

Keystart 9000/9600 Series Engine Controls

Installation Reference Sheet

mi5361
revision C, 29th July 2005
catalogue section 75



Front facia

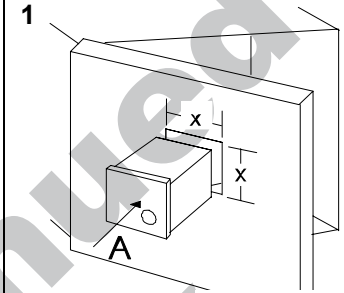


- 3 position (standard) or 4 position ('A' option) keyswitch:-
- O (STOP)** Isolates the DC supply, stopping the engine and resetting any latched fault condition.
 - I (RUN)** Activates the RUN output, allowing the engine to run. The RUN output de-activates if a fault is detected.
 - II (START)** Maintains the RUN output and activates the START (crank) output. Fault inputs are overridden.
 - III (AUX)** ('A' option only) Gives a positive DC output on pin A

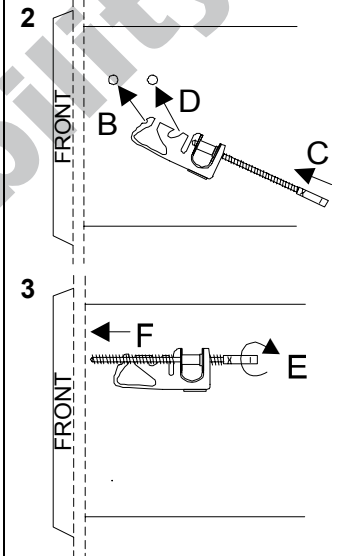
Red LED fault indicators:-

- low oil pressure
- high engine temperature
- overspeed (9001/9601/9002/9602) or plant fail (9000/9600)
- charge warning
- plant fail

Panel Installation



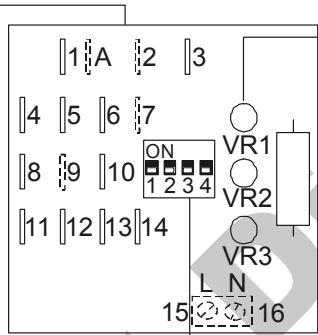
KEY9000 series: x = 68mm
KEY9600 series: x = 92mm



Rear facia connection and settings

Electrical Connection

- 1 Positive (+ DC) power supply
- A Aux Input ('A' option only)
- 2 Aux/preheat output ('A' option only)
- 3 Start output: + DC, 16 Amps max
- 4 Negative (- DC) power supply
- 5 Low oil pressure fault input
- 6 Alarm output: - DC, 250mA max.
- 7 Calibration/tachometer output, +ve
- 8 High engine temp fault input
- 9 Plant fail (9000/9600 only)
Mag. pickup signal (9001/9601 only)
Not used (9002/9602 only)
- 10 Plant fail input
- 11 RUN relay normally open contact
- 12 RUN relay change over contact
- 13 RUN relay normally closed contact
- 14 Charge fail warning input
- 15 Live } Generator AC input
- 16 Neutral } 90 - 350 VAC, 50/60Hz.
(9002/9602 only)



Potentiometer settings

Adjust with 3mm flat-head screwdriver

VR1: Nominal speed calibration:-

Connect calibration meter, run engine to normal speed, then adjust VR1 until meter reads 0.75mA.

VR2: Overspeed trip level:-

100 - 130% of nominal calibrated speed, clockwise to increase

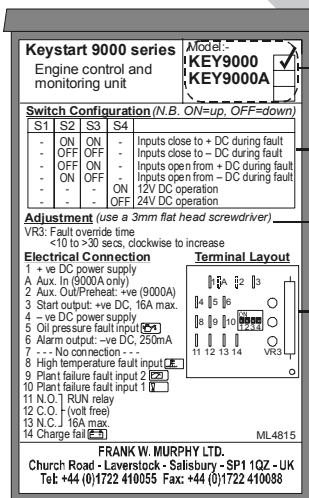
VR3: Fault input override timer:-
< 10 to > 30 seconds
clockwise to increase

Switch Settings (N.B. =up =down)

S1	S2	S3	S4
Not Used	Input fault state:-	Supply:-	
	closed -ve	12 V DC	
	closed +ve	24 V DC	
	open -ve		
	open +ve		



Top facia labelling (KEY9000 shown)



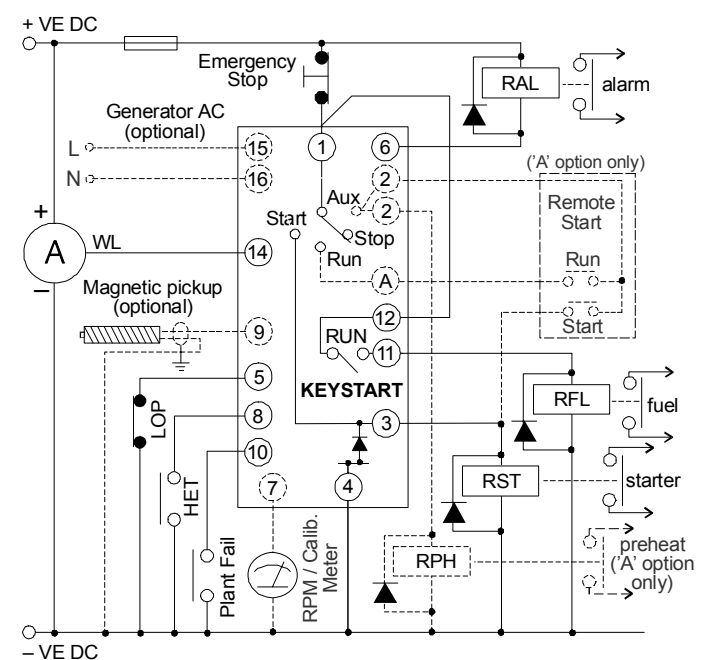
Model reference

Switch setting details

Potentiometer setting details

Electrical connection details

Typical Connection



Further information:-

Document	Description
ms6302	Keystart 9000/9600 series bulletin and specification

Electrical Connection



DANGER ! HIGH VOLTAGE

Models 9002, 9602 and derivatives use connections to high voltage generator AC. For all models, ensure that all AC and/or DC supplies are isolated before connection or disconnection.

Electrical connection is via ¼ inch blade connectors at the Keystart's rear. Models 9002 and 9602 use separate, shrouded screw terminals (pin 15 and 16) for the connection of generator AC. The available terminal functions are:-

Pin Function

1 Positive DC power supply

4 Negative DC power supply

Switch 4 on the rear facia allows selection of 12V or 24V DC power supply. Use a 5 Amp anti-surge fuse in the positive DC line (pin 3).

A Auxiliary input ('A' option only)

Pin A is located between pins 1 and 2 on 'A' option Keystarts. When positive DC is applied to pin A, the Keystart powers up into RUN mode, exactly as if the key had been turned to position I (RUN). The input is typically connected to remote contacts (e.g. the Murphy Econostart) with the positive feed for the circuit derived from 'Aux. out' (pin 2).

2 Auxiliary output ('A' option only)

'A' option Keystarts have a fourth keyswitch position, marked III (or AUX) and located anti-clockwise from O (STOP). With the key in this position, pin 2 gives a positive DC output (15 Amps max. rating).

The output is typically used to drive an engine preheat circuit, or in conjunction with the 'Aux. In' terminal (see pin A above).

3 Start output

This output is used to control an engine starter motor circuit. Pin 3 gives a positive DC, 16 Amp rated output when the key is switched to position II (START). To prolong keyswitch contact life, Murphy recommend the connection of a slave relay between Keystart and solenoid: connect the slave relay coil between pin 3 and battery negative, and ensure the coil is suppressed with a flywheel diode (reverse biased) or proprietary device.

5 Low Oil Pressure (LOP) fault input

8 High Engine Temperature (HET) fault input

10 Plant Fail Input

Rear facia switches S2 and S3 (see previous page) allow these inputs to be used with fault switches/contacts that either open or close during fault, with the switch wiring to battery positive or negative.

If either input becomes 'active', Keystart shuts down the engine, lights the appropriate front facia LED, and activates the alarm output. Shutdown is inhibited during cranking and until the end of the fault 'override' time.

6 Alarm output

Pin 6 is a semiconductor based (open collector transistor) output. It gives a negative DC, 300mA rated output immediately after a fault shutdown. The output is typically used to drive an audible/visible alarm, via a slave relay: connect the slave relay coil between pin 6 and battery positive, ensuring that the coil is suppressed with a reverse biased flywheel diode, or other proprietary device.

7 Calibration/RPM meter positive output (overspeed models only)

This output is designed to work with a 0 - 1 mA DC, 75 Ohm moving coil meter, either a) during set-up to aid speed calibration, or b) in normal operation to indicate engine speed or generator Hz. Connect meter positive to pin 7 and meter negative to battery negative (e.g. pin 4)

Stock 9002/9602 units are pre-calibrated to 50Hz; 9001/9601 units are set to 3000Hz (120 flywheel teeth at 1500RPM). For engines with other

nominal frequencies, the Keystart MUST be recalibrated. To set the nominal speed calibration:-

- connect the meter, turn VR1 fully clockwise (to max. frequency setting)
- start and run the engine to normal speed
- adjust VR1 anti-clockwise until the meter reading rises to 0.75mA

To set the overspeed trip point:-

- turn VR2 fully clockwise (to maximum, approx. 130% of nominal)
- (start and) run the engine to the required overspeed trip level, or simulate the speed input using a signal generator.
- adjust VR2 slowly anti-clockwise until the Keystart trips out and indicates overspeed.

After calibration, the meter may be disconnected and the terminals left open circuit, or replaced with a suitably scaled tachometer.

9 Magnetic pickup input (9000 and 9601 units)

Plant fail input (9000 and 9600 units)

Not used (9002 and 9602 units)

Models 9001 and 9601: pin 9 allows sensing of engine speed by use of a magnetic pickup and engine flywheel combination. The speed calibration and overspeed shutdown trip are set using potentiometers VR1 and VR2 (as detailed for pin 7 above).

Connect the pickup signal output to pin 9, and the pickup return connection to pin 1 or battery negative. Two-core and screen cable should be used for the interconnection, with the screen earthed at one end only.

Models 9000 and 9600: pin 9 may be used as an additional 'plant fail' input. An active input causes the overspeed LED to light, with operation otherwise similar to the shutdown inputs (pins 5, 8 and 10).

11 Run relay output: Normally open contact

12 Run relay output: Change-over contact

13 Run relay output: Normally closed contact

This volt-free relay output is used for the control of the engine fuel circuit. The relay energises when the operator switches to I (RUN), and de-energises when the operator switches the key to O (STOP) or if Keystart detects a fault.

The output contacts are rated to 16 Amps, but prolonged contact life can be achieved with a slave relay between Keystart and fuel solenoid. Ensure that the slave relay coil is suppressed with a reverse biased flywheel diode, or other proprietary device.

14 Charge fail input

The front facia charge fail LED lights when pin 2 is connected to negative DC. Note: the Keystart does not shut down the engine and the alarm output (pin 6) does not activate.

Pin 2 may be connected to the WL terminal of a charge alternator (Keystart provides the necessary excitation current) or to the 'charge fail' output of a Murphy BC700 series charger, or direct to negative DC via relay contacts which close on fault.

If a charge fail warning is not required, leave pin 2 open circuit.

15 Generator Live (models 9002/9602 only)

16 Generator Neutral (models 9002/9602 only)



DANGER ! HIGH VOLTAGE

On models 9002 and 9602, these terminals allow sensing of generator AC frequency. The speed calibration and over frequency trip level are set using pots VR1 and VR2 (see pin 7 above).

Pins 15 and 16 accept any nominal voltage between 90 and 300 VAC rms. A 1 Amp anti-surge fuse should be connected in series with pin 29.



FW Murphy

PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS & SERVICES DIVISION

PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.

Blvd. Antonio Rocha Cordero 300, Fracción del
Aguaje San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

INDUSTRIAL PANEL DIVISION

PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

FRANK W. MURPHY LTD.

Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk



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