SPO/98 CAST IRON VALVES
FAMILY 01 - GROUP 79,86

Master Handbook Description: Guide to Choice, Use and Maintenance of SPO/98 Cast Iron Valves (English version)

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DECLARATION OF UE CONFORMITY

Mod: 707
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VALVOLE A FARFALLA SERIE SPO
BUTTERFLY VALVES SERIES SPO

(in tutte le sue configurazioni / *in all their configurations*)

ITALVALVOLE® s.a.s. di Spadon Oscar & C. dichiara che l'intera gamma dei prodotti è stata progettata e costruita in accordo a quanto indicato nell'ALLEGATO I della direttiva UE:

ITALVALVOLE® *s.a.s. of Spadon Oscar & C. declare that all products it was engineered and built in according as indicated on Annex 1 of the directive UE:*

2014/68/UE

CLASSIFICAZIONE DELLE VALVOLE / *CLASSIFICATION OF THE VALVES*

CATEGORIA I per fluidi del gruppo **II** - ***CATEGORY I*** *for fluids group* ***II***

Secondo valutazione di conformità descritte dall' allegato III (MODULO A)
With respect to the conformity described in annex III (MODULE A)

NORME TECHICHE ARMONIZZATE e SPECIFICHE UTILIZZATE:
HARMONISED TECHNICAL STANDARDS and SPECIFICATIONS USED:

UNI EN 1092-1-2 / UNI EN 12266-1-2 / UNI EN 1561 / UNI EN 1563

LUOGO e DATA - *Place and Date*
Cossato, 19/07/2016

Legale rappresentante
Legal representative

Firmato digitalmente da
OSCAR SPADON
SerialNumber = IT:SPDSCR44M19L436J
C = IT

Table of contents

1 Foreword

Butterfly valves are more and more employed in almost all kinds of systems, thanks to their numerous and unquestionable advantages, if compared to the other types of valve.
Their reduced dimensions and weight, the quick assembly and disassembly, the reduced load losses make the butterfly valve the best solution in solving the most common problems related to the distribution and regulation of fluids.

The butterfly valves of ITALVALVOLE® have been carried out in different types and employing different materials, in order to meet the various requirements both of designer and installer as well.
Economy, reliability, easy performance and extremely limited maintenance are the main qualities of our valves.
Their easy operation and reduced torque values enable them to be connected to small actuators.
The butterfly valves we produce may be either hand-operated or controlled through lever, handwheel or pneumatic or electric servocontrol.
They may also be fitted with position indicators and positioner.
Control flanges comply with standard ISO 5211/1.
Butterfly valves are then suitable for a wide application field.
We are at your disposal to suggest you the type of valve, which more suits your requirements.
Please get in touch with our Technical Department for special executions of particular systems.

2 Technical Characteristics

General notice: ⇒all the pressure values indicated hereinafter are gauge pressure values.
⇒ **valve destined to fluids of group 2 (directive 2014/68/UE).**

ND: ⇒ 40 to 200

Connections: ⇒ valve to be interposed between PN 10 flanges

ΔPmax.: ⇒ 10 bar

Pmax allow.(PS): ⇒ 10 bar

Seal: ⇒ PTFE

Tmax allow.: ⇒ 130 °C (continuous duty), 150 °C (intermittent usage, not continuous)

Tmin alloow.: ⇒ environment temperature (20 °C) with gradual passage from heat to cold and vice versa.

Flow direction: ⇒ Wafer type butterfly valve, bidirectional.

Working materials: ⇒ see working drawings and relevant tables.

Overall dimensions: ⇒ see overall dimensions drawings and relevant tables.

2.1 Table 1: Actuation Torques of SPO/98 Butterfly Valves. Connection to our Actuators series ITAL

DN	Torque (Nm)	Double-Acting ITAL Size	Single-Acting ITAL Size
40	16	20	30
50	18	20	30
65	30	30	40
80	45	30	45
100	60	35	45
125	105	40	55
150	140	45	60
200	205	45	80

2.2 Table 2: Fluids Compatible with SPO/98 Butterfly Valves

Adipic acid
Lauric acid
Sulphuric acid (max 21 °C)
Succinic acid
Tannic acid (27 °C ÷ 93 °C)
Air (max 130 °C)
Benzaldehyde
Dietilammine (more than 38 °C)
Potassium sulphate
Aqueous solutions of group 2
Steam (max 130 °C)

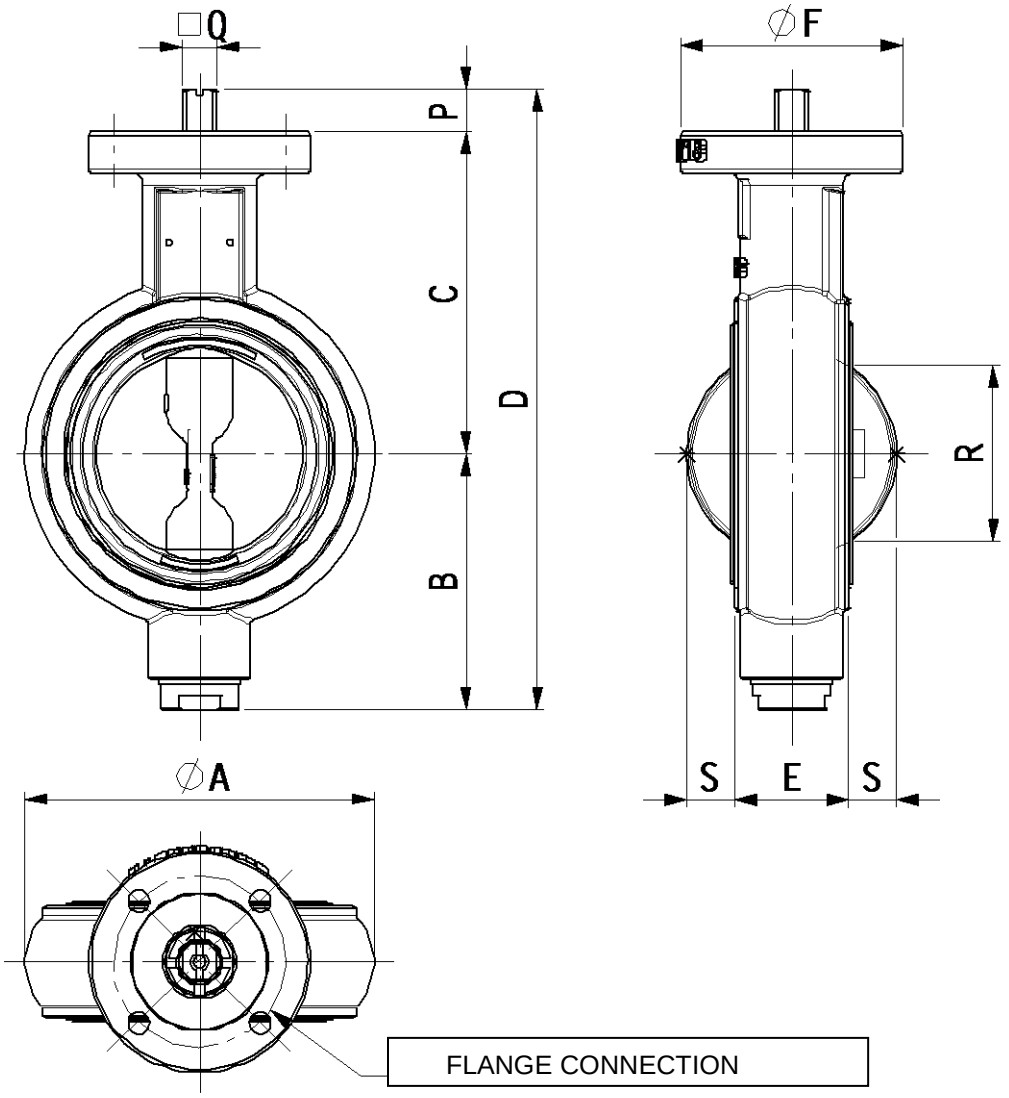
All data indicated under table 2, if not otherwise specified, are relevant to a temperature of 21°C.
All data have a general meaning and are not valid for all possible working conditions. These data may considerably vary depending upon various conditions, such as: temperature, concentration, fluid speed.
For a deeper and thorough information, please get in touch with the technical department.
Any use of the valve on explosive, easily inflammable, comburant and poison gases is strictly forbidden.
Any use of the valve on liquids based on: chlorine, fluorine, bromine, iodine and derivative elements is strictly forbidden.
Any deviation from such prohibitions may be issued for special applications, by our technical department.

2.3 Safety Notes

- The valve body, under the maximum operating temperature depending upon the system, may reach a temperature equal to 130° C. It is up to the engineer to provide the system with the required safety guards and/or warning signals aiming at removing/indicating the risks of burns by the user.
- During whatever operation made on the valve, the fluid shall not be present inside the piping.

2.4 Overall Dimensions of Cast Iron SPO/98 Butterfly Valves

2.4.1 Cast Iron Raw Shaft SPO/98

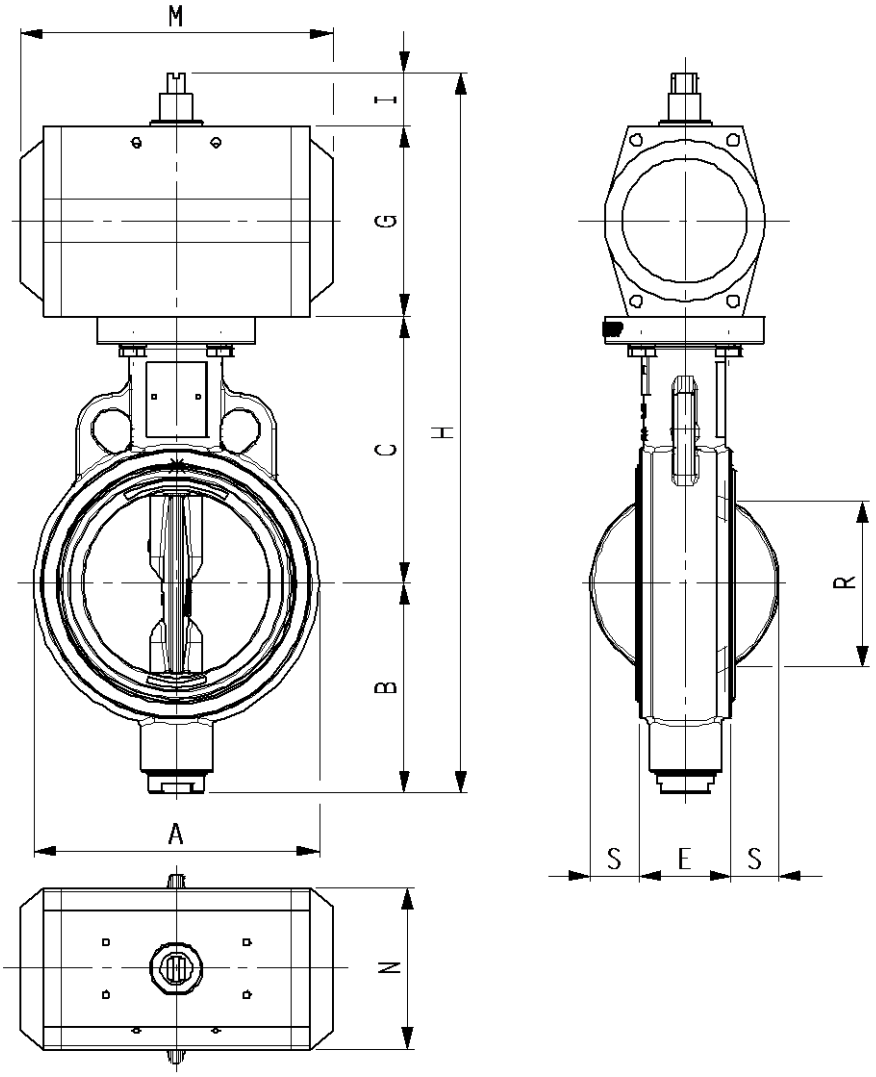


Drawing N° 020509 Rev:00

ND	40	50	65	80	100	125	150	200
CODE	5676	5677	5678	5679	5680	5681	5682	5683
FLANGE CONNECTION	ISO F05	ISO F07	ISO F07	ISO F07	ISO F07	ISO F07	ISO F07	ISO F10
A	93	109	127	142	162	194	217	274
B	70,5	90,5	93	104	118,5	136	161	203
C	98	109	123	131	152	177	190,5	225
D	186	216,5	233	252	288,5	332	371,5	451
E	33	43	46	46	52	56	56	60
F	65	90	90	90	90	90	90	125
P	17,5	17	17	17	18	19	20	23
Q	14	14	14	14	14	17	17	22
R	36	41	56,5	72	94	117,5	145	191
S	8	8	13,5	20	27,5	37	49,5	70

Dimensions are in millimeters ; NB: Dimensions S are present only when the disk is in the open position.

2.4.2 Cast Iron SPO/98 with Double-Acting Pneumatic Actuator Series ITAL

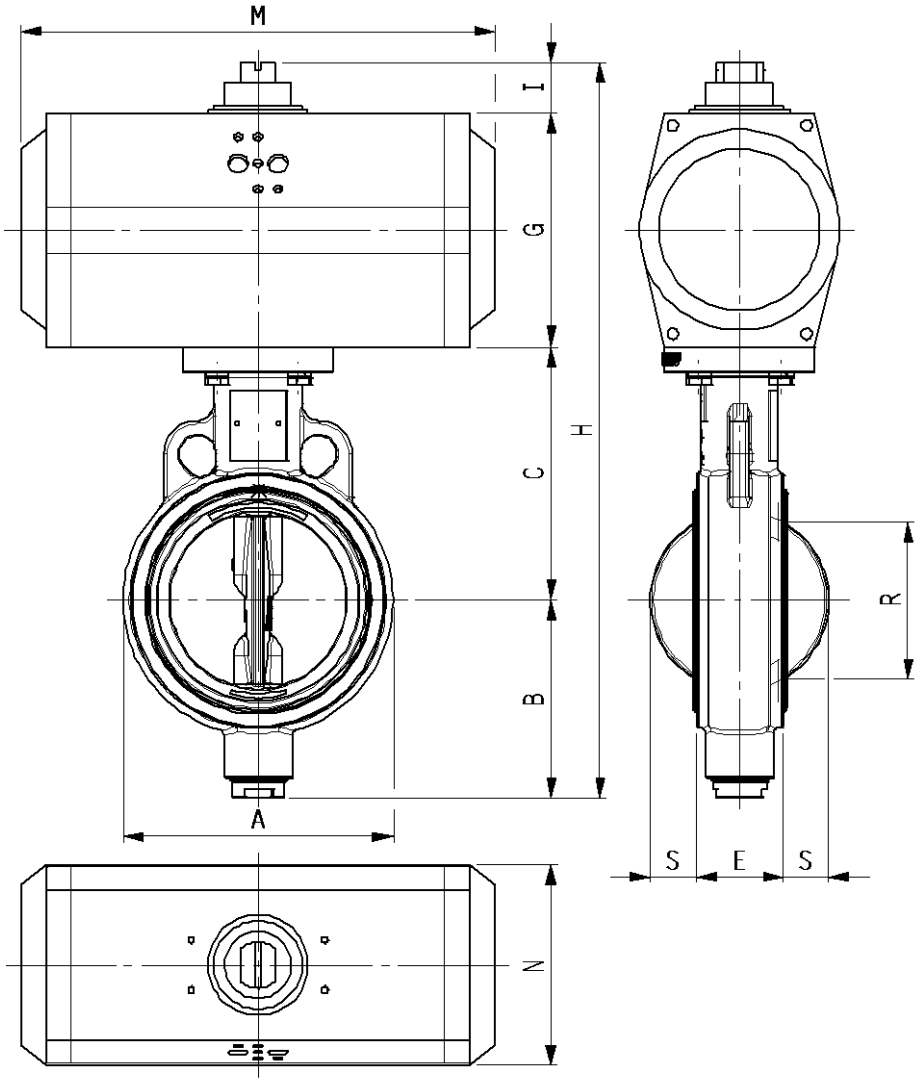


Drawing Nr. 020541 Rev:00

DN	40	50	65	80	100	125	150	200
Double-Acting ITAL Size	20	20	30	30	35	40	45	45
A	93	109	127	142	162	194	217	274
B	70,5	90,5	93	104	118,5	136	161	203
C	98	109	123	131	152	177	190,5	225
E	33	43	46	46	52	56	56	60
G	83	83	100	100	110	125	142	142
H	271,5	302,5	336	355	400,5	518	523,5	600
I	20	20	20	20	20	20	30	30
M	155	155	213	213	236	276	310	310
N	73	73	85	85	98	110	128	128
R	36	41	56,5	72	94	117,5	145	191
S	8	8	13,5	20	27,5	37	49,5	70

Dimensions are in millimeters ; NB: Dimensions S are present only when the disk is in the open position

2.4.3 Cast Iron SPO/98 with Single-Acting Pneumatic Actuator Series ITAL

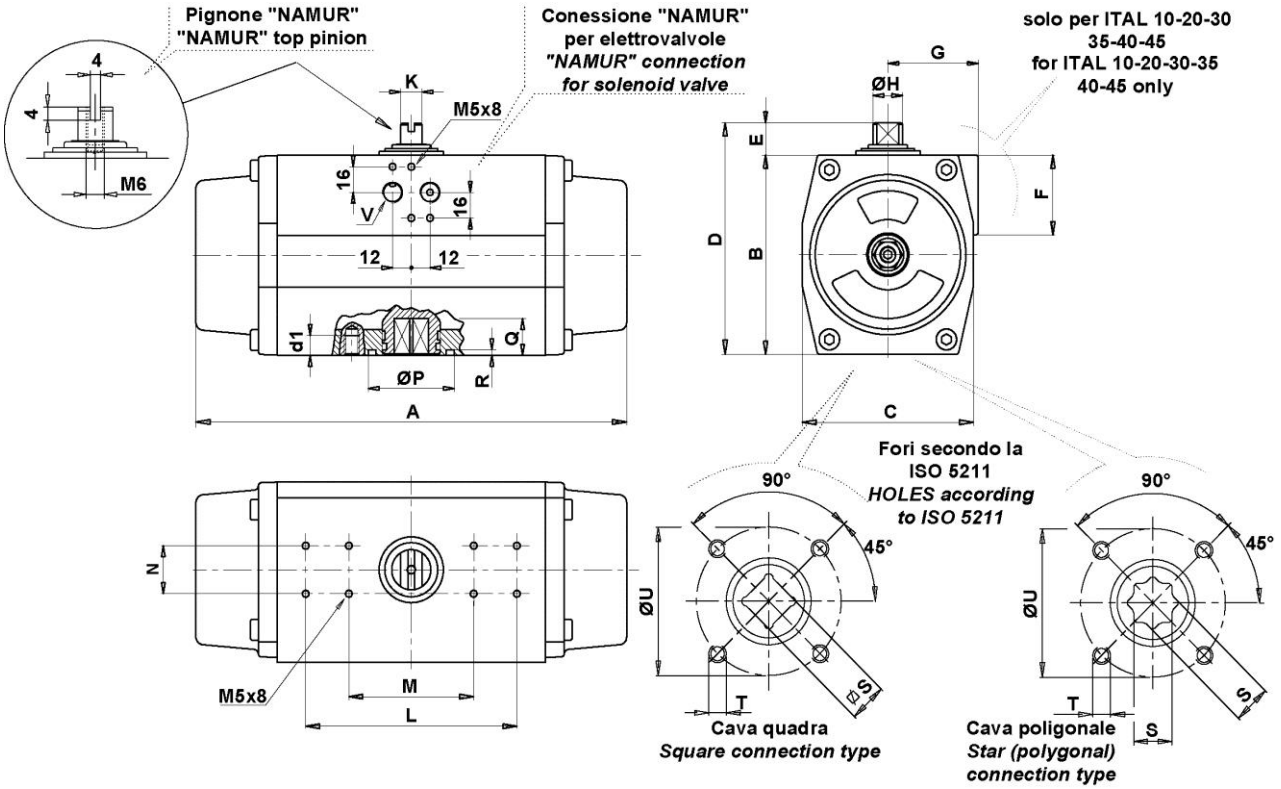


Drawing Nr. 020542 Rev:00

DN	40	50	65	80	100	125	150	200
Single-Acting ITAL Size	30	30	35	40	45	50	55	60
A	93	109	127	142	162	194	217	274
B	70,5	90,5	93	104	118,5	136	161	203
C	98	109	123	131	152	177	190,5	225
E	33	43	46	46	52	56	56	60
G	100	100	110	125	142	155	176	200
H	288,5	319,5	346	380	442,5	498	557,5	658
I	20	20	20	20	30	30	30	30
M	213	213	236	276	310	366	388	468
N	85	85	98	110	128	140	160	175
R	36	41	56,5	72	94	117,5	145	191
S	8	8	13,5	20	27,5	37	49,5	70

Dimensions are in millimeters ; NB: Dimensions S are present only when the disk is in the open position

2.4.4 Overall dimensions of pneumatic Actuators Series ITAL



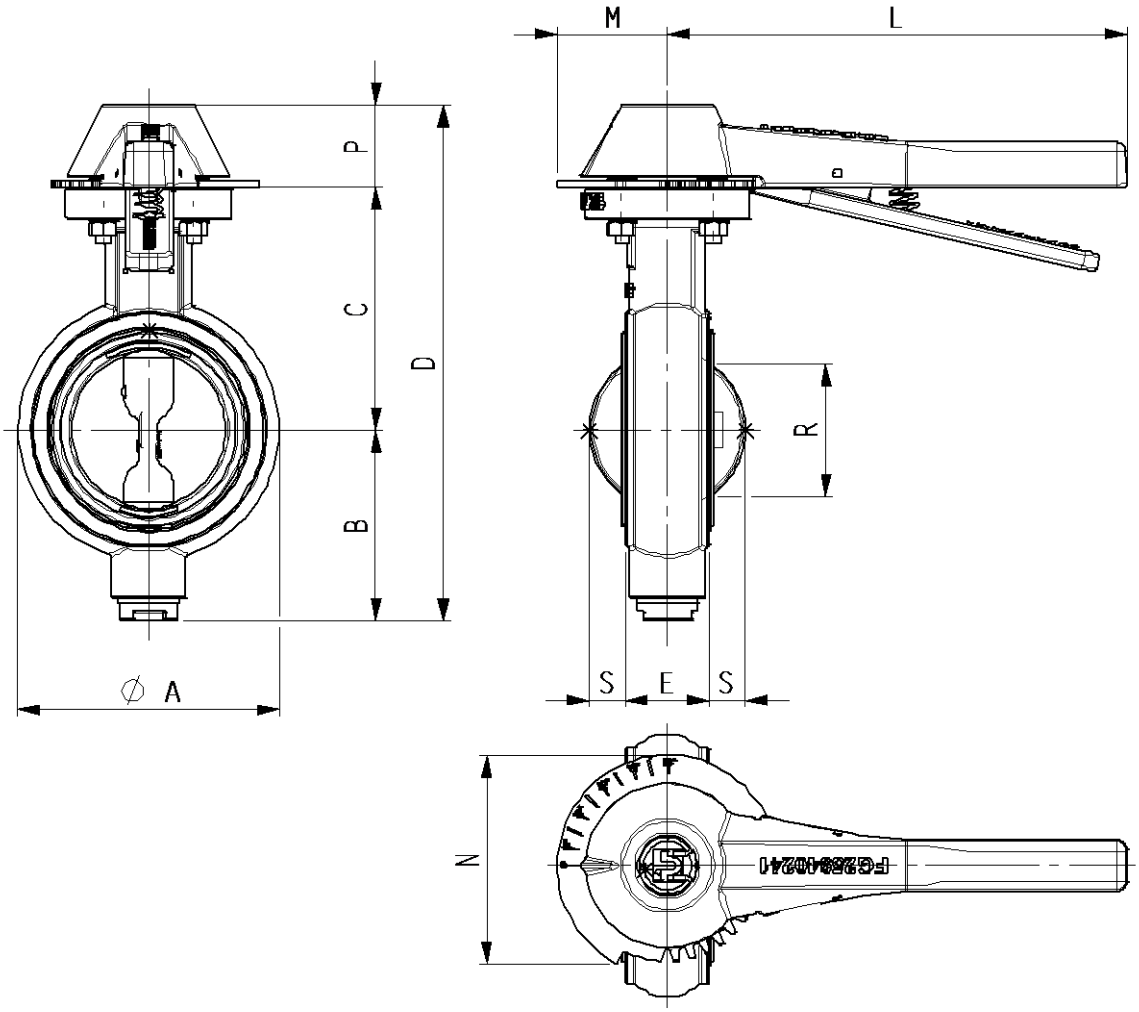
Actuator Size	A	B	C	D	E	F	G	H	K	L	M	N	P	Q	R	⌀S-S	T	d1	U	V	ISO 5211 standard	ISO 5211 speciale
10	142	67	60	87	20	42	41	12	8	-	80	30	25	10	2	9/11*	M5/M6	8/9	36/50	1/8"	F03/F05	F04
20	155	83	73	103	20	42	44,5	12	8	-	80	30	30/35	12	2	11/14*	M5/M6	8 o 9	42/50	1/4"	** F04/F05	-
30	213	100	85	120	20	50	49,5	14	10	-	80	30	35	20	3	14/17*	M6/M8	10/12	50/70	1/4"	F05/F07	-
35	236	110	98	130	20	50	53	19	14	-	80	30	35	22	3	17/22*	M8	12	70	1/4"	F07	F05/F07
40	276	125	110	145	20	50	58	19	14	-	80	30	55	22	3,5	17/22*	M8/M10	12/15	70/102	1/4"	F07/F10	-
45	310	142	128	172	30	58	69	28	20	130	80	30	55	24	3,5	17*/22	M10	15	102	1/4"	F10	F07
50	366	155	140	185	30	-	-	28	20	130	80	30	70	24	3,5	17*/27	M10	15	102	1/4"	F10	F07/F12
55	388	176	160	206	30	-	-	36	28	130	80	30	85	29	3,5	22*/27	M12	18	125	1/4"	F12	F10
60	468	200	175	230	30	-	-	36	28	130	80	30	85	29	3,5	22*/27	M12	18	125	1/4"	F12	F10
80	563	250	215	300	50	-	-	48	32	130	-	30	100	38	5	27*/36	M16	24	140	1/4"	F14	F12
100	750	335	290	385	50	-	-	48	32	130	-	30	130	50	5	36*/46	M20	30	165	1/4"	F16	F14

Dimensions are in millimeters.

** Dimension on demand*

*** Drilling to be specified – Standard or special drilling are available singularly*

2.4.5 Cast Iron SPO/98 with Lever Control



Drawing Nr. 020544 Rev:00

ND	40	50	65	80	100	125	150	200
CODE	5115	5116	5117	5118	5119	5120	5121	5122
A	93	109	127	142	162	194	217	274
B	70,5	90,5	93	104	118,5	136	161	203
C	98	109	123	131	152	177	190,5	225
D	213,5	244,5	261	280	315,5	358	396,5	473
E	33	43	46	46	52	56	56	60
L	250	250	250	250	250	330	330	330
M	60	60	60	60	60	60	60	60
N	113	113	113	113	113	113	113	113
P	45	45	45	45	45	45	45	45
R	36	41	56,5	72	94	117,5	145	191
S	8	8	13,5	20	27,5	37	49,5	70

Dimensions are in millimeters ; NB: Dimensions S are present only when the disk is in the open position

3 Storage, Assembly, Check And Maintenance

3.1 Transport, Storage And Handling

Butterfly valves shall be handled with the maximum care throughout the whole transport and assembly phase. Any crash or anomalous stress are to be avoided.
Valves shall be stored in areas, which are not exposed to the sunshine, so as to prevent inner gaskets from getting dry and old before time.
Storage temperatures shall be included between 5 °C and 40 °C.

A careful visual inspection before the assembly shall be carried out in order to avoid any damages further to casual crashes or fall of the valve. Any dent or disalignment of parts indicates that a damage is present, which might jeopardize the valve operation. Do not go on with assembly operation.

No fluid shall be present inside pipes, nor inside the valve itself during any operation carried out on the valve.

3.2 Assembly Instructions

3.2.1 Assembly

SPO/98 valves should be assembled keeping the disk axis of rotation on the pipe ground level, in order to prevent impurities from settling on the connection with pins. This position shall be used when the SPO/98 valve divides two lines at the same pressure. Should valves be subject to differential pressure ΔP, the valve should be assembled with a simple effect actuator in order to guarantee the position “off” of the valve, also in case of pipe where the fluid is not in full vein.
It is possible to adopt different solutions, provided that the following elements are taken into consideration:

- fluid in full vein;
- early wear of the basket further to the deposits near the connection with the pins;
- safety factor related to the position of the disk in case of no pressure into the servocontrol.

SPO/98 valves are to be inserted between the flanges, without interposing any gasket.
The pipe shall be carefully cleaned in order to prevent the gasket from being damaged by impurities and welding scraps.

1. Before going on with the assembly, check that the distance between the flanges is equal to the valve gauge (distance between metallic faces).
2. Remove flanges with proper tools.
3. Insert first the tie rods of the lower part, in order to support the valve during the assembly.
4. The valve should be lifted with proper equipment (hoisting gear with a capacity up to 100 Kg), starting from ND 150 included. The connection points for the lifting operations are the two upper eyebolts, to be used at the same time.
5. After placing the valve with the disk partially open, but inside the valve body, insert the other tie rods, starting from those passing through the centering tabs and screw down manually all the nuts.
6. Then, check that the opening/closing operations may be carried out easily and with no hindrance.
7. Open the valve and torque tighten the nut crosswise.

3.2.2 First use

The first use of this kind of valve, when it is applied on machines or systems with a high thermal excursion, has to be made with closed valve with a minimum temperature of 80 degrees centigrade and for a lapse of time equal or more than 1 hour.

This operation permits to the valve to have a total settlement which may not be possible to realise in our work, and in this way guarantees an optimal life of the gaskets.

The non observance of this rule excludes our guarantee of the total tight on the valves

3.3 Usage

The usage of the SPO/98 butterfly valve under operating conditions, in compliance with chapter 2 of this handbook, guarantees the proper operation and duration.
Inner parts of our valves have been lubricated with a proper substance, which guarantees the proper operation during the time interval between 2 maintenance operations.

3.3.1 Hand operation (for the lever control version)

In the lever control version, the valve shall be turned on and off rotating the lever by 90°.
The position of the lever gives furthermore a useful indication on the valve opening and closing state:
- valve on: the lever is parallel to the pipe;
- valve off : the lever is perpendicular to the pipe.

The circular sector gear permits to make intermediate positioning.

3.3.2 Operation through actuator

The valve can be controlled through actuator, either pneumatic (simple or double effect) or electric.

3.4 Troubleshooting

Troubleshooting operations shall be always carried out by qualified personnel only, adequately equipped for the hydraulic and pneumatic operations and provided with the proper safety clothing, paying particular attention to the protection of face, eyes and hands.
The valves might not work properly further to the following factors: leakage from the disk-obturator, leakage from the stem and the block of valves in the partially open position further to impurities between disk-obturator and gasket.
In case of leakages from the valve, before starting the disassembly operations, check that they are not caused by an improper closing further to a partial rotation of the disk.

Should leakages concern the stems, they might be due to an improper adjustment of the bushes, ref. (4) and (13) in drawing 020510 annexed to item 4.6.3 of this handbook. In this case, the following operations shall be carried out:

- In order to cancel the effect of screw brake put by Italvalvole, after having finished the setting, the top adjusting bush must be heated.
- Before acting on the top adjusted bush, the initial position must be detected. With the proper wrench the top adjusting bush must be completely unscrewed and screws must be carefully cleaned (after having removed the screw brake)
- Screw down the upper adjustment bush ; respect to the initial position a further screwing of at least 180° must be done, in order to compress the obturator gasket
- To adjust the lower bush, the valve bottom shall be removed first, then, using a proper wrench, screw down the lower adjustment bush by 90° degree as well, in order to compress the obturator gasket.
- Should the leakage persist, it is due to the damage or wear of the basket or disk. In this case, the valve shall be disassembled and the damaged components replaced.
- If no leakages occur, it's necessary to detect once more the position of the top adjusting bush, to unscrew it completely, to put a drop of screw brake (medium as loctite 243) and to screw it again in the tightness position as previously detected.

Precautions to be taken in case of removal:

- close the valves located upstream and downstream the one to be repaired;
- check that no pressurized fluid is present upstream or downstream the valve;
- should fluid used in the system processing be dangerous for the health, protective glasses, suit, gloves and boots are to be used.

The removal and repair operations can then be carried out.
Keeping the disk closed, unloosen and remove tie rods and nuts, leaving the two lower ones between flanges only.
Remove the flanges with proper tools and withdraw the valve. The valve shall be lifted with proper equipment (hoisting gear with a capacity up to 100 Kg) starting from ND 150 included. The connection points for the lifting operations are the two upper eyebolts to be used at the same time.

3.5 Scheduled Maintenance

SPO butterfly valve has been designed and manufactured to guarantee the proper operation under the conditions and within the limits provided for by its technical characteristics. (Chapter 2 of this handbook).
Butterfly valves do not need any special maintenance, nor lubrication, as already provided for during the assembly phase; the bronze bush, furthermore, guarantees their long duration.
All the fixed mechanical components, which do not have a sealing function, have a 10 years duration. Sealing parts and those subject to reciprocal movement shall undergo a complete overhauling in the shortest time interval between the one corresponding to 15.000 maneuvers and three years.
The overhauling operations must be performed by qualified personnel only.
Each time the machines are stopped and/or maintenance operations are to be made on the system, a check shall be always carried out (impurities or scraps unintentionally left on the system might seriously damage the gasket and the obturator).
Periodic maintenance operations must be performed independently of those carried out as a result of possible damages, which always require an immediate intervention.

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3.6 Instructions for Disassembly, Replacement of Gasket, Reassembly of SPO/98 Butterfly Valves.

Refer to the annexed Dwg. Nr. 020510 for the disassembly and assembly operations of the valves.
All the disassembly and assembly operations shall be carried out by qualified personnel, adequately equipped for the industrial hydraulic and pneumatic operations and with the proper working and safety equipment. Before carrying out any operation on systems and valves, get acquainted with the operation temperature and pressure and any other particular conditions.
Whenever operations are to be carried out on valves, remove the fluid completely. The valve body shall be completely empty.
NOTE: Read the procedures thoroughly before starting any operation.

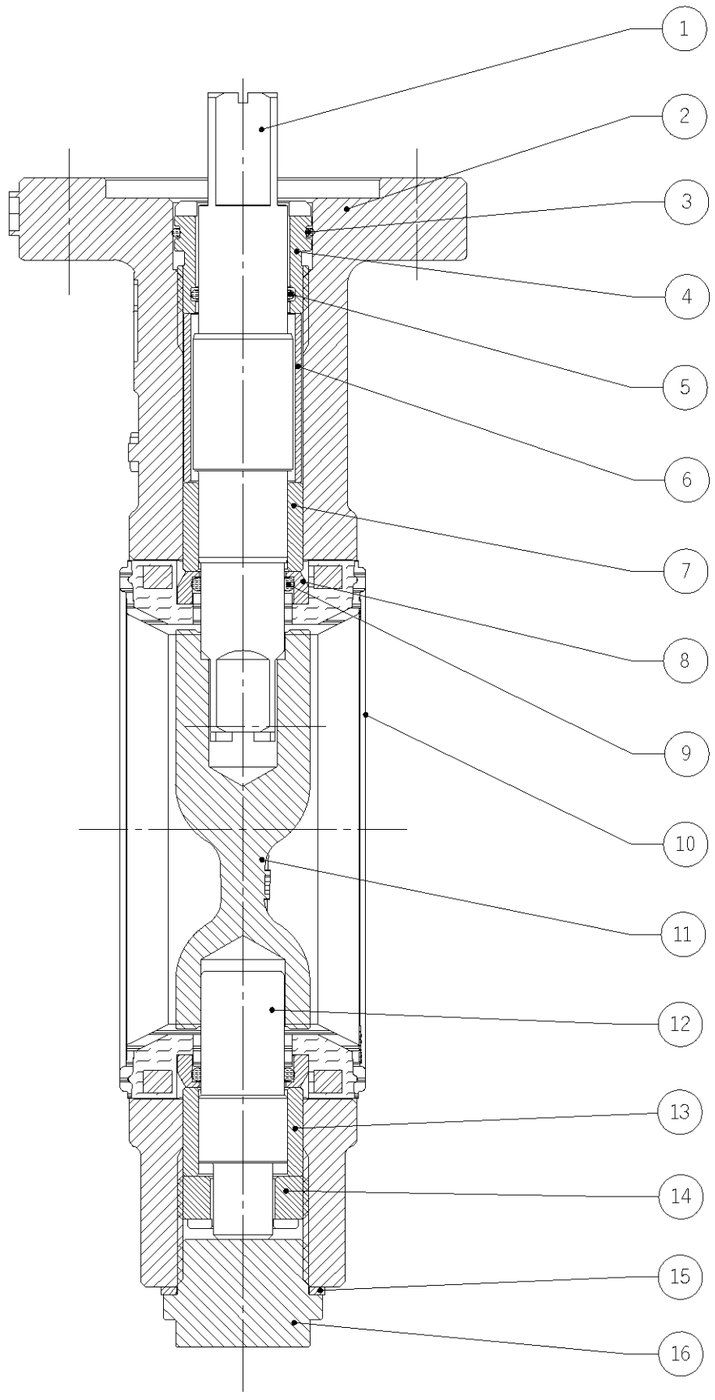
3.6.1 Disassembly

1) Unloosen the adjusting ring nut (4) and remove gaskets from OR (3) and (5).
2) Unloosen bottom (15) and remove the seal nut (14).
3) Screw out the adjusting bush (13).
4) Withdraw the upper stem (1), then remove the distance ring (6) and the guide bush (7).
5) Withdraw the lower stem (12), then remove the guide bush (7).
6) Remove the obturator (11) from the gasket (10).
7) Remove the gasket (10) from the valve body (2).
8) Withdraw washers (8) from the gaskets (10).
9) Remove the OR gaskets (9) from the washers (8).
10) Now the valve has been completely disassembled. The required components can then be replaced.

3.6.2 Assembly

1) Before going on with the assembly of the valve, carefully clean all the components and lubricate them with silicone grease.
2) Insert gaskets OR (9) into the washers (8).
3) Insert washers (8) into the proper seats of the gasket (10).
4) Place horizontally the valve body (2) and insert the gasket (10) inside it, paying attention to place the holes for the passage of stems on the same vertical of the valve body.
5) Insert the obturator (11) into the gasket (10), paying attention that the side broached with the control panel faces the body control flange.
6) Insert the guide bush (7) and the distance ring (6) into the valve body upper part.
7) Insert the upper stem (1).
8) Insert OR gaskets (3) and (5) into the adjusting bush (4).
9) Screw down the adjusting bush (4) into the valve body (2).
10) Insert the guide bush (7) into the lower part of the valve body (2).
11) Screw down the adjusting bush (13) into the valve body (2).
12) Go on regulating the adjusting bushes (4) and (13).
13) Place the seal washer (14) and screw down the bottom (15) into the valve body (2)

3.6.3 Section Plane – Cast Iron SPO/98 Butterfly Valve



Drawing N° 020510 Rev.:00

3.7 Components and Spare Parts of SPO/98 Valve

PART Nr.	Q.ty	DESCRIPTION	MATERIAL
1	1	Upper stem	S420000/1.4028+1X
2	1	Valve body	GS500/7
3	1	O-Ring gasket	FPM
4	1	Adjusting nut	S420000/1.4028+1X
5	1	O-Ring gasket	FPM
6	1	Spacer ring	S31600/1.4401
7	1	Guide bush	BRONZO o OTTONE
8	2	Packing gland washer	S31600/1.4401
9	2	O-Ring gasket	FPM
10	1	Body gasket	PTFE / EPDM HT / ALLUMINIO
11	1	Shutter	CF3M/1.4409
12	1	Lower stem	S420000/1.4028+1X
13	1	Guide bush	BRONZO o OTTONE
14	1	Adjusting bush	S420000/1.4028+1X
15	1	Seal washer	S31600/1.4401
16	1	Bottom	S31600/1.4401

GROUP 97

Complete spare parts – cast iron SPO/98 butterfly valve

SPARE PART CODE		2640	2641	2642	2643	2644	2645	2646	2647
PART Nr.	Q.ty	ND 40	ND 50	ND 65	ND 80	ND 100	ND 125	ND 150	ND 200
3	1		OR03093VI	OR02100VI			OR03112VI		
9	2	OR00114VI	OR03056VI	535		OR00123VI	OR00128VI		
10	1	GFTE940417	GFTE093915	GFTE093916	GFTE093917	GFTE093918	GFTE093919	GFTE093920	GFTE093921

4 Disposal

After use, for the valve disposal, it is necessary to disassemble the valve and separate the different materials the valve is composed of, according to the table annexed to chapter 4.7 of this handbook, then dispose of the different materials in compliance with the laws in force.

NOTES:

- The safety conditions shall not be guaranteed and malfunctions shall not be subjected to valves in case:
  - the disassembly, re-assembly, maintenance are not carried out in compliance with the use and maintenance manual.
  - original spare parts are not used
- It is forbidden to remove pages from this document or to make any correction.
- In case of doubt, make reference to Italian version of the manual.
- ITALVALVOLE® S.A.S. reserves the right to make modification and/or amendment to its products and relevant documentation without giving notice.
- The use of the handbook does not exempt from the observance of the laws in force.