TRANSFORMER RECTIFIER - Phase control - oil immersed

Transformer Rectifiers for Cathodic Protection of: pipelines, tank bottoms, tank internals, buried vessels, offshore structures, concrete reinforcement, Submerge metallic structures

- Single phase input: 115, 220, 230, 415, 480 VAC, 50 / 60 Hz cycles
- Three phase input: 208, 380, 415, 480 VAC, 50/ 60 Hz cycles
- Output current range: 3A-600A DC
- Output voltage range: 3V-100V DC
- Control: Phase control using Silicon Control Rectifier
- Over load and short circuit protection: MCB and high speed HRC secondary fuses
- Meters: 2% accuracy analog voltmeters and ammeters. Options include potential meter, LED and LCD displays
- Standard enclosure: 3 mm thick carbon steel for oil tank and 2 mm min for end housing. Options include hot dipped galvanized, stainless steel
- IP Rating: conforming to IP55 up to IP65
- Operating ambient: Continuously rated up to 55^0 C
- Heater: Thermostatically controlled anti condensate heater
- Optional Remote monitoring: 4-20mA transducer, RS485 digital via microcontroller, potential free contacts
- Optional Remote monitoring and control: RS 485 communication connected to remote PC with custom built software to graphically control and monitor CP parameters
- Optional interrupter: Cyclic on / off timer

PML Transformer Rectifiers are custom built to meet the diverse standards and specifications of the cathodic protection industry across the globe. PML can provide different types of Transformer Rectifiers such as tap set, variac, and phase control.

Each type of Transformer Rectifier can be provided with different types of cooling, enclosure etc.

This data sheet covers the specific details for phase control oil immersed units.

Enclosures can be constructed in a variety of materials and finishes. Standard enclosures are constructed using steel sheet with rating conforming to IP55. Our standard enclosure is coated with a metallic zinc flame spray, epoxy seal coat, polyurethane top coat in colour RAL 7036 gloss. However, almost any specification of material, coating or IP rating can be accommodated. Enclosures are fitted with galvanized sunshade for outdoor installations, lifting hooks and earth stud. Transformer Rectifiers are suitable for indoor/outdoor plinth mounting.

Enclosure - Oil immersed Transformer Rectifier enclosures comprise of end/top-housing which accommodates a.c. and d.c. terminals, instruments and breaker.

The Oil tank contains all heat generating components including transformers, LC filter and bridge assembly.

Operation - Phase control Transformer Rectifiers convert utility supply to the required d.c. output in the following stages:

- Voltage is stepped down using isolation transformer.
- Rectification is achieved using full wave SCR-diode bridge assembly.
- Stepless output voltage and current adjustment is made via control circuitry.
- DC output voltage filtering (smoothing) is achieved with a choke and capacitor.

Safety / Protection – AC input breaker is provided for over load and short circuit protection. Lightning arrestor is provided on the input side and surge arrestor is provided on the output side. High speed fuses are provided on the transformer secondary.

Instrument panel – The front instrument panel houses output control potentiometers, circuit breaker, d.c. voltmeter and d.c. ammeter. Where auto potential control is provided a volt meter with reference electrode selector switch can be offered. Potential set point can also be set from the front panel.

Control- The PML thyristor control card is able to automatically maintain constant voltage, constant current, or automatically adjust output to maintain a constant potential.

Output ripple - Ripple is less than 5% of RMS voltage from 10% to 100% of rated output.

Transformer -Transformers are open dry type built to class F insulation with temperature limited to class B.

Efficiency - Transformer efficiency is around 95%. Total efficiency is variable depending on Transformer Rectifier type and features but is usually greater than 80%.

Zone classification - Transformer Rectifiers can be manufactured to hazardous area classification. SIRA certification can also be provided.

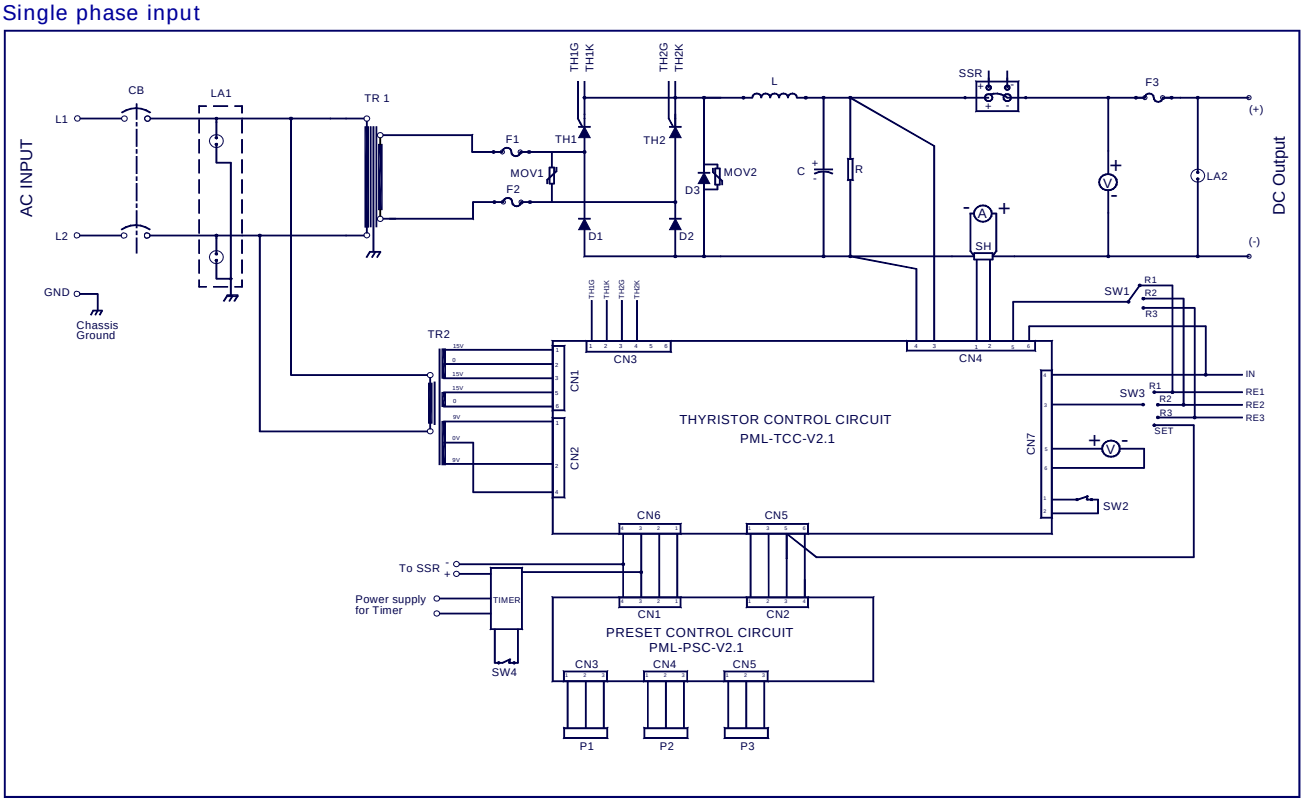
Remote Monitoring - Remote monitoring can be offered using 4-20mA output from transducers. Digital monitoring using RS485 network can be offered and requires a master control unit. Alarm signals can be offered using potential free contacts.

Remote control and monitoring - Full remote monitoring and control features can be offered using a micro controller which communicates via an RS485 network to a master control unit containing bespoke software. The master control unit can be accessed using any web browser meaning any standard protocol network can be used and no additional or ongoing software licenses are required.

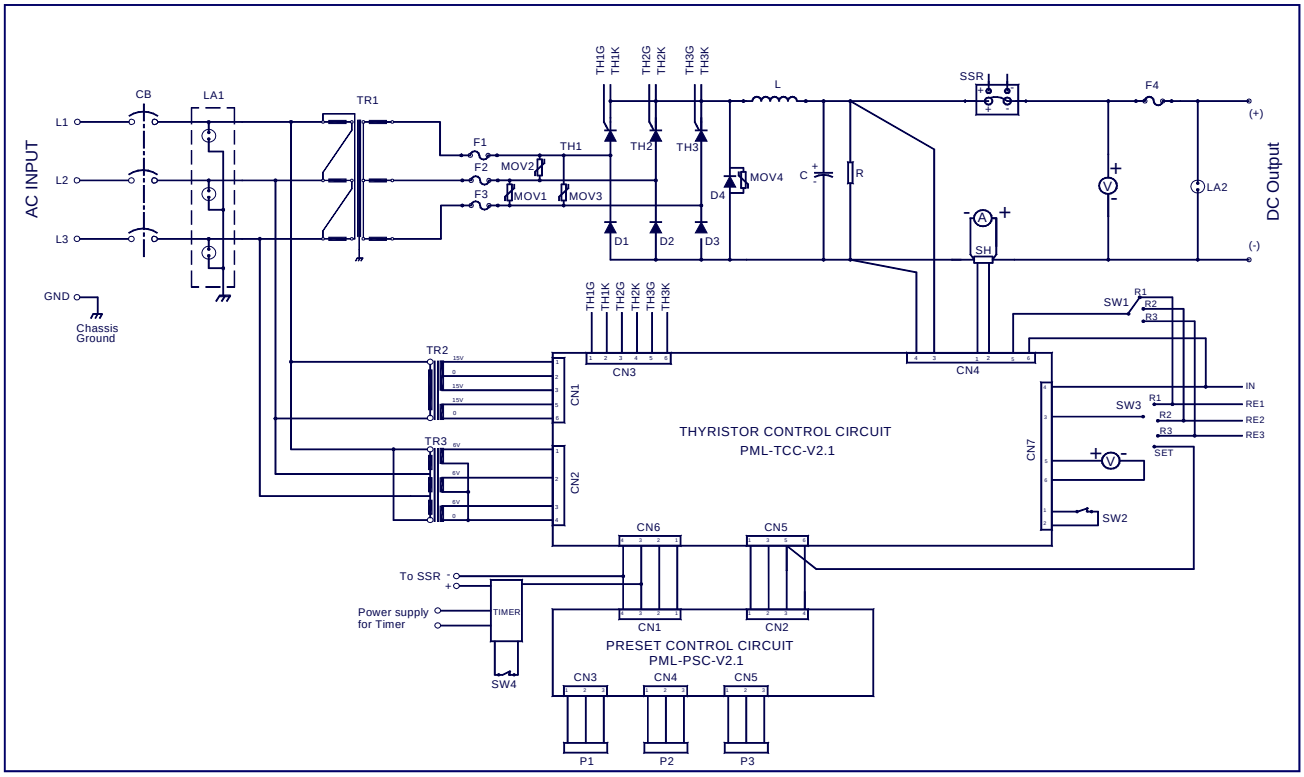
Power Supplies & Remote Monitoring

TRANSFORMER RECTIFIER - Typical schematic for phase control

Single phase input



Three phase input



Detailed design and GA drawings will be provided for approval after order is placed