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 conjuction 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

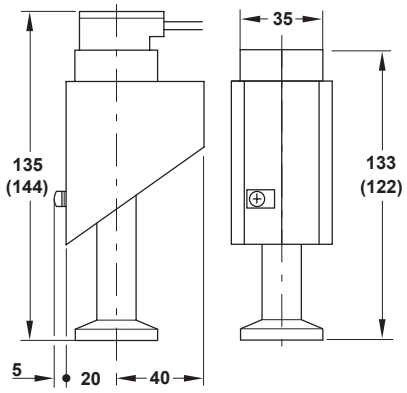
PRG20K–NW16 AI/PRG20K–DN16CF SS/PRG20KCR–NW16 SS

These passive sensors use thermal conductivity technology according to Pirani.

Features and benefits

- Measurement range 5 x 10^{-4} to 1000 mbar (3.8 x 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

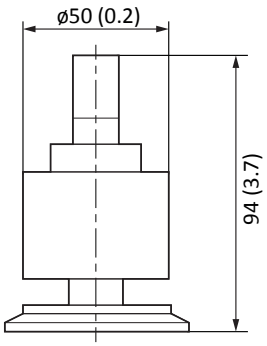
	Units	PRG20K - NW16	PRG20K - DN16CF	PRG20KCR - NW16
Measurement range	mbar (Torr)	5 x 10^{-4} to 1000 (3.8 x 10^{-4} to 750)	5 x 10^{-4} to 1000 (3.8 x 10^{-4} to 750)	5 x 10^{-4} to 1000 (3.8 x 10^{-4} to 750)
Operating temperature range (compensated)	°C	0 to +40	0 to +40	0 to +40
Maximum ambient temperature	°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^3	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_2O_3, NiFe 42	Stainless steel 1.4301 (SS 304), Al_2O_3, CrNi 8020, Platinum
Compatible controllers		PGC201/PGC202	PGC201/PGC202	PGC201/PGC202

PENNING GAUGE SENSORS

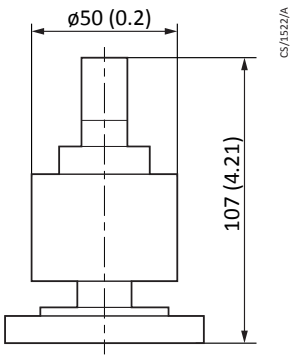
CPG35K-NW25/CPG35K-NW40/CPG35K-DN40CF/CPG35KB-DN40CF

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

Dimensions – mm



NW25/ NW40



DN40 CF

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

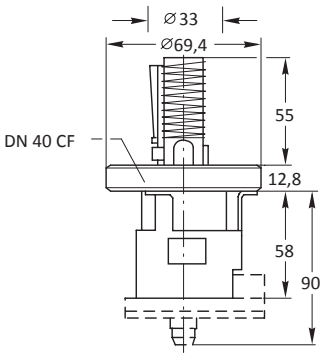
	Units	CPG35K NW25	CPG35K NW40	CPG35K DN40CF	CPG35KB DN40CF
Measurement range	mbar (Torr)	1 x 10^{-9} to 10^{-2} (0.75 x 10^{-9} to 10^{-2})	1 x 10^{-9} to 10^{-2} (0.75 x 10^{-9} to 10^{-2})	1 x 10^{-9} to 10^{-2} (0.75 x 10^{-9} to 10^{-2})	1 x 10^{-9} to 10^{-2} (0.75 x 10^{-9} to 10^{-2})
High voltage supply (anode potential) Trigger voltage Operation voltage	 kV kV	 3.3 1.6	 3.3 1.6	 3.3 1.6	 3.3 1.6
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^3	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

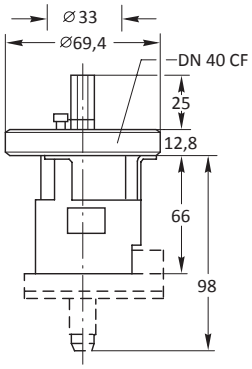
IG40 BA and IG40 EX

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 x 10^{-11} mbar (1.5 x 10^{-11} Torr)
- Protection shield welded in place

Extractor sensing system

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

Technical data

	Units	IG40 BA	IG40 EX
Measurement range	mbar (Torr)	2 x 10^{-11} to 10^{-2} (1.5 x 10^{-11} to 10^{-2})	2x10^{-12} to 10^{-4} (1.5 x 10^{-12} to 10^{-4})
X-ray limit	mbar (Torr)	≤10^{-11} (≤10^{-11})	≤10^{-12} (≤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 Anode Collector Reflector		 Iridium with yttrium oxide coating Pt/Ir 90/10 and Mo/pt wrapped wire Tungsten	 Iridium with yttrium oxide coating Mo and CoNiCr Tungsten NiFe
Vacuum connection		DN40CF	DN40CF
Operating characteristics Ion detector potential Cathode potential Anode potential Reflector potential	 V V V V	 0 80 220 -	 0 100 220 205
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	$mbar^{-1}$	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}
Pirani Gauge - Thermal Conductivity																
PRG20K - NW16 AI									5×10^{-4}							1000
PRG20K - DN16CF SS									5×10^{-4}							1000
PRG20KCR - NW16 SS									5×10^{-4}							1000
Penning Gauge - Cold Cathode Ionization																
CPG35K - NW25				1×10^{-9}							1×10^{-2}					
CPG35K - NW40				1×10^{-9}							1×10^{-2}					
CPG35K - DN40CF				1×10^{-9}							1×10^{-2}					
CPG35KB - DN40CF				1×10^{-9}							1×10^{-2}					
Ion Gauge - Hot Cathode Ionization																
Ion Gauge																
IG40 BA - DN40CF		2×10^{-11}									1×10^{-2}					
IG40 EX - DN40CF	2×10^{-12}							1×10^{-4}								
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}

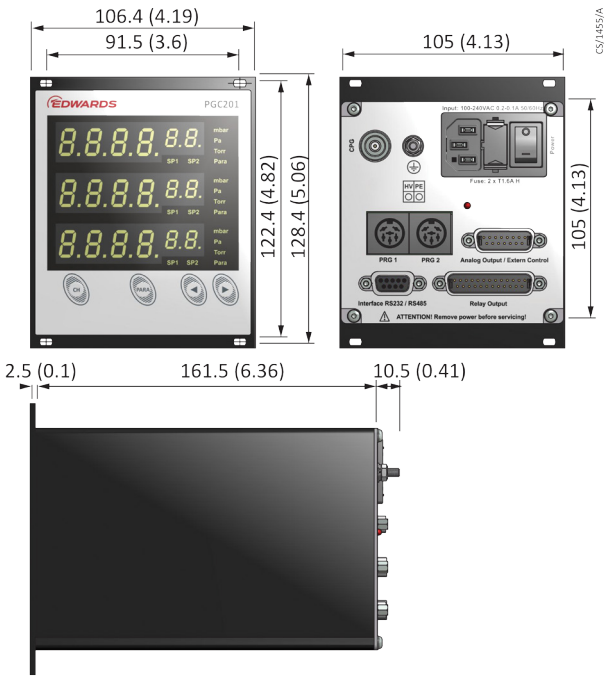
Selecting Your Controller

PGC201 Pirani and Penning Controller/PGC202 Pirani and Ion Controller

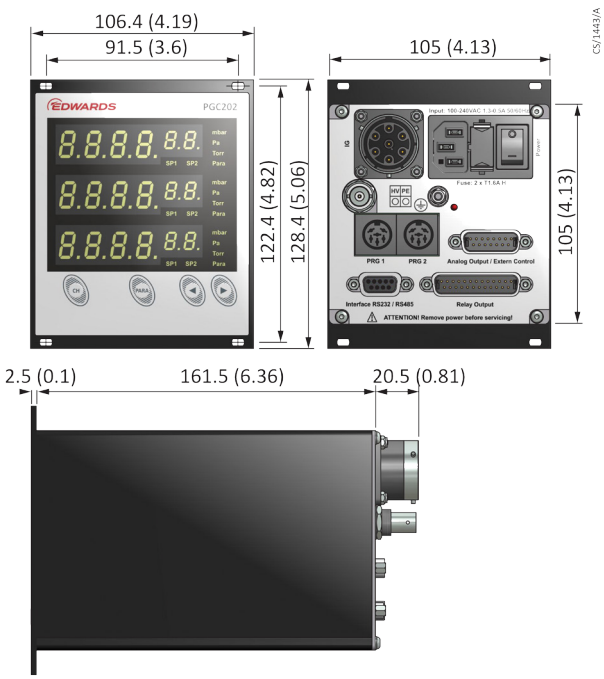
Edwards PGC201 controller covers the pressure range between 10^{-9} and 1000 mbar by combining two measurement principles from the PRG and CPG gauges. The PGC202 combines PRG gauges and IG40 BA or IG40 EX gauges for measurements of vacuum pressures in the range between 10^{-12} and 1000 mbar. Both these 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
- 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
- Easy to operate
- 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)	 5×10^{-4} to 1000 (3.5×10^{-4} to 750) 10^{-9} to 10^{-2} (10^{-9} to 10^{-2}) – –	 5×10^{-4} to 1000 (3.5×10^{-4} to 750) – 2×10^{-11} to 1×10^{-2} (1.5×10^{-11} to 0.75×10^{-2}) 2×10^{-12} to 1×10^{-4} (1.5×10^{-12} to 0.75×10^{-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)	5×10^{-3} to 500 (5×10^{-3} to 375)	5×10^{-3} to 500 (5×10^{-3} to 375)
CPG	mbar (Torr)	1×10^{-8} to 9.9×10^{-3} (0.75×10^{-8} to 7.4×10^{-3})	
IG40 BA	mbar (Torr)		1×10^{-8} to 5×10^{-3} (0.75×10^{-8} to 3.75×10^{-3})
IG40 EX	mbar (Torr)		1×10^{-11} to 1×10^{-11} (0.75×10^{-11} to 0.75×10^{-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: (1×10^{-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: (1×10^{-3} mbar), 1.67 V/decade
CPG		logarithmic: (1×10^{-9} mbar), 1.43 V/ decade	
IG40 BA or EX			logarithmic: (1×10^{-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 AI
- 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 AI	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

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