23-490

RULES FOR AUTOMATIC AND REMOTE CONTROL SYSTEMS

GUIDANCE FOR AUTOMATIC AND REMOTE CONTROL SYSTEMS

Rules for Automatic and Remote Control Systems
2023 AMENDMENT NO.1

Guidance for Automatic and Remote Control Systems 2023 AMENDMENT NO.1

Rule No.33 / Notice No.35 30 June 2023
Resolved by Technical Committee on 25 January 2023

ClassNK
NIPPON KAIJI KYOKAI

An asterisk (*) after the title of a requirement indicates that there is also relevant information in the corresponding Guidance.

RULES FOR AUTOMATIC AND REMOTE CONTROL SYSTEMS

RULES

2023 AMENDMENT NO.1

Rule No.33 30 June 2023

Resolved by Technical Committee on 25 January 2023

An asterisk (*) after the title of a requirement indicates that there is also relevant information in the corresponding Guidance.

Rule No.33 30 June 2023
AMENDMENT TO THE RULES FOR AUTOMATIC AND REMOTE CONTROL SYSTEMS

"Rules for automatic and remote control systems" has been partly amended as follows:

Amendment 1-1

Chapter 3 CENTRALIZED MONITORING AND CONTROL SYSTEMS FOR MACHINERY

3.3 Additional Requirements for Safety Measures

3.3.1 General

In the case of **MC**-ships, safety measures in accordance with the requirements given in this **3.3** are to be taken in addition to those requirements specified in **Chapter 18, Part D of the Rules for the Survey and Construction of Steel Ships**.

3.3.2 Main Propulsion Machinery or Controllable Pitch Propellers

Sub-paragraph -1 has been amended as follows.

1 Main propulsion machinery in ships in which reciprocating internal combustion engines are used as main propulsion machinery (excluding electric propulsion ships)

(1) Safety devices
Safety devices are to be provided to ~~shut~~ automatically shut off the fuel supp~~lies~~y to the main propulsion machinery under the following conditions:
(a) Over-speed
(b) Pressure drops of lubricating oil to main bearings and thrust bearings
(c) Pressure drops of lubricating oil to crosshead bearings in the case of crosshead engines which have separate lubricating oil systems
(d) Pressure drops of lubricating oil to camshafts in the case of crosshead engines which have separate lubricating oil systems
(e) High temperatures of thrust bearings or thrust bearing lubricating oil in cases where engines have thrust bearings

(2) Reductions of speeds or loads
Measures are to be taken to automatically reduce speeds or loads to main propulsion machinery under the following conditions. However, in cases where alternative measures such as activating alarms to request such reductions are taken, manual reductions of speeds or loads may be accepted.
(a) Pressure drops of lubricating oil to main bearings and thrust bearing in the case of crosshead engines
(b) Pressure drops of lubricating oil to crosshead bearings in cases where crosshead engines have separate lubricating oil systems
(c) High temperatures of thrust bearings or thrust bearing lubricating oil in cases where engines have thrust bearings
(d) Low flows of lubricating oil at each cylinder lubricator (non-flow may be accepted)
(e) Pressure drops of piston coolant at inlets in the case of crosshead engines (not required when cooling oil is provided from main lubricating oil systems of engines)
(f) High temperatures of piston coolant at cylinder outlets in the case of crosshead engines
(g) Low flows of piston coolant at cylinder outlets (alternative means may be accepted for

those crosshead engines which have piston coolant flows that cannot be measured.)

(h) Pressure drops of cylinder cooling water at inlets (low flows may be accepted in the case of trunk piston engines)

(i) High temperatures of cylinder cooling water at cylinder outlets
Temperatures at cylinder common outlets may be accepted in cases where engines have no individual stop valves at their cylinder outlets.

(j) High temperatures or fires in scavenge air boxes in the case of crosshead engines

(k) High temperatures of exhaust gases at cylinder outlets (not required for those trunk piston engines of maximum continuous power not exceeding 500 *kW*/cylinder)

(l) Other fault conditions considered necessary by the Society

(3) Standby pumps
Standby pumps for any pumps used as auxiliary machinery essential for main propulsion are to be arranged so as to start automatically or so as to be capable of being immediately remotely started from centralized control stations or the centralized monitoring and control stations on bridges under the following conditions:

(a) With respect to lubricating oil pumps, in cases where delivery pressures or flow rates of any pumps in operation fall below their predetermined values.

(b) With respect to cooling pumps used for cylinders, pistons, fuel valves and coolers and fuel oil supply pumps, in cases where delivery pressures or flow rates of any pumps in operation fall below their predetermined values or such pumps stop.

(4) Alarm devices
Main propulsion machinery is to be provided with alarm devices which activate in the event of any of those abnormal conditions given in **Table 3.1**.

(5) Monitoring devices
Monitoring devices for main propulsion machinery specified in **3.2.2(1)** are to be provided, and are to indicate at least the following information.

(a) Pressure of fuel oil to fuel oil burning pumps

(b) Pressure of lubricating oil to main and thrust bearings

(c) Pressure of lubricating oil to crosshead bearings in cases where crosshead engines have separate lubricating oil systems

(d) Differential pressure between inlets and outlets of lubricating oil strainers, or the pressure of lubricating oil at inlets and outlets of strainers in the case of trunk piston engines

(e) Temperature of lubricating oil to engines in the case of trunk piston engines

(f) Revolutions of turbochargers

(g) Pressure of lubricating oil to turbochargers in cases where trunk piston engines have separate lubricating oil systems

(h) Pressure of cooling seawater (including central cooling systems)

(i) Pressure at cylinder cooling water inlets

(j) Temperature of cylinder cooling water at cylinder outlets or at cylinder common outlets in cases where one common cooling space without individual stop valves is provided

(k) Pressure at starting air inlets

(l) Pressure of control air

(m) Pressure of scavenge air receivers

(n) Exhaust gas temperatures at cylinder outlets (not required for those engines with a maximum continuous power not exceeding 500 *kW*/cylinder)

(o) Exhaust gas temperatures at turbocharger inlets

(p) Exhaust gas temperatures at turbocharger outlets

(q) Pressure of low temperature cooling water in cases where central cooling systems are adopted

(r) Speed and direction of rotation of main propulsion machinery

(s) Any other information deemed necessary by the Society

(-2 to -4 are omitted.)

3.3.3 Boilers

(Omitted)

3.3.4 Generating Sets

1 Safety devices

Safety devices for electric generating sets are to comply with the following **(1)** through **(3)**:

((1) to (3) are omitted.)

2 Alarm devices

Electric generating sets are to be provided with alarm devices which activate in the event of any of those abnormal conditions given in **Table 3.4**.

3.3.5 Thermal Oil Installations

(Omitted)

3.3.6 Prime Movers Driving Auxiliary Machinery

1 Safety measures

Prime movers driving auxiliary machinery essential for main propulsion of ships are to be arranged so as to automatically stop under the following conditions:

((1) and (2) are omitted.)

2 Alarm devices

Prime movers driving auxiliary machinery essential for main propulsion of ships are to be provided with alarm devices which activate in the event of any of those abnormal conditions given in **Table 3.7**.

3.3.7 Other Machinery

(-1 and -2 are omitted.)

3 Alarm devices

Other machinery is to be provided with alarm devices which activate in the event of any of those abnormal conditions given in **Table 3.9**.

Table 3.1 has been amended as follows.

Table 3.1 Reciprocating Internal Combustion Engines used as Main Propulsion Machinery (and Gearing)

Monitored Variables		Alarms	Remarks
Temperature	Cylinder cooling water cylinder outlets	H	cylinder cooling water common outlets in ~~the~~ cases ~~of no~~ where individual stop valves are not provided for each cylinder outlet
	Piston coolant cylinder outlets	H	in the case of crosshead engines
	Fuel valve coolant outlets	H	
	L.O. inlets	H	
	L.O. camshaft inlets	H	in the case of crosshead engines with a separate L.O. system
	Thrust bearings or L.O. thrust bearing outlets	H	in the case of engines with a thrust bearing
	L.O. turbocharger bearing outlets	H	in cases where it is not possible to measure such temperature, continuous monitoring of inlet pressure and inlet temperature in combination with ~~bearing inspections conducted at specific intervals deemed appropriate by Society, etc.~~ specific intervals for bearing inspection in accordance with turbocharger manufacturer instructions may be accepted as an alternative measure.
	L.O. reduction gear inlets	H	in the case of engines with a separate L.O. system
	F.O. burning pump inlets	H L	in cases where viscosity is controlled (e.g. heavy fuel oil burning engines). Alternatively, high and low viscosity alarms may be accepted.
	Exhaust gas in cylinder outlets	H	not required for trunk piston engines of max. continuous power not exceeding 500 *kW*/cylinder
	Exhaust gas deviation for cylinder outlets	H	
	Exhaust gas in turbocharger inlets	H	
	Exhaust gas in turbocharger outlets	H	
	Air in scavenge air boxes	H	in the case of crosshead engines. Alternatively, fire alarm may be accepted.
	Air in scavenge air receivers	H	in the case of trunk piston engines
	Air in air cooler outlets	H L	in cases where temperatures are automatically controlled
Pressure	Cylinder cooling water inlets	L	
	Piston coolant inlets	L	in the case of crosshead engines
	Fuel valve coolant inlets	L	
	L.O. main bearing and thrust bearing inlets	L	
	L.O. crosshead bearing inlets	L	in the case of crosshead engines with separate L.O. systems
	L.O. camshaft inlets	L	
	L.O. strainer in/out differentials	H	
	L.O. turbocharger inlets	L	in the case of crosshead engines with separate L.O. systems
	L.O. reduction gear inlets	L	
	F.O. burning pump inlets (Engine inlet after filter)	L	
	Common accumulators fuel oil pressure	L	in the case of electronically-controlled engines (only they have common accumulators)
	Common accumulators or high pressure pipe hydraulic oil pressure	L	in the case of electronically-controlled engines
	Starting air engine inlets	L	~~not required in cases where an indicator is provided to show the intermediate valve or the automatic starting valve is open or close~~

	Cooling sea water	L	
	Low temperature cooling water	L	in cases where central cooling systems are adopted
(Omitted)			

Table 3.2 Steam Turbines used as Main Propulsion Machinery (and Gearing, Main Condenser)
(Table is omitted.)

Table 3.3 Boilers
(Table is omitted.)

Table 3.4 has been amended as follows.

Table 3.4 Electric Generating Sets

Monitored Variables		Alarms	Remarks
Reciprocating internal combustion engines driving generators			
Temperature	L.O. inlets	H	
	Cooling water or air outlets	H	
	Exhaust gas, turbo-blower inlets or cylinder outlets	H	at each cylinder outlet is required in the case of the engines with max. continuous power exceeding 500 *kW*/cylinder
	F.O. burning pump inlets	H L	in cases where viscosity is controlled (e.g. heavy fuel oil burning engines). Alternatively, high and low viscosity alarms may be accepted.
Pressure	L.O. inlets	L	
	Common accumulators fuel oil pressure	L	in the case of electronically-controlled engines (only they have common accumulators)
	Common accumulators or high pressure pipe hydraulic oil pressure	L	in the case of electronically-controlled engines
	Cooling water inlets	L	low flow may be accepted
	Starting air	L	not required when starting air piping for propulsion engines is commonly used
Others	Leakage from F.O. burning pipes, levels leakage tanks	○	
	Revolutions of turbochargers	H	applied only to the categories *B* and *C* turbochargers specified in **2.1.2, Part D of the Rules for the Survey and Construction of Steel Ships**, with novel design features or no service records
Steam turbines driving generators			
Temperature	L.O. inlets	H	
Pressure	L.O. inlets	L	
	Steam inlets	L	for ships in which steam turbines are used as main propulsion machinery (excluding electric propulsion ships), only applicable where extracted steam is used
	Exhaust	H	
(Omitted)			

Table 3.5 Thermal Oil Installations
(Table is omitted.)

Table 3.6 Controllable Pitch Propellers
(Table is omitted.)

Table 3.7 has been amended as follows.

Table 3.7 Engine Driving Auxiliary Machinery

Monitored Variables		Alarms	Remarks
Reciprocating internal combustion engines			
Temperature	L.O. inlets	H	
	Cooling water outlets	H	low pressures/flows may be accepted
	Exhaust gas, turbo charger inlets or cylinder outlets	H	
	F.O. burning pump inlets	H L	in cases where viscosity is controlled (e.g. heavy fuel oil burning engines). Alternatively, high and low viscosity alarms may be accepted.
Pressure	L.O. inlets	L	
	Common accumulators fuel oil pressure	L	in the case of electronically-controlled engines (only they have common accumulators)
	Common accumulators or high pressure pipe hydraulic oil pressure	L	in the case of electronically-controlled engines
	Cooling water outlets	L	low flows or high temperatures at cooling water outlets may be accepted
Others	Leakage from F.O. burning pipes, levels in leakage tanks	○	
	Revolutions of turbochargers	H	applied only to categories *B* and *C* turbochargers specified in **2.1.2, Part D of the Rules for the Survey and Construction of Steel Ships**, with novel design features or no service records
Steam turbines			
Temperature	L.O. inlets	H	
Pressure	L.O. inlets	L	
	Steam inlets	L	for ships in which steam turbines are used as main propulsion machinery (excluding electric propulsion ships), only applicable when extracted steam is used
	Exhaust steam	H	

Table 3.8 Electrical Equipment for Propulsion in Electrical Propulsion Ships
(Table is omitted.)

Table 3.9 has been amended as follows.

Table 3.9 Other Machinery

Monitored Variables		Alarms	Remarks	
Auxiliaries				
Distilling plants, salinity		H		
Purifiers, malfunctions		○		
F.O. or L.O. heater outlets, temperatures		H	or heater outlets, flow lows	
Cooling sea water pressures		L	in cases where central cooling systems are adopted for the main propulsion machinery	
Condensate pump outlets, pressures		L	or stoppage of driving units	for ships in which steam turbines are used as main propulsion machinery (excluding electric propulsion ships)
Condensate pump outlets, salinity		H		
Drain pump outlets, salinity		H		
External desuperheaters, steam temperatures		H L	L is required when the steam in used for auxiliary turbines relation to propulsion	
Deaerator, levels		H L		
Tanks				
F.O.	Settling tanks, levels	H L	H is required in the case of automatic filling ~~only, L is required to tanks having capacity not enough to 24 *hours*~~ tanks or tanks without overflow arrangements	
	Service tanks, levels	H L	~~continuous operation~~	
	Drain tanks levels	H		
	Sludge tanks, levels	H		
	Settling tanks, temperatures	H	applied to tanks where heating devices are provided	
	Service tanks, temperatures	H		
L.O. and control oil	Sump tanks for propulsion engines, levels	L	applied to each tank in cases where separate lubricating oil systems and relevant tanks (e.g. camshaft, rocker arms) are installed.	
	Drain tanks, levels	H		
	Sludge tanks, levels	H		
	Gravity tanks, levels	L	applied to oil bath type stern tube bearings, exhaust driven turboblowers, and reduction gear for propulsion steam turbines	
Water	Cooling water expansion (makeup) tanks, levels	L		
	Purifier water tanks, levels	L		
	Cascade tanks, levels	L	applied to ships in which reciprocating internal combustion engines are used as main propulsion machinery (excluding electric propulsion ships)	
	Atmospheric drain tanks, levels	H L	applied to ships in which steam turbines are used as main propulsion machinery (excluding electric propulsion ships)	
	Distilled water tanks, levels	L		
Air	Starting air tanks for propulsion engines, pressures	L		
	Starting air tanks for generator prime movers, pressures	L	applied to ships in which steam turbines are used as main propulsion machinery (excluding electric propulsion ships)	
(Omitted)				

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 1 July 2023.

2. Notwithstanding the amendments to the Rules, the current requirements apply to ships for which the date of contract for construction is before the effective date.

Amendment 1-2

Chapter 3 CENTRALIZED MONITORING AND CONTROL SYSTEMS FOR MACHINERY

3.3 Additional Requirements for Safety Measures

3.3.7 Other Machinery

(-1 and -2 are omitted.)

3 Alarm devices

Other machinery is to be provided with alarm devices which activate in the event of any of those abnormal conditions given in **Table 3.9**.

Table 3.9 has been amended as follows.

Table 3.9 Other Machinery

Monitored Variables		Alarms	Remarks
(Omitted)			
Main shafting			
Temperature	Stern tube bearings or bearing oil in oil baths	H	or stern tube outlet oil when forced circulation systems are used, applied to oil lubrication systems
Flow rate	Lubricating water for stern tube bearings	L	Applied to the ships whose classification characters are affixed with the notation *PSCM-1A*
Differential pressure	Filtration systems of lubrication water for stern tube bearings	H	Applied to the ships whose classification characters are affixed with the notation *PSCM-1A* Alarms for non-filter methods are to be those deemed appropriate by the Society.
Others	Abnormal lubricating water pumps for stern tube bearings	○	Applied to the ships whose classification characters are affixed with the notation *PSCM-1A*
Others	Critical speed	○	

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

1. The effective date of the amendments is 1 July 2023.

GUIDANCE FOR AUTOMATIC AND REMOTE CONTROL SYSTEMS

GUIDANCE

2023 AMENDMENT NO.1

Notice No.35 30 June 2023

Resolved by Technical Committee on 25 January 2023

Notice No.35 30 June 2023
AMENDMENT TO THE GUIDANCE FOR AUTOMATIC AND REMOTE CONTROL SYSTEMS

"Guidance for automatic and remote control systems" has been partly amended as follows:

Chapter 3 has been deleted.

~~Chapter 3 CENTRALIZED MONITORING AND CONTROL SYSTEMS FOR MACHINERY~~

~~3.2 Centralized Monitoring and Control Systems for Machinery~~

~~3.2.2 Centralized Monitoring and Control Systems for Machinery~~

~~The wording "necessary monitoring devices for main propulsion machinery" specified in **3.2.2(1) of the Rules** means those monitoring devices used to indicate any of the information listed below.~~

~~(1) Pressure of fuel oil to fuel oil burning pumps~~
~~(2) Pressure of lubricating oil to main and thrust bearings~~
~~(3) Pressure of lubricating oil to crosshead bearings in cases where crosshead engines have separate lubricating oil systems~~
~~(4) Differential pressure between inlets and outlets of lubricating oil strainers or the pressure of lubricating oil at inlets and outlets of strainers in the case of trunk piston engines~~
~~(5) Temperature of lubricating oil to engines in the case of trunk piston engines~~
~~(6) Revolutions of turbochargers~~
~~(7) Pressure of lubricating oil to turbochargers in cases where trunk piston engines have separate lubricating oil systems~~
~~(8) Pressure of cooling seawater (including central cooling systems)~~
~~(9) Pressure at cylinder cooling water inlets~~
~~(10) Temperature of cylinder cooling water at cylinder outlets, or at cylinder common outlets in cases where one common cooling space without individual stop valves is employed~~
~~(11) Pressure at starting air inlets~~
~~(12) Pressure of control air~~
~~(13) Pressure of scavenge air receivers~~
~~(14) Exhaust gas temperatures at cylinder outlets (not required for those engines with a maximum continuous power not exceeding 500 *kW/cylinder*)~~
~~(15) Exhaust gas temperatures at turbocharger inlets~~
~~(16) Exhaust gas temperatures at turbocharger outlets~~
~~(17) Pressure of low temperature cooling water in cases where central cooling systems are adopted~~
~~(18) Any other information deemed necessary by the Society~~

Chapter 5 SPECIFIC AUTOMATION EQUIPMENT

5.3 Standards for Specific Automation Equipment

5.3.13 Centralized Machinery Control Systems

Sub-paragraphs -2(1) and (2) have been amended as follows.

2 The wording "effectively controlling" specified in **5.3.13 of the Rules** means to control the following functions. However, in such cases, any functions not provided or required to be remote-controlled from navigating bridges by any requirements other than this **5.3.13** may be dispensed with.

(1) With respect to the controls of main propulsion ~~diesel~~reciprocating internal combustion engines
((a) to (j) are omitted.)

(2) With respect to the control of ~~diesel~~reciprocating internal combustion engines driving generators (except emergency generators, the same being referred to hereinafter)
((a) to (d) are omitted.)

((3) to (5) are omitted.)

Title of Table 5.3.12-1 has been amended as follows.

Table 5.3.12-1 Indications and Alarm Items of ~~Diesel~~Reciprocating Internal Combustion Engines
(Table is omitted.)

EFFECTIVE DATE AND APPLICATION

1. The effective date of the amendments is 1 July 2023.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to ships for which the date of contract for construction is before the effective date.