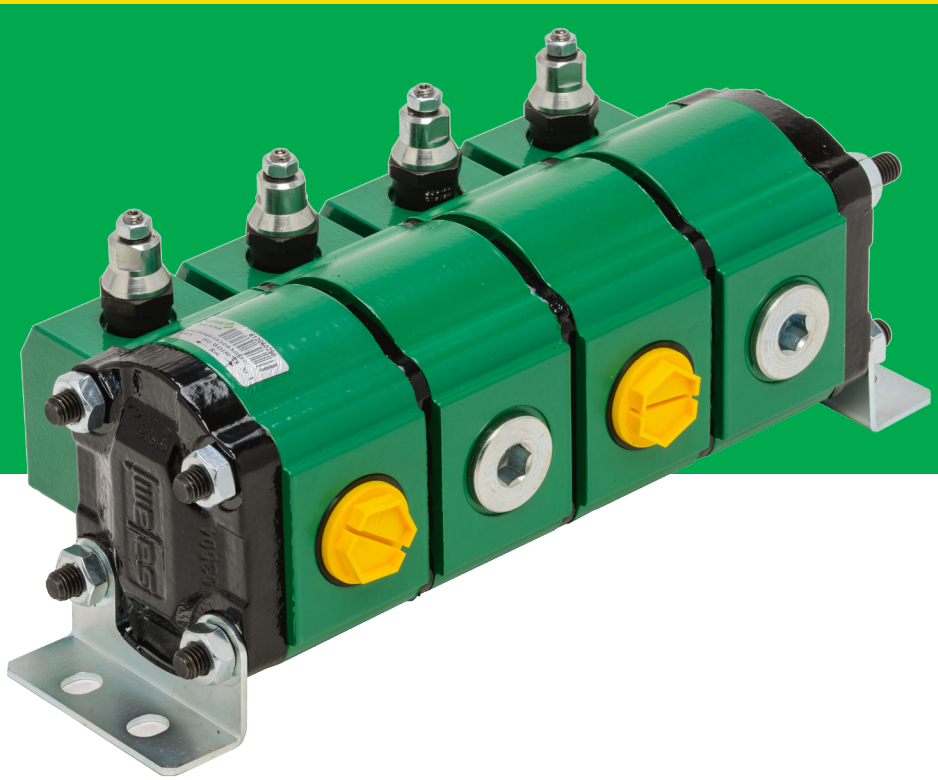
2DRE

Aluminium gear flow dividers

Technical Catalogue

E0.120.1121.02.00IM06



salami®

Final revised edition - November 2021

The data in this catalogue refers to the standard product.The policy of Salami S.p.A. consists of a continuous improvement of its products. It reserves the right to change the specifications of the different products whenever necessary and without giving prior information.
If any doubts, please contact our sales department.

Symbol Designation

INFORMATION:
Indicates reminders and communications to be taken into account for the correct configuration and mounting of the product.

CAUTION:
Indicates the recommendations and rules, to be observed before proceeding with the product's configuration.

REVIEW:
Indicates update or modify data.

Gear Flow Dividers

Aluminium body

Technical Catalogue

E0.100.1121.02.00IM05

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GEAR DIVIDERS

A flow divider is composed by two or more modular elements (stages) with driving gears mechanically linked by an internal coupling sleeve, that causes them to turn at the same speed. Unlike multiple pumps, in which the input power is mechanical (shaft connected to a motor), in a flow divider the input power is hydraulic, i.e. a flow under pressure supplies the modular elements, which are connected to the hydraulic circuits serving the users.

The portion of flow elaborated by each element is determined by its nominal flow rate. Therefore, unlike standard static dividers with variable ports, the flow dividers do not cause dissipation and are much more precise. The use of flow dividers reduces the number of pumps necessary as well as the associated individual mechanical power takeoffs and complex mechanical couplers (with greater losses). The total input power is always equal to the sum of the powers supplied by all elements plus a small power loss, usually negligible.

Therefore, if in a period of time the power required by a hydraulic circuit is equal to zero (inactive drained circuit), the power supplied by the element feeding that circuit becomes available for the other elements, which may use it in their own circuits, also operating at higher pressures than the intake pressure.

Typical applications

Flow dividers

Supply of two or more independent hydraulic circuits by means of a single pump, with an overall flow rate equal to the sum of the flow rates.

Examples of this kind of application:
- lifting platforms and bridges;
- hydraulic bending presses and shearing machines;
- hoisting of freight containers;
- lubrication systems;
- hydraulic opening / closing of gates;
- automatic hydraulically-driven machines;
- actuation of formwork for construction;
- wood processing machinery;
- conveyance of trolleys driven by hydraulic cylinders or motors;
- equipment for the food industry;
- military installations.

Pressure amplifiers

If one line requires higher operating or peak pressure than the others, a flow divider becomes a better solution than a pressure upgrade of all the lines.
With a two-element flow divider the flow can be discharged from the outlet of the first element so that the pressure in the second element becomes higher than the pressure on the main pump.

Examples of this kind of application:
- presses with fast movements
- machine tools

General Features

GEAR FLOW DIVIDERS "E" SERIES
Aluminium Body

WORKING CONDITIONS

- Minimum operating fluid viscosity	12 mm² / sec
- Max starting viscosity	800 mm² / sec
- Suggested fluid viscosity range	17 - 65 mm² / sec
- Fluid operating temperature range	-20 to 80 °C
- Fluid operating temperature range with FPM seals (Viton)	-15 to 110°C
- Fluid operating temperature range with HNBR seals*	-30 to 110°C
- Hydraulic fluid	mineral oil

*Available on request

FILTRATION INDEX RECOMMENDED

Working pressure	**>200 bar/*2900 psi***	**<200 bar/*2900 psi***
Contamination class NAS 1638	9	10
Contamination class ISO 4406	19/18/15	20/19/16
Achieved with filter β_x=75	15 µm	25 µm

For different TECHNICAL DATA, please contact our sales department.

TECHNICAL DATA

Max flow for each inlet section

When the inlet flow exceed the 40 l/min (1.5DRE)
please contact our sales department.

When the flow divider is used as pressure intensifier, the pressure between sections can be higher.

P_1 Max continuous pressure
P_2 Max peak pressure

1.5DRE - Type	Displacement		Max outlet pressure				Max outlet Δp		Speed		Flow per section		Flow per section	
			P_1	P_2	P_1	P_2	between sections		min.	max.	min.	max.	min.	max.
	cm³/ rev	cu.in./ rev	bar	bar	psi	psi	bar	psi	min-1		l/min		gpm	
1.5DRE - 2.8	2.8	*0.17*	250	270	3625	3915	50	725	1200	4500	3.54	13.26	0.93	3.49
1.5DRE - 3.5	3.5	*0.21*	250	270	3625	3915	50	725	1200	4500	4.42	16.58	1.16	4.36
1.5DRE - 4.1	4.1	*0.25*	250	270	3625	3915	50	725	1200	4000	5.18	17.26	1.36	4.54
1.5DRE - 5.2	5.2	*0.32*	230	250	3335	3625	50	725	1200	4000	6.57	21.89	1.73	5.76
1.5DRE - 6.2	6.2	*0.38*	230	250	3335	3625	50	725	1200	3400	7.83	22.19	2.06	5.84
1.5DRE - 7.6	7.6	*0.46*	200	220	2900	3190	50	725	1200	3400	9.60	27.20	2.53	7.16
1.5DRE - 9.3	9.3	*0.57*	180	200	2610	2900	50	725	1200	3000	11.75	29.37	3.09	7.73
1.5DRE - 11	11	*0.67*	170	190	2465	2755	50	725	1200	3000	13.89	34.74	3.66	9.14

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GEAR FLOW DIVIDERS "E" SERIES
Aluminium Body

General Features

TECHNICAL DATA

Max flow for each inlet section

When the inlet flow exceed the 80 l/min (2DRE)
please contact our sales department.

P_1 Max continuous pressure
P_2 Max peak pressure

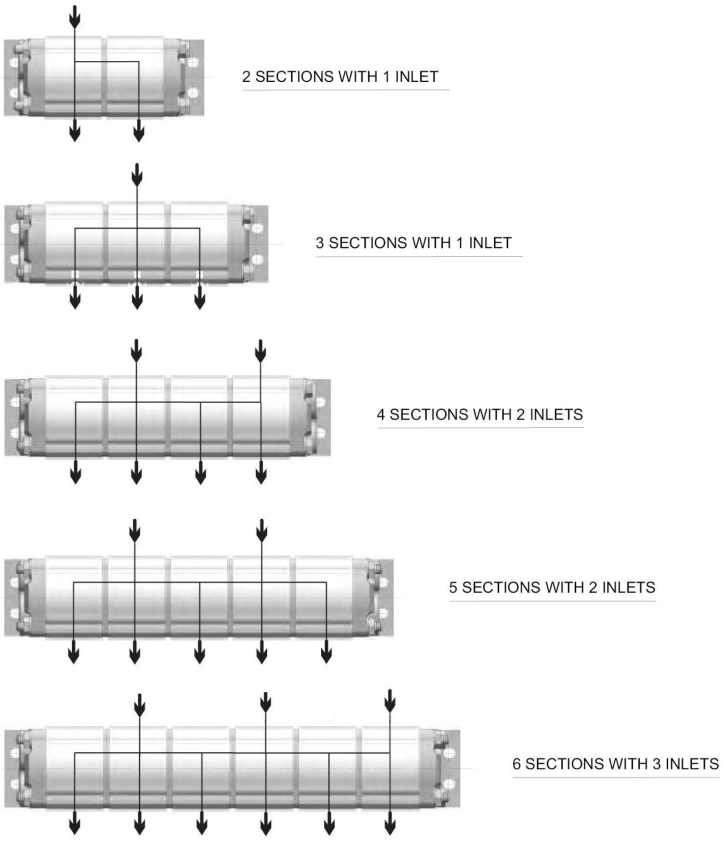
When the flow divider is used as pressure intensifier, the pressure between sections can be higher.

2DRE - Type	Displacement		Max. Outlet Pressure				Max. Outlet Δp		Speed		Flow per section		Flow per section	
			p_1	p_2	p_1	p_2	between sections		min.	max.	min.	max.	min.	max.
	cm^3/ rev	*cu.in./ rev*	bar	bar	psi	psi	bar	psi	min^{-1}		l/min		gpm	
2DRE - 8,3	8.20	*0.50*	250	280	3625	4060	50	725	1200	3600	10.36	31.07	2.73	8.18
2DRE - 10,5	10.60	*0.65*	250	280	3625	4060	50	725	1200	3500	13.39	39.05	3.52	10.28
2DRE - 11,3	11.50	*0.68*	250	280	3625	4060	50	725	1200	3500	14.53	42.37	3.82	11.15
2DRE - 12,5	12.70	*0.77*	250	280	3625	4060	50	725	1200	3400	16.04	45.45	4.22	11.96
2DRE - 13,8	13.80	*0.84*	250	280	3625	4060	50	725	1200	3400	17.43	49.39	4.59	13.00
2DRE - 16	16.60	*1.01*	250	280	3625	4060	50	725	1100	3200	19.22	55.92	5.06	14.71
2DRE - 19	19.40	*1.15*	220	240	3190	3480	50	725	1100	3200	22.46	65.35	5.91	17.20
2DRE - 22,5	22.90	*1.37*	220	240	3190	3480	50	725	1100	3000	26.52	72.32	6.98	19.03
2DRE - 26	25.80	*1.58*	200	220	2900	3190	50	725	1100	2850	29.87	77.40	7.86	20.37
2DRE - 32	32.4	*1.97*	200	220	2900	3190	50	725	1100	2700	34.85	85.55	9.71	22.51

GUIDELINE FOR THE COMBINATION OF THE ELEMENTS

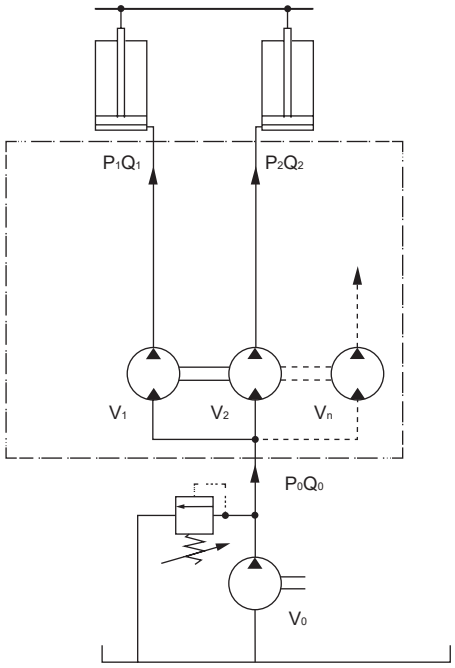
In flow dividers with many inlets, as they are all communicating it is even possible to use only one of them, by plugging the other ones. We suggest to make configurations with one inlet every 80 l/min (for 2DRE) and 40 l/min (for 1.5DRE) of flow elaborated.
For division error less than 4% a maximum level of differencial pressure of 50 bar between elements is suggested.

Number of elements	Number of inlets
2	1
3	1
4	2
5	2
6	3



DISPLACEMENT SELECTION

In order to equalize the flow, it needs to maintain the speed within the suggested speed range, with a Δp max of 50 bar *(725 psi)* between the different stages. Keeping these conditions, we can assure a flow deviation, within ± 2% on the different stages.



- n = number of section
- $V_{1,2...n}$ = displacement sections [cm^3/rev]
- $Q_{1,2...n}$ = flow sections [l/min]
- $P_{1,2...n}$ = pressure sections [bar]
- N = speed [rpm]
- $Q_0 = Q_1+Q_2+ \ldots +Q_n$ pump flow [l/min]
- $P_0Q_0 = P_1Q_1+P_2Q_2+\ldots+P_nQ_n$

$$V_i = \frac{1000 Q_i}{N}$$

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CALCULATION EXAMPLE

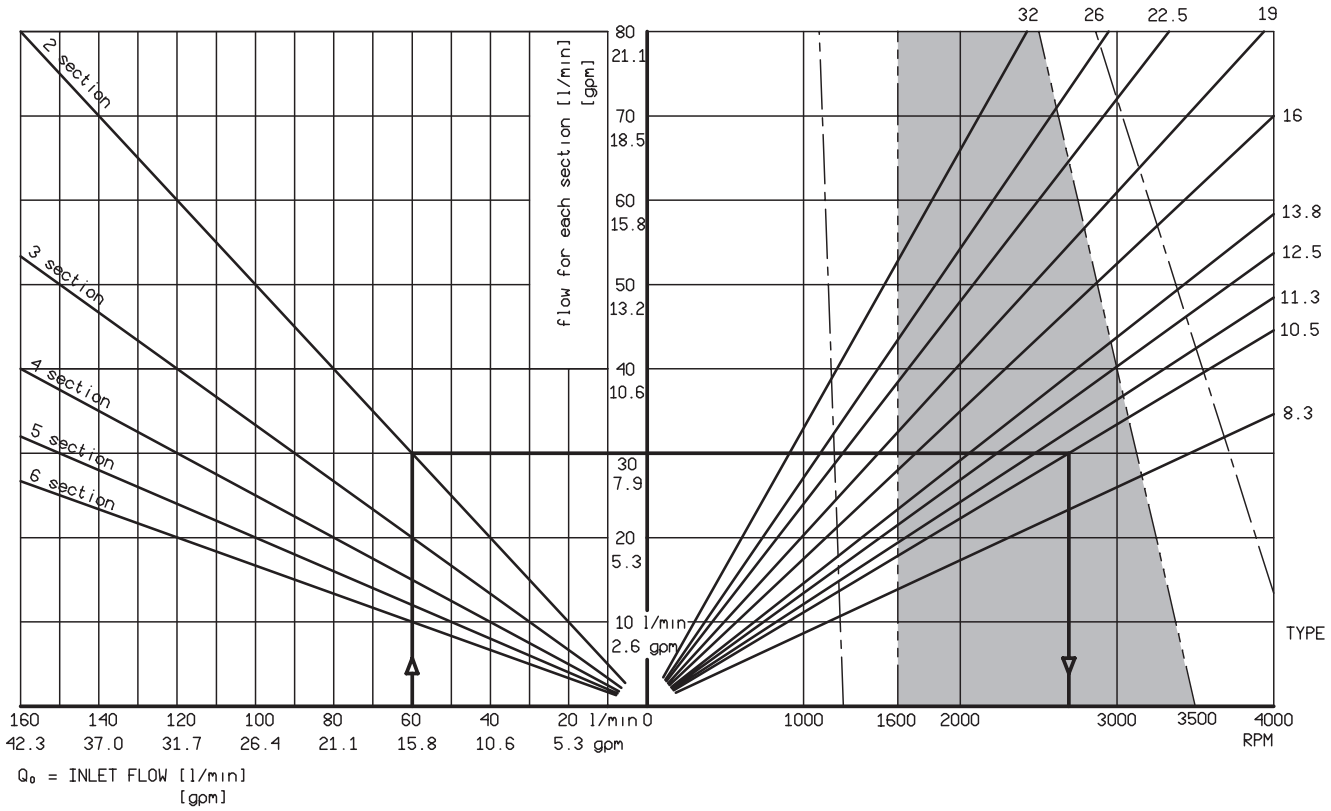
Flow equalizer:
suppose we have to supply two cylinders, both with the same flow of 30l/min.
The flow equalizer's inlet flow Q0, delivered by the pump, will be 60l/min.
Follow the vertical line corresponding to the inlet flow of 60l/min up to cross the line which matches the 2 stages flow divider. Then we trace an horizontal line matching the flow of 30l/min for each stage on the Y axis up to the recommended speeds area where we intercept the line corresponding to the displacement of 10.5 cm^3.
We suggest you to choice the displacement with the highest rpm, within the recommended speeds area.

Flow divider:
suppose we have to supply two cylinders, the one with the flow of 30 l/min, the other with 50 l/min.
The flow equalizer inlet flow Q0, delivered by the pump, will be 60 l/min.
Starting from the Y axis, we trace 2 horizontal lines corresponding to the flows of 30 l/min and 25 l/min until we intercept the displacement lines with the highest value of rpm, within the recommended speeds area.

Pressure intensifier:
The working principle of rotary flow dividers do not dissipate energy, in fact if the pressure of outlet line of one stage is lower than the inlet pressure, this stage works as a motor and uses the the energy of the inlet flow. This energy is not wasted but transferred, by the common shaft, to the other stage which operate as a pump therefore the outlet pressure will be higher than the inlet pressure.

FLOW EQUALIZER

All the data here showed were carried out with mineral oil at the temperature at 50°C with viscosity of 21 cSt



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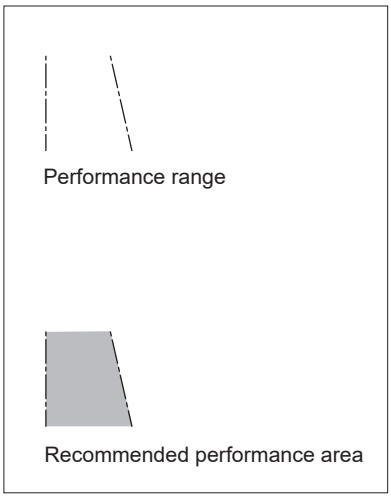
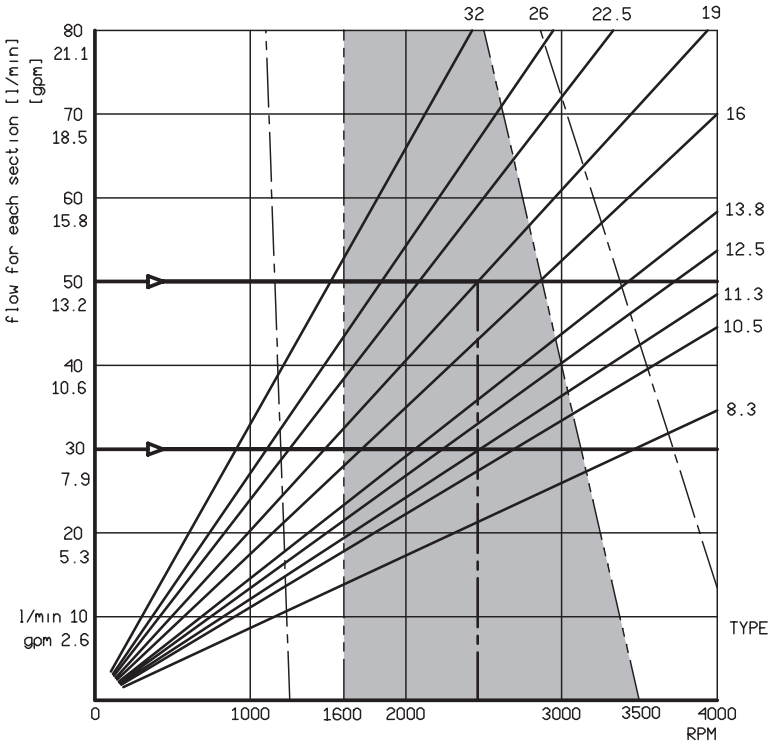
2DRE

GEAR FLOW DIVIDERS "E" SERIES
Aluminium Body

FLOW DIVIDER





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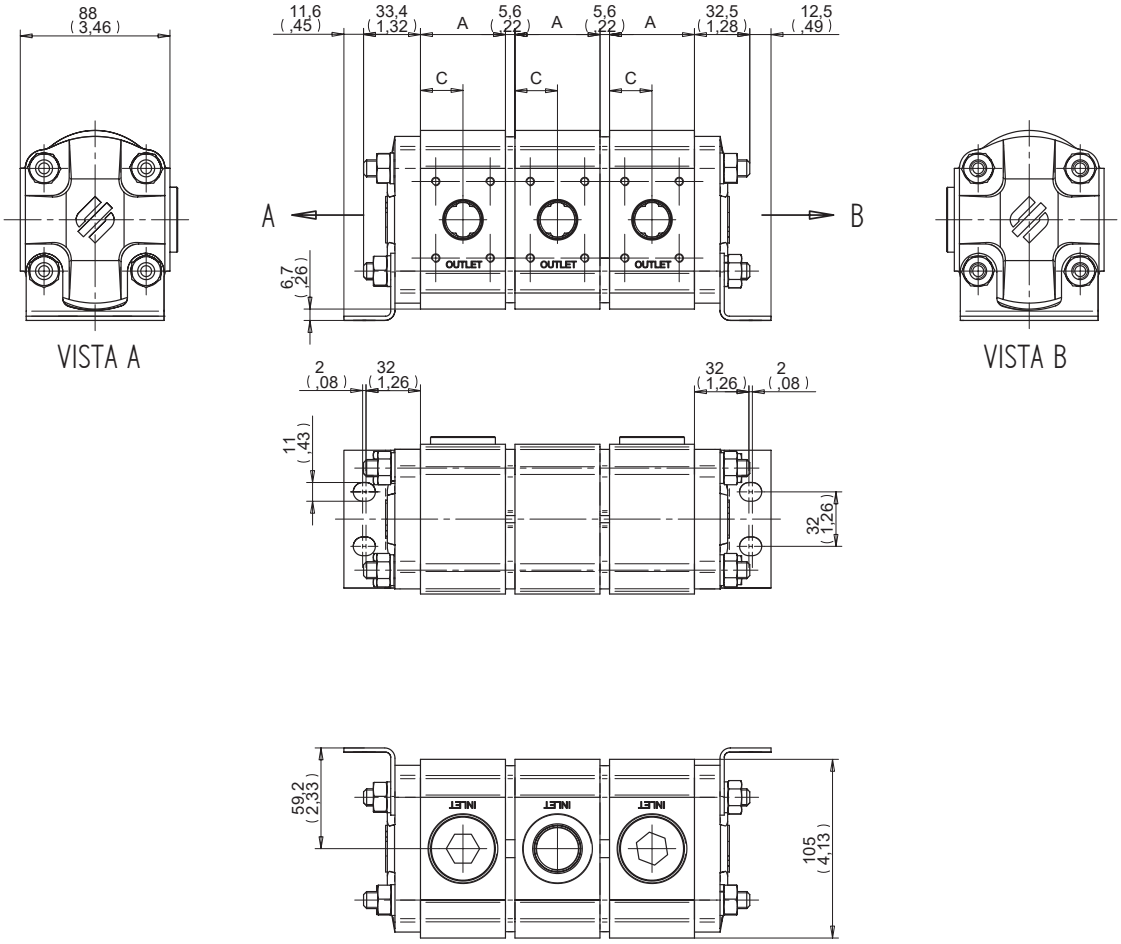
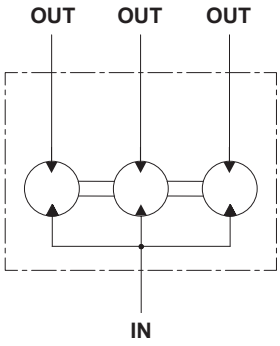
ASSEMBLING DIMENSIONS
BASIC RELEASE



Type	Dimension A		Dimension C	
	mm	*in*	mm	*in*
2DRE - 8,3	52.8	*2.07*	26.4	*1.04*
2DRE - 10,5	56.3	*2.22*	28.15	*1.11*
2DRE - 11,3	59.7	*2.35*	29.85	*1.17*
2DRE - 12,5	59.7	*2.35*	29.85	*1.17*
2DRE - 13,8	63.5	*2.5*	31.75	*1.25*
2DRE - 16	67.5	*2.65*	33.75	*1.33*
2DRE - 19	75.6	*2.97*	37.8	*1.49*
2DRE - 22,5	81	*3.19*	40.5	*1.59*
2DRE - 26	86.8	*3.42*	43.4	*1.71*
2DRE - 32	95	*3.74*	47.5	*1.87*



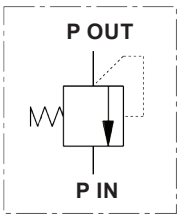
2DRE

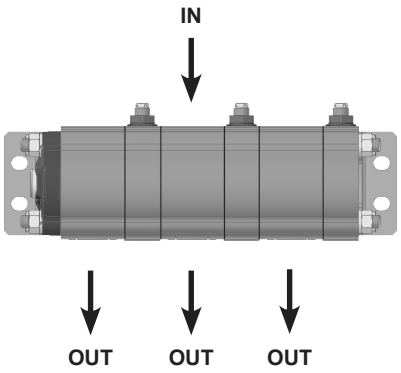
GEAR FLOW DIVIDERS "E" SERIES
Aluminium Body

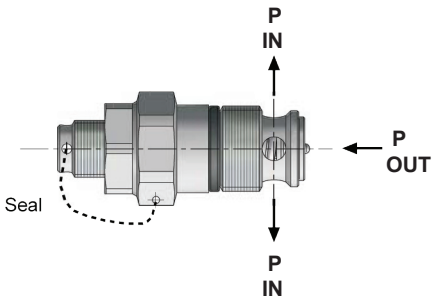
VALVES

VA

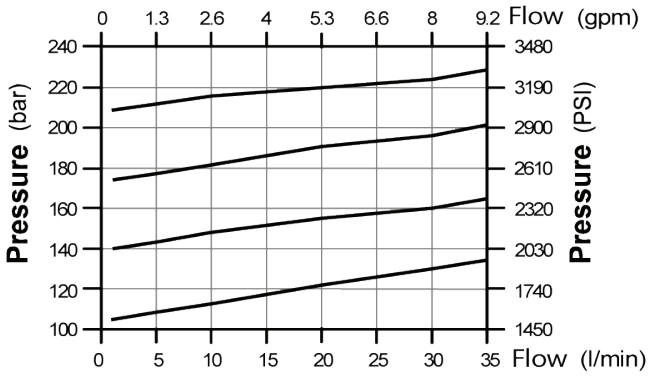
Overload valve (setting 70 bar - *1015 psi*)





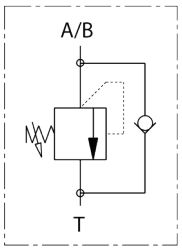


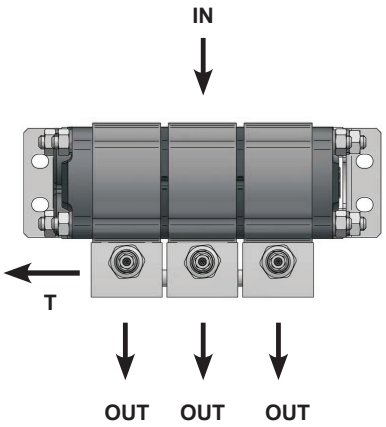
Overload valve allow the actuators to realign at the end of each cycle, discharging the overflow in the inlet line of the divider, for this reason they are setting at 70 bar.

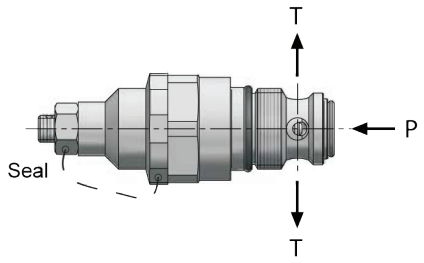


AR

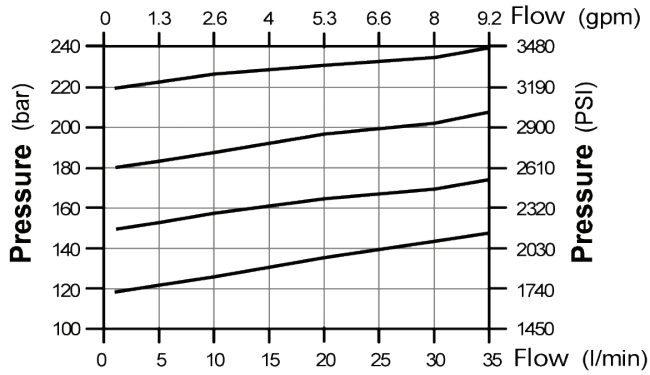
Overload and anticavitation valve (setting range from 50 to 275 bar - *725 to 4000 psi*)

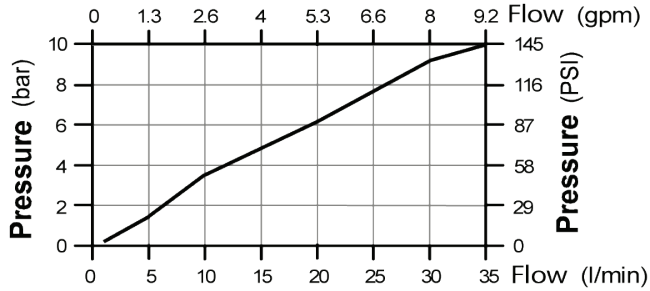






Overload and anticavitation valve allow the actuators to realign at the end of each cycle, discharging the overflow to tank, in addition the relief valve acts as check valve and opens to prevent cavitation.





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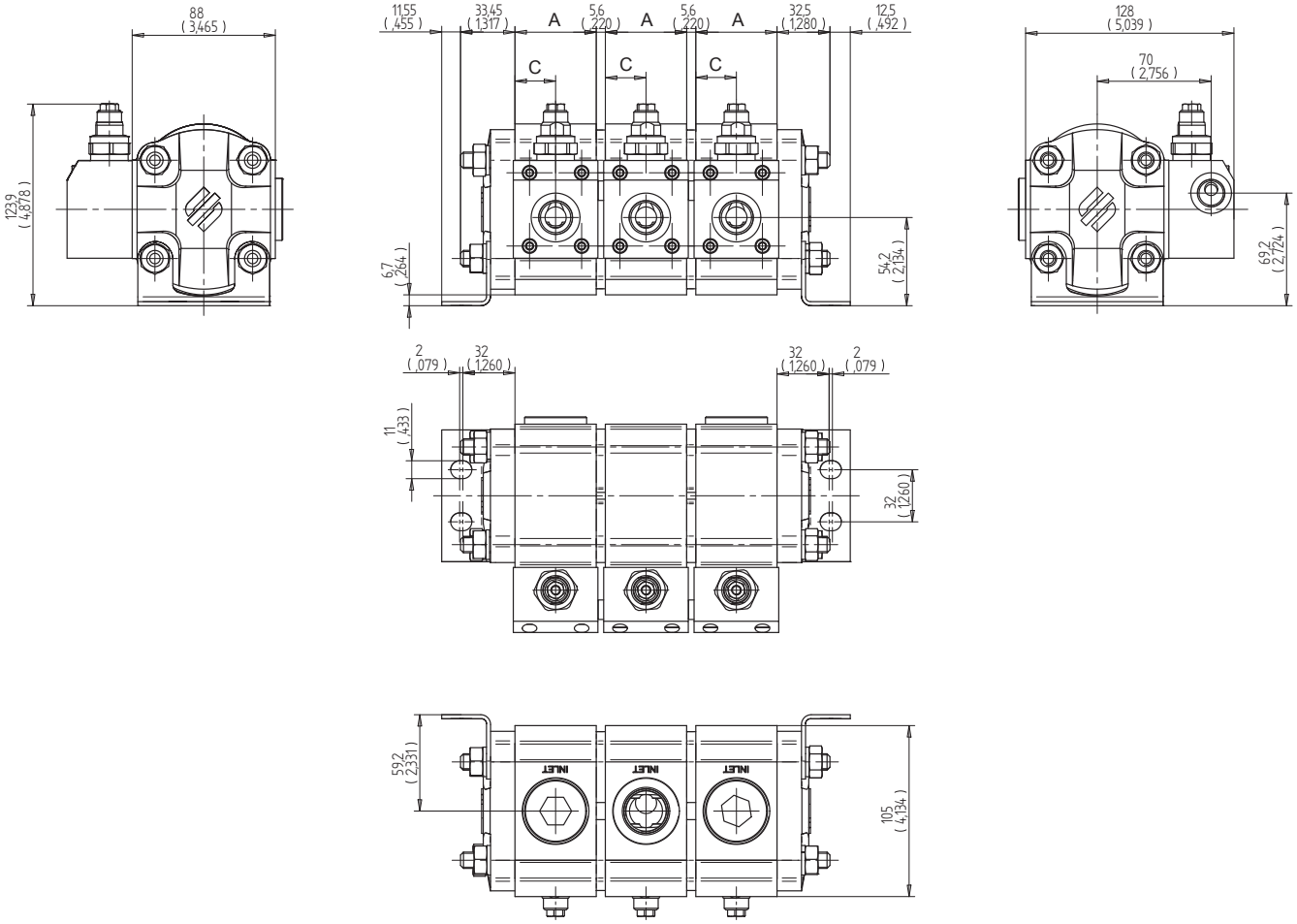
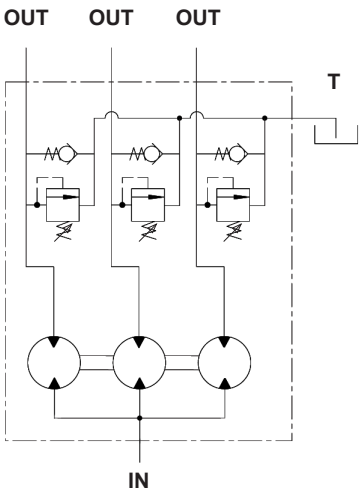
ASSEMBLING DIMENSIONS-2DRE-AR

RELEASE WITH VALVES/EXTERNAL DISCHARGE





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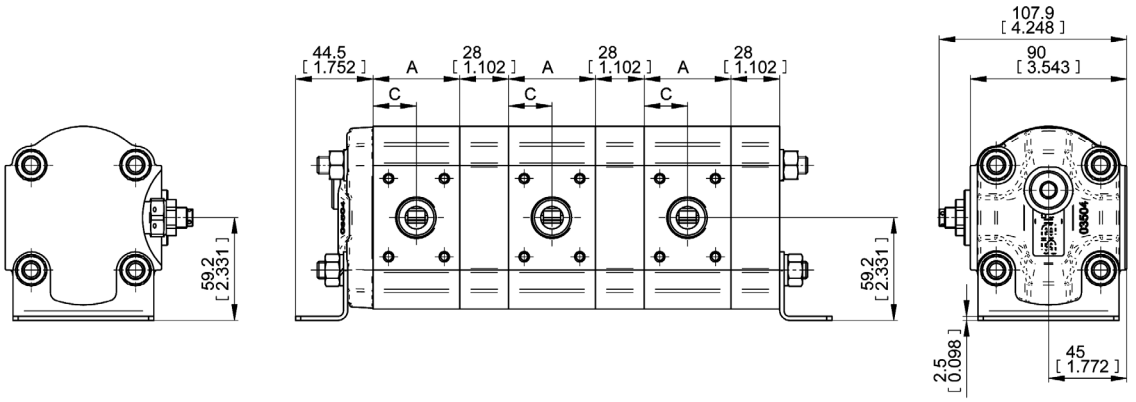
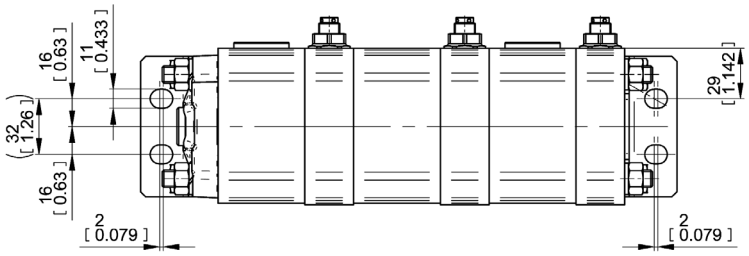
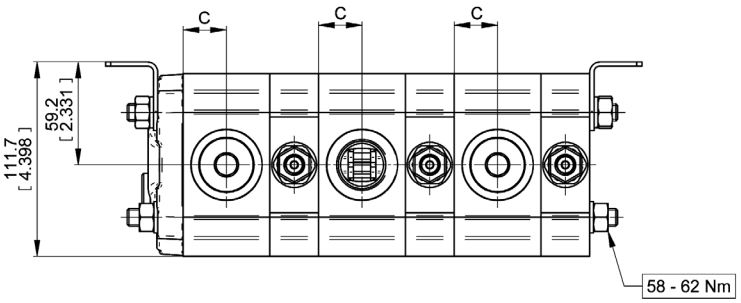
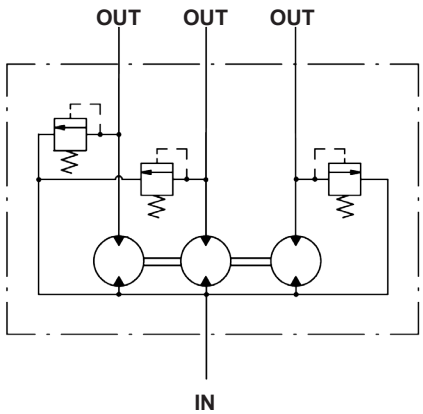
ASSEMBLING DIMENSIONS-2DRE-VA

RELEASE WITH VALVES/INTERNAL BY PASS









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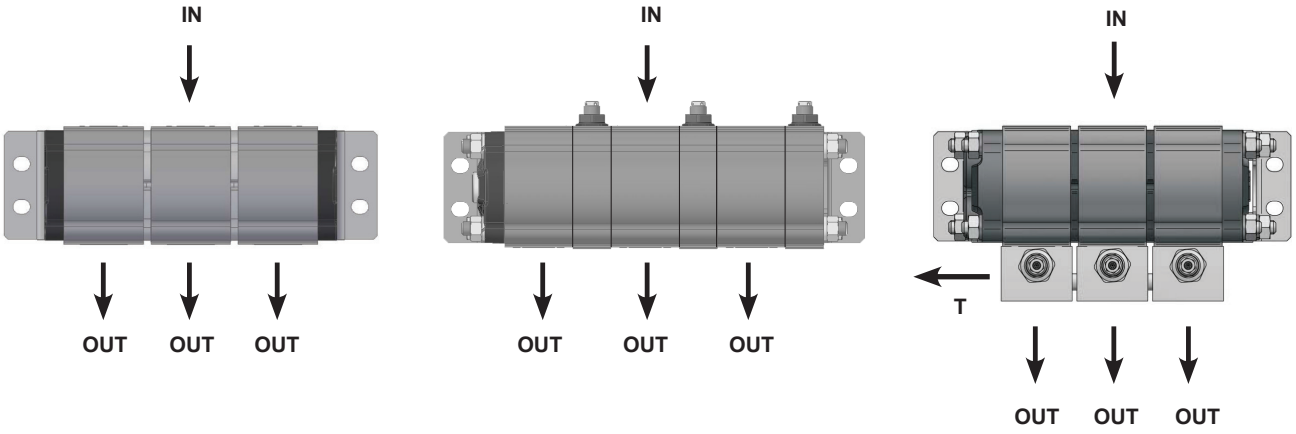
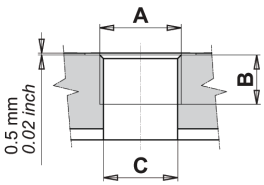
GEAR FLOW DIVIDERS "E" SERIES
Aluminium Body

2DRE

THREADED PORTS



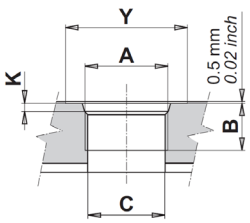
PORTS	BSPP			ODT		
TYPE	IN	OUT	T	IN	OUT	T
2DRE - 8,3	G3/4	G1/2	G3/8	1-1/16-12 UN (SAE 12)	7/8-14 UNF (SAE 10)	9/16-18 UNF (SAE 6)
2DRE - 10,5						
2DRE - 11,3						
2DRE - 12,5						
2DRE - 13,8						
2DRE - 16						
2DRE - 19						
2DRE - 22,5						
2DRE - 26						
2DRE - 32						



code G

Threaded ports
GAS (BSPP)

INLET			OUTLET		
A	B	C	A	B	C
G3/4	16 *(0.62")*	20 *(0.78")*	G1/2	15 *(0.58")*	



code R

Threaded ports
SAE (ODT)

INLET					OUTLET				
A	B	C	Y	K	A	B	C	Y	K
1-1/16-12 UN (SAE 12)	19 *(0.74")*	20 *(0.78")*	41 *(1.16")*	3.3 *(0.12")*	7/8-14 UNF (SAE 10)	14 *(0.54")*	15 *(0.58")*	34 *(1.34")*	2.5 *(0.10")*

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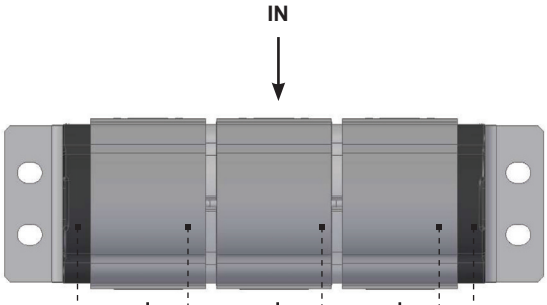
How to order-2DRE

GEAR FLOW DIVIDERS "E" SERIES
Aluminium Body

FLOW DIVIDERS
BASIC RELEASE



2DRE	/	A	-	B	/	C	D	/	C	D	/	C	D	/	B	-	E

PORTS (page 235)	CODES A
GAS threaded ports (BSPP)	G
SAE threaded ports (ODT)	R

COVERS	CODES B
Without inlet port	0
With inlet port	1

DISPLACEMENTS		CODES C
8.2 cm³/rev.	*0.50 cu.in/rev.*	8.3
10.6 cm³/rev.	*0.65 cu.in/rev.*	10.5
11.5 cm³/rev.	*0.68 cu.in/rev.*	11.3
12.7 cm³/rev.	*0.77 cu.in/rev.*	12.5
13.8 cm³/rev.	*0.84 cu.in/rev.*	13.8
16.6 cm³/rev.	*1.01 cu.in/rev.*	16
19.4 cm³/rev.	*1.15 cu.in/rev.*	19
22.9 cm³/rev.	*1.37 cu.in/rev.*	22.5
25.8 cm³/rev.	*1.58 cu.in/rev.*	26
32.4 cm³/rev.	*1.97 cu.in/rev.*	32

E SEAL	CODE
Buna standard	
Viton	V

D BODIES	CODES
Body with outlet port only	O
Body with inlet and outlet ports	IO

Order example: 2DRE (type), ports GAS (G), cover without inlet ports (0), displacement (8.3), outlet port (O) or inlet and outlet ports (IO), cover without inlet ports (0) .
2DRE/G-0/8.3O/8.3IO/8.3O/0

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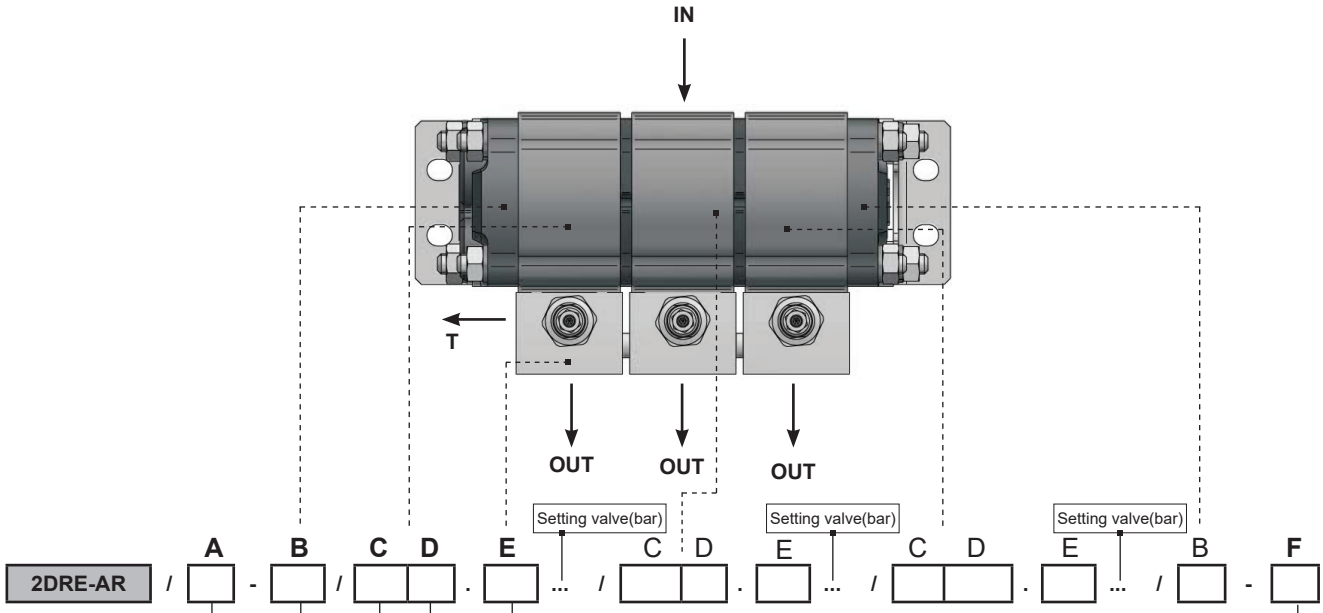
FLOW DIVIDERS
2DRE-AR



2DRE-AR / A - B / C D . E ... / C D . E ... / C D . E ... / B - F

Setting valve(bar) Setting valve(bar) Setting valve(bar)

PORTS (page 235)	CODES A
GAS threaded ports (BSPP)	G
SAE threaded ports (ODT)	R

COVERS	CODES B
Without inlet port	0
With inlet port	1

DISPLACEMENTS		CODES C
8.2 cm³/rev.	*0.50 cu.in/rev.*	8.3
10.6 cm³/rev.	*0.65 cu.in/rev.*	10.5
11.5 cm³/rev.	*0.68 cu.in/rev.*	11.3
12.7 cm³/rev.	*0.77 cu.in/rev.*	12.5
13.8 cm³/rev.	*0.84 cu.in/rev.*	13.8
16.6 cm³/rev.	*1.01 cu.in/rev.*	16
19.4 cm³/rev.	*1.15 cu.in/rev.*	19
22.9 cm³/rev.	*1.37 cu.in/rev.*	22.5
25.8 cm³/rev.	*1.58 cu.in/rev.*	26
32.4 cm³/rev.	*1.97 cu.in/rev.*	32

BODIES	CODES D
Body with outlet port only	O
Body with inlet and outlet ports	IO

F SEAL	CODE
Buna standard	
Viton	V

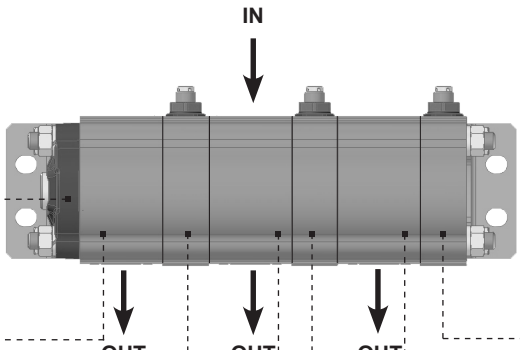
E VALVE	CODE
Overload and anti-cavitation valve	AR

Order example: 2DRE-AR (type), ports GAS (G), cover without inlet ports (0), displacement (8.3), outlet port (O) or inlet and outlet ports (IO), type of valve (AR), setting valve (175 bar), cover without inlet ports (0) .
2DRE-AR/G-0/8.3O.AR175/8.3IO.AR175/8.3O.AR175/0

How to order-2DRE

GEAR FLOW DIVIDERS "E" SERIES
Aluminium Body

FLOW DIVIDERS
2DRE-VA



2DRE-VA / A - B / C D / E / C D / E / C D / F - G

PORTS (page 235)	CODES A
GAS threaded ports (BSPP)	G
SAE threaded ports (ODT)	R

COVERS	CODES B
Without inlet port	0
With inlet port	1

DISPLACEMENTS		CODES C
8.2 cm³/rev.	*0.50 cu.in/rev.*	8.3
10.6 cm³/rev.	*0.65 cu.in/rev.*	10.5
11.5 cm³/rev.	*0.68 cu.in/rev.*	11.3
12.7 cm³/rev.	*0.77 cu.in/rev.*	12.5
13.8 cm³/rev.	*0.84 cu.in/rev.*	13.8
16.6 cm³/rev.	*1.01 cu.in/rev.*	16
19.4 cm³/rev.	*1.15 cu.in/rev.*	19
22.9 cm³/rev.	*1.37 cu.in/rev.*	22.5
25.8 cm³/rev.	*1.58 cu.in/rev.*	26
32.4 cm³/rev.	*1.97 cu.in/rev.*	32

G SEAL	CODE
Buna standard	
Viton	V

F END PLATE	CODE
Pre-arranged for Overload valve 70 bar VA	2VA70

E MID PLATE	CODE
Pre-arranged for Overload valve 70 bar VA	3VA70

D BODIES	CODES
Body with outlet port only	O
Body with inlet and outlet ports	IO

Order example: 2DRE-VA (type), ports GAS (G), cover without inlet ports (0), displacement (8.3), outlet port (O) or inlet and outlet ports (IO), mid plate pre-arranged for valve VA (3), end plate pre-arranged for valve VA (2).
2DRE-VA/G-0/8.3IO/3VA70/8.3IO/3VA70/8.3O/2VA70

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