

# TRANSFORMER RECTIFIERS OIL COOLED THYRISTOR CONTROL

BAC Corrosion Control Ltd design, manufacture and test a complete range of Transformer Rectifiers and Power Control systems under their Infinity Power brand name.



We cater for a wide range of specifications and functionality requirements and work with our clients to provide reliability, value and quality at every step of the process.

## DATASHEET 1.16

TRS



The transformer rectifier is housed inside an oil tank and control box with the control and indication mounted on an internal hinged door. The control box is fitted with a viewing window to enable easy viewing of the control and indication of the rectifier. The user is protected from High voltages via door interlocked isolator

The power transformer, choke, diode assembly and shunt are mounted inside the oil tank. The primary MCB, DC fuses, thyristor firing PCB and AC/DC lightning arrestors are mounted on the back panel of the control box.

The DC voltmeter, DC ammeter, AC On lamp, door interlocked isolator, 4mm test points and controls are all mounted on the internal door.



**BAC**<sup>®</sup>

CORROSION CONTROL

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## Electrical Circuit

The transformer rectifier converts a three-phase or single phase AC power supply into a direct current which will be used for providing an impressed current for cathodic protection.

The AC input is supplied to the main transformer via the AC isolator and MCB. The transformer steps down the voltage and steps up the current to that required for the maximum DC output.

This reduced voltage is then applied across the thyristor assembly, which provides full wave rectification. The rectified voltage is then smoothed using an choke and capacitor network. Thyristor control is used to regulate the DC output voltage and current. To allow the thyristor circuit to produce the correct DC output it receives an input signal from the controller, it then ramps up/ramps down the output power until the desired output is reached.

To monitor the DC output the thyristor circuit receives a current feedback signal from the shunt resistor and a voltage feedback signal from the DC output terminals.

For the control and indication of the rectifier the voltmeter is feed directly from the DC output terminals and the signal for the ammeter is from a shunt resistor. The AC 'ON' lamp is fed direct from the power supply. Protection against high transient voltages is achieved using a varistor on both the AC and DC sides of the circuit.

## Enclosure

The oil tank is constructed from 2 or 3mm (depending on size) thick mild steel sheet.

The oil tank is formed into shape and will be fully on outside seams.

The tank top will be Bolt down type. A single piece knock-on gasket shall be used to give an IP 65 rated seal between the oil tank and tank lid.

The oil tank and enclosure will be mounted onto a base frame that is constructed from 2 off 100mm U-channels. These channels will be welded to the oil tank and holes drilled into them to enable the tank to be fixed to a plinth.

All the components (diode assembly, transformer etc), which will be situated inside the oil tank, will be mounted onto a single chassis. It will be fitted with two lifting points and will be able to be unbolted from the oil tank above the oil level. All interconnecting wiring between the oil tank and control enclosures will be easily accessible from the top of the tank.



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## Supply Voltage

Please state AC input rating as available at site.

## Rated Output

To suit application, please request DC Voltage and Amperage as required.

## Type

Outdoor, plinth mounting. safe area locations.

## Control

Manual Thyristor Control as standard with option for automatic control available on request.

## Temperature Range

Minimum: -10°C to Maximum: 55°C as standard. Lower and higher ambient temp on request.

## Cooling

ONAN (oil immersed, natural convection air cooled)

## Protection

The equipment is provided with the following devices as standard for protection against over voltage and over current conditions:

- Primary MCB
- Transient over voltage surge suppression on AC and DC sides of rectifier rated 8/20us waveform
- Semiconductor fuses on secondary of the transformer
- Voltmeter fuse
- Fuse fitted to the DC output
- Control circuit fuse
- Electronic over voltage & current limit

## Optional features

- Remote monitoring and control equipment and software interface
- GPS timer interrupter
- RS485 telemetry
- Auto potential control from up to 8 reference electrodes
- Non synchronous timer interrupter
- Removable sunshade
- Datalogging
- 4-20mA transducers
- Volt free contact alarms

More features available on request.

## Power Transformer

The transformer rectifiers are designed and built to BSEN 60076. The transformer has high conductivity copper windings on steel core and is varnish impregnated under vacuum after assembly. It is fitted with an earth shield situated between the primary and secondary windings.

## Rectification

Silicon diodes / thyristors mounted on an aluminium heat sink and bridge connected for full wave rectification. Diodes and thyristors both have a reverse voltage of 1200V.



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## Finish

A range of surface preparation and paint finishes are available, as standard we offer as follows:

Surface preparation: Shot Blast SA2.5  
Interpon PZ790 zinc rich primer (75µm)  
Interpon D1036 high performance polyester powder (75µm)  
Finish Colour: Light Grey Shade (RAL 7035)

## Cable Entry

The equipment is arranged to allow for bottom cable entry.

The AC cable enters the control box via a suitable rated gland and terminates at the AC terminals.

The DC cables enter the control box via a suitable rated gland and terminates at the M8 brass bolt DC terminals.

## DC Ripple

Less than 5% from 5% to 100% of the DC output.

## Meters

The equipment is fitted with HMI controller as Standard.

Optional digital or Analogue metering can be included as follows :

- DC voltmeter
- DC Ammeter
- AC Voltmeter
- Potential meter
- Hours run meter

## Accessories

The equipment is supplied with the following as standard:

- Rating plate
- Operation and maintenance manual with circuit
- Test and inspection reports



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## Tests

Insulation resistance test at 1000V DC between:

1. Input and earth
2. Output and earth
3. Input and output

No load test conducted at rated supply voltage and frequency:

1. No load input losses and current
2. Polarity
3. Operation of output voltage control

Load tests conducted at rated supply voltage and frequency, and at rated DC output voltage and current:

1. Full load input watts and current
2. Efficiency
3. Heatrun for a duration of 12 hours or until all temperatures have reached equilibrium

Function test to include test of the correct operation of the following:

- DC voltmeter
- DC ammeter
- mV meter
- Constant current operation
- Constant voltage operation
- Auto potential control

BAC Corrosion Control would be pleased to receive your valued enquiries and we look forward to being of assistance with your project.

Please email your enquiries to

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