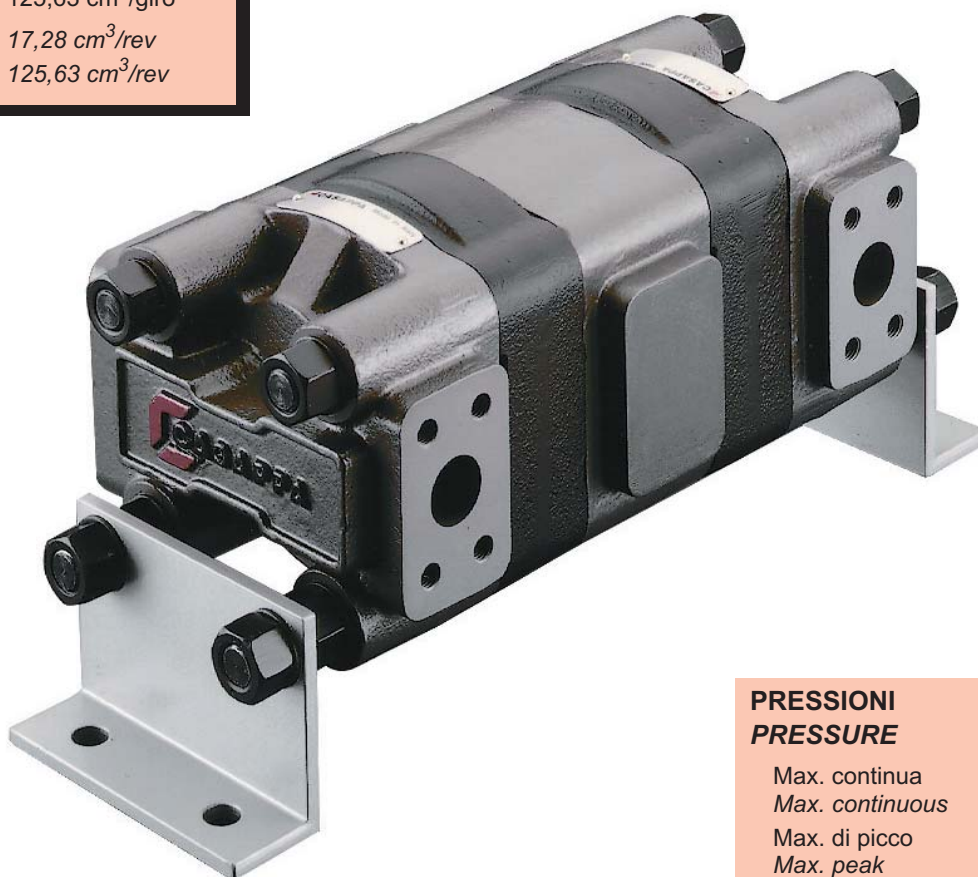




Divisori di flusso Gear flow dividers

CILINDRATE DISPLACEMENTS

Da	17,28 cm ³ /giro
A	125,63 cm ³ /giro
From	17,28 cm ³ /rev
To	125,63 cm ³ /rev



PRESSIONI PRESSURE

Max. continua <i>Max. continuous</i>	310 bar
Max. di picco <i>Max. peak</i>	335 bar

- Progetto modulare
Modular design
- Precisione di divisione
Accurate division of flow
- Portate elevate
High flow
- Combinazioni tra gruppi diversi
Combination between different groups



INDICE
Index

ARGOMENTO Sections	DA PAG. from page	A PAG. to page
CARATTERISTICHE GENERALI Features	1.2	1.4
PARAMETRI DI FUNZIONAMENTO General data	1.5	1.5
EQUALIZZATORI DI FLUSSO Flow equalizers	1.6	1.7
DIVISORI DI FLUSSO Flow dividers	1.8	1.9
INTENSIFICATORI DI PRESSIONE Pressure intensifiers	1.10	1.11
NOTE SULLA COMPOSIZIONE Notes about composition	1.12	1.12
COMPOSIZIONE STANDARD Standard composition	1.12	1.13
BOCCHIE Ports	1.14	1.15
DIMENSIONI Dimensions	1.16	1.17
CIRCUITI TIPICI Typical circuits	1.18	1.20
RACCORDI SAE SAE port connectors	1.21	1.28
COME ORDINARE How to order	1.29	1.30

CARATTERISTICHE GENERALI

Features

Le macchine moderne caratterizzate da cinatismi complessi richiedono spesso azionamenti multipli, separati ed indipendenti l'uno dall'altro. Dove è necessario equalizzare il flusso, dividerlo opportunamente o lavorare con pressioni elevate, la **CASAPPA** oleodinamica, propone la sua vasta gamma di divisori **MAGNUM 30** e **MAGNUM 35** per trasmettere potenza con soluzioni tecnicamente razionali ed economicamente interessanti. Questi componenti infatti, se opportunamente impiegati, consentono di ottimizzare i circuiti idraulici ed aumentare la durata della pompa principale, riducendo i costi di installazione e di esercizio. Consistono in due o più sezioni collegate internamente con un'albero comune pertanto rimane costante il rapporto fra le portate circolanti all'interno di ogni elemento, proporzionali alle cilindrata dell'elemento medesimo, escludendo le variazioni di rendimento volumetrico. I divisori di flusso sono componenti non dissipativi; infatti se all'uscita di una sezione la pressione risulta più bassa di quella in entrata, la sezione si comporta come un motore e preleva energia dal fluido. L'energia così prelevata non viene dissipata in calore, ma tramite l'albero comune, viene utilizzata in altre sezioni, funzionanti come pompe, in cui la pressione di uscita è superiore a quella di entrata. Questi componenti possono essere impiegati come:

EQUALIZZATORI DI FLUSSO

DIVISORI DI FLUSSO

INTENSIFICATORI DI PRESSIONE

Modern machinery with complex kinematics often calls for multiple movements that are separate and fully independent of each other. In flow equalization and flow division applications and for high pressure actuation, **CASAPPA** hydraulics respond with their comprehensive **MAGNUM 30** and **MAGNUM 35** range of flow dividing gear motors to transmit fluid power using rational technical solutions and at low costs. When these rotary flow dividers are used for the correct applications they permit the optimization of hydraulic circuits and improve pump life, thereby reducing installation and operating costs. The **MAGNUM** series of rotary flow dividers comprise two or more independent gear sections internally connected by a common shaft so that the ratio of the output flow from each section is proportional and constant to its individual displacement capacity, excluding small losses in volumetric efficiency. Rotary flow dividers do not dissipate energy. If the outlet pressure from a given section should fall below the inlet pressure then the section will act as a motor and absorb energy from the fluid. This energy is not then wasted in the form of heat, instead it is transferred via the common shaft to the other sections which will continue to pump since their outlet pressure is higher than their inlet pressure. These components can be used as:

FLOW EQUALIZERS

FLOW DIVIDERS

PRESSURE INTENSIFIERS

Fluido idraulico	Fluidi idraulici a base di oli minerali, secondo le norme ISO/DIN e fluidi resistenti al fuoco [vedi tab. (1)]. Per altri fluidi consultare il nostro servizio tecnico commerciale.
Temperatura fluido	Da -25 a +110 °C
Campo di viscosita'	Da 12 a 100 mm ² /s.(cSt) consigliato Fino a 750 mm ² /s (cSt) consentito
Filtrazione consigliata	Vedi tabella (2)

Tab. 1

Tipo	Composizione fluido	Pressione max [bar]	Velocità max [min ⁻¹]	Temperatura [°C]	Guarnizioni
ISO/DIN	Fluidi a base di oli minerali, secondo le norme ISO/DIN	Vedi pag. 1.5	Vedi pag. 1.5	-25 ÷ +80	N
				-25 ÷ +110	V
HFA	Emulsione di olio in acqua 5 ÷ 15 % di olio	50	1500	2 ÷ 55	N
HFB	Emulsione di acqua in olio 40 % di acqua	120	1500	2 ÷ 60	
HFC	Acqua - glicoli	70	1500	-20 ÷ +60	
HFD	Esteri fosforici	150	1500	-10 ÷ +80	E

Tab.2

Δp [bar]	> 200	< 200
Contaminazione classe NAS 1638	8	10
Contaminazione classe ISO 4406	17/14	19/16
Da ottenere con filtro βx=75	10 μm	25 μm

Fluid	Mineral oil based hydraulic fluids to ISO/DIN and fire resistant fluids [see table (1)]. For other fluids please consult our sales department.
Fluid temperature range	From -25 to +110 °C
Viscosity range	12 up to 100 mm ² /s (cSt) recommended
	Up to 750 mm ² /s (cSt) permitted
Filter recommendations	See table (2)

Tab. 1					
Type	Fluid composition	Max pressure [bar]	Max speed [min ⁻¹]	Temperature [°C]	Seals
ISO/DIN	Mineral oil based hydraulic fluid to ISO/DIN	See page 1.5	See page 1.5	-25 ÷ +80	N
				-25 ÷ +110	V
HFA	Oil emulsion in water 5 ÷ 15 % of oil	50	1500	2 ÷ 55	N
HFB	Water emulsion in oil 40 % of water	120	1500	2 ÷ 60	
HFC	Water - glycol	70	1500	-20 ÷ +60	
HFD	Phosphate esters	150	1500	-10 ÷ +80	E

Tab.2		
Δp [bar]	> 200	< 200
Contamination class NAS 1638	8	10
Contamination class ISO 4406	17/14	19/16
Achieved with filter β _x =75	10 μm	25 μm

PARAMETRI DI FUNZIONAMENTO
General data

Tipo Type	Cilindrata	Pressione max. Max pressure		Velocità max	Velocità min
	Displacement	p ₁	p ₂	Max speed	Min speed
	cm ³ /giro cu in/rev	bar psi		min ⁻¹	
HDD 30•17	17,20 1.05	310 4500	335 4800	3000	500
HDD 30•22	21,89 1.33				
HDD 30•27	26,58 1.62				
HDD 30•34	34,39 2.09				
HDD 30•43	43,77 2.67				
HDD 30•51	51,59 3.14			2500	
HDD 30•61	60,97 3.72				
HDD 30•73	73,47 4.48			2000	
HDD 30•82	81,29 4.96				
HDD 35•50	50,77 3.09	310 4500	335 4800	3000	500
HDD 35•63	63,46 3.87				
HDD 35•71	71,92 4.38				
HDD 35•80	80,39 4.90				
HDD 35•90	90,96 5.55			2700	
HDD 35•100	99,43 6.06				
HDD 35•112	112,12 6.84				
HDD 35•125	124,81 7.61				

p₁= Pressione max. continua
Max. continuous pressure

p₂= Pressione max. di punta
Max. peak pressure

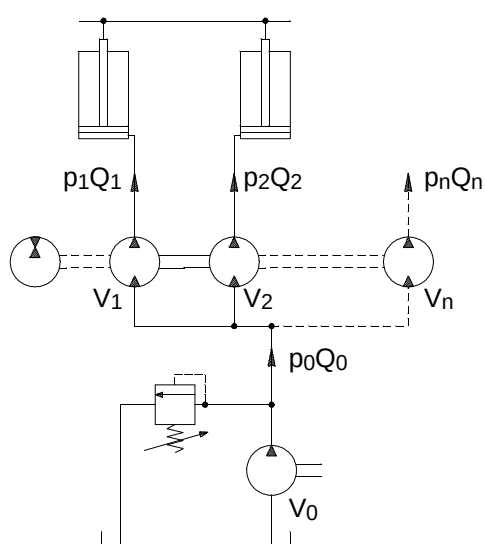
Nota : Nelle seguenti pagine troverete diagrammi che vi permetteranno di dimensionare i vostri gruppi.
Note : Diagrams providing selection data will be found on subsequent pages.

EQUALIZZATORI DI FLUSSO

Flow equalizers

Sono impiegati dove è necessario dividere il flusso in parti uguali garantendo una differenza massima di sincronismo del $\pm 2\%$. Per ottenere il sincronismo occorrono portate uguali quindi devono essere composti da sezioni di cilindrata uguale. Quando si azionano in sincronismo più cilindri a semplice effetto, che agiscono su carichi aventi peso proprio non sufficiente a vincere le resistenze del circuito, si consiglia aggiungere all'equalizzatore di flusso, una sezione che funziona come motore per garantire il rientro dei cilindri. La cilindrata della sezione motore, può essere dello stesso gruppo delle sezioni dell'equalizzatore o di gruppo diverso, ma deve essere circa uguale alla somma delle cilindrato delle altre sezioni. A pag.5.18 sono riportati due circuiti tipici che utilizzano gli equalizzatori di flusso.

Flow dividing gear motors are suited for applications where the flow must be divided equally with maximum actuator synchronization difference of $\pm 2\%$. In order to obtain synchronous operation the displacements of the gear sections must be identical. When several single acting cylinders are operated together, acting on loads have not sufficient mass to win the circuit's resistance, we recommend the flow equalizer must be supplemented by a further gear section acting as a motor in order to guarantee the cylinders retract. The displacement of this motor section can be in the same group as the sections of the equalizer or of a different group, but it should be roughly equal to the sum of the displacements of the other sections. Two typical circuit diagrams of applications where flow equalizers are utilized will be found on page 5.18.



V = Cilindrata - Displacement [cm³/giro] - [cm³/rev]

Q = Portata - Delivery [l/min]

p = Pressione - Pressure [bar]

n = Velocità - Speed [min⁻¹]

$$V_1 = V_2 \dots = V_n$$

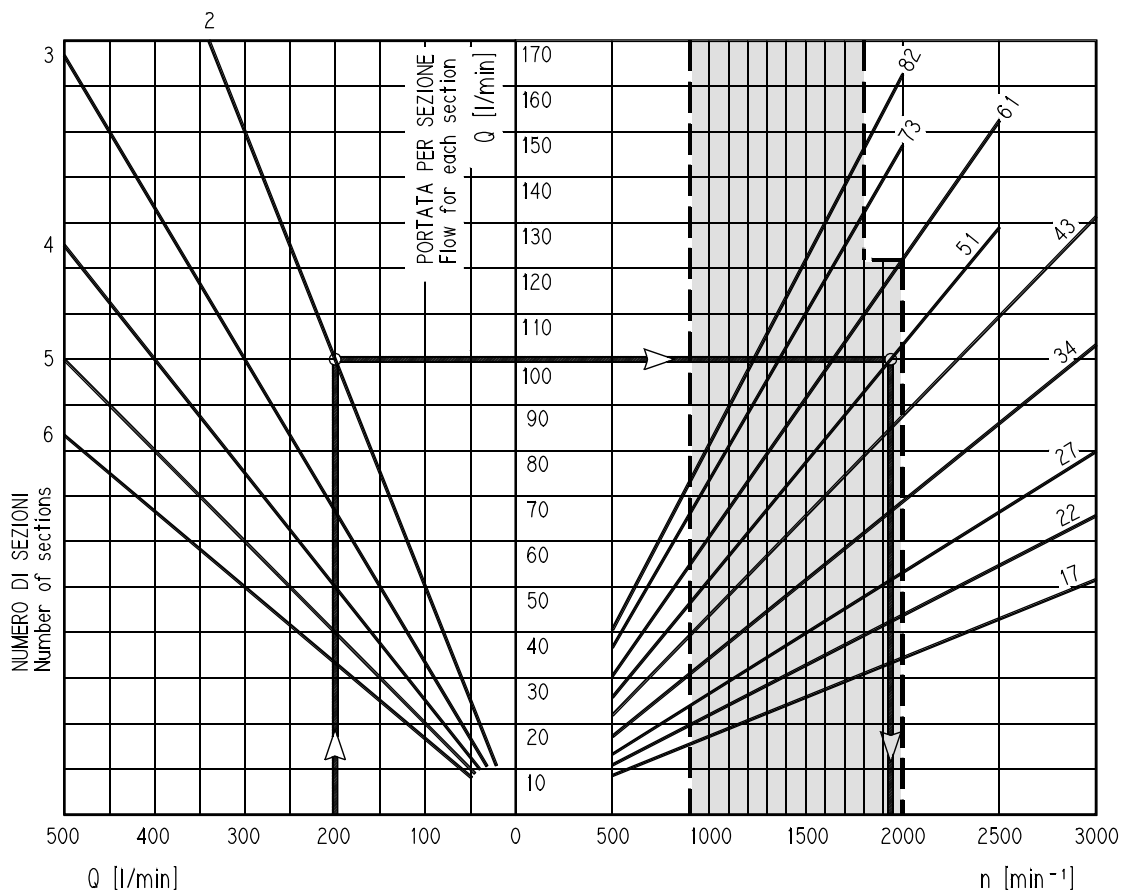
$$Q_0 = Q_1 + Q_2 \dots + Q_n$$

$$p_0 Q_0 = p_1 Q_1 + p_2 Q_2 \dots + p_n Q_n$$

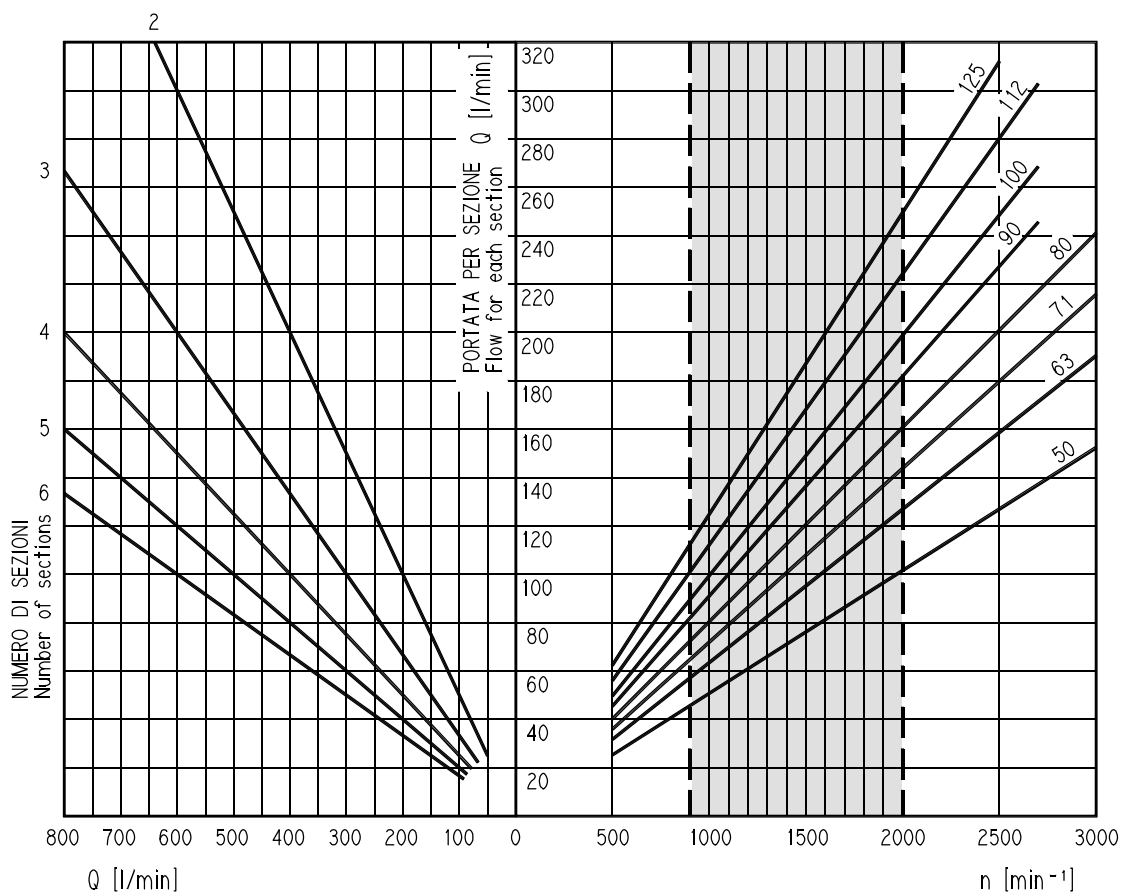
Supponiamo di dovere alimentare due utilizzi che richiedono una portata di 100 [l/min] ciascuno. Ipotizzando di lavorare in assenza di perdite e trascurando la comprimibilità del fluido, la portata che deve fornire la pompa è: $Q_0 = Q_1 + Q_2 = 200$ [l/min]. Per determinare la cilindrata delle due sezioni dell'equalizzatore di flusso, optando per la scelta del gruppo HDD 30, basta entrare nel diagramma sull'asse delle ascisse in corrispondenza della portata di 200 [l/min], salire verticalmente fino ad incontrare la linea relativa al numero di sezioni (2); da questo punto, proseguire orizzontalmente verso destra fino ad incontrare le linee relative alle cilindrato. Scegliere la cilindrata il cui punto di intersezione risulta più vicino possibile al limite massimo di velocità del campo di funzionamento ottimale.

Let us assume that it is necessary to supply power to two services that require a flow rate of 100 [l/min] each. For simplicity's sake we will ignore pressure losses and the compression factor of the fluid. The pump must deliver a flow equal to: $Q_0 = Q_1 + Q_2 = 200$ [l/min]. To find the displacement of the two sections of the flow equalizer, assuming group HDD 30 is to be used, simply locate the flow rate 200 [l/min] on the X axis and then ascend vertically until the line corresponding to the number of sections (2) is encountered; now trace a horizontal line to the right until encountering the lines referring to displacement. Select the displacement with the point of intersection on the graph that lies nearest to the maximum speed for the optimum performance range.

HDD 30



HDD 35



Campo di funzionamento ottimale
Range for optimum performance

Le curve sono state ottenute alla temperatura di 50°C, utilizzando olio con viscosità 36 mm²/s a 40°C.

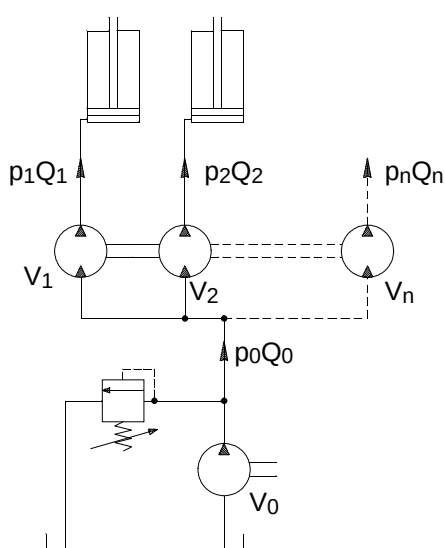
Each curve has been obtained at 50°C, using oil with viscosity 36 mm²/s at 40°C and at these pressures.

DIVISORI DI FLUSSO

Flow dividers

Sono impiegati dove è necessario alimentare con la stessa pompa diversi utilizzi che richiedono portate e pressioni differenti. La cilindrata di ogni sezione, deve essere proporzionale alla portata richiesta dall'utilizzo. A pag. 5.19 sono riportati due circuiti tipici che utilizzano i divisori di flusso.

These flow dividers are used where the same pump must drive several different services requiring different pressures and flow rates. The displacement of each section must be proportional to the flow rate required by the service to which it is connected. Two typical circuits in which flow dividers are installed will be found on page 5.19.



V = Cilindrata - Displacement	[cm ³ /giro] - [cm ³ /rev]
Q = Portata - Delivery	[l/min]
p = Pressione - Pressure	[bar]
n = Velocità - Speed	[min ⁻¹]

$$Q_0 = Q_1 + Q_2 \dots + Q_n$$

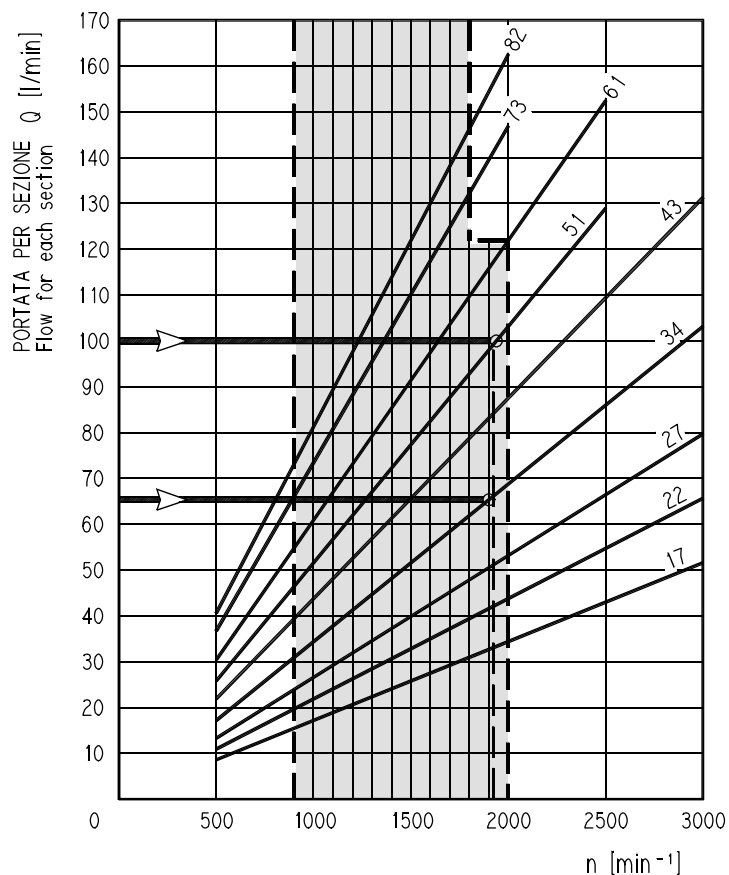
$$p_0 Q_0 = p_1 Q_1 + p_2 Q_2 \dots + p_n Q_n$$

$$V = \frac{1000 Q}{n}$$

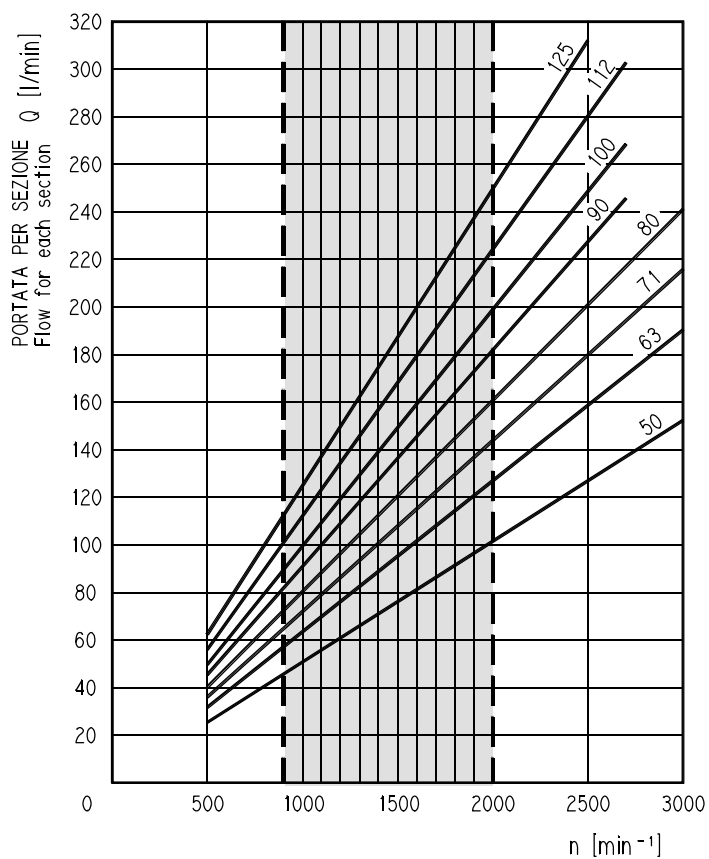
Supponiamo di dovere alimentare due utilizzi che assorbono rispettivamente 100 [l/min] e 65 [l/min]. Per determinare la cilindrata delle sezioni del divisore di flusso, optando per la scelta del gruppo HDD 30, basta entrare nel diagramma sull'asse delle ordinate in corrispondenza delle portate considerate e spostarsi orizzontalmente verso destra fino ad incontrare le linee relative alle cilindrata. Scegliere le cilindrata i cui punti di intersezione risultano allineati (o il più allineati possibile) su di una retta verticale e più vicini al limite massimo di velocità del campo di funzionamento ottimale.

Assume two services must be driven absorbing 100 [l/min] and 65 [l/min] respectively. To find the displacement of the flow divider sections, assuming the HDD 30 group is opted for, simply locate the flow rates in question on the Y axis and then move across horizontally until the lines corresponding to the displacement are encountered. Select a displacement with points of intersection aligned as near as possible vertically, and the nearest to the maximum speed for the optimum performance range.

HDD 30



HDD 35



Campo di funzionamento ottimale
Range for optimum performance

Le curve sono state ottenute alla temperatura di 50°C, utilizzando olio con viscosità 36 mm²/s a 40°C.

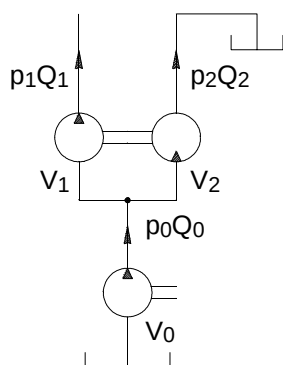
Each curve has been obtained at 50°C, using oil with viscosity 36 mm²/s at 40°C and at these pressures.

INTENSIFICATORI DI PRESSIONE

Pressure intensifiers

Sono impiegati per utilizzi che richiedono pressioni di lavoro superiori alla pressione di funzionamento della pompa principale. Questo aumento di pressione, si ottiene facendo funzionare una sezione come motore mettendola a scarico e l'altra come pompa collegandola all'utilizzo. Per ottimizzare il funzionamento degli intensificatori, il rapporto R fra la cilindrata della sezione motore e la cilindrata della sezione pompa, deve essere compreso nell'intervallo 0.5 ÷ 2. Nel diagramma di pag. 5.11 viene indicato l'incremento di pressione che è possibile ottenere con questi componenti. A pag. 5.20 sono riportati due circuiti tipici che utilizzano gli intensificatori di flusso.

Pressure intensifiers are used for services requiring working pressures in excess of the operating pressure of the pump. Pressure is increased by using one of two sections as a motor connecting it to "tank" and the other as a pump connecting it to the service. For optimum intensification, the ratio R between the displacement of the "motor" and "pump" sections must fall within the range 0.5 ÷ 2. The graph on page 5.11 illustrates pressure intensification available with these units. Two typical circuit diagrams incorporating pressure intensifiers are shown on page 5.20.



V = Cilindrata - Displacement [cm³/giro] - [cm³/rev]

Q = Portata - Delivery [l/min]

p = Pressione - Pressure [bar]

n = Velocità - Speed [min⁻¹]

$$Q_0 = Q_1 + Q_2$$

$$p_0 Q_0 = p_1 Q_1 + p_2 Q_2$$

$$V = \frac{1000 Q}{n}$$

Supponiamo di dovere alimentare un utilizzo alla pressione di 300 [bar] con una portata di 100 [l/min]. Per calcolare la pressione di lavoro della pompa principale, entrare nel diagramma a lato sull'asse delle ascisse in corrispondenza della pressione richiesta all'utilizzo e salire verticalmente fino ad incontrare le linee dei rapporti R. Scelto il rapporto di intensificazione R=1, spostarsi orizzontalmente verso sinistra, per leggere il valore sull'asse delle ordinate; p₀ = 180 [bar]. Ricordando che R = V₂ / V₁ = 1

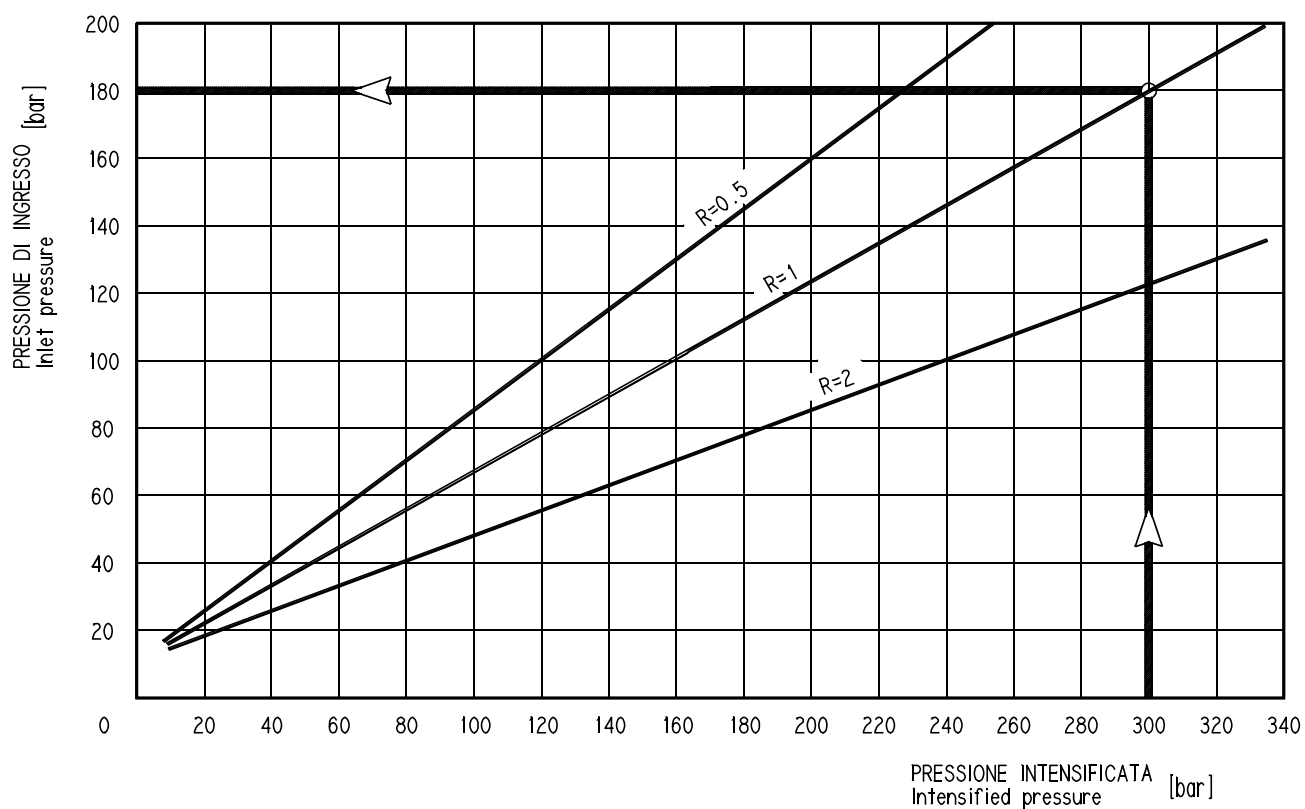
$$Q_1 = Q_2 = 100 \text{ [l/min]}$$

Per la scelta delle cilindrata, fare riferimento ai diagrammi di pag. 5.7 - 5.9.

Let us imagine that we must drive a service at a pressure of 300 [bar] with a flow of 100 [l/min]. To find the working pressure of the main pump use graph on the facing page. First locate the pressure required by the service on the X axis and then move up vertically until the lines of ratio R. Select the displacement ratio between the two intensifier sections R=1 and move horizontally to the left to read off the pressure value on the Y axis p₀ = 180 [bar]. Remember that R = V₂ / V₁ = 1

$$Q_1 = Q_2 = 100 \text{ [l/min]}$$

Select section displacements by consulting the graphs on pages 5.7 to 5.9.



Le curve sono state ottenute alla temperatura di 50°C, utilizzando olio con viscosità 36 mm²/s a 40°C.

Each curve has been obtained at 50°C, using oil with viscosity 36 mm²/s at 40°C and at these pressures.

NOTE SULLA COMPOSIZIONE NOTES ABOUT COMPOSITION

Le sezioni del divisore vengono disposte in ordine decrescente di cilindrata o gruppo da sinistra verso destra guardando il divisore dal lato delle bocche di mandata. Per i divisori composti da gruppi diversi, è obbligatorio interporre il collettore tra gli elementi dove cambia il gruppo. Sotto e nella pagina seguente sono riportate le composizioni standard dei divisori; per composizioni diverse consultare il nostro servizio tecnico commerciale.

Flow divider sections are arranged in descending displacements or groups with the largest displacement to the left as viewed from the delivery ports side. Where flow dividers are made up of different groups, an intermediate inlet section must be disposed between them. Standard formats of flow dividers are given beneath and on the following pages; for different configurations please consult our Technical Sales staff.

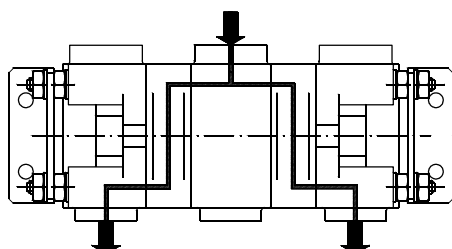
COLLETTORI Intermediate inlet sections

GRUPPO Group	HDD 30	HDD 35
HDD 30	C 30 • 30	—
HDD 35	C 35 • 30	C 35 • 35

COMPOSIZIONE STANDARD

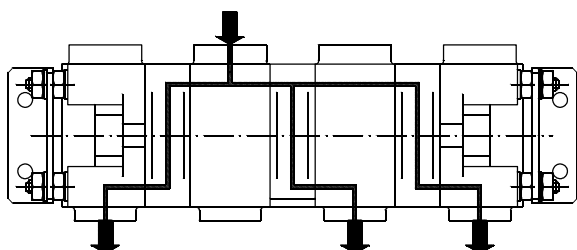
Standard composition

2 ELEMENTI - 2 SECTIONS

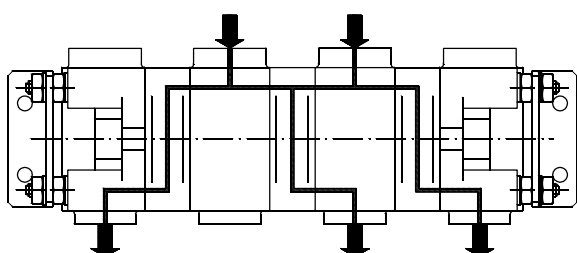


TIPO Type	PORTATA MAX. PER COLLETTORE Max. delivery for inlet section
	[l/min]
C 30•30	350
C 35•30	550
C 35•35	550

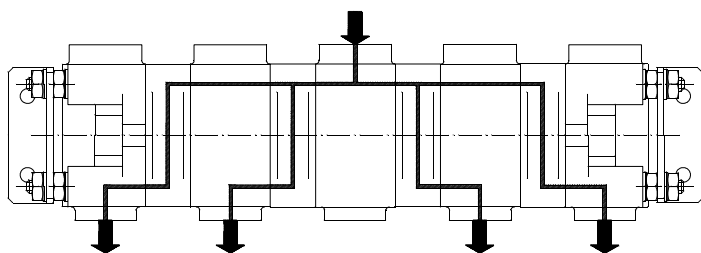
3 ELEMENTI - 3 SECTIONS



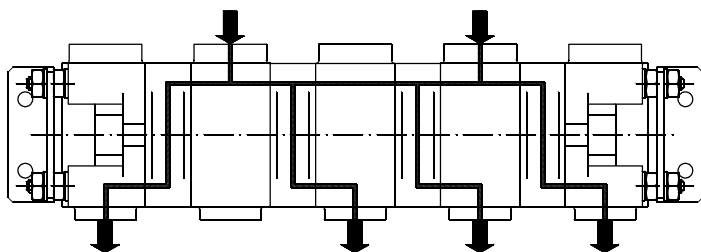
TIPO Type	PORTATA MAX. PER COLLETTORE Max. delivery for inlet section
	[l/min]
C 30•30	350
C 35•30	550
C 35•35	550



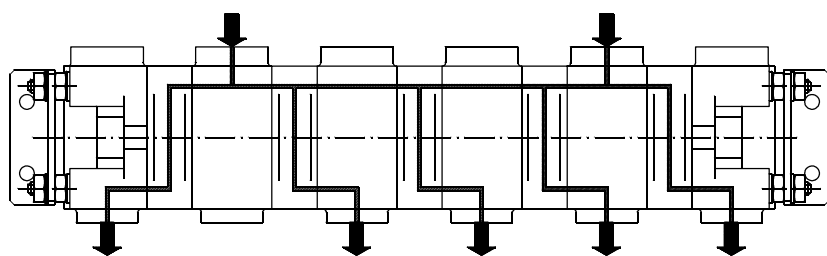
4 ELEMENTI - 4 SECTIONS



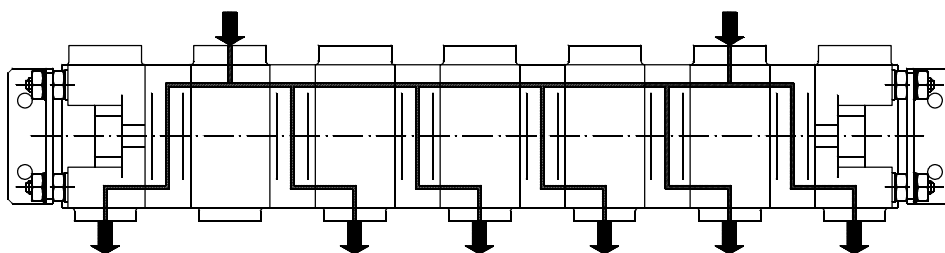
TIPO Type	PORTATA MAX. PER COLLETTORE Max. delivery for inlet section
	[l/min]
C 30•30	350
C 35•30	550
C 35•35	550



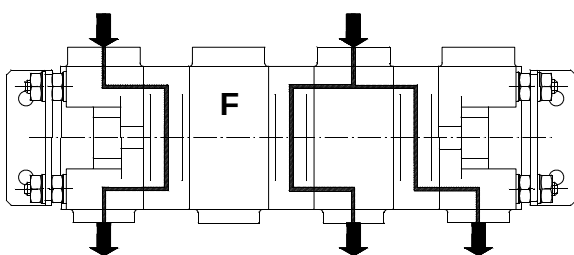
5 ELEMENTI - 5 SECTIONS



6 ELEMENTI - 6 SECTIONS



COMPOSIZIONE STANDARD PER EQUALIZZATORI CON SEZIONE MOTORE Standard composition for flow equalizers with motor section



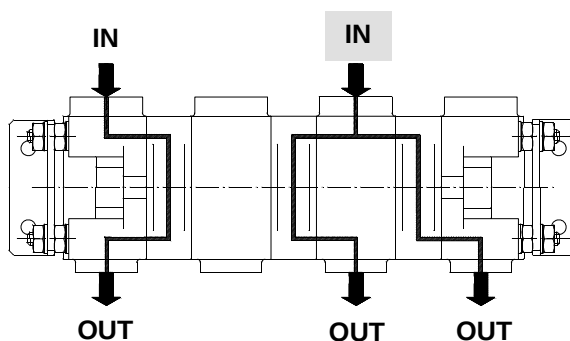
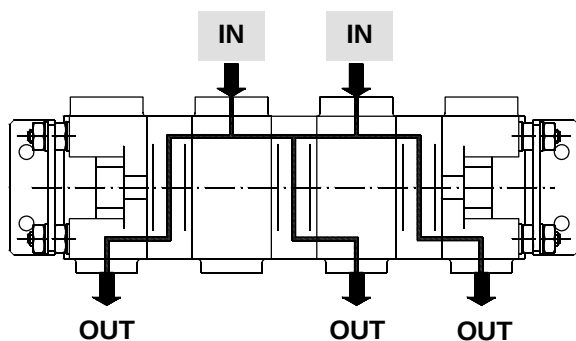
Max. 6 elementi
Max. 6 sections

FLANGIA INTERMEDIA Intermediate flange

GRUPPO Group	HDD 30	HDD 35
HDD 30	F 30 • 30	—
HDD 35	F 35 • 30	F 35 • 35

BOCCH

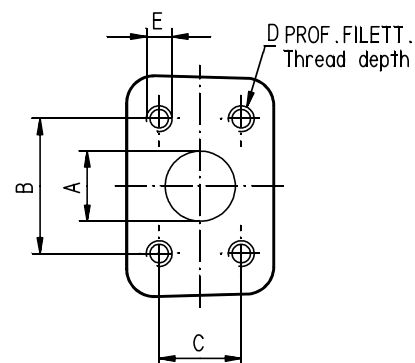
Ports



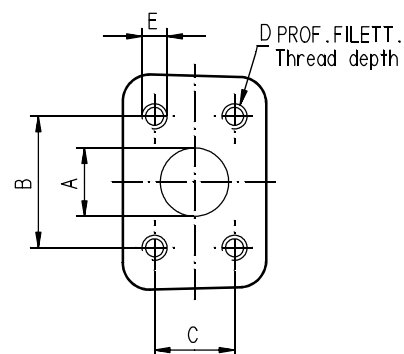
Equalizzatore di flusso con sezione motore.
Flow equalizer with motor section.

				Versione standard Standard version								
BOCCH PORTS	SSS			SSM			BSPP			ODT		
TIPO TYPE	IN	IN	OUT	IN	IN	OUT	IN	IN	OUT	IN	IN	OUT
HDD 30•17	SD	SB	SB	MD	MB	MB	GF	GE	GD	OF	OD	OB
HDD 30•22												
HDD 30•27		SC	SB		MC	MB		GF	GE		OF	OD
HDD 30•34												
HDD 30•43		SD	SC		MD	MC		GG	GF		OG	OF
HDD 30•51												
HDD 30•61		SE	SD		ME	MD						
HDD 30•73												
HDD 30•82												
HDD 35•50	SE	SE	SD	ME	ME	MD	GH	GH	GG	OH	OG	OF
HDD 35•63												
HDD 35•71												
HDD 35•80												
HDD 35•90		SF	SE		MF	ME		GL	GH		OH	OG
HDD 35•100												
HDD 35•112												
HDD 35•125												

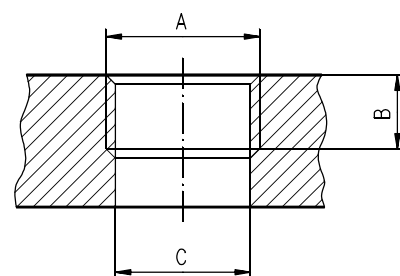
BOCCHE FLANGIATE SAE CON FILETTATURA UNC (SSS) SAE FLANGED PORTS UNC THREADED (SSS)						
CODICE CODE	DIMENSIONE NOMINALE NOMINAL SIZE	A	B	C	D	E
		mm	mm	mm	mm	
SA	1/2"	12,5	38,1	17,5	24	5/16 -18 UNC-2B
SB	3/4"	19	47,6	22,2	22	3/8 -16 UNC-2B
SC	1"	25,4	52,4	26,2		
SD	1 1/4"	30,5	58,7	30,2	28,5	7/16 -14 UNC-2B
SE	1 1/2"	39,3	69,8	35,7	27	1/2 -13 UNC-2B
SF	2"	51	77,8	42,9		



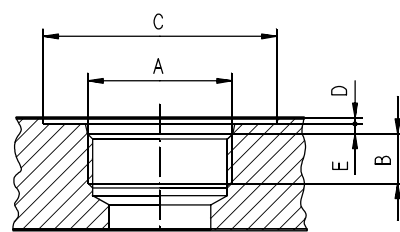
BOCCHE FLANGIATE SAE CON FILETTATURA METRICA (SSM) SAE FLANGED PORTS METRIC THREAD (SSM)						
CODICE CODE	DIMENSIONE NOMINALE NOMINAL SIZE	A	B	C	D	E
		mm	mm	mm	mm	
MA	1/2"	12,5	38,1	17,5	22	M 8
MB	3/4"	19	47,6	22,2		M 10
MC	1"	25,4	52,4	26,2		
MD	1 1/4"	30,5	58,7	30,2	27	M12
ME	1 1/2"	39,3	69,8	35,7		
MF	2"	51	77,8	42,9		



BOCCHE FILETTATE (BSPP) BRITISH STANDARD PIPE PARALLEL (BSPP)				
CODICE CODE	DIMENSIONE NOMINALE NOMINAL SIZE	A	B	C
			mm	mm
GD	1/2"	G 1/2	18	19
GE	3/4"	G 3/4	20	24,5
GF	1"	G 1	22	30,5
GG	1 1/4"	G 1 1/4	24	39,3
GH	1 1/2"	G 1 1/2	26	45
GL	2"	G 2	32	56

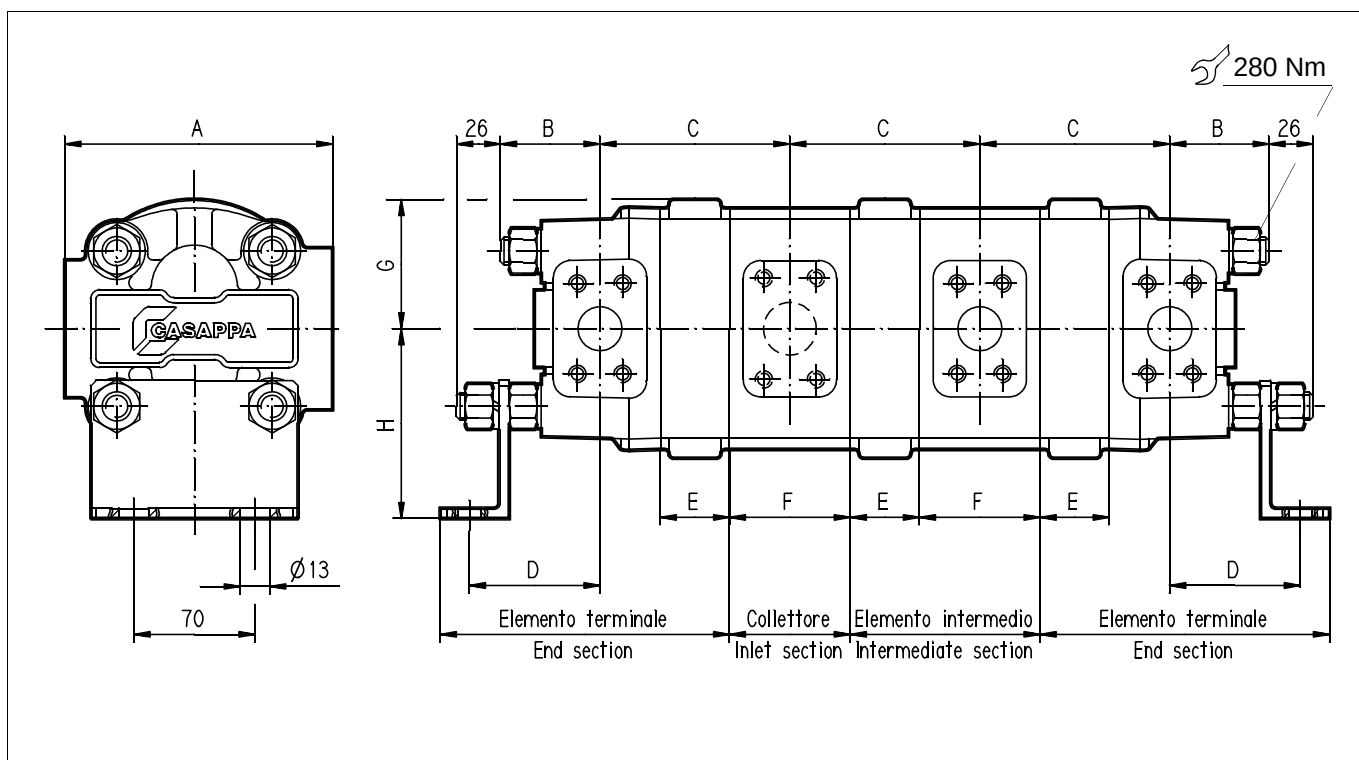


BOCCHE FILETTATE SAE (ODT) SAE STRAIGHT THREAD (ODT)						
CODICE CODE	DIMENSIONE NOMINALE NOMINAL SIZE	A	B	C	D	E
			mm	mm	mm	mm
OB	1/2"	3/4 -16 UNF-2B	15	32	0,5	2,5
OD	3/4"	1-1/16 -12 UN-2B	20	42		3,3
OF	1"	1-5/16 -12 UN-2B		50		
OG	1 1/4"	1-5/8 -12 UN-2B		60		
OH	1 1/2"	1-7/8 -12 UN-2B		70		



DIMENSIONI DIVISORI DI FLUSSO GRUPPI UGUALI

Same group flow dividers dimensions

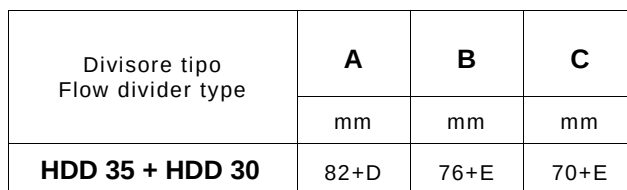


Divisore tipo Flow divider type	A	B	C	D	E	F	G	H
	mm	mm	mm	mm	mm	mm	mm	mm
HDD 30 + HDD 30	155	57	70+E	77	Vedi sotto See below	70	75	155
HDD 35 + HDD 35	175	63	82+E	93	Vedi sotto See below	82	87,5	185

Divisore tipo Flow divider type	E
	mm
HDD 30•17	23
HDD 30•22	26
HDD 30•27	29
HDD 30•34	34
HDD 30•43	40
HDD 30•51	45
HDD 30•61	51
HDD 30•73	59
HDD 30•82	64

Divisore tipo Flow divider type	E
	mm
HDD 35•50	38
HDD 35•63	44
HDD 35•71	48
HDD 35•80	52
HDD 35•90	57
HDD 35•100	61
HDD 35•112	67
HDD 35•125	73

Different group flow dividers dimensions



Divisore tipo Flow divider type	E
	mm
HDD 30•17	23
HDD 30•22	26
HDD 30•27	29
HDD 30•34	34
HDD 30•43	40
HDD 30•51	45
HDD 30•61	51
HDD 30•73	59
HDD 30•82	64

Typical circuits for flow equalizers

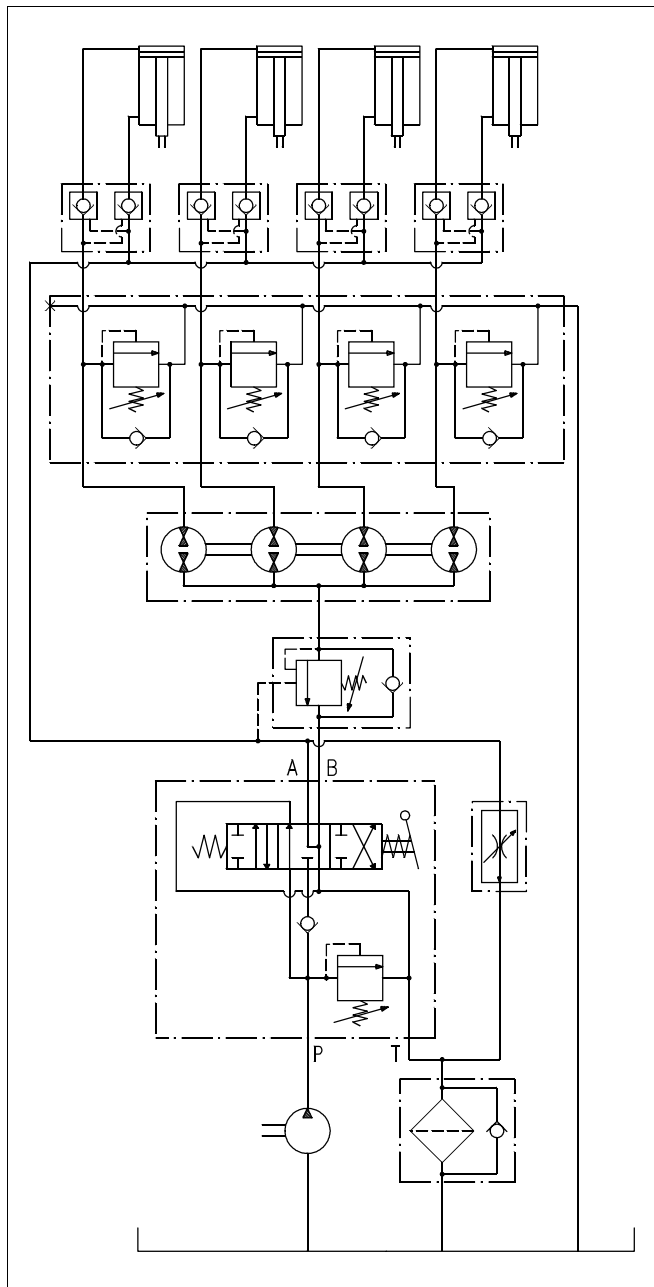


Diagram with a flow equalizer operating double acting cylinders. Special valves provide for correction at each end-of-stroke limit to ensure that actuators are kept fully synchronized.

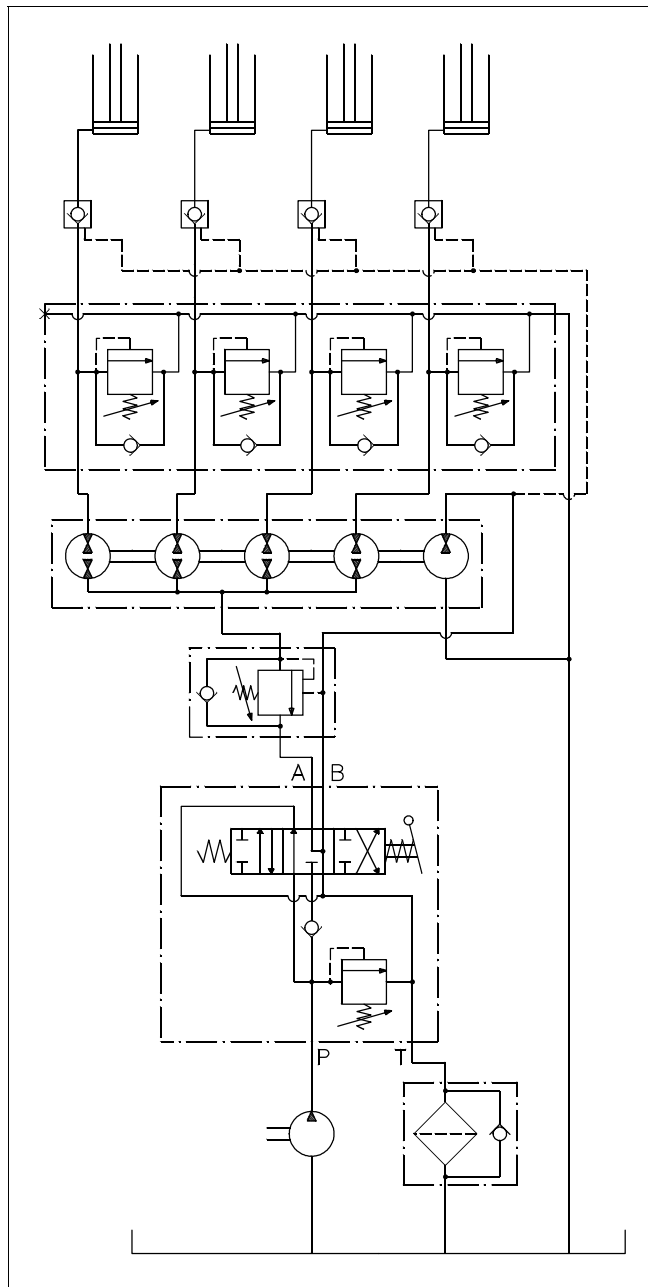
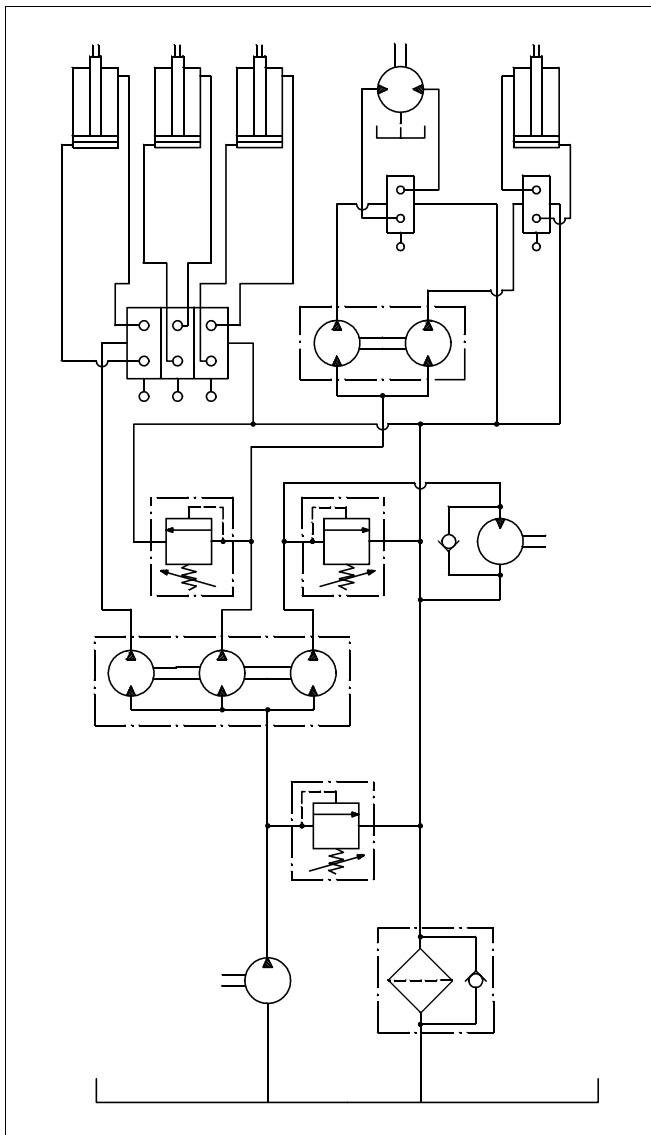


Diagram with flow equalizer operating single acting cylinders. The circuit incorporates special valves for correction of actuator synchronization errors at each end-of-stroke limit.

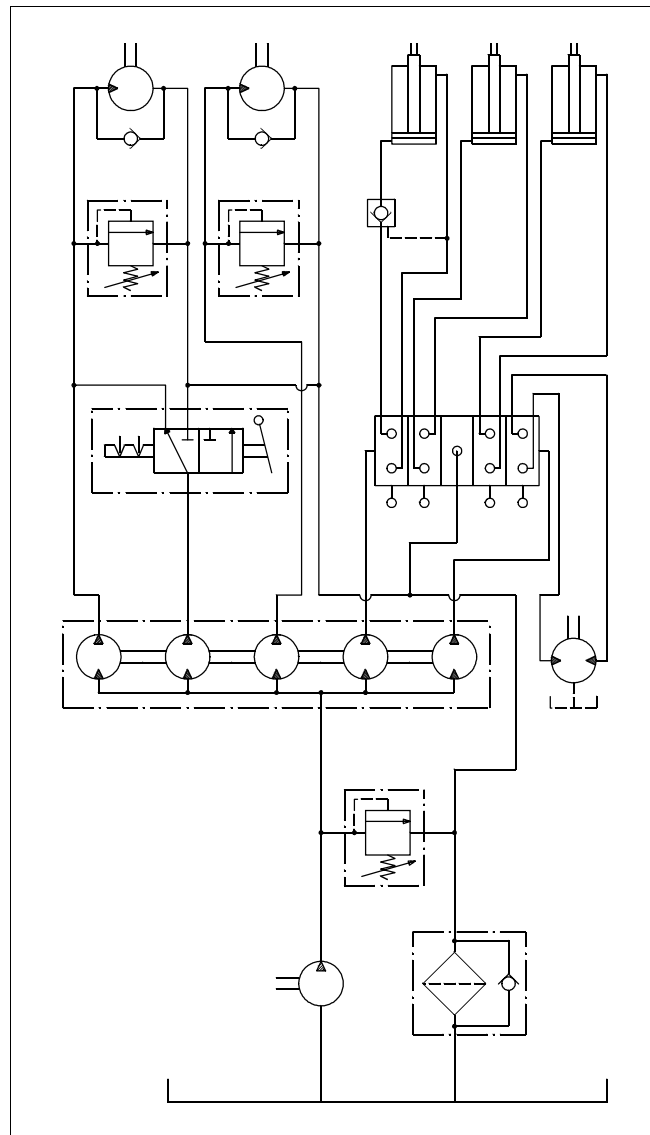
CIRCUITI TIPICI PER DIVISORI DI FLUSSO

Typical circuits for flow dividers



Schema con divisore di flusso che consente di impiegare una sola pompa per alimentare più utilizzi che necessitano di portate a pressioni diverse.

Diagram with a flow divider permitting the use of a single pump to drive a number of different services requiring flows at different pressures.

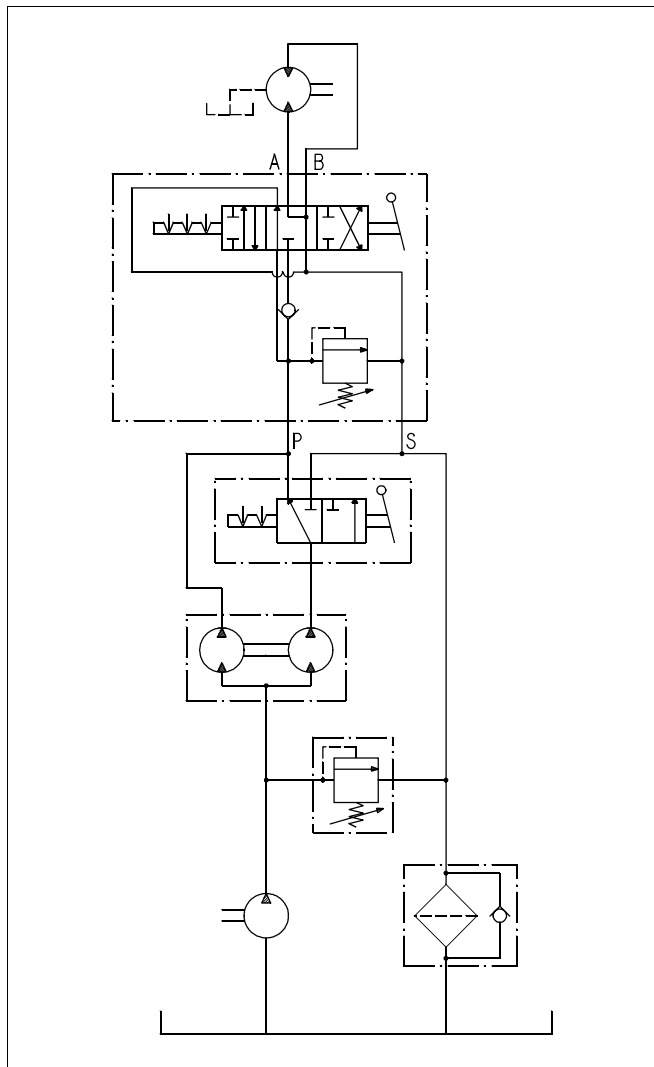


Schema con divisore di flusso che consente di impiegare una sola pompa per alimentare più utilizzi che necessitano di portate a pressioni diverse.

Diagram with a flow divider permitting the use of a single pump to drive a number of different services requiring flows at different pressures.

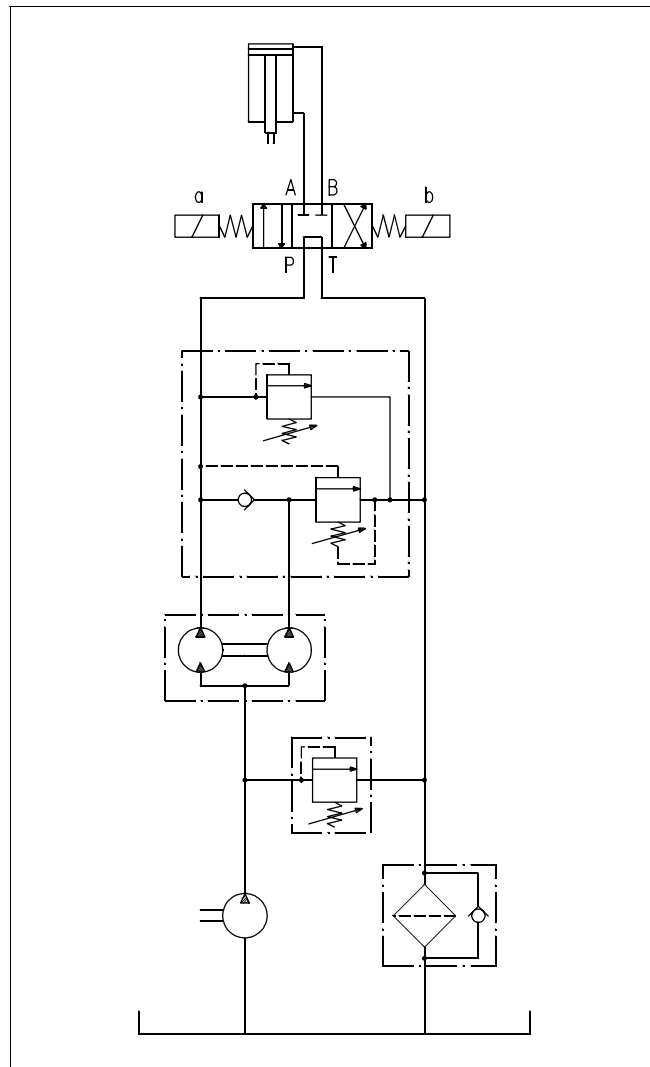
CIRCUITI TIPICI PER INTENSIFICATORI DI PRESSIONE

Typical circuits for pressure intensifiers



Schema con intensificatore di pressione che consente di alimentare l'utilizzo con una pressione superiore a quella della pompa di alimentazione.

Diagram with pressure intensifier so that a service requiring a pressure higher than the pressure available at the main delivery pump can be driven.

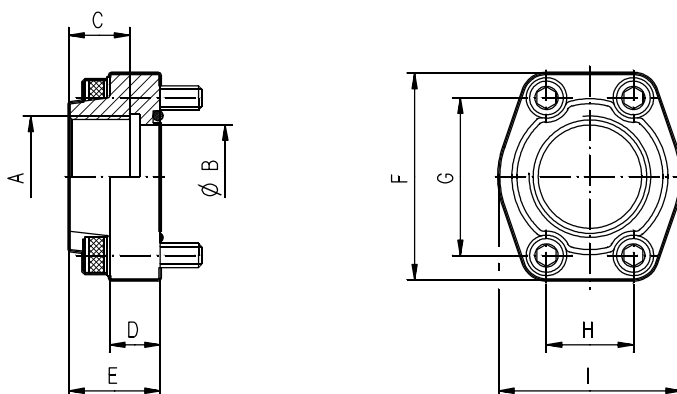


Schema con intensificatore di pressione che consente di alimentare l'utilizzo con una pressione superiore a quella della pompa di alimentazione.

Diagram with pressure intensifier so that a service requiring a pressure higher than the pressure available at the main delivery pump can be driven.

Raccordi SAE diritti filettati GAS

SAE straight BSPP thread port connectors



Tipo Type	A	B	C	D	E	F	G	H	I	Viti Screws	Coppia Torque	O-ring
		mm	mm	mm	mm	mm	mm	mm	mm		Nm	
RD2-MA/FG12-N	G 1/2	13	19	16	36	54	38,1	17,5	46	M 8 UNI 5931-8.8	25	4075
RD2-MA/FG38-N	G 3/8											
RD2-MB/FG34-N	G 3/4	19		18		65	47,6	22,2	50	M 10 UNI 5931-8.8	50	4100
RD2-MB/FG12-N	G 1/2	13										
RD2-MC/FG100-N	G 1	25				38	70	52,4	26,2	52		
RD2-MC/FG34-N	G 3/4	19										
RD2-MD/FG114-N	G 1 1/4	32	22	21	41	79	58,7	30,2	68	M 10 UNI 5931-12.9	86	4150
RD2-MD/FG100-N	G 1	25										
RD2-ME/FG112-N	G 1 1/2	38	24	25	44	93	69,8	35,7	78	M 12 UNI 5931-12.9	148	4187
RD2-ME/FG114-N	G 1 1/4	32										
RD2-MF/FG200-N	G 2	51	30		45	102	77,8	42,9	90			4225
RD2-MF/FG112-N	G 1 1/2	38	26									

Tipo Type	A	B	C	D	E	F	G	H	I	Viti Screws	Coppia Torque	O-ring	
		mm	mm	mm	mm	mm	mm	mm	mm		Nm		
RD2-SA/FG12-N	G 1/2	13	19	16	36	54	38,1	17,5	46	5/16 -18 UNC-2B	25	4075	
RD2-SA/FG38-N	G 3/8												
RD2-SB/FG34-N	G 3/4	19		18		65	47,6	22,2	50	3/8 -16 UNC-2B	50	4100	
RD2-SB/FG12-N	G 1/2	13											
RD2-SC/FG100-N	G 1	25				38	70	52,4	26,2	52			4131
RD2-SC/FG34-N	G 3/4	19											
RD2-SD/FG114-N	G 1 1/4	32	22	21	41	79	58,7	30,2	68	7/16 -14 UNC-2B	86	4150	
RD2-SD/FG100-N	G 1	25											
RD2-SE/FG112-N	G 1 1/2	38	24	25	44	93	69,8	35,7	78	1/2 -14 UNC-2B	148	4187	
RD2-SE/FG114-N	G 1 1/4	32											
RD2-SF/FG200-N	G 2	51	30		45	102	77,8	42,9	90				
RD2-SF/FG112-N	G 1 1/2	38	26										

I raccordi standard sono dotati di guarnizioni in BUNA. Per utilizzi più gravosi, richiedere raccordi con guarnizioni in VITON sostituendo la N finale del codice con la lettera V. (es. **RD2-MA/FG12-N** - **RD2-MA/FG12-V**)

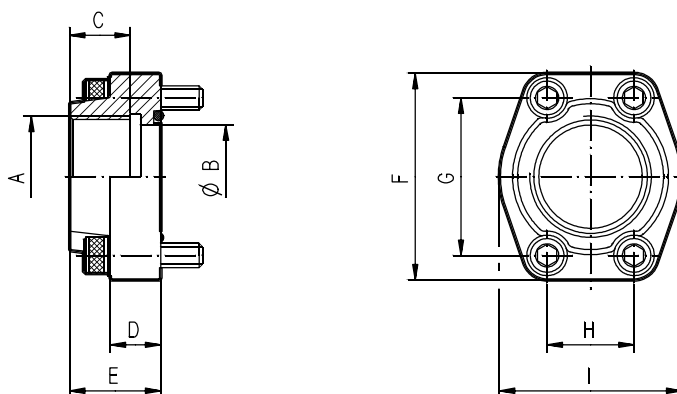
Standard port connectors are equipped with BUNA seals. For heavier operating conditions, require it with VITON seals replacing code's last letter N with the V letter. (eg. **RD2-MA/FG12-N** - **RD2-MA/FG12-V**)

N.B. I valori di coppia riportati in tabella sono riferiti al montaggio dei raccordi sulla serie **MAGNUM**.

N.B. Torque values in the table refer to the mounting of port connectors on **MAGNUM** series.

Raccordi SAE diritti filettati NPT

SAE straight NPT thread port connectors



Tipo Type	A	B	C	D	E	F	G	H	I	Viti Screws	Coppia Torque [Nm]	O-ring	
		mm	mm	mm	mm	mm	mm	mm	mm				
RD2-MA/FN12-N	1/2 NPT	13	19	16	36	54	38,1	17,5	46	M 8 UNI 5931-8.8	25	4075	
RD2-MA/FN38-N	3/8 NPT					65	47,6	22,2	50				
RD2-MB/FN34-N	3/4 NPT	19		18	38	70	52,4	26,2	52	M 10 UNI 5931-8.8	50	4100	
RD2-MB/FN12-N	1/2 NPT	13				70	52,4	26,2	52			4131	
RD2-MC/FN100-N	1 NPT	25		22	21	41	79	58,7	30,2	68	M 10 UNI 5931-12.9	86	4150
RD2-MC/FN34-N	3/4 NPT	19					79	58,7	30,2	68			
RD2-MD/FN114-N	1 1/4 NPT	32	24	25	44	93	69,8	35,7	78	M 12 UNI 5931-12.9	148	4187	
RD2-MD/FN100-N	1 NPT	25				93	69,8	35,7	78				4225
RD2-ME/FN112-N	1 1/2 NPT	38	30		45	102	77,8	42,9	90				
RD2-ME/FN114-N	1 1/4 NPT	32				102	77,8	42,9	90				
RD2-MF/FN200-N	2 NPT	51	26		45	102	77,8	42,9	90				
RD2-MF/FN112-N	1 1/2 NPT	38				102	77,8	42,9	90				

Tipo Type	A	B	C	D	E	F	G	H	I	Viti Screws	Coppia Torque [Nm]	O-ring		
		mm	mm	mm	mm	mm	mm	mm	mm					
RD2-SA/FN12-N	1/2 NPT	13	19	16	36	54	38,1	17,5	46	5/16 -18 UNC-2B	25	4075		
RD2-SA/FN38-N	3/8 NPT													
RD2-SB/FN34-N	3/4 NPT	19		18			65	47,6	22,2	50	3/8 -16 UNC-2B	50	4100	
RD2-SB/FN12-N	1/2 NPT	13												
RD2-SC/FN100-N	1 NPT	25				38	70	52,4	26,2	52			4131	
RD2-SC/FN34-N	3/4 NPT	19												
RD2-SD/FN114-N	1 1/4 NPT	32	22	21	41	79	58,7	30,2	68	7/16 -14 UNC-2B	86	4150		
RD2-SD/FN100-N	1 NPT	25												
RD2-SE/FN112-N	1 1/2 NPT	38	24	25	44	93	69,8	35,7	78	1/2 -14 UNC-2B	148	4187		
RD2-SE/FN114-N	1 1/4 NPT	32												
RD2-SF/FN200-N	2 NPT	51	30		45	102	77,8	42,9	90					
RD2-SF/FN112-N	1 1/2 NPT	38	26											

I raccordi standard sono dotati di guarnizioni in BUNA. Per utilizzi più gravosi, richiedere raccordi con guarnizioni in VITON sostituendo la N finale del codice con la lettera V. (es. **RD2-MA/FN12-N** - **RD2-MA/FN12-V**)

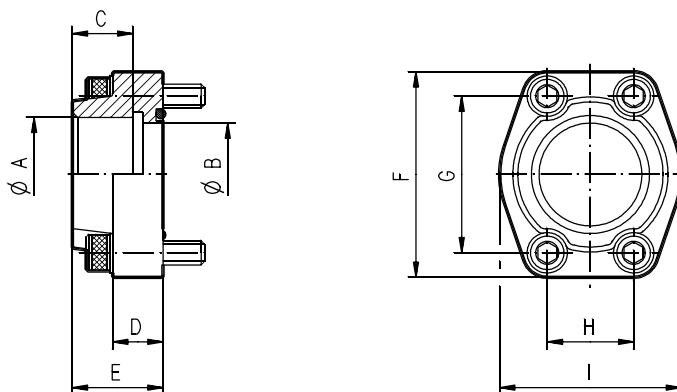
Standard port connectors are equipped with BUNA seals. For heavier operating conditions, require it with VITON seals replacing code's last letter N with the V letter. (eg. **RD2-MA/FN12-N** - **RD2-MA/FN12-V**)

N.B. I valori di coppia riportati in tabella sono riferiti al montaggio dei raccordi sulla serie **MAGNUM**.

N.B. Torque values in the table refer to the mounting of port connectors on **MAGNUM** series.

Raccordi SAE diritti a saldare di tasca

SAE straight weld in port connectors



Tipo Type	Dim. nominale Nominal size	A	B	C	D	E	F	G	H	I	Viti Screws	Coppia Torque	O-ring
		mm	mm	mm	mm	mm	mm	mm	mm	mm		Nm	
RD2-MA/S12-N	1/2"	21,6	13	19	16	36	54	38,1	17,5	46	M 8 UNI 5931-8.8	25	4075
RD2-MA/S38-N	3/8"	17,5			18		65	47,6	22,2	50		M 10 UNI 5931-8.8	
RD2-MB/S34-N	3/4"	27,2	19			38	70	52,4	26,2	52	M 10 UNI 5931-12.9		86
RD2-MC/S100-N	1"	34	25		44		93	69,8	35,7	78		M 12 UNI 5931-12.9	148
RD2-MD/S114-N	1" 1/4	42,8	32	22	21	41	79	58,7	30,2	68	M 12 UNI 5931-12.9		148
RD2-ME/S112-N	1" 1/2	48,6	38	24	25	45	102	77,8	42,9	90			
RD2-MF/S200-N	2"	61	51	26									

Tipo Type	Dim. nominale Nominal size	A	B	C	D	E	F	G	H	I	Viti Screws	Coppia Torque	O-ring
		mm	mm	mm	mm	mm	mm	mm	mm	mm		Nm	
RD2-SA/S12-N	1/2"	21,6	13	19	16	36	54	38,1	17,5	46	5/16 -18 UNC-2B	25	4075
RD2-SA/S38-N	3/8"	17,5			18		65	47,6	22,2	50		3/8 -16 UNC-2B	50
RD2-SB/S34-N	3/4"	27,2	25			38	70	52,4	26,2	52	4131		
RD2-SC/S100-N	1"	34											
RD2-SD/S114-N	1" 1/4	42,8	32	22	21	41	79	58,7	30,2	68	7/16 -14 UNC-2B	86	4150
RD2-SE/S112-N	1" 1/2	48,6	38	24	25	44	93	69,8	35,7	78	1/2 -14 UNC-2B	148	4187
RD2-SF/S200-N	2"	61	51	26		45	102	77,8	42,9	90			4225

I raccordi standard sono dotati di guarnizioni in BUNA. Per utilizzi più gravosi, richiedere raccordi con guarnizioni in VITON sostituendo la N finale del codice con la lettera V. (es. **RD2-MA/S12-N** - **RD2-MA/S12-V**)

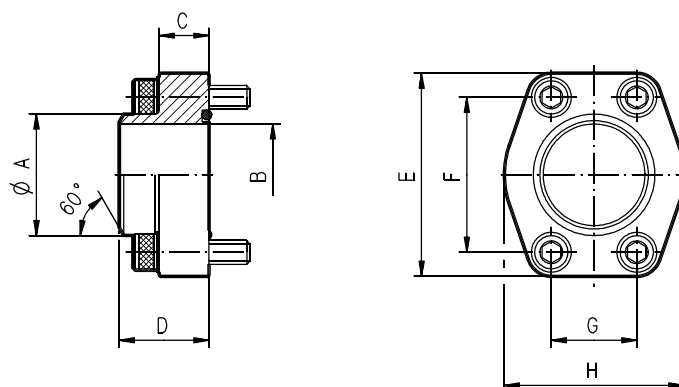
Standard port connectors are equipped with BUNA seals. For heavier operating conditions, require it with VITON seals replacing code's last letter N with the V letter. (eg. **RD2-MA/S12-N** - **RD2-MA/S12-V**)

N.B. I valori di coppia riportati in tabella sono riferiti al montaggio dei raccordi sulla serie **MAGNUM**.

N.B. Torque values in the table refer to the mounting of port connectors on **MAGNUM** series.

Raccordi SAE diritti a saldare di testa

SAE straight weld on port connectors



Tipo Type	Dim. nominale Nominal size	A	B	C	D	E	F	G	H	Viti Screws	Coppia Torque	O-ring
		mm	mm	mm	mm	mm	mm	mm	mm		Nm	
RD2-MA/T12-N	1/2"	21,6	13	16	36	54	38,1	17,5	46	M 8 UNI 5931-8.8	25	4075
RD2-MA/T38-N	3/8"	17,5										
RD2-MB/T34-N	3/4"	27,2	19	18	38	65	47,6	22,2	50	M 10 UNI 5931-8.8	50	4100
RD2-MC/T100-N	1"	34	25			70	52,4	26,2	52			4131
RD2-MD/T114-N	1" 1/4	42,8	32	21	41	79	58,7	30,2	68	M 10 UNI 5931-12.9	86	4150
RD2-ME/T112-N	1" 1/2	48,6	38	25	44	93	69,8	35,7	78	M 12 UNI 5931-12.9	148	4187
RD2-MF/T200-N	2"	61	51		45	102	77,8	42,9	90			4225

Tipo Type	Dim. nominale Nominal size	A	B	C	D	E	F	G	H	Viti Screws	Coppia Torque	O-ring
		mm	mm	mm	mm	mm	mm	mm	mm		Nm	
RD2-SA/T12-N	1/2"	21,6	13	16	36	54	38,1	17,5	46	5/16 -18 UNC-2B	25	4075
RD2-SA/T38-N	3/8"	17,5										
RD2-SB/T34-N	3/4"	27,2	19	18	38	65	47,6	22,2	50	3/8 -16 UNC-2B	50	4100
RD2-SC/T100-N	1"	34	25			70	52,4	26,2	52			4131
RD2-SD/T114-N	1" 1/4	42,8	32	21	41	79	58,7	30,2	68	7/16 -14 UNC-2B	86	4150
RD2-SE/T112-N	1" 1/2	48,6	38	25	44	93	69,8	35,7	78	1/2 -14 UNC-2B	148	4187
RD2-SF/T200-N	2"	61	51		45	102	77,8	42,9	90			4225

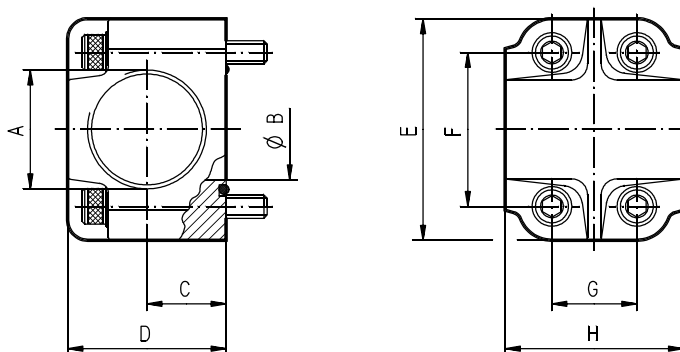
I raccordi standard sono dotati di guarnizioni in BUNA. Per utilizzi più gravosi, richiedere raccordi con guarnizioni in VITON sostituendo la N finale del codice con la lettera V. (es. **RD2-MA/T12-N** - **RD2-MA/T12-V**)

Standard port connectors are equipped with BUNA seals. For heavier operating conditions, require it with VITON seals replacing code's last letter N with the V letter. (eg. **RD2-MA/T12-N** - **RD2-MA/T12-V**)

N.B. I valori di coppia riportati in tabella sono riferiti al montaggio dei raccordi sulla serie **MAGNUM**.

N.B. Torque values in the table refer to the mounting of port connectors on **MAGNUM** series.

Raccordi SAE a gomito filettati GAS SAE BSPP thread elbows



Tipo Type	Dim. nominale Nominal size	B	C	D	E	F	G	H	Viti Screws	Coppia Torque Nm	O-ring
		mm	mm	mm	mm	mm	mm	mm			
RG2-MB/FG34-N	G 3/4 Depth 19	19	19	38	66	47,6	22,2	46	M 10 UNI 5931-8.8	50	4100
RG2-MC/FG100-N	G 1 Depth 19	25	22	45	71	52,4	26,2	55			4131
RG2-MD/FG114-N	G 1 1/4 Depth 22	31	27	55	81	58,7	30,2	65	M 10 UNI 5931-12.9	86	4150
RG2-ME/FG112-N	G 1 1/2 Depth 24	38	32	65	95	69,8	35,7	75			4187
RG2-MF/FG200-N	G 2 Depth 26	51	40	80	112	77,8	42,9	90	M 12 UNI 5931-12.9	148	4237

I raccordi standard sono dotati di guarnizioni in BUNA. Per utilizzi più gravosi, richiedere raccordi con guarnizioni in VITON sostituendo la N finale del codice con la lettera V. (es. **RG2-MB/FG34-N** - **RG2-MB/FG34-V**)

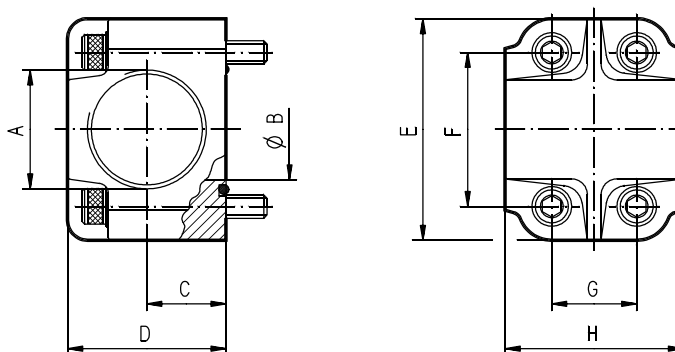
Standard port connectors are equipped with BUNA seals. For heavier operating conditions, require it with VITON seals replacing code's last letter N with the V letter. (eg. **RG2-MB/FG34-N** - **RG2-MB/FG34-V**)

N.B. I valori di coppia riportati in tabella sono riferiti al montaggio dei raccordi sulla serie **MAGNUM**.

N.B. Torque values in the table refer to the mounting of port connectors on **MAGNUM** series.

Raccordi SAE a gomito filettati NPT

SAE NPT thread elbows



Tipo Type	A	B	C	D	E	F	G	H	Viti Screws	Coppia Torque	O-ring
	Dim. nominale Nominal size	mm	mm	mm	mm	mm	mm	mm		Nm	
RG2-MB/FN34-N	3/4 NPT Depth 19	19	19	38	66	47,6	22,2	46	M 10 UNI 5931-8.8	50	4100
RG2-MC/FN-100-N	1 NPT Depth 19	25	22	45	71	52,4	26,2	55			4131
RG2-MD/FN114-N	1 1/4 NPT Depth 22	31	27	55	81	58,7	30,2	65	M 10 UNI 5931-12.9	86	4150
RG2-ME/FN112-N	1 1/2 NPT Depth 24	38	32	65	95	69,8	35,7	75	M 12 UNI 5931-12.9	148	4187
RG2-MF/FN200-N	2 NPT Depth 26	51	40	80	112	77,8	42,9	90			4237

I raccordi standard sono dotati di guarnizioni in BUNA. Per utilizzi più gravosi, richiedere raccordi con guarnizioni in VITON sostituendo la N finale del codice con la lettera V. (es. **RG2-MB/FN34-N** - **RG2-MB/FN34-V**)

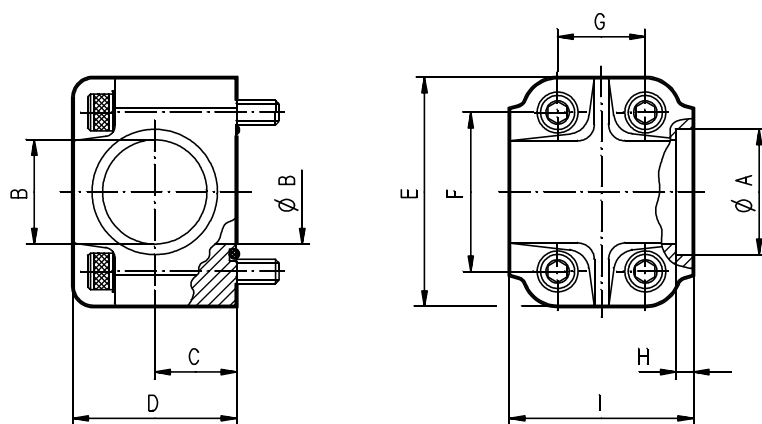
Standard port connectors are equipped with BUNA seals. For heavier operating conditions, require it with VITON seals replacing code's last letter N with the V letter. (eg. **RG2-MB/FN34-N** - **RG2-MB/FN34-V**)

N.B. I valori di coppia riportati in tabella sono riferiti al montaggio dei raccordi sulla serie **MAGNUM**.

N.B. Torque values in the table refer to the mounting of port connectors on **MAGNUM** series.

Raccordi SAE a gomito a saldare di tasca

SAE weld in elbows



Tipo Type	Dim. nominale Nominal size	A	B	C	D	E	F	G	H	I	Viti Screws	Coppia Torque Nm	O-ring
		mm	mm	mm	mm	mm	mm	mm	mm	mm			
RG2-MB/S34-N	3/4"	27,2	19	19	38	66	47,6	22,2	5	46	M 10 UNI 5931-8.8	50	4100
RG2-MC/S100-N	1"	34	25	22	45	71	52,4	26,2	6	55			4131
RG2-MD/S114-N	1" 1/4	42,8	31	27	55	81	58,7	30,2	7	65	M 10 UNI 5931-12.9	86	4150
RG2-ME/S112-N	1" 1/2	48,6	38	32	65	95	69,8	35,7	8	75			4187
RG2-MF/S200-N	2"	61,3	51	40	80	112	77,8	42,9	10	90	M 12 UNI 5931-12.9	148	4237

I raccordi standard sono dotati di guarnizioni in BUNA. Per utilizzi più gravosi, richiedere raccordi con guarnizioni in VITON sostituendo la N finale del codice con la lettera V. (es. **RG2-MB/S34-N** - **RG2-MB/S34-V**)

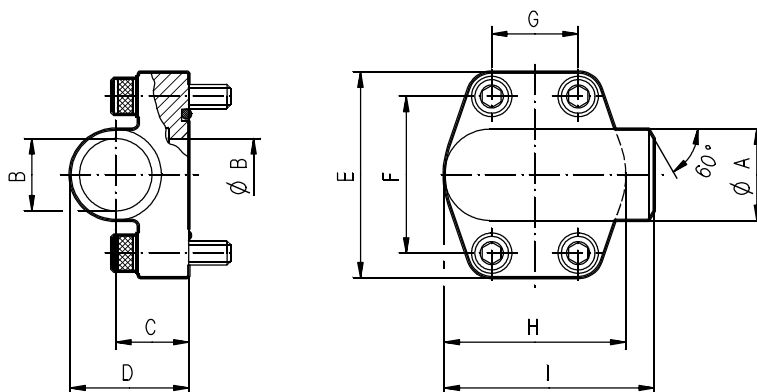
Standard port connectors are equipped with BUNA seals. For heavier operating conditions, require it with VITON seals replacing code's last letter N with the V letter. (eg. **RG2-MB/S34-N** - **RG2-MB/S34-V**)

N.B. I valori di coppia riportati in tabella sono riferiti al montaggio dei raccordi sulla serie **MAGNUM**.

N.B. Torque values in the table refer to the mounting of port connectors on **MAGNUM** series.

Raccordi SAE a gomito a saldare di testa

SAE weld on elbows



Tipo Type	Dim. nominale Nominal size	A	B	C	D	E	F	G	H	I	Viti Screws	Coppia Torque Nm	O-ring
		mm	mm	mm	mm	mm	mm	mm	mm	mm			
RG2-MB/T34-N	3/4"	27	19	23	38	70	47,6	22,2	44	63	M 10 UNI 5931-8.8	50	4100
RG2-MC/T100-N	1"	34,5	23	25	42	75	52,4	26,2	48	72			4112
RG2-MD/T114-N	1" 1/4	43	31	27	48	86	58,7	30,2	56	82	M 10 UNI 5931-12.9	86	4150
RG2-ME/T112-N	1" 1/2	50	35	31,5	56	97	69,8	35,7	62	92	M 12 UNI 5931-12.9	148	150
RG2-MF/T200-N	2"	65	48	37,5	60	100	77,8	42,9	72	99			156

I raccordi standard sono dotati di guarnizioni in BUNA. Per utilizzi più gravosi, richiedere raccordi con guarnizioni in VITON sostituendo la N finale del codice con la lettera V. (es. **RG2-MB/T34-N** - **RG2-MB/T34-V**)

Standard port connectors are equipped with BUNA seals. For heavier operating conditions, require it with VITON seals replacing code's last letter N with the V letter. (eg. **RG2-MB/T34-N** - **RG2-MB/T34-V**)

N.B. I valori di coppia riportati in tabella sono riferiti al montaggio dei raccordi sulla serie **MAGNUM**.

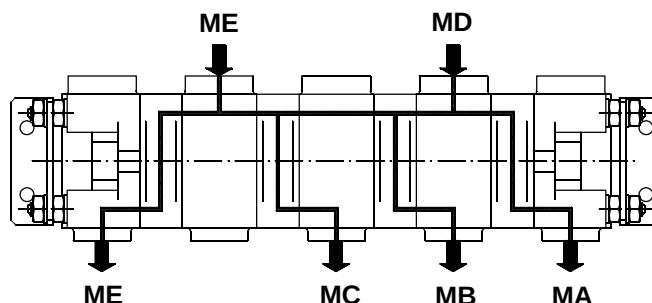
N.B. Torque values in the table refer to the mounting of port connectors on **MAGNUM** series.

Come ordinare

How to order

Esempio d'ordine di elementi separati di un divisore con 4 elementi
Prima di ordinare consultare le composizioni standard alle pagine 1.12 - 1.13

Order example for sections of flow divider with 4 sections
Before ordering consult standard compositions at pages 1.12 - 1.13



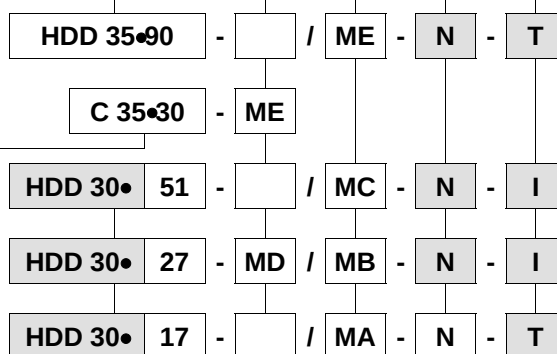
Divisore tipo vedi pag. 1.5
 Flow divider type see page 1.5

Codice bocca di ingresso vedi pag. 1.14 - 1.15
 Inlet port code see page 1.14 - 1.15

Codice bocca di uscita vedi pag. 1.14 - 1.15
 Outlet port code see page 1.14 - 1.15

Guarnizione N - V - E vedi pag. 1.3
 Seal N - V - E see page 1.4

Codice sezioni : T= elemento terminale
 I= elemento intermedio
 Sections code: T= end section
 I= intermediate section



Collettore tipo vedi pag. 1.12
 Inlet section type see page 1.12

Divisore tipo vedi pag. 1.5
 Flow divider type see page 1.5

☐ Codice da tralasciare solo nell'ordine di unità assemblate.
 Omit code only in the order of assembled units.

Esempio d'ordine di un divisore con 4 elementi assemblato
Order example for assembled flow divider with 4 sections

HDD 35•90 - ME + C 35•30 - ME + 51 - MC + 27 - MD / MB + 17 - MA - N

Come ordinare un equalizzatore con sezione motore

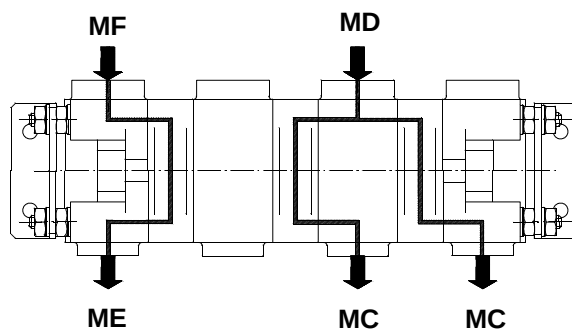
How to order flow equalizer with motor section

Esempio d'ordine di elementi separati

Prima di ordinare consultare le composizioni standard a pagina 1.13

Order example for sections

Before ordering consult standard compositions at page 1.13



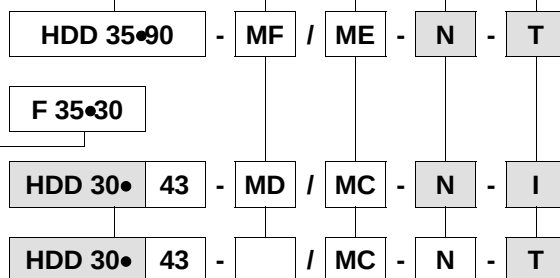
Divisore tipo vedi pag. 1.5
Flow divider type see page 1.5

Codice bocca di ingresso vedi pag. 1.14 - 1.15
Inlet port code see page 1.14 - 1.15

Codice bocca di uscita vedi pag. 1.14 - 1.15
Outlet port code see page 1.14 - 1.15

Guarnizione N - V - E vedi pag. 1.3
Seal N - V - E see page 1.4

Codice elemento: T= elemento terminale
I= elemento intermedio
Sections code: T= end section
I= intermediate section



Flangia tipo vedi pag. 1.13
Flange type see page 1.13

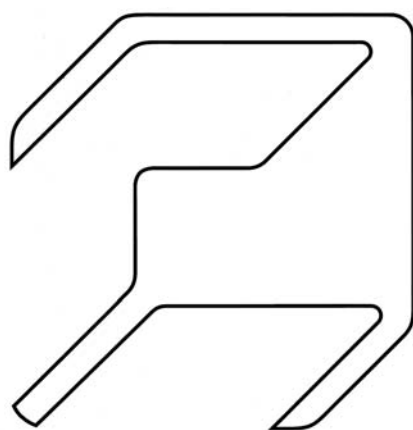
Divisore tipo vedi pag. 1.5
Flow divider type see page 1.5

Codice da tralasciare solo nell'ordine di unità assemblate.
Omit code only in the order of assembled units.

Esempio d'ordine di elementi assemblati

Order example for assembled sections

HDD 35•90 - MF / ME + F 35•30 + 43 - MD / MC + 43 - MC - N



CASAPPA®

FLUID POWER DESIGN

CASAPPA S.p.A. - Parma - Italy - Tel.: + 39 0521 304111 - Fax: + 39 0521 804600

CASAPPA Corp. - Batavia, IL 60510 U.S.A. - Phone: 630 761-0041 - Fax: 630 761-0048

CASAPPA GmbH - Plüderhausen - Germany - Tel.: + 49 (0)7181 989830 - Fax: + 49 (0)7181 989831

CASAPPA SARL - La Rochelle - France - Tel.: + 33 (0)5 46372433 - Fax: + 33 (0)5 46423907

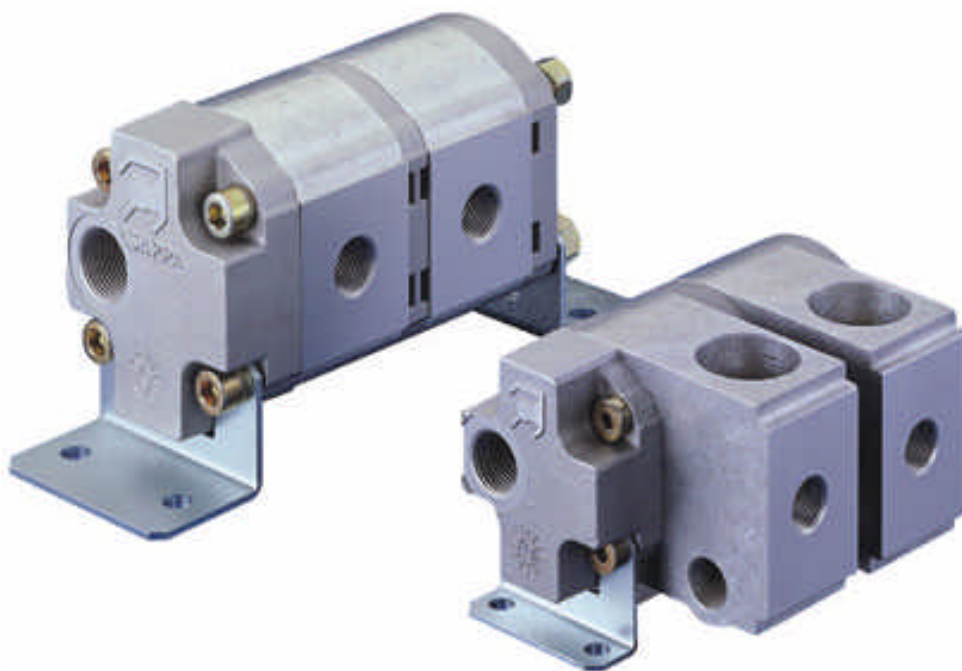
www.casappa.com
e-mail: info@casappa.com



Gear flow dividers

DISPLACEMENTS

From	2 cm ³ /rev
To	32,6 cm ³ /rev



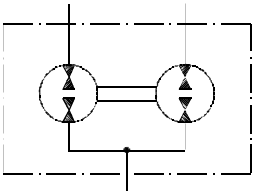
- Modular design
- Accurate division of flow
- Compact overall dimension
- Built-in relief valve

PRESSURE

Max. continuous	250 bar
Max. peak	280 bar

GENERAL FEATURES

Modern machinery with increasingly complex circuits often needs combinations of separate and independent movements. POLARIS 10 and POLARIS 20 flow dividers provide technically advanced, low cost power transmission and solve application problems wherever hydraulic flow has divided. In line with our policy of simplifying the design of hydraulic circuits, our flow dividers have relief valves built in to limit pressure and prevent cavitation. These components permit hydraulic circuits to be cleverly optimised and reduce installation costs. The POLARIS flow dividers are two or more section dividers with a common internal connecting shaft. This maintains a constant ratio between the flows through each section in accordance with section displacement. Theoretical working of rotary flow dividers do not dissipate energy in fact if the outlet pressure of one section drops below input pressure, that section operates as a motor and takes energy from the fluid. This energy is not wasted but transferred by the common shaft to the other sections which operate as pumps and therefore need outlet pressure to be greater than inlet pressure. In working conditions, overall efficiencies depend on the sum of the single sections efficiency. These products can therefore be used as flow equalizers, flow dividers and pressure intensifiers as shown in the table below.

	Outlet pressure	Sections with same displacement	Sections with different displacement
	Same	Flow equalizers	Flow dividers
	Different	Flow equalizers	Flow dividers
Pressure intensifiers			

Fluid	Mineral oil based hydraulic fluids to DIN 51524. For other fluids please consult our sales department.	
Fluid temperature range [°C]	-25 ÷ +80 with Buna N seals	
	-25 ÷ +110 with Viton V seals	
Fluid viscosity range [mm²/s] [cSt]	12 ÷ 100 recommended	
	Up to 750 permitted	

Filtering requirement	$\Delta p > 200$ bar	$\Delta p < 200$ bar
Contamination class NAS 1638	8	10
Contamination class ISO 4406	17/14	19/16
Achieved with filter $\beta_x = 75$	10 μm	25 μm

01/02.00

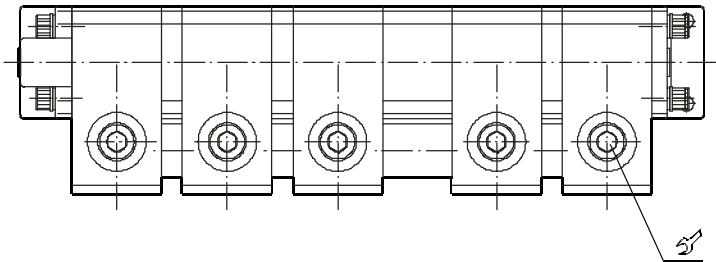
GENERAL FEATURES OF RELIEF VALVES

Relief valves allow the actuators to realign at the end of each cycle in both flow directions. As an example when the cylinders extend, they may not all reach their end stops exactly at the same time. In this case as soon as one cylinder reaches its stop, the relief valve in that section directs fluid to tank until all the other cylinders reach their stops. While retracting the relief valve acts as check valve and opens to prevent cavitation.

Relief settings valve and their identification code are listed in the table below.

Stamp code	Δp nominal setting (10 l/min)	Δp minimum begin opening valve
	[bar]	[bar]
34	35	32
4	50	46
22	60	54
23	70	66
6	80	76
7	100	96
17	120	116
8	125	120
9	140	135
26	150	145
10	160	155
11	175	170
35	180	174
12	190	184
33	206	199
14	210	203
15	230	222
16	250	242
27	260	252
20	280	271

Adjustable relief valves are available on request.



01/02.00

D024-D62/0200

GENERAL DATA

PLD 10

Type	Displacement	Max. outlet pressure		Max. outlet Δp between sections (1)	Speed		Flow per section	
		p_1	p_2		min.	max.	min.	max.
	cm ³ /rev	bar		bar	min ⁻¹		l/min	
PLD 10•2	2	250	280	200	1250	4200	2,65	8,9
PLD 10•3,15	3,1	250	280	200	1205	3990	3,99	13,2
PLD 10•4	4	250	280	200	1175	3840	4,98	16,2
PLD 10•5	4,9	250	280	200	1140	3680	6,04	19,5
PLD 10•6,3	6,2	250	280	200	1100	3500	7,29	23,2

 p_1 = Max. continuous pressure

 p_2 = Max. peak pressure

(1): Pressure intensifiers can work at higher pressure between sections.

For working conditions outside the recommended limits shown in the table, please consult our sales department.

MAX. FLOW
FOR INLET SECTION

35 l/min

01/02.00

GENERAL DATA

PLD 20

Type	Displacement	Max. outlet pressure		Max. outlet Δp between sections (1)	Speed		Flow per section	
		p_1	p_2		min.	max.	min.	max.
	cm ³ /rev	bar		bar	min ⁻¹		l/min	
PLD 20•4	4,8	250	280	200	1250	4100	6,16	20,2
PLD 20•6,3	6,5	250	280	200	1235	3970	8,12	26,1
PLD 20•8	8,3	250	280	200	1220	3850	10,05	31,65
PLD 20•11,2	11,1	250	280	200	1200	3660	13,42	40,85
PLD 20•14	14,4	250	280	200	1175	3460	17,03	50,02
PLD 20•16	16,6	200	230	200	1160	3335	19,47	55,88
PLD 20•20	20,8	200	230	200	1130	3125	23,83	65,7
PLD 20•25	26	200	230	200	1100	2900	28,9	76,21
PLD 20•31,5	32,6	200	230	200	1060	2660	34,84	87,39

 p_1 = Max. continuous pressure

 p_2 = Max. peak pressure

(1): Pressure intensifiers can work at higher pressure between sections.

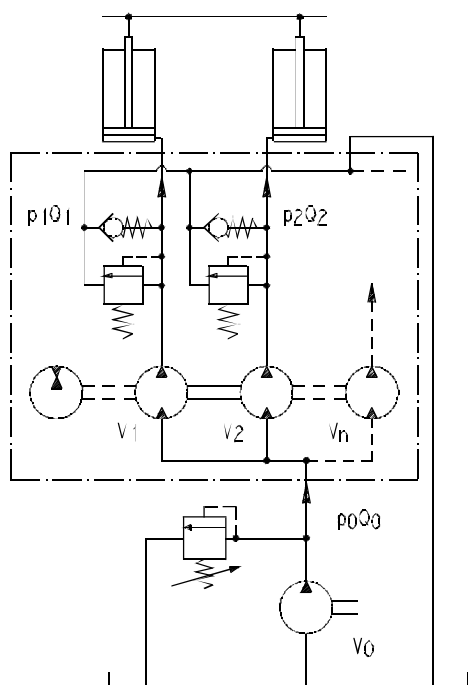
For working conditions outside the recommended limits shown in the table, please consult our sales department.

**MAX. FLOW
FOR INLET SECTION**
80 l/min

01/02.00

FLOW EQUALIZERS (WITH EQUAL DISPLACEMENTS)

Flow accuracy equalizers is within $\pm 2\%$ if they are rotating in the recommended speed range and the differential pressure between sections is less than 100 bar. When several single acting cylinders are operated together, acting on loads have not sufficient mass to win the circuit's resistance, we recommend a further gear section acting as a motor in order to guarantee the cylinders retract. The displacement of this motor should be roughly equal to the sum of the displacements of the other sections. Two typical circuit diagrams of applications where flow equalizers are utilized will be found on page 10.



D024-D02/1099

V = Displacement [cm³/rev]

Q = Flow [l/min]

p = Pressure [bar]

n = Speed [min⁻¹]

$$Q_0 = Q_1 + Q_2 + \dots + Q_n$$

$$p_0 Q_0 = p_1 Q_1 + p_2 Q_2 + \dots + p_n Q_n$$

$$V_{(..)} = \frac{1000 Q_{(..)}}{n}$$

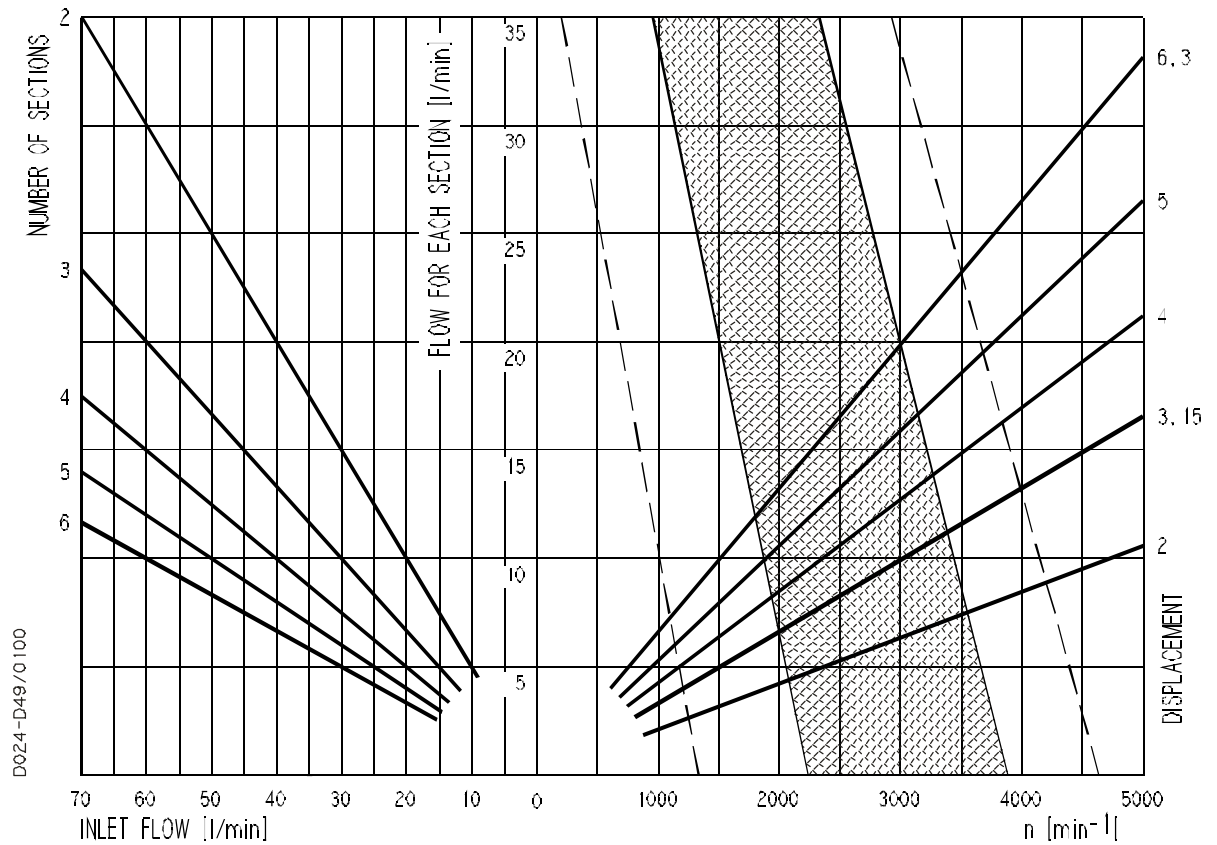
DISPLACEMENT SELECTION GUIDE EXAMPLE

Assume that it is necessary to supply power to two cylinders that require a flow rate of 40 [l/min] each. For simplicity's sake we will ignore pressure losses and the compression factor of the fluid. The pump must deliver a flow equal to: $Q_0 = Q_1 + Q_2 = 80$ [l/min]. To find the displacement of the two sections of the flow equalizer, simply locate the flow rate 80 [l/min] on the X axis and then ascend vertically until the line corresponding to the number of sections (2) is encountered; now trace a horizontal line to the right until encountering the lines referring to displacement. Select the displacement with the point of intersection on the graph that lies nearest to the maximum speed in optimum performance range.

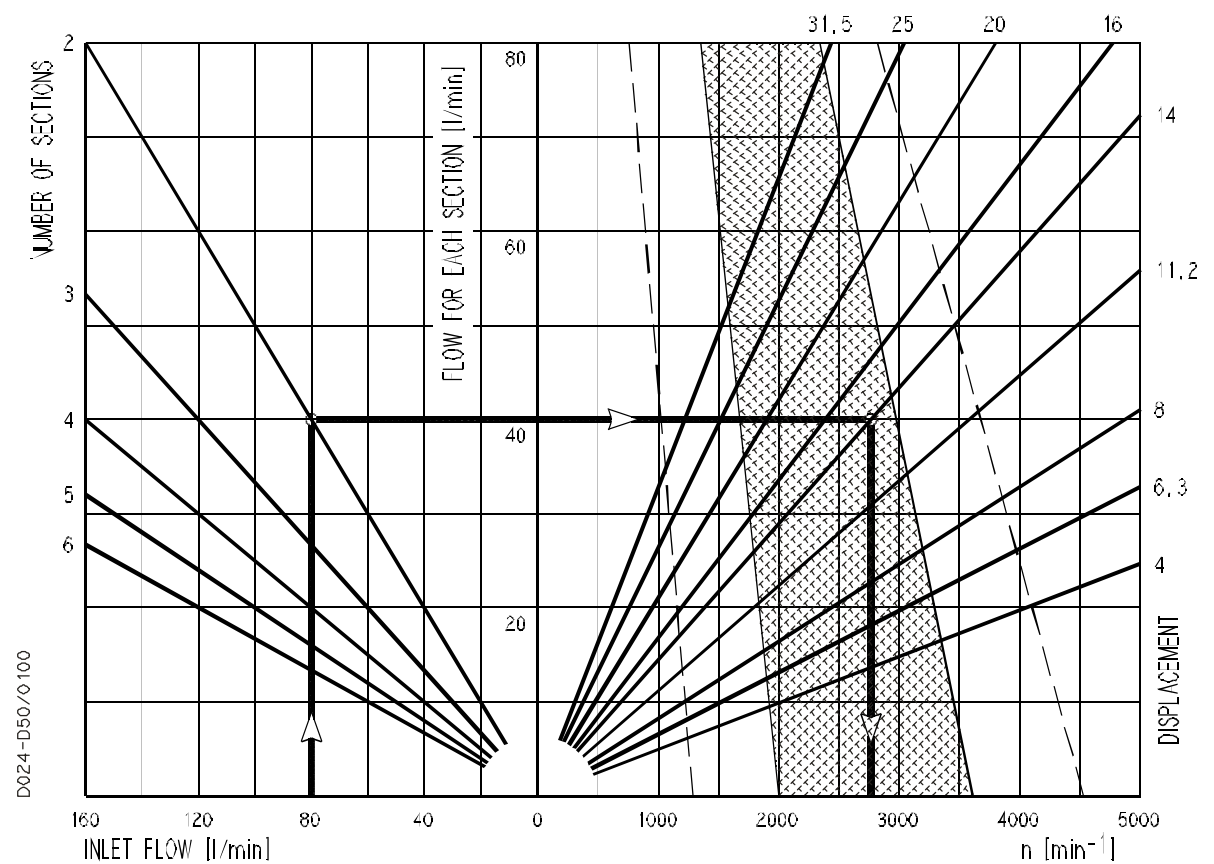
01/02.00

DISPLACEMENT SELECTION GUIDE

PLD 10



PLD 20



Performance range



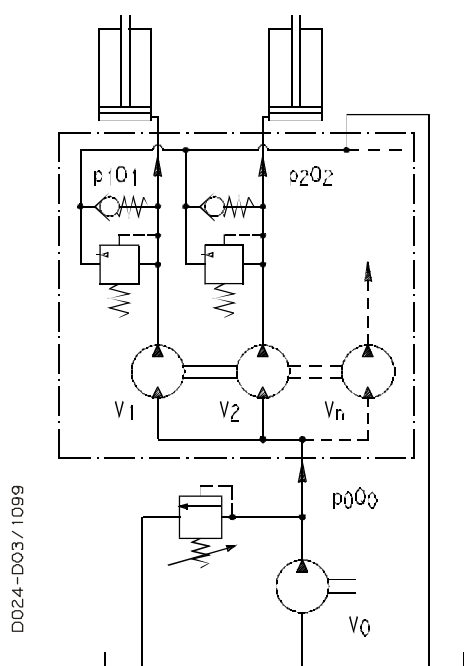
Optimum performance range

Each curve has been obtained at 50°C, using oil with viscosity 36 mm²/s at 40°C..

01/02.00

FLOW DIVIDERS (WITH UNEQUAL DISPLACEMENTS)

Flow dividers are used where the same pump must drive several different actuators requiring different pressures and flow rates. The displacement of each section must be proportional to the flow rate required by the actuator to which it is connected. Two typical circuit diagrams of applications where flow dividers are utilized will be found on page 11.



V = Displacement $[\text{cm}^3/\text{rev}]$

Q = Flow $[\text{l}/\text{min}]$

p = Pressure $[\text{bar}]$

n = Speed $[\text{min}^{-1}]$

$$Q_0 = Q_1 + Q_2 + \dots + Q_n$$

$$p_0 Q_0 = p_1 Q_1 + p_2 Q_2 + \dots + p_n Q_n$$

$$V_{(\dots)} = \frac{1000 Q_{(\dots)}}{n}$$

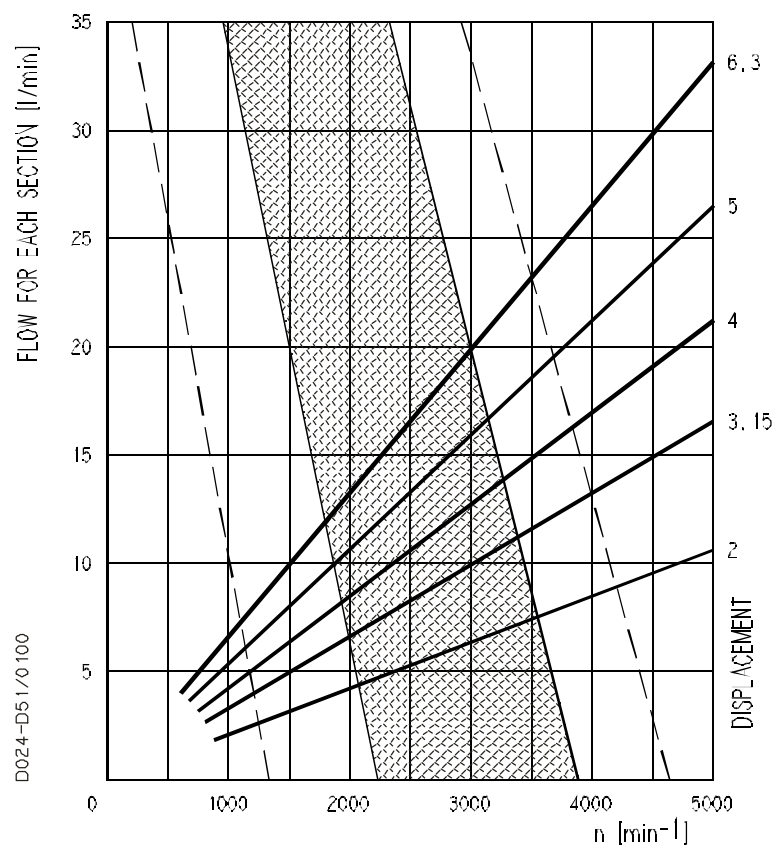
DISPLACEMENT SELECTION GUIDE EXAMPLE

Assume two actuators must be driven using 50 [l/min] and 20 [l/min] respectively. To find the displacement of the flow divider sections, simply locate the flow rates in question on the Y axis and then move across horizontally until the lines corresponding to the displacement are encountered. Select a displacement with points of intersection aligned as near as possible vertically, and the nearest to the maximum speed in optimum performance range.

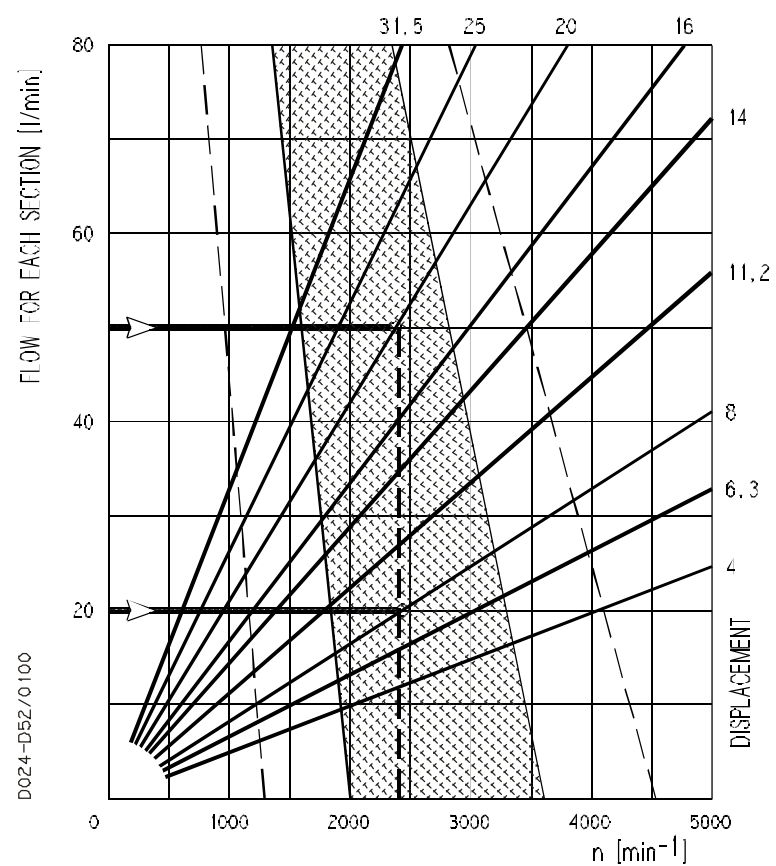
01/02.00

DISPLACEMENT SELECTION GUIDE

PLD 10



PLD 20



Performance range



Optimum performance range

Each curve has been obtained at 50°C, using oil with viscosity 36 mm²/s at 40°C.

TYPICAL CIRCUITS FOR FLOW EQUALIZERS (WITH EQUAL DISPLACEMENTS)

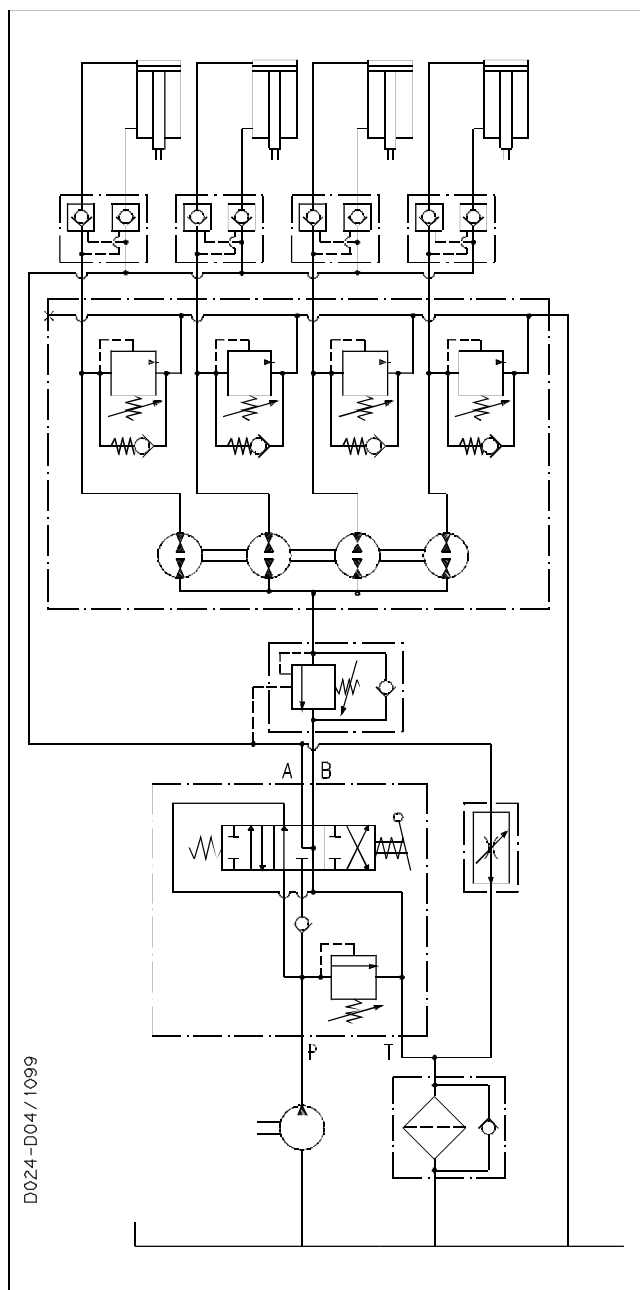


Diagram with a flow equalizer operating double-acting cylinders.

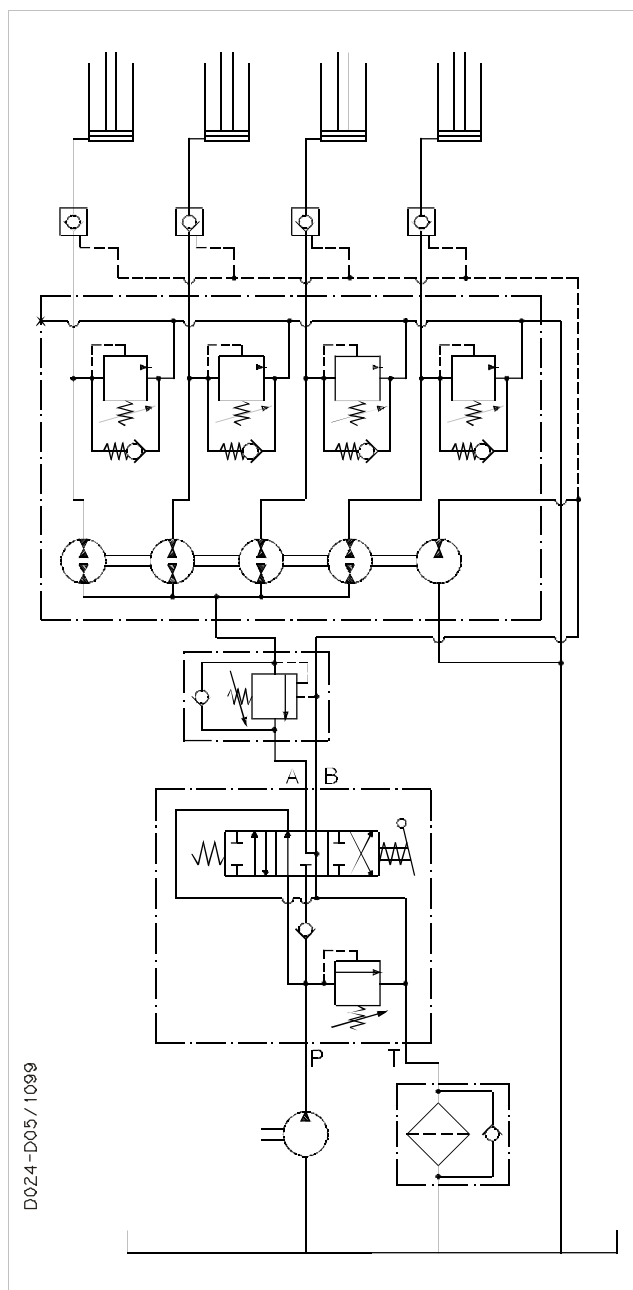


Diagram with a flow equalizer operating single acting cylinders.

TYPICAL CIRCUITS FOR FLOW DIVIDERS (WITH UNEQUAL DISPLACEMENTS)

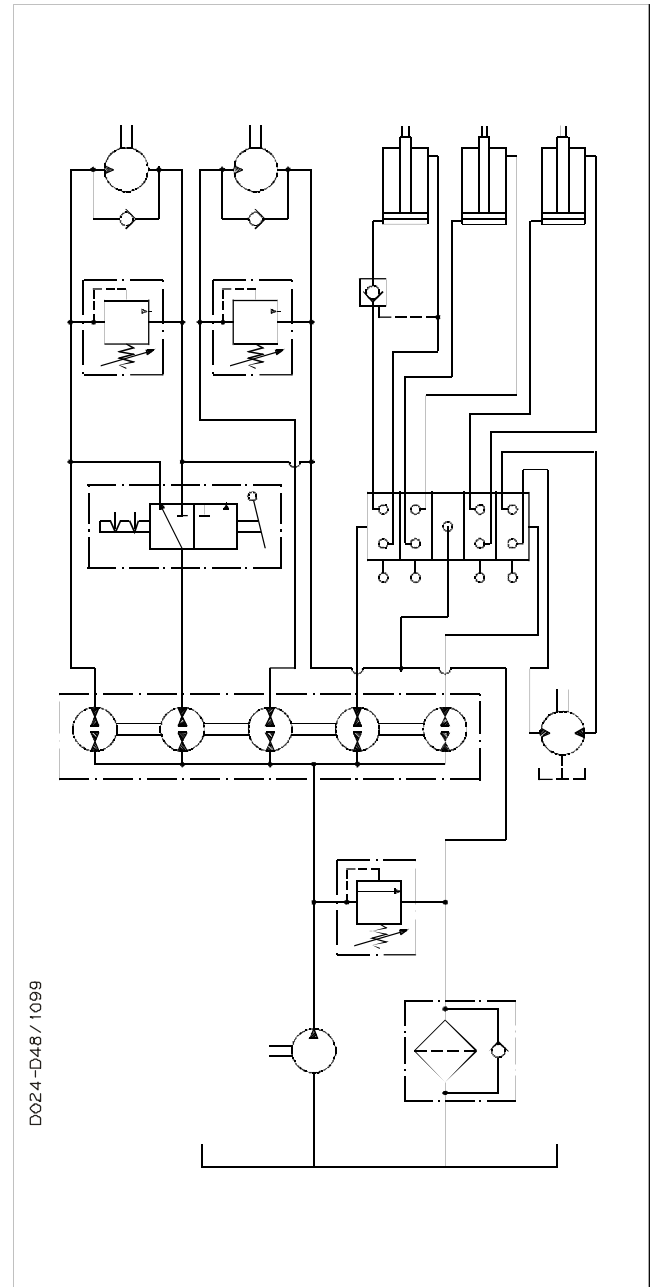
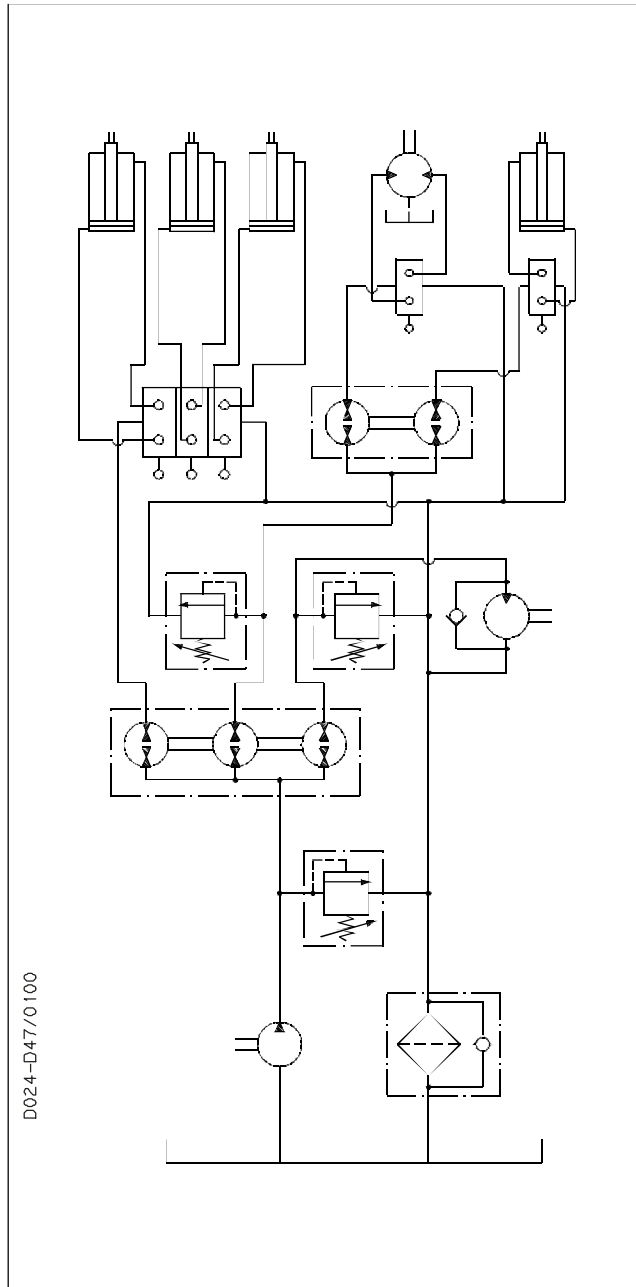


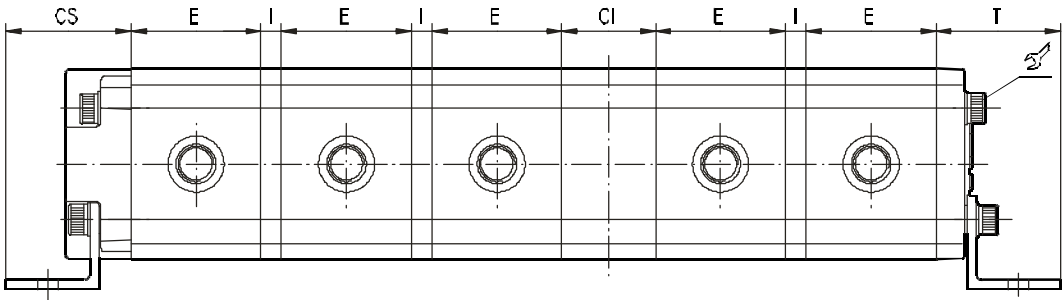
Diagram with a flow divider permitting the use of a single pump to drive a number of different actuators requiring flows at different pressures.

01/02.00

NOTES ABOUT COMPOSITION

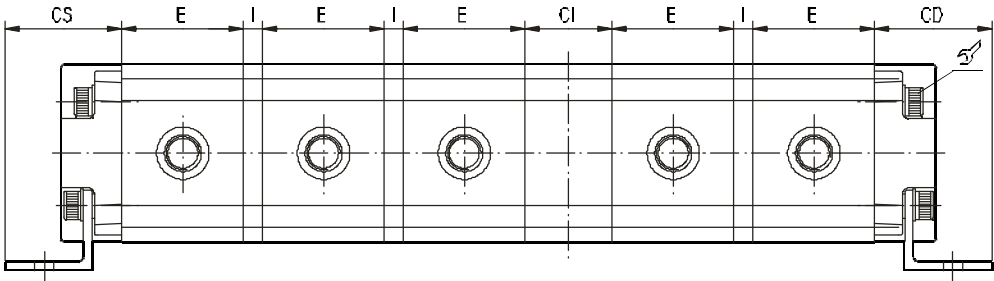
Flow divider sections are arranged in descending displacements or groups with the largest displacement to the left as viewed from the outlet ports side. Standard for mats of flow dividers are given below; for different configurations please consult our sales department.

STANDARD COMPOSITION FOR 5 SECTIONS



D024-D44/1099

COMPOSITION WITH ADDITIONAL INLET SECTION



D024-D25/0100

- CS Left inlet section kit
- E Section
- I Intermediate kit flange
- CI Intermediate inlet section kit
- T End cover kit
- CD Additional right inlet section kit (only for high delivery)

Type	Max. flow for inlet section
	l/min
PLD 10	35
PLD 20	80

Type	Tightening torque
	Nm
PLD 10	25
PLD 20	50

Replaces: 01/02.00

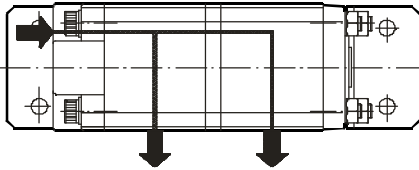
02/11.00

STANDARD COMPOSITIONS FOR SECTIONS WITH OR WITHOUT VALVE

Replaces: 01/02.00

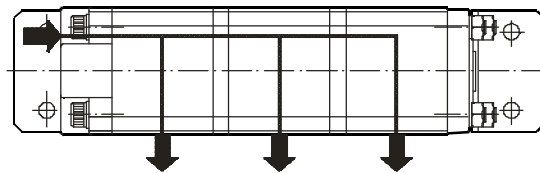
2 SECTIONS WITH 1 INLET SECTION

D024-D26/1099



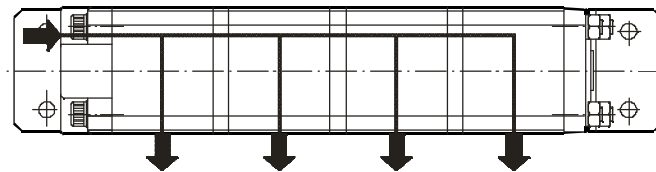
3 SECTIONS WITH 1 INLET SECTION

D024-D27/1099



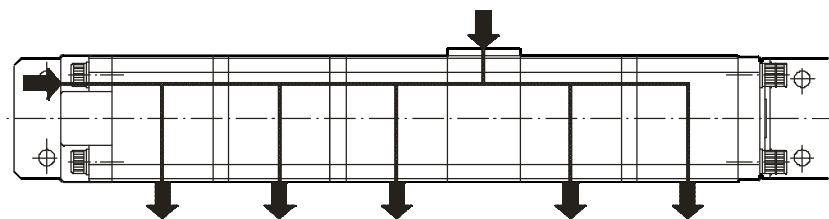
4 SECTIONS WITH 1 INLET SECTION

D024-D28/1099



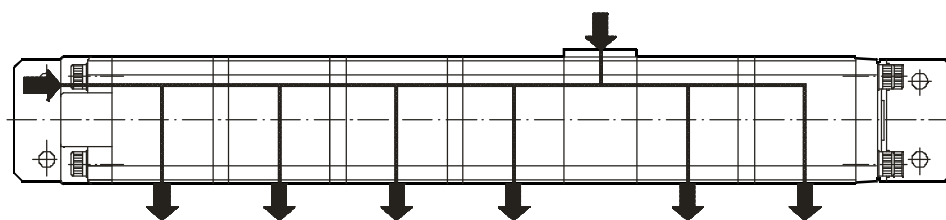
5 SECTIONS WITH 2 INLET SECTIONS

D024-D29/1099



6 SECTIONS WITH 2 INLET SECTIONS

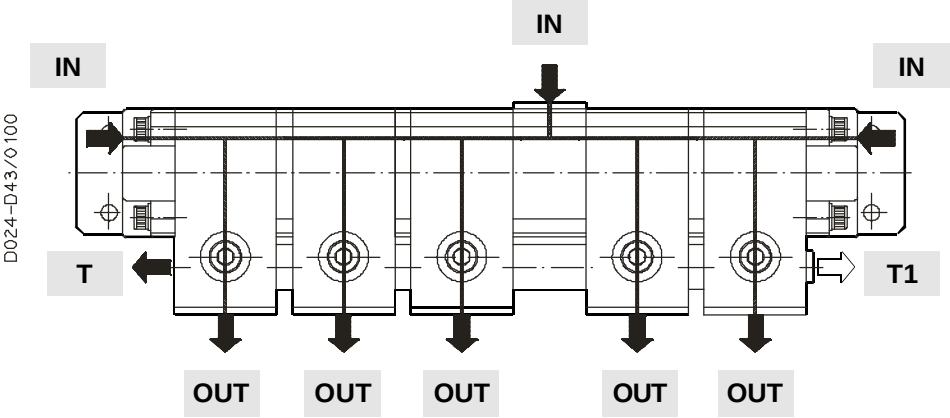
D024-D30/1099



02/11.00

Note: Combinations between different groups (PLD10 / PLD20) are available.
For more informations please consult our technical sales department.

PORTS DIMENSIONS



IN Inlet port
OUT Outlet port
T Drain port
T1 Additional drain port

PORTS	BSPP			ODT		
Type	IN	OUT	T - T1	IN	OUT	T - T1
PLD 10•2	GD	GC	GC	OB	OA	OA
PLD 10•3,15						
PLD 10•4						
PLD 10•5						
PLD 10•6,3						
PLD 20•4	GE	GD	GD	OD	OC	OB
PLD 20•6,3						
PLD 20•8						
PLD 20•11,2						
PLD 20•14						
PLD 20•16						
PLD 20•20						
PLD 20•25						
PLD 20•31,5						

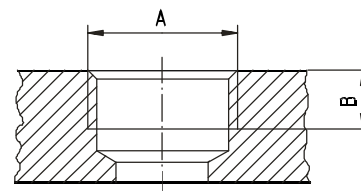
01/02.00

PORTS DIMENSIONS

BRITISH STANDARD PIPE PARALLEL (BSPP)

Code	Nominal size	A	B
			mm (in)
GC	3/8	G 3/8	14 (0.551)
GD	1/2	G 1/2	14 (0.551)
GE	3/4	G 3/4	18 (0.709)

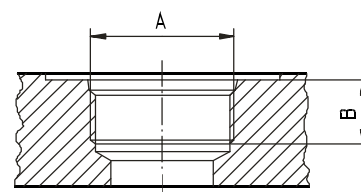
D024-D45 / 1099



SAE STRAIGHT THREAD PORTS (ODT)

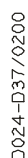
Code	Nominal size	A	B
			mm (in)
OA	3/8	9/16-18 UNF-2B	15 (0.591)
OB	1/2	3/4-16 UNF-2B	14 (0.551)
OC	5/8	7/8-14 UNF-2B	17 (0.669)
OD	3/4	1-1/16-12 UN-2B	20 (0.787)

D024-D46 / 1099



01/02.00

PLD 10



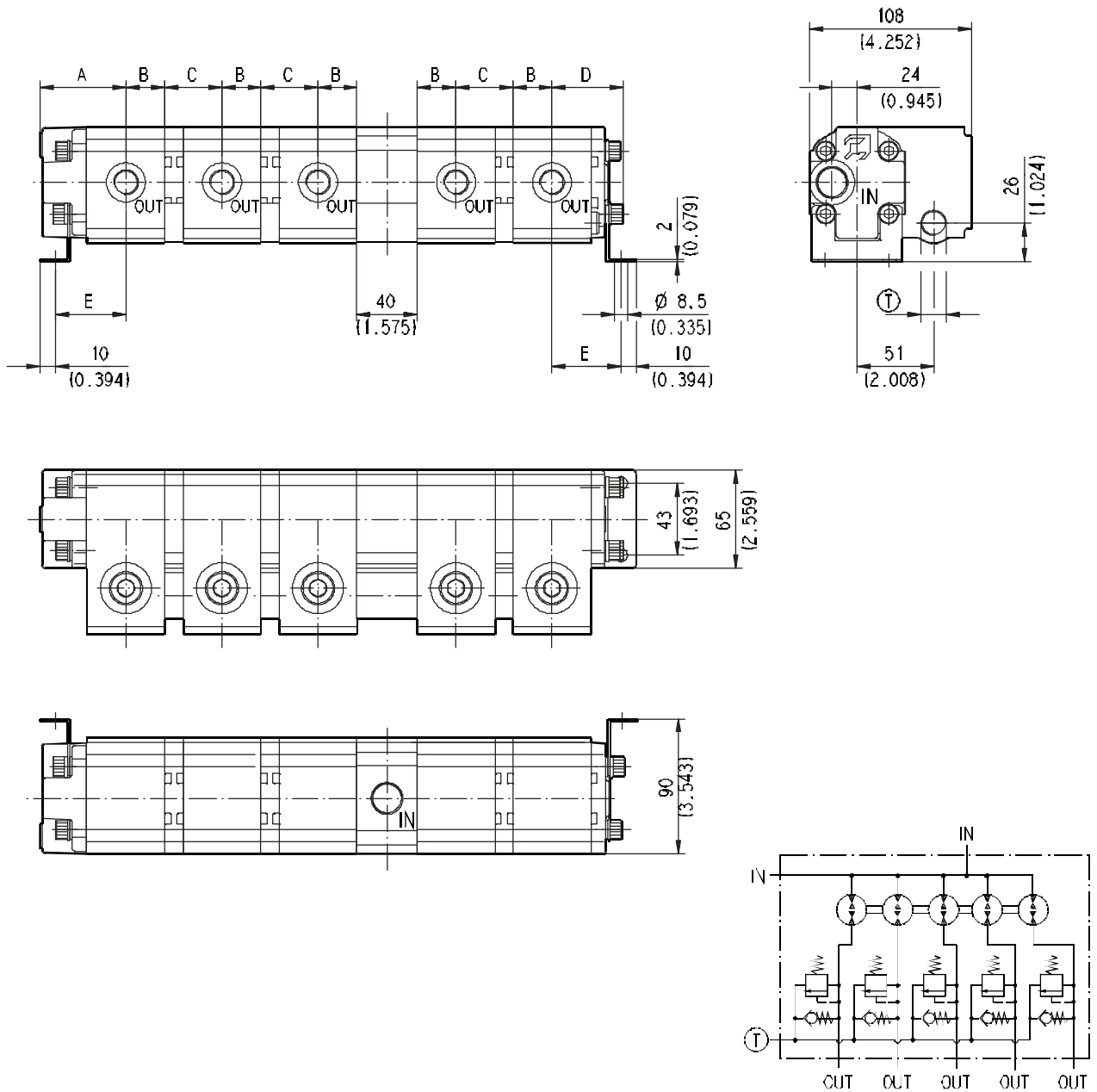
01/02.00

D024-002

SAME GROUP DIMENSIONS WITH VALVE

PLD 10

D024-D38/0200



IN, OUT and T ports dimensions are shown on page 14 and page 15.

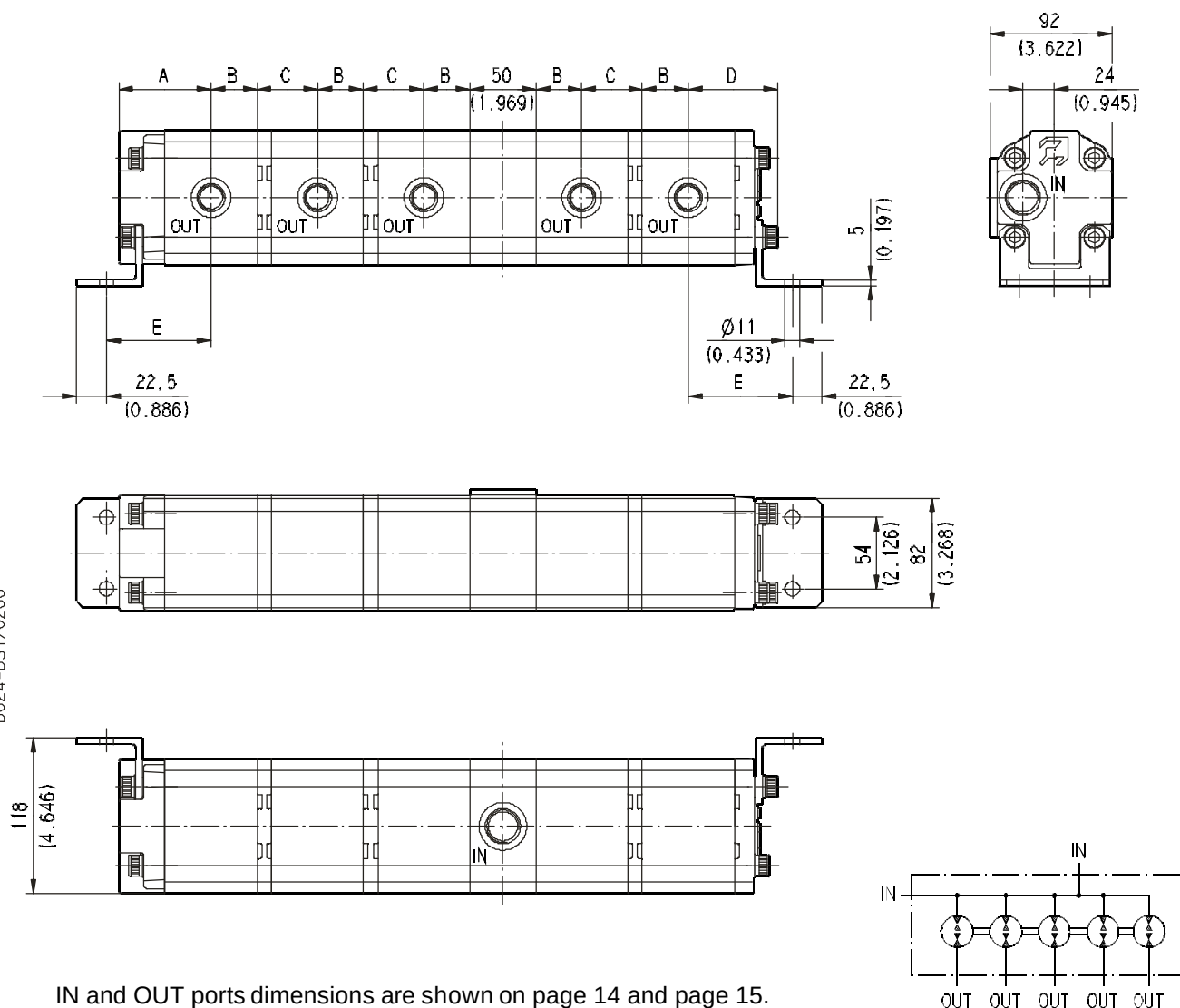
Type	A	B	C	D	E
	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)
PLD 10•2	50,2 (1.976)	19,2 (0.756)	31,2 (1.228)	41,8 (1.646)	40,3 (1.587)
PLD 10•3,15	52 (2.047)	21 (0.827)	33 (1.299)	43,6 (1.717)	42,1 (1.657)
PLD 10•4	53,4 (2.102)	22,4 (0.882)	34,4 (1.354)	45 (1.772)	43,5 (1.713)
PLD 10•5	55 (2.165)	24 (0.945)	36 (1.417)	46,6 (1.835)	45,1 (1.776)
PLD 10•6,3	57 (2.244)	26 (1.024)	38 (1.496)	48,6 (1.913)	47,1 (1.854)

01/02.00

SAME GROUP DIMENSIONS

PLD 20

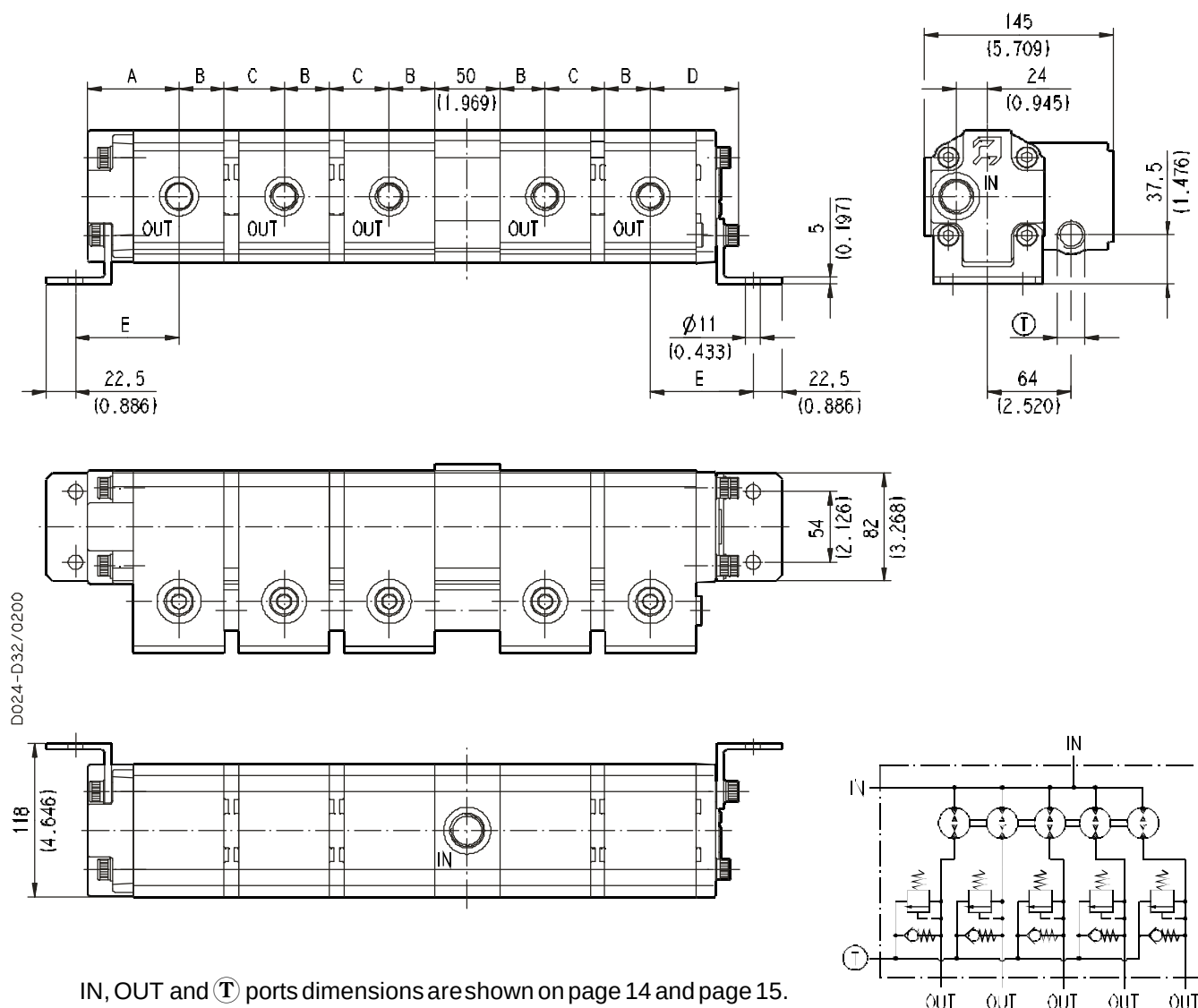
D024-D31/0200



Type	A	B	C	D	E
	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)
PLD 20•4	60,8 (2.394)	25,5 (1.016)	36,8 (1.449)	58,8 (2.315)	69,8 (2.748)
PLD 20•6,3	62 (2.441)	27 (1.063)	38 (1.496)	60 (2.362)	71 (2.795)
PLD 20•8	63,3 (2.492)	28,3 (1.114)	39,3 (1.547)	61,3 (2.413)	72,3 (2.846)
PLD 20•9	63,9 (2.516)	28,9 (1.138)	39,9 (1.571)	61,9 (2.437)	72,9 (2.870)
PLD 20•11,2	65,5 (2.579)	30,5 (1.201)	41,5 (1.634)	63,5 (2.500)	74,5 (2.933)
PLD 20•14	68 (2.677)	33 (1.299)	44 (1.732)	66 (2.598)	77 (3.031)
PLD 20•16	69,8 (2.748)	34,8 (1.370)	45,8 (1.803)	67,8 (2.669)	78,8 (3.102)
PLD 20•20	73 (2.874)	38 (1.496)	49 (1.929)	71 (2.795)	82 (3.228)
PLD 20•25	77 (3.031)	42 (1.654)	53 (2.087)	75 (2.795)	86 (3.386)
PLD 20•31,5	82 (3.228)	47 (1.850)	58 (2.283)	80 (3.150)	91 (3.583)

01/02.00

SAME GROUP DIMENSIONS WITH VALVE

PLD 20

Type	A	B	C	D	E
	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)
PLD 20•4	60,8 (2.394)	25,5 (1.016)	36,8 (1.449)	58,8 (2.315)	69,8 (2.748)
PLD 20•6,3	62 (2.441)	27 (1.063)	38 (1.496)	60 (2.362)	71 (2.795)
PLD 20•8	63,3 (2.492)	28,3 (1.114)	39,3 (1.547)	61,3 (2.413)	72,3 (2.846)
PLD 20•9	63,9 (2.516)	28,9 (1.138)	39,9 (1.571)	61,9 (2.437)	72,9 (2.870)
PLD 20•11,2	65,5 (2.579)	30,5 (1.201)	41,5 (1.634)	63,5 (2.500)	74,5 (2.933)
PLD 20•14	68 (2.677)	33 (1.299)	44 (1.732)	66 (2.598)	77 (3.031)
PLD 20•16	69,8 (2.748)	34,8 (1.370)	45,8 (1.803)	67,8 (2.669)	78,8 (3.102)
PLD 20•20	73 (2.874)	38 (1.496)	49 (1.929)	71 (2.795)	82 (3.228)
PLD 20•25	77 (3.031)	42 (1.654)	53 (2.087)	75 (2.952)	86 (3.386)
PLD 20•31,5	82 (3.228)	47 (1.850)	58 (2.283)	80 (3.150)	91 (3.583)

01/02.00

HOW TO ORDER

Only for version
with valve

1 2 3 4 5 6 5 6 7 4 5 6 8 4 9 10 11 12

PLD 20 / 3 / CS - GE / 25 - GD / 25 - GD / CI - GE / 25 - GD / CD - GE / VPEF - 50 - GD - V

Series / Left inlet section / Section / Section / Interm. inlet section / Section / Right inlet section / Relief valve

1	Series	CODE
Polaris 10		PLD 10
Polaris 20		PLD 20

2	Number of sections	CODE
From 2 to 6 sections		2 ... 6

3	Standard side inlet section	CODE
Left inlet section (1)		CS

4	Inlet port dimensions	CODE
BRITISH STANDARD PIPE PARALLEL (BSPP)		
PLD 10		GD
PLD 20		GE
SAE STRAIGHT THREAD PORTS (ODT)		
PLD 10		OB
PLD 20		OD

5	Displacement	CODE
	cm ³ /rev	
Polaris 10		
2		PLD 10-2
3,1		PLD 10-3,15
4		PLD 10-4
4,9		PLD 10-5
6,2		PLD 10-6,3
Polaris 20		
4,8		PLD 20-4
6,5		PLD 20-6,3
8,3		PLD 20-8
11,1		PLD 20-11,2
14,4		PLD 20-14
16,6		PLD 20-16
20,8		PLD 20-20
26,		PLD 20-25
32,6		PLD 20-31,5

CODE	Outlet port dimensions	6
BRITISH STANDARD PIPE PARALLEL (BSPP)		
GC	PLD 10	
GD	PLD 20	
SAE STRAIGHT THREAD PORTS (ODT)		
OA	PLD 10	
OC	PLD 20	

CODE	Intermediate inlet section (2)	7
CI	Intermediate inlet section	

CODE	Supplementary inlet section (2)	8
CD	Right inlet section (1)	

CODE	Relief valve	9
VPEF	Relief valve	

CODE	Valve setting [bar]	10
....	See page 3	

CODE	T Outlet port dimensions	11
BRITISH STANDARD PIPE PARALLEL (BSPP)		
GC	PLD 10	
GD	PLD 20	
SAE STRAIGHT THREAD PORTS (ODT)		
OA	PLD 10	
OB	PLD 20	

CODE	Seals	12
....	Buna (3)	
V	Viton	

(1) Looking at the sections from the outlet ports side.

(2) Choice the inlet sections number according to the general data on page 4 and 5.

(3) Omit this code for Buna seals.

Replaces: 01/02.00

02/11.00