PART

4

CHAPTER 7 **Shipboard Automatic or Remote Control and Monitoring Systems**

SECTION 1 **General**

1 Scope *(1998)*

The requirements contained in this section are intended for unrestricted vessels of under 90 m (295 ft) in length fitted with control and monitoring systems that embody various degrees of automatic or remote control and monitoring of the propulsion machinery and propulsion-machinery space. These requirements are in addition to those in other sections of the Rules. The following table indicates the applicability of the relevant requirements:

Vessel's Length (L)	*Gross Tonnage (GT)*		
	Under 500	*500 or over/not assigned optional* **ACCU** *or* **ABCU** *symbol*	*500 or over/assigned optional* **ACCU** *or* **ABCU** *symbol*
L < 20 m (65 ft)	Will be specially considered	Will be specially considered	—
20 m (65 ft) ≤ L ≤ 46 m (150 ft)	Use Section 4-7-6	Use Sections 4-7-1 to 4-7-3	Use Section 4-7-4 or 4-7-5, as applicable
L > 46 m (150 ft)	Use Section 4-7-6	Use Sections 4-9-1 and 4-9-2 of the *Steel Vessel Rules*	Use Sections 4-9-1 to 4-9-7 of the *Steel Vessel Rules*, for **ACCU** or Sections 4-9-1 to 4-9-7 of SVR plus 4-7-5 for **ABCU** as applicable

Consideration will be given to vessels of special design such as surface effect vessels, air cushion vessels, etc., upon submission of manufacturer's specification and drawings.

3 Propulsion Class Notations *(1998)*

Where requested by the Owner, automatic or remote control and monitoring systems for propulsion and monitoring systems of propulsion-machinery space that comply with the relevant requirements of this Section will be distinguished in the *Record* as follows. A certificate indicating the degree of automation, particulars and operating limitations, if any, will be issued. A notation preceded by ✠ (Maltese cross) signifies that the installations have been assembled and installed under survey by the Surveyor. A notation without ✠ (Maltese cross) symbol signifies that pertinent automatic or remote control and monitoring systems have not been assembled and installed under survey but have subsequently been surveyed and satisfactorily reported upon by the Surveyor.

3.1 Vessels ≥ 500 GT and ≤ 46 m (150 ft) in Length

3.1.1 ACCU Notation

Automatic or remote control and monitoring systems complying with Section 4-7-4 will be distinguished in the *Record* by the notation **ACCU**.

3.1.2 ABCU Notation

Automatic or remote control and monitoring systems complying with Section 4-7-5 will be distinguished in the *Record* by the notation **ABCU**.

Note: **ACCU** or **ABCU** class notation may be granted to vessels of < 500 GT and a length of 20 m (65 ft) ≤ L ≤ 46 m (150 ft), provided that the applicable requirements in Sections 4-7-1 through 4-7-5 of this Section are met.

5 Definitions

The following definitions apply for the purpose of this Chapter:

5.1 Machinery Space

See 4-1-1/13.

5.3 Manned Space

Means any space assigned at all times with crew members needed to locally supervise the operation of the specific machinery or system installed in the space.

5.5 Automatic Control

Type of control which is self-regulating in carrying out ordered instruction without action by the operator.

5.7 Remote Control

Control of a device by an operator from a distance through mechanical, electrical, electronic, pneumatic, hydraulic, electromagnetic (radio) or optical means or their combination.

5.9 Local Control

Control by an operator of machinery through a device located on or adjacent to the controlled machinery.

5.11 Remote Station

A permanent installation fitted with effective control and/or monitoring means and located at a distance from the specific machinery.

5.13 Centralized Control and Monitoring Station

A remote station designated as the central location where the necessary instrumentation required to maintain the control and monitoring of the specific machinery is fitted, and which is equivalent at least as if the machinery were under local supervision.

5.15 Instrumentation

A monitoring device including sensing and transmitting component.

5.17 Monitoring

The display and alarming of the operational status of a specific machinery/system.

5.19 Display Systems

Display systems are those which display operating machinery parameter values such as pressure, temperature, liquid flow, motor running, etc., or the sequential operation of the system's process.

5.21 Alarm

A visual and audible signal of a predetermined out of limits parameter for the controlled and/or monitored machinery or system.

5.23 Summary-alarm

A common alarm activated by any abnormal condition of the monitored machinery or system.

5.25 Safety Systems

Systems which provide automatic actions in response to faults that may develop too fast to be countered by manual intervention. The safety systems are intended to operate automatically in case of faults within the machinery plant for the purpose of:

i) Temporarily adjusting the operation of the machinery to the prevailing conditions (by reducing the output of the machinery), or

ii) Restoring the normal operating conditions (by starting of standby units), or

iii) Protecting the machinery from critical conditions by stopping the machinery (shutdown).

5.27 Emergency Shutdown Systems

Systems intended for manual activation in an emergency to stop a particular system's function or machinery operation.

5.29 Fail-safe

Fail-safe means that upon failure or malfunction of a component, subsystem or system, the output automatically reverts to a predetermined design state of least critical consequence.

5.31 Independent

As applied to two systems, means that one system will operate with the failure of any part of the other system including power sources and its supply connection. However, for electrical systems which are not required to have an emergency source of power as the standby power source, failure of the power source may be excluded from this criteria.

5.33 Computer-based System

A computer-based system consists of one or more electronic or optical devices which together with their peripherals and using fixed or programmable logic and memories, processes input data and output signals for purposes of display, alarm, control or storage. The system is understood to comprise all required hardware, i.e., microprocessors, monitor (video display unit), keyboard, etc., and data transmission path (data highways).

5.35 Nonvolatile Memory

Memory which does not require power to retain the stored data.

5.37 Computer Monitor (Video Display Unit)

A device where computer information or data is displayed.

5.39 ABS Type Approval Program *(2003)*

Certification scheme whereby ABS certifies, at the request of the equipment manufacturer, that the specific equipment conforms to cited standards and to cited ratings which ABS has verified by engineering analysis, and that an appropriate quality system is in place to manufacture a product of consistent quality. See the *ABS Type Approval Program* in Appendix 1-1-A3 of the ABS *Rules for Conditions of Classification (Part 1)*. The ABS *Type Approval Program* and the indicated references are available for download from the ABS website at http://www.eagle.org/absdownloads/index.cfm.

5.41 Integrated Propulsion Machinery

A propulsion machinery having its auxiliaries (fuel oil pumps, cooling water pumps, etc.), necessary for normal operation driven by the engine, the reduction gear or the propulsion shaft.

7 Required Plans and Data

Plans and data associated with automatic or remote control and monitoring of machinery and systems are to be submitted for approval in accordance with 4-1-1/7, and are to include the following:

7.1

A list of electrical, pneumatic or hydraulic equipment associated with the particular systems. This is to include manufacturer's name, model number, material, ratings, degree of protection, permissible angles of inclination and location of installation within the vessel.

7.3

A list of all major components installed within the particular equipment (i.e., control console, etc.) and the data as required in 4-7-1/7.1.

7.5

Certificates or test reports, as appropriate, attesting to the suitability of the particular equipment in compliance with the environmental criteria set forth in 4-7-2/15 and 4-7-2/17, as applicable. For equipment that have been already certified by the Bureau and provided their certification remains valid, the submission of a copy of pertinent certificate will suffice. See 4-7-2/17.3.

7.7

Plans showing the location of control and monitoring stations, controlled equipment and piping/cable runs, etc.

7.9

Arrangements and details of the control consoles and panels, including plan views and elevation details, installation details and wiring data (rating, construction standard, insulation type, armored/unarmored/shielded/non-shielded, temperature rating, flame-retardant properties, etc.).

7.11

A list of all cables connecting equipment associated with the systems. This is to include construction standard, electrical rating, insulation type, armored/unarmored/shielded/non-shielded, temperature rating, size and connected load's power consumption requirements.

7.13

A complete operational description of the automatic or remote control and monitoring systems, including a list of alarms and displays and functional sketches or description of all special valves, actuator, sensors and relays.

7.15

A simplified one-line diagram (electrical and piping) of all power and automatic or remote control and monitoring systems. This is to include power supplies, circuit or piping protection ratings and settings, cable or pipe sizes and materials, rating of connected loads, etc.

7.17

A schematic diagram of all control, alarm, display and safety systems.

7.19

For computer-based systems, the following is to be included:

i) Overall description and specification of the systems and equipment.

ii) Block diagrams for the computer hardware showing interfacing between the work stations, input/output (I/O) units, local controllers, traffic controllers, data highways, etc.

iii) Logic flow chart or ladder diagrams.

iv) Description of the alarm system indicating the ways it is acknowledged, displayed on the monitor or mimic display board, etc.

v) Description of the system redundancy and backup equipment, if any.

vi) Description of the data communication protocol, including anticipated data process response delays.

vii) Description of the system's security protocol to prevent unauthorized program changes which may compromise the integrity of the automatic or remote systems.

viii) Description of the system with regard to the degree of independence or redundancy provided for the control systems, alarm/display systems and safety systems.

ix) Description of system's task priorities.

x) Where applicable, description of UPS (uninterruptible power supply) and their capacities, including system's power consumption.

xi) Equipment ratings and environmental parameters.

7.21

Installation methods (electrical, pneumatic and hydraulic). This is to include details of cable or pipe runs, separation of cables of different voltage rating and insulating rating, cable tray laying, deck or bulkhead penetration, prevention of magnetic interference, etc. See also 4-7-2/15.9.

7.23

A matrix chart for each of the systems indicating the following, as applicable, upon activation of a given alarm or safety action:

i) Name, device designations and type, and location of alarms.

ii) Preset parameter values, if any.

iii) Automatic tripping and other safety provisions of controlled equipment.

iv) Location of control stations where shutdown, and control and monitoring power supply transfer devices are fitted.

v) Special remarks, if any.

9 Tests and Surveys

9.1 Installation Tests

Automatic or remote control and monitoring systems are to be subjected to tests witnessed by the Surveyor during and after installation onboard, as outlined in this Section.

9.3 Periodical Surveys *(1998)*

The continuance of **ACCU** or **ABCU** certification is subject to periodic survey of the automatic or remote control and monitoring systems installation, as outlined in Chapter 8 of the ABS *Rules for Survey After Construction (Part 7)*.