lubrication systems

DR-DF

Dual-line metering valve system

Designed to work all the day, every day
in extreme condition and difficult environments

Standard and air-oil versions (DF.A / DR.A)





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General description

Dual-line lubrication systems are generally used in large-scale plants and facilities. The DF/DR and DF.A/DR.A modular valves, zinc-nickel galvanized, are designed for centralized systems operating at pressures up to 400 bar.

Compared to traditional monoblock models, the modules mount onto a base permanently connected to the system piping and allow single- or double-outlet metering units to be combined in configurations of up to 16 outlets. The range includes fixed flow rate valves (DF / DF.A) and variable flow rate valves (DR / DR.A).

The air-oil variant DF.A / DR.A uses the same DF-1, DF-3 and DR-3 metering elements as the standard version and differs in its bases, which feature an internal circuit that, when supplied with compressed air, generates a continuous mixed air-oil flow at the outlets.

Steplessly adjustable module lubricant discharge (DR series)

Reduced failing components maintenance cost

Visual indicator for system control (DR series)

Modular design to adapt to any system needs

Closing plates for future system expansion

Always supplied complete with standard 'O' rings and fixing screws

Air-oil version (.A) for continuous lubrication with atomised oil

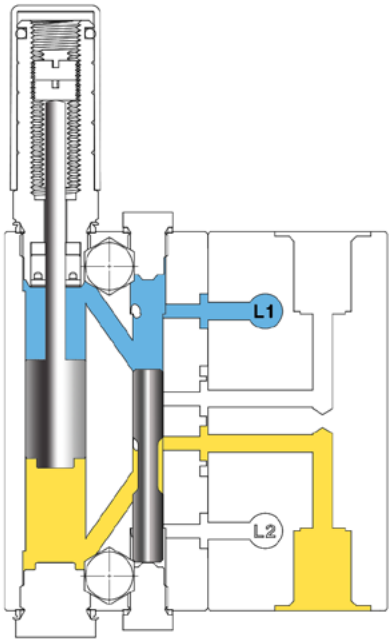
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Data sheet

Max pressure	400 bar
Operating temperature	from -30 °C to +80 °C from -30 °C to +180 °C with FKM seals
Lubricants	Min 100 cSt 40 °C Max NLGI 2 at operating temperature .A version: oil only, 100 ÷ 400 cSt at 40 °C
Cycle/minute	100
Main line connection inlet	3/8" bsp or nptf
Outlet line connection	1/4" bsp or nptf
Material body	Carbon steel (DF-DR / DF.A-DR.A) SS.316-L (DF-DR only)
Number of elements	max 8 (16 outlets)
Air pressure (.A only)	1.5 ÷ 3.5 bar
Intermediate base pitch	34.6 ±0.05 mm

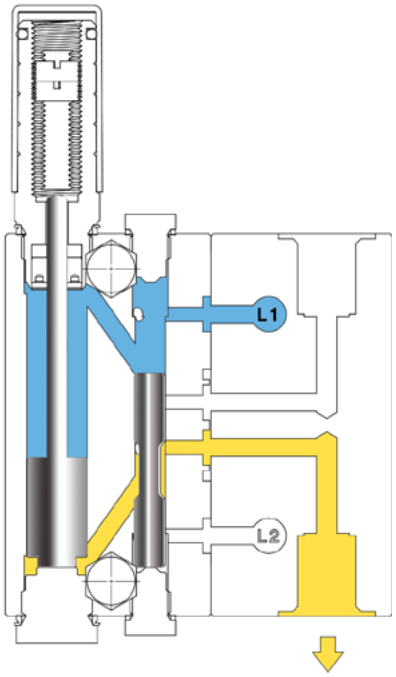
Outlet discharge/cycle (DF-DR and DF.A-DR.A)

DF-1	**DF-3**	**DR-3**
1 cc fixed	3 cc fixed	0.15 ÷ 3 cc adjustable



A

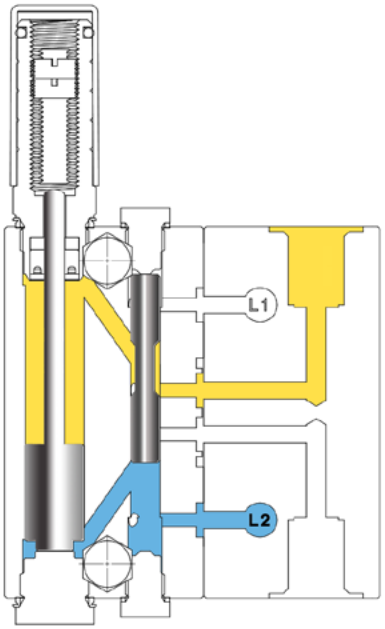
Lubricant from the pump discharge in L1, pressurized lubricant enters inlet at top right - pushing inlet piston down uncovering both diagonal passages and pressurising the upper diagonal passage and the chamber above Discharge piston. Discharge piston begins to move down.



B

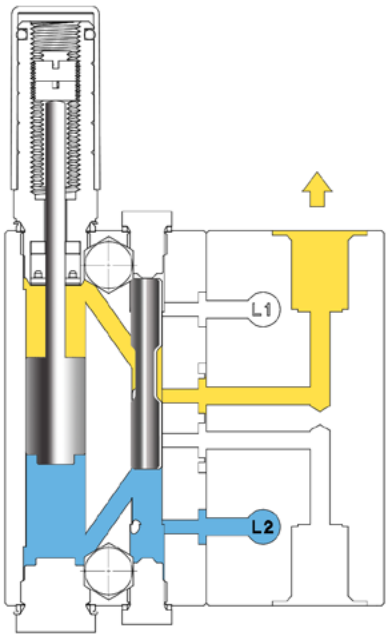
The pressurized lubricant forces the Discharge piston to the end of its stroke, and the full measured charge is delivered to the bearing. Further application of pressure on the upper supply line will have no effect.

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C

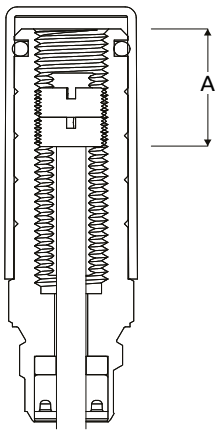
When the flow directing valve at the pump is changed over and the pressurised lubricant enters inlet at the bottom right - pushing inlet piston up uncovering both diagonal passages and pressurising the lower diagonal passage and the chamber below Discharge piston. Discharge piston begins to move up.



D

The pressurised lubricant from the lower port forces the Discharge piston to the end of its stroke and the full measured charge is delivered to the bearing. Further application of pressure on the lower supply line will have no effect.

Discharge adjustment



Every valve is equipped with a visual indicator for lubricant discharge adjustment.

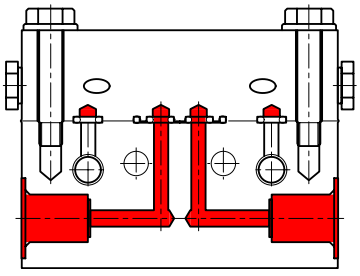
The valve discharge can be adjusted on site to suit the application needs or preliminary specified by ILC during design phase.

Lubricant discharge percentage is directly displayed by the visual pin position (A).

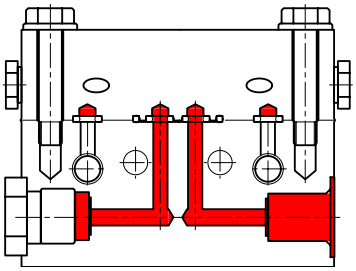
Single and double discharge outlet conversion

Valves are supplied as standard with double outlet discharge. To convert to single outlet discharge unscrew the two fastening screws that secure the metering device to the base. Remove then the two "O" ring inside and reassemble the valve on the base.

Important
Order the unused discharge closing cap separately (**cod. TW.107602**)



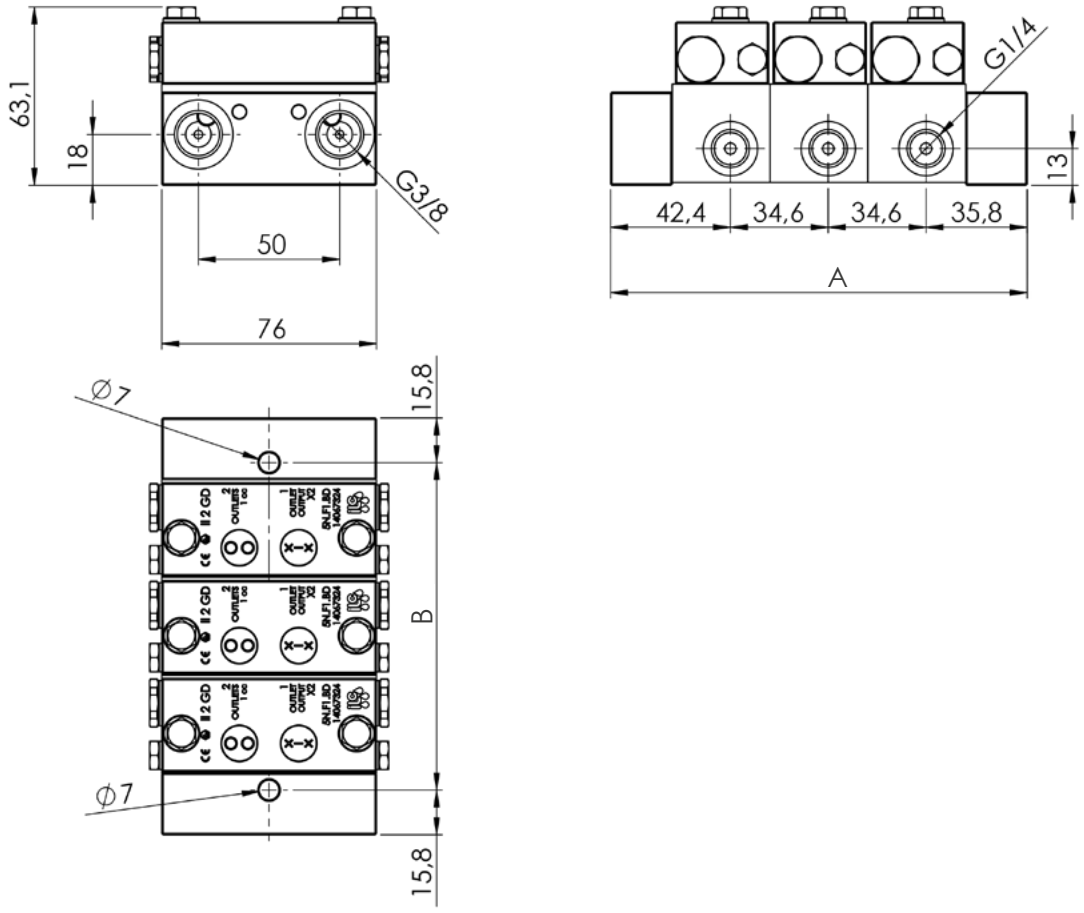
double discharge



single discharge

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Overall dimensions



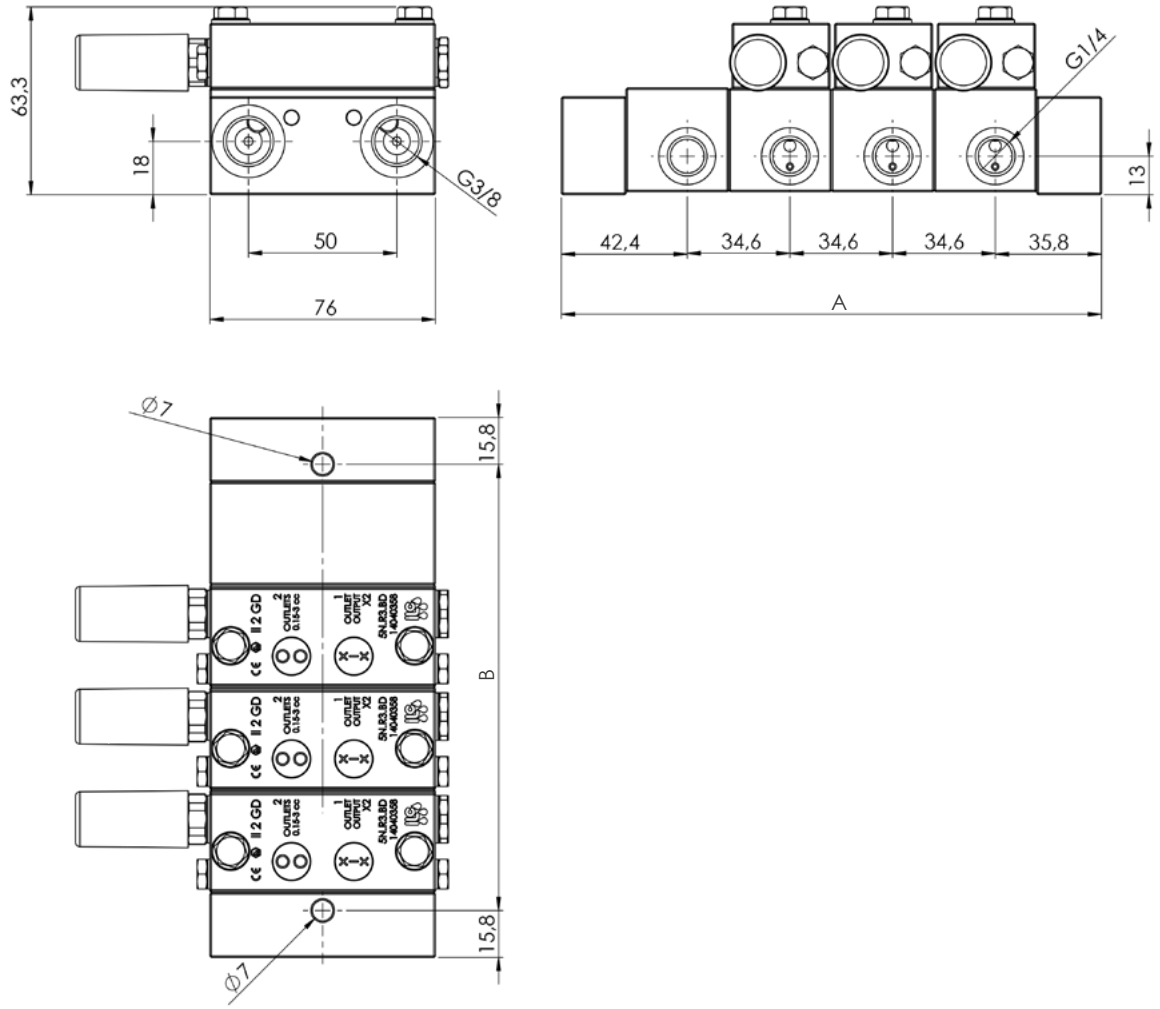
Standard blocks DF / DR

Valves	Outlets	A (mm)	B (mm)	Tol. B
1	2	78,2	46,6	±0,15
2	4	112,8	81,2	±0,20
3	6	147,4	115,8	±0,25
4	8	182	150,4	±0,30
5	10	216,6	185	±0,35
6	12	251,2	219,6	±0,40
7	14	285,8	254,2	±0,45
8	16	320,4	288,8	±0,50

A = overall block length; B = fixing hole centre distance (Ø 7 0/-0.2 mm).
Intermediate base pitch: 34.6 ±0.05 mm. The tolerance on B is the sum of the tolerances of the initial base, the end base and each intermediate base (±0.05 mm each).

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Overall dimensions



Air-oil blocks DF.A / DR.A

Valves	Outlets	A (mm)	B (mm)	Tol. B
1	2	112.8	81.2	±0.20
2	4	147.4	115.8	±0.25
3	6	182	150.4	±0.30
4	8	216.6	185	±0.35
5	10	251.2	219.6	±0.40
6	12	285.8	254.2	±0.45
7	14	320.4	288.8	±0.50
8	16	355	323.4	±0.55

A = overall block length; B = fixing hole centre distance (Ø 7 0/-0.2 mm).

Intermediate base pitch: 34.6 ±0.05 mm. The tolerance on B is the sum of the tolerances of the initial base, the end base and each intermediate base (±0.05 mm each).

In the air-oil version the air inlet base is added to the metering valve intermediate bases.

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How to order a block

Standard modular bases (DF / DR)

In the standard version the block consists of at least three elements:

- 1 initial base
- 1 standard intermediate base for each metering valve
- 1 end base

The system can be extended up to 8 metering valves (16 outlets) by inserting the required number of intermediate bases between the initial base and the end base. The 1/4" outlets are located on the intermediate bases, two for each metering valve.

Air-oil modular bases (DF.A / DR.A)

In the air-oil version the block consists of at least four elements:

- 1 initial base
- 1 air-oil intermediate base for each metering valve
- 1 air inlet intermediate base
- 1 end base

The system can be extended up to 8 metering valves (16 outlets) by inserting the required number of air-oil intermediate bases between the initial base and the air inlet base. The air inlet base is always positioned last in the block, next to the end base.

The air inlet base, connected to the compressed air line (1.5 ÷ 3.5 bar), supplies the internal circuit of the intermediate bases: the lubricant metered by each element is mixed with air and delivered to the outlets as a continuous air-oil flow.

Air-oil intermediate bases are available with Ø 1.5 mm or Ø 2.5 mm air hole: specify the version when ordering (codes on page 11).

Order example: standard block

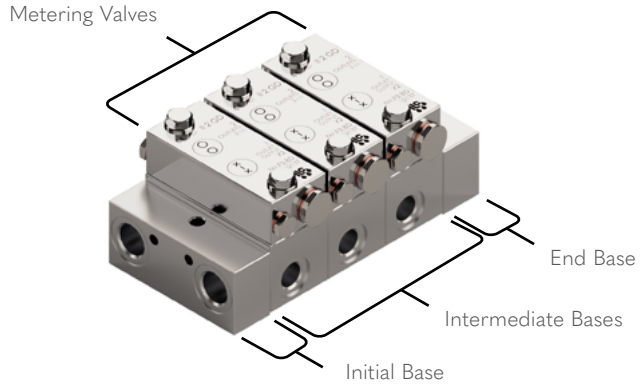
Qty	Code	Description
1	5N.BB.A.BSP	Initial base
3	5N.BB.B.BSP	Standard intermediate base
1	5N.BB.C.BSP	End base
3	5N.R3.BD	DR-3 metering valve

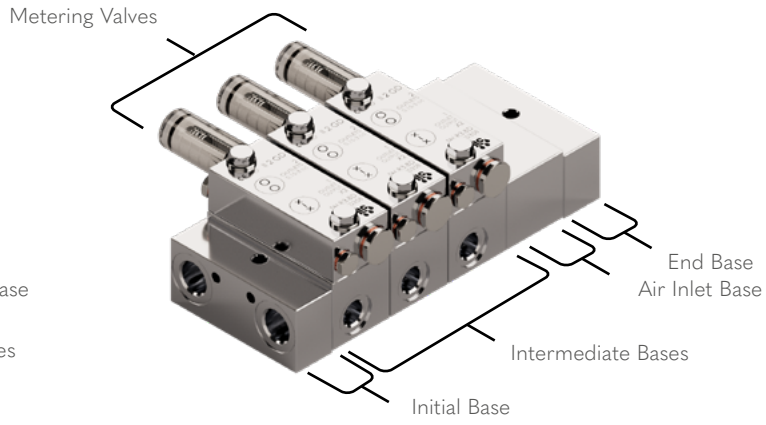
Alternatively, pre-assembled block: 5N.DR3.03.BSP (see page 14).

Order example: air-oil block

Qty	Code	Description
1	5N.BB.A.BSP	Initial base
3	5N.BBA.B.BSP	Air-oil intermediate base Ø 2.5 (*)
1	5N.BBA.A.BSP	Air inlet intermediate base
1	5N.BB.C.BSP	End base
3	5N.R3.BD	DR-3 metering valve

(*) With Ø 1.5 air hole: 5N.BBA15.B.BSP





Base





Initial (standard and .A)

Inlet	Steel	SS316.L
3/8" BSP	5N.BB.A.BSP	5X.BB.A.BSP
3/8" NPTF	5N.BB.A.NPTF	5X.BB.A.NPTF

Air inlet for air-oil (.A only)

Version	Steel	SS316.L
.A	5N.BBA.A.BSP	—





Standard intermediate

Outlet	Steel	SS316.L
1/4" BSP	5N.BB.B.BSP	5X.BB.B.BSP
1/4" NPTF	5N.BB.B.NPTF	5X.BB.B.NPTF

Air-oil intermediate (.A only)

Outlet	Air hole Ø 1.5 mm	Air hole Ø 2.5 mm
1/4" BSP	5N.BBA15.B.BSP	5N.BBA.B.BSP
1/4" NPTF	5N.BBA15.B.NPTF	5N.BBA.B.NPTF



End (standard and .A)

Inlet	Steel	SS316.L
3/8" BSP	5N.BB.C.BSP	5X.BB.C.BSP
3/8" NPTF	5N.BB.C.NPTF	5X.BB.C.NPTF

Fixing

All metering valves and bases are provided with fixing screws, washers and assembling threaded bushes.
Intermediate base thickness: 34.6 ±0.05 mm.

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Standard

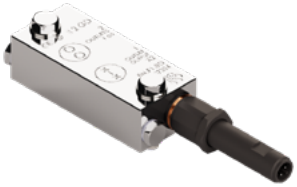




Fixed discharge			
Line	Discharge	Steel	SS316.L
DF1	1 cc	5N.F1.BD	5X.F1.BD
DF3	3 cc	5N.F3.BD	5X.F3.BD

Adjustable discharge			
Line	Discharge	Steel	SS316.L
DR3	0,15 - 3 cc	5N.R3.BD	5X.R3.BD

With cycle control





Fixed discharge			
Line	Discharge	Steel	SS316.L
DF1	1 cc	5N.F1.BD.ICS	5X.F1.BD.ICS
DF3	3 cc	5N.F3.BD.ICS	5X.F3.BD.ICS

Adjustable discharge			
Line	Discharge	Steel	SS316.L
DR3	0,15 - 3 cc	5N.R3.BD.ICS	5X.R3.BD.ICS

Single control element codes	
DF1/3-DR3	5N.ICS.03

Fixed or adjustable discharge valves can be equipped with a inductive sensor (M12 x 1) for cycle control.

This solution is applied where is necessary to monitor Discharge piston real movement.

The element can be ordered already equipped with control or expanded later removing the closing cap.

Closing plates



Closing plates can be installed in view of additional elements being added or unused points BSP-NPTF being removed.

Steel	SS316.L
5N.PC.SB	5X.PC.SB

Replacement parts





Regulator cap	Transparent	Aluminium
Line DR-3	A83.120870	A83.120870.A

'O'ring kit	Code
For base	5N.O.RING.B
For valves	5N.O.RING.D

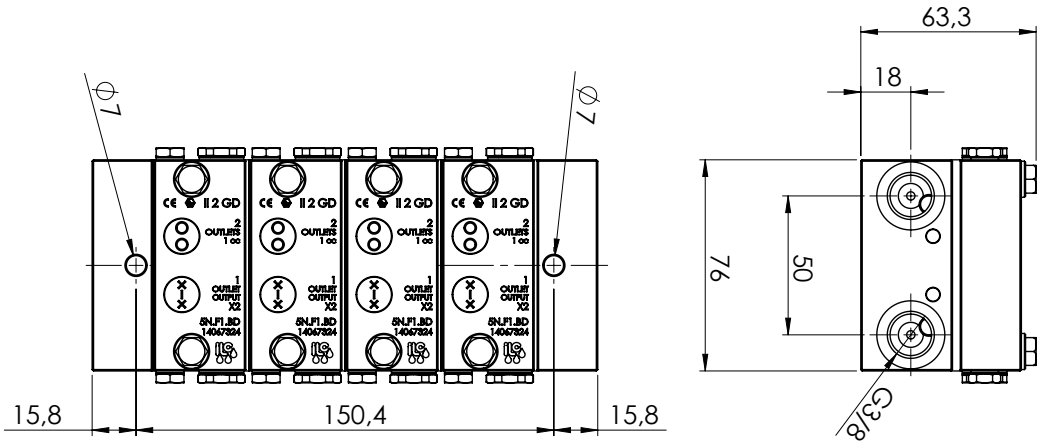
Metering elements, closing plates and spare parts are common to the standard and air-oil (.A) versions; the .A version is available in steel only.

DF-1 (Fixed Discharge 1 cc)

Steel		SS316.L				
BSP	NPTF	BSP	NPTF	Outlets	A	B
5N.DF1.01.BSP	5N.DF1.01.NPTF	5X.DF1.01.BSP	5X.DF1.01.NPTF	2	78.2	46.6
5N.DF1.02.BSP	5N.DF1.02.NPTF	5X.DF1.02.BSP	5X.DF1.02.NPTF	4	112.8	81.2
5N.DF1.03.BSP	5N.DF1.03.NPTF	5X.DF1.03.BSP	5X.DF1.03.NPTF	6	147.4	115.8
5N.DF1.04.BSP	5N.DF1.04.NPTF	5X.DF1.04.BSP	5X.DF1.04.NPTF	8	182	150.4

DF-3 (Fixed Discharge 3 cc)

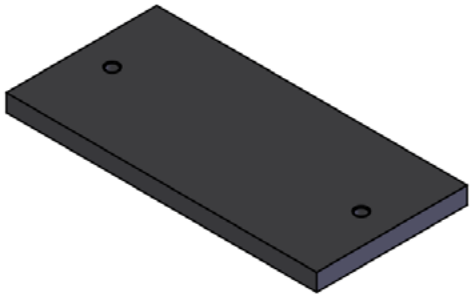
Steel		SS316.L				
BSP	NPTF	BSP	NPTF	Outlets	A	B
5N.DF3.01.BSP	5N.DF3.01.NPTF	5X.DF3.01.BSP	5X.DF3.01.NPTF	2	78.2	46.6
5N.DF3.02.BSP	5N.DF3.02.NPTF	5X.DF3.02.BSP	5X.DF3.02.NPTF	4	112.8	81.2
5N.DF3.03.BSP	5N.DF3.03.NPTF	5X.DF3.03.BSP	5X.DF3.03.NPTF	6	147.4	115.8
5N.DF3.04.BSP	5N.DF3.04.NPTF	5X.DF3.04.BSP	5X.DF3.04.NPTF	8	182	150.4



Weld plates

for DF-1 / DF-3 valves

Steel	SS316.L	Valves	A (mm)	B (mm)
CN.FP3.01	CX.FP3.01	1	75.1 ±0.1	46.6 ±0.1
CN.FP3.02	CX.FP3.02	2	109.7 ±0.1	81.2 ±0.1
CN.FP3.03	CX.FP3.03	3	144.3 ±0.1	115.8 ±0.1
CN.FP3.04	CX.FP3.04	4	178.9 ±0.1	150.4 ±0.1
CN.FP3.05	CX.FP3.05	5	213.5 ±0.1	185 ±0.1



Dimensions in mm. Tolerance on B and dimensions up to 8 valves: see page 8.

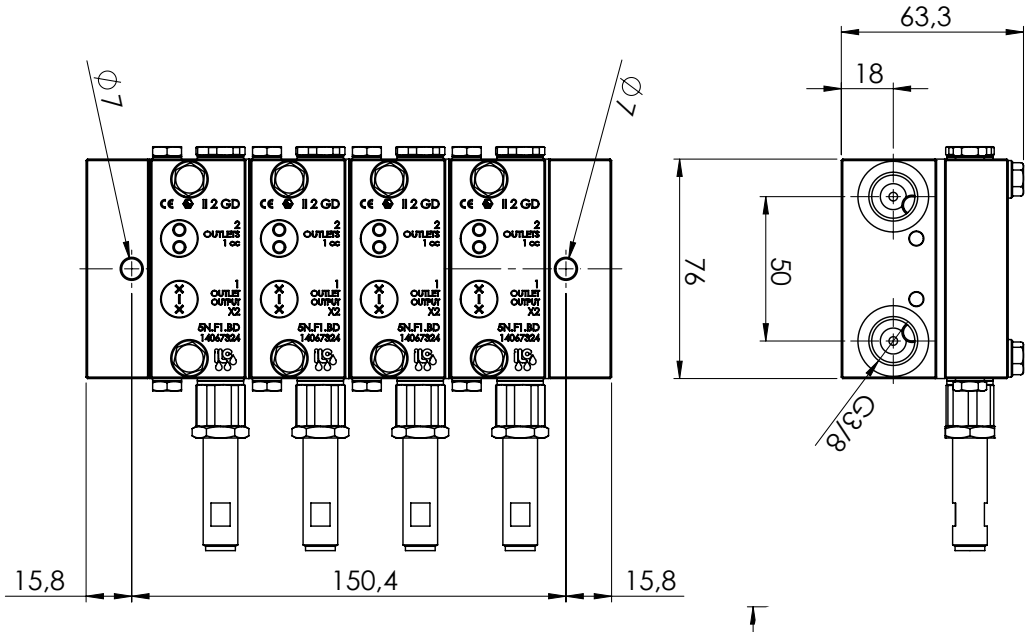
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DF-1 (Fixed Discharge 1 cc, with inductive sensor)

Steel		SS316.L				
BSP	NPTF	BSP	NPTF	Outlets	A	B
5N.DF1.01.BSP.ICS	5N.DF1.01.NPTF.ICS	5X.DF1.01.BSP.ICS	5X.DF1.01.NPTF.ICS	2	78.2	46.6
5N.DF1.02.BSP.ICS	5N.DF1.02.NPTF.ICS	5X.DF1.02.BSP.ICS	5X.DF1.02.NPTF.ICS	4	112.8	81.2
5N.DF1.03.BSP.ICS	5N.DF1.03.NPTF.ICS	5X.DF1.03.BSP.ICS	5X.DF1.03.NPTF.ICS	6	147.4	115.8
5N.DF1.04.BSP.ICS	5N.DF1.04.NPTF.ICS	5X.DF1.04.BSP.ICS	5X.DF1.04.NPTF.ICS	8	182	150.4

DF-3 (Fixed Discharge 3 cc, with inductive sensor)

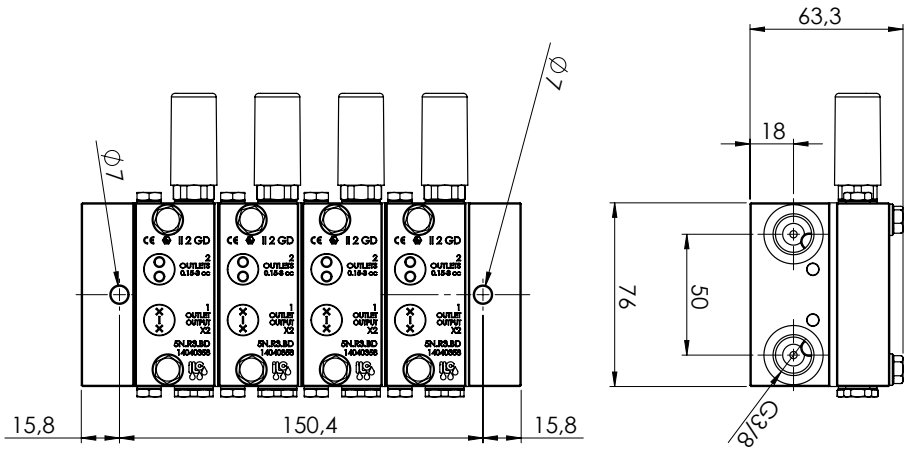
Steel		SS316.L				
BSP	NPTF	BSP	NPTF	Outlets	A	B
5N.DF3.01.BSP.ICS	5N.DF3.01.NPTF.ICS	5X.DF3.01.BSP.ICS	5X.DF3.01.NPTF.ICS	2	78.2	46.6
5N.DF3.02.BSP.ICS	5N.DF3.02.NPTF.ICS	5X.DF3.02.BSP.ICS	5X.DF3.02.NPTF.ICS	4	112.8	81.2
5N.DF3.03.BSP.ICS	5N.DF3.03.NPTF.ICS	5X.DF3.03.BSP.ICS	5X.DF3.03.NPTF.ICS	6	147.4	115.8
5N.DF3.04.BSP.ICS	5N.DF3.04.NPTF.ICS	5X.DF3.04.BSP.ICS	5X.DF3.04.NPTF.ICS	8	182	150.4



Dimensions in mm. Tolerance on B and dimensions up to 8 valves: see page 8.

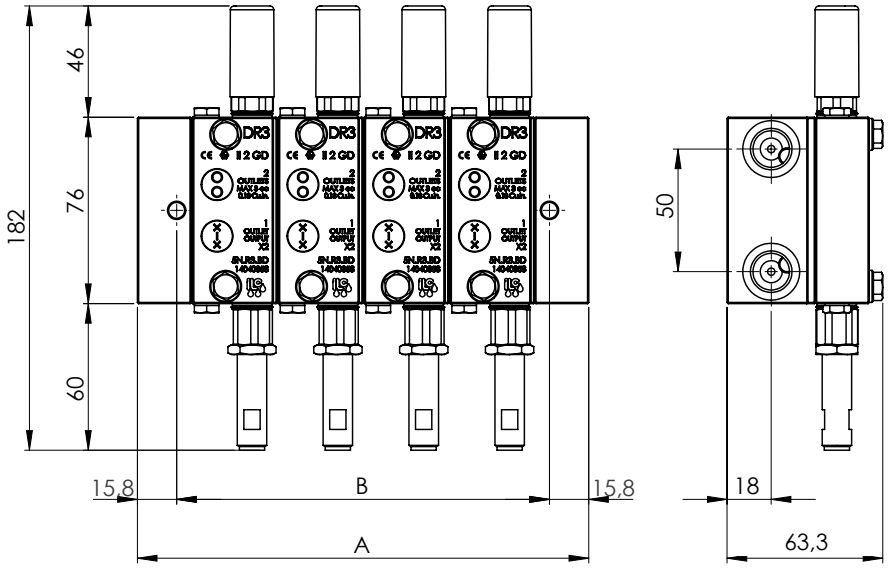
DR-3 (Adjustable Discharge 0.15 - 3.0 cc)

Steel		SS316.L				
BSP	NPTF	BSP	NPTF	Outlets	A	B
5N.DR3.01.BSP	5N.DR3.01.NPTF	5X.DR3.01.BSP	5X.DR3.01.NPTF	2	78.2	46.6
5N.DR3.02.BSP	5N.DR3.02.NPTF	5X.DR3.02.BSP	5X.DR3.02.NPTF	4	112.8	81.2
5N.DR3.03.BSP	5N.DR3.03.NPTF	5X.DR3.03.BSP	5X.DR3.03.NPTF	6	147.4	115.8
5N.DR3.04.BSP	5N.DR3.04.NPTF	5X.DR3.04.BSP	5X.DR3.04.NPTF	8	182	150.4



DR-3 (Adjustable Discharge 0.15 - 3.0 cc, with inductive sensor)

Steel		SS316.L				
BSP	NPTF	BSP	NPTF	Outlets	A	B
5N.DR3.01.BSP.ICS	5N.DR3.01.NPTF.ICS	5X.DR3.01.BSP.ICS	5X.DR3.01.NPTF.ICS	2	78.2	46.6
5N.DR3.02.BSP.ICS	5N.DR3.02.NPTF.ICS	5X.DR3.02.BSP.ICS	5X.DR3.02.NPTF.ICS	4	112.8	81.2
5N.DR3.03.BSP.ICS	5N.DR3.03.NPTF.ICS	5X.DR3.03.BSP.ICS	5X.DR3.03.NPTF.ICS	6	147.4	115.8
5N.DR3.04.BSP.ICS	5N.DR3.04.NPTF.ICS	5X.DR3.04.BSP.ICS	5X.DR3.04.NPTF.ICS	8	182	150.4



Dimensions in mm. Tolerance on B and dimensions up to 8 valves: see page 8.

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