

MAINTENANCE

GENERAL INSTRUCTIONS

This manual does not represent an exhaustive survey of maintenance steps necessary to ensure safe operation of the regulator. Particular applications may require further procedures. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the local Siemens sales representative.



WARNING

Failure to properly maintain the regulator can result in serious injury, death, or equipment damage. The instructions contained herein should be carefully reviewed, understood and followed.

To prevent:

The following maintenance procedures should be performed regularly:

1. Operational checks.
2. Periodic inspection.



DANGER



Hazardous voltages. Will cause serious injury, death, or equipment damage.

To prevent:

Always de-energize and ground the equipment before maintenance requiring access to high voltage parts.



WARNING

The use of unauthorized parts in the repair of the equipment, tampering by unqualified personnel, or faulty repair and adjustments can result in dangerous conditions which can cause serious injury, death, or equipment damage.

To prevent:

Follow all safety instructions contained herein, and contact your local Siemens sales representative for replacement parts.

OPERATIONAL CHECKS

Basic regulator operation can be checked while the regulator remains in service. The output voltage can be monitored from the control panel display under the <METER> menu on the "Vld" screen.

- Check the calibration by following the steps in the Basic Troubleshooting section of the Accu/Stat control panel instruction manual.
- Run the tapchanger several steps in one direction in the manual mode until the output voltage is outside of the bandwidth. Return the control to automatic mode. After the predetermined time delay, the tapchanger motor will be observed to return the output voltage in-band. Repeat this operation, running the tapchanger in the opposite direction.
- Check the **Vari-Amp™** limit switches by attempting to run the tapchanger beyond the position to which the switches are set. The limit switches should function to open the circuit. Note: If the limit switch is set at the maximum 10% range and fails to function, the tapchanger will stall against a mechanical stop. The motor is designed to stall continuously without damage.



CAUTION

Operation of the regulator at extreme tap positions could produce line voltages outside of operating limits that could result in property damage.

To prevent:

Operate the regulator only to judiciously determined voltage extremes.



WARNING

Regulator may have High Internal Pressure. Can cause serious injury, death, or equipment damage.

To prevent:

Use pressure relief valve to vent regulator before un tanking.

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PERIODIC INSPECTION

A sample of oil from the regulator should be subjected to dielectric breakdown test, per ASTM D-877. If found below 25kV, the oil should be changed or reconditioned. Refer to ANSI C57.106-2002. Other tests, especially Neutralization Number, Interfacial Tension and Power Factor are also useful and may be preferred by particular users.

The oxidation inhibitor in the oil will be depleted over a period of a few years and should be replaced. The inhibitor is 2, 6-ditertiary-butyl-para-cresol (DBPC) at a concentration level of 0.2 to 0.3%.

The time interval between internal inspections will depend upon frequency of tapchanger operation and the load on the regulator. Regulators subjected to numerous overloads and a high load factor may require more frequent inspections than those carrying normal loads. While internal inspection is not a necessity, preventive maintenance inspections will help assure the continuity of service.

To untank a JFR regulator, proceed as follows:

1. Remove the regulator from service as described on Page 10.

DANGER

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To prevent:

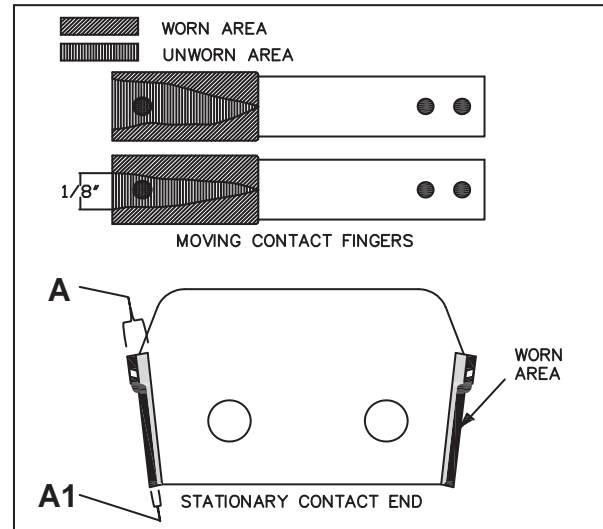
Always de-energize and ground the equipment before maintenance requiring access to high voltage parts.

2. Place the regulator in a position where energized overhead lines will not interfere.
3. Operate pressure relief valve to vent regulator before un-tanking
4. Remove the mounting bolts holding the control box onto the main tank.
5. Remove all cover bolts.
6. The regulator can now be pulled from the main tank by the cover lifting eyes.

When inspecting, check to be certain all hardware and connections are tight. The principal point of the internal inspection will be the condition of the arcing contacts on the tapchanger. Since numerous factors influence the rate of contact tip wear, no one criteria can be stated to recommend when a contact should be changed.

The following figure shows the possible condition of contact wear after a period of operation. If the contact surface is less than 1/8 inch wide, the contact should be replaced. (See the Figure below)

Contacts, both movable and stationary, show normal burning and wear once placed in service. If for any reason A1 dimensions exceed 4/5 of A, the stationary contact should be replaced. (See the Figure below)



• UPPER FILTER PRESS SEALING

If cover top cap is removed, make certain the cap is properly sealed when replaced on cover. Siemens recommends applying pipe sealant (Loctite PST or equivalent) around the threads of the adapter. Furthermore, it is recommended that the seal be tested by applying 5 psig pressure through the pressure relief valve fitting for 5 minutes, with no loss in pressure. Failure to assure seal may allow moisture to be pulled into the unit during a cool-down cycle.

• FAN MAINTENANCE

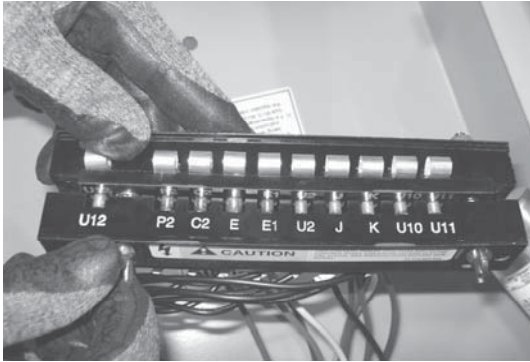
Cooling fans (if equipped), require minimum attention. Fans with plain sleeve bearings or **Oil-Lite** sleeve bearings should be oiled at least once a year with SAE 10-W engine oil which does not thicken in cold weather. Oil must be added to sleeve bearings before starting motor for the first time after installation.

Fans equipped with ball bearing motors are packed with grease before shipment and should be greased at least once a year with a soda-soap, ball-bearing grease of medium consistency furnished by a reliable supplier.

POLARIZED DISCONNECT SWITCH (JACK PLUG) AND HINGED CONTROL PANEL

The **Accu/Stat™** control panel is hinged and may be removed completely from the regulator control box by removing the wing nuts on the polarized jack plug and pulling the jack from its fixed position. This will automatically de-energize the control. It is not necessary to bypass or de-energize the regulator to remove the control.

A spring-loaded shorting bar in the plug automatically short circuits the current transformer secondary when the jack is removed.



REMOTE MOUNTING OF CONTROL EQUIPMENT

The **Accu/Stat™** control may be remotely mounted. Remote cable is available in standard lengths of 18, 25 and 30 feet incorporating oil and moisture resistant, color-coded conductors.

VARI-AMP™ POSITION INDICATOR

The **Vari-Amp™** feature provides a method of operating the regulator at increased load by decreasing the range of operation. It provides operator flexibility by allowing the range of regulation to be adjusted in 1¼ percent increments. The various regulation ranges together with the corresponding current capacities for standard regulators are listed on the next page. All that is necessary to adjust the range of regulation anywhere from ±5 percent to ±10 percent is to turn the adjusting knobs until the proper range of regulation is shown on the side of the position indicator. The upper and lower limits need not be the same.

It is not necessary to remove the regulator from service to make this adjustment. The switches are, however, in the motor power circuit so the motor should not be running while the switches are being set.

