5. ALARMS

The PT500D autopilot is provided with many monitoring functions to ensure steering safety.

5.1 Alarm types

The following three alarm types are available to make a quick and proper judgment if an abnormal condition is found.

(1) Individual alarms

These alarms are completely independent for each cause of an alarm. Their lamps are mounted on the ANNUNCIATOR UNIT. Alarms are processed also on the ANNUNCIATOR UNIT. For details on these alarms, See Section 2.2.7.

(2) Emergency alarms

These alarms require an immediate switchover to the control system, hand steering or non-follow-up steering when they have been issued. When an emergency alarm occurs, the [EMRG ALM] lamp on the ANNUNCIATOR UNIT begins to flash and the buzzer sounds. At the same time, the cause of the alarm is shown on the data display of the AUTO steering unit. (See Section 5.3.1. for details on the alarm.) When an alarm for anything other than a servo-loop failure has occurred, control output goes to the midship position if midship command control is enabled (See Section 4.9.5.2 for details on midship command control).

Press the [ALARM] key on AUTO STEERING UNIT, and check the alarm type.

> **⚠ WARNING**
>
> ■ Emergency alarm
> If an emergency alarm occurs, control output is set to the midship position except for the case of a servo-loop failure. Change the control system or select hand steering or non-follow-up steering to restart steering.

(3) Caution alarms

These alarms are designed to have marginal time to allow corrective actions to be taken when an alarm has occurred. When a caution alarm occurs, the [CAUT ALM] alarm lamp of the ANNUNCIATOR UNIT begins to flash and the buzzer sounds. At the same time, the cause of the alarm will be indicated on the data display of AUTO STEERING UNIT. (For details on the display, see Section 5.3.2.)

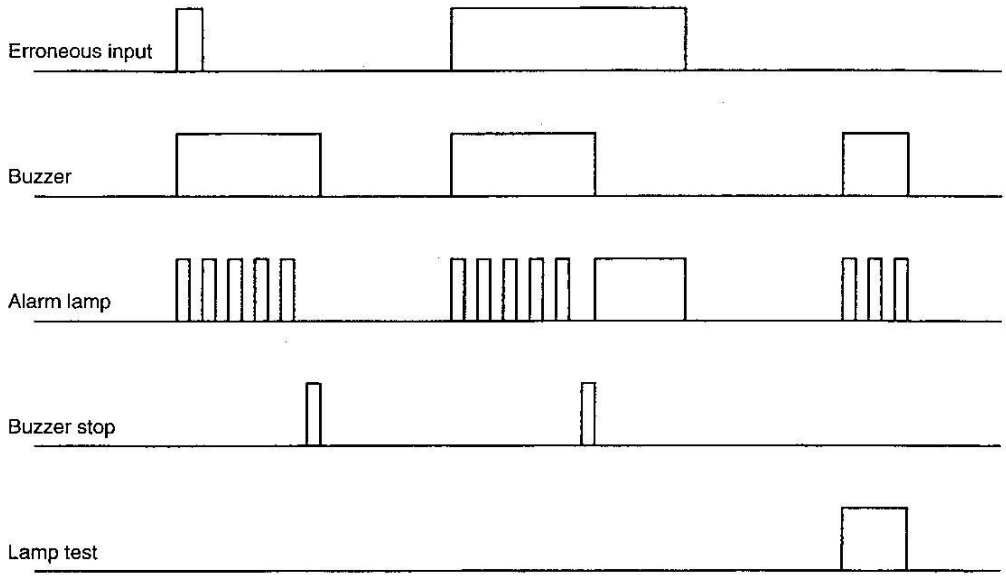
Press the [ALARM] key on the AUTO STEERING UNIT and check all the alarm types. Then the data on the display go back to normal display. Switch the control mode or steering mode according to the display.

5.2 Annunciator pattern

(1) The buzzer period differs depending on the type of alarm.

Type of alarm	Buzzer characteristics	Alarm lamp flashing rate
Individual alarm	Continuous	1 Hz
Emergency alarm	Intermittent Short interval, 10 Hz	1 Hz
Caution alarm	Intermittent Long interval, 2 Hz	1 Hz

(2) Annunciator pattern



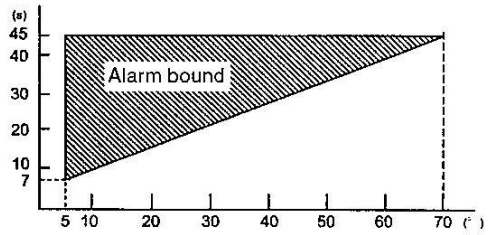
5.3 Types of alarm displays

When a typical alarm has occurred, the cause of the alarm is indicated in symbols on the data display. The following explains the alarm displays:

5.3.1 Emergency alarms(1/2)

NO.	Alarm displays on data display	Description
01	———	———
02	EMERGENCY-02 MEMORY(RAM)	MEMORY (RAM) ERROR Checks RAM writing and reading.
03	EMERGENCY-03 MEMORY(ROM)	MEMORY (ROM) ERROR Checks ROM contents.
04	EMERGENCY-04 AUTO OUTPUT	AUTO OUTPUT ERROR Checks to see that the difference between the manual terminal unit DAC output value and the ADC input value is within the reference value of ±0.1V(40 bits).
05	EMERGENCY-05 GYRO COMPASS	GYRO OUTPUT INPUT ERROR Issues an alarm if a gyrocompass signal input failure continues for 2 seconds or longer.
06	EMERGENCY-06 AUX COMPASS	AUX. COMPASS INPUT ERROR Issues an alarm if an auxiliary compass signal input failure continues for n-seconds or longer.

Emergency alarms(2/2)

NO.	Alarm displays on data display	Description
07 to 10	EMERGENCY-XX □ SERVO LOOP └ 1 to 4 control system	SERVO LOOP FAILURE This alarm is issued if the difference between the rudder order and feed back rudder angle is approx.5 degree or more and, the follow up time does not finish within the following time. (1) Rudder order angle 70 degree change --- 30s (2) Rudder order angle 5 degree change --- 7s (3) Rudder order angle 5 degree to 70 degree change --- late time is given by following expression. Late time t=(R/2.76)+4.64 (R : changing volume of rudder order angle)  Note : "Resting" system not monitored. * Rudder angle output does not go to midship position control when this alarm occurs.
11	EMERGENCY-11 LINK-MASTER	DATA LINK MASTER UNIT ERROR Issues an alarm if the data transmission master unit is faulty.
12 to 15	EMERGENCY-XX LINK-SLAVE □ 1 to 4 control system	DATA LINK SLAVE ERROR Issues an alarm when the currently operating manual terminal unit has been disabled.
16	EMERGENCY-16 STEERING MODE SW	STEERING MODE SWITCH ERROR Issues an alarm if two or more steering modes have been specified or no command is given for 2 seconds or longer.