

Vacuum Control Catalog 2024 - 2026

Vacuum Gauges, Fittings and Feedthroughs



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VACUUM GAUGES

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Vacuum Gauges

Vacuum Gauges

Active Vacuum Gauges & Controller

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Ambient Capacitance Diaphragm Gauge

Porter® CDG020D

The INFICON Porter CDG020D Capacitance Diaphragm Gauge is a high quality, cost effective, gas type independent absolute pressure sensor. The Porter is designed for stable long time performance in industrial environments. The ceramic sensor provides excellent span stability over many years of maintenance free operation paired with outstanding zero stability. The sensor architecture made from a single material guarantees excellent temperature compensation. Fully digital electronics and small footprint defines flexibility in any integration.



ADVANTAGES

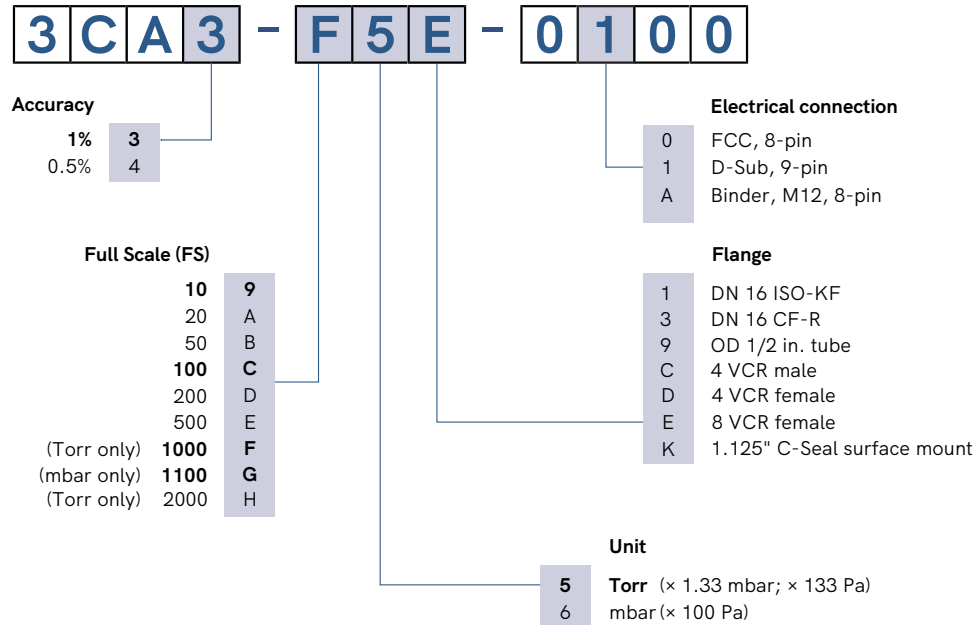
- Excellent span stability - gas type independent
- Alumina sensor
- Compact, smallest size in it's class
- Easy integration, any mounting orientation
- Digital signal processing
- Maintenance free

APPLICATIONS

- Vacuum coating
- Vacuum monitoring
- Sterilization
- Food and packaging
- Vacuum oven, puller
- Analytical
- Chemical vacuum processes

Porter® CDG020D

ORDERING INFORMATION



bold = standard products

Other flange types on request.

Porter® CDG020D

SPECIFICATIONS

Full scale (FS)	10 ... 2000 Torr / mbar
Accuracy ¹⁾	
3CA3-xxx-xxx	1 % of reading
3CA4-xxx-xxx	0.5 % of reading
Temperature effect	
On zero	0.02 % FS / °C
On span	0.02 % of reading / °C
Resolution	0.05 % FS
Long time stability	0.5 % FS / year
Lowest reading	0.05 % FS
Temperature compensated range	+10 ... +50 °C
Admissible temperature	
Operation (ambient)	0 ... +70 °C
Bakeout at flange ²⁾	≤110 °C
Storage	-20 ... +85 °C
Ambient humidity limits	<80% RH, non-condensing
Supply voltage	
At the gauge	+13 ... +30 V (dc)
Power consumption	≤0.3 W
Output signal (analog)	0 ... +10 V (dc)
Max. output voltage	+10.24 V (dc)
Response time ³⁾	100 ms
Degree of protection	IP 40
Standards	
CE conformity	EMC (EN 61000-6-2, EN 61000-6-3), EN 61010-1 and RoHS
ETL certification	UL 61010-1, CAN/CSA C22.2 No. 61010-1
SEMI compliance	SEMI S2
Electrical connection	
3CAx-xxx-0000	FCC, 8-pin
3CAx-xxx-0100	D-Sub, 9-pin, male
3CAx-xxx-0A00	Binder M12, 8-pin, male
Materials exposed to vacuum	ceramics (Al ₂ O ₃), stainless steel (AISI 316L)
Tightness	<1x10 ⁻⁹ mbar l/s
Mounting orientation	any
Internal volume	≤4.7 cm ³
Weight	80 ... 159 g
Maintenance	none

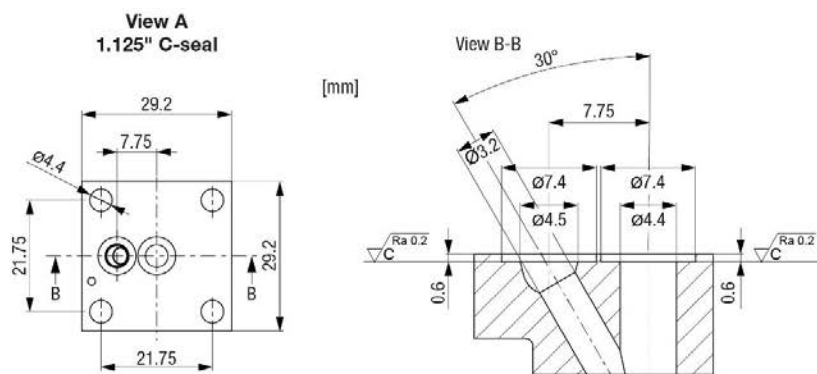
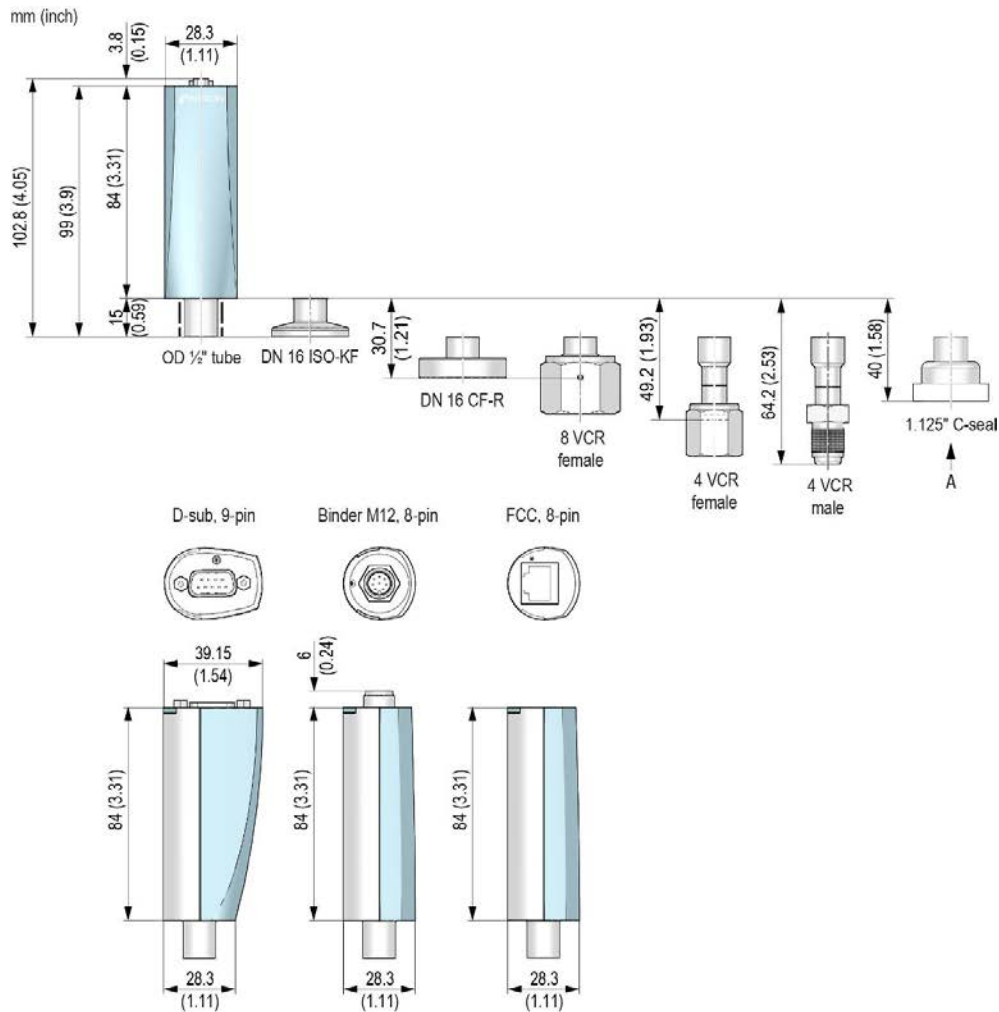
¹⁾ Non-linearity, hysteresis, repeatability at 25°C ambient operating temperature without temperature effects after two hours operation

²⁾ Non-operation

³⁾ Increase 10 ... 90% FS

Porter® CDG020D

DIMENSIONS



Ambient Capacitance Diaphragm Gauge

SKY[®] CDG025D, CDG025D-S

The INFICON SKY CDG025D Capacitance Diaphragm Gauge line of highly accurate temperature compensated manometers is designed for stable performance in harsh manufacturing tool environments. Advanced digital electronics improve gauge performance and offer easy handling features such as one push button zero function and setpoint adjustment. The corrosion resistant ultra pure ceramic sensor provides excellent zero stability with a long life expectancy of several million pressure cycles, including atmospheric bursts. A unique sensor shielding protects the gauge from process contamination. A robust mechanical design and digital electronics improve EMC compatibility, long term stability and temperature compensation. The CDG025D sets new standards for fast stability after power on and fast recovery from atmospheric pressure exposure.



ADVANTAGES

- Full scale (FS) ranges from 100 mTorr ... 1000 Torr
- Fast stability after power on
- Fast recovery from atmospheric pressure
- Corrosion resistant ceramic sensor
- Excellent long term signal stability
- Temperature compensated
- Sensor protected from contamination
- One push button zero function
- Wide range power supply
- Two setpoints (optional)
- RS232 interface (optional)

APPLICATIONS

- Semiconductor manufacturing equipment for Etch, CVD, PVD, ALD
- Data storage and display manufacturing equipment
- Industrial vacuum equipment
- General high accuracy pressure measurement

SKY® CDG025D, CDG025D-S

ORDERING INFORMATION

CDG025D, TEMPERATURE COMPENSATED

Full scale (FS)			Flange type			
Torr	Pascal	mbar	1/2 in. tube	DN 16 ISO-KF	DN 16 CF-R	8 VCR
1000	133,322	1333	375-000	375-001	375-002	375-003
100	13,332	133	376-000	376-001	376-002	376-003
10	1,333	13.3	377-000	377-001	377-002	377-003
1	133	1.3	378-000	378-001	378-002	378-003
0.1	13.3	0.13	379-000	379-001	379-002	379-003

CDG025D-S, WITH 2 SETPOINTS AND RS232 INTERFACE, TEMPERATURE COMPENSATED

Full scale (FS)			Flange type			
Torr	Pascal	mbar	1/2 in. tube	DN 16 ISO-KF	DN 16 CF-R	8 VCR
1000	133,322	1333	375-300	375-301	375-302	375-303
-	110,000	1,100	375-500	375-501	375-502	375-503
200	26,664	267	382-300	382-301	382-302	382-303
100	13,332	133	376-300	376-301	376-302	376-303
-	10,000	100	376-500	376-501	376-502	376-503
20	2,666	26.7	383-300	383-301	383-302	383-303
10	1,333	13.3	377-300	377-301	377-302	377-303
-	1,000	10	377-500	377-501	377-502	377-503
1	133	1.3	378-300	378-301	378-302	378-303
-	100	1	378-500	378-501	378-502	378-503
0.25	33.3	0.33	385-300	385-301	385-302	385-303
0.1	13.3	0.13	379-300	379-301	379-302	379-303
-	10	0.1	379-500	379-501	379-502	379-503

bold = standard products

Other flange types on request.

SKY® CDG025D, CDG025D-S

SPECIFICATIONS

Full scale (FS) Torr / mbar	1000/1100 ... 200	100 ... 5	2 ... 0.5	0.25	0.1
Accuracy ¹⁾	0.2 % of reading			0.25 % of reading	0.5 % of reading
Temperature effect					
on zero	0.005 % FS / °C		0.015 % FS / °C	0.02 % FS / °C	
on span	0.01 % of reading / °C		0.01 % of reading / °C	0.03 % of reading / °C	
Resolution	0.003 % FS				
Pressure, max.	400 kPa (absolute)	260 kPa (absolute)		130 kPa (absolute)	
Response time ²⁾	30 ms			130 ms	
Lowest reading	0.01 % FS				
Lowest suggested					
Reading	0.05 % FS				
Control pressure	0.5 % FS				
Temperature					
Operation (ambient)	+5 ... +50 °C				
Bakeout at flange ³⁾	≤110 °C				
Storage	-40 ... +65 °C				
Supply voltage	+14 ... +30 V (dc)				
Power consumption	≤1 W				
Output signal (analog)	0 ... +10 V (dc)				
Degree of protection	IP 30				
Standards					
CE conformity	EN 61000-6-2, EN 61000-6-3, RoHS				
ETL certification	EN 61010, UL 61010-1, CSA 22.2 No.61010-1				
Electrical connection	D-sub, 15-pin, male				
Setpoint					
Number of setpoints ⁴⁾	2 (SP1, SP2)				
Relay contact	30 / ≤0.5 V (dc) / A (dc)				
Hysteresis	1 % FS				
Materials exposed to vacuum	ceramics (Al ₂ O ₃), Vacon 70, stainless steel (AISI 316L), AgCuTi hard solder, sealing glass				
Internal volume	≤4.0 cm ³				
Weight	285 ... 342 g				

¹⁾ Non-linearity, hysteresis, repeatability at 25°C ambient operating temperature without temperature effects after two hours operation

²⁾ Increase 10 ... 90% FS

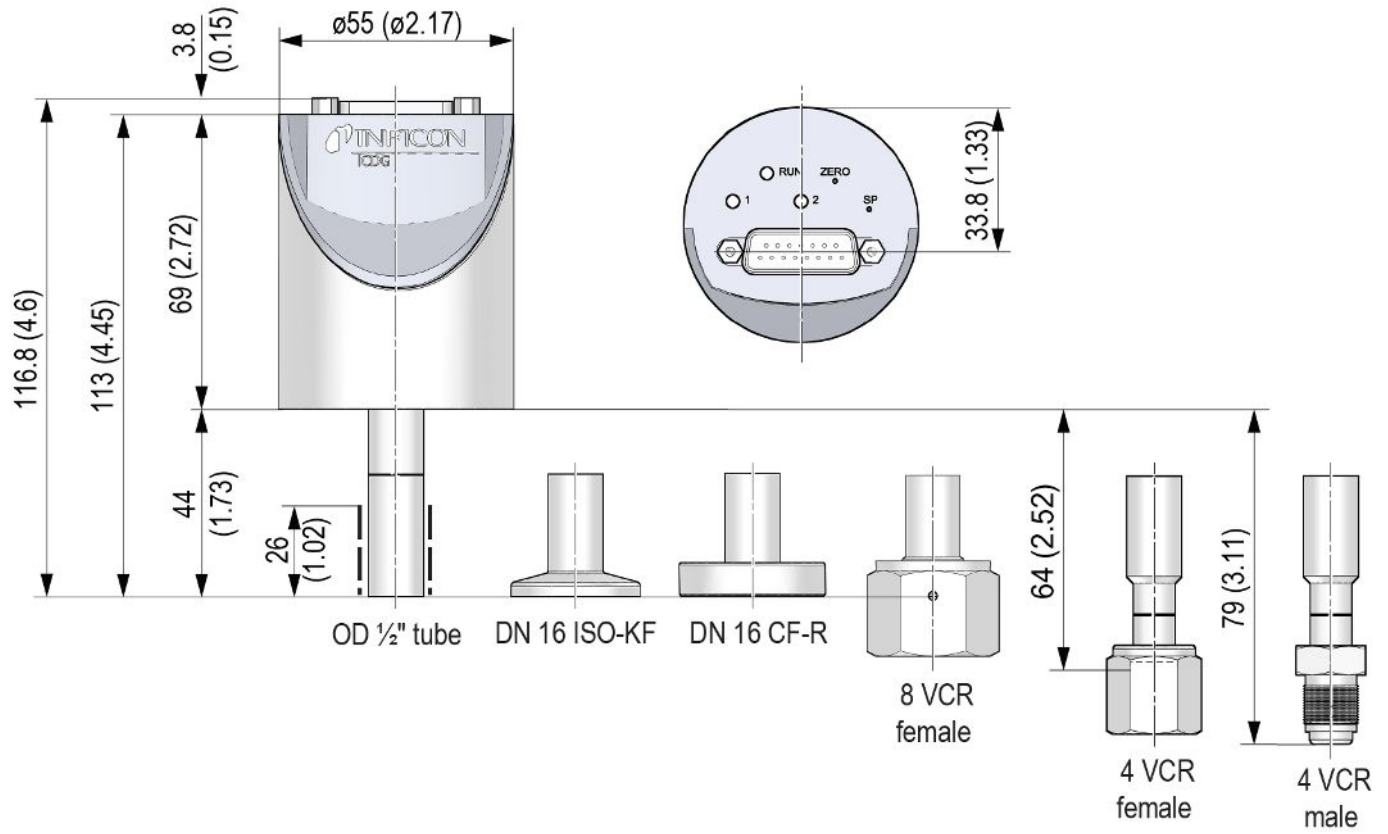
³⁾ Non-operation

⁴⁾ CDG025D-S only

SKY[®] CDG025D, CDG025D-S

DIMENSIONS

mm (inch)



Ambient Capacitance Diaphragm Gauge

SKY® CDG025D-X3

The INFICON SKY CDG025D Capacitance Diaphragm Gauge line of highly accurate temperature compensated manometers is designed for stable performance in harsh manufacturing tool environments. Advanced digital electronics improve gauge performance and offer easy handling features such as one push button zero function and setpoint adjustment. The corrosion resistant ultra pure ceramic sensor provides excellent zero stability with a long life expectancy of several million pressure cycles, including atmospheric bursts. A unique sensor shielding protects the gauge from process contamination. A robust mechanical design and digital electronics improve EMC compatibility, long term stability and temperature compensation. The CDG025D sets new standards for fast stability after power on and fast recovery from atmospheric pressure exposure.



ADVANTAGES

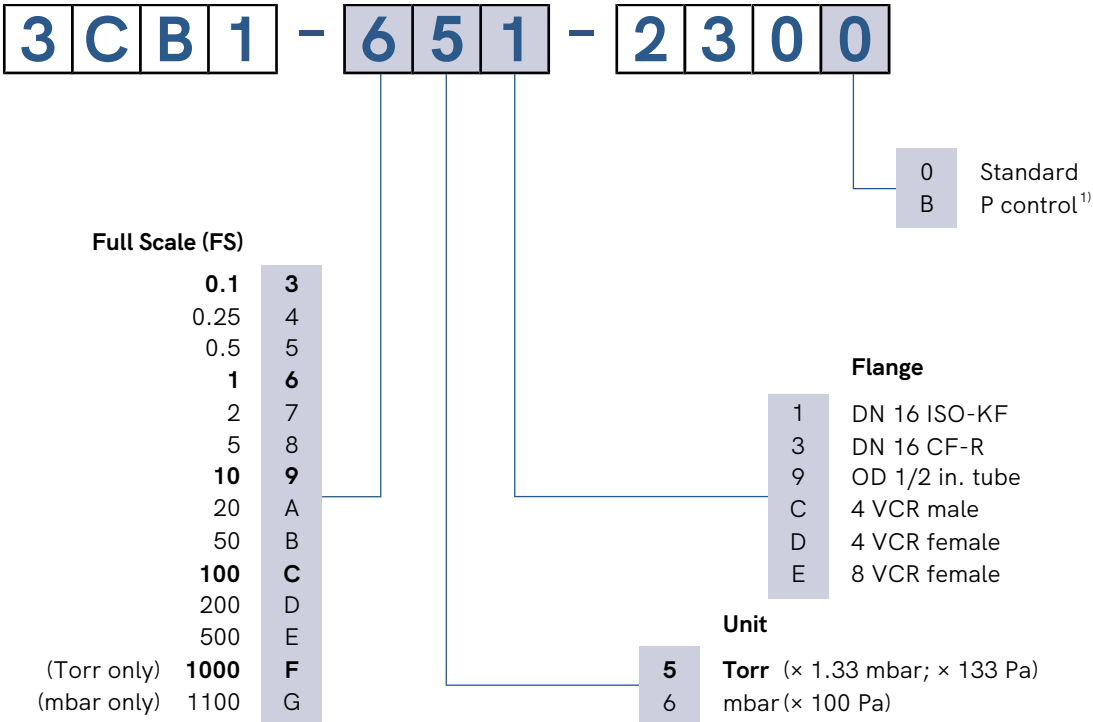
- Full scale (FS) ranges from 100 mTorr ... 1000 Torr
- Fast stability after power on and fast recovery from atmospheric pressure
- Corrosion resistant ceramic sensor
- Excellent long term signal stability
- Temperature compensated
- Sensor double protected from contamination
- One push button zero function
- Wide range power supply
- Two setpoints
- RS232 interface
- Clean room compliant

APPLICATIONS

- Semiconductor manufacturing equipment for Etch, CVD, PVD, ALD
- Data storage and display manufacturing equipment
- Industrial vacuum equipment
- General high accuracy pressure measurement

SKY[®] CDG025D-X3

ORDERING INFORMATION



1) Optimized signal filter setting for pressure control

bold = standard products
Other flange types on request.

SKY® CDG025D-X3

SPECIFICATIONS

Full scale (FS) Torr / mbar	1000 / 1100 ... 200	100 ... 5	2 ... 0.5	0.25	0.1
Accuracy ¹⁾	0.2 % of reading			0.25 % of reading	0.5 % of reading
Temperature effect					
on zero	0.005 % FS / °C		0.015 % FS / °C	0.02 % FS / °C	
on span	0.01 % of reading / °C		0.01 % of reading / °C	0.03 % of reading / °C	
Resolution	0.003 % FS				
Pressure, max. (absolute)	400 kPa	260 kPa		130 kPa	
Response time ²⁾	30 ms			130 / 30 ³⁾ ms	
Lowest reading	0.01 % FS				
Lowest suggested					
Reading	0.05 % FS				
Control pressure	0.5 % FS				
Temperature					
Operation (ambient)	+5 ... +50 °C				
Bakeout at flange ⁴⁾	≤110 °C				
Storage	-20 ... +65 °C				
Supply voltage	+14 ... +30 V (dc)				
Power consumption	≤1 W				
Output signal (analog)	0 ... +10 V (dc)				
Degree of protection	IP 30				
Standards					
CE conformity	EN 61000-6-2, EN 61000-6-3, EN 61010, RoHS				
ETL certification	UL 61010-1, CSA 22.2 No.61010-1				
Electrical connection	D-Sub, 15-pin, male				
Setpoint					
Number of setpoints	2 (SP1, SP2)				
Relay contact	30 V (dc) / ≤0.5 A (dc)				
Hysteresis	1 % FS				
Materials exposed to vacuum	ceramics (Al ₂ O ₃), stainless steel (AISI 316L)				
Internal Volume	≤5.1 cm ³				
Weight	285 ... 342 g				

¹⁾ Non-linearity, hysteresis, repeatability at 25°C ambient operating temperature without temperature effects after two hours operation

²⁾ Increase 10 ... 90% FS

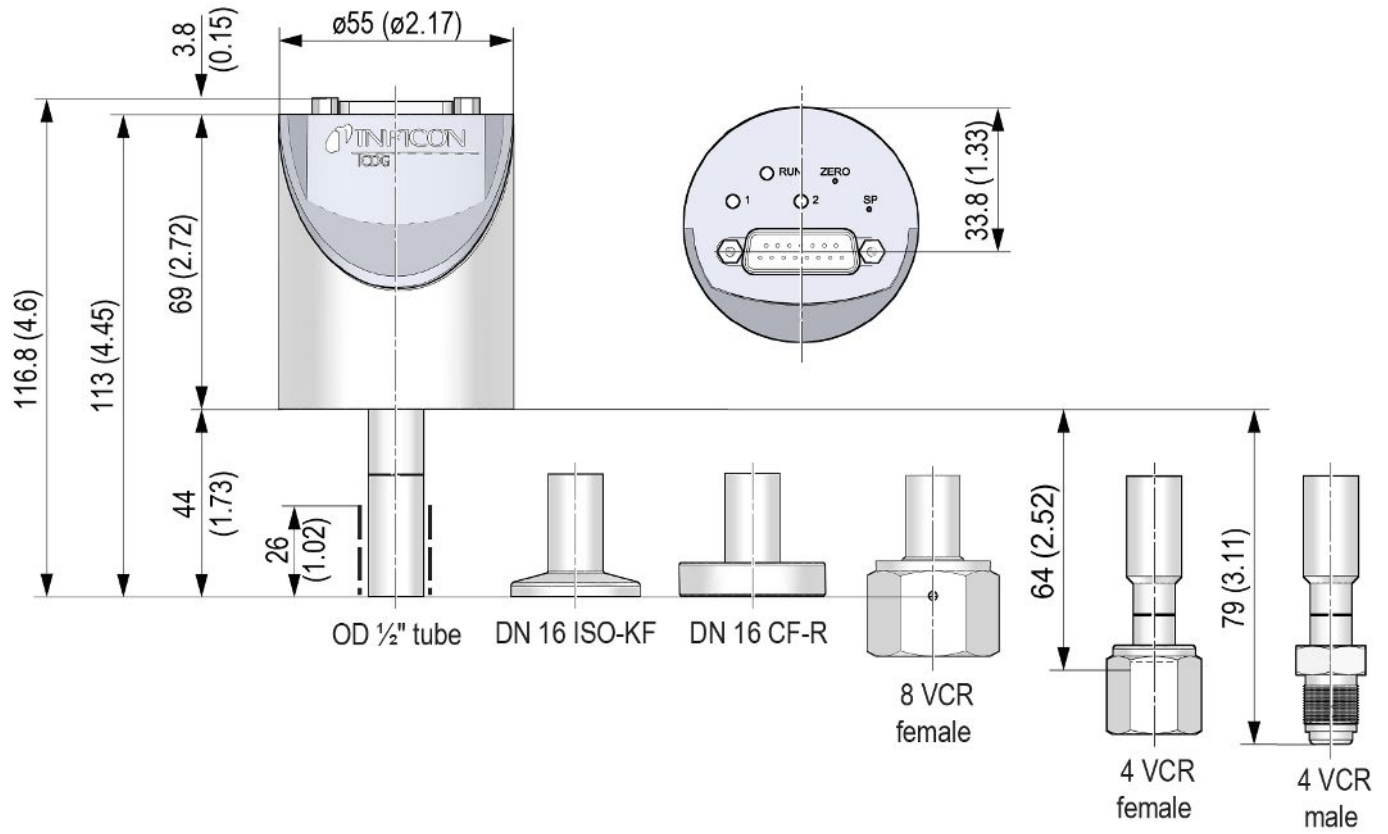
³⁾ For pressure control type only

⁴⁾ Non-operation

SKY® CDG025D-X3

DIMENSIONS

mm (inch)



Ambient Capacitance Diaphragm Gauge

SKY® CDG025D-X3 4-20mA current loop

The INFICON SKY CDG025D Capacitance Diaphragm Gauge line of highly accurate temperature compensated manometers is designed for stable performance in harsh manufacturing tool environments. Advanced digital electronics improve gauge performance and offer easy handling features such as one push button zero function and setpoint adjustment. The corrosion resistant ultra pure ceramic sensor provides excellent zero stability with a long life expectancy of several million pressure cycles, including atmospheric bursts. A unique sensor shielding protects the gauge from process contamination. A robust mechanical design and digital electronics improve EMC compatibility, long term stability and temperature compensation. The CDG025D sets new standards for fast stability after power on and fast recovery from atmospheric pressure exposure.



ADVANTAGES

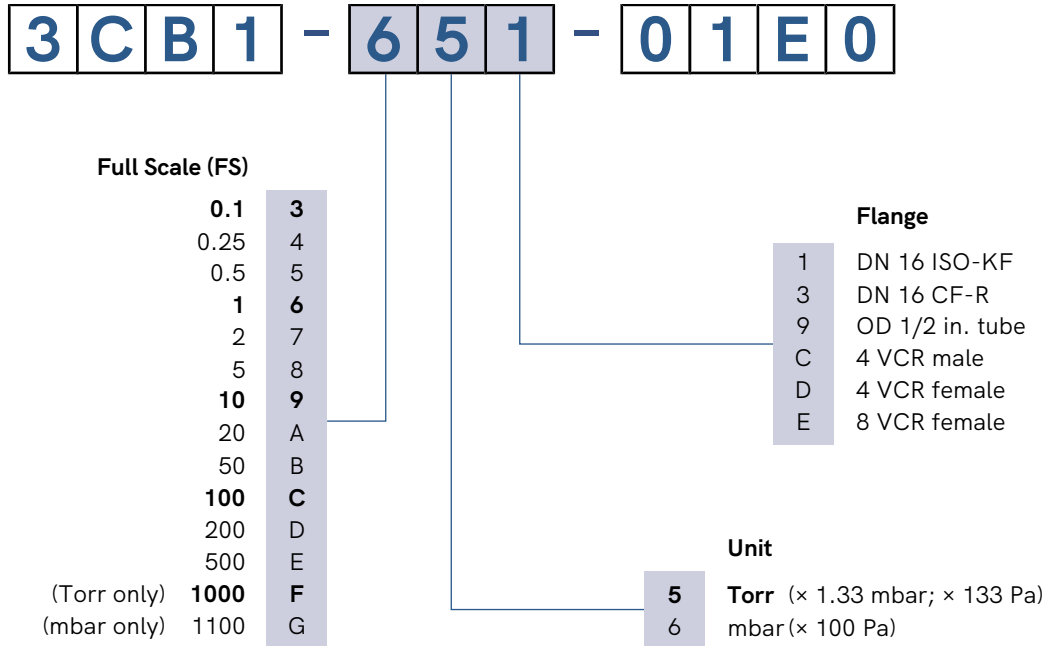
- Full scale (FS) ranges from 100 mTorr ... 1000 Torr
- Fast stability after power on and fast recovery from atmospheric pressure
- Corrosion resistant ceramic sensor with double protection from contamination
- Excellent long term signal stability
- Temperature compensated
- One push button zero function, remote zero included
- Interface with 2-wire current loop
- Long cable distance (<300 m)
- Low energy gauge
- Clean room compliant
- Status LED

APPLICATIONS

- Semiconductor manufacturing equipment for Etch, CVD, PVD, ALD
- Data storage and display manufacturing equipment
- Industrial vacuum equipment
- General high accuracy pressure measurement

SKY® CDG025D-X3 4-20mA current loop

ORDERING INFORMATION



bold = standard products

Other flange types on request.

SKY® CDG025D-X3 4-20mA current loop

SPECIFICATIONS

Full scale (FS) Torr / mbar	1000 / 1100 ... 200	100 ... 5	2 ... 0.5	0.25	0.1
Accuracy ¹⁾	0.2 % of reading			0.25 % of reading	0.5 % of reading
Temperature effect					
on zero	0.005 % FS / °C		0.015 % FS / °C	0.02 % FS / °C	
on span	0.01 % of reading / °C		0.01 % of reading / °C	0.03 % of reading / °C	
Resolution	0.003 % FS				
Pressure, max. (absolute)	400 kPa	260 kPa		130 kPa	
Response time ²⁾	≤100 ms				
Lowest reading	0.01 % FS				
Lowest suggested					
Reading	0.05 % FS				
Control pressure	0.5 % FS				
Temperature					
Operation (ambient)	+5 ... +60 °C				
Bakeout at flange ³⁾	≤110 °C				
Storage	-20 ... +65 °C				
Supply voltage	+21 ... +27 V (dc)				
Output signal (analog)	2-wire, current loop				
Relationship current- pressure	linear				
Signal range	3.8 ... 20.2 mA				
Measuring range (zero ... FS)	4.0 ... 20.0 mA				
Loaded impedance RL					
Ω	typical 500Ω±1% 24±3 V (dc) ⁴⁾				
absolute	309 ... 657Ω at 24 V (dc) ⁴⁾				
remote zero input	digital input, floating contact				
High level (pulse > 1s)	+21 ... +27 V (dc) / ≤8 mA				
Low level	≤2				
remote zero function					
High level (pulse > 1s)	auto zero adjust				
Low level	measurement operation				
Degree of protection	IP 30				
Standards					
CE conformity	EN 61000-6-3, EN 61010, 61326-1 & RoHS				
ETL certification	UL 61010-1, CSA 22.2 No.61010-1				
Electrical connection	D-Sub, 9-pin, male				
Sensor cable					
Without remote zero	two-wire cable plus shielding, twisted				
With remote zero	four-wire cable plus shielding, twisted				
Materials exposed to vacuum	ceramics (Al ₂ O ₃), stainless steel (AISI 316L)				
Internal volume	≤5.1 cm ³				
Weight	277 ... 334 g				

¹⁾ Non-linearity, hysteresis, repeatability at 25°C ambient operating temperature without temperature effects after two hours operation

²⁾ Increase 10 ... 90% FS

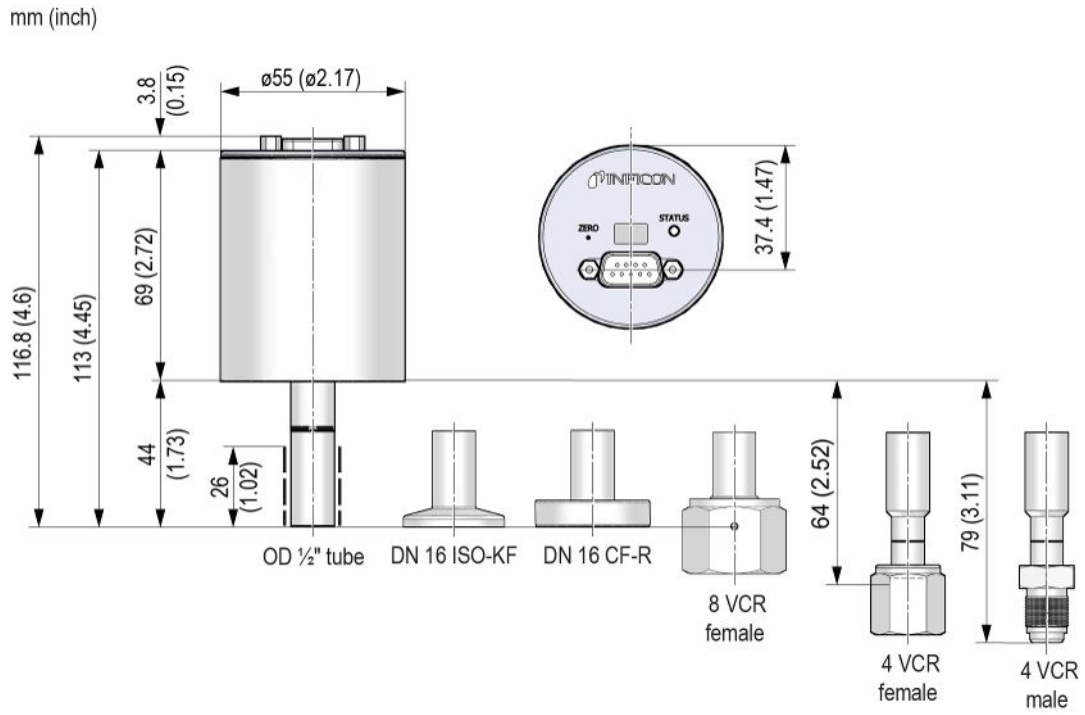
³⁾ Non-operation

⁴⁾ Supply voltage at the gauge

SKY® CDG025D-X3 4-20mA current loop

DIMENSIONS

mm (in.)



Ambient Capacitance Diaphragm Gauge

Edge[®] CDG025D2 with EtherCAT

INFICON temperature compensated Edge CDG025D2 with EtherCAT Capacitance Diaphragm Gauge is a highly accurate vacuum measurement instrument designed for harsh manufacturing environments.

The proven temperature compensated, corrosion resistant, ultra-pure ceramic sensor provides superior span stability over many years paired with state-of-the-art zero stability. Edge comes with the INFICON patented unique sensor shield which protects the gauge from undesired process by-products. Advanced electronics offer a wide range of configurable signal conditioning for all applications with EtherCAT fieldbus interface.



ADVANTAGES

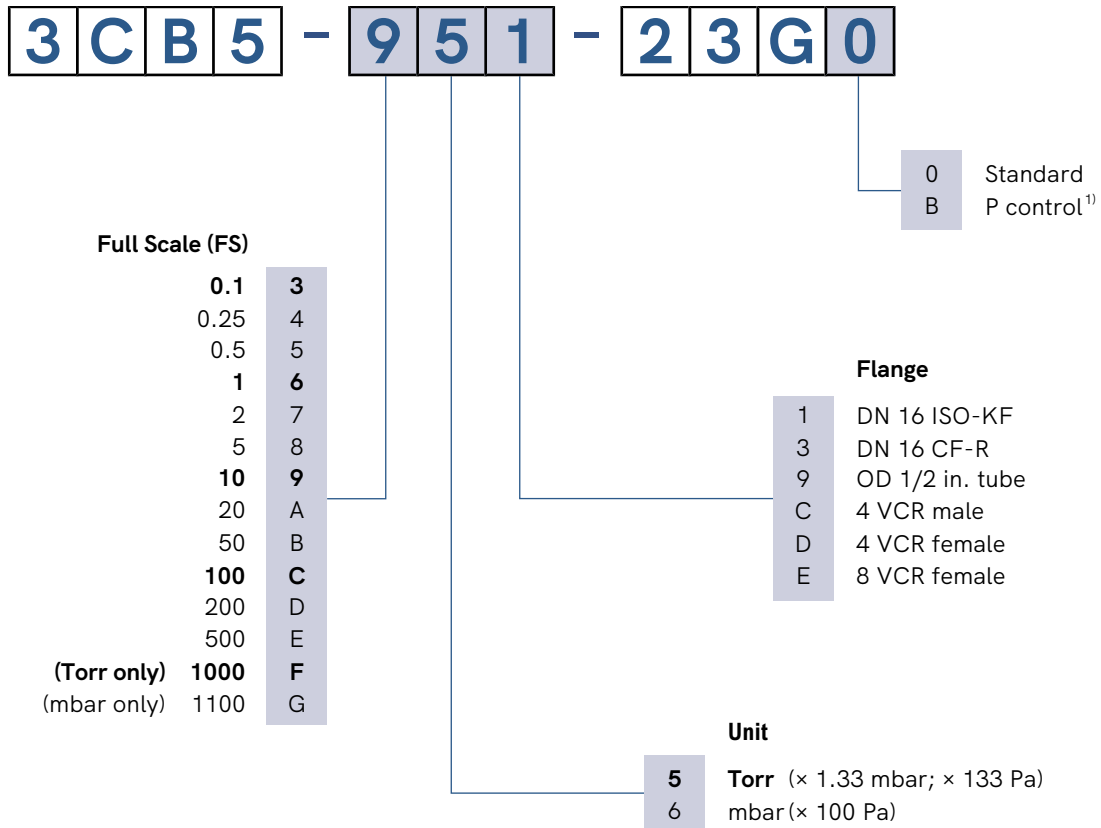
- Easy integration, EtherCAT, wide variety of full scales and flanges, standard with two set points
- Easy one push button or remote signal zero command, zero offset adjustable
- Diagnostic port for quick service and maintenance
- Corrosion resistant ceramic sensor
- Excellent long term signal stability
- Temperature compensated
- Sensor protected from contamination
- Compliance & standards: CE, EN, UL, SEMI, RoHS

APPLICATIONS

- Semiconductor manufacturing equipment for Etch, CVD, PVD, ALD
- Data storage and display manufacturing equipment
- Industrial vacuum equipment
- General high accuracy pressure measurement

Edge[®] CDG025D2 with EtherCAT

ORDERING INFORMATION



1) Optimized signal filter setting for pressure control

bold = standard products

Other flange types on request.

Edge[®] CDG025D2 with EtherCAT

SPECIFICATIONS

Full scale (FS) Torr / mbar	1000 / 1100 ... 200	100 ... 5	2 ... 0.5	0.25	0.1
Accuracy ¹⁾	0.2 % of reading			0.25 % of reading	0.5 % of reading
Temperature effect					
on zero	0.005 % FS / °C		0.015 % FS / °C		0.02 % FS / °C
on span	0.01 % of reading / °C		0.01 % of reading / °C		0.03 % of reading / °C
Pressure, max. (absolute)	400 kPa	260kPa		130 kPa	
Resolution	0.003 % FS				
Response time ²⁾	30 ms		130 / 30 ³⁾ ms		
Lowest reading	0.01 % FS				
Lowest suggested					
Reading	0.05 % FS				
Control pressure	0.5 % FS				
Temperature					
Sensor	25 °C				
Operation (ambient)	+5 ... +50 °C				
Bakeout at flange	≤110 °C				
Storage	-20 ... +65 °C				
Supply voltage	+14 ... +30 V (dc) or ± 15 V (±5%)				
Power consumption					
At operating temperature	<3 W				
Output signal (analog)	0 ... +10 V (dc)				
Degree of protection	IP 40				
Standards					
CE conformity	EN 61000-6-2/-6-3, EN 61010 & RoHS				
ETL certification	UL 61010-1, CSA 22.2 No.61010-1				
SEMI compliance	SEMI S2				
Electrical connection	D-sub, 15-pin, male				
Setpoint					
Number of setpoints	2 (SP1, SP2)				
Relay contact	≤30 V (dc) / ≤0.5 A (dc)				
Hysteresis	1 % FS				
Diagnostic port					
Protocol	RS232-C				
Read	pressure, status, ID				
Set	set points, filter, zero adjust, factory reset, DC offset				
Materials exposed to vacuum	ceramics (Al ₂ O ₃), stainless steel (AISI 316L)				
Internal volume	≤6.8 cm ³				
Weight	552 ... 622 g				

¹⁾ Non-linearity, hysteresis, repeatability at 25°C ambient operating temperature without temperature effects after two hours operation

²⁾ Increase 10 ... 90% FS

³⁾ For pressure control type only

EtherCAT[®]

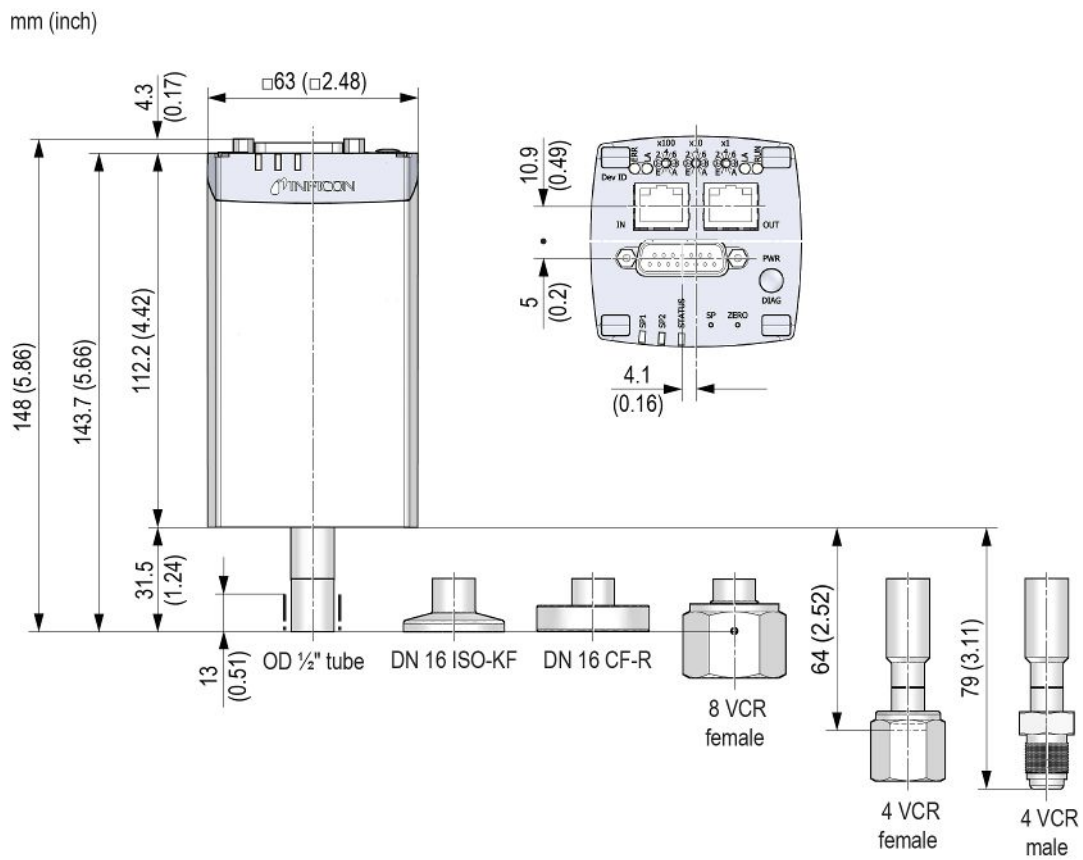
Protocol	EtherCAT [®]
Communication standards	Semiconductor Device Profile ETG.5003 Part 1 Common Device Profile ETG.5003 Part 2080 "Specific Device Profile - Vacuum Pressure Gauge"

Edge[®] CDG025D2 with EtherCAT

EtherCAT[®]

Process Data	Fixed PDO mapping and configurable PDO mapping
EtherCAT connector	RJ45, 8-pin (socket), IN and OUT
Cable	Shielded Ethernet CAT5e or higher
Cable length	≤100 m (330 ft.)
Data rate	100000 Kbps

DIMENSIONS



Heated Capacitance Diaphragm Gauge

SKY[®] CDG045D

INFICON SKY CDG045D manometers are your best choice for highly accurate total pressure measurement and control. CDG045D gauges are temperature controlled at 45°C for superior signal stability and repeatability. They are available for full scale ranges from 50 mTorr to 1000 Torr, with all common flange types and fieldbus interfaces and provide a linear 0 to 10 V, gas type independent, pressure signal. INFICON capacitance manometers use a corrosion proof ultra pure alumina ceramic diaphragm. The advantages of the ceramic sensor are better signal stability, faster recovery from atmosphere, short warm up time and an extraordinary lifetime. INFICON CDG are high quality, cost effective pressure sensors for demanding vacuum applications.



ADVANTAGES

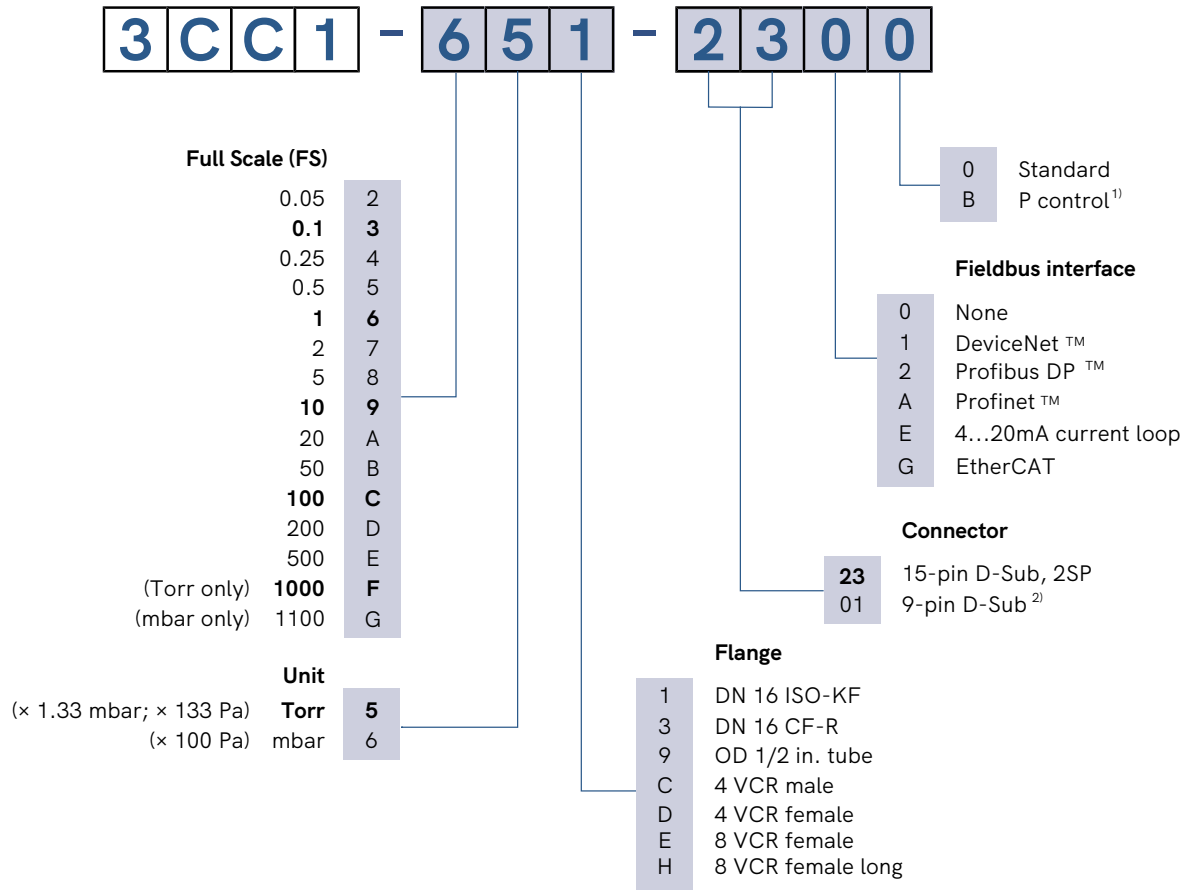
- Lower cost of ownership, 50% faster warm up, energy efficient low power consumption
- Easy integration, wide variety of full scales, flanges and interfaces, standard with two set points
- Easy one push button or remote signal zero command, zero offset adjustable
- Diagnostic port for quick service and maintenance
- Two year warranty, longer lifetime with advanced heating concept and gauge protection
- No long term recalibration due to excellent signal stability and repeatability, even in harsh plasma applications
- Compliance and standards: CE, EN, UL, SEMI, RoHS

APPLICATIONS

- Etch, CVD, PVD and other semiconductor production processes
- Chemical and corrosive vacuum processes
- General thin film and vacuum processes
- Reference sensor for monitoring of test instruments according to international standards
- Transfer standard for traceability measurements

SKY[®] CDG045D

ORDERING INFORMATION



1) Optimized signal filter setting for pressure control

2) Not possible with fieldbus interfaces

bold = standard products

Other flange types on request.

ACCESSORIES

Type	Part no.
Diagnostic cable RS232C; USB-A - phone jack 2.5mm (1.8m) ¹⁾	303-366

¹⁾ Diagnostic SW available upon request

SKY® CDG045D

SPECIFICATIONS

Full scale (FS) Torr / mbar	1000 / 1100 ... 200	100 ... 1	0.5 ... 0.25	0.1 ... 0.05
Accuracy ¹⁾	0.15 % of reading			
Temperature effect				
on zero	0.0025 % FS / °C		0.005 % FS / °C	
on span	0.01 % of reading / °C		0.01 % of reading / °C	
Pressure, max. (absolute)	400 kPa	260 kPa	130 kPa	
Response time ²⁾	30 ms		130 / 30 ³⁾ ms	
Resolution	0.003 % FS			
Lowest reading	0.01 % FS			
Lowest suggested				
Reading	0.05 % FS			
Control pressure	0.5 % FS			
Temperature				
Operation (ambient)	+10 ... +40 °C			
Bakeout at flange	≤110 °C			
Storage	-20 ... +65 °C			
Supply voltage	+14 ... +30 V (dc) or ±15 V (±5%)			
Power consumption				
During Heat up	≤12 W			
At operating temperature	≤8 W			
Output signal (analog)	0 ... +10 V (dc)			
Degree of protection	IP 40			
Standards				
CE conformity	EN 61000-6-2/-6-3, EN 61010 & RoHS			
ETL certification	UL 61010-1, CSA 22.2 No.61010-1			
SEMI compliance	SEMI S2			
Electrical connection	D-sub, 15-pin, male			
Setpoint				
Number of setpoints	2 (SP1,SP2)			
Relay contact	≤30 V (dc) / ≤0.5 A (dc)			
Hysteresis	1 % FS			
Diagnostic port				
Protocol	RS232-C			
Read	pressure, status, ID			
Set	set points, filter, zero, adjust, factory reset, DC offset			
Materials exposed to vacuum	ceramics (Al ₂ O ₃), stainless steel (AISI 316L)			
Internal volume	≤6.8 cm			
Weight	870 ... 942 g			

¹⁾ Non-linearity, hysteresis, repeatability at 25°C ambient operating temperature without temperature effects after two hours operation for ≥ 1 Torr and after 4 hours operation for < 1 Torr

²⁾ Increase 10 ... 90% FS

³⁾ For pressure control type only

SKY® CDG045D

SPECIFICATIONS INTERFACES

DeviceNet™

Protocol	DeviceNet™, group 2 slave only
Data rate switch	125, 250, 500 kBaud or network programmable
Cable length	
125 kbps	500 m (1650 ft.)
250 kbps	250 m (825 ft.)
500 kbps	100 m (330 ft.)
MAC ID	Two switches (address 00 - 63) or network programmable
Digital functions	Read pressure, select units: Torr, mbar, Pa Set points, filter, zero adjust, factory reset, DC offset Monitor gauge status Safe state allows definition of behavior in case of error Detailed alarm and warning information
Analog functions	0 ... 10 V analog output pressure indication two setpoint relays A + B
Visual communication indicators	LED network status (green / red) LED module status (green / red)
Specification	DeviceNet™ "Vacuum Gauge Device Profile"
Device type	"VG" for combination gauge
I / O slave messaging	Polling only
Supply voltage for DeviceNet™	24 V nominal (11 ... 25 V)
Supply voltage for gauge	+14 ... +30 V (dc) or ±15 V (±5%)
Connector for DeviceNet™	Microstyle, 5-pin
Connector for Gauges (analog output, supply voltage, setpoints)	D-Sub, 15-pin, male

PROFIBUS DP

Baud rates	9.6 / 19.2 / 93.75 / 187.5 / 500 kBaude 1.5 / 12 MBaud
Address	Two switches (address 00 - 125) or network programmable
Digital functions	Read pressure, select units: Torr, mbar, Pa Set points, filter, zero adjust, factory reset, DC offset Monitor gauge status, filament status Safe state allows definition of behavior in case of error Detailed alarm and warning information
Analog functions	0 ... 10 V analog output pressure indication two setpoint relays A + B
Connector for Profibus DP	D-Sub, 9-pin, female
Connector for CDG (analog output, supply voltage, setpoints)	D-Sub, 15-pin, male

SKY[®] CDG045D

PROFINET™

Communication protocol	protocol specialized for PROFINET
Physical Layer	100BASE-Tx (IEEE 802.3)
Digital functions	
read	pressure, status, ID
set	set points, filter, zero adjust, reset, DC offset
PROFINET connector	2 × RJ45, 8-pin (socket), IN and OUT
Cable	Special Ethernet Patch Cable or Crossover Cable, shielded (CAT5e quality or higher)
Cable length	≤100 m (330 ft.)
Data rate	100000 Kbps

4-20mA current loop (analog)

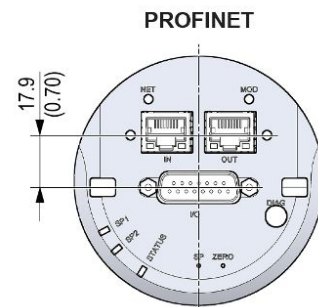
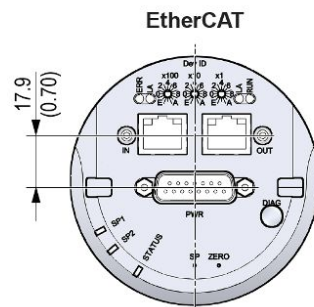
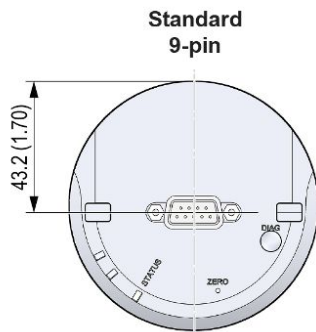
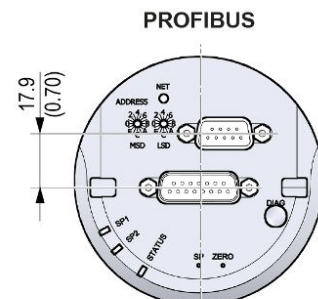
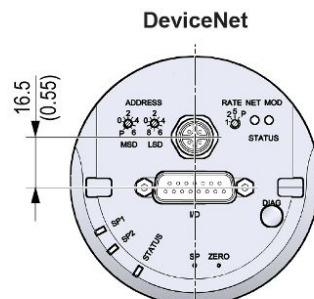
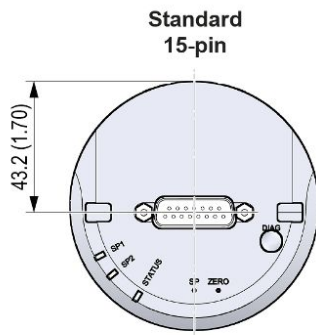
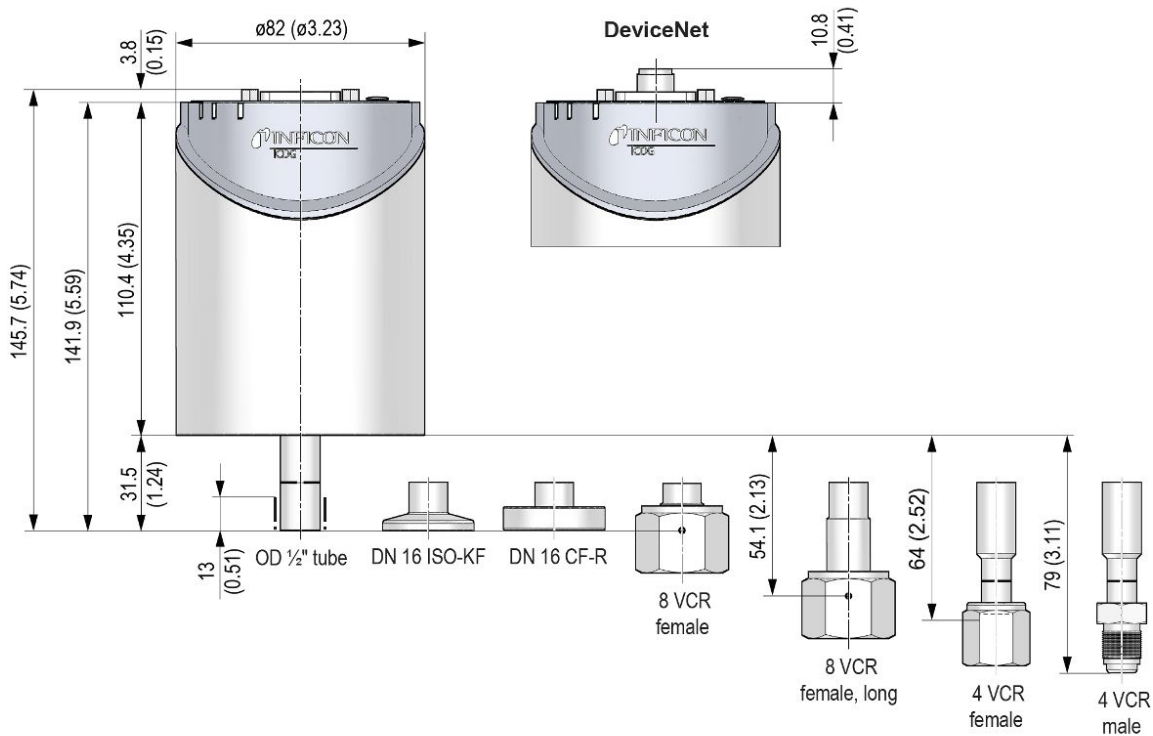
Output signal (measurement signal)	2-wire, current loop
Signal range	3.8 ... 20.2 mA
Measuring rang (zero ... FS)	4.0 ... 20.0 mA
Loaded impedance R_L	18.5 ... 33.3 V (dc) ¹⁾ 500 Ω
	16.2 ... 31.0 V (dc) ¹⁾ 400 Ω
	13.9 ... 28.8 V (dc) ¹⁾ 300 Ω
	11.7 ... 26.5 V (dc) ¹⁾ 200 Ω
	9.4 ... 24.2 V (dc) ¹⁾ 100 Ω

¹⁾ Supply voltage current interface

SKY® CDG045D

DIMENSIONS

mm (inch)



Heated Capacitance Diaphragm Gauge

Edge[®] CDG045D2

INFICON Edge Capacitance Diaphragm Gauge is a highly accurate vacuum measurement instrument designed for harsh manufacturing environments. The proven temperature controlled, corrosion resistant, ultra-pure ceramic sensor provides superior span stability over many years paired with state-of-the-art zero stability. Edge comes with the INFICON patented unique sensor shield, which protects the gauge from undesired process by-products. Advanced electronics offer a wide range of configurable signal conditioning for all applications and optional EtherCAT[®] fieldbus interface. The innovative heating concept enables a cool to the touch surface and saves valuable tool space.

INFICON Edge is the smallest vacuum measurement instrument of its kind.



ADVANTAGES

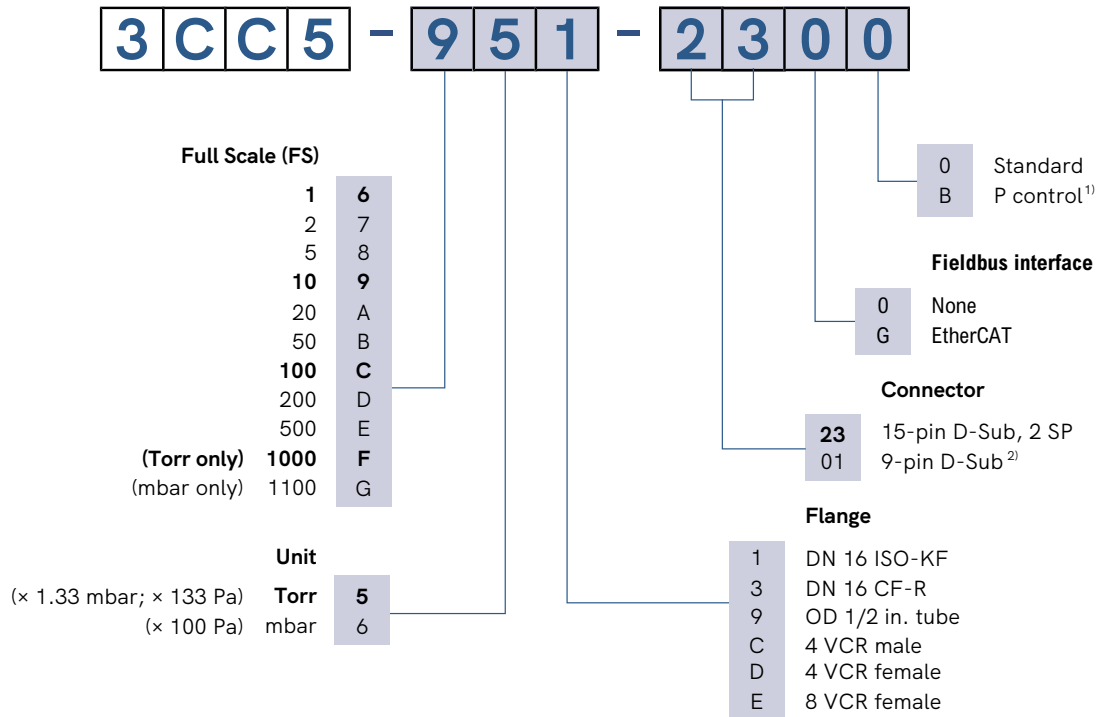
- Compact, saves valuable tool space
- Easy integration, EtherCAT, wide variety of full scales and flanges, standard with two set points
- Easy one push button or remote signal zero command, zero offset adjustable
- Diagnostic port for quick service and maintenance
- Two year warranty, longer life time with advanced heating concept and gauge protection.
- No long term recalibration due to excellent signal stability and repeatability, even in harsh plasma applications
- Compliance and standards: CE, EN, UL, SEMI, RoHS

APPLICATIONS

- CVD, Etch, PVD and other semiconductor production processes

Edge[®] CDG045D2

ORDERING INFORMATION



1) Optimized signal filter setting for pressure control

2) Not possible with fieldbus interfaces

bold = standard products

Other flange types on request.

Edge[®] CDG045D2

SPECIFICATIONS

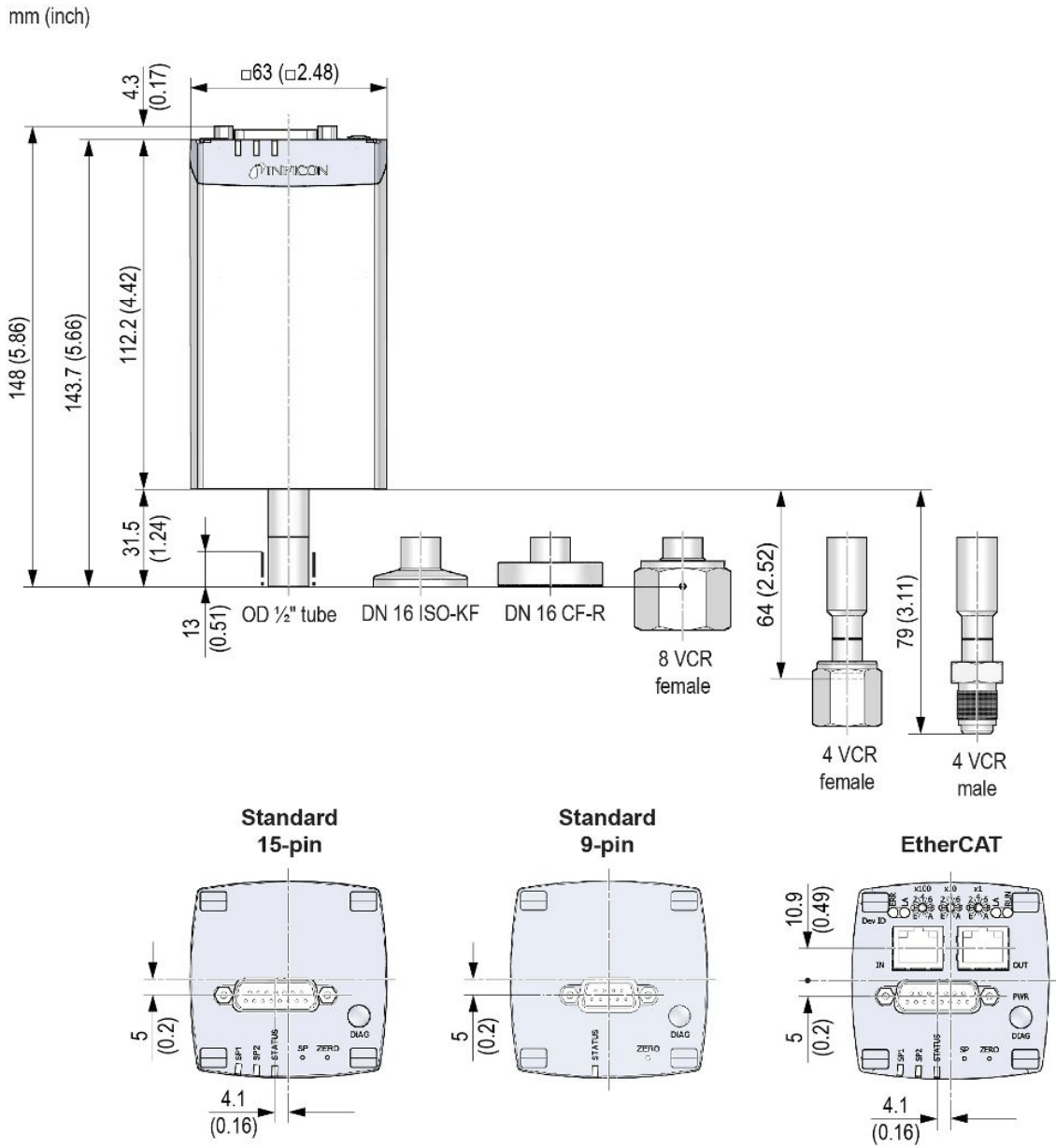
Full scale (FS) Torr / mbar	1000 / 1100 ... 200	100 ... 1
Accuracy ¹⁾	0.2 % of reading	
Temperature effect		
On zero	0.0025 % FS / °C	
On span	0.02 % of reading / °C	
Pressure, max. (absolute)	400 kPa	260kPa
Response time ²⁾	30 ms	
Resolution	0.003 % FS	
Lowest reading	0.01 % FS	
Lowest suggested		
Reading	0.05 % FS	
Control pressure	0.5 % FS	
Temperature		
Operation (ambient)	+10 ... +40 °C	
Bakeout at flange	≤110 °C	
Storage	-20 ... +65 °C	
Supply voltage	+14 ... +30 V (dc) or ±15 V (±5%)	
Power consumption		
During Heat up	≤12 W	
At operating temperature	≤8 W	
Output signal (analog)	0 ... +10 V (dc)	
Degree of protection	IP 40	
Standards		
CE conformity	EMC (EN 61000-6-2, EN 61000-6-3), EN 61010-1 and RoHS	
ETL certification	UL 61010-1, CSA 22.2 No. 61010-1	
SEMI compliance	SEMI S2	
Electrical connection	D-sub, 15-pin, male	
Setpoint		
Number of setpoints	2 (SP1, SP2)	
Relay contact	≤30 V (dc) / ≤0.5 A (dc)	
Hysteresis	1 % FS	
Diagnostic port		
Protocol	RS232-C	
Read	pressure, status, ID	
Set	setpoints, filter, zero adjust, factory reset, DC offset	
Materials exposed to vacuum	ceramics (Al ₂ O ₃), stainless steel (AISI 316L)	
Internal volume	≤6.8 cm ³	
Weight	540 ... 610 g	

¹⁾ Non-linearity, hysteresis, repeatability at 25°C ambient operating temperature without temperature effects after two hours operation

²⁾ Increase 10 ... 90% FS

Edge[®] CDG045D2

DIMENSIONS



Heated Capacitance Diaphragm Gauge

Stripe® CDG045Dhs

INFICON Stripe high-speed Capacitance Diaphragm Gauges are the fastest, highly accurate vacuum measurement instruments available. With the combination of response time below 2 ms and EtherCAT fieldbus interface, it opens up a total new field of applications. The proven temperature controlled, corrosion resistant, ultra-pure ceramic sensor provides superior span stability over many years paired with state-of-the-art zero stability. Stripe comes with the INFICON patented unique sensor shield, which protects the gauge from undesired process by-products. INFICON Stripe using an innovative heating concept, which provides a cool to the touch surface, and its unique speed capabilities, enabling an unprecedented productivity increase, making it the most advanced vacuum instrument of its kind.



Stripe CDG045Dhs is a proud winner of the prestigious 2014 R&D100 Award!

ADVANTAGES

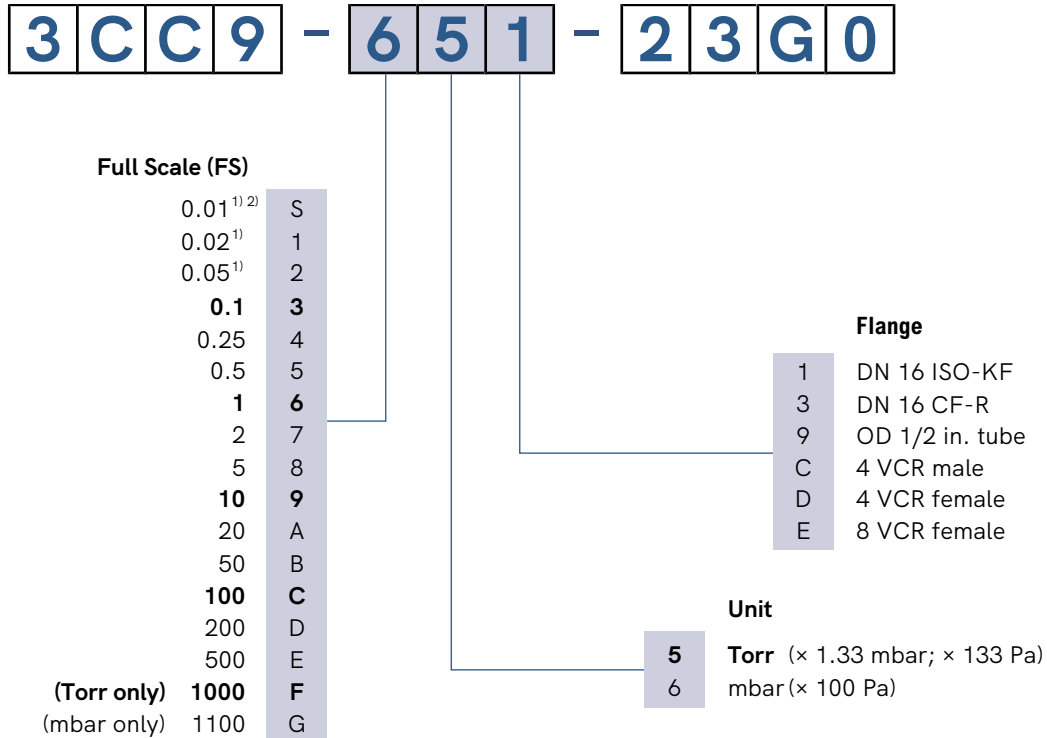
- High productivity - faster than 2 ms response time (FS > 50 mTorr)
- Flexible integration - EtherCAT fieldbus
- Long lifetime - proven ceramic sensor
- Forget recalibration - 90 ppm / year full scale stability

APPLICATIONS

- Atomic layer deposition
- High speed process control
- PVD, CVD, Etch
- General high temperature vacuum applications

Stripe® CDG045Dhs

ORDERING INFORMATION



1) Mounting orientation: vertical

2) Torr only

bold = standard products

Other flange types on request.

Stripe® CDG045Dhs

SPECIFICATIONS

Full scale (FS) Torr / mbar	1000 / 1100	500 ... 1	0.5 ... 0.1	0.05	0.02 ... 0.01
Accuracy ¹⁾	0.15 % of reading			-	
Precision	-			0.2 % of reading	
Temperature effect					
On zero	0.0025 % FS / °C		0.005 % FS / °C		0.01 % FS / °C
On span	0.01 % of reading / °C		0.01 % of reading / °C		0.01 % of reading / °C
Pressure, max. (absolute)	400 kPa	260 kPa	130 kPa		
Response time ²⁾	2 ... 20 ms				
Resolution	0.003 % FS				
Lowest reading	0.01 % FS				
Lowest suggested					
Reading	0.05 % FS				
Control pressure	0.5 % FS				
Temperature					
Operation (ambient)	+10 ... +40 °C				
Bakeout at flange	≤110 °C				
Storage	-20 ... +85 °C				
Supply voltage	+14 ... +30 V (dc) or ±15 V (±5%)				
Power consumption					
During Heat up	≤14 W				
At operating temperature	≤9 W				
Output signal (analog)	0 ... +10 V (dc)				
Measurement rate	1 kHz				
Degree of protection	IP 30				
Standards					
CE conformity	EN 61000-6-2, EN 61000-6-3, EN 61010 and RoHS				
ETL certification	UL 61010-1, CSA 22.2 No. 61010-1				
SEMI compliance	SEMI S2				
Electrical connection	D-sub, 15-pin, male				
Setpoint					
Number of setpoints	2 (SP1, SP2)				
Relay contact	≤30 V (dc) / ≤0.5 A (dc)				
Hysteresis	1 % FS				
Diagnostic port					
Protocol	USB				
Read	pressure, status, ID				
Set	Set points, filter, zero adjust, factory reset, DC offset				
Materials exposed to vacuum	ceramics (Al ₂ O ₃), stainless steel (AISI 316L)				
Internal volume	≤6.8 cm ³				
Weight	928 ... 985 g				

¹⁾ Non-linearity, hysteresis, repeatability at 25°C ambient operating temperature without temperature effects after two hours operation for ≥ 1 Torr and after 4 hours operation for < 1 Torr

²⁾ Increase 10 ... 90% FS

Heated Capacitance Diaphragm Gauge

Cube[®] CDGsci

The high-end INFICON Cube Capacitance Diaphragm Gauge is the most accurate ($\leq 0.025\%$ Rd accuracy; ≤ 50 ppm F.S. Repeatability) and most stable vacuum gauge available (< 5 ppm FS/ $^{\circ}\text{C}$ temperature stability; < 70 ppm FS/year long-term stability). Cube is designed as a pure reference device to standardize vacuum measurement systems and is the only choice for vacuum research applications. The proven INFICON temperature controlled, corrosion resistant ultrapure ceramic sensor is at the heart of Cube's outstanding performance. Cube sets new standards in modern communication and user flexibility with a 20 Bit analog output and RS232-C, TCP/IP and HTML digital output connected through a wireless or wired Ethernet interface. Each device comes with a quality assurance certificate, hand-signed by Cube's leading product researchers. Delivery in a reusable hard shell suitcase for storage or shipment to calibration laboratories underlines its professionalism.



ADVANTAGES

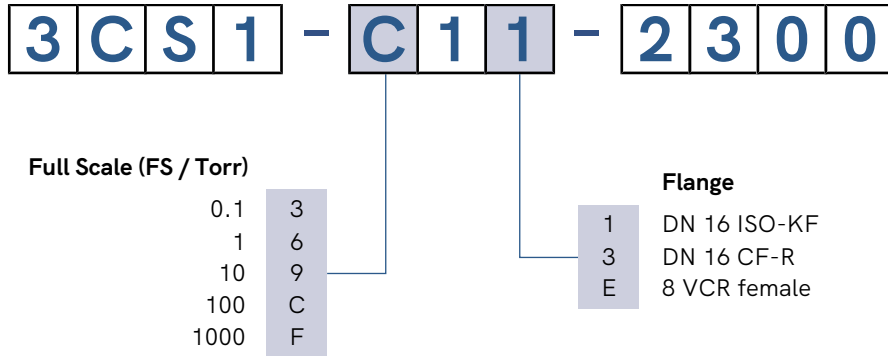
- True high precision pressure measurement - ceramic technology
- Full stable output - proven by PTB
- Flexible communication - various modern interfaces
- All functions integrated - no controller required
- Direct mounting to chamber - optimized center of gravity
- Transportation without isolation valve possible

APPLICATIONS

- Transfer standard
- Main reference gauge
- Research
- In-house standard

Cube[®] CDGsci

ORDERING INFORMATION



Other flange types on request.

Cube[®] CDGsci

SPECIFICATION

Full scale (FS) Torr	1000 ... 100	10 ... 1	0.1
Accuracy ¹⁾	0.025 % of reading		0.05 % of reading
Temperature effect			
On zero	0.0005 % FS / °C		0.005 % FS / °C
On span	0.001 % of reading / °C		0.01 % of reading / °C
Pressure, max.	3 bar (absolute)	2 bar (absolute)	1.3 bar (absolute)
Response time ²⁾	350 ms		
Lowest reading	0.01 % FS		
Lowest suggested reading	0.05 % FS		
Temperature			
Operation (ambient)	+10 ... +40 °C		
Storage	-10 ... +50 °C		
Supply voltage	+14 ... +30 V (dc) or ±15 V (±5%)		
Power consumption			
During Heat up	≤ 20 W		
At operating temperature	≤ 17 W		
Output signal (analog)	0 ... +10 V (dc)		
Degree of protection	IP 40		
Standards			
CE conformity	EN 61000-6-2, EN 61000-6-3, EN 61010-1 and RoHS		
ETL certification	UL 61010-1, CSA 22.2 No. 61010-1		
SEMI compliance	SEMI S2		
Electrical connection	D-sub, 15-pin, male; 2 × LEMO Coax; Ethernet FCC		
Setpoint			
Number of setpoints	2 (SP1, SP2)		
Relay contact	≤ 30 V (dc) / ≤ 0.5 A (dc)		
Hysteresis	1 % FS		
Diagnostic port			
Protocol	Web pages, REST services, RS232-ASCII		
Read	Pressure, status, ID		
Set	Setpoints, filter, zero adjust, factory reset, DC offset		
Materials exposed to vacuum	ceramics (Al ₂ O ₃), stainless steel (AISI 316L)		
Internal volume	≤ 4.6 cm ³		
Weight	1760 ... 1803 g		

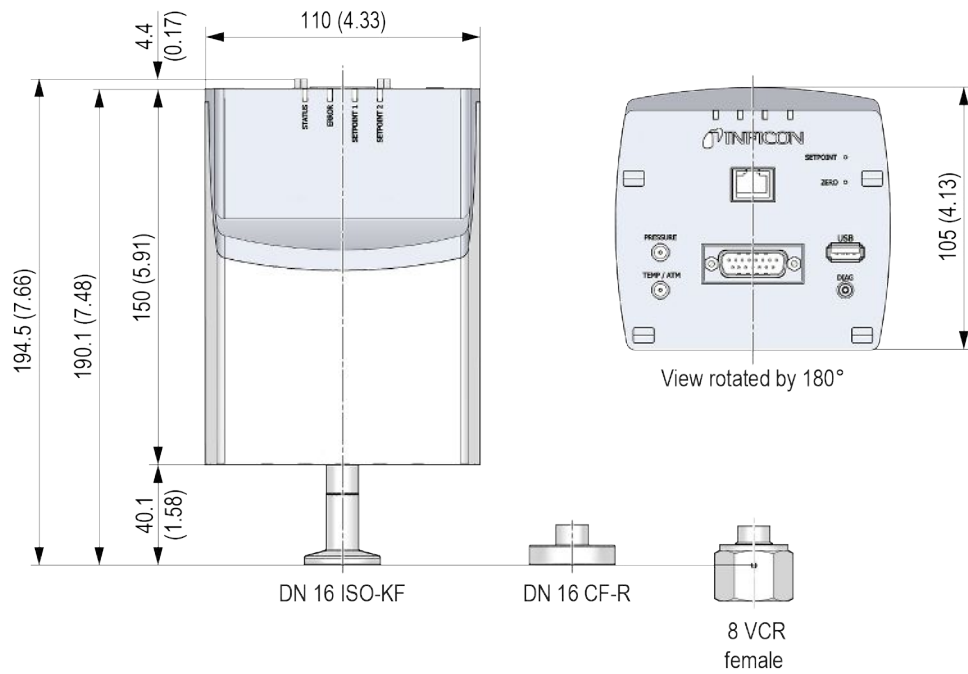
¹⁾ Non-linearity, hysteresis, repeatability at 25°C ambient operating temperature without temperature effects after two hours operation for ≥ 1 Torr and after 4 hours operation for < 1 Torr

²⁾ Increase 10 ... 90% FS

Cube® CDGsci

DIMENSIONS

mm (inch)



Heated Capacitance Diaphragm Gauge

SKY[®] CDG100D

INFICON SKY CDG100D manometers are your best choice for accurate total pressure measurement and control. CDG100D gauges are temperature controlled at 100°C for superior performance in demanding semiconductor and plasma processes. They are available for full scale ranges from 100 mTorr to 1000 Torr, with all common flange types and fieldbus interfaces and provide a linear 0 to 10 V, gas type independent, pressure signal. INFICON capacitance manometers use an ultra pure alumina ceramic diaphragm which is corrosion proof. The advantages of the ceramic sensor are better signal stability, faster recovery from atmosphere, short warm up time and an extraordinary lifetime. INFICON CDG are high quality, cost effective pressure sensors for demanding semiconductor, plasma and vacuum applications.



ADVANTAGES

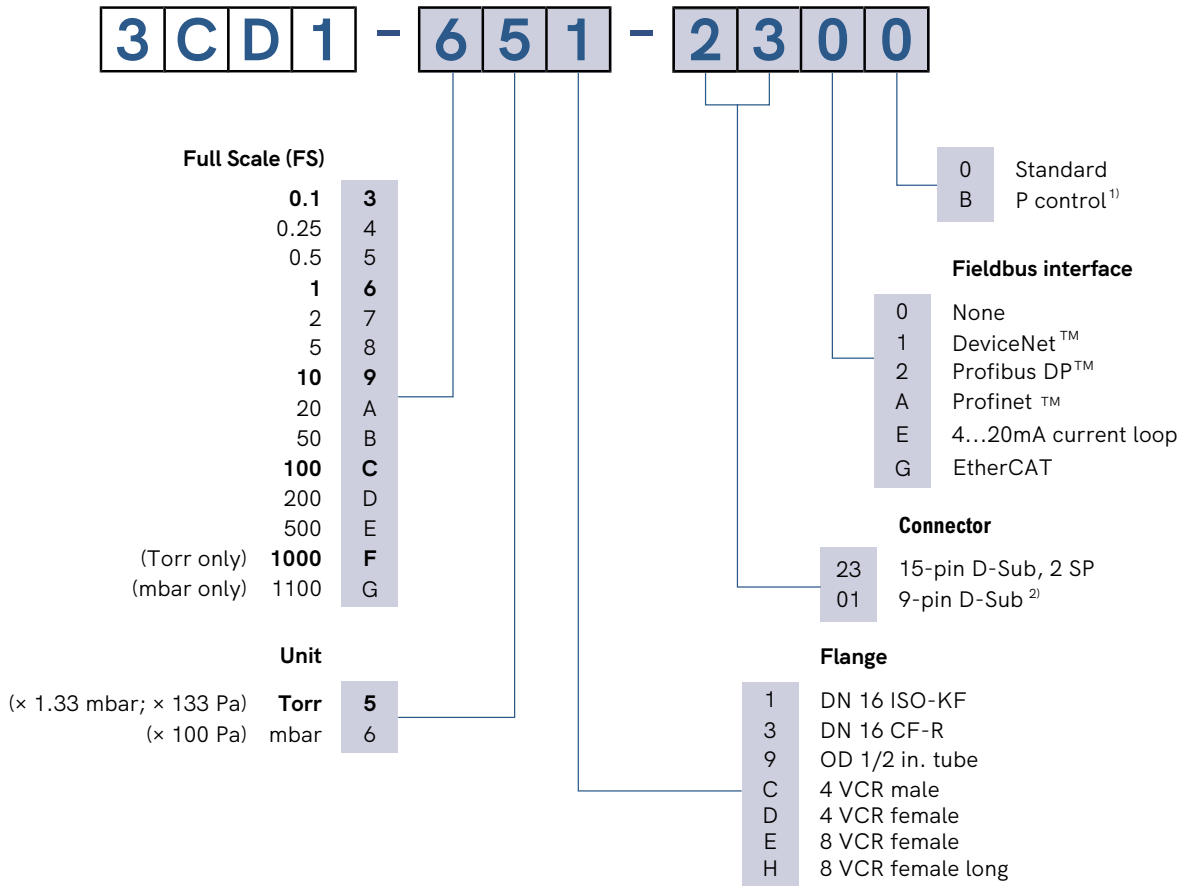
- Lower cost of ownership, 50% faster warm up, energy efficient low power consumption
- Easy integration, wide variety of full scales, flanges and interfaces, standard with two set points
- Easy one push button or remote signal zero command, zero offset adjustable
- Diagnostic port for quick service and maintenance
- Two year warranty, longer lifetime with advanced heating concept and gauge protection
- No long term recalibration due to excellent signal stability and repeatability, even in harsh plasma applications
- Compliance and standards: CE, EN, UL, SEMI, RoHS

APPLICATIONS

- Etch, PVD, CVD and other semiconductor production processes
- Chemical and corrosive high temperature processes
- General thin film and vacuum processes requiring gauge protection

SKY[®] CDG100D

ORDERING INFORMATION



1) Optimized signal filter setting for pressure control

2) Not possible with fieldbus interfaces

bold = standard products

Other flange types on request.

ACCESSORIES

Type	Part no.
Diagnostic cable RS232C; USB-A - phone jack 2.5mm (1.8m) ¹⁾	303-366

¹⁾ Diagnostic SW available upon request

SKY® CDG100D

SPECIFICATIONS

Full scale (FS) Torr / mbar	1000 / 1100 ... 200	100 ... 1	0.5 ... 0.25	0.1
Accuracy ¹⁾	0.2 % of reading		0.4 % of reading	
Temperature effect				
On zero	0.0025 % FS / °C		0.005 % FS / °C	
On span	0.02 % of reading / °C		0.02 % of reading / °C	
Pressure, max. (absolute)	400 kPa	260 kPa	130 kPa	
Response time ²⁾	30 ms		130 / 30 ³⁾ ms	
Resolution			0.003 % FS	
Lowest reading			0.01 % FS	
Lowest suggested				
Reading			0.05 % FS	
Control pressure			0.5 % FS	
Temperature				
Operation (ambient) ⁴⁾			+10 ... +50 °C	
Bakeout at flange			≤110 °C	
Storage			-20 ... +65 °C	
Supply voltage			+14 ... +30 V (dc) or ±15 V (±5%)	
Power consumption				
During Heat up			≤15 W	
At operating temperature			≤10 W	
Output signal (analog)			0 ... +10 V (dc)	
Degree of protection			IP 40	
Standards				
CE conformity			EN 61000-6-2, EN 61000-6-3, EN 61010	
ETL certification			UL 61010-1, CSA 22.2 No.61010-1	
SEMI compliance			SEMI S2	
Electrical connection			D-sub, 15-pin, male	
Setpoint				
Number of setpoints			2 (SP1, SP2)	
Relay contact			≤30 V (dc) / ≤0.5 A (dc)	
Hysteresis			1 % FS	
Diagnostic port				
Protocol			RS232-C	
Read			pressure, status, ID,	
Set			set points, filter, zero adjust, factory reset, DC offset	
Materials exposed to vacuum			ceramics (Al ₂ O ₃), stainless steel (AISI 316L)	
Internal volume			≤6.8 cm ³	
Weight			892 ... 964 g	

¹⁾ Non-linearity, hysteresis, repeatability at 25°C ambient operating temperature without temperature effects after two hours operation for ≥ 1 Torr and after 4 hours operation for < 1 Torr

²⁾ Increase 10 ... 90% FS

³⁾ For pressure control type only

⁴⁾ Ambient temperatures >40°C may increase surface temperature above SEMI S2 compliance levels — mark "caution hot!"

SKY[®] CDG100D

SPECIFICATIONS INTERFACES

DeviceNet™

Protocol	DeviceNet™, group 2 slave only
Data rate switch	125, 250, 500 kBaud or network programmable
Cable length	
125 kbps	500 m (1650 ft.)
250 kbps	250 m (825 ft.)
500 kbps	100 m (330 ft.)
MAC ID	Two switches (address 00 - 63) or network programmable
Digital functions	Read pressure, select units: Torr, mbar, Pa Set points, filter, zero adjust, factory reset, DC offset Monitor gauge status Safe state allows definition of behavior in case of error Detailed alarm and warning information
Analog functions	0 ... 10 V analog output pressure indication two setpoint relays A + B
Visual communication indicators	LED network status (green / red) LED module status (green / red)
Specification	DeviceNet™ "Vacuum Gauge Device Profile"
Device type	"VG" for combination gauge
I / O slave messaging	Polling only
Supply voltage for DeviceNet™	24 V nominal (11 ... 25 V)
Supply voltage for gauge	+14 ... +30 V (dc) or ±15 V (±5%)
Connector for DeviceNet™	Microstyle, 5-pin
Connector for Gauges (analog output, supply voltage, setpoints)	D-Sub, 15-pin, male

PROFIBUS DP

Baud rates	9.6 / 19.2 / 93.75 / 187.5 / 500 kBaude 1.5 / 12 MBaud
Address	Two switches (address 00 - 125) or network programmable
Digital functions	Read pressure, select units: Torr, mbar, Pa Set points, filter, zero adjust, factory reset, DC offset Monitor gauge status, filament status Safe state allows definition of behavior in case of error Detailed alarm and warning information
Analog functions	0 ... 10 V analog output pressure indication two setpoint relays A + B
Connector for Profibus DP	D-Sub, 9-pin, female
Connector for CDG (analog output, supply voltage, setpoints)	D-Sub, 15-pin, male

SKY® CDG100D

EtherCAT®

Protocol	EtherCAT®
Communication standards	Semiconductor Device Profile ETG.5003 Part 1 Common Device Profile ETG.5003 Part 2080 "Specific Device Profile - Vacuum Pressure Gauge"
Process Data	Fixed PDO mapping and configurable PDO mapping
EtherCAT connector	RJ45, 8-pin (socket), IN and OUT
Cable	Shielded Ethernet CAT5e or higher
Cable length	≤100 m (330 ft.)
Data rate	100000 Kbps

PROFINET™

Communication protocol	protocol specialized for PROFINET
Physical Layer	100BASE-Tx (IEEE 802.3)
Digital functions	
read	pressure, status, ID
set	set points, filter, zero adjust, reset, DC offset
PROFINET connector	2 × RJ45, 8-pin (socket), IN and OUT
Cable	Special Ethernet Patch Cable or Crossover Cable, shielded (CAT5e quality or higher)
Cable length	≤100 m (330 ft.)
Data rate	100000 Kbps

4-20mA current loop (analog)

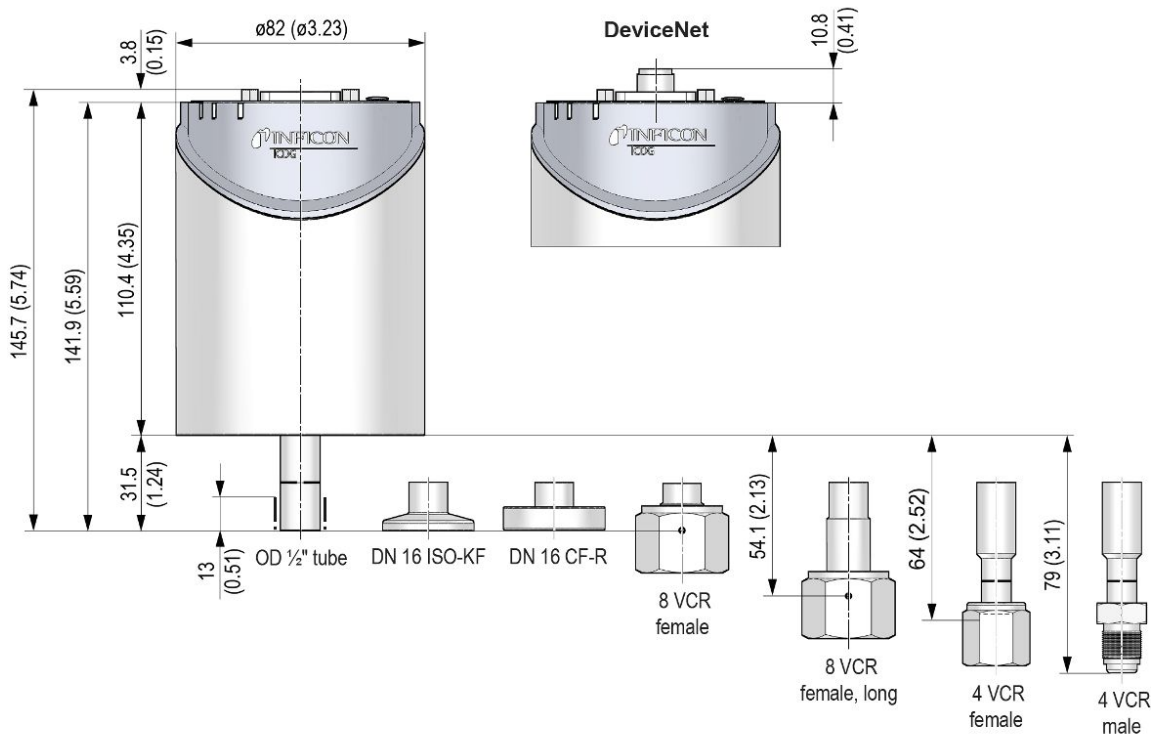
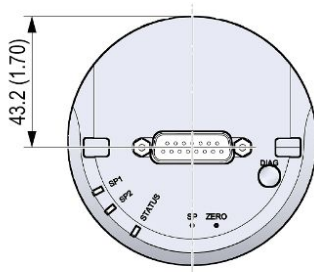
Output signal (measurement signal)	2-wire, current loop
Signal range	3.8 ... 20.2 mA
Measuring rang (zero ... FS)	4.0 ... 20.0 mA
Loaded impedance R_L	18.5 ... 33.3 V (dc) ¹⁾ 500 Ω 16.2 ... 31.0 V (dc) ¹⁾ 400 Ω 13.9 ... 28.8 V (dc) ¹⁾ 300 Ω 11.7 ... 26.5 V (dc) ¹⁾ 200 Ω 9.4 ... 24.2 V (dc) ¹⁾ 100 Ω

¹⁾ Supply voltage current interface

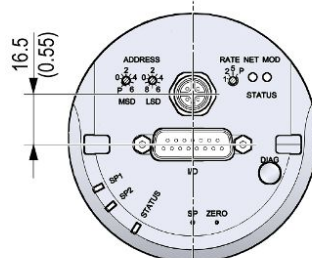
SKY[®] CDG100D

DIMENSIONS

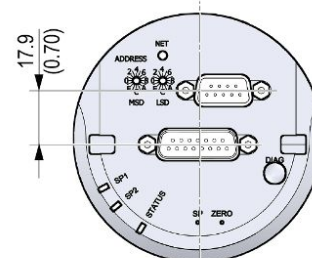
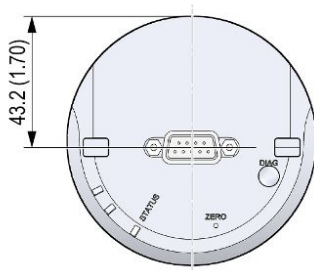
mm (inch)

Standard
15-pin

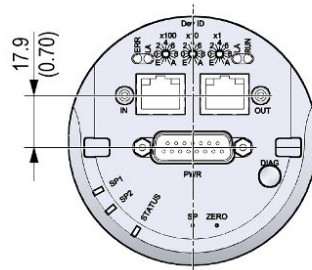
DeviceNet



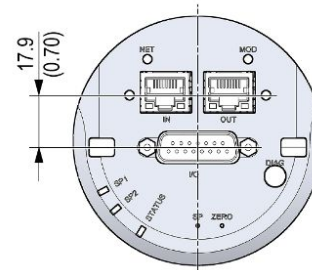
PROFIBUS

Standard
9-pin

EtherCAT



PROFINET



Heated Capacitance Diaphragm Gauge

Edge[®] CDG100D2

INFICON Edge Capacitance Diaphragm Gauge is a highly accurate vacuum measurement instrument designed for harsh manufacturing environments. The proven temperature controlled, corrosion resistant, ultra-pure ceramic sensor provides superior span stability over many years paired with state-of-the-art zero stability. Edge comes with the INFICON patented unique sensor shield which protects the gauge from undesired process by-products. Advanced electronics offer a wide range of configurable signal conditioning for all applications and optional EtherCAT fieldbus interface. The innovative heating concept enables a cool to the touch surface and saves valuable tool space. INFICON Edge is the smallest vacuum measurement instrument of its kind.



ADVANTAGES

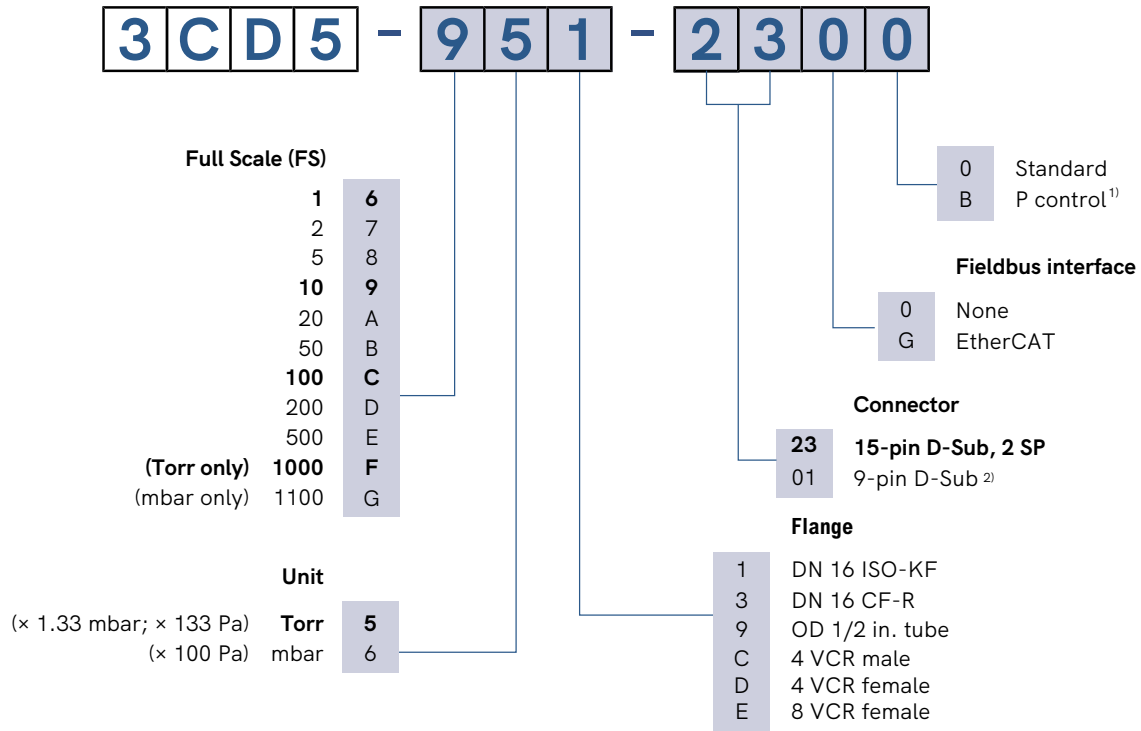
- Compact, saves valuable tool space
- Easy integration, EtherCAT, wide variety of full scales and flanges, standard with two set points
- Easy one push button or remote signal zero command, zero offset adjustable
- Diagnostic port for quick service and maintenance
- Two year warranty, longer life time with advanced heating concept and gauge protection
- No long term recalibration due to excellent signal stability and repeatability, even in harsh plasma applications
- Compliance and standards: CE, EN, UL, SEMI, RoHS

APPLICATIONS

- CVD, Etch, PVD and other semiconductor production processes

Edge[®] CDG100D2

ORDERING INFORMATION



1) Optimized signal filter setting for pressure control

2) Not possible with fieldbus interfaces

bold = standard products

Other flange types on request.

Edge[®] CDG100D2

SPECIFICATIONS

Full scale (FS) Torr / mbar	1000 / 1100 ... 200	100 ... 1
Accuracy ¹⁾	0.2 % of reading	
Temperature effect		
On zero	0.0025 % FS/ °C	
On span	0.02 % of reading / °C	
Pressure, max. (absolute)	400 kPa	260 kPa
Response time ²⁾	30 ms	
Resolution	0.003 % FS	
Lowest reading	0.01 % FS	
Lowest suggested		
Reading	0.05 % FS	
Control pressure	0.5 % FS	
Temperature		
Operation (ambient) ³⁾	+10 ... +50 °C	
Bakeout at flange	≤110 °C	
Storage	-20 ... +65 °C	
Supply voltage	+14 ... +30 V (dc) or ±15 V (±5%)	
Power consumption		
During Heat up	≤20 W	
At operating temperature	≤14 W	
Output signal (analog)	0 ... +10 V (dc)	
Degree of protection	IP 40	
Standards		
CE conformity	EN 61000-6-2, EN 61000-6-3, EN 61010-1 and RoHS	
ETL certification	UL 61010-1, CSA 22.2 No. 61010-1	
SEMI compliance	SEMI S2 ³⁾	
Electrical connection	D-sub, 15-pin, male	
Setpoint		
Number of setpoints	2 (SP1, SP2)	
Relay contact	≤30 V (dc) / ≤0.5 A (dc)	
Hysteresis	1 % FS	
Diagnostic port		
Protocol	RS232-C	
Read	pressure, status, ID	
Set	setpoints, filter, zero adjust, factory reset, DC offset	
Materials exposed to vacuum	ceramics (Al ₂ O ₃), stainless steel (AISI 316L)	
Internal volume	≤6.8 cm ³	
Weight	552 ... 622 g	

¹⁾ Non-linearity, hysteresis, repeatability at 25°C ambient operating temperature without temperature effects after two hours operation

²⁾ Increase 10 ... 90% FS

³⁾ Ambient temperatures >40°C may increase surface temperature above SEMI S2 compliance levels — mark "caution hot!"

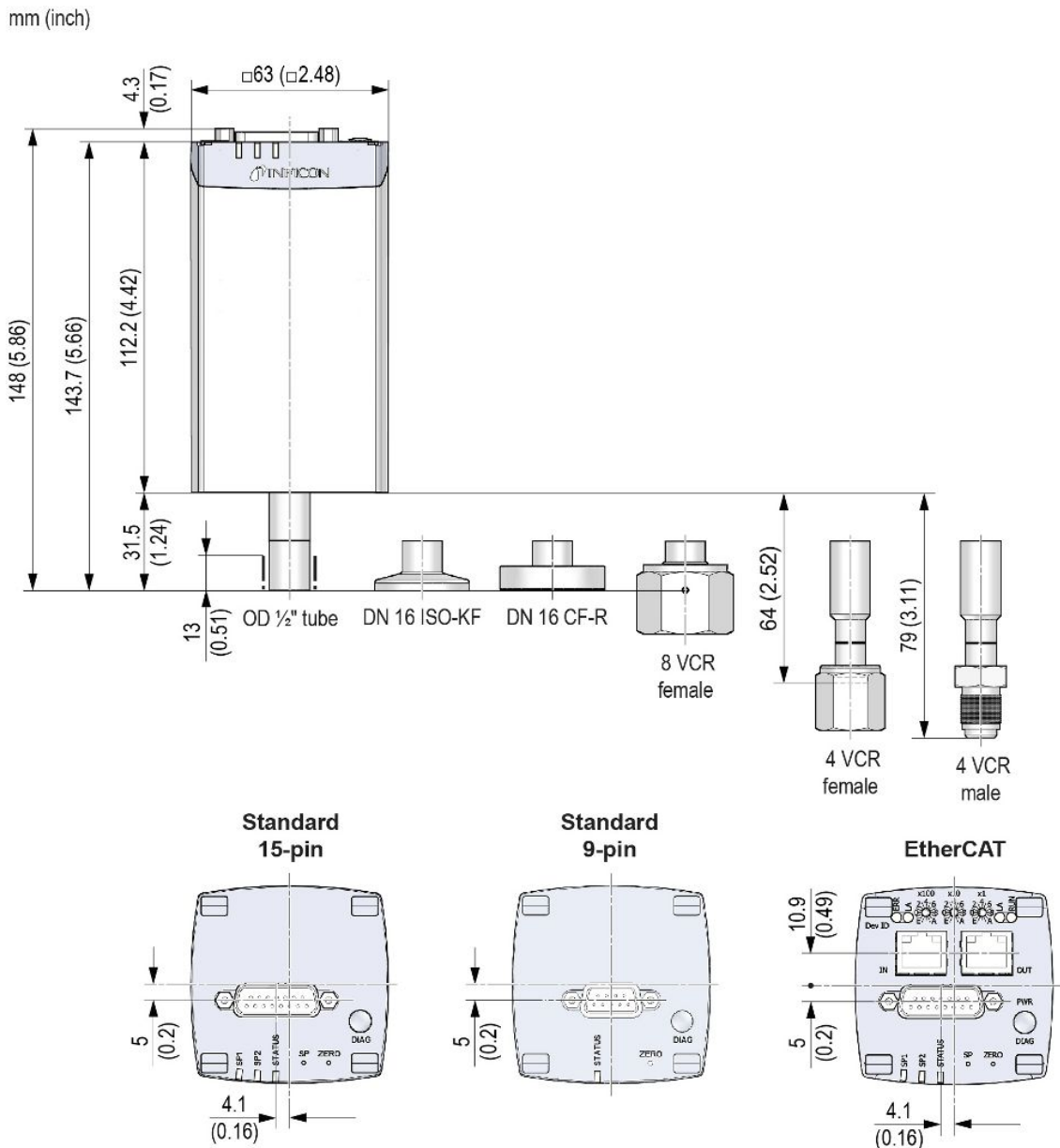
Edge[®] CDG100D2

SPECIFICATION INTERFACES

EtherCAT[®]

Protocol	EtherCAT [®]
Communication standards	Semiconductor Device Profile ETG.5003 Part 1 Common Device Profile ETG.5003 Part 2080 "Specific Device Profile - Vacuum Pressure Gauge"
Process Data	Fixed PDO mapping and configurable PDO mapping
EtherCAT connector	RJ45, 8-pin (socket), IN and OUT
Cable	Shielded Ethernet CAT5e or higher
Cable length	≤100 m (330 ft.)
Data rate	100000 Kbps

DIMENSIONS



Heated Capacitance Diaphragm Gauge

Stripe® CDG100Dhs

INFICON Stripe high-speed Capacitance Diaphragm Gauges are the fastest, highly accurate vacuum measurement instruments available. With a less than 2 ms response time combined with the EtherCAT fieldbus interface it opens up a total new field of applications. The proven temperature controlled, corrosion resistant, ultra-pure ceramic sensor provides superior span stability over many years paired with state-of-the-art zero stability. Stripe comes with the INFICON patented unique sensor shield which protects the gauge from undesired process by-products. INFICON Stripe using an innovative heating concept, which provides a cool to the touch surface, and its unique speed capabilities, enabling an unprecedented productivity increase, making it the most advanced vacuum instrument of its kind.



ADVANTAGES

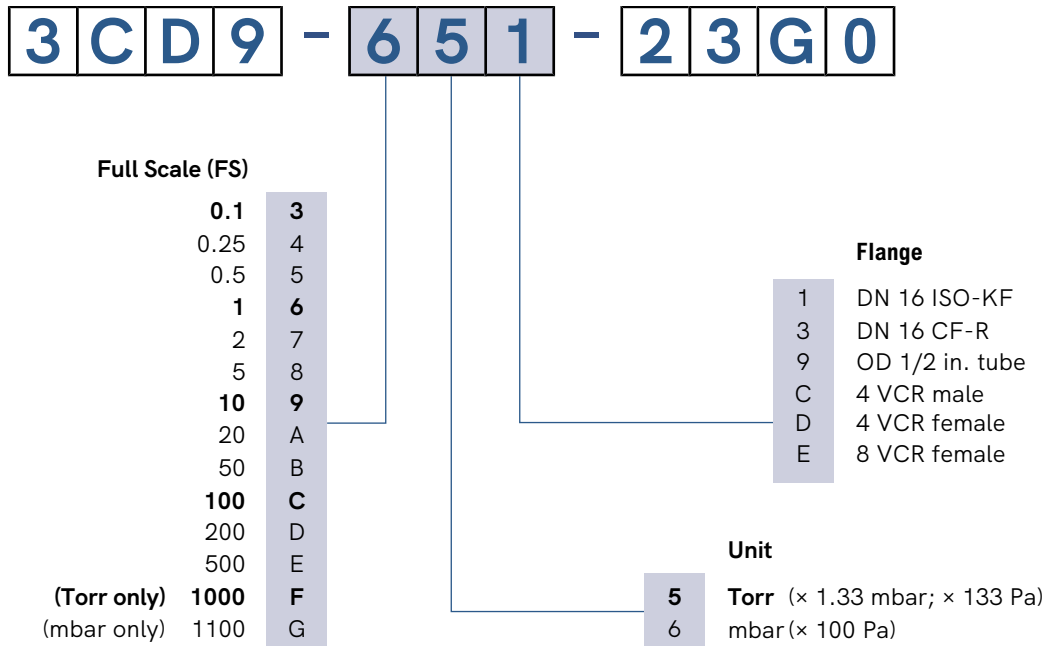
- High productivity - faster than 2 ms response time
- Flexible integration - EtherCAT fieldbus
- Long lifetime - proven ceramic sensor
- Forget recalibration - 90 ppm / year full scale stability

APPLICATIONS

- Atomic layer deposition
- High speed process control
- PVD, CVD, Etch
- General high temperature vacuum applications

Stripe® CDG100Dhs

ORDERING INFORMATION



bold = standard products

Other flange types on request.

Stripe® CDG100Dhs

SPECIFICATIONS

Full scale (FS) Torr / mbar	1000 / 1100	500 ... 1	0.5 ... 0.1
Accuracy ¹⁾	0.2 % of reading		0.4 % of reading
Temperature effect			
On zero	0.0025 % FS / °C		0.005 % FS / °C
On span	0.02 % of reading / °C		0.02 % of reading / °C
Pressure, max. (absolute)	400 kPa	260 kPa	130 kPa
Response time ²⁾	2 ... 20 ms		
Resolution	0.003 % FS		
Lowest reading	0.01 % FS		
Lowest suggested			
Reading	0.05 % FS		
Control pressure	0.5 % FS		
Temperature			
Operation (ambient)	+10 ... +50 °C		
Bakeout at flange	≤110 °C		
Storage	-20 ... +85 °C		
Supply voltage	+14 ... +30 V (dc) or ±15 V (±5%)		
Power consumption			
During Heat up	≤16 W		
At operating temperature	≤11 W		
Output signal (analog)	0 ... +10 V (dc)		
Degree of protection	IP 30		
Standards			
CE conformity	EN 61000-6-2, EN 61000-6-3, EN 61010-1 and RoHS		
ETL certification	UL 61010-1, CSA 22.2 No. 61010-1		
SEMI compliance	SEMI S2		
Electrical connection	D-sub, 15-pin, male		
Setpoint			
Number of setpoints	2 (SP1, SP2)		
Relay contact	≤30 V (dc) / ≤0.5 A (dc)		
Hysteresis	1 % FS		
Diagnostic port			
Protocol	USB		
Read	pressure, status, ID		
Set	setpoints, filter, zero adjust, factory reset, DC offset		
Materials exposed to vacuum	ceramics (Al ₂ O ₃), stainless steel (AISI 316L)		
Internal volume	≤6.8 cm ³		
Weight	962 ... 1019 g		

¹⁾ Non-linearity, hysteresis, repeatability at 25°C ambient operating temperature without temperature effects after two hours operation for ≥ 1 Torr and after 4 hours operation for < 1 Torr

²⁾ Increase 10 ... 90% FS

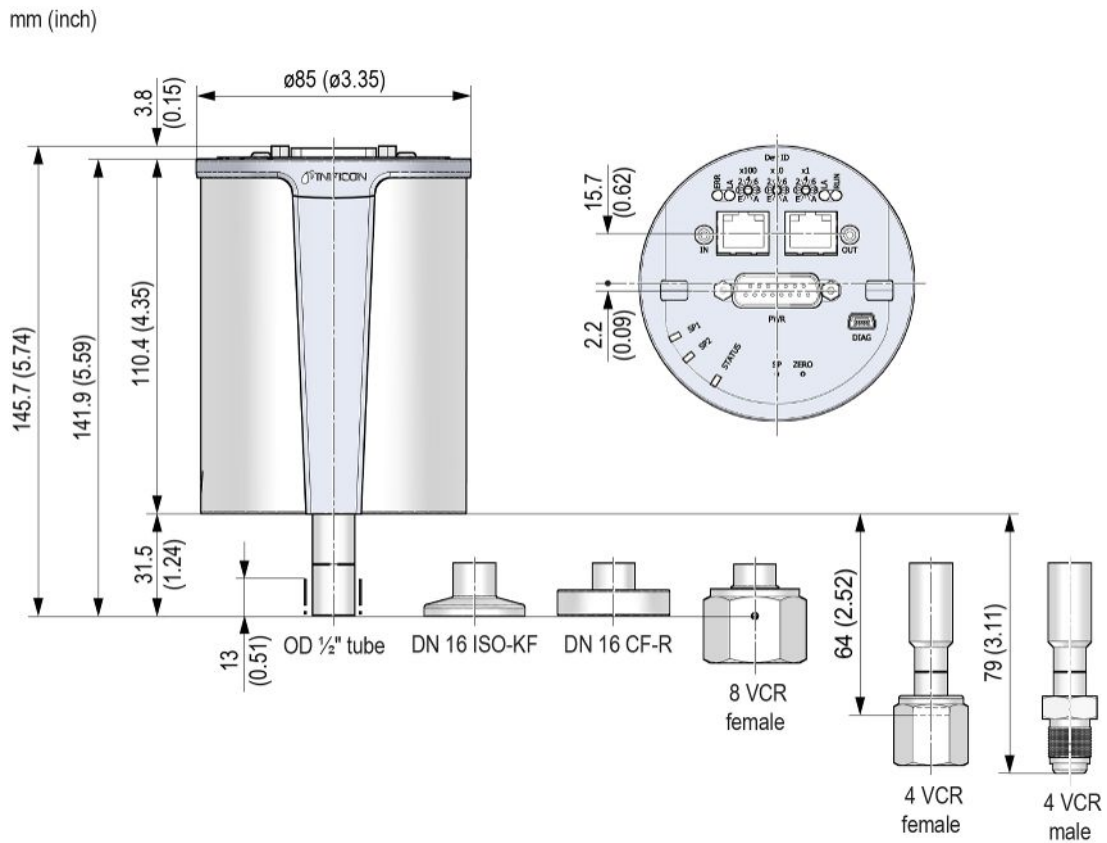
Stripe® CDG100Dhs

SPECIFICATION INTERFACES

EtherCAT®

Protocol	EtherCAT®
Communication standards	Semiconductor Device Profile ETG.5003 Part 1 Common Device Profile ETG.5003 Part 2080 "Specific Device Profile - Vacuum Pressure Gauge"
Process Data	Fixed PDO mapping and configurable PDO mapping
EtherCAT connector	RJ45, 8-pin (socket), IN and OUT
Cable	Shielded Ethernet CAT5e or higher
Cable length	≤100 m (330 ft.)
Data rate	100000 Kbps

DIMENSIONS



Heated Capacitance Diaphragm Gauge

SKY[®] CDG160D / CDG200D

INFICON SKY CDG160D and CDG200D high temperature manometers are your best choice for accurate total pressure measurement and control. CDG160D and CDG200D gauges are temperature controlled at 160°C respectively 200°C for superior performance in demanding semiconductor and plasma processes. They are available for full scale ranges from 1 Torr to 1000 Torr, with all common flange types and fieldbus interfaces and provide a linear 0 to 10 V, gas type independent, pressure signal. INFICON capacitance manometers use an ultra pure alumina ceramic diaphragm which is corrosion proof. The advantages of the ceramic sensor are better signal stability, faster recovery from atmosphere, short warm up time and an extraordinary lifetime. INFICON CDGs are high quality, cost effective pressure sensors for demanding semiconductor, plasma and vacuum applications.



ADVANTAGES

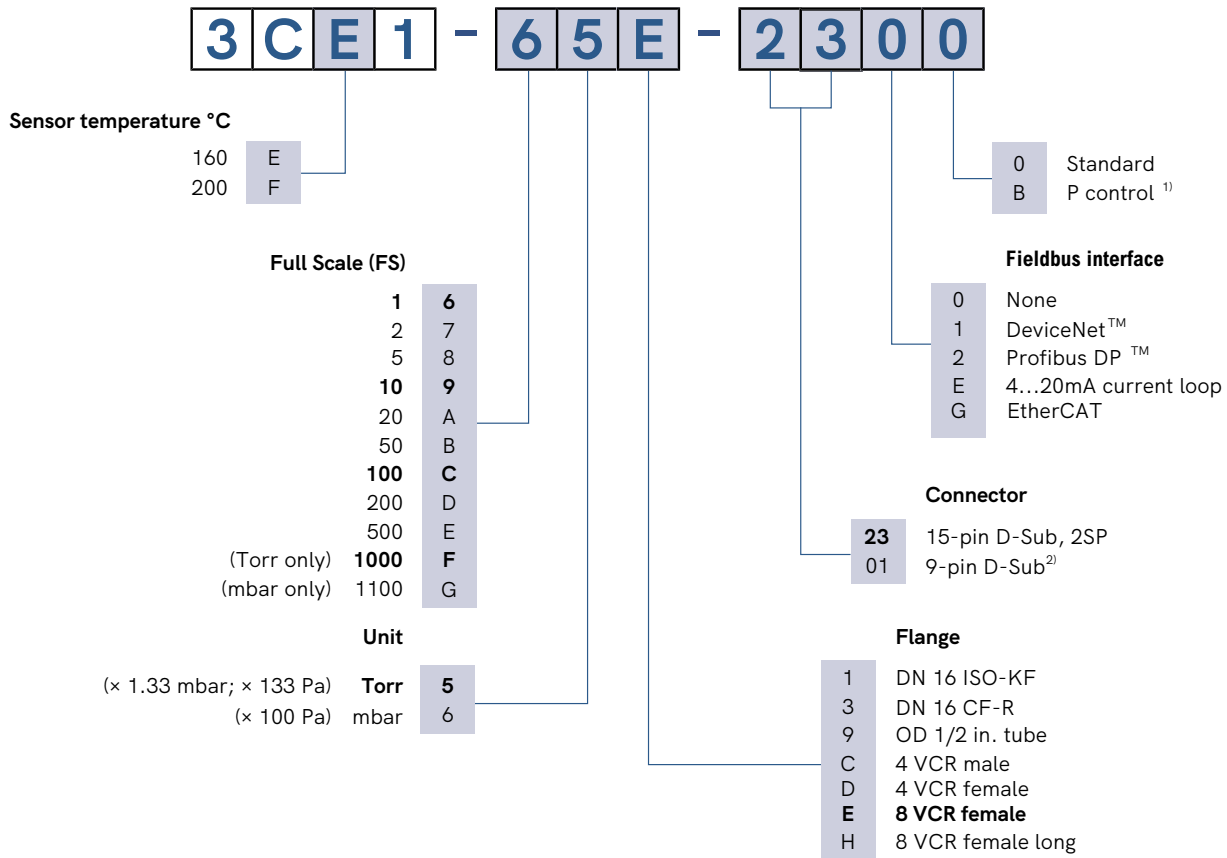
- Lower cost of ownership, 50% faster warm up, energy efficient low power consumption
- Easy integration, wide variety of full scales, flanges and interfaces, standard with two set points
- Easy one push button or remote signal zero command, zero offset adjustable
- Diagnostic port for quick service and maintenance
- Two year warranty, longer lifetime with HT heating concept and gauge protection
- No long term recalibration due to excellent signal stability and repeatability, even in harsh plasma applications
- Compliance and standards: CE, EN, UL, SEMI, RoHS

APPLICATIONS

- Etch, CVD, PVD and other semiconductor production processes
- Chemical and corrosive high temperature processes
- General thin film and vacuum processes requiring gauge protection

SKY® CDG160D / CDG200D

ORDERING INFORMATION



1) Optimized signal filter setting for pressure control

2) Not possible with fieldbus interfaces

bold = standard products

Other flange types on request.

ACCESSORIES

Type	Part no.
Diagnostic cable RS232C; USB-A - phone jack 2.5mm (1.8m) ¹⁾	303-366

¹⁾ Diagnostic SW available upon request

SKY® CDG160D / CDG200D

SPECIFICATIONS

Full scale (FS) Torr / mbar	1000 / 1100 ... 200	100 ... 1
Accuracy ¹⁾	0.4 % of reading	
Temperature effect		
On zero	0.005 % FS / °C	
On span	0.02 % of reading / °C	
Pressure, max. (absolute)	400 kPa	260 kPa
Response time ²⁾	30 ms	
Resolution	0.003 % FS	
Lowest reading	0.01 % FS	
Lowest suggested		
Reading	0.05 % FS	
Control pressure	0.5 % FS	
Temperature		
Operation (ambient) ³⁾	+10 ... +50 °C	
Bakeout at flange	≤200 °C	
Storage	-20 ... +65 °C	
Supply voltage	+21 ... +30 V (dc) or ±15 V (±5%)	
Power consumption during heat up		
CDG160D	≤18 W	
CDG200D	≤25 W	
Power consumption at operating temperature		
CDG160D	≤12 W	
CDG200D	≤18 W	
Output signal (analog)	0 ... +10 V (dc)	
Degree of protection	IP 40	
Standards		
CE conformity	EN 61000-6-2, EN 61000-6-3, EN 61010	
ETL certification	UL 61010-1, CSA 22.2 No.61010-1	
SEMI compliance	SEMI S2	
Electrical connection	D-Sub, 15-pin, male	
Setpoint		
Number of setpoints	2 (SP1, SP2)	
Relay contact	≤30 V (dc) / ≤0.5 A (dc)	
Hysteresis	1 % FS	
Diagnostic port		
Protocol	RS232-C	
Read	pressure, status, ID,	
Set	setpoints, filter, zero adjust, factory reset, DC offset	
Materials exposed to vacuum	ceramics (Al ₂ O ₃), stainless steel (AISI 316L)	
Internal volume	≤6.8 cm ³	
Weight	891 ... 964 g	

¹⁾ Non-linearity, hysteresis, repeatability at 25°C ambient operating temperature without temperature effects after three hours operation

²⁾ Increase 10 ... 90% FS

³⁾ Ambient temperatures >40°C may increase surface temperature above SEMI S2 compliance levels — mark "caution hot!"

SKY® CDG160D / CDG200D

SPECIFICATIONS INTERFACES

DeviceNet™

Protocol	DeviceNet™, group 2 slave only
Data rate switch	125, 250, 500 kBaud or network programmable
Cable length	
125 kbps	500 m (1650 ft.)
250 kbps	250 m (825 ft.)
500 kbps	100 m (330 ft.)
MAC ID	Two switches (address 00 - 63) or network programmable
Digital functions	Read pressure, select units: Torr, mbar, Pa Set points, filter, zero adjust, factory reset, DC offset Monitor gauge status Safe state allows definition of behavior in case of error Detailed alarm and warning information
Analog functions	0 ... 10 V analog output pressure indication two setpoint relays A + B
Visual communication indicators	LED network status (green / red) LED module status (green / red)
Specification	DeviceNet™ "Vacuum Gauge Device Profile"
Device type	"VG" for combination gauge
I / O slave messaging	Polling only
Supply voltage for DeviceNet™	24 V nominal (11 ... 25 V)
Supply voltage for gauge	+21 ... +30 V (dc) or ±15 V (±5%)
Connector for DeviceNet™	Microstyle, 5-pin
Connector for Gauges (analog output, supply voltage, setpoints)	D-Sub, 15-pin, male

PROFIBUS DP

Baud rates	9.6 / 19.2 / 93.75 / 187.5 / 500 kBaude 1.5 / 12 MBaud
Address	Two switches (address 00 - 125) or network programmable
Digital functions	Read pressure, select units: Torr, mbar, Pa Set points, filter, zero adjust, factory reset, DC offset Monitor gauge status, filament status Safe state allows definition of behavior in case of error Detailed alarm and warning information
Analog functions	0 ... 10 V analog output pressure indication two setpoint relays A + B
Connector for Profibus DP	D-Sub, 9-pin, female
Connector for CDG (analog output, supply voltage, setpoints)	D-Sub, 15-pin, male

SKY[®] CDG160D / CDG200D

EtherCAT[®]

Protocol	EtherCAT [®]
Communication standards	Semiconductor Device Profile ETG.5003 Part 1 Common Device Profile ETG.5003 Part 2080 "Specific Device Profile - Vacuum Pressure Gauge"
Process Data	Fixed PDO mapping and configurable PDO mapping
EtherCAT connector	RJ45, 8-pin (socket), IN and OUT
Cable	Shielded Ethernet CAT5e or higher
Cable length	≤100 m (330 ft.)
Data rate	100000 Kbps

4-20mA current loop (analog)

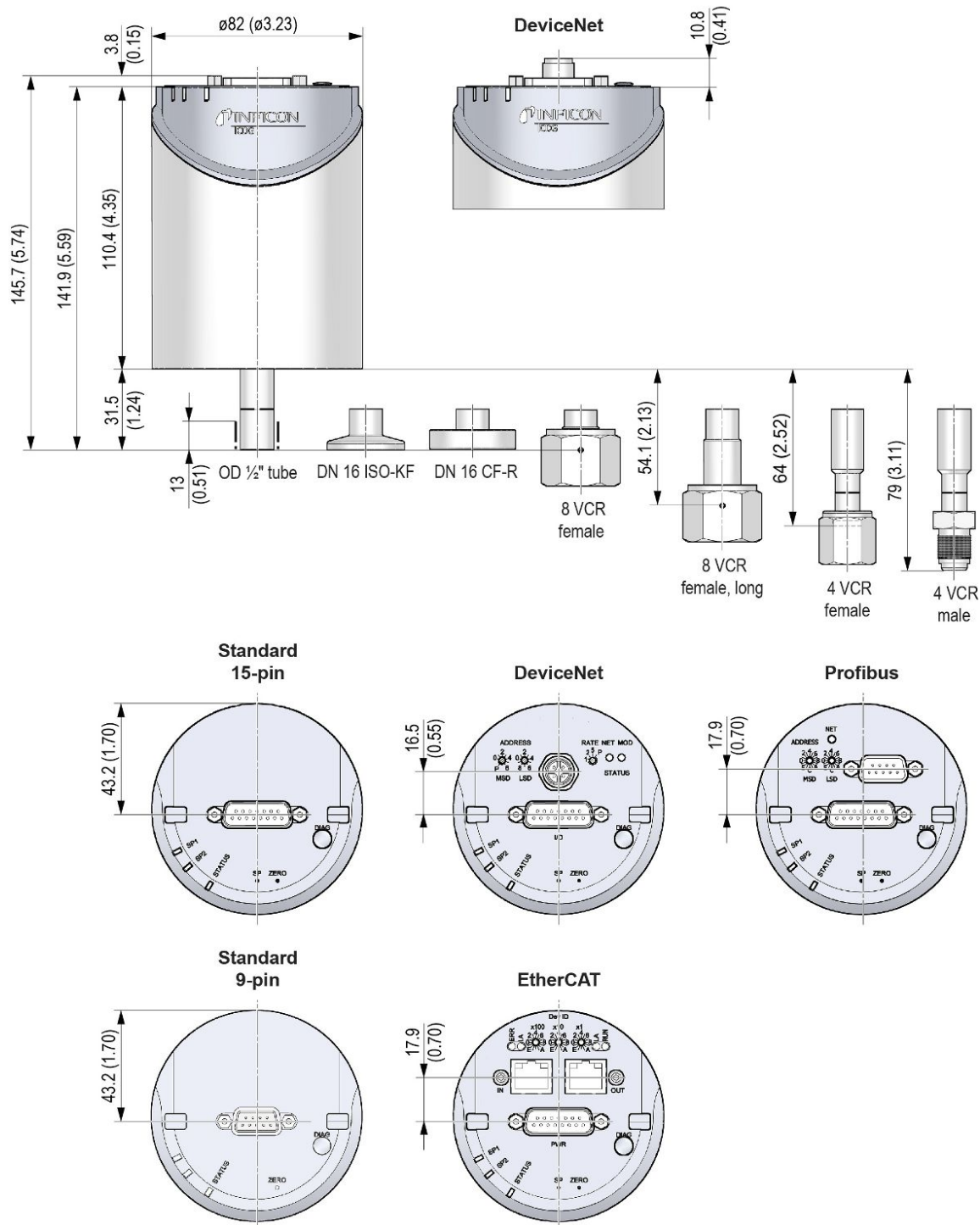
Output signal (measurement signal)	2-wire, current loop
Signal range	3.8 ... 20.2 mA
Measuring rang (zero ... FS)	4.0 ... 20.0 mA
Loaded impedance R_L	18.5 ... 33.3 V (dc) ¹⁾ 500 Ω
	16.2 ... 31.0 V (dc) ¹⁾ 400 Ω
	13.9 ... 28.8 V (dc) ¹⁾ 300 Ω
	11.7 ... 26.5 V (dc) ¹⁾ 200 Ω
	9.4 ... 24.2 V (dc) ¹⁾ 100 Ω

¹⁾ Supply voltage current interface

SKY[®] CDG160D / CDG200D

DIMENSIONS

mm (inch)



Ceramic Diaphragm Gauge

CDG015D 4-20mA current loop

The INFICON CDG015D Ceramic Diaphragm Gauge is designed for robust and reliable measurement in a variety of industrial applications. Advanced digital electronics improve gauge performance and offer easy handling features such as one push button zero function. The CDG015D is a compact sensor with IP 65 and an output signal of 4-20 mA.



ADVANTAGES

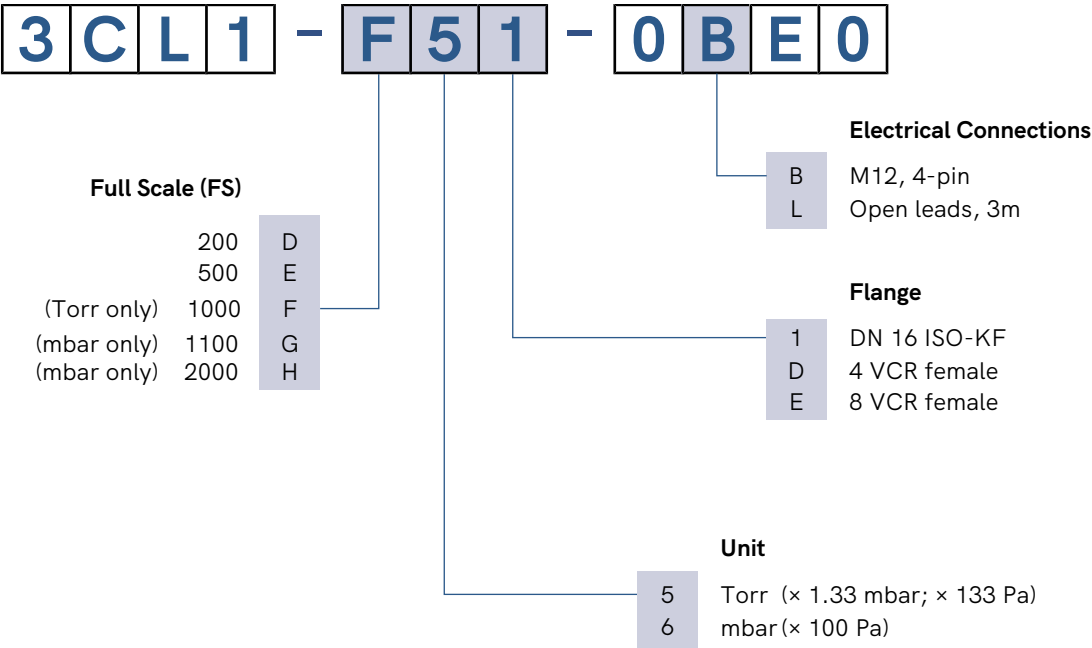
- Interface with 2-wire current loop
- One push button zero function
- IP65 enclosure for harsh environments
- Chemical & Corrosion resistant ceramic sensor

APPLICATIONS

- Furnace
- Diamond growth (CVD)
- PECVD (Plasma Enhanced Chemical Vapor Deposition)
- General fore-line pressure measurement
- Freeze drying

CDG015D 4-20mA current loop

ORDERING INFORMATION



CDG015D 4-20mA current loop

SPECIFICATIONS

Full scale (FS) Torr / mbar	2000	1000 / 1100 ... 200
Accuracy ¹⁾		
2000 mbar, 1100 mbar		0.75 % of reading
1000 Torr		0.75 % of reading
500 Torr / 500 mbar	+/- 1 % of reading or +/- 0.15% of FS, whichever is greater	
200 Torr / 200 mbar	+/- 1 % of reading or +/- 0.35% of FS, whichever is greater	
Temperature effect		
on zero		0.01 % FS / °C
on span		0.01 % FS / °C
Resolution		0.05 % FS
Response time ²⁾		≤20 ms
Pressure, max. (absolute)	400 kPa	200 kPa
Temperature		
Operation (ambient)		-40 ... +100 °C
Bakeout at flange ³⁾		≤100 °C
Storage		-40 ... +100 °C
Supply voltage		+12 ... +30 V (dc)
Output signal (analog)		2-wire, current loop
Relationship current-pressure		linear
Signal range		4.0 ... 20.0 mA
Measuring range (zero ... FS)		3.2 ... 3.6 mA
Degree of protection		IP 65
Standards		
CE conformity	EN 61000-6-3, EN 61010, 61326-1 & RoHS	
Electrical connection		M12, 4-pin male cable 3m, open leads
Materials exposed to vacuum		
Flange DN 16 ISO-KF		SS 1.4404, AISI 316
Flange 4 VCR female, 8 VCR female		SS 1.4404, AISI 316L
Sensor and diaphragm		ceramics (Al ₂ O ₃ 96%)
Sealing		<1x10 ⁻⁹ mbar l/s
Internal volume		
DN 16 ISO-KF		3,2 m ³
4 VCR female		0,6 m ³
8 VCR female		2,4 m ³
Weight		128 ... 212 g

¹⁾ Non-linearity, hysteresis, repeatability in the calibrated range +10°C ... +50°C without temperature effects

²⁾ Increase 10 ... 90% FS

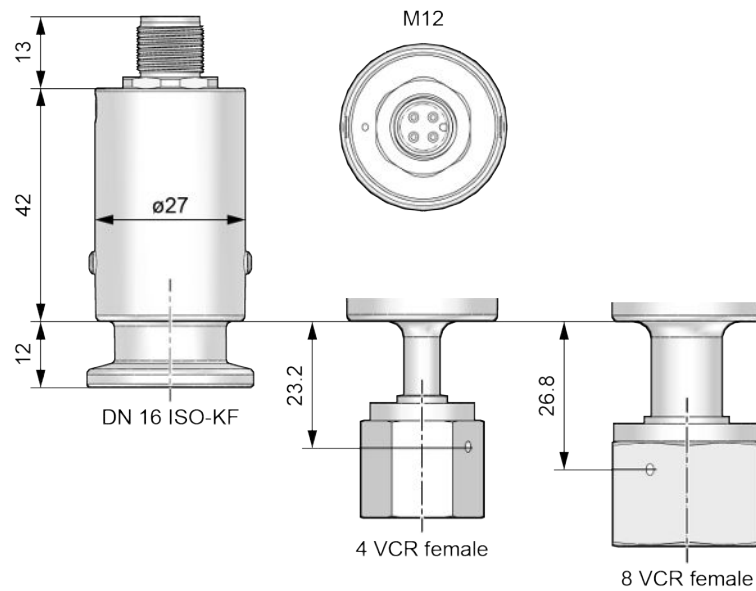
³⁾ Non-operation

CDG015D 4-20mA current loop

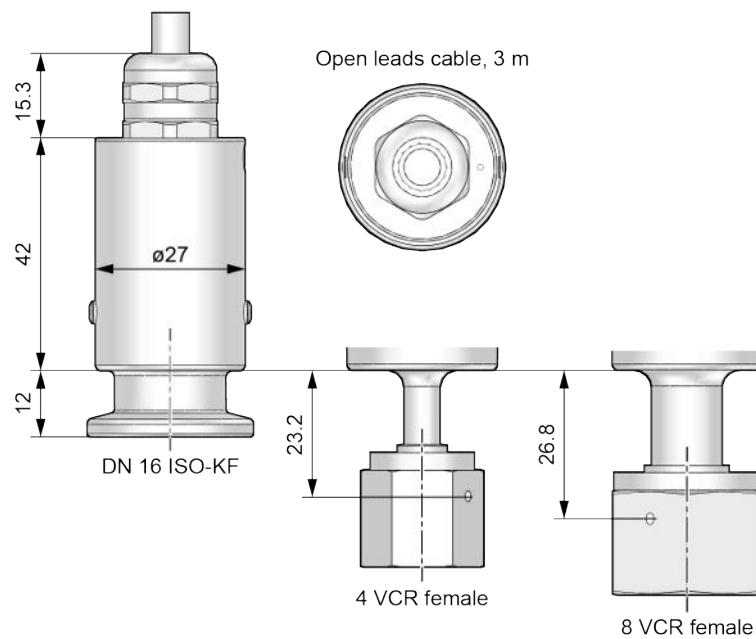
DIMENSIONS

[mm]

M12



Open leads cable



Capacitance Diaphragm Sensor

Spot™ CDS500D

The Spot CDS500D ceramic capacitance diaphragm sensor is designed for integration into the limited space in your specific vacuum instruments and systems. The miniature sensor offers a high accuracy and the alumina ceramic cell and the weldable stainless steel feedthrough are all alumina coated. The sensor electronics provide a digital SPI interface for easy integration. The sensor features a fast data cycle time for instant response to pressure changes, outstanding repeatability and long-term stability.



ADVANTAGES

- The miniature sensor offers a high accuracy
- Excellent repeatability and long-term stability
- Weldable feedthrough for custom integration and calibration, or welded custom flange for integration of factory calibrated sensor
- Sensor electronics with SPI interface for easy integration
- Fast response time

APPLICATIONS

- For integration into custom vacuum instrumentation and systems

Spot™ CDS500D

ORDERING INFORMATION

Type

CDS500D	on request
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SPECIFICATIONS

Full scale (FS)	1000 Torr	300 Torr	100 Torr	30 Torr	10 Torr
Accuracy ¹⁾	0.5 % of reading				
Temperature effect					
on zero	0.01 % FS / °C				
on span	0.01 % of reading / °C				
Resolution	0.01 % FS / °C				
Long time stability	0.5 % FS / year				
Lowest reading	0.05 % FS				
Measuring range	0.1 ... 100 % FS				
Temperature					
Ambient operating	0 ... 60 °C				
Compensated range	10 ... 50 °C				
Storage	-20 ... 80 °C				
Ambient humiditiy limits	< 80 % RH non-condensing				
Maximum admissible pressure	400 kPa absolute				
Burst pressure	800 kPa absolute				
Supply voltage	5 ± 0.25 VDC				
Supply voltage ripple	≤ 50 mV _{pp}				
Power consumption	< 0.05 W operation				
Digital interface	SPI bus				
Data rate	1, 2.5, 5, 10, 25, 100, 200, 250 ms (selectable during ordering process)				
Responds time	2 ms (10 ... 90%)				
Electrical connection	JST or Flex. cable				
Materials exposed to vacuum	ceramics (Al ₂ O ₃), stainless steel (AISI 316L)				
Tightness, leak rate	< 1 E-9 mbar l/s				
Mounting position	any, recommended vertical up				

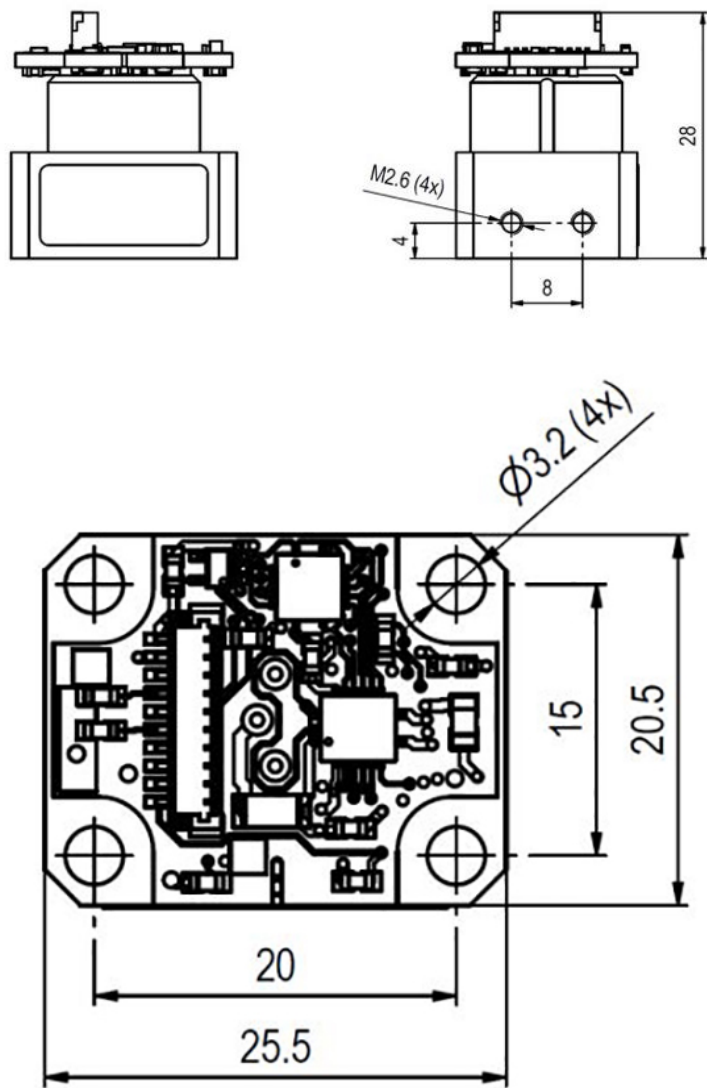
¹⁾ Calibrated at INFICON, non-linearity, hysteresis, repeatability at 25 °C ambient operating temperature without temperature effects after 2 hours operation.

Weight and internal volume are design specific

Spot™ CDS500D

DIMENSIONS

[mm]



For information only, final dimensions depend upon integration

Capacitance Diaphragm Sensor (Wide Range)

Spot™ CDS530D

The Spot CDS530D ceramic capacitance diaphragm sensor is designed for integration into the limited space in your specific vacuum instruments and systems. The dual miniature sensor offers a high accuracy in a wide measurement range and the alumina ceramic cells and the weldable stainless steel feedthrough are all alumina coated. The sensor electronics provides a digital SPI interface for easy integration. The sensor features a fast data cycle time for instant response to pressure changes, outstanding repeatability and long-term stability.



ADVANTAGES

- The dual miniature sensor offers a high accuracy in a wide measurement range
- Wide range, high precision
- Excellent repeatability and long-term stability
- Sensor electronics with SPI interface for easy integration
- Welded custom flange for integration of calibrated sensor
- Fast response time

APPLICATIONS

- For integration into custom vacuum instrumentation and systems

Spot™ CDS530D

ORDERING INFORMATION

Type

CDS530D	on request
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SPECIFICATIONS

Full scale (FS)	1000 Torr	300 Torr	100 Torr	30 Torr	10 Torr
Accuracy ¹⁾ (sensor 1 & 2)	0.5 % of reading				
Temperature effect					
on zero	0.01 % FS / °C				
on span	0.01 % of reading / °C				
Resolution	0.01 % FS				
Long time stability	0.5 % FS / year				
Lowest reading	0.05 % FS				
Measuring range	0.1 ... 100 % FS				
Temperature					
Ambient operating	0 ... 60 °C				
Compensated range	10 ... 50 °C				
Storage	-20 ... 80 °C				
Ambient humiditiy limits	< 80 % RH non-condensing				
Maximum admissible pressure	400 kPa absolute				
Burst pressure	800 kPa absolute				
Supply voltage	5 ± 0.25 VDC				
Supply voltage ripple	≤ 50 mV _{pp}				
Power consumption	< 0.05 W operation				
Digital interface	SPI bus				
Data rate	1, 2.5, 5, 10, 25, 100, 200, 250 ms (selectable during ordering process)				
Responds time	2 ms (10 ... 90%)				
Electrical connection	JST or Flex. cable				
Materials exposed to vacuum	ceramics (Al ₂ O ₃), stainless steel (AISI 316L)				
Tightness, leak rate	< 1 E-9 mbar l/s				
Mounting position	any, recommended vertical up				

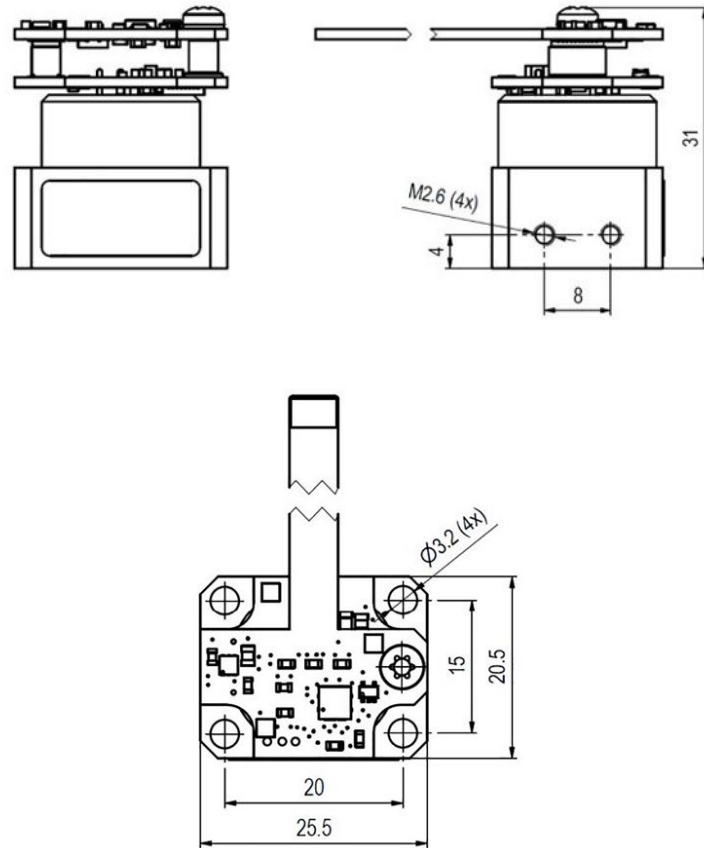
¹⁾ Calibrated at INFICON, non-linearity, hysteresis, repeatability at 25 °C ambient operating temperature without temperature effects after 2 hours operation.

Weight and internal volume are design specific

Spot™ CDS530D

DIMENSIONS

[mm]



For information only, final dimensions depend upon integration

Pressure Display for CDG

VGD500

The INFICON Vacuum Gauge Display VGD500 connects to our CDG product line to provide a 4 Digit Display. It's a small unit which displays the pressure of the gauge. The pressure reading is selectable in pressure unit Torr, mTorr, mbar and Pa.



ADVANTAGES

- 4 Digit display for easy read out
- Large 10 mm active LED display - readable from distance and wide range gauge of angle
- In-line plug design
- 15pin D-Sub, no extra power connection
- Compact small size
- Compatible with all Fullscale; 100 mTorr
- Pressure Units selectable (Torr, mTorr, mbar and Pa)
- CE certified

VGD500

ORDERING INFORMATION

Type	VGD500
VGD500 Vacuum Gauge Display	399-653

SPECIFICATIONS

Type	VGD500
Display	4 digits
Connection	
Gauge Side	D-Sub, 15-pin, female
Measurement cable side	D-Sub, 15-pin, male
Signal	digital input RS232
Pressure unit (adjustable)	Torr (default), mTorr, mbar, Pa
Supply	
Power consumption	≤1 W
Voltage	+14 - +30 V(dc) or +/- 15 V(ac)
Degree of protection	IP 40
Temperature	
Operation	+5 - +50 °C
Storage	-20 - +85 °C
Use	indoors only
Connectable gauges in the measurement Range (FS) 0.1 mbar/Torr to 1000 mbar/Torr	CDG025D / -S, CDG025D-X3, CDG045D ... CDG200D, CDG045D2 ... CDG100D2
Weight	58 g
Dimensions	50x63x34 mm

Application specific CDG solution

Application specific CDG solution

INFICON's innovative ceramic capacitance diaphragm technology offers new and unique solutions. The flexible platform allows direct drop in replacements for legacy products. Please contact our sales for more information.

ULTRA CLEAN PORTER

You need a Ultra Clean compatible CDG? INFICON's xParts coating lifts the product performance to Ultra Clean level matched with clean room double packaging.

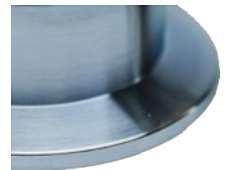
- Lower particle contamination
- Chemical resistant
- Lower metal contamination



ALLCERAMIC, THE METAL FREE PROCESS CDG

Only ceramic surfaces (aluminum oxide) are wetted to process media. This option is available to all CDG products (SKY, Edge).

- Higher corrosion resistance
- Lower metal contamination
- Lower particle contamination
- Longer lifetime, less maintenance



Application specific CDG solution

DROP IN RETROFIT SOLUTIONS

You need to replace a legacy gauge of any brand? No problem, INFICON offers attractive drop in solutions for most legacy products matching other vendors pinout and functionality.

"Click here to get a list of all DropIn INFICON products"

Some examples are:

- Dual output
- Trip point versions with pinout and trip point voltage levels

Pin	Legacy Gauge	INFICON Standard Gauge	INFICON drop in replacement
1	Trip point A V-level	SP1 common	SP1 voltage level
2	Pressure signal output	Signal output	Signal output
3	Trip point A N.C.	Status	SP1 normally closed contact N.C.
4	Trip point A N.O.	SP1 no	SP1 normally open contact N.O.
5	Power return	Supply common	Supply common
6	-15VDC	Supply (-15V)	Supply (-15V)
7	+15VDC	Supply (+14...+30V)	Supply (+14...+30 or +15V)
8	Trip point A Com	SP2 no	SP1 common
9	Trip point B N.O.	SP2 common	SP2 normally open contact N.O.
10	Trip point B N.C.	Gauge identification	SP2 normally closed
11	Trip point B Com	Supply	SP2 common
12	Pressure signal return	Signal common	SP2 Voltage level
13	Trip point B V-Level	RS232 TxD	SP2 Voltage level
14	No connection	RS232 RXD	Not used
15	Chassis ground	Chassis ground	Housing (Chassis ground)



Application specific CDG solution

YOU DIDN'T FIND THE CDG SOLVING YOUR APPLICATION?

INFICONs ceramic capacitance diaphragm technology paired with digital signal processing and experienced engineering will offer leading, innovative solutions. Please contact INFICON and describe your measurement requirements.

Pirani Standard Gauge

PSG50x/-S, PSG51x-S,

The INFICON Pirani Standard Gauges, PSG500, PSG500-S PSG502-S, PSG510-S and PSG512-S, employ the most advanced digital Pirani technology available in the marketplace. The rugged stainless steel sensor cell and compact design qualify them for use on semiconductor systems and for standard applications, such as for vacuum lines.



ADVANTAGES

- Easy push button ATM and HV adjustment
- Compact space saving and rugged design
- Aluminum housing
- Measuring performance independent of mounting orientation for maximum engineering freedom in tool design
- All stainless steel measuring cell
- Logarithmic signal output for easy integration
- 10 bar absolute overpressure with threaded connections
- 250°C bakeable version
- Nickel filament option for corrosive applications
- Ceramic feedthrough for extremely corrosive applications (PSG510 and PSG512)
- Optional setpoints
- RoHS compliance

APPLICATIONS

- Controlling high vacuum ionization gauges
- For vacuum pressure monitoring
- Safety circuits in vacuum systems
- General vacuum measurement and control in the fine and rough vacuum range

PSG50x/-S, PSG51x-S,

ORDERING INFORMATION

Type	PSG500	PSG500-S	PSG502-S	PSG510-S	PSG512-S
Setpoints	None	Two setpoints	Two setpoints	Two setpoints	Two setpoints
Filament	Tungsten	Tungsten	Nickel	Tungsten	Nickel
Feethrough	Glass	Glass	Glass	Ceramic	Ceramic
DN 16 ISO-KF	350-060	350-080	350-140	350-200	350-300
DN 16 CF-R	350-062	350-082	350-142	-	-
1/8 in. NPT	350-061	350-081	350-141	-	-
8 VCR	350-064	350-084	350-144	-	-
4 VCR	350-065	350-085	350-145	-	-
1/2 in. tube	350-063	350-083	350-143	-	-
7/16-20 UNF	350-066	350-086	350-146	-	-
DN 16 ISO-KF long tube	350-067	350-087	350-147	-	-
DN 16 CF-R long tube	350-068	350-088	350-148	-	-

Replacement sensor	PSG500/-S	PSG502-S	PSG510-S	PSG512-S
Filament	Tungsten	Nickel	Tungsten	Nickel
Feedthrough	Glass	Glass	Glass	Ceramic
DN 16 ISO-KF	350-920	350-900	350-930	350-940
DN 16 CF-R	350-922	350-902	-	-
1/8 in. NPT	350-921	350-901	-	-
8 VCR	350-924	350-904	-	-
4 VCR	350-926	350-906	-	-
1/2 in. tube	350-923	350-903	-	-
7/16-20 UNF	350-925	350-905	-	-
DN 16 ISO-KF long tube	350-927	350-907	-	-
DN 16 CF-R long tube	350-928	350-908	-	-

PSG50x/-S, PSG51x-S,

SPECIFICATIONS

Type	PSG500	PSG500-S	PSG502-S	PSG510-S	PSG512-S
500Filament Feedthrough	Tungsten Glass	Tungsten Glass	Nickel Glass	Tungsten Ceramic	Nickel Ceramic
Measuring principle	thermal conductance according to Pirani				
Measurement range (air, O ₂ , CO, N ₂)	5 × 10 ⁻⁴ to 1000 mbar				
Accuracy (N ₂)					
1 × 10 ⁻³ ... 100 mbar	±15% of reading				
5 × 10 ⁻⁴ ... 1 × 10 ⁻³ mbar	±50% of reading				
100 ... 1000 mbar	±50% of reading				
Repeatability (air) 1 × 10 ⁻³ ... 100 mbar	2% of reading				
Output signal (measurement signal)					
Voltage range	0 ... +10.3 V				
Measurement range	V +1.9 ... +10.0 V				
Voltage vs. pressure	Logarithmic 1.286 V / decade				
Error signal	0 ... +0.5 V (filament rupture)				
Output impedance	2 × 4.7 Ω				
Minimum loaded impedance	10 kΩ, short-circuit proof				
Response time	80 ms				
Gauge identification	27.0 kΩ, referenced to supply common				
Adjustment	One tactile switch for ATM and HV adjustment				
Setpoint	none	2			
Setting range	2 × 10 ⁻³ ... 500 mbar				
Hysteresis	10% of reading above lower threshold				
Relay contact	30 V (dc) / 0.5 A (dc) floating				
Switching time	<20 ms				
Supply voltage					
At gauge	+14 ... +30 V (dc)				
Ripple	≤1 V _{pp}				
Current consumption	<500 mA (max. starting current)				
Power consumption	≤1 W				
Electrical connection	FCC 68 / RJ45 appliance connector, 8 poles, male				
Sensor cable	8 poles plus shielding				
Cable length	≤100 m (8 × 0.14 mm ²)				
Materials exposed to vacuum	Glass, Ni, NiFe DIN 1.4301/1.4305/1.4435		Al ₂ O ₃ , Ni, DIN 1.3981/1.4305/1.4435		
Material Filament	W	W	Ni	W	Ni
Internal volume					
DN 16 ISO-KF, DN 16 CF-R, 7/16-20 UNF	1.5 cm ³ (0.092 in. ³)				
DN 16 ISO-KF and DN 16 CF-R long tube	10 cm ³ (0.61 in. ³)				
1/8 in. NPT, 4 VCR, 8 VCR, 1/2 in. tube	2 cm ³ (0.122 in. ³)				
Admissible pressure (absolute)	10 bar, limited to inert gases				
Admissible temperature					
Operation	+5 ... +60°C				
Vacuum connection ¹⁾	80 / 250°C ²⁾				
Storage	-20 ... +65°C				

¹⁾ In horizontal mounting orientation

²⁾ Long tube

PSG50x/-S, PSG51x-S,

Type	PSG500	PSG500-S	PSG502-S	PSG510-S	PSG512-S
500Filament Feedthrough	Tungsten Glass	Tungsten Glass	Nickel Glass	Tungsten Ceramic	Nickel Ceramic
Mounting orientation			any		
Degree of protection			IP40		
Weight					
DN 16 ISO-KF, 7/16-20 UNF			80 g		
DN 16 CF-R, 4 VCR			100 g		
1/8 in. NPT, 1/2 in. tube			70 g		
8 VCR, DN 16 ISO-KF long tube			130 g		
DN 16 CF-R long tube			140 g		

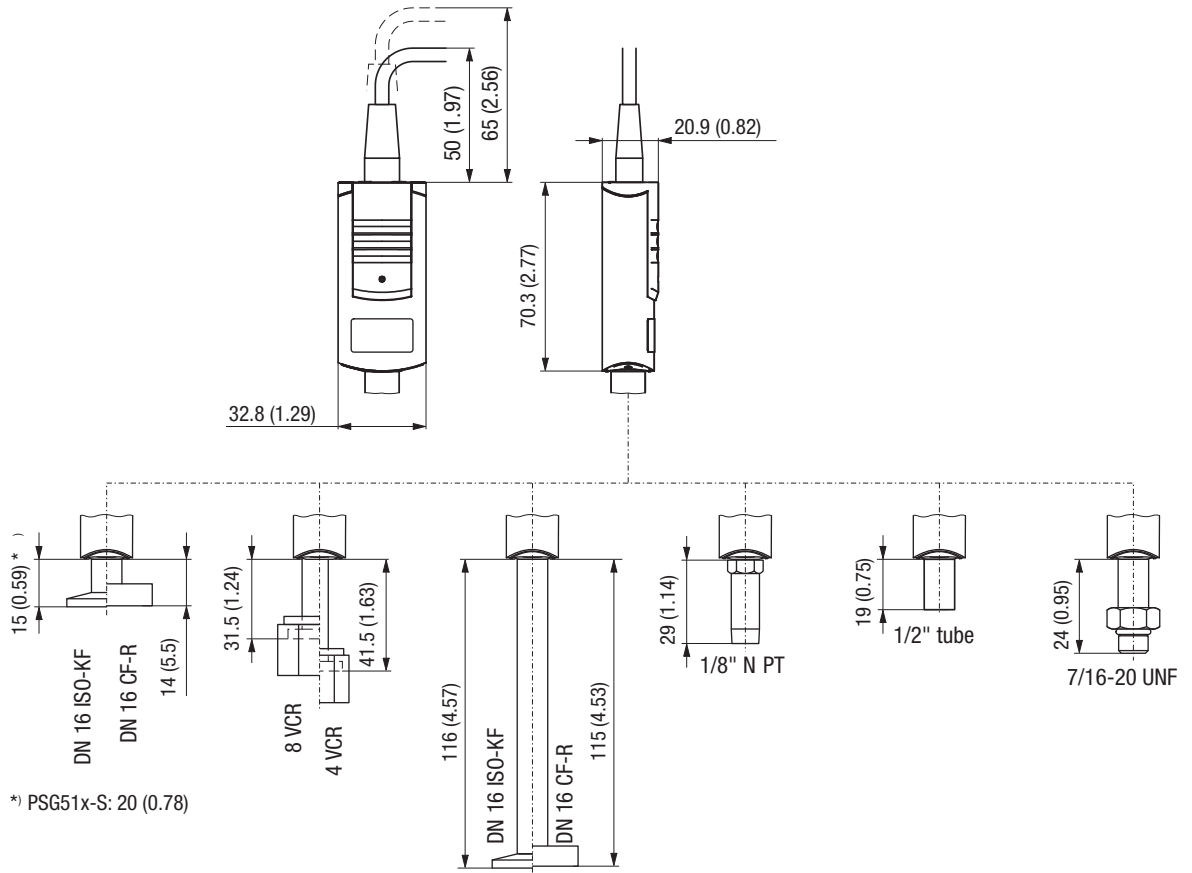
¹⁾ In horizontal mounting orientation

²⁾ Long tube

PSG50x/-S, PSG51x-S,

DIMENSIONS

mm (in.)



Pirani Standard Gauge

PSG550, PSG552, PSG554

The INFICON Pirani Standard Gauge (PSG55x) employs like his brothers PCG55x and PSG50x the most advanced digital Pirani technology available. The rugged sensor design combined with the compact size and the variety of features qualifies as the right product for measurement from low to the high vacuum range.



ADVANTAGES

- Available with tungsten (PSG550) or nickel (PSG552) filament or with a fully ceramic coated (PSG554) sensor unit for highly corrosive applications
- Optional display, setpoints and digital interfaces, e.g. EtherCAT®, DeviceNet™ etc.
- Latest EtherCAT® protocol generation 2.0
- Easy to exchange plug and play sensor element with on-board calibration data—guarantees high reproducibility and low cost of ownership
- Selectable output signal and various plug versions for easy integration
- Measuring performance independent of mounting orientation for maximum engineering freedom in tool design
- Diagnostic port on all versions
- Compliance and standards: CE, EN, UL, CSA, RoHS

APPLICATIONS

- For vacuum pressure measurement
- Safety circuits in vacuum systems
- General vacuum measurement and control from low to the high vacuum range

PSG550, PSG552, PSG554

ORDERING INFORMATION

3 P I 1 - 0 0 1 - 1 1 0 1									
Filament				Unit²⁾			Measurement range		
Tungsten	1				mbar	0	0	0.61 ... 10.23 V ³⁾	
Nickel	2				Torr	1	1	1.2 ... 8.68 V	
Ceramic coated	3				Pa	2	2	0.375 ... 5.659V	
Tungsten, galv. isolated ¹⁾	6				micron	3	3	1.57 ... 9.05 V	
Nickel, galv. isolated ¹⁾	7							Digital interface	
Ceramic coated, galv. isolated ¹⁾	8							0	None / RS485 ^{3) 8)}
								1	DeviceNet ^{TM 4) 7)}
								2	Profibus DP ^{TM 1) 7)}
								A	PROFINET ^{TM 4) 7)}
								G	EtherCAT ^{® 1) 7) 9)}
								Electrical connection	
								0	FCC, 8-pin ³⁾
								1	D-Sub, 9-pin
								2	D-Sub, 15-pin HD
								4	D-Sub, 15-pin HD, with RS485 ^{5) 7)}
								Display, switching functions	
								0	None
								1	LCD
								2	2 setpoints (solid state)
								4	LCD and 2 setpoints (solid state)
								6	2 setpoints (mechanical) ⁶⁾

- 1) Only with D-Sub 9-pin connector available
- 2) When selecting LCD (liquid crystal display) choose desired pressure unit
- 3) Choose these settings when using an INFICON VGC50x or PGD500 controller or when choosing "4" under electrical connections
- 4) Only with D-Sub 9-pin connector and galvanically isolated available
- 5) Only without additional digital interface available
- 6) Only with D-Sub 9-pin connector without LCD available
- 7) Fieldbus options only available together with switching functions (select number "2" or "4" from table "Display, switching functions")
- 8) Just selectable via number "4" from table "Electrical connection"
- 9) EtherCAT protocol generation 2.0; protocol generation 1.0 still available on request

PSG550, PSG552, PSG554

Replacement sensor	PSG550 Tungsten	PSG552 Nickel	PSG554 Ceramic coated
DN 16 ISO-KF	355-925	355-936	355-947
DN 16 ISO-KF long tube	355-926	355-937	355-948
DN 16 CF-F	355-927	355-938	355-949
DN 16 CF-R long tube	355-928	355-939	355-950
DN 25 ISO-KF	355-929	355-940	355-951
4 VCR female	355-932	355-943	355-954
8 VCR female	355-931	355-942	355-953
1/8 in. NPT	355-930	355-941	355-952
Surface mount 29 mm (1.15 in.)	355-934	355-945	355-956
4 VCR 90° female	355-935	355-946	355-957
7/16-20 UNF male	355-933	355-944	355-955

Accessories		
Centering ring with filter (DN 16 ISO-KF)		211-097
Diagnostic: Communication adapter (2 m) for PC RS232C serial port ¹⁾		303-333

¹⁾ Diagnostic SW available upon request

PSG550, PSG552, PSG554

SPECIFICATIONS

Type	PSG550	PSG552	PSG554
Filament	Tungsten	Nickel	Ceramic coated
Measurement range	$5 \times 10^{-5} \dots 1000$ mbar ($3.8 \times 10^{-5} \dots 750$ Torr)		
Accuracy (N ₂)			
$5 \times 10^{-4} \dots 1 \times 10^{-3}$ mbar	±50% of reading		
$1 \times 10^{-3} \dots 100$ mbar	±15% of reading		
100 ... 1000 mbar	±50% of reading		
Repeatability (N ₂) $1 \times 10^{-3} \dots 100$ mbar	±2% of reading		
Admissible pressure (absolute)	≤5 bar		
Pressure, max. (absolute)	10 bar		
Admissible temperature			
Operation (ambient)	+10 ... +50°C		
Storage	-20°C ... +65°C		
Bakeout at flange	≤80°C		
Long tube	≤250°C		
Supply voltage	+15 ... +30 V / A (dc)		
Power consumption			
Without fieldbus	≤2.5 W		
DeviceNet™	≤3 W		
Profibus DP	≤3 W		
EtherCAT® / PROFINET™	≤4.5 W		
Output signal analog			
3PIx-0xx-xxx0	0 ... +10 V		
3PIx-0xx-xxx1	0 ... +8.5 V		
3PIx-0xx-xxx2	0 ... +5.529 V		
3PIx-0xx-xxx3	0 ... +8.875 V		
Measuring range			
3PIx-0xx-xxx0	+0.61 ... +10 V		
3PIx-0xx-xxx1	+1.2 ... +8.5 V		
3PIx-0xx-xxx2	+0.375 ... +5.529 V		
3PIx-0xx-xxx3	+1.57 ... +8.875 V		
Voltage vs. pressure			
3PIx-0xx-xxx0	1.286 V / Decade		
3PIx-0xx-xxx1	1 V / Decade		
3PIx-0xx-xxx2	1 V / Decade		
3PIx-0xx-xxx3	1 V / Decade		
Load impedance	>10 kΩ		
Setpoint relay	2		
Range (N ₂)	$5 \times 10^{-5} \dots 1000$ mbar		
Relay contact	NO, potential free		
Hysteresis	10% of threshold		
Contact rating			
Solid state relays	≤30 V / ≤0.3 A (dc)		
Mechanical relays	≤30 V / ≤1 A (dc)		
Switching time	≤30 ms		
Interface (digital)	RS232C		

PSG550, PSG552, PSG554

Type	PSG550	PSG552	PSG554
Filament	Tungsten	Nickel	Ceramic coated
Electrical connection		FCC, 8-pin	
3PIx-0xx-x0xx		D-Sub, 9-pin, male	
3PIx-0xx -x1xx		D-Sub, 15-pin HD, male	
3PIx-0xx -x2xx		D-sub, 15-pin HD, with RS485, male	
3PIx-0xx -x4xx			
Cable length		≤100 m (≤330 ft)	
RS232C operation		≤30 m (≤100 ft)	
Materials exposed to vacuum	W, Ni, NiFe, glass, SnAg, stainless steel	Ni, NiFe, glass, SnAg, stainless steel	Al ₂ O ₃ , stainless steel
Internal volume			
DN 16 ISO-KF		4.7 cm ³	
DN 16 ISO-KF long tube		14.5 cm ³	
DN 16 CF-F		8 cm ³	
DN 16 CF-R long tube		14 cm ³	
DN 25 ISO-KF, 4 VCR		5.5 cm ³	
8 VCR		7 cm ³	
1/8 in. NPT, 7/16-20 UNF		5.2 cm ³	
Surface mount 29 mm (1.15 in.)		4.9 cm ³	
4 VCR 90°		7.9 cm ³	
Weight			
Without fieldbus interface		115 ... 130 g	
With fieldbus interface		230 ... 250 g	
Degree of protection		IP 40	
Standards	EN 61000-6-2/-6-3, EN 61010, UL 61010-1, CSA 22.2 No. 61010-1		

PSG550, PSG552, PSG554

SPECIFICATIONS INTERFACES

DeviceNet™

Protocol	DeviceNet™, group 2 slave only
Data rate switch	125, 250, 500 kBaud or network programmable
Cable length	
125 kbps	500 m (1650 ft.)
250 kbps	250 m (825 ft.)
500 kbps	100 m (330 ft.)
MAC ID	Two switches (address 00 - 63) or network programmable
Digital functions	Read pressure, select units: Torr, mbar, Pa Degas function, Pirani full scale adjust Monitor gauge status Safe state allows definition of behavior in case of error Detailed alarm and warning information
Analog functions	0 ... 10 V analog output pressure indication two setpoint relays A + B
Visual communication indicators	LED network status (green / red) LED module status (green / red)
Specification	DeviceNet™ "Vacuum Gauge Device Profile"
Device type	"CG" for combination gauge
I / O slave messaging	Polling only
Setpoint relays	2
Range	1×10^{-9} ... 100 mbar
Relay contact	NO, potential free
Hysteresis	10 % of reading
Contact rating	60 V / 0.5 A (dc)
Supply voltage for DeviceNet™	+11 - +25 V / 0.5 A (dc)
Supply voltage for gauge	+20 - +28 V / 0.8 A (dc)
Connector for DeviceNet™	Microstyle, 5-pin
Connector for Gauges (analog output, supply voltage, setpoints)	D-Sub, 15-pin, male

EtherCAT®

Protocol	EtherCAT®
Communication standards	Semiconductor Device Profile ETG.5003 Part 1 Common Device Profile ETG.5003 Part 2080 "Specific Device Profile - Vacuum Pressure Gauge"
Process Data	Fixed PDO mapping and configurable PDO mapping
EtherCAT connector	RJ45, 8-pin (socket), IN and OUT
Cable	Shielded Ethernet CAT5e or higher
Cable length	≤100 m (330 ft.)
Data rate	100000 Kbps

PSG550, PSG552, PSG554

PROFIBUS DP

Baud rates	9.6 / 19.2 / 93.75 / 187.5 / 500 kBaud 1.5 / 12 MBaud
Address	Two switches (address 00 - 127) or network programmable
Digital functions	Read pressure, select units: Torr, mbar, Pa Degas function, Pirani full scale adjust Monitor gauge status, filament status Safe state allows definition of behavior in case of error Detailed alarm and warning information
Analog functions	0 ... 10 V analog output pressure indication two setpoint relays A + B
Setpoint relays	2
Range	1×10^{-9} ... 100 mbar
Relay contact	NO, potential free
Hysteresis	10 % of reading
Contact rating	≤ 30 V / ≤ 0.5 A (dc)
Connector for Profibus DP	D-Sub, 9-pin, female
Connector for BPG (analog output, supply voltage, setpoints)	D-Sub, 15-pin, male

RS485C

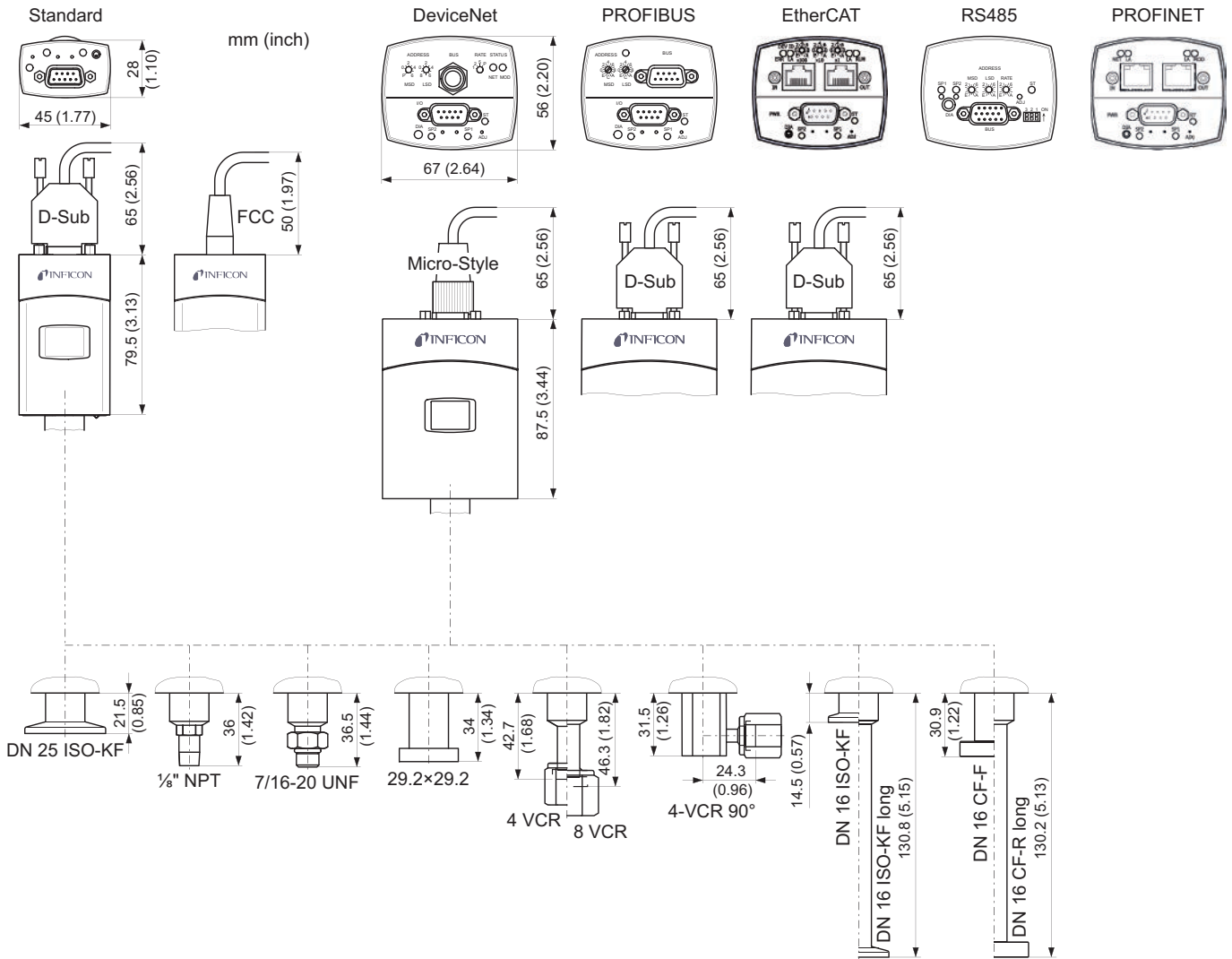
Baud rates	kBaud	9.6 / 19.2 / 38.4 / 57.6
Address	Two switches (address 00 - 255)	
Digital functions	Read pressure, select units: Torr, mbar, Pa, micron, counts monitor gauge status, detailed alarm and warning information, safe state allows definition of behavior in case of error	
Connector for RS485	D-Sub, 15-pin HD, male	

PROFINET™

Communication protocol	protocol specialized for PROFINET	
Physical Layer	100BASE-Tx (IEEE 802.3)	
Digital functions		
read	pressure, status	
set	pressure unit, set points, adjustment Pirani, reset	
PROFINET connector	2 × RJ45, 8-pin (socket), IN and OUT	
Cable	Special Ethernet Patch Cable, shielded (CAT5e quality or higher)	
Cable length	≤ 100 m (330 ft.)	
Data rate	100 MBit/s	

PSG550, PSG552, PSG554

DIMENSIONS



Pirani Gauge Enhanced

PGE500

The INFICON Pirani Gauge Enhanced (PGE) is equipped with the latest digital convection enhanced Pirani technology available on the market. Due to the physical properties of convection this type of Pirani offers higher accuracy in the measurement range between 100 to 1000 mbar. The rugged gauge and sensor design in combination with many factory built in features, such as the bright, sharp and clear OLED display with integrated keypad, RS485/RS232 digital interface and 4 selectable analog output signals make the PGE500 a high value/ low cost of ownership choice. All these features qualify this gauge for many applications where an economical vacuum measurement from low to high vacuum range is required.



ADVANTAGES

- Convection Enhanced Pirani Technology for wide measurement range and higher accuracy near atmosphere
- All-in-One active gauge with built-in display, 2 set points, 4 analog output signals, and 2 digital interfaces
- Bright digital OLED display with keypad for simple setup, calibration and operation
- 4 optional analog output signals (3 user selectable, 1 default)
- Factory pre-set analog output signal or selectable via keypad
- Factory pre-set display units or selectable via keypad
- User programmable set point relays (factory pre-set on request for volume orders)
- Gold plated tungsten filament, Platinum filament for enhanced corrosion resistance available on request
- Mechanical strength, highly robust and less susceptible to mechanical shock and vibration
- Choice of flange options
- Compliance & standards: CE, RoHS
- Direct drop in replaces most Granville-Phillips® Mini-Convector® modules (GP275)

APPLICATIONS

- For vacuum pressure measurement
- General vacuum measurement and control from low to the high vacuum range

**Granville-Phillips® and Mini-Convector® are registered trademarks of MKS Instruments, Andover, MA*

PGE500

ORDERING INFORMATION

3

P

E

5

-

0

0

1

-

B

7

F

0

Unit

mbar

0

Torr

1

Pa

2

Flange

DN 16 ISO-KF

1

DN 16 CF-R

3

DN 25 ISO-KF

6

DN 40 ISO-KF

7

DN 40 CF-R

8

4 VCR female

D

8 VCR female

E

1/8 in. NPT

F

Output Signal Analog

0

1.15 ... 10.215 V¹⁾

2

0.375 ... 5.659 V²⁾

5

1 ... 8 V³⁾

-

0 ... 10 V⁴⁾

- 1) log-linear, $p = 10^{0.778(U-c)}$
- 2) non-linear S-curve, compatible to most Granville-Phillips® Mini-Convectron® modules (GP275)
- 3) log-linear, $p = 10^{(V-5)}$
- 4) linear, available on all devices by default on pin 9

Power supply for PGE300 & PGE500 ¹⁾		352-525
Input power:	V (ac)	100 ... 240
Output power:	V (dc)	+24 @ 2.5 A (60 W)
Cable length:	m (ft)	2 (6)

¹⁾ The IEC 60320 AC power entry receptacle allows use with any user supplied AC mains cord set available worldwide



PGE500

SPECIFICATIONS

Type	PGE500 Tungsten gold-plated
Measurement range	$1.3 \times 10^{-4} \dots 1333 \text{ mbar}$ $1 \times 10^{-4} \dots 1000 \text{ Torr}$ $1.3 \times 10^{-2} \dots 133000 \text{ Pa}$
Accuracy (N ₂) ¹⁾	
$1.3 \times 10^{-4} \dots 1.3 \times 10^{-3} \text{ mbar}$	0.1 × 10 ⁻³ mbar resolution
$1.3 \times 10^{-3} \dots 530 \text{ mbar}$	±10% of reading
530 ... 1333 mbar	±2.5% of reading
$1 \times 10^{-4} \dots 1 \times 10^{-3} \text{ Torr}$	0.1 mTorr resolution
$1 \times 10^{-3} \dots 400 \text{ Torr}$	±10% of reading
400 ... 1000 Torr	±2.5% of reading
Repeatability (N ₂) ¹⁾	±2% of reading
Admissible Temperature	
Operation	0 ... +40°C
Storage	-40 ... +70°C
Bakeout (electronics removed)	≤150°C
Supply voltage	+12 ... +28 V (dc) ²⁾
Output signal (analog)	
3PE5-0xx-B7F0	1.15 ... 10.215 V (dc) (log-linear)
3PE5-0xx-B7F2	0.375 ... 5.659 V (dc) (non-linear S-curve)
3PE5-0xx-B7F5	1 ... 8 V (dc) (log-linear)
3PE5-0xx-B7F ⁻³⁾	1 ... 10 V (dc) (linear)
Voltage vs. pressure	
3PE5-0xx-B7F0	1.286 V / Decade
3PE5-0xx-B7F5	1 V / Decade
Setpoint relay	2 (single-pole double-throw relays (SPDT)) 1 A at 30 V (dc) resistive, or V (ac) non-inductive
Electrical connection	D-Sub, 9-pin, male and D-Sub, 15-pin HD, male (with RS485)
Mounting orientation	horizontal recommended ⁴⁾
Materials exposed to vacuum	gold-plated tungsten, 304 & 316 stainless steel, glass, nickel, Teflon®
Internal volume	26 cm ³ (1.589 in. ³)
Internal surface area	59.7 cm ³ (9.25 in. ³)
Weight	340 g (12 oz)

¹⁾ typically

²⁾ 2 W protected against power reversal and transient over-voltages

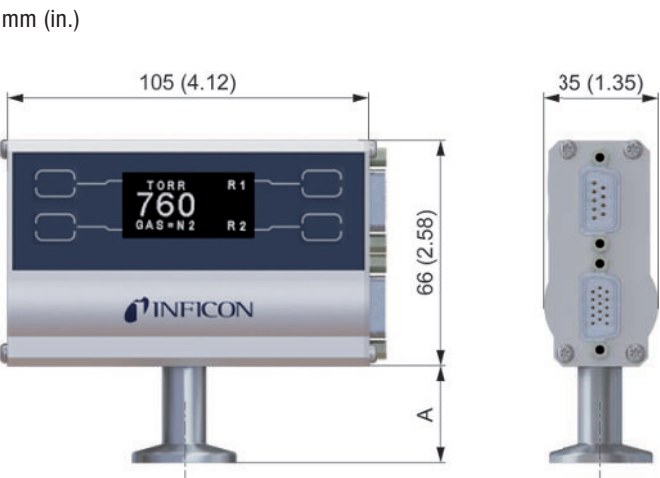
³⁾ available on all devices by default on pin 9

⁴⁾ orientation has no effect on measurements below 1.3 mbar (1 Torr)

PGE500

DIMENSIONS

Dimension A	mm	(in)
DN 16 ISO-KF	29.5	(1.16)
DN 25 ISO-KF	29.5	(1.16)
DN 40 ISO-KF	29.5	(1.16)
DN 16 CF-R	34	(1.34)
DN 40 CF-R	34	(1.34)
4 VCR female	43.7	(1.72)
8 VCR female	40.9	(1.61)
1/8" NPT	21.8	(0.86)



Pirani Gauge Enhanced

PGE500 DeviceNet™

The INFICON Pirani Gauge Enhanced (PGE) DeviceNet version is equipped with the latest digital convection enhanced Pirani technology available on the market. Due to the physical properties of convection this type of Pirani offers higher accuracy in the measurement range between 100 to 1000 mbar. The rugged gauge and sensor design in combination with many factory built in features, such as the bright, sharp and clear OLED display with integrated keypad, selectable units of measures and 2 programmable set points makes the PGE500 DeviceNet version a high value/low cost of ownership choice. All these features qualify this gauge for many applications where an economical vacuum measurement from low to high vacuum range is required. The PGE500 DeviceNet version is a direct drop-in plug-compatible replacement for the DeviceNet version of MKS / Granville-Phillips® Mini-Convector® (so called GP275 Modules). INFICON PGE500 spare sensor heads are also suited to replace Granville-Phillips® sensor heads.



ADVANTAGES

- Convection Enhanced Pirani Technology for wide measurement range and higher accuracy near atmosphere
- All-in-One active gauge with built-in display, 2 set points, and digital DeviceNet™ interface
- Bright digital OLED display with keypad for simple setup, calibration and operation
- Factory pre-set display units for measure or selectable via keypad
- User programmable set point relays (factory pre-set on request for volume orders)
- Gold plated tungsten filament or platinum filament for corrosive applications
- Mechanical strength, highly robust and less susceptible to mechanical shock and vibration
- Field replaceable spare sensor units
- Choice of flange options
- Compliance & standards: CE, RoHS
- Direct drop-in plug-compatible replacement for the DeviceNet versions of MKS / Granville- Phillips® Mini-Convector® (GP275 Modules)

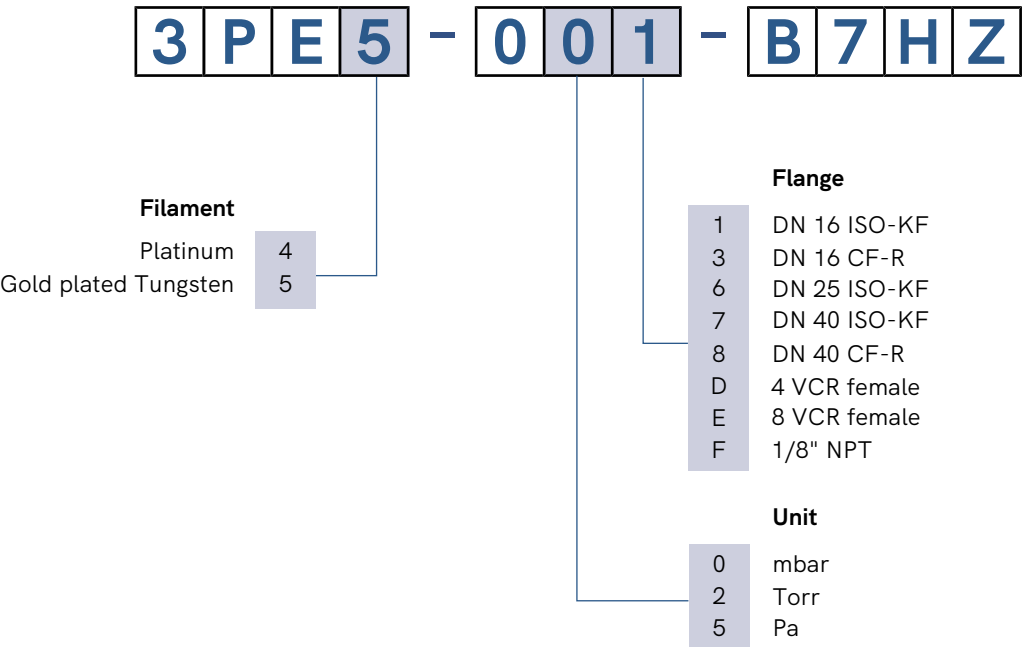
APPLICATIONS

- For vacuum pressure measurement
- General vacuum measurement and control from low to the high vacuum range

**Granville-Phillips® and Mini-Convector® are registered trademarks of MKS Instruments, Andover, MA*

PGE500 DeviceNet™

ORDERING INFORMATION



Replacement sensor	PGE500 DeviceNet
Gold plated Tungsten sensor	
DN 16 ISO-KF, W	352-550
DN 25 ISO-KF, W	352-551
DN 40 ISO-KF, W	352-552
DN 16 CF-R, W	352-553
DN 40 CF-R, W	352-554
4 VCR female, W	352-555
8 VCR female, W	352-556
1/8" NPT, W	352-557
Platinum sensor	
DN 16 ISO-KF, Pt	352-560
DN 25 ISO-KF, Pt	352-561
DN 40 ISO-KF, Pt	352-562
DN 16 CF-R, Pt	352-563
DN 40 CF-R, Pt	352-564
4 VCR female, Pt	352-565
8 VCR female, Pt	352-566
1/8" NPT, Pt	352-567

*These spare sensors only fit on PGE500 DeviceNet version. Not on PGE500 analog / RS485 version.

PGE500 DeviceNet™

Power supply for PGE300 & PGE500 ¹⁾		352-525
Input power:	V (ac)	100 ... 240
Output power:	V (dc)	+24 @ 2.5 A (60 W)
Cable length:	m (ft)	2 (6)



¹⁾ The IEC 60320 AC power entry receptacle allows use with any user supplied AC mains cord set available worldwide

PGE500 DeviceNet™

SPECIFICATIONS

Type	PGE500 DeviceNet
Measurement range	$1.3 \times 10^{-4} \dots 1333 \text{ mbar}$ $1 \times 10^{-4} \dots 1000 \text{ Torr}$ $1.3 \times 10^{-2} \dots 133000 \text{ Pa}$
Accuracy (N ₂) ¹⁾	
$1.3 \times 10^{-4} \dots 1.3 \times 10^{-3} \text{ mbar}$	0.1 × 10 ⁻³ mbar resolution
$1.3 \times 10^{-3} \dots 530 \text{ mbar}$	±10% of reading
530 ... 1333 mbar	±2.5% of reading
$1 \times 10^{-4} \dots 1 \times 10^{-3} \text{ Torr}$	0.1 mTorr resolution
$1 \times 10^{-3} \dots 400 \text{ Torr}$	±10% of reading
400 ... 1000 Torr	±2.5% of reading
530 ... 1333 mbar	0.1 × 10 ⁻¹ mbar resolution
$1.3 \times 10^{-2} \dots 1.3 \times 10^{-1} \text{ Pa}$	±10% of reading
$1.3 \times 10^{-1} \dots 53 \text{ kPa}$	±2.5% of reading
53 ... 133 kPa	
Repeatability (N ₂) ¹⁾	±2% of reading
Admissible temperature	
Operation	0 ... +40°C
Storage	-40 ... +70°C
Bakeout (electronics removed)	≤150°C
Supply voltage	+12 ... +26 V (dc) ²⁾
Setpoint relay	2 (single-pole double-throw relays (SPDT) 1 A at 30 V (dc) resistive, or V (ac) non-inductive
DeviceNet interface	
Device type	vacuum gauge / pressure gauge device
Adjustable parameters	setpoint, engineering units of measure, vacuum and atmosphere calibration
Messaging	polled I/O and explicit
Baud rates	125K, 250K or 500K (adjustable via rotary switch)
Electrical connection	D-Sub, 9-pin, male for setpoint relays and 5-pin Micro for power and DeviceNet interface
Mounting orientation	horizontal recommended ³⁾
Materials exposed to vacuum	platinum, 304 & 316 stainless steel, glass, nickel, Teflon®
3PE4-0xx-B7HZ	gold plated tungsten, 304 & 316 stainless steel, glass, nickel, Teflon®
3PE5-0xx-B7HZ	
Internal volume	26 cm ³ (1.589 in. ³)
Internal surface area	59.7 cm ³ (9.25 in. ³)
Weight	340 g (12 oz)

¹⁾ typically

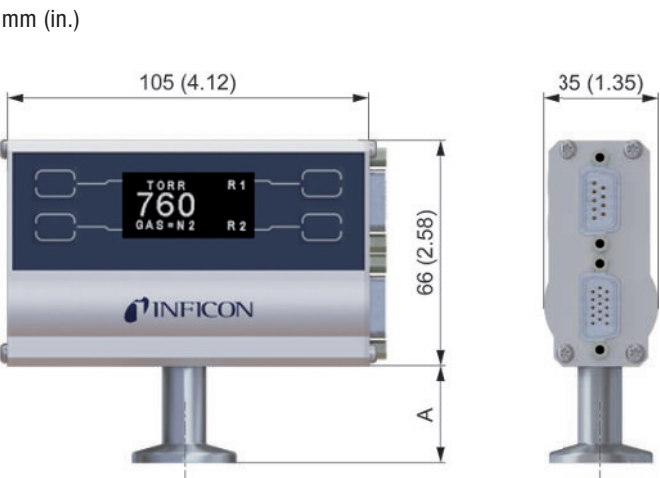
²⁾ 0.22 A, 2.4 W max protected against power reversal and transient over-voltages

³⁾ orientation has no effect on measurements below 1.3 mbar (1 Torr)

PGE500 DeviceNet™

DIMENSIONS

Dimension A	mm	(in)
DN 16 ISO-KF	29.5	(1.16)
DN 25 ISO-KF	29.5	(1.16)
DN 40 ISO-KF	29.5	(1.16)
DN 16 CF-R	34	(1.34)
DN 40 CF-R	34	(1.34)
4 VCR female	43.7	(1.72)
8 VCR female	40.9	(1.61)
1/8" NPT	21.8	(0.86)



Pirani Gauge Enhanced

PGE300

The INFICON Pirani Gauge Enhanced 300 (PGE300) like its bigger brother PGE500 is equipped with the latest digital convection enhanced Pirani technology available on the market. Equipped with the same sensor components as the PGE500, the PGE300 yields the same higher accuracy readings in the measurement range between 100 to 1000 mbar. The PGE300 offers only the critical built-in features that the majority of customers in the vacuum industry are looking for, minimizing costs and maximizing efficiency. This rugged gauge and sensor design, in combination with the factory build in clear readable LED display, 3 selectable analog output signals and a set point relay makes the PGE300 a high value/low cost of ownership choice not only for OEM customers, but all customers. These features qualify this gauge for many applications where an economical vacuum measurement from low to high vacuum range is required. With its wider measuring range and higher accuracy, especially at lower pressures in combination with the economically priced built in features the PGE300 also is the first choice when replacing thermocouple gauges in your vacuum system.



ADVANTAGES

- Convection Enhanced Pirani Technology for wide measurement range and higher accuracy near atmosphere
- All-in-One active gauge with built-in display, 1 set point and 3 selectable analog output signals
- Bright digital LED display features a user friendly for calibration and operation
- Factory pre-set analog output signal or selectable via user interface and user programmable set point relay
- Gold plated tungsten filament, Platinum filament for enhanced corrosion resistance available on request
- Mechanical strength, highly robust and less susceptible to mechanical shock and vibration
- Compliance & standards: CE, RoHS
- Direct drop in replaces most Granville-Phillips® Mini-Convector® modules (GP275) and ideal device for upgrading your installed thermocouple gauges

APPLICATIONS

- For vacuum pressure measurement
- General vacuum measurement and control from low to the high vacuum range

*Granville-Phillips® and Mini-Convector® are registered trademarks of MKS Instruments, Andover, MA

PGE300

ORDERING INFORMATION

3

P

E

5

-

0

0

1

-

A

7

0

0

Unit

mbar

0

Torr

1

Flange

DN 16 ISO-KF

1

DN 16 CF-R

3

DN 25 ISO-KF

6

DN 40 ISO-KF

7

DN 40 CF-R

8

4 VCR female

D

8 VCR female

E

1/8 in. NPT

F

Output Signal Analog

0

0.61 ... 10.23 V

2

0.375 ... 5.659 V

5

1 ... 8 V

Power supply for PGE300 & PGE500 ¹⁾		352-525
Input power:	V (ac)	100 ... 240
Output power:	V (dc)	+24 @ 2.5 A (60 W)
Cable length:	m (ft)	2 (6)

¹⁾ The IEC 60320 AC power entry receptacle allows use with any user supplied AC mains cord set available worldwide



PGE300

SPECIFICATIONS

Type	PGE300 Tungsten gold-plated
Measurement range	$1.3 \times 10^{-4} \dots 1333 \text{ mbar}$ $1 \times 10^{-4} \dots 1000 \text{ Torr}$ $1.3 \times 10^{-2} \dots 133000 \text{ Pa}$
Accuracy (N ₂) ¹⁾	
$1.3 \times 10^{-4} \dots 1.3 \times 10^{-3} \text{ mbar}$	0.1 × 10 ⁻³ mbar resolution
$1.3 \times 10^{-3} \dots 530 \text{ mbar}$	±10% of reading
530 ... 1333 mbar	±2.5
$1 \times 10^{-4} \dots 1 \times 10^{-3} \text{ Torr}$	0.1 mTorr resolution
$1 \times 10^{-3} \dots 400 \text{ Torr}$	±10% of reading
400 ... 1000 Torr	±2.5% of reading
Repeatability (N ₂) ¹⁾	±2% of reading
Admissible Temperature	
Operation	0 ... +40°C
Storage	-40 ... +70°C
Bakeout	≤70°C
Supply voltage	+12 ... +28 V (dc) ²⁾
Output signal (analog)	
3PE5-0xx-A700	0.61 ... 10.23 V (dc) (log-linear)
3PE5-0xx-A702	0.375 ... 5.659 V (dc) (non-linear S-curve)
3PE5-0xx-A705	1 ... 8 V (dc) (log-linear)
Voltage vs. pressure	
3PE5-0xx-A700	1.286 V / Decade
3PE5-0xx / -A705	1 V / Decade
Setpoint relay	1 (single-pole double-throw relay (SPDT)) 1 A at 30 V (dc) resistive, or V (ac) non-inductive
Electrical connection	D-Sub, 9-pin, male
Mounting orientation	horizontal recommended ³⁾
Materials exposed to vacuum	gold-plated tungsten, 304 & 316 stainless steel, glass, nickel, Teflon®
Internal volume	26 cm ³ (1.589 in. ³)
Internal surface area	59.7 cm ² (9.25 in. ²)
Weight	136 g (4.8 oz)

¹⁾ typically

²⁾ 2 W protected against power reversal and transient over-voltages

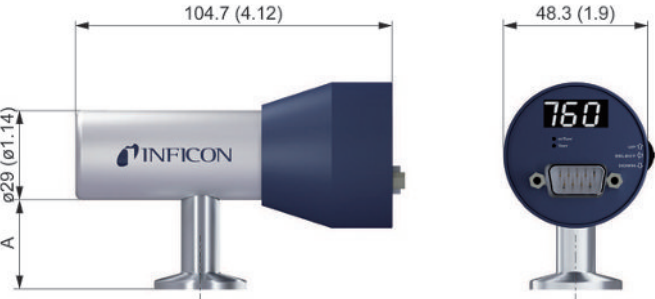
³⁾ orientation has no effect on measurements below 1.3 mbar (1 Torr)

PGE300

DIMENSIONS

Dimension A	mm	(in)
DN 16 ISO-KF	33	(1.3)
DN 25 ISO-KF	33	(1.3)
DN 40 ISO-KF	33	(1.3)
DN 16 CF-R	27.4	(1.08)
DN 40 CF-R	37.3	(1.47)
4 VCR female	47.2	(1.86)
8 VCR female	44.5	(1.75)
1/8" NPT	25.4	(1)

mm (in.)



Pirani Capacitance Diaphragm Gauge

PCG550, PCG552, PCG554

The INFICON Pirani Capacitance Diaphragm Gauge (PCG55x) combines the INFICON Pirani technology with the advantages of a ceramic capacitance diaphragm sensor in a single product.

In the measurement range between 10 mbar and atmosphere the capacitance diaphragm technology provides gas-type independent, highly accurate values for reliable pressure measurement. The PCG55x offers also a variety of features which allows the right product configuration for the demanded application.



ADVANTAGES

- Gas-type independent above 10 mbar – allows safe venting with any gas mixture
- High accuracy and reproducibility at atmosphere – for reliable atmospheric pressure detection
- Fast atmospheric detection – eliminates waiting time and shortens process cycle
- Measuring performance independent of mounting orientation for maximum engineering freedom in tool design
- Available with tungsten (PCG550) or nickel (PCG552) filament or with a fully ceramic coated (PCG554) sensor unit for highly corrosive applications
- Easy to exchange plug and play sensor element with on-board calibration data – guarantees high reproducibility and low cost of ownership
- Selectable output signal for easy integration
- Optional atmospheric switch, display and digital interfaces e.g. EtherCAT®, DeviceNet™ etc.
- Latest EtherCAT® protocol generation 2.0
- Diagnostic port on all versions
- Compliance and standards: CE, EN, UL, CSA, RoHS

APPLICATIONS

- Load lock control
- For vacuum pressure measurement
- Safety circuits in vacuum systems
- General vacuum measurement and control in the medium and rough vacuum range

PCG550, PCG552, PCG554

ORDERING INFORMATION

3 P C 1 - 0 0 1 - 1 1 0 1									
Filament					Measurement range				
Tungsten	1				0	0.61 ... 10.23 V ³⁾			
Nickel	2				1	1.2 ... 8.68 V			
Ceramic coated	3				2	0.375 ... 5.659 V			
Tungsten, galv. isolated ¹⁾	6				3	1.57 ... 9.05 V			
Nickel, galv. isolated ¹⁾	7				Digital interface				
Ceramic coated, galv. isolated ¹⁾	8				0	None / RS485 ^{3) 8)}			
					1	DeviceNet ^{TM 4) 7)}			
					2	Profibus DP ^{TM 1) 7)}			
					A	PROFINET ^{TM 4) 7)}			
					G	EtherCAT ^{® 1) 7) 9)}			
					Electrical connection				
					0	FCC, 8-pin ³⁾			
					1	D-Sub, 9-pin			
					2	D-Sub, 15-pin HD			
					4	D-Sub, 15-pin HD, with RS485 ^{5) 7)}			
					Display, switching functions				
					0	None			
					1	LCD display			
					2	2 setpoints (solid state)			
					3	ATM and 2 setpoints (solid state)			
					4	LCD display and 2 setpoints (solid state)			
					5	ATM and LCD display and 2 setpoints (solid state)			
					6	2 setpoints (mechanical) ⁶⁾			
					7	ATM and 2 setpoints (mechanical) ⁶⁾			

- 1) Only with D-Sub 9-pin connector available
- 2) When selecting LCD (liquid crystal display) choose desired pressure unit
- 3) Choose these settings when using an INFICON VGC50x or PGD500 controller or when choosing "4" under electrical connections
- 4) Only with D-Sub 9-pin connector and galvanically isolated available
- 5) Only without additional digital interface available
- 6) Only with D-Sub 9-pin connector without LCD display available
- 7) Fieldbus options only available together with switching functions (select number "2", "3", "4", or "5" from table "Display, switching functions")
- 8) Just selectable via number "4" from table "Electrical connection
- 9) EtherCAT protocol generation 2.0; protocol generation 1.0 still available on request

PCG550, PCG552, PCG554

Spare parts	PCG550 Tungsten	PCG552 Nickel	PCG554 Ceramic coated
DN 16 ISO-KF	357-925	357-936	357-947
DN 16 ISO-KF long tube	357-926	357-937	357-948
DN 16 CF-F	357-927	357-938	357-949
DN 16 CF-R long tube	357-928	357-939	357-950
DN 25 ISO-KF	357-929	357-940	357-951
4 VCR female	357-932	357-943	357-954
8 VCR female	357-931	357-942	357-953
1/8 in. NPT	357-930	357-941	357-952
Surface mount 29 mm (1.15 in.)	357-934	357-945	357-956
4 VCR 90° female	357-935	357-946	357-957
7/16-20 UNF male	357-933	357-944	357-955

Accessories	Part no.
Centering ring with filter (DN 16 ISO-KF)	211-097
Diagnostic: Communication adapter (2 m) for PC RS232C serial port ¹⁾	303-333

¹⁾ Diagnostic SW available upon request

PCG550, PCG552, PCG554

SPECIFICATIONS

Type	PCG550 Tungsten	PCG552 Nickel	PCG554 Ceramic coated
Measurement range	$5 \times 10^{-5} \dots 1500$ mbar ($3.8 \times 10^{-5} \dots 1125$ Torr)		
Accuracy			
$5 \times 10^{-4} \dots 1 \times 10^{-3}$ mbar (N ₂)		±50% of reading	
$1 \times 10^{-3} \dots 100$ mbar (N ₂)		±15% of reading	
100 ... 950 mbar		±5% of reading	
950 ... 1050 mbar		±2.5% of reading	
Repeatability			
$1 \times 10^{-3} \dots 1100$ mbar (N ₂)		±2% of reading	
Admissible pressure (absolute)		≤5 bar	
Pressure, max. (absolute)		10 bar	
Admissible temperature			
Operation (ambient)		+10 ... +50°C	
Storage		-20 ... +65°C	
Bakeout at flange		≤80°C	
Long tube		≤250°C	
Supply voltage		+15 ... +30 V / A (dc)	
Power consumption			
Without fieldbus		≤2.5 W	
DeviceNet™		≤3 W	
Profibus DP		≤3 W	
EtherCAT® / PROFINET™		≤4.5 W	
Output signal analog			
3PCx-0xx-xxx0		0 ... +10.23 V	
3PCx-0xx-xxx1		0 ... +8.68 V	
3PCx-0xx-xxx2		0 ... +5.659 V	
3PCx-0xx-xxx3		0 ... +9.05 V	
Measuring range			
3PCx-0xx-xxx0		+0.61 ... +10.23 V	
3PCx-0xx-xxx1		+1.2 ... +8.68 V	
3PCx-0xx-xxx2		+0.375 ... +5.659 V	
3PCx-0xx-xxx3		+1.57 ... +9.05 V	
Voltage vs. pressure			
3PCx-0xx-xxx0		1.286 V / Decade	
3PCx-0xx-xxx1		1 V / Decade	
3PCx-0xx-xxx2		1 V / Decade	
3PCx-0xx-xxx3		1 V / Decade	
Load impedance		>10 kΩ	
Setpoint relay		2	
Range (N ²)		$5 \times 10^{-5} \dots 1500$ mbar	
Relay contact		NO, potential free	
Hysteresis		10% of threshold	
Contact rating			
Solid state relays		≤30 V / ≤0.3 A (dc)	
Mechanical relays		≤30 V / ≤1 A (dc)	
Switching time		≤30 ms	
Interface (digital)		RS232C	

PCG550, PCG552, PCG554

Type	PCG550 Tungsten	PCG552 Nickel	PCG554 Ceramic coated
Electrical connection		FCC, 8-pin	
3PCx-0xx-x0xx		D-sub, 9-pin, male	
3PCx-0xx-x1xx		D-sub, 15-pin HD, male	
3PCx-0xx-x2xx		D-sub, 15-pin HD with RS485, male	
3PCx-0xx-x4xx			
Cable length		≤100 m (≤330 ft)	
RS232C operation		≤30 m (≤100 ft)	
Materials exposed to vacuum	W, Ni, NiFe, Al ₂ O ₃ , SnAg, stainless steel, glass	Ni, NiFe, Al ₂ O ₃ , SnAg, stainless steel, glass	Al ₂ O ₃ , stainless steel
Internal volume			
DN 16 ISO-KF		4.7 cm ³	
DN 16 ISO-KF long tube		14.5 cm ³	
DN 16 CF-F		8 cm ³	
DN 16 CF-R long tube		14 cm ³	
DN 25 ISO-KF, 4 VCR		5.5 cm ³	
8 VCR		7 cm ³	
1/8 in. NPT, 7/16-20 UNF		5.2 cm ³	
Surface mount 29 mm (1.15 in.)		4.9 cm ³	
4 VCR 90°		7.9 cm ³	
Weight			
Without fieldbus interface		115 ... 130 g	
With fieldbus interface		230 ... 250 g	
Degree of protection		IP 40	
Standards	EN 61000-6-2/-6-3, EN 61010, UL 61010-1, CSA 22.2 No. 61010-1		

PCG550, PCG552, PCG554

SPECIFICATIONS INTERFACES

DeviceNet™

Protocol	DeviceNet™, group 2 slave only
Data rate switch	125, 250, 500 kBaud or network programmable
Cable length	
125 kbps	500 m (1650 ft.)
250 kbps	250 m (825 ft.)
500 kbps	100 m (330 ft.)
MAC ID	Two switches (address 00 - 63) or network programmable
Digital functions	Read pressure, select units: Torr, mbar, Pa Monitor gauge status Safe state allows definition of behavior in case of error Detailed alarm and warning information
Analog functions	0 ... 10 V analog output pressure indication two setpoint relays A + B
Visual communication indicators	LED network status (green / red) LED module status (green / red)
Specification	DeviceNet™ "Vacuum Gauge Device Profile"
Device type	"VG" for combination gauge
I / O slave messaging	Polling only
Setpoint relays	2
Range	1×10^{-9} ... 100 mbar
Relay contact	NO, potential free
Hysteresis	10 % of reading
Contact rating	60 V / 0.5 A (dc)
Supply voltage for DeviceNet™	+11 - +25 V / 0.5 A (dc)
Supply voltage for gauge	+20 - +28 V / 0.8 A (dc)
Connector for DeviceNet™	Microstyle, 5-pin
Connector for Gauges (analog output, supply voltage, setpoints)	D-Sub, 15-pin, male

EtherCAT®

Protocol	EtherCAT®
Communication standards	Semiconductor Device Profile ETG.5003 Part 1 Common Device Profile ETG.5003 Part 2080 "Specific Device Profile - Vacuum Pressure Gauge"
Process Data	Fixed PDO mapping and configurable PDO mapping
EtherCAT connector	RJ45, 8-pin (socket), IN and OUT
Cable	Shielded Ethernet CAT5e or higher
Cable length	≤100 m (330 ft.)
Data rate	100000 Kbps

PROFIBUS DP

Baud rates	9.6 / 19.2 / 93.75 / 187.5 / 500 kBaud 1.5 / 12 MBaud
Address	Two switches (address 00 - 127) or network programmable

PCG550, PCG552, PCG554

PROFIBUS DP

Digital functions	Read pressure, select units: Torr, mbar, Pa Monitor gauge status, filament status Safe state allows definition of behavior in case of error Detailed alarm and warning information
Analog functions	0 ... 10 V analog output pressure indication two setpoint relays A + B
Setpoint relays	2
Range	$1 \times 10^{-9} \dots 100$ mbar
Relay contact	NO, potential free
Hysteresis	10 % of reading
Contact rating	≤ 30 V / ≤ 0.5 A (dc)
Connector for Profibus DP	D-Sub, 9-pin, female
Connector for BPG (analog output, supply voltage, setpoints)	D-Sub, 15-pin, male

RS485C

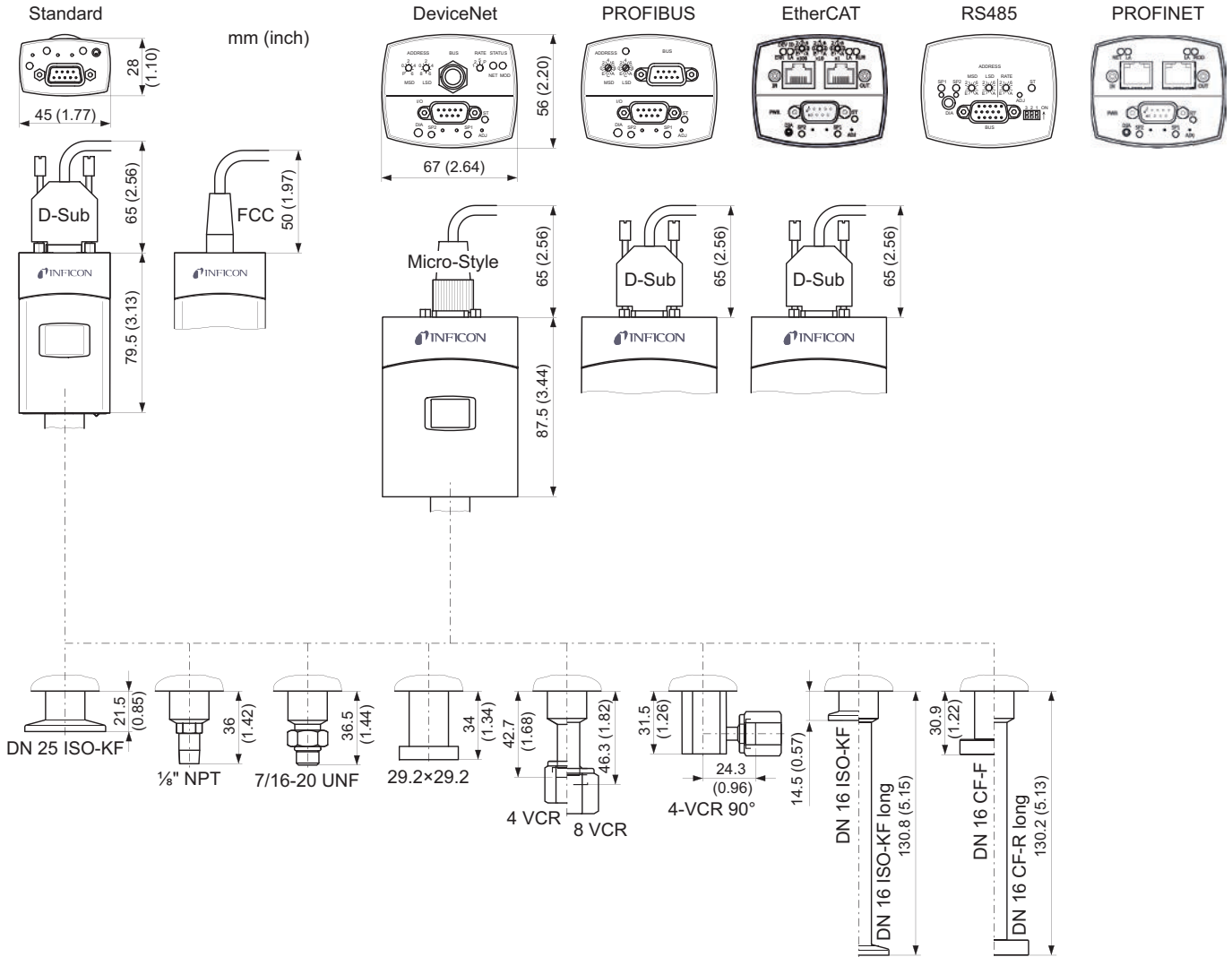
Baud rates	kBaud	9.6 / 19.2 / 38.4 / 57.6
Address	Two switches (address 00 - 255)	
Digital functions	Read pressure, select units: Torr, mbar, Pa, micron, counts monitor gauge status, detailed alarm and warning information, safe state allows definition of behavior in case of error	
Connector for RS485	D-Sub, 15-pin HD, male	

PROFINET™

Communication protocol	protocol specialized for PROFINET	
Physical Layer	100BASE-Tx (IEEE 802.3)	
Digital functions		
read	pressure, status	
set	pressure unit, set points, adjustment Pirani, reset	
PROFINET connector	2 × RJ45, 8-pin (socket), IN and OUT	
Cable	Special Ethernet Patch Cable, shielded (CAT5e quality or higher)	
Cable length	≤ 100 m (330 ft.)	
Data rate	100 MBit/s	

PCG550, PCG552, PCG554

DIMENSIONS



Pirani Piezo Gauge

PPG550

The new INFICON Pirani Piezo combination gauge (PPG550) is based on the most advanced MEMS (Microelectromechanical Systems) sensor technology available. The Pirani/ Piezo combination technology miniaturized in the MEMS process enables the construction of a very small and space-saving sensor. The Pirani, based on MEMS technology, is measuring deeper and more accurately in the HV range than a classic Pirani. Combined with a MEMS piezo sensor, mounted in the same flange, the gauge becomes a real vacuum wide range gauge, extending the measuring range far beyond the usual 1000 mbar. In the range of 2 ... 1333 mbar the MEMS Piezo part of the sensor provides gas type independent pressure measurement. PPG550 can be used to direct drop in replace the so called MKS910 "DualTrans™ MicroPirani™ - Absolute Piezo Vacuum Pressure Transducers" as well as MKS925 "Micro Pirani™ Vacuum Pressure Transducers". PPG550 offers same connectors/ pin assignment, analog output and RS232/485 compatibility.



ADVANTAGES

- Gas type independent above 2 mbar – allows safe venting with any gas mixture
- High accuracy and reproducibility at atmosphere – reliable, fast atmospheric pressure detection
- Versatile of mounting orientation – provides engineering freedom in tool design
- Selectable analog output signal for easy system integration
- Digital interfaces RS232/ RS485
- Direct drop in replacement MKS910 "DualTrans™ MicroPirani™ & MKS925 "Micro Pirani™" (Trademarks of MKS Instruments, Andover, MA)
- Compliance & standards: CE, EN, UL, CSA, RoHS

APPLICATIONS

- Use in Analytical equipment/ mass spectrometers
- Physical vapor deposition
- Fore-line measurement
- Gas-backfilling

PPG550

ORDERING INFORMATION

3 P P M - 0 0 1 - D D R 3

Unit

mbar	0
Torr	1
Pa	2

Flange

DN 16 ISO-KF	1
DN 16 ISO-KF, extended	2
DN 25 ISO-KF	6
4 VCR female	D
1/8" NPT	F

Analog output

0	0.61 ... 10.2V (INFICON PxG55x, Leybold TTR 101N)
2	0.372 ... 5.570 V (GP / MKS 275)
3	1.0 ... 9 V (MKS 910 / 925 / 901P)
Z	No analog output

Digital interface

0	None ¹⁾
R	RS232 ²⁾
S	RS485 ²⁾

Electrical connection

0	FCC, 8-pin (27 kOhm) ³⁾
D	D-sub, 9-pin ⁴⁾
E	D-sub, 15-pin HD

Optional function

0	No solid state relays ⁶⁾
2	2 solid state relays ⁷⁾
D	1 solid state relay ⁸⁾
E	3 solid state relays ⁹⁾

6) All connectors are also available without solid state relays

7) 2 solid state relays are only available on FCC 8-pin connector, solid state relays on FCC connector gauges have to be preset during production, they can't be set in the field due to missing RS interface

8) 1 solid state relay is only available on D-sub 9-pin connector, solid state relays can be set by customer via RS interface

9) 3 solid state relays are only available on D-sub 15-pin HD connector, solid state relays can be set by customer in the field via the RS interface

PPG550

SPECIFICATIONS

Type	PPG550
Measurement principle	
2 ... 1333 mbar	MEMS Piezo resistive diaphragm
1.5 ... 2 mbar	Crossover range
1×10^{-6} mbar	MEMS Pirani thermal conductivity
Measurement range N ₂	1×10^{-6} ... 1333 mbar
Accuracy	
1100 ... 1333 mbar	0.5% of reading
800 ... 1099 mbar	0.25 % of reading
100 ... 800 mbar	0.5 % of reading
2 ... 99.9 mbar	1% of reading
1×10^{-4} ... 1.99 mbar	5% of reading
1×10^{-5} ... 9.99×10^{-5} mbar	25% of reading
Hysteresis	
10 ... 1333 mbar	0.1% of reading
1×10^{-3} ... 10 mbar	1% of reading
Response time (ISO 19685:2017)	<20 ms
Temperature	
Compensation	+10 ... +50 °C
Measurement absolute accuracy	$\pm 1.5^\circ\text{C}$ (0 ... +80 °C)
Solid state relay	
Set point range	5×10^{-6} ... 1333 mbar
Contact rating	50 V, 100 mA / mA (dc)
Contact on resistance	<35 Ω
Contact endurance	Unlimited (no mechanical wear)
Analog output	
3PPM-xxx-xxx0	0.61 ... 10.2 V
3PPM-xxx-xxx2	0.375 ... 5.570 V
3PPM-xxx-xxx3	1.0 ... 9 V
3PPM-xxx-xxxZ	1.0 ... 9 V
Error signal	Check operating manual page 13
Power supply	
Supply voltage at gauge	+12 ... +30 V (dc) ripple max. 1 V
Power consumption	≤ 350 mW
Internal fuse	100 mA (thermal recoverable)
Reverse polarity and overvoltage protection	yes
Sensor cable connections	
Electrical connection	
3PPM-0xx-x0xx	FCC 68, 8-pin
3PPM-0xx-xDxx	D-sub, 9-pin, male
3PPM-0xx-xExx	D-sub HD, 15-pin, male
Sensor cable	shielded, 0.14 mm ² /conductor
Cable length	
Analog	≤ 100 m
RS232C operation	≤ 15 m
RS485 operation	≤ 1200 m

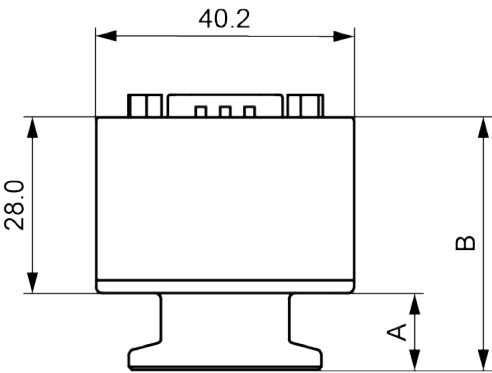
PPG550

Type	PPG550
RS232C/RS485 interface	
Data rate	9600 Baud (default)
Data format	binary 8 data bits one stop bit no parity bit no handshake
	Further information on RS232/ RS485 interface look operating manual page 15
Materials exposed to vacuum	
Housing	SS 1.4307, AISI 304L, Al 6061
Flange	SS 1.4307, AISI 304L
Further parts	AISI 304L, Kovar, glass, silicon, nickel, Al, SiO ₂ , Si ₃ N ₄ , gold, FPM, low outgassing epoxy resin, solder, RO4305
Pressure max	10 bar (absolute)
Admissible temperatures	
Storage	-40 ... +120 °C
Operation	-20 ... +50 °C
Bakeout	+120 °C (non operating)
Relative humidity (IEC 68-2-38) (year's mean / during 60 days)	98% non-condensing
Use	indoors only altitude up to 2000 m
Degree of protection	IP 40
Weight	
DN 16 ISO-KF	~136g
DN 16 ISO-KF, long tube	~154g
DN 25 ISO-KF	~155g
4 VCR female	~158g
1/8" NPT	~139g

PPG550

DIMENSIONS

[mm]



	A [mm]	B [mm]
DN 16 ISO-KF	12.0	40.0
DN 16 ISO-KF, long tube	29.0	56.4
DN 25 ISO-KF	12.0	40.0
4 VCR female	37.7	61.7
1/8" NPT	37.0	65.0

Pirani Piezo Gauge

PPG570

The new INFICON Pirani Piezo combination gauge (PPG570) is based on the most advanced MEMS (Microelectromechanical Systems) sensor technology available, which is also used 1:1 in our PPG550 "ATM to Medium Vacuum" Gauge.

What differentiates PPG570 from PPG550 is the additional installed ATM sensor that allows the use of PPG570 in classical Load-lock applications. For example in Semi-Conductor industries or any other vacuum applications where accurate pressure measurement relative to atmospheric ambient pressure is important.

The new INFICON PPG570 can be used to direct drop in replace the so called MKS Instruments MKS901P "MicroPirani™" and Piezo Loadlock Vacuum Pressure Transducer". PPG570 offers same connectors/ pin assignment, analog output and RS232/485 digital communication protocol compatibility.



ADVANTAGES

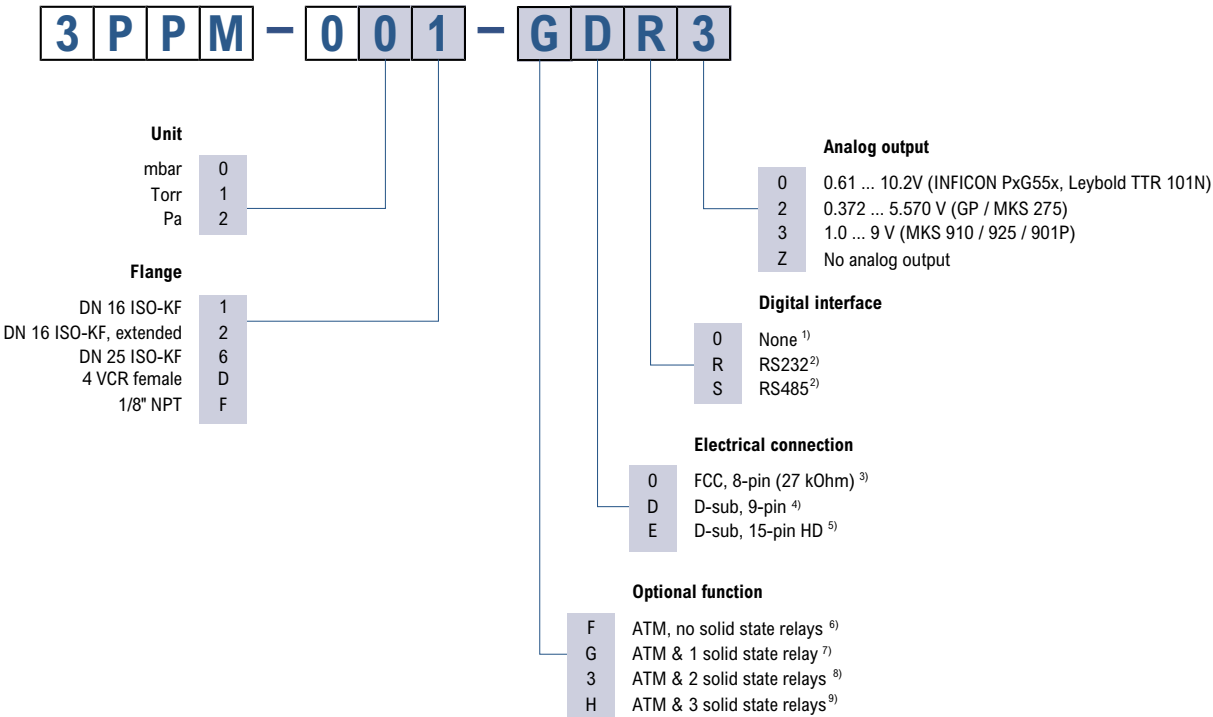
- Gas type independent above 2 mbar – allows safe venting with any gas mixture
- High accuracy and reproducibility at atmosphere – for reliable, fast atmospheric pressure detection
- Atmospheric ambient pressure measurement
- Up to 3 solid state relays
- Versatile of mounting orientation – provides engineering freedom in tool design
- Selectable analog output signal for easy system integration
- Digital interfaces RS232/ RS485
- Able to direct drop in replace MKS901P "MicroPirani™" – and Piezo Loadlock Vacuum Pressure Transducer"
- Compliance & standards: CE, EN, UL, CSA, RoHS

APPLICATIONS

- Semiconductor load-lock applications
- Use in Analytical equipment/ mass spectrometers
- Physical vapor deposition
- Furnace heat treatment

PPG570

ORDERING INFORMATION



- 6) ATM function without solid state relays is available on FCC 8-pin, D-sub 9-pin and D-sub 15-pin HD connector
- 7) ATM function & 1 solid state relay is only available on D-sub 9-pin connector, solid state relays can be set by customer via RS interface
- 8) ATM function & 2 solid state relays are only available on FCC 8-pin connector, solid state relays on FCC connector gauges have to be preset during production, they can't be set in the field due to missing RS interface
- 9) ATM function & 3 solid state relays are only available on D-sub 15-pin HD connector, solid state relays can be set by customer in the field via the RS interface

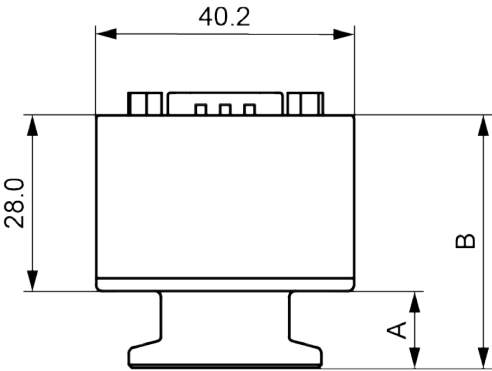
PPG570

SPECIFICATIONS

PPG570

DIMENSIONS

[mm]



	A [mm]	B [mm]
DN 16 ISO-KF	12.0	40.0
DN 16 ISO-KF, long tube	29.0	56.4
DN 25 ISO-KF	12.0	40.0
4 VCR female	33.7	61.7
1/8" NPT	37.0	65.0

Bayard-Alpert Hot Ion Gauge

BAG302

The INFICON single Bayard-Alpert Hot Ion Gauge BAG302 covers a wide measurement range from 1.3×10^{-9} mbar to 6.7×10^{-2} mbar (1×10^{-9} Torr to 5×10^{-2} Torr). The compact All in one Hot Ion gauge BAG302 offers an easy to exchange dual filament sensor, a built in OLED display, set-point relay and a long-linear analog output as well as an integrated RS485 digital interface for increased integration flexibility.

These features combined with the rugged design makes the BAG302 an affordable and repeatable process to base pressure measurement instrument of its own and provides a high value/low cost of ownership choice. The BAG302 is considered as OEM gauge and direct connection to customers PLC. It is not supported by VGC50x controller series.



ADVANTAGES

- Wide measurement range from 1.3×10^{-9} mbar to 6.7×10^{-2} mbar (1×10^{-9} Torr to 5×10^{-2} Torr)
- Two long-life yttrium oxide coated iridium filaments
- Tungsten filaments on special order
- All-in-One active gauge with built-in display, set-point, analog output and standard integrated RS485 digital interface
- Bright digital OLED display with keypad for simple setup, operation and programming
- User programmable set point relay
- User programmable display units in mbar, Torr or Pa
- User selectable Auto-ranging of emission current
- Mechanical strength and ruggedness
- Choice of various flange options
- Easy to exchange sensing element
- Compliance & standards: CE, RoHS
- Direct drop in replaces Granville-Phillips® 354 and 355 Micro-Ion® Module - identical control functions including software commands (RS485)

APPLICATIONS

- Pressure measurement in semiconductor process and transfer chambers
- Industrial coating
- General vacuum measurement and control in the low to ultra high vacuum range

BAG302

ORDERING INFORMATION

Type Sensor ¹⁾	BAG302 (OLED, SP, analog output, RS485)
DN 16 ISO-KF	352-050
DN 25 ISO-KF	352-051
DN 40 ISO-KF	352-052
DN 16 CF-R	352-053
DN 40 CF-R	352-054
3/4" tube	352-055
8 VCR female	352-056

¹⁾ Yt₂O₃ coated iridium filaments

Replacement Sensor ¹⁾	BAG302
DN 16 ISO-KF	352-060
DN 25 ISO-KF	352-061
DN 40 ISO-KF	352-062
DN 16 CF-R	352-063
DN 40 CF-R	352-064
3/4" tube	352-065
8 VCR female	352-066

¹⁾ Yt₂O₃ coated iridium filaments

Accessories	BAG302
Power supply for BAG302 ¹⁾	352-075

Input power: 100 ... 240 V (ac)

Output power: +24 V (ac) @2.5A (60W)

Cable length: 2 (6) m (ft.)

¹⁾ The IEC 60320 AC power entry receptacle allows use with any user supplied AC mains cord set available worldwide



BAG302

SPECIFICATIONS

Type	BAG302
Measurement range	$1.3 \times 10^{-9} \dots 6.7 \times 10^{-2}$ mbar $1 \times 10^{-9} \dots 5 \times 10^{-2}$ Torr $1.3 \times 10^{-7} \dots 6.7$ Pa
Accuracy (N ₂) ¹⁾	
$1.3 \times 10^{-8} \dots 6.7 \times 10^{-2}$ mbar	±15% of reading
$1 \times 10^{-8} \dots 5 \times 10^{-2}$ Torr	±15% of reading
Repeatability ¹⁾	±5% of reading
Degas ²⁾	
$p < 6.7 \times 10^{-5}$	electron bombardment, 2 min (default) mbar
$p < 5.00 \times 10^{-5}$	(programmable between 2 ... 10 min) Torr
Temperature	
Operation (ambient)	0 ... +40°C
Storage	-40 ... +70°C
Bakeout at flange (sensor only, electronics removed)	200°C
Supply voltage	+20 ... +28 V (dc) ³⁾
Output signal analog	0 ... +9 (log linear) V
Voltage vs. pressure	1 V / Decade
Set point relay	1 (single-pole double-throw relay (SPDT)) 1 A at 30 V (dc) resistive, or V (ac) non-inductive
Digital functions	degas, filament on/off and emission control
Interface (digital)	RS485
Emission control	Manual
Filament	Two Yt ₂ O ₃ coated Ir
Filament status	display / digital output
Electrical connection	D-Sub, 9-pin, male for analog D-Sub, 9-pin, female for RS485
Materials exposed to vacuum	Yt ₂ O ₃ , Ir, W, Ta, stainless steel, glass, Ni
Mounting orientation	any
Internal volume	16.4 cm ³ (1.0 in. ³)
Weight KF / CF	270 g (0.6 lb)

¹⁾ typically

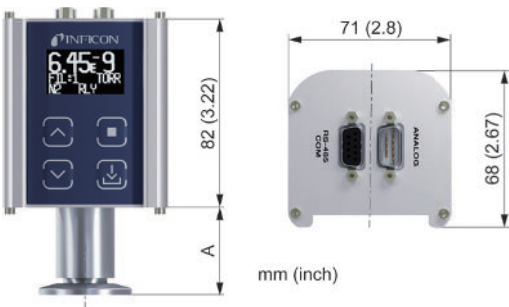
²⁾ Reduced accuracy during degas

³⁾ 30 W protected against power reversal and transient over-voltages

BAG302

DIMENSIONS

Dimension A	mm	(in)
DN 16 ISO-KF	37	(1.45)
DN 25 ISO-KF	37	(1.45)
DN 40 ISO-KF	37	(1.45)
DN 16 CF-R	47	(1.85)
DN 40 CF-R	33	(1.7)
8 VCR female	65	(2.58)
3/4" tube	55	(2.16)



Bayard-Alpert Hot Ion Gauge

Trigon™ BAG552 SingleGauge

For applications that require stand alone hot ion gauge technology, the Trigon™ family contains the single technology Bayard-Alpert Hot Ion Gauge BAG552. The BAG552 is designed for vacuum measurement of gases in the pressure range $5 \times 10^{-10} \dots 2 \times 10^{-2}$ mbar. The supported dual filament offers superior accuracy, repeatability and longevity. The removable calibration data chip, that comes along with the easy to install BAG552 spare sensor, to secure a seamless accurate process measurement, enables a higher bakeability of the sensor unit. BAG552 is available with analog output or EtherCAT interface option. Both enable easiest system integration. The Trigon™ BAG552 can also be operated in conjunction with the INFICON Vacuum Gauge Controller series VGC501, VGC502, VGC503 or with other control devices.

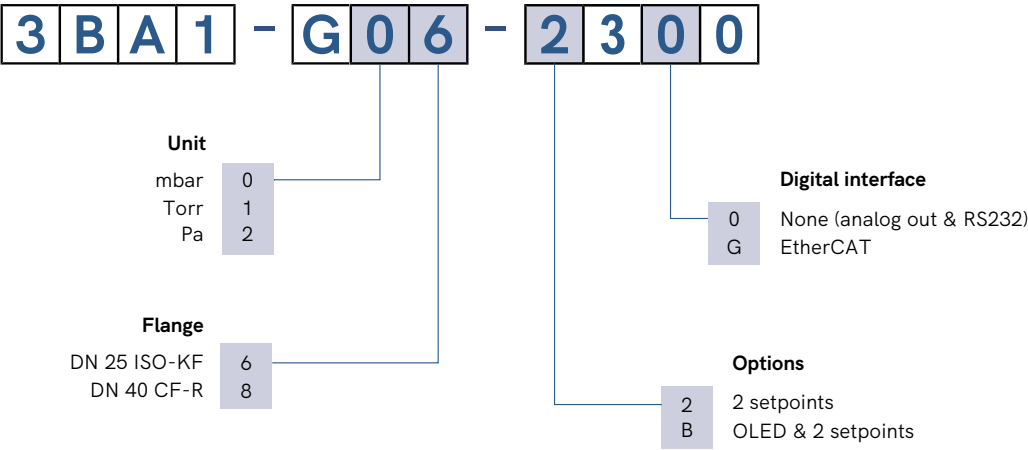


ADVANTAGES

- pure Bayard-Alpert measuring system for a wide UHV & HV measurement range
- 2 filaments for Bayard-Alpert system
- Galvanic isolated electronics to avoid electric stray current
- Sliding emission mode to avoid pressure jumps and freeze when switching the emission stream
- Extended bakeability due to removable calibration data chips
- Set point relays
- Bright & big OLED display (90° rotateable) with user interface
- Analog output, RS232C serial interface, EtherCAT®
- Usable in conjunction with VGC50x Controller series
- RoHS compliance

Trigon™ BAG552 SingleGauge

ORDERING INFORMATION



Trigon™ BAG552 SingleGauge

SPECIFICATIONS

Type	BAG552
Measurement range (air, O ₂ , CO, N ₂)	5×10 ⁻¹⁰ ... 2×10 ⁻² mbar, continuous
Accuracy 1 × 10 ⁻⁸ ... 2 × 10 ⁻² mbar	±15% of reading
Repeatability	5% of reading, 10 ⁻⁸ ... 2 × 10 ⁻² mbar (after 10 min. stabilization)
Switching threshold	
on	2.4×10 ⁻² mbar
off	3.2×10 ⁻² mbar
Emission current	
Sliding mode (default)	
p ≤ 8 × 10 ⁻⁷ mbar	5 mA
p > 1 × 10 ⁻³ mbar	25 µA
Two-Point-Mode	
p ≤ 7.2 × 10 ⁻⁶ mbar	5 mA
3.0 × 10 ⁻⁵ mbar < p < 3.2 × 10 ⁻² mbar	25 µA
Emission current switching	
25 µA -> 5 mA	7.2×10 ⁻⁶ mbar
5 mA -> 25 µA	3.0×10 ⁻⁵ mbar
Degas	
Emission current (p < 7.2 × 10 ⁻⁶ mbar)	≈16 mA (P _{degas} ≈4 W)
Control input signal	0 V/+24 V (dc), active high
Duration	≤3 min, followed by automatic stop. A new degas cycle can only be started after a waiting time of 30 min
Output signal	0 ... +10 V
Measuring range	+0.57 ... +8.176 V (5×10 ⁻¹⁰ ... 2×10 ⁻² mbar)
Relationship voltage-pressure	1 V/decade, logarithmic
Error signal	+0.1 V (EEPROM error) +0.3 V (BA sensor error)
Minimum load impedance	10 kΩ
Power supply	
Supply voltage at the gauge	+24 V (dc) (+20 ... +28 V (dc))
Ripple	≤2 V _{pp}
Current consumption	
Standard	≤0.5 A
Degas	≤0.9 A
Emission start (< 200 ms)	≤1.4 A
Power consumption	
BAG552	≤18 W
BAG552 with EtherCAT	≤21 W
Fuse necessary	1.25 AT
Sensor cable connection	
Receptacle	D-sub 15-pin, male
Measuring cable	shielded, number of conductors depending on the functions used, max. 15-pin plus shielding
Cable length (supply voltage 24 V)	
Analog and fieldbus operation	≤35 m (0.25 mm ² / conductor) ≤50 m (0.34 mm ² / conductor) ≤100 m (1.0 mm ² / conductor)
RS232C operation	≤30 m
Gauge identification	42 kΩ resistor between pin 10 and pin 5

Trigon™ BAG552 SingleGauge

Type	BAG552
Switching functions	
Setpoints	SP1, SP2
Adjustment range	5×10^{-10} ... 2×10^{-2} mbar
Relay contact rating	≤ 60 V (dc) / 0.5 A (dc), resistive
Admissible temperature	
Storage	-2 ... $+70$ °C
Operation	0 ... $+50$ °C
Bakeout	$+150$ °C (at vacuum connection, without electronics unit and calibration print, horizontally mounted)
Relative humidity	$\leq 65\%$ / 85% (no condensation) year's mean / during 60 days
Interface (digital)	Diagnostic port connection, RS232C, Jack connector. 2.5 m, 3-pin
Materials exposed to vacuum	stainless steel, NiFe, nickel plated, Hastelloy, glass, iridium, yttrium oxide (Y_2O_3)
Internal volume	
DN 25 ISO-KF	≈ 24 cm ³
DN 40 CF-R	≈ 34 cm ³
Weight	550 ... 760g
Pressure max.	5 bar (absolute)
Mounting orientation	any
Degree of pollution	2
Degree of protection	IP40

Trigon™ BAG552 SingleGauge

SPECIFICATIONS INTERFACES

RS232C

Data rate	9600 Baud
Data format	binary, 8 data bits, one stop bit, no parity bit, no handshake

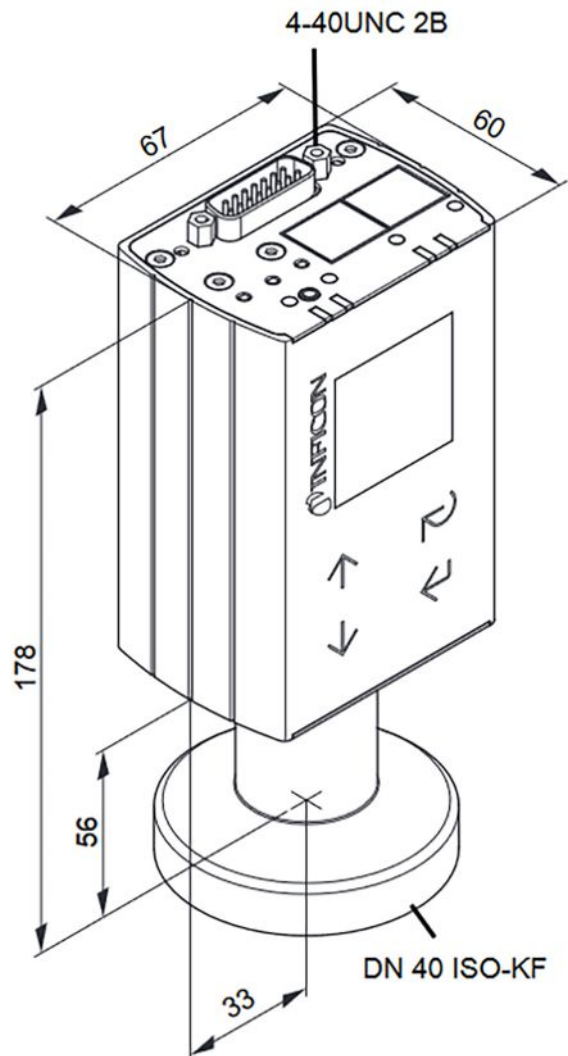
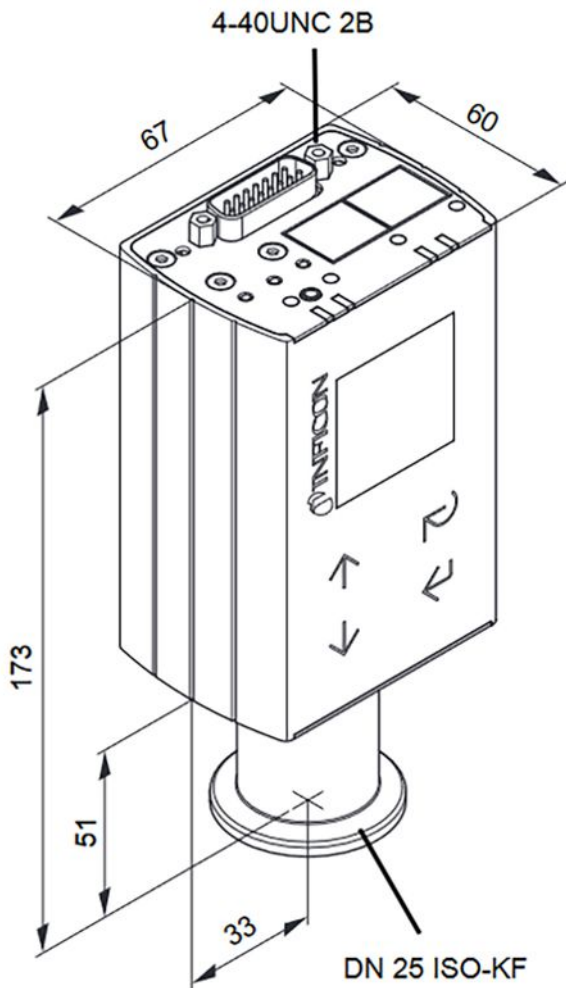
EtherCAT®

Protocol	EtherCAT®
Communication standards	Semiconductor Device Profile ETG.5003 Part 1 Common Device Profile ETG.5003 Part 2080 "Specific Device Profile - Vacuum Pressure Gauge"
Process Data	Fixed PDO mapping and configurable PDO mapping
EtherCAT connector	RJ45, 8-pin (socket), IN and OUT
Cable	Shielded Ethernet CAT5e or higher
Cable length	≤100 m (330 ft.)
Data rate	100000 Kbps

Trigon™ BAG552 SingleGauge

DIMENSIONS

[mm]



Bayard-Alpert Hot Ion Gauge

BAG402

The INFICON single Bayard-Alpert Hot Ion Gauge BAG402 covers a wide measurement range from 5×10^{-10} mbar to 2.7×10^{-2} mbar (3.75×10^{-10} Torr to 2×10^{-2} Torr). Choose the INFICON BAG402 for affordable and repeatable process to base pressure measurements in a compact active gauge package. The unique, supported dual filaments offer superior accuracy, longterm stability and longevity. The BAG402 is considered as OEM gauge and direct connection to customers PLC. It is not supported by VGC50x controller series.



ADVANTAGES

- Measurement range from 5×10^{-10} mbar to 2.7×10^{-2} mbar (3.75×10^{-10} Torr to 2×10^{-2} Torr)
- Excellent repeatability in the process pressure range from 10^{-8} ... 10^{-2} mbar of $\pm 5\%$
- Two long-life yttrium oxide coated iridium filaments
- Emission current selection reduces control complexity
- Easy to exchange sensing element with on-board calibration data guarantees high reproducibility
- RoHS compliance

APPLICATIONS

- Pressure measurement in semiconductor process and transfer chambers
- Industrial coating
- General vacuum measurement and control in the low to ultra high vacuum range

BAG402

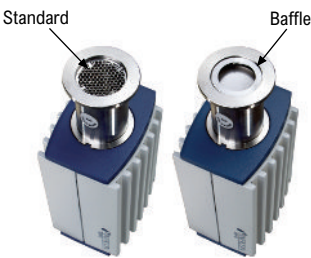
ORDERING INFORMATION

Sensor Type	BAG402
DN 25 ISO-KF	353-600
DN 40 CF-R	353-601

Replacement Sensor	BAG402
DN 25 ISO-KF	354-484
DN 40 CF-R	354-485

Accessories	
Baffle	353-512
Centering ring with baffle DN 25 ISO-KF	211-113

Baffle: Prevents contamination of the sensor, fast and easy installation.



BAG402

SPECIFICATIONS

Type	BAG402
Measurement range (air, O ₂ , CO, N ₂)	$5 \times 10^{-10} \dots 2.7 \times 10^{-2}$ mbar ($3.75 \times 10^{-10} \dots 2 \times 10^{-2}$ Torr)
Accuracy 10 ⁻⁸ ... 10 ⁻² mbar	±15% of reading
Repeatability 10 ⁻⁸ ... 10 ⁻² mbar	5% of reading
Degas ¹⁾ p < 7.2 × 10 ⁻⁶ mbar	Electron bombardment, max. 3 min
Pressure, max. bar	2 bar (absolute)
Temperature	
Operation (ambient)	0 ... +50°C
Storage	-20 - +70°C
Bakeout at flange without electronics	80°C
Supply voltage	+20 - +28 / ≤ 0.8 V / A (dc)
Output signal analog	0 - +10.5 V
Measurement range	0.57 ... 8.31 V
Voltage vs. pressure (logarithmic)	1 V / Decade
Error signal	>10 V
Load impedance, min.	10 kΩ
Interface (digital)	Diagnostic port connection, RS232C, Jack connector. 2.5 m, 3-pin
Emission control	Manual via interface
Filament	Two Yt ₂ O ₃ coated Ir
Filament status	LED
Electrical connection	D-Sub, 9-pin, male
Cable length, max.	100 m (330 ft)
Materials exposed to vacuum	Yt ₂ O ₃ , Ir, Pt, Mo, W, NiFe, NiCr, stainless steel, glass
Internal volume KF / CF	24 cm ³ (1.46 in. ³) / 34 cm ³ (2.1 in. ³)
Weight KF / CF	450 g / 710 g
Degree of protection	IP30

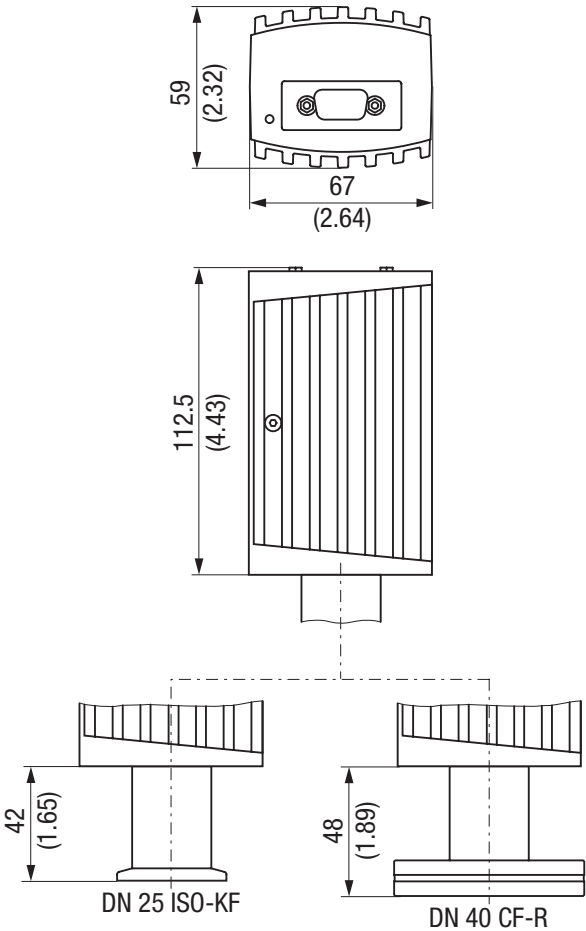
¹⁾ Reduced accuracy during degas

BAG402

DIMENSIONS

mm (in.)

BAG402
(D-Sub, 9-pin)



Bayard-Alpert Pirani Gauge

Trigon™ BPG552 DualGauge

For applications that require a measurement range from UHV (5×10^{-10}) up to ATM (1000 mbar) the Trigon™ family contains the dual technology BPG552 gauge. BPG552 consists out of an Bayard-Alpert Hot Ionization sensor element as well out of a classical, robust and reliable Pirani sensor element. Beside of extending the usable process to base pressure measuring range of BPG552, the integrated Pirani also automatically switches on/ off the Bayard-Alpert high vacuum sensing element, depending on unhealthy pressure changes during the process. Combining technologies reduces the complexity of installation, setup, and integration, thus reducing cost and valuable tool space. The supported Bayard-Alpert dual filament offers superior accuracy, repeatability and longevity. The removable calibration data chip, that comes along with the easy to install BPG552 spare sensor, to secure a seamless accurate process measurement, enables a higher bakeability of the sensor unit. BPG552 is available with analog output or EtherCAT interface option. Both enable easiest system integration. The Trigon™ BAG552 can also be operated in conjunction with the INFICON Vacuum Gauge Controller series VGC501, VGC502, VGC503 or with other control devices.

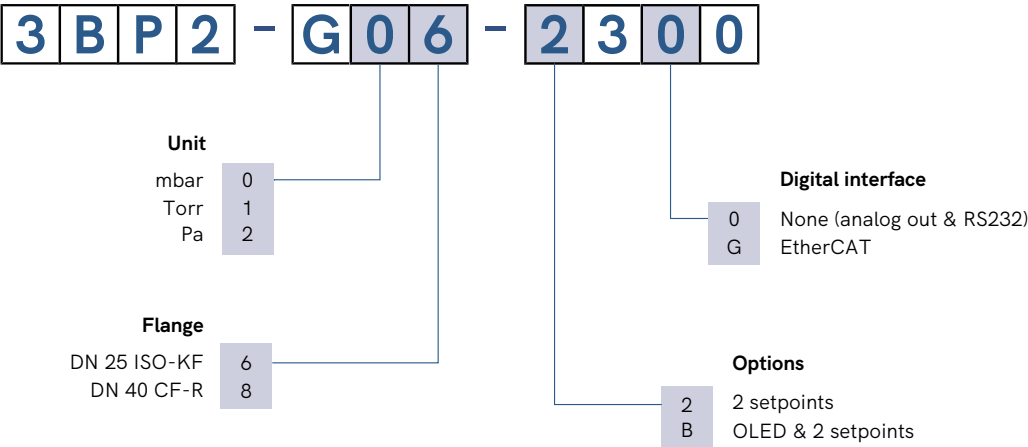


ADVANTAGES

- 2 sensing elements for a wide measurement range, cost reduction & space savingness
- 2 filaments for Bayard-Alpert system including Pirani interlock protection to avoid premature filament burnout
- Automatic high vacuum Pirani adjustment reduces operator interventions
- Galvanic isolated electronics to avoid electric stray current
- Sliding emission mode to avoid pressure jumps and freeze when switching the emission stream
- Extended bakeability due to removable calibration data chips
- Set point relays and bright & big OLED display (90° rotateable) with user interface
- Analog output, RS232C serial interface, EtherCAT®
- Usable in conjunction with VGC50x Controller series
- Backwards compatible to BPG402
- RoHS compliance

Trigon™ BPG552 DualGauge

ORDERING INFORMATION



Trigon™ BPG552 DualGauge

SPECIFICATIONS

Type	BPG552
Pressure range	
$2 \times 10^{-2} \dots 1000$ mbar	Pirani sensor
$5 \times 10^{-3} \dots 2 \times 10^{-2}$ mbar	crossover range
$5 \times 10^{-10} \dots 5 \times 10^{-3}$ mbar	hot cathode ionisation (BA)
Measurement range (air, O ₂ , CO, N ₂)	$5 \times 10^{-10} \dots 1000$ mbar, continuous
Accuracy	
$1 \times 10^{-8} \dots 100$ mbar	±15% of reading
100 ... 1000 mbar	±50% of reading
Repeatability	5% of reading, $10^{-8} \dots 100$ mbar (after 10 min. stabilization)
Switching threshold	
on	2.4×10^{-2} mbar
off	3.2×10^{-2} mbar
Emission current	
Sliding mode (default)	
$p \leq 8 \times 10^{-7}$ mbar	5 mA
$p > 1 \times 10^{-3}$ mbar	25 µA
Two-Point-Mode	
$p \leq 7.2 \times 10^{-6}$ mbar	5 mA
3.0×10^{-5} mbar $< p < 3.2 \times 10^{-2}$ mbar	25 µA
Emission current switching	
25 µA -> 5 mA	7.2×10^{-6} mbar
5 mA -> 25 µA	3.0×10^{-5} mbar
Degas	
Emission current ($p < 7.2 \times 10^{-6}$ mbar)	≈16 mA ($P_{\text{degas}} \approx 4$ W)
Control input signal	0 V/+24 V (dc), active high
Duration	≤3 min, followed by automatic stop. A new degas cycle can only be started after a waiting time of 30 min
Output signal	0 ... +10 V
Measuring range	0.774 ... +10.0 V ($5 \times 10^{-10} \dots 1000$ mbar)
Relationship voltage-pressure	0.75 V/decade, logarithmic
Error signal	+0.1 V (EEPROM error) +0.3 V (BA sensor error) +0.5 V (Pirani sensor error)
Minimum load impedance	10 kΩ
Display	
Display panel	OLED, 3.81 cm (1.5")
Pressure units (pressure p)	mbar (default), Torr, Micron, Pa, hPa
Power supply	
Supply voltage at the gauge	+24 V (dc) (+20 ... +28 V (dc))
Ripple	≤2 V _{pp}
Current consumption	
Standard	≤0.5 A
Degas	≤0.9 A
Emission start (< 200 ms)	≤1.4 A
Power consumption	
BPG552	≤18 W
BPG552 with EtherCAT	≤21 W
Fuse necessary	1.25 AT

Trigon™ BPG552 DualGauge

Type	BPG552
Sensor cable connection	
Receptacle	D-sub 15-pin, male
Measuring cable	shielded, number of conductors depending on the functions used (max. 15 conductors plus shielding)
Cable length (supply voltage 24 V)	
Analog and fieldbus operation	≤ 35 m (0.25 mm ² / conductor) ≤ 50 m (0.34 mm ² / conductor) ≤ 100 m (1.0 mm ² / conductor)
RS232C operation	≤ 30 m
Gauge identification	42 k Ω resistor between pin 10 and pin 5
Switching functions	
Setpoints	SP1, SP2
Adjustment range	5×10^{-10} ... 1000 mbar, continuous
Relay contact rating	≤ 60 V (dc) / 0.5 A (dc), resistive
Admissible temperature	
Storage	-2 ... +70 °C
Operation	0 ... +50 °C
Bakeout	+150 °C (at vacuum connection, without electronics unit and calibration print, horizontally mounted)
Relative humidity	$\leq 65\%$ / 85% (no condensation) year's mean / during 60 days
Interface (digital)	Diagnostic port connection, RS232C, Jack connector. 2.5 m, 3-pin
Materials exposed to vacuum	stainless steel, NiFe, nickel plated, Hastelloy, glass, iridium, yttrium oxide (Y ₂ O ₃), tungsten, copper
Internal volume	
DN 25 ISO-KF	≈ 24 cm ³
DN 40 CF-R	≈ 34 cm ³
Weight	550 ... 760g
Pressure max.	5 bar (absolute)
Mounting orientation	any
Degree of pollution	2
Degree of protection	IP40

Trigon™ BPG552 DualGauge

SPECIFICATIONS INTERFACES

RS232C

Data rate	9600 Baud
Data format	binary, 8 data bits, one stop bit, no parity bit, no handshake

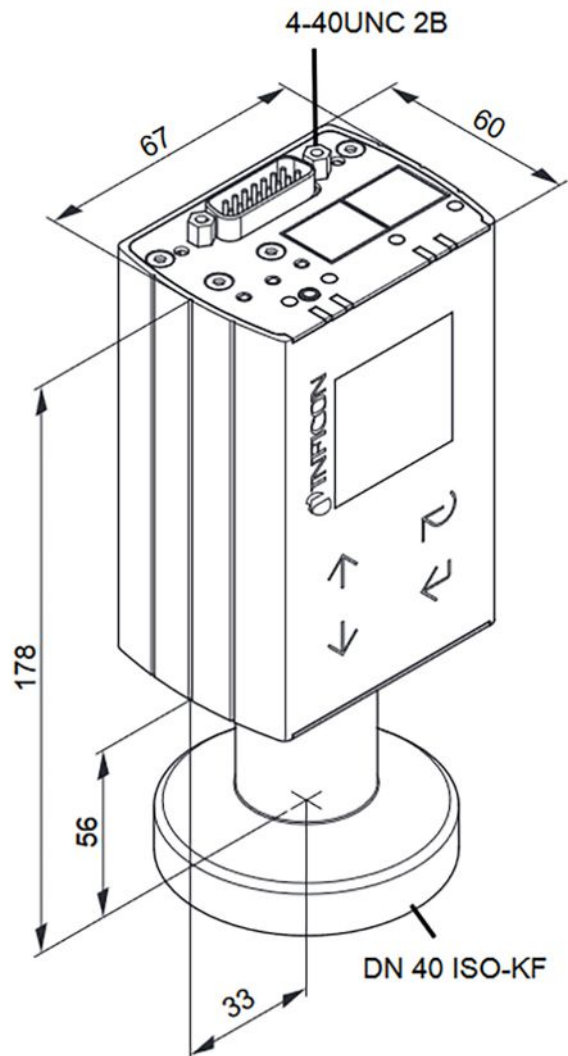
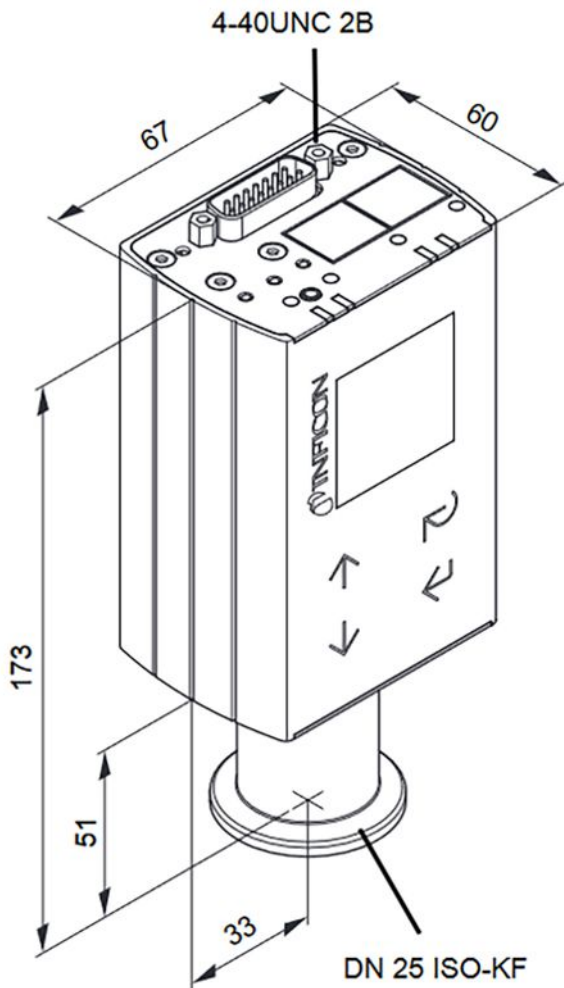
EtherCAT®

Protocol	EtherCAT®
Communication standards	Semiconductor Device Profile ETG.5003 Part 1 Common Device Profile ETG.5003 Part 2080 "Specific Device Profile - Vacuum Pressure Gauge"
Process Data	Fixed PDO mapping and configurable PDO mapping
EtherCAT connector	RJ45, 8-pin (socket), IN and OUT
Cable	Shielded Ethernet CAT5e or higher
Cable length	≤100 m (330 ft.)
Data rate	100000 Kbps

Trigon™ BPG552 DualGauge

DIMENSIONS

[mm]



Bayard-Alpert Pirani Gauge

BPG400

The INFICON Bayard-Alpert Pirani Combination Gauge, BPG400, functions as two gauges in a single compact unit measuring from 5×10^{-10} mbar to atmosphere (3.8×10^{-10} Torr to atmosphere). Combining technologies reduces the complexity of installation, setup, and integration. Choose the BPG400 for affordable and repeatable process to base pressure measurements in one economic package.



ADVANTAGES

- Extremely wide measurement range from 5×10^{-10} mbar to atmosphere (3.8×10^{-10} Torr to atmosphere)
- Excellent repeatability in the process pressure range from 10^{-8} ... 10^{-2} mbar of 5%
- The Pirani interlock protects the Bayard-Alpert system from premature filament burnout and excess contamination from high pressure operation
- Long-life yttrium oxide coated iridium filament
- Optional graphic display and Fieldbus interfaces available
- Automatic high vacuum Pirani adjustment reduces operator interventions
- RoHS compliance

APPLICATIONS

- Pressure measurement in semiconductor process and transfer chambers
- Industrial coating
- General vacuum measurement and control in the low to ultra high vacuum range

BPG400

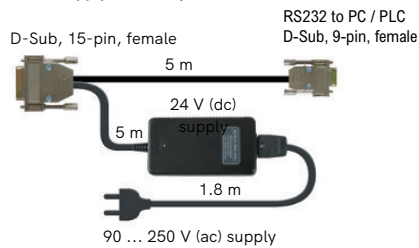
ORDERING INFORMATION

Type Sensor	BPG400 without LCD	BPG400 with LCD	BPG400 with Profibus DP	BPG400 with DeviceNet™
DN 25 ISO-KF	353-500	353-501	353-505	353-507
DN 40 CF-R	353-502	535-503	353-506	353-508

Replacement Sensor	BPG400 without LCD	BPG400 with LCD	BPG400 with Profibus DP	BPG400 with DeviceNet™
DN 25 ISO-KF	354-490	354-490	354-490	354-490
DN 40 CF-R	354-491	354-491	354-491	354-491

Accessories	Part no.
Power supply 24 V (dc) / RS232C line	353-511
Bakeout extension, 100 mm (3.94 in.)	353-510
Baffle	353-512
Centering ring with baffle DN 25 ISO-KF	211-113

Power supply 24 V (dc) / RS232C line



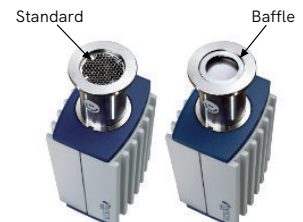
Bakeout extension:

Allows measurement at flange temperatures up to 150°C.
Easy installation into the vacuum connection - no tools required.



Baffle:

Prevents contamination of the sensor.
Fast and easy installation.



BPG400

SPECIFICATIONS

	BPG400 Standard	BPG400 Display
Measurement range (air, O ₂ , CO, N ₂)	5 × 10 ⁻¹⁰ ... 1000 mbar (3.8 × 10 ⁻¹⁰ ... 750 Torr)	
Accuracy 10 ⁻⁸ ... 10 ⁻² mbar	±15% of reading	
Repeatability 10 ⁻⁸ ... 10 ⁻² mbar	5% of reading	
Degas ¹⁾ p < 7.2 × 10 ⁻⁶ mbar	Electron bombardment, max. 3 min	
Pressure, max. (absolute)	2 bar	
Temperature		
Operation (ambient)	0 ... +50°C	
Storage	-20 ... +70°C	
Bakeout		
At flange with extension	150°C	
At flange without extension	80°C	
Electronics removed	150°C	
Supply voltage	+20 ... +28 / 0.8 V / A (dc)	
Output signal analog	0 ... +10 V	
Measurement range	+0.774 ... +10 V	
Voltage vs. pressure	0.75 V / Decade	
Error signal	0.3 / 0.5 V	
Load impedance, min.	10 kΩ	
Interface (digital) ²⁾	RS232C	
Electrical connection	D-Sub, 15-pin, male	
Cable length, max. ³⁾	100 m (330 ft)	
Materials exposed to vacuum	Yt ₂ O ₃ , Ir, Pt, Mo, Cu, W, NiFe, NiCr, stainless steel, glass	
Internal volume KF / CF	24 cm ³ (1.46 in. ³) / 34 cm ³ (2.1 in. ³)	
Weight KF / CF	285 g / 550 g	
Degree of protection	IP30	

¹⁾ Reduced accuracy during degas

²⁾ Simultaneous use of RS232C or VGC40x and VGC50x series controllers and Fieldbus is not allowed

³⁾ For RS232C operation <30 m

BPG400

SPECIFICATIONS INTERFACES

DeviceNet™

Protocol	DeviceNet™, group 2 slave only
Data rate switch	125, 250, 500 kBaud or network programmable
Cable length	
125 kbps	500 m (1650 ft.)
250 kbps	250 m (825 ft.)
500 kbps	100 m (330 ft.)
MAC ID	Two switches (address 00 – 63) or network programmable
Digital functions	Read pressure, select units: Torr, mbar, Pa Degas function, Pirani full scale adjust Monitor gauge status Safe state allows definition of behavior in case of error Detailed alarm and warning information
Analog functions	0 ... 10 V analog output pressure indication two setpoint relays A + B
Visual communication indicators	LED network status (green / red) LED module status (green / red)
Specification	DeviceNet™ "Vacuum Gauge Device Profile"
Device type	"CG" for combination gauge
I / O slave messaging	Polling only
Setpoint relays	2
Range	1×10^{-9} ... 100 mbar
Relay contact	NO, potential free
Hysteresis	10 % of reading
Contact rating	60 V / 0.5 A (dc)
Supply voltage for DeviceNet™	+11 - +25 V / 0.5 A (dc)
Supply voltage for gauge	+20 - +28 V / 0.8 A (dc)
Connector for DeviceNet™	Microstyle, 5-pin
Connector for Gauges (analog output, supply voltage, setpoints)	D-Sub, 15-pin, male

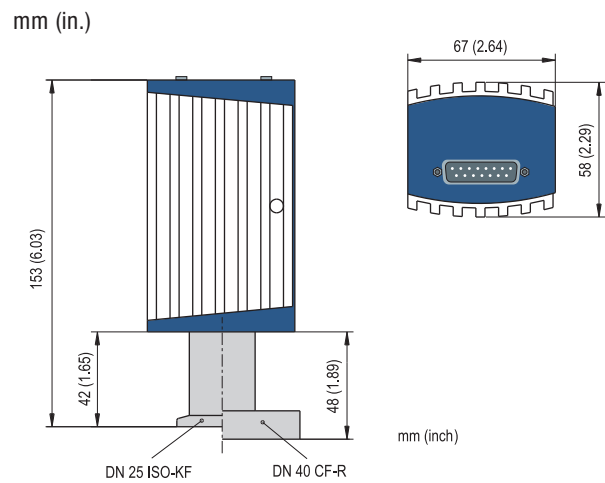
PROFIBUS DP

Baud rates	9.6 / 19.2 / 93.75 / 187.5 / 500 kBaud 1.5 / 12 MBaud
Address	Two switches (address 00 – 127) or network programmable
Digital functions	Read pressure, select units: Torr, mbar, Pa Degas function, Pirani full scale adjust Monitor gauge status, filament status Safe state allows definition of behavior in case of error Detailed alarm and warning information
Analog functions	0 ... 10 V analog output pressure indication two setpoint relays A + B
Setpoint relays	2
Range	1×10^{-9} ... 100 mbar
Relay contact	NO, potential free
Hysteresis	10 % of reading
Contact rating	≤ 30 V / ≤ 0.5 A (dc)

BPG400

PROFIBUS DP	
Connector for Profibus DP	D-Sub, 9-pin, female
Connector for BPG (analog output, supply voltage, setpoints)	D-Sub, 15-pin, male

DIMENSIONS



Bayard-Alpert Pirani Gauge

BPG402-S

The INFICON Bayard-Alpert Pirani Combination Gauge, BPG402-S, functions as two gauges in a single compact unit measuring from 5×10^{-10} mbar to atmosphere (3.8×10^{-10} Torr to atmosphere). Combining technologies reduces the complexity of installation, setup, and integration. Choose the BPG402-S with two yttrium oxide coated iridium filaments for affordable and repeatable process to base pressure measurements in one economical package. Sensing elements with on-board calibration data guarantees high reproducibility when exchanging sensors.



ADVANTAGES

- Extremely wide measurement range from 5×10^{-10} mbar to atmosphere (3.8×10^{-10} Torr to atmosphere)
- Excellent repeatability in the process pressure range from 10^{-8} ... 10^{-2} mbar of 5%
- Pirani interlock protects the filament from premature burnout
- Two long-life yttrium oxide coated iridium filaments
- Optional graphic display and Fieldbus interfaces available, e.g. EtherCAT, DeviceNet, etc.
- Latest EtherCAT protocol generation 2.0
- Automatic high vacuum Pirani adjustment reduces operator interventions
- Easy to exchange sensing element with on-board calibration data guarantees high reproducibility
- RoHS compliance

APPLICATIONS

- Pressure measurement in semiconductor process and transfer chambers
- Industrial coating
- General vacuum measurement and control in the low to ultra high vacuum range

BPG402-S

ORDERING INFORMATION

Type	BPG402-S w/o display	BPG402-S with display	BPG402-SL with long tube w/o display	BPG402-SP with Profibus DP ¹⁾	BPG402-SD with DeviceNet™ ¹⁾	BPG402-SE with EtherCAT® ²⁾
DN 25 ISO-KF	353-570	353-572	-	353-574	353-576	353-596
DN 40 CF-R	353-571	353-573	353-578	353-575	353-577	353-597

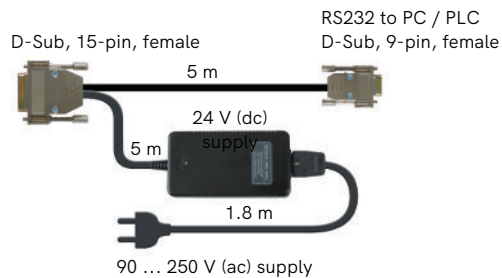
¹⁾ Communication standard ETG.5 == 3.2080 S (R) V1.3.0; old version V1.0.0 still available on request

²⁾ not available with LCD

Spare Parts	BPG402-S	BPG402-S	BPG402-SL	BPG402-SP	BPG402-SD	BPG402-SE
Replacement sensor DN 25 ISO-KF	354-494	354-494	-	354-494	354-494	354-494
Replacement sensor DN 40 CF-R	354-495	354-495	354-496	354-495	354-495	354-495

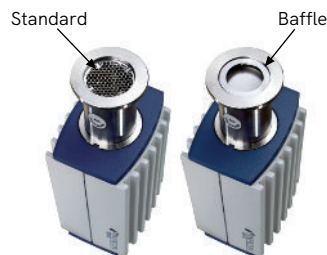
Accessories	Part no.
Power supply 24 V (dc) / RS232C line	353-511
Baffle	353-512
Centering ring with baffle DN 25 ISO-KF	211-113

Power supply 24 V (dc) / RS232C line



Baffle:

Prevents contamination of the sensor.
Easy installation into the vacuum connection - no tools required.



BPG402-S

SPECIFICATIONS

	BPG402-S / -SL Standard	BPG402-S Display
Measurement range (air, O ₂ , CO, N ₂)	5 × 10 ⁻¹⁰ ... 1000 mbar (3.8 × 10 ⁻¹⁰ ... 750 Torr)	
Accuracy 10 ⁻⁸ ... 10 ⁻² mbar	±15% of reading	
Repeatability 10 ⁻⁸ ... 10 ⁻² mbar	5% of reading	
Degas ¹⁾ p < 7.2 × 10 ⁻⁶ mbar	Electron bombardment, max. 3 min	
Pressure, max. (absolute)	2 bar	
Temperature		
Operation (ambient)	0 - +50°C	
Storage	-20 - +70°C	
Bakeout at flange without electronics		
BPG402-S	80°C	
BPG402-SL	150°C	
Supply voltage	+20 - +28 V / ≤0.8 A (dc)	
Output signal analog	0 - +10 V	
Measurement range	+0.774 - +10 V	
Voltage vs. pressure	0.75 V / Decade	
Error signal	0.1 / 0.3 / 0.5 V	
Load impedance, min.	10 kΩ	
Set point relay	1	
Range	1 × 10 ⁻⁹ ... 100 mbar	
Relay contact	NO, potential free	
Hysteresis	10% of reading	
Contact rating	≤30 V / ≤0.5 A (dc)	
Digital functions	Degas	
Interface (digital) ²⁾	RS232C	
Emission control	Automatic / manual via interface	
Filament	Two Yt ₂ O ₃ coated Ir	
Filament status	LED / digital output	
Electrical connection	D-Sub, 15 pin, male	
Cable length, max. ³⁾	100 m (330 ft)	
Materials exposed to vacuum	Yt ₂ O ₃ , Ir, Pt, Mo, Cu, W, NiFe, NiCr, stainless steel, glass	
Internal volume KF / CF	24 cm ³ (1.46 in. ³) / 34 cm ³ (2.1 in. ³)	
Weight KF / CF	450 g / 710 g	
Degree of protection	IP30	

¹⁾ Reduced accuracy during degas

²⁾ Simultaneous use of RS232C or VGC40x and VGC50x series controllers and Fieldbus is not allowed

³⁾ For RS232C operation <30 m

BPG402-S

SPECIFICATIONS INTERFACES

DeviceNet™

Protocol	DeviceNet™, group 2 slave only
Data rate switch	125, 250, 500 kBaud or network programmable
Cable length	
125 kbps	500 m (1650 ft.)
250 kbps	250 m (825 ft.)
500 kbps	100 m (330 ft.)
MAC ID	Two switches (address 00 - 63) or network programmable
Digital functions	Read pressure, select units: Torr, mbar, Pa Degas function, Pirani full scale adjust Monitor gauge status Safe state allows definition of behavior in case of error Detailed alarm and warning information
Analog functions	0 ... 10 V analog output pressure indication two setpoint relays A + B
Visual communication indicators	LED network status (green / red) LED module status (green / red)
Specification	DeviceNet™ "Vacuum Gauge Device Profile"
Device type	"CG" for combination gauge
I / O slave messaging	Polling only
Setpoint relays	2
Range	1×10^{-9} ... 100 mbar
Relay contact	NO, potential free
Hysteresis	10 % of reading
Contact rating	60 V / 0.5 A (dc)
Supply voltage for DeviceNet™	+11 - +25 V / 0.5 A (dc)
Supply voltage for gauge	+20 - +28 V / 0.8 A (dc)
Connector for DeviceNet™	Microstyle, 5-pin
Connector for Gauges (analog output, supply voltage, setpoints)	D-Sub, 15-pin, male

EtherCAT®

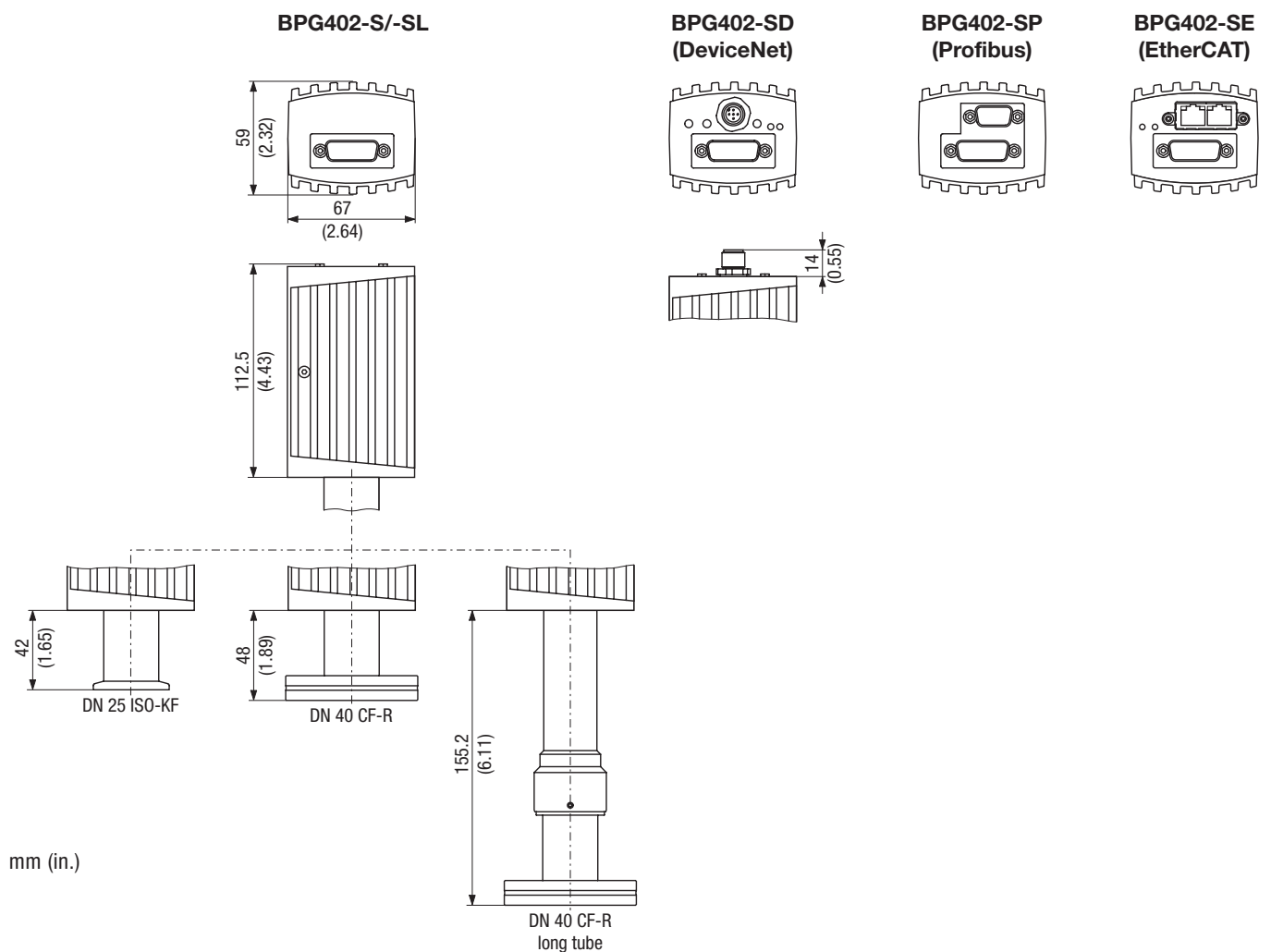
Protocol	EtherCAT®
Communication standards	Semiconductor Device Profile ETG.5003 Part 1 Common Device Profile ETG.5003 Part 2080 "Specific Device Profile - Vacuum Pressure Gauge"
Process Data	Fixed PDO mapping and configurable PDO mapping
EtherCAT connector	RJ45, 8-pin (socket), IN and OUT
Cable	Shielded Ethernet CAT5e or higher
Cable length	≤100 m (330 ft.)
Data rate	100000 Kbps

BPG402-S

PROFIBUS DP

Baud rates	9.6 / 19.2 / 93.75 / 187.5 / 500 kBaude 1.5 / 12 MBaud
Address	Two switches (address 00 - 127) or network programmable
Digital functions	Read pressure, select units: Torr, mbar, Pa Degas function, Pirani full scale adjust Monitor gauge status, filament status Safe state allows definition of behavior in case of error Detailed alarm and warning information
Analog functions	0 ... 10 V analog output pressure indication two setpoint relays A + B
Setpoint relays	2
Range	$1 \times 10^{-9} \dots 100$ mbar
Relay contact	NO, potential free
Hysteresis	10 % of reading
Contact rating	≤ 30 V / ≤ 0.5 A (dc)
Connector for Profibus DP	D-Sub, 9-pin, female
Connector for BPG (analog output, supply voltage, setpoints)	D-Sub, 15-pin, male

DIMENSIONS



Bayard-Alpert Pirani Capacitance Diaphragm Gauge

Trigon™ BCG552 TripleGauge®

The TripleGauge® BCG552 combines 3 vacuum sensing elements in one sensor flange. This flagship of the new Trigon™ family offers extreme wide measurement range from UHV (5×10^{-10}) up to ATM (1500 mbar). With its additional ATM sensor BCG552 is predestinated to use for differential pressure measurement and the use as vacuum switch in several applications. BCG552 consists out of a Bayard-Alpert Hot Ionization sensor, a classical, robust and reliable Pirani sensor element and a miniaturized capacitance diaphragm gauge on vacuum side. A Piezo sensor on ATM side completes BCG552. Combining technologies reduces the complexity of installation, setup, and integration, thus reducing cost and valuable tool space. The supported Bayard-Alpert dual filament offers superior accuracy, repeatability and longevity in the UHV and HV range, while the miniaturized Capacitance diaphragm gauge is superior accurate in the ATM range and gas type independent. BPG552 is available with analog output or EtherCAT interface option. Both enable easiest system integration. The Trigon™ BCG552 TripleGauge® can also be operated in conjunction with the INFICON Vacuum Gauge Controller series VGC501, VGC502, VGC503 or with other control devices.

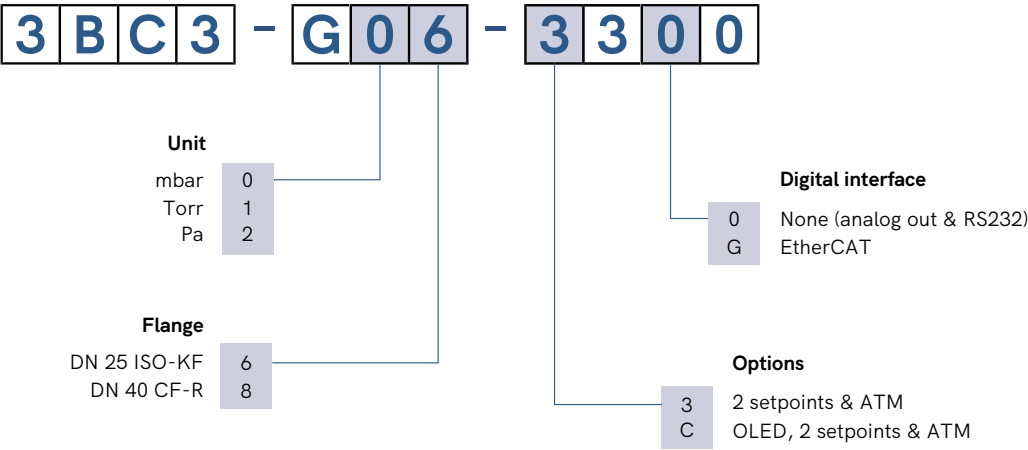


ADVANTAGES

- 3 + 1 sensing elements for extremely wide measurement range, cost reduction & space savingness including 2 filaments for Bayard-Alpert system
- Gas type independent pressure measurement above 10 Torr provides more reliable load lock control for any gas mixtures.
- Differential pressure measurement eliminates uncertainty related to atmospheric pressure changes
- Automatic high vacuum Pirani adjustment reduces operator interventions
- Galvanic isolated electronics to avoid electric stray current
- Sliding emission mode to avoid pressure jumps and freeze when switching the emission stream
- Set point relays and bright & big OLED display (90° rotateable) with user interface
- Analog output, RS232C serial interface, EtherCAT®
- Usable in conjunction with VGC50x Controller series
- Backwards compatible to TripleGauge® BCG450
- RoHS compliance

Trigon™ BCG552 TripleGauge®

ORDERING INFORMATION



Trigon™ BCG552 TripleGauge®

SPECIFICATIONS

Type	BCG552
Pressure range	
10 ... 1500 mbar	capacitance diaphragm sensor
1 ... 10 mbar	crossover range
2×10^{-2} ... 1 mbar	Pirani sensor
5×10^{-3} ... 2×10^{-2} mbar	crossover range
5×10^{-10} ... 5×10^{-3} mbar	hot cathode ionisation (BA)
Measurement range (air, O ₂ , CO, N ₂)	5×10^{-10} ... 1500 mbar, continuous
Accuracy	
1×10^{-8} ... 50 mbar	±15% of reading
50 ... 950 mbar	±5% of reading
950 ... 1050 mbar	±2.5% of reading
Repeatability	5% of reading, 1×10^{-8} ... 1050 mbar (after 10 min. stabilization)
Switching threshold	
on	2.4×10^{-2} mbar
off	3.2×10^{-2} mbar
Emission current	
Sliding mode (default)	
$p \leq 8 \times 10^{-7}$ mbar	5 mA
$p > 1 \times 10^{-3}$ mbar	25 µA
Two-Point-Mode	
$p \leq 7.2 \times 10^{-6}$ mbar	5 mA
3.0×10^{-5} mbar < $p < 3.2 \times 10^{-2}$ mbar	25 µA
Emission current switching	
25 µA -> 5 mA	7.2×10^{-6} mbar
5 mA -> 25 µA	3.0×10^{-5} mbar
Degas	
Emission current ($p < 7.2 \times 10^{-6}$ mbar)	≈16 mA ($P_{\text{degas}} \approx 4$ W)
Control input signal	0 V/+24 V (dc), active high
Duration	≤3 min, followed by automatic stop. A new degas cycle can only be started after a waiting time of 30 min
Output signal	0 ... +10.13 V
Measuring range	0.774 ... +10.13 V (5×10^{-10} ... 1500 mbar)
Relationship voltage-pressure	0.75 V/decade, logarithmic
Error signal	+0.1 V (diaphragm sensor or EEPROM error) +0.3 V (BA sensor error) +0.5 V (Pirani sensor error)
Minimum load impedance	10 kΩ
Display	
Display panel	OLED, 3.81 cm (1.5")
Pressure units (pressure p)	mbar (default), Torr, Micron, Pa, hPa

Trigon™ BCG552 TripleGauge®

Type	BCG552
Power supply	
Supply voltage at the gauge	+24 V (dc) (+20 ... +28 V (dc))
Ripple	$\leq 2 V_{pp}$
Current consumption	
Standard	$\leq 0.5 A$
Degas	$\leq 0.9 A$
Emission start (< 200 ms)	$\leq 1.4 A$
Power consumption	
BCG552	$\leq 18 W$
BCG552 with EtherCAT	$\leq 21 W$
Fuse necessary	1.25 AT
Sensor cable connection	
Receptacle	D-sub 15-pin, male
Measuring cable	shielded, number of conductors depending on the functions used (max. 15 conductors plus shielding)
Cable length (supply voltage 24 V)	
Analog and fieldbus operation	$\leq 35 m (0.25 mm^2 / conductor)$ $\leq 50 m (0.34 mm^2 / conductor)$ $\leq 100 m (1.0 mm^2 / conductor)$
RS232C operation	$\leq 30 m$
Gauge identification	42 k Ω resistor between pin 10 and pin 5
Switching functions	
Setpoints	SP1, SP2
Adjustment range	$5 \times 10^{-10} \dots 1500 mbar$
Relay contact rating	$\leq 60 V (dc) / 0.5 A (dc)$, resistive
Admissible temperature	
Storage	-2 ... +70 °C
Operation	0 ... +50 °C
Bakeout	+80 °C (at vacuum connection, without electronics unit, horizontally mounted)
Relative humidity	$\leq 65\% / 85\%$ (no condensation) year's mean / during 60 days
Interface (digital)	Diagnostic port connection, RS232C, Jack connector. 2.5 m, 3-pin
Materials exposed to vacuum	stainless steel, NiFe, nickel plated, Hastelloy, glass, ceramic (Al ₂ O ₃), iridium, yttrium oxide (Y ₂ O ₃), tungsten, copper, SnAg
Internal volume	
DN 25 ISO-KF	$\approx 24 cm^3$
DN 40 CF-R	$\approx 34 cm^3$
Weight	550 ... 760g
Pressure max.	5 bar (absolute)
Mounting orientation	any
Degree of pollution	2
Degree of protection	IP40

Trigon™ BCG552 TripleGauge®

SPECIFICATIONS INTERFACES

RS232C

Data rate	9600 Baud
Data format	binary, 8 data bits, one stop bit, no parity bit, no handshake

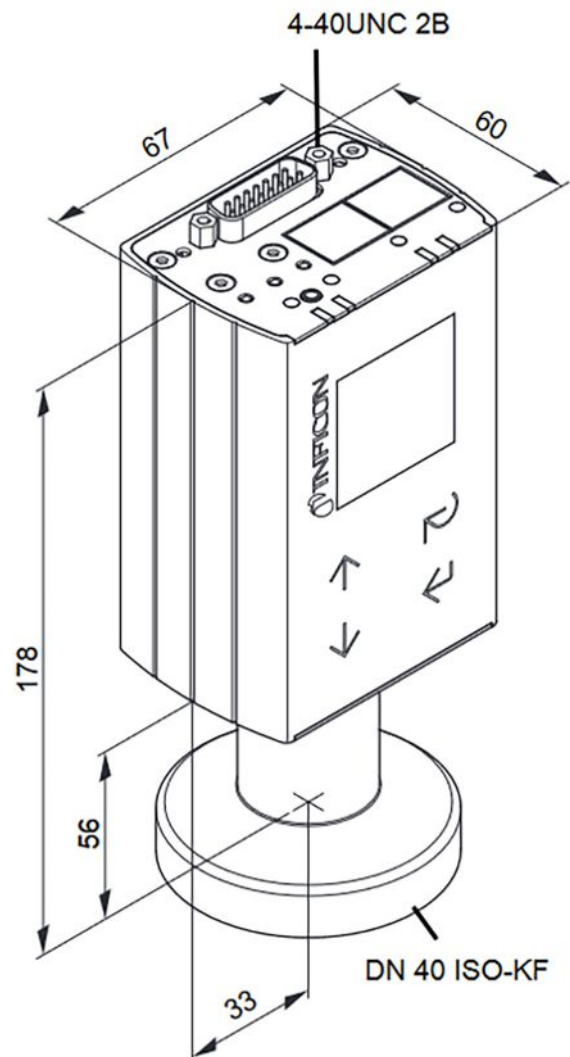
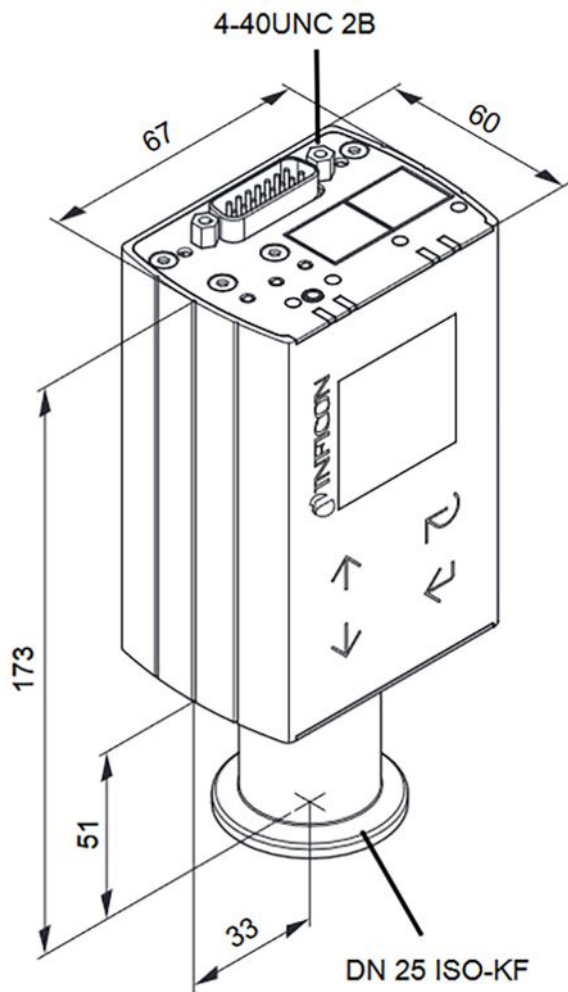
EtherCAT®

Protocol	EtherCAT®
Communication standards	Semiconductor Device Profile ETG.5003 Part 1 Common Device Profile ETG.5003 Part 2080 "Specific Device Profile - Vacuum Pressure Gauge"
Process Data	Fixed PDO mapping and configurable PDO mapping
EtherCAT connector	RJ45, 8-pin (socket), IN and OUT
Cable	Shielded Ethernet CAT5e or higher
Cable length	≤100 m (330 ft.)
Data rate	100000 Kbps

DIMENSIONS

[mm]

Trigon™ BCG552 TripleGauge®



Bayard-Alpert Pirani Capacitance Diaphragm Gauge

TripleGauge® BCG450

The INFICON Bayard-Alpert Pirani Capacitance Diaphragm Gauge, BCG450, combines the advantages of three different measurement technologies in a single, compact, economical package to measure process and base pressure from 5×10^{-10} to 1500 mbar (3.75×10^{-10} to 1125 Torr). The BCG450 is designed to take the place of three sensors (hot ion, convection enhanced Pirani and vacuum switch), thus reducing cost and valuable tool space.

Now available with Profinet digital interface.



ADVANTAGES

- BCG450 saves cost and tool space and reduces the complexity of vacuum measurement installation and setup
- Gas-type-independent pressure measurement above 10 Torr provides more reliable loadlock control for any gas-mixture
- Pirani interlock protects the hot filament from premature burnout
- Automatic high vacuum Pirani adjustment reduces operator interventions
- Differential pressure measurement at atmosphere eliminates uncertainty related to atmospheric pressure changes
- Easy-to-exchange sensing element with on-board calibration data guarantees reproducibility
- Optional graphic display and Fieldbus interfaces available, e.g. EtherCAT®, DeviceNet™, Profinet® etc.
- Latest EtherCAT protocol generation 2.0
- RoHS compliance

APPLICATIONS

- Pressure measurement in Semiconductor process, transfer and loadlock chambers
- Industrial coating
- General vacuum measurement and control on systems in the low to ultra high vacuum range

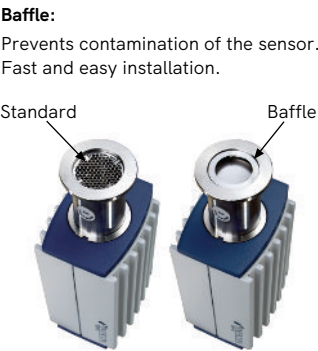
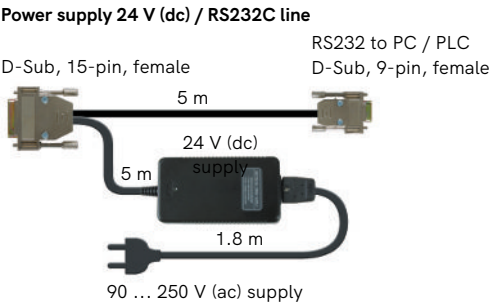
TripleGauge® BCG450

ORDERING INFORMATION

Type	BCG450	BCG450 with LCD	BCG450-SP Profibus DP ¹⁾	BCG450-SD DeviceNet™ ¹⁾	BCG450-SE EtherCAT® ¹⁾ ²⁾	BCG450-PN PROFINET® ¹⁾
DN 25 ISO-KF	353-550	353-552	353-554	353-557	353-598	353-517
DN 40 CF-R	353-551	353-553	353-556	353-558	353-599	353-518
Replacement sensor 25 ISO-KF	354-492	354-492	354-492	354-492	354-492	354-492
Replacement sensor 40 CF-R	354-493	354-493	354-493	354-493	354-493	354-493

¹⁾ not available with LCD
²⁾ Communication standard ETG.5 == 3.2080 S (R) V1.3.0; old version V1.0.0 still available on request

Accessories	Partno.
Power supply 24 V (dc) / RS 232 C line	353-511
Baffle	353-512
Centering ring with baffle DN 25 ISO-KF	211-113



TripleGauge® BCG450

SPECIFICATIONS

	BCG450 Standard	BCG450 Display
Measurement range	5×10^{-10} to 1500 mbar (3.75×10^{-10} to 1125 Torr)	
Accuracy		
10^{-8} ... 50 mbar		±15% of reading
50 ... 950 mbar		±5% of reading
950 ... 1050 mbar		±2.5% of reading
Repeatability 10^{-8} ... 10^{-2} mbar		5% of reading
Hot ion emission on		2×10^{-2} mbar (high)
(selectable high / low, via RS232 / Fieldbus)		8×10^{-3} mbar (low)
Degas ¹⁾ p < 7.2×10^{-6} mbar	Electron bombardment, max. 3 min	
Pressure, max. (absolute)	5 bar	
Temperature		
Operation (ambient)		0 ... +50°C
Storage		-20 ... +70°C
Bakeout		
At flange		80°C
Electronics removed		150°C
Supply voltage	20 ... 28 V / 0.8 A (dc)	
Output signal analog	0 ... 10.3 V	
Measurement range	0.774 ... 10.3 V	
Relation voltage / pressure	0.75 V / Decade	
Error signal	0.3 / 0.5 V	
Minimum load	10 kΩ	
Interface (digital) ²⁾	RS232C	
Connector	D-sub, 15-pin, male	
Cable length, max. ³⁾	100 m (330 ft)	
Materials exposed to vacuum	Yt ₂ O ₃ , Ir, Mo, Cu, W, NiFe, NiCr, Al ₂ O ₃ , SnAg, stainless steel, glass	
Internal volume KF / CF	24 cm ³ (1.46 in. ³) / 34 cm ³ (2.1 in. ³)	
Weight KF / CF	285 g / 550 g	
Degree of protection	IP30	

¹⁾ Reduced accuracy during degas

²⁾ Simultaneous use of RS232C or VGC40x and VGC50x series controllers and Fieldbus is not allowed

³⁾ For RS232C operation <30 m

TripleGauge® BCG450

SPECIFICATIONS INTERFACES

DeviceNet™

Protocol	DeviceNet™, group 2 slave only
Data rate switch	125, 250, 500 kBaud or network programmable
Cable length	
125 kbps	500 m (1650 ft.)
250 kbps	250 m (825 ft.)
500 kbps	100 m (330 ft.)
MAC ID	Two switches (address 00 - 63) or network programmable
Digital functions	Read pressure, select units: Torr, mbar, Pa Degas function, Pirani full scale adjust Monitor gauge status Safe state allows definition of behavior in case of error Detailed alarm and warning information
Analog functions	0 ... 10 V analog output pressure indication two setpoint relays A + B
Visual communication indicators	LED network status (green / red) LED module status (green / red)
Specification	DeviceNet™ "Vacuum Gauge Device Profile"
Device type	"CG" for combination gauge
I / O slave messaging	Polling only
Setpoint relays	2
Range	1×10^{-9} ... 100 mbar
Relay contact	NO, potential free
Hysteresis	10 % of reading
Contact rating	60 V / 0.5 A (dc)
Supply voltage for DeviceNet™	+11 - +25 V / 0.5 A (dc)
Supply voltage for gauge	+20 - +28 V / 0.8 A (dc)
Connector for DeviceNet™	Microstyle, 5-pin
Connector for Gauges (analog output, supply voltage, setpoints)	D-Sub, 15-pin, male

EtherCAT®

Protocol	EtherCAT®
Communication standards	Semiconductor Device Profile ETG.5003 Part 1 Common Device Profile ETG.5003 Part 2080 "Specific Device Profile - Vacuum Pressure Gauge"
Process Data	Fixed PDO mapping and configurable PDO mapping
EtherCAT connector	RJ45, 8-pin (socket), IN and OUT
Cable	Shielded Ethernet CAT5e or higher
Cable length	≤100 m (330 ft.)
Data rate	100000 Kbps

PROFIBUS DP

Baud rates	9.6 / 19.2 / 93.75 / 187.5 / 500 kBaud 1.5 / 12 MBaud
Address	Two switches (address 00 - 127) or network programmable

TripleGauge® BCG450

PROFIBUS DP

Digital functions	Read pressure, select units: Torr, mbar, Pa Degas function, Pirani full scale adjust Monitor gauge status, filament status Safe state allows definition of behavior in case of error Detailed alarm and warning information
Analog functions	0 ... 10 V analog output pressure indication two setpoint relays A + B
Setpoint relays	2
Range	1×10^{-9} ... 100 mbar
Relay contact	NO, potential free
Hysteresis	10 % of reading
Contact rating	≤ 30 V / ≤ 0.5 A (dc)
Connector for Profibus DP	D-Sub, 9-pin, female
Connector for BPG (analog output, supply voltage, setpoints)	D-Sub, 15-pin, male

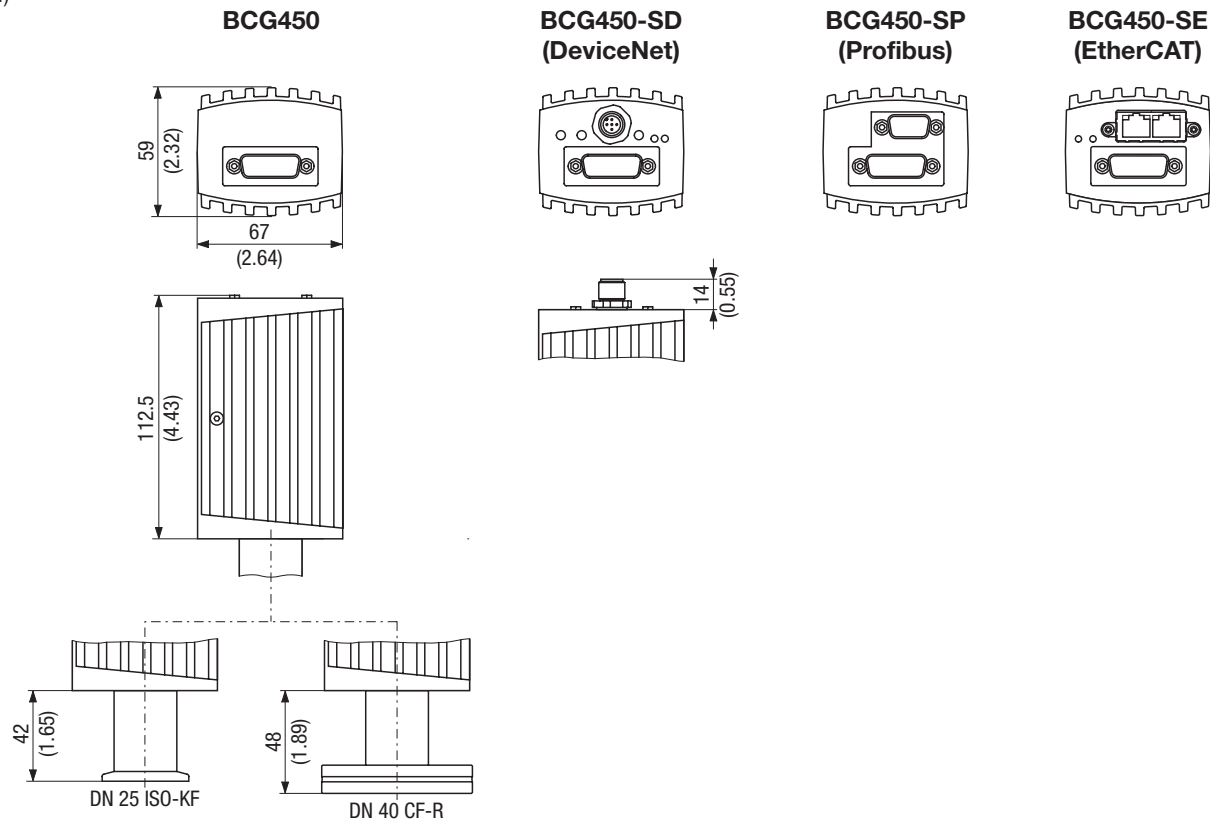
PROFINET™

Communication protocol	protocol specialized for PROFINET
Physical Layer	100BASE-Tx (IEEE 802.3)
Digital functions	
read	pressure, status, ID
set	set points, filter, zero adjust, reset, DC offset
PROFINET connector	2 × RJ45, 8-pin (socket), IN and OUT
Cable	Special Ethernet Patch Cable or Crossover Cable, shielded (CAT5e quality or higher)
Cable length	≤ 100 m (330 ft.)
Data rate	100000 Kbps

TripleGauge® BCG450

DIMENSIONS

mm (in.)



High Pressure Hot Ionization Pirani Gauge

HPG400

The INFICON High Pressure Hot Ionization Pirani Gauge, HPG400, combines High Pressure Hot Ionization and Pirani sensors in a single, compact, economical package to measure pressure from 2×10^{-6} mbar to atmosphere (1.5×10^{-6} Torr to atmosphere). The HPG400 provides highly repeatable and reproducible pressure measurement for accurate sputter process pressure control.



ADVANTAGES

- HPG400 saves cost and tool space and reduces the complexity of vacuum system installation and setup
- The high pressure hot ion gauge delivers accurate, reliable pressure measurements from 1×10^{-5} ... 1 mbar for improved process control
- User selectable hot ion emission activation between 5×10^{-2} and 1 mbar
- Pirani interlock protects the hot filament from premature burnout
- Optional graphic display and Fieldbus interfaces available
- Automatic high vacuum Pirani adjustment reduces operator interventions
- RoHS compliance

APPLICATIONS

- Sputter applications in semiconductor manufacturing, electronics and media industry
- Industrial coating
- General vacuum measurement and control in the low to high vacuum range

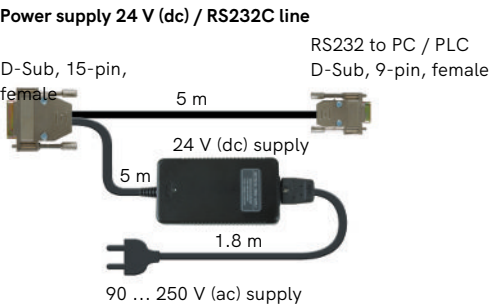
HPG400

ORDERING INFORMATION

Type	HPG400 w/o LCD	HPG400 with LCD	HPG400-SP with Profibus DP ¹⁾	HPG400-SD with DeviceNet™ ¹⁾
DN 25 ISO-KF	353-520	353-521	353-525	353-527
DN 40 CF-F	353-522	353-523	353-526	353-528
Replacement sensor 25 ISO-KF	354-487	354-487	354-487	354-487
Replacement sensor 40 CF-R	354-488	354-488	354-488	354-488

¹⁾ not available with LCD

Accessories	Part no.
Power supply 24 V (dc) / RS232C line	353-511
Centering ring with baffle DN 25 ISO-KF	211-113



HPG400

SPECIFICATIONS

	HPG400 Standard	HPG400 Display
Measurement range (air, N ₂)	2 × 10 ⁻⁶ ... 1000 mbar (1.5 × 10 ⁻⁶ ... 750 Torr)	
Accuracy 10 ⁻⁵ ... 1 mbar	±15% of reading ¹⁾	
Repeatability		
10 ⁻⁵ ... 10 ⁻¹	2% of reading	
10 ⁻¹ ... 100 mbar	30% of reading	
Hot ion emission on, selectable		
Option 1	1 mbar	
Option 2	5 × 10 ⁻¹ mbar	
Option 3	2 × 10 ⁻¹ mbar	
Option 4	1 × 10 ⁻¹ mbar	
Option 5	5 × 10 ⁻² mbar	
Pressure, max. (absolute)	2 bar	
Temperature		
Operation (ambient)	0 ... +50°C	
Storage	-20 ... +70°C	
Bakeout		
At flange	80°C	
Electronics removed	150°C	
Supply voltage	20 ... 28 V / 0.8 A (dc)	
Output signal analog	0 ... +10.2 V	
Measurement range		
Hot cathode	1.5 ... 7.5 V	
Pirani	8.5 ... 9.75 V	
Voltage vs. pressure		
Hot cathode	1 V / Decade	
Pirani	0.25 V / Decade	
Error signal		
Hot cathode	0.3 V	
Pirani	0.5 V	
Load impedance , min.	10 kΩ	
Interface (digital) ²⁾	RS232C	
Electrical connection	D-Sub, 15-pin, male	
Cable length, max. ³⁾	100 m (330 ft)	
Materials exposed to vacuum	Yt ₂ O ₃ , Ir, Pt, Mo, Cu, W, NiFe, NiCr, stainless steel, glass	
Internal volume KF / CF	20 cm ³ (1.2 in. ³) / 30 cm ³ (1.8 in. ³)	
Weight KF / CF	430 g / 695 g	
Degree of protection	IP30	

¹⁾ Accuracy from 10⁻⁵ mbar to the selected hot ion emission on value

²⁾ Simultaneous use of RS232C or VGC40x and VGC50x series controllers and Fieldbus is not allowed

³⁾ For RS232C operation <30 m

HPG400

SPECIFICATIONS INTERFACES

DeviceNet™

Protocol	DeviceNet™, group 2 slave only
Data rate switch	125, 250, 500 kBaud or network programmable
Cable length	
125 kbps	500 m (1650 ft.)
250 kbps	250 m (825 ft.)
500 kbps	100 m (330 ft.)
MAC ID	Two switches (address 00 – 63) or network programmable
Digital functions	Read pressure, select units: Torr, mbar, Pa Degas function, Pirani full scale adjust Monitor gauge status Safe state allows definition of behavior in case of error Detailed alarm and warning information
Analog functions	0 ... 10 V analog output pressure indication two setpoint relays A + B
Visual communication indicators	LED network status (green / red) LED module status (green / red)
Specification	DeviceNet™ "Vacuum Gauge Device Profile"
Device type	"CG" for combination gauge
I / O slave messaging	Polling only
Setpoint relays	2
Range	1×10^{-9} ... 100 mbar
Relay contact	NO, potential free
Hysteresis	10 % of reading
Contact rating	60 V / 0.5 A (dc)
Supply voltage for DeviceNet™	+11 - +25 V / 0.5 A (dc)
Supply voltage for gauge	+20 - +28 V / 0.8 A (dc)
Connector for DeviceNet™	Microstyle, 5-pin
Connector for Gauges (analog output, supply voltage, setpoints)	D-Sub, 15-pin, male

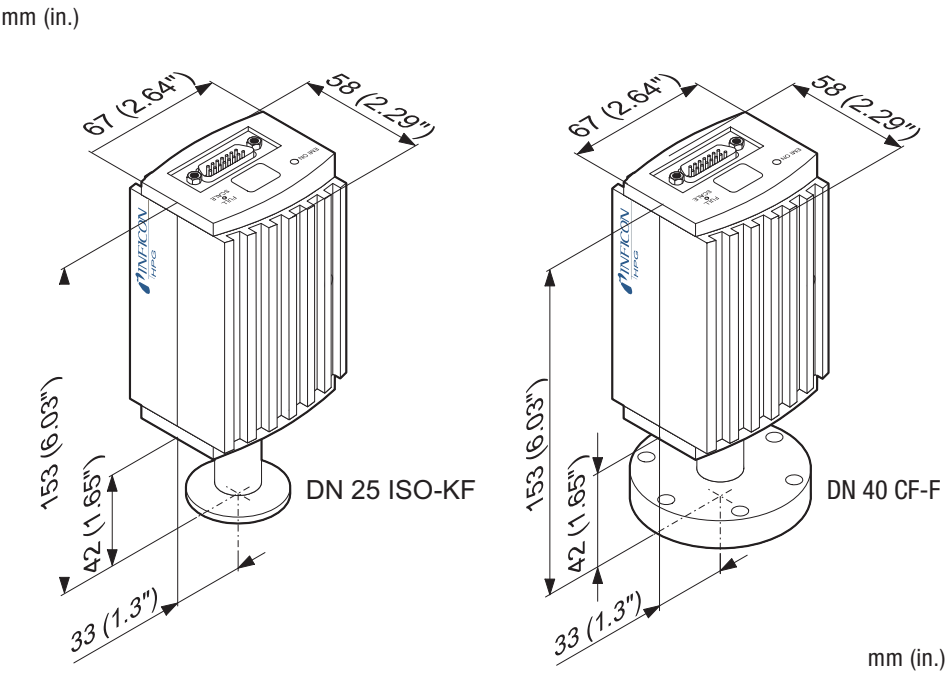
PROFIBUS DP

Baud rates	9.6 / 19.2 / 93.75 / 187.5 / 500 kBaud 1.5 / 12 MBaud
Address	Two switches (address 00 – 127) or network programmable
Digital functions	Read pressure, select units: Torr, mbar, Pa Degas function, Pirani full scale adjust Monitor gauge status, filament status Safe state allows definition of behavior in case of error Detailed alarm and warning information
Analog functions	0 ... 10 V analog output pressure indication two setpoint relays A + B
Setpoint relays	2
Range	1×10^{-9} ... 100 mbar
Relay contact	NO, potential free
Hysteresis	10 % of reading
Contact rating	≤ 30 V / ≤ 0.5 A (dc)

HPG400

PROFIBUS DP	
Connector for Profibus DP	D-Sub, 9-pin, female
Connector for BPG (analog output, supply voltage, setpoints)	D-Sub, 15-pin, male

DIMENSIONS



Pirani / Bayard-Alpert Hot Cathode Gauge

PBR 260

The INFICON PBR 260 is a combination gauge that operates as two gauges in one single and compact unit. The leading measuring principle is a hot cathode gauge according to the Bayard-Alpert principle, which will be completed and supported by a Pirani thermal conductivity measuring principle. The PBR 260 Pirani/Bayard-Alpert hot cathode combi gauge measures from UHV range (5×10^{-10} mbar) to ATM range (1000 mbar). One of PBR 260 key benefits is its drop in compatibility with other manufacturers PBR 260 gauge types, thanks to equal analog output signal and electrical interface used. This offers simple installation /exchange, setup and process integration. The PBR 260 Pirani/Bayard-Alpert hot cathode combi gauge provides the most economical solution for obtaining affordable and reliable base pressure measurements on the market.



ADVANTAGES

- PBR 260 Pirani/Bayard-Alpert hot cathode combination gauge for general vacuum measurement and control in the ATM to UHV range with just one compact device
- Flange: DN 25 ISO-KF, DN 40 CF-R, DN 40 ISO-KF
- Maximum pressure applies to inert gases and temperatures of less than 55°C
- Highly accurate, excellent repeatability in the process range $10^{-8} \dots 10^{-2}$ mbar
- Bayard-Alpert sensor ON/OFF automatically controlled by Pirani sensor
- Long-life yttrium oxide coated iridium filament
- RoHS compliance
- Easy to exchange/ replace sensor head

Drop in compatible to other manufacturers PBR 260 Pirani/Bayard-Alpert hot cathode gauges

- Partnumber IGG27000 matches PT R27 000
- Partnumber IGG27001 matches PT R27 001
- Partnumber IGG27002 matches PT R27 002

APPLICATIONS

- General pressure measurement in Semiconductor and Analytical process environment
- Optical and other industrial coating processes

PBR 260

ORDERING INFORMATION

Type	PBR 260
DN 25 ISO-KF	IGG27000
DN 40 ISO-KF	IGG27001
DN 40 CF-F	IGG27002
Replacement sensor head 25 ISO-KF	IN846517-T
Replacement sensor head 40 ISO-KF	IN846518-T
Replacement sensor head 40 CF-R	IN846519-T

PBR 260

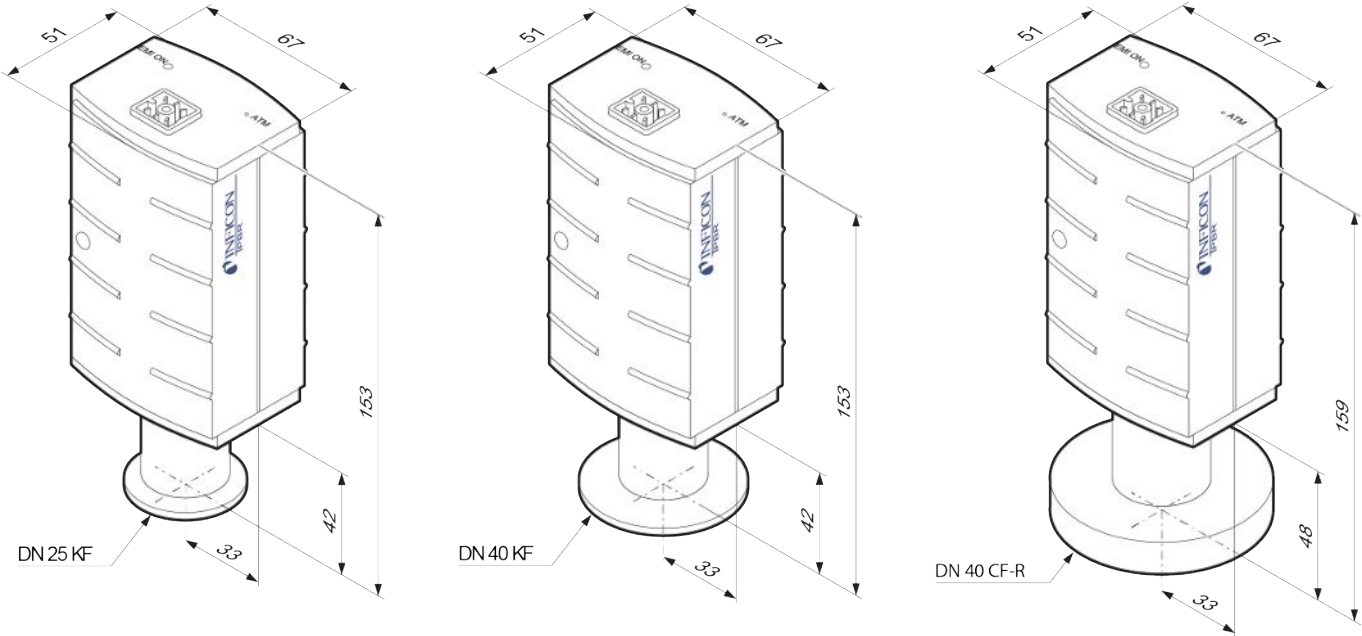
SPECIFICATIONS

PBR 260	
Measurement range	$5 \times 10^{-10} \dots 1000$ mbar
Bakeout temperature	150 °C
Accuracy $10^{-8} \dots 10^{-2}$ mbar	15 % of reading
Repeatability	5 % of reading
Supply Voltage	20 ... 28 V (dc)
Supply Power consumption max.	16 W
Output signal	
Pressure range	0.774 ... 10 V
Sensor error below	0.5 V
Minimum load	10 k Ω
Temperature	
Operating	0 ... +50 °C
Storage	-20 ... +70 °C
Filament	tungsten
Cathode	iridium yttriated
Materials exposed to vacuum	Cu, Glass, NiFe, Mo, St. steel, NiCr
Pressure max.	2 bar
Cable length, max.	100 m
Flange	stainless steel
Internal volume	
DN 25 ISO-KF	24 cm ³
DN 40 ISO-KF	24 cm ³
DN 40 CF-R	25 cm ³
Weight	
DN 25 ISO-KF	285 g
DN 40 ISO-KF	315 g
DN 40 CF-R	550 g

PBR 260

DIMENSIONS

[mm]



Inverted Magnetron/Inverted Magnetron Pirani Gauge

Gemini® MPG5xx / MAG5xx

The INFICON Gemini® Inverted Magnetron Vacuum Gauge is the workhorse for all vacuum measurement applications. While Gemini MPG5xx combines two sensor technologies in one small device to measure from atmosphere down to 1×10^{-9} mbar, the Gemini MAG5xx is a pure cold cathode sensor system (without Pirani element) which covers the range from 1×10^{-2} mbar to 1×10^{-9} mbar. The patented ultra-low magnetic stray field design opens up a whole new range of applications. A unique interchangeable dual chamber sensor unit avoids cleaning cycles and reduces maintenance, making Gemini the most robust and economical vacuum gauge of its kind.

MAG and MPG Gemini are available with EtherCAT and PROFINET fieldbus.

For corrosive applications we suggest to use the ceramic coated version MxG5x4. Feedthrough and Pirani inside the sensor head are fully ceramic coated for enhanced corrosion resistance.



ADVANTAGES

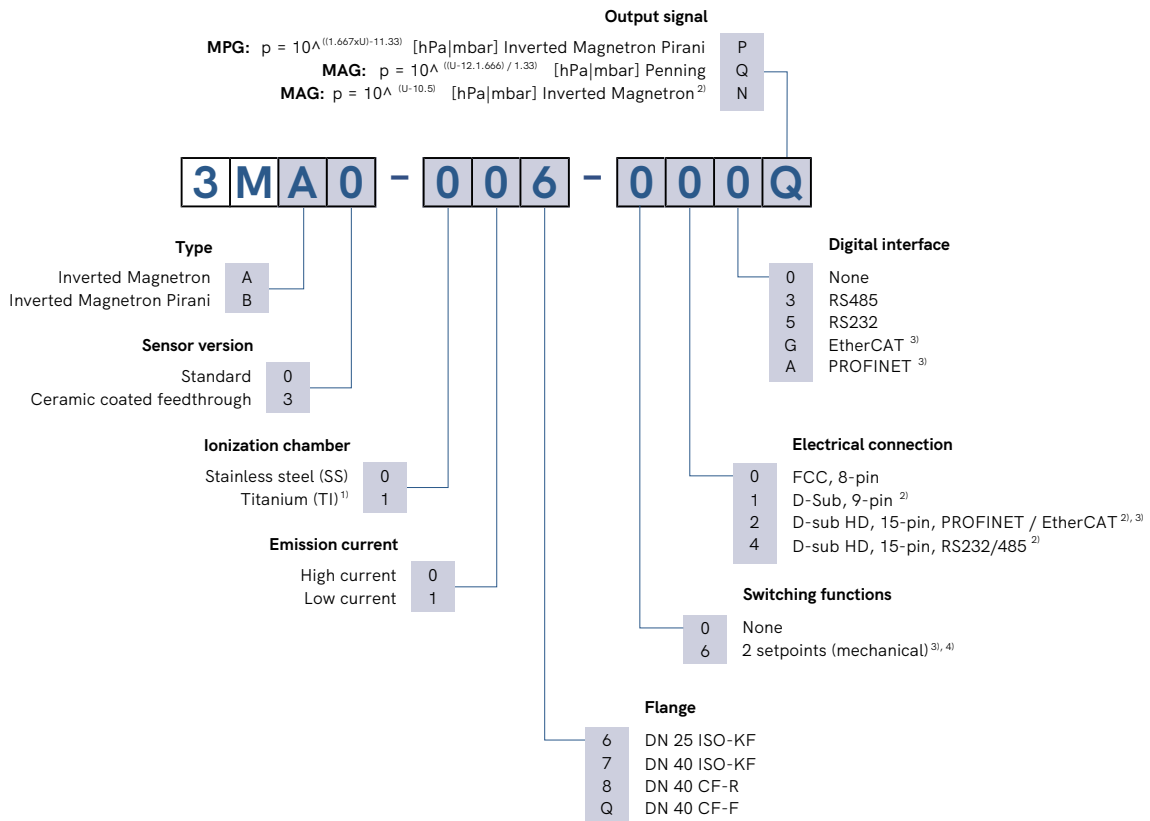
- Long lifetime in harsh environments
- Reliable fast ignition
- Low magnetic stray field
- Selectable measuring current
- Fast maintenance - replaceable ionization chamber
- Corrosion resistant feedthrough & sensor element
- PROFINET, EtherCAT and RS232/ RS485 digital interface
- Compact size - easy to integrate
- 2 relay setpoints (MxG55x)

APPLICATIONS

- Base pressure monitoring and control, from atmosphere to high vacuum in evaporation and sputter coating applications.
- General vacuum measurement - industrial furnaces, architectural glass, semiconductor, production laboratory's..
- Analytical and R&D applications - mass spectrometry, electron microscopes, ophthalmic, optical, medical and high energy physics.

Gemini® MPG5xx / MAG5xx

ORDERING INFORMATION



- 1) For low current version only
- 2) Not suited for operation with an INFICON vacuum gauge controller VGC40x or VGC50x
- 3) MxG55x in large housing and with switching functions
- 4) Set points only available with PROFINET & EtherCAT digital interface (mandatory) and not with any other digital interface or electrical connection

Gemini® MPG5xx / MAG5xx

Spare parts	MAG5xx	MPG5xx
MAG500 spare sensor		
25 KF, SS	351-500	-
25 KF, Ti	351-502	-
40 KF, SS	351-512	-
40 KF, Ti	351-514	-
40 CF-F, SS	351-524	-
40 CF-F, Ti	351-526	-
40 CF-R, SS	351-536	-
40 CF-R, Ti	351-538	-
MAG504 spare sensor		
25 KF, SS	351-501	-
25 KF, Ti	351-503	-
40 KF, SS	351-513	-
40 KF, Ti	351-515	-
40 CF-F, SS	351-525	-
40 CF-F, Ti	351-527	-
40 CF-R, SS	351-537	-
40 CF-R, Ti	351-539	-
MPG500 spare sensor		
25 KF, SS	-	351-506
25 KF, Ti	-	351-508
40 KF, SS	-	351-518
40 KF, Ti	-	351-520
40 CF-F, SS	-	351-530
40 CF-F, Ti	-	351-532
40 CF-R, SS	-	351-542
40 CF-R, Ti	-	351-544
MPG504 spare sensor		
25 KF, SS	-	351-507
25 KF, Ti	-	351-509
40 KF, SS	-	351-519
40 KF, Ti	-	351-521
40 CF-F, SS	-	351-531
40 CF-F, Ti	-	351-533
40 CF-R, SS	-	351-543
40 CF-R, Ti	-	351-545
MxG50x spare parts ignition aid (10 pieces)	351-995	351-995
Spare ion chamber SS	351-555	351-555
Spare ion chamber Ti	351-556	351-556

Accessories	MAG5xx	MPG5xx
Baffle for DN 25 KF flange	353-512	353-512
Centering ring with baffle DN 25 KF	211-113	211-113
Centering ring with fine filter DN 25 KF	211-098	211-098
MxG50x ignition tool set	351-550	351-550

Gemini[®] MPG5xx / MAG5xx

SPECIFICATIONS

Type	MAG5xx	MPG5xx
Measurement system	Cold Cathode ionization measurement sensor (according to the inverted magnetron principle)	Pirani and Cold Cathode ionization measurement sensor (according to the inverted magnetron principle)
Measurement range (air, N ₂)		
mbar	$1 \times 10^{-9} \dots 1 \times 10^{-2}$	$1 \times 10^{-9} \dots 1000$
Torr	$7.6 \times 10^{-10} \dots 7.6 \times 10^{-3}$	$7.6 \times 10^{-10} \dots 760$
Accuracy (N ₂)		
$1 \times 10^{-8} \dots 1 \times 10^{-2}$ mbar	30% of reading	30% of reading
$1 \times 10^{-2} \dots 100$ mbar	-	30% of reading
100 ... 1000 mbar	-	50% of reading
Repeatability (N ₂)		
$1 \times 10^{-8} \dots 1 \times 10^{-2}$ mbar	5% of reading	5% of reading
$1 \times 10^{-2} \dots 100$ mbar	-	5% of reading
Mounting orientation	any	
Admissible pressure (absolute)	10 bar (limited to inert gases <55°C)	
Admissible temperature		
Operation (ambient)	+5 ... +55°C	
Bakeout at flange ¹⁾	+150°C	
Storage	-40 ... +70°C	
Filament	120°C (MPG5xx only)	
Relative humidity for 30 days a year		
$1 \times 10^{-7} \dots 1 \times 10^{-2}$ mbar	$\leq 95\%$ RH (non-condensing)	
$1 \times 10^{-8} \dots 1 \times 10^{-2}$ mbar	$\leq 70\%$ RH (non-condensing)	
Supply voltage		
At gauge ²⁾	+14.5 ... +30 V (dc)	
Ripple	$\leq 1 V_{pp}$	
Power consumption	$\leq 3 W$	
Fuse to be connected	$\leq 1 AT$	
Voltage range (analog output)	0 ... +10.5 V	
Output impedance	$2 \times 4.7 \Omega$ (short circuit-proof)	
Load impedance	$\geq 10 k\Omega$ (short circuit-proof)	
Measurement range		
3MAx-xxx-xxxN	+1.5 ... +8.5 V	
3MBx-xxx-xxxP	+1.398 ... +8.598 V	
3MAx-xxx-xxxQ	+0.667 ... +10 V	
Voltage vs. pressure		
3MAx-xxx-xxxN	1 V/decade (logarithmic)	
3MBx-xxx-xxxP	0.6 V/decade (logarithmic)	
3MAx-xxx-xxxQ	1.33 V/decade (logarithmic)	
Step response time (pressure dependent)		
$> 1 \times 10^{-6}$ mbar	$< 100 ms$	
$1 \times 10^{-6} \dots 1 \times 10^{-8}$ mbar	$\approx 1 s$	
Gauge identification	100 k Ω	85 k Ω

¹⁾ Without electronics

²⁾ The minimum voltage of the supply unit must be increased proportionally to the length of the sensor cable

Gemini® MPG5xx / MAG5xx

Type	MAG5xx	MPG5xx
Status signal (digital output)		
FCC connector		
Current rating		100 mA
High voltage is ON	+14.5 ... +30 V (dc) (depending on supply voltage)	
High voltage is OFF		0 V (dc)
D-sub connector		
Current rating		100 mA (sink)
High voltage is ON		0 V (dc)
High voltage is OFF		open
Supply voltage		≤30 V (dc)
Cable length		
50 m cable	≤50 m (8x0.14 mm ²)	
75 m cable	≤75 m (8x0.25 mm ²)	
100 m cable	≤100 m (8x0.34 mm ²)	
300 m cable	≤300 m (8x1.00 mm ²)	
FCC connector cable	≤50 m (0.14 mm ² /conductor)	
High voltage (in the measuring chamber)		
Ignition voltage		≤4.5 kV
Operating voltage		≤3.3 kV
Current (in the measuring chamber)		
High current		
Low current		≤380 µA
		≤130 µA
Setpoint relays (MxG55x)		
Range (N2)	5 × 10 ⁻⁵ ... 1500 mbar	
Relay contact	normally open (ON), potential free	
Hysteresis	10% of threshold	
Contact rating of mechanical relays	≤30 V / ≤1 A	
Switching time	≤30 ms	
Materials exposed to vacuum	W, Ni alloy, Mo, Al ₂ O ₃ , glass, Ti, stainless steels	
Internal volume		
DN 25 ISO-KF	≈19.9 cm ³	
DN 40 ISO-KF	≈20.9 cm ³	
DN 40 CF-F	≈25.2 cm ³	
DN 40 CF-R	≈25.6 cm ³	
Weight		
MxG50x		
DN 25 ISO-K	<280 g	
DN 40 ISO-KF	<320 g	
DN 40 CF-F & CF-R	<570 g	
MxG55x		
DN 25 ISO-K	≤500 g	
DN 40 ISO-KF	≤530 g	
DN 40 CF-F & CF-R	≤780 g	
Degree of protection	IP40	

¹⁾ Without electronics

²⁾ The minimum voltage of the supply unit must be increased proportionally to the length of the sensor cable

Gemini[®] MPG5xx / MAG5xx

Type	MAG5xx	MPG5xx
Standards CE conformity		
EMC	2014/30/EU (EN 61000-6-2, EN61000-6-3 EN61326-1)	
RoHS		2011/65/EU
Safety		EN 61010-1
Baud rates (RS232C/485C)	9.6 / 19.2 / 38.4 / 57.6 kBaud	
Address (RS232C/485C)	2 switches (address 00 - 255)	
Digital functions	Read pressure, select units: Torr, mbar, Pa, micron, counts monitor gauge status, detailed alarm and warning information, soft state allows definition of behaviour in case of error	
Connector for RS232 & RS485	D-sub HD, 15-pin, male	

¹⁾ Without electronics

²⁾ The minimum voltage of the supply unit must be increased proportionally to the length of the sensor cable

Gemini[®] MPG5xx / MAG5xx

SPECIFICATIONS INTERFACES

EtherCAT[®]

Protocol	EtherCAT [®]
Communication standards	Semiconductor Device Profile ETG.5003 Part 1 Common Device Profile ETG.5003 Part 2080 "Specific Device Profile - Vacuum Pressure Gauge"
Process Data	Fixed PDO mapping and configurable PDO mapping
EtherCAT connector	RJ45, 8-pin (socket), IN and OUT
Cable	Shielded Ethernet CAT5e or higher
Cable length	≤100 m (330 ft.)
Data rate	100000 Kbps

PROFINET[™]

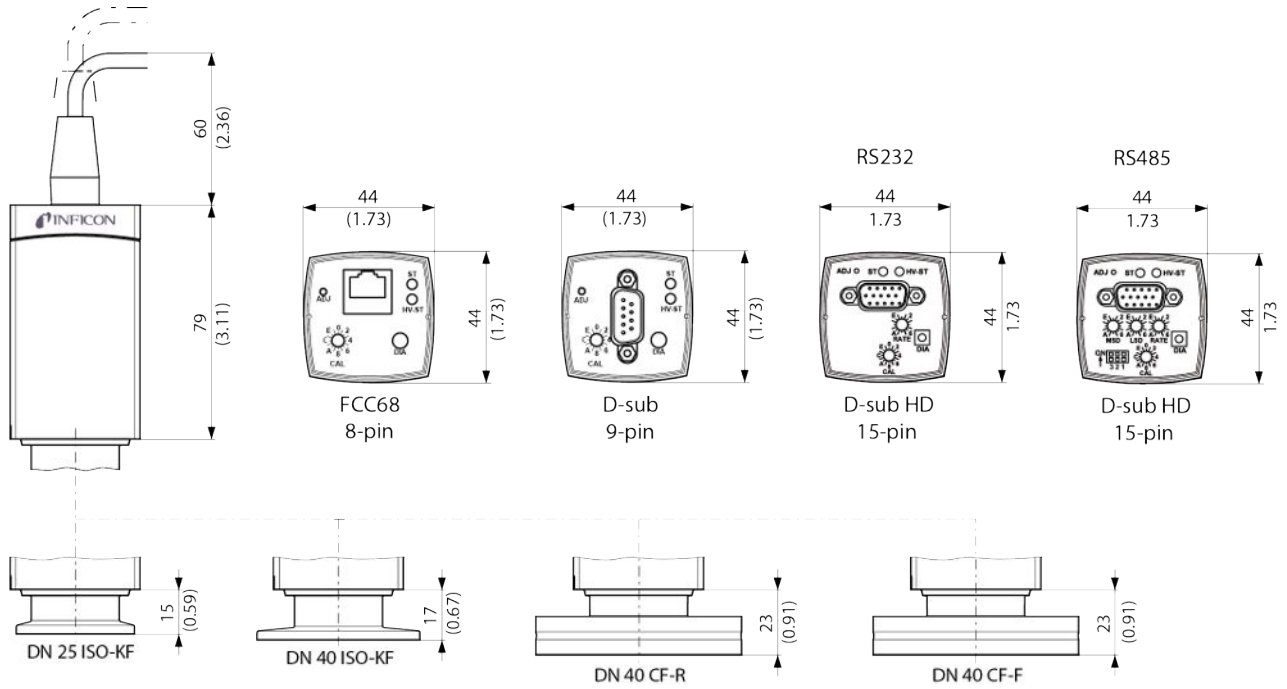
Communication protocol	protocol specialized for PROFINET
Physical Layer	100BASE-Tx (IEEE 802.3)
Digital functions	
read	pressure, status, ID
set	set points, filter, zero adjust, reset, DC offset
PROFINET connector	2 × RJ45, 8-pin (socket), IN and OUT
Cable	Special Ethernet Patch Cable or Crossover Cable, shielded (CAT5e quality or higher)
Cable length	≤100 m (330 ft.)
Data rate	100000 Kbps

Gemini® MPG5xx / MAG5xx

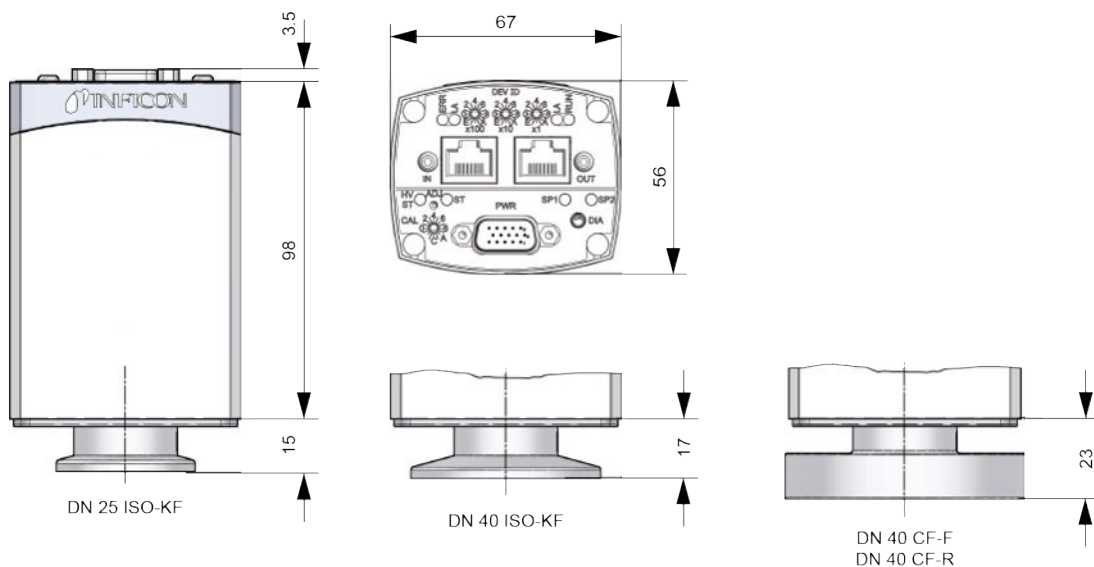
DIMENSIONS

[mm (inch)]

MxG50x



MxG55x



Inverted Magnetron/Inverted Magnetron Pirani Gauge

MPG400/401

The INFICON Inverted Magnetron Pirani Gauges, MPG400 and MPG401, measure from 5×10^{-9} mbar to atmosphere (3.8×10^{-9} Torr to atmosphere). Combining technologies into one single compact unit with one logarithmic analog output signal significantly reduces the complexity of installation, setup and integration.



ADVANTAGES

- Combination gauge - inverted Magnetron and Pirani
- Wide measurement range from 5×10^{-9} mbar to atmosphere
- No filament to burn out
- Excellent ignition properties
- Easy to clean
- FPM or metal-sealed feedthrough
- LED indicator for high voltage on
- Logarithmic analog output signal

APPLICATIONS

- High vacuum pressure monitoring
- Base pressure for evaporation and sputtering systems
- General vacuum measurement and control in the medium and high vacuum range

MPG400/401

ORDERING INFORMATION

Type	MPG400 FPM sealed	MPG401 Metal-sealed
DN 25 ISO-KF	351-010	351-020
DN 40 ISO-KF	351-011	351-021
DN 40 CF-F	351-012	351-022

Spare parts	MPG400 FPM sealed	MPG401 Metal-sealed
Maintenance kit includes: support/centering ring seals ignition aid	351-999	351-997
Repair kit includes: Pirani element anode anode extension ¹⁾ Cu seal ¹⁾ screw fitting ¹⁾ support/centering ring seals ignition aid	351-998	351-996
Ignition aid kit includes: ignition aid	351-995	351-995
Mounting tool for ignition aid	351-994	351-994

¹⁾ MPG401 only

Accessories	MPG400 FPM sealed	MPG401 Metal-sealed
Magnetic shield	351-023	351-023

MPG400/401

SPECIFICATIONS

	MPG400 FPM sealed	MPG401 Metal-sealed
Measurement range (air, N ₂)	5 × 10 ⁻⁹ ... 1000 mbar (3.8 × 10 ⁻⁹ ... 760 Torr)	
Accuracy (N ₂) 1 × 10 ⁻⁸ ... 100 mbar	≈ ±30% of reading	
Repeatability 1 × 10 ⁻⁸ ... 100 mbar	≈ ±5% of reading	
Mounting orientation	any	
Admissible pressure (absolute)	≤ 10 bar (limited to inert gases)	
Admissible temperature		
Operation (ambient)	+5 ... +55 °C	
Storage	-40 ... +65 °C	
Bake-out ¹⁾	+150 °C	
Filament (Pirani)	+120 °C	
Supply voltage		
At gauge	+15 ... +30 V (dc)	
At supply unit with max. cable length ²⁾	+16 ... +30 V (dc)	
Ripple	≤ 1 V _{pp}	
Power consumption	≤ 2 W	
Fuse to be connected	≤ 1 AT	
Output signal (measurement signal)		
Voltage range	0 ... +10.5 V	
Measurement range	+1.82 ... +8.6 V	
Voltage vs. pressure	Logarithmic, 0.6 V/decade	
Error signal		
No supply	< 0.5 V	
Pirani sensor, filament rupture	> 9.5 V	
Output impedance	2 × 10 Ω	
Minimum loaded impedance	10 kΩ, short-circuit proof	
Response time		
p > 10 ⁻⁶ mbar	< 10 ms	
p = 10 ⁻⁸ mbar	≈ 1000 ms	
Identification gauge	85 kΩ, referenced to supply common	
Status		
Pirani-only mode	0 V (low)	
Combined Pirani / cold cathode mode	15 ... 30 V (high)	
LED	green, high voltage on	
Electrical connection	FCC 68 appliance connector, 8 poles, female	
Sensor cable	8 poles plus shielding	
Cable length	≤ 50 m (8 × 0.14 mm ²)	
Operating voltage	≤ 3.3 kV	
Operating current	≤ 500 μA	
Materials exposed to vacuum	Stainless steel, Al ₂ O ₃ , FPM75, Mo, Ni, Au, W	Stainless steel, Al ₂ O ₃ , Ag, Cu, Sn Mo, Ni, Au, W
Internal volume	≈ 20 cm ³	
Weight		
DN 25 ISO-KF	≈ 700 g	≈ 730 g
DN 40 ISO-KF	≈ 720 g	≈ 750 g
DN 40 CF-F	≈ 980 g	≈ 1010 g

¹⁾ Without electronics and magnetic shielding

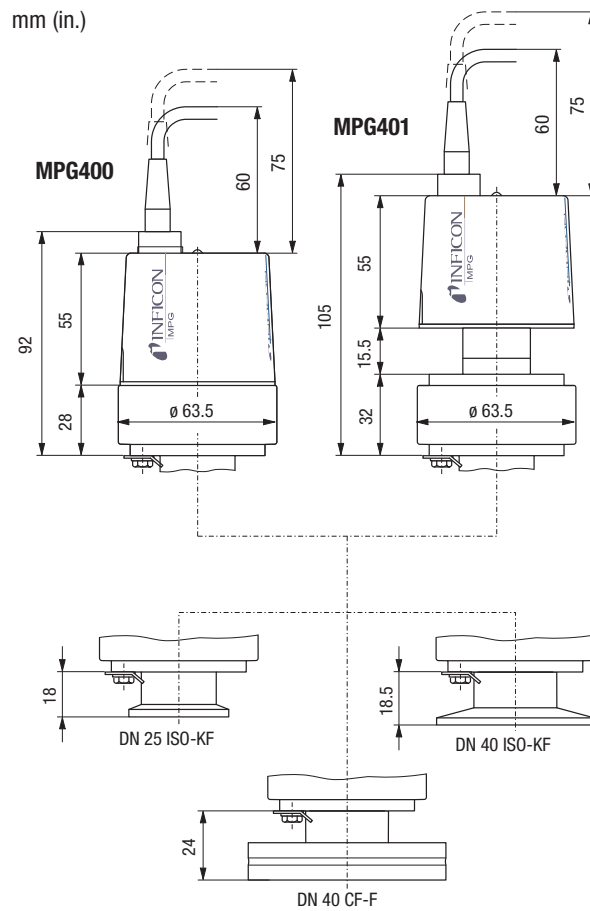
²⁾ The minimum voltage of the supply unit must be increased proportionally to the length of the sensor cable

MPG400/401

	MPG400 FPM sealed	MPG401 Metal-sealed
Protection category	IP 40	
Standards	EN 61000-6-2, EN 61000-6-3, EN 61010-1	

- ¹⁾ Without electronics and magnetic shielding
- ²⁾ The minimum voltage of the supply unit must be increased proportionally to the length of the sensor cable

DIMENSIONS



MAG470

MAG470

The INFICON Inverted Magnetron Gauge, MAG470, measure from 5×10^{-11} mbar to 1×10^{-2} mbar (3.8×10^{-11} Torr to 7.5×10^{-3} Torr).



ADVANTAGES

- No filament to burn out
- Extended version, sensor bakeout up to 250°C
- Excellent ignition properties
- Easy to clean
- Metal-sealed feedthrough
- LED indicator for high voltage on
- Logarithmic analog output signal

APPLICATIONS

- Ultra high vacuum pressure monitoring
- Base pressure for evaporation and sputtering systems
- General vacuum measurement and control in the medium and high vacuum range

MAG470

ORDERING INFORMATION

Type	MAG470	MAG470 extended
DN 40 CF-F	399-360	399-361

Spare parts	MAG470	MAG470 extended
Maintenance kit includes: support/centering ring seals ignition aid	351-997	351-997
Repair kit includes: anode Cu seal screw fitting support/centering ring seals ignition aid	351-990	351-990
Ignition aid kit includes: ignition aid	351-995	351-995
Mounting tool for ignition aid	351-994	351-994

Accessories	MAG470	MAG470 extended
Magnetic shield	351-023	351-023

MAG470

SPECIFICATIONS

	MAG470	MAG470 extended
Measurement range (air, N ₂)	5 × 10 ⁻¹¹ ... 1 × 10 ⁻² mbar (3.8 × 10 ⁻¹¹ ... 7.5 × 10 ⁻³ Torr)	
Accuracy (N ₂) 1 × 10 ⁻⁹ ... 1 × 10 ⁻³ mbar	≈ ±30% of reading	
Repeatability 1 × 10 ⁻⁹ ... 1 × 10 ⁻³ mbar	≈ ±5% of reading	
Mounting orientation	any	
Admissible pressure (absolute)	≤ 10 bar (limited to inert gases)	
Admissible temperature		
Operation (ambient)	+5 ... +55 °C	
Storage	-40 ... +65 °C	
Bake-out	+250 °C ¹⁾ (extended version ²⁾)	
Supply voltage		
At gauge	+15 ... +30 V (dc)	
At supply unit with max. cable length ³⁾	+16 ... +30 V (dc)	
Ripple	≤ 1 V _{pp}	
Power consumption	≤ 2 W	
Fuse to be connected	≤ 1 AT	
Output signal (measurement signal)		
Voltage range	0 ... +10.5 V	
Measurement range	+1.96 ... +8.6 V	
Voltage vs. pressure	Logarithmic, 0.8 V/decade	
Error signal	< 0.5 V (no supply)	
Output impedance	2 × 10 Ω	
Minimum loaded impedance	10 kΩ, short-circuit proof	
Response time		
p > 10 ⁻⁶ mbar	< 10 ms	
p = 10 ⁻⁸ mbar	≈ 1000 ms	
Identification gauge	7.15 kΩ, referenced to supply common	
Electrical connection	FCC 68 appliance connector, 8 poles, female	
Sensor cable	8 poles plus shielding	
Cable length	≤ 50 m (8 × 0.14 mm ²)	
Operating voltage	≤ 3.3 kV	
Operating current	≤ 100 μA	
Materials exposed to vacuum	Stainless steel, Al ₂ O ₃ , Ag,	
Internal volume	≈ 20 cm ³	
Weight		
DN 40 CF-F	≈ 950 g	≈ 1100 g
Protection category	IP 40	
Standards	EN 61000-6-2, EN 61000-6-3, EN 61010-1	

¹⁾ Without electronics and magnetic shielding

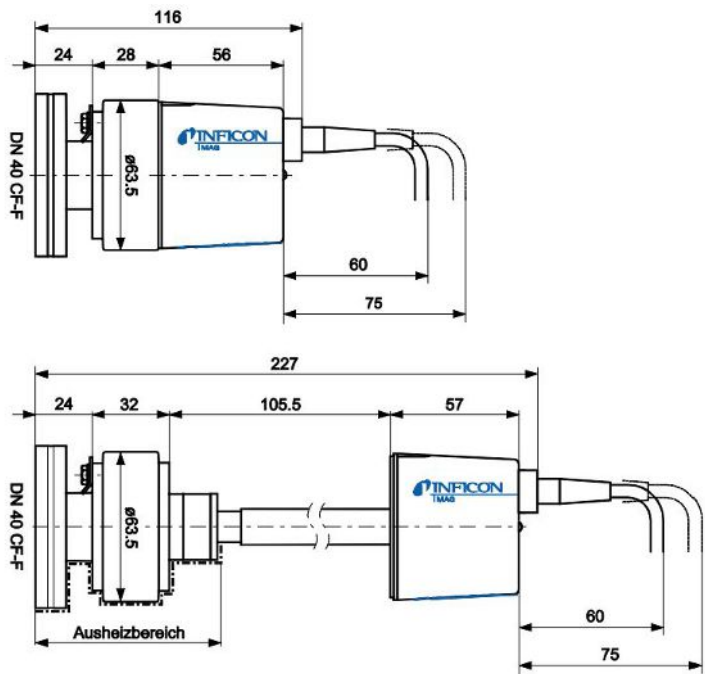
²⁾ 250°C in defined area, see dimensions

³⁾ The minimum voltage of the supply unit must be increased proportionally to the length of the sensor cable

MAG470

DIMENSIONS

[mm]



Optical Plasma Gauge

Augent[®] OPG550

The INFICON Augent™ Optical Plasma Gauge OPG550 is an intelligent solution for vacuum monitoring.

Augent™ OPG550 combines two sensor technologies into one compact device for gas type monitoring from 1×10^{-7} to 5 mbar and to measure total pressure from atmosphere to 1×10^{-7} mbar at the same time. Augent™ OPG550 is protected by an integrated Pirani sensor to switch off plasma above 20 mbar.

In the measurement range between 1×10^{-7} and 5 mbar the gauge allows the detection of gas composition.



ADVANTAGES

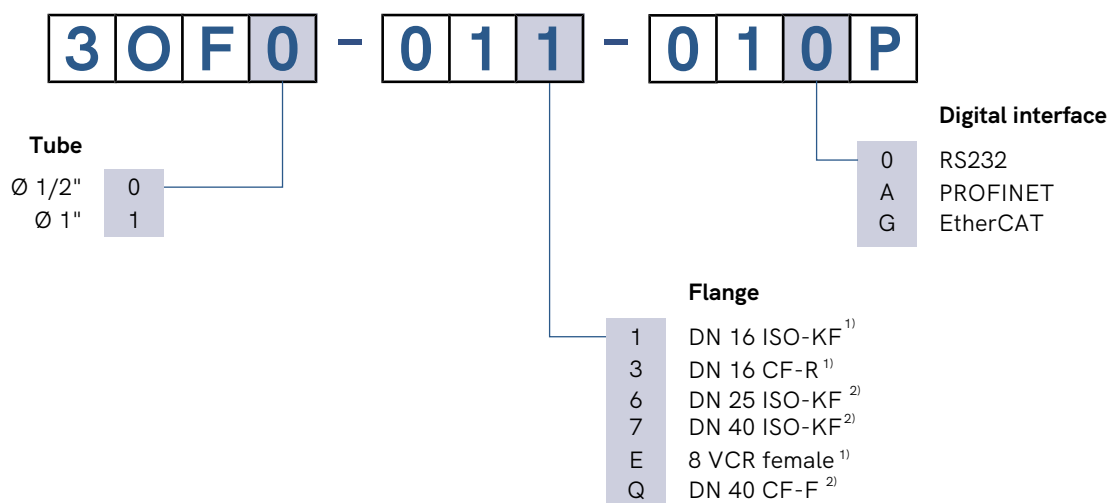
- High speed chamber leak tests
- Increase of productivity and yield
- Long life time, no filament burns, air inrush protection
- Withstand process chemistry
- Smart algorithm for easy integration
- Compact design and small footprint
- Reliable and fast start up

APPLICATIONS

- Chamber leak check, faster RoR (rate of rise) test
- Leak check to find internal leaks from gas supply lines
- Real time end point control
- Gas type and gas concentration control

Augent[®] OPG550

ORDERING INFORMATION



Replacement sensor	OPG550 1/2" tube
DN 16 ISO-KF	351-594
DN 16 CF-R	351-595
8VCR, female	351-596

Replacement sensor	OPG550 1" tube
DN 25 ISO-KF	351-597
DN 40 ISO-KF	351-598
DN 40 CF-F	351-599

Accessories	
Power Supply, OPG550, RS232 / Analog Out	351-051
Cleaning kit	351-052
Ionisation chamber TI	351-055
Diagnostic cable RS232C; 9p-Dsub - phone jack 2.5mm (2m)	303-333
MxG40x/50x, OPG550 Spare ignition aid (set of 10 pcs)	351-995
Centering ring DN 16 ISO-KF, Inox / FPM	211-066
Centering ring DN 25 ISO-KF, SS / FPM	211-068
Clamping ring DN 20 - 16 ISO-KF	211-001
Clamping ring DN 20 - 25 ISO-KF	211-002
Copper seal DN 16 CF (set of 10 pcs)	213-451

Augent[®] OPG550

SPECIFICATIONS

Total pressure measurement	OPG550
Measurement system	Cold cathode according inverted magnetron principle and thermal conductivity according pirani principle
Measurement range (N ₂)	1 × 10 ⁻⁷ ... 1000 mbar 0.75 × 10 ⁻⁷ ... 750 Torr
Accuracy total pressure reading (N ₂)	
1 × 10 ⁻⁷ ... 100 mbar	30% of reading
100 ... 1000 mbar	50% of reading
Repeatability total pressure reading (N ₂)	
1 × 10 ⁻⁷ ... 100 mbar	5 % of reading

Gas analysis	OPG550
Measurement system	Optical emission spectroscopy with integrated DC discharge plasma, spectrometer and intelligent electronics
Measurement range (N ₂)	1 × 10 ⁻⁷ ... 5 mbar 7.6 × 10 ⁻⁸ ... 3.8 Torr
Detection limit 25 liter chamber	
O ₂ leaks in pressure rise method	≥0.3 mTorr / min
O ₂ leaks during pump down from atmosphere with N ₂ backfill	≥1 mTorr / min
Sampling frequency	<10 Hz
Typical exposure time	5 ... 1000 ms
Spectral range	313 ... 870 nm

General	OPG550
Pressure	
Limited to inert gases <50 °C	≤10 bar (absolute)
Temperature	
Operation (ambient)	+5 ... +50 °C
Storage	-20 ... +70 °C
Bakeout at flange with electronic unit	≤80 °C
Bakeout at flange w/o electronic unit	≤120 °C
Relative humidity for 30 days a year	≤95% (non-condensing)
Supply voltage	
At gauge	+14.5 ... +30 V (dc)
Ripple	≤1 V (p-p)
Power consumption	≤5 W
Fuse to be connected	≤1 AT
Output signal	
Analog	0 ... +10 V (dc)
Digital	RS232C
Electrical connection	D-Sub, 9-pin, male

Augent[®] OPG550

General	OPG550
High voltage (in the measuring chamber)	
Ignition voltage	≤4.5 kV
Operating voltage	≤3.3 kV
Materials expose to vacuum	
General	Al ₂ O ₃ , stainless steel 1.4435
Anode	Molybdenum
Ionization chamber	Titanium, stainless steel 1.4016
Ignition aid	Stainless steel 1.4310
Vacuum flange	
1/2" tube (spiral baffle)	DN16 ISO-KF DN16 CF-R 8VCR, female
1" tube (standard baffle)	DN25 ISO-KF DN40 ISO-KF DN40 CF-F
Internal volume	≤46 m ³ (2.81 inch ³)
Weight	≤700 g
Dimensions	
Footprint	68 × 68 mm
Height	≤154 mm
Protection type	IP40
Standards	CE
Serviceability	Sensor cell is field replaceable, cleanable optical window

Augent[®] OPG550

SPECIFICATIONS INTERFACES

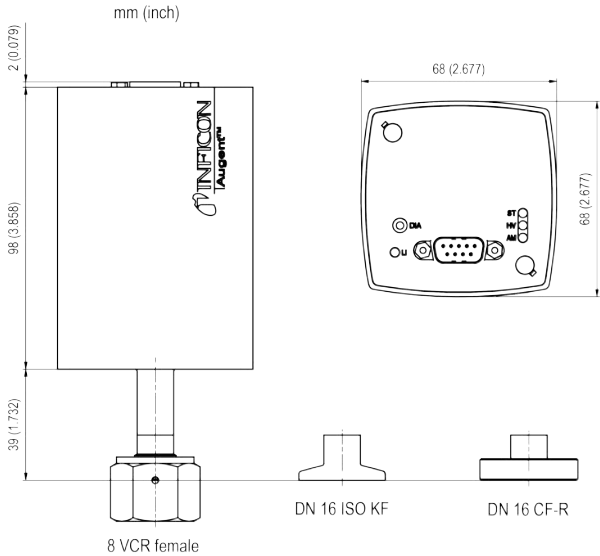
EtherCAT [®]	
Protocol	EtherCAT [®]
Communication standards	Semiconductor Device Profile ETG.5003 Part 1 Common Device Profile ETG.5003 Part 2080 "Specific Device Profile - Vacuum Pressure Gauge"
Process Data	Fixed PDO mapping and configurable PDO mapping
EtherCAT connector	RJ45, 8-pin (socket), IN and OUT
Cable	Shielded Ethernet CAT5e or higher
Cable length	≤100 m (330 ft.)
Data rate	100000 Kbps

PROFINET [™]	
Communication protocol	protocol specialized for PROFINET
Physical Layer	100BASE-Tx (IEEE 802.3)
Digital functions	
read	pressure, status, ID
set	set points, filter, zero adjust, reset, DC offset
PROFINET connector	2 × RJ45, 8-pin (socket), IN and OUT
Cable	Special Ethernet Patch Cable or Crossover Cable, shielded (CAT5e quality or higher)
Cable length	≤100 m (330 ft.)
Data rate	100000 Kbps

Augent[®] OPG550

DIMENSIONS

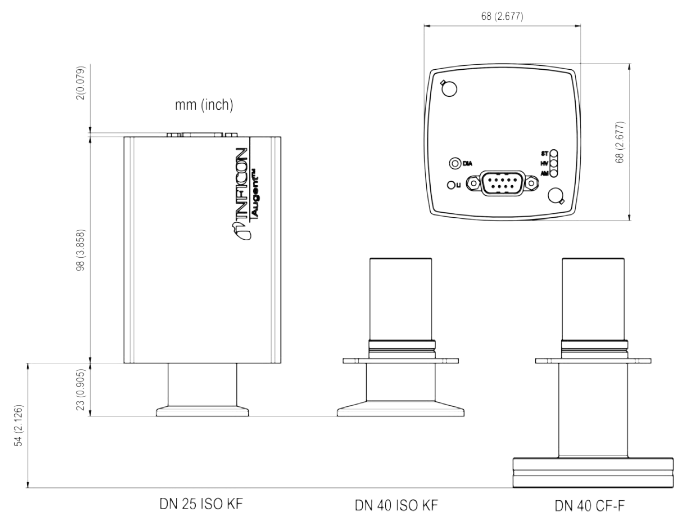
1/2" tube (spiral baffle)
mm (inch)



Augent[®] OPG550

1" tube (standard baffle)

mm (inch)



Vacuum Gauge Controllers

VGC501, VGC502, VGC503

Sustainable solution for process measurement, control and data log

Compatible to the wide range of INFICON active gauges, the VGC50x series of active gauge controllers are able to monitor and data log the entire pressure range from 10^{-10} to 1500 mbar (10^{-10} to 1125 Torr) and the set point status.



ADVANTAGES

- Simple operation with dot matrix menu guided display for parameter, sensor or general settings
- Very bright and clear Display for long distance instrument read-out
- Bar graph display with setpoints or pressure vs. time display
- Data log and parameter log function with USB port (rear side) and USB flash drive (front side)
- Ethernet interface
- Firmware upgrade available online or with USB flash drive
- Two free definable setpoints per channel with adjustable hysteresis
- High Resolution - 16 bit A/D converter
- Automatic identification of the INFICON active gauges
- Programmable 0 to 10 V Chart Recorder Output with logarithmic/ linear characteristics for single gauge or gauge combination (only VGC502 and VGC503)

VGC501, VGC502, VGC503

ORDERING INFORMATION

Type	VGC501	VGC502	VGC503
Vacuum Gauge Controller	398-481	398-482	398-483
Adapter rack mount 2HE / 3HE	398-499	-	-
Adapter USB to RS232	398-487	398-487	398-487

Accessories	PCG, PEG, PSG, MAG, MPG, Porter	BCG, BPG, HPG, CDG-D	CDG (unheated)
Signal read out and communication	analog only	digital RS232 / analog	analog only
Cable connectors	FCC / FCC	D-Sub ¹⁾ / D-Sub ¹⁾	FCC / D-Sub ¹⁾
Cable to Gauges in m (ft)			
3 (9.0)	398-500	398-520	398-540
5 (16.5)	398-501	398-521	398-541
10 (33.0)	398-502	398-522	398-542
15 (49.5)	398-503	398-523	398-543
20 (66.0)	398-504	398-524	398-544
30 (99.0)	398-505	398-525	398-545

¹⁾ D-Sub 15-pin

Other lengths on request

VGC501, VGC502, VGC503

SPECIFICATIONS

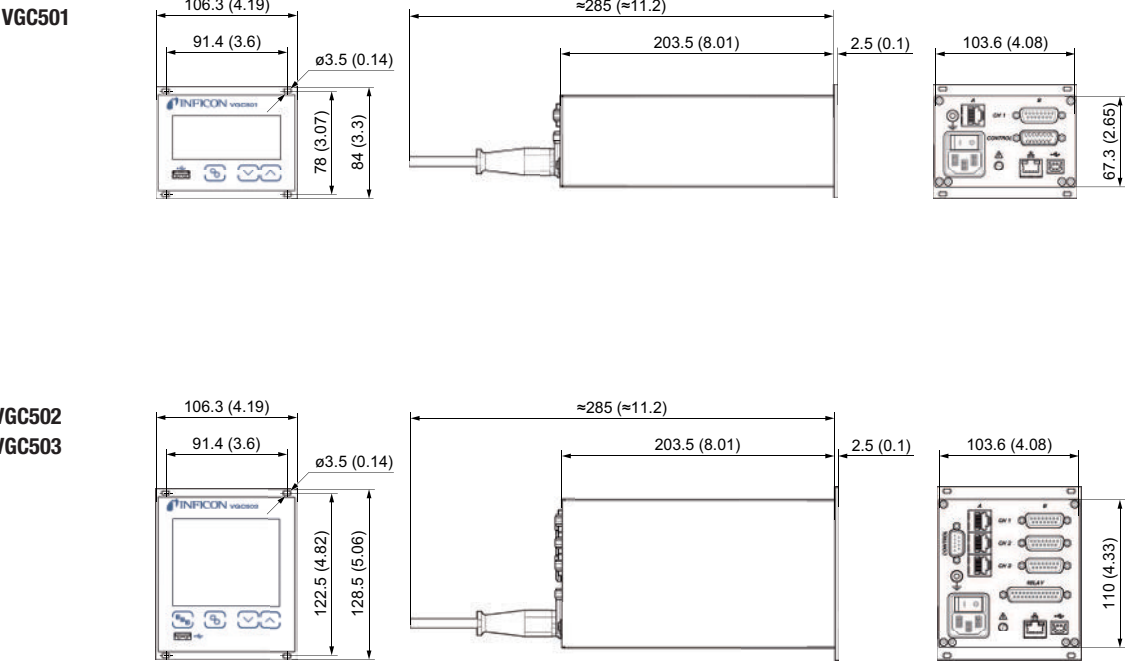
Type	VGC501	VGC502	VGC503
Measurement channels	1	2	3
Display	LCD, LED backlight		
Rate	10 / s		
Connectable gauges with display range			
CDG (A/D)	$1 \times 10^{-3} \times \text{FS} \dots 1 \times \text{FS Torr}$		
PCG	$3.75 \times 10^{-4} \dots 1125 \text{ Torr}$		
PSG	$3.75 \times 10^{-4} \dots 750 \text{ Torr}$		
MPG	$3.75 \times 10^{-9} \dots 750 \text{ Torr}$		
PEG	$7.5 \times 10^{-10} \dots 7.5 \times 10^{-3} \text{ Torr}$		
MAG	$7.5 \times 10^{-10} \dots 7.5 \times 10^{-3} \text{ Torr}$		
BCG	$3.75 \times 10^{-10} \dots 1125 \text{ Torr}$		
BPG	$3.75 \times 10^{-10} \dots 750 \text{ Torr}$		
HPG	$1.5 \times 10^{-6} \dots 750 \text{ Torr}$		
Connectable gauges with display range			
PCG	$5 \times 10^{-4} \dots 1500 \text{ mbar}$		
PSG	$5 \times 10^{-4} \dots 1000 \text{ mbar}$		
MPG	$1 \times 10^{-9} \dots 1000 \text{ mbar}$		
PEG	$1 \times 10^{-9} \dots 1 \times 10^{-2} \text{ mbar}$		
MAG	$1 \times 10^{-9} \dots 1 \times 10^{-2} \text{ mbar}$		
BCG	$5 \times 10^{-10} \dots 1500 \text{ mbar}$		
BPG	$5 \times 10^{-10} \dots 1000 \text{ mbar}$		
HPG	$2 \times 10^{-6} \dots 1000 \text{ mbar}$		
Measurement unit (selectable)	mbar, Torr, Pa, hPa, Micron, V		
Setpoints			
Setpoint relays	2	4	6
Channel assignment	1	1 or 2	1, 2 or 3
Adjustment range	sensor dependent	sensor dependent	sensor dependent
Hysteresis	adjustable	adjustable	adjustable
Relay contact	floating changeover	floating changeover	floating changeover
Connector	D-Sub, 15-pin, male	D-Sub, 25 pin female	D-Sub, 25 pin female
Contact rating	30 V (ac) / 1 A 60 V (dc) / 0.5 A	30 V (ac) / 1 A 60 V (dc) / 0.5 A	30 V (ac) / 1 A 60 V (dc) / 0.5 A
Analog output			
Range	0 ... 10.3 V, sensor analog output signal	0 ... 10.3 V, sensor analog output signal	0 ... 10.3 V, sensor analog output signal
Analog output	1	2	3
programmable analog output	-	1	1
Connector	D-Sub, 15-pin, male	D-Sub, 9 pin, male	D-Sub, 9-pin, male
Interface			
Connector	USB slave, master and Ethernet, USB Type A (stick), USB Type B, FCC68/RJ45		
Power			
Supply	100 ... 240 V (ac)		
Frequency	50 ... 60 Hz		
Consumption	≤45 W	≤65 W	≤90 W

VGC501, VGC502, VGC503

Type	VGC501	VGC502	VGC503
Operating temperature (ambiance)		+5 ... +50 °C	

DIMENSIONS

mm (in.)



Vacuum Gauge Controllers

TPG361, TPG362

Sustainable solution for process measurement, control and data log

Compatible to the wide range of INFICON active gauges, the TPG36x active gauge controllers are able to monitor and data log the entire pressure range from 10^{-10} to 1500 mbar (10^{-10} to 1125 Torr) and the set point status.



ADVANTAGES

- Simple operation with dot matrix menu guided display for parameter, sensor or general settings
- Very bright and clear display for long distance instrument read-out
- Bar graph display with setpoints or pressure vs. time display
- Data log and parameter log function with USB port (rear side) and USB flash drive (front side)
- Ethernet interface
- Firmware upgrade available online or with USB flash drive
- Two free definable setpoints per channel with adjustable hysteresis
- High Resolution - 16 bit A/D converter
- Automatic identification of the INFICON active gauges
- RS485 interface

TPG361, TPG362

ORDERING INFORMATION

Type	TPG361	TPG362
Vacuum Gauge Controller	IGD28040	IGD28290

Accessories	CMR, PCR, TPR, PKR, IKR, APR, PBR, IMR
Cable to Gauges in m (ft)	
3 (9.0)	BG448250-T
5 (16.5)	BG448251-T
10 (33.0)	BG448252-T
15 (49.5)	BG448253-T
20 (66.0)	BG448254-T
30 (99.0)	BG448256-T
35 (115.0)	BG448257-T
40 (132.0)	BG448258-T
45 (148.0)	BG448259-T
50 (164.0)	BG448260-T

Other lengths on request

TPG361, TPG362

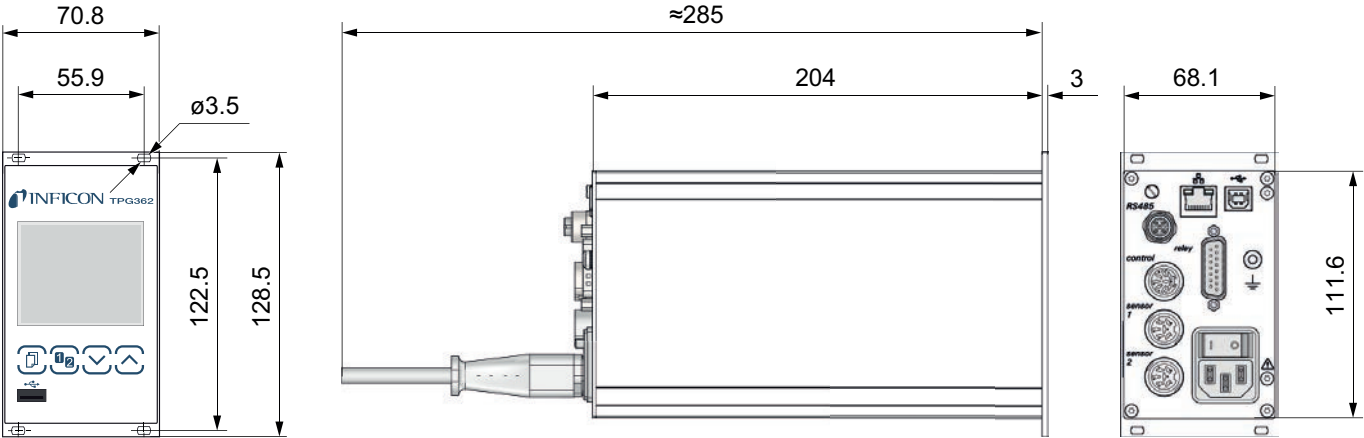
SPECIFICATIONS

Type	TPG361	TPG362
Measurement channels	1	2
Display	LCD, LED backlight	
Rate	10 1/s	
Connectable gauges with display range		
CMR (A/D)	$1 \times 10^{-3} \times \text{FS} \dots 1 \times \text{FS} \text{ mbar / Torr}$	
PCR	$5 \times 10^{-4} \dots 1500 \text{ mbar} / 3.75 \times 10^{-4} \dots 1125 \text{ Torr}$	
TPR	$5 \times 10^{-4} \dots 1000 \text{ mbar} / 3.75 \times 10^{-4} \dots 750 \text{ Torr}$	
PKR	$1 \times 10^{-9} \dots 1000 \text{ mbar} / 7.5 \times 10^{-10} \dots 750 \text{ Torr}$	
IKR	$1 \times 10^{-9} \dots 1 \times 10^{-2} \text{ mbar} / 7.5 \times 10^{-10} \dots 7.5 \times 10^{-3} \text{ Torr}$	
APR	$0.1 \dots 55000 \text{ mbar} / 7.5 \times 10^{-2} \dots 4.125 \times 10^4 \text{ Torr}$	
PBR	$5 \times 10^{-10} \dots 1000 \text{ mbar} / 3.75 \times 10^{-10} \dots 750 \text{ Torr}$	
IMR	$2 \times 10^{-6} \dots 1000 \text{ mbar} / 1.5 \times 10^{-6} \dots 750 \text{ Torr}$	
Measurement unit (selectable)	mbar, Torr, Pa, hPa, Micron, V	
Setpoints		
Setpoint relays	2	4
Channel assignment	1	1 or 2
Adjustment range	sensor dependent	sensor dependent
Hysteresis	adjustable	adjustable
Relay contact	floating changeover	floating changeover
Connector	D-Sub, 15 pin female	D-Sub, 15 pin female
Contact rating	30 V (ac) / 1 A 60 V (dc) / 0.5 A	30 V (ac) / 1 A 60 V (dc) / 0.5 A
Analog output		
Range	0 ... 10.3 V, sensor analog output signal	
Analog output	1	2
Connector	Amphenol C91B, 7-pin, female	Amphenol C91B, 7-pin, female
Interface (digital)	USB slave, master, Ethernet and RS485	
Connector	USB Type A (stick), USB Type B, FCC68/RJ45, Binder M12	
Power		
Supply	100 ... 240 V (ac)	100 ... 240 V (ac)
Frequency	50 ... 60 Hz	50 ... 60 Hz
Consumption	≤45 w	≤65 W
Operating temperature (ambiance)	+5 ... +50 C°	

TPG361, TPG362

DIMENSIONS

[mm]



Pirani Gauge Display

PGD500

The INFICON Pirani Gauge Display PGD500 in combination with the INFICON Pirani Standard Gauge PSG5xx provides a cost effective pressure monitoring solution. Although it is called Pirani Gauge Display the PGD500 also supports our PCG55x and MPG series vacuum gauges.



ADVANTAGES

- User selectable measurement unit (Pa, mbar or Torr)
- Compact bench top model design can be easily mounted in a panel or 19 in. rack
- 0 to 10 V output signal from the gauge is available for use in PLC or with a chart recorder
- One free adjustable set point
- User selectable gauge PSG, PCG and MPG

APPLICATIONS

- For vacuum pressure measurement
- Pressure measurement on filling stations for RAC and automotive applications
- Pressure measurement in light bulb production lines
- General vacuum measurement and control in the medium and rough vacuum range

PGD500

ORDERING INFORMATION

Type	PGD500
Pirani Gauge Display	398-802

Accessories		Part no.
Sensor cable ¹⁾	1.3 m (4.27 ft.)	398-498
Seal with centering ring and filter	DN 16 ISO-KF	211-090
Adapter for rackmount 2HE / 3HE		398-499

¹⁾ Other/longer lengths on request

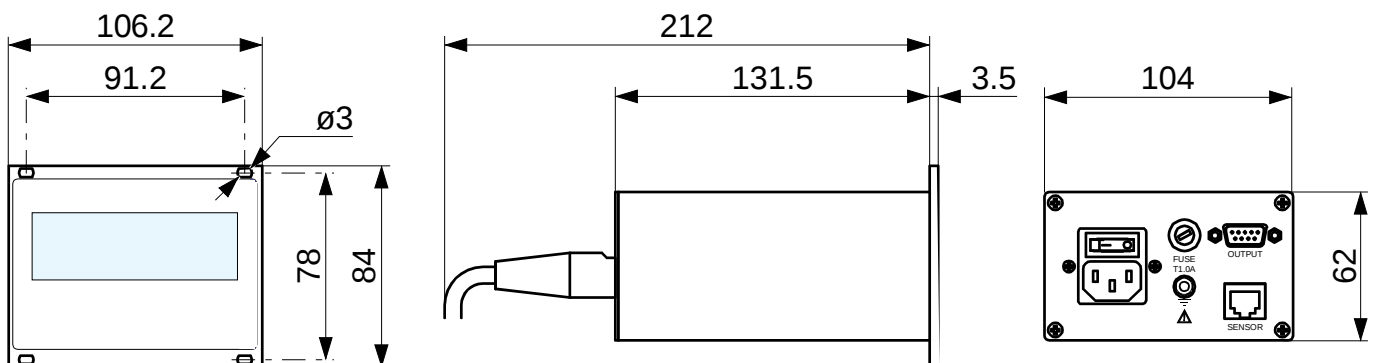
PGD500

SPECIFICATIONS

PGD500	
Measurement channels (sensors to connect)	1 (PSG5xx, PCG5xx or MPG series)
Display	LCD
Range	$5 \times 10^{-7} \dots 1.5 \times 10^5$ Pa $5 \times 10^{-9} \dots 1500$ mbar
Measurement rate	30 / s
Measurement unit (selectable)	Pa, mbar, Torr
Setpoint	
Setpoint relay	1
Adjustment range	$1 \times 10^{-8} \dots 500$
Hysteresis	$\geq 10\%$ of measurement value
Relay contact	Floating changeover contact
Contact rating	50 V (ac) / 5 A
Connector	D-Sub, 9 pin, male
Analog output	0 ... 10.3 V, sensor output signal
Power	
Supply	100 ... 240 V (ac)
Frequency	50 ... 60 Hz
Consumption	≤ 30 VA
Temperature	
Operation (ambiance)	+5 ... +50 °C
Storage	-20 ... +60 °C
Relative humidity	$\leq 80\%$ up to +31 °C Decreasing to 50% at +40 °C
Degree of protection	IP20
Weight	0.85

DIMENSIONS

mm (in.)



Pirani Gauge Enhanced - Passive

PGE050

The Pirani Gauge Enhanced 050 (PGE050) is the passive version of our active convection enhanced Pirani gauges PGE300 and PGE500. Equipped with the same sensor technology, PGE050 works in conjunction with our VGC031 and VGC083 passive gauge controller units. Thanks to its convection enhanced principle, PGE050 is capable of high accuracy readings in the measurement range between 1.3×10^{-3} to 1333 mbar. With its wider measuring range and unmatched accuracy, especially at near-atmospheric pressures, PGE050 is the first choice when replacing other Pirani or thermocouple gauges in your vacuum system. The robust sensor design makes PGE050 a high value/low cost of ownership choice and qualifies for many applications where an economical vacuum measurement from atmosphere to high vacuum range is required.



ADVANTAGES

- Convection enhanced Pirani technology for wide measurement range and higher accuracy near atmosphere
- Gold plated tungsten filament, platinum filament for enhanced corrosion resistance available on request
- Mechanical robust and less susceptible to mechanical shock and vibration
- Large choice of flange options
- Compliance & standards: CE, RoHS
- Direct drop in replaces MKS / Granville-Phillips® Convectron® gauge sensor (same plug/ pinouts)
- PGE050 accepts MKS / Granville-Phillips® Convectron® controllers, cables and modules
- Ideal gauge sensor for upgrading your installed thermocouple gauges

APPLICATIONS

- General vacuum measurement and control from low to the high vacuum range

OPERATING UNITS

- Vacuum Gauge Controller VGC083 and VGC031

**Granville-Phillips® and Mini-Convectron® are registered trademarks of MKS Instruments, Andover, MA*

PGE050

ORDERING INFORMATION

Type	PGE050
DN 16 ISO-KF	352-500
DN 25 ISO-KF	352-501
DN 40 ISO-KF	352-502
DN 16 CF-R	352-503
DN 40 CF-R	352-504
4 VCR female	352-505
8 VCR female	352-506
1/8" NPT	352-507

SPECIFICATIONS

Type	PGE050
Measurement system	Pirani, convection-enhanced
Measurement range (N ₂) with VGC083 or VGC031 controller	$1.3 \times 10^{-4} \dots 1333 \text{ mbar}$
	$1 \times 10^{-4} \dots 1000 \text{ Torr}$
	$1.3 \times 10^{-2} \dots 133000 \text{ Pa}$
Accuracy (N ₂ , typical)	
$1.3 \times 10^{-4} \dots 1.3 \times 10^{-3} \text{ mbar} \mid 1.3 \times 10^{-4} \dots 1.3 \times 10^{-3} \text{ Torr}$	$0.1 \times 10^{-3} \text{ mbar} \mid 0.1 \text{ mTorr resolution}$
$1.3 \times 10^{-3} \dots 530 \text{ mbar} \mid 1 \times 10^{-3} \dots 400 \text{ Torr}$	$\pm 10 \% \text{ of reading}$
$530 \dots 1333 \text{ mbar} \mid 400 \dots 1000 \text{ Torr}$	$\pm 2.5 \% \text{ of reading}$
Repeatability (N ₂ , typical)	$\pm 2 \% \text{ of reading}$
Mounting orientation	recommended horizontal
$< 1.3 \text{ mbar} \mid 1 \text{ Torr}$	any
Admissible temperature	
Ambient, in operation	$0 \dots +50 \text{ }^{\circ}\text{C}$
Bake-out	$\leq 150 \text{ }^{\circ}\text{C}^{1)}$
Storage	$-40 \dots +70 \text{ }^{\circ}\text{C}$
Relative humidity	$\leq 95 \% \text{ (non-condensing)}$
Materials exposed to vacuum	
Filament	gold-plated tungsten
Other	AISI 304 and 316 stainless steel, glass, nickel, Teflon®
Internal volume	$26 \text{ cm}^3 \mid 1.589 \text{ in.}^3$
Internal surface area	$59.7 \text{ cm}^2 \mid 9.25 \text{ in.}^2$
Weight	85 g

¹⁾ With high temperature cable or without cable

PGE050

DIMENSIONS		
Dimension A	mm	(in.)
DN 16 ISO-KF	33	(1.3)
DN 25 ISO-KF	33	(1.3)
DN 40 ISO-KF	33	(1.3)
DN 16 CF-R	27.4	(1.08)
DN 40 CF-R	37.3	(1.47)
4 VCR female	47.2	(1.86)
8 VCR female	44.5	(1.75)
1/8" NPT	25.4	(1)

[mm]



Vacuum Gauge Controller

VGC031

The Vacuum Gauge Controller VGC031 is a single channel gauge controller for the INFICON Pirani Gauge Enhanced PGE050. VGC031 acts as a convenient power supply, control and readout, allowing straightforward vacuum pressure monitoring and controlling from atmosphere down to high vacuum (1.3×10^{-4} mbar).

VGC031 supports a variety of technical features as 2 setpoint relays, 4 user selectable analog outputs and offers additionally RS232/RS485 digital interfaces. The bright, sharp and clear OLED display with the integrated keypad user interface rounds out this user friendly vacuum gauge controller package. The housing of VGC031 allows panel mounting thus providing a great rack space saving capability. The combination VGC031 - PGE050 is the best choice for many vacuum applications where economical vacuum measurement from atmosphere to high vacuum range is required.



ADVANTAGES

- Displays and controls wide measurement range from 1.3×10^{-4} up to 1333 mbar
- Bright digital OLED display with keypad for simple set up and operation
- 4 user selectable analog output signals
- 2 set point relays
- RS232 / RS485 digital interface
- Space saving design - 1/8 DIN panel mount housing for rack mount installation or as standalone unit
- Powered through user supplied 12 to 28 V (dc) or by INFICON's VGC031 Power Supply
- Compliance & standards: CE, RoHS
- Replacement capability for MKS / Granville-Phillips® 375 and 475 controllers and 275 Convector® gauge sensors and gauge cable (remote interface, relay and power connectors are different)

APPLICATIONS

- General vacuum measurement and control from low to the high vacuum range

**Granville-Phillips® and Mini-Convector® are registered trademarks of MKS Instruments, Andover, MA*

VGC031

ORDERING INFORMATION

Type	VGC031
Vacuum Gauge Controller VGC031	399-570

VGC031

SPECIFICATIONS

Type	VGC031
Measurement channels	1
Display	OLED, 4 digits
Display rate	2 s ⁻¹
Connectable gauge with display range PGE050	1.3 × 10 ⁻⁴ ... 1333 mbar 1 × 10 ⁻⁴ ... 1000 Torr 1.3 × 10 ⁻² ... 133000 Pa
Measurement unit (selectable)	mbar, Torr, Pa
Controller connections	
Gauge	9-pin D-Sub female ¹⁾
Analog output, serial interface	9-pin D-Sub male
Relay outputs	6-pin pluggable terminal block ²⁾
Power	2-pin pluggable terminal block ²⁾
Setpoint relay	2 (single-pole double-throw relays SPDT) 1 A at 30 V resistive (dc), non-inductive (ac)
Analog output	
Range (selectable)	
log-linear	0 ... 7 V (dc) or 1 ... 8 V (dc) 1 V/decade
linear	0 ... 10 V (dc)
non-linear S-curve	0.375 ... 5.659 V (dc)
non-linear S-curve	0 ... 9 V (dc)
Interface (digital)	RS232, RS485
Supply voltage (external)	+12 ... +28 V (dc) ³⁾
Temperature	
Operation (ambient)	0 ... 40 °C
Storage	-40 ... +70 °C
Relative humidity	≤95%
Housing	1/8 DIN panel-mount enclosure (aluminum extrusion)
Weight	250 g

¹⁾ Mating connector provided as part of the gauge cable

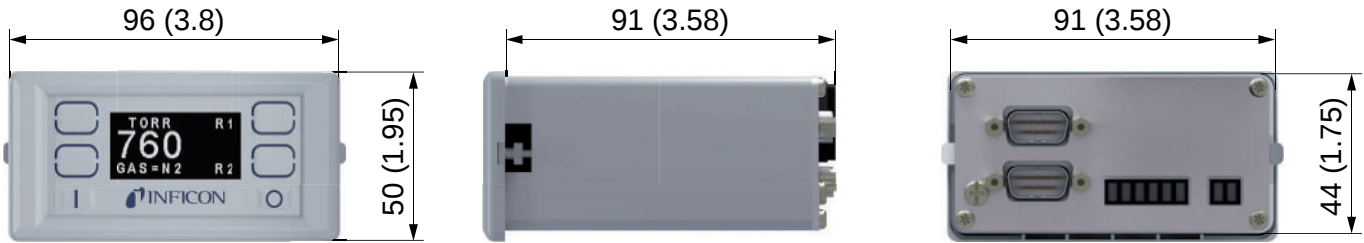
²⁾ Mating connector included

³⁾ 2 W protected against power reversal and transient over-voltages

VGC031

DIMENSIONS

[mm]



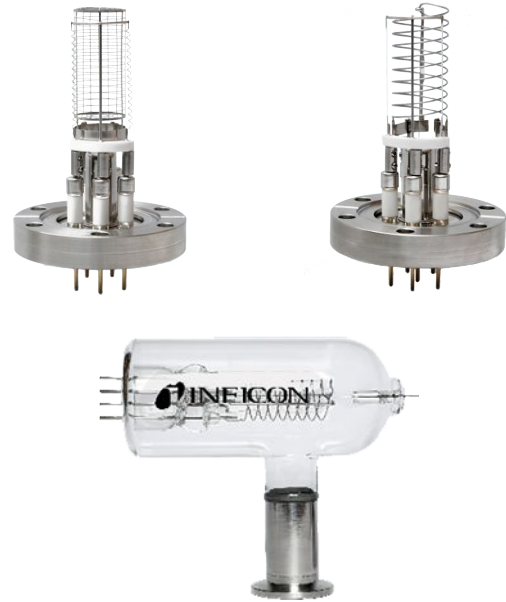
Bayard-Alpert Gauges - Passive

BAG050, BAG051, BAG052, BAG053

The hot cathode ionization passive vacuum gauge heads BAG05x are nude (BAG050, BAG051) or glass tube (BAG052, BAG053) Bayard-Alpert sensors designed for use with the Vacuum Gauge Controller VGC083A/B. Yttrium oxide coated iridium filaments are offered for general vacuum applications where air and inert gases, such as N₂ and argon, are present. Tungsten filaments are offered for specific applications where yttrium oxide coated iridium filaments are not compatible. BAG05x gauges are largely compatible and may be operated with other user-selected compatible vacuum gauge controllers.

The INFICON passive Bayard-Alpert ionization vacuum gauges (BAG05x) are offered in three different configurations:

- BAG050 is an electron bombardment (EB) degas nude ionization vacuum gauge capable of UHV pressure measurement as low as 2×10^{-11} mbar
- BAG051 is a resistive (I²R) degas nude ionization vacuum gauge capable of pressure measurement as low as 5×10^{-10} mbar
- BAG052 and BAG053 are resistive (I²R) degas glass enclosed ionization vacuum gauges capable of pressure measurement as low as 5×10^{-10} mbar



ADVANTAGES

- Long standing, reliable and proven gauge head design
- Drop-in replacement for most nude hot ion gauge heads
- Wide range of emission currents (100 µA to 10 mA)
- Available with single/dual yttria coated iridium and dual tungsten filament cathode assemblies
- Degas: all models can be degassed using EB (electron bombardment). BAG051, BAG052 and BAG053 can also be degassed using resistive degas (I²R)

APPLICATIONS

- General vacuum measurement and control in the low to ultra-high vacuum range
- Industrial and analytical applications

OPERATING UNITS

- Vacuum Gauge Controller VGC083 A/B

BAG050, BAG051, BAG052, BAG053

ORDERING INFORMATION

BAG050

BA nude EB-degas, DN 40 CF, dual iridium filament (Ir)	399-720
BA nude EB-degas, DN 40 CF, dual tungsten filament (W)	399-721
Spare dual iridium filament (Ir)	399-730
Spare dual tungsten filament (W)	399-731



BAG051

BA nude I ² R, DN40CF, single iridium filament (Ir)	399-725
BA nude I ² R, DN40CF, dual iridium filament (Ir)	399-726
BA nude I ² R, DN40CF, dual tungsten filament (W)	399-727
Spare iridium filament (Ir)	399-735
Spare dual iridium filament (Ir)	399-736
Spare dual tungsten filament (W)	399-737



BAG052

BA glass I ² R, 1/2" Kovar metal inlet port, single iridium filament (Ir)	399-740
BA glass I ² R, 1" Kovar metal inlet port, single iridium filament (Ir)	399-741
BA glass I ² R, 1/2" glass inlet port, single iridium filament (Ir)	399-742
BA glass I ² R, 1" glass inlet port, single iridium filament (Ir)	399-743
BA glass I ² R, DN 25 ISO-KF, single iridium filament (Ir)	399-744
BA glass I ² R, DN 40 ISO-KF, single iridium filament (Ir)	399-745
BA glass I ² R, DN 16 CF, single iridium filament (Ir)	399-746
BA glass I ² R, DN 40 CF, single iridium filament (Ir)	399-747



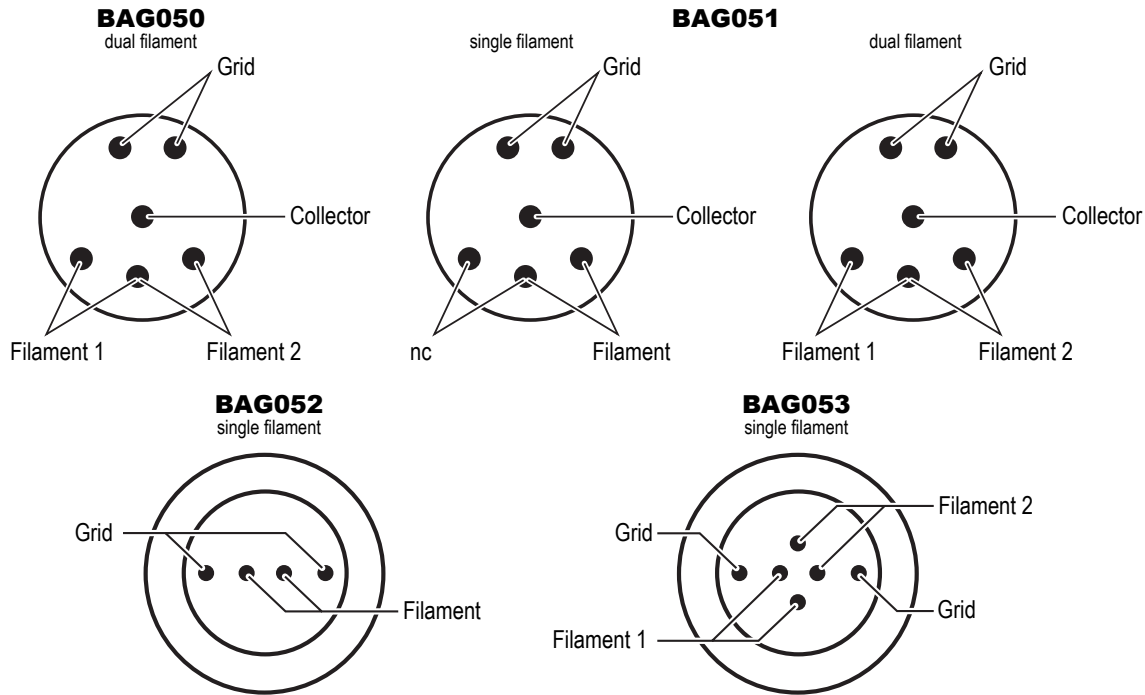
BAG053

BA glass I ² R, 1/2" Kovar metal inlet port, dual tungsten filament (W)	399-750
BA glass I ² R, 1" Kovar metal inlet port, dual tungsten filament (W)	399-751
BA glass I ² R, 1/2" glass inlet port, dual tungsten filament (W)	399-752
BA glass I ² R, 1" glass inlet port, dual tungsten filament (W)	399-753
BA glass I ² R, DN 25 ISO-KF, dual tungsten filament (W)	399-754
BA glass I ² R, DN 40 ISO-KF, dual tungsten filament (W)	399-755
BA glass I ² R, DN 16 CF, dual tungsten filament (W)	399-756
BA glass I ² R, DN 40 CF, dual tungsten filament (W)	399-757



BAG050, BAG051, BAG052, BAG053

ELECTRICAL CONNECTION



SPECIFICATIONS

Type	BAG050	BAG051	BAG052	BAG053
Measurement system	hot cathode ionization			
Electrode system configuration	Bayard-Alpert			
Measurement range (N ₂)	2.7x10 ⁻¹¹ ... 1.3x10 ⁻³ mbar 2 × 10 ⁻¹¹ ... 1 × 10 ⁻³ Torr 2.7 × 10 ⁻⁹ ... 1.3 × 10 ⁻¹ Pa		5.3 × 10 ⁻¹⁰ ... 1.3 × 10 ⁻³ mbar 4 × 10 ⁻¹⁰ ... 1 × 10 ⁻³ Torr 5.3 × 10 ⁻⁸ ... 1.3 × 10 ⁻¹ Pa	
X-ray limit	2 × 10 ⁻¹¹ Torr		4 × 10 ⁻¹⁰ Torr	
Sensitivity (N ₂ , typical)	25 Torr ⁻¹		10 Torr ⁻¹	
Accuracy (N ₂ , typical)		±20%		
Repeatability (N ₂ , typical)		±5%		
Mounting orientation		any		
Admissible temperature				
Bake-out		450 °C		

¹⁾ 1.3x10⁻⁸ ... 6.7x10⁻² mbar (1x10⁻⁸ ... 5x10⁻² Torr)

²⁾ Stainless steel

³⁾ For corresponding cables to connect gauge with the VGC083x controller please check VGC083x Data Sheet tiba59e1 or VGC083x Operating Manual tinb29e1

BAG050, BAG051, BAG052, BAG053

Type	BAG050	BAG051	BAG052	BAG053
Degas				
Electron bombardment (EB)	≤40 W	70 W nominal, ≤100 W	≤100 W	≤100 W
Resistive I ² R ¹⁾	□	6.3 ... 7.5 V (ac) at 10 A	6.3 ... 7.5 V (ac) at 10 A	6.3 ... 7.5 V (ac) at 10 A
Standard operating characteristics with VGC083 controller				
Cathode (filament)	2.5 ... 3.5 A		4 ... 6 A	
Heating current	3 ... 5 V (dc)		3 ... 5 V (dc)	
Heating voltage	+30 V (dc)		+30 V (dc)	
Potential	+180 V (dc)		+180 V (dc)	
Anode (grid) potential	0 V		0 V	
Collector potential				
Materials exposed to vacuum				
Collector	tungsten (W), ø0.005"	tungsten (W), ø0.010"	tungsten (W), ø0.010"	tungsten (W), ø0.010"
Cathode (filament)	dual yttria coated Ir or dual W	single/dual yttria coated Ir or dual W	single hairpin type yttria coated Ir	dual W
Anode (grid)	photo etched closed end SS ²⁾ cage	non-sag double helical 0.025" tungsten	non-sag double helical 0.025" tungsten	non-sag double helical 0.025" tungsten
Insulator	ceramic	ceramic	glass to metal	glass to metal
Flange	SS AISI 304 ²⁾	SS AISI 304 ²⁾	glass Nonex 7720	glass Nonex 7720
Dimensions				
Overall length	4□ in.	4□ in.	6 in.	6 in.
Insertion length	3 in.	3 in.	-	-
Glass envelope	-	-	Ø2 □ in. × 5 in. long	Ø2 □ in. × 5 in. long
Compatible INFICON controller ³⁾	VGC083A (PN 399-700)		VGC083B (PN 399-701)	

¹⁾ 1.3x10⁻⁸ ... 6.7x10⁻² mbar (1x10⁻⁸ ... 5x10⁻² Torr)

²⁾ Stainless steel

³⁾ For corresponding cables to connect gauge with the VGC083x controller please check VGC083x Data Sheet tiba59e1 or VGC083x Operating Manual tinb29e1

Mini Bayard-Alpert Gauge - Passive

BAG055

The hot cathode ionization passive vacuum gauge head BAG055 is a miniature, metal enclosed Bayard-Alpert sensor designed for use with the Vacuum Gauge Controller VGC083A. BAG055 has an electron bombardment (EB) degas and is capable of pressure measurement down to 1×10^{-9} mbar. Thanks to its compact size and a large selection of possible flanges and fittings, BAG055 can be installed in every vacuum system easily and with minimal footprint. BAG055 is offered with a dual yttrium oxide coated iridium filament and can be baked up to 200 °C. The high accuracy makes BAG055 a cost effective and robust choice for general vacuum industrial or R&D applications.



ADVANTAGES

- Long standing, reliable and proven gauge head design
- Drop-in replacement thanks to its compact size, large choice of connection flanges and fittings
- Dual, yttrium oxide coated iridium filament
- Electron bombardment (EB) degassing

APPLICATIONS

- General vacuum measurement and control in the low to high vacuum range
- Industrial and analytical applications

OPERATING UNITS

- Vacuum Gauge Controller VGC083 A

BAG055

ORDERING INFORMATION

BAG055

BA EB-degas, 1/4" tube, Y ₂ O ₃ coated dual iridium filament (Ir)	399-760
BA EB-degas, DN 16 ISO-KF, Y ₂ O ₃ coated dual iridium filament (Ir)	399-761
BA EB-degas, DN 25 ISO-KF, Y ₂ O ₃ coated dual iridium filament (Ir)	399-762
BA EB-degas, DN 40 ISO-KF, Y ₂ O ₃ coated dual iridium filament (Ir)	399-763
BA EB-degas, DN 16 CF-R, Y ₂ O ₃ coated dual iridium filament (Ir)	399-764
BA EB-degas, DN 40 CF-R, Y ₂ O ₃ coated dual iridium filament (Ir)	399-765
BA EB-degas, 8 VCR female, Y ₂ O ₃ coated dual iridium filament (Ir)	399-766

SPECIFICATIONS

Type	BAG055
Measurement system	hot cathode ionization
Electrode system configuration	Bayard-Alpert
Measurement range (N ₂)	1.3 × 10 ⁻⁹ ... 6.7 × 10 ⁻² mbar 1 × 10 ⁻⁹ ... 5 × 10 ⁻² Torr 1.3 × 10 ⁻⁷ ... 6.7 × 10 ⁻² Pa
X-ray limit	5 × 10 ⁻¹⁰ Torr
Sensitivity (N ₂ , typical)	10 Torr ⁻¹
Accuracy (N ₂ , typical)	±15%
Repeatability (N ₂ , typical)	±5%
Mounting orientation	any
Admissible temperature	
Bake-out	200 °C ¹⁾
Degas	
Electron bombardment (EB)	≤3 W
Standard operating characteristics with VGC083 controller	
Cathode (filament)	2 ... 2.5 A
Heating current	1.5 ... 2 V (dc)
Heating voltage	+30 V (dc)
Potential	+180 V (dc)
Anode (grid) potential	0 V
Collector potential	
Materials exposed to vacuum	
Collector	tungsten (W), ø0.010"
Cathode (filament)	dual yttria coated iridium
Anode (grid)	etched stainless steel
Insulator	glass
Flange	stainless steel AISI 304
Length	
Overall	2.7 ... 3.8 in. ²⁾
Compatible INFICON controller ³⁾	VGC083A (PN 399-700)

¹⁾ With high temperature cable or without cable

²⁾ Depending on flange

³⁾ For corresponding cables to connect gauge with the VGC083x controller please check VGC083x Data Sheet tiba59e1 or VGC083x Operating Manual tinb29e1

Vacuum Gauge Controller

VGC083A, VGC083B, VGC083C

The Vacuum Gauge Controller VGC083 is a three channel gauge controller for vacuum pressure monitoring and controlling from atmosphere down to ultra-high vacuum (2×10^{-11} mbar). VGC083 can be configured to control and read-out up to 3 passive gauge heads among two types of passive sensors design types: one ionization gauge (hot cathode BAG05x or cold cathode MAG0x0), plus two Pirani gauges PGE050. Six single pole setpoint relays are assignable to any of the gauge heads. Built-in RS232 and RS485 control interfaces are provided for system integration. The industrial design in combination with extended compatibility make VGC083 a flexible yet reliable and economical choice for vacuum applications requiring a wide vacuum measurement range and the ideal solution for existing systems requiring direct drop-in replacements.



ADVANTAGES

- Simple operation with three individual clear and bright LED display for long distance vacuum pressure read-out
- Parameter, sensor and general settings with softkeys
- User selectable filament, degas electron bombardment or I^2R resistive heating for gauge conditioning depending on gauge head type
- Three analog outputs, user assignable to a single gauge or to gauges combinations
- Six assignable single-pole double through setpoint relays
- Remote digital I/O sensor & emission on/off
- Sensor 1 can be automatically turned on/off from sensor 2 or 3
- RS232 / RS485 serial communication
- Ion gauge overpressure protection
- Direct drop-in replacement opportunity for MKS / Granville-Phillips® Bayard-Alpert Gauge Controller 307 and accessories
- Alternative active gauge use

VGC083A, VGC083B, VGC083C

ORDERING INFORMATION

Type	VGC083A	VGC083B	VGC083C
Vacuum Gauge Controller	399-700	399-701	399-702
Power supply 220 W VGC083x ¹⁾	399-710	399-710	-
Power supply 60 W VGC083x ¹⁾	399-711 ²⁾	-	399-711

¹⁾ The IEC 60320 AC power entry receptacle allows use with any user supplied AC mains cord set available worldwide

²⁾ When used with BAG055

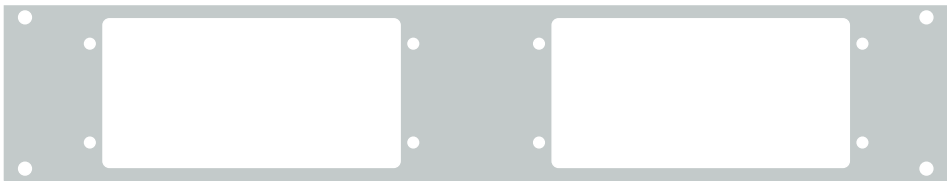
OPTIONAL RACK MOUNT ADAPTER

Optional EIA-standard 19-inch wide, 2U height rack mount panels (aluminum – power paint finish)

For installation of one VGC083x as a left-mount or a right-mount:



For installation of two VGC083x side-by-side:



Type	
Rack mount adapter for 19" 2U for one VGC083x	399-714
Rack mount adapter for 19" 2U for two VGC083x	399-715

VGC083A, VGC083B, VGC083C

Accessories	BAG050		BAG055		PGE050	
	50 °C	200 °C	50 °C	200 °C	50 °C	150 °C
Cables for VGC083A to						
3 m (9.9 ft)	399-780	399-770	399-810	399-860	399-580	399-520
8 m (25 ft)	399-781	399-771	399-811	399-861	399-581	399-521
15 m (50 ft)	399-782	399-772	399-812	399-862	399-582	399-522
Touch protection cover for cables 200 °C (BAG050, BAG051)	399-779					

Other lengths on request

	BAG051		BAG052 BAG053	PGE050	
	50 °C	200 °C	50 °C	50 °C	150 °C
Cables for VGC083B to					
3 m (9.9 ft)	399-780	399-770	399-790	399-580	399-520
8 m (25 ft)	399-781	399-771	399-791	399-581	399-521
15 m (50 ft)	399-782	399-772	399-792	399-582	399-522
Touch protection cover for cables 200 °C (BAG050, BAG051)	399-779				

Other lengths on request

	MAG050 MAG060		PGE050	
	80 °C	250 °C	50 °C	150 °C
Cables for VGC083C to				
3 m (9.9 ft)	399-820	399-830	399-580	399-520
8 m (25 ft)	399-821	399-831	399-581	399-521
15 m (50 ft)	399-822	399-832	399-582	399-522

Other lengths on request

Cable adaptors	
Cable adaptor MKS / GP® 355 Micro-Ion® to VGC083A	399-767

VGC083A, VGC083B, VGC083C

CONNECTABLE GAUGES

BAG050 Hot Ion Gauge	VGC083A	VGC083B	VGC083C
BA nude EB-degas, DN 40 CF, dual iridium filament (Ir)	399-720	-	-
BA nude EB-degas, DN 40 CF, dual tungsten filament (W)	399-721	-	-
BAG051 Hot Ion Gauge	VGC083A	VGC083B	VGC083C
BA nude I ² R, DN 40 CF, single iridium filament (Ir)	-	399-725	-
BA nude I ² R, DN 40 CF, dual iridium filament (Ir)	-	399-726	-
BA nude I ² R, DN 40 CF, dual tungsten filament (W)	-	399-727	-
	-		
BAG052 Hot Ion Gauge	VGC083A	VGC083B	VGC083C
BA glass I ² R, □" Kovar metal inlet port, single iridium filament (Ir)	-	399-740	-
BA glass I ² R, 1" Kovar metal inlet port, single iridium filament (Ir)	-	399-741	-
BA glass I ² R, □" glass inlet port, single iridium filament (Ir)	-	399-742	-
BA glass I ² R, 1" glass inlet port, single iridium filament (Ir)	-	399-743	-
BA glass I ² R, DN 25 ISO-KF, single iridium filament (Ir)	-	399-744	-
BA glass I ² R, DN 40 ISO-KF, single iridium filament (Ir)	-	399-745	-
BA glass I ² R, DN 16 CF, single iridium filament (Ir)	-	399-746	-
BA glass I ² R, DN 40 CF, single iridium filament (Ir)	-	399-747	-
BAG053 Hot Ion Gauge	VGC083A	VGC083B	VGC083C
BA glass I ² R, □" Kovar metal inlet port, dual tungsten filament (W)	-	399-750	-
BA glass I ² R, 1" Kovar metal inlet port, dual tungsten filament (W)	-	399-751	-
BA glass I ² R, □" glass inlet port, dual tungsten filament (W)	-	399-752	-
BA glass I ² R, 1" glass inlet port, dual tungsten filament (W)	-	399-753	-
BA glass I ² R, DN 25 ISO-KF, dual tungsten filament (W)	-	399-754	-
BA glass I ² R, DN 40 ISO-KF, dual tungsten filament (W)	-	399-755	-
BA glass I ² R, DN 16 CF, dual tungsten filament (W)	-	399-756	-
BA glass I ² R, DN 40 CF, dual tungsten filament (W)	-	399-757	-
BAG055 Hot Ion Gauge	VGC083A	VGC083B	VGC083C
BA, □" tube, Y ₂ O ₃ coated single iridium filament (Ir)	399-760	-	-
BA, DN 16 ISO-KF, Y ₂ O ₃ coated single iridium filament (Ir)	399-761	-	-
BA, DN 25 ISO-KF, Y ₂ O ₃ coated single iridium filament (Ir)	399-762	-	-
BA, DN 40 ISO-KF, Y ₂ O ₃ coated single iridium filament (Ir)	399-763	-	-
BA, DN 16 CF-R, Y ₂ O ₃ coated single iridium filament (Ir)	399-764	-	-
BA, DN 40 CF-R, Y ₂ O ₃ coated single iridium filament (Ir)	399-765	-	-

VGC083A, VGC083B, VGC083C

BAG055 Hot Ion Gauge	VGC083A	VGC083B	VGC083C
BA, 8 VCR female, Y ₂ O ₃ coated single iridium filament (Ir)	399-766	-	-

PGE050 Pirani Gauge Enhanced	VGC083A/B/C
Pirani Gauge, DN 16 ISO-KF, tungsten filament (W)	352-500
Pirani Gauge, DN 25 ISO-KF, tungsten filament (W)	352-501
Pirani Gauge, DN 40 ISO-KF, tungsten filament (W)	352-502
Pirani Gauge, DN 16 CF-R, tungsten filament (W)	352-503
Pirani Gauge, DN 40 CF-R, tungsten filament (W)	352-504
Pirani Gauge, 4 VCR female, tungsten filament (W)	352-505
Pirani Gauge, 8 VCR female, tungsten filament (W)	352-506
Pirani Gauge, 1/8" NPT, tungsten filament (W)	352-507

MAG050 Cold Cathode Gauge	VGC083A	VGC083B	VGC083C
Cold Cathode Gauge, DN 25 ISO-KF, FPM sealed	-	-	399-840
Cold Cathode Gauge, DN 40 ISO-KF, FPM sealed	-	-	399-841
Cold Cathode Gauge, DN 40 CF-F, FPM sealed	-	-	399-842

MAG060 Cold Cathode Gauge	VGC083A	VGC083B	VGC083C
Cold Cathode Gauge, DN 40 ISO-KF, metal sealed	-	-	399-845
Cold Cathode Gauge, DN 40 CF-F, metal sealed	-	-	399-846

CONTROLLER CONFIGURATION

VGC083A



BAG050

OR



BAG055

PLUS



2 x PGE050

VGC083B



BAG051

OR

BAG052
BAG053

PLUS



2 x PGE050

VGC083C



MAG050

OR



MAG060

PLUS



2 x PGE050

VGC083A, VGC083B, VGC083C

SPECIFICATIONS

Type	VGC083A	VGC083B	VGC083C
Measurement channels	3	3	3
Display			
Pressure indication	LED - 3 independent pressure display channels, 3 digit plus 2 digit exponent		
Programming & set-up screen	OLED		
Connectable gauges with display range	1.3 × 10 ⁻⁴ ... 1333 mbar	1.3 × 10 ⁻⁴ ... 1333 mbar	1.3 × 10 ⁻⁴ ... 1333 mbar
PGE050	1 × 10 ⁻⁴ ... 1000 Torr	1 × 10 ⁻⁴ ... 1000 Torr	1 × 10 ⁻⁴ ... 1000 Torr
BAG050	2 × 10 ⁻¹¹ ... 1.3 × 10 ⁻³ mbar 2 × 10 ⁻¹¹ ... 1 × 10 ⁻³ Torr	-	-
BAG051	-	4 × 10 ⁻¹⁰ ... 1333 mbar 4 × 10 ⁻¹⁰ ... 1000 Torr	-
BAG052, BAG053	-	4 × 10 ⁻¹⁰ ... 1333 mbar 4 × 10 ⁻¹⁰ ... 1000 Torr	-
BAG055	1.3 × 10 ⁻⁹ ... 6.7 × 10 ⁻² mbar 1 × 10 ⁻⁹ ... 5 × 10 ⁻² Torr	-	-
MAG050	-	-	2 × 10 ⁻⁹ ... 5 × 10 ⁻³ mbar 1.5 × 10 ⁻⁹ 3.75 × 10 ⁻³ Torr
MAG060	-	-	1 × 10 ⁻¹⁰ ... 5 × 10 ⁻³ mbar 0.75 × 10 ⁻¹⁰ 3.75 × 10 ⁻³ Torr
Measurement unit (selectable)	mbar (default), Torr, Pa		
Sensor 1 over pressure protection (factory default settings)	1 × 10 ⁻³ Torr at 100 µA emission current 5 × 10 ⁻⁴ Torr at 4 µA emission current 1 × 10 ⁻⁴ Torr at 10 µA emission current		5 × 10 ⁻³ Torr
Connectors			
BAG supply	CPC ¹⁾	CPC ¹⁾	
BAG col	BNC ¹⁾	BNC ¹⁾	
MAG			SHV
PGE050		D-sub, 9 p-pin female	
Remote digital I/O		D-sub, 9 p-pin male	
RS232		D-sub, 9 p-pin female	
RS485		D-sub, 9 p-pin male	
Analog out		2 pole pluggable terminal block ²⁾	
Analog in			
Relay (6x)		3 pole pluggable terminal block ²⁾	
DC power		3 pole pluggable terminal block ²⁾	
		2 pole pluggable terminal block ²⁾	
Setpoint relays	6 single-pole double-throw relays (SPDT), user assignable to any of the gauges		
Contact rating	5 A at 30 V (dc) / 250 V (ac), resistive load		

¹⁾ Gauge cable assemblies provided by INFICON

²⁾ Mating connector included

³⁾ Command protocol compatibility with GP307

⁴⁾ When used with BAG050

⁵⁾ When used with BAG055

VGC083A, VGC083B, VGC083C

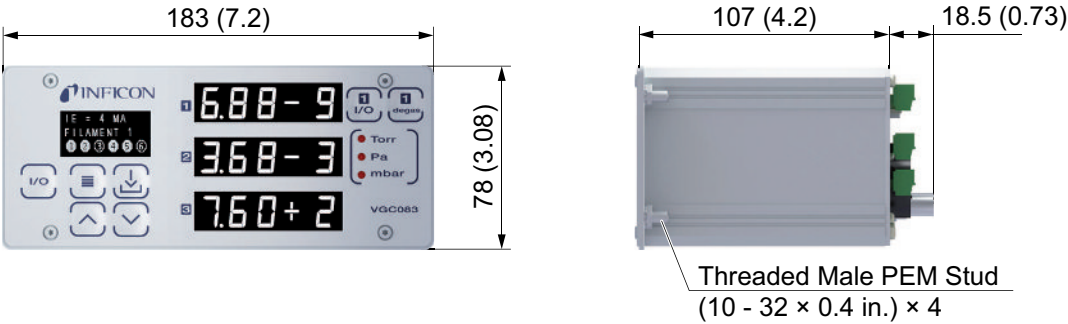
Type	VGC083A	VGC083B	VGC083C
Analog output			
Ion gauge (BAG, MAG)			
log-linear		0 ... 10 V (dc), 1 V/decade	
log-linear	1.7 ... 9.3 V (dc) (nominal 1.8 ... 8.7 V (dc), 0.8 V/decade)		
linear		0 ... 10 V (dc), usable over 3 decades	
Combination Ion gauge & PGE (or alternative gauge)			
log-linear		0.5 ... 7 V (dc), 0.5 V/decade	
PGE			
log-linear		1 ... 8 V (dc), 1 V/decade	
log-linear		0 ... 7 V (dc), 1 V/decade	
linear		0 ... 10 V (dc), usable over 3 decades	
non-linear, S-curve		0.375 ... 5.659 V (dc)	
Interface (digital)		RS232, RS485 ³⁾	
Supply voltage (external)	+20 ... +28 V (dc), 200 W ⁴⁾ / 36W ⁵⁾	+20 ... +28 V (dc), 200 W	+20 ... +28 V (dc), 12W
Temperature			
Operation (ambient)		+0 ... +40 °C	
Storage		-40 ... +70 °C	
Relative humidity		0 ... 95% , non-condensing	
Housing		aluminum housing	
Weight		0.7 kg	

¹⁾ Gauge cable assemblies provided by INFICON
²⁾ Mating connector included
³⁾ Command protocol compatibility with GP307
⁴⁾ When used with BAG050
⁵⁾ When used with BAG055

VGC083A, VGC083B, VGC083C

DIMENSIONS

[mm]



Vacuum Gauge Controller

IM540

The Vacuum Gauge Controller IM540 is a versatile ionization gauge controller offering complete vacuum measurement and control in the range between 10^{-12} mbar and atmospheric pressure. Depending on the application and user's needs, IM540 is the one-stop solution as it may combine up to 4 different principles of vacuum measurement - Pirani, capacitive diaphragm, Bayard-Alpert and Extractor. This controller allows for a reliable and complete integration in complex process control systems.



ADVANTAGES

- Supports the operation of the IE414 (Bayard-Alpert) and the IE514 (extractor) hot cathode ionization gauges
- Two active gauges from the PSG5xx (Pirani) and CDG (Capacitance diaphragm) active gauge lines can be connected and operated
- Simple operation with menu guided display for parameter, sensor or general settings
- Built-in RS232 communication interface, optional Profibus DP communication card (IF 540 P)
- Two set points (optional 7) with adjustable hysteresis
- High resolution - 16 bit A/D converter
- 2 programmable 0 to 10 V chart recorder outputs

APPLICATIONS

- Scientific and R&D applications requiring precise vacuum measurement from atmosphere down to ultra-high vacuum range

IM540

ORDERING INFORMATION		
Type		IM540
Vacuum Gauge Controller		399-660
Sensors	IE414	IE514
DN 40 CF	399-661	399-663
Replacement cathode	399-676	399-677
Communication cards		
Interface and relay board, IF540P Profibus, 45 W, 75 VA		399-670
Accessories		
Gauge head cables to IE414/514, 80 °C		
3 m		399-680
5 m		399-681
10 m		399-682
50 m		399-685
Gauge head cables to IE414/514, 200 °C		
3 m		399-686
5 m		399-687
10 m		399-688
50 m		399-690
Extension cables to IE414/514		available on request

IM540

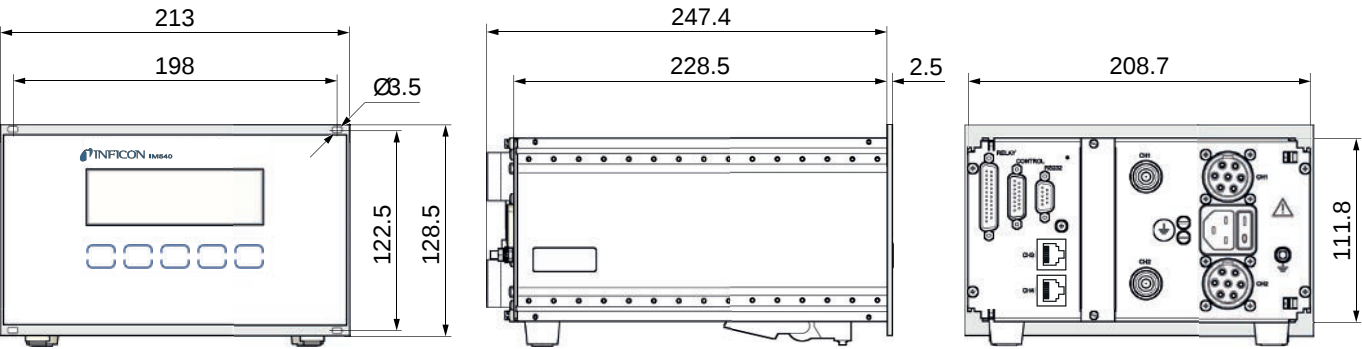
SPECIFICATIONS

Type	IM540
Measurement channel	3
Display	LCD, LED backlight
Display rate	4 s ⁻¹
Measurement range	
IE414 (Bayard-Alpert)	1×10 ⁻¹¹ ... 1×10 ⁻² mbar 0.75×10 ⁻¹¹ ... 0.75×10 ⁻² Torr
IE514 (Extractor)	1×10 ⁻¹² ... 1×10 ⁻⁴ mbar 0.75×10 ⁻¹² ... 0.75×10 ⁻⁴ Torr
Measurement unit (selectable)	mbar, Torr, Pa, hPa, Micron, V
Measurement range switching	automatic or decade pre-select
Trend indication	bargraph
Emission current	
IE414 (Bayard-Alpert)	0.1 ... 10 mA, automatic control
IE514 (Extractor)	1.6 mA
Emission current shutdown at	p > 1×10 ⁻² mbar, broken cathode, short-circuit, interruption of the electric circuit
Degassing power	
IE414 (Bayard-Alpert)	41 W
IE514 (Extractor)	21 W
Gauge supply	
Anode (IE414 / IE514)	220 V / 220 V
Cathode (IE414 / IE514)	80 V / 100 V
Reflector (IE514)	205 V
Sensor connections	2x IE414 or IE514 (single operation or automatic switch-over for redundant operation) 2x PSG50x/PSG51x-S (Pirani) or CDG025D/045D
Measurement system detection	automatically
Measurement system switchover	automatically, pressure dependent, error dependent
Chart recorder outputs	logarithmic 0 to 10 V (1 V / dec) or linear 0 to 10 V error indication U > 10.5 V
Interface	RS232C, Profibus (with IF540P)
Switching thresholds (single operation or interval)	2 with floating changeover contact
Power supply	
Voltage	90 ... 264 V (ac)
Frequency	47 ... 63 Hz
Temperature	
Operation (ambient)	+5 ... +40 °C
Storage	-20 ... +60 °C
Weight	~3.0 kg ~6.62 lb

IM540

DIMENSIONS

[mm]



High-end Hot Ion Gauges - Passive

IE414 & IE514 Sensors

The IE414 and IE514 are high-end vacuum sensors based on hot cathode ionization effect. The IE414 is a Bayard-Alpert gauge while the IE514 is based on the extractor principle. These passive gauges are combined and controlled by the IM540 vacuum gauge controller. Thanks to the modulation of the cathode emission current, the measurement range of IE414 spans over 9 decades from 1×10^{-2} mbar down to 1×10^{-11} mbar. The extractor principle allows IE514 reaching a lower measurement limit of 2×10^{-12} mbar thanks to its intrinsic reduction of X-ray and ion desorption effects.



ADVANTAGES

- High accuracy, individually calibrated sensor
- Exchangeable cathode
- High temperature bake-out 400 °C

IE414

- Bayard-Alpert sensing principle
- Measurement range to 2×10^{-11} mbar (1.5×10^{-11} Torr)
- Protection shield welded in place

IE514

- Extractor sensing principle
- Reliable to 2×10^{-12} mbar (0.75×10^{-12} Torr)
- Significant reduction of X-ray and ion desorption effects

APPLICATIONS

- Scientific and R&D applications requiring precise vacuum measurement in the ultra-high vacuum range and high temperature bake-out

OPERATING UNITS

- Vacuum Gauge Controller IM540

IE414 & IE514 Sensors

ORDERING INFORMATION

Type	IE414	IE514
Sensor DN 40 CF	399-661	399-663
Replacement cathode	399-676	399-677

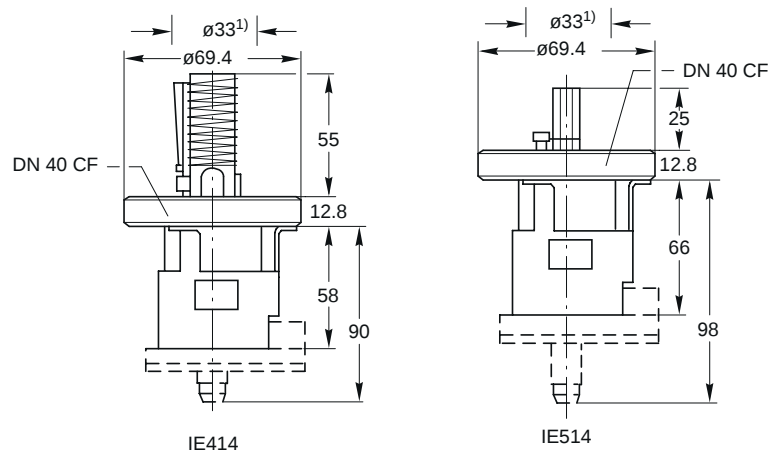
SPECIFICATIONS

Type	IE414	IE514
Measurement system	hot cathode ionization	
Electrode system configuration	Bayard-Alpert	Extractor system
Measurement range (N ₂)	$2 \times 10^{-11} \dots 1 \times 10^{-2}$ mbar	$2 \times 10^{-12} \dots 1 \times 10^{-4}$ mbar
X-ray limit	$< 1 \times 10^{-11}$ mbar	$< 1 \times 10^{-12}$ mbar
Sensitivity (N ₂ , typical)	17 mbar ⁻¹	6.25 mbar ⁻¹
Admissible temperature		
Ambient, in operation		+20 ... +80 °C
Max. flange temp. with heat resistant gauge head cable set		250 °C
Max. bake-out temperature without plugs		400 °C
Storage temperature		+20 ... +50 °C
Relative humidity		
Annual average		≤65% (non-condensing)
On 60 days		≤85% (non-condensing)
Use	within indoor rooms only, altitude up to 2000 meters above sea level	
Standard operating characteristics with IM540 controller		
Cathode (filament)		
Heating current	1.5 A	1.5 A
Heating voltage	3 V	3.7 V
Potential	+80 V	+100 V
Emission current range	0.1 ... 10 mA	1.6 mA
Anode (grid) potential	220 V	220 V
Collector potential	0 V	0 V
Reflector potential	-	+205 V
Max. power when baking out	90 mA / 480 V	45 mA / 480 V
Flange connection	DN 40 CF	
Materials exposed to vacuum		
Lead-in pins	NiFe	NiFe
Insulator	Al ₂ O ₃ ceramic	Al ₂ O ₃ ceramic
Pin sealing plate	NiFe	NiFe
Flange	stainless steel	stainless steel
Cathode	iridium with yttrium oxide coating	iridium with yttrium oxide coating
Anode	molybdenum	stainless steel
Collector	tungsten	tungsten
Reflector	NiFe	NiFe

IE414 & IE514 Sensors

DIMENSIONS

[mm]



¹⁾ Diameter electrical feedthrough vacuum side.

Pirani Gauges - Passive

PSG010, PSG017, PSG018

The gauge heads PSG010, PSG017 and PSG018 are long-established passive Pirani gauges intended to operate with the Vacuum Gauge Controller VGC094. They are designed for vacuum measurement of gases in the pressure range of 8×10^{-4} to 1000 mbar. The compact metal design provides a robust solution suitable for general vacuum applications. While PSG010 is suited for industrial vacuum applications, PSG017 and PSG018 respond to needs of demanding applications requiring bake-out temperature up to 250 °C or high ionizing radiation resistance, thanks to a metal sealing design. PSG017 has a Nickel filament suitable for corrosive media applications.



ADVANTAGES

- Elastomer (PSG010) or metal-sealed (PSG017, PSG018) design
- Specified high measurement accuracy and repeatability
- Bake-out temperature up to 100 °C (PSG010) / 250 °C (PSG017, PSG018)
- Ionizing radiation resistant up to 10^6 Gy (PSG017, PSG018)
- Corrosion resistance with Ni filament (PSG017)
- Cable length up to 100 m (500 m with PI 300 DL and CP 300 T11L)

APPLICATIONS

- General vacuum measurement and control for demanding and/or high temperature applications from low to the high vacuum range

OPERATING UNITS

- Vacuum Gauge Controller VGC094

PSG010, PSG017, PSG018

ORDERING INFORMATION

Type	PSG010	PSG017	PSG018
DN 10 ISO-KF	350-400	-	-
DN 16 ISO-KF	-	350-430	350-420
DN 16 CF-F	-	350-431	350-424
DN 40 CF-F	-	-	350-423

SPECIFICATIONS

Type	PSG010	PSG017	PSG018
Measurement system	Pirani		
Measurement range (air, O ₂ , CO, N ₂)	$8 \times 10^{-4} \dots 1000$ mbar		
Accuracy (N ₂)			
in the range of ≥ 100 mbar	up to factor 2 of reading	up to factor 2 of reading	up to factor 2 of reading
at room temperature and cable length <20 m	$\sim \pm 20\%$ of reading in the range of $1 \times 10^{-1} \dots 10$ mbar up to factor 2 of reading in the range of $\leq 10^{-2}$ mbar	$\sim \pm 10\%$ of reading in the range of $1 \times 10^{-2} \dots 100$ mbar	$\sim \pm 10\%$ of reading in the range of $1 \times 10^{-2} \dots 100$ mbar
up to +70 °C and within the entire range of specified cable length	-	-	$\sim \pm 20\%$ of reading in the range of $1 \times 10^{-2} \dots 100$ mbar
within the entire specified range of temperatures and cable length	-	-	$\sim \pm 35\%$ of reading in the range of $1 \times 10^{-2} \dots 100$ mbar
Repeatability (N ₂)	$\sim \pm 2\%$ of reading in the range of $1 \times 10^{-2} \dots 100$ mbar	$\sim \pm 2\%$ of reading in the range of $1 \times 10^{-2} \dots 100$ mbar	$\sim \pm 5\%$ of reading in the range of $1 \times 10^{-2} \dots 100$ mbar
Mounting orientation	any		
Admissible temperature			
Ambient, in operation			
with standard cable	0 ... +70 °C	0 ... +80 °C	0 ... +80 °C
with high temperature cable	-	0 ... +120 °C	0 ... +120 °C
Bake-out	100 °C	250 °C ¹⁾	250 °C ¹⁾
Storage	-	-40 ... +80 °C	-
Relative humidity	$\leq 80\%$ at temperatures $\leq +31$ °C, decreasing to 50% at +40 °C		
Radiation resistance	-	1×10^6 Gy	1×10^6 Gy
Use	indoors only, altitudes up to 2000 m		
Maximum cable length	depending on measurement board		
Overpressure	≤ 9 bar (limited inert gases)		
Protection category	IP 40		
Materials exposed to vacuum			
Feedthrough	glass	Al ₂ O ₃	Al ₂ O ₃
Internal seal	FPM	Nimonic 90, Al	Nimonic 90, Al
Filament / holder	W/Ni	Ni/Ni	W/Ni
Chamber wall	AlMgSi	Stainless Steel EN 1.4435, EN 1.4306	Stainless Steel EN 1.4435, EN 1.4306
Filter	sinter bronze	-	-
Weight	0.14 kg	1.2 kg	1.2 kg

¹⁾ With high temperature cable or without cable

Cold Cathode Gauges - Passive

MAG084 & MAG086

The MAG084 and MAG086 passive inverted magnetron cold cathode gauges are the solution for extremely demanding vacuum applications requiring the highest performance. They offer immunity to strong external magnetic fields, the lowest stray magnetic field, high resistance to ionizing radiation, high bake-out temperature and operation from long distance. Based on the patented GEMINI™ magnetic field configuration, MAG084/086 feature a double ionization chamber with an optimized and closed magnetic circuit. This design, combined to the in-built magnetic shielding, enables unprecedented immunity to external magnetic fields while also minimizing stray magnetic field. Thanks to the removable ionization chamber, MAG084/086 can be easily disassembled, maintained and cleaned, allowing long-term use with minimal downtime. In combination with the Vacuum Gauge Controller VGC094, MAG084 and MAG086 are the pressure measurement solution from UHV to 5×10^{-3} mbar to applications with unique demands, such as nuclear fusion, particle accelerators, industrial and analytical processes and medical diagnostics.



ADVANTAGES

- Wide vacuum pressure measurement range from 1×10^{-11} (MAG086) to 5×10^{-3} mbar
- Proven immunity to strong external magnetic fields up to 500 mT
- Ultra-low stray magnetic field with built-in shielding
- High radiation resistant design to 1×10^7 Gy
- Reduced material radioactivation, high temperature bake-out up to 230 °C
- Long distance operation (MAG086: up to 500 m) with VGC094 controller
- Replaceable ionization chamber enables easy maintenance and low cost of ownership

APPLICATIONS

- Nuclear Fusion, Particle Accelerators
- Special R&D application presenting strong magnetic fields
- Industrial and Analytical applications requiring lowest stray magnetic field
- Medical and diagnostic applications

OPERATING UNITS

- Vacuum Gauge Controller VGC094

MAG084 & MAG086

ORDERING INFORMATION		
Type	MAG084	MAG086
DN 40 ISO-KF	399-849	399-853
DN 40 CF-F	399-850	399-854

MAG084 & MAG086

SPECIFICATIONS

Type	MAG084	MAG086
Measurement system	cold cathode ionization (inverted magnetron, double ionization principle)	
Measurement range (N ₂)	1 × 10 ⁻¹⁰ mbar ... 5 × 10 ⁻³ mbar	1 × 10 ⁻¹¹ mbar ... 5 × 10 ⁻³ mbar
Accuracy (N ₂ , typical)	30% of reading	
Repeatability (N ₂ , typical)	5% of reading	
Mounting orientation	any	
Admissible temperature		
Operation		
with standard cable	+5 ... +80 °C	+5 ... +80 °C
with high temperature cable	+5 ... +230 °C	+5 ... +230 °C ²⁾
Bakeout	+230 °C ¹⁾	+230 °C ¹⁾
Storage	-40 ... +80 °C	-40 ... +80 °C
Relative humidity	max. 80 % at temperature up to +30 °C, decreasing to 50 % at +40 °C	
Radiation resistance	1 × 10 ⁷ Gy	
External magnetic field: Immunity		
Deviation of reading		
As per ITER Test Method (ITER_D_98IL4W)		
Axial direction		
≤10 %	≤180 mT	
≤factor 2	≤280 mT	
Radial direction		
≤10 %	≤150 mT	
≤factor 2	≤180 mT	
Ultimate performance		
Axial direction		
≤10 %	≤215 mT	
≤factor 2	≤500 mT	
Radial direction		
≤10 %	≤230 mT	
≤factor 2	≤280 mT	
External magnetic field: Integrity		
Exposure with full reversible recovery	tested up to 600 mT (any orientation)	
Standard operating characteristics with VGC094		
Voltage (within measuring chamber)	≤3.3 kV	≤3.3 kV
Current (within measuring chamber)	≤600 µA	≤100 µA
Electrical connection		
Type	coaxial	triaxial
Connector	Bayonet, SHV	Push-pull self-latching, triax
Use	indoor only	
Maximum cable length	≤100 m ≤6 m, if the lower limit of the measurement range is used	≤500 m
Overpressure	≤9 bar (only inert gases)	
Degree of protection	IP40	

¹⁾ With high temperature cable or without cable

²⁾ On request

MAG084 & MAG086

Type	MAG084	MAG086
Materials exposed to vacuum		
Vacuum chamber	stainless steel (EN 1.4404, EN 1.4435, EN 1.4104)	
Ionization chamber	stainless steel (EN 1.4301, EN 1.4016)	
Retention circlip	stainless steel (EN 1.4122)	
Feedthrough	Al ₂ O ₃	
Internal seal	Ag	
Anode	Mo	
Ignition aid	stainless steel (EN 1.4330)	
Magnet	NdFeB	
Internal volume		
DN 40 ISO-KF	~24 cm ³	
DN 40 CF-F	~25 cm ³	
Weight		
DN 40 ISO-KF	690 g	710 g
DN 40 CF-F	880 g	900 g

¹⁾ With high temperature cable or without cable

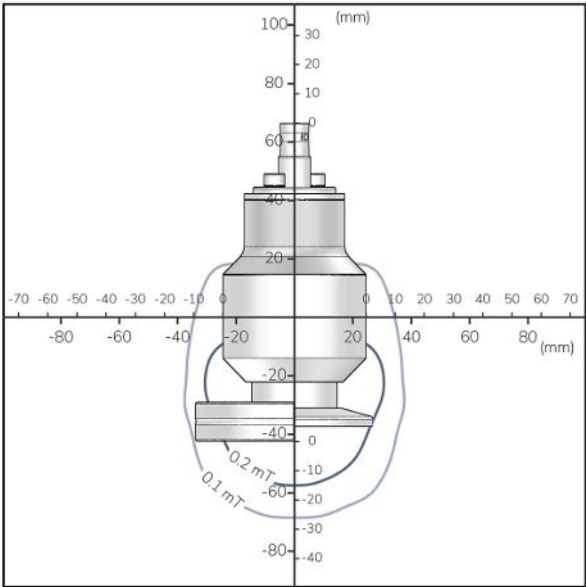
²⁾ On request

MAG084 & MAG086

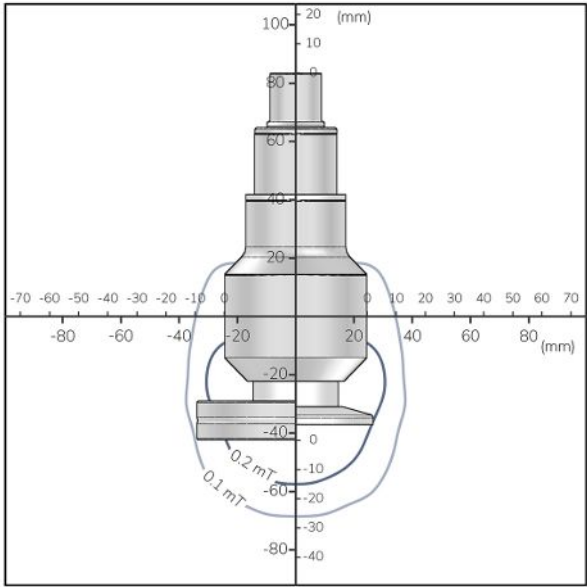
STRAY MAGNETIC FIELD

[mT]

MAG084

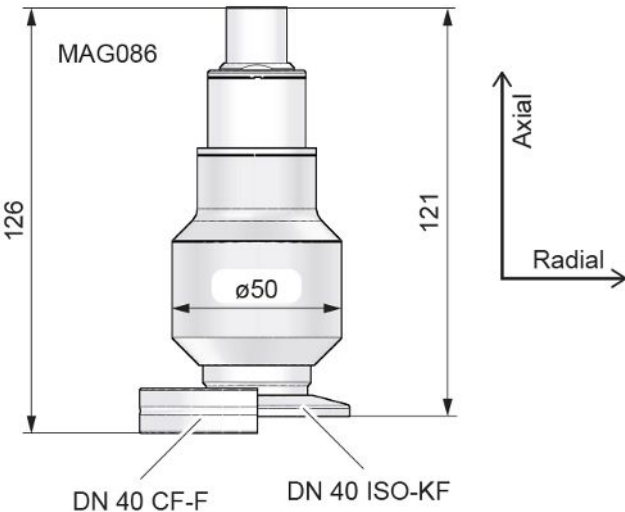
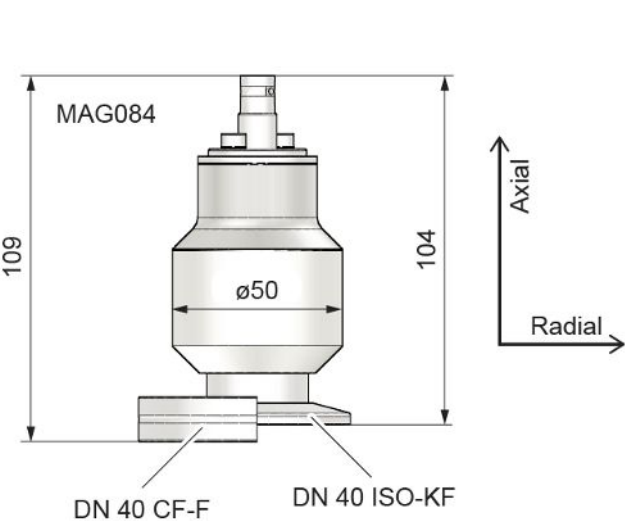


MAG086



DIMENSIONS

[mm]



Cold Cathode Gauges - Passive

MAG050, MAG060, MAG070

The gauge heads MAG050, MAG060 and MAG070 are long-established passive, inverted magnetron cold cathode gauges intended to operate with the Vacuum Gauge Controllers VGC094 and VGC083C. They are designed for vacuum measurement in the pressure range from 1×10^{-11} (MAG070) to 5×10^{-3} mbar. The compact metal design provides a robust solution suitable for general vacuum applications.

MAG050 is a simpler cold cathode gauge with an elastomer sealed feedthrough. Thanks to their all-metal design, MAG060 and MAG070 respond to needs of demanding applications requiring bake-out temperature up to 250 °C or high ionizing radiation resistance. Both allow pressure measurement in the UHV range. The triaxial connection of MAG070 allows lowest pressure reading (down to 1×10^{-11} mbar) and long distance operation between the gauge head and controller (up to 500 m). All gauge heads have an ignition aid mounted on the anode (reducing the cold cathode ignition time at low pressure) and can be easily disassembled and cleaned, allowing long term use with minimal downtime.



ADVANTAGES

- Reliable and proven gauge head design, based on the inverted magnetron principle
- Large vacuum pressure measurement range capability from 1×10^{-11} (MAG070) to 5×10^{-3} mbar
- Bakeable to 150 °C (MAG050) or 250 °C (MAG060, MAG070)
- Good ignition properties
- Corrosion resistant with ceramic feedthrough
- Radiation resistant design available (MAG060, MAG070)
- Easy to maintain, low cost of ownership

APPLICATIONS

- General vacuum measurement and control for demanding and/or high temperature applications from low to the high vacuum range

OPERATING UNITS

- Vacuum Gauge Controller VGC094 and VGC083C (MAG070 excluded)

MAG050, MAG060, MAG070

ORDERING INFORMATION

Type	MAG050	MAG060	MAG070
DN 25 ISO-KF	399-840	-	-
DN 40 ISO-KF	399-841	399-845	399-847
DN 40 CF-F	399-842	399-846	399-848

SPECIFICATIONS

Type	MAG050	MAG060	MAG070
Measurement system	cold cathode ionization (inverted magnetron principle)		
Measurement range (N ₂)	2 × 10 ⁻⁹ ... 5 × 10 ⁻³ mbar	1 × 10 ⁻¹⁰ ... 5 × 10 ⁻³ mbar	1 × 10 ⁻¹¹ ... 5 × 10 ⁻³ mbar
Accuracy (N ₂ , typical)	30% of reading		
Repeatability (N ₂ , typical)	5% of reading		
Mounting orientation	any		
Admissible temperature			
Operation			
with standard cable	+5 ... +80 °C	+5 ... +80 °C	+5 ... +80 °C
with high temperature cable	+5 ... +150 °C	+5 ... +250 °C	+5 ... +250 °C ²⁾
Bakeout	150 °C ¹⁾	250 °C ¹⁾	250 °C ¹⁾
Storage	-40 ... +80 °C	-40 ... +80 °C	-40 ... +80 °C
Relative humidity	max. 80 % at temperature up to +30°C, decreasing to 50 % at +45°C		
Radiation resistance	□	1 × 10 ⁷ Gy	1 × 10 ⁷ Gy
Standard operating characteristics with VGC094/VGC083			
Voltage (within measuring chamber)	≤3.3 kV		
Current (within measuring chamber)	≤700 µA		
Electrical connection			
Type	coaxial		triaxial
Connector	Bayonet, SHV		Push-pull self-latching, triax
Use	indoors only, altitudes up to 2000 m		
Maximum cable length	≤100 m	≤100 m	≤500 m
	≤40 m, if the lower limit of the measurement range is used	≤6 m, if the lower limit of the measurement range is used	
Overpressure	≤9 bar (limited inert gases)		
Protection category	IP40		
Materials exposed to vacuum			
Vacuum chamber	Stainless steel (EN 1.4306, 1.4104, 1.4306)		
Feedthrough	Al ₂ O ₃		
Internal seal	FPM	Ag	Ag
Anode	Mo		
Ignition aid	Stainless steel (EN 1.4310)		
Internal volume	~20 cm ³		

¹⁾ With high temperature cable or without cable

²⁾ On request

MAG050, MAG060, MAG070

Type	MAG050	MAG060	MAG070
Weight		600 g (DN 25/40 ISO-KF) 850 g (DN 40 CF-F)	

¹⁾ With high temperature cable or without cable

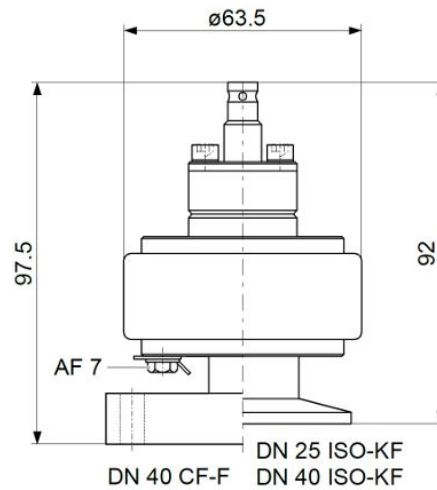
²⁾ On request

MAG050, MAG060, MAG070

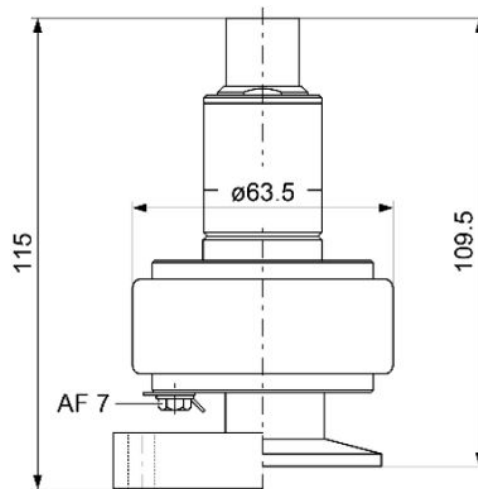
DIMENSIONS

[mm]

MAG050/060



MAG070



Vacuum Gauge Controller

VGC094

The Vacuum Gauge Controller VGC094 is a prestigious solution for vacuum process measurement, control and data log. Compatible to the wide range of INFICON passive gauges, VGC094 is able to monitor the entire vacuum pressure range from 1×10^{-11} to 1000 mbar. VGC094 can be user-configured to control up to 4 passive gauge heads (Pirani gauges, inverted magnetron gauges) by two sets of measurement boards. VGC094 is the ideal solution for applications with demanding performance, such as operation from long distance, high temperature or high ionizing radiation exposure. The controller provides latest digital communication interfaces (USB, RS485, Ethernet) and can be customized with user's specific communication standards thanks to individual communication boards (RS232, RS422, Profibus, PROFINET).



ADVANTAGES

- Complete solution for vacuum monitoring and control monitor from 1×10^{-11} to 1000 mbar
- Bright and clear screen, 4 channel display
- Bar graph display with set-point or pressure vs. time views
- Simple operation with intuitive and guided menus for parameter, sensor or general settings
- Data and parameter log function with USB port (rear side) and USB flash drive (front side)
- High resolution – 16 bit A/D converter
- 4 programmable 0 to 10 V chart recorder output
- Four freely definable setpoints per channel with adjustable hysteresis
- RS485, Ethernet, optional RS232, RS422 and fieldbus communication interfaces
- Firmware upgrade available online or by USB stick

VG094

ORDERING INFORMATION

Type	VG094
Vacuum Gauge Controller	398-401

Accessories Pirani cables to VG094 ¹⁾	PSG010 80°C	PSG017 / 018 80°C	PSG017 / 018 250°C
Cable connectors (controller side / sensor side)	Amphenol / Amphenol	Amphenol / Push- pull self-latching	Amphenol / Push- pull self-latching
3 m (9.9 ft)	BG548402-T	BG548308-T	BG548414-T
6 m (19.8 ft)	BG548403-T	BG548309-T	BG548465-T
10 m (33 ft)	BG548450-T	BG548456-T	BG448047-T
15 m (49 ft)	BG548451-T	BG548457-T	BG448043-T

Extensions cables ¹⁾	PSG010 / 017 / 018
Cable connectors (controller side / sensor side)	Amphenol / Amphenol
10 m (33 ft)	BG548466-T
20 m (65 ft)	BG548468-T
30 m (99 ft)	BG548470-T

Cold cathode cables to VG094 ¹⁾	MAG050/060/084 80°C	MAG050/060/084 250°C	MAG070 80°C
Cable connectors (controller side / sensor side)	Bayonet, SHV / SHV	Bayonet, SHV / SHV	Push-pull self- latching, Triax / Triax
3 m (9.9 ft)	BG548406-T	BG548542-T	BG548306-T
6 m (19.8 ft)	BG548407-T	BG548543-T	BG548317-T
10 m (33 ft)	BG548419-T	BG448045-T	BG548490-T
15 m (49 ft)	BG548483-T	BG548989-T	BG548491-T

¹⁾ Other/longer lengths on request

Measurement Boards	
Double Pirani measurement board, PI 300 D	IG546920-T
Double Pirani measurement board, PI 300 DL	IG549212-T
Double Pirani measurement board, PI 300 DN	IG549214-T
Double cold cathode measurement board, PE 300 DC9	IG441375-T
Pirani/Cold cathode measurement board, CP 300 C9	IG441000-T
Pirani/Cold cathode measurement board, CP 300 C10	IG441114-T
Pirani/Cold cathode measurement board, CP 300 T11	IG441080-T
Pirani/Cold cathode measurement board, CP 300 T11L	IG441120-T

Interface Boards	
Interface and relay board, IF300A RS232C, 45 W, 75 VA	IG441130-T
Interface and relay board, IF300B RS232C, 120 W, 1000 VA	IG441250-T
Interface and relay board, IF300C RS422, 45 W, 75 VA	IG441390-T
Interface and relay board, IF300P Profibus, 45 W, 75 VA	IG441395-T
Interface and relay board, IF301P Profibus semi-relays, 15 W, 25 VA	IG441396-T
Interface board, IF500PN Profinet	398-421

VGC094

Pirani Gauges	DN 10 ISO-KF	DN 16 ISO-KF	DN 16 CF-F	DN 40 CF-F
PSG010	350-400	-	-	-
PSG017	-	350-430	350-431	-
PSG018	-	350-420	350-424	350-423

Cold cathode Gauges	DN 25 ISO-KF	DN 40 ISO-KF	DN 40 CF-F
MAG050	399-840	399-841	399-842
MAG060	-	399-845	399-846
MAG070	-	399-847	399-848
MAG084	-	399-849	399-850

VGC094

SPECIFICATIONS

Type	VGC094
Measurement channels	4
Display	LCD, LED backlight
Measurement rate	100 s ⁻¹
Display rate	10 s ⁻¹
Measurement range	1×10 ⁻¹¹ ... 1000 mbar 7.5×10 ⁻¹² ... 750 Torr
Connectable gauges with display range	
PSG010 / 017 / 018	8×10 ⁻⁴ ... 1000 mbar 6×10 ⁻⁴ ... 750 Torr
MAG050	2×10 ⁻⁹ ... 5×10 ⁻³ mbar 1.5×10 ⁻⁹ ... 3.75×10 ⁻³ Torr
MAG060	1×10 ⁻¹⁰ ... 5×10 ⁻³ mbar 7.5×10 ⁻¹¹ ... 3.75×10 ⁻³ Torr
MAG070	1×10 ⁻¹¹ ... 5×10 ⁻³ mbar 7.5×10 ⁻¹² ... 3.75×10 ⁻³ Torr
MAG084	1×10 ⁻⁹ ... 1×10 ⁻² mbar 7.5×10 ⁻¹⁰ ... 7.5×10 ⁻³ Torr
Measurement unit (selectable)	mbar, Torr, Pa, hPa, Micron, V
Slots for plug-in boards	2 measurement boards 1 interface board
Setpoints	
Setpoint relays	4
Error relay	1
Channel assignment	freely assignable
Adjustment range	sensor dependent
Hysteresis	adjustable
Relay contact	floating changeover contact
Contact rating	30 V (dc, ac) / 1.5 A 60 V (dc) / 0.6 A 40 V (ac) / 1 A
Connector	D-Sub, 25-pin, female
Analog output	4
Range	0 ... 10 V / 4...20 mA
Interface (digital)	USB slave, master, RS485, Ethernet USB Type A (flash drive), USB Type B, M12 5-pin FCC68/RJ45
Power	
Supply	100 ... 240 V (ac)
Frequency	50 ... 60 Hz
Consumption	≤65 W
Temperature	
Operation (ambient)	+5 ... +50 °C
Storage	-20 ... +60 °C
Relative humidity	max. 80% (up to 30 °C) max. 50% (from 40 °C)
Weight	1.45 kg 3.2 lb

SPECIFICATIONS CARDS

Measurement Boards	PI 300 D	PI 300 DL	PI 300 DN	PE 300 DC9	CP 300 C9	CP 300 C10	CP 300 T11	CP 300 T11L
Measurement channels	2 Pirani	2 Pirani	2 Pirani	2 Cold cathode	1 Pirani 1 Cold cathode	1 Pirani 1 Cold cathode	1 Pirani 1 Cold cathode	1 Pirani 1 Cold cathode

VG094

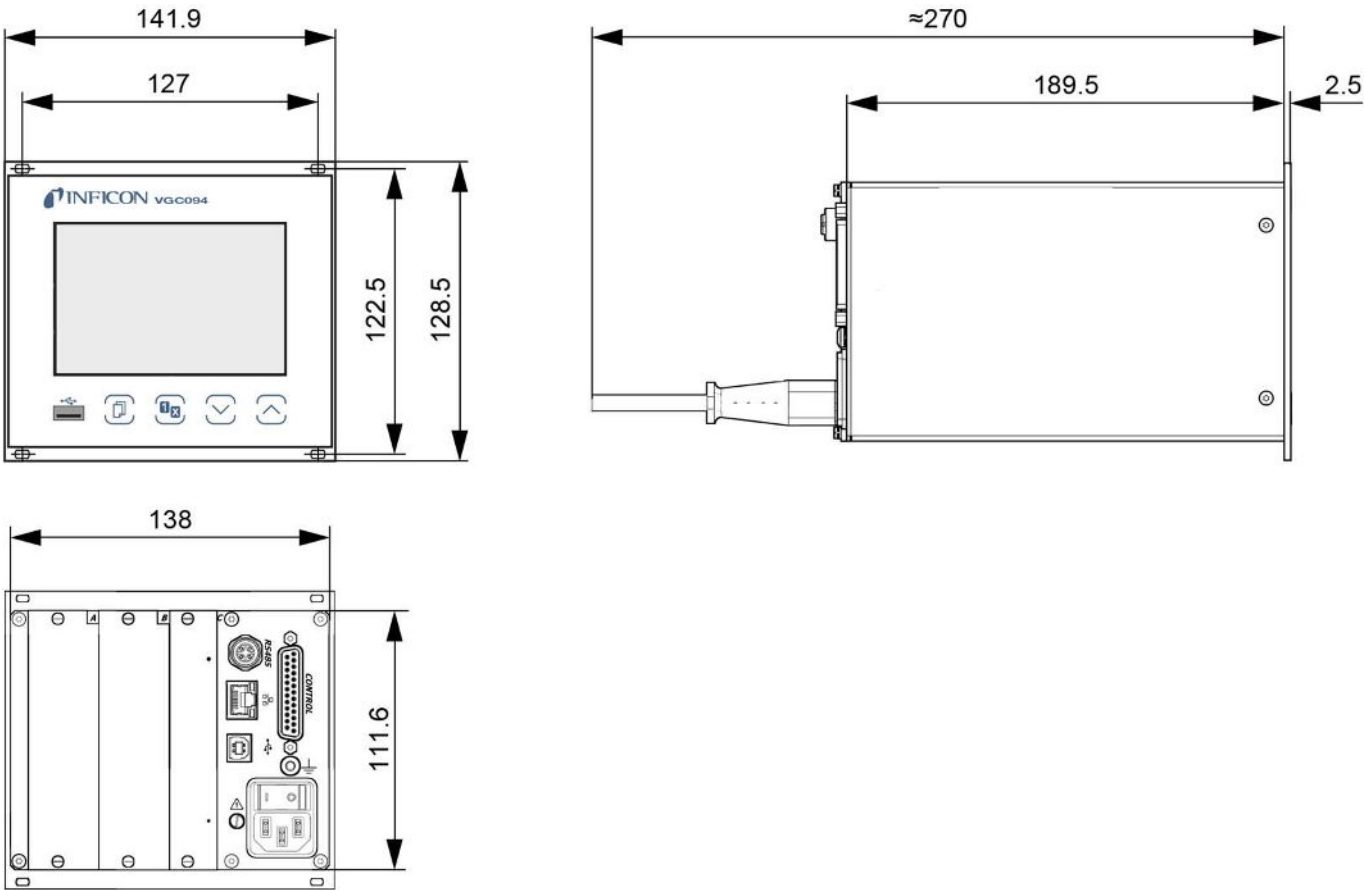
Measurement Boards	PI 300 D	PI 300 DL	PI 300 DN	PE 300 DC9	CP 300 C9	CP 300 C10	CP 300 T11	CP 300 T11L
Gauge type								
Pirani	PSG010 PSG018	PSG010 PSG018	PSG017	-	PSG010 or PSG018	PSG010 or PSG018	PSG010 or PSG018	PSG010 or PSG018
Cold cathode	-	-	-	MAG050 MAG060	MAG050 or MAG060 or MAG084	MAG050 or MAG060	MAG070	MAG070
Max. operating distance								
Pirani	<100 m	<500 m	<100 m	-	<100 m	<100 m	<100 m	<500 m
Cold cathode	-	-	-	<100 m	<100 m	<100 m	<500 m	<500 m

Measurement plug-in board		Pirani			Cold Cathode	Pirani / Cold Cathode		
		PI 300 D	PI 300 DL	PI 300 DN	PE 300 DC9	CP 300 C9	CP 300 C10	CP 300 T11 CP 300 T11L
Compatible gauges								
	PSG010	●	●			●	●	●
	PSG017			●				
	PSG018	●	●			●	●	●
	MAG050				●	●	●	
	MAG060				●	●	●	
	MAG070							●
	MAG084					●		

VG094

DIMENSIONS

[mm]



Ion Reference Gauge - Passive

IRG080

The Ion Reference Gauge IRG080 is a first-of-a-kind vacuum sensor developed for precise total pressure measurement in vacuum systems. This passive sensor is based on an innovative concept of ionization vacuum gauge, whereby a hot cathode emits electrons travelling on a straight path into a Faraday cup.

The IRG080 is suitable as reference standard in the range of 10^{-8} mbar (10^{-6} Pa) to 10^{-4} mbar (10^{-2} Pa). This gauge offers predictable gas sensitivity with a very small spread, very good short-term repeatability and reproducibility. The gauge can be used for calibration purposes of other vacuum gauges and quadrupole mass spectrometers. It is ideal for precise vacuum measurement in industrial applications pursuing no calibration or process readjustments after a gauge exchange. The IRG080 is connected and controlled by the IRC081 operating unit.



ADVANTAGES

- Developed for applications requiring high measurement accuracy in the high and ultra-high vacuum range
- True pressure for all gas species thanks to predictable relative gas sensitivity with small uncertainty
- Stable electron emission and lack of influence from ESD or X-ray effects
- Reproducible and easy to transport
- Bakeable to 165 °C (with temperature resistant cable) or up to 400 °C without connector unit
- Mu-metal intermediate piece available for magnetic shielding purposes

APPLICATIONS

- Metrology, transfer standards to national and calibration laboratories
- Advanced scientific and industrial applications requiring precise vacuum pressure measurement for quality assurance
- Calibration of other vacuum gauges and mass spectrometers, pump speed measurement

OPERATING UNITS

- Ion Reference gauge Controller IRC081

IRG080

ORDERING INFORMATION

Type	IRG080
Sensor, with BNC and multipin connector, DN 63 CF-R	399-874
Sensor, with BNC and multipin connector, DN 63 CF-F, with mu-metal intermediate piece	399-875

Accessories	IRG080
Replacement cathode	399-890
Mu-metal intermediate piece, DN 63 CF-F (incl. protection grid)	399-891
Protection grid for intermediate piece	399-892

IRG080

SPECIFICATIONS

Type	IRG080
Measurement system	hot cathode ionization
Electrode system configuration	according ISO TS 6737
Measurement range (N ₂) with IRC081 controller	$<1 \times 10^{-8} \dots 1 \times 10^{-4}$ mbar $<1 \times 10^{-6} \dots 1 \times 10^{-2}$ Pa
Sensitivity (N ₂ , typical)	29 mbar ⁻¹
Accuracy (N ₂ , typical)	± 1% of reading
Repeatability (typical)	1% of reading
Mounting orientation	recommended aligned with magnetic field ¹⁾
with mu-metal int. piece (399-891)	any
Admissible temperature	
Ambient, in operation	+20 ... +80 °C
Bake-out	
max. flange with temp. resistant gauge head cable set	+165 °C +400 °C
max. bake-out temp. without plug and connector plate unit	+200 °C
max. bake-out temp. without plug and connector plate unit with mu-metal int. piece (399-891)	+20 ... +50 °C
Storage	
Relative humidity	≤ 85% (non-condensing)
Admissible external magnetic field	
in the plane normal to gauge axis, without shielding	≤50 µT
Use	indoors only
Standard operating characteristics with IRC081 controller	
Cathode	1.4 ... 1.8 A / 2 V
Heating current / voltage (typ.)	+50 V
Potential	10 ... 100 µA
Emission current range	+34 V
Wehnelt potential	+250 V
Anode potential	0 V
Collector potential	45 V
Deflector potential	+280 V
Faraday cup potential	
Flange connection	DN 63 CF-R
Gauge connections	
Ion collector	Bayonet (BNC)
Interface to Sensor (IS)	Push-pull self-latching, 7-pin
Materials exposed to vacuum	
Feedthrough pins	stainless steel (EN 1.4301)
Feedthrough caps	NiFeCo (EN 1.3981)
Feedthrough isolation	ceramic (Al ₂ O ₃)
Cathode	Ta, W, Kovar, Al ₂ O ₃
Anode	stainless steel (EN 1.4404, EN 1.4435)
Wehnelt cylinder	stainless steel (EN 1.4404, EN 1.4435)
Flange	stainless steel (EN 1.4335 ESU)
Internal volume	~385 cm ³

¹⁾ Orientation should be such that magnetic field is not perpendicular to the electron trajectory

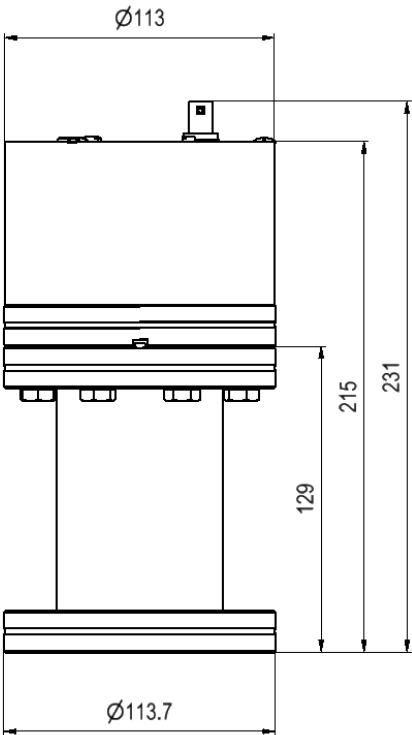
IRG080

Type	IRG080
Weight	4.3 kg

¹⁾ Orientation should be such that magnetic field is not perpendicular to the electron trajectory

DIMENSIONS

[mm]



Ion Reference Gauge Controller

IRC081

The Ion Reference gauge Controller IRC081 and its User Interface are an operating and display interface to the standardized Ion Reference Gauge IRG080. IRC081 delivers, in combination with IRG080, precise and reference total pressure measurement in the range of 10^{-8} mbar (10^{-6} Pa) to 10^{-4} mbar (10^{-2} Pa).

IRC081 provides local control for the IRG080 gauge parameters set. Read-out and switch on/off functionality are available remotely via an USB computer interface. Thanks to the intuitive included "IRC081 User Interface" software, selected settings and measured pressure value can be conveniently graphically displayed.

The IRC081 operating unit is offered with different sets of cable lengths.



ADVANTAGES

- Operating and display solution for accurate vacuum pressure measurement
- User control on all IRG080 gauge parameters set
- Simple manual operation with 5 potentiometers
- User Interface connection via USB-B port to PC
- PC Software in LabVIEW™
- Data log and parameter log functionality
- External port for status and vacuum interlock

APPLICATIONS

- Metrology, transfer standards to national and calibration laboratories
- Advanced scientific and industrial applications requiring precise vacuum pressure measurement for quality assurance
- Calibration of other vacuum gauges and mass spectrometers, pump speed measurement

IRC081

ORDERING INFORMATION

Type	IRC081
Ion Reference gauge Controller, USB 2.0 incl. 2x measuring lines CAT III (1 m, red/black), USB Type-A/B cable, USB stick with software and instructions, D-sub 9-pin port	399-880

Accessories

Heat resistant gauge head cable set to IRG080, with contact protection	
5 m (16.4 ft)	399-883
10 m (32.0 ft)	399-884
15 m (49.5 ft)	399-885
Shockproof measuring line, CAT III, 1 m	
black	399-887
red	399-888

Gauge

Ion Reference Gauge IRG080, DN 63 CF-R	399-874
Ion Reference Gauge IRG080, DN 63 CF-F, with mu- metal intermediate piece	399-875

IRC081

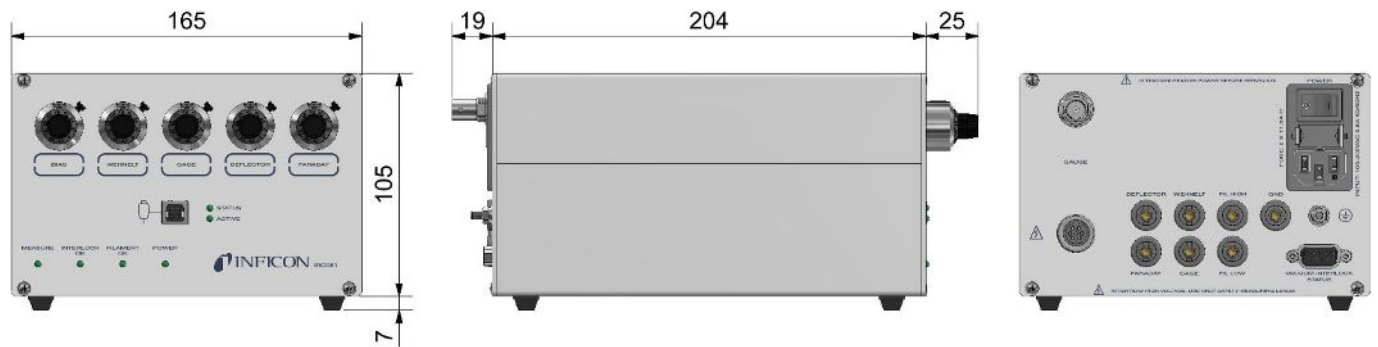
SPECIFICATIONS

Type	IRC081
Measurement channel	1
Measurement rate	1 s ⁻¹
User interface	Front panel, PC-software
Manual control	5 knobs
Remote control	via USB 2.0 with PC software "IRC081 user interface"
Installation	Tabletop
Connectable gauges with display range	
IRG080	$<1 \times 10^{-8} \dots 1 \times 10^{-4}$ mbar $<1 \times 10^{-6} \dots 1 \times 10^{-2}$ Pa
Measurement unit (selectable)	mbar, Torr, Pa
Sources (accuracy: 0.1%)	
Cathode bias	20 ... 60 V (dc)
Wehnelt	20 ... 60 V (dc) / ≤ 1 mA
Anode	200 ... 400 V (dc) / ≤ 1 mA
Deflector	20 ... 60 V (dc) / ≤ 1 mA
Faraday	200 ... 400 V (dc) / ≤ 1 mA
Emission range	100 μ , 1 mA
Heater	controlled by emission current
Controller connections	
to gauge ion collector	Bayonet (BNC)
to gauge control interface	Push-pull self-latching, 7-pin
Measuring sockets	7 (2x filament, Wehnelt, anode, deflector, Faraday, GND)
Min. measurable current	<0.1 pA
Accuracy	0.5% in the 50 pA range $<0.1\%$ elsewhere
Connection type	CAT III, 4 m
Vacuum interlock / status port	1 $\times$ D-sub 9-pin
Available input / output signals	1 $\times$ sensors status, 1 $\times$ external vacuum interlock
Interface (digital)	USB 2.0
to user computer	USB Type-A
to controller	USB Type-B
Power supply	
Required connector	IEC 320 C14 plug
Voltage	100 ... 240 V (ac)
Frequency	50 ... 60 Hz
Consumption	≤ 20 W
Temperature	
Operation (ambient)	+5 ... +40 °C
Storage	-20 ... +60 °C
Relative humidity	max. 80% (up to 30 °C) max. 50% (from 40 °C)
Use	indoors, max. altitude 3000m above sea level
Ingress protection	IP40
Weight	2.2 kg

IRC081

DIMENSIONS

[mm]



Vacuum Switch

VSA100A

The pressure switch VSA100A is used as a safety switch in rough vacuum systems. For example, to automatically interrupt the gas supply when venting vacuum systems with a purge gas at a pressure of 6 mbar below atmospheric pressure.

At a differential pressure of 6 mbar resp. return switching pressure of 3 mbar below atmospheric pressure, an elastic diaphragm actuates a changeover contact which in turn may be used to switch directly any ancillary equipment.

The electrical connections are protected by a plastic cover.



ADVANTAGES

- Reliable and budget-priced vacuum switch
- Long service life
- Rugged design
- Easy to integrate
- IP 44 protection
- Can be connected to a programmable control

APPLICATIONS

- Control of load lock chambers
- Safety shutdown of vacuum systems

VSA100A

ORDERING INFORMATION

Type	VSA100A
DN 16 ISO-KF, complete with 3 m (9.9 ft.) cable	399-001

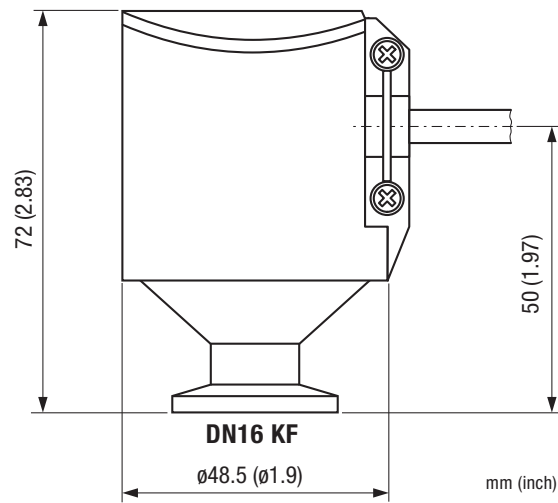
SPECIFICATIONS

	VSA100A
Switching pressure	6 ± 2 mbar (below atmosphere)
Back switching	3 ± 2 mbar (below atmosphere)
Operating pressure (absolute)	<2 bar
Helium permeation	5×10^{-5} mbar l/s
Temperature	
Operation	0 ... +85 °C
Storage	-20 ... +85 °C
Switching contacts (gold plated)	Change over contact
Voltage max.	24 V (dc) / 24 V (ac)
Current max.	30 mA (24 V (dc)) / 100 mA (24 V (ac))
Load min.	1 mA
Electrical connector	Cable, bare wire
Cable length, standard	3 m (9.9 ft.)
Vacuum connection	DN 16 ISO-KF
Protective type	IP 44
Mounting orientation	Vertical (standing)
Internal volume	2 cm ³ (0.122 in. ³)
Materials exposed to vacuum	Stainless steel 1.4305, EPDM, PTFE (Teflon)
Weight	315 g

Technical Note: Due to the diaphragm material used (EPDM), the Vacuum Switch VSA100A is not suited for applications in which the process gas contains large quantities of helium. The leak rate of the diaphragm for helium is 5×10^{-5} mbar l/s.

VSA100A

DIMENSIONS



Vacuum Switch

VSA200, VSD200

INFICON Vacuum Switches are designed for accurate and reliable pressure detection. These robust electronic switches are used in all vacuum applications, including pressure interlock. The switches are available in two versions, absolute (references vacuum) or differential (references ambient).



ADVANTAGES

- Corrosion resistant all stainless steel design
- Relay output with potential free contacts
- Easy installation with setpoints factory preset or field-adjustable
- High-accuracy temperature compensated sensor
- Robust design, cleanroom compliant
- Pressure range 1×10^{-9} mbar ... 2 bar
- CE, RoHS

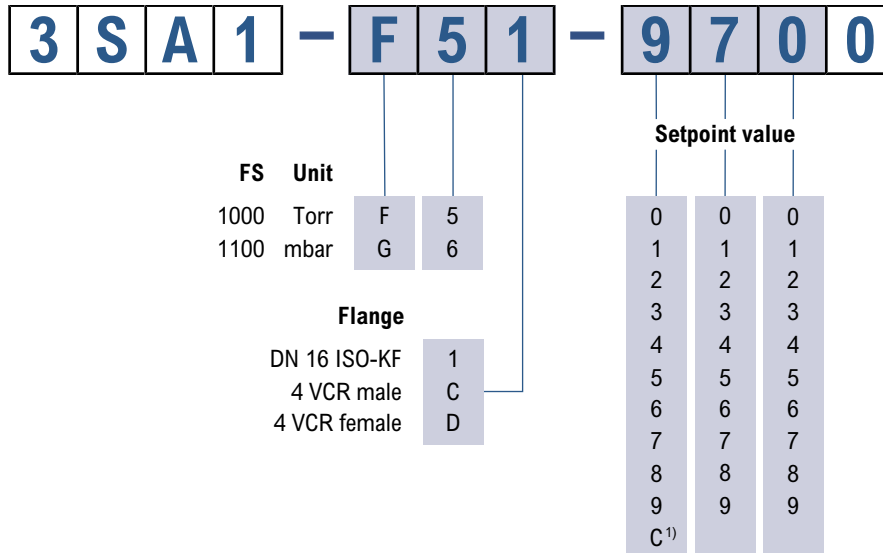
APPLICATIONS

- Atmospheric pressure detection for all vacuum applications
- Pressure interlock (power supplies, gas supplies, pumps, valves, actuators, etc.)
- Vacuum to high vacuum

VSA200, VSD200

ORDERING INFORMATION

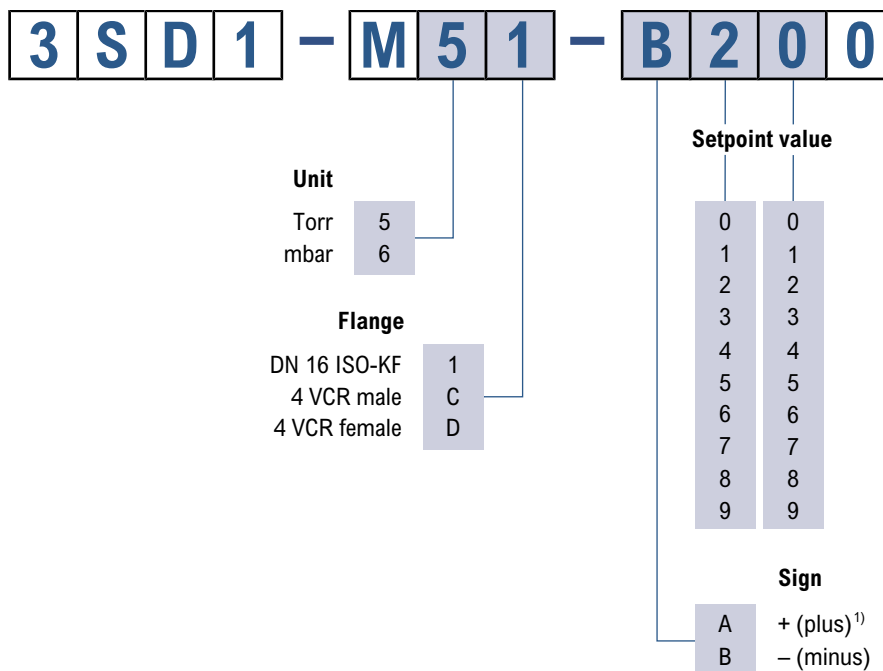
ORDERING INFORMATION VSA200 ABSOLUTE SWITCH



1) C=10

Example:	Setpoint at 970 Torr absolute pressure, DN 16 ISO-KF:	3SA1-F51-9700
	Setpoint at 1080 mbar absolute pressure, 4 VCR male:	3SA1-G6C-C800

ORDERING INFORMATION VSD200 DIFFERENTIAL SWITCH



1) setpoint only possible up to +46 Torr / mbar

Example:	20 Torr below ambient pressure, DN 16 ISO-KF:	3SD1-M51-B200
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VSA200, VSD200

Accessories	Part no.
Communication adapter (2 m) for PC USB port ¹⁾	303-336

¹⁾ Software to read or write data on Windows can be downloaded from our website

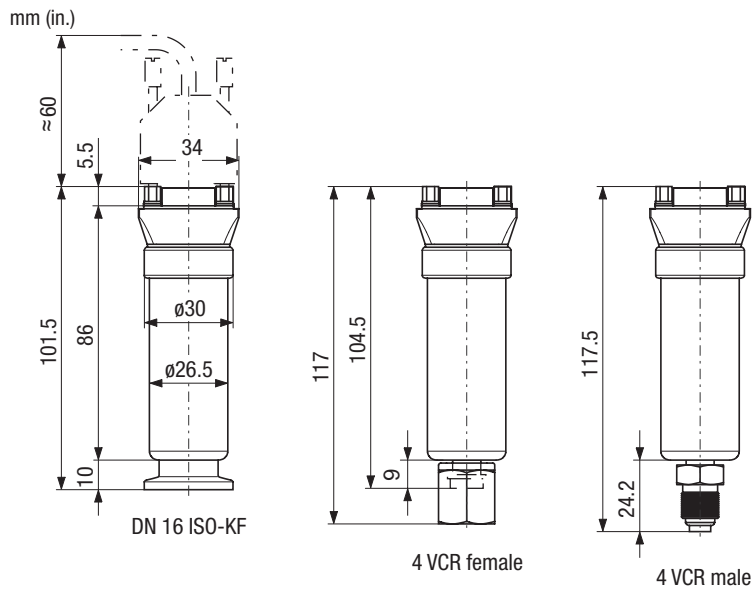
SPECIFICATION

	VSA200	VSD200
Full Scale (FS)	1000 Torr / 1100 mbar	-
Differential range ¹⁾	-	-100 ... +50 Torr / mbar
Setpoint range	20 ... 970 Torr / 30 ... 1060 mbar	-99 ... +46 Torr / mbar
Admissible pressure (absolute)	5 bar	2 bar
Setpoint relay	n.o., n.c., potential free	
Relay output	30 V / 1 A (dc)	
Contact rating	125 V / 0.3 A (ac)	
Setpoint accuracy	0.5 % FS	
Temperature effect on zero and span	$\leq \pm 0.02$ % FS / °C	
Response time	≤ 45 ms	
Hysteresis	2% FS	
Electrical connection	D-Sub, 9-pin	
Supply voltage	14 ... 30 V (dc)	
Power consumption	<0.5 W	
Admissible temperature		
Operation (ambient)	0 ... 70 °C	
Storage	-40 ... 80 °C	
Materials exposed to vacuum	Stainless steel	
Mounting orientation	Any	
Internal volume		
DN 16 ISO-KF	2.81 cm ³ (0.17 in. ³)	
4 VCR	0.93 cm ³ (0.057 in. ³)	
Weight	140 g	
Degree of protection	IP 40	
Sensor protection	Short circuit protection and reverse polarity protection	

¹⁾ References to ambient pressure

VSA200, VSD200

DIMENSIONS



Vacuum Switch

VSC150A

The INFICON Vacuum Switch VSC150 is an absolute pressure switch with an adjustable electrical switching contact from 0.5 to 2000 mbar. The mechanical design allows short term overload of 3000 mbar without impairing the switching accuracy of ± 0.1 mbar. INFICON offers customer specific adjustment of pressure switch.



ADVANTAGES

- High switching accuracy (± 0.1 mbar)
- Stable long term operating characteristics
- Rugged, corrosion protected design
- Increased switching capability when using switching amplifier
- Switching contacts (normally closed) in the reference chamber and thus protected against process media
- Adapter available for differential pressure measurement

APPLICATIONS

- Pressure switch or differential pressure switch to control valves, pumps, power supplies
- Load lock chambers
- Process chambers

VSC150A

ORDERING INFORMATION

Type	VSC150A
DN 16 ISO-KF	399-005

Accessories

SV Switching Amplifier	399-008
Pressure Switch Adjustment	399-006
Differential Pressure Adapter	399-007

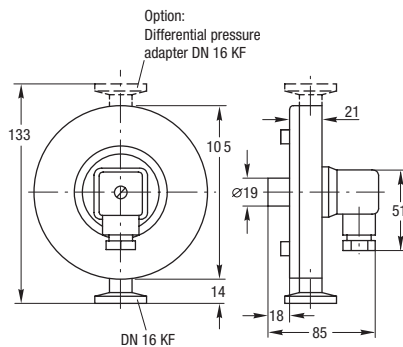
VSC150A

SPECIFICATIONS

SV Switching Amplifier	
Mains supply (selectable)	110 ... 130 V, 220 ... 240 V
Mains frequency	50 / 60 Hz
Power consumption	3 VA
Output relay	Change over contact
Switching voltage	250 V
Switching current	5 A
Switching capacity	500 VA
Response time	30 ms
Release time	7 ms
Control circuit	24 V / 10 mA
Operation temperature	5 ... 50 °C
Weight	0.36 kg

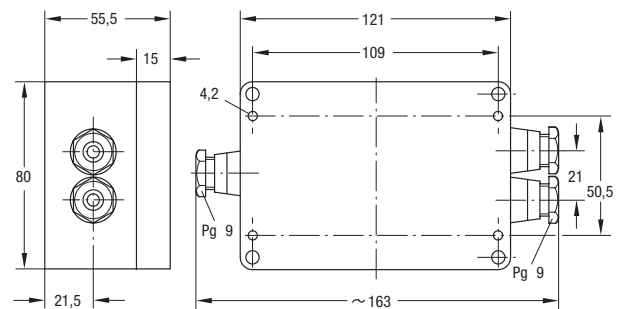
DIMENSION

VSC150A Vacuum Switch



mm

SV Switching Amplifier



mm

Calibration Service

Vacuum Gauges

INFICON offers calibration services for vacuum gauges. DAkkS (Deutsche Akkreditierungsstelle; according to DIN EN ISO/IEC 17025:2005) calibration certificate or factory calibration certificate can be issued.

All issued inspection documents are in compliance with the European Standard EN 10204.

ADVANTAGES

- Known deviation to calibration standards
- Controlled quality over time

APPLICATIONS

- Reference to standard is required
- Reference for customer in house calibration service of vacuum gauges

DAKKS CALIBRATION

The German Calibration Service (DAkkS) ensures traceability of industrial measurements and testing to national calibration standards. It is run jointly by the Federal Institution for Physics and Technology (PTB), the Industry, the federal Minister for Economics and the Western European Metrology Club (WEMC).

The transfer standards employed in the DK calibration facility are checked regularly (recalibrated) by the PTB.

FACTORY CALIBRATION

Factory calibrations traced back to DAkkS transfer standards.

CDG gauges are calibrated on a special tool with traceability to national standards at PTB.

Thus, traceability to national standards is ensured in both cases.

OTHER CALIBRATIONS

NIST Calibration available upon request. Call for availability and pricing.

ORDERING INFORMATION

Calibration Service for	Calibration Range [mbar], [Torr]	DAkks Calibration ¹⁾	Factory Calibration ¹⁾
Pirani, Pirani Combination Gauges	$1 \times 10^{-3} \dots 30$	398-900	398-910
Capacitance Diaphragm Gauges	$1 \times 10^{-3} \dots$ $10001 \times 10^{-3} \dots 1000$	-	398-913
Capacitance Diaphragm Gauges (gauges with measurement cable to controller)	$1 \times 10^{-3} \dots 1000$	-	398-914
Bayard Alpert, Cold Cathode, High Pressure and Combination Gauges	$1 \times 10^{-6} \dots 30$	398-902	-
Bayard Alpert, Cold Cathode, High Pressure and Combination Gauges	$5 \times 10^{-7} \dots 1000$	-	398-912

¹⁾ Pressure media: Nitrogen

Inspection Documents Service

Vacuum Control

INFICON offers a inspection documents service for Vacuum Control products.

All issued inspection documents are in compliance with the European Standard EN 10204.

ADVANTAGES

- Choice of three different inspection documents for customers individual needs
- Inspection documents according to European Standard EN 10204

ORDERING INFORMATION		
Designation of Inspection Document	Type	Ordering Number
Declaration of compliance with the order (Werksbescheinigung 2.1)	EN 10204-2.1	211-801
Test report (Werkszeugnis 2.2) (Werkszeugnis 2.2)	EN 10204-2.2	211-802
Inspection certificate (Abnahmeprüfzeugnis 3.1)	EN 10204-3.1	211-800

Please check with the given information in the following chart the right inspection document for your specific needs and order your choice of inspection document together with the corresponding Vacuum Control product you need it for.

The inspection document will be issued and delivered together with your goods and / or can be sent as pdf file for your attention. For pricing or specific questions concerning inspection documents please call our customer service center.

Vacuum Control

INSPECTION DOCUMENTS SERVICE

Inspection Documents	EN 10204-2.1	EN 10204-2.2	EN 10204-3.1
Inspection document	Declaration of compliance with the order	Test report	Inspection certificate
Kind of inspection	Non-specific inspection. The products inspected are not necessarily the products actually supplied.	Non-specific inspection. The products inspected are not necessarily the products actually supplied.	Specific inspection. The products inspected are the products, or part of the products, actually supplied.
Contents of inspection document	Manufacturer's declaration that the products supplied are in compliance with the requirements of the order, without inclusion of test results.	Manufacturer's declaration that the products supplied are in compliance with the requirements of the order, with test results based on non-specific inspection.	Manufacturer's declaration that the products supplied are in compliance with the requirements of the order, with test results based on specific inspection.
Conditions of delivery	In accordance with conditions of order.	In accordance with conditions of order.	According to regulations of authorities and the corresponding technical rules.
Inspection document confirmed by	The manufacturer	The manufacturer	The manufacturer's authorized inspection representative, independent of the manufacturing department
Example for ordering at INFICON	Add ordering number 211-801 to your order in a separate order position directly after the order position of the corresponding parts you like to have the declaration of compliance for.	Add ordering number 211-802 to your order in a separate order position directly after the order position of the corresponding parts you like to have the test report for.	Add ordering number 211-800 to your order in a separate order position directly after the order position of the corresponding parts you like to have the certificate for.
Notes by INFICON	If this declaration is needed for all of your purchase order items you simply can add the ordering number 211-801 at the end of your order in the last position and state that it should be valid for the whole order	The test report just can be issued to a specific part number you have ordered. It can't be valid for multiple part numbers. It should be ordered along with the corresponding product it belongs to (add ordering number 211-802 directly after the product it belongs to).	This certificate just can be issued to a specific part number you have ordered. It can't be valid for multiple part numbers. It strictly has to be ordered along with the corresponding product it belongs to (add ordering number 211-800 directly after the product it belongs to). The original certificate always comes along with the corresponding product it belongs to. On customer request we can send it in addition to our shipment as pdf file by email or by post (copies).

Vacuum Control

Inspection Documents	EN 10204-2.1	EN 10204-2.2	EN 10204-3.1
Inspection document available for	All INFICON Vacuum Control products	All INFICON Vacuum Control products	Majority of our vacuum fittings (usually this certificate is asked for fittings made of stainless steel and aluminum and their specific chemical composition). Other Vacuum Control products on request and according feasibility. Please define in your request values you like to have tested and confirmed Standard prices apply for this type of certificate, however we reserve the right to apply further charges for any additional work that maybe required.

Vacuum Control

Vacuum Feedthroughs

Vacuum Feedthroughs

Vacuum Feedthroughs

FRH DN 16 - DN 63 Rotary Feedthroughs ISO-KF / ISO-K	B1
FRU DN 16 - DN 40 Rotary Feedthroughs CF	B3
FCH DN 16 - DN 40 Rotary/Linear Motion Feedthroughs ISO-KF	B5
FPU DN 16 - DN 40 Linear Motion Feedthroughs CF	B7
DN 16 ISO-KF Electrical Feedthroughs	B9
DN 40 ISO-KF Electrical Feedthroughs	B11
DN 16 CF-F Electrical Feedthroughs	B13
DN 40 CF-F Electrical Feedthroughs	B15
DN 40 ISO-KF High Current Feedthrough	B18
BNC / MHV DN 16 - 40 Coaxial Feedthroughs ISO-KF/CF-F	B20
Metal-Ceramic Connections Vacuum Feedthroughs	B22
DN 40 Liquid Feedthroughs ISO-KF/CF-F	B24
DN 16 - DN 50 ISO-KF Viewports	B26
DN 63 - DN 160 ISO-K Viewports	B28
DN 16 - DN 160 CF Viewports	B30
DN 63 - DN 160 ISO-F Viewports	B32
Vacuum Ball Bearings Vacuum Feedthroughs	B34
Lubricants and Sealing Materials Vacuum Feedthroughs	B36

Rotary Feedthroughs ISO-KF / ISO-K

FRH DN 16 – DN 63

PROPERTIES

- For transmitting high torque
- With FPM shaft seal and ball bearings



SELECTION DATA

Vacuum connection		DN 16 ISO-KF	DN 25 ISO-KF	DN 40 ISO-KF	DN 63 ISO-K
Feedthrough / seal		FPM	FPM	FPM	FPM
Shaft measure	mm	Ø5	Ø8	Ø12	Ø20

ORDERING INFORMATION

Type	FRH016-H	FRH025-H	FRH040-H	FRH063-H
Part No.	214-300	214-302	214-304	214-306 ¹⁾

¹⁾ Centering ring / CR / aluminum Part No. 212-251 / FPM / stainless steel Part No. 212-281 not included in delivery

SPECIFICATIONS

Type	FRH016-H	FRH025-H	FRH040-H	FRH063-H
Vacuum connection	DN 16 ISO-KF	DN 25 ISO-KF	DN 40 ISO-KF	DN 63 ISO-KF
Feedthrough / seal	FPM	FPM	FPM	FPM
Shaft measure	Ø5 mm	Ø8 mm	Ø12 mm	Ø20 mm
Transferable torque	1.5 Nm	6 Nm	25 Nm	100 Nm
Rotational speed ¹⁾	1500 rpm	1000 rpm	750 rpm	500 rpm
Idling torque under vacuum	≤3 Ncm	≤4 Ncm	≤5 Ncm	≤10 Ncm
Starting torque under vacuum	≤6 Ncm	≤8 Ncm	≤10 Ncm	≤20 Ncm
Shaft load vacuum sided				
Radial force	60 N	150 N	250 N	500 N
Axial force	30 N	50 N	60 N	100 N
Service life (revolutions)	20 000 000	20 000 000	20 000 000	10 000 000
Tightness, static	1 × 10 ⁻⁹ mbar l/s			
Pressure (absolute)	1 × 10 ⁻⁹ mbar ... 1 bar			
Operating temperature	50 °C			
Bakeout temperature	110 °C			

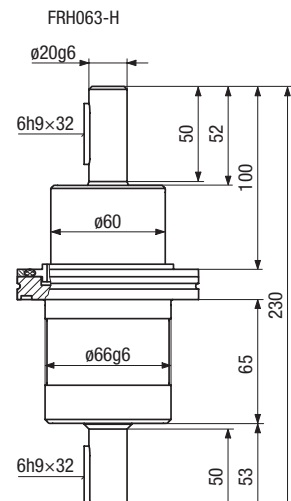
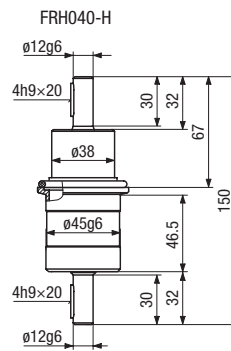
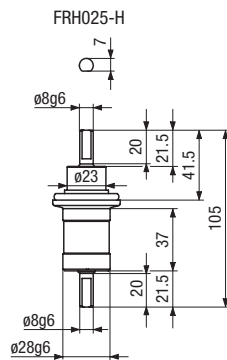
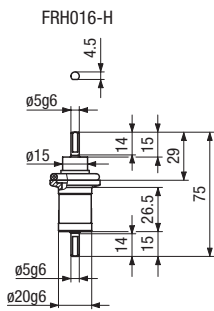
¹⁾ When a reduced service life is acceptable, the rotation can be increased by up to a factor of two

FRH DN 16 – DN 63

Type	FRH016-H	FRH025-H	FRH040-H	FRH063-H
Materials exposed to process media	Stainless steel 420/1.4021 Aluminum 6082 Elastomer FPM			
Weight	0.1 kg	0.2 kg	0.6 kg	2 kg

¹⁾ When a reduced service life is acceptable, the rotation can be increased by up to a factor of two

DIMENSIONS



Rotary Feedthroughs CF

FRU DN 16 - DN 40

PROPERTIES

- Bellow sealed
- All-metal version
- For very demanding vacuum requirements



SELECTION DATA

Vacuum connection	DN 16 CF-F	DN 40 CF-F	DN 40 CF-F
Feedthrough / seal	bellow	bellow	bellow
Shaft connection	mm 4	8	12

ORDERING INFORMATION

Type	FRU016-H	FRU040-N	FRU040-L
Part No.	214-310	214-312	214-314

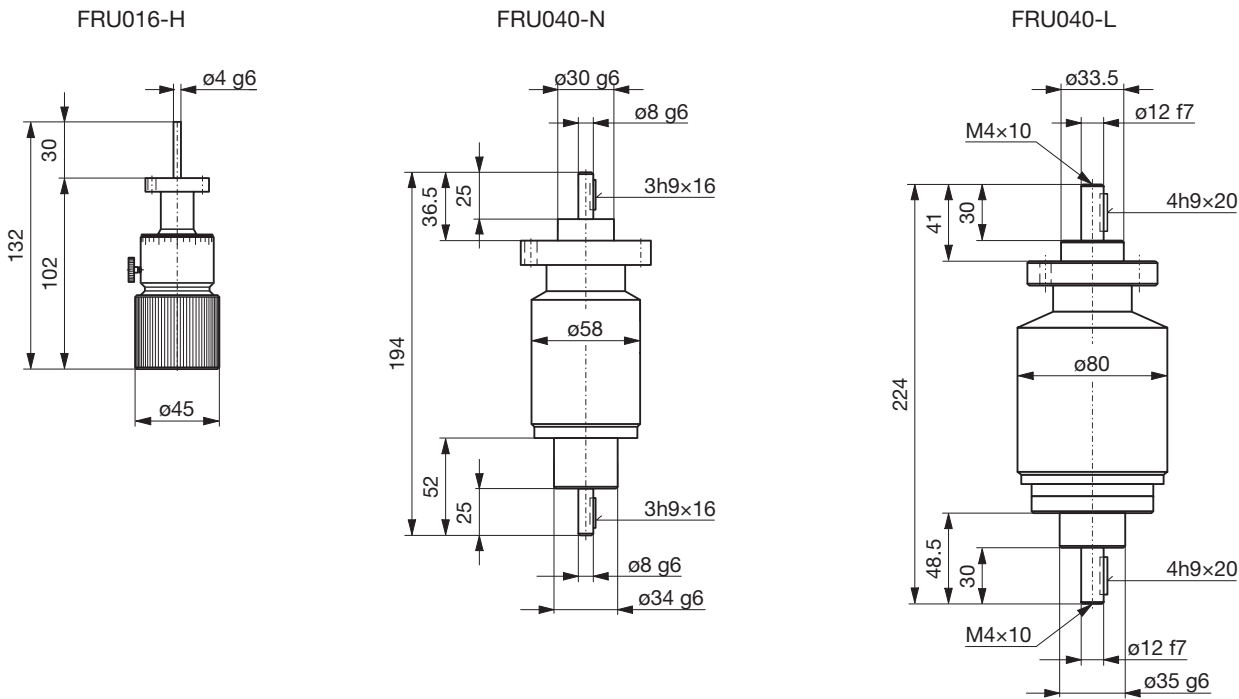
SPECIFICATIONS

Type	FRU016-H	FRU040-N	FRU040-L
Vacuum connection	DN 16 CF-F	DN 40 CF-F	DN 40 CF-F
Feedthrough / seal	bellow	bellow	bellow
Shaft connection	4 mm	8 mm	12 mm
Transferable torque			
Dynamic	0.4 Nm	4 Nm	10 Nm
Dynamic, at 300°C	0.2 Nm	2 Nm	2 Nm
Static	0.2 Nm	3 Nm	5 Nm
Rotational speed	200 rpm	1000 rpm	500 rpm
At max. torque		500 rpm	300 rpm
Shaft load vacuum sided			
Radial force	10 N	60 N	100 N
Axial force	5 N	20 N	30 N
Service life (revolutions)	1 000 000	2 000 000	1 000 000
Scale division	10 °C	□	□
Tightness		5 × 10 ⁻¹¹ mbar l/s	
Pressure (absolute)		1 × 10 ⁻¹⁰ mbar ... 2 bar	
Operating temperature		300 °C	
Bakeout temperature		300 °C	

FRU DN 16 - DN 40

Type	FRU016-H	FRU040-N	FRU040-L
Materials exposed to process media	304L/1.4306 304/1.4301 -/2.4360	304L/1.4306 304/1.4301 -	304L/1.4306 304/1.4301 303/1.4305
Weight	0.3 kg	1.5 kg	3.0 kg

DIMENSIONS



Rotary/Linear Motion Feedthroughs ISO-KF

FCH DN 16 - DN 40

PROPERTIES

- Two FPM shaft seals
- Direct push/pull and rotary actuation
- With locking ring and optional anti-rotation device



SELECTION DATA

Vacuum connection		DN 16 ISO-KF	DN 25 ISO-KF	DN 40 ISO-KF
Feedthrough / seal		FPM	FPM	FPM
Shaft connection		M 3 / Ø 5mm	M 4 / Ø 8mm	M 6 / Ø 12mm
Travel	mm	50	100	150

ORDERING INFORMATION

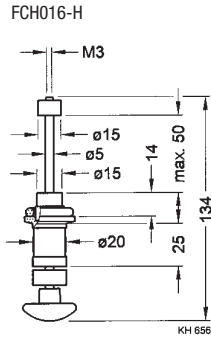
Type	FCH016-H	FCH025-H	FCH040-H
Rotary/linear feedthrough	214-320	214-322	214-324
Anti-rotation device	214-072	214-073	214-074

SPECIFICATIONS

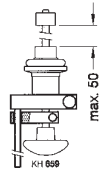
Type	FCH016-H	FCH025-H	FCH040-H
Vacuum connection	DN 16 ISO-KF	DN 25 ISO-KF	DN 40 ISO-KF
Feedthrough / seal	FPM	FPM	FPM
Shaft connection	M 3 / Ø 5mm	M 4 / Ø 8mm	M 6 / Ø 12mm
Travel	50 mm	100 mm	150 mm
Shaft load			
Radial force at max. travel	10 N	15 N	30 N
Torsion torque	2 Nm	8 Nm	20 Nm
Tightness, static	1×10^{-9} mbar l/s		
Pressure (absolute)	1×10^{-8} mbar ... 1 bar		
Operating temperature	50 °C		
Bakeout temperature	110 °C		
Materials exposed to process media	Stainless steel 304/1.4301 Aluminum 6082		
Weight	0.1 kg	0.2 kg	0.3 kg

FCH DN 16 - DN 40

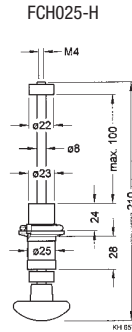
DIMENSIONS



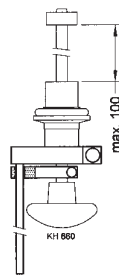
Feedthrough



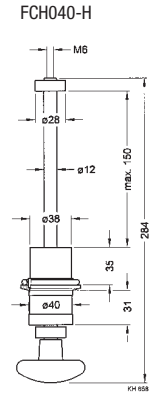
Anti-rotation device



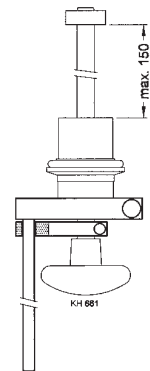
Feedthrough



Anti-rotation device



Feedthrough



Anti-rotation device

Linear Motion Feedthroughs CF

FPU DN 16 - DN 40

PROPERTIES

- With bellows for more demanding vacuum requirements
- Direct push and pull actuation
- High accuracy adjustment using micrometer screw



SELECTION DATA

		DN 16 CF-R	DN 40 CF-R	DN 16 CF-R	DN 40 CF-R
Vacuum connection		DN 16 CF-R	DN 40 CF-R	DN 16 CF-R	DN 40 CF-R
Feedthrough/seal		Bellow	Bellow	Bellow	Bellow
Shaft connection		M4x16 mm	M6x10 mm, Ø10 mm	M4x16 mm	M6x10mm, Ø10 mm
Actuator		Manual	Manual	Micrometer screw	Micrometer screw
Travel	mm	25	50	20	50

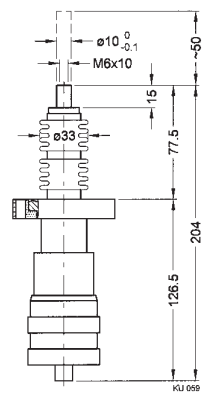
ORDERING INFORMATION

Type	FPU016-H	FPU040-H	FPU016-Z	FPU040-Z
Part No.	214-330	214-332	214-334	214-336

SPECIFICATIONS

Type	FPU016-H	FPU040-H	FPU016-Z	FPU040-Z
Vacuum connection	DN 16 CF-R	DN 40 CF-R	DN 16 CF-R	DN 40 CF-R
Feedthrough/seal	Bellow	Bellow	Bellow	Bellow
Shaft connection	M4x16 mm	M6x10 mm Ø10 mm	M4x16 mm	M6x10mm Ø10 mm
Actuator	Manual	Manual	Micrometer screw	Micrometer screw
Travel	25 mm	50 mm	20 mm	50 mm
Travel per revolution			0.5 mm	1 mm
Scale division	5 mm	10 mm	0.01 mm	0.005 mm
Shaft load				
Radial force at max.	20 N	100 N	20 N	100 N
Axial force vacuum	85 N	140 N	185 N	440 N
Axial force against atm	100 N	200 N	200 N	500 N
Torsion torque	0.2 Nm	0.5 Nm	0.2 Nm	0.5 Nm
Tightness	5 × 10 ⁻¹¹ mbar l/s			
Pressure (absolute)	1 × 10 ⁻¹⁰ mbar ... 2 bar			
Bakeout temperature				
Feedthrough	300 °C	300 °C	300 °C	300 °C
Micrometer screw			100 °C	100 °C

Type	FPU016-H	FPU040-H	FPU016-Z	FPU040-Z
Materials exposed to process media			stainless steel 304L/1.4306	
			stainless steel 316Ti/1.4571	
Weight	0.15 kg	0.75 kg	0.25 kg	1 kg



Electrical Feedthroughs

DN 16 ISO-KF



SELECTION DATA

Vacuum connection		DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF
Number of feedthroughs		4	9	9
Voltage per pole	V	50	50	50
Current per pole	A	1	2	2

ORDERING INFORMATION

Type	4 Feedthroughs w. ATM connector	9 Feedthroughs w. ATM connector	9 Feedthroughs w. ATM & vacuum connector
Feedthrough	214-111	214-112	214-113
Connector: vacuum side	-	-	214-191
Connector: atmospheric side	214-171	214-172	214-172

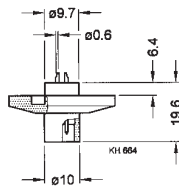
SPECIFICATIONS

Type	4 Feedthroughs w. ATM connector	9 Feedthroughs w. ATM connector	9 Feedthroughs w. ATM & vacuum connector
Vacuum connection	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF
Number of feedthroughs	4	9	9
Voltage per pole	50 V	50 V	50 V
Current per pole	1 A	2 A	2 A
Connection			
Vacuum side	Solder connection	Solder connection	Connector
Atmospheric side	Connector	Connector	Connector
Diameter of connecting wire	0.6 mm	1.2 mm	1.2 mm
Tightness		1×10^{-9} mbar l/s	
Pressure (absolute)		1×10^{-8} mbar ... 2.5 bar	
Bakeout temperature (feedthrough and connector)		130 °C	
Housing		Stainless steel 303/1.4305	
Insulator		PEEK / Araldite	
Seal		FPM	
Contacts (feedthrough and connector)		Gold-plated brass / bronze / stainless steel	

DN 16 ISO-KF

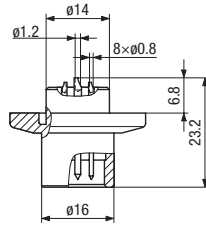
DIMENSIONS

214-111



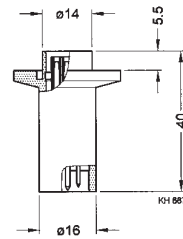
Feedthrough

214-112



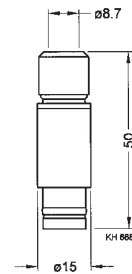
Feedthrough

214-113

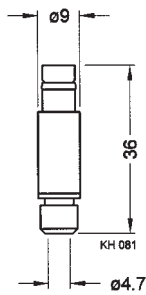


Feedthrough

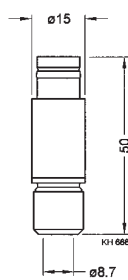
214-191

Connector:
vacuum side

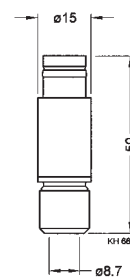
214-171



214-172



214-172

Connector:
air side

Electrical Feedthroughs

DN 40 ISO-KF



SELECTION DATA

Vacuum connection		DN 40 ISO - KF	DN 40 ISO - KF	DN 40 ISO - KF	DN 40 ISO - KF
Number of feedthroughs		7	7	4	1
Voltage per pole	V	380	380	800	6000
Current per pole	A	16	16	16	25

ORDERING INFORMATION

Type	7 Feedthroughs w. ATM Connector	7 Feedthroughs w. ATM & Vacuum Connector	4 Feedthroughs w. ATM & Vacuum Connector	1 Feedthrough w. ATM & Connector
Feedthrough	214-121	214-122	214-123	214-131
Connector: vacuum side	-	214-193	214-194	-
Connector: atmospheric side	214-174	214-174	214-175	214-180

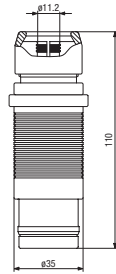
SPECIFICATIONS

Type	7 Feedthroughs w. ATM Connector	7 Feedthroughs w. ATM & Vacuum Connector	4 Feedthroughs w. ATM & Vacuum Connector	1 Feedthrough w. ATM & Connector
Number of feedthroughs	7	7	4	1
Voltage per pole	380 V	380 V	800 V	6000 V
Current per pole	16 A	16 A	16 A	25 A
Connection				
Vacuum side	solder connection	connector	connector	bolted connection
Atmospheric side	connector	connector	connector	connector
Diameter of connecting wire	1.8 mm	1.8 mm	2.5 mm	5 mm
Test voltage	-	-	-	15 kV / 50 Hz
Pressure (absolute)	1×10^{-8} mbar ... 2.5bar			
Bakeout temperature (feedthrough and connector)	130 °C			
Housing	stainless steel 303/1.4305			
Insulator	PTFE/Araldite			
Seal	FPM			
Contact (feedthrough and connector)	Gold-plated bronze	Gold-plated bronze	Gold-plated bronze	Nickel-plated brass

DN 40 ISO-KF

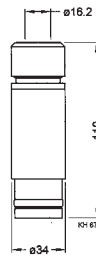
DIMENSIONS

214-193



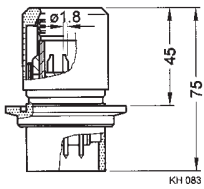
Connector:
vacuum side

214-194



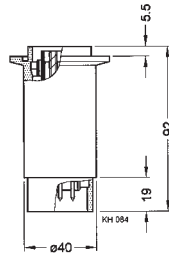
Connector:
vacuum side

214-121



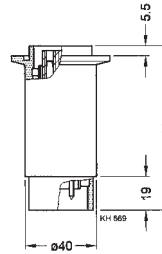
Feedthrough

214-122



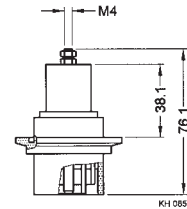
Feedthrough

214-123



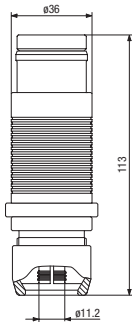
Feedthrough

214-131



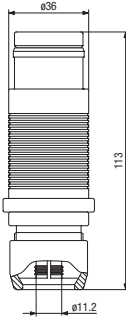
Feedthrough

214-174



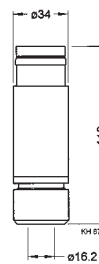
Connector:
air side

214-174



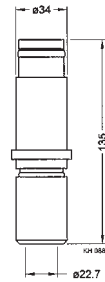
Connector:
air side

214-175



Connector:
air side

214-180



Connector:
air side

Electrical Feedthroughs

DN 16 CF-F



SELECTION DATA

Vacuum connection		DN 16 CF-F
Number of feedthroughs		1
Voltage per pole	kV	0.3
Current per pole	A	120

ORDERING INFORMATION

Type	1 Feedthrough DN 16 CF-F
Feedthrough	214-126
Connection piece: vacuum side	214-195
Connector: atmospheric side	214-176

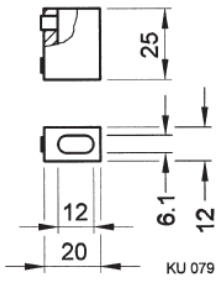
SPECIFICATIONS

Type	1 Feedthrough DN 16 CF-F
Vacuum connection	DN 16 CF-F
Number of feedthroughs	1
Voltage per pole	4 kV
Current per pole	150 A
Bakeout temperature	400 °C
Tightness	5×10^{-11} mbar l/s
Pressure (absolute)	1×10^{-10} mbar ... 2 bar
Flange	Stainless steel 304L/1.4306
Conductor	OF-copper 2.0040
Insulator	Aluminum oxide ceramic Al_2O_3
Weight	0.15 kg
Connection piece vacuum side	
Pieces	2
Current max.	100 A
Bakeout temperature	400 °C
Material	Stainless steel 304/1.4301
Connector atmospheric side	
Pieces	2
Current max.	100 A
Insulated, for use up to	Not insulated
Bakeout temperature	150 °C
Contact	Silver-plated brass

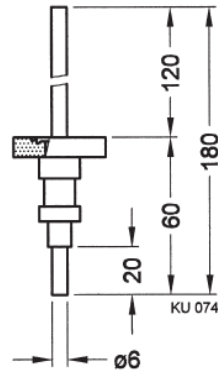
DN 16 CF-F

DIMENSIONS

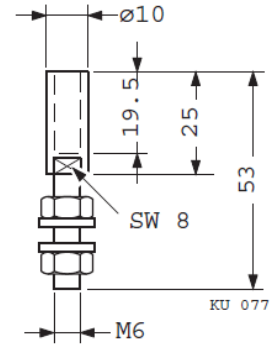
214-195
Connection piece vacuum side



214-126
Feedthrough

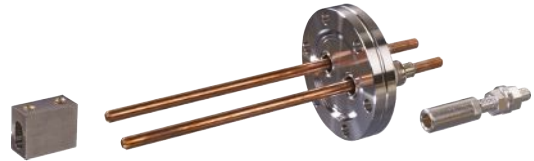


214-176
Connector air side



Electrical Feedthroughs

DN 40 CF-F



SELECTION DATA

Vacuum connection		DN 40 CF-F	DN 40 CF-F	DN 40 CF-F	DN 40 CF-F	DN 40 CF-F
Number of feedthroughs		1	1	2	4	9
Voltage per pole	kV	0.3	1	4	1	1
Current per pole	A	70	200/1000 ¹⁾	150	8	8

¹⁾ With water-cooling

ORDERING INFORMATION

Type	1 Feedthrough DN 40 CF-F	1 Feedthrough DN 40 CF-F (high current)	2 Feedthroughs DN 40 CF-F	4 Feedthroughs DN 40 CF-F	9 Feedthroughs DN 40 CF-F
Feedthrough	214-136	214-127	214-128	214-116	214-117
Connection piece vacuum side	214-195	214-196	214-195	214-192	214-198
Connector atmospheric side	214-176	214-177	214-176	214-173	214-181
Connector atm. side, H ₂ O cooled	-	214-178	-	-	-

SPECIFICATIONS

Type	1 Feedthrough DN 40 CF-F	1 Feedthrough DN 40 CF-F (high current)	2 Feedthroughs DN 40 CF-F	4 Feedthroughs DN 40 CF-F	9 Feedthroughs DN 40 CF-F
Vacuum connection	DN 40 CF-F	DN 40 CF-F	DN 40 CF-F	DN 40 CF-F	DN 40 CF-F
Number of feedthroughs	1	1	2	4	9
Voltage per pole	0.3 kV	1 kV	4 kV	1 kV	1 kV
Current per pole	70 A	200/1000 A ¹⁾	150 A	8 A	8 A
Bakeout temperature	400 °C				
Tightness	5 × 10 ⁻¹¹ mbar l/s				
Pressure (absolute)	1 × 10 ⁻¹⁰ mbar ... 2 bar				
Flange	304L/1.4306	304L/1.4306	304L/1.4306	304L/1.4306	304L / 1.4306
Conductor	OFC 2.0040	OFC 2.0040	OFC 2.0040	304/1.4301	304/1.4301
Insulator	Al ₂ O ₃	Al ₂ O ₃	Al ₂ O ₃	Al ₂ O ₃	Al ₂ O ₃
Weight	0.15 kg	0.5 kg	0.45 kg	0.3 kg	0.5 kg

¹⁾ With water-cooling

DN 40 CF-F

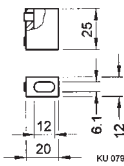
Type	1 Feedthrough DN 40 CF-F	1 Feedthrough DN 40 CF-F (high current)	2 Feedthroughs DN 40 CF-F	4 Feedthroughs DN 40 CF-F	9 Feedthroughs DN 40 CF-F
Connection piece vacuum side					
Pieces	2	1	2	5	10
Current	20 A	1000 A ¹⁾	100 A	12 A	12 A
Bakeout temperature	400 °C	400 °C	400 °C	400 °C	400 °C
Material	304/1.4301	2.0060	304/1.4301	304/1.4301	304/1.4301
Connector atmospheric side					
Pieces	2	1	2	5	10
Current max.	100 A	250 A	100 A	25 A	25 A
Insulated, for use up to	Not insulated	30 V (ac) / 60 V (dc)	30 V (ac) / 60 V (dc)	30 V (ac) / 60 V (dc)	30 V (ac) / 60 V (dc)
Bakeout temperature	150 °C	150 °C	50 °C	50 °C	50 °C
Contact	Silver-plated brass	Silver-plated brass	Silver-plated brass	Gold-plated brass	Gold-plated brass

¹⁾ With water-cooling

DN 40 CF-F

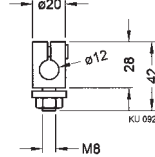
DIMENSIONS

214-195



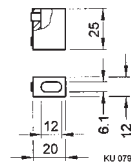
Connector vacuum side

214-196



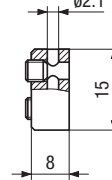
Connector vacuum side

214-195



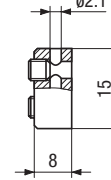
Connector vacuum side

214-192



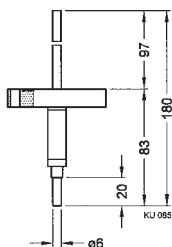
Connector vacuum side

214-198



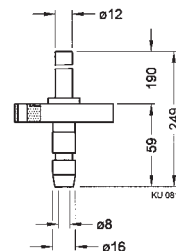
Connector vacuum side

214-136



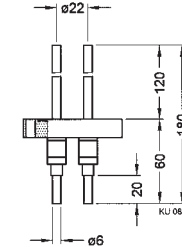
Feedthrough

214-127



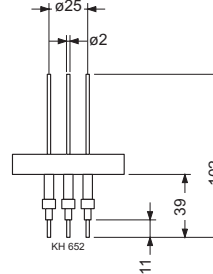
Feedthrough

214-128



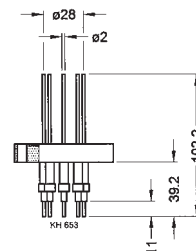
Feedthrough

214-116



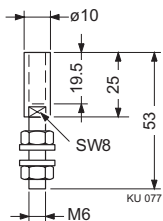
Feedthrough

214-117



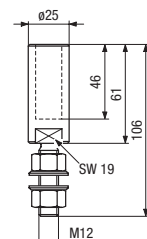
Feedthrough

214-176



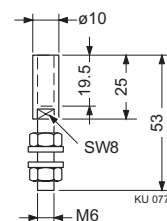
Connector air side

214-177



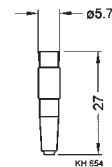
Connector air side

214-176

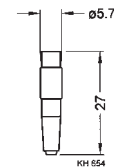


Connector air side

214-173

Connector air side
With soldered joint

214-181

Connector air side
With soldered jointWith water-proof ¹⁾

Current max.	A	1000
Not insulated, for use up to		24
Bakeout temperature	°C	120
Contact		Silver-plated brass

High Current Feedthrough

DN 40 ISO-KF

PROPERTIES

- Selection of three electrodes
- Slide into mounted feedthrough
- Current connection with water cooling



SELECTION DATA

Vacuum connection		DN 40 ISO-KF
Number of feedthroughs		1
Voltage	V	100
Current	A	250/1500 ¹⁾

¹⁾ With water-cooling

ORDERING INFORMATION

Type	1 Feedthrough high current DN 40 ISO-KF
Feedthrough with O-ring KF40	214-141
Current connection with water cooling ¹⁾	214-145
Straight electrode	214-142
Angle electrode	214-143

¹⁾ Not insulated

SPECIFICATIONS

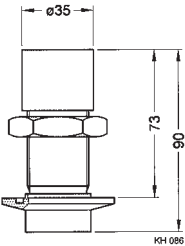
Type	1 Feedthrough high current DN 40 ISO-KF
Vacuum connection	DN 40 ISO-KF
Number of feedthroughs	1
Voltage	100 V
Current	250/1500 A ¹⁾
Tightness	1×10^{-9} mbar l/s
Pressure (absolute)	1×10^{-8} mbar ... 2.5 bar (max. 10 bar with external centering ring)
Bakeout temperature	110 °C
Housing	aluminum 6082
Insulator	thermoplast and thermoset
Seal	FPM

¹⁾ With water-cooling

DN 40 ISO-KF

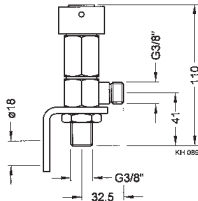
DIMENSIONS

214-141



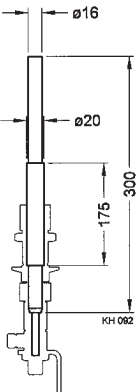
Feedthrough

214-145



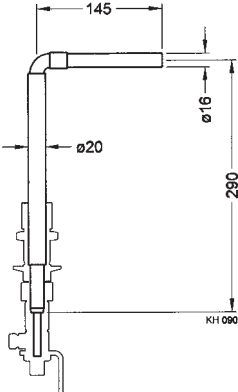
Current connection
with water cooling
copper/brass

214-142



Electrodes copper/brass

214-143



Electrodes copper/brass

Coaxial Feedthroughs ISO-KF/CF-F

BNC / MHV DN 16 - 40**PROPERTIES**

- Based on MIL-C-39012A
- Voltage up to 5 kV DC
- With atmospheric connector

**SELECTION DATA**

Vacuum connection	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 CF-F	DN 16 CF-F	DN 40 CF-F
Number of feedthroughs	1	1	1	1	3

ORDERING INFORMATION

Type	BNC DN 16 ISO-KF	MHV DN 16 ISO-KF	BNC DN 16 CF-F	MHV DN 16 CF-F	MHV DN 40 CF-F
Part No.	214-151	214-152	214-155	214-156	214-157

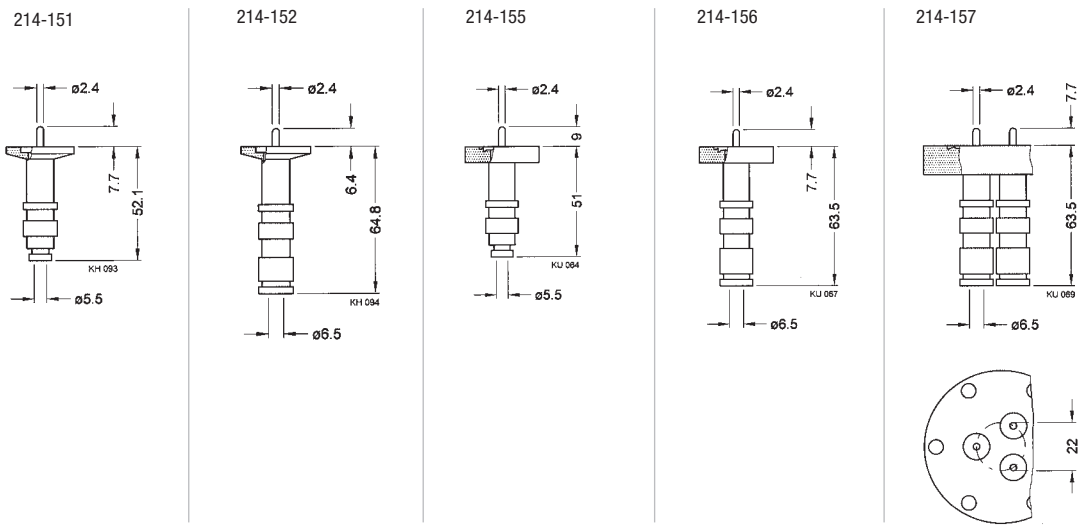
SPECIFICATIONS

Type	BNC DN 16 ISO-KF	MHV DN 16 ISO-KF	BNC DN 16 CF-F	MHV DN 16 CF-F	MHV DN 40 CF-F
Vacuum connection	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 CF-F	DN 16 CF-F	DN 40 CF-F
Number of feedthroughs	1	1	1	1	3
Voltage					
AC, 50 Hz	0.35 kV	3.5 kV	0.35 kV	3.5 kV	3.5 kV
DC	0.5 kV	5 kV	0.5 kV	5 kV	5 kV
Current	3 A	3 A	3 A	3 A	3 A
Frequency	150 MHz	-	150 MHz	-	-
Impedance	50-60 Ω	-	50-60 Ω	-	-
Insulation resistance at 20°C	10 ¹⁰ Ω				
Tightness	1 × 10 ⁻⁹ mbar l/s	1 × 10 ⁻⁹ mbar l/s	1 × 10 ⁻¹⁰ mbar l/s	1 × 10 ⁻¹⁰ mbar l/s	1 × 10 ⁻¹⁰ mbar l/s
Pressure (absolute) ¹⁾	1 × 10 ⁻⁸ mbar ... 2.5 bar	1 × 10 ⁻⁸ mbar ... 2.5 bar	1 × 10 ⁻¹⁰ mbar ... 10 bar	1 × 10 ⁻¹⁰ mbar ... 10 bar	1 × 10 ⁻¹⁰ mbar ... 10 bar
Material					
Housing, flange, conductor	stainless steel				
Feedthrough, seal	Al ₂ O ₃				
Bakeout temperature					
With connector	50 °C	50 °C	50 °C	50 °C	50 °C
Without connector	200 °C	200 °C	400 °C	400 °C	400 °C
Standard connection					
Atmospheric connector	UG 88/U	UG 932/U	UG 88/U	UG 932/U	UG 932/U
Cable	RG 58/U	RG 59/U	RB 58/U	RG 59/U	RG 59/U
Weight	0.1 kg	0.1 kg	0.14 kg	0.14 kg	0.5 kg

¹⁾ Pressure at 400°C : 2 bar

BNC / MHV DN 16 - 40

DIMENSIONS



Vacuum Feedthroughs

Metal-Ceramic Connections

PROPERTIES

- High grade materials allow repeated bakings up to 400°C



SELECTION DATA

Voltage ¹⁾	3 kV	2 kV	5 kV	10 kV
-----------------------	------	------	------	-------

¹⁾ Based on VDE 0110 for air and surface-leakage in atmosphere on both sides.
Higher values up to factor two are admissible in pressures <10⁻⁴ mbar.

ORDERING INFORMATION

Type	3 kV Connector	2 kV Connector	5 kV Connector	10 kV Connector
Part No.	214-161	214-162	214-163	214-164

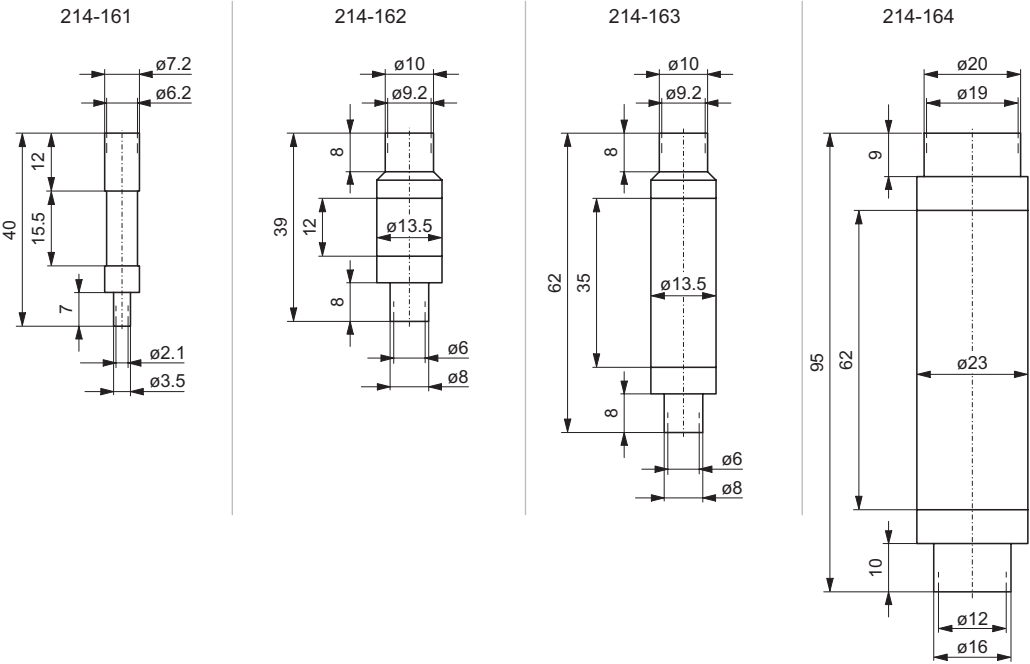
SPECIFICATIONS

Type	3 kV Connector	2 kV Connector	5 kV Connector	10 kV Connector
Voltage ¹⁾	3 kV	2 kV	5 kV	10 kV
Insulator	Al ₂ O ₃			
Connection				
a	Fe-Ni	Fe-Co	Fe-Co	Fe-Ni
b	Fe-Ni	stainless steel 304/1.4301	stainless steel 304/1.4301	stainless steel 304/1.4301
Bakeout temperature	400 °C			
Tightness	5 × 10 ⁻¹¹ mbar l/s			
Weight	5 g	12 g	25 g	90 g

¹⁾ Based on VDE 0110 for air and surface-leakage in atmosphere on both sides.
Higher values up to factor two are admissible in pressures <10⁻⁴ mbar.

Metal-Ceramic Connections

DIMENSIONS

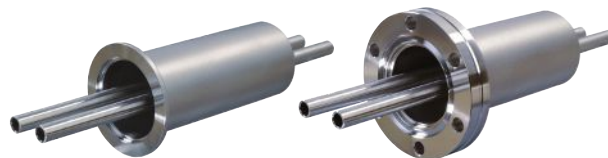


Liquid Feedthroughs ISO-KF/CF-F

DN 40

PROPERTIES

- For H₂O and LN₂
- Thermically insulated
- Specially suited for very hot and very cold applications



SELECTION DATA

Vacuum connection	DN 40 ISO-KF	DN 40 CF-F
Feedthrough/seal	Welded	Welded
Tube dimensions mm	Ø 8 × 1	Ø 8 × 1
Number of tubes	2	2

ORDERING INFORMATION

Type	DN 40 ISO-KF Liquid	DN 40 CF-F Liquid
Part No.	214-101	214-102

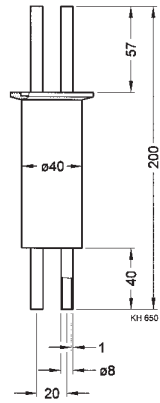
SPECIFICATIONS

Type	DN 40 ISO-KF Liquid	DN 40 CF-F Liquid
Vacuum connection	DN 40 ISO-KF	DN 40 CF-F
Feedthrough/seal	Welded	Welded
Tube dimensions	Ø 8 × 1 mm	Ø 8 × 1 mm
Number of tubes	2	2
Tightness	1 × 10 ⁻⁹ mbar l/s	1 × 10 ⁻¹⁰ mbar l/s
Pressure	10 ⁻⁸ mbar ... 10 bar	10 ⁻⁹ mbar ... 10 bar
Temperature range	-200 ... +150 °C	-200 ... +400 °C
Material	Stainless steel 304/1.4301	Stainless steel 304/1.4301
Weight	0.3 kg	0.3 kg

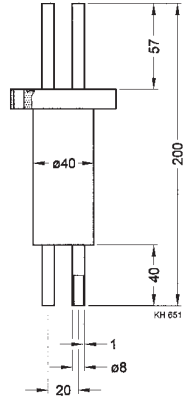
DN 40

DIMENSIONS

214-101

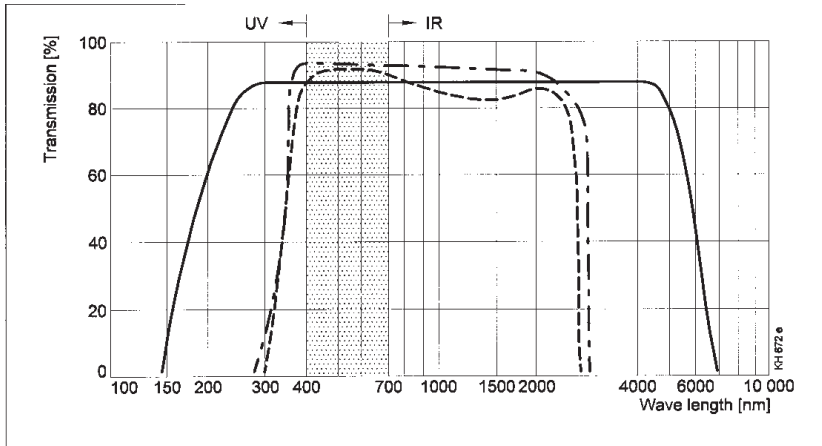


214-102



Viewports

DN 16 - DN 50 ISO-KF



Average transmittance curve

- Sapphire
- . - Kodial
- - - Borosilicate

PROPERTIES

- Wide viewing angle

SELECTION DATA

Vacuum connection	DN16 ISO-KF	DN 25 ISO-KF	DN 40 ISO-KF	DN 50 ISO-KF
Window	borosilicate glass			
Seal	FPM			
Flange	aluminum 6082/3.2315			
Bakeout temperature	150 °C			

ORDERING INFORMATION

Type	DN 16 ISO-KF Viewport	DN 25 ISO-KF Viewport	DN 40 ISO-KF Viewport	DN 50 ISO-KF Viewport
Part No.	214-002	214-003	214-004	214-005

SPECIFICATIONS

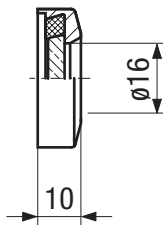
Type	DN 16 ISO-KF Viewport	DN 25 ISO-KF Viewport	DN 40 ISO-KF Viewport	DN 50 ISO-KF Viewport
Vacuum connection	DN16 ISO-KF	DN 25 ISO-KF	DN 40 ISO-KF	DN 50 ISO-KF
Window	borosilicate glass			
Seal	FPM			

DN 16 - DN 50 ISO-KF

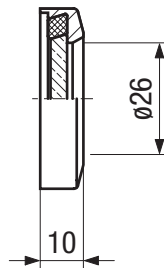
Type	DN 16 ISO-KF Viewport	DN 25 ISO-KF Viewport	DN 40 ISO-KF Viewport	DN 50 ISO-KF Viewport
Flange	aluminum 6082			
Bakeout temperature	150 °C			
Tightness	1×10^{-9} mbar l/s			
Pressure (absolute)	1×10^{-8} mbar ... 4 bar			
Max. at 150°C	3 bar			
Window thickness	3.8 mm			
Weight	15 g	20 g	30 g	50 g

DIMENSIONS

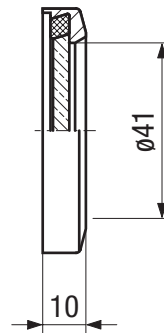
214-002



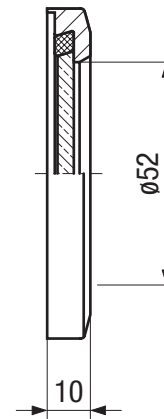
214-003



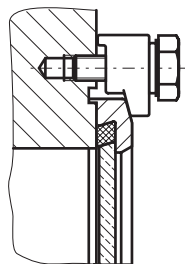
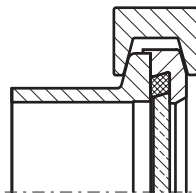
214-004



214-005



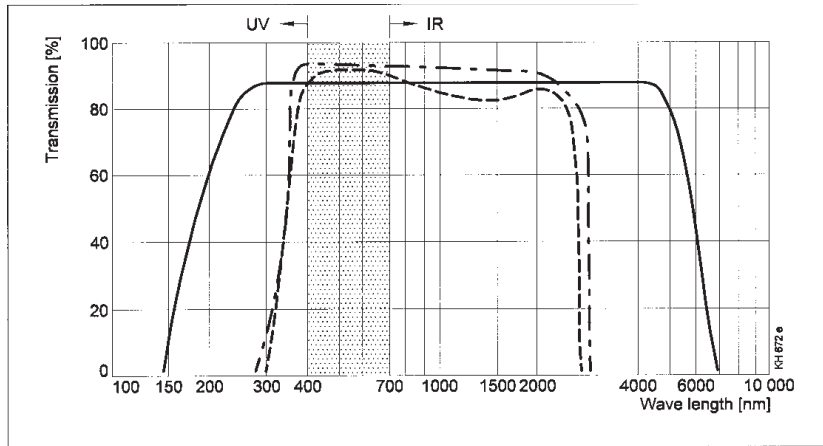
Mounting



Claws, screws and
clamping ring not included

Viewports

DN 63 - DN 160 ISO-K



Average transmittance curve

- Sapphire
- · - Kodial
- - - Borosilicate

PROPERTIES

- Wide viewing angle

SELECTION DATA

Vacuum connection	DN 63 ISO-K	DN 100 ISO-K	DN 160 ISO-K
Window		Borosilicate glass	
Seal		FPM	
Flange		Aluminum 6082	
Bakeout temperature		150 °C	

ORDERING INFORMATION

Type	DN 63 ISO-K Viewport	DN 100 ISO-KF Viewport	DN 160 ISO-K Viewport
Part No. ¹⁾	214-006	214-007	214-008

¹⁾ Claws not included

SPECIFICATIONS

Type	DN 63 ISO-K Viewport	DN 100 ISO-K Viewport	DN 160 ISO-K Viewport
Vacuum connection	DN 63 ISO-K	DN 100 ISO-K	DN 160 ISO-K
Window		Borosilicate glass	
Seal		FPM	

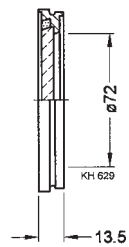
DN 63 - DN 160 ISO-K

Type	DN 63 ISO-K Viewport	DN 100 ISO-K Viewport	DN 160 ISO-K Viewport
Flange	Aluminum 6082		
Bakeout temperature	150 °C		
Tightness	1×10^{-9} mbar l/s		
Pressure (absolute)	1×10^{-8} mbar ... 2 bar		
Max. at 150°C	1 bar		
Window thickness	6 mm	8 mm	10 mm
Weight	0.2 kg	0.3 kg	0.4 kg

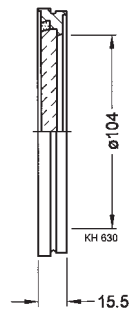
DIMENSIONS

[mm]

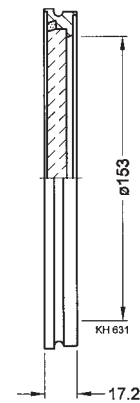
214-006



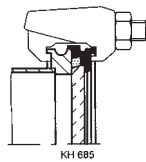
214-007



214-008

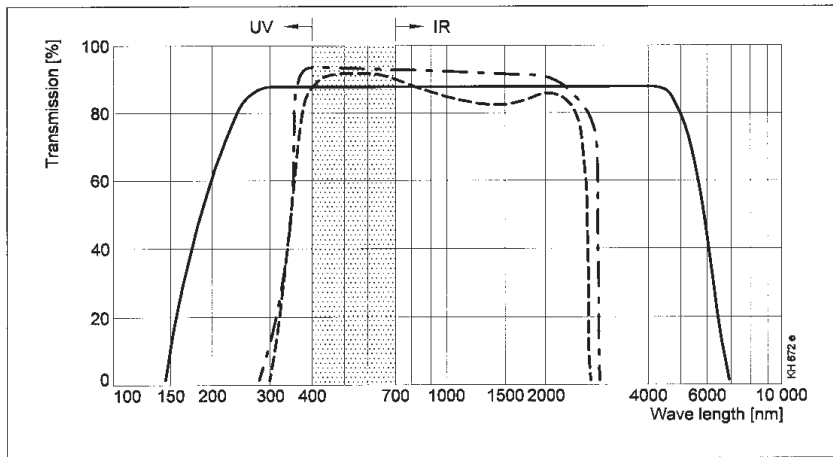


Mounting



Viewports

DN 16 - DN 160 CF



Average transmittance curve

- Sapphire
- . - Kodial
- - - Borosilicate

PROPERTIES

- Protection window
- With Fe-Ni alloy as transition material

SELECTION DATA

Vacuum connection	DN 16 CF-F	DN 40 CF-F	DN 40 CF-F	DN 63 CF-F	DN 100 CF-F	DN 160 CF-F
Window	Kodial glass	Kodial glass	Sapphire glass	Kodial glass	Kodial glass	Kodial glass
Seal	Iron/nickel					
Flange	Stainless steel 304/1.4301					
Bakeout temperature	400 °C					

ORDERING INFORMATION

Type	DN 16 CF-F Viewport	DN 40 CF-F Viewport	DN 63 CF-F Viewport	DN 100 CF-F Viewport	DN 160 CF-F Viewport	DN 40 CF-F Viewport (Sapphire)
Viewport	214-021	214-022	214-023	214-024	214-025	214-032
Bolt set	213-416	Standard	Standard	Standard	Standard	Standard

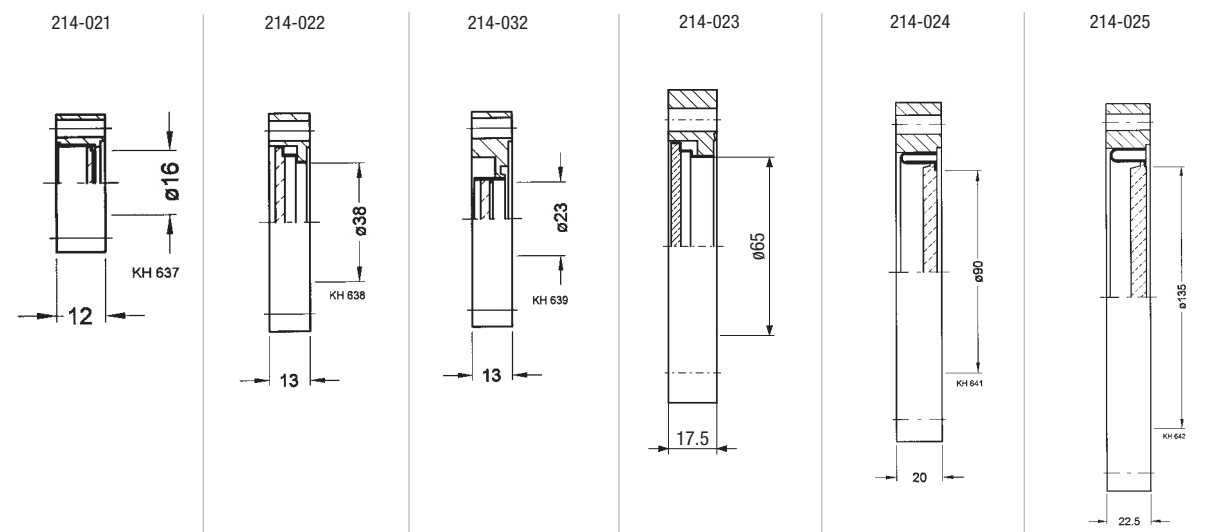
DN 16 - DN 160 CF

SPECIFICATIONS

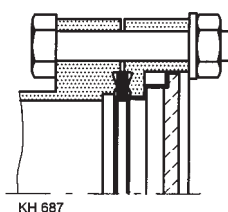
Type	DN 16 CF-F Viewport	DN 40 CF-F Viewport	DN 63 CF-F Viewport	DN 100 CF-F Viewport	DN 160 CF-F Viewport	DN 40 CF-F Viewport (Sapphire)
Vacuum connection	DN 16 CF-F	DN 40 CF-F	DN 63 CF-F	DN 100 CF-F	DN 160 CF-F	DN 40 CF-F
Window	kodial glass	kodial glass	kodial glass	kodial glass	kodial glass	sapphire glass
Seal	iron/nickel					
Flange	stainless steel 304/1.4301					
Bakeout temperature	400 °C					
Tightness	5×10^{-11} mbar l/s					
Pressure (absolute)						
Min.	1×10^{-10} mbar					
Max.	2 bar					
Max. at 400°C	1 bar					
Window thickness	1.5 mm	3 mm	3.5 mm	6 mm	8 mm	3 mm
Weight	0.04 kg	0.24 kg	0.85 kg	1.4 kg	2.8 kg	0.35 kg

DIMENSIONS

[mm]

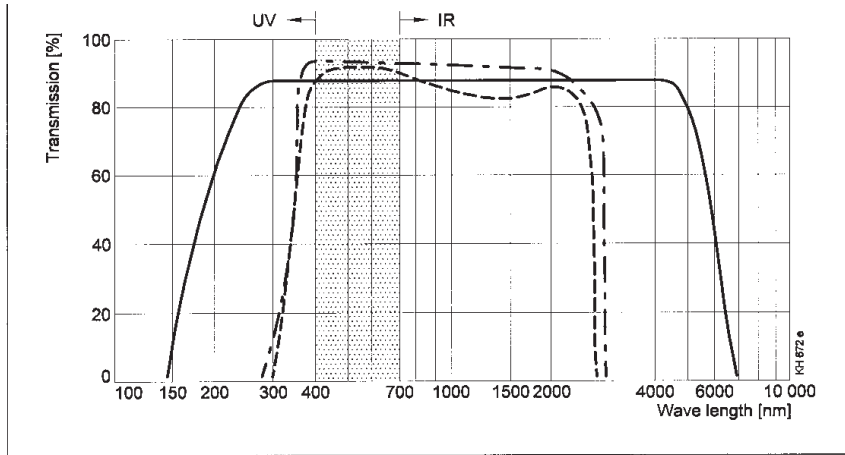


Mounting



Viewports

DN 63 - DN 160 ISO-F



Average transmittance curve

- Sapphire
- . - Kodial
- - - Borosilicate

PROPERTIES

- Wide viewing angle

SELECTION DATA

Vacuum connection	DN 63 ISO-F	DN 100 ISO-F	DN 160 ISO-F
Window		Borosilicate glass	
Seal		FPM	
Flange		Black anodized aluminum 6082	
Centering ring		Aluminum 6082	
Snap ring		Stainless steel 304/1.4301	
Bakeout temperature		150 °C	

ORDERING INFORMATION

Type	DN 63 ISO-F Viewport	DN 100 ISO-F Viewport	DN 160 ISO-F Viewport
Viewport ¹⁾	214-016	214-017	214-018
Protective glass, 5 pcs.	214-046	214-047	214-048

¹⁾ Claws, bolts, nuts and washer included

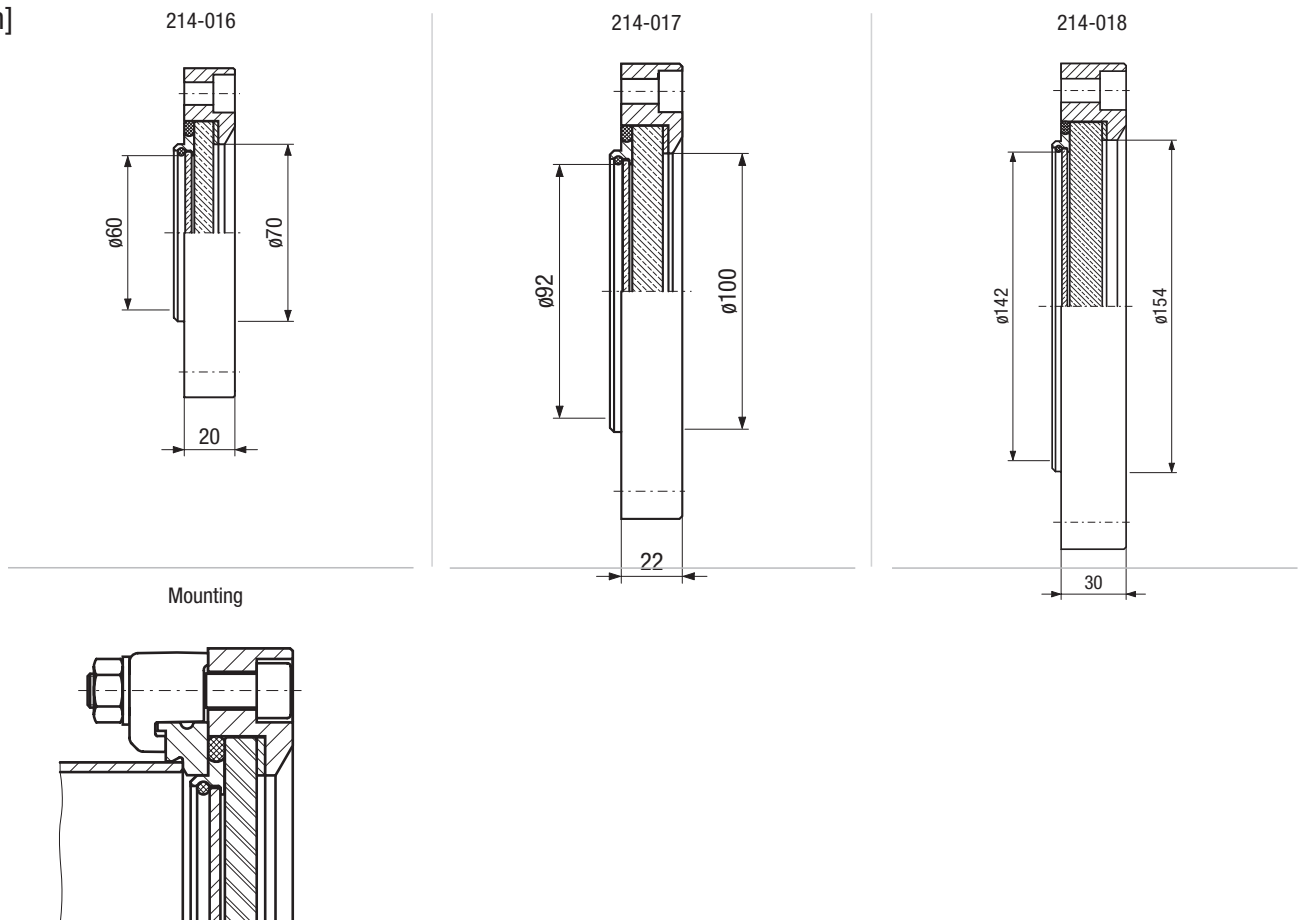
DN 63 - DN 160 ISO-F

SPECIFICATIONS

Type	DN 63 ISO-F Viewport	DN 100 ISO-F Viewport	DN 160 ISO-F Viewport
Vacuum connection	DN 63 ISO-F	DN 100 ISO-F	DN 160 ISO-F
Material			
Window		Borosilicate glass	
Seal		FPM	
Flange		Black anodized aluminum 6082	
Centering ring		Aluminum 6082	
Snap ring		Stainless steel 304/1.4301	
Bakeout temperature		150 °C	
Tightness		1×10^{-9} mbar l/s	
Pressure (absolute)		1×10^{-8} mbar ... 2 bar	
Max. at 150 °C		1 bar	
Thickness			
Window	7.5 mm	11 mm	15 mm
Protective glass	2.3 mm	2.3 mm	2.3 mm
Weight	0.8 kg	1.4 kg	3 kg

DIMENSIONS

[mm]



Vacuum Feedthroughs

Vacuum Ball Bearings

PROPERTIES

- Especially suited for clean vacuum applications and extreme residual gas requirements
- With shields (non-rubbing seals)
- With dry lubrication
- Bearing clearance



SELECTION DATA

Service life ¹⁾ (revolutions)	> 20 Mio.
Pressure (absolute)	$1 \times 10^{-12} \dots 1 \times 10^{-2}$ mbar
Operating temperature ²⁾	-200 ... +300 °C
Material	
Inner ring, outer ring, balls	Stainless steel – /1.4037 AISI/DIN
Cage	Stainless steel 430 / 1.4016 AISI/DIN
Coating (dry lubrication)	
Inner ring, outer ring, cage	Wolfratherm®

¹⁾ At half load and >1000 rpm

²⁾ At -200°C reduction of tenacity

ORDERING INFORMATION

Type	624 Ball Bearing	605 Ball Bearing	626 Ball Bearing	608 Ball Bearing	6000 Ball Bearing	6001 Ball Bearing
Part No.	214-211	214-212	214-213	214-214	214-215	214-216

SPECIFICATIONS

Type	624 Ball Bearing	605 Ball Bearing	626 Ball Bearing	608 Ball Bearing	6000 Ball Bearing	6001 Ball Bearing
Service life ¹⁾ (revolutions)	> 20 Mio.					
Pressure (absolute)	$1 \times 10^{-12} \dots 1 \times 10^{-2}$ mbar					
Operating temperature ²⁾	-200 ... +300 °C					
Material						
Inner ring, outer ring, balls	Stainless steel – /1.4037 ISI/DIN					
Cage	Stainless steel 430 / 1.4016 ISI/DIN					
Coating (dry lubrication)						
Inner ring, outer ring, cage	Wolfratherm®					

¹⁾ At half load and >1000 rpm

²⁾ At -200°C reduction of tenacity

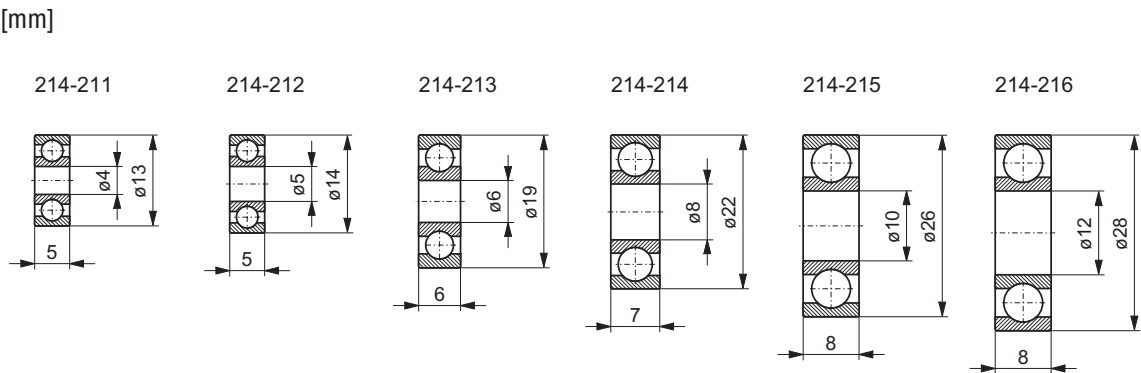
³⁾ At 20°C; half value at 300°C

Vacuum Ball Bearings

Type	624 Ball Bearing	605 Ball Bearing	626 Ball Bearing	608 Ball Bearing	6000 Ball Bearing	6001 Ball Bearing
Rotational speed at						
20°C	5000 rpm	4000 rpm	3000 rpm	2500 rpm	2000 rpm	1500 rpm
300°C	1500 rpm	1500 rpm	1000 rpm	800 rpm	500 rpm	300 rpm
Load capacity ³⁾						
Static load rating (C ₀)	400 N	400 N	800 N	1000 N	1500 N	2000 N
Dynamic load rating (C)	50 N	50 N	100 N	150 N	200 N	250 N
Axial load	<<C	<<C	<<C	<<C	<<C	<<C
Fit according to ISO	G6 / f6	G6 / f6	G6 / f6	G6 / f6	G6 / f6	G6 / f6
Weight	3 g	4 g	8 g	13 g	20 g	25 g

¹⁾ At half load and >1000 rpm
²⁾ At -200°C reduction of tenacity
³⁾ At 20°C; half value at 300°C

DIMENSIONS



Vacuum Feedthroughs

Lubricants and Sealing Materials



HIGH TEMPERATURE LUBRICANT

- Prevents seizing of stainless steel screw connections at atmosphere even at high temperatures
- Remains fully effective for at least 10 bakeout cycles

SELECTION DATA

Temperature resistance	1000°C
In packages of	28 g

ORDERING INFORMATION

Type	C100
Part No.	214-231

SPECIFICATIONS

Type	C 100
Temperature resistance	1000°C
In packages of	28 g

Lubricants and Sealing Materials

SEALING MATERIAL

- For sealing small leaks

SELECTION DATA

Temperature resistance	-40 – 200 °C
Version	Paste
In packages of	100 g

ORDERING INFORMATION

Type	CAF 4
Part No.	214-233

SPECIFICATIONS

Type	CAF 4
Temperature resistance	-40 – 200 °C
Version	Paste
In packages of	100 g

VACUUM GREASE/OIL

- For sliding elastomer seals
- Low vapor pressure
- Good adhesiveness

SELECTION DATA

Temperature resistance	10 – 30	-40 – 200	-20 – 200	-60 – 300	-60 – 300
Vapor pressure at					
20°C	<10 ⁻⁸ mbar	<5 × 10 ⁻⁷ mbar	<10 ⁻¹² mbar	<10 ⁻¹² mbar	<10 ⁻¹² mbar
100°C		<7 × 10 ⁻⁶ mbar	<10 ⁻⁷ mbar	<10 ⁻⁷ mbar	<10 ⁻⁷ mbar
In packages of	25 g	50 g	10 g	30 g	10 ml
Material	Mineral grease	Silicon grease	Fluorinated grease	Fluorinated grease with MoS ₂	Fluorinated oil

ORDERING INFORMATION

Type	Apezon M	Dow Corning	FU 090	FM 090	OL 090
Part No.	214-236	214-237	214-238	214-239	214-240

SPECIFICATIONS

Type	Apezon M	Dow Corning	FU 090	FM 090	OL 090
Temperature resistance	10 – 30 °C	-40 – 200 °C	-20 – 200 °C	-60 – 300 °C	-60 – 300 °C

Lubricants and Sealing Materials

Type	Apezon M	Dow Corning	FU 090	FM 090	OL 090
Vapor pressure at					
20°C	<10 ⁻⁸ mbar	<5 × 10 ⁻⁷ mbar	<10 ⁻¹² mbar	<10 ⁻¹² mbar	<10 ⁻¹² mbar
100°C		<7 × 10 ⁻⁶ mbar	<10 ⁻⁷ mbar	<10 ⁻⁷ mbar	<10 ⁻⁷ mbar
In packages of	25 g	50 g	10 g	30 g	10 ml
Material	Mineral grease	Silicon grease	Fluorinated grease	Fluorinated grease with MoS ₂	Fluorinated oil
Lubricity	Very good	Good	Good	Good/very good	Good
Resistance to					
Oxidation		Very good	Very good	Very good	Very good
Chemicals		Good	Very good	Very good	Very good
Thermal decomposition		Very good	Good	Good	Good

Vacuum Fittings

Vacuum Fittings

Specifications

Seals Materials & Pressure Ranges Specifications	C1
ISO-KF Small Flange Components	
Connection Elements ISO-KF Small Flange Components	C2
Seals ISO-KF Small Flange Components	C8
Flanges ISO-KF Small Flange Components	C18
Pipe Fittings ISO-KF Small Flange Components	C20
Bellows/Hose with Flanges ISO-KF Small Flange Components	C25
Transition Pieces ISO-KF Small Flange Components	C28
Hose, Hose Connection ISO-KF Small Flange Components	C33
ISO-K Clamp Flange Components	
Connection Elements ISO-K Clamp Flange Components	C37
Seals ISO-K Clamp Flange Components	C39
Flanges ISO-K Clamp Flange Components	C42
Pipe Fittings ISO-K Clamp Flange Components	C44
Bellows/Hose with Flanges ISO-K Clamp Flange Components	C48
Transition Pieces ISO-K Clamp Flange Components	C49
Protective Lids ISO-K Clamp Flange Components	C52
ISO-F Fixed Flange Components	
Flange Components ISO-F Fixed Flange Components	C53
UHV CF Components	
Connection Elements UHV CF Components	C56
Seals UHV CF Components	C58
Flanges UHV CF Components	C61
Pipe Fittings UHV CF Components	C66
Bellows/Hose with Flanges UHV CF Components	C70
Transition Pieces UHV CF Components	C72
Protective Lids UHV CF Components	C73

Specifications

Seals Materials & Pressure Ranges

SEALS			
Seal Material		Temperature	Reusability
Elastomer			
NBR	°C	-30 - +90	Yes
CR	°C	-40 - +100	Yes
FPM	°C	-15 - +150	Yes
Metal			
Indium	°C	-196 - +60	Yes
Aluminum	°C	-196 - +200	No
Copper	°C	-196 - +200	No
Silver-plated copper	°C	-196 - +450	No

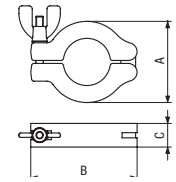
PRESSURE RANGE					
Code Designation		Pressure Range (mbar - bar)	Tightness (mbar l/s)	Centering	Connection
ISO-KF	Aluminum	10^{-7} - 2	10^{-8}	inside	Clamping ring
		10^{-7} - 5	10^{-8}	outside	Clamping ring
		10^{-7} - 10	10^{-8}	outside	Clamping element / chain clamp
	Stainless steel	10^{-8} - 2	10^{-9}	inside	Clamping ring
		10^{-8} - 5	10^{-9}	outside	Clamping ring
		10^{-8} - 10	10^{-9}	outside	Clamping element / chain clamp
ISO-K	Stainless steel	10^{-8} - 2	10^{-9}	inside	Clamping screw, claw grips
CF-F/R	Stainless steel	10^{-12} - 1	10^{-9}	□	screws

ISO-KF Small Flange Components

Connection Elements

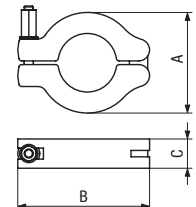
CLAMPING RING WING NUT

		DN ... ISO-KF	Part No.	A	B	C
Clamping ring half:	aluminum 380.0	10 - 16	211-001	45	61	16
		20 - 25	211-002	55	72	16
Bolt:	steel nickel plated	32 - 40	211-003	70	90	18
Nut:		50	211-004	95	123	25
	zinc alloy nickel plated					



CLAMPING RING HEX NUT

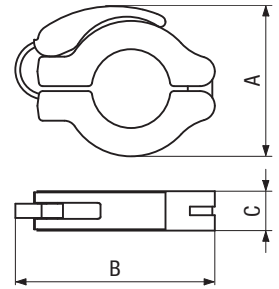
		DN ... ISO-KF	Part No.	A	B	C
Clamping ring half:	aluminum 380.0	10 - 16	211-611	45	61	16
		20 - 25	211-612	55	72	16
Bolt and nut:	steel nickel plated	32 - 40	211-613	70	90	18
		50	211-614	95	123	25



Connection Elements

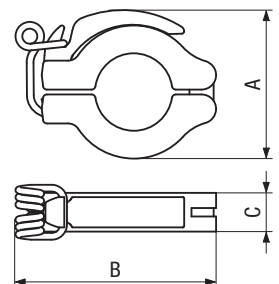
RAPID FASTENING CLAMP

		DN ... ISO-KF	Part No.	A	B	C
Spring:	steel	10 - 16	211-005	52	70	16
Clamping ring half:	aluminum	20 - 25	211-006	61	81	16
	380.0	32 - 40	211-007	75	98	18
Lever:	polyamide					
Temperature	$\leq 80^{\circ}\text{C}$					



RAPID FASTENING CLAMP ALL METAL

		DN ... ISO-KF	Part No.	A	B	C
Spring:	stainless steel	10 - 16	211-036	53	71	16
Clamping ring half:	aluminum	20 - 25	211-037	61	82	16
	380.0	32 - 40	211-038	78	99	18
Lever:	aluminum					
Temperature	$\leq 150^{\circ}\text{C}$					

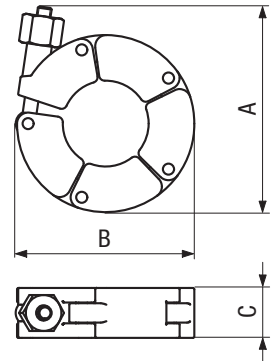


Connection Elements

CHAIN CLAMP

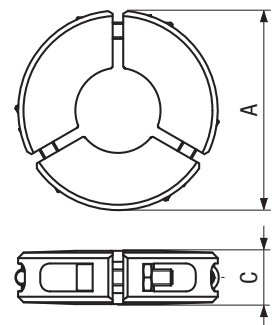
		DN ... ISO-KF	Part No.	A	B	C	Nm ¹⁾
Chain link:	aluminum 6081	10 - 16	211-021	72	52	18	2.5 / 2.5
Screw & nut & bolts:	steel 1.6582 / nitro	20 - 25	211-022	82.5	62	18	3.5 / 3
		32 - 40	211-023	85	77	18	5 / 3
	gas carburized	50	211-024	119	95	20	6 / 3

¹⁾ Tightening torque aluminum max / elastomer max



CLAMPING ELEMENT

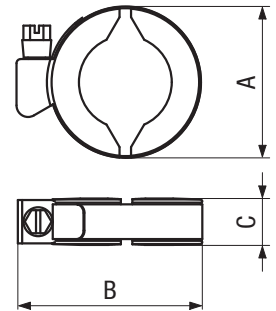
		DN ... ISO-KF	Part No.	A	C
Clamping Element:	aluminum	10 - 16	211-008	52	18
	380.0	20 - 25	211-009	75	20
Bolt:	stainless steel	32 - 40	211-010	90	23
Nut:	steel zinc plated	50	211-011	115	28



Connection Elements

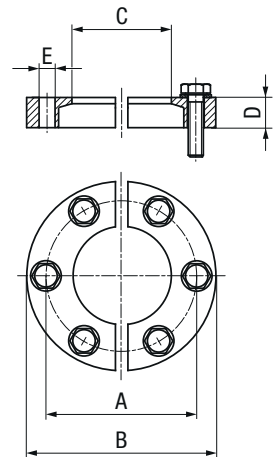
HOSE CLIP CLAMPING RING

		DN ... ISO-KF	Part No.	A	B	C
Clamping ring half:	aluminum 380.0	10 - 16	211-016	42	54	16
		20 - 25	211-017	52	64	16
Band:	stainless steel	32 - 40	211-018	67	79	16
Bolt, nut & thread:	steel zinc plated					



BULKHEAD CLAMP WITH METRIC SCREWS

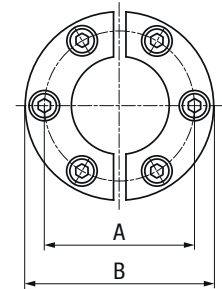
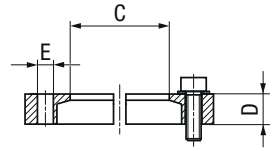
		DN ... ISO-KF	Part No.	A	B	C	D	E	Bolts
Clamping Element:	aluminum 6082	10 - 16	211-541	38.1	51	22	9.5	5.3	6
	Hexagon head	20 - 25	211-542	48	61	32	9.5	5.3	pcs.
Bolt:	screw;	32 - 40	211-543	62	75	47	9.5	5.3	6
	DIN933, A2,	50	211-544	82.5	95	62	10	5.3	pcs.
	M5x20;			5					6
	silver plated								pcs.
Washer:	Washer DIN								8
	125 A								pcs.
	A2, 5.3/10x1								



Connection Elements

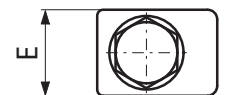
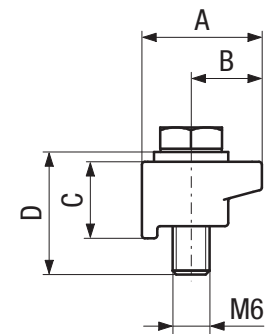
BULKHEAD CLAMP WITH INCH SCREWS

		DN ... ISO-KF	Part No.	A	B	C	D	E	Bolts
Clamping Element:	aluminum 6082	10 - 16	211-545	38.1	51	22	9.5	5.3	6
	Hexagon socket	20 - 25	211-546	48	61	32	9.5	5.3	pcs.
Bolt:	head	32 - 40	211-547	62	75	47	9.5	5.3	6
	cap screw;	50	211-548	82.5	95	62	10	5.3	pcs.
	Inox, 10-32			5					6
	UNF × 5/8";								pcs.
	silver plated								8
Washer:	Washer DIN								pcs.
	125 A								
	A2, 5.3/10x1								



CLAW CLAMP WITH HEX. HEAD SCREW

		DN ... ISO-KF	Part No.	A	B	C	D	E	Set of
Claw:	aluminum 6081	10 - 50	211-015	19.5	11.5	12.5	20	14	4
Screw & washer:	stainless steel								pcs.

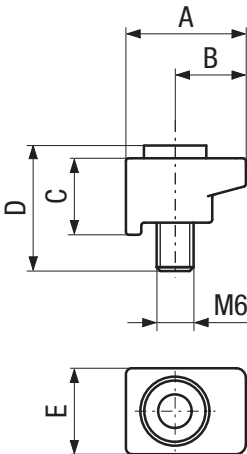


Connection Elements

CLAW CLAMP WITH HEX. SOCKET CAP SCREW

		DN ... ISO- KF	Part No.	A	B	C	D	E	Set of
Claw:	aluminum 6081	10 - 50	211-040	19.5	11.5	12.5	20	14	4
Screw:	stainless steel								pcs.

* recommended for MAG / MPG

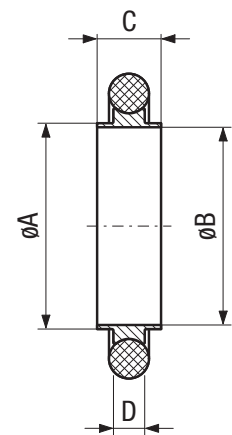


ISO-KF Small Flange Components

Seals

CENTERING RING ALUMINUM

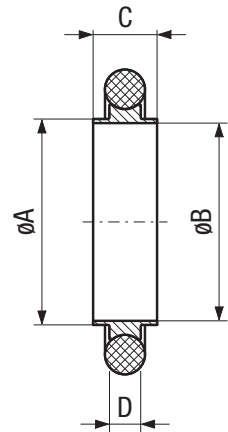
	DN ... ISO-KF	Part No.	A	B	C	D
Ring: aluminum	10	211-051	12	10	8	3.9
Seal: elastomer CR	16	211-052	17	16	8	3.9
	20	211-053	22	20	8	3.9
	25	211-054	26	25	8	3.9
	32	211-055	34	32	8	3.9
	40	211-056	41	40	8	3.9
	50	211-057	52	50	8	3.9
Ring: aluminum	10	211-058	12	10	8	3.9
Seal: elastomer FPM	16	211-059	17	16	8	3.9
	20	211-060	22	20	8	3.9
	25	211-061	26	25	8	3.9
	32	211-062	34	32	8	3.9
	40	211-063	41	40	8	3.9
	50	211-064	52	50	8	3.9
Ring: aluminum	10	211-651	12	10	8	3.9
Seal: elastomer NBR	16	211-652	17	16	8	3.9
	20	211-653	22	20	8	3.9
	25	211-654	26	25	8	3.9
	32	211-655	34	32	8	3.9
	40	211-656	41	40	8	3.9
	50	211-657	52	50	8	3.9
Ring: aluminum	10	211-658	12	10	8	3.9
Seal: elastomer EPDM	16	211-659	17	16	8	3.9
	20	211-660	22	20	8	3.9
	25	211-661	26	25	8	3.9
	32	211-662	34	32	8	3.9
	40	211-663	41	40	8	3.9
	50	211-664	52	50	8	3.9
Ring: aluminum	10	211-665	12	10	8	3.9
Seal: elastomer VMQ (silicone)	16	211-666	17	16	8	3.9
	20	211-667	22	20	8	3.9
	25	211-668	26	25	8	3.9
	32	211-669	34	32	8	3.9
	40	211-670	41	40	8	3.9
	50	211-671	52	50	8	3.9



Seals

CENTERING RING STAINLESS STEEL 303

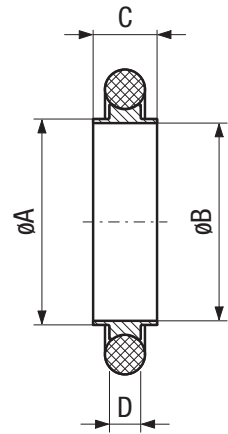
	DN ... ISO-KF	Part No.	A	B	C	D
Ring: stainless steel 304/1.4301	10	211-672	12	10	8	3.9
Seal: elastomer CR	16	211-673	17	16	8	3.9
	20	211-674	22	20	8	3.9
	25	211-675	26	25	8	3.9
	32	211-676	34	32	8	3.9
	40	211-677	41	40	8	3.9
	50	211-678	52	50	8	3.9
Ring: stainless steel 304/1.4301	10	211-065	12	10	8	3.9
Seal: elastomer FPM	16	211-066	17	16	8	3.9
	20	211-067	22	20	8	3.9
	25	211-068	26	25	8	3.9
	32	211-069	34	32	8	3.9
	40	211-070	41	40	8	3.9
	50	211-071	52	50	8	3.9
Ring: stainless steel 304/1.4301	10	211-679	12	10	8	3.9
Seal: elastomer NBR	16	211-680	17	16	8	3.9
	20	211-681	22	20	8	3.9
	25	211-682	26	25	8	3.9
	32	211-683	34	32	8	3.9
	40	211-684	41	40	8	3.9
	50	211-685	52	50	8	3.9
Ring: stainless steel 304/1.4301	10	211-686	12	10	8	3.9
Seal: elastomer EPDM	16	211-687	17	16	8	3.9
	20	211-688	22	20	8	3.9
	25	211-689	26	25	8	3.9
	32	211-690	34	32	8	3.9
	40	211-691	41	40	8	3.9
	50	211-692	52	50	8	3.9
Ring: stainless steel 304/1.4301	10	211-693	12	10	8	3.9
Seal: elastomer VMQ (silicone)	16	211-694	17	16	8	3.9
	20	211-695	22	20	8	3.9
	25	211-696	26	25	8	3.9
	32	211-697	34	32	8	3.9
	40	211-698	41	40	8	3.9
	50	211-699	52	50	8	3.9



Seals

CENTERING RING STAINLESS STEEL 316L

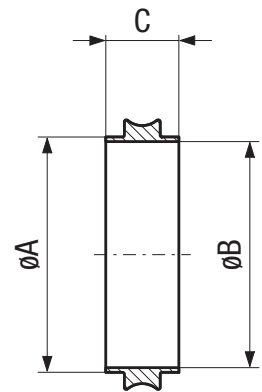
	DN ... ISO-KF	Part No.	A	B	C	D
Ring: stainless steel 316L/ Seal: 1.4404 elastomer CR	10	211-735	12	10	8	3.9
	16	211-736	17	16	8	3.9
	20	211-737	22	20	8	3.9
	25	211-738	26	25	8	3.9
	32	211-739	34	32	8	3.9
	40	211-740	41	40	8	3.9
Ring: stainless steel 316L/ Seal: 1.4404 elastomer FPM	50	211-741	52	50	8	3.9
	10	211-742	12	10	8	3.9
	16	211-743	17	16	8	3.9
	20	211-744	22	20	8	3.9
	25	211-745	26	25	8	3.9
	32	211-746	34	32	8	3.9
Ring: stainless steel 316L/ Seal: 1.4404 elastomer NBR	40	211-747	41	40	8	3.9
	50	211-748	52	50	8	3.9
	10	211-749	12	10	8	3.9
	16	211-750	17	16	8	3.9
	20	211-751	22	20	8	3.9
	25	211-752	26	25	8	3.9
Ring: stainless steel 316L/ Seal: 1.4404 elastomer EPDM	32	211-753	34	32	8	3.9
	40	211-754	41	40	8	3.9
	50	211-755	52	50	8	3.9
	10	211-756	12	10	8	3.9
	16	211-757	17	16	8	3.9
	20	211-758	22	20	8	3.9
Ring: stainless steel 316L/ Seal: 1.4404 elastomer VMQ (silicone)	25	211-759	26	25	8	3.9
	32	211-760	34	32	8	3.9
	40	211-761	41	40	8	3.9
	50	211-762	52	50	8	3.9
	10	211-763	12	10	8	3.9
	16	211-764	17	16	8	3.9
Ring: stainless steel 316L/ Seal: 1.4404 elastomer VMQ (silicone)	20	211-765	22	20	8	3.9
	25	211-766	26	25	8	3.9
	32	211-767	34	32	8	3.9
	40	211-768	41	40	8	3.9
	50	211-769	52	50	8	3.9



Seals

CENTERING RING WITHOUT O-RING

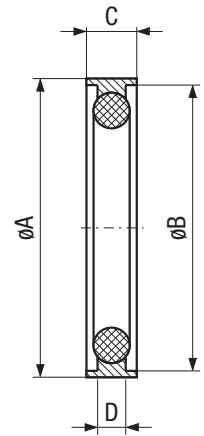
	DN ... ISO-KF	Part No.	A	B	C
Aluminum	10	201-301	12	10	8
	16	201-302	17	16	8
	20	201-303	22	20	8
	25	201-304	26	25	8
	32	201-305	34	32	8
	40	201-306	41	40	8
	50	201-307	52	50	8
Stainless steel 304/1.4301	10	201-308	12	10	8
	16	201-309	17	16	8
	20	201-310	22	20	8
	25	201-311	26	25	8
	32	201-312	34	32	8
	40	201-313	41	40	8
	50	201-314	52	50	8
Stainless steel 316L/1.4404	10	201-375	12	10	8
	16	201-376	17	16	8
	20	201-377	22	20	8
	25	201-378	26	25	8
	32	201-379	34	32	8
	40	201-380	41	40	8
	50	201-381	52	50	8



Seals

EXTERNAL CENTERING RING

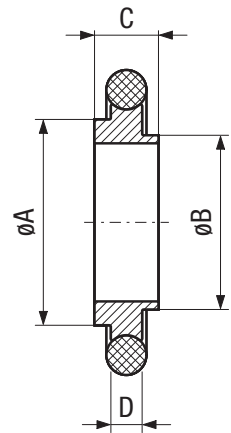
	DN ... ISO-KF	Part No.	A	B	C	D
Ring: aluminum	10-16	211-081	32	30.2	7	3.9
Seal: elastomer CR	20-25	211-082	42	40.2	7	3.9
	32-40	211-083	57	55.2	7	3.9
	50	211-084	77	75.2	7	3.9
Ring: aluminum	10-16	211-085	32	30.2	7	3.9
Seal: elastomer FPM	20-25	211-086	42	40.2	7	3.9
	32-40	211-087	57	55.2	7	3.9
	50	211-088	77	75.2	7	3.9
Ring: aluminum	10-16	211-700	32	30.2	7	3.9
Seal: elastomer NBR	20-25	211-701	42	40.2	7	3.9
	32-40	211-702	57	55.2	7	3.9
	50	211-703	77	75.2	7	3.9
Ring: aluminum	10-16	211-704	32	30.2	7	3.9
Seal: elastomer EPDM	20-25	211-705	42	40.2	7	3.9
	32-40	211-706	57	55.2	7	3.9
	50	211-707	77	75.2	7	3.9
Ring: aluminum	10-16	211-708	32	30.2	7	3.9
Seal: elastomer VMQ (silicone)	20-25	211-709	42	40.2	7	3.9
	32-40	211-710	57	55.2	7	3.9
	50	211-711	77	75.2	7	3.9



Seals

REDUCING CENTERING RING

	DN ... ISO-KF	Part No.	A	B	C	D	E
Ring: aluminum	10 / 16	211-072	17	10	12	8	3.9
Seal: elastomer CR	20 / 25	211-073	26	20	22	8	3.9
	32 / 40	211-074	41	32	34	8	3.9
Ring: aluminum	10 / 16	211-075	17	10	12	8	3.9
Seal: elastomer FPM	20 / 25	211-076	26	20	22	8	3.9
	32 / 40	211-077	41	32	34	8	3.9
Ring: aluminum	10 / 16	211-712	17	10	12	8	3.9
Seal: elastomer NBR	20 / 25	211-713	26	20	22	8	3.9
	32 / 40	211-714	41	32	34	8	3.9
Ring: aluminum	10 / 16	211-715	17	10	12	8	3.9
Seal: elastomer EPDM	20 / 25	211-716	26	20	22	8	3.9
	32 / 40	211-717	41	32	34	8	3.9
Ring: aluminum	10 / 16	211-718	17	10	12	8	3.9
Seal: elastomer VMQ (silicone)	20 / 25	211-719	26	20	22	8	3.9
	32 / 40	211-720	41	32	34	8	3.9
Ring: stainless steel 304/1.4301	10 / 16	211-721	17	10	12	8	3.9
Seal: elastomer CR	20 / 25	211-722	26	20	22	8	3.9
	32 / 40	211-723	41	32	34	8	3.9
Ring: stainless steel 304/1.4301	10 / 16	211-078	17	10	12	8	3.9
Seal: elastomer FPM	20 / 25	211-079	26	20	22	8	3.9
	32 / 40	211-080	41	32	34	8	3.9
Ring: stainless steel 304/1.4301	10 / 16	211-724	17	10	12	8	3.9
Seal: elastomer NBR	20 / 25	211-725	26	20	22	8	3.9
	32 / 40	211-726	41	32	34	8	3.9
Ring: stainless steel 304/1.4301	10 / 16	211-727	17	10	12	8	3.9
Seal: elastomer EPDM	20 / 25	211-728	26	20	22	8	3.9
	32 / 40	211-729	41	32	34	8	3.9
Ring: stainless steel 304/1.4301	10 / 16	211-730	17	10	12	8	3.9
Seal: elastomer VMQ (silicone)	20 / 25	211-731	26	20	22	8	3.9
	32 / 40	211-732	41	32	34	8	3.9



Seals

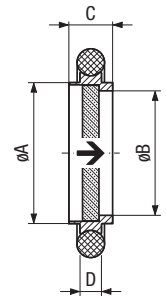
CENTERING RING WITH FILTER

	DN ... ISO-KF	Part No.	A	B	C	D	E ¹⁾
Ring: stainless steel 304/1.4301	10	211-089	12	8	8	3.9	0.5
Seal: elastomer FPM	16	211-090	17	14	8	3.9	1.2
Filter: stainless steel 316L/1.4404	25	211-092	26	23	8	3.9	4.2
	40	211-094	41	38	8	3.9	11.3
	50	211-095	52	48	8	3.9	18.1

Pore size: 0.02 mm

E: flow rate m³/h

¹⁾ Air at 20°C, 200 mbar differential pressure



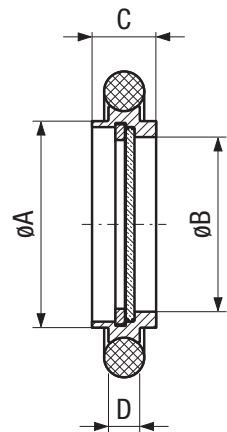
→ Recommended gas flow direction

CENTERING RING WITH FINE FILTER

	DN ... ISO-KF	Part No.	A	B	C	D
Inner ring: stainless steel 304/1.4301	10	211-096	12	9	8	3.9
Retaining ring: stainless steel -/1.4122	16	211-097	17	13	8	3.9
Seal: elastomer FPM	25	211-098	26	22	8	3.9
Filter: stainless steel 316L/1.4404	40	211-099	41	35.5	8	3.9
	50	211-100	52	45.7	8	3.9

Pore size: 0.004 mm

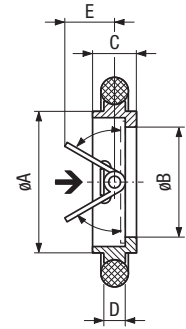
Degree of separation at 0.001 mm up to 98%



Seals

CENTERING RING WITH THROTTLE

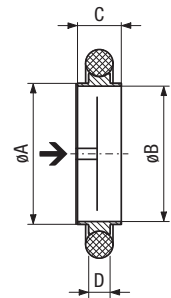
		DN ... ISO-KF	Part No.	A	B	C	D	E
Ring:	aluminum 6082	16	211-622	17	13	8	3.9	6.2
Inner parts:	stainless steel	25	211-623	26	18	8	3.9	9
	301/1.4310	40	211-624	41	30	8	3.9	14.3
Seal:	stainless steel	50	211-625	52	42	8	3.9	19.9
	303/1.4305							
	elastomer FPM							



→ Recommended gas flow direction

CENTERING RING WITH BAFFLE

		DN ... ISO-KF	Part No.	A	B	C
Ring:	stainless steel 304/1.4301	20 - 25	211-113	26	25	8
Baffle:	stainless steel 301 / 1.4310					
Seal:	elastomer FPM					

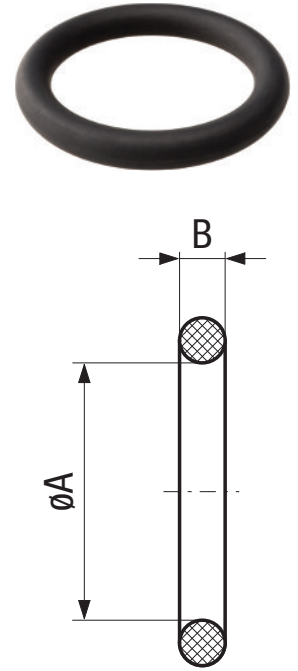


→ Recommended gas flow direction

Seals

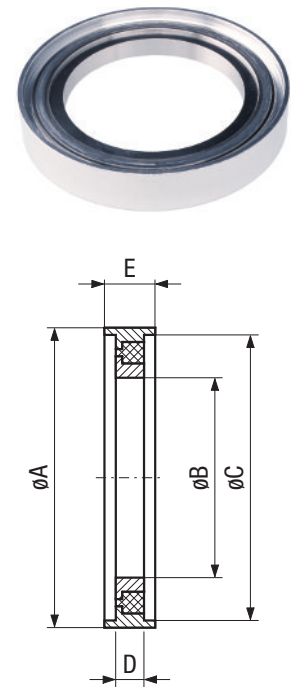
O-RING

	DN ... ISO-KF	Part No.	A	B	Set of
Elastomer CR	10	211-146	15	5	10 pcs.
	16	211-147	18	5	10 pcs.
	20	211-148	25	5	10 pcs.
	25	211-149	28	5	10 pcs.
	32	211-150	40	5	10 pcs.
	40	211-151	42	5	10 pcs.
	50	211-152	55	5	10 pcs.
Elastomer FPM	10	211-153	15	5	10 pcs.
	16	211-154	18	5	10 pcs.
	20	211-155	25	5	10 pcs.
	25	211-156	28	5	10 pcs.
	32	211-157	40	5	10 pcs.
	40	211-158	42	5	10 pcs.
	50	211-159	55	5	10 pcs.



INDIUM SEAL

	DN ... ISO-KF	Part No.	A	B	C	D	E
Inner ring: stainless steel	10-16	211-162	32	18	30	3.9	7
Outer ring: 304/1.4301	20-25	211-163	42	28	40	3.9	7
aluminum 5012	32-40	211-164	57	43	55	3.9	7
Seal: indium	50	211-165	77	63	75	3.9	7
Working temperature -196° ... +60°C							

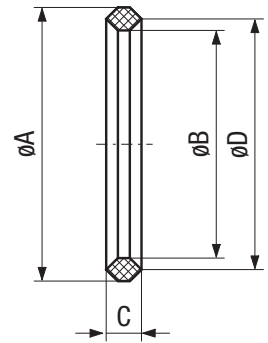


Seals

ALUMINUM SEAL

	DN ... ISO-KF	Part No. ¹⁾	A	B	C	D
Aluminum annealed 6082	10-16	211-167	25.6	19.6	4.5	22.6
	20-25	211-168	35.6	29.6	4.5	32.6
	32-40	211-169	50.6	44.6	4.5	47.6
	50	211-170	65.6	59.6	4.5	62.6
Set of 3 pieces						

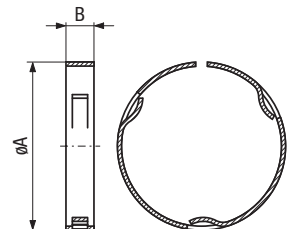
¹⁾ for support ring see separate ordering information "support ring for aluminum seal"



SUPPORT RING FOR ALUMINUM SEAL

	DN ... ISO-KF	Part No. ¹⁾	A	B
Stainless steel 301/1.4310	10-16	211-171	32	7
	20-25	211-172	42	7
	32-40	211-173	57	7
	50	211-174	77	7

¹⁾ for aluminum seal see separate ordering information "aluminum seal"

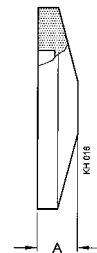
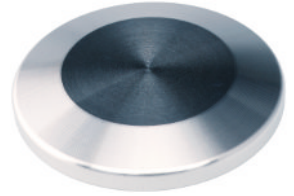


ISO-KF Small Flange Components

Flanges

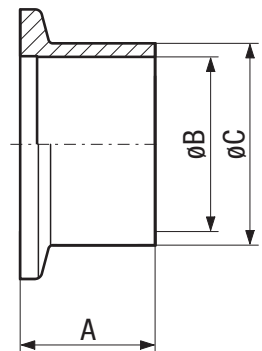
BLANK FLANGE

	DN ... ISO-KF	Part No.	A
Aluminum 6082	10	211-176	5
	16	211-177	5
	25	211-178	5
	40	211-179	5
	50	211-180	6
Stainless steel 304/1.4301	10	211-181	5
	16	211-182	5
	25	211-183	5
	40	211-184	5
	50	211-185	6
Stainless steel 316L/1.4404	10	211-791	5
	16	211-792	5
	25	211-793	5
	40	211-794	5
	50	211-795	6



FLANGE WITH TUBE, SHORT

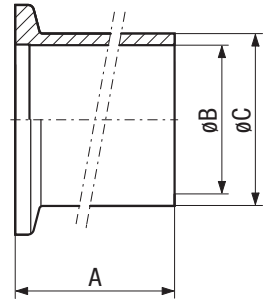
	DN ... ISO-KF	Part No.	A	B	C
Steel 1.0037	10	211-201	20	12	16
	16	211-202	20	16	20
	25	211-203	20	26	30
	40	211-204	20	41	45
	50	211-205	20	51	55
Stainless steel 304/1.4301	10	211-211	20	12	16
	16	211-212	20	16	20
	25	211-213	20	26	30
	40	211-214	20	41	45
	50	211-215	20	50	54
Stainless steel 316L/1.4404	10	211-826	20	12	16
	16	211-827	20	16	20
	25	211-828	20	26	30
	40	211-829	20	41	45
	50	211-830	20	50	54



Flanges

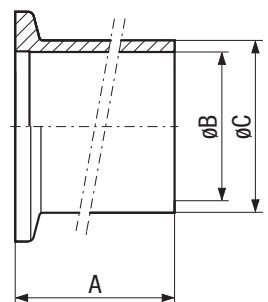
FLANGE WITH TUBE, MEDIUM

	DN ... ISO-KF	Part No.	A	B	C
Stainless steel 304/1.4301	10	211-221	30	12	16
	16	211-222	30	16	20
	25	211-223	30	26	30
	40	211-224	30	41	45
	50	211-225	30	50	54
Stainless steel 316L/1.4404	10	211-831	30	12	16
	16	211-832	30	16	20
	25	211-833	30	26	30
	40	211-834	30	41	45
	50	211-835	30	50	54



FLANGE WITH TUBE, LONG

	DN ... ISO-KF	Part No.	A	B	C
Steel 1.0037	10	211-206	70	12	16
	16	211-207	70	16	20
	25	211-208	70	26	30
	40	211-209	70	41	45
	50	211-210	70	51	55
Stainless steel 304/1.4301	10	211-216	70	12	16
	16	211-217	70	16	20
	25	211-218	70	26	30
	40	211-219	70	41	45
	50	211-220	70	50	54
Stainless steel 316L/1.4404	10	211-836	70	12	16
	16	211-837	70	16	20
	25	211-838	70	26	30
	40	211-839	70	41	45
	50	211-840	70	50	54

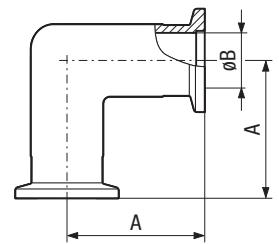


ISO-KF Small Flange Components

Pipe Fittings

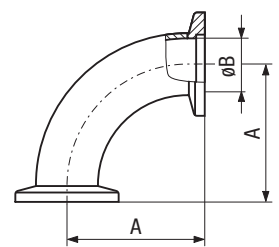
ELBOW 90° ALUMINUM

	DN ... ISO-KF	Part No.	A	B
Aluminum 6082	10	211-251	30	12
	16	211-252	40	16
	25	211-253	50	25
	40	211-254	65	39



ELBOW 90° STAINLESS STEEL

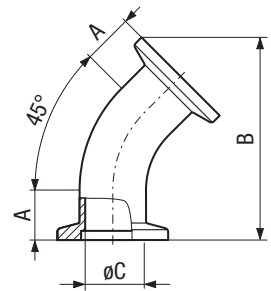
	DN ... ISO-KF	Part No.	A	B
Stainless steel 304/1.4301	10	211-286	30	9
	16	211-287	40	15
	25	211-288	50	25
	40	211-289	65	40.5
	50	211-290	70	49



Pipe Fittings

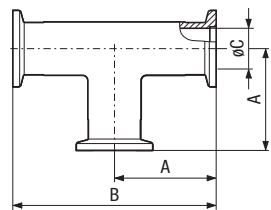
ELBOW 45°

	DN ... ISO-KF	Part No.	A	B	C
Stainless steel 304/1.4301	16	211-307	13.6	55	15
	25	211-308	16.7	68.8	25
	40	211-309	15.1	87.7	37



TEE

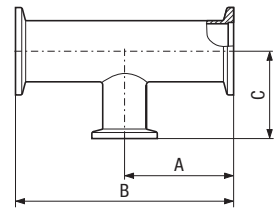
	DN ... ISO- KF	Part No.	A	B	C
Aluminum 6082	10	211-261	30	60	12
	16	211-262	40	80	16
	25	211-263	50	100	25
	40	211-264	65	130	39
Stainless steel 304/1.4301	10	211-291	30	60	12
	16	211-292	40	80	16
	25	211-293	50	100	25
	40	211-294	65	130	40.5
	50	211-295	70	140	53



Pipe Fittings

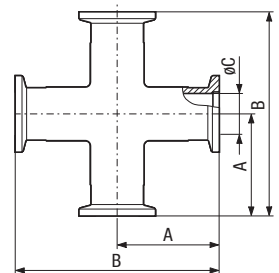
REDUCING TEE

	DN ... ISO-KF	Part No.	A	B	C
Stainless steel 304/1.4301	25 / 16	211-316	50	100	40
	40 / 16	211-317	65	130	40
	40 / 25	211-318	65	130	50
	50 / 16	211-319	70	140	50
	50 / 25	211-320	70	140	65
	50 / 40	211-321	70	140	65



CROSS

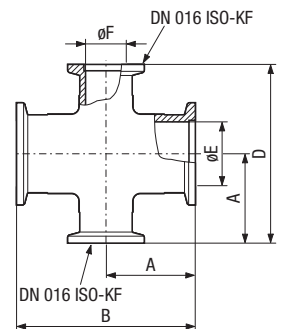
	DN ... ISO-KF	Part No.	A	B	C
Aluminum 6082	10	211-266	30	60	12
	16	211-267	40	80	16
	25	211-268	50	100	25
	40	211-269	65	130	39
Stainless steel 304/1.4301	10	211-296	30	60	12
	16	211-297	40	80	16
	25	211-298	50	100	25
	40	211-299	65	130	40.5
	50	211-300	70	140	53



Pipe Fittings

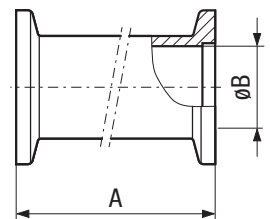
REDUCING CROSS

	DN ... ISO-KF	Part No.	A	B	C	D	E	F
Aluminum 6082	25 / 16	211-271	35	70	35	70	25	16
	40 / 16	211-272	40	80	45	90	39	16
Stainless steel 304/1.4301	25 / 16	211-301	35	70	35	70	25	17
	40 / 16	211-302	40	80	45	90	40.5	16
	50 / 16	211-303	50	100	50	100	53	16



INTERMEDIATE PIECE

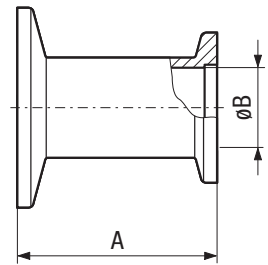
	DN ... ISO-KF	Part No.	A	B
Aluminum 6082	16	211-227	80	16
	25	211-228	100	25
	40	211-229	130	40
Stainless steel 304/1.4301	16	211-277	80	16
	25	211-278	100	25
	40	211-599	76.2	40.5
	40	211-279	130	40.5
	50	211-280	140	53



Pipe Fittings

REDUCER

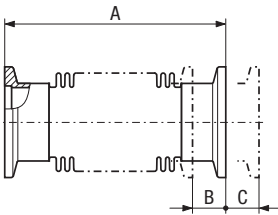
	DN ... ISO-KF	Part No.	A	B
Aluminum 6082	25 / 16	211-231	40	16
	40 / 16	211-232	40	16
	40 / 25	211-233	40	25
	50 / 40	211-234	40	40
Stainless steel 304/1.4301	25 / 16	211-281	40	16
	40 / 16	211-282	40	16
	40 / 25	211-283	40	26
	50 / 16	211-323	40	16
	50 / 25	211-324	40	26
	50 / 40	211-284	40	40



ISO-KF Small Flange Components

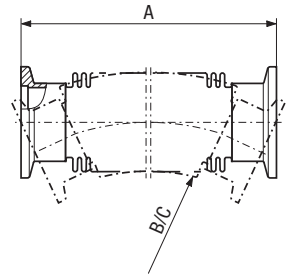
Bellows/Hose with Flanges

BELLOWS								
		DN ... ISO- KF	Part No.	A	B	C	D	E
Flanges:	stainless steel 304/1.4301	10	211-326	70	3.5	3	23°	5
Bellows:	stainless steel 316Ti/ 1.4571	16	211-327	70	6.4	4.1	21°	4
		25	211-328	80	8	5	17°	3.5
		40	211-329	100	11	7	15°	7
		50	211-330	100	10	6	15°	8
Max. internal pressure: 4 bar								
A = unstressed length								
D = max. deviation from axis								
E = lateral displacement								



Bellows/Hose with Flanges

METAL HOSE, HIGH FLEXIBLE



		DN ... ISO-KF	Part No.	A	B	C
Flange	stainless steel 304	10	211-331	250	100	17
s:	stainless steel	10	211-332	500	100	17
Bellow	316L/1.4404	10	211-333	750	100	17
s:		10	211-334	1000	100	17
		16	211-335	250	70	50
		16	211-336	500	70	50
		16	211-337	750	70	50
		16	211-338	1000	70	50
		16	211-531	1500	70	50
		16	211-532	2000	70	50
		25	211-339	250	100	60
		25	211-340	500	100	60
		25	211-341	750	100	60
		25	211-342	1000	100	60
		25	211-533	1500	100	60
		25	211-534	2000	100	60
		40	211-343	250	130	100
		40	211-344	500	130	100
		40	211-345	750	130	100
		40	211-346	1000	130	100
		40	211-535	1500	130	100
		40	211-536	2000	130	100
		50	211-347	250	200	130
		50	211-348	500	200	130
		50	211-349	750	200	130
		50	211-350	1000	200	130

B = radius for multiple bending

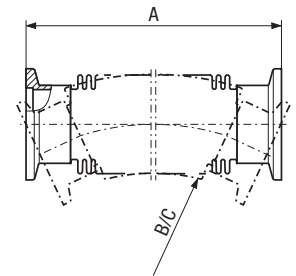
C = radius for single bend

max. internal pressure 4 bar

Bellows/Hose with Flanges

METAL HOSE, FLEXIBLE

		DN ... ISO-KF	Part No.	A	B
Flange s:	stainless steel 316/ (304)	10	211-851	250	40
		10	211-852	500	40
Bellows s:	stainless steel 316L/(316Ti)	10	211-853	750	40
		10	211-854	1000	40
		16	211-857	250	60
		16	211-858	500	60
		16	211-859	750	60
		16	211-860	1000	60
		16	211-861	1500	60
		16	211-862	2000	60
		25	211-863	250	115
		25	211-864	500	115
		25	211-865	750	115
		25	211-866	1000	115
		25	211-867	1500	115
		25	211-868	2000	115
		40	211-869	250	149
		40	211-870	500	149
		40	211-871	750	149
		40	211-872	1000	149
		40	211-873	1500	149
		40	211-874	2000	149

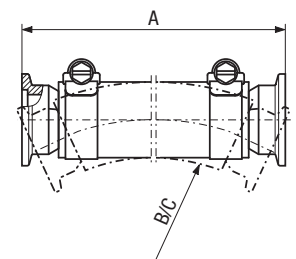


B = radius for single bending

max. internal pressure 4 bar

PVC HOSE

		DN ... ISO-KF	Part No.	A	B	C
Hose:	PVC with cast in steel spiral	16	211-406	500	130	65
Nipple:		16	211-407	1000	130	65
Hose clamp:	aluminum 6082	16	211-509	1500	130	65
	stainless steel 430	25	211-408	500	200	100
		25	211-409	1000	200	100
		25	211-412	2000	200	100
		25	211-413	5000	200	100
		40	211-410	500	260	130
		40	211-411	1000	260	130



B = radius for multiple bending

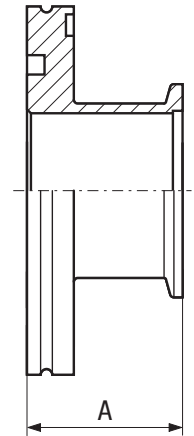
C = radius for single bending

ISO-KF Small Flange Components

Transition Pieces

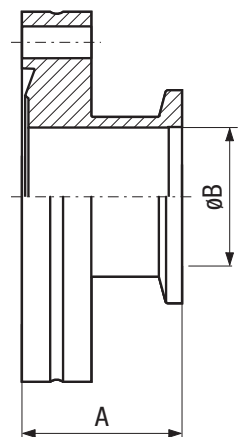
ADAPTOR ISO-KF/ISO-K

	ISO-KF/ ISO-K	Part No.	A
Aluminum 6082	40 / 63	212-171	40
	50 / 63	212-172	45
Stainless steel 303/1.4305	40 / 63	212-173	40
	50 / 63	212-174	45
	40 / 100	212-175	40
	25 / 63	212-176	50



ADAPTOR ISO-KF/ISO-CF-F

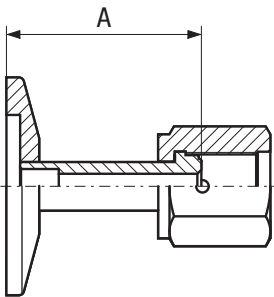
	ISO-KF/CF- F	Part No.	A	B
Stainless steel 304L/1.4306	16 / 16	213-251	35	16
	25 / 16	213-252	35	16
	16 / 40	213-254	30	16
	25 / 40	213-255	30	26
	40 / 40	213-256	50	37
	40 / 63	213-259	35	41
	40 / 100	213-262	50	41



Transition Pieces

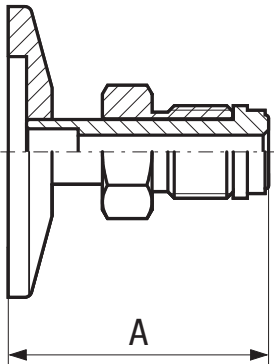
ADAPTOR ISO-KF/VCR FEMALE

		ISO-KF/ VCR	Part No.	A
Flange: Nut:	stainless steel 304/1.4301	16 / □ in.	211-359	35.8
	stainless steel 316L/	25 / □ in.	211-480	35.8
	1.4435	25 / □ in.	211-360	40.6
		40 / □ in.	211-361	53.3
Width across flats in inch				



ADAPTOR ISO-KF/VCR MALE

		ISO-KF/ VCR	Part No.	A
Flange: Nut:	stainless steel 304/1.4301	16 / 1/2 in.	211-362	35.8
	stainless steel 316L/	25 / 1/2 in.	211-481	35.8
	1.4435	25 / 3/4 in.	211-363	40.6
		40 / 1 in.	211-364	53.3
Width across flats in inch				



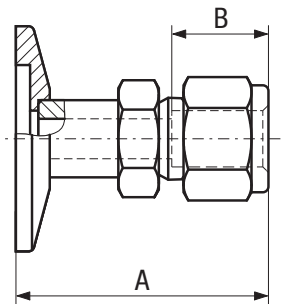
Transition Pieces

ADAPTOR ISO-KF/SWAGELOK®

		ISO-KF/ Swagelok®	Part No.	A	B
Flange:	stainless steel 304/1.4301	16 / 6 mm	211-356 ¹⁾	37	15.3
	stainless steel 316L/	25 / 10 mm		45	17.2
Nut:	1.4435	40 / 16 mm	211-357 ¹⁾	53	24.4
		16 / □ in.	211-358 ¹⁾	35	12.7
		25 / □ in.		37	15.5
		40 / □ in.	211-476 ²⁾	37	15.5
		40 / □ in.	211-477 ²⁾	47	23
			211-478 ²⁾		
			211-479 ²⁾		

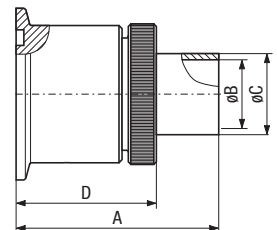
¹⁾ Width across flats metric (SI)

²⁾ Width across flats in inch



GLASS TUBE CONNECTION

		DN ... ISO- KF	Part No.	A	B	C	D
Flange:	aluminum 6082	10	211-351	50	8	10	30
Sealing	elastomer FPM	40	211-353	65	22	26	45
Tube:	glas Pyrex						

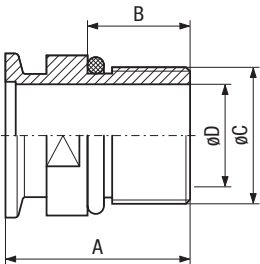


Transition Pieces

SCREW-IN FLANGE

	ISO-KF/DN	Part No.	A	B	C	D
Flange: stainless steel	16 /	211-372	42	11.5	M16x1.	10.5
Sealing 303/1.4305	M16x1.5	211-366	35	15	5	12
: elastomer FPM	10 / G 1/8 in.	211-367	35	15	G 1/8 in.	16
	16 / G 1/4 in.	211-368	45	25	G 1/4 in.	25
	25 / G 1/2 in.	211-369	50	30	G 1/2 in.	41
	40 / G 3/4 in.				G 3/4 in.	

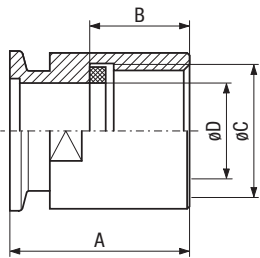
Width across flats metric (SI)



SCREW-ON FLANGE

	ISO-KF/DN	Part No.	A	B	C	D
Flange: stainless steel	10 / G 1/8 in.	211-376	35	15	G 1/8 in.	10
Sealing 303/1.4305	16 / G 1/4 in.	211-377	35	15	G 1/4 in.	15
: elastomer FPM	25 / G 1/2 in.	211-378	45	25	G 1/2 in.	24
	40 / G 3/4 in.	211-379	50	30	G 3/4 in.	38

Width across flats metric (SI)

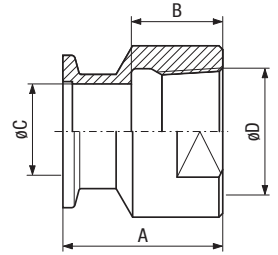


Transition Pieces

ADAPTOR ISO-KF/NPT FEMALE

	ISO-KF/ NPT	Part No.	A	B	C	D
Stainless steel 303 / 1.4305	16 / □ in.	211-566	19	10	12	□-27 NPT
	16 / □ in.	211-567	19	13	15	□-18 NPT
	25 / □ in.	211-569	19	10	12	□-27 NPT
	25 / □ in.	211-570	19	13	15	□-18 NPT
	25 / □ in.	211-571	26	18	25	□-14 NPT
	25 / 1 in.	211-572	42	24	25	1-11 □ NPT
	40 / □ in.	211-574	19	13	15	□-18 NPT
	40 / □ in.	211-575	26	18	25	□-14 NPT
	40 / 1 in.	211-576	26	23	29	1-11 □ NPT

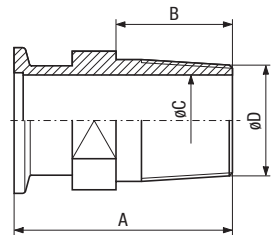
Width across flats in inch



ADAPTOR ISO-KF/NPT MALE

	ISO-KF/ NPT	Part No.	A	B	C	D
Stainless steel 303 / 1.4305	16 / □ in.	211-551	40	17	5	□-27 NPT
	16 / □ in.	211-552	40	22	7	□-18 NPT
	25 / □ in.	211-554	40	17	5	□-27 NPT
	25 / □ in.	211-555	40	22	7	□-18 NPT
	25 / □ in.	211-556	50	30	14	□-14 NPT
	25 / 1 in.	211-557	60	32	25	1-11 □ NPT
	40 / □ in.	211-559	40	21	7	□-18 NPT
	40 / □ in.	211-560	50	30	14	□-14 NPT
	40 / 1 in.	211-561	60	33	25	1-11 □ NPT
	40 / 1 □ in.	211-562	50	31.5	32	1 □-11 □ NPT
	40 / 1 □ in.	211-563	50	28	32	1 □-11 □ NPT
	40 / 2 in.	211-564	50	27	40	2-11 □ NPT

Width across flats in inch



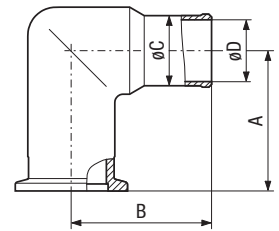
ISO-KF Small Flange Components

Hose, Hose Connection

HOSE ADAPTOR 90°

	DN ... ISO-KF	Part No.	A	B	C	D
Aluminum 6082	16	211-257	40	40	16	13
	25	211-258	50	50	25	22
	40	211-259	65	65	40	37

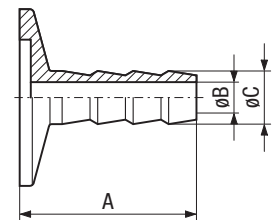
C = nominal connection for sleeve / hose



HOSE ADAPTOR FOR RUBBER HOSE

	DN ... ISO-KF	Part No.	A	B	C
Aluminum 6082	16	211-387	40	7	12
	25	211-388	40	7	12
	40	211-389	40	7	12
Stainless steel 303	16	211-392	40	7	12
	25	211-393	40	7	12
	40	211-394	40	7	12

C = nominal connection for hose

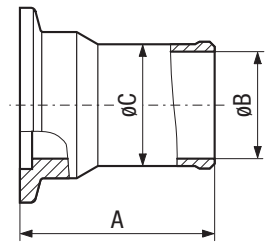


Hose, Hose Connection

HOSE CONNECTION

	DN ... ISO-KF	Part No.	A	B	C
Aluminum 6082	25	211-401	40	13	16
	16	211-402	40	13	16
	25	211-403	40	22	25
	40	211-404	40	37	40

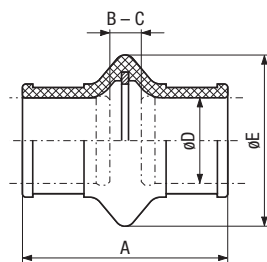
C = nominal connection for sleeve / hose



SLEEVE WITH HOSE CLAMP

		DN ... ISO-KF	Part No.	A	B	C	D	E
Hose clamp:	stainless steel	16	211-417	58	7	14	16	44
		25	211-418	60	9	16	25	50
Sleeve:	elastomer CR	40	211-419	64	13	20	40	68

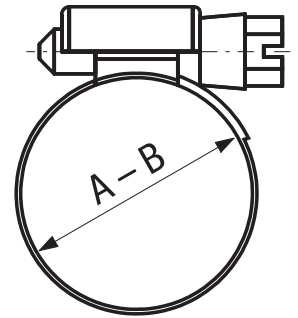
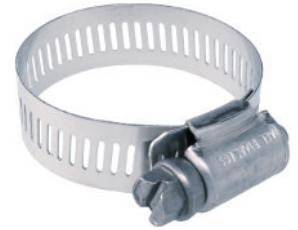
Max. internal pressure: 1 bar



Hose, Hose Connection

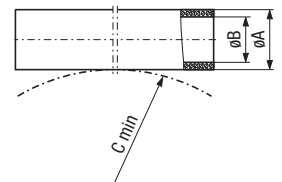
HOSE CLAMP

	DN ... ISO-KF	Part No.	A	B
Stainless steel 430	16	211-461	13	32
	25	211-462	19	44
	40	211-463	26	76



PVC HOSE

	DN ... ISO-KF	Part No.	A	B	C
With cast in spiral	16	211-442	22	16	130
	25	211-443	33	25	200
	40	211-444	49	40	260
for vacuum applications Indicate length in meters					



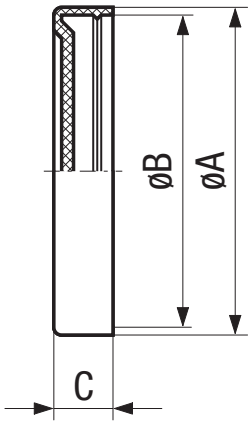
RUBBER HOSE

	DN ... ISO-KF	Part No.	A	B
For vacuum applications natural rubber NR	10	211-451	17	7
	16	211-452	25	10
	20	211-453	32	16
Indicate length in meters Hardness: 45 ± 5 Shore A Temperature: -30 ... +75 °C				



Hose, Hose Connection

PROTECTIVE LID					
	DN ... ISO-KF	Part No.	A	B	C
Polyethylene	10-16	211-427	32	29	7.5
	20-25	211-428	42	39	7.5
	32-40	211-429	57	54	7.5
	50	211-430	77	74	7.5

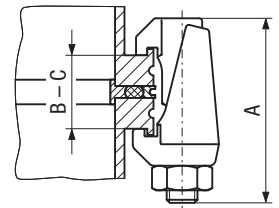


ISO-K Clamp Flange Components

Connection Elements

CLAMP

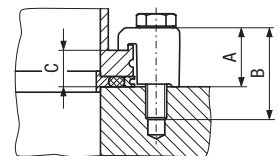
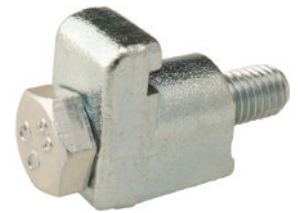
	DN ... ISO-K	Part No. ¹⁾	A	B	C	Thread size
Steel zinc plated 1045	63-250	212-225	60	17	27	M10
	320-500	212-226	78	27	39	M12
	630	212-227	88	31	49	M12
Stainless steel 316	63-250	212-228	61	18	28	M10
	320-630	212-240	82	29	47	M12

¹⁾ Set of 4 pcs

CLAW WITHOUT GROOVE

	DN ... ISO-K	Part No. ¹⁾	A	B	C	Thread size
Clamp steel zinc plated 1045	63-100	212-231	22.5	35	13.9	M8
	160-250	212-232	23	35	13.9	M10
Screw: steel zinc plated 1045	320-500	212-233	36.5	50	20.6	M12
	630	212-234	41.5	55	25.6	M12

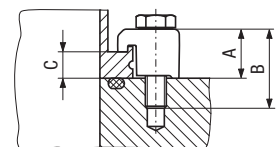
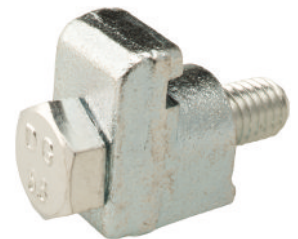
Clamping flange and base plate without groove

¹⁾ Set of 4 pcs

CLAW BASE PLATE WITH GROOVE

	DN ... ISO-K	Part No. ¹⁾	A	B	C	Thread size
Clamp steel zinc plated 1045	63-100	212-235	18.6	30	10	M8
	160-250	212-236	19	35	10	M10
Screw: steel zinc plated 1045	320-500	212-237	31	45	15	M12
	630	212-233	36.5	50	20.6	M12

Clamping flange / base plate with groove

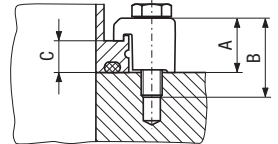
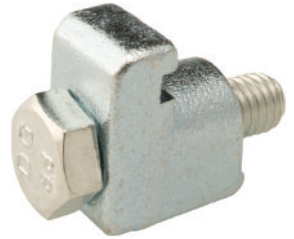
¹⁾ Set of 4 pcs

Connection Elements

CLAW FOR FLANGE WITH SEALING GROOVE

	DN ... ISO-K	Part No. ¹⁾	A	B	C	Thread size
Clamp & Screw: Steel zinc plated 1045	63-100	212-247	20.6	30	12	M8
	160-250	212-248	21.1	35	12	M10
	320-500	212-249	33.9	45	18	M12
	630	212-233	36.5	50	20.6	M12
Clamping flange with groove / base plate						

¹⁾ Set of 4 pcs

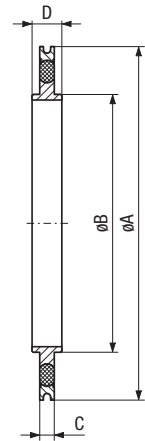


ISO-K Clamp Flange Components

Seals

CENTERING RING

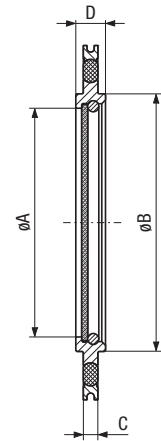
		DN ... ISO-K	Part No.	A	B	C	D
Inner ring:	aluminum 6082	63	212-251	96	70	3.9	8
Outer ring:	aluminum 6082	80	212-091	109	83	3.9	8
Seal:	elastomer CR	100	212-252	128	102	3.9	8
		160	212-253	179	153	3.9	8
		200	212-254	239	213	3.9	8
		250	212-255	287	261	3.9	8
		320	212-256	358	318	5.6	14
		400	212-257	440	400	5.6	14
		500	212-258	541	501	5.6	14
		630	212-259	691	651	5.6	14
Inner ring:	aluminum 6082	63	212-261	96	70	3.9	8
Outer ring:	aluminum 6082	80	212-092	109	83	3.9	8
Seal:	elastomer FPM	100	212-262	128	102	3.9	8
		160	212-263	179	153	3.9	8
		200	212-264	239	213	3.9	8
		250	212-265	287	261	3.9	8
		320	212-266	358	318	5.6	14
		400	212-267	440	400	5.6	14
		500	212-268	541	501	5.6	14
		630	212-269	691	651	5.6	14
		800	212-270	840	800	5.6	14
		1000	212-271	1040	1000	5.6	14
Inner ring:	stainless steel 304	63	212-281	96	70	3.9	8
Outer ring:	aluminum 6082	80	212-093	109	83	3.9	8
Seal:	elastomer FPM	100	212-282	128	102	3.9	8
		160	212-283	179	153	3.9	8
		200	212-284	239	213	3.9	8
		250	212-285	287	261	3.9	8



Seals

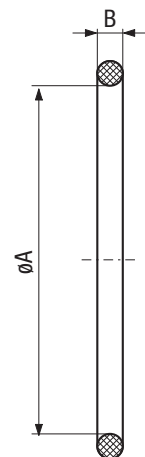
CENTERING RING WITH FINE FILTER

		DN ... ISO-K	Part No.	A	B	C	D
Inner ring:	stainless steel 304	63	212-291	62	69.8	3.9	8
Outer ring:	aluminum 6082	100	212-292	94	101.8	3.9	8
Seal:	elastomer FPM						
Snap ring:	stainless steel 304						
Filter grit:	stainless steel 304						
Filter:	stainless steel 316L						
Pore size 0.004 mm							
Degree of separation at 0.001 mm up to 98%							



O-RING

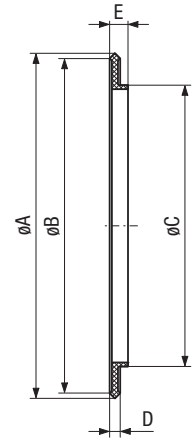
	DN ... ISO-K	Part No.	A	B	Set of
Elastomer CR	63	212-386	75.6	5.3	5 pcs.
	80	212-387	88.3	5.3	5 pcs.
	100	212-388	107.3	5.3	5 pcs.
	160	212-389	158.1	5.3	5 pcs.
	200	212-390	208.9	5.3	5 pcs.
	250	212-391	253.4	5.3	5 pcs.
Elastomer FPM	63	212-392	75.6	5.3	5 pcs.
	80	212-393	88.3	5.3	5 pcs.
	100	212-394	107.2	5.3	5 pcs.
	160	212-395	158.1	5.3	5 pcs.
	200	212-396	208.9	5.3	5 pcs.
	250	212-397	253.4	5.3	5 pcs.
	320	212-366	329.6	7	1 pcs.
	400	212-367	405.3	7	1 pcs.
	500	212-368	506.9	7	1 pcs.
	630	212-369	658.9	7	1 pcs.



Seals

ALUMINUM SEAL

	DN ... ISO-K	Part No.	A	B	C	D	E
Aluminum annealed 6082	63	212-301	85.6	83	69.8	2.6	4.5
	100	212-302	116.6	114	101.8	2.6	4.5
	160	212-303	166.6	164	152.8	2.6	4.5
	250	212-305	276.6	274	260.8	2.6	4.5
Number of	Clamps						
	DN 63 ISO-K	4					
		6 - 8					
	DN 100 ISO-K	8					
	DN 160 ISO-K	12					
	DN 250 ISO-K						

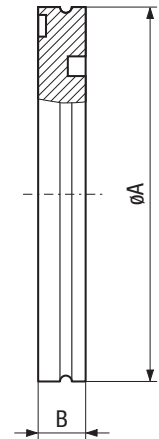


ISO-K Clamp Flange Components

Flanges

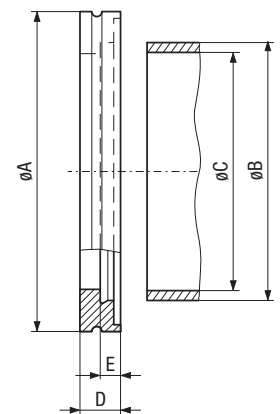
BLANK FLANGE

	DN ... ISO-K	Part No.	A	B
Aluminum 6082	63	212-441	95	12
	100	212-442	130	12
	160	212-443	180	12
	200	212-444	240	12
	250	212-445	290	12
	320	212-446	370	17
Steel nickel plated A570	63	212-001	95	12
	100	212-002	130	12
	160	212-003	180	12
	250	212-005	290	12
Stainless steel 304	63	212-011	95	12
	80	212-076	110	12
	100	212-012	130	12
	160	212-013	180	12
	200	212-014	240	12
	250	212-015	290	12
	320	212-016	370	17
	400	212-017	450	17
	500	212-018	550	17
	630	212-019	690	22



WELDING FLANGE

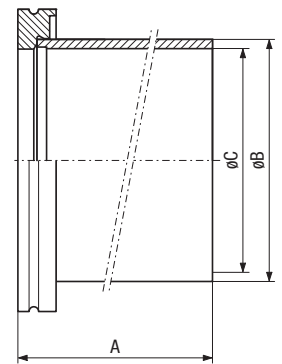
	DN ... ISO-K	Part No.	A	B	C	D	E
Steel /1.0831	63	212-021	95	76.1	70.3	12	6
	100	212-022	130	108	102.2	12	6
Steel A570	160	212-023	180	159	153.2	12	6
	250	212-025	290	267	261	12	6
Stainless steel 304	63	212-031	95	76.1	71.5	12	6
	80	212-078	110	88.9	84.9	12	6
	100	212-032	130	108	102	12	6
	160	212-033	180	159	155	12	6
	200	212-034	240	219.1	213.1	12	6
	250	212-035	290	267	261	12	6
	320	212-036	370	324	318	17	8.5
	400	212-037	450	381	375	17	8.5
Stainless steel 304	250	212-385	290	254	250	12	6
	250	212-505	290	273	261	12	5



Flanges

FLANGE WITH TUBE

		DN ... ISO-K	Part No.	A	B	C
Flange:	steel 1.0831	63	212-041	100	76.1	70.3
Tube:	steel 1.0308	100	212-042	100	108	102.2
		160	212-043	100	159	153.2
		250	212-045	100	267	261
Stainless steel 304		63	212-051	100	76.1	71.5
		100	212-052	100	108	104
		160	212-053	100	159	155
		200	212-054	100	219.1	212.7
		250	212-055	100	267	261
		320	212-056	100	324	318
		400	212-057	100	406	400
		500	212-058	100	508	500
Stainless steel 304/-		630	212-059	100	660	650
		250	212-506	100	273	267

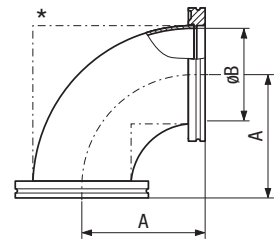


ISO-K Clamp Flange Components

Pipe Fittings

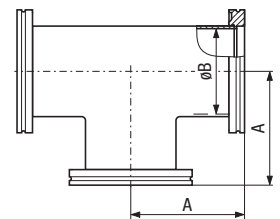
ELBOW 90°

	DN ... ISO-K	Part No.	A	B
Stainless steel 304	63	212-101	88	66
	100	212-102	108	100
	160*	212-103	138	150
	200*	212-104	178	213
	250*	212-105	208	250
	320*	212-106	250	318



TEE

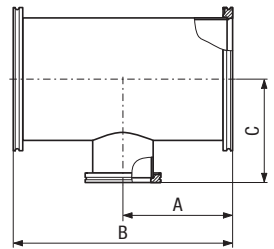
	DN ... ISO-K	Part No.	A	B
Stainless steel 304	63	212-111	88	66
	100	212-112	108	100
	160	212-113	138	150
	200	212-114	178	213
	250	212-115	208	250
	320	212-116	250	318



Pipe Fittings

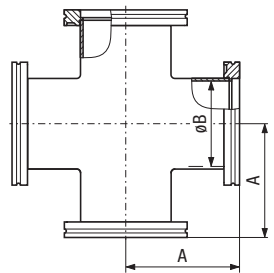
REDUCING TEE

	DN ... ISO-K	Part No.	A	B	C
Stainless steel 304	160/63	212-196	138	276	130
	160/100	212-197	138	276	131
	250/200	212-198	190	380	208



CROSS

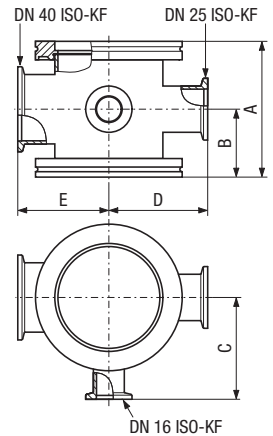
	DN ... ISO-K	Part No.	A	B
Stainless steel 304	63	212-121	88	66
	100	212-122	108	100
	160	212-123	138	150
	200	212-124	178	213
	250	212-125	208	250



Pipe Fittings

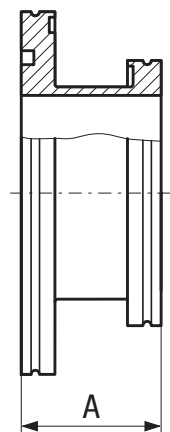
REDUCING CROSS

	DN ... ISO-K	Part No.	A	B	C	D	E
Stainless steel 304	63	212-131	88	44	66	64	59
	100	212-132	100	50	82	80	77
	160	212-133	100	50	107	107	105
1x DN 16 ISO-KF							
1x DN 25 ISO-KF							
1x DN 40 ISO-KF							



REDUCER

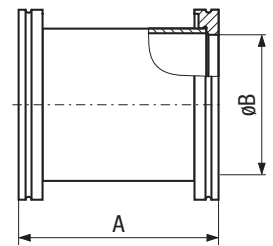
	DN ... ISO-K	Part No.	A
Stainless steel 304	80/63	212-084	50
	100/63	212-161	50
	160/100	212-163	50
	200/160	212-166	50
	250/160	212-169	50
	250/200	212-170	50



Pipe Fittings

INTERMEDIATE PIECE

	DN ... ISO-K	Part No.	A	B
Stainless steel 304	63	212-191	100	70
	63	212-192	176	70
	63	212-193	500	70



ISO-K Clamp Flange Components

Bellows/Hose with Flanges

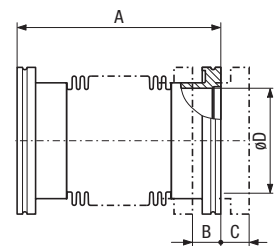
BELLOWS

		DN ... ISO-K	Part No.	A	B	C	D	E
Flanges:	stainless steel 304	63	212-201	132	20	20	66	30°
Bellows:	stainless steel 316Ti	100	212-202	132	28	28	95	30°
		160	212-203	150	22	22	153	14°
		200	212-204	150	20	20	213	12°
		250	212-205	200	30	30	261	13°
		320	212-206	250	50	50	313	7.5°

Max. internal pressure 1.5 bar

A = unstressed length

E = max. deviation from axis



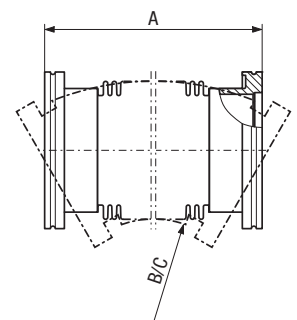
METAL HOSE

		DN ... ISO-K	Part No.	A	B	C
Flanges:	stainless steel 304	63	212-211	250	330	90
Bellows:	stainless steel 316Ti	63	212-212	500	330	90
		63	212-213	750	330	90
		63	212-214	1000	330	90
		100	212-215	250	530	130
		100	212-216	500	530	130
		100	212-217	750	530	130
		100	212-218	1000	530	130
		160	212-222	1000	1050	215

Max. internal pressure 1.5 bar

B = radius for multiple bending

C = radius for single bending

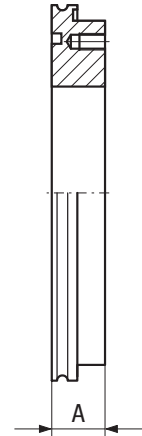


ISO-K Clamp Flange Components

Transition Pieces

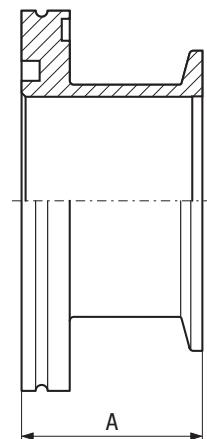
ADAPTOR FLANGE ISO-K/ISO-F

	DN ... ISO-K/ISO-F	Part No.	A
Stainless steel 304	160/63	212-152	22
	160/100	212-153	25
	200/100	212-155	20
	200/160	212-156	25
	250/160	212-159	22



ADAPTOR FLANGE ISO-K/ISO-KF

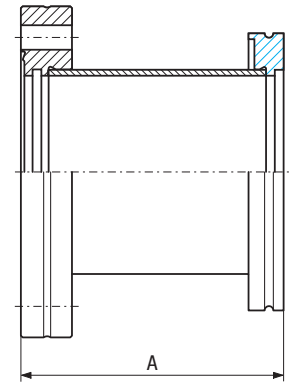
	DN ... ISO-K/ISO-KF	Part No.	A
Aluminum 6082	63/40	212-171	40
	63/50	212-172	45
Stainless steel 304	63/25	212-176	50
	63/40	212-173	40
	63/50	212-174	45
	100/40	212-175	40



Transition Pieces

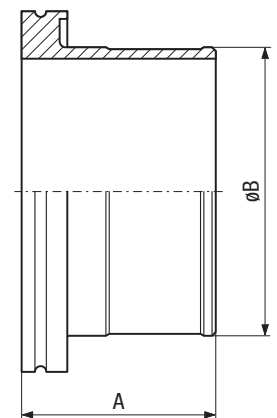
ADAPTOR FLANGE CF/ISO-K

	DN ... ISO- CF/ISO-K	Part No.	A	B	C
Stainless steel 304L	63/63	213-271	90	1	1
	100/100	213-272	90	1	1
	160/160	213-273	90	1.5	1.5



ADAPTOR FLANGE DN/ISO-K

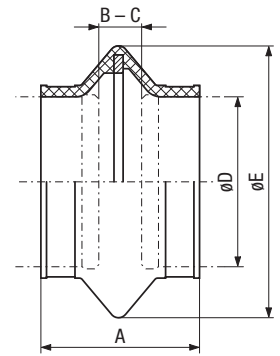
	DN ... ISO- K	Part No.	A	B
Aluminum 6082	63	212-181	51	76
	100	212-182	56	107
	160	212-183	56	156



Transition Pieces

SLEEVE WITH HOSE CLAMP

		DN ... ISO-K	Part No.	A	B	C	D	E
Sleeve:	elastomer CR	63	212-186	70	14	24	75	120
Hose clamp:	stainless steel 304	100	212-187	72	8	26	106	150
		160	212-188	72	8	26	155	200
Max. internal pressure: 1 bar								

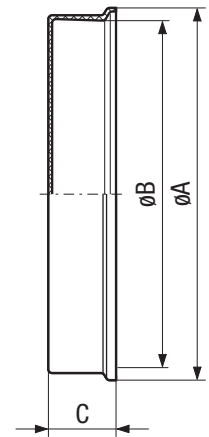


ISO-K Clamp Flange Components

Protective Lids

PROTECTIVE LID

	DN ... ISO-K	Part No.	A	B	C
Polyethylene	63	212-311	102	95	18
	100	212-312	137	130	18
	160	212-313	187	180	18
	200	212-314	248	240	18.5
	250	212-315	297.5	290	18.5
	320	212-316	380	370	23.5
	400	212-317	461	450	23.5
	500	212-318	557	550	24
	630	212-319	697	690	29



ISO-F Fixed Flange Components

Flange Components

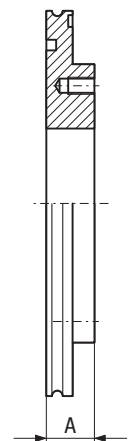
COLLAR FLANGE WITH RETAINING RING

		DN ... ISO-F	Part No.	A	B	C
Flange:		63	212-061	12	95.5	130
DN 63 - 160:	steel nickel plated -/ 1.0831	80	212-081	12	110.5	145
		100	212-062	12	130.5	165
DN 200 - 630:	steel nickel plated -/ 1.0037	160	212-063	16	180.7	225
		200	212-064	16	240.7	285
Retaining ring:	steel nickel plated	250	212-065	16	290.7	335
		320	212-066	20	370.8	425
		400	212-067	20	450.8	510
		500	212-068	20	550.8	610
		630	212-069	24	691	750



ADAPTOR FLANGE ISO-K/ISO-F

	DN ... ISO-K/ISO-F	Part No.	A
Stainless steel 304/1.4301	160 / 63	212-152	22
	160 / 100	212-153	25
	200 / 100	212-155	20
	200 / 160	212-156	25
	250 / 160	212-159	22

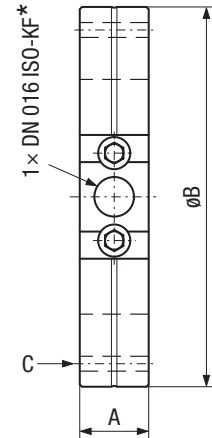


Flange Components

MEASUREMENT FLANGE

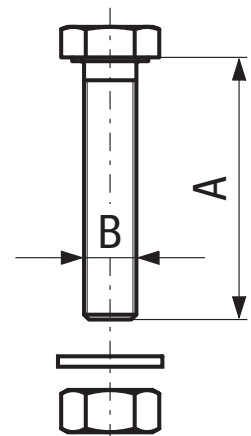
	DN ... ISO-F	Part No.	A	B	C
Aluminum 6082/3.2315	100	212-142	30	165	M 8
	160	212-143	30	225	M 10
Stainless steel 304/1.4301	63	212-146	30	130	M 8
	100	212-147	30	165	M 8
	160	212-148	30	225	M 10

* Claw grip DN16 ISO-KF included



SET OF HEXAGON BOLTS

	DN ... ISO-F	Part No.	A	B	Set of
Steel zinc plated	63-100	212-241	40	M8	8 pcs.
	160-250	212-242	50	M10	12 pcs.
	320-500	212-243	70	M12	16 pcs.
	630	212-244	80	M12	20 pcs.



Flange Components

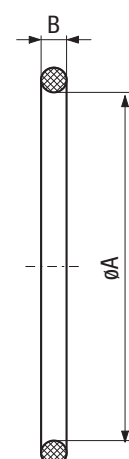
SEALING DISK

		DN ... ISO-F	Part No.	A	B	C
Disk:	aluminum	63	212-321	73	3.9	98
O-Ring:	6082/3.2315	100	212-322	107	3.9	132
	elastomer CR	160	212-323	160	3.9	185
		250	212-325	270	3.9	295
		320	212-326	330	5.6	375
		400	212-327	415	5.6	460
		500	212-328	515	5.6	560
		630	212-329	656	5.6	701
		800	212-330	825	5.6	870
		1000	212-331	1025	5.6	1070



O-RING

	DN ... ISO-F	Part No.	A	B	Set of
Elastomer CR	63	212-345	80	5	5 pcs.
	100	212-346	110	5	5 pcs.
	160	212-347	165	5	5 pcs.
	250	212-349	265	5	5 pcs.
	320	212-338	325	8	
	400	212-339	412	8	
	500	212-340	510	8	
	630	212-341	640	8	
	800	212-342	820	8	
	1000	212-343	1023	8	

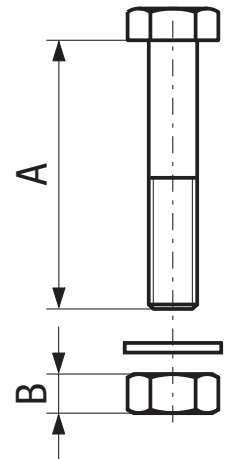


UHV CF Components

Connection Elements

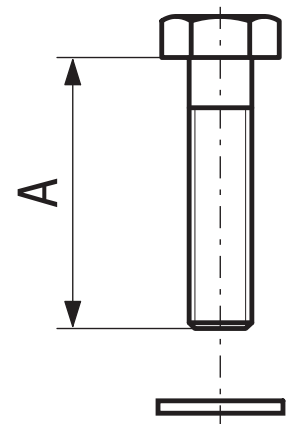
HEXAGON BOLTS WITH NUTS

		DN ... CF	Part No.	A	B	Set of	Nm ¹⁾
Bolt:	stainless steel	16	213-401	20	3.2	25 × M	3.5
Washer:	316/1.4401	40	213-402	35	5	4	10
Nut:	stainless steel	63	213-403	45	6.5	25 × M	20
	304/1.4301	100	213-404	50	6.5	6	20
	stainless steel	160	213-405	55	6.5	25 × M	20
	316/1.4401	200-250	213-406	60	6.5	8	20
		300	213-408	70	8	25 × M	30
		350	213-409	70	8	8	30
						25 × M	8
						34 × M	10
						38 × M	10

¹⁾ Tightening torque

HEXAGON BOLTS WITHOUT NUTS

		DN ... CF	Part No.	A	Set of	Nm ¹⁾
Bolt:	stainless steel	16	213-411	16	25 × M4	4
Washer:	316/1.4401	40	213-412	25	25 × M6	10
	stainless steel	63-160	213-413	35	25 × M8	20
	304/1.4301					

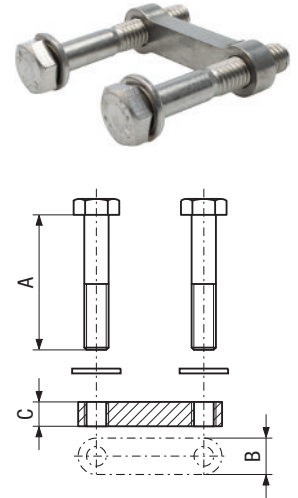
¹⁾ Tightening torque

Connection Elements

HEXAGONAL BOLTS WITH DUO NUTS

		DN...CF	Part No.	A	B	C	Duo nut	Nm ¹⁾
Bolt:	stainless steel	16	213-421	20	7	4	6 × M4/	4
Washer:	316/1.4401	40	213-422	35	10	5	3	10
Duo nut:	stainless steel	63	213-423	45	12	8	6 × M6/	20
	304/1.4301	100	213-424	50	12	8	3	20
	stainless steel	160	213-425	55	12	8	8 × M8/	20
	316/1.4401						4	20
							16 × M8	
							/8	
							20 × M8	
							/10	

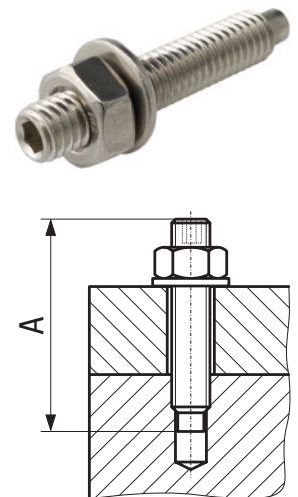
¹⁾ Tightening torque



SET OF STUD SCREWS

		DN ... CF	Part No.	A	Set of	Nm ¹⁾
Bolt:	stainless steel	16	213-431	20	6 × M4	4
Washer:	316/1.4401	40	213-432	35	6 × M6	10
Nut:	stainless steel	63-100	213-433	45	16 × M8	20
	304/1.4301					
	stainless steel					
	316/1.4401					

¹⁾ Tightening torque



THREAD LUBRICANT

		Part No.	Temperature resistance
C100	28g	214-231	1000°C
Remains fully effective for at least 10 bakeout cycles			



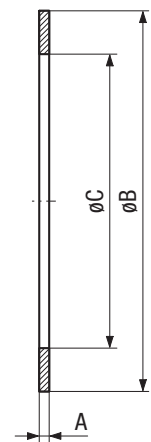
UHV CF Components

Seals

Quality copper gaskets and silver plated copper gaskets are strictly designed for use in high-end UHV applications. These gaskets, made of OFHC copper, are inspected, cleaned and individually packed to ensure the highest quality.

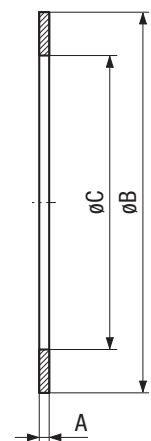
COPPER GASKET

	DN ... CF	Part No.	A	B	C	Set of
High quality	16	213-451	2.1	21.3	16.2	10 pcs.
Copper OFHC 2.0040	25	213-473	2	32.8	25.7	10 pcs.
	40	213-452	2.1	48.1	39	10 pcs.
	50	213-474	2	61.6	51.1	10 pcs.
	63	213-453	2.1	82.4	63.6	10 pcs.
	100	213-454	2.1	120.5	101.8	10 pcs.
	130	213-475	2	141.4	127.3	10 pcs.
	160	213-455	2.1	171.3	152.6	10 pcs.
	200	213-456	2.1	222.1	203.4	10 pcs.
	250	213-457	2.1	272.9	254.2	5 pcs.
	300	213-458	2.1	326.2	307	1 pcs.
	350	213-459	2.1	376.5	357	1 pcs.



COPPER GASKET SILVER PLATED

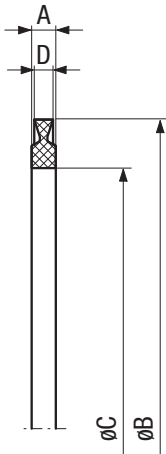
	DN ... CF	Part No.	A	B	C	Set of
High quality	16	213-461	2.1	21.3	16.2	10 pcs.
Copper OFHC 2.0040	40	213-462	2.1	48.1	39	10 pcs.
Double silver plated	63	213-463	2.1	82.4	63.6	10 pcs.
	100	213-464	2.1	120.5	101.8	10 pcs.
	160	213-465	2.1	171.3	152.6	5 pcs.
	200	213-466	2.1	222.1	203.4	5 pcs.
	250	213-467	2.1	272.9	254.2	5 pcs.



Seals

FPM SEAL

	DN ... CF	Part No.	A	B	C	D	Set of
Elastomer FPM	16	213-391	2	21	16		5 pcs.
	40	213-392	2.5	48.2	42		5 pcs.

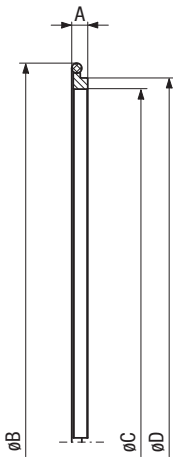


63	213-393	3.2	82.7	69.7	2.5	2 pcs.
100	213-394	3.2	119.8	107.8	2.5	2 pcs.
160	213-395	3.2	171.1	156	2.5	2 pcs.
200	213-396	3.2	222.5	206	2.5	2 pcs.

Seals

FPM SEAL WITH SUPPORT RING

		DN ... CF	Part No.	A	B	C	D	Set of
Seal:	elastomer FPM	250	213-397	5	266.5	248.3	256.2	1 pcs.
Support ring:	aluminum 6082							

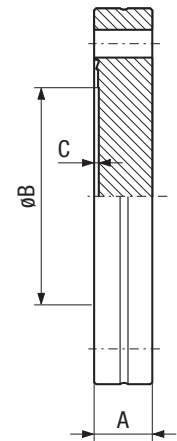
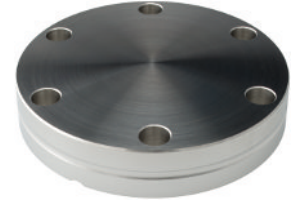


UHV CF Components

Flanges

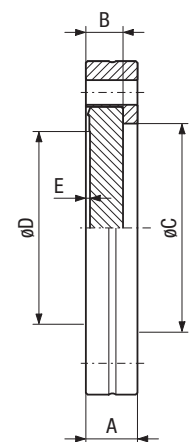
BLANK FLANGE

	DN ... CF-F	Part No.	A	B	C
Stainless steel 304L/1.4306	16	213-001	7.5	14	1.4
	40	213-002	13	38	1.4
	63	213-003	17.5	66	1.4
	100	213-004	20	104	1.4
	160	213-005	22	155	1.4
	200	213-006	24.5	205	1.4
	250	213-007	24.5	256	1.4
Stainless steel 316LN/1.4429	16	213-101	7.5	14	1.4
	40	213-102	13	38	1.4
	63	213-103	17.5	66	1.4
	100	213-104	20	104	1.4
	160	213-105	22	155	1.4
	200	213-106	24.5	205	1.4
	250	213-107	24.5	256	1.4



BLANK FLANGE, ROTATABLE

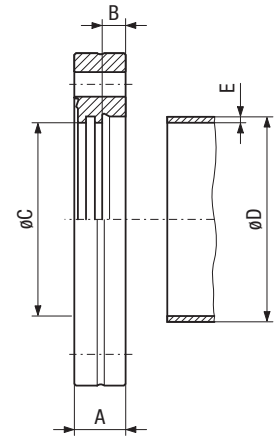
	DN ... CF-R	Part No.	A	B	C	D	E
Stainless steel 304L/1.4306	16	213-011	7.5	5.8	18.6	14	1.4
	40	213-012	13	7.6	41	38	1.4
	63	213-013	17.5	12.6	71	66	1.4
	100	213-014	20	14.3	109	104	1.4
	160	213-015	22	15.8	160	155	1.4
	200	213-016	24.5	17.1	206	205	1.4
	250	213-017	24.5	18	257	256	1.4
Plate: Stainless steel 316LN/ 1.4429	16	213-111	7.5	5.8	18.6	14	1.4
	40	213-112	13	7.6	41	38	1.4
External ring: Stainless steel 304L/1.4306	63	213-113	17.5	12.6	71	66	1.4
	100	213-114	20	14.3	109	104	1.4
	160	213-115	22	15.8	160	155	1.4
	200	213-116	24.5	17.1	206	205	1.4
	250	213-117	24.5	18	257	256	1.4



Flanges

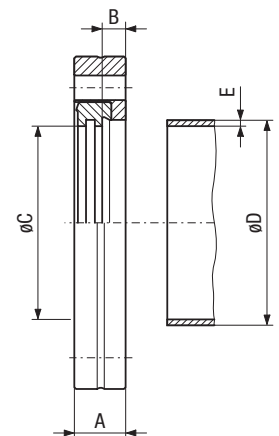
WELDING FLANGE

	DN ... CF-F	Part No.	A	B	C	D	E
Stainless steel 304L/1.4306	16	213-021	7.5	3.3	17.2	18	1
	40	213-022	13	7.5	39.5	40	1.5
	63	213-023	17.5	8	66	70	2
	100	213-024	20	9	104	108	2
	160	213-025	22	10	155	159	2
	200	213-026	24.5	12	205	205	2.5
	250	213-027	24.5	12	256	256	3
Stainless steel 316L/1.4435	300	213-028	28.5	15.8	306	306	3
	350	213-029	28.5	15.8	356	356	3
Stainless steel 316LN/1.4429	16	213-121	7.5	3.3	17.2	18	1
	40	213-122	13	7.5	39.5	40	1.5
	63	213-123	17.5	8	66	70	2
	100	213-124	20	9	104	108	2
	160	213-125	22	10	155	159	2
	200	213-126	24.5	12	205	205	2.5
	250	213-127	24.5	12	256	256	3



WELDING FLANGE, ROTATABLE

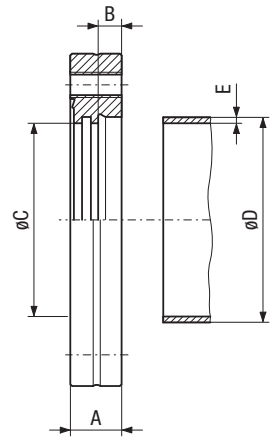
	DN ... CF-R	Part No.	A	B	C	D	E
Stainless steel 304L/1.4306	16	213-041	7.5	3.3	17.2	18	1
	40	213-042	13	7.5	39.5	40	1.5
	63	213-043	17.5	8	66	70	2
	100	213-044	20	9	104	108	2
	160	213-045	22	10	155	159	2
	200	213-046	24.5	12	205	205	2.5
	250	213-047	24.5	12	256	256	3
Internal ring: Stainless steel 316LN/1.4429	16	213-141	7.5	3.3	17.2	18	1
	40	213-142	13	7.5	39.5	40	1.5
External ring: Stainless steel 304L / 1.4306	63	213-143	17.5	8	66	70	2
	100	213-144	20	9	104	108	2
	160	213-145	22	10	155	159	2
	200	213-146	24.5	12	205	205	2.5
	250	213-147	24.5	12	256	256	3



Flanges

WELDING FLANGE WITH TAPPED HOLES

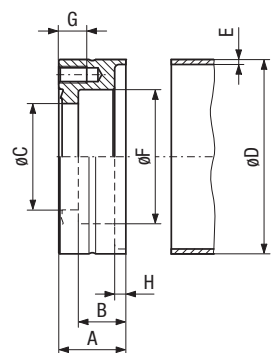
	DN ... CF-F	Part No.	A	B	C	D	E	Set of
Stainless steel 304L/1.4306	16	213-031	7.5	3.3	17.2	18	1	6xM4
	40	213-032	13	7.5	39.5	40	1.5	6xM6
	63	213-033	17.5	8	66	70	2	8xM8
	100	213-034	20	9	104	108	2	16xM8



WELDING FLANGE FOR GAUGES

	DN ... CF-F	Part No.	A	B	C	D	E	F	G	H
Stainless steel 304L/1.4306	40	213-092	24	17	38	69.5	1.75	48	10	4

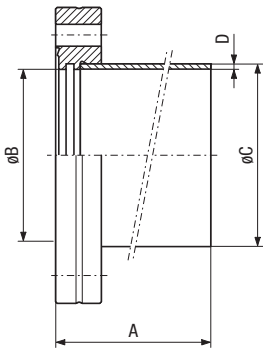
*Screws 6xM6 included



Flanges

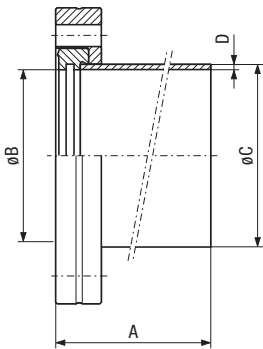
FLANGE WITH TUBE

	DN ... CF-F	Part No.	A	B	C	D
Stainless steel 304L/1.4306	16	213-051	38	17.2	18	1
	40	213-052	63	39.5	40	1.6
	63	213-053	105	66	70	2
	100	213-054	135	104	108	2
	160	213-055	167	155	159	2



FLANGE WITH TUBE, ROTATABLE

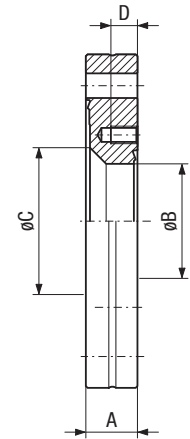
	DN ... CF-R	Part No.	A	B	C	D
Stainless steel 304L/1.4306	16	213-061	38	17.2	18	1
	40	213-062	63	39.5	40	1.6
	63	213-063	105	66	70	2
	100	213-064	135	104	108	2
	160	213-065	167	155	159	2



Flanges

REDUCING FLANGE CF-F/CF-F

	DN ... CF-F	Part No.	A	B	C	D	Set of
Stainless steel 304L/1.4306	40/16	213-071	13	16	22	5.5	6xM4
	63/40	213-073	17.5	39	50	9	6xM6
	100/40	213-075	20	39	55	9	6xM6
	100/63	213-076	20	66	85	11	8xM8
	160/40	213-078	22	39	60	9	6xM6
	160/63	213-079	24	66	85	13	8xM8
	160/100	213-080	22	104	120	11	16xM8
Stainless steel 316LN/1.4429	40/16	213-171	13	16	22	5.5	6xM4
	63/40	213-173	17.5	39	50	9	6xM6
	100/40	213-175	20	39	55	9	6xM6
	100/63	213-176	20	66	85	11	8xM8
	160/40	213-178	22	39	60	9	6xM6
	160/100	213-180	22	104	120	11	16xM8
							8

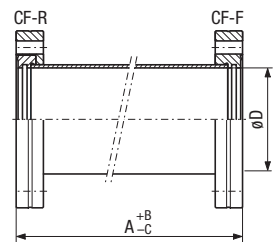


UHV CF Components

Pipe Fittings

INTERMEDIATE PIECE

	DN ... CF	Part No.	A	B	C	D
Stainless steel 304L/1.4306	16	213-201	76	0.5	0.5	16
	40	213-202	126	1	1	37
	63	213-203	210	1	1	66
	100	213-204	270	1	1	104
	160	213-205	334	1.5	1.5	155



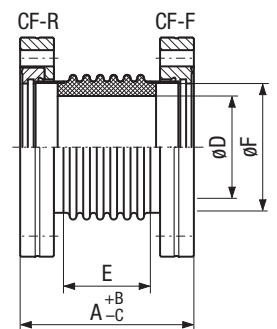
INTERMEDIATE PIECE, INSULATED

	DN ... CF	Part No.	A	B	C	D	E	F	G
Flanges: stainless steel 304L/ 1.4306	40	213-212	70	1	1	25	30	34.	44
	63	213-213	90	1	1	53	45	5	65

Insulator: ceramic Al_2O_3

Transition insulator/flange: FeNi

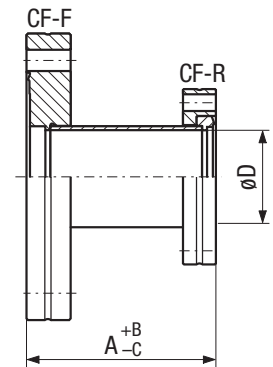
Bakeout temperature: 350°C

G = Surface leakage 20 kV at 10^{-4} mbar

Pipe Fittings

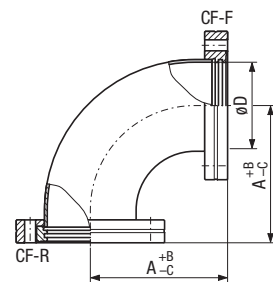
REDUCER CF-F/CF-R

	DN ... CF	Part No.	A	B	C	D
Stainless steel 304L/1.4306	40/16	213-221	45	1	1	16
	63/40	213-223	75	1	1	37
	100/40	213-225	75	1	1	37
	100/63	213-226	95	1	1	66
	160/100	213-230	105	1.5	1.5	104



ELBOW 90°

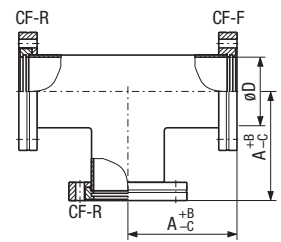
	DN ... CF	Part No.	A	B	C	D
Stainless steel 304L/1.4306	16	213-301	38	0.5	0.5	15
	40	213-302	63	0.5	0.5	38
	63	213-303	105	1	1	66
	100	213-304	135	1	1	100
	160	213-305	167	1.5	1.5	150



Pipe Fittings

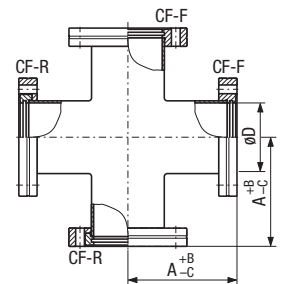
TEE

	DN ... CF	Part No.	A	B	C	D
Stainless steel 304L/1.4306	16	213-311	38	0.5	0.5	15
	40	213-312	63	0.5	0.5	38
	63	213-313	105	1	1	66
	100	213-314	135	1	1	100
	160	213-315	167	1.5	1.5	150



CROSS

	DN ... CF	Part No.	A	B	C	D
Stainless steel 304L/1.4306	16	213-321	38	0.5	0.5	15
	40	213-322	63	0.5	0.5	38
	63	213-323	105	1	1	66
	100	213-324	135	1	1	100
	160	213-325	167	1.5	1.5	150



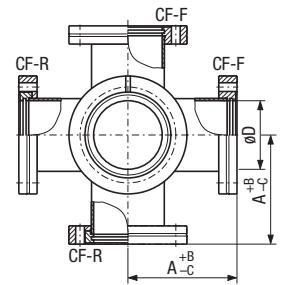
Pipe Fittings

DOUBLE CROSS PIECE

	DN ... CF	Part No.	A	B	C	D
Stainless steel 304L/1.4306	40	213-332	63	0.5	0.5	38
	63	213-333	105	1	1	66
	100	213-334	135	1	1	100
	160	213-335	167	1.5	1.5	150

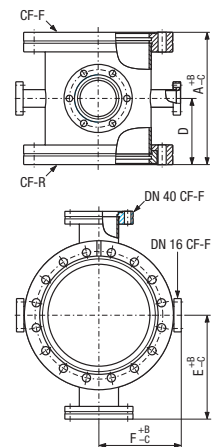
3 × rotatable flanges

3 × fix flanges



REDUCING CROSS

	DN ... CF	Part No.	A	B	C	D	E	F
Stainless steel 304L/1.4306	100	213-342	135	1	1	67.5	106	84
2 × DN 16 CF-F								
2 × DN 40 CF-F								



UHV CF Components

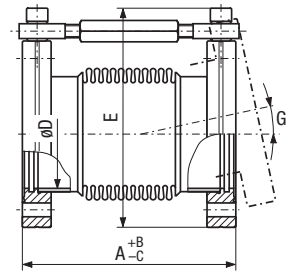
Bellows/Hose with Flanges, Compensator

COMPENSATOR

		DN...CF-F	Part No.	A	B	C	D	E	F	G
Flanges:	stainless steel 304L/ 1.4306	40	213-346	120	10	0	36.	100	10	10°
Bellows:		63	213-347	130	20	0	8	154	13	12°
	stainless steel 316Ti/ 1.4571	100	213-348	127	30	0	62	192	13	12°
							92			

Max. internal pressure for DN 40: 4 bar

Max. internal pressure for DN 63/100: 1.5 bar



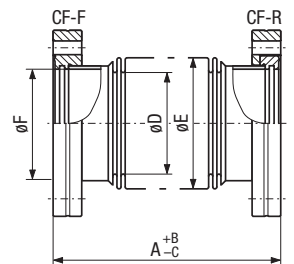
BELLOWS

		DN...CF	Part No.	A	B	C	D	E	F	G
Flanges:	stainless steel 304L/ 1.4306	16	213-351	76	4.1	6.4	15	22	16	21°
Bellows:		40	213-352	126	3.5	5.5	40	55	36.	7.5°
	stainless steel 316Ti/ 1.4571	63	213-353	139	23	23	62	80	8	
		100	213-354	142	26	26	92	116	66	37°
		160	213-355	250	23	23	154	187	102	28°
									153	16°

A = unstressed length

Max. internal pressure for DN 16/40: 4 bar

Max. internal pressure for DN 63 ... 160: 1.5 bar



Bellows/Hose with Flanges, Compensator

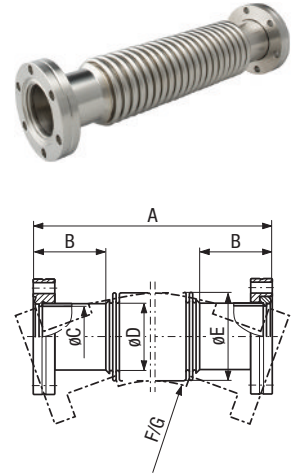
FLEXIBLE METAL HOSE

		DN...CF	Part No.	A	B	C	D	E	F	G
Flanges:	stainless steel 304L/	16	213-361	250	23	16	15	22.	70	50
	1.4306	16	213-362	500	23	16	15	5	70	50
Bellows:	stainless steel 316Ti/	16	213-363	750	23	16	15	22.	70	50
	1.4571	16	213-364	100	23	16	15	5	70	50
		40	213-365	0	46	36.	40.	5	130	100
		40	213-366	250	46	8	5	22.	130	100
		40	213-367	500	46	36.	40.	5	130	100
		40	213-368	750	46	8	5	53	130	100
				100		36.	40.	53		
				0		8	5	53		
						36.	40.	53		
						8	5	53		

F = radius for multiple bending

G = radius for single bending

Max. internal pressure: 5 bar

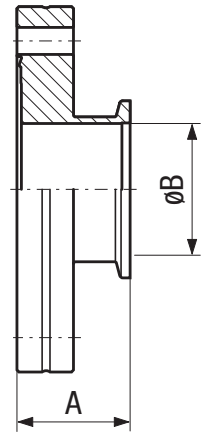


UHV CF Components

Transition Pieces

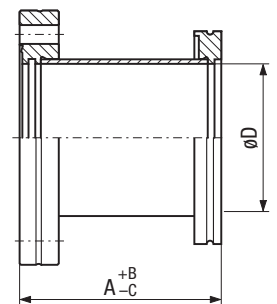
ADAPTOR CF-F/ISO-KF

	DN...CF-F/ ISO-KF	Part No.	A	B
Stainless steel 304L/1.4306	16/16	213-251	35	16
	16/25	213-252	35	16
	40/16	213-254	30	16
	40/25	213-255	30	26
	40/40	213-256	50	37
	63/40	213-259	35	41
	100/40	213-262	50	41



ADAPTOR CF-F/ISO-K

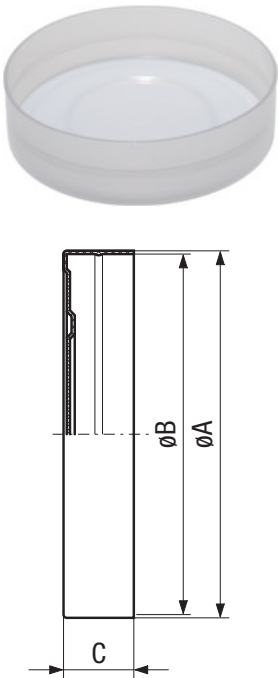
	DN...CF-F/ ISO-K	Part No.	A	B	C	D
Stainless steel 304L/ 1.4306	63/63	213-27	90	1	1	66
	100/100	1	90	1	1	104
	160/160	213-27 2	90	1.5	1.5	155
		213-27 3				



UHV CF Components

Protective Lids

PROTECTIVE LIDS					
	DN ... CF	Part No.	A	B	C
Polyethylene	16	213-441	36	34	9.5
	40	213-442	71.5	69.5	17.5
	63	213-443	115.5	113.5	22
	100	213-444	154	152	24.5
	160	213-445	205	202.5	27
	200	213-446	262	253	26.5
	250	213-447	308.5	303.5	30.9





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