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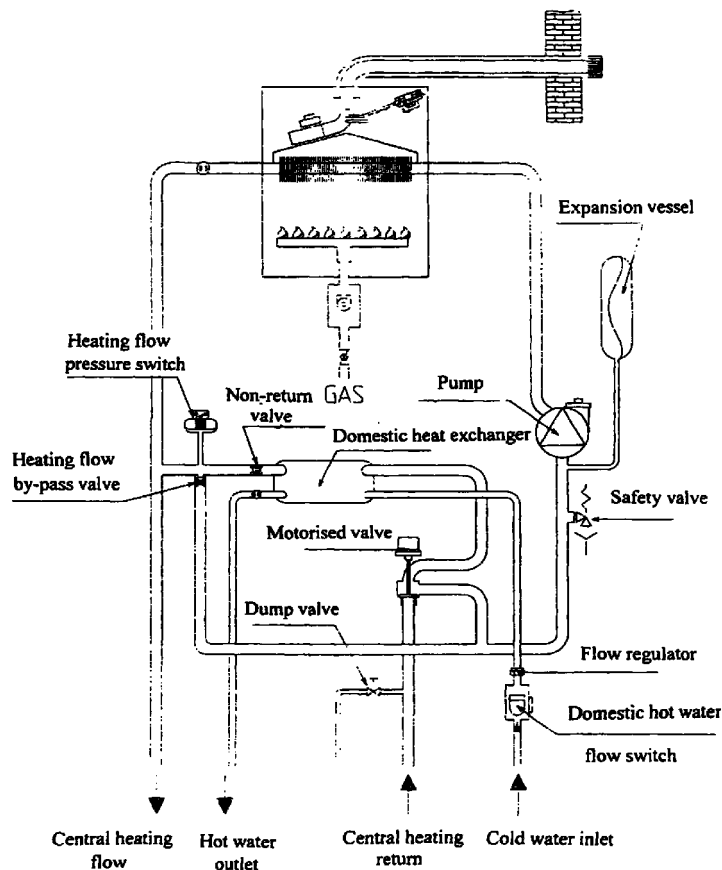
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(54) Hydraulic group

(57) The group features a price/performance ratio, a reference architecture with standardized systems, reduction of the number of components thus avoiding code proliferation, simplified assembly and testing procedures with consequent reduction of production times, modularity for use with boilers of different architectures.

It allows to reduce field failures and to switch from an hydraulic to a motorized system, using composite material components.

The users' advantage is represented by the evolution of the hydraulic group reducing hot water waiting time.



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Description

General

[0001] The project originates from the need of a functional group featuring an aggressive price/performance ratio, a reference architecture with system standardization, reduction of the number of components to prevent codes proliferation, simplification of assembly and testing procedures with consequent reduction of production time, modular design for use on boilers with different architectures.

[0002] A product featuring performance and reliability improvements enabling to minimize field failures and to switch from an hydraulic to a motorized system using components made of composite material.

[0003] At user's level, the advantage provided by the evolution of the hydraulic group consists in the reduction of the sanitary hot water waiting time.

Modified elements

[0004] The elements presenting a greater innovation as compared to the current model are in bold type (reference European patent no. 0652408, enclosed)

- Inclusion of quick fastening systems with o-ring seals and fastening pin or clamping screw.
- Inclusion of hoses with fastening pin at one of the two ends
- Previous by-pass valve (head + spring + sealing ring nut) replaced by a by-pass valve, diameter 20, providing easier and more reliable disassembly
- Application of a limestone-proof system consisting of a check valve (reference our European patent request no. 97830588.6 filed on November 11, 1997)
- the group has been conceived as modular in order to obtain with the same components the following versions :

- heating only
- heating only with connection to remote boiler
- heating + sanitary water

- the hydraulic group inside the boiler has been standardized leaving to the template, provided separately with different configurations, the function to match the various types of plant loading system available in the different countries.
- Inclusion of one-level safety pressure switch for heating purposes to replace the mechanical differential flow switch consisting of a diaphragm, a cap, a spring, a spindle and a micro for the electric signal. The differential flow switch authorizes gas ignition when the following two conditions under its control occur :

- The water pressure is sufficient
- The pump is running

The one-level pressure switch, connected to the electronic card, checks the water pressure while circulation is kept under control by an intelligent probe. The one-level pressure switch is a completely new component and its use allows to replace the differential flow switch increasing reliability and making the control of water pressure easier.

- Inclusion of a 3-way electric actuator allowing to switch from a 3-way hydraulic system with intermediate control lever (at rest when in heating position) to a direct electric actuator of new design with built-in over stroke (at rest when in sanitary water position) to reduce the user's waiting time for the hot sanitary water.
- Inclusion of a sanitary flow switch complete with filter, allowing to switch from a diaphragm (venturi) priority system for sanitary water to a sanitary priority system with a float + magnet flow switch controlled by a reed switch to reduce the user's waiting time for hot sanitary water.

[0005] Enclosed please find :

- 3 color assembly views of the new hydraulic group
- diagram of the new hydraulic circuit
- exploded view of the new hydraulic group evidencing the sanitary flow switch, the 3-ways actuator and the new pressure switch
- drawing of the heating by-pass
- specifications and drawing of the electric actuator
- specifications and drawing of the heating pressure switch
- specifications and drawing of the sanitary pressure switch

Claims

The new design enables to reduce the number of components and of codes, to simplify assembly and testing procedures with consequent reduction of production times, and finally assures the possibility of use with boilers of different architectures.

Such system provides an evident reduction of the waiting time for the sanitary hot water.

The hydraulic group features the following characteristics:

1. quick fastening system with o-ring seal and fastening pin or clamping screw
2. hoses with fastening pin at one of the two ends
3. use of a more reliable by-pass valve that can be easily dismantled
4. increased modularity of use
5. standardization of the hydraulic group inside the

boiler, leaving to the template the function to match the different loading systems

6. inclusion of a one-level safety pressure switch for heating

7. 3-way electric actuation group

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8. sanitary flow switch complete with filter

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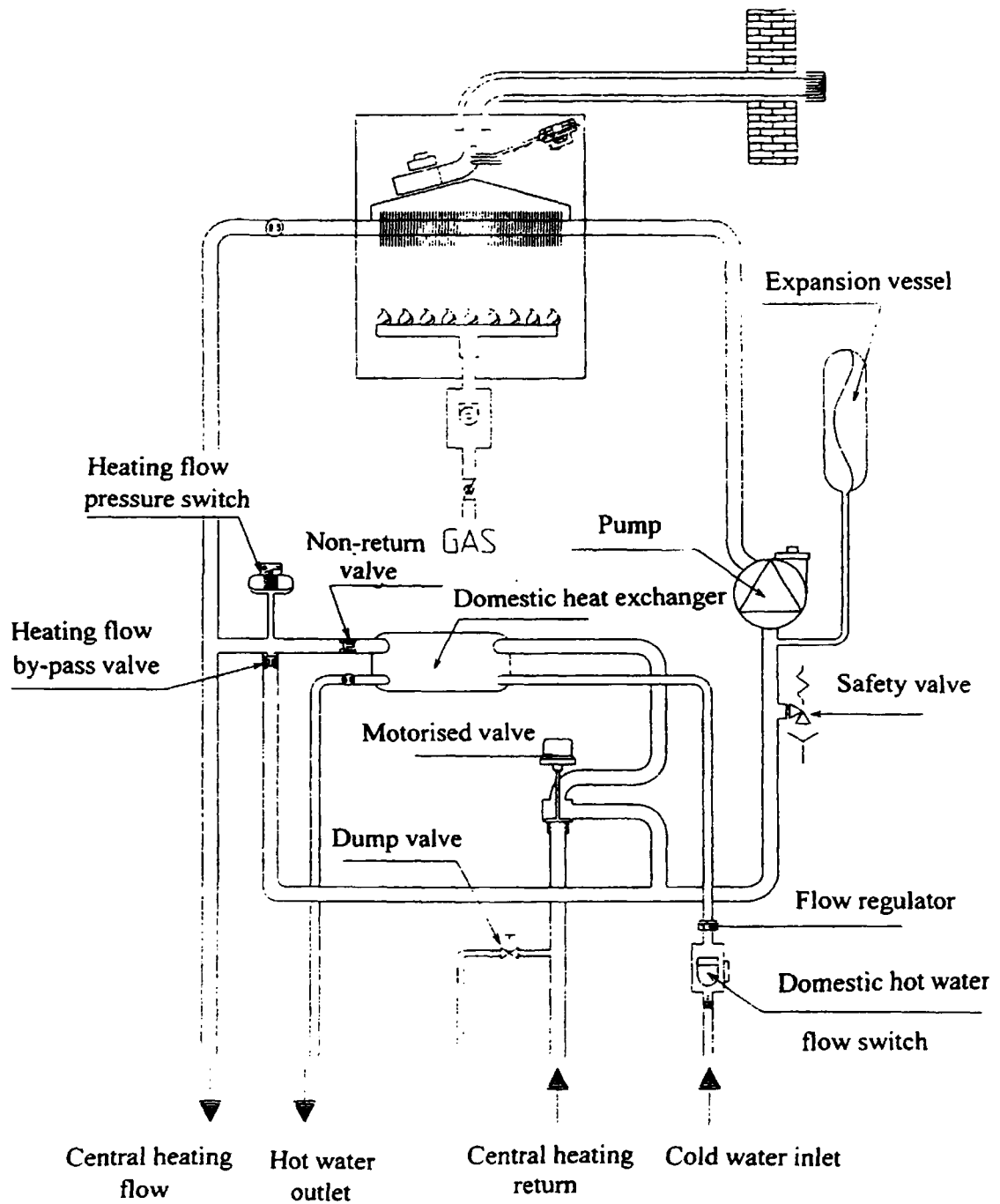
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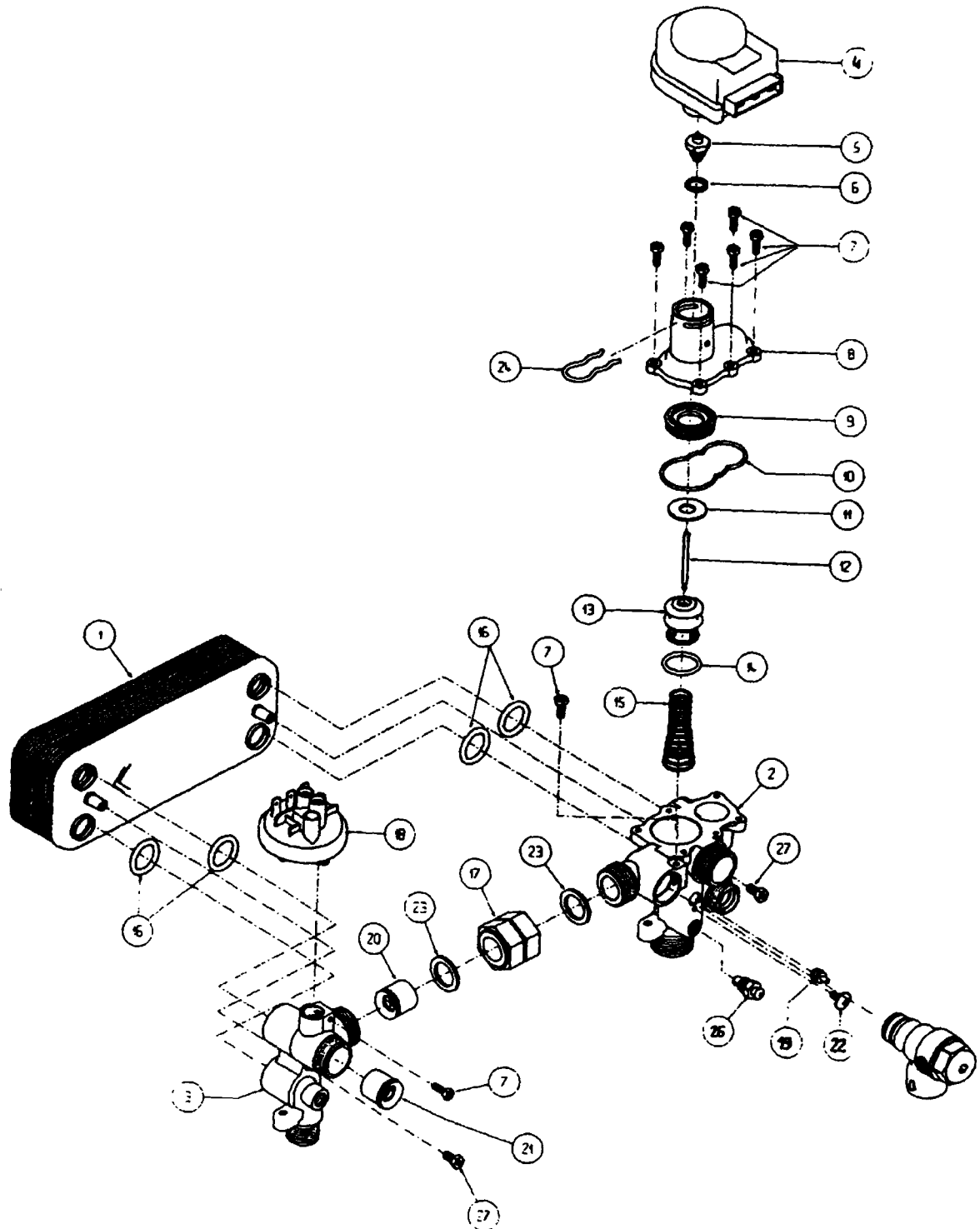
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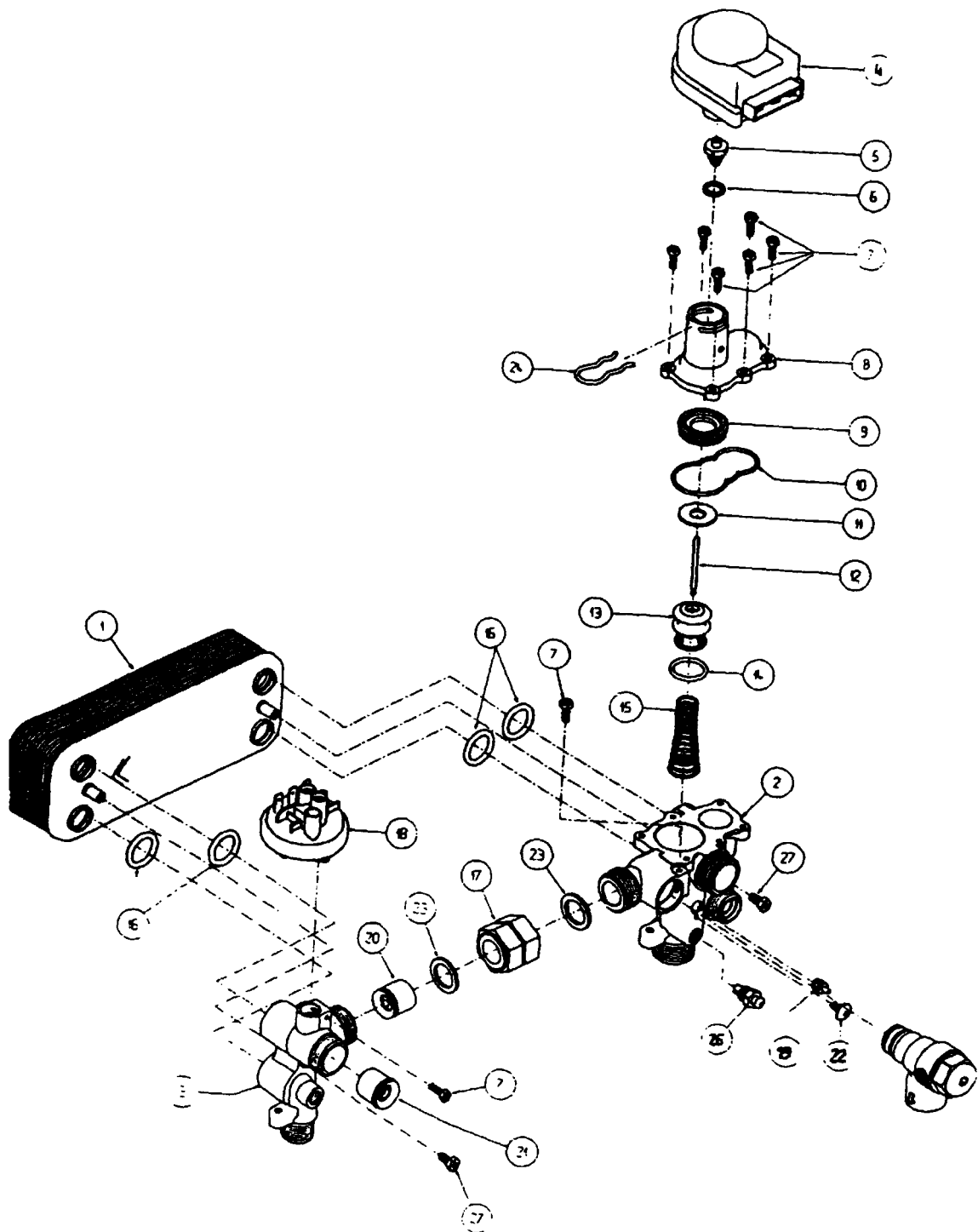


Hidraulic group part list

Item	Quantity	Drawing number
27 screw M5x10 TE/C	2	0679/B
26 air release valve	1	0603/33
25 safety valve	1	0676/10
24 motorised valve spring	1	0676/18
23 gasket d. 24x17x2	2	0641/64
22 special screw M4x12 Fe	1	0637/5
21 non return valve	1	0676/9
20 heating flow by-pass valve	1	0676/8
19 plug	1	0679/13
18 heating flow pressure switch 1 level	1	0679/6
17 flow pipe connection	1	0679/3
16 o-ring r. 15	4	0640/157
15 conical spring for diverter valve	1	9679/7
14 o-ring 3075	1	0635/68
13 diverter valve bobbin	1	0676/25
12 bobbin rod	1	0635/6
11 bobbin gasket	1	0676/26
10 diverter valve cover gasket	1	0635/140
9 inner ring group	1	0635/75
8 diverter valve cover	1	0676/16
7 screw M4 x07 x12 TE/C	8	0635/24
6 nipple gasket	1	0635/70
5 nipple	1	0635/51
4 motorised valve	1	0676/17
3 hot water pipe fitting	1	0679/2
2 diverter valve and flow switch manifold	1	0679/1
1 domestic heat exchanger 24000 kcal/h	1	0636/32

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9 inner ring group	1	0635/75
8 diverter valve cover	1	0676/16
7 screw M4 x07 x12 TE/C	8	0635/24
6 nipple gasket	1	0635/70
5 nipple	1	0635/51
4 motorised valve	1	0676/17
3 hot water pipe fitting	1	0679/2
2 diverter valve and flow switch manifold	1	0679/1
1 domestic heat exchanger 24000 kcal/h	1	0636/32



Heating flow pressure switch specification

Voltages	Currents
230 Vac	50 mA
24 Vdc	20 – 40 mA
5 Vdc	1 – 2 mA

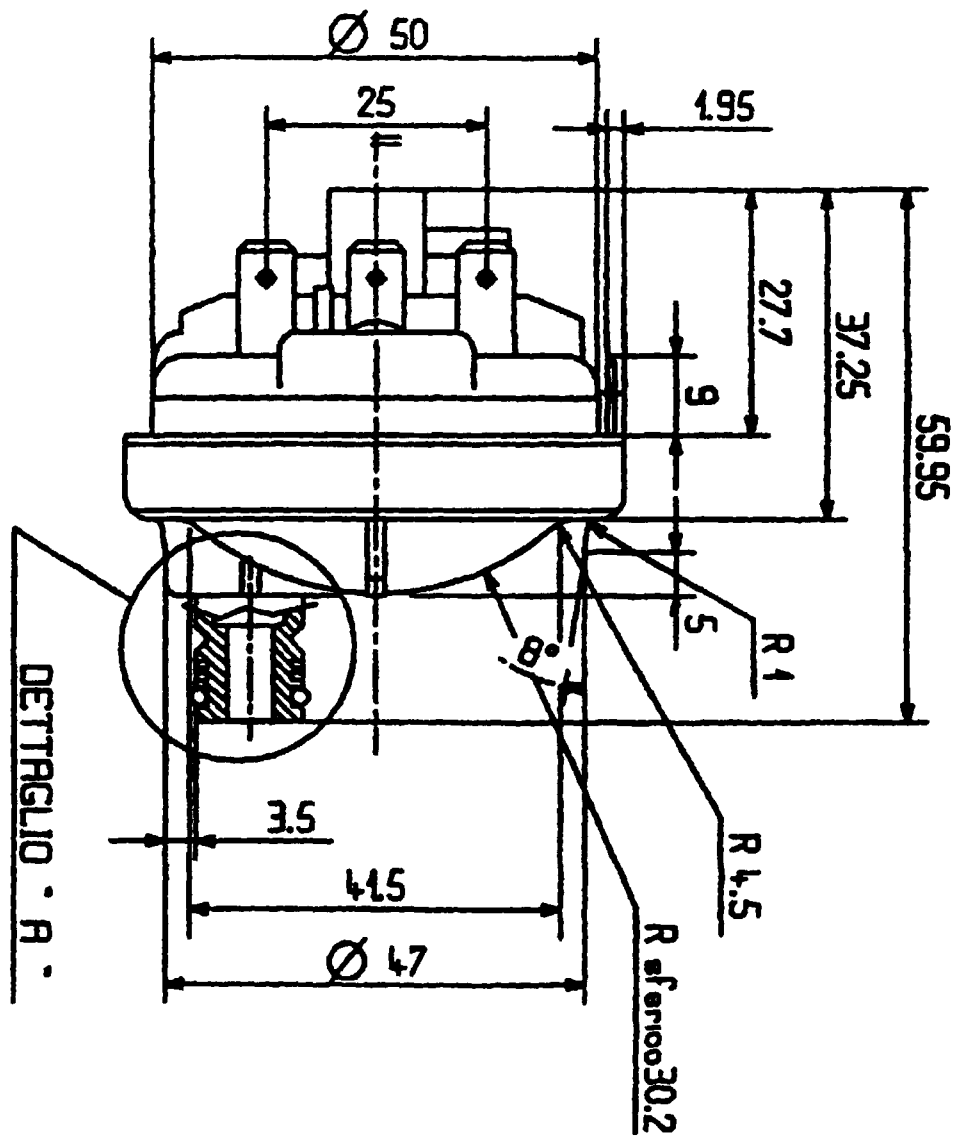
Water temperature range: +3° C - +90° C

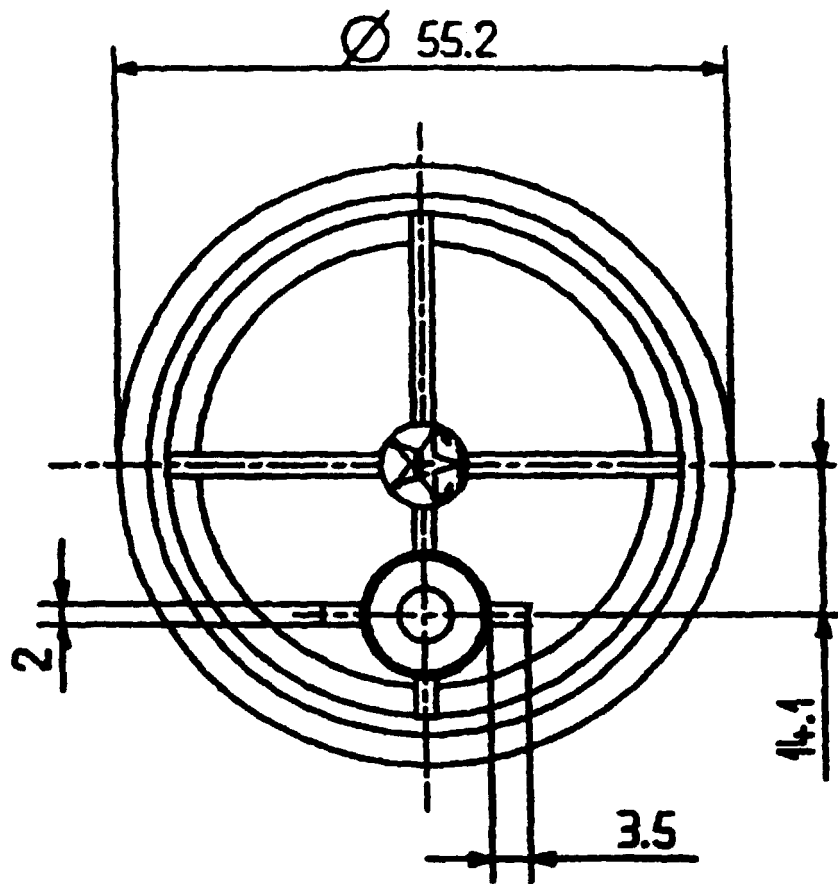
Max working pressure: 3 bar

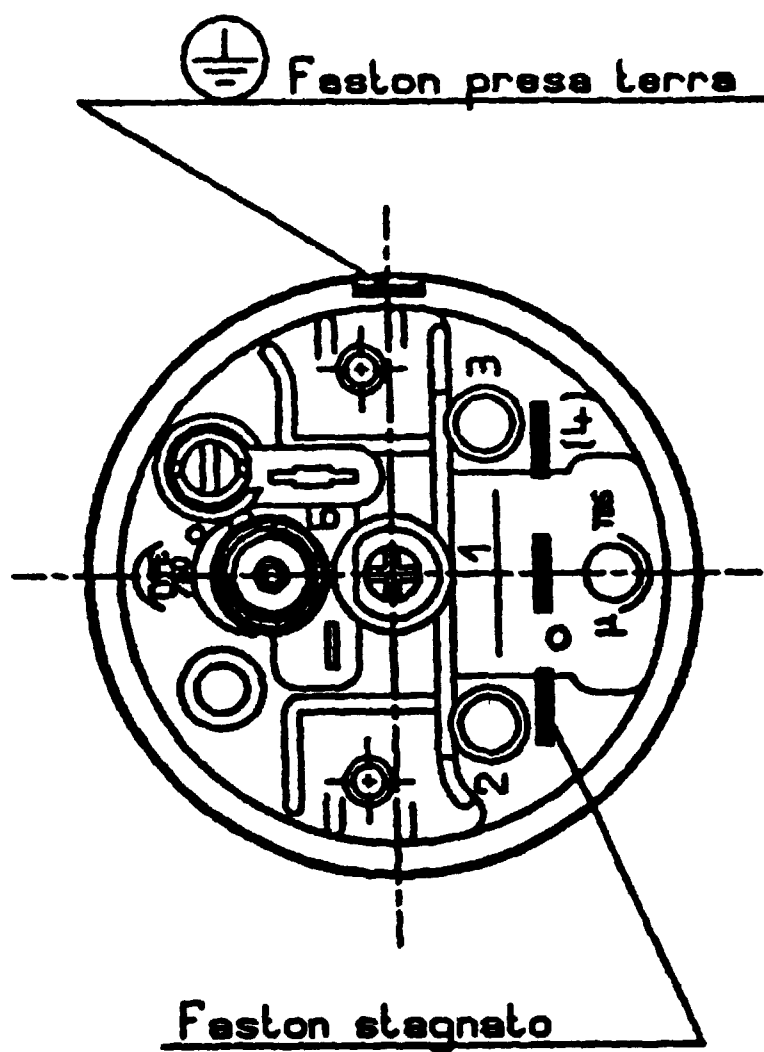
Working parameters:

ON: 0.25 – 0.45 bar with increasing pressure
OFF: 0.1 – 0.2 bar with decreasing pressure

Brass terminal 6.3 x 0.8 (DIN 46244)



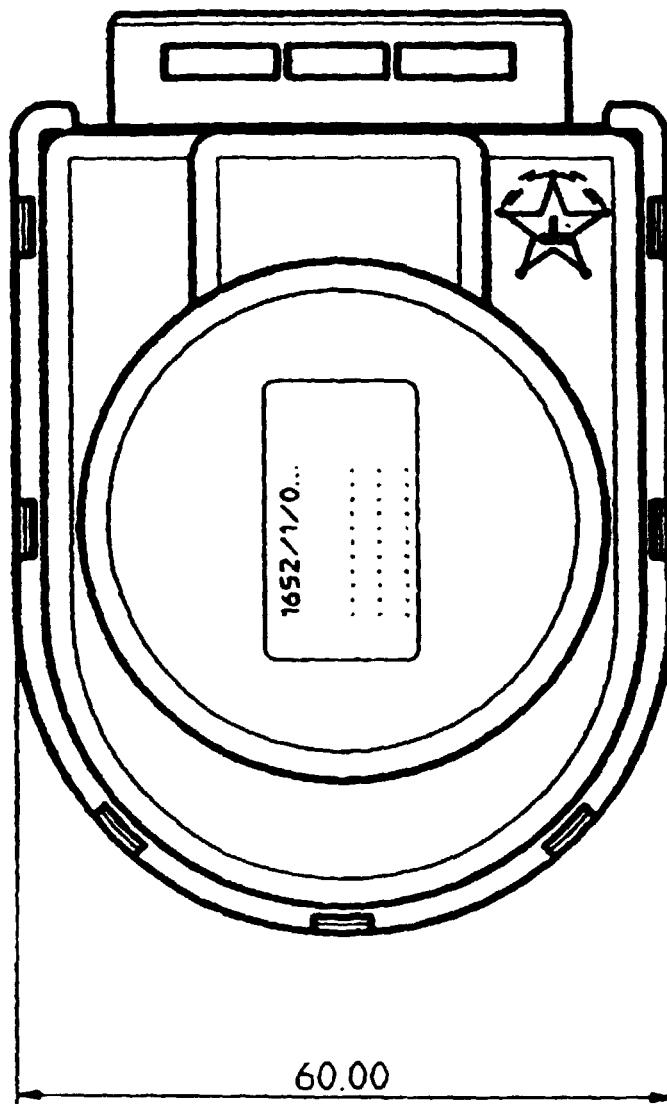


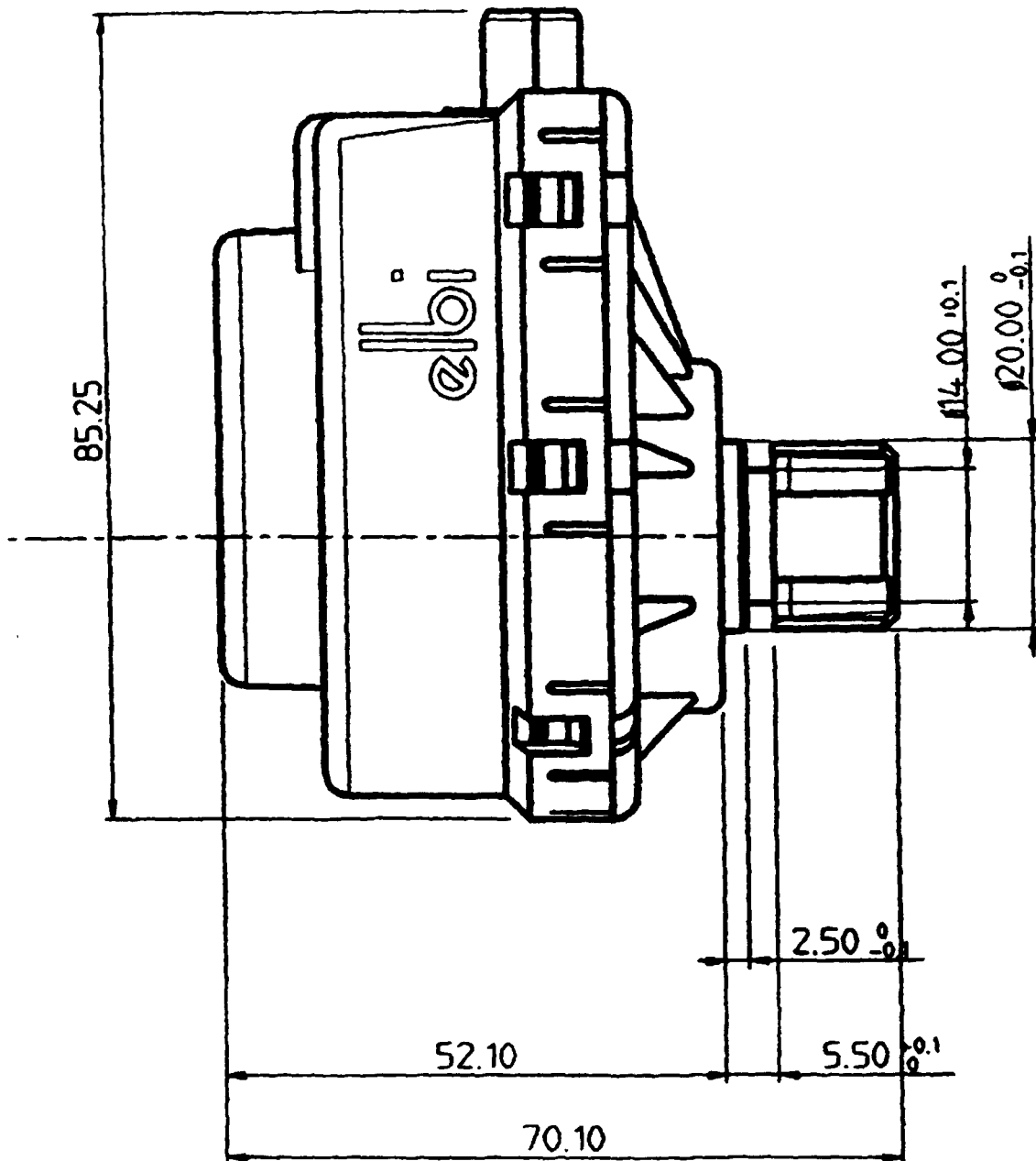


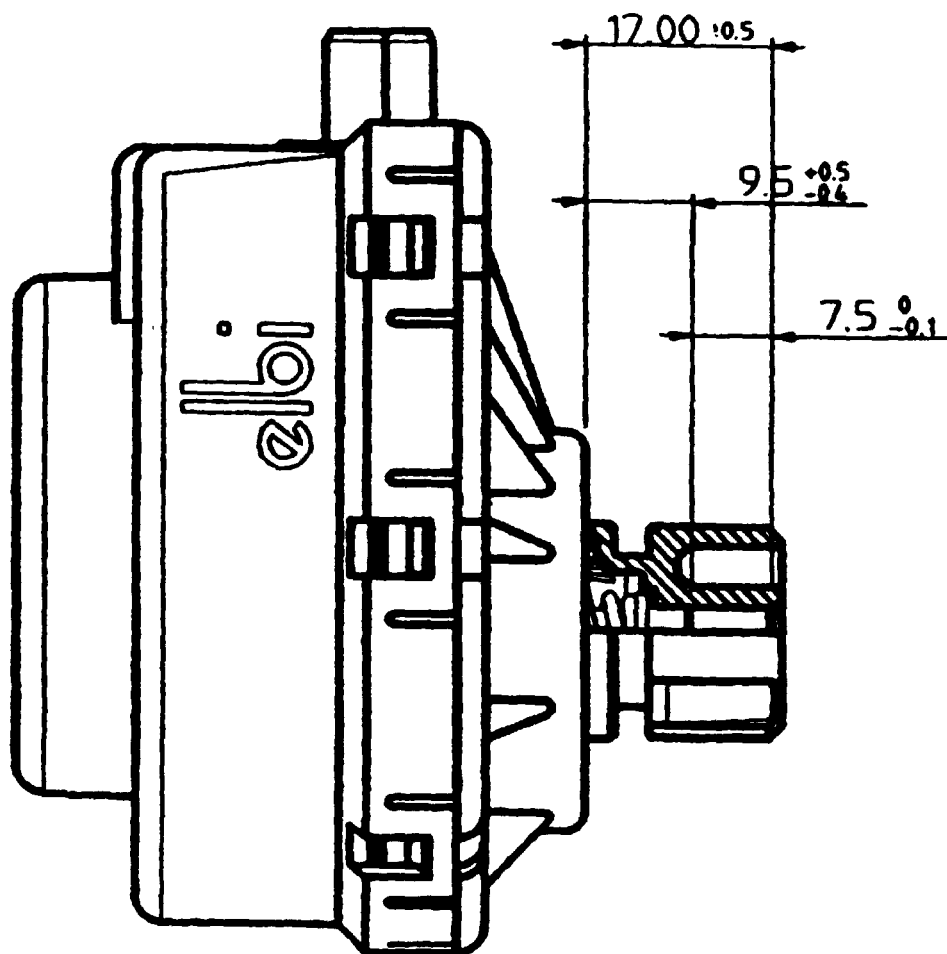
Motorised valve specification

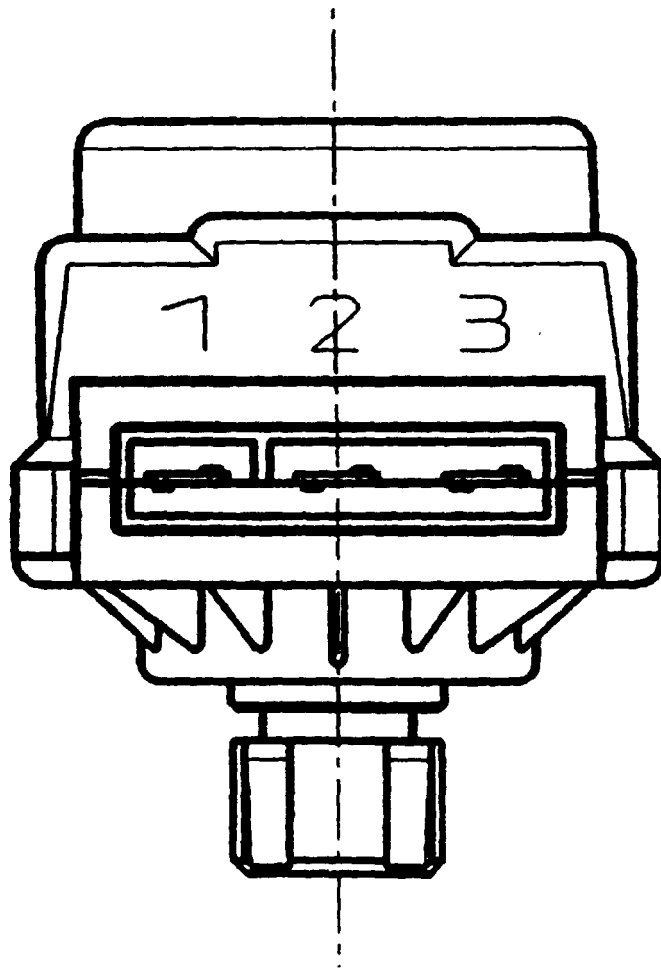
Voltage:	220/240 V 50/60 Hz
Temperature range:	-20° C / 70° C
Stroke:	7.5 mm
Force:	10 N to 70 N
Timing:	opening valve 4.8 s at 60 Hz 6 s at 50 Hz closing valve 3.2 s at 60 Hz 4 s at 50 Hz

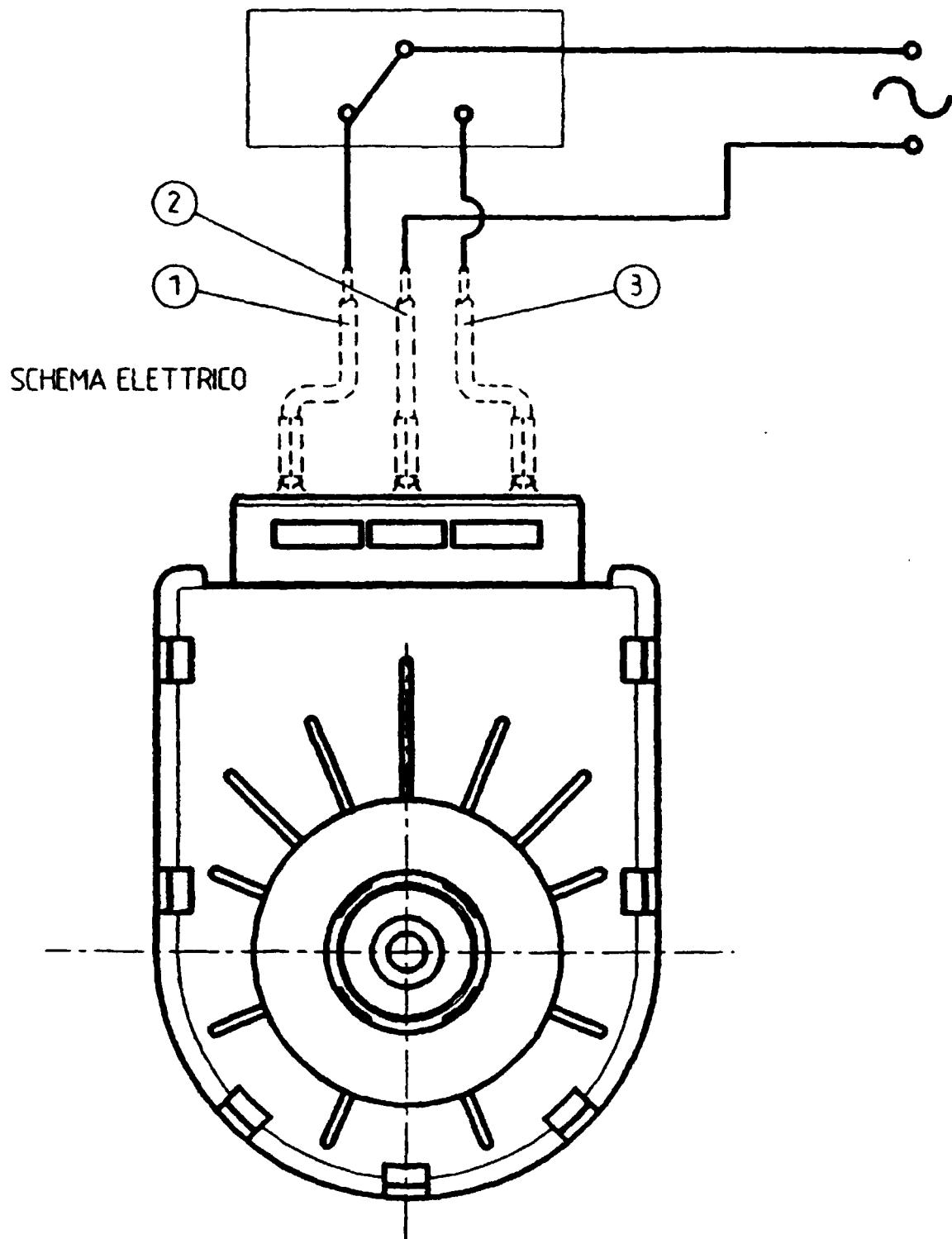
Degrees of protection: IP20











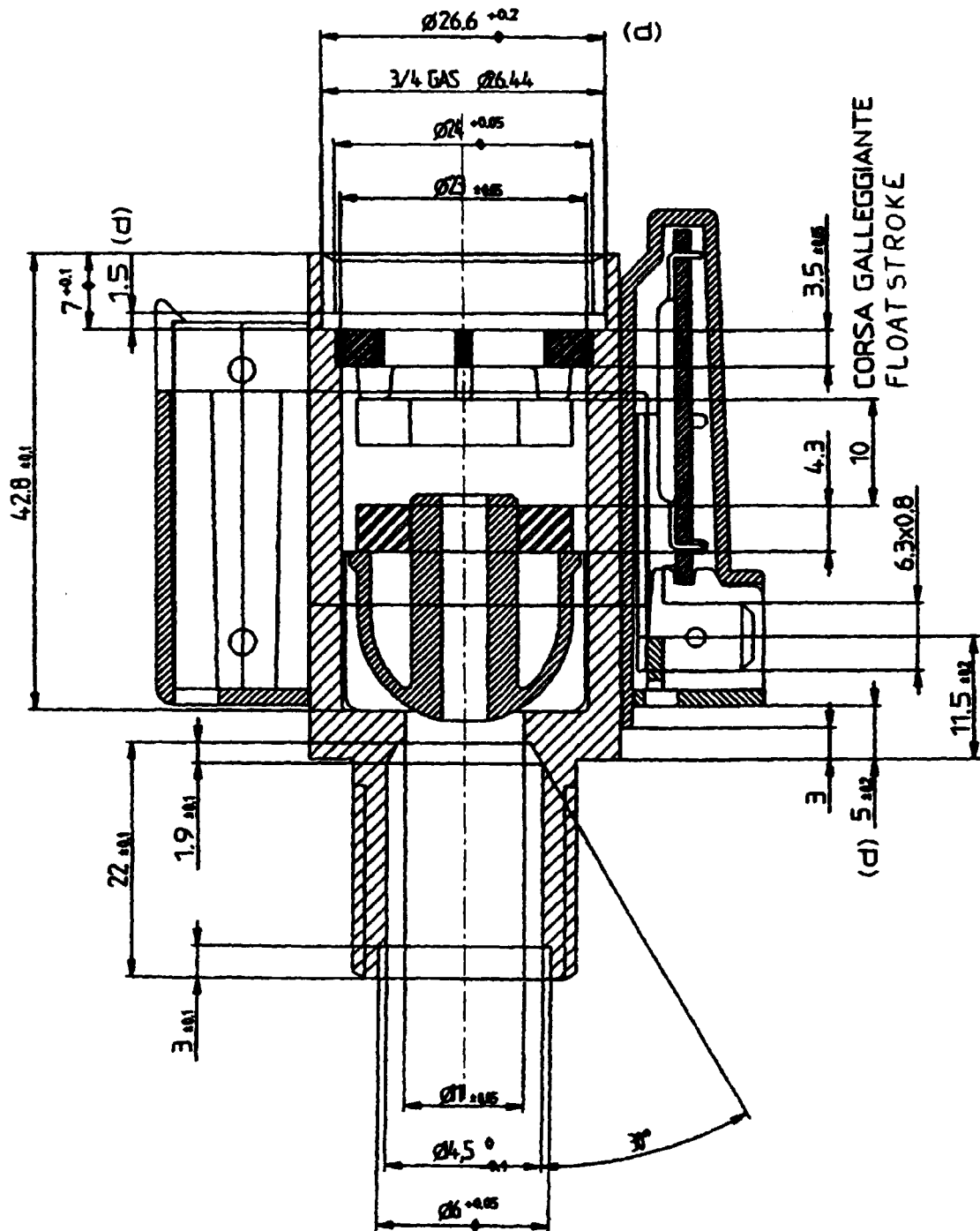
Flow switch specification

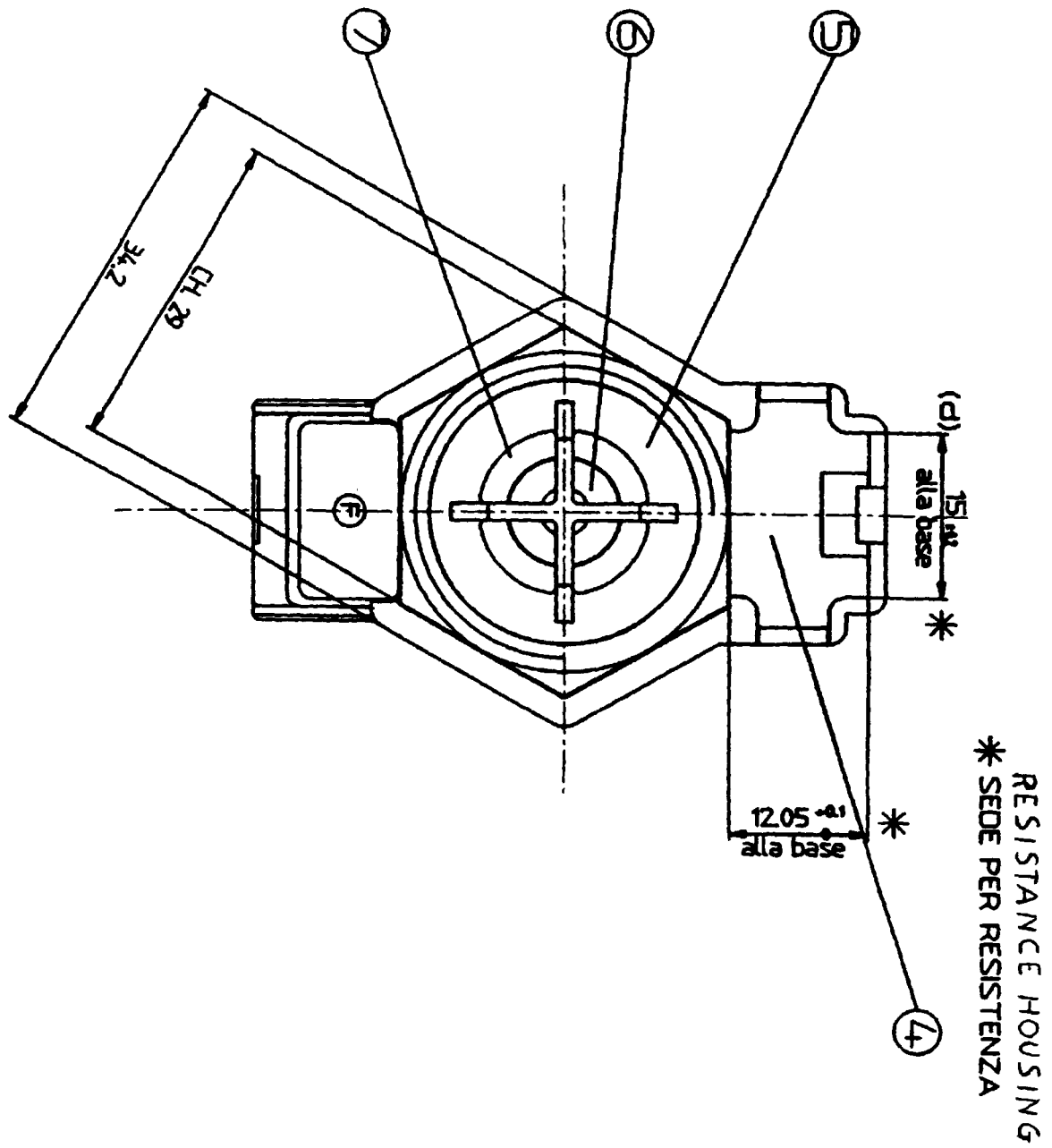
Item	Material	Code
Printed circuit	FR2 – Cu 35 micron thickness	204142
Reed NA Philips RI 46-EBB		205147
Permanent ring magnet	Hardferrite 26/16	507001
Float	Acetalica naturale	354000
Washer	Acetalica naturale	703006
Faston CS 6.3x0.8	OT 63 H20 UNI 4892	301099
Reed support	PA66 FV nat. + red color	760139
Body	CuZn 40Pb2 ½ DURO	210134

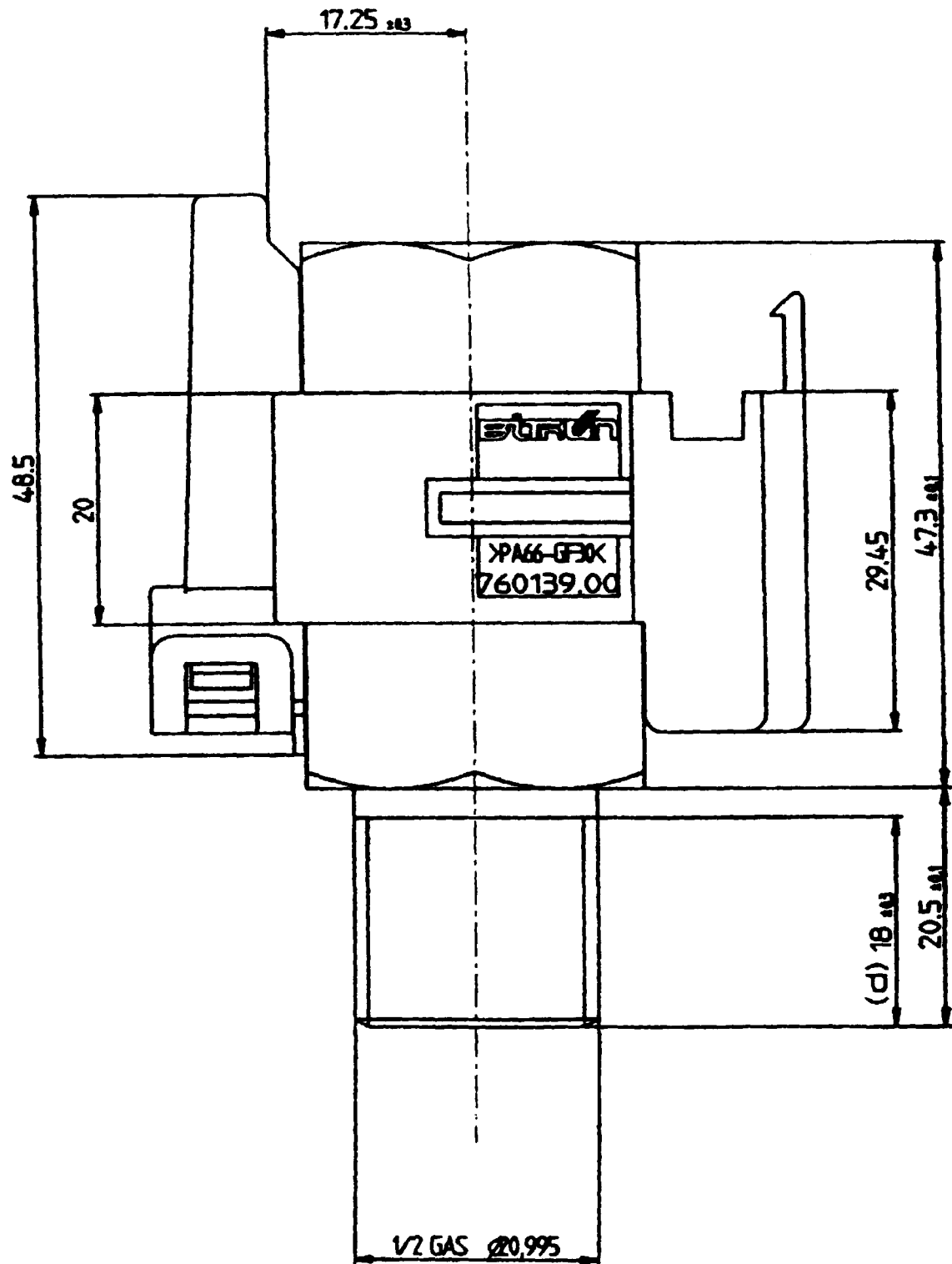
Note: WRC omologation

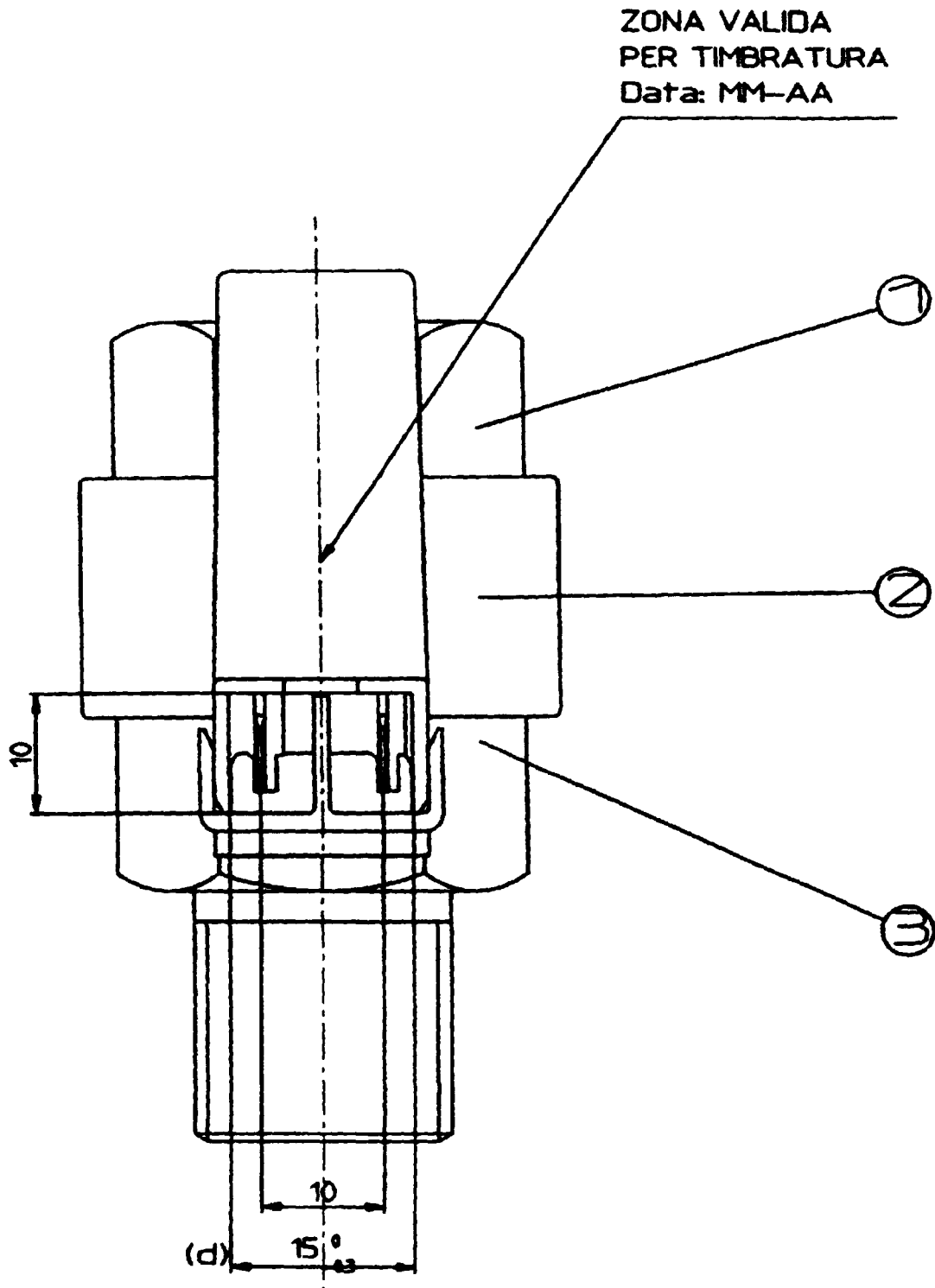
Plastic materials UL94 HB

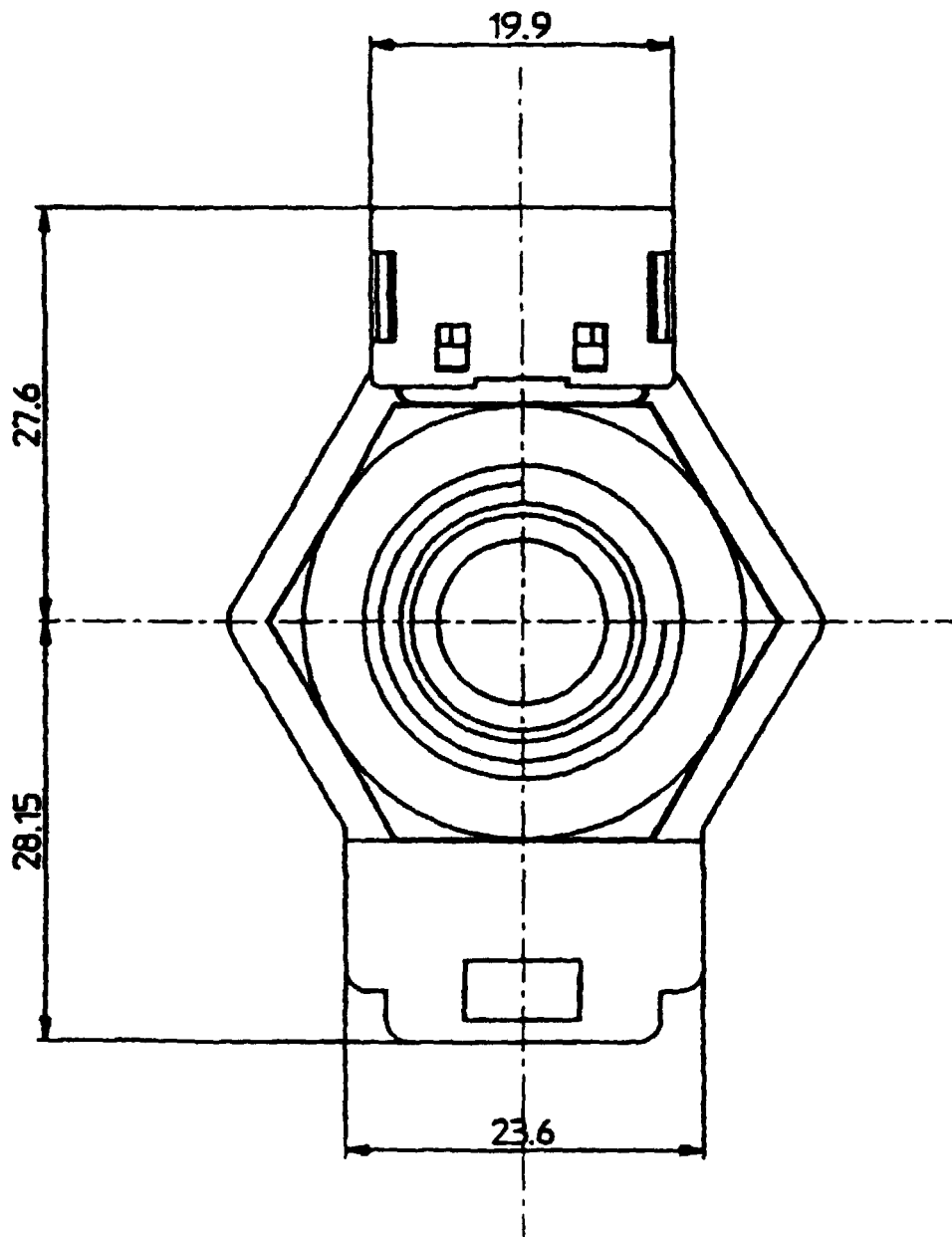
Technical and electrical characteristics as per
BERETTA n° 001/97 Flow Switch specification











By-pass valve specification

Plastic part material: P.O.M. ULTRAFORM S2320

Max working temperature: 100° C

Max temperature level before deformation: 150° C

Spring characteristics:

Wire diameter: 0.6 mm

External diameter: 9 +/-0.1 mm

Number of turns: 7

Free length: 23.3 +/-0.5 mm

Compression at L 17 mm 0.245 kg +/-10%

Compression at L 12 mm 0.440 kg +/-10%

Material: INOX AISI 302



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 99 83 0054

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP 0 797 057 A (FUGAS SRL) 24 September 1997 * abstract *	1	F24H9/14
A	DE 196 13 579 A (ECKERFELD ERIKA) 9 October 1997 * abstract *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			F24H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 22 June 1999	Examiner Van Gestel, H
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 83 0054

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The members are as contained in the European Patent Office EDP file on
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22-06-1999

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82