Keystart 9700 Series
Engine/Generator Controllers
Installation Reference Sheet

mi5332
revision C, 29th July 2005
catalogue section 75

MURPHY

Front facia

3 position (standard) or 4 position ('A' option) keyswitch:-

O (STOP) Removes power from unit, stopping the engine and resetting a latched fault condition

I (RUN) Activates FUEL output, allowing engine to run. Fuel output will de-activate if a fault is detected.

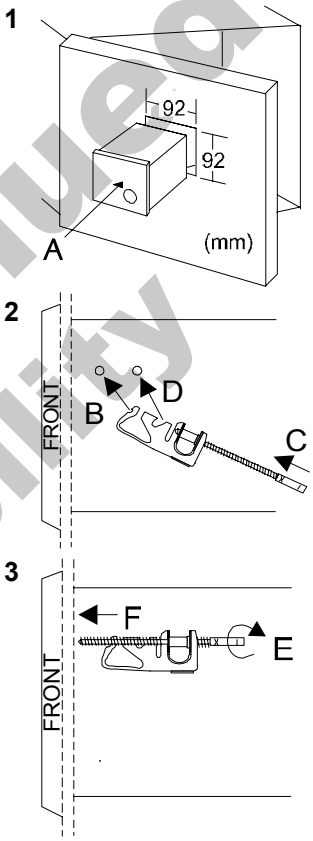
II (START) Maintains FUEL output and activates the START (crank) output. Fault inputs are overridden.

III (AUX) ('A' option only) Gives a positive output on pin 15.

Red LED fault indicators:-

- low oil pressure
- high engine temperature
- overspeed (9701/9702) or plant fail (9700)
- charge warning
- plant fail

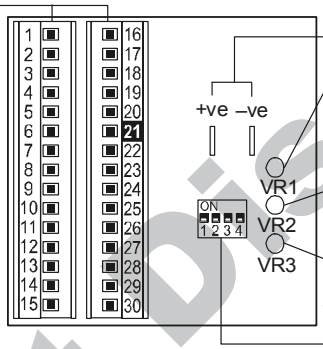
Panel Installation



Rear facia connection and settings

1 Negative DC power supply
2 Charge fail input
3 Positive DC power supply
4 Aux. input ('A' option only)
✳ 5 Magnetic pickup input (9701 only)
6 Alarm output: – DC, 250mA max.
7-14 *No connection*
15 Aux./preheat output: + DC ('A' option only)
16 Input 1: Low Oil Pressure
17 Input 2: High Engine Temp.
18 Input 3: Plant Fail (9700 only)
✳ 19 Input 4: Plant Fail
20 *No connection*
21 Index Pin
22 Fuel output: + DC, 16A max.
23 Start output: + DC, 15A max.
24-28 *No connection*
✳ 29 L ┐ Generator AC: 90 - 300 VAC
✳ 30 N ┘ (9702 models only)

✳ *Note:–*
Pin 5 is not used on 9700 and 9702 models.
Pin 18 is not used on 9701 and 9702 models.
Pins 29 and 30 are not used on 9700 and 9701 models.



Tachometer/calibration output:–
0 - 1mA into 75 Ohm meter

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

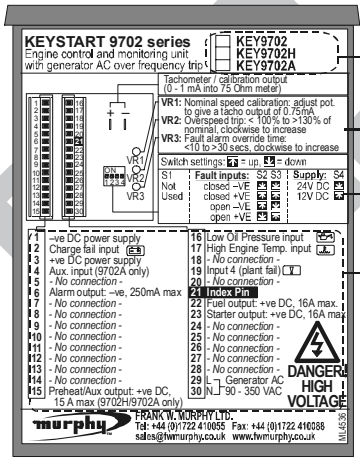
VR3: Fault input override timer:–
< 10 to > 30 seconds clockwise to increase

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 ◪ ◪	

DANGER ! HIGH VOLTAGE
(9702 models)

Top facia labelling (KEY9702 shown)



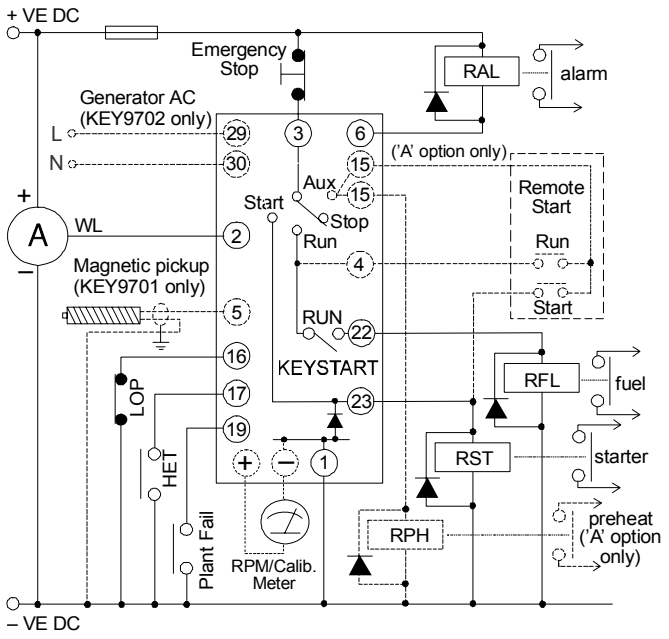
Model reference

Potentiometer setting details

Switch setting details

Electrical connection details

Typical Connection



Further information:-

Document	Description
ms6303	Keystart 9700 series bulletin and specification

ELECTRICAL CONNECTION

DANGER ! HIGH VOLTAGE

Models 9702(A) and derivatives use connections to high voltage generator AC. For *ALL* models, ensure:
1) that all AC and/or DC supplies are isolated, and
2) that the key is switched to O (stop/reset) before connection or disconnection.

Connection is through a pair of two-part type terminal blocks. Each block has 15 screw terminals, each of which is loosened/tightened using a 3mm flat-head screwdriver. Models 9701 and 9702 also have two 1/4 inch blade terminals (labelled + and –) for the connection of a calibration/tacho meter.

Terminal numbers not listed below are 'no connection' and should be left open circuit. The available terminal functions are:-

Pin Function

1 Negative DC power supply
3 Positive 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).

2 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.

4 Auxiliary input ('A' option only)

This feature allows 'A' option Keystarts to be interfaced with semi-automatic engine controls such as the Murphy Econostart.

When positive DC is applied to pin 4, the Keystart powers up into RUN mode, exactly as if the key had been turned to position **II** (RUN). The input is typically connected to a remote contact, with the positive feed for the circuit derived from the 'Aux. out' terminal (pin 15).

5 Magnetic pickup (9701 units only)

Pin 5 permits engine speed sensing with a magnetic pickup and engine flywheel combination. The speed calibration and overspeed shutdown trip are set using potentiometers VR1 and VR2 (see + / - calibration output right).

Connect the pickup signal output to pin 5, and the pickup return 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.

6 Alarm output

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

15 Auxiliary output ('A' option units 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 15 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 4 above).

16 Low Oil Pressure (LOP) fault input
17 High Engine Temperature (HET) fault input

Rear facia switches S2 and S3 allow these inputs to be used with fault switches 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.

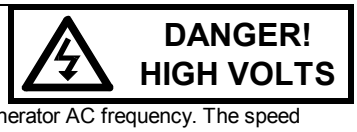
18 Plant fail input (9700 only)
19 Plant fail Input

Operation and rear facia switch settings are similar to pins 16 and 17 above. On non-overspeed models (9700), pin 18 is provided as an extra plant fail input: when pin 18 is activated, the overspeed LED lights.

22 Fuel output
23 Starter output

These are positive DC, 16 Amp rated outputs for the control of engine fuel and starter motor circuits. To prolong contact life, Murphy recommend the connection of slave relays (with suppressed coils) between each output and battery negative, with the slave relay contacts used to drive fuel and starter solenoids.

29 Generator Live (9702 models)
30 Generator Neutral (9702 models)



Pins 29 and 30 allow sensing of generator AC frequency. The speed (frequency) calibration and over frequency trip level are set using pots VR1 and VR2 (see +/- calibration output below). These pins accept any nominal voltage between 90 and 300 VAC. A 1 Amp anti-surge fuse should be connected in series with pin 29.

+ Calibration/RPM meter positive output (KEY9701/9702 only)
– Calibration/RPM meter negative output (KEY9701/9702 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.

Stock KEY9702 units are pre-calibrated to 50Hz; KEY9701 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)
- start and run the engine to normal speed
- turn 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.

MURPHY

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

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

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

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.