

Improvements to Electrical Trunking

The present invention relates to electrical trunking.

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Electrical trunking for receiving electrical cables in an electrical wiring installation is well known. Normally the trunking is mounted to a surface for support. Frequently such trunking is made from a plastics extrusion, although
10 for particular applications the trunking may be formed from metal. Where both the properties of metal and plastic are required it is known to have a composite trunking. In many domestic and commercial installations electrical trunking provides significant benefits to the installer over
15 alternative installation methods such as using conduit or leaving the electrical cable exposed. A benefit is of ease and speed of installation of trunking, and it may be easier to mount the trunking to the surface than it would be to mount exposed electric cables. A further benefit is of the
20 improved appearance of the completed installation. In addition to these benefits, the installer may be required to install trunking to provide mechanical protection to the electrical cables. However, with known systems, to achieve the optimum appearance and mechanical protection to the
25 installation it is necessary to use trunking fittings at each corner and each intersection and each interface with any electrical mounting boxes for electrical wiring accessories such as switches and socket outlets. These fittings have a number of disadvantages. They fit around
30 the trunking, so that it is necessary to mount the fittings to the surface before mounting the trunking to the surface. This is inconvenient, and makes it difficult to achieve neat installations. Further each size of trunking requires a complete range of matching fittings. This increases
35 manufacturing costs and also causes the wholesaler and installer to have to carry a large number of fittings to cover the various requirements that will be met in installations. In addition in use electric cable is laid

through the trunking to the mounting boxes and it is necessary with existing systems to have to pass the cable through a fitting at some part of the installation. This is both inconvenient and time consuming. To avoid this fittings are frequently omitted from an installation. This is undesirable since the fittings are essential to ensure the integrity of the electrical installation system. It is also important to ensure that the trunking is closely fitted at each junction to ensure integrity of the insulation and of the protection afforded by the trunking.

According to the present invention there is provided an electrical trunking and at least one fitting for the trunking, the trunking comprising at least a base and a lid for the base, the base having side walls extending therefrom with a first connecting means extending along the top edge of each side wall, the lid having a second connecting means extending along each of two edges, said first connecting means arranged to co-operate with said second connecting means to retain the lid to the base so as to form an enclosed space, the fitting comprising a lid portion with a third connecting means and an overlap portion, the third connecting means arranged to co-operate with the first connecting means to retain the fitting to the base, the overlap portion being arranged to overlap a cut end of the lid wherein the overlap portion does not extend substantially down the side walls further than the lid.

An advantage of the invention is that the fitting which may be a "T" fitting, a corner or an end stop, ensure the integrity of the insulation of the trunking and fully protects the cables in the trunking. The appearance is also aesthetically pleasing.

Preferably the major part of the fitting has a width substantially the same as the width of the side walls of the trunking at the top so that the outer surfaces of the major part of the fitting are flush with the outer surfaces of the side walls of the trunking at least at the top of the trunking and advantageously also as the width of the base of the trunking. This ensures that the assembled trunking can be fitted neatly against adjacent wall or ceiling surfaces of a building. The appearance is further improved.

According to a particular embodiment of the invention the base has upstanding side walls, the first connecting means being positioned along the top edge of the side walls. To provide trunking with a larger enclosed space to allow greater capacity for electrical cables, the base may be made with several alternative height side walls.

The third connecting means on the lid preferably has an inwardly facing protrusion and a further depending web which strengthens the clip fit connection with the first connecting means.

An embodiment of the invention will now be described by way of example with reference to the accompanying drawings in which:-

FIGURE 1 shows a perspective view of an electrical accessory mounting box mounted to a surface, connected to an installation of trunking in accordance with the invention, and

FIGURE 2 shows a perspective view of a base component of the box shown in Fig. 1 mounted on a surface, with a number of lengths of a base component of the trunking inter-connected to the base component of the box, and

FIGURE 3 shows a perspective view of the components shown in Fig. 1 with lid components of the trunking fitted to the base components of the trunking installation, and

5 FIGURE 4 shows an exploded perspective view of the same box shown in Fig. 1, and

FIGURE 5 shows a perspective view of the same box as shown in Fig. 1 without any trunking connected to it, and

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FIGURE 6 shows a perspective view of a flat tee fitting as shown in Fig. 1, and

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FIGURE 7 shows a cross sectional view of the fitting in Fig. 6 taken on Section AA, and

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FIGURE 8 shows a series of end sectional views of trunking profiles from "A" to "E" comprising the lid component fitted to base components with a range of side wall heights, and

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FIGURE 9 shows a series from "A" to "E" of side views and perspective views of box adaptors to suit base components with different sidewall heights, each corresponding to the respective trunking profile as shown in Figure 8, and

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FIGURE 10 shows a perspective view of a mitre block suitable for cutting the base and the lid of the trunking, and

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FIGURE 10A shows an end view of the mitre block shown in Fig. 10 with a cross section of a length of the base component of the trunking in place ready to be cut, and

FIGURE 10B shows an end view of the mitre block shown in



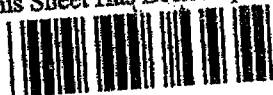
Fig. 10 with a cross section of a length of the lid component of the trunking in place ready to be cut, and

FIGURE 11 shows a plan view of six possible arrangements of trunking and mounting box, marked "A" to "F", with a socket outlet mounted to each of the mounting boxes, and

Figure 12 shows a perspective view from the inside of an end fitting shown in Fig. 1.

An embodiment of the invention comprises an electrical trunking installation system 1 shown assembled in a particular configuration in Fig. 1. The electrical trunking installation system 1 comprises a mounting box 10, a box adaptor 200, lengths of trunking 100, and fittings for the trunking such as a tee fitting 140, a corner fitting 160 and stop end fittings 180. The electrical trunking installation system 1 is designed to receive and protect electrical cables (not shown) that are used to interconnect electrical accessories such as a socket outlet 60 A to F as shown in Fig. 11. A further intention of this embodiment is to enable the provision of an electrical trunking installation system that is aesthetically pleasing when installed.

The mounting box 10 may be seen more clearly in Figs. 4 and 5 and comprises a base 11, a frame 12 providing outer walls 16 of the box and four removable blanking plates 13. The frame has two snap fits 14 (only one visible in Fig. 4) on the inside surface 15 of the wall 16. Each of the snap fits 14 engage a corresponding recess 17 (only two visible in Fig. 4) on the periphery 18 of the base 11. In the case of the square mounting box shown, the snap fits and recesses are such that the frame may be assembled to the base in any of four perpendicular orientations, (in the case of a rectangular box the frame may be assembled in



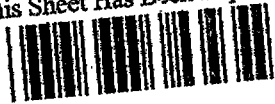
only two of the orientations) shown in Fig. 11. Stops 19 are provided on the inside surface 15, which abut a top surface 20 of the periphery 18. The base 11 is provided with four elongated countersunk fixing screw slots 21 each having an upstanding surround 22 on a base surface 50. A circular portion 23 with a reduced thickness perimeter 24 and thicker webs 25 is positioned centrally in the base surface 50 (see Fig. 5). If it is required to provide conduit entry to the rear of the mounting box, this circular portion 23 may be removed by breaking or cutting the perimeter 24 and webs 25, additionally a recessed area 26 is provided to accommodate the flange of a conduit fitting. Upstanding from the base surface 50 is an initially continuous wall 27, which is spaced in from the perimeter 18 to provide the top surface 20. The continuous wall 27 has reduced thickness grooves 28 which divide the continuous wall into segments 29, 30, 31, 32 and 33 on each of four box base sides 34, 35, 36 and 37 of the base. Selected one or more of the segments will form flaps or bridges as will be described below. Upstanding from the base are two tubular posts 38 and 39, with threaded holes 40 and 41 to receive screws 62 for mounting an electrical accessory such as a socket outlet 60A to F shown in Fig. 11. The frame 12 is provided with hooks 42 which fit over the continuous wall 27 when the frame is snapped onto the base. In use these hooks provide additional support for the wall 16 of the frame when snapped onto the base. The removable blanking plates 13 have two latches 43 (see Fig. 4) and a bottom wall 44 protruding from an inner surface 45, and an inner face 46 on three sides which abuts a ledge 47 when the blanking plate is fitted to frame 12 to ensure that a front face 48 is flush with the surrounding outer visible face 49 of wall 16 of the frame 12. Hence a blanking plate is a close fit to a box aperture 52 (Fig. 1).



5 The trunking lengths 100 comprise a lid 101 and a base 102
(Fig. 3). The base and lid may be cut to particular
lengths to suit a particular installation. From the cross
section shown in Fig. 10B it may be seen that the lid 101
has clip fits 103 extending along each longitudinal edge
105. Each of the clip fits 103 is formed by an inner
depending web 106 and which co-operates with a resilient
depending lid sidewall 107 to form a longitudinal snap fit
groove 108 having a narrow opening 109 and a larger
10 receiving portion 110 (Figs. 8E and 10B). The base 102 has
clip fits 104 (Fig. 10A) extending along the front edge
113 of sidewalls 111. The base 102 has a bottom 114 for
fixing to a supporting surface 2 shown in Fig. 1. The lid
101 has an inside surface 116 (Fig. 10B).

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Clip fits 104 are formed as a bulbous protrusion 112 on the
front edges 113, so that in use the bulbous protrusions
112 may be inserted through the narrow openings 109 of the
lid clip fits, resiliently deflecting the lid sidewalls
20 107, and in doing so retaining the lid 101 onto the base
102. When the lid is retained onto the base, each lid side
face 130 of each lid sidewall 107 is substantially flush
with a respective external side face 131 of its base side
wall 111. A joint line 118 is visible on each side of the
25 trunking where each lid side face 130 abuts its respective
external side face 131.

From Fig. 8 it will be seen that a particular enclosed
cross sectional area 117 can be obtained by selecting one
30 of the base components with the required height of the side
walls 111A to 111E. No change to the lid component is
required, and hence fittings that do not extend below the
joint line 118 may be used with any size of base. In the
case of base 102A, the side wall 111A no longer has an
35 external side face, as it is completely covered and



enclosed by the lid. Hence for the profile in Fig. 8A having base 102A the joint line is substantially on the same plane as the bottom 114 of the base 102A.

5 Fittings 140, 160, 180 and box adaptor 200 are provided to ensure that the installer may achieve a neat installation without the need for extremely accurate cutting of the lids 101. At each fitting position the lid 101 is cut
10 perpendicular to its longitudinal axis forming a cut end 120, so that a protruding portion 122 of the base 102 protrudes from under the cut end 120. At protruding portion 122' in Fig. 3 it may be seen that two lids 101' and 101" are fitted to a single length of base 102', the cut ends 120' and 120" spaced to leave a protruding portion
15 122'. From Fig. 6 showing a plan view of a flat 'T' fitting 140, each arm 141, 141' and 141" of the fitting ending with an overlapping portion 142. Each of the overlapping portions 142 has a recess 124 to receive one of the cut ends 120 of the lids. To provide the recess an
20 enlarged external profile 123 is provided. Each recess has a first dimension 125 measured from an external end 128 of the flat tee fitting 140 to an internal end face 126. Inside each overlapping portion is a snap fit feature 143 and 143'. The snap fit features 143 and 143' each
25 comprises an inner depending web portion 144 which corresponds to the inner depending web 106 of the lid 101, and an inwardly extending protrusion 145. Depending side portion 149 (Fig. 7) corresponds to the depending lid sidewall 107. At the snap fit region, the fitting has a
30 second external surface profile 146 that is similar to a first external surface profile 115 of the lid 101.

In use the fittings are positioned on the trunking base and a second dimension 127 (Fig. 1) between the external ends
35 of the fittings is measured. The length of lid to be



fitted to cover this part of the installation is then measured to a third dimension 129 (Fig. 3) that is slightly less than sum of the second dimension 127 plus twice the first dimension 125. When the cut length of lid has been fitted to the trunking, each of the cut ends is then covered by the recess 124 of a fitting. Since the lids do not extend down the sidewall of the trunking it is essential that a clean and accurate cut is made to the trunking base, particularly at corners.

From Fig. 10 a mitre block 230 is shown which is particularly adapted for ensuring accurate cutting of the base and lid components of the trunking system. The mitre block is formed from an aluminium extrusion to enable the following features to be easily and cheaply incorporated. The basic shape of the mitre block is formed by upstanding side walls 232 and 234 which are connected along their length by a block base 236. The block base 236 has a raised centre portion 238 formed by internal walls 240 and 242 and a top surface 244. The upstanding internal walls 232 and 234 and the raised centre portion 238 have a number of saw slots 246, 248, 250 and 252, the first three being at an angle of 45 degrees to a longitudinal axis of the mitre block, and saw slot 252 being perpendicular to the longitudinal axis. Each slot extends through the raised centre portion 238. The saw slots are of such a width that they may accept a fine tooth saw blade (not shown) that is suitable for cutting either the base or the lid components of the trunking. The slots guide the saw blade to ensure the cut ends of the trunking are at an accurate 45 degree or perpendicular angle as required. The raised centre portion 238 formed by internal walls 240 and 242 and a top surface 244 form two guides 254 and 256 (Fig 10B). The guides are of an adequate depth to accept the base sidewall 111E of the largest size of trunking (Fig. 8A). A width



258 (see Fig. 10A) of the guides and the distance 260 between the upstanding walls 232 and 234 is such that the sidewalls 111 and 111' and the bulbous protrusion 112 and 112' are supported by guide surfaces 262, 262' and 264, 264' respectively. This support ensures that the side walls 111 and 111' are maintained perpendicular to the bottom 114 of the base 102, and hence a base cut end 132 in Fig. 2 is produced at the desired angle. If the side walls were not held perpendicular as would be the case if a known mitre block without a raised centre portion were used, then the side walls would be likely to flex as they were cut, which would give a rough cut edge that would not necessarily be at the required angle.

Likewise to ensure that the lid is adequately supported when being cut, the raised centre portion 238 has steps 266 and 268 along its length. The top surface 244 is also shaped so as to conform to the inside surface 116 of the lid (see Fig. 10B). The inner depending webs 106 and 106' of the lid locate on the steps 266 and 268 to retain the lid to the mitre block.

Hence the block base 236 with the raised centre portion 238 formed by side walls 240 and 242 form a longitudinal guide to receive side walls of a trunking component. This longitudinal guide together with the top surface 244 combined with the upstanding side walls 232 and 234 forming the two guides 254 and 256 with the guide surfaces 262, 262' and 264, 264' and steps 266 and 268 combine to create a form that corresponds to both the base and the lid so that either one or the other of the base or the lid is held securely in the mitre block while it is being cut.

Additionally the mitre block 230 has four longitudinal ribs 280, 282, 284 and 286 protruding from the underside 237 of



block base 236. The function of these ribs is to provide location features to facilitate the use of the mitre block in typical situations that may occur in practice. Ribs 280 and 282, and ribs 284 and 286 form external angle recesses 288 and 290 respectively. Further the rib 282 and the underside 237 form internal angle recess 292, likewise rib 284 forms internal angle recess 294. In use where a vice is available, the mitre block may be positioned so that the external angle recesses 288 and 290 rest on the vice jaws (not shown) which may then be tightened to securely grip the ribs 282 and 284 holding the mitre block firm. Where a suitable edge 296 (shown in dotted lines) exists, such as the edge of a table top, the mitre block may be rested as shown in Fig. 10B so that it may easily be held firm with one hand while a trunking component is being cut. Should the block be used to cut a lid where it has already been partly fitted to a base that is secured to a supporting surface the trunking base will provide a suitable edge 296. Where the mitre block has to be rested on a flat surface such as a floor or a wall, then the ribs 282 and 284 will act as spacers to ensure that in use the saw blade will be spaced away from the surface reducing the risk of accidentally damaging the surface with the saw.

Fig. 9 shows a series of box adaptors 200A to 200E. The function of the box adaptor 200 is to provide a connection between the mounting box 10 and the trunking 100. Fig. 8 shows how the size of the enclosed cross sectional area 117 may be increased from a trunking profile 98A to a trunking profile 98E by selecting a base 102 with an appropriate height of sidewall 111. Hence since the size of box aperture 52 (Fig. 2) is constant a different box adaptor is necessary for each trunking profile 98. The box adaptor 200 comprises adaptor latches 202, 204 and 206 (corresponding to latches 43) and a locating edge 208 (corresponding to

blanking plate edge 54). An extended sidewall 210 is provided to cover any gap between the trunking and the box, and a corresponding sidewall step 212, the height of which corresponds to the height of the base sidewall 111 of the trunking profile A to E that the fitting is intended to be used with. In the case of the profile A, the step height is zero as there is no external side face. From Fig. 9 it will be seen that an angle R alters from a maximum when the sidewall step 212 is zero, to a minimum when the step 212 is at a maximum. From Fig. 9E may be seen the hidden detail of the inside of the box adaptor 200E. An adaptor recess 214 (corresponding to recess 124) to receive one of the cut ends 120 of the lids is formed at the end of the box adaptor opposite to the end arranged to fit box aperture 52. The adaptor external profile 216 (corresponding to enlarged external profile 123) is extended to provide an aesthetically pleasing appearance to the adaptor. The adaptor recess 214 has an external adaptor end 218 (corresponding to external end 128) and an adaptor internal end face 220 (corresponding to internal end face 126). An adaptor snap fit rib 222 (only one visible) is provided on each side, corresponding to a portion of the resilient depending lid sidewall 107. While the above description has been in respect of Fig. 9E, all the other adaptors have similar features but they are not shown.

In use the mounting box base 11 is mounted to the supporting surface 2 as shown in fig. 2 and the required lengths of the trunking base 102 are also mounted to the supporting surface. The installer is free to mount first whichever is more convenient of the mounting box base or the trunking base. When both the box base 11 and the trunking base 102 are mounted to the wall the installer selects the two reduced thickness grooves 28 either side of

any segments 29 to 33, in this case segment 33, in the continuous wall 27 to cut to form a flap or bridge 56 which is bent down and in effect hinged at 58 so that it lies substantially flat against the bottom 114 of the base 102.

5 The frame 12 is then clipped over base 11, an adaptor 20 is clipped onto frame 12 and lid 101 is clipped onto base 102 of trunking 100. The installer may select any of the orientations shown in Fig. 11. The importance of the flap or bridge 56 is that it bridges any gap between the base

10 cut end 132 and the base surface 50 of the mounting box 10, and hence enables continuous insulation to be provided throughout the installation. An additional benefit is that the installer does not have to cut the trunking accurately to length, since the box flap will bridge and cover any gap

15 at the bottom, and, as shown in Fig. 1, the extended sidewall 210 of the box adaptor 200 will cover any gap at the side, while the adaptor external profile 216 provides a pleasing top appearance. As with the tee fitting described before the lid is cut to length so that the cut

20 end 120 is positioned under the adaptor recess 214.

A benefit of having the box aperture 52 a single constant size is that several different sizes of trunking may be connected to any one box. A further benefit is that the

25 installer only has to carry the one style of box, and can fit these to the wall in the required locations in the knowledge that they will accept whichever trunking profile he ultimately requires to accommodate the electrical

30 cables.

The stop end fitting 180 (see Fig. 12) has a similar overlapping portion 142' and associated features to the overlapping portion 142 and associated features of the tee fitting 140 already described. The end fitting has a blank

35 end 182 which is formed as a wall depending from the blank

top external profile 186 that is similar to the first external surface profile 115 of the lid. A blank end internal surface 184 is formed with a series of notches 188A to 188D that do not extend to a blank visible edge 190. Adjacent to and above a bottom edge 192 and each of the notches 188 is a protruding stem 194. In use the installer obtains the required height of the blank end 182 by breaking or cutting the blank end at the appropriate notch 188A or B or C or D to suit the corresponding base profile. For the base profile 102E the end fitting is used as supplied. When the blank end is the correct height the end fitting may be clipped onto a length of base adjacent to the required base cut end 132 so that the blank end internal surface 184 abuts the base cut end. Particularly for the larger base profiles, and where the end fitting may be tampered with, an adhesive material, such as silicone rubber sealant may be applied to the inside of the base so that the protruding stem 194 is glued to the base.

Although the specific embodiments above have described a trunking system with components made from plastics, components of the system could be manufactured from metal to obtain advantage of either the electrical shielding properties of metal and or the mechanical strength of metal. The plastics component could be directly replaced with metal or replaced with a composite part made of plastics and metal.

A further benefit of an electrical trunking installation system as described is that a manufacturer is required to produce fewer system components (such as fittings) to offer a complete system. In the case of the specific embodiment described above, a complete system having 7 sizes of trunking, would require 13 fittings, 6 of which are common



5 to all sizes, giving a total number of component parts required to be produced for the complete system of 21 parts, which compares with 121 component parts required for a comparable known system providing similar functionality with 7 sizes of trunking.

10 Whereas the mounting box 10 is shown as being square with four inner and outer side walls it can equally be round with of course only a single inner and a single outer wall. It is possible for the box to be formed with only an outer side wall or side walls, so that a bridge flap bends out or hinges from the outer side but in order to maintain the advantage of being able to lay cables into the recess formed by the bridge being broken out, a ring requires to be fitted over the single outer side which traps the cable and box adaptor.

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CLAIMS

1. Electrical trunking and at least one fitting for the
5 trunking, the trunking comprising a base and a lid for the
base, the base having side walls extending therefrom with
a first connecting means extending along the top edge of
each side wall, the lid having a second connecting means
10 extending along each of two edges, said first connecting
means arranged to co-operate with said second connecting
means to retain the lid to the base so as to form an
enclosed space, the fitting comprising a lid portion with
a third connecting means and an overlap portion, the third
15 connecting means arranged to co-operate with the first
connecting means to retain the fitting to the base, the
overlap portion being arranged to overlap a cut end of the
lid, wherein the overlap portion does not extend
substantially down the side walls further than the lid.
- 20 2. Electrical trunking as claimed in claim 1 wherein the
lid has a width substantially the same as the width of the
side walls of the trunking at the top so that the outer
surfaces of the lid are flush with the outer surfaces of
the side walls of the trunking at least at the top of the
25 trunking.
3. Electrical trunking as claimed in claim 1 or 2 wherein
the lid has a width substantially the same as the width of
the base of the trunking.
- 30 4. Electrical trunking as claimed in any one of claims 1
to 3 wherein the first connecting means comprises an
outwardly facing protrusion and the second connecting means
comprises an inwardly facing protrusion arranged to clip
35 under the outwardly facing protrusion.



5. Electrical trunking as claimed in claim 4 wherein the second connecting means further comprises an inner depending web of the lid which together with the inwardly facing protrusion provide a recess into which the top edge of the respective trunking side wall is arranged to clip.

6. Electrical trunking as claimed in any one of claims 1 to 5 wherein the fitting has a major part having a width substantially the same as the width of the side walls of the trunking at the top so that the outer surfaces of the major part of the fitting are flush with the outer surfaces of the side walls of the trunking at least at the top of the trunking.

7. Electrical trunking as claimed in any one of claims 1 to 6 wherein the fitting has a major part having a width substantially the same as the width of the base of the trunking.

8. Electrical trunking as claimed in any one of claims 1 to 7 wherein the third connecting means comprises an inwardly facing protrusion arranged to clip under the outwardly facing protrusion of the first connecting means.

9. Electrical trunking as claimed in claim 8 wherein the third connecting means further comprises an inner depending web of the fitting which together with the inwardly facing protrusion of the fitting provides a recess into which the top edge of the respective trunking side wall is arranged to clip.

10. Electrical trunking as claimed in any one of claims 1 to 9 further comprising adaptor means to clip an end of the trunking to a mounting box, said adaptor means having a fourth connecting means similar to said third connecting



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means.

5 11. Electrical trunking as claimed in claim 10 wherein the
adaptor means has portions to cover, when clipped to the
trunking, at least a part of end portions of the side walls
of the trunking.

10 12. Electrical trunking substantially as described with
reference to the accompanying drawings.