

## A) TECHNICAL SPECIFICATIONS

### Item-1 Qty. 6 nos.

Three-phase Thyristor Bridge suitable for duty points as given below:

Input AC supply: 90V±10% from 25kVA, 400V/90V Excitation transformer

Duty Points				
	(1)	(2)	(3)	(4)
Uac (pu)	1	1	1	1
If (A dc)	121	200	227	240
Vf (V dc)	36	64	76	82
$\alpha$ (firing angle delay in degree)	78	60	56	46
Form factor	2.4	2.2	2.1	2
Duty Cycle	Continuous	Continuous	Continuous	10 seconds

(1) This duty point correspond to the functioning of the generator at no load

(2) This duty point correspond to the functioning of the generator at rated load

(3) This duty point correspond to the functioning of the generator at over load

(4) This duty point correspond to the functioning of the generator at ceiling conditions

### Item-2 Qty. 6 sets.

Thyristors module assembled with heat-sink suitable for Item-1.

### Item-3 Qty. 6 nos.

Spare Fuses with microswitch for Item-1.

### Item-4 Qty. 6 nos.

Fan assembly for Item-1.

## General Conditions

### PIV of Thyristors

PIV should be minimum 1600V for all above thyristor bridges and its devices.

### Cooling

In built top mounted fan, operating from 400V, 3 $\phi$ , 50Hz AC supply, with a flow rate of at least 615m<sup>3</sup>/hr, **fan failure monitoring potential free contact shall be provided.**

### Protections

6 Nos high speed semiconductor fuse in series with each device suitably rated.

Each fuse will be provided with micro switch for monitoring healthiness. NC contacts from the six micro switches to be wired in series & brought out to a terminal block in front of the stack.

6 sets of snubber circuits of suitable rating

2 sets of bimetal thermal trips shall be supplied for each phase with one to operate at vendor determined safe heat-sink crossover temperature and the other at 90 deg C. NC contacts from

each set of three switches to be wired in series and brought out to separate terminal blocks on the front of the stack.

### **Application**

The Bridge will be operating at continuous current output level of 227A DC for item 1 respectively.

### **Gate Circuit**

3no. DIN rails shall be provided by supplier on the bridge front facia (one for each phase) to mount 60 x 110mm size pulse transformer cards (BHEL scope). Two end stoppers shall be provided on each rail. Flying leads of sufficient length starting from the gate and cathode of the thyristors shall be provided for terminating directly on the pulse transformer cards.

### **Construction**

The stack shall comprise of six thyristors sandwiched between heat sinks to enable double sided cooling from the fan above. Busbars for AC & DC terminations shall be provided. A control terminal block shall be provided for termination of the wires from each of the 6 sets of pulse circuits & terminations of all the thermal trips connected in series. The construction will be modular type to enable easy replacement of thyristor/ fuse/ snubber circuit/ thermal trip/ pulse circuit. **Module must be replaceable by opening 2 bolts. Vendor to demonstrate module replacement during inspection.**

Overall limiting dimensions: 500\*500\*500mm.

### **3D model**

Vendor has to submit 3D model of Thyristor Bridge in UG NX/equivalent within 7days after PO placement.

### **Standardas per IS: 7788**

### **Testing**

As per IS: 7788. BHEL representative will inspect the thyristor module assembly for routine & type tests at supplier's/ dealers works for which a prior notice of 7 days shall be given by the vendor.

**Thyristor bridge shall be witnessed at works. Cooling fan and bridge shall be dispatched in separate box. Extra gasket (2nos) shall be supplied suitable for fan mounting.**

## **B) COMMERCIAL TERMS & CONDITIONS**

- The price bid of only those vendors will be considered who shall comply with the technical specifications; any deviations shall be clearly spelt out in the technical offer.
- The vendor will have to furnish the details of sizing calculations of major components like thyristors, fuses & heatsink, also datasheets of components shall be furnished along with the offer.
- The vendor shall furnish the drawing of complete assembly showing dimensions, mounting & termination details & BOM along with the offer.
- A quality plan depicting the tests to be carried out shall be furnished after placement of order. List of type tests to be conducted on bridge is to be submitted along with the offer.
- 2 copies of documentation shall be furnished illustrating maintenance of the equipment, i.e. process of dismantling & re-assembling the stack components, maintenance of thyristors and any other pertinent information.
- The supplier will have to demonstrate the functioning of the stack at defined duty points at their works during inspection. Inspection call shall be given at least 10 days prior.
- Routine test & type test certificates shall be submitted along with the consignment
- All items will be purchased from single source.