DIESEL CONTROL UNIT TYPE 500

Power supply:

Main unit: 24VDC from starting batteries. Consumption approx. 100mA.

Alarm unit: 24VDC from ships main alarm supply. Consumption approx. 100mA.

Fuses: 1. 1A fuse for engine instruments.
2. 1A fuse for power supply to circuit boards.
3. 1A fuse for supply to alarm boards 501 and 502.
4. 2A main fuse.

All fuses are located on board 506.

Alarm indication for fuse failures, except for the instrument fuse.

Dimensions:

See separate dimension drawing.

Available for desk-mounting, or in a steel enclosure for wall mounting.

General.

The automatic unit is designed to cover all control functions for an aux. diesel engine, including manual and automatic start/stop functions.

The unit consists of a maximum of 6 circuit boards, mounted in a standard "Europe-rack" module.

The boards are internally connected via a mother-board in the bottom of the rack, which is connected to the terminal strip via a plug-in 40-lead flat-cable. The mother-board has AMP-terminals for connection to engine instruments: oil pressure gauge, coolant temp. gauge, hour meter and tachometer.

ALARM CARD 501

This card has up to 6 alarm channels, 3 of them being activated internally:

START FAIL. (Only if equipped with AUTOMATIC START-unit 503). Gives an alarm after 3 unsuccessful start-attempts.

PICK-UP FAIL. Gives an alarm if the signal from the pick-up disappears whilst the engine is running. If this alarm is given when the engine is not running, the probable cause is the oil pressure switch connected to terminal 4. This switch interlocks the alarm when the engine is not running.

VOLTAGE FAIL. Gives an alarm if the power supply connected to terminals 1 and 2 drops below 23,2 Volts. Adjustable on board 505.

The 3 external alarms are based on normally closed circuits.

The alarm-loop connected to terminal 24 is interlocked for 15 seconds after the engine has started, i.e. the alarm is blocked when the engine is not running.

An activated alarm gives a flashing LED and the common alarm output relay is released (terminals 28-29-30). The alarm is reset by pressing the RESET button. The common alarm relay will then return to the normal position and the light will be continuous. When the alarm-loop is closed, the light will go out.

All alarm inputs have a 5 sec. delay.

In case of a shut-down, the common alarm relay will be released and a 24V+ output will appear at terminal 12.

All alarms can be tested by pushing the TEST button. All the LEDs will flash and the common alarm relay will be released without delay.

ALARM CARD 502

This circuit has up to 3 alarm channels and is a supplement to card 501, giving a total of 9 alarm channels.

The alarm-loop connected to terminal 21 is interlocked for 15 seconds after the engine has started.

Testing and resetting of the alarms is done from card 501.

AUTOMATIC START CARD 503

The automatic start-program can be activated with the keyswitch in the ON position and the switch at the front in AUTO position. The LED "STANDBY" will then light. A 24VDC output is then available at terminals 17 - 18.

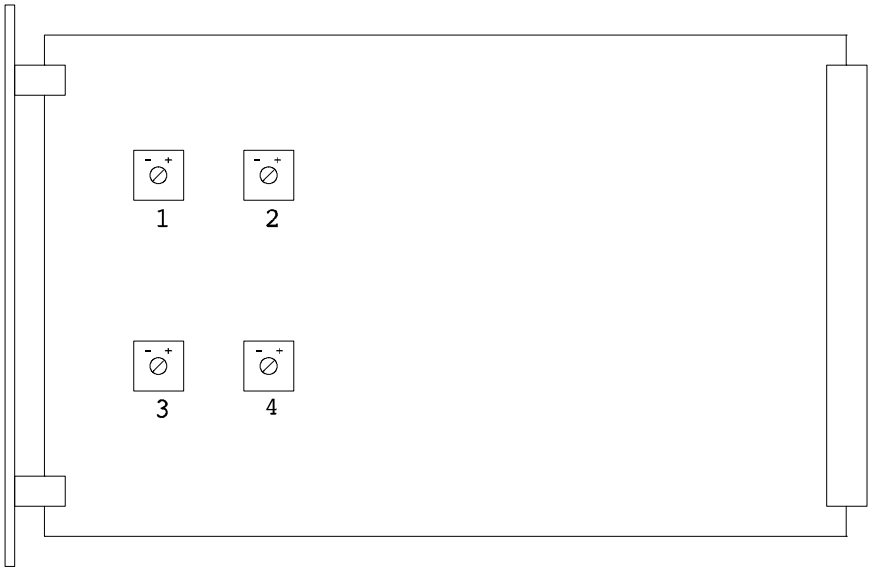
AUTOMATIC START:

3 start attempts are made when the contact across terminals 13 - 14 is closed. The LED "AUTOSTART" will light. When started, the engine will continue to run even if the contact is opened. Each start attempt is 6 seconds, with 6 seconds pause. This is not adjustable.

The delay before start is adjustable, see sketch.

DELAYED STOP:

If the contact across terminals 15 - 16 is closed, a time delay will start. The LED "DELAYED STOP" will light. When the preset time has elapsed (potentiometer 4), 24VDC will be applied to terminals 19 - 20 for disconnection of the generator breaker. The engine will continue to run for cooling (potentiometer 3) before it stops. Manual stop or shut-down will also cause voltage on terminals 19 - 20.



1: Delay before start/pre-heating. 1 - 5 seconds.

2: Pre-heating before start. 1 - 5 seconds.

3: Cooling time. 3 - 150 seconds.

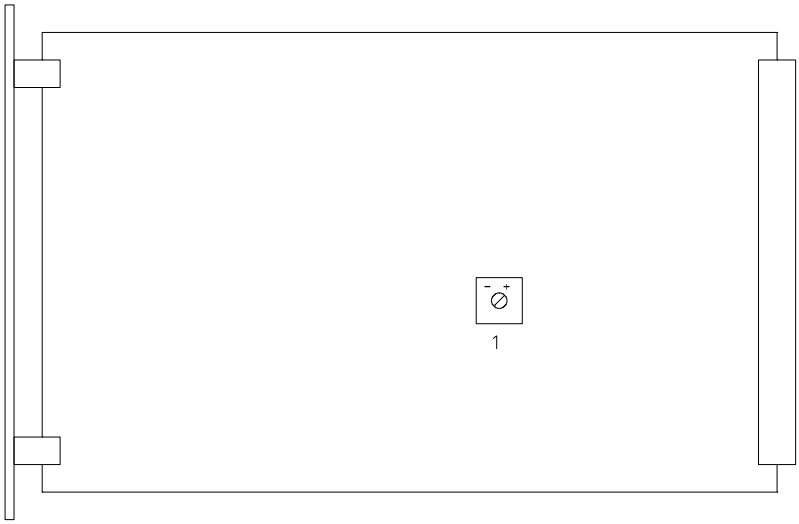
4: Delayed disconnect of generator circuitbreaker. 3 - 150 seconds.

SHUT-DOWN CARD 504

This circuit has up to 4 shut-down inputs. Shut-down-switches connected to terminals 4 and 7 are interlocked for 15 seconds after the engine has started. All switches should be normally open. The inputs are delayed 0,5 seconds to eliminate contact bounce.

The stop-solenoid will be energized for an adjustable time if one of the shut-down-switches closes or if the stop-button is pressed. As long as the stop-solenoid is energized the LED "STOP" will light and terminal 11 will have a 24VDC output. Another LED will light, indicating which switch caused the shut-down. Simultaneously the common alarm relay on card 501 will release. The LED will light until RESET is pressed. Overspeed shut-down is activated from card 505, which in turn gives a stop signal to card 504. There is 24VDC output to terminal 12 for an emergency stop device. This voltage remains as long as one of the shut-down LEDs is lit.

Neither manual nor automatic start is possible until a shut-down is RESET.



1: Stop-solenoid holding time. 30 - 90 seconds.

R.P.M. CARD 505

The card receives the signal from either a tacho-generator or magnetic pick-up. It is the frequency of the incoming signal that is measured. The voltage of the signal must however be minimum 2.5VAC. The card can be delivered with 3 different frequency ranges, depending on where the speed sensor is installed:

Card 505-1: For tacho-generator. Frequency range 100Hz.

Card 505-2: For pick-up installed at the timing gear train. Frequency range 1000Hz.

Card 505-3: For pick-up installed at the flywheel. Frequency range 7.500Hz.

There are 2 setpoints:

1. Starter interlock. Adjustable from 300 - 500 RPM. When the setpoint is exceeded the LED "RUNNING" will light and the interlocking of alarms and shut-downs will cease after a time delay of 15 seconds.

   If the voltage from the pick-up disappears during running, an alarm-signal will be given to card 501 ("PICK-UP FAIL").

NOTE: If "RUNNING" light appears during standstill there is an open connection or defective oil pressure switch connected at terminal 4.

2. Overspeed setpoint. Adjustable from 1300 - 2500 RPM.

   If the setpoint is exceeded, a stop signal is immediately given to card 504. The LED "RACING" will light. Reset with RESET switch on card 504.

   Adjustment:

   1: Run the engine at normal rated speed.

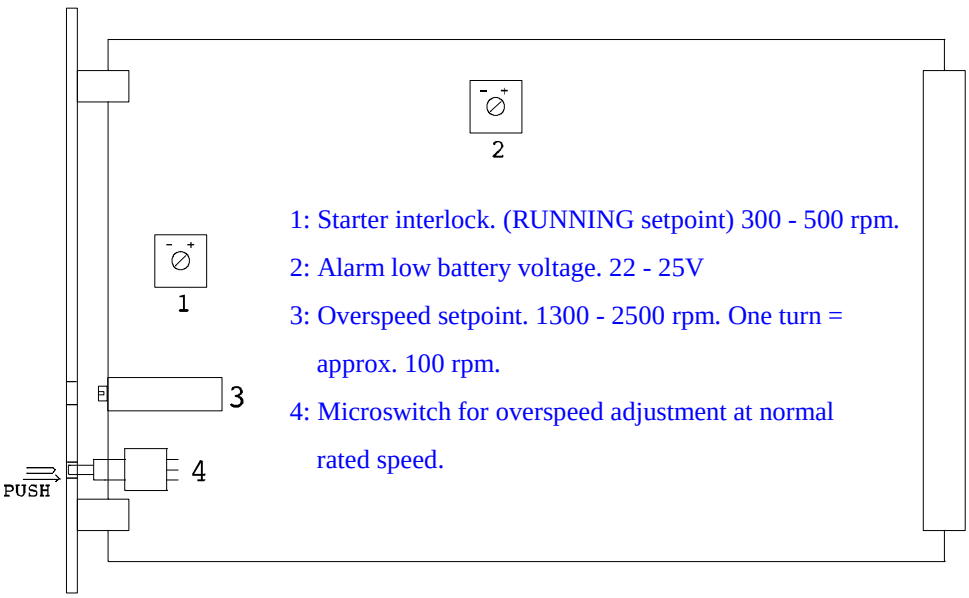
   2: Press the microswitch in front and slowly adjust potentiometer no. 3 counter-clockwise until "RACING" occurs (with the microswitch pressed).

   3: Release the microswitch. The setpoint will then increase with 15%.

   One turn on the potentiometer equals 100 engine rpm.

The LED "PWR ON" will light when the keyswitch is in ON position. The engine cannot be started when the keyswitch is OFF, but alarms and shut-downs are not affected.

The circuit monitors the battery voltage at terminals 1 - 2. If this voltage drops below 23.2Volts (adjustable), alarm signal ("VOLTAGE FAIL") is given to card 501.



1: Starter interlock. (RUNNING setpoint) 300 - 500 rpm.
2: Alarm low battery voltage. 22 - 25V
3: Overspeed setpoint. 1300 - 2500 rpm. One turn = approx. 100 rpm.
4: Microswitch for overspeed adjustment at normal rated speed.

FUSES/PUSHBUTTONS, CARD 506

Fuses. The card contains 4 fuses.

If the main fuse (4) or the circuit fuse (2) is blown , alarm "VOLTAGE FAIL." will occur on card 501.

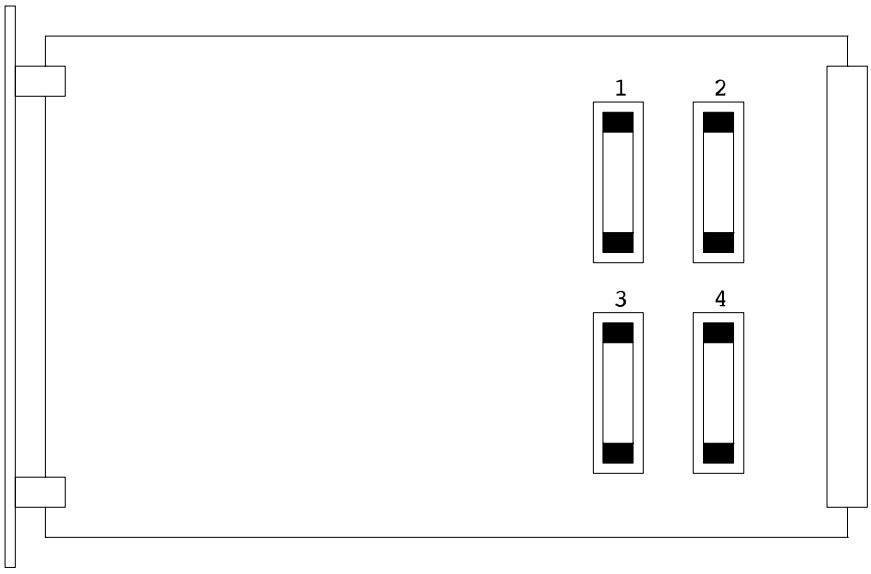
If the fuse (3) for cards 501 and 502 is blown, the common alarm relay will release and none of the LEDs at cards 501 or 502 will flash when the TEST-button is pressed..

The keyswitch's only purpose is to prevent a start, both manual and automatic, when in the OFF position. All other functions are independent of the keyswitch.

The startbutton will give voltage to terminal 10 if the LED "RUNNING" is not lit.

The stopbutton activates the stop timer on card 504, which in turn gives voltage to terminal 11. The LED "STOP" will light as long as the stop solenoid is energized.

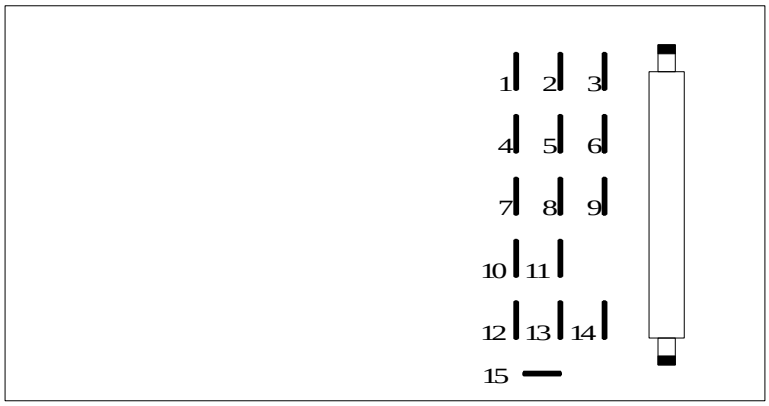
If the engine has glow plugs, card 506 will be equipped with an LED marked "HEATING CONTROL". This LED will light when the thermo-switch in the glowsystem's serial resistor closes, i.e. the plugs are warm enough for the engine to be started. The keyswitch is then installed in the right side-panel and has combined start/glow function.



1. Instrument fuse, 1A fast
2. Fuse for cards 503, 504 and 505. 1A fast.
3. Fuse for cards 501 and 502. 1A fast
4. Main fuse. 2A slow.

   All fuses 5x20mm.

TERMINALS ON MAIN PCB 500.0 (507)



1: +
2: - OIL PRESSURE GAUGE
3: G

4: +
5: - TEMPERATURE GAUGE
6: G

7: +
8: - TACHOMETER
9: G

10: +
11: - HOUR METER

12: 50
13: 15
14: 17,19 COMBINED GLOW/START SWITCH
15: 30

CONNECTIONS

Wires to terminals 1 - 2 should be minimum 1.5mm^2.

Shielded wire should be used to terminal 3. All other wiring can be made with 0.5mm^2.

TERMINAL	COMMENT
1 - 2	24VDC supply. + to terminal 1, - to terminal 2
3	Input from tachogenerator/magnetic pick-up. Shielded wire. Connect shield to terminal 2 in engine junction box, NOT to ground.
4 - 5 - 6 - 7	Shut-down switches. N.O. contacts. 4 and 7 are interlocked.
8	Oil pressure gauge sender.
9	Temperature gauge sender.
10	Output to intermediate relay for start motor.
11	Output to intermediate relay for stop solenoid.
12	Output to intermediate relay for emergency stop solenoid.
13 - 14	Automatic start input, for example black-out signal from main switchboard.
15 - 16	Delayed stop input, for example from synchronizing equipment.
17 - 18	24VDC output when in "STANDBY". Keyswitch ON and card 503 in AUTO.
19 - 20	24VDC output to release generator breaker.
21 - 22 - 23 - 24 - 25 - 26	Alarm switches. N.C. contacts. 21 and 24 are interlocked.
27	Common terminal for all alarm switches.
28 - 29 - 30	Common alarm output. Potential free changeover contact. Shown in alarm position.
31 - 32	24VDC supply to alarm units 501/502. + to terminal 31. - to terminal 32.
33 - 34 - 35	Remote start button.
36 - 37	Remote stop button.
38 - 39	24VDC output to "RUNNING" lamp or relay.
40	Output to relay for negative supply to glow plugs.
41	Output to relay for slow heating of glow plugs.
42	Output to relay for intense heating of glow plugs.
43	Input from glow indicator resistor.
44 - 45	Remote glow indication lamp.