MODEX AUTOMATION
The Generator Controls Division of Frank W. Murphy

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AUTOSTART 705S V1.00
AUTOSTART 710S / 720S / 730S V1.04
Programming Reference and Check Sheets

Introduction

The microprocessor based Autostart series features a comprehensive range of over 50 programmable functions. Timers, trip levels, inputs, outputs and fault configurations may all be programmed for use with a wide range of engine and generator applications.

The pages overleaf list the functions available, the default factory settings and an explanation for each.

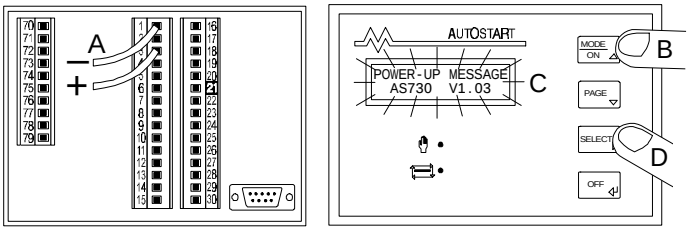
Each Autostart MUST be programmed correctly before use.
Failure to set up the program correctly can result in damage to the Autostart, engine and electrical equipment.

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

The Autostart 705 is programmed using separate PC based software (model AS7CK). This software allows AS705 program 'profiles' to be created and stored on disk, and to be down-loaded to the Autostart over an RS232 communication link, quickly and error-free. This method of programming is particularly suited to larger batches of Autostarts with the same specification. Full details about the installation and operation of software AS7CK can be found in document M011210.

The same software may be used with Autostart 710, 720 or 730 controllers. Alternatively, these units can be programmed without a PC connection. On the AS730, front facia push buttons may be used to step through and adjust each program option on the liquid crystal display. The principle is similar for the AS710 and AS720, but the push buttons are on a separate key-pad (model AS7PROG) which is connected to the Autostart only when programming.

AS730: programming from the front facia



To enter program mode:-

- Ensure that the unit is switched off, and that the DC power is connected (A above): +ve DC to pin 3, –ve DC to pin 1. Other terminals may be left open circuit or connected as normal.
- Press the ON/MODE key (B).
- As soon as the display lights (C), press and hold the SELECT key (D).
- Autostart may ask the user to enter a 4 figure PIN (Personal Identification Number). Use the ▷, △ and ▽ keys (labelled in blue) to change the display to the correct PIN, then press ⏎. The factory default PIN is 1234.
- 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:-

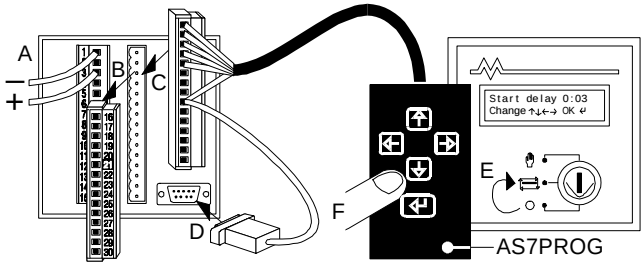
- Use the △ and ▽ keys (and the ▷ key for text messages) to change the option or value displayed. When the correct setting is displayed, press ⏎ to confirm the value/option and move on to the next function. Full details of each programmable function are listed overleaf.

.To exit program mode and save changes:-

- When 'exit program mode?' is displayed, press the ⏎ key, wait a second or so, then press the OFF (⏎) key again. Alternatively, press the ▷, △ or ▽ keys to view the program settings again.

AS710/AS720: using the hand-held key pad

AS7PROG connection:-



To enter program mode:-

- Ensure that the key is in the Off position, and that the DC supply is connected (see A above): connect + DC to pin 3, – DC to pin 1.
- 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).
- Autostart may ask the user to type in a 4 figure PIN (Personal Identification Number). Use the ⇧ ⇩ ⇦ and ⇨ buttons to change the display to the correct PIN, then press ⏎. The factory default PIN is 1234.
- 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.

All units: programming through the RS232 link.

All Autostarts may be programmed through their on-board RS232 communications port. Full details of this can be found in our Autostart PC software documentation, reference M011210.

Note: when programming from a PC, the Autostart's programmable functions are exactly as listed overleaf (the numbers of functions and the options for each are the same), but the PC software displays the functions in groups, with several functions per 'screen'.

Programming Check Sheets

Customer Name:..... Autostart serial number:.....

Job ref. .....

Programmed by ..... Date:…….....

AS705 AS710 AS720 AS730	Function	Settings (tick as appropriate): Default	New	Description
● ● ● ●	Start delay	q 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) or mains fail condition, 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	q 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 any repeat crank attempts are made.
● ● ● ●	Start attempts	❑ 3	❑ .....attempts	***(1 – 9)*** Sets the maximum number of crank attempts that 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 may be used to hold 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).
●	Contactor	❑ 02 sec	❑ .....sec	***(00 - 59 secs)*** *AS720 only. A*fter the AS720 has taken the mains or generator off load, this timer ensures a minimum delay before any attempt is made to re-engage the load (to mains or 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 programmed 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)*** When a remote PC operator initiates a 'test' run, Autostart will run the engine for this time.
● ● ● ●	Hours run:	❑ ON	❑ OFF	***(ON or OFF)*** Enables or disables the display of the hours run counter.

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AS705	AS710	AS720	AS730	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:*** a 'charge fail' fault is overridden while the engine is at rest, when starting and during the 'override' time. ***mains charge:*** Autostart may give a charge fail warning at any time (when engine is stationary or running). ***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. This setting allows the automatic release of the engine starter motor to be triggered from an engine driven charge alternator: it can be used in addition, or as an alternative, to the generator AC frequency or magnetic pickup 'crank cut' settings (see below). This feature is typically 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 (as 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 (as 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 voltage falls below this level.
●	●	●	●	Battery HI:	❑ 32 V	❑ V	***(12 – 35 V DC)*** Autostart gives a 'high battery volts' warning if the DC supply voltage rises above this level.
●	●	●	●	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 AS730, 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 (AS730) or mains AC supplies (AS720).
		●	●	AC display:	❑ L–N	❑ L–L	***(L–N or L–L)*** *AS720 and 730 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.
		●		Mains Fail	❑ 200 V	❑ V	***(50 - 500 VAC)*** *AS720 only.* Mains supply is considered failed if any of the mains AC voltages fall below this level.
		●		Mains OK	❑ 225 V	❑ V	***(50 - 500 VAC)*** *AS720 only*. Mains supply is considered healthy if all 3 mains AC voltages are above this level.

AS705	AS710	AS720	AS730	Function	Settings (tick as appropriate): Default	New	Description
			●	Gen UV trip:	❑ 200 V	❑ V	***(50 – 500 VAC)*** *AS730 only.* The AS730 indicates 'gen. under volts' if any of the three AC voltages fall below this set level. The UV level is NOT programmable on the AS705, 710 or 720, but is pre-set in hardware to around 66% of nominal. The response to an under voltage – 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:*** Autostart immediately unloads the generator, shuts down the engine and displays 'Gen Under volts'.
			●	Gen UV OK:	❑ 210 V	❑ V	***(50 – 500 VAC)*** *AS730 only*. This sets the level above which Autostart considers the generator AC voltage is OK. This level is NOT programmable on the AS705, 710 or 720, 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)*** *- AS730 only.* The AS730 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)*** *AS730 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)*** *AS730 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)*** *AS730 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)*** *AS730 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	*AS730 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**'.

AS705	AS710	AS720	AS730	Function	Settings (tick as appropriate): Default	New	Description
●	●	●	●	Crank cut:	❑ 20 Hz	❑ .....Hz	***(5 – 25 Hz.)*** Sets the AC frequency for the engine crank release, when generator 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 generator 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 to sense engine speed, 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 level, when is 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/generator is running within normal limits. ***NO:*** the 'gen. contactor' output never operates in manual mode.
	●			Load in REM	❑ NO	❑ YES	*AS720 only.* Controls whether or not the AS720 loads the generator during a 'remote start' condition:- ***YES:*** Autostart starts the engine, then transfers the load from the mains to the generator. ***NO:*** Autostart starts the engine and runs it off load; it keeps the mains on load.
	●			Load in TST	❑ NO	❑ YES	*AS720 only.* Controls whether or not the AS720 loads the generator when TEST mode is selected:- ***YES:*** Autostart starts the engine, then automatically transfers the load from mains to the generator. ***NO:*** Autostart starts the engine, and runs the generator off load (keeping the mains on load).

AS705	AS710	AS720	AS730	Function	Settings (tick as appropriate): Default	New	Description
●	●	●	●	Inputs:	❑ close –VE	❑ close +VE ❑ open –VE ❑ open +VE	Sets the 'active' state of programmable switch inputs 3 – 5 (or 1 to 5 on the AS705). 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.
●	●	●	●	Input 3 action:	❑ +++not used+++		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 be left open circuit.
						❑ Shut: override	***Shutdown: override:*** used with remote fault sensor contacts to trigger a shutdown of the generator. The input may only be activated once the engine has started and the fault override timer has expired. Typical uses: earth fault.
						❑ Shut: no override	***Shutdown: no override:***used to trigger an engine shutdown, similar to the above, but the input may be activated at ANY time (with the engine stationary or running). Typical uses: fire, coolant loss, earth fault.
						❑ Warn: override	***Warning: override:*** used with remote fault contacts to trigger a fault warning (but not an engine shutdown). The input may only be triggered after the engine has started and the fault override time has expired. Typical uses: general pre-alarms, e.g. engine/alternator temperature warnings, over-current warning
						❑ Warn: no override	***Warning: no override:*** triggers a warning, similar to above, but the input may be activated at ANY time. Typical uses: low/high fuel level, low ambient temperature.
						❑ Disp: override	***Display: override:*** may be used to display a status message, without activation of any alarm or warning outputs. The input will only trigger a message after the engine is running and the override time has expired. Typical uses: 'generator on load', 'full load'.
						❑ Disp: no override	***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	***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	***Lamp Test:*** Autostart displays LAMP TEST, lights both Auto and Manual mode LEDs and activates any output programmed to lamp test.
						❑ Manual restore	***Manual restore:*** (AMF applications) inhibits an auto load transfer back to the mains after a mains return.
						❑ Test OFF load	***Test off load:*** triggers Autostart into starting the engine and running it off load (display says 'TEST').
						❑ Test ON load	***Test on load:*** *AS720 only*. Starts the engine and transfers load from mains to generator.
						❑ Alarm mute	***Alarm mute:*** may be used to turn off any 'alarm (muteable)' output, without affecting indication of fault.
						❑ Load reset	***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.
						❑ MF inhibit	***Mains fail inhibit:*** *AS720 only.* used to prevent AS720 from starting the engine during a mains fail.
●	●	●	●	Input 3 message	❑ INPUT 3	❑	This 16 character fault or warning message is programmed when input 3 has been set with certain 'actions' above. The programmed message is displayed (on the LCD for AS710, 720 or AS730 units, or on the PC monitoring screen for the AS705) whenever the input is activated. 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.

AS705	AS710	AS720	AS730	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	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. Analogue senders are not an option on the AS705.
	●	●	●	Oil pressure:	❑ psi	❑ bar	***(PSI or Bar)*** This and the two screens below only appear when an 'analogue' option is selected above. Use this screen to select the measurement units for displaying and programming engine oil pressure and 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	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.
	●	●	●	Eng temp in:	❑ °C	❑ °F	***(ºC or ºF)*** This and the two screens below only appear when an 'analogue' option is selected above. Use this screen to select the measurement units (Celcius or Fahrenheit) for displaying and programming engine temperature and warning/shutdown trip levels.
	●	●	●	HET shut:	❑ 106 °C	❑ ..... ºC / ºF	***(80–140 °C, 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 °C, or 176–284ºF)***. Similar to above, except that Autostart only gives an engine temperature warning message, and allows the engine to run on.

AS705	AS710	AS720	AS730	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 imminent 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 programmed 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 the engine is running within pre-set voltage, freq. and oil pressure limits.
Engine cooling	Output active during the engine 'cooling' time.

Control functions:-

Preheat mode 1	Used to control an engine pre-heater/glow-plug circuit. 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 during the preheat, crank and fault override times.
Preheat mode 4	As above, but with output active during the preheat, crank and warm-up times.
Energise to stop	Used for the control of Energised to Stop (ETS) type fuel solenoids. The output activates when the engine is required to stop. The output de-activates once the engine has stopped and a further (programmable) 'energised to stop' time has expired.
Gen contactor	Used to 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 voltage.
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	This type of 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	Allows the output to be controlled from a remote PC keyboard, when RS232 communication is in progress. 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 only 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 *(AS730 only)*, HI current shut *(AS730 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, Mains Fail *(AS720 only)*, Mains healthy *(AS720 only)*

AS705	AS710	AS720	AS730	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.
		●		Prog output 7:	❑ Mains contactor	❑	*AS720 only.* Sets the function of programmable output 7 (pins 50 and 51). This output is normally used to control the mains contactor coil circuit, but may be re-programmed if necessary with 'actions' as for outputs 1 - 6.
	●	●	●	Site name:	❑ Modex UK 001	❑	Allows the setting of a unique site name, for use as an identifier during communication to/from a remote PC.
	●	●	●	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	❑ Modex Automation	❑	Sets a 16 character message, displayed whenever the unit is powered up.
			●	Switch on PIN	❑ (0000)	❑	***(0000 – 9999)*** AS730 only: this PIN may be used to prevent unauthorised control of the Autostart and generator. After the AS730 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 AS710 and AS720, 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 AS730, 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 AS710 and AS720, 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 AS730, this PIN may be used to inhibit an accidental or unauthorised switch off of the unit. When a YES setting is made, the AS730 will only power down by pressing and holding the front facia OFF button for approximately 10 seconds.
●	●	●	●	Store changes?			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.

AS705	AS710	AS720	AS730	Function	Settings (tick as appropriate): Default	New	Description
●				Prog LED 1:	❑ +++not used+++	❑.....	*AS705 only*. Programmable LEDs 1 – 5 are on the right-hand side of the AS705 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:- *Status and timing functions*:- LEDs 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. *Inputs/outputs*:- 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. *Fault functions*:- '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	❑.....	*AS705 only*. Programmable LEDs A – J are on the left hand side of the AS705 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.