THE UNITRACK MANUAL

Triple E Limited

1999

- **ALL TRIPLE E PULLEYS, PICKUPS, MASTER RUNNERS, CARRIERS AND GUIDES ARE DESIGNED TO BE USED WITH 8 mm PRE-STRETCHED POLYESTER CORD.**

- **IF ALTERNATIVE CORDS ARE USED, TRIPLE E CANNOT ACCEPT RESPONSIBILITY FOR COMPONENT MALFUNCTION.**

- **TRIPLE E SUPPLY 8mm BLACK PRE-STRETCHED POLYESTER CORD SUITABLE FOR ALL APPLICATIONS.**

Introduction

This manual provides step by step instructions on the assembly of Triple E components. As Triple E components are based on modules, a number of separate functions may need to be performed to complete any assembly.

We have tried to separate the functions into distinct sections so that the users of the manual will be able to follow and complete the work of each function before moving on to the next.

Ancillary information as to the capacity of the suspension system and the weight of the tracked load will also inform the user's selection and approach.

We have provided instructions, a Glossary and parts descriptions. We recommend that before starting, all relevant instruction sections are read and the meanings of all words are clarified where necessary.

We have endeavoured to show the most commonly used applications of the Unitrack System. Many further variations are possible using standard parts. Please call us to discuss any further requirements.

We hope that your use of this manual results in straightforward installation and operation.

Contents

Preparation Guide

The dimension and function of the system to be assembled needs to be clearly understood. As with any modular system, the correct number and types of parts required need to be available. Please check with Triple E if you have any doubts. The function of the system will inform the requisite parts list.

1. **Be clear as to your specific Unitrack application – single, double, overlap or wipe, etc.**

2. **Calculate overall length, allow for overall width of tracked articles plus allowance for storage offstage – 4 cm per runner.**

3. **Be sure you have the correct number of appropriate parts (check Part List).**

4. **You should have:–**

Tape Measure		
2 x 13mm spanners	for	Joins
2 x 19mm spanners	for	Fitting pulleys and suspension
1 x Stanley knife	for	Cord cutting
1 x Large flat-bladed screwdriver	for	Cord clamping
4 mm Allen Key	for	Tracdrive cording
5mm Allen Key	for	Rearfold accessory

Joining Unitrack Sections

Unitrack is a simple modular system based on 4 square section tubes held together by vertical rectangular central tubes. The central tubes have holes for the bolts used to join lengths of track.

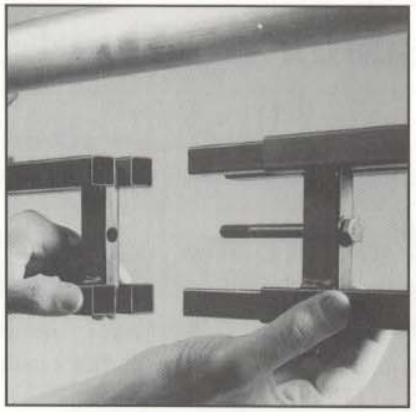
Clear a linear space the length of the proposed completed track lengths.

Have trestles or similar ready to support the track. Each join is made by inserting 4 square spigots into the open ends of the track tubes.

Sleeve the next piece of track onto the exposed spigots until the track sections butt.

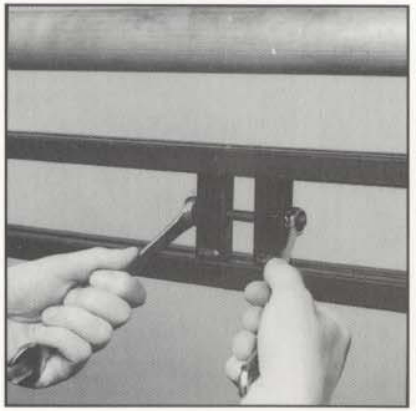
Then pass a join bolt through the holes in the central vertical tubes allowing for a washer at either end. Apply the nut.

Tighten the bolt. Avoid over tightening as it will crush the tubes.



Joining Unitrack Sections I

Four square spigots have been inserted in the tube ends of the right hand track section. Similarly, a join bolt has been inserted into the hole in the upright member.



Joining Unitrack Sections II

The two sections have now been 'sleeved' together, the nut has been applied to the bolt and is being tightened with spanners.

Assembling Two Lengths

In all cases, join the correct lengths of track first. Next, if required, affix the two lengths together with the correct overlap.

FIXING TWO ASSEMBLED LENGTHS TOGETHER

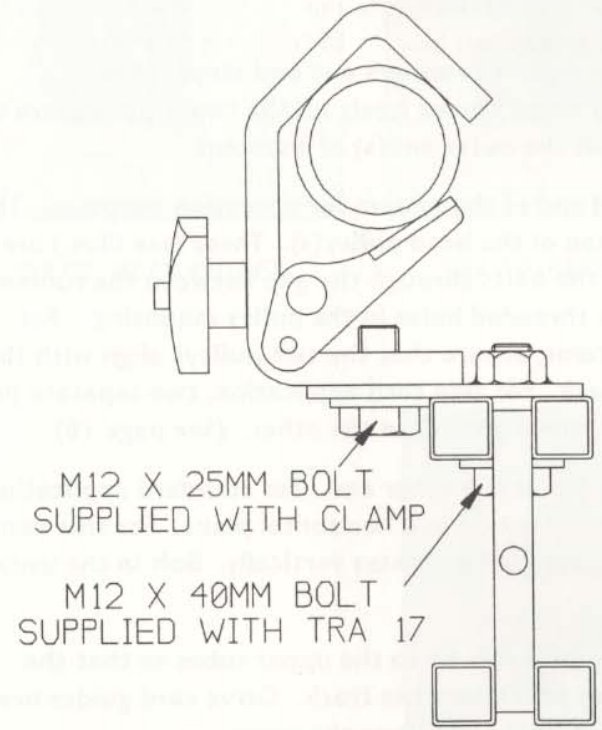
To affix two lengths of assembled Unitrack together, place the two lengths in parallel with desired 'overlap'. The Triple E overlap clip will hold the two assembled lengths in the correct alignment when tightened up.

A MINI OVERLAP SYSTEM

The track s are held securely in parallel by the two overlap clips which bolt to either track. The central hole in the clip is for hook clamps or other suspension attachments. Also seen are offset plates which fit to the outer ends of the track and provide a fixing point, centred to the system (to avoid twisting). Also for hook clamps or attachments.

Fitting a Hook Clamp to an Offset Plate

To ensure that an overlap track system hangs centrally from a single bar or pipe, offset plates need to be used.



IMPORTANT

Where an offset plate is to be used with a hook clamp, first remove both bolts completely. The longer bolt (from the clamp) will secure the offset plate to the track. The shorter bolt (from the plate) is used to fit the hook clamp to the plate. If this configuration is not used, the hook clamp will not function properly.

Fitting Components

Having joined (and assembled) the correct lengths of track to suit the purpose, the fitted components will determine the potential of the completed system.

The lengths should, for ease, be held at working height on trestles or similar.

First, slide on the required runners and end stops for the application. They should move freely on the two lower square tubes. The endstops go at the outer end(s) of a system.

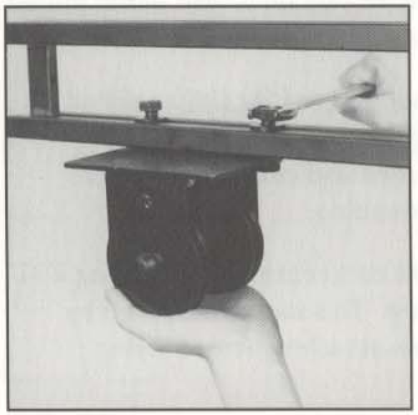
Verify the desired end of the system for operation purposes. This defines the location of the head pulley(s). These (see illus.) are fitted by passing the bolts through the gap between the running bars and into the threaded holes in the pulley mounting. For double track systems, ensure that the two pulleys align with the two lengths of track. For side cord application, two separate pulleys need to be fitted, one higher than the other. (See page 16).

The return pulley fits at the other end. For standard applications the return pulley will rotate in a horizontal plane. For side cords and double cords the pulley rotates vertically. Bolt in the usual way.

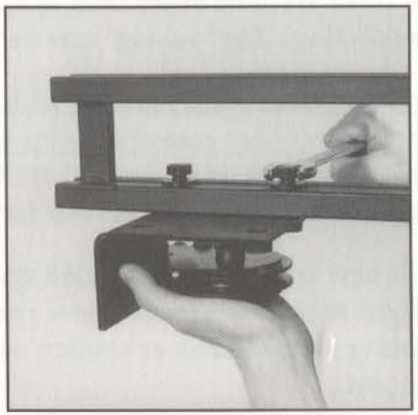
Curved system components fit to the upper tubes so that the operating cord can pass above the track. Curve cord guides need to be fitted at 500 mm intervals along the curve.

Line pickups (preventing slack cord sagging into view) can now be fitted at 2.5m centres on the outer sides of overlap systems. The hook should be in line with the head or return pulley. Similarly, fit suspension points at suitable separation to the intended load (See page 21).

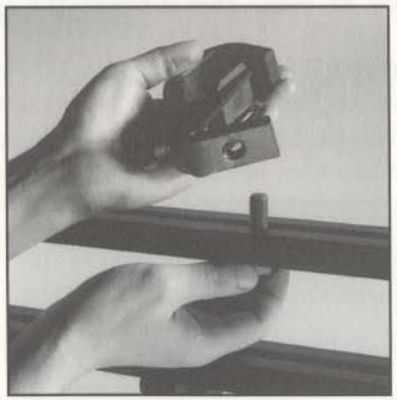
Examples of Fitted Components



TRA 09 HEAD PULLEY



TRA 10 RETURN PULLEY



TRA 14N HOOK CLAMP

These components fitted by passing the bolts between the tubes of the track and threading them into the mountings in the components.

Cording

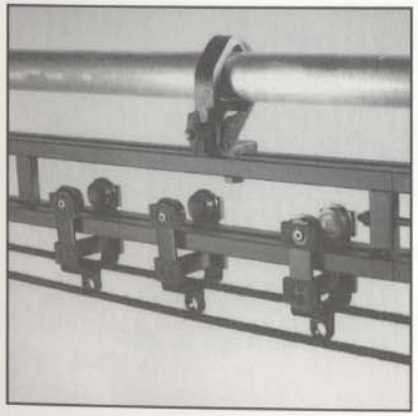
All track systems other than linear drive rely on a cord being pulled to function. The 'pulling' may be manual or mechanical.

Tripe E systems are supplied with enough cord for the specified application. For ease of cutting, tightly wrap a few turns of insulating tape onto one end of the cord and cut through an an angle, leaving an unfrayed end for threading.

It is best to get the assembled system to a reasonable working height with easy access before cording. This can be achieved by resting it on trestles or similar, or pre-attaching it to a flying system.

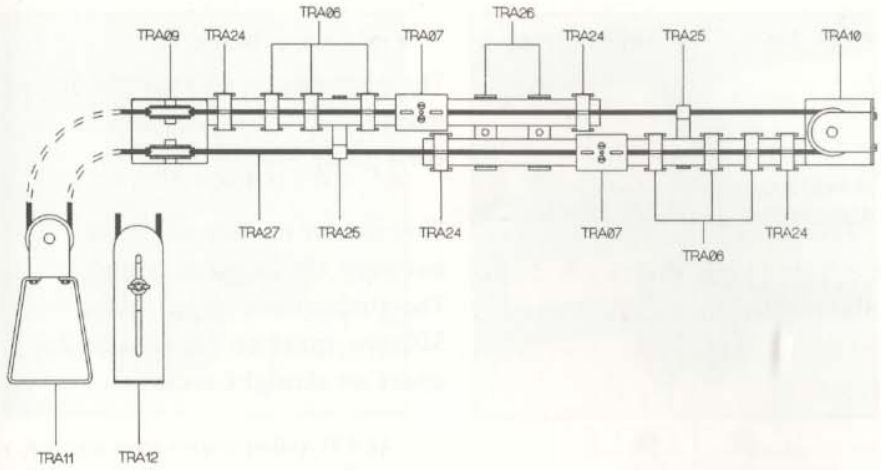
The cording principle is that of a long loop, with the ends of the cord meeting and being clamped into the master runner. This will now be known as the Cord End Master Runner. For many systems, eg: centre overlap (draw tabs) another master runner is clamped to the cord as well. This is called the slave master runner.

The process then normally begins by loosely tying one end of the cord to the cord end master runner. The other end is then threaded through the complete system until it returns to the cord end master runner, where it, too may be tied. Do not forget the floor pulley or foot stirrup. Cutting off excess cord and final clamping should only take place when the system has been located into its operational position.



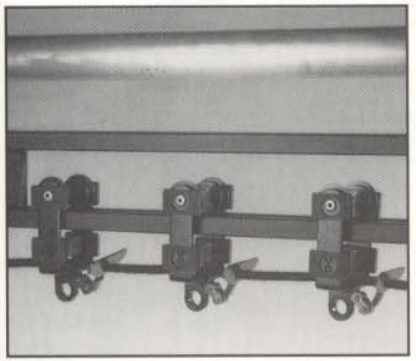
Cord passing <u>through</u> Standard Two Wheeled Runners. The cord runs between the keeper bar and the bottom of the runner.

Cording

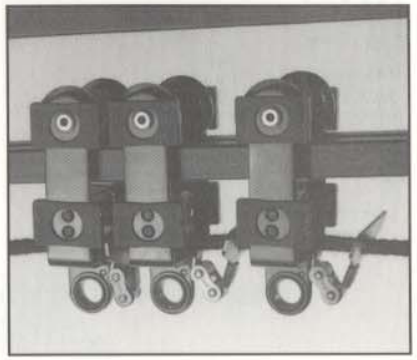


CORD PATH FOR STANDARD CENTRE OVERLAP TRACK
(VIEWED FROM UNDERSIDE)

REARFOLD VARIATION



(See Left) The rearfold tags are seen on the right of the runners. The cord runs through the hole in the tag as well as through the runner. Tension on the cord causes the tag to lock onto the cord and thereby pull the runner.

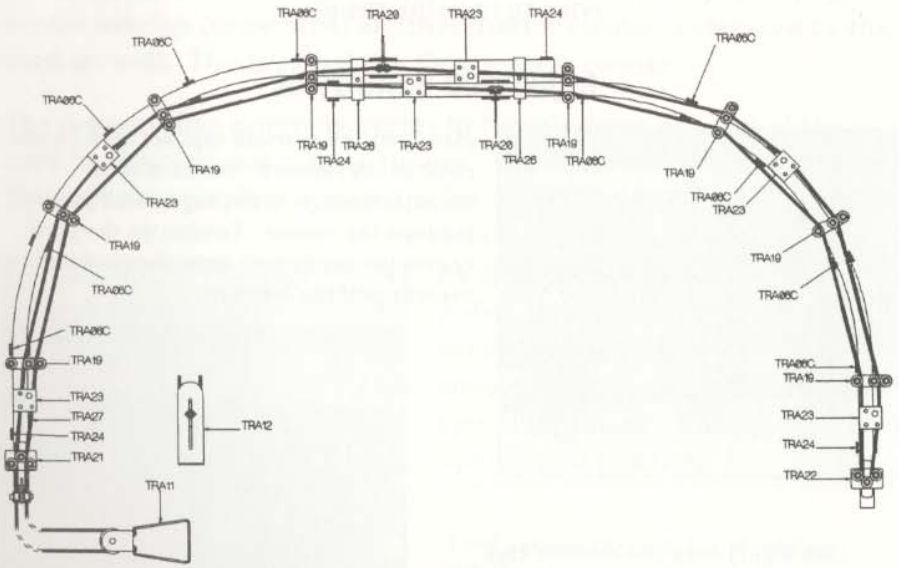


(See Right) Here the rearfold tags have become trapped between runners, allowing the cord to pass freely.

Curved Cording

The picture shows a curve cord master runner TRA 20 and a cord guide TRA 19.

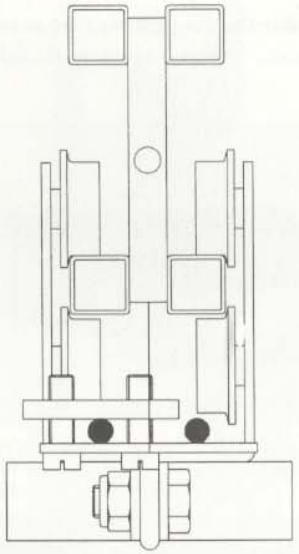
The master runner will pass between the capstan wheels. The guides need to be set at 500mm apart on curves and 2m apart on straight sections.



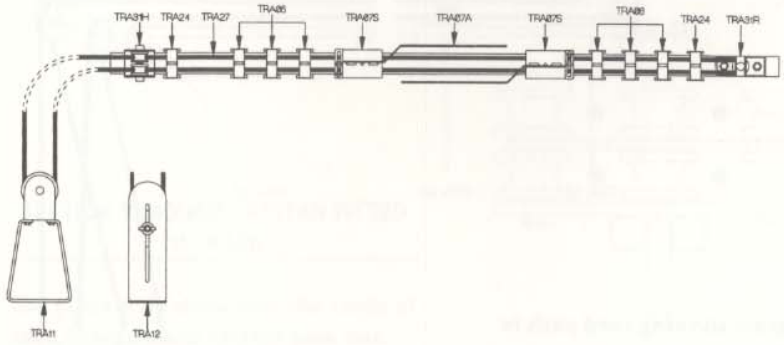
CORD PATH FOR STANDARD CURVED CENTRE OVERLAP TRACK (VIEWED FROM ABOVE)

Single Cording

A single cord return pulley TRA 31. The cord passes round the pulley and lies under and within the dimension of the track.



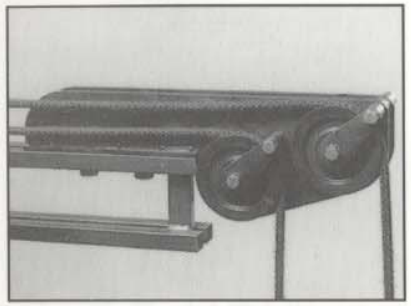
The black dots show how the cords pass <u>through</u> the master carrier TRA 07S. The left one is held by the clamping plate.



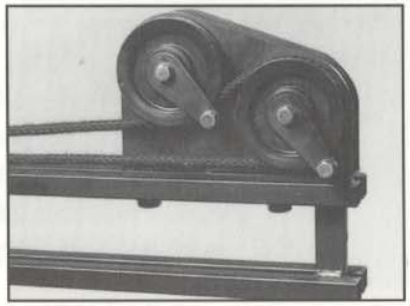
SINGLE TRACK CORD PATH WITH CENTRE OVERLAPPING ARMS (VIEWED FROM UNDERSIDE)

Double Cording

Double cording allows two master runners to operate independently on curved tracks. The two systems lie side by side.



A DOUBLE CORD HEAD PULLEY
TRA 42



A DOUBLE CORD RETURN PULLEY
TRA 43

NB: the pulley mounting extends below the line of the track, so the component must be at the end of a track section (nearside only corded).

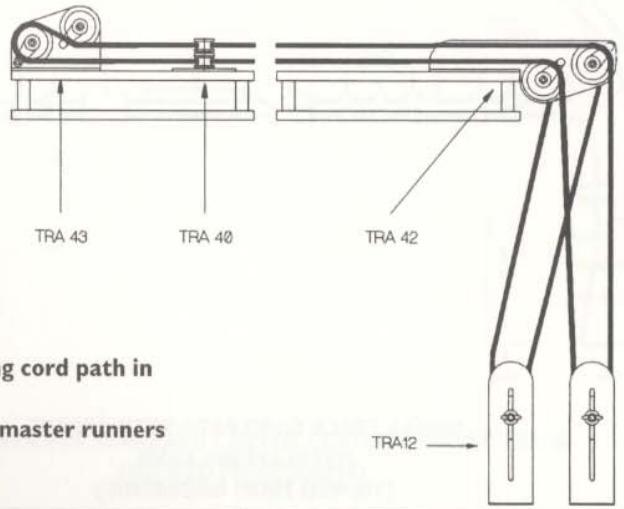


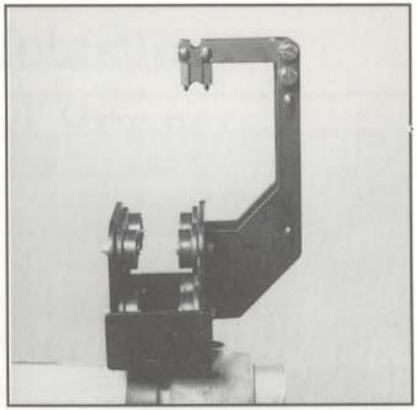
Diagram showing cord path in double system.
Shown without master runners
(see next page)

DOUBLE CORD MASTER RUNNER

The overhead bracket arm provides a fixing and clamping point for the right hand operating cord.

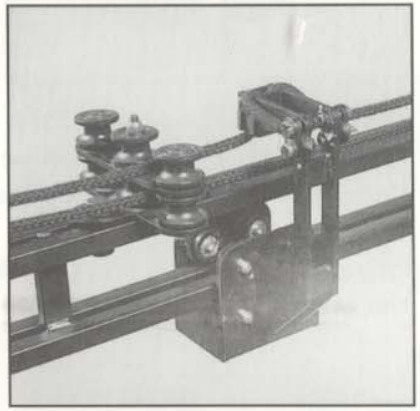
The two slotted screw heads hold the clamping plate (see also page 19).

The runner would face the other way for the left hand cord.



A DOUBLE CORD MASTER RUNNER WITH CAPSTAN (TRA 40)

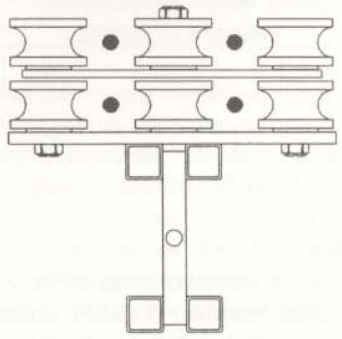
The upper cords from right and left are held in the clamping plates at the top of the bracket arm.
When moved, the end of the overhead bracket arm will pass between the two nearer capstan pulleys. The capstans are used to divert operating cords around corners in curved systems.



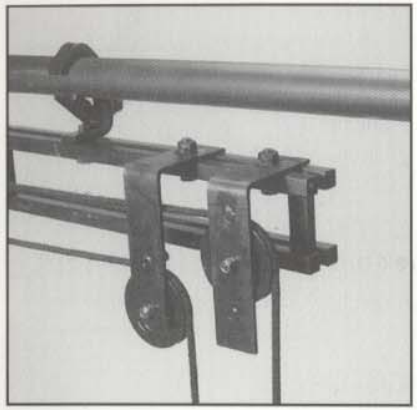
TRA 40

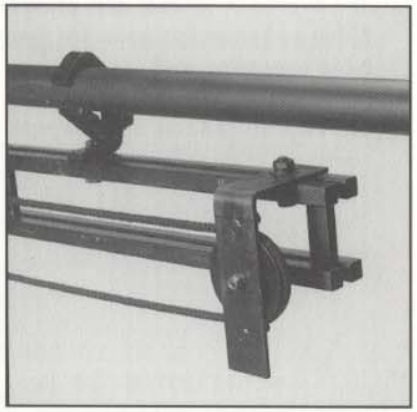
SECTION THROUGH CAPSTAN FITTED TO TRACK.

The black dots show how the cords of each independent system pass one above the other between the capstans.



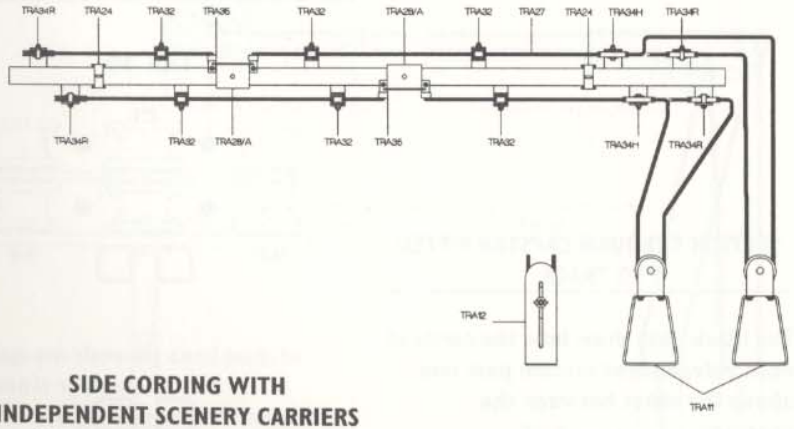
Side Cording





Shown here is the cording path for side cord head and return pulleys (TRA 34). Although it has three separate pieces, they form a single item. The return and upper head pulleys are identical and interchangeable.

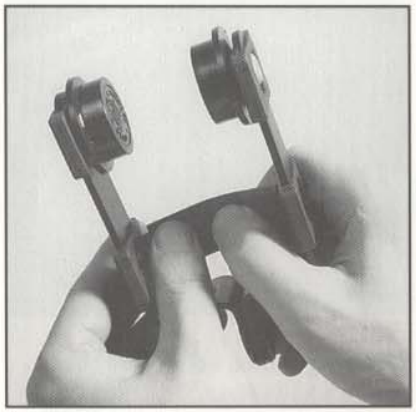
NB: Another system using similar components can be installed on the other side of the track.



SIDE CORDING WITH INDEPENDENT SCENERY CARRIERS (VIEWED FROM UNDERSIDE)

Removing/Installing Two Wheeled Runners

Standard two-wheeled runners (TRA 06) may be added or taken out of a tracking system. This is done by pressing the plastic 'keeper' bar to either side so that the studs at the ends come out of the locating holes in the sides of the runner.



Keeper being removed from two-wheeled runner

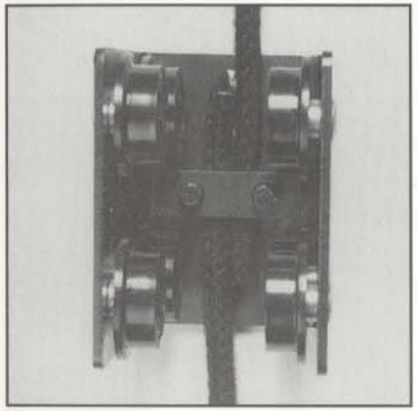
The keeper is being pressed away from the camera and will bend to a point where it dislodges from the locating holes either side of the runner. The keeper will need to be bent again during reinstatement.

Two-wheeled runner being added to a system

With the keeper removed, the body of the runner will pass at right angles across the 'running' tubes. It will then rotate the 90° to where the runner wheels correctly straddle the running tubes. NB: The hauling cord is being held to ensure that it locates within the body of the runner.

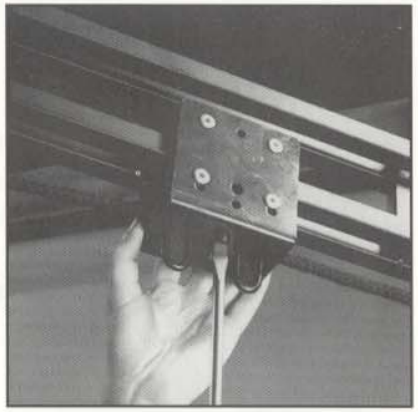
Rope Clamping

In all cord operating systems, the cord (or rope) needs to be secured to prevent slippage when the system is used. The rope is held by clamping, or compressing, it between a plate or in a short tube. In both cases, the pressure is applied by slot headed screws. The pictures show the most common overlap situation. Drawings show other types of clamping



This shows the two ends of an operating cord held securely in the clamping plate in the centre of a master runner.

The clamp bolts are tightened from below. For reasons of clarity, the master runner is shown by itself and not inserted into track, as it would normally be seen.

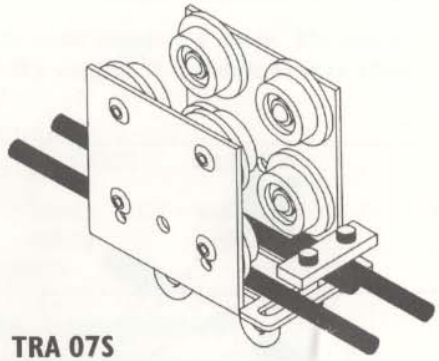


Clamping screws being tightened with a screwdriver.

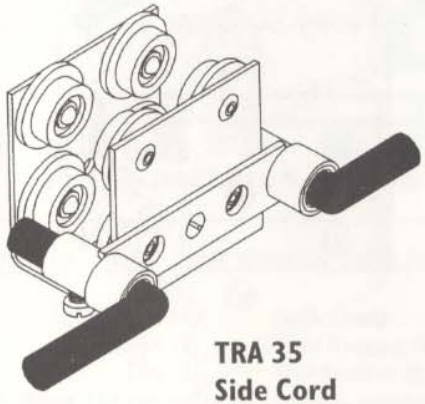
Here, the master runner is installed in the track in the usual way.

ILLUSTRATED IS A MASTER RUNNER, TRA 07.

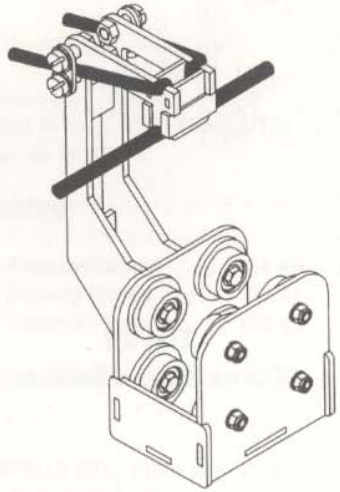
Other Types of Rope Clamping



TRA 07S
Single Track

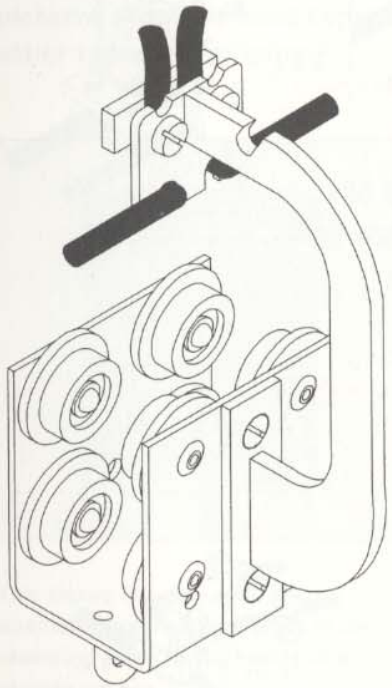


TRA 35
Side Cord

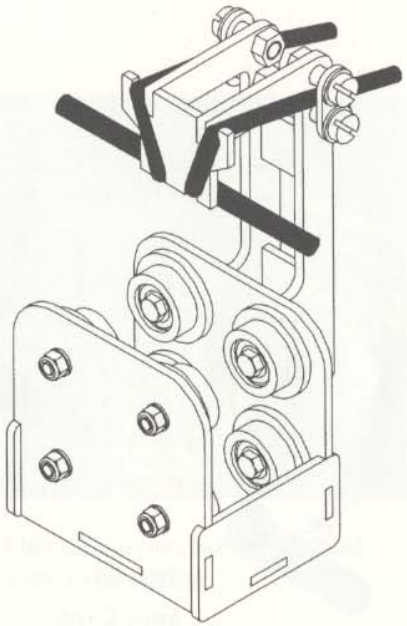


TRA 41
Double Cord

Other Types of Rope Clamping



TRA 20
Curve Master Runner



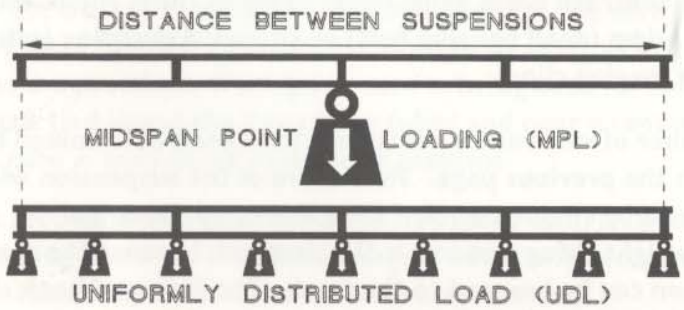
TRA 20 HD
Curve Master Runner
Heavy Duty

Calculating Suspension Needs

Unitrack and whatever is hung from it needs to be suspended safely. The number of suspension points will vary according to the weight. It is always best to allow for more weight than the immediate need.

UNITRACK SUSPENDED AT	1m centres	2m centres	3m centres
Max. midspan point loading	200 Kg	100 Kg	50 Kg
Max. uniformly distributed load	400 Kg	200 Kg	100 Kg

Midspan = ie: halfway between two suspension points.



SAFE WORKING LOADS FOR SUSPENSION FITTINGS

TRA 14N	Hook Clamp	70 Kg
TRA 15	Dead Hanging Hook	150 Kg
TRA 16	Wall Bracket @ 200mm from wall	100 Kg

NB: Allow 3Kg per metre for Unitrack, unladen and without fittings. Wall Bracket TRA 16 has two 11mm clearance holes allowing for suitable fixings up to 10mm.

SAFE WORKING LOADS FOR RUNNERS

TRA 06	2-wheel	25 Kg	TRA 28	Scenery Carrier	50 Kg
TRA 06c	4-wheel	25 Kg	TRA 28A	Scenery Carrier Top	50 Kg
			TRA28HD	Scenery Carrier	100 Kg

Copies of test reports and certification may be inspected at our premises by prior arrangement.

THE PARTICULAR SUITABILITY OF FLYING SYSTEMS, WALLS ETC. DOES NOT FORM PART OF THESE ADVICES AND MUST BE ASSESSED BY THE INSTALLER.

Suspending Track

The very nature of a modular product like Unitrack means that normally the system(s) will be assembled at a convenient working height. The next process is to move to and affix the system in its working destination.

The objective is to ensure that the track can be aligned without any twisting forces in a true vertical plane, so that the moving parts can work properly. Unitrack parts allow for this in most cases.

Standard Unitrack parts allow ready fixing to tubes (hook clamp), ropes or wires (dead hanging bolt) or threaded studding (offset plates or overlap clips).

The number of suspension points will have been determined by the tables on the previous page. The nature of the suspension will be determined by circumstances. Attachment to theatrical counterweight flying systems is the simplest, because the means of suspension can be lowered to the track. The fitting of hook clamps may be delayed until this point.

Hook clamps fit to overlap clips and offset plates (see pages 6–7). On single tracks they fit directly to the track.

Bring the flying bar down to the track. Verify the lateral position of the track or the centre of the overlap and locate the system accordingly. Sufficient personnel will now be required to lift the system.

Open all the hook clamps fully. If staff all work from the same side of the track system, the system can be lifted and the hook clamps engaged onto the flying bar. An individual should be responsible for seeing that the lateral alignment is not altered.

TIGHTEN THE HOOK CLAMPS.

Where a track has to be dead hung, the same principles apply, ie: any of the normal suspension fittings can be employed.

This description includes fitting to scaffolding, trussing, wall brackets, girders or dead lines in a theatre. The same loading constraints apply.

Where the suspension point is to be fixed, eg: wall bracket, the key dimension is the height of the fixing point of the suspended article. This should align with the eye of the runner which is 170 mm below the top tube of the track.

Usually, a secondary, temporary, lifting system has to be employed to raise the track system to the required position. Be sure that this does not place bending stresses on the track by using as many lifting points as are practical. If a rope or cord is being used for this, a clove hitch tied round the two upper tubes and near a centre upright tube is considered reasonable practice.

It is not recommended that the track be loaded until secured in its dead hanging position. The dead hanging hooks will accept ropes, cords or shackles – snaphooks are not recommended.

Consideration must be given to produce even tension on each suspension point, eg: wire rope adjusters (bottle screws) or adjustable knots (eg: clove hitches).

Where rope (hemp) flying systems are concerned, dead hanging bolts should be used.

To make a bridle, set pairs of hooks 1500 mm apart, ensuring that the eyes of the bolts are all either parallel or in line with the track system. Each hanging line can then be passed through two eyes (see p.24).

It is very important that the bolts are located equidistant either side of the drop point of the hanging line and that the knot (bowline) is central to the bolts as well. Failure to achieve this will induce a tendency to lateral swing.

Other Suspensions

CURVED TRACK

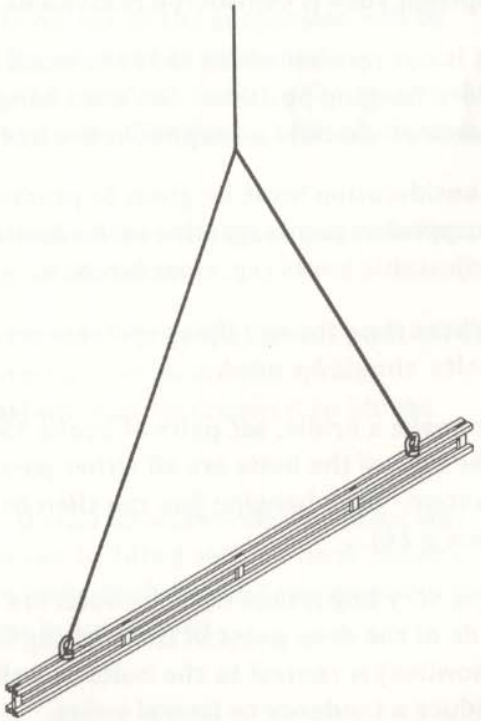
The picture shows the suspension bracket TRA 23 fitted between curved Unitrack and a hook clamp. The two bolts passed through the upper rails are clearly visible.

This bracket allows the operating cords to pass either side of its central column above the track.

A BRIDLE

See text on page 23

The rope runs diagonally between the hooks to evenly distribute lateral pulls and prevent twisting.



Setting the System

When the cording is complete, operate the whole length of the system a few times to verify unimpeded working.

If the track system is to be flown, it is sensible to attach the load at floor working level. Drapes should be laid face up while the tapes or snaphooks are attached to the runners. The master runner has two hooks to allow the leading edge of a drape to be 'turned back', minimising the likelihood of seeing the lining. The offstage end of a simple open and shut system should attach to the end stop.

When the track and its load are being lifted to their working height, avoid pulling on the drape as it may put undue strain on the runners or the web fixings on the drape.

Set the working dead. For floor operating systems, the loop of cord should now hang at the operating end, with a foot stirrup pulley or adjustable floor pulley. Strain the pulley to the floor. The cord should not be slack. The adjustable floor pulley can be altered to suit. If a foot stirrup pulley is in use, then access equipment will be needed to take up tension at the cord ends master runner.

Tracdrive

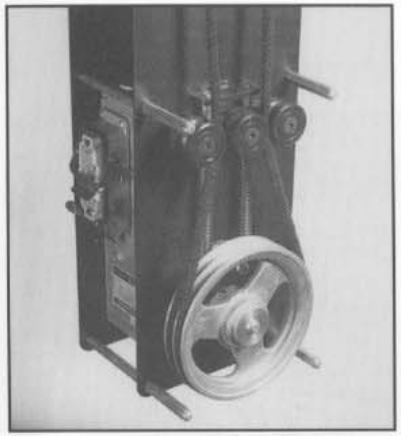
Fit the Tracdrive unit to the track so that the black pulleys align with the head pulleys of the system.

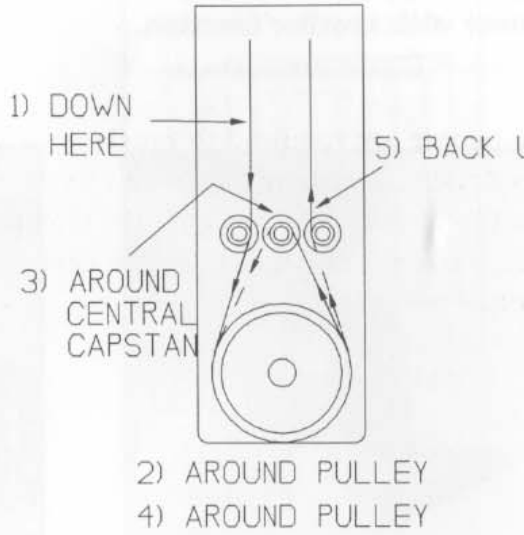
Cord in the usual way (see pages 10 – 16) except that the cord has to pass through the unit (see illus.).

Two people are required to tension the system, unless the unit is fitted with a pre-tensioner: one to depress the entry/exit pulleys (see illus.); the other to ease the clamping plates in the cord ends master runner and pull the slack cord through before tightening the clamp.

TRACDRIVE TENSIONING

The black pulleys are being depressed to create slack in the operating cord, which has to be taken up by another, by adjusting the master runner clamp.



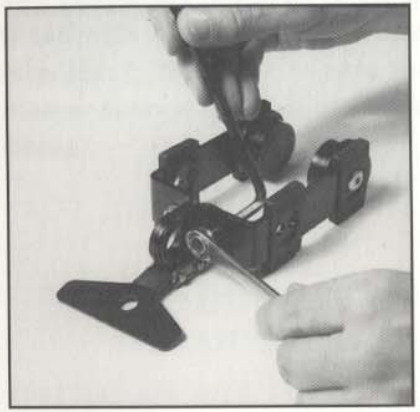


TRACK DRIVE THREADING

Remove the protective plate held on by four Allen key bolts. To thread, pass the cord between two of the black rollers. It should then go into the rear groove of the large drive wheel before passing over the centre plastic roller and into the outer groove of the drive wheel before passing out of the system on the opposite side from which it entered.

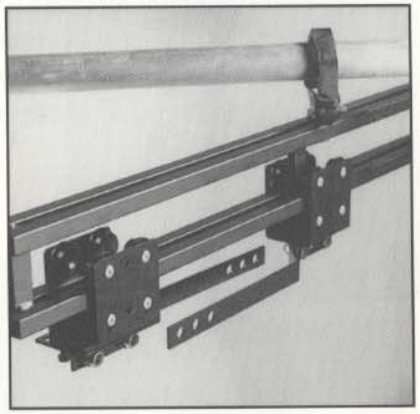
Fitting Accessories to Runners

Triple E supply additional parts which, when fitted, provide the runner with another function.



Component TRA 06R, Rearfold Runner, is supplied complete.
If you have plain runners, TRA 08 can be added for rearfold use.
Securing the rearfold attachment will require a 5 mm Allen key to hold the bolt head while the nut is tightened with a spanner below the runner. Best done on a flat surface.

The rearfold attachment fits into the base of a runner. Pass the bolts through the holes in the attachment and the runner.

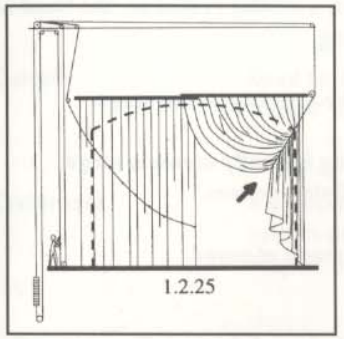


This picture shows two Overlap Arms (TRA 07A) bolted onto the two lugs underneath a Master Runner.

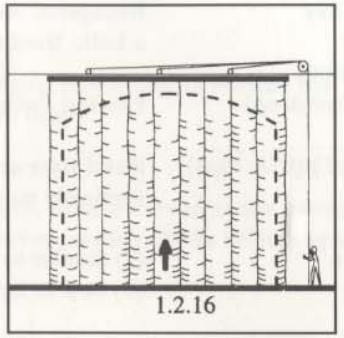
As fitted, they provide a centre overlap for drapes running on a single track.

Drape Effects

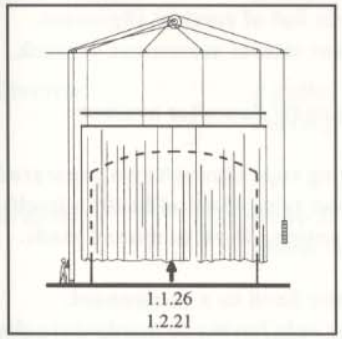
There are a number of frequently used methods of opening drapes. They are not always known by the same name in different countries. Here are some examples:



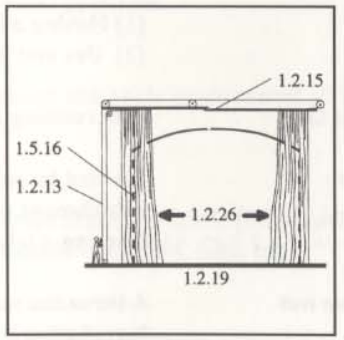
SWAG	ENGLAND
Italian Curtain	France
Italian Curtain	Germany
Wagner Curtain	Sweden
Italian Curtain	Italy
Italian Curtain	Spain



FESTOON	ENGLAND
Festoon	France
Reef Curtain	Germany
Act Curtain	Italy
Italian Opening	Nederlands



FLOWN CURTAIN	ENGLAND
German Curtain	France
Vertical	Germany
Fall Curtain	Italy
Guillotine	Spain



CENTRE OVERLAP TRAVELLERS DRAW TABS	ENGLAND
Greek Curtain	France
Greek Curtain	Germany
American Curtain	Spain
Greek Curtain	Italy

Drawings from 'New Theatre Words' published by OISTAT.