

# Control the Pressure of your System

## Alfa Laval CPM Constant-Pressure Modulating Valve

2.7

### Concept

CPMI-2, CPMI-D60 and CPMO-2 are hygienic constant-pressure valves. CPMI-2 and CPMI-D60 (Constant-Pressure Modulating Inlet) maintain a constant pressure in the process line at the inlet side of the valve. Typical applications are after separators, heat exchangers or overflow valves. CPMO-2 (Constant-Pressure Modulating Outlet) maintains a constant pressure in the process line at the outlet side of the valve. Typical applications are before filling/bottling machines etc.

### Working principle

The valves are remote-controlled by means of compressed air. A diaphragm/valve plug system reacts immediately to any alteration of the product pressure and changes position so that the preset pressure is maintained.

### Standard design

The CPMI-2 and CPMO-2 consist of a valve body with valve seat, cover, a valve plug with a diaphragm unit and a clamp. The cover and the valve body are clamped together. The valve body and the seat are welded together. The CPM-I-D60 consists of upper and lower valve bodies, an inlet tube, a cover, a valve plug with diaphragm unit and clamps. The cover and the valve bodies are clamped together.



### TECHNICAL DATA

Max. product pressure: . . . . . 1000 kPa (10 bar).  
 Min. product pressure: . . . . . 0 kPa (0 bar).  
 Temperature range: . . . . . 10°C to 95°C (EPDM).  
 Temperature range with upper diaphragm  
 in PTFE/EPDM: . . . . . 10° C to +140° C.  
 (Higher on request).  
 Air pressure (CPMI-2/CPMO-2): . . . . . 0 to 800 kPa (0 to 8 bar).  
 Air pressure (CPM-I-D60): . . . . . 0 to 600 kPa (0 to 6 bar).  
 Flow Kv 23, fully open (Dp = 1 bar): . . . . . Approx 23 m<sup>3</sup>/h.  
 Flow Kv 7 (Δp = 1 bar): . . . . . Approx 7 m<sup>3</sup>/h.  
 Flow Kv 9 (Δp = 1 bar): . . . . . Approx 9 m<sup>3</sup>/h.  
 Flow Kv2/15, low capacity (Δp = 1 bar): . . . . . Approx 2 m<sup>3</sup>/h.  
 (Alternative size) . . . . . (regulating area). Approx. 15  
 m<sup>3</sup>/h. (CIP area).  
 Flow range Kv60, fully open (Δp = 1 bar)  
 (CPM-I-D60) . . . . . Approx 60 m<sup>3</sup>/h.

### PHYSICAL DATA

#### Materials

Product wetted steel parts: . . . . . 1.4404 (316L).  
 Other steel parts: . . . . . 1.4301(304).  
 Lower diaphragm: . . . . . PTFE covered EPDM rubber  
 Upper diaphragm . . . . . NBR

#### Air Connections

R 1/4" (BSP), internal thread.

**Options**

- A. Male parts or clamp liners in accordance with required standard.
- B. Air pressure regulating valve kit, 0-8 bar.
- C. Air throttling valve for adjustment of regulating speed for the CPM-2 valve.
- D. Booster for product pressure exceeding the available air pressure. (Product pressure = 1.8 x air pressure).
- E. US 3A version available on request for CPM-2 valves only

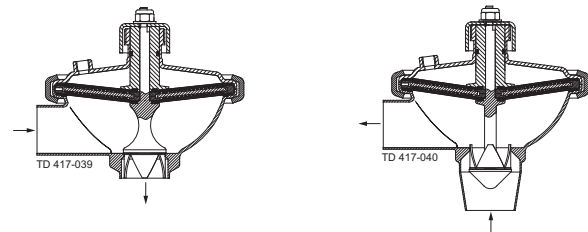
**Material grades CPM-2**

- F. Upper diaphragm of PTFE covered EPDM and O-ring of FPM covered EPDM, (for temperature 95-140°C).
- G. Both diaphragms of solid PTFE and O-ring of FPM (for temperatures above 140°C).

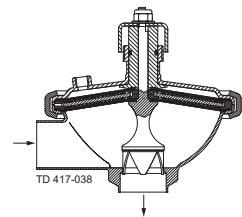
**Material grades CPM-I-D60**

- H. Upper diaphragm of PTFE covered EPDM.
- I. Valve body seal rings of NBR or FPM.
- J. Guide O-ring of FPM (for temperatures above 95°C).

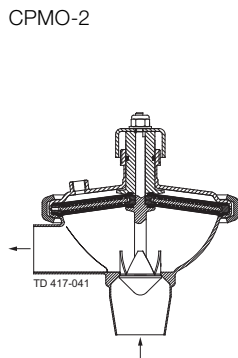
**Fig. 1. Principle**



CPMI-2  
a. Reduced product pressure.



CPMI-2  
b. Increased product pressure.



CPMO-2

CPMI-2 and CPM-I-D60 opens at increasing product pressure and vice versa.  
CPMO-2 closes at increasing product pressure and vice versa.

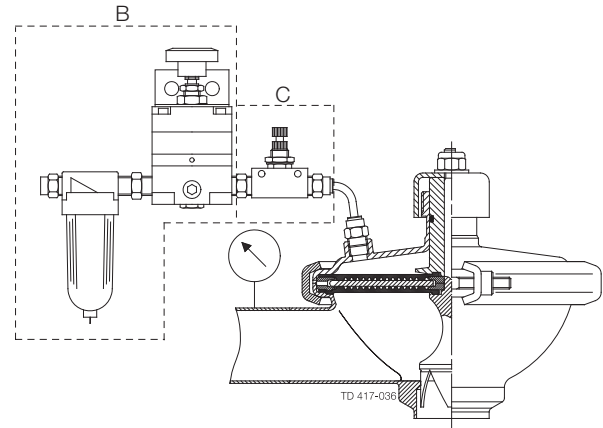
**Diaphragm Unit**

CPMI-2 and CPMO-2: The diaphragm unit consists of a stainless steel disc which is divided into sectors and of flexible diaphragms which are placed on each side of the sectors. CPM-I-D60: The diaphragm unit consists of two flexible diaphragms supported by 12 stainless steel sectors in between them.

**Note!**

For further details, see also instructions ESE01825 and ESE01834

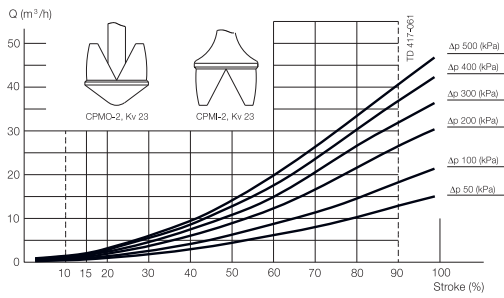
**Fig. 2. CPMI-2 with pressure regulating valve and pressure gauge.**



The valves operate without a transmitter in the product line and require only a pressure regulating valve for the compressed air and a pressure gauge in the product line.

Pressure drop/capacity diagrams

CPM-2, Kv 23



**Note!**

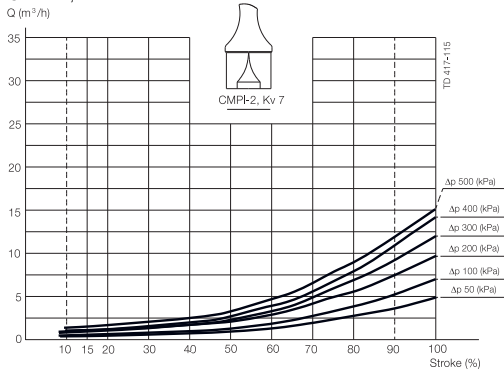
For all diagrams the following applies:

Medium: Water (20°C).

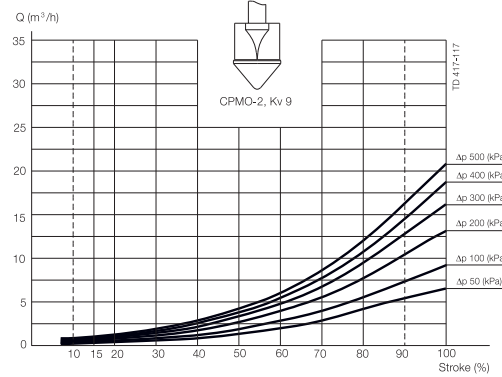
Measurement: In accordance with VDI 2173.

Alfa Laval recommend max. flow velocity in tubing and valves to be 5 m/sec.

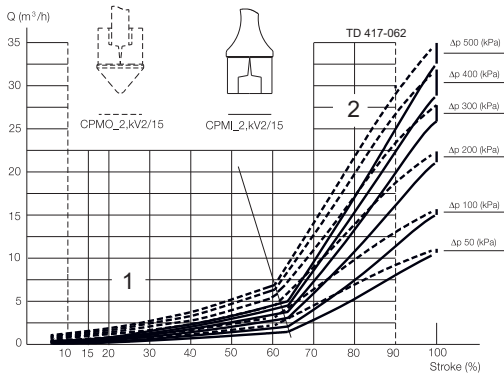
CPMI-2, Kv 7



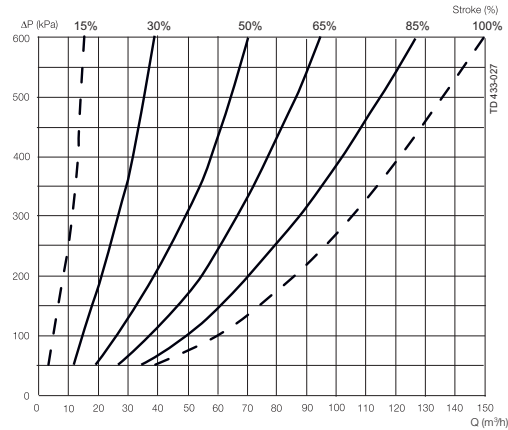
CPMO-2, Kv 9



CPM-2, Kv 2/15



CPM-I-D, Kv 60



**Example 1:**

Pressure drop  $\Delta p = 200$  kPa.

Flow  $Q = 8$  m<sup>3</sup>/h.

Select: CPM-2, Kv 23 which at working point will be 48% open.

**Example 2:**

CPMI-2:

Pressure drop  $\Delta p = 300$  kPa.

Flow  $Q = 1$  m<sup>3</sup>/h.

Select: CPMI-2, Kv 2/15 which at working point will be approx. 35% open equal to about 50% of the regulating area.

**Example of using the diagram:**

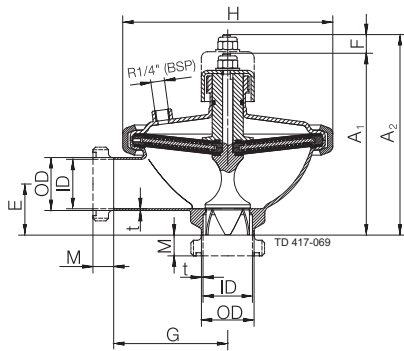
1. Pressure drop  $\Delta p = 300$  kPa.

2. Flow = 50m<sup>3</sup>/h.

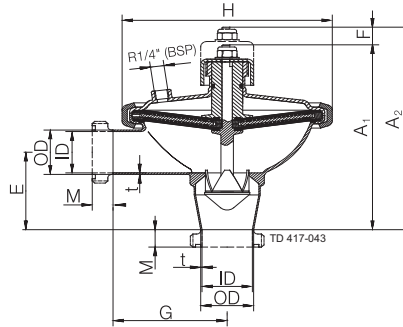
The intersection is on the 50% curve.

**Note!**

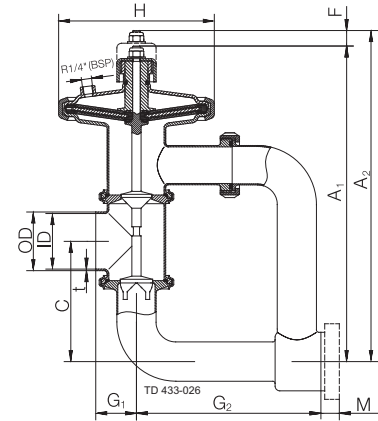
Always try to get as close as possible to the 50% open curve. If the CPM-I-D60 is too big select from the CPMI-2 curves.



a. CPMI-2.



b. CPMO-2



c. CPM-I-D60.

Dimensions (mm)

Size	CPMI-2			CPMO-2		CPM-I-D60	
	Kv 23	Kv 7	Kv 2/15	Kv 23	Kv 9	Kv 2/15	76 mm
A1	175.1	175.1	175.1	211	175.1	175.1	413.2
A2	193.4	193.4	193.4	229.3	229.3	193.4	430
C	-	-	-	-	-	-	155
OD (Inch/DN)	53/50.8	53/50.8	53/50.8	53/50.8	53/50.8	53/50.8	76
ID (Inch/DN)	50/47.6	50/47.6	50/47.6	50/47.6	50/47.6	50/47.6	72
t (Inch/DN)	1.6/1.5	1.6/1.5	1.6/1.5	1.6/1.5	1.6/1.5	1.6/1.5	2
E (Inch/DN)	50/49.2	50/49.2	50/49.2	50/49.2	50/49.2	50/49.2	
F	18.3	18.3	18.3	18.3	18.3	18.3	16.8
G	110	110	110	110	110	110	
G1	-	-	-	-	-	-	53
G2	-	-	-	-	-	-	240
H	203	203	203	203	203	203	200
M/ISO clamp	21	21	21	21	21	21	21
M/ISO male	21	21	21	21	21	21	21
M/DIN male	22	22	22	22	22	22	30
M/SMS male	20	20	20	20	20	20	24
M/BS male	22	22	22	22	22	22	22
Seat diameter	42	31	31	42	31	31	
Weight (kg)	5.5	5.5	5.5	5.5	5.5	5.5	10

Constant pressure valve  
Product code: 5284

Material: 1.4404 (316L)  
Connection: ISO/DIN Welding ends  
Seals: PTFE/EPDM  
Inside surface finish: Ra ≤ 1.6 µm  
Outside surface finish: Blasted  
Actuation: Pneumatic NC

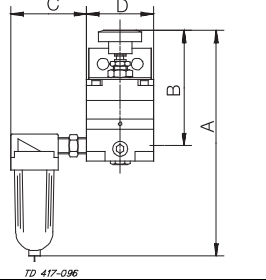
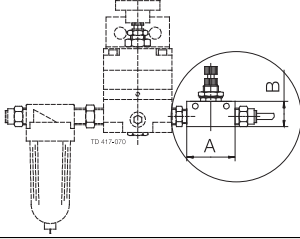
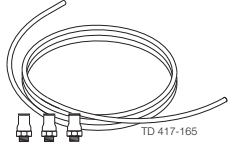
Item No.	PPL EUR	Item No.	PPL EUR	Size mm		Flow Kv (m <sup>3</sup> /h)	Dimension (mm)				CPMI-2	
				Inch	DIN		A		E			G
Inch tube		DIN tube				min.	max.	Inch	DIN			
9612305501	<b>3332</b>	9612305505	<b>3332</b>	51	50	23	175.1	193.4	49.2	50.4	110	
9612305517	<b>3560</b>	9612305519	<b>3560</b>	51	50	7	175.1	193.4	49.2	50.4	110	
9612305503	<b>3560</b>	9612305507	<b>3560</b>	51	50	2/15	175.1	193.4	49.2	50.4	110	
<b>CPMI-D60</b>												
3135661411	<b>5634</b>			76		60	413.2	430	155	53	240	
<b>CPMO-2</b>												
9612305502	<b>3432</b>	9612305506	<b>3432</b>	51	50	23	211.0	229.3	89.2	86.3	110	
9612305504	<b>3643</b>	9612305508	<b>3643</b>	51	50	2/15	175.1	193.4	49.2	50.4	110	
9612305518	<b>3643</b>	9612305520	<b>3643</b>	51	50	9	175.1	229.3	49.2	50.4	110	

Options - please see later this chapter.

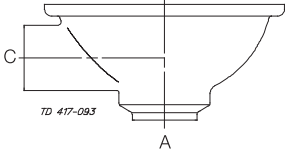
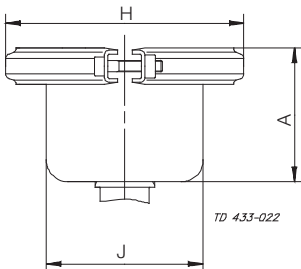
For further information - please see PD-sheet.

Product code: 5289

2.7

Item No.	PPL EUR	Size		Dimension (mm)				Air pressure regulating valve kit, 0-8 bar
		Inch	DIN	A	B	C	D	
3135601501	627	All	All	186	93	54	47	 <p>TD 417-096</p>
<b>Air throttling valve for adjustment of regulating velocity</b>								
3135601531	84	All	All	38	20			 <p>TD 415-070</p>
				<b>Tube Length mm</b>	<b>Tube Dia.</b>			<b>Air connecting kit</b>
3135601511	18	All	All	3000	6			 <p>TD 417-165</p>

The regulating valves not mentioned in the code number sheets, should be ordered as below:  
 Product code: 5284

Item No.	PPL EUR	Size mm		Type	Options
		Inch	DIN		
	77 134	51 76	50	CPMI/O-2 CPMI-D60	<p>Male part standards (included in the price) SMS, ISO/IDF, DS, BS, DIN, ISO clamp.</p> <p style="text-align: right;"><b>Male parts</b></p>  <p>Please state which type of male part you want and to which outlet it should be connected.</p>
	0 24 24			CPMI-D60 CPMI-D60 CPMI-D60	<p style="text-align: right;"><b>Valve body seal</b></p> <p>Replacement to seals of Nitrile (NBR).                      Replacement to seals of Fluorinated rubber (FPM).                      Replacement to PTFE.</p>
	121 1021			CPMI/O-2 CPMI/O-2	<p style="text-align: right;"><b>Diaphragm</b></p> <p>Replacement to PTFE covered EPDM and Fluorinated rubber (FPM) O-ring.                      Replacement to solid PTFE upper and lower diaphragm and Fluorinated rubber (FPM) O-ring.</p>
3135600901	1289	A 95	H 165	J 110	<p style="text-align: right;"><b>Booster 3 for cover with thread</b></p> 

\* = On request

NOTE! Other options on request.

Size		Body combi- nation	PPL EUR	PPL EUR	PPL EUR	PPL EUR
<b>CPMI-2/CPMO-2</b>						
Inch	DIN		Internal (Product wetted parts) Ra ≤ 0.8 µm	Internal/External (Complete valve) Ra ≤ 0.8 µm	Internal (Product wetted parts) Ra ≤ 0.5 µm	Internal/External (Complete valve) Ra ≤ 0.5 µm
51	50		423	1162	531	1465

NOTE! CPMI-D60 cannot be delivered with ID polishing.