Fucoli Somepal
FUNDIÇÃO DE FERRO, S.A.
DESDE 1946 SINCE

OPERATION MANUAL

BALL CHECK VALVE
Series BOLA

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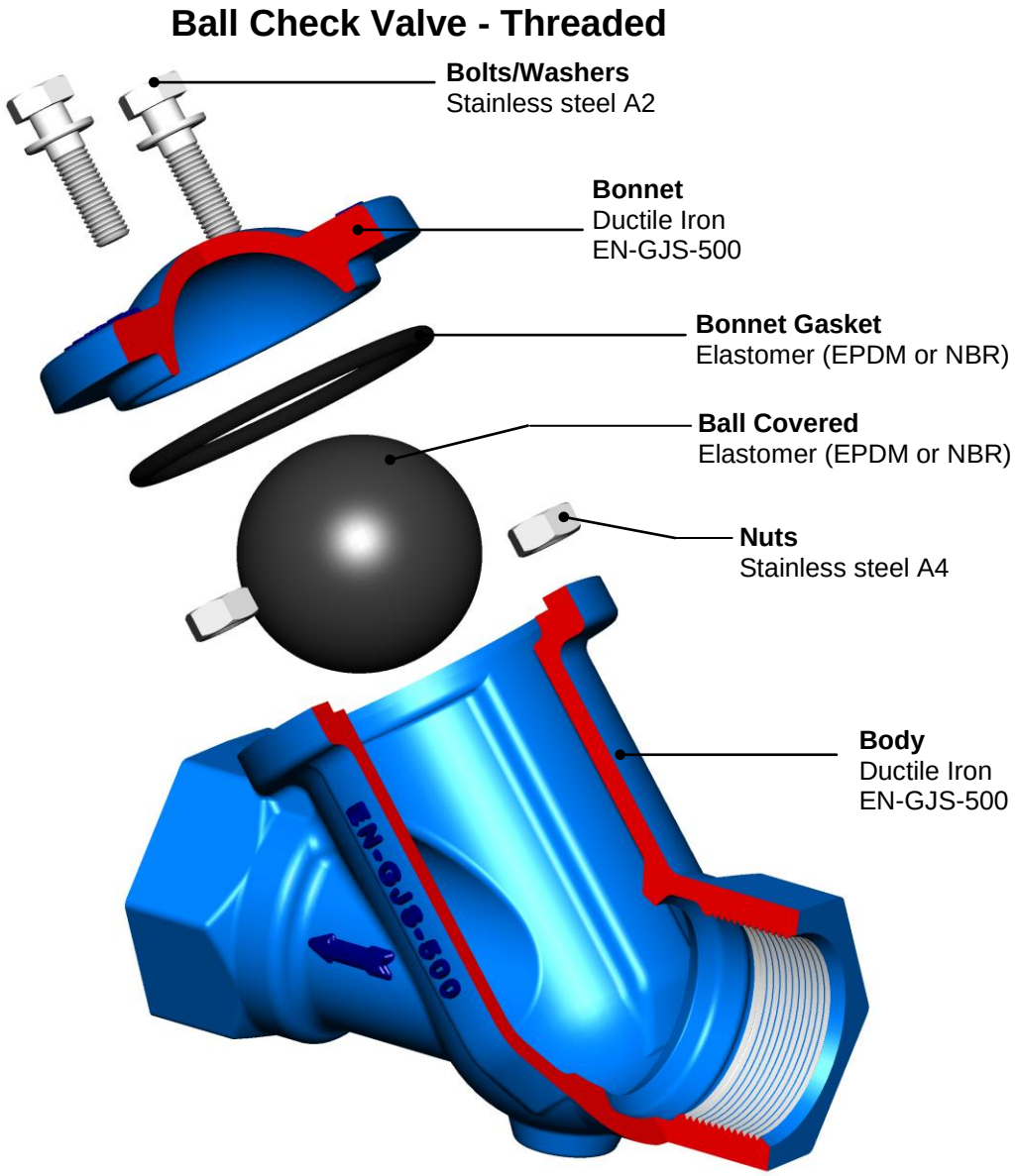
1. DESCRIPTION

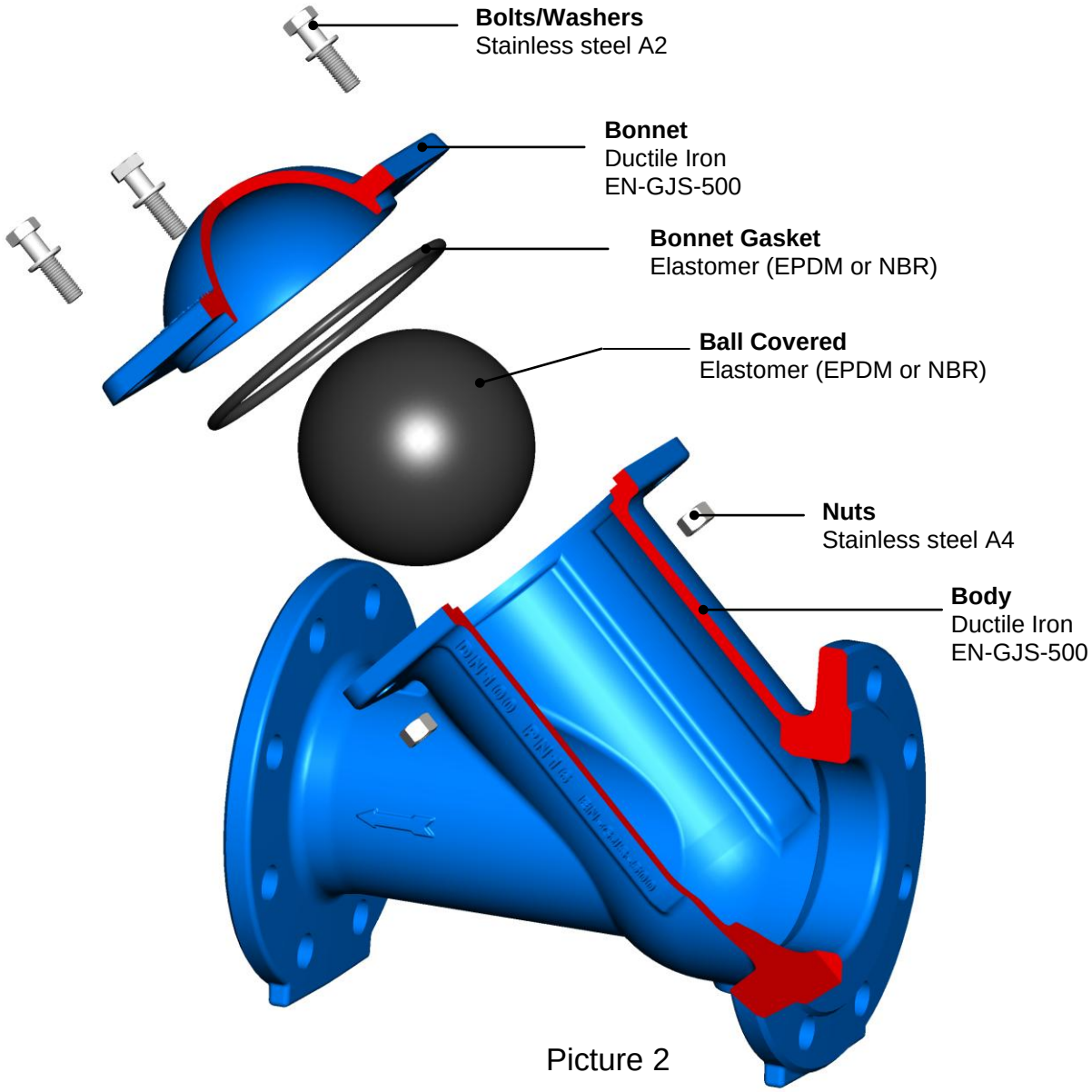
The **BALL CHECK VALVE Series Bola,** is a non return valve with metal/rubber sealing, designed to be fully automatic in operation.
This valve is composed of body and bonnet in ductile iron, and the ball coated EPDM or NBR elastomer according to the use.
Ball Check Valves will have one moving part, the ball, which moves automatically out of the path of flow, providing an unobstructed smooth flow through the valve body.
Fucoli-somepal provides Ball Check Valves with flanged or thread connections.

1.1 Materials



Picture 1

Ball Check Valve – Flanged model

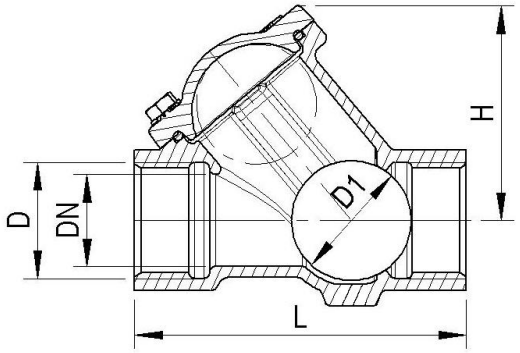


Picture 2

component	material	standard
body	ductile iron (EN-GJS-500-7)	DIN EN 1563
bonnet	ductile iron (EN-GJS-500-7)	DIN EN 1563
ball	DN32 to DN100 aluminium ALSi 12 DN125 to DN400 ductile Iron (EN-GJS-500-7)	NP EN 1706 DIN EN 1563
ball covering	coated with elastomer EPDM with CE marking	BS EN 681-1
bonnet gasket	elastomer EPDM with CE marking	BS EN 681-1
bolts and washers	stainless steel A2 (X5 CrNi 18-10)	EN 10088-1
nuts	stainless steel A4 (X5 CrNiMo 17-12-2)	EN 10088-1
coating inside and outside	epoxy paint potable RESICOAT R4 BLUE applied electrostatically with thickness ≥ 250 µm	DIN 30677

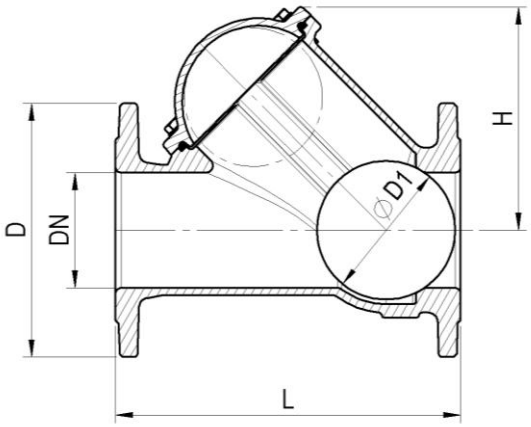
1.2. Dimensions

Threaded Model



DN	D (BSP)	D1	L	H	Weight (kg)
32	1¼"	50	140	105	2.8
40	1½"	50	150	105	2.9
50	2"	65	180	120	4.3

Flanged Model



DN	D PN 10	D PN 16	D1	L	H	hole Ø / Ø and nº of holes PN 10	hole Ø / Ø and nº of holes PN 16	peso - weight (kg) PN 10	peso - weight (kg) PN 16
40	150	150	50	180	105	110ø - 4 x 19ø	110ø - 4 x 19ø	6.4	6.4
50	165	165	65	200	120	125ø - 4 x 19ø	125ø - 4 x 19ø	8.1	8.1
60	175	175	80	240	142	135ø - 4 x 19ø	135ø - 4 x 19ø	10.1	10.1
65	185	185	80	240	142	145ø - 4 x 19ø	145ø - 4 x 19ø	10.5	10.5
80	200	200	100	260	165	160ø - 8 x 19ø	160ø - 8 x 19ø	13.6	13.6
100	220	220	120	300	194	180ø - 8 x 19ø	180ø - 8 x 19ø	18.4	18.4
125	250	250	146	350	221	210ø - 8 x 19ø	210ø - 8 x 19ø	25.0	25.0
150	285	385	173	400	262	240ø - 8 x 23ø	240ø - 8 x 23ø	35.5	35.5
200	340	340	238	500	353	295ø - 8 x 23ø	295ø - 12 x 23ø	58.6	58.6
250	400	400	298	600	437	350ø - 12 x 23ø	355ø - 12 x 28ø	95.5	95.5
300	455	455	358	700	523	400ø - 12 x 23ø	410ø - 12 x 28ø	141.0	141.0
350	505	520	418	800	611	460ø - 16 x 23ø	470ø - 16 x 28ø	206.0	212.5
400	565	580	478	900	700	515ø - 16 x 28ø	525ø - 16 x 31ø	299.0	308.0

1.3. Pressure Tests

hydraulic test **(bar)** according to standard EN 12050-4			
hydraulic pressure test	**PN**	**sealing**	**body**
	10	11	17
	16	18	25
minimum closing pressure	0,2		

All the valves are individually tested at factory.

1.4. Working conditions

- **Pressure:** This Ball Check Valve is for installation at water speeds under stable flow rates according to:

PFA	Velocity of flow
10	3 m/s
16	4 m/s

- **Working temperature:** Between 0ºC (excluding ice) up to 70ºC
- **Minimum pressure for opening:** 0,05 bar
- **Minimum closing pressure:** 0,2 bar

1.5. Homologations

- **Coating**

  INETI (Portugal)
  KIWA (Netherlands)
  WRAS (United Kingdom)
  CARSO (France)
  HYGIENE Institut Ruhrgebiets (Germany)

- **EPDM Elastomers** (With CE marking, according to standard BS EN 681-1)

  INETI (Portugal)
  CRECEP (France)

2. POTENTIAL RISK IDENTIFICATION

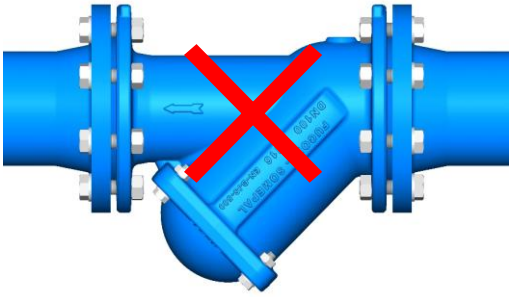
There were not identified any potential use risks during its development. However must be handled by trained / authorized personnel only.

3. INSTALATION AND HANDELING

Remove all packing material from the valve. Prior to the valve installation examine the pipeline for debris, impurities and foreign matter. If there, the pipeline should be cleaned.

In the installation of the valve the flow direction must coincide with the arrow on the valve's body. The valves can be installed in horizontal as well as in vertical pipelines (in this case, upward flow direction).
The installation must respect the illustration as follows:

Horizontal installation



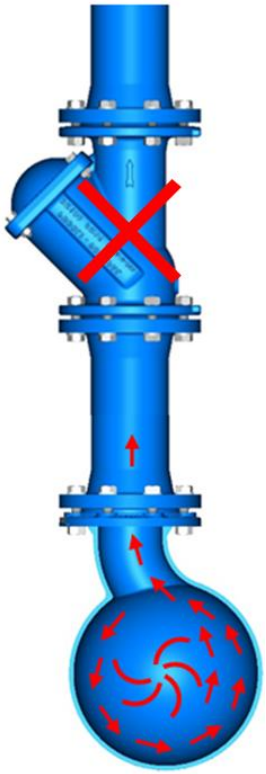
Vertical installation

It is important that all around the valve there is free access for maintenance.

Ball Check Valves should not be installed directly upstream or downstream of pipeline fittings as pipe bend, valves, pumps, once the ball can be disturbed by the flow and will thus not or only partially open. There should be a clear pipe section of at least 100mm upstream and downstream of the Ball Check Valve.

We recommend the following position installation of Ball Check Valve after the Water Pump, in order to respect the water flow of the pump like illustration as follows:

Recomended



Not
Recomended

Are recommended for installation of flanged valves EPDM rubber gaskets. To ensure the adequate sealing, is important select the correct type of gasket as well as two gaskets of the correct flange size to each side.

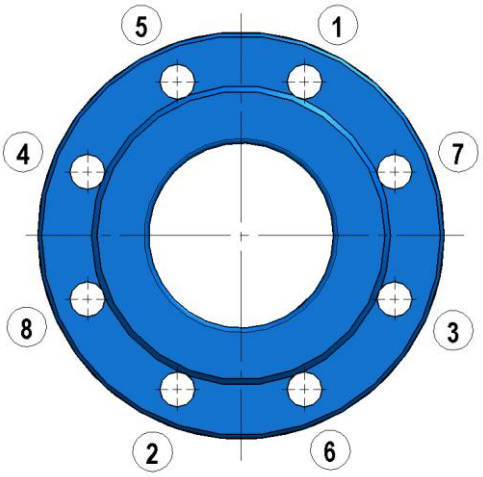
On installation of the valve, the distance of the pipe flanges should exceed the face-to-face dimension of the valve in at least 20mm to not damage the raised faces and the gaskets can be inserted

The pipe flanges have to be parallel and concentric to each other. The connecting bolts must be tight according with picture 3. Tightening bolts loosely in accordance with the torque from table 1. The pipeline must be mounted tension free.

3.1 Tightening torque of the flange bolts

Table 1				
DN	Bolts		Torque (máx.)	
	PN 10	PN 16	PN 10	PN 16
40	M16		45Nm	60Nm
50				
60				
65				
80				
100				
125				
150	M20		70Nm	90Nm
200				
250	M20	M24		180Nm
300				
350				
400	M24	M27	150Nm	220Nm

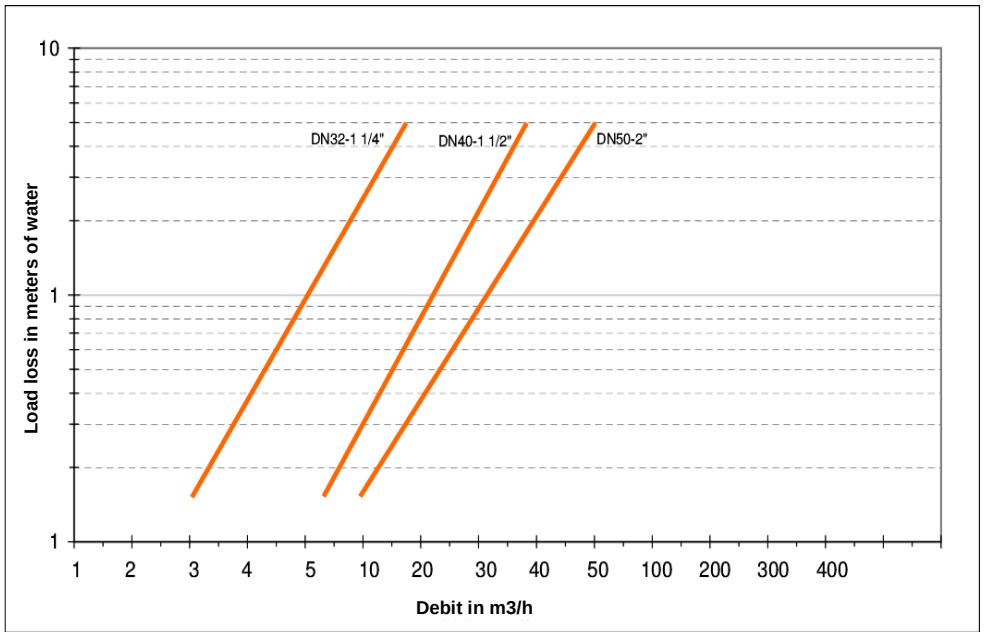
The tightening of the screws should be made in cross, as shown in picture 3.



Picture 3

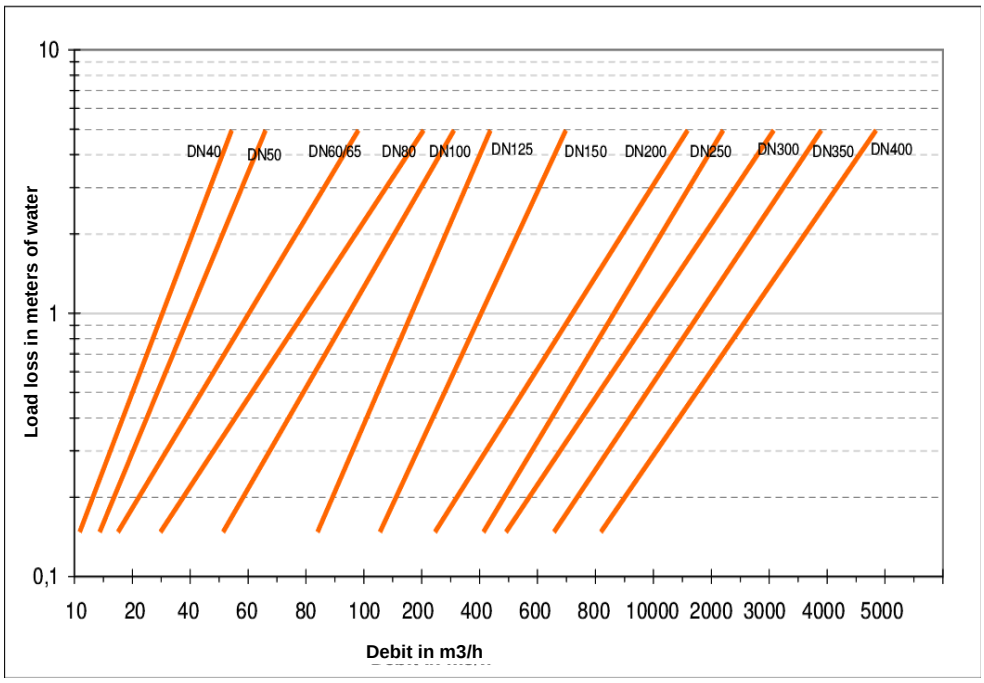
3.2 Load loss

Ball Check Valve - Threaded



Picture 4

Ball Check Valve - Flanged

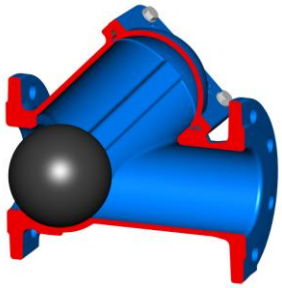


Picture 5

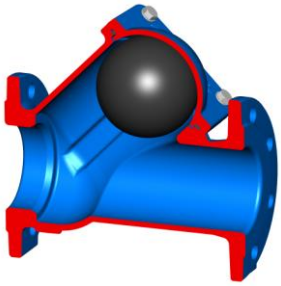
4. PERFORMANCE AND MODE OF OPERATION

4.1. Horizontal installation:

In conditions of no pressure, the Ball Check Valve is slightly open (picture 6).
When the fluid start to flow, the ball is automatically pushed upwards (out of the path of flow) letting through the fluid (picture 7).
The ball movement depends of the flow (dynamic pressure). Upon discontinuation of flow the ball automatically rolls back to the closed position, providing a positive seal against back pressure or back flow.



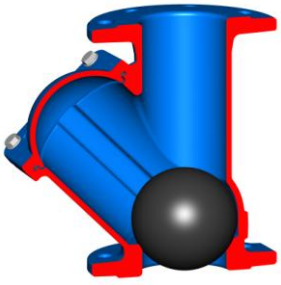
Picture 6



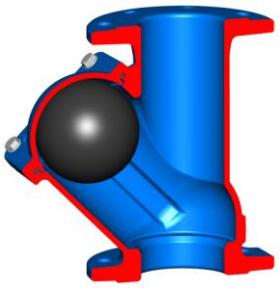
Picture 7

4.2. Vertical installation: (flow from below upwards)

In conditions of no pressure, the ball is on their body seat (picture 8).
When the fluid start to flow, the ball is automatically pushed upwards (out of the path of flow) letting through the fluid (picture 9).
The ball movement depends of the flow (dynamic pressure). Upon discontinuation of flow the ball automatically rolls back to the closed position, providing a positive seal against back pressure or back flow.



Picture 8



Picture 9

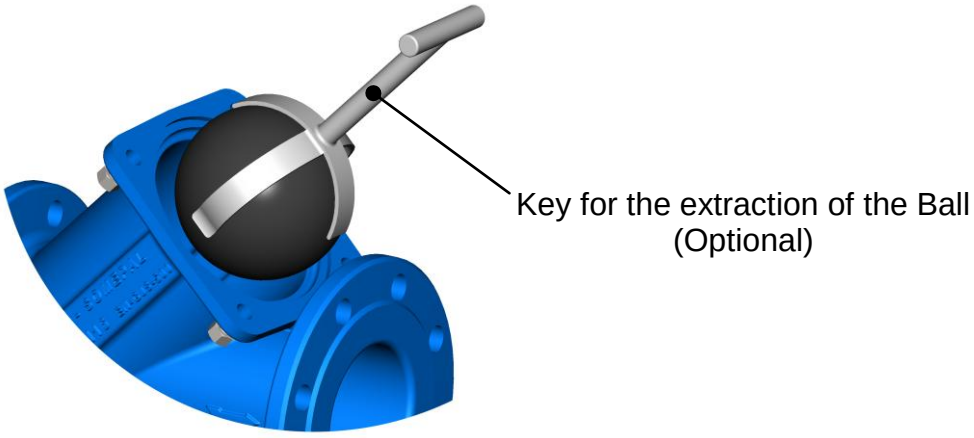
5. MAINTENANCE

The Ball Check Valve, has not set a periodicity of maintenance actions, it should be taken or planned according to its use or at least every 12 months.
On this occasion, the ball must be checked and cleaned from possible deposits.

In maintenance actions for cleaning, whenever is necessary remove casing cover, BONNET GASKET (picture 1, 2) should be replaced by new one and properly placed on the accommodation of body for that purpose.

5.1 Ball extraction

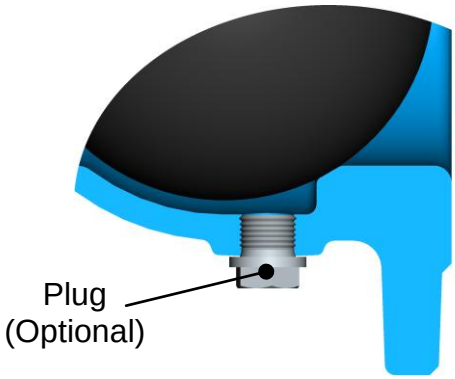
In maintenance actions for cleaning of Ball Check Valve Series Bola is not necessary to remove the valve from the pipeline, just by unbolting and lifting off the bonnet, the ball may be removed (to cleaning action or ball replacement).
Using a key provided by Fucoli-Somepal (picture 10), the ball can be safely removed and get a totally free access to the valve interior.



Picture 10

5.2 Plug application

Optionally the valve can be supplied with plug (picture 11) for valve inspection and cleaning.



Picture 11