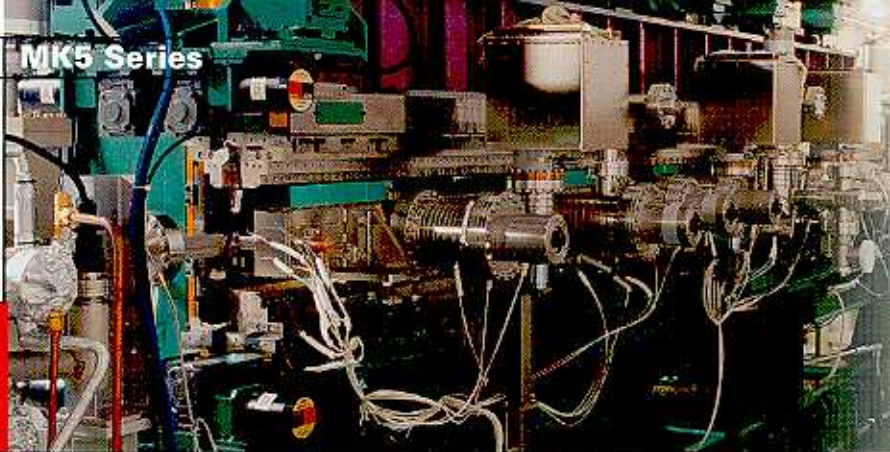


SORB-AC® Cartridge Pumps MK5 Series



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HIGHLIGHTS



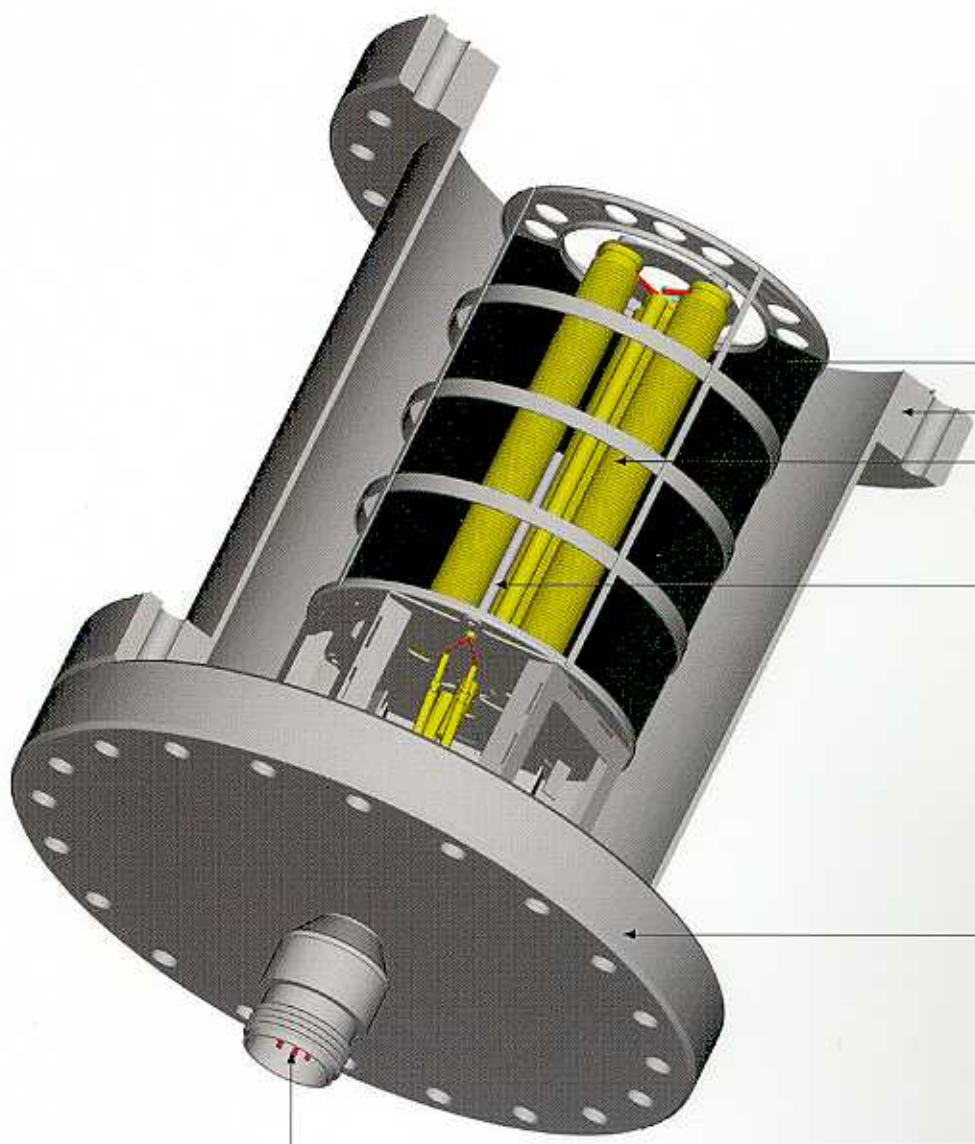
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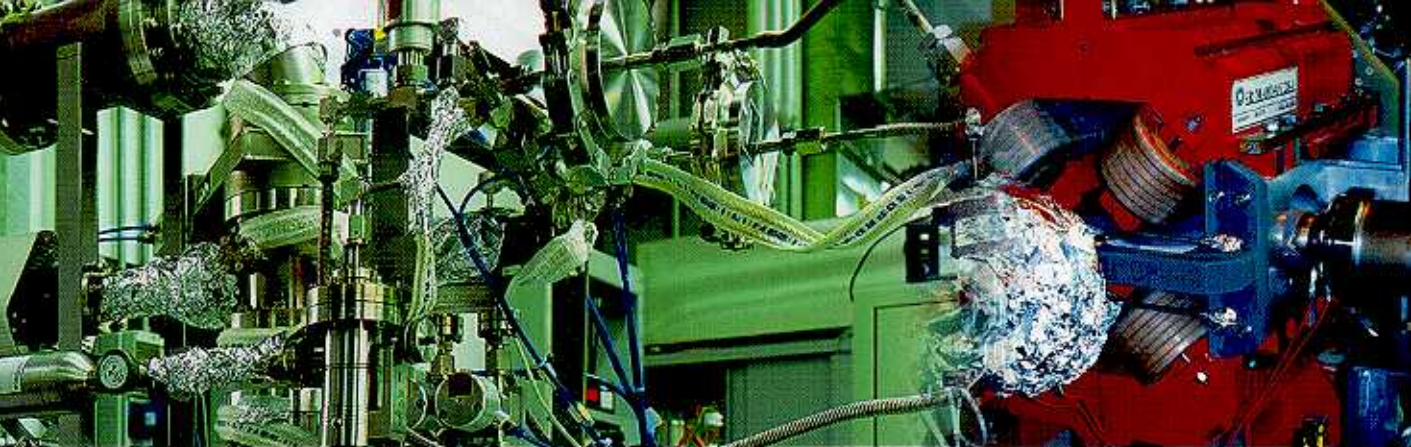
General features

- High pumping speed for all active gases
- Constant pumping speed in HV and UHV pressure region
- No low pressure limitation (down to 10^{-12} Torr region)
- Reversible pumping of hydrogen and its isotopes
- Possibility of operation at room temperature after activation, without power
- Operation in the presence of high magnetic fields
- Oil free and vibration free ultra high vacuum
- Low weight

Applications

- Improving ultimate vacuum in combination with ion, diffusion, cryogenetic or turbomolecular pumps
- Surface analysis systems
- Particle accelerators, synchrotron radiation sources and related equipment
- Process pumps for vacuum devices
- Portable vacuum instrumentation
- Pumping, storing and releasing hydrogen isotopes
- Plasma machines
- Hydrogen traps
- Impurities removal in rare gas filled devices





SORB-AC® Cartridge Pumps - MK5 Series

SAES Getter the world leader in Gettering Technology, is introducing the new MK5 series of the SORB-AC Cartridge non evaporable getter pumps.

These pumps are based on the well-known St 707 getter material, which achieves high sorption performances for all the active gases even after an activation at moderate temperature¹.

The new MK5 series includes a new flange design². Which makes the overall pump assembly more simple and compact, with foot print and reliability advantages over the previous series. In particular, the flange includes a new electrical connector which integrates both power and thermocouple pins. In this way the design gains in reliability adopting a thermocouple solution, which does not need to be sheathed, and in operability since the new connector is bakeable up to 400 °C. In addition the pump also gains in compactness since it gets rid of the previous bulky electrical connector.

The St 707 getter material used in the pump cartridge is provided as metal powder mechanically coated by cold compression onto a constantan strip folded to form the getter cartridge. St 707 provides high pumping performances for all active gases at the lowest activation temperatures. Standard activation temperature is 450 °C, but full activation is also achievable at temperatures as low as 350 °C if maintained for a suitably long time.

SORB-AC Cartridge pumps find wide use in a variety of applications, alone or in combination with traditional UHV pumps. They are particularly suitable to boost the vacuum performances of general purpose vacuum systems, thanks to their high pumping speed for hydrogen and other active gases. In particular the SORB-AC Cartridge pumps exploit a high pumping speed for hydrogen which does not decrease at UHV level, where other UHV pumps show poor performance.

Typical applications of SORB-AC Cartridge pumps are in the field of particle accelerators, synchrotron radiation sources and related equipment, surface analysis systems and other R&D vacuum systems.

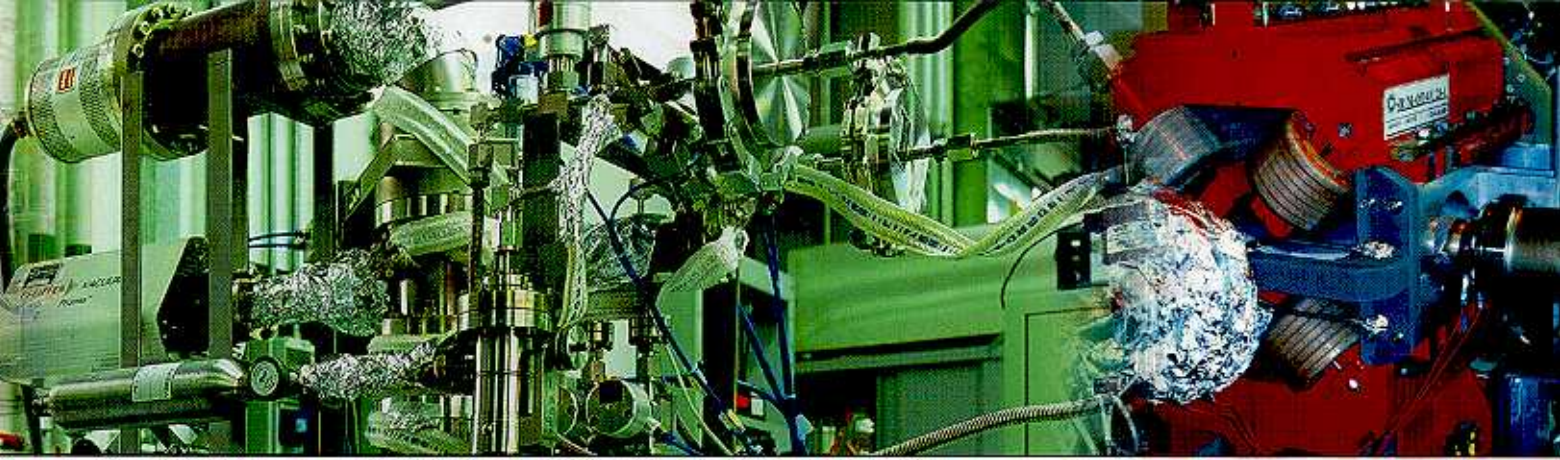
¹. St 101 cartridges are still available only with the MK4 type of the SORB-AC Cartridge pumps.

². Not available for the GP 50 model.

GAUGE 1
GAUGE 2
ION TUBE
MULTIPLIER



SP 1
SP 2
SP 3
SP 4
PC



CARTRIDGE

The cartridge is made by coating the getter alloy onto constantan strips, which are then pleated in concertina fashion and formed into cylinders which make up the cartridge. For the SORB-AC MK5 cartridge pumps, only St 707 cartridges are available. A stainless steel separator is inserted in the cartridge to facilitate the correct positioning of the thermocouple.

PUMP BODY

The optional pump body is a simple double flanged nipple. If desired, the pump can be mounted nude inside the vacuum system to fully exploit its pumping speed. The pump body can be supplied with a water-cooled jacket, but it should be noted that water cooling is not necessary for the pump to function efficiently. The pump body is leak tested to 1.5×10^{-10} sccm/s.

HEATER

The heater consists of a tantalum wire spiral-wound on an alumina element supported by a stainless steel rod. The heater assembly also includes the cartridge- and the thermocouple-positioning (stainless steel tube) and securing components.

THERMOCOUPLE

The thermocouple is a K-type, electrically insulated within an alumina tube. The thermocouple is assembled to the support flange. It is connected to the thermocouple pins of the connector with compensated contact terminations.

FLANGE

The support flange is a standard CF type flange in which one Special Connector equipped with six conductors for electrical- and thermocouple-connections is TIG welded. The pump flange is leak tested to 1.5×10^{-10} sccm/s.

ELECTRICAL CONNECTOR

The Special Connector allows the connection of the pump to the power supply and control unit. The connector is bakeable up to 400°C.

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HIGHLIGHTS

General features

- High pumping speed for all active gases
- Constant pumping speed in HV and UHV pressure region
- No low pressure limitation (down to 10^{-12} Torr region)
- Reversible pumping of hydrogen and its isotopes
- Possibility of operation at room temperature after activation, without power
- Operation in the presence of high magnetic fields
- Oil free and vibration free ultra high vacuum
- Low weight

Applications

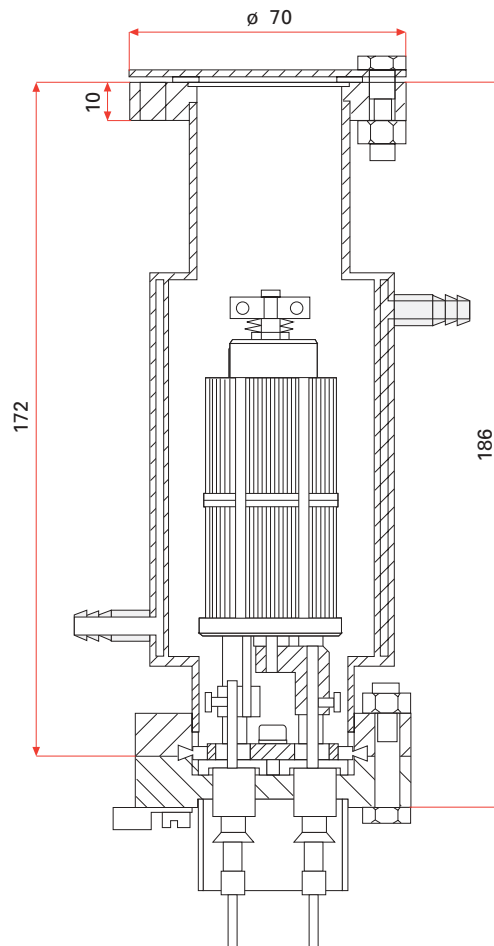
- Improving ultimate vacuum in combination with ion, diffusion, cryogenetic or turbomolecular pumps
- Surface analysis systems
- Particle accelerators, synchrotron radiation sources and related equipment
- Process pumps for vacuum devices
- Portable vacuum instrumentation
- Pumping, storing and releasing hydrogen isotopes
- Plasma machines
- Hydrogen traps
- Impurities removal in rare gas filled devices



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GP 50

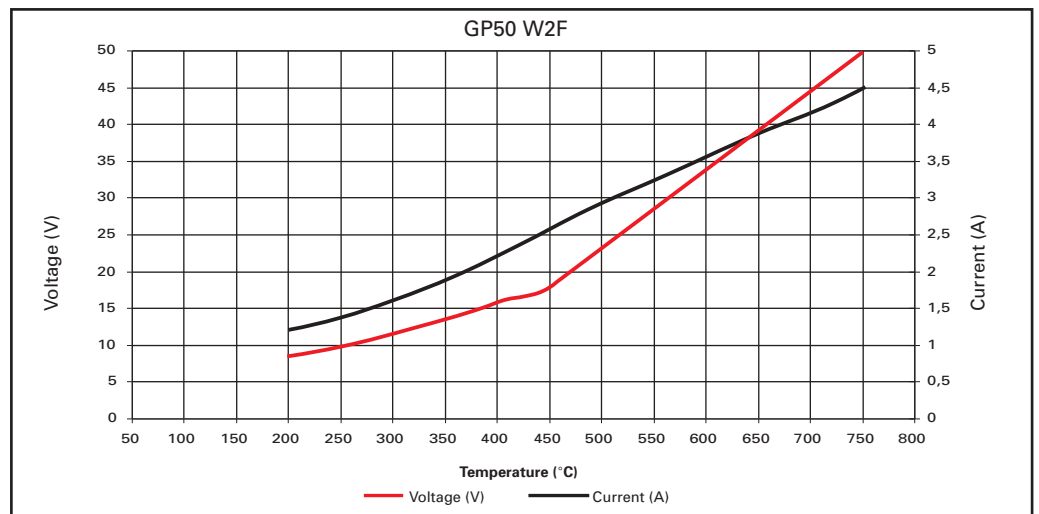
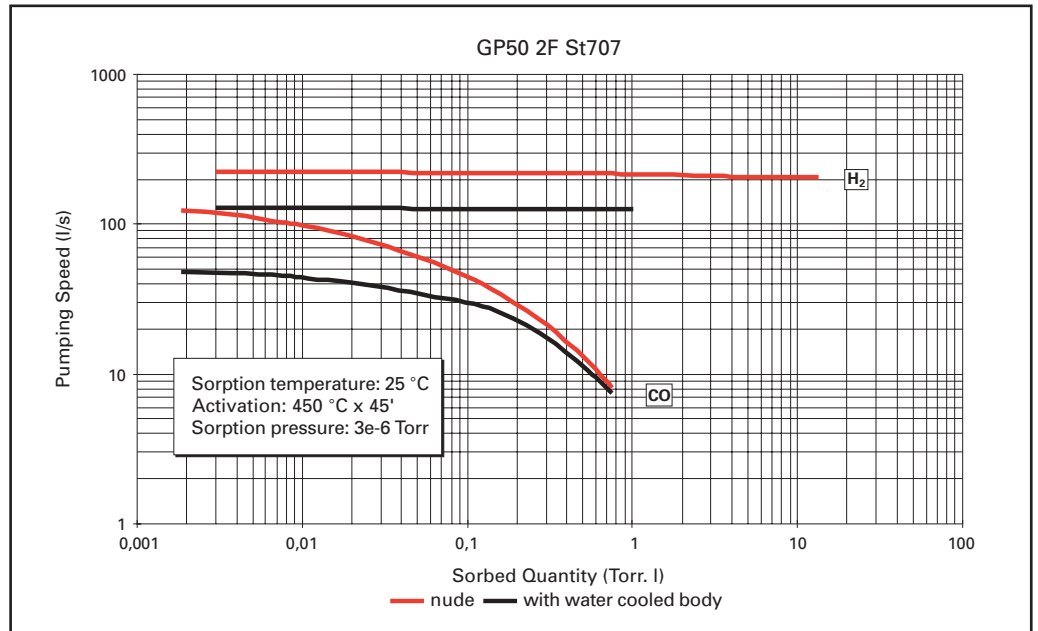
The GP 50 pump still maintains its original configuration with the two copper current feedthrough protruding out of the base flange. It uses both St 707 and St 101 getter cartridges mounted on a heater structure based on a single heater element, and is available on CF35 (2 3/4") flange. The pumping speed curves and the activation curves are shown in the enclosed graphs.



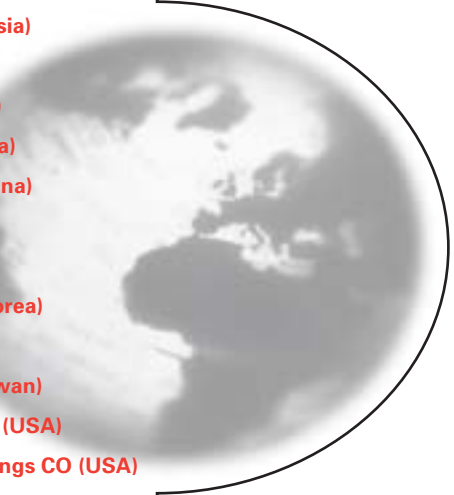
Dimensions in mm

Ordering Information

4H0305	GP 50 2F	Base Flange with Heater
4H0295	GP 50 W2F	Base Flange with Heater and Water Cooled Body
4H0030	C 50-St101	St 101 Getter Cartridge on Iron Substrate
4H0065	C 50-St101AM	St 101 Getter Cartridge on Constantan Substrate
4H0205	C 50-St707	St 707 Getter Cartridge on Constantan Substrate



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- Tokyo (Japan)
- Seoul (Korea)
- Chin Chon (Korea)
- Singapore
- Hsin Chu (Taiwan)
- Cleveland OH (USA)
- Colorado Springs CO (USA)
- San Luis Obispo CA (USA)
- Sparks MD (USA)



Typical Pump Characteristics

Alloy Type		St 101	St 707
Getter Alloy Mass (g)		24	32
Getter Surface (cm ²)		830	830
Pumping Speed (l/s)	H ₂	210	200
	CO	110	100
Sorption Capacity (Torr l)	H ₂	240	320
	CO Room Temperature	0,55	0,55
	CO Total	215	290

Note: Pumping speed data refer to the initial values of the pump without the pump body. CO capacity based on speed below 10 l/s.

Conversion Table

given \ sought	Pa	mbar	Torr
1 Pa	1	10 ⁻²	750.06x 10 ⁻⁵
1 mbar	10 ²	1	0.75006
1 Torr	133.322	1.333	1

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HIGHLIGHTS



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- Portable vacuum instrumentation
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- Plasma machines
- Hydrogen traps
- Impurities removal in rare gas filled devices

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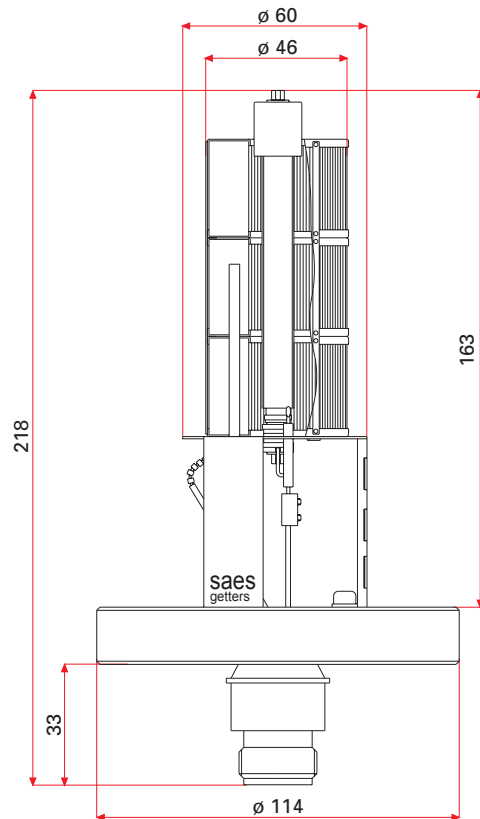
GP 100 MK5

The GP 100 MK5 pump uses an St 707 getter cartridge mounted on a heater structure based on a single heater element, and is available on CF63 (4 1/2") flange.

The flange is conveniently supplied with a custom-made, bakeable electrical connector which combines power and thermocouple pins, for best integration and minimum footprint.

The pump sorption speed is at its maximum when mounted directly in the vacuum system without a body.

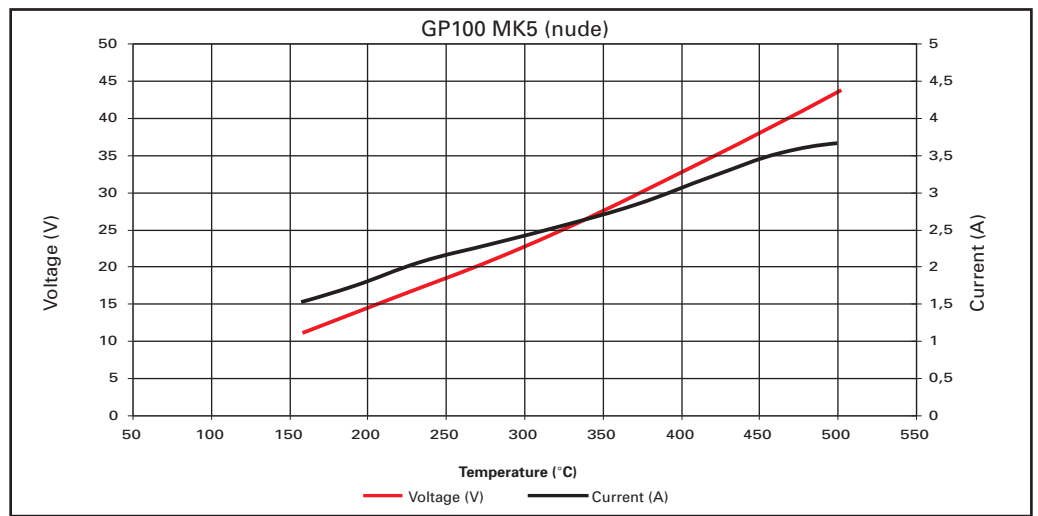
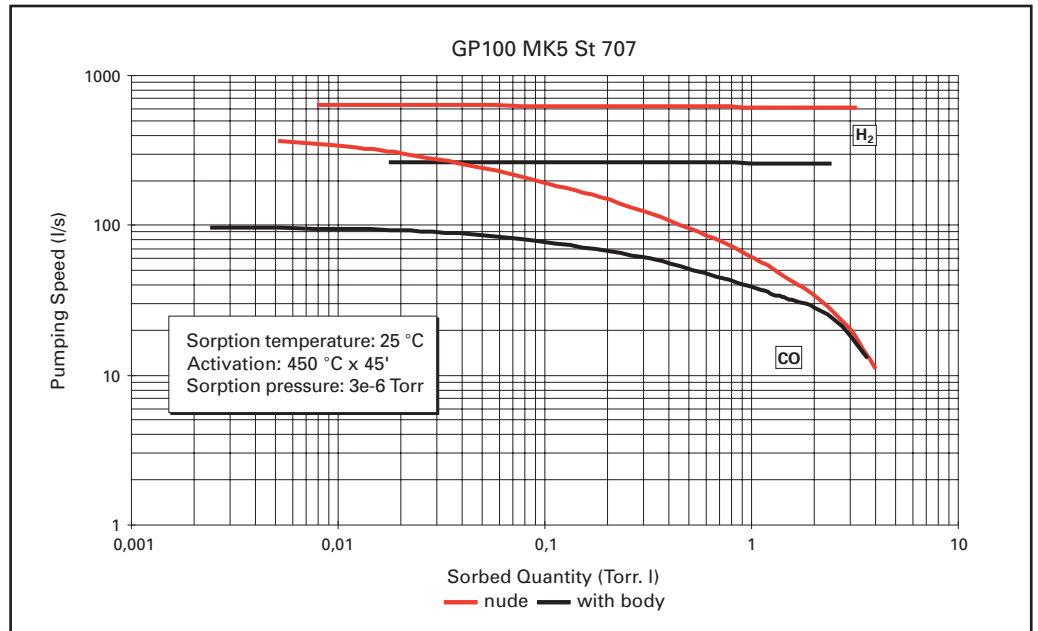
The pumping speed curves and the activation curves are shown in the enclosed graphs.



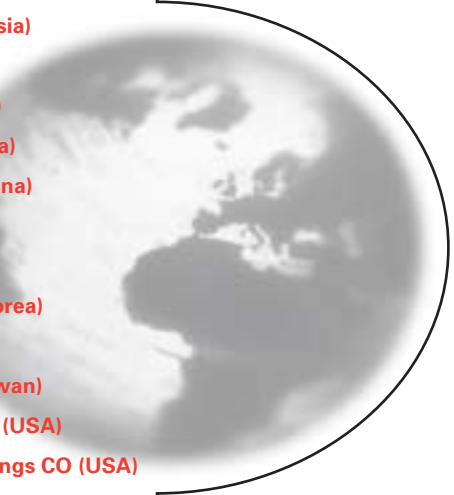
Dimensions in mm

Ordering Information

4H0273	GP 100 MK5	Base Flange with Connector and Heater
4H0450	GP 100 MK5 B	Base Flange with Connector, Heater and Body
4H0451	GP 100 MK5 W	Base Flange with Connector, Heater and Water Cooled Body
4H0250	C 100-MK5 St707	St 707 Getter Cartridge on Constantan Substrate



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- Singapore
- Hsin Chu (Taiwan)
- Cleveland OH (USA)
- Colorado Springs CO (USA)
- San Luis Obispo CA (USA)
- Sparks MD (USA)



Typical Pump Characteristics

Alloy Type	St 707	
Getter Alloy Mass (g)	100	
Getter Surface (cm ²)	2600	
Pumping Speed (l/s)	H ₂	600
	CO	300
Sorption Capacity (Torr.l)	H ₂	1000
	CO Room Temperature	2.1
	CO Total	900

Note: Pumping speed data refer to the initial values of the pump without the pump body. CO capacity based on speed below 30 l/s.

Conversion Table

	sought given	Pa	mbar	Torr
1 Pa		1	10 ⁻²	750.06x 10 ⁻⁵
1 mbar		10 ²	1	0.75006
1 Torr		133.322	1.333	1

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HIGHLIGHTS

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General features

- High pumping speed for all active gases
- Constant pumping speed in HV and UHV pressure region
- No low pressure limitation (down to 10⁻¹² Torr region)
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Applications

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- Hydrogen traps
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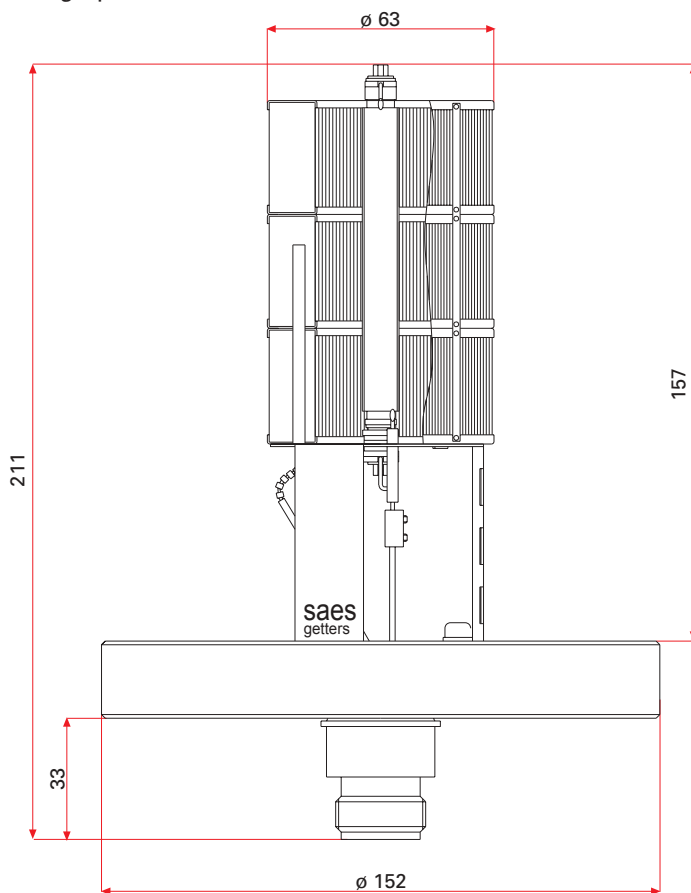
GP 200 MK5

The GP 200 MK5 pump uses a St 707 getter cartridge mounted on a heater structure based on a single heater element, and is available on CF100 (6") flange.

The flange is conveniently supplied with a custom-made, bakeable electrical connector which combines power and thermocouple pins, for best integration and minimum footprint.

The pump sorption speed is at its maximum when mounted directly in the vacuum system without a jacket.

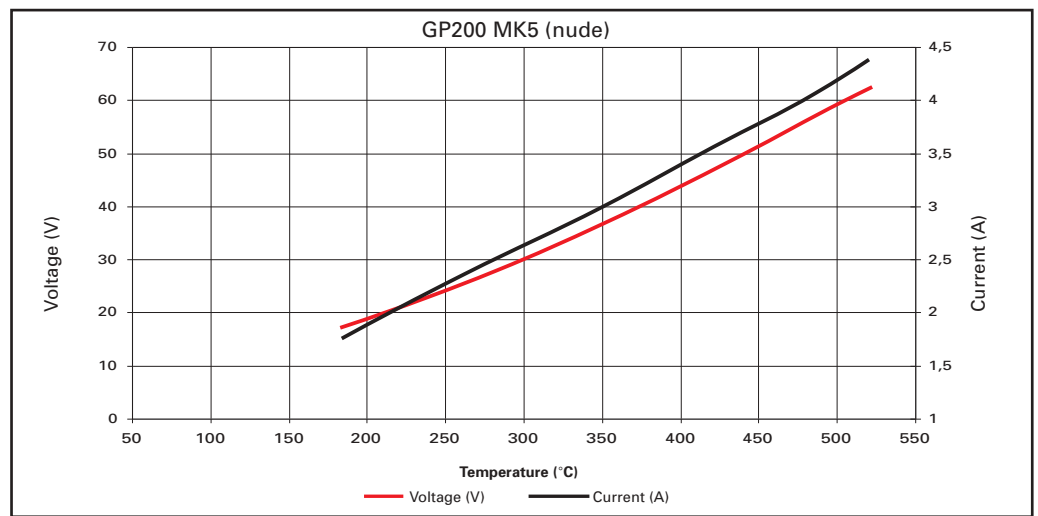
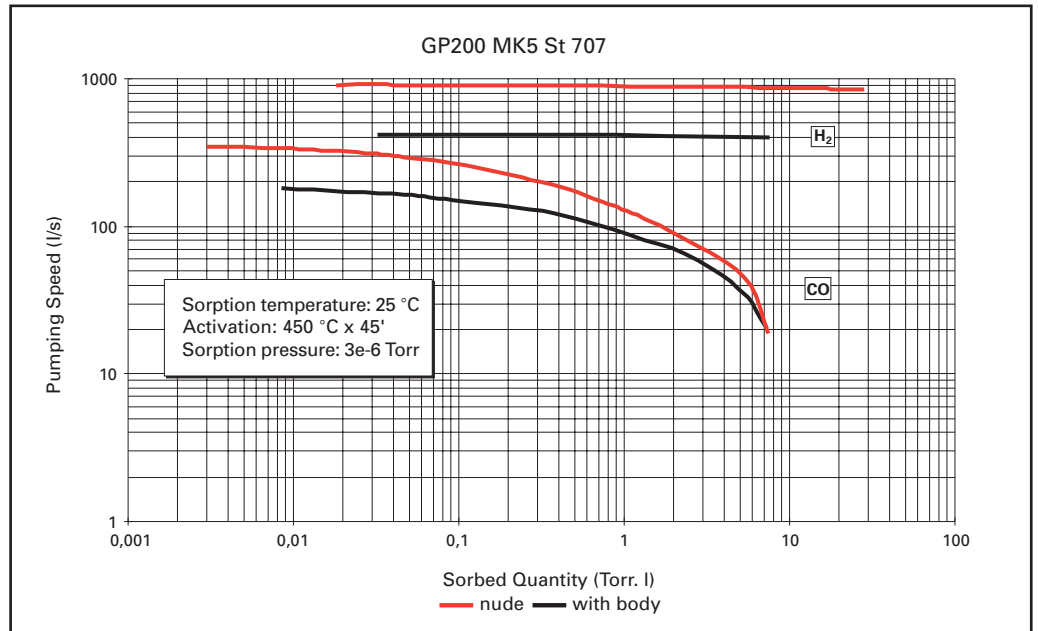
The pumping speed curves and the activation curves are shown in the enclosed graphs.



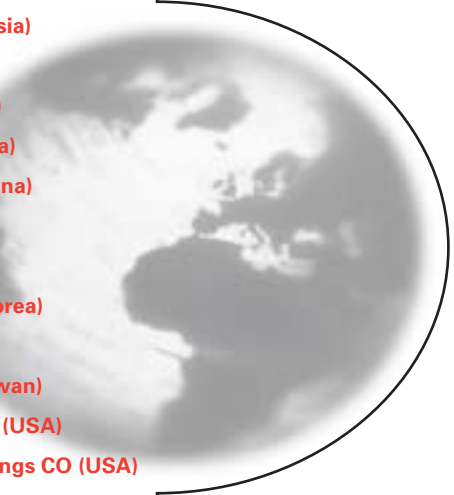
Dimensions in mm

Ordering Information

4H0236	GP 200 MK5	Base Flange with Connector and Heater
4H0452	GP 200 MK5 B	Base Flange with Connector, Heater and Body
4H0453	GP 200 MK5 W	Base Flange with Connector, Heater and Water Cooled Body
4H0249	C 200-MK5 St707	St 707 Getter Cartridge on Constantan Substrate



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- Cleveland OH (USA)
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- Sparks MD (USA)



Typical Pump Characteristics

Alloy Type		St 707
Getter Alloy Mass (g)		170
Getter Surface (cm ²)		4470
Pumping Speed (l/s)	H ₂	900
	CO	350
Sorption Capacity (Torr l)	H ₂ Room Temperature	1700
	CO Room Temperature	4.5
	CO Total	1530

Note: Pumping speed data refer to the initial values of the pump without the pump body. CO capacity based on speed below 50 l/s.

Conversion Table

	sought	Pa	mbar	Torr
given	1 Pa	1	10 ⁻²	750.06x 10 ⁻⁵
	1 mbar	10 ²	1	0.75006
	1 Torr	133.322	1.333	1

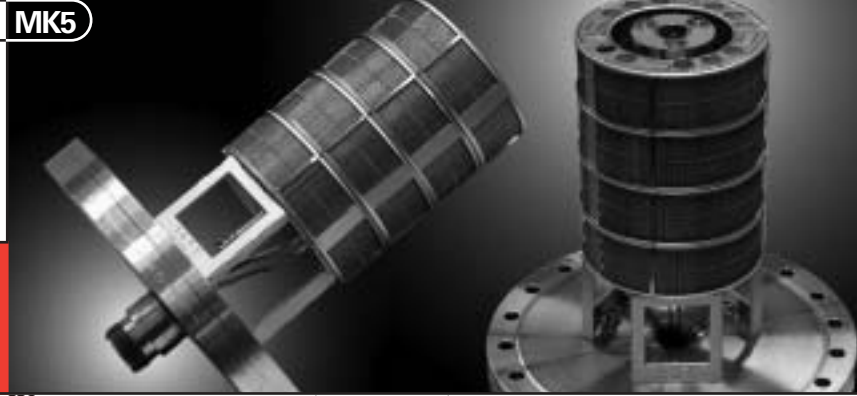
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HIGHLIGHTS

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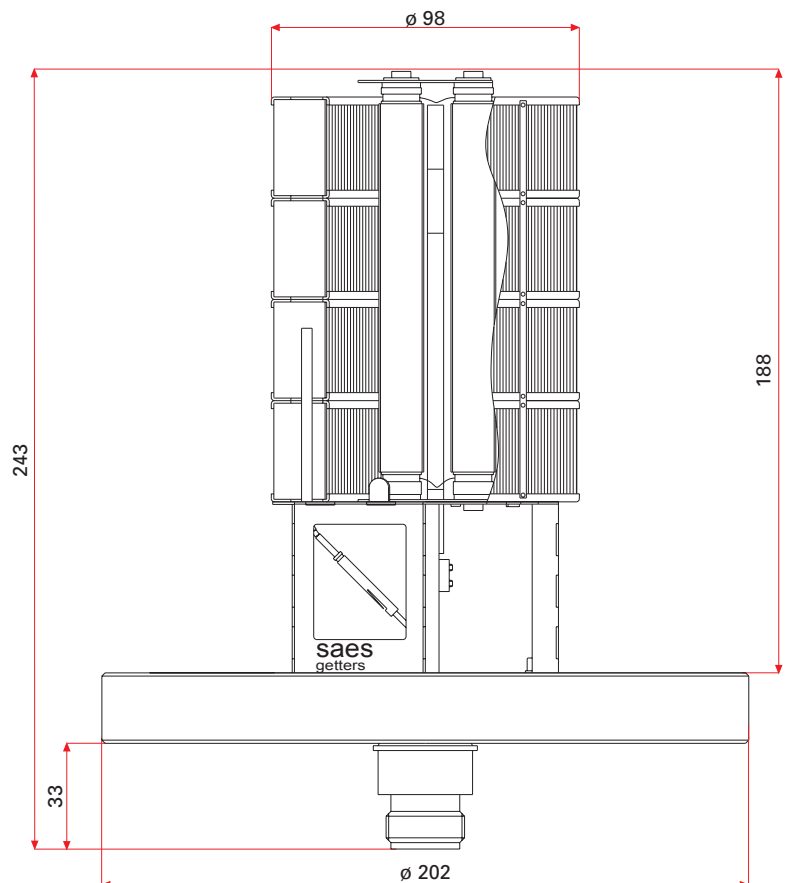
GP 500 MK5

The GP 500 MK5 pump uses a St 707 getter cartridge mounted on a heater structure based on three heater elements, and is available on CF150 (8") flange.

The flange is conveniently supplied with a custom-made, bakeable electrical connector which combines power and thermocouple pins, for best integration and minimum footprint.

The pump sorption speed is at its maximum when mounted directly in the vacuum system without a jacket.

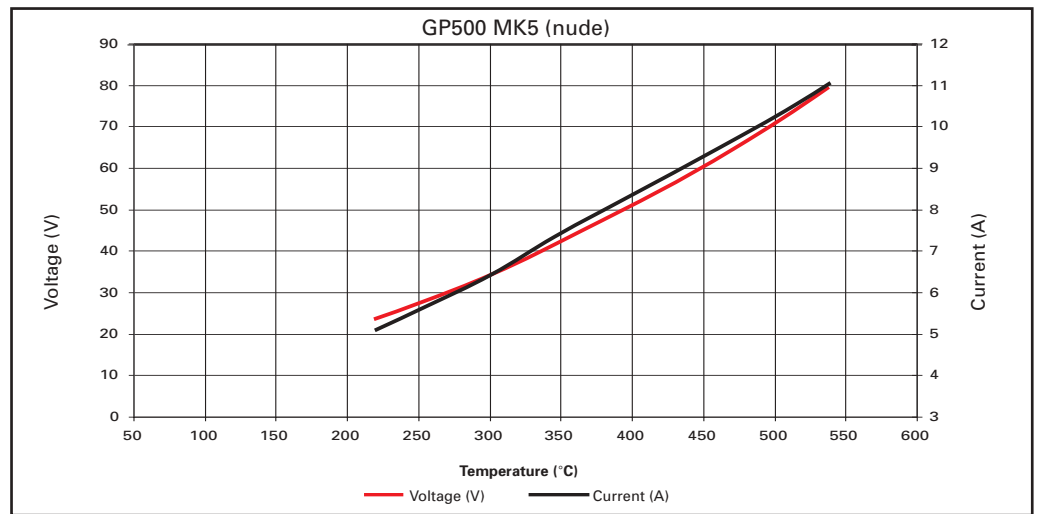
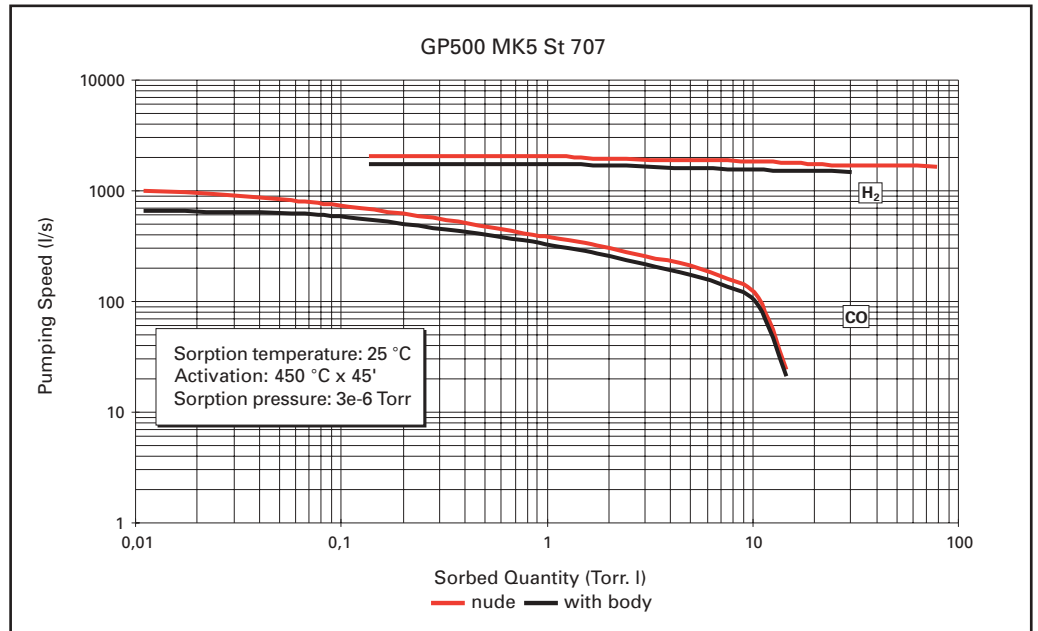
The pumping speed curves and the activation curves are shown in the enclosed graphs.



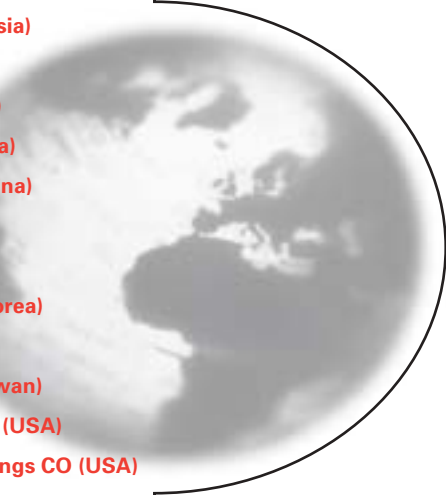
Dimensions in mm

Ordering Information

4H0243	GP 500 MK5	Base Flange with Connector and Heater
4H0454	GP 500 MK5 B	Base Flange with Connector, Heater and Body
4H0455	GP 500 MK5 W	Base Flange with Connector, Heater and Water Cooled Body
4H0248	C 500-MK5 St707	St 707 Getter Cartridge on Constantan Substrate



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- Sparks MD (USA)



Typical Pump Characteristics

Alloy Type	St 707	
Getter Alloy Mass (g)	540	
Getter Surface (cm ²)	14290	
Pumping Speed (l/s)	H ₂	1900
	CO	650
Sorption Capacity (Torr.l)	H ₂ Room Temperature	5400
	CO Room Temperature	10
	CO Total	4860

Note: Pumping speed data refer to the initial values of the pump without the pump body. CO capacity based on speed below 100 l/s.

Conversion Table

sought given	Pa	mbar	Torr
1 Pa	1	10 ⁻²	750.06x 10 ⁻⁵
1 mbar	10 ²	1	0.75006
1 Torr	133.322	1.333	1

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D.VS.03.02

Power Supplies for Getter Pumps



GENERAL FEATURES

CapaciTorr CF35 Power Supply

- Line Voltage**
 - Supply Voltage 100 – 210 Vac
-15%, +25%
 - Frequency 50/60Hz
 - Mains Cord Connector IEC Type 6 A 250 V
 - Over-Voltage Class Cat II
- Line Protection Required**
 - Supply Protection 6 A Fuse or
Circuit Breaker
 - Differential Switch 30 mA
 - Isolation Type Class I
- Output**
 - Output Voltage 16,5 Vdc ± 5%
 - Max. Current 6.0 A
 - Maximum Power 100 W
- Instrument Protection**
 - Internal Line Fuse 3.5 A T.
 - Overload Protection Electronic Control
 - High Temp. Protection Electronic Control
- Dimensions**
 - 72 x 144 x 300 mm (HxWxD)
- Weight**
 - 1,8 kg

NEG Pump Controller V1.1

- Line Voltage**
 - Supply Voltage 110 - 240Vac
-15%, +25%
 - Frequency 50/60Hz
 - Mains Cord Connector IEC Type 16A 250V
 - Over Voltage Class Cat II
- Line Protection Required**
 - Supply Protection 16 A Fuse or
Circuit Breaker
 - Differential Switch 30 mA
 - Isolation Type Class I
- Output**
 - Output Voltage 0-110Vdc ± 6%
 - Max. Current 10 A
 - Maximum Power 1100W
- Instrument Protection**
 - Automatic Breaker Line 16 A - C
 - Output Fuse 10 A - T.
 - Overload Protection Electronic Control
 - High Temp. Protection Electronic Control
- Dimensions**
 - 19" Rack, 3U, 401 mm depth
- Weight**
 - 10 kg



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CapaciTorr® CF35 Power Supply

The CapaciTorr CF35 Power Supply is an electronic unit specifically designed to control the activation process of the CapaciTorr B 200, CapaciTorr D 400 and CapaciTorr D 400-2 getter pumps. The instrument receives line voltage (100 - 240VAC, 50/60 Hz), converts it to DC voltage of 16.5 V and supplies the getter pump by way of a microprocessor-based electronic control card. The instrument is designed to control the getter pumps in three different modes:

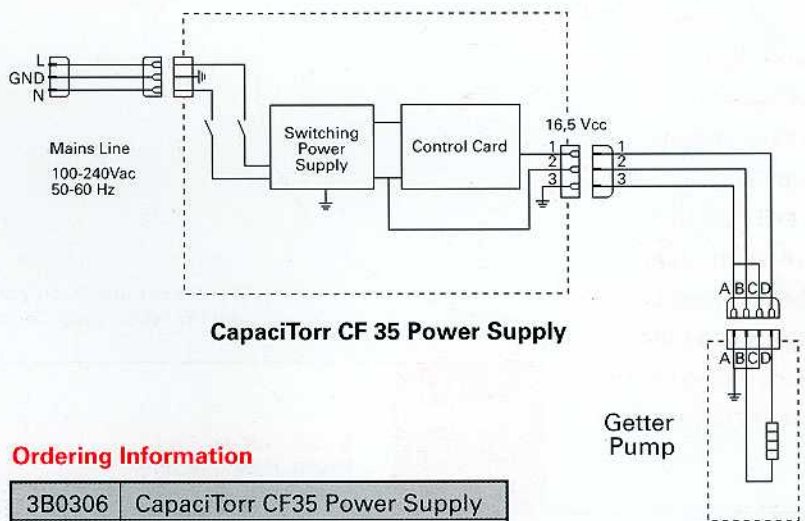
- Activation.
- Timed-Activation.
- Conditioning.

In the Activation mode the instrument supplies the power needed to heat up the getter pump to activation temperature (about 500°C). In this operating mode, the CapaciTorr CF 35 power supply delivers 100% of the available power.

In the Timed Activation mode, the instrument supplies the power required to heat up the getter pump to activation temperature (about 500°C) for one hour. In this operating mode, the CapaciTorr CF 35 power supply delivers 100% of the available power.

In the Conditioning mode, the CapaciTorr CF 35 power supply provides the power necessary to heat up the getter pump to the conditioning temperature (about 150°C). In this operating mode, it delivers 25% of the available power, using a duty cycle control.

Block Schematic



Ordering Information

3B0306	CapaciTorr CF35 Power Supply
3B0338	Cable Mains Input CF35 3Mt*
3B0339	Cable Supply Output CF35 3Mt*

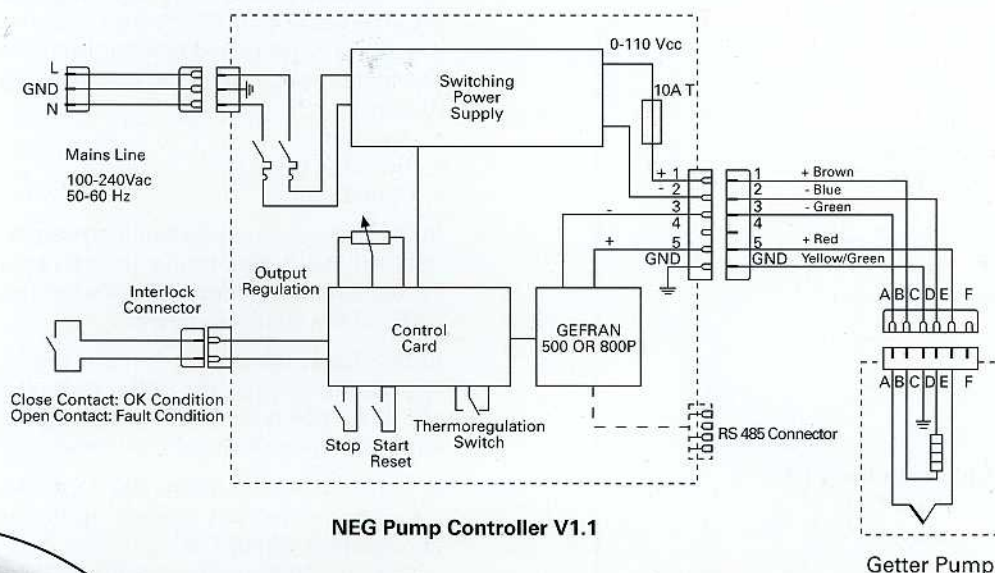
* Other cable lengths available on request

NEG Pump Controller V1.1

The NEG Pump Controller V1.1 is an electronic unit specifically designed to control the heating and in particular the activation process of all getter pumps equipped with a thermocouple of the GP (GP100, GP200¹, GP500¹) and CapaciTorr (CapaciTorr B 1300-2 and CapaciTorr D 2000) families. In addition, it can also be used as a power supply to heat and activate the pumps not equipped with a thermocouple, such as the GP 50, CapaciTorr D 400-2 and CapaciTorr B 200. It can also be used to control the activation process of pumps of the InsiTorr family.

The NEG Pump Controller V1.1 is an 1100 W switching power supply, with an adjustable voltage output from 0 to 110V. The instrument has two modes of operation: in the first mode (Thermoregulation OFF), the unit behaves as a variable voltage (0-110 V) power supply. By manually adjusting the voltage delivered to the pump with the 10-turn potentiometer, it is possible to reach the desired temperature for a specific pump. In the case of pump models not equipped with a thermocouple, it is necessary to refer to the voltage temperature charts (in the pump manual) for proper setting of the potentiometer. In the second mode (Thermoregulation ON), the unit uses a thermoregulator to control the power delivered to the pump and reach the set temperature. Also in this case it is advisable to use the adjustable potentiometer to set the voltage output to a value compatible with pump model being powered. The use of a special thermoregulator, available on request, allows the remote control of the unit via an RS 485 interface.

Block Schematic



- Lainate (Italy)
- Avezzano (Italy)
- Köln (Germany)
- Moscow (Russia)
- Paris (France)
- Daventry (UK)
- Nanjing (China)
- Shanghai (China)
- Tokyo (Japan)
- Seoul (Korea)
- Chin Chon (Korea)
- Singapore
- Hsin Chu (Taiwan)
- Cleveland OH (USA)
- Colorado Springs CO (USA)
- Menlo Park CA (USA)
- San Luis Obispo CA (USA)
- Sparks MD (USA)

Ordering Information

3B0351	NEG Pump Controller V1.1
3B0336	Cable Mains Input V1.1 2Mt
3B0337**	Cable Supply Output V1.1-5 3Mt*
3B0345***	Cable Supply Output V1.1-4 3Mt*

* Other cable lengths available on request

** For MK5 type pumps

*** For MK4 type pumps

¹ For these models, only the pumps equipped with St 707 cartridges can be activated with the NEG Pump Controller V1.1

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