PSM72H 'Push-Button' Start Module

Genset Controls - Timers/Monitors/Trips - Battery Charging – Spares & Accessories - Custom Products

- Ultra compact 72mmsq DIN standard case ... just 90mm deep
- 4 to 40Vdc single range supply – no drop-out on cranking
- Selectable - LOP or HET inputs, open or close to –Ve on fault
- Hours Counter and Timed Preheat
- Protected Solid-state outputs to drive external power relays

Incorporating IP67 Push Button switches for use in harsh enviroments, these 'short' 72mmsq DIN sized Modules can be easily mounted into almost any control panel or switchbox for use with a wide range of engine driven equipment. Five 'High Intensity' LED's indicate system status. From the top, the symbols represent: Unit Powered, Low Oil Pressure, Cooling Fault, Preheat and Charge Fail.

RED Button Press momentarily to stop the engine and reset all Shutdowns ('**!**'LED not lit). **Always ensure that the engine is stationary before restarting.**

GREEN Button Press momentarily to power the module ('**!**'LED lit), energising the fuel solenoid and activating the Preheat output (and LED) for the pre-set time.

As soon as the Preheat LED has extinguished, Press and hold the GREEN button to crank the engine (the Starter output is inhibited out until the Preheat timer has elapsed). Release the Button to disengage the starter motor as soon as the engine 'fires'. The hold–off timer is now running. Alternatively, if the engine fails to start after approx. 8 sec's cranking, release the Button, wait 10 sec's and try again. If the engine fails to start after three attempts, press the RED button to power-down the module ('**!**' LED not lit) and consult the engine manufactures Handbook.
Note: - If the engine is continuously cranked for more than 10 sec's the module will shutdown on over-crank, as indicated on the top LED.

Note: During Preheat time and engine cranking, the **protection hold-off timer** is held at reset. If the engine is not cranked within approx. 18 sec (from the end of either the Preheat time or the previous cranking period) the hold-off timer will elapse and the module will shutdown on Low Oil Pressure.

This module incorporates a safety circuit which inhibits the starter output if …
1. Pulse output or Preheat are active
2. Low Oil Pressure is NOT sensed
3. The engine has shutdown on a Low Oil Pressure or Cooling Fault condition

Assuming that the engine 'fires', the GREEN button is released to disengage the Starter, the engine runs up to normal speed and the protection hold-off timer is running. When the hold-off timer has elapsed, the Low Oil Pressure and Cooling Fault circuits are enabled. In the event of a shutdown, the appropriate fault Led is lit, the Fuel relay is locked out (stopping the engine) and the LOP & HET channels disabled (first-up interlock).

Note: This module incorporates circuitry to guarantee correct operation while experiencing **voltage 'dips' during cranking** - *without the need for internal batteries.*

Excitation (term.7) is connected to the 'IGN' terminal on the Charging Alternator. This is only active while the Fuel Solenoid is energised

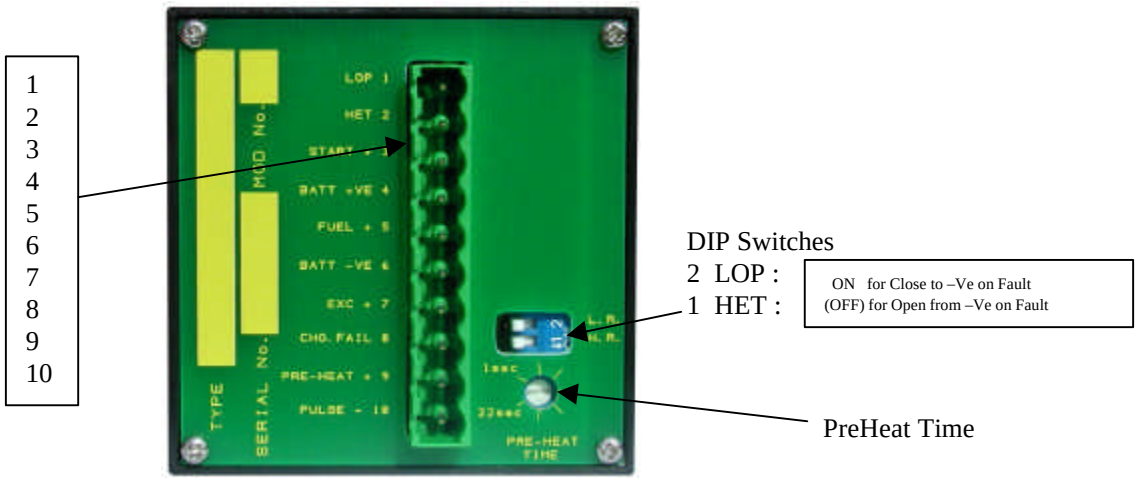
Charge Failure (term.8) is connected to the 'WL' terminal on the Charging Alternator. When the fuel solenoid is energised but the engine is stationary or cranking the WL terminal will be at a potential close to Battery negative and the 'Charge Failure' LED will be lit. During this time, an 'excitation' current via an internal 82 Ohm resistor, is applied to the WL terminal. As the engine runs up to speed, the potential at the WL terminal rises to a level close to Battery positive, reducing the excitation current to zero and extinguishing the Charge Failure LED. The excitation supply is switched off at the end of the hold-off time (typically 18 sec from crank-cut). Should the Charging Alternator fail, the potential at the WL terminal will fall towards zero and the Charge Failure LED will light.

Preheat (term.9) is connected to an external slave relay that powers the engine heater (or Glow Plugs). Use an insulated 'Pot' adjuster or miniature insulated screwdriver to carefully adjust this timer (1 – 22 sec.) at the rear of the module.

Fuel Pulse (term.10) is connected (if required) to an external slave relay that powers the Fuel Solenoid 'Pull-In' coil for approx. 1 second.

DC Supply (term.4 & 6) should be connected directly to the battery with a suitable fuse in the +Ve line.

Connections



Always ensure that the correct wire sizes are used and that all terminals are correctly tightened.

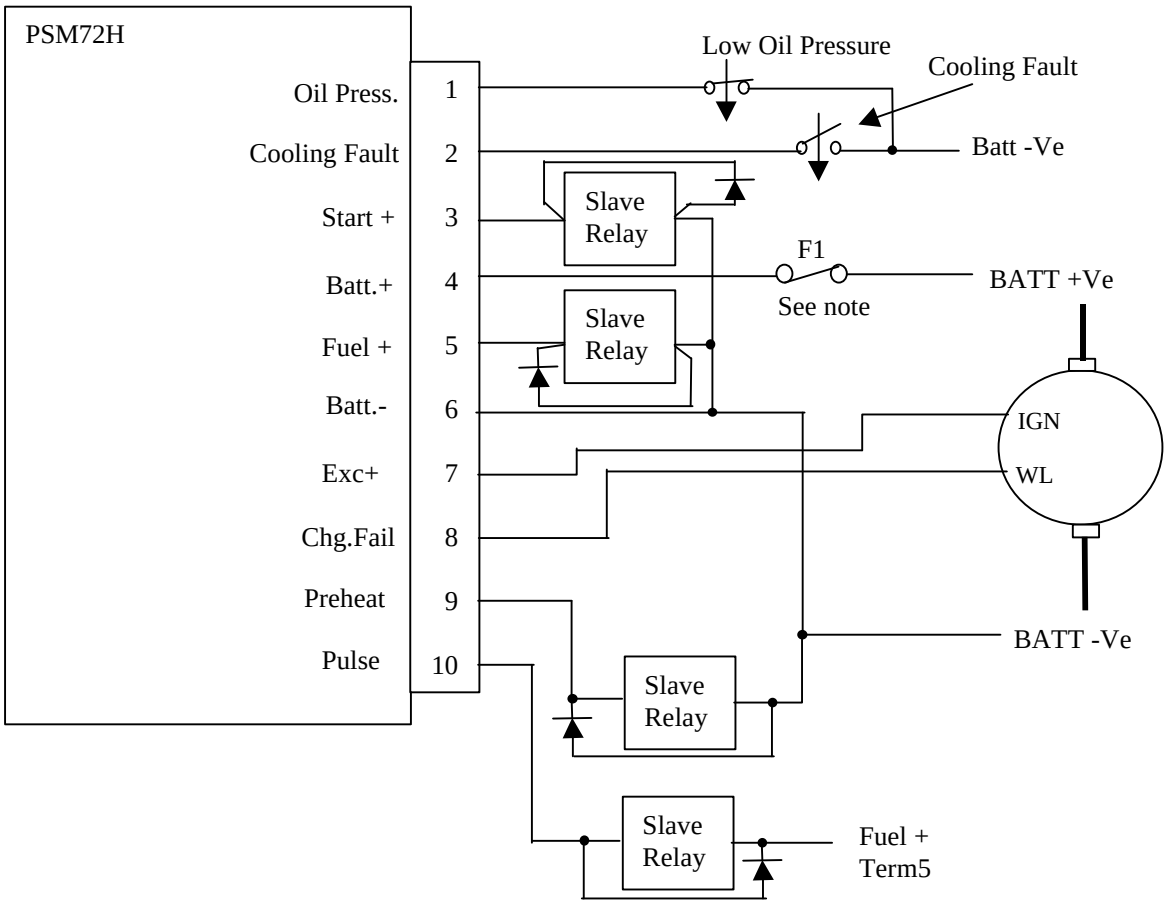
Terminal	Description	Type	Connect To ------
1 LOP	Low Oil Pressure	- Ve Input	Low Oil Pressure switch
2 HET	Cooling Fault	- Ve Input	High Engine Temp / Coolant Level, Switch
3 Starter	Starter Motor control	♦ +Ve Output	External Slave Relay
4 Batt+	Supply +Ve	----------	Battery positive
5 Fuel	Fuel Solenoid control	♦ +Ve Output	External Slave Relay
6 Batt -	Common DC -Ve supply	----------	Battery negative
7 Exc	Excitation	♦ +Ve Output	'IGN' terminal on the Charging Alternator
8 C.F.	Charge Failure (see text)	Input / Output	'WL' terminal on the Charging Alternator
9 Preheat	Timed Preheat control	♦ +Ve Output	External Slave Relay
10 Pulse	1sec Fuel Pull-In Pulse	♦ - Ve Output	External Slave Relay

NOTE : ♦ Fully protected and current limited, DC 'solid-state' switches designed to control external slave relays

The PSM72H is pin for pin compatible with the KSM72CYZH

_____**C**YZH	'C' indicates that Overspeed protection is NOT fitted
_____C**Y**ZH	'Y' indicates 1sec pulse output for Fuel Solenoid with separate pull-in coil
_____CY**Z**H	'Z' indicates the timed Preheat output
_____CYZ**H**	'H' indicates an 'LCD' Hours Counter is fitted behind the windowed front label. An 'hour glass' indicator flashes every 6th second to indicate that counting is in progress (only while the fuel solenoid is energised). Data retention is in excess of 20 years.

Application Notes



Notes

1. Oil Press. & Cooling Fault inputs are shown as 'close to ground' on fault (see text).
2. Cooling Fault can be used to indicate 'High Engine Temperature' & / or 'Low Coolant Level'
3. Fuse F1 = 5A Anti-surge
4. For Slave Relays see 'Spares & Accessories' section of our latest 'Price List'.
5. All Slave Relays should have 'flywheel' suppression diodes fitted, to comply with EMC regulations ( )
6. Terminals 7, 9 & 10 need only be connected if required.
7. The starter output is inhibited unless Low Oil Pressure is sensed. This safety circuit helps prevent operating the starter on a running engine.

FAULT FINDING ----- PSM72H BASED SYSTEMS

Always check the 'obvious' first i.e. :

- System correctly wired
- Preheat Timer correctly set
- DIP switches correctly selected
- All connections use suitably rated cables to comply with all appropriate regulations.
- All terminal screw connections are correctly tightened.
- Battery(s) charged, in good condition, clean & tight connections and of the correct voltage
- The Module MUST be fitted in a control panel with adequate protection from adverse Temperature, Moisture & Vibration

WARNING - Connecting any terminals to an AC supply may permanently damage this module.

- **Unit Dead – Charge Fail led not lit, set will not start**
  Check for battery supply on term.4(B+) and term.6(B-) of the PSM72H using a DC voltmeter
- **Preheat not operating**
  (a) Observe Preheat LED, if lit for minimal time adjust on rear of module.
  (b) Check connections to slave relay and from there to the engine heater
- **Over-crank shutdown**
  (a) Engine has been continuously cranked for 10 seconds.
- **Low oil pressure shutdown**
  (a) Faulty oil pressure switch, incorrect type or trip setting
  (b) Check user selectable 'Input phasing' (Dipswitch-2 = 'ON' for close to –Ve on fault)
  (c) Green button only pressed once (for Power-up and Preheat), engine not cranked
- **Cooling Fault (High engine temp.) shutdown**
  (a) Faulty temperature switch, incorrect type or trip setting
  (b) Check user selectable 'Input phasing' (Dipswitch-1 = 'ON' for close to –Ve on fault)
- **Charging Alternator fails to excite**
  (a) Exc+ (term.7) not connected to the 'IGN' connection on the charging alternator (if required)
  (b) Charge Fail (term.8) not connected to the WL. connection on the charging alternator

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MOUNTING

The module must be fitted into a suitable control panel that provides adequate protection from the extremes of : Temperature, Humidity & Vibration. If this control panel is set-mounted then suitable 'Anti-Vibration' mounts **MUST** be used

SPECIAL BUILDS

PSM72CYZH / X0? These 'X' numbers, indicate non-standard product, which have been manufactured to suit specific customer's requirements. They do not appear in any catalogues and may only be available to the original customer. When re-ordering, please quote the full part number together with the 'Serial Number' of the original unit(s).

CUSTOMISED PRODUCTS

If you have a specific requirement that is not listed above; please contact our Sales Desk for a quotation. We can normally customise a standard product within a matter of days in order to provide a prototype (if not, production) unit.

SPECIFICATION

Supply 12/24V Single range supply, operating from 6V to 30VDC
Drop out : < 4 VDC Absolute maximum input : 40VDC

Preheat Single turn potentiometer at rear of module 1 – 22 seconds.

Over-crank Added starter motor protection, will shutdown if engine is continuously cranked for 10 seconds.

Fault Inputs

Low Oil Pressure	Close / open from Batt.-Ve on fault (user selectable)
Cooling Fault	Close / open from Batt.-Ve on fault (user selectable)

Hold-Off Timer Fixed 18 sec, held reset during Preheat time and while engine is cranking

Outputs

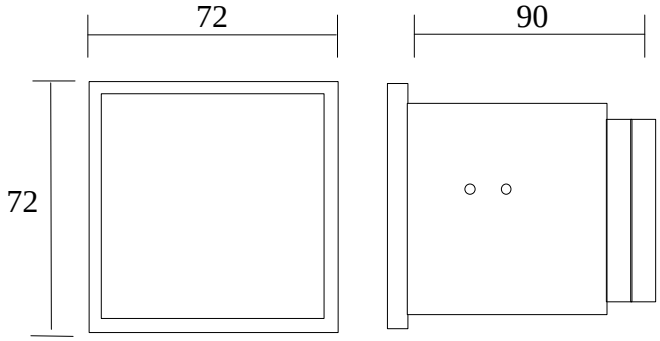
FUEL (+)	DC 'solid-state' switch, 1A current limited and fully protected (high side driver)
FUEL PULSE (-)	DC 'solid-state' switch, 1A current limited and fully protected (low side driver)
START (+)	DC 'solid-state' switch, 1A current limited and fully protected (high side driver)
PREHEAT (+)	DC 'solid-state' switch, 1A current limited and fully protected (high side driver)

Push Buttons Sealed to IP67, mechanical life = 1,000,000 operations, electrical life > 500,000 operations

General Ambient temperature -10^0C to $+55^0$C Operating,
-25^0C to $+70^0$C Storage

Construction Through panel fitting**,** 72mm sq. DIN standard case. Reversed screen-printed "LEXAN" (or similar) front panel. Printed Circuit Boards varnished as standard.

Dimensions



Notes :
1/ Not to Scale
2/ Dimensions in mm
3/ Panel cut-out
68 x 68 mm

For a spare or replacement, please quote the 'Serial Number' of the original unit.

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