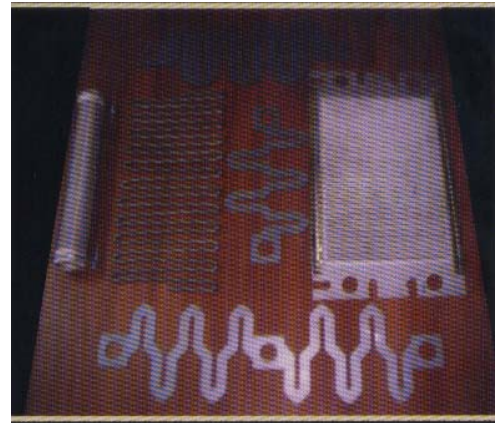


NEUTRAL GROUNDING RESISTORS

- Designed and tested as per IEEE 32 – 1972 standards
- All stainless steel resistor elements and terminals
- All units triple insulated



NGR Unit



Resistor Elements

- Protects power system equipments against 50 / 60 Hz faults (Short circuit) and transient phenomena (lighting)
- Prevents additional faults from occurring
- Localises the fault
- Significantly improves system stability
- Provides safety to personnel

RANGE

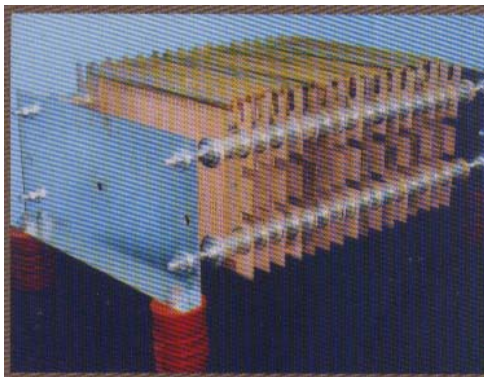
Rated Current : 1 Amps to 5000 Amps
 Rated Voltage : 380 Volts to 33Kv
 Rated Time : 10 Seconds to continuous

APPLICATION

NGS's are used in industrial Power Systems for resistance grounding of wye connected generators and transformers. NGR is connected between ground and neutral of transformers, generators and grounding transformers. NGR limits the faults current to value enough to operate protective relays, thereby preventing unwanted damage to the system.



TAPERED RESISTOR STACK



PUNCHED RESISTOR STACK

RESISTOR ELEMENTS

Are made of unbreakable corrosion proof joint less elements edge wound, coiled, formed, punched or tapers from stainless steel, CU-NI, NI-CR, Fechril or resistance material as per requirement

CONSTRUCTION

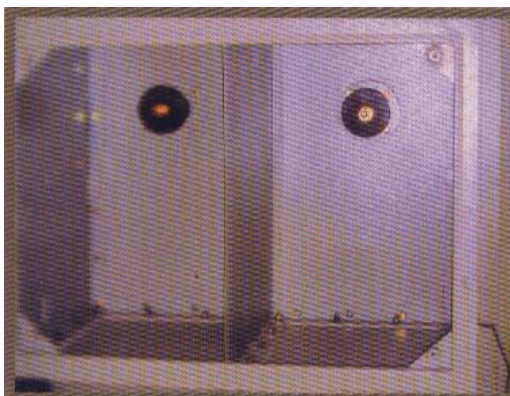
Resistance grids are mounted on steel rods insulated by special heat resistant micanite paper tubes. Grid washers are of natural mica. Resistor grid assembly is mounted on angle iron structure properly supported to absorb vibration and stress during faults and transit. End connections of resistors is brought out to terminal box or through top or side mounted high voltage bushings. Stand – off / support insulators are ceramic or epoxy resin cast.

ENCLOSURE

Resistor grid assembly is housed in an enclosure made of heavy gauge sheet steel ($\geq 2\text{mm}$) totally enclosed, vermin proof, with screened or louverdcovers (with fine wire mesh) on front and back for easy servicing. Bottom screening provided for maximum cooling of resistors. Corrosion resistant nameplate, clear warning labels (danger, high voltage, earthing etc.) fixed enclosures. Suitable earthing studs are provided on 2 sides. Enclosures are designed for protection degree of resistors as per **IEC 529, IS2147 (from IPOO to IP55)**

ENCLOSURE OPTIONS:-

- All Aluminium, Stainless Steel body.
- Canopy to prevent standing water.
- Eyebolts in all four corners for easy handling/hoisting.
- Support stands for elevating above ground.



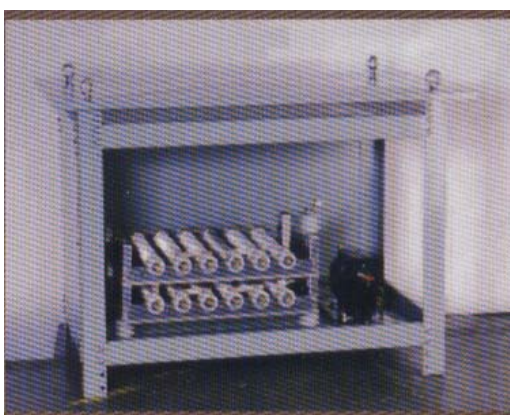
TERMINAL BOX

TERMINALS

Bushing type terminals for neutral and earthing connections are housed into separate vermin proof, weather proof compartment. Epoxy insulated terminals are provided for terminating the specified size of cables, earthing stripe and supplied with tinned copper lugs/strips. Connections between the equipment neutral and resistor is done by single core unarmoured cable of suitable size. Top or side mounted bushings can also be provided as per requirement

PAINTING

Powder coated or epoxy painted as per specification. Synthetic enamel shade 632 as per IS - 5



INDOOR NGR WITH C.T

OPTIONAL

Space heater, C.T's P.T's Earthfault relays, Isolators, Contactors, Auxiliary contacts etc. can be provided as per requirement.

TESTING

- Visual and dimensional.
- Measurement of resistor value at room temperature $\pm 10\%$
- 1 Minute power frequency High Voltage withstand test:

upto 600 volts system : $2 \times PN + 1000$ volts
for M.V Systems : $2.25 \times PN + 2000$ volts

- Insulation resistance measurement by Meggar before and after the power frequency H.V test.
- Heat run test : simulated by passing rated current for rated time on a limited section of resistor in a proportionate test enclosure to ensure that complete NGR temperature rise is within specific range.

STANDARDS FOLLOWED

IEEE – 32 – 1972, IS : 3043 FOR EARTHING STANDARDS
ALLOWABLE TEMPERATURE RISE (above 30°C)

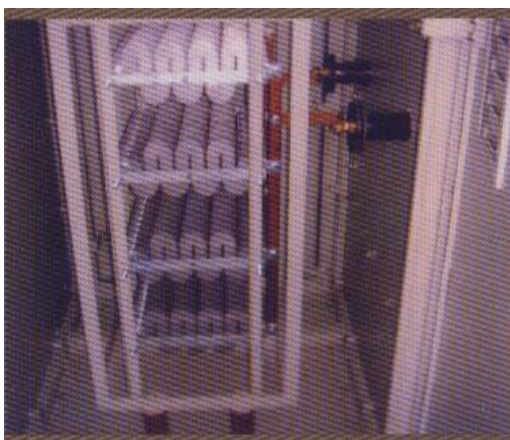
10, 30 & 60 SECOND RATING - 760°C

≥ 10 MIN RATING - 610°C

CONTINUOUS RATING - 385°C

IS2147 OR IS 12063 – FOR DEGREE OF IP PROTECTION:

Standard enclosure is designed to IP23 (to prevent the ingress of foreign bodies greater than 12mm and rain falling at any angle upto 60° from vertical) suitable for indoor or outdoor use

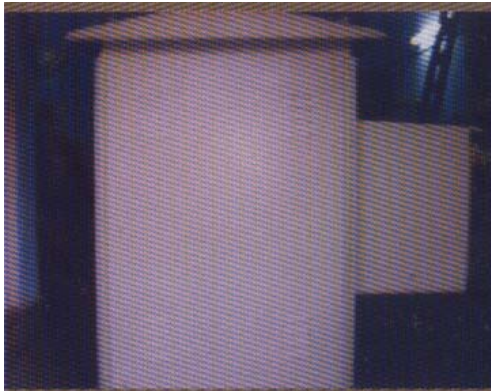


NGR UNIT (BUSHING)

Unit no. 40, SDF – II, Seepz (SEZ), Andheri (East), Mumbai - 400 096.

Tel No. +91 22 2829 0232 / 2829 1316 Fax No. 022 2829 0821

Email: mfr@vsnl.com . Website: www.mfrelectronics.com



OUTDOOR NGR ENCLOSURE

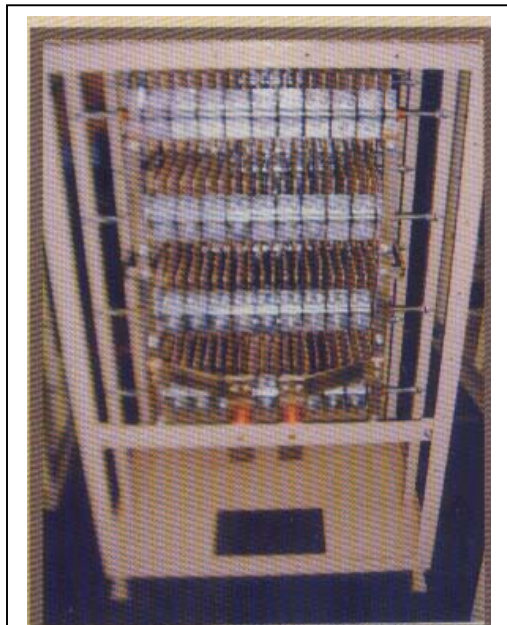
TO ORDER A NGR, KINDLY SPECIFY

- SITE CONDITION
- SYSTEM DETAILS
- LINE TO NEUTRAL VOLTAGE
- INITIAL FAULT CURRENT
- MAXIMUM TIME "ON"
- RATING: SHORT TIME, EXTENDED OR CONTINUOUS.
- ENCLOSURE PROTECTION DEGREE (IP)
- ANY OTHER OPTIONAL REQUIREMENT
- OVERALL DIMENSIONS

TYPE TESTED

NGR 11KV, 1 OHM TESTED O.K AT VJTI (MUMBAI) FOR:

**1 MINUTE POWER FREQUENCY HIGH VOLTAGE WITHSTAND TEST (28 KV AC RMS 50 HZ).
IMPULSE WITHSTAND VOLTAGE OF 75KV**



RESISTOR BOX