

THYRACONT

Vacuum Instruments

Smartline

**Intelligent Vacuum Metrology
New VSR, VSP, VSM & VSH series**



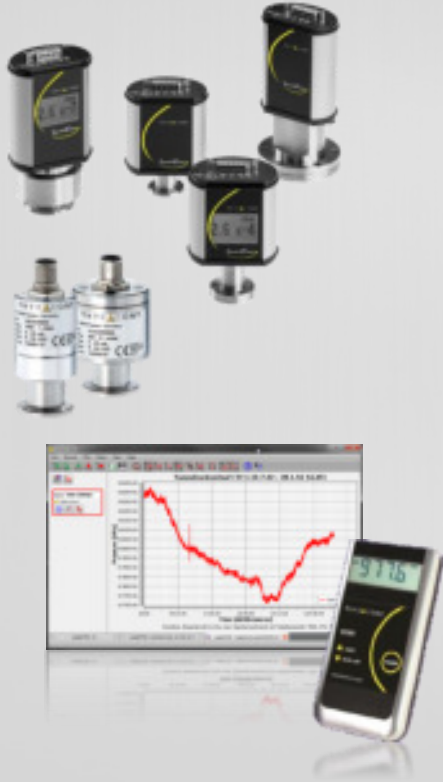
Introduction of THYRACONT



- Founded 1970, located in Passau (Germany)
- More than 45 years vacuum gauge experience
- Gauges are "Made in Germany"
- One of the three biggest EU vacuum gauge producers
- THYRACONT holds a number of valuable patents



Introduction of THYRACONT



- **Main know-how in vacuum gauge R&D:** Sensor technology, computer simulation, firmware, hardware design etc.
- **Main products:** VD8 compact vacuum meters, active digital vacuum gauges Smartline and Analogline, VacuGraph™ software, vacuum switches
- **Sales channels:** Private label partners, distributors, resellers, online shop and direct sales
- **Markets:** Industry, system manufacturers, general vacuum, R&D market



Smartline™ Vacuum Gauge Family



- VSP | 1000 - 1×10^{-4} mbar
Pirani sensor with tungsten spiral coil filament



- VSR | 1200 - 1×10^{-4} mbar
Wide range combination sensor Piezo & Pirani



- VSM | 1000 - 5×10^{-9} mbar
Wide range combination sensor Cold Cathode & Pirani



- VSH | 1000 - 5×10^{-10} mbar
Wide range combination sensor Hot Cathode & Pirani

Why New Smartline™ Series?



- More flexibility concerning the measurement parameter through digital microcontroller intelligence
- Flexible gauge configuration via PC or PLC through digital interfaces (RS485 & EtherCat) and 0-10V output signal
- Extended operation lifetime through double hot cathode filament and protected spiral coiled tungsten filament
- Highest precision of measurements and reliability
- Developed especially for industrial applications (IP40 or IP54)
- New modular design (display, interfaces, metal housing etc.)

Highlights Smartline™ Series at a Glance



- Maximum **sensor control** and precise **signal processing** via PLC or PC
- Robust sensors, insensitive **against shock venting and vibration**
- **No zero adjustment before first operation starts**
- **Automatic zero adjustment via PLC/PC**
- Optional large LCD display (changeable colours) and 3-coloured status LEDs
- Various digital interfaces (RS485, EtherCAT ...) and 0-10 V output
- Manual and digital individual adjustment via interface and software (e.g. VacuGraph)

Smartline™ Vacuum Gauge Family



- **VSP | 1000 - 1×10^{-4} mbar**
Pirani sensor with tungsten spiral coil filament



- **VSR | 1200 - 1×10^{-4} mbar**
Wide range combination sensor Piezo & Pirani



- **VSM | 1000 - 5×10^{-9} mbar**
Wide range combination sensor Cold Cathode & Pirani



- **VSH | 1000 - 5×10^{-10} mbar**
Wide range combination sensor Hot Cathode & Pirani

Benefits Smartline™ VSP (Pirani)



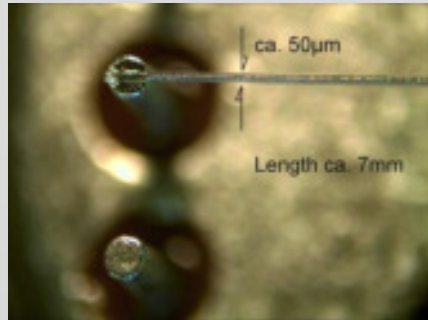
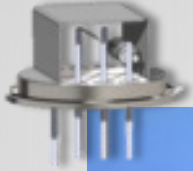
- Extended measurement range up to 1×10^{-4} mbar due to durable spiral coil tungsten filament
- Excellent measurement accuracy $<10\%$ (20 mbar – 2×10^{-3} mbar) and $<30\%$ (1000 mbar – 20 mbar)
- Customizable gauge configuration via PC or PLC
- Digital microcontroller intelligence for more flexibility concerning measurement parameters
- Superior stability through individual temperature compensation
- Robust sensors, insensitive against shock venting and vibration
- High protection class IP54 (dust protected and splash proof)

Benefits Smartline™ VSP (Pirani)



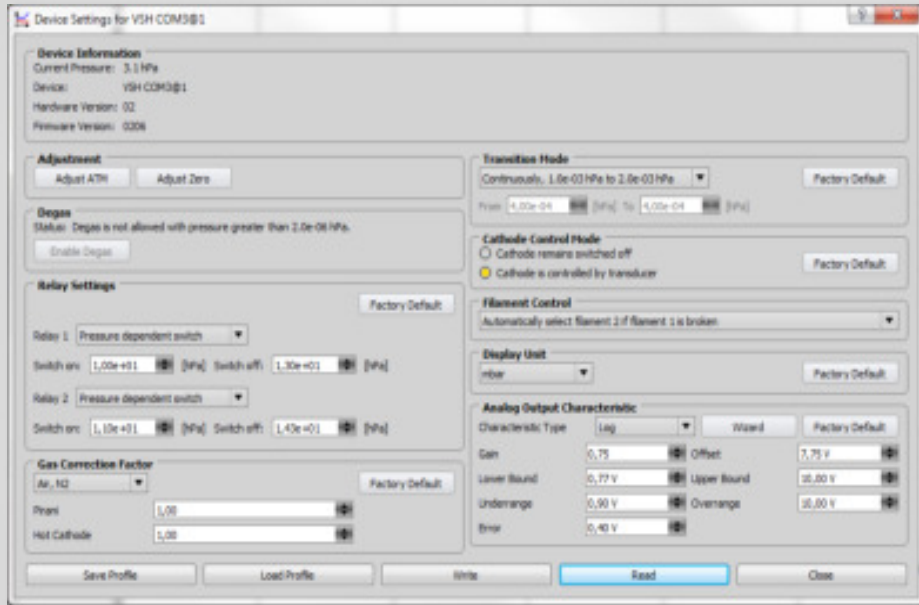
- Various digital interfaces (RS485, EtherCAT ...) and 0-10 V output
- 3-coloured status LEDs and optional large LCD display
- Plug and play:
 - No zero adjustment prior to first use as each unit is adjusted and temperature calibrated ex works
 - Replacement sensors take all parameters automatically
- Zero adjustment via PLC/PC possible
- Metal sealed, outstanding low leakage rate $< 5 \times 10^{-10}$ mbar l/s
- 100 % quality checked
- Individual manual and digital adjustment via interface and Windows software (e.g. VacuGraph™)

Proven Reliability Smartline™ VSP Series



- Enhanced measurement accuracy due to large filament surface area
- Optimized measurement accuracy due to the higher resistance value (Ω) correlates with improved and stable sensor signal (V)
- Filament temperature of 80°C above ambient air temperature minimizes deposit on the filament
→ Important in case of moisture and oil vapour, e.g. drying or industrial applications
- Competitors' technology with stretched wire filament or micro chip has a limited life time in tough applications
- 45 years success story, more than 120.000 units sold

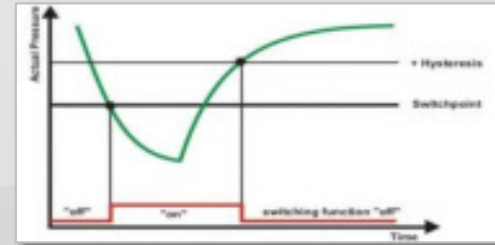
Highlights Smartline™ Firmware | VGR



VGR VacuGraph™ –
Demo version for setting gauge parameters free of charge

Set **gauge parameters** according to process requirements via interface per VacuGraph™ software or PLC:

- Flexible output function (0-10 V)
- Zero adjustment possible at individual reference pressure (e.g. 1×10^{-2} mbar)
- Two integrated switch points (switch-over relays) with adjustable hysteresis



Part Numbers – VSP Series



Article No.	Description	€
VSP63D	Pirani 1000-1e-4 mbar DN16KF	333,00
VSP63DL	Pirani 1000-1e-4 mbar DN16KF, Display	418,00
VSP63E	Pirani 1000-1e-4 mbar DN16KF, EtherCat	693,00
VSP64D	Pirani 1000-1e-4 mbar DN16CF	363,00
VSP63DL	Pirani 1000-1e-4 mbar DN16CF, Display	448,00
VSP63E	Pirani 1000-1e-4 mbar DN16CF, EtherCat	723,00
B_VSP63D	Replacement sensor head DN16KF	75,00
B_VSP64D	Replacement sensor head DN16CF	105,00
SLZUB	Accessory set: protection case, power supply, converter RS485-USB, VGR demo	278,00

Smartline™ Vacuum Gauge Family



- **VSP** | 1000 - 1×10^{-4} mbar
Pirani sensor with tungsten spiral coil filament



- **VSR** | 1200 - 1×10^{-4} mbar
Wide range combination sensor Piezo & Pirani



- **VSM** | 1000 - 5×10^{-9} mbar
Wide range combination sensor Cold Cathode & Pirani



- **VSH** | 1000 - 5×10^{-10} mbar
Wide range combination sensor Hot Cathode & Pirani

Benefits Smartline™ VSR (Piezo & Pirani)



- Extended measurement range 1200 - 1×10^{-4} mbar due to dual gauge Piezo & Pirani with tungsten spiral coil filament
- Excellent measurement accuracy $<0,3\%$ (1200 mbar – 20 mbar) and $<10\%$ (20 mbar – 2×10^{-3} mbar)
- Extended lifetime and process guaranty due to spiral coil filament
- Customizable gauge configuration via PLC or PC
- Superior stability through individual temperature compensation
- Robust sensors, insensitive against shock venting and vibration
- High protection class IP54 (dust protected and splash proof)

Benefits Smartline™ VSR (Piezo & Pirani)



- Various digital interfaces (RS485, EtherCAT ...) and 0-10 V output
- 3-coloured status LEDs and optional large LCD display
- Plug and play:
 - No zero adjustment prior to first use as each unit is adjusted and temperature calibrated ex works
 - Replacement sensors take all parameters automatically
- Zero adjustment via PLC/PC possible
- Metal sealed, outstanding low leakage rate $< 5 \times 10^{-10}$ mbar l/s
- Individual manual and digital adjustment via interface and Windows software (e.g. VacuGraph™)

Advantages of Piezo & Pirani Spiral Coil Filament VSR

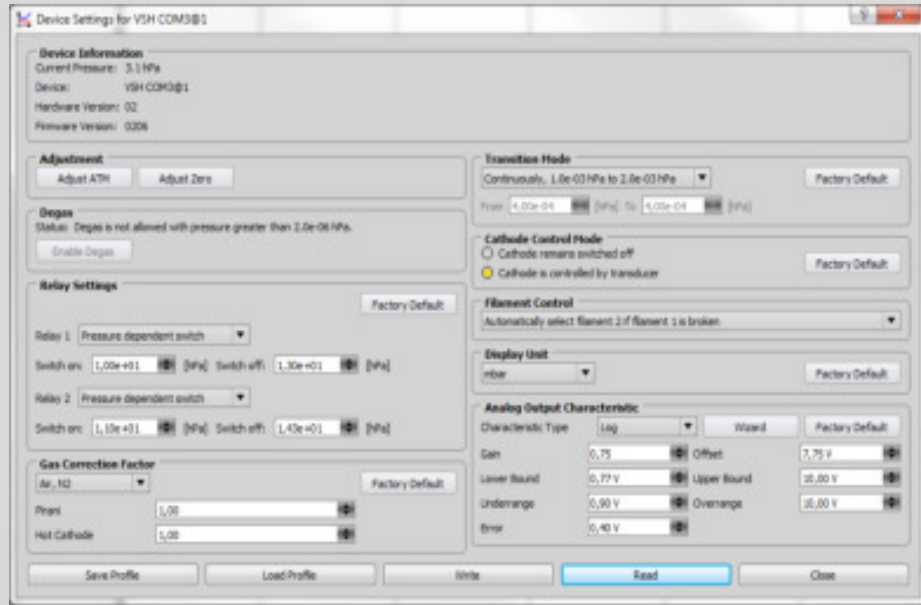
Piezo:

- High measurement accuracy < 0,3% (1200 mbar – 20 mbar)
- Gas type independent
- No contamination risk, as electronic is placed in reference vacuum area
- High long-term stability, because of huge reference chamber and metal seal

Pirani with spiral coil filament:

- High measurement accuracy <10% (20 mbar – 2×10^{-3} mbar) due to large filament surface area
- Filament temperature of 80°C above ambient air temperature minimizes deposit on the filament. Important in case of moisture and oil vapour, e.g. drying or industrial applications
- Optimized measurement accuracy due to its higher resistance value (Ω) correlates with improved and stable sensor signal (V)

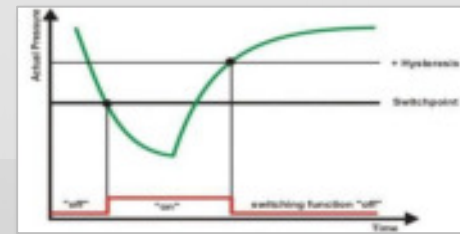
Highlights Smartline™ Firmware | VGR



VGR VacuGraph™ –
Demo version for setting gauge parameters free of charge

Set **gauge parameters** according to process requirements via interface per VacuGraph™ software or PLC:

- Flexible output function (0-10 V)
- Zero adjustment possible at individual reference pressure
- Two integrated switch points (switch-over relays) with adjustable hysteresis



Part Numbers - VSR Series



Article No.		€
VSR53D	Piezo/Pirani 1200-1e-4 mbar DN16KF	632,00
VSR53DL	Piezo/Pirani 1200-1e-4 mbar DN16KF, Display	717,00
VSR53E	Piezo/Pirani 1200-1e-4 mbar DN16KF, EtherCat	992,00
VSR54D	Piezo/Pirani 1200-1e-4 mbar DN16CF	662,00
VSR53DL	Piezo/Pirani 1200-1e-4 mbar DN16CF, Display	747,00
VSR53E	Piezo/Pirani 1200-1e-4 mbar DN16CF, EtherCat	1022,00
B_VSR53	Replacement sensor head DN16KF	184,00
B_VSR54	Replacement sensor head DN16CF	214,00
SLZUB	Accessory set: protection case, power supply, converter RS485-USB, VGR demo	278,00

Smartline™ Vacuum Gauge Family



- VSP | 1000 - 1×10^{-4} mbar
Pirani sensor with tungsten spiral coil filament



- VSR | 1200 - 1×10^{-4} mbar
Wide range combination sensor Piezo & Pirani



- **VSM | 1000 - 5×10^{-9} mbar**
Wide range combination sensor Cold Cathode & Pirani



- VSH | 1000 - 5×10^{-10} mbar
Wide range combination sensor Hot Cathode & Pirani

Benefits Smartline™ VSM Series (Pirani/Magnetron)



- Extended measurement 1000 - 5×10^{-9} mbar due to dual gauge Cold Cathode & Pirani with tungsten spiral coil filament
- Excellent measurement accuracy <30% (1000 mbar – 10 mbar), <10% (10 mbar – 2×10^{-3} mbar), <25% up to 1×10^{-8} mbar
- Cold Cathode is automatically controlled by Pirani
- Customizable gauge configuration via PC or PLC
- Superior stability by individual temperature compensation
- Robust sensors, insensitive against shock venting and vibration
- High protection class IP54 (dust protected and splash proof)

Benefits Smartline™ VSM Series



- Various digital interfaces (RS485, EtherCAT ...) and 0-10 V output
- 3-coloured status LEDs and optional large LCD display
- Plug and play:
 - No zero adjustment before first use as each unit is adjusted and temperature calibrated ex works
 - Replacement sensors take all parameters automatically
- During operation automatic adjustment of Pirani zero pressure
- Metal sealed, outstanding low leakage rate $< 5 \times 10^{-10}$ mbar l/s
- Individual manual and digital adjustment via interface and Windows software (e.g. VacuGraph)

Advantages of Pirani & Magnetron VSM

Cold cathode (Magnetron):

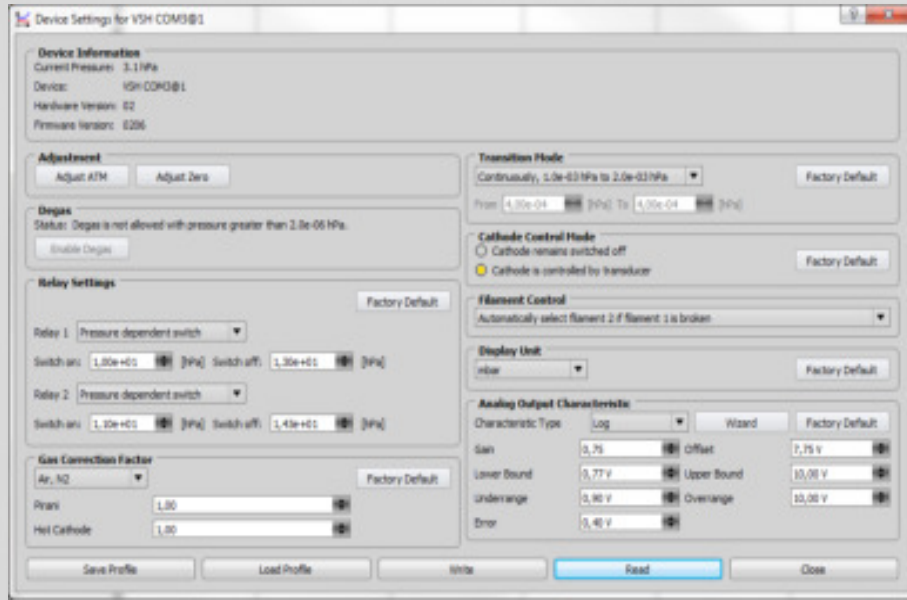
- Measurement range till 5×10^{-9} mbar
- Measurement uncertainty only <25% till 1×10^{-8} mbar (benchmark!)
- Cold Cathode is automatically controlled by Pirani

Pirani with spiral coil filament:

- Measurement only uncertainty <10% (20 mbar – 2×10^{-3} mbar)
- Maximum surface area to vacuum environment reduced the measurement uncertainty
- During operation automatic adjustment of Pirani zero pressure



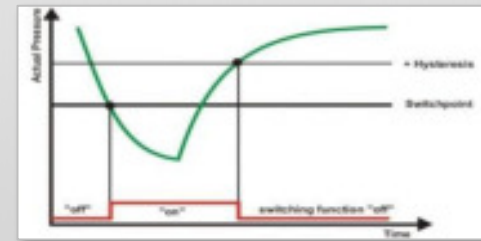
Highlights Smartline™ Firmware | VGR



VGR VacuGraph™ –
Demo version for setting gauge parameters free of charge

Set **gauge parameters** according to process requirements via interface per VacuGraph software or PLC:

- Flexible output function
- Changeable zero adjustment references
- Two integrated switch points (switch-over relays) with adjustable hysteresis



Part Numbers - VSM Series



Article No.	Description	€
VSM77D	Pirani/Coldcathode 1000-1e-9 mbar DN25KF	914,00
VSM77DL	Pirani/Coldcathode 1000-1e-9 mbar DN25KF, Display	999,00
VSM77E	Pirani/Coldcathode 1000-1e-9 mbar DN25KF, EtherCat	1.274,00
VSM79D	Pirani/Coldcathode 1000-1e-9 mbar DN40CF	942,00
VSM79DL	Pirani/Coldcathode 1000-1e-9 mbar DN40CF, Display	1.027,00
VSM79E	Pirani/Coldcathode 1000-1e-9 mbar DN40CF, EtherCat	1.302,00
B_VSM77	Replacement sensor head DN25KF for VSM77 series	245,00
B_VSM79	Replacement sensor head DN40CF for VSM79 series	282,00
SLZUB	Accessory set: protection case, power supply, converter RS485-USB, VGR demo	278,00

Smartline™ Vacuum Gauge Family



- VSP | 1000 - 1×10^{-4} mbar
Pirani sensor with tungsten spiral coil filament



- VSR | 1200 - 1×10^{-4} mbar
Wide range combination sensor Piezo & Pirani



- VSM | 1000 - 5×10^{-9} mbar
Wide range combination sensor Cold Cathode & Pirani



- **VSH | 1000 - 5×10^{-10} mbar**
Wide range combination sensor Hot Cathode & Pirani

Benefits Smartline™ VSH Series



- Extended measurement range up to 5×10^{-10} mbar due to combination sensor (Pirani and hot cathode filaments)
- Excellent measurement accuracy: <10% (10 mbar – 1×10^{-8} mbar), <30% (1000 mbar – 10 mbar)
- Extended lifetime due to double hot cathode filament
- Customizable gauge configuration via PC or PLC
- Superior stability through individual temperature compensation
- Robust sensors, insensitive against shock venting and vibration
- High protection class IP54 (dust protected and splash proof)

Benefits Smartline™ VSH Series



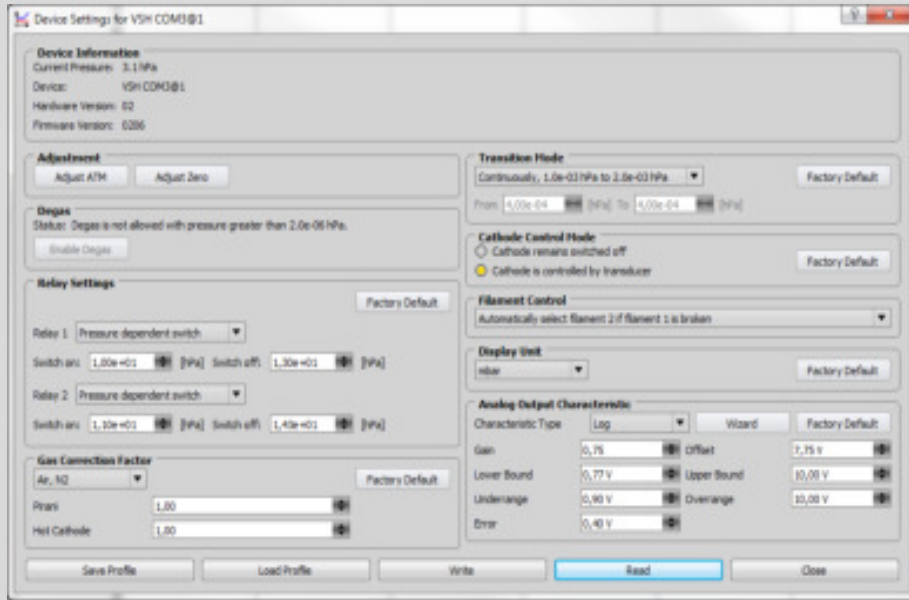
- Various digital interfaces (RS485, EtherCAT...) and 0-10 V output
- 3-coloured status LEDs and optional large LCD display
- Plug and play:
 - No zero adjustment prior to first use as each unit is adjusted and temperature calibrated ex works
 - Replacement sensors take all parameters automatically
- During operation automatic adjustment of Pirani zero pressure
- Metal sealed, outstanding low leakage rate $< 5 \times 10^{-10}$ mbar l/s
- Individual manual and digital adjustment via interface or Windows software (e.g. VacuGraph™)

Proven Reliability Smartline™ VSH Series



- Automatic switch-off of ionization sensors
- Insensitive against shock venting
- Proof of durability by extensive stress tests
> 100.000 shock venting cycles proceeded
- Ionization sensors are switched on only below 3×10^{-3} mbar
or according to user setting
→ enhanced life time
- Shielded Pirani with robust spiral coil filament
- Bayard Alpert with double filaments (yttriated iridium)
- Protection class IP40 ... 54

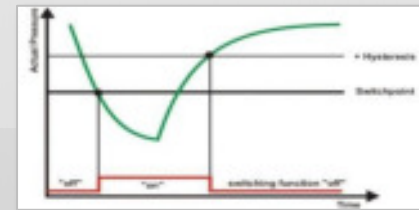
Highlights Smartline™ Firmware | VGR



VGR VacuGraph™ –
Demo version for setting gauge parameters free of charge

Set **gauge parameters** according to process requirements via interface per VacuGraph software or PLC:

- Switch-on pressure of ionization sensor
- Adjust mode and range of transition between sensors
- Enable or disable ionization sensor
- Two integrated switch points (switch-over relays) with adjustable hysteresis

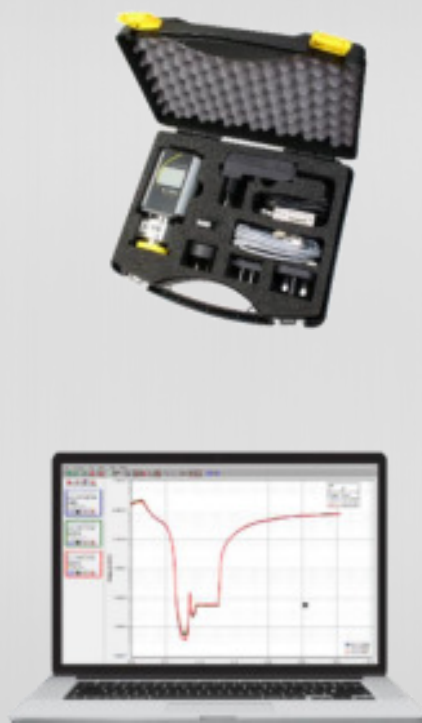


Part Numbers VSH Series



Article No.	Description	€
VSH88D	Pirani/Hot cathode DN40KF	1.050,00
VSH88DL	Pirani/Hot cathode DN40KF, Display	1.135,00
VSH89D	Pirani/Hot cathode DN40CF	1.070,00
VSH89DL	Pirani/Hot cathode DN40CF, Display	1.155,00
VSH88E	Pirani/Hot cathode DN40 KF, EtherCat	1.410,00
VSH89E	Pirani/Hot cathode DN40 CF, EtherCat	1.430,00
B_VSH88A	Replacement sensor DN40KF	353,00
B_VSH89A	Replacement sensor DN40CF	373,00
SLZUB	Accessory set: protection case, power supply, converter RS485-USB, VGR demo	278,00

Smartline Accessories



Display and Control Units

VD12S2: 2 channel controller

VD10S8: 4 channel controller



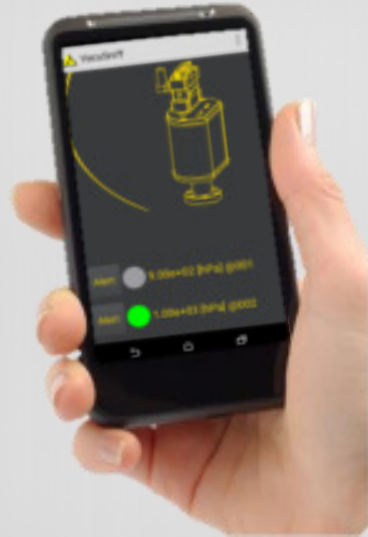
- Large graphic LCD display with background illumination, pressure display in mbar, Torr, hPa
- Easy to use, menu-driven operator instructions
- USB interface for process documentation and parameterization
- VacuGraph software: Documentation and evaluation of vacuum processes, remote control

Bluetooth Adapter SLKBT



- Wireless communication of up to 16 Smartline gauges (RS485 bus)
- Controlling of bus communication by a PC, a PLC or a Thyracont display and control unit
- Wireless connection reaches up to 100m (class 1)
- USB interface for process documentation and gauge configuration / parameterization
- Perfectly suited for cable replacement in complex constructions
- Ideally used in connection with Thyracont's VacuGraph PC and tablet software (Windows/Android), VacuSniff app (Android) free of charge (available in Google PlayStore)

VacuSniff



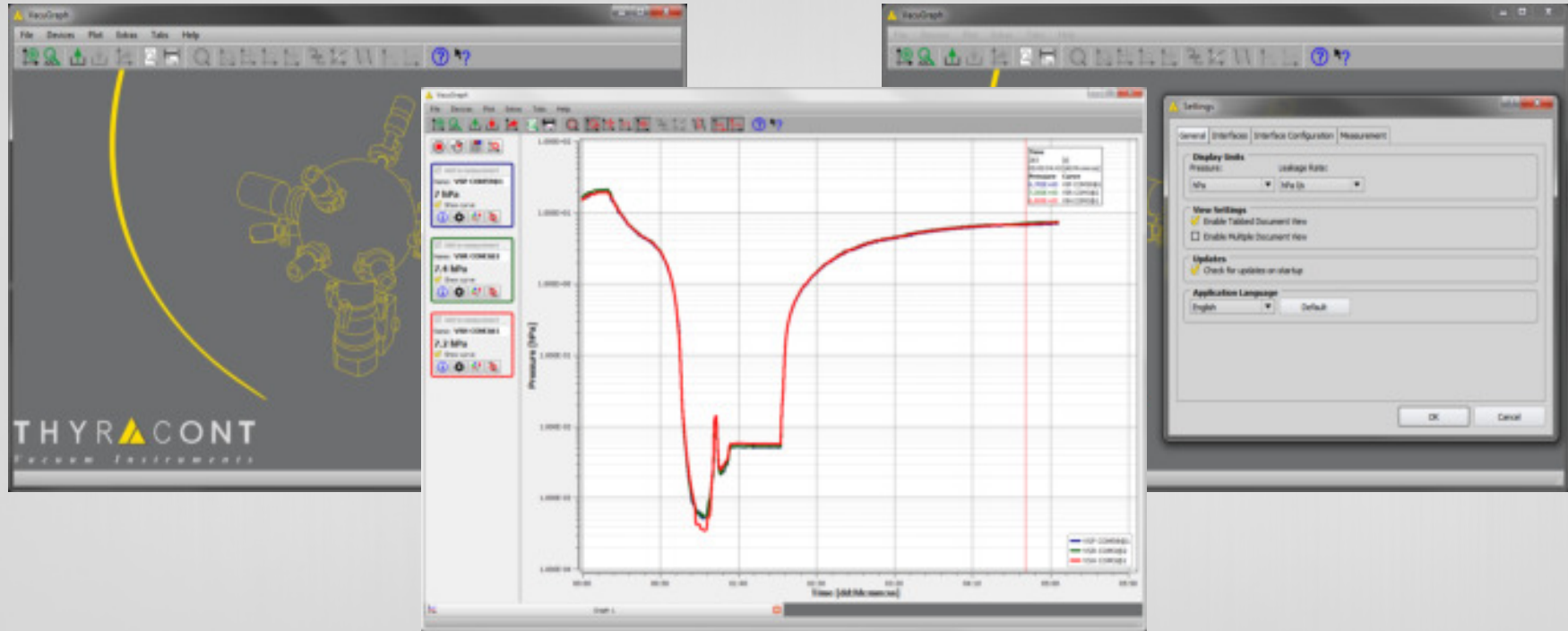
- The easy Bluetooth bus sniffer for your smartphone and tablet (Android)
- Visual and acoustic alert function for minimum and maximum pressures
- Connect up to 16 devices with own connection symbols, pressure indicator and alert settings
- Ideally used in connection with Thyracont's VacuGraph PC and tablet software (Windows/Android), VacuSniff app (Android) free of charge (available in Google PlayStore)



Scan the QR Code to
download VacuSniff on your
Android Smartphone or tablet



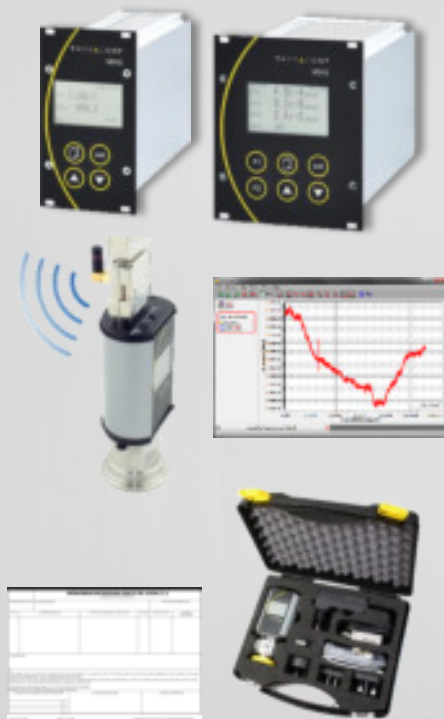
VGR VacuGraph™ Software



VacuGraph™ Software for Windows and Android

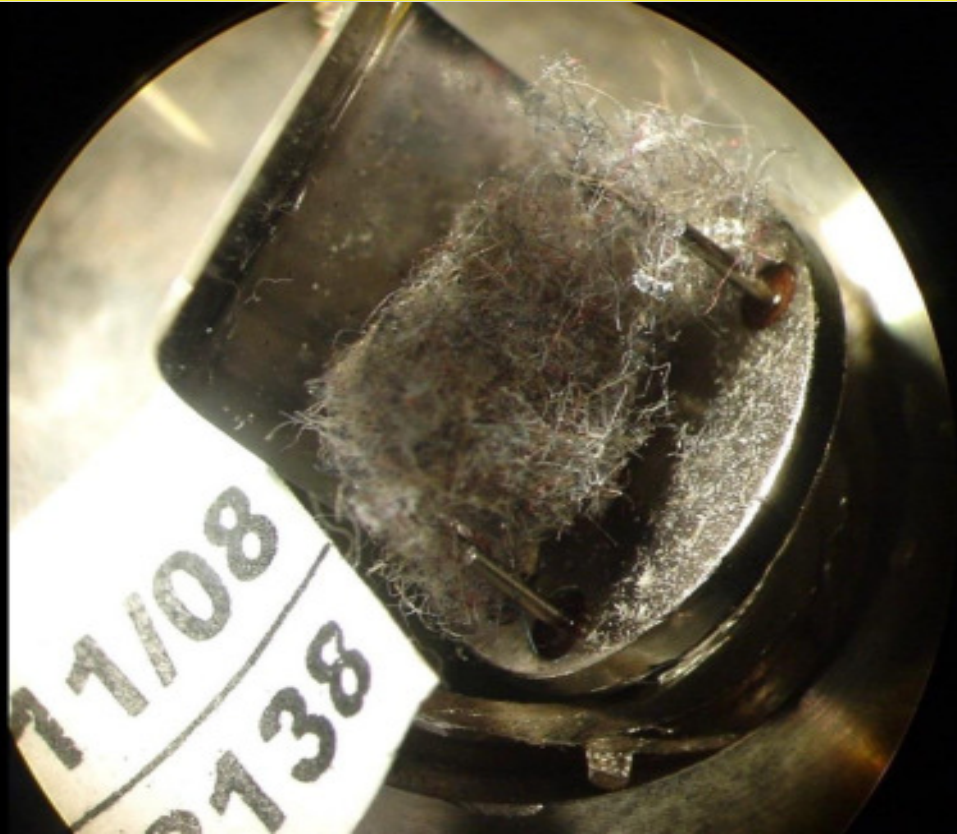


Smartline Accessories & Article Numbers



Article No.	Description	€
VD12S2	Controller 2 channel	780,00
VD10S8	Controller 4 channel	1.390,00
SLKBT	Bluetooth Adapter	141,00
SLN4	Separate power supply 24 V	92,00
SLKUSB	Customized interface converter RS485-USB	168,00
VGR	VacuGraph™ Windows Software	194,00
W1505002	Connection cable 2m VD12/VD10	52,00
W1505006	Connection cable 6m VD12/VD10	74,00
W1505020	Connection cable 20m VD12/VD10	149,00
XB1500002	Counterplug 15pole	6,20
ADJCERT	Works calibration 1000 ... 1e-4 mbar	174,00
DKDCERT	DAkkS calibration 1000 ... 1e-4 mbar	471,00
ADJCERTHV	Works calibration 1000 ... 1e-5 mbar	201,00
DKDCERTHV	DAkkS calibration 1000 ... 1e-6 mbar	662,00

How To Prevent Sensor Contamination



Smartline Accessories & Part Numbers



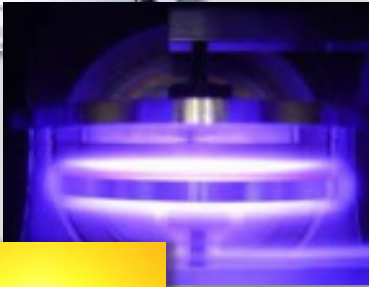
Article No.	Flanges & Fittings ISO KF	€
ZSR1016	Clamp DN10/16KF, aluminum	3,40
ZSR2025	Clamp DN20/25KF, aluminum	3,90
ZSR3240	Clamp DN32/40KF, aluminum	4,10
ZZR016	Centering ring DN16KF, stainless steel/FKM	3,40
ZZR025	Centering ring DN25KF, stainless steel/FKM	4,00
ZZR040	Centering ring DN40KF, stainless steel/FKM	5,00
ZRZ1016	Adaptive centering ring DN10 - 16KF, stainless steel/FKM	5,00
ZZDF016	Centering ring DN16KF with wire filter, stainless steel/FKM	15,00
ZG1614	Adaptor DN16KF - G1/4, stainless steel	19,00
ZNPT14	Adaptor DN16KF - NPT1/4, stainless steel	26,00
ZTS016	Tee, DN16KF, stainless steel	28,00
ZBS016	Elbow 90° DN16KF, stainless steel	36,00
ZBS025	Elbow 90° DN25KF, stainless steel	30,00
ZBS040	Elbow 90° DN40KF, stainless steel	45,00
ZRRG2516	Reducing piece DN25 - 16KF, stainless steel, 16mm	19,00
ZRRG4025	Reducing piece DN40 - 25KF, stainless steel, 16mm	27,00

Typical Applications Smartline™ Series



- **Process industry:**
 - Sputtering systems
 - Electron beam welding
 - Vacuum chamber furnaces
 - Evaporation and coating systems
 - General vacuum measurement and control in the low to ultra high vacuum range
- **Analytical instruments and surface physics:**
 - Electron microscopy
 - Gas analysis systems
 - mass spectrometers
 - ESCA, SIMS, AES, XPS

Typical Applications Smartline™ Series



- **Research:**
Application in MBE systems ▪ Particle accelerators ▪ Beam guidance systems, cyclotron
▪ Fusion experiments ▪ Space simulation chamber
- **Semiconductor technology:**
CVD, plasma etching etc. and transfer chambers
- **System control / pressure control:**
Vacuum measurement and control in the low to ultra high vacuum range ▪ Valve control, pressure dependent systems control

Market References THYRACONT



- Famous vacuum pump manufacturers as private label partners/ market leader in R&D market



- Famous vacuum pump manufacturers as private label partners/ market leader in process industry market



- EU market leader for laboratory freeze dryers
- Well-known suppliers in analytic market

U N I K A S S E L
V E R S I T Ä T

- Biggest supplier for semiconductor system producer



- ...and many more



Contact

Expertise & Responsiveness

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