Autostart AS710S/AS730S V1.05 – V1.09(a)
Autostart AS705S V1.00 – V1.06(a)
Installation Instructions
Section B: Programming

mi5265
revision E, 12th Sept 2011
catalogue section 75

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.

WARNING

BEFORE BEGINNING INSTALLATION OF THIS MURPHY 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

Description

The Autostart AS7XX family of controls is designed to provide automatic or manual control of a standby diesel generator, pump or engine driven application.

The units in the range – the AS705S, AS710S and AS730S - share a number of common programmable features, including timers, trip levels, inputs, outputs and fault configurations.

This document details the programming of the AS7XX range. Further details on specification, installation and operation of the range can be found in the following documents:-

Doc. ref.	*Title*
ms5258	AS705S bulletin
mi5396	AS705S installation and wiring
ms5259	AS710S bulletin
mi5262	AS710S installation and wiring
ms5261	AS730S bulletin
mi5264	AS730S installation and wiring
mi5266	AS7xx communications and AS7CK PC software

The above are available on request from your Murphy representative, or from the products section of our website **www.fwmurphy.co.uk**

Programming

Each Autostart **MUST** be programmed before it can be tested or used to control an engine.

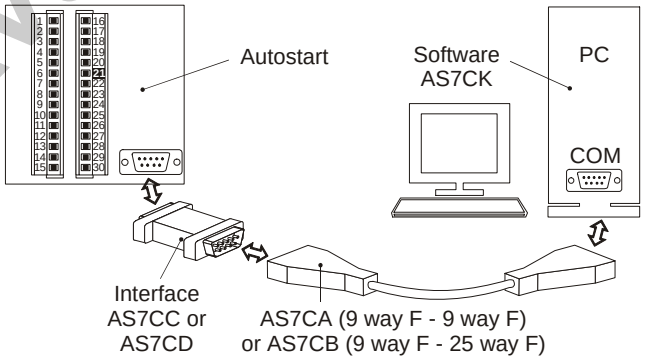
WARNING: Failure to correctly program each unit can result in damage to Autostart, engine and other equipment.

Programming is typically carried out after installation into the engine control panel, but may also be carried out 'on the bench' with a minimum power supply connection. The pages following list the program functions and options available, with an explanation for each, and the default factory settings.

Autostarts can be programmed in several ways, depending on the unit type:-

All units

Any AS7xx unit may be programmed by use of Murphy PC software model AS7CK. (Note: the AS705S can **ONLY** be programmed in this way.) The software allows Autostart program 'profiles' to be created, edited and stored on a desktop or laptop PC. These program profiles may be uploaded and downloaded between Autostart and PC over an RS232 communication link:-



This method of programming is particularly suited to larger batches of Autostarts having the same program specification.

Full details about the installation and operation of software and communication links can be found in document mi5266.

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BSI
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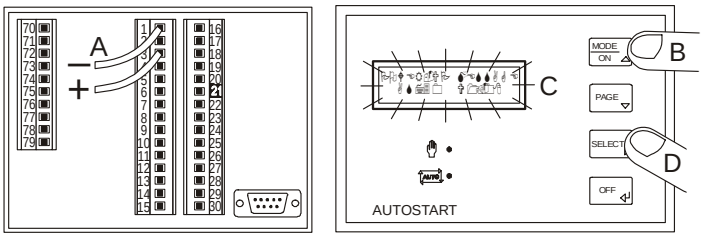
AS730S

The AS730S front facia has a liquid crystal display (LCD) and push buttons, which may be used to step through and adjust each program option in turn.

To enter 'program mode':-



- Connect DC power to the AS730S: positive DC to pin 3, negative DC to pin 1. Other terminals may be left open circuit or connected as normal.
- Press and release the ON/MODE key (B). Immediately that the display lights (C), press and hold the SELECT key (D).
- If the AS730S displays 'Enter PIN (Personal Identification Number), use the ▷, △ and ▽ keys (labelled in red) to change the display to the correct 4 figure PIN (the factory default is 1234), then press ⏎. If the PIN is correctly entered (or if PIN entry is not requested), the AS730S displays the first program function ('start delay').

Programming each function:-

- Use the △ and ▽ keys (and the ▷ key for text messages) to change the option or value displayed.
- When the correct setting is displayed, press ⏎ to confirm the value/option and move on to the next function. Full details of each programmable function are listed overleaf.

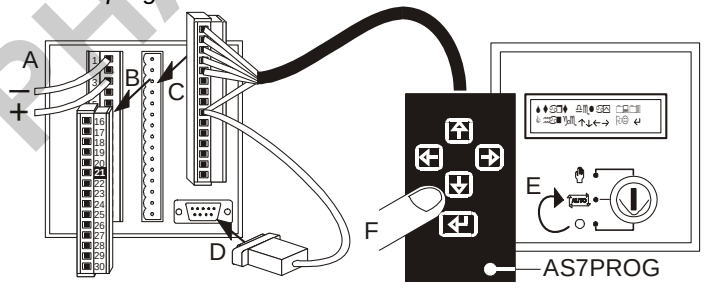
To exit program mode and save changes:-

- At the end of the program sequence, the AS730S displays 'exit program mode?'. To save the program changes, press the ⏎ key, wait a second or so, then press the OFF (⏎) key again when prompted. Alternatively, press the ▷, △ or ▽ keys to review the program settings again. If power is removed during the program sequence, the unit reverts to the previously held program settings.

AS710S

Programming the AS710S is similar in principle to the AS730S. The AS710S has a front facia LCD, but the program mode navigation keys are provided on a separate hand-held programmer keypad. The key-pad, model AS7PROG, is supplied separately from the AS710S, and is connected to the AS710S only when programming:-

To enter program mode:-



- Ensure that the AS710S is switched to O (Off/reset). Connect a power supply, 5 – 40 VDC: positive DC to pin 3, negative DC to pin 1 (A above).
- Remove terminal block 16 - 30 (B), and in its place connect the programming key-pad's 15 way terminal block (C)
- Connect the key-pad 'D' connector into the 9 way D-socket at the Autostart's rear (D above).
- Switch the Autostart to Auto mode (E).
- The display should momentarily read 'program mode'. If the displays then reads 'Enter PIN' (Personal Identification Number), use the ⇧ ⇩ ⇦ and ⇨ buttons to change the display to the correct PIN (the factory default PIN is 1234), then press ⏎.
- Once the correct PIN is entered (or if PIN entry is not requested), Autostart displays the first programmable function ('Start delay').

To re-program each function:-

- Use the key-pad ⇧ and ⇩ buttons (and the ⇦ and ⇨ buttons for text messages) to change the option or value shown on the Autostart's display.
- When the correct setting is displayed, press ⏎ to confirm the value/option and move on to the next function. Full details of each programmable function are listed overleaf.

To exit program mode and save changes:-

- When 'exit program mode?' is displayed, press the ⏎ key, wait a second or two, then turn the key to ◯ (off/reset). Alternatively, press the ⇧ ⇩ ⇦ or ⇨ keys to review the program settings.
- Disconnect the hand-held programmer unit, then re-connect terminal block 16 - 30.

Note: at power up, the AS710S detects the connection of the program key-pad by looking at pin 28. If pin 28 is connected to negative DC, the unit operates normally. If pin 28 is left open circuit (as on the keypad connector), the unit attempts to enter 'program mode'. After disconnection of the key-pad, pin 28 must be reconnected (to negative DC, via a wire link or manual stop button) before normal operation can occur.

Program sequence

The following pages detail the program functions available on each unit. Feature availability for each unit type is given in the first three columns.

The functions are listed in the order of appearance when programming from the front facia (AS730S) or using a key-pad (AS710S). When programming from the PC software, the functions and options are identical, but are ordered differently on 6 screens, with each screen displaying several program options at once.

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Programming Check Sheets

Customer/Engine/Site Name:.....……..... Autostart serial number:.....

Job ref. .....…….....

Programmed by .....……..... Date:…….....

AS705S	AS710S	AS730S	Function	Settings (tick as appropriate): Default	New	Description
●	●	●	Start delay	❑ 0:02	❑ .....min.....sec	***(0 – 10 mins)*** In Auto mode, this timer sets a delay between the occurrence of a remote start (pin 11 going open circuit) and the first engine start attempt.
●	●	●	Preheat	❑ 00 sec	❑ .....sec	***(00 – 59 secs)*** If any of the programmable outputs (see sections below) have been programmed to give a 'preheat' function, that output will activate for this time period before each engine crank attempt.
●	●	●	Crank	❑ 10 sec	❑ .....sec	***(03 – 59 secs)*** Sets the maximum time for each engine crank attempt.
●	●	●	Crnk cool	❑ 10 sec	❑ .....sec	***(03 – 59 secs)*** Allows the batteries & starter motor to recover before repeat crank attempts are made.
●	●	●	Start attempts	❑ 3	❑ .....attempts	***(1 – 9)*** Sets the maximum number of crank attempts Autostart makes before signalling a 'start fail' alarm.
●	●	●	Override	❑ 15 sec	❑ .....sec	***(02 – 59 secs)*** Immediately after an engine start, this timer may be used to hold off fault shutdowns (e.g. oil pressure) for a further short time.
●	●	●	Speedsig	❑ 01 sec	❑ .....sec	***(01 – 59 secs)*** This holds off a 'no speed signal' fault shutdown immediately after engine start, particularly if a 'soft-start' AC alternator is used (where there is initially little or no AC frequency signal).
●	●	●	Warmup	❑ 02 sec	❑ .....sec	***(00 – 59 secs)*** In Auto mode, after the engine has started, this timer may be used to delay the operation of a 'gen. contactor' output (i.e. delay the loading of the generator).
●	●	●	Restore	❑ 0:03:00	❑ ....hrs.....min.....sec	***(0 – 1 hour)*** In Auto mode, after a mains return (or clearing of a 'remote start' condition), this timer sets a delay before Autostart transfers the load from the generator back to the mains AC supply.
●	●	●	Eng.cool	❑ 0:03:00	❑ ....hrs.....min.....sec	***(0 – 1 hour)*** In Auto mode, this timer lets the engine run off load before stopping the engine.
	●	●	Energ 2 stop	❑ 5 sec	❑ .....sec	***(05 – 59 secs)*** Any output set to 'energised to stop' (fuel) output activates as soon as the engine is required to stop; the output de-activates after the engine has stopped and this further time has expired.
	●	●	Rem test	❑ 1 min	❑ .....min	***(1 – 240 mins)*** A engine or generator test run may be initiated from a remote PC over the communications link. Autostart will then run for this time, even if the communication link is broken.
●	●	●	Hours run:	❑ ON	❑ OFF	***(ON or OFF)*** Enables or disables the display of the hours run counter.

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AS705S	AS710S	AS730S	Function	Settings (tick as appropriate): Default	New	Description
●	●	●	CF:	❑ not used	❑ charge alt. ❑ mains charge	Sets the operation of the Autostart's 'charge fail' warning (as measured through pin 2):- ***charge alt:*** overrides display of any 'charge fail' fault while the engine is at rest, during engine starting and for the duration of the 'override' time. ***mains charge:*** allows Autostart to give a charge fail warning at any time (when engine is stationary or running). A charge fail warning will not, however, occur during engine cranking. ***not used:*** use this setting to disable the charge fail warning. Leave pin 2 open circuit.
●	●	●	WL crank cut:	❑ – – V	❑ V	***(1 – 30 VDC, or '– –' if not used)*** This setting is only available if 'charge alt' option has been selected above, and allows the rising charge alternator WL voltage to be used to trigger the automatic release of the engine starter motor. This feature can be used in addition to, or instead of, the generator AC frequency or magnetic pickup 'crank cut' settings (see below). Typically, this option can be used where the generator AC (50/60Hz) alternator is a 'soft-start' type, with little or no AC output until after the engine is fully running. Autostart releases the starter motor when the charge alternator WL voltage, measured through pin 2, exceeds the programmed setting. If the WL crank release feature is not required, use the – – setting.
●	●	●	WL chrg fail:	❑ 10V	❑ V	***(1 – 30 V DC)*** This setting is only available if either the 'charge alt' or 'mains charge' option has been selected above. It sets the voltage level, measured through pin 2, below which Autostart considers a 'charge fail' fault has occurred. For charge alternators, this is typically set at slightly below the nominal battery voltage.
●	●	●	Battery LO:	❑ 10 V	❑ V	***(10 – 30 V DC)*** Autostart gives a 'low battery volts' warning if the DC supply falls below this voltage.
●	●	●	Battery HI:	❑ 32 V	❑ V	***(12 – 35 V DC)*** Autostart gives a 'high battery volts' warning if the DC supply rises above this voltage.
●	●	●	AC sense (AC gen fitted?)	❑ YES	❑ NO	***(Yes or No)*** Sets whether or not the generator AC (50/60Hz) signal is used to sense engine speed. On the AS730S, this setting also enables or disables the generator AC voltage and current sensing.
		●	Gen phases	❑ 3	❑	***(3, 2 or 1)*** Allows Autostart to be used with 3, 2 or single phase generators (AS730S only).
		●	AC display:	❑ L–N	❑ L–L	***(L–N or L–L)*** *AS730S only.* Sets whether the Autostart displays 'line to neutral' or 'line to line' voltage, both during normal operation and when programming AC voltage trip levels.

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AS705S	AS710S	AS730S	Function	Settings (tick as appropriate): Default	New	Description
		●	Gen UV trip:	❑ 200 V	❑ V	***(50 – 500 VAC)*** *AS730S only.* The AS730S indicates 'gen. under volts' if any of the three AC voltages fall below this set level. The UV level is NOT programmable on the AS705S or 710S, but is pre-set in hardware to around 66% of nominal. The Autostart response to this fault – engine shutdown or load release – is also programmable: see below.
●	●	●	Gen UV action:	❑ RELEASE	❑ SHUTDOWN	Sets the response to a generator under voltage condition:- ***Release:*** Autostart takes the generator off load, displays 'Gen. Under Volts', but allows the engine to run on. Autostart automatically attempts to reload the generator if the voltage rises to within normal limits (except when an input has been programmed to 'load reset' - see 'programmable inputs' section below). ***Shutdown:*** causes immediate unload and shutdown of the generator, and display of 'Gen Under volts'.
		●	Gen UV OK:	❑ 210 V	❑ V	***(50 – 500 VAC)*** *AS730S only*. This sets the level above which Autostart considers the generator AC voltage is OK. This level is NOT programmable on the AS705S or 710S, but is pre-set in hardware to around 66% of nominal. Autostart never attempts to load the generator unless the AC voltage is above the appropriate (programmed or pre-set hardware) level.
		●	Gen OV trip:	❑ 500 V	❑ V	***(50 – 600 VAC)*** *- AS730S only.* The AS730S shuts down the generator and indicates GEN OVERVOLTS if any of the three AC voltages rise above this programmed level.
		●	CT ratio	❑ 1000 : 5 A	❑ ..... : 5 A	***(10:5 to 5000:5)*** *AS730S only.* Autostart measures AC generator current by use of current transformers (with 5 Amp secondary coils). To correctly measure AC current, the CT ratio must be entered here.
		●	Full load:	❑ 500 A	❑ ..... A	***(2 to 5000 Amps)*** *AS730S only.* Set this to match the full load current rating of the generator. This setting (with the IDMT constant below) sets the overload/trip-time response for the over-current warning and shutdown alarms.
		●	IDMT constant	❑ 36	❑	***(10 to 50)*** *AS730S only.* The overload current/trip time curve has an IDMT characteristic, giving a quicker response for large overloads and a slower response for smaller overloads. Higher settings of the IDMT constant result in longer trip times (for a fixed over current level). This setting should be made in consultation with the alternator spec.
		●	**I** trip (xFLC)	❑ 3.0	❑	***(1.0 – 3.0)*** *AS730S only.* Allows a user-programmable maximum current limit, above which Autostart instantly trips out (overriding the IDMT response). The setting is expressed as multiples of the full load current setting (see above).
		●	Over **I**:	❑ RELEASE	❑ SHUTDOWN	*AS730S only.* Sets the response to a generator over current condition:- ***Release:*** Autostart takes the generator off load, displays 'Gen. Over **I**', but allows the engine to run on. Autostart will automatically attempt to reload the generator if the current falls to within normal limits (except when an input has been programmed to 'load reset' - see programmable input section below). ***Shutdown:*** Autostart immediately unloads and shuts down the generator, and displays 'Gen Over **I**'.

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AS705S	AS710S	AS730S	Function	Settings (tick as appropriate): Default	New	Description
●	●	●	Crank cut:	❑ 20 Hz	❑ ..... Hz	***(5 – 25 Hz.)*** Sets the AC frequency for engine crank release, when AC is used for speed sensing.
●	●	●	Undr freq:	❑ 45 Hz	❑ ..... Hz	***(40 – 60 Hz.)*** Sets the generator under frequency level, when generator AC is used for speed sensing.
●	●	●	Over freq:	❑ 55 Hz	❑ ..... Hz	***(50 – 70 Hz.)*** Sets the generator over frequency shutdown trip, when the AC is used for speed sensing.
●	●	●	Mag pickup	❑ NO	❑ YES	***(YES or NO)*** Enables or disables engine speed sensing via magnetic pickup.
●	●	●	MPU teeth:	❑ 60	❑ ..... teeth	***(1 – 250 teeth)*** When a magnetic pickup is used, enter the number of flywheel teeth.
●	●	●	Crank cut:	❑ 525	❑ ..... RPM	***(100 – 1500 RPM)*** Sets the engine crank release speed, when speed is measured by magnetic pickup.
●	●	●	Undr speed:	❑ 1350	❑ ..... RPM	***(500 – 3550 RPM)*** Sets the engine underspeed level, when speed is measured by magnetic pickup.
●	●	●	Over speed:	❑ 1650	❑ ..... RPM	***(1000 – 5400 RPM)*** Sets the engine overspeed shutdown trip, when measured by magnetic pickup.
●	●	●	O/S override	❑ 0 %	❑ ..... %	***(0 – 25%)*** Sets an additional speed overshoot (as percentage of the overspeed level above), permitted immediately after engine start (for 'speed sig. delay).
●	●	●	U F/RPM:	❑ RELEASE	❑ SHUTDOWN	Sets the response to a generator under speed/frequency condition:- ***Release:*** Autostart takes the generator off load, displays UNDER SPEED/FREQ, but allows the engine to run on. Autostart will automatically attempt to reload the generator if the speed/frequency rises to within normal limits (except when an input has been programmed to 'load reset' - see programmable input section below). ***Shutdown:*** Autostart immediately unloads and shuts down the generator, and displays UNDER SPEED/FREQ.
●	●	●	Load in MAN:	❑ NO	❑ YES	When running the generator in manual mode, this setting affects whether or not Autostart will attempt to load the generator in response to a remote start (if pin 11 goes open circuit) or mains fail condition:- ***YES*****:** Autostart activates any 'gen. contactor' output, providing the engine is running within normal limits. ***NO:*** the 'gen. contactor' output never operates in manual mode.
		●	Remote start	❑ OP +VE	❑ CL +VE	*(AS730S only)* Allows the AS730S remote start terminal (pin 11) to be activated by either 'opening from positive' or 'closing to positive' contacts.
●	●	●	Inputs:	❑ close –VE	❑ close +VE ❑ open –VE ❑ open +VE	For AS705S and AS710SK_B units, this program function sets the 'active' state of switch inputs 1 to 5. The inputs may be set up for remote contacts which open or close when 'active', wired between the input and either +ve or –ve DC. For AS710SK_A and AS730S units, this setting only applies to switch inputs 3 – 5. Analog inputs 1 (oil pressure) and 2 (engine temperature) have individual program options for selection of sender type (see below).

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AS705S	AS710S	AS730S	Function	Settings (tick as appropriate): Default	New	Description
●	●	●	Input 3 action:	❑ +++not used+++	❑ Shut: override ❑ Shut: no override ❑ Warn: override ❑ Warn: no override ❑ Disp: override ❑ Disp: no override ❑ Load release ❑ Lamp test ❑ Manual restore ❑ Test OFF load ❑ Alarm mute ❑ Load reset ❑ Remote mode control	Sets the 'action' which Autostart takes when input 3 is made active:- ***+++not used+++***: use this selection when the input is not used. The input may then be left open circuit. ***Shutdown: override:*** used with remote fault sensor contacts to trigger a shutdown of the generator. An active input will only trigger a response if the engine is running and the fault override timer has expired. Typical uses: generator under voltage. ***Shutdown: no override:*** similar to the above, but an active input will trigger a shutdown response at ANY time (whether the engine stationary, starting or running). Typical uses: fire, coolant loss, earth fault. ***Warning: override:*** used with remote fault contacts to trigger a fault warning (but not an engine shutdown). An active input will only trigger a response if the engine is running and the fault override time has expired. Typical uses: general pre-alarms, e.g. engine/alternator temperature warnings, over-current warning ***Warning: no override:*** similar to the above, but an active input will trigger a warning at ANY time. Typical uses: low/high fuel level, low ambient temperature. ***Display: override:*** may be used to display a status message, without activation of any alarm or warning outputs. The an active input will only trigger a message if the engine is running and the override time has expired. Typical uses: 'generator volts OK', 'full load'. ***Display: no override:*** used to trigger a display message, like the above, but the input may be activated at any time. Typical use: 'battery charger boost', 'mains available'. ***Load release:*** Autostart de-activates any 'gen. contactor' output and displays a 16 character message. This action is non-latching: unless another input has been programmed to 'load reset' (see below), Autostart will attempt to reload the generator when the 'load release' input clears. ***Lamp Test:*** Autostart displays LAMP TEST, lights both Auto and Manual mode LEDs and activates any output programmed to lamp test. ***Manual restore:*** (AMF applications) an active input will indefinitely inhibit an automatic load transfer back to the mains after a mains return. ***Test off load:*** triggers an engine/generator start and run off load (display says 'TEST'). ***Alarm mute:*** used to turn off any 'alarm (muteable)' output, without affecting indication of fault. ***Load reset:*** permits an operator-controlled re-activation of a 'gen. contactor' output once the Autostart has automatically taken the generator off load (e.g. because of a low frequency trip). Autostart only attempts to re-activate the 'gen.contactor' output when the 'load reset' input is made active, providing that the generator is running within normal limits. ***Remote Mode Control:*** *AS730 only.* Allows Auto or Manual operating mode to be remotely selected. An active input causes the unit to adopt manual mode; an inactive input causes the unit to default to Auto mode. When this option is selected, the front facia MODE key is disabled.
●	●	●	Input 3 message	❑ INPUT 3	❑ ……	This 16 character fault or warning message is programmed when input 3 has been set with certain 'actions' above. Whenever the input is activated, this programmed message is then displayed (on the LCD for AS710S and AS730S units, or on the PC monitoring screen for the AS705S). To change the message, use the ▷ key to select each character position (indicated by the underlining cursor), and the △ and ▽ keys to amend each character's letter or number. Press the ↵ key to enter when the full, correct message is displayed.

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AS705S	AS710S	AS730S	Function	Settings (tick as appropriate): Default	New	Description
●	●	●	Input 4 action	❑ +++not used+++	❑	Sets the type of 'action' for input 4 (programming as for input 3 above).
●	●	●	Input 4 message	❑ INPUT 4	❑	Sets a 16 character message for input 4 (programming as for input 3 above).
●	●	●	Input 5 action	❑ +++not used+++	❑	Sets the type of 'action' for input 5 (programming as for input 3 above).
●	●	●	Input 5 message	❑ INPUT 5	❑	Sets a 16 character message for input 5 (similar programming to input 3 above).
	●	●	LOP sensor	❑ LOP:swch clos–VE	❑ LOP:swch open–VE ❑ LOP:analogDATCON ❑ LOP:analogMURPHY ❑ LOP:analog VDO 7 ❑ LOP:analog VDO 5	*(AS730S and AS710SK_A only)* Sets up the oil pressure input (pin 16) for use with one of several sensor types. Options are available for both switch type sensors (opening or closing on fault) and analogue (resistive) senders (including Murphy, Datcon, VDO 5 bar and VDO 7 bar). The pressure sender unit (whether switch or analogue) is connected between pin 16 and –ve DC. This program feature is not available on AS705S and AS710SK._B units, where the low oil pressure input switch polarity is set as part of 'inputs' programming (see above).
	●	●	Oil pressure:	❑ psi	❑ bar	***(PSI or Bar)*** This and the two screens below only appear when an 'analogue' sender option is selected above. Use this screen to select the measurement units for displaying oil pressure and programming warning/shutdown trip levels: PSI (Pounds per Square Inch) or Bar (i.e. 'atmospheres').
	●	●	LOP shut:	❑ 12 psi	❑ .....psi/bar	***(10–100 PSI, or 0.6–6.9 Bar)*** If the actual oil pressure falls below this setting, Autostart shuts down the engine and displays 'low oil pressure'.
	●	●	LOP warn:	❑ 18 psi	❑ .....psi/bar	***(10–100 PSI, or 0.6–6.9 Bar)*** If the actual oil pressure falls below this setting, Autostart gives a 'low oil pressure' warning, but allows the engine to run on.
	●	●	HET sensor	❑ HET:swch clos–VE	❑ HET:swch open–VE ❑ HET:analogDATCON ❑ HET:analogMURPHY ❑ HET:analog VDO	*(AS730S and AS710SK_A only)* Sets up the engine temperature input (pin 17) for use with one of several sensor types. Options are available for both switch type sensors (opening or closing on fault) and analogue (resistive) senders (including Murphy, VDO, Datcon and BMI). The temperature sender unit (whether switch or analogue) is connected between pin 17 and –ve DC. This program feature is not available on AS705S and AS710SK._B units, where the high engine temperature input switch polarity is set as part of 'inputs' programming (see above).
	●	●	Eng temp in:	❑ °C	❑ °F	***(ºC or ºF)*** This and the two screens below only appear when an 'analogue' sender option is selected above. Use this screen to select the measurement units (Celcius or Fahrenheit) for displaying engine temperature and programming warning and shutdown trip levels.
	●	●	HET shut:	❑ 106 °C	❑ ..... ºC / ºF	***(80–140 ºC, or 176–284ºF)***. If the actual engine temperature rises above this setting, Autostart shuts down the engine, displays 'high engine temp' and activates any appropriate alarm outputs.
	●	●	HET warn:	❑ 102 °C	❑ ..... ºC / ºF	***(80–140 ºC, or 176–284ºF)***. Similar to above, except that Autostart only gives an engine temperature warning message, and allows the engine to run on.

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AS705S	AS710S	AS730S	Function	Settings (tick as appropriate): Default	New	Description
●	●	●	Prog output 1:	❑ ++not used++	❑	Sets the function of programmable output 1 (pin 6). Over 40 different options are available:-

Status and timing functions:-

Auto mode	Output active when Autostart is in AUTO mode.
Manual mode	Output active when Autostart is in MANUAL mode.
Auto or Man mode	Output active when Autostart is in Auto or Manual modes.
Start warning	Output active during the start and preheat delays, to warn of an engine start.
Engine active	Output activates while the fuel relay is on, i.e. during starting and running.
Engine running	Output active when the engine is running above the crank release speed.
Ext. alarm enable	Used to enable or inhibit remote alarm circuits or annunciators. The output activates at the end of the fault 'override' time, and de-activates when the engine is stopped.
Gen available	Output active when engine is running within voltage, freq. and oil pressure limits.
Engine cooling	Output active during the engine 'cooling' time.

Control functions:-

Preheat mode 1	Used to control engine pre-heater circuits. Output active for preheat time only.
Preheat mode 2	As above, but with output active during the preheat and engine crank times.
Preheat mode 3	As above, but with output active for preheat, crank and fault override times.
Preheat mode 4	As above, but with output active for preheat, crank and warm-up times.
Energise to stop	Used for the control of Energised to Stop (ETS) type fuel solenoids. Output activates when the engine is required to stop, and de-activates following an engine stop and a expiry of the 'energised to stop' time.
Gen contactor	Used to allow control a generator contactor coil, allowing Autostart to load/unload the generator.
Field flashing	May be used to control excitation of AC alternator field windings. Output activates at crank release and de-activates when Autostart senses AC volts.
Louvre control	Used to control engine enclosure louvres. Output activates at the end of the start delay, and de-activates when the engine is stopped.
Charger isolate	Used to isolate/connect a mains charger, using normally closed contacts of a connected slave relay. The output activates (isolating the charger) while the generator fuel is on.
Lamp test	Output activates for a few seconds during power up, when the Autostart carries out an automatic lamp test cycle, or when a Lamp test input is active.
PC cntl A mode 1/2	Output activates when communication to remote PC is in progress and PC F5 key is pressed. The output will toggle on and off with each press of the PC F5 key. When the communication link is broken, the type 1 output always switches off, whereas the type 2 output remains in its current state.
PC cntl B mode 1/2	As above, but output is activated by pressing PC keyboard F6 key.
Rem test on load	Output activates during a remote (PC initiated) Autostart test. This output can be used to isolate the mains supply and ensure an on-load test of the generator.

Fault functions:-

Common alarm	Output activates during all faults (shutdown or warning).
Alarm(muteable)	As common alarm, but output may be turned off by use of an 'Alarm mute' input.
Shutdown fault	Output activates after a shutdown fault, and de-activates when Autostart is reset.
Warning fault	Output activates during a warning fault, and de-activates when the fault clears.
Individual faults	Output actions for the remote signalling of individual faults:- Start fail, Overspeed/Freq, Under speed/freq., Gen under volts, Gen over volts, HI current warn *(AS730S only)*, HI current shut *(AS730S only)*, Gen out Limits, No speed signal, Mag.pickup fail, Emergency Stop, LOP shutdown, LOP warning, HET shutdown, HET warning, Input 3, Input 4, Input 5, Charge Fail, Battery Volts Low, Battery Volts High, Battery Volts fault

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AS705S	AS710S	AS730S	Function	Settings (tick as appropriate): Default	New	Description
●	●	●	Prog output 2:	❑ +++not used+++	❑	Sets the function of programmable output 2 (pin 7). Program options as for output 1 above.
●	●	●	Prog output 3:	❑ +++not used+++	❑	Sets the function of programmable output 3 (pin 9). Program options as for output 1 above.
●	●	●	Prog output 4:	❑ +++not used+++	❑	Sets the function of programmable output 4 (pin 10). Program options as for output 1 above.
●	●	●	Prog output 5:	❑ Common alarm	❑	Sets the function of programmable output 5 (pin 24). This output is normally used as a 'common alarm' output for remote signalling of fault conditions, but may be re-programmed if necessary with 'actions' as for outputs 1 - 4.
●	●	●	Prog output 6:	❑ Gen contactor	❑	Sets the function of programmable output 6 (pins 25 and 26). This output is normally used to control the generator contactor coil circuit, but may be re-programmed if necessary with 'actions' as for outputs 1 - 5.
	●	●	Site name:	❑ Murphy UK 001	❑	Allows the setting of a unique site name, for use as an identifier during remote communication.
	●	●	Phone out if:	❑ Never	❑ Shutdown only ❑ Warn or Shutdown	Sets the conditions for which Autostart automatically dials out and establishes communications with a remote PC. A 'Warn or Shutdown' option also causes an automatic dial out in the event of a remote start/mains fail condition.
	●	●	Phone-out number	❑ none	❑	Sets the telephone number (for the modem and PC) that Autostart dials when the above condition be met. This screen is not displayed if the above is set to 'never'.
	●	●	Power-up message	❑ **Murphy**	❑	Sets a 16 character message, displayed whenever the unit is powered up.
		●	Switch on PIN	❑ (0000)	❑	***(0000 – 9999)*** AS730S only: this PIN may be used to prevent unauthorised control of the Autostart and generator. After the AS730S is powered up (by pressing the On/mode button), the user must enter a correct Personal Identification Number (PIN) before any control of the generator (automatic or manual) is permitted. A setting of 0000 gives unrestricted access. On the AS710S, mode control is restricted by a keyswitch – the key may be removed in Off and Auto modes.
	●	●	Program mode PIN	❑ (1234)	❑	***(0000 – 9999)*** This PIN may be used to restrict 'program mode' access. A setting of 0000 gives unrestricted access. Note that this PIN does not restrict program mode access over a communications link, which is covered by the 'Remote log on PIN' (see below).
	●	●	Remote Log-on PIN	❑ (5678)	❑	***(0000 – 9999)*** This PIN may be used to prevent unauthorised communication from a modem/PC to an Autostart. An Autostart with a 0000 setting will give unrestricted remote access to monitoring, control and programming.
		●	Mode change PIN	❑ (0000)	❑	***(0000 – 9999)*** On the AS730S, the mode change PIN setting may be used to prevent unauthorised switching between Auto and Manual modes. A setting of 0000 gives unrestricted mode changes. On the AS710S, mode control is restricted by a keyswitch – the key may be removed in Off and Auto modes.
		●	Sw off delay:	❑ NO	❑ YES	***(YES or NO)*** On the AS730S, this PIN may be used to inhibit an accidental or unauthorised switch off of the unit. When a YES setting is made, the AS730S will only power down by pressing and holding the front facia OFF button for approximately 10 seconds.
	●	●	Store changes?			(AS710S and AS730S only). This screen appears once all the programmable settings have been stepped through. Select YES to store the changes and exit program mode, or NO to return to 'start delay' and step through the program settings again.

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AS705S	AS710S	AS730S	Function	Settings (tick as appropriate): Default	New	Description
●			Prog LED 1:	❑ +++not used+++	❑	*AS705S only*. Programmable LEDs 1 – 5 are on the right-hand side of the front facia. These LEDs can be programmed to indicate a range of status or fault conditions; a pocket in the front label allows for custom labelling of these LEDs. LED1 is amber in colour. The programmable options are:- <u>*Status and timing functions*</u>:- LEDs light to indicate Autostart or plant status. Options are:- Fuel on, engine cranking, fault holdoff, engine warmup, restore delay, engine cooling, Gen volts OK, Gen available, Gen. On load, Mains on Load, Start demand, Engine running. <u>*Inputs/outputs*</u>:- LED's light to indicate an active input or output. Depending on the input or output configuration, each LED can be used to indicate a wide range of status/fault conditions (e.g. preheat, manual restoration, warning fault, etc). Options are:- Input 3, Input 3 (flashing), Input 4, Input 4 (flashing), Input 5, Input 5 (flashing), Prog. Output 1, Prog. Output 2, Prog. Output 3, Prog. Output 4, Prog. Output 5, Prog. Output 6. <u>*Fault functions*</u>:- 'Common alarm' LED lights during all faults (shutdown or warning). Other fault functions cause LED to light during a particular fault. LED typically flashes for a 'warning' type fault and is lit continuously for a 'shutdown' fault. Individual fault options are:- Batt. Volts Low, Batt. Volts High, Batt. Volts Fault, No Speed Signal, Bad Oil Pressure, Gen. Under Volts, Mag. Pickup Failure, Start Fail, LOP (Low Oil Pressure) shutdown, HET (High Engine Temperature) shutdown, Overspeed, Underspeed, Charge Fail, Emergency Stop.
●			Prog LED 2:	❑ +++not used+++	❑	LED 2 (amber). Similar programming/operation to LED1 above.
●			Prog LED 3:	❑ +++not used+++	❑	LED 3 (red). Similar programming/operation to LED1 above.
●			Prog LED 4:	❑ +++not used+++	❑	LED 4 (red). Similar in programming/operation to LED1 above.
●			Prog LED 5:	❑ +++not used+++	❑	LED 5 (red). Similar programming/operation to LED1 above.
●			Prog LED A:	❑ Start demand	❑	*AS705S only*. Programmable LEDs A – J are on the left hand side of the AS705S front facia, with default settings that reflect the standard labelling. These LEDs can, however, be reprogrammed with the same range of options as LEDs 1 to 5 above (e.g. when a custom front label is fitted). Programmable LED A is amber in colour.
●			Prog LED B:	❑ Engine running	❑	LED B (amber). Similar programming/operation to LED1 above.
●			Prog LED C:	❑ Start fail	❑	LED C (red). Similar programming/operation to LED1 above.
●			Prog LED D:	❑ Low oil pressure	❑	LED D (red). Similar programming/operation to LED1 above.
●			Prog LED E:	❑ High engine temp	❑	LED E (red). Similar programming/operation to LED1 above.
●			Prog LED F:	❑ Overspeed	❑	LED F (red). Similar programming/operation to LED1 above.
●			Prog LED G:	❑ Underspeed	❑	LED G (red). Similar programming/operation to LED1 above.
●			Prog LED H:	❑ Charge fail	❑	LED H (red). Similar programming/operation to LED1 above.
●			Prog LED I:	❑ Common alarm	❑	LED I (red). Similar programming/operation to LED1 above.
●			Prog LED J:	❑ Emergency stop	❑	LED J (red). Similar programming/operation to LED1 above.

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