

### § 23.1329

direction indicator, is installed. Deviations of a magnetic nonstabilized direction indicator of more than 10 degrees must be placarded in accordance with § 23.1547(e).

[Amdt. 23-20, 42 FR 36969, July 18, 1977]

#### § 23.1329 Automatic pilot system.

If an automatic pilot system is installed, it must meet the following:

(a) Each system must be designed so that the automatic pilot can—

(1) Be quickly and positively disengaged by the pilots to prevent it from interfering with their control of the airplane; or

(2) Be sufficiently overpowered by one pilot to let him control the airplane.

(b) If the provisions of paragraph (a)(1) of this section are applied, the quick release (emergency) control must be located on the control wheel (both control wheels if the airplane can be operated from either pilot seat) on the side opposite the throttles, or on the stick control, (both stick controls, if the airplane can be operated from either pilot seat) such that it can be operated without moving the hand from its normal position on the control.

(c) Unless there is automatic synchronization, each system must have a means to readily indicate to the pilot the alignment of the actuating device in relation to the control system it operates.

(d) Each manually operated control for the system operation must be readily accessible to the pilot. Each control must operate in the same plane and sense of motion as specified in § 23.779 for cockpit controls. The direction of motion must be plainly indicated on or near each control.

(e) Each system must be designed and adjusted so that, within the range of adjustment available to the pilot, it cannot produce hazardous loads on the airplane or create hazardous deviations in the flight path, under any flight condition appropriate to its use, either during normal operation or in the event of a malfunction, assuming that corrective action begins within a reasonable period of time.

(f) Each system must be designed so that a single malfunction will not produce a hardover signal in more than

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one control axis. If the automatic pilot integrates signals from auxiliary controls or furnishes signals for operation of other equipment, positive interlocks and sequencing of engagement to prevent improper operation are required.

(g) There must be protection against adverse interaction of integrated components, resulting from a malfunction.

(h) If the automatic pilot system can be coupled to airborne navigation equipment, means must be provided to indicate to the flight crew the current mode of operation. Selector switch position is not acceptable as a means of indication.

[Doc. No. 4080, 29 FR 17955, Dec. 18, 1964; 30 FR 258, Jan. 9, 1965, as amended by Amdt. 23-23, 43 FR 50593, Oct. 30, 1978; Amdt. 23-43, 58 FR 18976, Apr. 9, 1993; Amdt. 23-49, 61 FR 5169, Feb. 9, 1996]

#### § 23.1331 Instruments using a power source.

For each instrument that uses a power source, the following apply:

(a) Each instrument must have an integral visual power annunciator or separate power indicator to indicate when power is not adequate to sustain proper instrument performance. If a separate indicator is used, it must be located so that the pilot using the instruments can monitor the indicator with minimum head and eye movement. The power must be sensed at or near the point where it enters the instrument. For electric and vacuum/pressure instruments, the power is considered to be adequate when the voltage or the vacuum/pressure, respectively, is within approved limits.

(b) The installation and power supply systems must be designed so that—

(1) The failure of one instrument will not interfere with the proper supply of energy to the remaining instrument; and

(2) The failure of the energy supply from one source will not interfere with the proper supply of energy from any other source.

(c) There must be at least two independent sources of power (not driven by the same engine on multiengine airplanes), and a manual or an automatic means to select each power source.

[Doc. No. 26344, 58 FR 18976, Apr. 9, 1993]