

Manual

Protectostat

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1. Safety instructions

- Always ensure correct electrical connection when assembling and repairing.
- Repair and maintenance jobs must only be carried out by skilled personnel.
- Disconnect from the power supply when carrying out maintenance. The electrical equipment must be secured against being switched on.
- Only use original spare parts.

2. Important remarks

1. The device must be installed in a safe position. Protective equipment required for operator's safety has to be provided by the customer.
2. The line must be correctly connected. The manufacturer's declaration (CE) is invalid if changes are carried out on the device without our agreement.
3. Fuse protection and earthing provided by the customer must be carried out according to VDE 0100 and to the regulations of the local power supply company.

3. General

The device (Protostat) produces a permanent anodic protection potential against metal tanks (stainless steel) and piping. This anodic protection of passivated tanks quadruples the lifetime before a new passivation of the equipment with nitric acid is necessary.

If small holes develop in the passive layer during use of the bath, a variable anodic protective current (electronically controlled) becomes effective and prevents metal being deposited. Due to this the utilization of the line can be extended until the next operation break (weekend) so that no loss of production occurs.

The Protostat has the following advantages for any equipment (stainless steel, e.g. type 1.4301) for electroless (chemical) metal deposition:

1. Production stability by avoiding faults during working.
2. Reduction of passivation costs to a fraction.
3. Reduced costs for chemicals (nitric acid) and their disposal.
4. Also effectiveness in piping through to the filter units.
5. Increased operational safety for the tanks and rapid pay back for the Protostat.

4. Application and commissioning

The Protostat is designed for wall mounting. It is to be located as close to the tank as possible. (The length of the sensor cables provided is 10 m.)

The pipes for circulation and filtration must be as short as possible in order to avoid potential drops.

After the device has been connected, adjusted and commissioned as described in the following instructions, an inspection glass can be fitted in the front door to prevent misadjustments.

4.1. Preparation of the Protostat

The device is equipped with an emergency current supply module to guarantee the protection potential in case of a mains supply failure. In order that the accumulators in the module do not discharge during shipment or long storage (more than 4 weeks), the module is rotated by 180° for delivery. It must be turned to its correct position during assembly.

When this is done the Protostat is already ready for operation before turning on the emergency switch.

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It is important that the unit is left switched during operation breaks and on holidays so that a permanent protection of the tanks can be guaranteed.

During maintenance of the nickel plater the unit should be partially removed from the Protektostat to cut off the current from the main equipment.

4.2. Preparation of the nickel-plating analysis

In order to ensure an optimal cleaning the whole line including pumps, pipe work and filters must be carefully treated with nitric acid (min. 30%) for approx. 12 hours according to the instructions of the nickel bath manufacturer. Then rinse with DI water until the indicator paper (nitrate test) or the pH indicator displays a neutral value.

In case cathodes are already fitted they must be removed to avoid passivation.

Attention!

When the equipment is filled with nitric acid, the **Protektostat** must not be switched on. Therefore the emergency power supply module must be removed so far that the control lights switch off.

4.3. Installing the Protektostat

Before installing and commissioning the Protektostat the operator must check if the public or work-owned power supply is protected against power peaks. Damage to electrical parts can be avoided by using appropriate chokes.

The **Protektostat** is connected to the line (tank body, piping) and to the cathode with the current and sensor cables according to the connection diagram. For long pipe runs the individual pipe sections must be additionally connected to each other to obtain the same potential at every point. In this way the tank and all attachments (piping, pump...) have a common ground potential.

Cathode

This can be made of stainless steel (e.g. material 1.4301) or alternatively of normal steel. It is important to pre-nickel plate stainless steel cathodes for 2 minutes before installing the cathode.

The cathode fixation is insulated against the tank and must be fitted so that all 4 corners are approx. 100 mm from the tank wall and base.

The electrical connection of the cathode must be outside the tank vapour zone. This prevents the formation of moisture bridges and short-circuits. U-profiles (along the length) are recommended for rectangular tanks.

P r o t e k t o s t a t

After installation of the emergency power module or switching on the mains switch the correct function of the **Protektostat** is indicated by an identical display on both right-hand instruments (actual and set value).

The left-hand ammeter must display a value clearly under 100 mA in a cold bath.

Higher current values indicate an isolation fault or a short circuit. These must be eliminated before starting operation.

If the current value is as above, the voltage potentiometer must be set in the range 700-800 mV until the diode U_{diff} stops blinking red.

The **Protektostat** is then correctly connected and the anodic tank protection is actuated.

4.4. Current alarm threshold / Over-current fuse

To ensure optimal protection for the unit and the audio and/or visual warning function of the unit the protection current can be chosen and set by the „Current alarm threshold“ potentiometer

If the set point is exceeded, a red diode blinks and an alarm - switchable over the potential-free connections 3, 4, 5 - is set.

If no attention is paid to these safety features major operating errors can occur in the equipment (short circuit due to large work pieces between anode and cathode) which can result in damage to or destruction of module.

To avoid damage as far as possible, the current amplifier for the module is switched off by the overcurrent switch when 20 A are applied for 30 to 60 seconds.

The interruption also removes power from the current-alarm module. A loss of the visual / acoustic signal can be avoided by the installation of a self-holding switch with manual reset for the connections 3, 4 and 5.

The current amplifier is re-actuated with the Reset key after removal of the fault.

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4.5. Check Program

This program is exclusively to use for testing the electrical condition of the **Prot e k t o s t a t** when errors are displayed despite correct assembly of the tank and the cathode.

Procedure :

4.5.1. Install out mains connection.

4.5.2. Remove all modules, except the power unit, after removing the screws.

4.5.3. Turn the main switch on. The green control lamps must light.

4.5.4. Turn the main switch off again.

4.5.5. Install the modules *Current amplifier* and *Emergency supply*.

4.5.6. Install jumpers between connections 6 and 12 and between connections 8 and 13 (circuit diagram).

4.5.7. Turn on the main switch and depress Reset.

Note:

Reset must be depressed after every switch-on to avoid a possible high current pulse.

4.5.8. The green diode 'Operation' must light up. This indicates the function of the protection potential therefore also for the protection current.

4.5.9. Both voltmeters indicate identical values (set / actual voltage) when using active cathodes.

4.5.10. The LED U-Control („U-Steuer“) must light and indicates the correct internal control of the current amplifier. If the current supply is from the emergency supply, the LED is not lit in order to save current although the control voltage is present.

4.5.11. The LED „U_{diff}“ blinks „RED“ if there is a difference of 50 mV between the set and actual voltages and if the set voltage input is incorrect.

4.5.12. Set the set-voltage potentiometer so that the LED „U_{diff}“ does not blink anymore (approx. 700 - 900 mV). The display scale of the left hand ammeter is extended up to 1.5 A to allow better legibility.

4.5.13. Test switch

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4.5.14. To test the function of the current amplifier set the voltage to 700 mV and depress the button. The correct function is indicated by a full-scale deflection of the left-hand ammeter as well as by the current alarm.

4.5.15. The red overcurrent LED must switch off directly after releasing the test button.

4.5.16. The test program is complete. The unit is OK.

4.5.17. Switch off the mains supply.

4.5.18. Remove jumpers 6/12 and 8/13

4.5.19. Connect the Protokostat to the tank with supply and sensor cables. Take care that the tank is earthed and check the isolation at the tank.

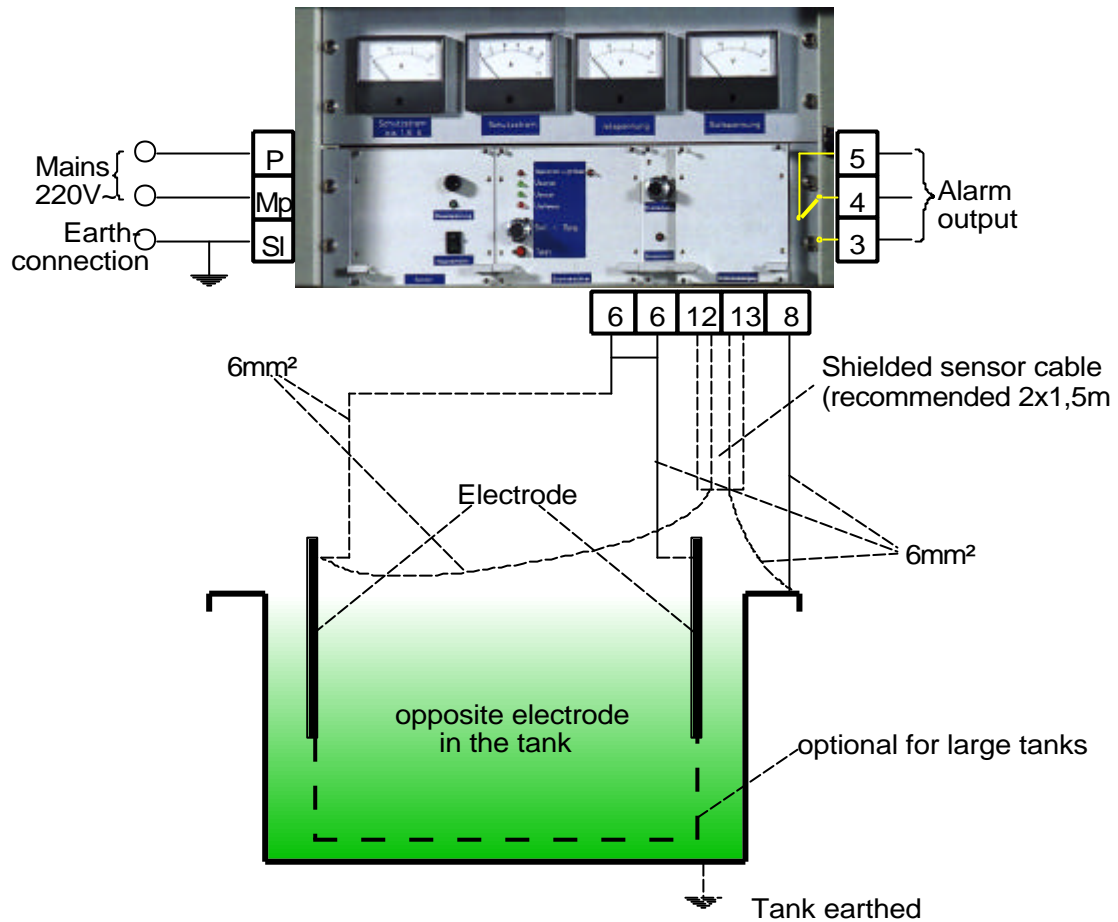
4.5.20. Turn on the mains switch

4.5.21. Green LEDs light up - red LEDs do not.

The Protokostat is ready for operation.

Prot e k t o s t a t

5. Electrical connection of the protection device



6. Maintenance:

The battery pack of modul 'uninterruptible power supply' should be replaced after 5 years latest.

N.B. :

If you have any questions regarding the function of the Prot e k t o s t a t or apparent errors, please consult us with email to info@seg-team.com subject: protectostat .

The modular design enables a quick repair by exchanging appropriate parts without the need to return the complete unit.

IMPORTANT REMARK

Because we are electrical engineers we cannot give any chemical consultings !

6. Dimensions for wall fixing

