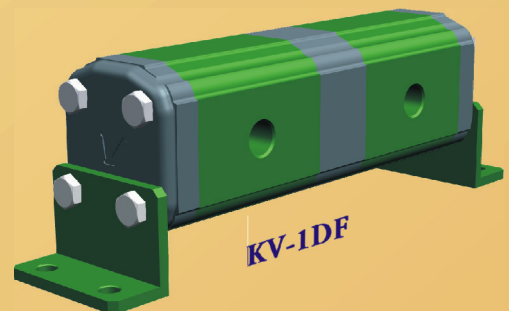
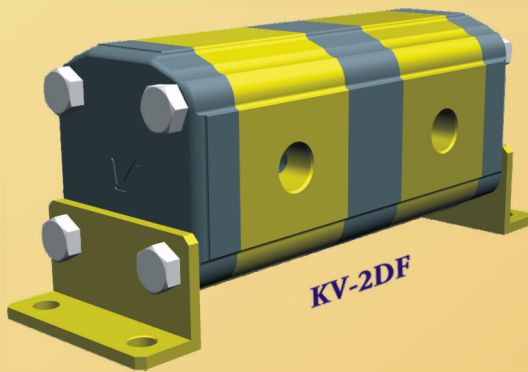
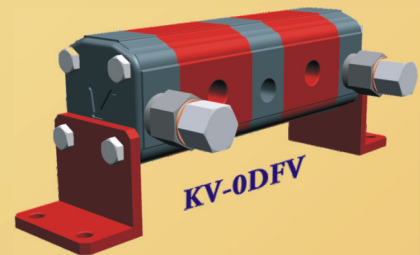
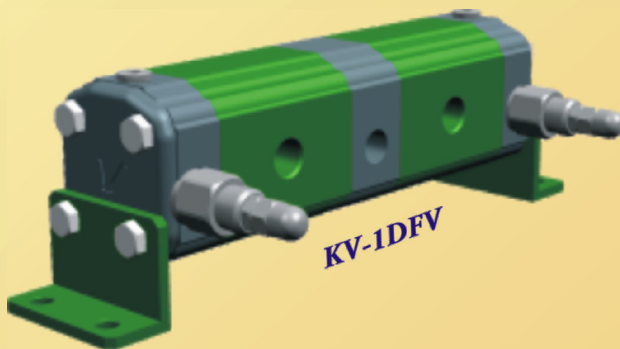
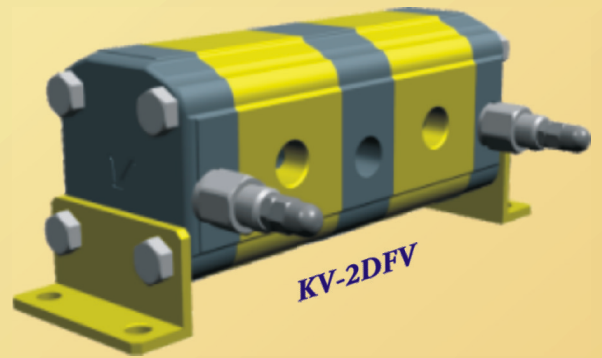
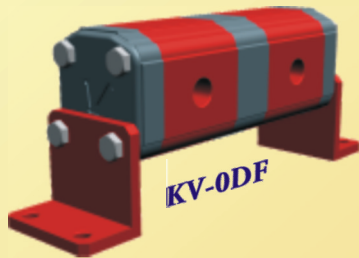


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WEB ADDRESS: [www.vivoil.com](http://www.vivoil.com)



English

## Flow dividers

On-line version  
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**TECHNICAL COMMUNICATION**



## **1 INTRODUCTION**

- 1.1 Summary description of flow dividers
- 1.2 Most frequent applications of flow dividers
- 1.3 Sizes of flow dividers
- 1.4 Flow dividers with and without valves
- 1.5 Number of divider elements



## 1 INTRODUCTION

### 1.1 Summary description of flow dividers

A flow divider is made up of *two or more* modular elements (sections) with gears mechanically linked by an internal shaft 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 of a fluid-mechanical nature, i.e. a flow of oil under pressure parallelly supplies the modular elements, which are in turn connected to the hydraulic circuits serving the users.

The portion of flow utilized by each element is solely determined by its nominal flow rate. Therefore, unlike standard static dividers with variable ports, the flow dividers do not cause dissipation and are also much more precise.

The use of flow dividers in a system reduces the number of pumps necessary as well as the associated individual mechanical power takeoffs and complex mechanical couplers (with greater losses).

Leaving aside small losses for the time being, at any given moment the total input power is equal to the sum of the powers supplied by all elements making up the flow divider.

Therefore, if in an interval 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.

### 1.2 Most frequent applications of flow dividers:

**1.2.1** 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.

### 1.2.2 Pressure amplifiers.

When in a hydraulic system one user requires a much higher operating or peak pressure than all the others, it is more convenient to supply it by means of a flow divider than to upgrade the whole system to work with higher pressure.

With a two-element flow divider flow may be discharged from the outlet of one element so that the pressure in the other will become much higher than that of the pump supplying the system.

Examples of this kind of application:

- presses with rapid approach
- machine tools

## 1.3 Sizes of flow dividers

The first general classification of flow dividers is made according to size; they may be divided into three groups:

- Group 0
- Group 1
- Group 2

Group 0 comprises dividers with small powers and dimensions, displacements ranging from 0,24 to 2,28 cm<sup>3</sup>/revolution.

Group 1 comprises dividers with medium powers and dimensions, displacements ranging from 0,91 to 9,88 cm<sup>3</sup>/revolution.

Group 2 is characterized by higher powers and dimensions and displacements ranging from 4.2 to 39,6 cm<sup>3</sup>/revolution.

## 1.4 Flow dividers with and without valves

The flow dividers may be supplied with or without phase correction valves that correct any small phase errors occurring in each cycle between two or more hydraulic cylinders.



## 1.5 Number of divider elements

ne = number of elements comprising a divider.

In a complex system it often becomes necessary to subdivide a circuit supplied by the same pump into several independent sections.

Examples:

- a. *Simultaneous movement of several hydraulic motors or cylinders which must be kept in phase.*

An optimal solution for this problem is a flow divider that separately supplies each hydraulic motor or cylinder.

- b. *Movement of several hydraulic motors and / or cylinders with different operating cycles at a constant pre-established speed.*

In general, non-simultaneous operation results in considerable variations in the flow rate and pressure in each actuator, which alter their regular movement. Adopting a flow divider that separately supplies each hydraulic motor and / or cylinder will solve the problem since the delivery flow rates and pressures are solely determined by the flow rates of the elements making up the divider.

- c. *Hydraulic motors or cylinders that require pressures greater than the maximum pressure within the circuit.*

As mentioned previously, a flow divider can solve this problem. In the divider you must have one or more elements from which flow is discharged.

Therefore:

$N_e =$  number of cylinders or motor that require separate supply +  $N_s$

where  $N_s$  is the number of elements from which flow is to be discharged, calculated taking into account the pressure values (normal and amplified) and the corresponding flow rates.



## **2 TECHNICAL FEATURES**

- 2.1 [Flow dividers group 0 - Red series](#)
- 2.2 [Flow dividers group 1 - Green series](#)
- 2.3 [Flow dividers group 2 - Yellow series](#)
- 2.4 [General structure of divider codes](#)
- 2.5 [Examples of divider coding Red Series](#)
- 2.6 [Examples of divider coding Green Series](#)
- 2.7 [Examples of divider coding Yellow Series](#)



Whenever you find this image you can click with the left button of the mouse to open the technical sheet in the PDF format. To save the technical sheet, click with the right button and select "Save as..."

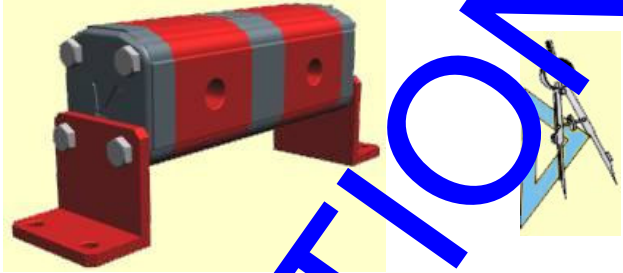


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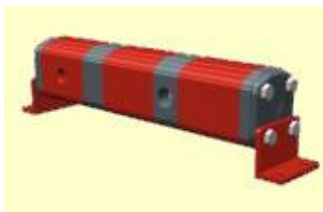
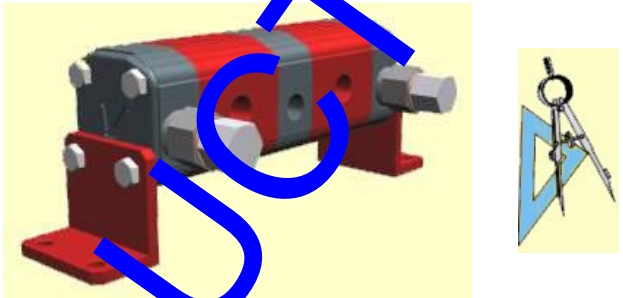
## KV-ODF

FLOW DIVIDER

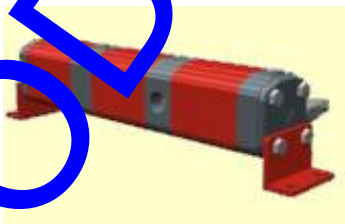


## KV-ODFV

FLOW DIVIDER WITH PHASE CORRECTION VALVES



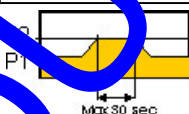
**KV-ODF+OM**  
FLOW DIVIDER WITH MOTOR



**KV-ODFV+OM**  
FLOW DIVIDER WITH VALVES AND MOTOR

TYPE	Displacement cm <sup>3</sup> /rev	Flow rate of one element l/min.			Number of gear revolutions rpm			D P (*) bar	MAX Pressure bars		Weight kg
		Min.	Rec.	Max	Min.	Rec.	Max		P1	P2	
KV-ODF ODFV /0.25	0.24	0.300	0.430	0.750	1200	1800	3000	30	210	250	0.410
KV-ODF ODFV /0.35	0.35	0.540	0.810	1.350	1200	1800	3000	30	210	250	0.420
KV-ODF ODFV /0.47	0.47	0.684	1.044	1.710	1200	1800	3000	30	210	250	0.430
KV-ODF ODFV /0.70	0.70	0.912	1.404	2.280	1200	1800	3000	30	210	250	0.440
KV-ODF ODFV /0.98	0.98	1.176	1.746	2.940	1200	1800	3000	30	210	250	0.460
KV-ODF ODFV /1.27	1.30	1.524	2.340	3.810	1200	1800	3000	30	210	250	0.480
KV-ODF ODFV /1.52	1.56	1.824	2.808	4.560	1200	1800	3000	30	210	250	0.500
KV-ODF ODFV /2.00	2.28	2.750	4.104	6.900	1200	1800	3000	30	210	250	0.520

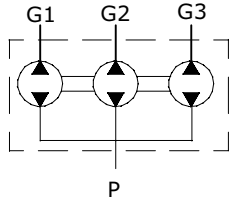
(\* ) Max pressure difference between the various sections



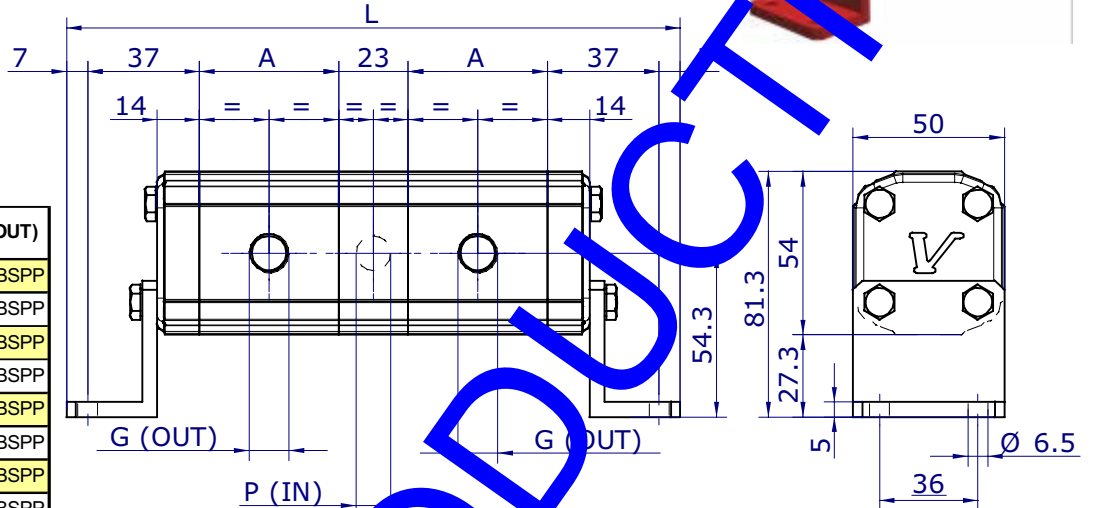
P1 = Operating pressure  
P2 = Peak pressure

The flow division error between one element and another is  $\leq 3\%$

Provided that the values of the table and the data indicated below are complied with  
 Ambient temperature:  $-10^{\circ}\text{C} \div +60^{\circ}\text{C}$   
 Oil temperature:  $+30^{\circ}\text{C} \div +60^{\circ}\text{C}$   
 Mineral-base hydraulic oil hlp, hv (din 51524)  
 Oil viscosity  $20 \div 40$  cSt  
 Oil filtering  $10 \div 25$   $\mu$



**KV-0DF**



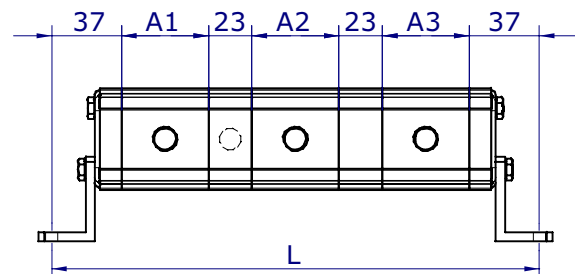
TIPO Type	A	G (OUT)
KV-0DF / 0.25	29,9	1/4" BSPP
KV-0DF / 0.45	31,5	1/4" BSPP
KV-0DF / 0.57	32,5	1/4" BSPP
KV-0DF / 0.76	34	1/4" BSPP
KV-0DF / 0.98	35,5	1/4" BSPP
KV-0DF / 1.27	38	1/4" BSPP
KV-0DF / 1.52	40	1/4" BSPP
KV-0DF / 2.30	46	1/4" BSPP

**P (IN) BSPP**

TIPO Type	NUMERO DI ELEMENTI CHE COMPONGONO IL DIVISORE QUANTITY OF ELEMENTS COMPOSING THE DIVIDER														
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
ODF / 0.25	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"
ODF / 0.45	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"
ODF / 0.57	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"
ODF / 0.76	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 3/8"	1 x 3/8"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"
ODF / 0.98	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 3/8"	1 x 3/8"	2 x 1/4"	2 x 1/4"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"
ODF / 1.27	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 3/8"	1 x 3/8"	2 x 1/4"	2 x 1/4"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"
ODF / 1.52	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 3/8"	1 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"
ODF / 2.30	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 3/8"	1 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"

$L = (n - 1) \times 23 + 74 + A_1 + A_2 + A_3 + \dots + A_n$

n = Numero di elementi del Divisore  
n = Number of elements making up Divider

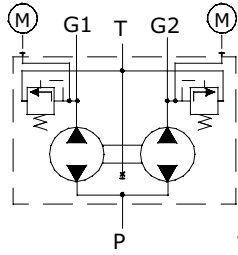


**ESEMPIO**

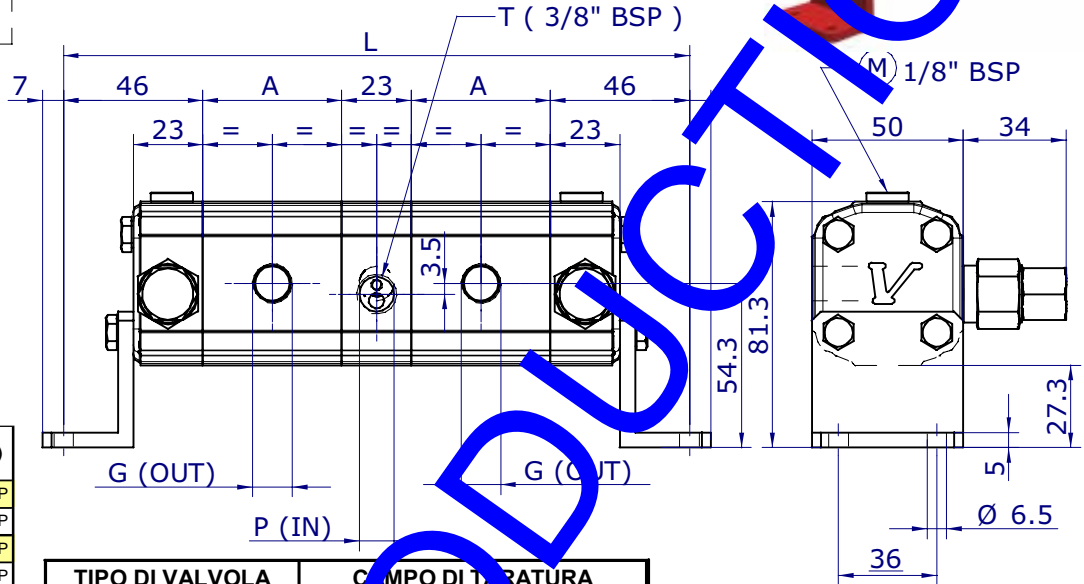
Per ottenere la lunghezza totale (L) di un divisore a tre elementi (n=3), di TIPO KV-0DF/0.76 x 3  
 $L = (n-1) \times 23 + 74 + A_1 + A_2 + A_3 = (3-1)23 + 74 + 34 + 34 + 34 = 222 \text{ mm}$

**ESAMPLIO**

To obtain the total length (L) of a three-element divider (n=3), the element being TYPE KV-0DF/0.76 x 3  
 $L = (n-1) \times 23 + 74 + A_1 + A_2 + A_3 = (3-1)23 + 74 + 34 + 34 + 34 = 222 \text{ mm}$



**KV-0DFV**



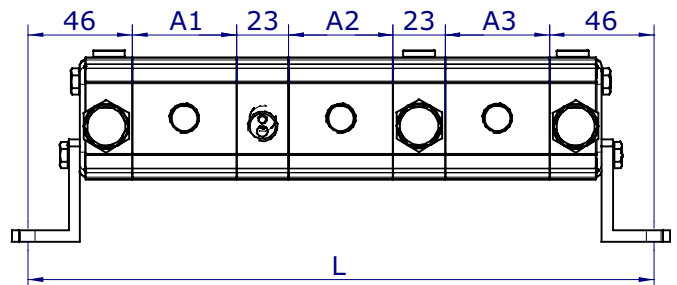
TIPO Type	A	G (OUT)
KV-0DF / 0.25	29.9	1/4" BSPP
KV-0DF / 0.45	31.5	1/4" BSPP
KV-0DF / 0.57	32.5	1/4" BSPP
KV-0DF / 0.76	34	1/4" BSPP
KV-0DF / 0.98	35.5	1/4" BSPP
KV-0DF / 1.27	38	1/4" BSPP
KV-0DF / 1.52	40	1/4" BSPP
KV-0DF / 2.30	46	1/4" BSPP

TIPO DI VALVOLA VALVE TYPE	CAMPO DI TEMPERATURA SETTING RANGE	
	CODE 01	CODE 02
VM 25DIF	20 ÷ 140 bar	70 ÷ 315 bar

TIPO Type	NUMERO ELEMENTI CHE COMPONGONO IL DIVISORE QUANTITY OF ELEMENTS COMPOSING THE DIVIDER															
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
0DF / 0.25	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"
0DF / 0.45	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"
0DF / 0.57	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"
0DF / 0.76	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 3/8"	1 x 3/8"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 1/4"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"
0DF / 0.98	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 3/8"	1 x 3/8"	2 x 1/4"	2 x 1/4"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"
0DF / 1.27	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 3/8"	1 x 3/8"	2 x 1/4"	2 x 1/4"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"
0DF / 1.52	1 x 1/4"	1 x 1/4"	1 x 1/4"	1 x 3/8"	1 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"
0DF / 2.30	1 x 1/4"	1 x 1/4"	1 x 3/8"	1 x 3/8"	1 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"	3 x 3/8"

$$L = (n-1) \times 23 + 92 + A1 + A2 + A3 + \dots + An$$

n = Numero Elementi del Divisore  
n = Number of elements making up Divider



ESEMPLO:

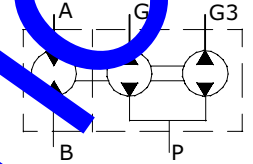
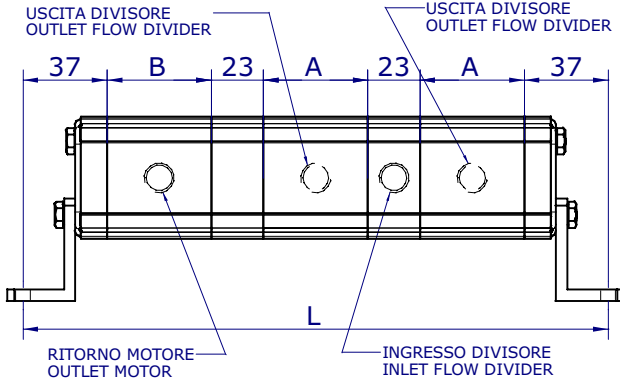
Per ottenere la lunghezza totale (L) di un divisore a tre elementi (n=3), di TIPO KV-0DFV/0.76 x 3  
 $L = (n-1) \times 23 + 92 + A1 + A2 + A3 = (3-1) \times 23 + 92 + 34 + 34 + 34 = 240 \text{ mm}$

ESAMPI:

Per ottenere la lunghezza totale (L) di un divisore a tre elementi (n=3), di TIPO KV-0DFV/0.76 x 3  
 $L = (n-1) \times 23 + 92 + A1 + A2 + A3 = (3-1) \times 23 + 92 + 34 + 34 + 34 = 240 \text{ mm}$

**DIVISORE DI FLUSSO CON MOTORE**  
**FLOW DIVIDER WITH MOTOR**

**KV-0DF+0M**



$$L = (n-1) \times 23 + 74 + B + A1 + A2 + A3 + \dots + An$$

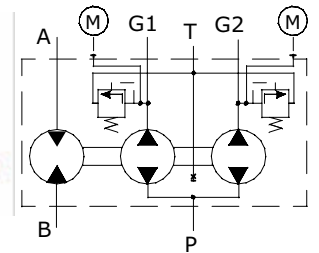
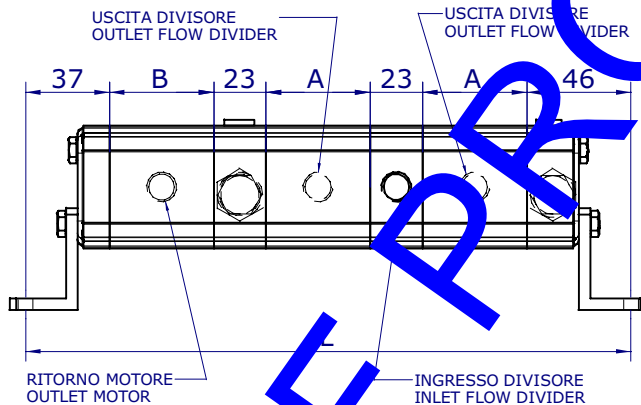
n = Numero di elementi del Divisore compreso il motore  
n = Quantity of elements of the divider including the motor

ESEMPIO: Per ottenere la lunghezza totale (L) di un divisore a due elementi con motore (n=3), di TIPO KV-0DF/0.76x2+0M/1.52  
 $L = (n-1) \times 23 + 74 + B + A1 + A2 + A3 = (3-1) \times 23 + 74 + 40 + 34 + 34 = 228 \text{ mm}$

EXAMPLE: To obtain the total length (L) of a two element divider with motor (n=3), Type KV-0DF/0.76x2+0M/1.52  
 $L = (n-1) \times 23 + 74 + B + A1 + A2 + A3 = (3-1) \times 23 + 74 + 40 + 34 + 34 = 228 \text{ mm}$

**DIVISORE DI FLUSSO CON MOTORE E VALVOLA**  
**FLOW DIVIDERS WITH VALVES AND MOTOR**

**KV-0DFV+0M**



$$L = (n-1) \times 23 + 83 + B + A1 + A2 + A3 + \dots + An$$

n = Numero di elementi del Divisore compreso il motore  
n = Quantity of elements of the divider including the motor

ESEMPIO: Per ottenere la lunghezza totale (L) di un divisore a due elementi con motore (n=3), di TIPO 0DFV/0.76x2+0M/1.52  
 $L = (n-1) \times 23 + 83 + B + A1 + A2 + A3 = (3-1) \times 23 + 83 + 40 + 34 + 34 = 237 \text{ mm}$

EXAMPLE: To obtain the total length (L) of a two element divider with motor (N=3), Type KV-0DFV/0.76x2+0M/1.52  
 $L = (n-1) \times 23 + 83 + B + A1 + A2 + A3 = (3-1) \times 23 + 83 + 40 + 34 + 34 = 237 \text{ mm}$

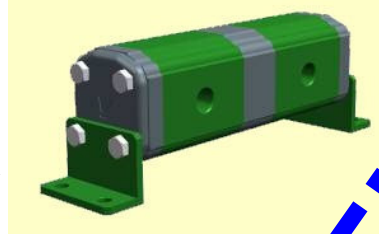
Elementi Divisore ELEMENTS OF DIVIDER		
Tipo TYPE	A	Uscita OUTLET
KV-0DF / 0.25	29,9	1/4" BSPP
KV-0DF / 0.45	31,5	1/4" BSPP
KV-0DF / 0.57	32,5	1/4" BSPP
KV-0DF / 0.76	34	1/4" BSPP
KV-0DF / 0.98	35,5	1/4" BSPP
KV-0DF / 1.27	38	1/4" BSPP
KV-0DF / 1.52	40	1/4" BSPP
KV-0DF / 2.30	46	1/4" BSPP

Elemento Motore ELEMENT OF MOTOR			
Tipo TYPE	B	Ingresso INLET	Uscita OUTLET
KV-0DF / 0.76	34	1/4" BSPP	1/4" BSPP
KV-0DF / 0.98	35,5	1/4" BSPP	1/4" BSPP
KV-0DF / 1.27	38	1/4" BSPP	1/4" BSPP
KV-0DF / 1.52	40	1/4" BSPP	1/4" BSPP
KV-0DF / 2.30	46	1/4" BSPP	1/4" BSPP



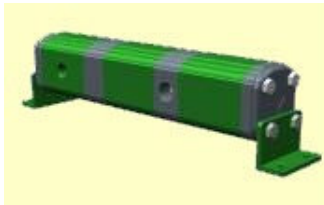
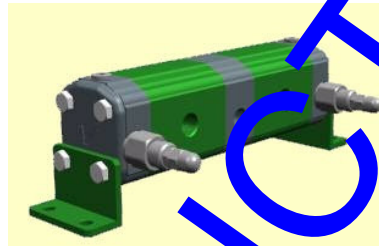
## KV-1DF

### FLOW DIVIDER



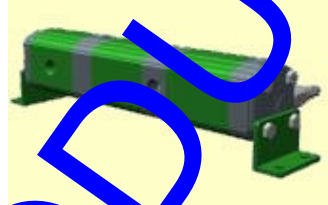
## KV-1DFV

### FLOW DIVIDER WITH PHASE CORRECTION VALVES



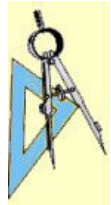
## KV-1DF+1M

### FLOW DIVIDER WITH MOTOR



## KV-1DFV+1M

### FLOW DIVIDER WITH VALVES AND MOTOR



TYPE	Disp. cm3/rev.	Flow rate of one element (l/min)			Number of gear revolutions rpm			D P (*) bars	MAX pressure bars		Weight kg
		Min.	Rec.	Max	Min.	Rec.	Max		P1	P2	
KV-1DF 1DFV /0.9	0.91	1.08	1.63	2.43	1200	1800	2700	40	220	270	0.950
KV-1DF 1DFV /1.2	1.17	1.44	2.10	3.24	1200	1800	2700	40	220	270	0.970
KV-1DF 1DFV /1.7	1.66	2.04	2.81	4.59	1200	1800	2700	40	220	270	1.010
KV-1DF 1DFV /2.2	2.08	2.64	3.74	5.94	1200	1800	2700	40	220	270	1.030
KV-1DF 1DFV /2.6	2.60	3.12	4.68	7.02	1200	1800	2700	40	220	270	1.060
KV-1DF 1DFV /3.2	3.17	3.84	5.61	8.64	1200	1800	2700	40	220	270	1.090
KV-1DF 1DFV /3.8	3.74	4.56	6.55	10.26	1200	1800	2700	40	220	270	1.120
KV-1DF 1DFV /4.3	4.30	5.16	7.48	11.61	1200	1800	2700	40	220	270	1.170
KV-1DF 1DFV /4.8	4.86	5.88	8.89	13.23	1200	1800	2700	40	220	270	1.200
KV-1DF 1DFV /5.9	5.85	7.08	10.06	15.93	1200	1800	2700	40	220	270	1.260
KV-1DF 1DFV /6.5	6.50	7.80	11.70	17.55	1200	1800	2700	40	220	270	1.300
KV-1DF 1DFV /7.8	7.54	9.36	13.57	21.06	1200	1800	2700	40	210	250	1.360
KV-1DF 1DFV /9.8	9.88	11.76	17.78	26.46	1200	1800	2700	40	200	240	1.500

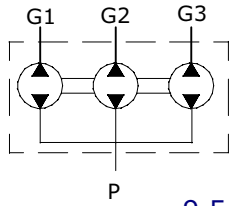
(\*) Max. pressure difference between the various sections



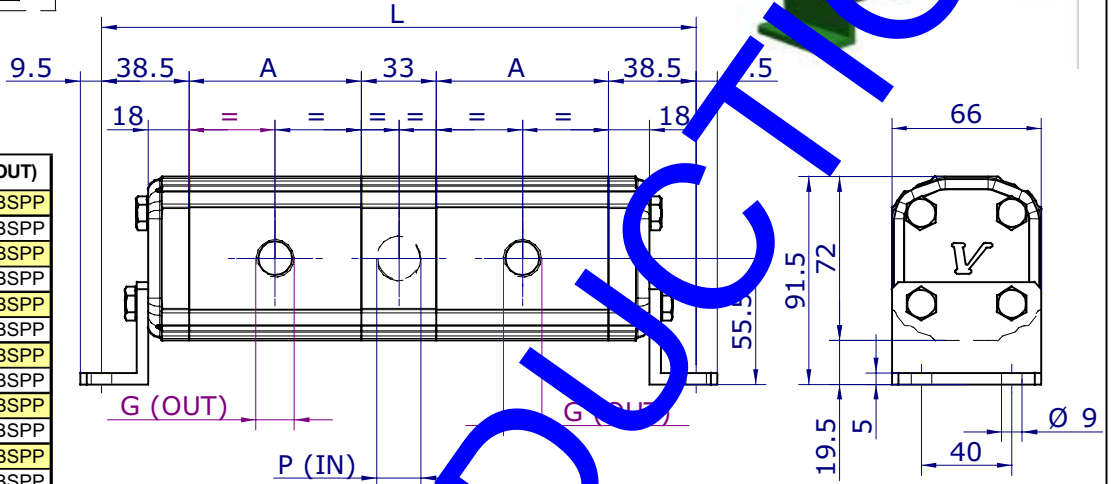
P1 = Operating pressure  
P2 = Peak pressure

The flow division error between one element and another is  $\leq 3\%$

Provided that the values of the table and the data indicated below are complied with  
 Ambient temperature:  $-10^{\circ}\text{C} \div +60^{\circ}\text{C}$   
 Oil temperature:  $+30^{\circ}\text{C} \div +60^{\circ}\text{C}$   
 Mineral-base hydraulic oil hlp, hv (din 51524)  
 Oil viscosity  $20 \div 40$  cSt  
 Oil filtering  $10 \div 25$   $\mu$



**KV-1DF**

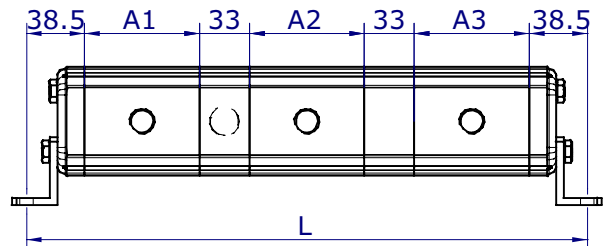


TIPO/Type	A	G (OUT)
KV1 DF/0.9	41,5	3/8" BSPP
KV1 DF/1.2	42,5	3/8" BSPP
KV1 DF/1.7	44	3/8" BSPP
KV1 DF/2.2	46	3/8" BSPP
KV1 DF/2.6	48	3/8" BSPP
KV1 DF/3.2	50	3/8" BSPP
KV1 DF/3.8	52	3/8" BSPP
KV1 DF/4.3	54	3/8" BSPP
KV1 DF/4.9	57	3/8" BSPP
KV1 DF/5.9	60,5	3/8" BSPP
KV1 DF/6.5	63	3/8" BSPP
KV1 DF/7.8	67	3/8" BSPP
KV1 DF/9.8	76	3/8" BSPP

TIPO Type	P (x IN) BSPP														
	NUMERO DI ELEMENTI CHE COMPONGONO IL DIVISORE QUANTITY OF ELEMENTS COMPOSING THE DIVIDER														
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1DF / 0.9	1 x 3/8"	1 x 3/8"	1 x 3/8"	1 x 3/8"	1 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	3 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"
1DF / 1.2	1 x 3/8"	1 x 3/8"	1 x 3/8"	1 x 3/8"	1 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	3 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"
1DF / 1.7	1 x 3/8"	1 x 3/8"	1 x 3/8"	1 x 3/8"	1 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	3 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"
1DF / 2.2	1 x 3/8"	1 x 3/8"	1 x 3/8"	1 x 1/2"	1 x 1/2"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	3 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"
1DF / 2.6	1 x 3/8"	1 x 3/8"	1 x 1/2"	1 x 1/2"	1 x 1/2"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 1/2"	2 x 1/2"	2 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"
1DF / 3.2	1 x 3/8"	1 x 3/8"	1 x 1/2"	1 x 1/2"	1 x 1/2"	2 x 3/8"	2 x 1/2"	2 x 1/2"	2 x 1/2"	2 x 1/2"	2 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"
1DF / 3.8	1 x 3/8"	1 x 1/2"	1 x 1/2"	1 x 1/2"	1 x 1/2"	2 x 3/8"	2 x 1/2"	2 x 1/2"	2 x 1/2"	2 x 1/2"	2 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"
1DF / 4.3	1 x 1/2"	1 x 1/2"	1 x 1/2"	1 x 1/2"	1 x 3/4"	2 x 3/8"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"
1DF / 4.9	1 x 1/2"	1 x 1/2"	1 x 1/2"	1 x 1/2"	1 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"
1DF / 5.9	1 x 1/2"	1 x 1/2"	1 x 1/2"	1 x 3/4"	1 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"
1DF / 6.5	1 x 1/2"	1 x 1/2"	1 x 3/4"	1 x 3/4"	2 x 1/2"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"
1DF / 7.8	1 x 1/2"	1 x 3/4"	1 x 3/4"	2 x 1/2"	2 x 1/2"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"
1DF / 9.8	1 x 3/4"	1 x 3/4"	1 x 3/4"	1 x 1/2"	2 x 1/2"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"

$$L = (n-1) \times 33 + 77 + A1 + A2 + A3 + \dots + An$$

n = Numero di elementi del Divisore  
n = Number of elements making up Divider

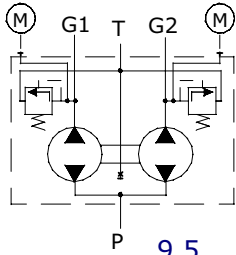


**ESEMPIO:**

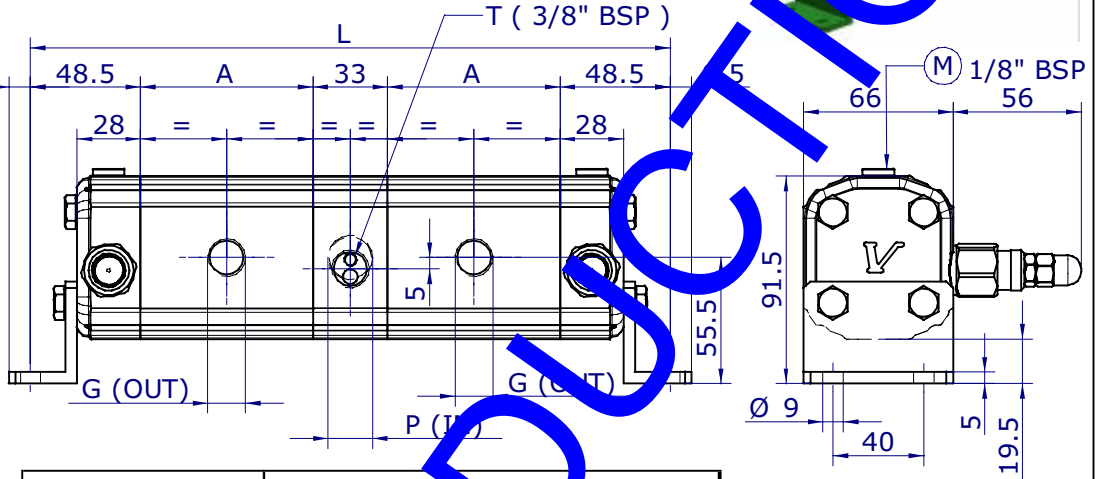
Per ottenere la lunghezza totale (L) di un divisore a tre elementi (n=3), di TIPO KV-1DF/4.3 x 3  
 $L = (n-1) \times 33 + 77 + A1 + A2 + A3 = (3-1) \times 33 + 77 + 54 + 54 + 54 = 305 \text{ mm}$

**EXAMPLE:**

To obtain the total length (L) of a three-element divider (n=3), the element being TYPE KV-1DF/4.3 x 3  
 $L = (n-1) \times 33 + 77 + A1 + A2 + A3 = (3-1) \times 33 + 77 + 54 + 54 = 305 \text{ mm}$



### KV-1DFV



TIPO/Type	A	G (OUT)
KV1 DF/0.9	41,5	3/8" BSPP
KV1 DF/1.2	42,5	3/8" BSPP
KV1 DF/1.7	44	3/8" BSPP
KV1 DF/2.2	46	3/8" BSPP
KV1 DF/2.6	48	3/8" BSPP
KV1 DF/3.2	50	3/8" BSPP
KV1 DF/3.8	52	3/8" BSPP
KV1 DF/4.3	54	3/8" BSPP
KV1 DF/4.9	57	3/8" BSPP
KV1 DF/5.9	60,5	3/8" BSPP
KV1 DF/6.5	63	3/8" BSPP
KV1 DF/7.8	67	3/8" BSPP
KV1 DF/9.8	76	3/8" BSPP

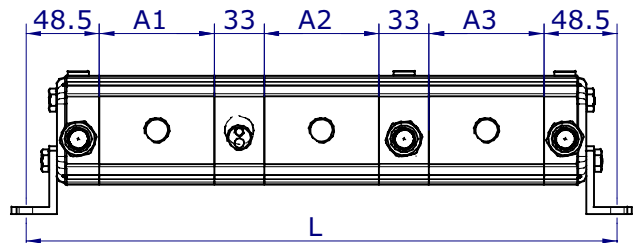
TIPO DI VALVOLA VALVE TYPE	CAMPO DI TARATURA/SETTING RANGE		
	CODE 01	CODE 02	CODE 03
VM 50 DIF	10 ÷ 100 bar	70 ÷ 110 bar	140 ÷ 350 bar

### P (MAX IN) BSPP

TIPO Type	NUMERO DI ELEMENTI CHE COMPONGONO IL DIVISORE QUANTITY OF ELEMENTS COMPOSING THE DIVIDER															
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
1DF / 0.9	1 x 3/8"	1 x 3/8"	1 x 3/8"	1 x 3/8"	1 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	3 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"	
1DF / 1.2	1 x 3/8"	1 x 3/8"	1 x 3/8"	1 x 3/8"	1 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	3 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"	
1DF / 1.7	1 x 3/8"	1 x 3/8"	1 x 3/8"	1 x 3/8"	1 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	3 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"	
1DF / 2.2	1 x 3/8"	1 x 3/8"	1 x 3/8"	1 x 1/2"	1 x 1/2"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 3/8"	3 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"	
1DF / 2.6	1 x 3/8"	1 x 3/8"	1 x 1/2"	1 x 1/2"	1 x 1/2"	2 x 3/8"	2 x 3/8"	2 x 3/8"	2 x 1/2"	2 x 1/2"	2 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"	
1DF / 3.2	1 x 3/8"	1 x 3/8"	1 x 1/2"	1 x 1/2"	1 x 1/2"	2 x 3/8"	2 x 1/2"	2 x 1/2"	2 x 1/2"	2 x 1/2"	2 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"	
1DF / 3.8	1 x 3/8"	1 x 1/2"	1 x 1/2"	1 x 1/2"	1 x 1/2"	2 x 3/8"	2 x 1/2"	2 x 1/2"	2 x 1/2"	2 x 1/2"	2 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"	3 x 1/2"	
1DF / 4.3	1 x 1/2"	1 x 1/2"	1 x 1/2"	1 x 1/2"	1 x 3/4"	2 x 3/8"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	
1DF / 4.9	1 x 1/2"	1 x 1/2"	1 x 1/2"	1 x 1/2"	1 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	
1DF / 5.9	1 x 1/2"	1 x 1/2"	1 x 1/2"	1 x 3/4"	1 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	
1DF / 6.5	1 x 1/2"	1 x 1/2"	1 x 3/4"	2 x 3/8"	2 x 1/2"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	
1DF / 7.8	1 x 1/2"	1 x 3/4"	1 x 3/4"	1 x 1/2"	2 x 1/2"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	
1DF / 9.8	1 x 3/4"	1 x 3/4"	1 x 3/4"	2 x 1/2"	2 x 1/2"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	

$$L = (n-1) \times 33 + 97 + A1 + A2 + A3 + \dots + An$$

n = Numero di elementi del Divisore  
n = Number of elements making up Divider

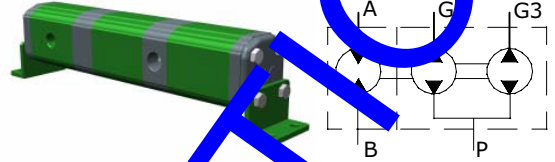
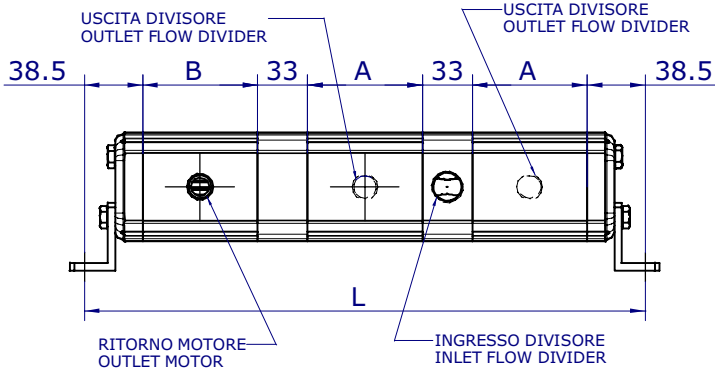


ESEMPLO:  
Per ottenere la lunghezza totale (L) di un divisore a tre elementi (n=3), di TIPO KV-1DFV/4.3 x 3  
 $L = (n-1) \times 33 + 97 + A1 + A2 + A3 = (3-1) \times 33 + 97 + 54 + 54 + 54 = 325 \text{ mm}$

EXAMPLE:  
To obtain the total length (L) of a three-element divider (n=3), the element being TYPE KV-1DFV/4.3 x 3  
 $L = (n-1) \times 33 + 97 + A1 + A2 + A3 = (3-1) \times 33 + 97 + 54 + 54 + 54 = 325 \text{ mm}$

**DIVISORE DI FLUSSO CON MOTORE**  
**FLOW DIVIDER WITH MOTOR**

**KV-1DF+1M**



$$L = (n-1) \times 33 + 77 + B + 1 + A_2 + A_3 + \dots + A_n$$

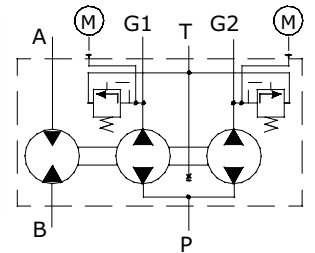
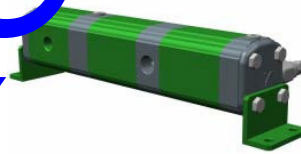
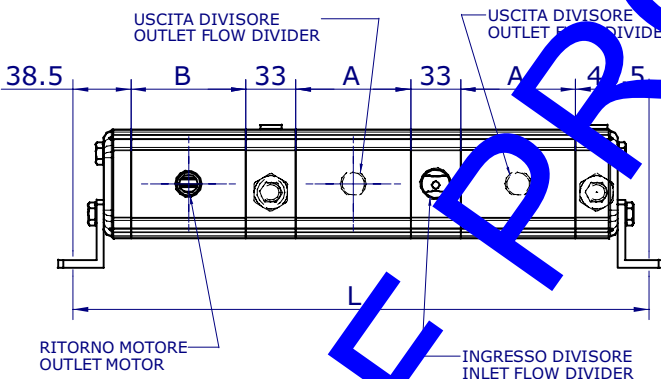
n = Numero di elementi del Divisore compreso il motore  
n = Quantity of elements of the divider including the motor

ESEMPIO: Per ottenere la lunghezza totale (L) di un divisore a due elementi con motore (n=3), di TIPO KV-1DF/4.3 x 2 + 1M/9.8  
L = (n-1) x 33 + 77 + B + A1 + A2 + A3 = (3-1) x 33 + 77 + 76 + 54 + 54 = 327 mm

EXAMPLE: To obtain the total length (L) of a two element divider with motor (n=3), Type TIPO KV 1DF/4.3 x 2 + 1M/9.8  
L = (n-1) x 33 + 77 + B + A1 + A2 + A3 = (3-1) x 33 + 77 + 76 + 54 + 54 = 327 mm

**DIVISORE DI FLUSSO CON MOTORE E VALVOLE**  
**FLOW DIVIDERS WITH MOTOR AND VALVES**

**KV-1DFV+1M**



$$L = (n-1) \times 33 + 87 + B + A_1 + A_2 + A_3 + \dots + A_n$$

n = Numero di elementi del Divisore compreso il motore  
n = Quantity of elements of the divider including the motor

ESEMPIO: Per ottenere la lunghezza totale (L) di un divisore a tre elementi con motore (n=3), di TIPO KV-1DFV/4.3 x 2+1M/9.8  
L = (n-1) x 33 + 87 + B + A1 + A2 + A3 = (3-1) x 33 + 87 + 76 + 54 + 54 = 337 mm

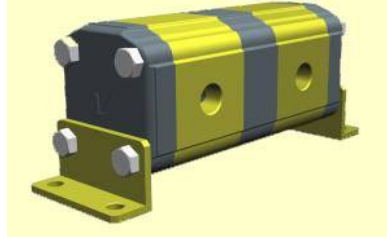
EXAMPLE: To obtain the total length (L) of a two element divider with motor (N=3), Type KV-1DFV/4.3 x 2 + 1M/9.8  
L = (n-1) x 33 + 87 + B + A1 + A2 + A3 = (n-1) x 33 + 87 + 76 + 54 + 54 = 337 mm

ELEMENTI DIVISORE ELEMENTS OF DIVIDER		
TIPO TYPE	A	INGRESSO OUTLET
KV-1DF 1DFV /0.9	41,5	3/8" BSPP
KV-1DF 1DFV /1.2	42,5	3/8" BSPP
KV-1DF 1DFV /1.7	44	3/8" BSPP
KV-1DF 1DFV /2.2	46	3/8" BSPP
KV-1DF 1DFV /2.6	48	3/8" BSPP
KV-1DF 1DFV /3.2	50	3/8" BSPP
KV-1DF 1DFV /3.8	52	3/8" BSPP
KV-1DF 1DFV /4.3	54	3/8" BSPP
KV-1DF 1DFV /4.9	57	3/8" BSPP
KV-1DF 1DFV /5.9	60,5	3/8" BSPP
KV-1DF 1DFV /6.5	63	3/8" BSPP
KV-1DF 1DFV /7.8	67	3/8" BSPP
KV-1DF 1DFV /9.8	76	3/8" BSPP

ELEMENTO MOTORE ELEMENT OF THE MOTOR			
TIPO TYPE	B	INGRESSO INLET	USCITA OUTLET
KV1 M/1.7	44	3/8" BSPP	3/8" BSPP
KV1 M/2.2	46	3/8" BSPP	3/8" BSPP
KV1 M/2.6	48	3/8" BSPP	3/8" BSPP
KV1 M/3.2	50	3/8" BSPP	3/8" BSPP
KV1 M/3.8	52	3/8" BSPP	3/8" BSPP
KV1 M/4.3	54	3/8" BSPP	3/8" BSPP
KV1 M/4.9	57	3/8" BSPP	3/8" BSPP
KV1 M/5.9	60,5	3/8" BSPP	3/8" BSPP
KV1 M/6.5	63	3/8" BSPP	3/8" BSPP
KV1 M/7.8	67	3/8" BSPP	3/8" BSPP
KV1 M/9.8	76	3/8" BSPP	3/8" BSPP

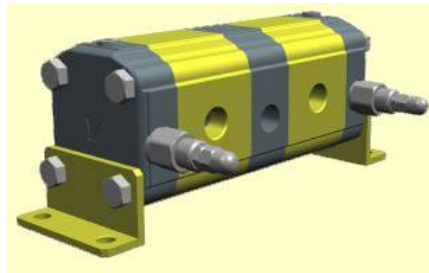
## KV-2DF

### FLOW DIVIDER



## KV-2DFV

### FLOW DIVIDER WITH PHASE CORRECTION VALVES



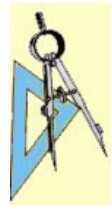
## KV-2DF+2M

### FLOW DIVIDER WITH MOTOR



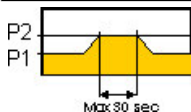
## KV-2DFV+2M

### FLOW DIVIDER WITH VALVES AND MOTOR



TYPE	Displacement cm <sup>3</sup> /rev.	Flow rate of one element l/min.			Number of gear revolutions rpm			D P (*) bars	MAX Pressure bars		Weight kg
		Min.	Rec.	Max	Min.	Rec.	Max		P1	P2	
KV-2DF 2DFV /4	4.2	4.8	7.6	10	1200	1800	2500	50	210	260	2.200
KV-2DF 2DFV /6	6	7.2	10.8	15	1200	1800	2500	50	210	260	2.300
KV-2DF 2DFV /9	8.4	10.8	15.1	22.5	1200	1800	2500	50	210	260	2.400
KV-2DF 2DFV /11	10.8	13.2	19.4	27.5	1200	1800	2500	50	210	260	2.500
KV-2DF 2DFV /14	14.4	16.8	25.9	35	1200	1800	2500	40	200	240	2.700
KV-2DF 2DFV /17	16.8	20.4	30.2	42.5	1200	1800	2500	40	200	240	2.800
KV-2DF 2DFV /19	19.2	22.8	34.6	47.5	1200	1800	2500	40	190	230	2.900
KV-2DF 2DFV /22	22.8	26.4	41	55	1200	1800	2500	40	180	220	3.050
KV-2DF 2DFV /26	25.2	31.2	45.4	65	1200	1800	2500	40	160	200	3.150
KV-2DF 2DFV /30	30	36	54	75	1200	1800	2500	30	160	190	3.400
KV-2DF 2DFV /34	34.2	40.8	61.6	85	1200	1800	2500	30	140	170	3.600
KV-2DF 2DFV /40	39.6	48	71.3	100	1200	1800	2500	30	130	160	3.800

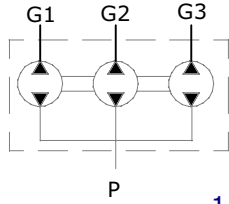
(\*). Max. pressure difference between the various sections



P1 = Operating pressure  
P2 = Peak pressure

The flow division error between one element and another is  $\leq 3\%$

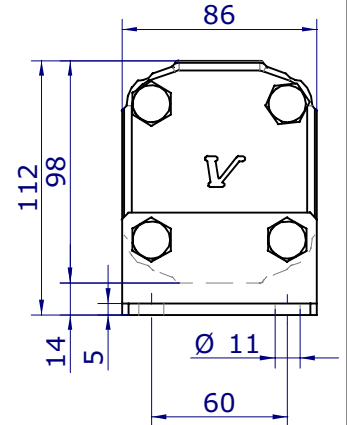
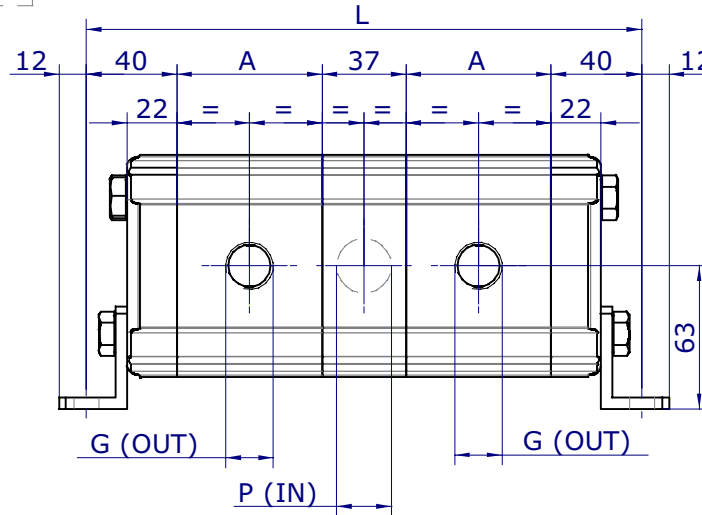
Provided that the values of the table and the data indicated below are complied with  
Ambient temperature:  $-10^{\circ}\text{C} \div +60^{\circ}\text{C}$   
Oil temperature:  $+30^{\circ}\text{C} \div +60^{\circ}\text{C}$   
Mineral-base hydraulic oil hlp, hv (din 51524)  
Oil viscosity  $20 \div 40$  cSt  
Oil filtering  $10 \div 25$   $\mu$



### KV-2DF



TIPO/Type	A	G (OUT)
KV-2DF/4	47	1/2" BSPP
KV-2DF/6	50	1/2" BSPP
KV-2DF/9	54	1/2" BSPP
KV-2DF/11	58	1/2" BSPP
KV-2DF/14	64	1/2" BSPP
KV-2DF/17	68	1/2" BSPP
KV-2DF/19	72	1/2" BSPP
KV-2DF/22	78	1/2" BSPP
KV-2DF/26	82	3/4" BSPP
KV-2DF/30	90	3/4" BSPP
KV-2DF/34	97	3/4" BSPP
KV-2DF/40	106	3/4" BSPP

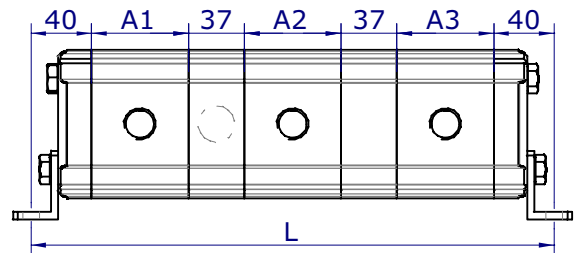


### P (N x IN) BSPP

TIPO Type	NUMERO DI ELEMENTI CHE COMPONGONO IL DIVISORE QUANTITY OF ELEMENTS COMPOSING THE DIVIDER															
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
2DF / 4	1 x 1/2"	1 x 1/2"	1 x 3/4"	1 x 3/4"	1 x 3/4"	2 x 1/2"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	
2DF / 6	1 x 1/2"	1 x 3/4"	1 x 3/4"	1 x 3/4"	1 x 3/4"	2 x 1/2"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	
2DF / 9	1 x 3/4"	1 x 3/4"	1 x 3/4"	1 x 3/4"	1 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	
2DF / 11	1 x 3/4"	1 x 3/4"	1 x 3/4"	1 x 1"	1 x 1"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	
2DF / 14	1 x 3/4"	1 x 3/4"	1 x 3/4"	1 x 1"	1 x 1"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	
2DF / 17	1 x 3/4"	1 x 3/4"	1 x 3/4"	1 x 1"	1 x 1"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	
2DF / 19	1 x 3/4"	1 x 1"	1 x 1"	1 x 1"	1 x 1"	2 x 3/4"	2 x 3/4"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	3 x 1"	3 x 1"	3 x 1"	3 x 1"	
2DF / 22	1 x 3/4"	1 x 1"	1 x 1"	1 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	3 x 1"	3 x 1"	3 x 1"	3 x 1"	
2DF / 26	1 x 1"	1 x 1"	1 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	3 x 1"	3 x 1"	3 x 1"	3 x 1"	
2DF / 30	1 x 1"	1 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	3 x 1"	3 x 1"	3 x 1"	3 x 1"	
2DF / 34	1 x 1"	1 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	3 x 1"	3 x 1"	3 x 1"	3 x 1"	
2DF / 40	1 x 1"	1 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	3 x 1"	3 x 1"	3 x 1"	3 x 1"	

$$L = (n-1) \times 37 + 80 + A1 + A2 + A3 + \dots + An$$

n = Numero di elementi del Divisore  
n = Number of elements making up Divider

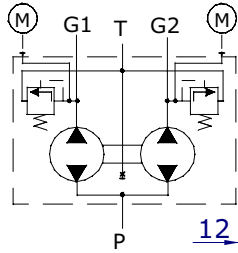


#### ESEMPIO:

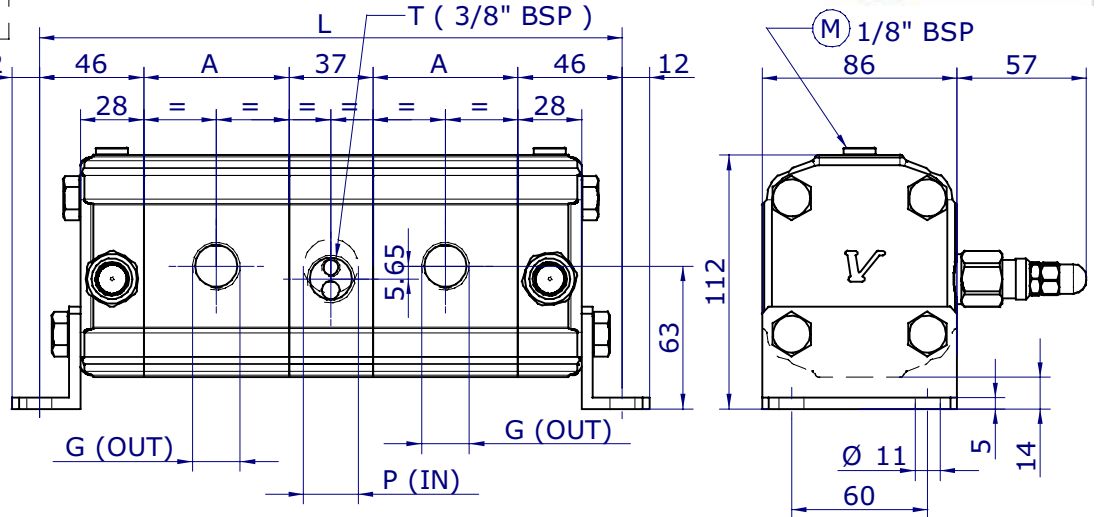
Per ottenere la lunghezza totale (L) di un divisore a tre elementi (n=3), di TIPO KV-2DF/22 x 3  
 $L = (n-1) \times 37 + 80 + A1 + A2 + A3 = (3-1) \times 37 + 80 + 78 + 78 + 78 = 388 \text{ mm}$

#### EXAMPLE:

To obtain the total length (L) of a three-element divider (n=3), the element being, TYPE KV-2DF/22 x 3  
 $L = (n-1) \times 37 + 80 + A1 + A2 + A3 = (3-1) \times 37 + 80 + 78 + 78 + 78 = 388 \text{ mm}$



### KV-2DFV



TIPO/Type	A	G (OUT)
KV-2DF/4	47	1/2" BSPP
KV-2DF/6	50	1/2" BSPP
KV-2DF/9	54	1/2" BSPP
KV-2DF/11	58	1/2" BSPP
KV-2DF/14	64	1/2" BSPP
KV-2DF/17	68	1/2" BSPP
KV-2DF/19	72	1/2" BSPP
KV-2DF/22	78	1/2" BSPP
KV-2DF/26	82	3/4" BSPP
KV-2DF/30	90	3/4" BSPP
KV-2DF/34	97	3/4" BSPP
KV-2DF/40	106	3/4" BSPP

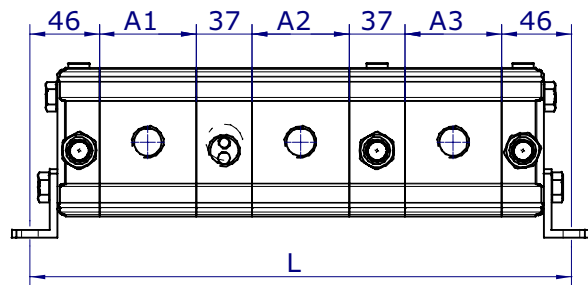
TIPO DI VALVOLA VALVE TYPE	CAMPO DI TARATURA/SETTING RANGE		
	CODE 01	CODE 02	CODE 03
VM 50 DIF	10 ÷ 105 bar	70 ÷ 210 bar	140 ÷ 350 bar

### P ( N x IN ) BSPP

TIPO Type	NUMERO DI ELEMENTI CHE COMPONGONO IL DIVISORE QUANTITY OF ELEMENTS COMPOSING THE DIVIDER															
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
2DF / 4	1 x 1/2"	1 x 1/2"	1 x 3/4"	1 x 3/4"	1 x 3/4"	2 x 1/2"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	
2DF / 6	1 x 1/2"	1 x 3/4"	1 x 3/4"	1 x 3/4"	1 x 3/4"	2 x 1/2"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	
2DF / 9	1 x 3/4"	1 x 3/4"	1 x 3/4"	1 x 3/4"	1 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	
2DF / 11	1 x 3/4"	1 x 3/4"	1 x 3/4"	1 x 1"	1 x 1"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	
2DF / 14	1 x 3/4"	1 x 3/4"	1 x 3/4"	1 x 1"	1 x 1"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	
2DF / 17	1 x 3/4"	1 x 3/4"	1 x 3/4"	1 x 1"	1 x 1"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	2 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	3 x 3/4"	
2DF / 19	1 x 3/4"	1 x 1"	1 x 1"	1 x 1"	1 x 1"	2 x 3/4"	2 x 3/4"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	3 x 1"	3 x 1"	3 x 1"	3 x 1"	
2DF / 22	1 x 3/4"	1 x 1"	1 x 1"	1 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	3 x 1"	3 x 1"	3 x 1"	3 x 1"	
2DF / 26	1 x 1"	1 x 1"	1 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	3 x 1"	3 x 1"	3 x 1"	3 x 1"	
2DF / 30	1 x 1"	1 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	3 x 1"	3 x 1"	3 x 1"	3 x 1"	
2DF / 34	1 x 1"	1 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	3 x 1"	3 x 1"	3 x 1"	3 x 1"	
2DF / 40	1 x 1"	1 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	2 x 1"	3 x 1"	3 x 1"	3 x 1"	3 x 1"	

$$L = (n-1) \times 37 + 92 + A1 + A2 + A3 + \dots + An$$

n = Numero di elementi del Divisore  
n = Number of elements making up Divider



**ESEMPIO:**

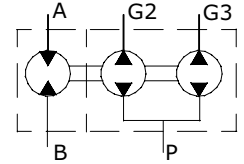
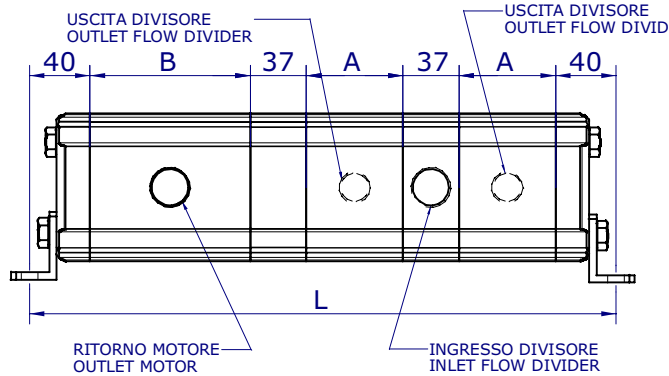
Per ottenere la lunghezza totale (L) di un divisore a tre elementi (n=3), di TIPO KV-2DFV/9 x 3  
 $L = (n-1) \times 37 + 97 + A1 + A2 + A3 = (3-1) \times 37 + 97 + 54 + 54 + 54 = 333 \text{ mm}$

**EXAMPLE:**

To obtain the total length (L) of a three-element divider (n=3), the element being TYPE KV-2DFV/9 x 3  
 $L = (n-1) \times 37 + 97 + A1 + A2 + A3 = (3-1) \times 37 + 97 + 54 + 54 + 54 = 333 \text{ mm}$

### DIVISORE DI FLUSSO CON MOTORE FLOW DIVIDER WITH MOTOR

### KV-2DF+2M



$$L = (n-1) \times 37 + 80 + B + A_1 + A_2 + A_3 + \dots + A_n$$

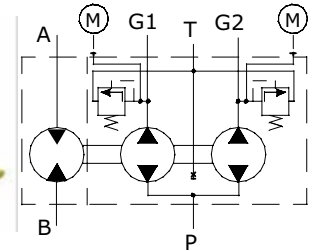
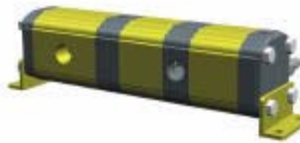
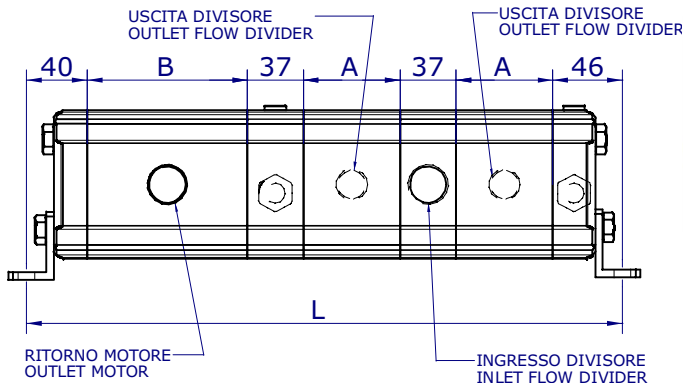
n = Numero di elementi del Divisore compreso il motore  
n = Quantity of elements of the divider including the motor

ESEMPIO: Per ottenere la lunghezza totale (L) di un divisore a due elementi con motore (n=3), di TIPO KV-2DF/6 x 2 + 2M/11  
 $L = (n-1) \times 37 + 80 + B + A_1 + A_2 + A_3 = (3-1) \times 37 + 80 + 58 + 50 + 50 = 312 \text{ mm}$

EXAMPLE: To obtain the total length (L) of a two element divider with motor (N=3), Type KV 2DF/6 x 2 + 2M/17  
 $L = (n-1) \times 37 + 80 + B + A_1 + A_2 + A_3 = (3-1) \times 37 + 80 + 58 + 50 + 50 = 312 \text{ mm}$

### DIVISORE DI FLUSSO CON MOTORE E VALVOLE FLOW DIVIDER WITH MOTOR AND VALVES

### KV-2DFV+2M



$$L = (n-1) \times 37 + 86 + B + A_1 + A_2 + A_3 + \dots + A_n$$

n = Numero di elementi del Divisore compreso il motore  
n = Quantity of elements of the divider including the motor

ESEMPIO: Per ottenere la lunghezza totale (L) di un divisore a due elementi con motore (n=3), di TIPO KV-2DFV/6 x 2 + 2M/11  
 $L = (n-1) \times 37 + 86 + B + A_1 + A_2 + A_3 = (3-1) \times 37 + 86 + 58 + 50 + 50 = 318 \text{ mm}$

EXAMPLE: To obtain the total length (L) of a two element divider with motor (N=3), Type KV-2DFV/6 x 2 + 2M/11  
 $L = (n-1) \times 37 + 86 + B + A_1 + A_2 + A_3 = (3-1) \times 37 + 86 + 58 + 50 + 50 = 318 \text{ mm}$

ELEMENTI DIVISORE ELEMENTS OF DIVIDER		
TIPO TYPE	A	INGRESSO OUTLET
KV-2DF/4	47	1/2" BSPP
KV-2DF/6	50	1/2" BSPP
KV-2DF/9	54	1/2" BSPP
KV-2DF/11	58	1/2" BSPP
KV-2DF/14	64	1/2" BSPP
KV-2DF/17	68	1/2" BSPP
KV-2DF/19	72	1/2" BSPP
KV-2DF/22	78	1/2" BSPP
KV-2DF/26	82	3/4" BSPP
KV-2DF/30	90	3/4" BSPP
KV-2DF/34	97	3/4" BSPP
KV-2DF/40	106	3/4" BSPP

ELEMENTO MOTORE ELEMENT OF MOTOR			
TIPO TYPE	B	INGRESSO INLET	USCITA OUTLET
KV-2M/9	54	1/2" BSPP	1/2" BSPP
KV-2M/11	58	1/2" BSPP	1/2" BSPP
KV-2M/14	64	1/2" BSPP	3/4" BSPP
KV-2M/17	68	1/2" BSPP	3/4" BSPP
KV-2M/19	72	1/2" BSPP	3/4" BSPP
KV-2M/22	78	1/2" BSPP	3/4" BSPP
KV-2M/26	82	3/4" BSPP	1" BSPP
KV-2M/30	90	3/4" BSPP	1" BSPP
KV-2M/34	97	3/4" BSPP	1" BSPP
KV-2M/40	106	3/4" BSPP	1" BSPP



## 2.4 General structure of codes

A COMPOSITION CODE identifies a divider made up of elements with identical displacements and valves (if requested). To order a divider with motor you must also indicate the displacement.

<b>9X</b>	<b>NN</b>	<b>CC</b>	<b>MM</b>	<b>LL</b>
-----------	-----------	-----------	-----------	-----------

<b>9X</b>	<b>Type of divider</b>
<b>NN</b>	<b>Total number of divider elements (from 01 to</b>
<b>CC</b>	<b>Displacement code of divider element</b>
<b>MM</b>	<b>Displacement code of motor</b>
<b>LL</b>	<b>Valve code</b>

The type of divider may be one of the following:

<b>9D</b>	Flow divider
<b>9V</b>	Flow divider with valves
<b>9G</b>	Flow divider with motor
<b>9N</b>	Flow divider with motor and valves

The displacement of the divider elements may be one of the following:

Table of divider element codes					
<b>Cod.</b>	<b>Group 0</b>	<b>Cod.</b>	<b>Group 1</b>	<b>Cod.</b>	<b>Group 2</b>
02	0.25 cm <sup>3</sup> /rev.	16	0.9 cm <sup>3</sup> /rev.	41	4 cm <sup>3</sup> /rev.
04	0.45 cm <sup>3</sup> /rev.	17	1.2 cm <sup>3</sup> /rev.	43	6 cm <sup>3</sup> /rev.
05	0.57 cm <sup>3</sup> /rev.	18	1.7 cm <sup>3</sup> /rev.	45	9 cm <sup>3</sup> /rev.
06	0.76 cm <sup>3</sup> /rev.	20	2.2 cm <sup>3</sup> /rev.	47	11 cm <sup>3</sup> /rev.
07	0.98 cm <sup>3</sup> /rev.	21	2.6 cm <sup>3</sup> /rev.	49	14 cm <sup>3</sup> /rev.
09	1.27 cm <sup>3</sup> /rev.	23	3.2 cm <sup>3</sup> /rev.	51	17 cm <sup>3</sup> /rev.
11	1.52 cm <sup>3</sup> /rev.	25	3.8 cm <sup>3</sup> /rev.	53	19 cm <sup>3</sup> /rev.
13	2.30 cm <sup>3</sup> /rev.	27	4.3 cm <sup>3</sup> /rev.	55	22 cm <sup>3</sup> /rev.
		29	4.9 cm <sup>3</sup> /rev.	57	26 cm <sup>3</sup> /rev.
		31	5.9 cm <sup>3</sup> /rev.	59	30 cm <sup>3</sup> /rev.
		32	6.5 cm <sup>3</sup> /rev.	61	34 cm <sup>3</sup> /rev.
		34	7.8 cm <sup>3</sup> /rev.	61	40 cm <sup>3</sup> /rev.
		36	9.8 cm <sup>3</sup> /rev.		

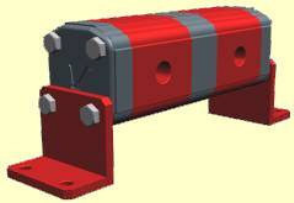
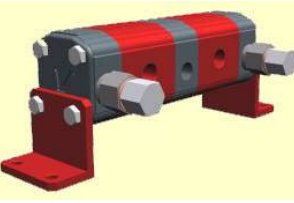
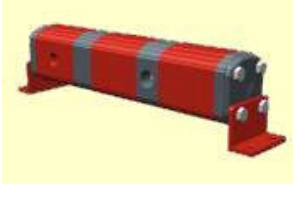
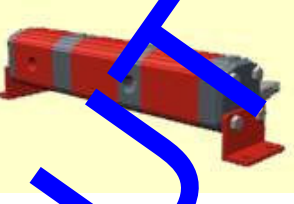
The codes of the valves, if requested, are as follows:

Table of valves codes				
<b>VM 25</b>		<b>VM 50</b>		
<b>Cod.</b>	<b>Group 0</b>	<b>Cod.</b>	<b>Group 1</b>	<b>Group 2</b>
01	20÷140	01	10÷105 bars	10÷105 bars
02	70÷315	02	70÷210 bars	70÷210 bars
		03	140÷350	140÷350

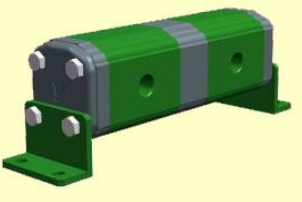
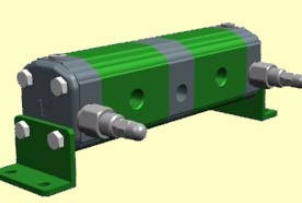

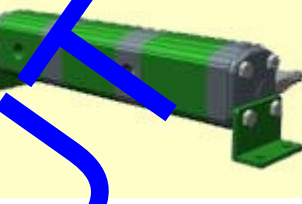
You may choose one of the displacement below for the motor:

<b>Table of motor codes</b>		
<b>Cod.</b>	<b>Group 0</b>	
<b>06</b>	0.76 cm <sup>3</sup> /rev.	
<b>07</b>	0.98 cm <sup>3</sup> /rev.	
<b>09</b>	1.27 cm <sup>3</sup> /rev.	
<b>11</b>	1.52 cm <sup>3</sup> /rev.	
<b>13</b>	2.30 cm <sup>3</sup> /rev.	
<b>Cod.</b>	<b>Group 1</b>	
<b>18</b>	1.7 cm <sup>3</sup> /rev.	
<b>20</b>	2.2 cm <sup>3</sup> /rev.	
<b>21</b>	2.6 cm <sup>3</sup> /rev.	
<b>23</b>	3.2 cm <sup>3</sup> /rev.	
<b>25</b>	3.8 cm <sup>3</sup> /rev.	
<b>27</b>	4.3 cm <sup>3</sup> /rev.	
<b>29</b>	4.9 cm <sup>3</sup> /rev.	
<b>31</b>	5.9 cm <sup>3</sup> /rev.	
<b>32</b>	6.5 cm <sup>3</sup> /rev.	
<b>34</b>	7.8 cm <sup>3</sup> /rev.	
<b>36</b>	9.8 cm <sup>3</sup> /rev.	
<b>Cod.</b>	<b>Group 2</b>	
<b>45</b>	9 cm <sup>3</sup> /rev.	
<b>47</b>	11 cm <sup>3</sup> /rev.	
<b>49</b>	14 cm <sup>3</sup> /rev.	
<b>51</b>	17 cm <sup>3</sup> /rev.	
<b>53</b>	19 cm <sup>3</sup> /rev.	
<b>55</b>	22 cm <sup>3</sup> /rev.	
<b>57</b>	26 cm <sup>3</sup> /rev.	
<b>59</b>	30 cm <sup>3</sup> /rev.	
<b>61</b>	34 cm <sup>3</sup> /rev.	
<b>63</b>	40 cm <sup>3</sup> /rev.	

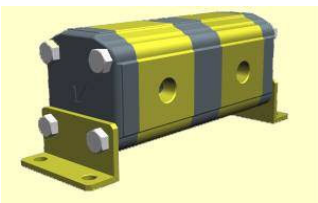
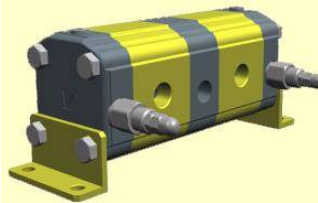


## 2.5 EXAMPLES OF DIVIDER CODING FOR RED Series GROUP "0"

<p><b>KV-ODF</b></p>  <p><b>9D NN CC</b></p>	<p>Example: <b>KV-ODF/0,25 X 2</b></p> <p>Code: <b>9D 02 02</b></p> <p><b>9D</b>: identifies the divider  <b>02</b>: is the number of elements  <b>02</b>: is the divider displacement</p>	<table border="1"> <thead> <tr> <th colspan="2">DIVIDER DISPLACEMENT cm<sup>3</sup>/rev.</th> </tr> <tr> <th>Code</th> <th>Group 0</th> </tr> </thead> <tbody> <tr><td>02</td><td>0.25</td></tr> <tr><td>04</td><td>0.45</td></tr> <tr><td>05</td><td>0.57</td></tr> <tr><td>06</td><td>0.76</td></tr> <tr><td>07</td><td>0.98</td></tr> <tr><td>09</td><td>1.27</td></tr> <tr><td>11</td><td>1.52</td></tr> <tr><td>13</td><td>2.30</td></tr> </tbody> </table>	DIVIDER DISPLACEMENT cm <sup>3</sup> /rev.		Code	Group 0	02	0.25	04	0.45	05	0.57	06	0.76	07	0.98	09	1.27	11	1.52	13	2.30
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<p><b>KV-ODFV</b></p>  <p><b>9V NN CC LL</b></p>	<p>Example: <b>KV-ODFV/0,57 X 2 with VM25 - 20÷140 bars</b></p> <p>Code: <b>9V 02 05 01</b></p> <p><b>9V</b>: identifies the divider with valves  <b>02</b>: is the number of elements  <b>05</b>: is the divider displacement  <b>01</b>: is the valve code</p>	<table border="1"> <thead> <tr> <th colspan="2">MOTOR DISPLACEMENTS cm<sup>3</sup>/rev.</th> </tr> <tr> <th>Code</th> <th>Group 0</th> </tr> </thead> <tbody> <tr><td>06</td><td>0.76</td></tr> <tr><td>07</td><td>0.98</td></tr> <tr><td>09</td><td>1.27</td></tr> <tr><td>11</td><td>1.52</td></tr> <tr><td>13</td><td>2.30</td></tr> </tbody> </table>	MOTOR DISPLACEMENTS cm <sup>3</sup> /rev.		Code	Group 0	06	0.76	07	0.98	09	1.27	11	1.52	13	2.30						
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<p><b>KV-ODF+OM</b></p>  <p><b>9G NN CC MM</b></p>	<p>Example: <b>KV-ODF/0,76 X 2 + 1,52 M</b></p> <p>Code: <b>9G 02 06 11</b></p> <p><b>9G</b>: identifies the divider with motor  <b>02</b>: is the number of elements  <b>06</b>: is the divider displacement  <b>11</b>: is the motor displacement</p>	<table border="1"> <thead> <tr> <th colspan="2">MOTOR DISPLACEMENTS cm<sup>3</sup>/rev.</th> </tr> <tr> <th>Code</th> <th>Group 0</th> </tr> </thead> <tbody> <tr><td>06</td><td>0.76</td></tr> <tr><td>07</td><td>0.98</td></tr> <tr><td>09</td><td>1.27</td></tr> <tr><td>11</td><td>1.52</td></tr> <tr><td>13</td><td>2.30</td></tr> </tbody> </table>	MOTOR DISPLACEMENTS cm <sup>3</sup> /rev.		Code	Group 0	06	0.76	07	0.98	09	1.27	11	1.52	13	2.30						
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<p><b>KV-ODFV+OM</b></p>  <p><b>9N NN CC MM LL</b></p>	<p>Example: <b>KV-ODFV/1,27 X 2 + 2,30 M with VM25 - 70÷315 bars</b></p> <p>Code: <b>9N 02 09 13 02</b></p> <p><b>9N</b>: identifies the divider with motor and valves  <b>02</b>: is the number of elements  <b>09</b>: is the divider displacement  <b>13</b>: is the motor displacement  <b>02</b>: is the valve code</p>	<table border="1"> <thead> <tr> <th colspan="2">MOTOR DISPLACEMENTS cm<sup>3</sup>/rev.</th> </tr> <tr> <th>Code</th> <th>Group 0</th> </tr> </thead> <tbody> <tr><td>06</td><td>0.76</td></tr> <tr><td>07</td><td>0.98</td></tr> <tr><td>09</td><td>1.27</td></tr> <tr><td>11</td><td>1.52</td></tr> <tr><td>13</td><td>2.30</td></tr> </tbody> </table>	MOTOR DISPLACEMENTS cm <sup>3</sup> /rev.		Code	Group 0	06	0.76	07	0.98	09	1.27	11	1.52	13	2.30						
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## 2.6 Examples of divider coding for GREEN Series GROUP "1"

<p><b>KV-1DF</b></p>  <p><b>9D NN CC</b></p>	<p>Example: <b>KV-1DF/1,7 X 2</b></p> <p>Code: <b>9D 02 18</b></p> <p><b>9D</b>: identifies the divider  <b>02</b>: is the number of elements  <b>18</b>: is the divider displacement</p>	<table border="1"> <thead> <tr> <th colspan="2">DIVIDER DISPLACEMENTS cm<sup>3</sup>/rev.</th> </tr> <tr> <th>Code</th> <th>Group 1</th> </tr> </thead> <tbody> <tr><td>16</td><td>0.9</td></tr> <tr><td>17</td><td>1.2</td></tr> <tr><td>18</td><td>1.7</td></tr> <tr><td>20</td><td>2.2</td></tr> <tr><td>21</td><td>2.6</td></tr> <tr><td>23</td><td>3.2</td></tr> <tr><td>25</td><td>3.8</td></tr> <tr><td>27</td><td>4.3</td></tr> <tr><td>29</td><td>4.9</td></tr> <tr><td>31</td><td>5.9</td></tr> <tr><td>32</td><td>6.5</td></tr> <tr><td>34</td><td>7.8</td></tr> <tr><td>36</td><td>9.8</td></tr> </tbody> </table>	DIVIDER DISPLACEMENTS cm <sup>3</sup> /rev.		Code	Group 1	16	0.9	17	1.2	18	1.7	20	2.2	21	2.6	23	3.2	25	3.8	27	4.3	29	4.9	31	5.9	32	6.5	34	7.8	36	9.8
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<p><b>KV-1DFV</b></p>  <p><b>9V NN CC LL</b></p>	<p>Example: <b>KV-1DFV/2,2 X 2 with VM50 - 140÷350 bars</b></p> <p>Code: <b>9V 02 20 03</b></p> <p><b>9V</b>: identifies the divider with valves  <b>02</b>: is the number of elements  <b>20</b>: is the divider displacement  <b>03</b>: is the valve code</p>	<table border="1"> <thead> <tr> <th colspan="2">MOTOR DISPLACEMENTS cm<sup>3</sup>/rev.</th> </tr> <tr> <th>Code</th> <th>Group 1</th> </tr> </thead> <tbody> <tr><td>18</td><td>1.7</td></tr> <tr><td>20</td><td>2.2</td></tr> <tr><td>21</td><td>2.6</td></tr> <tr><td>23</td><td>3.2</td></tr> <tr><td>25</td><td>3.8</td></tr> <tr><td>27</td><td>4.3</td></tr> <tr><td>29</td><td>4.9</td></tr> <tr><td>31</td><td>5.9</td></tr> <tr><td>32</td><td>6.5</td></tr> <tr><td>34</td><td>7.8</td></tr> <tr><td>36</td><td>9.8</td></tr> </tbody> </table>	MOTOR DISPLACEMENTS cm <sup>3</sup> /rev.		Code	Group 1	18	1.7	20	2.2	21	2.6	23	3.2	25	3.8	27	4.3	29	4.9	31	5.9	32	6.5	34	7.8	36	9.8				
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<p><b>KV-1DF+1M</b></p>  <p><b>9G NN CC MM</b></p>	<p>Example: <b>KV-1DF/3,2 X 2 + 6,5 M</b></p> <p>Code: <b>9G 02 23 32</b></p> <p><b>9G</b>: identifies the divider with motor  <b>02</b>: is the number of elements  <b>23</b>: is the divider displacement  <b>32</b>: is the motor displacement</p>	<table border="1"> <thead> <tr> <th colspan="2">MOTOR DISPLACEMENTS cm<sup>3</sup>/rev.</th> </tr> <tr> <th>Code</th> <th>Group 1</th> </tr> </thead> <tbody> <tr><td>18</td><td>1.7</td></tr> <tr><td>20</td><td>2.2</td></tr> <tr><td>21</td><td>2.6</td></tr> <tr><td>23</td><td>3.2</td></tr> <tr><td>25</td><td>3.8</td></tr> <tr><td>27</td><td>4.3</td></tr> <tr><td>29</td><td>4.9</td></tr> <tr><td>31</td><td>5.9</td></tr> <tr><td>32</td><td>6.5</td></tr> <tr><td>34</td><td>7.8</td></tr> <tr><td>36</td><td>9.8</td></tr> </tbody> </table>	MOTOR DISPLACEMENTS cm <sup>3</sup> /rev.		Code	Group 1	18	1.7	20	2.2	21	2.6	23	3.2	25	3.8	27	4.3	29	4.9	31	5.9	32	6.5	34	7.8	36	9.8				
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<p><b>KV-1DFV+1M</b></p>  <p><b>9N NN CC MM LL</b></p>	<p>Example: <b>KV-1DFV/4,3 X 2 + 9,8 M with VM50 - 10÷105 bars</b></p> <p>Code: <b>9N 02 27 36 01</b></p> <p><b>9N</b>: identifies the divider with motor and valves  <b>02</b>: is the number of elements  <b>27</b>: is the divider displacement  <b>36</b>: is the motor displacement  <b>01</b>: is the valve code</p>	<table border="1"> <thead> <tr> <th colspan="2">MOTOR DISPLACEMENTS cm<sup>3</sup>/rev.</th> </tr> <tr> <th>Code</th> <th>Group 1</th> </tr> </thead> <tbody> <tr><td>18</td><td>1.7</td></tr> <tr><td>20</td><td>2.2</td></tr> <tr><td>21</td><td>2.6</td></tr> <tr><td>23</td><td>3.2</td></tr> <tr><td>25</td><td>3.8</td></tr> <tr><td>27</td><td>4.3</td></tr> <tr><td>29</td><td>4.9</td></tr> <tr><td>31</td><td>5.9</td></tr> <tr><td>32</td><td>6.5</td></tr> <tr><td>34</td><td>7.8</td></tr> <tr><td>36</td><td>9.8</td></tr> </tbody> </table>	MOTOR DISPLACEMENTS cm <sup>3</sup> /rev.		Code	Group 1	18	1.7	20	2.2	21	2.6	23	3.2	25	3.8	27	4.3	29	4.9	31	5.9	32	6.5	34	7.8	36	9.8				
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## 2.7 Examples of divider coding for **YELLOW Series GROUP "2"**

<p><b>KV-2DF</b></p>  <p><b>9D NN CC</b></p>	<p>Example: <b>KV-2DF/11 X 2</b></p> <p>Code: <b>9D 02 47</b></p> <p><b>9D</b>: identifies the divider  <b>02</b>: is the number of elements  <b>47</b>: is the divider displacement</p>	<p><b>DIVIDER DISPLACEMENTS</b> cm<sup>3</sup>/rev.</p> <table border="1"> <thead> <tr> <th>Code.</th> <th>Group 2</th> </tr> </thead> <tbody> <tr><td>41</td><td>4</td></tr> <tr><td>43</td><td>6</td></tr> <tr><td>45</td><td>9</td></tr> <tr><td>47</td><td>11</td></tr> <tr><td>49</td><td>14</td></tr> <tr><td>51</td><td>17</td></tr> <tr><td>53</td><td>19</td></tr> <tr><td>55</td><td>22</td></tr> <tr><td>57</td><td>26</td></tr> <tr><td>59</td><td>30</td></tr> <tr><td>61</td><td>34</td></tr> <tr><td>61</td><td>40</td></tr> </tbody> </table>	Code.	Group 2	41	4	43	6	45	9	47	11	49	14	51	17	53	19	55	22	57	26	59	30	61	34	61	40
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<p><b>KV-2DFV</b></p>  <p><b>9V NN CC LL</b></p>	<p>Example: <b>KV-2DFV/14 X 2 with VM50 - 70÷210 bars</b></p> <p>Code: <b>9V 02 49 02</b></p> <p><b>9V</b>: identifies the divider with valves  <b>02</b>: is the number of elements  <b>49</b>: is the divider displacement  <b>02</b>: is the valve code</p>	<p><b>MOTOR DISPLACEMENTS</b> cm<sup>3</sup>/rev.</p> <table border="1"> <thead> <tr> <th>Code</th> <th>Group 2</th> </tr> </thead> <tbody> <tr><td>45</td><td>9</td></tr> <tr><td>47</td><td>11</td></tr> <tr><td>49</td><td>14</td></tr> <tr><td>51</td><td>17</td></tr> <tr><td>53</td><td>19</td></tr> <tr><td>55</td><td>22</td></tr> <tr><td>57</td><td>26</td></tr> <tr><td>59</td><td>30</td></tr> <tr><td>61</td><td>34</td></tr> <tr><td>63</td><td>40</td></tr> </tbody> </table>	Code	Group 2	45	9	47	11	49	14	51	17	53	19	55	22	57	26	59	30	61	34	63	40				
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<p><b>KV-2DF+2M</b></p>  <p><b>9G NN CC MM</b></p>	<p>Example: <b>KV-2DF/17 X 2 + 34 M</b></p> <p>Code: <b>9G 02 51 61</b></p> <p><b>9G</b>: identifies the divider with motor  <b>02</b>: is the number of elements  <b>51</b>: is the divider displacement  <b>61</b>: is the motor displacement</p>	<p><b>MOTOR DISPLACEMENTS</b> cm<sup>3</sup>/rev.</p> <table border="1"> <thead> <tr> <th>Code</th> <th>Group 2</th> </tr> </thead> <tbody> <tr><td>45</td><td>9</td></tr> <tr><td>47</td><td>11</td></tr> <tr><td>49</td><td>14</td></tr> <tr><td>51</td><td>17</td></tr> <tr><td>53</td><td>19</td></tr> <tr><td>55</td><td>22</td></tr> <tr><td>57</td><td>26</td></tr> <tr><td>59</td><td>30</td></tr> <tr><td>61</td><td>34</td></tr> <tr><td>63</td><td>40</td></tr> </tbody> </table>	Code	Group 2	45	9	47	11	49	14	51	17	53	19	55	22	57	26	59	30	61	34	63	40				
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61	34																											
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<p><b>KV-2DFV+2M</b></p>  <p><b>9N NN CC MM LL</b></p>	<p>Example: <b>KV-2DFV/19 X 2 + 40 M with VM50 - 10÷105 bars</b></p> <p>Code: <b>9N 02 53 63 01</b></p> <p><b>9N</b>: identifies the divider with motor and valves  <b>02</b>: is the number of elements  <b>53</b>: is the divider displacement  <b>63</b>: is the motor displacement  <b>01</b>: is the valve code</p>	<p><b>MOTOR DISPLACEMENTS</b> cm<sup>3</sup>/rev.</p> <table border="1"> <thead> <tr> <th>Code</th> <th>Group 2</th> </tr> </thead> <tbody> <tr><td>45</td><td>9</td></tr> <tr><td>47</td><td>11</td></tr> <tr><td>49</td><td>14</td></tr> <tr><td>51</td><td>17</td></tr> <tr><td>53</td><td>19</td></tr> <tr><td>55</td><td>22</td></tr> <tr><td>57</td><td>26</td></tr> <tr><td>59</td><td>30</td></tr> <tr><td>61</td><td>34</td></tr> <tr><td>63</td><td>40</td></tr> </tbody> </table>	Code	Group 2	45	9	47	11	49	14	51	17	53	19	55	22	57	26	59	30	61	34	63	40				
Code	Group 2																											
45	9																											
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## **3 INSTALLATION**

- 3.1 General information
- 3.2 Installation
- 3.3 Breaking in
- 3.4 Setting of phase correction valves





## 3 INSTALLATION

### 3.1 General information

The dividers are very easy to install; you need only to connect the hydraulic pipes to them. However, you should closely abide by to the directions below to avoid subsequent problems.

As we have seen in [paragraph 4](#) of the introduction, the dividers may be equipped with phase correction valves that correct any small errors occurring in the extension or return cycles of the hydraulic cylinders. In order for the valves to perform their function the cylinders must reach the end of their stroke.

### 3.2 Installation

#### 3.2.1 Preliminary checks and operations

- Make sure that the intake pipes and the pipes connecting the divider to the actuators have adequate sections and are **clean**.
- If dirt (dust, metal shavings, rubber fragments from the pipe unions, etc.) circulates inside the divider, it will prevent the latter from working efficiently.
- The pipes connecting the elements to the various actuators must have the same or very similar lengths. Otherwise they will increase the phase errors between actuators.
- Make sure that the fluid within the system is clean, suitable and has the recommended viscosity as shown in the fluid tables.
- An unsuitable fluid, besides undermining the efficiency of the divider, will also shorten its life.
- In dividers with phase correction valves, every time that the valve opens in an element, the flow of that element goes to be discharged.
- The discharge flow of the valves is conveyed to the outside by means of a drainage outlet to which must be connected a pipe that drains directly into the tank; thus you obtain external drainage.
- By removing the dowel set inside the drainage outlet and installing a plug made of BSP in the same outlet, you will direct the flow to the inlet of the divider, thereby obtaining internal drainage.

**NOTE: In almost all cases external drainage is to be preferred. The dowel is always inserted by Vivoil.**

Internal drainage is allowed only in very special cases, on prior consultation with our Technical Department.

Type of Divider	Dowel	Plug
<b>0DFV</b>	M4 H=7	1/4" BSP
<b>1DFV</b>	M6 H=8	3/8" BSP
<b>2DFV</b>	M8 H=10	1/2" BSP

### 3.2.2 Connection of pipes to the divider.

- Rest the divider on a clean table, preferably with an unpainted metal surface.
- Remove the plastic caps, making sure not to tear them so as to avoid the risk of fragments getting into the divider.
- Screw in the pipe unions by hand and complete the operation by tightening them with a suitable wrench, without using extensions that will increase the force exerted on the unions themselves.

### 3.3 Breaking in

The flow dividers are tried out one by one in our **test department** to ensure that they perform efficiently.

However, it is important to note that once the divider is connected to the system, it must operate for about an hour before it will reach full efficiency.

During this breaking in period you must also check for any leaks in the pipe unions. Tighten them further as necessary.

After the divider has been broken in, you may control its performance by checking whether the actuators move according to the specifications provided in the engineering design.

Dividers with valves should also be broken in as described above, though in addition you must set the phase correction valves.

### 3.4 Setting the phase correction valves

The phase correction valves must be set; for this purpose the divider is provided with a 1/8" plugged threaded hole on each element or, on request, a mini pressure tap.

The **valves must be set** one at a time in succession according to the following procedure:

- a. place a pressure gauge on the 1/8" BSP hole after removing the plug (DIN 908 5.8 1/8" cylindrical tap with a 10.5 x 14 x 1.5 washer made of soft copper), or on the mini pressure tap of the first of the elements that has a valve to be set;
- b. discharge flow through the outlets of all the other elements, start the pump and adjust the valve until the pressure gauge indicates a pressure that is 10-15% lower than the setting of the system's pressure relief valve.
- c. unscrew the pressure gauge and replace the plug in the hole, or else screw the cap back on the mini pressure tap;
- d. repeat the operation for all the other valves.

## **4 CALCULATIONS**

- 4.1 Initial data
- 4.2 Dimensioning of divider with identical elements
- 4.3 Dimensioning of divider with different elements
- 4.4 Dividers with phase correction valves
- 4.5 Dividers with motor



## 4 CALCULATIONS

### 4.1 Initial data

Normally the following data are taken:

<b>Q</b> [l / min]	Flow rate of feed pump
<b>p</b> [bars]	Operating pressure of the pump
<b>qi</b> [l / min]	Capacity of each element
<b>ne</b> [rpm]	Number of divider outlets (number of flows to be obtained)

### 4.2 Dimensioning of divider with identical elements

To achieve a good compromise between volumes yielded and noise, it is recommended that you consider a rotation speed of

$$n = 1800 \text{ [rpm]}$$

whichever unit the divider belongs to.

*For cases in which noise levels are not important but it is rather the precision of the divider that counts, you may consider speeds equal to 90% of the maximum speeds indicated in the technical tables.*

After taking into account the above, you may determine the dimension of the divider by calculating the **displacement** required for each element according to the formula:

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

capacity of each individual element

$$c_i = q_i \times 1000 / n \text{ [cm}^3\text{/rev.]}$$

theoretical displacement of each element

Among the displacements shown in the tables, choose the one that is closest to the theoretical displacement.

Then you must ascertain the effective **rotation speed** of the gears using the formula

$$n = q_i / c \times 1000 \text{ [rpm]}$$

where "**c**" is the effective displacement available in the tables of dividers

## EXAMPLE

The example below shows how you can calculate the displacements of the divider elements and then, after choosing the effective displacements, ascertain the speed of rotation of the gears.

### DATA

**Q** = 15 l/min pump flow rate

**n** = 1800 rpm number of gear revolutions

**ne** = 3 number of divider elements

### CALCULATION OF DISPLACEMENTS

$$q_i = Q / ne = 15 / 3 = 5 \text{ l/min}$$

$$c_i = q_i \times 1000 / n = 5 \times 1000 / 1800 = 2,78 \text{ cm}^3/\text{rev.}$$

Then you choose among the effective displacements available to find the one that is equal to the calculated displacement or the next lowest; in the case above it would be 2.6 cm<sup>3</sup> / rev., which corresponds to the divider with the code: **KV-1DF/2.6 x 3**

### ASCERTAINING SPEED

$$n = q_i / c \times 1000 = 5 / 2.6 \times 1000 = 1923 \text{ rpm}$$

### NOTE:

*If the actuators are double-acting hydraulic cylinders with a very high **k** ratio between the base area and the rod area, you must also check the **nr** speed corresponding to the cylinder reentry phase.*

If, for example, **k** = **1,5** in the rod reentry phase, you will obtain the gear speed by calculating:

$$q_{ir} = K \times q_i \text{ [l/min]}$$

$$= 1,5 \times 5 = 7.5 \text{ [l/min]}$$

$$nr = q_{ir} / c \times 1000$$

$$= 7.5 / 2.6 \times 1000 = 2885 \text{ [rpm]}$$

this speed is too high so you will have to compromise by choosing greater displacements so as to obtain speeds ranging from 1000 to 2800 rpm

If the speed is closer to 1000 rpm, the precision of the divider will decrease, whereas as it gets closer to 2800 rpm, the divider will be noisier.

### 4.3 Dimensioning of divider with different elements

**DATA:**

<b>Q</b> [l/min]	Flow rate of feed pump
<b>q1</b> [l/min]	Flow rate of first section
<b>q2</b> [l/min]	Flow rate of second section
<b>q3</b> [l/min]	Flow rate of third section
<b>n</b> [rpm]	Number of gear revolutions

To calculate the displacements, you establish the numbers of revolutions of the gears

$$n = 1800 \text{ rpm}$$

$$c1 = q1 \times 1000 / n \text{ [cm}^3\text{/rev.]}$$

$$c2 = q2 \times 1000 / n \text{ [cm}^3\text{/rev.]}$$

$$c3 = q3 \times 1000 / n \text{ [cm}^3\text{/rev.]}$$

You must choose among the effective displacements available to find ones that are equal to the calculated displacement or the next lowest.

Then you must ascertain the effective **rotation speed** of the gears using the formula:

$$n = Q \times 1000 / C \text{ [rpm]}$$

where "**C**" is the total displacement of the divider ( $c1+c2+c3+\dots$  derived from the tables)

Finally, it is necessary to calculate the effective flow rates of each element:

$$q1 = c1 \times n / 1000 \text{ [cm}^3\text{/rev.]}$$

$$q2 = c2 \times n / 1000 \text{ [cm}^3\text{/rev.]}$$

$$q3 = c3 \times n / 1000 \text{ [cm}^3\text{/rev.]}$$

$c1$  = displacements derived from the tables  
 $n$  = number of revolutions calculated

**NOTE:**

*If the actuators are double-acting hydraulic cylinders with a very high **k** ratio between base area and rod area, you must also check the **nr** speed corresponding to the cylinder reentry phase.*

**EXAMPLE**

The example below shows how you calculate the displacements of the divider elements and then, after choosing the effective displacements, ascertain the speed of rotation of the gears and the effective flow rates.

**DATA:**

- Q** = 15 l/min Flow rate of the feed pump
- q1** = 2 l/min Flow rate of first section
- q2** = 8 l/min Flow rate of second section
- q3** = 5 l/min Flow rate of third section
- n** = 1800 rpm Recommended speed

**CALCULATION OF DISPLACEMENTS**

$$\begin{aligned}c1 &= q1 \times 1000 / n = 2 \times 1000 / 1800 = 1,11 \text{ cm}^3/\text{rev.} \\c2 &= q2 \times 1000 / n = 8 \times 1000 / 1800 = 4,44 \text{ cm}^3/\text{rev.} \\c3 &= q3 \times 1000 / n = 5 \times 1000 / 1800 = 2,77 \text{ cm}^3/\text{rev.}\end{aligned}$$

You choose among the effective displacements available to find the ones that are equal to the calculated displacements or the next lowest. In the above case they are: 1.2 - 4.16 - 2.6 cm<sup>3</sup>/revolution, corresponding to the divider with the code:

**KV-1DF/1.2+4.3+2.6****ASCERTAINING SPEED**

In the above case:

$$\begin{aligned}C &= 1,17 + 4,16 + 2,6 = 7,93 \text{ cm}^3/\text{rev.}, \text{ and:} \\n &= Q / C \times 1000 = 15 / 7,93 \times 1000 = 1891 \text{ rpm}\end{aligned}$$

**CALCULATION OF EFFECTIVE FLOW RATES**

$$\begin{aligned}q1 &= c1 \times n / 1000 = 1.2 \times 1891 / 1000 = 2.26 \text{ l/min} \\q2 &= c2 \times n / 1000 = 4.16 \times 1891 / 1000 = 7.86 \text{ l/min} \\q3 &= c3 \times n / 1000 = 2.6 \times 1891 / 1000 = 4.91 \text{ l/min}\end{aligned}$$



#### 4.4 Dividers with phase correction valves

When you have to ensure that the phase of several hydraulic cylinders is maintained over time, it will be necessary to compensate in each cycle the small phase errors arising from a variety of causes. The simplest way to correct these errors is to install a phase correction valve on each divider element which will guarantee the phase of its respective cylinder.

On request it is possible for us to supply the divider equipped with phase correction valves.

The method for **dimensioning and choosing** dividers with valves is the same as for normal dividers.

In reference to the previous examples, the codes of dividers with valves differ from the normal ones only in the code and in the addition of the valve settings (see also [Chap. on valves](#)):

**KV-1DFV/2.6 x 3 (70-210bar)**

**KV-1DFV/1.2+4.3+2.6 (10-105bar)**

The phase correction valves must be set by the installer.

To facilitate setting operations, the divider is provided with a 1/8" plugged threaded hole on each element or else, on request, a mini pressure tap.

For directions on how to set valves, see Chap. on **Installation**

#### 4.5 Dividers with motor

If the flow divider feeds several **single-acting** hydraulic cylinders, their reentry may be somewhat hindered, also due to the backpressure generated through the discharge of all the oil contained in the cylinder delivery chambers. Consequently it will become difficult for the flow divider to pick up. In such cases you must add to the flow divider an element that acts as a motor, i.e., which causes the other elements linked to the cylinders to rotate. On the outside the divider appears like a normal divider with one extra element in addition to those strictly necessary for feeding the cylinders. Internally it has a mechanical connection (shaft), but not a hydraulic connection with the other elements, given that it must work independently from them.

The **motor must be connected** to the system as directed below:

- **inlet** connected to the check valve of the system in the position in which it is set for the reentry of the cylinders. The motor is in fact supplied independently from the pump flow.
- **outlet** directly connected to the tank by means of a conduit that discharges a few dozen centimeters below the minimum fluid level and in any case at a height of at least 10-15 cm from the bottom of the tank.

In the *cylinder extension phase* all the flow of the pump passes through the elements connected to the cylinders and the latter drive the rotation of the motor element by means of the linked shaft. In this phase the motor element is inactive and tends to take in oil from the tank, causing it to be discharged from the delivery outlet through the check valve. For this reason you must ensure that the discharge pipe may draw oil from the tank to avoid cavitation within the motor element.

In the *cylinder reentry phase* the flow of the pump goes to the delivery outlet of the motor element; the latter thereby drives all the other elements, which in turn receive the return fluid from the cylinders and convey it to be discharged through the check valve. The pump flow, which in the previous phase supplied all the elements connected to the cylinders, now completely converges in the motor element and thus results to be excessive.

To prevent the motor element from rotating at excessively high speeds, the divider must be connected with a flow-reducing valve.

#### **Dimensioning of motor element.**

Given that all the other elements of the divider are normally dimensioned as previously illustrated, the choice of elements also determines which group the divider itself belongs to. For the motor element you must choose the displacement that is closest to the sum of the displacements of the other elements. If the total displacement of the elements exceeds the largest displacement available for the group in question, you will have to go to the next group up or connect the motor with a flow-reducing valve.

In reference to the previous examples, the divider codes are:

**KV-1DF/2.6 x 3+1M/9.8**

**KV-1DF/1.2+4.3+2.6+1M/9.8**

**KV-1DFV/2.6 x 3 +1M/9.8 (70-210bar) [with valves]**

**KV-1DFV/1.2+4.3+2.6+1M/9.8 (10-105bar) [with valves]**

## **5 TROUBLESHOOTING**

5.1 Failure to start

5.2 Distribution errors



## 5 Troubleshooting

### 5.1 Failure to start

If all the installations have been carried out properly and the divider does not start when the pump is turned on, the causes may be the following:

- **Wrong choice of divider.**

The displacement chosen for the individual elements make the gears turn very slowly so that the divider cannot start up.

The input pressure is too low (recommended min  $p = 15 \div 50$  bar)

**Remedies**

You must adopt a flow divider that ensures a gear rotation speed close to 1800 rpm or else increase the flow rate of the pump.

If the pressure is too low, adjust the setting of the system's pressure-relief valve.

- **Excessive tightening torque of divider stay bolts**

Excessive torque may generate abnormal forces of adhesion which prevent the gears from picking up.

**Remedies**

Loosen the eight screws fastening the unit in place and use a manual dynamometric wrench to tighten them at the torques shown in the table below:

Screw tightening torque		
Divider	Kg.m	N.m
<b>ODF - ODFV</b>	1,2 - 1,4	11,8 - 13,7
<b>1DF - 1DFV</b>	2,6 - 3,0	25,4 - 29,4
<b>2DF - 2DFV</b>	5,5 - 6,0	54,0 - 58,9

- **Use of a proportional valve downstream from divider.**

Since proportional valves are normally used to graduate speed, they absorb a variable flow which may prevent the divider from working.

**Remedies**

- replace the proportional valve with one having fixed openings;
- if the proportional valve is indispensable, adjust its opening until the divider starts up. This is the minimum flow for pickup.  
To ensure regular functioning, the flow rate of the divider must be high enough to cause the gears to turn at least 1200 rpm.

- **Presence of air in the system**

The presence of air may prevent the divider from starting and from working properly, besides causing it to deteriorate rapidly due to wear and constant impacts.

**Remedies**

Carry out a thorough bleeding of the system, paying particular attention to the hydraulic cylinders.

- **Excessively dirty oil**

The presence of impurities in the oil of the hydraulic system may cause the divider not to start.

**Remedies**

Replace the dirty oil in the system with new oil and ensure a total filtering of 10-20  $\mu$ .

## 5.2 Errors in distribution of flow among elements

In the flow distribution errors exceed nominal values by 3-4%, a variety of causes are possible; this error may derive from either the system itself or the divider. To determine whether the flow distribution error is due to the system or to the divider, you need only exchange the outlet pipes of the elements: if the error is once again manifested in the same elements, its cause is not ascribable to the divider.

Below we will examine the most common causes of error deriving from an irregular functioning of the divider; some of these have already been discussed in the previous chapter.

- **Wrong dimensioning of divider**

**Remedies**

You must adopt a flow divider that ensures a gear rotation speed close to 1800 rpm or else adjust the flow rate of the pump.

- **Presence of air in the system and in the hydraulic cylinders**

The presence of air may prevent the divider from starting and from working properly, besides causing it to deteriorate rapidly due to wear and constant impacts.

**Remedies**

Carry out a thorough bleeding of the system, paying particular attention to the hydraulic cylinders.

- **Dirty oil**

The presence of impurities in the oil of the hydraulic system may prevent the divider from working properly.

**Remedies**

Replace the dirty oil in the system with new oil and ensure a total filtering of 10-20  $\mu$ .

- **Wrong setting of phase correction valves**

An error in the setting of the phase correction valves may impede the regular realignment of the cylinders in each cycle. The valves must be set at a pressure that is 10-15% lower than the setting of the system's pressure relief valve.

**Remedies**

Set the valves as directed in [paragraph 3.4](#) of the chapter on Installation.

- **Excessive pressure difference between elements**

In order for the divider to work properly, the pressure difference between its elements must not exceed 40 bars.

**Remedies**

Use throttling devices at the outlets of actuators operating at lower pressures.

- **Excessively fluid oil**

The recommended viscosity is 20-40 cSt.

**Remedies**

Replace the oil with one of those recommended (20-40 cSt).

- **Operating temperatures too high or too low**

The optimal operating temperature for the fluid ranges between 30 and 60 °C

**Remedies**

Replace the oil with a type suitable for low temperatures.

- **Divider not broken in**

In order for the divider to work efficiently, it must go through a breaking-in period of 1-2 hours.

**Remedies**

[Break in the divider.](#)

- **Excessive tightening torque of divider stay bolts**

Excessive torque may generate abnormal forces of adhesion which prevent the gears from picking up.

**Remedies**

Loosen the eight screws fastening the unit in place and use a manual dynamometric wrench to tighten them at the torques shown in the table below:

<b>Screw tightening torque</b>		
Divider	Kg.m	N.m
<b>0DF -</b>	1,2 - 1,4	11,8 -13,7
<b>1DF -</b>	2,6 - 3,0	25,4 -
<b>2DF -</b>	5,5 - 6,0	54,0 -

- **Insufficient tightening torque of divider stay bolts**

Insufficient torque causes internal leakage that undermines the volumetric efficiency of the elements, with a consequent increase in the flow distribution error.

**Remedies**

Using a manual dynamometric wrench, tighten the 8 screws fastening the divider with the torques indicated in the table above.



## **6 PRESSURE RELIEF VALVES**

6.1 Phase-correction pressure-relief valves

6.2 Solenoid valves



## **6 PRESSURE-RELIEF VALVES**

### **6.1 Description**

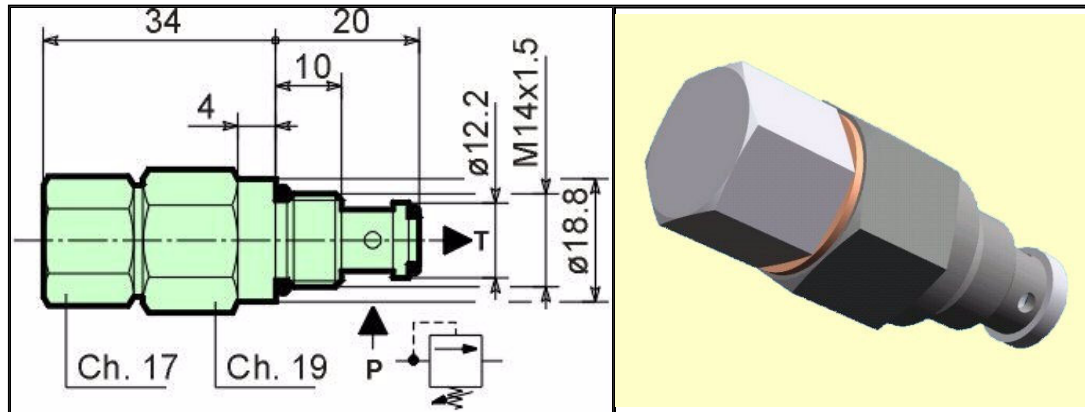
The phase correction valves fitted onto the dividers are pressure-relief valves with direct-acting differential plugging device.

If, in fact, we consider a group of cylinders in motion, it is highly unlikely that they will reach the end of their respective strokes at the same instant. The first cylinder to complete its stroke stops and the fluid coming from its section of the divider is discharged through its phase correction valve at the pressure set for the latter (which must be 20% lower than the setting of the pump's pressure-relief valve); the same thing subsequently occurs with the other cylinders on completion of their respective strokes.

As soon as all the cylinders have stopped, the reentry cycle may begin.

## 6.2 VM 25 DIF-type valves

Note: this valve is applied only for dividers belonging to group 0: **KV-ODFV**

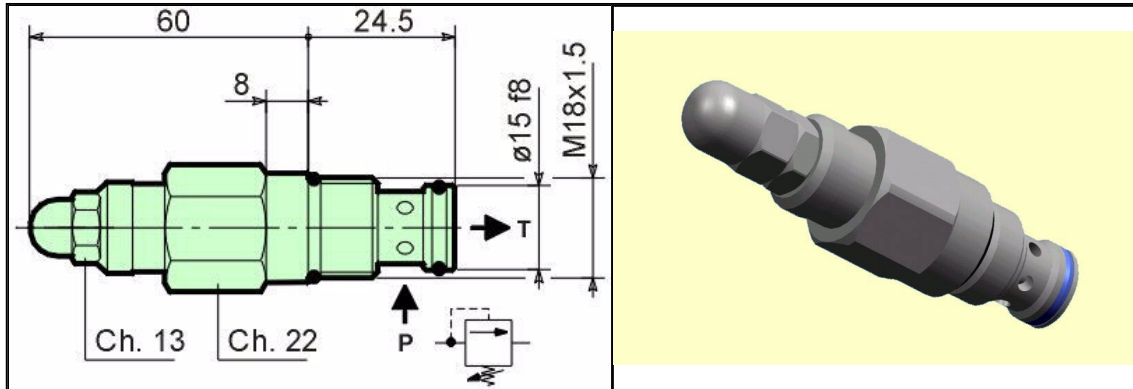


TECHNICAL FEATURES	VM 25 DIF
Max. flow rate	25 l/min.
Max. pressure in P	315 bars
Max. pressure in T	315 bars
Spring setting range: <b>type 01</b>	<b>20 ÷ 140 bars</b>
Spring setting range: <b>type 02</b>	<b>70 ÷ 315 bars</b>
Filtering required	10 ÷ 15 microns
Oil viscosity range	2.8 ÷ 350 cSt
Recommended oil temperature	-20 +80 °C
Gasket material	Buna N
Weight	0.110 kg
Pressures with flow of 1 l/min: Opening value as compared to set value	95 %
Closing value as compared to set value	75 %
Hydraulic oil	HM , HV ISO 6074

When ordering, specify the maximum operating pressure and request the corresponding pressure-relief valve.

## 6.3 VM 50 DIF-type valves

Note: this valve is applied to the dividers belonging to groups 1 and 2: **KV-1DFV e KV-2DFV**

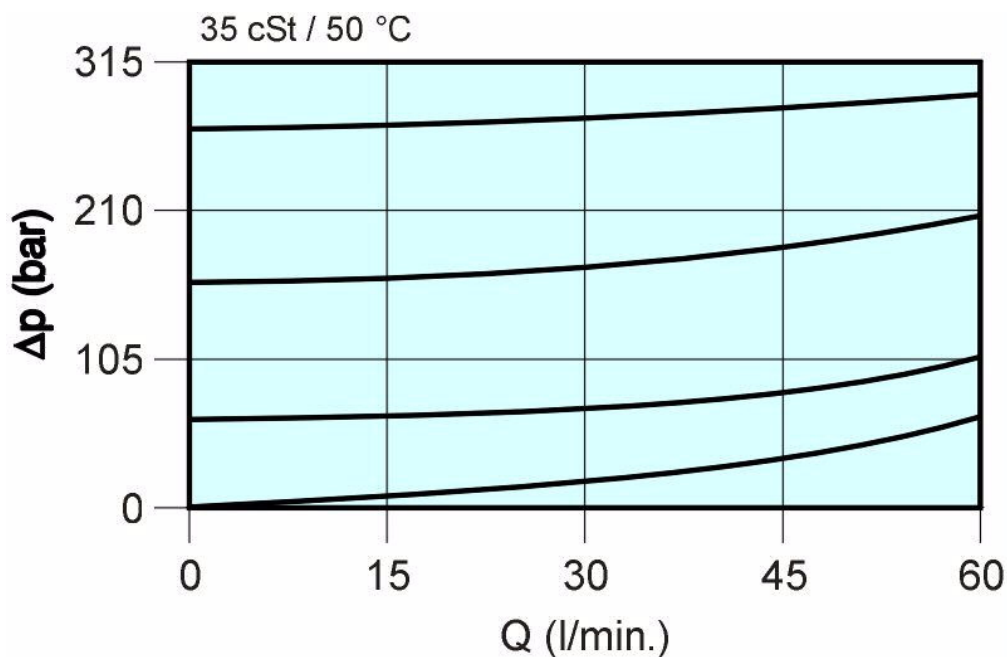


TECHNICAL FEATURES	VM 50 DIF
Max. flow rate	50 l/min.
Max. pressure in P	350 bars
Max. pressure in T	350 bars
Spring setting range: <b>type 01</b>	<b>10 ÷ 105 bars</b>
Spring setting range: <b>type 02</b>	<b>70 ÷ 210 bars</b>
Spring setting range: <b>type 03</b>	<b>140 ÷ 350 bars</b>
Filtering required	10 ÷ 15 microns
Oil viscosity range	2.8 ÷ 350 cSt
Recommended oil temperature	-20 +80 °C
Gasket material	Polyurethane Buna N
Weight	0.125 kg
Pressures with flow of 1 l/min: Opening value as compared to set value	95 %
Closing value as compared to set value	75 %
Hydraulic oil	HM , HV ISO 6074

CHECK STANDARD SETTING			PRESSURE INCREASE bar x 1 turn screw
TYPE	pressure bar	flow rate l/min	
<b>10 ÷ 105 bar</b>	50	5	15
<b>70 ÷ 210 bar</b>	130	5	32
<b>140 ÷ 350 bar</b>	200	5	67

When ordering, specify the maximum operating pressure and request the corresponding pressure-relief valve.

## 6.4 Performance features of VM 25 DIF and VM 50 DIF valves



## 6.5 SOLENOID VALVES

To correct the phase errors of cylinders supplied by a flow divider you may use solenoid valves that cause flow to be discharged when their coils are energized. Unlike in the case of pressure-relief valves, the coils may be energized in any intermediate position of the cylinder and not only when it has completed its stroke. This possibility increases both the range of applications and the functionality of the circuit.

## **7 DIAGRAMS**

7.1 Hydraulic diagrams of flow dividers

7.2 Diagrams of systems with flow dividers





## 7 DIAGRAMS

### 7.1 Hydraulic diagrams of flow dividers

We shall examine the path of fluid inside the flow divider by means of diagrams. The following symbols are used:

- P** = conduit for incoming flow from the pump
- T** = conduit for flow conveyed to the tank
- Gi** = conduits for delivery of fluid to users
- A e B** = delivery and discharge of motor element

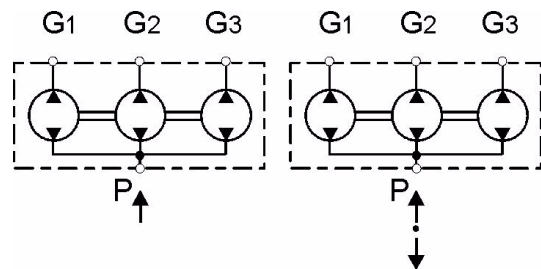
#### 7.1.1 Diagram of divider comprising three elements

In this example we consider a divider made up of three elements, but the same considerations also apply for a divider with **Ne** elements.

The incoming flow from the **P** supplies the three sections, whose gears, fitted onto the same shaft, start turning at equal speeds.

From the elements, three branches carry flow to the users. The flow rates are solely determined by the displacements of the respective elements.

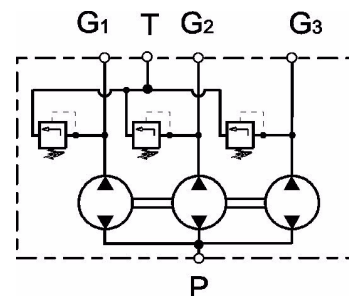
Depending on the external circuit, the divider may work in either one or both directions.



#### 7.1.2 Diagrams of three-element divider with valve

This case differs from the previous one only in that there are three phase correction valves, which are connected to the **Gi** branches and discharge flow into manifold **T**.

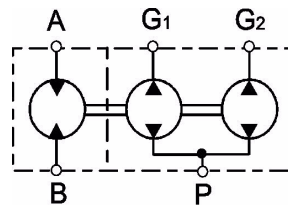
This example shows the configuration with external drainage of the valves, given that this is the most frequent case. For the sake of simplicity, the diagram does not show the service conduits for the pressure gauges.



### 7.1.3 Diagrams of two-element divider with motor

The motor element is mechanically linked to the other elements by means of the shaft. However, it is wholly independent from a hydraulic standpoint.

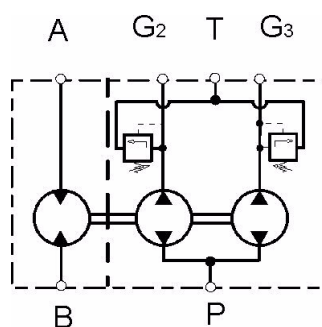
In fact the delivery and discharge outlets **A** and **B** are separate from intake **P** and the **Gi** branches serving the users.



### 7.1.4 Diagram of divider with valves and motor

In this diagram of a two-element divider with motor, two phase correction valves have been added on the branches delivering flow to the users.

For the sake of simplicity, the diagram does not show the service taps for the pressure gauges.



## 7.2 Diagrams of systems with flow dividers

For the purpose of illustration, below we shall describe some examples of systems using flow dividers.

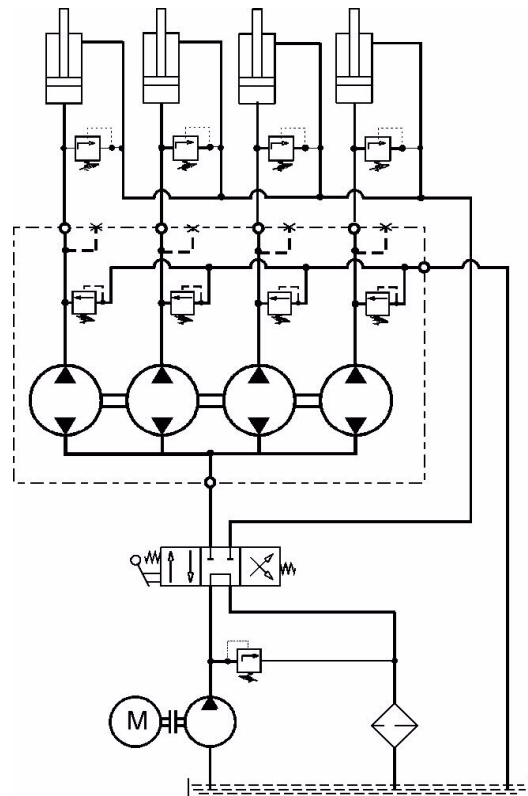
### 7.2.1 Diagram with four element divider with valves

The divider, comprising 4 sections, feeds 4 double-acting cylinders from the extension side, whereas from the return side, flow is delivered directly from the pump: (one-way divider).

To keep the cylinders synchronized in phase, the divider is equipped with 4 phase correction valves (one for each cylinder from the extension side and therefore with alignment of the cylinders only from the thrusting side). The flow discharged from the valves is directly conveyed to the fluid tank.

The divider is also provided with auxiliary 1/8" outlets, here shown plugged up; these outlets are for applying the pressure gauges that are necessary for setting the valves.

To prevent the cylinders from spontaneously reentering as a result of loading, 4 piloted check valves are provided on the branches feeding the thrust chambers of the cylinders. These valves allow the flow of fluid only when the reentry command is activated, which puts the reentry conduit under pressure. This pressure opens the limit valves and allows fluid to circulate.

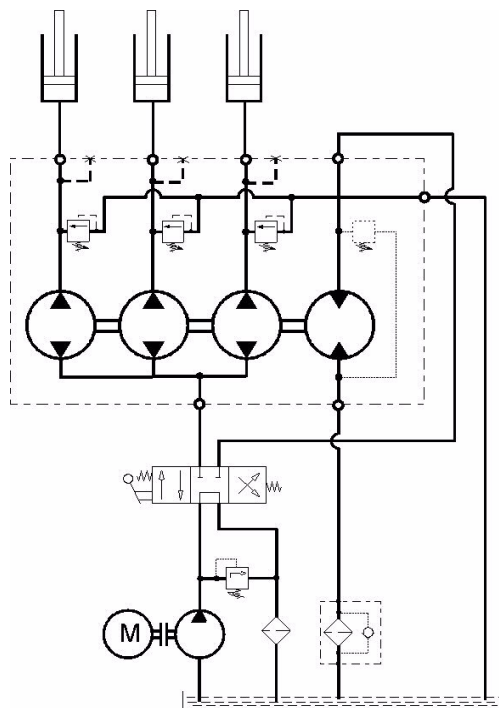


## 7.2.2 Diagram with three-elements divider with three valves and motor

The divider has 3 sections that supply 3 single-acting cylinders with 3 phase correction valves and a section that acts as a motor. The divider has three 1/8" outlets (plugged) for pressure gauges.

In the cylinders reentry phase, the motor receives flow from the pump and discharges it into the tank through a filter. To prevent the motor from gaining too much speed, there is an adjustable flow-limiting valve that drains part of the flow coming from the pump. As it turns, the motor draws with it the gears of the divider, thereby allowing the cylinders to reenter and to discharge the fluid through the divider into the tank after its filtering.

In the cylinders extension phase, the motor is instead drawn by the shaft of the divider and aspirates from the tank, bypassing the filter, to prevent cavitation.



### 7.2.3 Diagram with four element divider

The divider shown here in the diagram is capable of supplying four circuits in a wholly independent manner, three being connected to three hydraulic cylinders and one to a hydraulic motor.

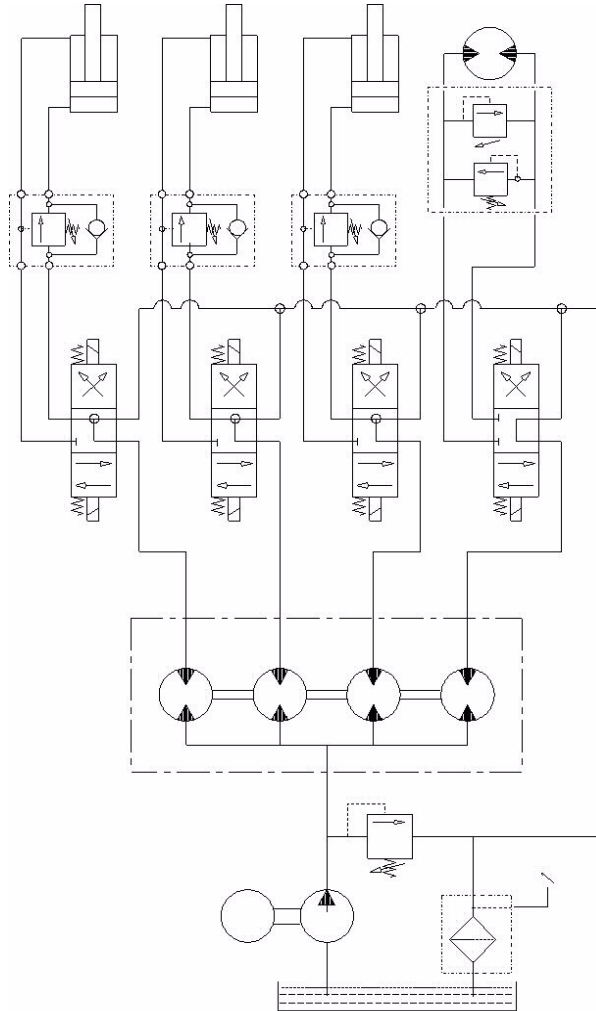
The layout of the connections provides for the divider to work with flow moving through it in both directions.

A double pressure-relief valve protects the motor against overloads. All the cylinders are provided with unidirectional piloted check valves (flow is blocked in one direction and free in the other), which maintain the load until their reentry is actuated.

The phase correction of the cylinders is not provided here, being presumed unnecessary in the presence of independent circuits.

It should be noted that the fluid returning to the tank is completely filtered. In fact, to prolong the life of the flow divider, it is recommended not to use filters with a bypass designed to prevent dirt from clogging the filter.

If you wish to monitor the degree of clogging in the cartridge, equip the filter with a suitable pressure gauge.

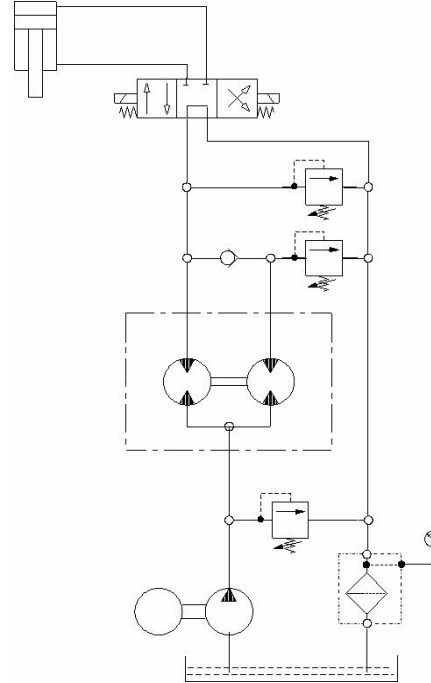


### 7.2.4 Diagram of pressure amplifying circuit

The circuit shown is a simplified example of the use of a two-element flow divider as a pressure amplifier in a hydraulic press where the approach to the piece to be pressed must be fast even at low pressures, whereas the pressing must be at high pressure even if slow.

In the example, the flow for the approach is the sum of the flow rates of the two elements comprising the divider. Since the two pressure-relief valves on the branches of the hydraulic cylinder are set at two different pressures (one at low pressure and the other at high pressure), when the rod begins to press the piece, the pressure rises and causes the valve set at a low pressure to open and the flow in the corresponding branch goes to be discharged.

As the rotation of the divider gears and the power of the pump do not change, all the power converges in the active element of the divider, which may consequently supply a pressure exceeding even that of the pump itself.



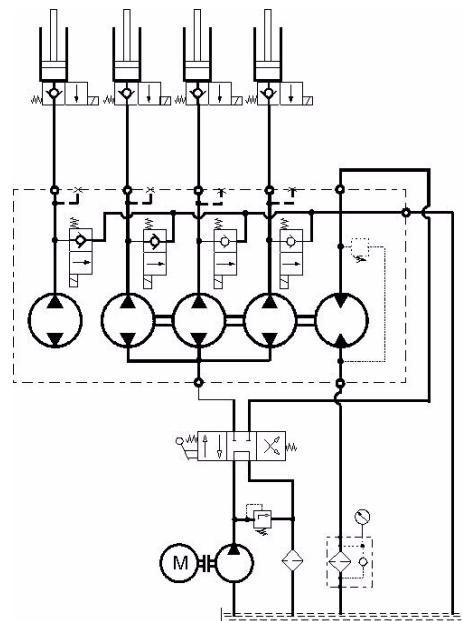
### 7.2.5 Diagram of 4-element divider with valves + motor

The difference between this circuit and the one with three elements + motor (par. 7.2.2) lies in the number of elements and the type of phase correction valves, which are electrically rather than hydraulically controlled.

The following operating modes are possible:

- all cylinders in parallel;
- all cylinders independent;
- groups of cylinders independent from others;
- disabling of one or more cylinders, by keeping the corresponding solenoid valves de-energized.

All the hydraulic cylinders (single-acting) are provided with solenoid valves that disable their movement if the coils are not energized.



**BOLOGNA** 19/11/99**Ogg.:** **COMUNICAZIONE TECNICA - TECHNICAL COMMUNICATION**

Si comunica che dalla data odierna 19/11/1999 sono entrate in produzione le seguenti migliorie:

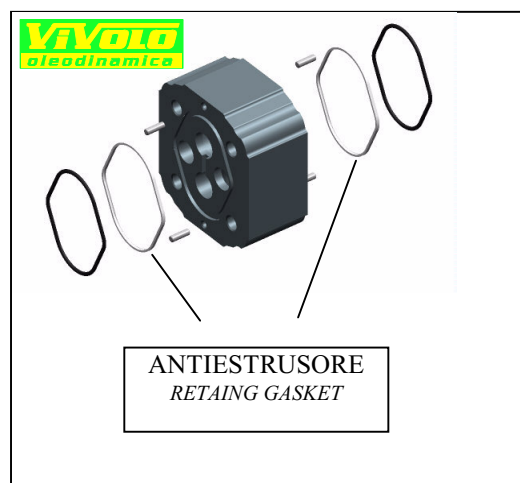
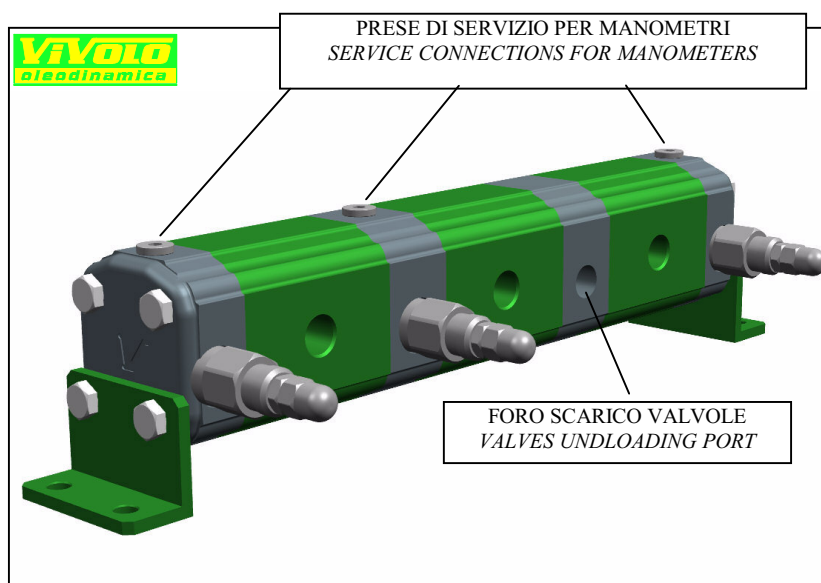
- Per una maggiore affidabilità ai picchi di pressione, le guarnizioni di tutti i divisori di flusso sono state corredate di antiestrusori in PTFE vergine (Teflon).
- I divisori di flusso con valvola vengono tutti predisposti dalla VIVOIL, in fase di montaggio, per lo scarico esterno (drenaggio esterno).  
Per ottenere lo scarico interno (drenaggio interno) occorre svitare e togliere il grano alloggiato nel foro di scarico.
- Nei divisori di flusso con valvola, nelle piastre e coperchi, sono stati aggiunti dei fori di servizio di 1/8" BSP (GAS) per predisposizione manometro.  
A richiesta sono disponibili delle miniprese attacco rapido per inserimento manometri.

Finché non saranno esaurite le scorte di magazzino alcuni modelli di divisore non avranno queste innovazioni.

It is advised that, starting from today's date 19/11/99, the following improvements have entered in our production:

- For a bigger entrustment to the picks of pressure, the seals of every Flow-Dividers have been provided with retaining-gasket made by virgin PTFE (Teflon).
- Flow-Dividers with valve are all arranged by VIVOIL, in the mounting phase, for the external unloading (external drainage).  
In order to obtain the internal unloading (internal drainage) it is necessary to unscrew and remove the dowel located in the unloading port.
- In the Flow-Dividers with valves, service ports with 1/8" BSP (GAS) for manometer connection have been added on the plates and the covers.  
Upon request little-connections for rapid attacks for manometers are available.

Until the stock on hand is sold out, some models of Divider will not have these innovations



**BOLOGNA** 03-02-2000**Ogg.:** **NOTA TECNICA - TECHNICAL NOTE**

Dal mese di dicembre 1999 i divisori di flusso con valvola vengono tutti predisposti dalla VIVOIL, in fase di montaggio, per lo scarico esterno (drenaggio esterno). FIG. -A -

Per ottenere lo scarico interno FIG.- B - (drenaggio interno) occorre:

- 1 - svitare e togliere il grano alloggiato nel foro di scarico
- 2 - tappare il foro di scarico

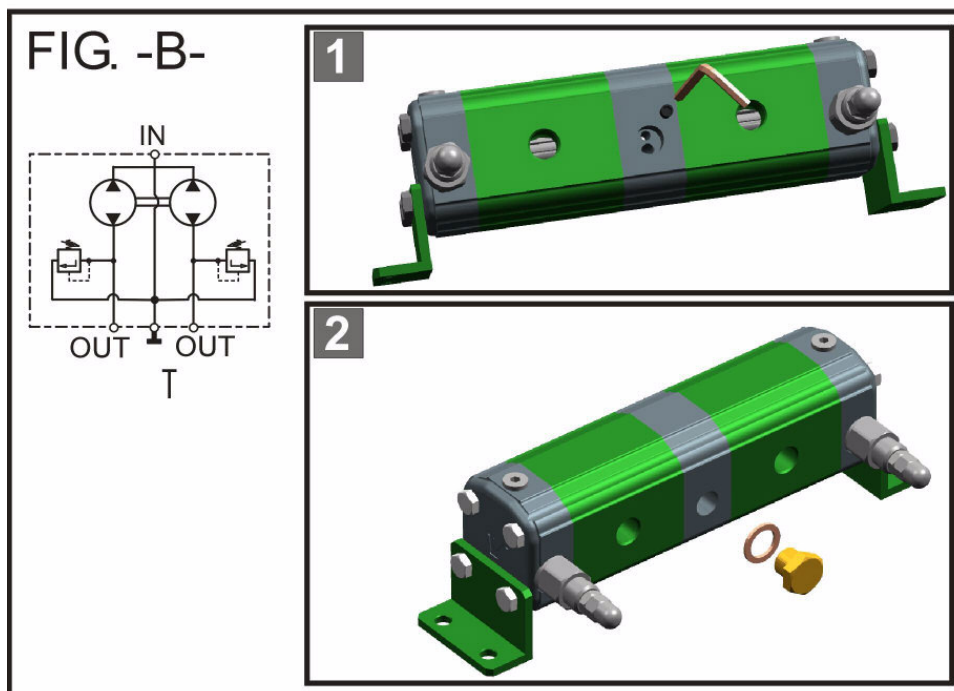
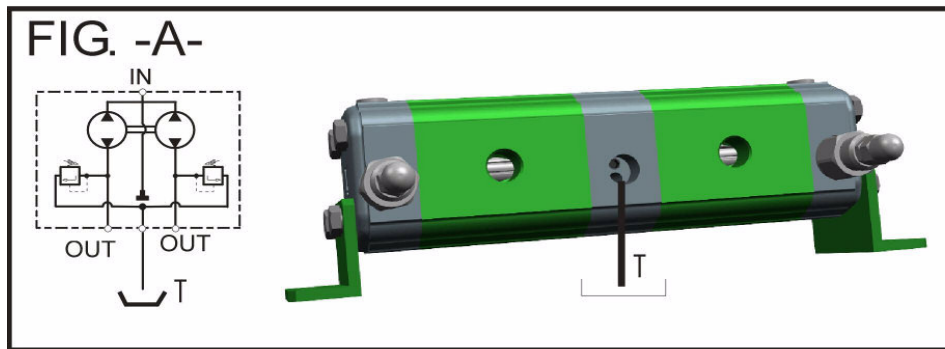
**N.B.** Per un buon funzionamento del divisore consigliamo di adottare il drenaggio esterno

Since the month of December 1999, Flow-Dividers with valves are all arranged by VIVOIL, in the mounting phase, for the external unloading (external drainage). PICTURE A.

In order to obtain the internal unloading PICTURE B (internal drainage) it is necessary:

- 1 - to unscrew and remove the dowel located in the unloading port
- 2 - to cap the unloading port

**N.B.** For a good working of the divider, we suggest to adopt the external drainage





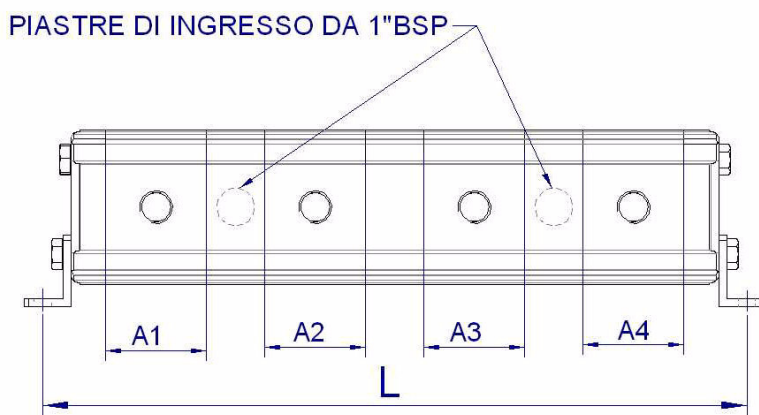
**BOLOGNA** 01-10-2000

**Ogg.:** **COMUNICAZIONE TECNICA : - DIVISORI DI FLUSSO GRUPPO 2**

**KV-2DF – KV-2DFV - KV-2DF + 2M – KV-2DFV + 2M**

Dal mese di settembre 2000 abbiamo modificato lo spessore della piastra di ingresso da 1" BSP per i divisori del gruppo 2. Pertanto per calcolare la lunghezza del divisore è necessario aggiungere alla misura "L", ottenuta dalle formule indicate nel catalogo, 7 mm per ogni piastra di ingresso da 1" BSP.

**ESEMPIO : DIVISORE KV2DF / 40x4**



**I dati per il calcolo della lunghezza sono nella pagina "dati tecnici KV-2DF"**

Consultando la tabella degli ingressi si individuano il numero e le dimensione degli ingressi, che nel nostro caso è: 2 x 1" ovvero due ingressi da 1" BSP.

Per calcolare la lunghezza "L" si usa la formula:

$$L = (n-1) \times 37 + 80 + A1 + A2 + A3 + \dots + An$$

n = Numero di elementi del Divisore, nell'esempio n=4

I valori di A1-A2-A3-A4 sono, nel nostro caso, uguali tra loro e si ottengono dalla tabella.

$$A1=A2=A3=A4=106 \text{ mm}$$

$$L = (4-1) \times 37 + 80 + 106 + 106 + 106 + 106 = 615 \text{ mm} \text{ a cui bisogna aggiungere } 7 \times 7 = 629 \text{ mm}$$

NOTE:

NEI CATALOGHI CON DATA SUCCESSIVA AL 05/10/2000 (vedi cap. indice) E' STATA AGGIUNTA NELLE PAGINE DEI DATI TECNICI DEL GRUPPO 2 LA SEGUENTE NOTA:

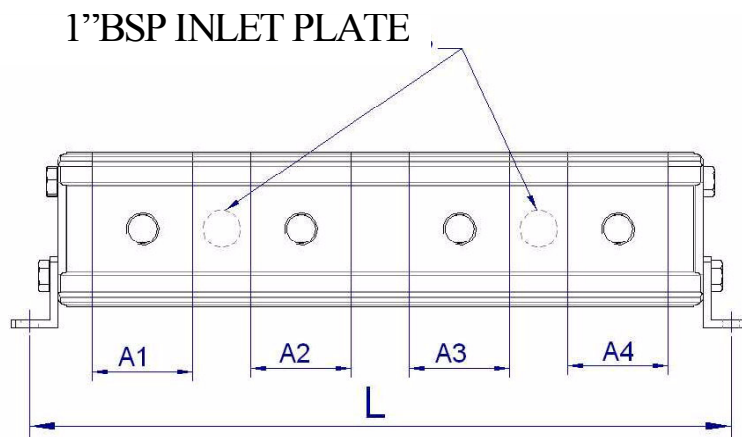
**ATT. :** Aggiungere a "L" 7 millimetri per ogni ingresso da 1" BSB

BOLOGNA, 01/10/00

**SUBJECT: TECHNICAL COMMUNICATION – GROUP 2 FLOW-DIVIDERS**

Since the month of September 2000 we have modified the thickness of the 1" BSP Inlet plate for Gr.2 Dividers. Therefore, to calculate the length of the Divider, it is necessary to add 7 mm for each 1" Inlet plates to the measure "L", obtained from the formulas indicated in the catalogue.

**EXAMPLE: DIVIDER KV2DF/40 X 4**



The data for the calculation of the length are in the page "technical data KV-2DF"

Consulting the table of the Inlets, the number and the dimensions of the Inlets are found out, that in our case is 2 X 1", i.e. 2 1" BSP Inlets.

To calculate the length "L" the following formula must be used:

$$L = (n-1) \times 37 + 80 + A1 + A2 + A3 + \dots + An$$

n = number of the elements of the Divider, in the example n = 4.

The values for A1-A2-A3-A4 are, in our case, equal each other and they are obtained from the table.

$$A1=A2=A3=A4=106 \text{ mm}$$

$$L = (4-1) \times 37 + 80 + 106+106+106+106= 615 \text{ mm, to which } 7+7 \text{ must be added} = 629 \text{ mm}$$

NOTE:  
In the catalogues with date after 05/10/00 (see paragraph in the index) we have added the following note in the pages of Group 2 technical data.

**ATT.** Add 7 mm to "L" for each 1" BSP Inlet