

Company Directive

STANDARD TECHNIQUE: CA2U/4

Relating to Procedures for Making 11kV Cable EPR Terminations

Policy Summary

This Standard Technique document contains all the approved 11kV cold applied/pour Terminations for EPR cables. It shall be implemented in conjunction with the appropriate General Requirements in ST: CA2C/8.

This ST has not been written as a training document. It is not intended to be exhaustive in content and you must refer to your supervisor if you require training or instruction.

You shall work safely and skilfully, utilising the training/instruction you have already received, relating to the contents of this document and its cross-references.

You must make sure that you understand your job instructions and that you have the necessary tools and equipment for the job.

Author: Peter White

Implementation Date: September 2017

Approved by

Policy Manager

Date:

29 September 2017

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IMPLEMENTATION PLAN

Introduction

This updated Standard Technique defines all the standard 11kV terminations which are available for use on the 11kV underground cable used within.

Main Changes

Document modified to include the (K)400 TB/G separable connector.

Impact of Changes

Minimal, new connector has slightly different measurements

Implementation Actions

Team managers to their 11kV Joints of the new connector and revised dimensions.

Implementation Timetable

This Standard Technique can be implemented with immediate effect.

REVISION HISTORY

Document Revision & Review Table		
Date	Comments	Author
September 2017	Document modified to include the (K)400 TB/G separable connector.	Peter White
April 2016	Document has been modified to take into account the WPD losses strategy and the harmonization of the 11kV cables within the company. New JP for the installation of Euromold surge diverters. Minor changes in the additional items lists.	Peter White
May 2014	Pages 26, 28, 29, 32, 35, 36 and 39 have been modified to reflect the changes that have occurred in ST: OH4H/5 namely the inclusion of the Surge Arrester Adaptor Plate on the outdoor termination.	Peter White
January 2014	Page 6 of Jointing Procedure 7.401 has been modified to rectify an error in the kit list. Page 26 of Jointing Procedure 7.403 has been modified to rectify an error in the kit list.	Peter White
September 2013	Mastic removed from end termination connectors. Drawings JP2D 7.401.2, 7.402.2, 7.403.2, 7.404.2 and 7.409.6 have been modified to show this change along with the text in the relevant Jointing Procedures.	Peter White
April 2013	The changes that have been made to this document are the inclusion of all the 11kV cables and the associated general requirements which have over the years been used in the Midlands Areas and not used in the South Wales and South Western areas, thus providing a unified common document applicable to the whole company. This document now contains all the required the Jointing Procedures associated to the cables used within the enlarged company thus allowing Cable Terminations to be installed on the said cables. Inclusion of Interface C Separable Connectors Jointing Procedures. Rectification of known typographic errors.	Peter White

ST: CA2U/4 - PROCEDURES FOR MAKING 11KV CABLE EPR TERMINATIONS

INTRODUCTION

This Standard Technique document contains all the approved 11kV Terminations, which shall be implemented in conjunction with the appropriate General Requirements, contained in ST: CA2C/8, including: -

1. General Cleanliness and Accident Prevention.
2. Joint Bay Preparation.
3. General Jointing Procedures – Dead Cables.

If the need arises to undertake a termination (i.e. non-standard) not covered within the Standard Technique the Policy Manager, Avonbank, is to be consulted.

As from 1st March 2016 WPD have changed the specification of Approved cable sizes. These changes will affect all new installations and are aimed at reducing cable losses in accordance with the WPD Losses Strategy. This means that the 95mm² triplex and single core cables are now removed from general use, they can only be used for padmounts and the repair of faults in existing 95mm² circuits.

Where 240mm² EPR Triplex is to be found, then for material selection and installation data use 300mm² EPR Triplex; but for the electrical purposes i.e. loadings, ratings etc. then the 240mm² EPR Triplex shall be treated as 185mm² EPR Triplex.

Any reference to EPR equally applies to XLPE.

All crossing of cores will be undertaken outside of the cable box for Indoor Terminations and below the cable cleat of the crucifix for Outdoor Terminations.

Earth Fault Indicators (E.F.I's) are no longer fitted as standard, where there is a requirement then the appropriate procedure/drawing shall be consulted.

Cable boxes that have single core glands on entries (as opposed to three core cable glands) will require the base plate to be split and insulating material placed between the split (prevention of circulating currents), alternatively the base plate is to be of a non-ferrous metal i.e. in stainless steel, brass or aluminium.

NOTE: - 300/400/630mm² Cu EPR single core outdoor terminations are to be constructed at their final erected position.

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ST: CA2U/4 PROCEDURES FOR MAKING 11kV CABLE EPR TERMINATIONS

JOINTING PROCEDURE 7.401

70/95/185/300mm² EPR TRIPLEX CABLE 11kV INDOOR TERMINATION

**(This Jointing Procedure also makes provision for the fitting of an EFI
CT)**

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA2C/8 Section 6
of the 11kV Jointing Manual**

JOINTING PROCEDURE 7.401

TERMINATION KIT MATERIALS

CABLE SIZE: - 70/95/185/300mm² Al. EPR

Termination Kit Materials – Jointing Procedure 7.401										
Cable size	Termination Module CSTI-3121-GB01 (set of 3)	Termination Module CSTI-3131-GB01 (set of 3)	Bushing Boot SMOE 62803 (set of 3)	Connector BAH-02-403-0127	Connector BAH-02-403-0100	Connector VETB 28-12UTB	Connector BET 120-12	Breakout 402W248/S	Tube Set SMOE 28003	Compression gland PG 42
SAC 70mm ²	1	-	1	3	-	-	1	1	1	-
SAC 95mm ²	1	-	1	3	-	-	1	1	1	-
SAC 185mm ²	-	1	1	3	-	-	1	1	1	-
SAC 300mm ²	-	1	1	-	3	-	1	1	1	-
Copper 300mm ²	-	1	1	-	-	3	1	1	1	3

EFI Fitted

70mm² PVC/PVC Copper Earth Tail
Connector BET 120-12

1.5m
2

ADDITIONAL ITEMS FOR EACH TERMINATION

PVC tape
Scotch 70
Scotch 13 tape
Tinned copper wire 16 swg
Tinned copper wire 20 swg
De-solvit 1000 FD
De-solvit 1000
Workhorse dry wipes
Emery cloth
5313 Water block tape
Cable ties
Sealing putty
Aluminium oxide cloth 320 grit
Aluminium oxide cloth 400 grit
Copaslip

Note: - Individual material item numbers (E 5) are to be found in Section 4 of the 11kV Jointing Manual.

As from 1st March 2016 WPD have changed the specification of Approved cable sizes. These changes will affect all new installations and are aimed at reducing cable losses in accordance with the WPD Losses Strategy. This means that the 95mm² triplex and single core cables are now removed from general use, they can only be used for padmounts and the repair of faults in existing 95mm² circuits.

JOINTING PROCEDURE 7.401

Actions

General Requirements (ST: CA2C/8)

Refer to Drawing **JP2D 7.401.1, 7.401.2, 7.401.3, 7.401.4** and **7.401.5** whilst undertaking this Jointing Procedure.

- | | | |
|-----|--|-----|
| 1. | Ensure cable box dimensions are suitable for terminations. | 52 |
| 2. | Unravel and straighten individual cores. | -- |
| 3. | Identify and mark core phasing clear of termination position. | -- |
| 4. | Set and align cores into their termination positions, ensuring that any cross is undertaken well away from termination position. | -- |
| 5. | Clean each oversheath for a distance of 1.5m. | -- |
| 6. | Apply a temporary earth continuity bond clear of termination position. | 10 |
| 7. | Park a mastic lined heat shrink tube next to temporary earth continuity bond of each core. | -- |
| 8. | For Al. conductors - park a heat shrink breakout over cores, turrets first. | -- |
| | For Cu. conductors - park a compression gland over each cable. | 60 |
| 9. | Park gland plate and gland over cores. | -- |
| 10. | Set and mark cores into their required positions. | 5/6 |
| 11. | Cut each core 300mm above its connection point. | -- |
| 12. | Place a connector on each bushing, measure and mark internal depth of barrel onto outside of connector. | -- |
| | This mark becomes the reference point for the procedure. | |
| 13. | Remove oversheaths and bedding tapes. | 16 |
| 14. | Abrade oversheaths. | 17 |
| 15. | Apply a turn of mastic tape around oversheaths. | -- |
| 16. | Straighten copper screen wires and bend back over oversheath termination ensuring copper screen wires are spaced evenly and bedded into mastic tape applied in 15. | -- |

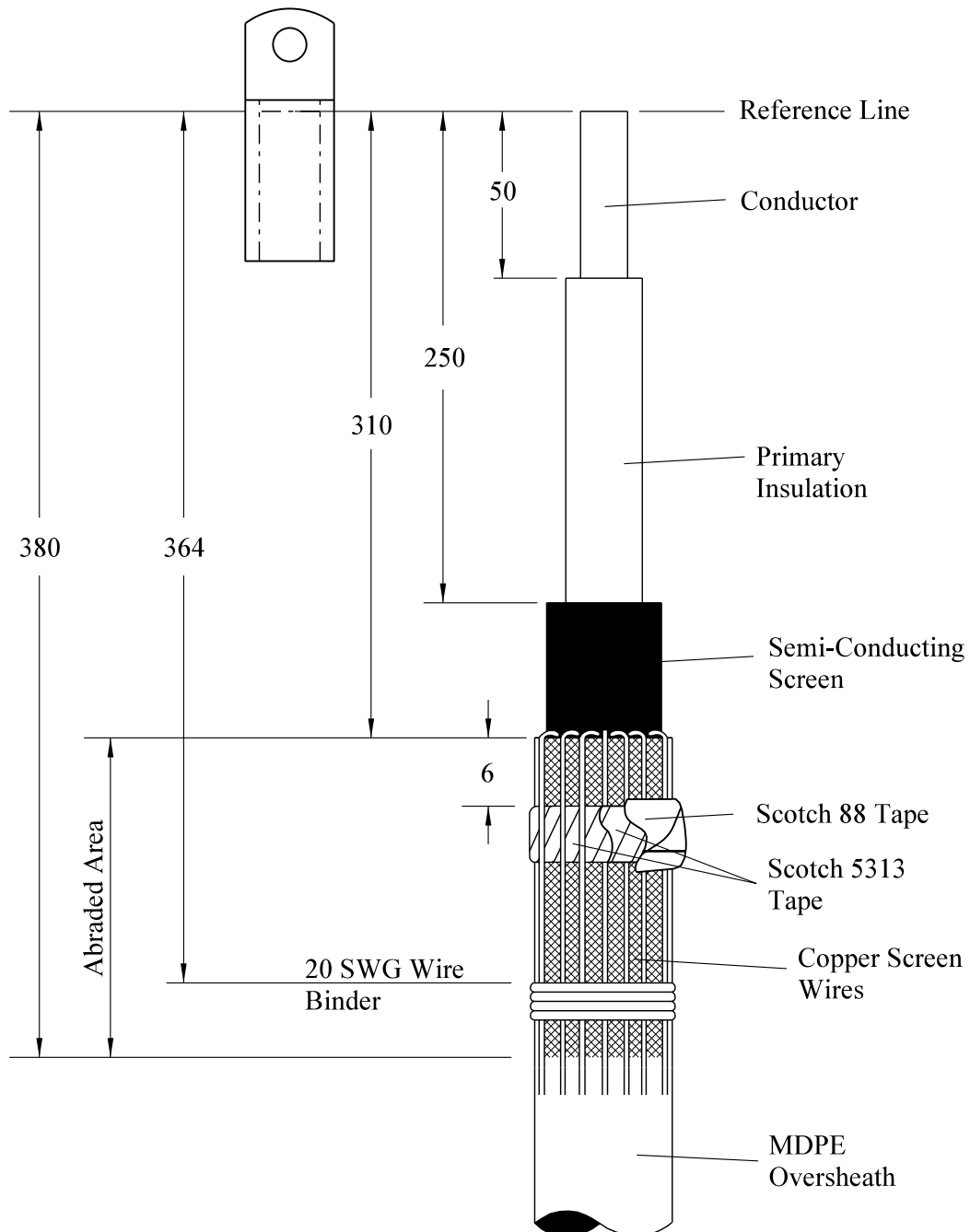
JOINTING PROCEDURE 7.401 - Continued

Actions	General Requirements (ST: CA2C/8)
17. Apply three turns of 20 swg binder over copper screen wires at a point 364mm down from the reference point.	--
18. Apply a second layer of mastic tape over copper screen wires and mastic tape applied in 15.	--
19. Cover mastic tape seal with two layers of Scotch 88 tape overlapping onto copper screen wires by 5mm.	--
20. Offer cores to reference point marked on connectors, mark and cut cores.	25
21. Remove semi-conducting screens ensuring insulation is free from all conductive material.	28
22. Remove connectors from bushings and connect to phase conductors; ensure connector palm is in correct position to bushings before shearing bolts.	31/36
23. Apply silicon grease to the EPR insulation.	--
24. Apply termination bodies.	56
25. Apply four turns minimum of Scotch 88 tape around copper screen wires 10mm below termination body. On top of the Scotch 88 tape apply relevant phase colour PVC tape.	--
Do not apply PVC tape to the termination body.	
26. Form copper screen wires into a bunch and remove 20 swg binder applied in 17.	--
27. Slide cold applied boots onto cores.	57
28. Apply build up tape to centralise cable within gland.	60
29. Fit gland plate to cable box.	--
30. Connect phase connectors to bushings.	--
31. Fit cold applied boots to bushings.	57

JOINTING PROCEDURE 7.401 - Continued

Actions	General Requirements (ST: CA2C/8)
32. Form copper screen wire bunches into one conductor terminating into an earth connector, and connect to earth stud.	36
33. Position heat shrink breakout over gland and shrink into position.	51
Note: - If an EFI is to be fitted move to action 36.	
34. Connect switchgear/transformer earth to gland plate earth stud.	--
35. Remove temporary earth continuity bond applied in 6 and reseal EPR oversheaths.	51
36. Replace cable box cover ensuring all external bolt threads are treated with “Copaslip” paste and security bolts are in place.	--
If EFI's are FITTED	
37. Connect an earth connector to 70mm ² PVC/PVC copper earth tail and connect to gland plate earth stud.	--
Note: - The earth stud must be insulated from the cable box steelwork.	
38. Form earth tail close to cable gland and turn down along with EPR cores, cable tie into position.	--
39. Fit EFI around EPR cores and earth tail.	--
40. Turn earth tail up towards gland plate, fit earth connector and connect to switchgear/transformer earth reference point.	--
41. Complete actions 35 and 36.	--

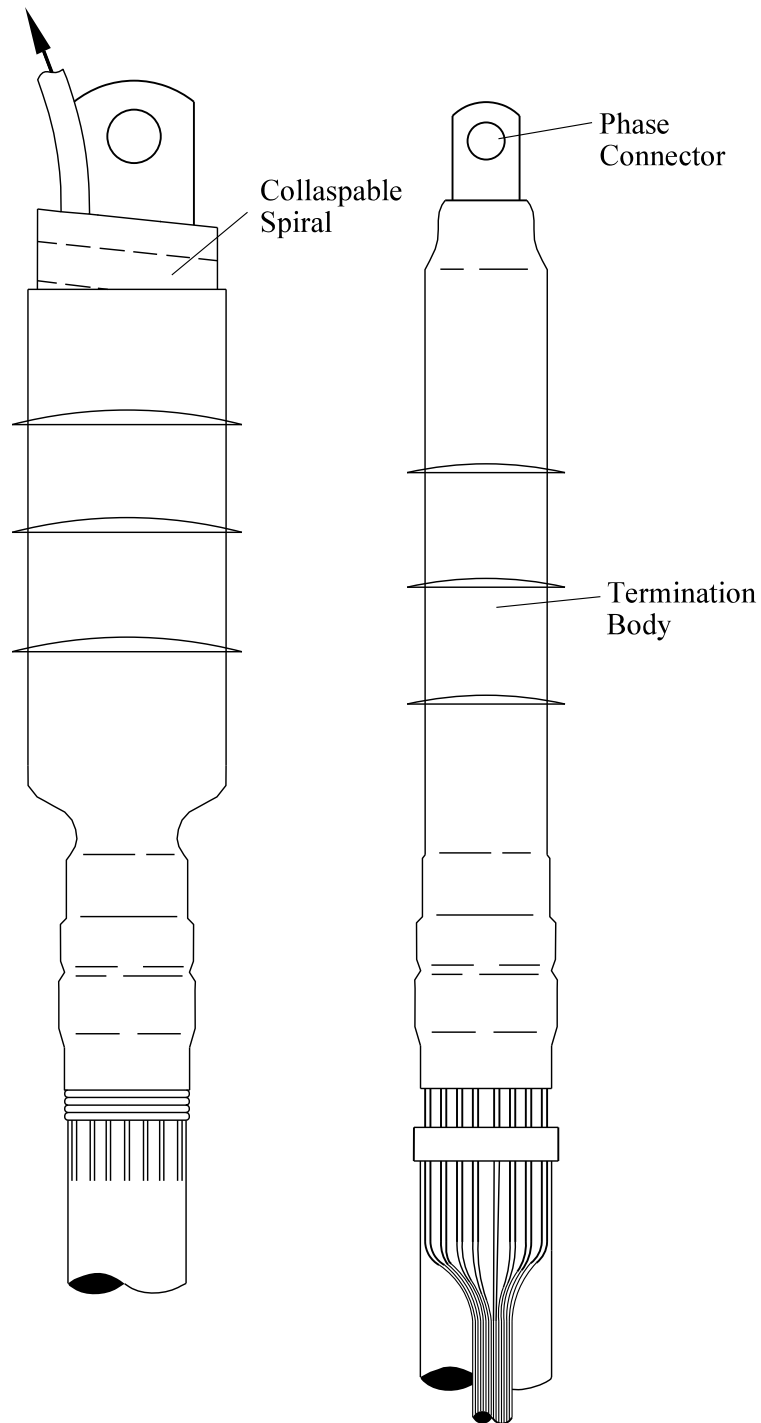
All dimensions in mm




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ORIGINAL	ISSUE	DATE	WESTERN POWER DISTRIBUTION Design Department. Avonbank, Feeder Road, Bristol BS2 0TB Tel: 0117 933 2000 Fax: 0117 933 2001.		
Drawn	RJB	04/13	Title 70/95/185/300mm ² EPR TRIPLEX INDOOR TERMINATION STRIPPING DIMENSIONS		
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Approved			Drg. No. JP2D 7.401.1		
SCALE	N.T.S.		Rev No		

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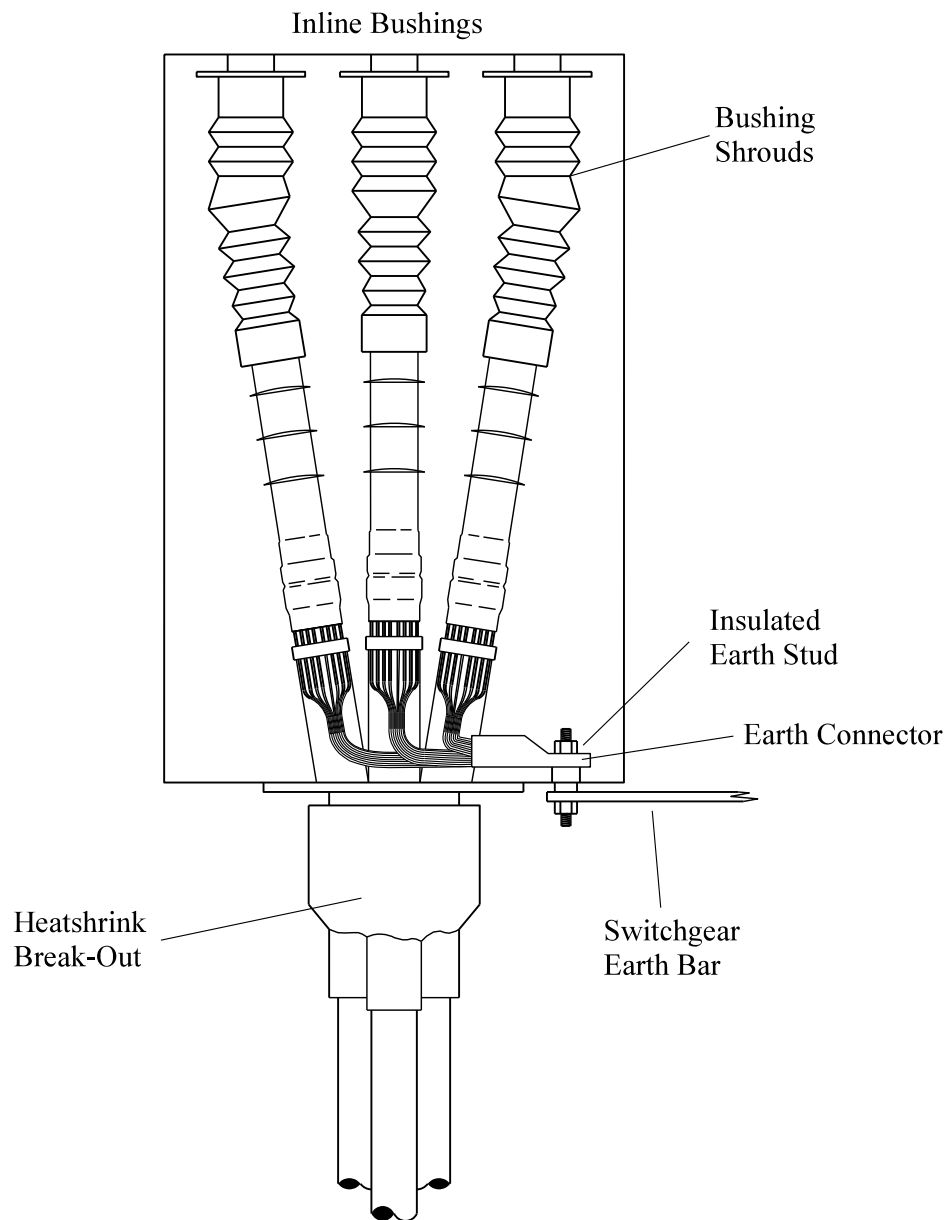
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SCALE		N.T.S.		Title 70/95/185/300mm ² EPR TRIPLEX INDOOR TERMINATION TERMINATION COMPLETION	
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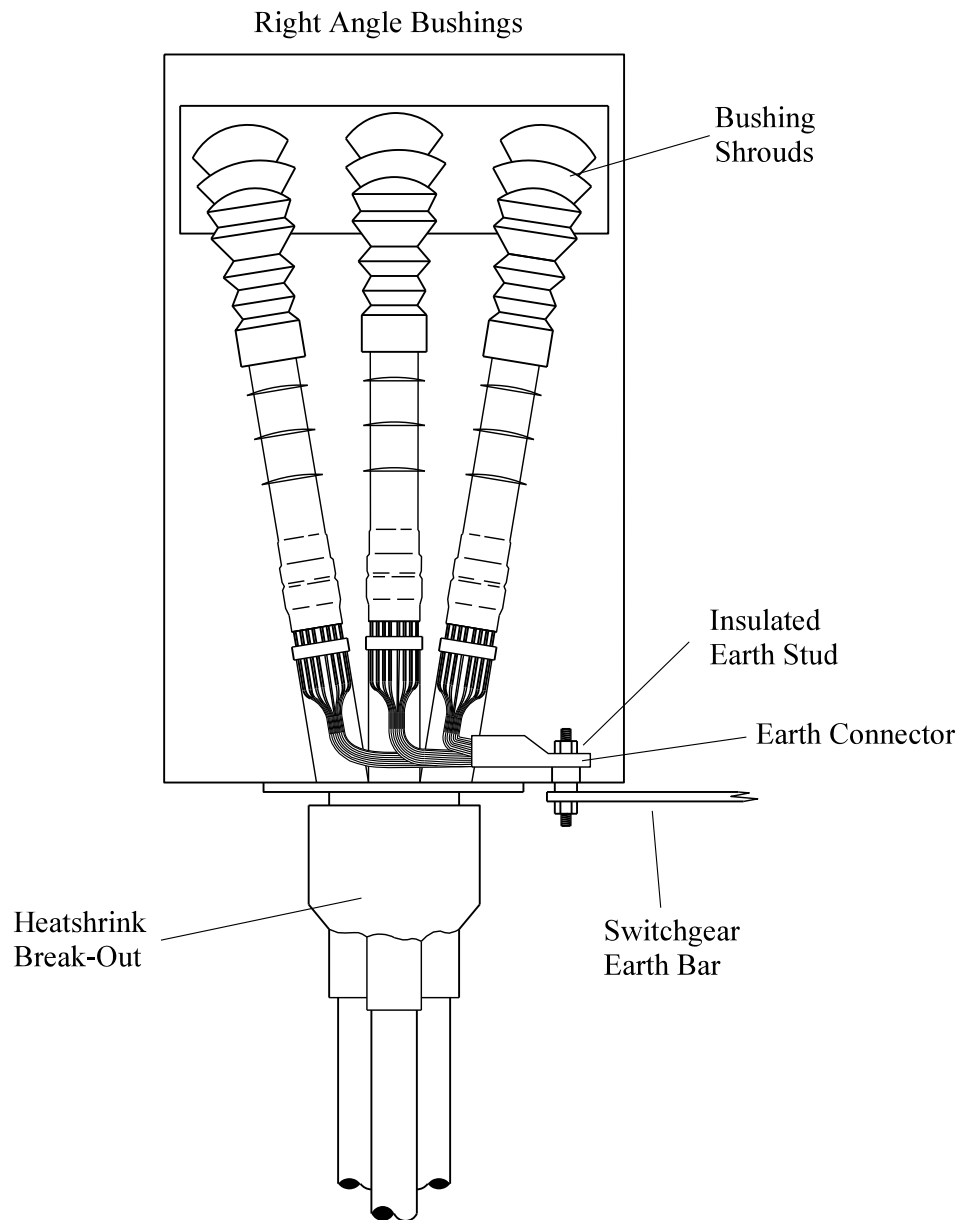
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Drawn	RJB	04/13									
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SCALE		N.T.S.		Title		70/95/185/300mm ² EPR TRIPLEX INDOOR TERMINATION GENERAL LAYOUT		Drg. No. JP2D 7.401.3		Rev No	

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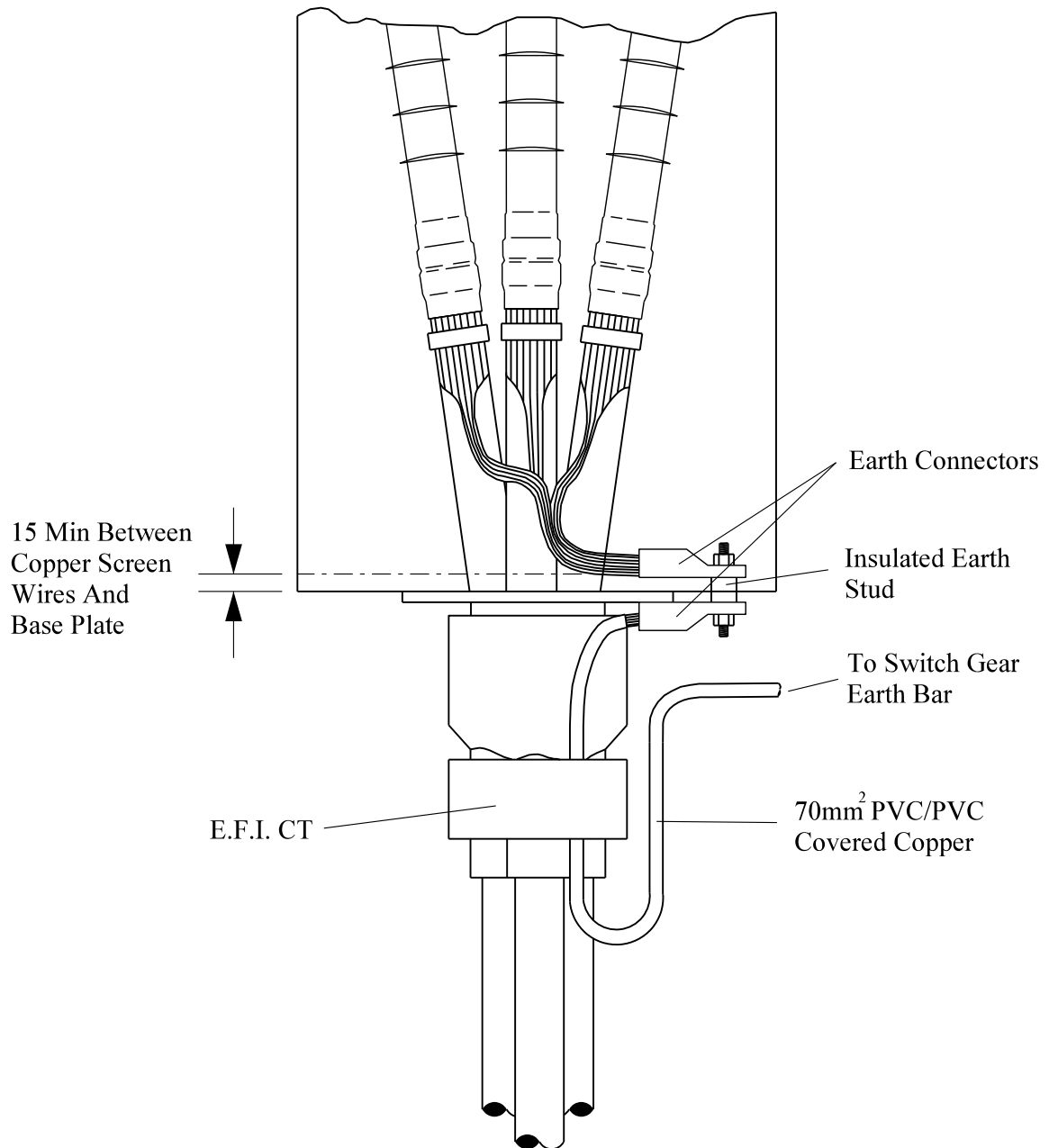
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Drawn	RJB	04/13	Title EARTHING ARRANGEMENT WHEN FITTING A E.F.I. CT		
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ST: CA2U/4 PROCEDURES FOR MAKING 11kV CABLE EPR TERMINATIONS

JOINTING PROCEDURE 7.402

400/630mm² Cu EPR SINGLE CORE CABLE 11kV INDOOR TERMINATION

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA2C/8 Section 6
of the 11kV Jointing Manual**

JOINTING PROCEDURE 7.402

TERMINATION KIT MATERIALS

CABLE SIZE: - 400/630mm² Cu. EPR

Item	Quantity
400mm² Cu. EPR	
Termination Module CSTI-3141-GB01 (set of 3)	1
Bushing Shroud ABB Rule Tape	1
Connector VETB28-12	3
Connector BET-12	1
Sealing Sleeve WCSM 120/40 x350	3
Compression Gland G 2	3

630mm² EPR

Termination Module CSTI-3141-GB01 (set of 3)	1
Bushing Shroud ABB Rule Tape	1
Connector VETB33-12	3
Connector BET-12	1
Sealing Sleeve WCSM 120/40 x350	3
Compression Gland G 2½	3

ADDITIONAL ITEMS FOR EACH TERMINATION

PVC tape
Scotch 70
Scotch 13 tape
Tinned copper wire 16 swg
Tinned copper wire 20 swg
De-solvit 1000 FD
De-solvit 1000
Workhorse dry wipes
Emery cloth
5313 Water block tape
Cable ties
Sealing putty
Aluminium oxide cloth 320 grit
Aluminium oxide cloth 400 grit
Copaslip

Note: - Individual material item numbers (E 5) are to be found in Section 4 of the 11kV Jointing Manual.

JOINTING PROCEDURE 7.402

Actions

General Requirements (ST: CA2C/8)

Refer to Drawing **JP2D 7.402.1, 7.402.2, 7.402.3 and 7.402.4** whilst undertaking this Jointing Procedure.

- | | | |
|-----|--|-----|
| 1. | Ensure cable box dimensions are suitable for terminations. | 52 |
| 2. | Unravel and straighten individual cores. | -- |
| 3. | Identify and mark core phasing clear of termination position. | -- |
| 4. | Set and align cores into their termination positions, ensuring that any cross is undertaken well away from termination position. | -- |
| 5. | Clean each oversheath for a distance of 1.5m. | -- |
| 6. | Apply a temporary earth continuity bond clear of termination position. | 10 |
| 7. | Park a mastic lined heat shrink tube next to temporary earth continuity bond of each core. | -- |
| 8. | For Al. conductors - park a heat shrink breakout over cores, turrets first. | -- |
| | For Cu. conductors - park a compression gland over each cable. | 60 |
| 9. | Park gland plate and gland over cores. | -- |
| 10. | Set and mark cores into their required positions. | 5/6 |
| 11. | Cut each core 300mm above its connection point. | -- |
| 12. | Place a connector on each bushing, measure and mark internal depth of barrel onto outside of connector. | -- |
| | This mark becomes the reference point for the procedure. | |
| 13. | Remove oversheaths and bedding tapes. | 16 |
| 14. | Abrade oversheaths. | 17 |
| 15. | Apply a turn of mastic tape around oversheaths. | -- |
| 16. | Straighten copper screen wires and bend back over oversheath termination ensuring copper screen wires are spaced evenly and bedded into mastic tape applied in 15. | -- |

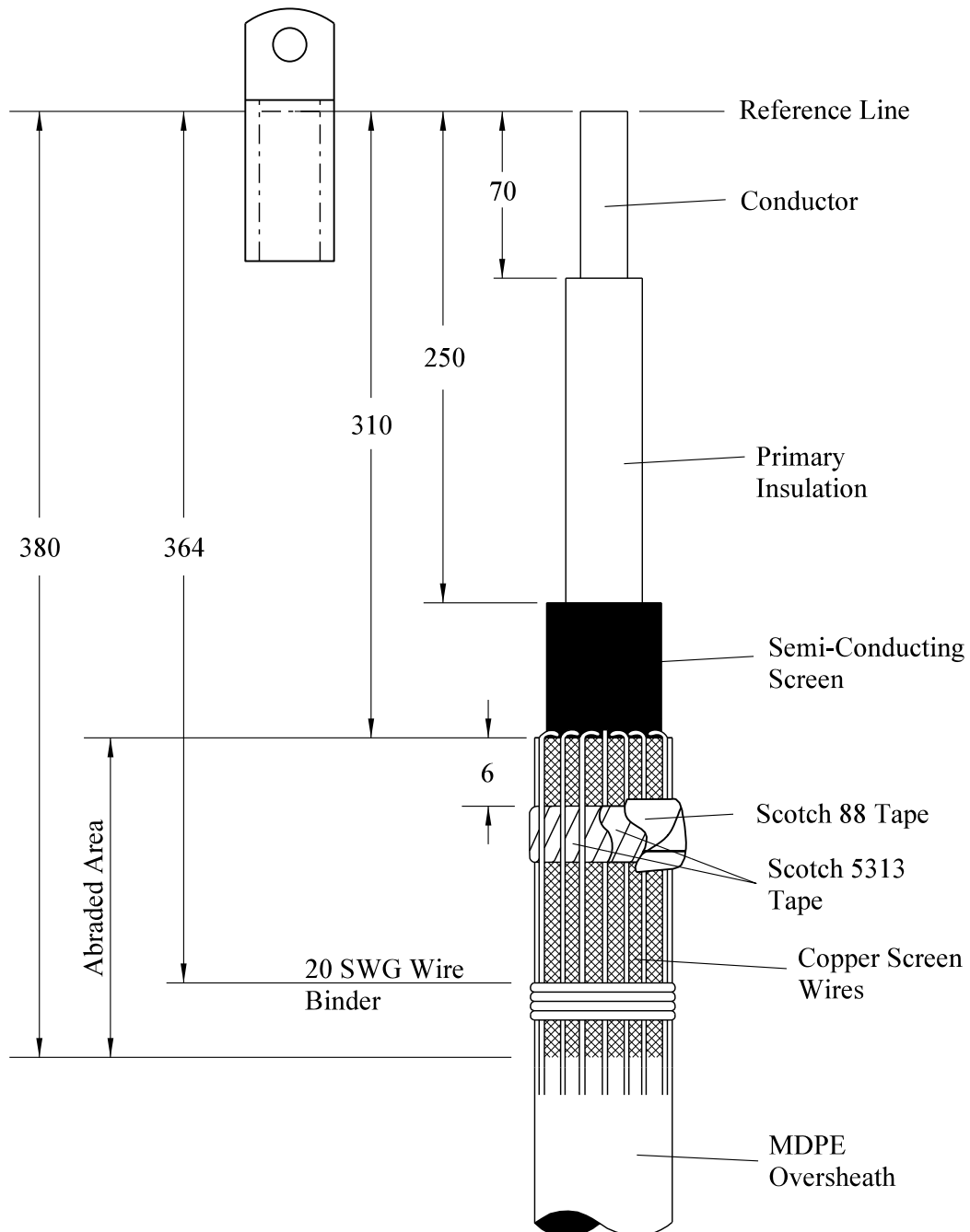
JOINTING PROCEDURE 7.402 - Continued

Actions	General Requirements (ST: CA2C/8)
17. Apply three turns of 20 swg binder over copper screen wires at a point 364mm down from the reference point.	--
18. Apply a second layer of mastic tape over copper screen wires and mastic tape applied in 15.	--
19. Cover mastic tape seal with two layers of Scotch 88 tape overlapping onto copper screen wires by 5mm.	--
20. Offer cores to reference point marked on connectors, mark and cut cores.	25
21. Remove semi-conducting screens ensuring insulation is free from all conductive material.	28
22. Remove connectors from bushings and connect to phase conductors; ensure connector palm is in correct position to bushings before shearing bolts.	31/36
23. Apply silicon grease to the EPR insulation.	--
24. Apply termination bodies.	56
25. Apply four turns minimum of Scotch 88 tape around copper screen wires 10mm below termination body. On top of the Scotch 88 tape apply relevant phase colour PVC tape.	--
Do not apply PVC tape to the termination body.	
26. Form copper screen wires into a bunch and remove 20 swg binder applied in 17.	--
27. Slide cold applied boots onto cores.	57
28. Apply build up tape to centralise cable within gland.	60
29. Fit gland plate to cable box.	--
30. Connect phase connectors to bushings.	--
31. Fit cold applied boots to bushings.	57

JOINTING PROCEDURE 7.402 - Continued

Actions	General Requirements (ST: CA2C/8)
32. Form copper screen wire bunches into one conductor terminating into an earth connector, and connect to earth stud.	36
33. Position heat shrink breakout over gland and shrink into position.	51
34. Connect switchgear/transformer earth to gland plate earth stud.	--
35. Remove temporary earth continuity bond applied in 6 and reseal EPR oversheaths.	51
36. Replace cable box cover ensuring all external bolt threads are treated with “Copaslip” paste and security bolts are in place.	--

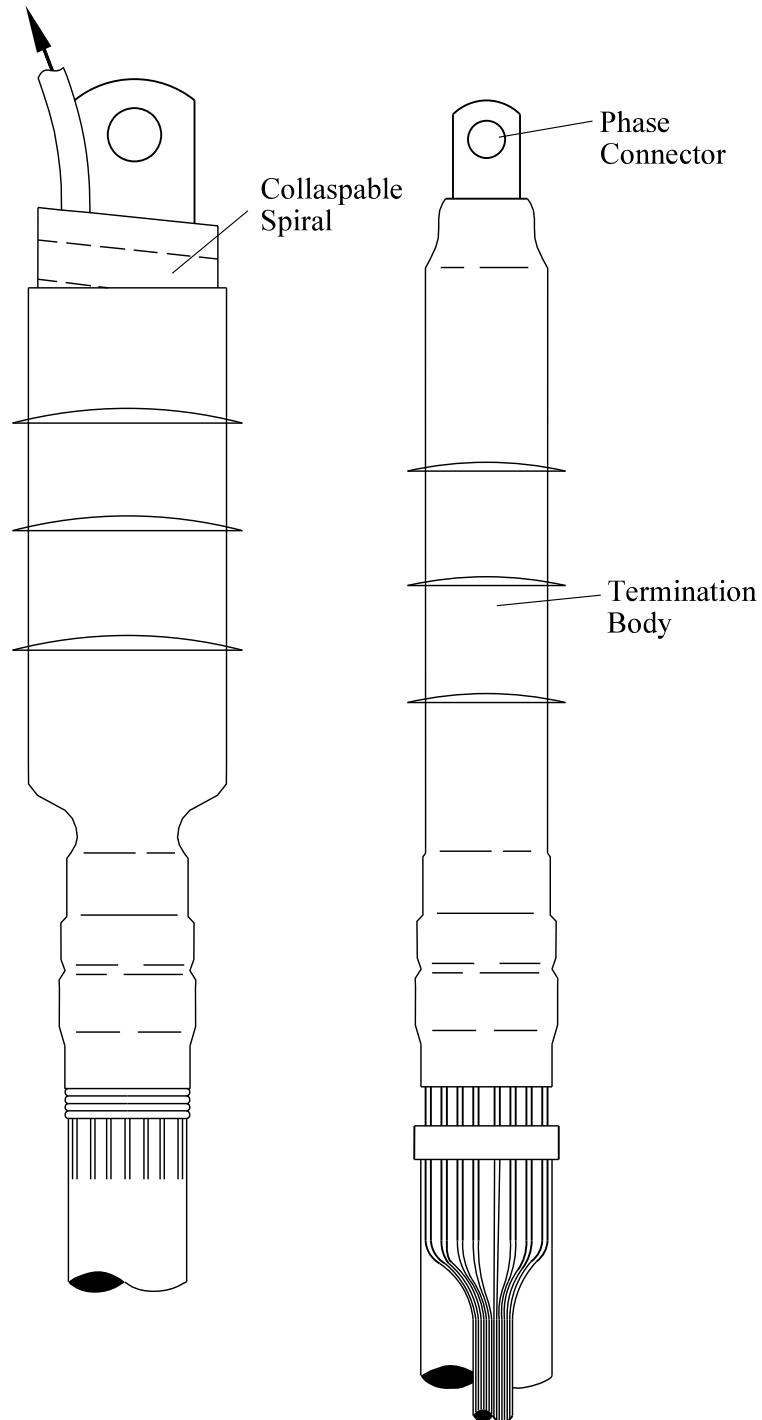
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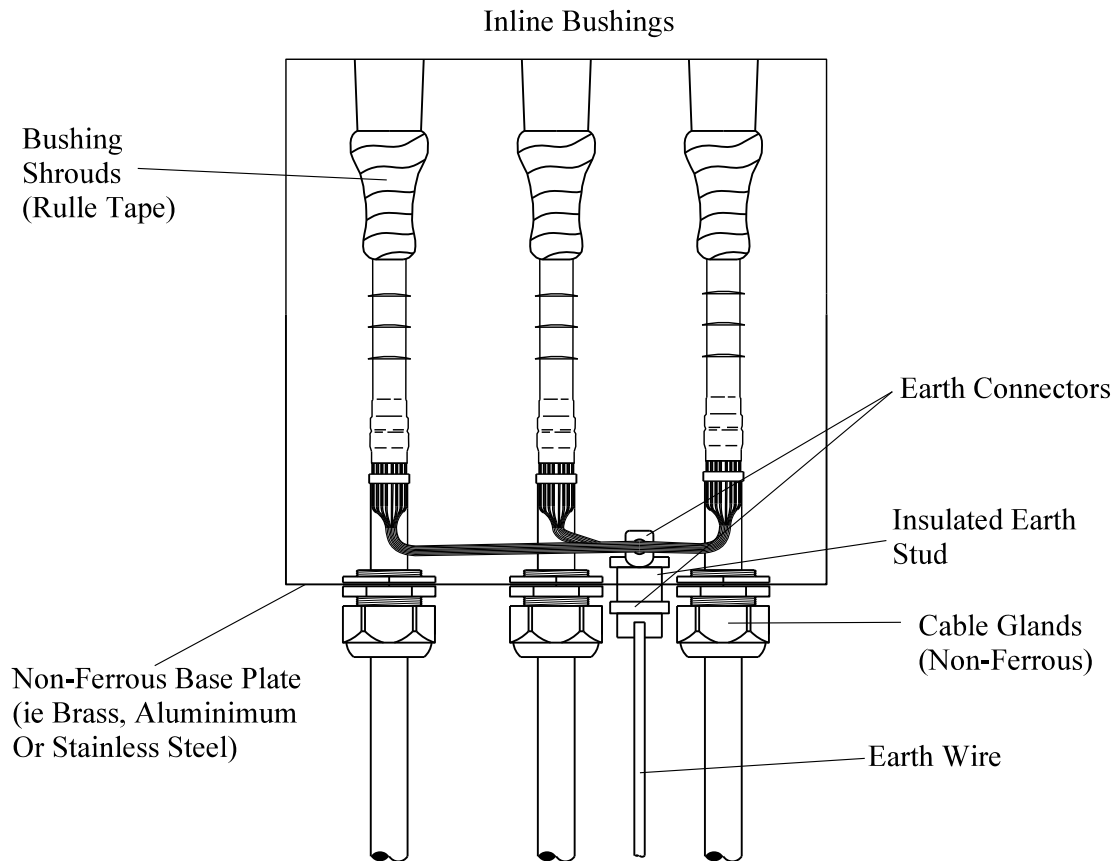
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Drawn	RJB	04/13				
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SCALE		N.T.S.		Title		400/630mm ² EPR SINGLE CORE INDOOR TERMINATION TERMINATION COMPLETION
				Drg. No.		Rev No
				JP2D 7.402.2		1

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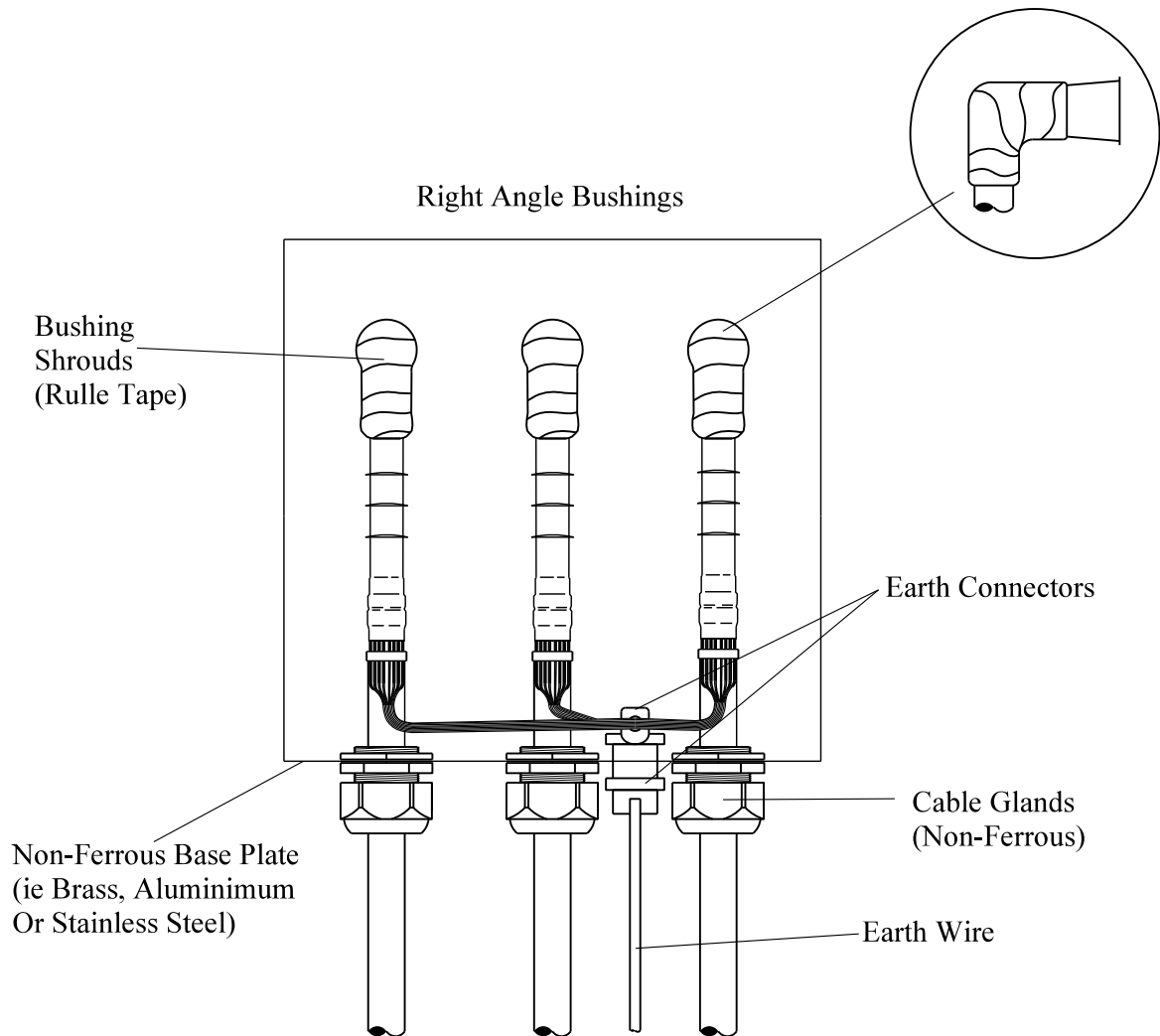
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SCALE	N.T.S.		Title 400/630mm² EPR SINGLE CORE INDOOR TERMINATION GENERAL LAYOUT			Drg. No. JP2D 7.402.3 Rev No

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All dimensions in mm



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Drawn	RJB 04/13					
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Approved						
SCALE	N.T.S.	Title 400/630mm ² EPR SINGLE CORE INDOOR TERMINATION GENERAL LAYOUT				Drg. No. JP2D 7.402.4 Rev No

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ST: CA2U/4 PROCEDURES FOR MAKING 11kV CABLE EPR TERMINATIONS

JOINTING PROCEDURE 7.403

70/95/185/300mm² Al. EPR & 300mm² Cu EPR TRIPLEX CABLE 11kV OUTDOOR TERMINATION

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA2C/8 Section 6
of the 11kV Jointing Manual**

JOINTING PROCEDURE 7.403

TERMINATION KIT MATERIALS

CABLE SIZE: - 70/95/185/300mm² Al. EPR & 300mm² Cu EPR Triplex

Termination Kit Materials – Jointing Procedure 7.403											
Cable size	Termination Module CSTO-3121-GB01 (set of 3)	Termination Module CSTO-3131-GB01 (set of 3)	Surge Diverter (set of 3)	Connector BAH-02-403-0128	Connector BAH-02-403-0129	Connector VETC28 OHUTB	Connector BET 120-12	Crucifix	Surge Arrester Adaptor Plate	Copper earth bar kit	Cable cleat.
SAC 70mm ²	1	-	1	3	-	-	1	1	3	1	1
SAC 95mm ²	1	-	1	3	-	-	1	1	3	1	1
SAC 185mm ²	-	1	1	3	-	-	1	1	3	1	1
SAC 300mm ²	-	1	1	-	3	-	1	1	3	1	1
Copper 300mm ²	-	1	1	-	-	3	1	1	3	1	1

ADDITIONAL ITEMS FOR EACH TERMINATION

PVC tape
Scotch 70
Scotch 13 tape
Tinned copper wire 16 swg
Tinned copper wire 20 swg
De-solvit 1000 FD
De-solvit 1000
Workhorse dry wipes
Emery cloth
5313 Water block tape
Cable ties
Sealing putty
Aluminium oxide cloth 320 grit
Aluminium oxide cloth 400 grit
Heavy-duty cable ties
Copaslip

Note: - Individual material item numbers (E 5) are to be found in Section 4 of the 11kV Jointing Manual.

As from 1st March 2016 WPD have changed the specification of Approved cable sizes. These changes will affect all new installations and are aimed at reducing cable losses in accordance with the WPD Losses Strategy. This means that the 95mm² triplex and single core cables are now removed from general use, they can only be used for padmounts and the repair of faults in existing 95mm² circuits.

JOINTING PROCEDURE 7.403

Actions

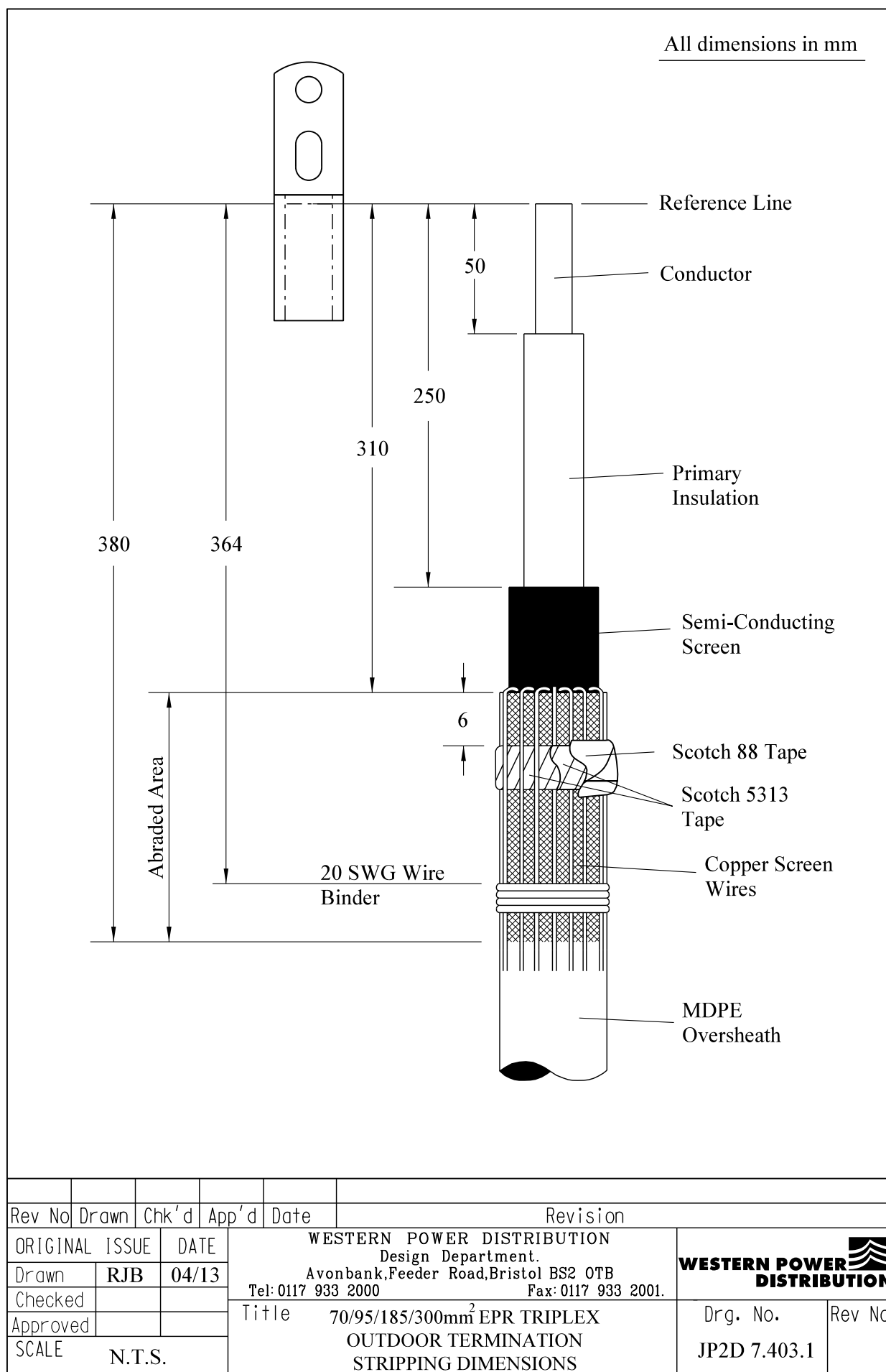
General Requirements (ST: CA2C/8)

Refer to Drawing **JP2D 7.403.1, 7.403.2 and 7.403.3** whilst undertaking this Jointing Procedure.

- | | | |
|-----|--|-----|
| 1. | Obtain required termination height and line phasing. | -- |
| 2. | Assemble crucifix and fit to pole at ground level. | 55 |
| 3. | Set and cut cable to length. | 5/6 |
| 4. | Unravel and straighten individual cores. | -- |
| 5. | Identify and mark core phasing clear of termination position. | -- |
| 6. | Fit cable to crucifix, ensure any crossing is undertaken below crucifix cable cleat. | 5/6 |
| 7. | Set and align cores into their termination positions. | -- |
| 8. | Place a connector on each surge arrester adaptor plate, measure and mark internal depth of barrel onto outside of connector. | -- |
| | This mark becomes the reference point for the procedure. | |
| 9. | Clean each oversheath for a distance of 1.5m. | -- |
| 10. | Remove oversheaths and bedding tapes. | 16 |
| 11. | Abrade oversheaths. | 17 |
| 12. | Apply a turn of mastic tape around oversheaths. | -- |
| 13. | Straighten copper screen wires and bend back over oversheath termination ensuring copper screen wires are spaced evenly and bedded into mastic tape applied in 12. | -- |
| 14. | Apply three turns of 20 swg binder over copper screen wires at a point 364mm down from the reference point. | |
| 15. | Apply a second layer of mastic tape over copper screen wires and mastic tape applied in 12. | -- |
| 16. | Cover mastic tape seal with two layers of Scotch 88 tape overlapping onto copper screen wires by 5mm. | -- |

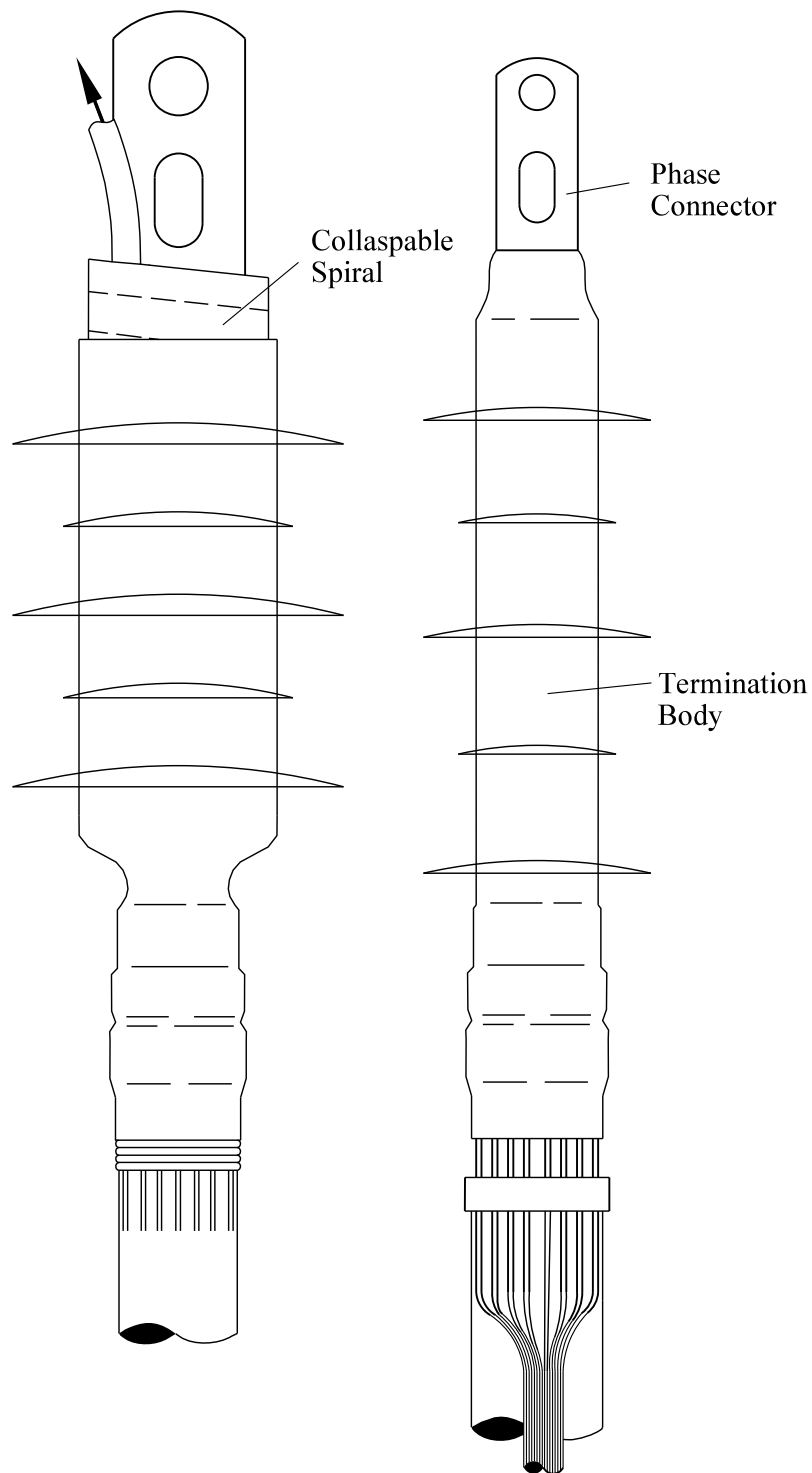
JOINTING PROCEDURE 7.403 – Continued

Actions	General Requirements (ST: CA2C/8)
17. Offer cores to reference point marked on connectors, mark and cut cores.	30
18. Remove semi-conducting screens ensuring insulation is free from all conductive material.	28
19. Remove connectors from the surge arrester adaptor plate and connect to phase conductors; ensure connector palm is in correct position to surge diverters before shearing bolts.	31/36
20. Apply silicon grease to the EPR insulation.	--
21. Apply termination bodies.	56
22. Apply four turns minimum of Scotch 88 tape around copper screen wires 10mm below termination body. On top of the Scotch 88 tape apply relevant phase colour PVC tape.	--
Do not apply PVC tape to the termination body.	
23. Form copper screen wires into a bunch and remove 20 swg binder applied in 14.	--
24. Form copper screen wire bunches into one conductor terminating into a earth connector, and connect to crucifix earth stud.	36
25. Leave completed termination secure prior to erection.	55



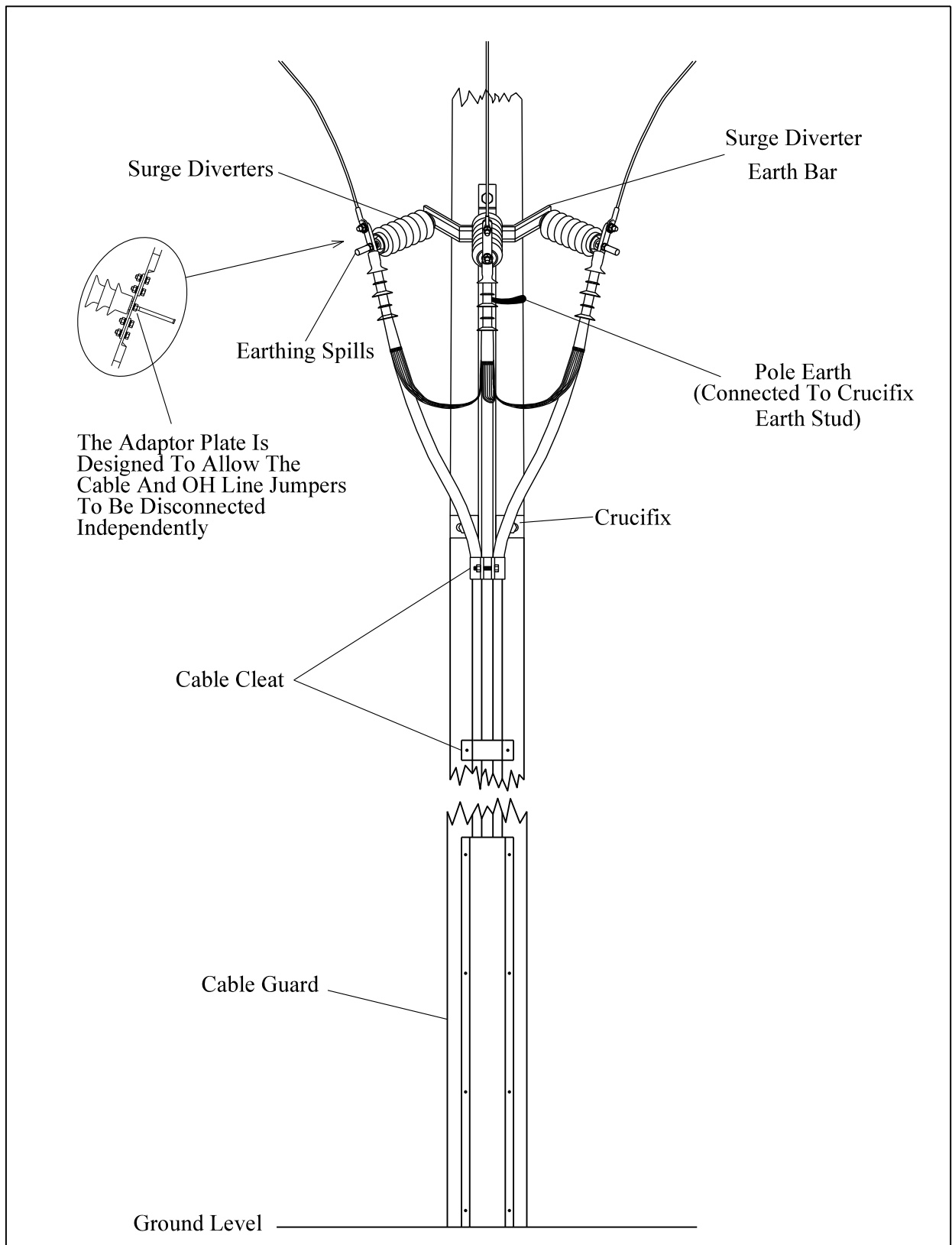
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All dimensions in mm



1	RJB			09/13	INSERT REMOVED	
Rev No	Drawn	Chk'd	App'd	Date	Revision	
ORIGINAL ISSUE		DATE		<div>WESTERN POWER DISTRIBUTION Design Department. Avonbank,Feeder Road,Bristol BS2 0TB Tel: 0117 933 2000 Fax: 0117 933 2001.</div> <div><div>Title70/95/185/300mm² EPR TRIPLEX OUTDOOR TERMINATION TERMINATION COMPLETION</div><div><div>Drg. No. JP2D 7.403.2</div><div>Rev No 1</div></div></div>		
Drawn	RJB	04/13				
Checked						
Approved						
SCALE		N.T.S.				

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1	RJB			05/14	ADAPTOR INSERT ADDED		
Rev No	Drawn	Chk'd	App'd	Date	Revision		
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Drawn	RJB	04/13					
Checked				Title 70/95/185/300mm ² EPR TRIPLEX OUTDOOR TERMINATION GENERAL LAYOUT		Drg. No. JP2D 7.403.3	Rev No 1
Approved							
SCALE		N.T.S.					

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ST: CA2U/4 PROCEDURES FOR MAKING 11kV CABLE EPR TERMINATIONS

JOINTING PROCEDURE 7.404

400/630mm² Cu EPR SINGLE CORE CABLE 11kV OUTDOOR TERMINATION

(This termination is to be constructed at its fixing height)

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA2C/8 Section 6
of the 11kV Jointing Manual**

JOINTING PROCEDURE 7.404

TERMINATION KIT MATERIALS

CABLE SIZE: - 400/630mm² Cu. EPR Single Core

Item	Quantity
400mm² EPR	
Termination Module MOSCX11C-WPD (set of 3)	1
Connector VETC28OHUTB	3
Connector BET 120-12	1
Surge Diverter (set of 3)	1
Crucifix	1
Copper Earth Bar Kit	1
Cable cleat (plus fixing nut, bolt and washers)*	1
Surge arrester adaptor plate	3
630mm² EPR	
Termination Module MOSCX11C-WPD (set of 3)	1
Connector VETC33OHUTB	3
Connector BET 120-12	1
Surge Diverter (set of 3)	1
Crucifix	1
Copper Earth Bar Kit	1
Cable Cleat (plus fixing nut, bolt and washers)*	1
Surge arrester adaptor plate	3

ADDITIONAL ITEMS FOR EACH TERMINATION

PVC tape
Scotch 70
Scotch 13 tape
Tinned copper wire 16 swg
Tinned copper wire 20 swg
De-solvit 1000 FD
De-solvit 1000
Workhorse dry wipes
Emery cloth
5313 Water block tape
Cable ties
Sealing putty
Aluminium oxide cloth 320 grit
Aluminium oxide cloth 400 grit
Copaslip

*** This item for 400mm² and 630mm² cables are a special order from Ellis Patents the part required is an Emperor Cleat type ER40-46 (400mm²) and ER48-55 (630mm²).**

Note: - Individual material item numbers (E 5) are to be found in Section 4 of the 11kV Jointing Manual.

JOINTING PROCEDURE 7.404

Actions

General Requirements (ST: CA2C/8)

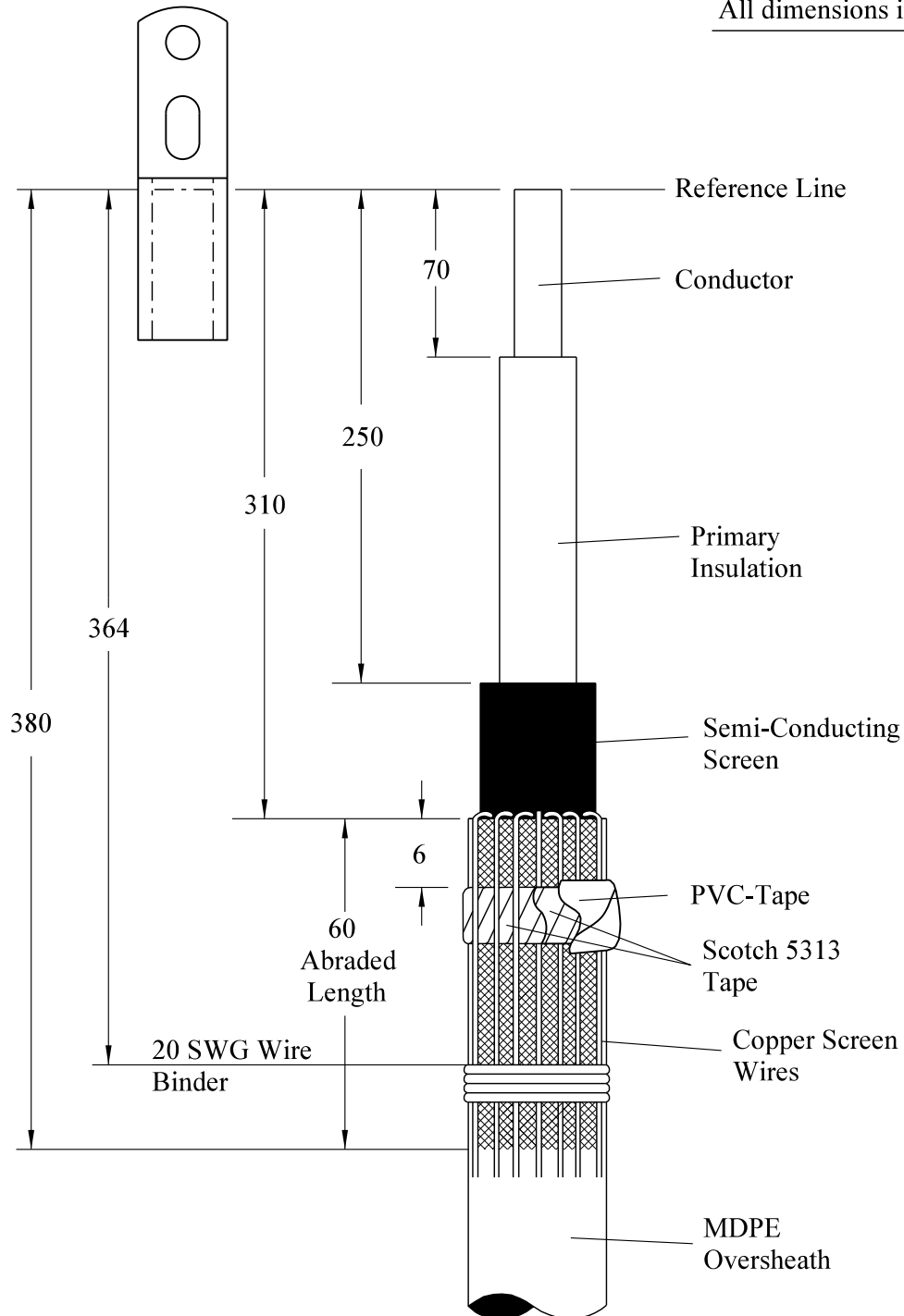
Refer to Drawing **JP2D 7.404.1, 7.404.2 and 7.404.3** whilst undertaking this Jointing Procedure


- | | | |
|-----|--|-----|
| 1. | Obtain required termination height and line phasing. | -- |
| 2. | Assemble crucifix and fit to pole at ground level. | 55 |
| 3. | Set and cut cable to length. | 5/6 |
| 4. | Unravel and straighten individual cores. | -- |
| 5. | Identify and mark core phasing clear of termination position. | -- |
| 6. | Fit cable to crucifix, ensure any crossing is undertaken below crucifix cable cleat. | 5/6 |
| 7. | Set and align cores into their termination positions. | -- |
| 8. | Place a connector on each surge arrester adaptor plate, measure and mark internal depth of barrel onto outside of connector. | -- |
| | This mark becomes the reference point for the procedure. | |
| 9. | Clean each oversheath for a distance of 1.5m. | -- |
| 10. | Remove oversheaths and bedding tapes. | 16 |
| 11. | Abrade oversheaths. | 17 |
| 12. | Apply a turn of mastic tape around oversheaths. | -- |
| 13. | Straighten copper screen wires and bend back over oversheath termination ensuring copper screen wires are spaced evenly and bedded into mastic tape applied in 12. | -- |
| 14. | Apply three turns of 20 swg binder over copper screen wires at a point 364mm down from the reference point. | -- |
| 15. | Apply a second layer of mastic tape over copper screen wires and mastic tape applied in 12. | -- |
| 16. | Cover mastic tape seal with two layers of Scotch 88 tape overlapping onto copper screen wires by 5mm. | -- |

JOINTING PROCEDURE 7.404 – Continued

Actions	General Requirements (ST: CA2C/8)
17. Offer cores to reference point marked on connectors, mark and cut cores.	30
18. Remove semi-conducting screens ensuring insulation is free from all conductive material.	28
19. Remove connectors from surge arrester adaptor plate and connect to phase conductors; ensure connector palm is in correct position to surge diverters before shearing bolts.	31/36
20. Apply silicon grease to the EPR insulation.	--
21. Apply termination bodies.	56
22. Apply four turns minimum of Scotch 88 tape around copper screen wires 10mm below termination body. On top of the Scotch 88 tape apply relevant phase colour PVC tape.	--
Do not apply PVC tape to the termination body.	
23. Form copper screen wires into a bunch and remove 20 swg binder applied in 14.	--
24. Form copper screen wire bunches into one conductor terminating into a earth connector, and connect to crucifix earth stud.	36
25. Leave completed termination secure prior to erection.	55

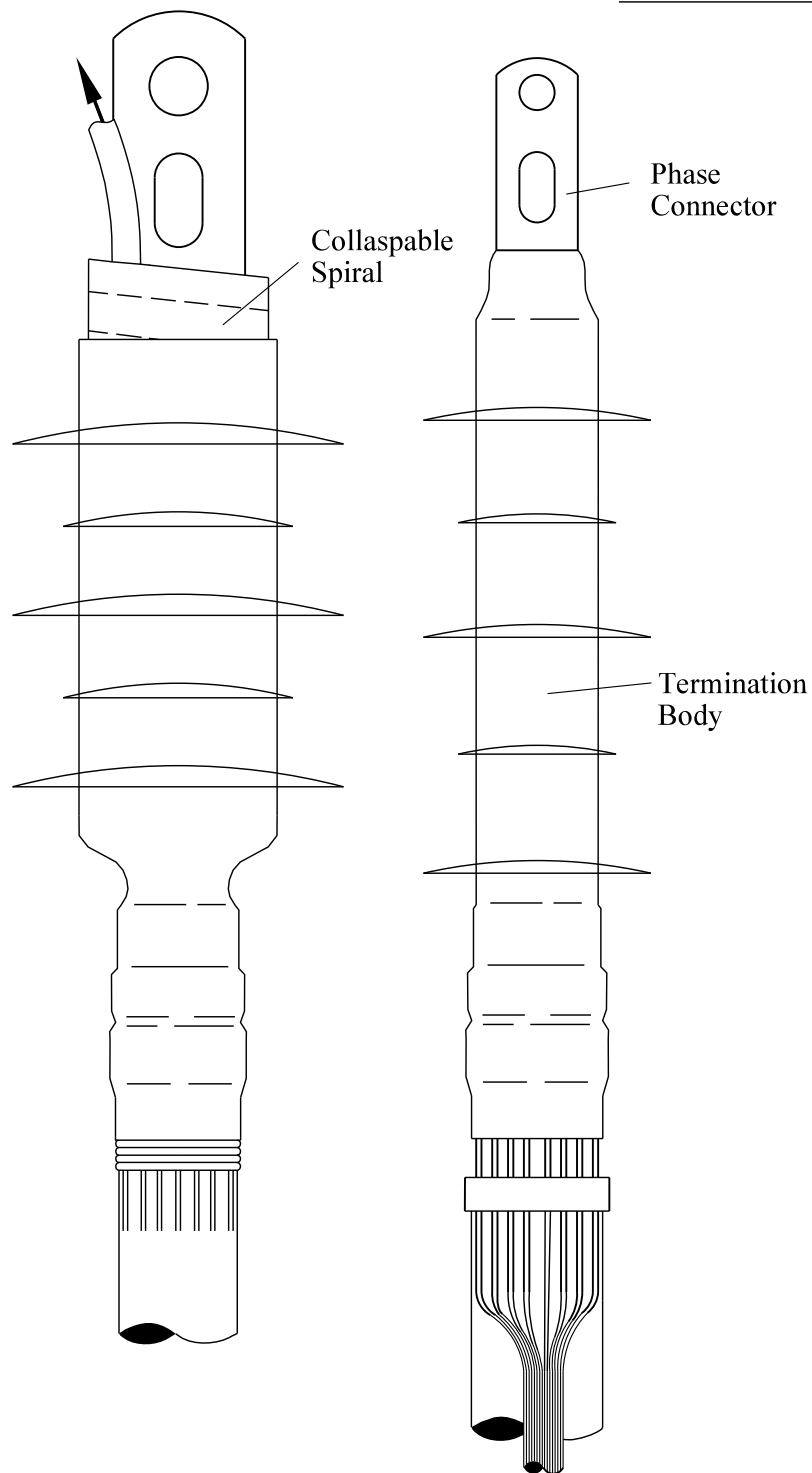
All dimensions in mm




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Drawn	RJB	04/13				
Checked						
Approved						
SCALE	N.T.S.		Title 300/630mm ² Cu EPR SINGLE CORE OUTDOOR TERMINATION STRIPPING DIMENSIONS			Drg. No. JP2D 7.404.1 Rev No

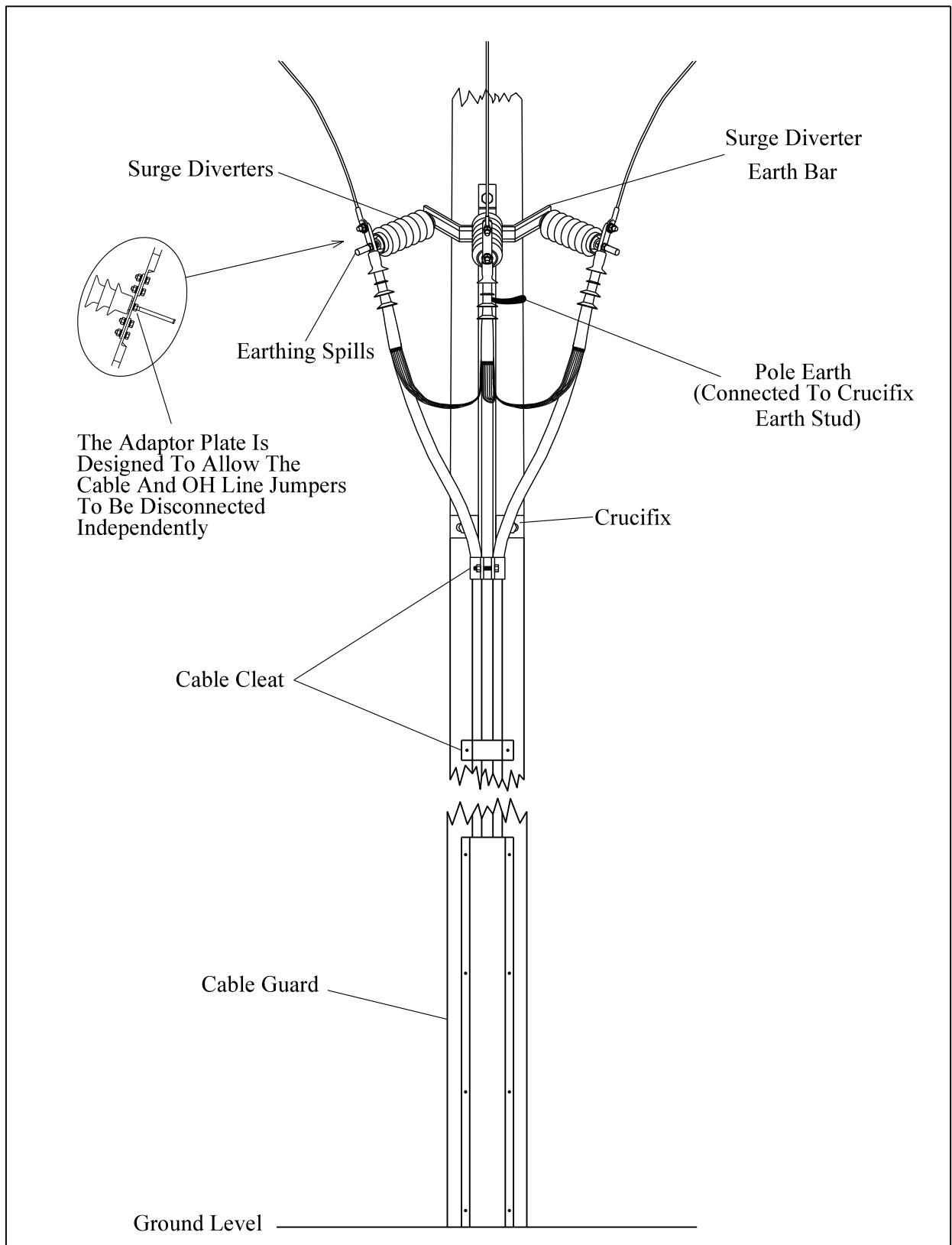
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All dimensions in mm



1	RJB			09/13	DRAWING ALTERED		
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Drawn	RJB	04/13					
Checked				Title 300/630mm ² Cu EPR SINGLE CORE OUTDOOR TERMINATION TERMINATION COMPLETION		Drg. No. JP2D 7.404.2	Rev No 1
Approved							
SCALE		N.T.S.					

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1	RJB			05/14	ADAPTOR INSERT ADDED
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Drawn	RJB	04/13	Title 300/630mm ² Cu EPR SINGLE CORE OUTDOOR TERMINATION GENERAL LAYOUT		
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Approved			Drg. No.		Rev No
SCALE	N.T.S.		JP2D 7.404.3		1

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ST: CA2U/4 PROCEDURES FOR MAKING 11kV CABLE EPR TERMINATIONS

JOINTING PROCEDURE 7.405

95/185/300mm² EPR TRIPLEX CABLE 11kV COMPOUND FILLED TERMINATION

**(This Jointing Procedure also makes provision for Island Layer
Assemblies)**

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA2C/8 Section 6
of the 11kV Jointing Manual**

JOINTING PROCEDURE 7.405

TERMINATION KIT MATERIALS

CABLE SIZE: - 95/185/300mm² EPR Triplex

Item	Quantity
95/185mm² EPR	
Connector BAH-02-403-0127	3
Connector BET-120	2
Stress Cone Module SCM 95/185 (set of 3)	1
Breakout 402W248/S	1
Resin Module RM-B	1
Silicon Compound 4.7 litres	Quantity to suit Cable box
Earth Stud	1
Compression Gland PG42 (for single cable entry only)	3
300mm² EPR	
Connector BAH-02-403-0100	3
Connector BET-120	2
Stress Cone Module SCM 300 (set of 3)	1
Breakout 402W248/S	1
Resin Module RM-B	1
Silicon Compound 47 litres	Quantity to suit Cable box
Earth Stud	1
Compression Gland PG42 (for single cable entry only)	3

Note: - Two part resin packs not used within Resin Module-B must be mixed before disposal.

ADDITIONAL ITEMS FOR EACH TERMINATION

PVC tape
Scotch 70
Scotch 13 tape
Tinned copper wire 16 swg
Tinned copper wire 20 swg
De-solvit 1000 FD
De-solvit 1000
Workhorse dry wipes
Emery cloth
5313 Water block tape
Cable ties
Sealing putty
Aluminium oxide cloth 320 grit
Aluminium oxide cloth 400 grit
Copaslip
Siligasket

Note: - Individual material item numbers (E 5) are to be found in Section 4 of the 11kV Jointing Manual.

As from 1st March 2016 WPD have changed the specification of Approved cable sizes. These changes will affect all new installations and are aimed at reducing cable losses in accordance with the WPD Losses Strategy. This means that the 95mm² triplex and single core cables are now removed from general use, they can only be used for padmounts and the repair of faults in existing 95mm² circuits.

JOINTING PROCEDURE 7.405

CABLE BOX PREPARATION

Before commencing this jointing procedure the following points must be observed and followed.

Where possible the existing cable box should be removed and replaced with new, a new box to fit existing transformers/switchgear may be obtained from Webster Wilkinson Ltd, the details are as follows: -

1. Establish the make and type of transformer/switchgear.
2. Contact Webster Wilkinson Ltd in Telford on 01952 585701 ask for Mr Kevin Allison Sales Manager. Give details of the make and type of switchgear/transformer cable box required. When ordering the new box ask for single cable entry and a stainless steel gland plate, giving the diameter of hole size required to fit the appropriate gland and insulated earth stud. The new cable box must come complete with through bushings.
3. When installing the new gaskets siligasket is to be applied to both surfaces of the new gasket prior to the gasket being fitted, this will provide a leak proof seal.

Where it is not possible to change the complete cable box, then the existing cable box must be prepared as follows: -

1. The bitumen filling compound shall be completely removed from the cable box by using infra-red heating lamps, making sure that the bitumen is captured to prevent an environmental issue and disposed of correctly. The cable box is then to be cleaned with DeSolvit 1000FD.
2. Existing gaskets are to be replaced with new.
3. The cable box is to be drilled to allow an insulated earth stud to be fitted.
4. When installing the new gaskets siligasket is to be applied to both surfaces of the new gasket prior to the gasket being fitted, this will provide a leak proof seal.

JOINTING PROCEDURE 7.405

Actions	General Requirements (ST: CA2C/8)
Refer to Drawing JP2D 7.405.1, 7.405.2 and 7.405.3 whilst undertaking this Jointing Procedure.	
1. Ensure cable box dimensions are suitable for terminations.	71
2. Remove existing and fit new cable box, alternatively prepare existing cable box.	--
3. Unravel and straighten individual cores.	--
4. Identify and mark core phasing clear of termination position.	--
5. Set and align cores into their termination positions, ensuring that any cross is undertaken well away from termination position.	5/6
6. Clean each oversheath for a distance of 1.5m.	--
7. Apply a temporary earth continuity bond clear of termination position.	10
8. Park a mastic lined heat shrink tube next to temporary earth continuity bond of each core.	--
9. Park a heat shrink breakout over cores, turrets first.	--
Note: - The breakout is not required for single cable entry.	
10. Park gland plate and gland over cores.	--
Note: - For single cable entry, compression glands may be used.	
11. Set and mark cores into their required positions.	5/6
12. Cut each core 300mm above its connection point.	--
13. Place a connector on each bushing, measure and mark internal depth of barrel onto outside of connector.	--
This mark becomes the reference point for the procedure.	
14. Remove oversheaths and bedding tapes.	16

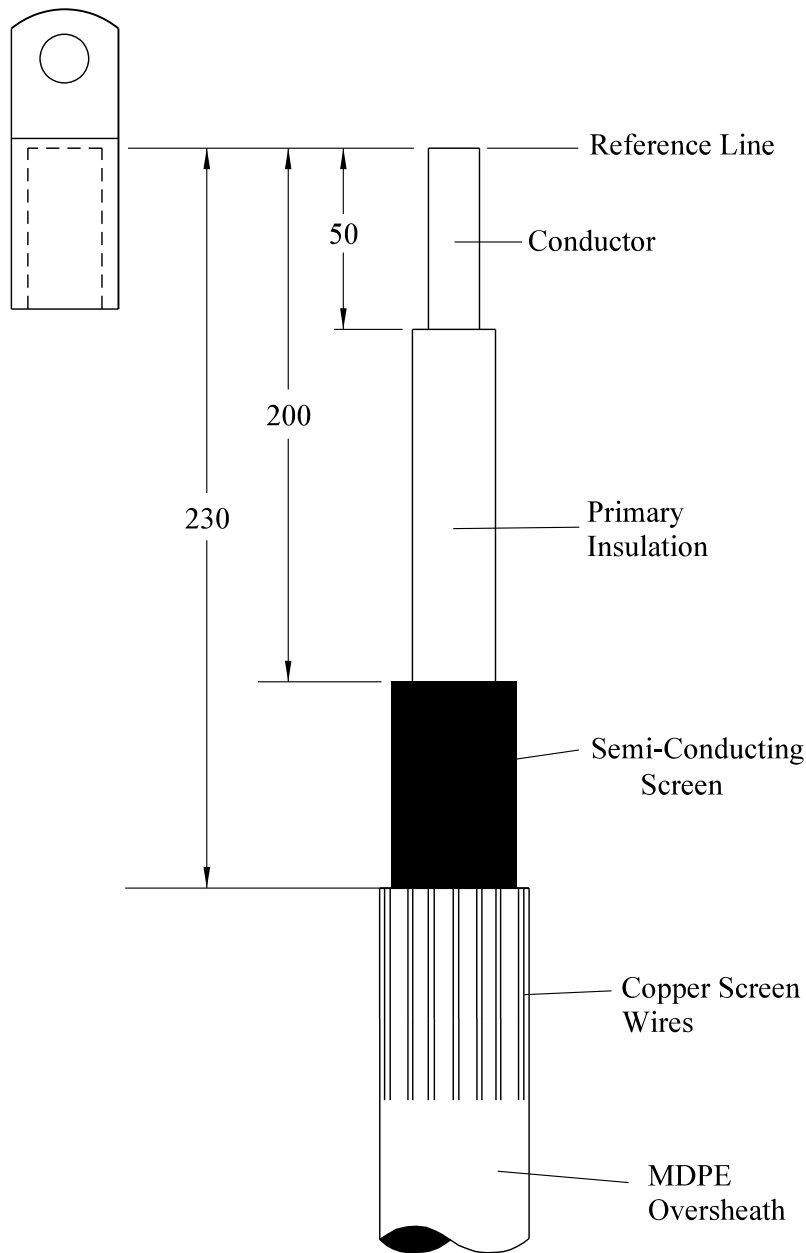
JOINTING PROCEDURE 7.405 – Continued


Actions	General Requirements (ST: CA2C/8)
15. Abrade oversheaths full length of gland.	17
Note: - For compression glands omit this action.	
16. Straighten copper screen wires at oversheath termination point and form into a bunch.	--
17. Offer cores to reference point marked on connectors, mark and cut the cores.	30
18. Remove semi-conducting screens ensuring insulation is free from all conductive material.	28
19. Remove core insulation to allow connector fitting.	31
20. Apply a stress cone to each core.	35
21. Remove connectors from bushings and connect to phase conductors, ensure connector palm is in correct position to bushings before shearing bolts.	36
22. Apply build up tape to centralise cable within gland.	60
23. Fit gland plate to cable box.	--
Note: - Where compression glands are to be installed they will be fitted at this point and move to action 28.	
24. Position heat shrink breakout over gland and shrink into position.	51
25. Position cores into their final position maintaining a gap between each core and gland inner face.	--
26. Connect phase connectors to bushings.	--
27. Fill gland with “Lovifit” glue and allow to harden.	39
28. Form copper screen wire bunches into one conductor terminating into an earth connector, and connect to earth stud.	36

JOINTING PROCEDURE 7.405 – Continued

Actions	General Requirements (ST: CA2C/8)
29. Connect switchgear/transformer earth to gland plate earth stud.	--
Note: - For Island layer assemblies the earth must be insulated from the cable box steelwork.	
30. Remove temporary earth continuity bond applied in 7 and reseal EPR oversheaths.	51
31. Replace cable box cover ensuring all external bolt threads are treated with “Copaslip” paste.	--
32. Fill cable box with silicon compound to required level and replace filling cover; ensure external bolt threads are treated with “Copaslip” paste.	--
33. Mix and dispose correctly the un-used Pu resin.	

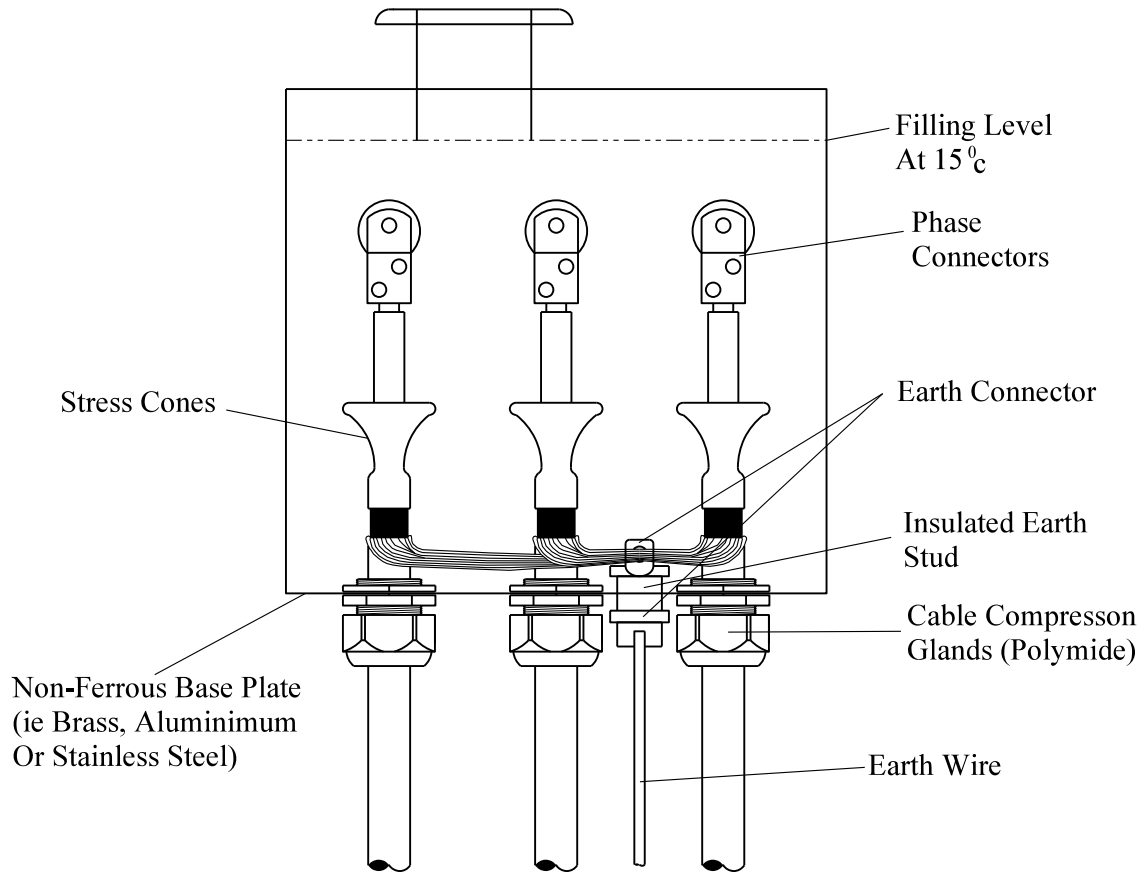
All dimensions in mm



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Drawn	RJB	04/13				
Checked						
Approved						
SCALE N.T.S.			Title 95/185/300mm² EPR TRIPLEX COMPOUND FILLED TERMINATION STRIPPING DIMENSIONS			Drg. No. JP2D 7.405.1
						Rev No

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All dimensions in mm



NOTE:- 1. Minimum Distance Between Centre Of Connection Point And Base Plate Is To Be 300mm.

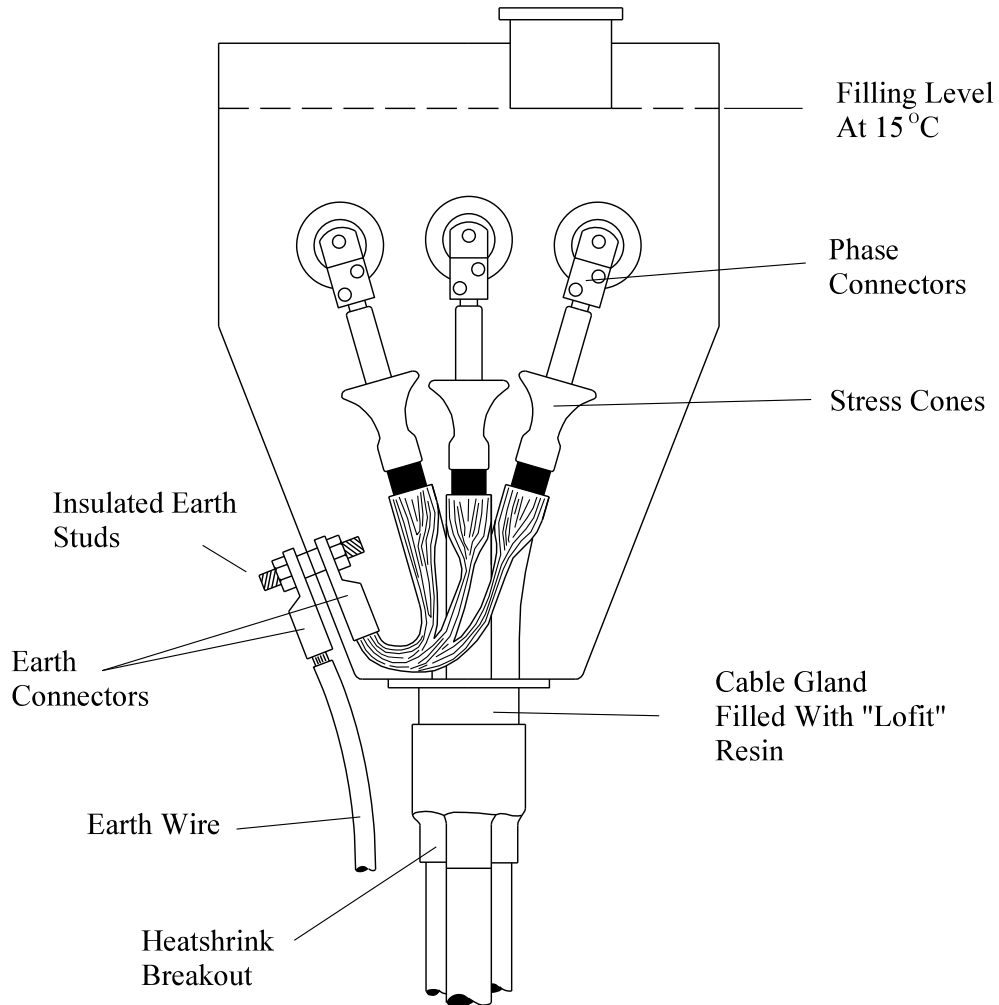
2. Cable Box To Be Filled Only With Lowsil Cold Pour Compound.

3. The Cable Compression Glands Must Have A Sealing Ring Between The Gland Plate And Gland.

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Drawn	RJB	04/13			
Checked				<div>Title 95/185/300mm² EPR TRIPLEX COMPOUND FILLED TERMINATION GENERAL LAYOUT</div> <div>Drng. No. JP2D 7.405.2</div> <div>Rev No</div>	
Approved					
SCALE		N.T.S.			

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All dimensions in mm



- Note:- 1. Minimum Distance Between Centre Of Connection Point And Base Plate Is To Be 300mm
2. Cable box To Be Filled Only With Lovisil Cold Pour compound

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Drawn	RJB	04/13	Title 95/185/300mm ² EPR TRIPLEX COMPOUND FILLED TERMINATION GENERAL LAYOUT		
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Approved			Drg. No. JP2D 7.405.3		Rev No
SCALE		N.T.S.			

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ST: CA2U/4 PROCEDURES FOR MAKING 11kV CABLE EPR TERMINATIONS

JOINTING PROCEDURE 7.406

RECOMPOUNDING OF 11kV COMPOUND FILLED TERMINATION

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA2C/8 Section 6
of the 11kV Jointing Manual**

JOINTING PROCEDURE 7.406

TERMINATION KIT MATERIALS

CABLE SIZE: - Existing Cables

Item	Quantity
Silicon Compound 4.7 litres	Quantity to suit
New gasket for the cable box	1
Siligasket	1

ADDITIONAL ITEMS FOR EACH TERMINATION

PVC tape
Scotch 70
Scotch 13 tape
Tinned copper wire 16 swg
Tinned copper wire 20 swg
De-solvit 1000 FD
De-solvit 1000
Workhorse dry wipes
Emery cloth
5313 Water block tape
Cable ties
Sealing putty
Aluminium oxide cloth 320 grit
Aluminium oxide cloth 400 grit
Copaslip

Note: - Individual material item numbers (E 5) are to be found in Section 4 of the 11kV Jointing Manual.

As from 1st March 2016 WPD have changed the specification of Approved cable sizes. These changes will affect all new installations and are aimed at reducing cable losses in accordance with the WPD Losses Strategy. This means that the 95mm² triplex and single core cables are now removed from general use, they can only be used for padmounts and the repair of faults in existing 95mm² circuits.

JOINTING PROCEDURE 7.406

CABLE BOX PREPARATION

Before commencing this jointing procedure the following points must be observed and followed.

The existing cable box must be prepared as follows: -

1. The bitumen filling compound shall be completely removed from the cable box by using infra-red heating lamps, making sure that the bitumen is captured to prevent an environmental issue and disposed of correctly. The cable box is then to be cleaned.
2. Existing gaskets are to be replaced with new.
3. When installing the new gaskets siligasket is to be applied to both surfaces of the new gasket prior to the gasket being fitted, this will provide a leak proof seal.

JOINTING PROCEDURE 7.406

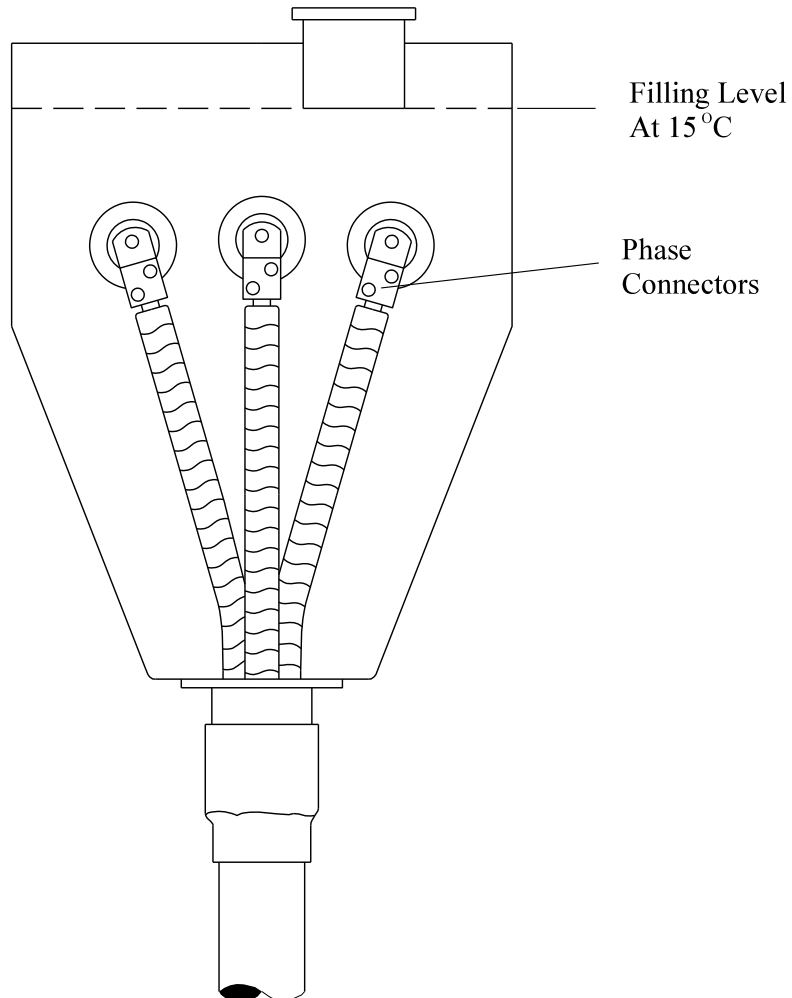
Actions

General Requirements (ST: CA2C/8)


Refer to Drawing JP2D 7.406.1 whilst undertaking this Jointing Procedure.

- | | | |
|----|---|----|
| 1. | The bitumen filling compound shall be completely removed from the cable box by using infra-red heating lamps, making sure that the bitumen is captured to prevent an environmental issue. | -- |
| 2. | The cable box is then to be cleaned. | -- |
| 3. | Existing gaskets are to be replaced with new. | |
| 4. | When installing the new gaskets siligasket is to be applied to both surfaces of the new gasket prior to the gasket being fitted, this will provide a leak proof seal. | -- |
| 5. | Replace cable box cover ensuring all external bolt threads are treated with "Copaslip" paste. | -- |
| 6. | Fill cable box with Lovisil silicon compound to required level. | -- |
| 7. | Replace filling cover. | -- |

All dimensions in mm



- Note:-
1. Using Infra-Red Lamps Burn Out Existing Bitumen Compound. Then Clean Cable Box.
 2. Ensure The Siligasket Is Applied To Both Sides Of New Gasket
 3. Cable box To Be Filled Only With Lovisil Cold Pour Compound

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SCALE	N.T.S.		Title RECOMPOUNDING FILLED TERMINATION GENERAL LAYOUT			Drg. No. JP2D 7.406.1
						Rev No

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ST: CA2U/4 PROCEDURES FOR MAKING 11kV CABLE EPR TERMINATIONS

JOINTING PROCEDURE 7.407

630mm² EPR SINGLE CORE CABLE 11kV COMPOUND FILLED TERMINATION

(This Jointing Procedure also makes Provision for Island Layer Assemblies)

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA2C/8 Section 6
of the 11kV Jointing Manual**

JOINTING PROCEDURE 7.407

TERMINATION KIT MATERIALS

CABLE SIZE: - 630mm² EPR Single Core

Item	Quantity
630mm² EPR	
Connector VETB33-12 UTB	3
Connector BET 120-12	2
Stress Cone Module SCM 630 (set of 3)	1
Sealing Sleeve WCSM 120/40x350	3
Resin Module RM-B	1
Silicon Compound 4.7 litres	Quantity to suit cable box
Aluminium Cable Gland EAKT 1608 (set of 3)	3

Note: - Two part resin packs not used within Resin Module-B must be mixed before disposal.

ADDITIONAL ITEMS FOR EACH TERMINATION

PVC tape
Scotch 70
Scotch 13 tape
Tinned copper wire 16 swg
Tinned copper wire 20 swg
De-solvit 1000 FD
De-solvit 1000
Workhorse dry wipes
Emery cloth
5313 Water block tape
Cable ties
Sealing putty
Aluminium oxide cloth 320 grit
Aluminium oxide cloth 400 grit

Note: - Individual material item numbers (E 5) are to be found in Section 4 of the 11kV Jointing Manual.

JOINTING PROCEDURE 7.407

CABLE BOX PREPARATION

Before commencing this jointing procedure the following points must be observed and followed.

Where possible the existing cable box should be removed and replaced with new.

A new box to fit existing transformers/switchgear may be obtained from Webster Wilkinson Ltd, the details are as follows: -

1. Establish the make and type of transformer/switchgear.
2. Contact Webster Wilkinson Ltd in Telford on 01952 585701 ask for Mr Kevin Allison Sales Manager. Give details of the make and type of switchgear/transformer cable box required. When ordering the new box ask for single cable entry and a stainless steel gland plate, giving the diameter of hole size required to fit the appropriate gland and insulated earth stud. The new cable box must come complete with through bushings.

Where it is not possible to change the complete cable box, then the existing cable box will be prepared as follows: -

1. The bitumen filling compound shall be completely removed from the cable box by using infra-red heating lamps, making sure that the bitumen is captured to prevent an environmental issue and disposed of correctly. The cable box is then to be cleaned.
2. Existing gaskets are to be replaced with new.
3. The cable box is to be drilled to allow an insulated earth stud to be fitted.

JOINTING PROCEDURE 7.407

Actions

General Requirements (ST: CA2C/8)

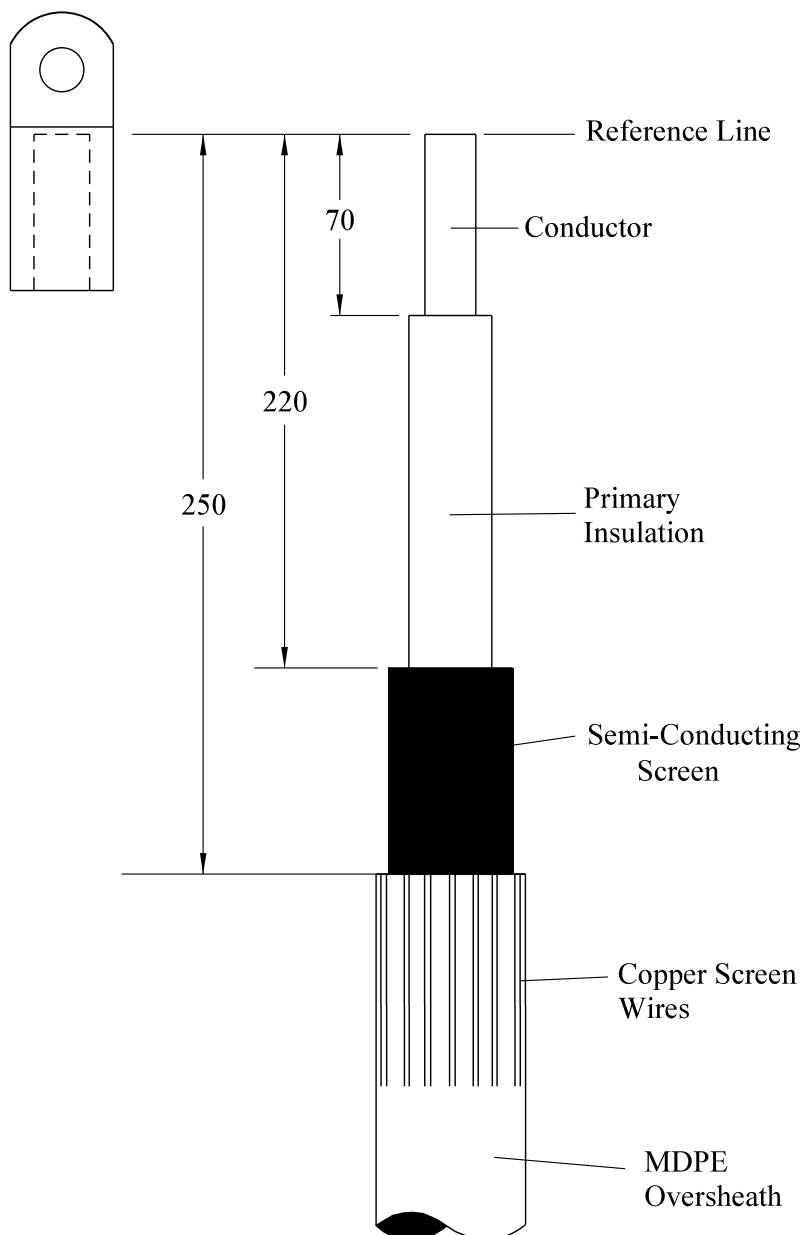
Refer to Drawing **JP2D 7.407.1** and **7.407.2** whilst undertaking this Jointing Procedure.

1.	Ensure cable box dimensions are suitable for terminations.	71
2.	Remove existing and fit new cable box, alternatively prepare existing cable box.	--
3.	Identify and mark cable phasing clear of the termination position.	--
4.	Set and align cables into their termination positions.	5/6
5.	Clean each oversheath for a distance of 1.5m.	--
6.	Apply a temporary earth continuity bond clear of termination position.	10
7.	Park a mastic lined heat shrink tube next to temporary earth continuity bond of each cable.	--
8.	Park a mastic lined heat shrink sealing sleeve over each cable.	--
9.	Park gland plate and glands over cables.	--
10.	Set and mark each cables into there required positions.	--
11.	Cut each core 300mm above its connection point.	--
12.	Place a connector on each bushing, measure and mark internal depth of barrel onto outside of connector.	--
	This mark becomes the reference point for the procedure.	
13.	Remove oversheaths and bedding tapes.	15
14.	Abrade oversheaths full length of gland.	17
15.	Straighten copper screen wires at oversheath termination point and form into a bunch.	--

JOINTING PROCEDURE 7.407 – Continued

Actions	General Requirements (ST: CA2C/8)
16. Offer cores to reference point marked on connectors, mark and cut cores.	30
17. Remove semi-conducting screens ensuring insulation is free from all conductive material.	28
18. Remove core insulation to allow connector fitting.	31
19. Apply a stress cone to each core.	35
20. Remove connectors from bushings and connect to phase conductors, ensure connector palm is in correct position to bushings before shearing bolts.	36
21. Apply build-up tape to centralise cables within glands.	--
22. Fit gland plate to cable box.	--
23. Position heat shrink sealing sleeves over glands and shrink into position.	51
24. Position cables into their final position maintaining a gap between cable and gland inner face.	--
25. Connect phase connectors to bushings.	--
26. Fill gland with “Lovifit” glue and allow to harden.	39
27. Form copper screen wire bunches into one conductor terminating into an earth connector, and connect to earth stud.	36
28. Connect switchgear/transformer earth to gland plate earth stud. Note: - For Island layer assemblies the earth must be insulated from the cable box steelwork.	--
29. Remove temporary earth continuity bond applied in 6 and reseal EPR oversheaths.	--
30. Replace cable box cover ensuring all external bolt threads are treated with “Copaslip” paste.	--
31. Fill cable box with silicon compound to required level and replace filling cover; ensure external bolt threads are treated with “Copaslip” paste.	--
32. Mix and dispose correctly the un-used Pu resin.	

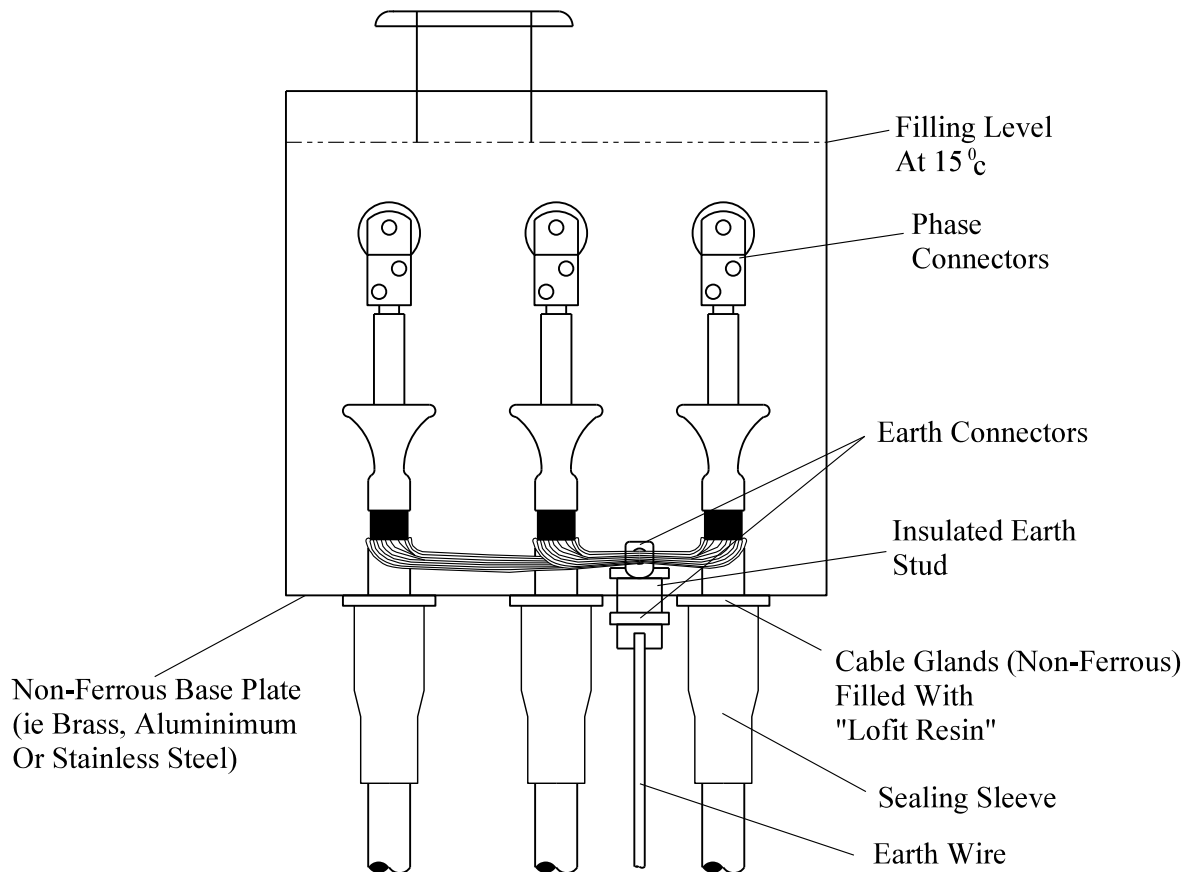
All dimensions in mm



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ORIGINAL ISSUE		DATE		<div>WESTERN POWER DISTRIBUTION Design Department. Avonbank, Feeder Road, Bristol BS2 0TB Tel: 0117 933 2000 Fax: 0117 933 2001.</div> <div>Western Power Distribution</div>	
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SCALE		N.T.S.			
				Title	
				630mm ² EPR SINGLE CORE	
				COMPOUND FILLED TERMINATION	
				STRIPPING DIMENSIONS	
				Drg. No.	
				JP2D 7.407.1	
				Rev No	

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All dimensions in mm



NOTE:- 1. Minimum Distance Between Centre Of Connection Point And Base Plate Is To Be 350mm.

2. Cable Box To Be Filled Only With Lowsil Cold Pour Compound.

3. Ensure The Cable Glands Are Sealed With A Gasket To The Gland Plate.

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Drawn	RJB	04/13			
Checked				<div>Title 630mm² EPR SINGLE CORE COMPOUND FILLED TERMINATION GENERAL LAYOUT</div> <div>Drg. No. JP2D 7.407.2</div> <div>Rev No</div>	
Approved					
SCALE		N.T.S.			

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ST: CA2U/4 PROCEDURES FOR MAKING 11kV CABLE EPR TERMINATIONS

JOINTING PROCEDURE 7.408

95mm² EPR TRIPLEX CABLE 11kV ELBOW TERMINATION (PADMOUNT)

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA2C/8 Section 6
of the 11kV Jointing Manual**

JOINTING PROCEDURE 7.408

TERMINATION KIT MATERIALS

CABLE SIZE: - 95mm² EPR

95mm² EPR

Item	Quantity
Elbow LE 215-B-95SH	3
Bushing Well Insert LB 1215X	3
Connector BET 60-12	3
Sealing Sleeve SMOE 28003 (set of 3)	2

Note: - The above list covers a three phase Padmount, for a single phase Padmount one less of the above items will not be required.

ADDITIONAL ITEMS FOR EACH TERMINATION

PVC tape
Scotch 70
Scotch 13 tape
Tinned copper wire 16 swg
Tinned copper wire 20 swg
De-solvit 1000 FD
De-solvit 1000
Workhorse dry wipes
Emery cloth
5313 Water block tape
Cable ties
Sealing putty
Aluminium oxide cloth 320 grit
Aluminium oxide cloth 400 grit

Note: - Individual material item numbers (E 5) are to be found in Section 4 of the 11kV Jointing Manual.

Note: - The following items are a direct purchase from Radio Spares.

Terminal block 20A black PVC – Radio Spares Part No. 423-544.
Green / Yellow 2.5mm² wire – Radio Spares Part No. 364-590.

As from 1st March 2016 WPD have changed the specification of Approved cable sizes. These changes will affect all new installations and are aimed at reducing cable losses in accordance with the WPD Losses Strategy. This means that the 95mm² triplex and single core cables are now removed from general use, they can only be used for padmounts and the repair of faults in existing 95mm² circuits.

JOINTING PROCEDURE 7.408

Actions

General Requirements (ST: CA2C/8)

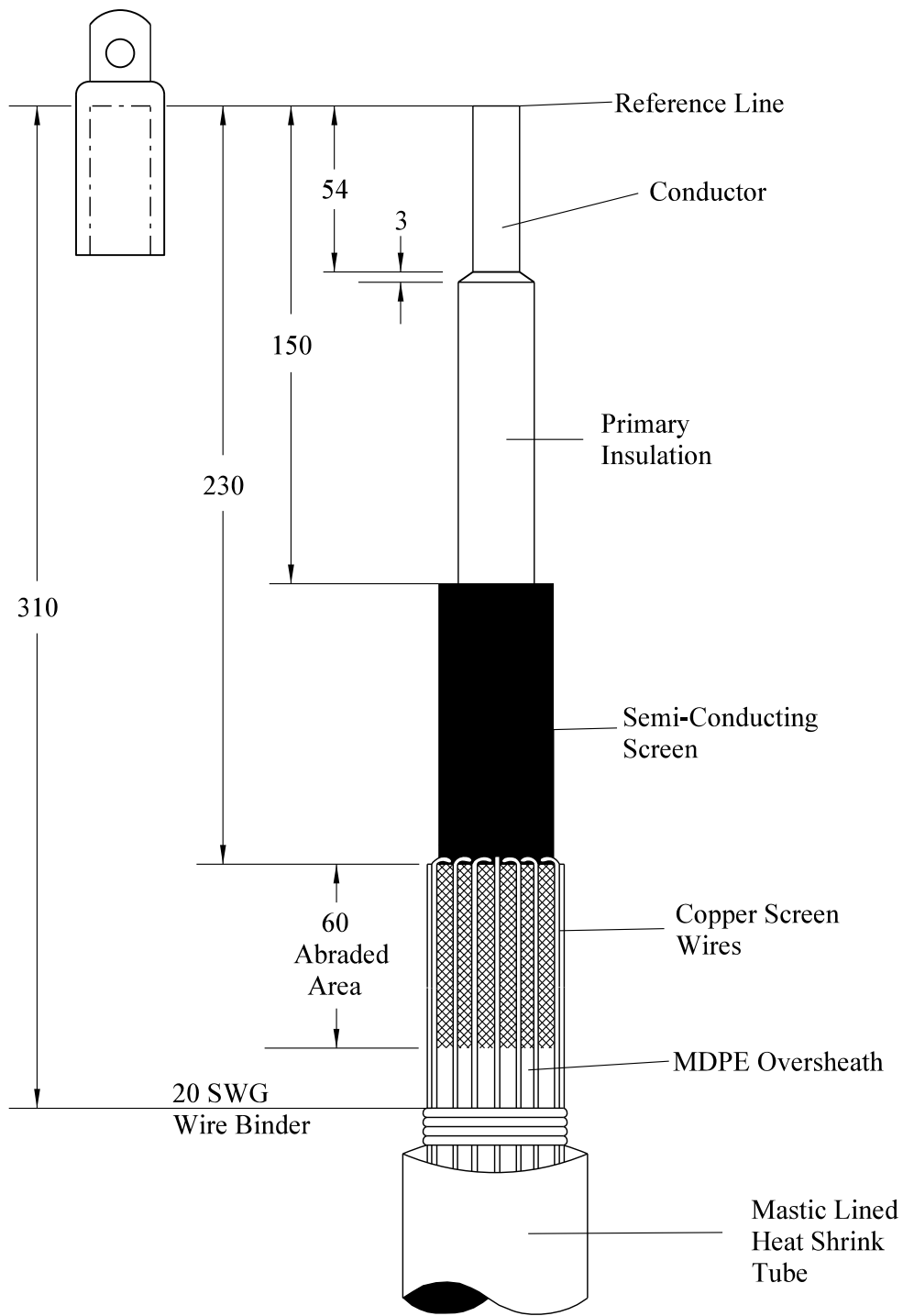
Refer to Drawing **JP2D 7.408.1, 7.408.2 and 7.408.3** whilst undertaking this Jointing Procedure.


- | | | |
|-----|--|----------|
| 1. | Apply a temporary earth continuity bond clear of termination position. | 10 |
| 2. | Park a mastic lined heat shrink tube next to temporary earth continuity bond of each core. | --
-- |
| 3. | Fit bushing well insert to the “Padmount” transformer. | 64 |
| 4. | Identify and mark core phasing clear of termination position. | -- |
| 5. | Set and align cores into their termination position, ensuring sufficient slack in the cores to enable elbow to be parked in the earth position. | -- |
| 6. | Clean each oversheath for a distance of 1.5m. | -- |
| 7. | Cut each core 500mm above bushing well insert centre. | -- |
| 8. | Measure and mark internal depth of barrel onto outside of connector. | -- |
| | This mark becomes the reference point for the procedure. | |
| 9. | Offer connector to bushing well insert centre, mark cores at reference point. | -- |
| 10. | Remove oversheaths and bedding tapes. | 16 |
| 11. | Abrade oversheaths. | 17 |
| 12. | Straighten copper screen wires and bend back over oversheath termination, ensuring they are evenly spaced. | -- |
| 13. | Apply three turns of 20 swg binder wire over copper screen wires 100mm from oversheath termination. | |
| 14. | Park a heat shrink sleeving sleeve over each core onto copper screen wires, position 35mm onto semi-conducting screen and shrink carefully into position starting at semi-conducting screen end. | 51 |

JOINTING PROCEDURE 7.408 – Continued

Actions	General Requirements (ST: CA2C/8)
15. Apply four turns minimum of Scotch 88 tape around copper screen wires 10mm below the heat shrink tube. On top of the Scotch 88 tape apply the relevant phase colour tape.	--
Do not apply PVC tape to the body of the live break elbow.	
16. Form copper screen wires into a bunch and remove 20 swg binder applied in 13.	--
17. Remark cores as in 9 and cut.	30
18. Remove semi-conducting screens ensuring insulation is free from all conductive material.	28
19. Remove core insulation making a 3mm bevel to insulation end.	31
20. Connect connectors to phase conductors, ensuring connector palm is in correct position to bushing well insert before shearing bolts.	36
21. Fit elbows to cores.	64
22. Fit load break probes to elbow connector.	65
23. Connect drain earths to bushing well inserts and elbow bodies.	64/65/36
24. Form each copper screen wire bunch and drain earth wire into one conductor and terminate into a earth connector, connect to earth bar.	64/65/36
25. Fit elbows to bushing well inserts.	65
26. Remove temporary earth continuity bond applied in 1 and reseal EPR oversheaths.	51

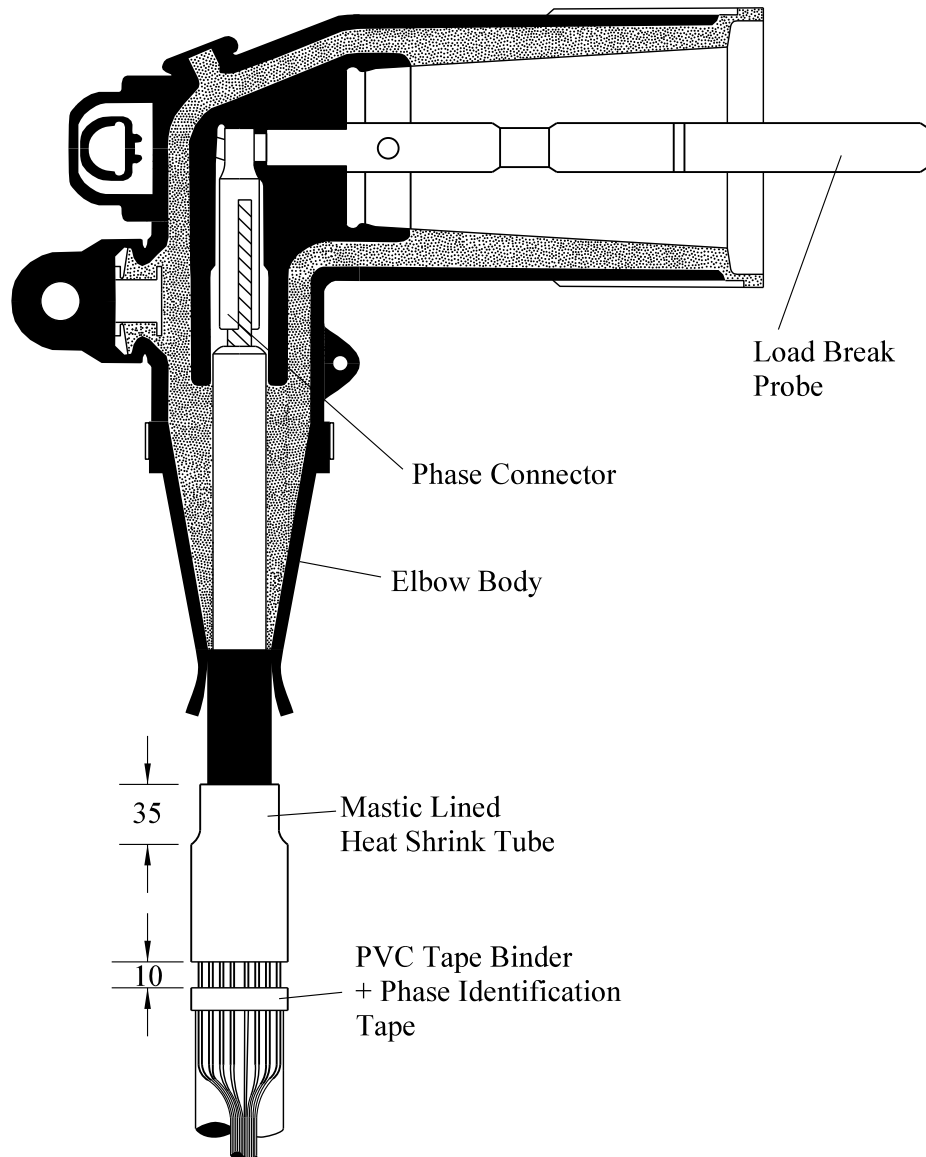
All dimensions in mm




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Drawn	RJB	04/13					
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Approved							
SCALE		N.T.S.		Title		Drg. No.	Rev No
				95mm ² EPR SINGLE CORE LOAD BREAK ELBOW TERMINATION STRIPPING DIMENSIONS		JP2D 7.408.1	

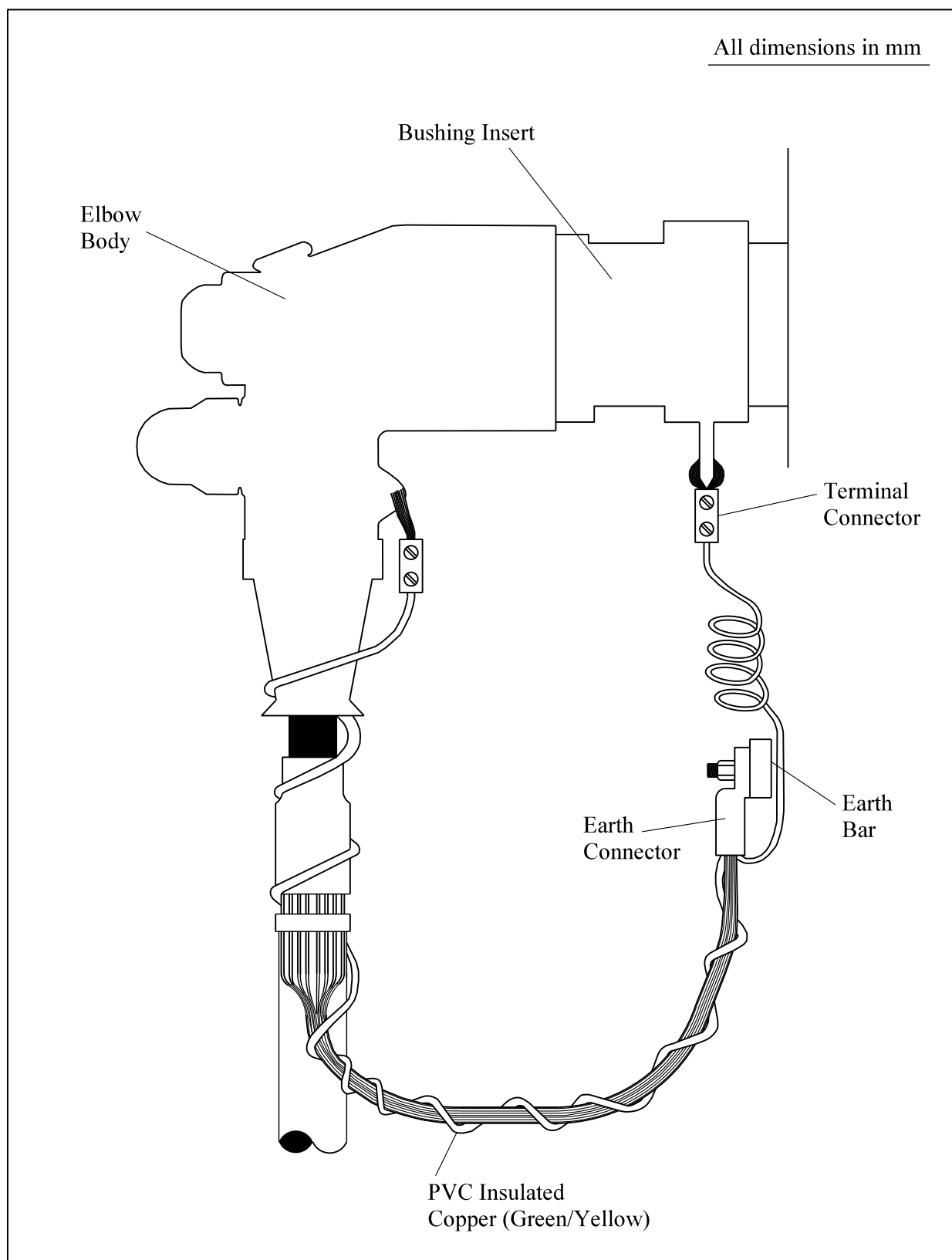
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SCALE	N.T.S.		Title 95mm ² EPR SINGLE CORE LOAD BREAK ELBOW TERMINATION GENERAL LAYOUT			Drg. No. JP2D 7.408.2 Rev No

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SCALE	N.T.S.		Title 95mm ² EPR SINGLE CORE LOAD BREAK ELBOW TERMINATION EQUALISATION BONDING ARRANGEMENT			Drg. No. JP2D 7.408.3 Rev No

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**ST: CA2U/4 PROCEDURES FOR MAKING 11kV CABLE EPR
TERMINATIONS**

JOINTING PROCEDURE 7.409

**95/185/300mm² SAC EPR COPPER WIRE SCREEN 11kV
EUROMOLD (K) 430 TB/G INTERFACE C, 630A,
SEPARABLE CONNECTOR TERMINATIONS.**

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA2C/8 Section 6
of the 11kV Jointing Manual**

JOINTING PROCEDURE 7.409

TERMINATION KIT MATERIALS LIST

CABLE SIZES — 95/185/300mm² EPR

Item	Quantity
K 430 TB / G Series Separable Connector 630A (set of 3)	1
Connector BET 120-12	1
Compression Gland PG 42	3

ADDITIONAL ITEMS FOR EACH TERMINATION

PVC tape
Scotch 70
Scotch 13 tape
Tinned copper wire 16 swg
Tinned copper wire 20 swg
De-solvit 1000 FD
De-solvit 1000
Workhorse dry wipes
Emery cloth
5313 Water block tape
Cable ties
Sealing putty
Aluminium oxide cloth 320 grit
Aluminium oxide cloth 400 grit
Copaslip

Note: - Individual material item numbers (E 5) are to be found in Section 4 of the 11kV Jointing Manual.

As from 1st March 2016 WPD have changed the specification of Approved cable sizes. These changes will affect all new installations and are aimed at reducing cable losses in accordance with the WPD Losses Strategy. This means that the 95mm² triplex and single core cables are now removed from general use, they can only be used for padmounts and the repair of faults in existing 95mm² circuits.

JOINTING PROCEDURE 7.409

Actions	General Requirement (ST: CA2C/8)
Refer to Drawings JP2D 7.409.1, 7.409.2, 7.409.3, 7.409.4, 7.409.5, 7.409.6, 7.409.7, 7.409.8 and 7.409.9 whilst undertaking this Jointing Procedure.	
1. Ensure cable box dimensions are suitable for termination.	--
2. Identify and mark core phasing clear of termination position.	--
3. Set and align cores into their termination positions.	5/6
4. Clean each oversheath for a distance of 2m.	--
5. Apply a temporary earth continuity bond clear of termination position.	10
6. Park a mastic lined heat shrink tube next to temporary earth continuity bond of each core.	--
7. Park a compression gland and gland plate over each core.	--
8. Set and mark cores into their required positions.	5/6
9. Cut each core 500mm above its connection point ensuring a sufficient length of the copper screen wires for connection to cable box earth stud.	--
10. Place a connector onto each bushing, measure and mark internal depth of barrel onto outside of connector.	--
Note: - This mark becomes the reference point for the procedure.	
11. Remove oversheaths and bedding tapes.	16
12. Abrade oversheaths.	17
13. Apply a turn of mastic tape around oversheath.	--
14. Straighten copper screen wires and bend back over oversheath termination ensure copper screen wires are spaced evenly into mastic tape applied in 13.	--
15. Apply three turns of 20swg binder over copper screen wires at a point 400mm down from the reference point.	--
16. Place a PVC tape marker 245 & 355mm from the reference point onto the copper screen wires.	--

JOINTING PROCEDURE 7.409 - Continued

Actions	General Requirement (ST: CA2C/8)
17. Offer cores to reference point marked on connectors, mark and cut cores.	--
18. Remove semi-conducting screens, ensuring insulation is free from all conductive material.	28
19. Remove core insulation making a 3mm bevel to insulation end.	31
20. Apply a few turns of PVC tape to the conductor end as protection.	--
21. Thoroughly clean core insulation.	--
22. Apply field control mastic strip, type MFC, slightly stretch one end applying with a 5mm overlap onto both semi-conducting screen and core insulation, push the mastic in place while stretching it progressively until both ends overlap and tear-off excess mastic.	--
Note: - Ensure mastic does not break during application.	
23. Apply the insulation coned rod to conductor end, thoroughly clean coned rod and lubricate coned rod and core up to the MFC mastic tape.	--
Note: - Alternatively the conductor can be coned using PVC tape adhesive side up to start and tapered to insulation diameter, it is important to apply a cover to the stranded conductor to prevent internal damage to the bore of the reducer when applied.	
24. Lubricate internal face (stepped end of the cable reducer, slide reducer down the core without hesitation and in one smooth movement until the end reaches the PVC tape marker applied in 16.	--
25. Remove connectors from bushings and connect to phase conductors, ensure connector palm is in correct position to bushings before shearing bolts.	36
Note: - Before shearing bolts check distance between top of connector and top of reducer is between 150 and 160mm	
26. Clean cable reducer, core insulation and connector.	--
27. Lightly lubricate the inner surface of the tee connector housing and cable reducer.	--

JOINTING PROCEDURE 7.409 - Continued

Actions	General Requirement (ST: CA2C/8)
28 Check the angle of the tee connector housing is correct to connector palm and longer interface is pointing towards the bushing. Whilst supporting the cable reducer at its stepped end preventing movement, gently slide the housing onto the cable until it cannot advance any further. Check correct installation by trying to pull back the connector, it is correct when it stays in its locked position , also check to ensure cable reducer has stayed in place during installation.	--
29 Clean and lightly lubricate both inner face of connector housing and bushing, push connector housing onto bushing.	--
30 Insert clamping screw (longer thread) into threaded hole of bushing and tighten.	--
Note: - The screw must be tightened with a torque wrench exerting 50Nm of torque using a 22mm socket in order to achieve correct torque, ensure there is to be no lubrication on the threaded parts.	
31 Clean and lubricate plug and inner face of connector housing.	--
32 Insert the plug into connector housing and tighten assembly.	--
Note: - The plug must be tightened with a torque wrench exerting 30Nm of torque using a 22mm socket in order to achieve correct torque, ensure there is to be no lubrication on the threaded parts.	
33 Clean inside of protective cap and outer face of connector housing and insulating plug.	--
34 Push protective cap over connector housing onto the insulating plug, slightly pull the edge of the protective cap to exhaust any air whilst pressing cap centre onto its locking point until it snaps into place. Position cap with the pulling tab facing downwards.	--
35 Apply four turns of Scotch tape of the relevant phase colour around the copper the screen wires 10mm below cable reducer end.	--
Note: - Do not apply PVC tape to cable reducer or connector housing.	
36 Form copper screen wires into a bunch, remove 20swg binder and PVC tape binder applied in 15/16.	--

JOINTING PROCEDURE 7.409 - Continued

Actions	General Requirement (ST: CA2C/8)
37 Fit gland plate to cable box.	--
38 Fit compression gland to each core.	60
39 Form copper screen wires bunches into one conductor terminating into a terminating into an earth connector, and connect to earth stud.	--
40 Connect earth leads from connector housings to earth stud.	--
41 Fit and secure cables into cable cleats.	--
42 Connect switchgear/transformer earth to gland plate earth stud.	--
43 Remove temporary earth continuity bond applied in 5 and reseal oversheaths with heat shrink tubes applied in 6.	51
44 Replace cable box cover ensuring all external bolt threads are treated with “Copaslip” paste and security bolts are in place.	--

All Dimensions in mm

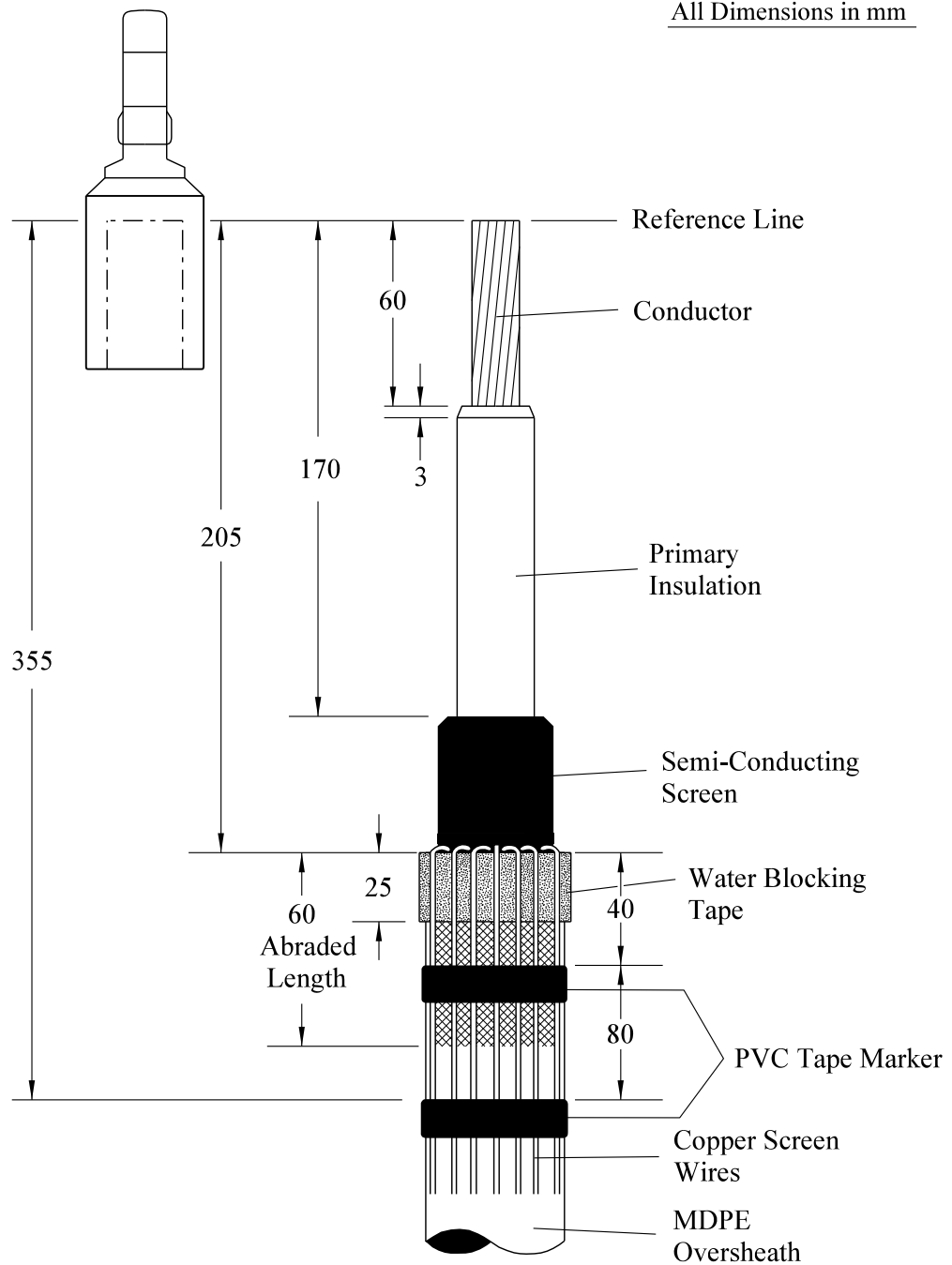



Fig 1

3	RJB			11/17	DIMENSIONS ALTERED			
Rev No	Drawn	Chk'd	App'd	Date	Revision			
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Drawn	RJB	07/13						
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SCALE		N.T.S.		Title			Drg. No.	Rev No
				K43OTBG TEE CONNECTOR TERMINATION STRIPPING DIMENSIONS			JP2D 7.409.1	3

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All Dimensions in mm

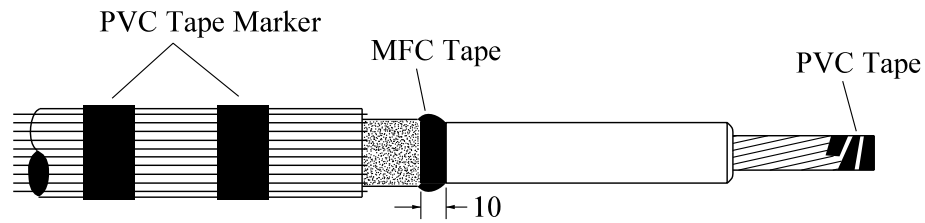


Fig 2

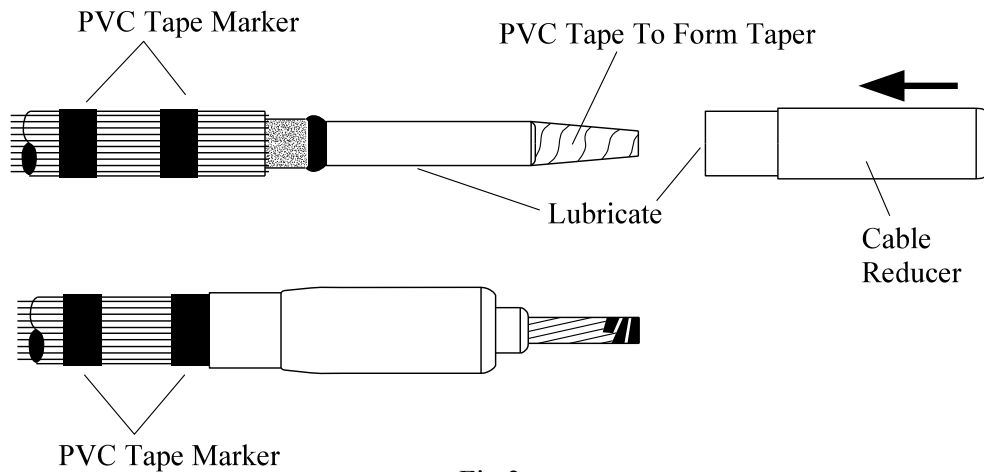



Fig 3

1	RJB			04/16	SECOND PVC TAPE ADDED		
Rev No	Drawn	Chk'd	App'd	Date	Revision		
ORIGINAL ISSUE		DATE		<div>WESTERN POWER DISTRIBUTION Design Department. Avonbank,Feeder Road,Bristol BS2 0TB Tel: 0117 933 2000 Fax: 0117 933 2001.</div> <div>Title K430TBG TEE CONNECTOR TERMINATION TERMINATION COMPLETION</div>		<div> WESTERN POWER DISTRIBUTION</div> <div>Drg. No. JP2D 7.409.2</div>	Rev No 1
Drawn	RJB	04/13					
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All Dimensions in mm

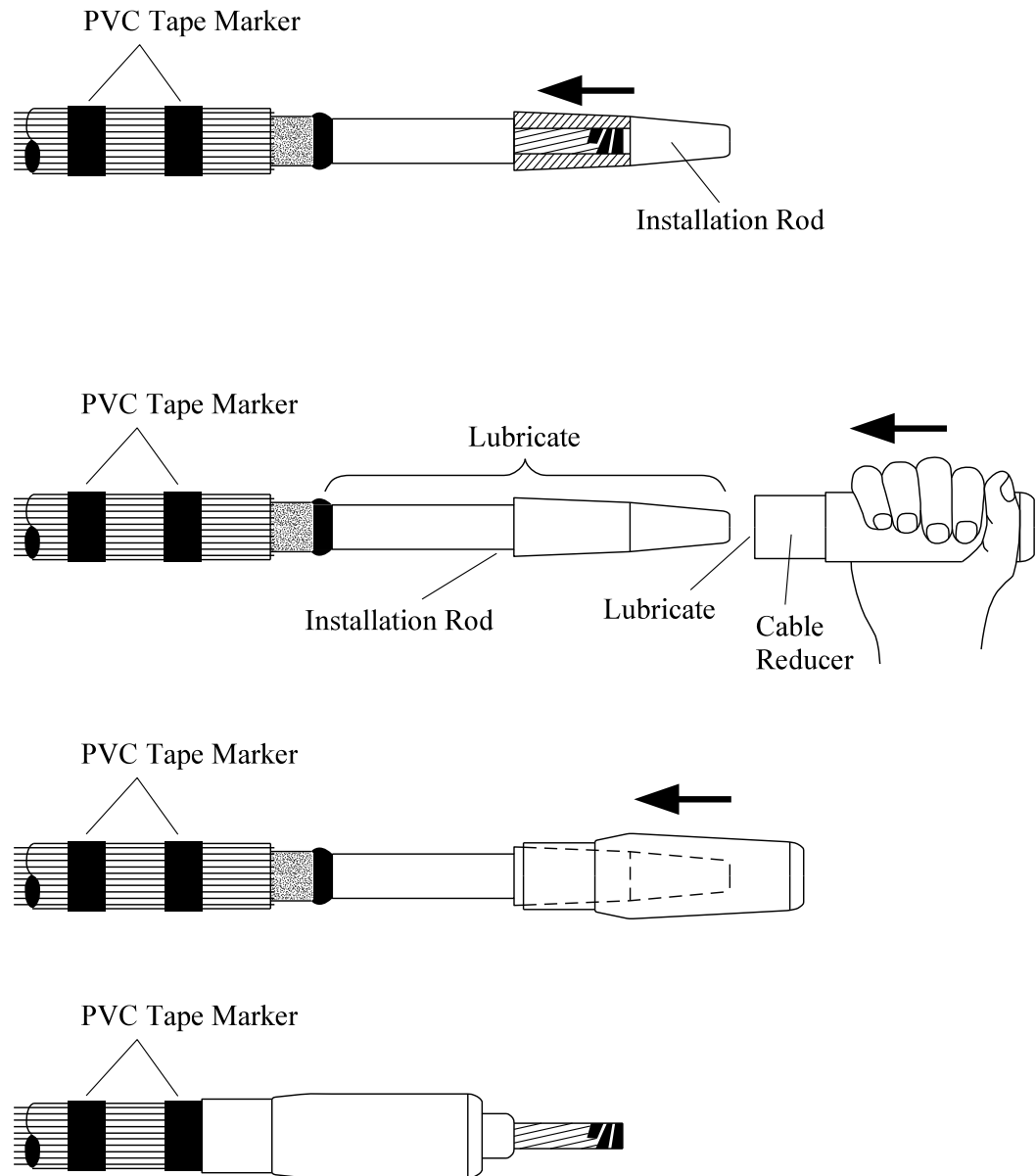



Fig 4

1	RJB			04/16	SECOND PVC TAPE ADDED		
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Checked							
Approved							
SCALE		N.T.S.		Title		Drg. No.	Rev No
				K430TBG TEE CONNECTOR TERMINATION TERMINATION COMPLETION		JP2D 7.409.3	1

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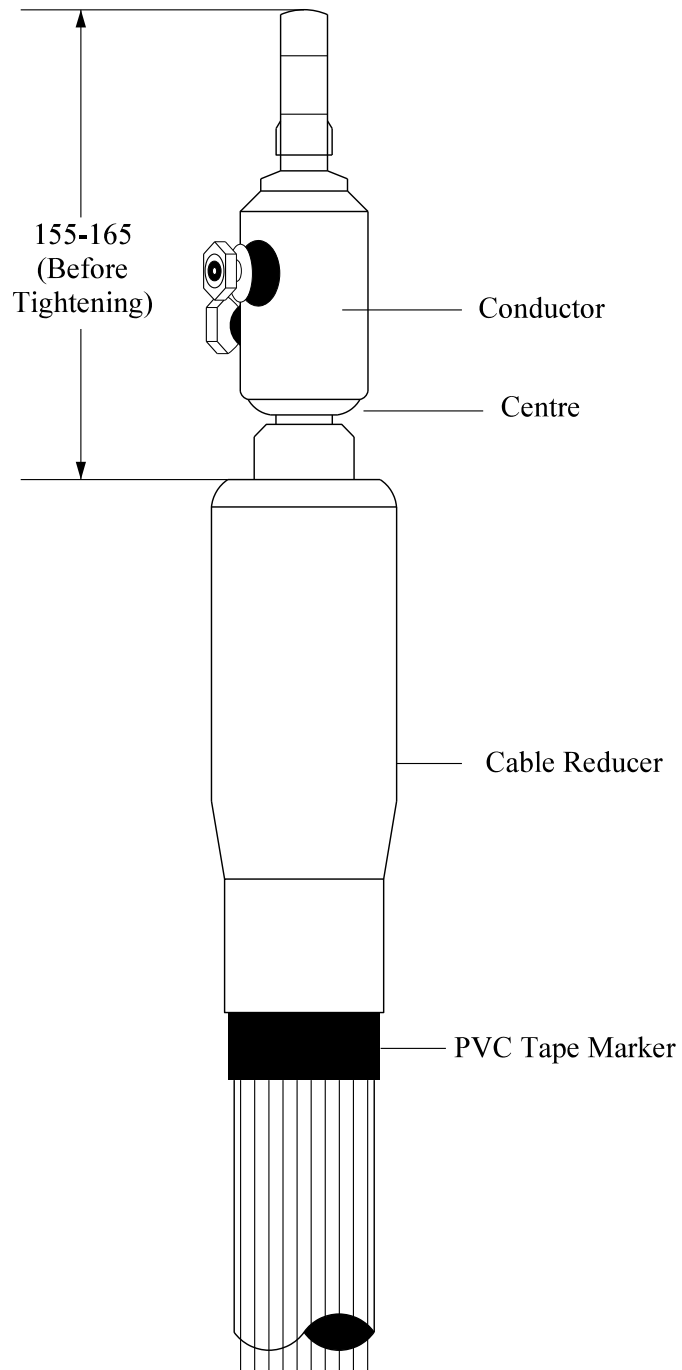

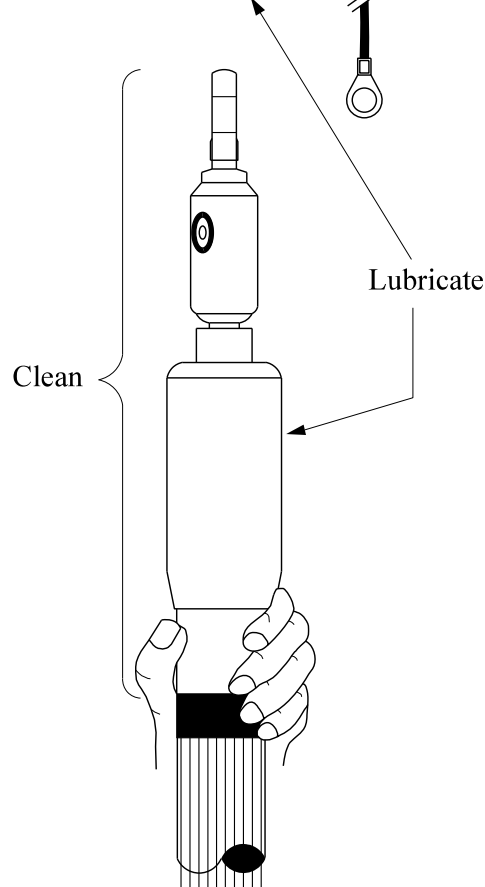
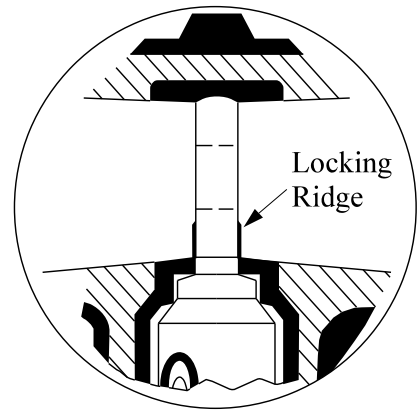
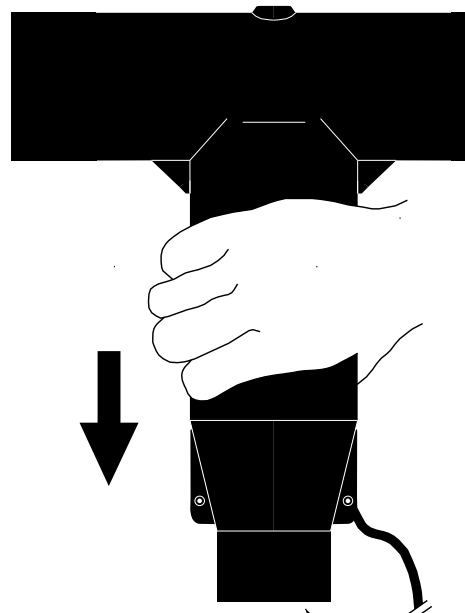



Fig 5

1	RJB			11/17	DIMENSIONS ALTERED			
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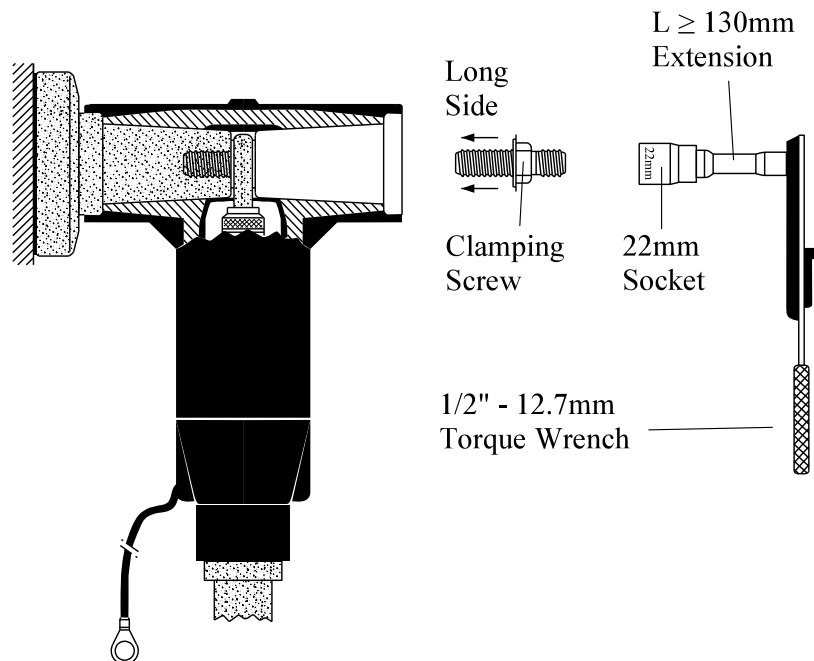
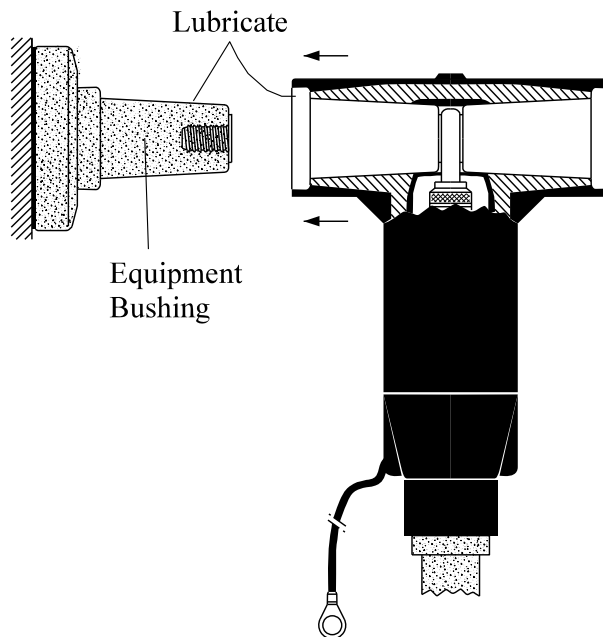
All Dimensions in mm




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				Drg. No. JP2D 7.409.5	
				Rev No	

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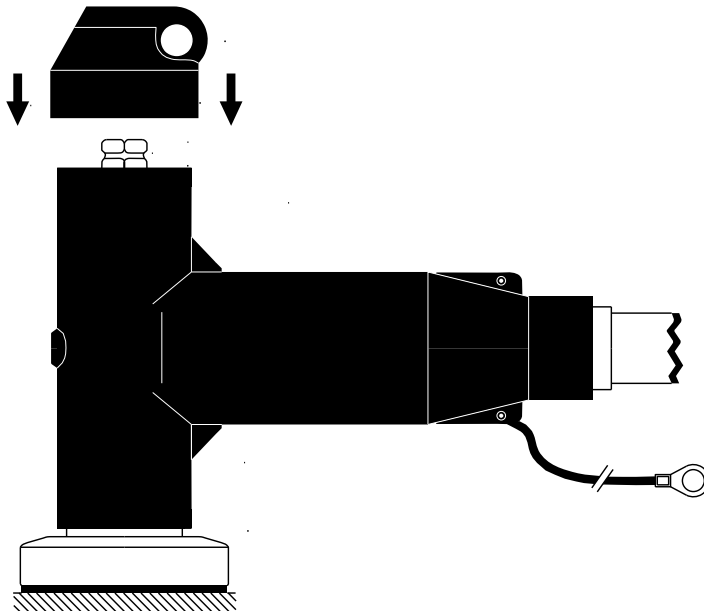
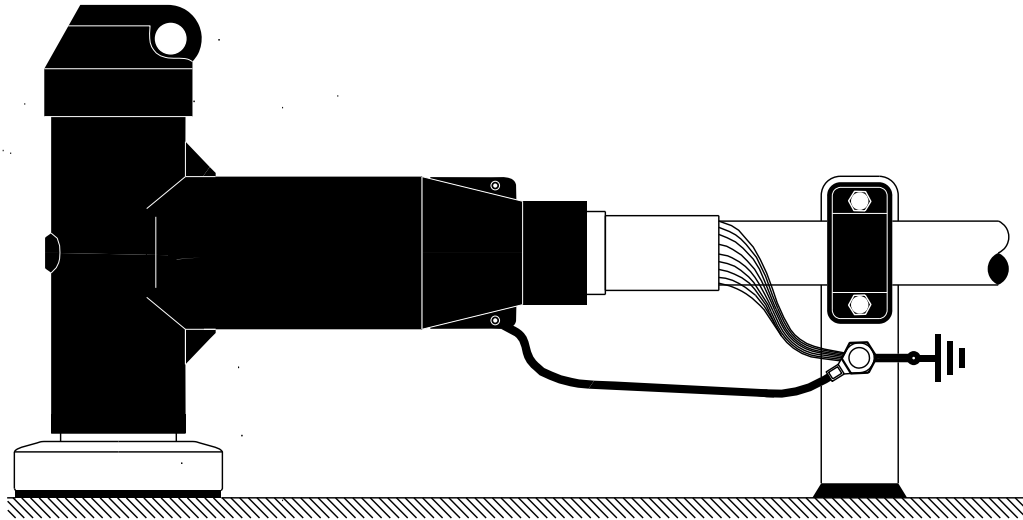
All dimensions in mm




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Drawn	RJB	04/13		Title			Drg. No.
Checked				K430TBG TEE CONNECTOR TERMINATION TERMINATION BOLTING TOGETHER		JP2D 7.409.6	1
Approved							
SCALE		N.T.S.					

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All dimensions in mm



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Approved							
SCALE		N.T.S.		Title		Drg. No.	Rev No
				K430 SEPARABLE TEE CONNECTOR TERMINATION COMPLETION		JP2D 7.409.7	

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All dimensions in mm

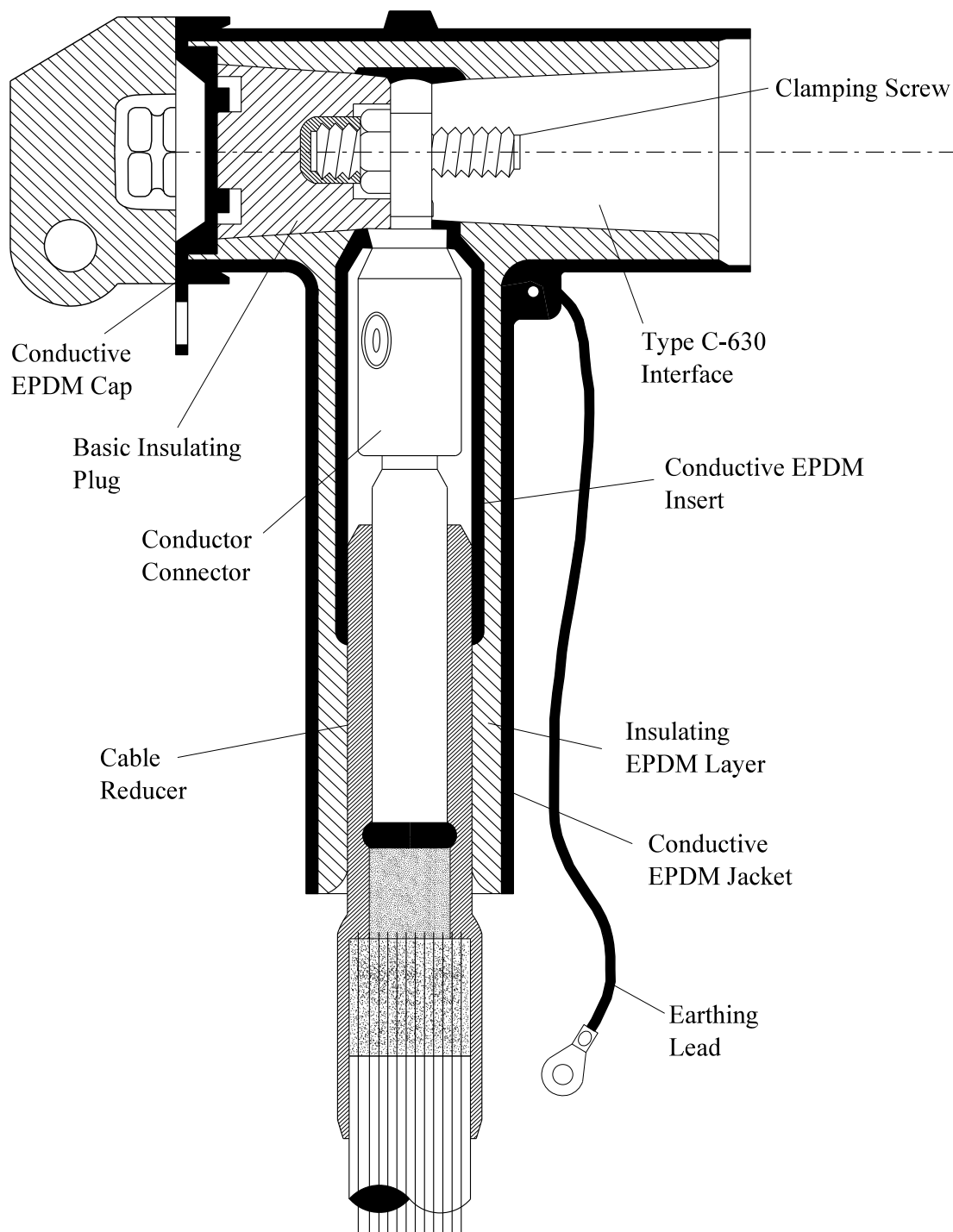

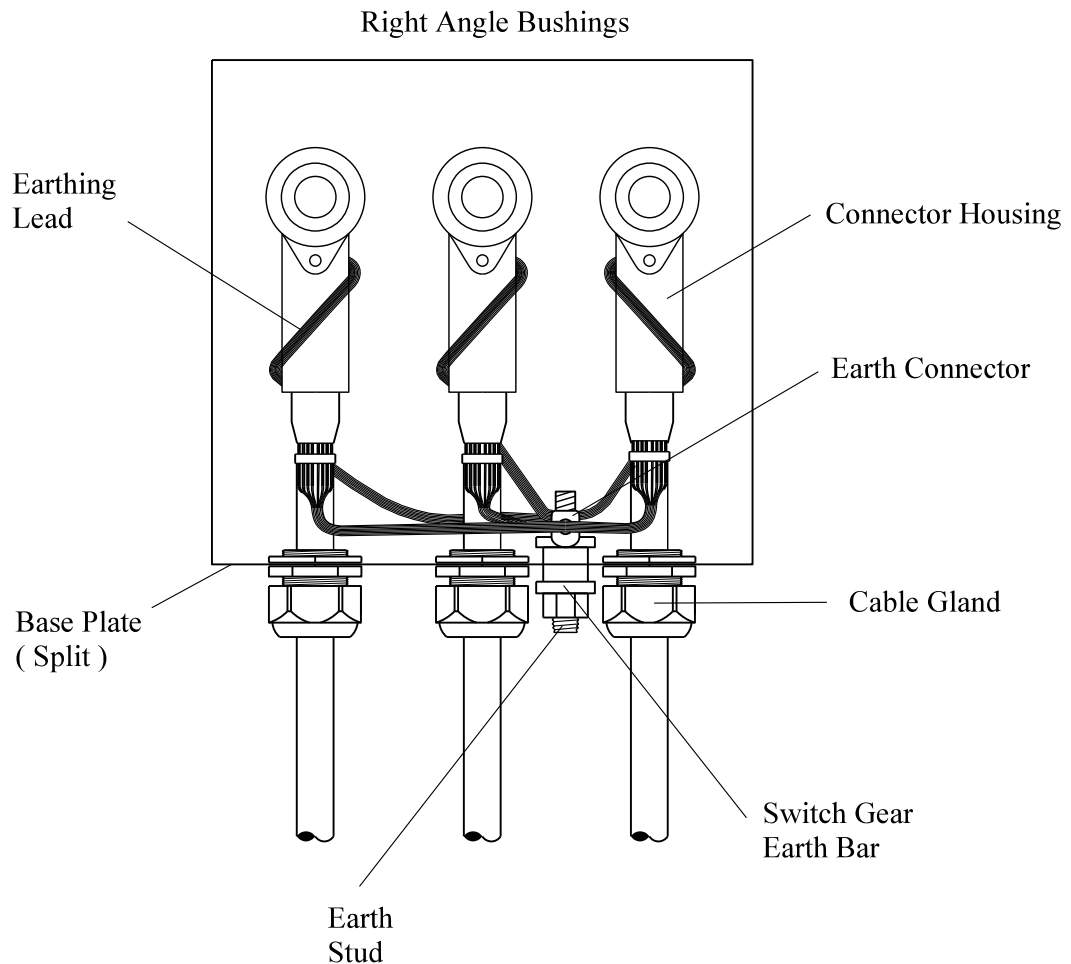



Fig 8

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SCALE N.T.S.			Title K430TBG TEE CONNECTOR TERMINATION TERMINATION COMPLETION			Drg. No. JP2D 7.409.8
						Rev No

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All dimensions in mm



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Drawn	RJB	04/13					
Checked			Title K430TBG TEE CONNECTOR TERMINATION EQUALISATION BONDING ARRANGEMENT.			Drg. No. JP2D 7.409.9	Rev No
Approved							
SCALE		N.T.S.					

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**ST: CA2U/4 PROCEDURES FOR MAKING 11kV CABLE EPR
TERMINATIONS**

JOINTING PROCEDURE 7.410

**300mm² EPR COPPER WIRE SCREEN CABLE 11kV EUROMOLD (K)
400 TB/G INTERFACE C SEPARABLE CONNECTOR
TERMINATIONS.**

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA2C/8 Section 6
of the 11kV Jointing Manual**

JOINTING PROCEDURE 7.410

TERMINATION KIT MATERIALS LIST

CABLE SIZES — 300, 400 and 630mm² EPR

Item	Quantity
K 400 TB / G Series Separable Connector 1250A (each)	3
Cable reducer 611CA-W	3
Clamping screw - 400TCS	3
Conductor connector - TMBC-X	3
Basic insulating plug & cap - 400BIPA	3
Field control mastic, type MFC-RLT	3
Silicone grease & wipes	3
Connector BET 120-12	1
Compression Gland PG42	3

ADDITIONAL ITEMS FOR EACH TERMINATION

PVC tape
Scotch 70
Scotch 13 tape
Tinned copper wire 16 swg
Tinned copper wire 20 swg
De-solvit 1000 FD
De-solvit 1000
Workhorse dry wipes
Emery cloth
5313 Water block tape
Cable ties
Sealing putty
Aluminium oxide cloth 320 grit
Aluminium oxide cloth 400 grit
Copaslip

Note: - Individual material item numbers (E 5) are to be found in Section 4 of the 11kV Jointing Manual.

Note: - The 300 and 630mm² cable sizes are stock items held in E 5, if it is required to terminate a 400mm² then please contact the 11kV Cable Engineer in Avonbank for the requisite cable reducer.

JOINTING PROCEDURE 7.410

Actions	General Requirement (ST: CA2C/8)
Refer to Drawings JP2D 7.410.1, 7.410.2, 7.410.3 7.410.4, 7.410.5, 7.410.6, 7.410.7 and 7.410.8 whilst undertaking this Jointing Procedure.	
1. Identify and mark core phasing clear of termination position.	--
2. Set and align cables into their termination positions.	--
3. Clean each oversheath for a distance of 1 .5m.	--
4. Apply a temporary earth continuity bond clear of termination position.	--
5. Park a compression gland over each core.	60
6. Set and mark cables into their required positions.	5/6
7. Cut each cable 300mm above its connection point.	--
8. Place a connector on each bushing, measure and mark internal depth of barrel onto outside of connector. This mark becomes the reference point for the procedure.	--
9. Remove oversheaths and bedding tapes — Fig 1.	--
10. Abrade oversheaths — Fig 1.	--
11. Apply a turn of mastic around oversheath — Fig 1.	
12. Straighten copper screen wires and bend back over oversheath termination ensure copper screen wires are spaced evenly and bedded into mastic applied in 11.	--
13. Apply three turns of 20swg binder over copper wires at a point 400mm down from the reference point.	--
14. Place a PVC tape marker 385mm from the reference point onto the copper screen wires — Fig 1.	--
15. Offer cores to reference point marked on connectors, mark and cut cores.	--
16. Remove semi-conducting screens, ensuring insulation is free from all conductive material — Fig 1.	28

JOINTING PROCEDURE 7.410 - Continued

Actions	General Requirement (ST: CA2C/8)
17. Remove core insulation making a 3mm bevel to insulation end — Fig 1.	31
18. Apply a few turns of PVC tape to the conductor end as a protection.	--
19. Thoroughly clean core insulation.	--
20. Apply field control mastic strip, type MFC, slightly stretch one end applying with a 5mm overlap onto both semi-conducting screen and core insulation, push the mastic in place while stretching it progressively until both ends overlap and tear-off excess mastic — Fig 2	--
Note: - Ensure mastic does not break during application.	
21. Apply the installation coned rod to conductor end, thoroughly clean coned rod and lubricate coned rod and core up to the MFC mastic tape — Fig 4.	--
22. Lubricate internal face (stepped end) of the cable reducer, slide cable reducer down the core without hesitation and in one smooth movement until the end reaches the PVC tape marker applied in 9—Fig 4.	--
23. Remove connectors from bushings and connect to phase conductors, ensure connector palm is in correct position to bushings before shearing; before and after shearing check distance between top of shearbolt connector and top of cable reducer is between 155 and 165mm see Fig 5.	36
24. Clean cable reducer, core insulation and connector — Fig 6.	--
25. Lightly lubricate the inner surface of the tee connector housing and cable reducer — Fig 6.	--
26. Check the angle of the tee connector housing is correct to connector palm and longer interface is pointing towards the bushing. Whilst supporting the cable reducer at its stepped end preventing movement, gently slide the housing onto the cable until it cannot advance no further — Fig 6.	--
27. Check correct installation by trying to pull back the connector, it is correct when it stays in its locked position, also check to ensure cable reducer has stayed in place during installation — Fig 7.	--
27. Clean and lightly lubricate both inner face of connector housing and bushing, push connector housing onto bushing.	

JOINTING PROCEDURE 7.410 - Continued

Actions	General Requirement (ST: CA3C)
28. Insert clamping screw (longer thread) into threaded hole of bushing and tighten — Fig 8.	--
Note: - The screw must be tighten with a torque wrench exerting a 50Nm of torque using a 22mm socket in order to achieve correct torque, ensure there is to be no lubricate on the threaded parts.	
29. Clean and lubricate plug and inner face of connector housing. Insert nylon venting rod into the connector interface.	--
30. Insert the plug into connector housing, remove nylon venting rod and tighten assembly - Fig 8.	--
Note: - The plug must be tighten with a torque wrench exerting 50Nm of torque using a 22mm socket in order to achieve correct torque, ensure there is to be no lubricate on the threaded parts.	
31. Clean inside of protective cap and outer face of the connector housing and insulating plug.	--
32. Push protective cap over connector housing onto the insulating plug, slightly pull the edge of the protective cap to exhaust any air whilst pressing cap centre onto its locking point until it snaps into place. Position the cap with the pulling tab facing downwards — Fig 8.	--
33. Apply four turns of Scotch tape of the relevant phase colour around copper screen wires 10mm below cable reducer end.	--
Note: - Do not apply PVC tape to cable reducer or connector housing.	
34. Form copper screen wires into a bunch and removing 20swg binder and PVC tape binder applied in 13/14.	--
35. Fit gland plate to cable box.	--
36. Fit compression glands to gland plate and each cable.	60
37. Form copper screen wire bunches into one conductor terminating into a earth connector, and connect to earth stud.	36
38. Remove temporary earth continuity bond applied in 4 and reseal EPR oversheaths.	51
39. Replace cable box cover ensuring all external bolt threads are treated with “Copaslip” paste and security bolts are in place.	--

All Dimensions in mm

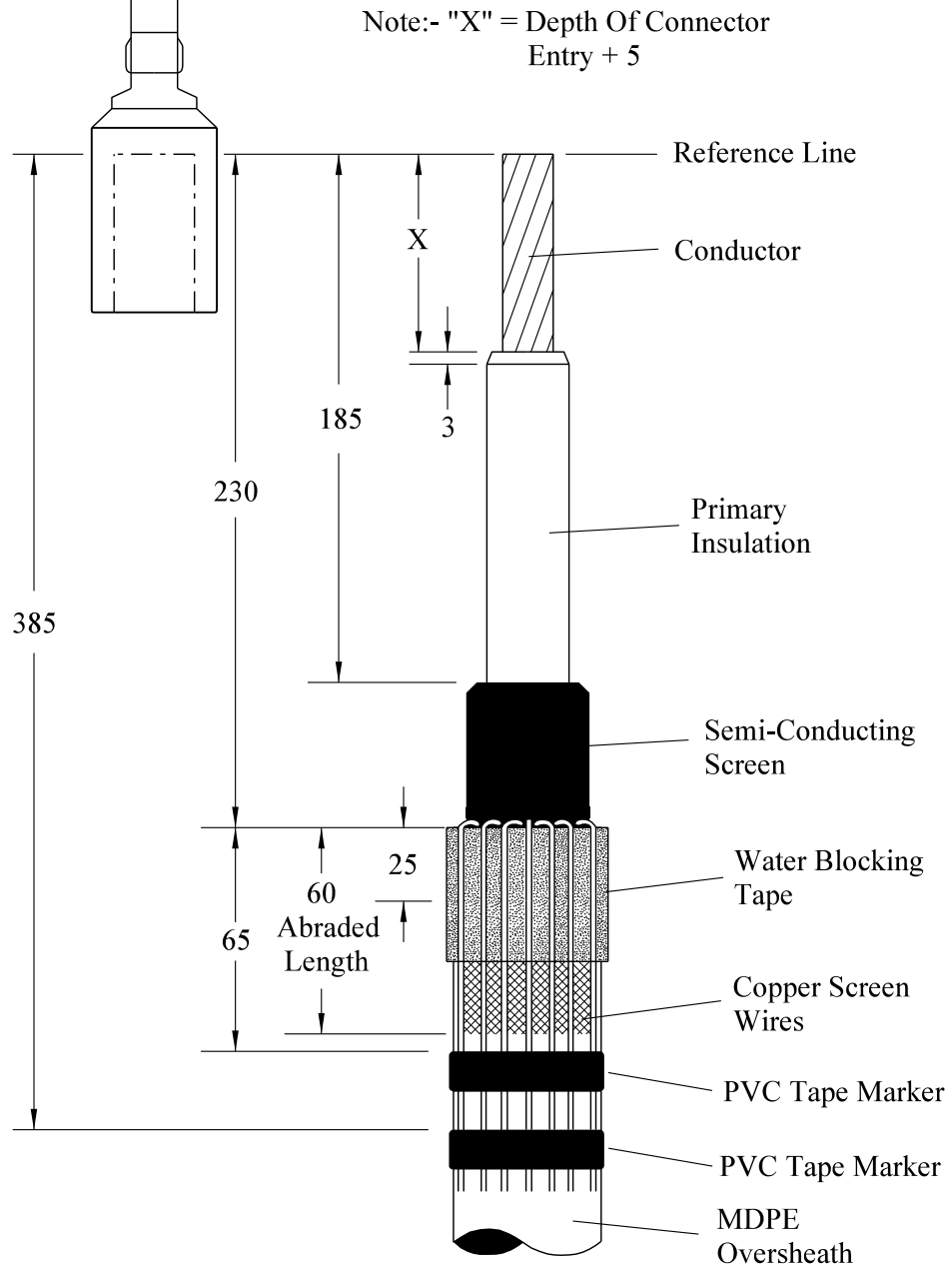



Fig 1

1	RJB			04/16	LENGTHS ALTERED 2ND PVC MARKER ADDED			
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Checked								
Approved								
SCALE		N.T.S.		Title 300mm ² EPR SINGLE CORE K400TBG TEE CONNECTOR TERMINATION STRIPPING DIMENSIONS			Drg. No. JP2D 7.410.1	Rev No 1

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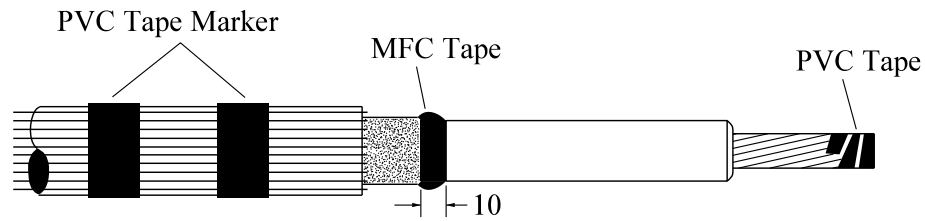


Fig 2

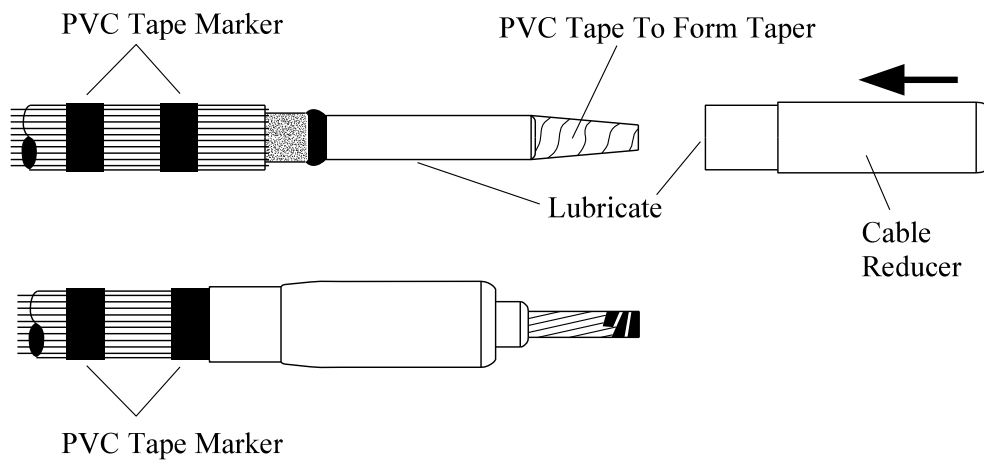



Fig 3

1	RJB			04/16	SECOND PVC TAPE ADDED		
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SCALE		N.T.S.		Title		Drg. No.	Rev No
				300mm ² EPR SINGLE CORE K400TBG TEE CONNECTOR TERMINATION STRIPPING DIMENSIONS		JP2D 7.410.2	1

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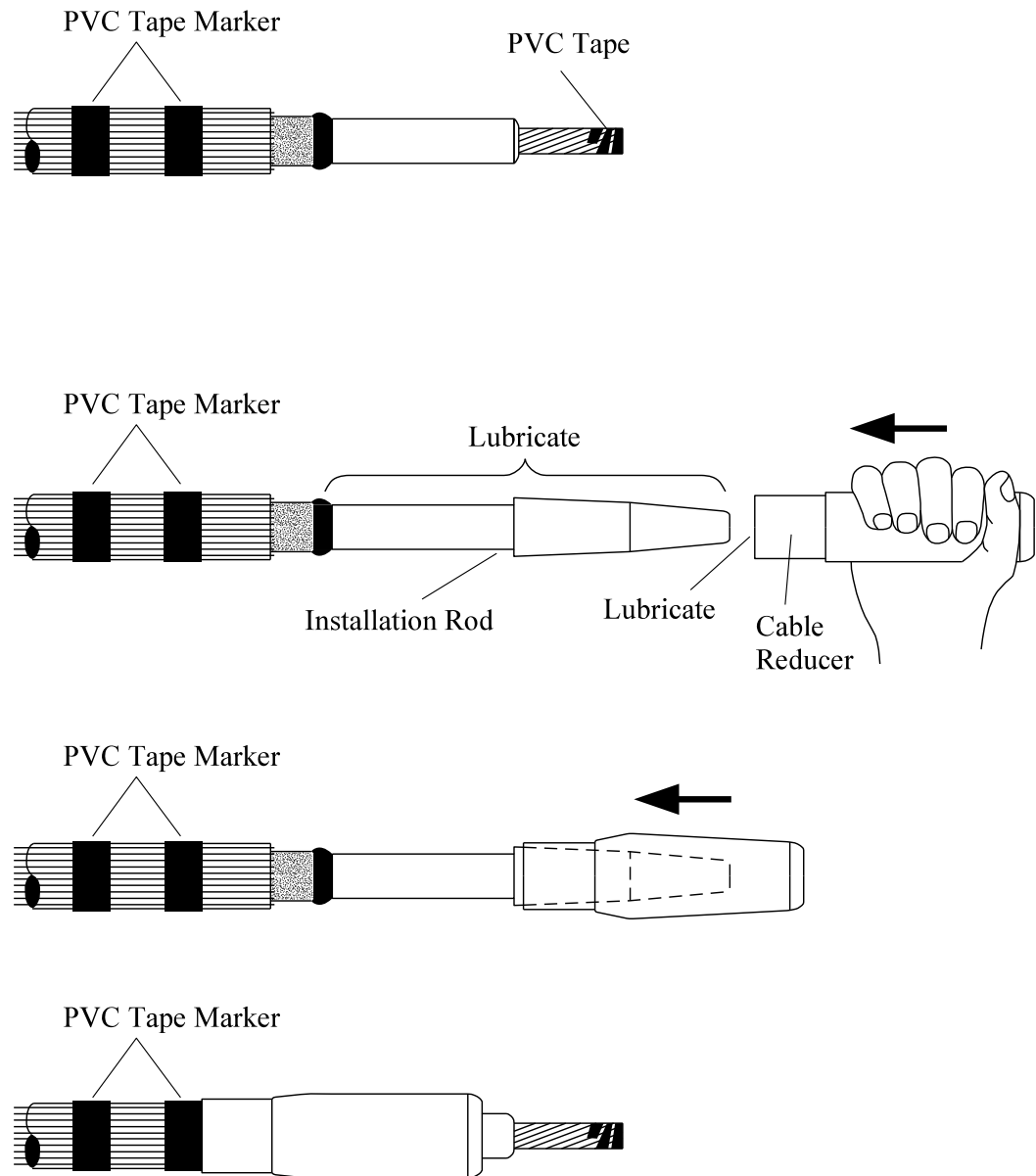


Fig 4

1	RJB			04/16	SECOND PVC TAPE ADDED	
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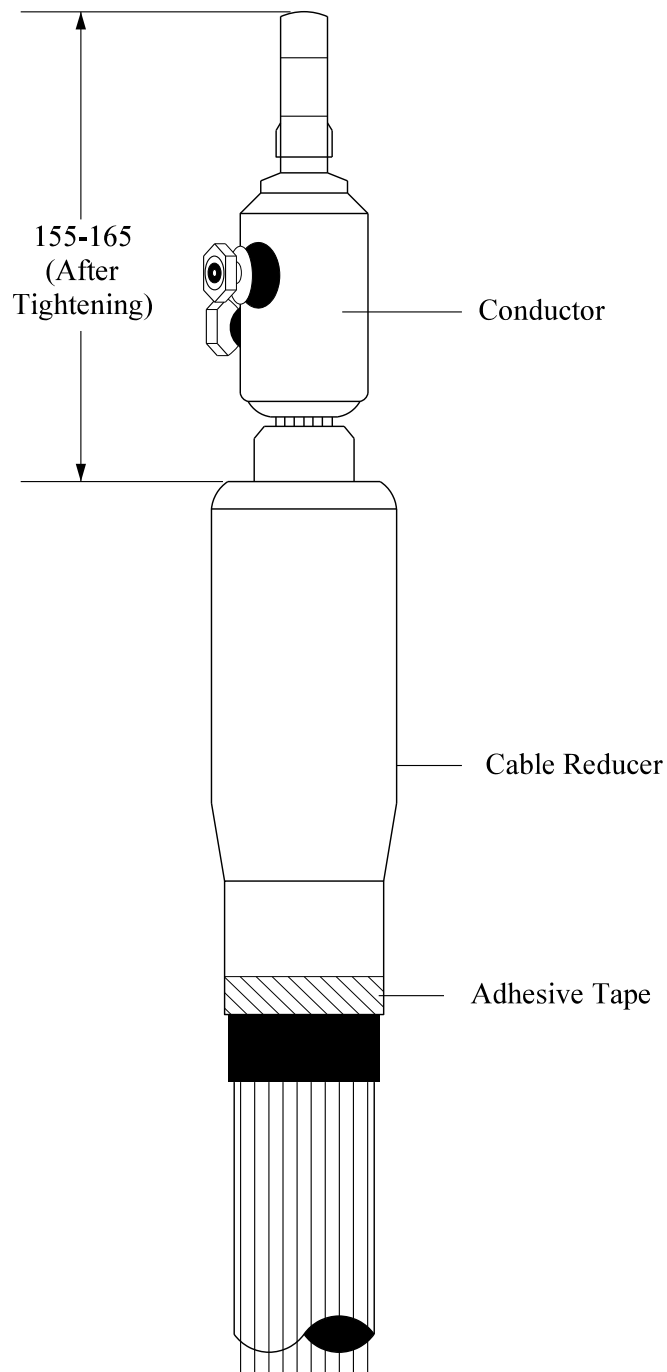



Fig 5

1	RJB			04/16	DIMENSION ALTERED		
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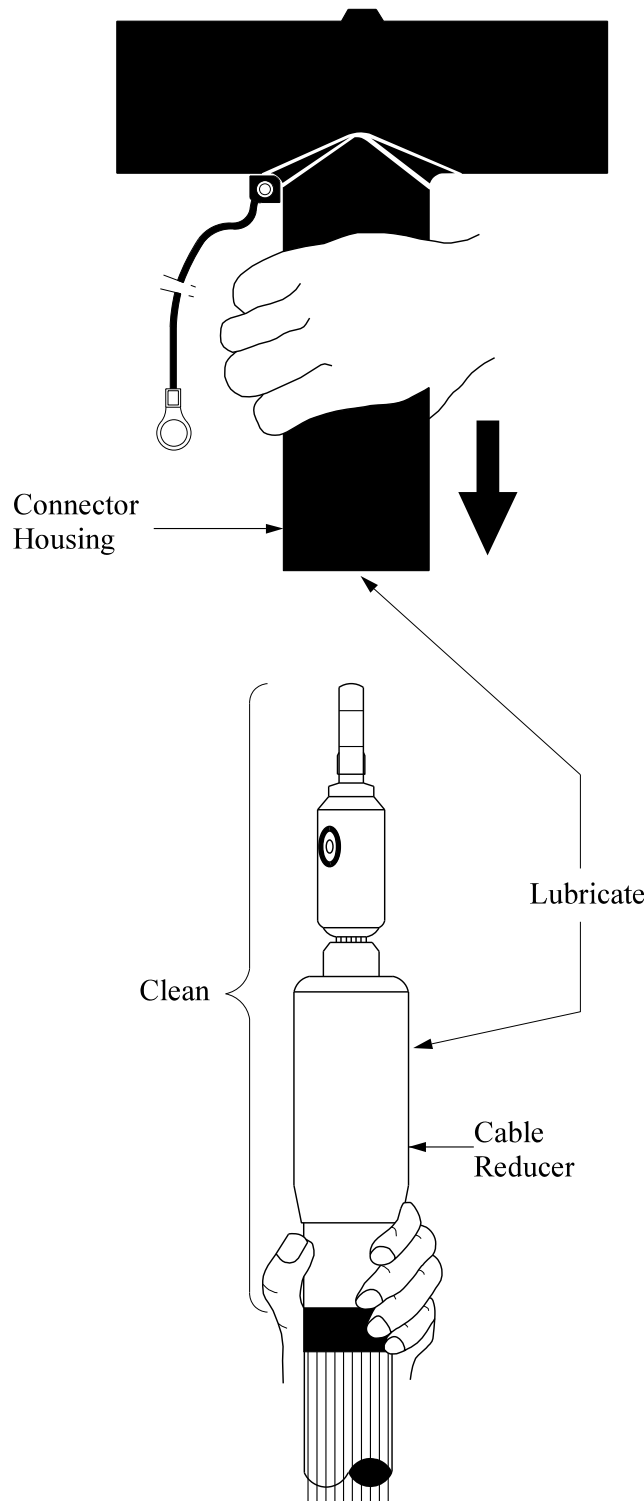

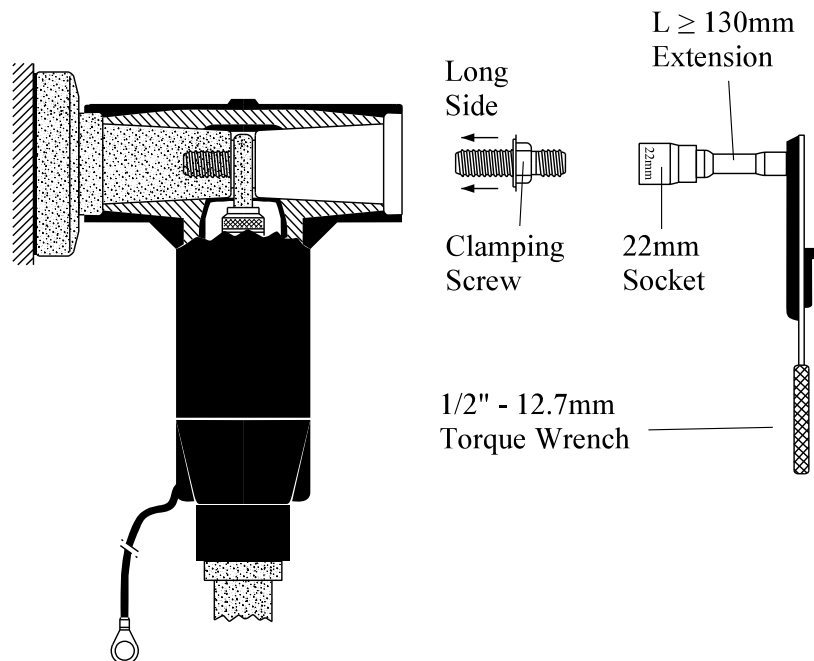
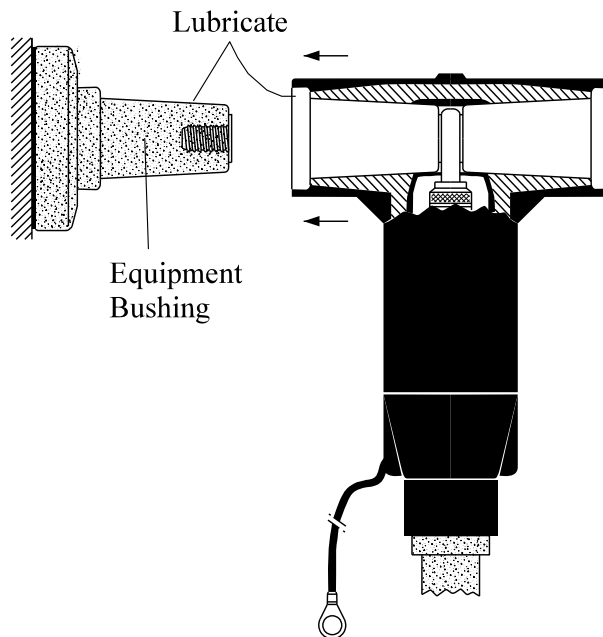


Fig 6

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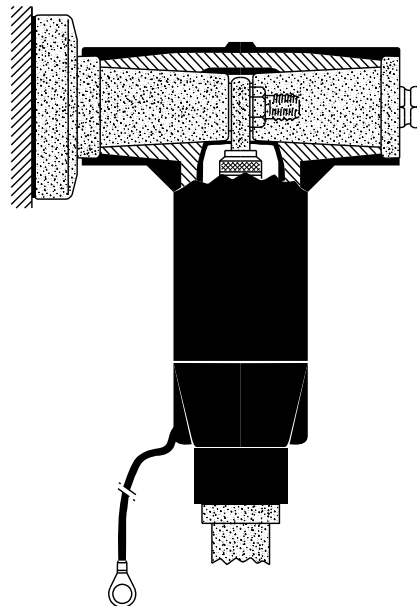
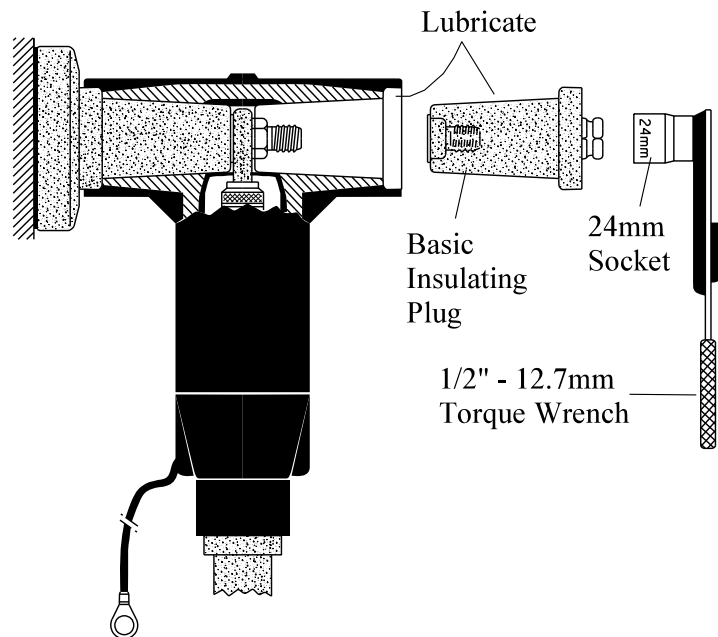
All dimensions in mm




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Checked					
Approved					
SCALE		N.T.S.		<div>Title 300mm² EPR SINGLE CORE K400TBG TEE CONNECTOR TERMINATION TERMINATION COMPLETION</div> <div>Drg. No. JP2D 7.410.6</div> <div>Rev No</div>	

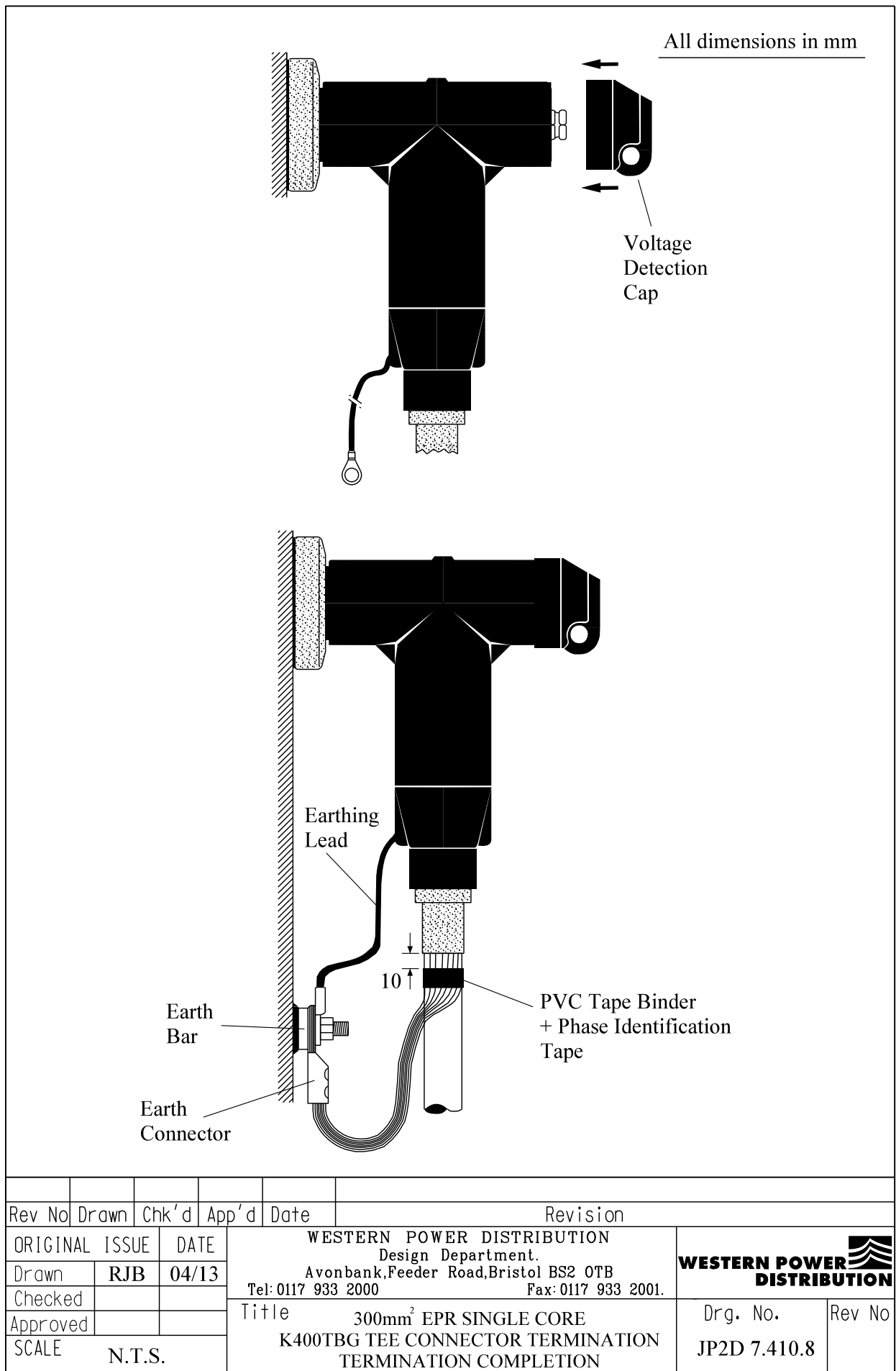
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All dimensions in mm



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Checked				<div>Title 300mm² EPR SINGLE CORE K400TBG TEE CONNECTOR TERMINATION TERMINATION COMPLETION</div> <div>Drg. No. JP2D 7.410.7</div> <div>Rev No</div>	
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ST: CA2U/4 PROCEDURES FOR MAKING 11kV CABLE EPR TERMINATIONS

JOINTING PROCEDURE 7.411

400 and 630mm² EPR COPPER WIRE SCREEN CABLE 11kV EUROMOLD (K) 440 TB/G INTERFACE C SEPARABLE CONNECTOR TERMINATIONS.

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA2C/8 Section 6
of the 11kV Jointing Manual**

JOINTING PROCEDURE 7.411

TERMINATION KIT MATERIALS LIST

CABLE SIZES — 400 and 630mm² EPR

Item	Quantity
K 440 TB / G Series Separable Connector 1250A (each)	3
Cable reducer 611CA-W	3
Clamping screw - 400TCS	3
Conductor connector - TMBC-X	3
Basic insulating plug & cap - 400BIPA	3
Field control mastic, type MFC-RLT	3
Silicone grease & wipes	3
Connector BET 120-12	1
Compression Gland PG42	3

ADDITIONAL ITEMS FOR EACH TERMINATION

PVC tape
Scotch 70
Scotch 13 tape
Tinned copper wire 16 swg
Tinned copper wire 20 swg
De-solvit 1000 FD
De-solvit 1000
Workhorse dry wipes
Emery cloth
5313 Water block tape
Cable ties
Sealing putty
Aluminium oxide cloth 320 grit
Aluminium oxide cloth 400 grit
Copaslip

Note: - Individual material item numbers (E 5) are to be found in Section 4 of the 11kV Jointing Manual.

Note: - The 300 and 630mm² cable sizes are stock items held in E 5, if it is required to terminate a 400mm² then please contact the 11kV Cable Engineer in Avonbank for the requisite cable reducer.

JOINTING PROCEDURE 7.411

Actions	General Requirement (ST: CA2C/8)
Refer to Drawings JP2D 7.411.1, 7.411.2, 7.411.3 7.411.4, 7.411.5, 7.411.6, 7.411.7 and 7.411.8 whilst undertaking this Jointing Procedure.	
1. Identify and mark core phasing clear of termination position.	--
2. Set and align cables into their termination positions.	--
3. Clean each oversheath for a distance of 1 .5m.	--
4. Apply a temporary earth continuity bond clear of termination position.	--
5. Park a compression gland over each core.	60
6. Set and mark cables into their required positions.	5/6
7. Cut each cable 300mm above its connection point.	--
8. Place a connector on each bushing, measure and mark internal depth of barrel onto outside of connector. This mark becomes the reference point for the procedure.	--
9. Remove oversheaths and bedding tapes — Fig 1.	--
10. Abrade oversheaths — Fig 1.	--
11. Apply a turn of mastic around oversheath — Fig 1.	
12. Straighten copper screen wires and bend back over oversheath termination ensure copper screen wires are spaced evenly and bedded into mastic applied in 11.	--
13. Apply three turns of 20swg binder over copper wires at a point 400mm down from the reference point.	--
14. Place a PVC tape marker 385mm from the reference point onto the copper screen wires — Fig 1.	--
15. Offer cores to reference point marked on connectors, mark and cut cores.	--
16. Remove semi-conducting screens, ensuring insulation is free from all conductive material — Fig 1.	28

JOINTING PROCEDURE 7.411 - Continued

Actions	General Requirement (ST: CA2C/8)
17. Remove core insulation making a 3mm bevel to insulation end — Fig 1.	31
18. Apply a few turns of PVC tape to the conductor end as a protection.	--
19. Thoroughly clean core insulation.	--
20. Apply field control mastic strip, type MFC, slightly stretch one end applying with a 5mm overlap onto both semi-conducting screen and core insulation, push the mastic in place while stretching it progressively until both ends overlap and tear-off excess mastic — Fig 2	--
Note: - Ensure mastic does not break during application.	
21. Apply the installation coned rod to conductor end, thoroughly clean coned rod and lubricate coned rod and core up to the MFC mastic tape — Fig 4.	--
22. Lubricate internal face (stepped end) of the cable reducer, slide cable reducer down the core without hesitation and in one smooth movement until the end reaches the PVC tape marker applied in 9—Fig 4.	--
23. Remove connectors from bushings and connect to phase conductors, ensure connector palm is in correct position to bushings before shearing; before and after shearing check distance between top of shearbolt connector and top of cable reducer is between 155 and 165mm see Fig 5.	36
24. Clean cable reducer, core insulation and connector — Fig 6.	--
25. Lightly lubricate the inner surface of the tee connector housing and cable reducer — Fig 6.	--
26. Check the angle of the tee connector housing is correct to connector palm and longer interface is pointing towards the bushing. Whilst supporting the cable reducer at its stepped end preventing movement, gently slide the housing onto the cable until it cannot advance no further — Fig 6.	--
27. Check correct installation by trying to pull back the connector, it is correct when it stays in its locked position, also check to ensure cable reducer has stayed in place during installation — Fig 7.	--
27. Clean and lightly lubricate both inner face of connector housing and bushing, push connector housing onto bushing.	

JOINTING PROCEDURE 7.411 - Continued

Actions	General Requirement (ST: CA2C/8)
28. Insert clamping screw (longer thread) into threaded hole of bushing and tighten — Fig 8.	--
Note: - The screw must be tighten with a torque wrench exerting a 50Nm of torque using a 22mm socket in order to achieve correct torque, ensure there is to be no lubricate on the threaded parts.	
29. Clean and lubricate plug and inner face of connector housing. Insert nylon venting rod into the connector interface.	--
30. Insert the plug into connector housing, remove nylon venting rod and tighten assembly - Fig 8.	--
Note: - The plug must be tighten with a torque wrench exerting 50Nm of torque using a 22mm socket in order to achieve correct torque, ensure there is to be no lubricate on the threaded parts.	
31. Clean inside of protective cap and outer face of the connector housing and insulating plug.	--
32. Push protective cap over connector housing onto the insulating plug, slightly pull the edge of the protective cap to exhaust any air whilst pressing cap centre onto its locking point until it snaps into place. Position the cap with the pulling tab facing downwards — Fig 8.	--
33. Apply four turns of Scotch tape of the relevant phase colour around copper screen wires 10mm below cable reducer end.	--
Note: - Do not apply PVC tape to cable reducer or connector housing.	
34. Form copper screen wires into a bunch and removing 20swg binder and PVC tape binder applied in 13/14.	--
35. Fit gland plate to cable box.	--
36. Fit compression glands to gland plate and each cable.	60
37. Form copper screen wire bunches into one conductor terminating into a earth connector, and connect to earth stud.	36
38. Remove temporary earth continuity bond applied in 4 and reseal EPR oversheaths.	51
39. Replace cable box cover ensuring all external bolt threads are treated with “Copaslip” paste and security bolts are in place.	--

All Dimensions in mm

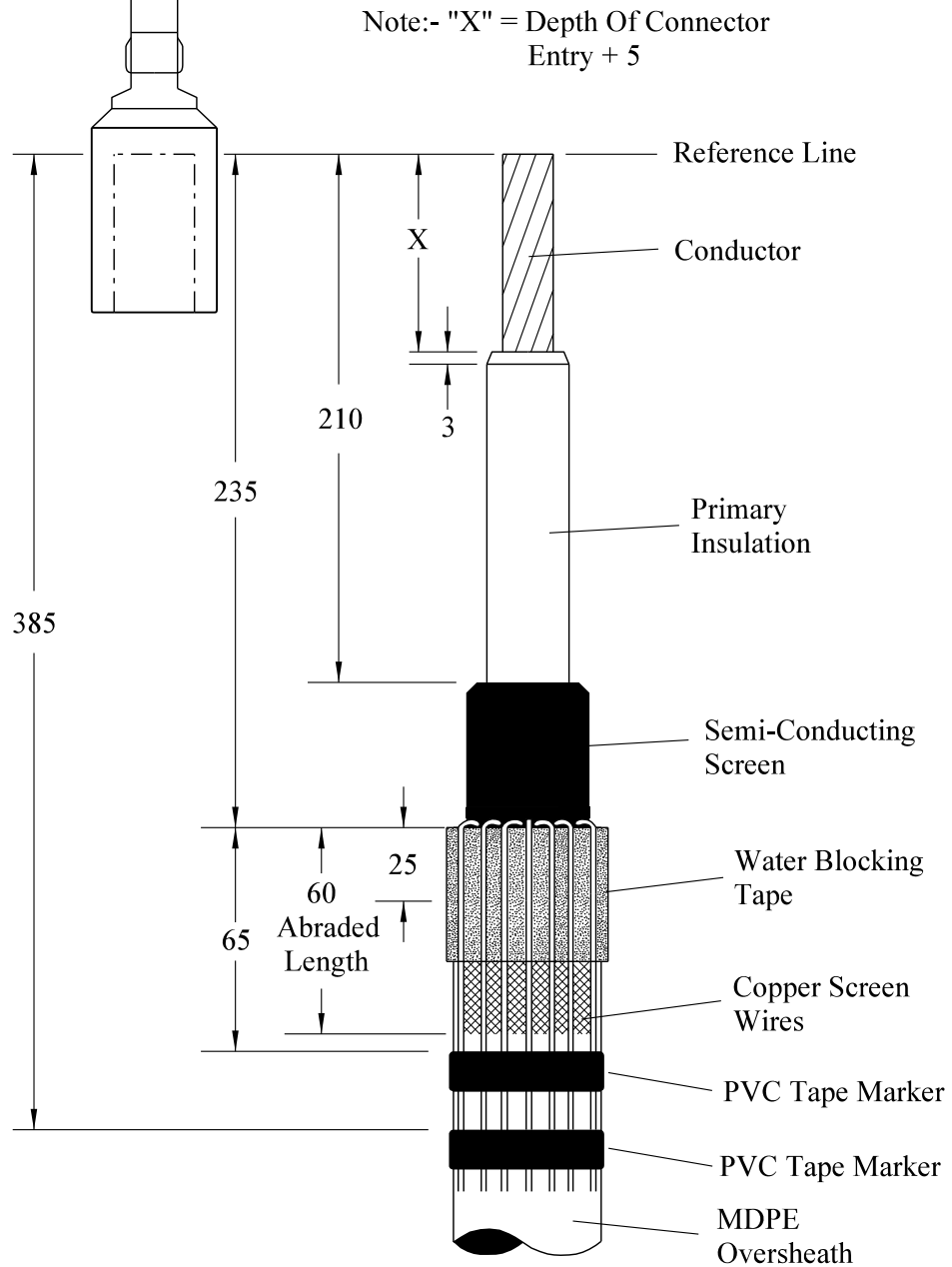


Fig 1

1	RJB			04/16	LENGTHS ALTERED 2ND PVC MARKER ADDED		
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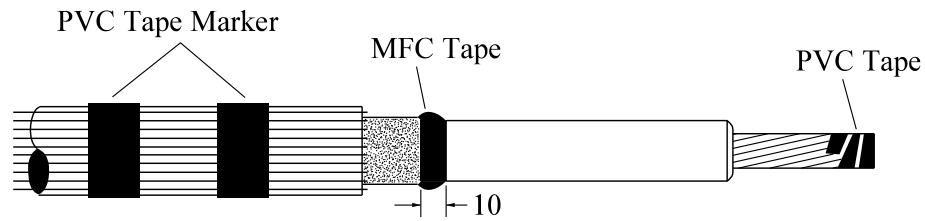


Fig 2

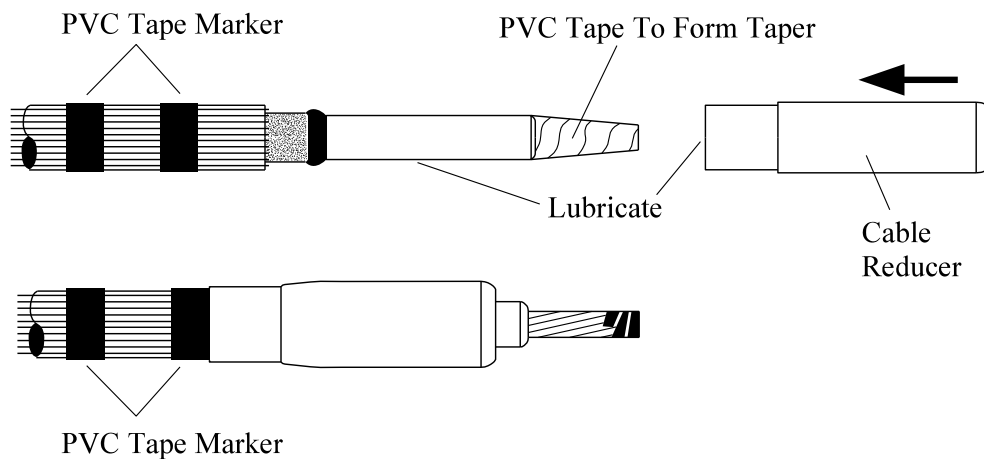



Fig 3

1	RJB			04/16	SECOND PVC TAPE ADDED		
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SCALE		N.T.S.		Title		Drg. No.	Rev No
				400/630mm ² EPR SINGLE CORE K440TBG TEE CONNECTOR TERMINATION STRIPPING DIMENSIONS		JP2D 7.411.2	1

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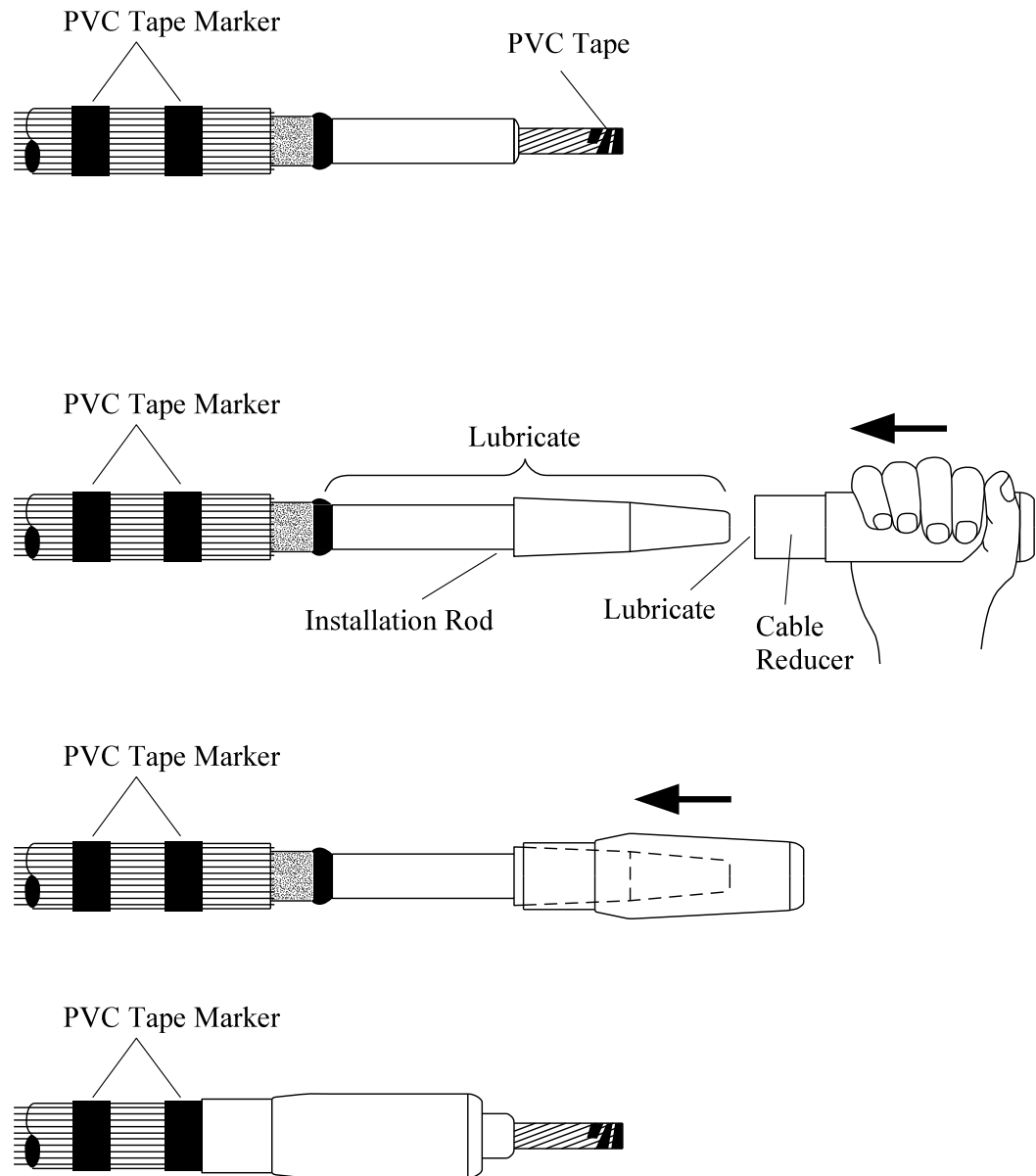



Fig 4

1	RJB			04/16	SECOND PVC TAPE ADDED			
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Approved				Title			Drg. No.	Rev No
SCALE		N.T.S.		400/630mm ² EPR SINGLE CORE K440TBG TEE CONNECTOR TERMINATION TERMINATION COMPLETION			JP2D 7.411.3	1

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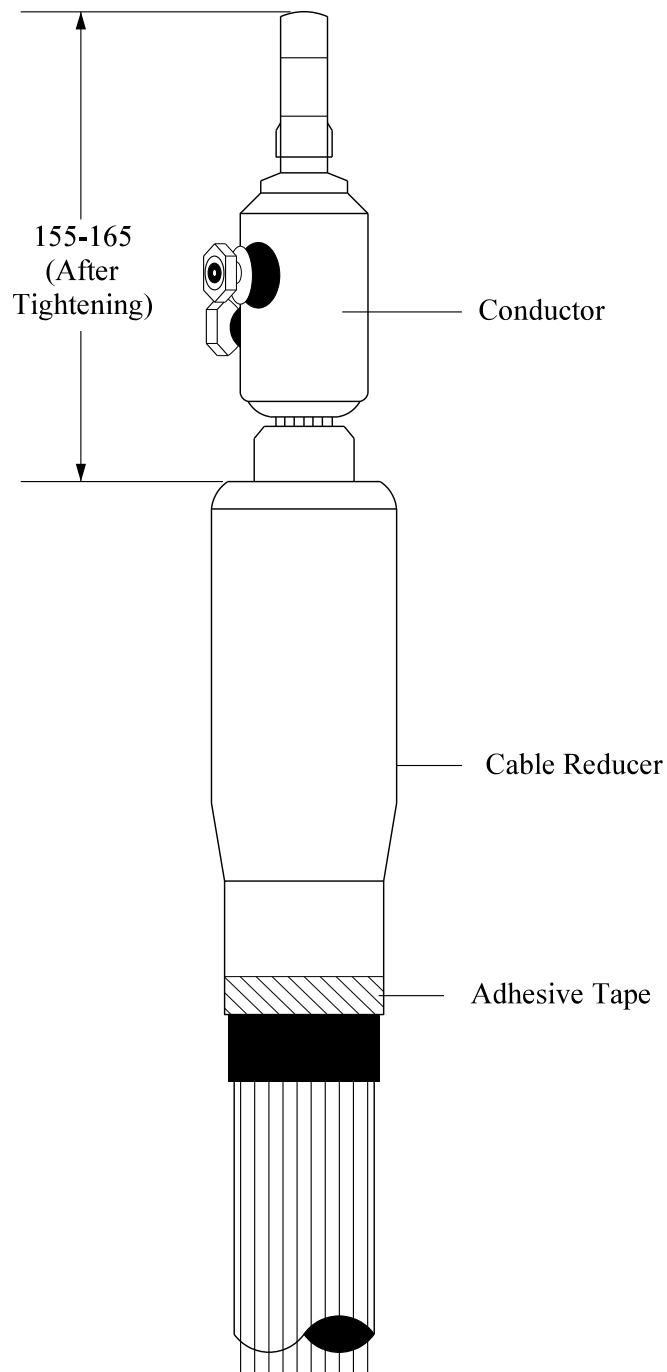



Fig 5

1	RJB			04/16	DIMENSION ALTERED		
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All Dimensions in mm

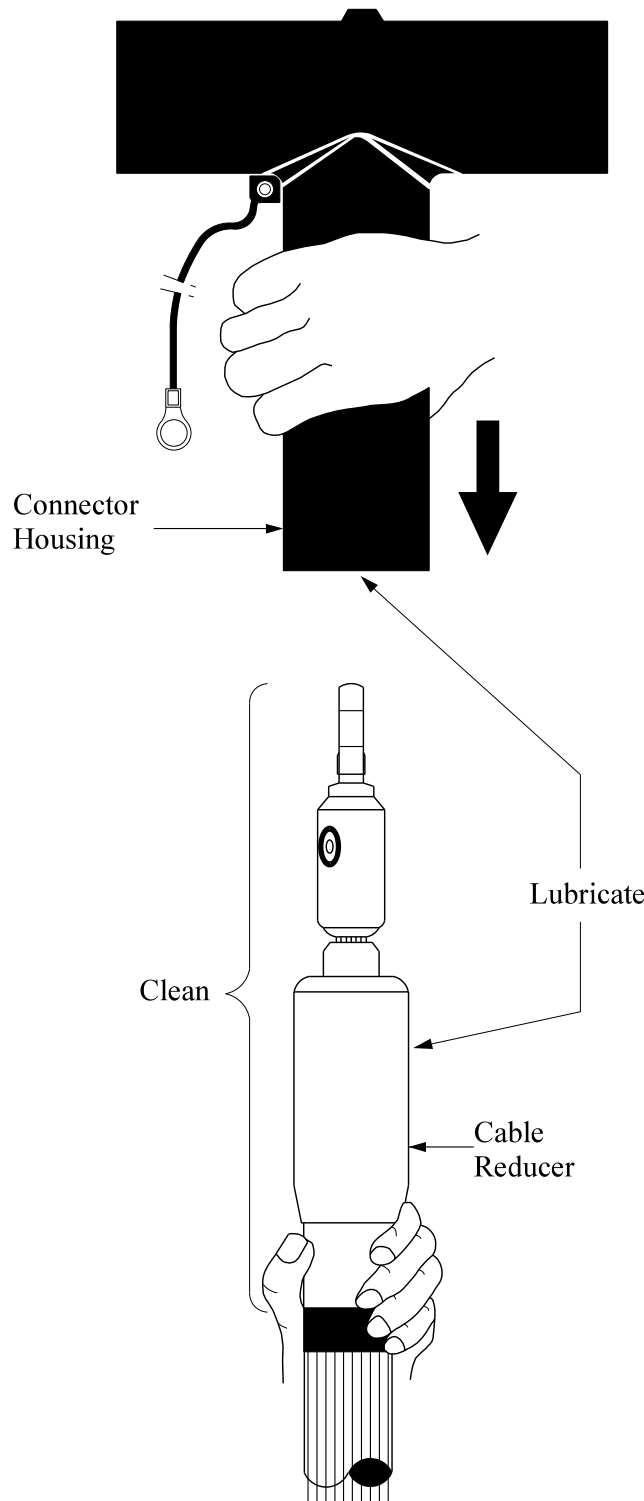

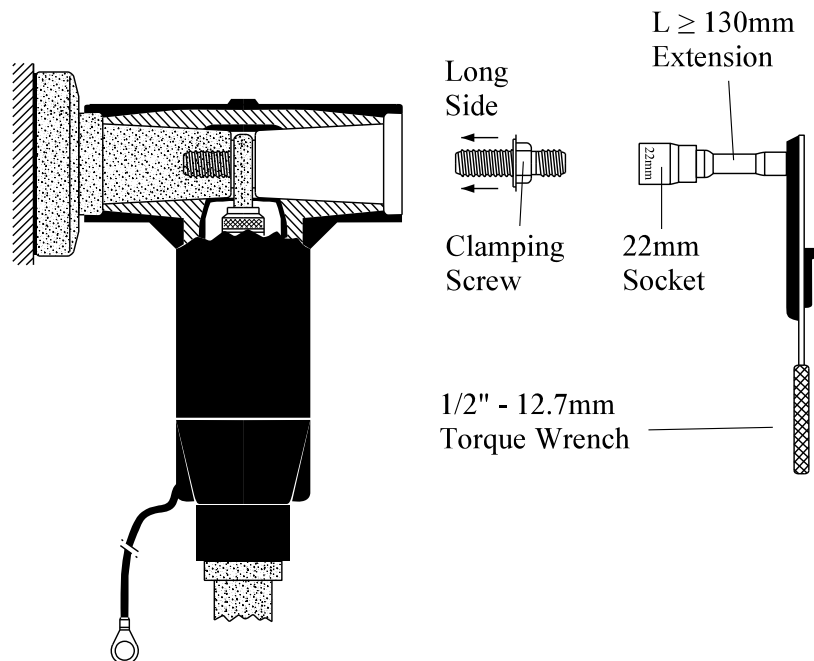
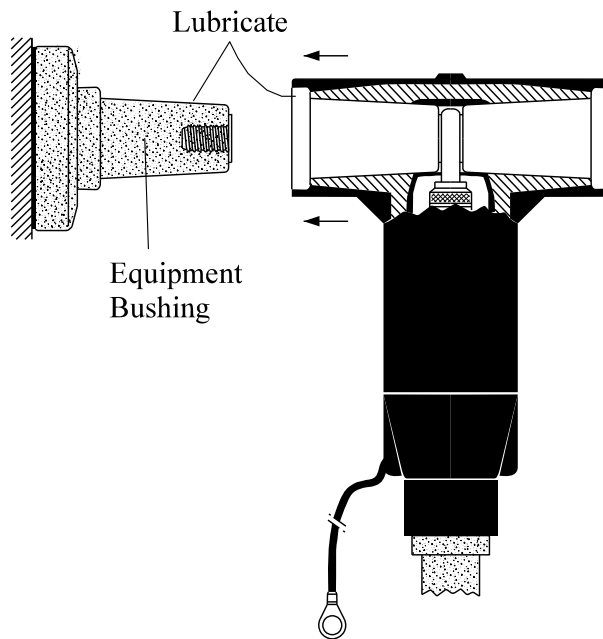



Fig 6

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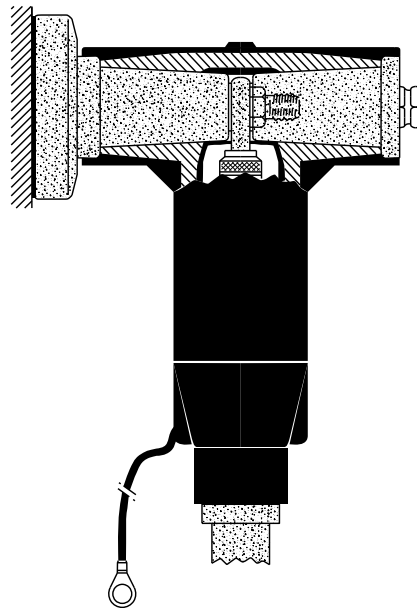
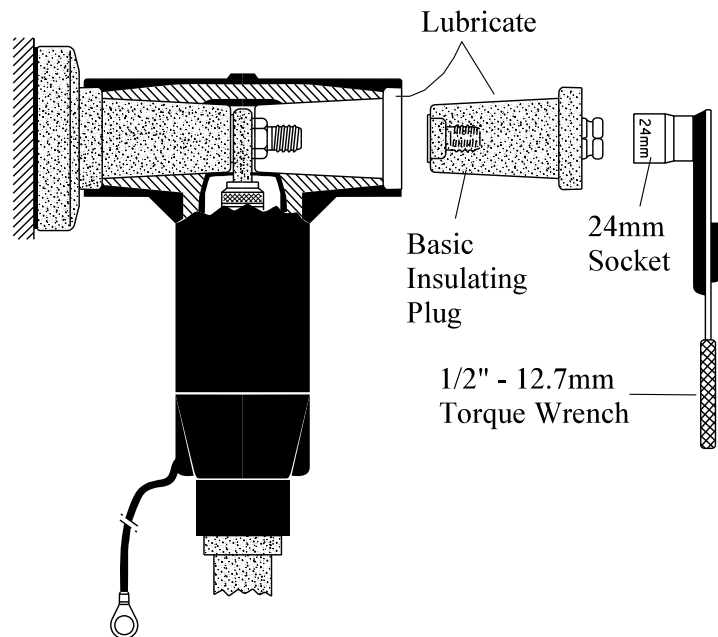
All dimensions in mm



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Approved						
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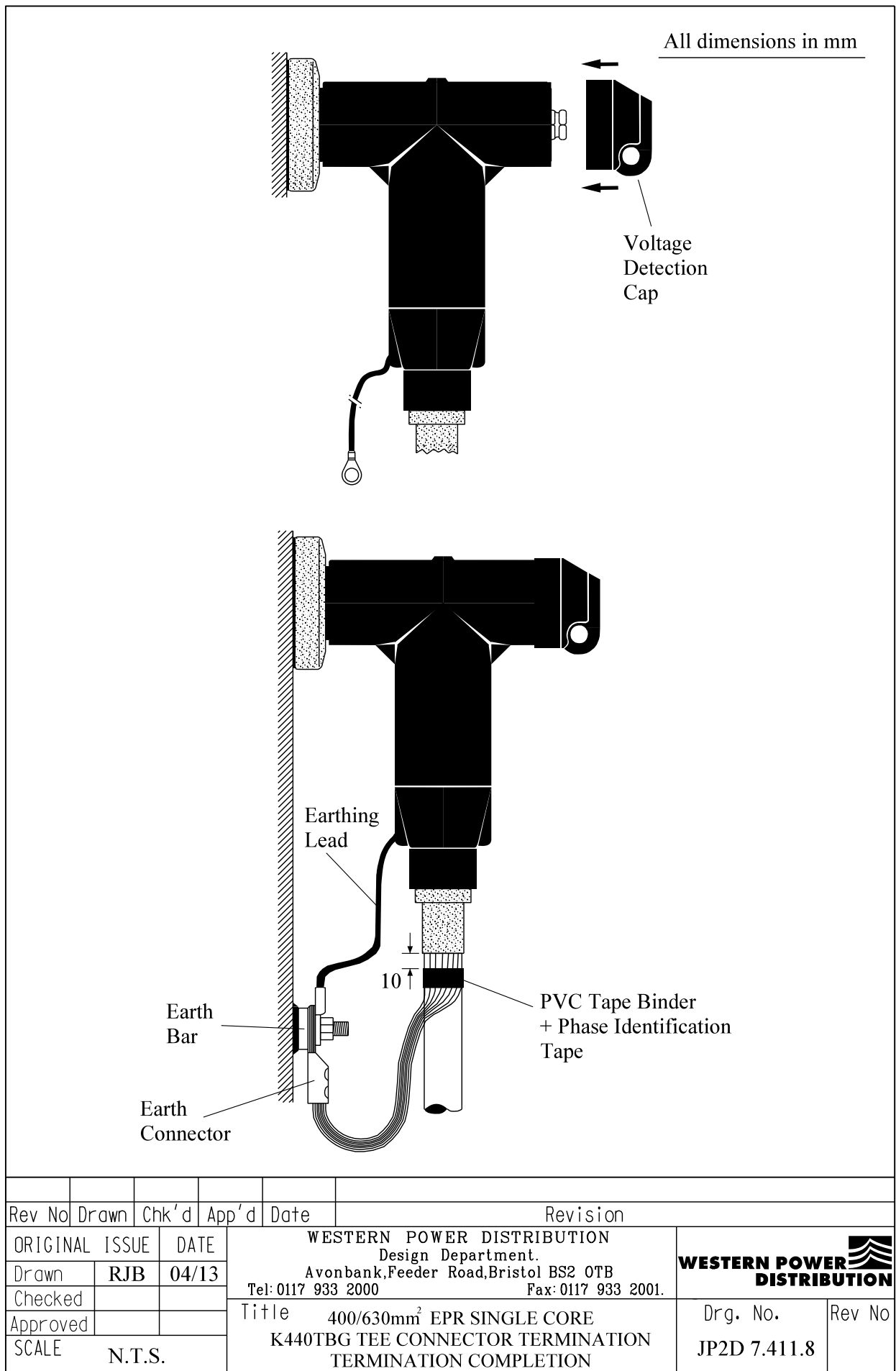
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All dimensions in mm



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Approved			Drg. No. JP2D 7.411.7		
SCALE	N.T.S.		Rev No		

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ST: CA2U/4 PROCEDURES FOR MAKING 11kV CABLE EPR TERMINATIONS

JOINTING PROCEDURE 7.412

**400 and 630mm² EPR, COPPER WIRE SCREEN, 11kV EUROMOLD (K)
440 TB/G INTERFACE C, 1250A, in BACK to BACK
CONFIGURATION SEPARABLE CONNECTOR TERMINATIONS.**

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA2C/8 Section 6
of the 11kV Jointing Manual**

JOINTING PROCEDURE 7.412

TERMINATION KIT MATERIALS LIST

CABLE SIZES — 400 and 630mm² EPR

Item	Quantity
(K) 440 TB (/G) Tee connector housing	6
650CA-W or 611CA-W Cable reducer	6
TBC-X Conductor contact	6
400TCS Clamping screw	6
(K) 400BIPA Basic insulating plug + cap	3
(K) 400CP Connecting plug	3
Sachets of silicone grease + wipers	
Connector BET 120-12	3
Compression Gland PG42	6

ADDITIONAL ITEMS FOR EACH TERMINATION

PVC tape
Scotch 70
Scotch 13 tape
Tinned copper wire 16 swg
Tinned copper wire 20 swg
De-solvit 1000 FD
De-solvit 1000
Workhorse dry wipes
Emery cloth
5313 Water block tape
Cable ties
Sealing putty
Aluminium oxide cloth 320 grit
Aluminium oxide cloth 400 grit
Copaslip

Note: - Individual material item numbers (E 5) are to be found in Section 4 of the 11kV Jointing Manual.

Note: - The 630mm² cable size is a stock items held in E 5, if it is required to terminate a 400mm² then please contact the 11kV Cable Engineer in Avonbank for the requisite cable reducer.

JOINTING PROCEDURE 7.412

Actions	General Requirement (ST: CA2C/8)
Refer to Drawings JP2D 7.412.1, 7.412.2, 7.412.3 7.412.4, 7.412.5, 7.412.6, 7.412.7, 7.412.8, 7.412.9, 7.412.10, 7.412.11, 7.412.12 and 7.412.13 whilst undertaking this Jointing Procedure.	
1. Identify and mark core phasing clear of termination position.	--
2. Set and align cables into their termination positions.	--
3. Clean each oversheath for a distance of 1 .5m.	--
4. Apply a temporary earth continuity bond clear of termination position.	--
5. Park a compression gland over each core.	60
6. Set and mark cables into their required positions.	5/6
7. Cut each cable 300mm above its connection point.	--
8. Place a connector on each bushing, measure and mark internal depth of barrel onto outside of connector. This mark becomes the reference point for the procedure.	--
9. Remove oversheaths and bedding tapes — Fig 1.	--
10. Abrade oversheaths — Fig 1.	--
11. Apply a turn of mastic around oversheath — Fig 1.	
12. Straighten copper screen wires and bend back over oversheath termination ensure copper screen wires are spaced evenly and bedded into mastic applied in 11.	--
13. Apply three turns of 20swg binder over copper wires at a point 400mm down from the reference point.	--
14. Place a PVC tape marker 385mm from the reference point onto the copper screen wires — Fig 1.	--
15. Offer cores to reference point marked on connectors, mark and cut cores.	--
16. Remove semi-conducting screens, ensuring insulation is free from all conductive material — Fig 1.	28

JOINTING PROCEDURE 7.412 - Continued

Actions	General Requirement (ST: CA2C/8)
17. Remove core insulation making a 3mm bevel to insulation end — Fig 1.	31
18. Apply a few turns of PVC tape to the conductor end as a protection.	--
19. Thoroughly clean core insulation.	--
20. Apply field control mastic strip, type MFC, slightly stretch one end applying with a 5mm overlap onto both semi-conducting screen and core insulation, push the mastic in place while stretching it progressively until both ends overlap and tear-off excess mastic — Fig 2	--
Note: - Ensure mastic does not break during application.	
21. Lubricate internal face (stepped end) of the cable reducer, slide cable reducer down the core without hesitation and in one smooth movement until the end reaches the PVC tape marker applied in 9—Fig 4.	--
22. Remove connectors from bushings and connect to phase conductors, ensure connector palm is in correct position to bushings before shearing- Fig 5.	36
23. Remove any burrs resulting from tightening.	--
24. Clean cable reducer, core insulation and connector — Fig 6.	--
25. Lightly lubricate the inner surface of the tee connector housing and cable reducer — Fig 6.	--
26. Check the angle of the tee connector housing is correct to connector palm and longer interface is pointing towards the bushing. Whilst supporting the cable reducer at its stepped end preventing movement, gently slide the housing onto the cable until it cannot advance no further — Fig 6.	--
27. Check correct installation by trying to pull back the connector, it is correct when it stays in its locked position, also check to ensure cable reducer has stayed in place during installation — Fig 7.	--
27. Clean and lightly lubricate both inner face of connector housing and bushing, push connector housing onto bushing.	
28. Insert clamping screw (longer thread) into threaded hole of bushing and tighten — Fig 8.	--

JOINTING PROCEDURE 7.412 - Continued

Actions	General Requirement (ST: CA2C/8)
Note: - The screw must be tighten with a torque wrench exerting a 50Nm of torque using a 22mm socket in order to achieve correct torque, ensure there is to be no lubricate on the threaded parts.	
29. Clean and lightly lubricate both, connector interface and connecting plug interface.	--
30. Push the connecting plug into the connector, engage the threads and hand tighten - Fig 8.	--
Note: - The plug must be tighten with a torque wrench exerting 50Nm of torque using a 10mm hex key in order to achieve correct torque, ensure there is to be no lubricate on the threaded parts.	
31. Clean and lightly lubricate both, the second connector and the connecting plug interface. Push the connector on to the connecting plug.	--
32. Insert the second 400TCS clamping screw (longer thread) into threaded hole of the connecting plug and tighten.	--
Note: - The screw must be tighten with a torque wrench exerting a 50Nm of torque using a 22mm socket in order to achieve correct torque, ensure there is to be no lubricate on the threaded parts.	
33. Clean and lightly lubricate both, connector interface and connecting plug interface.	--
34. Push the connecting plug into the connector, engage the threads and hand tighten.	--
Note: - The plug must be tighten with a torque wrench exerting 50Nm of torque using a 24mm socket in order to achieve correct torque, ensure there is to be no lubricate on the threaded parts.	
35. Clean inside of protective cap and outer face of the connector housing and insulating plug.	--
36. Push protective cap over connector housing onto the insulating plug, slightly pull the edge of the protective cap to exhaust any air whilst pressing cap centre onto its locking point until it snaps into place. Position the cap with the pulling tab facing downwards.	--

JOINTING PROCEDURE 7.412 - Continued

Actions	General Requirement (ST: CA2C/8)
37. Apply four turns of Scotch tape of the relevant phase colour around copper screen wires 10mm below cable reducer end.	--
Do not apply PVC tape to the cable reducer or connector housing.	
38. Form copper screen wires into a bunch and removing 20swg binder and PVC tape binder applied in 13/14.	--
39. Fit gland plate to cable box.	--
40. Fit compression glands to gland plate and each cable.	
41. Form copper screen wire bunches into one conductor terminating into a earth connector, and connect to earth stud.	--
42. Remove temporary earth continuity bond applied in 4 and reseal EPR oversheaths.	--
43. Replace cable box cover ensuring all external bolt threads are treated with “Copaslip” paste and security bolts are in place.	--
44. Ensure all cables are adequately cleated and carry the weight of the cables.	--

All Dimensions in mm

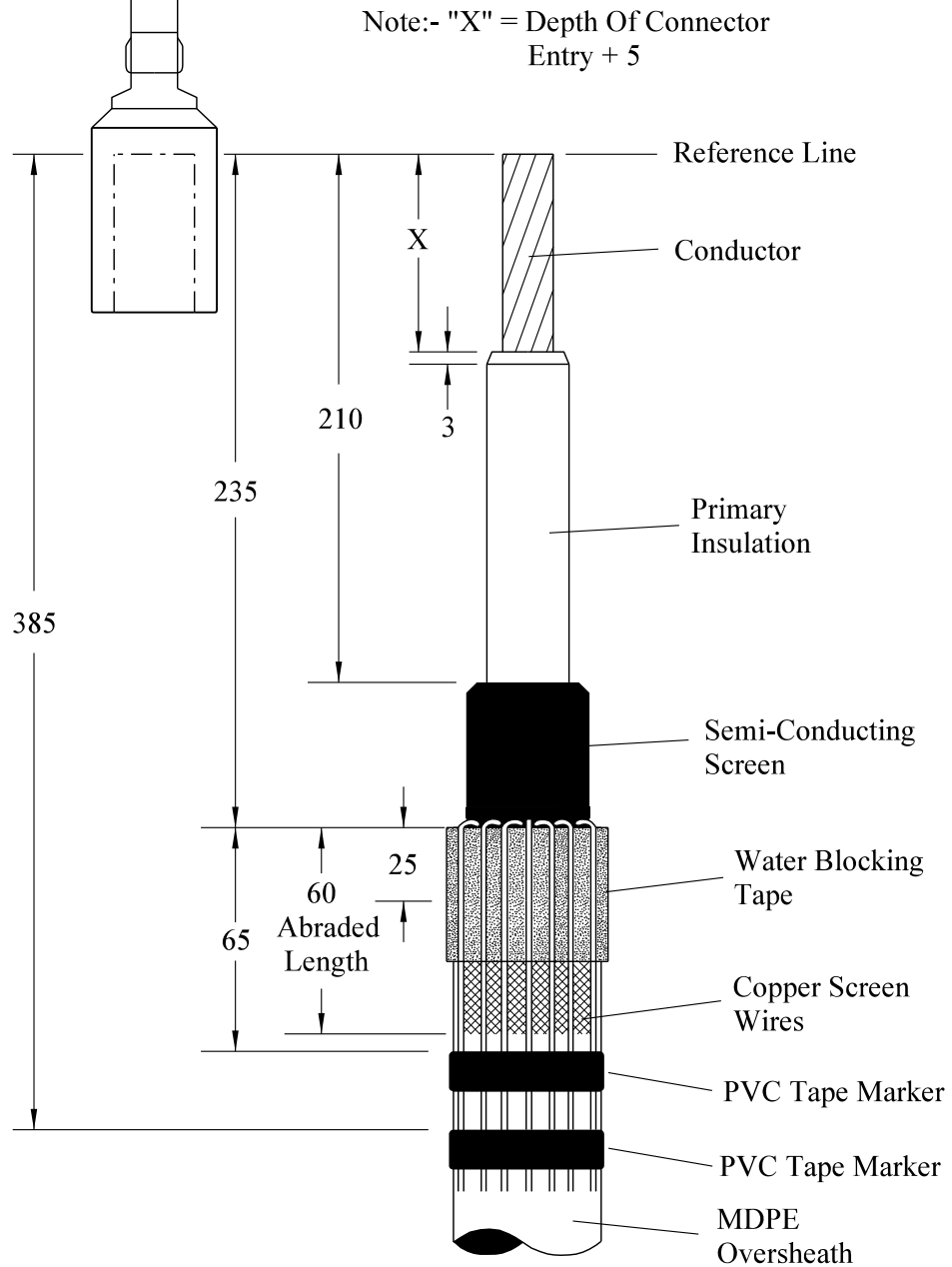



Fig 1

1	RJB			04/16	LENGTHS ALTERED 2ND PVC MARKER ADDED			
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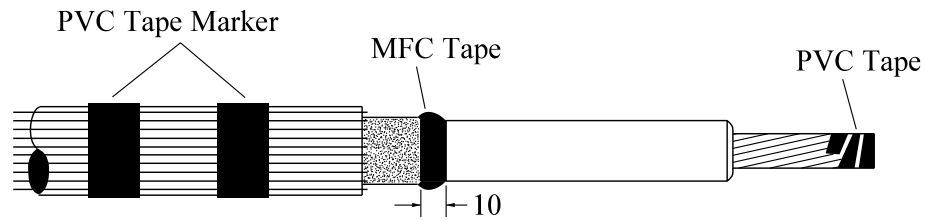


Fig 2

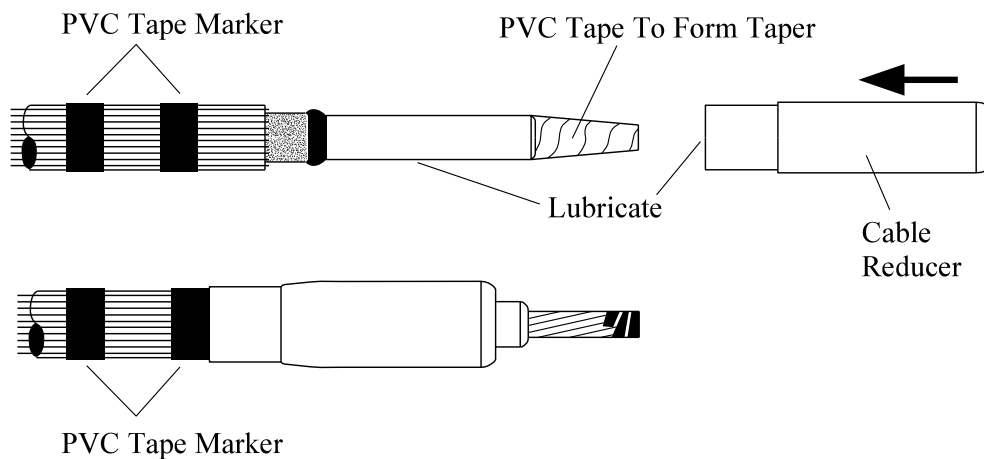



Fig 3

1	RJB			04/16	SECOND PVC TAPE ADDED		
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				400/630mm ² EPR SINGLE CORE K440TBG TEE CONNECTOR TERMINATION STRIPPING DIMENSIONS		JP2D 7.412.2	1

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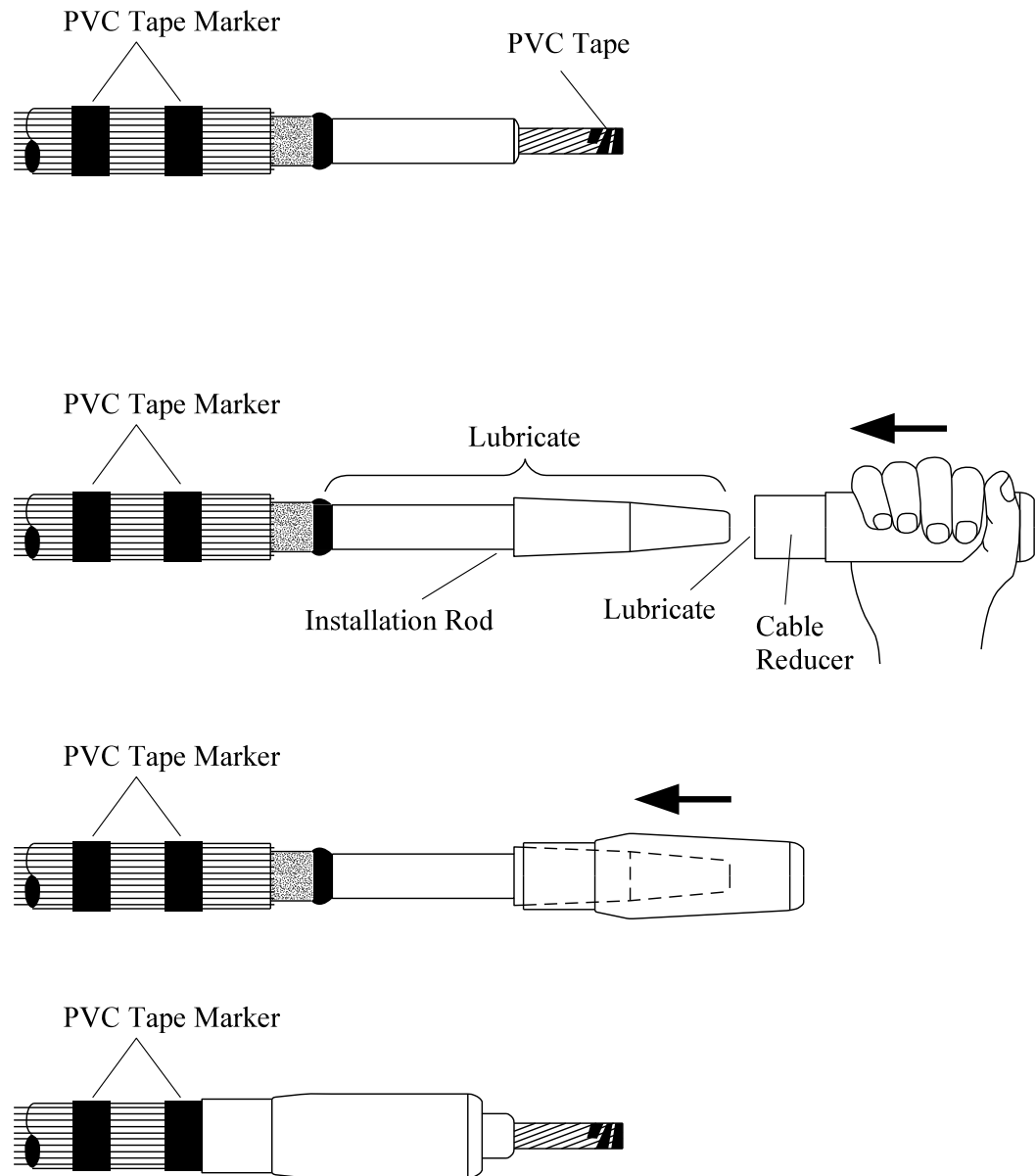


Fig 4

1	RJB			04/16	SECOND PVC TAPE ADDED	
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All Dimensions in mm

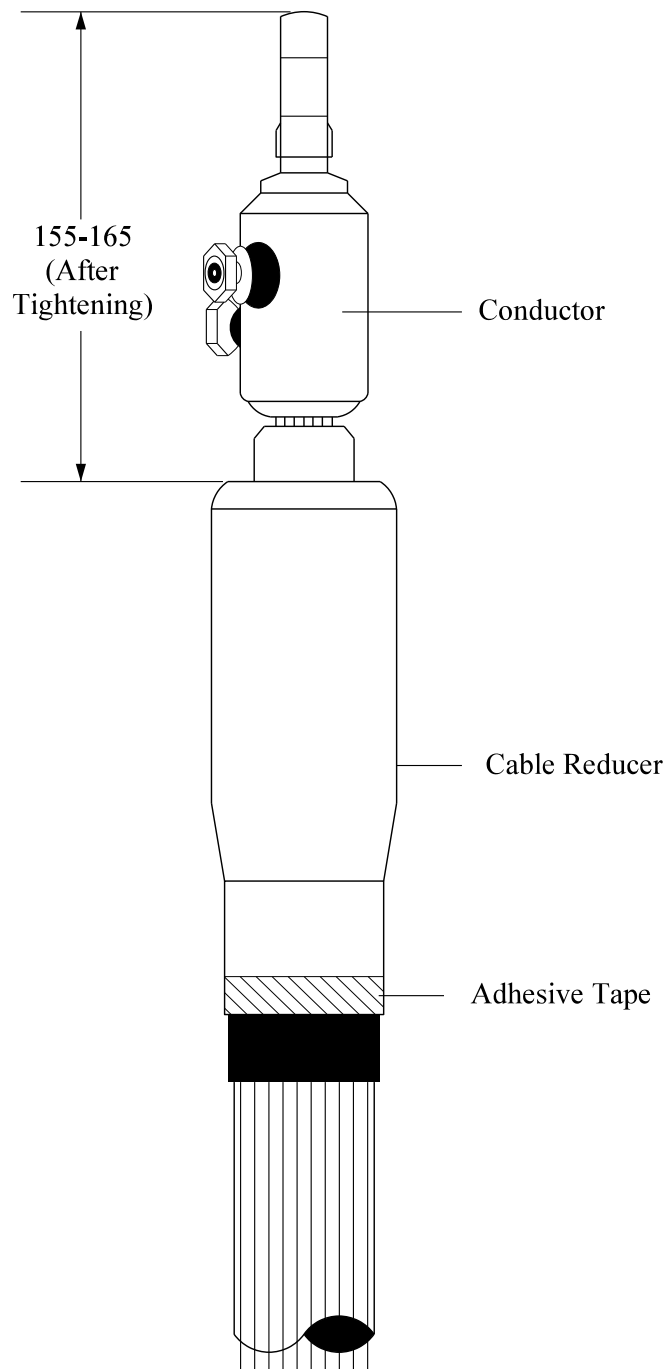



Fig 5

1	RJB			04/16	DIMENSION ALTERED		
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Checked						Drg. No.	Rev No
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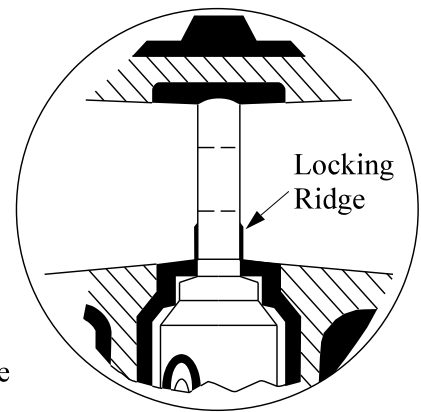
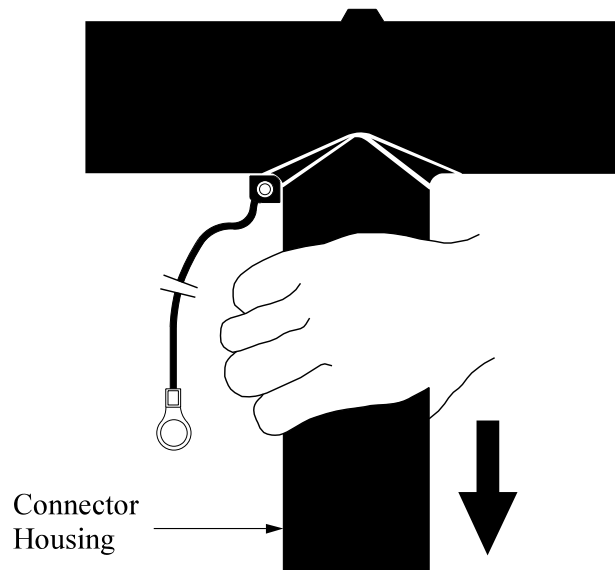


Fig 7

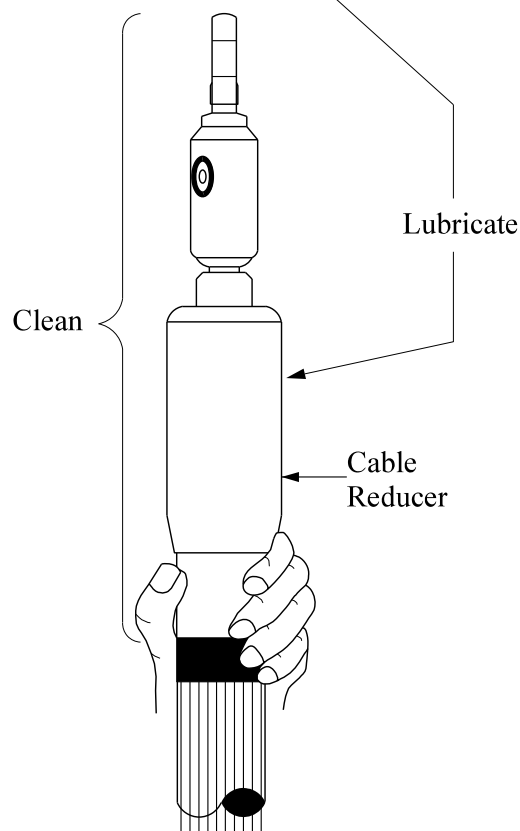

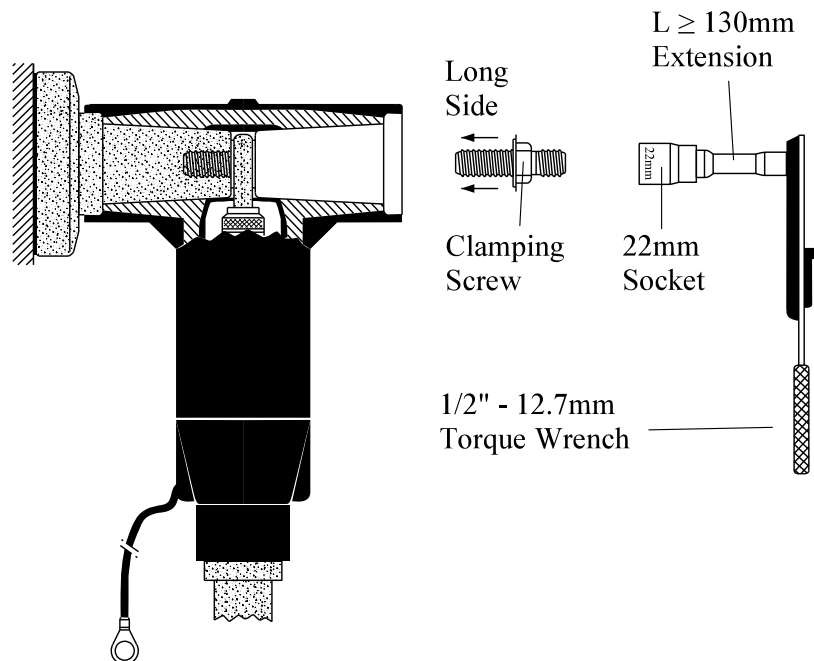
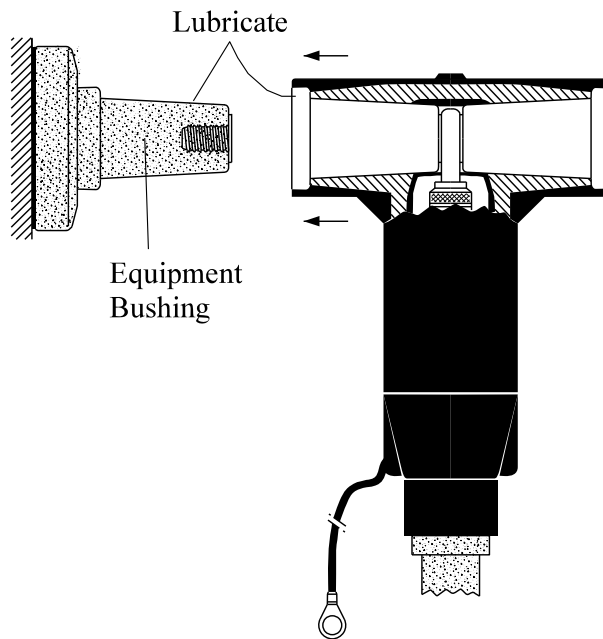


Fig 6

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Drawn	RJB	04/13		Title K440TBG TEE CONNECTOR TERMINATION TERMINATION COMPLETION			Drg. No. JP2D 7.412.5	Rev No
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Approved								
SCALE		N.T.S.						

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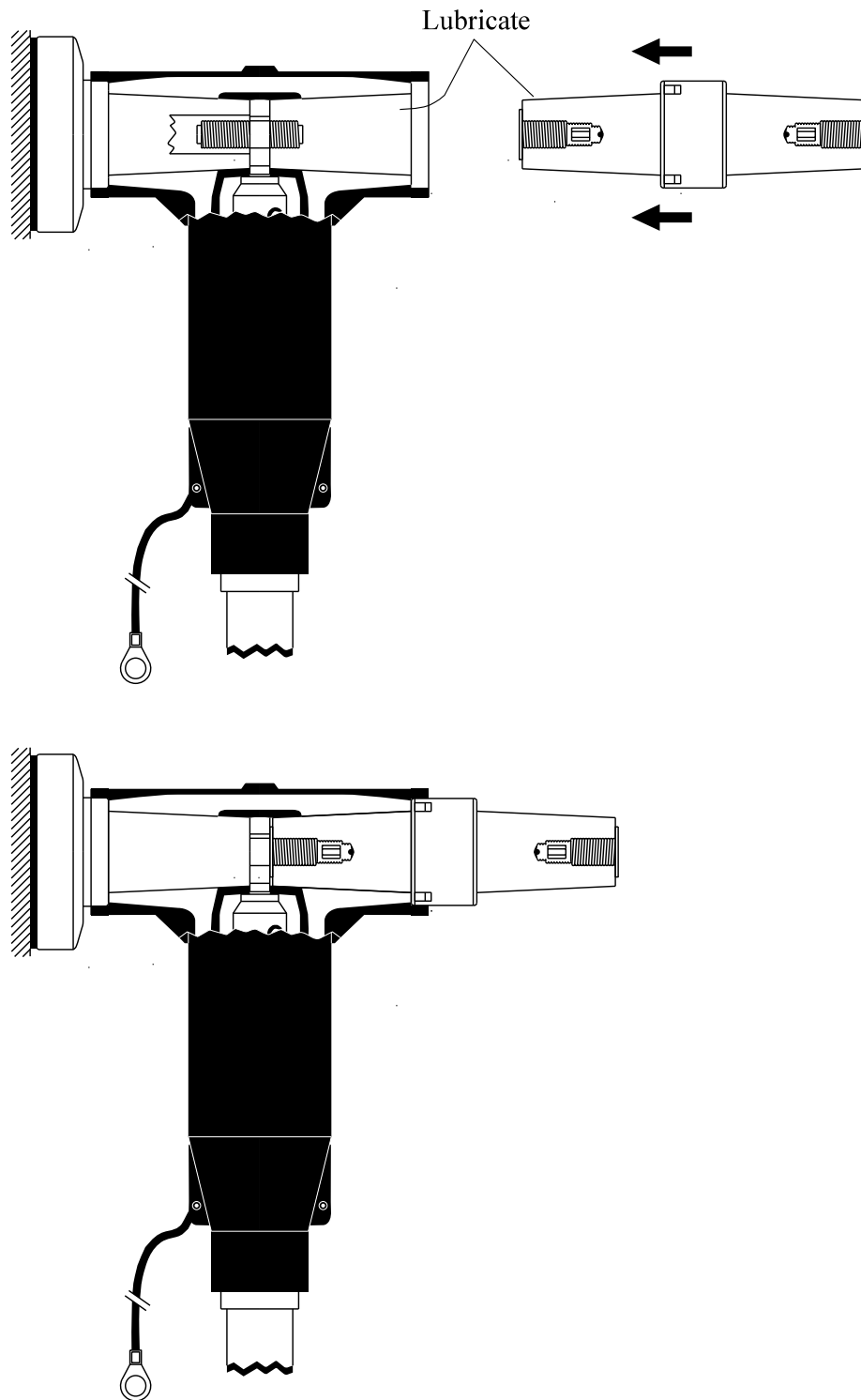
All dimensions in mm



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Drawn	RJB	04/13					
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Approved							
SCALE		N.T.S.		Title		Drg. No.	Rev No
				K440TBG (P2) TEE CONNECTOR TERMINATION BACK TO BACK		JP2D 7.412.6	

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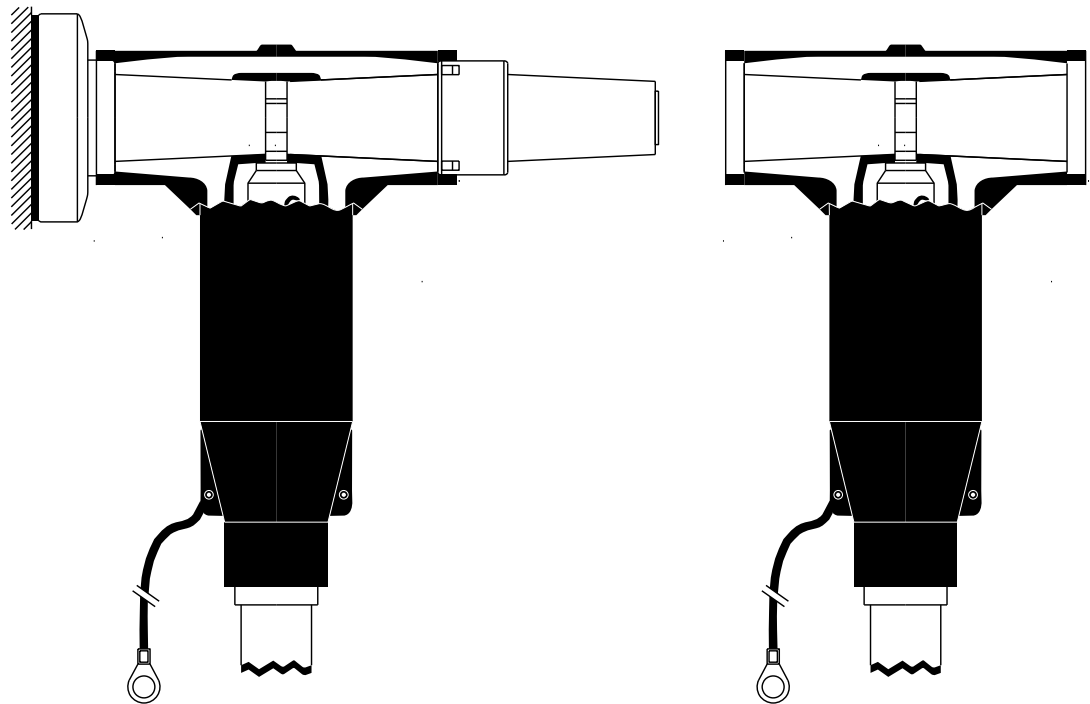
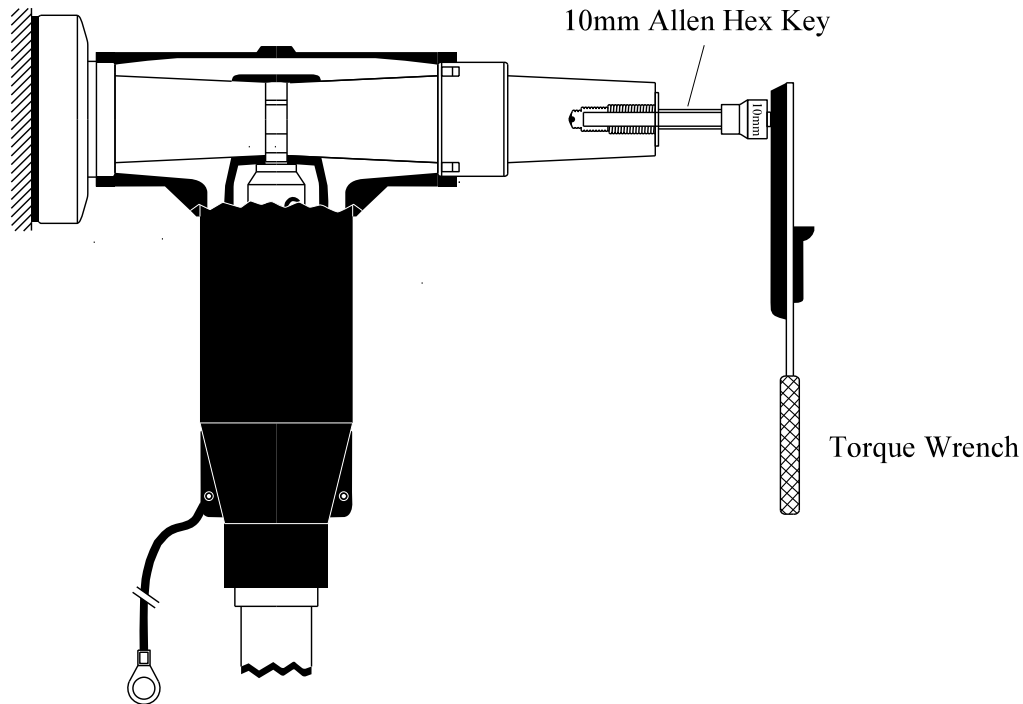
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Drawn	RJB	04/13			
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Approved					
SCALE		N.T.S.		Title	
				K440TBG (P2) TEE CONNECTOR BACK TO BACK	
				Drg. No. JP2D 7.412.7	
				Rev No	

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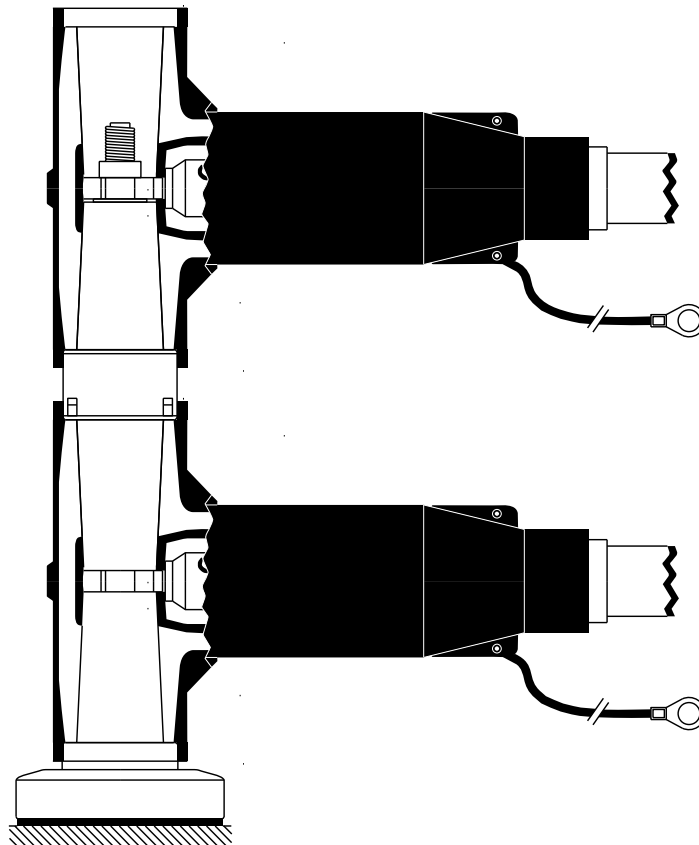
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Drawn	RJB	04/13	Title		
Checked					
Approved			K440TBG (P2) TEE CONNECTOR BACK TO BACK		
SCALE	N.T.S.				
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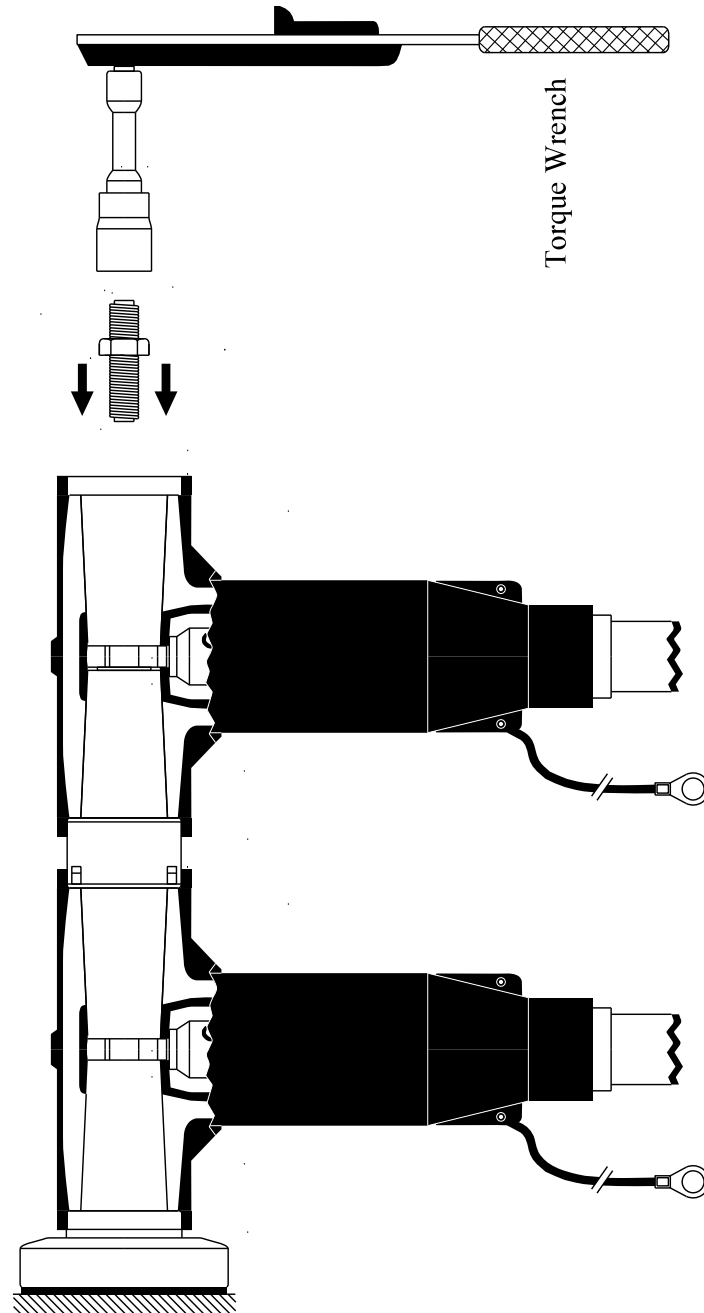
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SCALE	N.T.S.		Title K440TBG (P2) TEE CONNECTOR BACK TO BACK			Drg. No. JP2D 7.412.9
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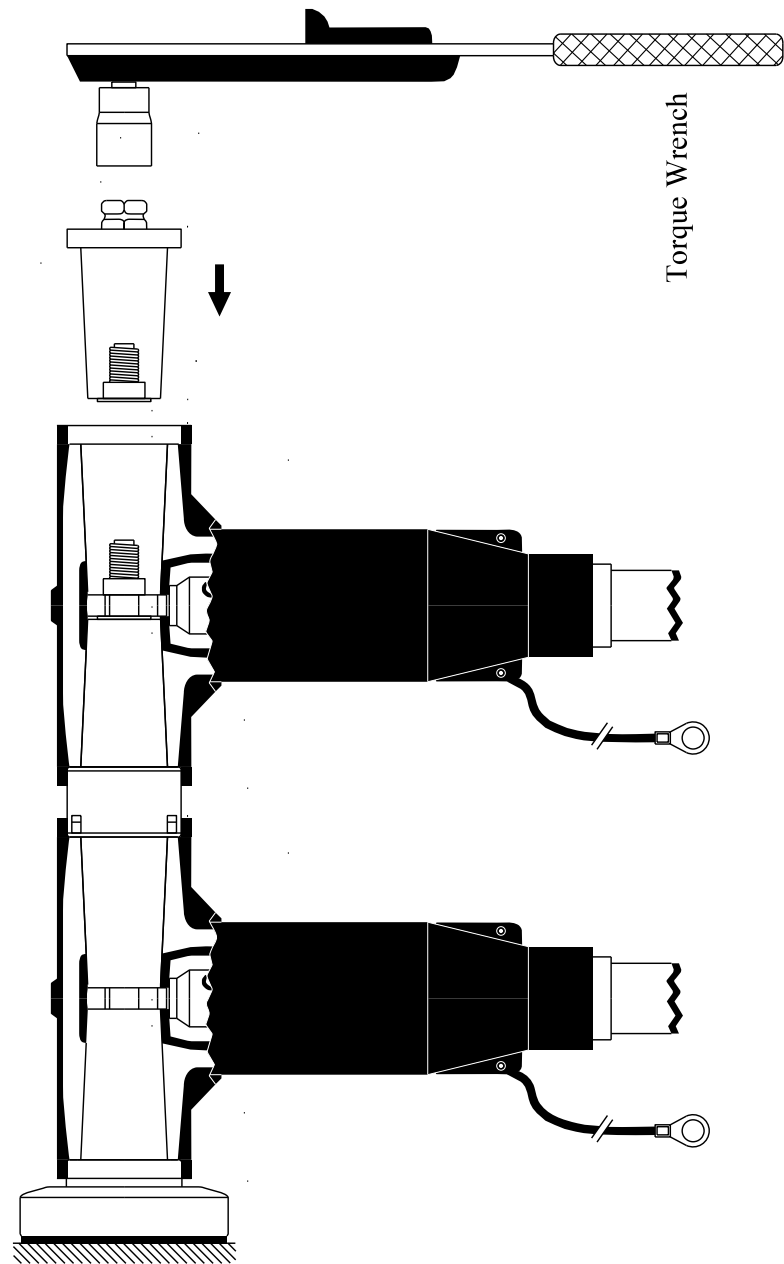
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SCALE	N.T.S.		Title K440TBG (P2) TEE CONNECTOR BACK TO BACK			Drg. No. JP2D 7.412.10 Rev No

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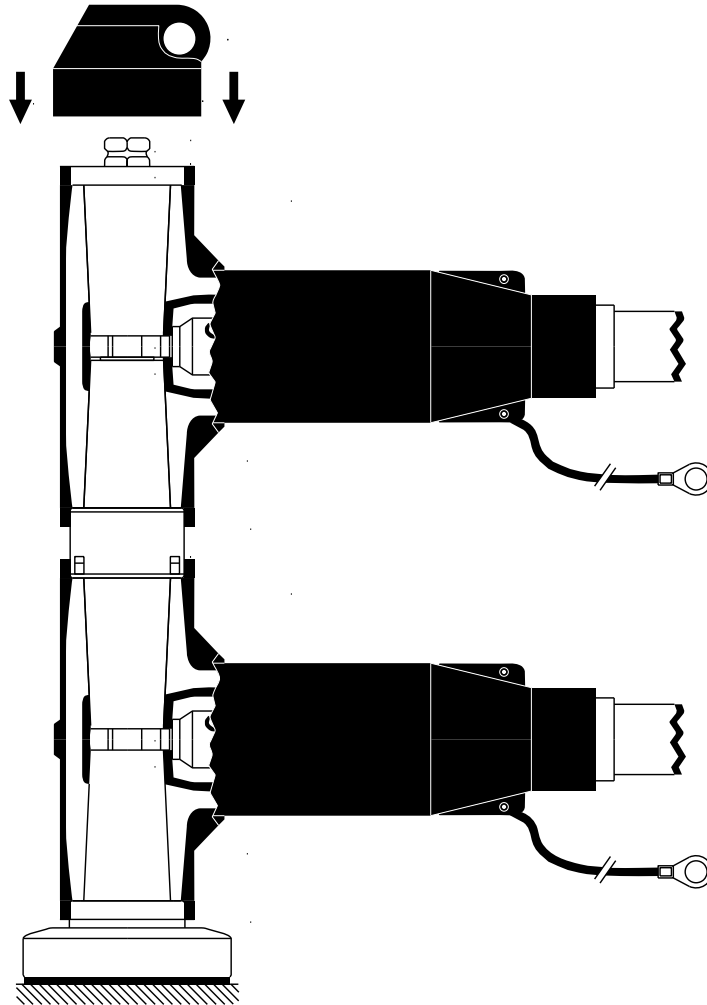
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Drawn	RJB	04/13			
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Approved					
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				K440TBG (P2) TEE CONNECTOR BACK TO BACK	
				Drg. No. JP2D 7.412.11	
				Rev No	

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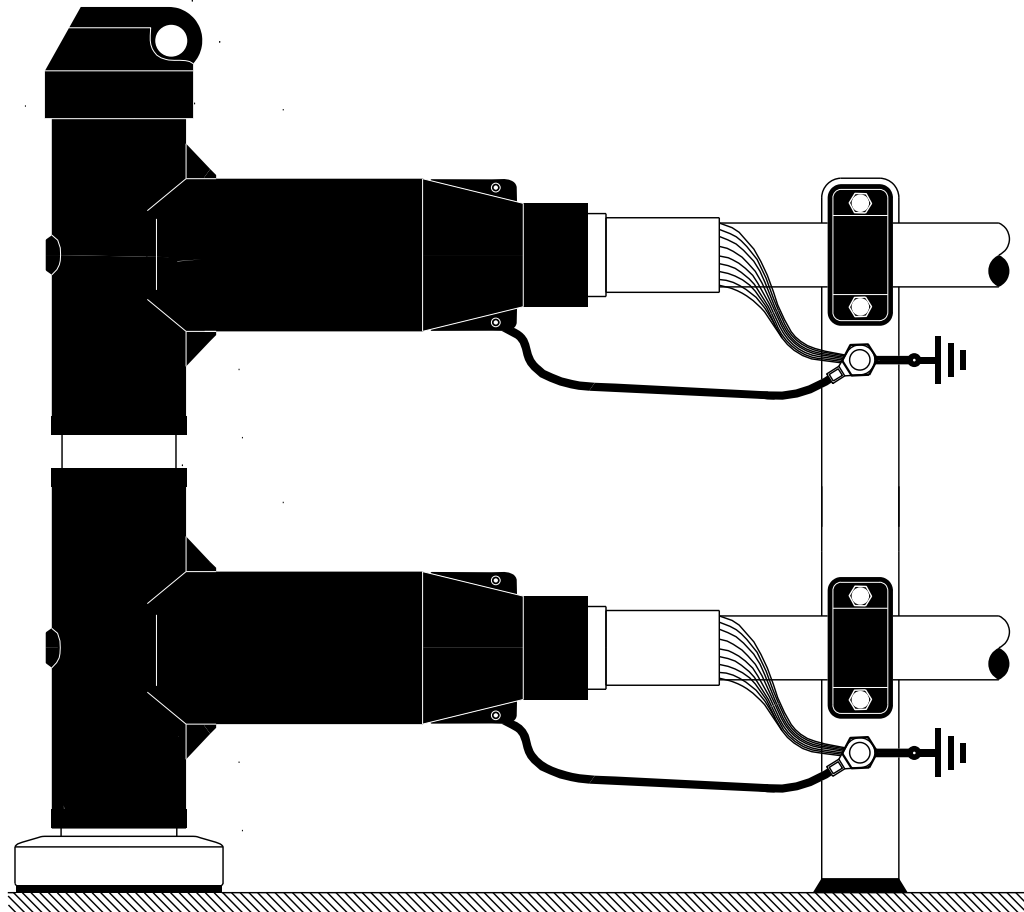
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SCALE	N.T.S.		Title K440TBG TEE CONNECTOR TERMINATION TERMINATION COMPLETION			Drg. No. JP2D 7.412.12
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All dimensions in mm



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SCALE	N.T.S.		Title K440TBG (P2) TEE CONNECTOR BACK TO BACK			Drg. No. JP2D 7.412.13
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**ST: CA2U/4 PROCEDURES FOR MAKING 11kV CABLE EPR
TERMINATIONS**

JOINTING PROCEDURE 7.413

**11kV EUROMOLD 400PB-10SA-15N INTERFACE C SURGE
DIVERTER SEPARABLE CONNECTOR.**

**This procedure is to be read in conjunction with the appropriate
General Requirements ST: CA2C/8 Section 6
of the 11kV Jointing Manual**

JOINTING PROCEDURE 7.413

TERMINATION KIT MATERIALS LIST

SURGE DIVERTER — 400PB-10SA-15N

Item	Quantity
400PB-10SA-15N Surge Diverter	3

These surge diverters are a special order.

ADDITIONAL ITEMS FOR EACH TERMINATION

PVC tape
Scotch 70
Scotch 13 tape
Tinned copper wire 16 swg
Tinned copper wire 20 swg
De-solvit 1000 FD
De-solvit 1000
Workhorse dry wipes
Emery cloth
5313 Water block tape
Cable ties
Sealing putty
Aluminium oxide cloth 320 grit
Aluminium oxide cloth 400 grit
Copaslip

Note: - Individual material item numbers (E 5) are to be found in Section 4 of the 11kV Jointing Manual.

JOINTING PROCEDURE 7.413

Actions

General Requirement (ST: CA2C/8)

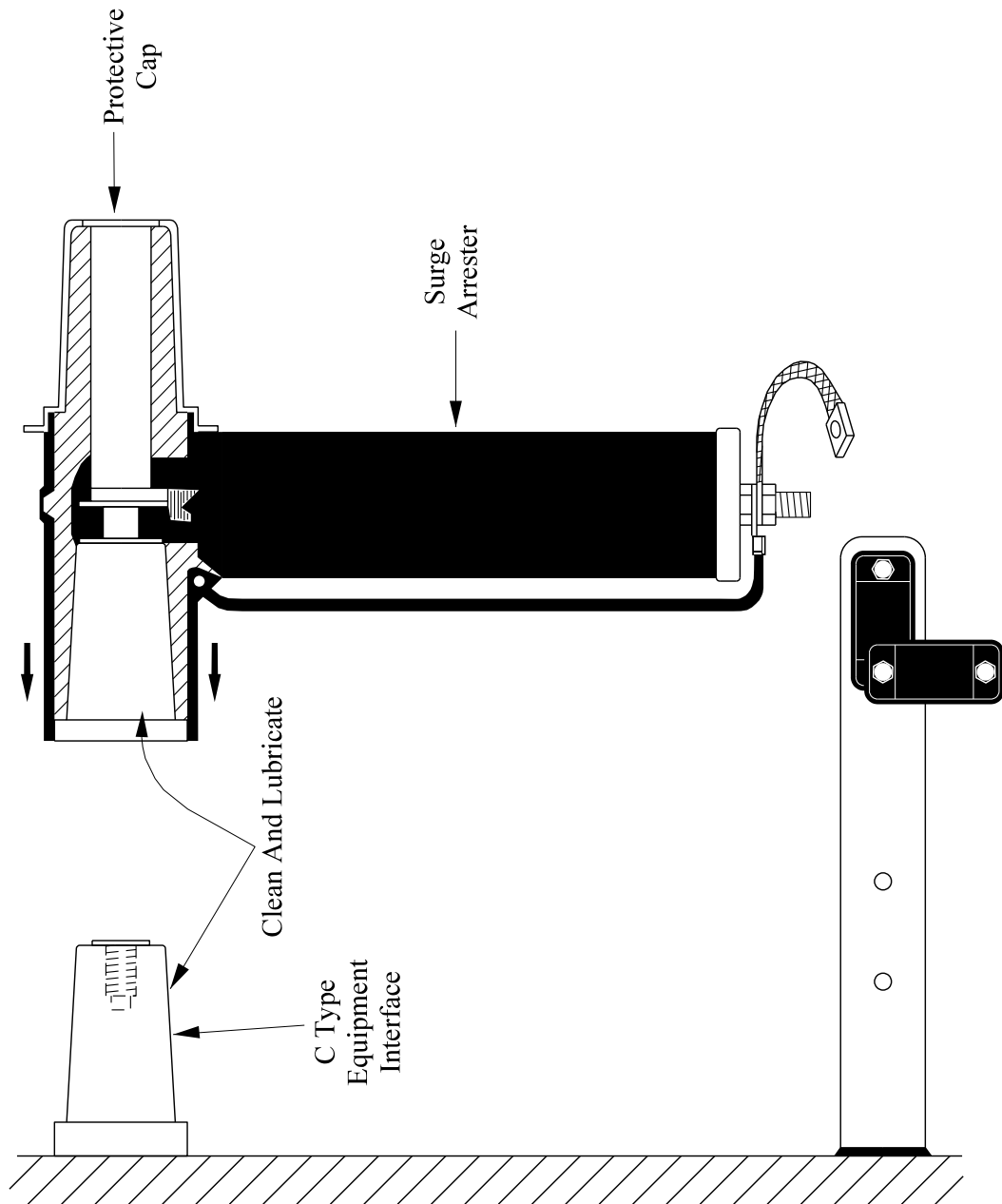
Refer to Drawings **JP2D 7.413.1, 7.413.2, 7.413.3 7.413.4, 7.412.5, 7.413.6 and 7.413.7** whilst undertaking this Jointing Procedure.

- | | | |
|-----|--|----|
| 1. | Clean and lightly lubricate the female interface of the surge diverter and male interface of the equipment bushing. | -- |
| 2. | Push the surge diverter home on the equipment bushing. | -- |
| 3. | Remove the protective cap from the surge diverter interface. | -- |
| 4. | Insert the contact rod into the metal insert of the surge diverter. | -- |
| 5. | Using the ½” drive torque wrench fitted with a 10mm Allen key tighten the contact rod to 50Nm of torque. | -- |
| 6. | Clean and lightly lubricate the male interface of the surge diverter and female interface of the separable connector fitted to the cable. | -- |
| 7. | Push the separable connector home on the surge diverter. | -- |
| | <p>Note: - The separable connector shall not be allowed to carry the full weight of the cable. Therefore it is necessary that the cable is cleated as close as possible to the separable connector.</p> | |
| 8. | Ensure the clamping screw is free of any lubricant on the threads | -- |
| 9. | Insert the clamping screw into the thread of the contact rod. | -- |
| 10. | Ensure the body of the surge diverter is positioned vertically and the and the earth terminal side is pointing downwards. | -- |
| 11. | Using the ½” drive torque wrench fitted with a 130mm extension and 22mm socket tighten the clamping screw to 50Nm of torque. | -- |
| 12. | Clean and lightly lubricate the female interface of the separable connector and male interface of the 400BIPA basic insulating plug. | -- |
| 13. | Insert the insulating plug into the separable connector and engage the Thread and hand tighten. | -- |
| 14. | Using the ½” drive torque wrench fitted with a 24mm socket tighten the Insulation plug to 50Nm of torque. | -- |

JOINTING PROCEDURE 7.413 - Continued

Actions	General Requirement (ST: CA2C/8)
15. Clean the inner surface of the voltage detection cap, do not lubricate.	--
16. Push down hard on the cap until it snaps into position.	--
17. Ensure the surge diverter and separable connector semi-con outers are earthed down.	--
18. Connect the earth braid of the surge diverter is connected to the substation earth.	--

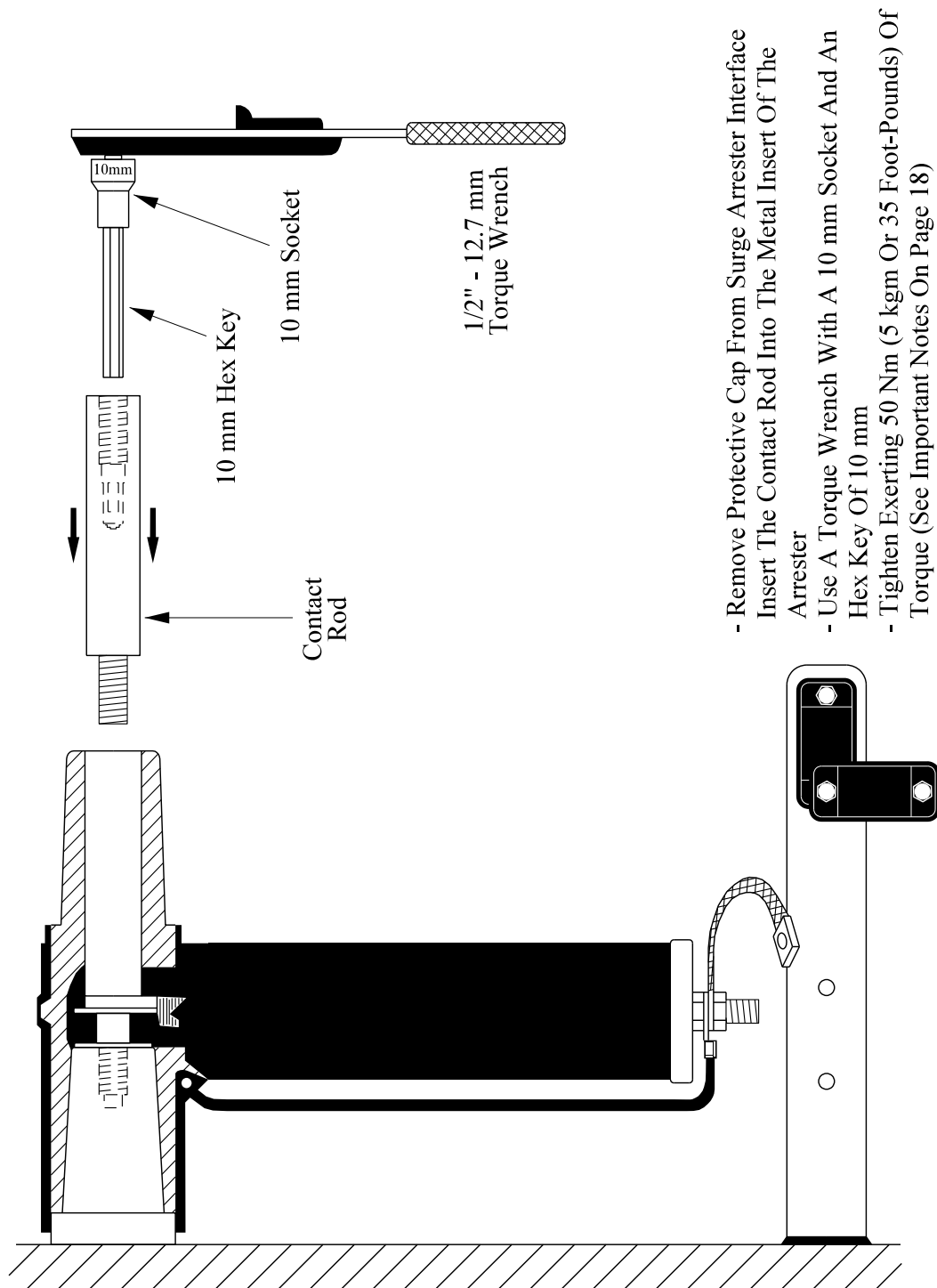
All dimensions in mm



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Drawn	RJB	03/16			
Checked					
Approved					
SCALE		N.T.S.		Title	
				PREPARATORY WORK FOR INSTALLING EUROMOLD SURGE DIVERTER	
				Drg. No. JP2D 7.413.1	
				Rev No	

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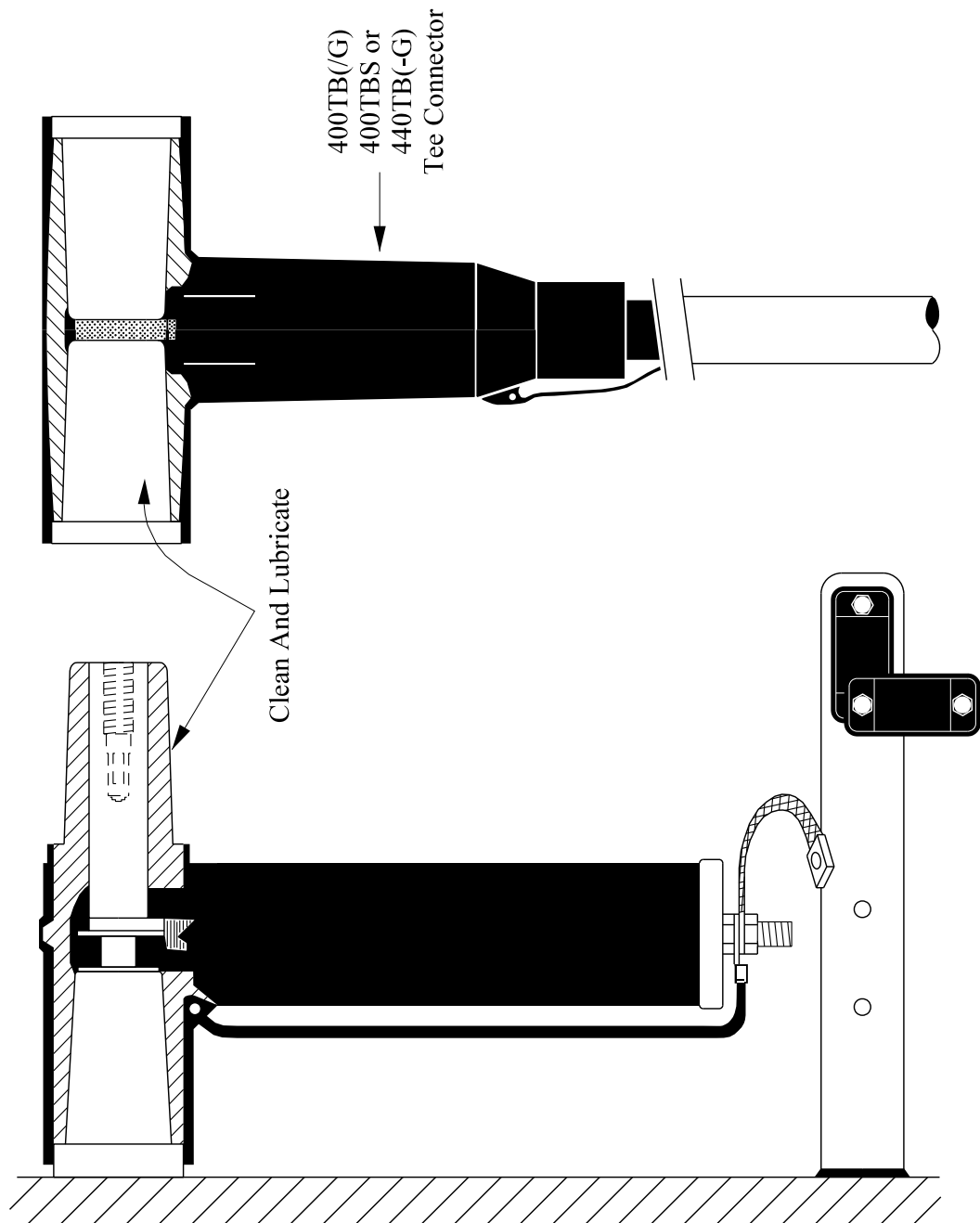
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Drawn	RJB	03/16	Title INSTALLATION OF CONTACT ROD		
Checked					
Approved			Title INSTALLATION OF CONTACT ROD		
SCALE	N.T.S.				
			WESTERN POWER DISTRIBUTION Drg. No. JP2D 7.413.2 Rev No		

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SCALE	N.T.S.		Title INSTALLING THE INTERFACE C CABLE SEPARABLE CONNECTOR			Drg. No. JP2D 7.413.3
						Rev No

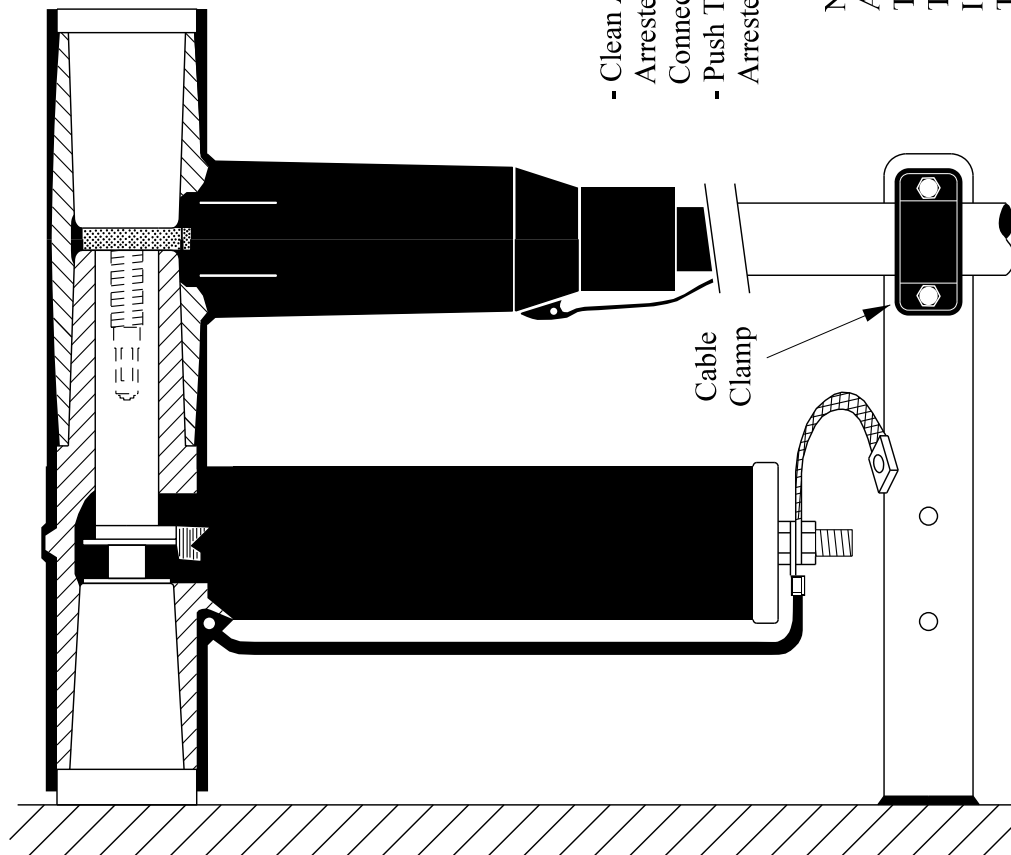
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All dimensions in mm

- Clean And Lubricate * The Male Interface Of the Arrestor And The Female Interface Of The Tee Connector
- Push The Tee Connector Home On To The Surge Arrestor

NOTE :

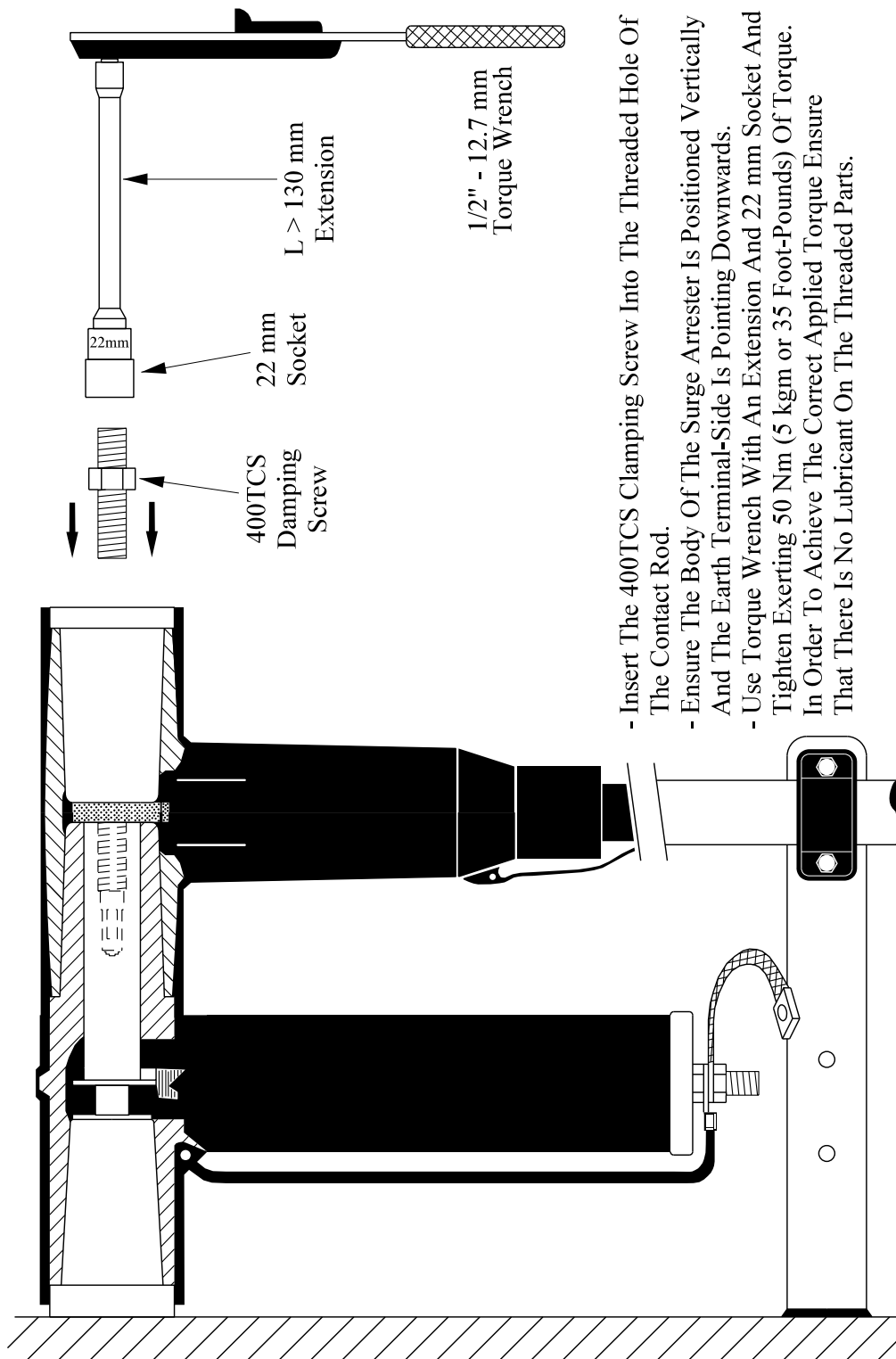
A Connector Should Not Be Allowed To Carry The Full Weight Of The Cable Therefore It Is Necessary The Cable Is Clamped As Close As Possible To The Connector




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Approved						
SCALE N.T.S.			Title CLEATING THE CABLE IN PLACE			Drg. No. JP2D 7.413.4
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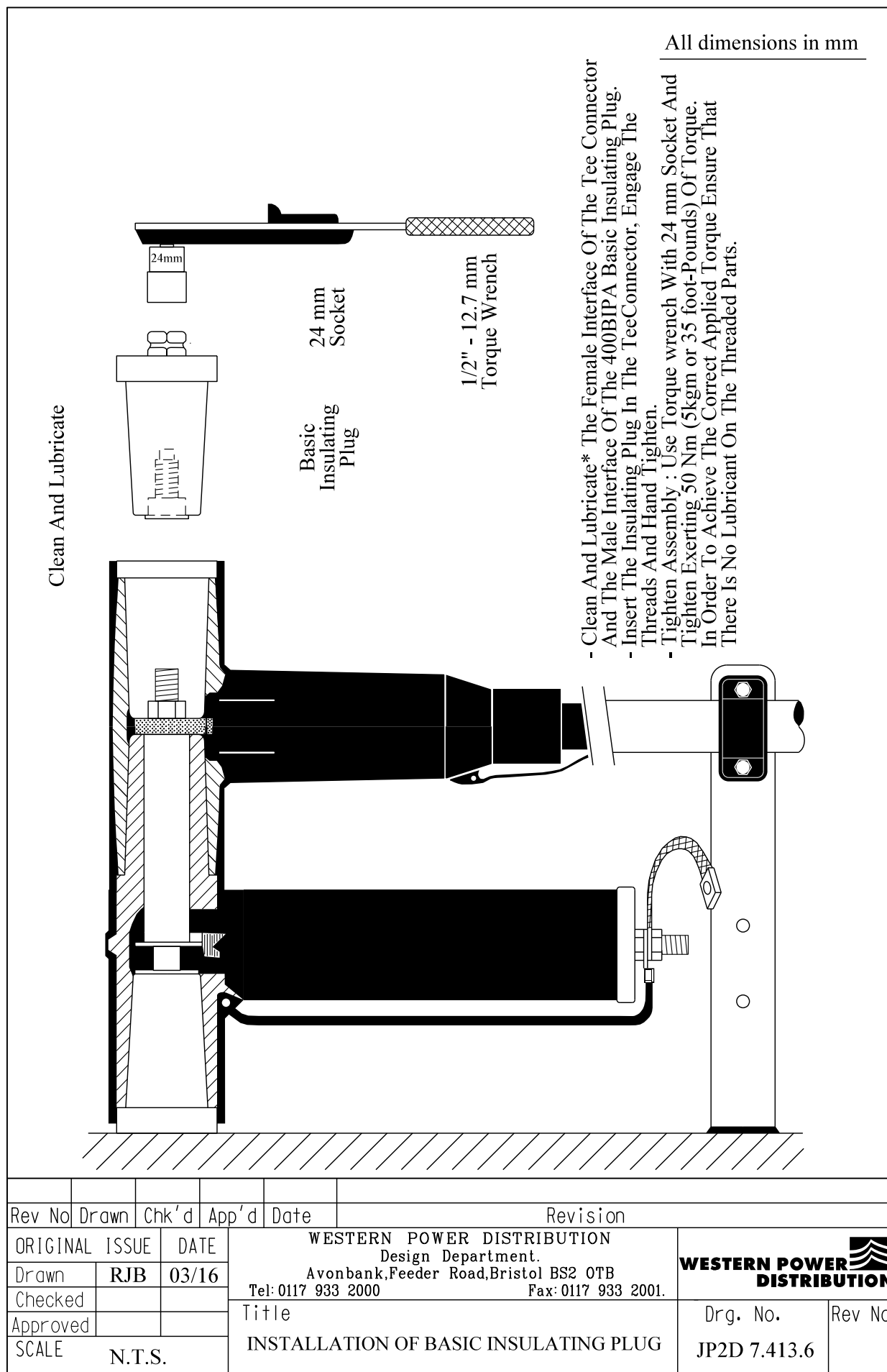
All dimensions in mm



- Insert The 400TCS Clamping Screw Into The Threaded Hole Of The Contact Rod.
- Ensure The Body Of The Surge Arrester Is Positioned Vertically And The Earth Terminal-Side Is Pointing Downwards.
- Use Torque Wrench With An Extension And 22 mm Socket And Tighten Exerting 50 Nm (5 kgm or 35 Foot-Pounds) Of Torque. In Order To Achieve The Correct Applied Torque Ensure That There Is No Lubricant On The Threaded Parts.

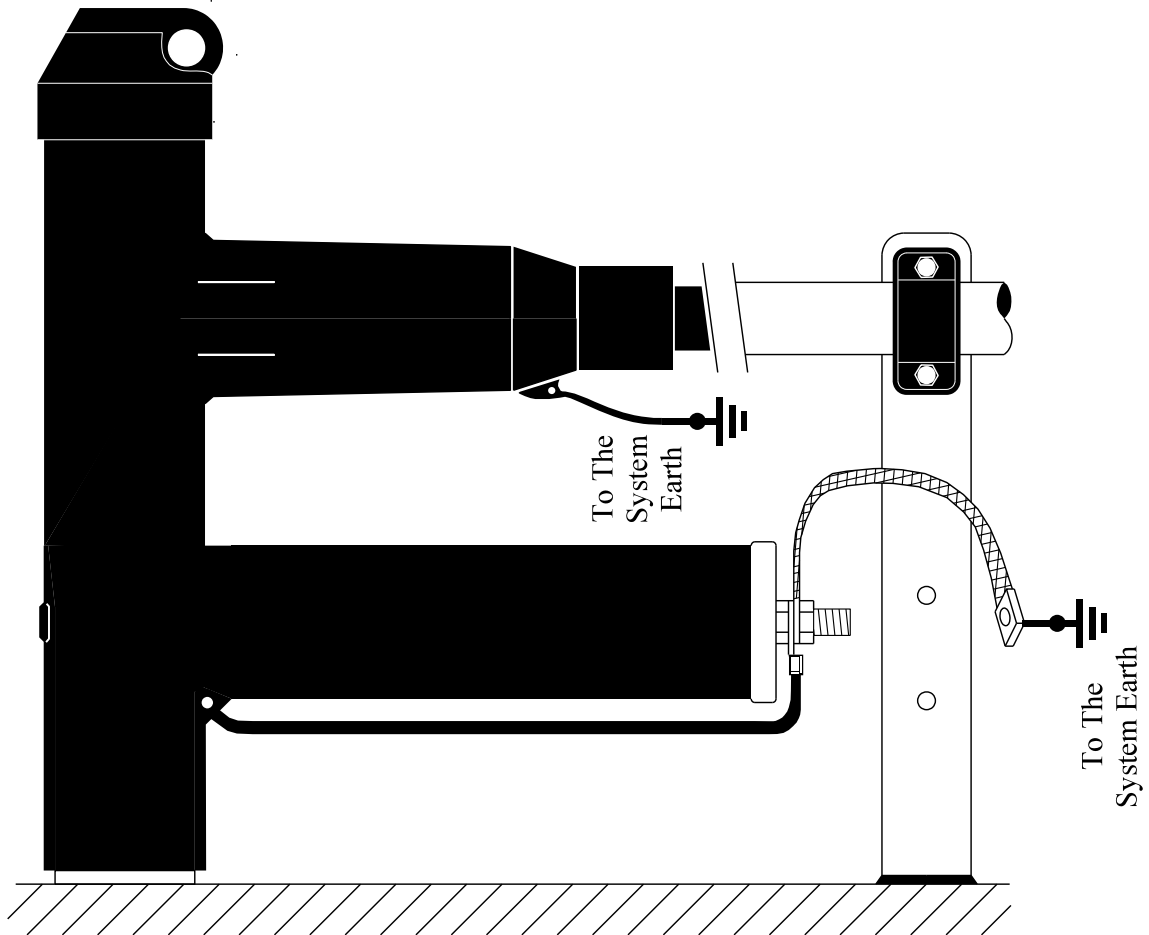
Rev No	Drawn	Chk'd	App'd	Date	Revision
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SCALE		N.T.S.		Title	
				APPLICATION OF CLAMPING SCREW	
				Drg. No. JP2D 7.413.5	
				Rev No	


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SCALE N.T.S.			Title CONNECTING SURGE DIVERTER TO SUBSTATION EARTH			Drg. No. JP2D 7.413.7
						Rev No

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APPENDIX A

SUPERSEDED DOCUMENTATION

This document replaces ST:CA2U/3 dated May 2016 which should now be withdrawn.

APPENDIX B

ASSOCIATED DOCUMENTATION

ST:CA2A/2, ST:CA2C/8, ST:CA2M/4, ST:CA2N/4, ST:CA2O/3, ST:CA2S/3, ST:CA2T/3, ST:CA2U/4, ST:CA2V/3.

APPENDIX C

IMPACT ON COMPANY POLICY

None, as this document has just been updated to incorporate the WPD Losses strategy.

APPENDIX D

IMPLEMENTATION OF POLICY

For WPD staff Team Managers shall ensure that all relevant 11kV Jointing staff are aware of the changes to 11kV Jointing Manual of which this Standard Technique forms a major part. It can be implemented into all areas of WPD with immediate effect. Managers shall ensure that all staff involved in the design, installation, maintenance and operation of the 11kV system are familiar with, and follow, the requirements of this document.

Independent Connection Providers (ICPs) shall follow the requirements of ST: CA2U/3 or of this document (ST: CA2U/2) for a period of up to 3 months from the issue of this document. After this date, all jointing works shall comply with ST: CA2U/3.

Where any difficulty is encountered in the application of this Standard Technique the author shall be notified who will determine whether a variation is appropriate.

APPENDIX E

KEY WORDS

11kV indoor and outdoor terminations, 11kV compound replacement terminations, 11kV load break connectors, 11kV dead break separable connectors.