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EARTHING OF MULTIPLE GENERATORS

Neutral Earthing Resistors (NERs) with vacuum contactors

Features and Benefits

- Standard designs – quicker deliveries.
- Suitable for system voltages up to 13.8kV and a BIL of 75kV BIL
- Remote control as standard (option for local controls).
- 2 n/o, 2 n/c auxiliary contacts per contactor for customer use
- IP54 painted enclosure (for switchgear compartment).
- Options for 304 or 316L stainless steel or Mild Steel Painted, enclosures.

Neutral Earthing Resistors (NERs) – sometimes called Neutral Grounding Resistors (NGRs) – are employed in medium-voltage AC distribution networks to limit the current that would flow through the neutral point of a generator in the event of an earth fault. NERs limit fault currents to a value that is low enough to prevent further damage to switchgear, or generators (beyond what has already been caused by the fault itself) yet high enough to allow for protection devices to operate.

Neutral Earthing of Multiple Generators

For reasons of security of supply, standby and primepower generators are often connected in parallel. They still need to be earthed, however to avoid problems associated with currents circulating in the neutral only one generator must be connected to earth at one time.

This can be achieved in two different ways:

1 Each Generator is supplied with its own interlocked resistor/isolator arrangement.

2 One resistor is supplied fitted with the multiple interlocked isolating devices, one per generator.

3 The selection of options 1 or 2 will depend on the space available, the level of maintenance/access required and the cost.

For installations with more than two generators the most cost effective solution is generally a single resistor combined with multiple interlocked vacuum contactors.

Resistor Elements

An extensive range of resistor elements allows selection of the most efficient and cost effective solution for any required duty.

For low current we will usually use our well proven coiled coil wire resistance elements, these high grade alloy elements have a very low resistance change with temperature producing a stable current during operations.

For higher current applications we use our 'stamped grid' elements also with a range of resistance alloys to suit specification.

Range

In addition to those highlighted above Cressall multi-switched NER/ Vacuum contactor panels offer a range of features:

- Optional current transformers.
- Single pole fixed pattern mechanically latched vacuum contactors.
- Top cable entry as standard, option available for bottom entry.
- IP23 resistor compartment (option for IP54)
- Standard designs for up to 9 vacuum contactors.
- Designs for more than 9 contactors available on request.
- Suitable for any current and time rating.
- Suitable for system voltages up to 12kV (75kV BIL).
- Choice of resistance alloys and element types (dependent on rating).

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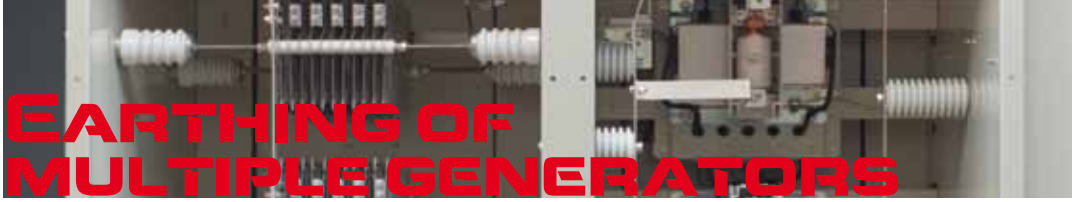


EARTHING OF MULTIPLE GENERATORS

Ratings

Voltage Ratings

Standard voltages offered are shown opposite, alternative ratings can be supplied.

System Voltage /kV	Rated (line) Voltage /kV	Rated Impulse /kV
3.30	1.91	40
4.16	2.40	40
6.60	3.81	60
11.00	6.35	60
13.80	8.00	75

Current Ratings

Standard current ratings are based on the system voltage and the kVA ratings of the generator set. Most commonly the set sizes are and their associate full load currents are as shown below, if you require a current rating not listed please ask, most ratings can be catered for:

Full Load Current Ratings for Generator Sets										
System Voltage/kV	1000 kVA	1250 kVA	1350 kVA	1500 kVA	1750 kVA	2000 kVA	2250 kVA	2500 kVA	3000 kVA	4000 kVA
3.30	175	219	236	262	306	350	394	437	525	700
4.16	139	173	187	208	243	278	312	347	416	555
6.60	87	109	118	131	153	175	197	219	262	350
11.00	52	66	71	79	92	105	118	131	157	210
13.80	42	52	56	63	73	84	94	105	126	167

Standard Features

Resistor Tolerance:	±10%
Max. Element Temp rise:	760°C (to IEC60076-25 or IEEE-C57-32a)
Insulation level:	See table 1
Impulse level:	See table 1
Ingress Protection:	
Resistor compartment:	IP23 (option IP54)
Switchgear compartment:	IP54
Incoming (HV) connection:	Top/Bottom entry to stand off insulator, via removable gland plate
Outgoing (LV) connections:	To M12 sidewall mounted insulated stud
Current Transformer:	LV ring core 5P10, 5VA
CT connections:	Taken to IP55 terminal box on enclosure end.
Anti-condensation heaters:	Self-regulating 110/220V fitted in switchgear compartment
Earth Connection:	12mm stud
Enclosure type:	AISI 304/316L stainless steel with lockable access doors

Routine Tests

Visual & dimensional check

Measurement of resistance value at ambient temperature

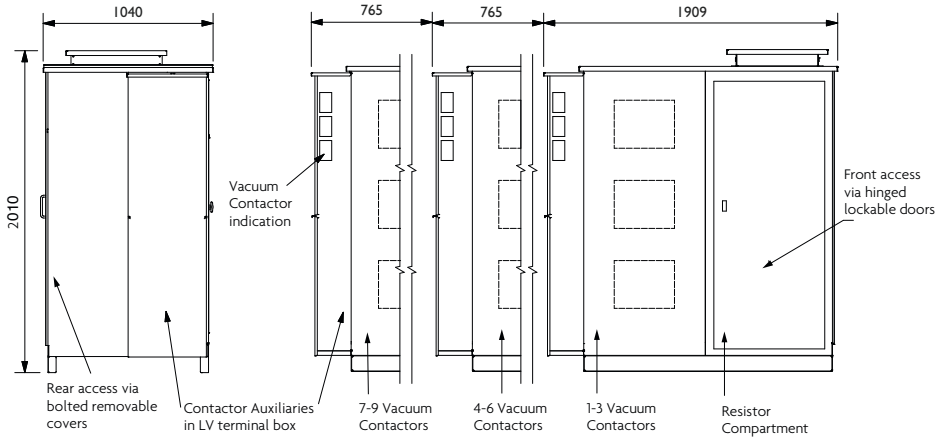
60 sec power frequency withstand

Insulation resistance check

Contactor functional check

Applied standards

Neutral grounding resistors:	IEC 60076-25 or ANSI IEEE-C57-32a
General construction & testing:	IEC 60076-25 or ANSI IEEE-C57.32a (2020)
Resistance alloy:	IEC 60076-25, ANSI IEEE-32 (1972) or C57-32a (2020)
Insulation coordination:	IEC 60071
IP ratings:	IEC 60529
Current transformers:	IEC 61869-1 & 2



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