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Motorcycles — Direct current flasher units

Motorcycles — Centrales clignotantes en courant continu

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 7398 was prepared by Technical Committee ISO/TC 22, *Road vehicles*.

This second edition cancels and replaces the first edition (ISO 7398:1984), references in which have been updated and a change made to 5.6.

This International Standard forms one of a series of related Standards:

ISO 7398, *Motorcycles — Direct current flasher units*

ISO 7399, *Motorcycles — Alternating current flasher units*

ISO 7400, *Mopeds — Alternating current flasher units*

ISO 8052, *Mopeds — Direct current flasher units*

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Motorcycles — Direct current flasher units

1 Scope

This International Standard specifies the electrical characteristics with which direct current (d.c.) flasher units for motorcycles are required to comply when submitted for type-testing.

It applies to flashers intended for use on motorcycles, as defined in ISO 3833, with 6 V or 12 V electrical systems.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3833:1977, *Road vehicles — Types — Terms and definitions*.

IEC 810:1986, *Lamps for road vehicles — Performance requirements*.

IEC 810:1986/Amd.1:1988, Amendment 1.

3 General

3.1 Identification

Each flasher unit shall show, legibly and indelibly, the trade-name or -mark of the manufacturer, the rated voltage, and the identification numbers of the terminals in accordance with table 1, and the wattages of the lamps for which the flasher is designed.

Table 1 — Identification of flasher unit terminal

Identification number of terminals ¹⁾	Allocation
1	Current supply
2	To the turn signal switch
4	Common return
5	To the tell-tale lamp
7	"Off" circuit of the operating tell-tale
8	Return for the turn signal switch, left side
9	Return for the turn signal switch, right side
10 ²⁾	Indicator lights to the left
11 ²⁾	Indicator lights to the right

1) Other terminal identifications are allowed.
2) When front and rear direction indicator lights of a motorcycle are individually connected to the flasher, the corresponding terminals shall each have the same identification number.

3.2 Functions

The functions of the flashers may be the following:

- flasher exclusively for direction indicator lights;
- flasher exclusively for hazard warning signalling;
- combined flasher for direction indicator lights and hazard warning.

4 Electrical characteristics

4.1 Working voltage

The working voltage is the voltage existing between points D and E of the test circuit (see figure 1) according to 4.3, with the flasher short-circuited.

4.2 General test conditions

If not otherwise specified, the flasher shall be tested in a room at an ambient temperature of $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$, at a working voltage of 6,5 V or 13 V.

The flashers shall be tested in the position (or positions) indicated by the manufacturer.

4.3 Test circuitry and equipment

4.3.1 Wiring diagram

The resistance in the circuitry shall have the values indicated in the wiring diagram shown in figure 1. The resistances of the cables and the ammeter are included in the resistances indicated in the wiring diagram. To check these resistances, the flasher and the filament lamps shall be short-circuited by two shunts with a resistance not exceeding 0,005 Ω each.

4.3.2 Filament lamps

Only filament lamps in accordance with IEC 810 shall be used. This does not apply to tell-tale lamps when they are not connected in parallel to the main lamps.

4.3.3 Measuring equipment

The equipment used to measure the flash-rate, the "on"-time, the starting time, and the voltage drop in the flasher shall not disturb the circuit.

4.3.4 Power supply

The stabilized power supply used for the measurements shall comply with the requirements in 4.3.4.1 and 4.3.4.2.

4.3.4.1 For all tests, except that conducted according to 5.10:

- a) the stabilized power supply shall be capable of supplying the steady load current continuously and the inrush current necessary for the tests;
- b) the voltage between B and C (see figure 1) shall not deviate by more than 1 V when the load is raised from 0 to the maximum value (inrush current included). The voltage variation shall not exceed 370 mV after 100 μs ;
- c) static regulation: the voltage between B and C shall not deviate by more than 2 % with changes in static load from 0 to the maximum stabilized value (not including inrush current), or for static input line voltage variations;
- d) ripple voltage: maximum 75 mV peak to peak.

4.3.4.2 For the endurance test (see 5.10):

- a) the voltage between B and C (see figure 1) shall be 7 V or 14 V and 6,5 V or 13 V according to the mode of use of the flasher (see 5.10.1 and 5.10.2);
- b) the voltage between B and C shall not deviate by more than 1 V when the load is raised from 0 to the maximum load (inrush current included); the voltage variation shall not exceed 370 mV after 100 μs ;
- c) static regulation: the voltage between B and C shall not deviate by more than 2 % with changes in static load from 0 to the maximum load (not including inrush current), or for static input line voltage variations;
- d) ripple voltage: maximum 300 mV peak to peak.

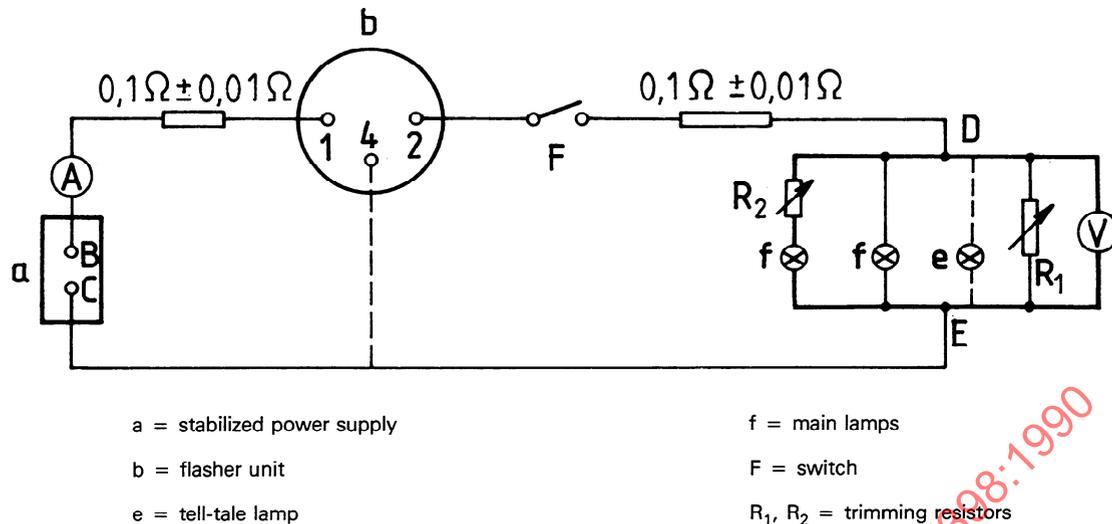


Figure 1 — Wiring diagram to test flashers

4.4 Adjustments

4.4.1 The voltage at the terminals D and E (see figure 1) of the filament lamps shall be adjusted to 6,75 V or 13,5 V after the flasher has been short-circuited by a shunt in accordance with 4.3.1.

The lamps used for the tests shall be selected so that the sum of the wattages does not deviate by more than + 2 % and – 6 % from the sum of the corresponding mean wattage values at 6,75 V or 13,5 V.

The current to obtain the electrical load of the motorcycle shall be adjusted, exact to 0,5 %, to the sum of the corresponding mean wattage values at test voltage, by adjusting one of the trimming resistors R₁ or R₂, with the other neutralized. The filament lamps of the tell-tales shall also be included when they are connected in parallel to the main lamps.

For the tests, the power supply shall be adjusted to obtain the voltages specified at the terminals D and E at the different test temperatures without re-adjustment of the trimming resistor R₁ or R₂.

4.4.2 Where an operating tell-tale is fitted, it shall be connected in the test circuit as indicated by the manufacturer.

4.4.3 Where the flasher also operates as a hazard warning, an additional filament lamp corresponding to the tell-tale shall be provided for the hazard warning signal in accordance with the manufacturer's instructions.

5 Test procedure

5.1 Starting time

5.1.1 By convention, the following terms apply:

- **beginning of the current "on"-time:** the moment when, starting from a voltage equal to or less than 1,5 V (or 3 V), the working voltage reaches 5,5 V (or 11 V);
- **beginning of the current "off"-time:** the moment when, starting from a voltage equal to or exceeding 5,5 V (or 11 V), the working voltage reaches 1,5 V (or 3 V).

5.1.2 The beginning of the first current "on"-time shall be not more than 1 s after switching on at point F for a preset working voltage of 6,5 V or 13 V.

5.1.3 The period of time for the first current "on"-time shall be at least 0,2 s.

5.1.4 The beginning of the first current "off"-time shall be not more than 1,5 s after switching on at point F for a preset working voltage of 6,5 V or 13 V.

5.1.5 The requirements of 5.1.2, 5.1.3 and 5.1.4 shall be complied with, averaged over three starts, separated by cooling intervals of at least 5 min. The same requirement shall be complied with for one start only after 5 min of continuous operation.

5.2 Flash-rate and current “on”-time

5.2.1 Flash-rate

5.2.1.1 Functioning as direction indicator

With the lowest and highest electrical load (i.e. for the smallest and the greatest number of lamps for which the flasher is designed), the flash-rate shall comply with the requirements of table 2 when, after at least five consecutive cycles, the mean value of at least three consecutive cycles is determined.

Table 2 — Flash-rate for flashers as direction indicator signals

Working voltage V		Stabilized temperature °C	Flash-rate cycles/min
6	12	- 18 ± 2,5	60 to 120
7,5	15	- 18 ± 2,5	
5,5	11	+ 52 ± 2,5	
7	14	+ 52 ± 2,5	
6,5	13	+ 23 ± 5	

Measurements shall be taken after 2 h stabilization at the specified temperatures. The time of operation at the temperature of - 18 °C shall not exceed 15 s. At the temperature of 52 °C, measurements shall be taken after 5 min ± 1 min of continuous operation.

5.2.1.2 Functioning as hazard warning

With the lowest and highest electrical load specified by the manufacturer, the flash-rate shall comply with the values of table 3 when, after at least five consecutive cycles, the mean value of at least three consecutive cycles is determined.

Table 3 — Flash-rate for flashers as hazard warning signals

Working voltage V		Stabilized temperature after 2 h °C	Flash-rate cycles/min
5,5 and 6,5	11 and 13	- 18 ± 2,5 + 23 ± 5 + 52 ± 2,5	60 to 120

5.2.2 Current “on”-time

The current “on”-time (ratio, as a percentage, of the current “on”-time over one cycle) shall be measured after at least five consecutive cycles by determining the mean value of at least three consecutive cycles

under the conditions of temperature and voltage defined in 5.2.1.1 and 5.2.1.2.

Under these conditions, the current “on”-time shall remain between 30 % and 75 %.

5.3 Operating tell-tales

5.3.1 Normal conditions (all lamps operating)

When all lamps are operating normally, the audible and/or optical operating tell-tale(s) (if any) shall operate, at the rate of the main filament lamps, in phase or counterphase at temperatures of - 18 °C ± 2,5 °C, 23 °C ± 5 °C and 52 °C ± 2,5 °C, and in the working voltage ranges between 5,5 V and 7 V or between 11 V and 14 V. The tell-tale(s), if any, need not function when in hazard warning.

This test shall be carried out in accordance with 4.4 but without re-adjustment of resistors R₁ and R₂.

5.3.2 Indication of filament lamp failure

In the case of a failure of a main filament lamp at temperatures of - 18 °C ± 2,5 °C, 23 °C ± 5 °C and 52 °C ± 2,5 °C, and in the working voltage ranges between 5,5 V and 7 V or between 11 V and 14 V, the audible and/or optical operating tell-tale(s) (if any) shall indicate this failure either by ceasing to function, or by a change of frequency.

In the case of a tell-tale lamp, it is considered that the tell-tale ceases to function when it remains either constantly extinguished or lit.

The unaffected main filament lamp shall either remain lit or continue to flash, in which case a change in frequency is permitted.

This test shall be carried out in accordance with 4.4 but without re-adjustment of resistors R₁ and R₂.

5.4 Voltage drop

Measurements shall be carried out after at least five complete cycles.

With the flasher supplied with 6,5 V or 13 V, the smallest voltage drop measured between the input and output terminals considered shall not exceed 0,4 V when operating for direction indicating and 0,5 V when operating for hazard warning.

5.5 Dielectric strength

When new and in an ambient air relative humidity of 45 % to 75 %, the flashers shall be capable of withstanding for 1 min a voltage of 1000 V r.m.s. with a frequency of 50 Hz or 60 Hz between the terminals and the exterior metallic parts (mounting

brackets, housing, rivets), if these parts are not electrically connected to one of the terminals.

This test is not required where such exterior metallic parts do not exist or if an electrical connection exists as stated above.

5.6 Overload strength

Before the test, the flasher terminals considered shall be shunted by $5\text{ m}\Omega$ max. With the resistor R_3 (see figure 2), the current shall be adjusted to 35 A. The shunt shall then be removed for the test.

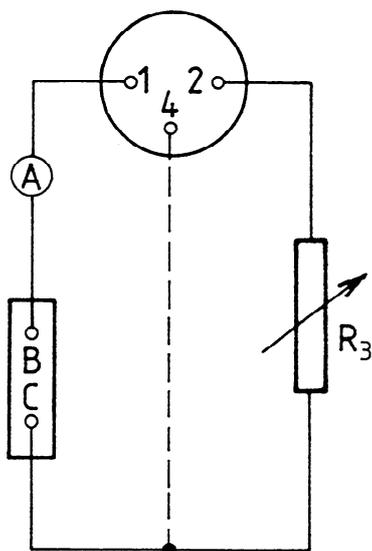


Figure 2 — Wiring diagram for overload strength test

With a voltage of 6,5 V or 13 V, the flasher shall be capable of resisting a maximum current of 35 A once only for 10 s between the input and output terminals considered, with the exception of tell-tale circuits.

5.7 Vibration test

The flasher shall be mounted on a test bench in the position and with the mounting method corresponding to that on the vehicle. The test shall be carried out at an ambient temperature of $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.

5.7.1 Checking

With sinusoidal vibrations between 20 Hz and 200 Hz with an acceleration amplitude of 50 m/s^2 , the flash-rates of the main filament lamps shall comply with the specifications of 5.2.1. However, this test is only required at an ambient temperature of $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$. The tell-tales shall also still continue to function. Momentary frequency variations with

respect to the main filament lamps are, however, allowed.

This test shall be carried out successively in each of the three main axes.

5.7.2 Vibration endurance

The flasher, not connected to the power supply, shall be subjected to sinusoidal vibrations varying from 20 Hz to 200 Hz and back with a frequency variation of 2 octaves/min and an acceleration amplitude of 50 m/s^2 .

After 45 h of test, equally divided between the three main axes, the flasher shall not have deteriorated and shall still comply with the conditions specified in 5.1 and 5.2. The tell-tales shall also still continue to function.

5.8 Impact test

5.8.1 Test conditions

At an ambient temperature of $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$, the flasher shall be suspended at the end of a wire of 500 mm length, the other end of which shall be fixed. The fixing point shall be in the plane of a vertical face of a steel block of mass 25 kg. The wire shall be moved to make an angle of 60° with the vertical in a plane perpendicular to the corresponding steel block surface. The flasher shall then be released to strike the block.

This test shall be carried out in both directions of each of the three main axes. One test only shall be conducted on each sample.

Any other equivalent method may be accepted.

5.8.2 Test requirements

After at least 3 min operating as a direction indicator, or as a hazard warning if the flasher is designed for that function only, the flasher tested shall comply with the requirements of 5.1, 5.2 and 5.3 at an ambient temperature of $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$. The frequency shall not vary, because of the impact, by more than 12 cycles/min.

However, if the variation is more than 12 cycles/min, the impact test shall be repeated five times, after which it is sufficient that the flashers tested comply with the requirements of 5.2.1 at the temperature of $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.

5.9 Resistance to heat and cold

The flasher shall withstand:

- a temperature of $+40\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ at a relative humidity of 90 % to 95 % for 48 h;

- b) a temperature of $+ 80\text{ °C} \pm 3\text{ °C}$ for 1 h;
- c) a temperature of $- 40\text{ °C} \pm 3\text{ °C}$ for 3 h.

These tests shall be conducted with no electrical connection.

At the end of each of these three tests, which are not cumulative, and after reaching an ambient temperature of $23\text{ °C} \pm 5\text{ °C}$, the flasher shall meet the requirements of the tests specified in 5.1, 5.2, 5.3 and 5.4.

5.10 Endurance

The flasher shall be connected as indicated in 4.3, but without trimming resistors.

5.10.1 Functioning as direction indicator

The circuit shall be supplied with 7 V or 14 V (measured at the terminals of the power supply), and the flashers shall be subjected to the following tests at an ambient temperature of $23\text{ °C} \pm 5\text{ °C}$, but one of the tests only is to be conducted on each sample:

- a) 100 h of working cycles consisting of 15 s "on" and 15 s "off";
- b) 50 h of continuous operation.

5.10.2 Functioning as hazard warning

The flasher shall be tested at an ambient temperature of $23\text{ °C} \pm 5\text{ °C}$ with the maximum load indicated by the manufacturer and a voltage of 6,5 V or 13 V, measured at the terminals of the power supply, for continuous operation for 36 h.

5.10.3 Test sequence

For combined flashers, the test in 5.10.1 shall be conducted first, followed by the test in 5.10.2.

5.10.4 Test requirements

After a minimum rest time of 1 h, the flasher shall meet the requirements of the tests specified in 5.1 and 5.2 at a voltage of 6,5 V or 13 V, and 5.3.

Two out of eight samples tested in accordance with 5.4 shall, however, be allowed to exceed the maximum voltage drop specified in 5.4 by a margin of 20 %.

6 Number of samples and sequence of individual tests

The number of samples shall be 20.

Initially all samples shall comply with the specifications of 5.1 to 5.4. Subsequently the tests on samples shall be carried out in accordance with 5.5 to 5.10, as shown in table 4.

Table 4 — Individual tests

Test No.	1	2	3	4	5	6		7
Sample No.	Dielectric strength (see 5.5)	Overload strength (see 5.6)	Heat and cold (see 5.9)	Impact (see 5.8)	Vibration (see 5.7)	Endurance, direction indicator (see 5.10.1)		Endurance, hazard warning (see 5.10.2)
						100 h	50 h	
1	X	X						
2	X	X						
3			X	X				
4			X	X				
5			X	X				
6			X	X				
7			X	X				
8			X	X				
9					X			
10					X			
11					X			
12					X			
13						X		X
14						X		X
15						X		X
16						X		X
17							X	X
18							X	X
19							X	X
20							X	X

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