



Catalogue

Standard Range of Airline Valves



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Airline Valves

Catalogue

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Airline Ball Valves & Butterfly Valves

Design Options

Function

An airline valve is used when the tank is pressurised during testing or discharge and can be used for inert gas blanketing or vapour recovery. We offer ball valves and butterfly valves for airline connections.

Design Options

The design options below are available on our standard range of airline valves.

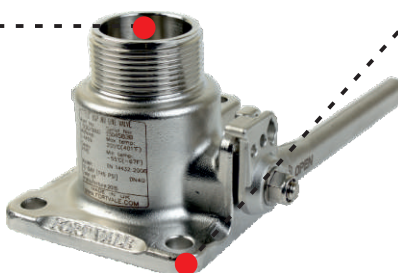
Nominal Bore

40mm (1½"): Ball valves

50mm (2"): Ball valves & butterfly valves

Special service conditions:

Reduced bore e.g. 25mm (1")



Tank Connection

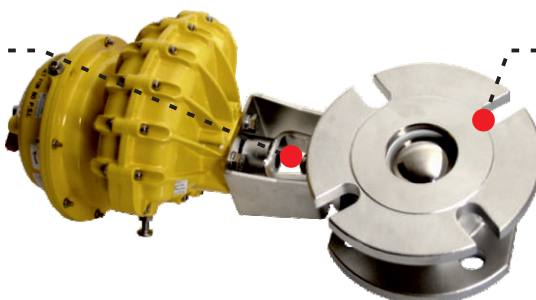
Flanged: 4 holes

Different drilling patterns

Operation

Manually operated: A range of handles is available

Pneumatically actuated



Outlet / Process Connection

Threaded: 1½" BSP, 2" BSP

Dual threaded: 1½" BSP/1½" NPT

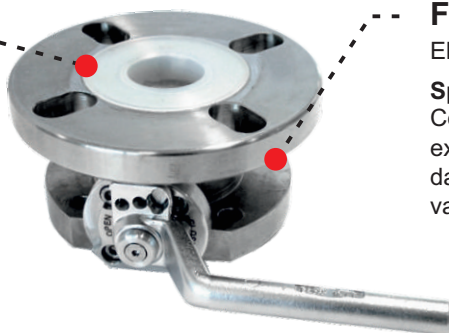
Flanged: Closed or open slots

Valve Materials

316 stainless steel

Special service conditions:

Lined wetted parts, e.g. PFA



Finish

Electropolished

Special service conditions:

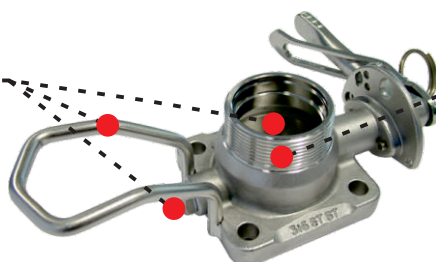
Corrosion-resistant paint on external surfaces to prevent damage from corrosive cargo vapour/splash

Accessories

Gauge guard

Gauze or sintered filter

TIR to gauge inlet plug



Main Seal

PTFE

Special service conditions:

High-temperature compatible seals



Airline Ball Valves & Butterfly Valves

Design Options

Related Parts

We recommend our range of compatible accessories:

- Pressure gauges
- Filters: gauzed or sintered
- Blank caps
- Flanges - weld-in and adaptor
- Fasteners
- Gaskets

Please contact us for more information about these parts.



1½" BSP Blacko Airline Ball Valve

Part No: 530/0000



Specification

Nominal size

32mm

Tank connection

Flanged: 4 x 10.8mm holes on a 103.5mm PCD

Outlet/Process connection

Threaded: 1½" BSP male

Properties

¼" BSP gauge connection, handle with TIR

Materials

Contact parts: 316 stainless steel

Main seal: PTFE

Alternatives are available, refer to the Design Options page

Design Conditions

Weight:	2.9 Kg
Design Pressure (MAWP):	10 Bar
Test Pressure:	21.4 Bar
Design Temperature Min:	-55°C
Design Temperature Max:	205°C

NOTE: The Design Conditions and Section View dimensions are for the specified part number only.

Design Code

BS EN14432

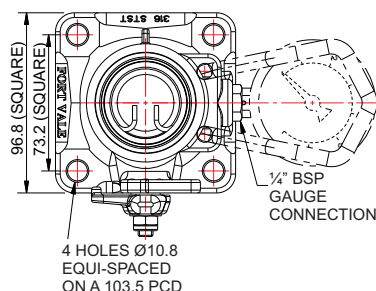
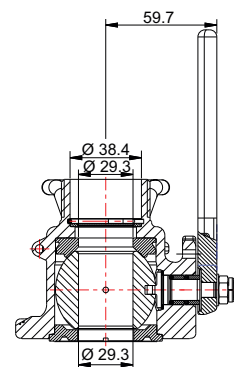
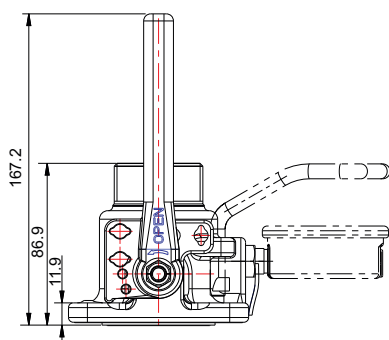
Range

Description	Part No.
Standard specification	530/0000
With gauze	530/0000F
With gauge guard	530/0000G
With gauze and gauge guard	530/0000FG
With TIR wire to ¼" BSP plug	530/0000W

Related Parts

Description	Part No.
Pressure gauge	920/07BBSP
Gauge adaptor	352/4004
1½" BSP dust cap	10300PS
Stud kit	350/1300
Weld-in flange	350/0025

Section View

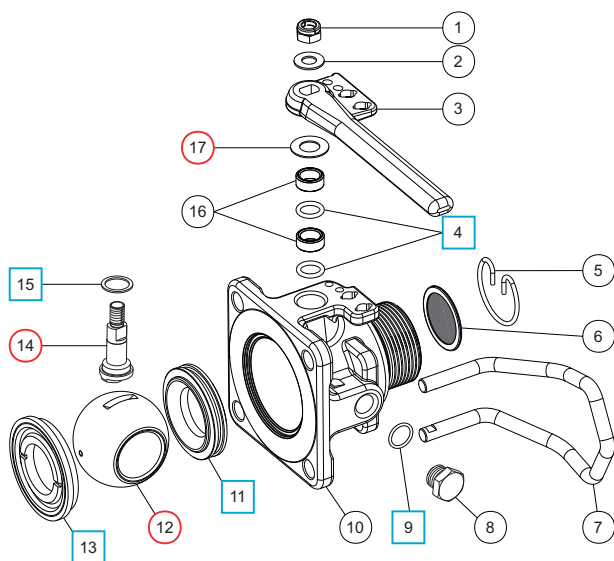




1½" BSP Blacko Airline Ball Valve

Part No: 530/0000

Parts Drawing



Parts List

Item	Description	Part No.
1	Self-locking nut	5112-031
2	M8 washer	5113-005
3	Handle	531/0025
4	PTFE O ring (2)	5005-008 □ ○
5	Snap ring *Note 1	5120-017
6	Gauze filter *Note 1	353/0010
7	Gauge guard *Note 2	530/0040
8	¼" BSP plug	5128-005
9	PTFE O ring	5005-048 □ ○
10	Body	530/0100
11	Front ball seal	5005-006 □ ○
12	Ball	350/0002 ○
13	Rear ball seal	5005-007 □ ○
14	Spindle	530/0001 ○
15	PTFE washer	5003-002 □ ○
16	Stuffing boss (2)	530/0003
17	Disc spring	5113-036 ○

NOTE 1: Optional part, see Range 530/0000F

NOTE 2: Optional part, see Range 530/0000G

Seal Kit

Description	Part No.
All parts marked □ in the Parts List	530/00SK

Repair Kit

Description	Part No.
All parts marked ○ in the Parts List	530/00RK



1½" Dual Connection Blacko Airline Ball Valve

Part No: 530/0300



Specification

Nominal size

32mm

Tank connection

Flanged: 4 x 10.7mm holes on a 103.5mm PCD

Outlet/process connection

Dual threaded: 1½" BSP male & 1½" NPT male

Properties

¼" BSP gauge connection, handle with TIR

Materials

Contact parts: 316 stainless steel

Main seal: PTFE

Alternatives are available, refer to the Design Options page

Design Conditions

Weight:	3.1 Kg
Design Pressure (MAWP):	10 Bar
Test Pressure:	21.4 Bar
Design Temperature Min:	-55°C
Design Temperature Max:	205°C

NOTE: The Design Conditions and Section View dimensions are for the specified part number only.

Design Code

BS EN14432

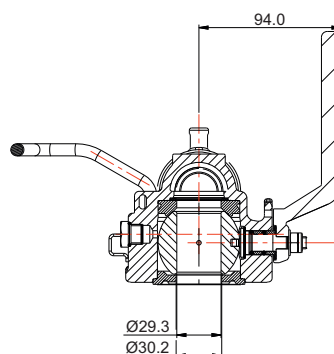
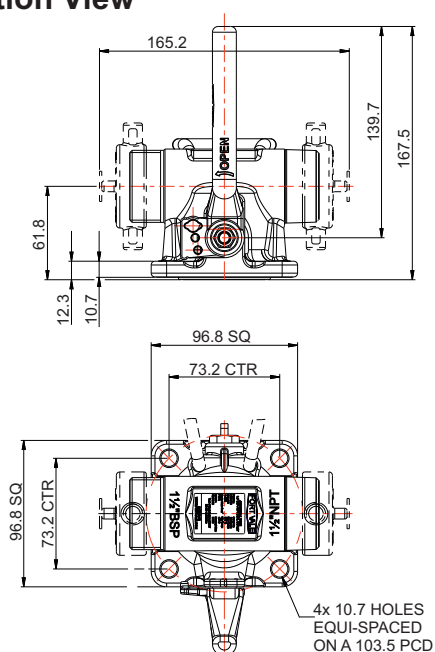
Range

Description	Part No.
Standard specification	530/0300
With gauze	530/0300F
With gauge guard	530/0300G
With gauze and gauge guard	530/0300FG

Related Parts

Description	Part No.
Pressure gauge	920/07BBSP
Gauge adaptor	352/4004
1½" BSP dust cap	10300PS
1½" NPT dust cap	10300PNT
Stud kit	350/1300
Weld-in flange	350/0025

Section View

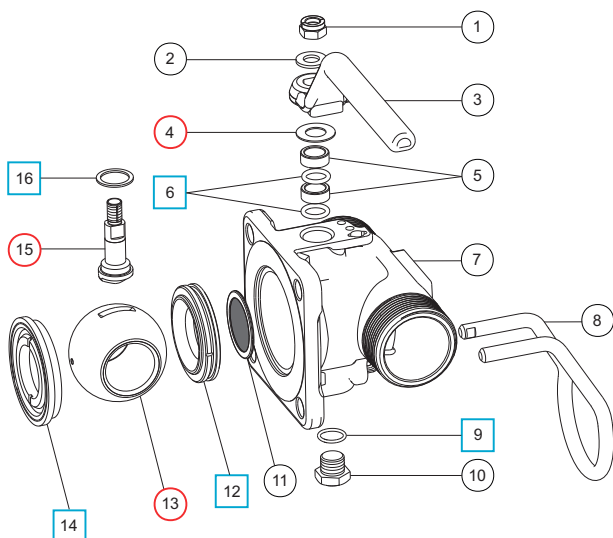




1½" Dual Connection Blacko Airline Ball Valve

Part No: 530/0300

Parts Drawing



Parts List

Item	Description	Part No.
1	M8 self lock nut	5112-031
2	M8 plain washer	5113-005
3	Handle	530/0020
4	8mm Belleville washer	5113-036
5	Stuffing collar (2)	530/0003
6	PTFE O ring (2)	5005-008
7	Body	530/0301
8	Gauge guard *Note 2	530/0040
9	PTFE O ring	5005-048
10	¼" BSP plug	5128-005
11	Filter *Note 1	353/0010
12	PTFE front seal	5005-006
13	Ball	350/0002
14	PTFE rear seal	5005-007
15	Spindle	530/0001
16	PTFE thrust seal	5003-002

NOTE 1: Optional part, see Range 530/0300F

NOTE 2: Optional part, see Range 530/0300G

Seal Kit

Description	Part No.
All parts marked □ in the Parts List	530/00SK

Repair Kit

Description	Part No.
All parts marked ○ in the Parts List	530/00RK



1½" Flanged Blacko Airline Ball Valve

Part No: 530/1000



Specification

Nominal size

32mm

Tank connection

Flanged: 4 x 10.8mm holes on a 103.5mm PCD

Outlet/Process connection

Flanged: 4 x Ø18mm open slots on a 98.4 min. I/D

Properties

¼" BSP gauge connection, handle with TIR

Materials

Contact parts: 316 stainless steel

Main seal: PTFE

Alternatives are available, refer to the Design Options page

Design Conditions

Weight:	4.4 Kg
Design Pressure (MAWP):	7 Bar
Test Pressure:	15 Bar
Design Temperature Min:	-40°C
Design Temperature Max:	205°C

NOTE: The Design Conditions and Section View dimensions are for the specified part number only.

Design Code

BS EN14432

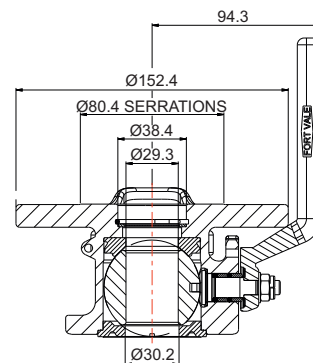
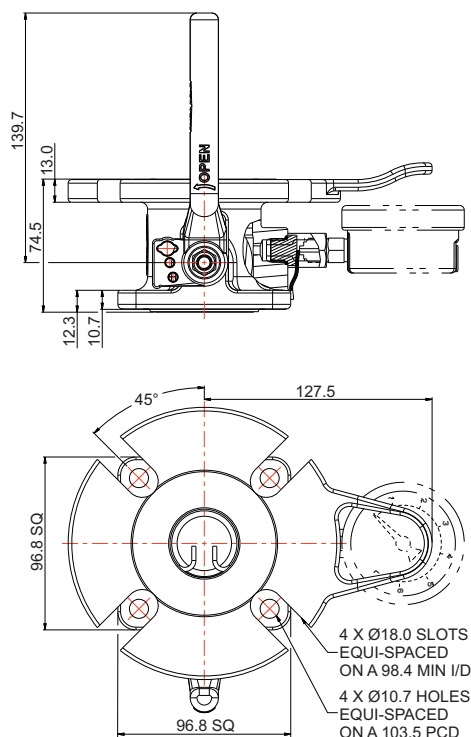
Range

Description	Part No.
Standard specification	530/1000
With gauze	530/1000F

Related Parts

Description	Part No.
Pressure gauge	920/07BBSP
Gauge adaptor	352/4004
Blind flange	530/8053CM
Bolting kit	311/3500
Solid PTFE gasket	5005-348
Stud kit	350/1300
Weld-in flange	350/0025

Section View

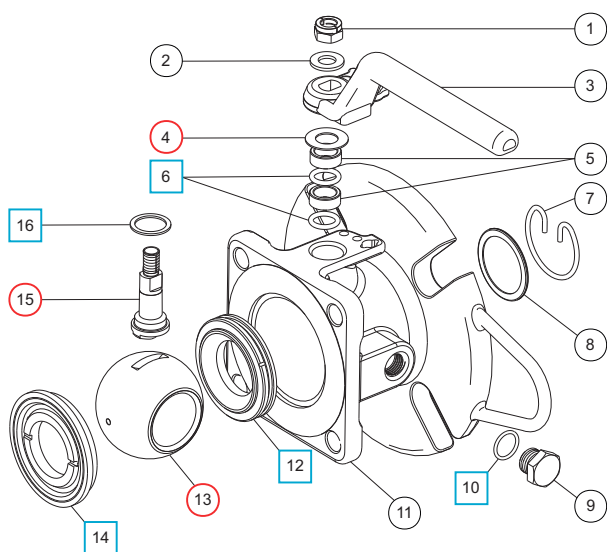




1½" Flanged Blacko Airline Ball Valve

Part No: 530/1000

Parts Drawing



Parts List

Item	Description	Part No.
1	Self-locking nut	5112-031
2	M8 washer	5113-005
3	Handle	530/0020
4	8mm Belleville washer	5113-036
5	Stuffing collar (2)	530/0003
6	PTFE O ring (2)	5005-008
7	Snap ring *Note	5120-017
8	Gauze filter *Note	353/0010
9	¼" BSP plug	5128-005
10	PTFE O ring	5005-048
11	Body	530/1100
12	PTFE front seal	5005-006
13	Ball	350/0002
14	PTFE rear seal	5005-007
15	Spindle	530/0001
16	PTFE thrust seal	5003-002

NOTE: Optional part, see Range 530/1000F

Seal Kit

Description	Part No.
All parts marked ■ in the Parts List	530/00SK

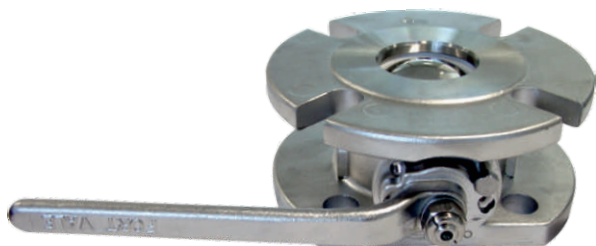
Repair Kit

Description	Part No.
All parts marked ● in the Parts List	530/00RK



2" Flanged Blacko Ball Valve

Part No: 370/0100



Specification

Nominal size

50mm

Tank connection

Flanged: 4 x 18mm holes on a 125mm PCD

Outlet/Process connection

Flanged: 4 x open slots on a 120.7mm minimum PCD

Properties

Left hand operated, handle with TIR

Materials

Contact parts: 316 stainless steel

Main seal: PTFE

Alternatives are available, refer to the Design Options page

Design Conditions

Weight:	5.5 Kg
Design Pressure (MAWP):	7.5 Bar
Test Pressure:	13.8 Bar
Design Temperature Min:	-40°C
Design Temperature Max:	205°C

NOTE: The Design Conditions and Section View dimensions are for the specified part number only.

Design Codes

Design Approval by Lloyds Register of Shipping
BS EN14432

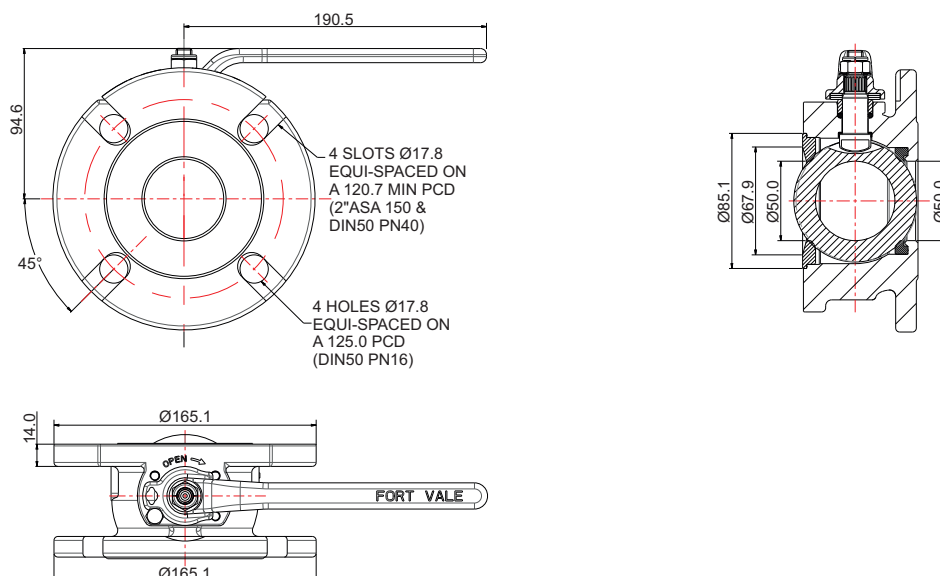
Range

Description	Part No.
Standard specification	370/0100
With steam heating chamber	370/0100SH
DIN80 inlet adaptor & outlet blind flange	370/0140
With 2" BSP outlet spigot flange	370/0150
With outlet blind flange	370/0180

Related Parts

Description	Part No.
Weld-in flange	355/3100
Stud kit	311/3700
PTFE outlet gasket	5005-361
Blind flange	370/4239CM
Bolting kit	311/3500

Section View

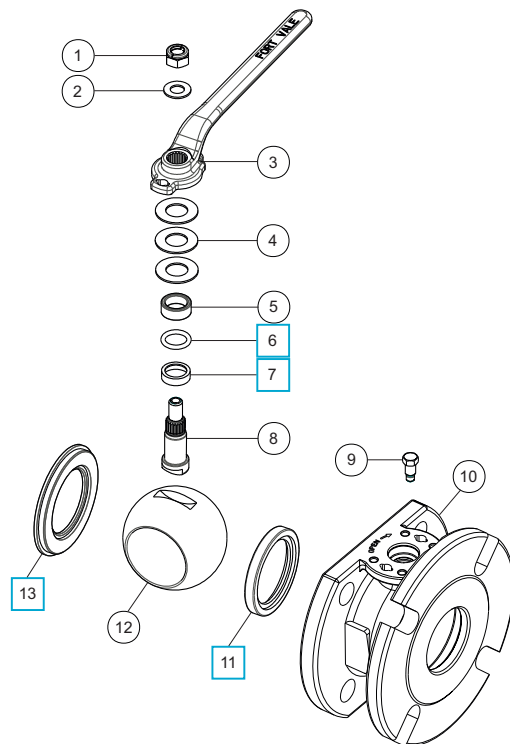




2" Flanged Blacko Ball Valve

Part No: 370/0100

Parts Drawing



Parts List

Item	Description	Part No.
1	M10 self locking nut	5112-008
2	M10 plain washer	5113-009
3	Handle	370/0125
4	16mm Belleville washer (3)	5113-038
5	Stuffing collar	370/0103
6	PTFE O ring	5005-688 ☐
7	Bottom bearing	370/0104 ☐
8	Spindle	370/0120
9	Stop bolt	370/0107
10	Body	370/0110
11	PTFE rear seal	370/0102 ☐
12	50mm ball	370/3301
13	PTFE front seal	370/0105 ☐

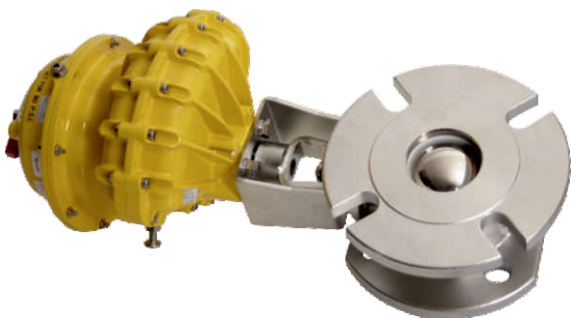
Seal Kit

Description	Part No.
All parts marked ☐ in the Parts List	370/01SK



2" Flanged Blacko Ball Valve - Pneumatically Actuated

Part No: 370/0100PN/1



Specification

Nominal size

50mm

Tank connection

Flanged: 4 x 18mm holes on a 125mm PCD

Outlet/Process connection

Flanged: 4 x 18mm open slots on a 120.7mm min. PCD compatible with 2" ASA150/DIN50 PN40

Properties

Kinetrol pneumatic actuator with spring return and 1/4" BSP air inlet

Materials

Contact parts: 316 stainless steel

Main seal: PTFE

Alternatives are available, refer to the Design Options page

Design Conditions

Weight:	5.81 Kg
Design Pressure (MAWP):	7.5 Bar
Test Pressure:	13.8 Bar
Design Temperature Min.	Valve: -40°C
Design Temperature Min.	Actuator: -20°C
Design Temperature Max:	Valve: 205°C
Design Temperature Max:	Actuator: 80°C

NOTE: The Design Conditions and Section View dimensions are for the specified part number only.

Design Code

BS EN14432

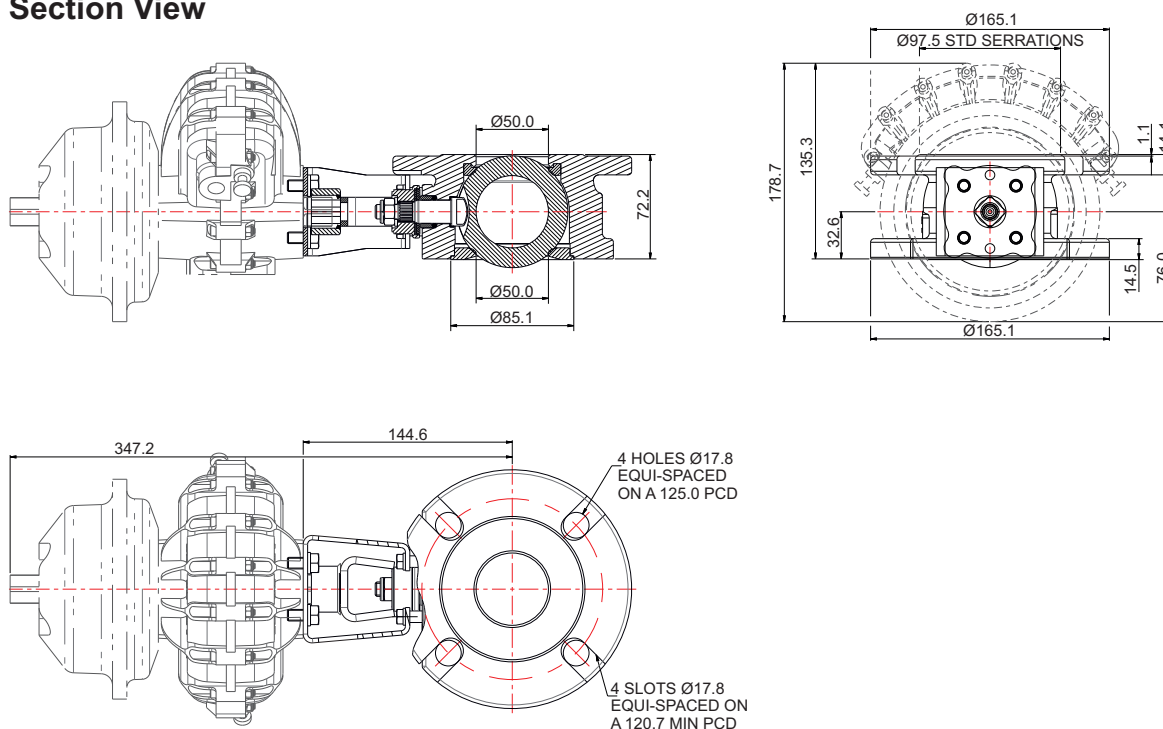
Range

Description	Part No.
2" ball valve pneumatically actuated	370/0100PN/1
2" ball valve manually operated	370/0100

Related Parts

Description	Part No.
Mating flange	294/0082
Weld-in flange	355/3100
Stud kit	311/3700
Outlet gasket	5005-361
Blind flange	370/4239CM
Bolting kit	311/3000

Section View

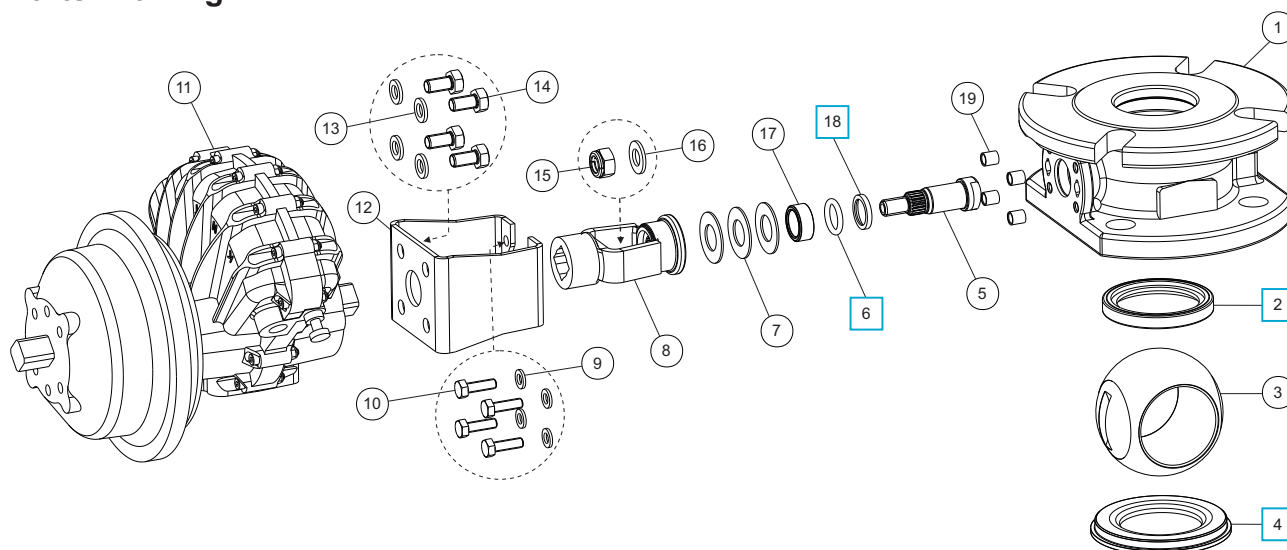




2" Flanged Blacko Ball Valve - Pneumatically Actuated

Part No: 370/0100PN/1

Parts Drawing



Parts List

Item	Description	Part No.
1	Body	370/0110
2	PTFE front seal	370/0102 ☐
3	Ø50mm ball	370/3301
4	PTFE rear seal	370/0105 ☐
5	Spindle	370/0120
6	PTFE O ring	5005-688 ☐
7	Belleville washer (3)	5113-038
8	Spline adaptor assembly	370/0209
9	M6 spring washer (4)	5113-008
10	M6 hex bolt (4)	5111-076
11	Kinetrol pneumatic actuator	5127-078
12	Mounting bracket	370/0208
13	M8 spring washer (4)	5113-003
14	M8 hex bolt (4)	5111-822
15	M10 self lock nut	5112-008
16	M10 plain washer	5113-009
17	Stuffing collar	370/0103
18	Bottom bearing bush	370/0104 ☐
19	Spacer boss (4)	370/0163

Seal Kit

Description	Part No.
All parts marked ☐ in the Parts List	370/01SK



2" BSP Airline Butterfly Valve

Part No: 535/0200



Specification

Nominal size

50mm

Tank connection

Flanged: 4 x 10.9mm holes on a 100mm PCD

Outlet/Process connection

Threaded: 2" BSP male

Properties

1/4" BSP gauge connection, gauge guard, handle with TIR

Materials

Contact parts: 316 stainless steel

Main seal: PTFE

Alternatives are available, refer to the Design Options page

Design Conditions

Weight:	3.7 Kg
Design Pressure (MAWP):	6.9 Bar
Test Pressure:	12.5 Bar
Design Temperature Min:	-40°C
Design Temperature Max:	190°C

NOTE: The Design Conditions and Section View dimensions are for the specified part number only.

Design Code

BS EN14432

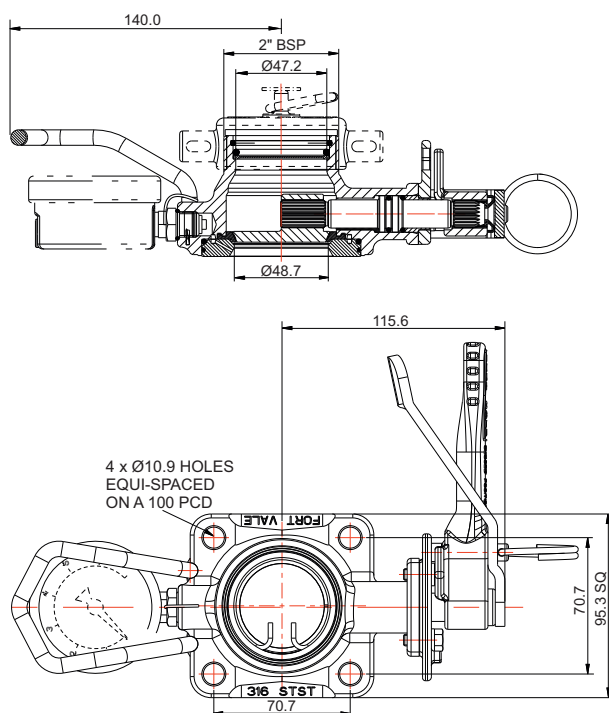
Range

Description	Part No.
Standard specification	535/0200
With gauze filter	535/0200F
With sintered filter	535/0200S

Related Parts

Description	Part No.
Dust cap	10301PS
Pressure gauge	920/07BBSP
Gauge adaptor	352/4004
Stud kit	350/1300
Gasket	5005-500
Weld-in flange	355/1000

Section View

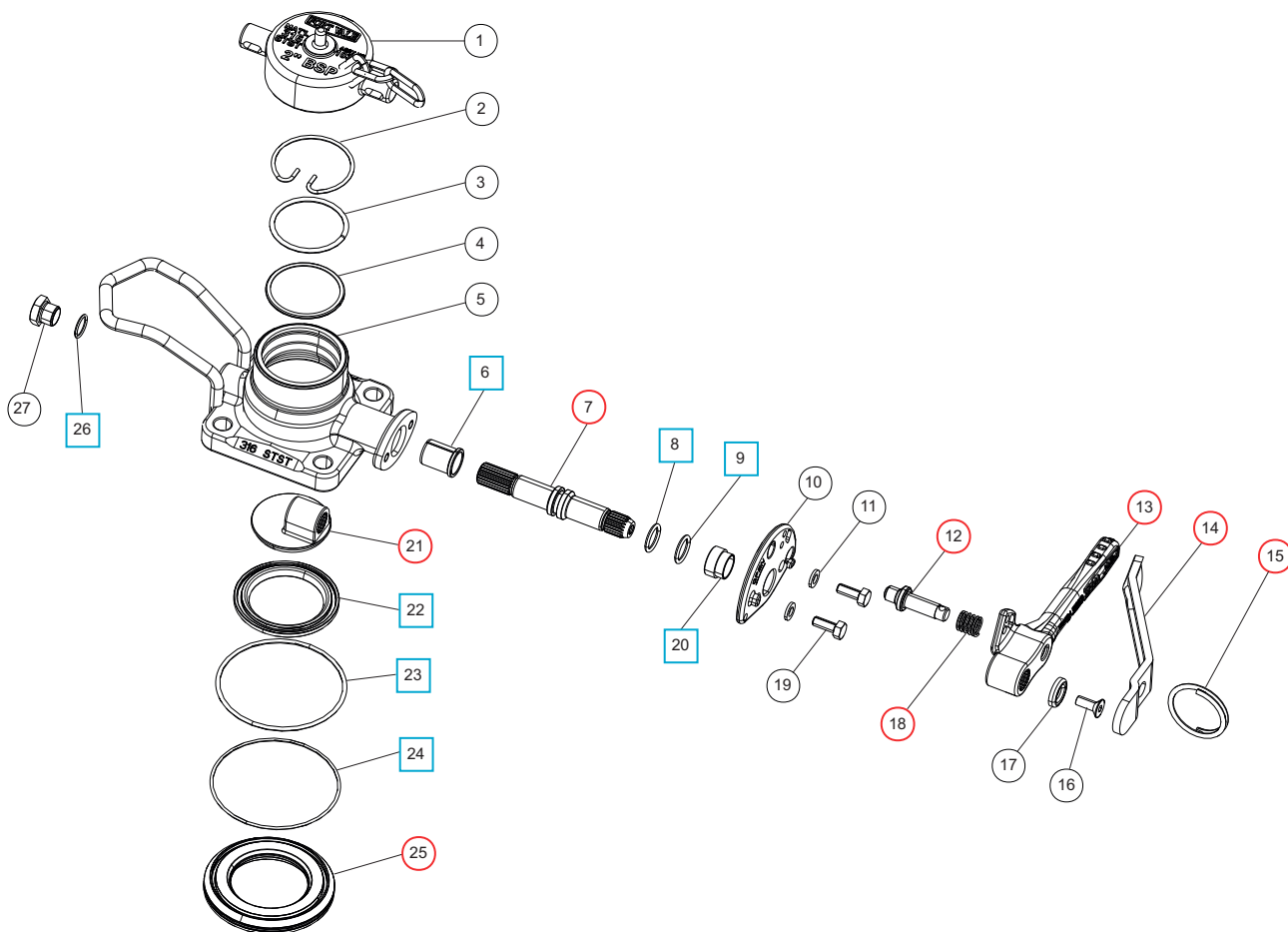




2" BSP Airline Butterfly Valve

Part No: 535/0200

Parts Drawing



Parts List

Item	Description	Part No.
1	2" BSP dust cap (supplied separately)	10301PS
2	Snap ring *Note 1 & 2	5120-005
3	Spacer *Note 1 & 2	355/0295
4	Gauze filter *Note 1 Sintered filter (2) *Note 2	355/0010 355/0206
5	Body	535/0215
6	PTFE bush	535/0009 □ ○
7	Spindle	535/0203 ○
8	Viton O ring	20361 □ ○
9	PTFE O ring	20363 □ ○
10	Stuffing clamp	535/0204
11	Spring washer (2)	5113-008
12	Handle location pin	368/0010 ○
13	Handle	535/0050 ○
14	Operating lever	368/9838 ○
15	Split ring	368/0011 ○
16	Countersunk bolt	5111-030
17	Retaining washer	20370
18	Handle spring	368/0012 ○

Parts List

Item	Description	Part No.
19	Hex bolt (2)	5111-022
20	PTFE stuffing clamp bush	368/0301 □ ○
21	Closure plate	535/0225 ○
22	PTFE main seal	355/0202 □ ○
23	PTFE O ring	5005-659 □ ○
24	EPDM O ring	5005-664 □ ○
25	Clamp plate	535/0201 ○
26	PTFE O ring	5005-048 □ ○
27	1/4" BSP plug	5128-005

NOTE 1: Optional part, see Range 535/0200F

NOTE 2: Optional part, see Range 535/0200S

Seal Kit

Description	Part No.
All parts marked □ in the Parts List	535/00SK

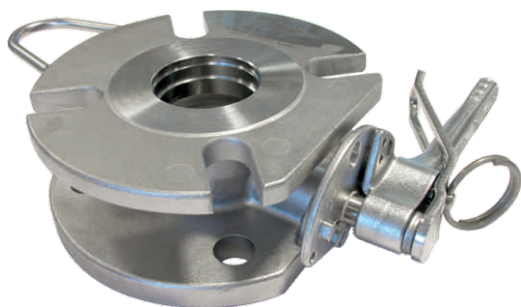
Repair Kit

Description	Part No.
All parts marked ○ in the Parts List	535/00RK



2" MKII Flanged Airline Butterfly Valve

Part No: 535/3000



Specification

Nominal size

50mm

Tank connection

Flanged: 4 x 18mm holes on a 125mm PCD (DIN50 PN10)

Outlet/Process connection

Flanged: 4 x open slots, min. PCD: 2" BSTD

Properties

1/4" BSP gauge connection, gauge guard, handle with TIR

Materials

Contact parts: 316 stainless steel

Main seal: PTFE

Alternatives are available, refer to the Design Options page

Design Conditions

Weight:	5.9 Kg
Design Pressure (MAWP):	6.9 Bar
Test Pressure:	12.5 Bar
Design Temperature Min:	-40°C
Design Temperature Max:	190°C

NOTE: The Design Conditions and Section View dimensions are for the specified part number only.

Design Code

BS EN14432

Range

Description	Part No.
Standard specification	535/3000
With gauze filter	535/3000F
With sintered filter	535/3000S
With TIR wire to 1/4" BSP plug	535/3000W

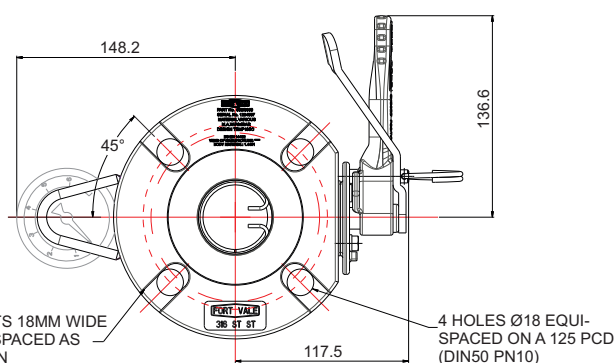
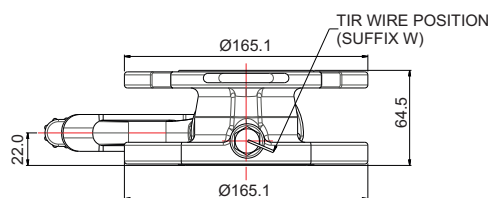
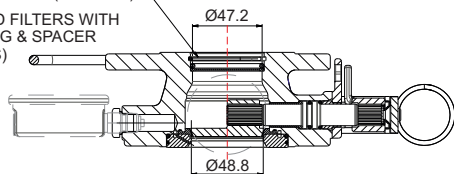
Related Parts

Description	Part No.
Blind flange	370/4239CM
Inlet gasket	5005-360
Bolting kit	311/3000
Pressure gauge	920/07BBSP
Gauge adaptor	352/4004
Stud kit	311/3700
Outlet gasket	5005-361
Weld-in flange	355/3100

Section View

GAUZE FILTER WITH SNAP RING & SPACER (SUFFIX F)

SINTERED FILTERS WITH SNAP RING & SPACER (SUFFIX S)

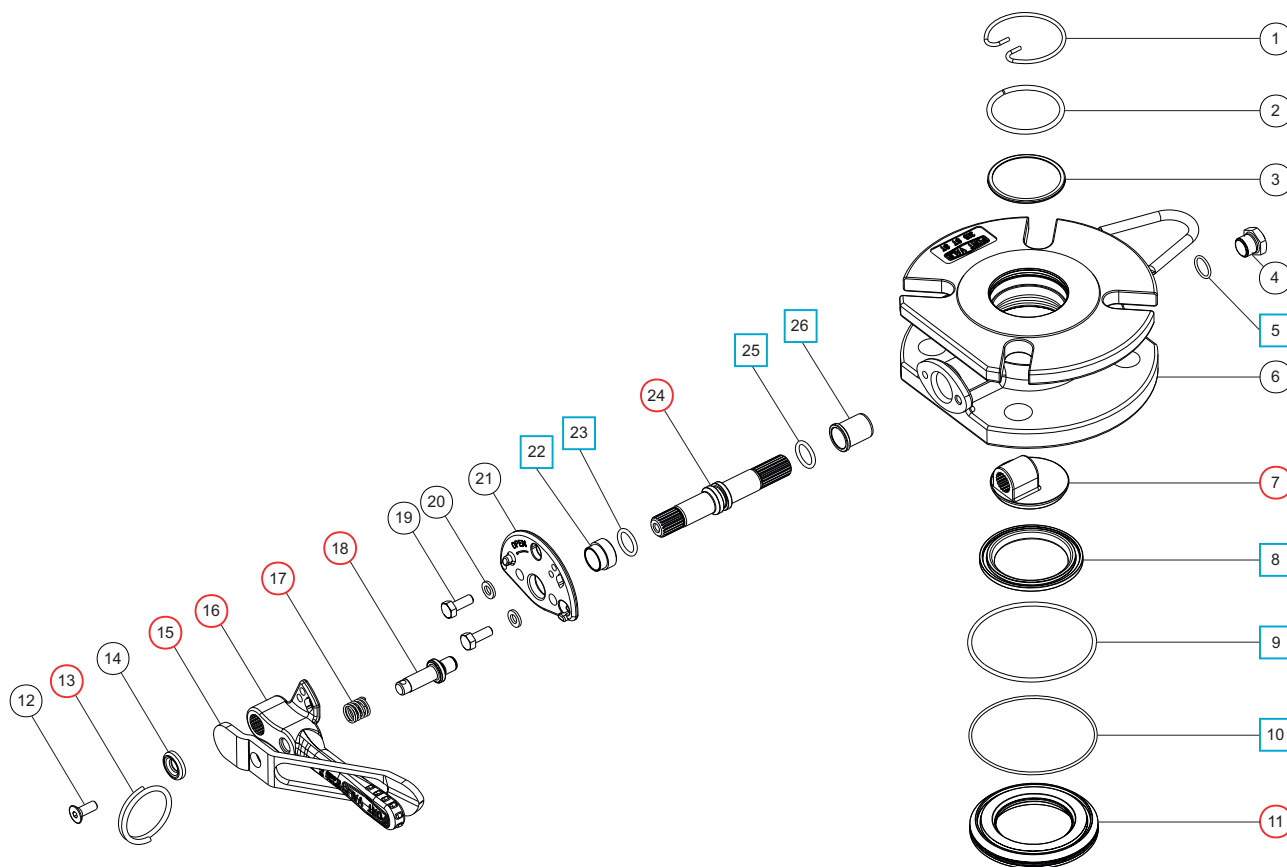




2" MKII Flanged Airline Butterfly Valve

Part No: 535/3000

Parts Drawing



Parts List

Item	Description	Part No.
1	Snap ring *Note 1 & 2	5120-005
2	Spacer *Note 1 & 2	355/0295
3	Gauze filter *Note 1	355/0010
	Sintered filter (2) *Note 2	355/0206
4	1/4" BSP plug	5128-005
5	PTFE O ring	5005-048 □ ○
6	Body	535/3015
7	Closure plate	535/0225 ○
8	Main seal	355/0202 □ ○
9	PTFE O ring	5005-659 □ ○
10	EPDM O ring	5005-664 □ ○
11	Seal plate	535/0201 ○
12	M6 screw	5111-030
13	Split ring	368/0011 ○
14	Retaining washer	20370
15	Operating lever	368/9838 ○
16	Handle	535/0050 ○
17	Handle spring	368/0012 ○
18	Location pin	368/0010 ○
19	M6 hex bolt (2)	5111-022

Parts List

Item	Description	Part No.
20	M6 spring washer (2)	5113-008
21	Stuffing clamp	535/0204C
22	Stuffing bush	368/0301 □ ○
23	PTFE O ring	20363 □ ○
24	Spindle	535/0203 ○
25	Viton O ring	20361 □ ○
26	PTFE bearing	535/0009 □ ○

NOTE 1: Optional part, see Range 535/3000F

NOTE 2: Optional part, see Range 535/3000S

Seal Kit

Description	Part No.
All parts marked □ in the Parts List	535/00SK

Repair Kit

Description	Part No.
All parts marked ○ in the Parts List	535/00RK

Accessories & Spare Parts



Description	Part No.
1½" BSP to DIN40 adaptor kit	530/ADAP40KIT
1½" BSP to DIN40 adaptor flange only	530/ADAP40
1½" BSP to DIN50 adaptor kit	530/ADAP50KIT
1½" BSP to DIN50 adaptor flange only	530/ADAP50



Pressure Gauges

Accessories & Spare Parts

Standard Pressure Gauge



Tell-Tale Pressure Gauge



Specification

We supply standard pressure gauges and tell-tale pressure gauges. Tell-tale pressure gauges have a secondary pointer to indicate if there has been an increase in pressure, even if the pressure subsequently decreases.

All pressure gauges have a 1/4" BSP bottom connection and are glycerine filled.

Pressure range options

0-6 Bar, 0-10 Bar, 0-16 Bar, 0-40 Bar

Material options - internal parts

Brass, stainless steel

Standard Pressure Gauge

Pressure Range Bar	Pressure Range PSI	Internal Parts	Part No.
0-6	0-90	Brass	921/06BBSP
0-6	0-90	St/steel	920/06BBSP
0-10	0-150	Brass	921/10BBSP
0-10	0-150	St/steel	920/10BBSP
0-40	0-580	St/steel	920/40BBSP

Tell-Tale Pressure Gauge

Pressure Range Bar	Pressure Range PSI	Internal Parts	Part No.
0-6	0-90	Brass	921/06TTBBSP
0-6	0-90	St/steel	920/06TTBBSP
0-10	0-150	Brass	921/10TTBBSP
0-10	0-150	St/steel	920/10TTBBSP
0-16	0-230	St/steel	920/16TTBBSP
0-40	0-580	St/steel	920/40TTBBSP



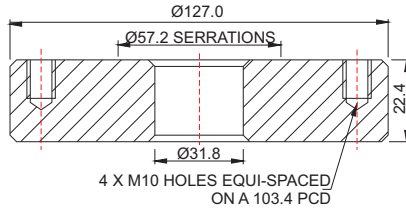
Weld-In Flanges for Airline Valves

Accessories & Spare Parts

Part No: 350/0025



Section View



Specification

Flange type

Weld-in flange

Nominal size

32mm

Flange drilling

4 x M10 holes equi-spaced on a 103.4mm PCD

Material

316L stainless steel

Compatible valve

1½" airline ball valve

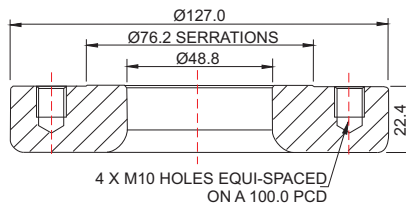
Related Parts

Description	Part No.
Stud kit	350/1300

Part No: 355/1000



Section View



Specification

Flange type

Weld-in flange

Nominal size

50mm

Flange drilling

4 x M10 holes equi-spaced on a 100.0mm PCD

Material

316L stainless steel

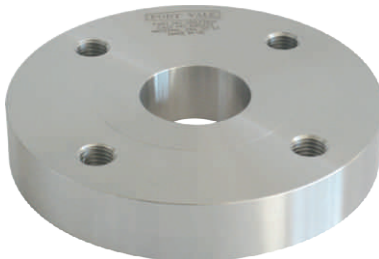
Compatible valve

2" BSP airline butterfly valve

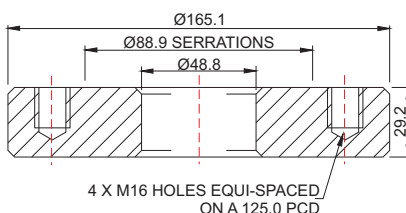
Related Parts

Description	Part No.
Stud kit	350/1300

Part No: 355/3100



Section View



Specification

Flange type

Weld-in flange

Nominal size

50mm

Flange drilling

4 x M16 holes equi-spaced on a 125.0mm PCD

Material

316L stainless steel

Compatible valve

2" flanged butterfly valve

2" flanged ball valve

Related Parts

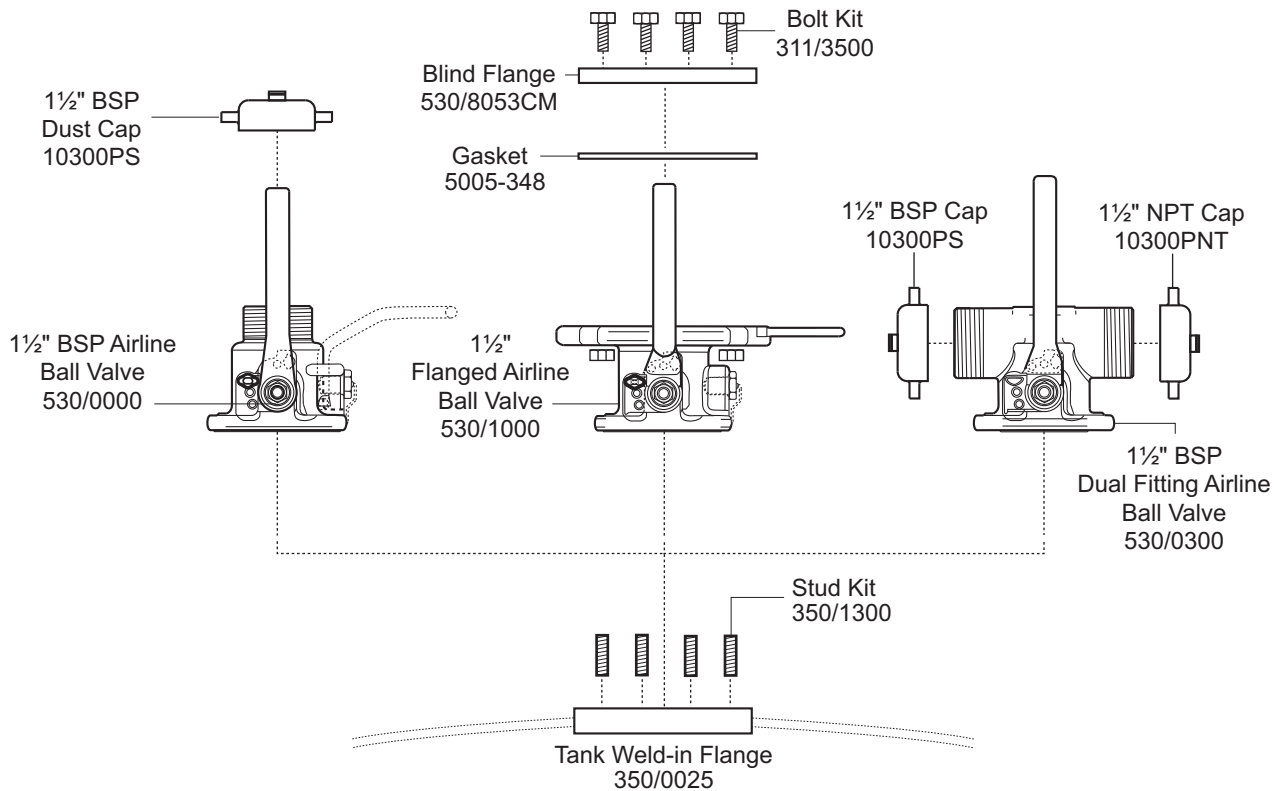
Description	Part No.
Stud kit	311/3700



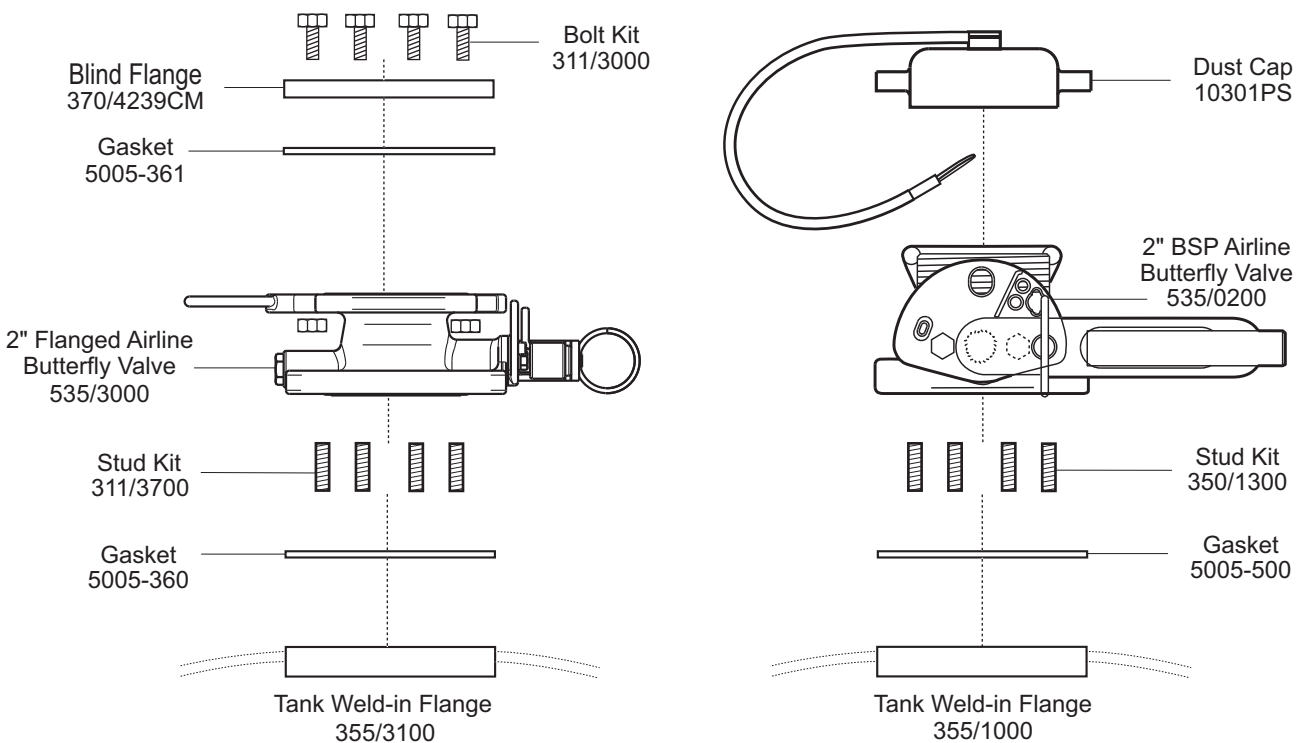
Airline Ball Valves & Airline Butterfly Valves

Installation Options

1½" Airline Ball Valves



2" Airline Butterfly Valves





APPENDIX

Catalogue

A	Bolt Torque Guide & Step Loading Procedure
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B	Client Responsibilities - Valves & Accessories
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Bolt Torque Guide & Step Loading Procedure

Installation & Operating Instructions

Flange Bolting

CAUTION: Weld-distortion and too much tightening force will cause damage to a flange.

It is important not to cause damage to weld-in flanges and mating flanges. If a flange is damaged it will not give a satisfactory seal when a gasket and secondary mating flange is installed.

Bolt-stress can decrease after initial tightening. The cause can be deformation of the gasket material, particularly with soft materials such as a CNAF/PTFE envelope gasket.

Best procedure recommends that, after initial bolting, the flange joint is tightened again after a period of time. Most gasket manufacturers advise a period of 24 hours. ASME PCC-1-2000 GUIDELINES FOR PRESSURE BOUNDARY BOLTED FLANGE JOINT ASSEMBLY advises a minimum period of 4 hours.

Bolt torque calculations are based on a flat flange to within 0.15mm.

Recommended bolt torque values will be reduced if a lubrication is used.

Bolt Torque

Bolt Torque Values

Fort Vale bolt torque values are given as a reference guide only and are based on:

- The use of a CNAF/PTFE gasket.
- Unlubricated fasteners.
- A flange flat to within 0.15mm.

CAUTION: If you use a different gasket material, a lubricant, a flange with distortion, you must re-calculate the torque value.

Bolt Torque Procedure

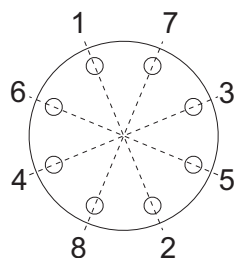
To install flanged parts correctly:

- Examine the mating flange of the part.
- If the flange is marked with a torque value, obey that torque value.
- If there is no torque value marked on the mating flange, obey the bolt torque values given in Table BT1.
- Tighten the bolts evenly in sequence. See Figure BT1.
- Obey the Step Loading Procedure (ASME PCC-1-2000). See next page.

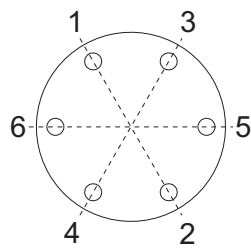
Table BT1

Thread	Torque Value
M10	30 Nm (22 lbf.ft)
M12	65 Nm (48 lbf.ft)
M16	81 Nm (60 lbf.ft)

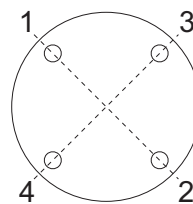
Figure BT1



8 HOLE PATTERN



6 HOLE PATTERN



4 HOLE PATTERN



Bolt Torque Guide & Step Loading Procedure

Installation & Operating Instructions

Step Loading Procedure

To install flanged parts correctly, obey the Step Loading Procedure extract from ASME PCC-1-2000:

Install

Hand tighten, then “snug up” to 15 Nm (10 lbf.ft) to 30 Nm (20 lbf.ft) (not to exceed 20% of Target Torque). Check flange gap around circumference for uniformity. If the gap around the circumference is not reasonably uniform, make the appropriate adjustments by selective tightening before proceeding.

Round 1

Tighten to 20% to 30% of Target Torque. Check flange gap around circumference for uniformity. If the gap around the circumference is not reasonably uniform, make the appropriate adjustments by selective tightening before proceeding.

Round 2

Tighten to 50% to 70% of Target Torque. Check flange gap around circumference for uniformity. If the gap around the circumference is not reasonably uniform, make the appropriate adjustments by selective tightening before proceeding.

Round 3

Tighten to 100% of Target Torque. Check flange gap around circumference for uniformity. If the gap around the circumference is not reasonably uniform, make the appropriate adjustments by selective tightening before proceeding.

Round 4

Continue tightening the bolts, but on a rotational clockwise pattern until no further nut rotation occurs at the Round 3 Target Torque value. For indicator bolting, tighten bolts until the indicator rod retraction readings for all bolts are within the specified range.

Round 5

Time permitting, wait a minimum of 4 hr and repeat Round 4; this will restore the short-term creep relaxation/embedment losses. If the flange is subjected to a subsequent test pressure higher than its rating, it may be desirable to repeat this round after the test is completed.



Client Responsibilities - Valves & Accessories

Installation, Operation & Maintenance Instructions

Compatibility

Make sure that the function and technical specification of the valve/accessory is compatible with the vessel service conditions and the cargo. This includes, but is not limited to:

- dimensions
- pressure/vacuum setting
- air/gas/liquid flow capacity
- maximum allowable working pressure
- test pressure
- minimum/maximum design temperatures
- materials of construction.

Maintenance

Fort Vale valves and accessories have a long life if you use them correctly in compatible service conditions. It is not necessary to lubricate the parts, but we recommend that you obey the precautions that follow:

Visual checks at regular intervals:

1. Examine the valve to make sure there is no damage, wear or corrosion.
2. Examine the valve and adjacent area to make sure there is no leakage of cargo.
3. Examine the fasteners to make sure they are not loose.
4. Make sure the valve operates correctly.

CAUTION: If you operate the valve with very corrosive cargo, or near its temperature and/or pressure limit (very high or very low temperature and/or pressure), do the visual checks more frequently.

As well as the visual checks, schedule suitable maintenance intervals for the valve based on how frequently the valve is used, the type of cargo and the service conditions.

After 2½ years of service, do the checks that follow:

1. Examine the valve to make sure there is no damage, wear or corrosion.
2. Make sure the valve operates correctly.
3. Do a pressure test on the valve.

After 5 years of service, do the checks that follow:

1. Disassemble and clean the valve.
2. Replace all the valve seals.

Replacement Parts

Do not adapt or change the valve. If you install a replacement part, it must be a genuine Fort Vale part.

WARNING: If you install a part that is not a genuine Fort Vale part, there is a risk of:

- injury to personnel
- permanent damage to the valve
- permanent damage to the vessel
- valve malfunction.

External Fire

If the valve is installed in an area where there is a risk of external fire, you must install compatible accessories to prevent damage to the valve.

Compatibility of Accessories

Accessory components must cause no interference with the valve function. Accessories must be made from compatible materials that will cause no damage to the valve materials. Do not install an accessory that will cause an increased load on the valve, i.e. mechanical, static, dynamic, thermal.

Mis-use

Obey the instructions and recommended procedures in the installation and operating instructions. Obey the pressure and temperature markings on the valve and on the drawing. Use the valve/accessory for its correct function only. Fort Vale accept no liability or responsibility for incorrect use of the valve/accessory.



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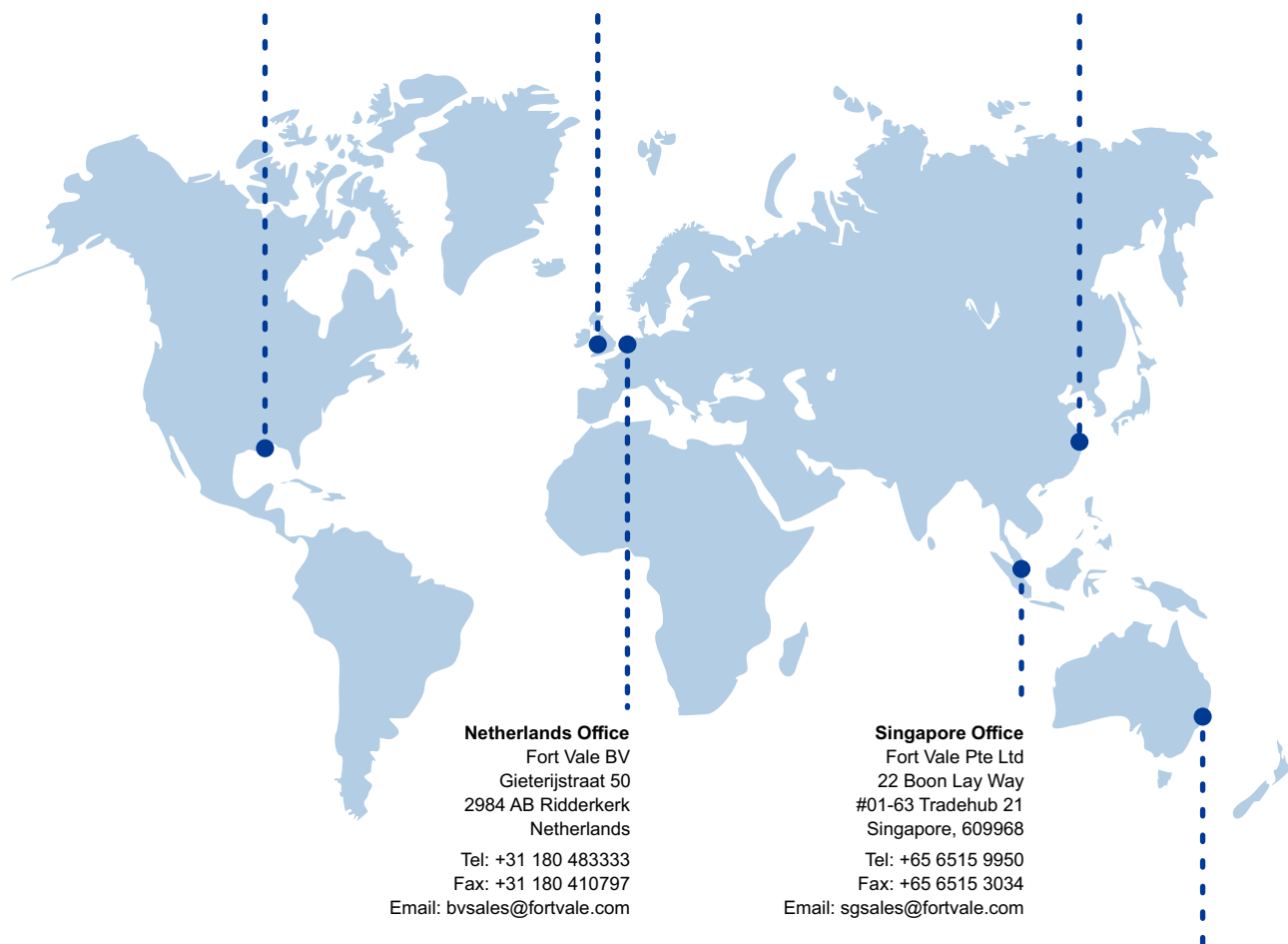
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