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## KSM720 series

Micro-processor based Key-start Module

The KSM720 series provide manual start and fault protection in a wide range of engine applications. They are housed in custom designed 72mm sq DIN standard modules that can be easily mounted into almost any switch box or control panel. Dedicated fault channels are provided for Low Oil Pressure (LOP), Cooling Fault (TEMP) and Overspeed (OS). An auxiliary channel (AUX) is user programmable. A slide-in label allows custom wording for the AUX channel and omission of OS if this is not used. The fuel control output provides engine shut-down and alarm functions, via an external relay. KSM720H shown opposite >



### Operation

Turning the key from OFF (O) to RUN (I) powers the module, energises the fuel solenoid and starts the Protection Delay timer. Turning the key from RUN to START (II) energises the start solenoid to crank the engine, activates the Excitation output and holds the Protection Delay timer at reset. As soon as the engine 'fires', release the key to the RUN position (Crank-Cut). Both the Protection Delay and Excitation Timers are now running. If the engine does not 'fire' after 10 sec's cranking, return the key to the OFF position and allow the engine to rest for 10 sec's before attempting a re-start. If the engine is not running after two re-starts, return the key to the OFF position and consult the engine manufacturer's handbook.

### Features

The Fault channels are normally enabled at power on or when the protection delay has elapsed (Protection On). This delay allows the engine parameters to stabilise. Please refer to the **Customer Specific Programming** label on the side of the controller. A typical example of this (CCL003) is shown below. If the label is un-

readable or missing, please email the unit Serial Number for assistance.

The **Low Oil Pressure Safety Circuit** inhibits cranking without a low oil pressure input and the starter motor is inhibited for 1 second at power-on to ensure that it cannot engage momentarily in the event of an immediate shutdown. The **Speed Sensing Safety Circuit** helps prevent the starter motor from engaging into a running engine by inhibiting the starter if the engine is running.

Both the **Protection Delay** and **Excitation Timers** are held at reset while the Keyswitch is in position II (cranking) so that the timers effectively run from when the engine fires, that is when the key is returned to the RUN position. The top LED flashes green to indicate the unit is powered and turns to steady-on when the Protection delay has elapsed, indication 'Protection On'.

The **Excitation** output is to excite the Charging Alternator. It is enabled on first crank and times out from Crank-Cut.

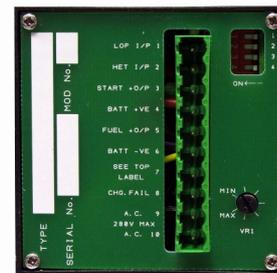
**First-up interlock** ensures that only the first shutdown fault will be displayed.

The **Slide-in Label** allows last minute changes to the wording of the auxiliary and Overspeed channels and could be

hand written on-site, if required.

**Fuel, Starter and Aux** outputs have protected drivers. Term.7: **Aux Input / Aux Output** can be used as an Input, Output or as a bi-directional I/O line with an EXM720 Expansion Module to add up to Six additional fault channels.

### Rear Controls

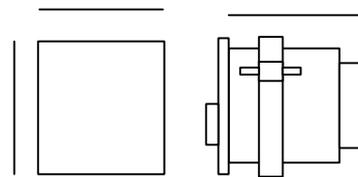


Rear view with connector removed

**Switches S1 - S4** allow in-field programming without the need for specialist tools. The single turn potentiometer **VR1** is typically used for the Pre-Heat timing option but can also be used in other applications. Please refer to side label.

CAPRICORN STANDARD PROGRAM : KSM720-003						
Ch	Function	Select	Prot' Delay	Input Rev'	Shut-Down	LED Colour
1	Protection On	---	---	---	---	Green
2	Charge Fail	---	---	---	No	Red
3	Low Oil Press.	---	Yes	S1 on	Yes	Red
4	Cooling Fault	---	Yes	S2 on	Yes	Red
5	Auxiliary	---	S3 on	---	Yes	Red
6	Over-Crank	---	---	---	Yes	Red Pulsing
6	57Hz Overspeed 68Hz Overspeed	S4 off S4 on	---	---	Yes	Red
VR1 = not implemented		Protection Delay = 15 s		Excitation = 10 s		
Input Response = 100mS OS Response = 16 cycles		Oil-Pressure Safety circuit Crank Inhibit = 20 / 24Hz		Crank Delay = 1 s Over-Crank = 12 s		

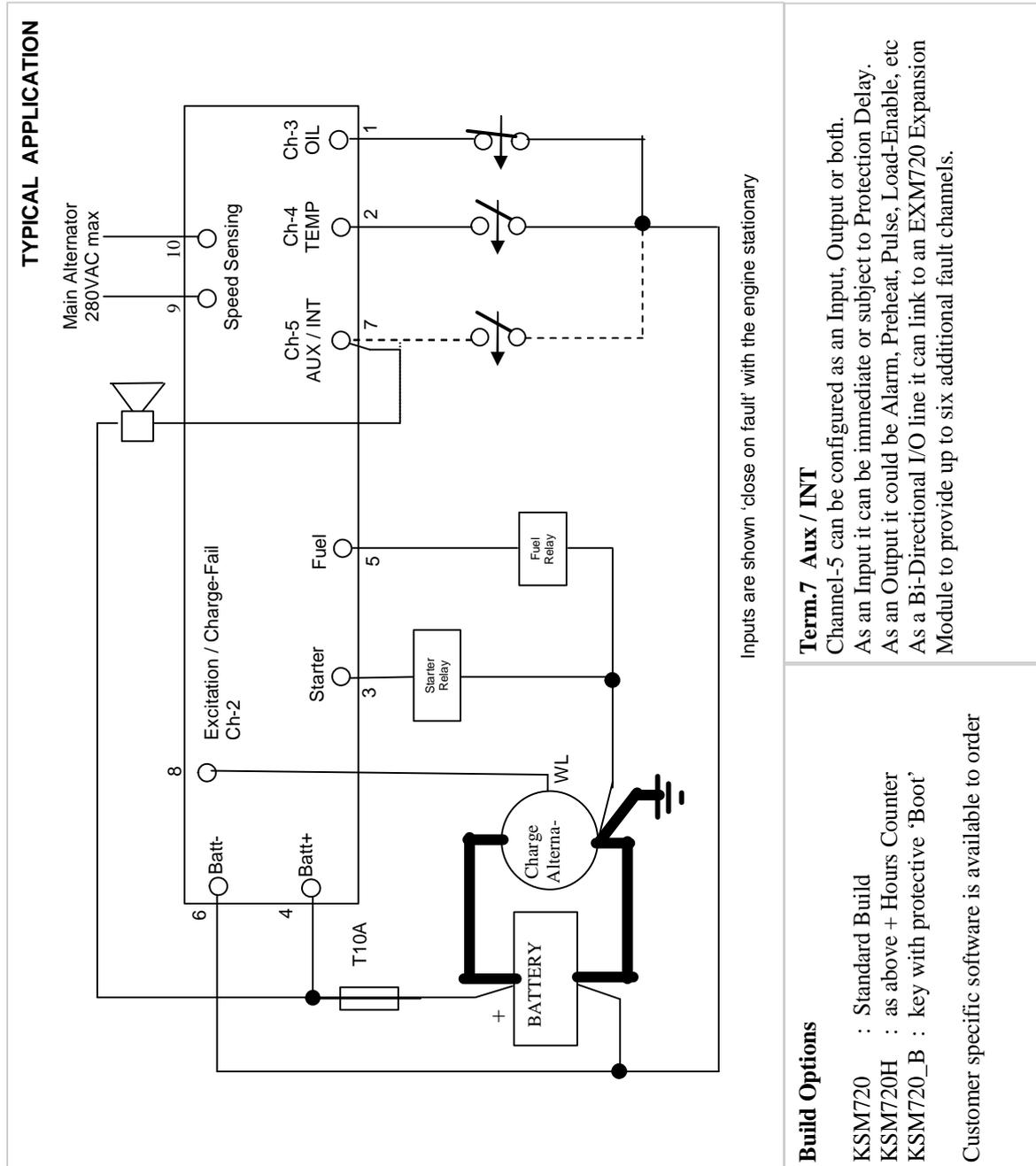
### Dimensions



View - with Key removed  
 Front Face = 72mm sq  
 Panel cut-out = 68mm sq  
 Depth behind panel = 90mm

Supplied complete with mounting sleeve, connector and two keys.

Mounting : Ensure that the module is protected from extremes of temperature, humidity and vibration



<b>SPECIFICATION</b>	Speed Sense	40VAC min 280VAC max (390V peak)
Nominal Supply	9V to 30Vdc	Burden = 50mA at 12Vdc
Maximum Supply	36Vdc	Ambient Temperature -20°C to +55°C Operating
Minimum Supply	<8Vdc	-40°C to +70°C Storage
Input Threshold	0.6mA (7K3 ohms at 12Vdc)	
Input response	100 ms (or as specified)	Excitation time-out 10 s (or as specified)
Over Crank time-out	12 s (or as specified)	Protection Delay 15 s (or as specified)
FUEL + Output	700mA Source, current limited to 1.1A to drive an external relay.	
START + Output	700mA Source, current limited to 1.1A to drive an external relay.	
Term.7 - Output	700mA Sink, current limited to 1.1A to drive an external relay.	