

# PASSIVE GAUGES AND CONTROLLERS

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Edwards is proud to introduce our new range of passive gauge heads and controllers, selected specifically to complement the current Edwards range of active gauges and controllers. These passive gauges offer a solution for measuring pressure in a wide range of applications, from UHV systems to process industries or wherever the use of an active gauge is not possible e.g. Cyclotrons.



The Edwards range of passive gauges comprises of Pirani, Penning and both Bayard-Alpert and Extractor Ion gauge heads which together can measure from atmosphere down to  $10^{-12}$  mbar. These are used in conjunction with a Passive gauge controller (PGC) to display pressure and offer an intuitive interface for the user alongside the ability to control remotely. Edwards will offer 2 controller variants; the PGC201 which covers the Pressure range of  $10^{-9}$  to 1000 mbar, in conjunction with Pirani and Penning gauges, and the PGC202 which covers the wider range of and  $10^{-12}$  to 1000 mbar when used with a Pirani and Ion gauge.

# PIRANI GAUGE SENSORS

PRG20K–NW16 AI/PRG20K–DN16CF SS/PRG20KCR–NW16 SS

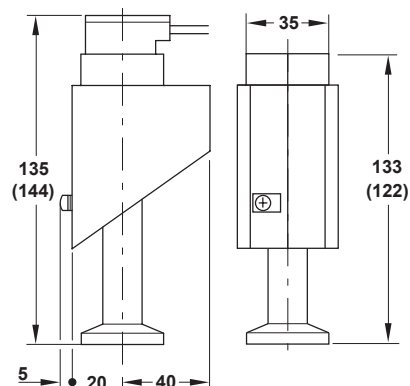


These passive sensors use thermal conductivity technology according to Pirani.

## Features and benefits

- Measurement range  $5 \times 10^{-4}$  to 1000 mbar ( $3.8 \times 10^{-4}$  to 750 Torr)
- Tungsten or platinum filament
- Cost-effective sensing cell
- Fully aligned and temperature compensated 0 to +40 °C
- Constant filament temperature

## Dimensions – mm



### PRG20K–NW16 AI

- Aluminum sensing cell with tungsten filament
- Improved temperature compensation

### PRG20K–DN16CF SS

- Stainless steel sensing cell with tungsten filament
- Overpressure resistant

### PRG20KCR–NW16 SS

- Stainless steel sensing cell with platinum filament and ceramics feed through
- Well suited for corrosive processes and water vapour atmospheres

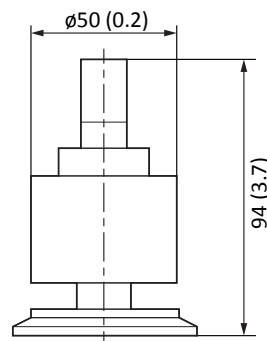
## Technical data

	Units	PRG20K - NW16	PRG20K - DN16CF	PRG20KCR - NW16
Measurement range	mbar (Torr)	$5 \times 10^{-4}$ to 1000 ( $3.8 \times 10^{-4}$ to 750)	$5 \times 10^{-4}$ to 1000 ( $3.8 \times 10^{-4}$ to 750)	$5 \times 10^{-4}$ to 1000 ( $3.8 \times 10^{-4}$ to 750)
Operating temperature range (compensated)	°C	0 to +40	0 to +40	0 to +40
Maximum ambient temperature	°C	80	80	80
Filament		Tungsten	Tungsten	Platinum
Filament temperature	°C	110	110	110
Permissible overload (abs.), max.	bar	3	10	10
Volume of the sensing cell, approx.	cm <sup>3</sup>	11	11	11
Vacuum connection		NW16	DN16CF	NW16
Materials in contact with the medium		Aluminum, Vacon, Glass, Tungsten, CrNi 8020 Nickel plated steel, epoxy adhesive	Stainless steel, Vacon, Tungsten, CrNi 8020 ceramics, Al <sub>2</sub> O <sub>3</sub> , NiFe 42	Stainless steel 1.4301 (SS 304), Al <sub>2</sub> O <sub>3</sub> , CrNi 8020, Platinum
Compatible controllers		PGC201/PGC202	PGC201/PGC202	PGC201/PGC202

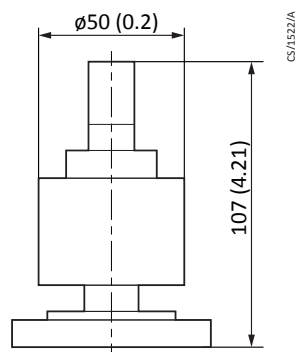
# PENNING GAUGE SENSORS

CPG35K-NW25/CPG35K-NW40/CPG35K-DN40CF/CPG35KB-DN40CF

## Dimensions – mm



NW25/ NW40



DN40 CF

These passive sensors use cold cathode ionization technology according to Penning.

## Features and benefits

- Rugged
- Insensitive to air inrushes and vibrations
- Easy disassembly and cleaning of the measurement system
- Exchangeable cathode plate
- Improved ignition characteristic through titanium cathodes

## Technical data

	Units	CPG35K NW25	CPG35K NW40	CPG35K DN40CF	CPG35KB DN40CF
Measurement range	mbar (Torr)	$1 \times 10^{-9}$ to $10^{-2}$ ( $0.75 \times 10^{-9}$ to $10^{-2}$ )	$1 \times 10^{-9}$ to $10^{-2}$ ( $0.75 \times 10^{-9}$ to $10^{-2}$ )	$1 \times 10^{-9}$ to $10^{-2}$ ( $0.75 \times 10^{-9}$ to $10^{-2}$ )	$1 \times 10^{-9}$ to $10^{-2}$ ( $0.75 \times 10^{-9}$ to $10^{-2}$ )
High voltage supply (anode potential)	kV	3.3	3.3	3.3	3.3
Trigger voltage	kV	1.6	1.6	1.6	1.6
Operation voltage					
Storage temperature range	°C	-25 to +80	-25 to +80	-25 to +80	-25 to +80
Nominal temperature range	°C	0 to +80	0 to +80	0 to +80	0 to +80
Bake out temperature (flange)	°C	-	-	-	200
Permissible overload (abs.)	bar	6	6	6	6
Dead volume	cm <sup>3</sup>	21	21	21	21
Materials in contact with the medium		Stainless steel, Nichrome, Ceramics, Titanium	Stainless steel, Nichrome, Ceramics, Titanium	Stainless steel, Nichrome, Ceramics, Titanium	Stainless steel, Nichrome, Ceramics, Titanium
Weight, approx. kg (lbs)		0.48 (1.06)	0.50 (1.10)	0.74 (1.63)	0.86 (1.90)
Vacuum connection		NW25	NW40	DN40CF	DN40CF
Compatible controllers		PGC201	PGC201	PGC201	PGC201

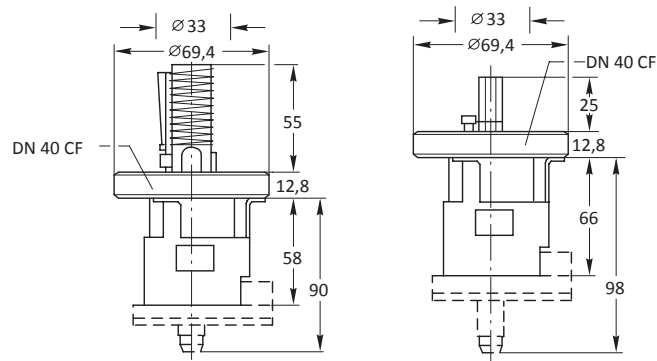
# ION GAUGE SENSORS

## IG40 BA and IG40 EX



These passive sensors use hot cathode ionization technology.

## Dimensions – mm



IG40 BA

IG40 EX

## Features and benefits

- Exchangeable cathode in both the Bayard-Alpert and Extractor Gauges
- High accuracy of the measurements due to individually calibrated sensing system

### Bayard-Alpert sensing system

- Measurement range from  $10^{-2}$  to  $2 \times 10^{-11}$  mbar ( $1.5 \times 10^{-11}$  Torr)
- Protection shield welded in place

### Extractor sensing system

- Measurement range from  $10^{-4}$  to  $2 \times 10^{-12}$  mbar ( $1.5 \times 10^{-12}$  Torr)
- Significant reduction of X-ray and ion desorption effects

## Technical data

	Units	IG40 BA	IG40 EX
Measurement range	mbar (Torr)	$2 \times 10^{-11}$ to $10^{-2}$ ( $1.5 \times 10^{-11}$ to $10^{-2}$ )	$2 \times 10^{-12}$ to $10^{-4}$ ( $1.5 \times 10^{-12}$ to $10^{-4}$ )
X-ray limit	mbar (Torr)	$\leq 10^{-11}$ ( $\leq 10^{-11}$ )	$\leq 10^{-12}$ ( $\leq 10^{-12}$ )
Ambient temperature during operation	°C	20 to +80	20 to +80
Maximum flange temperature with bakeable gauge cable	°C	250	250
Maximum bakeout temperature (with no cable connected)	°C	400	400
Material			
Cathode		Iridium with yttrium oxide coating	Iridium with yttrium oxide coating
Anode		Pt/Ir 90/10 and Mo/pt wrapped wire	Mo and CoNiCr
Collector		Tungsten	Tungsten
Reflector			NiFe
Vacuum connection		DN40CF	DN40CF
Operating characteristics			
Ion detector potential	V	0	0
Cathode potential	V	80	100
Anode potential	V	220	220
Reflector potential	V	-	205
Emission current	mA	0.1 to 10.0	1.6
Heating current for the hot cathode	A	1.5	1.5
Heating voltage for the hot cathode	V	3.0	3.7
Sensitivity for nitrogen	mbar <sup>-1</sup>	17.0	6.25
Bake out operation, Electron bombardment	V/mA	480/90	480/45
Compatible controllers		PGC202	PGC202

## Selecting The Right Gauge for Your Application

	mbar	$10^{-12}$	$10^{-11}$	$10^{-10}$	$10^{-9}$	$10^{-8}$	$10^{-7}$	$10^{-6}$	$10^{-5}$	$10^{-4}$	$10^{-3}$	$10^{-2}$	$10^{-1}$	$10^0$	$10^1$	$10^2$	$10^3$	
<b>Pirani Gauge - Thermal Conductivity</b>																		
PRG20K - NW16 AI										$5 \times 10^{-4}$							1000	
PRG20K - DN16CF SS										$5 \times 10^{-4}$							1000	
PRG20KCR - NW16 SS										$5 \times 10^{-4}$							1000	
<b>Penning Gauge - Cold Cathode Ionization</b>																		
CPG35K - NW25					$1 \times 10^{-9}$						$1 \times 10^{-2}$							
CPG35K - NW40					$1 \times 10^{-9}$						$1 \times 10^{-2}$							
CPG35K - DN40CF					$1 \times 10^{-9}$						$1 \times 10^{-2}$							
CPG35KB - DN40CF					$1 \times 10^{-9}$						$1 \times 10^{-2}$							
<b>Ion Gauge - Hot Cathode Ionization</b>																		
Ion Gauge																		
IG40 BA - DN40CF																$2 \times 10^{-11}$	$1 \times 10^{-2}$	
IG40 EX - DN40CF																$2 \times 10^{-12}$	$1 \times 10^{-4}$	

## Selecting Your Controller

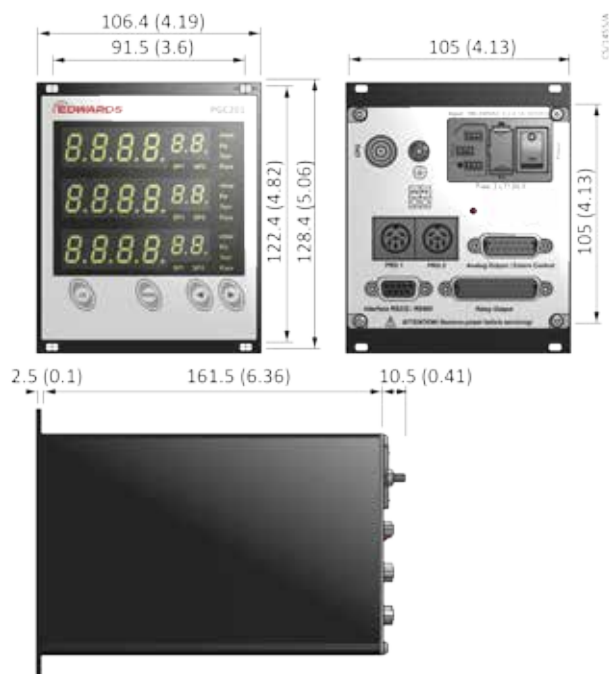
### PGC201 Pirani and Penning Controller/PGC202 Pirani and Ion Controller

Edwards PGC201 controller covers the pressure range between  $10^{-9}$  and 1000 mbar by combining two measurement principles from the PRG and CPG gauges. The PGC202 combines PRG gauges and IG40 BA or IG40 EX gauges for measurements of vacuum pressures in the range between  $10^{-12}$  and 1000 mbar. Both these controllers provide monitoring and control functions for the connected gauges.

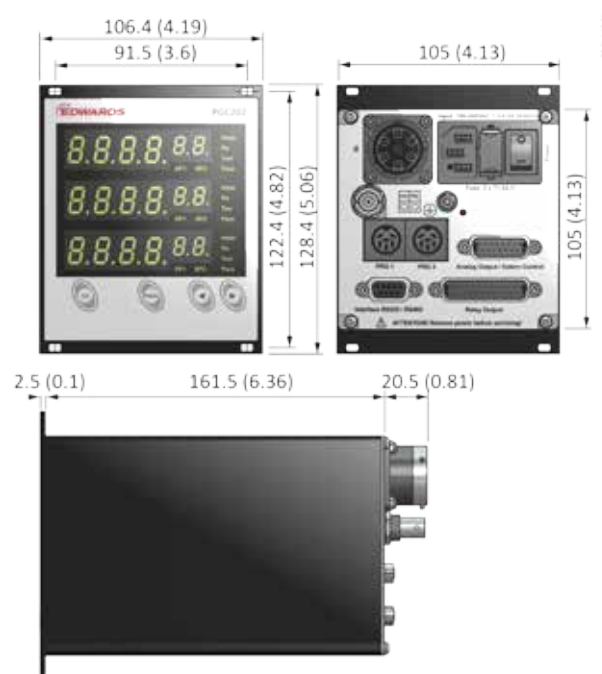


## Dimensions

### PGC 201



### PGC 202



\*Dimensions in mm

## Features and benefits

- Compact 3 channel operating unit for a pressure range for passive sensors of
  - $10^{-9}$  to 1000 mbar PGC201
  - $10^{-12}$  to 1000 mbar PGC202
- Automatic switchover from PIRANI operation to
  - Penning cold cathode operation (PGC201)
  - UHV sensors either Bayard-Alpert measurement system IG40 BA or extractor measurement System IG40 EX (PGC202)
- Measurement cable lengths up to 50 meters
- Easy to operate
- Two adjustable switching thresholds with a relay contact for each measurement channel
- Logarithmic chart recorder output 0-10 V or 2-10 V
- Wide range power supply 100 - 240 V
- Unit of pressure selectable between mbar, Torr and Pascal
- Compact, rugged Penning (CPG) sensor insensitive to operation at high pressures
- Aligned and temperature compensated Pirani (PRG) sensors
- Cost-effective replacement sensors and electrodes
- Error message for each channel, for example in the case of broken filament, defective sensor line or failed plasma discharge
- Compact benchtop enclosure (1/4 19", 3 HU) made of metal for installation in front panel cut outs and 19" racks
- RS 232 interface
- CE mark
- RoHScompliant

## Typical applications

- Universal pressure monitoring of high vacuum pump systems: turbomolecular, diffusion, cryogenic, ion etc.
- Annealing, melting, brazing and hardening furnaces
- Coating systems
- Analytical instrumentation
- Deployment in thermal radiation resistant and degassable systems is possible
- Particle accelerators

## Technical data

Units		Pirani/Penning Controller PGC201	Pirani/Ion Controller PGC202
Number of measurement channels		3	3
Measurement range Channel 1, 2 (PRG) Channel 3 (CPG) Channel 3 (IG40 BA) (IG40 EX)	mbar (Torr) mbar (Torr) mbar (Torr) mbar (Torr)	$5 \times 10^{-4}$ to 1000 ( $3.5 \times 10^{-4}$ to 750) $10^{-9}$ to $10^2$ ( $10^{-9}$ to $10^2$ ) – –	$5 \times 10^{-4}$ to 1000 ( $3.5 \times 10^{-4}$ to 750) – $2 \times 10^{-11}$ to $1 \times 10^{-2}$ ( $1.5 \times 10^{-11}$ to $0.75 \times 10^{-2}$ ) $2 \times 10^{-12}$ to $1 \times 10^{-4}$ ( $1.5 \times 10^{-12}$ to $0.75 \times 10^{-4}$ )
Unit of measurement (selectable)		mbar, Torr, Pa	mbar, Torr, Pa
Measurement uncertainty			
PRG		≤20% of the measured value in the range $10^{-3}$ to $10^2$ mbar (± 20%) in the range $10^2$ to $10^2$ mbar (± 15%)	≤20% of the measured value in the range $10^{-3}$ to $10^2$ mbar (± 20%) in the range $10^2$ to $10^2$ mbar (± 15%)
CPG		± 30% of the measured value in the range $10^{-8}$ to $10^4$ mbar	
IG40 BA/EX			+/- 2% of the measured value
Measurement cable	m	up to 50 (application dependent)	up to 50 (application dependent)
Display for measured values		digital, 7 segment LED, 4 digit mantissa and 2 digit exponent	digital, 7 segment LED 4 digit mantissa and 2 digit exponent
Type of gas (selectable)		factor adjustable	factor adjustable
Operating mode switching thresholds		2 per channel single, interval-trigger	2 per channel single, interval-trigger
Adjustable switching thresholds PRG	mbar (Torr)	$5 \times 10^{-3}$ to 500 ( $5 \times 10^{-3}$ to 375)	$5 \times 10^{-3}$ to 500 ( $5 \times 10^{-3}$ to 375)
CPG	mbar (Torr)	$1 \times 10^{-8}$ to $9.9 \times 10^{-3}$ ( $0.75 \times 10^{-8}$ to $7.4 \times 10^{-3}$ )	
IG40 BA	mbar (Torr)		$1 \times 10^{-8}$ to $5 \times 10^{-3}$ ( $0.75 \times 10^{-8}$ to $3.75 \times 10^{-3}$ )
IG40 EX	mbar (Torr)		$1 \times 10^{-11}$ to $1 \times 10^{-11}$ ( $0.75 \times 10^{-11}$ to $0.75 \times 10^{-11}$ )
Switching relay hysteresis		10% of the trigger value (default), freely adjustable for PRG and CPG	10% of the trigger value (default), freely adjustable for PRG and IG40 BA or EX
Relay contact load rating		a.c./d.c., max. 30 V/1 A	a.c./d.c., max. 30 V/1 A
Chart recorder output (default) PRG		0 to 10 V, log. divisions linear: 3 decades, approximately 10.5 V in case of a failure, logarithmic: ( $1 \times 10^{-3}$ mbar), 1.67 V/decade	0 to 10 V, log. divisions linear: 3 decades, approximately 10.5 V in case of a failure logarithmic: ( $1 \times 10^{-3}$ mbar), 1.67 V/decade
CPG		logarithmic: ( $1 \times 10^{-9}$ mbar), 1.43 V/ decade	
IG40 BA or EX			logarithmic: ( $1 \times 10^{-12}$ mbar), 1.00 V/decade
Interface		RS 232, RS 485	RS 232 C, RS 485
Mains connection 50/60 Hz	V a.c.	100 - 240	100 - 240
Power consumption	W	< 10	< 60
Storage temperature range	°C	-20 to +60	-20 to +60
Nominal temperature range	°C	+5 to +50	+5 to +50
Max. rel. humidity	% n.c.	80	80
Weight	kg (lbs)	1.4 (3.09)	1.4 (3.09)
Dimension (W x H x D)	mm	106.4x128.4x174.5	106.4x128.4x184.5
Installation depth	mm	approx. 220	approx. 220
Protection class	IP	40	40

## Connectable Sensors

### Pirani

- PRG20K – NW16 Al
- PRG20K – DN16CF SS
- PRG20KCR – NW16 SS

### Penning Gauge (only PGC201)

- CPG35K – NW25
- CPG35K – NW40
- CPG35K – DN40CF
- CPG35KB – DN40CF

### Ion Gauge (only PGC202)

- IG40 BA DN40CF
- IG40 EX DN40CF

## Order information

Gauge type	Product description	Order number
Penning gauge	CPG35K - NW40	D03000100
Penning gauge	CPG35K - DN40CF	D03000110
Penning gauge	CPG35K - NW25	D03000130
Penning gauge	CPG35KB - DN40CF	D03000140
Pirani gauge	PRG20K - NW16 Al	D03000200
Pirani gauge	PRG20K - DN16CF SS	D03000210
Pirani gauge	PRG20KCR - NW16 SS	D03000220
Ion gauge	IG40 BA DN40CF	D03000300
Ion gauge	IG40 EX DN40CF	D03000310
Controllers	Product description	Order number
Pirani/Penning	PGC201*	D03000400
Pirani/Ion	PGC202*	D03000410

\*Supplied with EU and USA Line Cord

Accessories	Product description	Order number
Pirani gauge	PRG cable 5m	D03000201
Penning gauge	CPG cable 5m	D03000101
Penning gauge	CPG cable 10m	D03000102
Penning gauge	CPG cable 20m	D03000103
Penning gauge	CPG cable 30m	D03000104
Penning gauge	CPG cable 50m	D03000105
Pirani gauge	PRG cable 10m	D03000202
Pirani gauge	PRG cable 20m	D03000203
Pirani gauge	PRG cable 30m	D03000204
Pirani gauge	PRG cable 50m	D03000205
Ion gauge	IG40 BA / EX cable 5 m bakeable	D03000301
Ion gauge	IG40 BA / EX cable 10m bakeable	D03000302
Ion gauge	IG40 BA / EX cable 50m bakeable	D03000305
Spares	Product description	Order number
Penning gauge	Spare anode ring	D03000109
Penning gauge	Spare cathode plates & discs	D03000119
Pirani gauge	Replacement sensing cell K	D03000209
Pirani gauge	Replacement sensing cell KCR	D03000229
Ion gauge	Spare Cathode IG40 BA	D03000309
Ion gauge	Spare Cathode IG40 EX	D03000319

## GLOBAL CONTACTS

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