PENNINGVAC-Transmitter PTR 90 N

PENNINGVAC Transmitter PTR 90 N analog (left); digital (middle), with Display (right)

The PENNINGVAC transmitter combines the cold cathode ionization principle with the MEMS-Pirani sensor. This allows the complete coverage of the measurement range from 1 x 10^{-8} mbar to atmosphere by a single transmitter. The compact design, broad measurement range and cost efficiency make this transmitter the perfect gauge for several applications.

Advantages to the User

- Enhanced reliability through automatically turning on the cold cathode by the MEMS-Pirani
- Significantly higher accuracy in the upper range by using the MEMS Pirani
- Longer lifetime due to low cold cathode turn on pressure
- High reproducibility
- Available with display for pressure units, set point parameters and operation status
- Wide measurement range combining two sensor technologies into a single output
- Ease of serviceability by modular design of the cold cathode
- Automatic zeroing during pump down cycle for improved accuracy
- LED ring to indicate status of the sensor
- Measurement signal insensitive to mounting position

Typical Applications

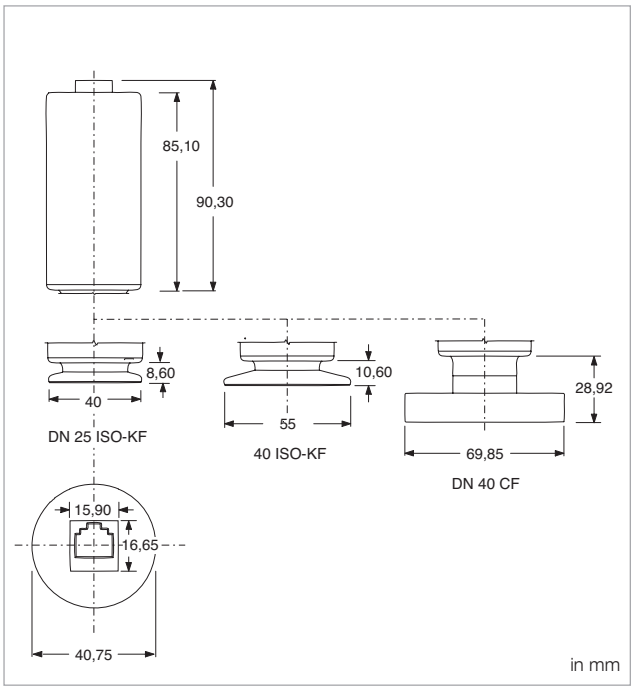
Typical Applications within the measurement range from 1 x 10^{-8} mbar to atmosphere are:

- General vacuum base pressure measurement
- Sputtering and coating technology
- Analytical technology (e. g. mass spectrometer control)
- Vacuum Furnaces
- Multipurpose pressure measurement and control up to the high vacuum range
- Metallurgy
- Scanning electron microscopes
- Process industry

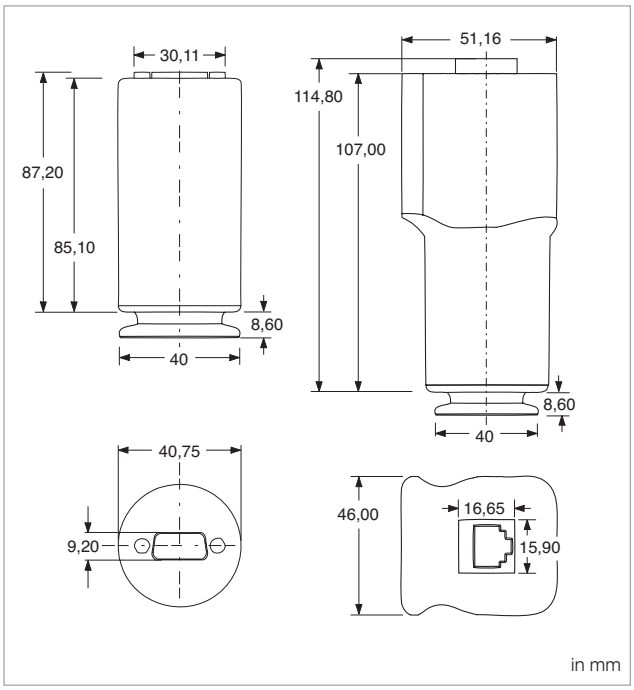
Option

For protection of the sensor PTR 90 N against contamination, radiation and other disturbing factors the installation of a baffle is recommended.

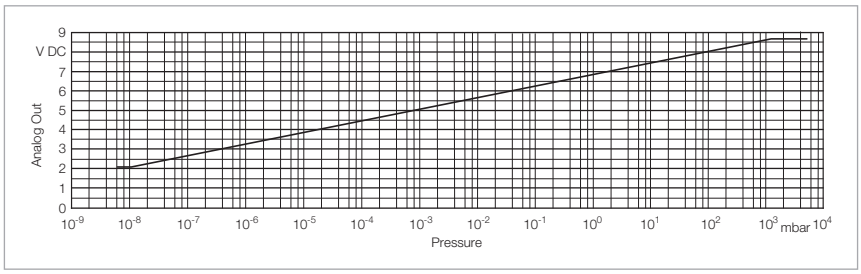
Two types of baffles are available:
A build-in version for CF connections is mounted in the sensor; the baffle for ISO-KF connections is integrated in a centering ring.



Dimensional drawing for the PENNINGVAC transmitter PTR 90 N



Dimensional drawing for the PENNINGVAC transmitters
PTR 90 N, RS 232 (left) and PTR 90 N, EtherCAT (right)



Characteristics of the PENNINGVAC Transmitters PTR 90 N

Technical Data

PENNINGVAC Transmitter PTR 90 N

Measurement range	**mbar (Torr)**	1.0 x 10^{-8} to 1000 (0.75 x 10^{-8} to 750)
Measurement uncertainty of reading (typical) [1]		
Cold cathode	**mbar**	1 x 10^{-8} to 5 x 10^{-4} ±30 %
MEMS Pirani	**mbar**	5 x 10^{-4} to 1 x 10^{-3} ±10 % 1 x 10^{-3} to 100 ±5 % 100 to 1000 ±25 %
Repeatability of reading (typical) [1]	**mbar**	1 x 10^{-3} to 100 ±2 %
Sensor		Cold cathode and MEMS Pirani
Measurement principle		Cold cathode ionization and thermal conductivity
Supply voltage	**V DC**	9 – 30
Power consumption	**W**	< 2
Electrical connection		FCC 68, RJ 45 (analog) / Sub-D 15 PIN (digital)
Analog output	**V DC**	V_{out} = log 0.6 (P_{mbar}) + 6.8 2.0 to 8.668 / 2.0 to 8.667 [RS 232]
Resolution	**bit**	16
Impedance	**Ω**	100
Update rate	**Hz**	16
Interfaces		FCC 68, RJ 45 (analog) / RS232, EtherCAT (digital)
Set point		
Range	**mbar (Torr)**	1.0 x 10^{-8} to 1000 (0.75 x 10^{-8} to 750)
Relay		0 / 2 [RS 232]
Relay contact rating		1 A at 30 V AC / DC, resistive load
Relay contact resistance, max.	**mΩ**	100
Relay contact endurance, min.		
1.0 A at 30 V DC load		100 000
0.2 A at 30 V DC load		2 000 000
Status indicators		LED-ring (360°)
Max. cable lenght	**m**	100
Overpressure limit	**bar**	6
Operating temperature range [2]	**°C (°F)**	0 to 60 (32 to 140)
Storage temperature range	**°C (°F)**	-20 to +65 (-4 to 149)
Max. bakeout temperature (power off)	**°C (°F)**	85 (185)
Max. rel. humidity	**% n.c.**	0 – 95
Installation orientation		Any
Materials exposed to vacuum		304 stainless steel, 403 stainless steel, Ceramic (Al_2O_3), Tin, Gold, Viton®, Titanium
Dead volume (DN 25 ISO-KF), approx.	**cm^3**	28.6
Weight (DN 25 ISO-KF)	**g**	321
Protection class	**IP**	40
CE certification		EMC Directive 2014/30/EEC
Controller type		DISPLAY ONE / TWO / THREE and GRAPHIX ONE / TWO / THREE

[1] Accuracy and repeatability are typical values measured with Nitrogen gas at ambient temperature after zero adjustment

[2] There may be minimal deviation tolerances in the range of 40 - 60 °C

Ordering Information

PENNINGVAC Transmitter PTR 90 N

	Part No.
PTR 90 N	
DN 25 ISO-KF, FCC 68 / RJ 45	**230070V02**
DN 25 ISO-KF, Display, FCC 68 / RJ 45	**230085V02**
DN 25 ISO-KF, EtherCAT	**230089V02**
DN 25 ISO-KF, 2 SP, RS 232	**230088V02**
DN 40 ISO-KF, FCC 68 / RJ 45	**230071V02**
DN 40 CF, FCC 68 / RJ 45	**230072V02**
Replacement cathode plate	
for PTR 90 N / PTR 225 N (up to serial no. 17022777352)	**EK16291V02**
for PTR 90 N / PTR 225 N (from serial no. 17022777353)	**EK16292V02**
Replacement anode ring	
for PTR 90 N / PTR 225 N (up to serial no. 17022777352)	**20028711V02**
for PTR 90 N / PTR 225 N (from serial no. 17022777353)	**E20028712V02**
Baffle, with centering ring (FPM (FKM))	
DN 25 ISO-KF	**230 078**
DN 40 ISO-KF	**230 079**
Calibration	see chapter “Miscellaneous”, para. “Leybold Calibration Service”
Operating Units	
DISPLAY ONE	**230 001**
DISPLAY TWO	**230 024**
DISPLAY THREE	**230 025**
GRAPHIX ONE	**230680V01**
GRAPHIX TWO	**230681V01**
GRAPHIX THREE	**230682V01**
Connection cable, FCC 68 on both ends[1)]	**Type A**
5 m	**124 26**
10 m	**230 012**
15 m	**124 27**
20 m	**124 28**
30 m	**124 29**
50 m	**124 31**
75 m	**124 32**
100 m	**124 33**
Connection cable, RS 232 [1)]	**Type G**
5 m	**230550V01**
10 m	**230551V01**
15 m	**230552V01**
20 m	**230553V01**
RS232 / USB Converter for setpoint definition of RS232 gauges	**230399V02**

[1)] See chapter “Connection cables for Active Sensors”

PENNINGVAC Transmitters PTR 225 N, PTR 237 N

PENNINGVAC Transmitter PTR 225 N analog (left), PTR 225 N digital (middle), PTR 237 N analog (right)

The PENNINGVAC Transmitters are based on the cold cathode measurement principle. The compact design and broad measuring range of the PTR 225 N, makes it well suited for easy system integration and process control from medium to high vacuum pressure. Options include various serial interfaces and programmable setpoint relays, making it an ideal transmitter for control systems.

Advantages to the User

- Good performance to price ratio
- Available with up to three setpoints
- Ease of serviceability by modular design of the cold cathode
- High reproducibility and high accuracy
- Available with display for pressure units, set point parameters and operation status
- LED ring to indicate status of the sensor
- Measurement signal insensitive to mounting position
- Optional Computer interfaces: EtherCAT and RS 232

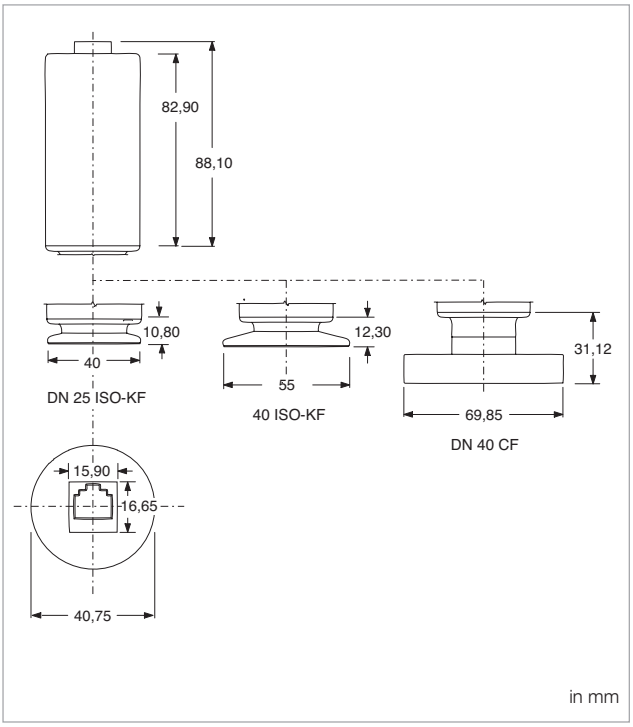
Typical Applications

- Analytical Instrumentation
- Scanning electron microscopes
- Evaporation and sputtering systems
- High vacuum systems
- Coating systems
- Vacuum furnaces
- Cryo processes
- Systems control in the medium and high vacuum range

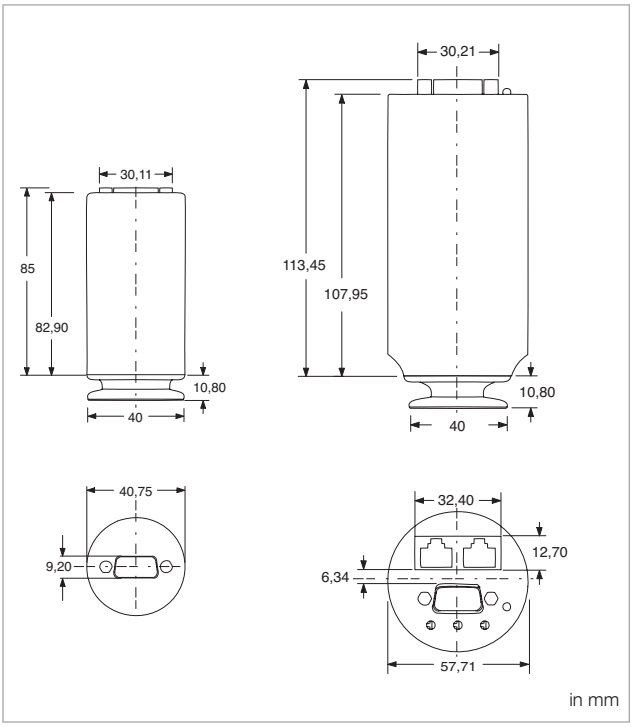
Option

For protection the PTR sensors against contamination, radiation and other disturbing factors the installation of a baffle is recommended.

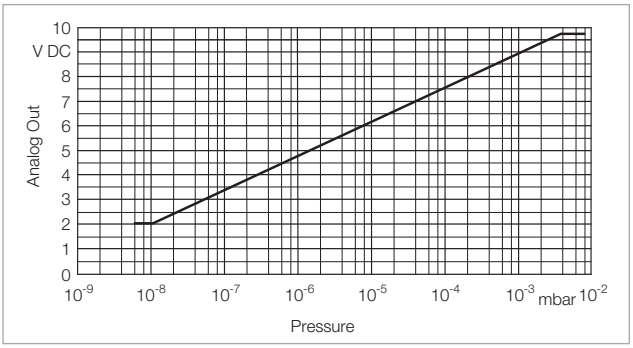
Baffle DN 25 ISO-KF, with centering ring,
Part No. 230 078



Dimensional drawing for the PENNINGVAC transmitters
PTR 225 N and PTR 237 N



Dimensional drawing for the PENNINGVAC transmitters
PTR 225 N, RS 232 (left) and PTR 225 N, EtherCAT (right)



Characteristic of the PENNINGVAC transmitters PTR 225 S/237

Technical Data

	PENNINGVAC Transmitter PTR 225 N / PTR 237 N
Measurement range mbar (Torr)	1.0 x 10^{-8} to 5 x 10^{-3} (0.75 x 10^{-8} to 3.75 x 10^{-3}) 1.0 x 10^{-8} to 6.7 x 10^{-3} (0.75 x 10^{-8} to 5.0 x 10^{-3}) [RS 232/EtherCAT]
Measurement uncertainty of reading [1] Cold cathode mbar	 1 x 10^{-8} to 1 x 10^{-3} ±30 %
Repeatability of reading [1] mbar	1 x 10^{-8} to 1 x 10^{-3} ±30 %
Sensor Measurement principle	Cold cathode Cold cathode ionization
Supply voltage V DC	9 – 30
Power consumption W	< 2
Electrical connection	FCC 68 / RJ 45, RS 232
Analog output V DC Resolution bit Impedance Ω Update rate Hz	V_{out} = 1.33 x log 10 (P_{mbar}) + 12.66 2.0 to 9.6 16 100 16
Interfaces	FCC 68 / RJ 45
Set point Relay range mbar (Torr) Relay Relay contact rating Relay contact resistance mΩ Relay contact endurance, min. 1.0 A at 30 V DC load 0.2 A at 30 V DC load	 1 x 10^{-8} to 5 x 10^{-3} (0.75 x 10^{-8} to 3.75 x 10^{-3}) 2 [RS 232) 1 A at 30 V AC / DC, resistive load 100 100 000 2 000 000
Status indicators	LED-ring (360°)
Max. cable lenght m	100
Overpressure limit bar	6
Operating temperature range [2] °C (°F)	0 to 60 (32 to 140)
Storage temperature range °C (°F)	-20 to +65 (-4 to 149)
Max. bakeout temperature (power off) °C (°F)	85 (185)
Max. rel. humidity % n.c.	0 – 95
Installation orientation	Any
Materials exposed to vacuum	304 stainless steel, 403 stainless steel, Ceramic (Al_2O_3), Viton®, Titanium
Dead volume (DN 25 ISO-KF), approx. cm^3	25.6
Weight (DN 25 ISO-KF) g	318
Protection class IP	40
CE certification	EMC Directive 2014/30/EC
Controller type	DISPLAY ONE / TWO / THREE and GRAPHIX ONE / TWO / THREE

[1] Accuracy and repeatability are typical values measured with Nitrogen gas at ambient temperature after zero adjustment

[2] There may be minimal deviation tolerances in the range of 40 – 60 °C

Ordering Information

PENNINGVAC Transmitter PTR 225 N / PTR 237 N

	Part No.
PTR 225 N	
DN 25 ISO-KF, FCC 68 / RJ 45	**15734V02**
DN 25 ISO-KF, 3 SP, RS 232	**89642V02**
DN 25 ISO-KF, EtherCAT	**230703V02**
PTR 237 N	
DN 40 CF, FCC 68 / RJ 45	**15736V02**
Replacement cathode plate	
for PTR 90 N / PTR 225 N (up to serial no. 17022777352)	**EK16291V02**
for PTR 90 N / PTR 225 N (from serial no. 17022777353)	**EK16292V02**
Replacement anode ring	
for PTR 90 N / PTR 225 N (up to serial no. 17022777352)	**20028711V02**
for PTR 90 N / PTR 225 N (from serial no. 17022777353)	**E200287112V02**
Baffle, with centering ring (FPM (FKM))	
DN 25 ISO-KF	**230 078**
Calibration	see chapter “Miscellaneous”, para. “Leybold Calibration Service”
Operating Units	
DISPLAY TWO	**230 024**
DISPLAY THREE	**230 025**
GRAPHIX ONE	**230680V01**
GRAPHIX TWO	**230681V01**
GRAPHIX THREE	**230682V01**
Connection cable, FCC 68 on both ends [1]	**Type A**
5 m	**124 26**
10 m	**230 012**
15 m	**124 27**
20 m	**124 28**
30 m	**124 29**
50 m	**124 31**
75 m	**124 32**
100 m	**124 33**
Connection cable, RS 232 [1]	**Type G**
5 m	**230550V01**
10 m	**230551V01**
15 m	**230552V01**
20 m	**230553V01**
RS232 / USB Converter for setpoint definition of RS232 gauges	**230399V02**

[1] See chapter “Connection cables for Active Sensors”