

**Installation Instructions**  
**35kV PILC TRANSITION MODULES**  
 with Oil Retaining Boot Assembly  
 Oil Filled to Extruded Dielectric Cable  
 Instruction for following Modules:  
**CTM-11-35-HP & CTM-9-35-HP**

G/TI/001 – Iss 7  
 2 March 2015

The following procedures are for module installation and cable preparation for the CTM-11-35-HP and CTM-9-35-HP PILC Transition Modules.

## Table of contents

### **SECTION 1: Introduction**

1.1	General	Page 2
1.2	Qualified Persons	Page 2
1.3	Storage	Page 3

### **SECTION 2: Safety Information**

2.1	Safety Alert Messages	Page 3
2.2	Following Safety Instructions	Page 3

### **SECTION 3: CTM Description**

3.1	General	Page 4
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### **Section 4: Installation**

4.1	Handling	Page 4
4.2	CTM Mounting	Page 4
4.3	Cable and Sleeve preparation	Page 5
4.4	Oil Filled Cable Installation	Page 5
4.5	Connector Installation	Page 8
4.6	Final Conductor Assembly	Page 9
4.7	Wiping Sleeve Assembly	Page 12
4.8	Filling Sleeve with Oil	Page 12
4.9	Solid Dielectric Insulated Cable Preparation	Page 12
4.10	Bonding and Grounding	Page 13
4.11	CTM-11 Coffin	Page 14
4.12	Network Rail Assembly of Supports & GRP Covers	Page 16
4.13	Kit Bill of Materials	Page 17

### **SECTION 4: Attachments**

#### ***Required Prints to be attached with Instructions:***

1401.CTM	Transition Module	2023.CTM-18	Oil Retaining glove
1010.SLV	Termination sleeve	1700.CTM	Taping Detail
SL-0000	Ferrule	2023.CTM-16	Wiping Shell

## SECTION 1

## INTRODUCTION

### 1.1 General

The following procedures are for module installation and cable preparation for the CTM 11-35HP and CTM-9-35-HP PILC Transition Modules. The PILC taping directions were written in conjunction with UK Customers. The customers are familiar with these special PILC taping methods and use of Oil Retaining Glove Assembly. If the practices outlined are not familiar, contact Groove Associates, Ltd.

#### **Read these Instructions**

Read and understand the contents of this document and follow all approved procedures and safety practices for installing, operating or maintaining this equipment. Be sure to read and understand any Safety Information.

#### **Keep these Instructions**

This document is a permanent part of your equipment. Keep it in a safe location where it can be readily available and referred to as necessary.

#### **How to Contact Groove Associates**

By Phone: 01420 88776  
 By Fax: 01420 88777  
 e-mail: [sales@groove-ltd.com](mailto:sales@groove-ltd.com)  
 Mail: 2 Alton Business Centre, Omega Park, ALTON, Hampshire GU34 2YU  
 Internet: [www.groove-ltd.com](http://www.groove-ltd.com)

### 1.2 Qualified Persons

## Warning

The equipment covered by this document is intended to be installed, operated and maintained by qualified persons who are trained in the installation, operation and maintenance of electric power distribution equipment along with the associated hazards.

A qualified person has been trained and is competent:

- To de-energise, clear and tag circuits and equipment in accordance with established safety procedures.
- To distinguish between live parts from non-live parts of the equipment.
- In the proper use of insulated tools, wears protective equipment such as rubber gloves, hard hat, safety glasses, flash-clothes, etc in accordance with established safety practices and is trained in the care of such equipment.
- As in certified in rendering first aid, especially in the technique of removing a person in contact with a live circuit and in applying cardiopulmonary respiration.

These instructions are intended only for qualified persons and are not intended as a substitute for adequate training and experience in safety procedures for this type of equipment.

### 1.3 Storage

CTM that will not be installed immediately should be suitably stored in a clean, dry location. Possible replacement of carting material should be investigated. Make certain CTM is protected from potential damage.

## SECTION 2

## SAFETY INFORMATION & PRECAUTIONS

### 2.1 Safety Alert Messages

**The following is important safety information. For safe installation and operation, be sure to read and understand all danger, warning and caution information. The various types of safety alert messages are described below:**

#### **DANGER**

DANGER – Indicates an imminently hazardous situation which, if not avoided, could result in death or serious injury

#### **WARNING**

WARNING – Indicates a potentially hazardous situation which, if not avoided, could result in serious death or serious injury.

#### **CAUTION**

CAUTION – Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. May also be used to alert against unsafe practices.

### 2.2 Following Safety Instructions

Carefully read all safety messages in this manual and on your equipment. Keep safety signs in good condition. Replace missing or damaged safety signs.

Keep your equipment in proper working condition. Unauthorised modifications to the equipment may impair the function and/or safety and effect equipment life.

If you do not understand any part of these safety instructions and need assistance, contact Groove Associates Ltd.

#### **CAUTION**

G & W Cable Transition Module is designed to be operated in accordance with normal safe operating procedures. These instructions are not intended to supersede or replace existing safety and operating procedures. Cable Transition Modules must be de-energised during operation or maintenance. Visible break and adequate grounding must be provided before work proceeds. Ensure that Cable Transition Module is rated for the intended application before it is installed. Cable Transition module should be installed and serviced only by personnel familiar with good safety practice and the handling of hi-voltage electrical equipment.

## SECTION 3

## CTM DESCRIPTION

### 3.1 General

G&W Epox cable transition module provide an efficient method of connecting extruded dielectric cable using separable connectors to oil or gas filled paper insulated lead cable (PILC) for system rated through 35kV.

Various models permit either deadend or feedthrough of the PILC cable. Modules can accommodate both 200A or 600A bushing interfaces which conform to ANS/IEEE 386 standard.

## SECTION 4

## INSTALLATION

### 4.1 Handling

#### WARNING

Do not lift the CTM by the bushings. Doing so may result in damage to the CTM and possible injury or death to personnel.

### 4.2 CTM Mounting

Since the CTM is normally positioned on a bracket, care must be used in selection of a mounting location. Proper cable routing for all cables connected to the CTM must be investigated before selecting a mounting location.

#### CAUTION

G&W'S Cable Transition Module is designed to be operated in accordance with normal safe operating procedures. These instructions are not intended to supersede or replace existing safety and operating procedures. Cable Transition Modules must be de-energised during operation or maintenance. Visible break and adequate grounding must be provided before work proceeds. Ensure that the Cable Transition Module is rated for the intended application before it is installed. Cable Transition Modules should be installed and serviced only by personnel familiar with good safety practice and the handling of high-voltage electrical equipment.

#### 4.2. a Mount module in concrete joint bay. (Figure 1)

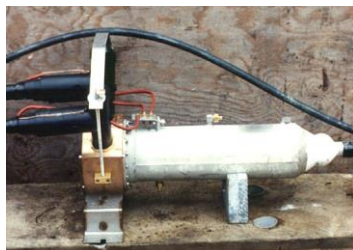


Figure 1

4.2.b For wall mount applications, order EPOX Bracket 1021.BKT. (Figure 2)



Figure 2

## WARNING

Not securing the cable properly can cause damage to the equipment

4.2.c If using Armour cable, mount G & W mounting bracket for Armour cable as required.

### 4.3 Cable and Sleeve Preparation

4.3.a Train all cables to approximate position they will assume after connection to the CTM.

4.3.b Cut the conical portion of the copper sleeve to a diameter slightly larger than the outside diameter of the cable involved.

### 4.4 Oil Filled Cable Installation (Reference Print 1700.CTM)

4.4.a Adjust the hydraulic system for jointing.

4.4.b Align the cable and module into position for cable preparation.

4.4.c Measure from the face of module 27 inches (686mm) to sheath cut and add 5.0inches (127mm) and mark. See Print 1700.CTM (Figure 3, 4 and 5)



Figure 3



Figure 4

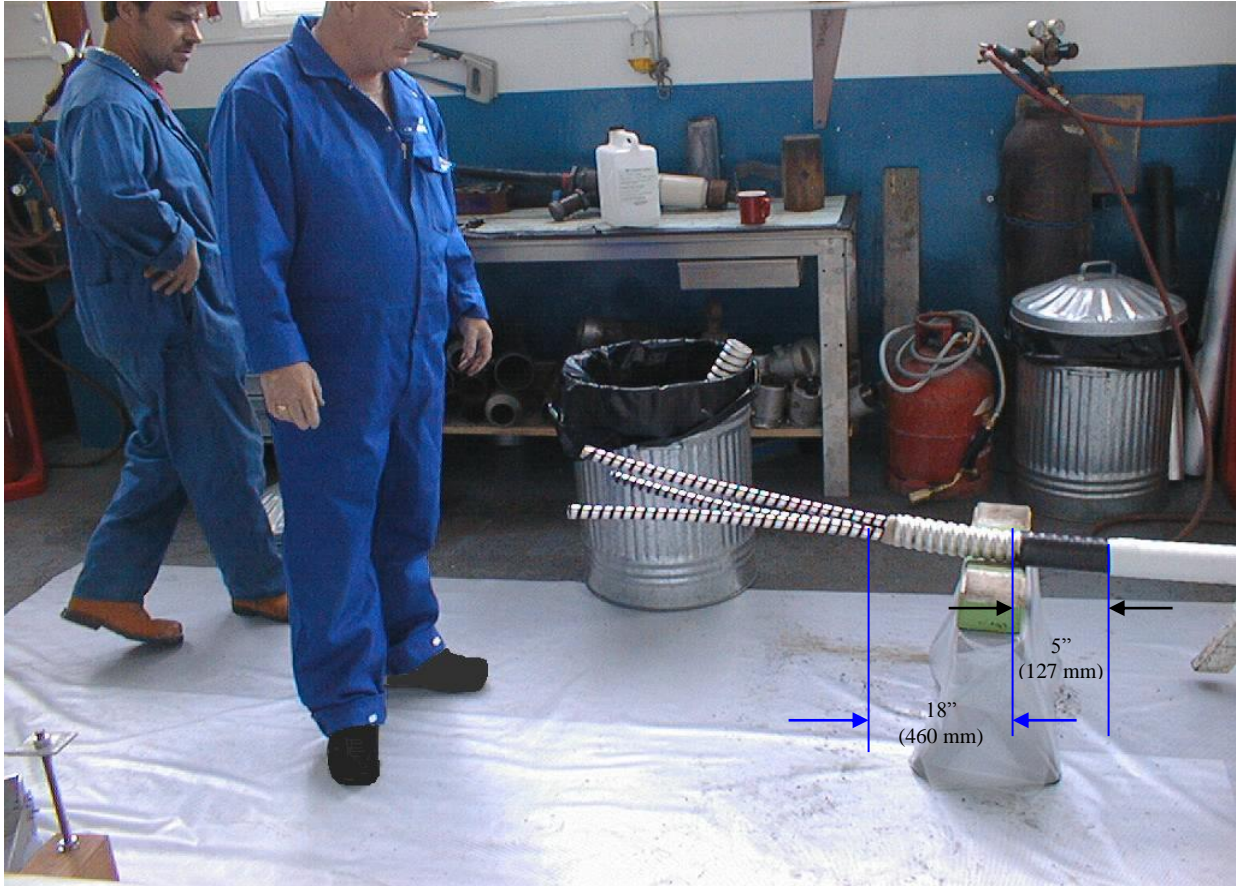


Figure 5

- 4.4.d Remove outer PVC sheath to mark made in step C, exposing corrugated seamless aluminum sheath. In the case of lead sheathed cable also remove reinforcing phosphor bronze / copper tapes over the lead sheath. Remark sheath cut at 27 inches (686mm). (Figure 3,4 and 5)
  - 4.4.e In the case of corrugated seamless aluminum (CSA) sheathed cable, fill in between corrugations with plumbing metal to form a smooth 5" platform behind the sheath cut mark, on which to seat the oil retaining glove assembly.
  - 4.4.f Cut through the oil filled cable at the sheath cut mark and remove the remaining outer PVC sheath, CSA/ lead sheath etc. to expose the three 1Ø cables.
  - 4.4.g Tape over graphite sheath to protect it, then slide copper sleeve with o-ring over the cable and out of the way for cable preparation. Don't forget the o-ring.
  - 4.4.h Terminate oil ducts; copper woven tapes and filler tapes in cable crutch at sheath cut. Note: Oil ducts may be turned back and soldered to lead sheath.
  - 4.4.i Fit oil retaining glove assembly using the hose clamps provided. Use sheath bushings when necessary and be careful not to over tighten clamps on the conductors whereby damage to the core insulation could result. (Refer to print 2023.CTM). (Figure 6)
- NOTE: The wiping shell taper may be cut back as necessary, to fit the cable sheath, up to a maximum throat diameter of 90mm . The maximum size cable the glove will accept is 500 mm<sup>2</sup> CSA.





Figure 6

- 4.4.j Tighten nylon hex screw in oil retaining glove.
- 4.4.k Check distance to center of nylon screw from module face, it should be 25.5" (647mm). The alignment is necessary in order to vent oil pressure through access port in termination sleeve after completion of splice.
- 4.4.l Remove conductor-shielding tapes to dimensions shown in print 1700.CTM.
- 4.4.m Remove first two layers of insulating paper tapes.
- 4.4.n Remove insulation from the end of each conductor and chamfer the remaining insulation per print 1700.CTM.
- 4.4.o Temporarily bind cable insulation by applying two layers of 1-inch wide varnish cambric tape (not supplied) or equivalent tape. Application with oil will allow tightening of tapes and help to fill voids. Tape should extend ½ inch (12mm) from metallic shielding tapes and cover penciled insulation.
- 4.4.p Repeat steps (3.4.1 – 3.4.o) for all three phases.

## 4.5 Connector Installation

- 4.5.a Check the torque on 6-32 cap head screws on all modules of CTM. The torque should be 18 in-Lb. If required, retighten the screws to required torque (figure 7)

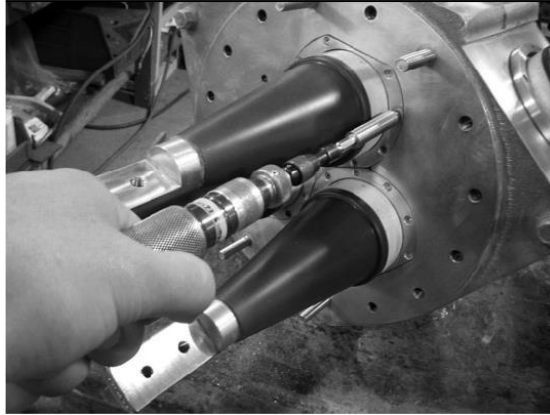


Figure 7

- 4.5.b Connectors are machined to allow proper soldering to a specific conductor size.
- 4.5.c
- i Connectors are supplied with a 1/4" pilot hole to allow customer machining.
  - ii When machining to fit to conductor, please refer to drawing SL-0000, Part SL- 1/4 and machine tapers in proportion to those on other part numbers. The solder slot should be cut such as that it is at the top of the connector when the connector is bolted to the module.
- 4.5.d Conductors formed in a sectored shape will require reshaping before insertion into connectors. Reshaping can be accomplished with a hydraulic press and rounding dies or other similar tools.
- 4.5.e Install connectors on conductors with Teflon spacers and lightly tighten to module with 5/16-18 socket head cap screws. See sketch below. (Figure 8a)

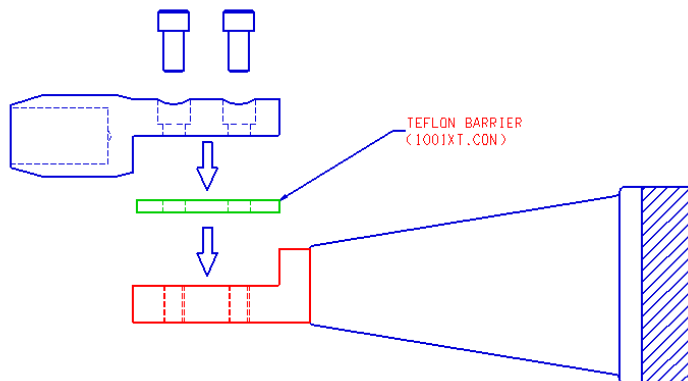


Figure 8a



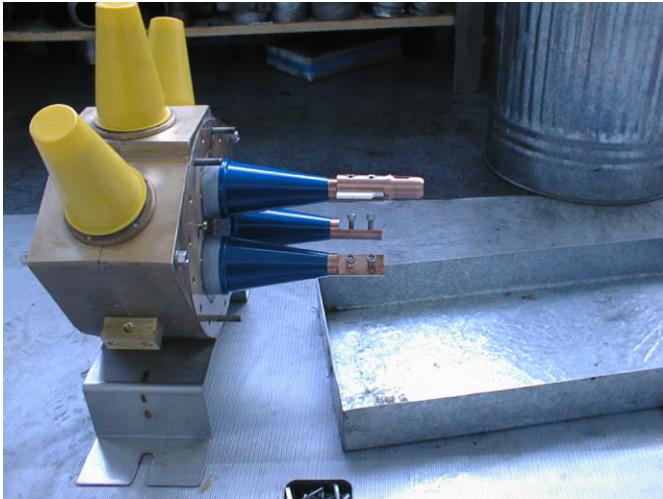


Figure 8b

4.5.f Solder connectors to conductors. Protect cable insulation with supplied ½" Cotton Tape while soldering. Visually check each soldered joint for solder flow into conductor strands and complete filling of connector.

4.5.g Remove Cotton Tape.

4.5.h REMOVE TEFLON HEAT BARRIERS BEFORE TAPING!

### **WARNING**

Failure to remove Teflon heat barriers will result in the inability of the device to carry full rates current. This will result in overheating and possible failure of the device, which could cause severe personal injury or death.

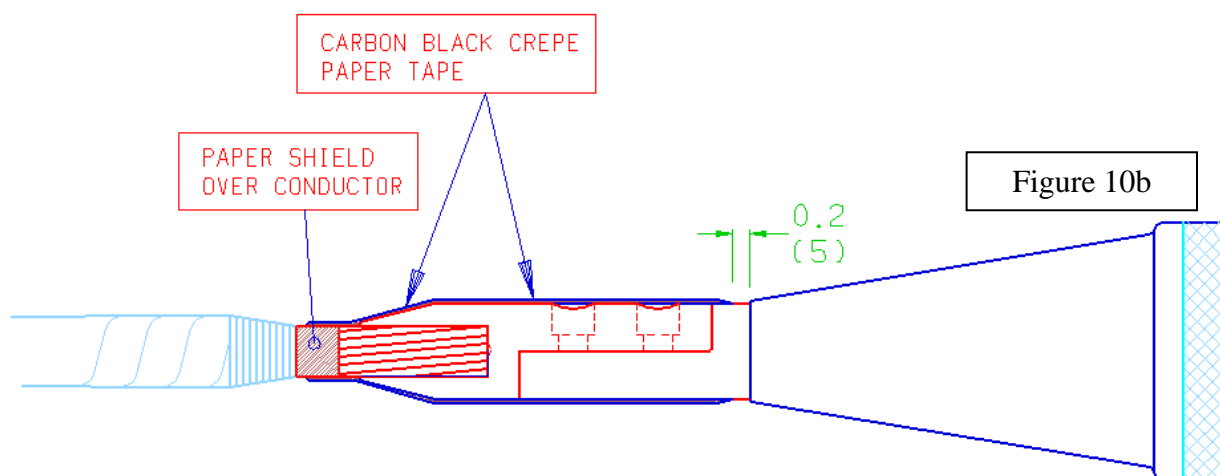
## **4.6 Final Conductor Assembly**

4.6.a After connectors are soldered, attach to module and tighten cap screws to 12 ft-lbs. Fill bolt holes with supplied Epoxy Putty and sand smooth. Clean terminal insulated surface and connectors before final taping. (Figure 9)



Figure 9

- 4.6.b Remove temporary binding tapes placed over insulation.
- 4.6.c Install 1 half-lapped layer of carbon black oil-impregnated crepe paper tape over the connector. Start from the copper/insulation interface on the module and overlap the carbon black tape of the cable. (See sketch below and print 1700.CTM). (Figure 10a and 10b)



- 4.6.d Divide the paper crepe tapes supplied into three equal groups. Apply to the 3 cables in turn per print 1700.CTM. (Figure11, 12)

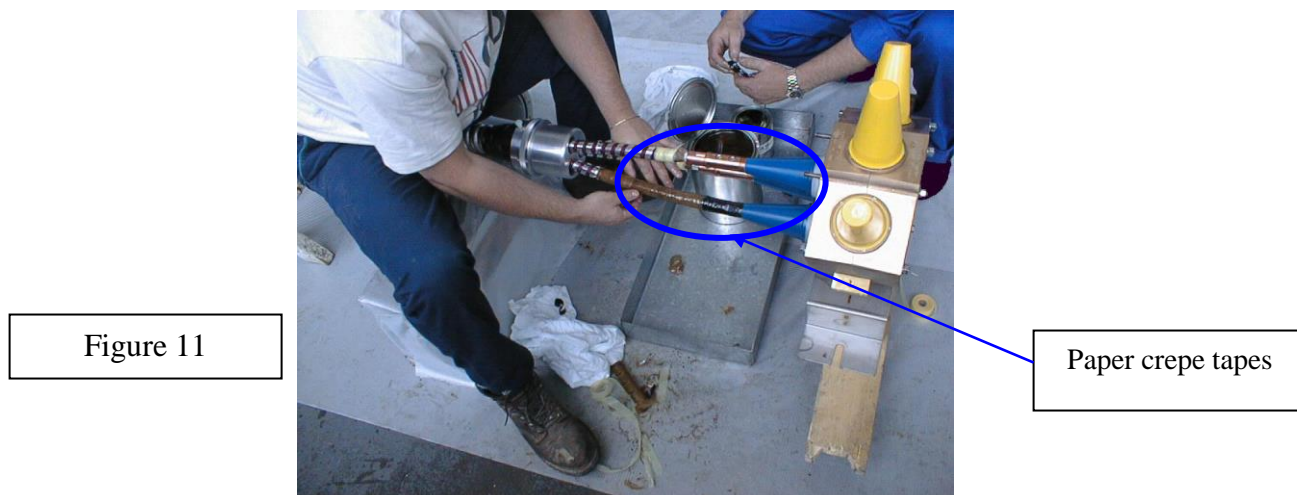


Figure 12



- 4.6.e Apply 1 half-lapped layer of copper braid. Overlap cable shielding tape 1 inch (25mm) and tape up to module phase shield. (See print 1700.CTM) Attach braid to 1/4 -20 lug provided on the module face. Solder shielding braid to cable shield and to itself with 3 axial beads along the length. (Figure 13a and 13b)

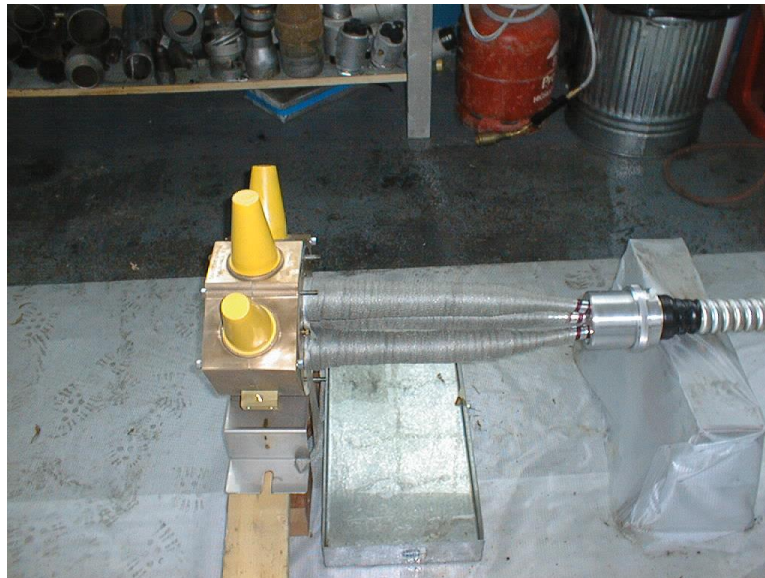
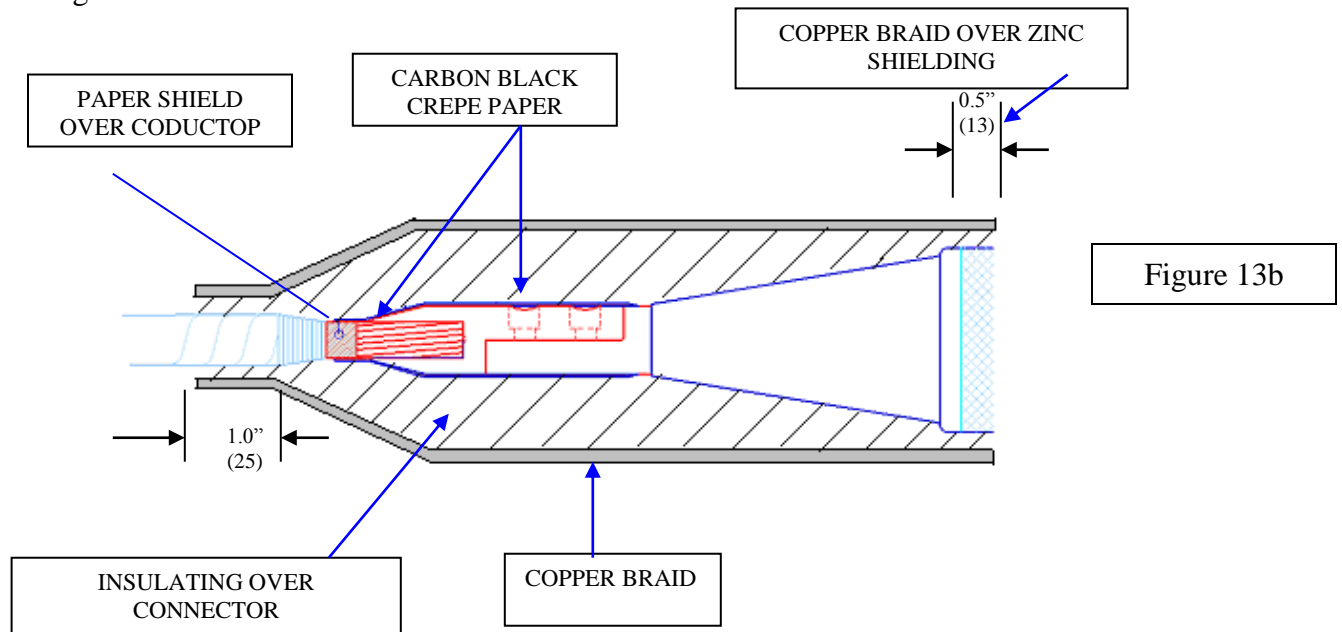


Figure 13a



#### 4.7 Wiping Sleeve Assembly

- 4.7.a Having completed the insulation and shielding of each phase, position the wiping sleeve over the terminations. Fill plugs should be on top of joint. Make sure O-ring on wiping sleeve is in proper position before bolting sleeve to module surface.
- 4.7.b Tighten wiping sleeve bolts by hand until all bolts are touching the casing surface. Retighten all bolts to a torque of 20 ft. lbs. An alternating and diagonal tightening pattern is required.
- 4.7.c Lead wipe cable sheath to the wiping sleeve.

#### 4.8 Filling Sleeve With Oil

- 4.8.a Connect vacuum and oil connections to sleeve. Draw vacuum on sleeve and fill with oil under vacuum.
- 4.8.b Slacken 5/16-18 hex bolt in oil glove to permit cable hydraulic system to pressurize sleeve.
- 4.8.c Tighten all blanking plugs.
- 4.8.d Finish Off Joint Bay Covers (if mounted in bay).

#### 4.9 Solid Dielectric Insulated Cable Preparation for Separable Cable Connections

- 4.9.a Cable ends must be prepared following instructions provided with the Separable Cable Terminations.
- 4.9.b Care should be used when cutting these cables so the molded device fits the module with adequate cable length. This is an important requirement since the module can no longer be moved after paper lead cables are completed.
- 4.9.c Cables with metallic shields require bonding connection. Provisions should be made either by leaving sufficient metal wires exposed for bond connection or use of special adapters made for the separable connector.



**WARNING**

Apparatus Bushings are designed to accept cable accessories constructed in accordance with IEEE 386 or a termination means specifically approved by G & W Electric Co. The use of any other cable termination means can present an electrical hazard or cause failure resulting in serious injury or death.

**WARNING**

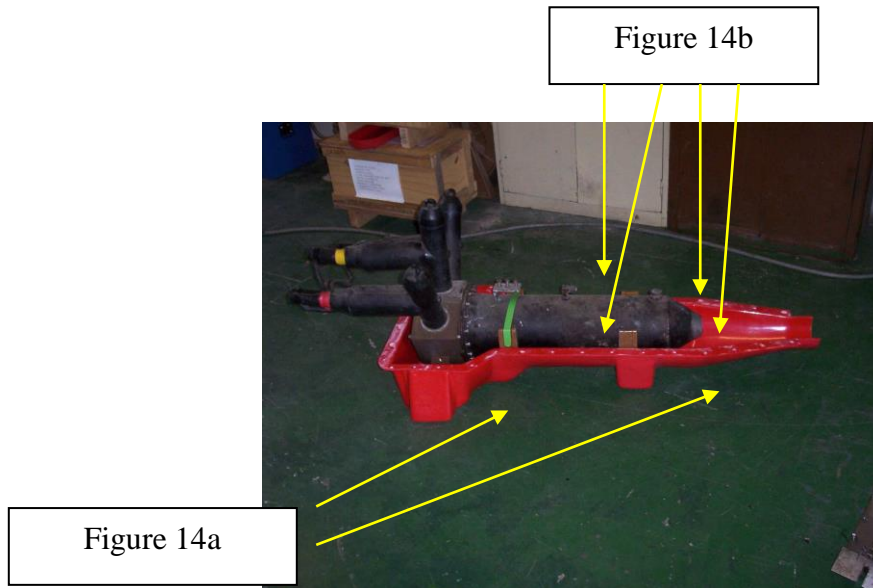
End caps constructed in accordance with IEEE 386 or a termination means specifically approved by G & W Electric Co. must be used to cover any terminal connections that are not terminated to a cable. The shipping caps will not provide proper electrical insulation for an energized terminal. Energizing a non-terminated connection can present an electrical hazard or cause failure resulting in serious injury or death.

#### **4.10 Bonding and Grounding**

- 4.10.a It is the responsibility of the user to establish bonding and grounding of these devices in accordance with local practices and circuit design.
- 4.10.b The copper casing on the oil filled cable side is fitted with a copper grounding bus. This facilitates the fitting of appropriate lead and appropriate current carrying bonding to the dielectric cables if required. With high fault currents to be considered it is important to establish from the engineer if they are required and their size.
- 4.10.c Grounding lugs are provided with the module for easy attachment to existing grounding systems.
- 4.10.d While the module is completely bonded internally through the bolting devices, the shield from the extruded dielectric cable must be attached to the ground lug on the termination sleeve (as shown on the jointing instruction for the termination) . This is in addition to the considerations given in 4.10.b

#### 4.11 CTM 11 Coffin

- 4.11.a Set the bottom half of the coffin in position
- 4.11.b Place the 2 lower supports in position as shown (See Figure 14a) one for the module, another for the wiping sleeve.
- 4.11.c Remove the lower bracket support from the CTM-11 Module.  
Place CTM-11 module into position on the supports and terminate.  
(Follow start of Instruction Manual)



- 4.11.d **The front section of the coffin has to be slipped over the XLPE cables before the elbows are connected.**

- 4.11.e Grease the inside of XLPE and top section of the coffin to avoid the guroflex sticking to them.
- 4.11.f Position the porcelain supports on the wiping sleeve. (see Figure 14b)
- 4.11.g Run a bead of sealant around the coffin flanges, assemble and bolt together
- 4.11.h All cable exits need to be sealed with bitco tape or similar and a 2 part putty.
- 4.11.i Coffin can be filled with 50 litres of bitumen and then 110 litres of Guroflex (or similar material) (See Figure 15) – or 160 litres of Guroflex only



4.11.j Figure 16 shows the final assembly

Figure 15



Figure 16

## 4.12 Network Rail Assembly of Supports and GRP Covers

- 4.12.a The wiping sleeve is painted with a coat of bitumen
- 4.12.b The hardwood supports and XLPE lockdown bracket are shown in position. (See Figure 17) These need to be secured to the concrete base. The XLPE lockdown bracket is secured using the same fixings as the stainless steel support attached to the module.



Figure 17

- 4.12.c The GRP covers are fitted and secured to concrete base as shown below (See Figure 18)

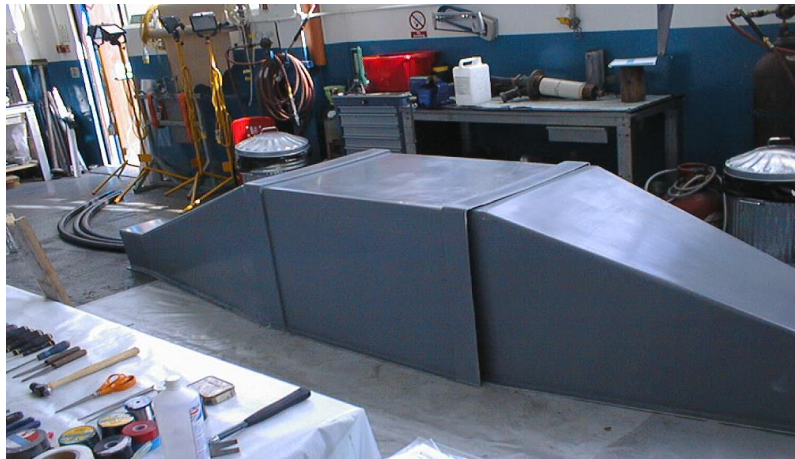
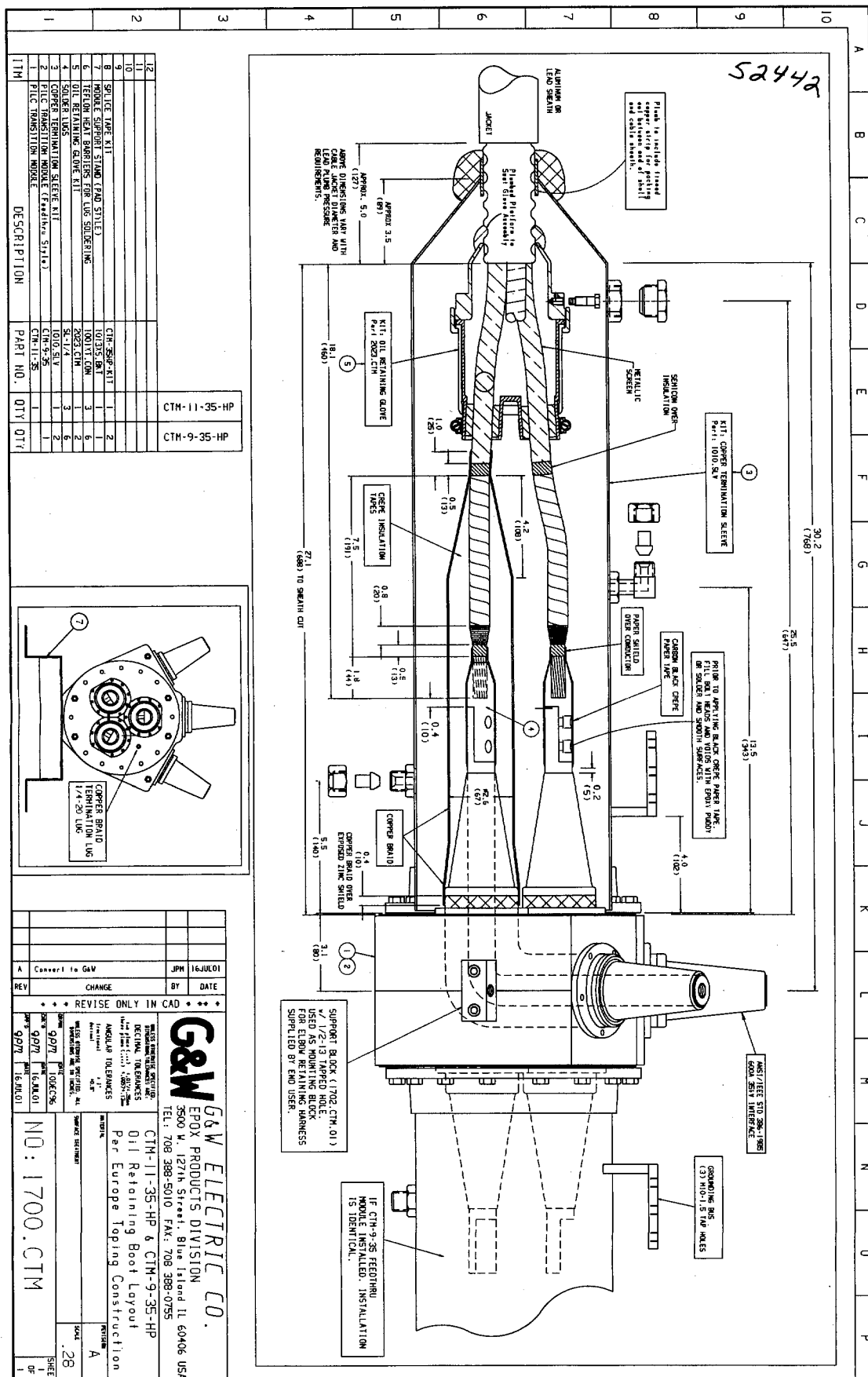
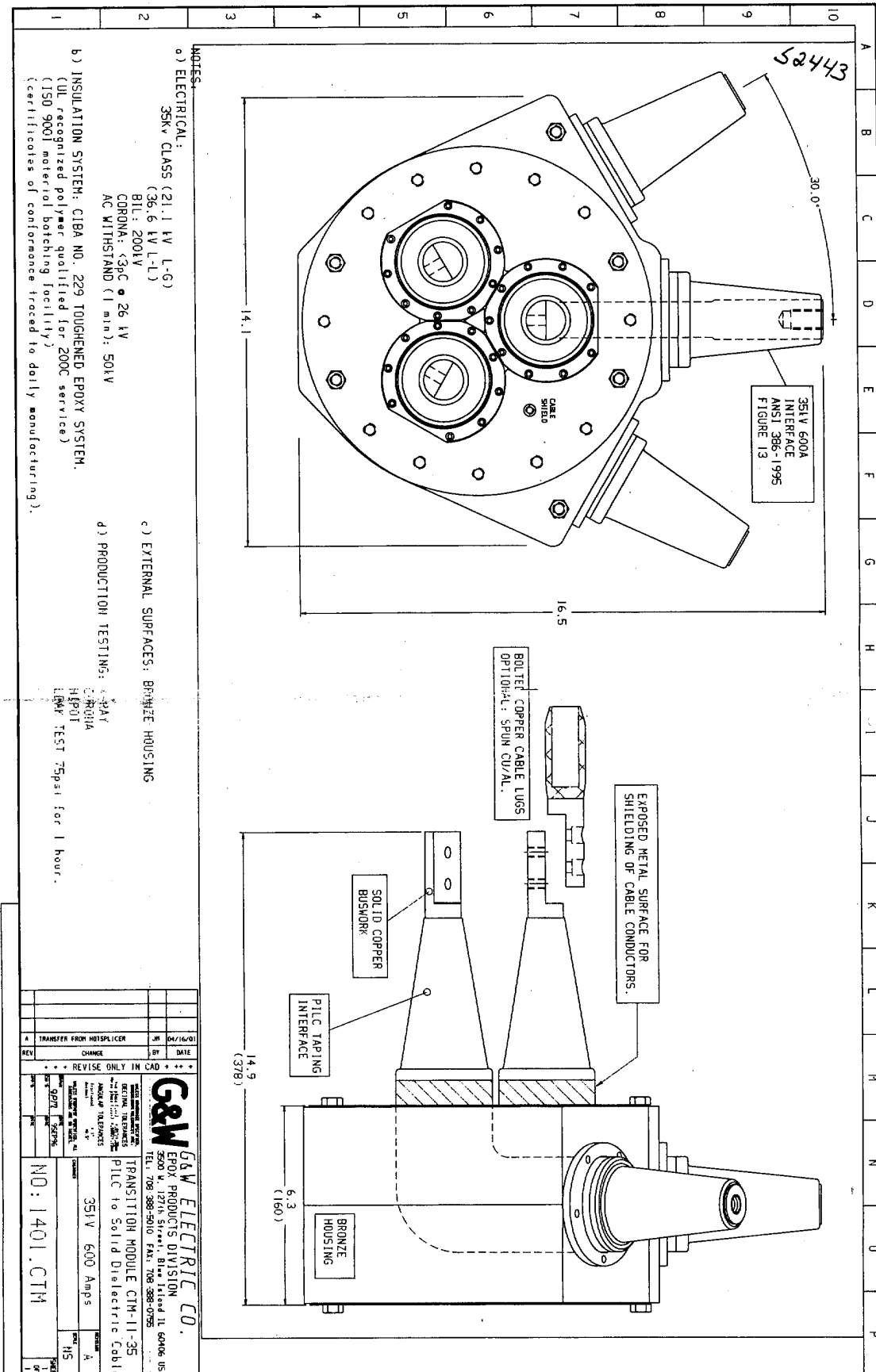


Figure 18

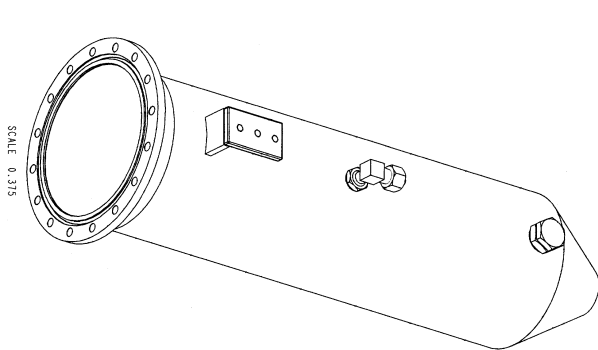
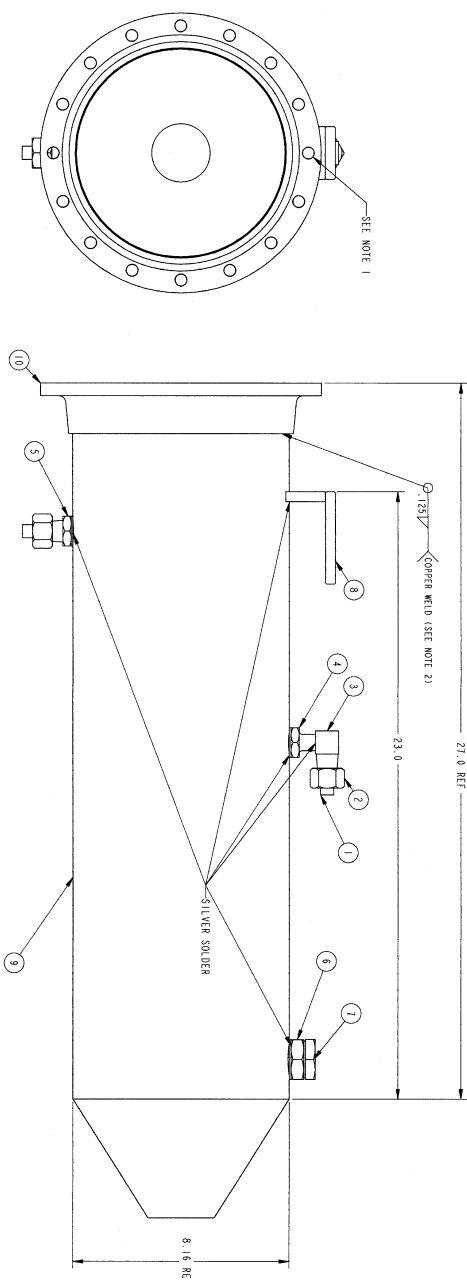
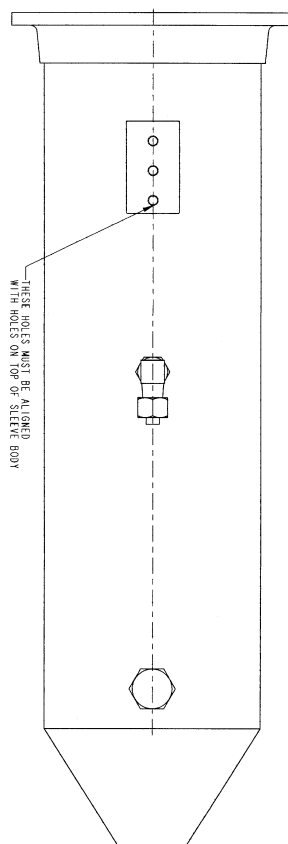
**4.13 Bill Of Materials**

Item No.	Part Description	Part No.	CTM-11-35-HP QUANTITY	CTM-9-35-HP QUANTITY
1	Module	CTM-11-35	1	0
2	Module	CTM-9-35	0	1
3	Special Copper Sleeve (8"x27") w/60 deg.	1010.SLV	1	2
4	Teflon Heat Barriers	1001.CTM	3	6
5	Solder Lugs (With ¼ " Pilot Hole, assembled to unit)	SL-1/4	3	6
6	Module Support Stand (S.S)	1013XS.BKT	1	1
7	Glove Assembly	2023-CTM-18	1	2
8	Splice Kit	CTM-35HP-KIT	1	2
9	Crepe (33 rolls oil packed, 2" x 12')	HPKIT07	1	2
10	Crepe (60 rolls oil packed, 1" x 12')	HPKIT06	1	2
11	Crepe (3 rolls oil packed 1" x 12')	HPKIT03	1	2
12	Cotton yarn (¼ oz. Spool, oil packed)	HPKIT04	1	2
13	Copper Braid (6 rolls 1"x 20')	233000001006	1	2
14	String Solder (1/8" string, 8 ft)	228000001002	1	2
15	Bar Solder (4 lb.)	428000001002	1	2
16	Stearine Candles (2-oz candles)	247000001001	2	4
17	Cotton Tape (1 roll, ½" x 27 ft)	212000001005	1	2
18	Epoxy Filler Putty (2 stick kits)	296000001001	2	4
19	O-ring for sleeve	A16200218R00	1	2
20	5/8-11 Tinned Copper Stud	A22150584A00	3	3
21	3 /8" Spring Washers	030000032007	16	32
22	3/8" – 16 x 1" Bolts	030000018014	12	24
23	5/16" – 18 x 3/4 " Bolts (assembled to unit)	030000023027	6	12
24	Copper crimp eye lug	EP06926K5400	3	6
25	L-Key ¼ hex	EP07122A2400	1	1
26	M10-1.5 grounding bolt	030000018537	3	6
27	O-ring for sleeve (1 extra)	A16200218R00	1	2
28	CAPLUG – fitted to copper sleeve	A1341 0211 BDO	1	2
29	Installation Instructions	GW1-701-6	1	1
30	Drawings	1401.CTM 1700.CTM 2023-CTM-18 Rev A 1010.SLV SL-0000 2023-CTM-16	1	1





ITEM NUMBER	DESCRIPTION	PART NUMBER	QTY	TOTAL
1	10 SODIUM BRASS PLUG	1010.SLV.01	1	
2	BRASS REC NUT 1/2 BSP THD	1010.SLV.02	2	
3	1/8 BRASS 50 1/2 BSP THD	1010.SLV.03	1	
4	1/8 BRASS REC NUT	1010.SLV.04	1	
5	1/8 BRASS REC 1/2 BSP THD	1010.SLV.05	1	
6	1.5 BRASS REC SEALING NUT	1010.SLV.06	1	
7	1/2 BRASS REC SEALING NUT	1010.SLV.07	1	
8	3/8 x 3 COPPER CAD BODY	1010.SLV.08	1	
9	3/8 COPPER STEEL BODY	1010.SLV.10	1	
10	BRONZE FLANGE FOR C/A SELECTIC	1021.SLV.01	1	



This drawing and the information thereon are and remain the property of GDM and are not to be copied, reproduced or disclosed to others without the expressed written consent of GDM.

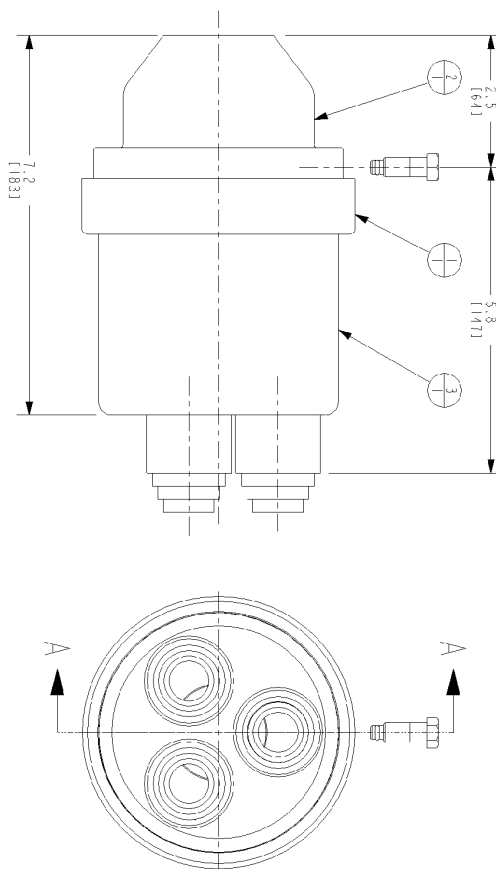
NOTES:  
1. USE THIS HOLE FOR ALIGNMENT WHEN SOLDERING  
2. FILL SMOOTH W/SILVER SOLDER.  
3. ELECTRO TIN SPEC #23.011-55

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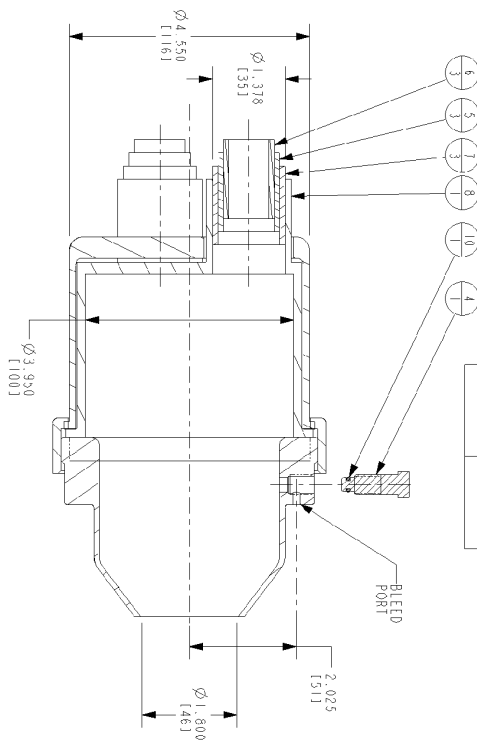


A

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## SECTION A-A



DRAWING REVIEW TEAM		REVISIONS	
	REV.	CHANGE	DATE
	A.	31510 MPL	02 25 08

IT	DESCR PTION	PART NUMBER	QTY
1	COLLAR	2023.CTM.15	1
2	WIPING SHELL	2023.CTM.15	1
3	HOUSING FACE FOR 35mm HOLES	2023.CTM.17	1
4	NYLON HEX BOLT	2023.CTM.07	1
5	SHEATH BUSHING, GLOVE ASSY	2023.CTM.09	3
6	SHEATH BUSHING, GLOVE ASSY	2023.CTM.11	3
7	SHEATH BUSHING	2023.CTM.12	3
8	MOLDED RUBBER BOOT 35mm	2023.CTM.13	1
9	HOSE CLAMP WITH SHOE	A1341 1314.100	3
10	VITON CASSET G-RING 1/ 6"	A1670 0492.400	1

ALL LINEAR DIMENSIONS ARE IN INCHES

ALL DRAWING CHANGES MUST BE MADE ON CAD. ANY MANUAL CHANGES WILL VOID DRAWING

NOTES

1. SILKATI BUSININGS WILL SHIP LOOSE IN BOX.

2. HOSE CLAMPS ARE NOT SHOWN FOR CLARITY.

3. INSTALL O-RING GNTD NYLON HEX BOLT.

4. ALL DIMENSIONS ARE REFERENCE.

SURFACE TREATMENT

CIL RETAINING GLOVE:

FRACTIONAL	±
.XX	±.06
.XXX	±.01
.XXXX	±.00
ANGULAR	±1/2

USED ON

UNION OF: MFL

APPR B\*: RHA

DATE: 10-07-10 PM 3:14

DATE: 03-21-07

DRAWINGS

[illegible]

SCAFF:	SHIFT:
--------	--------

**G&W**  
G&W ELECTRIC CO.

REV  
A

NAME: G&W PROJECT: SL-0000 DATE: 12-Jan-04 11:10:43 OPER: MRS ROUT/EST APPR: DATE: 12/21/04 DWG. NO.: SL-0000

This drawing and the information thereon are and remain the property of G&W and are not to be copied, reproduced or disclosed to others without the expressed written consent of G&W.

53947

NOTES:  
1. MAKE CUT ON PARTS WHICH STOCK DIAMETER IS GREATER THAN 1.125.  
CUT NOT NEEDED ON 1.125 DIAMETER STOCK.

SEE NOTE 1

5/16" HOLE  
Ø .500 COUNTERBORE  
.346 DEEP  
(2 PLACES)

Ø 1.125

Ø "A"

Ø "C"

"E"

1.625  
1.500  
2.255 ± .005  
1.000  
.627

"B"

"D"

TABLE:

PART #	DESCRIPTION	DIM "A"	DIM "B"	DIM "C"	DIM "D"	DIM "E"	STRAND O.D.	CABLE SIZE
SL-1/0	SOLDER LUG FOR 1/0	1.125	.456	.406	1.000	4.125	.373	1/0
SL-2/0	SOLDER LUG FOR 2/0	1.125	.503	.453	1.000	4.125	.418	2/0
SL-3/0	SOLDER LUG FOR 3/0	1.125	.550	.500	1.000	4.125	.470	3/0
SL-4/0	SOLDER LUG FOR 4/0	1.125	.612	.562	1.000	4.125	.528	4/0
SL-250	SOLDER LUG FOR 250 KCMIL	1.125	.659	.609	1.000	4.125	.575	250
SL-300	SOLDER LUG FOR 300 KCMIL	1.125	.706	.656	1.000	4.125	.630	300
SL-350	SOLDER LUG FOR 350 KCMIL	1.125	.768	.718	1.000	4.125	.681	350
SL-400	SOLDER LUG (.765)	1.125	.815	.765	.875	4.125	.728	400
SL-500	SOLDER LUG (.842)	1.125	.893	.843	.875	4.125	.813	500
SL-600	SOLDER LUG FOR 600 KCMIL	1.125	.972	.922	.500	4.125	.893	600
SL-750	SOLDER LUG FOR 750 KCMIL	1.250	1.081	1.031	.500	4.125	.998	750
SL-800	SOLDER LUG FOR 800 KCMIL	1.375	1.175	1.125	.500	4.125	1.029	800
SL-1000	SOLDER LUG FOR 1000 KCMIL	1.440	1.230	1.190	.500	4.500	1.152	1000
SL-2	SOLDER LUG FOR CABLE #2	1.125	.378	.328	1.000	4.125	.292	#2
SL-1	SOLDER LUG FOR CABLE #1	1.125	.410	.36	1.000	4.125	.332	#1
SL-1/4	SOLDER LUG W/ 1/4" PILOT HOLE	1.250	-----	.250	-----	4.125		

\* ALL LINEAR DIMENSIONS ARE IN INCHES

DATE FROM QTY USED ON

SURFACE TREATMENT

SOLDER LUG

15-35 KV  
MODULE SOLDER LUG

TO: UNLESS OTHERWISE SPECIFIED

DRAWN BY: JUG DATE: Apr-14-03

APPR BY: MMS DATE: 05-06-03

PATTERN NO.

SCALE: 1" = 1"

REV

SL-0000

G&W ELECTRIC CO.

REVISIONS

REV	CHANGE	DATE
A	23359	05-05-03
B	24290	01-12-04

53947

