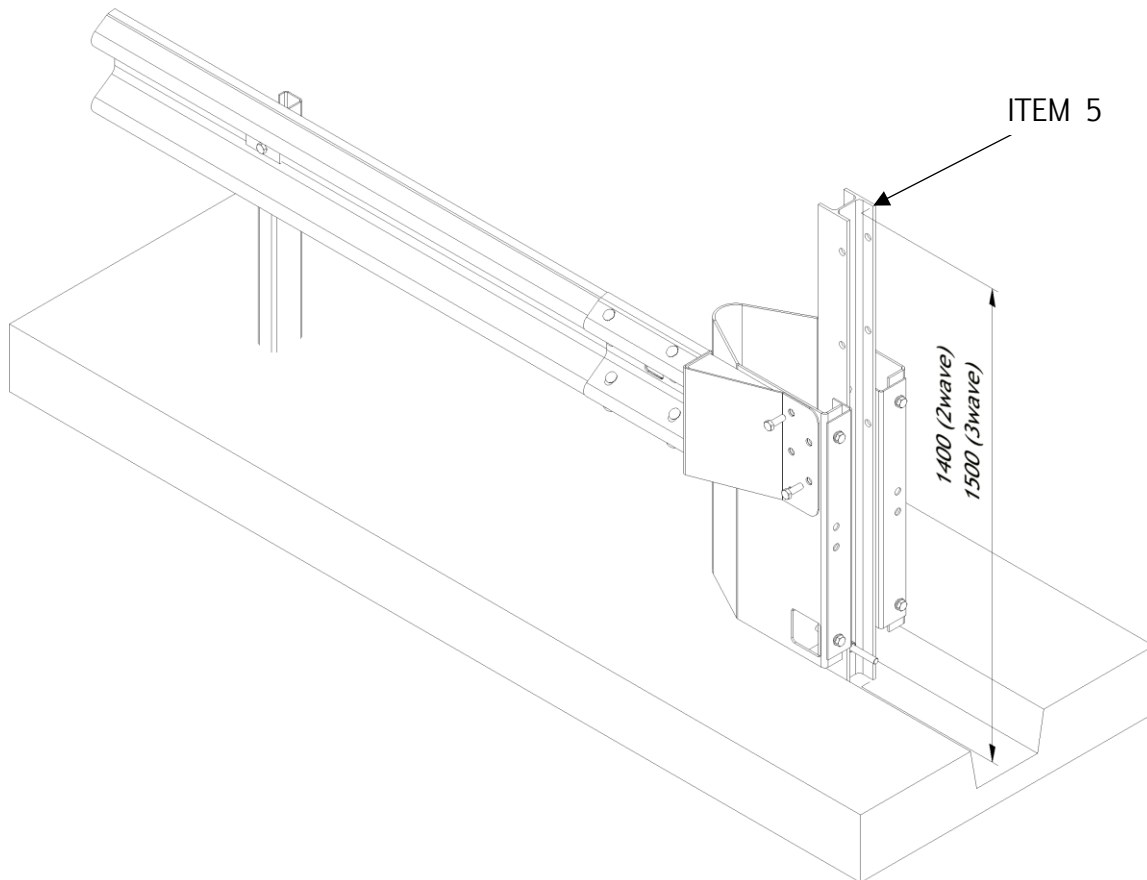
6.2.2. Temporarily assemble the profile L on first module



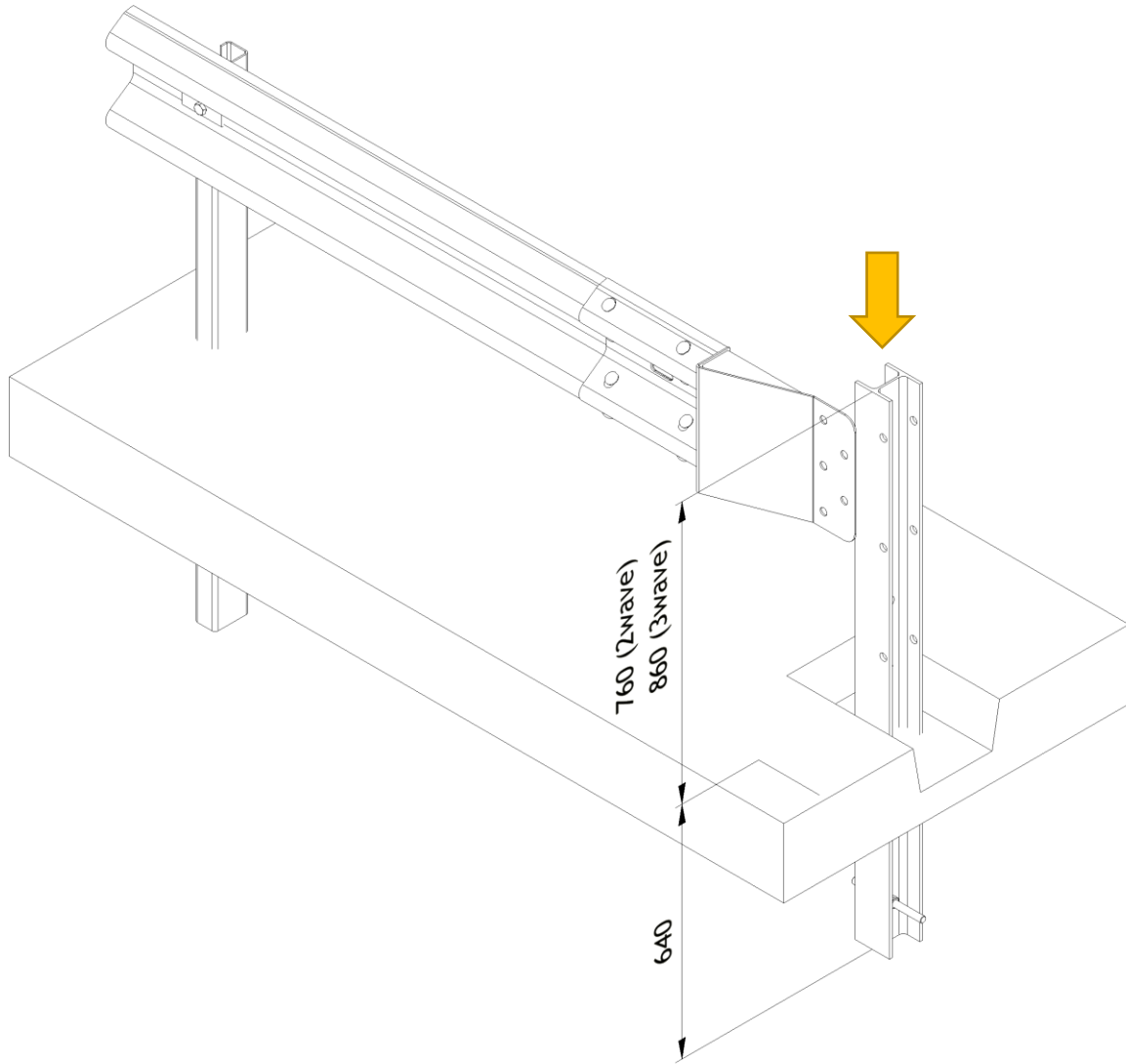
6.2.3. Install the threaded bar M16x200 on post HE L=1400 mm



6.2.4. Position the first module aligned on the 2wave terminal. Use the profile L on the module to position the post HE. Mark the position and remove the first module



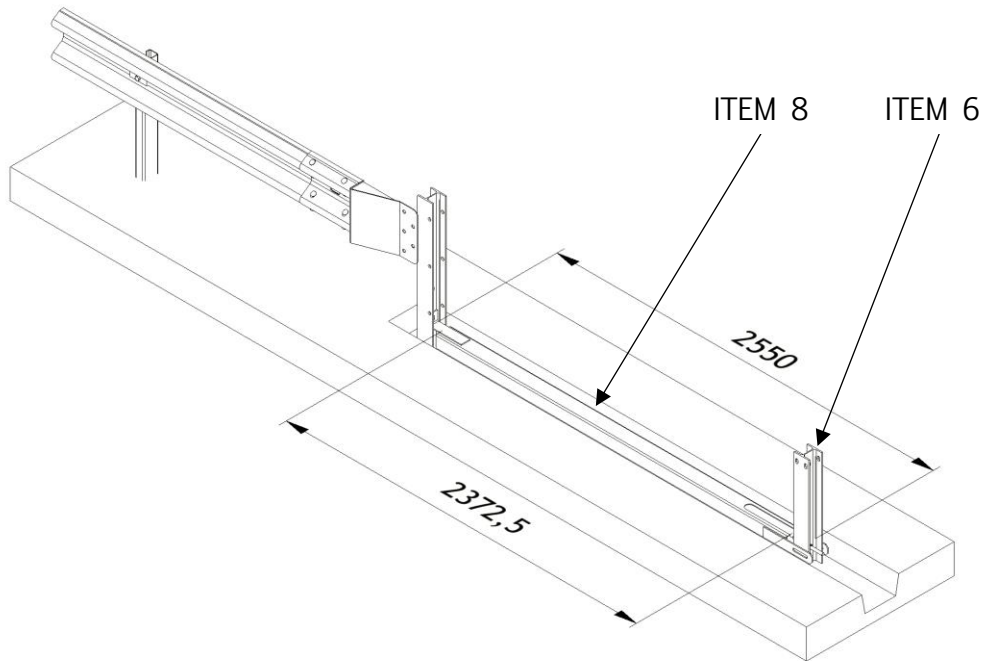
6.2.5. Drive the post into the ground using a suitable VRS driving machine.



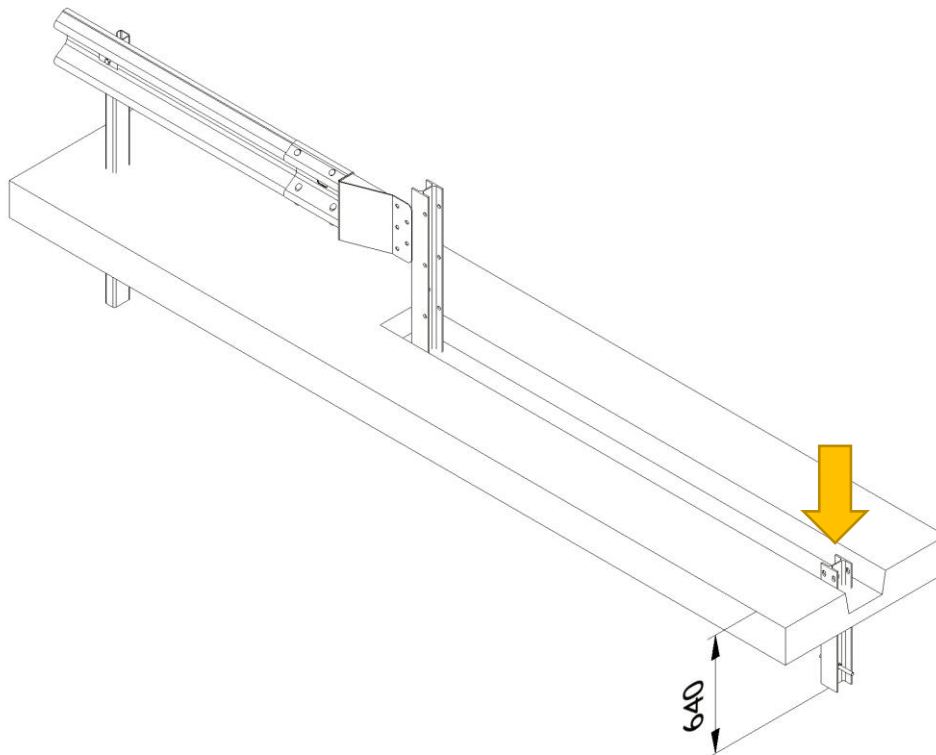
6.3. Install the first sliding profile L=2372,5 mm

6.3.1. Install the threaded bar M16x200 on post HE L=650 mm (like before)

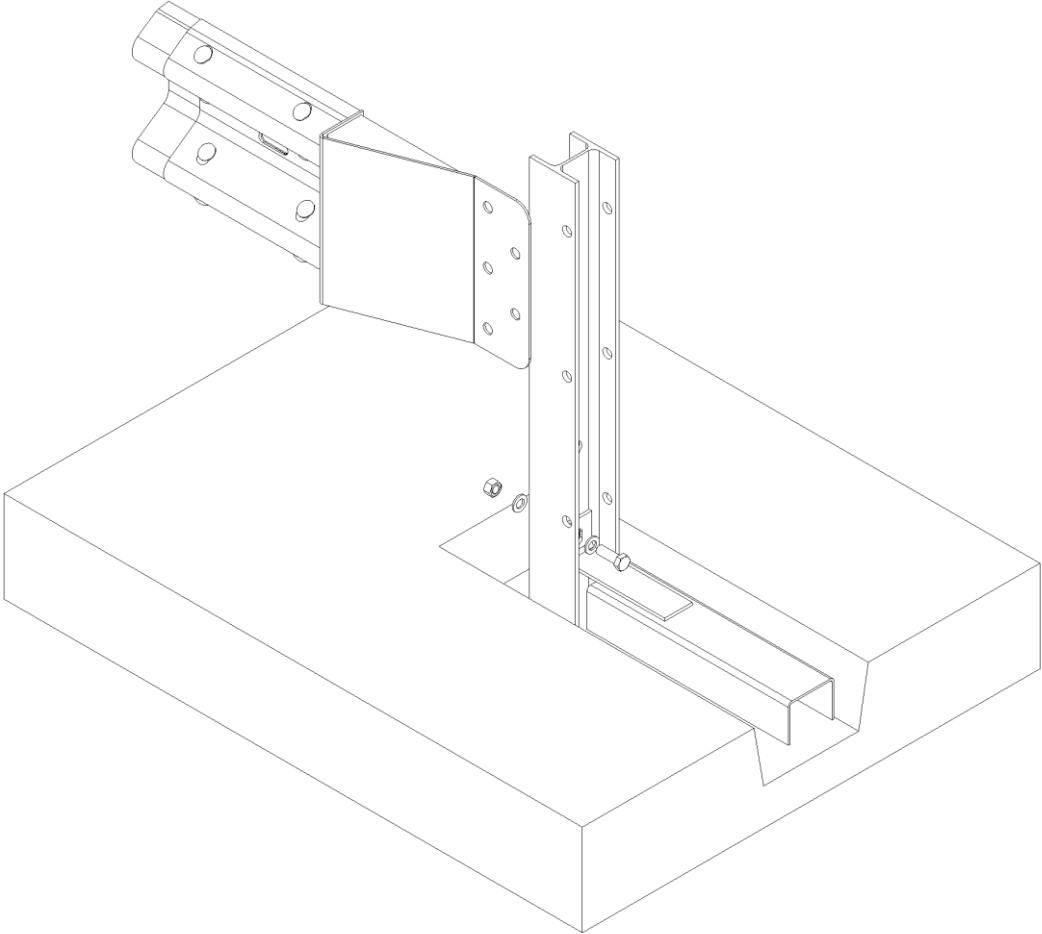
6.3.2. Put the sliding profile L=2372,5 mm aligned with the mark and position the second HE post.



6.3.3. Remove the sliding profile and drive the post into the ground.

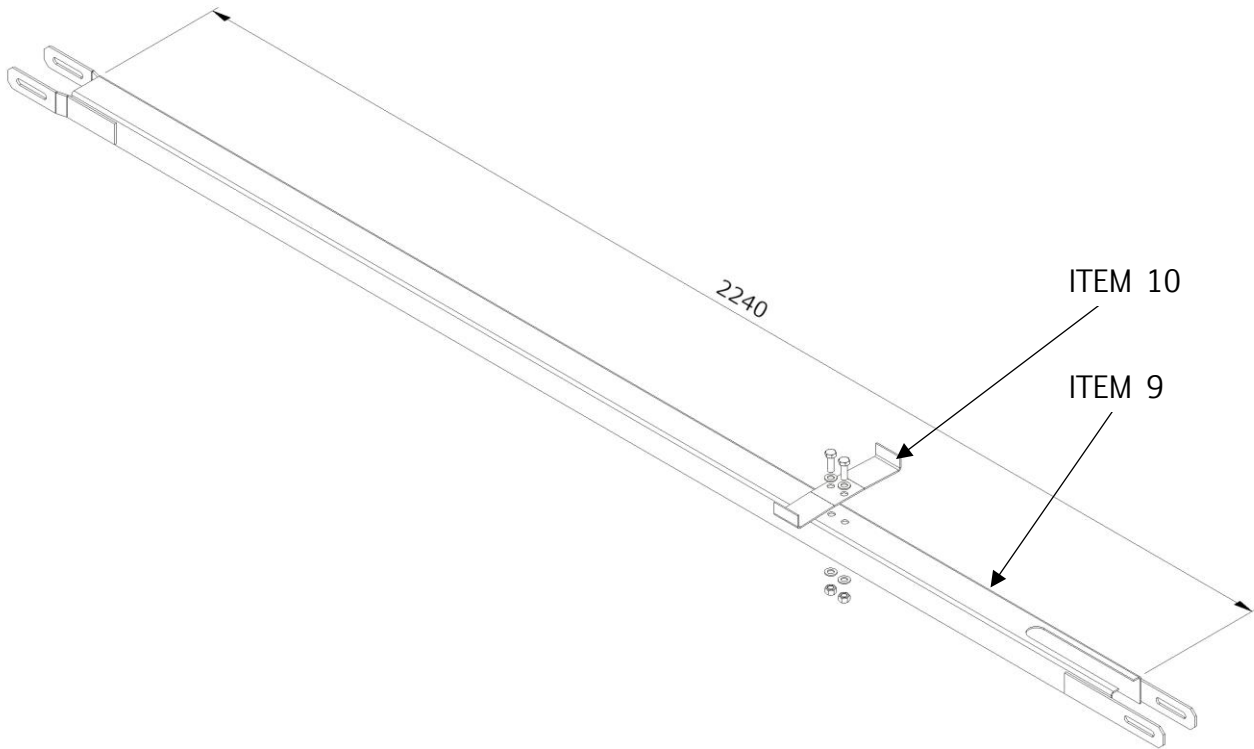


6.3.4. Replace the sliding profile and fix with the bolt M16 to the first post HE L=1400 mm



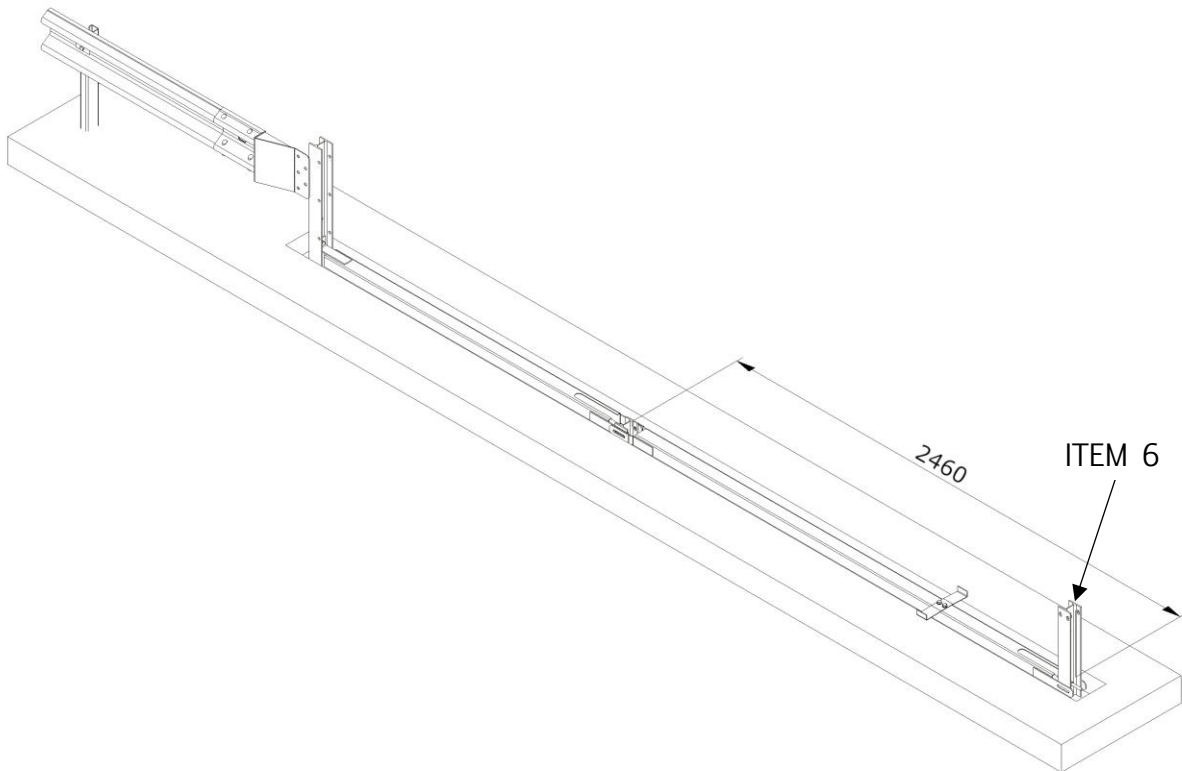
6.4. Install the second sliding profile L=2240 mm

6.4.1. Assemble the support shaped plate on the sliding profile L=2240 mm

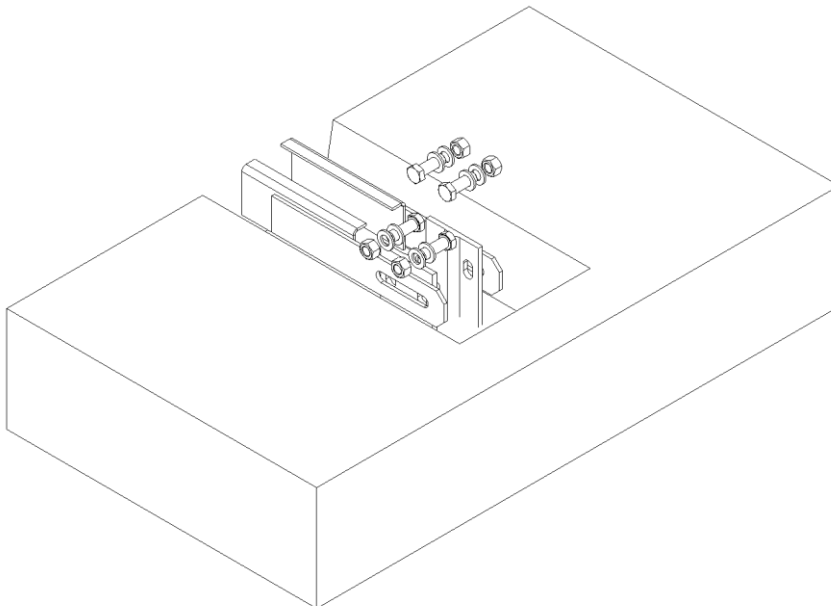
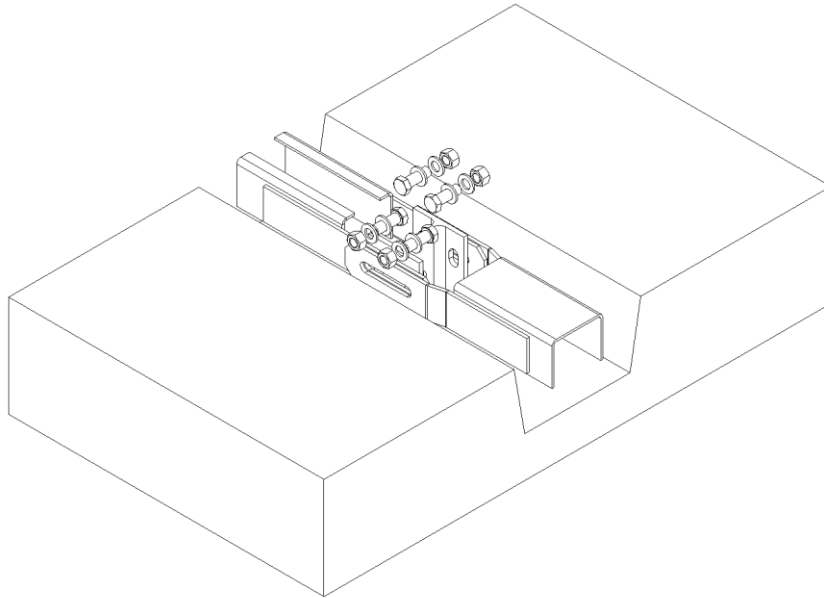


6.4.2. Install the threaded bar M16x200 on post HE L=650 mm (as before)

6.4.3. Put the second sliding profile to position the last post HE L=650 mm



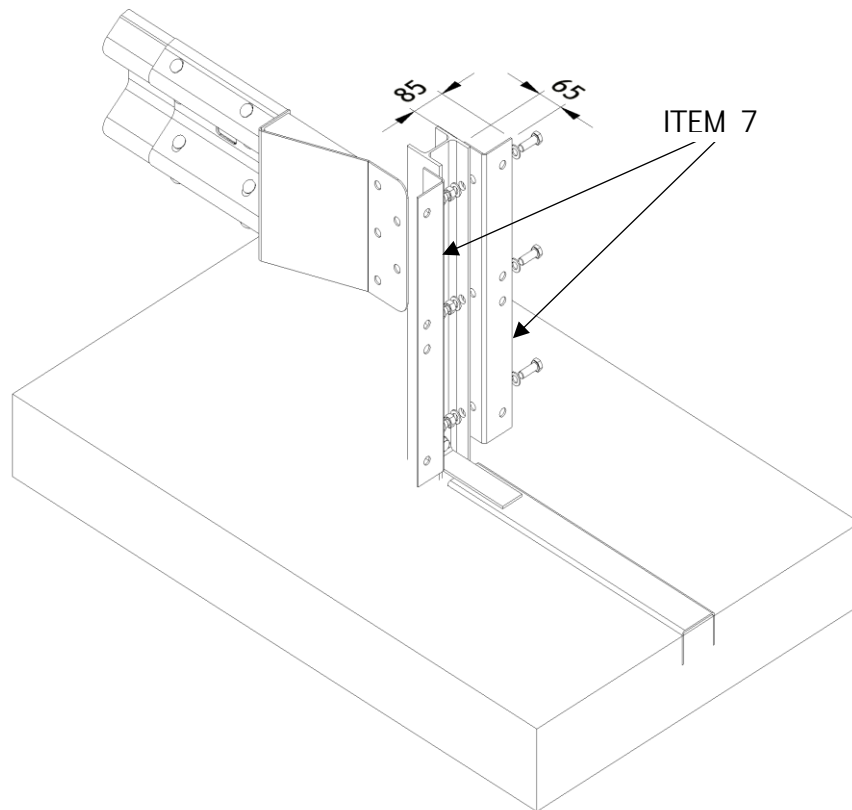
- 6.4.4. Remove the sliding profile and push the HE post into the ground (as before)
- 6.4.5. Replace the sliding profile and fix with M16 bolt sets on middle and last HE post. Install the bolts so that the nut can be tightened from the outer side. It may be useful to dig away a small amount of soil to facilitate this process. Check the correct alignment of the sliding profile.



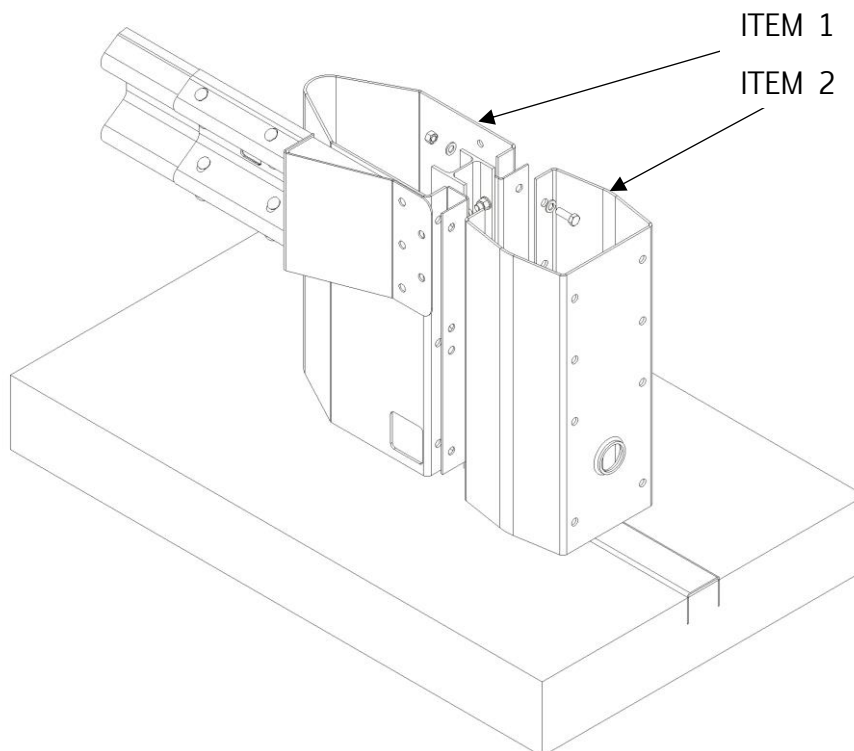
- 6.4.6. Partially cover the excavation leaving the last post bare to connect the rope at the end

6.5. Assembly the first module

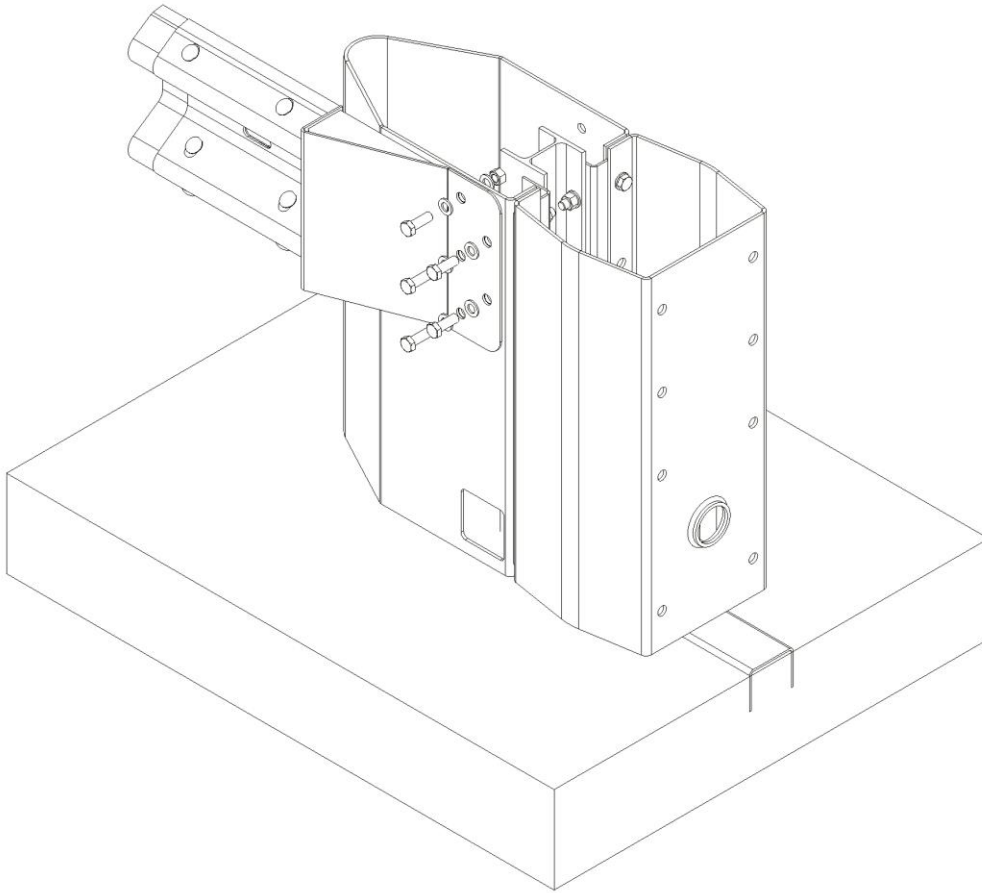
6.5.1. Disassemble the L profile to the first module and fix to the first HE post.



6.5.2. Fix the first and the second module to the L profile (both thickness 6 mm)



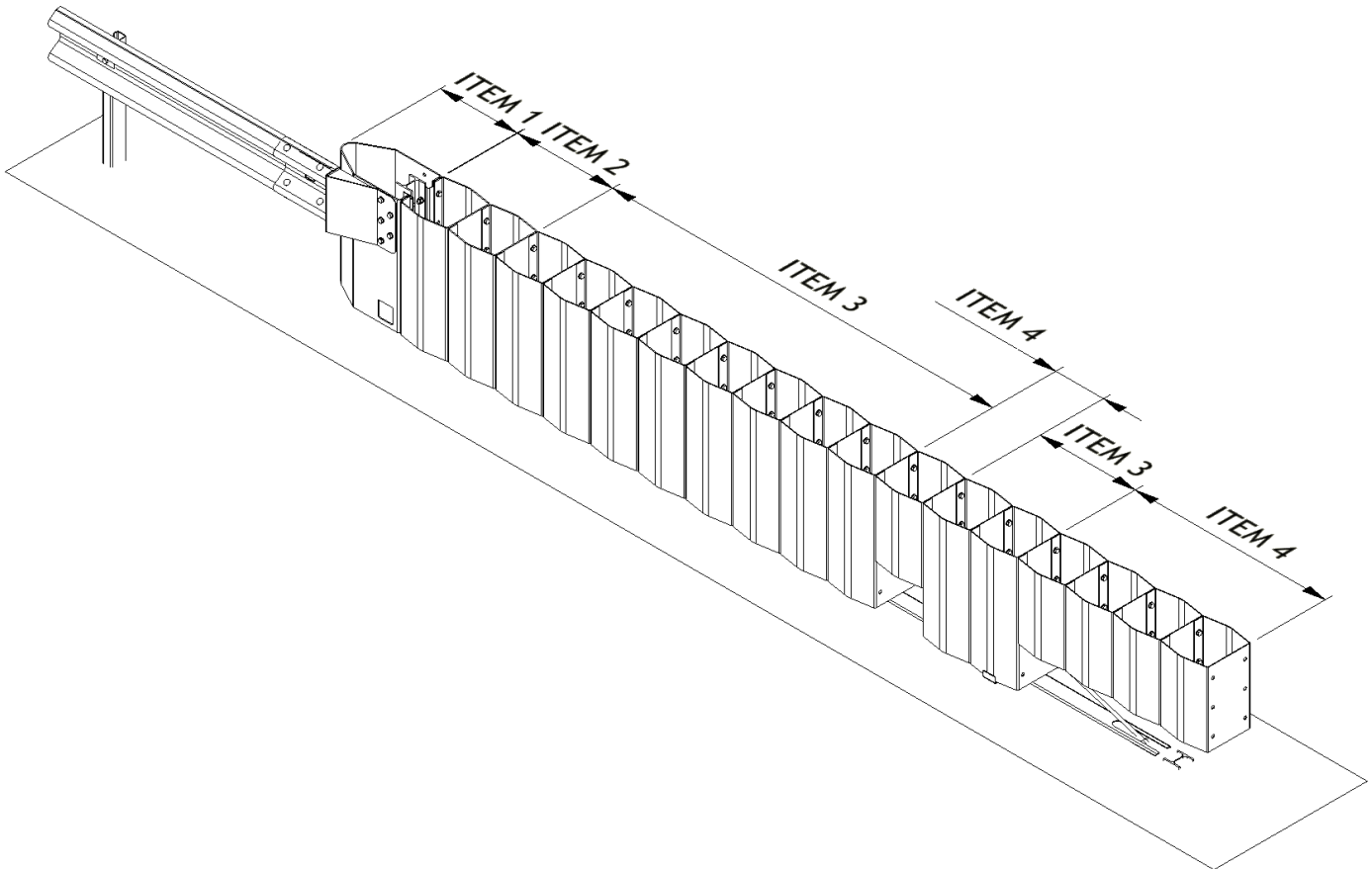
6.5.3. Fix the first module to the 2wave terminal with M16x45 bolted inwards as shown.



6.6. Connecting the modules

6.6.1. Connecting the remaining modules as show below in the following sequence:

- 1 no. 750mm th.6mm high modules (ITEM 2)
- 8 no. 750mm th.4mm high modules (ITEM 3)
- 1 no. 480mm high module (ITEM 4)
- 2 no 750mm th.4mm high modules (ITEM 3)
- 4 no. 480mm high modules (ITEM 4)

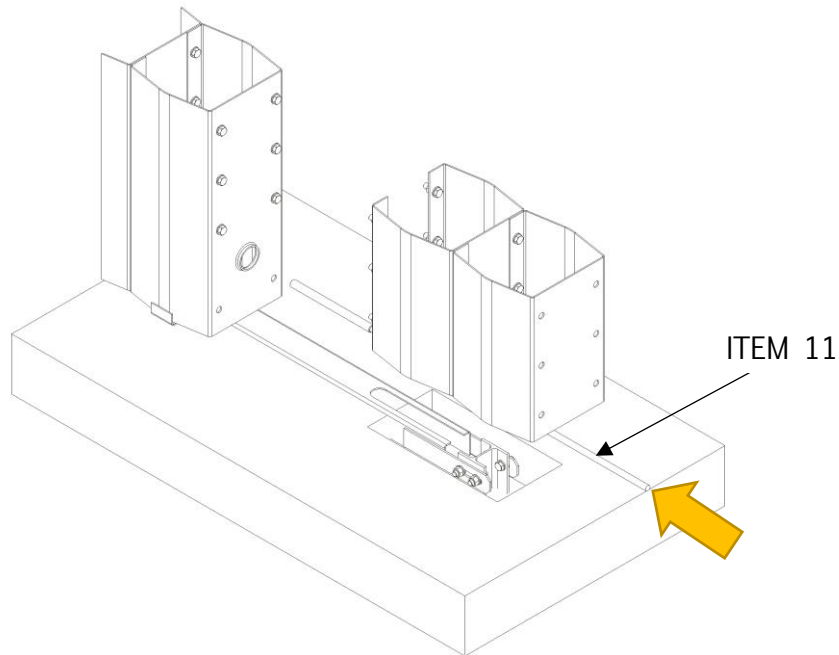


NOTE

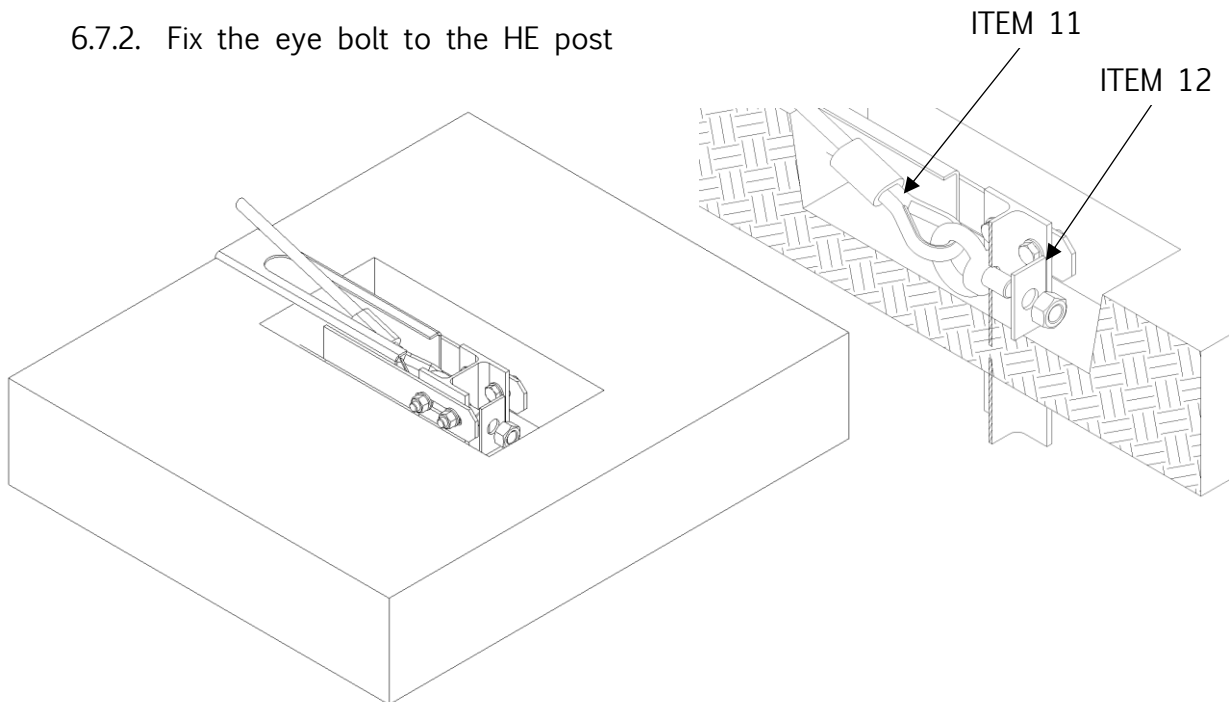
During the assembly check the correct alignment of entire terminal.

6.7. Fix the rope

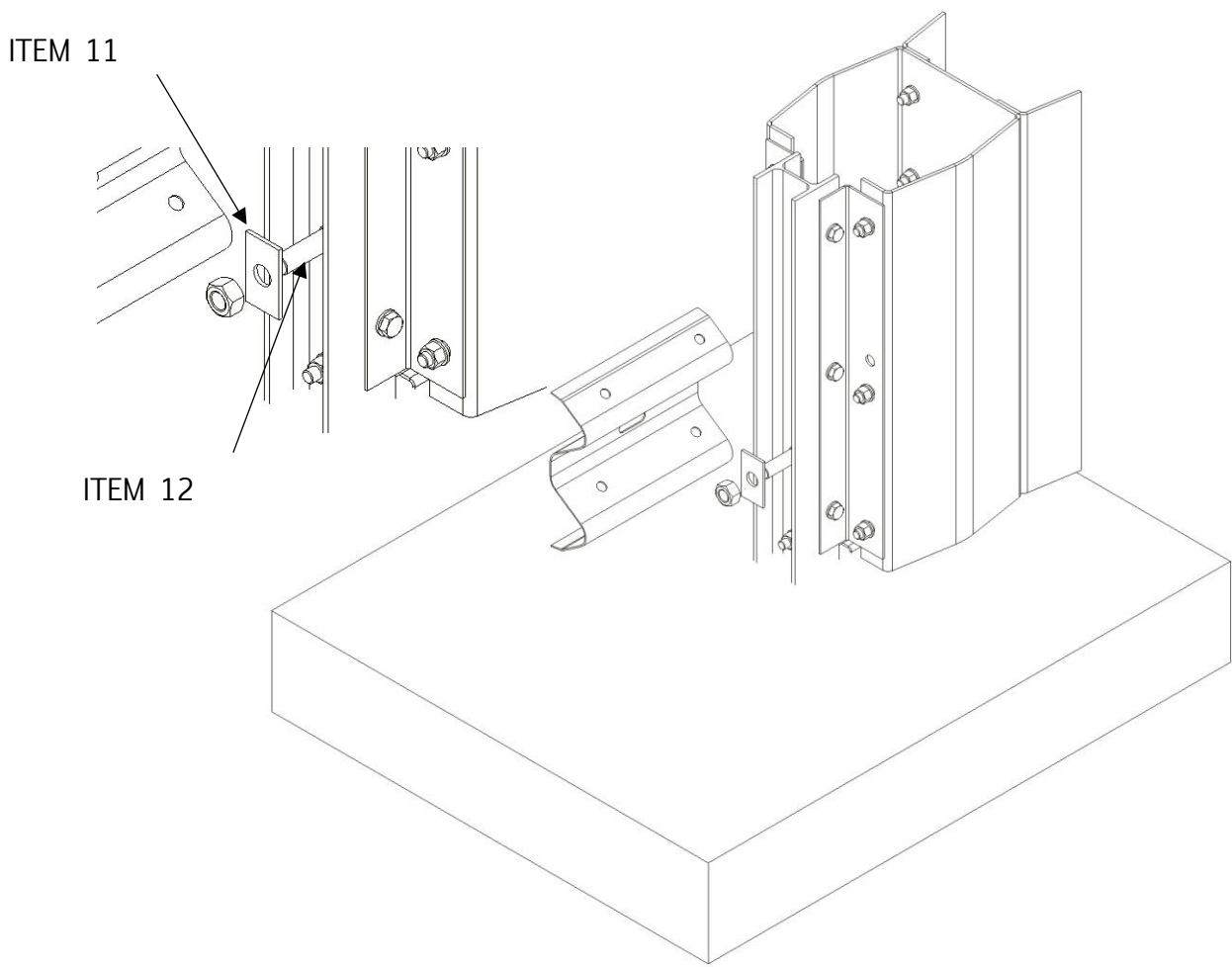
6.7.1. Slide the rope from the last module to the first through the large diameter holes (in the image below the modules are hidden for clarity)



6.7.2. Fix the eye bolt to the HE post

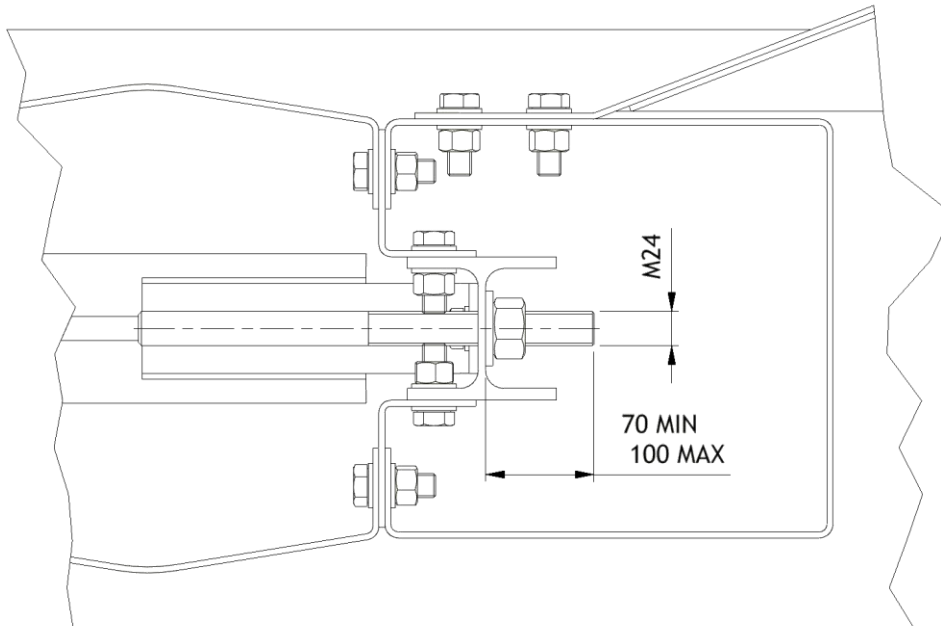


6.7.3. Fix the threaded extremity to the HE post (in the image below the modules



are hidden for clarity)

6.7.4. Check the rope is stretched & taut. Tighten the nut on the threaded bar until the rope is fully stretched (see the images below). It is however unnecessary to achieve a torque measurement.



A upward vertical pull by hand should not result in a movement at this location. Should a gap appear between the rope and the first hole, it is likely that the rope needs additional tightening.

6.8. Final operations

- 6.8.1. After completing the assembly, carry out a full inspection to make sure that all dimensional requirements conform to the system drawings. Make sure that the alignment of the terminal is to line and level and properly connected to the guardrail that it is terminating.
- 6.8.2. Apply the self-adhesive reflective label to the front plate. Make sure the label is level and centred on the end plate. Note that 3 Labels are available to facilitate left, right & central applications

7. Routine Inspection and Maintenance

It is recommended that a visual inspection of the terminal is carried out during routine inspections and at minimum every 12 months.

7.1. Guidance for Inspection

To ensure the terminal is complete and in good order check for:

- Absence or looseness of bolts or nuts.
- Check alignment in relation to the ground profile and check that the cable is taut.
- Remove any accumulation of debris and dirt inside the modules.

7.2. Accident Damage Inspection

For many impacts it is expected that a number of components can be reused. A visual inspection should be undertaken and any component that has been distorted due to impact must be replaced.

- As a basic principle, all parts showing permanent plastic deformation have to be replaced. Special care must be taken to carry out an inspection of the wire rope and should any damage be visible it must be replaced.
- All welding on the U profiles should also be examined for damage.
- All fixings at the area of vehicle impact should be replaced regardless of the condition for safety.
- If the distortion on energy absorbing modules does not exceed a tolerance of 10 mm compared to the original shape it is acceptable that it does not require replacing.
- A visual inspection of the posts will identify if they or if the ground support has been damaged by vehicle impact. It is recommended to compact the ground locally around any posts that have been impacted if there is any doubt about the integrity of the soil.

If in any doubt contact OBEX who can offer immediate technical support.

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Disclaimer: OBEX Systems Limited take no liability for the performance of the system in the case of poor ground conditions and incorrect installation. The system is an integral part of road furniture to protect road users and under no circumstances should an installation deviate from these instructions without prior approval from the OBEX technical department.