CATALOGUE A

COMPRESSION SYSTEMS
TOOLS AND EQUIPMENT

MOSDORFER
CCL

COMPRESSION SYSTEMS TOOLS AND EQUIPMENT

INTRODUCTION

CCL - LEADERS IN ELECTRICAL EQUIPMENT AND ACCESSORIES.

THE COMPANY

The Electrical division of CCL was founded in 1935 and over the intervening years has become a major supplier of COMPRESSION FITTINGS AND TOOLING SYSTEMS to power supply companies and contractors all over the world.

THE PRODUCT

All our materials are designed by our experienced team of engineers, to meet the most exacting standards compatible with the purpose for which they are to be used.
Our development test facilities are used to ensure products comply with internationally recognised standards where they apply, I.E.C, BSS, V.D.E. and NEMA to name a few.
CCL's production facilities are equipped with modern CNC machine tools and our quality assurance is BSS 5750 Part 1, ISO 9000 Approved.

THE SERVICE

Our SALES ENGINEERS are all experienced and trained to respond to customers' enquires and on site problems. Assistance with special problems, arising from requirements for items not produced as standard, is freely available. We especially welcome customers to visit our plant and avail themselves of the opportunity to discuss any aspect of compression jointing materials with us.

THE ADVANTAGE

The Index of Contents will enable easy reference to be made, to the fittings and tools required for any particular installation application Once the CONNECTOR TYPE and TOOL has been identified from the pages 1,2 and 3, further detailed information will be found from the SYSTEMS CHOICE in sections 1,2 3 and 4.

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COMPRESSION SYSTEMS
TOOLS AND EQUIPMENT

INDEX OF CONTENTS

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PRODUCT SELECTION

GENERAL GUIDANCE

The choice of compression fitting produced by Mosdorfer CCL is very wide and all embracing. **VERSA-PRESS®** and **HEX-PRESS®** are the registered and proprietary systems produced as standard. We also produce compression fittings for specific projects and customers who are equipped with conventional or **EURO-NORM** dedicated die change tooling systems. Therefore, if specific fittings for the great number of different conductors and cables available around the world, are not identified in our catalogue contact our sales office for further assistance.

TO ORDER FITTINGS & EQUIPMENT

MOSDORFER CCL NEED TO KNOW THE FOLLOWING:-

- **OVERHEAD LINE FITTINGS**
  - Size and type of conductor, copper, aluminium, ACSR.
  - Application:- Tension, non-tension, service.
- **CABLE FITTINGS**
  - Size and type of cable, copper, aluminium, stranded, sectoral.
  - Application:- Splice or lug.
- **TOOLS & EQUIPMENT**
  - Type of compression required.
  - Size of fittings to be compressed.

For further assistance contact our sales office.

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TOOLS AND EQUIPMENT

HAND TOOLS

A VERSA-PRESS® universal "no die" change hydraulic

B CONVENTIONAL (typical) die change hydraulic

TOOL HEADS — REMOTE

A VERSA-PRESS® universal "no die" change hydraulic

B CONVENTIONAL (typical) die change hydraulic

C HEX-PRESS® die change hydraulic

PUMPS

A HAND/FOOT OPERATED
Note: can be used mounted to O.H. line pole

B MOTOR DRIVEN ELECTRIC OR PETROL ENGINE
Note: adaptable for "Hot Line" work

HYDRAULIC HOSES AND TOOL TESTING ACCESSORIES

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VERSA-PRESS
THE COMPREHENSIVE COMPRESSION SYSTEM LINESMEN PREFER

INTRODUCTION TO VERSA-PRESS®
The CCL **VERSA-PRESS®** Compression system has been designed to make compression connections on cables and conductors to a standard of efficiency complying with BS and NEMA Specifications.

Consisting of 1 Tool with NO dies plus a related series of joints, terminations and connectors, the system will accommodate conductors and cables irrespective of construction or material.

Regardless of the working environment, be it overhead power lines or factory installation, **VERSA-PRESS®** will perform with equal effectiveness.

PRINCIPLE
Pressure is applied to an automatic controlled maximum and transmitted by four concentrically closing jaws or nibs, which will continue to close until the requisite degree of compression is obtained. This arrangement allows a range of conductors to be accommodated within a single connector, and a range of connectors to be acceptable to the tool without employing separate varying sizes of dies.

RANGE
The range of the **VERSA-PRESS®** system is only limited by two factors:
1. The diameter of connectors that can be physically accommodated in the tool.
2. The ultimate tensile strength the joint has to develop.

Reference should be made to the minimum and maximum limits which are detailed on the appropriate data sheets for all types of connectors and tools.

CODING
All fittings are coded for easy identification and grouping. The code used is a combination of characters and numerals which denote:-

SYSTEM	MATERIAL	GROUP	TYPE	SIZE	CODE
VERSA-PRESS®	Aluminium	Tension	ONE	ONE	VPAT 1:1
VERSA-PRESS®	Copper	Stirrup	ONE	TWO	VPCS 1:2
VERSA-PRESS®	Bi-Metal	Non-tension	ONE	THREE	VPBN 1:3

TOOLING
There is basically only one tool but this can be supplied in a variety of forms with a range of accessories for various applications. All variations employ the standard universal compression head accepting various physical sizes of joints. Tools are coded with characters and numerals and are identified on data sheets.
— See Section 5. Compression Tools & Equipment

PRODUCTIVITY
Physical energy required to operate any VERSA-PRESS® tool is minimum and they can be comfortably worked for long periods. Time is not wasted in preparation and because of the range taking tolerances, insertion of the conductor into any connector is speedy and sure, even when the conductor has been damaged due to cutting or cleaning. Since NO dies have to be selected or fitted operations can be continuous, irrespective of changes in cable construction or diameter and regardless of connector size. VERSA-PRESS® equipment is extremely robust and will operate for extensive periods with minimum maintenance. In the event of accidental damage, their unit type construction and interchangeability means savings in production time.

SAFE · EFFICIENT · FOOLPROOF
All tools are controlled by an automatic relief valve which is calibrated and set before leaving the factory. The user can check this setting periodically by compressing a test slug and checking its elongation with a simple 'GO - NO GO' gauge. Because no dies are employed, they cannot be lost or misplaced; more important, the wrong size cannot be used. THIS FEATURE ELIMINATES THE MAJOR CAUSE OF FAILURE ASSOCIATED WITH COMPRESSION SYSTEMS.

The four indent compression has proved stable under all load conditions.

All connectors are filled with an inhibitor compound and sealed before despatch which ensures a sound and efficient connection in every application.

Compression Heads of all tools rotate through 360 degrees and by use of available accessories, safe and convenient working is achieved.

CONDUCTORS cannot be over inserted in connectors.

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OVERHEAD LINE FITTINGS

DISTRIBUTION

End Span – dead end anchor clamps
Available with variety of termination jumper Terminal dropper plates or integral jumper lug connections single or double take-off.

Also end fittings:- to users specification
Eyebolt
Socket
Ball
Clevis

Mid-span tension splice

Jumper non tension splice

Single bolt

Jumper terminal lugs

Tap off service connector angle 'L' type

Parallel type

'C' type

Bail type (live line)

TRANSMISSION

End Span - dead end anchor clamp

Steel earthwire end span

Mid-span tension splice

Steel inner sleeve

Jumper terminal

Double bolt

Dropper Plates

Tap off Heavy duty type

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CABLE FITTINGS

- TERMINAL LUGS (copper & aluminium) tubular stamped
- SINGLE HOLE

- DOUBLE HOLE AND RIGHT ANGLED SPECIAL VERSIONS

- FOUR HOLE (transformer pads)

- SOLID CAST (water block)

- TWO CORE SOLID ALUMINIUM CABLE
- THREE CORE SOLID ALUMINIUM CABLE
- FOUR CORE SOLID ALUMINIUM CABLE

- BI-METAL (friction welded) for aluminium cable

- SPLICES (copper & aluminium)

- BI-METAL (friction welded) for aluminium to copper

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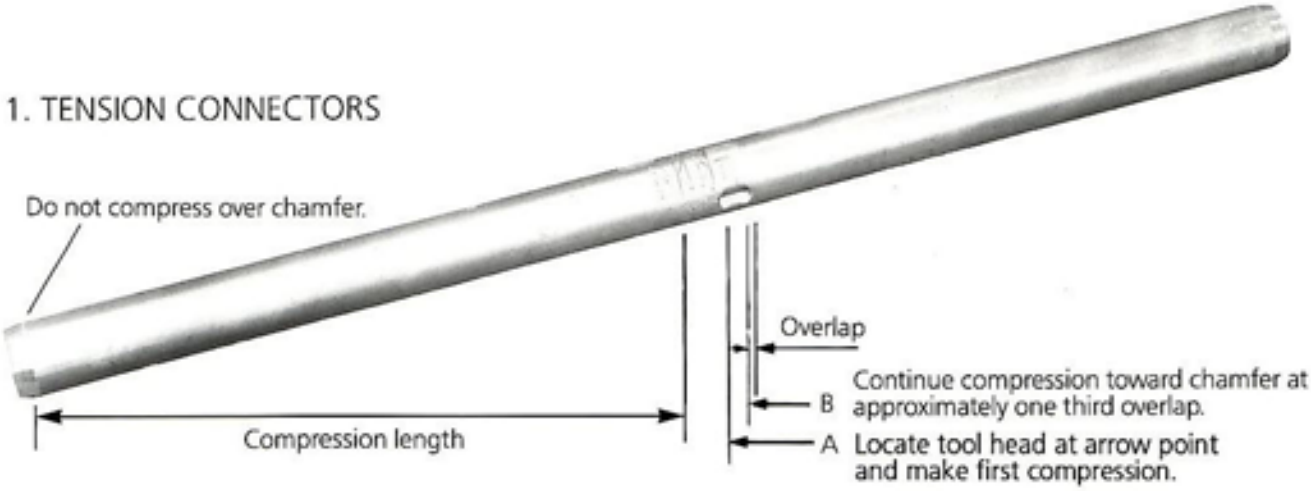
FITTING AND CONNECTOR INSTALLATION

TUBULAR CONNECTORS

Compression

In general, all tubular connectors are compressed such that the compression commences at the arrow mark and progresses towards the chamfer, each compression overlapping the previous one by approx. one third.
DO NOT COMPRESS OVER THE CHAMFER.
This procedure ensures the correct distribution of inhibitor compound within the joint and the mechanical stress is relieved.

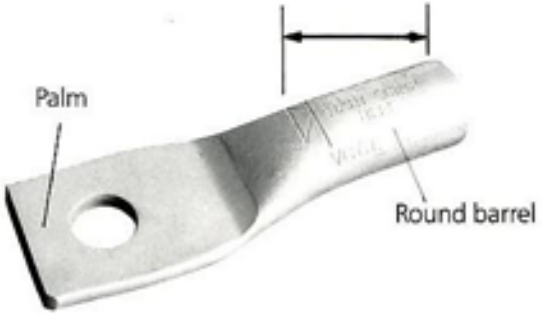
1. TENSION CONNECTORS



2. NON TENSION CONNECTORS

3. TERMINAL LUGS

Compress from arrow point outward to chamfer, and overlap approx. one third.



PREVENTION OF UNDULY CURVED (BANANA) TENSION JOINTS

Prior to installing tension connectors, ensure that the conductor is perfectly straight over a length equal to three times that which is to be inserted in the connector.

PREVENTION OF UNDUE STRAND OPENING (BIRDCAGING)

"Birdcaging" occurs when the conductor is extruded excessively during compression, it can be minimised by fitting restraining clamps, i.e. live line clamps on the conductor 1.00" (25.4 mm) outside the mouth of the joint.

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INSTALLATION

OPEN THROAT CONNECTORS

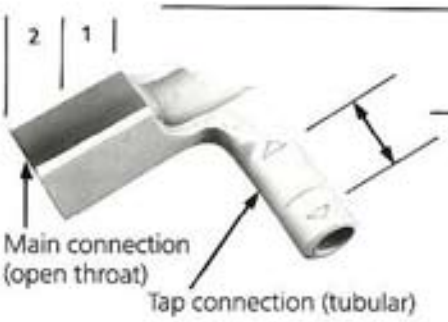
Compression

All OPEN THROAT connectors are located in the tool head as shown in the adjacent illustration. The tool nibs are advanced to lightly grip the connector profile at the position where the first compression is to be made. Subsequent compressions are made by sliding the tool head along the connector.

1. TAP CONNECTORS

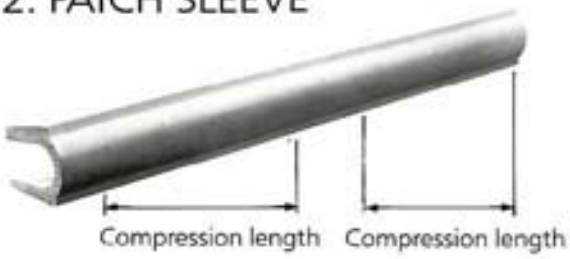
Main connection requires 2 spaced compressions, the first one at the tube end.

Tap connection. Compress between arrows, starting at closed end and overlapping succeeding compressions by one third. In the case of BI-METAL connections refer to section 1.17.



2. PATCH SLEEVE

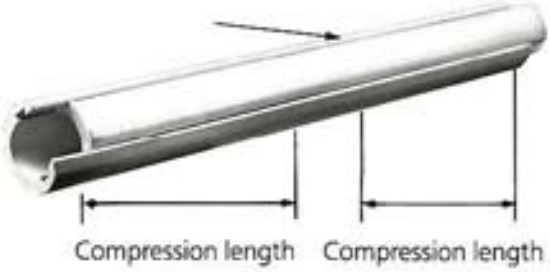
Commence compression at the centre of the sleeve and work outwards. Details of the number to be applied, are indicated on the connector.

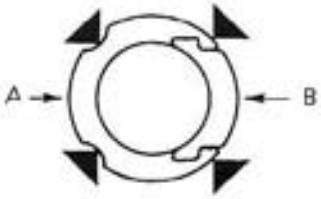


SPLIT TUBE CONNECTORS

1. REPAIR SLEEVE

Locate the two lower nibs of the tool head around Section A to lightly grip at the point of the first compression. Apply to the conductor, then slide section B into place and make the first compression. Commence at the centre and work outwards.





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END SPAN – DEADEND ANCHOR CLAMPS

APPLICATIONS

This section of the catalogue identifies the range of fittings required to terminate overhead line conductors at tower insulator sets; in full tension or partial tension situations.

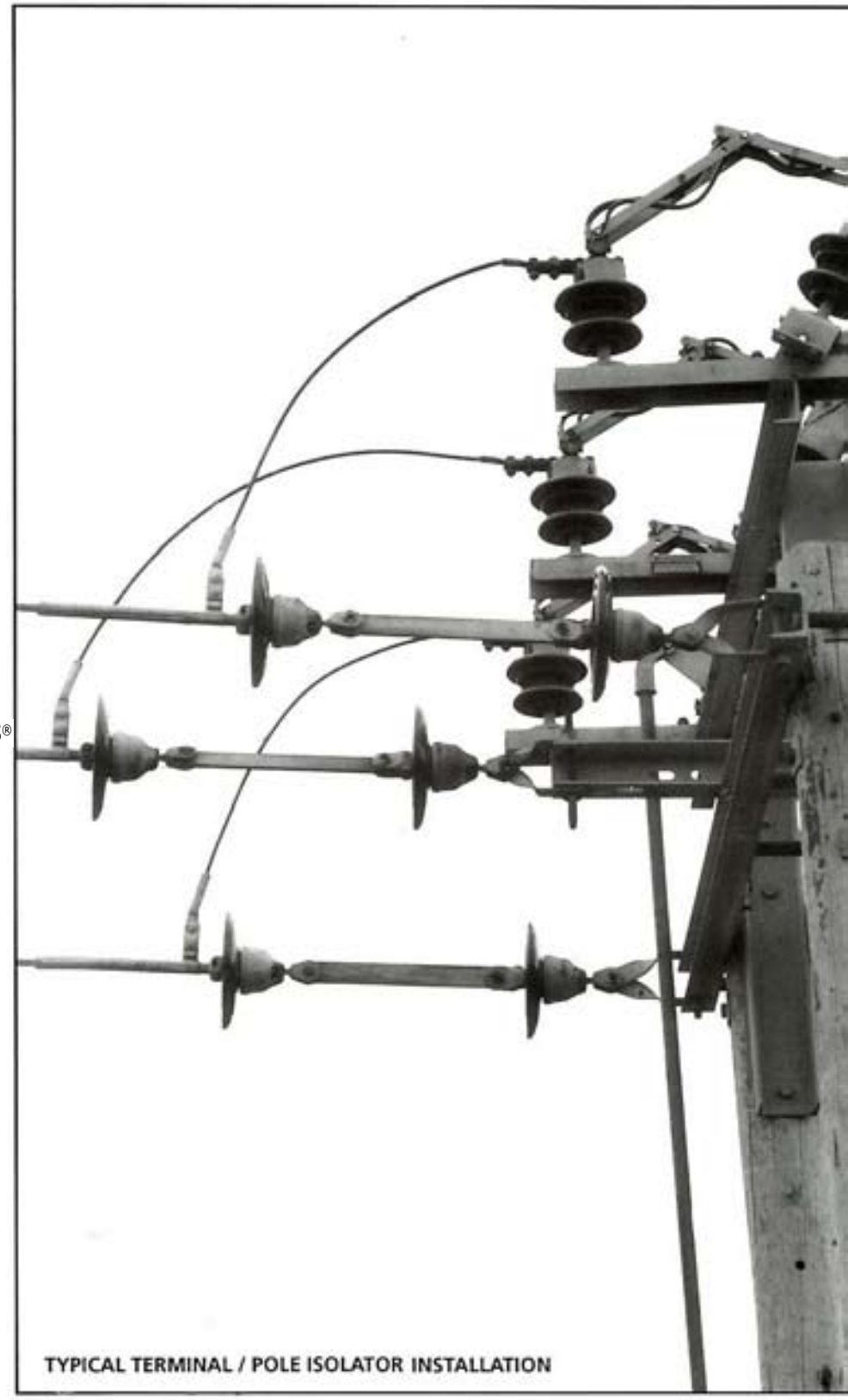
The fittings are designed to be "Range Taking" and accommodate plain aluminium, aluminium alloy and aluminium conductor steel reinforced, (A.C.S.R.) or copper and copper alloys. Steel conductors are also covered. Each size of fitting may be specified by the user, with Standard Socket, Eyebolt or Pinball, galvanised end fitting, for final connections to the insulator hardware.

Jumper Lugs may be integral or disconnectable, dependent upon the line design specification. The design concept allows a maximum number of conductor sizes and types to be jointed using a minimum number of fitting sizes when compressed with the "Universal Die" **VERSA-PRESS®** tooling.

ADVANTAGES

When you use Mosdorfer CCL VERSA-PRESS® Anchor Clamp assemblies you know that:-

1. The compressed joints are field proven and tested in accordance with British Standard Specification (BSS 3288) and Electricity Supply Industry (ESI 43-92) requirements.
2. Current Ratings of compressed joints, are always equal to that of the conductor to which the assemblies are connected.
3. Test Reports are available on request along with other technical support information.
4. When installed using the "unique" **VERSA-PRESS® "Universal Die"** only 4/5 sizes of Anchor Clamp are required to cover conductor sizes up to 125mm² copper or 200mm² (18/1) A.C.S.R. This feature reduces the need to stock numerous different sizes of fittings and makes installation errors considerably less likely to occur.
5. With **VERSA-PRESS®** operators cannot use the wrong die or be caught without the correct die for a particular joint.



TYPICAL TERMINAL / POLE ISOLATOR INSTALLATION

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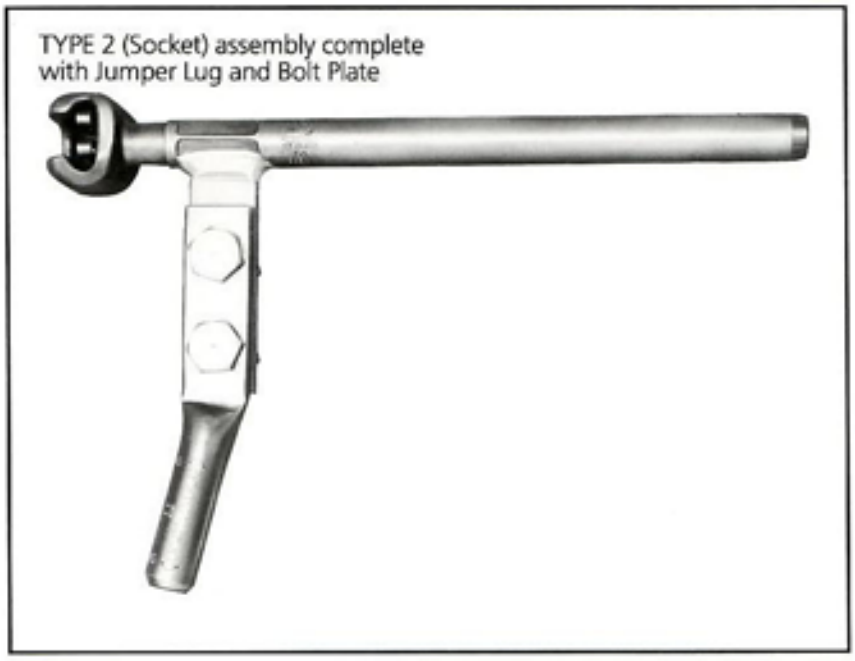
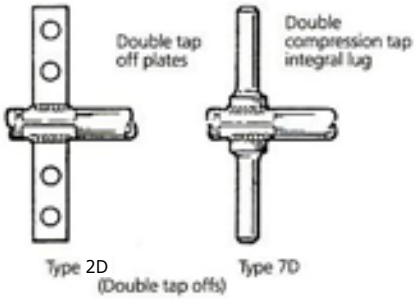
ALUMINIUM AND COPPER FITTINGS



SPECIALS



Other types are available as follows
(See Section 1.4 tables 1 & 2)
Type 2D No tap off plate
Type 7 Integral jumper lug
Type 5D Double tap off plate (Special to order)
Type 7D Double integral jumper lug (Special to order)

Anchor clamps can be supplied as follows
(See section 1.4 tables 1 & 2)
Form 'S' Socket end fitting
Form 'B' Ball end fitting (Type 5 only)
Form 'E' Eyebolt fitting
Form 'C' Clevis fitting (Special to order)

Anchor jumper lugs can be supplied as follows
(See section 1.4 tables 1 & 2)
Type 2A Cranked with bolt plate
Type 2B Cranked without bolt plate
Type 2C Straight without bolt plate

INSTALLATION

1. For all instructions and dimensions, weights, etc, refer to appropriate Technical Data Sheets (TD——) listed in the text or tables.

2. Aluminium Fittings are suitable for all types of plain hard drawn aluminium, aluminium alloy and steel reinforced (A.C.S.R.) conductors up to 200mm² (18/1) A.C.S.R. Galvanised Steel conductor may also be jointed and CCL should be consulted for details of this capability.

3. Copper fittings are suitable for all types of hard drawn copper and copper alloys up to 125mm².

4. Special clamps are available to joint higher strength conductors having ultimate Breaking Tensile Strength (U.T.S.) greater than the tabled U.T.S. figures. **See notes section 1.4 below Tables 1 & 2.**

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ALUMINIUM FITTINGS

TABLE 1. ALUMINIUM FITTINGS, ANCHOR CLAMP & "JUMPER" LUGS

FITTING				ACCEPTABLE CONDUCTOR DIAMETER		ULTIMATE TENSILE LOAD (U.T.S.)	PART NUMBERS			APPROX. CONDUCTOR AREA mm²	
DIAGRAM	TYPE	SIZE	T/D No.	MIN mm	MAX mm	kN	FORM 'S'	FORM 'B'	FORM 'E'	min	max
 Bolted tap off	VPAA 2	1 2 3 4	220/8	5.8 7.4 9.1 13.2	8.2 11.3 14.3 19.3	15.44 21.62 34.25 45.95	220000 220003 220006 220009	— — — —	220001 220004 220007 220010	4 25 50 100	25 50 100 200
 No tap off	VPAA 5	1 2 3 4	220/7	5.8 7.4 9.1 13.2	8.2 11.3 14.3 19.3	15.44 21.62 34.25 45.95	220027 220030 220033 220036	220029 220032 220035 220038	220028 220031 220034 220037	4 25 50 100	25 50 100 200
 Integral plug tap off	VPAA 7	1 2 3 4	220/9	5.8 7.4 9.1 13.2	8.2 11.3 14.3 19.3	15.44 21.62 34.25 45.95	220320 220300 220325 220311	— — — —	— — — —	4 25 50 100	25 50 100 200
	VPAL 2(A)	1 2 3 4	220/12A	5.8 7.4 9.1 13.2	8.2 11.3 14.3 19.3	— — — —	15° Cranked lug with bolt plate nuts and washers		220075 220076 220077 220078	4 25 50 100	25 50 100 200
	VPAL 2(B)	1 2 3 4	220/12B	5.8 7.4 9.1 13.2	8.2 11.3 14.3 19.3	— — — —	15° Cranked lug without fixing bolts		220079 220080 220081 220082	4 25 50 100	25 50 100 200
	VPAL 2(C)	1 2 3 4	220/12C	5.8 7.4 9.1 13.2	8.2 11.3 14.3 19.3	— — — —	Straight lug without fixing bolts		220093 220094 220095 220096	4 25 50 100	25 50 100 200

- Acceptable diameter of the conductor may be ± .127mm of tabled dimensions.
- Connectors comply with "British Standard" Electrical and Mechanical requirements.
- Current ratings compatible with conductor range specified in table.
- TEST REPORTS available on request.
- In the event of conductors not being compatible with conductor diameters **or** breaking load shown in the table, consult Mosdorfer CCL. Per NOTE.

NOTE EXAMPLE:—Table 1 lists the standard Anchor Clamps (Dead end) available up to:- 200mm². Other sizes are available to order.

For example:- To accept high strength A.C.S.R. conductors with compacted aluminium strands Code Name:- "DOUNE" 25mm², 7.4mm diameter **but** with U.T.S. of 22 kN.

In this case Mosdorfer CCL would have to offer a **SPECIAL** fitting not listed in the table.

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COPPER FITTINGS

TABLE 2. COPPER FITTINGS, ANCHOR CLAMP & "JUMPER" LUGS

FITTING				ACCEPTABLE CONDUCTOR DIAMETER		ULTIMATE TENSILE LOAD (U.T.S.)	PART NUMBERS			APPROX. CONDUCTOR AREA mm²	
DIAGRAM	TYPE	SIZE	T/D No.	MIN mm	MIN mm	kN	FORM 'S'	FORM 'B'	FORM 'E'	min	max
 Bolted tap off	VPCA 2	1	221/8A	4.0	5.8	9.01	221234	–	221240	4	25
		2		5.5	8.1	15.24	221235	–	221241	25	50
		3		8.1	10.7	29.86	221236	–	221242	50	70
		4		10.4	12.9	37.94	221237	–	221243	70	100
		5		12.7	14.7	51.60	221238	–	221244	95	125
		6		14.7	18.3	77.50	221239	–	221245	125	185
 No tap off	VPCA 5	1	221/8	4.0	5.8	9.01	221000	221002	221001	4	25
		2		5.5	8.1	15.24	221003	221005	221004	25	50
		3		8.1	10.7	29.86	221006	221008	221007	50	70
		4		10.4	12.9	37.94	221009	221011	221010	70	100
		5		12.7	14.7	51.60	221012	221014	221013	95	125
		6		14.7	18.3	77.50	221046	221047	221048	125	185
 Integral lug tap off	VPCA 7	1	221/8B	4.0	5.8	9.01	221036	–	–	4	25
		2		5.5	8.1	15.24	221037	–	–	25	50
		3		8.1	10.7	29.86	221038	–	–	50	70
		4		10.4	12.9	37.94	221039	–	–	70	100
		5		12.7	14.7	51.60	221040	–	–	95	125
		6		14.7	18.3	77.50	221049	–	–	125	185
	VPCL 2(A)	1/2	221/10A	4.0	8.1	–	Lug with bolt plate nuts and washers		221289	4	35
		3		8.1	10.7	–			221290	25	70
		4		10.4	12.9	–			221291	50	100
		5		12.7	14.7	–			221292	95	125
		6		14.7	18.3	–			221299	125	185
	VPCL 2(C)	1	221/10	4.0	5.8	–	Straight lug without fixing bolts		221070	4	35
		3		8.1	10.7	–			221071	25	70
		4		10.4	12.9	–			221072	50	100
		5		12.7	14.7	–			221073	95	125
		6		14.7	18.3	–			221078	125	185

- Acceptable diameter of the conductor may be ±.127mm of tabled dimensions.
- Connectors comply with "British Standard" Electrical and Mechanical requirements.
- Current ratings compatible with conductor range specified in table.
- TEST REPORTS available on request.
- In the event of conductors not being compatible with conductor diameters **or** breaking load shown in the table, consult Mosdorfer CCL. Per NOTE.

NOTE EXAMPLE:—Table 2. lists the standard Anchor Clamps (Dead end) available up to:- 125mm². Other sizes are available to order.

For example:- High strength cadmium copper conducted size 25mm², 8mm diameter **but** with U.T.S. of 17kN.
In this case Mosdorfer CCL would have to offer a **SPECIAL** fitting not listed in the table.

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MID SPAN TENSION AND JUMPER SPLICES

APPLICATIONS

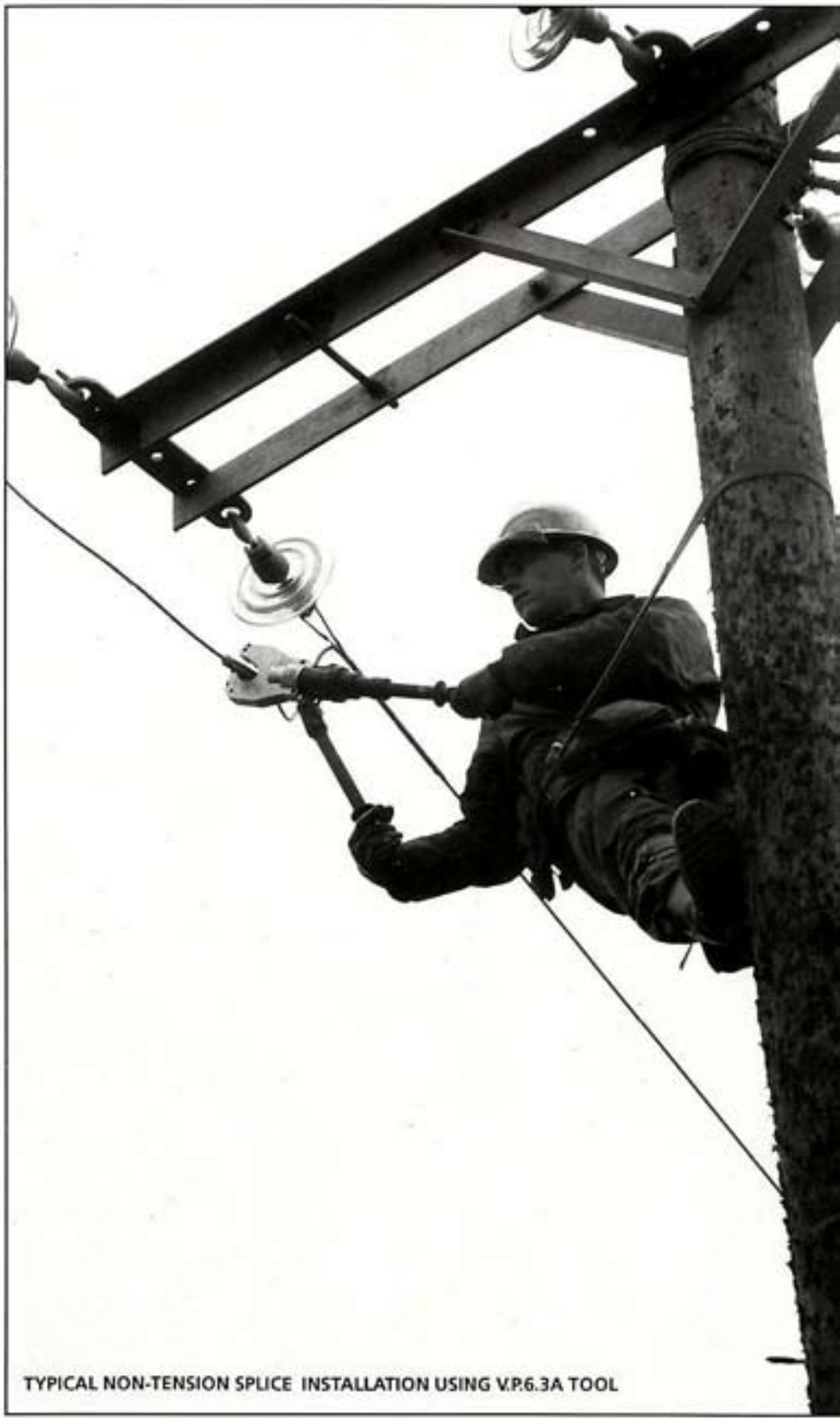
This catalogued range of connectors provides for situations where the overhead line has to be jointed mid-span, either in the tensioned main span or non tensioned jumper locations between the main span or at switchgear, fuses and other apparatus. Additionally connectors for jointing between feeder cables and the overhead conductors or apparatus are tabulated, to provide for BI-METAL transition joints.

The connector designs available ensure the complete requirements of H.V. and L.V. jointing are catered for with a minimum number of "Range Taking" connectors compressed with the **"Universal Die VERSA-PRESS®"** tooling.

ADVANTAGES

When you use CCL **VERSA-PRESS®** connectors you know that:-

1. The connectors have been fully tested in accordance with British Standard Specifications (BSS 3288) and Electricity Supply Industry (ESI) requirements.
2. Current Ratings of compressed joints, are always equal to that of the conductor connected.
3. Test Reports are available on request along with other technical support information from Technical Data Sheets referenced TD—.
4. **VERSA-PRESS®** connectors installed with the unique "Universal Die" offers flexibility, by reducing the number of fitting sizes needed to connect up to 200mm² cable-conductor combinations.
5. Operators cannot use the wrong die or be caught without the correct die for a particular joint.



TYPICAL NON-TENSION SPLICE INSTALLATION USING V.P.6.3A TOOL

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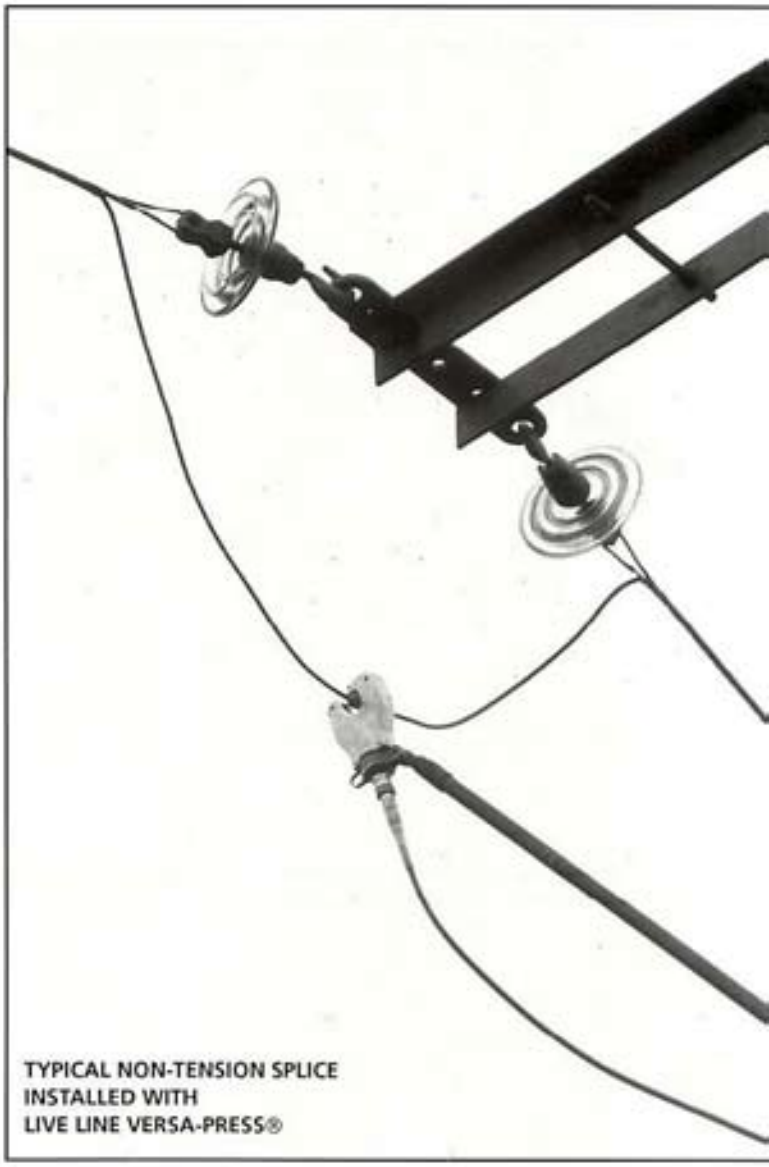
ALUMINIUM FITTINGS

FIG. 1
MID SPAN TENSION SPLICE

FIG. 2

JUMPER NON-TENSION SPLICE

TYPICAL COMPRESSED SPLICE



TYPICAL NON-TENSION SPLICE INSTALLED WITH LIVE LINE VERSA-PRESS®

VPAT
For jointing tensioned conductors to 100% of rated conductor ultimate tensile strength (U.T.S.).

VPAN
For jointing non tension jumper conductors and L.V. service connections.
Connectors can be used as service connections equivalent to INSULINK type fittings but a separate snap on insulated cover is required type SEC.4 (see sheet TD220/14A).
This application includes BI-METAL connections on C.N.E. type service cables 25 and 35 mm² per E.S.I. 09-7 standard.

NOTES
1. All overall dimensions are available from the appropriate T.D. sheet tabled below.
2. For STEEL conductor and in the event of a conductor not being compatible with diameters or breaking loads in table consult Mosdorfer CCL.

INSTALLATION
1. For all instructions refer to appropriate Technical Data Sheet (T/D No. -) listed in table.
2. Fittings are suitable for all types of Aluminium, hard drawn, annealed and steel reinforced (ACSR) conductors and cables up to 200mm² (18/1 ACSR)

FITTING				ACCEPTABLE CONDUCTOR DIAMETER		PART NUMBER	BREAKING LOAD kN	APPROX CONDUCTOR AREA mm²	
TYPE	SIZE	FIG.	T/D No.	MIN mm	MAX mm			MIN	MAX
VPAT.1	1	1	220/13	5.8	8.2	220110	15.44	4	25
	2			7.4	11.3	220111	21.62	25	50
	3			9.1	14.3	220112	34.25	50	100
	4			13.2	19.3	220113	45.95	100	200
	*5			5.8	10.7	*220114	30.48	25	50
VPAN.1	1	2	220/14	2.5	8.2	220130	—	4	25
	2			9.1	14.3	220131	—	25	100
	3			13.2	19.3	220132	—	100	200

*NOTE: HIGH STRENGTH COMPACTED A.C.S.R.

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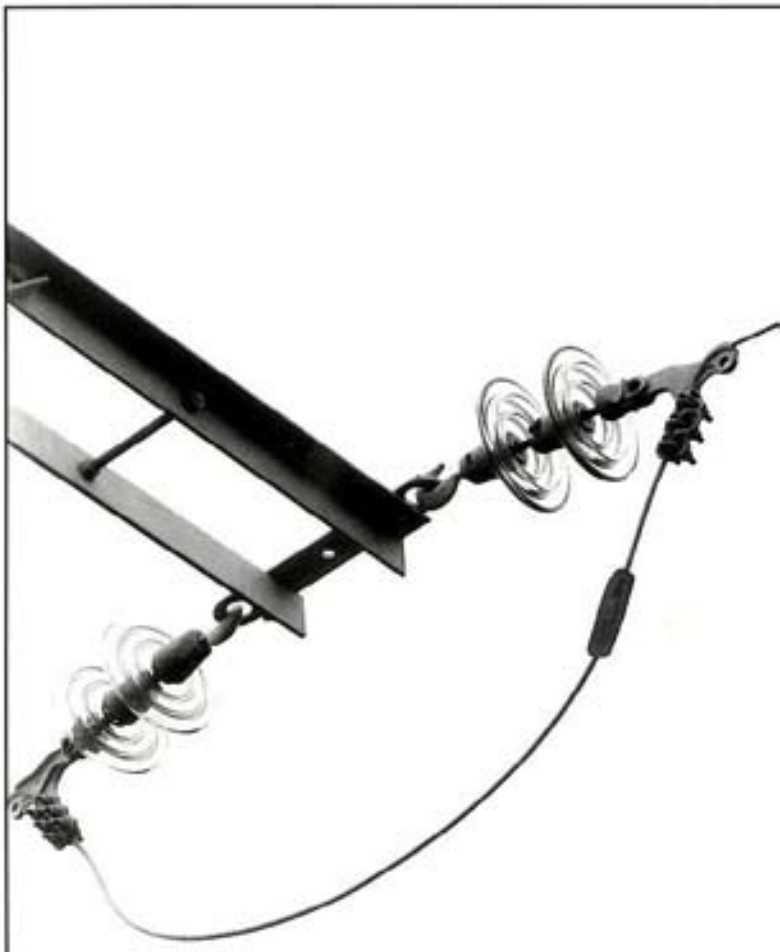
COPPER FITTINGS

FIG. 1
MID SPAN TENSION SPLICE

FIG. 2

JUMPER NON-TENSION SPLICE

TYPICAL COMPRESSED SPLICE



TYPICAL NON-TENSION SPLICE INSTALLED ON 11kV JUMPER SPAN.

VPCT
For jointing tensioned conductors to 100% of rated conductor ultimate tensile strength (U.T.S.).

VPCN
For jointing non tension jumper conductors and L.V. service connections.

NOTES
1. All overall dimensions are available from the appropriate T.D. sheet tabled below.
2. Special connectors can be supplied for high strength conductors outside the VPCT range of breaking loads listed in the table below, e.g. 7/093 cadmium copper with a diameter of .279" but having a breaking load of 4150lb.

INSTALLATION
1. For all instructions refer to appropriate Technical Data Sheet (T/D No.) listed in table.
2. Fittings are suitable for all types of copper, hard drawn, annealed, and copper alloys, solid or stranded conductor and cables up to 125mm².

FITTING				ACCEPTABLE CONDUCTOR DIAMETER		PART NUMBER	BREAKING LOAD	APPROX CONDUCTOR AREA mm²	
TYPE	SIZE	FIG.	T/D No.	MIN mm	MAX mm		kN	min	max
VPCT.1	1	1	221/12	4.0	5.8	221050	9.01	4	25
	2			5.5	8.1	221051	15.28	25	32
	3			8.1	10.7	221052	29.86	32	70
	4			10.4	12.9	221053	37.94	70	100
	5			12.7	14.7	221054	51.60	95	125
	6			14.7	18.3	221069	77.50	125	185
VPCN.1	1	2	221/16	4.0	5.8	221080	–	4	25
	2			5.5	8.1	221081	–	25	32
	3			8.1	10.7	221082	–	32	70
	4			10.4	12.9	221083	–	70	100
	5			12.7	14.7	221084	–	95	125
	6			14.7	18.3	221189	–	125	185

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BI-METAL FITTINGS

FIG.1

FIG.2

3 core (VPBN-3) FIG.3

4 core (VPB-4) FIG.4

TYPICAL COMPRESSED SPLICE

HEAT SHRINK CABLE TERMINATION WHERE BI-METAL LUGS AND SPLICES MAY BE USED.

INSTALLATION

1. For all instructions refer to appropriate Technical Data Sheet (T/D No. -) listed in table.
2. These fittings are particularly designed for jointing between stranded or solid (S.A.C.) aluminium cables and copper overhead lines. They are particularly useful as 'transition' connectors, used in conjunction with heat shrink type jointing methods on pole box or other similar situations.
3. When compressing sector shaped aluminium either Mosdorfer CCL Universal No Die change tools or conventional die change tools may be used. Refer to appropriate Technical data sheets (T/D No. -) listed in table for recommended location of compression sequence.

FITTING DETAIL				ACCEPTABLE CONDUCTOR DIAMETER							FITTING PART No.
				ALUMINIUM		APPROX. AREA mm²	COPPER		APPROX. AREA mm²		
TYPE	SIZE	FIG.	T/D No.	MIN	MAX		MIN	MAX			
				mm	mm	max	mm	mm	min	max	
VPBN.1	1	1	224/8	5.1	15.0	100	4.0	8.1	4	32	224000
	2			5.1	15.0	100	6.6	10.7	32	70	224001
	3			11.9	19.3	200	10.4	12.9	70	100	224002
	4			11.9	19.3	200	12.7	14.7	95	125	224003

FITTING DETAIL				*ACCEPTABLE CONDUCTOR					
				ALUMINIUM SOLID SECTOR SHAPED AREA mm²	COPPER				FITTING PART No.
					DIAMETER		APPROX. AREA mm²		
TYPE	SIZE	FIG.	T/D No.		MIN	MAX			
					mm	mm	min	max	
VPBN.3	1	2/3	224/7	70 x 3 CORE	4.0	8.1	4	32	224200
	2			95 x 3 CORE	4.0	8.1	4	32	224201
	3			120 x 3 CORE	10.4	12.9	70	100	224202
	4			185 x 3 CORE	10.4	12.9	70	100	224203
VPBN.4	1	2/4	224/6	70 x 4 CORE	4.0	8.1	4	32	224210
	2			95 x 4 CORE	4.0	8.1	4	32	224211
	3			120 x 4 CORE	10.4	12.9	70	100	224212
	4			185 x 4 CORE	10.4	12.9	70	100	224213

*NOTE: OTHER SIZES SUPPLIED TO ORDER ON REQUEST

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TERMINAL JUMPER LUGS

APPLICATIONS

This catalogued range of connectors identifies the series of fittings required to terminate overhead line conductors and cables at apparatus including pole mounted isolators, fuses, surge arresters, fuse cut outs, O.Y.T. Recloser Gear, transformers and terminal boxes. Connections are designed and tested for use in air or under compound or heat shrink type insulation. The fittings are "Range Taking" and accommodate plain aluminium, aluminium alloy and aluminium conductor steel reinforced, (A.C.S.R.). Fittings are included for 3 and 4 core solid aluminium cables also. Copper fittings are included for use on all types of hard drawn and annealed copper or copper alloy conductors and cables.

Terminal lugs for installing in Bi-Metal situations are available in either "economic" transition washer form, or with friction welded copper palm, to aluminium connector body design.

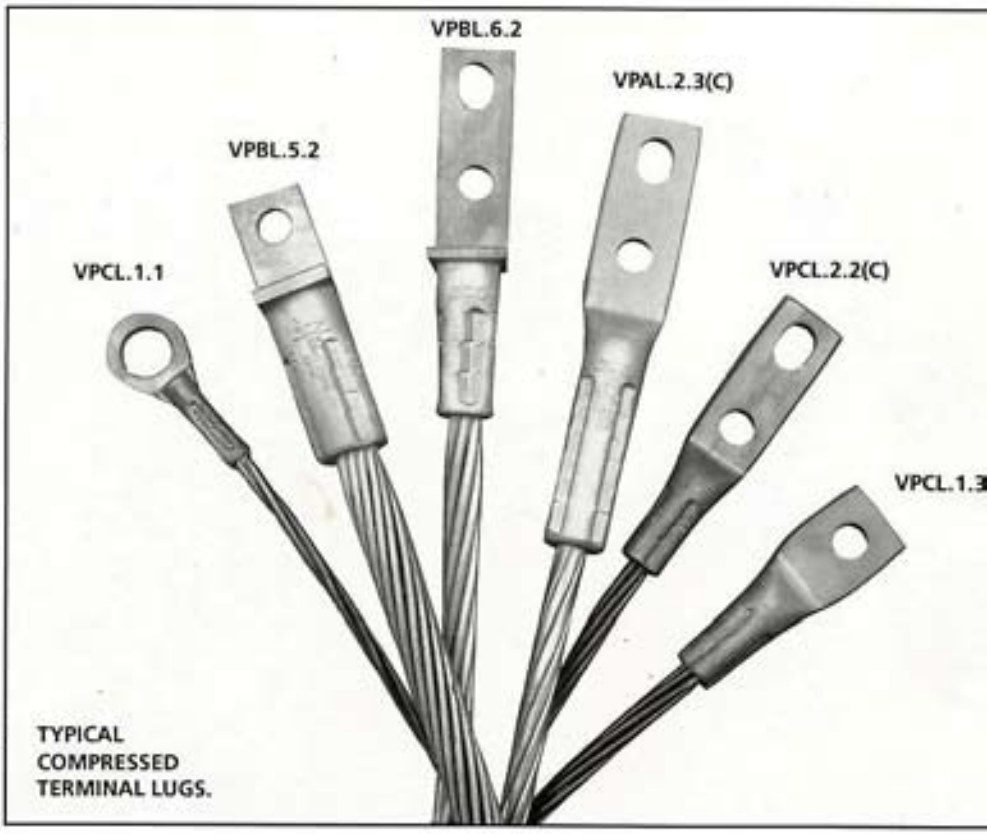
SPECIAL NOTE For general application of terminal lugs to aluminium or copper cables in the size range 10mm² to 1200mm² reference should be made to section 4.

TYPICAL POLE MOUNTED ISOLATOR USING TERMINAL LUGS TO CONNECT O.H. LINE JUMPERS

ADVANTAGES

When you use Mosdorfer CCL VERSA-PRESS® terminal lugs you know that:-

1. The compressed connections are field proven and tested in accordance with British Standard Specification BSS 3288 Overhead Line fittings. BSS 4579 Copper Terminals and Aluminium Terminals and/or Electricity Supply Industry (E.S.I.) requirements. (ESI 43-92).
2. Current Ratings of compressed joints are always equal to that of the conductor or cable to which the fittings are connected.
3. Test Reports are always available on request along with other technical support information.
4. When installed using the "unique" VERSA-PRESS® "Universal Die" a minimum number of connectors are required to cover a maximum number of different conductor/cable sizes. This special feature dramatically reduces the stock holding and stores administration, not to mention reducing the possibility of installation jointing errors.
5. With VERSA-PRESS® operators cannot use the wrong die or be caught without the correct die for a particular joint.



TYPICAL COMPRESSED TERMINAL LUGS.

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ALUMINIUM FITTINGS

FIG. 1
Single hole fixing for stranded or solid core conductor

FIG. 2
Double hole fixing for stranded or solid core conductor

FIG. 3
Single hole fixing for 3 & 4 core solid cable (S.A.C.)

FIG. 4

NOTE (Bi-Metal)
Standard connectors reference FIG. 3 are available with machined brass washers to provide Bi-Metal corrosion barrier terminal transition when bolted to copper bus-bars or apparatus. This Bi-Metal feature is more economic than friction welded Bi-Metal terminals and meets all test requirements.

Terminals shown in FIG. 3 are available for connecting solid core (S.A.C.) type cables to pole mounted apparatus. These fittings may be compressed with Die Change type tools if required.

When using VERSA-PRESS® universal "No Die Change" tools locate tool head as shown. →

FITTING				ACCEPTABLE CONDUCTOR DIAMETER		PART NUMBERS		APPROX. CABLE AREA mm²	
				min	max				
TYPE	SIZE	FIG.	T/D No.	mm	mm	PLAIN	BI-METAL	min	max
VPAL.5	1	1	220/15	5.8	8.2	220215	—	4	25
	2			7.4	11.3	220216	—	25	50
	3			9.3	14.3	220217	—	50	100
	4			11.9	19.3	220218	—	100	200
VPBL.1	1	4	233/4	5.8	8.2	—	233625	4	25
	2			7.4	11.3	—	233640	25	50
	3			9.3	14.3	—	233651	50	100
	4			11.9	19.3	—	233654	100	200
AL.3	95	3	230/6	These terminals are designed for 3 and 4 core solid aluminium cable. Other sizes are available see TD's for details.		230110	—	95	
	185					230122	—	185	
BL.3	95	3	233/3			—	233050	95	
	185					—	233062	185	
AL.4	95	3	230/7			230210	—	95	
	185					230222	—	185	
BL.4	95	3	233/2			—	233110	95	
	185					—	233122	185	
VPAL.2(C)	1	2	220/12C	5.8	8.2	220093	—	4	25
	2			7.4	11.3	220094	—	25	50
	3			9.3	14.3	220095	—	50	100
	4			11.9	19.3	220096	—	100	200

NOTE:—
Fixing holes are 14.3mm as standard for these fittings. Alternative fixing holes are available to order. To order such sizes customer should quote:- Fitting type and size followed by hole size required in brackets. Example:- VPAL 5.1 (12)

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COPPER FITTINGS

FIG. 1
Single hole fixing for stranded or solid core conductor

FIG. 2
Double hole fixing for stranded or solid core conductor

FIG. 3
Single hole fixing for stranded or solid core conductor and large fixing stud applications

FITTING				ACCEPTABLE CONDUCTOR DIAMETER		PART NUMBER	APPROX CABLE AREA mm²	
TYPE	SIZE	FIG.	T/D No.	min mm	max mm		min	max
VPCL.1	1 & 2 3 4 5 6	1	221/11	4.0 6.6 10.4 12.7 14.7	8.1 10.7 12.9 14.7 18.3	221121 221122 221123 221124 221162	4 25 50 95 125	35 70 100 125 185
VPCL.2(C)	1 & 2 3 4 5 6	2	221/10	4.0 6.6 10.4 12.7 14.7	8.1 10.7 12.9 14.7 18.3	221070 221071 221072 221073 221078	4 25 50 95 125	35 70 100 125 185
VPCL.1	1	3	221/11	4.0	8.1	221131	4	35

NOTE:-
Fixing holes are 14.3mm as standard for these fittings. Alternative fixing holes are available to order. To order such sizes customer should quote:- Fitting type and size followed by hole size required in brackets. Example:- VPCL 1.1 (12)

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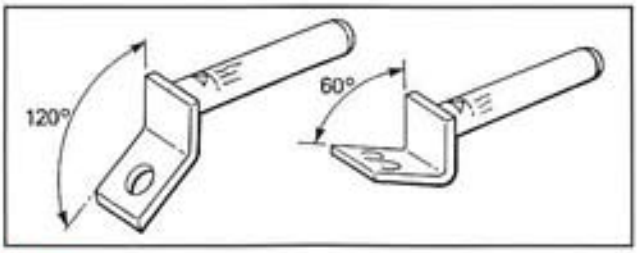
BI-METAL (FRICTION WELDED) FITTINGS

FIG. 1

FIG. 2



NOTE:-
These styles of angled terminals are made to order if required.

For these applications see also TD 224/9 (Spill Take Off) when connections have to be made to Live Line Clamps from the main overhead line

TYPICAL HEAT SHRINK TERMINATION WHERE BI-METAL TERMINALS SHOULD BE USED.

FITTING				ACCEPTABLE CONDUCTOR DIAMETER		PART NUMBER	APPROX CABLE AREA mm²	
TYPE	SIZE	FIG.	T/D No.	min mm	max mm		min	max
BL5	1 2 3 4	1	224/5A	— — 9.3 11.9	— — 14.3 19.3	S.T.O. S.T.O. 233401 233403	4 25 50 100	25 50 100 200
BL6	1 2 3 4	2	224/5B	— — 9.3 11.9	— — 14.3 19.3	S.T.O. S.T.O. 233501 233503	4 25 50 100	25 50 100 200

NOTE:-
Fixing holes are 14.3mm as standard for these fittings. Alternative fixing holes are available to order. To order such sizes customer should quote:- Fitting type and size followed by hole size required in brackets. Example:- BL 5.4 (16)

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TAP OFF AND SERVICE CONNECTORS

APPLICATIONS

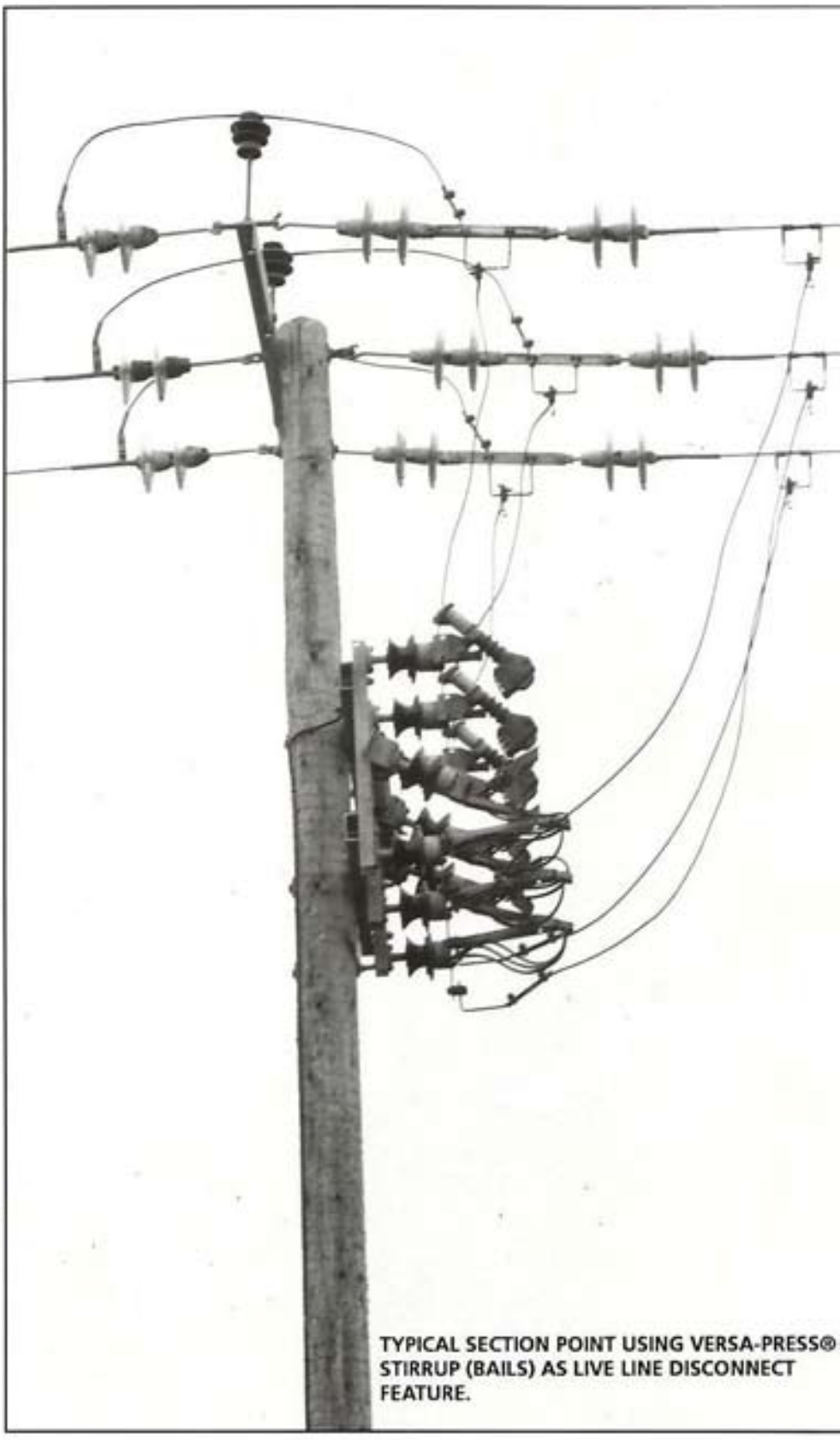
This catalogued range of connectors provides for service and heavy duty "T" connections from Main Lines. Connectors are available for copper, aluminium and Bi-Metal interconnections between Main Line conductors and branch cables. Live Line Stirrups (Bails) are included in the range, since these provide for disconnectable features at Overhead Line section points, or any situation where live line clamp tapping of the conductor is desirable.

The types of connector designs available ensure the complete requirements of H.V. and L.V. tapping are catered for with a minimum number of "Range Taking" connectors compressed with the **"Universal Die VERSA-PRESS®"** tooling.

ADVANTAGES

When you use CCL **VERSA-PRESS®** terminal lugs you know that:-

1. The connectors have been fully tested in accordance with British Standard Specification (BSS 3288) and Electricity Supply Industry (ESI) requirements.
2. Current Ratings of compressed joints are always equal to that of the conductor connected.
3. Test Reports are always available on request along with other technical support information.
4. **VERSA-PRESS®** connectors installed with the unique "Universal Die" offers flexibility, by reducing the number of fitting sizes needed to connect 10mm² to 200mm² cable-conductor combinations.
5. Operators cannot use the wrong die or be caught without the correct die for a particular joint.



TYPICAL SECTION POINT USING VERSA-PRESS® STIRRUP (BAILS) AS LIVE LINE DISCONNECT FEATURE.

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ALUMINIUM FITTINGS

FIG. 1
("L" Tap)

Used for L.V. & H.V. connections, Open throat main and closed service or "T" connection.

FIG. 2
("C" Tap)

Especially suitable for use on L.V. surface wiring connections on cleated and Aerial Bundled cables. (see FIG.5 section 17)

FIG. 3

FIG. 4

May be used as alternative to FIG. 2 also for L.V. "make off" at insulators.

NOTE: FIGS. 2 & 3 Type fittings can be supplied with insulation covers for L.V. installation or in L.V. jointing kits including self amalgamating isulation and protective cover (See Technical Data Sheet TD 224/4).

FIG. 6

Live Line Stirrups (Bails) are designed for simple installation on H.V. section points, auto reclosers and other O.H. Line isolation disconnect points.

NOTE:
See Technical Data Sheet TD 229/1 for details of CCL Live Line Taps and accessories.

FIG.5

Designed for H.V. heavy duty connections of 400A rating conductors of 60mm² to 150mm²

INSTALLATION

1. For all instructions refer to appropriate Technical Data Sheet (T.D. No. —) listed in table.
2. Suitable for all types of aluminium, hard drawn, annealed and steel re-inforced (ACSR) conductors and cables 10 to 200mm² (18/1 ACSR).
3. Type VPASC (FIG. 3) connector may be used to joint split concentric 25 and 35mm² hybrid service cables in bi-metal situations see Technical Data Sheet TD 224/4.

TYPE CODE	FITTING			ACCEPTABLE CONDUCTOR DIMENSIONS MAIN				TAP				PART No.
	SIZE	FIG. No.	T.D. No.	DIA Ø MM MIN	DIA Ø MM MAX	APPROX AREA MM² MIN	APPROX AREA MM² MAX	DIA Ø MM MIN	DIA Ø MM MAX	AREA MM² MIN	AREA MM² MAX	
VPATC.3	1 2 3 4 5 6	1	220/1	2.4 5.8 5.8 13.2 13.2 13.2	12.2 14.2 14.2 19.3 19.3 19.3	10 22 22 100 100 100	60 100 100 200 200 200	2.4 2.4 5.8 2.4 5.8 13.2	10.2 10.2 14.2 10.2 14.3 19.3	10 10 22 10 22 100	60 60 100 60 100 200	220166 220167 220168 291000 2910 291001
VPATC.7	1	2	220/2	2.4	7.1	10	25	2.4	7.1	10	25	220180
VPASC.2	1 2	3	220/3	5.8 5.8	14.2 14.2	22 22	100 100	2.4 5.8	10.2 14.2	10 22	60 100	220284 220287
VPATC.5	1	4	220/4	2.4	10.2	10	60	2.4	10.2	10	60	220169
VPACT.9	1	5	220/5	10.2	17.5	60	150	10.2	17.5	60	150	220240
VPAS.1	1 2 3	6	220/6	2.4 5.8 14.0	12.2 14.2 21.0	10 22 100	60 100 200	USE LIVE LINE CLAMP PER TD 229/1				220146 220147 220151

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COPPER FITTINGS

FIG. 1
("L" Tap)

Used for L.V. & H.V. connections, Open throat main and closed service or "T" connections.

FIG. 2
("C" Tap)

Especially suitable for use on L.V. surface wiring connections on cleated and Aerial Bundled cables. (see FIG.5 section 17)

FIG. 3

FIG. 4

May be used as alternative to FIG. 2 also for L.V. "make off" at insulators.

NOTE: FIGS. 2 & 3 Type fittings can be supplied with insulation covers for L.V. installations or in L.V. jointing kits including self amalgamating insulation and protective cover (See Technical Data Sheet TD 224/4)

FIG. 6

Live Line Stirrups (Bails) are designed for simple installation on H.V. section points, auto reclosers and other O.H. Line isolation disconnect points.

NOTE:
See Technical Data Sheet TD 229/1 for details of CCL Live Line Taps and accessories.

FIG.5

Designed for special applications alternative to Type VPCTC.3

INSTALLATION

1. For all instructions refer to appropriate Technical Data Sheet (T.D. No. —) listed in table.
2. Suitable for all types of aluminium, hard drawn, annealed and copper alloy conductors and cables 10 to 200mm².
3. Type VPCSC (FIG.3) connector may be used to joint split concentric 25 and 35mm² hybrid service cables in bi-metal situations see Technical Data Sheet TD 224/4

TYPE CODE	FITTING			ACCEPTABLE CONDUCTOR DIMENSIONS MAIN				TAP				PART No.
	SIZE	FIG. No.	T.D. No.	DIA Ø MM MIN	DIA Ø MM MAX	APPROX AREA MM² MIN	APPROX AREA MM² MAX	DIA Ø MM MIN	DIA Ø MM MAX	AREA MM² MIN	AREA MM² MAX	
VPCTC.3	1 2 3 4	1	221/1	4.1 6.6 7.9 8.1	8.1 10.7 12.4 14.7	10 25 32 32	35 70 95 150	4.1 6.6 4.1 8.1	8.1 10.7 8.1 14.7	10 25 10 32	35 70 35 150	221206 221207 221208 221209
VPCTC.2	2	2	221/2	2.5	7.9	10	35	2.5	7.9	10	35	221201
VPCSC.2	1 2	3	221/3	6.6 6.6	10.7 10.7	25 25	70 70	4.1 6.6	8.1 10.7	10 25	35 70	221230 221233
VPCTC.5	1	4	221/4	4.1	10.7	10	70	4.1	10.7	10	70	221210
VPCTC.1	6	5	221/5	USE TO CONNECT EARTH GRIDS								221116
VPCS.1	1 2	6	221/6	4.1 8.0	8.1 14.7	10 32	38 150	USE LIVE LINE CLAMP PER TD 229/1				221100 221101

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BI-METAL FITTINGS

FIG. 1
("L" Tap)

Used for L.V. & H.V. connections, open throat main and closed service or "T" connections. COPPER MAIN TO ALUMINIUM SERVICE

FIG. 2
("C" Tap)

Used for L.V. & H.V. connections, open throat main and closed service "T" connections. ALUMINIUM MAIN TO COPPER SERVICE.

FIG. 3

Especially suitable for use on L.V. or H.V. connections on Aerial Bundled Cables (ABC) Quadruplex and similar constructed cables.

FIG. 4

FIG. 3 ALUMINIUM MAIN TO COPPER SERVICE
FIG.4 COPPER MAIN TO ALUMINIUM SERVICE

FIG. 3 Type fittings are available with insulation covers for use on L.V. connections or in L.V. jointing kits including self amalgamating insulation and protective covers (See Technical Data Sheet TD 224/4a)

BIMETAL CONNECTIONS CAN BE MADE USING STANDARD COPPER OR ALUMINIUM CONNECTORS AS DESCRIBED BELOW.

Method

1. Strip back the insulation to dimension "X", or for bare conductors, tape back from dimension "X". Apply such that the insulation fits inside the connector up to the radial mark and the bare core lies between the radial mark and the closed end arrow head.
2. Compress between the arrow heads over dimension "Y". Compress in the order 1-2 to ensure that the insulation (or P.V.C. tape) is gripped to form a seal barrier at the connector entry. Compression 3 will be necessary on larger connectors (See Technical Data Sheet TD 224/5)

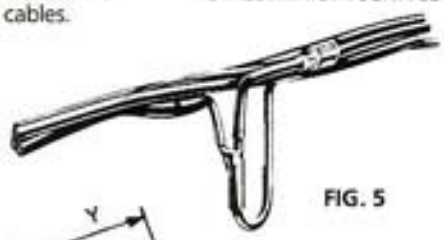

FIG. 5

FIG. 6

Compression order

TYPE CODE	FITTING			ACCEPTABLE CONDUCTOR DIMENSIONS MAIN				TAP				PART No.
	SIZE	FIG. No.	T.D. No.	DIA Ø MM MIN	DIA Ø MM MAX	APPROX AREA MM² MIN	APPROX AREA MM² MAX	DIA Ø MM MIN	DIA Ø MM MAX	APPROX AREA MM² MIN	APPROX AREA MM² MAX	
VPBT.1	1	1	224/1	7.9	12.4	32Cu	95Cu	5.8	14.2	22Al	100Al	224010
	2			4.1	8.1	10Cu	35Cu	5.8	14.2	22Al	100Al	224011
VPBT.2	1	2	224/2	5.8	14.2	22Al	100Al	4.1	8.1	10Cu	35Cu	224020
	2			5.8	14.2	22Al	100Al	6.6	10.7	25Cu	70Cu	224022
VPBSC.1	1	3	224/3	6.6	10.7	25Cu	70Cu	2.4	10.2	10Al	60Al	224016
VPBSC.2	1	4	224/4	5.8	14.2	22Al	100Al	4.1	8.1	10Cu	35Cu	224015

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END SPAN — DEADEND ANCHOR CLAMPS

APPLICATIONS

This section of the catalogue identifies the range of fittings required to terminate overhead line conductors at tower insulator sets; in full tension or partial tension situations.

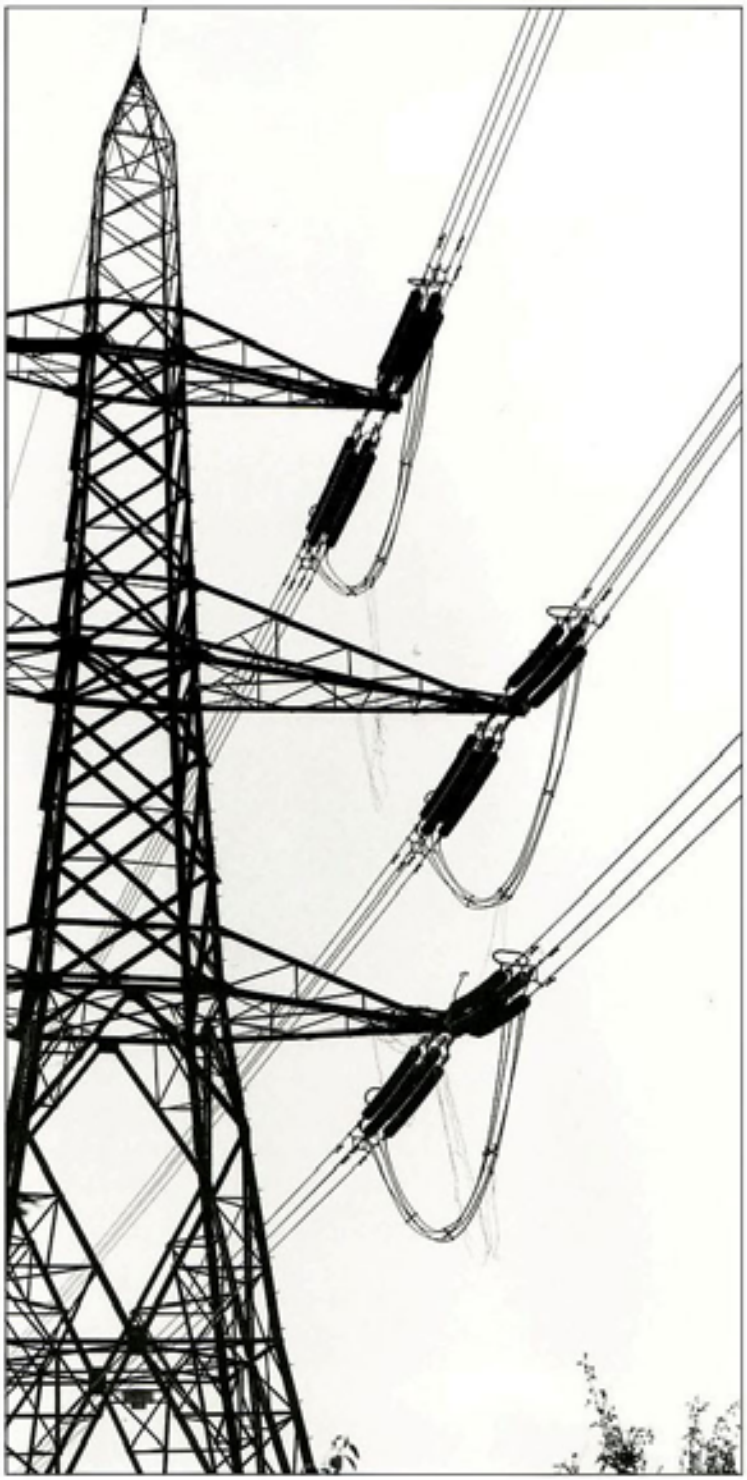
The fittings are designed to accommodate plain aluminium, aluminium alloy and aluminium conductor steel reinforced, (A.C.S.R.) Steel conductors are also covered. Each size of fitting may be specified by the user, with Eyebolt or Clevis galvanised end fitting, for final connections to the insulator hardware.

Jumper Lugs may be integral or disconnectable, dependent upon the line design specification. The design concept allows a maximum number of conductor sizes and types to be jointed using a mimimum number of fitting sizes when compressed with the HEX-PRESS® tooling.

ADVANTAGES

/hen you use CCL HEX-PRESS® Anchor Clamp assemblies you know that:

1. The compressed joints are field proven and tested in accordance with British Standard Specification (BSS 3288) and Electricity Supply Industry (ESI 43-92) requirements.
2. Current ratings of compressed joints are always equal to that of the conductor to which the assemblies are connected.
3. Test Reports are available on request along with other technical support information.
4. **All fittings designed for use on U.K. National Grid Company (N.G.C.) installations are approved to relevant N.G.C. Engineering Specification.**



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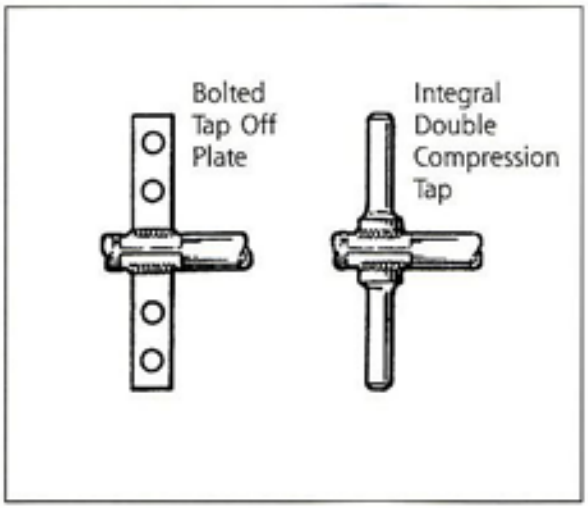
ALUMINIUM FITTINGS

SPECIALS



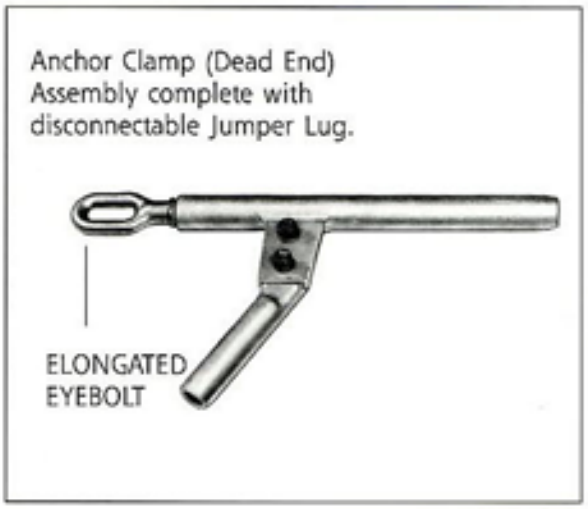
Other types are available including **U.K. National Grid Company (N.G.C.) type made to Clients own specification.**

TYPE 5: NO TAP OFF
TYPE 7: INTEGRAL JUMPER LUG
TYPE 5D: DOUBLE TAP OFF PLATE
TYPE 7D: DOUBLE INTEGRAL JUMPER STRAIGHT OR ANGLED

Anchor Clamp can be supplied with:

FORM "E" EYEBOLT (Fixing to Insulator)
FORM "C" CLEVIS (Fixing to Insulator)
As preferred by N.G.C.

STANDARD TYPE 2



Anchor Jumper Lugs are supplied with:—

TYPE 2A: CRANKED WITH BOLTS
TYPE 2B: CRANKED WITHOUT BOLTS
TYPE 2C: STRAIGHT WITHOUT BOLTS

INSTALLATION

1. For all instructions and dimensions, weight, etc. refer to appropriate Technical Data Sheets (TD's) listed in the text or tables.

2. Aluminium Fittings are suitable for all types of plain hard drawn aluminium, aluminium alloy and steel reinforced (A.C.S.R.) conductors up to 800mm² (A.A.A.C.). Galvanised Steel conductor may also be jointed and CCL should be consulted for details of this capability.

3. Special clamps are available to joint higher strength conductors having Ultimate Tensile Strength (U.T.S.) greater than the tabled U.T.S. figures.

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FITTING AND CONNECTOR INSTALLATION

TUBULAR FITTINGS

Steel Inner Sleeve (2 Part Joint)

Aluminium
Tension Sleeve

Anchor Clamp (Dead End)

COMPRESSION
In general all tubular connectors are compressed starting at the arrow or start line furthest from the cable or conductor entry and progressing towards the entry in OVERLAPPED "BITES". Compression continues over the chamfered entry to the connector/fitting which forms a gradual stress relief.
This procedure ensures the correct distribution of anti-corrosion inhibitor grease within the joint and a uniform mechanical stress within the completed joint. This is especially important when compressing multi-strand A.C.S.R. 2-PART FITTINGS.
For complete instructions always refer to CCL's Technical Data Sheets (TD's) which are referenced by number in the tables of each catalogue page.

PREVENTION OF UNDULY CURVED (BANANA) TENSION JOINTS
Prior to installing tension connectors, ensure that the conductor is perfectly straight over a length equal to three times that which is to be inserted in the connector.

PREVENTION OF UNDUE STRAND OPENING (BIRDCAGING)
"Birdcaging" occurs when the conductor is extruded excessively during compression. It can be minimised by fitting restraining clamps, i.e. live line clamps on the conductor 1.00" (25.4mm) outside the mouth of the joint.

SPLIT TUBE FITTINGS

"T" Tap

Repair Sleeve

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HEX-PRESS®

CONVENTIONAL HEXAGON COMPRESSION TO INTERNATIONAL STANDARD

INTRODUCTION TO HEX-PRESS®

The CCL HEX-PRESS® Compression System has been designed to make compression connections on cables and conductors to a standard of efficiency complying with IEC, CENELEC, BSS and NEMA Specifications.
Tools and Equipment comprise a range of HYDRAULIC PRESSES and choice of hand or power operated PUMPS.
The press heads accept conventional "HEXAGON" DIE SETS, which ensure connectors and fittings are compressed to the specified "ACROSS FLATS" dimension, to achieve low resistance, high mechanical performance installed joints.
See SECTION 5 Pages 6, 7 and 8.
Regardless of the working environment, be it overhead lines or general cable termination installation, HEX-PRESS® will perform with equal effectiveness.

PRINCIPLE

When pressure is applied from the pump to the press head, the lower half die travels forward to engage the connector and compress it between the upper half of the HEXAGON DIE SET, the compression is complete when the lower and upper half dies close fully and or the pump relief valve operates, having reached pre-set maximum pressure.
Ideally, the compressed joint should be checked, to ensure the across flats hexagon formed by the compression action, conforms to design dimension.

RANGE

The range of the HEX-PRESS® System is limited by two factors:

1. The diameter of connector or fitting, that can be physically accommodated in the press head die set.
2. The ultimate tensile strength the joint has to develop.

Guidance may be obtained by referring to CCL Technical Data Sheets (TD's) referenced in the various tables on each page of the catalogue.

CODING

All fittings are coded for easy identification and grouping. The code used is a combination of characters and numerals which denote:

SYSTEM	MATERIAL	GROUP	SIZE mm²	CODE
HEX-PRESS®	ALUMINIUM	TENSION	400	HPAT 400
HEX-PRESS®	COPPER	LUG	400	HPCL 400
HEX-PRESS®	BI-METAL	NON-TENSION	150/200	HPBN 150/200

TOOLING

There are a range of options from 12 TON hand operated "G" heads, through to 100 TON "H" frame press heads with appropriate die sets accommodating cables and conductors from 16mm² to 1200mm².
The options of using foot-operated, AC mains electric, DC 12/24 Volt, or petrol engine driven pumps as prime movers, are all available in the HEX-PRESS® System.
See Catalogue SECTION 5: COMPRESSION TOOLS & EQUIPMENT.

PRODUCTIVITY

Physical energy to operate any HEX-PRESS® tool is minimal and they can comfortably be worked for long periods.
The unique AUTO-LOK "fast fit" die set design enables dies to be changed rapidly without using separate hand tools or nuts and bolts.
Operating cycle time is rapid, while the equipment is relatively light weight and portable for ease of handling on site, it is nevertheless robust and maintenance is minimal.

SAFE — EFFICIENT — FOOLPROOF

All tools have an automatic calibrated relief valve which is set before leaving the factory. This feature ensures the equipment cannot be overloaded.
Fittings and Connectors in the HEX-PRESS® range are produced to International and U.K. standards.
Items produced for U.K. National Grid Company (N.G.C.) are strictly in accordance with and approved to the N.G.C. Technical Standard Documents (previously C.E.G.B. T.P.S's).
VIDEO OF CCL HEX-PRESS® SYSTEM AVAILABLE ON REQUEST.

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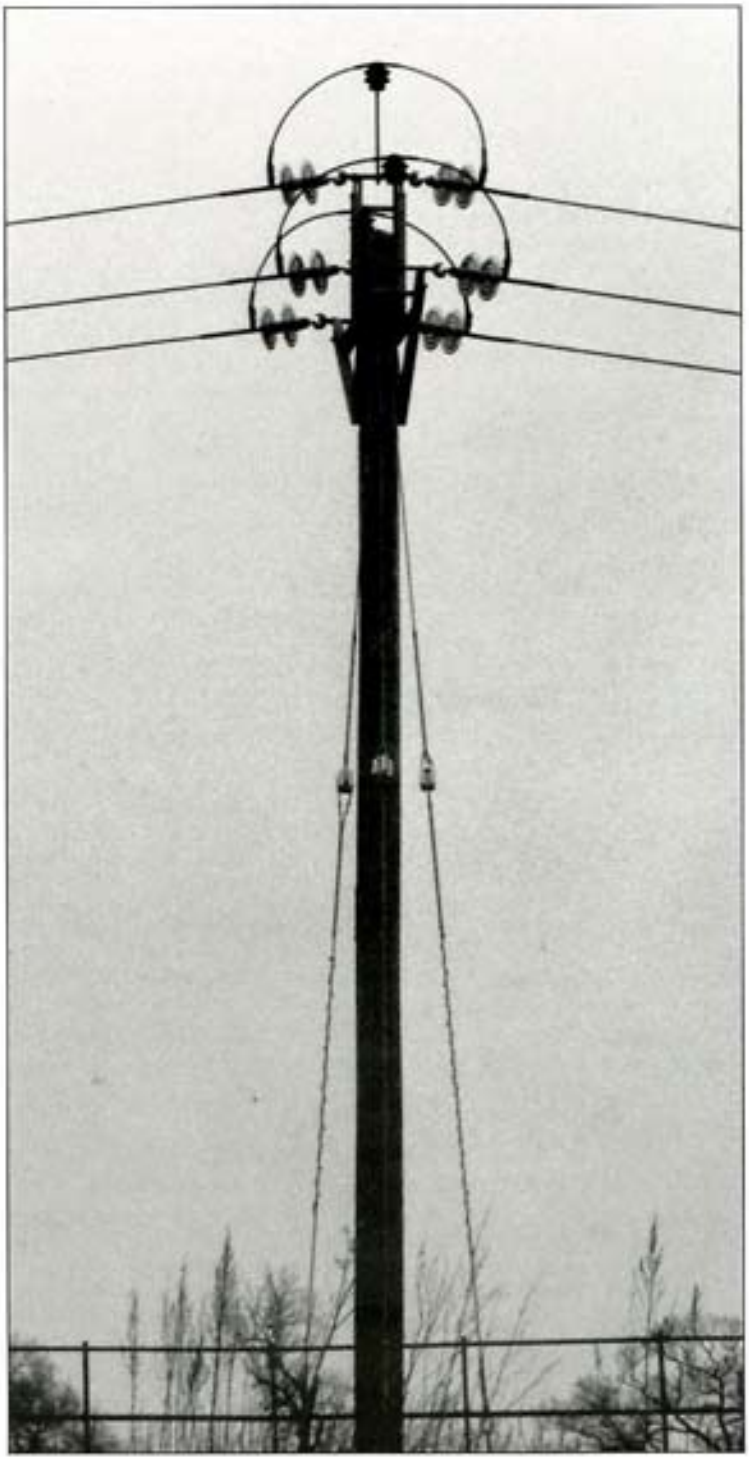
END SPAN — DEADEND ANCHOR CLAMPS

APPLICATIONS

This section of the catalogue identifies the range of fittings required to terminate overhead line conductors at tower insulator sets; in full tension or partial tension situations.

The fittings are designed to accommodate plain aluminium, aluminium alloy and aluminium conductor steel reinforced, (A.C.S.R.) Steel conductors are also covered. Each size of fitting may be specified by the user, with Eyebolt or Clevis galvanised end fitting, for final connections to the insulator hardware.

Jumper Lugs may be integral or disconnectable, dependent upon the line design specification. The design concept follows E.C. practice of dedicating one fitting to a particular conductor size and compression die set.



ADVANTAGES

When you use CCL EURO-NORM Anchor Clamp assemblies you know that:

1. The compressed joints are field proven and tested in accordance with I.E.C., CENELEC OR OTHER E.C. Specifications for example DIN (GERMANY).

2. Current ratings of compressed joints are always equal to that of the conductor to which the assemblies are connected.

3. Test Reports are available on request along with other technical support information.

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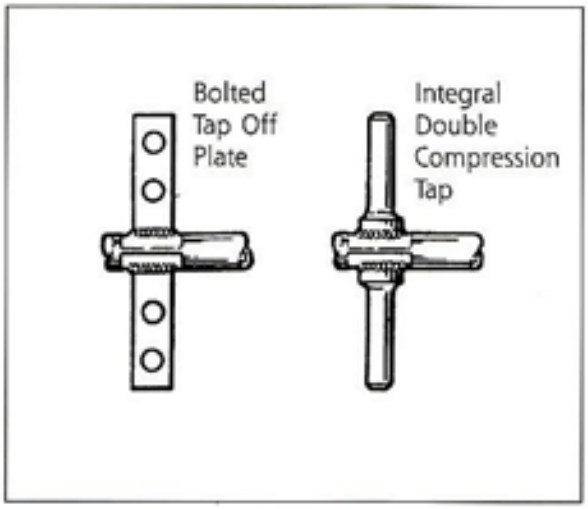
ALUMINIUM FITTINGS

SPECIALS



TYPE 5: NO TAP OFF
TYPE 7: INTEGRAL JUMPER LUG
TYPE 5D: DOUBLE TAP OFF PLATE
TYPE 7D: DOUBLE INTEGRAL JUMPER
STRAIGHT OR ANGLED

Anchor Clamp can be supplied with:

FORM "E" EYEBOLT (Fixing to Insulator)
FORM "S" SOCKET (Fixing to Insulator)

STANDARD TYPE 2

Anchor Clamp (Dead End)
with disconnectable style tap off plate.
Jumper Lug facility.

CLEVIS

Anchor Jumper Lugs are supplied with:—

TYPE 2A: CRANKED WITH BOLTS
TYPE 2B: CRANKED WITHOUT BOLTS
TYPE 2C: STRAIGHT WITHOUT BOLTS

INSTALLATION

1. For all instructions and dimensions, weight, etc. refer to appropriate Technical Data Sheets (TD's) listed in the text or tables.

2. Aluminium Fittings are suitable for all types of plain hard drawn aluminium, aluminium alloy and steel reinforced (A.C.S.R.) conductors up to 200mm² (A.A.A.C.). Galvanised Steel conductor may also be jointed and CCL should be consulted for details of this capability.

3. Aluminium Power Cables are jointed using **EURO-NORM** sleeves and terminal lugs. (BI-METAL FRICTION WELDED TYPE). **EURO-NORM** includes connectors for solid aluminium, sector shaped cored cables.
Copper cables are jointed using conventional **EURO-NORM** dimensioned sleeves and terminal lugs.

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FITTING AND CONNECTOR INSTALLATION

TUBULAR FITTINGS

Aluminium or Copper
Tension Sleeve

Anchor Clamp (Dead End)

"C" TYPE FITTINGS

Tap Connector

"Live Line" Bail

TERMINALS & SLEEVES

"Bi-Metal" Sleeve
Transition Connector

"Bi-Metal" Terminal
for Aluminium Cable

Copper Tube Terminals

Copper Tube Sleeves

1, 2, 3 and 4 Core
Solid Aluminium Cable
Connectors

■ EURO-NORM OVERHEAD LINE

COMPRESSION
In general all tubular connectors are compressed starting at the START line furthest from the cable or conductor entry and progressing towards the entry in spaced "BITES", finishing at the appropriate STOP mark.

This procedure ensures the correct distribution of anti-corrosion inhibitor grease within the joint and a uniform mechanical stress within the completed joint.

This is especially important when compressing multi-strand A.C.S.R. FITTINGS on overhead lines. For complete instructions always refer to CCL's Technical Data Sheets (TD's) which are referenced by number in the tables of each catalogue page.

■ EURO-NORM POWER CABLES

A comprehensive range of L.V. and H.V. Power Cable Connectors which may be compressed using conventional Die Change Tooling supplied by most International manufacturers.

When compressing these Connectors, take care to apply the die set on the compression location points marked on the connector barrel.

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EURO-NORM

EUROPEAN COMPATIBLE COMPRESSION SYSTEM FOR POWER LINES AND CABLES

INTRODUCTION TO EURO-NORM

The CCL EURO-NORM Compression System recognises the need for connectors and fittings, to be so designed as to be compatible with compression tools and die equipment, manufactured to GERMAN, FRENCH and other E.C. countries recognised dimensional norms. Tools and Equipment comprise a range of HYDRAULIC PRESSES and choice of hand or power operated PUMPS.
The press heads accept conventional HEXAGON or "C" TYPE DIE SETS, which ensure that connections are compressed to achieve optimum electrical and mechanical performance, when in service.
See SECTION 5 Pages 6, 7 and 8 of this catalogue.
Regardless of the working environment, be it overhead lines or general cable terminations installation, EURO-NORM performs with equal effectiveness.

PRINCIPLE

When pressure is applied from the pump to the press head, the lower and upper halves of the die set engage the connector and compress the joint between them. Full compression is achieved when pump action stops, either automatically or when the operator observes the die set to be fully closed.

RANGE

The range of the EURO-NORM System is limited by three factors:

1. The diameter of the connector or fitting that can be physically accommodated in the press head/die sets.
2. The diameter of the conductor or cable to enter the fitting.
3. The correct DIE SET to compress the combination of 1 and 2.

Guidance may be obtained by referring to CCL Technical Data Sheets (TD's) referenced in the various tables on each page of the catalogue.

CODING

All fittings are coded for easy identification and grouping. The code used is a combination of characters and numerals which denote:

SYSTEM	MATERIAL	GROUP	SIZE mm²	CODE
EURO-NORM	ALUMINIUM	TENSION	100	ENAT 100
EURO-NORM	COPPER	LUG	★50 (8)	ENCL 50 (8)
EURO-NORM	BI-METAL	NON-TENSION	100/50	ENBN 100/50

★ For Terminal Lugs the (8) = Fixing Bolt Size.

TOOLING

There are equipment systems from numerous International manufacturers which are CCL EURO-NORM compatible. They range from simple mechanical hand operated tools, to sophisticated electric or pneumatic driven systems.
CCL's own range can be found in SECTION 5 of this catalogue.
If in doubt, always consult CCL Sales Engineers or factory engineering office, to advise on compatibility of materials comprising CCL and other manufacturers products.

PRODUCTIVITY

All CCL EURO-NORM materials are designed to give the optimum operating cycle times with minimum operator fatigue.

GENERAL

Fittings and Connectors are designed to fit as closely as CCL can design them, to numerous options of Internationally available compression tools.
The fittings cover OVERHEAD LINE and POWER CABLE TERMINALS (LUGS) for almost every conceivable type and size of conductor or power cable.
CCL recommend that users carefully check that the CORRECT DIE SIZE — CONNECTOR SIZE — CABLE SIZE combination is identified before making any joints with conventional die change systems.

COPPER TUBE TERMINALS

16mm²

500mm²

(16mm² to 1000mm²) FOR STRANDED COPPER POWER CABLES

- CCL Copper Tube Compression Terminals are produced from high conductivity copper and tin plated to resist oxidization of contact surfaces and to operate at temperatures of up to 120°C.
- Terminals are tested to BS4579 Part 1 in various forms of tooling dies, including CCL Versa-Press® and Euro-Norm.
- TD231 Series drawing gives dimensions.
- Tooling: See section 5 of CCL catalogue A for alternatives.

1.VERSA-PRESS
(16mm² - 300mm²)
UNIVERSAL "NO DIE" CHANGE

2. EURO-NORM
(16mm² - 1000mm²)

CONVENTIONAL DIE CHANGE

3. INDENT
(16mm² - 300mm²)

TABLE 1

Cable area mm²	Stud size mm	Stud size Imperial	CCL code
16	6	OBA	CL16(6)
	8	5/16"	CL16(8)
	10	3/8"	CL16(10)
	12	1/2"	CL16(12)
25	6	OBA	CL25(6)
	8	5/16"	CL25(8)
	10	3/8"	CL25(10)
	12	1/2"	CL25(12)
35	6	OBA	CL35(6)
	8	5/16"	CL35(8)
	10	3/8"	CL35(10)
	12	1/2"	CL35(12)
50	6	OBA	CL50(6)
	8	5/16"	CL50(8)
	10	3/8"	CL50(10)
	12	1/2"	CL50(12)
	14	9/16"	CL50(14)
70	6	OBA	CL70(6)
	8	5/16"	CL70(8)
	10	3/8"	CL70(10)
	12	1/2"	CL70(12)
	14	9/16"	CL70(14)
	16	5/8"	CL70(16)
95	8	5/16"	CL95(8)
	10	3/8"	CL95(10)
	12	1/2"	CL95(12)
	14	9/16"	CL95(14)
	16	5/8"	CL95(16)
	20	3/4"	CL95(20)
120	10	3/8"	CL120(10)
	12	1/2"	CL120(12)
	14	9/16"	CL120(14)
	16	5/8"	CL120(16)
	20	3/4"	CL120(20)

Cable area mm²	Stud size mm	Stud size Imperial	CCL code
150	10	3/8"	CL150(10)
	12	1/2"	CL150(12)
	14	9/16"	CL150(14)
	16	5/8"	CL150(16)
	20	3/4"	CL150(20)
185	10	3/8"	CL185(10)
	12	1/2"	CL185(12)
	14	9/16"	CL185(14)
	16	5/8"	CL185(16)
	20	3/4"	CL185(20)
240	12	1/2"	CL240(12)
	14	9/16"	CL240(14)
	16	5/8"	CL240(16)
	20	3/4"	CL240(20)
300	14	9/16"	CL300(14)
	16	5/8"	CL300(16)
	20	3/4"	CL300(20)
400	16	5/8"	CL400(16)
	20	3/4"	CL400(20)
500	18	5/8"	CL500(16)
	20	3/4"	CL500(20)
630	18	11/16"	CL630(18)
	22	7/8"	CL630(22)
	4 X 10	3/8"	CL630(4 X 10)
800	18	11/16"	CL800(18)
	22	7/8"	CL800(22)
	4 X 10	3/8"	CL800(4 X 10)
1000	18	11/16"	CL1000(18)
	22	7/8"	CL1000(22)
	4 X 10	3/8"	CL1000(4 X 10)

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COPPER TUBE SLEEVES
(16mm² to 1000mm²)

- CCL Copper Tube Compression Sleeves are produced from high conductivity copper and tin plated to resist oxidization of contact surfaces and to operate at temperatures of up to 120°C.
- Sleeves are tested to BS4579 Part 1 in various forms of tooling dies, including CCL Versa-Press® and Euro-Norm.
- TD231 Series drawing gives dimensions.
- Tooling: See section 5 of CCL catalogue A for alternatives.

1.VERSA-PRESS
(16mm² - 300mm²)
UNIVERSAL "NO DIE" CHANGE

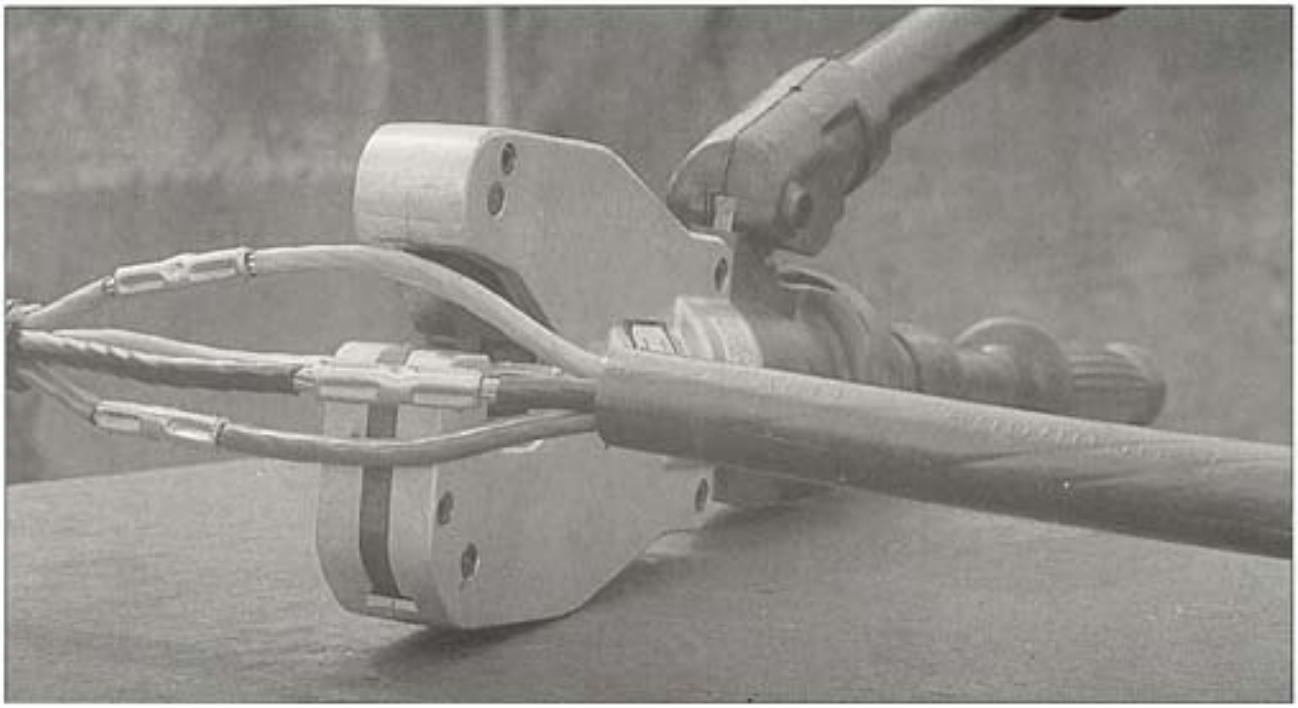
2. EURO-NORM
(16mm² - 1000mm²)

CONVENTIONAL DIE CHANGE

3. INDENT
(16mm² - 300mm²)

TABLE 1

Cable area mm²	16	25	35	50	70	95	120	150	185	240	300	400	500	630	800	1000
CCL Code	CN16	CN25	CN35	CN50	CN70	CN95	CN120	CN150	CN185	CN240	CN300	CN400	CN500	CN630	CN800	CN1000



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ALUMINIUM TERMINALS

(25mm² to 1000mm²) FOR STRANDED ALUMINIUM POWER CABLES

- CCL Aluminium Compression terminals are produced from bar and the palm is high conductivity copper, friction welded to the body. The terminal may therefore also be used for bi metal connections to copper bus-bars and distribution boxes
- Terminals are tested to BSS4579 Part 3 in various forms of tooling dies, including CCL Versa-Press® and Euro-Norm.
- TD233 Series drawing gives dimensions.
- Tooling: See section 5 of CCL catalogue A for alternatives.

1.VERSA-PRESS
(16mm² - 300mm²)
UNIVERSAL "NO DIE" CHANGE

2. EURO-NORM
(16mm² - 1000mm²)

CONVENTIONAL DIE CHANGE

3. INDENT
(16mm² - 300mm²)

- **SPECIAL NOTE** Terminals marked * are "Range Taking" when used with Versa-Press® universal no die change tools. (See drawing TD233/4 for details).

TABLE 1

Cable area mm²	Stud size mm	Stud size Imperial	CCL code
25	6	OBA	AL25(6)
	8	5/16"	AL25(8)
	10	3/8"	AL25(10)
	12	1/2"	AL25(12)
35*	6	OBA	AL35(6)
	8	5/16"	AL35(8)
	10	3/8"	AL35(10)
	12	1/2"	AL35(12)
50	6	OBA	AL50(6)
	8	5/16"	AL50(8)
	10	3/8"	AL50(10)
	12	1/2"	AL50(12)
	14	9/16"	AL50(14)
70	6	OBA	AL70(6)
	8	5/16"	AL70(8)
	10	3/8"	AL70(10)
	12	1/2"	AL70(12)
	14	9/16"	AL70(14)
	16	5/8"	AL70(16)
95*	8	5/16"	AL95(8)
	10	3/8"	AL95(10)
	12	1/2"	AL95(12)
	14	9/26"	AL95(14)
	16	5/8"	AL95(16)
120	10	3/8"	AL120(10)
	12	1/2"	AL120(12)
	14	9/16"	AL120(14)
	16	5/8"	AL120(16)
	20	3/4"	AL120(20)
150*	10	3/8"	AL150(10)
	12	1/2"	AL150(12)
	14	9/16"	AL150(14)
	16	5/8"	AL150(16)
	20	3/4"	AL150(20)

Cable area mm²	Stud size mm	Stud size Imperial	CCL code
185	10	3/8"	AL185(10)
	12	1/2"	AL185(12)
	14	9/16"	AL185(14)
	16	5/8"	AL185(16)
	20	3/4"	AL185(20)
240*	12	1/2"	AL240(12)
	14	9/16"	AL240(14)
	16	5/8"	AL240(16)
	20	3/4"	AL240(20)
300	14	9/16"	AL300(14)
	16	5/8"	AL300(16)
	20	3/4"	AL300(20)
400	18	11/16"	AL400(18)
	20	3/4"	AL400(20)
500	18	11/16"	AL500(18)
	20	3/4"	AL500(20)
630	18	11/16"	AL630(18)
	22	7/8"	AL630(22)
	4 X 10	3/8"	AL630(4 X 10)
800	18	11/16"	AL800(18)
	22	7/8"	AL800(22)
	4 X 10	4 X 3/8"	AL800(4 X 10)
1000	18	11/16"	AL1000(18)
	22	7/8"	AL1000(22)
	4 X 10	4 X 3/8"	AL1000(4 X 10)

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ALUMINIUM SLEEVES

(25mm² to 1000mm²) FOR STRANDED ALUMINIUM

- CCL Aluminium Compression Sleeves are produced from bar and have a solid centre barrier in the barrel to assist equal loading on each cable end.
- Sleeves are tested to BS4579 Part 3 in various forms of tooling dies, including CCL Versa-Press® and Euro-Norm.
- TD233 Series drawing gives dimensions.
- Tooling: See section 5 of CCL catalogue A for alternatives.

1.VERSA-PRESS
(16mm² - 300mm²)
UNIVERSAL "NO DIE" CHANGE

2. EURO-NORM
(16mm² - 1000mm²)

CONVENTIONAL DIE CHANGE

3. INDENT
(16mm² - 300mm²)

- **SPECIAL NOTE** Sleeves marked * are "Range Taking" when used with Versa-Press® universal no die change tools. (See drawing TD233/4 for details).

TABLE 1

Cable area mm2	25	35*	50	70	95*	120	150*	185	240*	300	400	500	630	800	1000
CCL Code	AN25	AN35	AN50	AN70	AN95	AN120	AN150	AN185	AN240	AN300	AN400	AN500	AN630	AN800	AN1000

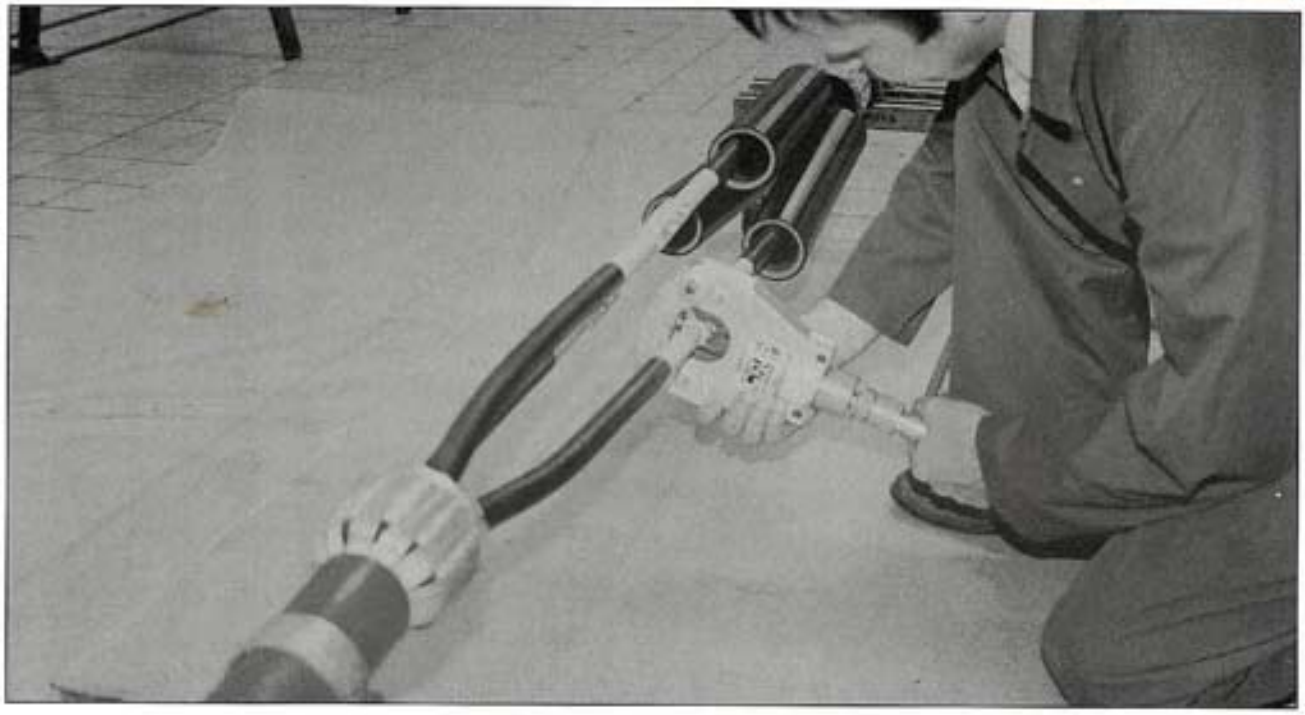

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FIG.1 CENTRE

FIG.2 RIGHT HAND

FIG.3

ALUMINIUM TERMINALS

(50mm² to 300mm²) FOR 3 & 4 CORE SOLID ALUMINIUM POWER CABLES

- CCL Aluminium Compression Terminals for solid Aluminium cable (S.A.C) are produced from extruded section factory stamped to give finished palm dimensions.
- This range of terminals is primarily designed for LV power cable of the concentric neutral earth (C.N.E) type. For example: Waveform, Consac & Districable.
- Terminals are tested to BS4579 Part 3 using tools and dies of conventional indent form and CCL Versa-Press®
- TD233 Series drawing gives dimensions.
- Tooling: See section 5 of CCL catalogue A for alternatives.

1.VERSA-PRESS®
UNIVERSAL "NO DIE" CHANGE

2. INDENT
CONVENTIONAL DIE CHANGE

- **Bi-Metal Connections**: CCL recommend the use of "BL" transition washer sets listed in table 2 when bolting these terminals to copper contacts. (Select "BL" size to suit stud diameter)

TABLE 1

Cable area mm²	Stud size mm	Stud size Imperial	CCL code (Fig 1) 3 Core	CCL code (Fig 2) 4 Core
50	8	5/16"	AL50/3(8)	AL50/4(8)
	10	3/8"	AL50/3(10)	AL50/4(10)
	12	1/2"	AL50/3(12)	AL50/4(12)
70	10	3/8"	AL70/3(10)	AL70/4(10)
	12	1/2"	AL70/3(12)	AL70/4(12)
	16	5/8	AL70/3(16)	AL70/4(16)
95	10	3/8"	AL95/3(10)	AL95/4(10)
	12	1/2"	AL95/3(12)	AL95/4(12)
	16	5/8"	AL95/3(16)	AL95/4(16)
120	10	3/8"	AL120/3(10)	AL120/4(10)
	12	1/2"	AL120/3(12)	AL120/4(12)
	16	5/8"	AL120/3(16)	AL120/4(16)
150	10	3/8"	AL150/3(10)	AL150/4(10)
	12	1/2"	AL150/3(12)	AL150/4(12)
	16	5/8"	AL150/3(16)	AL150/4(16)
185	12	1/2"	AL185/3(12)	AL185/4(12)
	16	5/8"	AL185/3(16)	AL185/4(16)
	20	3/4"	AL185/3(20)	AL185/4(20)
240	12	1/2"	AL240/3(12)	AL240/4(12)
	16	5/8"	AL240/3(16)	AL240/4(16)
	20	3/4"	AL240/3(20)	AL240/4(20)
300	12	1/2"	AL300/3(12)	AL300/4(12)
	16	5/8"	AL300/3(16)	AL300/4(16)
	20	3/4"	AL300/3(20)	AL300/4(20)

TABLE 2

Bi-Metal Transition Set Size mm	Code 3 & 4 Core
8	BL(8)
10	BL(10)
12	BL(12)
16	BL(16)
20	BL(20)

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ALUMINIUM SLEEVES

(50mm² to 300mm²) FOR 3 & 4 CORE SOLID ALUMINIUM POWER CABLES

FIG.1

FIG.2

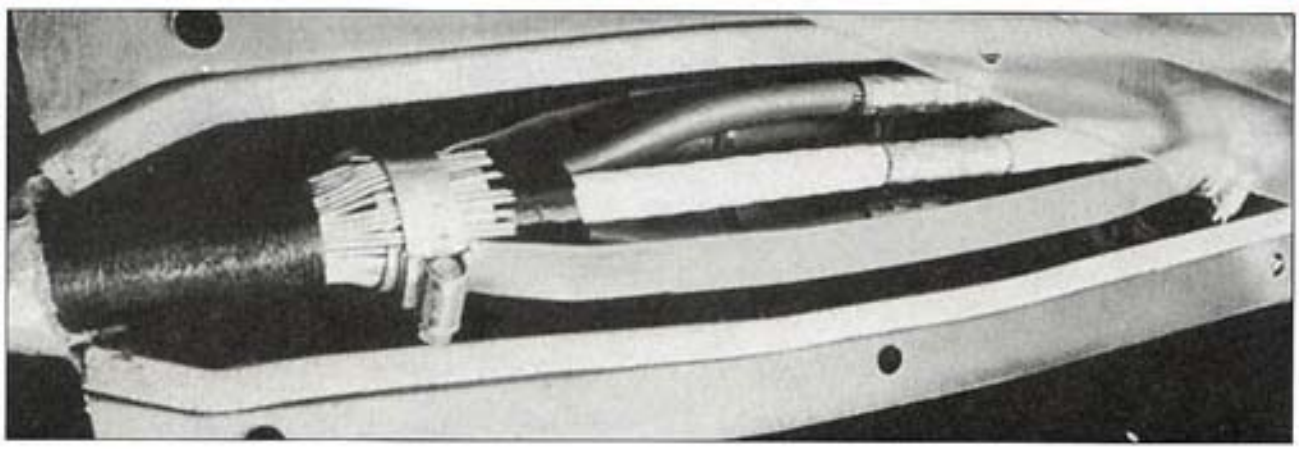
- CCL Aluminium Compression Sleeves for solid Aluminium cable (S.A.C).
- This range of sleeves is primarily designed for LV power cable of the concentric neutral earth (C.N.E) type. For example: Waveform, Consac & Districable.
- Sleeves are tested to BS4579 Part 3 using tools and dies of conventional indent form and CCL Versa-Press®
- TD233 Series drawing gives dimensions.
- Tooling: See section 5 of CCL catalogue A for alternatives.

1.VERSA-PRESS®
UNIVERSAL "NO DIE" CHANGE

2. INDENT
CONVENTIONAL DIE CHANGE

TABLE 1

Cable area mm2		50	70	95	120	150	185	240	300
CCL Code	Fig.2 4 core	AN50/4	AN70/4	AN95/4	AN120/4	AN150/4	AN185/4	AN240/4	AN300/4
	Fig.1 3 core	AN50/3	AN70/3	AN95/3	AN120/3	AN150/3	AN185/3	AN240/3	AN300/3



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