



CORROSION CONTROL

## Technical Datasheet

# TRANSFORMER RECTIFIER

### THYRISTOR, OIL COOLED UNIT FOR OUTDOOR PLINTH MOUNTING

#### General Arrangement

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 meter viewing window.

The power transformer, choke, shunt and thyristor assembly are mounted inside the oil tank. The EMC filter, Primary MCB, AC fuses, DC fuses, and DC surge arrestors are mounted on the back panel as sub-assemblies.

The following are mounted on the internal door of the control box: voltmeter, ammeter, digital ref. cell meter, AC 'on' lamp, voltmeter fuses, door-interlocked isolator, voltage potentiometer, current potentiometer auto/man selector switch and current interrupter selector switch.

#### Electrical Circuit

The AC input is supplied to the transformer via the AC isolator, EMC filter and Primary 3 pole 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 fully controlled diode assembly, which provides full wave rectification. The rectified voltage is then passed through a swinging choke to smooth the output to less than 5 %. On the DC negative output a brass-ended shunt is fitted. This is used for the ammeter and also supplies the thyristor firing board with a feedback signal.

Fitting varistors provides protection against high transient voltages on the AC side of the circuit. On the DC side of the circuit a GDT and varistor is used. To comply with the EMC directive a dual stage EMC filter is used.

#### Standards and Directives

The rectifier is built with all the necessary components to enable the unit to comply with EMC, low voltage and machinery directives. All components used where applicable are CE marked.

Standards complied with:	Directives complied with:
BS EN 61000	73/23/EEC
BS EN 61000	89/336/EEC
BS EN 60204	

#### Specification

<b>Supply Voltage</b>	400/440 Volts 3 phase 50 Hz
<b>Type</b>	Outdoor, plinth mounting, non-hazardous area
<b>Ambient Storage Temperature</b>	0 – 50 °C
<b>Maximum Operating Temperature</b>	30 °C maximum shade temperature
<b>Cooling</b>	ONAN (oil immersed, natural convection air cooled) BS 184

#### Control

The rectifier can operate in either manual or auto-potential mode. In manual operation the DC voltage and current is controlled using the potentiometers mounted on the internal door of the control box. In manual mode the rectifier can operate in either constant current or constant voltage modes. When operating in auto-potential mode the DC output is controlled by the auto-potential PCB that receives a signal from the connected reference cell.

#### Enclosure

3.0 mm thick sheet steel oil tank and dry control box. The oil tank contains the transformer and rectifier assembly. The control box houses the meters, fuses, and knobs of output control, AC breaker and terminals. Access to control box is via a hinged door. All external fittings to the enclosure will be of stainless steel.



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All external surfaces of oil tank are protected against corrosion to BS 5493:1977 table 3, pt 3 for exterior, exposed, polluted atmosphere. The system comprises:

- Shot Blast to SA 2.5
- Zinc flame spray - 100µm min d.f.t.
- Epoxy undercoat - 190µm d.f.t.
- Polyurethane topcoat - 250µm min d.f.t. (colour – BS 381C Shade 631 – light grey)

### Protection

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

- Primary 3 Pole MCB
- Semi conductor fuse in AC line to Diode Assembly
- Transient over voltage surge suppression on AC and DC sides of rectifier
- Voltmeter Fuses
- DC output fuse
- Control circuit fuse
- Electronic Voltage Limit
- Electronic Current Limit

### Cable Entry

The unit is fitted with a gland plate located at the bottom of the enclosure. Cable access should come from the bottom of the unit.

### DC Ripple

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

### Meters

The unit is fitted with a DIN 72 DC Voltmeter, DC Ammeter and a Digital Ref. cell mV meter

### Accessories

The equipment is supplied complete with the following:

- Oil sight glass / oil temperature gauge
- Oil drain valve with protective kick plate and filler plug
- Silica – gel breather
- Rolled steel channel base for plinth mounting. Drilled to accept anchor bolts
- Lifting lugs and external earthing terminal
- Rating plate
- Operation and maintenance manual with circuit and outline drawings
- Test and inspection reports complete with a certificate of conformity
- Anti condensation heaters
- Sunshade
- Reference electrode meter
- Automatic potential control

### Tests

- Insulation resistance test
- No load tests
- Load tests conducted DC output voltage and current.
- Full load input watts and current
- Efficiency
- Function tests

### Optional Extras

The following items can be supplied as optional extras:

- Current Interrupter
- Remote monitoring by 4-20 mA converters for connection to SCADA systems or SMS