# VPi-4 iVacSens™ LT

OEM Vacuum transducer for system integration 1×10<sup>-6</sup> to 13.33 mbar / 7.5×10<sup>-7</sup> to 10 Torr Ultra-compact wide range heat-loss MEMS Pirani transducer module

## **Advantages**

- Wide measuring range of 7 decades
- Digital RS-485 serial interface
- Digital UART serial interface
- Analog voltage output
- 3 digital setpoint outputs for process control
- Remote zero adjustment
- Vacuum temperature sensor for diagnostics
- Ultra-compact design

## **Applications**

- Mass spectrometers
- Scanning electron microscopes
- Vacuum pump integration
- Valve integration
- Space flight
- Leak detection
- Flywheel energy storage
- Vacuum switch









**ISENS** 

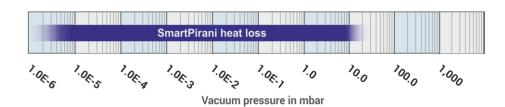


(
)
Aout

The iVacSens™ Series vacuum transducer module is the world's smallest wide-range multi-function vacuum gauge.

The iVacSens™ functions as a full-featured traditional vacuum transducer and is delivered calibrated and ready to use.

It is designed for high-level equipment integration in instrumentation operated under vacuum, like mass spectrometers, leak detectors and scanning electron microscopes.



The iVacSens™ is based on the proven record-breaking SmartPirani™ MEMS heat-loss sensor that offers best-in-class performance, wider measurement range and higher accuracy than traditional Pirani and convection gauges.

#### **Multiparameter sensor solution**

The iVacSens™ compromises a heat-loss MEMS Pirani sensor and a vacuum temperature sensor.

Sensor measurement values are accessible either through a UART or an RS-485 digital interface.

The temperature parameters can be used to provide warning or control signals to shut down equipment in the event of over-heating, or as a parameter for calculating predictive maintenance of the equipment.

#### **Customized solution**

The transducer module can be delivered with a custom configuration of setpoint switch values and other digital parameters.

For OEM customers Sens4 also offers customized installation flanges, interfaces, and digital protocols.

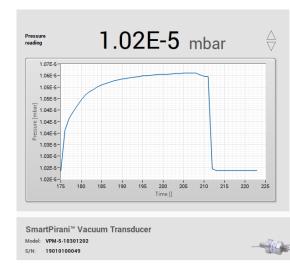


#### **Getting started**

The iVacSens™ evaluation kit enables users to seamlessly evaluate the features and measurement performance prior to integration in the equipment.

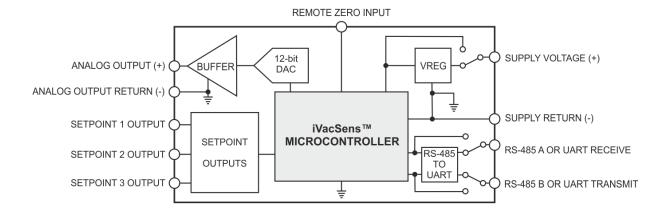
The evaluation kit offers USB connectivity and evaluation software.

The evaluation sensor module is mounted on a DN16KF vacuum flange for easy mounting to a vacuum system.



#### Flexible operation and configuration

The iVacSens™ offers multiple different analog and digital operation modes for flexible integration in customer equipment.



#### Analog voltage output

The standard analog voltage output provides a voltage signal of 150 mV/decade and can be interfaced to an external digital-to-analog converter.

#### **Universal Asynchronous Receiver/Transmitter (UART)**

The UART interface can be connected directly to a host microcontroller for digital acquisition of measurement data and configuration of the iVacSens™ transducer module.

#### **RS-485** interface

The RS-485 interface allows multiple iVacSens™ devices to be connected in parallel, with individual addressing of each transducer. It is an easy, standardized interface to external devices. The communication protocol is compatible with the VPM-5 and VPM-7 SmartPirani™ transducer series.

### **Setpoint control**

The three independent setpoints provide a means of digital signaling at user-defined pressure values. When using the setpoints the iVacSens™ transducer module can be used as a vacuum pressure switch to control the vacuum process or to ensure that an adequate vacuum level is achieved for turning on vacuum-operated devices like ion sources.

The switching function can also be used as a safety interlock switch.



## **Applications**

Vacuum measurement is fundamental for operating many types of analytical and industrial vacuum-based equipment.

The iVacSens™ provides a ready-to-use solution for equipment integration and direct connectivity to equipment electronics and microcontrollers.

In space-constrained applications where traditional vacuum transducers and sensors might not be suitable, the iVacSens™ can eliminate time-consuming measurement electronics development and provide fast time to market with a well-proven, high-performance solution.

#### **Analytical equipment**

In many types of vacuum-operated analytical instrumentation, like mass spectrometers, vacuum gauges are used to determine safe operation of an equipment ion source.

In some applications, the ultra-wide range of the iVacSens™ can replace expensive high vacuum ionization gauges.



### **Spaceflight systems**

The compact size, low weight, and small mass of iVacSens™ makes it well suited for demanding applications like space flight systems.

The novel MEMS sensor technology used in iVacSens™ can withstand continuous vibrations and high G-forces that are common during rocket launches.

### Portable equipment

The small footprint, ultra-low power consumption and insensitivity to mounting position and vibrations makes iVacSens™ ideal for portable, battery-operated vacuum equipment and instrumentation.

## **Technical data**

Measuring range       1×10 <sup>6</sup> to 13.3 mbar (7.5×10 <sup>7</sup> to 10 Torr)         Measuring principle 1×10 <sup>6</sup> to 9.99×10 <sup>5</sup> mbar       25% of reading         Accuracy 1×10 <sup>4</sup> to 9.99×10 <sup>-1</sup> mbar       5% of reading         Accuracy 1.0 to 10 mbar       30% of reading         Hysteresis 1×10 <sup>-3</sup> to 9.99×10 <sup>-1</sup> mbar       1%         Hysteresis 1 to 10 mbar       10%         Vacuum temperature sensor range       -20 to + 85°C         Transducer temperature sensor range       -20 to + 85°C         Transducer temperature sensor accuracy       +/- 1.5°C         Analog output       0.2 - 1.55 VDC (150 mV/decade mbar/torr)         Analog output resolution       12 bit         Analog output update rate       124 Hz         Response time       <20 ms         Temperature compensation       +10 to +50 °C         Set point range (absolute)       5×10 <sup>6</sup> to 13.33 mbar (3.75×10 <sup>6</sup> to 10 Torr)         Setpoint output ligh level       >2.9 VDC         Setpoint output bigh level       >2.9 VDC         Setpoint output bigh level       >2.0 to +50°C         Media temperature       -20 to +50°C	Specifications	
Accuracy 1×10 <sup>-5</sup> to 9.99×10 <sup>-5</sup> mbar 5% of reading Accuracy 1×10 <sup>-4</sup> to 9.99×10 <sup>-1</sup> mbar 5% of reading Accuracy 1.0 to 10 mbar 30% of reading Hysteresis 1×10 <sup>-3</sup> to 9.99×10 <sup>-1</sup> mbar 1% Hysteresis 1 to 10 mbar 10% Vacuum temperature sensor range -20 to +85°C Vacuum temperature sensor accuracy +/-1.5°C Transducer temperature sensor accuracy +/-1.5°C Analog output 0.2 - 1.55 VDC (150 mV/decade mbar/torr) Analog output resolution 12 bit Analog output update rate 124 Hz Response time -20 ms Temperature compensation +10 to +50°C Set point range (absolute) 5×10 <sup>-6</sup> to 13.33 mbar (3.75×10 <sup>-6</sup> to 10 Torr) Setpoint output high level -2.9 VDC Setpoint output by level -0.4 VDC Setpoint output source and sink current 1 mA maximum  Environment conditions  Operating ambient temperature -20 to +50°C Storage ambient temperature -20 to +50°C Storage ambient temperature -40 to +120°C Bake-out temperature (non-operating) +120°C Maximum media pressure 10 bar absolute Mounting position Arbitrary  Protection rating, EN 60529/A2:2013   P40 Humidity, IEC 68-2-38 98%, non-condensing  Power supply  Supply voltage +3.3 VDC or 4-18 VDC supply 95 mW (max) 3.3 VDC supply 95 mW (max) 3.3 VDC supply 95 mW (max) 3.3 VDC supply	Measuring range	1×10 <sup>-6</sup> to 13.33 mbar (7.5×10 <sup>-7</sup> to 10 Torr)
Accuracy 1×10 <sup>-4</sup> to 9.99×10 <sup>-1</sup> mbar 30% of reading  Accuracy 1.0 to 10 mbar 30% of reading  Hysteresis 1×10 <sup>-3</sup> to 9.99×10 <sup>-1</sup> mbar 1%  Hysteresis 1 to 10 mbar 10%  Vacuum temperature sensor range -20 to +85°C  Vacuum temperature sensor accuracy +/- 1.5°C  Transducer temperature sensor accuracy +/- 1.5°C  Transducer temperature sensor accuracy +/- 1.5°C  Analog output 0.2 - 1.55 VDC (150 mV/decade mbar/torr)  Analog output resolution 12 bit 124 Hz  Response time -20 ms  Temperature compensation +10 to +50°C  Set point range (absolute) 5×10 <sup>-6</sup> to 13.33 mbar (3.75×10 <sup>-6</sup> to 10 Torr)  Setpoint output high level >2.9 VDC  Setpoint output high level >2.9 VDC  Setpoint output source and sink current 1 mA maximum  Environment conditions  Operating ambient temperature -20 to +50°C  Storage ambient temperature -40 to +120°C  Bake-out temperature (non-operating) +120°C  Maximum media pressure 10 bar absolute  Mounting position Arbitrary  Protection rating, EN 60529/A2:2013 IP40  Humidity, IEC 68-2-38 98%, non-condensing  Power supply  Supply voltage +3.3 VDC or 4-18 VDC  Power consumption No	Measuring principle 1×10 <sup>-6</sup> to 13.3 mbar	MEMS Pirani thermal conductivity
Accuracy 1.0 to 10 mbar Hysteresis 1×10³ to 9.99×10¹ mbar Hysteresis 1 to 10 mbar Vacuum temperature sensor range Vacuum temperature sensor accuracy Vacuum temperature Vacuum	Accuracy 1×10 <sup>-5</sup> to 9.99×10 <sup>-5</sup> mbar	25% of reading
Hysteresis 1×10³ to 9.99×10¹ mbar  Hysteresis 1 to 10 mbar  Vacuum temperature sensor range  -20 to +85°C  Vacuum temperature sensor accuracy  +/- 1.5 °C  Transducer temperature sensor accuracy  Analog output  0.2 - 1.55 VDC (150 mV/decade mbar/torr)  Analog output resolution  12 bit  Analog output update rate  Response time  -20 ms  Temperature compensation  Set point range (absolute)  Setpoint output high level  Setpoint output low level  Setpoint output source and sink current  Environment conditions  Operating ambient temperature  Maximum media pressure  Mounting position  Power supply  Supply voltage  Power consumption  Reverse polarity protection  10%  -20 to +85°C  -20 to +85°C  -20 to +50°C  -20 to +20°C  -20 to	Accuracy 1×10 <sup>-4</sup> to 9.99×10 <sup>-1</sup> mbar	5% of reading
Hysteresis 1 to 10 mbar  Vacuum temperature sensor range  Vacuum temperature sensor accuracy  Transducer temperature sensor range  Transducer temperature sensor accuracy  Analog output  Analog output  Analog output resolution  Analog output update rate  Response time  Vacuum temperature compensation  Temperature compensation  Temperature compensation  Temperature compensation  Temperature desolute)  Set point range (absolute)  Setpoint output high level  Setpoint output low level  Setpoint output low level  Setpoint output source and sink current  Environment conditions  Operating ambient temperature  Media temperature  Porage ambient temperature  Ao to +120 °C  Storage ambient temperature  Mounting position  Arbitrary  Protection rating, EN 60529/A2:2013  Humidity, IEC 68-2-38  Power supply  Supply voltage  Power consumption  No  Power supply  Reverse polarity protection  10 to +85°C  C to +85°C  C (150 mV/decade mbar/tor)  A.2 bit C  Set O.2 - 1.55 VDC (150 mV/decade mbar/tor)  Avisor  C 150 mV/decade mbar/tor)  Avisor  Avisor  C 20 ms  Temperature compensation  10 to +50 °C  Temperature compensation  Avisor  Aviso		30% of reading
Vacuum temperature sensor range  Vacuum temperature sensor accuracy  Transducer temperature sensor range  Transducer temperature sensor accuracy  Analog output  Analog output vesolution  Analog output update rate  Response time  Temperature compensation  Set point range (absolute)  Setpoint output high level  Setpoint output source and sink current  Environment conditions  Operating ambient temperature  Bake-out temperature (non-operating)  Maximum media pressure  Mounting position  Power supply  Supply voltage  Power consumption  Pour 18 VDC supply  Reverse polarity protection  Pour 18 VDC supply  No  Pour 4-18 VDC supply  Reverse polarity protection  P.20 to +85°C  C.20 to +85°C  C.20 to +50°C  Set C.20 mV/decade mbar/torr)  Also C.20 mV/decade mbar/torr)  Also C.20 mV/decade mbar/torr)  Also C.20 mV/decade mbar/torr)  Analog output resolution  12 bit  124 Hz  220 mS  125 VDC  220 mS  124 Hz  220 mS  125 VDC  220 mV/decade mbar/torr)  Analog output resolute mbar/torr)  Analog output resolute mbar/torr)  12 bit  124 Hz  220 mS  2	Hysteresis 1×10 <sup>-3</sup> to 9.99×10 <sup>-1</sup> mbar	1%
Vacuum temperature sensor accuracy Transducer temperature sensor range Transducer temperature sensor range Transducer temperature sensor accuracy Analog output O.2 - 1.55 VDC (150 mV/decade mbar/torr) Analog output resolution 12 bit Analog output update rate Response time <20 ms Temperature compensation +10 to +50 °C Set point range (absolute) Setpoint output high level Setpoint output low level Setpoint output low level Setpoint output source and sink current  Environment conditions Operating ambient temperature -20 to +50 °C Storage ambient temperature -20 to +50 °C Arbitrary Protection rating, EN 60529/A2:2013 HP40 Humidity, IEC 68-2-38 Power supply Supply voltage +3.3 VDC or 4-18 VDC Supply voltage Power consumption No	Hysteresis 1 to 10 mbar	10%
Transducer temperature sensor range  Transducer temperature sensor accuracy  Analog output  Analog output cesolution  Analog output update rate  Analog output update rate  Response time  Temperature compensation  Temperature compensation  Temperature compensation  Set point range (absolute)  Setpoint output high level  Setpoint output low level  Setpoint output source and sink current  Environment conditions  Operating ambient temperature  Pover supply  Supply voltage  Power consumption  Transducer temperature sensor range  -20 to +85°C  -20 to H25°C  10 to +50°C  -20 to +120°C  -20 to +12	Vacuum temperature sensor range	-20 to + 85°C
Transducer temperature sensor accuracy Analog output 0.2 - 1.55 VDC (150 mV/decade mbar/torr) Analog output resolution 12 bit Analog output update rate 124 Hz Response time <20 ms Temperature compensation +10 to +50 °C Set point range (absolute) 5×10 °6 to 13.33 mbar (3.75×10 °6 to 10 Torr) Setpoint output high level >2.9 VDC Setpoint output low level 30.4 VDC Setpoint output source and sink current Environment conditions Operating ambient temperature -20 to +50 °C Storage ambient temperature -20 to +50 °C Storage ambient temperature -40 to +120 °C Bake-out temperature (non-operating) +120 °C Maximum media pressure Mounting position Arbitrary Protection rating, EN 60529/A2:2013 Humidity, IEC 68-2-38 98%, non-condensing Power supply Supply voltage +3.3 VDC or 4-18 VDC Power consumption Supply woltage Power consumption No	Vacuum temperature sensor accuracy	+/- 1.5 °C
Transducer temperature sensor accuracy Analog output 0.2 - 1.55 VDC (150 mV/decade mbar/torr) Analog output resolution 12 bit Analog output update rate 124 Hz Response time <20 ms Temperature compensation +10 to +50 °C Set point range (absolute) 5×10 °6 to 13.33 mbar (3.75×10 °6 to 10 Torr) Setpoint output high level >2.9 VDC Setpoint output low level 30.4 VDC Setpoint output source and sink current Environment conditions Operating ambient temperature -20 to +50 °C Storage ambient temperature -20 to +50 °C Storage ambient temperature -40 to +120 °C Bake-out temperature (non-operating) +120 °C Maximum media pressure Mounting position Arbitrary Protection rating, EN 60529/A2:2013 Humidity, IEC 68-2-38 98%, non-condensing Power supply Supply voltage +3.3 VDC or 4-18 VDC Power consumption Supply woltage Power consumption No	Transducer temperature sensor range	-20 to + 85°C
Analog output resolution  Analog output update rate  Analog output update rate  Response time  -20 ms  Temperature compensation  +10 to +50 °C  Set point range (absolute)  5×10° to 13.33 mbar (3.75×10° to 10 Torr)  Setpoint output high level  >2.9 VDC  Setpoint output low level  -2.0 to +50 °C  Media temperature  -20 to +50 °C  Media temperature  -20 to +50 °C  Media temperature  -20 to +50 °C  Storage ambient temperature  -20 to +120 °C  Sake-out temperature (non-operating)  Maximum media pressure  Mounting position  Arbitrary  Protection rating, EN 60529/A2:2013  Humidity, IEC 68-2-38  Power supply  Supply voltage  +3.3 VDC or 4-18 VDC  Power consumption  25 mW (max) 3.3 VDC supply  95 mW (max) 4-18 VDC supply  Reverse polarity protection		+/- 1.5 °C
Analog output resolution  Analog output update rate  Analog output update rate  Response time  -20 ms  Temperature compensation  +10 to +50 °C  Set point range (absolute)  5×10° to 13.33 mbar (3.75×10° to 10 Torr)  Setpoint output high level  >2.9 VDC  Setpoint output low level  -2.0 to +50 °C  Setpoint output source and sink current  Environment conditions  Operating ambient temperature  -20 to +50 °C  Media temperature  -20 to +50 °C  Storage ambient temperature  -40 to +120 °C  Bake-out temperature (non-operating)  H120 °C  Maximum media pressure  10 bar absolute  Mounting position  Arbitrary  Protection rating, EN 60529/A2:2013  Humidity, IEC 68-2-38  98%, non-condensing  Power supply  Supply voltage  +3.3 VDC or 4-18 VDC  Power consumption  25 mW (max) 3.3 VDC supply  95 mW (max) 4-18 VDC supply  Reverse polarity protection	Analog output	0.2 - 1.55 VDC (150 mV/decade mbar/torr)
Analog output update rate  Response time  <20 ms  Temperature compensation  Fet point range (absolute)  Set point output high level  Setpoint output low level  Setpoint output source and sink current  Environment conditions  Operating ambient temperature  Storage ambient temperature  For temperature (non-operating)  Maximum media pressure  Mounting position  Humidity, IEC 68-2-38  Power supply  Supply voltage  Power consumption  Reverse polarity protection  10 to +50 °C  10 to +50 °C  40 to +120 °C  Arbitrary  10 bar absolute  Arbitrary  Protection rating, EN 60529/A2:2013  Humidity, IEC 68-2-38  Power supply  Supply voltage  Power consumption  Storage and in the protection  10 to a supply supply  4.3 VDC or 4-18 VDC  Supply supply  Supply voltage  Power consumption  Storage and in the protection  No	<u> </u>	·
Response time  Temperature compensation  Temperature compensation  Set point range (absolute)  Setpoint output high level  Setpoint output low level  Setpoint output source and sink current  Environment conditions  Operating ambient temperature  Operating ambient temperature  Tenvironment conditions  Operating ambient temperature  -20 to +50 °C  Media temperature  -20 to +50 °C  Storage ambient temperature  -40 to +120 °C  Bake-out temperature (non-operating)  Maximum media pressure  Mounting position  Arbitrary  Protection rating, EN 60529/A2:2013  Humidity, IEC 68-2-38  Power supply  Supply voltage  Power consumption  Set 10 to +50 °C  -20 t		124 Hz
Temperature compensation +10 to +50 °C  Set point range (absolute) 5×10°6 to 13.33 mbar (3.75×10°6 to 10 Torr)  Setpoint output high level >2.9 VDC  Setpoint output low level <0.4 VDC  Setpoint output source and sink current 1 mA maximum  Environment conditions  Operating ambient temperature -20 to +50 °C  Media temperature -20 to +50 °C  Storage ambient temperature -40 to +120 °C  Bake-out temperature (non-operating) +120 °C  Maximum media pressure 10 bar absolute  Mounting position Arbitrary  Protection rating, EN 60529/A2:2013 IP40  Humidity, IEC 68-2-38 98%, non-condensing  Power supply  Supply voltage +3.3 VDC or 4-18 VDC  Power consumption 25 mW (max) 3.3 VDC supply 95 mW (max) 4-18 VDC supply  Reverse polarity protection	<u> </u>	<20 ms
Set point range (absolute)  Setpoint output high level  Setpoint output low level  Setpoint output source and sink current  Environment conditions  Operating ambient temperature  Media temperature  Storage ambient temperature  40 to +120 °C  Maximum media pressure  Mounting position  Protection rating, EN 60529/A2:2013  Humidity, IEC 68-2-38  Power supply  Supply voltage  Power consumption  Reverse polarity protection  5×10-6 to 13.33 mbar (3.75×10-6 to 10 Torr)  >2.9 VDC  20 to +50 °C  C  -20 to +50 °C  -20 to +50 °C  -20 to +120 °C  Arbitrary  -40 to +120 °C  Arbitrary  IP40  98%, non-condensing  Power supply  Supply voltage  +3.3 VDC or 4-18 VDC  Power consumption  95 mW (max) 3.3 VDC supply  95 mW (max) 4-18 VDC supply  No	•	+10 to +50 °C
Setpoint output high level <a href="#">&lt;2.9 VDC</a> Setpoint output low level <a href="#">&lt;0.4 VDC</a> Setpoint output source and sink current 1 mA maximum  Environment conditions  Operating ambient temperature -20 to +50 °C  Media temperature -20 to +50 °C  Storage ambient temperature -40 to +120 °C  Bake-out temperature (non-operating) +120 °C  Maximum media pressure 10 bar absolute  Mounting position Arbitrary  Protection rating, EN 60529/A2:2013 IP40  Humidity, IEC 68-2-38 98%, non-condensing  Power supply  Supply voltage +3.3 VDC or 4-18 VDC  Power consumption 25 mW (max) 3.3 VDC supply 95 mW (max) 4-18 VDC supply  Reverse polarity protection No		5×10 <sup>-6</sup> to 13.33 mbar (3.75×10 <sup>-6</sup> to 10 Torr)
Setpoint output low level < <0.4 VDC  Setpoint output source and sink current 1 mA maximum  Environment conditions  Operating ambient temperature -20 to +50 °C  Media temperature -20 to +50 °C  Storage ambient temperature -40 to +120 °C  Bake-out temperature (non-operating) +120 °C  Maximum media pressure 10 bar absolute  Mounting position Arbitrary  Protection rating, EN 60529/A2:2013 IP40  Humidity, IEC 68-2-38 98%, non-condensing  Power supply  Supply voltage +3.3 VDC or 4-18 VDC  Power consumption 25 mW (max) 3.3 VDC supply 95 mW (max) 4-18 VDC supply  Reverse polarity protection No		,
Setpoint output source and sink current  Environment conditions  Operating ambient temperature  -20 to +50 °C  Media temperature  -20 to +50 °C  Storage ambient temperature  -40 to +120 °C  Bake-out temperature (non-operating)  +120 °C  Maximum media pressure  10 bar absolute  Mounting position  Arbitrary  Protection rating, EN 60529/A2:2013  IP40  Humidity, IEC 68-2-38  98%, non-condensing  Power supply  Supply voltage  +3.3 VDC or 4-18 VDC  Power consumption  25 mW (max) 3.3 VDC supply  95 mW (max) 4-18 VDC supply  Reverse polarity protection	· · · · · · · · · · · · · · · · · · ·	
Environment conditions  Operating ambient temperature -20 to +50 °C  Media temperature -20 to +50 °C  Storage ambient temperature -40 to +120 °C  Bake-out temperature (non-operating) +120 °C  Maximum media pressure 10 bar absolute  Mounting position Arbitrary  Protection rating, EN 60529/A2:2013 IP40  Humidity, IEC 68-2-38 98%, non-condensing  Power supply  Supply voltage +3.3 VDC or 4-18 VDC  Power consumption 25 mW (max) 3.3 VDC supply 95 mW (max) 4-18 VDC supply  Reverse polarity protection No	<u> </u>	
Operating ambient temperature  -20 to +50 °C  Media temperature  -20 to +50 °C  Storage ambient temperature  -40 to +120 °C  Bake-out temperature (non-operating)  +120 °C  Maximum media pressure  10 bar absolute  Mounting position  Arbitrary  Protection rating, EN 60529/A2:2013  IP40  Humidity, IEC 68-2-38  98%, non-condensing  Power supply  Supply voltage  +3.3 VDC or 4-18 VDC  Power consumption  25 mW (max) 3.3 VDC supply  95 mW (max) 4-18 VDC supply  Reverse polarity protection		
Media temperature-20 to +50 °CStorage ambient temperature-40 to +120 °CBake-out temperature (non-operating)+120 °CMaximum media pressure10 bar absoluteMounting positionArbitraryProtection rating, EN 60529/A2:2013IP40Humidity, IEC 68-2-3898%, non-condensingPower supply-3.3 VDC or 4-18 VDCPower consumption25 mW (max) 3.3 VDC supply 95 mW (max) 4-18 VDC supplyReverse polarity protectionNo		-20 to +50 °C
Storage ambient temperature -40 to +120 °C  Bake-out temperature (non-operating) +120 °C  Maximum media pressure 10 bar absolute  Mounting position Arbitrary  Protection rating, EN 60529/A2:2013 IP40  Humidity, IEC 68-2-38 98%, non-condensing  Power supply  Supply voltage +3.3 VDC or 4-18 VDC  Power consumption 25 mW (max) 3.3 VDC supply 95 mW (max) 4-18 VDC supply	• •	-20 to +50 °C
Bake-out temperature (non-operating) +120 °C  Maximum media pressure 10 bar absolute  Mounting position Arbitrary  Protection rating, EN 60529/A2:2013 IP40  Humidity, IEC 68-2-38 98%, non-condensing  Power supply  Supply voltage +3.3 VDC or 4-18 VDC  Power consumption 25 mW (max) 3.3 VDC supply 95 mW (max) 4-18 VDC supply  Reverse polarity protection No	-	-40 to +120 °C
Maximum media pressure10 bar absoluteMounting positionArbitraryProtection rating, EN 60529/A2:2013IP40Humidity, IEC 68-2-3898%, non-condensingPower supplySupply voltage+3.3 VDC or 4-18 VDCPower consumption25 mW (max) 3.3 VDC supply 95 mW (max) 4-18 VDC supplyReverse polarity protectionNo		+120 °C
Mounting position  Arbitrary  Protection rating, EN 60529/A2:2013  Humidity, IEC 68-2-38  98%, non-condensing  Power supply  Supply voltage  +3.3 VDC or 4-18 VDC  Power consumption  25 mW (max) 3.3 VDC supply 95 mW (max) 4-18 VDC supply No		10 bar absolute
Protection rating, EN 60529/A2:2013  Humidity, IEC 68-2-38  98%, non-condensing  Power supply  Supply voltage  +3.3 VDC or 4-18 VDC  Power consumption  25 mW (max) 3.3 VDC supply 95 mW (max) 4-18 VDC supply No	Mounting position	Arbitrary
Power supply Supply voltage +3.3 VDC or 4-18 VDC  Power consumption 25 mW (max) 3.3 VDC supply 95 mW (max) 4-18 VDC supply  Reverse polarity protection No	<u>.                                    </u>	·
Power supply Supply voltage +3.3 VDC or 4-18 VDC  Power consumption 25 mW (max) 3.3 VDC supply 95 mW (max) 4-18 VDC supply  Reverse polarity protection No	Humidity, IEC 68-2-38	98%, non-condensing
Supply voltage +3.3 VDC or 4-18 VDC  Power consumption 25 mW (max) 3.3 VDC supply 95 mW (max) 4-18 VDC supply  Reverse polarity protection No		<u> </u>
95 mW (max) 4-18 VDC supply Reverse polarity protection No		+3.3 VDC or 4-18 VDC
Reverse polarity protection No	Power consumption	25 mW (max) 3.3 VDC supply
·	·	95 mW (max) 4-18 VDC supply
·	Reverse polarity protection	No
		No
Materials	Materials	
Vacuum exposed materials (media wetted) 304 Stainless steel, Kovar, glass, silicon,	Vacuum exposed materials (media wetted)	304 Stainless steel, Kovar, glass, silicon,
nickel, aluminum, SiO <sub>2</sub> , Si <sub>3</sub> N <sub>4</sub> , gold, low out-	·	nickel, aluminum, SiO <sub>2</sub> , Si <sub>3</sub> N <sub>4</sub> , gold, low out-
gassing epoxy resin, Viton <sup>(1)</sup>		gassing epoxy resin, Viton <sup>(1)</sup>
Sensor leak tightness (ISO 27895:2009) <1·10 <sup>-9</sup> mbar·l/s	Sensor leak tightness (ISO 27895:2009)	<1·10 <sup>-9</sup> mbar·l/s
Approvals	<u> </u>	
RoHS compliance Directive EU 2015/863		Directive EU 2015/863



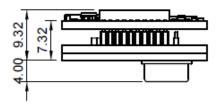
## Connector Pin outs (10 pin 0.5 mm pitch FCC)

Pin	Description
1	Supply voltage – (return)
2	Supply voltage 3.3 VDC or 4-18 VDC <sup>(2)</sup>
3	Analog voltage signal – (return)
4	Analog voltage signal +
5	Setpoint 3 output
6	Setpoint 2 output
7	Setpoint 1 output
8	UART receive or RS-485 B (2)
9	UART transmit or RS-485 A (2)
10	Remote Zero input

<sup>(2)</sup> Part number dependent

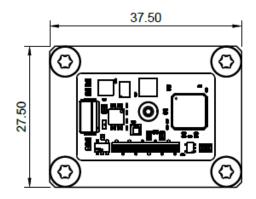
## **Dimensions**

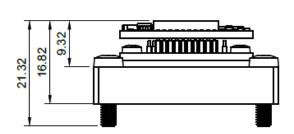
All dimensions in mm.



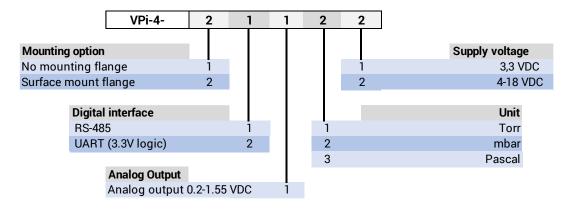
## **Dimensions with surface mount flange**

All dimensions in mm.





## **Order guide**



#### **Evaluation kit**

iVacSens™ Evaluation kits	Part number
VPi-4-12111 Evaluation kit USB, DN16KF	VPi-4-12111-EVL
VPi-4-12112 Evaluation kit USB, DN16KF	VPi-4-12112-EVL
VPi-4-12121 Evaluation kit USB, DN16KF	VPi-4-12121-EVL
VPi-4-12122 Evaluation kit USB, DN16KF	VPi-4-12122-EVL
VPi-4-12131 Evaluation kit USB, DN16KF	VPi-4-12131-EVL
VPi-4-12132 Evaluation kit USB, DN16KF	VPi-4-12132-EVL
VPi-4-13111 Evaluation kit USB, DN16KF	VPi-4-13111-EVL
VPi-4-13112 Evaluation kit USB, DN16KF	VPi-4-13112-EVL
VPi-4-13121 Evaluation kit USB, DN16KF	VPi-4-13121-EVL
VPi-4-13122 Evaluation kit USB, DN16KF	VPi-4-13122-EVL
VPi-4-13131 Evaluation kit USB, DN16KF	VPi-4-13131-EVL
VPi-4-13132 Evaluation kit USB, DN16KF	VPi-4-13132-EVL

#### **Accessories**

iVacSens™ connection cables	Part number
FCC flat cable 0.5 mm pitch 10 pin 30 mm length	CAB-FCC10P-030
FCC flat cable 0.5 mm pitch 10 pin 50 mm length	CAB-FCC10P-050
FCC flat cable 0.5 mm pitch 10 pin 100 mm length	CAB-FCC10P-100
FCC flat cable 0.5 mm pitch 10 pin 150 mm length	CAB-FCC10P-150
FCC flat cable 0.5 mm pitch 10 pin 200 mm length	CAB-FCC10P-200
FCC flat cable 0.5 mm pitch 10 pin 300 mm length	CAB-FCC10P-300

## Other iVacSens™ Series products

The VPi iVacSens™ includes the VPi-5 with MEMS Pirani sensor and piezo diaphragm and VPi-7 with MEMS Pirani, piezo diaphragm sensor and atmospheric switch function. For more information visit <a href="https://www.sens4.com/ivacsens-series/">www.sens4.com/ivacsens-series/</a>

#### **About**

Copyright © 2020, Sens4 A/S

Sens4 develops, manufactures, markets, and distributes vacuum, pressure and temperature measuring equipment for industrial applications worldwide. Our products are designed, engineered, and manufactured in Denmark to the highest quality standards. Our mission is to continuously endeavor to provide customer centric state of the art measurement solutions.

Our passion | Your value™









Sens4 A/S | Ndr. Strandvej 119G | 3150 Hellebaek | Denmark

Rev: A, Oct. 2020





