

Guideline No. 37e

GUIDE LINES FOR THE CONSTRUCTION, SAFEGUARDING AND CHECKING FOR AN
UNMANNED ENGINE ROOM ON BOARD VESSELS EQUIPPED WITH A PROPULSION
ENGINE OF MORE THAN 750 KW AND LESS THAN 3.000 KW

- English Edition -

In case of doubt
the Netherlands
edition always
prevails.

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Subject to alterations

I N D E X

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NOTE:

- FOR FIXED BLADED PROPELLER INSTALLATIONS: B AND N NOT APPLICABLE
- FOR CONTROLLABLE PITCH PROPELLER AND/OR REVERSABLE CLUTCH INSTALLATIONS : A AND M NOT APPLICABLE

5. The requirements for the alarm installation in the engine room should comply with art. 51 of Annex II of Shipping Decree 1965 (Regulation 51 of part E of Chapter II-1 of the 1974 SOLAS Convention as amended).
Moreover there shall as far as applicable be complied with the following:
5.1 The main alarm panel shall be installed in the E.R.C. station. Contrary to this other approved alarm systems can be accepted so far as the construction and the location are concerned.

GENERAL REGULATIONS

1. Definitions:

E.R.C. Station = space where the main alarm panel is located.

Manoeuvring stand in engine room = space where the main engine is controlled.

H = high alarm

HH = high-high alarm (extra high)

L = low alarm

LL = low-low alarm (extra low)

2. On the bridge shall be visually indicated whether the engine room is manned or unmanned. On the bridge as well as on the manoeuvring stand in the engine room a visual indication must show where the main propulsion installation is controlled. It shall be impossible to control the installation from the bridge and the engine room simultaneously. Switching to and taking back of remote control shall be possible from the engine room only. Furthermore there shall be sufficient safety being incorporated in the system to prevent the propelling thrust altering considerably when switching from one station to the other.

Note: Above mentioned safety is also presumed to be obtained if a so called "final take over button" has been installed on the bridge control desk. Switching from ERC to BC has to activate on bridge control desk a signal light with inscription "Bridge control possible". The bridge control system may not become operative before the "final take over button" has been activated. The signal light "bridge control possible" shall extinguish whereas the signal light "bridge control" shall light up.

3. All alarm mentioned in these guide lines shall be displayed as follows:

3.1 Audible and if required visible all over the engine room.

3.2 Audible in the cabins of duty officers.

3.3 Audible in accommodation where considered necessary.

Additional rules or in case it is also required to display an alarm directly on the bridge such requirements will be mentioned in the column "Remarks". In case an alarm is not acknowledged within a predetermined period, the General Engineers Alarm System as prescribed shall be activated whereas the bridge shall also be notified.

4. There shall be a clear distinction between the respective sound sources. Where a clear distinction cannot be sufficiently obtained it is allowed, with the exception of the CO₂ or Halon alarm, to install one common sound source with the addition of a (light)panel at appropriate places, visually indicating the cause of the audible alarm. In case the audibility of a sound source is insufficient, one or several rotating beam lights may be installed with the exclusion of the CO₂/Halon alarm.
5. The requirements for the alarm installation in the engine room should comply with art. 51 of Annex II of Shipping Decree 1965 (Regulation 51 of part E of Chapter II-1 of the 1974 SOLAS Convention as amended).

Moreover there shall as far as applicable be complied with the following:

- 5.1 The main alarm panel shall be installed in the E.R.C. station. Contrary to this other approved alarm systems can be accepted so far as the construction and the location are concerned.

All alarm signals mentioned in this guideline shall be made known audible and visible on the main alarm panel.
If this indication takes place via a monitor (C.R.T.) one of the next requirements shall be met:

- the E.R.C. station shall be provided with two monitor units;
- the possibility to replace in an easy way the monitor by a spare one;
- the installation of local monitors or alarm panels in the engine room.

If the E.R.C. station is situated at the bridge one or more monitors or alarm panels shall be installed in the engine room in addition to the monitor installed at the bridge.

The information flow to the monitor shall be guaranteed in two independent ways unless an alarm system, independently operating of the central processing unit (C.P.U.) is available.

The sensors and associated wiring may be fitted in a single way.

If safeguarding of the engine room installation takes place from the bridge the monitor shall display both the alarm and the required action.

Instead of the foregoing system it will be acceptable to order the required action, for example, by keying a codenumber.

In case of a monitor failure at the bridge, those alarms, which are related to a reduction of the propulsion power or to a complete power cut shall remain in operation.

A short interruption of the electric power supply shall not result in deviations of the reading or in a failure of the alarm signalling.

- 5.2 On the alarm panel a visual indication shall register that the panel is switched on.
- 5.3 By means of coloured signals the cause of an alarm shall be indicated. An illuminated display may be used for this purpose, while any contemporary system may be acceptable after approval.
- 5.4 For a group alarm originating from a local alarm panel, being part of a particular installation, e.g. a boilerplant, it might be accepted that only the first alarm activates the main alarm panel.
Such an alarm indicated on the main-panel may be accepted on the local alarmpanel, provided that all remaining alarms on the main alarmpanel will not be influenced. This audible alarm may be switched off by the duty officer.
Safeguarding systems of such an installation shall always remain operational.
- 5.5 Alarm and safeguarding circuits shall be separated.
The use of common sensors in alarm- and safeguarding circuits is acceptable with the exception of those circuits provided with an automatic stop function.
Alarm circuits shall be executed according to the principle based on normally closed contact as far as possible.
Cable failure and defective sensors shall activate an alarm as far as possible.
Safeguard circuits may be executed according to the principle based on normally open contact. In this case at least the electric power supply shall be guarded.
It is strongly recommended to guard the circuit against cable failure.

- 5.6 Alarm and safeguarding circuits shall be provided with facilities for testing in such a manner that these systems shall be capable of being tested during normal machinery operation either manually or automatically.
- 5.7 Where required, alarms shall be provided with delayed action. During manoeuvring unnecessary alarms shall be prevented. These alarms do sometimes occur in case of main-engine or shaft driven auxiliaries.
6. Requirements for alarm installation on the bridge
- 6.1 Visual and audible alarms which have to be relayed directly to the bridge according to these guidelines shall be shown on the bridge control panel as stated hereafter:
- 6.1.1 red indicators or another approved display which cannot be dimmed nor switched off on the bridge for:
- 6.1.1.1 remote control failure of the main engine;
- 6.1.1.2 indication "reduce to minimum revs.", "reduce pitch" or automatic revs. reduction;
- 6.1.1.3 spontaneous stop of main engine;
Furthermore, if provided, disengaging of clutch, low lub.oil pressure of reduction gear or reversing gear with display "installation out of order";
- 6.1.1.4 the alarms which have been prescribed in the column "Remarks" to be relayed to the bridge";
- 6.1.1.5 non-acknowledging of all other alarms in the engine room within a predetermined period, preferably by means of only one group alarm.
- 6.1.2 Acknowledgement of the above mentioned alarms in the engine room shall be signalled to the bridge by a change in presentation of the visual alarm, which contrary to 6.1.1 after acknowledging may be dimmed but not switched off.
- 6.1.3 An indication which cannot be switched off but may be dimmed shall indicate that the alarm installation is switched on.
- 6.1.4 The visual alarms mentioned in 6.1.1 shall be accompanied by an audible alarm. This audible alarm may be switched off on the bridge provided that any consecutive alarm signal shall activate the audible alarm again.
7. Safety control equipment for engine room watchkeeping personal (SCE):
A safety control equipment shall be installed which operates as follows:
Upon switching on, the SCE shall give an alarm signal in the engine room after 27 minutes. In case this alarm is not acknowledged within 3 minutes the SCE shall activate the general engineers alarm.
Various reset buttons for the SCE may be installed throughout the engine room.
The SCE needs normally not to be activated, but shall be switched on if:
- a. an alarm requires the presence of the duty officer in the engine room.

In this case the SCE shall be switched on automatically through the occurring alarm whereas it can be switched off by the duty officer when leaving the engine room.

- b. the duty officer for other reasons e.g. periodical inspections or temporarily one-man watchkeeping, is present in the engine room. In this case the SCE shall be switched on and -off by the duty officer concerned.

Switching on and -off of the SCE shall be effected outside the engine room at a location which is determined in consultation with the NSI surveyor.

8. General

If the operation of a protective device causes a stop of machinery or part of the installation, arrangements shall be made as to prevent that the entire installation is put out of operation. This is applicable, in particular, in case of a power cut of the propulsion plant, whereby the auxiliary installation shall remain in operation as far as possible.

If, as a result of a black-out, blocking devices prevent the main engine from restarting - after restoring the normal working conditions - the bridge shall be equipped with an arrangement to release this blocking system.

In case of a failure in the control system, the installation shall remain in a safe working condition.

In case that the electrical power of the ship's electrical distribution system has been restored after a "black out" all installations required for the main engine, the steering of the ship and necessary navigation equipment should automatically start operating again.

Bridge control desk(s) shall be provided with a lighting for the instruments that can be dimmed.

Arrangements are to be such, that in case of failure of the remote control of the main engine or automatic control of the engine room installation, the installation can be manually operated in a reasonable and justified manner.

For special installations e.g. diesel electric propulsion, additional requirements can be prescribed by the Head of the Shipping Inspectorate.

Wherever in these guidelines is indicated: with order "reduce to minimum revs." this should read for controllable pitch propeller installations: with order "reduce propeller pitch" in case the revolutions of the main engine cannot be controlled from the bridge.

9. Fire prevention, -detection and fighting.

9.1 Fire prevention.

Fuel oil and lubricating oil pipelines in engine rooms shall as far as desirable and practicable be shielded and/or protected, in order to prevent spraying of oil or oil leakages to contact heated surfaces or enter air intakes of machinery. This is also applicable to hydraulic systems in case a combustible fluid is used.

Special attention shall be paid to the shielding of H.P. fuel lines on diesel engines; possible spillages shall be conducted to a drain tank with an appropriate level alarm.

In case daily service tanks for fuel oil are filled automatically, spillage of oil from this tank shall be prevented.

Spillage of oil shall also be prevented for centrifugal separators and filters for treatment of fuel oil and lubricating oil.

Fuel oil daily service tanks and settling tanks in machinery spaces equipped with heating appliances shall be provided with a high temperature alarm in case the temperature in these tanks could rise above the flash point of the oil concerned.

9.2 Fire detection.

The arrangements for fire detection shall be in compliance with art. 13 and 14 of Annex II of Shipping Decree 1965. (Regulation 13 and 14 of part A of Chapter II-2 of the 1974 SOLAS Convention as amended).

9.3 Fire fighting

Provisions for fire fighting c.q. starting of fire fighting pumps, stopping of ventilators, fuel pumps and/or centrifugal separators, controls of the CO₂/Halon fire extinguishing installations, closing of valves on high positioned fuel oil tanks etc. shall be arranged as close together as possible. Preferably a central safety station should be provided to this effect, however the CO₂/Halon bottles for the use of fire extinguishing shall never be located in this safety station.

10. Inspection and approval.

Documents which have to be submitted for approval are mentioned in the Notice to Shipping number 187/1983.

The installation shall be presented on a technical trial trip for inspection and approval on behalf of the Inspector of Shipping, Head of the District in which the ship is registered or under construction. After the engine installation has proved to function properly and no alarms or almost no alarms are activated, an unmanned engine room shall be simulated during a period of four to six hours sailing.

When intervention during above mentioned trial appears to be necessary alterations may be carried out, if possible in consultation with the NSI surveyor or by notifying him afterwards.

During the above mentioned period only the necessary required persons shall be present in the engine room at the discretion of the surveyor of the Shipping Inspectorate.

All alarms activated during the trial period shall be noted, with the cause of the alarms if possible.

After simulation of unmanned engine room during four to six hours the following manoeuvres with the main engine shall be carried out:

- a. reduce revs. of main engine from full power ahead to half power ahead. There after with intervals of approximately 3 to 5 minutes:
- b. stop main engine;
- c. slow astern;
- d. half astern;
- e. slow ahead;
- f. slow astern;
- g. stop;
- h. slow ahead and increase to full power ahead;
- i. to perform a "black out" test on which occasion, without interference in the engine room, after some time manoeuvring from the bridge shall be possible.

The performance of the "black out" test shall in case of an installed shaft-generator, take place with this shaft-generator in operation. The "black out" test shall be carried out in consultation with the surveyor of the Shipping Inspectorate. After the trial trip the surveyor of the Shipping Inspectorate shall make out a written report to the Head of the Shipping Inspectorate via the Head of the District.

Upon receipt of the written report of the trial trip the Head of the Shipping Inspectorate will consider the issue of a certificate for an unmanned E.R. and attached thereto the minimum engine room manning requirements.

In the affirmative case a manning appendix will be provided, on which is indicated the minimum manning condition of the engine room and the minimum engine room manning requirements.

In case that the manning appendix cannot be provided due to defects established during the trial trip, these remaining defects can be presented again after repair for approval to the Inspector of Shipping, Head of the District.

On his behalf a surveyor of the Shipping Inspectorate shall carry out the final approval tests.

Upon receipt of the report of this surveyor of the Shipping Inspectorate it will be considered if the ship will be issued with the requested manning appendix.

In the affirmative case this will be provided by the surveyor of the Shipping Inspectorate.

Temporary provision.

With regard to the construction of an installation as mentioned before on board a ship the Head of the Shipping Inspectorate can deviate from this guideline for ships of which the keel has been laid before the date of publication of this guideline or the construction of the ship is at a similar stage.

WATCHDOG			
1. Propulsion machinery control position	at all propulsion machinery control positions	yes	By an alarm if temperature diverges from the average temperature. Group alarm provided.
2. Change over control - E.R. control - resp. v.v.	at the engine room control station	yes	Change over operation by one control.
3. Emergency stop	at all propulsion machinery control positions	yes	Restriction of the number of automatic starts. Audible and visual alarm at the bridge if a programmed bridge control system is installed.
4. Exhaust gas temp. each cylinder	at all propulsion machinery control positions	yes	By an alarm if temperature diverges from the average temperature. Group alarm provided.
5. MAIN ENGINE WITH CONTROLLABLE PITCH PROPULSION (bridge control included)			
1. Starting and stopping of main engine	at the bridge and in the engine room	yes	Visual indication, from which position can be started. Interlock to be provided against operation from more than one position.
2. Change over which controls control - E.R. control - resp. v.v.	at the engine room control station	yes	Change over operation by one control.

WATCHCOMPONENT	Means of operation, safeguarding, checking.	ALARMS	REMARKS
A. <u>MAIN ENGINE WITH FIXED PITCH PROPELLER</u> (Remote control included)			
1. Propulsion machinery control position	a. at the bridge ⁺ ; and b. at another place preferably at the bridge, independent of remote-control as mentioned under a.; and c. locally at the engine ⁺⁺ (plain emergency control)	yes ^o	+ When one or more remote controls have been provided than at least one of the controls must be operated by one handle only, this control must be fully programmed, an overload protection, if necessary, included. Handle to point in required direction of sailing. ^o Audible and visual alarm at the bridge in case of remote-control(s) failure. (see 6.1.1.1) ⁺⁺ In case second control is not situated in E.R.
2. Change over switch remote control - E.R. control resp. v.v.	at the engineroom control station		Change over operation by one control.
3. Emergency stop button ^o	at the bridge, independent of remote control(s)	yes ⁺	+ Directly activating the general engineers alarm. Reset on the bridge. Not required if an independent clutch control is installed.
4. Exhaust gas temp. of each cylinder	at all propulsion machinery control positions	yes ^{H+}	+ Or an alarm if temperature diverges from the average temperature. Group alarm permitted.
5. Overload indication	from fuel control shaft, or torsion meter, or pressure transmitters etc.	yes	Audible and visual alarm at the bridge and delayed at the alarmpanel in the engine room.
6. Engine telegraph	at all propulsion machinery control positions		
7. Tachometer main engine with direction of rotation	at all propulsion machinery control positions		Critical speed range to be indicated in red colour.
8. Tachometer propeller-shaft with direction of rotation.	at all propulsion machinery control positions		+ Only required if a clutch is installed. Critical speed range to be indicated in red colour.
9. Starting protection ⁺		yes	+ Restriction of the number of automatic starts. Audible and visual alarm at the bridge if a programmed bridge control system is installed.
B. <u>MAIN ENGINE WITH CONTROLLABLE PITCH PROPELLER</u> (bridge control included)			
1. Starting and stopping of main engine	at the bridge and in the engine room		Visual indication, from which position can be started, interlock to be provided against operation from more than one position.
2. Change over switch remote control - E.R. control resp. v.v.	at the engineroom control station		Change over operation by one control.

WATCHCOMPONENT	Means of operation, safeguarding, checking.	ALARMS	REMARKS
B. MAIN ENGINE WITH CONTROLLABLE PITCH PROPELLER (Remote control included) (cont.)			
3. Revolutions control main engine	See item A.1		+ If revolutions control is provided.
4. Emergency stop button ^o	at the bridge, independent of the remote control(s)	yes ⁺	^o Not required if a clutch is installed independent of the remote control. + Directly activating the general engineers alarm. Reset on the bridge.
5. Exhaust gas temp. of each cylinder	spare pump automatically starting	yes ^{H +}	+ Or an alarm if temperature diverges from the average temperature. Group alarm permitted.
6. Overload indication	from fuel control shaft, or torsionmeter, or pressure transmitter etc.	yes ⁺	+ Visual alarm on the bridge and delayed at the alarmpanel in the engine room.
7. Engine telegraph	at all propulsion machinery control positions		Telegraph's subdivision depends on type of propulsion machinery.
8. Tachometer propeller-shaft ⁺	at all propulsion machinery control positions		+ Only required if a clutch is installed. Critical areas to be indicated in red colour.
9. Tachometer main engine	at all propulsion machinery control position		Critical areas to be indicated in red colour.
10. Propeller pitch control.	See item A.1.	yes ⁺	In case of a failure in pitch control the preset position of the propeller blades shall be maintained as far as possible. (See 2.7 art.31 Ann.II) Control handle on the bridge to indicate the required direction. Audible and visual alarm at the bridge in case of failure of pitch control. (See 6.1.1.1) *Not required at mechanical control
11. Propeller pitch indicator	at all propulsion machinery control positions		
12. Oil pressure of positioning unit propellerblades	spare pump automatically starting	yes ^{L +}	+ Audible and visual alarm at the bridge. Combined alarm with B 10 is permitted.
13. Temperature of oil in system ⁺		yes ^H	+ If system is provided with a cooler.
14. Pumps for positioning unit propeller blades	spare pump automatically starting	yes	
15. Level of oil supply- or circulating tank for positioning unit propeller blades		yes ^L	

WATCHCOMPONENT	Means of operation, safeguarding, checking.	ALARMS	REMARKS
C. <u>PISTON COOLING SYSTEM MAIN ENGINE</u> (if separate system)			
1. Temperature of system ⁺	automatic control	yes ^H	* If each piston is equipped with a temperature alarm, a system alarm is not required
2. Pressure ⁺		yes ^{L O}	+ Visible at E.R. control station. O Audible and visual alarm at the bridge with order "reduce to minimum revs" or "automatic reduction of revs"
3. Pumps	spare pump automatically starting	yes	
4. Coolant flow or temperature of each piston		yes ⁺	+ Audible and visual alarm at the bridge with order "reduce to minimum revs". If desired automatic reduction of revs or automatic stop. In case of an automatic stop the general engineers alarm shall be activated. Manual override allowed. Group alarm permitted.
5. Level control header tank ⁺		yes ^L	+ Manual fill up. Level alarm to be positioned at top of tank.
D. <u>JACKET COOLING SYSTEM MAIN ENGINE</u>			
1. Temperature of system	automatic control	yes ^H	- If valves have been fitted in the supply lines to each cylinder an alarm for each cylinder is required. Group alarm permitted.
2. High temperature protection ⁺		yes ^{HH}	+ Required only at medium- and highspeed engines, automatic stop, or automatic reduction of revs, directly activating the general engineers alarm. Manual override allowed.
3. Pressure or coolant flow ⁺		yes ^{L O}	+ Visible at E.R. control station. O Audible and visual alarm at the bridge with order "reduce to minimum revs". If desired automatic reduction of revs or aut. stop of main engine. In case of an automatic stop the general engineers alarm shall be activated. Manual override allowed.
4. Pumps	spare pump automatically starting.	yes	
5. Level control header tank ⁺		yes ^L	+ Manual fill-up Level alarm to be positioned at top of tank.
6. Detection of leaking H.P. fuel lines	steel welded piping, valves or equivalent system	yes ⁺	Alarm depending on design.
7. Over-speed protection	Independent of governor	yes	Alarm to engine room only permitted with visual indication of functioning of over-speed protection

WATCH COMPONENT	Means of operation, safeguarding, checking.	ALARMS	REMARKS
E. LUBRICATING OIL SYSTEM MAIN ENGINE			
1. Temperature	automatic control	yes ^H	Visible at E.R. control station.
2. Pressure in system ⁺		yes ^L ^o	⁺ Visible at E.R. control station. ^o Audible and visual alarm at the bridge with order "reduce to minimum revs".
3. Low pressure protection		yes ^{LL}	Automatic stop, directly activating general engineers alarm. "Manual override" at the bridge allowed.
4. Pumps	Spare pump automatically starting	yes	
5. Lubrication of valve rockers etc.	automatically	yes ⁺	⁺ If lub.oil system is independent of main lub. oil system. Alarm dependent on system.
6. Replenishing cylinder-liner lubricators	automatically	yes ⁺	⁺ Dependent on system.
7. Proper working condition of cylinder lubricators	automatic	yes ⁺	⁺ Alarm per lubricator permitted. Group alarm permitted.
8. Lub.oil drain tank, level		yes ^H ^L ⁺	⁺ Dependent on engine type.
9. Lub.oil spillage tank, level		yes ^H	
10. Lub.oil filters	manual- or automatic change-over	yes ^H ⁺	⁺ Differential pressure. In case more filters are installed, group alarm permitted.
F. CRANKCASE, SCAVENGING AIR RECEIVER, H.P. FUEL LINES AND OVERSPEED PROTECTION MAIN ENGINE			
1. Monitoring of running parts in crankcase	oil mist detector, or temperature measuring of bearings [†]	yes ⁺ yes ⁺	[†] Required for engines with an output of more than 2250 kW or a cylinder diameter of more than 300 mm ⁺ Audible and visual alarm at the bridge with order "reduce to minimum revs". If desired: automatic reduction of revs.
2. Monitoring of scavenging air receiver 2 stroke engines	fire alarm per cylinder	yes ⁺	⁺ Group alarm permitted. Audible and visual alarm at the bridge with order "reduce to minimum revs". If desired; automatic reduction of revs.
3. Protection of leaking H.P. fuel lines	dual valved piping, screens or equivalent system	yes ⁺	⁺ Alarm depending on design.
4. Overspeed protection	independent of governor	yes	Reset in engine room only permitted with visual indication of functioning of overspeed protection.

WATCH COMPONENT	Means of operation, safeguarding, checking.	ALARMS	REMARKS
G. FUEL INJECTOR COOLING SYSTEM MAIN ENGINE (if separate system)			
1. Temperature	automatic control	yes ⁺	+ Alarm high or low depending on type of engine.
2. Pressure or coolant flow ⁺		yes ^L	+ Visible at E.R. control station. Automatic replenishing.
H. SALT WATER CIRCULATING SYSTEM MAIN ENGINE			
1. Pressure or flow		yes ^L	Visible at E.R. control station.
I. LUBRICATING OIL SYSTEM TURBO CHARGERS MAIN ENGINE (if separate system)			
1. Temperature	automatic control	yes ^H	
2. Pressure or flow		yes ^L	After filters
3. Pumps	spare pump automatically starting	yes	
4. Gravity tank, level		yes ^L	Capacity of gravity tank sufficient for running-out-time of turbo chargers. Group alarm. Another 2 consecutive starts shall be possible. Automatic replenishing of air vessels.
J. FUEL OIL SYSTEM MAIN ENGINE (heavy fuel)			
1. Temperature or viscosity	automatic control	yes ^H yes ^L	
2. Pressure in system		yes ^L	Fitted to H.P. air line under pressure during sea service.
3. Pumps	spare pump automatically starting	yes	Group alarm. Another 2 consecutive starts of main engine shall be possible.
4. Fuel oil service tank, level ⁺		yes ^L	+ Automatic replenishing. Automatic replenishing of air vessels.
5. Fuel oil spillage tank, level		yes ^H	stop.
6. Fuel oil filters main engine	manual- or automatic change over	yes ^H +	+ Differential pressure. Group alarm permitted in case more than one filter is installed.

WATCH COMPONENT	Means of operation, safeguarding, checking.	ALARMS	REMARKS
K. FUEL OIL SYSTEM MAIN ENGINE (marine diesel fuel)			
1. Pressure after filter	at engine with clutch	yes ^L	
2. Fuel oil service tank, level ⁺		yes ^L	+ Automatic replenishing.
3. Fuel oil spillage tank, level		yes ^H	Automatic stop or automatic disengagement of clutch, directly notifying general engineers
L. SCAVENGING AIR OR SUPERCHARGING-AIR MAIN ENGINE			
1. Air temperature after cooler	automatic control ⁺	yes ^H	+ Control by means of temperature of cooling water is acceptable.
2. Water draining	continually open, automatic control, or waterdetection in scavenging air duct	yes	
M. STARTING AIR SYSTEM (fixed pitch propeller installation)			
1. Pressure at main automatic starting valve ^o	a. electric b. hydraulic	yes ^{L+}	o Visible at E.R. control station and at bridge. Audible and visual alarm at bridge. + Upon alarm, another 6 consecutive starts shall be possible.
2. Air compressors ⁺ a. lub. oil pressure ^o b. temp. high-pressure air	c. electric d. hydraulic	yes ^L yes ^H yes	+ Automatic replenishing of air vessels. o Low lub. oil pressure protection with automatic stop.
N. STARTING AIR SYSTEM (controllable pitch propeller installation)			
1. Pressure in air vessels		yes ^{L o}	o Fitted on H.P. air line under pressure during sea service. Upon alarm another 3 consecutive starts of main engine shall be possible.
2. Air compressors ⁺ a. lub. oil pressure ^o b. temp. high-pressure air		yes ^L yes ^H yes	+ Automatic replenishing of air vessels. o Low lub. oil pressure protection with automatic stop.

WATCH COMPONENT	Means of operation, safeguarding, checking, design, etc.	ALARMS	REMARKS
O. <u>GEAR BOX</u> (if provided with independent lub.oil system) wether or not combined with clutch			
1. Lub.oil pressure	automatic control	yes ^{L +}	+ Audible and visual alarm at the bridge with order "reduce to minimum revs". If desired, automatic reduction of revs.
2. Low lub.oil pressure protection	automatic control	yes ^{LL}	Automatic stop or automatic disengagement of clutch, directly activating general engineers alarm. "Manual override" at the bridge allowed.
3. Lub.oil temperature	automatic control	yes ^H	only required when lub.oil cooler is fitted.
4. Pumps	spare pump automatically starting	yes	
5. Lub.oil level in gear casing or drain tank	automatic control	yes ^L	
P. <u>CLUTCH, FRICTION-, HYDRAULIC- OR ELECTRIC TYPE</u>			
1. Operating device	a. on the bridge and at E.R.control station		
2. Pressure or voltage of activating mechanism	a. friction clutches	yes ^L	
	b. hydraulic clutches	yes ^L	
	c. electric clutches	yes ^L	
Q. <u>SHAFTING</u>			
1: Oil-lubricated propeller shaft seal, level of gravity tank	automatic	yes ^L	
2. Temperature stern-bearing	automatic	yes ^H	Alarm dependent on design.
3. Temperature intermediate shaft bearings	automatic	yes ^H	Group alarm permitted. Required if output main engine is more than 2250 kW
4. Temperature thrust bearing ⁺	automatic	yes ^H	*Required with separate thrustblock
5. Pumps	spare pump automatically starting	yes	Engines to be provided with automatic protection device against failure of water circulation. Only required on engines with coolingwater temperature protection.
6. Level control header tank	automatic	yes	Manual fill-up. Levelalarm to be positioned at top of tank.

WATCHCOMPONENT	Means of operation, safeguarding, checking.	ALARMS	REMARKS
<p>R. AUXILIARY DIESEL ENGINES (for requirements see Schepenbesluit 1965 (Dutch Shipping Act 1965) Ann.II Art.41 The alarms mentioned under S.T.U.Y and Z, groups alarm permitted.</p>			
<p>The power supply for essential auxiliaries must be ensured in case of a generator failure. This condition will be met if one of the following provisions is available;</p> <p>a) One generator in operation; a stand-by generator is connected automatically when the service-generator fails. [*])</p> <p>b) Two or more generators in operation: an instruction plate to be provided on the main switch-board prescribing that two or more generators have to be connected at all times.</p> <p>c) Shaft generator in operation: of which the power delivery is ensured during manoeuvring: a stand-by generator is connected automatically when the shaft generator fails. ^{**})</p> <p>d) Shaft generator in operation: of which the power delivery is not ensured during manoeuvring: a stand-by generator is connected automatically when the shaft generator fails and another generator is available having sufficient output for the power supply of essential auxiliaries and -apparatuses.</p> <p>A generator is an auxiliary power driven generator.</p> <p>A shaft generator is a generator driven by the propulsion machinery.</p>			
<p>S. LUBRICATING OIL SYSTEM AUXILIARY DIESEL ENGINES</p>			
1. Temperature	automatic control	yes ^H	
2. Pressure ⁺		yes ^L	+ Engines to be provided with low lub.oil pressure protection. Automatic stop.
3. Replenishing cylinder lubricators	automatic	yes ⁺	+ Dependent on system
<p>T. JACKET COOLING SYSTEM AUXILIARY DIESEL ENGINES</p>			
1. Temperature	automatic control	yes ^H	
2. High temperature protection		yes ^{HH}	Automatic stop on engines with an output of more than 220 kW
3. Pressure or flow		yes ^L	
4. Pumps	build on ⁺ , or spare pump automatically starting	yes	+ Engines to be provided with automatic protection device against failure of water circulation. Only required on engines with coolingwater temperature protection.
5. Level control header-tank		yes ^L	+ Manual fill-up. Level alarm to be positioned at top of tank.

WATCHCOMPONENT	Means of operation, safeguarding, checking.	ALARMS	REMARKS
<u>U. SALT WATER CIRCULATING SYSTEM AUXILIARY DIESEL ENGINES</u>			
1. Pressure or flow		yes ^L	Not required if low pressure alarm saltcooling-water main engine is installed.
<u>V. STEAMTURBINE (for generator drive) Following alarms may be connected to the central alarmpanel as a groupalarm</u>			
1. Lubricating oil temperature	automatic control	yes ^H	
2. Lubricating oil pressure		yes ^L	
3. Low lub.oil pressure protection		yes ^{LL}	Automatic stop.
4. Condensor vacuum		yes ^L	Automatic stop
5. Axial displacement of turbine rotor		yes	Automatic stop.
6. Overspeed protection		yes	Automatic stop independent of governor. Local reset only permitted.
<u>W. GENERATORS DRIVEN BY MAIN PROPULSION OR AUXILIARY ENGINES (for requirements see art.41 Ann.II Schepenbesluit 1965 (Dutch Shipping Act 1965))</u>			
1. Voltage		yes ^H yes ^L	
2. Output	readable per generator.		
3. Frequency		yes ^L	+ Not required if non-preference groups are switched off by low frequency
4. Cooling air temperature, or winding temperature		yes ^H	+ only on systems with watercooling or external ventilation
5. Tripping of non-essential consumers		yes	
6. Overspeed protection of prime mover	independent of governor	yes	Only required if diesel engines are used with visual indication of functioning of over-speed protection.
7. Feed pump	feed pump automatically starting	yes	
8. Circulating pump	circulating pump automatically starting	yes	
9. Hotwell level	automatic control	yes	
10. Fluegas temperature		yes	sensor in uptake of oil-fired boiler.

WATCHCOMPONENT	Means of operation, safeguarding, checking.	ALARMS	REMARKS
X. <u>THRUSTERS</u> (following alarms may be connected to the central-alarmpanel as a group alarm)			
1. Pressure of hydraulic system		yes ^L	
2. Level of hydraulic oil tank		yes ^L	
3. Overload prime mover ⁺		yes	⁺ Dependent on system. Audible and visual alarm on the bridge
4. Pitch indicator ⁺			⁺ On each control station.
5. Emergency stop ⁺			⁺ Required only if the prime mover cannot be stopped from the bridge.
6. Dieselengine a. lub.oil pressure b. cooling		yes ^L yes ^H	⁺ Low lub.oil pressure protection
Y. <u>FUEL OIL SYSTEM AUXILIARY DIESEL ENGINES</u> (heavy fuel) see: Fuel oil system main engine			
Z. <u>FUEL OIL SYSTEM AUXILIARY DIESEL ENGINES</u> (marine diesel fuel)			
1. Pressure after filter		yes ^L	
2. Fuel oil service tank, level		yes ^L	
3. Fuel oil spillage tank, level		yes ^H	
AA. <u>OIL FIRED STEAM BOILER AND EXHAUST GAS STEAM BOILER</u> (whether or not combined) (following alarms may be connected to the central-alarmpanel as a groupalarm)			
1. Firing installation	automatically operated ⁺	yes	⁺ In case of flame failure burner to be shut down.
2. Steam pressure oil fired boiler	automatic control ⁺	yes ^H yes ^L	⁺ In case heavy fuel is used, or steamturbine is driving a generator
3. Steam pressure exhaust gas boiler	automatic control ⁺	yes ^H yes ^L	⁺ Not required with combined boiler installation when the steampressure is controlled by the oilfired boiler
4. Water level oil fired boiler	automatic control	yes ^H yes ^L LL ⁺	⁺ At LL level alarm burner to be shut down. At LL level alarm to be activated by a separate sensor.
5. Feed pumps	spare pump automatically starting ⁺	yes	⁺ see AA 2
6. Circulating pump	spare pump automatically starting ⁺	yes	⁺ see AA 2
7. Hotwell level	automatic control	yes ^L	
8. Fluegas temperature ⁺		yes ^H	⁺ Sensor in uptake of oilfired boiler.

WATCH COMPONENT	Means of operation, safeguarding, checking.	ALARMS	REMARKS
BB. <u>THERMAL FLUID HEATING APPLIANCE</u> (following alarms may be connected to the central-alarmpanel as a groupalarm)			
1. Firing installation	automatically operated ⁺	yes	+ In case of flame failure burner to be shut down.
2. Temperature of system	automatic control	yes ^H + yes ^L	+ If an exhaust gas boiler is in use, means to be provided, manually or automatically, to prevent overheating of thermal fluid. At high temp. alarm burner to be shut down.
3. Flow of thermal fluid		yes ⁺	+ In case of flow alarm burner to be shut down.
4. Header tank, level		yes ^H yes ^L	
5. Fluegas temperature ⁺		yes ^H	+ Sensor must be of a long type and to be positioned in uptake.
6. Circulating pumps	spare-pump automatically starting	yes	
CC. <u>EVAPORATOR INSTALLATION</u>			
1. Operation ⁺			+ Automatic operation, however manual starting up, permitted.
2. Salinity level monitoring	automatic	yes ^H +	+ In case of high salinity; alarm automatic condensate discharge to bilges or automatic recirculation of condensate to evaporator.
DD. <u>LUB. OIL SEPARATORS, FUEL OIL SEPARATOR(S) AND HEATERS</u> (following alarms may be connected to the central-alarmpanel as a groupalarm)			
1. Separator for heavy fuel	automatic bowl cleaning ⁺		+ Fully programmed automatic bowl cleaning
2. Control oil spillage		yes	+ Automatic oil supply shut off, or recirculation
3. Sludge tank level		yes ^H	
4. Temperature of fuel oil	automatic control	yes ^H yes ^L	
5. Temperature lub. oil	automatic control	yes ^H	
3. Oily water separator	proper operation	yes ⁺	Group alarm to central-alarmpanel

WATCH COMPONENT	Means of operation, safeguarding, checking.	ALARMS	REMARKS
EE. INCINERATORS (following alarms may be connected to the central-alarmpanel as a group alarm)			
1. Fuel oil temperature	automatic control	yes ⁺ H L	+ Only required if heavy fuel is used.
2. Fuel oil pressure		yes ^L	
3. Combustion air pressure		yes ^L +	+ At low pressure alarm; fuel supply to be shut off.
4. Flame failure		yes ⁺	+ At flame failure; fuel supply to be shut off.
5. Combustion chamber temperature		yes ^H L +	+ At high- and low temperature alarm; fuel supply to be shut off.
6. Fluegas fan failure		yes ⁺	+ In case of alarm; fuel supply to be shut down.
FF. CONTROL SYSTEMS (For remote control main engine, control and alarm system)			
1. Pneumatic Pressure		yes ^L	Duplex reducing-stations to be provided. Only for connections outside the engine room a frost protector to be fitted.
2. Hydraulic Pressure		yes ^L	At least from two separate sources.
3. Electric Voltage		yes ^L	At least from two separate sources
GG. STEERING GEAR (for requirements, alarms, etc. see: Schepenbesluit 1965 (Dutch Shipping Act 1965 Ann.II, art.29 and 30)			
HH. BILGE SOUNDINGS			
1. Engine room, shaft tunnel and additional spaces		yes ^H +	+ Total number dependent on shape and dimensions of spaces concerned. Alarms independent of each other. Group alarm for a space allowed. Separate alarm to the bridge for ships < 75 mtr. See Schepenbesluit 1965 Bekendmaking No.140/1978
2. Bilge system	if automatically operated by means of the oily water separator	yes ^O +	° Indication at the bridge and at the main control station when pump is in operation. + Alarm if bilge water supply to the pump exceeds the pump capacity or if the pump is in operation for an extraordinarily long period.
3. Oily water separator	proper operation	yes ⁺	+ Group alarm to central-alarmpanel

INDEX

GENERAL REMARKS.

WATCHCOMPONENT	Means of operation, safeguarding, checking.	ALARMS	REMARKS
<u>II. ALARMS AND CALL SYSTEM</u>			
1. main control station alarms connected to:	a. cabins watch officers and additionally considered public rooms b. general engineers alarm c. bridge		See Art.51 Schepenbesluit 1965
2. General engineers alarm at control station connected to:	officer's accommodation		See Art.38 Schepenbesluit 1965
3. Safety control system watchkeeping engineer		yes	See general remark No.7
4. Engineerroom connected to:	cabins of watch-officers and additionally considered public rooms		In case of an automatic telephone system, preference lines to be provided for the bridge, engine-room, master and chief engineer. See Art.45 Ann.II Schepenbesluit 1965
5. Bridge connected to:	cabins of watch-officers and additionally considered public rooms		In case of an automatic telephone system preference lines to be provided for the bridge, engine-room, master and chief engineer. See Art.45 Ann.II Schepenbesluit 1965
<u>JJ. FIRE ALARM AND FIRE EXTINGUISHING SYSTEM</u>			
1. Engine room fire alarm	automatic	yes	See Art.13 and 14 Ann.IV Schepenbesluit 1965
2. Water supply to fire main ⁰	fire main under constant pressure, or starting of main fire pumps from bridge or from a possible available safety station	yes ^{L +}	⁰ On board of ships with a tonnage of less than 1600 GRT dependent on the possibilities of entering the engine-room. ⁺ If fire main is under constant pressure.
<p>NOTE:</p> <p>- FOR FIXED BLADED PROPELLER INSTALLATIONS: M AND N NOT APPLICABLE</p> <p>- FOR CONTROLLABLE PITCH PROPELLER AND/OR REVERSIBLE CLUTCH INSTALLATIONS: A AND X NOT APPLICABLE</p>			