

AS2941-08 DIGITAL FIRE PUMP CONTROLLER

COMPLIANT WITH AS2941-2008
SECTION 9.4 -9.5

OPERATION INSTRUCTIONS



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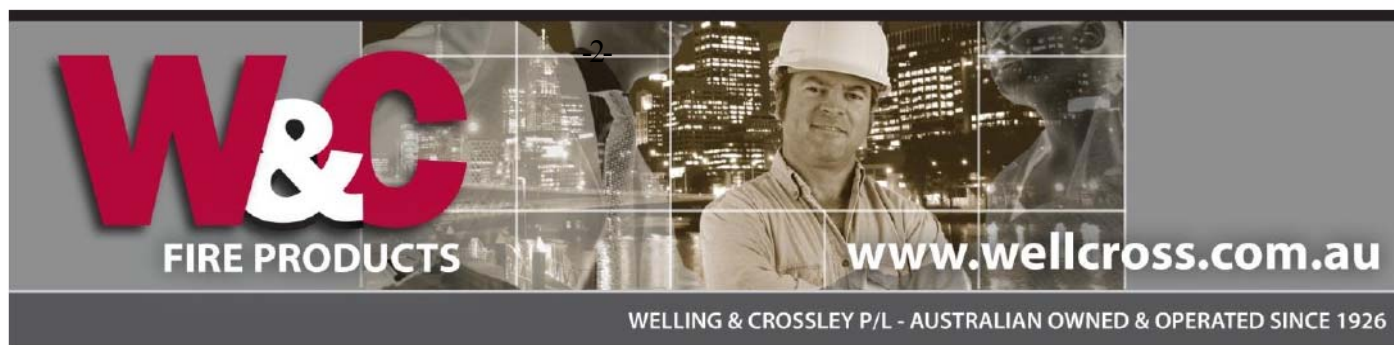
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FUNCTION	Designed to automatically operate a diesel fire pump engine when the contacts of a remote water pressure switch close.
POWER SUPPLY:	240V A.C single phase supply and 12 or 24 V D.C.
INDICATORS:	<p>Power available (green) - Mains power available.</p> <p>Pump standby (green) - Operational and without major faults.</p> <p>Pump running (red) - Pump is running.</p> <p>Crank isolated (red) - Isolates controller auto starting (see crank isolate switch below).</p> <p>Start fail (red) - Diesel engine has failed to start when requested.</p> <p>Charger supply fail (red) - Battery charger power supply failed.</p> <p>Controller fail (red) - Controller has failed. Alarm muted (red) - Audible alarm is muted.</p> <p>Start charger fail (red) - Start battery charger is faulty.</p> <p>Control charger fail (red) - Control battery charger is faulty</p> <p>Start battery fail (red) - Start battery volts is/was below the preset low level</p> <p>Control battery fail (red) - Control battery volts is/was below the preset low level.</p> <p>Engine overspeed (red) - Pump speed is/was in excess of preset limit.</p> <p>Coolant temp fault (red) - Engine coolant temp is exceedingly high or low (if low temp, alarm optioned flash fast)</p> <p>Oil pressure low (red) - Oil pressure is/was below preset. Fuel level low (red) - Fuel level in tank is/was low.</p>
BUTTONS:	<p>Display scroll - Scrolls the displayed screen. Start - Push to manually start the engine.</p> <p>Stop - Push to stop the engine and clear alarm conditions.</p> <p>Light test - Illuminates all indicator lights</p> <p>Alarm test - Tests the alarm bell and light</p> <p>Alarm mute - Silences the audible alarm bell. Mute will be reset when the alarm condition stops, or alarm test is pressed.</p> <p>Start charger boost - Push to boost the charge rate on the control battery. Charging turns off automatically.</p> <p>Crank isolate - Isolates the pump preventing cranking from the controller. Engine can still be cranked from the emergency manual start solenoid buttons located below the controller fascia.</p> <p>Over speed test- simulates over speed test when engine is running.</p>
OPERATION:	<p>Starting - System is designed to automatically start the engine by closing a remote pressure switch. System may be test run by pressing the start button on the controller fascia.</p> <p>Stopping - Push controller stop/reset button.</p>

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**EMERGENCY
STARTING:**

Emergency manual start buttons - located below the controller fascia on the fire pump controller. Press either solenoid button to crank the engine from the start or control battery, external to the controller circuitry.

JOCKEY PUMP:

If fitted, automatically maintains water pressure in system pipe work.
 AUTO button - Automatically starts and stops the jockey pump upon the closure or opening of a remote located jockey pressure switch.
 JOCKEY PUMP ISOLATE button - Jockey pump will not operate.
 MANUAL button - Allows the Jockey pump to run continuously whilst pressed.

INTRODUCTION

This controller is a dedicated microprocessor that operates in a similar fashion to an IBM or Macintosh Computer.
 It has specific input, output and display capabilities that have been designed to meet all the requirements of AS2941-2008 (The Australian Fire Pump Standard).

AS2941 REQUIREMENTS

A fire pump controller must „start“ the diesel engine driving a fire pump in response to an external „start“ signal, usually a pressure switch that is plumbed into the fire service ring main.

Once started the engine must continue to run until it is manually stopped or runs out of fuel.

In the event of an engine not starting immediately it must be „cranked“ for 15 seconds followed by a pause in cranking of 15 seconds. This cycle must be repeated 6 times or until the engine starts.



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CONTROL SWITCHES

CRANK ISOLATE SWITCH

A two position rotary key lockable switch located to the left of the liquid crystal display.

In the isolate position the engine cranking circuits are disconnected from the controller. Automatic pressure switch starting and controller manual starting are disabled.

This switch position will allow routine maintenance to be undertaken without concern about the engine starting.

In the normal position the controller will crank the engine whenever an external start signal is present or when the controller start button is pressed.

Note that turning this switch to the isolate position will cause the controller to generate an alarm condition.

When this switch is in the isolate position the engine can still be started using the emergency manual start buttons located adjacent to the controller.

CONTROL BUTTONS

DISPLAY SCROLL BUTTONS

Two buttons located to the right of the liquid crystal display. Many sorts of information can be displayed on the liquid crystal; these buttons allow an operator to „scroll“ through display items to get to specific required information. You may scroll „up“ or „down“ to get to the required information.

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Push the arrow to scroll

AS2941 Diesel Fire Pump Controller

Serial # -----

Software REV:

↕
Engine Speed _____
RPM

Hours Run

-----:--:--

↕
Engine Alternator

- Amps DC

Fuel Remaining

--- %

↕
Coolant Temperature

-- C

-- KPA

↕
Control Battery

--.- Volts DC

Control Charge Rate

--.- Amps DC

↕
Start Battery --.- Volts

DC

Start Charge Rate

--.- Amps DC



The position at which scrolling is stopped is not relevant to controller operation.

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START BUTTON

Allows an operator to test start the fire pump engine in order to carry out routine maintenance. It can also be used to start the engine if external start signals have failed or are not present.

Note: that the crank isolate key switch must be in the normal position for the start button to operate.

STOP / RESET BUTTON

When pressed will send a stop signal to the engine fuel stop solenoid.

Note: if an external start signal is present (pump on call) the engine will not stop. The stop button also functions as a reset on any „latched“ alarm information i.e. „Charger Supply Fail“ or „Oil Pressure Low“.

Note: if alarm condition is still present then stop /reset button cannot clear the alarm indication.

LIGHTS TEST BUTTON

Will cause all 32 alarm and status light emitting diodes to illuminate. It is provided as a test for indicator failure.

ALARM TEST BUTTON

When pressed will test the external alarm bell if connected to the controller bell circuit. It will also test the flashing alarm light or strobe if connected to the controller visible alarm circuit.

ALARM MUTE BUTTON

When pressed will mute the alarm bell if it is currently operating. The alarm cause will continue to be indicated by the alarm and status LED's. Alarm mute will automatically cancel when all alarm causes are cleared or reset.

When an alarm condition is muted a further alarm condition will not cause the bell to operate.

Note: that the flashing light or strobe is not turned off when alarm mute is pressed.

START CHARGER BOOST BUTTON

The battery chargers are current limited constant potential type that will maintain an optimum charge level in each set of batteries. Chargers will turn on at maximum charge rate when battery voltage has fallen to nominal voltage plus .75V. Charger will turn off completely when battery voltage has risen to nominal voltage plus approximately 2.5V.

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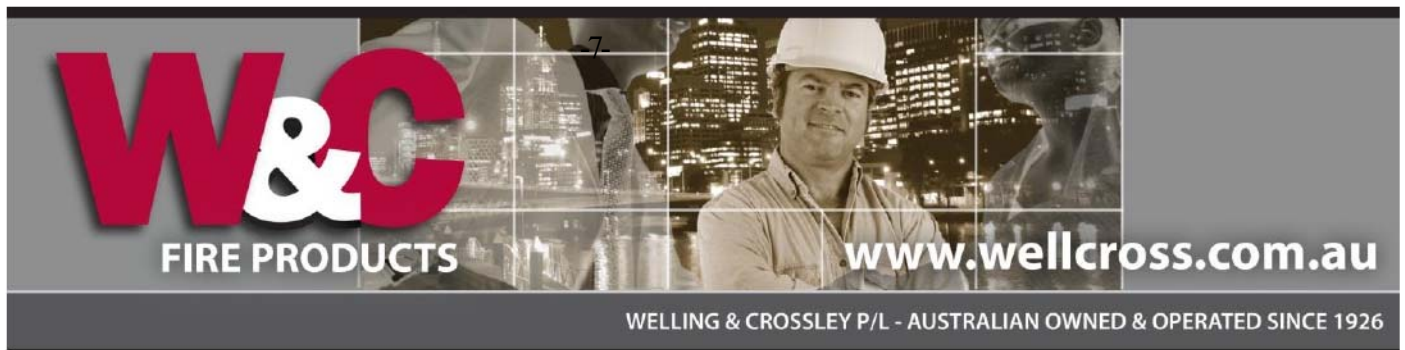
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Note: That the chargers are not a trickle charger and must have a battery connected for correct operation. When the boost button is pressed the charger will turn on at maximum charge rate, charging the battery up to the high charge turn off point.

CONTROL CHARGER BOOST BUTTON

As for start charger boost button.

Two light emitting decodes are provided to indicate each function.

OVER SPEED TEST BUTTON

When diesel engine is running press button to simulate an over speed. Engine will stop and indicate over speed. To reset press stop reset button.

POWER AVAILABLE

These green LED's should be continuously lit and indicate the presence of the AC supply.

CONTROL INDICATORS

PUMP STANDBY

These green LED's should be continuously lit and indicate a normal standby situation.

If they are not lit check

- Is crank isolate switch in normal position?
- Fuel level?
- Battery voltages?
- Engine temperatures low?
- Or any other fault indicators?

PUMP RUNNING

Will indicate when the pump is running at rated speed.

CRANK ISOLATED

Will indicate that the crank isolate key switch is not in the normal position.

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START FAIL

Will indicate that the diesel engine has not started after completing 6 crank cycles.

This indicator will flash if alarm cause has occurred but is no longer present. Cancel flashing by pressing STOP/RESET.

CHARGER SUPPLY FAIL

Indicates failure of the AC to battery chargers. When supply fail LED's are lit the green power available LED's must be off.

FUEL LEVEL LOW

Indicates when fuel tank level is low. This level is adjustable with a factory setting of 75%. Flashing LED's indicate that fuel level was low and is now normal. Pressing the STOP/RESET button will cancel the flashing.

ALARM MUTED

Indicates that an alarm condition exists and the alarm mute button has been pressed.

The LED's will turn off automatically when the alarm condition ceases.

START CHARGER FAIL

Indicates when the battery should be charging but is not.

CONTROL CHARGER FAIL

Refer to above.

START BATTERY FAIL

Indicates when start battery voltage has fallen to an unacceptable low level. This level is adjustable, with a factory setting of 12 / 24 volts.

Flashing LED's indicate that start battery voltage was unacceptably low and is now normal. Pressing the stop/reset button will cancel the flashing. Although the controller can deem a start battery as "failed" it may continue to attempt starting.

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CONTROL BATTERY FAIL

Refer to above.

ENGINE OVERSPEED

Indicates when diesel engine speed exceeds programmed set point, this level is adjustable.

An over speed alarm status will display then the engine will stop.

If this condition occurs during routine testing, check program settings or call a service technician.

This indicator will flash if alarm cause has occurred but is no longer present. Cancel flashing by pressing STOP/RESET.

COOLANT TEMPERATURE FAULT

Indicates when the diesel engine coolant temperature exceeds that's recommended by the engine manufacturer. This level is adjustable with a factory setting of 95°C.

Although a Coolant Temperature High alarm may be displayed the engine is not stopped.

If this condition occurs during routine testing the engine should be immediately stopped and attended to by a competent mechanic.

For engines fitted with a water jacket heater; failure of which could prevent engine starting; a low temperature alarm can be indicated. This condition will be indicated by the "Coolant Temperature High" LED's flashing at a fast rate. The engine should be attended to immediately by a competent mechanic.

This indicator will flash if alarm cause has occurred but is no longer present. Cancel flashing by pressing STOP/RESET.

OIL PRESSURE LOW

Indicates when the diesel engine lubricating oil pressure is less than that recommended by the engine manufacturer. This level is adjustable with a factory setting of 50KPA.

Although an oil pressure low alarm status may be displayed, the engine is not stopped.

If this condition occurs during routine testing the engine should be immediately stopped and attended to by a competent mechanic.

This indicator will flash if alarm cause has occurred but is no longer present. Cancel flashing by pressing STOP/RESET.

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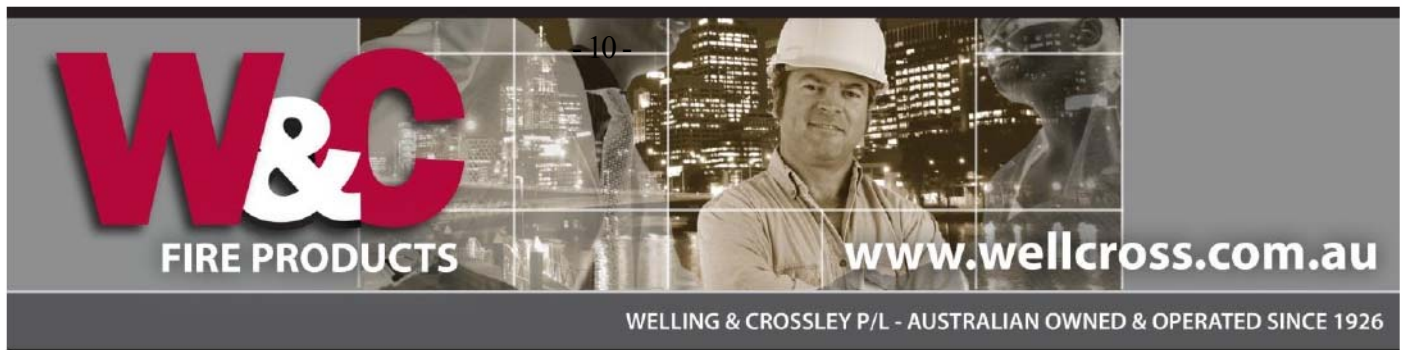
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CONTROLLER FAIL

Indicates if the microprocessor stops operating. Detected by “Hard Wired” circuitry outside of the microprocessor. This alarm status may or may not indicate that the controller is unable to start the diesel engine in a fire situation. However competent technicians should attend to this situation at the earliest possibility.

VOLT FREE CONTACTS

Are rated for a maximum current of 1A @ AC1 and a maximum voltage of 32VDC. If these ratings are exceeded, even for the shortest possible time, permanent damage may result, causing the controller to be unable to start the engine.

CONTROLLER SERVICEABLE (NC-200; COM-201; NO-202)

Is normally “energised” and changes to the state indicated on the drawings for microprocessor failure.

Competent technicians should attend to this situation at the earliest possible.

Note: that both batteries flat or disconnected will also cause this condition.

COMMON ALARM (NC-212; COM-213; NO-214)

Will energise when all systems are normal and controller / engine are ready to start in a fire situation.

OVERSPEED (NC-221; COM-222; NO-223)

Will energise when low battery volts on start and control condition exists, or has existed.

Note: that engine fault does not necessarily mean the engine has stopped.

FUEL LEVEL LOW (NC-218; COM-219; NO-220)

Will energise for low fuel level.

Note: that if both batteries fail or are disconnected the microprocessor will eventually stop and this alarm will disappear.

PUMP RUNNING (NC-203; COM-204; NO-205)

Will energise when diesel engine is at a speed higher than starter motor cut out speed.

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FAIL TO START (NC-206; COM-207; NO-208)

Will energise when the engine has been told by the control panel to start and has not. This contact is most suited when a pump fail contact is required to drive external circuitry.

CHARGER SUPPLY FAIL (NC-209; COM-210; NO-211)

Will energise when the battery charger AC supply has failed.

Power is continually being consumed by the controller and under normal conditions this power is being replaced by the battery chargers. If a charger supply failure condition exists for 24 hours the power consumed by the controller will cause batteries to go flat.

Attention from competent personnel should happen at the earliest possible time. If competent repair people are not available, isolate AC supply and disconnect both batteries.

Notification to Local Fire Authorities and continual supervision should occur until all systems are back to normal.

START / CRANK ISOLATE (NC-215; COM-216; NO-217)

Energises when crank isolating switch is in ISOLATE position.

INSTALLATION

The controller should be mounted in a position away from vibration, heat and hot exhaust pipes and potential diesel fuel and water spills.

If located outdoors considerations must be given to a sun shade. Direct sunlight combined with high ambient temperatures will cause controller failure.

Note: that PVC insulated engine and control wiring will also fail if continually subjected to UV radiation (i.e. sunlight).

The controller is certified to IP54 AS 1939 and has a "Lexan" membrane fascia. Continual UV radiation on fascia will cause permanent damage and possibly controller failure.

Controller should be wired to solenoid panel, engine, external start signal and alarm circuits. Using the schematic drawings and termination diagrams supplied with the controller.

Note: that even though the controller has fuses and reverse polarity protection, various components of the controller can suffer permanent damage if incorrectly connected.

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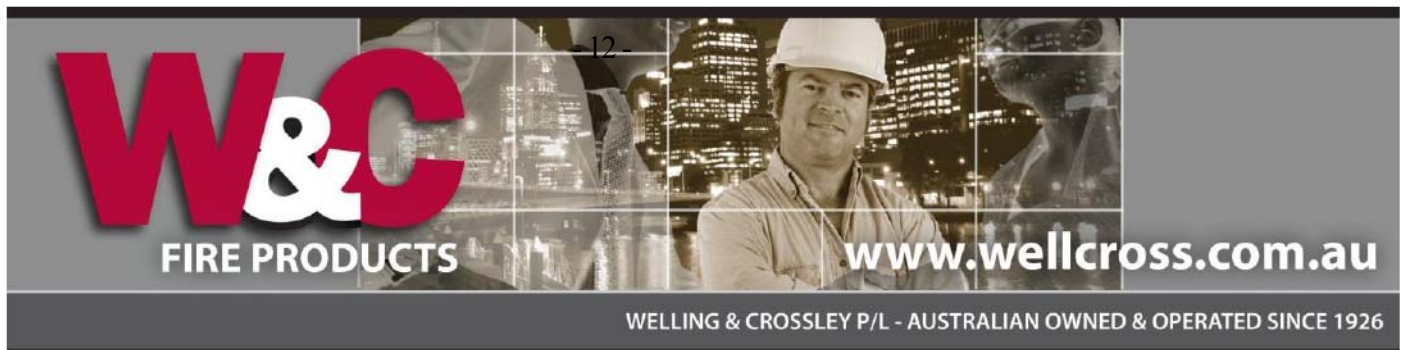
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Before connecting AC supply or batteries, double check all wiring and stated voltage rating which will be on a Silver or White /Black ID Sticker located on inside of controller door.

TESTING

Turn crank isolate switch to "isolate" position.

Verify that engine is okay to run; fuel; lube oil; coolant etc.

Connect control battery, ensure correct polarity.

Controller will take a few seconds to initialize and will then display serial no. and software revision.

Controller may also be indicating error conditions.

Scroll up twice.

Display will show control battery voltage and charge rate.

Charge rate will be 0.0 Amps DC as AC supply not yet connected.

Scroll down once.

Display will show start battery voltage and charge rate. Both should be zero.

Connect start battery - ensure correct polarity.

Display should show start battery voltage.

Leaving crank isolate switch in "isolate" position; scroll up & down, press a few buttons to get a "feel" for what's happening.

Apply AC supply to controller. Battery charge rate should now be about 3 AMPS DC.

If display shows 0.0 AMPS DC momentarily press the appropriate charger boost button; correct charge rate should now be displayed.

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FUSES

Fuses are fitted to several of the cards fitted to the controller. They have been fitted to protect the controller components from abnormal load conditions and unusual transients. If a fuse "blows" replace only with size and rating specified. Fitting larger fuses than that specified will eventually lead to permanent irreplaceable damage to controller and/or components. Before replacing fuses or removing plug in cards, turn off AC supply and disconnect batteries.

ENGINE CONTROLLER CARD (207206)

- F1 12/24V Crank Fuse
30A Blade Automotive
- F2 12/24V Stop Solenoid Fuse
30A Blade Automotive
- F3 12/24V Regulator Fuse 30A
Blade Automotive
- F4 12/24V NFPA 20 Crank Fuse
30A Blade Automotive

POWER SUPPLY CARD (207207)

- F1 Control Battery
5A Blade Automotive
- F2 Start Battery
5A Blade Automotive
- F3 AC Mains Supply
5A Automotive
- F4 Control Transformer Secondary
5A Blade Automotive
- F5 Auxiliary Supply
5A Blade Automotive

BATTERY CHARGER CARD (207208)

- F1 Charger Protection
7.5A Blade Automotive

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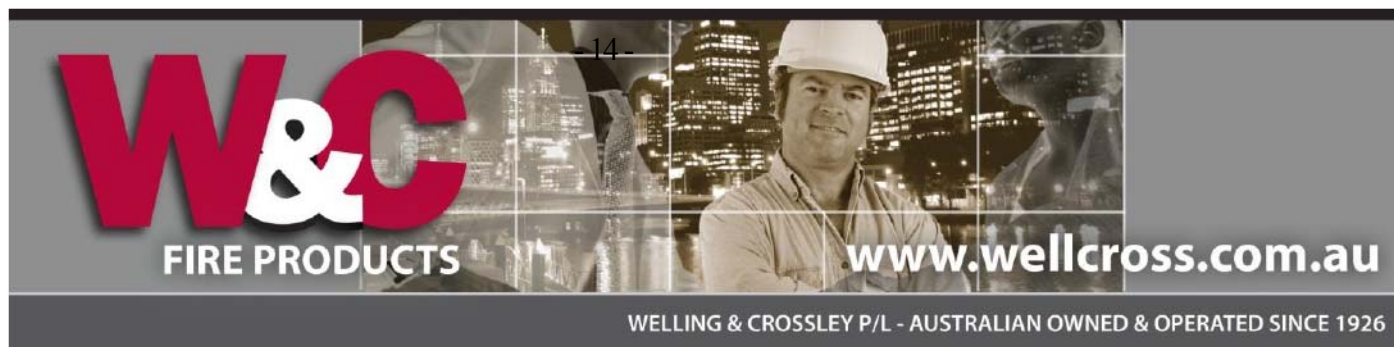
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I/O TERMINAL CARD (207205)

F1	Alarm Bell
F2	Flashing Light 1A Resettable Fuse
F3	12V Auxiliary Supply 1A Resettable Fuse

JOCKEY PUMP SETUP

To install an electric Jockey Pump with the Diesel Fire Pump Panel, switch dipswitch 4 to the “on” position (on the processor card), remove mains power, remove both Start and Control batteries, wait 1 minute, replace both batteries and mains, and a scrollable Jockey Pump screen will appear on the LCD, displaying Jockey Pump Status, and Jockey Pump switch status.

JOCKEY PUMP FASCIA BUTTON OPERATION

AUTO: The Jockey Pump will automatically Start/Stop when the Jockey Pump pressure switch is closed / opened.

JOCKEY PUMP ISOLATE: The Jockey Pump will not operate when the Jockey Pump pressure switch is closed / opened. The Jockey Pump will not run.

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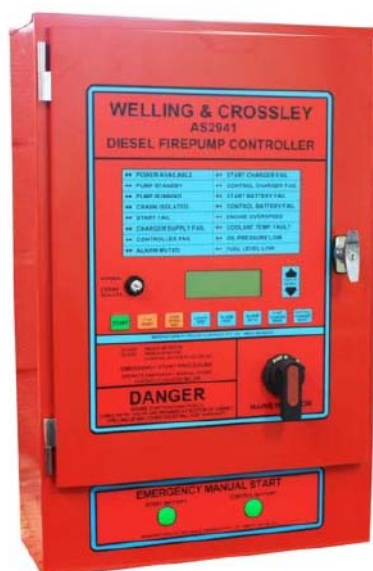
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AS2941-08

DIGITAL DIESEL FIRE PUMP CONTROLLER

INSPECTION & TEST SHEET



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DESCRIPTION:

AS2941 DIGITAL DIESEL PANEL

DATE:

TYPE:

S/N:

CUSTOMER:

CUSTOMER O/N:

LOCATION:

TESTED BY:

SOFTWARE REVISION:

12/24V DC:

PAINT:

SIGNAL RED

KEY NO:

003

EQUIPMENT LIST:

PCB'S	START CHARGER	80-PCB-207212	12v or 24v
	CONTROL CHARGER	80-PCB-207212	12v or 24v
	(POWER SUPPLY CARD	80-PCB-207207	
	MOTOR CONTROLLER	80-PCB-207206	
	I/O CARD	80-PCB-207204	
	LED CARD	80-PCB-207210	
	PROCESSOR	80-PCB-207209	
	I/O TERMINAL	80-PCB-207205	
	JOCKEY PUMP	80-PCB-207211	
	2x TRANSFORMERS: 240/28	80-TRANS-1PH-028V	

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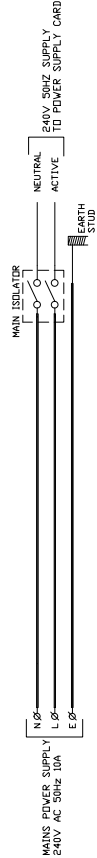
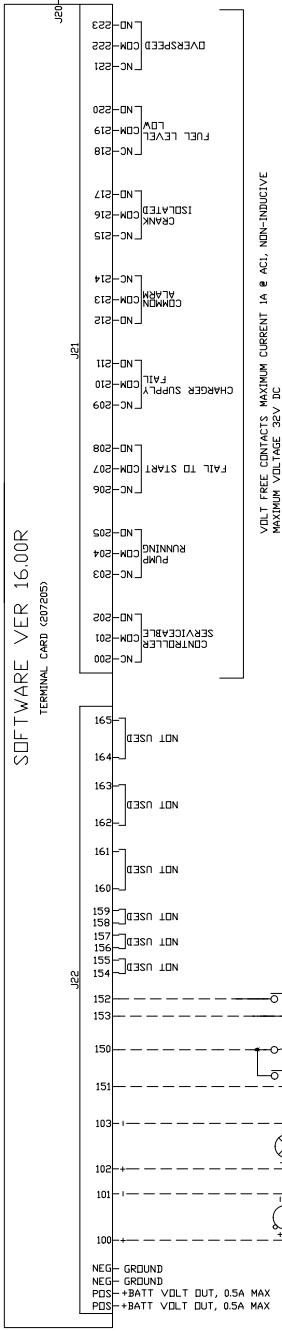
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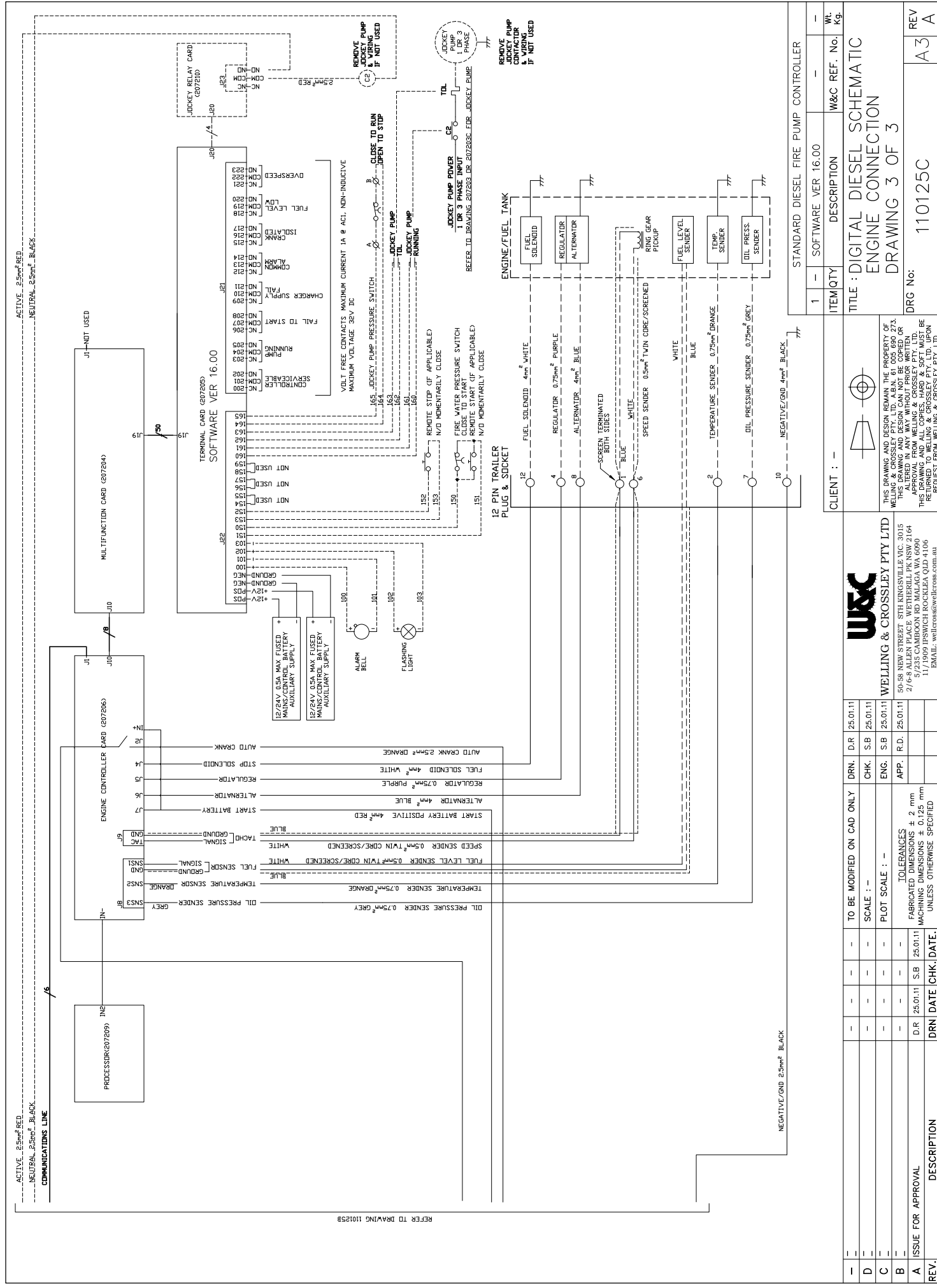
DESCRIPTION / MODIFIED:

DIESL PANEL MANUFACTURE	TASK COMPLETED (DATE & SIGN)	INDEPENDENT INSPECTION CHECK
Inspect Components		
Assembly		
Programming		
Bench Test		
Field Test		



- NOTE:
- THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE CONTROLLER ELECTRICAL SCHEMATIC.
 - FOR COMPLIANCE WITH AS2941, ALL CABLES ENTERING CONTROLLER TERMINAL STRIP SHOULD BE NUMBERED.
 - FOR COMPLIANCE WITH AS3000, ALL SITE TERMINATIONS MADE TO THE CONTROLLER SHOULD BE UNDERTAKEN BY A QUALIFIED ELECTRICIAN.
 - VOLTAGE OF BELL & LIGHT MUST BE THE SAME AS CONTROLLER. THIS VOLTAGE WILL BE SPECIFIED ON THE IDENTITY PLATE LOCATED ON THE INSIDE OF THE CONTROLLER DOOR.

STANDARD DIESEL FIRE PUMP CONTROLLER									
1	—	SOFTWARE	VER 16.00	DESCRIPTION	W&C REF. No.	WT. Kg.	<div>CLIENT : —</div> <div></div> <div>THIS DRAWING AND DESIGN REMAIN THE PROPERTY OF WELLS & CROSSLEY PTY LTD. A.B.N. 61 005 690 273. THIS DRAWING AND DESIGN CAN NOT BE COPIED OR ALTERED IN ANY WAY WITHOUT PRIOR WRITTEN APPROVAL FROM WELLS & CROSSLEY PTY. LTD. THIS DRAWING AND ALL COPIES, HARD & SOFT, MUST BE RETURNED TO WELLS & CROSSLEY PTY. LTD. UPON REQUEST FROM WELLS & CROSSLEY PTY. LTD.</div>		
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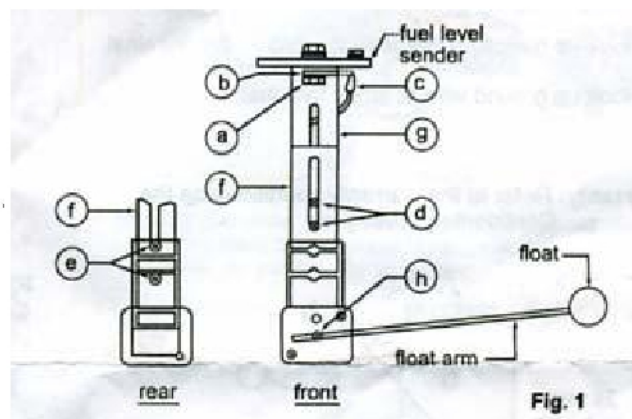


INSTALLATION INSTRUCTIONS FOR FUEL SENDER

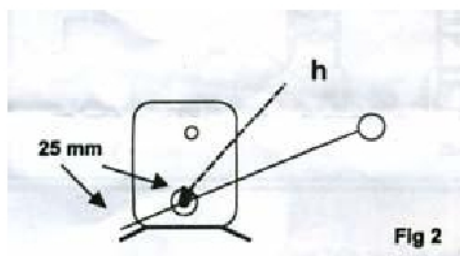
Float arm installation

- To install the float arm loosen screw "h", remove the short piece of rod and discard it. (Refer to Fig. 1)

This is the screw "h"



- Insert the float arm/rod to the proper length. (Length located in table 1R on following page)
- Allow 25mm to protrude out from the "h" point. (Refer to Fig. 2)



- Carefully cut off any excess arm/rod with a bolt cutter or a similar tool, taking care not to damage the assembly.

H = Tank Unit Height (Refer to Fig. 1)

L = Body Length "g & f" (Refer to Fig.1)

R = Arm Length from "b" point to float centre (Refer to Fig. 1)

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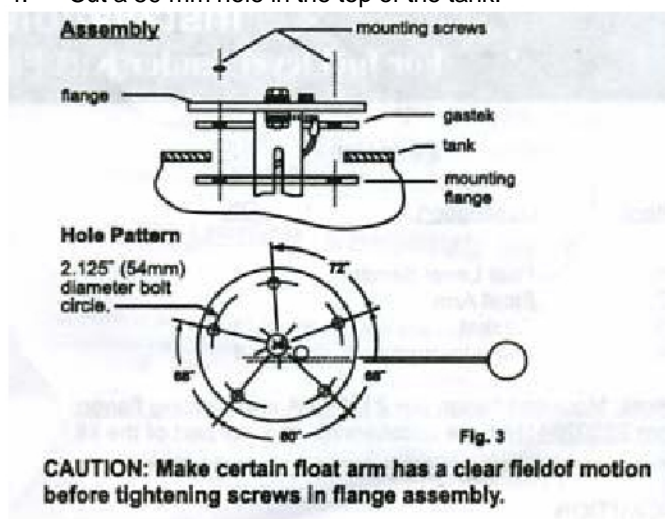
Table 1 (Dimensions in mm)

H	L	R	H	L	R	H	L	R	H	L	R
150	80	94	270	135	160	380	190	252	490	245	340
165	82.5	97	275	137.5	163	385	192.5	255	495	247.5	344
170	85	100	280	140	166	390	195	260	500	250	348
175	87.5	103	285	142.5	169	395	197.5	264	505	252.5	352
180	90	106	290	145	172	400	200	268	510	255	356
185	92.5	109	295	147.5	175	405	202.5	272	515	257.5	360
190	95	112	300	150	178	410	205	276	520	260	364
195	97.5	115	305	152.5	181	415	207.5	280	525	262.5	368
200	100	118	310	155	184	420	210	284	530	265	372
205	102.5	121	315	157.5	187	425	212.5	288	535	267.5	376
210	105	124	320	160	190	430	215	292	540	270	380
215	107.5	127	325	162.5	193	435	217.5	296	545	272.5	384
220	110	130	330	165	196	440	220	300	550	275	388
225	112.5	133	335	167.5	199	445	222.5	304	555	277.5	392
230	115	136	340	170	202	450	225	308	560	280	396
235	117.5	139	345	172.5	205	455	227.5	312	565	282.5	400
240	120	142	350	175	208	460	230	316	570	285	404
245	122.5	145	355	177.5	211	465	232.5	320	575	287.5	408
250	125	148	360	180	214	470	235	324	580	290	412
255	127.5	151	365	182.5	217	475	237.5	328	585	292.5	416
260	130	154	370	185	220	480	240	332	590	295	420
265	132.5	157	375	187.5	223	485	242.5	336	595	297.5	424

Add 25 mm to all values of "R"

Installation of the tank unit sender into the fuel tank using a flange tank

1. Cut a 59 mm hole in the top of the tank.



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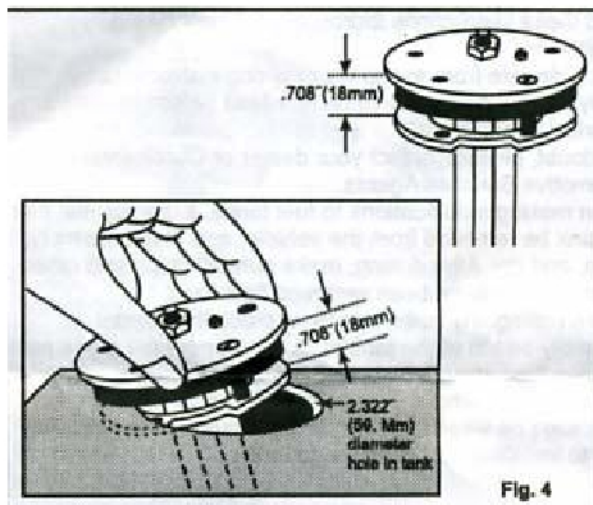
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1. Slide the rubber gasket up to the bottom of the fuel sender flange. Then slide the second flange over fuel sender to bottom of rubber gasket. Align the pre-threaded holes in mounting flange and rubber gasket with those in fuel sender flange. Use 25 mm screw to loosely attach mounting flange. Do not tighten completely. (Refer to Fig. 3)

CAUTION: Make certain float arm has a clear field of motion before tightening screws in flange assembly.



1. Slip the fuel sender assembly into the 59mm hole in the tank and turn until it goes into the tank. (Refer to Fig. 4)
1. Tighten all screws until flange is fully seated onto gasket.
1. Hook up gauge sensor wire to centre stud terminal.
1. Hook up ground wire to small terminal.

NOTE: Make sure the float is installed as shown in Fig. 1, if installed backwards, the fuel gauge will indicate "full" when the tank is actually empty and vice versa.

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