
International Standard



7284

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Resistance welding equipment — Particular specifications applicable to transformers with two separate secondary windings for multi-spot welding, as used in the automobile industry

Matériel de soudage par résistance — Spécifications particulières applicables aux transformateurs à deux enroulements secondaires séparés pour soudage multipoints, utilisés dans l'industrie automobile

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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

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Resistance welding equipment – Particular specifications applicable to transformers with two separate secondary windings for multi-spot welding, as used in the automobile industry

1 Scope and field of application

The purpose of this International Standard is to give specific details or to complement ISO 5826, which deals with general specifications applicable to all transformers, relating to particular transformers within its field of application.

Unless otherwise specified, those requirements of ISO 5826 not modified by this International Standard are applicable.

This International Standard applies to transformers with two separate secondary windings for electric resistance welding machines for multi-spot welding as used in the automobile industry.

NOTE – By agreement between the manufacturer and the user, this International Standard may also be applied to those transformers for multi-spot welding used in other industries or for other types of welding machines where possible. ISO 5826 is applicable in all cases.

2 References

ISO 669, *Rating of resistance welding equipment.*

ISO 5826, *Transformers for resistance welding machines – General specifications applicable to all transformers.*

IEC Publication 423, *Outside diameters of conduits for electrical installations and threads for conduits and fittings.*

3 Types of transformers

This International Standard covers the following types of transformers which are characterized by the secondary no-load voltage U_{20} , the secondary permanent current I_{2p} and, for

information, by continuous output S_p and/or the rated power at the duty factor 50 % (S_{50}) (see table 1).

Transformers may have a control switch or not for the secondary no-load voltage U_{20} .

The power on which the definition of the transformer type is based is the primary power, i.e. the sum of the powers of both the secondary windings.

Table 1 – Types of transformers, electrical characteristics

U_{20} without steps V	U_{20} with steps		I_{2p} kA	S_p kVA	S_{50} kVA
	Position	V			
5,0	1	3,0	5,6	28	40
	2	3,6			
	3	4,2			
	4	5,0			
7,1	1	5,0	6,3	45	63
	2	5,6			
	3	6,3			
	4	7,1			
10,0	1	7,1	7,1	71	100
	2	8,0			
	3	9,0			
	4	10,0			

NOTES

1 The selection of the secondary voltage is made on the primary side by means of a rotary switch or a set of connectors. In the following clauses, only rotary switch assemblies are shown.

2 For requirements concerning the secondary permanent current I_{2p} and the secondary no-load voltage U_{20} , see ISO 5826.

4 Positions of the rotary switch

The rotary switch shall be either on the transformer according to one of the five positions shown in figure 1 or separated from the transformer (position 6).

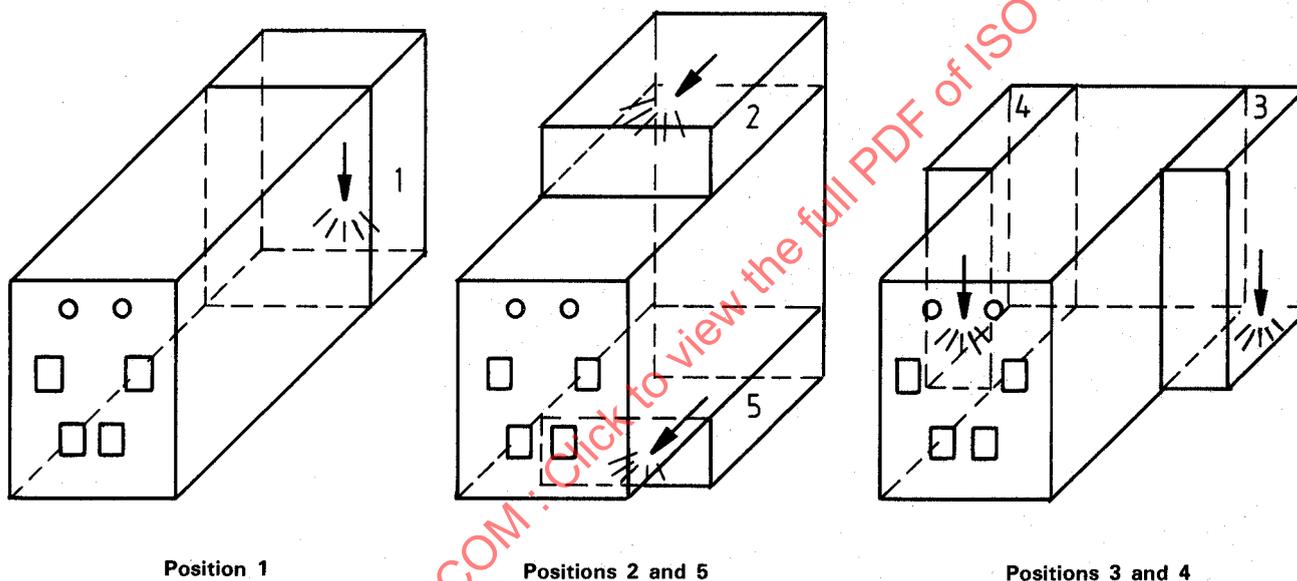
5 Dimensions

5.1 Transformers

The dimensions of the transformers shall be as given in figure 2 and table 2.

5.2 Rotary switch

The dimensions of the rotary switch when it is separate from the transformer shall be as given in figure 3.



Position 1

Positions 2 and 5

Positions 3 and 4

Figure 1 — Positions of the rotary switch

Dimensions in millimetres, roughness values in micrometres

Table 2 — Dimensions l_1 , l_2 and l_3 , in millimetres, as a function of the secondary permanent current

	Transformer		
	I_{2p} kA	5,6	6,3
l_1	500	550	660
l_2	224	280	400
l_3	408	458	568

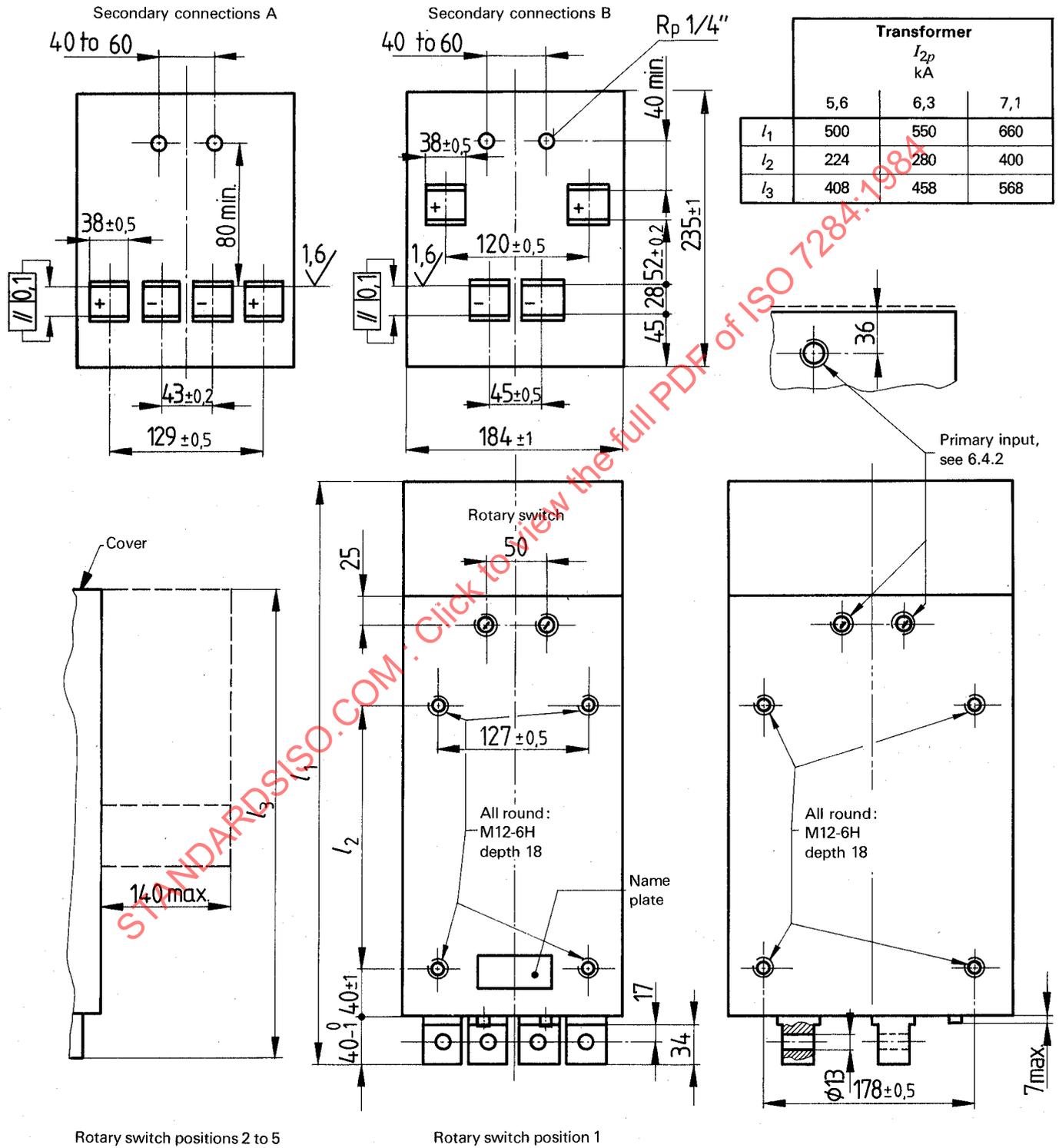
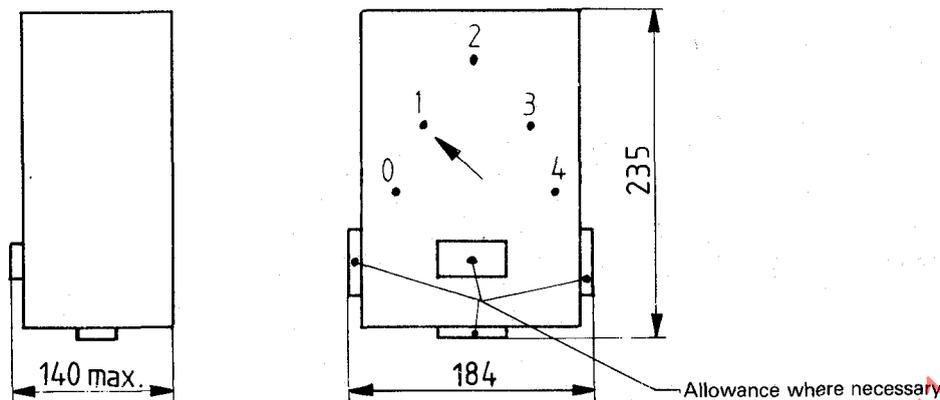


Figure 2 — Dimensions and arrangement of secondary connections



NOTE — All sizes are overall, including any allowance necessary for primary inputs, see 6.4.2.

Figure 3 — Dimensions of the separate rotary switch (position 6) — Position of the handle

6 Construction

6.1 Secondary connections

The arrangement and dimensions of the secondary connections shall be as given in figure 2 and table 2.

6.2 Cooling water circuit

The cooling water circuit shall ensure effective cooling of the transformer for a nominal water flow of 4 l/min and the incoming cooling water shall be at a maximum temperature of 30 °C¹⁾.

It shall be leakproof at a pressure of 10 bar²⁾.

For the said water flow, the pressure drop shall be not more than 0,6 bar.

6.3 Rotary switch

6.3.1 The rotary switch has five steps of which four are active and one a zero step.

The rotary switch shall be designed so as to

- a) allow rapid transition from one step to another;
- b) allow positive positioning at each step;
- c) block direct transition from step 4 to step 0.

6.3.2 The direction of rotation for voltage increase shall be clockwise.

6.3.3 The torque necessary for switch rotation shall not be greater than 6 N·m. The length of the lever shall be approximately 80 mm.

6.3.4 The cover of the switch shall be so designed that the control lever is protected and so that an accumulation of liquid which could leak into the transformer is avoided.

6.3.5 The control switch shall hold any position indicated in clause 4 equally well.

6.4 Primary connections

6.4.1 Cables and terminals

Cables used for primary connections and terminals shall be appropriate to the primary current which may flow and in accordance with the requirements of the relevant IEC Publications.

6.4.2 Cable input

For the transformers, the cable input into the transformer and the rotary switch shall be planned according to one of the methods given in the annex. The position of the threaded holes for the cable input into the transformer shall be as shown in figure 2.

6.5 No-load current

The value of the no-load current shall not be greater than the values given in table 3.

1) Value in accordance with ISO 5826.

2) 1 bar = 100 kPa, 1 Pa = 1 N/m².

Table 3 — Limit values of the no-load current, I_0

I_{2p} kA	U_1 V						S_p kVA	S_{50} kVA	S_0 kVA
	220	380	415	500	550	660			
	I_0 A								
5,6	25,5	14,7	13,5	11,2	10,2	8,5	28	40	5,60
6,3	37,2	21,6	19,7	16,4	14,9	12,4	45	63	8,20
7,1	45,5	26,3	24,1	20,0	18,2	15,2	71	100	10,00

7 Tests

Transformers covered by this International Standard shall be tested in accordance with the requirements of ISO 5826.

8 Designation

Transformers covered by this International Standard are designated by noting in order:

a) the reference to this International Standard;

b) the arrangement of the secondary connections (see figure 2);

c) the position of the rotary switch (see clause 4);¹⁾

d) the secondary no-load voltage U_{20} (see table 1);

e) the continuous output S_p (see table 1);

f) the primary voltage.

Example:

Transformer ISO 7284 - B - 1 - 7,1 - 45 - 380

1) If there is no rotary switch, 0 shall be indicated for transformers without controls and 7 for transformers with control of the secondary voltage by means of a set of connectors.

Annex

Cable input for the primary connection

A.1 Transformers

Two alternatives are possible.

A.1.1 One or two threaded holes are made on each of the four sides of the transformer, as indicated in figure 2.

The holes used are fitted with a conduit for the cable; the others are blocked by means of a special screw the sizes of which are given in table 4.

A.1.2 An opening is made on all four sides of the transformer. Each of these openings is covered by a plate one or more of which has a hole for the passage of a cable conduit. The others are without holes.

Dimensions of such plates are given in figure 4. The openings shall be made so that the hole is positioned, as indicated in figure 2. Conduit sizes are given in table 4.

A.2 Rotary switch

Three alternatives are possible.

A.2.1 Four openings are made in the cover of the switch, as shown in figure 4. These openings are covered by plates with or without a cable conduit, as indicated in A.1.1.

The sizes of the plates are given in figure 5; the conduit size is 40 mm in accordance with IEC 423.

A.2.2 A threaded hole is drilled into the surface of the switch with the lever. The opposite side of the switch is formed by a detachable plate.

A.2.3 Connection is made on the lever surface of the switch by means of a plug and socket device, the dimensions of which are given in figure 6. The alternative is only possible where the current is less than or equal to 200 A.

Table 4 — Dimensions of the conduits

I_{2p} kA	Thread of steel conduit according to IEC 423	
	Conductors	
	1	3
	Nominal size mm	
5,6	32	50
6,3	40	50
7,1	40	50