POWER METERS

Easy insight into power consumption

Electricity: an expensive source of power

Monitoring the energy usage of a factory is a powerful tool and key to maximizing energy savings. Energy consumption data provides insight for accurate cost allocation, and in identifying areas of improvement to lower energy consumption and to increase performance. Implement complete power metering solutions to keep a close eye on all your energy consumers, circuit by circuit, like compressed air systems, vacuum systems, HVAC systems, cooling water stations, lighting and more.

Measuring power consumption with VPInstruments

VPInstruments offers two types of meters to measure power consumption: the VPInstruments 3 Phase Power Meter that measures true power and the VPLog-i that measures current consumption. Our solution cover a wide range of power meter applications in the industry.

Applications

> Power consumption of large consumers (i.e. compressors, dryers, pumps, water chillers)
> Submetering
> Cost allocation
> Baseline condition monitoring
> Energy management
> Efficiency calculations (i.e. compressor electrical usage vs output)

3 Phase Power Meter vs. VPLog-i

Both the 3 Phase Power Meter and the VPLog-i are power meters for a wide range of applications. The 3 Phase Power Meter measures both voltage and current for each phase, thus providing a high-accuracy measurement of the real power consumption. We recommend the 3 Phase Power Meter for permanent installations. For short-term measurements like air audits or less critical applications, we recommend using the VPLog-i. The VPLog-i is easy and quick to install. Just snap it around a power cable to start measuring AC current. The VPLog-i can also be used for permanent installation.

Short overview

FEATURES	3 PHASE POWER METER	VPLOG-I	VPLOG-I-R
True power	•		
Ampere only		•	•
Single Phase	•	•	•
Three Phase	•		
Wide range	•		•
RS485 (Modbus RTU)	•		•
4 … 20 mA, loop powered		•	
Pulse output		•	
Audit tool (portable)		•	•
Permanent installation	•	•	•

3 Phase Power Meter

With the VPInstruments 3 Phase Power Meter you can measure the voltage and current of all three phases. It provides power, voltage, current, cos(phi) and many more electrical parameters via the RS485 (Modbus RTU) interface. The Modbus interface allows the meter to be easily connected to a monitoring system. And when combined with one or more flow meters, you can monitor compressor efficiency in real-time.


> True RMS power measurement of single-phase or three-phase systems
> One size fits all: one model for 100 to 600 Vac, 50 / 60Hz
> RS485 (Modbus RTU) output
> Wye or delta in one model
> For permanent installation
> 0.3333 VAC input for current transformers (CT)
> LED indicator for CT status and serial communication
> Configurable using Modbus

Specifications

POWER METER	
Accuracy	± 0.5% reading
Power supply	Power from measured voltage < 2 W
Voltage input	100 .. 600 (L to N), 100 .. 600 (L to L)
Current input	5 .. 1500 Amps per phase
Output	RS485 (Modbus RTU), 2 wire
Size	153 x 85 x 38 mm | 6.02 x 3.35 x 1.50"
Weight	307 .. 314 g | 10.8 .. 11.1 oz
Environment	Indoor use
Operational temperature	-30 .. 55 °C | -22 .. 131 °F
Operational humidity	Non-condensing, 5 to 90% relative humidity
Operating frequencies	50 / 60 Hz

Order codes

Selection is easy due to the wide voltage range of the 3 Phase Power Meter. The same meter can be used for all nominal voltages between 100 Vac and 600 Vac, for delta and wye configurations at 50 Hz or 60 Hz. In addition, you will need to specify a current transformer (CT) for each phase. For delta systems you may only need two CTs. To determine your size of current transformer, check the maximum amperage and be sure to account for the input power factor (cos(phi)), minimum input voltage and other factors. The 3 Phase Power Meter is compatible with VPInstruments' current transformers or any other, that has a 0.3333 Vac output.
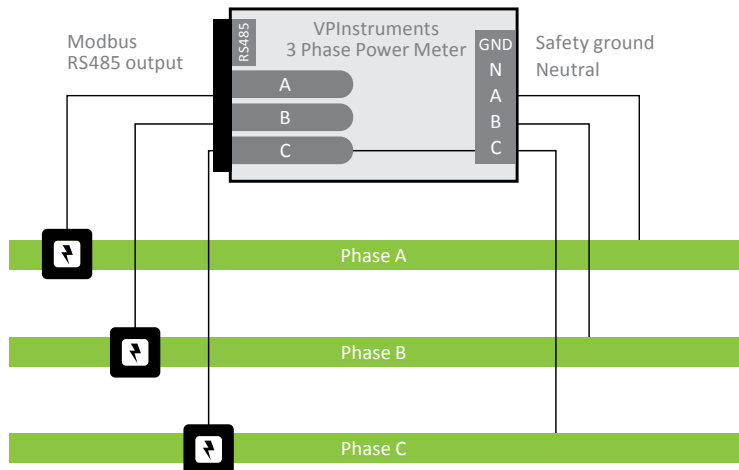

PRODUCT	ORDER CODE	DESCRIPTION	DETAILS
	VPA.8000.WRMB	3 Phase Power Meter - Wide Range Modbus	100-600 V, Delta, Wye, 50/60Hz
	VPA.8075.0100	Current Transformer 100A, 0.3333V output	Size: 19.1 mm | 0.75"
	VPA.8125.0200	Current Transformer 200A, 0.3333V output	Size: 31.8 mm | 1.25"
	VPA.8125.0400	Current Transformer 400A, 0.3333V output	Size: 31.8 mm | 1.25"
	VPA.8200.0600	Current Transformer 600A, 0.3333V output	Size: 50.8 mm | 2"
	VPA.8200.1000	Current Transformer 1000A, 0.3333V output	Size: 50.8 mm | 2"
	VPA.8200.1500	Current Transformer 1500A, 0.3333V output	Size: 50.8 mm | 2"

Power measurement examples

Efficiency calculations

Monitor the efficiency of a machine by comparing input and output. For instance, the efficiency of a compressor can be measured by combining a power meter with a flow meter. By monitoring this KPI continuously, you will be able to see changes in efficiency due to e.g. internal mechanical wear, a change of inlet conditions, fouling, a malfunctioning drain, and other maintenance issues.
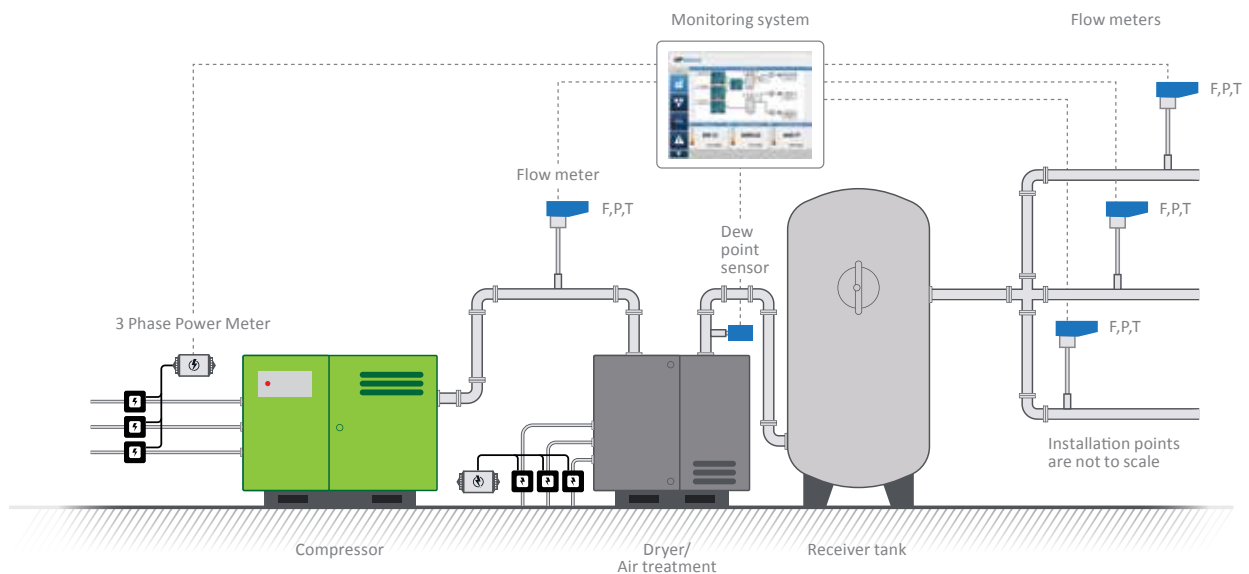
Efficiency

Flow meter
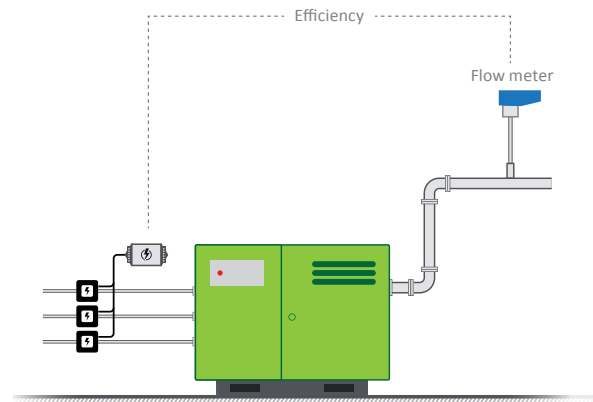
Compressor efficiency is indicated by a typical Key Performance Indicator (KPI) with units of kW/m3n/min or kW/100 SCFM.

Baseline condition monitoring and maintenance

Condition monitoring is an important tool in predictive maintenance. Changes in your power consumption, like an increase, can indicate wear of a machine or other potential maintenance issues. Even more, monitoring allows improving the condition of entire systems, e.g. by improving your compressor controls based upon insights of the load/unload/standby hours of your compressors.

Energy management

Energy costs are rising and there is a greater emphasis on energy efficiency. Lowering your energy consumption starts with understanding what drives your electrical bills. What are your main energy users and what measures have the biggest impact? Metering combined with other measurement data in an Energy Management System, like VPVision, allows facility managers to gather data and make informed decisions about energy use.

Monitoring system

Flow meters

F,P,T

Flow meter

F,P,T

Dew point sensor

F,P,T

3 Phase Power Meter

F,P,T

Installation points are not to scale

Compressor

Dryer/ Air treatment

Receiver tank

Submetering

Submetering gives the ability to monitor departments, processes, or individual pieces of equipment. You can collect actual, real-time energy consumption data, rather than estimating.

It provides the granular in-depth information needed to make the right optimization decisions and it allows for cost allocation.

"Power measurements combined with flow measurements, showed that the efficiency of our compressors was lower than thought, ranging between 7 to 8 kWh/m^3/min. As an efficiency of 6,18 kWh/m3/min is possible, the savings potential is 15%!"

VPLog-i

The VPLog-i is a Rogowski type coil that measures AC currents (true-RMS on a single-phase power cable). The VPLog-i is very easy to use; just wrap around one of the three-phase power cables and close the snap fitting. The LED provides feedback. The VPLog-i offers the best solution for power measurements in audits. The sensor can also be used for permanent installation. In this case, cos(phi) has to be estimated, and voltage needs to be measured once. These parameters are used to calculate the estimated power consumption. In VPVision, you simply enter these numbers in the power meter configuration wizard.
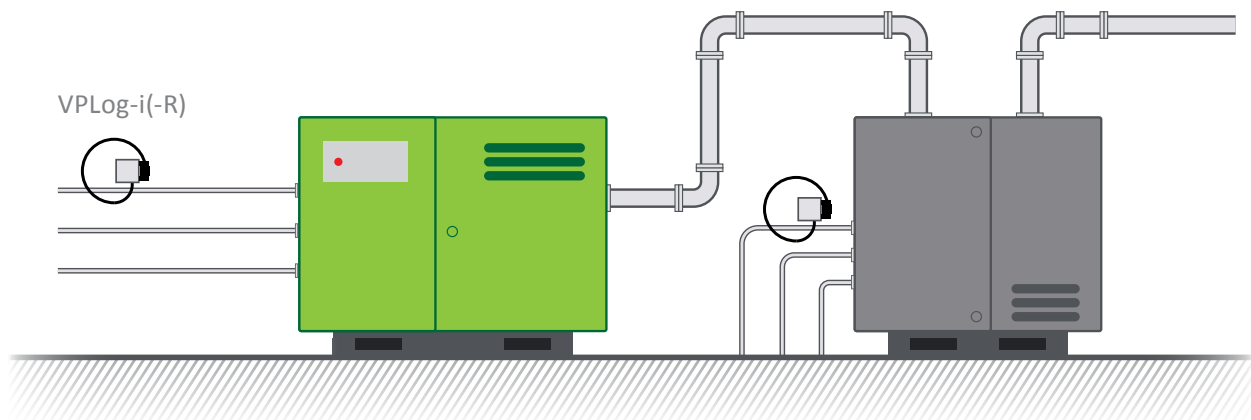
The VPLog-i is available in two models, where the main difference is the output signal. The VPLog-i offers a 4..20mA and pulse output. The VPLog-i-R features an RS485 (Modbus RTU) output.

Product highlights

> Very easy and quick installation
> Plug and play
> For short-term and permanent measurements
> One size fits all VPLog-i-R model with RS485 interface

VPLog-i-R Configuration Software

Configure the Modbus parameters of your VPLog-i-R with our easy to use VPLog-i-R Configuration software. This software is free to download from www.vpinstruments.com. Just connect your VPLog-i-R to your PC via VPInstruments' JB5 Interface Kit and VPLog-i-R connector, and configure the Modbus address, parity, baud rate and stop-bits of your VPLog-i-R.

VPLog-i(-R)

Specifications VPLog-i

	VPLOG-I	VPLOG-I-R
Accuracy	± 1% full scale	
Power supply	6 .. 30 Vdc	7 .. 28 Vdc
Power consumption	4 .. 20 mA	11 mA
Current input	5 models available from 100 to 1500 Amps	100 .. 1600 A-rms. Insulated cables only
Outputs	4 .. 20 mA: proportional to the measured input. Pulse: pulse frequency is proportional to the current measured.	RS485 (Modbus RTU). Output of true RMS current, frequency and current at base frequency.
LED	Feedback on power connection	Feedback on Modbus communication
Pulse rate	0 .. 2.66 Hz	N.A.
Coil diameter	7 mm	0.28"	6 mm	0.24"
Coil bend radius	35 mm	1.38"	30 mm	1.18"
Housing W x H x D	26.7 x 41.4 x 13.6 mm	1.1 x 1.6 x 0.6"	
Operation temperature range	-20 .. 70 °C	-4 .. 158 °F	
Operational relative humidity	Max 95%, non-condensing	
Coil length	170 mm	6.7", 250 mm	9.8"	250 mm	9.8"
Operating frequencies	50 / 60 Hz	50 Hz

The VPLog-i and VPLog-i-R cannot be combined with the 3 Phase Power Meter.

Order codes VPLog-i

MODEL	CODE	CURRENT RMS	OUTPUT	COIL LENGTH
VPLog-i	VPA.8000.2100	Max 100 A	4 .. 20mA and pulse	170 mm | 6.69"
	VPA.8000.2200	Max 200 A	4 .. 20mA and pulse	170 mm | 6.69"
	VPA.8000.2400	Max 400 A	4 .. 20mA and pulse	170 mm | 6.69"
	VPA.8000.2800	Max 800 A	4 .. 20mA and pulse	250 mm | 9.84"
	VPA.8000.21K5	Max 1500 A	4 .. 20mA and pulse	250 mm | 9.84"
VPLog-i-R	VPA.8000.21K6	100 .. 1600A	RS485 (Modbus RTU)	250 mm | 9.84"

Accessories VPLog-i-R

	CODE	
	VPA.0000.300	VPLog-i-R Connector for connecting your VPLog-i-R to the JB5 Interface Kit
	VPA.5001.205	JB5 interface KIT for programming your VPLog-i-R. Interface box JB5 + 5m/16,4 ft cable (M12 connector) + 12V power supply + RS485 to USB cable.

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.

easy insight into energy flows™

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