VP INSTRUMENTS

VPFLOWSCOPE®

Your next step in gas flow measurement

VPFlowScope insertion flow meters

The VPFlowScope probe - Thermal Mass (dry air) and the VPFlowScope DP (saturated air), measure mass flow, pressure and temperature simultaneously. With the optional display module, users are able to see all three parameters immediately. In addition, they can choose for the onboard / integrated 2 million point data logger to record this data. The VPFlowScope probe can be used in various pipe diameters, which makes it the perfect solution for supply side monitoring and sub metering of compressed air. The flow meter shows you where, when and how much air is used in order to allocate cost and subsequently to save money and energy. The VPFlowScope DP is perfect for efficiency monitoring of compressors whereas the VPFlowScope probe is perfect for leakage management and flow measurement of technical gases, for example; nitrogen, carbon dioxide and argon. VPInstruments' flow meters use a patented sensor design and are able to perform Bi-directional measurements.

VPFlowScope Probe - Thermal Mass

The VPFlowScope Probe is designed for dry compressed air and other technical gases, such as; nitrogen, carbon dioxide and argon. It's the ultimate compressed air measuring tool used by leading auditors and industries worldwide.

"The VPFlowScope Probe enables us to perform air audits quicker, easier and more cost effective. It is the Swiss army knife for any compressed air auditor"

- Air Energy Management, UK

Specifications: VPFlowScope Probe

FLOW SENSOR	
Measuring principle	Thermabridge™ Thermal Mass flow sensor
Flow range	0.5 … 150 m_n/sec | 1.7 … 490 sfps
	Bi-directional measurement (option)
Accuracy	2% of reading under calibration conditions. Recommended pipe diameter: 40 mm (1.5”) and up.
Reference conditions	0 °C, 1013.25 mbar 32 °F, 14.65 psi - DIN 1343
Gases	Compressed air, nitrogen and inert, non-condensing gases, 95% non-condensing gases
Gas temperature range	0 … 60 °C | 0 … 140 °F

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	0 … 60 °C | 32 … 140 °F
Accuracy	> 10 m_n/sec: +/- 1 °C | 1.8 °F < 10 m_n/sec: + 5 °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 (option)	2 million points memory

MECHANICAL & ENVIRONMENTAL	
Probe lengths	400 mm | 15” (300 mm or 600 mm on request)
Process connection	Compression fitting, 0.5” NPT thread
Pressure rating	PN16 (PN35 on request)
Ingress Protection (IP) 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 (no flow) 4.8 Watt (full flow) +/- 10% 150 mA (no flow) 200 mA (full flow) +/- 10% @24VDC
UL/ CUL	14 AZ, Industrial Control Equipment
CE	EN 61325-1 (2006), Class AEN 61000-6-1 (2007)

Order codes VPFlowScope Probe

FLOW METERS	
VPS.R150.P400.KIT	VPFlowScope Thermal Mass Probe with 400mm/15.4” probe combination kit, including software
VPS.R150.P400.D2	VPFlowScope Thermal Mass Probe 400mm/15.4” probe with connector cap
VPS.R150.P400.D10	VPFlowScope Thermal Mass Probe 400mm/15.4” probe with display no data logger
VPS.R150.P400.D11	VPFlowScope Thermal Mass Probe 400mm/15.4” probe with display and data logger

Other probe lengths

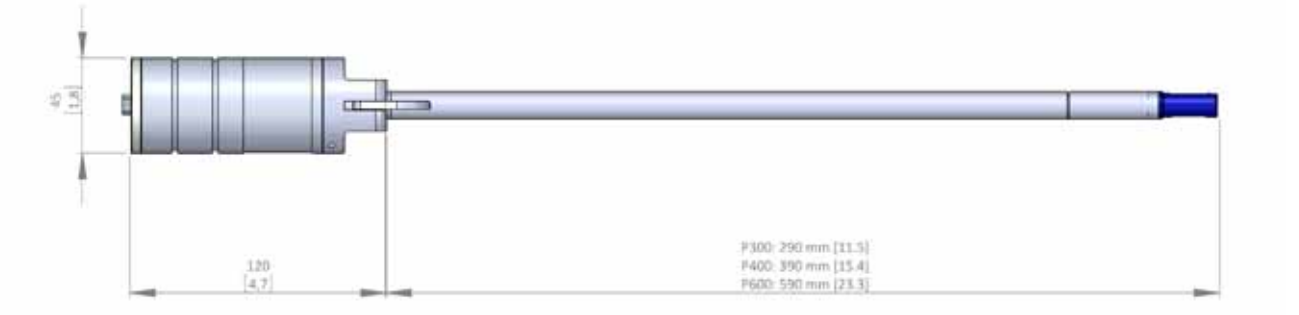
The standard P400 probe is a one size fits all solution for most pipe sizes. We offer 300 mm (12”) and 600 mm (24”) probes on request. The VPFlowScope Probe is the only model available in several lenghts.

VPS.R150.Pxxx flow range table

SCHEDULE 40 STANDARD SEAMLESS CARBON STEEL PIPE								SCHEDULE 10 STANDARD SEAMLESS CARBON STEEL PIPE					
Size (inch)	DN	ID (inch)	ID (mm)	Min flow (scfm)	Max flow (scfm)	Min flow (m^3_n/hr)	Max flow (m^3_n/hr)	ID (inch)	ID (mm)	Min flow (scfm)	Max flow (scfm)	Min flow (m^3_n/hr)	Max flow (m^3_n/hr)
2	50	2.1	52.5	2.3	688	3.9	1169	2.2	54.8	2.5	749	4.2	1273
3	80	3.1	77.9	5.1	1516	9	2576	3.3	82.8	5.7	1712	10	2908
4	100	4.0	102.3	8.7	2610	15	4435	4.3	108.2	9.7	2923	17	4966
6	150	6.1	154.1	20	5924	34	10065	6.4	161.5	22	6508	37	11057
8	200	8.0	202.7	34	10259	58	17429	8.3	211.6	37	11173	63	18982
10	250	10.2	259.1	56	16756	95	28468	10.4	264.7	58	17487	99	29709
12	300	11.9	303.2	77	22953	130	38995	12.4	314.7	82	24724	140	42004
16	400	15.0	381.0	121	36237	205	61565	15.6	396.8	131	39315	223	66794
20	500	18.8	477.8	190	56996	323	96832	19.6	496.9	205	61643	349	104729

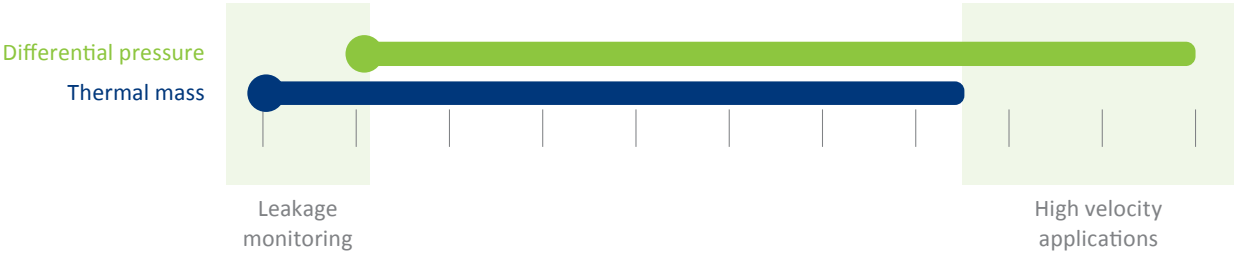
The ranges only apply to compressed air and nitrogen. Contact us for other gases. The field accuracy of an insertion probe is typically +/- 5% due to installation conditions. Insertion probes may not be used for official compressor testing.

Technical drawing



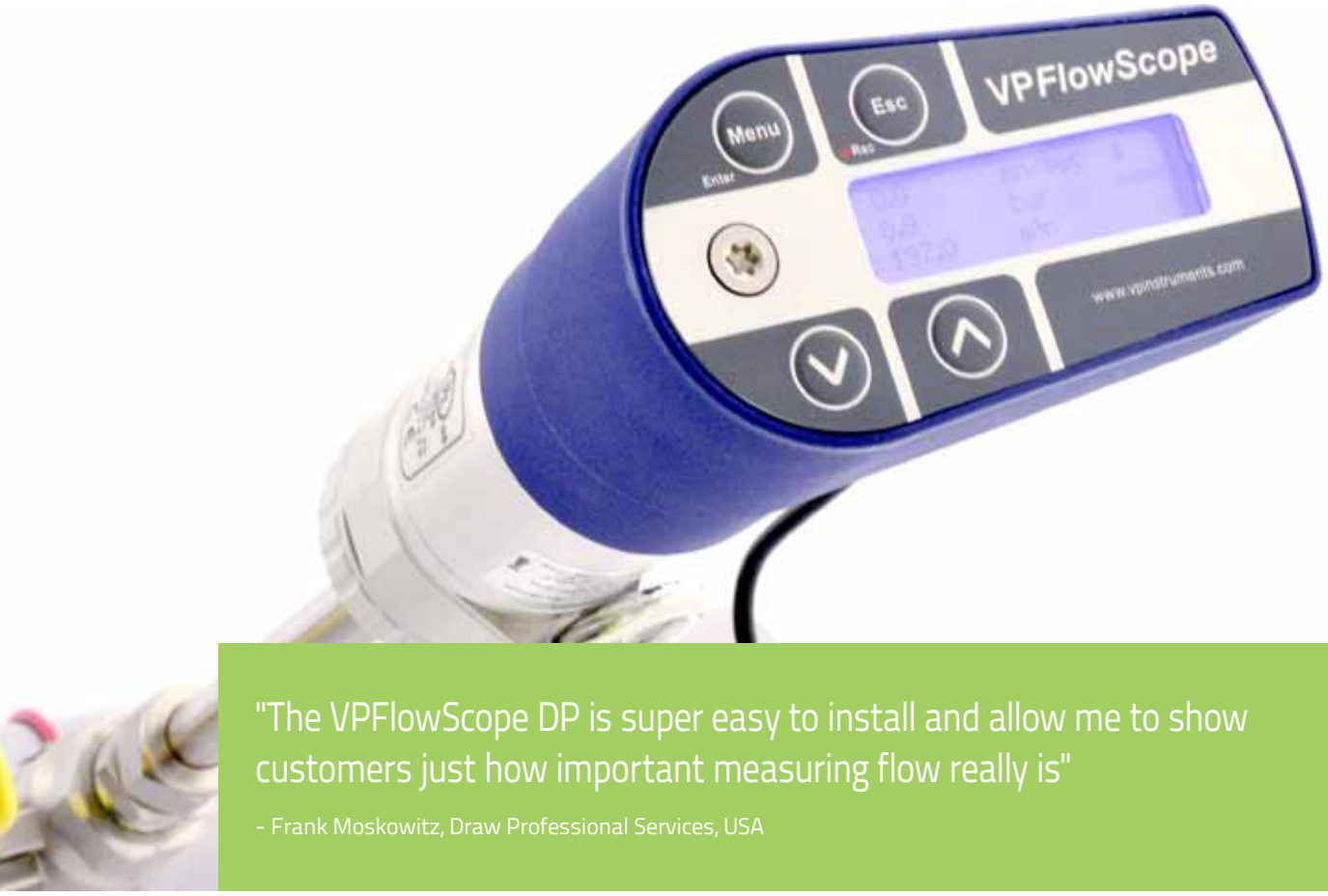
Differential pressure vs thermal mass

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 such as compressor efficiency monitoring.



VPFlowScope DP – Differential Pressure

The VPFlowScope® DP is designed for wet compressed air measurements[1]. The unique design enables users to take measurements in the discharge pipe of any compressor under 100% saturated conditions.



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

- Frank Moskowitz, Draw Professional Services, USA

[1] *The VPFlowScope DP can be used up to a high water content (saturated air). However, as it's based on the Pitot principle, some limitations apply: the rangeability is smaller, no vertical lines, no overflooding with water. See user manual for details and installation instructions.*

Specifications: VPFlowScope DP

FLOW SENSOR	
Measuring principle	Differential pressure
Flow range	20 ... 200 m_n/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	0 … 16 bar | 0 … 250 psi gage
Accuracy	+/- 1.5% FSS (0 ... 60°C) +/- 1.5% FSS (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, 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, Class AEN 61000-6-1 (2007)

Order codes VPFlowScope DP

FLOW METERS	
VPS.R200.P4DP.KIT	VPFlowScope dP start kit, for air audits, complete with software
VPS.R200.P4DP.D2	VPFlowScope dP with connector cap. For Modbus networks
VPS.R200.P400.D10	VPFlowScope with three row display
VPS.R200.P4DP.D11	VPFlowScope dP with 2 million point data logger display module, for auditors and permanent installation (stand-alone)

Other probe lengths

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

VPS.R200.P4DP.x flow range table

SCHEDULE 40 STANDARD SEAMLESS CARBON STEEL PIPE								SCHEDULE 10 STANDARD SEAMLESS CARBON STEEL PIPE					
Size (inch)	DN	ID (inch)	ID (mm)	Min flow (scfm)	Max flow (scfm)	Min flow (m^3_n/hr)	Max flow (m^3_n/hr)	ID (inch)	ID (mm)	Min flow (scfm)	Max flow (scfm)	Min flow (m^3_n/hr)	Max flow (m^3_n/hr)
2	50	2.1	52.5	92	917	156	1559	2.2	54.8	100	1000	170	1698
3	80	3.1	77.9	202	2020	343	3432	3.3	82.8	228	2282	388	3877
4	100	4.0	102.3	348	3483	592	5918	4.3	108.2	390	3897	662	6620
6	150	6.1	154.1	790	7904	1343	13429	6.4	161.5	868	8681	1475	14749
8	200	8.0	202.7	1368	13675	2323	23234	8.3	211.6	1490	14902	2532	25319
10	250	10.2	259.1	2234	22344	3796	37963	10.4	264.7	2332	23320	3962	39621
12	300	11.9	303.2	3060	30597	5199	51985	12.4	314.7	3296	32962	5600	56004
16	400	15.0	381.0	4831	48314	8209	82087	15.6	396.8	5240	52405	8904	89036
20	500	18.8	477.8	7598	75983	12910	129097	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.

Technical drawing

Display module

VPFlowScope insertion flow meters are available in three versions: without display module (with a connector cap), with display module and with display module with integrated data logger. The display provides real time information that can be recorded with the data logger. The data logger is optional and offers 2 million data points, which makes recording as easy as taking pictures. This is enough to measure all three channels once per second for more than a week.

The optional display module offers a variety of interfaces and an unparalleled 2 million data logger. All in a very unique compact design. The display text can be rotated 180 degrees when desired.

Product configuration options

In this table you will find an overview of the features offered.

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

Start kits

VPInstruments offers customers an easy way to start saving energy and money: the VPInstruments' VPFlowScope probe start kit. This start kits are designed to offer you ease of use and access to some of the most sophisticated compressed air tools in the market. The start kits come in striking, rugged blue cases and contains all you need to get started.

Start kits

VPS.R150.P400.KIT (as shown on picture)

VPS.R200.P4DP.KIT

Includes

- VPFlowScope probe or VPFlowScope DP
- Rugged explorer case includes pre-cut foam to match your VPFlowScope sensor, display and cables
- Three row LCD display
- 2.000.000 points data logger
- Interface box JB5 + 5m/16,4 ft cable (M12 connector) + DC power adapter supply + RS485 to USB cable
- Compression fitting with Teflon ferrule
- Safety chain
- Calibration report
- English user manual
- VPStudio full version software

Options for start kits

- The start kits are also available without the rugged explorer case

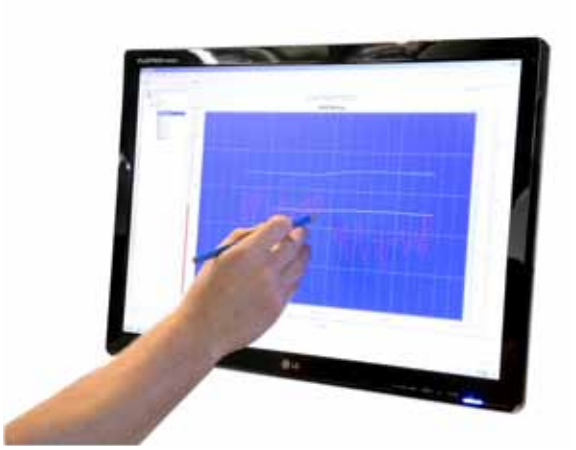
VPS.R150.P400.BOX

VPS.R200.P4DP.BOX

Software

VPStudio software

Correct flow measurements start with entering the correct inner pipe diameter into your flow meter. To program this inner pipe diameter into the flow meter you can easily use the display keypad and enter it or you will need to use this configuration software. For non-display models, the diameter can only be set via the software. VPStudio can be installed on your PC and communicates with the VPFlowScope via your PC's USB port.



VPStudio software can be used for configuring VPInstruments' products, like:

> Setting your pipe diameter
> View real time measurements
> Retrieve logged data sessions
> Setting your logging intervals
> Setting your Modbus and networking parameters
> Spanning the analogue output to 4 ... 20 mA or Pulse

Download via www.vpinstruments.com

VPVision

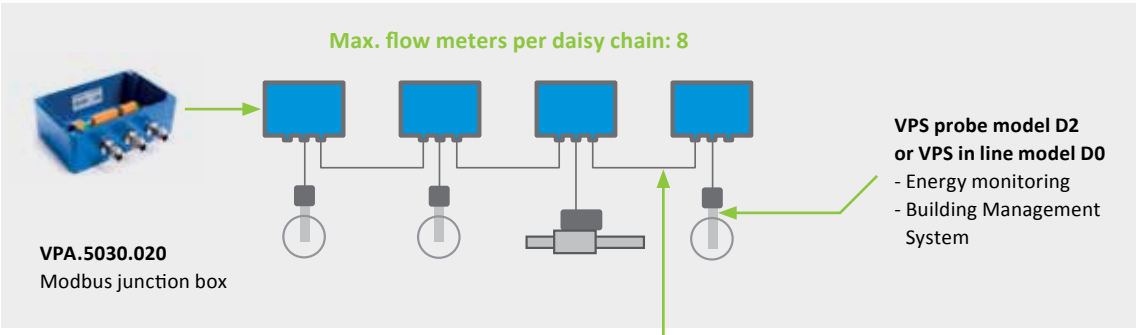
VPVision is the complete real time energy monitoring solution for all utilities within your company. Get a grip on your usage and see the patterns on your supply and demand side. Take factual and well-founded decisions on your costs and investments. Reveal the consumption of all utilities, including 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.

Energy monitoring applications

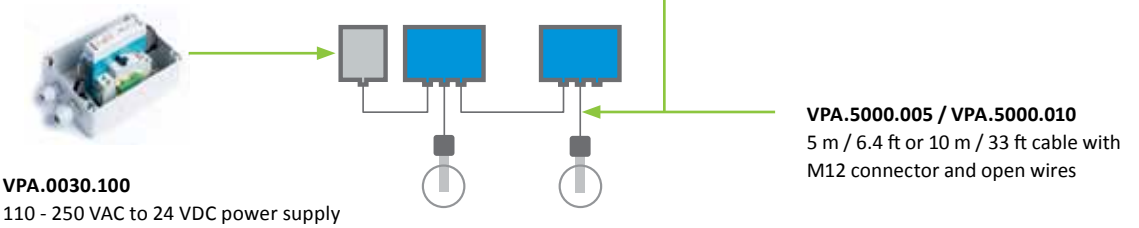
Once you are working with an energy monitoring application, such as VPVision for example, the VPFlowScope can be read out through Modbus RTU. When you look at the image below, you will notice that you can connect up to eight VPFlowscope flow meters to one daisy chain. Following, you will need a junction box for each flow meter in order to connect it properly to the Modbus network.

However, if you would like to connect your flow meter to an existing Modbus network or 4 … 20 / 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 at 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 M)



Power supply module VPA.0030.100



Accessories

JB5 interface kit

The interface kit, which is included in the VPFlowScope start kit, can also be ordered as a separate item. In the interface kit, you will find a split 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 feet cable with M12 5-pin connector

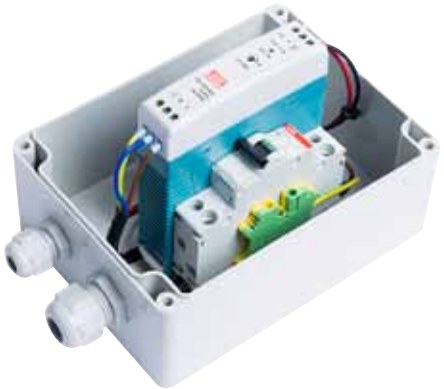
RS485 output: via RS485 to USB converter

Part number

VPA.5001.205: VPFlowScope JB5 interface kit

Power supply module

The VPInstruments power supply module has been developed for the permanent installation of maximum two VPFlowScopes. However, the power supply module can be used to power up any device at 24 VDC up to 1 ampere. The field enclosure of the power supply module is rated IP65, which means it is well protected from dust and splashing water. The module can be wall mounted.



Specifications

Mechanical & Environmental

Construction: IP65 ABS enclosure

Temperature: -20 ~ 40°C | -4 ~ 104°F

Weight: 0.9 kg | 1.98 lbs

Outer dimensions: 160 x 120 x 140 mm | 6.30” x 4.72” x 5.51”

Electrical

Supply input (mains): 110 - 250 VAC, 50 - 60Hz

Supply output: 24 VDC 24 Watt

Part number

VPA.0030.100: power supply module in IP65 enclosure

Integrated safety cable

Insertion probes are installed through a compression fitting. By design, insertion probes can slide in the compression fitting as they can be used in various pipe diameters. This is why a safety cable is required to keep them in place during installation and use.

The VPInstruments safety cable is safe and easy to use. Thanks to the integrated auto brake function, the safety cable is automatically locked after it has been adjusted by the user. It can only be adjusted intentionally, by pushing the brake release which is double secured.

Specifications

Mechanical

Pressure limit: 16 bar

Length: for P400 probes (use special accessory for VPFlowScope DP)

Materials

Cable: stainless steel, coated with red paint

Hook: stainless steel

Compression fitting

Material: stainless steel 316

Ferrule: teflon ferrules

Thread: NPT

Size: 0.5”

Part number

VPA.0003.003: adjustable safety cable for VPFlowScope 400 mm probes

VPA.0003.004: quick link for use of adjustable safety cable with DP probes

Specifications

Aluminum IP65 enclosure

3 high quality cable glands included

Built-in PCB with termination resistor and bias resistors

LED indicator for power

Constructions

Aluminum enclosure, painted

Dimensions

125 x 80 x 57 mm | 4.92 x 3.15 x 2.24 inch

Part number

VPA.5030.020: modbus junction box (IP65)

Modbus junction box

VPInstruments offers a convenient junction box for quick and easy connection between VPFlowScope sensor modules and your Modbus RS485 network. This junction box contains a special PCB, with screw terminals for the Modbus trunk cable and the derivation cable. The built-in LED indicates when the sensor has sufficient power. This feature is very handy to check voltage drops over longer distances.

Get the complete picture

Measure, monitor and manage your compressed air system to reduce your energy consumption. Our flow meters are used to establish baseline air flows and energy use. VPVision warehouses and analyzes flow data. It becomes the cornerstone of an energy management system for any plant seeking to sustain the energy efficiencies they have achieved.

Monitor efficiency

No more assumptions: We offer total solutions for monitoring the efficiency of your compressors.

Measure energy loss

Monitor your pressure loss over the entire air treatment and take timely action.

Get a grip on quality

Monitor dew point to check the performance of your air dryer. Make sure that the air quality meets your standards.

Monitor demand side

Use VPVision to check where, when and how much air is being used, and allocate costs.

easy insight into energy flows™