

### Description

THYRICON 1(3)P3.40/80R microcontroller based reactor switching thyristor modules are designed to switch inductive loads where inductive reactive power is needed, without affecting the power quality. They are designed to switch inductive loads up to 75 kVAr.



### Features

- Used in the design of dynamic PFC systems for low voltage grids.
- Thyristors can be controlled separately, appropriate for the unbalanced load compensation (optional)
- Tracks and switches at 90° phase instants of voltage difference between reactor and line.
- Reactors do not saturate at switching instants, prevents DC over-currents.
- No voltage transients caused by switching operations
- No noise during switching.
- Can be controlled by any PFC relay, PLC and other control equipment.
- Monitors faults and status via LED.
- High switching speed, less than 20 msec.
- Compact design ready for connection
- Silent operation
- Maintenance free
- Long operational life

### Application

THYRICON industrial series products are used in PFC applications requiring fast response and high power quality. Installations with rapid changing and high fluctuating loads like pressing, welding machines, elevators, cranes, arc and ladle furnaces, wind turbines etc. pumping stations, commercial and public buildings are the example application areas. Appropriate for unbalanced load compensation by independent thyristor module control option.

Technical Specifications	1P3.40R	3P3.40R	1P3.80R	3P3.80R
Operating Voltage	230 VAC	400 VAC	230 VAC	400 VAC
Operating Frequency	50Hz, 60Hz			
Nominal Operating Current	40A		80A	
Supply Voltage	220 VAC			
Max. Power Consumption (Conduction Loss)	114W		228W	
Max. Power Consumption (Control+Cooling)	40W		40W	
Max. Reactor Power	9,2 kVAr	48 kVAr	18,4 kVAr	96 kVAr
Trigger Signal	10 – 30VDC (Recommended: 24VDC)			
Switching Time	<20msec			
Re-switching Time	<20msec			
Operating Temperature	between -10°C to 55°C			
Display	Power Led, Conduction and Fault Status Led			
Number of Thyristor Module	3			
Cooling	Passive cooling with aluminum heat + Air cooling (fan operates at 50°)			
Thermal Protection	Module is disabled at 85°C			
Dimensions (wxhxd)	130x240x200		130x240x200	
Weight (kg)				
Assembling	Vertical mounting on mounting plate			
Degree of Protection	IP20			

## Structure and Operating Principles

THYRICON industrial series products are compact units with thyristor modules, driver circuit and cooling unit.

Oppose to capacitor switching, switching of the reactors without creating inrush current, is done at the instant of 90° phase of the voltage across the reactor. The reactors being saturated and drawing a high amount of initial DC current is prevented by this method. At the instant of the switching, absence of DC inrush currents, prevents voltage transient. Similarly, in turn off, the natural commutation of the thyristors prevents the voltage spikes on the switching element.

Conduction of the thyristor modules are independent from the other. Optionally each thyristor module can be controlled by separate control signal. Upon the loss of trigger signal, thyristors turn off by natural commutation. The conduction status of thyristors are indicated by the corresponding led.

1P3 ve 3P3 industrial series modules have fault detection feature. Thyristors will not conduct in the case of trigger signal available but on the loss of power on the terminals of thyristor modules. This status will be evaluated as fault. On the other hand, if the thyristors are conducting on the loss of trigger signal, this condition will also be evaluated as fault. If fault event occurs the power led will blink, indicating the fault.

There is an auxiliary contact output in 1P3 and 3P3 industrial series products. In the case of thyristor or circuit board fault, the auxiliary contact will be closed.

The 1(3)P3.80R modules are cooled by both aluminum heat sink and fan. On 1(3)P3.40R products fan is not available. If the temperature reaches to 85°C thyristors are disabled. Module switches to normal operation again when it reaches to the proper temperature. In ventilated models the fan is activated when the coolant temperature reaches to 50°C.

## Safety Instructions and Precautions

Thyristor modules may only be used for the purpose they have been designed for.

The installation and commissioning must be done by qualified electrical staff.

Do not work with live conductors.

Thyristor-modules may only be used in combination with appropriate safety devices (Super-fast fuses and surge arresters -

see "Recommended Use" part).

The devices have to be protected against moisture and dust – a sufficient cooling has to be assured.

Even in switched off state no electrical isolation is achieved for electronic switches. Therefore parts of the systems may not be touched after switching off the complete system before the capacitors have been completely discharged and switching device is isolated from the grid.

## Installation and Operation

The mechanical mounting is done on a mounting plate from front side using the mounting pieces and screws supplied with the product (see "Mounting and Dimesions" part).

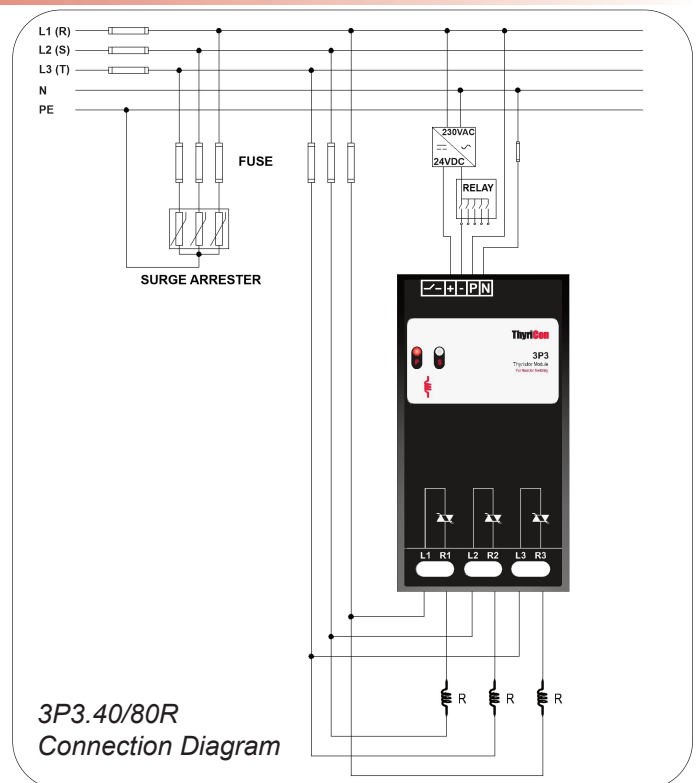
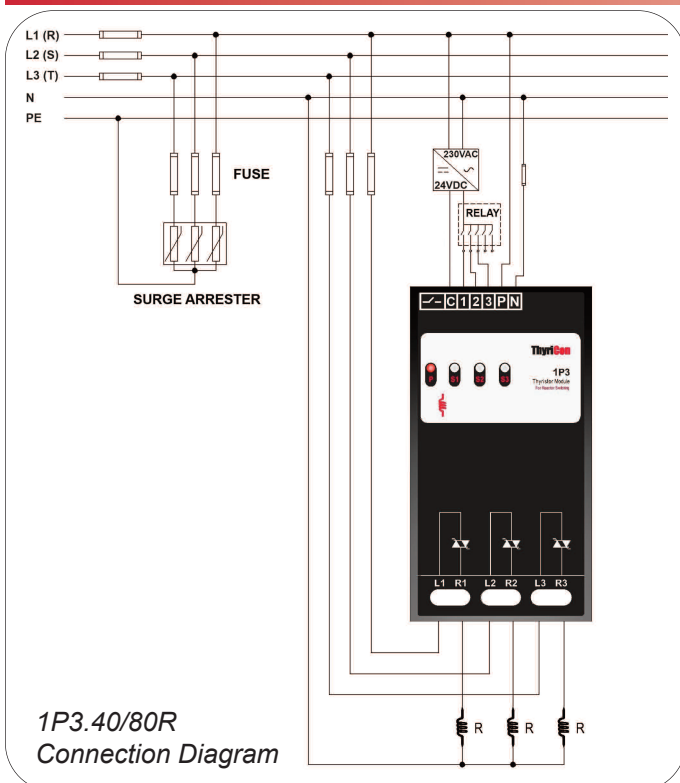
The electrical connections to main terminals are done according to "connection diagram" part according to application. It is mandatory to use super fast electronic fuses as branch fuses of the THYRICON module to protect the semiconductor device!

Connect a supply voltage of 220VAC to the power terminals and

triggering signal of 10 – 30 VDC (coming from the PFC-controller or an adequate control system) to the triggering terminals of the connector supplied by the product in the given order and insert the connector to the socket located at the upper side of the device.

If the supply power of the module and supply power for the reactor groups are switched on, the thyristor module is ready for operation.

## Connection Diagram



## Recommended Use

\* It is recommended to use super fast fuses for each thyristor module.

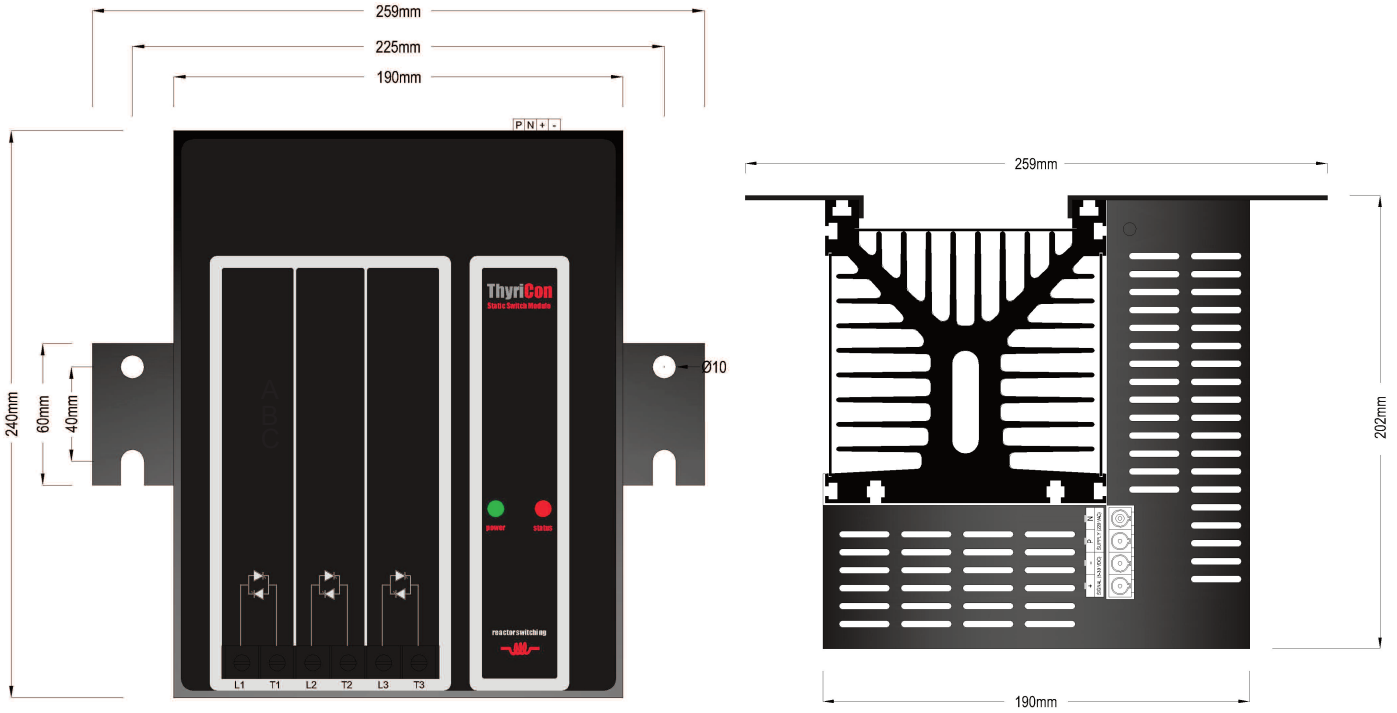
1(3)P40	63 A
1(3)P80	125 A

\* Semiconductor devices can be easily damaged at voltage spikes. For this reason, it is recommended to use surge arresters in the panel.  
(ex: VAL-MS-230ST Phoenix Contact)

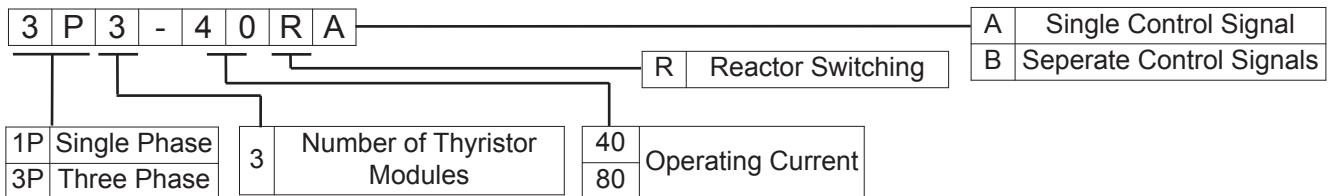
\* Due to core and iron losses, reactors are elements with significant active losses. Appropriate precautions should be taken due to damage of reactor because of temperature rise.

\* For this reason, it is recommended to choose reactors with internal thermostat and connect normally open contact of the thermostats serial to the module trigger signal.

## Mounting and Dimensions



## Ordering Information



## Warranty Terms and Conditions

Elektrolojik Energy Tech. Ltd. Co. warrants a trouble free operation of the THYRICON Industrial Series device within 24 months from the date of sale, on condition that following terms are provided:

- the proper connection and operation

- the safety of the quality control seal

- the integrity of case, no trace of opening, cracks, spalls etc.

The warranty shall not apply to malfunctions or damages resulting from accidents or user supplied faults.

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