

Multiple generator automatic synchronising

Introduction

A composite floor standing multi-bay control cubicle for automatic synchronising of diesel generators in multiple set installations.

Each bay has a generator control and load switching section linked to a common busbar.

A total load output circuit breaker or automatic load transfer panel can be incorporated into the suite of panels and connected to the common bus section. All control devices are segregated and shrouded from the load switching and busbars.

The common bus section runs the length of the panel with a fully rated neutral and earth bar. The busbar is an asta tested system rated to 50kA for 1 second.

As standard there is a central load take-off point, which allows for a reduction on the rating for the busbar. A fully rated busbar can be fitted for load take off at one end.

The cubicles are to IP55 and of a proprietary manufacture (Rittal or equivalent) with lockable hinged front access door and removable aluminium gland plates to the top and base. Cable entry can be arranged for top or base entry. Removable side and rear panels assist installation. Lifting eyes are mounted on the top of the enclosure. Finished in RAL7032. Higher specification cubicles can be used and finished in other colours to suit the installation.

Motorised fixed pattern circuit breakers are fitted as standard, but withdrawable versions are available.



Generator control section(s)

Automatic generator control module, microprocessor based and fully programmable with event logging and communications if required. Features as follows;

Pushbuttons:

- Start
- Stop/reset
- Auto
- Manual
- Mute/lamp test

LCD display (generator):

- Voltage
- Amperage
- Frequency
- RPM
- Oil pressure
- Engine temperature
- Hours run
- Battery voltage

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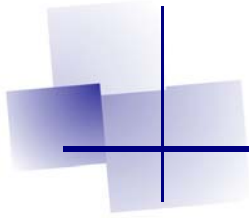
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LED / LCD display:

- Charge fail
- Low oil pressure
- High engine temperature
- Underspeed
- Overspeed
- Fail to start
- Low battery voltage
- High battery voltage
- Fail to stop
- Under voltage
- Over voltage
- Under frequency
- Over frequency
- Reverse power
- CB closed

Spare inputs and outputs are available subject to module configuration.

Autosynchroniser and load sharing controller, microprocessor based and fully programmable with keypad display unit, displaying:

- Voltage
- Amperage
- Frequency
- kW
- kVAr
- Power factor
- Synchroscope

Functions and protections:

- Reverse power
- Dead bus sensing
- Voltage matching
- Frequency matching
- Phase angle matching
- Ramp control
- Blend control
- Circuit breaker closing contact
- Engine speed control

Also incorporated into control section:

- 1 x 5A automatic battery charger
- 1 x Battery charger mode switch - "Off", "Normal" and "Boost"
- 1 x Set of control and monitoring fuses
- 2 x Slave relays (fuel and starter)
- 1 x Emergency stop pushbutton
- 1 x Test switch
- 1 x Set of volt free contacts for "generator running" and "generator fault"

Load switching section(s)

- 1 x 3 pole fixed pattern circuit breaker rated for the full rating of the generator output. Fitted with electronic overload and short circuit trips, motor operator, under voltage release and auxiliaries.
- 1 x Set of generator input terminals
- 1 x Common bus section
- 1 x Set of current transformers

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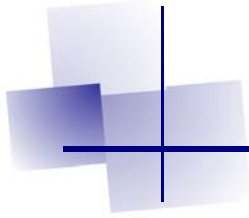
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Optional bays

1) Total load output circuit breaker

- 1 x 4 pole fixed pattern circuit breaker rated for the total output of all the generators. Fitted with electronic overload and short circuit trips, motor operator, under voltage release and auxiliaries.
- 1 x Selector switch to select the required number of sets on line for CB closing.
- 1 x Common bus section

2) Automatic load transfer panel for switching load from mains to generators

- 1 x Pair of fixed pattern circuit breakers rated for the total output of all the generators. Mechanically and electrically interlocked and fitted with motor operators.
- 1 x Selector switch to select the required number of sets on line before closing generator CB.
- 1 x Automatic transfer module with the following features;
 - 3 phase mains detection
 - 1 phase generator detection
 - Mimic display
 - Generator available indication
 - Generator on load indication
 - Mains available indication
 - Mains on load indication
 - 4 position key switch - "Auto mode", "Auto mode with manual mains restoration", "Run generators off load" and "Run generators on load"
 - Delay on start timer
 - Delay on stop timer
 - Delay on restoration timer
 - Settle timer
 - Transfer delay timers
- 1 x Set of control and monitoring fuses

Optional extras

1) Power measurement

Additional kW, kWh, kVA, kVAh, kVAr, kVArh and power factor metering on the generator control module.

2) Manual synchronising facility

- 1 x Auto/manual synchronising switch
- 1 x Circuit breaker open/close pushbuttons
- 1 x Raise/lower speed potentiometer
- 1 x Raise/lower volts potentiometer
- 1 x Synchroscope display on the generator control module with voltage and frequency matching and check sync contact.

NOTE: If power measurement is not fitted in the generator controller then a separate synchroscope with voltage and frequency matching and check sync contact is supplied.

3) Analogue metering

- 1 x Voltmeter and selector switch
- 3 x Ammeters
- 1 x Frequency meter

4) Load demand start / stop

- 1 x kW transducer, 3 phase 4 wire unbalanced with individual adjustable load settings and hysteresis
- 1 x Generator sequence selector switch
- 1 x Set of current transformers

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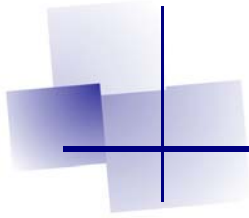
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Miscellaneous extras

- Earth fault restricted
- Earth fault unrestricted
- 10A heater switch, fuse and indicator
- 16A heater switch, fuse and indicator
- Volt free relay board 4 way
- Volt free relay board 8 way
- Annunciator 4 way
- Annunciator 6 way
- 8 way relay expansion module
- 5 way protection expansion module
- 10 way protection expansion module
- 8 way remote expansion/annunciator
- Audible alarm

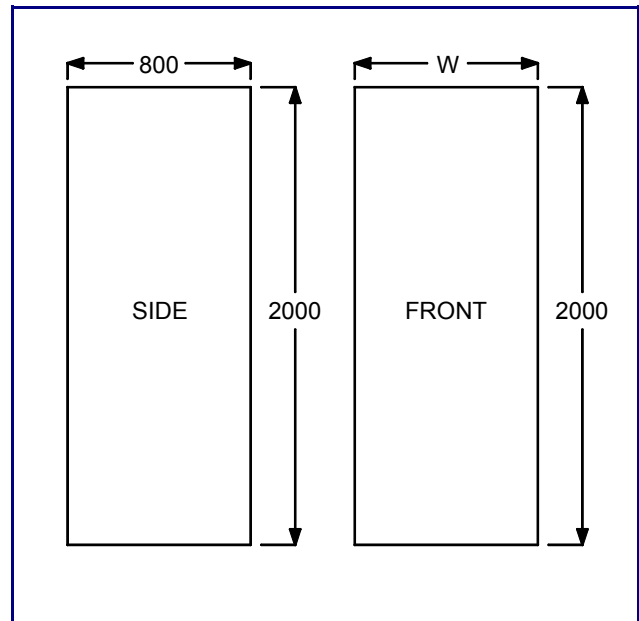
Communications

- RS232 link
- RS485 link
- PC interface 100 metres

Specifications

All components meet relevant European standards and regulations.

Panel meters	IEC51 BS89
	IP52 -25+50°C
Ammeters/voltmeters	Class 1.5
Frequency meters	Class 0.5
Selector switches	IEC73, 529
Circuit breakers;	
MCCB	IEC 947-2
ACB	IEC 947-2
MCCB/ACB (non-auto)	IEC 947-3



	W (per bay)
0-2500A	800
3200-4000A	1000
5000-6000A	1200

Total width of control panel:

(“No. of generators” x W) + W of “output section”

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