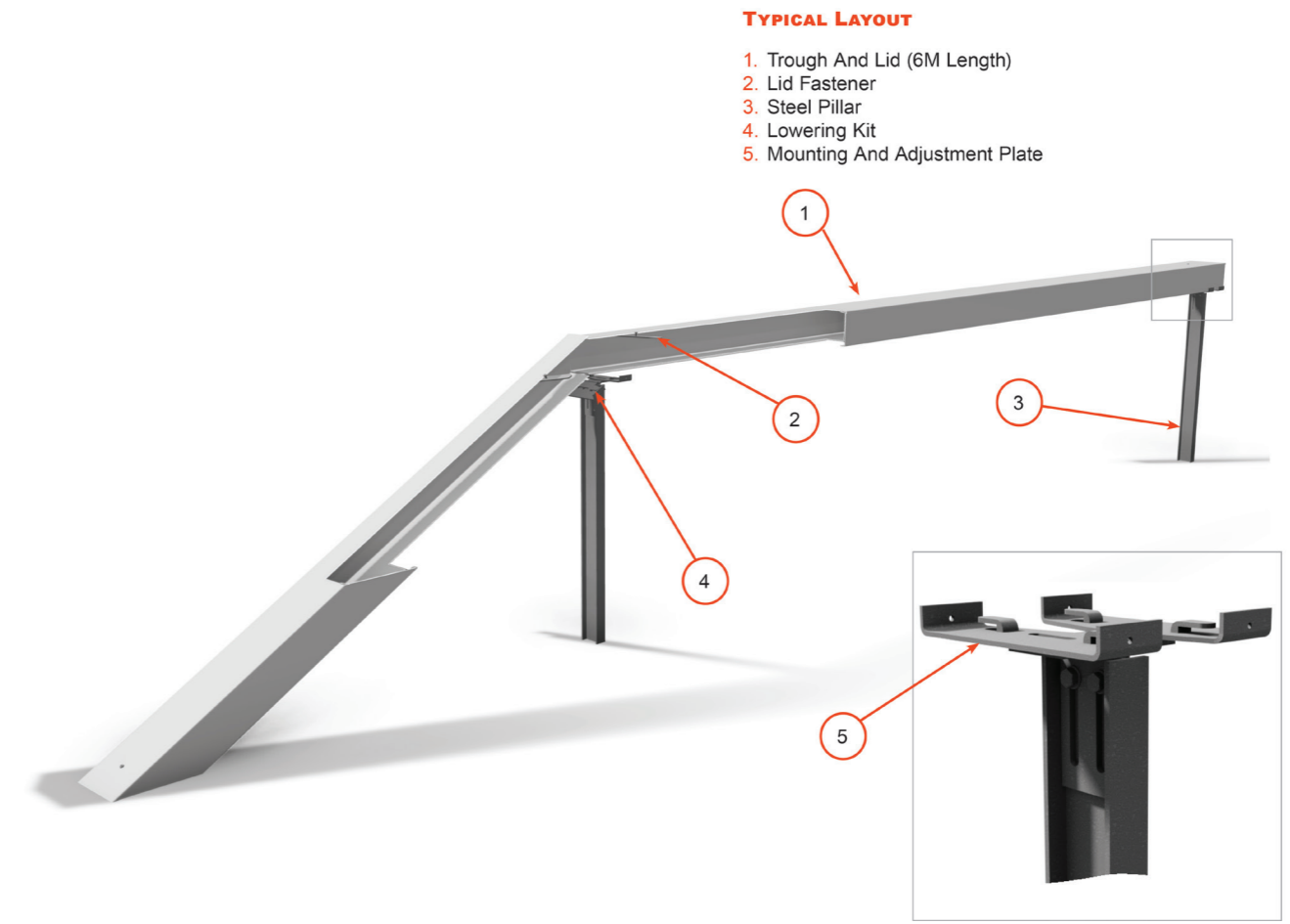


# Elevated Troughing

## Installation Guide

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## SYSTEM DESCRIPTION

The RIVVAL Elevated pillar-mounted trough is a system of pillar-mounted cable ducts made of glass fibre reinforced plastic (GRP), utilised without any separate mounting framework.

The system consists of the following:-

i) IPE 100 steel girder, drilled and galvanised, available in:-

- 1.5m
- 2.0m
- 2.5m
- 3.0m
- 3.5m

ii) mounting plate:-

- Top Mounted
- Side Mounted
- Double Side Mounted

These typically include two supporting angles, one connecting plate and two mounting plates for the top mounting. The side mounting has additional T brackets(s), a backing plate (single-sided), and four connection bolts.

iii) GRP Trough profile and the lid profile, available in:-

- Size 1 - 100 x 150
- Size 1a - 150 x 150
- Size 2 - 150 x 250

Note: All steel parts and mounting hardware are hot galvanised and electroplated.

The ducts are perfectly suitable for installation in topographically difficult terrain, at river crossings, on noise barriers, and on bridge railings. They are easily adapted to local conditions, e.g. at deviations around the masts of overhead lines.

Mounting plates are designed to allow for a marginal compensation for dimensional inaccuracies caused by ramming.

Note: The Type 1a installation process differs from the Type 1/2 process.

**The Elevated pillar-mounted system is not for use in tunnels.**

The Elevated cable duct system should only be installed outside safety zones (refuges). The minimum clearance between the cable duct system and track centreline will have to be determined by the train operating companies and its associated specifications.



Type 1/2



Type 1a

Please take into account that lateral or top snow loads are to be expected if the cable duct system is installed in excavations or on slopes with snow flow, snow-drift, and the deployment of a snow plough.

In these cases, the relevant authority will have to verify and ultimately decide if utilisation of the pillar-mounted GRP cable duct system will be possible. In areas subject to falling rocks installation of the cable duct is not permissible. Please also note that the cable duct system may not be subject to any loads that result from railroad traffic.

DIMENSIONS	SIZE 1	SIZE 1A	SIZE 2
LENGTH	6000MM	6000MM	6000MM
WIDTH	100MM	150MM	250MM
HEIGHT	150MM	150MM	150MM

WEIGHT	SIZE 1	SIZE 1A	SIZE 2
1 PIECE	32 KG	44 KG	52 KG

PROPERTY	LONGITUDINAL	TRANSVERSE
TENSILE STRENGTH	300 MPA	100 MPA
FLEXURAL STRENGTH	250 MPA	140 MPA
E-MODULUS TENSION	20,000 MPA	10,000 MPA
E-MODULUS FLEXURE	25,000 MPA	11,000 MPA

PROPERTY	VALUE
DENSITY	1.8 KG/DM <sup>3</sup>
IMPACT RESISTANCE (IZOD)	1,600 J/M
BARCOL HARDNESS	-
THERMAL PROPERTIES	PERMANENT DIMENSIONAL STABILITY FROM -30°C TO +85°C
SERVICE LOAD (VERTICAL)	1.2 KN/M + 0.75 KN MAN LOAD
WIND LOAD (HORIZONTAL)	1.45 KN/M <sup>2</sup>

## PREPARING THE INSTALLATION

Installation shall be carried out in line with the Railway Authorities approved process. All installation staff must follow the approved process. Inspect all components for damage before their installation. Only Elevated trough profiles and components without any defects may be installed. Any modifications (e.g. extension of the cable duct profile) and repairs of GRP profiles or components will immediately render the warranty void.

Unloading of the components at the site or storage facility will be done only via the pallets supplied, using suitable lifting devices or individually by hand. No liability whatsoever is assumed for consequential damages that result from improper handling of individual components.

### TOOLS REQUIRED

The following minimum tools are required for the installation:

- 1 x Suitable Piling rig with guide bush for IPE 100
- 2 x 19 mm open-end spanners (or box-end spanners)
- 1 x TX40 headed Key
- 1 x Drill
- 1 x 6 mm drill bit
- 1 x 9 mm drill bits
- 1 x Torque spanner
- 1 x Spirit level
- 1 x File
- 1 x Square
- 1 x Angle grinder, cutting disc or saw
- 1 x Zinc repair spray
- 1 x 6m Spacing Gauge RP00709/1
- 1 x 3mm Gauge

### PILLARS

The pillars can be mounted using various methods including:-

- RAMMED
- BURIED
- CONCRETE
- PILE MOUNTED

The method selected shall depend on the Railway Authority specifications in relation and local ground conditions encountered on site.

The minimum distance between steel props (cable duct) and track centreline will have to be determined depending on the respective track speed on the basis of the currently valid guidelines of DB AG.

### PROTRUDED LENGTH

We recommend adherence to the following protruding length for the pillar top mounted application:-

OVERALL LENGTH (M)	CLAMPING DEPTH	PROTRUSION
1.5	1.3	0.2

These recommended clamping depths are based on standard ground of category 3. The clamping depth should be adjusted in line with the local conditions encountered on site and/or in line with the Railway Authority specifications.

### SPACING GAUGE



Spacer gauge 6 m RP00709/1

The spacing gauge (fig. 2) is used to assist with the spacing of pillars at a uniform 6m gap.

Select the method for installation:-

### BURIED

Dig and bury following the relevant Railway Authority specification.

### RAMMED

Use appropriate equipment for pillar ramming. The recommended equipment is a pneumatic pile driver GR40 with a guide bush for IPE100 (weight approx. 40 kg, fig. 4) with a compressor pressure to between 5 and 6 bar.

Pillars should be aligned properly, both horizontally and vertically. This provides for easier mounting support and trough installation.

Position the ram on top of the pillar to be rammed, align the pile to be rammed steading it until slightly rammed in, once supported in an aligned position continue to ram until protrusion distance is achieved without supporting the pile.

### CONCRETE

Dig and concrete following the relevant Railway Authority specification.

### PILE MOUNTED

Pile following the relevant Railway Authority specification.

### NOTE:

If the distance between props is shortened, the cable trough profile and possibly the lid profile will have to be shortened accordingly.

Comply with the operating instructions of the equipment manufacturer when operating the pile driver.

Comply with all safety requirements for the use of ramming equipment. Be aware of the strong vibrations encountered during operation, for this reason, do not hold on to the pile driver during operation.

The pillars come with 2 holes 15mm diameter holes in the web. One is 40cm from top, the other 60cm. These are provided as an option where soft ground, bad ground, or a steep embankment is encountered. Here you can utilise a steel bar through the hole and create a concrete plug around the pillar to provide additional support for the pillar/system.

## FITTING MOUNTING PLATE

First, align the height of the preassembled mounting Plate and attach it to the pillar in the mounting arrangement selected.  
Use the supplied M12 bolts to fit mounting plates in position and tighten (tighten to 90 Nm).

Note: The slotted holes in the mounting structure allow for accurate adjustment in longitudinal and transverse direction and alignment of the height.

### Fitting Lowering Plate

Where vertical changes of slopes, e.g. at inclinations or downhill sections, occur use a hinged mounting plate instead of a straight mounting plate.

Then position the GRP duct loosely on the plate / push in and butt against the underground duct.

Next, position the stop angle on the plate with the rigid connecting angle and use a pencil to scribe the cutting line for the mitre joint on the duct. The reference point is the centre of the steel prop. Mark the lines on both sides of the cable duct with a pencil.

The ducts are then cut, using appropriate equipment. Drill the two mounting holes – dia. = 6 mm – (on the sides of the trough profile), using the plate as a drilling jig.

Mounting plate and the cable trough must lie flat when drilling the holes. Then attach the GRP trough to the mounting plate on both sides with the hinged angles and secure with grooved pins DIN 1476 – ISO 8746. Installation of the first horizontal GRP duct may now be started.

## CABLE DUCT PROFILE

After the mounting structure has been adjusted properly and bolted to the steel props, insert the cable duct into the plate (floating installation).

**Make sure to adhere to an air gap of 3 mm at the butt joint.**

Secure the installed cable troughs in intervals of 30 m (on both sides) using grooved pins (fig. 4). The hole in the mounting plate serves as a drilling jig.

If obstacles such as e.g. overhead line masts or signal masts are detoured, the cable troughs and lid profiles will have to be cut to the required angle.

A lowering kit is required for vertical deviations in order to ensure stress-free installation of the cable ducts.

If the pillar-mounted cable route is not connected to an underground cable duct or the like, an end cover will have to be installed at the end of the duct.



3 mm air gap

Cable profile secured with grooved pin

**Stress-free installation of the cable ducts is essential.**

**No sharp edges are permissible at the inside or outside of the cable duct system.**

**Make sure and comply with the maximum permissible bending radii of the cables to be installed.**

## LID PROFILE

Position and install the lid of 6 m length as follows:



Lid profile, locking bar, mushroom head bolt, offset screwdriver

Insert the bolts (M8x16 with flange), 5 each per 6 m of lid profile, into the bore in the lid from the top, and thread 2 turns into the locking bar steadied from underneath (exploded view). Then rotate the locking bar in longitudinal direction of the lid (fig. 5).

On a straight cable trough run, position the first lid so that the lid centre is aligned with the joint of the cable troughs (one lid connects two troughs). Then tighten the bolts, using a TX40 headed screwdriver, allen key, or suitable device. Turning the mushroom head bolt will rotate the locking bar to mesh with the lower part of the cable trough (fig. 6).

The remaining lids follow the same sequence. For the ends use a half-lid segment to close the remaining trough sections at the beginning and end of the cable route.

In some bends, the lid may be positioned no further than 50 mm away from the joint of the cable troughs in order to ensure stress-free installation. The lid must be mitred in case of any change of direction of the cable duct system.

**NOTE: A 3MM AIR GAP BETWEEN LIDS IS REQUIRED.**



Locking bar installed

Do not store the lids loosely and unprotected next to the installed cable duct system. To ensure the stability of the cable duct system, it is always recommended to close the cable ducts with the lids. This prevents incidents during unfair weather conditions.

**NOTE:**

The 1A T ype has a different fixing arrangement where the duct is bolted to the mounting base plates. Images below, Fig 7 & 8 show this version.



## CABLE OUTLET GLAND

Place the cable outlet drill template in the required position on the elevated trough. Drill fastener and outlet holes as marked on the template. Deburr the cable penetration with a file or sandpaper to remove any sharp edges or fibres.

Install the Cable Outlet to the desired location on the elevated trough base, using the bolts supplied (M8x16 - fig. 9). Ensure that the bolt's mushroom head is located inside the cable duct.



Cable outlet gland

**CAUTION: IF ADDING A CONDUIT ENSURE THAT IT HAS THE SAME, OR HIGHER, FIRE PROTECTION RATING THAN THE ELEVATED TROUGH.**

Additional Tooling Required:-

- DRILL
- 7MM DRILL BIT
- 70MM HOLE CUTTER
- ALLEN KEY
- 10MM SPANNER

## SPECIAL COMPONENTS

Special consoles are used to run a cable route over engineering structures (bridges, overpasses, viaducts, etc.).

Prior to the installation work, determine the shape of the poles (round, square or rectangular tube, angled profile, etc.) and their dimension as well as spacing.



Special console on bridge railing

## COUPLER KIT

A coupler kit can be provided to meet special requirements.







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