



## REOTRON Power supplies for use in cathodic protection applications



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For many years REO has manufactured and developed power supplies for use in Cathodic Protection (CP) applications.

The REOTRON TRPS-CP are robust transformer-rectifier (TR) power supply units. They are used all over the world in CP applications and provide exceptionally reliable and economical protection.

Remote monitoring, control and maintenance of CP plant is becoming more important as it allows cost effective and accurate measurement of the performance of a given installation at any time and without large survey costs. For these applications, REO has developed a specific solution, the REOTRON SMP-CP is a robust electronic power supply based on the latest primary switch mode technology.

The REOTRON SMP-CP can be controlled from a true zero of voltage or current (very important for CP applications) up to the maximum rated values using a wide variety of control options, for example, the user can use the integral keypad, fit external potentiometers or use analog control signals (0 - 10 VDC, 0 – 20 mA), serial communication or a variety of industrial fieldbus interfaces (Profibus, CAN, DeviceNet or EtherCat). This ensures that the units can easily be integrated using the latest SCADA based control schemes or even be used in retro-fit applications to replace older systems. In addition each unit provides a 4-20 mA feedback which provides a proportional output for current and voltage. The means that metering is much easier as there is no requirement for current shunts.

These electronic power supply units, offer high efficiency, easy maintenance, very low output voltage ripple all in a reliable compact package.

Another power supply solution from REO is the regulating/firing unit REOTRON MDZ2000. This is used for controlling 6-pulse semiconductor rectifier circuits in conjunction with oil or air cooled transformers to provide low voltage/high current DC power. Again using the standard REO control schemes (keypad, analog, comms) voltage or current can be accurately controlled to ensure reliable regulation and easy integration. Whatever your preferred power option for your CP requirements, REO has the solution.

We also engineer and manufacture customer specified equipment, if you have an application and cannot find a solution please contact us.





# REOTRON TRPS-CP/M

The REOTRON transformer-rectifier systems TRPS-CP, are variable power supplies for use in cathodic protection applications.

The output voltage can be regulated by a rotary switch in 14 steps or infinitely variable by a variable transformer. At the output you can choose between 20 V or 40 V. The devices can be manually controlled using either the rotary switch for the tapped option or the control knob for variable option.

Units in the REOTRON TRPS-CP series are available in various output ratings from 100W up to 3000W and larger sizes are possible. The units are protected against overload using a thermal over current protection switch and have built-in measuring instruments for the display of output current and output voltage.

Optionally, among many other additions, a third high impedance voltage measuring instrument for the potential display can be integrated. The measuring range is 0 ... 1.5 V or 2.5 V with internal resistance 100 Kohm.

The REOTRON TRPS-CP range can be supplied either open mounted on a frame, for incorporation into a customer's own enclosure or supplied in a self contained naturally ventilated housing for indoor applications.



## Numerous additional options:

- cabinet for wall mounting
- potential measuring instrument
- operating hours run counter
- inrush current limiter
- auxiliary power outlet
- surge arrester
- valve arrester
- Lightning arrestors
- Electricity meter
- Meter panel with circuit breaker and auxiliary socket
- Varistor
- Earth leakage protection - RCD

Technical data	
Type	REOTRON TRPS-CP
Input voltage	115 V AC, 230 V AC, 440V AC, +/- 10%
Input frequency	50 / 60 Hz
Efficiency	>88% (230V)
Device output power	100W, 200W, 400W, 600W, 800W, 1000W, 1250W, 1500W, 1750W, 2000W, 3000W
Output voltage	20 V, 40 V
Ripple	4,8% at rated power
Protection class	IP00, IP20
Operating temperature	-10...+45 °C
Storage temperature	-40...+85 °C
Relative humidity	20...90 % without condensation
Dimensions (WxHxD)	REOTRON TRPS-CP 380x600x215 mm
Weight	ca.40 kg (IP20)

# REOTRON MDZ 2000

The range of REOTRON MDZ regulators are microprocessor based units designed to control thyristors in a 6- pulse controlled bridge (B6). The units comprise control and regulating electronics and also firing pulse generation and the pulse output module.

The MDZ 2000 can be used as a current or voltage regulator, whereby output corrections are made relative to the appropriate setpoint input. The actual set point can be derived from an external potentiometer, 0...10 VDC or a 0...20mA / 4...20mA control signal. The standard actual output feedback is +/- 0...40 VDC for the rectifier output voltage and +/- 0...100mA for the current output.



## Function

The MDZ regulating and firing unit has been conceived for the regulation of large power units used in the Cathodic Protection industry. The unit can be configured to control a thyristor bridge on the primary or secondary side of a transformer. Typically in voltage regulation mode the output voltage is held constant, relative to a set point, through the internal regulating circuitry and load or mains input changes therefore have no influence on the output voltage. When the unit is used as a current regulator, the output current of the unit is compared with the set point and the output adjusted accordingly.

The output voltage can, under these conditions, rise to the maximum permitted. If both set points are used simultaneously, the regulator with the lowest value always has priority. This means, for example, that for a voltage regulator with a secondary current regulation, the voltage control remains in operation providing the selected current value is not exceeded. If the current limit is reached, then the current regulator has priority.

If the unit is used as a pure voltage or current controller, the reference voltage (10 VDC), provided for the other set point inputs, must be bridged to allow the regulator to run at maximum.

### Range of functions:

- All 6 pulses in the power control circuit can be used, i.e. for primary control of a transformer
- Set point enable (switch or 24 VDC control signal)
- Impulse enable (switch or 24 VDC control signal)
- Input for over temperature switch
- Set point source from potentiometer, control voltage ...10 VDC or 0...20mA / 4...20mA, DC
- Adjustable start-up and run-down ramps
- Additional over current monitor (adjustable from 100% to 150% of the maximum current)
- Switchable to manual mode without regulator control
- Connection for clockwise or anticlockwise phase rotation (self detection)
- Potential free change over contacts for fault warning

Technical data	
Type	REOTRON MDZ 2000
Mains supply	3x 400 V +6%-10% 50/60 Hz
Firing pulse steps	6
Pulse voltage	ca. 12 V
Pulse current	500 mA
Transformer groups	Dd0, Yy0, Dz0, Dy5, Yd5, Yz5, Dd6, Yy6, Dz6, Dy11, Yd11, Yz11 and primary regulator
Voltage set point	0...10 V, DC / 0...20 mA / 4...20 mA / Poti 10 kΩ
Current set point	0...10 V, DC / 0...20 mA / 4...20 mA / Poti 10 kΩ
Voltage actual value input	+/- 0...40 V (0...10 V, DC optionally)
Current actual value input	+/- 0...100 mV (0...10 V, DC optionally)
Up/Down ramp integrator	0,1...10 Sec adjustable
Voltage regulation	PI - regulator adjustable percentage of P
Current regulation	PI - regulator adjustable percentage of P
Input Impedance voltage actual value Input	56 kΩ
Input Impedance current actual value Input	5,6 Ω
Control signal – pulse enable	12...24 V, DC / 2,5 mA
Control signal – set point inhibit	12...24 V, DC / 2,5 mA
Over temperature input switch	Switch 1 mA
Fault relay	1 changeover contact load 250 V, 1 A
Status relay	1 changeover contact load 250 V, 1 A
Operating ambient temperature	0...45 °C
Dimensions (WxHxD)	140x290x160 mm



# REOTRON SMP-CP and CP/M

The REOTRON series SMP-CP are self contained DC power supplies which provide an electrically isolated variable voltage or current output. The devices can be used as a voltage or current regulator or both combined.

They are operated locally via an integral keyboard and display or via external control signals for voltage and current setpoints. The internal regulation electronics ensures that any line or load changes are compensated ensuring a steady output.

Even after a power interruption the units are configured to automatically restart and return to their programmed operating state.

The acceptable control signals are typically 0 ... +10 V DC or 4 ... 20 mA.

Furthermore, the output can be electronically enabled or disabled via an inhibiting input (not isolated).

This input can be driven with a potential-free contact or a control voltage 24 V DC.

For monitoring of the protection current, the actual values of current and voltage are given in form of a 4 ... 20 mA signal current, this allows easy remote monitoring or metering of the applied voltage and current.

Alternatively the units can be controlled using a serial RS232 interface or a field bus (Profibus, CAN, DeviceNet, EtherCAT, EtherNet/IP, ProfiNet).

A status signal indicates the operating status of the device and an integral hours run meter provides the user with a dynamic indication of service life.

The flexibility and amount of readily available features of the REOTRON SMP CP / M range means that Cathodic Protection systems can be easily produced, installed and remotely monitored to ensure the most cost effective solution possible.

For installation in a switch cabinet the devices are inserted in a compact aluminium housing.

Another mechanical option is to utilize an industry standard 19" rack system of REOTRON SMP-ESM-CP devices.

All REOTRON SMP-CP have an input stage which is designed to minimize the power consumption (PFC filter) this means that the cost for providing a Cathodic Protection solution using a REOTRON SMP-CP/M is exceptionally low. For protection against mains borne external influences, the units are fitted with circuitry designed to deal with voltage spikes. This is a multistage surge suppressor which comprises varistors and gas discharge tubes.



## Benefits at a glance:

- Integral meters with version SMP CP / M
- Plug-in version
- Very compact design with high-frequency technology
- Very low weight
- Easy installation and replacement
- Integrated PFC filter
- High efficiency
- Low power consumption, savings over the entire service life
- Adjustable on the local display, analog signals and optional via FieldBus
- Easy combination with remote control technology in SCADA systems
- Auto restart after power failure
- Galvanic isolation
- High control accuracy of 1%
- Low ripple of only 200 mV p-p
- Control from 0 ... 100%
- Compensation for mains voltage fluctuations
- Adjustable ramps start and stop
- Current voltage or power control
- Parallel and series connection possible to increase power
- Display of error messages on the display as e.g. Overvoltage, overcurrent, overtemperature
- Built-in hours run meter
- All connections made via pluggable terminals
- Several mechanical options
- Also available in customized versions

# REOTRON SMP-CP/M 24-5

Technical Data		
Type	REOTRON SMP-CP 24-5	REOTRON SMP-CP/M 24-5
Input voltage	110 V AC +/- 10% 230 V AC +/- 10%	
Input frequency range	50 / 60 Hz	
Efficiency (Typ.)	> 85 %	
Power factor	0,95	
Output voltage	0...24 V	
Output current range	0...5 A	
Unit output power	120 W	
Voltage tolerance	+/- 1 %	
Current tolerance	+/- 1 %	
Ripple & Noise	+/- 200 mVp-p	
Set point input voltage / current	0... +10 VDC, 0(4)...20 mA/DC Potentiometer 10 kOhm	
Feedback output Actual voltage / actual current	4...20 mA	
Inhibit input (Remote control)	12 / 24 VDC, 3300 Ohm or volt free contact	
Status signal	Relay, change over contact 1 A, 250 VAC 1 A, 60 VDC	
Interface (Option)	Profibus-DP, CAN-Bus, DeviceNet, EtherCAT, EtherNet/IP, ProfiNet	
Protection class	IP 20	
Working temperature	-10...+45 °C	
Storage temperature	-40...+85 °C	
Working Humidity	20 ~ 90 % RH non-condensing	
Storage Humidity	10...95 % RH	
Standards	EN50178, EN61000-6-2, EN61000-6-4	
Weight	2,5 kg (CP/M)	



REOTRON SMP-CP/M 24-5



REOTRON SMP-CP 24-5

REOTRON SMP-CP/M 48-10 & 48-20



REOTRON SMP-CP 48-10 & 48-20



# REOTRON SMP-CP/M 48-10 & 48-20

Technical Data			
Type	REOTRON SMP-CP & CP/M 48-10	REOTRON SMP-CP & CP/M 48-20	
Input voltage	110 V AC +/- 10% 230 V AC +/- 10%	110 V AC, +/- 10%	230 V AC, +/- 10%
Input frequency range	50 / 60 Hz		
Efficiency (Typ.)	> 85 %		
Power factor	0,95		
Output voltage	0...48 V		
Output current range	0...10 A	0...20 A	
Unit output power	580 W	768W *PR	960 W
Voltage tolerance	+/- 1 %		
Current tolerance	+/- 1 %		
Ripple & Noise	+/- 200 mVp-p		
Set point input voltage / current	0... +10 VDC, 0(4)...20 mA/DC Potentiometer 10 kOhm		
Feedback output Actual voltage / actual current	4...20 mA		
Inhibit input (Remote control)	12 / 24 VDC, 3300 Ohm or volt free contact		
Status signal	Relay, change over contact 1 A, 250 VAC 1 A, 60 VDC		
Interface (Option)	Profibus-DP, CAN-Bus, DeviceNet, EtherCAT, EtherNet/IP, ProfiNet		
Protection class	IP 20		
Working temperature	-10...+45 °C		
Storage temperature	-40...+85 °C		
Working Humidity	20 ~ 90 % RH non-condensing		
Storage Humidity	10...95 % RH		
Standards	EN50178, EN61000-6-2, EN61000-6-4		
Weight	7,7 kg (CP/M)		



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