October 7, 2020

Mr. Adam Lanning
Rochelle Municipal Utilities
700 West Second Avenue
PO Box 456
Rochelle, IL 61068

Ref: 2031K003 – Prologis Park Substation Upgrades
Equipment Purchase Recommendation

Dear Mr. Lanning:

The RMU received and opened bids on October 7, 2020 for the equipment purchase, a part of the Prologis Park Substation Upgrades project. A total of two (2) bids were received and have been reviewed for completeness and ability to meet specification requirements.

Bidder	Total Bid Price	Lead Time
Dis-Tran Pckgd Subs	$578,749.00	26 weeks
Peak Sub Srvcs	$1,259,800.00	28 weeks

The bid from Dis-Tran was the apparent low bid for Specification 2031K003, no major exceptions were listed. Dis-Tran has a good list of reference completed projects. The company appears to be in good standing and employs certified and trained craftsmen.

The low bid for the project is in accordance with the Engineer's estimate of $572,000 for the contract. The bid from Peak was evaluated, and it was determined their proposal was incorrectly summed, the assumed correct proposal would have been $594,160, which is still not the low bid. Therefore, it is the recommendation of BHMG to award the project to Dis-Tran, for the supply of the equipment.

With the City's approval, release, and financial approval; BHMG can assist with issuing contract documents. Should you have any questions concerning the bids or the project, please do not hesitate to contact us.

Sincerely:
BHMG Engineers, Inc.

Jason F. Jackson, P.E.
Enclosures: Bid tab, and Dis-Tran's Quote

10/6/20 11am

BHMG

2031 K003- ROCHELLE MUNICIPAL UTILITIES - PROLOGIS PARK SUBSTATION

BIDDERS / PROPOSALS	Dis-Tran	Hamby Young	UUSCO	Veak Substation Services
	(Power Equipment Sales)			
BID SECURITY	✓			✓
Furnish the Goods & Special Services for the Equipment Purchase	578749.00			1,259,800.00
PROJECT COMPLETION TIME - PROPOSAL 1	182 days			196

	Dis-Tran	Hamby Young	UUSCO	Veak Substation Services
Registered Bidder	✓	✓	✓	✓
Non-Collusion Affidavit				
Bid Bond				
Bid Form				
Any other documents as required by the specificaton				

BHMG ENGINEERS, INC.
Consulting Engineers
630 Jeffco Blvd.
Arnold, MO 63010

ROCHELLE MUNICIPAL UTILITIES
Prologis Park Substation
Equipment Purchase
Bids Received 11:00 a.m., 10/06/20

Bid Opening Witnesses:

City: Mary Haigamo

BHMG:

BID FORM

TABLE OF CONTENTS

This Bid is submitted by: DIS-TRAN Packaged Substations

BID FORM

ARTICLE 1 - BID RECIPIENT

1.01 This Bid is submitted to:

Rochelle Municipal Utilities
420 N 6th Street
Rochelle, IL 61068

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into a Contract with Buyer in the form included in the Bidding Documents to furnish the Goods and Special Services as specified or indicated in the Bidding Documents, for the prices and within the times indicated in this Bid, and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 - BIDDER'S ACKNOWLEDGMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Buyer.

ARTICLE 3 - BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, the related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged:

Addendum No.	Addendum Date
N/A	N/A

B. Bidder has visited the Point of Destination and site where the Goods are to be installed or Special Services will be provided and become familiar with and is satisfied as to the observable local conditions that may affect cost, progress, or the furnishing of Goods and Special Services, if required to do so by the Bidding Documents, or if, in Bidder's judgment, any local condition may affect cost, progress, or the furnishing of Goods and Special Services.

C. Bidder is familiar with and is satisfied as to all Laws and Regulations in effect as of the date of the Bid that may affect cost, progress, and the furnishing of Goods and Special Services.

D. Bidder has carefully studied, considered, and correlated the information known to Bidder; information commonly known to sellers of similar goods doing business in the locality of the Point of Destination and the site where the Goods will be installed or where Special Services will be provided; information and observations obtained from Bidder's visits, if any, to the Point of Destination and the site where the Goods will be installed or Special Services will be provided; and any reports and drawings identified in the Bidding Documents regarding the Point of Destination and the site where the Goods will be installed or where Special Services will be provided, with respect to the effect of such information, observations, and documents on the cost, progress, and performance of Seller's obligations under the Bidding Documents.

E. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution (if any) thereof by Engineer is acceptable to Bidder. -See attached bid letter for DTPS comments.

F. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for furnishing the Goods and Special Services for which this Bid is submitted.

ARTICLE 4 - BIDDER'S CERTIFICATIONS

4.01 Bidder certifies that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Buyer,

(b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Buyer of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Buyer, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process.

ARTICLE 5 - BASIS OF BID

5.01 **Proposal No. 1 -** Bidder will furnish the Goods and Special Services in accordance with the Contract Documents for the following price(s):

ITEM #	DESCRIPTION	QTY	UNIT PRICE	TOTAL PRICE
1	138kV Circuit Breaker	4	$54,064.60	$216,258.40
2	138kV Line Disconnect Switch	1	$12,511.75	$12,511.75
3	138kV Breaker Disconnect Switch	4	$12,511.75	$50,047.00
4	138kV CCVT	4	$7,021.38	$28,085.52
5	138kV Surge Arrestor	3	$1,409.46	$4,228.38
6	138kV Station Post Insulator	42	$348.21	$14,624.82
7	138kV Suspension Insulator	6	$142.11	$852.66
8	138kV A-Frame Deadend Support	1	$48,521.36	$48,521.36
9	138kV 3-Phase CCVT Support	1	$3,899.73	$3,899.73
10	138kV 1-Phase CCVT Support	1	$942.54	$942.54
11	138kV Switch Operator Platform	5	$198.40	$198.40
12	138kV 3-Phase Low Bus Support	7	$4,268.11	$29,876.77
13	138kV 3-Phase High Bus Support	7	$5,589.19	$39,124.33
14	138kV 3-Phase Low Vee Switch Support	4	$5,970.27	$23,881.08
15	65 ft Lightning Mast	7	$12,702.70	$88,918.90
	Lot of anchor bolts for steel structures	1	$15,983.76	$15,983.76

Lump Sum Total Bid Price for Proposal No. 1	**$** 578,749.00

SCHEDULE GUARANTEES

Breaker Delivery:	182	Calendar days ARO
Disconnect Switch Delivery:	182	Calendar days ARO
Steel Structures Delivery:	182	Calendar days ARO
CCVT Delivery:	182	Calendar days ARO
Insulator Delivery:	182	Calendar days ARO

5.02 It is understood and agreed by the undersigned that the Municipal Utility reserves the unrestricted privilege to reject the foregoing proposal indicated above and which the Municipality may consider excessive or unreasonable; to accept such proposal which it may consider fair and reasonable.

The lump sum of the proposal shall be the basis for establishing the amount of the performance bond and for comparison of bids.

The above delivery dates and times are to be filled in by the bidder before submitting his proposal.

ARTICLE 6 - TIME OF COMPLETION

6.01 Bidder agrees that the work will be substantially complete on or before date specified in 5.01 and will be completed and ready for final payment in accordance with Paragraph 14.07.B of the General Conditions on or before 30 days after date specified in 5.01.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.
-See attached bid letter for DTPS comments.

ARTICLE 7 - ATTACHMENTS TO THIS BID

7.01 The following documents are attached to and made a condition of this Bid:

A. Bid Bond. -See attached bid letter for DTPS comments.

B. List of Proposed Major Suppliers.

C. Affidavit of Non-Collusion.

D. List of Project References.

E. Bidder's Qualifications.

ARTICLE 8 - DEFINED TERMS

8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders and the General Conditions.

ARTICLE 9 - BID SUBMITTAL

9.01 This Bid submitted by:

If Bidder is:

An Individual

Name: N/A

By: N/A

Doing Business As: N/A

(Individual's signature)

Business address: N/A

Phone: N/A

Email address: N/A

A Partnership

Partnership Name: N/A

(Seal)

By: N/A

(Signature of general partner – attach evidence of authority to sign.)

Name: (typed or printed) N/A

Business Address: N/A

Phone: N/A

Email Address: N/A

A Corporation

Corporation Name: N/A

State of Incorporation: N/A

Type: N/A

(General Business, Professional, Service, Other)

By: N/A

(Signature – attach evidence of authority to sign)

Name: *(typed or printed)* N/A

Title: N/A

(Corporate Seal)

Attest: N/A

(Signature of Corporate Secretary)

Business Address: N/A

Phone: N/A

Email Address: N/A

A Limited Liability Company (LLC)

LLC Name: DIS-TRAN Packaged Substations

State in which organized: Delaware

By: 

(Signature – attach evidence of authority to sign)

Name: *(typed or printed)* David Harrington

Business Address: 4725 Highway 28E

Pineville, LA 71360

Phone: 318-767-5527

Email: david.harrington@distran.com

A Joint Venture

First Joint Venturer Name: N/A

(seal)

By: N/A

(Signature – attach evidence of authority to sign)

Name: *(typed or printed)* N/A

Title: N/A

Business Address: N/A

Phone: N/A

Email Address: N/A

Second Joint Venturer Name: N/A

(seal)

By: N/A

(Signature – attach evidence of authority to sign)

Name: *(typed or printed)* N/A

Title: N/A

Business Address: N/A

Phone: N/A

Email Address: N/A

Phone and Facsimile Number, and Address for receipt of official communications to Joint Venture:

(Each joint venturer must sign. The manner of signing for each individual, partnership, corporation, and limited liability company that is a party to the joint venture should be in the manner indicated above.)

QUALIFICATIONS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Appointment of Counsel.

B. Pre-qualifications.

C. Bidder's Qualifications.

D. Certifications.

E. References.

F. Signatures.

1.02 AWARD OF BID

A. Failure of Bidder to meet all qualification criteria as stated in these Specifications shall disqualify Bidder from consideration for the Project.

B. The Owner reserves the right to exclude Bidder from consideration due to the Bidder's failure to present with written documentation his experience and capability to complete the project to the Owner's expectations.

PART 2 – QUALIFICATIONS

2.01 APPOINTMENT OF COUNSEL – NON-RESIDENT

A. Bidder has appointed Registered Agent Solutions, Inc, whose address is 901 S. 2nd Street Suite 201 Springfield, IL 62704 , as the agent of Bidder for service of process in the event any litigation or controversy results between the Bidder and Owner arising out of the contractual relationship created by the acceptance of this Bid. Bidder agrees that the courts of the State in which the project is located will have jurisdiction over Bidder for all such purposes to the same extent as though Bidder were a resident of the State.

2.02 PRE-QUALIFICATION

A. Failure of Bidder to meet the Pre-qualification requirements as stated in the Instruction to Bidders Bid shall disqualify Bidder from consideration for the Project.

2.03 BIDDER'S QUALIFICATIONS

A. Bidder shall prove to the Owner's satisfaction Bidder's experience in completing similar projects, thus demonstrating the ability of the Bidder to complete the Project to the Owner's Satisfaction.

B. Bidder shall submit written proof and abide by the written proof that the Bidder will complete a minimum of (30) thirty percent of the overall project by his own company and workers.

C. Bidder shall submit documentation proving that the Bidder is capable of funding the Project and is not in financial hardship.

D. Bidder shall submit documentation proving that the Bidder uses only qualified, licensed workers experienced in the line of work.

E. Bidder's subcontractors shall be the responsibility of the Bidder and shall be considered part of the Bidder's company and shall meet qualification requirements for all aspects of the Project.

2.04 CERTIFICATIONS

A. The Bidder certifies the following as required by law:

1. Bidder has not been convicted of bribery or attempting to bribe an officer or employee of the State, nor has the Bidder made an admission of guilt of such conduct which is a matter of record, nor has an official, agent or employee of the Bidder been so convicted or made such admission of bribery on its behalf and pursuant to the direction or authorization of a responsible official thereof.

2. Bidder is not barred from bidding with any unit of state or local government as a result of unlawful bid rigging.

3. Under penalty of perjury, the Bidder certifies that the Federal Taxpayer Identification Number noted below is correct and the Bidder is doing business as a (please check one):

_____Individual	_____Real Estate Agent
_____Corporation	_____Government Entity
_____Partnership	_____Trust or Estate
__x__Corporation	
_____Not-for-Profit Corporation	
_____Tax Exempt Organization (IRC 501 (a) only)	
_____Medical and Health Care Services Provider Corporation	

4. Bidder, if an individual, is not in default on an educational loan.

2.05 REFERENCES

A. Bidder shall submit a minimum of three (3) written letters of recommendation with references' signatures and contact information to the Engineer.

B. These References shall be from the Owner, Project Manager, or other individual who is knowledgeable on the project, or recent previous Projects with very similar Scope of Work completed under the current Bidder's name.

C. Bidder shall submit a minimum of three (3) company brochures, or company information sheets, along with list of completed equivalent projects.

2.06 SIGNATURES

Firm Name: DIS-TRAN Packaged Substations

Federal Taxpayer Identification Number: 72-0728139

By: David Harrington

Title: Proposal Department Manager

By: _____

Title: _____

Note: If the Bidder is a corporation, the legal name of the corporation shall be set forth above together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation; if the Bidder is a partnership, the true name of the firm shall be set forth above together with the signature of the partner or partners authorized to sign contracts on behalf of the partnership; and if the Bidder is an individual, his signature shall be placed above. If signature is by an agent, other than an officer of a corporation or member of a partnership, a power of attorney must be submitted with the bid.

PART 3 – EXECUTION

NOT USED

END OF SECTION

DIS-TRAN
PACKAGED SUBSTATIONS™
4725 Highway 28 E • Pineville, LA 71360 • 318.448.0274

Rochelle Municipal Utilities

RFP PROLOGIS PARK SUBSTATION EQUIPMENT PURCHASE
2031 K003

Dis-Tran Packaged Substations
10/6/20

1. **Bidder Information**
    1. **Firm Name:** DIS-TRAN Packaged Substations, LLC
    2. **Parent Company:** Crest industries, LLC
    3. **Business Address:** PO Box 5109, Alexandria, LA 71307
    4. **State of Incorporation:** Delaware
    5. **Number of years in business:** 55
    6. **Key Personnel:**
        a. Brittany Jackson, Proposal Coordinator, 318-427-9317, brittany.jackson@distran.com
        b. David Harrigton, Proposal Dept. Manager, 318-767-5527, david.harrington@distran.com

2. **Bid Clarifications**
    - See the attached technical documents and DTPS material list containing detailed descriptions, ratings, options, clarifications and/or exceptions offered.
    - P-200 - INSTRUCTIONS TO BIDDERS Article 8.01 - A Bid bond form was not included with RFQ documents; bond issued on AIA document A310-2010 form.
    - Anticipated submittal schedule:
        - Steel Calculations for approval = 35 calendar days
        - Steel Fabrication Drawings for approval = 56 calendar days
    - A nticipated Anchor Bolts Delivery = 35 calendar days ARAD (after receipt of approved designs)
    - No addendum have been received for this RFQ.
    - P-800 - SUPPLEMENTARY CONDITIONS Article 1.02 - Liquidated damages accepted at $500 per day; not to exceed 5% of total contract price.
    - Section 16359 Substation Structures, Part 2, Item 2.3, Section H Detail 2 - Steel will be galvanized to ASTM A123 specs regarding cleaning and galvanizing process.
    - Section 16359 Substation Structures, Part 2, Item 2.3, Section H, Detail 3 - Steel will not be sandblasted prior to galvanizing.
    - Steel weights based on customer provided design drawings; deviations may result in change order.

3. Bidder References:

a. Basin Electric
345kV Chappelle Creek Switchyard
Chad Kuntz - Engineering Supervisor
1717 East Interstate Ave, Bismarck, ND
701-557-5743
ckuntz@bepc.com

b. El Paso Electric
13.8kV Horizon Substation
Lily Bustamante - Engineering Supervisor
3511 A. Montana BLDG O, El Paso, TX
915-543-5733
lily.bustamante@epelectric.com

c. Center Point Energy
138kV Greens Bayou Substation Hugo
Castro - Engineering Lead
1111 Louisiana Ave, Houston, TX
713-207-6131
hugo.castro@centerpointenergy.com

4. Steel Fabricator

- **Klute, Inc.**
  1313 Road G,
  York, NE 68467
  Phone: 402-362-1055
  www.kluteinc.com
  AISC and ISO 9001:2015-certified

DIS-TRAN
PACKAGED SUBSTATIONS

138kV Prologis Park Substation
Rochelle Municipal Utilities
Rochelle Municipal Utilities
Rochelle, IL

Origination Date: 10/5/2020
Proposal No: 101021SP

Item	Qty	UOM	Description	MFG	MFG Part Num	Unit Cost	Ext Cost
			STRUCTURES				
S1	1	EA	138KV, A-FRAME DEADEND STRUCTURE, 40' PULL-OFF HEIGHT, 52' STATIC PULL-OFF HEIGHT, 42' BAY WIDTH *All columns are folded plate A572 GR65 and base plates A572 GR65 or Gr50 as applicable.	Klute Inc.	APPX WT = 18,250 LBS EA	$48,521.36	$48,521.36
S2	1	EA	138KV, 3-PHASE CCVT SUPPORT, 8'-6" STRUCTURE HEIGHT, 12' PHASE SPACING, 1 COLUMNS *All columns are folded plate A572 GR65 and base plates A572 GR65 or Gr50 as applicable.	Klute Inc.	APPX WT = 1,535 LBS EA	$3,899.73	$3,899.73
S3	1	EA	138KV, 1-PHASE CCVT SUPPORT, 8'-6" STRUCTURE HEIGHT *All columns are folded plate A572 GR65 and base plates A572 GR65 or Gr50 as applicable.	Klute Inc.	APPX WT = 371 LBS EA	$942.54	$942.54
S4	5	EA	138KV, SWITCH OPERATOR PLATFORM, 4X3	Klute Inc.	APPX WT = 145 LBS EA	$198.40	$992.00
S5	7	EA	138KV, THREE PHASE LOW BUS SUPPORT, 17' BUS HEIGHT, 12' PHASE SPACING, 1 COLUMNS *All columns are folded plate A572 GR65 and base plates A572 GR65 or Gr50 as applicable.	Klute Inc.	APPX WT = 1,680 LBS EA	$4,268.11	$29,876.77
S6	7	EA	138KV, THREE PHASE HIGH BUS SUPPORT, 25' BUS HEIGHT, 12' PHASE SPACING, 1 COLUMNS *All columns are folded plate A572 GR65 and base plates A572 GR65 or Gr50 as applicable.	Klute Inc.	APPX WT = 2,200 LBS EA	$5,589.19	$39,124.33
S7	4	EA	138KV, 3-PHASE LOW VEE SWITCH SUPPORT, 17' BUS HEIGHT, 12' PHASE SPACING, 2 COLUMNS *All columns are folded plate A572 GR65 and base plates A572 GR65 or Gr50 as applicable.	Klute Inc.	APPX WT = 2,350 LBS EA	$5,970.27	$23,881.08
S8	7	EA	65' LIGHTNING MAST *All columns are folded plate A572 GR65 and base plates A572 GR65 or Gr50 as applicable.	Klute Inc.	APPX WT = 5,000 LBS EA	$12,702.70	$88,918.90
			MAJOR EQUIPMENT				
P4	1	EA	138KV SWITCH, GROUP OPERATED, AIR BREAK, CENTER BREAK VEE SWITCH, 650kV BIL, 2000A CONTINUOUS, TR288 GREY INSULATORS, HORIZONTAL UNDERHUNG MOUNT, MANUAL OPERATOR, MOUNTED ON DEADEND STRUCTURE	Southern States, LLC	EC-1V-5BC-138-2000	$12,511.75	$12,511.75
P5	4	EA	138KV SWITCH, GROUP OPERATED, AIR BREAK, CENTER BREAK VEE SWITCH, 650kV BIL, 2000A CONTINUOUS, TR288 GREY INSULATORS, HORIZONTAL UPRIGHT MOUNT, MANUAL OPERATOR, MOUNTED ON SWITCH STAND	Southern States, LLC	EC-1V-5BC-138-2000	$12,511.75	$50,047.00

P6	4	EA	138KV CIRCUIT BREAKER, 2000A, 40KA INTERRUPTING, 3 CYCLES, 650kV BIL, SF6 - INCLUDES GE RECOMMENDED SPARE PARTS	GE Grid Solutions, LLC	DT1-145 FK F1	$54,064.60	$216,258.40
P7	4	EA	CCVT, OIL-FILLED, 138KV NOMINAL, 650 BIL, SINGLE BUSHING, 80,500V PRIMARY, 1200/700:1 RATIO, TWO 115/67.08 & 115/67.08 SECONDARY WINDINGS, THERMAL RATING: 1000 VA, 0.3 W, X,Y, Z, ZZ **** Per MFG: CVT model TEMP145 offered to meet the minimum required capacitance of 6,000pF****	Trench Limited	TEMP145	$7,021.38	$28,085.52
P8	3	EA	SURGE ARRESTOR, STATION CLASS, POLYMER, UPRIGHT MOUNTING, WITH NEMA PAD TERMINAL, 120KV DUTY CYCLE, 88KV MCOV.	Hubbell Power Systems, Inc.	EVP008800-3001	$1,409.46	$4,228.38
P9	42	EA	STATION POST INSULATOR, HIGH STRENGTH 138KV, 650KV BIL, TR-289, GRAY, 2200# CANTILEVER ***QUOTED PER SPEC SECTION 16356 2.5***	Newell Porcelain	47822-7001	$348.21	$14,624.82
P10	6	EA	INSULATOR, SUSPENTION, 30 KIP, STANDARD LEAKAGE DISTANCE, Y CLEVIS TOP FITTING, ANSI BALL BOTTOM FITTING. ***QUOTED PER SPEC SECTION 16356 2.6***	Hubbell Power Systems, Inc.	S030047S2010	$142.11	$852.66
AB1	1	EA	LOT OF ANCHOR BOLTS AND TEMPLATES FOR STEEL STRUTURES	Threaded Fasteners, Inc.		$15,983.76	$15,983.76
						TOTAL	**$578,749.00**

UNANIMOUS WRITTEN CONSENT
OF THE SOLE MEMBER OF
DIS-TRAN PACKAGED SUBSTATIONS, LLC

The undersigned, being the sole member (the "Member") of DIS-TRAN PACKAGED SUBSTATIONS, LLC a Delaware Limited Liability Company (the "Company"), pursuant to Section 18-404(d) of the Delaware Limited Liability Company Act, hereby adopts, by written consent, the following resolution:

RESOLVED, that, effective as of the date hereof, David Harrington is hereby authorized and empowered to execute new contracts, contract amendments, bid proposals and non-disclosure agreements, involving Company business in the name of and on behalf of the Company.

FURTHER RESOLVED, this appointment shall remain in effect until the earlier of revocation or termination of employment for any reason.

IN WITNESS WHEREOF, the Member has adopted the foregoing resolutions effective as of the 12th day of September, 2018.

Crest Operations, LLC, Sole Member of
DIS-TRAN Packaged Substations, LLC

By: _____
Kenneth L. Robison, CEO

NON-COLLUSION AFFIDAVIT

The Municipality reserves the right, before any award of contract is made, to require any bidder to whom it may make an award of the Principal Contract, to sign a non-collusion affidavit in the form designated below:

STATE OF Louisiana)

COUNTY OF Rapides)

David Harrington, being first duly sworn, deposes and says that he is Proposal Dept Manager * (sole owner, partner, president, secretary, etc.) of the interest of or on behalf of any undisclosed person, partnership, company, association, organization or corporation; that such bid is genuine and not collusive or sham; that said bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that said bidder has not in any manner, directly or indirectly, sought by agreement, communication or conference with anyone to fix the bid price of said bidder or of any bidder to fix any overhead, profit or cost element of such bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract or anyone interested in the proposed contract; that all statements contained in such bid are true; and, further, that said bidder has not, directly or indirectly, submitted his bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid and will not pay any fee in connection therewith to any corporation, partnership, company, association, organization, bid depository, or any member or agent thereof, or to any other individual except to such person or persons as have a partnership or other financial interest with said bidder in his general business.

Signed: _____

Proposal Department Manager
Title

Subscribed and sworn to before me this 5 day of October, 2020.

Seal of Notary

Debra Humphreys
Notary Public

* In making out this form, the title that is not applicable should be struck out. For example, if the Contractor is a corporation and this form is to be executed by its president, the words "Sole Owner", "Partner", "secretary", etc. should be struck out.

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)
DIS-TRAN Packaged Substations, LLC
4725 Highway 28 East
Pineville, LA 71360

SURETY:
(Name, legal status and principal place of business)
Federal Insurance Company
202B Hall's Mill Road
Whitehouse Station, NJ 08889

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

OWNER:
(Name, legal status and address)
Rochelle Municipal Utilities
420 N 6th Street
Rochelle, IL 61068

BOND AMOUNT: Five Percent (5%) of the Amount Bid----------

PROJECT:
(Name, location or address, and Project number, if any)
Prologis Park Substation Equipment Purchase, 2031 K003

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

Init.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this **6th** day of **October** , **2020**

Buddy Rhodes
(Witness)

DIS-TRAN Packaged Substations, LLC
(Contractor as Principal) *(Seal)*

Commercial Director
(Title) David Ducote

(Witness)

Federal Insurance Company
(Surety) *(Seal)*

Mary E. Rhodes
(Title) **Mary E. Rhodes, Attorney-In-Fact**

Init.

CHUBB

Power of Attorney

Federal Insurance Company | Vigilant Insurance Company | Pacific Indemnity Company
Westchester Fire Insurance Company | ACE American Insurance Company

Know All by These Presents, that **FEDERAL INSURANCE COMPANY**, an Indiana corporation, **VIGILANT INSURANCE COMPANY**, a New York corporation, **PACIFIC INDEMNITY COMPANY**, a Wisconsin corporation, **WESTCHESTER FIRE INSURANCE COMPANY** and **ACE AMERICAN INSURANCE COMPANY** corporations of the Commonwealth of Pennsylvania, do each hereby constitute and appoint Andrew P. Underwood of Mobile, Alabama; Kadie C. Crawford and Rhonda S. Crooks of Alexandria, Louisiana; Markham R. McKnight, Stephanie S. McKnight, William G. McKnight, Charles E. Reagin III, Mary E. Rhodes, Thomas M. Sandahl, Trent J. Sandahl, Tawanda A. Weatherspoon and Charlotte L. Wright of Baton Rouge, Louisiana; Jim E. Brashier, Dewey B. Mason, Patrick Mason, Kathleen Scarborough and Troy Wagener of Biloxi, Mississippi; Lisa Butler of Gulfport, Mississippi; Kimberly Barhum, David Fortenberry and Mary Jones Norval of Hattiesburg, Mississippi ----------

each as their true and lawful Attorney-in-Fact to execute under such designation in their names and to affix their corporate seals to and deliver for and on their behalf as surety thereon or otherwise, bonds and undertakings and other writings obligatory in the nature thereof (other than bail bonds) given or executed in the course of business, and any instruments amending or altering the same, and consents to the modification or alteration of any instrument referred to in said bonds or obligations.

In Witness Whereof, said **FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, PACIFIC INDEMNITY COMPANY, WESTCHESTER FIRE INSURANCE COMPANY** and **ACE AMERICAN INSURANCE COMPANY** have each executed and attested these presents and affixed their corporate seals on this **28th** day of **January, 2020.**

Dawn M. Chloros

Dawn M. Chloros, Assistant Secretary

Steven M Haney

Stephen M. Haney, Vice President

STATE OF NEW JERSEY
County of Hunterdon ss.

On this **28th** day of **January, 2020** before me, a Notary Public of New Jersey, personally came Dawn M. Chloros and Stephen M. Haney, to me known to be Assistant Secretary and Vice President, respectively, of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, PACIFIC INDEMNITY COMPANY, WESTCHESTER FIRE INSURANCE COMPANY and ACE AMERICAN INSURANCE COMPANY, the companies which executed the foregoing Power of Attorney, and the said Dawn M. Chloros and Stephen M. Haney, being by me duly sworn, severally and each for herself and himself did depose and say that they are Assistant Secretary and Vice President, respectively, of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, PACIFIC INDEMNITY COMPANY, WESTCHESTER FIRE INSURANCE COMPANY and ACE AMERICAN INSURANCE COMPANY and know the corporate seals thereof, that the seals affixed to the foregoing Power of Attorney are such corporate seals and were thereto affixed by authority of said Companies; and that their signatures as such officers were duly affixed and subscribed by like authority.

Notarial Seal

KATHERINE J. ADELAAR
NOTARY PUBLIC OF NEW JERSEY
No. 2316685
Commission Expires July 16, 2024

Notary Public

CERTIFICATION

Resolutions adopted by the Boards of Directors of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY on August 30, 2016; WESTCHESTER FIRE INSURANCE COMPANY on December 11, 2006; and ACE AMERICAN INSURANCE COMPANY on March 20, 2009:

"RESOLVED, that the following authorizations relate to the execution, for and on behalf of the Company, of bonds, undertakings, recognizances, contracts and other written commitments of the Company entered into in the ordinary course of business (each a "Written Commitment"):

(1) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise.

(2) Each duly appointed attorney-in-fact of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise, to the extent that such action is authorized by the grant of powers provided for in such person's written appointment as such attorney-in-fact.

(3) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to appoint in writing any person the attorney-in-fact of the Company with full power and authority to execute, for and on behalf of the Company, under the seal of the Company or otherwise, such Written Commitments of the Company as may be specified in such written appointment, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.

(4) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to delegate in writing to any other officer of the Company the authority to execute, for and on behalf of the Company, under the Company's seal or otherwise, such Written Commitments of the Company as are specified in such written delegation, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.

(5) The signature of any officer or other person executing any Written Commitment or appointment or delegation pursuant to this Resolution, and the seal of the Company, may be affixed by facsimile on such Written Commitment or written appointment or delegation.

FURTHER RESOLVED, that the foregoing Resolution shall not be deemed to be an exclusive statement of the powers and authority of officers, employees and other persons to act for and on behalf of the Company, and such Resolution shall not limit or otherwise affect the exercise of any such power or authority otherwise validly granted or vested."

I, Dawn M. Chloros, Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, PACIFIC INDEMNITY COMPANY, WESTCHESTER FIRE INSURANCE COMPANY and ACE AMERICAN INSURANCE COMPANY (the "Companies") do hereby certify that

(i) the foregoing Resolutions adopted by the Board of Directors of the Companies are true, correct and in full force and effect,
(ii) the foregoing Power of Attorney is true, correct and in full force and effect.

Given under my hand and seals of said Companies at Whitehouse Station, NJ, this October 6, 2020

Dawn M. Chloros

Dawn M. Chloros, Assistant Secretary

IN THE EVENT YOU WISH TO VERIFY THE AUTHENTICITY OF THIS BOND OR NOTIFY US OF ANY OTHER MATTER, PLEASE CONTACT US AT:
Telephone (908) 903-3493 Fax (908) 903-3656 e-mail: surety@chubb.com

Item #10

Four (4) 145 kV Dead Tank Circuit Breakers according to ANSI/IEEE standards for outdoor installation with mechanical spring operating mechanisms including support structures:

▪ Type		DT1-145 FK F1
▪ Rated Nominal Voltage		138 kV
▪ Rated Maximum Voltage		145 kV
▪ Frequency		60 Hz
▪ Rated Continuous Current		2000 A
▪ Rated Short-Circuit Current		40 kA
▪ Interrupting Time		3 cycles
▪ High-Speed-Auto-Reclosure		3 Phase – Gang Operated
▪ BIL		650 kV @ 3,300' ASL
▪ Creep Distance / Material / Color		92" / Porcelain / Gray
▪ Insulating Medium		SF_6 (Included for First Filling)
▪ Current Transformers	1-3-5 X & Y	2000:5 MR C400, TRF 2.0
	2-4-6 X & Y	2000:5 MR C400, TRF 2.0
▪ Cabinet Enclosure Rating / Material		NEMA 3R / Painted Steel
▪ Ambient Temperature		-30°C to +40°C without Tank Heaters
▪ Seismic Rating		Moderate per IEEE 693-2005
▪ Control Voltage / Range		125 VDC / (T) 70-140 VDC- (C) 90-140 VDC
▪ Motor Voltage		125 VDC
▪ Alternate Current Circuit (Lighting / Heating)		120 / 240 VAC

Features and Benefits

- The circuit breaker is qualified to M2 class for mechanical endurance in accordance with IEC 62271-100. This qualifies the circuit breaker mechanically for 10,000 Close-Open operations without maintenance.
- The circuit breaker is qualified to C2 class for capacitor switching in accordance with IEEE/ANSI C37. This qualifies the circuit breaker for switching of capacitive loads (lines, cables, shunt capacitor bank, back to back) and with very low probability of re-strike.

Spare Parts, Special Tools and Field Service

Spare Parts

Item #	Parts Description	DT1-145 FK F1 Price per Unit in USD
a	Spring Charging Motor	$650.00
b	One (1) Trip or Close Coil	$105.00

Prices of spare parts are valid only when ordered and delivered with the circuit breaker.

It's recommended for emergency purposes to purchase and stock a spare charging motor, trip and close coil.

Special Tools

No special tools are necessary for installation or maintenance of the breakers. We do recommend, however, having one (1) of each of the following SF_6 handling tools on site:

- Gas regulator and fill hose set — One (1) included per substation
- Doble Transducer Bracket — One (1) included per substation
- Hand crank for manual spring charge — One (1) included per breaker

Field Service

A field service representative is not included in the base price of the circuit breakers. If service is required, pricing information is listed below.

- Initial Trip (airfare & travel time) — $3,250.00 - USD
- Ten (10) hour day (time, lodging, meals & local transportation) — $2,000.00 - USD

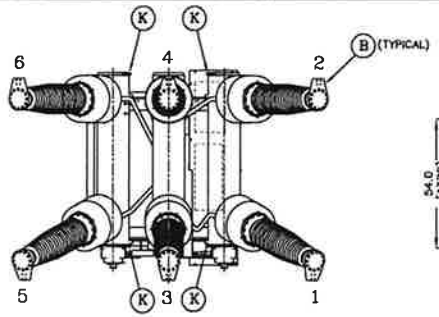
Comments, Clarifications and Exceptions

* This offer is made strictly in accordance with the attached Terms and Conditions for Sale of Products and Services Form EM 104 (Grid Solutions). This document will take precedent over any terms defined in the Invitation for Bid.

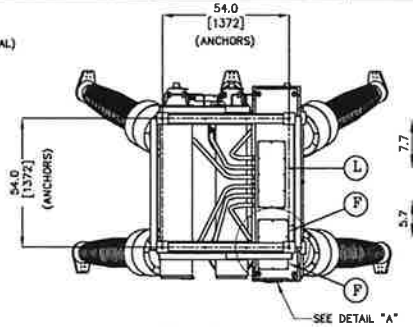
* The breakers have NEMA four (4) hole bushing terminals, made of aluminum (silver plated) and arranged in a horizontal plane

* The circuit breaker will be provided with an external electrical trip push button with permissive control. The electrical push button is protected by the low gas lockout function and cannot be operated if the gas level should fall below safe operating levels. A mechanical trip lever is provided on each circuit breaker and located inside the mechanism enclosure.

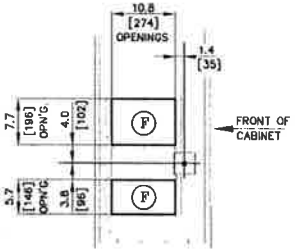
Warranty: Sixty (60) months after installation, not to exceed sixty-six (66) months after delivery. Warranties exclude wear and tear associated with normal circuit breaker operation, circuit breakers used in special applications not covered by ANSI/IEEE C37.04, and circuit breakers that have exceeded the maximum allowable cumulated current. Warranties are based on strict accordance with the maintenance instructions found in the breaker manual. Supervision by GE personnel for installation of bushings removed for transport is mandatory to maintain the warranty and is included where applicable.



TOP VIEW



BOTTOM VIEW



DETAIL "A"

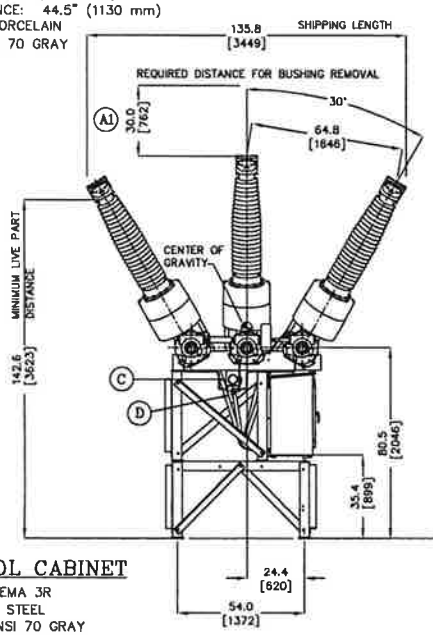
BOTTOM VIEW
(CABLE ENTRANCE OPENINGS)
(NOT TO SCALE)

LEGEND

A1 -- MINIMUM DISTANCE FOR BUSHING REMOVAL: 30.0" (762 mm)
A2 -- MINIMUM DISTANCE FOR INTERRUPTER REMOVAL: 85.0" (2159 mm)
B -- NEMA 4 HOLE TERMINAL PAD
C -- SF6 DENSITY MONITOR
D -- SF6 FILL VALVE
E1 -- CHARGED/DISCHARGE INDICATORS
E2 -- OPEN/CLOSE INDICATORS & COUNTER
F -- CABLE ENTRANCE
G -- RATINGS NAME PLATE (EXTERNAL)
H -- PRESSURE RELIEF DEVICE
J -- NEMA 2 GROUND PAD (DIAMETRICALLY OPPOSED)
K -- LIFTING LOCATIONS
L -- MECHANISM ACCESS
M -- BCT NAMEPLATE (INTERNAL)
N -- EXTERNAL GFI RECEPTACLE
P -- EMERGENCY TRIP PUSHBUTTON

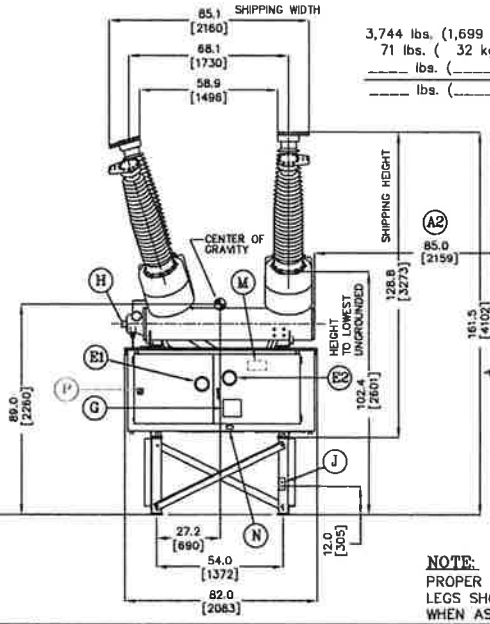
BUSHING DATA

CREEPAGE: 92.0" (2337 mm)
STRIKE DISTANCE: 44.5" (1130 mm)
MATERIAL: PORCELAIN
COLOR: ANSI 70 GRAY

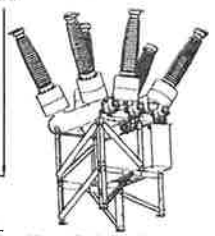


CONTROL CABINET

RATING: NEMA 3R
MATERIAL: STEEL
COLOR: ANSI 70 GRAY



3,744 lbs. (1,699 kg) -- WEIGHT OF BREAKER
71 lbs. (32 kg) -- WEIGHT OF SF6 GAS
_____ lbs. (_____kg) -- WEIGHT OF CT's
_____ lbs. (_____ kg) -- TOTAL WEIGHT OF BREAKER



NOTE:
PROPER ARRANGEMENT OF SUPPORT LEGS SHOW ABOVE. USE CAUTION WHEN ASSEMBLING LOWER STRUCTURE.

TYPE:	DT1-145FK-F1
IMPULSE WITHSTAND:	650 kV
MAXIMUM VOLTAGE:	145 kV
INTERRUPTER CURRENT RATING:	40 kA
CURRENT RATING:	1200 A

DIMESIONS: INCHES / mm

NOTES:

1) FOUR (4) ø3/4" [19 mm] ANCHOR BOLTS (ASTM A 36 OR GREATER)
2) 3.0" [76 mm] MINIMUM PROJECTION ABOVE FOUNDATION.
3) ANCHORING TO BE SUPPLIED BY CUSTOMER.
4) FOUNDATION TO BE LEVEL WITHIN 0.25" [6 mm] AT FOUR (4) BASEPLATES.
5) SHIM AND GROUT AS REQUIRED.
6) RATED SEISMIC LEVEL 0.2g OF RRS PER IEEE 693
7) OPERATIONAL FORCES IN ANY DIRECTION = 1112N (250 lbf)
8) HV TERMINAL STATIC HORIZONTAL FORCE (LONGITUDINAL) = 1250N (281 lbf)
9) HV TERMINAL STATIC HORIZONTAL FORCE (TRANSVERSE) = 750N (169 lbf)
10) HV TERMINAL STATIC VERTICAL FORCE = 1000N (225 lbf)

REV.	DESCRIPTION	DRAWN	CHECKED	DATE

CUSTOMER:
CUSTOMER ORDER No.:
SUBSTATION:
SERIAL No.:
CUSTOMER EQ. NO.:

SAMPLE DRAWING

MATERIAL ID: CC
ORDER No. X

OUTLINE DRAWING

	DRAWN	CHECKED	DATE
xxxxxxx	xxxxxxx	xxxxxxx	
DRAWN	CHECKED	DATE	

Grid Solutions
One Power Lane
Charleroi, PA 15022

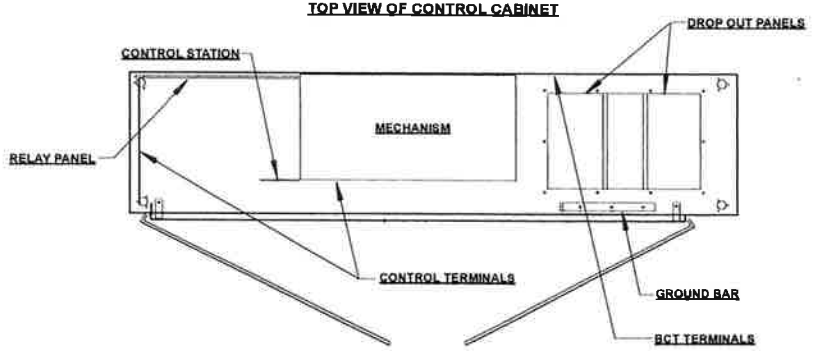
DRAWING No.: DT1-145FK F1

SHT 1 OF 1

CIRCUIT BREAKER	FUSE PULLOUT, SLUGGED	01CS BREAKER CONTROL SWITCH	52Y ANTIPUMP RELAY
CABINET LIGHT	INDICATOR LIGHT	23 THERMOSTAT	52-MON BREAKER CONDITION MONITOR
COIL	KNIFE SWITCH	23X HEATER CONTACTOR	63G SF6 PRESSURE / DENSITY GAUGE
CONTACT, NORMALLY CLOSED	MOTOR	27X LOSS OF POWER RELAY	63GX SF6 PRESSURE / DENSITY RELAY
CONTACT, NORMALLY OPEN	PUSHBUTTON	30 ANNUNCIATOR	69 PERMISSIVE CONTROL SWITCH
CONNECTOR	RESISTOR/ HEATER	37 UNDERCURRENT ALARM	69-KI KEY INTERLOCK
DENSITY MONITOR	TERMINAL BLOCK	43L/R LOCAL REMOTE TRANSFER SWITCH	74CC CLOSE COIL MONITOR
DOOR SWITCH	TERMINAL BLOCK (AUXILIARY)	49 MOTOR THERMAL OVERLOAD	74TC TRIP COIL MONITOR
FUSE BLOCK	THERMOSTAT	52a,b BREAKER AUXILIARY SWITCH	79X RECLOSE DELAY RELAY
FUSE BLOCK, SLUGGED	THERMAL OVERLOAD	52C CLOSE PUSHBUTTON	83X MOTOR TRANSFER CONTACTOR
FUSED DISCONNECT	TOGGLE SWITCH	52CC BREAKER CLOSE COIL	88 MOTOR
FUSED DISCONNECT, SLUGGED	TRANSFORMER	52T TRIP PUSHBUTTON	88F MOTOR FAILURE ALARM
FUSE PULLOUT		52TC BREAKER TRIP COIL	88LS MOTOR LIMIT SWITCH
		52X CLOSING RELAY	AIL AMBER INDICATOR LIGHT
			GIL GREEN INDICATOR LIGHT
			HTR HEATER
			RIL RED INDICATOR LIGHT

STANDARD ANSI DESIGNATIONS

TOP VIEW OF CONTROL CABINET



WIRING KEY

SHEET No.	DESCRIPTION
1	LEGEND/ TABLE OF CONTENTS
2	DC CONTROL & TRIP CIRCUITS
3	MOTOR CIRCUIT, ALARMS & SPARE CONTACTS
4	AC CONTROL SCHEMATIC
5	TERMINAL BLOCK WIRING DIAGRAM
6	MECHANISM PANEL WIRING DIAGRAM
7	RELAY PANEL WIRING DIAGRAM
8	COMPONENT LAYOUT - CONTROL CABINET
9	BILL OF MATERIAL - CONTROL CABINET
10	BUSHING CURRENT TRANSFORMER DATA
11	GAS SCHEMATIC & RATING NAMEPLATE
12	TERMINAL BLOCK & DEVICE TAGS
13	BUSHING OUTLINE

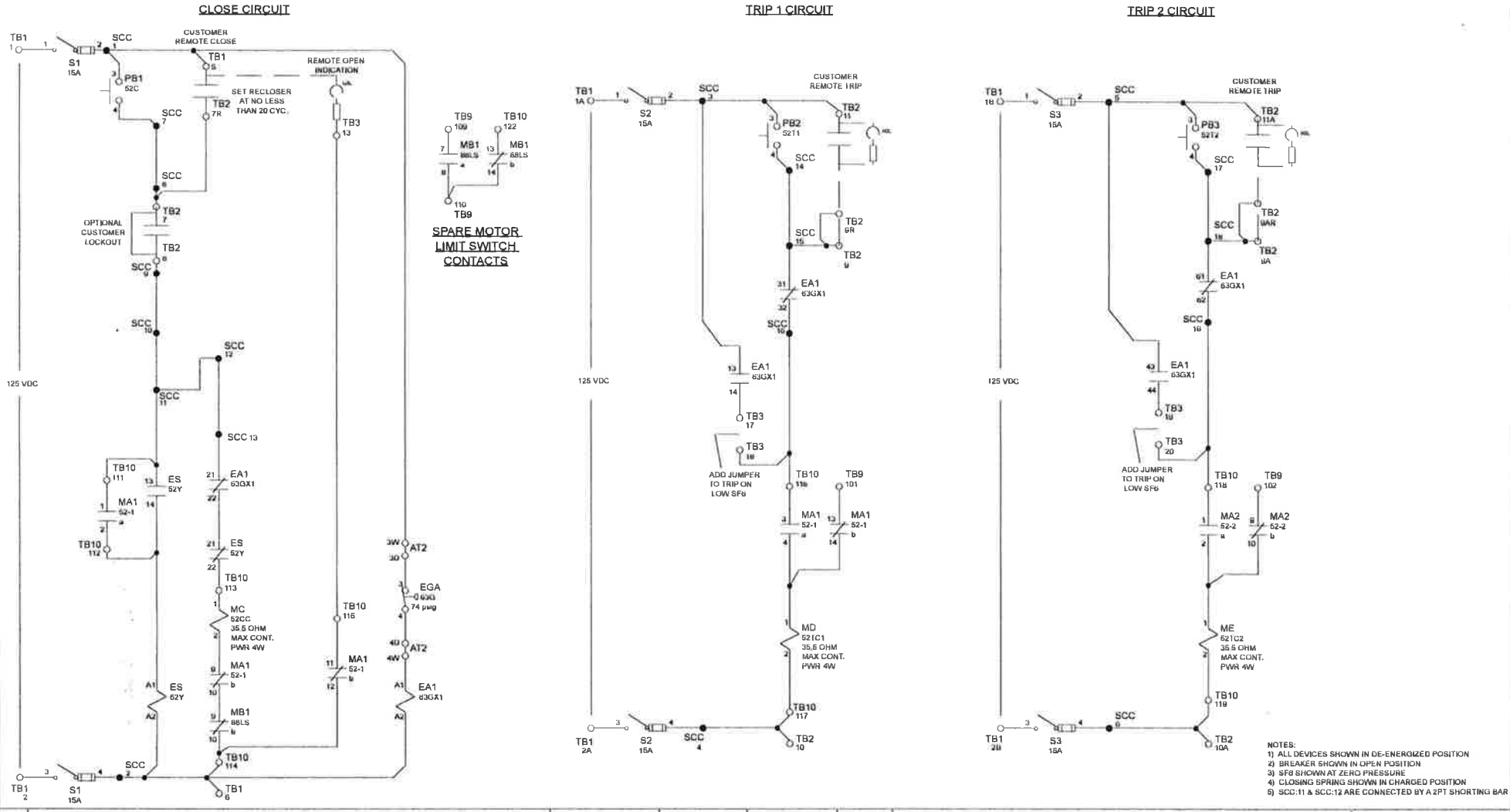
REV.	DESCRIPTION	ECN NO.	DRAWN BY	CHECKED	DATE
	LEGEND		DRAWN	CHECKED	DATE

CUSTOMER:
CUSTOMER ORDER No.:
SUBSTATION:
SERIAL No.:
CUSTOMER EQ. No.:

SAMPLE DRAWING

Grid Solutions
One Power Lane
Charlotte, PA 15022

MATERIAL ID: CCDT1-145FK-F1-001
ORDER No.:
DRAWING No.: DT1-145FK F1
SHT 1 OF 13



REV.	DESCRIPTION	ECN NO.	DRAWN BY	CHECKED	DATE
			DRAWN	CHECKED	DATE

DC CONTROL SCHEMATIC

CUSTOMER
CUSTOMER ORDER No.
SUBSTATION:
SERIAL No.:
CUSTOMER EQ. No.

SAMPLE DRAWING

Grid Solutions
One Power Lane
Charlotte, PA 15022

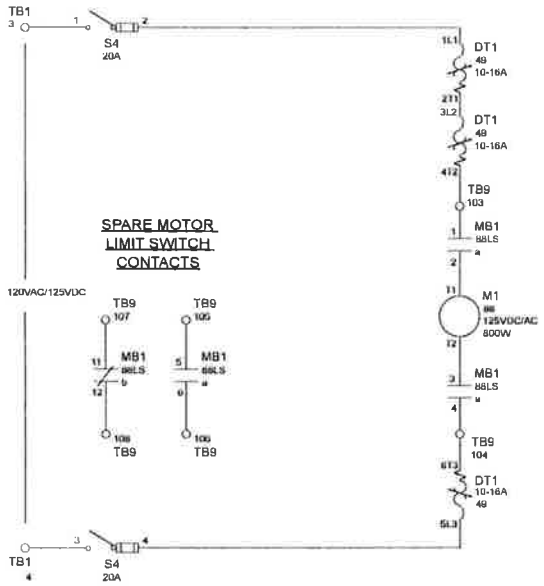
MATERIAL ID: CCDT1-145FK-F1-001

ORDER No.

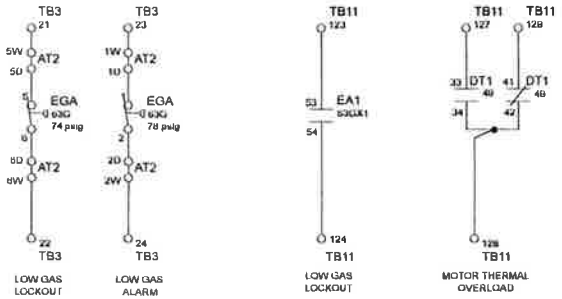
DRAWING No.: DT1-145FK F1

SHT 2 OF 13

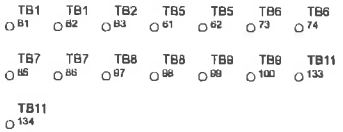
MOTOR CIRCUIT



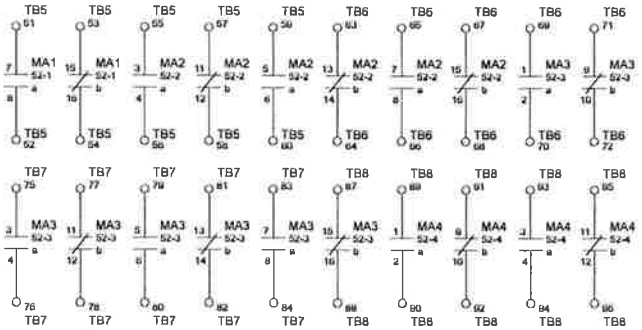
CUSTOMER ALARMS



SPARE TERMINAL BLOCKS FOR CUSTOMER USE



SPARE AUXILIARY SWITCHES FOR CUSTOMER USE



NOTES:
1) ALL DEVICES SHOWN IN DE-ENERGIZED POSITION
2) BREAKER SHOWN IN OPEN POSITION
3) SFS SHOWN AT ZERO PRESSURE
4) CLOSING SPRING SHOWN IN CHARGED POSITION
5) SCC:11 & SCC:12 ARE CONNECTED BY A 2PT SHORTING BAR

REV.	DESCRIPTION	ECN NO.	DRAWN BY	CHECKED	DATE
			DRAWN	CHECKED	DATE

CUSTOMER:
CUSTOMER ORDER No.:
SUBSTATION:
SERIAL No.:
CUSTOMER EQ. No.:

SAMPLE DRAWING

MATERIAL ID: CCDT1-145FK-F1-001

ORDER No.:

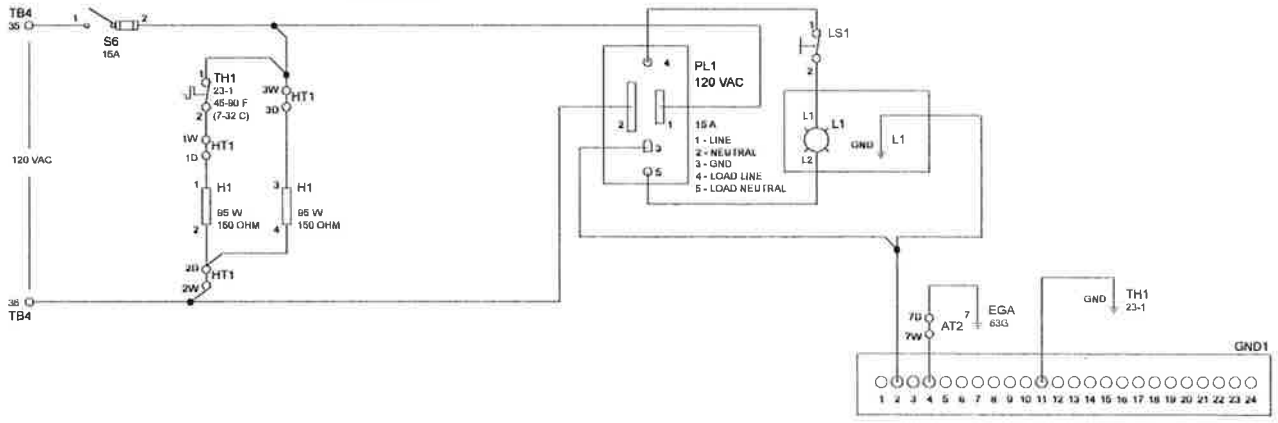
Grid Solutions
One Power Lane
Charlotte, PA 15022

DRAWING No.: DT1-145FK F1

SHT 3 OF 13

MOTOR CIRCUIT AND ALARMS

AC CIRCUIT



NOTES:
1) ALL DEVICES SHOWN IN DE-ENERGIZED POSITION
2) BREAKER SHOWN IN OPEN POSITION
3) SF6 SHOWN AT ZERO PRESSURE
4) CLOSING SPRING SHOWN IN CHARGED POSITION
5) SCC:11 & SCC:12 ARE CONNECTED BY A 2PT SHORTING BAR

REV.	DESCRIPTION	ECN NO.	DRAWN BY	CHECKED	DATE
	AC SCHEMATIC		DRAWN	CHECKED	DATE

CUSTOMER:
CUSTOMER ORDER No.:
SUBSTATION:
SERIAL No.:
CUSTOMER EQ. No:

SAMPLE DRAWING

Grid Solutions
One Power Lane
Charleroi, PA 15022

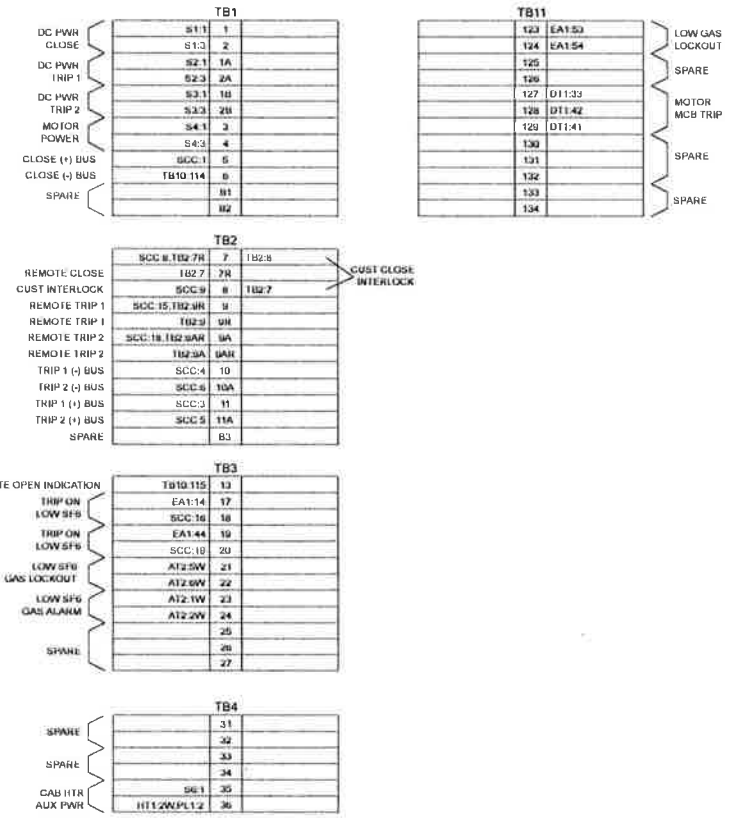
MATERIAL ID: CCDT1-145FK-F1-001

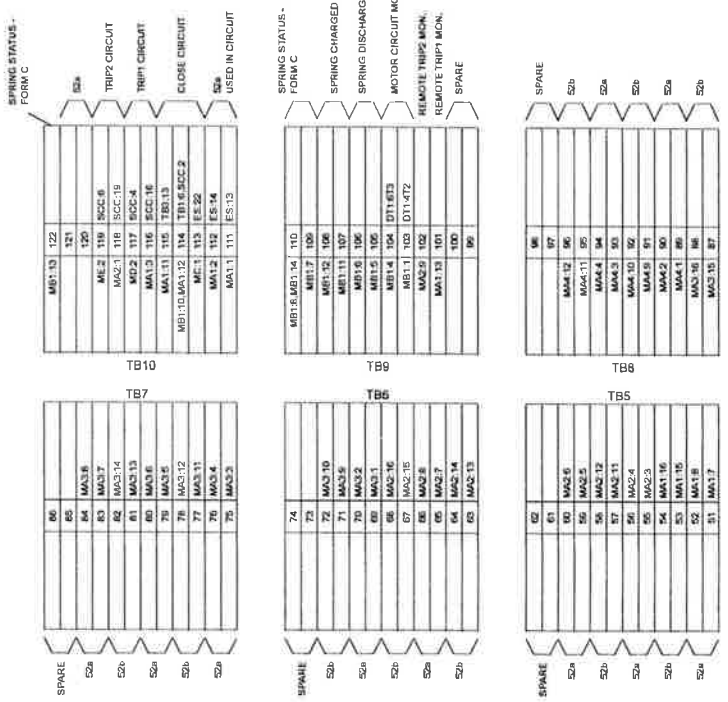
ORDER No.:

DRAWING No.: DT1-145FK F1

SHT 4 OF 13

TERMINAL BLOCK WIRING





NOTES:
1) ALL AC WIRING TO BE 14GA GRAY SIS VW1
2) DC WIRING TO BE 14GA GRAY SIS VW1, MOTOR CIRCUIT WIRING TO BE 12GA GRAY SIS VW1
3) ALL GROUND WIRES TO BE 14GA GREEN SIS VW1
4) WIRE MARKERS TO BE SHRINK-TYPE AND TO SHOW SAME-END/OPPOSITE-END DESIGNATION
5) WIRE LUGS ARE TO BE INSULATED RING-TYPE (EXCEPT FOR DEVICES THAT DO NOT ACCEPT RING-TYPE TERMINALS)
6) SCC:11 & SCC:12 ARE CONNECTED BY A 2PT SHORTING BAR

REV.	DESCRIPTION	ECN NO.	DRAWN BY	CHECKED	DATE
			DRAWN	CHECKED	DATE

TERMINAL BLOCK WIRING DIAGRAM

CUSTOMER
CUSTOMER ORDER No.
SUBSTATION:
SERIAL No.

SAMPLE DRAWING

CUSTOMER EQ. No.

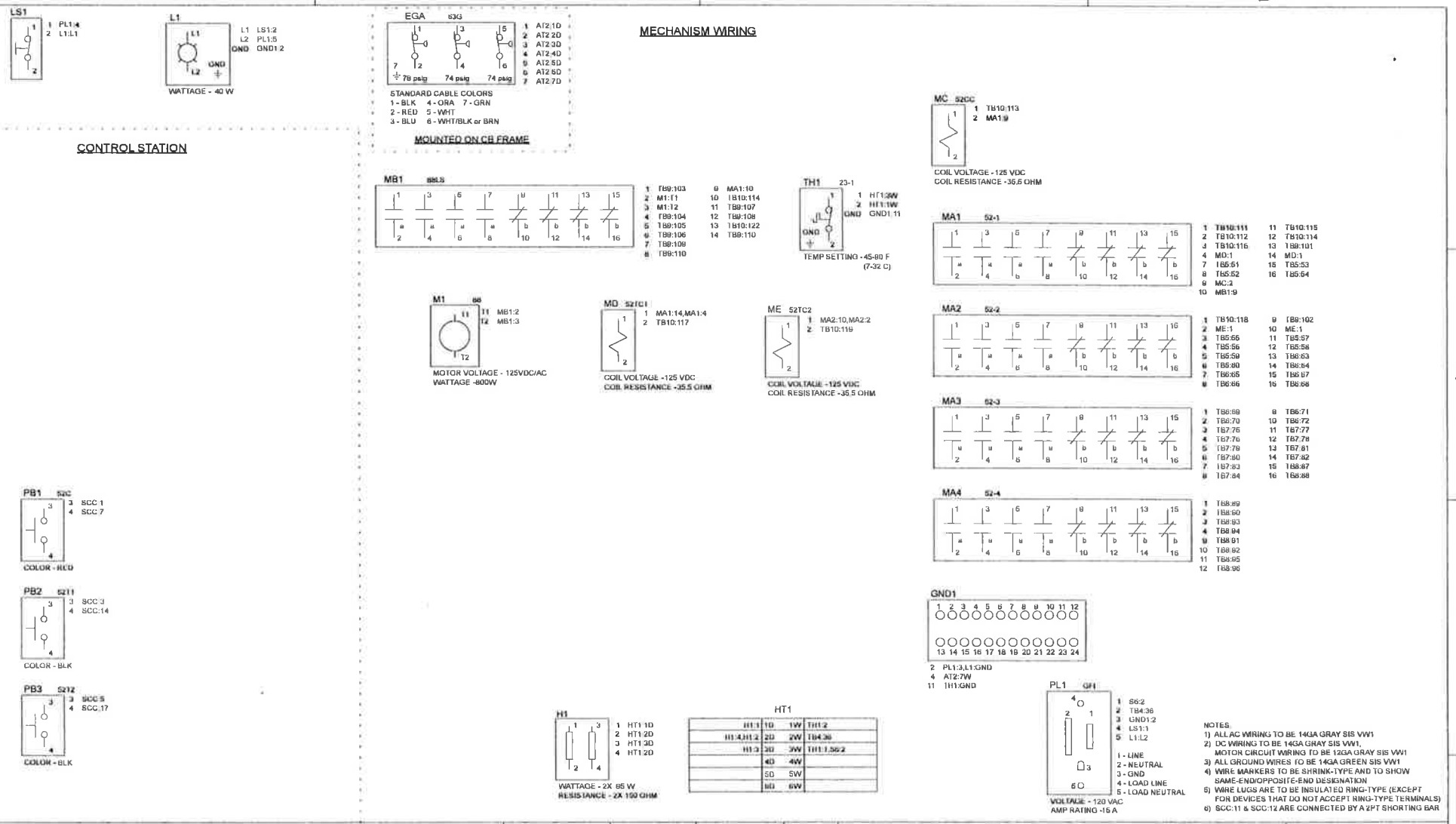
Grid Solutions
One Power Lane
Charlotte, PA 15022

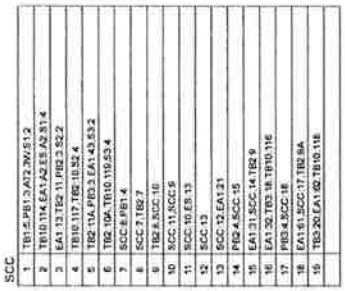
MATERIAL ID: CCDT1-145FK-F1-001

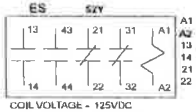
ORDER No.

DRAWING No.: DT1-145FK F1

SHT 5 OF 13

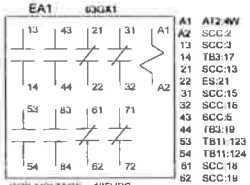

MECHANISM WIRING
CONTROL STATION
LS1
1 PL1:4
2 L1:L1
L1
WATTAGE - 40 W
L1 LS1:2
L2 PL1:5
GND GND1:2
EGA 83G
1 AT2:1D
2 AT2:2D
3 AT2:3D
4 AT2:4D
5 AT2:5D
6 AT2:6D
7 AT2:7D
78 psig
74 psig
74 psig
STANDARD CABLE COLORS
1 - BLK 4 - ORA 7 - GRN
2 - RED 5 - WHT
3 - BLU 6 - WHT/BLK or BRN
MOUNTED ON CB FRAME
MC 52CC
1 TB10:113
2 MA1:9
COIL VOLTAGE - 125 VDC
COIL RESISTANCE - 36.6 OHM
MB1 88B
1 TB9:103
2 M1:T1
3 M1:T2
4 TB9:104
5 TB9:105
6 TB9:106
7 TB9:109
8 TB9:110
9 MA1:10
10 TB10:114
11 TB9:107
12 TB9:108
13 TB10:122
14 TB9:110
TH1 23-1
1 HT1:2W
2 HT1:1W
GND GND1:11
TEMP SETTING - 45-80 F
(7-32 C)
MA1 52-1
1 TB10:111
2 TB10:112
3 TB10:116
4 MD:1
7 TB5:51
8 TB5:52
9 MC:2
10 MB1:9
11 TB10:115
12 TB10:114
13 TB9:101
14 MD:1
15 TB5:53
16 TB5:54
MA2 52-2
1 TB10:118
2 ME:1
3 TB5:55
4 TB5:56
5 TB5:59
6 TB5:60
7 TB6:65
8 TB6:66
9 TB9:102
10 ME:1
11 TB5:57
12 TB5:58
13 TB6:63
14 TB6:64
15 TB6:67
16 TB6:68
MA3 52-3
1 TB6:69
2 TB6:70
3 TB7:75
4 TB7:76
5 TB7:79
6 TB7:80
7 TB7:83
8 TB7:84
9 TB6:71
10 TB6:72
11 TB7:77
12 TB7:78
13 TB7:81
14 TB7:82
15 TB8:87
16 TB8:88
MA4 52-4
1 TB8:89
2 TB8:90
3 TB8:93
4 TB8:94
9 TB8:91
10 TB8:92
11 TB8:95
12 TB8:96
M1 88
T1
T2
MB1:2
MB1:3
MOTOR VOLTAGE - 125VDC/AC
WATTAGE -800W
MD 52TC1
1 MA1:14,MA1:4
2 TB10:117
COIL VOLTAGE -125 VDC
COIL RESISTANCE -35.5 OHM
ME 52TC2
1 MA2:10,MA2:2
2 TB10:119
COIL VOLTAGE -125 VDC
COIL RESISTANCE -35.5 OHM
GND1
1 2 3 4 5 6 7 8 9 10 11 12
13 14 15 16 17 18 19 20 21 22 23 24
2 PL1:3,L1:GND
4 AT2:7W
11 TH1:GND
PB1 52C
3 SCC:1
4 SCC:7
COLOR - RED
PB2 52T1
3 SCC:3
4 SCC:14
COLOR - BLK
PB3 52T2
3 SCC:5
4 SCC:17
COLOR - BLK
H1
1 HT1:1D
2 HT1:2D
3 HT1:3D
4 HT1:2D
WATTAGE - 2X 85 W
RESISTANCE - 2X 150 OHM
HT1
H1:1 1D 1W TH1:2
H1:4,H1:2 2D 2W TB4:36
H1:3 3D 3W TH1:1,5G2
4D 4W
5D 5W
6D 6W
PL1 GFI
1 S6:2
2 TB4:36
3 GND1:2
4 LS1:1
5 L1:L2
1 - LINE
2 - NEUTRAL
3 - GND
4 - LOAD LINE
5 - LOAD NEUTRAL
VOLTAGE - 120 VAC
AMP RATING -15 A
NOTES:
1) ALL AC WIRING TO BE 14GA GRAY SIS VW1
2) DC WIRING TO BE 14GA GRAY SIS VW1,
MOTOR CIRCUIT WIRING TO BE 12GA GRAY SIS VW1
3) ALL GROUND WIRES TO BE 14GA GREEN SIS VW1
4) WIRE MARKERS TO BE SHRINK-TYPE AND TO SHOW
SAME-END/OPPOSITE-END DESIGNATION
5) WIRE LUGS ARE TO BE INSULATED RING-TYPE (EXCEPT
FOR DEVICES THAT DO NOT ACCEPT RING-TYPE TERMINALS)
6) SCC:11 & SCC:12 ARE CONNECTED BY A 2PT SHORTING BAR
REV. DESCRIPTION
ECN NO.
DRAWN BY
CHECKED
DATE
CUSTOMER
CUSTOMER ORDER No.:
SUBSTATION:
SERIAL No.:
SAMPLE DRAWING
CUSTOMER EQ. No.:
MATERIAL ID:
CCDT1-145FK-F1-001
ORDER No.
MECHANISM AND CONTROL STATION WIRING DIAGRAM
DRAWN
CHECKED
DATE
Grid Solutions
One Power Lane
Charlotte, PA 15022
DRAWING No.: DT1-145FK F1
SHT 6 OF 13





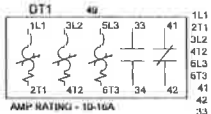
A1 ES:14
A2 SCC:2
13 TB10:111,SCC:11
14 TB10:112,ES:A1
21 EA1:22
22 TB10:113

COIL VOLTAGE - 125VDC
COIL RESISTANCE - 3729 Ohms



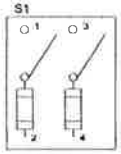
A1 AT2:4W
A2 SCC:2
13 SCC:3
14 TB3:17
21 SCC:13
22 ES:21
31 SCC:15
32 SCC:16
43 SCC:6
44 TB3:19
53 TB11:123
54 TB11:124
61 SCC:18
62 SCC:19

COIL VOLTAGE - 125VDC
COIL RESISTANCE - 3729 Ohms



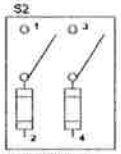
1L1 S4:2
2T1 DT1:3L2
3L2 DT1:2T1
4T2 TB9:103
6L3 S4:4
6T3 TB9:104
41 TB11:129
42 DT1:34,TB11:128
33 TB11:127
34 DT1:42

AMP RATING - 10-16A



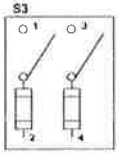
1 TB1:1
2 SCC:1
3 TB1:2
4 SCC:2

AMP RATING - 15A



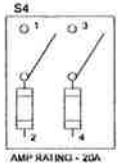
1 TB1:1A
2 SCC:3
3 TB1:2A
4 SCC:4

AMP RATING - 15A



1 TB1:1B
2 SCC:5
3 TB1:2B
4 SCC:6

AMP RATING - 15A



1 TB1:3
2 DT1:1L1
3 TB1:4
4 DT1:5L3

AMP RATING - 20A

1 TB4:35
2 HT1:3W,PL1:1

AMP RATING - 15A

AT2

TB3:23	1W	1D	EGA:1
TB3:24	2W	2D	EGA:2
SCC:1	3W	3D	EGA:3
EA1:A1	4W	4D	EGA:4
TB3:21	5W	5D	EGA:5
TB3:22	6W	6D	EGA:6
GND1:4	7W	7D	EGA:7

NOTES:
1) ALL AC WIRING TO BE 14GA GRAY SIS VW1
2) DC WIRING TO BE 14GA GRAY SIS VW1.
   MOTOR CIRCUIT WIRING TO BE 12GA GRAY SIS VW1
3) ALL GROUND WIRES TO BE 14GA GREEN SIS VW1
4) WIRE MARKERS TO BE SHRINK-TYPE AND TO SHOW SAME-END/OPPOSITE-END DESIGNATION
5) WIRE LUGS ARE TO BE INSULATED RING-TYPE (EXCEPT FOR DEVICES THAT DO NOT ACCEPT RING-TYPE TERMINALS)
6) SCC:11 & SCC:12 ARE CONNECTED BY A 2PT SHORTING BAR

REV.	DESCRIPTION	ECN NO.	DRAWN BY	CHECKED	DATE
			DRAWN	CHECKED	DATE

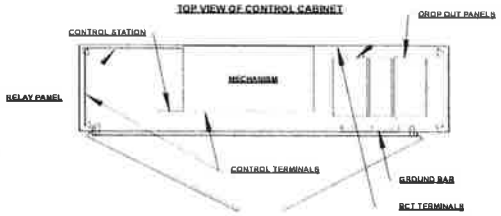
RELAY PANEL WIRING DIAGRAM

CUSTOMER
CUSTOMER ORDER No.:
SUBSTATION:
SERIAL No.:
CUSTOMER EQ. No.:

SAMPLE DRAWING

Grid Solutions
One Power Lane
Charleroi, PA 15022

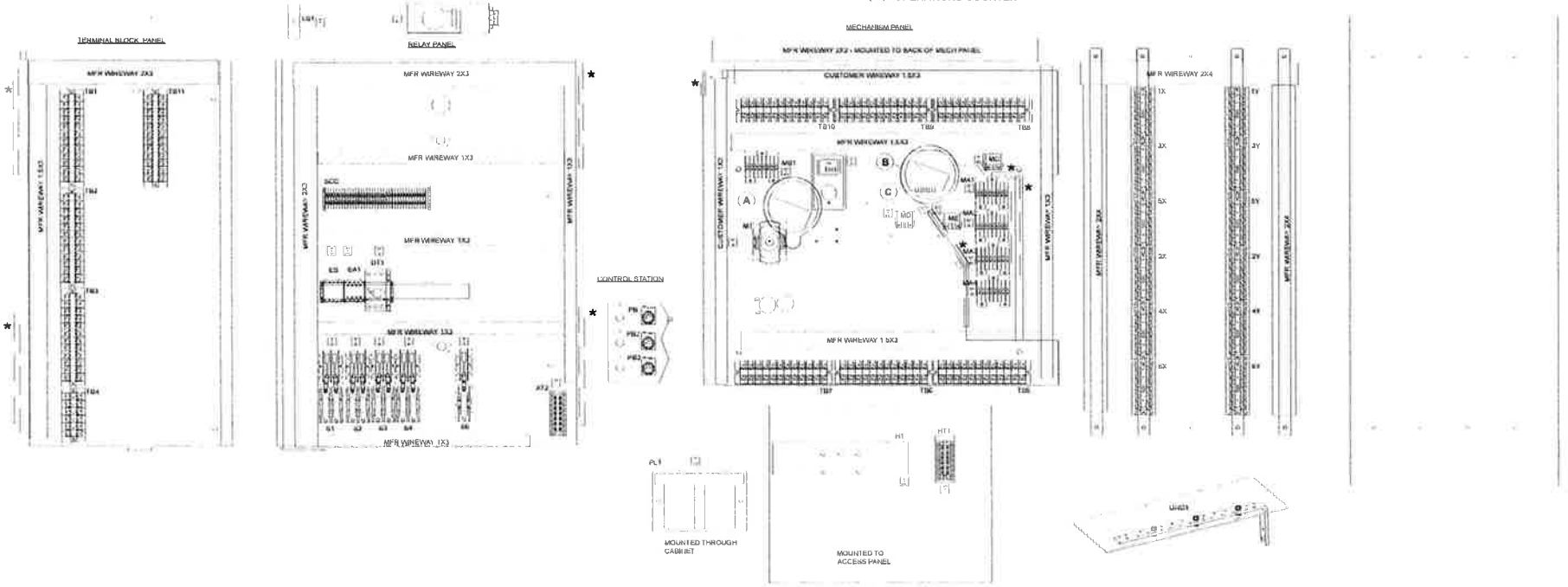
MATERIAL ID: CCDT1-145FK-F1-001
ORDER No.:
DRAWING No.: DT1-145FK F1
SHT 7 OF 13



MANUFACTURING NOTES:
1) DEVICES TO BE MARKED WITH ENGRAVED PLASTIC TAGS.
2) DIN RAIL TO BE PER SPEC 1_419_661.
3) POSITION INDICATOR TAGS ATTACHED WITH STAINLESS STEEL SCREWS.
4) SCC 11 & SCC 12 ARE CONNECTED BY A 2PT SHORTING BAR.
5) MECHANISM OPERATION COUNTER TO INCREMENT ON CB OPENING.

EQA

(A) - CHARGE / DISCHARGE INDICATOR
(B) - OPEN / CLOSE INDICATOR
(C) - OPERATIONS COUNTER



REV.	DESCRIPTION	ECN NO.	DRAWN BY	CHECKED	DATE
	COMPONENT LAYOUT		DRAWN	CHECKED	DATE

CUSTOMER:
CUSTOMER ORDER No.:
SUBSTATION:
SERIAL No.:

SAMPLE DRAWING

CUSTOMER EQ. No.:

Grid Solutions
One Power Lane
Charlotte, PA 15022

MATERIAL ID: CCDT1-145FK-F1-001

ORDER No.:

DRAWING No.: DT1-145FK F1

SHT 8 OF 13

ITEM	QTY	SAP #	MFR #	MFR	DESCRIPTION	DEVICE ID
001	001	CC410504-017	EB25B12	GENERAL ELECTRIC	TERMINAL BLOCK 12PT	TB11
002	003	CC410504-017	EB25B12	GENERAL ELECTRIC	TERMINAL BLOCK 12PT	TB1, TB2, TB3
003	001	CC410504-019	EB25B06	GENERAL ELECTRIC	TERMINAL BLOCK 6PT	TB4
004	012	CC410504-003	EB27B06S	GENERAL ELECTRIC	TERMINAL BLOCK 6PT, SHORTING	3X, 3Y, 4X, 4Y, 5X, 5Y, 6X, 6Y, 1X, 1Y, 2X, 2Y
005	001	CC410632-019	1-410-632-P19	GRID SOLUTIONS	CABINET LIGHT	L1
006	001	CC417123-001	E69-30A	CHERRY	DOOR SWITCH, 10A, 125/250VAC	LS1
007	001	CC410634-009	TSA901	ELECTROMODE	ADJUSTABLE THERMOSTAT 45-90F (7-32C)	TH1
008	001	CC410635-010	201-J	STATES	KNIFE SWITCH 1 POLE	S6
009	004	CC410635-009	202-AW	STATES	KNIFE SWITCH 2 POLE	S3, S4, S1, S2
010	001	CC410640-101	TP7018	THEPITT	RECEPTACLE, ENCLOSURE	TH1
011	001	CC410640-019	IH3-1	THOMAS & BETTS / RED DOT	RECEPTACLE, ENCLOSURE	PL1
012	001	CC410640-002	GF15LA OR =	HUBBELL	120VAC, 15A, NEMA TYPE 5-15R GFCI DUPLEX RECEPTACLE	PL1
013	001	CC410640-031	BWFFG-1BCV	HUBBELL	RECEPTACLE, WEATHERPROOF COVER	PL1
014	002	CC410641-073	CLIPFIX35-5	PHOENIX	END CLAMP	END10, END33
015	007	CC410650-006	1-410-650-P6	GRID SOLUTIONS	FUSE, 15A, CLASS RK5	S3, S3, S6, S1, S1, S2, S2
016	002	CC410650-007	1-410-650-P7	GRID SOLUTIONS	FUSE, 20A, CLASS RK5	S4, S4
017	001	CC410749-201	CS8C-22Z-110D	SPRECHER + SCHUH	CONTROL RELAY 4NO 4NC (125 VDC)	EA1
018	001	CC410749-201	CS8C-22Z-110D	SPRECHER + SCHUH	CONTROL RELAY 2NO 2NC (125 VDC)	ES
019	001	CC410749-208	CS8-P22	SPRECHER + SCHUH	AUXILIARY CONTACT	EA1
020	001	CC413999-004	CIR409NYXX 120VAC	CHROMALOX	ANTICONDENSATION HEATER ASSY 120VAC	H1
021	009	CC416091	1-416-091	GRID SOLUTIONS	COPPER STRAP	S2, S2, S3, S3, S4, S4, S6, S1, S1
022	001	CC416206-004	1-416-206-P4	GRID SOLUTIONS	TERMINAL BLOCK COVER AUX 6PT	8
023	001	CC416868-001	1-416-868-P1	GRID SOLUTIONS	PUSH BUTTON / IND LITE BRACKET	17
024	001	CC417056-001	1-417-056-P1	GRID SOLUTIONS	SWITCH BRACKET	LS1
025	001	CC417125-001	GEL 40A15/120V 15199	GENERAL ELECTRIC	LIGHT BULB 40W 120VAC	L1
026	001	CC417294-001	1-417-294-G1	GRID SOLUTIONS	SPRING CHARGE MOTOR FOR FK3-1/131	M1
027	001	CC990024-001	2-990-024-P1	WIKA	DENSITY MONITOR (93,78,74) PSIG-BAR SCALE - PURE SF6	EGA
028	001	CC990035-001	2-990-035-P1	GRID SOLUTIONS	MECHANISM PANEL	PAN11
029	001	CC990156-003	2-990-156-P3	GRID SOLUTIONS	DT72.5 RELAY PANEL, VERSION 3	PAN17
030	004	CC991268-001	2-991-268-P1	GRID SOLUTIONS	6PT TB MOUNTING STRIP-NEW	PAN12, PAN13, PAN14, PAN15
031	001	CC410748-001	TB206	BUSSMANN	AUX. TERMINAL BLOCK, 6 PT	HT1
032	001	CC410748-003	TB207	BUSSMANN	AUX. TERMINAL BLOCK, 7 PT	AT2
033	003	CC413166-023	WNO SER B	C3CONTROLS	PUSH BUTTON NO CONTACT, SER B	PB1, PB2, PB3
034	002	CC413168-025	W22PB-FK SER B	C3CONTROLS	PUSH BUTTON, BLK, 1NO	PB2, PB3
035	001	CC413166-026	W22PB-FR SER B	C3CONTROLS	PUSH BUTTON, RED, 1NO	PB1
036	001	CC966188-002	KTA7-25S-16A	SPRECHER+SCHUH	MOTOR CIRCUIT CONTROLLER, 10-16A	DT1
037	001	CC966188-004	KT7-PA1-11	SPRECHER+SCHUH	AUX CONTACT FOR MOTOR CONTROLLER	DT1
038	001	CC410651-003	RF30A1SP1	MARATHON	FUSED KNIFE SWITCH 1 POLE, 15A	S6
039	003	CC410651-002	RF30A2SP1	MARATHON	FUSED KNIFE SWITCH 2 POLE, 15A	S2, S3, S1
040	001	CC410651-002	RF30A2SP1	MARATHON	FUSED KNIFE SWITCH 2 POLE, 20A	S4
041	001		GROUND_BAR	GRID SOLUTIONS	GROUND BAR, 24PT	GND1
042	003	CC410504-017	EB25B12	GENERAL ELECTRIC	TERMINAL BLOCK 12PT	TB5, TB6, TB7
043	003	CC410504-017	EB25B12	GENERAL ELECTRIC	TERMINAL BLOCK 12PT	TB10, TB8, TB9
044	003	CC49.102.110-20	49.102.110-20	GRID SOLUTIONS	COIL (125 VDC)	MC, MD, ME
045	005	CC49.105.100-01	49.105.100-01	GRID SOLUTIONS	AUXILIARY SWITCH FK3-X	MA1, MA2, MA3, MA4, MB1
046	001	CC417925-002	1-417-925-G2	GRID SOLUTIONS	STANDARD CIRCUIT CONNECTOR	SCC

REV.	DESCRIPTION	ECN NO.	DRAWN BY	CHECKED	DATE

CUSTOMER
CUSTOMER ORDER No.
SUBSTATION:
SERIAL No.:

SAMPLE DRAWING

CUSTOMER EQ. No.:

MATERIAL ID: CCDT1-145FK-F1-001

ORDER No.

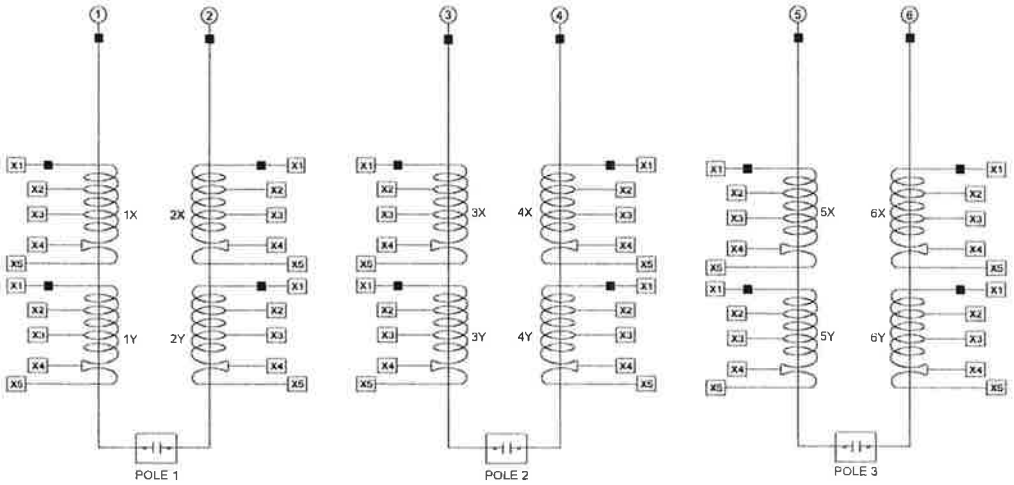
BILL OF MATERIALS

DRAWN | CHECKED | DATE

Grid Solutions
One Power Lane
Charlotte, PA 15022

DRAWING No.: DT1-145FK F1

SHT 9 OF 13



BCT WIRING

1X		1Y	
1X-X1	1X1	1Y1	1Y-X1
1X-X2	1X2	1Y2	1Y-X2
1X-X3	1X3	1Y3	1Y-X3
1X-X4	1X4	1Y4	1Y-X4
1X-X5	1X5	1Y5	1Y-X5
GND	GND	GND	GND

3X		3Y	
3X-X1	3X1	3Y1	3Y-X1
3X-X2	3X2	3Y2	3Y-X2
3X-X3	3X3	3Y3	3Y-X3
3X-X4	3X4	3Y4	3Y-X4
3X-X5	3X5	3Y5	3Y-X5
GND	GND	GND	GND

5X		5Y	
5X-X1	5X1	5Y1	5Y-X1
5X-X2	5X2	5Y2	5Y-X2
5X-X3	5X3	5Y3	5Y-X3
5X-X4	5X4	5Y4	5Y-X4
5X-X5	5X5	5Y5	5Y-X5
GND	GND	GND	GND

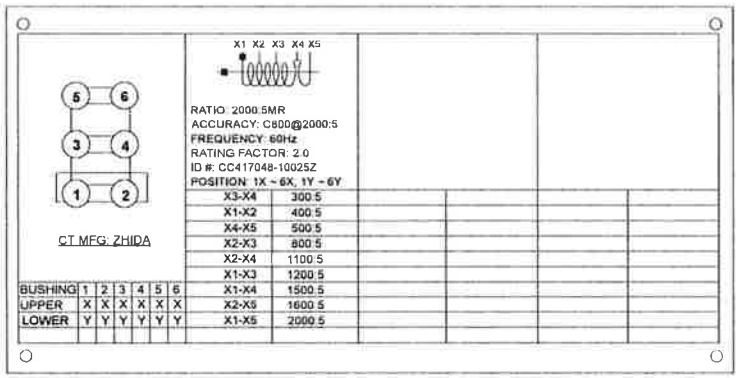
2X		2Y	
2X-X1	2X1	2Y1	2Y-X1
2X-X2	2X2	2Y2	2Y-X2
2X-X3	2X3	2Y3	2Y-X3
2X-X4	2X4	2Y4	2Y-X4
2X-X5	2X5	2Y5	2Y-X5
GND	GND	GND	GND

4X		4Y	
4X-X1	4X1	4Y1	4Y-X1
4X-X2	4X2	4Y2	4Y-X2
4X-X3	4X3	4Y3	4Y-X3
4X-X4	4X4	4Y4	4Y-X4
4X-X5	4X5	4Y5	4Y-X5
GND	GND	GND	GND

6X		6Y	
6X-X1	6X1	6Y1	6Y-X1
6X-X2	6X2	6Y2	6Y-X2
6X-X3	6X3	6Y3	6Y-X3
6X-X4	6X4	6Y4	6Y-X4
6X-X5	6X5	6Y5	6Y-X5
GND	GND	GND	GND

CT WIRING NOTES:
1) LEADS TO BE TERMINATED WITH INSULATED TYPE LUGS.
2) ALL CT LEADS ARE TO BE SHORTED BEFORE SHIPMENT. IF TERMINAL BLOCKS ARE NOT EQUIPPED WITH INTEGRATED SHORTING BARS - SHORTING TO BE ACCOMPLISHED WITH 10GA GRAY SIS VW1 WIRE JUMPERS. (W1-BLK-GND).
(IF LEADS ARE NOT COLOR CODED SHORT THE FIRST LEAD-THE LAST LEAD-GROUND)
3) ALL BCT LEADS ARE 10GA WIRE.
4) ALL GROUND WIRES ARE 10GA GREEN SIS WIRE.

BCT NAMEPLATE



BCT NAMEPLATE NOTES:
1) NAMEPLATE MATERIAL: ANODIZED ALUMINUM
2) NAMEPLATE LOCATION: INTERNAL
3) NAMEPLATE DIMENSIONS AS SHOWN ON DRAWING 1_415_218_P3/4.
4) NAMEPLATE IS TO BE ATTACHED WITH ALUMINUM RIVETS.

REV.	DESCRIPTION	ECN NO.	DRAWN BY	CHECKED	DATE

BCT WIRING DIAGRAM & NAMEPLATE

DRAWN | CHECKED | DATE

CUSTOMER:
CUSTOMER ORDER No.:
SUBSTATION:
SERIAL No.:
CUSTOMER EQ. No.:

SAMPLE DRAWING

Grid Solutions
One Power Lane
Charleroi, PA 15022

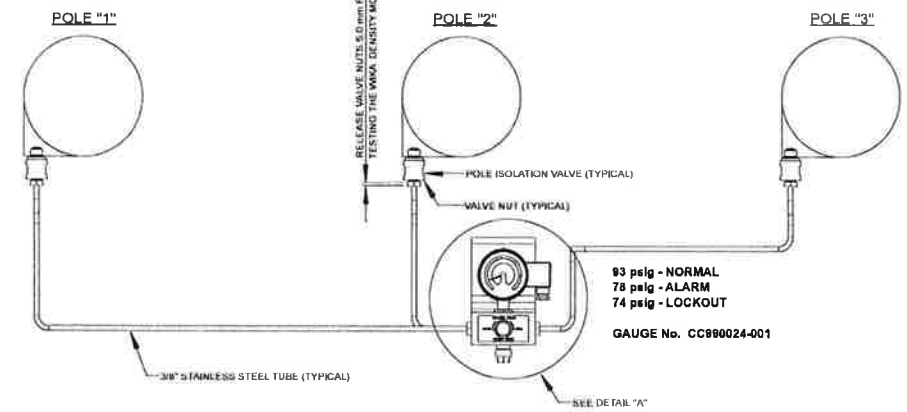
MATERIAL ID: CCDT1-145FK-F1-001

ORDER No.:

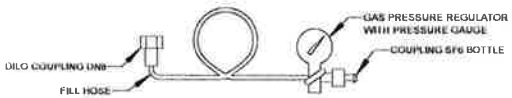
DRAWING No.: DT1-145FK F1

SHT 10 OF 13

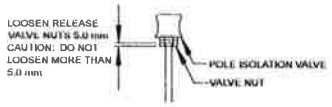
SF6 GAS SCHEMATIC

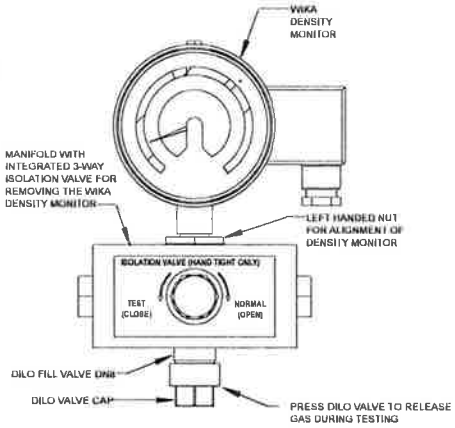


FILL HOSE & REGULATOR DETAIL



POLE ISOLATION VALVE DETAIL





DETAIL "A"

NOTES
1) ALL TUBING IS 3/8" STAINLESS.
2) GAS SAMPLING CAN BE DONE THROUGH FILL VALVE.
3) POLE ISOLATION VALVES USED TO ISOLATE TANK FROM GAS PIPING.
4) PRESSURE SWITCHES ARE LOCATED INSIDE THE DENSITY GAUGE HOUSING

RATINGS NAMEPLATE

	TYPE: DT1-145FK F1	CUSTOMER P.O.:
	SERIAL NUMBER:	ORDER NUMBER:
	MANUFACTURE DATE:	PARTS LIST No.:
		WIRING DIAGRAM:
		INSTRUCTION BOOK No.: IB-DT12FK
RATED MAXIMUM VOLTAGE 145 kV	RATED INTERRUPTING TIME: 3.0 CYCLES	SF6 PRESSURE (@ 20° C / 68° F) RELATIVE PRESSURE
RATED VOLTAGE RANGE FACTOR (Kr) 1.0	RATED SHORT CIRCUIT CURRENT	-NORMAL OPERATING PRESSURE 93 psig
RATED FREQUENCY 60 Hz	-TERMINAL FAULT 40 kA	-LOW PRESSURE ALARM 78 psig
DUTY CYCLE O-0.3s-CO-15s-CO	-90% SLF WITH 0nFL_g CAPACITANCE (WITHIN 100m) 40 kA	-MINIMUM PRESSURE 74 psig
RATED CONTINUOUS CURRENT 2000 A	TEMPERATURE RANGE -30° C to +40° C	WEIGHT OF GAS 75 lb
CAPACITANCE CURRENT SWITCHING	SHORT CIRCUIT CURRENT WITHSTAND DURATION 3s	TOTAL WEIGHT 5234 lb
-VOLTAGE FACTOR 1.4	% DC COMPONENT 55.2	MECHANISM TYPE FK3-1/131 SPRING
-LINE CHARGING 160 A	FULL WAVE IMPULSE WITHSTAND 650 kV	CONTROL VOLTAGE
-ISOLATED BANK 400 A	SWITCHING IMPULSE WITHSTAND	-CLOSING 125VDC, 3.5A
-BACK-TO-BACK 400 A	-TERMINAL-TO-GROUND N/A	-TRIPPING (EACH) 125VDC, 3.5A
-INRUSH PEAK 20 kA	-TERMINAL-TO-TERMINAL N/A	-MOTOR 120VAC/125VDC, 800W
-INRUSH FREQUENCY 4250 Hz		-SPACE HEATER 120VAC, 190W
OUT-OF-PHASE SWITCHING 10 kA		
ONE POWER LANE CHARLEROI, PA 15022	GRID SOLUTIONS	DESIGNED AND MANUFACTURED IN USA

RATINGS NAMEPLATE NOTES:
1) NAMEPLATE MATERIAL: ANODIZED ALUMINUM
2) NAMEPLATE LOCATION: EXTERNAL
3) NAMEPLATE DIMENSIONS AS SHOWN ON DRAWING 1_416_218_P1/P2
4) MANUFACTURE DATE AND SERIAL NUMBER ARE TO BE FILLED IN BY NAMEPLATE VENDOR PRIOR TO ENGRAVING
5) NAMEPLATE IS TO BE ATTACHED WITH ALUMINUM RIVETS.

REV.	DESCRIPTION	ECN NO.	DRAWN BY	CHECKED	DATE
			DRAWN	CHECKED	DATE

RATINGS NAMEPLATE - GAS SCHEMATIC

CUSTOMER:
CUSTOMER ORDER No.:
SUBSTATION:
SERIAL No.:
CUSTOMER EQ. No.:

SAMPLE DRAWING

Grid Solutions
One Power Lane
Charleroi, PA 15022

DRAWING No.: DT1-145FK F1

MATERIAL ID: CCDT1-145FK-F1-001

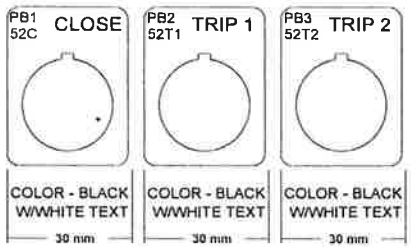
ORDER No.:

SHT 11 OF 13

DEVICE TAGS

AT2	EA1 63GX1	DT1 49	ES 52Y	H1 2X 95 W	HT1	L1 40 W
LS1	M1 88	MA1 52-1	MA2 52-2	MA3 52-3	MA4 52-4	MB1 88LS
MC 52CC	MD 52TC1	ME 52TC2	PL1 GFI	S1 15A	S2 15A	S3 15A
S4 20A	S6 15A	TH1 23-1				

DEVICE TAG NOTES:
1) TAG MATERIAL: PLASTIC - YELLOW WITH BLACK LETTERS
2) TAG DIMENSIONS AS PER FABRICATION DRAWING 1_417_376_P1.



TERMINAL BLOCK MARKER STRIPS

TB1	TB2	TB3	TB5	TB6	TB7	TB8	TB9	TB10	TB11	TB4
1	7	13	51	63	75	87	99	111	123	31
2	7R	17	52	64	76	88	100	112	124	
										32
1A	8	18	53	65	77	89	101	113	125	
2A	9	19	54	66	78	90	102	114	126	
1B	9R	20	55	67	79	91	103	115	127	
2B	9A	21	56	68	80	92	104	116	128	
3	9AR	22	57	69	81	93	105	117	129	
4	10	23	58	70	82	94	106	118	130	33
5	10A	24	59	71	83	95	107	119	131	
6	11	25	60	72	84	96	108	120	132	34
B1	11A	26	61	73	85	97	109	121	133	35
B2	B3	27	62	74	86	98	110	122	134	36
P4	P4	P4	P4	P4	P4	P4	P4	P4	P4	P5

TERMINAL MARKER STRIP NOTES:
1) STRIP MATERIAL: PLASTIC - BLACK WITH WHITE LETTERS
2) STRIP DIMENSIONS AS SHOWN ON FABRICATION DRAWING 1_417_376_P... (SEE PIFS FOR EACH STRIP)

BCT TERMINAL BLOCK MARKER STRIPS

1X 1X1	2X 2X1	3X 3X1	4X 4X1	5X 5X1	6X 6X1
1X2	2X2	3X2	4X2	5X2	6X2
1X3	2X3	3X3	4X3	5X3	6X3
1X4	2X4	3X4	4X4	5X4	6X4
1X5	2X5	3X5	4X5	5X5	6X5
GND	GND	GND	GND	GND	GND
P8	P8	P8	P8	P8	P8

1Y 1Y1	2Y 2Y1	3Y 3Y1	4Y 4Y1	5Y 5Y1	6Y 6Y1
1Y2	2Y2	3Y2	4Y2	5Y2	6Y2
1Y3	2Y3	3Y3	4Y3	5Y3	6Y3
1Y4	2Y4	3Y4	4Y4	5Y4	6Y4
1Y5	2Y5	3Y5	4Y5	5Y5	6Y5
GND	GND	GND	GND	GND	GND
P8	P8	P8	P8	P8	P8

BCT TERMINAL MARKER STRIP NOTES:
1) STRIP MATERIAL: PLASTIC - YELLOW WITH BLACK LETTERS
2) STRIP DIMENSIONS AS SHOWN ON FABRICATION DRAWING 1_417_376_P... (SEE PIFS FOR EACH STRIP)

REV.	DESCRIPTION	ECN NO.	DRAWN BY	CHECKED	DATE
			DRAWN	CHECKED	DATE

DEVICE TAGS

CUSTOMER
CUSTOMER ORDER No.
SUBSTATION:
SERIAL No.
CUSTOMER EQ. No.

SAMPLE DRAWING

Grid Solutions
One Power Lane
Chalfont, PA 15022

MATERIAL ID: CCDT1-145FK-F1-001
ORDER No.
DRAWING No. DT1-145FK F1
SHT 12 OF 13

GE

Grid Solutions

DT1-145
DT1-170

Dead Tank Circuit Breakers from 123 kV to 170 kV

The DT1-145 and the DT1-170 are dead tank circuit breakers suitable for application at 170 kV and below. They are specifically designed and tested for general or definite purpose applications as well as for severe environmental conditions including low temperature, highly active seismic areas and regions with high pollution levels or corrosive atmospheres.

Reliable Performance

The DT1-145 and the DT1-170 are suitable for applications up to nameplate ratings, including definite purpose ratings. Extensive mechanical design testing to 10,000 operations and Class M2 certification ensure trouble-free operation for the lifetime of the circuit breaker.

Gas Tightness Guarantee & Superior Manufacturing

GE leads the industry in SF_6 gas tightness testing technology including seals, castings and plumbing systems. Each breaker is factory tested using GE's proprietary gas tightness testing system which provides measurable, quantifiable test results on the breaker in its fully assembled, as-shipped condition.

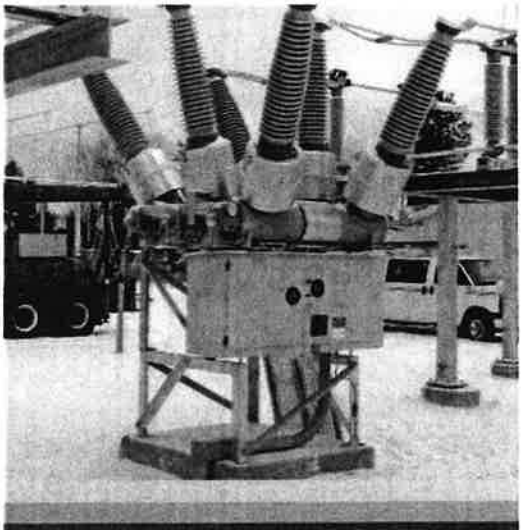
GE designs, manufactures, tests and delivers its circuit breakers in accordance with the latest IEEE/ANSI and IEC Standards, maintaining a quality assurance system according to ISO 9001 and ISO 14001 certifications. The center of excellence for dead tank circuit breakers is located in Charleroi, PA (USA).

Enhanced Installation and Maintenance

The DT1-145/170 are factory tested and adjusted and do not require any "special tools" for the installation. Designed with the smallest symmetrical footprint to allow for minimized foundation costs, they are recognized worldwide as easy-to-install and operate circuit breakers. Thanks to the low energy mechanism and lifetime lubricants, the DT series is virtually maintenance free. For installations where truck shipment is impossible, all DT series circuit breakers can be readied for standard container shipment with only their bushings disassembled.

IPO Option

The DT1-145 and the DT1-170 are also available in Independent Pole Operation (IPO) configuration with separated spring/spring mechanism for each phase. Paired with a synchronous controller this can be used for point-on-wave switching of shunt capacitor or shunt reactor banks.



Main Characteristics

- Advanced self-blast interrupters
- Leak resistant cast aluminum enclosures
- Durable low energy spring-spring-operated mechanism
- More than 100.000 circuit breakers with self-blast interrupters and FK spring-operated mechanism in service since 1989

Key Benefits

- SF_6 gas tightness guarantee
- High performance ratings
- Reliability under the most severe conditions
- Design customization
- Virtually maintenance free
- Easy to install

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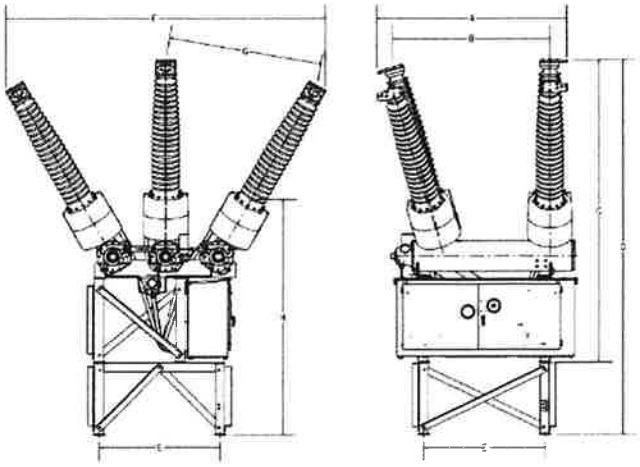
Technical Data

	Value	Units
SF_6 pressure	93/0.64	psig/Mpa
Motor	1,600	watts
Close coil/Trip coil	440/440	watts
Ambient temperature range*	-30 to +40	degree C
High seismic capability in accordance with IEEE 693-2005		
Weight (without current transformers)	4,180/1,900	lb/kg

* Optional values available on request



Dimensions

Rated Max. Voltage	A (in/mm)	B (in/mm)	C (in/mm)	D (in/mm)	E (in/mm)	F (in/mm)	G (in/mm)	H (in/mm)
145 kV	90/2,284	70/1,779	136/3,459	169/4,289	54/1,372	90/2,284	69/1,747	102/2,600
170 kV	90/2,366	73/1,849	146/3,719	179/4,549	54/1,372	153/3,898	74/1,881	102/2,591

Ratings

IEEE	IEC	Value	Units
Rated maximum voltage	Rated voltage	123/145/170	kV
Rated power frequency	Rated frequency	50/60	Hz
Rated dielectric withstand capability	Rated insulation level		
dry withstand	at power frequency, dry	260/310/365	kV
wet withstand	at power frequency, wet	230/275/315	kV
Rated lightning impulse withstand voltage	at lightning impulse	550/650/750	kV
Rated chopped wave impulse voltage 2us		710/838/968	kV
Rated continuous current	Rated normal current	1,200/2,000/3,000	A
Rated short-circuit current	Rated short-circuit breaking current	40	kA
Rated closing, latching, and short time carrying		104	kA
Rated capacitance switching*			
	Rated single capacitor bank breaking current	400	A
Rated interrupting time		3	cycles
	Rated break time	50	ms
Rated standard operating duty	Rated operating sequence	O-0.3s-CO-15s-CO	

** Ratings available upon request. ** Please contact GE for special purpose, high TRV, high X/R or other ratings requirements.*

For more information please contact
GE Energy Connections
Grid Solutions

Worldwide Contact Center

Web: www.GEGridSolutions.com/contact
Phone: +44 (0) 1785 250 070

GEGridSolutions.com

Grid-AIS-L3-DT1-123_170-0277-2017_01-EN.

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GE
Grid Solutions

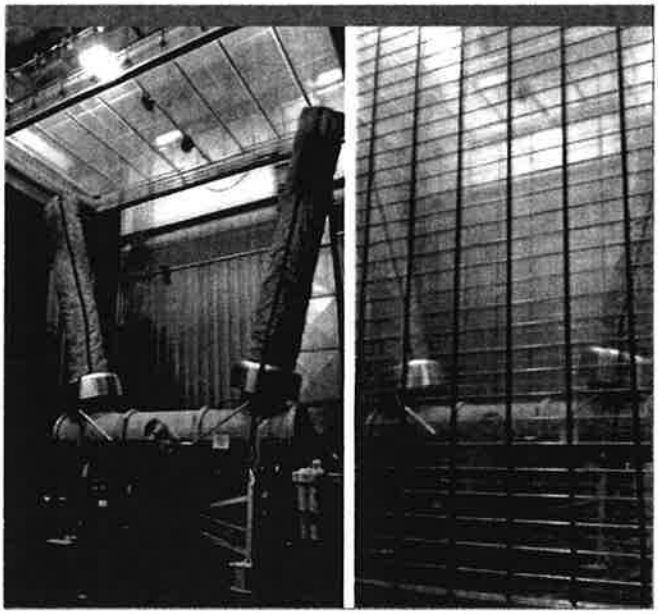
SF_6 Gas Tightness Testing System

GE's Grid Solutions has perfected its industry leading production testing system for every 38kV through 550kV kV dead tank circuit breaker produced in our Charleroi, Pennsylvania factory. The system not only confirms SF_6 gas tightness and also quantifies the exact emission rate, with accuracy of 0.2 grams/year,

Grid Solutions' proprietary technology utilizes photo-acoustic infrared spectroscopy which is the highest possible sensitivity method for leak detection.

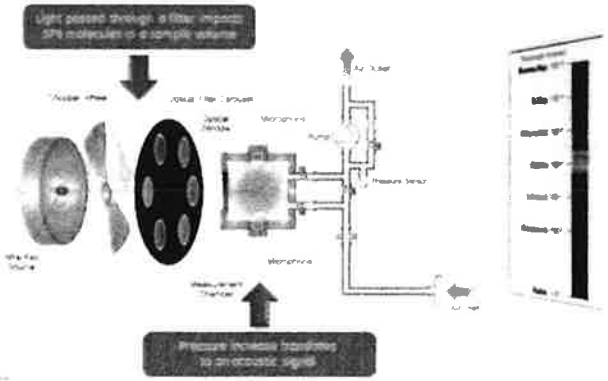
Our technology provides:

- Sensitivity **5,000 times greater** than "bubble" test or infrared camera.
- **Sensitivity 10 ten times** greater than helium mass spectrometer method with accuracy of 0.2 grams per year compared to 2 grams per year.
- Every breaker produced is **tested fully assembled with bushings installed** (as-delivered condition for domestic delivery) while helium mass spectrometer only tests smaller components such as castings.
- **High accuracy measurement** of less than 0.5% per year emission rate in a routine production test environment.



550 kV Dead Tank
Volumetric Tightness Testing

Photo-Acoustic Infrared Spectroscopy



SF_6 Leak Detection Methods

Comparison of detection methods
CIGRE Technical Brochure No. 430 "SF6 Tightness Guide"

Method	Sensitivity (kg/year)	Ratio vs. bubble test
Vacuum increase	10	10
Infrared camera	1	1
Bubble test	1	1
Density monitor	0.6	1.7
Infrared absorption spectroscopy	0.06	16.7
Negative ion detector	0.02	50.0
Electron capture detector	0.002	500.0
Helium mass spectrometer	0.002	500.0
Photo-acoustic infrared spectroscopy	**0.0002**	**5000.0**

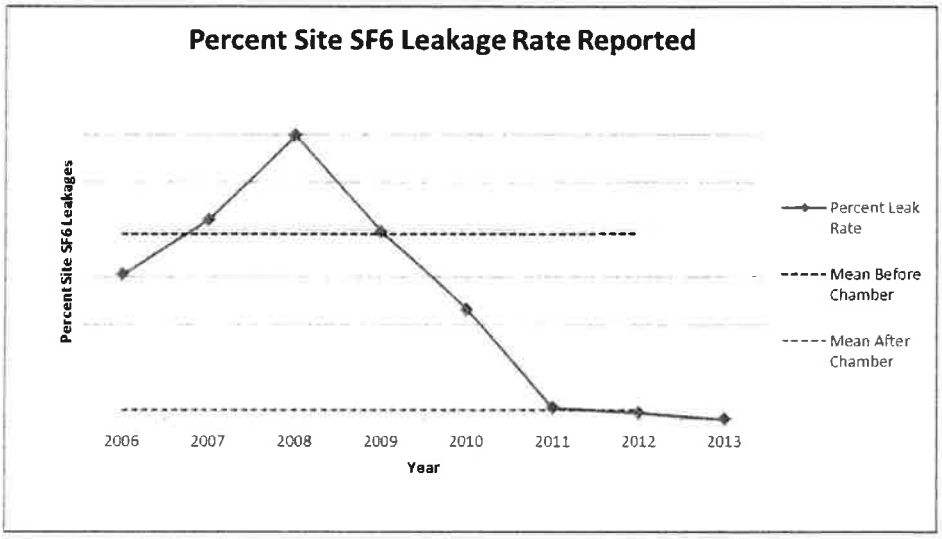
- **Greatest Sensitivity and Accuracy**
  - Method used by Grid Solutions for Type Tests and Production

Photo Acoustic Infrared Spectroscopy

SF_6 Emissions Reductions

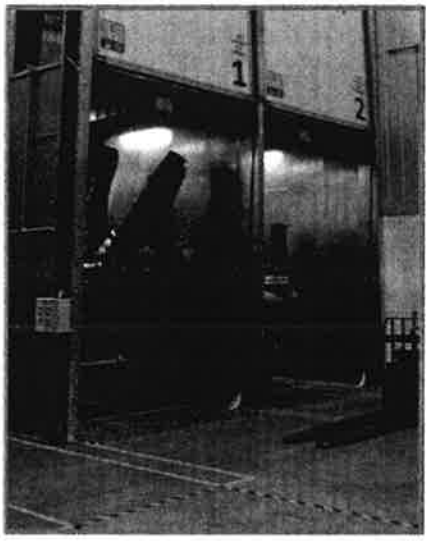
Every dead tank circuit breaker produced in the Charleroi, Pennsylvania factory from 38kV to 550kV is tested with Grid Solutions' proprietary technology in use since 2010 at this site.

The graph shown to the right illustrates the dramatic improvement realized after implementation of 72.5kV production testing.

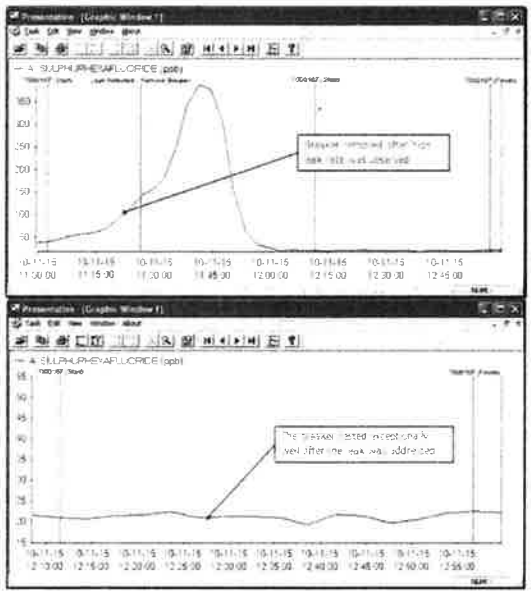


Multiple systems for High Volume Production

Multiple systems allow for high efficiency testing of every fully assembled dead tank circuit breaker from 38kV to 550kV. The systems are scaled to allow for highly accurate measurements as an automated routine production test.



Production Testing (Shown with Chamber Doors Open)
362kV (Left), 145kV (Center), 72.5kV (Right)



Sample Test Results
Fail (Above) and Pass (Below)

Grid Solutions' commitment to reducing SF_6 emissions extends from our robust designs with high grade gaskets to testing and certification. Our continuing efforts provide for quantifiable reduction in SF_6 emissions for our customers resulting in industry leading reliability and lower cost of maintenance.

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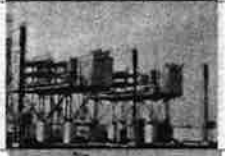
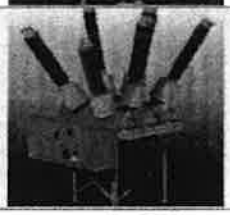
Line Card
High Voltage Circuit Breakers

Grid Solutions offers a comprehensive portfolio of high voltage circuit breakers designed and tested to meet the rigorous demands of the North American power system

Product		Ratings	Features
DT1-38FK F1		• Up to 38kV • 1200A to 3000A • 40kA, 3 cycles	• FK3-1 SPRING/SPRING mechanism • Gang Operated
DT1-72.5FK F1		• 72.5kV • 1200A to 3000A • 40kA, 3 cycles	• FK3-1 SPRING/SPRING mechanism • Gang Operated
DT1-72.5FK F3		• 72.5kV • 1200A to 3000A • 40kA, 3 cycles	• FK3-1 SPRING/SPRING mechanisms • Independent Pole Operation (IPO) • Optional Synchronous Control for Point-on-Wave Switching
DT1-145FK F1 DT1-170FK F1		• 123kV, 145kV, 170kV • 1200A to 3000A • 40kA, 3 cycles	• FK3-1 SPRING/SPRING mechanism • Gang Operated
DT1-145FK F3 DT1-170FK F3		• 123kV, 145kV, 170kV • 1200A to 3000A • 40kA, 3 cycles	• FK3-1 SPRING/SPRING mechanisms • Independent Pole Operation (IPO) • Optional Synchronous Control for Point-on-Wave Switching
DT1-72.5 63 DT1-145 63		• 72.5kV, 123kV, 145kV • 1,200A to 4,000A • 63kA, 3 cycles	• FK3-4 SPRING/SPRING mechanism • Gang Operated • NO CAPACITORS
DT1-245P F1		• 245kV • 1,200A to 4,000A • 40kA, 3 cycles	• FK3-4 SPRING/SPRING mechanism • Gang Operated • Optional 2 cycle performance
DT1-245P F3		• 245kV • 1,200A to 4,000A • 40kA, 3 cycles	• FK3-1 SPRING/SPRING mechanisms • Independent Pole Operation (IPO) • Optional Synchronous Control for Point-on-Wave Switching
DT1-245P 63		• 245kV • 1,200A to 5,000A • 63kA, 2 cycles	• SPRING/SPRING mechanisms • Gang Operated • NO CAPACITORS
Surge Arresters for Reactor Switching		• 72.5kV to 550kV • Dead Tank, Live Tank, Circuit Switcher • Arresters sized based on user specifications.	• Arresters across HV Terminals extend circuit breaker life • External mounting for increased reliability and ease of maintenance

Line Card
High Voltage Circuit Breakers

Product		Ratings	Features
DT1-362 F3 DT1-362R F3		• 362kV • 1,200A to 5,000A • 63kA, 2 cycles	• FK3-6 SPRING/SPRING mechanism • Independent Pole Operation (IPO) • Optional Synchronous Control for Point-on-Wave Switching • Optional Pre-Insertion Resistors (PIR)
DT2-550 H3 DT2-550 F3 DT2-550R H3 DT2-550R F3		• 550kV • 1,200A to 5,000A • 63kA, 2 cycles	• Hydraulic Mechanisms • Independent Pole Operation (IPO) • Optional Point-on-Wave Switching • Optional Pre-Insertion Resistors (PIR) • Optional SPRING/SPRING Mechanism
GL3 Series Live Tank		• 72.5kV to 800kV • 1,200A to 4,000A • Up to 63kA, 3 cycles	• FK3-x SPRING/SPRING mechanism • Independent Pole Operation (IPO) • Or Gang Operated (voltage dependent)
Live Tank GL309 GL312 GL313 GL314		• 72.5kV to 245kV • 1,200A to 3,000A • Up to 40kA, 3 cycles	• Circuit Switcher applications • FK SPRING/SPRING operated mechanism • Circuit Breaker performance in a Circuit Switcher footprint
GL314 BPS Bypass Switch		• Up to 800kV system • Up to 170kV across gap • Making Current 120kAp • Insertion Current 5,000A • Insertion Voltage 300kVp	• Series Capacitor Bypass Protection • FK3-2 SPRING/SPRING mechanism • Independent Pole Operation
HYpact		• 72,5 kV to 170kV • 2,500A • 40kA, 3 cycles • Hybrid compact switchgear assembly	• FK3-1 SPRING/SPRING mechanism • Gang Operated • Endless configurations –breakers, disconnect switches, CTs, VTs, cable connections.
g^3 ("gee-cubed")		• Ratings are product and customer specific.	• SF_6 Free • Global Warming Potential 98% lower than SF_6 gas
CBWatch3		• Circuit Breaker Monitoring • IEC 61850 8.1 (DNP3 option)	• Permanent real-time monitoring of CB operational parameters • SF6 emissions trending
Synchronous Control (Point on Wave Switching)		• Cabinet mounted or Rack Mounted	• Point-on-wave (POW) trip/close • Capacitors, reactors, transformers • Residual Flux compensation available

* Special ratings and applications available on request. Contact your GE representative for more information.

Item	Material	Description
10	Capacitor Voltage Transformer	TEMP145

Rated Voltage 138 kV , Capacitance 10,400 pF , Type of Insulator Porcelain , Creepage 148 IN , No. of Secondaries 2 , Carrier accessory Yes ,

Note: We offer our CVT model TEMP145 to meet the minimum required capacitance of 6,000pF

Testing: Price includes Routine Testing according to the quoted standards only. Type test reports of similar units can be provided in lieu of performing type tests upon request at no charge.
Actual type tests, if required, would be charged extra. If type testing is required, delivery dates may be affected.

Warranty: 60 months in service ,maximum 66 months from delivery
Warranty only applies to products manufactured and supplied by Trench Group.

Our standard manuals as well as the following drawings are included in our supply:

- outline drawing with details of primary terminal, grounding terminal and mounting holes
- wiring diagram
- rating plates
- secondary terminal box

Painting of transformers:
All iron parts are hot-dip galvanized or of stainless steel. Other metal parts are of corrosion resistant cast aluminum and additional painting is not necessary.

All terminal box / enclosures meet the degree of protection IP54.
CVT supplied with oil level indicator on electromagnetic unit only.
If applicable, carrier accessories include:
- in low voltage box: drain coil with protective spark gap and carrier ground switch;
- in base box: choke coil with protective spark gap and voltage tap ground switch (if required).

If applicable, Line Trap mounting holes 4 x 5/8–11 inch tapped on 5 inch [127 mm] BCD. (Alternatively, holes tapped on 11.65 inch [296 mm] BCD available upon request.)

For Line Trap mounting feasibility, please consult the factory.

CVT designed with:
- Transient response < 10 % residual voltage after 1 cycle;
- Ferroresonance suppression < 10 cycles;
- Capacitor section supplied with mixed dielectric (polypropylene film / Kraft paper) impregnated with synthetic oil. Dissipation factor < 0.4 %.

TEMP145

Trench proposal #.....22012921 Item #.....000010

Product Type	TEMP145
Quantity	4.000
Standard	ANSI C93.1

Altitude above sea level ft	3,300 FT
Temperature range Min.	-40 °C
Temperature range Max.	45 °C
Wind speed maximum	100MPH
Seismic specification	ANSI

Rated System Voltage	138 kV
Max System Voltage	145.0 kV
Frequency	60 Hz
1 Minute Dry withstand	320 kV
10 Second Wet Withstand	275 kV
Switching Insulation Level	0 kV
Basic Impulse Level	650 kV
Over Voltage Factor	1.4/60s

Nominal Capacitance	10,400 pF

Performance Reference Voltage	80,500 V
Max Thermal Burden	1000VA

Number of secondary windings	2

Secondary Volt full winding w1	115 V

Trench Limited
1865 Clements Road
Pickering, Ontario
Canada L1W 3R8
Quote # 22012921
Unrestricted

Tel: 416 751 8570
24/7 Toll free: 1844 873 6241
Fax: 416 751 6952
Email: edna.romero@trench-group.com

Secondary Voltage tap W1	67.08 V
Accuracy W1	0.3
Burden W1	WXYZ,ZZ
Ratio W1	700/1200:1

Secondary Volt full winding w2	115 V
Secondary Voltage tap W2	67.08 V
Accuracy W2	0.3
Burden W2	WXYZ,ZZ
Ratio W2	700/1200:1

Simultaneous Accuracy	0.3
Simultaneous Burden	WXYZ,ZZ

Base Box Style	Universal
Carrier accessory	Yes
Drain coil	10 mH

Total sections	1
Color of Insulator	Grey
Type of Insulator	Porcelain
Creepage distance in	148 IN
Flashover distance in	47 IN
Max. term. pull-80 mph wind	1,079 LB

Dimensions as per drawing	SMP14Y0U
Net Weight	740 LB
Gross Weight	773 LB
Crate Length	36 IN
Crate Width	24 IN
Crate Height	88 IN

Primary Terminal	Al NEMA 4 holes
Primary Connector	No
Ground Terminal	Al NEMA 2 holes Tin
Ground Connector	No
Secondary Terminal Type	Screw type integrated

Trench Limited
1865 Clements Road
Pickering, Ontario
Canada L1W 3R8
Quote # 22012921
Unrestricted

Tel: 416 751 8570
24/7 Toll free: 1844 873 6241
Fax: 416 751 6952
Email: edna.romero@trench-group.com

Secondary Protection	No

Additional Accessories

Heater	Yes
Additional Spark Gap	No
Oil Drain Valve	No
Harmonic Monitoring Device	No
Damping Pads	No
Bellow level indicator	No
Shock Indicator	No
Suspension Bracket	No
Low Voltage Box K.O.	No
LV Box Interlocking	No
Gland Plate K.O.	No

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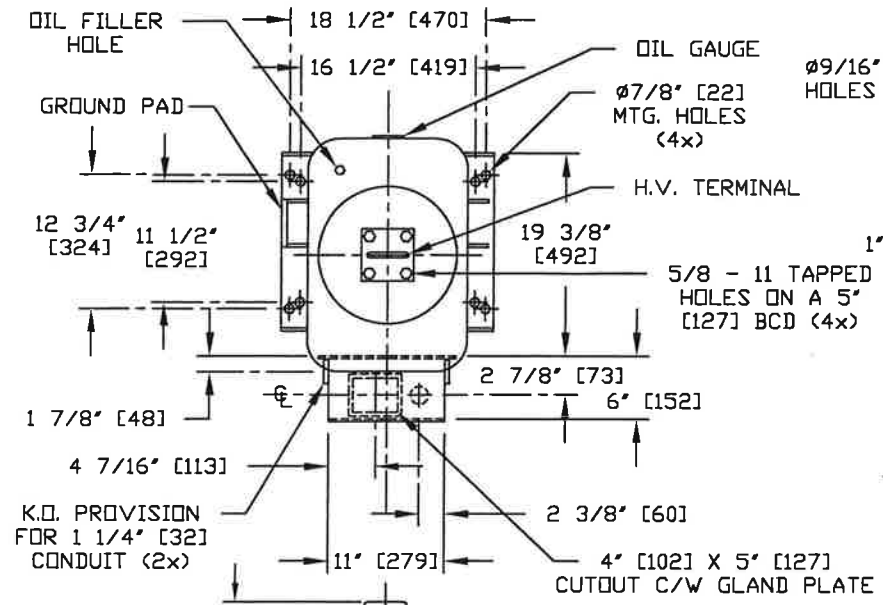
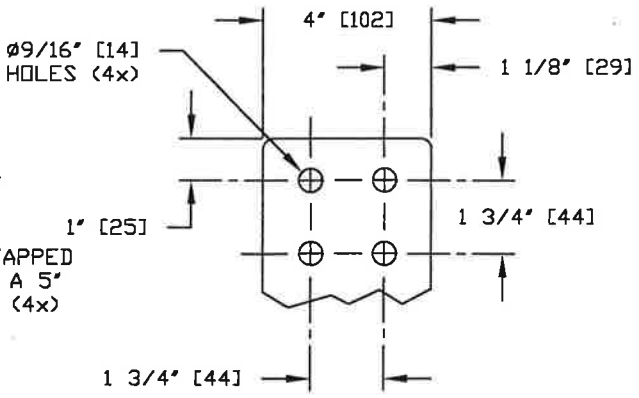
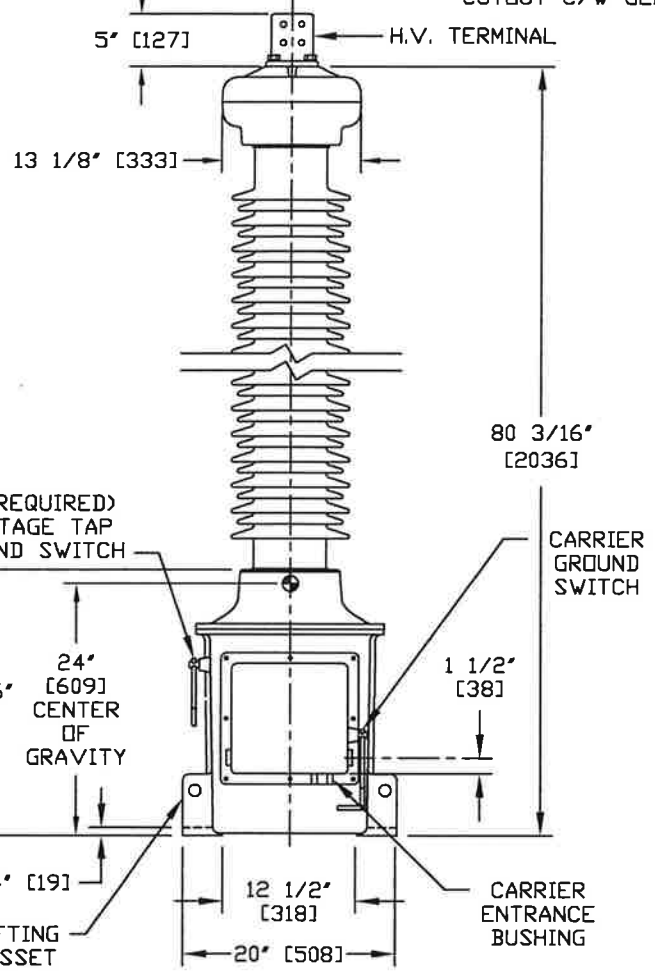
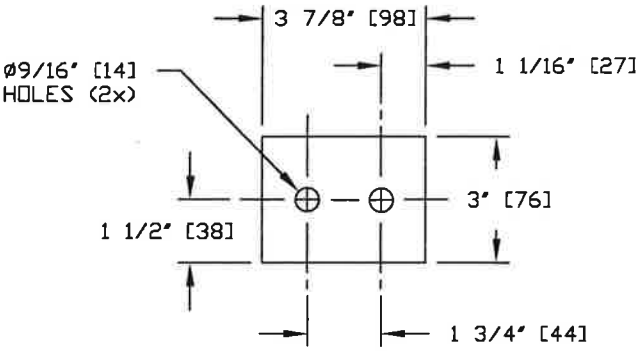




H.V. TERMINAL DETAIL

MATERIAL: 1/2" [13] THICK ALUMINUM





GROUND PAD DETAIL

MATERIAL: 1/2" [13] THICK ALUMINUM
TIN PLATED ALSTAN PROCESS

NOTES:

1. ALL DIMENSIONS ARE IN INCHES AND [MILLIMETERS]
2. INSULATOR COLOR: GREY ☐ BROWN ☐
3. BASE HOUSING CAST ALUMINUM
4. BIL: 650 kV
5. CREEPAGE DISTANCE: 145.3" [3690]
6. CAPACITANCE: 10400 pF
7. MAX. HORIZ. TERM. PULL: 1079 LBS 4.8 kN @ 80 mph [130 km/h] WIND SPEED.
8. INSULATOR TYPE: P145
9. TOTAL WEIGHT: 740 LBS 335 kg
10. OIL VOLUME : BASEBOX 13.3 GAL / 60 LTRS.
    SECTION 2.93 GAL / 13.3 LTRS.

TOLERANCES UNLESS OTHERWISE SPECIFIED	REVISION No.	REVISION DESCRIPTION	TRENCH LIMITED
0-12"[305]±1/32"[0.8] 12"[305]-24"[610]±1/16"[1.6] 24"[610]-36"[914]±3/32"[2.4] 36"[914]-48"[1219]±1/8[3.2] 48"[1219] AND UP ±3/16"[4.8] WEIGHT±10% ANGULAR±2°			

CAPACITOR VOLTAGE TRANSFORMER
TYPE TEMP 145

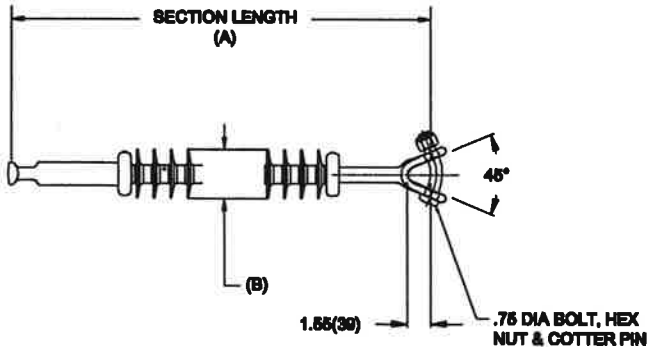
TRENCH

DESG.	DRN.	APPD.	DATE	SCALE 1=18	W.O.
				DWG. SMP14YOU	

OHIO BRASS QUADRI*SIL SUSPENSION INSULATOR

CAT NO.: S030047S2010		
REV:	00	March 4, 2018

HUBBELL POWER SYSTEMS, INC.
CUSTOMER SERVICE: (573) 682-5521
www.hubbellpowersystems.com



MECHANICAL VALUES	LBS	KN
MAX DESIGN TENSILE LOAD (RTL)	30000	133
SPECIFIED TENSILE LOAD (STL)	15000	66.5

ELECTRICAL VALUES	KV	
60 HZ DRY FLASHOVER (DRY WITHSTAND)	500	-
60 HZ WET FLASHOVER (WET WITHSTAND)	475	(355)
CRITICAL IMPULSE FLASHOVER + (WITHSTAND)	800	(720)
CRITICAL IMPULSE FLASHOVER - (WITHSTAND)	795	(715)
RIV AT 115% SYSTEM VOLTAGE	≤100 µV	

DIMENSIONAL VALUES	IN.	MM
SECTION LENGTH (A)	59.2	1503
MAJOR SHED DIAMETER (B)	2.9	73
MINOR SHED DIAMETER (C)	0	0
DRY ARC DISTANCE	47.4	1203
SHEATH THICKNESS	>0.118	>3
LEAKAGE DISTANCE	121	3073

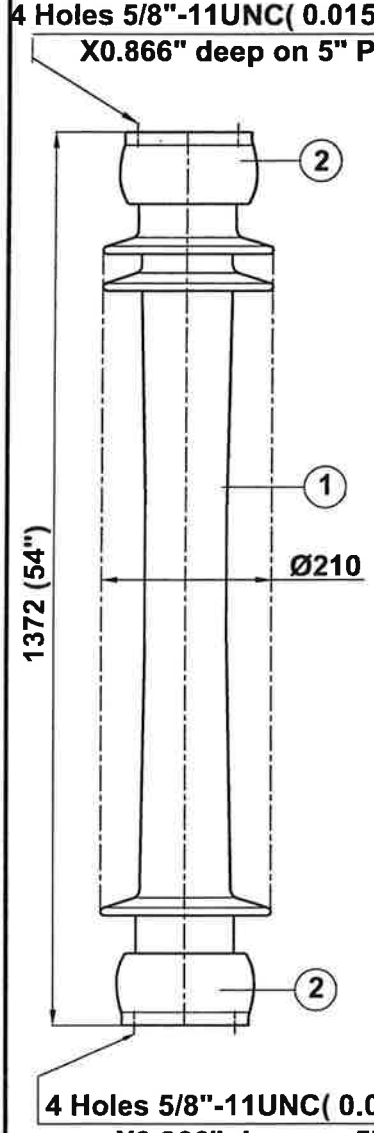
END FITTINGS AND MATERIALS

TOWER END: ANSI_52-5_BALL / GALV STEEL
LINE END: Y-CLEVIS / GALV STEEL

NOTES:
1. SILICONE RUBBER SHEATH AND SHEDS. WASHABLE PER IEEE P957
2. ELECTRICAL VALUES PER ANSI C29.17 (IEC 61109 & 62217)

OTHER DETAILS

CORONA RING (TOWER)	NONE	
CORONA RING (LINE)	NONE	
TORQUE REQUIREMENTS	N/A	
MOUNTING ANGLE	-	
NUMBER OF SHEDS	44	
WEIGHT	8.7 lbs.	3.9 kg.



TECHNICAL PARTICULARS

MECHANICAL VALUES

Bending strength (Upright & under hung)	lb	2200	kN	9.78
Compression strength	lb	75000	kN	333.6
Tensile strength	lb	25000	kN	111.2
Torsional strength	in lb	90000	kNm	10.17

ELECTRICAL VALUES

Dry power frequency withstand voltage		kV	335
Wet power frequency withstand voltage		kV	275
Dry power frequency flashover voltage		kV	365
Wet power frequency flashover voltage		kV	305
Lightning impulse withstand voltage		kVp	650
Impulse flash over voltage		kVp	710
Min. creepage distance	inch. 116	mm	2946
Net Weight (approx.)	161 lbs	kgs	73

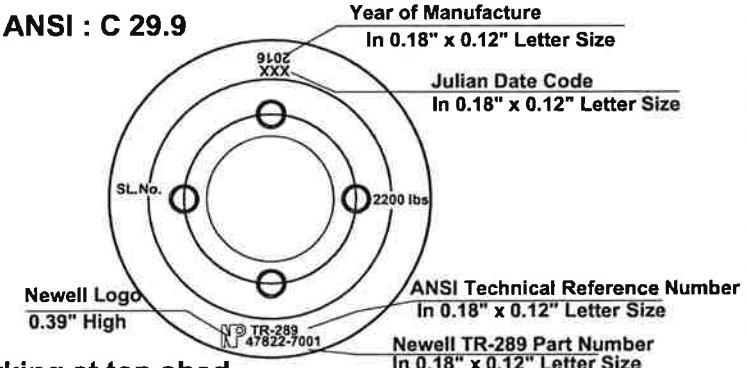
Shed profile as per IEC : 60815

RADIO INFLUENCE VOLTAGE DATA

Test voltage to ground	kV	88
Max. RIV at 1000 kHz	µV	200

NOTE: -

Test & tolerance as per IS :2544 , 5350 & IEC:60168,273 & ANSI : C 29.9

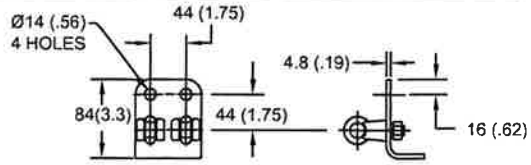


Marking at top shed

S.No.	DESCRIPTION	MATERIAL	REMARKS
2	Caps	MCI / SGI	Hot dip galv .
1	Insulator body	Porcelain	Grey Glazed

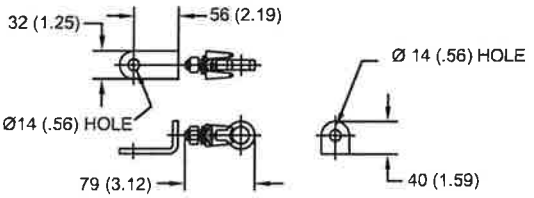
Title: **STATION POST INSULATOR** (BIL - 650 kV)	Scale N.T.S.	Matl. See table
Ref. **47822-7001 [TR-289]**	Drawn	Kirti Nambiar
	Checked	S.K.dixit
	Approved	KR JC
All dimension are in mm /inch.	Date	06-02-1998
NEWELL PSN LLC		Rev. 0

LINE TERMINAL DETAIL



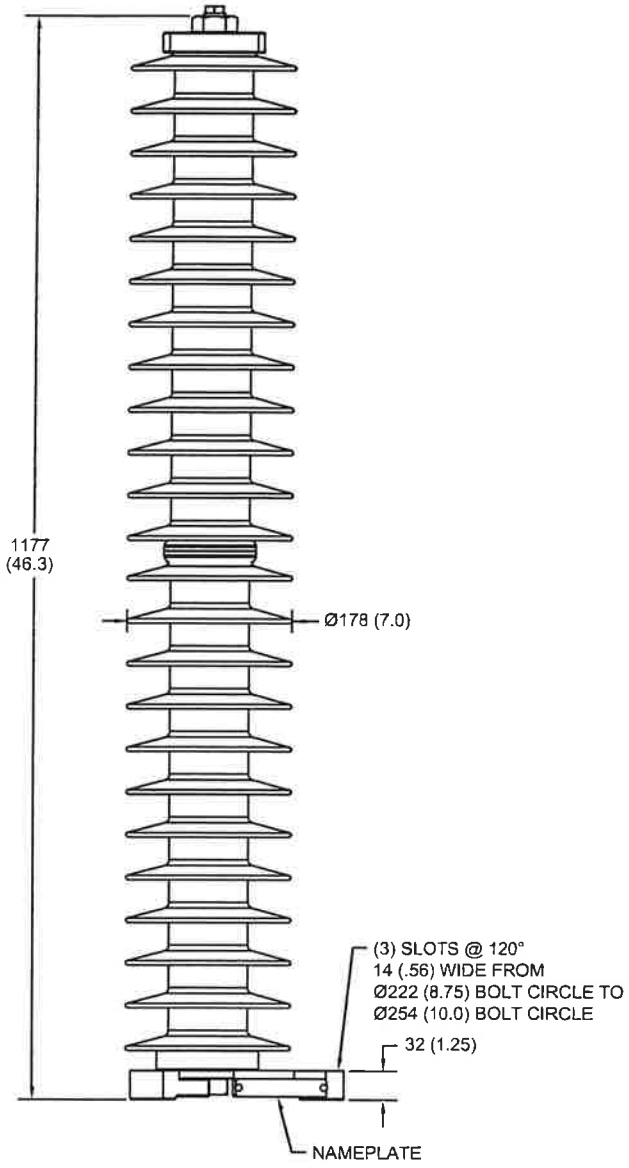
HDG 4-HOLE TERMINAL PAD, PART No. 274914-4002
TWO HDG TERMINALS, PART No. 271414-3001
SUITABLE FOR COPPER OR ALUMINUM CONDUCTOR SIZE
Ø 7 (.25) - Ø 21 (.81)
25 - 240 sq mm
AWG#4 - 500 MCM

GROUND TERMINAL DETAIL



HDG TERMINAL BRACKET, PART No. 89606-4001
ONE HDG TERMINAL, PART No. 271414-3001
SUITABLE FOR COPPER OR ALUMINUM CONDUCTOR SIZE
Ø 7 (.25) - Ø 21 (.81)
25 - 240 sq mm
AWG#4 - 500 MCM

Ø = DIAMETER
HDG = HOT DIP GALVANIZED



CHARACTERISTICS	
RATED VOLTAGE (Ur)	108 kVrms
MCOV (Uc)	88 kVrms
MASS	26.7 kg (58.9 lb)
COG ABOVE BASE	589 (23.2)
CREEPAGE DISTANCE	3124 (123)
STRIKE DISTANCE	1100 (43.3)
LIGHTNING IMP W/S	631 kVpk
SWITCHING IMP WET W/S	529 kVpk
POWER FREQ WET W/S	275 kVrms
TOV 1s NO PRIOR DUTY	125 kVrms
TOV 10s NO PRIOR DUTY	120 kVrms
TOV 1s W/PRIOR DUTY	119 kVrms
TOV 10s W/PRIOR DUTY	113 kVrms

CANTILEVER FORCE	
MAXIMUM CONTINUOUS	897 N (202 lbf)
ULTIMATE (max pk)	1794 N (403 lbf)

RECOMMENDED CLEARANCE (METAL - METAL)	
PHASE TO GROUND	503.1 (19.8)
PHASE TO PHASE	582.4 (22.9)

NOTES:
1. DIMENSIONS IN millimeters(inches) SUBJECT TO ±3% TOLERANCE
2. CLEARANCE AND INSULATION W/S VOLTAGE APPLY AT SEA LEVEL
3. ARRESTER SUITABLE FOR OPERATION AT ALTITUDES UP TO 4380 m (14370 ft)
4. PACKAGED IN A CORRUGATED BOX.

.5μSEC 10kA IR kV	SWITCHING SURGE IR kV		MAXIMUM 8/20 DISCHARGE VOLTAGE - kV AT					
	500 A	1 KA	1.5 kA	3.0 kA	5 kA	10 kA	20 kA	40 kA
289	207	216	221	232	244	261	283	322

IEEE C62.11
STATION-CLASS
SURGE ARRESTER
Program Revision
2015.07.30.08.09.10

REV DATE **05/03/11**

TITLE
EVP ARRESTER
88 KV MCOV

SIZE	DWG NO.	CAT / PART / ASSY NO.	REV
S	181962397	EVP0088003001	1

DO NOT SCALE THIS DRAWING	DRN BY NON	DATE 05/03/11	SHEET 1 OF 1

HUBBELL® POWER SYSTEMS

1:8