

VIGILANT
Fire and Evacuation Systems

SPC94
DIESEL SPRINKLER PUMP CONTROLLER
OPERATOR'S MANUAL

PRODUCT MANUAL

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-- A P P R O V A L S --
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The SPC94 has a programming facility which may be accessed from the keypad for on-site configuration.

This facility allows the user to configure the detail of the operation of the SPC94. It is possible for the user to set operational limits that prevent the installed SPC94 from meeting statutory requirements.

VIGILANT FIRE & EVACUATION SYSTEMS does not accept responsibility for the suitability of the settings programmed by the user.

AMENDMENTS

ISSUE	AMENDMENT	DATE	COMMENTS	ECN
1		23/09/94	Original	
1.1	1	27/02/95	Pump set wiring diagram changed for Issue A units.	

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PROGRAMMED CONTROLLER SETTINGS FOR THIS INSTALLATION

The particular configuration values for this installation should be recorded here for use in case of controller PCB replacement.

Setting Name	Value	Units
Personality	NZ, Aus	-
Recycling Delay		seconds
Crank Fail Time		seconds
Temperature sender type		-
Max. engine temperature		°C
Min. engine temperature		°C
Pressure sender type		-
Min. oil pressure		kPa
Max. battery voltage		volts
Min. battery voltage		volts
No of pulses per engine rev.		-
Engine crank speed threshold		rpm
Engine run speed threshold		rpm
Engine overspeed limit		rpm
Off normal battery voltage	Yes/No	-
Off normal engine readings	Yes/No	-
Off normal sensor connections	Yes/No	-
Off normal charger fail	Yes/No	-
Off normal start fail	Yes/No	-

Installation Name:

Date Installed:

Chapter 1
INTRODUCTION

1.1

USING THIS MANUAL

This manual contains information for personnel engaged in routine maintenance and testing of a sprinkler pump set containing the SPC94 controller unit. It would normally be consulted for reference in abnormal situations.

The manual has these chapters:

1. Introduction - an introduction to this manual.
2. System Description - a brief description of the SPC94.
3. Specifications - a summary of SPC94 specifications.
4. Interpreting the Displays - how to read the display panel.
5. Using the Control Panel - what the controls on the panel do.
6. Alarm Displays - what the alarm displays mean.

1.2

ASSOCIATED DOCUMENTS

SPC94 Technical Manual - provides complete details on planning, commissioning and configuring the SPC94, as well as technical descriptions and schematics of the internal electronics.

The part number is LT0145.

1.3

OPERATOR NOTES

Chapter 2

SYSTEM DESCRIPTION

2.1

OVERVIEW

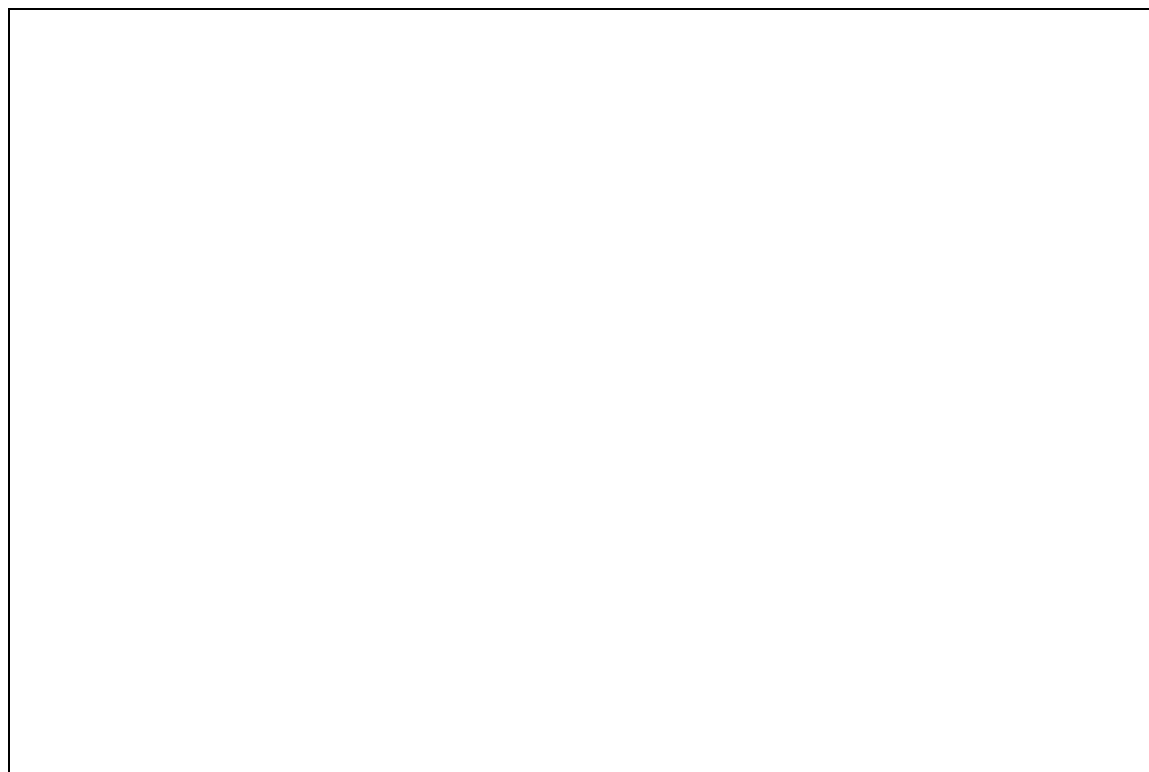
The Vigilant SPC94 Sprinkler Pump Controller is an intelligent microcontroller-based unit intended for use with diesel engine sprinkler pump sets. It provides displays of engine and battery condition, monitors up to six pressure switch circuits, and will attempt to automatically start the pump set when any pressure switch operates. It will generate alarm signals in the event of abnormal engine or battery conditions.

2.2

DISPLAY PANEL

The SPC94 has five electronic digital displays and status indicators and two mechanical gauges. The electronic displays show the state of the batteries, pump engine and pressure switches, while the mechanical gauges show the suction and delivery pressures from the pump.

The meaning of the displays are detailed in Section 4.



2.3**CONTROL KEYS**

Adjacent to the electronic displays are ten pushbutton controls, which allow the operator to test the displays, silence alarms, check battery condition and manually start the pump set.

Each key is labelled in white according to its functions. Some keys have alternate functions in programming mode; these are the blue legends under the key. This manual does not deal with programming the controller; refer to the Technical Manual.

With the exception of the Manual Start buttons, all keys produce a brief "beep" from the internal buzzer when pressed. The use of the controls is detailed in Section 5.

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Chapter 3
SPECIFICATIONS

3.1

SPECIFICATION

Physical

Dimensions: 1425H x 600W x 225D (including feet and gauge housing)
Weight: 40kg
Cabinet rating: better than IP54

Power Supply

Single phase 230V 2A AC, permanently connected.

Environmental

Ambient Temperature: -10°C to +55°C
Humidity: 0-95% RH (non condensing)

Battery Chargers

Dual constant voltage type, with separate voltage sensing inputs.
Independently capable of supplying at least 10A charge current.
Tolerant of short circuit and reverse battery connection.

Engine Sensor Types

Proximity detector: NPN type, compatible with system battery voltage.
Compatible temperature senders: VDO type 320-002
Compatible oil pressure senders: VDO type 360-002

Engine Start Outputs

Two outputs, START A and START B, each switching the respective battery voltage. Each is one set of NO contacts rated at 5A, with 33V arc suppression diodes across each.

Other Outputs

Engine Run 1: two sets of voltage-free NO contacts, operated whenever the engine is running. Not maskable.

Engine Run 2: two sets of voltage-free NO contacts, operated whenever the engine is running. Maskable for up to 1 hour by pressing the **SILENCE ALARMS** button.

Off Normal Alarm: two sets of voltage-free NO contacts, operated whenever the controller or engine is in an abnormal state. The conditions contributing to this output may be configured on site. Maskable for up to 1 hour by pressing the **SILENCE ALARMS** button.

Auxiliary Supply: a DC supply derived from both batteries, available at the Main PCB supply connector (J4). This is fused at 5A but is nominally rated at 2A, and is intended for powering alarms, strobes, etc, associated with the controller.

Chapter 4

INTERPRETING THE DISPLAYS

4.1

SYSTEM NORMAL

Under normal circumstances (pump not running, AC mains on, no pressure switches operated), the display panel will be as follows:

Status Area: **Ready to Start** On.

Engine: **Engine Speed** reading zero.
 Engine Run Time reading accumulated run time.
 Temperature/Oil Pressure reading a temperature, with
 °C on.

Pressure
Switches: All indicators off.

Battery A & B: **VOLTS** indicators on, and display reading in the region
 of 13-14V (for a 12V system). Both **CHARGER ON**
 indicators on.

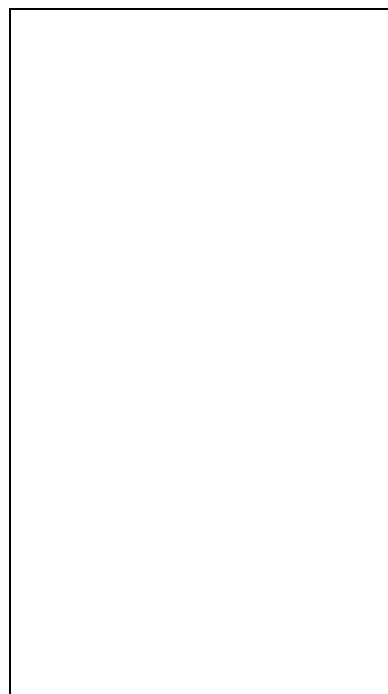
In the absence of any activity for the previous 15 minutes, the displays will dim to conserve power; if any key is pressed, or if the engine is active, the displays will brighten up again.

In general, the displays will be steadily lit. Any flashing display indicates an alarm or abnormal condition. See section 6 for details.

4.2

STATUS DISPLAY

These status indicators show the state of the engine starting process and alarm indicators. When lit the indicators have the following meaning:



Ready to Start: The controller is ready to start the pump motor. To confirm that the controller is operating, this indicator "blinks" at about 8 second intervals.

Start Initiated: The controller is in the process of starting, or has started the motor.

Cranking Engine: The starter motor relays are energised, either by the controller, or by pressing a Manual Start key.

Engine Running: The engine has reached a predefined minimum running speed.

Alarms Silenced: The external alarm contacts have been disabled by pressing **SILENCE ALARMS**.

4.3

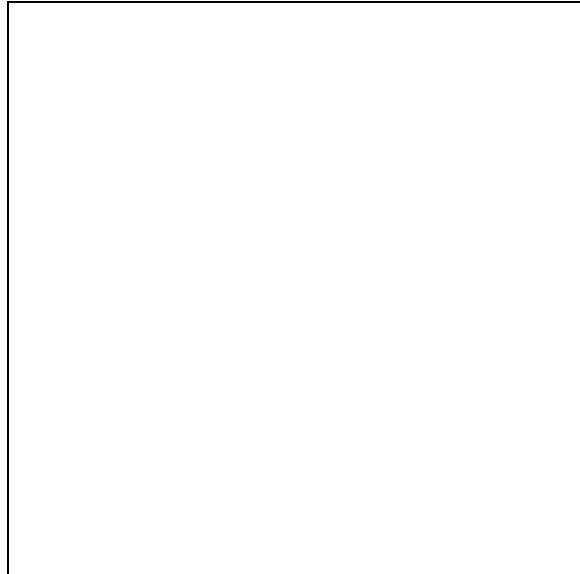
ENGINE READINGS

The engine displays show these engine conditions:

Engine Speed: Shows the measured speed in rpm.

Engine Run Time: Displays the cumulative engine run time.

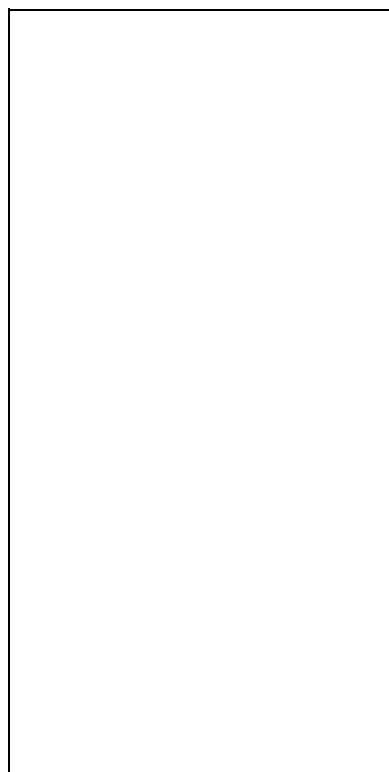
Temperature/Oil Pressure: This is a dual mode display. The °C or kPa indicators show which of engine temperature or engine oil pressure is being displayed. Pressing the adjacent **TEMP/OIL** key toggles the display from one to the other. The display defaults to Temperature after a period of time.



4.4

PRESSURE SWITCHES

The pressure switch indicators show the status of the pressure switches. When lit, the indicators have these meanings:



Activated: These show which pressure switches are operated.

Isolated: These show that the corresponding operated pressure switch has been isolated.

Pressing **ISOLATE** will isolate all the currently operated pressure switches. When each pressure switch is released, it will be automatically de-isolated after a short delay.

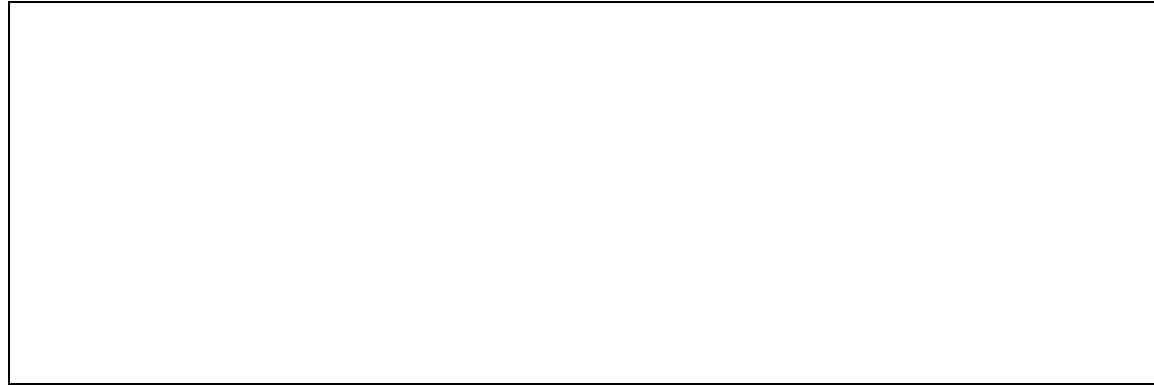
4.5

BATTERY A & BATTERY B

There are two identical battery displays, one for each of the separate battery/charger combinations. Each value displayed is either battery voltage or charge current. The **VOLTS** or **AMPS** indicators show which is being displayed. Pressing **VOLTS/AMPS** toggles between the different readings. The display defaults to voltage after a period of time.

The **CHARGER ON** indicator shows that there is input power to the respective battery charger, regardless of whether charge current is being delivered.

The voltage display normally shows battery voltage under charging conditions. Pressing **BATT VOLTS** temporarily inhibits the charger and displays the off-charge battery voltage, which is a better indication of actual battery condition.



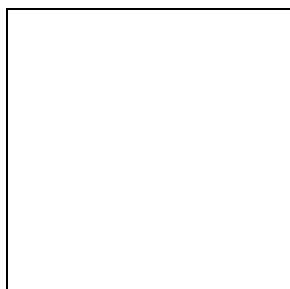
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Chapter 5

USING THE CONTROL PANEL

5.1

TESTING THE DISPLAY PANEL



Press and hold the **Lamp Test** key. All indicators will light up, all digits will read "8"s, and all but 8 decimal points will light. The normal display resumes when **LAMP TEST** is released.

5.2

SILENCING ALARMS

All external alarm contacts and internal buzzer can be disabled for 60 minutes by pressing **SILENCE ALARMS**. The **Alarms Silenced** indicator will be lit.

During the last minute before re-enabling the alarms, the internal buzzer will beep at one second intervals as a warning.

Pressing **SILENCE ALARMS** again resets the disabled period to 60 minutes.

The alarms can be re-enabled by pressing and holding **SILENCE ALARMS** for two seconds. The **Alarms Silenced** indicator will go out.

5.3

READING BATTERY CHARGE CURRENT

If the **AMPS** indicator is not on steadily, press **VOLTS/AMPS** once. The charge current in amps will be displayed.

5.4

READING BATTERY FLOAT VOLTAGE

If the **VOLTS** indicator is not on steadily, press **VOLTS/AMPS** once. The battery float voltage while on charge will be displayed.

5.5

READING BATTERY VOLTAGE

Press and hold **BATT VOLTS**. The **CHARGER ON** indicator will go out, and the **VOLTS** indicator will come on. The "OFF-CHARGE" battery voltage will be displayed.

The previous display will be restored when **BATT VOLTS** is released.

5.6

READING ENGINE TEMPERATURE

If the **°C** indicator is not on steadily, press **TEMP/OIL**. The engine temperature will be displayed.

5.7**READING ENGINE OIL PRESSURE**

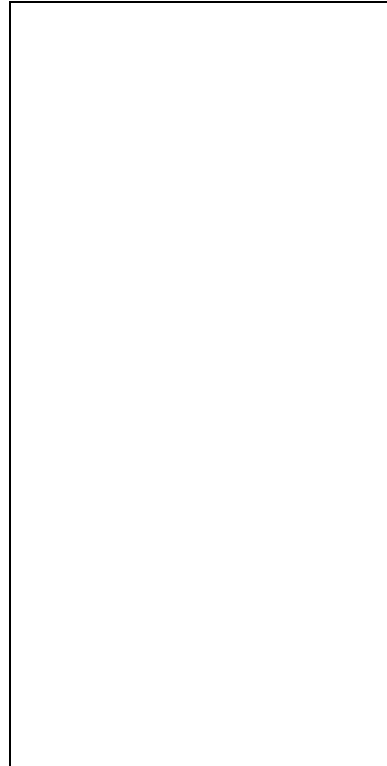
If the **kPa** indicator is not on steadily, press **TEMP/OIL**. The engine oil pressure will be displayed.

5.8**ISOLATING PRESSURE SWITCHES**

The **ACTIVATED** indicators show which pressure switch(es) are operated. Pressing **ISOLATE** will isolate all the currently operated pressure switches. When each pressure switch is released, it will be automatically de-isolated.

5.9**MANUALLY STARTING THE PUMP**

Pressing either the green **BATT A** or **BATT B** keys will directly operate the start relays and crank the engine without using the controller. If the controller is running, the status indicators and engine display will show the state of the engine. These keys will still operate even if the controller has failed.



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Chapter 6

ALARM DISPLAYS

6.1 ALARM CONDITIONS

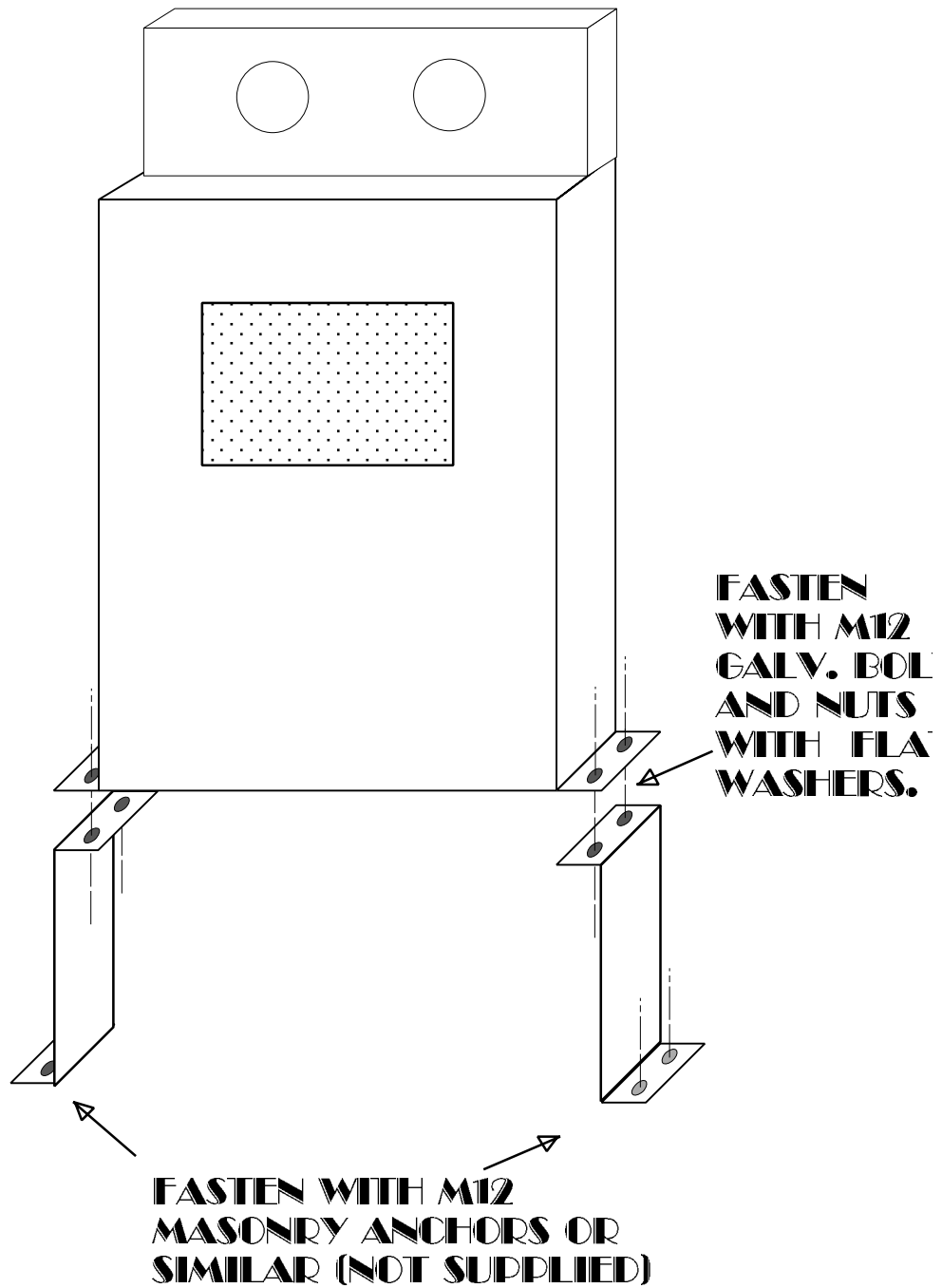
Alarm conditions may be signalled by devices connected to the external Off-Normal alarm relay contacts, and sounding of the internal buzzer. More detail is provided by the flashing of the part of the display associated with the alarm condition.

The controller may have been configured so that some off-normal conditions will not cause an external alarm. Regardless of this, any abnormal part of the display will always flash.

WHAT IS FLASHING?	WHAT IT MEANS
READY TO START (blinks off about once every 8 seconds)	The controller program is operating correctly - no action required.
EITHER BATTERY DISPLAY (AMPS indicator on steady) AMPS INDICATOR	The corresponding charger has failed. Check mains supply if both chargers have failed, or corresponding charger fuse if only one has failed. (CHARGER ON indicator will be off).
EITHER BATTERY DISPLAY (VOLTS indicator on steady) VOLTS INDICATOR	The battery voltage is out of range (too high or too low). Check the battery condition.
TEMPERATURE/OIL PRESSURE (°C indicator on steady) °C INDICATOR	The engine temperature is out of range. Press TEMP/OIL to read the actual temperature (display will be flashing). Check the engine cooling system.
TEMPERATURE/OIL PRESSURE (kPa indicator on steady) kPa INDICATOR	The oil pressure is too low while the engine is running. Check the lubrication system.
FLASHING "oC" IN BATTERY DISPLAYS (VOLTS indicator on steady), AND TEMPERATURE/OIL PRESSURE DISPLAY	The reference lead to the engine chassis is broken (pin 7 on AMP connector), or connector J12 is not seated properly on the main PCB.
FLASHING "oC" IN TEMPERATURE/OIL PRESSURE (°C indicator on steady)	The lead to the temperature sender is broken, or connector J12 is not seated properly on the main PCB.
FLASHING "oC" IN TEMPERATURE/OIL PRESSURE (kPa indicator on steady)	The lead to the oil pressure sender is broken, or connector J12 is not seated properly on the main PCB.
ENGINE SPEED	The engine speed is too high.

WHAT IS FLASHING?	WHAT IT MEANS
<p>ANY PRESSURE SWITCH ISOLATED INDICATOR</p>	<p>The associated pressure switch cable is faulty. Check for a broken wire at the PCB end, or in the pressure switch case.</p>
<p>START INITIATED</p>	<p>The controller is attempting to start the engine, but without success. Isolate the pressure switches by pressing ISOLATE, and attempt a manual start.</p>
<p>DECIMAL POINT IN RUN TIME 1000s OF HOURS DIGIT</p>	<p>Internal controller analogue input circuit has failed self test. Other displays may be giving false readings. Call the service agent.</p>
<p>DECIMAL POINT IN RUN TIME 100s OF HOURS DIGIT</p>	<p>Internal controller backup memory is faulty. The controller is using a default configuration. Call the service agent.</p>
<p>DECIMAL POINT IN RUN TIME 10s OF HOURS DIGIT</p>	<p>Internal controller communication with front panel display is faulty. Parts of the display may not be working. Check the seating of each end of the flat ribbon cable in the controller. Call the service agent if this does not fix the fault.</p>

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SPC94 Diesel Pump Controller Cabinet/Plinth Assembly Details