MICROSTART Generator Controller

INSTALLATION AND CONNECTION

This sheet gives details of how to fit and electrically connect Microstart into a generator control panel. For additional information on 'Programming Microstart' and 'Using Microstart' please refer to our separate ready reference sheets. Further technical assistance is also available direct from Modex on:

Tel: +44 (0)1705 463971, or Fax: +44 (0)1705 461686

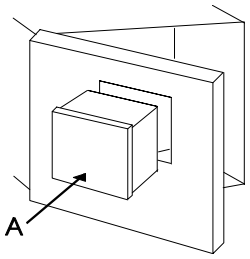
FAMILIARISATION

Each unit comes packed with 4 fixing clamps, a set of connecting blocks (as many as there are receptacles at the rear of the unit) and one pair of keys. When large quantities are ordered, keys, clamps and terminal blocks may be wrapped together in the package, separate from each unit.

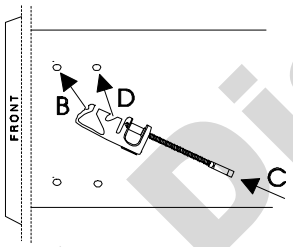
The (yellow) label on the top side of each Microstart gives its part number (this should be checked before connection to ensure compatibility with the type of unit ordered and the generator/panel specification) and a listing of electrical connections (as detailed below and overleaf).

FITTING TO THE PANEL

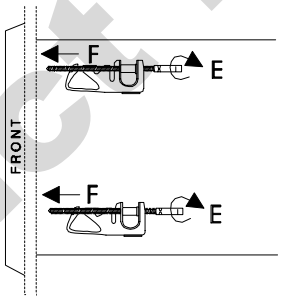
Microstart has a 192mm wide by 144mm high casing, designed for mounting in a standard panel cut-out. (Size to DIN standard 43700: 186mm [-0.0, +1.1mm] wide, 138mm [-0.0, +1.0mm] high.)



With the fixing clamps removed, insert the unit through the front of the cut-out (A).



Working behind the panel front, fit each of the four clamps to pairs of studs on the side of the case: locate the clamp onto the front stud (B), compress the clamp by pressing on the screw (C) and push the clamp upwards so as to locate onto the rear stud (D).



With all four clamps fitted, tighten each of the screwed pins (E) so that they move forward and secure the unit to the rear of the panel facia (F). Panel thicknesses of up to 8mm can be accommodated.

Microstart extends to 215mm behind the panel front; an extra 30mm should typically be allowed for the connection of a wiring loom.

Care should be taken to locate the unit in a position which is free from ingress of dust and water, and away from excessive build up of heat.

ELECTRICAL CONNECTION

General

The standard version of Microstart has five 'two-part' connectors at the rear, each consisting of a receptacle and removable terminal block; future versions and upgrades may contain up to 10 such connectors. Each block has up to 12 individual screw terminals for the connection of panel wiring - use a 3mm flat head screwdriver to tighten each terminal. One terminal position in each block is used as a location pin, preventing the connection of a block into the wrong receptacle.

Earthing

The rear facia also has two stud terminals for the connection of generator/battery earth. The left hand stud (as viewed from the rear, below terminals 1 - 10) should be connected to an earth rod using a braided cable (available from Modex on request).

The right hand stud should be connected, using the short green/yellow flying lead already attached, to the DC supply terminal that is already commoned with earth: i.e. connect the wire to pin 109 for –ve earth systems, or pin 110 for +ve earth systems.

Interference Suppression

Extensive measures have been taken in Microstart's design to ensure that it is robust to electromagnetic interference; good earthing, as detailed above, will improve this still further.

In line with current developments in EMC regulation, Modex recommend the suppression at source of all external equipment which are likely to create radiated and line-borne interference. Relay and solenoid coils, for example, should be suppressed with either flywheel diodes (for DC coils) or proprietary snubber networks (AC coils).

Fusing

Fusing should be fitted externally to Microstart's +ve DC supply terminal and to each of the AC input terminals. Please refer to the diagram overleaf for typical fuse connections and ratings.

Terminal functions:

The terminals listed below are those found on ALL versions of Microstart. Where additional options are fitted, e.g. 'R' (remote, individual alarms) or 'C' (remote communication by RS232/485), please refer to our additional literature.

The standard terminal numbers and their functions are:

(1) Battery volts input
Connect direct to battery +ve. Used to monitor and display the current battery voltage.

(2-5) Generator Neutral/phase 3/2/1

(6-9) Mains Neutral/phase 3/2/1
Inputs for monitoring the generator and mains voltage/frequency (300V AC L-N max.). In the UK, phase 1=red, 2=yellow, 3=blue.

(26) Event ref.

(27-33) Event inputs 8 - 2

(34) Event input 1 (low oil pressure)
8 fault inputs, switched to/from +ve or -ve via remote sensors. Channel 1 (pin 34) must be used for low oil pressure. The event ref. terminal (pin 26) should normally be connected to +ve DC.

(37,38) Magnetic pick-up input
Used an optional method of speed sensing (leave open circuit if not used). A two core and screened cable should be used for this circuit, with the screen tied to earth at one end only.

(39) Alert output (open collector, 250mA max.)
Activates (goes 'low') only during an 'alert' type fault.

(41) Off output (open collector, 250mA max.)
Activates (goes 'low') whenever the key is set to O (off/reset).

(42) Klaxon output (open collector, 250mA max.)
Activates during both 'alert' and 'alarm/shutdown' faults, and for the last few seconds of the preheat time (just before cranking).

(43,44) Generator/mains contactor open inputs
Allows Microstart to detect that each contactor has engaged correctly. Connect these terminals to –ve DC through the mains and generator contactors' normally closed auxiliary contacts.

(45) Remote start input
In Auto mode, switching this input to –ve DC causes an automatic generator start. (The response is similar to a mains fail).

(46,47) Manual start / stop
These inputs allow the engine to be started/stopped by remote push buttons (but only when Microstart is set to ✋). Connect a push-to-make start switch between 46 and 47, and a push-to-break stop switch between 46 and –ve DC. Alternatively, connect both terminals to –ve DC for an immediate start on turning to ✋.

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(97,98) Generator contactor output
(101,102) Mains contactor output
Used for the control of mains and generator contactors. AC coiled contactor versions use solid state relays (SSRs) to control AC coils: the SSRs are switched on to pass voltage and engage each contactor. Versions for use with DC coiled contactors use electro-mechanical relays: the mains relay de-energises (NC contacts) to engage the mains contactor; the generator relay (NO contacts) energises to engage generator contactor.

(99,100) Preheat output
(103,104,105) Fuel output
(119,120) Starter output
Relay outputs for the DC switching of engine control functions, each rated to 16A max. @ 24VDC. The labelled polarity must be observed when connecting these outputs (incorrect polarity will result in the non-operation of, and may result in damage to, the remote coil suppression diodes fitted inside Microstart).

(107, 108) Emergency stop input
Use mechanically latching, push-to-open switches wired in series. Link out these terminals if emergency stop buttons are not used.

(109, 110) DC supply
The power supply required to operate Microstart: a DC source in the range 9 - 40 V, normally the generator's main battery. The green/yellow flying lead attached to one of Microstart's earth studs should be connected to whichever DC supply terminal is connected to the frame of the engine (usually negative, pin 109).

(111) Charge control output (open collector, 250mA)
May be used to switch the panel DC between mains charger and charge alternator supplies. The output activates (goes 'low') whenever the engine is meant to be stationary.

(112,116) Mains Live & Neutral input
(AC coiled contactor versions only). When Microstart is turned off, the mains contactor SSR output switches on (engaging mains), providing that mains voltage on these terminals is above approx. 80 VAC.

(113) Charge fail input
Prior to an engine start, switching this input to –ve DC activates the 'charge fail' warning. This input can therefore be connected direct to the LED –ve terminal of a Modex BC700 series charger.

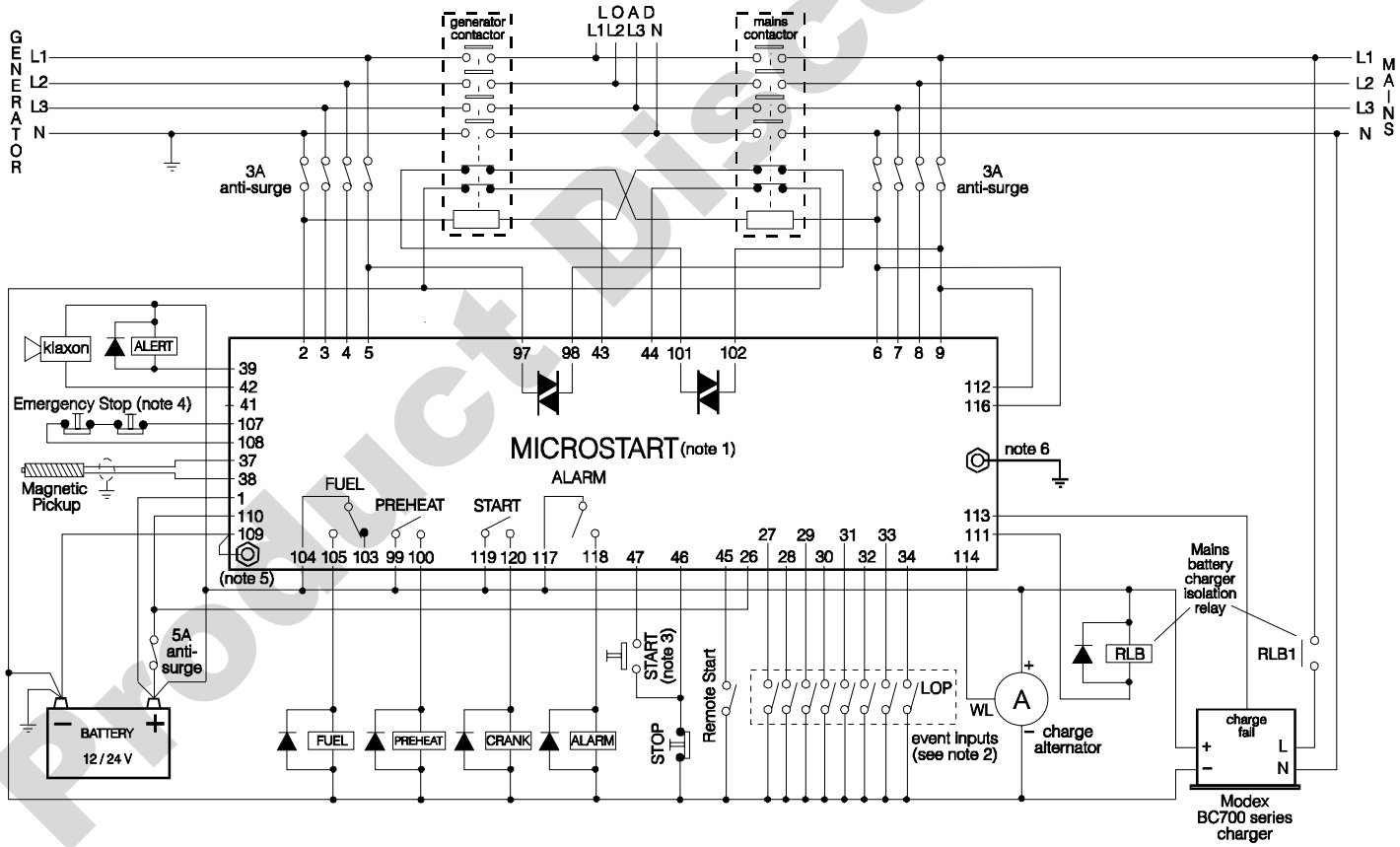
(114) Charge alternator WL
Connect direct to the charge alternator WL terminal. After the fuel is turned on, this terminal provides the initial excitation current required at start up, and then monitors the WL charging voltage (a 'charge fail' warning is given if voltage falls too low).

(117,118) Alarm output
Used to signal that an 'alarm' (i.e. shutdown) type fault has occurred. SPNO contacts, rated 16A @ 24V. The relay is energised (contacts closed) during fault.

BEFORE USING MICROSTART...

Important: once Microstart is connected, and before it is used, the unit must be programmed in accordance with the requirements of the generator system. Please refer to our ready reference sheet 'Programming Microstart' (document reference 010403) for full details. Failure to program Microstart correctly may result in the faulty operation of, and damage to, the generator, plant or electrical controls.

TYPICAL CONNECTION



Notes:

1 Microstart type MS1A shown (solid state relays controlling contactors with AC coils).
2 Event inputs (pins 27 - 34) may be individually programmed for fault contacts which either close to –ve DC (as shown), open from –ve DC, close to +ve DC or open from +ve DC.
3 For an immediate generator start on selecting manual mode, link pins 46 and 47.
4 Where emergency stop buttons are not used, pins 46 and 47 must be linked.
5 Rear facia earthing shown for a system with AC neutral and –ve DC commoned to earth.
6 Low impedance, high frequency earth. An earth rod and 10mm^2 braid are recommended.