VP INSTRUMENTS

VPFLOWSCOPE M

Your next step in gas flow measurement

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The Internet of things / Industry 4.0 is rapidly transforming our world. Production becomes smart, intelligent and autonomous. Production lines will make their own decisions and human intervention will only be needed when things go wrong. The VPFlowScope M can be seamlessly integrated into VPVision, which offers a complete monitoring solution for compressed air and other utilities in your plant.

VPFLOWSCOPE M

- Four-in-one flow meter
- For compressed air and technical gases
- Patented VPSensorCartridge®: no more recalibration required
- Optional direction measurement
- Ethernet interface: Industry 4.0/IOT ready
- Ultra compact size and low weight

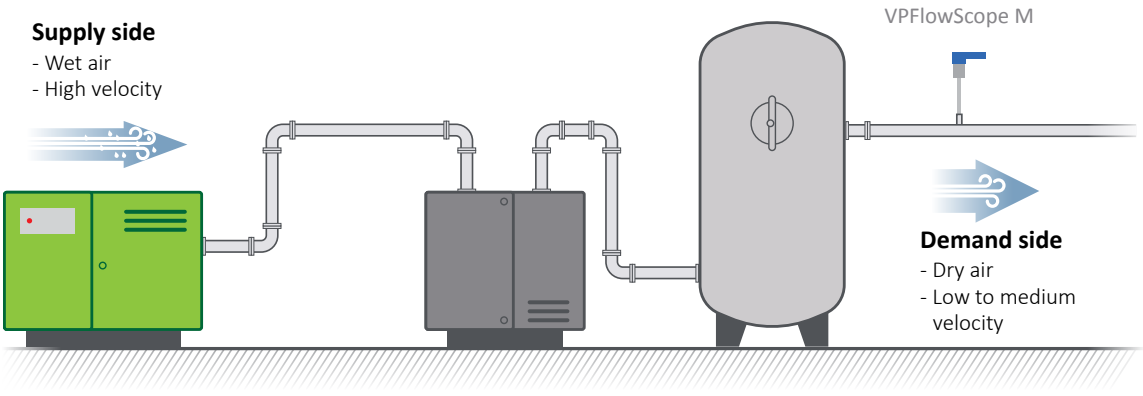
The next step in flow measurement

The VPFlowScope M is a four-in-one insertion flow meter for compressed air and technical gases. It can be installed under pressure and measures flow, pressure, temperature and total flow simultaneously. With the introduction of the VPFlowScope M, recalibration becomes history.

Unlike traditional flow meters, the VPFlowScope M does not require traditional recalibration, where you have to ship the unit back. Instead, the VPFlowScope M consists of a Transmitter and the patented VPSensorCartridge® which reduces recalibration to a simple exchange in the field and lowers your scope 3 emissions as well.

Applications

- Demand side compressed air monitoring
- Air audits
- Submetering of compressed air
- Ring networks (bi-directional)
- Cost allocation
- Industrial gas monitoring (air, nitrogen, carbon dioxide, argon and other dry, noncorrosive industrial gases)
- Leak detection

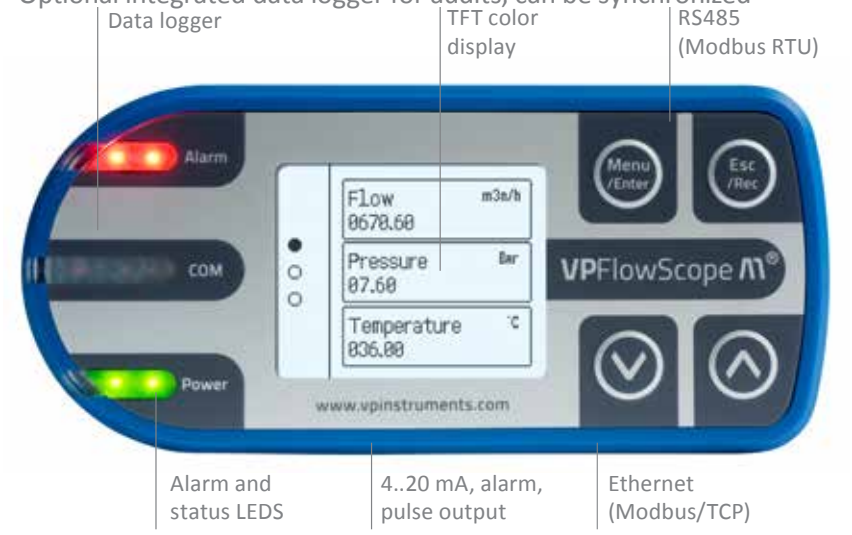


Industry 4.0 ready

With its standard internal Ethernet interface, the VPFlowScope M will connect directly to any network and will form seamlessly one of the cornerstones of any real-time energy management platform. But it is also compatible with the traditional world, thanks to the standard 4..20 mA signals and RS485 (Modbus RTU) interface.

Features and benefits

- Ethernet (Modbus/ TCP)
- RS485 (Modbus RTU)
- 4..20 mA linearized, alarm or pulse output
- USB interface for configuration and downloading of data log files
- Optional display with real-time information with possibility to visualize 1, 2 or 3 parameters simultaneously
- Seamless integration into VPVision monitoring platform
- Optional integrated data logger for audits, can be synchronized



One Transmitter. Many possibilities!

Thanks to the versatile IO, the VPFlowScope M Transmitter can be connected to both the traditional 4..20 mA, RS485 (Modbus RTU), and modern Ethernet based systems. The Transmitter is available in three versions.

TRANSMITTER MODEL	ETHERNET	RS485	4 .. 20 ALARM PULSE	DISPLAY	DATA LOGGER	APPLICATION
VPM.T001.D000	•	•	•			VPVision, BMS, remote monitoring
VPM.T001.D010	•	•	•	•		Remote monitoring and local read-out
VPM.T001.D011	•	•	•	•	•	Audits

No more recalibration

With the patented VPSensorCartridge®, traditional recalibration is something of the past. From now on, you simply exchange the VPSensorCartridge® and continue your measurements. No more waiting, no more downtime.

Your benefits

- Near zero down-time
- Less customs/on-site paperwork
- Less transport costs
- Consistent, reliable measurements

Applications

- Leakage management
- Demand and supply side flow measurements
- General purpose flow measurements
- Audits
- Internal billing and cost allocation
- Ring networks
- Multi plant compressor installations
- Shared compressor facilities

VPM.R150.PXXX flow range table

The VPFlowScope M is available in 2 sizes (P350 and P220) and is extremely flexible to use. The following table shows you the minimum and maximum flow for various pipe diameters between 1 and 16 inch. Please note that flow ranges apply only to compressed air and nitrogen. The ranges may vary when used with other technical gases. Contact us for more details.

SCHEDULE 40 STANDARD SEAMLESS CARBON STEEL PIPE

Size (inch)	DN	P220	P350	ID (inch)	ID (mm)	Min flow (scfm)	Max flow (scfm)	Min flow (m^3_n/hr)	Max flow (m^3_n/hr)
1	25			1.0	26.6	1	177	1	301
1.25	32			1.4	34.5	1	298	2	506
1.5	40			1.6	40.9	1	417	2	709
2	50			2.1	52.5	2	688	4	1,169
2.5	65			2.5	62.7	3	982	6	1,668
3	80			3.1	77.9	5	1,516	9	2,576
4	100			4.0	102.3	9	2,61	15	4,435
6	150			6.1	154.1	20	5,924	34	10,065
8	200			8.0	202.7	34	10,259	58	17,429
10	250			10.2	259.1	56	16,756	95	28,468
12	300			11.9	303.2	77	22,953	130	38,995
16	400			15.0	381.0	121	36,237	205	61,565

SCHEDULE 10 STANDARD SEAMLESS CARBON STEEL PIPE

ID (inch)	ID (mm)	Min flow (scfm)	Max flow (scfm)	Min flow (m^3_n/hr)	Max flow (m^3_n/hr)
1.1	27.9	1	194	1	329
1.4	36.4	1	330	2	561
1.7	42.7	2	456	3	774
2.2	54.8	2	749	4	1,273
2.6	66.9	4	1,118	6	1,9
3.3	82.8	6	1,712	10	2,908
4.3	108.2	10	2,923	17	4,966
6.4	161.5	22	6,508	37	11,057
8.3	211.6	37	11,173	63	18,982
10.4	264.7	58	17,487	99	29,709
12.4	314.7	82	24,724	140	42,004
15.6	396.8	131	39,315	223	66,794

Measure more in less time

VPStudio takes flow measurement to the next level. Install and configure your flow meter in less time, thanks to the intuitive interface and the advanced data processing. Simply connect your flow meter and get the job done.

You can use VPStudio for configuration, read-out (real-time) and processing of data log sessions.

Features and benefits

- Fully intuitive interface
- Auto device detection
- For VPFlowScope M
- Processing of data sessions
- CSV and XLSX data export
- Live graph of flow, pressure, and temperature

Auditor Start Kit

Begin measuring energy savings immediately with a VPFlowScope Start Kit. The Start Kit contains all items needed to perform air audits or permanent measurements.
You can install the unit right out of the box and connect it to your laptop, company network or building management system. The time on all units can be synchronized, ensuring the accuracy, reliability, and consistency of your measurements.

VPFlowScope M Start Kit
model - VPM.T001.D011.KIT

- VPSensorCartridge® (VPM.R150.P351) including bi-directional flow sensitivity
- VPFlowScope M Transmitter (VPM.T001.D011) with display and integrated data logger
- Safety cable for VPFlowScope M with integrated compression fitting
- Mini USB cable
- Power supply adapter 12V with 5 pin M12 connector
- Ethernet cable 5m/16.4 ft. with 4 pin M12 on one side and RJ45 connector on the other side
- Rugged explorer case with pre-cut foam
- ISO Calibration report
- VPStudio software, free available at www.vpinstruments.com

For comprehensive measurement capabilities, add the VPSensorCartridge P220 for pipe diameters of 1" up to 3" to your Start Kit.

Order codes and accessories

Models and start kit

Our VPFlowScope M products will be supplied including compression fitting with integrated safety cable, 5 m. cable for power, RS485, 4..20mA and mini USB cable.

DESCRIPTION			ORDER CODE
		**VPFlowScope M Auditor Start Kit**	VPM.T001.D011.KIT
350 length, bi-directional			
	Display + data logger	**VPFlowScope M D011 with bi-directional 350mm cartridge + cable** Display + data logger transmitter with Modbus (RS485), Ethernet (Modbus/TCP), 4..20mA/Pulse/Alarm output, bi-directional VPSensorCartridge.	VPM.R150.P351.D011
	Display	**VPFlowScope M D010 with bi-directional 350mm cartridge + cable** Display transmitter with Modbus (RS485), Ethernet (Modbus/TCP), 4..20mA/Pulse/Alarm output, bi-directional VPSensorCartridge.	VPM.R150.P351.D010
	No Display	**VPFlowScope M D000 with bi-directional 350mm cartridge + cable** No Display transmitter with Modbus (RS485), Ethernet (Modbus/TCP), 4..20mA/Pulse/Alarm output, bi-directional VPSensorCartridge.	VPM.R150.P351.D000
350 length, uni-directional			
	Display + data logger	**VPFlowScope M D011 with uni-directional 350mm cartidge + cable** Display + data logger transmitter with Modbus (RS485), Ethernet (Modbus/TCP), 4..20mA/Pulse/Alarm output, uni-directional VPSensorCartridge.	VPM.R150.P350.D011
	Display	**VPFlowScope M D010 with uni-directional 350mm cartridge + cable** Display transmitter with Modbus (RS485), Ethernet (Modbus/TCP), 4..20mA/Pulse/Alarm output, uni-directional VPSensorCartridge.	VPM.R150.P350.D010
	No Display	**VPFlowScope M D000 with uni-directional 350mm cartridge + cable** No display transmitter with Modbus (RS485), Ethernet (Modbus/TCP), 4..20mA/Pulse/Alarm output, uni-directional VPSensorCartridge.	VPM.R150.P350.D000
220 length, bi-directional			
	Display + data logger	**VPFlowScope M D011 with bi-directional 220mm cartridge + cable** Display + data logger transmitter with Modbus (RS485), Ethernet (Modbus/TCP), 4..20mA/Pulse/Alarm output, bi-directional VPSensorCartridge.	VPM.R150.P221.D011
	Display	**VPFlowScope M D010 with bi-directional 220mm cartridge + cable** Display transmitter with Modbus (RS485), Ethernet (Modbus/TCP), 4..20mA/Pulse/Alarm output, bi-directional VPSensorCartridge.	VPM.R150.P221.D010
	No Display	**VPFlowScope M D000 with bi-directional 220mm cartridge + cable** No display transmitter with Modbus (RS485), Ethernet (Modbus/TCP), 4..20mA/Pulse/Alarm output, bi-directional VPSensorCartridge.	VPM.R150.P221.D000
220 length, uni-directional			
	Display + data logger	**VPFlowScope M D011 with uni-directional 220mm cartridge + cable** Display + data logger transmitter with Modbus (RS485), Ethernet (Modbus/TCP), 4..20mA/Pulse/Alarm output, uni-directional VPSensorCartridge.	VPM.R150.P220.D011
	Display	**VPFlowScope M D010 with uni-directional 220mm cartridge + cable** Display transmitter with Modbus (RS485), Ethernet (Modbus/TCP), 4..20mA/Pulse/Alarm output, uni-directional VPSensorCartridge.	VPM.R150.P220.D010
	No Display	**VPFlowScope M D000 with uni-directional 220mm cartridge + cable** No display transmitter with Modbus (RS485), Ethernet (Modbus/TCP), 4..20mA/Pulse/Alarm output, uni-directional VPSensorCartridge.	VPM.R150.P220.D000

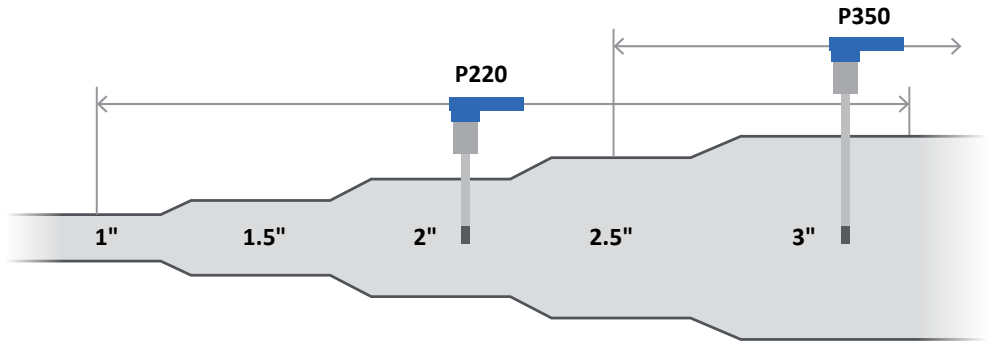
Accessories and spare parts

Our VPFlowScope M products will be supplied including compression fitting with integrated safety cable, 5 m. cable for power, RS485, 4..20mA and mini USB cable.

DESCRIPTION		ORDER CODE
	**VPFlowScope M Transmitter with display and datalogger** Display + data logger transmitter with Modbus (RS485), Ethernet (Modbus/TCP), 4..20mA/Pulse/Alarm output. Without compression fitting with integrated safety cable.	VPM.T001.D011
	VPFlowScope M Transmitter with display Display transmitter with Modbus (RS485), Ethernet (Modbus/TCP), 4..20mA/Pulse/Alarm output. Without compression fitting with integrated safety cable.	VPM.T001.D010
	**VPFlowScope M Transmitter without display** No display transmitter with Modbus (RS485), Ethernet (Modbus/TCP), 4..20mA/Pulse/Alarm output. Without compression fitting with integrated safety cable.	VPM.T001.D000
	**Cartridge bi-directional for flow, pressure, temperature and total flow** Length 350mm / 13.7 inch, pressure range 0..10 Bar(g). Incl. 10-point calibration certificate.	VPM.R150.P351.PN10
	Cartridge uni-directional for flow, pressure, temperature and total flow Length 350mm / 13.7 inch, pressure range 0..10 Bar(g). Incl. 10-point calibration certificate.	VPM.R150.P350.PN10
	Cartridge bi-directional for flow, pressure, temperature and total flow Length 220mm / 13.7 inch, pressure range -1..16 Bar(g). Incl. compression fitting with safety lock and 10-point calibration certificate.	VPM.R150.P221.PN16
	Cartridge uni-directional for flow, pressure, temperature and total flow Length 220mm / 13.7 inch, pressure range -1..16 Bar(g). Incl. compression fitting with safety lock and 10-point calibration certificate.	VPM.R150.P220.PN16
	**Cable, 5m / 16.4 ft. with M12 5pin connector on one side** The other side is open wires (0V, 24V, Modbus A, Modbus B and Analog out). For permanent connection.	VPA.5000.005
	Cable, 10m / 32.9 ft. with M12 5pin connector on one side The other side is open wires (0V, 24V, Modbus A, Modbus B and Analog out). For permanent connection.	VPA.5000.010
	**Ethernet cable 5m/16.4 ft.** With 4 pin M12 on one side and RJ45 connector on other side.	VPA.5004.0005
	**Power supple adapter 12V** 90 .. 240 VAC to12V DC, with 5 pin M12 connector	VPA.0000.200

Available in two sizes

The VPFlowScope M is available in two sizes, the P350 and P220, designed to accommodate different pipe diameters. The P220 is ideal for pipes ranging from 1” to 3” in diameter, while the P350 supports a broader range, up to 18”*. Both sizes maintain high accuracy and reliability, making the VPFlowScope M a versatile solution for compressed air and technical gas flow measurements.



* The P350 is suited for larger diameters, though this may impact accuracy.

"The VPFlowScope M thermal mass flow meter is the easiest unit to install that I am aware of. It has a great cable restraint, a rotating head to see the display from any angle, and a configurable keypad."

Tim Dugan, Compression Engineering Corporation

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 combination downstream a refrigerant dryer, investigation if a machine can use less air at a lower pressure.

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 VPFlowScope
bi-directional flow measurement option.

Proprietary safety cable

Safety first when 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.

Specifications – VPSensorCartridge®

FLOW SENSOR	
Measuring principle	Thermabridge™ Thermal Mass Flow sensor
Flow range	0 (0.5) .. 150 m_n/sec | 0 .. 500 sfps
Bi-directional flow	Optional, see product order codes
Accuracy	2% of reading under calibration conditions; Please refer to the user manual for details. Recommended pipe diameter: 1 .. 2.5” (VPSensorCartridge P220) and 1 .. 20” (VPSensorCartridge P350)
Reference conditions	0 °C, 1013.25 mbar | 32 °F, 14.65 psi
Gases	Compressed air, nitrogen and inert, non condensing gases
Gas temperature range	0 .. +60 °C | 0 .. +140 °F

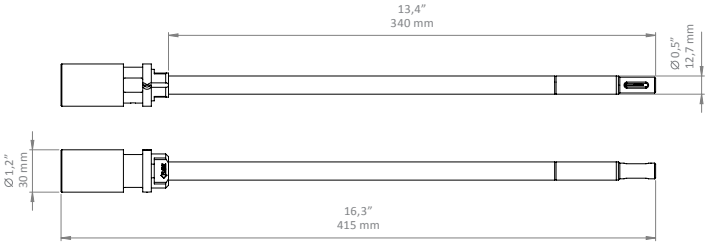
PRESSURE SENSOR	
Pressure sensor range	0 .. 10 bar | 0 .. 145 psi gage (VPSensorCartridge P350), 0 .. 16 bar | 0 .. 250 psi gage (VPSensorCartridge P220)
Accuracy	+/- 1% FSS (total error band) Temperature compensated

TEMPERATURE SENSOR	
Temperature sensor range	0 .. +60 °C | 32 .. +140 °F
Accuracy	> 10 m/sec: +/- 1 °C | 1.8 °F < 10 m/sec: + 5 °C | 9 °F

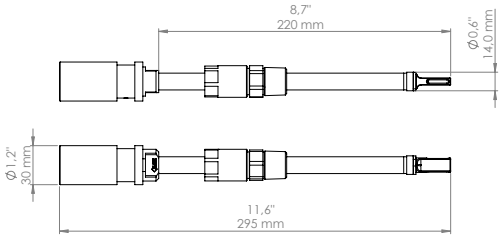
MECHANICAL & ENVIRONMENTAL	
Probe lengths	340 mm | 13.4", 220 mm | 8.7”
Weight	200 grams | 7.05 ounces (VPSensorCartridge P350), 246 grams | 8.68 ounces (VPSensorCartridge P220 including safety system)
Process connection	Compression fitting, 1/2" NPT, Tapered (VPSensorCartridge P350), O-ring sealed fitting, NBR (VPSensorCartridge P220)
Pressure rating	PN10 (VPSensorCartridge P350), PN16 (VPSensorCartridge P220)
Protection grade	IP65 | NEMA 4 when mated to Transmitter
Ambient temperature range	0 .. +60 °C | 32 .. 140 °F. Avoid direct sunlight or radiant heat
Wetted materials	Anodized Aluminum, Stainless steel 316, Glass, Epoxy
Corrosion resistance	Highly corrosive or acid environments should be avoided
ball valve	For installation of the VPSensorCartridge P220 a full bore DN15 ball valve is required. Prior to installation, please verify that the inner diameter of the ball valve is at least 15.0 mm | 0.60”. Larger ball valves can be used with a reducer.

ELECTRICAL	
Connection type	VPSensorCartridge® proprietary
Power consumption	See Transmitter specifications for combined power consumption
CE	See Transmitter
UL	See Transmitter

VPSensorCartridge P350



VPSensorCartridge P220



Specifications – Transmitter

SENSOR INTERFACE	
VPSensorCartridge®	Proprietary interface, rotational 360 degrees

DISPLAY	
Display type (D010 and D011)	1.8” TFT with auto power save (option)
LED status (All models)	LED indicators on all models for power, communication and alarm

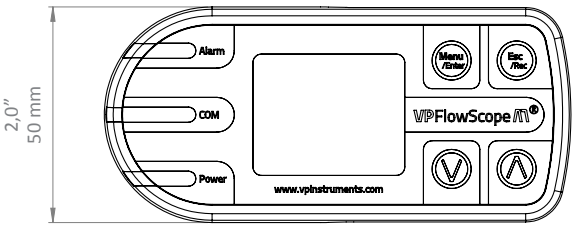
DATA LOGGER (D011 ONLY)	
Memory	One-year circular memory, 1 x per second logging interval for all parameters
Logging mode	Cyclic

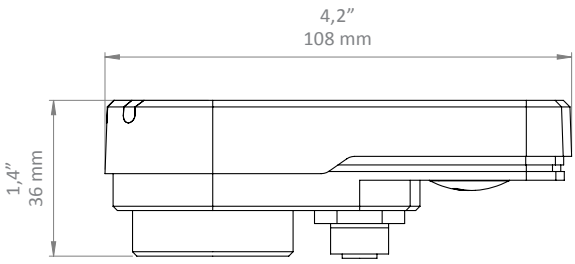
OUPUTS	
RS485	Modbus RTU
Analog / digital	Configurable: 4 .. 20mA, pulse, alarm
USB	Mini USB, behind sealed cap (for configuration)
Ethernet	Modbus / TCP

MECHANICAL & ENVIRONMENTAL	
Dimensions	50 x 108 x 36 mm | 1.97 x 4.25 x 1.42 inch
Weight	220 grams | 7.76 ounces including locking ring
Material	Aluminum, anodized body with polycarbonate cover
O-ring seals	NBR
Protection grade	IP65 | NEMA 4 when mated to VPSensorCartridge® and USB cap tightened

ELECTRICAL	
Power supply	14 .. 24 VDC +10% CLASS 2 (UL)
Power / RS485 / 4 .. 20 mA	M12, 5 pin
Ethernet	M12, 4 pin d-coded
Power consumption	1 Watt (no flow) 3.5 Watt (full flow) +/- 10% Varies per VPSensorCartridge® type and Transmitter type
CE	EN 60950-1, EN 61326-1, EN 61000-3-2, EN 61000-3-3, EN 61326-1
UL	UL 508

(1) 12 Volt should be available at the input terminal under all flow conditions and all environmental conditions. Cable resistance and power supply impedance, which are temperature dependent, will cause permanent and transient voltage drops. These voltage drops have to be taken into account when designing and implementing the electrical installation. The VPFlowScope M continuously monitors available input voltage and will automatically turn into power save mode when the supply voltage drops below 11 Volt. For startup, a minimum voltage of 11.9 volt is required. For maximum power reliability under all circumstances, we recommend to use 24 VDC.



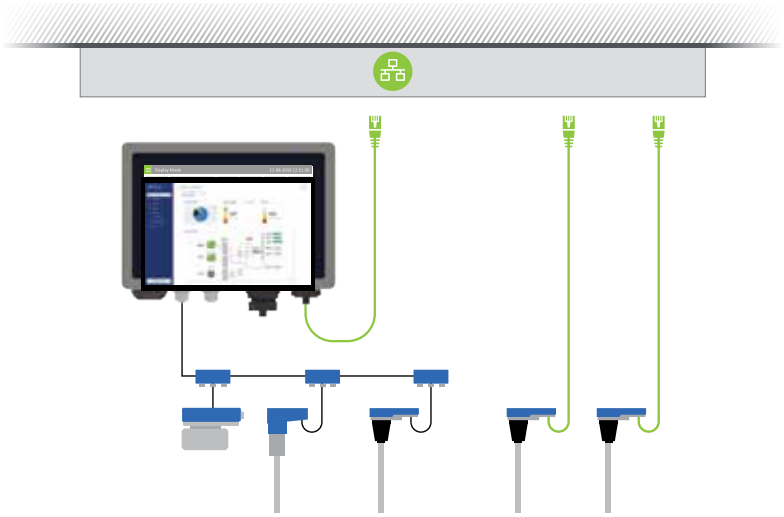


Ease of connection

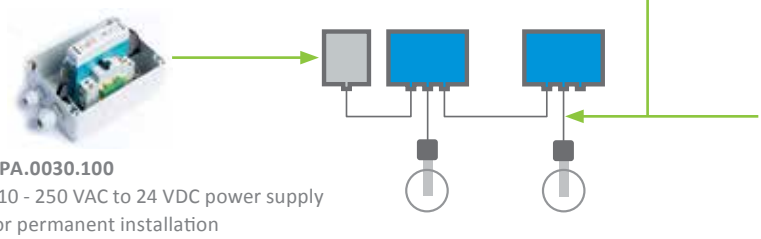
The VPFlowScope offers an RS485 (Modbus RTU) interface, ideal for energy monitoring systems like VPVision. You can connect up to eight VPFlowScope flow meters in a streamlined daisy chain. For optimal integration, we recommend using a junction box for each flow meter.

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 at your convenience. For additional installation guidance, refer to the user manual.

VPVision or other Energy Management System/Modbus TCP converter



Power supply module VPA.0030.100



VPA.0030.100
110 - 250 VAC to 24 VDC power supply for permanent installation

VPA.5000.005 / VPA.5000.010
5 m / 6.4 ft or 10 m / 33 ft cable with M12 connector and open wires

VPVision and energy monitoring applications

VPVision

Accessible from any platform and via cloud, VPVision empowers your team to boost energy awareness and foster company-wide engagement in achieving sustainability goals. With VPVision, you can prevent unnecessary production losses while driving energy savings and operational excellence. Combine VPVision with VPInstruments sensors for a powerful real-time energy monitoring solution tailored to optimize your plant's efficiency. Monitor energy consumption, detect leaks, and maximize uptime (OEE) with precision.

VPVision provides actionable insights into the supply and demand of all your utilities, including compressed air, technical gases, steam, vacuum, natural gas, electricity, and more. By visualizing real-time data and identifying patterns, you can make informed decisions to control costs, allocate resources effectively, and plan smarter investments.

Early warnings about high compressor status, excessive consumption, temperatures, pressure drops, or dew point events ensure you can address potential issues before they cause unplanned downtime. Contact us today for more information.

VPFlowScope family

Other VPFlowScope products:

VPFlowScope Probe

The VPFlowScope Probe 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 DP

The patented VPFlowScope DP enables you to take measurements in the discharge pipe of a compressor under 100% saturated conditions.

VPFlowScope In-line

The VPFlowScope In-line is the ideal flow meter for high accuracy 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.

energy insights trusted by professionals™

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