

VPFlowScope DP

The ultimate tool for saturated
and hot compressed air measurement



VPFlowScope DP

The patented VPFlowScope® DP is the ultimate measurement tool for saturated compressed air flow measurements. This differential pressure flow sensor measures bi-directional flow, pressure, temperature and total flow simultaneously. Its unique design enables you to take measurements in the discharge pipe of any compressor under 100% saturated conditions. With the VPFlowScope DP you can measure the performance or efficiency of your compressor. Furthermore, you can measure compressor contribution of the total compressed air supply.

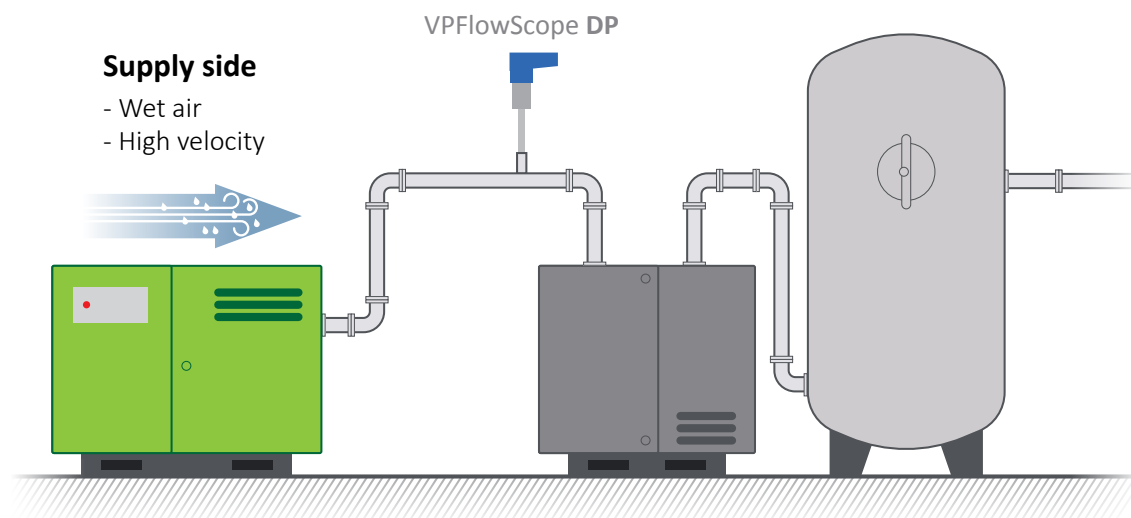
The VPFlowScope DP is an insertion type flow meter, so you can use one device for various pipe diameters. The bright blue LCD display provides real-time information and with the built-in data logger, you can record for certain periods of time. Combine this with our VPStudio software on your PC and you can use this information to process data, print reports and analyze where and how exactly you can save

Highlights

- > For saturated compressed air measurements, can handle droplets of condensate
- > 4-in-1 sensor: Bi-directional flow, pressure, temperature and total flow
- > Differential pressure flow measurement
- > Standard RS485 (Modbus RTU), 4..20mA and pulse output
- > 3-line display (optional) with real-time information and configuration keys
- > Built-in data logger with 2 million points (optional)

Applications

- > Supply side audits
- > Compressor performance measurement
- > Compressor efficiency monitoring (in combination with power measurement)
- > High velocities (up to 200m/sec | 650 sfps)
- > High temperatures (up to 150°C | 302°F)
- > Demand side flow measurement when dryers are not in use
- > Input/ output monitoring of desiccant dryers/ air treatment equipment



The VPFlowScope DP is preferably installed in the second horizontal piping after the compressor where there is less possibility for excess water. A cyclone separator is recommended upstream of the flow meter, to remove excess water from the system.

Insertion type flow meter can be installed under pressure

Your compressed air supply is often vital for your 24/7 production process. You can install the VPFlowScope DP under pressurized conditions without stopping your compressor.

Bi-directional flow measurement

Bi-directional flow occurs frequently in compressed air systems, examples are in ring networks, at receivers in case of multiple compressed rooms, overseen branches or a leaking non-return valve. Discover the actual consumption and avoid mis-readings with the built-in bi-directional sensitivity.

Power of combined measurement

Get the complete picture by measuring flow, pressure and temperature simultaneously. Examples are: pressure drop caused by excessive flow, flow & temperature measurement combined downstream of a refrigerant dryer, and to get to know the true delivery of your compressors.

Proprietary safety cable

We value your safety while you install your flow meter under pressurized conditions. The safety cable prevents unintended launching of the flow meter. As an extra benefit, the flow meter remains better in its position over time.

Software

VPStudio software

Correct flow measurements start with entering the correct inner pipe diameter into your flow meter. You program this easily via the display keypad or via the VPStudio software.

For non-display models, the diameter can only be

set via the software. VPStudio can be installed on your PC and communicates via the JB5 interface kit with the VPFlowScope via your PC's USB port.

Features of VPStudio:

- > Setting your pipe diameter
- > View real time measurements
- > Viewing and retrieving your (air audit) data log sessions in a structured manner in the Projects module
- > Setting your logging intervals
- > Setting your Modbus and networking parameters
- > Spanning the analogue output to 4 ... 20 mA or Pulse

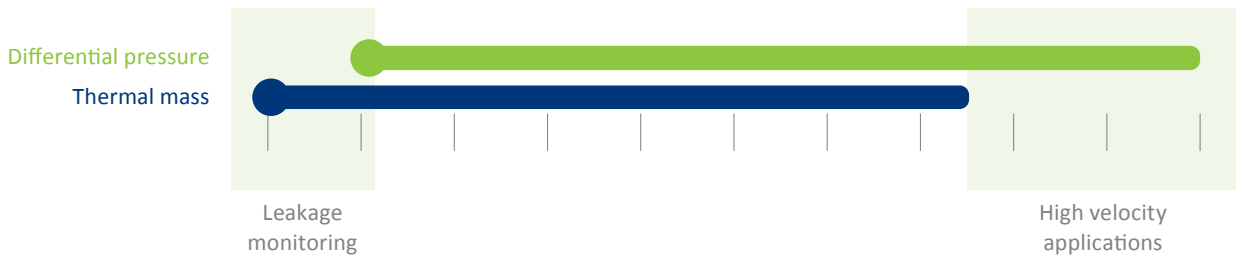


Download from www.vpinstruments.com.

VPFlowScope DP measurement range

Differential pressure vs. thermal mass

The range of thermal mass flow technology is superior to differential pressure technology. Therefore, differential pressure meters should not be used for leakage monitoring. They are intended for use in high velocity applications where there is a continuous flow over a minimum value, such as compressor efficiency monitoring.



VPS.R200.P4DP.x flow range table

SCHEDULE 40 STANDARD SEAMLESS CARBON STEEL PIPE							
Size (inch)	DN	ID (inch)	ID (mm)	Min flow (scfm)	Max flow (scfm)	Min flow (m ³ /hr)	Max flow (m ³ /hr)
2	50	2.1	52.5	92	917	156	1559
3	80	3.1	77.9	202	2020	343	3432
4	100	4.0	102.3	348	3483	592	5918
6	150	6.1	154.1	790	7904	1343	13429
8	200	8.0	202.7	1368	13675	2323	23234
10	250	10.2	259.1	2234	22344	3796	37963
12	300	11.9	303.2	3060	30597	5199	51985
16	400	15.0	381.0	4831	48314	8209	82087
20	500	18.8	477.8	7598	75983	12910	129097

SCHEDULE 10 STANDARD SEAMLESS CARBON STEEL PIPE					
ID (inch)	ID (mm)	Min flow (scfm)	Max flow (scfm)	Min flow (m ³ /hr)	Max flow (m ³ /hr)
2.2	54.8	100	1000	170	1698
3.3	82.8	228	2282	388	3877
4.3	108.2	390	3897	662	6620
6.4	161.5	868	8681	1475	14749
8.3	211.6	1490	14902	2532	25319
10.4	264.7	2332	23320	3962	39621
12.4	314.7	3296	32962	5600	56004
15.6	396.8	5240	52405	8904	89036
19.6	496.9	8218	82180	13962	139624

The ranges only apply to compressed air and nitrogen. Contact us for other gases. The field accuracy of an insertion probe is typically +/- 5% due to installation conditions. Insertion probes may not be used for official compressor testing.

"The VPFlowScope DP is super easy to install and allows me to show customers just how important measuring flow really is."

- Frank Moskowitz, Draw Professional Services, USA

Display module

The VPFlowScope DP is available in several versions: without display (with connector cap) (D2), with display module (D10), and with display module and integrated data logger (D11).

All your options in one overview:

PRODUCT CODE	FLOW	PRESSURE	TEMPERATURE	TOTALIZER	4 ... 20 MA AND PULSE	RS485 / MODBUS RTU	DISPLAY	2 MILLION POINT DATA LOGGER	APPLICATION
VPS.RXXX.PXXX.D0	•	•	•	•	•	•			Spare part
VPS.RXXX.PXXX.D2	•	•	•	•	•	•			BMS/ permanent monitoring
VPS.RXXX.PXXX.D10	•	•	•	•	•	•	•		Local display
VPS.RXXX.PXXX.D11	•	•	•	•	•	•	•	•	Local display, Auditing
VPS.RXXX.PXXX.KIT	•	•	•	•	•	•	•	•	Auditing

The display provides real-time information that can be recorded with the optional data logger. The display is reversible and shows all information on three lines, which are fully configurable. You can choose from SI and Imperial display units. The data logger offers 2 million data points, which makes recording as easy as taking pictures. This is enough storage to measure flow, pressure and temperature once per second for more than a week.



Start kits



Begin measuring energy savings immediately with a VPFlowScope start kit. The start kit features all the accessories needed to start measuring now. We offer several start kits, pending on your needs:

	VPFLOWSCOPE DP START KIT VPS.R200.P4DP.BOX	VPFLOWSCOPE DP START KIT IN EXPLORER CASE VPS.R200.P4DP.KIT	VPFLOWSCOPE DP WITH VPFLOWTERMINAL VPS.R200.P4DP.VPT.KIT
VPFlowScope DP Sensor	•	•	•
Three row LCD display with built-in datalogger	•	•	
VPFlowTerminal* with: - 4 extra analogue inputs, - Three row LCD display with built-in datalogger. - Pre-wired 10m cable with connector cap			•
VPFlowScope JB5 interface KIT for configuration.	•	•	
Compression fitting with integrated proprietary safety cable VPFlowScope DP	•	•	•
Rugged explorer case with pre-cut foam		•	
Calibration report	•	•	•
VPStudio software	•	•	•

* For the VPFlowTerminal, the power cord to be ordered separately for US/EU adapter selection.

* Order your VPFlowTerminal with flow meter always together. The standard connector cap has an M12 - 5 pin connector, whereas the VPFlowTerminal requires a connector cap with an M12 - 8 pin.

Specifications: VPFlowScope DP

FLOW SENSOR

Measuring principle	Differential pressure
Flow range	20 ... 200 m _v /sec 65 ... 650 sfps Bi-directional measurement (standard)
Accuracy	2% of reading over 1:10 range, under calibration conditions: please refer to the user manual for details. Recommended pipe diameter: 50 mm (2 inch) and up.
Reference conditions	0 °C, 1013.25 mbar 32 °F, 14.65 psi - DIN 1343
Gases	Wet* and dry compressed air, nitrogen and inert gases

PRESSURE SENSOR

Pressure sensor range, standard	0 ... 16 bar 0 ... 250 psi gage
Accuracy	+/- 1.5% FSS (0 ... 60 °C) (32 ... 140 °F) Temperature compensated

TEMPERATURE SENSOR

Temperature sensor range	-40 ... 150 °C -40 ... 302 °F. Icing should be avoided
Accuracy	+/- 1 °C 1.8 °F

DATA OUTPUTS

Digital	RS485, MODBUS RTU protocol
Analog	4 ... 20 mA single analog / pulse output, selectable via VPStudio software

DISPLAY/DATA LOGGER

Technology	Liquid Crystal (LCD)
Back light	Blue, with auto power save
Data logger	2 million points memory

MECHANICAL & ENVIRONMENTAL

Probe lengths	386 mm 15"
Process connection	Compression fitting, 0.5" NPT thread
Pressure rating	PN16
Protection grade	IP52 NEMA 12 when mated to display module, avoid upside down installation IP63 NEMA 4 when mated to connector cap, avoid upside down installation
Ambient temperature range	0 ... 60 °C 32 ... 140 °F. Avoid direct sunlight or radiant heat
Wetted materials	Anodized aluminum, stainless steel 316, glass and epoxy
Corrosion resistance	Highly corrosive or acid environments should be avoided

ELECTRICAL

Connection type	M12, 5-pin connector, female
Power supply	12 ... 24 VDC +/- 10 % Class 2 (UL)
Power consumption	3.6 Watt +/- 10% 150 mA +/- 10% @24VDC, constant over the entire flow range
UL/ CUL	14 AZ, Industrial Control Equipment
CE	EN 61325-1 (2006), Class AEN 61000-6-1 (2007)





*Note: The VPFlowScope DP is a flow meter for compressed air measurements, NOT for water measurements. Water drops are allowed. Excessive oil & water carryover conditions are not allowed.

Other probe lengths

The VPFlowScope DP has a standard length of 386 mm. Custom lengths are not possible.







Order codes and accessories

START KITS AND MODELS

	VPS.R200.P4DP.KIT	VPFlowScope DP start kit in explorer case
	VPS.R200.P4DP.BOX	VPFlowScope DP start kit, items only, no carry case
	VPS.R200.P4DP.VPT.KIT	VPFlowScope DP start kit with VPFlowTerminal
	VPS.R200.P4DP.D0	VPFlowScope DP sensor module (spare part)
	VPS.R200.P4DP.D2	VPFlowScope DP with connector cap
	VPS.R200.P4DP.D10	VPFlowScope DP with display, no data logger
	VPS.R200.P4DP.D11	VPFlowScope DP with display and datalogger

Calibration report and compression fitting with safety cable are included in all models.

ACCESSORIES

	VPS.D110.000	VPFlowScope display, with datalogger
	VPS.D100.000	VPFlowScope display, no datalogger
	VPA.5001.900	VPFlowScope connector cap
	VPA.5000.005	Cable 5m/16.4ft. with 5 pin M12 on one side. For permanent installation.
	VPA.5000.010	Cable 10m/32.8ft. with 5 pin M12 on one side. For permanent installation.
	VPA.5001.205	VPFlowScope JB5 interface KIT for programming your flow meter via VPStudio. Interface box JB5 + 5m/16,4 ft cable (M12 connector) + 12V power supply + RS485 to USB cable.
	VPA.0000.200	Power supply adapter with 5 pin connector. Useful for air audits.
	VPA.5100.004	Set of 10 filters and 10 O-rings. Spare part for maintenance.

JB5 interface kit

The interface kit, which is included in the VPFlowScope start kit, can also be ordered as a separate item. The JB5 interface kit is needed to connect your flow meter to the PC with VPStudio. In the interface kit, you will find a splitter box with pre-mounted M12 cable, a DC power supply and an RS485 to USB converter.



Specifications

Mechanical & Environmental

Temperature: -20 ~ 50°C | -4 ~ 122°F

Weight: 0.9 kg | 1.98 lbs

Electrical

Supply input (mains): 100 - 240 VAC

Output: 12 - 24 VDC

Cable: 5 meter | 16.4 foot cable with M12

5-pin connector

RS485 output: via RS485 to USB converter

Part number

VPA.5001.205: VPFlowScope JB5 interface kit

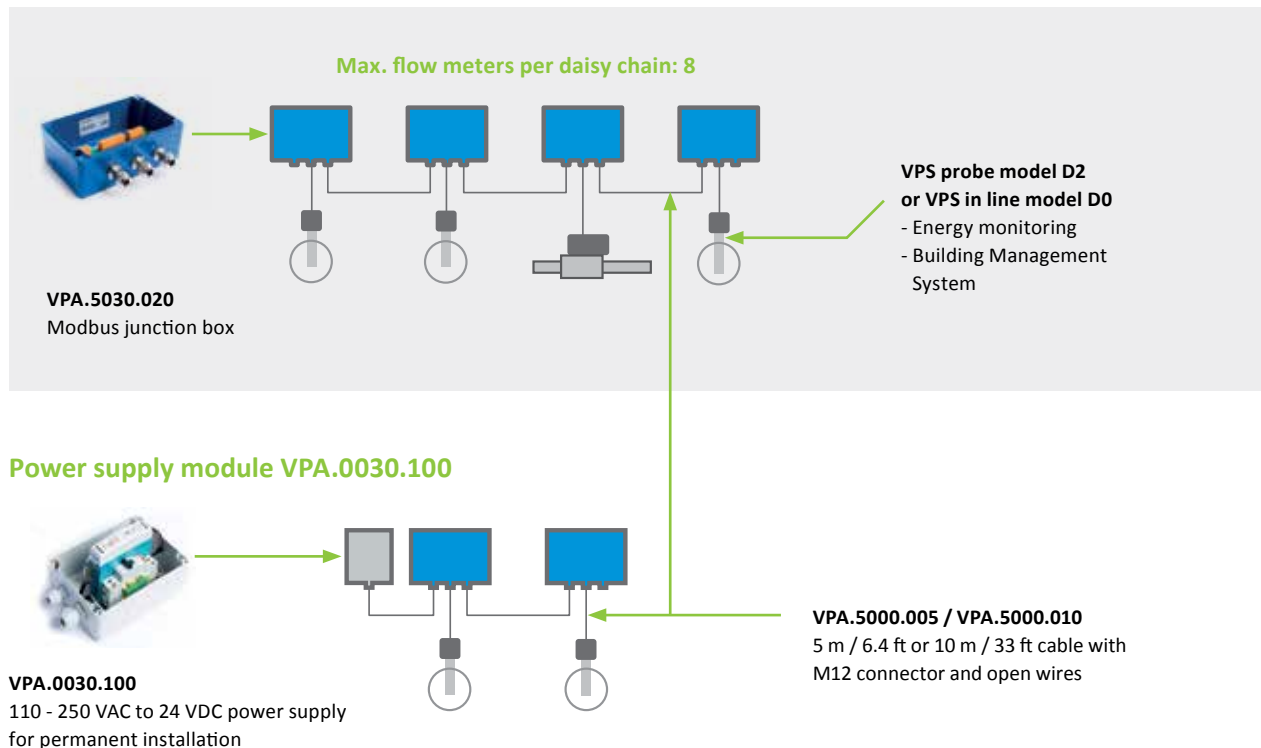


Ease of connection

The VPFlowScope features a RS458 (Modbus RTU) interface, which is especially useful in energy monitoring applications, like VPVision. You can connect up to eight VPFlowScope flow meters in one daisy chain. It is recommended to use a junction box for each flow meter to ease proper connection to the Modbus network. The junction box has biasing, termination resistors and provides feedback by LED on the power supply.

However, if you would like to connect your flow meter to an existing Modbus network or 4..20mA / pulse based data acquisition system, you can use the power supply module to supply DC power to the flow meter. The power supply module can supply power to two flow meters at the same time. You will find screw terminals in the power supply module for both RS485 and the 4 ... 20 mA / pulse output for your convenience. If you require more installation examples, please refer to the user manual.

Modbus network with multiple flow meters (DC power supplied from VPVision)



VPVision and energy monitoring applications

VPVision

VPVision is the complete real time energy monitoring solution for all utilities within your company. Get real-time data on your usage and see the patterns on your supply and demand side. Take factual and well-founded decisions on your costs and investments. Reveal the consumption of all utilities, including compressed air, technical gases, steam, vacuum, natural gas, electricity, waste water, heating fuels etc. VPVision enables you to view data on any platform; from PC to smartphone. It will help your organization raise the energy awareness among your staff. It will be your guiding hand to

target energy savings for individuals, teams or at company-wide level.



VPFlowScope family

Other VPFlowScope products:



VPFlowScope M

The VPFlowScope M is the next step in gas measurement. Unlike traditional flow meters, the VPFlowScope M consists of a Transmitter and the patented VPSensorCartridge® which reduces recalibration to a simple exchange.



VPFlowScope Probe

The VPFlowScope® is the measurement tool for dry compressed air and other technical gases like nitrogen, carbon dioxide and argon. The VPFlowScope Probe measures thermal mass flow, pressure, temperature and total flow simultaneously.



VPFlowScope In-line

The VPFlowScope In-line is the ideal flow meter for point of use consumption measurement. It is perfect for smaller diameters where it produces all the data you need to optimize your compressed air consumption.



easy insight into energy flows™

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