BID NO.: 50-00140666

BID FORM
Non Public Works

All Public Work Projects are required to use the Louisiana Uniform Public Work Bid Form

All prices must be held firm unless an escalation provision is requested in this bid. Jefferson Parish will allow one escalation during the term of the contract, which may not exceed the U.S. Bureau of Labor Statistics National Index for all Urban Consumers, unadjusted 12 month figure. The most recently published figure issued at the time an adjustment is requested will be used. A request must be made in writing by the vendor, and the escalation will only be applied to purchases made after the request is made.

Are you requesting an escalation provision?

YES _____ **NO** X

MAXIMUM ESCALATION PERCENTAGE REQUESTED _____%

INITIAL BID PRICES WILL REMAIN FIRM THROUGH THE DATE OF February 6, 2023.

For the purposes of comparison of bids when an escalation provision is requested, Jefferson Parish will apply the maximum escalation percentage quoted by the bidder to the period to which it is applied in the bid. The initial price and the escalation will be used to calculate the total bid price. It will be assumed,for comparison of prices only, that an equal amount of material or labor is purchased each month throughout the entire contract.

DELIVERY: FOB JEFFERSON PARISH

INDICATE DELIVERY DATE ON EQUIPMENT AND SUPPLIES 22 - 24 weeks ARO

LOUISIANA CONTRACTOR'S LICENSE NO.: (if applicable) 51804

THIS SECTION MUST BE COMPLETED BY BIDDER:

FIRM NAME: Shermco Industries, Inc.

ADDRESS: 2425 E. Pioneer Drive

CITY, STATE: Irving, TX **ZIP:** 75061

TELEPHONE: (972) 793-5523 **FAX:** (972) 793-5593

EMAIL ADDRESS: jennifer.burns@shermco.com

In the event that addenda are issued with this bid, bidders MUST acknowledge all addenda on the bid form.Bidder must acknowledge receipt of an addendum on the bid form by placing the addendum number as indicated. Failure to acknowledge any addendum on the bid form will result in bid rejection.

Acknowledge Receipt of Addenda: **NUMBER:** 1

NUMBER: _____

NUMBER: _____

NUMBER: _____

TOTAL PRICE OF ALL BID ITEMS: $ 570,102.00

AUTHORIZED SIGNATURE: DocuSigned by: Kim Drake-Loy 915E367D73094AE... Kim Drake-Loy

Printed Name

TITLE: Chief Legal and Risk Officer

SIGNING INDICATES YOU HAVE READ AND COMPLY WITH THE INSTRUCTIONS AND CONDITIONS.

NOTE: All bids should be returned with the BID NUMBER and BID OPENING DATE indicated on the outside of the envelope submitted to the Purchasing Department.

INVITATION TO BID FROM JEFFERSON PARISH - continued

BID NO.: 50-00140666

SEALED BID

ITEM NUMBER	QUANTITY	U/M	DESCRIPTION OF ARTICLES	UNIT PRICE QUOTED	TOTALS
			Labor & Materials to Remove, Supply & Replace for Upgrade of Allis-Chalmers Switchgear Technology for The Jefferson Parish Department of Water		
1	1.00	JOB	0010 TECHNOLOGY UPGRADE OF EXISTING ALLIS-CHALMERS FC 15kV SWITCHEAR LABOR AND MATERIAL FOR THE FOLLOWING: REMOVE EXISTING BREAKERS, RATCHET RACKING SYSTEM AND 5 OF THE 7 CABINET DOORS. REPLACE WITH ABB VACUUM CIRCUIT BREAKER, REMOTE RACKING DEVICES, NEW DOORS WITH SOLID STATE SEL-751 RELAYS, RELAY TEST SWITCHES, ELECTRO-SWITCH BREAKER CONTROL SWITCHES, RED/GREEN PUSH TO TEST LED PILOT LIGHTS, KIRK KEYS FOR MANUAL TRANSFER AND HEATERS FOR EACH CABINET FOR MOISTURE CONTROL. UPGRADE ON 15kV SUBSTATION SWITCHGEAR AT THE WB WATER PLANT LOCATION: JEFFERSON PARISH WB WATER PLANT 4500 WESTBANK EXPRESSWAY MARRERO, LA 70072 ***PLEASE SEE ATTACHED SPECIFICATIONS***	$570,102.00	$570,102.00

Non-Public Works Bid

AFFIDAVIT

STATE OF Texas

PARISH/COUNTY OF Dallas

BEFORE ME, the undersigned authority, personally came and appeared: Kim Drake-Loy _____, (Affiant) who after being by me duly sworn, deposed and said that he/she is the fully authorized Secretary of Shermco Industries, Inc (Entity), the party who submitted a bid in response to Bid Number 50-00140666, to the Parish of Jefferson.

Affiant further said:

Campaign Contribution Disclosures

(Choose A or B, if option A is indicated please include the required attachment):

Choice A _____ Attached hereto is a list of all campaign contributions, including the date and amount of each contribution, made to current or former elected officials of the Parish of Jefferson by Entity, Affiant, and/or officers, directors and owners, including employees, owning 25% or more of the Entity during the two-year period immediately preceding the date of this affidavit or the current term of the elected official, whichever is greater. Further, Entity, Affiant, and/or Entity Owners have not made any contributions to or in support of current or former members of the Jefferson Parish Council or the Jefferson Parish President through or in the name of another person or legal entity, either directly or indirectly.

Choice B X there are **NO** campaign contributions made which would require disclosure under Choice A of this section.

Debt Disclosures

(Choose A or B, if option A is indicated please include the required attachment):

Choice A _____ Attached hereto is a list of all debts owed by the affiant to any elected or appointed official of the Parish of Jefferson, and any and all debts owed by any elected or appointed official of the Parish to the Affiant.

Choice B X There are **NO** debts which would require disclosure under Choice A of this section.

Affiant further said:

That Affiant has employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the public contract under which he received payment, other than persons regularly employed by the Affiant whose services in connection with the construction, alteration or demolition of the public building or project or in securing the public contract were in the regular course of their duties for Affiant; and

[*The remainder of this page is intentionally left blank.*]

That no part of the contract price received by Affiant was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the contract, other than the payment of their normal compensation to persons regularly employed by the Affiant whose services in connection with the construction, alteration or demolition of the public building or project were in the regular course of their duties for Affiant.

Signature of Affiant

Kim Drake-Loy, Chief Legal and Risk Officer
Printed Name of Affiant

SWORN AND SUBSCRIBED TO BEFORE ME
ON THE 18th DAY OF January, 2023.

JENNIFER BURNS
Notary Public, State of Texas
Comm. Expires 10-25-2025
Notary ID 133411770

Notary Public

Jennifer Burns
Printed Name of Notary

133411770
Notary/Bar Roll Number

My commission expires 10/25/2025.

CORPORATE RESOLUTION

EXCERPT FROM MINUTES OF MEETING OF THE BOARD OF DIRECTORS OF Shermco Industries, Inc.
INCORPORATED.

AT THE MEETING OF DIRECTORS OF Shermco Industries, Inc.
INCORPORATED, DULY NOTICED AND HELD ON June 24, 2022,
A QUORUM BEING THERE PRESENT, ON MOTION DULY MADE AND SECONDED. IT WAS:

RESOLVED THAT Kim Drake-Loy, BE AND IS HEREBY APPOINTED, CONSTITUTED AND DESIGNATED AS AGENT AND ATTORNEY-IN-FACT OF THE CORPORATION WITH FULL POWER AND AUTHORITY TO ACT ON BEHALF OF THIS CORPORATION IN ALL NEGOTIATIONS, BIDDING, CONCERNS AND TRANSACTIONS WITH THE PARISH OF JEFFERSON OR ANY OF ITS AGENCIES, DEPARTMENTS, EMPLOYEES OR AGENTS, INCLUDING BUT NOT LIMITED TO, THE EXECUTION OF ALL BIDS, PAPERS, DOCUMENTS, AFFIDAVITS, BONDS, SURETIES, CONTRACTS AND ACTS AND TO RECEIVE ALL PURCHASE ORDERS AND NOTICES ISSUED PURSUANT TO THE PROVISIONS OF ANY SUCH BID OR CONTRACT, THIS CORPORATION HEREBY RATIFYING, APPROVING, CONFIRMING, AND ACCEPTING EACH AND EVERY SUCH ACT PERFORMED BY SAID AGENT AND ATTORNEY-IN-FACT.

I HEREBY CERTIFY THE FOREGOING TO BE A TRUE AND CORRECT COPY OF AN EXCERPT OF THE MINUTES OF THE ABOVE DATED MEETING OF THE BOARD OF DIRECTORS OF SAID CORPORATION, AND THE SAME HAS NOT BEEN REVOKED OR RESCINDED.

SECRETARY~~-TREASURER~~

1/18/2023
DATE

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 5/4/2022

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Arthur J. Gallagher Risk Management Services, Inc.
11311 McCormick Road Suite 450
Hunt Valley MD 21031

License#: BR-724491

CONTACT NAME: Certificate Administrator
PHONE (A/C, No, Ext): 443-798-7499 **FAX (A/C, No):** 443-798-7290
E-MAIL ADDRESS: BW2.BSD.CERTS@AJG.COM

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Crum & Forster Specialty Insurance Co	44520
INSURER B : Twin City Fire Insurance Company	29459
INSURER C : Hartford Fire Insurance Company	19682
INSURER D : Allied World Assurance Co (U.S.) Inc.	19489
INSURER E :	
INSURER F :	

INSURED SHERINT-01
Shermco Industries, Inc.; Shermco Buyer, Inc.; Shermco Intermediate Holdings, Inc.
Shermco Systems Integration, LLC
2425 E Pioneer Drive
Irving TX 75061

COVERAGES **CERTIFICATE NUMBER:** 1807655258 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X **COMMERCIAL GENERAL LIABILITY** CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY X PRO-JECT X LOC OTHER:	Y	Y	EPK139544	5/1/2022	5/1/2023	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 500,000 $ 25,000 $ 1,000,000 $ 2,000,000 $ 2,000,000 $
C	**AUTOMOBILE LIABILITY** X ANY AUTO OWNED AUTOS ONLY HIRED AUTOS ONLY SCHEDULED AUTOS NON-OWNED AUTOS ONLY	Y	Y	30CSEQU3811	5/1/2022	5/1/2023	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $ $
A D	X **UMBRELLA LIAB** X OCCUR X **EXCESS LIAB** CLAIMS-MADE DED X RETENTION $ 0	Y	Y	EFX120259 03113141	5/1/2022 5/1/2022	5/1/2023 5/1/2023	EACH OCCURRENCE AGGREGATE	$ 10,000,000 $ 10,000,000 $
B	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N: N **(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below	N / A	Y	30WEQU3810	5/1/2022	5/1/2023	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ 1,000,000 $ 1,000,000 $ 1,000,000
A A	Contractors Pollution Professional Liability Third Party Poll/Onsite Cleanup			EPK139544 EPK139544	5/1/2022 5/1/2022	5/1/2023 5/1/2023	Each Pollution Cond. Each Wrongful Act Each Pollution Cond.	$1,000,000 $1,000,000 $1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
Professional Liability is claims made coverage
Installation Floater - XL Specialty Insurance Company - Policy # UM00139754MA22A - 5/1/2022-5/1/2023 - $1,000,000 Limit

CERTIFICATE HOLDER

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE
Michael P. Hoods

01-18-2023

Bid Bond in Accordance with Contract Specifications

SLA01182702
Bond Number

Shermco Industries, Inc.
Principal Name

2425 E. Pioneer Drive, Irving, TX, 75061, US
Principal Address

Principal Signature

Jefferson Parish
Owner/Obligee Name

200 Derbigny Street, Gretna, LA, 70053, US
Owner/Obligee Address

Bond Information

01-19-2023
Bid Date

Argonaut Insurance Company
Surety

51804
Contractor Vendor ID Number

50-00140666
Contract ID Number

Labor & Materials to Remove, Supply & Replace for Upgrade of Allis-Chalmers Switchgear Technology for the Jefferson Parish Department of Water.
Description of Job

5% of Their Greatest Amount Bid
Amount of Bid Security

Bid Security Maximum

5%
Bid Security Percentage

Stephanie Hope Shear Attorney-in-Fact
Bond Entered and Executed By

Contractor Managing General Insurance Agency, Inc.
Primary Agency

Stephanie Hope Shear
Attorney-In-Fact Signature

Know all men by these presents that Argonaut Insurance Company, *a Corporation duly organized under the laws of the State of* IL, *are held and firmly bound unto the above owner/obligee by the transmission. The surety agrees to waive the statute of Fraud defense and further agrees that the owner/obligee is a third party beneficiary of the waiver for the purposes of enforcing this bid bond.*

S2K:r03ycVm1A:660973

Shermco industries

Dallas Service Center
2425 E. Pioneer Drive, Irving, TX 75061
p. 9727935523 f. (972) 793-5542

This Proposal has been prepared specifically, for Shanna Folse

for
Bid# 50-00140666
Allis-Chalmers Switchgear Retrofit Project

Approved by:
Keith Mayeux

Shermco Quote Number:
SIQ-07956-21R2

January 19, 2023

January 19, 2023

Mrs. Shanna Folse
Buyer II
Jefferson Parish
Purchasing
200 Derbigny St.
Suite 4400
Gretna, La 70053

Re: Bid# 50-00140666 Allis-Chalmer Switchgear Upgrade Project
Shermco Quote # SIQ-07956-21R2

Dear Shanna,

Shermco Industries is pleased to provide the following quotation:

Technology Upgrade of Existing Allis-Chalmers FC 15 kV Switchgear

Background:

The existing 15 kV Allis-Chalmers FC Switchgear contains the original vintage air magnetic circuit breakers and electro-mechanical relay protection and was manufactured and installed in 1970. Additionally, the breakers rack into the switchgear using a floor ratchet system and is obsolete when compared to current remote racking technology. The electrical room the switchgear is located is old, sheltered isle outdoor switchgear located within an electric room shell building. The switchgear enclosure, instrument transformers, bussing, and cables are in good working order and have regular maintenance performed.

Shermco proposes to modernize the circuit breaker technology from Air Magnetic to Vacuum and to replace the ratchet racking system with a remote racking device with 25' pendant to a controller. Additionally, all (6) switchgear doors will be replaced with new solid state SEL-751 Relays, Relay Test Switches, Electro-Switch breaker control switches, Red/Green push-to test LED pilot lights. On the main and tie breakers, Shermco will provide kirk key interlock for manual transfer.

The above solution replaces the outdated circuit breakers and relays while reusing and not disturbing the existing switchgear enclosure, bussing, instrument transformers, and cables. Jefferson Parish Water should expect an additional 30-35 years of life expectancy from the switchgear with recommended maintenance and eliminates the end-of-life components and ratchet racking system.

Shermco Industries is a Louisiana Licensed State Contractor and will provide Engineering Project Review, Project Management, NETA / NEC Qualified Technicians for your project.

Shermco RENEW Engineers specialize in switchgear retrofits, with many years of experience. Shermco will provide similar-recent project references available upon request.

Shermco's mission is to provide a level of service that exceeds our customers' expectations. We will maintain a healthy work environment and advance a culture of safe work practices wherein management and employees work together as a team seeking excellence in safety.

Vacuum Circuit Breakers Details:

Provide and install the following:

- Six (6) FC-500B Vacuum Roll-In Replacement 1200A Vacuum Breakers

New Door with Control and Protection Bill of Materials:

MV Switchgear Upgrade Description:

Feeder Section:

- (1) 1200A Feeder Replacement Vacuum Breaker

Replacement Door to include:

- Breaker Control Switch
- Red closed, Green open Push to Test 30MM LED Pilot Lights
- SEL751 Relay
- PT1 Test Switch for relay

Spare Section:

- (1) 1200A Feeder Replacement Vacuum Breaker

Main Section:

- (1) 1200A Main Replacement Vacuum Breaker

Replacement Door to include:

- Breaker Control Switch
- Red closed, Green open Push to Test 30MM LED Pilot Lights
- SEL 751 Relay
- PT1 Test Switch for relay
- KK Interlock for M-T-M

Tie Section:

- (1) 1200A Tie Replacement Vacuum Breaker

Replacement Door to include:

- Breaker Control Switch
- Red closed, Green open Push to Test 30MM LED Pilot Lights
- SEL 751 Relay
- PT1 Test Switch for relay
- KK Interlock for M-T-M

Main Section:

- (1) 1200A Replacement Main Vacuum Breaker

Replacement Door to include:

- Breaker Control Switch
- Red closed, Green open Push to Test 30MM LED Pilot Lights
- SEL 751 Relay
- PT1 Test Switch for relay
- KK Interlock for M-T-M

Feeder Section:

- (1) 1200A Replacement Feeder Vacuum Breaker

Each breaker to include:

- Breaker Control Switch
- Red closed, Green open Push to Test 30MM LED Pilot Lights
- SEL751 Relay
- PT1 Test Switch for relay

Additional Bill of Materials:

- Remote Racking Device for new Vacuum Breakers.
- Cubicle heaters for each cubicle
- Coordination and Arc Flash labeling – including relay setting files for new SEL's
- (3) New LED Lighting Fixtures – Turnkey Installed in switchgear aisle (power from SWGR CPT or customer provided 120/277/480V.)
- Breaker Test Station.
- Include SEL Gateway for Single Point Connection of Connection for customer for SEL relays and meters.
- Include Breaker Lift Device and standard tools.

Clarifications:

- Assume 120V AC control power (from SWGR CPT). Client to confirm.
- Proposal assumes removing one of the two (2) spares and having one (1) spare.
- Proposal assumes replacing only five (5) doors only.
- Proposal removes the Bard air conditioning unit.
- Proposal assumes anti-condensation heaters in the breaker cubicles.

TURNKEY INSTALLED PRICE $570,102.00

Applicable taxes and credit card processing fees are not included, terms net 30 days. All sales subject to Shermco Industries terms and conditions form SI-100995. All freight will be prepaid and added to the invoice.

Please Note: Due to the extreme volatility in the precious metals and raw materials marketplace, all orders placed will be immediately reviewed for final acceptance by our quoting Vendors and Shermco at the offered pricing for acceptance and delivery. Any precious metals and raw materials cost changes will be requoted for your final order entry acceptance or refusal.

LARGE PROJECT & EQUIPMENT TERMS & CONDITIONS

Shermco will progressively invoice this project monthly in accordance with the established milestones below:

- 10% of total project price upon order placement to start engineering and procurement project process.
- 20% of total project price upon placement of major material items with vendors.
- 30% of total project price upon (shipment or ready to ship) of major material items for project.
- 30% of total project price upon completion of installation at site with no customer related delay.
- 10% of total project price upon completion of project scope, delivery of final report and initial project red line drawings for site with no customer delays.
- Project installation or equipment delays are subject to storage costs and 3% initial project delay charge on total if circumstances are not the direct result or cause by Shermco Industries. Further delay charges will be 1% per month.

Schedule:
Shermco will provide services Monday-Friday, non-holiday and during normal business hours established from 7AM – 4 PM. Additional hours worked beyond normal business hours and holidays will be billable per Shermco established rates.
The start date is to be determined; work will be confirmed and scheduled upon the receipt of a purchase order. Please give at least two weeks' notice for scheduling purposes.

Note: This proposal is based on estimated mobilizations to the work site. Additional or changes to the mobilization(s) are subject to additional billing.

Monday through Friday 7:00AM until 4:00 PM will be billed at a straight time (ST) rate.
Monday through Friday before 7:00AM or after 4:00PM will be billed at an overtime (OT) rate.
Saturday and after eight consecutive ST hours worked will be billed at an OT rate.
Sunday and after twelve consecutive hours worked will be billed at a premium time (PT) rate.

Report
Upon completion of the above listed work scope, you will receive one (1) electronic copy of the report, prepared within thirty (30) working days. The report will include conditions and test data, with a summary of recommendations for future maintenance, replacement of components or replacement of apparatus.

General Conditions
Work performed by Shermco Industries will be in accordance with the following:

1. The customer's electrician or engineer, familiar with the distribution system, is to be available during the testing and commissioning period.
2. The customer shall provide an auxiliary source of 120 volts, 60 hertz, single-phase power for lights, vacuum cleaners, small power tools and test equipment unless other agreements are made.
3. Switching of electrical equipment is the responsibility of the customer. If Shermco is requested or required to perform the switching operations, no responsibility will be assumed by Shermco for any possible equipment failure during these switching operations. In the event Shermco has to perform switching, the customer will be charged for any cost incurred per Shermco established rates. Any utility service-disconnect or reconnect is to be scheduled by the customer so that the electrical equipment is available without delay. The "line side" or entire service entrance of the electrical equipment must be de-energized and available for testing before any system performance testing can be performed.
4. Site specific training is not included in the price.
5. Cancellations, which may include weather related issues, will be assessed with a mobilization and/or project management/completion charge based on expenses incurred. Delays due to circumstances beyond the control of the Shermco service personnel will be subject to additional billing at established rates. This includes stand-time for switching, power-up operations & equipment clearances and permitting.
6. This quotation is effective for 45 days from quotation date, unless otherwise authorized by Shermco Industries. If materials have been quoted and to be provided, additional costs may apply due to the rapid changing price of raw materials.
7. All permits required will be the responsibility of the customer.

Thank you for this opportunity to be of service. Should you have any questions please do not hesitate to give me a call.

Respectfully Submitted
Shermco Industries, Inc.

Keith Mayeux

Keith Mayeux
Territory Account Manager
Engineering Services Division
keith.mayeux@shermco.com
(225) 715-3504

Copy:
Kendale Perry – Senior Estimator – Engineering, Tom Kennedy – Shermco Renew

IB 1VAF101300
Rev. 03
May 22, 2012

RMVAC™
Direct Roll– In Replacement Magnetically Actuated Vacuum Circuit Breakers

For ALLIS CHALMERS Type FC & SIEMENS-ALLIS Type FS

15kV, 500MVA/750MVA,1200 & 2000 Amp

Power Technology Medium Voltage

TABLE OF CONTENTS

1. CIRCUIT BREAKER SERVICE CONDITIONS

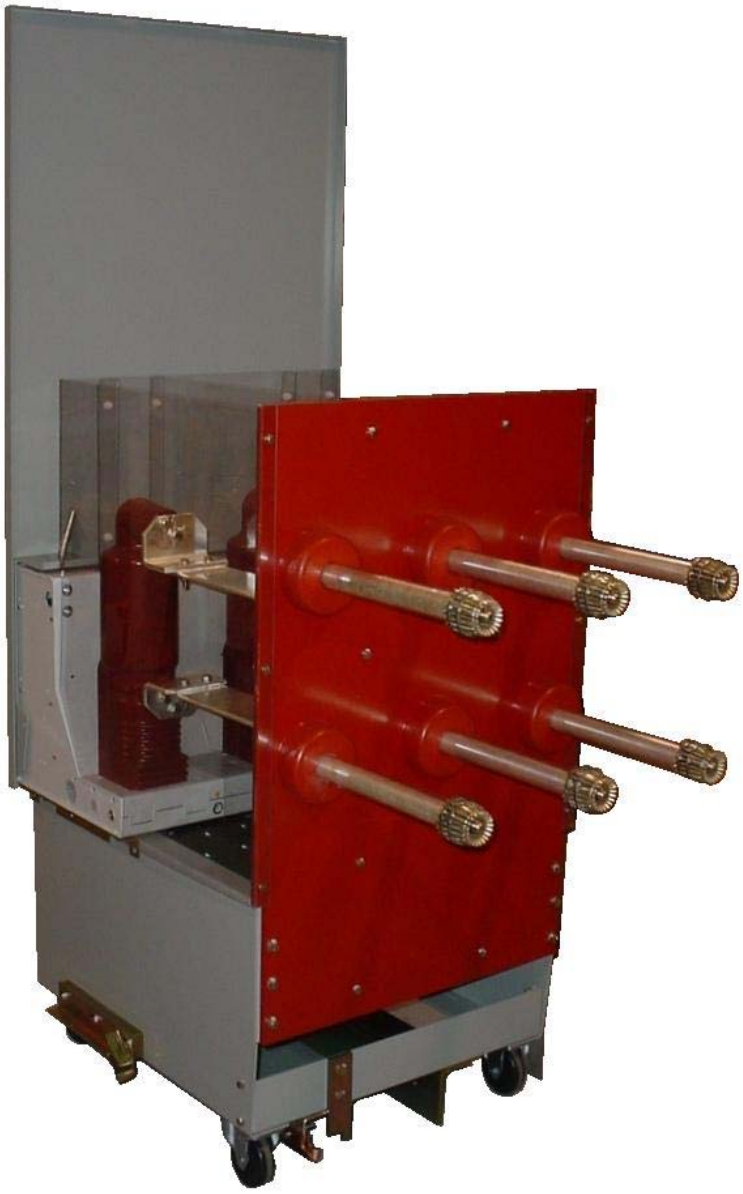
INSTALLATION, MAINTENANCE, AND/OR REPAIRS OF ELECTRICAL EQUIPMENT DESCRIBED IN THIS DOCUMENT SHOULD ONLY BE PERFORMED BY TRAINED AND QUALIFIED PERSONNEL.

Normal service conditions for RMVAC™ circuit breakers are ambient temperatures from -30° C (-22° F) to 40° C (104° F) and altitudes no higher than 1000 meters (3300 feet). Application of RMVAC breakers outside these conditions must be done only with the agreement of ABB.

Abnormal service conditions include:

- Exposure to outdoor weather
- Exposure to condensation
- Exposure to excessive or abrasive dust, explosive mixtures of dust or gases
- Exposure to steam or salt spray
- Exposure to excessive moisture, dripping water, or other similar conditions
- Exposure to abnormal vibration, shocks, or tilting
- Exposure to excessively high or low temperatures
- Exposure to unusual transportation or storage conditions
- Unusual space limitations
- Unusual operating duty, frequency of operation, and difficulty of maintenance
- Short circuit current with asymmetry greater than 100 percent

An isometric rear view of the RMVAC-FC/FS direct roll-in replacement breaker is shown below.



2. INTRODUCTION & SAFE PRACTICES

2.1 INTRODUCTION:

The purpose of this manual is to provide instructions for unpacking, storage, installation, operation, and maintenance for RMVAC™ replacement vacuum circuit breakers. This manual should be carefully read and used as a guide during installation, initial operation, and maintenance.

The specific ratings of each model circuit breaker are listed on the individual nameplates. Wiring diagrams are specific to each job. The RMVAC™ replacement circuit breakers are protective devices. As such, they are maximum rated devices. Therefore under no circumstances should they be applied outside of their nameplate ratings.

WARNING

THE CIRCUIT BREAKERS DESCRIBED IN THIS BOOK ARE DESIGNED AND TESTED TO OPERATE WITHIN THEIR NAMEPLATE RATINGS. OPERATION OUTSIDE OF THESE RATINGS MAY CAUSE EQUIPMENT TO FAIL, RESULTING IN PROPERTY DAMAGE, BODILY INJURY AND/OR DEATH.

ALL SAFETY CODES, SAFETY STANDARDS AND/OR REGULATIONS AS THEY MAY BE APPLIED TO THIS TYPE OF EQUIPMENT MUST BE ADHERED TO STRICTLY.

2.2 SAFE PRACTICES:

RMVAC™ replacement circuit breakers are equipped with high energy / high speed mechanisms. The design includes several interlocks and safety features which help ensure safe and proper operating sequences. To ensure safety of personnel associated with installation, operation, and maintenance of these cirucit breakers, the following recommendations must be followed:

Only qualified persons, as defined in the National Electric Safety Code, who are familiar with the installation and maintenance of medium voltage circuits and equipment should be permitted to work on these circuit breakers.

Read these instructions carefully before attempting any installation, operation, or maintenance of these power circuit breakers.

DO NOT work on an energized circuit breaker.

DO NOT work on a circuit breaker unless all components are disconnected by means of a visible break and securely grounded.

DO NOT work on a circuit breaker with power supplied to the secondary control circuit.

DO NOT defeat safety interlocks. This may result in bodily injury, death and/or equipment damage.

DO NOT work on a closed circuit breaker.

DO NOT work on a circuit breaker with charged energy. (springs, capacitors, etc.)

DO NOT use a circuit breaker by itself as the sole means of isolating a high voltage circuit.

DO NOT leave a circuit breaker in an intermediate position in a cell. Always place the circuit breaker in the Disconnect, Test or Connect position.

NOTICE

FAILURE TO OBSERVE THE REQUIREMENTS OF OSHA STANDARD 1910.269 CAN CAUSE DEATH OR SEVERE BURNS AND DISFIGUREMENT. THAT STANDARD SPECIFICALLY PROHIBITS THE WEARING OF POLYESTER, ACETATE, NYLON, OR RAYON CLOTHING BY EMPLOYEES WORKING WITH EXPOSURE TO ELECTRIC ARCS OR FLAMES.

3. RECEIVING, HANDLING, AND STORAGE

RMVAC™ replacement circuit breakers are subject to complete factory production tests and inspection prior to packaging and shipment. The shipping package is designed to provide reasonable protection during shipment and to provide convenient handling.

3.1 RECEIVING:

Immediately upon receipt of the circuit breaker(s), examine the carton(s) to determine if any damage or loss was sustained during transit. If damage or indication of rough handling is evident, file a damage claim at once with the carrier and promptly notify the nearest district office. ABB is not responsible for damage of goods after delivery to the carrier. However, ABB will lend assistance if notified of claims. Use care in unpacking to avoid damaging any circuit breaker parts.

Unpack circuit breakers as soon as possible after receipt. If unpacking is delayed, difficulty may be experienced in making a claim for damages not evident upon receipt. Check the contents of each carton against the packing list before discarding any packing material. If any discrepancy is discovered, promptly notify the nearest district office. Information specifying the purchase order number, carton number, and part numbers of damaged or missing parts should accompany the claim.

3.2 HANDLING:

RMVAC™ replacement circuit breaker shipping containers are designed to be handled by fork lift.

Once removed from the shipping container, the circuit breaker wheels are designed to move the circuit breaker across a smooth, paved surface.

DO NOT pull the circuit breaker by the front handles with the circuit breaker in any position other than full Disconnect.

DO NOT move the circuit breaker by pushing on the embedded pole assemblies or primary leads of the embedded poles. Damage and misalignment of the pole assemblies will occur if force is applied to them.

3.3 STORAGE:

Circuit breakers should be installed in their permanent location as soon as possible. If the circuit breakers are not placed in service for some time, it is advisable to provide adequate means of environmental protection. This may be done by keeping the circuit breaker in its original shipping container and storing it in a warm, dry, and uncontaminated atmosphere. The circuit breakers should be stored to minimize condensation. Moisture can cause deterioration of metal parts and high voltage insulation.

Prior to storage of the circuit breaker, verification should be made that it is free from shipping damage and is in satisfactory operating condition.

4. RACKING OPERATION

The following rules should always be observed when inserting or removing the circuit breaker device from the switchgear compartment.

DO NOT attempt to insert the circuit breaker into any compartment prior to inspection. Compare the circuit breaker name plate rating with the switchgear rating. Verify secondary voltages on the circuit breaker and in the compartment.

DO NOT attempt to insert a closed circuit breaker.

ALWAYS inspect the circuit breaker compartment to insure that it is free of obstructions, tools, or other equipment.

DANGER

Do not attempt to remove the circuit breaker from the circuit breaker compartment without the required ramp, dolly or lift truck. Refer to the specific switchgear Installation and Maintenance manual for details.

WARNING

To avoid damage to the control system, control power MUST be removed BEFORE removing the breaker front cover.

4.1 INSERTION: (from WITHDRAWN Position)

Check to see if the breaker is open. If not, open the breaker.

The breakers and cells have a blocking interlock system which prevents rolling breakers into cells which are not of the correct rating. With the system only 1200A breakers will go into 1200A cells and 2000A breakers into 2000A cells, and there is no interchangeability between these two ratings.

Roll the breaker into the cell to the “DISCONNECTED” position, the handle (item 1, fig. 1) will rise up and drop down as the racking interlock latches the breaker into position.

From the “DISCONNECTED” position, lift the handle momentarily to the Travel position while beginning racking in the breaker. As the breaker begins to move, release the handle. When the breaker reaches the “TEST” position, the latch and handle drop into place. The secondary disconnects are made up and control power is supplied to the circuit breaker. The capacitors will be charged indicating when the beaker is ready to operate.

To rack the breaker to the “CONNECTED” position, open the breaker. The handle cannot be lifted to allow travel if the breaker is closed. Lift the handle momentarily to the Travel position while beginning racking the breaker. As the breaker begins to move, release the handle. When the breaker reaches the “CONNECTED” position, the latch and handle drop into place.

4.2 REMOVAL: (to WITHDRAWN Position)

In order to remove the breaker from the “CONNECTED” position, the breaker must be open. Open the breaker, lift and hold the handle and use the racking lever (item 2, fig, 1) to draw the breaker out.

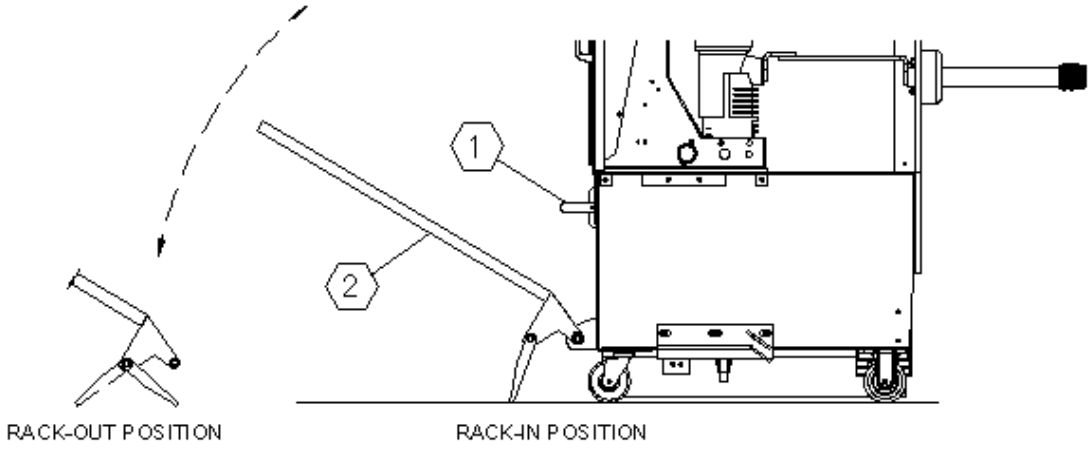


Figure 1 : Racking Detail

5. CIRCUIT BREAKER STRUCTURE

Refer to Figure 2 on page 8.

5.1 ENCAPSULATED POLE ASSEMBLIES

(Figure 2b)

The encapsulated poles are mounted on the rear flat section of the circuit breaker enclosure (1). The live parts of the circuit breaker poles are enclosed in cast resin to protect them from impacts and other external influences.

With the circuit breaker closed, the current path for each pole leads from the upper circuit breaker terminal (25) to the fixed contact (24.2) in the vacuum interrupter (24), then via the moving contact (24.1) and the flexible connector (21) to the lower circuit breaker terminal (22).

The change of contact state is delivered by means of the insulated link rod (19) with internal contact force springs (20).

5.2 OPERATING MECHANISM (Figures 2a to 2d)

The operating mechanism consists of a magnetic actuator (10), control module (27) with sensor systems, storage capacitor(s) (26), and linkages which transmit the force to the breaker poles.

The controls and components for emergency manual opening are located on the front of the enclosure.

The actuator (10) transmits the actuating force on the three circuit breaker poles by way of the lever shaft (18). The storage capacitor(s) (26) provide the necessary actuating energy on demand.

The positions of the poles in the circuit breaker are detected by two sensors (15) and (16) located by the lever shaft (18).

Name plates with the ratings of the circuit breaker are located on the front panel (1.1) and on the inside rear wall just left of the actuator. Depending on options, the label may be located on the inside lower left wall.

The basic version of the magnetic actuator mechanism contains the following controls and instruments:

- Switching readiness signal lamp (READY) (2)
- CLOSE push-button (3)
- OPEN push-button (4)
- Mechanical operating cycle counter (5)
- Mechanical switch position indicator (6)
- Emergency manual OPEN (8)

5.3 CONTROL MODULE

The control module consists of a single circuit board containing the following components:

- AC/DC converter
- Logic circuit / Power Electronics
- Electric optoccouplers for input
- Relays for output
- power electronics to control the actuator coils
- sockets for control and signals

5.4 STORAGE CAPACITOR (Figure 2c)

The energy for operation of the circuit breaker is stored electrically in a capacitor which is designed so that, when fully charged, the energy for an O-C-O (open-close-open) sequence is available without recharging.

Note: The auxiliary power must be turned on and supplied to the control board.

The capacitor's stored energy is continuously monitored by measuring the capacitor voltage.

The READY lamp indicates whether the circuit breaker is functional or not and indicates if the circuit breaker is ready to operate or not.

The energy available in relation to the switch position determines whether a switching operation can be performed or an error message is issued:

Case 1: Circuit breaker in the OPEN position:

The energy available is sufficient for a CLOSE and

Case 2: Circuit breaker in the CLOSED position:

- The energy available is sufficient for an OPEN -CLOSE-OPEN switching sequence.
- The energy available is sufficient for an OPEN switching operation up to 200 seconds after failure of the auxiliary power supply.

5.5 PROXIMITY SENSOR SYSTEM (Figure 2d)

Two inductive proximity switches (15 and 16) are used to detect the mechanical limit positions. The switches permit control of the circuit breaker without auxiliary switches. These two proximity switches also provide

Figure 2a: Circuit breaker front with controls

1 Breaker enclosure
2 "Ready" indicator
3 CLOSE push- button
4 OPEN push-button
5 Mechanical operating cycle counter
6 Mechanical CLOSE/OPEN indicator
7 Rating plate
8 Socket for emergency manual operation lever

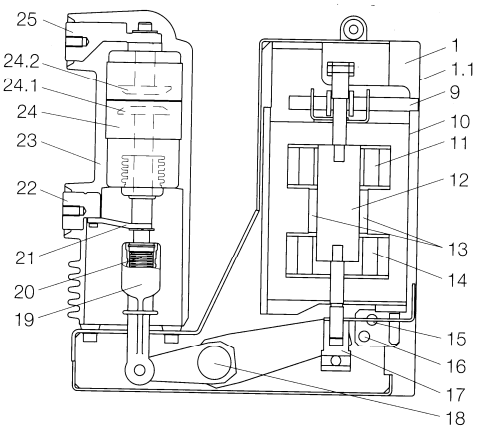


Figure 2b: Sectional view of schematic diagram

1 Circuit breaker enclosure
1.1 Front panel, removable
9 Emergency manual opening mechanism
10 Magnetic actuator
11 OPEN coil
12 Magnet armature
13 Permanent magnets
14 CLOSE coil
15 Sensor for "Circuit-breaker open" signal
16 Sensor for "Circuit-breaker closed" signal
17 Stroke adjuster
18 Lever shaft
19 Insulated link rod
20 Contact force spring
21 Flexible connector
22 Lower breaker terminal
23 Cast insulation
24 Vacuum interrupter
24.1 Moving Contact
24.2 Fixed Contact
25 Upper breaker terminal

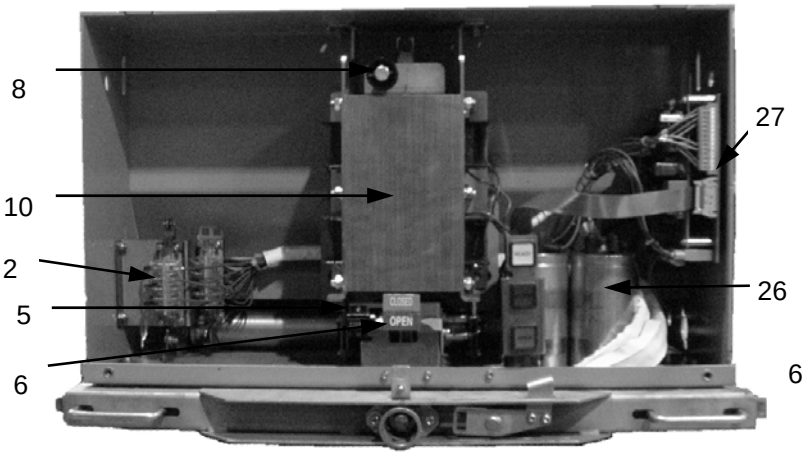


Figure 2c: View of magnetic actuator mechanism and auxiliary systems with front cover removed

5 Mechanical operating cycle counter
6 Mechanical switch position indicator
8 Socket for emergency manual operation lever
10 Actuator
26 Storage Capacitor
27 Circuit breaker control unit
28 Auxiliary switches

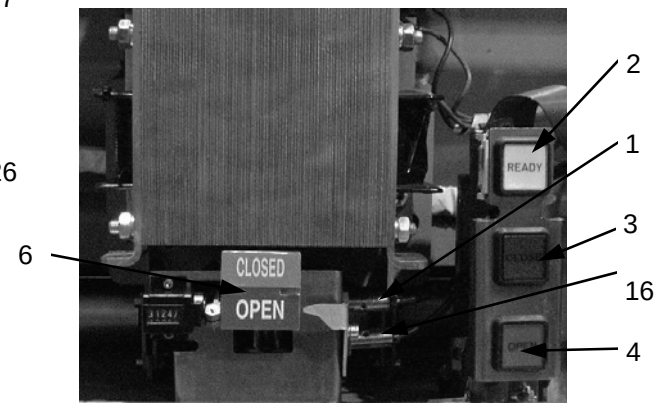


Figure 2d: Switch position indicator

2 "Ready" indicator
3 CLOSE push- button
4 OPEN push-button
6 Mechanical switch position indicator
15 Sensor for "Circuit-breaker OPEN" signal
16 Sensor for "Circuit-breaker CLOSED" signal

6. CIRCUIT BREAKER FUNCTION

In the following sections, refer to the figures on the previous page.

6.1 MAGNETIC ACTUATOR (Figures 2b and 2c)

The magnetic actuator is the heart of the circuit breaker operating mechanism. The actuator is a bistable permanent magnet system in which the armature motion is affected by activating the virtual close and virtual trip coil. In the limit positions, the armature is held in place magnetically by the field of two permanent magnets. Changing of the switched position is performed by exciting one of the two coils until the latching force of the permanent magnets is exceeded.

The actuator does not require control power to maintain the open or closed state.

6.2 ELECTRONIC CONTROLLER

The electronic controller module controls all conditions of the magnetic actuator mechanism. The module controls capacitor charging, Open and Close functions, and anti-pump functions. The following expanded functions are installed on all RMVAC™ circuit breakers.

- Trip on declining capacitor voltage

(Refer to Section 7.4 for instructions on enabling the expanded functions.)

Electronic control requirements for closing the circuit breaker are as follows:

- Auxiliary voltage must be applied to the AC/DC converter.
- The storage capacitor must have sufficient charge for the next switching operation.
- The moving contacts in the circuit breaker poles must be in a defined CLOSE or OPEN limit position.
- The virtual closing coil can only be activated with the circuit breaker in the OPEN position.
- The virtual opening coil can only be activated with the circuit breaker in the CLOSE position.
- Closing is blocked when an opening command is simultaneously active.
- Activation of the virtual closing coil can be disabled by an external blocking signal.
- The antipumping system ensures that, when a closing command is applied and followed by an opening command, only one CLOSE-OPEN switching operation is performed. For the next closing operation, the active closing command has to be cleared and must be issued again.
- Deactivation of the virtual opening or closing coil takes place when the relevant limit position has been reached.

6.3 OPENING AND CLOSING PROCEDURE

(Figures 2a to 2c)

The opening and closing processes are initiated either by remote control via closing contacts or locally by manual operation of push-buttons (3) or (4).

In the closing process, the armature motion acts directly via the lever shaft (18) on the moving contact (24.1) until the vacuum interrupter contacts meet.

In the full motion sequence, the spring arrangement (20) is tensioned to 100% to apply the necessary contact force. The available overtravel is greater than the maximum contact burn-off throughout the life of the vacuum interrupter.

6.4 AUTORECLOSING SEQUENCE

The operating mechanism is fundamentally prepared for autoreclosing. With the short recharging time of the storage capacitor, it is also suitable for multi-shot autoreclosing.

6.5 VACUUM INTERRUPTER QUENCHING PRINCIPLE

Due to the extremely low static interrupter chamber pressure of 10^{-4} to 10^{-8} mbar, only a relatively small contact gap is required to achieve a high dielectric strength. The vacuum arc is extinguished on one of the first natural current zeros. Due to the small contact gap, the high conductivity of the metal vapor plasma, and the short arcing time, the associated arc energy is extremely low. This has positive effects on the life of the contacts and on the vacuum interrupters.

6.6 ELECTRICAL OPERATION

To operate the circuit breaker electrically, control power must be available. Section 5.1 *Racking* describes the application of control power through the secondary disconnect when the circuit breaker is in the Connect position.

1. Inspect the initial state of the circuit breaker to determine the operations available.
   - Close/Open Indicator.
   - Circuit breaker position Connect (or control power applied externally if in the Test/Disconnect position).
2. Energize Control Power.
   - Wait until the READY lamp is on. This will take approximately two minutes maximum, depending on the control voltage, with 48 VDC taking the longest amount of time.
   - Circuit breaker is ready to perform C-O operation.
3. Close the circuit breaker using the close push-button or by sending an electrical signal to the magnetic actuator.
   - The magnetic armature moves down.
     – Close/Open indicator changes to Closed.
     – READY lamp illuminates again after about one second.
   - Circuit Breaker is ready to perform O-C-O operation.
4. Open the circuit breaker using the local OPEN push-button or by sending an electrical signal to the magnetic actuator.
   - The magnetic armature moves up.
     – Close/Open indicator changes to Open.
     – "READY" lamp will remain illuminated.

The circuit breaker is ready to perform C-O operation.

6.7 CONTROL SCHEME

RMVAC™ replacement circuit breakers are similar in switching control to standard spring stored energy mechanisms or solenoid operated breakers.

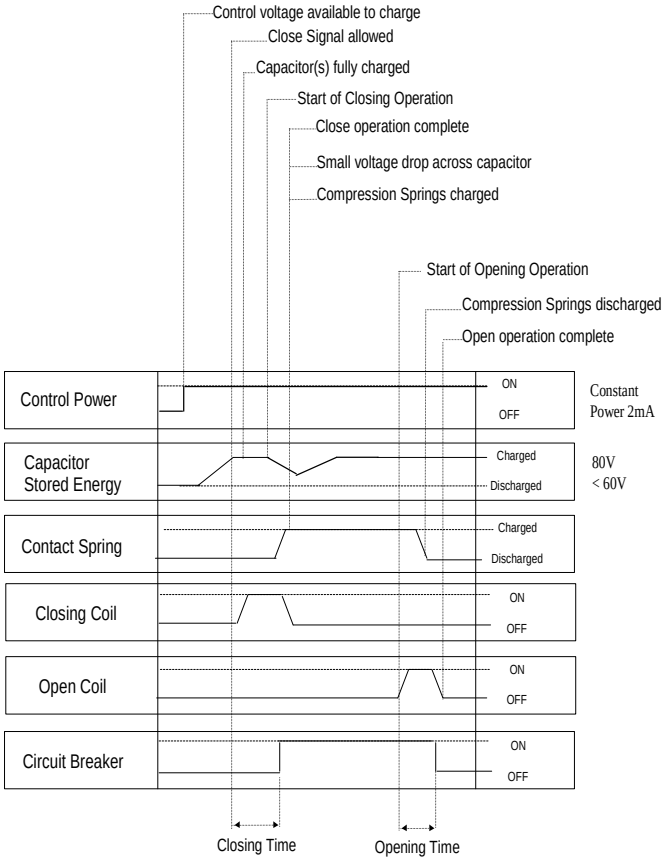


Chart 1: Sequence of Operation (not to scale)

Notes related to Chart 1 are on the next page.

NOTES FOR CHART 1

- Capacitor charging from a fully discharged state requires ten seconds or less, drawing no more than 100 watts.
- After that initial charge, 2 milliamps are required from the control power source to maintain capacitor charge. Compare this to spring-type stored energy mechanisms requiring currents up to 20amps.
- The capacitor voltage will vary 5 to 10 VDC during switching operations, allowing for fast recharge and reclose schemes. The electronic controller switches stored energy to the opening and closing coils.
- The control voltage for field testing of close and trip circuits can be any convenient voltage - AC or DC between 24 and 280 volts. The voltage to energize the control board (the charging motor circuit from the breaker that was replaced) must be > 80 volts for nominal 120 VAC/125 VDC or higher nameplate and > 24 VDC for others.
- The nominal circuit breaker closing and opening times are independent of the control signal and are approximate 45-60ms and 35-50ms respectively. Times are measured from application of signal at the circuit breaker terminals to contact touch and contact parting respectively.

7.1 INTERLOCKS:

The RMVAC™ replacement circuit breaker contains a number of interlocks. A description of each interlock follows as encountered during racking of the circuit breaker into the compartment.

DANGER

MODIFICATION TO INTERLOCKS CAN RESULT IN HAZARDOUS CONDITIONS TO PERSONNEL AND EQUIPMENT. DO NOT OVERRIDE, BY-PASS OR ADJUST INTERLOCKS.

7.2 POSITION INTERLOCKS

The ability to close the circuit breaker is blocked mechanically and electrically unless it is in one of the three positions (Disconnect, Test, or Connect). The handle on the front of the breaker must be lifted to move the breaker to the Test/Disconnect or Connect positions. If the circuit breaker is in between positions, the remote close signal and the front panel close signal are disengaged and the circuit breaker cannot be closed.

7.3 MANUAL OPERATION (Opening)

The circuit breaker can be operated manually (opening only) or electrically. The Manual Opening Handle is required for manual operation (see Section 9).

1. Inspect the initial state of the circuit breaker to determine the available operations (Table 1).
   a. Close/Open indicator
   b. Stored Energy Charged/Discharged Ready Indicator
2. Manual opening may be performed in any switch position, but should be avoided when the circuit breaker is in the Connect position. Any manual operation while the circuit breaker is racked onto a live bus should be avoided to ensure the safety of the operator.

Stored Energy "READY" Indicator	Circuit Breaker	Operations Available
Discharged (Lamp OFF)	Open	None Available
Discharged (Lamp OFF)	Closed	Open
Charged (Lamp ON)	Open	Close-Open
Charged (Lamp ON)	Closed	Open-Close-Open

Table 1: Available Switch Operations

CAUTION

THE STORAGE CAPACITOR MAY BE CHARGED IN THE DISCONNECT AND WITHDRAWN POSITIONS. VERIFY THAT THE CIRCUIT BREAKER IS OPEN AND THE STORAGE CAPACITOR(S) IS(ARE) DISCHARGED BEFORE REMOVING THE FRONT COVER.

7.4 ENABLING EXPANDED FUNCTIONS

The expanded functions of the electronic controller are enabled by DIP switches on the electronic control board. When shipped from the factory, these functions are turned off unless specific instructions were provided to ABB at the time of order entry.

To enable these functions and features, the circuit breaker should be in the Test/Disconnect or withdrawn position with control power disconnected and the capacitors discharged. Otherwise, if control power is connected, the enabling of some of the functions and features could cause unintended breaker operation.

Access is gained to the DIP switch by removing the front cover of the circuit breaker.

For trip on declining capacitor voltage, locate 'DIP' switch position number one and move it to the ON position. When the capacitor voltage falls to approximately 56 volts, the circuit breaker will trip automatically. This is intended to assure that the circuit breaker will always be able to perform its safety function.

8. MAINTENANCE

8.1 BREAKER INSPECTION

The RMVAC-FC/FS circuit breaker requires little maintenance. ABB recommends annual inspection and one or two operations per year. Maintenance is recommended after each 10,000 operations.

Before beginning an inspection, the stored energy in the capacitors must be discharged. Open the circuit breaker and rack it to the Disconnect position. The CLOSE light will turn off when the capacitors are discharged.

With respect to lubrication, the RMVAC-FC/FS circuit breaker is maintenance free. When used in normal service conditions (see page 3), no re-lubrication is required for the life of the circuit breaker.

Ten years after energization, and at subsequent ten year anniversary dates, the RMVAC-FC/FS magnetic actuator, capacitors, and electronic controller must be inspected.

Visually inspect the mounting hardware of the magnetic actuator.

8.2 INSPECTION PROCESS

1. Remove the circuit breaker from the switchgear and move it to a suitable workstation.
2. Remove the front cover. Retain hardware for reinstallation.
3. Correct any loose hardware where the magnetic actuator is attached to the frame. Replace missing hardware.
4. Inspect the electrical connections of the capacitors and electronic controller.
5. Remove excess dust by wiping where possible or by using dry compressed air. Do not direct forceful blasts at the electronic controller. Avoid directing the air in such a way that dust is blown into the magnetic actuator.
6. Do not loosen or tighten the nut at the base of the magnetic actuator. This adjustment has been set and sealed at the factory and must not be changed.
7. Capacitor replacement is suggested at the 20 year inspection point. At ambient temperatures of 40^{O}C inside the switchgear, the life expectancy of the capacitors is approximately 25 years.
8. Inspect the primary disconnects to determine that there are no gouges or other damage.
8. Inspect the secondary disconnect pins to determine there is no damage.
9. Check torque values of the hardware on the primary power circuit: 1/2 inch bolts should be at 40 ft-lbs, 3/8 inch bolts should be at 20 ft-lbs.
10. Inspect ground shoe for tightness and damage.
11. Reinstall the front cover.

WARNING

Do not attempt to operate the breaker with the front cover removed. The front cover is interlocked with the mechanism so that the breaker cannot be operated with the front cover removed. If the circuit breaker is operated without the front cover installed, the control board may be damaged.

13. Before returning the breaker to service, apply a thin coat of an appropriate lubricant to the breaker primary disconnect connections and the secondary connections.

8.3 CONTROL WIRING INSPECTION

Caution: Confirm that control power is off before inspecting control power or control terminations. Control power must also be disabled before control wiring dielectric withstand testing.

Visually inspect the insulation and terminations of the control wiring, and conduct low-frequency withstand voltage testing.

1. Correct any loose or missing mounting hardware.
2. Verify the ground wire connection to the frame and all connectors' alignment and snugness on the electrical components.
3. Replace the front cover before operation

8.4 VERIFICATION OF OPERATION

1. Connect a control power source per the voltage indicated on the nameplate. Operate the circuit breaker 5 to 10 times.

NOTE: Conventional low voltage pick up tests for the close and trip system are not required for the RMVAC™ because the electronic controller always provides the same control voltage and current regardless of the signal input.

2. Verification can be checked at a control station if it is available. Verification can also be checked by returning the breaker to the cell Test position. See Section 4, Insertion and Removal, for additional inspection guidance.
3. Check to see that the proximity sensor LEDs illuminate properly when the breaker is open and when it is closed. If the LEDs do not operate properly, contact the ABB factory for instructions on how to adjust the proximity sensors.
4. After successful operational testing, return the circuit breaker to service.

8.5 DIELECTRIC TESTING, AC HI-POT

PRIMARY INSULATION: To verify the integrity of the primary insulation, perform the following low-frequency withstand voltage test:

1. Close the breaker (after the breaker is closed, de-energize the control power).
   a. Connect the high potential lead to one pole.
   b. Ground the remaining poles and breaker frame.
   c. Some special application breakers are equipped with surge suppressors which are located in the rear of the breaker. Disconnect the surge suppressor from the primary bus.
2. Set the output potential at 0 (zero) VAC.
3. Increase the potential to the required voltage (See Table 2).
4. Hold for one minute.
5. Decrease the potential to 0 VAC.
6. Repeat for the remaining poles.
7. Reconnect surge suppressors after the low frequency withstand test.

A good low-frequency withstand voltage test indicates satisfactory insulation strength of the primary circuit.

VACUUM INTERRUPTER INTEGRITY: To verify the integrity of the vacuum interrupters perform the following low-frequency withstand voltage test:

1. Open the breaker (no control power to breaker).
   a. Connect the high potential lead to one line or load terminal.
   b. Ground the remaining 5 terminals and the frame.
   c. Some special application breakers are equipped with surge suppressors which are located in the rear of the breaker. Disconnect the surge suppressor from the primary bus.
2. Start the machine with output potential at 0 VAC (Do not use DC voltage; false readings can result).
3. Increase potential to the required voltage (Table 2).
4. Hold for one minute.
5. Decrease potential to 0 VAC and turn off machine.
6. Repeat for the remaining line or load terminals.
7. Reconnect surge suppressors after the low frequency withstand test.

A good low-frequency withstand voltage test indicates satisfactory vacuum integrity.

Replace pole assemblies that fail to withstand the voltage across the open contacts, if flashover occurs.

WARNING: **DO NOT** apply high voltage directly to the RMVAC-FC/FS electronic controller (EC). Disconnect secondary control wiring from the EC prior to a wiring integrity test. Do not perform MEGGAR or other tests with control wiring connected to the electronic controller.

Rated Max Voltage	Dielectric Test Value, 1 Minute Dry AC rms New Condition reference c37.06	Dielectric Test Value, 1 Minute Dry AC rms Field Condition reference c37.20.2
15kV	27kV	27kV

Table 2: Primary Low-Frequency withstand Test Voltages

SECONDARY CONTROL WIRING: To verify the integrity of the secondary wiring insulation, perform the following low-frequency withstand voltage test:

1. Connect all pins from the secondary to a test wire. Note: A mating secondary disconnect plug with all pins wired to a common wire is a useful tool for this test.
2. Connect the test wire to the high potential lead of the test machine.
3. Ground the breaker frame.
4. Start dielectric test set with output potential at 0 (zero) VAC RMS.
5. Increase the potential to the required insulation test voltage (1125 VAC RMS).
6. Hold for one minute.
7. Reduce potential to 0 (zero) VAC and turn off the machine.

A successful low-frequency withstand voltage test indicates satisfactory insulation strength of the secondary circuit. Failing insulation will not sustain the voltage across the secondary. Replace the breaker control wiring if the insulation fails during low-frequency withstand voltage testing.

8.6 DIELECTRIC TESTING, DC HI-POT

The use of a DC hi-pot test unit is NOT recommended by ABB. If an AC Hi-Pot test unit is not available, a DC hi-pot unit which has adequate rectification and filtering to ensure less than 5% ripple may be used. The voltages are shown in Table 3.

Breaker Rated Voltage	Field Test Voltage	DC Hi-Pot Voltage
15kV	27kV	36kV

Table 3: DC Hi-Pot Test Voltages

The tests should be conducted using the procedures in Section 9.5. Always recheck with an AC Hi-Pot test unit if the results are questionable. Note: Provided no breakdown occurs, the test is satisfactory. Especially in the case of a DC test, there is no significance to the magnitude of the leakage current recorded.

8.7 CONTACT RESISTANCE TESTING

With the circuit breaker outside of the switchgear, check the primary circuit resistance. This check should be done with a 100 amp source similar to a digital low resistance ohmmeter (DLRO) or Ductor.

This primary circuit resistance test is performed with the breaker closed. Connect one lead to the A-phase line side and one lead to the load side. Turn on the ohmmeter. If the resistance is more than 80 micro ohms for a 1200 amp breaker or 60 micro ohms for a 2000 amp breaker, check the hardware on the primary circuit using the torque values shown in Table 4.

If the tightening of loose hardware does not reduce the resistance to a level below 80 micro ohms for 1200 amp breakers or below 60 micro ohms for 2000 amp breakers, contact the nearest ABB field office.

Repeat the test on both the B and C phases.

Bolt Size (inches)	Torque Value (foot-pounds)
1/2”	40 ft-lbs
3/8”	20 ft-lbs

Table 4: Torquing Requirements for Primary Circuit Hardware

8.8 CLEANING

Clean epoxy encapsulated pole assemblies, primary leads, and insulating barriers using a soft cloth moistened with distilled water. Clean all surfaces with a moistened cloth. Do not use solvents for cleaning.

CAUTION

Applying abnormally high voltage across a pair of open contacts in vacuum may produce X-radiation. The radiation may increase with the increase in voltage and/or the decrease in contact spacing. All operating personnel should stand at least one meter (3 feet) away and in front of the circuit breaker during testing.

9. MANUAL OPENING HANDLE

The Manual Opening Handle (Figures 3 and 4) is designed to open the device manually. Insert the handle into the opening in the front panel as shown and turn it counter-clockwise until the circuit breaker opens. The Manual Opening Handle should be stored near the circuit breaker switchgear for easy access when needed.

Manual Opening Handle - P/N 19540-G00

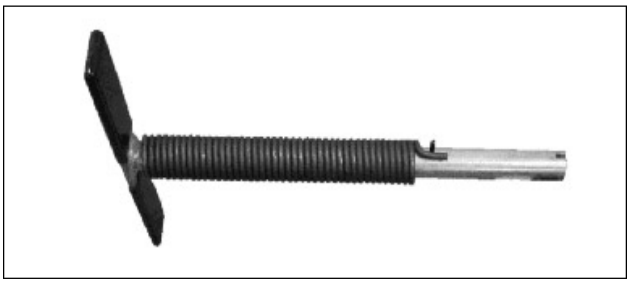


Figure 3: Manual Opening Handle

Figure 4: Manual Opening Handle Inserted

10. TROUBLE SHOOTING GUIDE

Problem	Possible Cause	Possible Solutions
READY indicator does not illuminate	No Control Voltage Present	• Check for incoming control power at secondary disconnects. • Check that the breaker racking mechanism is in the disconnect, test or connect position. If not, the close blocking switch may have control power removed. • Check for control power on pins 48(+) and 49(-) on control board
	Capacitor Voltage	• Check for 80Vdc across the capacitors. The capacitors should be fully charged within 15 seconds after the control voltage supply is applied.
	Proximity Sensors	• Verify the proximity sensors connections to the control board on connector BB1. The black wires are connected to pin 29 (Open Signal) and 30 (Close Signal) The brown wires are connected to pins 31 and 32 (+18V) and the Blue wires are connected to pins 33 and 34 (Ground). • When the sensor is properly positioned, a yellow light on the rear of the sensor for each breaker position will illuminate. When the breaker is closed, the lower sensor will be lit. When open, the upper sensor will be lit. The gap between the sensor and the metal flag
	Magnetic Actuator Coils are not connected or damaged.	• **DO NOT REMOVE OR REPLACE THE CONNECTOR WITH THE CAPACITORS CHARGED. CONNECTOR PIN DAMAGE WILL OCCUR.** • Check for good actuator coil connections on the control board connector, BB2. • With the capacitors discharged, remove the plug from connector BB2. Measure the DC resistance of each coil. This resistance should be between 0.6 and 1.0 ohms.
Breaker will not close from local close pushbutton or remote close signal.	The Ready LED on front panel is off.	• If the Ready LED is off, verify the above conditions under "**READY indicator does not illuminate".**
	Racking Position	• The breaker racking mechanism must be in the disconnect, test or connect position.
	Pushbutton Connector (Local Close)	• The ribbon cable from the pushbutton assembly should be connected to the control board connector BB7.
	Close Signal (Remote Close)	• Check for a proper close signal on the control board input connector BB5 pins 15 (+) and 16 (-). This voltage should be greater than 24VDC or greater than 100VAC. This depends on your control voltage.
	Close Blocking Input	Check for control voltage on the close blocking input, BB5 pins 25 (+) and 26 (-). Voltage should be greater than 24VDC or greater than 100VAC. This depends on your control voltage.
	Normal / Bypass Switch	• (AMVAC drawout breaker) The Normal / Bypass switch located on the front panel pushbutton assembly should be in the NORMAL position. • (AMVAC fixed mount or Retrofits) The Normal / Bypass switch located on the front panel pushbutton assembly should be in the BY-PASS position.
	The Under Voltage (UV) function is enabled and Input is open.	• Inspect dip switch I1004 make sure switches 2,3,4 are in the off position (disables UV) or apply correct input voltage to pins 27(+) and 28 (-) on BB5.

Breaker will not close from local close pushbutton or remote close signal. **(Continued)**	The Under Voltage function is enabled and the monitored voltage is connected to the Under Voltage Input, but the voltage is lower than the threshold.	• Set the correct UV threshold level via DIP Switch I1001 or disable UV by putting switches 2,3,4 are in the off position on I1004
	Trip Signal Applied	• The circuit breaker will not close with a simultaneous close and trip signal applied. Insure that no trip signal is applied to the control board input, BB5 pins 17 (+) and 18 (-). • Insure the local Open pushbutton is not jammed.
Breaker will not open from local open pushbutton or remote open signal.	Low Capacitor Voltage	• The voltage on the capacitors is below the minimum level to open the circuit breaker. This minimum voltage is approximately 56V DC.
	Pushbutton Connector (Local Open)	• The ribbon cable from the pushbutton assembly should be connected to the control board connector BB7.
	Open Signal (Remote Open)	• Check for a proper open signal on the control board input connector BB5 pins 17 (+) and 18(-). This voltage should be greater than 24VDC or greater than 100VAC. This depends on your control voltage.
The CB closes and then opens during a close operation.	The close position sensor is not connected or broken.	• Verify the close position sensor circuit. See details above under "**READY indicator does not illuminate".**
	The CB doesn't reach the correct close position.	• Verify the presence of unwanted objects under the Magnetic Actuator Plunger or between the helper magnet located on top of the actuator behind the manual open assembly. The helper magnet is used on 40 and 50kA models only.
The CB opens if the control power supply is switched off.	The UV function is active and the control power supply is parallel to this input.	• Either disable the UV function or connect to a different voltage source.
	The "Open on Declining Capacitor Voltage" function is enabled.	• Disable the function via I1004-1.Switch 1 should be in the off position to disable this function.

NOTE: There are no user replaceable parts on the electronic controller. When it has been confirmed that the electronic controller is defective, it should be replaced in its entirety.

APPENDIX A - RENEWAL PARTS AND ACCESSORIES

The parts listed below are available from ABB for field use or replacement. Consult your ABB sales representative for current pricing and availability.

ACCESSORIES

Part #	Qty/Breaker	Description
19540G00	1	MANUAL OPENING HANDLE
1VAF005343R001	1	LIFTING YOKE
713222A00	AS REQUIRED	LUBRICANT: NO-OX-ID (1 pt Can) (for Primary and Secondary contacts)
712994A00	AS REQUIRED	LUBRICANT: Anderol 757 (4oz Tube) (for all other lubrication)

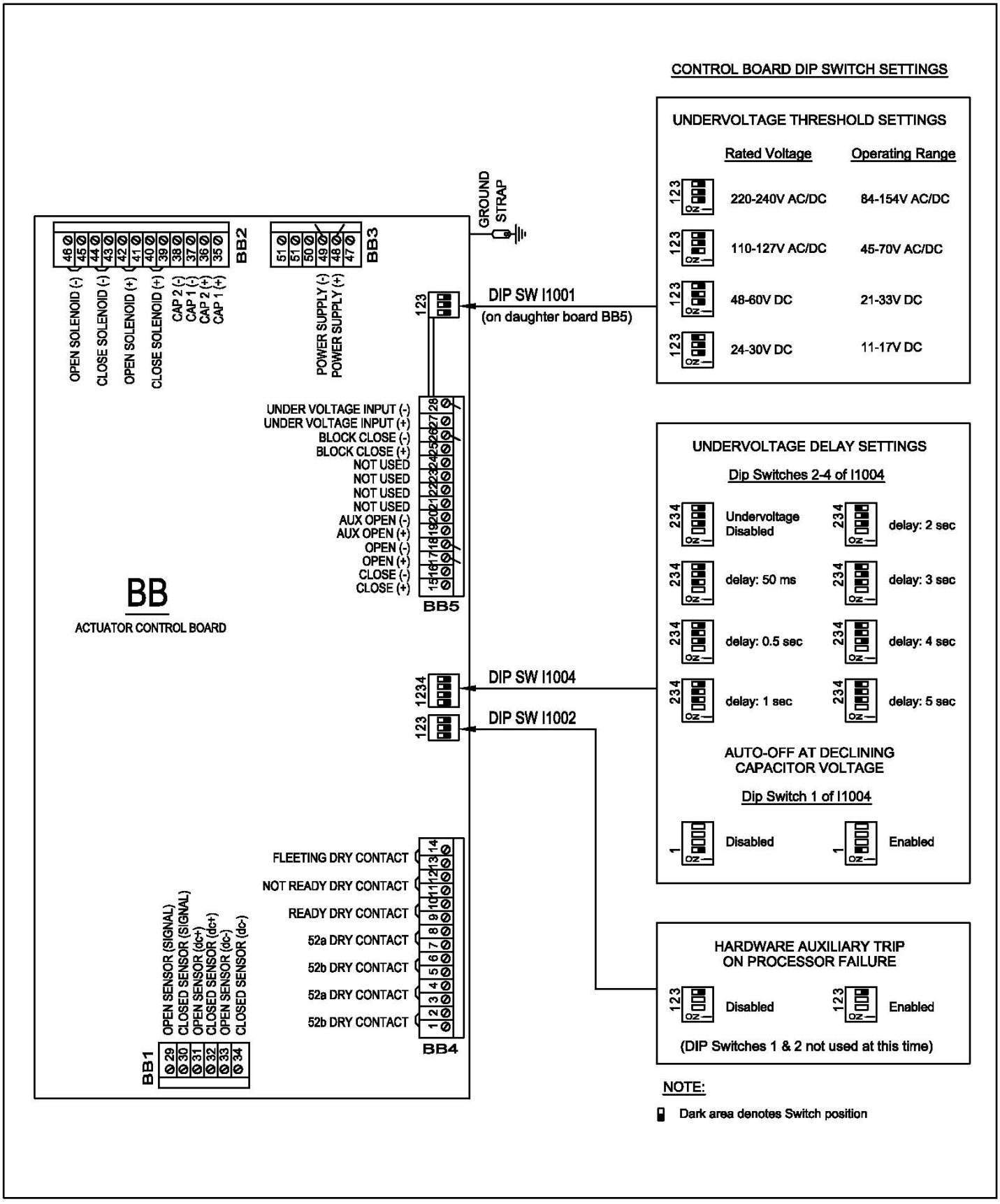
MECHANISM

Part #	Qty/Breaker	Description
GCE7004390R0101	1	ACTUATOR 25kA 5/15/kV
GCE7004390R0102	1	ACTUATOR 31.5kA 5/15kV
GCE7004390R0105	1	ACTUATOR 25kA 27kV
GCE7004390R0106	1	ACTUATOR 40kA 5/15kV
GCE7003094P0101	1	OPERATION COUNTER

ELECTRICAL (CONTROL)

Part #	Qty/Breaker	Description
GCE7002397R0119	2	AUX. SWITCH, 5a/b
GCE7004905R0101	1-5	CAPACITOR (.1F)
GCE0905045P0100	2	PROXIMITY SENSOR
19911P30	1	LV (48 VDC) CONTROL CIRCUIT BOARD
19911P40	1	HV (125/250 VAC/VDC) CONTROL CIRCUIT BOARD

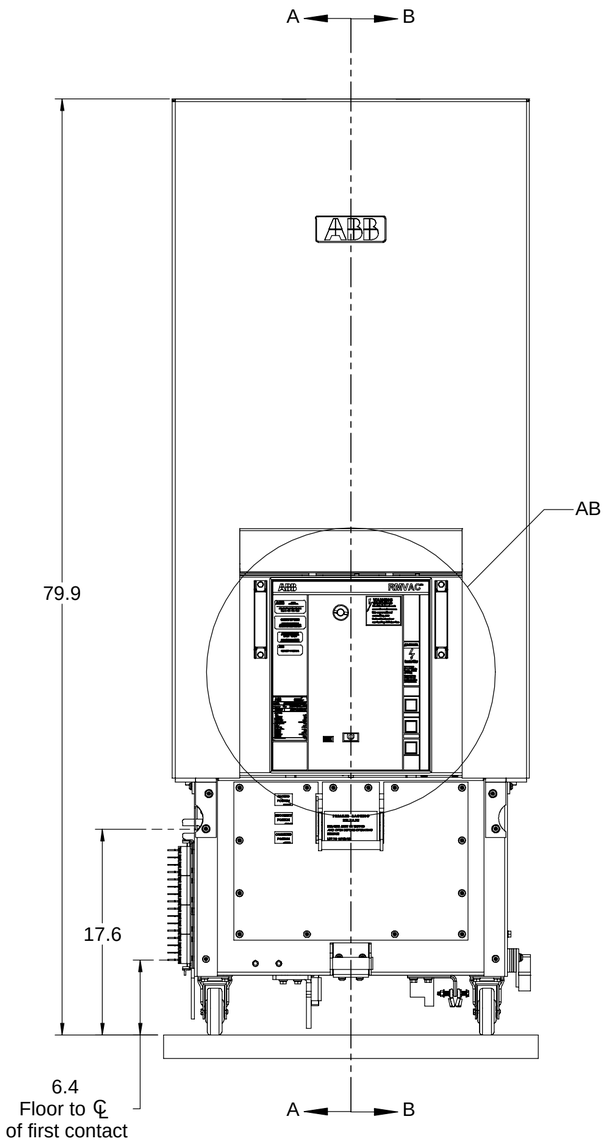
APPENDIX B - ELECTRONIC CONTROLLER CIRCUIT BOARD

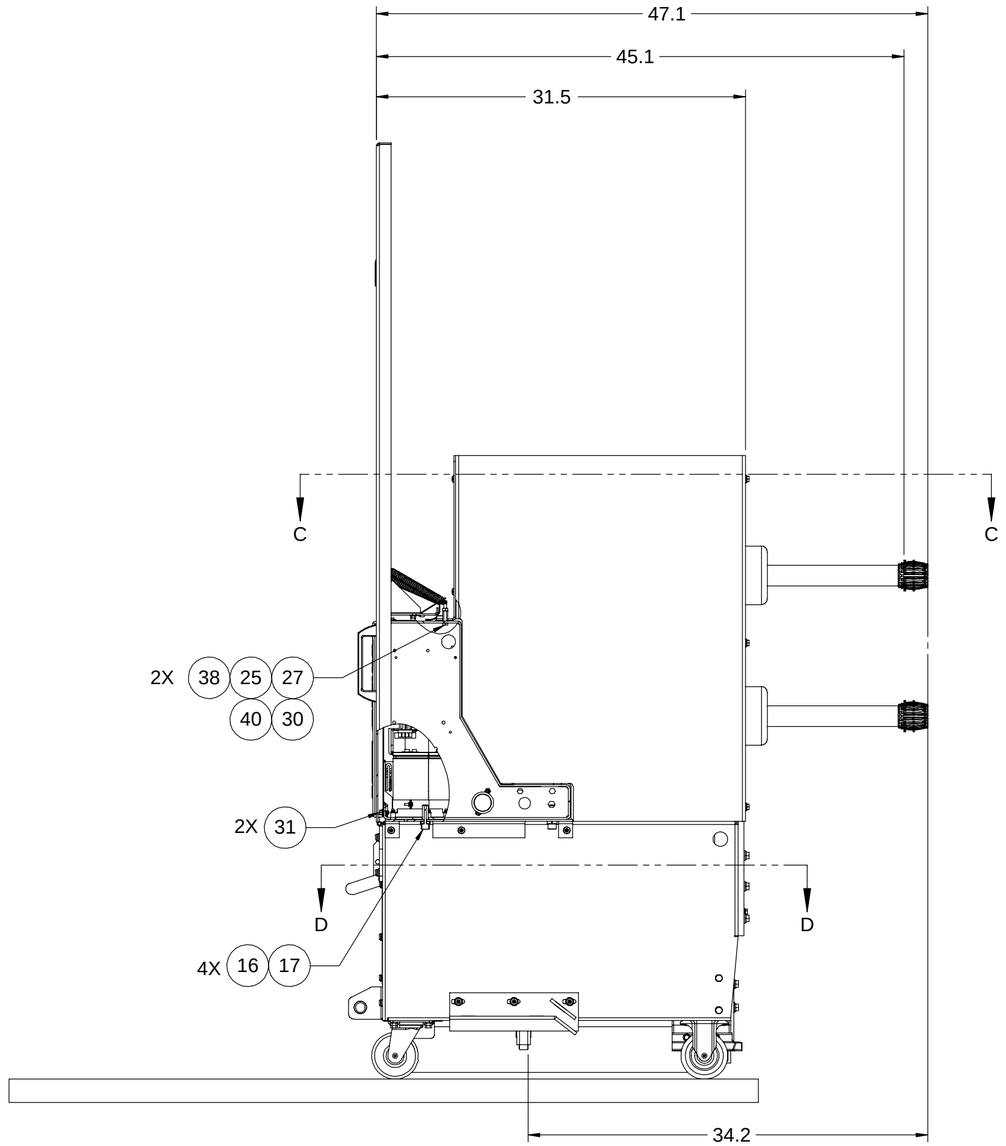


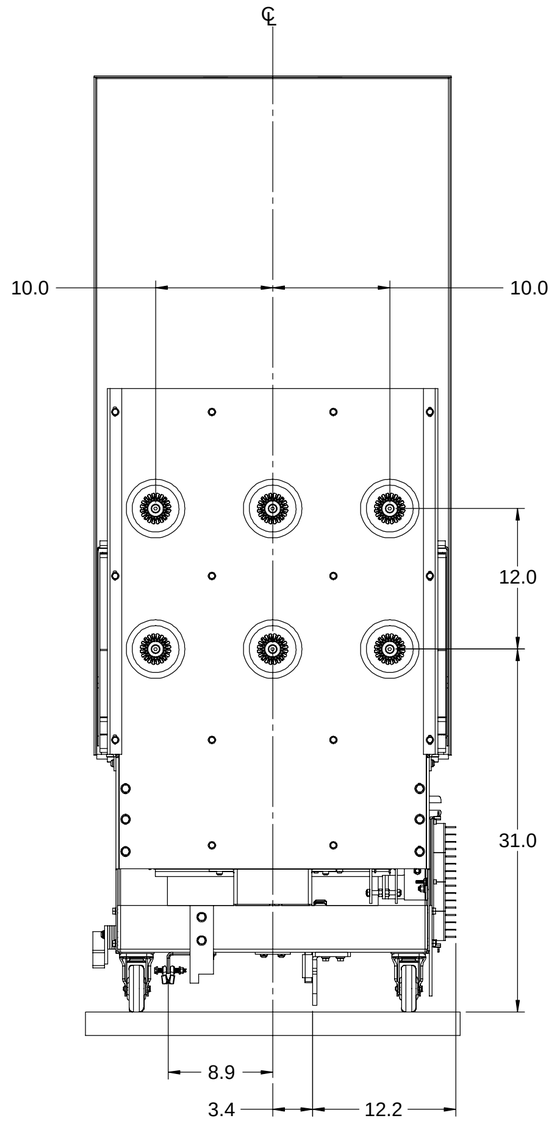
For more information contact your local ABB field representative or the customer service power products at 1-800-435-7365 extension 7. Visit the ABB Web site at www.ABB.com.

ABB Inc
2300 Mechanicsville Road
Florence, SC 29501
Phone + 1-843-413-4700
Fax + 1-843-413-4850

ABB Inc
655 Century Point
Lake Mary, Fl 32746
Phone + 1-407-732-2000
Fax + 1-407-732-2161







A0001 FSV1-15-500-12/20 Final Assembly
MATERIAL: See BOM
FINISH: None

REV	DATE	REVISION DESCRIPTION	BY
14	02/03/15	[12454] Added lt. 45 to A0001 & lt.44 to A0002 through A0005.	SAF
13	08/29/14	[12254] Added views AB, AC, AD, AE & AF.	SAF
12	12/06/13	[11912] lt. 15 was 650626F08 & lt. 17 was 650395H09.	SAF
11	10/07/13	[11595] lt. 30 was 54414F00 & lt. 10 was 54500H00. +lt. 44.	SAF
10	09/28/12	[11128] Quantity for lt.'s 25, 27, 30, 38, 39 & 40 was 1. + lt.'s 42 & 43.	SAF
09	10/01/11	[9807] Separated models & created sub-assemblies.	SAF
08	12/22/09	[9653] Addition of 1.2k_2k convertible.	GCH
07	02/16/09	[9331] Addition of no MOC Model.	GCH
06	09/30/08	[8846] Reformat; improvements.	GCH
05	04/16/07	[8690] Corrections, hardware callouts.	RJK
04	02/14/06	[1215] Added secondary bracket.	RJK
03	02/02/05	[0918 & 0919] Added frame sides & labels.	JMG
02	01/31/05	[0915] Initial Release.	GCH

NOTES:
1. STANDARD TOLERANCE INFORMATION IS ON DRAWING 52016
2. UNLESS OTHERWISE SPECIFIED, DIMENSION UNITS ARE: ENGLISH
3. CIRCLED FEATURES DENOTE KEY CHARACTERISTICS
4. UNSPECIFIED TOLERANCES:
   3-PLACE DECIMAL .006
   2-PLACE DECIMAL .020
   1-PLACE DECIMAL .060
   ANGLES 1 °

REF	CR239
REF	
REF	
REF	
NEXT ASSY	N/A
NEXT ASSY	
NEXT ASSY	
NEXT ASSY	
ECN NO.	0915

REV	DESCRIPTION
14	FSV1-15-500-12/20 Final Assembly

DATE DRN	DATE APP'D	DWG NO.	SHEET
09/05/05	09/05/05	1VAF004374	2 OF 20

DRN	CKD	APP'D
GCH	JMG	KIG

Medium Voltage Service
2300 Mechanicsville Road
Florence, S.C. 29501

Shermco Terms and Conditions

A proposal or quotation issued by the Shermco company named in the proposal ("Shermco") provided to you (the "Proposal") is an offer to sell services to you and/or procure equipment, parts, components, and software ("Procured Items") for you as specified in the Proposal ("Services") pursuant to these terms (the "Terms"). By accepting the Proposal, instructing Shermco to begin work or by executing the Proposal, you are agreeing to be bound by these Terms. The Proposal and Terms together form the entire agreement between you and Shermco (the "Agreement"). Shermco reserves the right to increase fees via Change Order should the terms or conditions of the service or the costs associated with the procurement of equipment, parts, components, and software increase during the term of the engagement.

Your Obligations and Changes

You agree to pay Shermco's fees, charges, and reimbursable expenses for the Services and applicable taxes thereon (the "Charges") within 30 days after receipt of the invoice by you unless otherwise specified in the Proposal. Invoices are deemed received by you within 24 hours of being sent by Shermco. Invoices that are not paid to Shermco within 30 days of your receipt thereof accrue interest from the date of the invoice at the rate of one and a half percent (1.5%) per month. A surcharge of 2.5% of the invoice amount will apply for all invoices paid by credit card. You will be billed monthly for Services performed during the prior month for Services provided on a time and materials basis, otherwise, you will be billed upon the completion of applicable milestones as set out in the Proposal. In addition, Shermco may suspend performance of the Services without liability to you until payment of all overdue amounts is made in full, including applicable interest and may require a retainer for Services to be rendered in future. All expenses incurred by Shermco relating to collection of past due amounts shall be charged to your account.

You will provide Shermco with access to the job site and all information about hazards including Material Safety Data Sheets as well as timely decisions upon request and all documentation and information reasonably required by Shermco for its provision of the Services. Shermco is entitled to rely upon the accuracy of that documentation and information and you assume the risk of any inaccuracy unless validation of that documentation and information is specifically part of the Services. You may not require Shermco or its employees, as a condition to site access or otherwise, to further agree or to enter into any agreement which waives, releases, indemnifies or otherwise limits or expands any right or obligations whatsoever hereunder. You and Shermco shall take all such reasonable steps to protect the confidentiality of information provided by one to the other and neither party shall disclose same or use it for purposes other than for the project under which the Services are rendered.

If, during the term of this Agreement, circumstances or conditions that were not originally known to Shermco become known, to the extent that they affect the Services, Prices, Charges, schedule, allocation of risks or other material terms of this Agreement, Shermco reserves the right to renegotiate appropriate portions of this Agreement. Shermco shall notify you in writing of the changed conditions necessitating renegotiation, and you and Shermco shall promptly and in good faith enter into renegotiation of this Agreement to address them and it is specifically agreed that the re-negotiation may result in a change in the scope of the Services, the Charges, the schedule, or other material terms of this Agreement and that a change order premium may be applied by Shermco.

Standard of Care and Warranty

Shermco's Services shall reflect that degree of care and skill ordinarily exercised by members of the same profession currently practicing under similar circumstances at the same time and in the same or similar locality (the "Standard of Care"). Upon prompt, written notice to Shermco, but in any event within one (1) year of completion of the Services, that the Services or part of the Services fail to meet that Standard of Care, Shermco shall, at its option, re-perform the portion of the Services not meeting the Standard of Care to remedy the deficiency, or pay you the amount of the Charges paid by you for the Services not meeting the Standard of Care.

All Procured Items carry only the specific manufacturer's warranty related to it or extended to Shermco by its supplier and Shermco provides no separate warranty including but not limited to any warranties relating to title and non-infringement of third-party intellectual property rights. Shermco will assign or flow through to you all warranties provided by third parties with respect to the Services. You will be responsible for all Shermco's costs associated with your cancellation of any order of Procured Items including shipping and cancellation or re-stocking charges. Shermco bears no liability for any delays in shipping or delivery of Procured Items. Risk of loss of Procured Items passes to you at the same time as Shermco's supplier's terms transfer that risk to Shermco.

Except for the Standard of Care, Shermco disclaims all warranty, guarantee or condition, statutory or otherwise, express, or implied, written, or oral, including but not limited to warranties of merchantability and fitness for a particular purpose. Nothing in the Agreement creates a fiduciary duty owed by one party to the other. The Limitation of Liability provision below limits Shermco's liability to you.

Limitation of Liability

In recognition of the relative risks and rewards for you and Shermco in connection with the project under which Shermco provides the Services, you and Shermco agree that notwithstanding any other provision in the Agreement, the common law, applicable statutes, or any other legal theory, and to the fullest extent permitted by law, **THE TOTAL AGGREGATE LIABILITY OF SHERMCO AND, TO THE EXTENT LEGALLY LIABLE IN ANY MANNER, THE LIABILITY OF ITS OFFICERS, DIRECTORS, PARTNERS, EMPLOYEES, SHAREHOLDERS, OWNERS AND SUBCONSULTANTS, FOR ANY AND ALL CLAIMS, LOSSES, COSTS, DAMAGES OF ANY NATURE WHATSOEVER OR CLAIMS OR EXPENSES FROM ANY CAUSE OR CAUSES RESULTING FROM OR IN ANY WAY RELATED TO THE PROJECT, THE SERVICES OR THE AGREEMENT, INCLUDING LEGAL FEES AND COSTS AND EXPERT-WITNESS FEES AND COSTS, IS LIMITED to,** at Shermco's option, either the re-performance by Shermco of the Services not meeting the Standard of Care to remedy the deficiency or the payment by Shermco to you for actual damages incurred by you directly up to an amount equal to the Charges paid by you for the Services not meeting the Standard of Care.

This limitation limits any and all of Shermco's liability or cause of action however alleged or arising including any indemnity obligations, and regardless of the success or effectiveness of other remedies, relating in any fashion to any work and any Services, whether originally performed or re-performed, any revisions to the work or the services rendered hereunder and any misrepresentations made during the course of rendering those services whether by Shermco's employees, sub-contractors, consultants, or agents, and includes without limitation, those caused by Shermco's negligence or gross negligence, a fundamental breach of contract or breach of a fundamental term or any other breach of duty whatsoever unless otherwise prohibited by law.

Notwithstanding any other provision of this Agreement, and to the fullest extent permitted by law, neither party shall ever be liable to the other for any special, indirect, incidental, punitive, or

consequential damages arising out of the project, the provision of the Services or the Agreement regardless of whether such losses were foreseeable at the time of the making of the Agreement. This mutual waiver of damages includes, but is not limited to loss of use, business interruption or loss of revenue, savings, reputation, data, computer functionality, use of equipment, earnings, income or profits, that either party may have incurred from any cause of action including negligence, strict liability, breach of contract and breach of warranty of any kind even if such party has been advised of the possibility of such potential loss or damage in advance. Shermco shall not be responsible for the acts or omissions of you, your employees, contractors, subcontractors, agents, or their employees, nor liable for any loss, injury, or damage to persons or property caused by their negligence or fault.

Ownership and Use of Documents, Patents and Trademarks

All documents, including drawings, plans, models, designs, specifications, reports, photographs, computer software, surveys, calculations, computer print-outs, electronic files, and other data used in connection with the Services and which were prepared by, or on behalf of, Shermco (the "Documents") and all patents, trademarks, copyrights, industrial or other intellectual property rights resulting from the Services or from concepts, products, or processes that are developed or first reduced to practice by Shermco, or others on behalf of Shermco, in performing the Services (the "Intellectual Property") are Shermco's property whether the work is executed or not and together, are Shermco's "Instruments of Service". Shermco retains all common law, statutory and other reserved rights thereto.

You may only use the Instruments of Service as permitted under these Terms if you have paid the Charges. Thereafter, you are granted a non-exclusive license to use the Intellectual Property inherent in the Instruments of Service for the life of, and only for, the project under which Shermco provided the Services and retain and use a copy of the Documents all solely for purposes of its maintenance and repair. The terms of use and license of any of Shermco's intellectual property licensed to you under a separate license agreement are not governed by this Agreement.

You will not, directly, or indirectly, disclose to third parties, use, misuse or modify the Instruments of Service except as specifically authorized in this Agreement or explicitly agreed to in writing by Shermco. You will, to the fullest extent permitted by law, indemnify and hold harmless Shermco from any and all claims by any party (including claims of infringement of third-party intellectual property rights), damages, liabilities or costs, including reasonable legal fees and expenses on a solicitor and own client basis, arising, directly or indirectly in any manner whatsoever, out of any such unauthorized disclosure, use, misuse or modification of the Instruments of Service. You agree that Shermco is not responsible or liable to you or anyone else for the consequences, financial, legal or otherwise, of your disclosure, use, misuse or modification of the Instruments of Service.

Remedies on Breach

Nothing in the Agreement shall operate to limit a party's legal remedies for breach of the other party's obligations hereunder which shall, at all times, be cumulative. You agree that any material breach of this Agreement will cause irreparable harm to Shermco, that such harm will be difficult if not impossible to ascertain, and that Shermco shall be entitled to equitable relief, including injunction, against any actual or threatened breach hereof, without bond and without liability should such relief be denied, modified, or vacated. Neither the right to obtain such relief nor the obtaining of such relief shall be exclusive of or preclude Shermco from any other remedy.

Force Majeure

Shermco shall not be responsible or liable for any loss, damage, detention or delay arising directly or indirectly from any cause or event beyond Shermco's reasonable control including war, invasion, insurrection, riot, the order of any civil or military authority, or by fire, flood, weather or other acts of the elements or acts of God or other emergencies, pandemics or other public health emergencies, breakdown, lockouts, strikes or labor disputes; the lack of availability of equipment, supplies or products (but not to the extent that any such lack of availability of any of the foregoing results from Shermco's failure to have exercised reasonable diligence); failure of any Government agency to act in a timely manner, or, failure of performance by you or your contractors or consultants; or without limiting the foregoing, any other cause beyond Shermco's reasonable control.

General

Nothing in the Agreement shall create a contractual relationship with, or a cause of action in favor of, any third party. The Services are being performed solely for your benefit and no other party shall have any claim against Shermco because of the Agreement or the performance or non-performance of the Services. Shermco may provide Services through resources of its subsidiaries or affiliates and may subcontract performance of the Services without your consent but remains liable, therefore.

Neither party shall, during the term of the Agreement and for a period of two (2) years thereafter, without the prior written consent of the other party, offer employment to or actively solicit any employees or personnel of the other party who have been engaged in or associated with the Services.

Unless the Services are rendered in Canada, your relationship with Shermco and the Agreement shall be governed by the applicable laws of the State of Texas and the Courts thereof and the courts of appeal therefrom. If the Services are rendered in Canada, same will be governed by the jurisdiction where the Services are provided and the Courts of that jurisdiction and the courts of appeal therefrom.

This Agreement supersedes all prior negotiations, discussions, agreements, or representations whether written or oral. No other terms, conditions, warranties, or understandings whether express or implied, form a part of this Agreement. No amendment or waiver of the Agreement is binding unless agreed to in writing by both parties, a waiver of one provision does not operate to waive any other provision and no waivers of a provision of the Agreement shall act as a subsequent waiver of the same provision. If any provision of the Agreement is invalid or unenforceable, the remaining provisions are valid and binding. Shermco may, at any time, at its sole option, assign this Agreement wholly or in part.

Termination and Survival

Either party may terminate this Agreement upon material breach of this Agreement by the other party upon five (5) days' written notice to the breaching party or for convenience upon giving the other party not less than fifteen (15) calendar days' written notice and, in the event of termination of this Agreement by either party, you shall, within fifteen (15) calendar days of receipt of Shermco's final invoice, pay Shermco for all Charges up to and including the date of termination. If a party is purporting to terminate for material breach, the breaching party shall have seven (7) days to resolve the breach in which case, the Agreement shall not be terminated. Obligations related to confidentiality, payment for Services and indemnification survive the termination of this Agreement.

Client: _____

By: _____

Printed Name/Title: _____

Date: _____

The Terms and Conditions detailed herein will supersede any Client Terms that may be issued subsequent to this Proposal