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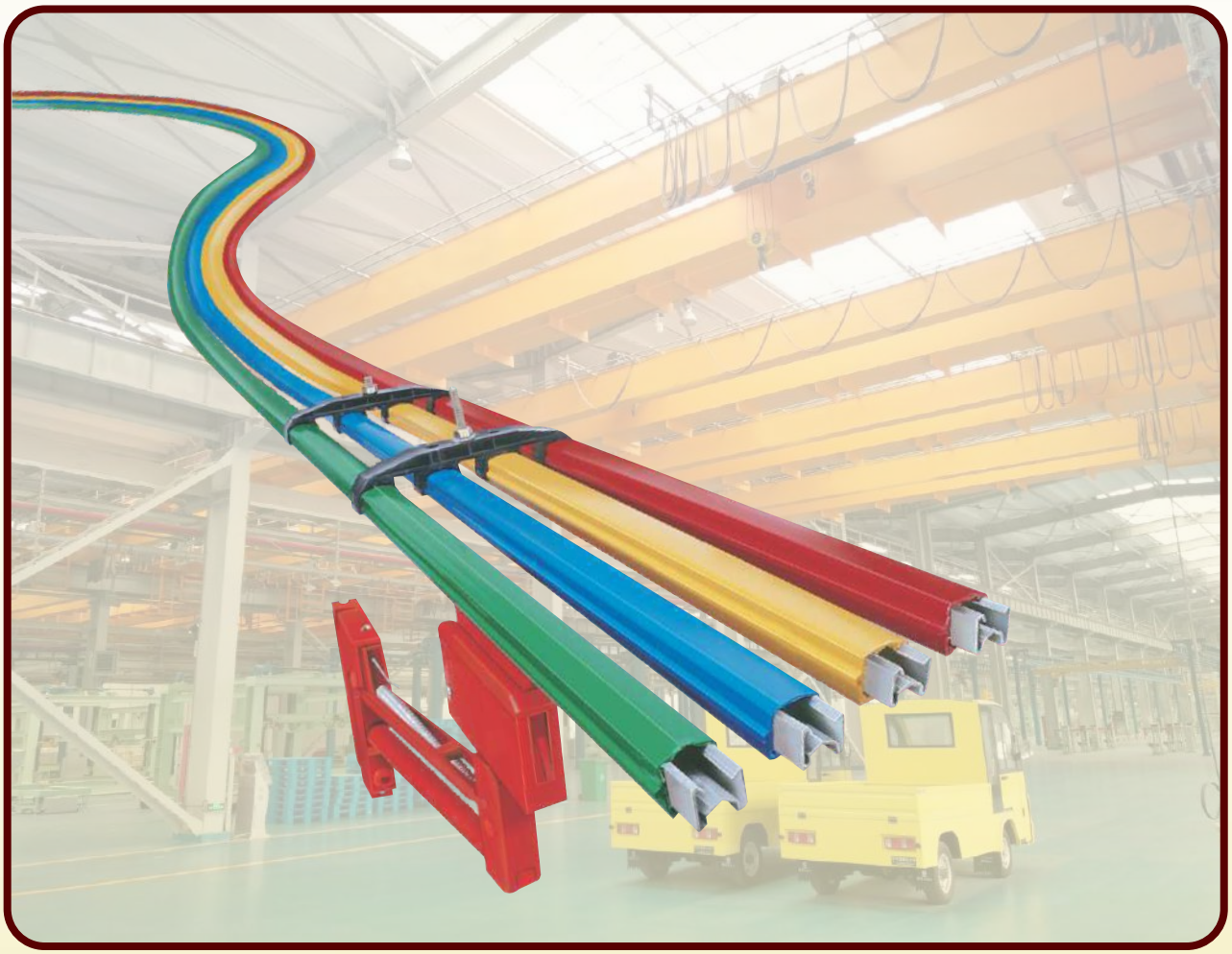
SPEED-O-CONTROLS PVT. LTD.

INSULATED CONDUCTOR BAR

SAFELINE W

SAFELINE W

The Unique Conductor Bar System



DISCOVER OUR RANGE OF SAFE LINE FOR CRANES

V6

INDEX

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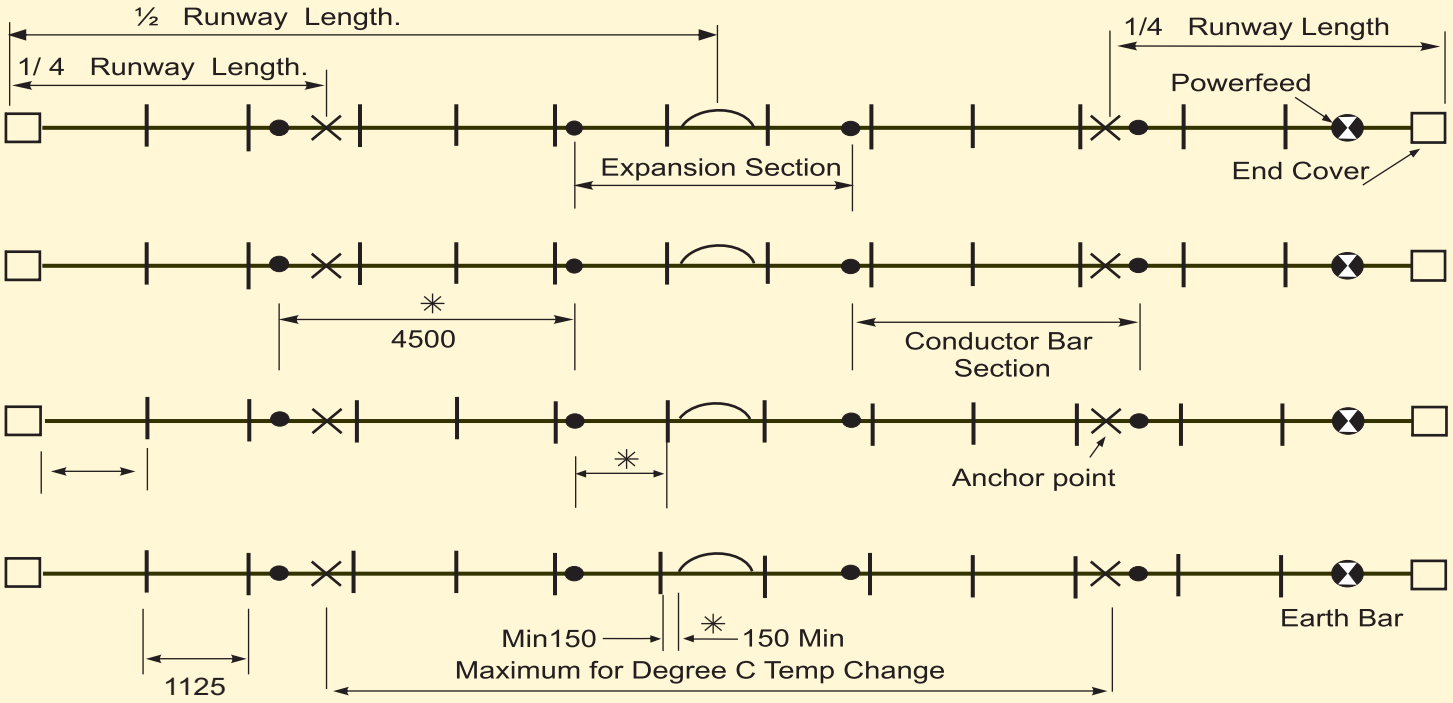
TYPICAL LAYOUT OF A 3-PHASE & GROUND CONDUCTOR SYSTEM :

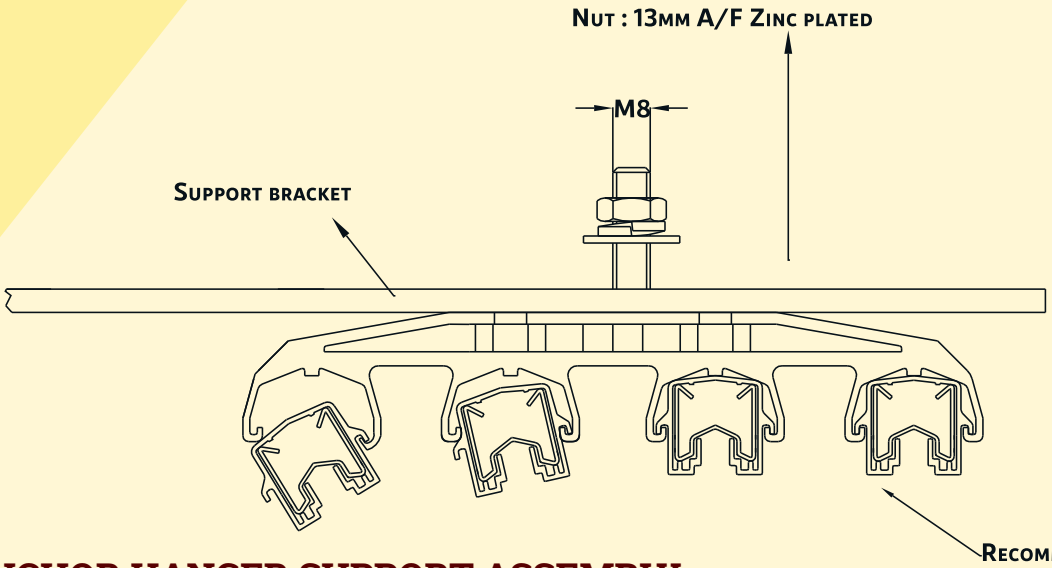
Nomenclature :

- SINGLE CONDUCTOR
- CONDUCTOR SYSTEM
- EXPANSION SECTION
- TRANSFER GUIDE
- END CAP
- ISOLATION SECTION
  ISOLATION = INSULATING MATERIAL
- ISOLATING SWITCH
- HANGER CLAMP
- ANCHOR POSITION
- POWER FEED
- PICKUP GUIDE
- ISOLATION SECTION
- ISOLATION = AIR GAP COLLECTOR
- SWITCH FUSE

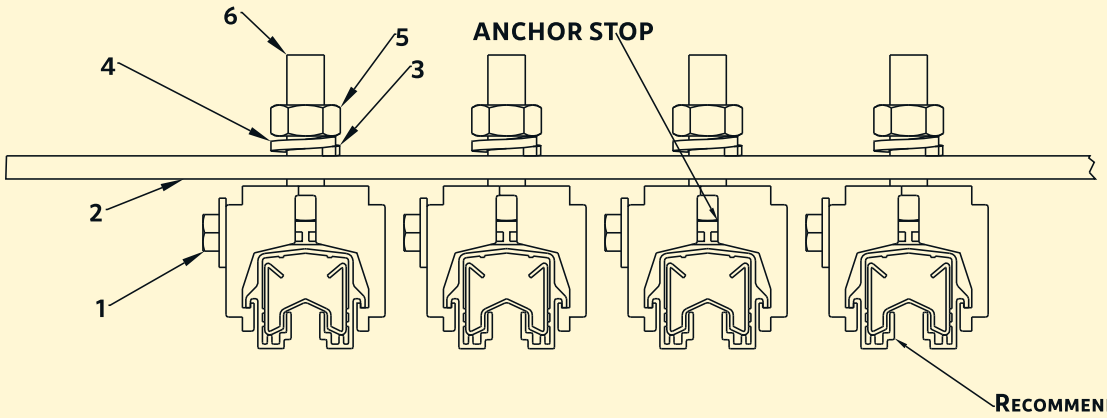
LAYOUT OF A TYPICAL 3-PHASE WITH EARTH CONDUCTOR SYSTEM :



FITTING CONDUCTORS ONTO FOUR BAR CONDUCTOR HANGER :



ANCHOR HANGER SUPPORT ASSEMBLY :



TOOLS REQUIRED :

3mm A/F open-ended wrench 8 mm A/F open ended wrench

1 - Remove items 3, 4 & 5 from assembly.

2 - Clip anchor hanger over so that it free to slide.

3 - Insert anchor hanger in support bracket.

4 - Reassemble items 3, 4 & 5 ensure item 5 is finger tight.

5 - Tighten item 1 until anchor stops meet (check anchor is tight on cover).

6 - Tighten item 5 to a torque of 3 kgm.

Note : For ease of access to clamping setscrews (item 1), Install anchor hanger assemblies as shown above.

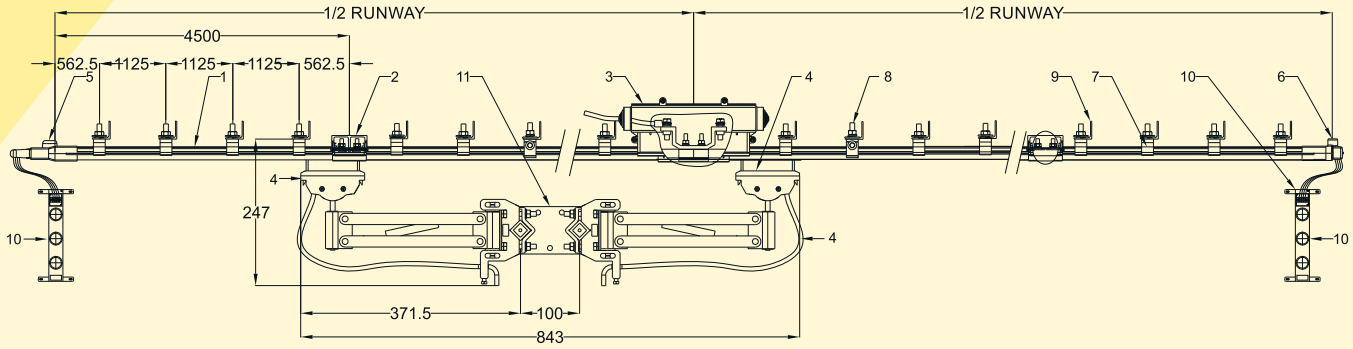
SYSTEM ARRANGEMENT :

1 - Locate and secure support brackets at the Recommended Spacing

Note - Locate support brackets at a spacing that is divisible into the conductor bar lengths. This will always Insure that the joint positions do not Interfere with the support brackets.

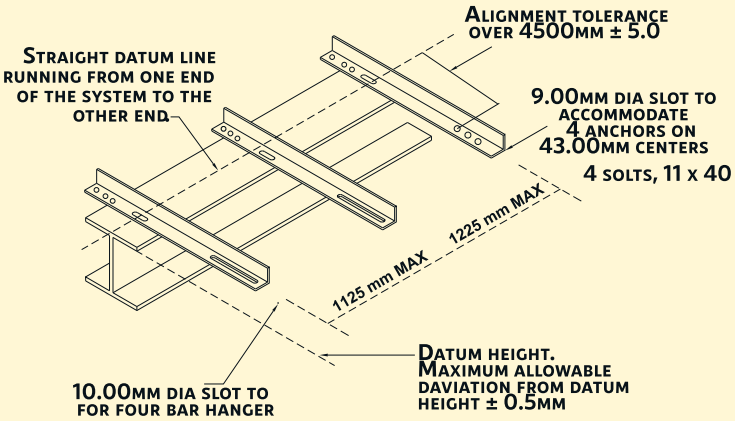
2 - Observe all alignment tolerance.

Hanger support brackets come complete with all necessary mounting holes and easy Installation hanger with slides in slots.



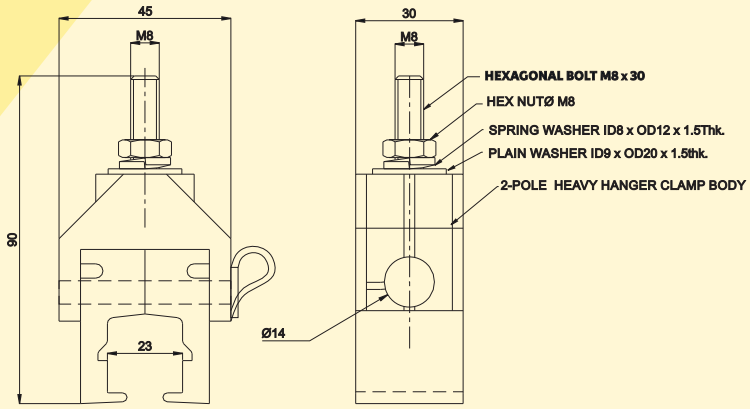
SR. NO	DRG. NO	NAME OF THE PART
1	DSL/01	INSULATED CONDUCTOR BAR 4.5M LENGTH (R) INSULATED CONDUCTOR BAR 4.5M LENGTH (Y) INSULATED CONDUCTOR BAR 4.5M LENGTH (B) INSULATED CONDUCTOR BAR 4.5M LENGTH (G)
2	DSL/02	JOINT COVER ASSEMBLY
3	DSL/03	CENTER POWER FEED ASSY
4	DSL/04	CURRENT COLLECTORS
5	DSL/05	END POWER FEED ASSY
6	DSL/06	END COVER ASSY
7	DSL/07	HANGER CLAMP ASSEMBLIES
8	DSL/08	ANCHOR CLAMP ASSY.
9	DSL/09	WEB BRACKETS
10	DSL/10	INDICATING LAMP
11	DSL/11	CURRENT COLLECTOR BRACKET

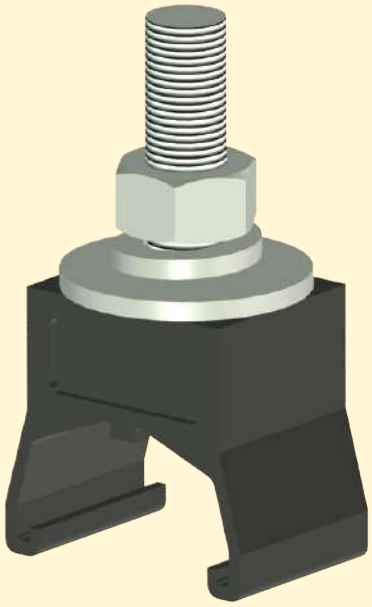
SUPPORT BRACKET INSTALLATION



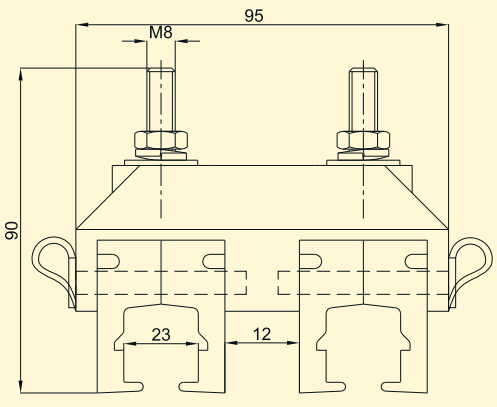
MOUNTING DETAILS OF HANGER CLAMP FOR INDOOR AND OUTDOOR USE :

ONE POLE HANGER (HEAVY)

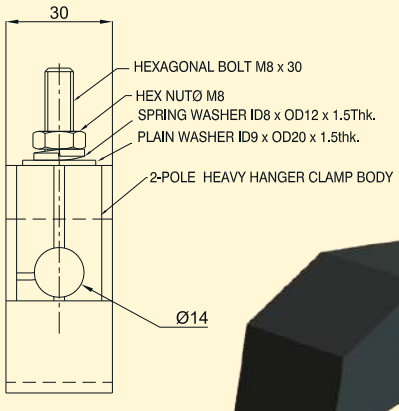




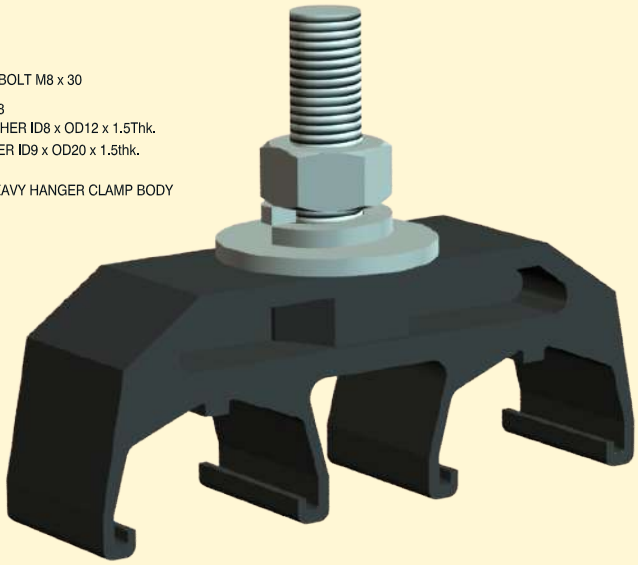
TWO POLE HANGER (HEAVY)



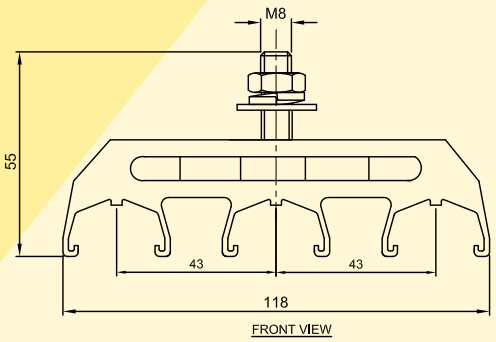
FRONT VIEW

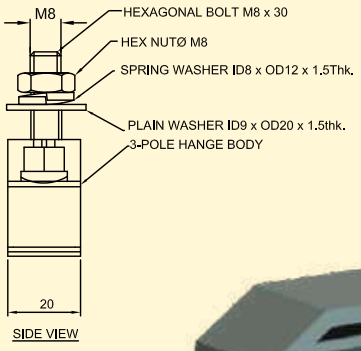


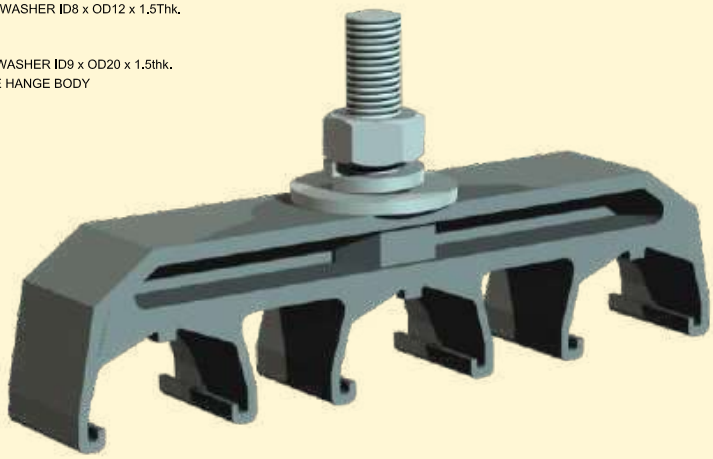
SIDE VIEW



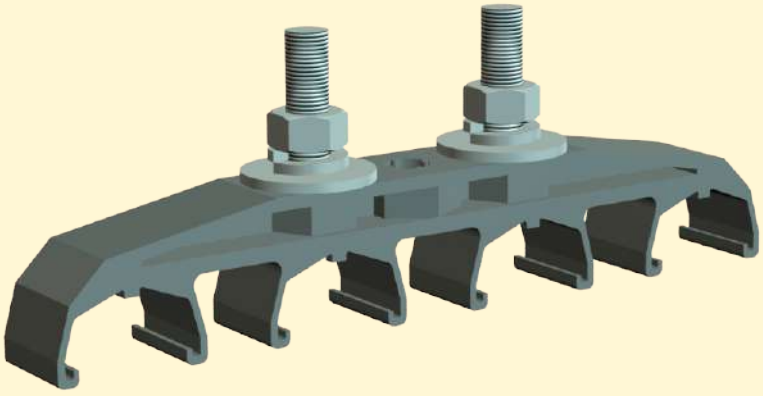
THREE POLE HANGER

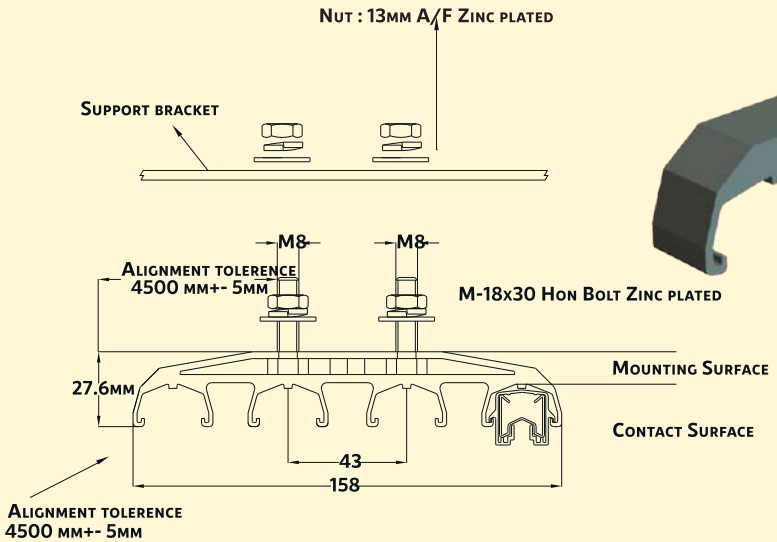






FOUR POLE HANGER

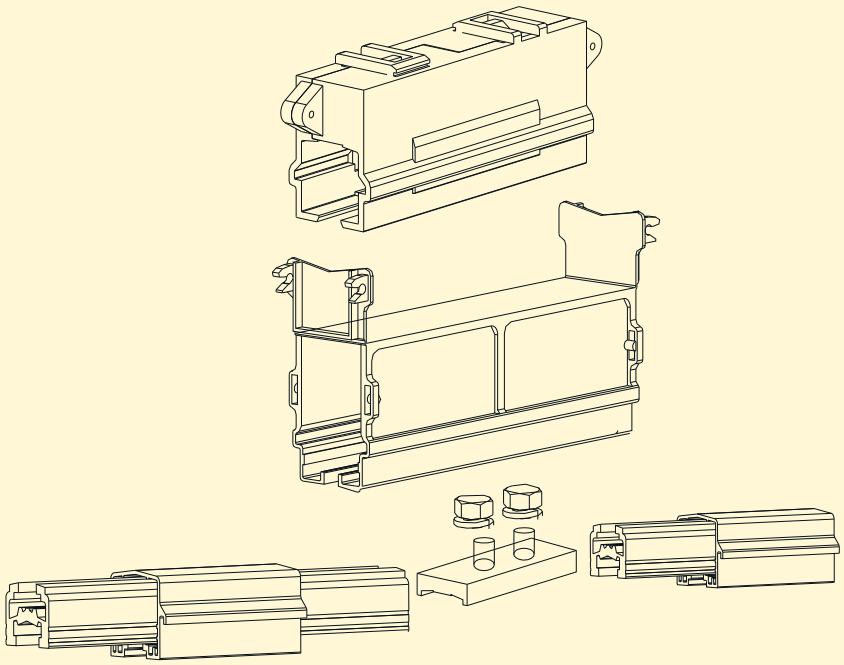




TOOLS REQUIRED FOR HANGER POLE :

1 - Remove nut, spring washer and washer from hanger assembly
(The M8 bolt will stay in place inside the moulding)
2 - Assemble as shown in the diagram ensuring the correct alignment is observed.
3 - Finger tighten M8 nut.
4 - Fit conductor bars into hangers.

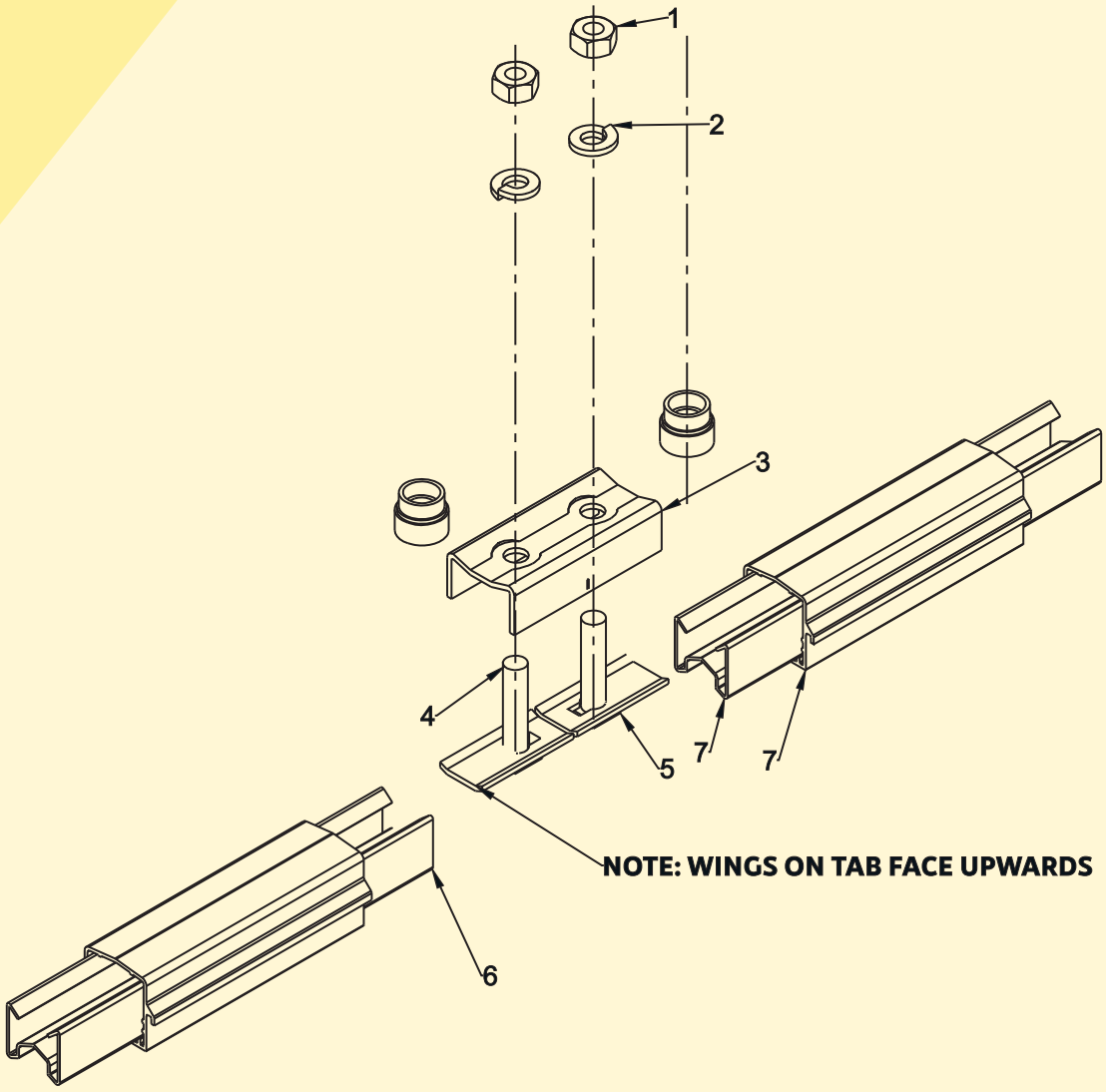
ASSEMBLY BOLTED ALUMINIUM JOINT WITH COVER



TOOLS REQUIRED :

10mm A/F open-ended spanner Electrical joint compound
1 - Fit item 4 into item. (Ensure tab captivates the head on the setscrew)
2 - Slide item 4 into item 5 and item 6 respectively.
3 - Place item 3 on item 4 making sure alignment with end faces of conductor bar.
4 - Fit item 2 and 1 in the order shown.
5 - Tighten item 1 to a recommended torque of 1 kgm.
6 - Check that both faces of the conductor bar are touching each other and there is no gap exceeding 0.5mm at the faces.

ASSEMBLY BOLTED GALVANISED STEEL & COPPER JOINT :



TOOLS REQUIRED :

10mm A/F open-ended spanner Electrical joint compound

1 - Fit item 4 into item 5. (Ensure tab captivates the head on the setscrew)

2 - Slide item 4 into item 5 and item 6 respectively.

3 - Place item 3 on item 4 making sure alignment with end faces of conductor bar.

4 - Fit item 2 and 1 in the order shown.

5 - Tighten item 1 to a recommended torque of 1 kgm.

6 - Check that both faces of the conductor bar are touching each other and there is no gap exceeding 0.5mm at the faces.

ASSEMBLY OF POWER FEED AND COVER :

TOOLS REQUIRED :

1 - Cut hole in grommet item 8 to suit cable.

2 - Assembly joint as shown in fig in sequence (1,2,3,4)

3 - Pass supply cable through grommet (7,8)

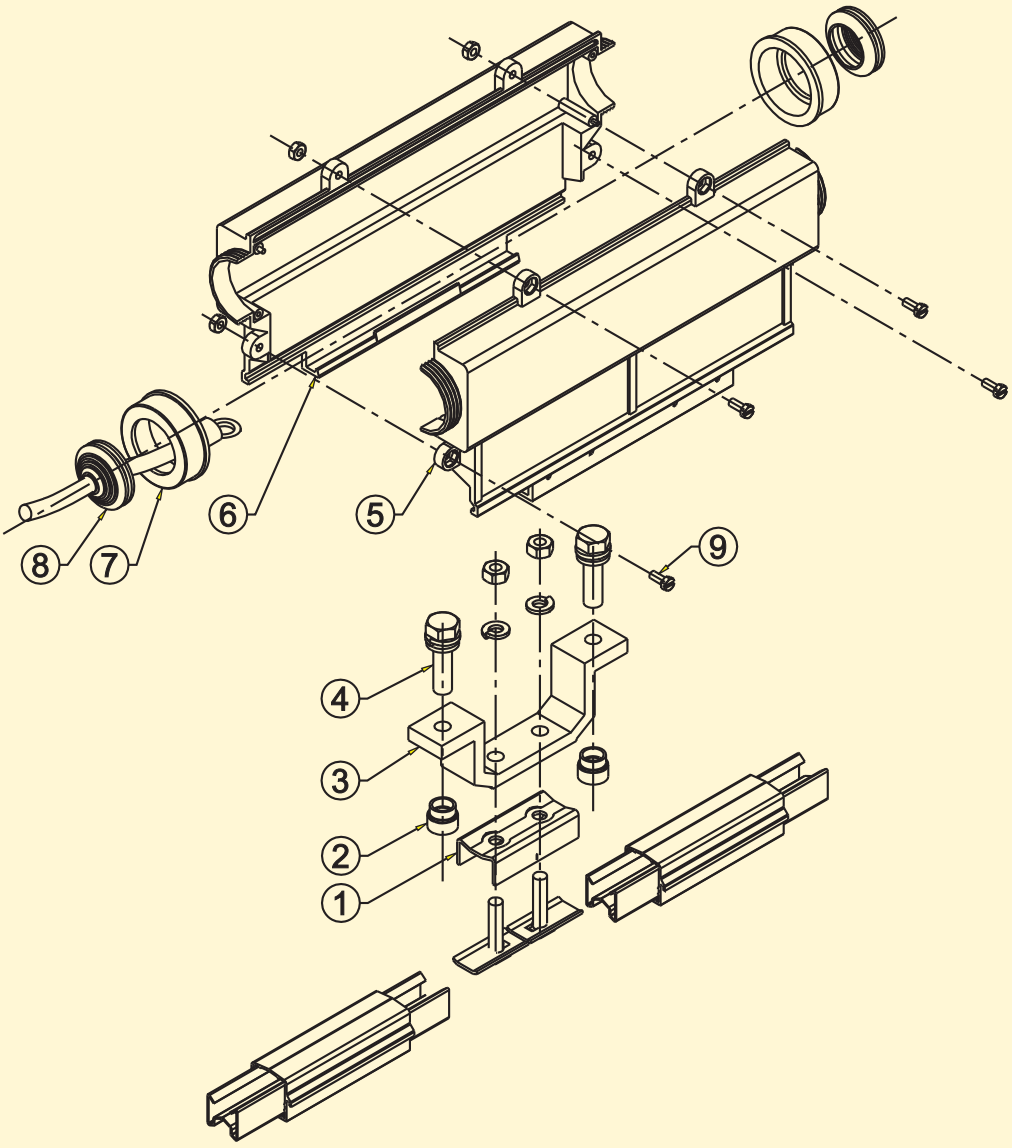
4 - Crimp terminal to supply cable

5 - Secure terminal to joint item No. 4 & tighten item no. 4 to an torque of 1.1 kgm.

6 - Fit item 5 over assembly with help of item No. 9

7 - Ensure the cable is threaded carefully through grommet.

8 - Thread item No. 7 assembly of item No. 5



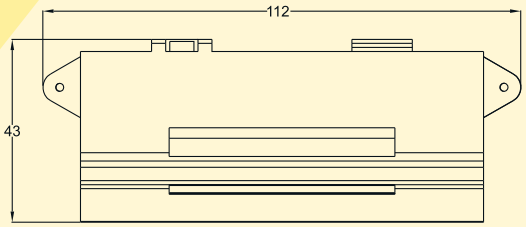
ASSEMBLY OF JOINT COVER (HEAVY) ON TO BOLTED JOINT :

1 - Unlock “D” & “D” upward to open joint cover on both direction as shown “A-A”

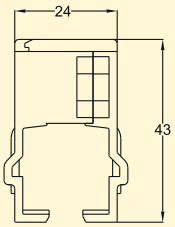
2 - Fit the joint cover bolted joint

3 - Joint must not be opened more than 2 mm

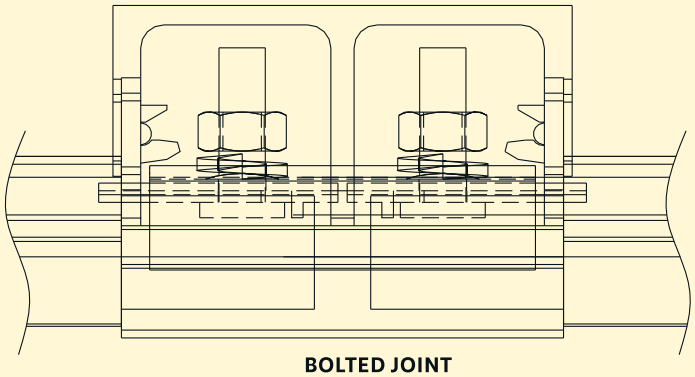
4 - Close the lock in reverse direction of “A-A”

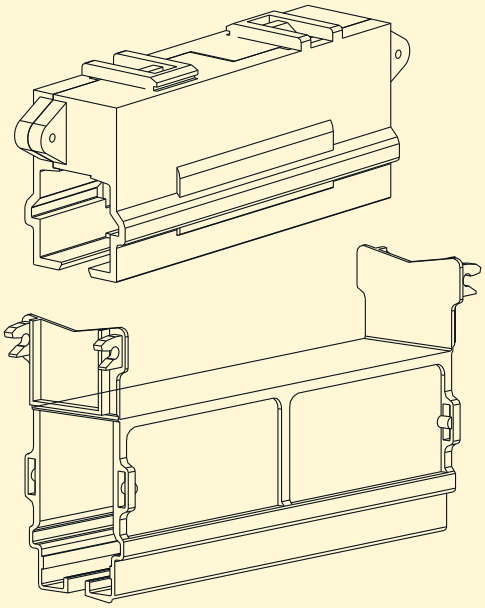


SIDE VIEW



END VIEW


BOLTED JOINT


BOLTED JOINT 3D VIEW

5 - Spring legs out in the directions A-A as shown
(This is to ease the fitting of the joint cover over the conductor bar).

6 - Fit the joint cover over the bolted joint. Joint cover must not be opened more than 45.
Ensure the “Location Section” sits between the two bolts.

7 - Close the flaps in the direction ‘ID’.
Ensure the flaps ‘click’ home on both sides.

ASSEMBLY OF LOW AMP JOINT POWERFEED AND COVER :

TOOLS REQUIRED :

1 - 13mm A/F wrench
2 - Cable crimping tool suitable cable terminal
3 - 1 Omm A/F wrench
4 - Sharp Knife.
5 - Flat bladed screwdriver
6 - Cable Stripper

UP TO AND INCLUDING 250 AMPS :

1 - Assemble Joint To Conductor Bar

2 - Fit Aluminum Top Hot Section Item 3 To Join Assembly.

3 - Discard Spring Washers Originally Fitted To The Joint Assembly And Fit External Shake Proof Washers Item 1.

4 - Fit Joint Power Feed Cover Item 4 As Shown

5 - Cut Grommet Item 17 Out Using Suitable Knife And Fit Over Cable.

6 - Crimp Terminal To Supply Cable.

7 - Ensure The Terminal Is Properly Crimped As Failure To Do So Will Result In Overheating Of The Power Feed Assembly.

8 - Fit terminal to item 3 and secure using items 5,6 and 7.

9 - Item 14, 15 and 16 are for use with two cable feeds, and should be left tight in item 3

10 - Fit power feed cover item 18 to assembly.

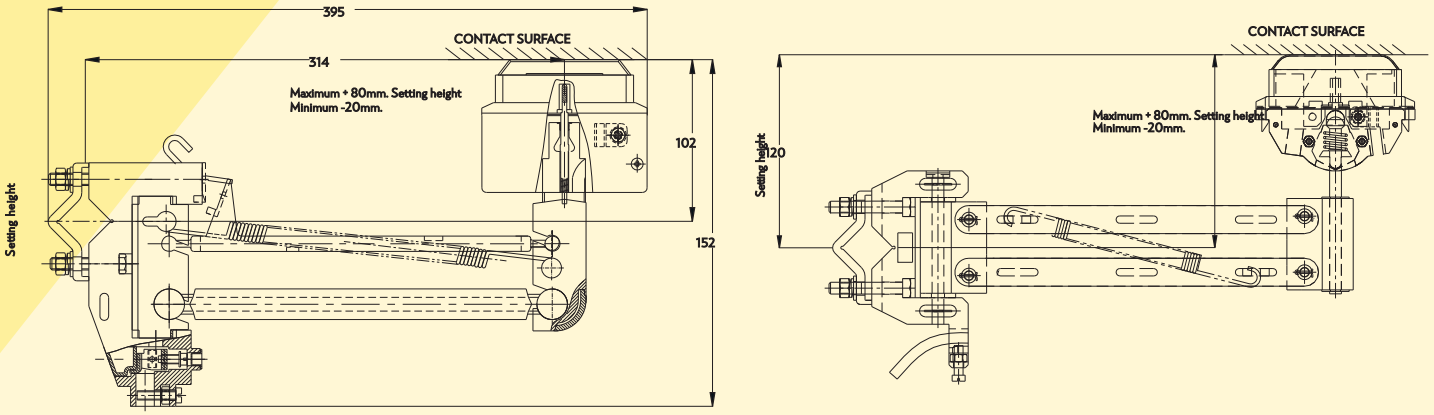
11 - Ensure both grommets are fitted into item 18 before closing halves together.

12 - Make sure the legs of the cover fit under the conductor cover support ears
(A little pressure at points x-x will ensure this)

13 - Fit items 19 to item 18 secure with item 20

For 400 Amps
Fit lug to the center of item 8 and secure using items 10, 11, 12 and 13 in the order shown

MOUNTING DETAILS OF COLLECTOR

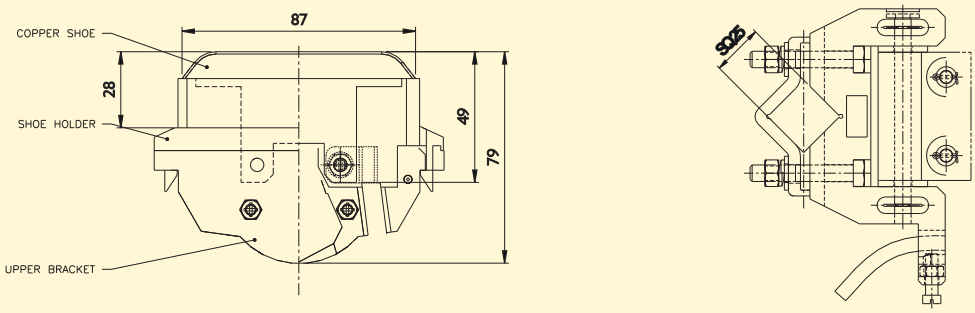


1 - Fix collector mounting bracket to a suitable support at the correct setting height (see diagram)

2 - Place collector on the mounting bracket

3 - Tighten nuts 1 & 2 to recommended torque of 3 kgm.

CUSTOMERS SUPPLY CABLE INSTALLATION



1 - Strip customers supply cable back 13-15 mm, using suitable cable stripping tool.

2 - Remove protection plug from the hole.

3 - Loosen screw number 1.

4 - Loosen screw number 2 until from entry hole.

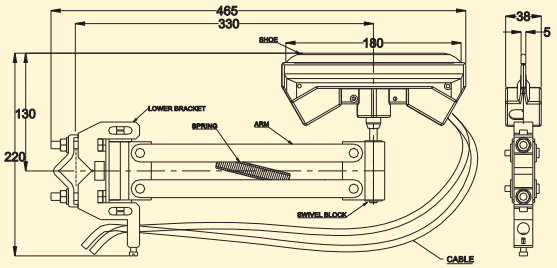
5 - Push customer supply cable into entry hole.

6 - Tighten screw number 1 fully and ensure that the cable is clamped firmly in position.

7 - Tighten cable clamp screw number 2.

8 - Replace protection plug.

CURRENT COLLECTOR ASSEMBLY 250W :

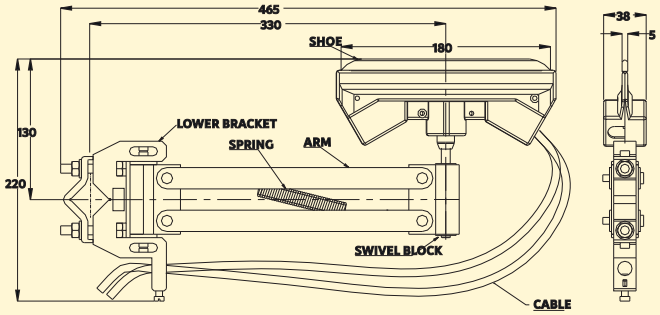


CURRENT COLLECTOR 250AMPS

CURRENT COLLECTOR ASSEMBLY 250W :

TECHNICAL DATA

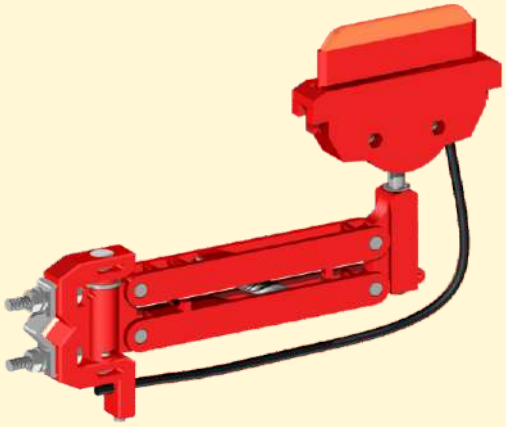
MAX CURRENT LOAD	- 250 AMPS
MAX TRAVELING SPEED	- 200M/MIN
CONTACT PRESSURE	- 0.07KG/MM2
LATERAL MOVEMENT	- ± 50MM
MOVEMENT IN DIRECTION OF CONTACT	- ± 40MM
CONNECTING CABLE	- 2 x 25sq MM 1.5M LONG, HIGHLY FLEXIBLE
DISTANCE BETWEEN TOWING ARM AXIS AND CONDUCTOR RAIL SLIDING SURFACE	- 25 x 25MM

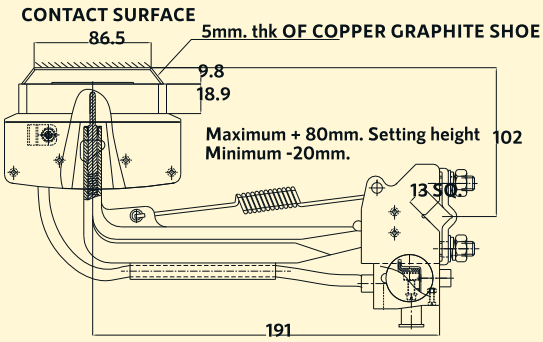


CURRENT COLLECTOR ASSEMBLY 50W :

TECHNICAL DATA

MAX CURRENT LOAD	- 50 AMPS
MAX TRAVELING SPEED	- 200M/MIN
CONTACT PRESSURE	- 0.065KG/MM2
LATERAL MOVEMENT	- ± 50MM
MOVEMENT IN DIRECTION OF CONTACT	- ± 40MM
CONNECTING CABLE	- 1 x 6sq MM 1.5M LONG, HIGHLY FLEXIBLE
MOVEMENT BAR SIZE ARM AXIS AND CONDUCTOR RAIL SLIDING SURFACE	- 12.5 x 12.5 MM

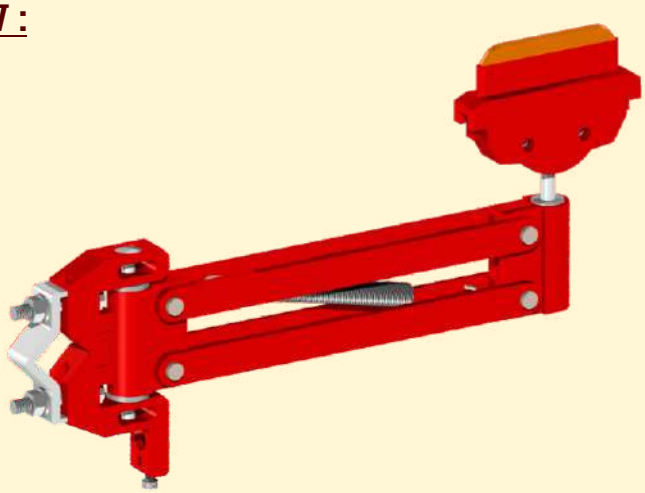


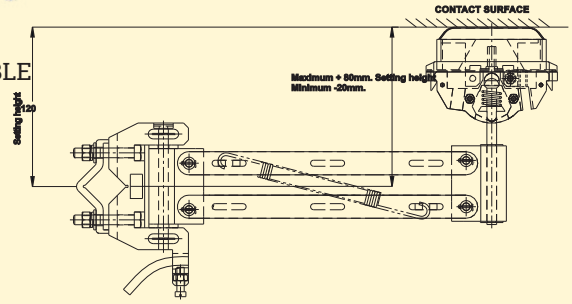


CURRENT COLLECTOR ASSEMBLY 100W :

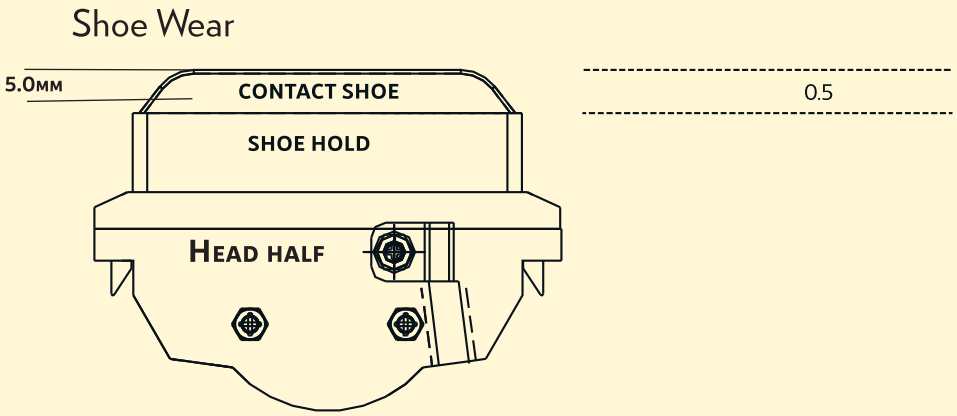
TECHNICAL DATA

MAX CURRENT LOAD	- 100 AMPS
MAX TRAVELING SPEED	- 200M/MIN
CONTACT PRESSURE	- 0.07KG/MM2
LATERAL MOVEMENT	- ± 63MM
MOVEMENT IN DIRECTION OF CONTACT	- ± 25 x 25MM
CONNECTING CABLE	- 1 x 10sq MM 1.5M LONG, HIGHLY FLEXIBLE
MOUNTING BAR SIZE	- 25 x 25MM



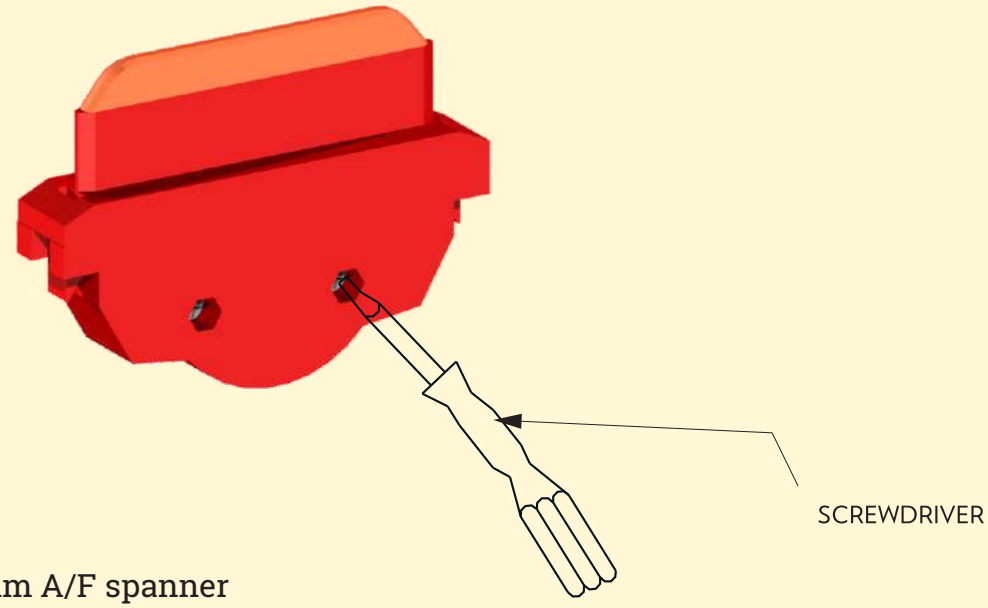


REPLACEMENT OF COLLECTOR CONTACT SHOE & SHOE HOLDER



NOTE :

Collector shoe contact shoe and shoe holder are supplied as replacement Ground Conductor
(For Ground shoes with Deflector consult factory)



TOOLS REQUIRED :

Flat blade screwdriver 7.0mm A/F spanner

1 - Lever lugs in direction shown.

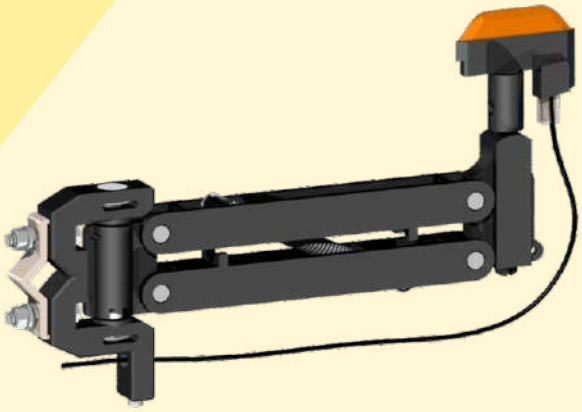
2 - Lift shoe and holder

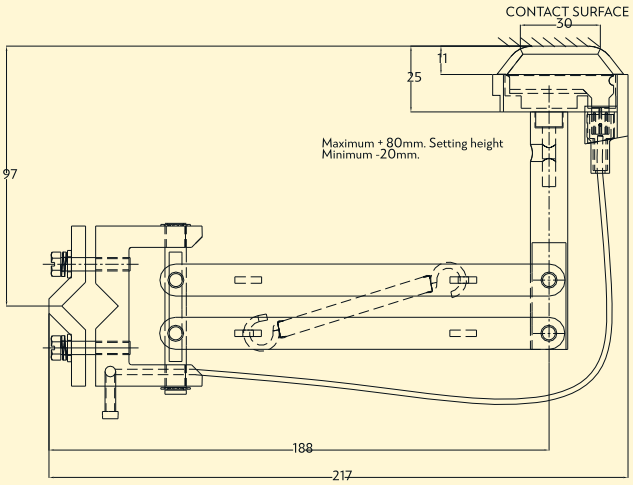
3 - Disconnect cable

4 - Reverse procedure to fit new shoe

Note : Collector contact shoe and shoe holder are supplied as replacement part

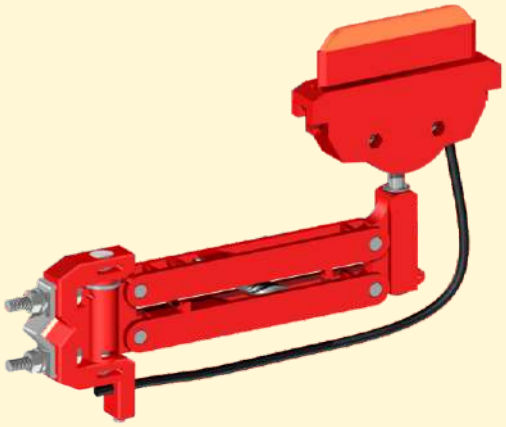
MOUNTING DETAIL FOR CURRENT COLLECTOR (CC- 25)

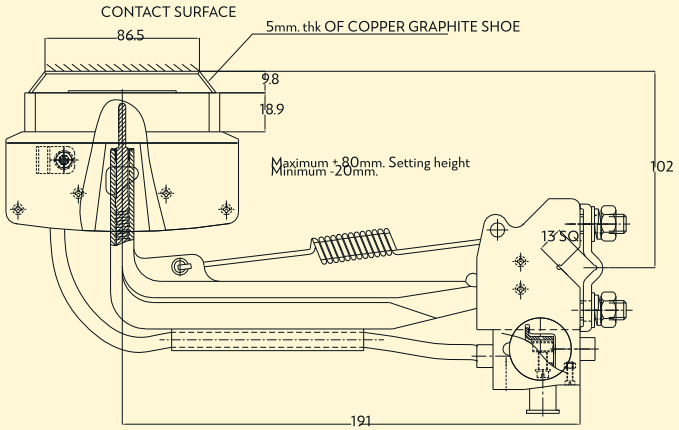




25A CURRENT COLLECTOR

MOUNTING DETAIL FOR CURRENT COLLECTOR (CC-50)





50A CURRENT COLLECTOR

TOOLS REQUIRED :

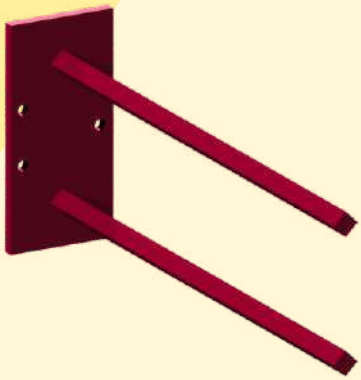
8.0 mm A/F steel rule or suitable tape measure.

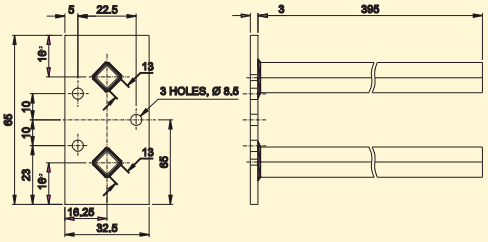
1 - Fix collector mounting bracket to a suitable support at the correct setting height (see diagram)

2 - Place collector on the mounting bracket.

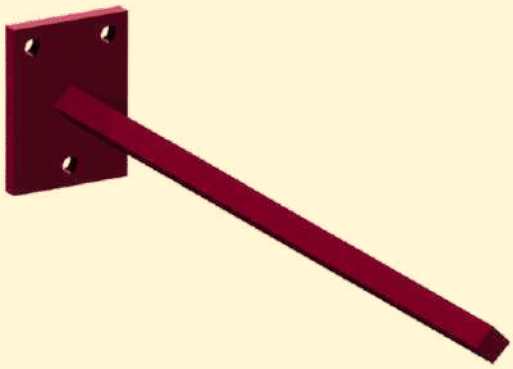
3 - Tighten setscrew item 1

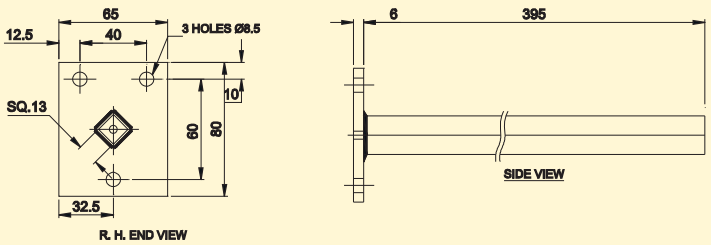
CURRENT COLLECTOR BRACKET :



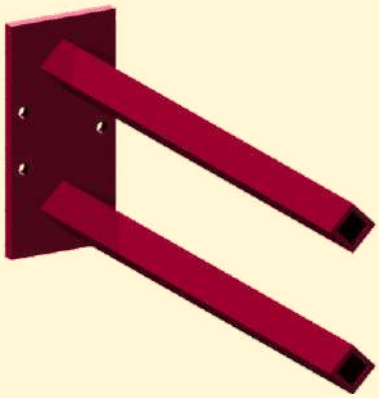


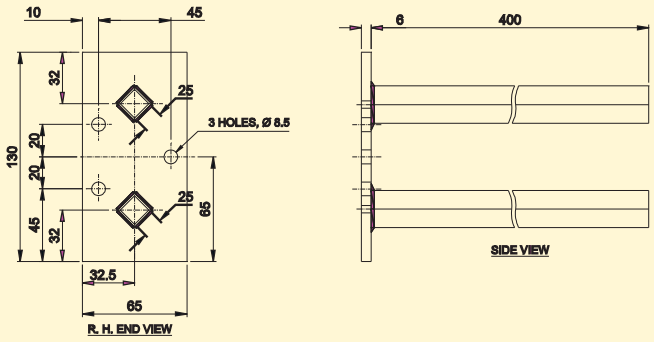
DOUBLE CURRENT COLLECTOR BRACKET 13SQ



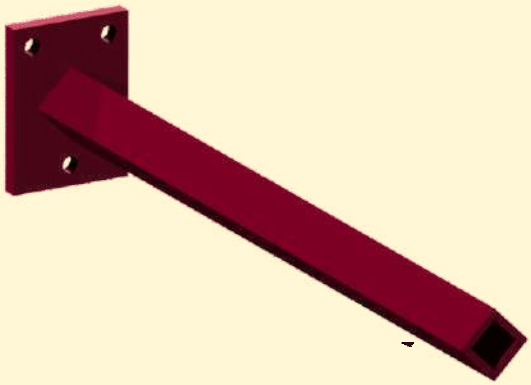


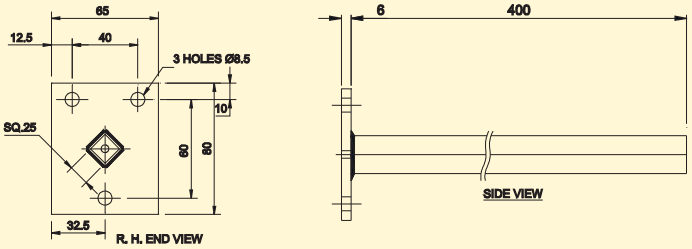
SINGLE CURRENT COLLECTOR BRACKET 13SQ





DOUBLE CURRENT COLLECTOR BRACKET 25SQ





SINGLE CURRENT COLLECTOR BRACKET 25SQ

EXPANSION SECTION ASSEMBLY :

1 - The maximum allowable conductor system length without an expansion is as follows

SAFELINE	60 amps	150 meters
SAFELINE	100 amps	150 meters
SAFELINE	125 amps	150 meters
SAFELINE	160 amps	150 meters
SAFELINE	250 amps	150 meters
SAFELINE	400 amps	150 meters
SAFELINE	200 amps	150 meters

2 - The maximum distance between anchor points with an expansion section at approximately mid-point is as follows.

SAFELINE	60 amps	75 meters
SAFELINE	100 amps	75 meters
SAFELINE	125 amps	75 meters
SAFELINE	160 amps	75 meters
SAFELINE	250 amps	75 meters
SAFELINE	400 amps	75 meters
SAFELINE	200 amps	75 meters
SAFELINE	315 amps	75 meters

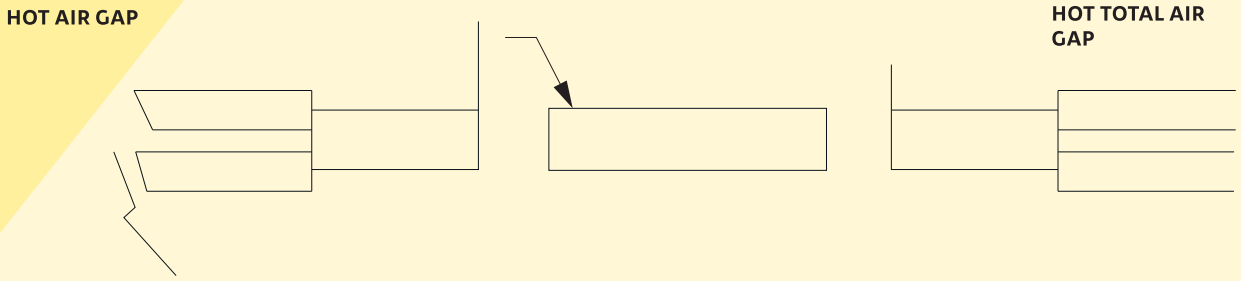
3 - Set expansion air gaps when fitting assembly to appropriate gap setting for ambient temperature, (see chart). The gap is adjusted by sliding the moving lengths of conductor in or out of the expansion assembly

(NOTE : BOTH HALVES BE SET EQUAL)

Always allow sufficient time for the conductor bar to achieve ambient temperature before setting expansion gap.

All expansion assemblies must be set, they are not pre-set before leaving our factory. Failure to set this part correctly good result in buckling of all conductors.

EXPANSION AIR GAP SETTING FOR CONDUCTOR BARS WITH PVC COVER :



ACTUAL SITE AMBIENT °C

LOWEST POSSIBLE SITE AMBIENT °C SEE NOT*

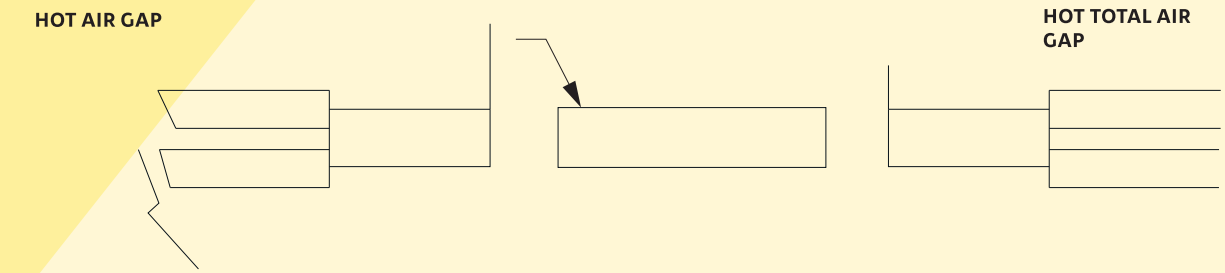
	-25°	-20°	-15°	-10°	-5°	-0°	5°	-10°	-15°	-20°	25°	30°	35°	40°	45°	50°	55°
										50	45	41	36	32	27	23	
									50	46	42	38	33	29	25	21	
								50	46	42	38	35	31	27	23	19	
							50	46	43	39	36	32	29	25	21	18	
						50	47	43	40	37	33	30	27	23	20	17	
					50	47	44	41	38	34	31	28	25	22	19	16	
				50	47	44	41	38	35	32	29	26	24	21	18	15	
			50	47	44	42	38	26	33	31	28	25	22	19	17	14	
		50	47	45	42	39	37	34	35	29	26	24	21	18	16	13	
	50	48	45	43	40	38	35	33	30	28	25	23	20	18	15	13	
50	48	45	43	40	38	36	33	31	29	26	24	21	19	17	14	12	

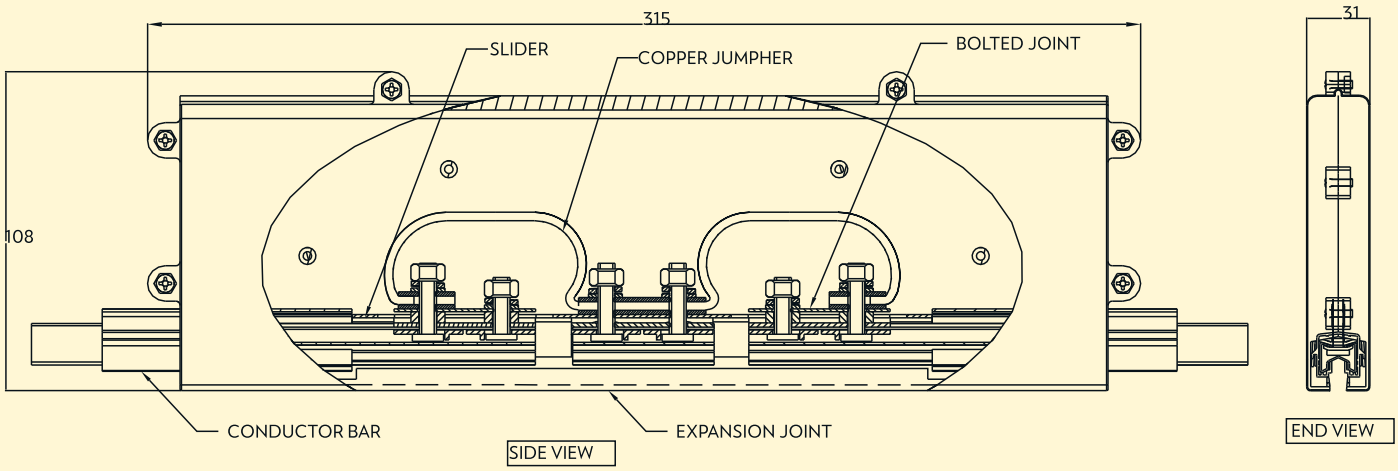
TOTAL GAP SETTING (mm)

NOTE : This figure is the lowest possible ambient C used in calculation to determine the number of expansion section required for phase.

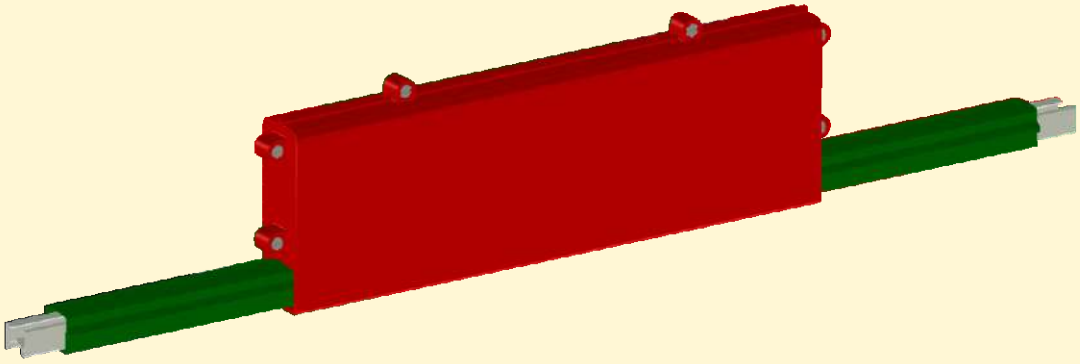
°

EXPANSION AIR GAP SETTING FOR CONDUCTOR BARS WITH PVC COVER :

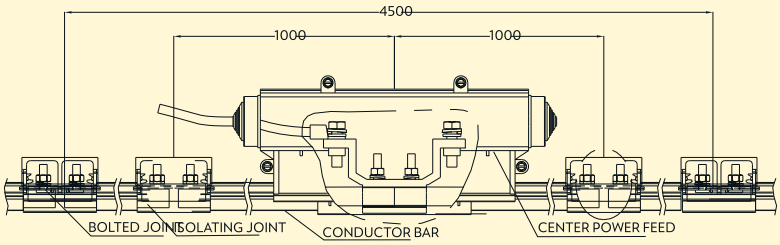


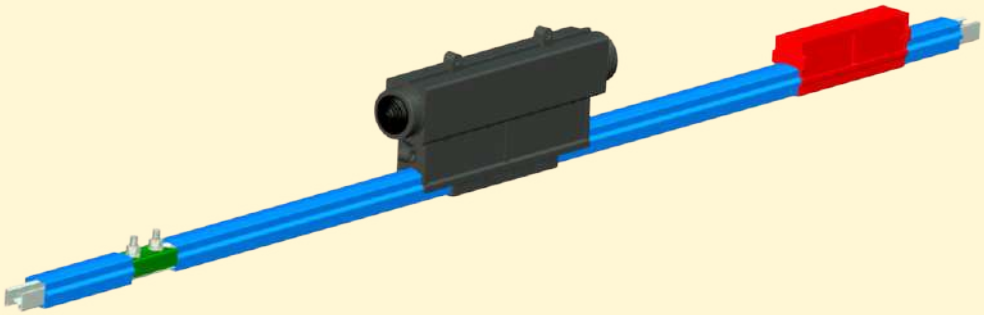


TOOLS REQUIRED :

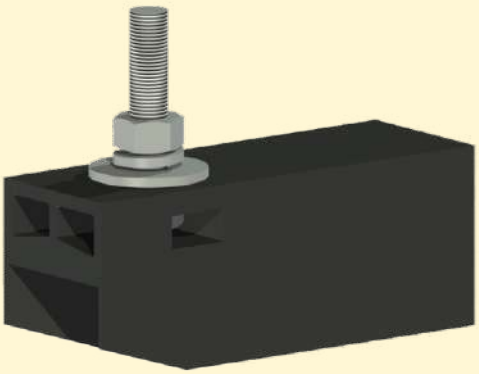


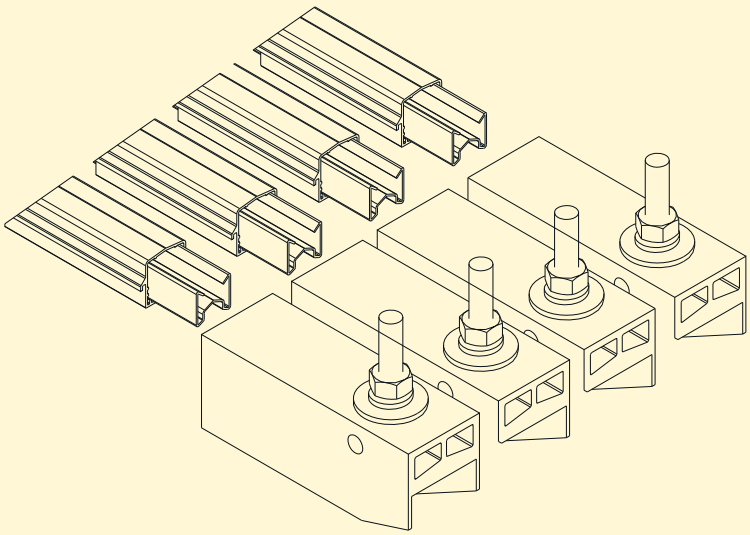
ISOLATION SECTION :





TRANSFER CAP :





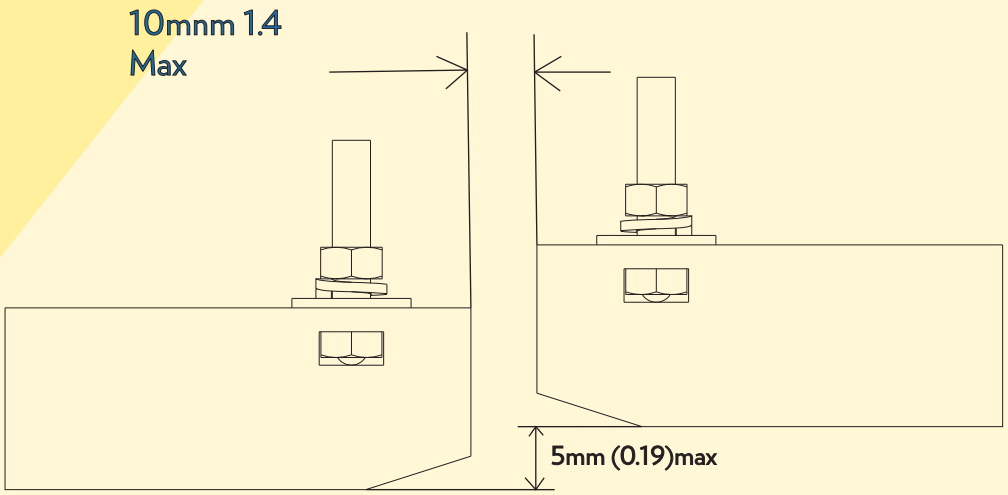
1 - Mark conductor cover 22mm (0.87”) in form end of cover
2 - Gently tap transfer cap item 1 onto bar and cover assembly using a soft mallet
3 - Line up back edge of transfer cap with mark on the cover
4 - Install transfer cap into support bracket (not shown) at 43 mm (1.7”) centers
5 - Fit items 2, 3, & 4 in the order shown
6 - Tighten item 4 to an Insul 8 recommended torque of 28.4 Nm (20-21 ft. lbs)

TOOLS REQUIRED :

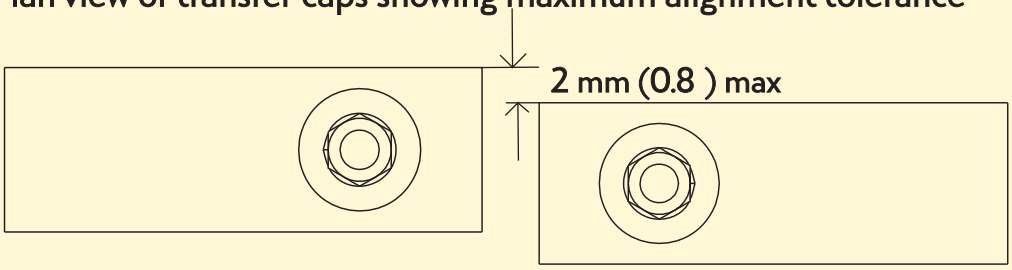
13mm A/F wrench soft mallet

TRANSFER CAP MOUNTING DETAILS :

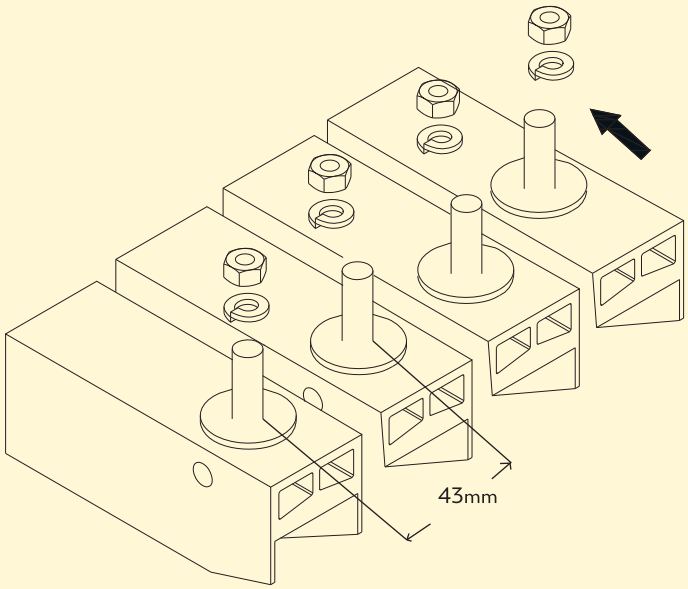
Side view of transfer caps showing maximum alignment tolerance



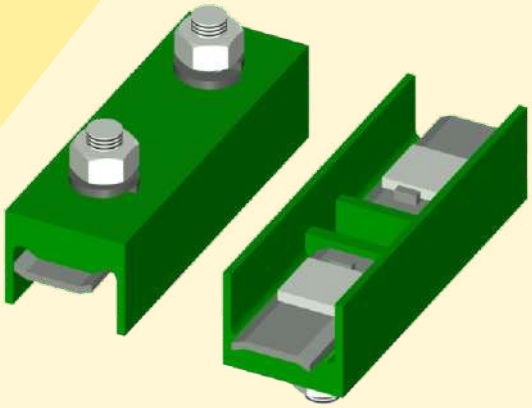
Plan view of transfer caps showing maximum alignment tolerance

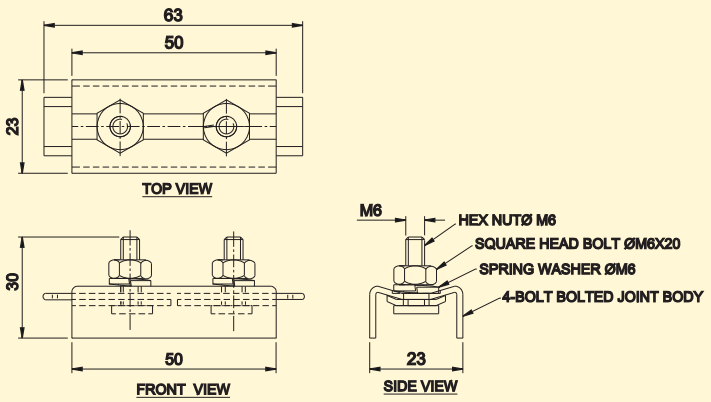


PLEASE NOTE : Where transfer caps are used in a system, Tandem collectors must be used

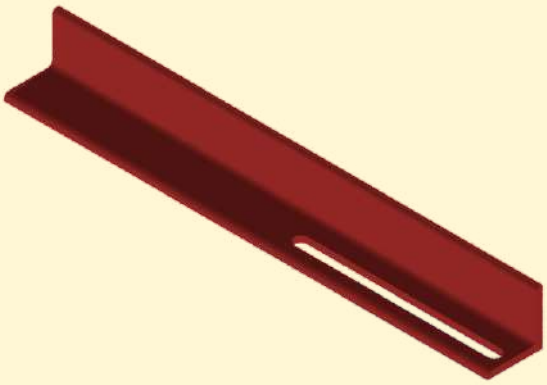


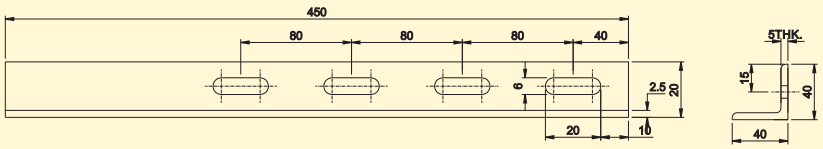
ISOLATION JOINT :





WEB BRACKET :





RECOMMENDED INSTALLATION TOOLS & EQUIPMENT :

1 - Man lift or platform lift for access to the installation location (if required)
2 - Sharp knife - to cut power feed grommets
3 - Straight blade screwdriver - for securing feed cable to collectors and replacing collector shoes
4 - Steel rule or tape measure - to position collectors during installation
5 - Wire/ cable stripper
6 - Cable lug crimping tool (see list of lugs on page 16)
7 - Cordless drill with socket adapter (1/4" or 3/8" driver)
8 - Deep socket for cordless drill
  a - 8mm for anchor cross bolts
  b - 10mm for Splices, Isolation sections and Power feeds
  c - 13mm for mounting hangers, collectors, anchors and transfer caps
9 - Torque wrench for sockets listed above
10 - Open/box end wrenches (use ratcheting box-end wrenches if you have them)
  a - 8mm
  b - 10mm
  c - 13mm
11 - Hacksaw
12 - Flat file and/or rat tail file to remove burrs on field-cut conductors
13 - Pliers

GENERAL ASSEMBLY INSTRUCTIONS :

WARNING : Always lock out/tag out all electrical power before starting work
This manual provides detailed instruction in the general order of system Installation
System Installation consists of 5 phases :

1 - Identifying and organizing the materials.
2 - Installation of brackets along the runway
3 - Pre-install assemblies on the ground
4 - Installation of hangers and conductors and final assembly along the runway
5 - Installation and alignment of collectors on the crane

1 - Identifying and organizing the materials. Check the pack list against the items received. Parts are labeled for your convenience. Review your specific installation layout drawing (if provided) or the typical layout diagram on p.4 to become familiar with component location on the system.

NOTE : Where the anchors, expansions, power feed and other assemblies will be located along the runway. read through these Instructions before starting work.

2 - Install the brackets per the diagram on p.7. Keep them as level and evenly spaced as possible. You may install the hangers on the brackets before or after they are mounted along the runway.

1 - Assemble as much as possible on the ground - it's faster, easier, safer and more convenient should you drop something.
a - Conductor Bar and Expansion section will come from the factory with one splice pre-installed.
b - Install end caps on the end conductors, keeping these separated from the main runway conductors.
c - Roll adjacent conductors into the hangers (per 3 step process) as shown on p.8 Insul-8 recommends the first accessible conductor being the ground conductor.
d - Move down the runway, Install the next inboard conductor and join it to the corresponding conductor installed in step 4c. Install the splice assemblies 6-12" from the hanger brackets to allow for conductor movement from expansion. Repeat for the remaining phases and ground conductors.
e - When you get to where the expansion assemblies are to be installed, refer to instructions on p.12. Be sure to divide the total expansion gap distance (from chart) between the two air gap location in the expansion assembly. (If the total gap setting = 47mm, each air gap will be 23.5mm). Ensure the expansion assembly body is 6-12" from the nearest bracket.
f - Proceed with system installation, ensuring anchors are positioned the correct distance from the expansion and that they are tightened to the correct torque.
g - If a conductor must be cut to a specific length, ensure that the cut end is properly de-bured. The conductor cover is always shorter than bar length , the proper cover length is 66mm (2.60") shorter than bar length. (33mm/1.30" on each end)

When you run the feed cable to the power feed assembly, ensure the cables have sufficient free length and are flexible enough to enable movement of the conductor due to expansion. Locating the power feed as close as possible to the anchors minimizes this concern.
Do not support the weight of the feed cables with the conductors.
h - Install power feeds on conductors bars as per layout and the instructions on p.14.
2 - Collectors must be properly positioned and aligned to ensure safe, reliable operation.
a - The collector mounting post must be 127mm (5.0") for 250A. collector, 102mm (4.0") for 100A. DI collector & 90mm (3.5") for 50A. SI collector, below the contact surface of the conductor and the arms
1 - Identifying and organizing the materials. Check the pack list against the items received. level from end to end.
b - Slide the collectors on the mounting staff. Ensure the mounting base of each collector is centered below the corresponding conductor. Ensure the collectors are evenly spaced. Tighten hardware to specifications and connect the supply cable to the collector per the diagram on p.17.

REMEMBER :

1 - Follow lockout/tagout procedures
2 - Keep accessories at least 6" from hanger brackets
3 - Follow all torque specifications
4 - Allow for movement of accessories due to expansion
5 - Connect only flexible power cables to power feed assemblies
Keep collectors straight, level and aligned with conductors

SYSTEM MAINTENANCE & INSTALLATION NOTES :

1 - Ensure all mains power is Isolated before attempting to install or maintain the system.

2 - Ensure all electrical joints are free from any contamination.

3 - Ensure correct alignment of support brackets.

4 - Ensure for conductor joints are not against hanger clamps. Adequate clearance must be allowed for expansion & contraction.

5 - Ensure correct alignment of collector with conductor bar.

6 - Ensure all power cables are flexible to allow expansion and contraction in the conductor bar system.

7 - Ensure all armored cables terminated into suitable junction box and only flexible cables are installed onto the power feed assemblies.

8 - Ensure conductor bars **DO NOT** support the weight of the main cable.

MAINTENANCE NOTES :

1 - Contact shoes should be checked for wear on monthly bases until a wear pattern can be established.

2 - Check the alignment of collector to conductor bars.

3 - Check conductor system to ensure no damage to insulated cover.

4 - In environments that are subject to considerable build up of dust, especially conductive dust, remove at regular intervals by brushing.

5 - Check collector pivot points are free from any contamination.

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