



## Measurement Technology | METPOINT® OCV and OCV compact

# METPOINT® OCV and OCV compact: Continuous oil vapour measuring for your process safety

### Permanent and accurate monitoring

Oil contamination can affect compressed air processing systems in many different ways, posing a danger to the safety of workers, the environment and the production equipment. Monitoring systems such as the METPOINT® OCV continuously control the compressed air accurately and according to applicable standards for the residual oil vapour concentration. You therefore retain the compressed air quality.

### Continuous recording of vapour and gaseous-type hydrocarbons in pressurised air.

The METPOINT® OCV has been developed for measuring hydrocarbon vapours and gases in compressed air system applications. The detection levels are as low as one thousandth mg/m<sup>3</sup> of residual oil vapour content and are executed continuously in ongoing operation. Shortened measuring intervals enable the rapid and reliable display of even the smallest deviations. This on-line monitoring process provides the certainty about the quality of your compressed air as an important element of your process safety at all times and at all quality-critical system points. The measurement data can be utilised for documenting the compressed air quality and for identifying contamination sources. The oil vapour measuring can be implemented with two various products: METPOINT® OCV and METPOINT® OCV compact. The similarities and differences will be explained in detail in this brochure.

### Reliable measuring via innovative technology

The sensor of the METPOINT® OCV functions on the principle of a photo-ionisation detector by utilising a so-called PID sensor. The values to be evaluated for accurate measuring will be compensated for temperature and pressure. The requirements of ISO 8573 are therefore fulfilled. The reference gas will be generated internally via an integrated catalytic converter and ensures reproducible results.

### › Safe

- › TÜV certified and BfArM (Federal Institute for Drugs and Medical products) validated\*
- › Reproducible accuracy of the measurement values by utilising reference gas generation (catalytic converter principle)
- › Automatic monitoring for the reference gas and sensor electronics
- › Issuing and transferring of alarm signal messages

### › Reliable

- › Measuring range from  $\leq 0.01$  to 5.0 mg/m<sup>3</sup>\*
- › Pressure range from 3 to 16 bar
- › Online monitoring for the oil vapour concentration
- › Data transfer to display as standard feature and control centre with customary communication methods
- › Standardised multiple point calibration (5-10\*)

### › User-friendly

- › Intuitive user interface and setting possibilities\*
- › Visualisation of all measurement values
- › Accessible from anywhere through the Internet\*
- › Robust industrial housing\*
- › Flexible installation

\* For individual design characteristics for METPOINT® OCV and METPOINT® OCV compact, please observe the following pages.



Better through Responsibility

# The most important characteristics of the METPOINT® OCV and METPOINT® OCV compact in direct comparison

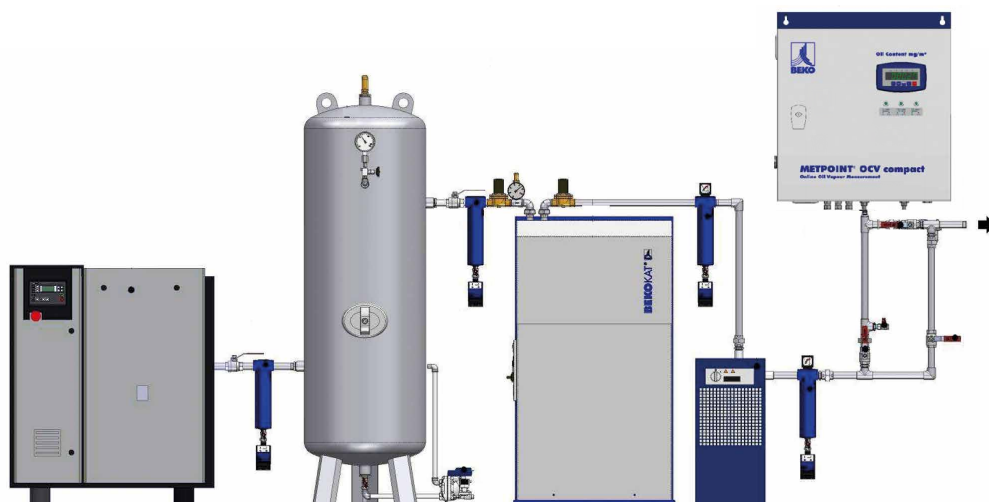
METPOINT® OCV and METPOINT® OCV compact enable us to provide two products with which you can permanently measure the quality of your compressed air with regard to the oil vapour content. Many of the device details indicate that both devices can provide the same performance data. There are however

certain differences, which can qualify them more efficiently for the respective application purpose. The following table presents both measuring devices in direct comparison to simplify your decision. The details will be clarified more precisely on the following pages.



	OCV	OCV compact
Measuring and display unit	Separated, connected with data cable (maximum 5m)	One unit with a robust industrial design
IP protection class	IP20 sensor unit / IP54 display unit	IP54
External test certificate	TÜV NORD, BfArM	No
Oil vapour detection	Compressed air free of aggressive, corrosive, caustic, toxic, flammable and combustion supporting materials or substances	
Detectable substances	Polyalphaolefins, aromatics, aliphatic compounds, hydrocarbon with functional groups	
Sensor element	PID (photo-ionisation detector)	
Measuring range	<0.01 - 5.000 mg/m <sup>3</sup>	<0.01 - 2.500 mg/m <sup>3</sup>
Calibrated measuring range	≤ 0.01...1.25 mg/m <sup>3</sup> residual oil content, according to ISO 8573-1	
Updating the measuring value display	Every 2 minutes	Every 4 seconds
Interfaces	4...20 mA, Ethernet	4...20 mA, RS485/Modbus (only for measuring value)
Display and operating concept	Menu-guided on colour touch screen	7-Segment display with 5 buttons for setting configuration and alarm
Optical display for the operating status	Coloured representation on touch screen display	3 LEDs (each red/green) for purifier, PID and oil class
Measuring cell protection against too high oil content	Utilising error indicator on display	The measuring cell will be protected against too high oil content via a valve switching process
Subversion of measuring value stripping	Continuous floating mean value	

## Installation example with METPOINT® OCV compact



## Recognised procedure and external test certificate

The eligibility of the utilised measuring procedure in the METPOINT® OCV for the continuous recording of hydrocarbon vapour and gases in compressed air will be executed via comparison measurements in the PID procedure with reference procedures according to:

- › ISO 8573-5
- › Pharmacopoeia (Ph. Eur. 2.1.6)

While the reference procedures according to ISO 8573-5 and the pharmacopoeia are based on a discontinued sampling method, the METPOINT® OCV measuring procedure provides the advantage of on-line monitoring. This therefore creates the prerequisite to immediately react to an increase in the residual oil content in the compressed air and possible breaching of the limiting values.

The METPOINT® OCV is the first TÜV certified on-line system for recording the oil vapour content in compressed air. It has been certified by TÜV NORD according to the requirements ISO 8573-1.



## Multiple point calibration

Both METPOINT® OCV systems are delivered with a 5 and/or 10 point calibration with certificate. In order to guarantee an increased performance and measurement accuracy, we recommend that maintenance is executed annually by the manufacturer. A recalibration with a certified reference gas must also be jointly carried out. You will therefore be assured of the complete functionality of your METPOINT® OCV systems and can rely on the measured oil vapour values at all times.

## Communication

The METPOINT®-OCV systems are equipped with various technologies which transfer the data and alarm messages to a central control centre: analogue (4-20 mA), Modbus RS485 or Ethernet are the possible communication paths. You therefore have the necessary flexibility for reliable data transfer for controlling the oil vapour measurements from the remote control centres.

## Simple and safe operation

Both METPOINT® OCV systems provide output information about the current measurement value (oil vapour in mg/m<sup>3</sup>), the ISO 8573 oil class as well as the status of the measuring system and its components. In addition, the status of the measuring cell and the purifier will be displayed visually. You therefore have an overview about the measurement values, oil class, system status at all times and know immediately that your compressed air is correct.

## Defined measurement values according to ISO 8573-1

The oil content is defined according to classes in accordance with ISO 8573:

ISO 8573-1, 2010	Oil content Liquefied, aerosol, mist
Class	mg/m <sup>3</sup>
0	User defined but < Class 1
1	< 0.01
2	< 0.1
3	< 1
4	5

The measuring range of the METPOINT® OCV systems are hereby aligned analogously. The METPOINT® OCV covers the complete range from 0.010 to 5.000 mg/m<sup>3</sup> while the METPOINT® OCV compact is limited to the lower range of 0.010 to 2.500 mg/m<sup>3</sup>. Both systems immediately indicate that your compressed air complies with the ISO purity classes for oil.

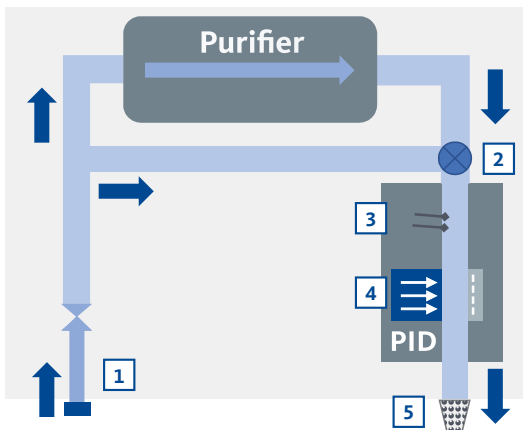
## Rapid measuring

Compared to other technologies, the photo-ionisation detector (PID) utilised in this case reacts rapidly to the smallest alterations in the oil content in the compressed air. Differences can be displayed and alarms can be triggered in the shortest possible time. This is the transparency and safety that you, as a user of the compressed air, require to be able to rely on the desired quality of compressed air at all times.

## Configuration for operating pressure

Both METPOINT® OCV systems can be adjusted for all operating pressures according to the provisions from the compressed air system (3...16 bar). Pressure reducers can adjust the systems to their local requirements and provide flexibility for the application – also when the operating conditions often alter.

# Accuracy based on principles: the operating principle of the Oil vapour measuring in METPOINT® OCV



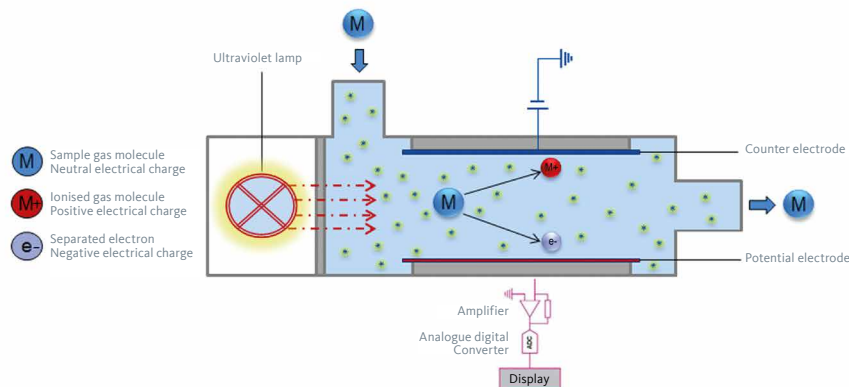
- 1 Gas inlet with integrated pressure limiter set for OCV operating conditions
- 2 Valve for interchanging between current compressed air sample and reference gas from purifier
- 3 Measuring cells monitored with temperature and pressure sensors
- 4 Photo-ionisation detector PID (UV lamp and detector)
- 5 Gas outlet with silencer

Addition information about METPOINT® OCV measuring technology can be found in our YouTube video.

The reduced compressed air via a nozzle **1** or pressure reducer to the working pressure of the METPOINT® is divided into two partial flows. One part flows directly in the direction of the measuring cell. The other part flows into the heated purifier in which all hydrocarbons are subjected to a catalytic cracking process which converts them into water (H<sub>2</sub>O) and carbon dioxide (CO<sub>2</sub>). The air which is now purified of hydrocarbons is available as the zero-air or reference air for the measuring cells **3**. The measuring chamber is therefore cleaned from possible

, adhering hydrocarbons and the PID measures the zero-air as constant reference value. The valve **2** enables both partial flows to enter the measuring chamber alternatively. Sensors monitor the pressure and temperature here **3**. The highly-sensitive photo-ionisation detector (PID) **4** subsequently evaluates the respective oil vapour content. The measured air subsequently exits the measuring chamber via a nozzle with a silencer **5** into the ambient air. The compressed air flow through via the purifier and the measuring chamber is 1...2 standard litre (1 bar, 20 °C).

## The operating principle of the photo-ionisation detector (PID)



A sample of the partial volume flow is taken from the compressed air during oil vapour measuring and routed to the sensor unit. The photo-ionisation detector (PID) measures the hydrocarbon content by means of UV light. The UV light ionises the hydrocarbon molecules that pass through the beam. The resulting photo ionisation is proportional to (M = Hydrocarbon molecule, M+ = Ionised hydrocarbon, e- = Emitted electron) Its strength is proportional to the hydrocarbon concentration.

### OCV system for trace analysis

If one considers the oil classes defined in ISO 8573, the detecting hydrocarbons of Class 1 i.e. smaller than 0.010 mg/m<sup>3</sup> = 10 µg/m<sup>3</sup> can be designated as trace analysis.

This concentration is shown on the display. Compared to other detectors, the PID operates with an encapsulated UV lamp which ensures long-term durability and reproducible measurements. The UV lamp installed in the PID can react rapidly to alterations and is always ready for operation again even after higher oil loads e.g. with a filter perforation. This measuring technology, which has been utilised in the market for many years, provides you with the assurance of reliable measurements - even in the case of problem situations.

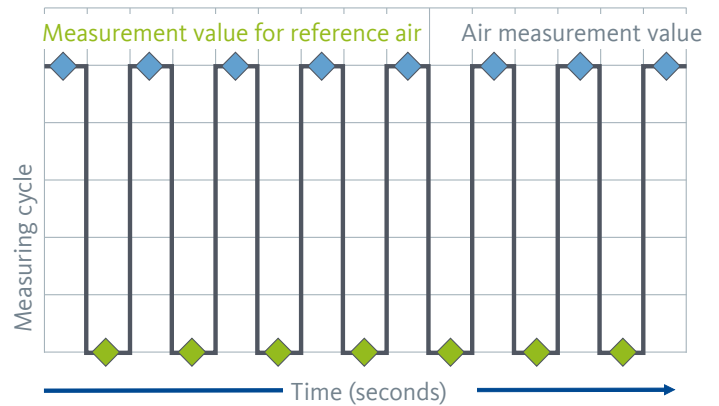
Detecting these very small contaminations in the air on-line and as reproducible is a high-performance capability in compressed air analysis.

# Internal reference gas generating by utilising a purifier

## Integrated reference gas generation

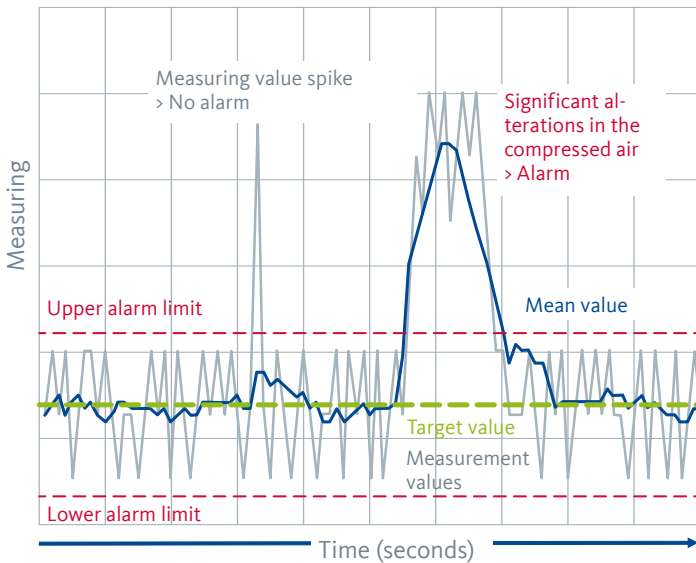
Both METPOINT® OCV systems are equipped with an integrated reference gas preparation from the compressed air sample using a patented catalytic converter. The compressed air sample is hereby passed onto a heated catalytic converter surface and the hydrocarbons are decomposed catalytically to water (H<sub>2</sub>O) and carbon dioxide (CO<sub>2</sub>). This therefore means that no environmentally harmful substances are created which need to be disposed.

This reference gas is then continuously routed in alternation with the normal compressed air sample into the measuring chamber and the oil content is measured with the photo-ionisation detector (PID). The measuring chamber will be regularly “cleaned” by this reference gas generation and the measuring system will be inspected for its zero point. This “internal independent monitoring” from the OCV systems provides assurance for a long-term, accurate operating system.



Representation for measuring the interchange between measuring gas and reference gas

## Meaningful results by utilising correct measuring



Principle for the flowing mean value formation from noisy measurement values with target value and alarm limits

## Measurement value for mean value formation

The compressed air composition hardly ever alters, apart from during malfunctions. It therefore makes sense to design a continuous oil vapour monitoring which can reliably display any possible, gradual deterioration or the sudden failure of a cleaning stage. This will also result, in certain operating conditions, that short-term occurring peak values will be recorded and indicated. These increased measurement values may not always relate to a malfunction in the compressed air preparation or a defect in the measuring devices. If these peaks occur at very short time intervals, or they relate to individual measurement values, one can assume that this is due here to other influencing factors and not due to hydrocarbons within the interpretation of the definitions for oil. For these reasons, the METPOINT® OCV systems provides a measurement recording with flowing mean value formation via defined cells in order to eliminate individual measurement value stripping. This means that the configured alarm contacts will only be triggered when a limiting value is actually exceeded at this time, thereby sustainably preventing “error alarms”.

## Sampling (measuring section)

The type and method of sampling is also of particular importance to ensure an accurate oil content measurement. The sample should be taken from one position where it can be assured that a representative and evaluation capable mixture of all integral parts of the compressed air is available. Implementing a homogeneous distribution over the measuring. Cross section of the pipe enables the execution of the gas sampling at one fixed point, roughly in the middle of the measuring cross-section. Utilising the measuring section from BEKO TECHNOLOGIES will ensure a representative sampling in all cases. This is however in dependent on the operating principles of the METPOINT® OCV systems.

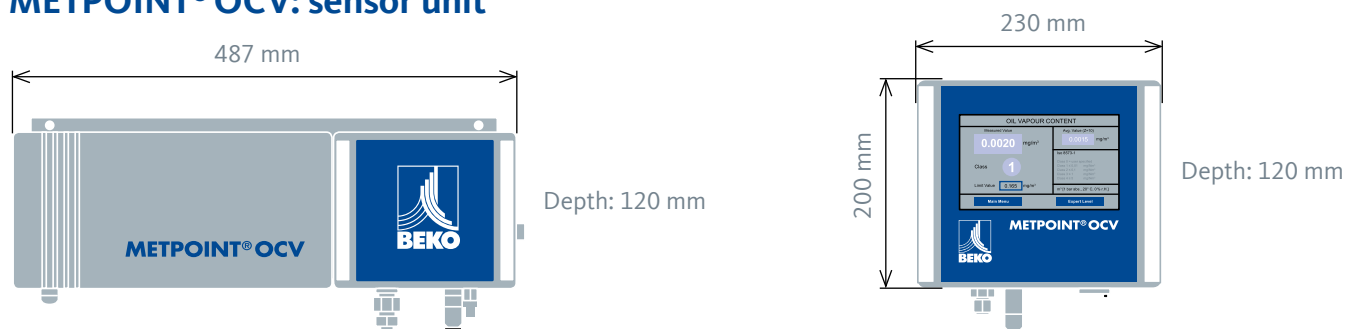




# Technical data for METPOINT® OCV and OCV compact

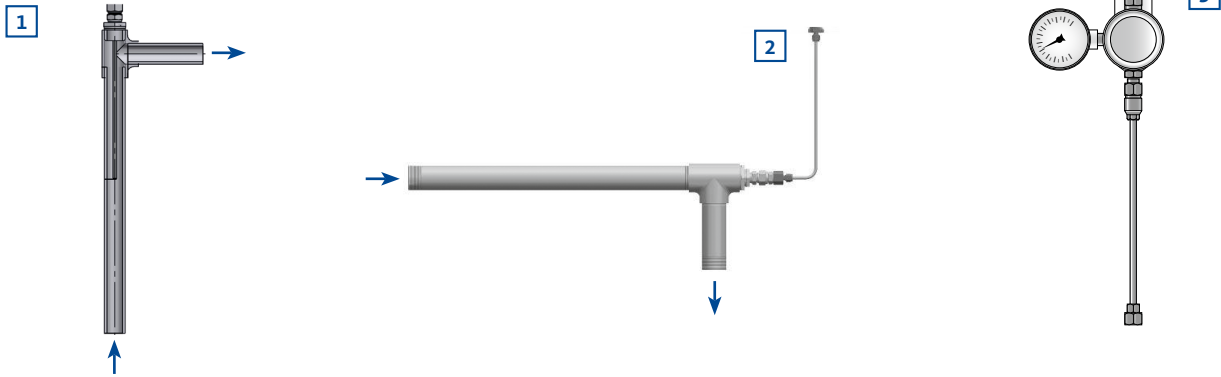
Specifications	METPOINT® OCV	METPOINT® OCV compact
Medium	Compressed air, free of aggressive, corrosive, caustic, toxic, flammable or combustion supporting materials and substances. The use of a compressed air preparation adapted to the measurement task is necessary.	
Measured parameter	Residual oil content in mg of oil/normal m <sup>3</sup> , relative to 1.0 bar, +20°C, 0% relative humidity, according to ISO 8573-1	
Detectable substances	Polyalphaolefines, aromatic, and aliphatic hydrocarbons and functional hydrocarbons	
Applications	Downstream of activated carbon filter and, activated carbon adsorber, downstream of BEKOKAT® (catalytic converter), downstream of oil-free compressing compressor, each with pre-switched filtration and drying	
Ambient temperature, minimum/maximum	+5°C ... +45°C, relative humidity ≤ 75% without condensation	
Storage temperature	+5°C ... +50°C	
Ambient pressure	800...1200 mbar absolute	
Climatic resistance	Maximum +10 °Ctd	
Compressed air temperature, minimum/maximum	+5°C ... +50°C	
Excess operating pressure	3 ... 16 bar(a), optional pressure reducer pre-switched for up to 300 bar (a)	
Settings for operating pressure	By utilising nozzle for defined pressure range	By utilising integrated pressure reducer with manometer
Measuring gas humidity	≤ 40 % relative humidity, PDP maximum +10°C Non-condensing humidity	
Compressed air connection	G 3/8" female thread	G 1/8" female thread according to ISO 228-1
Measurement values	mg / Standard m <sup>3</sup>	mg / standard m <sup>3</sup> , pressure and temperature compensated
Measuring range	≤ 0.01 ... 5.000 mg/m <sup>3</sup>	≤ 0.01 ... 2.50 mg/m <sup>3</sup>
Calibrated measuring range	≤ 0.01 ... 1.25 mg/m <sup>3</sup> residual oil content, according to ISO 8573-1	
Application for measuring probe	Required according to certification	Optional
Detection limit (residual oil)	0.001 mg/m <sup>3</sup>	
Measuring range and accuracy	≤ 0.01 ... 0.5 mg/m <sup>3</sup> ± 0.003 ≥ 0.5 ... 1.0 mg/m <sup>3</sup> ± 0.10 ≥ 1.0 ... 5.0 mg/m <sup>3</sup> ± 0.10	≤ 0.01 ... 0.5 mg/m <sup>3</sup> ± 0.003 ≥ 0.5 ... 1.0 mg/m <sup>3</sup> ± 0.10 ≥ 1.0 ... 2.5 mg/m <sup>3</sup> ± 0.10
Measuring gas flow through rate	2 - 3 Standard litre / minute, relating to 1.0 bar absolute and +20°C, in depressurised status Depending on the applied operating pressure	Approx. 1.20 Standard litre / minute relative to 1.0 bar absolute and +20°C, in depressurised status
Display for adhering to an ISO residual oil vapour class	On display with class	as LED (red/green)
Reference gas generation	Integrated catalytic converter	
Power supply	Version 1: 230 V AC 50 Hz +/- 10% Version 2: 115 V AC 60 Hz +/- 10%	100-240 VAC / 1Ph. / PE / 50-60 Hz / ± 10%
Protection class	IP 20 Sensor unit, IP54 Display unit	IP54 / DIN EN 60529
Outputs	4 ... 20 mA analogue output (configurable), Ethernet for measurement value transfer, 1 alarm contact	4 ... 20 mA analogue output, 2-conductor system, RS-485, MODBUS RTU for the transmission of measured values 1 alarm contact, normally open contact
Operating hours counter	Integrated	
Dimensions	487 x 170 x 120 mm sensor unit. 200 x 230 x 120 mm display unit (W x H x D)	410 x 440 x 163 mm (W x H x D)
Weight	6.6 kg Sensor unit, 3.6 kg Display unit	approx. 16.3 kg

## METPOINT® OCV: sensor unit



# Optional equipment for both OCV systems

Depending on the specifications of the compressed air system, the OCV systems can be equipped with sampling probes for various measuring sections according to DN20-80 (1/2"- 1 1/2") and as customer-specific as DN80-xx (3" and above) **1**. Stainless steel pipe-work as 6 x 1 mm (including screwed fittings) can also be provided to suit local circumstances for your system **2**. For applications with higher pressures up to 40 bar, a pressure reducer with manometer is available as an accessory, this reduces the operating pressure before the inlet to the OCV system permissible pressure **3**.



## METPOINT® OCV and PC evaluating software

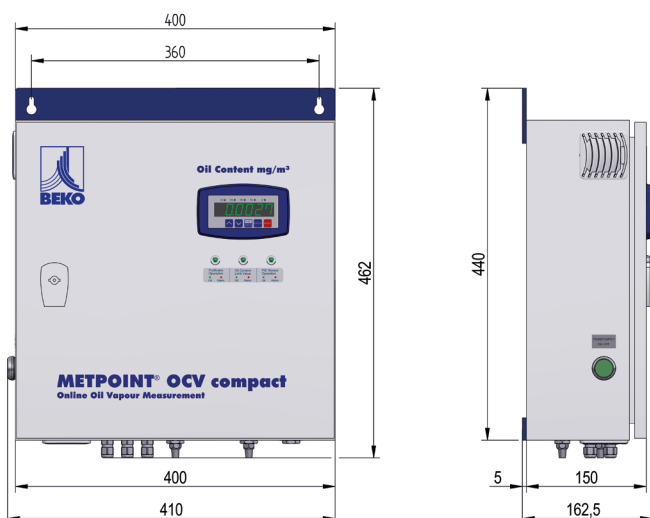
You can now call up the OCV directly via the Ethernet access with the PC software METPOINT® OCV DATALOG. Call up the actual measuring values on-line and visualise them as a table or graphic display.



## METPOINT® BDL compact + Ethernet

Take advantage of the possibilities to access the BDL compact from anywhere in the world via an optional web server with your mobile phone or tablet to retrieve all measured values and alarm messages. Simply select the IP address for the BDL compact in the web server and you are up to date immediately and can remain so at all times. You can therefore safely and securely retrieve all values and the status from the BDL but only edit them locally in BDL compact.

## METPOINT® OCV compact



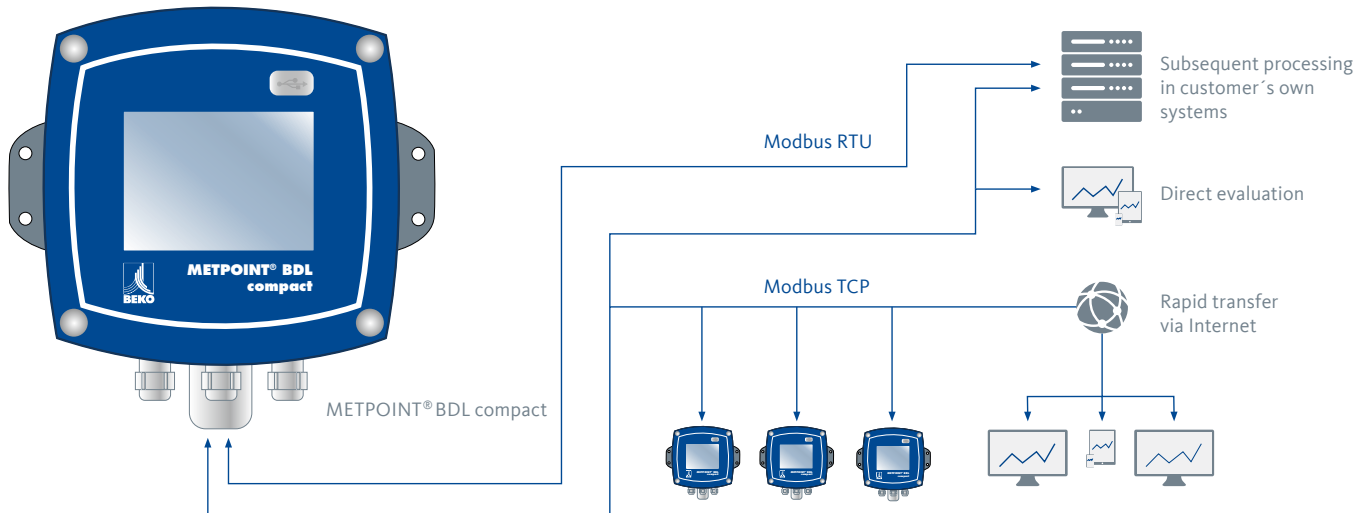
## Applied EU Directives and harmonised standards

- |                   |   |
|-------------------|---|
| <b>2014/68/EU</b> | Pressure Equipment Directive  |
| <b>2014/35/EU</b> | Low Voltage Directive   |
| <b>2014/30/EU</b> | Electric Compatibility (EMC) Directive  |
| <b>EN 61010-1</b> | Safety requirements for electrical equipment for measurement, control, and laboratory use |
| <b>EN 61326-1</b> | Electrical equipment for measurement, control and laboratory use – EMC requirements       |

# Basic principle of the METPOINT® BDL compact

The METPOINT® BDL compact is an electronic screen recorder for recording parameters e.g. for compressed air and gas applications. The display unit flexibly measures connected input signals in digital and analogue form. The process activity can be archived long-term and alarm messages can be forwarded to superordinated systems. The screen recorder therefore enables, if required, an immediate control for the processes and speeds up access locally. Up to four analogue and/or digital sensors can

be simply configured and connected. The 3.5" large coloured touch screen will display all the measurement values (also graphically) as well as indicating exceeded limiting values. Daily, weekly and monthly evaluations with costs and meter status can be calculated in combination with the consumption volume analysis. The optional Ethernet cards provide direct access to the BDL compact via the IP network worldwide.



## Do you have questions about the best way of processing your compressed air?

We have the answers! We offer efficient solutions for any type of processing chain. Please contact us with your queries. We would be delighted to tell you more about our condensate

treatment, filtration, drying, measuring and process technology, and our comprehensive services.

Visit us at



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