

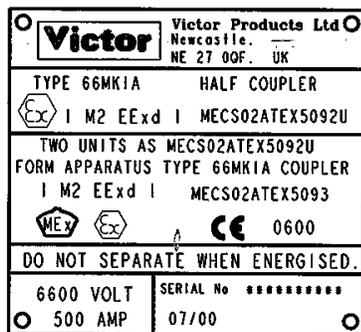
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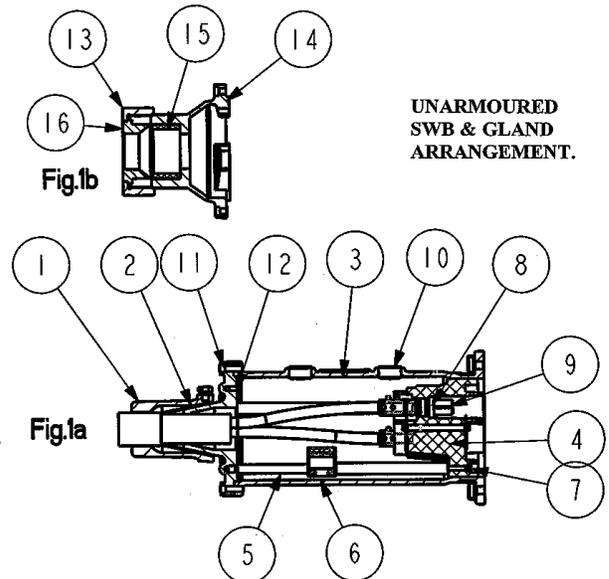
**Making Hazardous  
 Environments Work**

## 6.6Kv HALF COUPLER – 66MK1A

Certification number MECS02ATEX5092U I M2 EExd I  
 The ATEX certificate carries the ATEX group and category marking: - I M2  
 Where: I signifies suitability for use in mining and M2 signifies suitability for use in mines where it must be de-energised in the presence of an explosive atmosphere.



**TYPICAL LABEL**



**SPECIFICATION:-**

6600 VOLTS 500 AMPS GENERALLY CONSTRUCTED IN ACCORDANCE WITH BS3905 FOR USE WITH THE FOLLOWING CABLES:

Suitable for use with SWA, DWA cables to BCC specs 295, 656 and PWA to BCC spec 504 generally constructed in accordance with these specifications, SWB and unarmoured cables. Contact tubes are available to suit stranded copper, stranded aluminium or solid aluminium conductors.

**MAIN COMPONENTS:**

- |                               |  |
|-------------------------------|--|
| 1. Armour Clamp               | 10. Certified Stopper Plug               |
| 2. Inter Cone (DWA only)      | 11. Gland Fixing Screws                  |
| 3. Main Body                  | 12. Screen Terminating Points . optional |
| 4. Main Insulator             | 13. Gland Nut                            |
| 5. Support Pillars            | 14. Gland Body                           |
| 6. Earth bosses . Optional    | 15. Sealing Ring                         |
| 7. Insulator Retaining Screws | 16. Clamp Washer                         |
| 8. Contact Tube Locking Rings |  |
| 9. Contact Tubes              |  |

**PRE-CABLE MAKE OFF** - Prior to cable make off the half coupler should be disassembled and the parts kept in a clean and safe area. For SWA, DWA and PWA cables the armour clamp should be passed over the cable until clear of the jointing area. For unarmoured cable the gland nut, clamp washer and sealing ring should be passed over the cable until clear of the jointing area.

TABLE 1.				
CODE		Stranded copper core	Aluminium core cables	
		All conductor sizes.	50/70 & 95mm2 Stranded	120/150 & 185mm2 Stranded
A	Armour length	70	70	70
B	Core Length	245	248	248
C	Insulation Removal	47	53	68
D	Contact Tube position prior to compression	255	261	261
E	Earth screen termination	85	85	85
F	Semi-Conducting Tape termination	5	AS COPPER	AS COPPER
G	Minimum make off length	360	360	360

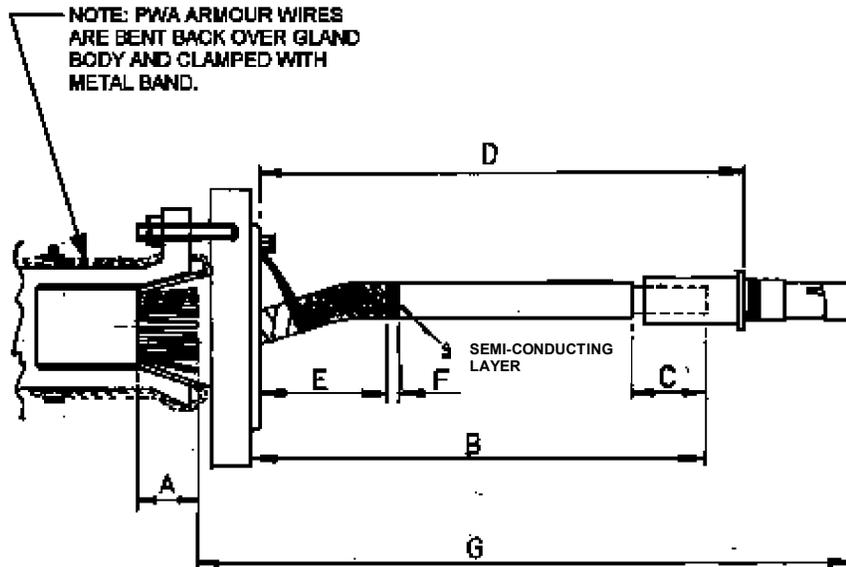


Figure 2.

**1. CABLE GLAND MAKE OFF – SWA AND DWA**

- a) Apply a PVC binder to the outside of the cable to dimension  $\pm Q$  and with the use of a hacksaw around the circumference remove the outer insulation and the armour, by cutting half way through. If the cable is DWA cut fully through outer armour and half way through the inner armour, which allows the armours to be fractured off cleanly.
- b) Remove the PVC binder adding a new binder to dimension  $\pm A$  and remove the outer insulation.
- c) Unlay the armour wires removing any bitumised tape and clean the armoured wires.

- d) Position the gland body under the innermost armouring and spread the wires out evenly over the tapered cone face. For DWA cable bend back the outer armour wires, insert the inter cone over the inner armour wires then relay the outer armour wires back evenly over the inter cone.
- e) Slide the armour clamp over the armouring and inner cone and fully tighten.
- f) Remove the Melinex tapes to a point in line with front face of the gland body. Prepare the cable to dimensions in Table 1 taking care not to damage the conductor insulation when removing the inner sheath.
- g) Straighten the cable cores out and preform to position the conductors on a 59mm P.C.D. as shown in Fig.2.
- h) Apply a PVC tape binder to each core 75mm from the armour wire, unwinding the copper screen tape and semi-conducting tape up to the PVC binder. Thoroughly clean the surfaces of the core insulation removing all traces of semi-conducting material.
- i) Relay the semi-conducting tape as shown in Figure 2. Apply a PVC binder to provide a straight edge around the core to  $\pm$  dimension in table 1. Rewind semi-conducting tape back along for two turns and cut off excess tape.
- j) Relay the copper tape to a point 5 mm short of the semi-conducting tape and then fold the copper tape to provide a straight edge around the core at this point. Rewind copper tape back along the core and apply PVC binder to secure. A hole should be punched into the tape and then clamped onto the front face of the inner cone gland using the supplied fastener.
- k) For cables with an Extruded Semi-Conducting Layer remove the semi-conducting layer as sections 1l to 1p using a special fixed depth scoring tool see Fig.3b, alternatively with a round file, abrade an annular groove through the semi-conducting layer adjacent to the PVC binder ensuring the groove cuts through to expose the white under lying insulation see Fig.3a
- l) With a depth gauge set to 0.4mm cut two parallel  $\pm$ ram lines  $\pm$  5mm apart to the cable end. See Fig.3c.
- m) Using a pair of long nose pliers remove the semi conducting layer from between the  $\pm$ ram lines  $\pm$  Starting at cable end, rotate the pliers to remove the tape in a progressive and controlled manner until the annular groove is reached. See fig. 3d.
- n) After this first strip has been removed use the pliers in a similar manner to remove the remainder.
- o) Clean the surface of the insulation with a fresh paper wipe moving the cleaner wiper from the end of the cable towards the semi conducting layer, so any fine particles remain on the edge of the screen and not on the insulation. If any fine cuts or light surface damages are present, abrade them away using fine Aluminium Oxide paper.
- p) Proceed to section 4 for fitting of contact tubes.

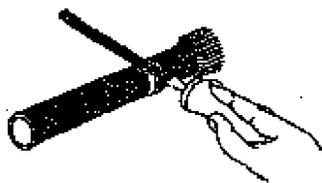


Fig. 3a

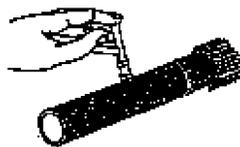


Fig. 3b

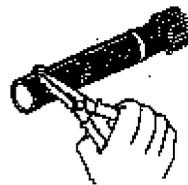


Fig. 3c

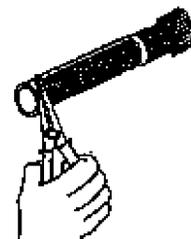


Fig. 3d

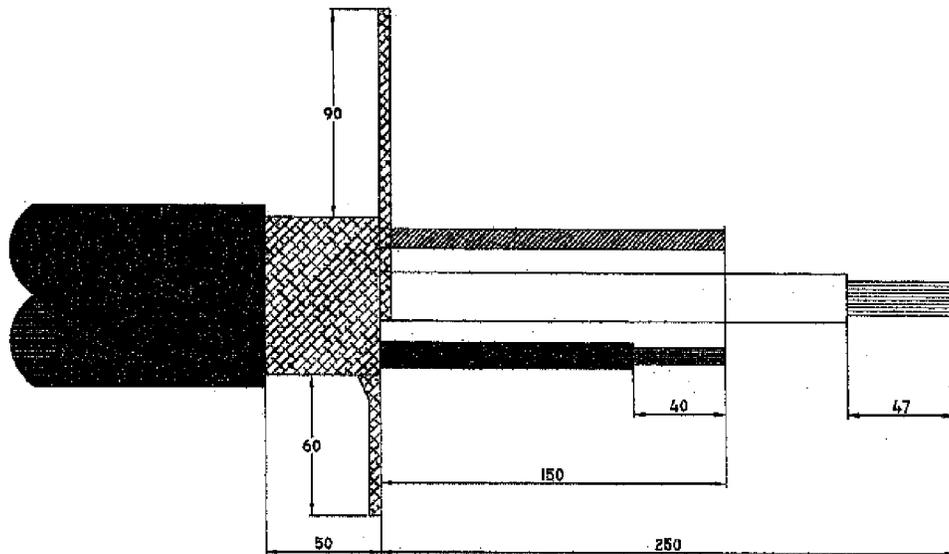
## 2. CABLE MAKE OFF – PWA.

- a) Remove the outer insulation to expose the armoured wires to a minimum dimension of 430mm and unlay the armour.
- b) Remove the inner sheath to dimension  $\pm$  in Table 1. This will line up approx. with the front face of inner gland body when fitted.
- c) Remove all the insulation from the earth core for terminating later into the earth bosses.
- d) Where applicable, unwind the screening on the power cores for terminating later onto the earth fixing points on the gland body face, alternatively, if fitted into the earth bosses.

- e) Position the gland body under the armouring, locating the armour clamp over the armouring with the armouring split equally to either side of the studs, fit retaining nuts and tighten down.
- f) The armouring should be turned back along the armour clamp. Using a jubilee type clip securely clamp the armouring midway along the armour clamp. The excess armouring can now be removed.
- g) Preform the conductors to 59 PCD and from the front face of the gland body, in a straight line, measure and cut to dimension  $\pm B$  in Table 1.
- h) Remove the power core insulation to dimension  $\pm C$  in Table 1.
- i) Proceed to section 4 for fitting of contact tubes.

### **3. CABLE MAKE OFF AND GENERAL ASSEMBLY FOR USE WITH 3 CORE PROTOMONT, SWB OR UNARMoured CABLE.**

- a) Strip down the half coupler and slide the gland nut, clamp washer, sealing ring and gland plate onto the cable.
- b) Mark the outer cable a minimum of 320mm (to allow for testing) from the end of the cable and cut. Strip the outer sheath and any tapes.
- c) Tiewrap the outer screen 50mm forward of the outer sheath. Unthread the screening back to the tyrap and fold back over.
- d) Cut back the inner sheath and tapes to the tyrap, strip and cut out the central rubber strand.
- e) Separate the outer screening into 3 bunches, adjacent to the pilot and earth cores, twisting each piece and taping up. Cut to 60mm and fit the crimp lugs.
- f) Unwrap the screening round the power cores back to the tyrap, twist and tape up. Cut to 90mm and fit 25C6 lugs.
- g) Cut the two earth cores and pilot core to 150mm. Strip the tape off the pilot core and cut the insulation 40mm from the end and fit the earth bosses. Cut the power cores to a length of 250mm and remove 47mm of insulation from the end.



**Figure 4.**

- h) Remove the tyrap from the outer screen and replace with insulating tape, then fasten outer screen and core screens to the inner face of the gland body.
- i) Strip the insulation from power cores and fit the contact tubes ensuring the flat on each of the 3 bores of the insulator correspond with a flat on the contact tube. If the contact tubes are fitted with grub screws ensure the grub screws face outwards and tighten. If crimped contact tubes are fitted crimp as section 4.

- j) Position the inner face of the gland body flush with the face of the inner sheath, positioning the arrow on the outside of the gland body adjacent to the uppermost power core. Assemble and tighten up the gland nut sufficiently to prevent the rear gland assembly from moving.
- k) Slide the insulator support pillars into the earth bosses and screw into the gland body.
- l) Fit the insulator onto the tubes and fit and tighten the contact tube locking rings, taking care not to cross the threads. Fit the screws through insulator into support pillars and tighten.
- m) Slide the main body over the insulator and fasten onto gland assembly. Fully tighten gland nut and test.
- n) Proceed to section 9 for filling instructions.

The above procedure is for use with Protomont cable. For other cables with any earth cores, screening or braiding, they can be terminated onto either the inner face of the gland body or into the provided earth bosses.

#### **4.CONTACT TUBE FITTING – CRIMPED AND GRUBSCREW**

- a) From the front face of the gland body remove the conductor insulation to dimension `C' Table 1, firmly wire-brush each exposed conductor . IMPORTANT - do not use the same wire brush for copper and aluminium cable.
- b) Select the correct die set from Table 2. For Stranded Aluminium Conductors follow procedures 4c) and 4d) to pre-compact conductors.
- c) Compact the first half of the conductor then make a second compression leaving approx. 5 mm of compacted conductor protruding from the die.
- d) Position the contact tube onto the end of conductor and complete the pre-compacting of the conductor with an additional compression and finally push the contact tube onto the conductor. Repeat for the remaining conductors.
- e) Check dimension to `D' Table 1. Line up one of the flats on the contact tubes with the location flat on insulator mark tube position on conductor insulation.
- f) Crimp each tube in turn between the knurled lines. Reset the cores to the pre-compression positions ensuring the location flats on the tubes correspond with those in insulator bores. If using contact tubes with grub screws ensure these face outwards.

TABLE 2						
Conductor Size	Stranded Copper		Stranded Aluminium			Solid Aluminium Indentor Die
	Indentor Die	Nest Die	Indentor Die	Compacting Die	Nest Die	
16mm <sup>2</sup>	Up 35-70 CP1-U10AD-1	UN70C	-	-	-	-
25mm <sup>2</sup>	"	"	-	-	-	-
35mm <sup>2</sup>	"	"	-	-	-	-
50mm <sup>2+</sup>	Up 75-300 CP1-U10AD-1	UN150C	-	-	-	-
70mm <sup>2</sup>	"	"	UP70 AST3	U70PC	UNA3-1	UP70A3
95mm <sup>2</sup>	"	"	UP95 AST3	U95PC	UNA-3	UP95A3
120mm <sup>2</sup>	"	"	-	-	-	-
150mm <sup>2</sup>	"	"	UP150 AST3	U150PC	UNA-3	UP150A3
185mm <sup>2</sup>	"	UN185C	UP185 AST3	U185PC	UNA-3	UP185A3

#### **5. STRESS CONTROL – 3M TAPE METHOD.**

NOTE:- stress control kits are not supplied with the half-coupler. For further information on alternative stress kits please contact the Technical Department.

- a) Apply two highly stretched half lap layers of Scotch 13 semi conducting tape as shown in **Fig.5** commencing at the termination of the copper tape screen extending over the semi conducting layer 5mm onto the primary insulation and back 5mm onto the copper screen.

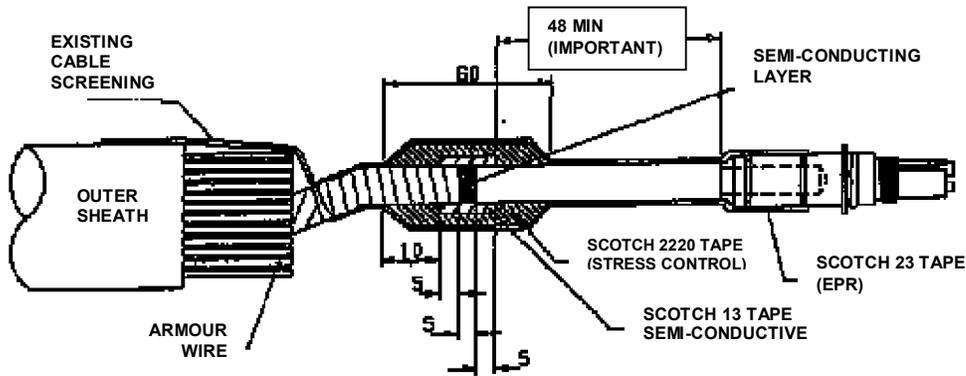


Figure 5.(Gland Plate removed for clarity)

- b) Apply two half lapped layers of Scotch 2220 stress control tape (silver side out) starting 10mm below the Scotch 13 tape then going 60mm up the core and back again to the starting point.
- c) Apply two half-lap layers Scotch 23 tape from the connector over the entire core.
- d) Proceed to section 6 for general assembly..

## **6. GENERAL ASSEMBLY FOR SWA, DWA AND PWA ARMoured GLANDS**

- a) Locate and tighten the 3 steel or brass support pillars into the gland body. If they are brass, additional brass earth bosses will be fitted for terminating any earth cores or screening from around the power conductor cores. After termination of any earth cores or screening, any excess material should be removed.
- b) Locate the insulator onto the contact tubes ensuring the small protrusion on one of the contact tube housings corresponds with the marker on the gland body and secure by fitting the locking rings, taking care not to cross the threads. do not over tighten.
- c) Using the 3 insulator retaining screws, tighten the insulator onto the support pillars.
- d) Slide the main body over the insulator and gland body assembly ensuring that the small protrusion on the insulator is in line with the filling ports on the main body. The gland body spigot should fit neatly into the rear end of the main body. Using the 6 screws provided tighten to a torque of 70Nm the gland body assembly onto the coupler body.
- e) **IMPORTANT** . before filling ensure that the insulator is flush or below the FLP face of the Main Body using a straight edge, if not tighten retaining screws.
- f) Perform pre-insulation test.
- g) Proceed to section 9 for filling instructions.

## **7. HALF COUPLERS WITH CENTRE PILOT.**

For half couplers with a centre pilot, the pilot core conductor should be cut to a length that will allow the boss, when clamped onto the bared conductor, to fit snugly into the crutch of the preformed power cores. After determining the length, remove 15mm of insulation and insert into boss and tighten grubscrews. Apply half lap layers of self amalgamating tape to cover the boss to a point 15mm along both cable insulations and position into the crutch of the power cores.

## **8. HALF COUPLERS WITH AUXILLIARY CONTACTS**

For further information on auxiliary circuits please contact the Technical Department.

## 9. FILLING PROCEDURE

- a) Check coupler to ensure correct make off then position coupler level with filling ports at the top.
- b) Using the **MECS approved Victor Products Limited polyurethane resin C18-1** thoroughly mixing the resin to the mixing instructions and fill to the bottom of the FLP filler port screw thread. If topping up is required this should be done within 10 minutes of the main fill and fit approved stopper plugs.
- c) Allow 2 hours before moving or commencing high voltage testing.

**NOTE: ONLY VICTOR PRODUCTS LIMITED RESIN C18-1 SHOULD BE USED WHEN FILLING THE VICTOR PRODUCTS RANGE OF HALF COUPLERS AND ADAPTORS.**



TYPICAL SEALING RING



AUXILIARY/ PILOT PIN  
NOTE: PILOT IS INSULATED.



PHASE CONTACT PIN



INTER-CONNECTING KIT ASSEMBLY

## **MAINTENANCE AND INSPECTION.**

1. When assembled to an associated half coupler or adaptor with an interface flange designed to BS3905 the electrical contact is made between each component by the insertion of three 3 contact pins or if fitted the pilot/auxiliary contact pins into their respective contact tubes.
2. When assembled to a blanking cover, adaptor or half coupler a rubber sealing ring complying with BS3905 must be used between the two interface flanges with the flanges secured by 6 off interconnecting nut assemblies.
3. After assembly the gap between the two mating faces should be checked using feeler gauges and should not exceed .5mm.
4. Ensure there is an adequate earth connection from the Half Coupler. This can be achieved by an earth connection from the studs on the rear of the armoured gland plate or from the earth boss on the rear of the un-armoured gland plate to the Half Couplers mating part.

## **HEALTH AND SAFETY AT WORK etc. ACT 1974**

In the United Kingdom all equipment must be installed, operated and disposed of (as required) within the legislative requirements of the Health and Safety at Work etc. Act 1974. Leaflet No. HSS L1 refers to the Company's obligation and is available on request.

It is the responsibility of the user to select, install, operate and maintain the equipment in accordance with the relevant legislation and appropriate code of practice.



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*We reserve the right to change characteristics of our products. All data is for guidance only*

## EC - Declaration of conformity

CE . Déclaration De Conformité  
EG - Konformitätserklärung



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Certification number MECS02ATEX5092U I M2 EExd I

### Victor Products Ltd

**Hereby declare our sole responsibility that the product which is the subject of this declaration is in conformity with the following standards or normative documents.**

Erklären in alleiniger Verantwortung, da das Product auf das sich diese Erklärung bezieht, mit der/den folgenden Norm(en) oder normativen Dokumenten Übereinstimmt.

Déclarons de notre seule responsabilité, que le produit auquel cette déclaration se rapporte, est conforme aux norme(s) ou aux documents normatifs suivants.

<b>Number and date of standard</b> Nr. Sowie Ausgabedatum der Norm No. Ainsi que date de mission des normes.	<b>Directive description</b> Bestimmungen der Richtlinie Prescription de la directive
EN 50014 (1998) EN 50018 (2000)  This equipment has been reviewed against the requirements of EN60079-0: 2009 and EN60079-1: 2007, in respect of the differences from the standards to which this certificate was issued; none of these differences affect this equipment.  Diese Ausrüstung ist gegen die Anforderungen von EN60079-0 wiederholt worden: 2009 und EN60079-1: 2007, in Bezug auf die Unterschiede von den Standards, zu denen diese Bescheinigung ausgestellt wurde; keine dieser Unterschiede beeinflussen diese Ausrüstung.  Cet équipement a été passé en revue contre les conditions d'EN60079-0 : 2009 et EN60079-1 : 2007, en ce qui concerne les différences des normes auxquelles ce certificat a été délivré ; aucune de ces différences n'affecte cet équipement.	<b>94/9 EC : Equipment and protective systems intended for use in potentially explosive atmospheres.</b>  94/9 EG: Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen  94/9 CE: Appareils et systèmes de protection destinés à être utilisés en atmosphères explosibles.
EN50082 (1992) EN55015 (1993) EN 60555-2 (1987)	<b>89/336 EEC: Electromagnetic Compatibility</b>  89/336 EWG: Elektromagnetische Verträglichkeit  89/336 CEE: Compatibilité électromagnétique
<b>Notified Body:</b> SIRA Certification Services (0518) Rake Lane Eccleston Chester CH4 9JN Notification No. SIRA 02 ATEX M191	  H. Davis Engineering & Quality Manager April 2010