

Keystart 7210 & 9610 series Engine & generator controls

yi6405
29th July 2005
catalogue section 75



Retrofitting guide for Keystart 9000/9600/9700/7201 series

Please read the following information before installing. A visual inspection of this product for damage during shipping is recommended before installation. It is your responsibility to ensure that qualified mechanical and electrical technicians install this product. If in doubt, please contact your local Murphy representative.

GENERAL INFORMATION

WARNING

BEFORE BEGINNING INSTALLATION OF THIS PRODUCT

- ✓ Disconnect all electrical power to the machine
- ✓ Make sure the machine cannot operate during installation
- ✓ Follow all safety warnings of the machine manufacturer
- ✓ Read and follow all installation instructions



General

As of July 2005, Keystart 9000, 9600, 9700 and 7201 series engine and genset controls are superseded by the Keystart 7210 and 9610 range.

This guide aims to help with the retrofitting of new models in place of old. For definitive installation instructions and connection ratings, please refer to the following documents:-

document	description
yi6379	Keystart 7210 & 9610 series installation
mi5361	Keystart 9000 & 9600 series installation
mi5332	Keystart 9700 series installation
yi6365	Keystart 7201 installation

Links to the above documents and additional information can be found at www.fwmurphy.co.uk/keystart

Panel installation

The latest 7210 and 9610 series units are designed for (respectively) 68 x 68 mm and 92 x 92 mm DIN panel cut-outs, the same aperture size as required for the older 9000, 9600, 9700 and 7201 series Keystarts.

Keystart 9000, 9600 and 9700 series units have longer case depths than the latest equivalent 7210 or 9610 series replacements: case depth should not therefore be an issue with these units. However, the Keystart 7201 features an open-backed design with very low low depth: the closest equivalent model 7211 requires approx. 90mm behind the front fascia for the case, plus a typical 30mm extra for wiring.

Installation issues may also arise with regard to wire harness termination or length, particularly if the existing Keystart wiring harness features 6mm blade receptacles. (These will need to be removed or extended for the latest Keystarts, which require wires with stripped leads – see Electrical Connection overleaf for more details.)

Closest model equivalents

Old model	Closest new equivalent	Notes
<i>9000 series:-</i>		
9000(A)(H)	7210	1
9001(A)(H)	7211	1
9002(A)(H)	7211	1
<i>9600 series:-</i>		
9600(A)(H)	9610	1, 2
9601(A)(H)	9611	1, 2
9602(A)(H)	9611	1, 2
<i>9700 series:-</i>		
9700(A)	9610	1
9701(A)	9611	1
9702(A)	9611	1
<i>7200 series:-</i>		
7201	7211	1

Notes:-

- 1 For 9000, 9600 and 9700 series part numbers with an 'H' or 'A' suffix, and also model 7201, see Electrical Connection overleaf for details of compatibility ref. Preheat output, Aux output and Aux input.
- 2 Models 9650, 9651 and 9652 models were designed for energised-to-stop fuel systems. No direct Murphy replacement now exists.

ELECTRICAL CONNECTION



WARNING: DANGER OF INJURY OR DEATH. Some Keystart models provide for connection of high voltage AC circuits. Before connection, disconnection or handling of any unit, ensure that all AC and DC power supplies are isolated. Connection to or disconnection from live wiring may also cause damage to the Keystart's internal components.

The new Keystart 7210 and 9610 series has electrical connection features that are broadly similar to older models but with revised terminal numbering. The chart below gives terminal number cross-referencing for Keystart connections, with notes on compatibility issues.

Physically, the latest 7210/9610 series feature spring-clamp terminals that require a wiring harness with stripped ends. Some older Keystarts use 6mm blade terminals for connection, meaning that wiring harness blade receptacles will need to be stripped off before connection of replacement

models. The Keystart 9000 and 9600 series used 6mm blades for most connections, with screw terminals provided for high voltage generator AC connection on models 9002/9602. The Keystart 9700 series used two-part type (removable) screw terminal blocks (i.e. stripped wires), plus 2 blade connectors for the calibration output on overspeed models. Model 7201 used spring-clamp terminals (i.e. stripped wires) for most connections, but 6mm blades for connections on the open-backed keyswitch.

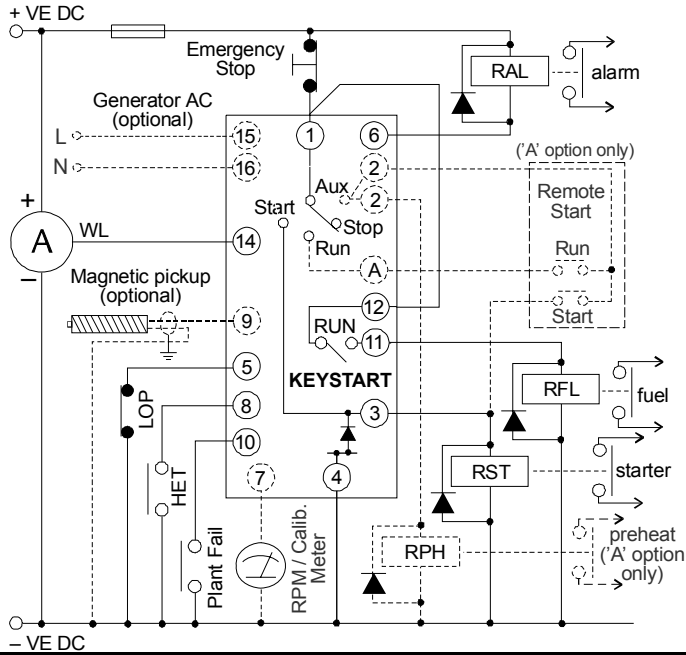
Terminal function	Terminal numbers				Notes
	9000/ 9600 series	old 9700 series	7201 series	new 7210/ 9610 series	
Positive DC power supply Negative DC power supply	1 4	1 3	1 2	5 6	The DC supply connections for powering the module. The Keystart 9000/9600/9700 series has a rear facia switch S4 for setting 12 or 24V operation. Keystart 7201 and 7210/9610 series units have a universal 8 to 32 VDC power supply.
Fuel/Run output N/O Fuel/Run output COM Fuel/Run output N/C Fuel/Run output +DC	11 12 13	22	13	2	The Run or Fuel output is used to control the engine fuel solenoid circuit. 9000/9600 series units feature a volt-free changeover relay output (16 Amp rated): for energised-to-run fuel systems, a positive DC feed is usually connected to pin 12, and pin 11 is connected to the fuel control circuit. On 9700, 7201 and 7210/9610 series units, energised-to-run fuel control is by switched positive outputs (derived from the main positive DC power supply connection). Murphy recommend the connection of a slave relay between the Run/Fuel output and the engine fuel solenoid: note in particular the lower 1A maximum rating on Keystart 7210 and 7211 units.
Start output	3	23	3 (ST)	4	A switched positive DC output for control of engine starter motor. Murphy recommend the connection of a slave relay (with suppressed coil) between this output and fuel solenoid.
Aux output Preheat output	2	15	5 12	3	9000, 9600 an 9700 series units with the 'A' or 'H' option, and also model 7201, had an "Aux Out" terminal that gave a switched positive DC signal when the keyswitch was turned to a fourth position marked III (or Aux). The output could be used to power auxiliary equipment, e.g. remote automatic start equipment (See "Aux. In" terminal below) or engine preheaters. Model 7201 and on 7210/9610 series has dedicated, timed outputs for engine preheaters: the output gives a positive DC signal for an adjustable time after the key is turned to position II (Run). Output ratings are generally 16 Amps, except models 7210/7211 which have a 1A maximum rating: Murphy recommend the connection of a slave relay (with suppressed coil) between this output and engine preheaters. Model 7201 and 7210/9610 series units do not have a 4 th keyswitch position or associated switched positive output.
Aux input	A	4	4	16 (9610 /9611 only)	On 9000, 9600, 9700 series units with the 'A' option, on 7201 series units, and on the latest models 9610 and 9611, connection of battery positive to the Aux In terminal causes the Keystart to power up into 'Run' mode, exactly as if the key had been turned to position II (Run). This feature allows the Keystart to be enhanced with automatic start equipment. On older models, the positive feed for remote start circuit was often derived from the Aux Out terminal (see above). The Aux In feature is not available on the latest 7210 or 7211 models.

ELECTRICAL CONNECTION (cont)

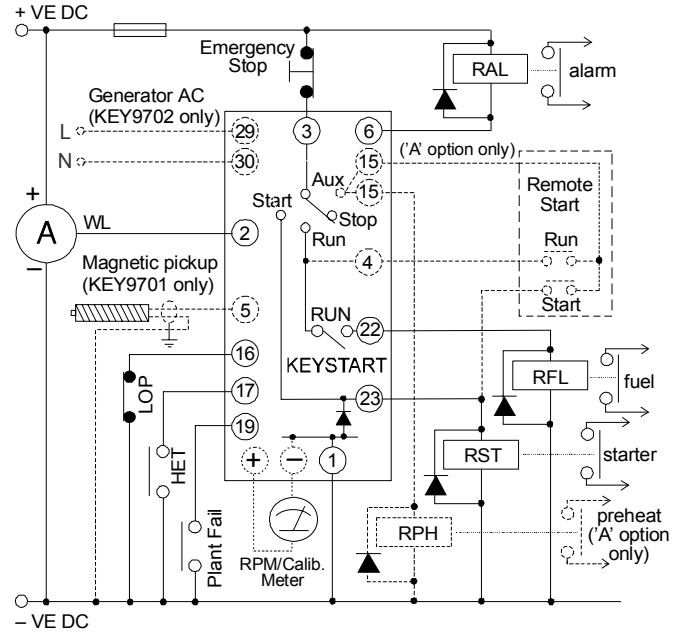
Terminal function	Terminal numbers				Notes
	9000/ 9600 series	old 9700 series	7201 series	new 7210/ 9610 series	
Alarm output	6	6	6	1	On all Keystarts, this is a semiconductor-based output that gives a negative DC output following engine shutdown faults. On the 7210/9610 series, the maximum current rating is 100mA, but older Keystart models may feature a higher current rating – check literature for details. A slave relay with suppressed coil is typically connected between the output and battery positive; the slave relay contacts then drive a warning indicator or audible alarm circuit.
Low oil pressure input High engine temp. input Plant fail 1 input Plant fail 2 input	5 8 10 9	16 17 19 18	10 11 7	8 9 7 15	These inputs are designed for connection to engine or plant fault switches/contacts. Activation of these inputs causes an immediate, automatic shutdown of the engine, and a lighting of the appropriate front facia fault LED. On 9000, 9600 and 9700 units, the inputs' active polarity and phasing (open/closed/positive/negative) could be controlled using rear facia switches S2 and S3. On 7201 and 7210/9610 models, activation is by closing each input to negative DC. Plant fail 2 inputs are found only on non-overspeed models, and cause the overspeed LED to light.
Charge fail / excitation	14	2	9	10	On all units, this terminal acts as an excitation output and charge fail warning input for an engine-driven charge alternator. As an output, the terminal gives a positive DC output for driving charge alternator field windings. As an input, external connection to battery negative causes the front facia charge fail LED to light.
Magnetic pickup input	9 (9001/ 9601 only)	5 (9701 only)	8	15	A speed transducer input for sensing an engine overspeed fault. Models 9001, 9601 and 9701 are designed to sense engine overspeed only via a magnetic pickup. Models 7201, 7211 and 9611 can be configured (via a circuit board link) to sense speed from magnetic pickup or generator AC. For all units, the pickup return wire is connected to the battery negative DC supply. These inputs must be calibrated before use - see separate installation instructions for full details.
Generator AC	15 (L) 16 (N)	29 30	14 15	13 14	A high voltage 50/60Hz generator AC input for sensing an engine overspeed fault. Models 9002, 9602 and 9702 are designed to sense engine overspeed only via generator AC. Models 7201, 7211 and 9611 can be configured (via circuit board link) to sense speed from magnetic pickup or generator AC. See separate installation instructions for details of speed calibration.
Calibration/RPM positive Calibration/RPM negative	7	+ –	17 16	11 12	A 0 –1mA DC meter output for use in speed calibration or engine RPM indication. On 9000 and 9600 units, the meter negative is connected to battery DC negative. On 9700 series units, meter connection is by + and – blade terminals (separate from the main terminal block). All units are calibrated to give a 0.75mA output (into a 75 Ohm meter) when the engine is running normally – see separate installation instructions for full calibration details.

TYPICAL CONNECTION

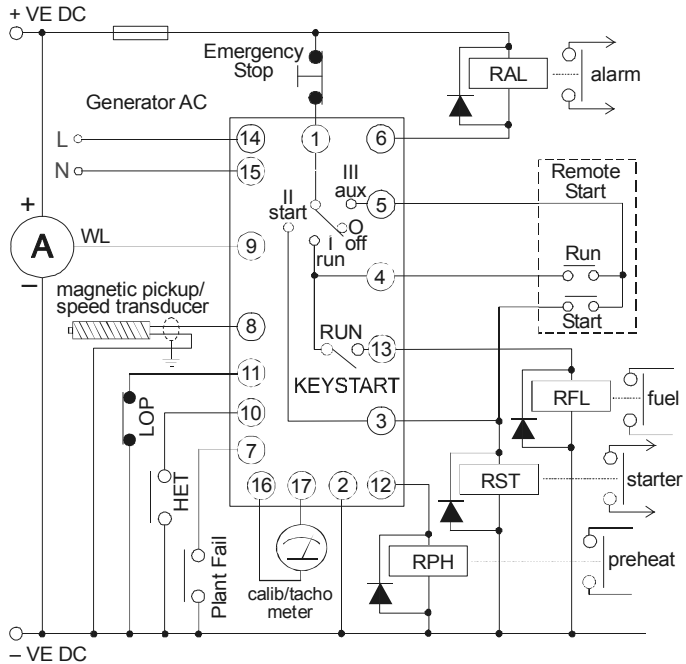
Old models: 9000/9600 series



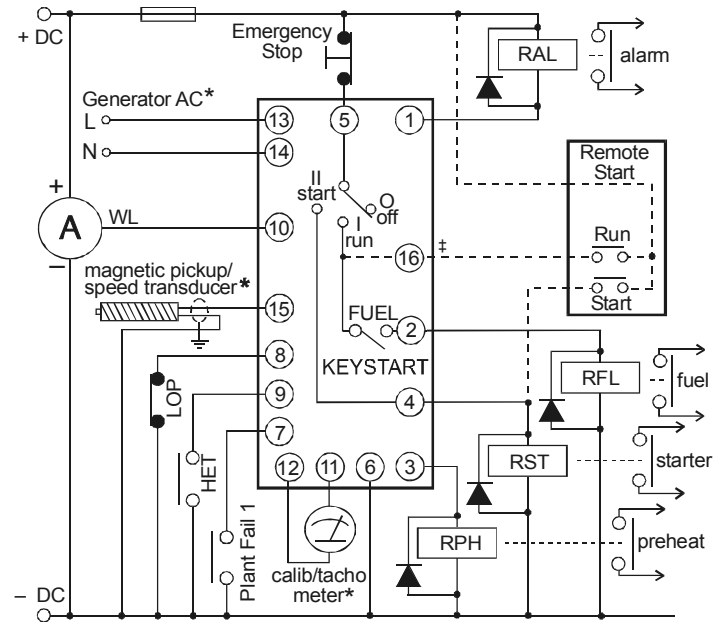
Old models: 9700 series



Old models: 7200/7201



New models: 7210/9610 series



Notes:-

* Overspeed models 7211/9611 only. Selection of generator AC or magnetic pickup speed sensing is by internal circuit board link J1. Stock units are set for generator AC sensing, 50Hz nominal. On non-overspeed models, pin 15 is 'plant fail 2' switch input, with connection as pin 7.

‡ Pin 16 (remote run input) available only on models 9610/9611.



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