Be172 Diesel Engine Protection Module Installation Manual 03-Nov-2022

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BE172 Specifications	
DC Supply / OFF mode current	6V up to 30 Vdc / 8mA
Static Outputs (short circuit proof)	200 mA dc
Key Switch Rating	30 A (15 secs)
Dimensions / Cut-out	72X72X55 mm / 68x68mm
Case/Weight	Steel powder-coated / 390 gr
Operating Temperature /H.R.	-30° C /+70° C / 95 n.c.
Mounting /Ingress Proetction	Two clips / IP54

DESCRIPTION

The Be172 includes the basic safeguards to protect a diesel engine. It features a 4-digit military-grade 7-segment display capable of indicating engine hour count, battery voltage, alarms and miscellaneous information. It offers 3 static outputs, 7 digital inputs, and a 30Adc-rated key switch. The Be172 monitors an oil pressure switch, a temperature switch, a fuel level switch, charger alternator voltage and auxiliary alarms. The Be172 provides a MANUAL mode of operation via a key switch. Finally, the Be172 offers 4 adjustable settings about pre-glow, fuel solenoid, fuel alarm and auxiliary alarm. The Be172 is an upgrade of the most popular Be72 engine protection module.

!! W A R N I N G !! Relays and solenoids connected to Be172 must be wired to flywheel diodes or noise-suppression devices as indicated in the wiring diagram.

1.0 MANUAL START & STOP

A) - When the KEY is in position ‘OFF’, a white dot blinks on the right side of the display. This indicates the standby mode. All the time you turn the KEY to ‘OFF’ the display indicates the [HOUR COUNT] for about 10 seconds (for example [h 278]). Then, the display turns off. The ‘OFF’ mode clears all alarms.

B) - Turn the KEY to ‘ON’. The display indicates the battery voltage for 3 seconds (for example [b 12.6]).

C) - When the display indicates the prompt [StA-] (it stands for START) you are required to turn the KEY to ignition in the same way you start your car. When the Be172 detects oil pressure from the switch or the Be172 detects voltage on the charger alternator, the display indicates for a few seconds the status of the HOUR COUNTER and then a rotating animation will be continuously displayed. In case you programmed a pre-glow, the message [ПППП] will immediately appear as you turn the key on. You can turn the key to ignition as soon as the prompt [StA-] appears on the display.
If you leave the KEY in the on position without starting the engine, the Be172 shuts down the fuel after 20 seconds. The display will indicate the message [FAIL] (it stands for starting failure shutdown).

Note1 In normal conditions, when the engine is not running, the Be172 expects an oil pressure switch closed and no voltage on D+ terminals. If the Be172 finds a different logic condition, it will warn you by indicating for a few seconds the messages [oil.] or [cHAr.] or both in sequence. You can anyway start the engine without problems. The Be172 reminds you to investigate the issue. It could be an open connection problem that prevents the full protection of the engine,

D) - Turn the KEY to ‘OFF to stop the engine. The display will indicate for 10 seconds the [HOUR COUNT]. Then, it will shut down the display. A white dot on the right side will blink slowly indicating a standby status. The Be172 absorbs as lower as 8mA of current. Consider removing the battery supply if you do not use the engine for a long time (e.g. weeks or months).

2.0 ALARMS LIST

[DISPLAY]	ALARM DESCRIPTION	NOTES
[bELt]	Engine Belt break or Charger failure shutdown. The Be172 triggers this alarm and shuts down the engine if the input [D+/W.L] is continuously missing for at least 20 seconds. This alarm is ignored during the first 8 seconds after starting the engine.	Check for the belt or the charger alternator.
[°C]	Engine High-Temperature alarm. The Be172 triggers this alarm and shuts down the engine if the switch input [°C] is closed for at least one second. This alarm is ignored during the first 8 seconds after starting the engine.	Check the engine cooling system.
[ALAr]	Emergency alarm. The Be172 triggers this alarm and shuts down the engine if the switch input [ALR] is closed for at least one second.	Check the emergency button status.
[FuEL]	Fuel level alarm. The Be172 triggers this alarm if the switch input [FUEL] is closed for at least one second. Based on the settings of the parameter [P3], the BE172 triggers a warning (it features auto-reset) or shuts down the engine after a programmable time.	Refuel the tank
[ALr1]	Alarm 1. The Be172 triggers this alarm if the switch input [SPARE] is closed for at least one second. Based on the settings of the parameter [P4], the Be172 triggers a warning (it features auto-reset) or shuts down the engine after a programmable time.	Check the Alarm 1 source.
[oiLP]	Low oil pressure. The Be172 triggers this alarm and shuts down the engine if the oil pressure switch connected to the [OIL] input is closed for at least one second. This alarm is ignored during the first 8 seconds after starting the engine.	Check the oil level.
[FAIL]	Fail to start alarm. The Be172 triggers this alarm and shuts down the [FUEL] output if it does not detect, within 20 seconds, a valid source of engine running from terminal [D+/WL] or a valid transition of the [OIL] input (closed-to-open).	Check the engine or check if have forgotten the KEY in the ON position.
[bXX.X]	This blincking message indicates a low/high battery voltage 11.8/15,6V & 23.6/31.0V	Check the battery
[Err-]	The Be172 fails to enter the 'PROGRAM MODE' due to an erroneous input setup.	
[Err2][Err1]	The supply is lower than 10V. The Be172 denies access to the memory. Check the dc supply.	
[EE.Er]	The Be172 failed the memory initialization routine during the power-on. Remove the supply for a few seconds. If the error persists, replace the Be172.	

3.0 FUEL SOLENOID & STOP SOLENOID

In order to stop the engine, we recommend that you use a **FUEL SOLENOID** (energized to run)**.** This solenoid must be connected to the output [FUEL] via a pilot relay. In the case of **STOP SOLENOID** (energized to stop), you are required to set up the adjustable parameter [P2] as indicated in the programming instructions. You are required to connect the **STOP SOLENOID** to output [ALARM] via a pilot relay as indicated in the wiring diagram. The Be172 will energize the output for the programmed STOP time. When you use the output [ALARM] to drive a **STOP SOLENOID**, the **ALARM** function output will no be longer available. In other words, the **STOP SOLENOID** output shares the same output used for **ALARM.** The factory setting for the [ALARM] output is **ALARM MODE**

4.0 PROGRAMMING INSTRUCTIONS

There are four adjustable parameters: [P1], [P2], [P3], and [P4]. Follow the instructions.

1) Make sure the battery supply is over 10Vdc; 12Vdc is the optimal supply.
2) Remove the DC supply, turn the key to OFF and connect to the battery minus the terminal **[PRG]**.
3) Connect to the battery minus the "**[TERMINAL]"** associated with the parameter you want to program.

The following table shows the allowed combinations. Disallowed connections display an error code.

DISPLAY	TERMINAL	DESCRIPTION	DEFAULT	OPTIONS
[P1]	**[AUX1]**	Pre-glow settings	OFF=No preglow	6" 15" 30" 45" 1'
[P2]	**[ALR]**	Alarm/Stop solenoid	OFF=Alarm mode	5" 15" 30" 45" 1' 2'
[P3]	**[FUEL]**	Fuel alarm modes	OFF=Warning only	5' 10' 20' 30' 60'
[P4]	**[SPARE]**	Alarm 1 modes	OFF=Warning only	5" 15" 30" 45" 1' 5'
[Err-]	The Be172 detected a not-valid combination of inputs. For example [PRG] + [OIL] or [PRG] + [°C]			

4) Connect the supply. The display will indicate the message [Prog], and for a second, the name of the parameter ([P1] for example). Finally, the display indicates the active setting (usually the factory default).
5) Turn the key ON. The Be172 will automatically scan, in sequence, each option for two seconds (if you have selected [P1], the Be172 displays OFF-6"-15"-30"-45"-1').
6) When you see display the desired option, immediately turn the key to OFF. The display will blink twice in order to confirm your option: the Be172 immediately stores and activates the new setting.
7) Remove the supply, remove the **[PRG]** connection, and remove the "**[TERMINAL]"**.
8) Apply the supply. After the indication of the internal firmware on four digits form, the Be172 displays the parameter you modified ([P1] for example) and the setting ([6"] for example). In this way, all the time you supply the controller, you will be aware of the status of the parameters. If you modify all parameters, the display will indicate all parameters in sequence.

5.0 RECOMMENDED WIRING DIAGRAM

Relays and solenoids connected to Be172 must be wired to flywheel diodes. The D+/WL terminal supplies about 300mA dc current max. If the charger alternator is not available, connect the D+/WL to OIL PRESSURE input.