

Technical leaflet - alarm calibration

Major engine damages with resulting high repair costs and vessel downtime occur, because the cooling water, water- or oil level and or oil pressure alarm did not function.

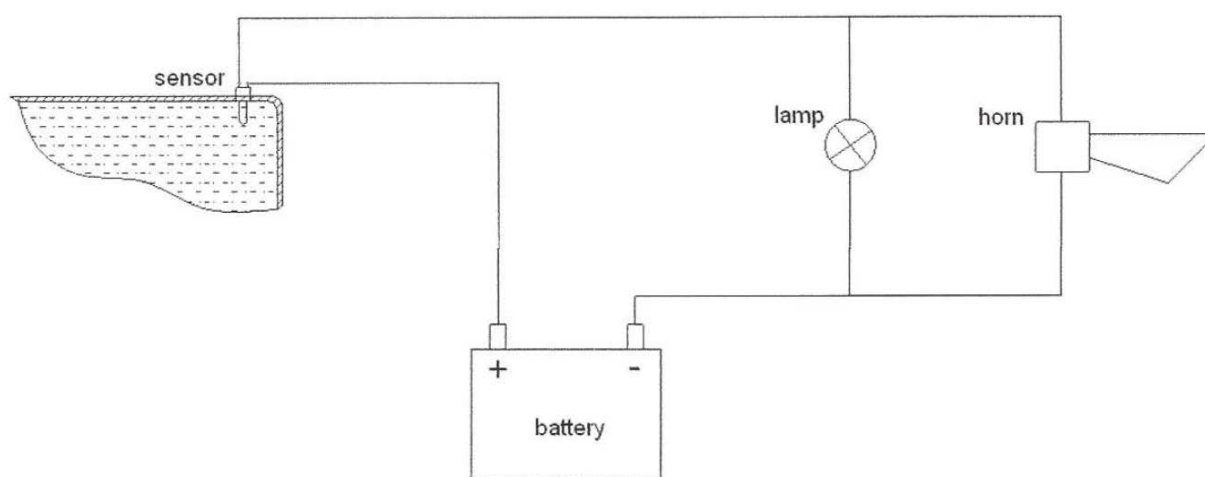
All insurers and many ship owners have been confronted with this in the past. Not correct functioning alarms form a major damage risk. Frequent testing of the correct functioning of the alarms should be high on the damage prevention list.

However, only the checking of the alarm and the short circuiting of the wire to see if the alarm indeed sounds and the warning light blinks, is not sufficient.

"Checking" also means the calibration of the alarm indicator itself.

What is "calibration"?

What is actually meant by "Calibration" is made clear in below example. For instance we take a look at a cooling water alarm. The schematics look like as is shown below:



An alarm system consists of an electrical circuit, powered by a battery.

The temperature sensor is the contact that opens or closes the circuit, depending on the temperature of the cooling water.

In normal circumstances, the contact of the sensor is open. If the protection of the engine cooling water alarm should go off at 92 ° C, the sensor is set from the factory in the measurement of 92 ° C to close the contacts. When the contacts are closed, the electrical power circuit activates the alarm signal lamp and the horn. The setting of the sensor at 92 ° C is called the "calibration of the sensor" or in short, "calibration of the alarm."

The initial setting value of the initial calibration of the sounder (sensor) may diverge in time (contamination of the sensor, aging). As a result, it may be that the contact points of the trigger device (sensor) only begin to close at 102 ° C instead of at 92 ° C. In that condition, the cooling water alarm is worthless, because the engine is already overheating before the alarm is factually activated. Hence the importance of a periodic check of the alarm calibration.

How is such a calibration of alarms carried out?

A distinction should be made between cooling water temperature alarm, oil pressure alarm and oil level alarm.

In case of the cooling water temperature and oil pressure alarm, original settings values should firstly be obtained from the engine manufacturer

The checking of the alarm calibration is then carried out as follows:

1. Cooling water temperature alarm:

In a conventional engine, the trigger device is to be taken out to be hung in a pot with water. The contacts are connected to a signal light or voltmeter. With a coil heater, the water is brought up to temperature, and in a separate thermometer which hangs into the water, the temperature rise is continuously measured. At the time when the light starts to burn, the temperature is noted. The measured temperature should in principle be equal to the setting value specified by the manufacturer

With type of alarm sensors the setting value can be adjusted (calibrated) manually. When the sensor isn't equipped with such a setting adjustment possibility, the sensor when giving an incorrect measure value needs to be exchanged for a new one.

It should be noted that the control of the calibration method described above does not require development of the trigger device by modern electronically controlled engines. In principle, the engine manufacturer can, by using a laptop, verify that which temperatures the sensor will be activated.



2. Oil pressure alarm:

The sensor of an oil pressure alarm is called a "pressure switch". Most pressure switches can be adjusted manually. In principle, one should not have to build out the sensor in order to check the calibration of the pressure switch. One only has to place an accurate gauge on the oil pressure pipe and note when the oil pressure starts to activate the pressure switch when the engine is shut down the engine and the oil pressure drops.

Here also the same remark applies for electronically controlled engines, where the activating moment of the pressure switch is read with the help of a laptop.

3. Level alarms:

Level alarms of which a float is the sensor, can be checked by (if accessible) moving the float with the hand up and down. If it is not visible, it is necessary to examine the way in which the level of the liquid can be increased or decreased to check the float's functionality depending on the type of liquid system. With rod level alarms, depending on the system, one must examine how the liquid level can be increased or decreased in order to check the correct functioning of the rod the liquid level alarm.

If this is not possible, the rod has to be removed and to be immersed in a tub with the same liquid in order to establish at which level the sensor is activated.

Practical alarm calibration sheet:

In the enclosure a universal sheet is added which can be changed to the situation at hand on board a certain to be inspected vessel. The initial calibration in this sheet is called "soll" ("soll" = should be) value. The ship owner should once, in consultation with the manufacturer of the machinery components fill in these initial values.

The column next to this is called the "ist"-column ("ist" = factual measured value). Here the values measured on board should be filled in.

Performing the check of the alarm calibrations must be done by a specialized firm. The auditor should in the column "comments" refer to "ok" if the measured value corresponds to the initial calibration. If the latter is not the case, then it should be filled in which action was taken.

The attached sheet "Test report alarms" is an example.

Test report alarms



Carried out by:

date

Place

Signature auditor:

SB main engine	Make		Type	Power (kW)	rpm
	"soll" = required value	"ist" = measured value	Kind/type	Remarks	
Cooling water alarm LT circuit					
Cooling waster alarm HT circuit					
Oil pressure alarm					
Oil pressure stop alarm					
Expansion tank level alarm					
Sump oil level alarm					
PS main engine	Make		Type	Power (kW)	rpm
	"soll" = required value	"ist" = measured value	Kind/type	Remarks	
Cooling water alarm LT circuit					
Cooling waster alarm HT circuit					
Oil pressure alarm					
Oil pressure stop alarm					
Expansion tank level alarm					
Sump oil level alarm					
Carterolie niveau alarm					
Gearbox	Make		Type	Power (kW)	rpm
	"soll" = required value	"ist" = measured value	Kind/type	Remarks	
Oil pressure alarm					
Oil temperaturte alarm					
Sump level alarm					
SB auxiliary engine	Make		Type	Power (kW)	rpm
	"soll" = required value	"ist" = measured value	Kind/type	Remarks	
Cooling water alarm LT circuit					
Cooling waster alarm HT circuit					
Oil pressure alarm					
Oil pressure stop alarm					
Expansion tank level alarm					
Sump oil level alarm					
PS auxiliary engine	Make		Type	Power (kW)	rpm
	"soll" = required value	"ist" = measured value	Kind/type	Remarks	
Cooling water alarm LT circuit					
Cooling waster alarm HT circuit					
Oil pressure alarm					
Oil pressure stop alarm					
Expansion tank level alarm					
Sump oil level alarm					
Oil lubricated propeller shaft	"soll" = required value	"ist" = measured value	Kind/type	Remarks	
Level alarm					
Water lubricated propellor shaft	"soll" = required value	"ist" = measured value	Kind/type	Remarks	
Flow alarm					