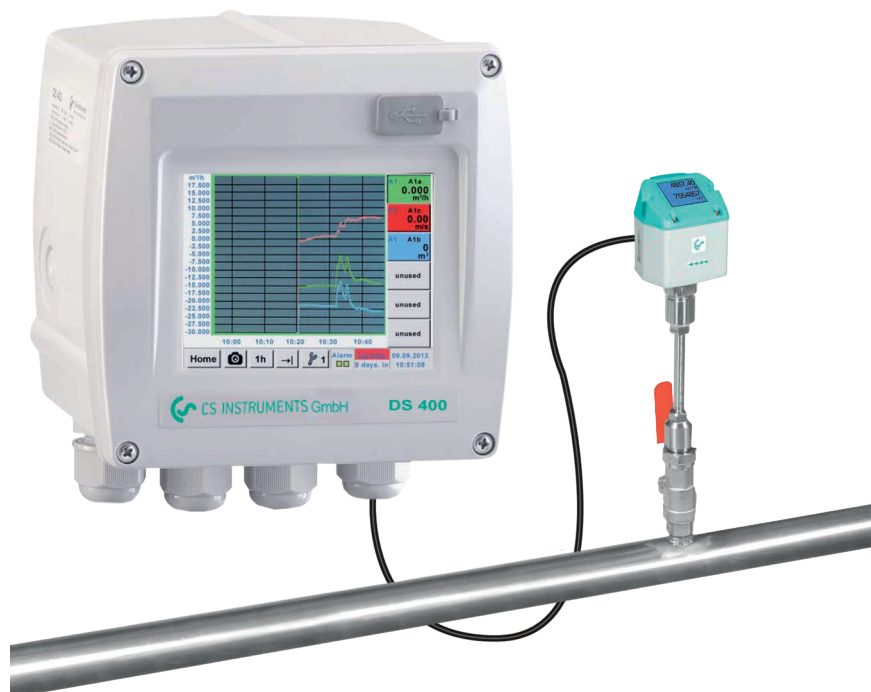


Measure compressed air consumption and save energy

Compressed air is one of the most expensive forms of energy at all. An intelligent use of compressed air holds enormous savings potential.

Therefore a consumption measurement that can measure and record the actual compressed air consumption and even the smallest leaks quickly and reliably is very helpful.



When talking about operating costs in compressed air systems, one actually means the energy costs, because the electricity costs make up about 70-80% of the total cost of a compressed air system.

Depending on the size of the plant this means considerable operating costs. Even in smaller plants this may quickly add up to 10,000 to 20,000 € per year. This is an amount which can be considerably reduced – even in case of well operated and maintained plants.

In case of a three shift operation with 200 kW compressor performance a bad compressed air distribution can create redundant energy costs of more than 50,000 € per year.

This mainly relates to the detection of leaks and the correct design of the compressed air lines to minimize the pressure losses.

Energy resources like electricity, water or gas are usually monitored and therefore the costs are transparent.

Contrary to compressed air, a water leak is usually found quickly due to the visibility of the leak and therefore is fixed immediately. Leakages in the compressed air network „blow out“ unnoticed, even on weekends and during production stops.

Also during that time compressors are running continuously in order to establish a constant pressure within the system. In case of compressed air systems which have grown during the years the leakage rate can be between 25 and 35 per cent.

They are the most industrious consumers working 365 days a year.

Not considered in these considerations are the costs of producing clean and dry compressed air. Refrigeration and desiccant dryers dry the air with significant operating costs, which then „blow out“ useless through leaks.

At constantly rising energy costs these potential energy savings have to be implemented in order to stay competitive within the market. Only if the consumption of single machines or plants becomes known and transparent for all it is possible to make use of possible savings.

However, often there is no knowledge about the leak ratio. In the following we show you how leakage rate can be determined easily in your company.

Formerly the simple but inaccurate container method was applied very often.

A simplified determination of the leakages is possible by means of the emptying of the tank.

To carry out this measurement you just need a clock and a manometer.

Furthermore you should know the storage volume of the tank as well as of the compressed air system.

For measurement first the tank and the compressed air system are set to the upper cut-out pressure value. All compressed air consumers have to be switched off.

Then the compressor is switched off and there will be no compressed air feeding into the system.

Now the time T is measured which passes by until there is a pressure drop of 1 to 2 bar due to the leakages.

The pressure drop between which the measurement is taking place can be selected freely.

However, in practice the described method is very time-consuming, not adequate and inaccurate due to the following reasons:

- Storage volume, distribution pipelines cannot be determined exactly
- The accuracy of the differential pressure measurement and time measurement has to be observed
- During pressure drop the compressed air volume cools down and therefore it changes the volume flow reference value
- An online measurement with consumption record is not possible

This method belongs to the so-called indirect measurements, like also the method of the load and unload measurement during which the current intake is measured by means of clamp-on ammeters and calculated back to the volume flow over the technical data of the compressor.

These indirect methods are antiquated and not suitable to detect leakages in the lower measuring range.

Determination of compressed air leakages with modern flow meters

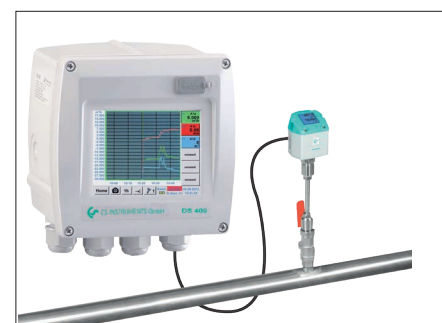
A modern compressed air consumption measurement resp. leakage measurement should be able to measure the real compressed air flow and also the smallest leakages quickly and reliably and record them.

New: Flow measurement DS 400 for compressed air and gases

Worldwide unique with 3.5 inch, graphic display with touch screen and print function.

With the new "ready for plug-in" flow measurement DS 400 the current flow in m³/h, l/min etc. as well as the consumption in m³ or l can be measured.

The new flow station works according to the approved calorimetric measuring principle.



The heart is the flow sensor which has been proven and tested for years.

It is characterized by a new thermally more efficient sensor structure which shows a higher chip temperature in case of same electrical connection values.

Compared to other calorimetric measuring instruments the sensor has a considerably lower mass and therefore a faster response time.

An additional pressure and temperature compensation is not necessary.

The advantage is that the user can use the flow meters in different pressures and temperatures without any further compensation.

Apart from compressed air also other gases like e. g.

- **Nitrogen**
- **Oxygen**
- **CO₂**
- **Argon**
- **Natural gas**
- **Helium**

can be measured.

The flow meter DS 400 is supplied completely wired. There is no need for a time consuming instruction manual reading.

Exceeding of threshold values can be reported optically and acoustically. 2 relays for pre- and main alarm are freely adjustable.

*** Channel A1 ***				~ 0.0 V ~ 0 mA	
Type	VA5xx		VA-Sensor		
Flow	Velocity	Diameter	Unit		
m ³ /h	m/s	53.100	mm		
Gas Constant	Ref. Pressure	Unit			
Air (real)	J/Kg*K	1000.00	hpa		
Ref. Temp.	Unit	Count.Val	Unit		
20.000	°C	---			
Back	Store	More-Settings	Info		

An alarm delay can be set for each relay. This grants that only really long-term exceeding of the threshold values are indicated. Additionally every alarm can be reset.

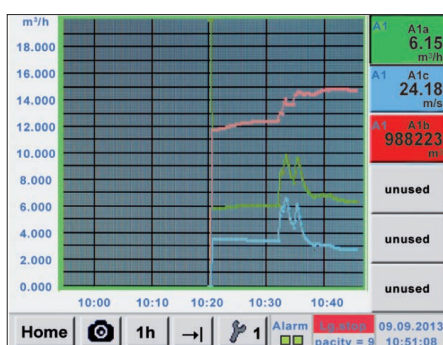
The intuitive operation with the 3.5 inch touch screen graphic display with zoom function and print key is worldwide unique in this price class.

The graphic display with zoom function shows the actual flow, the peak values and the leakage at a glance, the values are stored in the data logger.

So the user can take a look at the stored measuring curves also without any computer at any time on site.

This allows the user to view the stored measured curves without a PC at any time on site.

With the print button, the current screen can be saved as an image file on the internal SD card or on a USB stick and can be printed out without additional software on a PC.



Ideal for documentation of the measured values/ curves on site. Colored measured curves can be sent by e-mail as image files or integrated into a service report.

The internal data logger enables the storage of the measured data for several years. The measured data can be evaluated via a USB stick or via Ethernet by means of the comfortable software CS Soft Basic.

Particularly comfortable is the consumption analysis at the touch of a button. The CS Soft Basic automatically draws up daily, weekly and monthly reports.

Special features

- 3.5" graphic display, intuitive operation via touch screen
- Zoom function for accurate analysis of measured values
- Consumption analysis with daily/weekly/monthly reports
- Colored measured curves with names
- Mathematical calculation function e. g. addition of several consumers to a total consumption or energy costs per kWh/m³
- Print key: Optional indications can be stored as image files directly on a USB stick and sent by e-mail without any software
- 2 alarm contacts for exceeding of threshold values
- Freely adjustable alarm delay for both alarm contacts
- With reset function
- Up to 4 sensor inputs for: Further flow sensors, dew point, pressure, temperature, consumption, active power meters, optional third-party sensors can be
- Connected: Pt100/1000, 0/4..20 mA, 0-1/10 V,
- Modbus, pulse
- Integrated data logger 8 GB
- USB, Ethernet interface, RS 485
- Webserver

Installation under pressure

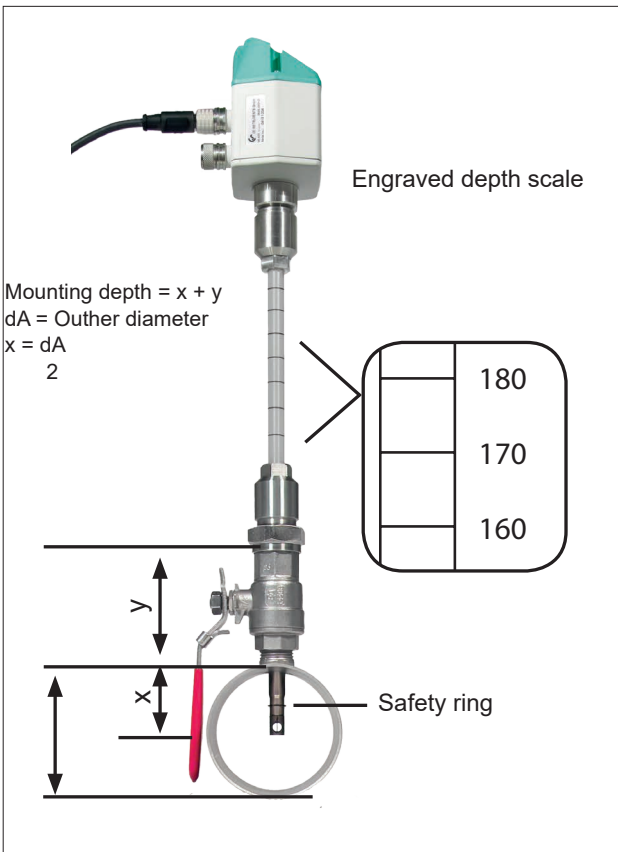


VA 500 flow meter for compressed air and gases

The VA 500 flow meter is installed via a standard ball valve under pressure. The circlip prevents the instrument from being ejected during installation and removal by the operating pressure.

For the installation at different pipe diameters, the VA 500 can be ordered at special lengths: 120, 160, 220, 300, 400 mm. Therefore it is possible to use the VA 500 flow sensor from inner pipe diameters of 1/2" up to 12" and bigger.

The exact positioning of the sensor is carried out with the aid of the engraved depth scale at the sensors shaft. The maximum insertion depth is therefore determined by the sensor length. Please see picture to determine the sensor length required.



Measuring site

If no 1/2" ball valve is present to carry out the installation of the VA 500 sensor, we have two possible alternatives to offer:

- A** 1/2"-thread needs to be welded onto the pipe work and the ball valve is then threaded on.
- B** A spot drilling collar can be ordered and installed.

Making use of the specialized drilling jig, it is then possible to drill a whole into the pipe work under load. The filings are caught in a special filter system at the drilling jig. Afterwards the VA 500 probe should be installed as described above.

The VA 500 measuring range allows for measurements in almost all possible applications. Even high flow rates in small pipe diameters can be measured.