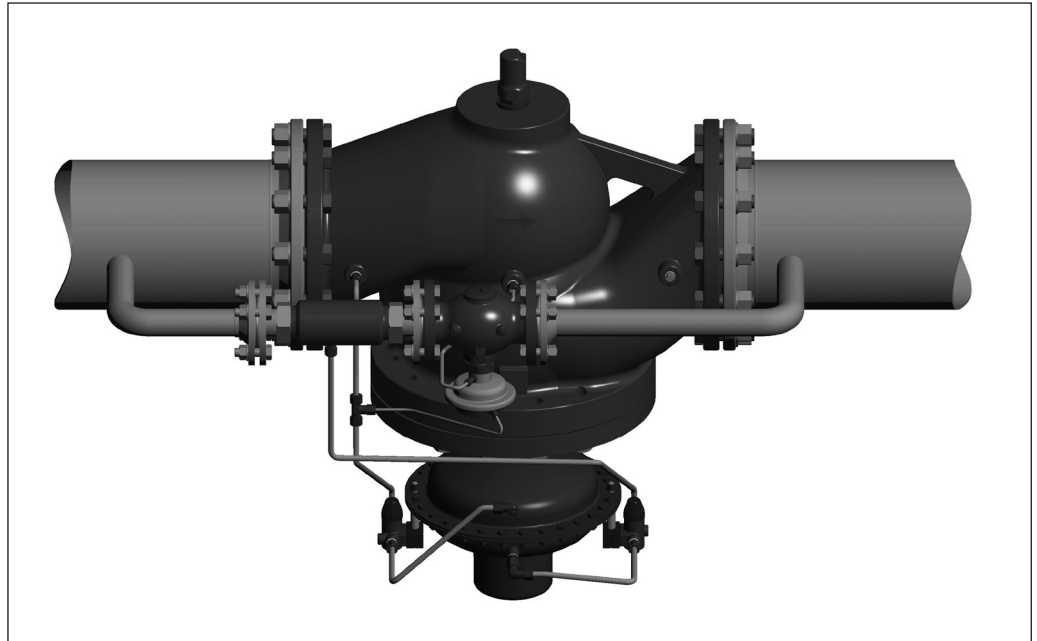


Data sheet

Pilot-controlled flow controller (PN 16, 25, 40) PCVQ - flow and return mounting, adjustable setting

Description



Pilot-controlled flow controller is a self-acting flow controller primarily for use in district heating, district cooling or in industrial systems as well. It can be flow and return mounted in applications with and without heat exchanger like large substations and distribution stations.

The control function of the PCVQ controller is defined by the control function of the pilot controller. Setting is done on main controller.

Throttle valve data can be found on page 8.

Main data¹⁾:

- DN 50-250²⁾
- k_{VS} 32-630 m³/h
- PN 16, 25, 40³⁾
- Temperature:
 - Circulation water/glycolic water up to 30%: 2 ... 150°C
- Connections:
 - Pilot controller: ext. thread (weld-on tailpieces) or flange
 - Main valve: flange

¹⁾ for details see *Technical data and Ordering sections*

²⁾ smaller DN on request

³⁾ PN 40 on special request

Features:

- Flow controller
- Extremely high control ratio (see Tab.1) as a result of low pilot controller min. flow rate (k_{VS} value) and high flow rate (k_{VS}) of the main valve
- Small overall dimensions comparing to standard design (especially height)
- Higher valve capacities for DN 150-250 comparing to standard design
- High control stability
- Smooth operation flow controller
- Water/glycolic water applications

Tab. 1

DN	Min. control ratio
50	100 : 1
65	140 : 1
80	220 : 1
100	300 : 1
125	400 : 1
150	400 : 1
200	550 : 1
250	750 : 1

Technical Data

For pilot controllers technical data please see relevant Data Sheet

Main valve

Nominal diameter		DN	50	65	80	100	125	150	200	250	
k_{vs} value		m ³ /h	32	50	80	125	160	320	450	630	
Cavitation factor z			0.5	0.5	0.45	0.4	0.35	0.3	0.2	0.2	
Leakage acc. to standard IEC 534			≤ 0.05 % of k_{vs}								
Nominal pressure		PN	16, 25, 40								
Max. differential pressure	PN 16	bar	16		15		12	10			
	PN 25/40		20								
Min. differential pressure			0.5								
Min. static pressure			1.5								
Media			Circulation water/glycolic water up to 30%								
Media pH			Min. 7, max. 10								
Media temperature		°C	2 ... 150								
Connections	Main controller		Flange								
	Pilot controller										
			Ext. thread (weld-on tailpieces) and flange					Flange			
Weight	PN 16	kg	18.5	28.5	31	61	71	120	193	337	
	PN 25/40			31	34	63	72	147	264	347	
Materials											
Valve body	PN 16		Grey cast iron EN-GJL-250 (GG-25)								
	PN 25		Ductile cast iron EN-GJS-400-18-LT (GGG-40.3)					Cast steel EN-GP-240-GH (GS-C 25)			
	PN 40		Cast steel EN-GP-240-GH (GS-C 25) 2)								
Valve seat			Stainless steel M. No. 1.4021					Stainless steel M. No. 1.4313			
Valve cone	VFQ 21		Stainless steel M. No. 1.4404					Stainless steel M. No. 1.4021			
Sealing	VFQ 21		EPDM								
Pressure relieve system			Bellows ¹⁾					Diaphragm ²⁾ (T _{max} 150°C) Bellows ¹⁾ (T _{max} 300°C)			

¹⁾ Stainless steel M. No. 1.4571

²⁾ EPDM

Main actuator

For main valve		DN	50 - 125	150 - 250
Actuator size		cm ²	250	630
Max. operational pressure			25	16, 25
Flow restrictor differential pressure Δp_b ¹⁾		bar	0.2/0.5	
Diff. pressure setting ranges ¹⁾			0.2-1.0 / 0.3-2.0 / 1-5 / 3-12	
Weight		kg	11	24
Materials				
Housing			Stainless steel M. No. 1.0338	
Control diaphragm			EPDM	
Impulse tube			Stainless steel tube Ø10 × 0.8 mm	
Nr. of throttle valves (mounted on impulse tubes)			1	2

¹⁾ Defined by pilot controller

Trotting element

For main valve		DN	50 - 125	150 - 250
Size of throttling element		DN	25	40
Connections			Welded end	Flange
Max. operational pressure		bar	25, 40	
Weight		kg	3.2	6.6
Materials				
Body material			Red bronze, M. No. 2.1090	
Impulse tube			Stainless steel tube Ø10 × 0.8 mm	

Ordering

Example 1:

Pilot-controlled flow controller;
flow 58 m³/h; PN 16; flow restrictor
 Δp_b 0.2 bar; T_{max} 150 °C; flange;

- 1x PCV-VFQ 21 DN 100
Code No.: **003G1533**
- 1x Pilot controller AVP-F DN 25
Code No.: **003H6335**
- 1x Weld-on tailpieces DN 25
Code No.: **003H6910**
- 1x Mounting set for Impulse tube
Code No.: **003G1599**

Example 2:

Pilot-controlled flow controller;
flow 58 m³/h; PN 40; flow restrictor
 Δp_b 0.2 bar; T_{max} 150 °C; flange;

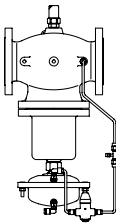
- 1x PCV-VFQ 21 DN 100
Code No.: **On request**
- 1x Pilot controller
VFG 2 DN 25 PN 40
Code No.: **065B2413**
- 1x Pilot actuator AVP-F 0.2
Code No.: **003G1026**
- 1x Mounting set for Impulse tube
Code No.: **003G1391**

¹⁾ Pilot controller has to be specified PN 40 as well

²⁾ Contains accessories for remounting the impulse tube on the pilot controller from internal connection (factory delivered) to external connection.

DN 50-125

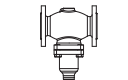
PCV-VFQ 21 - Main controller, throttling element, throttle valve, impulse tubes

  DN 25 	DN (mm)	k _{VS} (m³/h)	T _{max} (°C)	PN	Connection	Δp _{max} (bar)	Flow range (m³/h)		Code No.
							Δp _b 0.2 bar	Δp _b 0.5 bar	
	50	32	150	16	Flange EN 1092-2	15	0.8-16	1.2-24	003G1627
	65	50					3-28	4-40	003G6895
	80	80					4-40	6-58	003G6898
	100	125					6-63	9-90	003G1533
	125	160					8-80	12-120	003G1534
	50	32		25			0.8-16	1.2-24	003G6710
	65	50					3-28	4-40	003G6878
	80	80					4-40	6-58	003G1578
	100	125					6-63	9-90	003G1543
	125	160					8-80	12-120	003G1544
	100	125		40			6-63	9-90	on request¹⁾
	125	160					8-80	12-120	
Impulse tube		Copper		Ø 6 × 1 × 3000 mm					
				Ø 10 × 1 × 1500 mm					
		Stainless steel		Ø 10 × 0.8 × 1500 mm					

AVP-F Pilot controller - PN 16, 25

	DN (mm)	k_{VS} (m ³ /h)	T _{max} (°C)	PN	Connection		Δp _b (bar)	Δp _{max} (bar)	Code No.
	25	8.0	150	25	Cylindr. ext. thread acc. to DIN ISO 228/1	G 1¼ A	0.2	20	003H6335
							0.5		003H6341
	Weld-on tailpieces DN 25								003H6910
	Mounting set for impulse tube ²⁾								003G1599

VFG 2 Pilot controller - PN 40

	DN (mm)	k_{vs} (m ³ /h)	$T_{max.}$ (°C)	PN	Connections	Code No.
	25	8.0	150 (200)	40	Flanges acc. to EN 1092-1	065B2413

AFPB(-F) Actuators

	Δp setting range (bar)	Max. operat. pressure	Code No.
	0.2	25	003G1026
	0.5		003G1027

DN 150-250

PCV-VFQ 21 - Main controller, throttling element, throttle valves, impulse tubes

  DN 40 	DN (mm)	k_{vs} (m ³ /h)	T_{max} (°C)	PN	Connection	Flow range (m ³ /h)		Δp_{max} (bar)	Code No.
						Δp_b 0.2 bar	Δp_b 0.5 bar		
	150	320	150	16	Flange EN 1092-2	15-145	25-220	12	003G1535
	200	450				20-180	30-280	10	003G1536
	250	630				25-250	40-380		003G1537
	150	320	25	15-145		25-220	12	003G1545	
	200	450		20-180		30-280	10	003G1546	
	250	630		25-250		40-380		003G1547	
Impulse tube			Copper	$\varnothing$ 6 × 1 × 3000 mm					
				$\varnothing$ 10 × 1 × 1500 mm					
			Stainless steel	$\varnothing$ 10 × 0.8 × 1500 mm					

AVP-F Pilot controller

	DN (mm)	k_{vs} (m ³ /h)	T _{max} (°C)	PN	Connection	Δp _b (bar)	Δp _{max} (bar)	Code No.
	40	16	150	25	Flange EN 1092-2	0.2	16	003H6385
						0.5		003H6391
	Mounting set for impulse tube ¹⁾							

¹⁾ Contains accessories for remounting the impulse tube on the pilot controller from internal connection (factory delivered) to external connection.

Accessories

	Type designation	Description	Connections	Code No.
	Impulse tube set AF ¹⁾	- 1 × Copper tube Ø10 × 1 × 1500 mm - 1 × compression fitting for imp. tube connection to pipe (G 1/4) - 2 × socket	-	003G1391
	Compression fitting ¹⁾²⁾	For impulse tube Ø10 connections to controller	G 1/4	003G1468
	Throttle valve-PCV	Regulating and shut-off device	-	065Z1502

¹⁾ Impulse tubes on T>150 °C or PN> PN 16 should be of stainless steel

²⁾ Consist of a nipple, compression ring and nut

Service kits AVP-F

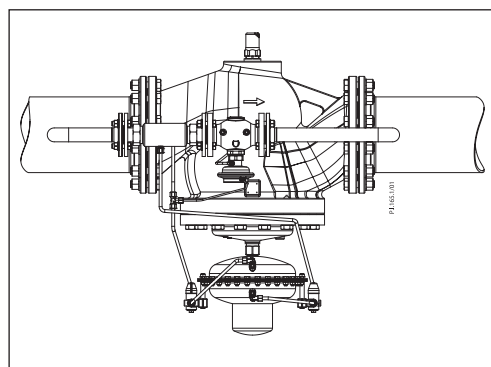
	Type designation	DN	k _{vs} (m ³ /h)	Code No.
	Valve insert	25	8.0	003H6875
	Type designation	Δp setting range (bar)		Code No.
	Actuator without adjustable handle (AVP-F)	0.2		003H6839
		0.5		003H6840

Service kits VFQ 21

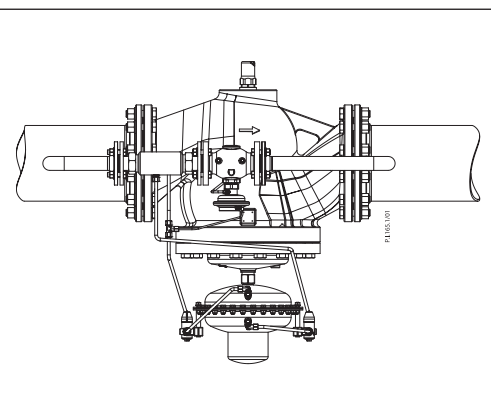
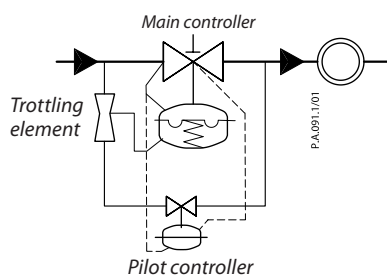
	Type designation	For valve	DN (mm)	k _{vs} (m ³ /h)	Code No.
	Valve insert	VFQ 2	40	20	065B2799
	Stuffing cone (with EPDM O-rings)				003G1464

Installation positions

Both main and pilot controllers have to be installed in horizontal pipes only, with a pressure actuator oriented downwards.



Installation in the supply or return pipe

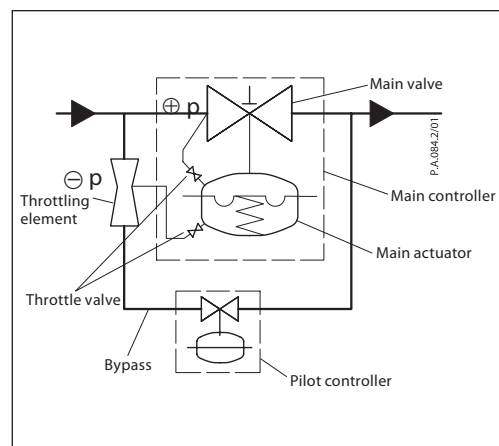


Function

The pilot valve maintains the differential pressure over the main controller. By this action also flow through a bypass changes and therefore (-p) at the throttling element.

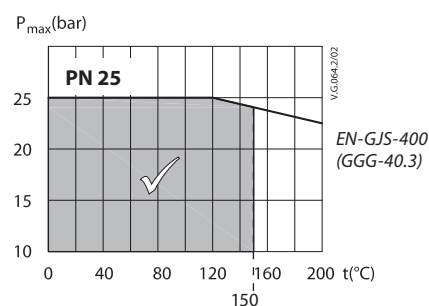
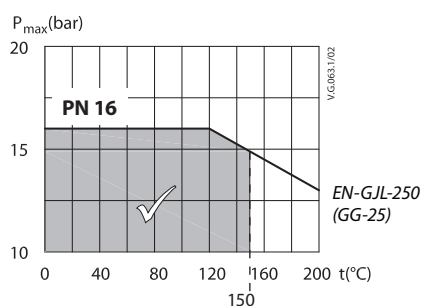
Pressure changes from inlet pipe (+p) and from throttling element (-p) are being transferred through the impulse tubes to the main actuator chambers and act on control diaphragm

In case of small flow rates the main controller is closed and control is taken by the pilot controller only. With increasing the flow rate, a negative pressure is built in the throttling element. This partial vacuum acts on the main actuator diaphragm and causes the main controller to open.

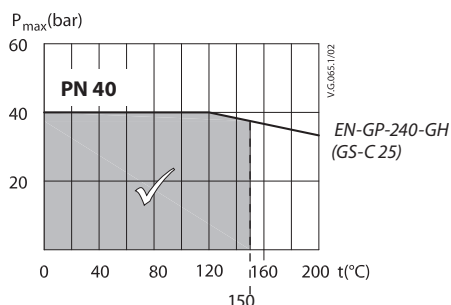


Pressure temperature diagram

Working area is below P-T line and it ends at T_{max} for each valve



Maximum allowed operating pressure as a function of media temperature (according to EN 1092-2)

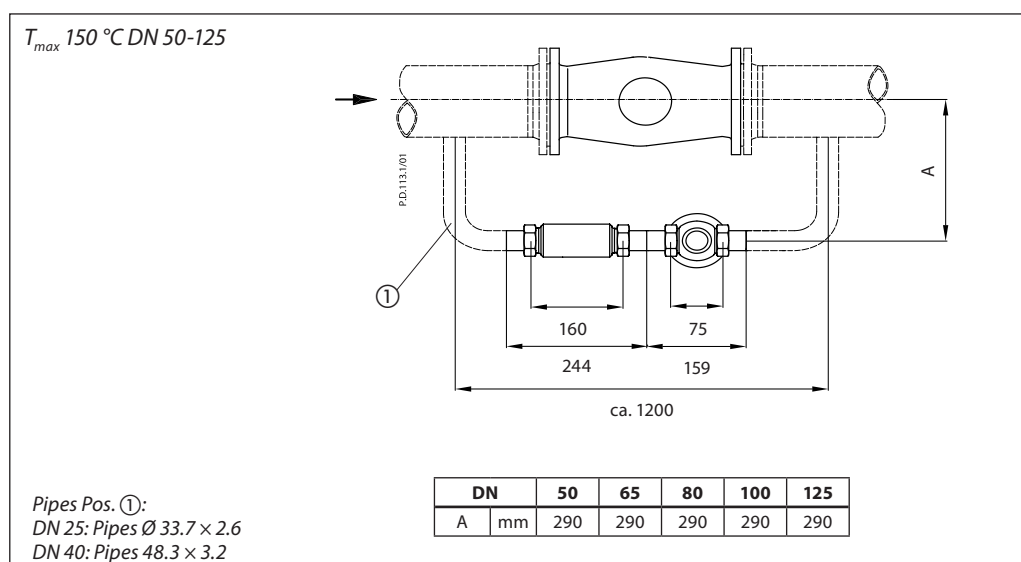
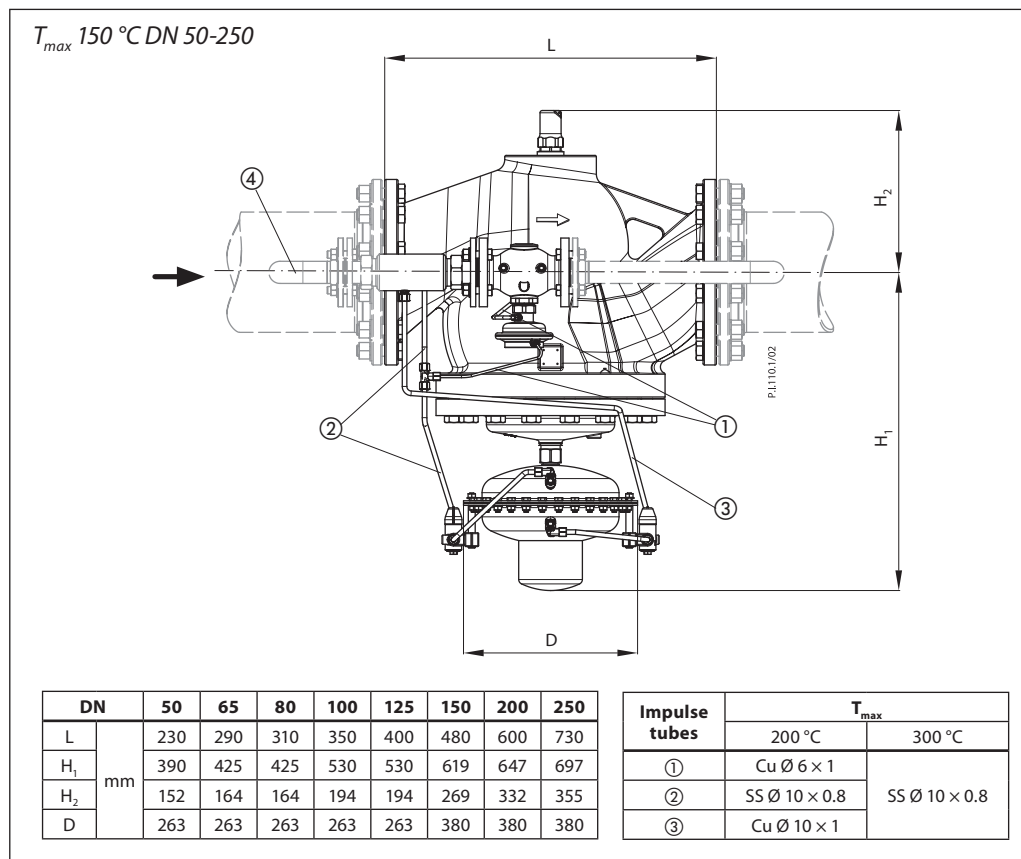


Maximum allowed operating pressure as a function of media temperature (according to EN 1092-1)

Dimensions

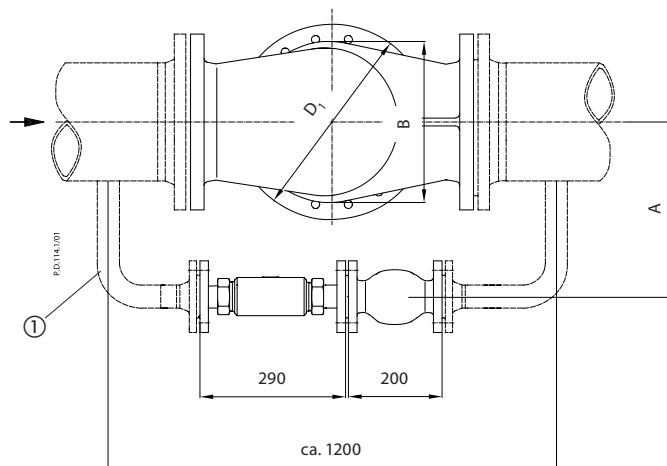
Impulse tubes (pos. ①, ②, ③) are part of the delivery. Their shape depends on the controller type. In case of high temperatures ($T_{max} > 150\text{ °C}$) seal pots have to be installed. For details see relevant Instructions.

The components shown with dashed lines are NOT part of the delivery. The pipes (pos. ④) must be welded during mounting.



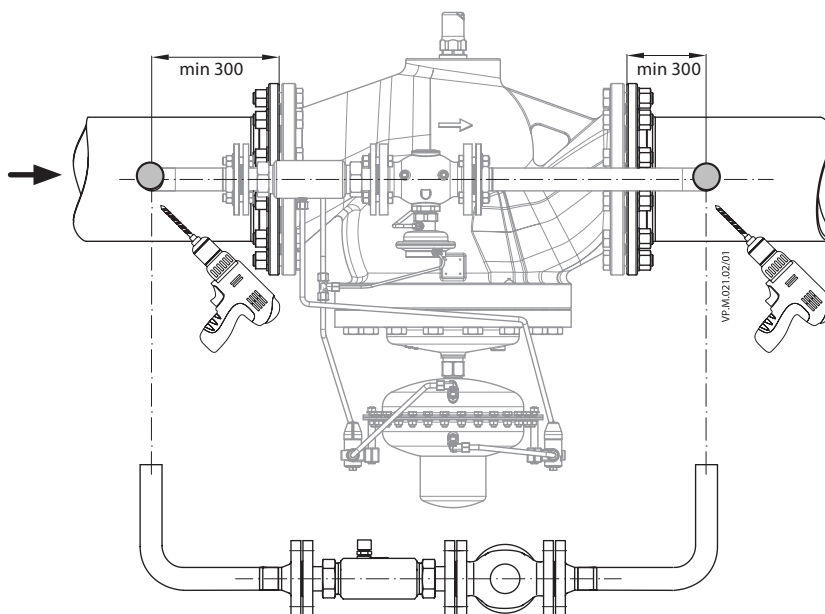
Dimensions (continuous)

T_{max} 150 °C DN 150-250



Pipes Pos. 1:
DN 25: Pipes $\varnothing 33.7 \times 2.6$
DN 40: Pipes 48.3×3.2

DN	150	200	250
D ₁	320	385	500
A mm	320	350	410
B	310	336	412



Data sheet

Pilot-controlled flow controller PCVQ (PN 16, 25, 40)

Throttle valve



Throttle valve is regulating and shut-off device, which is / are installed on the impulse tubes connected to main PCV actuator. Number of used throttle valves can be seen in table for Main actuator in Technical Data section.

Function of throttle valve is to control flow speed through impulse tube and consequently influence on PCV's reaction time. Influence on reaction time is not completely defined and strongly depends on application conditions and could significantly vary from application to application.

In general:

- by opening of the valve (clockwise) PCV's reaction time increases
- by valve closing (counterclockwise) PCV's reaction time decreases

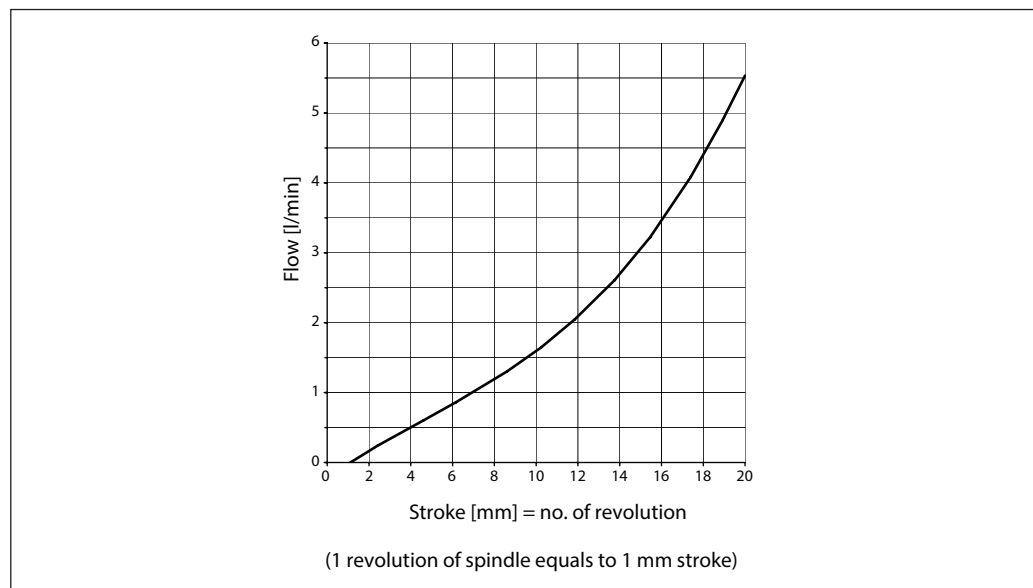
In case valve is completely closed it has function as shut-off valve.

Throttle valve is delivered from factory in completely open position.

Main data:

- DN 4
- used for Ø10 mm impulse tube

Flow diagram

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