

FUSION™

COMMERCIAL BALUSTRADE CUT STRING FITTING INSTRUCTIONS

The following instructions are for installing Richard Burbidge Fusion™ Commercial Stair Balustrading on to a cut string staircase. For Fusion™ Commercial Installation Instructions for a closed string staircase, please refer to the instructions on the reverse side of this broadsheet. If you have any queries please contact our Technical Helpline on 01691 678212.

Richard Burbidge Fusion™ stair balustrading comprises a patented system of round newel posts and handrails connected using a series of metal brackets. Balusters fix into place using patented brackets designed to adjust to suit staircase pitches between 33° & 42°.

Note – care should be taken when handling and assembling pre-finished components to avoid damaging the finish. All finishes are carefully checked prior to leaving the factory and are designed to withstand most types of normal use, however it is possible to damage these with sharp tools.

Please check all components carefully PRIOR to installation for any damage to the surface, as Richard Burbidge cannot be held responsible for any damage once installation has commenced.

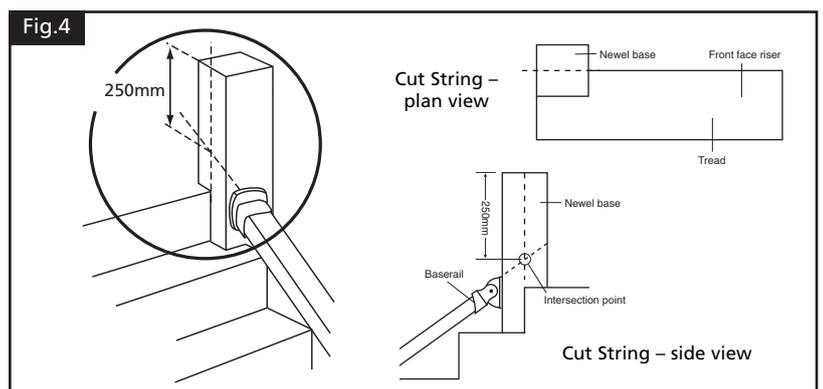
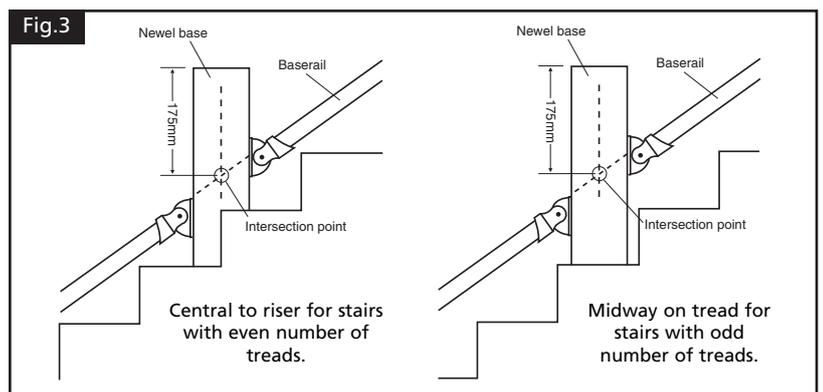
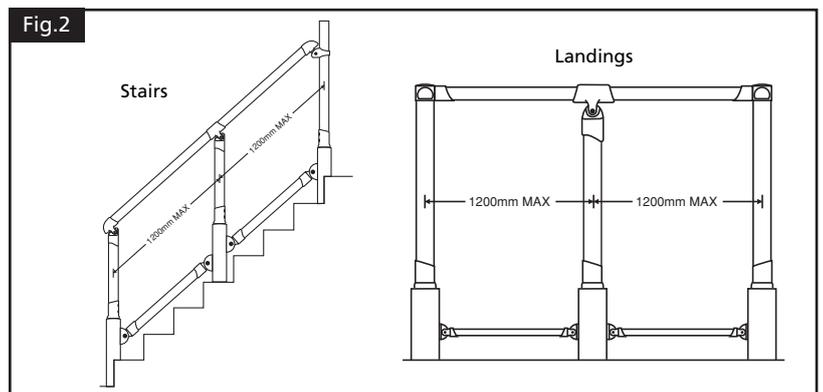
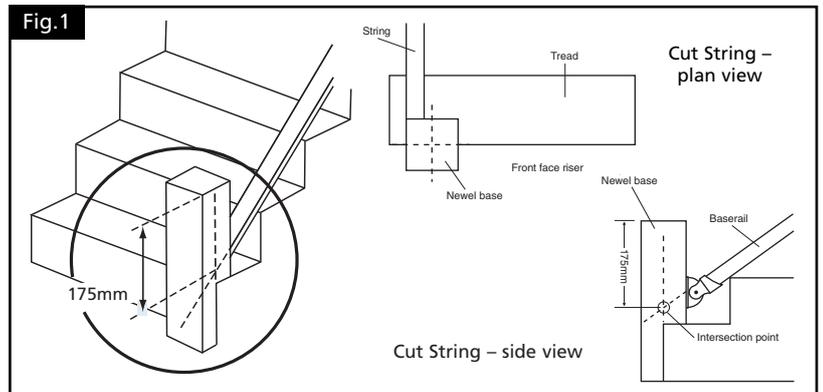
Fusion™ carries design registration and has patent pending. Only genuine Richard Burbidge Fusion™ components have been independently tested to guarantee conformity to UK building regulations.

Fusion™ is designed for use in commercial situations and will fit cut string staircases with pitches between 33° - 42° and minimum handrail heights of 900mm stairs and 1100mm landings. Fusion™ is tested by FIRA to UK strength requirements of 0.74kN/M (FIRA Structural testing reports TCMSF06489/1/BP & TCMSF06489/2/BP) and Richard Burbidge balustrades are safety approved by TRADA (BM TRADA Approved Timber Balustrading Scheme certificate number 022/001).

To install Fusion™ you will need, 3mm & 8.5mm diameter drill bits, crosshead No. 2 screwdriver, 17 & 19mm box/socket spanner, 13mm spade bit, 25mm spade bit and 2.5mm and 5mm allen keys together with electric/battery drill, spirit level, tape measure, handsaw, adjustable bevel and 50mm No. 8 crosshead countersunk screws for fixing the baserail.

Fusion™ is manufactured to exacting tolerances, however as timber is a natural material some expansion and or shrinkage of the timber components can occur. If the newels and rails are slightly too big for the connectors, gently sand/shave the components to allow for a tight fit, being careful to only rework the area of the timber component that will be concealed by the metal connector. Alternatively if the timber component is loose in the connector, a rigid fix can be achieved using a proprietary gap filling adhesive.

Important – you should note that acclimatising timber products by leaving in the room or a room with a similar humidity for at least 48 hours is essential if problems associated with shrinkage and expansion are to be avoided. Storing timber products in cold damp conditions and then using for immediate internal installation is not good trade practice.



As a natural material, timber will both absorb and lose moisture, timber plus moisture results in expansion and timber plus heat results in shrinkage. It is extremely important therefore to acclimatise the products for at least 48 hours before installation.

Fusion™ will fit most staircase configurations. For further details please refer to the staircase configurations drawings in the brochure and website at www.rb-professional.co.uk.

Fusion™ has been designed primarily for new build applications requiring new newel bases. The positioning of newel bases forms an important part of the installation and whilst the system can work with existing newel bases this is something we would not recommend as the existing bases would need to be a minimum section size of 90mm, a hardwood comparable in strength to American Red Oak and fixed in the positions instructed. This is especially important for newels on half landings.

Fusion™ is designed for use with a maximum span between centres of newels of 1200mm. The system uses pre-cut balusters, and all cut-off points are referenced from the top of the baserail upwards. For new build applications use a setting out board, 8' x 4' sheet material, and draw the stair details in full size side elevation to establish the overall height of the newel base remembering to take the base rail thickness into account.

Note – Before commencing the installation please read all instructions carefully. Fusion™ has been independently tested by TRADA and when installed in accordance with these instructions conforms with Building Regulations. Further details are available as downloadable documents from our website. Should you have any enquiries regarding Fusion™ Commercial please contact our Technical department on 01691 678212.

Important - Before fixing, calculate the position of all newels to achieve an aesthetically pleasing balance. The maximum span between centres of newels should not exceed 1200mm.

Bottom Newel

The bottom newel (the first newel at the start of the stairs) should be positioned so that it is central to the riser and the outside edge is flush with the side of the stairs and set at a height of 175mm above the baserail (Fig. 1). Fix the newel base centrally to the riser, checking it is the correct height and vertical before securing to the riser with bolts/screws/dowels and appropriate plugs.

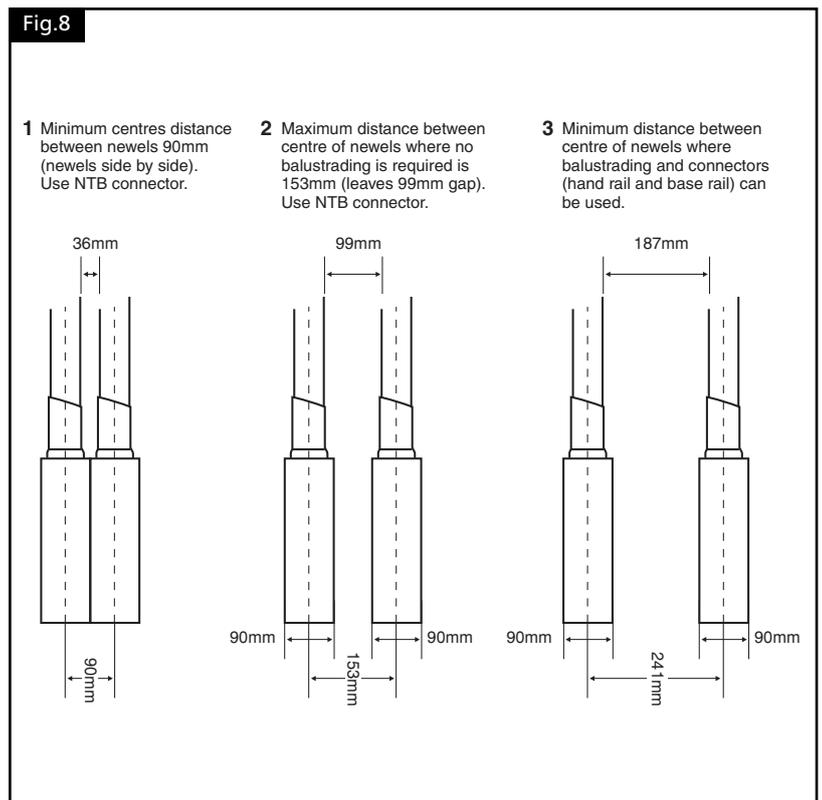
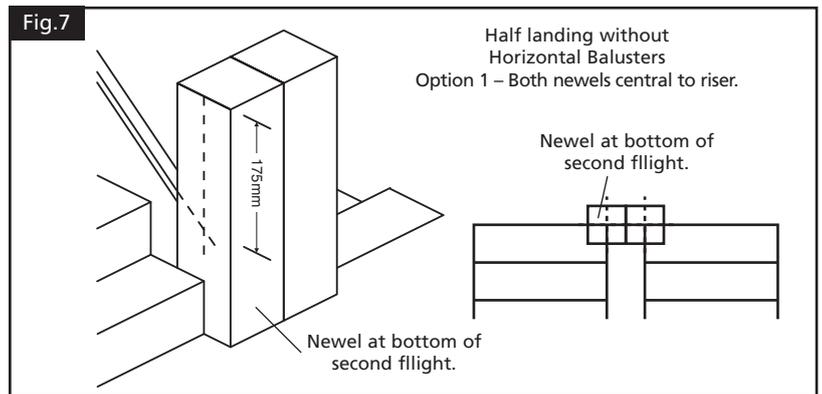
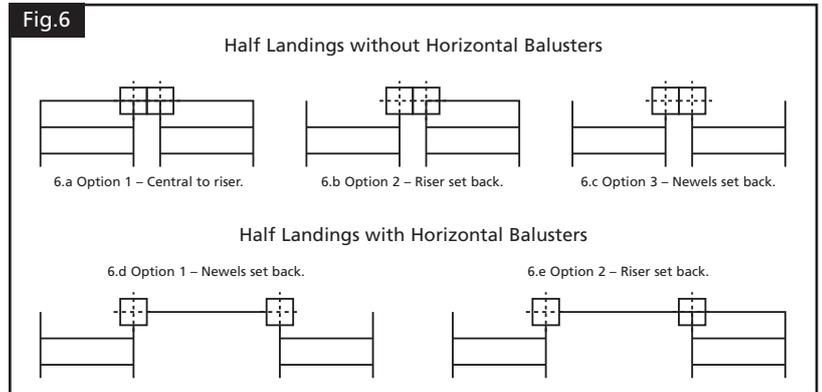
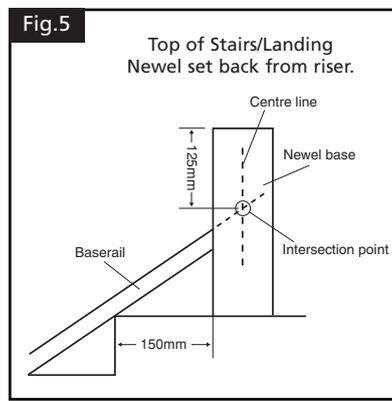
Intermediate Newels

Fusion™ uses intermediate newels on both stairs and landings. The maximum span between centres of newels should not exceed 1200mm (Fig. 2). For stairs with an even number of treads the intermediate newels can be positioned as the bottom newel, to the same height 175mm above baserail and central to the riser (Fig. 3).

For stairs with an uneven number of treads the newels will be positioned midway on the treads and are fixed using the Fusion™ Base Plate (CBP). The height of the newel base above the baserail should again be set at 175mm (Fig. 3). See 'Newel Base Fixing Plate' section.

Top Newel

The top newel (sometimes called the top raking newel) is the newel that accommodates the last section of staircase handrail and any landing handrail requirement. When fixed central to the last staircase riser the height of the base should be set at 250mm above baserail (Fig. 4). If the newel is positioned back from the last riser due to staircase construction it should be set at 125mm above baserail (Fig. 5). If using the newel base plate to fix the newel base to landing floor, the front face of the newel base should be set 150mm from the face of the last riser (Fig. 5). Set all subsequent landing newels at the same height.



Half Landings

Before setting out newels on half landings you will need to establish the type of half landing you have and if horizontal railing and balusters are required between the newels at the top and bottom of both stairs.

The position and height of newel bases on half landings where no landing balustrade is required between the newels is determined by the half landing configuration (Fig. 6).

Half Landings Without Horizontal Balustrades

Option 1 – where the two newels are central to risers (Fig. 6a), set the newel at the bottom of the second flight first at 175mm above baserail (Fig. 7). The newel at the top of the first flight should then be set at the same height so as to allow the top of both bases to be flush. When the two newel bases are set side by side the distance between the newel posts is 36mm, when the newel bases are set a maximum of 63mm apart the distance between the newel posts is 99mm conforming with Building Regulations regarding not allowing the passage of a 100mm sphere (Fig. 8).

Option 2 – on half landings where the first tread of the second flight is set back from the last tread of the first flight (Fig. 6b), the newel at the top of the first flight should be set 250mm above baserail (Fig. 9). The newel at the bottom of the second flight should then be set at the same height so as to allow the top of both bases to be flush.

Option 3 – for those half landings with both newels set back (Fig. 6c), the newel at the top of the first flight should be positioned so that the front face of the newel is 150mm from the face of the last riser and set at a height of 125mm above the baserail (Fig. 10). The newel at the bottom of the second flight should then be set at the same height so as to allow the top of both bases to be flush.

Half Landings With Horizontal Balustrades

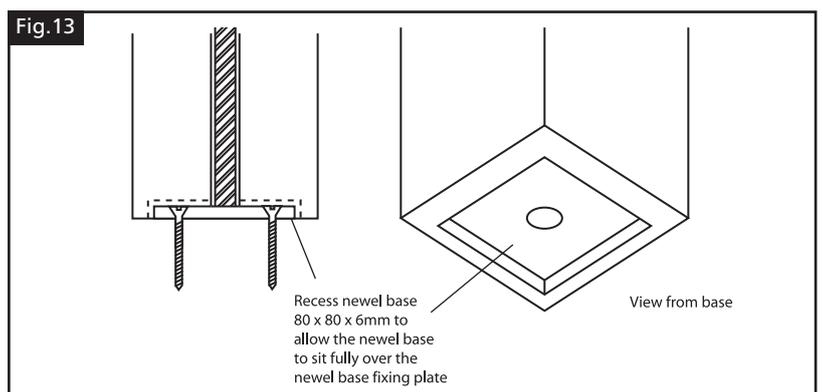
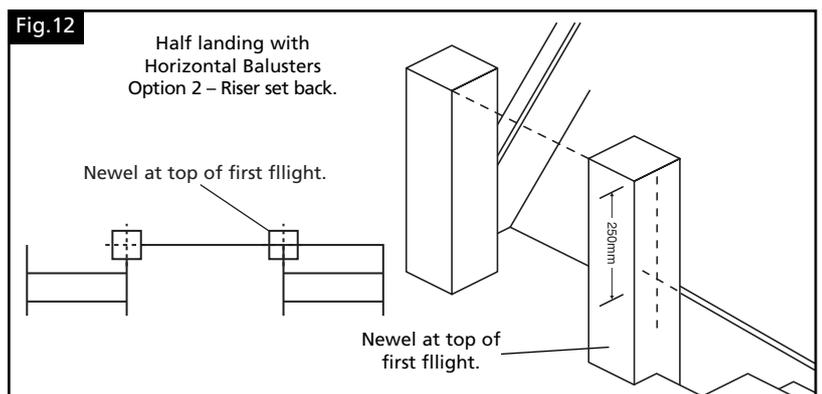
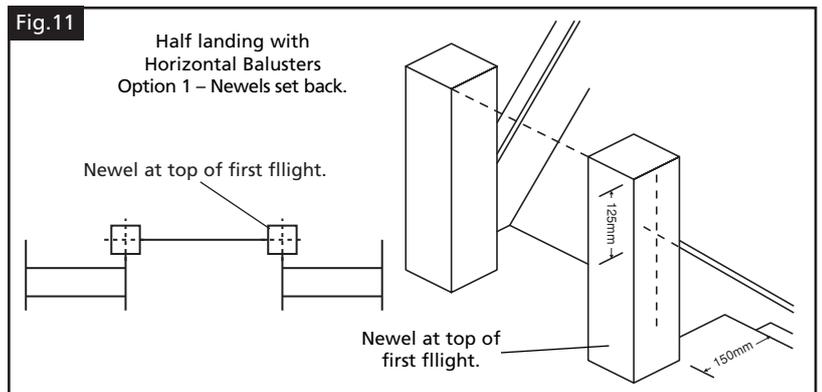
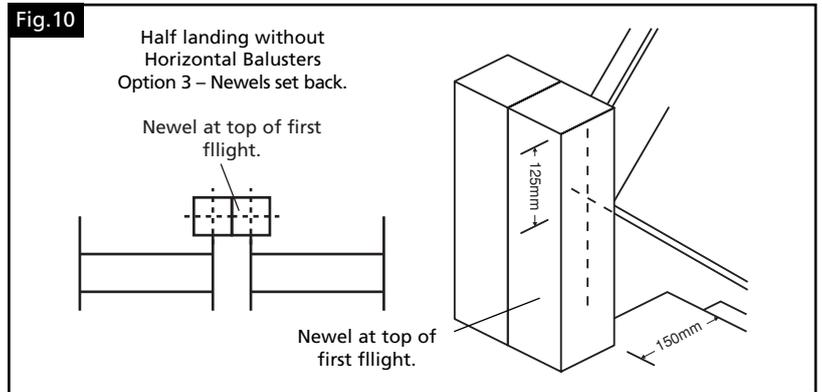
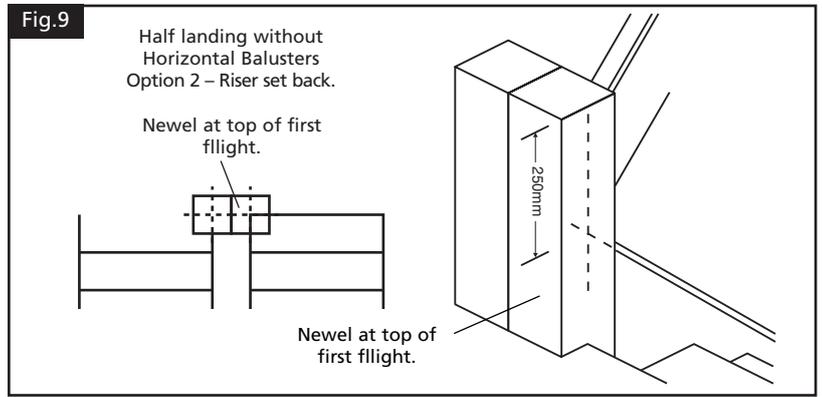
For half landings where landing balustrades are required between the newels at the top and bottom of stairs, a handrail transition profile (MCB Mitre Connector) is used to accommodate the difference in handrail pitch from horizontal to rake (see Fixing Half Landing Connectors & Handrails) section.

Option 1 – on half landings where the risers of both the first and second stairs are in the same plane (Fig. 6d) the newels must be set back from the risers so as to allow enough room for the handrail transition profile (MCB Mitre Connector). Fix the newel at the top of the first flight so that the front face of the base is 150mm from the riser and at a height of 125mm above baserail (Fig. 11). Set the newel at the bottom of the second flight at the same height so that the top of the bases are flush. On the second riser of the second flight fix a newel base at 175mm above the baserail and as previously described in the 'Intermediate Newels' section (Fig. 3).

Option 2 – on half landings where the first tread of the second flight is set back from the last tread of the first flight (Fig. 6e), the newel at the top of the first flight should be set 250mm above the baserail (Fig. 12). The newel at the bottom of the second flight should then be set at the same height so as to allow the top of both bases to be flush. On the second riser of the second flight fix a newel base at 175mm above the baserail and as previously described in the 'Intermediate Newels' section (Fig. 3).

Newel Base Fixing Plate

When positioning newel bases forward or back of risers and onto landings, the newel base fixing plate must be fixed to the floor. For solid surfaces such as concrete fix as normal, drill, plug and screw. With timber floors it is important that the screws are located to the joist/s beneath the floorboards for strength. If necessary remove floorboards and position a joist/noggin in the required position. Fix the plate using a minimum of 4 x 50mm crosshead No. 8 screws and appropriate anchor fixings/plugs.



On the underside of the newel base cut a square rebate 80 x 80 x 6mm to allow the newel base to sit fully over the fixing plate (Fig. 13).

When using the newel base fixing plate midway on top of stair treads the face of the newel base must be positioned at least 70mm from the stair nosing (Fig. 14).

Apart from the 400mm Fusion™ Newel Base NB400AF all other newel bases will need to be drilled to accommodate the fixing stud and newel base nut. From the top of the newel base mark a centre line and measure down 125mm. Mark a rectangular hole 31 x 17mm and cut out as you would for a mortise to a depth of 70mm. The new Richard Burbidge newel bases are drilled at 50mm diameter to a depth of 85mm, extend this hole depth to 125mm using a 13mm spade bit (Fig. 15).

Fixing Newels

The Fusion™ newel post is supplied in one length, 950mm, and will need to be cut down to suit. You should note that the top part of the newel post has been counterbored, make sure you always cut the newel post to length from the other end of the post.

Bottom and intermediate stair newel posts should be cut to a length of 555mm. At this stage do not cut any other newel posts. Insert the newel base nut into the mortise previously cut into the newel base and screw the newel extension onto the threaded bar to a distance of a 150mm from the top of the newel extension to the bottom of the bar.

Insert this assembly into the newel base and screw the threaded bar into the newel base nut. Screw the newel base extension so that the top part of the extension is flush with the top of the newel base (Fig. 16).

Slide the newel base connector over the threaded bar and down onto the top of the base. The newel post is supplied pre drilled along its full length. Slide the newel post over the threaded bar making sure that the counterbored end of the post is at the top. Use the nut and washers, in order 29mm washer, spring washer and M12 nut to tighten the newel post to the threaded bar with a 19mm socket/box spanner and cut surplus threaded bar off with a hacksaw so that the threaded bar is flush with the top surface of the newel post (Fig. 17).

Once the bottom newel and intermediate stair newel posts have been fixed all other newels can be temporarily fixed into position. Do not cut to length at this stage as the overall length of the posts are established using a combination of baserail, connectors and handrail.

Baserail

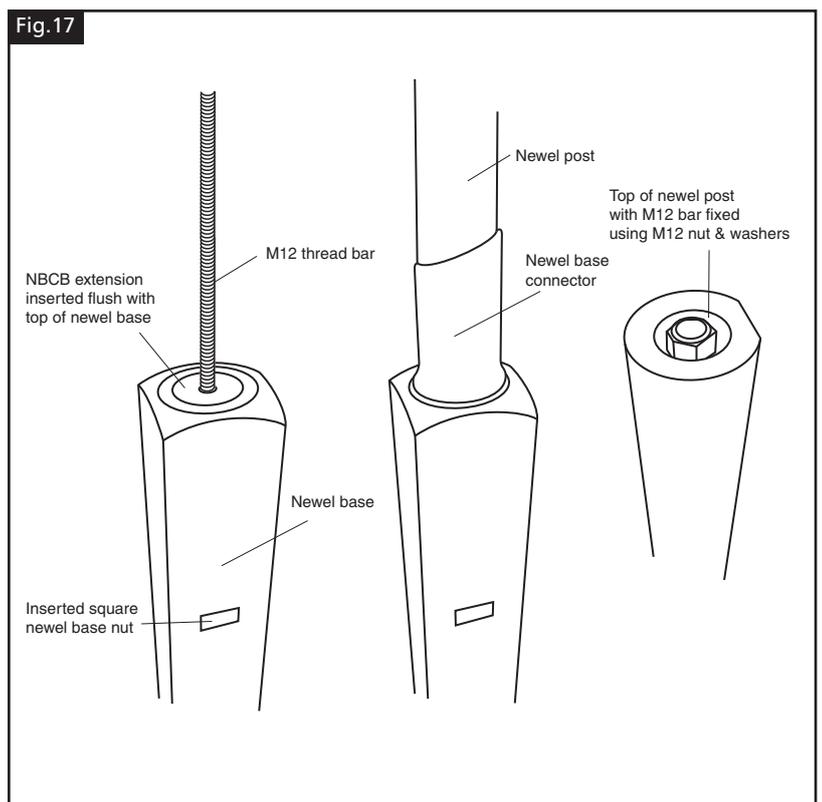
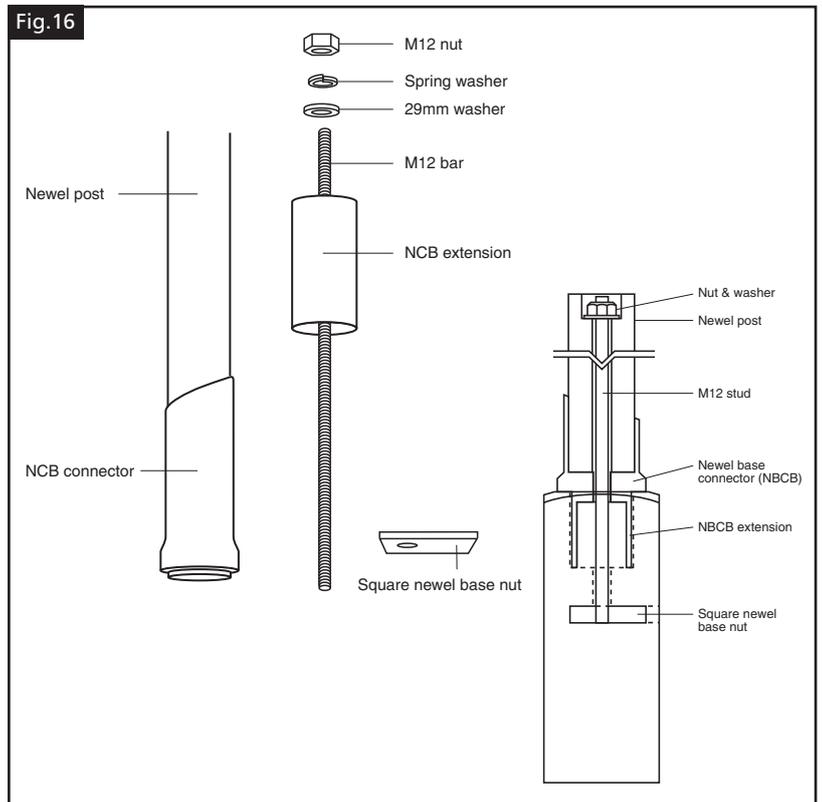
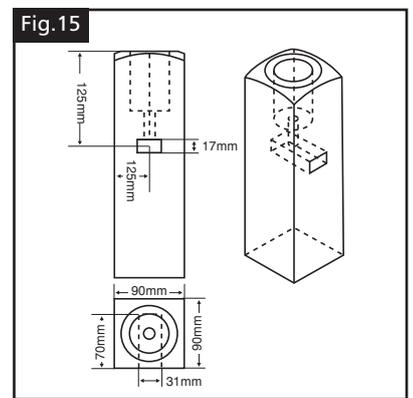
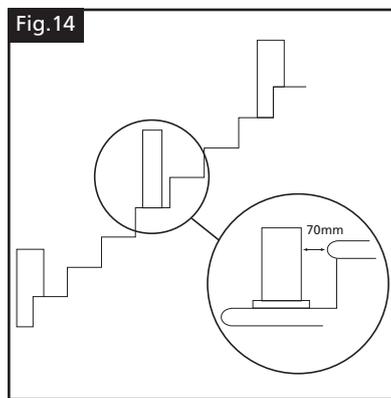
On stairs position the baserail to the bottom newel base as illustrated and where it intersects the next newel base up (intermediate or top newel base) mark the bottom edge. From this mark measure back 78mm and cut to length (Fig. 18).

Fix the two-part baserail connector assembly together (SBCB) and then fix to the baserail using the screws supplied. Place between the newel bases with the bottom edge of the baserail resting on the staircase nosings and mark the position of the suspended baserail connectors to the face of the newel bases using a pencil. Disassemble the two-piece baserail connector and fit the flat plate part of the connector to the newel bases using the screws supplied. Finally, with the baserail in position, reconnect the two-part connector.

For landings see 'Fixing Landing Connectors, Handrails & Baserails' section.

Fixing Stair Connectors & Handrails

Fixing the handrails and connectors is best done by two people. To establish the correct angles of connectors and lengths of handrail assemble two stair balusters as described in the 'Assembling & Fixing Balusters & Brackets' section.



The bottom connector (BCB), intermediate newel connector (INCB) and top connector (TCB) are a two-part assembly. Attach and fix the newel post part of the connectors to the newel posts using the screws supplied.

Note – the top newel post connector slides over the top newel post and should not be permanently fixed at this stage.

The handrail part of the bottom and intermediate newel connector/s should now be attached to the overlong handrail, being careful to slide the intermediate newel connector/s gently along the handrail to avoid damage. Offer the handrail assembly to the newel post connectors and to check the handrail is parallel to the baserail and at the correct height, position the assembled balusters to the underside of the handrail (Fig. 19).

Adjust the height of the top connector by sliding up and down the top post making sure that the baluster is vertical using a spirit level. Mark the position of the top connector to the newel post using a pencil and with the overlong handrail to the side of the top connector mark and cut the handrail to the required length. Fit the top post connector in place by setting to the previously marked pencil line and secure the newel post part of the connector using the screws supplied. It is important that this connector is fixed so that it is in line with the bottom and intermediate newels. Fix the top handrail connector to the end of the handrail and then fix the handrail to all newel post connectors checking that everything is vertical and parallel before securing all connector bolts, nuts and screws (Fig. 19).

Fixing Landing Connectors, Handrails & Baserails

When using Fusion™ components you will require a minimum 214mm measured from the centre of the staircase baserail to the centre of the landing baserail for stairs with landings at 180° (Fig. 20).

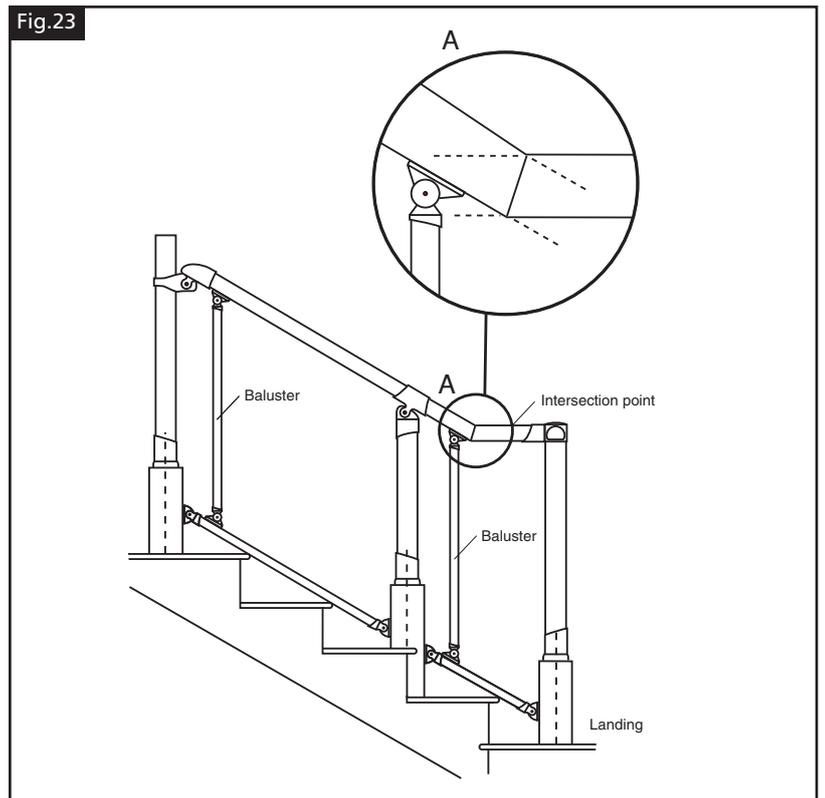
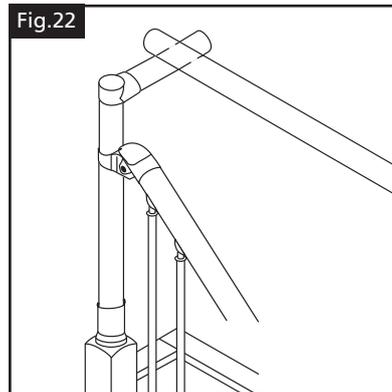
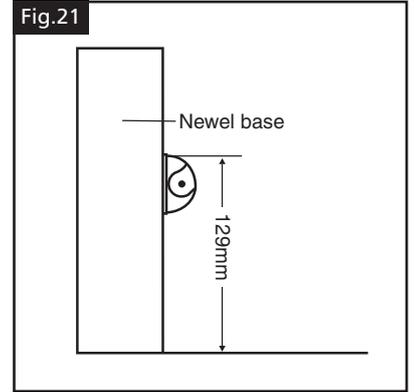
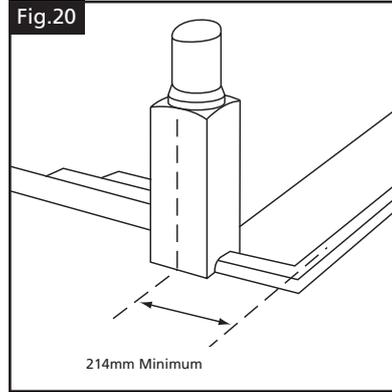
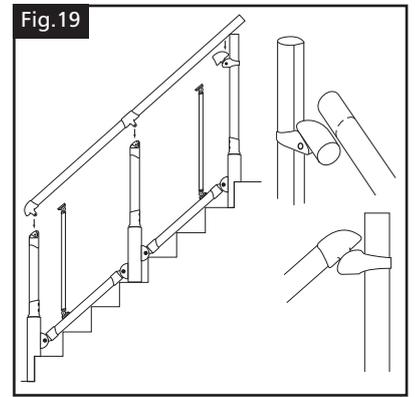
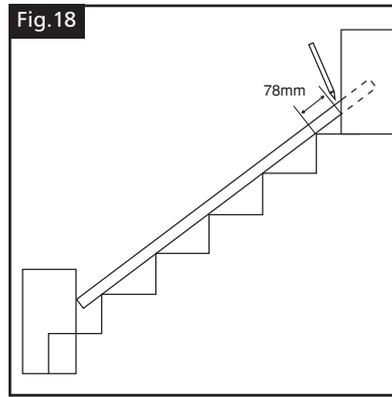
Landings at 180° to the Top Staircase Newel

Place two lengths of baserail central to the newels and mark the outside edges to the floor with a pencil. Mark and mitre the baserails and cut 43mm off each end to allow for the suspended baserail connectors. Position the first part of the suspended corner (SCB) central to the intersection of the pencil lines representing where the two baserails meet and fix to the floor with the screws supplied using suitable plugs.

For landings the baserail is suspended off the floor using the baserail connectors, which are supplied in two parts.

Position the back plates of the baserail connectors so that they are central to the newel bases and to a height of 129mm from the floor to the top edge of the connectors (Fig. 21). Mark, drill and screw the connector to the newel bases. Insert the mitred ends of both baserails into the second part of the suspended corner (SCB) and fix from the underside using the screws supplied. Drill through the 8.5mm hole in the SCB and into the baserails to a depth of 25mm and apply a small amount of gap filling adhesive. Fix the second part of the suspended baserail connectors (SBCB) to the ends of the baserails and offer the assembly to the previously fixed first part of the suspended baserail connectors and the prong of the suspended corner (SCB). Fix the suspended baserail connectors using the bolts supplied.

To establish the height of the newel post place an off-cut of handrail loosely into the landing connector and position an assembled baluster onto the baserail. Place the loosely assembled handrail and landing connector on top of the baluster and to the side of the post and mark and cut post to the required height. Secure the newel post to the threaded bar as described in the 'Fixing Newels' section. The height and the position of the wall connector where the landing balustrade ends against the wall is established in the same way substituting the wall connector for the landing connector.



Place an off-cut of handrail to the landing connector and position on the top newel. Slide the intermediate landing connector over the overlong handrail, being careful to slide the intermediate landing connector/s gently along the handrail to avoid damage. Offer the handrail assembly to the newel/s and where the two handrails meet place the universal horizontal turn to the rails to establish lengths of both handrails. Mitre both ends of the handrails and insert into the universal horizontal turn and secure using the screws supplied (Fig. 22).

Landings

When fixing the baserail for all other newels on landings position the back plate of the baserail connector so that it is central to the newel base or wall and to a height of 129mm from the floor to the top edge of the connector (Fig. 21). Mark, drill and screw the connector to the newel base or wall. The length of the baserail required is established by measuring the distance between the internal faces of the newel bases/wall and subtracting 86mm. Mark and cut the baserail to length and fix connectors to both ends of the rail. Offer the assembly to the previously fixed connectors and fix using bolts supplied.

Fixing Half Landing Connectors & Handrails

For half landings where landing balustrades are required between the newels at the top and bottom of stairs a handrail transition profile (MCB mitre connector) is used to accommodate the handrail transition from horizontal to rake.

The mitre connector (MCB) works for stairs with pitches of 33° to 42°. Where the horizontal and pitching handrails meet each other they need to be cut. To establish the shared angled of cut, attach the handrail connectors to the top of the newel posts and connectors to handrails as previously described, offer the assemblies to posts and where the two handrails meet, mark and cut to suit (Fig. 23). Position the mitre connector to one of the rails (this is important as it will not be possible to position the mitre connector once the two rails are joined) and then drill and fix serrated dowels to the faces of both rails, apply a proprietary wood workers adhesive to the face of one of the rails and push together. To make sure the rails are parallel, assemble balusters and position as illustrated (Fig. 24).

Although the balusters for Fusion™ have been designed and supplied for assembly without cutting, in this situation you will need to cut and assemble a landing baluster to suit due to the increased height requirement caused by the horizontal rail (Fig. 24).

Newel Tie Connector

In situations where there is not enough room to use standard handrail connectors such as half landings where two newels are side by side the Newel Tie Connector (NTB) is used to join the newels. To assemble the newel tie connector firstly identify all the parts as detailed in Fig. 25. The steel tube and threaded bar are supplied overlong and will need to be cut to length. Measure the distance between the inside faces of the newel posts (Fig. 26) and subtract 8mm for the steel tube and 2mm for the threaded bar.

Example – distance between inside faces of newels = 62mm.

Steel tube length = 62mm – 8mm = 54mm.

Threaded bar length = 62mm – 2mm = 60mm.

Cut the steel tube and threaded bar to length and screw the threaded bar to the connector (NTB) so that it is flush with the inside face. Fix the nut to the threaded bar using a 17mm spanner so that the nut is flush against the connector. Insert the steel tube over the threaded bar and into the circular recess within the connector. Hand screw the other newel tie connector to the end of the threaded bar again making sure that it locates into the circular recess in the connector (Fig. 27). Check for fit over newels, adjust accordingly and fix to posts using the screws supplied (Fig. 26).

Fig.24

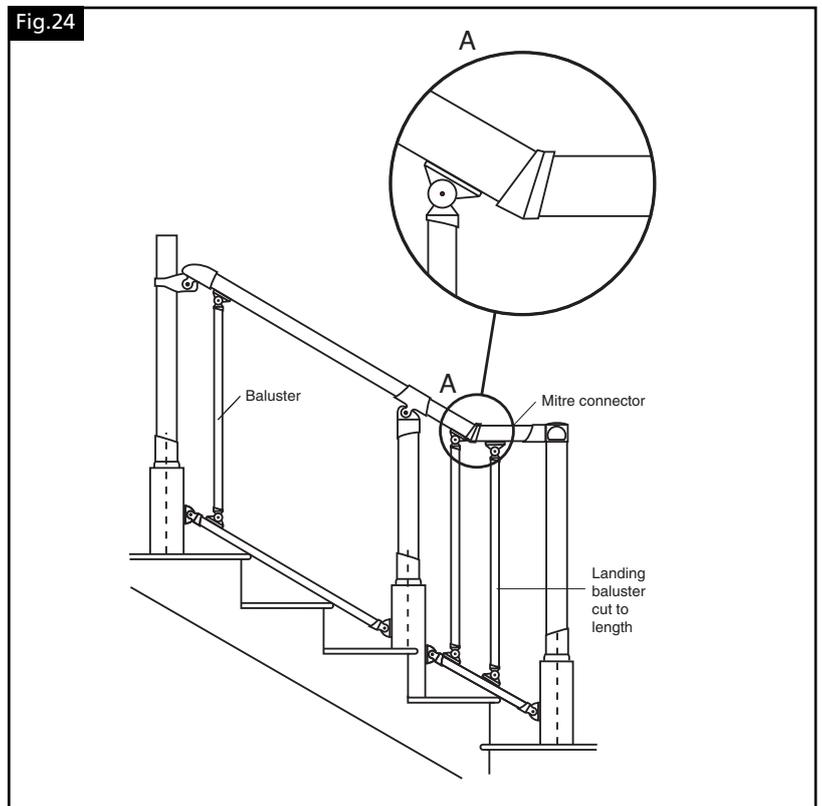


Fig.25

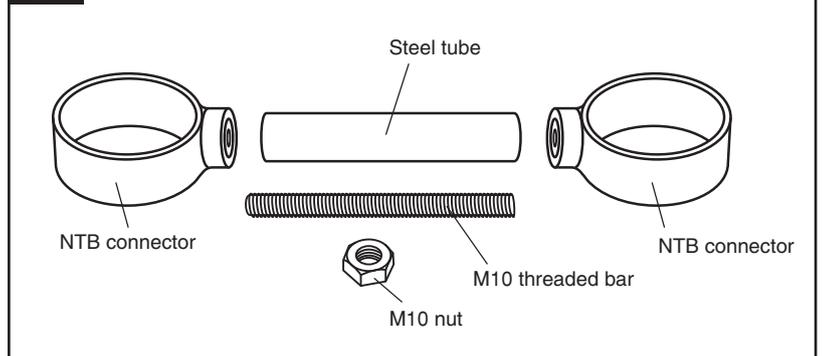


Fig.26

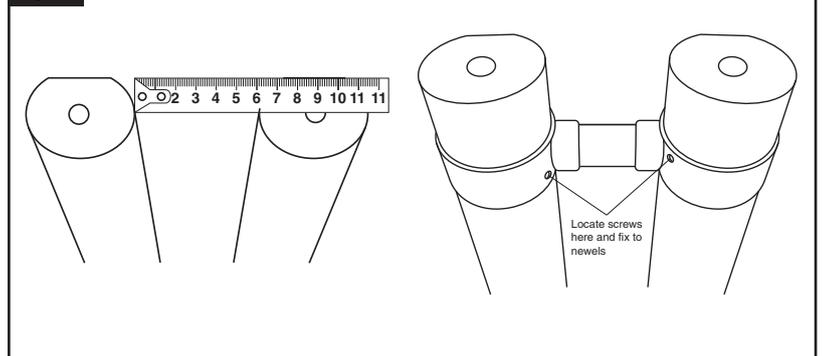
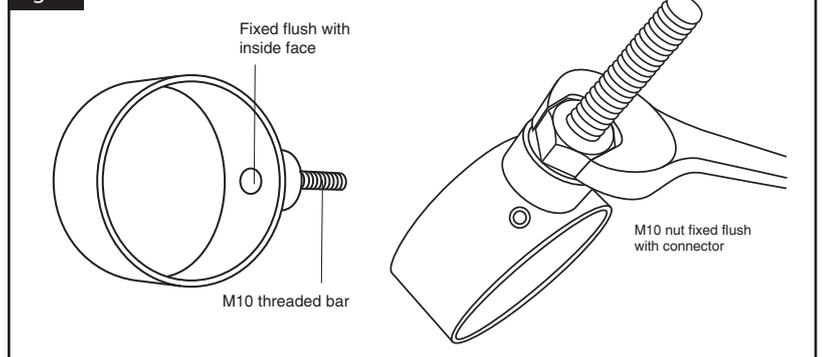


Fig.27



Assembling & Fixing Balusters & Brackets

To assemble the baluster brackets and balusters firstly identify all the parts as detailed in Fig. 28. Using a 2.5mm allen key insert the socket cap screw fully into the baluster bracket part 2. Place the hollow fixing wedge over the socket cap screw and then the threaded fixing wedge onto the socket cap screw so that the end of the socket cap screw is flush with the top of the threaded fixing wedge (Fig. 29).

Insert this assembly into the end of the baluster and repeat the process for the other end. Align the brackets using two off-cuts of timber and tighten the socket cap screws with a 2.5mm allen key until the brackets are secure (Fig. 30).

Place baluster brackets part 1 to baserail and handrail and fix using the screws supplied making sure the brackets are aligned to allow for vertical fixing of the baluster (Fig. 31). The assembly of baluster and brackets are then fixed to this bracket using the self-tapping screws supplied. To finish fix the cover cap to hide the fixing.

On staircases fix the first and last balusters between newels and space so that the gap between the baluster and newel post is no greater than 99mm. Measure the distance between the spacing marks (notches) on the sides of the brackets of the first and last balusters and divide by 148.5mm. Round the answer up to the next whole number and divide the whole number back into your original measurement to give an exact spacing.

Example – 2159mm between bottom and top spacing marks divided by 148.5mm = 14.45, rounded up to 15.

$2159 \div 15 = 143.9\text{mm}$ spacing measurement.

Fix all the remaining balusters.

On landings fix the first and last balusters between newels and space so that the gap between the baluster and newel post or wall is no greater than 99mm. Measure the distance between the spacing marks (notches) on the sides of the brackets of the first and last balusters and divide by 117mm. Round the answer up to the next whole number and divide the whole number back into your original measurement to give an exact spacing.

Example – 1150mm between bottom and top spacing marks divided by 117mm = 9.82, rounded up to 10.

$1150 \div 10 = 115\text{mm}$ spacing measurement.

Fix all the remaining balusters.



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Fig.27 cont

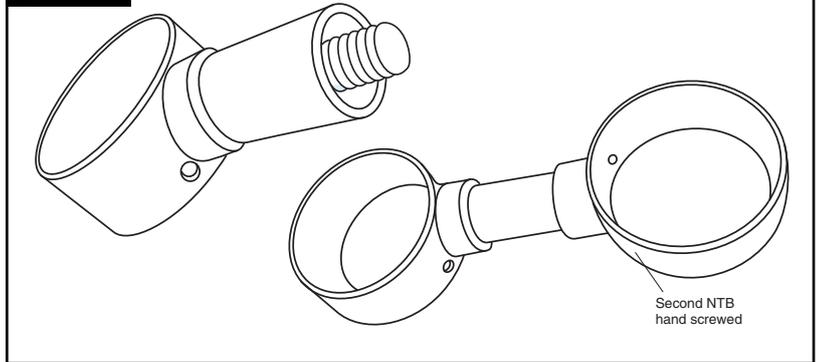


Fig.28

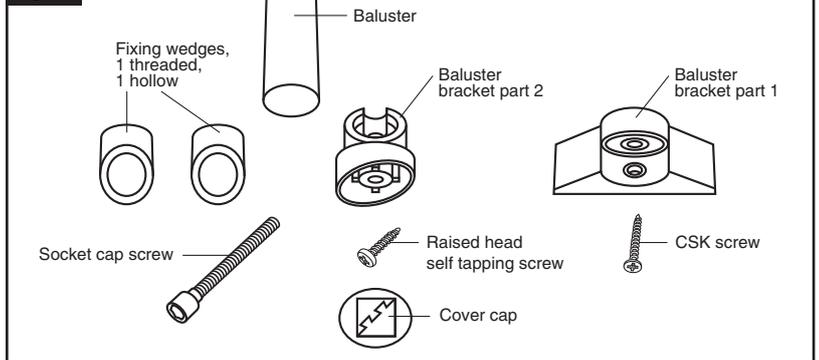


Fig.29

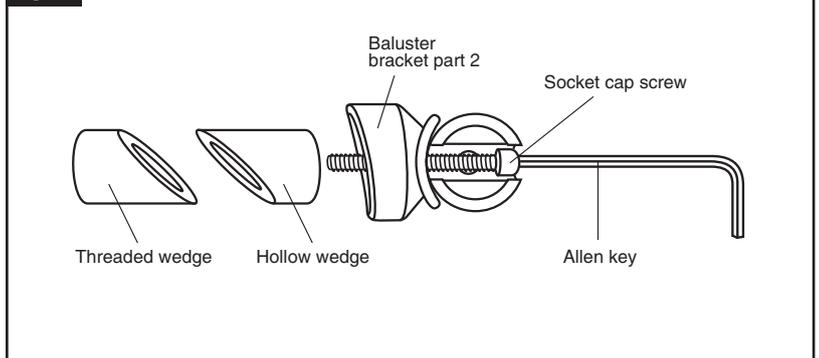


Fig.30

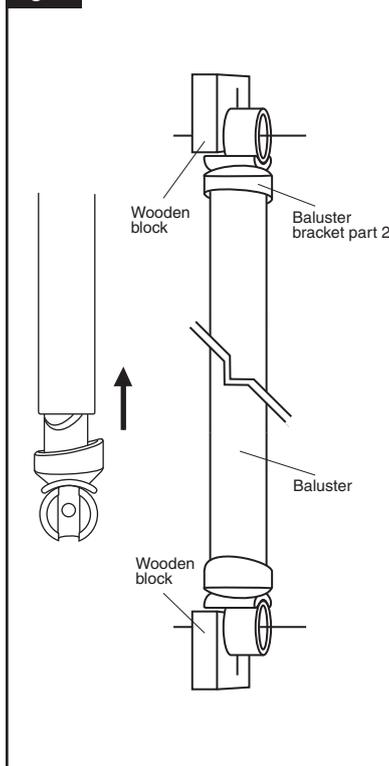


Fig.31

