

VP223R, VP224R



DN15-32 with MP140
Thermal Actuator



DN15-32 with MP200
Electro-Motoric Actuator



DN40-50 with AVU..
Electro-Motoric Actuator

SPECIFICATIONS

Pressure Class	PN25
Operating Pressure	30-400 kPa
Function	Normally Open (Stem Up, Spring assisted without actuator)
End Connection	Rp (ISO 7/1)
Media Temperature	-20°C to +120°C
Glycol Concentration	Max. 50%
Leakage, Q_{max}	0.01%
Accuracy (Venturi measurement)	3%
Accuracy (Setting knob)	Max. 7%, typ. 5%
Min. Controllable flow, Q_{min} (AVU../MP200)	1%
Flow Characteristic	Linear
Stroke, VP223R	3.5mm
Stroke, VP224R	12.5mm

MATERIALS

Valve Body	DZR Brass CW602N
Cartridge	Brass/PPS Composite
Seals	EPDM
Membrane	Nylon Reinforced EPDM
Stem	303 AISI

Media Compatibility

It is the responsibility of the installer or product specifier to verify media compatibility of the valves construction materials with the supplier of water treatment/heat transfer solution.

Best Practice Guidelines

It is recommended to fit a strainer upstream of the valve to increase reliability and to follow water treatment guidelines as detailed in VDI 2035.

Recommendations

The pipework system should be flushed prior to the operation. The inner cartridge should be removed and the valve capped with the pre-setting/blind cap prior to flushing.

Valves should be installed in the return pipe to reduce exposure to media temperature extremes.

PRESSURE INDEPENDENT CONTROL VALVES

The VP223R and VP224R are pressure independent control valves for use in hydronic heating and cooling circuits.

This innovative range of balance and control valves provide a stable hydronic flow independently to any change in system pressure.

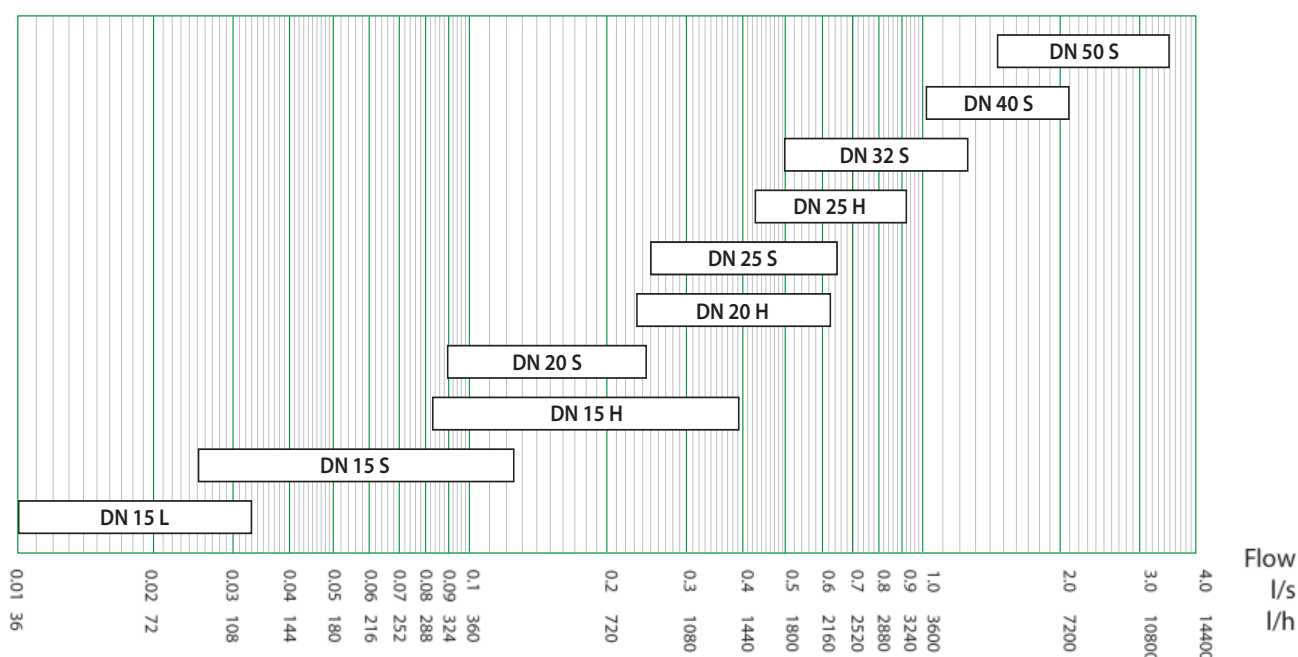
The VP223R valve covers the sizes of DN15-32 and paired with the MP200 and MP140 actuators. The VP224R valve is DN40-50 and connects to the AVU.. actuators.

Without an actuator, the valve can be operated as an automatic balancing valve for flow limiting applications.

KEY FEATURES

- Simple flow pre-setting**
Pre-setting tool supplied with each valve adjusts the desired maximum flow rate.
- Differential pressure controller**
An integrated differential pressure controller maintains a constant differential pressure across the valve thus totally regulating the flow independent of any system pressure fluctuations
- Direct flow measuring**
Integrated Venturi nozzle enables direct and precise flow measurement using a manometer or a hand held electronic flow meter. The desired flow can then be set to an accuracy of $\pm 3\%$.
- Full control authority**
Within the working pressure range of the valve, the actuator has full control authority regardless of the flow presetting, thus providing a very predictable and stable control of the downstream flow.
- Removable flow cartridge**
The cartridge can be removed and the valve capped using the pre-setting knob allowing unrestricted flushing of pipework.

FLOW RANGE SELECTION CHART, Q_{max}



VALVE BODY ORDERING DETAILS

Part Number	Size	Flow range*			Venturi (Kvm)**	Actuator
		m ³ /h	GPM (US)	l/s		
VP223R-15BQL	DN15	0.036 - 0.118	0.16 - 0.52	0.010 - 0.033	0.23	MP200, MP140
VP223R-15BQS		0.09 - 0.45	0.40 - 1.98	0.025 - 0.125	0.78	
VP223R-15BQH		0.30 - 1.40	1.32 - 6.18	0.083 - 0.390	2.5	
VP223R-20BQS	DN20	0.32 - 0.88	1.41 - 3.88	0.089 - 0.245	1.9	
VP223R-20BQH		0.84 - 2.22	3.68 - 9.78	0.232 - 0.617	4.7	
VP223R-25BQS	DN25	0.87 - 2.34	3.80 - 10.30	0.240 - 0.650	5.05	
VP223R-25BQH		1.75 - 3.33	7.69 - 14.66	0.485 - 0.925	8.25	
VP223R-32BQS	DN32	1.91 - 4.40	8.40 - 19.34	0.530 - 1.220	8.35	AVUE, AVUM, AVUX
VP224R-40BQS	DN40	3.67 - 7.56	16.17 - 33.29	1.02 - 2.10	17	
VP224R-50BQS	DN50	5.18 - 12.60	22.83 - 55.48	1.44 - 3.50	28.5	

* Adjustable Maximum Flow range for a fully open valve. Flow will control down to close off from chosen actuator.

** Kvm, Venturi measurement for fine flow adjustment using hand held flow meter devices, do not size the valve using traditional valve sizing calculations with this figure.

Flushing / Commissioning Kit

- Full set of flow pre-setting knobs/blind caps
- 1 of each size blind caps plus 54 flow hanger ID's/valve tags
- **Part No. 911 4050 000**



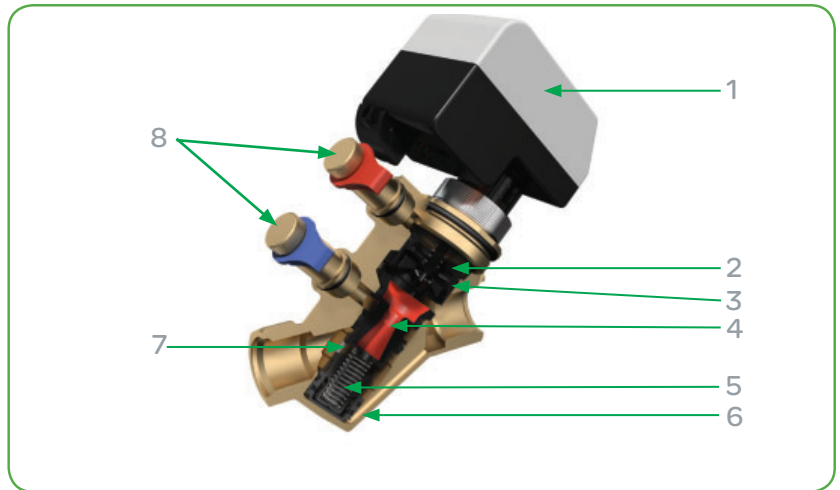
Schneider Electric

Ref.	
DN	
Pos.	
Flow	
Flow	
Pos.	
Date	
Name	

Go to page 11 for guidance on recording the flow on the valve tag

KEY FEATURES

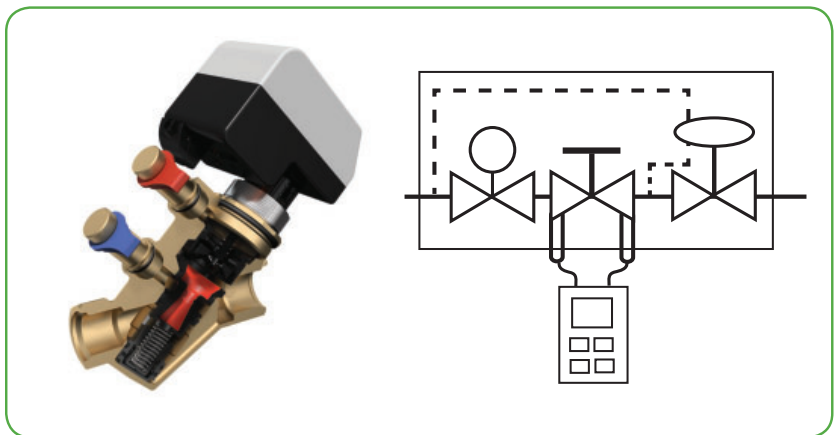
- 1 - PICV with Thermal or electro-motoric actuator (flow limiting balancing valve without)
- 2 - Flow pre-setting unit adjusted radially independent of full linear stroke of the valve plug
- 3 - Inlet opening adjusted by flow pre-setting unit
- 4 - Venturi orifice for direct flow verification
- 5 - Differential pressure regulator
- 6 - Valve housing
- 7 - Outlet opening area controlled by regulator 5
- 8 - Measuring points for flow verification



INTEGRATED VENTURI NOZZLE

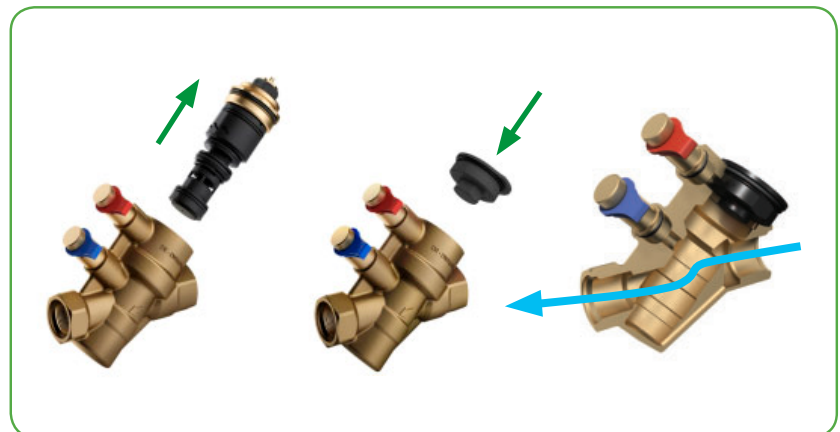
The Venturi nozzle enables accurate direct flow measurement. This provides an exact flow setting on the valve via a manometer or hand held flow meter. The result is a quick and precise verification of the actual flow rate.

Saves time for the balancing and commissioning engineer during set up and troubleshooting.



REMOVABLE CARTRIDGE

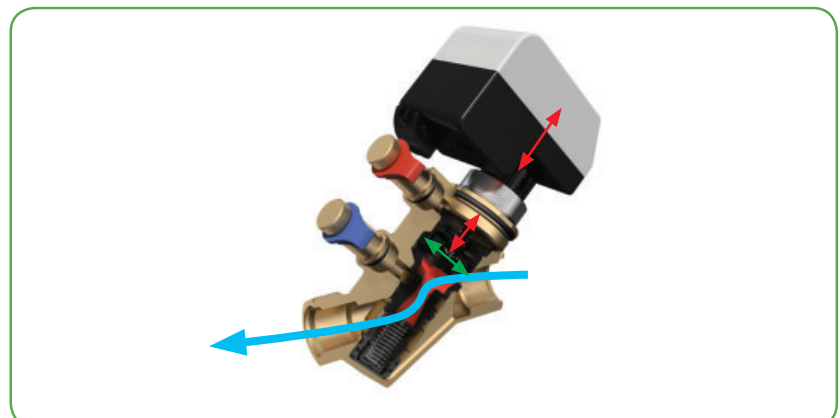
The flow balancing cartridge can be removed from the valve body to enable unrestricted system flushing. The flow presetting tool doubles as a blind cap to seal the valve housing. A hex key is used to tighten and remove the cap.



FULL CONTROL AUTHORITY

The pre-setting of the flow is radially adjusted (green arrow) and independent of the linear flow control function from the actuator and valve stem (red arrows).

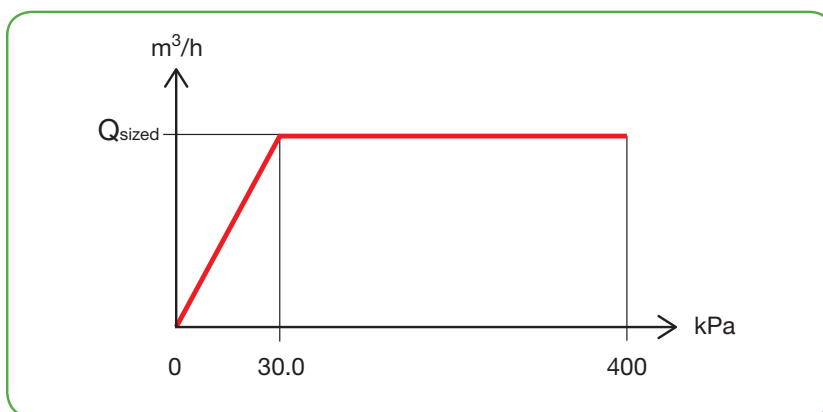
In combination of the valves ΔP regulator function, the actuator has full control authority over the flow. This ensures good minimum flow control for large turn down ratios on reduced flow setpoints.



ΔP REGULATOR

The regulator ensures a constant differential pressure across the flow pre-setting unit. The valve unit requires a working pressure drop in the range of 30 kPa to 400 kPa to operate properly. Within this pressure range the valve will maintain a constant flow, independent of upstream pressure variation. ($Q_{\text{ sized }}$).

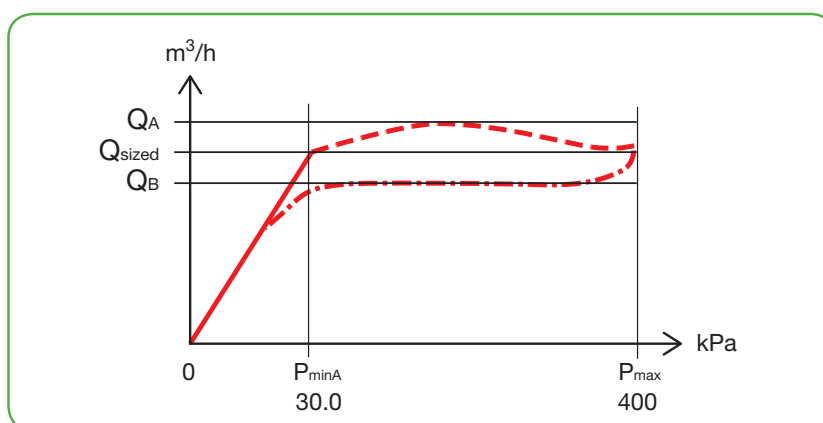
When the pressure loss decreases below 30 kPa, the valve behaves similar to a traditional non-pressure balanced valve.



FLOW CONTROL STABILITY

Within the working pressure range of 30-400kPa ($P_{\text{ minA }}$ to $P_{\text{ max }}$) a high flow control accuracy ($Q_{\text{ sized }}$) of at least $\pm 7\%$ ($Q_{\text{ A }} - Q_{\text{ B }}$) is ensured, compared with the flow set point.

High flow stability across a wide differential pressure range.



ACTUATORS



MP140

- Thermal On / Off for VP223R
- (NC/NO) pressure independent flow limiting control



MP200

- Proportional Electro-Motoric for VP223R
- Full pressure independent flow control
- Floating or 0-10V modulating control



AVUE

- Proportional Electro-Motoric for VP224R (DN40/50)
- Full pressure independent flow control
- Floating or 0-10V modulating control

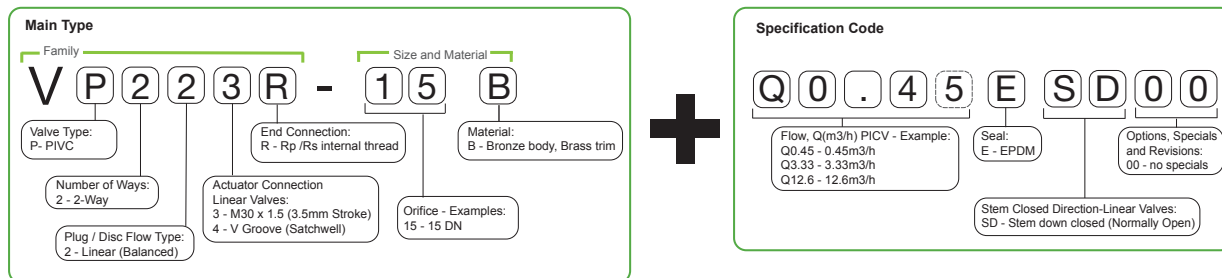
ACTUATOR ORDERING DETAILS

Part Number	Power	Control	Valve Type	Data Sheet
MP140NC-24T	24 V AC	On / Off (Normally Closed)	DN15-32	03-00280
MP140NC-230T	230V AC	On / Off (Normally Closed)		
MP140NO-24T	24V AC	On / Off (Normally Open)		
MP140NO-230T	230V AC	On / Off (Normally Open)		
MP200-230F	230V AC	Floating	DN40-50	03-00279
MP200-24F	24V AC	Floating		
MP200-24M	24V AC	0-10V*		
AVUX5202	24V AC	Floating		
AVUM5601	230V AC	Floating	DN40-50	03-00281
AVUE5354	24V AC	0-10V		

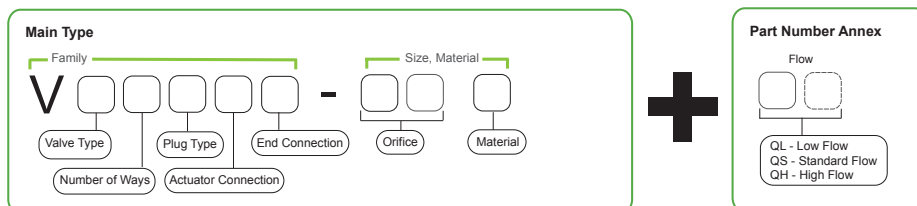
* Selectable: 6-9, 1-5, 2-10, 4-7, 6-10

TYPE DESIGNATION GUIDE

Full Type Designation



Part Number

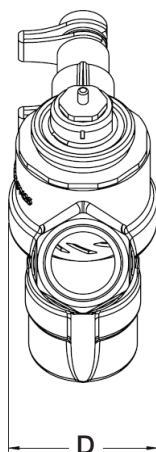
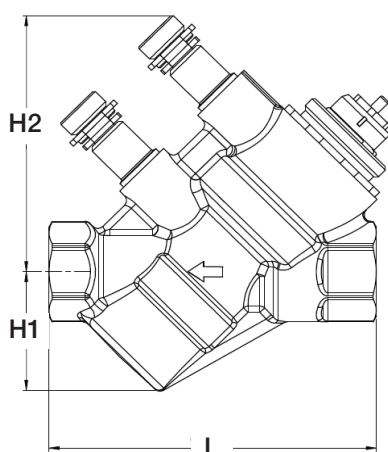


See document 02-00047 for the full type designation guide

PART NUMBER AND TYPE DESIGNATION

Part Number	Full Type Designation	Description
VP223R-15BQL	VP223R-15B Q0.12E SD00	PICV, DN15, 0.036 to 0.118m ³ /h
VP223R-15BQS	VP223R-15B Q0.45E SD00	PICV, DN15, 0.09 to 0.45m ³ /h
VP223R-15BQH	VP223R-15B Q1.40E SD00	PICV, DN15, 0.30 to 1.40m ³ /h
VP223R-20BQS	VP223R-20B Q0.88E SD00	PICV, DN20, 0.32 to 0.88m ³ /h
VP223R-20BQH	VP223R-20B Q2.22E SD00	PICV, DN20, 0.84 to 2.22m ³ /h
VP223R-25BQS	VP223R-25B Q2.34E SD00	PICV, DN25, 0.87 to 2.34m ³ /h
VP223R-25BQH	VP223R-25B Q3.33E SD00	PICV, DN25, 1.75 to 3.33m ³ /h
VP223R-32BQS	VP223R-32B Q4.40E SD00	PICV, DN32, 1.91 to 4.40m ³ /h
VP224R-40BQS	VP224R-40B Q7.56E SD00	PICV, DN40, 3.67 to 7.56m ³ /h
VP224R-50BQS	VP224R-50B Q12.6E SD00	PICV, DN50, 5.18 to 12.60m ³ /h

DIMENSIONS (mm)



Size	L	H1	H2	D
DN15	95	35	75	44
DN20	120	49	83	55
DN25	127	56	81	71
DN32	154	72	87	82
DN40	190	212		110
DN50	195	212		111

EXPLANATION OF CHARTS

Black Curve

This curve indicates the flow rate for a given valve setting when using the scale on the presetting caps (+/- 7% Accuracy).

Red Curve

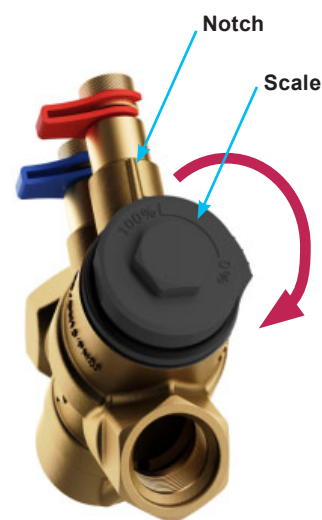
This curve represents the Venturi signal for setting the valve using a manometer (+/- 3% Accuracy).

Precise setting of the valve's max flow is easily done with a digital flow meter. Simply enter the Venturi Kvm into the flow meter and turn the pre-setting tool until the design flow is displayed on the meter.

For valve setting with a differential pressure manometer, the red curve on the charts indicates the Venturi signal that will be measured on the valve for any given flow.

NOTE: Before setting the design flow on the VP223R / VP224R valves, the pump must be set at maximum capacity and all service valves in the system must be in fully open position. The differential pressure across the valve must at all times not exceed 400 kPa.

The design flow is easily adjusted with the supplied pre-setting tool. The pre-setting tool is mounted on top of the valve covering the valve stem. The scale on the pre-setting tool is read against the notch on the brass housing of the valve. Flow charts are based on water with an Specific Gravity of 1.0.



Adjusting the pre-setting tool on the valve

FLOW SETTING CHARTS

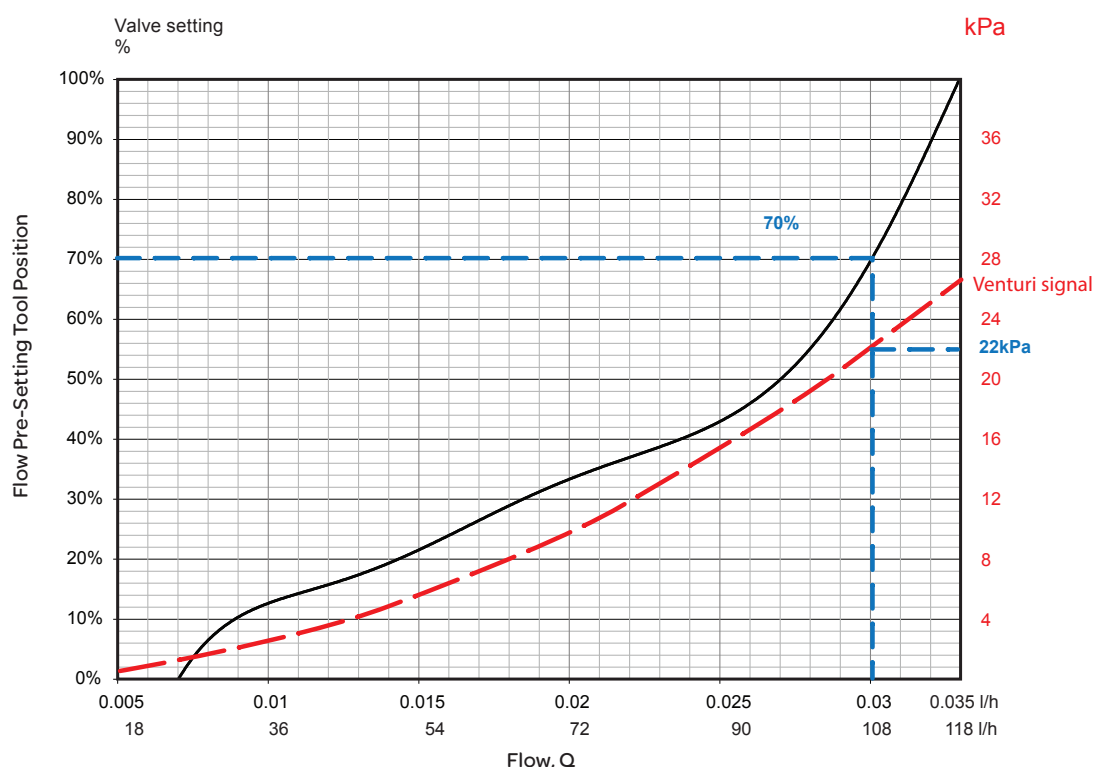
Example: to set to a desired flow of 108 l/h.

Using the pre-setting tool - From the desired flow, draw a vertical line upwards until it meets the black curve, a horizontal line can be drawn from here to the scale on the left of the chart obtaining the position needed for the hand setting knob scale (70%).

Fine tuning using a manometer - A horizontal line drawn to the right where the flow line intersects the red curve will provide the venturi differential pressure signal needed for the desired flow (22 kPa).

DN15 - Low Flow

Venturi Kvm: 0.23

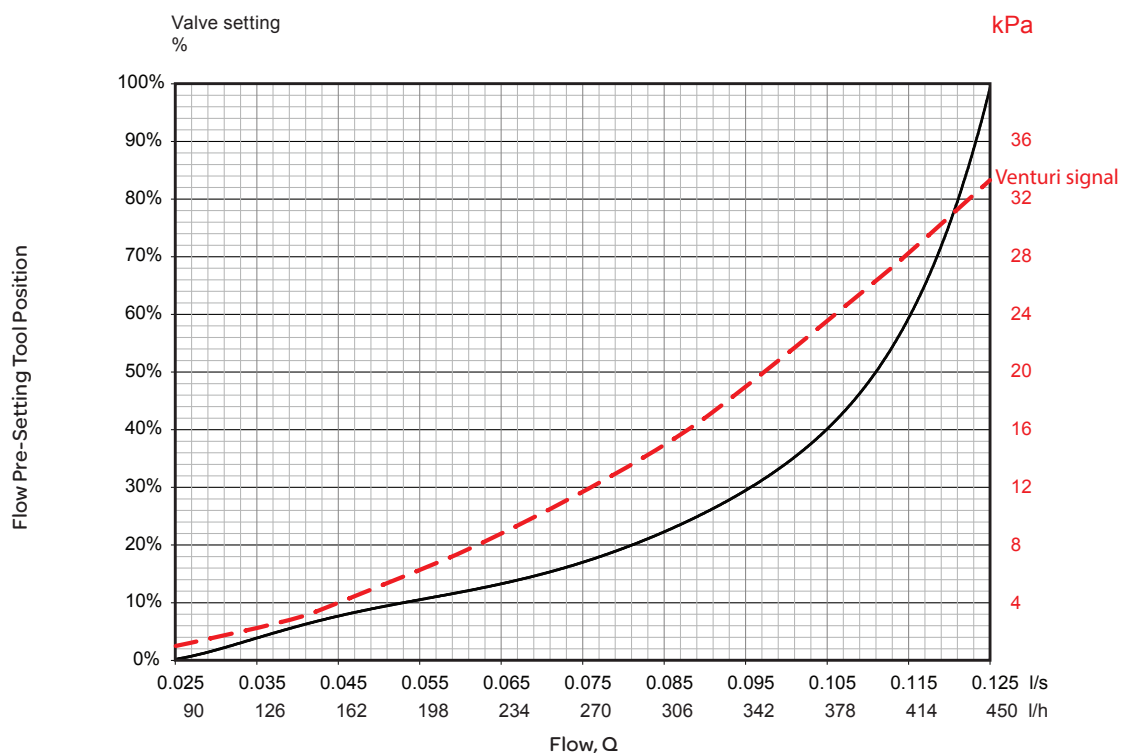


Shaded area is where the setting tolerance using a manometer or flow meter is less than the normal 3% accuracy.

FLOW SETTING CHARTS (cont'd)

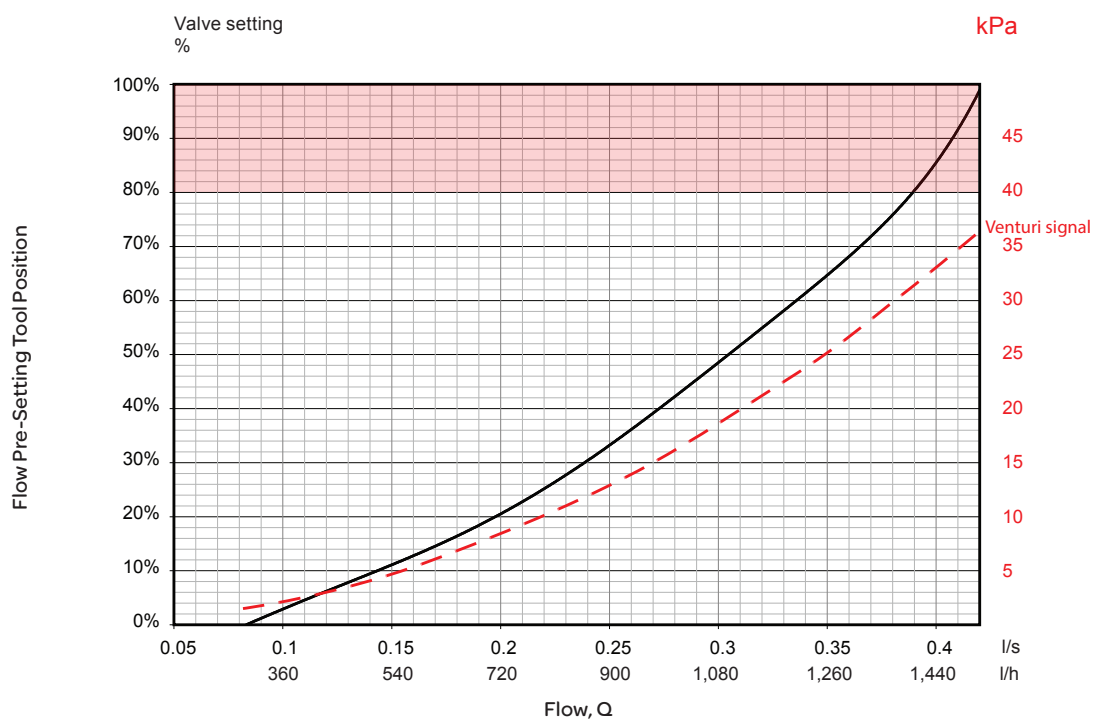
DN15 - Standard Flow

Venturi Kvm: 0.78



DN15 - High Flow

Venturi Kvm: 2.5

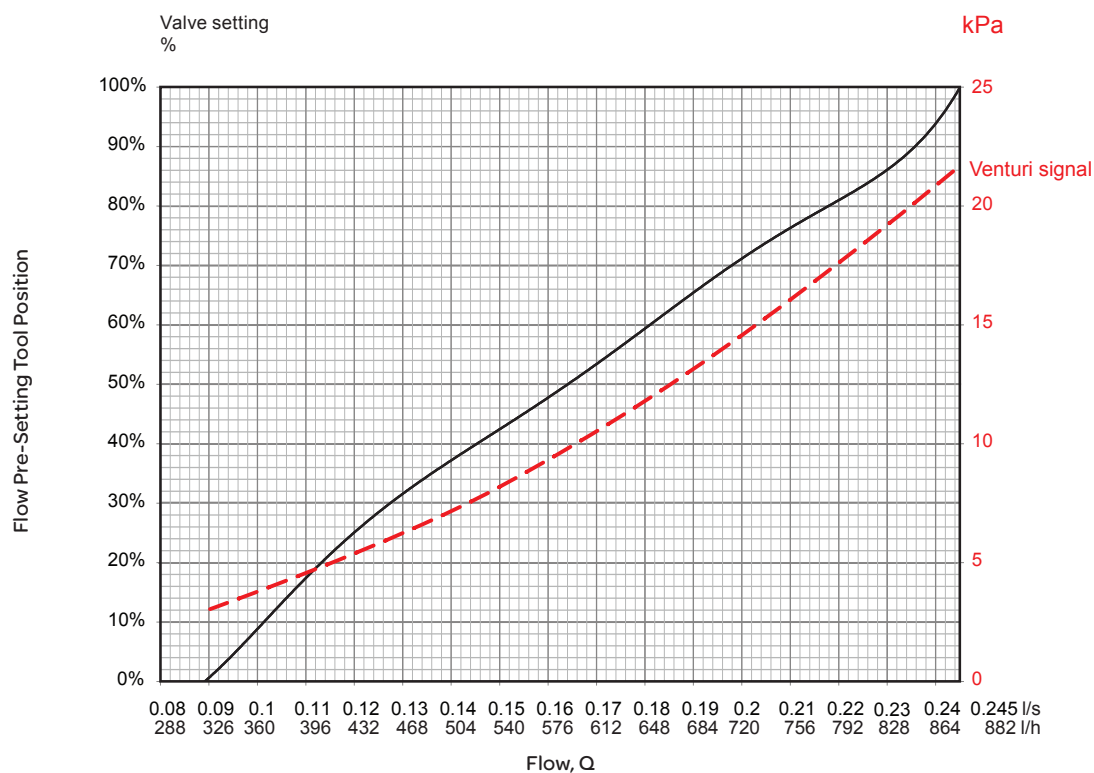


Shaded area is where the setting tolerance using a manometer or flow meter is less than the normal 3% accuracy.

FLOW SETTING CHARTS (cont'd)

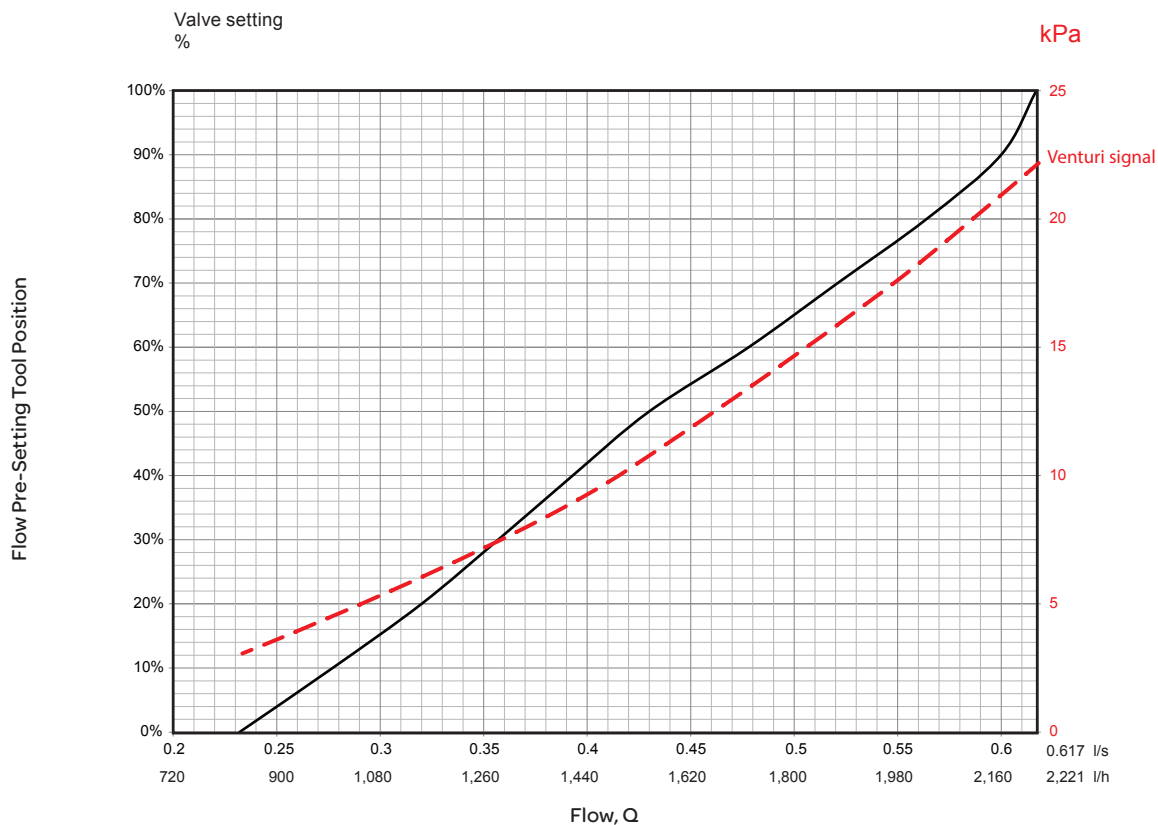
DN20 - Standard Flow

Venturi Kvm: 1.9



DN20 - High Flow

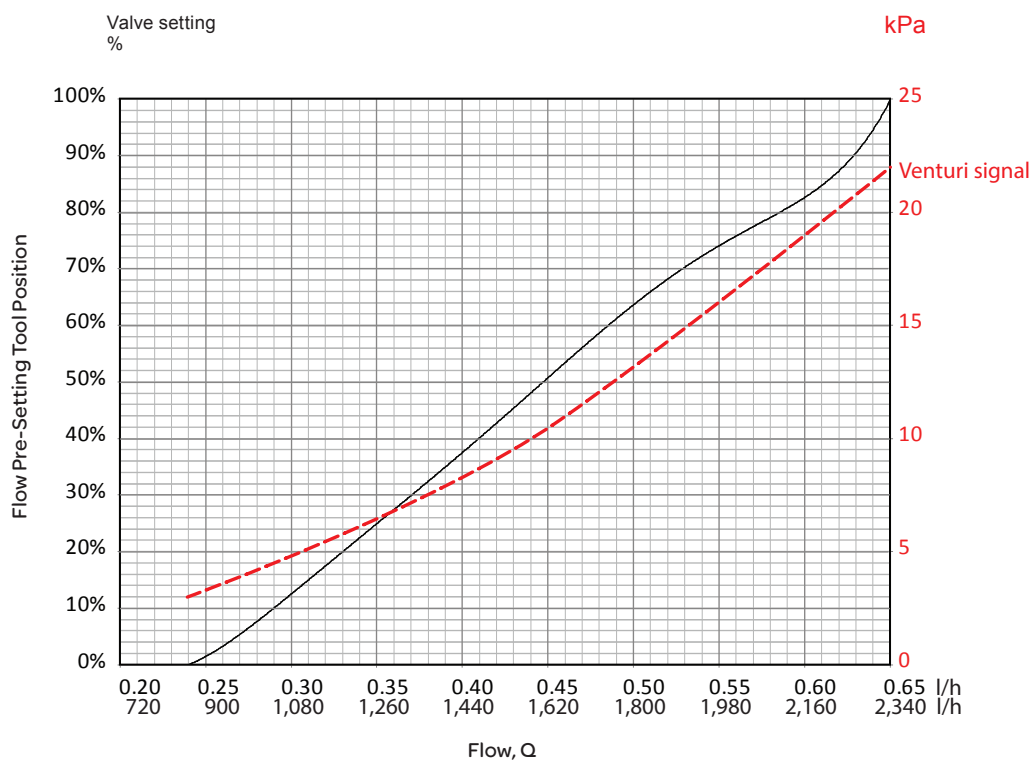
Venturi Kvm: 4.7



FLOW SETTING CHARTS (cont'd)

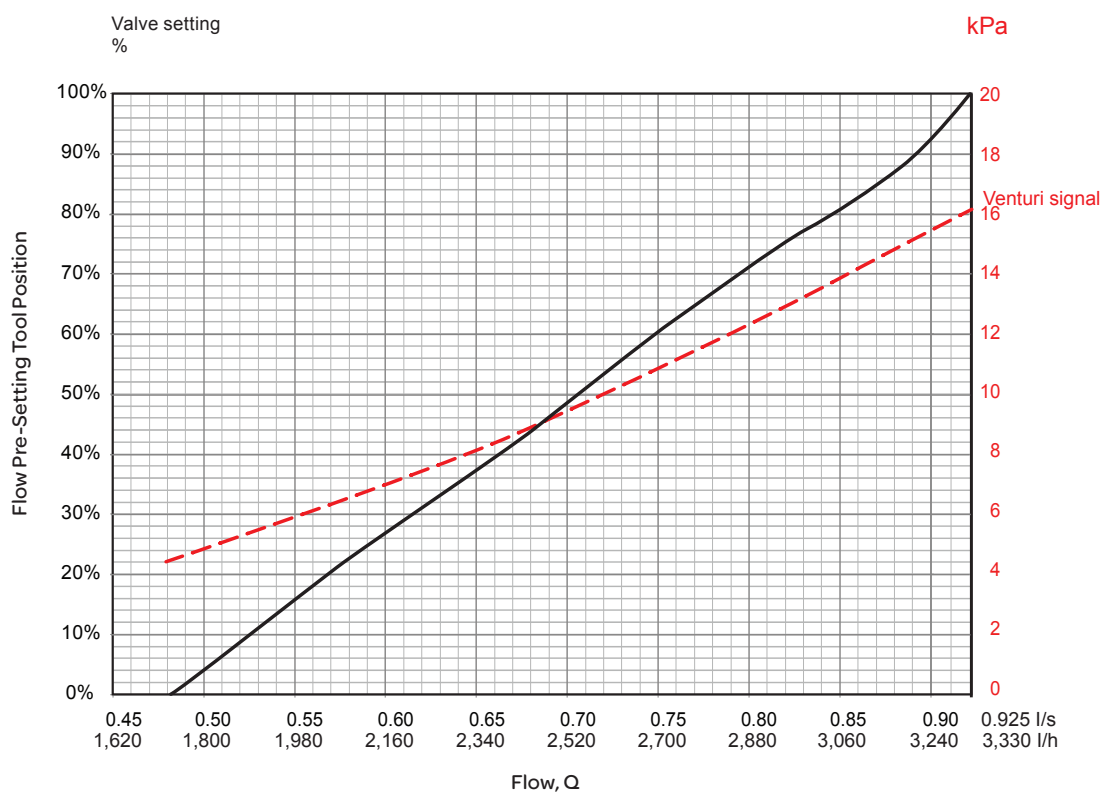
DN25 - Standard Flow

Venturi Kvm: 5.05



DN25 - High Flow

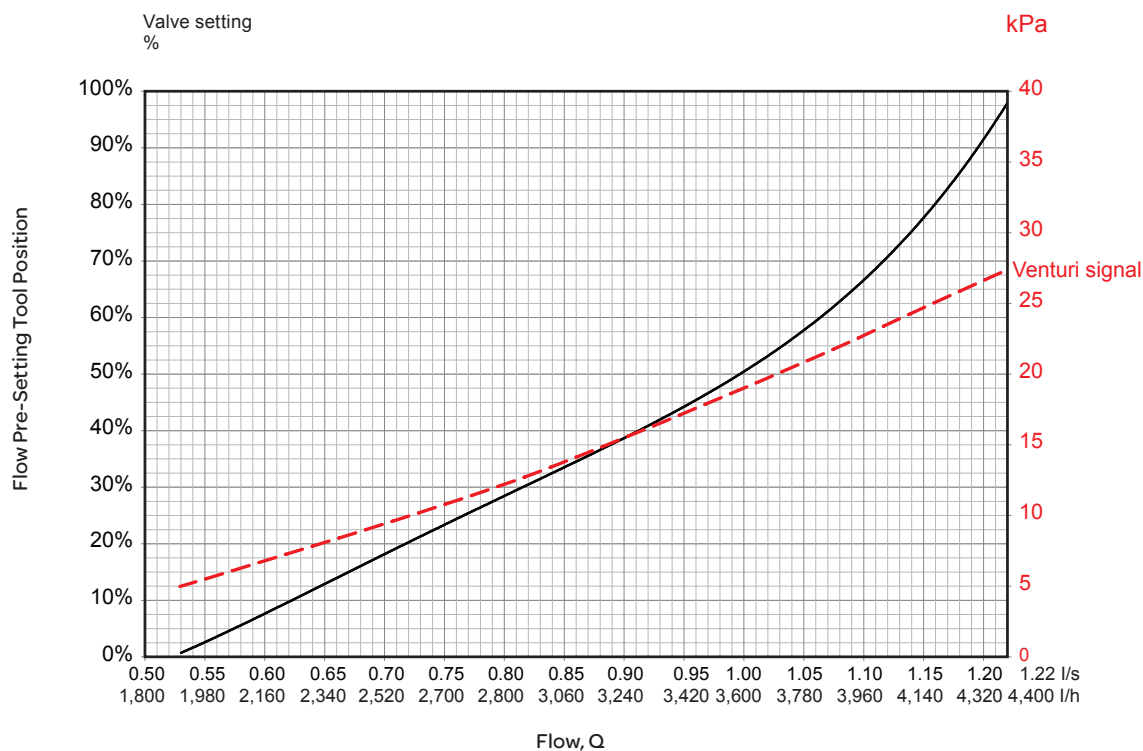
Venturi Kvm: 8.25



FLOW SETTING CHARTS (cont'd)

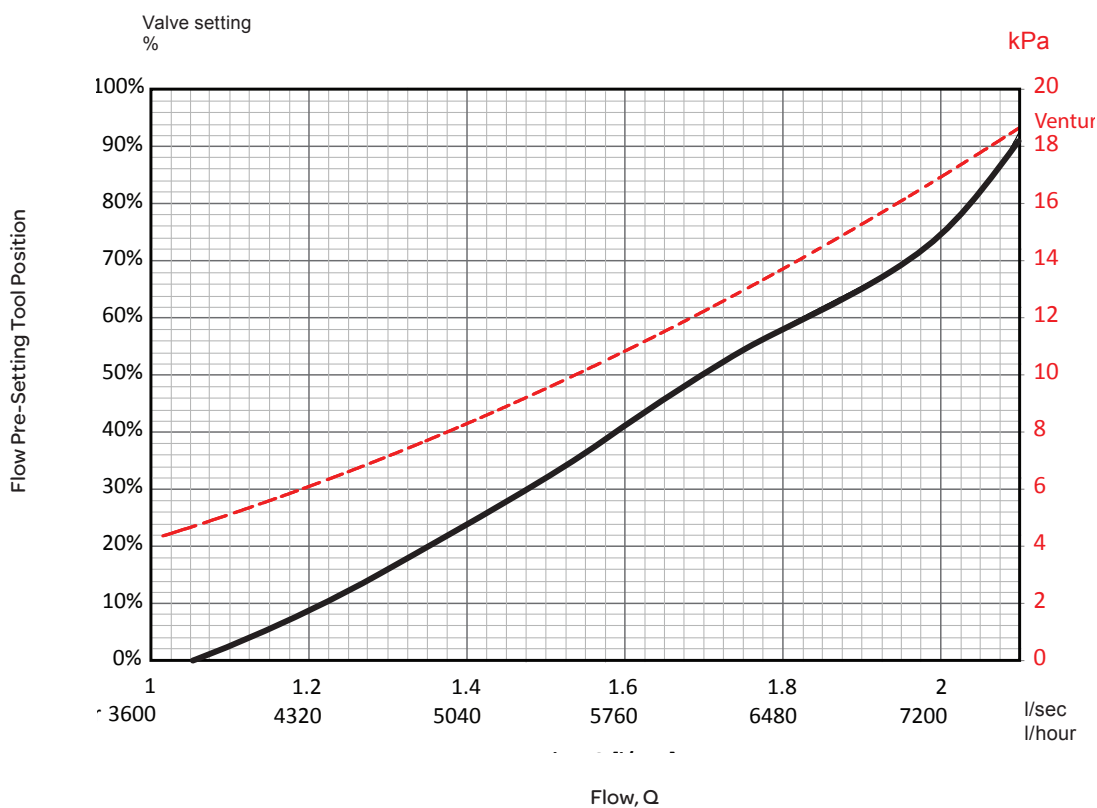
DN32

Venturi Kvm: 8.35



DN40

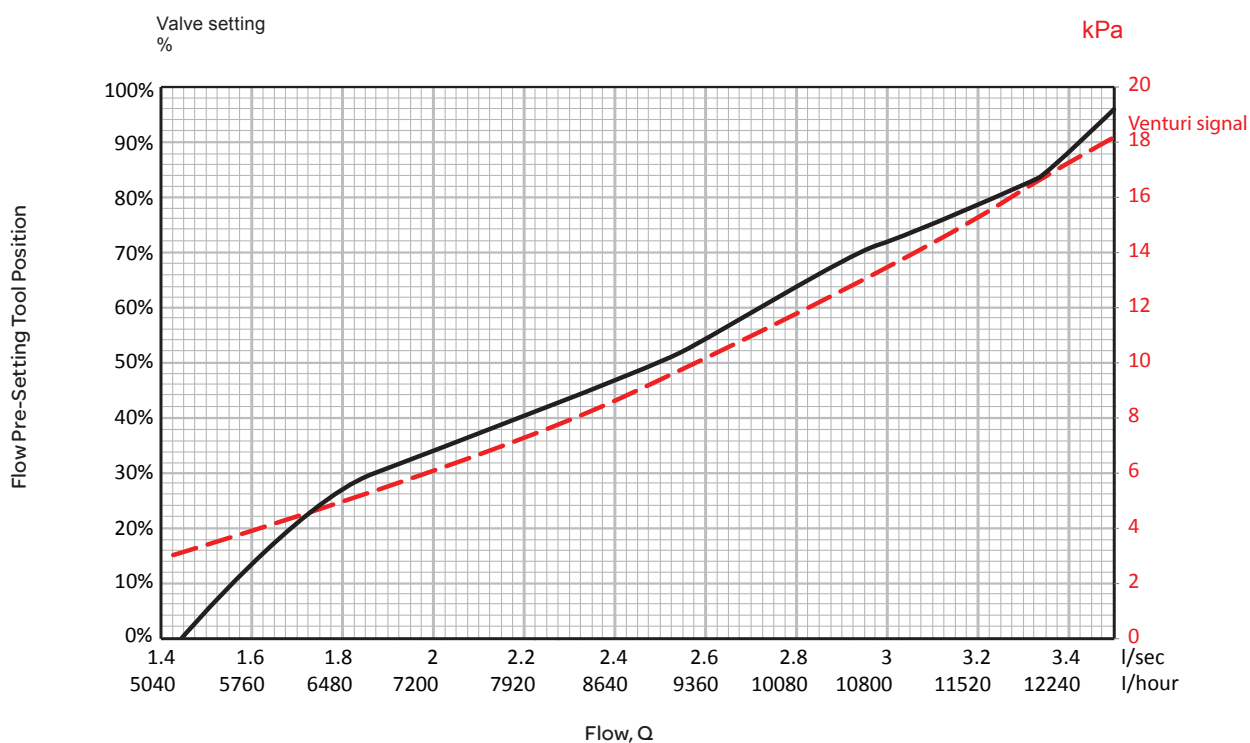
Venturi Kvm: 17



FLOW SETTING CHARTS (cont'd)

DN50

Venturi Kvm: 28.5



VALVE TAG - RECORDING THE SET FLOW

Before an actuator is mounted onto the VP223R/VP224R pressure independent control valve, it is advisable, if not already done so, to adjust to the maximum flow required.

If the maximum flow has already been set, a valve tag/hanger ID should have been completed and attached to the valve.

If the maximum flow is set using the hand flow setting knob from the charts in this data sheet, the top section of the valve tag should be completed.

If the maximum flow has been set using a calibrated manometer or flow meter, the lower portion of the valve tag should be completed.

If the desired flow is not known when installing the valve and it is necessary to fit the actuator for commissioning purposes, the valve tag should not be filled in and left for the balancing engineer to adjust at a later stage.

Schneider Electric	
Ref.	
DN	
Pos.	
Flow	
Flow	
Pos.	
Date	
Name	

Upper portion: Flow and valve position recorded when adjusted to flow chart values using the pre-setting knob.

Lower portion: Flow and valve position recorded after commissioning / balancing using calibrated equipment.

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