Agilent Technologies

Vacuum Products Division

CE

Vacuum Gauge Controller

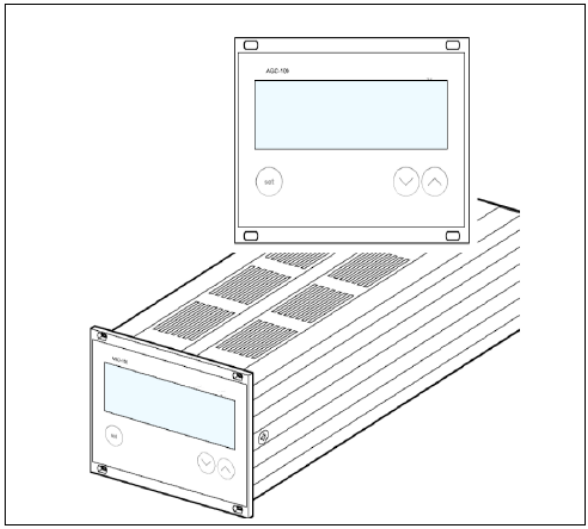
AGC-100

Operating Instructions

Manual No. TQNb15e1
Revision 1
March 2012

Vacuum Gauge Controller

AGC-100



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Vacuum Gauge Controller AGC-100

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- EN 61010 1:2001 (Safety requirements for electrical equipment for measurement, control and laboratory use)
- EN 61000 3 2:2006 (EMC: limits for harmonic current emissions)
- EN 61000 3 3:1995 + A1:2001 + A2:2005 (EMC: limitation of voltage changes, voltage fluctuations and flicker)
- EN 61000 6 2:2005 (EMC: generic immunity standard)
- EN 61000 6 3:2007 (EMC: generic emission standard)

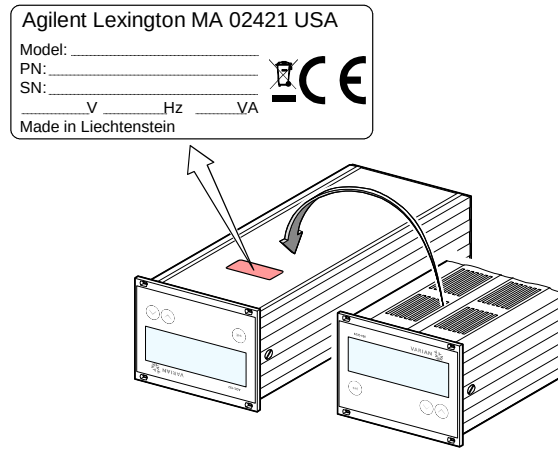
John Ehmann
Operations Manger
Agilent, Inc.
Vacuum products Division
Lexington, MA USA

Contents

For cross-references within this document, the symbol (→ 🗎 XY) is used, for cross-references to further documents listed under "Literature", the symbol (→ 🕮 [Z]).

Product Identification

In all communications with Agilent, please specify the information on the product nameplate. For convenient reference copy that information into the space provided below:



Validity

This document applies to products with part number AGC100.

The part number (PN) can be taken from the product nameplate.

This document is based on firmware number 302-564--.

If your unit does not work as described in this document, please check that it is equipped with the above firmware version (→ 🗎 45).

We reserve the right to make technical changes without prior notice.

All dimensions are indicated in mm.

Intended Use

The Vacuum Gauge Controller AGC-100 is used together with Agilent gauges for total pressure measurement. All products must be operated in accordance with their respective Operating Manuals.

Scope of Delivery

1× Single-Channel Controller
1× Power cord
1× Rubber bar
2× Rubber feet
4× Collar screws
4× Plastic sleeves
1× CD-ROM (Operating Manuals)
1× EC Declaration of Conformity
1× Installation Manual

1 Safety

1.1 Symbols Used

Symbols for residual risks

DANGER

Information on preventing any kind of physical injury.

WARNING

Information on preventing extensive equipment and environmental damage.

Caution

Information on correct handling or use. Disregard can lead to malfunctions or minor equipment damage.

Further symbols


The lamp/display is lit.


The lamp/display flashes.


The lamp/display is dark.

Press the key (example: 'para' key).


Do not press any key

1.2 Personnel Qualifications

Skilled personnel

All work described in this document may only be carried out by persons who have suitable technical training and the necessary experience or who have been instructed by the end-user of the product.

1.3 General Safety Instructions

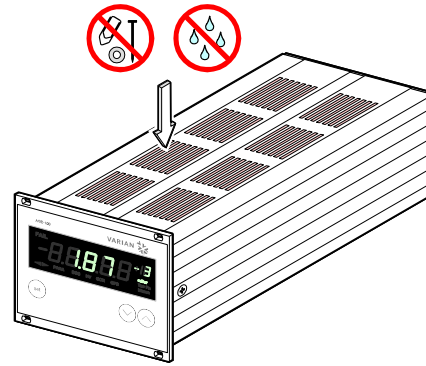
Adhere to the applicable regulations and take the necessary precautions for all work you are going to do and consider the safety instructions in this document.

DANGER

DANGER: mains voltage

Contact with live parts is extremely hazardous when any objects are introduced or any liquids penetrate into the unit.

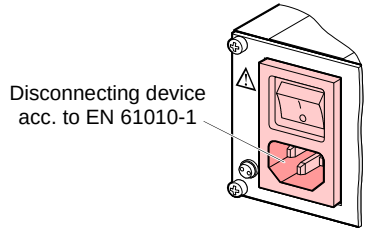
Make sure no objects enter through the louvers and no liquids penetrate into the equipment.



Disconnecting device

The disconnecting device must be readily identifiable and easily reached by the user.

To disconnect the controller from mains, you must unplug the mains cable.



Communicate the safety instructions to all other users.

1.4 Liability and Warranty

Agilent assumes no liability and the warranty becomes null and void if the end-user or third parties

- disregard the information in this document
- use the product in a non-conforming manner
- make any kind of interventions (modifications, alterations etc.) on the product
- use the product with accessories not listed in the corresponding documentation.

2 Technical Data

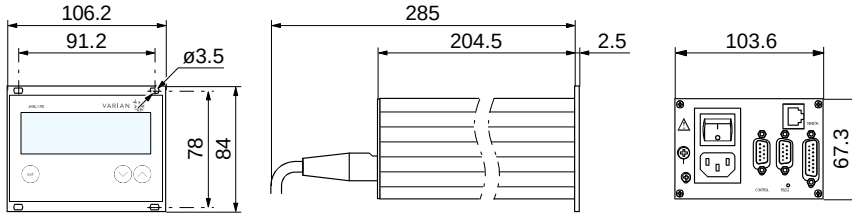
Mains specifications	Voltage	90 … 250 VAC
	Frequency	50 … 60 Hz
	Power consumption	≤30 VA
	Overvoltage category	II
	Protection class	1
	Connection	European appliance connector IEC 320 C14
Ambient conditions	Temperature	
	Storage	–20 … +60 °C
	operation	+ 5 … +50 °C
	Relative humidity	≤80% up to +31 °C, decreasing to 50% at +40 °C
	Use	indoors only max. altitude 2000 m NN
	Pollution degree	II
	Degree of protection	IP 30
Compatible gauges	Number	1
	Compatible types	
	Pirani	PVG (PVG-500, PVG502) (PVG-550, PVG552)
	Pirani/Capacitive	PCG (PCG-750, PCG752)
	Cold cathode/Pirani	FRG (FRG-700, FRG-702)
	Hot cathode/Pirani	FRG (FRG-720, FRG-730)
	Capacitive	CDG (CDG-500)
Gauge connections	Number	2 (parallel)
		Caution Do not connect more than one gauge at the same time.
	SENSOR connector	15-pin D-Sub, female RJ45 (FCC68), female (pin assignment → 24)
Operation	Front panel	via 3 keys
	HOST (remote control)	via RS232C interface

Measurement values	Measurement ranges	depending on gauge (→ 🕮 [1] … [7])
	Measurement error	
	gain error	≤0.02% FSr
	offset error	≤0.05% FSr
	Measurement rate	
	analog	100 / s
	digital	50 / s (FRG-720, FRG-730, CDG-500)
	Display rate	10 / s
	Filter time constant	
	slow	750 ms (f_g = 0.2 Hz)
	normal (nor)	150 ms (f_g = 1 Hz)
	fast	20 ms (f_g = 8 Hz)
	Pressure units	mbar, Pa, Torr, Micron
	Zero adjust	for linear gauges
	Correction factor	for logarithmic gauges 0.10 … 10.00
	A/D converters	resolution >0.001% FSr (The measurement values of FRG-720, FRG-730 and CDG-500 are transmitted digitally.)
Gauge supply	Voltage	+24 VDC ±5%
	Current	750 mA
	Power consumption	18 W
	Fuse protection	900 mA with PTC element, self-resetting after turning the AGC-100 off or disconnecting the gauge
Switching function	Number	1
	Reaction delay	≤10 ms if switching threshold close to measurement value (for larger differences consider filter time constant).
	Adjustment range	depending on gauge (→ 🕮 [1] … [7])
	Hysteresis	≥1% FSr for linear gauges ≥10% of measurement value for logarithmic gauges
Switching function relay		

	Contact type	floating changeover contact
	Load max.	125 VAC, 60 W (ohmic) 110 VDC, 2 A, 60 W (ohmic)
		DANGER
		For benchtop use, max. 30 VAC or 60 VDC may be connected.
	Service life mechanic electric	 10^8 cycles 10^5 cycles (at maximum load)
	Contact positions	→ 25
	CONTROL connector	9-pin D-Sub, male (pin assignment → 25)
Error signal	Number	1
	Reaction time	≤20 ms
Error signal relay	Contact type	floating normally open contact
	Load max.	125 VAC, 60 W (ohmic) 110 VDC, 2 A, 60 W (ohmic)
		DANGER
		For benchtop use, max. 30 VAC or 60 VDC may be connected.
	Service life mechanic electric	 10^8 cycles 10^5 cycles (at maximum load)
	Contact positions	→ 25
	CONTROL connector	9-pin D-Sub, male (pin assignment → 25)
Analog output	Number	1
	Voltage range	0 … +10 V
	Internal resistance	660 Ω
	Measurement signal vs. pressure	depending on gauge (→ [1] … [7])
	CONTROL connector	9-pin D-Sub, male (pin assignment → 25)
Interface		

Standard	RS232C
Protocol	ACK/NAK, ASCII with 3-character mnemonics, bi-directional data flow, 8 data bits, no parity bit, 1 stop bit
RS232C	only TXD and RXD used
Transmission rate	9600, 19200, 38400 baud
RS232 connector	9-pin D-Sub, female (pin assignment → 🗎 26)

Dimensions [mm]



Use	For incorporation into a rack or control panel or as desk-top unit
Weight	0.85 kg

3 Installation

3.1 Personnel

Skilled personnel

The unit may only be installed by persons who have suitable technical training and the necessary experience.

3.2 Installation, Setup

The AGC-100 is suited for incorporation into a 19" rack or a control panel or for use as desk-top unit.

DANGER

DANGER: damaged product

Putting a damaged product into operation can be extremely hazardous.

In case of visible damages, make sure the product is not put into operation.

3.2.1 Rack Installation

The AGC-100 is designed for installation into a 19" rack chassis adapter according to DIN 41 494. For this purpose, four collar screws and plastic sleeves are supplied with it.

DANGER

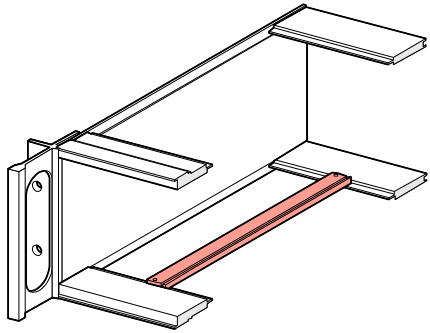
DANGER: protection class of the rack

If the product is installed in a rack, it is likely to lower the protection class of the rack (protection against foreign bodies and water) e.g. the EN 60204-1 regulations for switching cabinets.

Take appropriate measures for the rack to meet the specifications of the protection class.

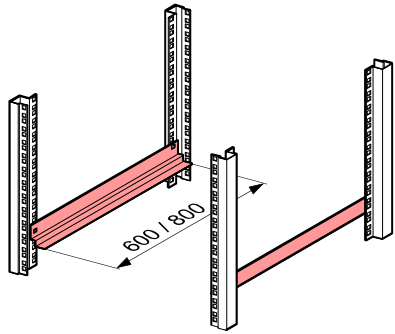
Guide rail

In order to reduce the mechanical strain on the front panel of the AGC-100, preferably equip the rack chassis adapter with a guide rail.

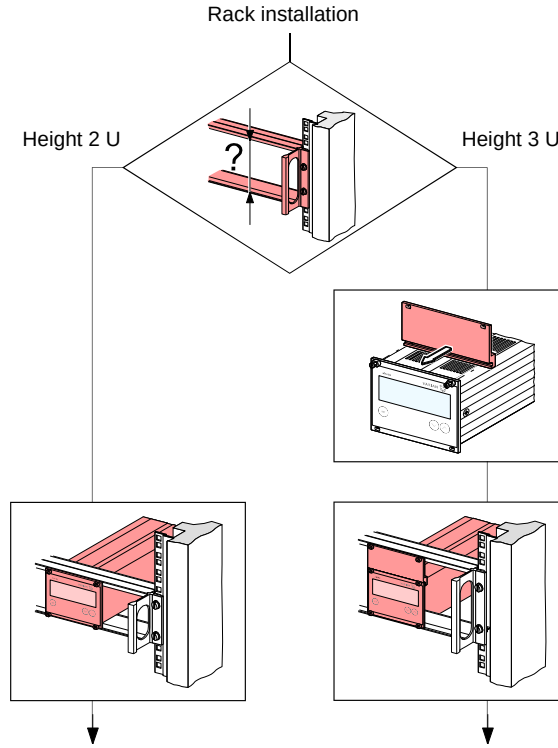


Slide rails

For safe and easy installation of heavy rack chassis adapters, preferably equip the rack frame with slide rails.



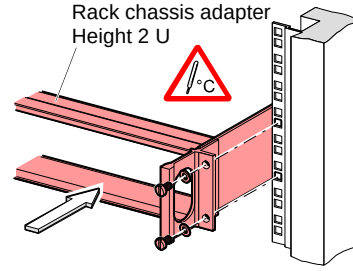
Mounting height



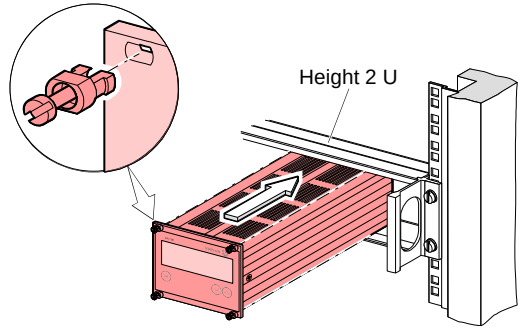
Height 2 U rack chassis adapter

❶ Secure the rack chassis adapter in the rack frame.

The admissible maximum ambient temperature (→ 11) must not be exceeded neither the air circulation obstructed.



❷ Slide the AGC-100 into the adapter …



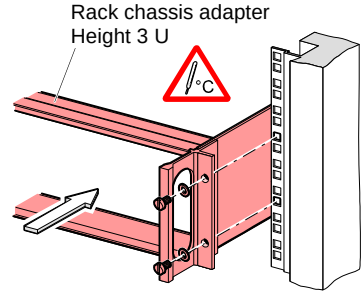
… and fasten the AGC-100 to the rack chassis adapter using the screws supplied with it.

Height 3 U rack chassis adapter

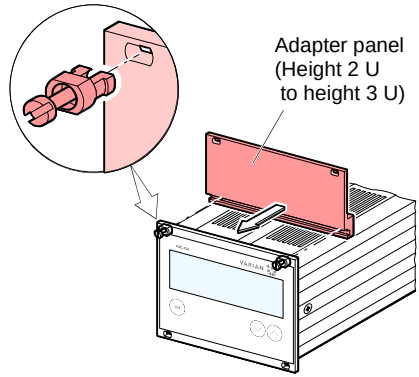
For incorporation into a 19" rack chassis adapter, height 3, an adapter panel (incl. two collar screws and plastic sleeves) is available (→ 🗎 74).

❶ Secure the rack adapter in the rack frame.

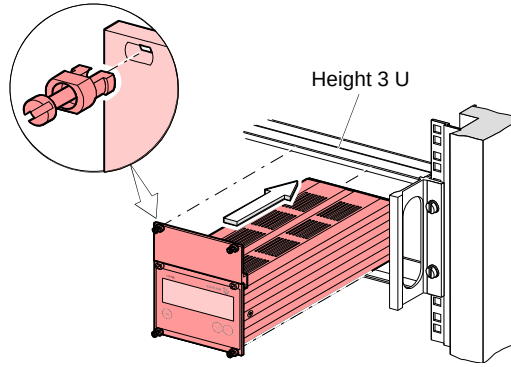
The admissible maximum ambient temperature (→ 🗎 11) must not be exceeded neither the air circulation obstructed.



❷ Mount the adapter panel as upper extension to the front panel of the AGC-100 using the screws supplied with the adapter panel.



❸ Slide the AGC-100 into the rack chassis adapter …



…and fasten the adapter panel to the rack chassis adapter using the screws supplied with the AGC-100.

3.2.2 Installation in a Control Panel

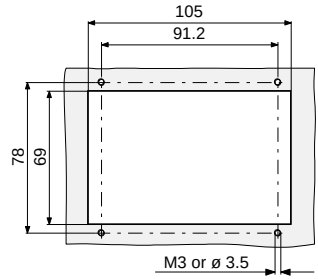
DANGER

DANGER: protection class of the control panel

If the product is installed in a rack, it is likely to lower the protection class of the rack (protection against foreign bodies and water) e.g. according to the EN 60204-1 regulations for switching cabinets.

Take appropriate measures for the control panel to meet the specifications of the protection class.

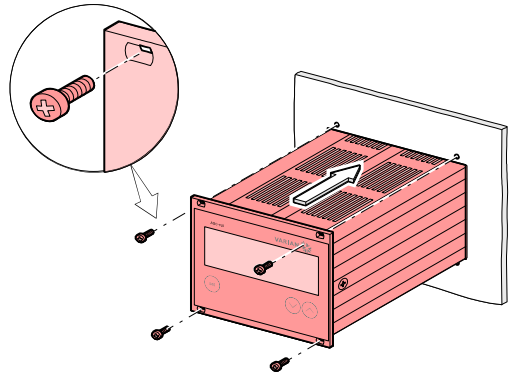
For mounting the AGC-100 into a control panel, the following cut-out is required:



The admissible maximum ambient temperature (→ 11) must not be exceeded neither the air circulation obstructed.

For reducing the mechanical strain on the front panel, preferably support the unit.

❶ Slide the AGC-100 into the cut-out of the control panel …

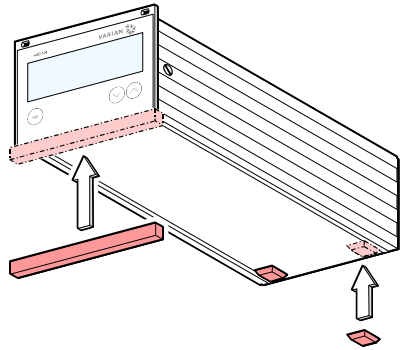


… and secure it with four M3 or equivalent screws.

3.2.3 Use as Desk-Top Unit

The AGC-100 is also suited for use as desk-top unit. For this purpose, two self-adhesive rubber feet as well as a slip-on rubber bar are supplied with it.

❶ Stick the two supplied rubber feet to the rear part of the bottom plate …



… and slip the supplied rubber bar onto the bottom edge of the front panel.

Select a location where the admissible maximum ambient temperature (→ 11) is not exceeded (e.g. due to sun irradiation).

3.3 Mains Power Connector

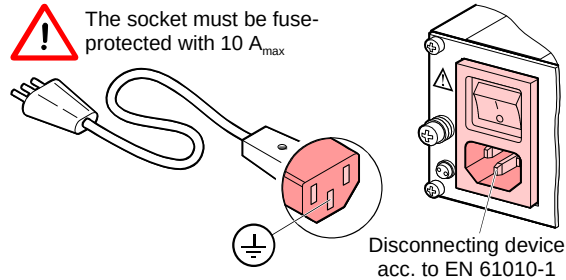
DANGER

DANGER: line voltage

Incorrectly grounded products can be extremely hazardous in the event of a fault.

Use only a 3-conductor power cable (3×1.5 mm^2) with protective ground. The power connector may only be plugged into a socket with a protective ground. The protection must not be nullified by an extension cable without protective ground.

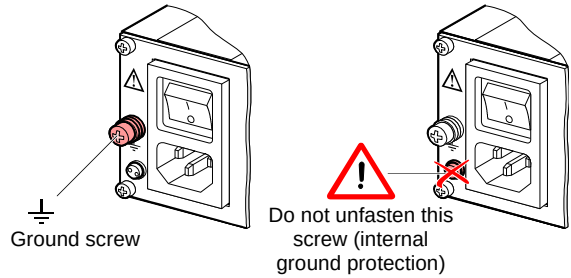
The unit is supplied with a 2.5 m power cord. If the mains cable is not compatible with your system, use your own, suitable cable with protective ground.



If the unit is installed in a switch cabinet, the mains voltage should be supplied and turned on via a central power distributor.

Grounding

On the rear of the unit, there is a screw which can be used to connect the unit to ground, e.g. using the grounding of the pumping station.



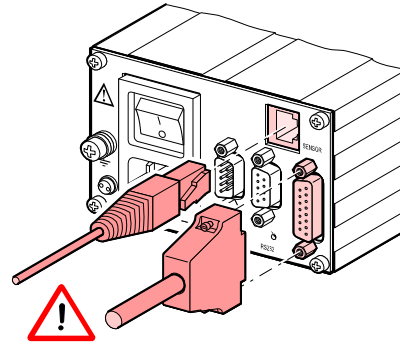
3.4 SENSOR Connector

The AGC-100 is equipped with two different gauge connectors.

Caution

Caution: one channel measurement unit

Connecting more than one gauge at the same time may lead to gauge destruction.



1 only at once

Make sure that there is never more than one gauge connected to the AGC-100 at the same time.

Connect the gauge to one of the two SENSOR connectors on the rear of the unit. Use a screened 1:1 cable (electromagnetic compatibility). Make sure the gauge is compatible (→ 11).

DANGER

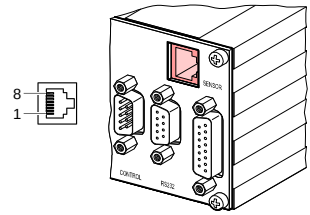
DANGER: protective low voltage

According to EN 61010, voltages exceeding 30 VAC or 60 VDC are hazardous.

If you are using the AGC-100 as desk-top unit, you may only connect a protective low voltage (SELV).

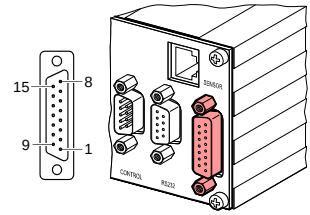
Pin assignment
SENSOR

Pin assignment of the 8-pin RJ45 appliance connector:



Pin	Signal	
4	Identification	
1	Supply	+24 VDC
2	Supply common	GND
3	Signal input	(Measurement signal+)
5	Signal common	(Measurement signal–)
6	Status	
7	HV_L	
8	HV_H	

Pin assignment of the female 15-pin D-Sub appliance connector:



Pin	Signal	
10	Identification	
8	Supply for Hot Cathode Gauges	
11	Supply for Capacitance Diaphragm Gauges	
5	Supply common	GND
2	Signal input	(Measurement signal+)
12	Signal common	(Measurement signal–)
3	Status	
1	Emission status	
7	Degas	
4	HV_H	
13	RXD	
14	TXD	
15	Screening = chassis	
6, 9	not connected	

3.5 CONTROL Connector

This connector allows to read the measurement signal, to evaluate state of the floating switching function and error contacts.

Connect the peripheral components to the CONTROL connector on the rear of the unit. Use a shielded cable (electromagnetic compatibility).

DANGER

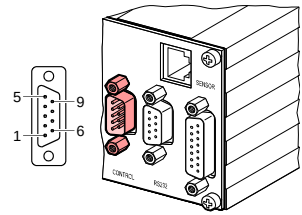
DANGER: protective low voltage

According to EN 61010, voltages exceeding 30 VAC or 60 VDC are hazardous.

If you are using the AGC-100 as desk-top unit, you may only connect a protective low voltage (SELV).

Pin assignment
Contact positions
CONTROL

Pin assignment of the male 9-pin D-Sub appliance connector:



Pin	Signal
1	Analog output 0 … +10 VDC
7	Chassis = GND
5	HV_H on +24 V off 0 V The control over this signal is placed superior to the key operation.
4 3 2	Pressure below threshold Pressure above threshold or power supply turned off
	Error signal
9 8	No error Error or power supply turned off
	Supply for relays with higher switching power
6 7	+24 VDC, 200 mA Chassis = GND Fuse-protected at 300 mA with PTC element, self-resetting after power off or pulling the CONTROL connector. Meets the requirements of a grounded protective extra low voltage (SELV).

3.6 RS232 Interface Connector

The RS232C interface allows for operating the AGC-100 via a HOST or terminal. It can also be used for updating the firmware (→ 🗎 78).

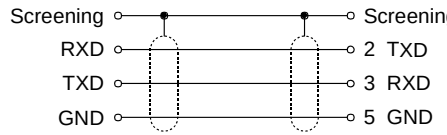
Connect the serial interface to the RS232 connector on the rear of the unit using your own, screened (electromagnetic compatibility) cable.

DANGER

DANGER: protective low voltage

According to EN 61010, voltages exceeding 30 VAC or 60 VDC are hazardous.

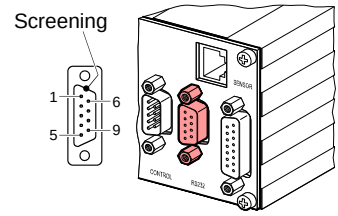
If you are using the AGC-100 as desk-top unit, you may only connect a protective low voltage (SELV).



(Minimum configuration)

Pin assignment RS232

Pin assignment of the female 9-pin D-Sub appliance connector:



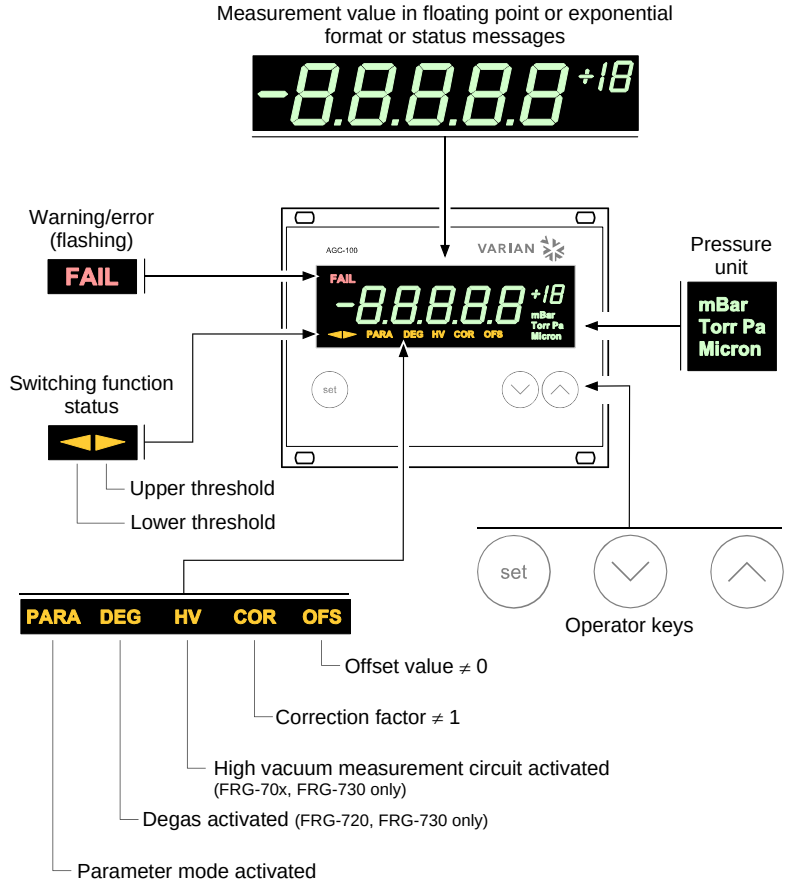
Pin	Signal
2	TXD
3	RXD
5	GND
6	DSR
8	CTS
9	GND

Pin	Signal
1	not connected
4	not connected
7	not connected

Chassis = screening

4 Operation

4.1 Front Panel



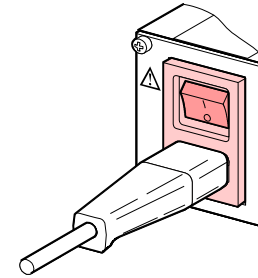
4.2 Turning the AGC-100 On and Off

Make sure the AGC-100 is correctly installed and the specifications in the Technical Data are met.

Turning the AGC-100 on

The power switch is on the rear of the unit.

Turn the AGC-100 on with the power switch (or centrally, via a switched power distributor, if the unit is incorporated in a rack).



After power on, the AGC-100 …

- automatically performs a self-test
- identifies the connected gauge
- activates the parameters that were in effect before the last power off
- switches to the Measurement mode
- adapts the parameters if required (if another gauge was previously connected).

Turning the AGC-100 off

Turn the AGC-100 off with the power switch (or centrally, via a switched power distributor, if the unit is incorporated in a rack).

Wait at least 10 s before turning the AGC-100 on again in order for it to correctly initialize itself.

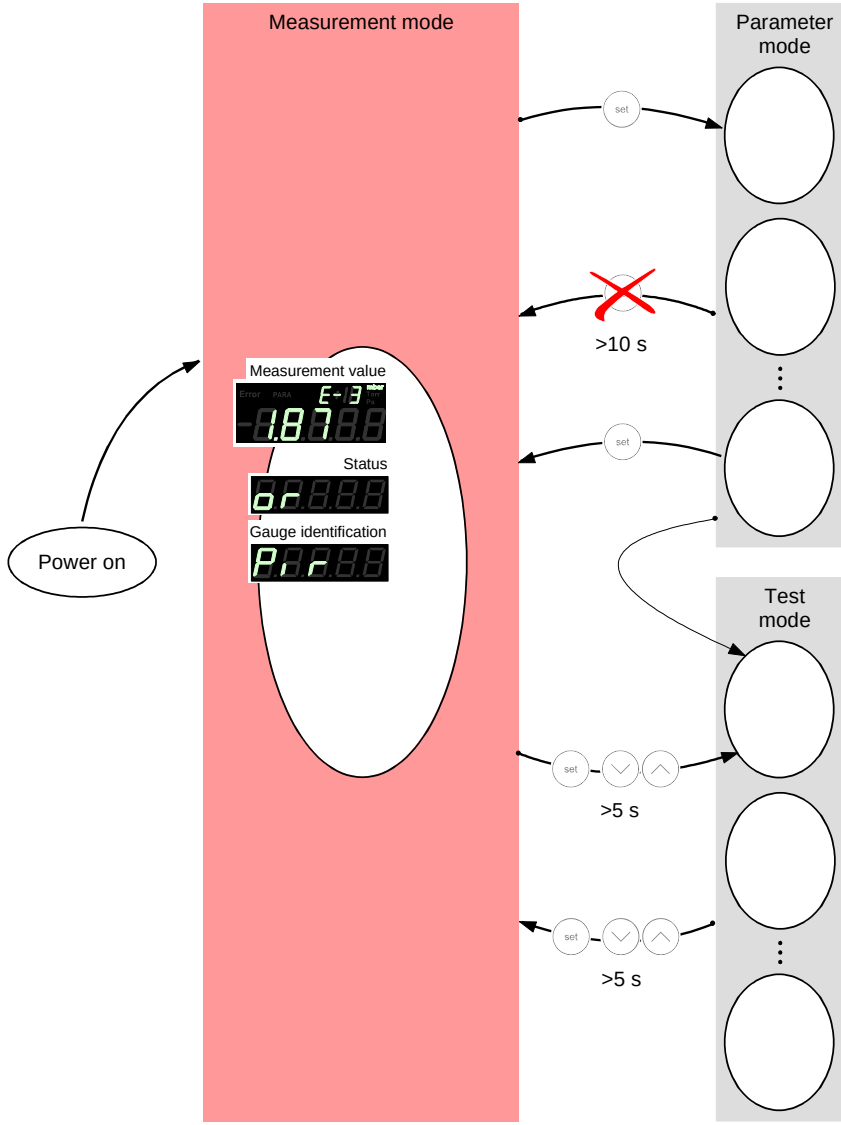
4.3 Operating Modes

The AGC-100 works in the following operating modes:

- Measurement mode
  for displaying measurement values or status messages (→ 🗎 29)
- Parameter mode
  for entering or displaying parameters (→ 🗎 31)
- Test mode
  for running internal test programs (→ 🗎 43)
- Program transfer mode
  for updating the firmware (→ 🗎 78)

4.4 Measurement Mode

The Measurement mode is the standard operating mode of the AGC-100. Measurement values and status messages as well as the gauge identification are displayed in this mode.



Displaying the gauge identification

⇨ Press keys >0.5 s:
The type of the connected gauge is automatically identified and displayed for 5 s:

Pirani gauge
(PVG-500, PVG-502, PVG-550, PVG-552)

Pirani/Capacitive gauge
(PCG-750, PCG-752)

Cold cathode/Pirani gauge
(FRG-700, FRG-702)

Hot cathode/Pirani gauge
(FRG-720)

Hot cathode/Pirani gauge
(FRG-730)

Linear gauge (capacitive, digital)
(CDG-500)

No gauge connected
(no Sensor)

Connected gauge cannot be identified (no Identifier)

Getting to the Parameter mode

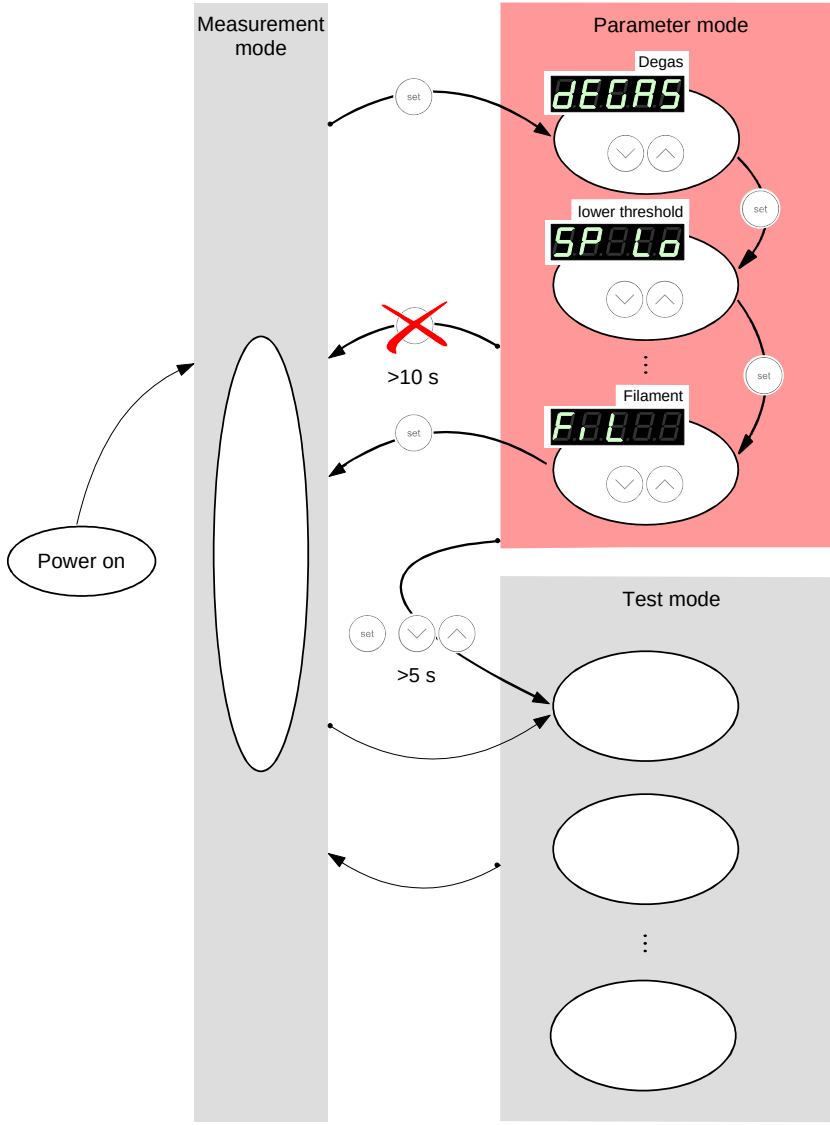

→ 🗎 31

Getting to the Test mode

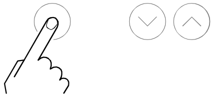

Press keys >5 s
(→ 🗎 43)

4.5 Parameter Mode

The Parameter mode is used for displaying, editing and entering parameter values.



Selecting a parameter



⇨ The name of the parameter

e.g.: dEGAS

Degas

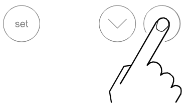
is displayed as long as the key is pressed or at least for 2 s.

Afterwards, the currently valid parameter value is displayed.

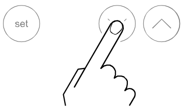
Some parameters are not available for all gauge types. They are only displayed if available.

→ 🗎	33	34	37	37	38	39	39	41	41	42	42
Available for	dEGAS	SP.Hi / Lo	FS.r	oFS.d	Unit	Cor	FiLt	diGt	bAud	Emi	FiL
Pir	–	✓	–	–	✓	✓	✓	✓	✓	–	–
PCG	–	✓	–	–	✓	✓	✓	✓	✓	–	–
FrG70	–	✓	–	–	✓	✓	✓	✓	✓	–	–
FrG72	✓	✓	–	–	✓	✓	–	✓	✓	–	–
FrG73	✓	✓	–	–	✓	✓	–	✓	✓	✓	✓
CdG	–	✓	✓	✓	✓	–	✓	–	✓	–	–

Editing the parameter value



⇨ Press key <1 s:
The value is increased/ decreased by 1 increment.



Press key >1 s:
The value is increased/ decreased continuously.

Modifications of parameters come into effect immediately and are stored automatically. Exceptions are mentioned under the corresponding parameters.

Loading the default parameters

⇨ Press keys >5 s:
All user-defined parameters are restored to their default values (→ 🗎 77).

Loading of the default parameter settings is irreversible.

Getting to the Test mode


Press keys >5 s
(→ 🗎 43)

4.5.1 Parameters

Degas

Contamination deposits on the electrode system of Hot cathode gauges may cause instabilities of the measurement values. The Degas function allows to clean the electrode system.

FRG-730 gauges: The Degas function acts only upon the active filament.

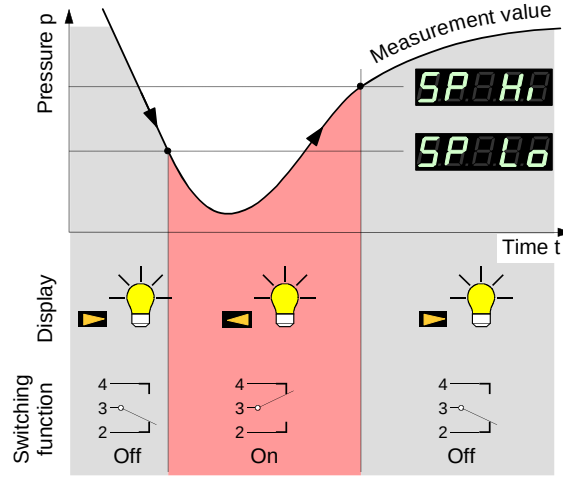
Available for:

☐	Pirani	(PVG)
☐	Pirani/Capacitive	(PCG)
☐	Cold cathode/Pirani	(FRG-70x)
☑	Hot cathode/Pirani	(FRG-720, FRG-730)
☐	Capacitive	(CDG)

	Value
dEGAS	DEG
oFF	⇨ Normal operation.
on	⇨ Degas: The electron collection grid is heated to ≈700 °C by electron bombardment and the electrode system is thus cleaned. Duration of the Degas function: 3 min (can be aborted).

Lower/upper switching threshold

The AGC-100 has a switching function with two adjustable thresholds. The status of the switching function is displayed on the front panel (→ 27) and can be evaluated via the floating contact at the CONTROL connector (→ 24).



	Value
	The lower switching threshold (Setpoint low) defines the pressure at which the switching function is activated when the pressure is dropping.
e.g.: 	⇨ gauge dependent (→ table). If another gauge type is connected, the AGC-100 automatically adjusts the switching threshold if required.

	lower threshold limit 	upper threshold limit 
	2×10^{-3}	5×10^{2}
	2×10^{-3}	1.5×10^{3}
	5×10^{-9}	1×10^{3}
	1×10^{-8}	1×10^{3}
	1×10^{-8}	1×10^{3}
	FSr / 1000	FSr

all values in mbar, Cor = 1

The minimum hysteresis between the upper and lower switching threshold is at least 10% of the lower threshold or 1% of the set full scale value. If the value of the minimum hysteresis drops below these values, the upper threshold is automatically adjusted. This prevents unstable states.

	Value
	The upper switching threshold (Setpoint high) defines the pressure at which the switching function is deactivated when the pressure is rising.
e.g.: 	⇨ gauge dependent (→ table). If another gauge type is connected, the AGC-100 automatically adjusts the threshold if required.

	lower threshold limit 	upper threshold limit 
	+10% lower threshold	5×10^2
	+10% lower threshold	1.5×10^3
	+10% lower threshold	1×10^3
	+10% lower threshold	1×10^3
	+10% lower threshold	1×10^3
	+1% measurement range (FSr)	FSr

lower threshold

all values in mbar, Cor = 1

☞ The minimum hysteresis between the upper and lower switching threshold is at least 10% of the lower threshold or 1% of the set full scale value. This prevents unstable states.

Measurement range of capacitive gauges

The full scale value of the measurement range (**F**ull **S**cale **r**ange) of the linear gauges has to be defined by the user; the full scale value of logarithmic gauges is automatically recognized.

Available for:

☐	Pirani	(PVG)
☐	Pirani/Capacitive	(PCG)
☐	Cold cathode/Pirani	(FRG-70x)
☐	Hot cathode/Pirani	(FRG-720, FRG-730)
☑	Capacitive	(CDG)

	Value
	
e.g.: 	⇨ 0.01 mbar 0.01 Torr, 0.02 Torr, 0.05 Torr 0.10 mbar 0.10 Torr, 0.25 Torr, 0.50 Torr 1 mbar 1 Torr, 2 Torr 10 mbar 10 Torr 100 mbar 100 Torr 1000 mbar, 1100 mbar 1000 Torr 2 bar, 5 bar, 10 bar, 50 bar

Conversion table → Appendix, 🗎 76

Offset correction

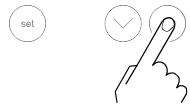
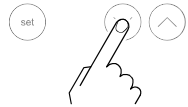
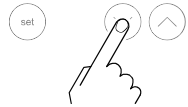
The offset value is displayed, zero adjustmend of the gauge and adjustmend to the currently measurered value (in the range -5 … +110% of the full scale setting).

First adjust the gauge and then the controller.

Available for:

☐	Pirani	(PVG)
☐	Pirani/Capacitive	(PCG)
☐	Cold cathode/Pirani	(FRG-70x)
☐	Hot cathode/Pirani	(FRG-720, FRG-730)
☑	Capacitive	(CDG)

The offset correction affects:
- ☑ the displayed measurement value
- ☐ the displayed threshold value of the switching functions
- ☐ the analog output at the CONTROL connector (→ 24)

	Value
	
	⇨ Offset correction deactivated
e.g.: 	⇨ Offset correction activated 
	⇨ Press key >2 s: The offset value is readjusted. The actual measurement value is accepted as new offset value.
	⇨ Reset the offset value.
	⇨ Press >2 s Zero adjustmend of the gauge.

When the offset correction is activated, the stored offset value is subtracted from the actual measurement value. This allows measuring relative to a reference pressure.

When the zero of the gauge is readjusted, the offset correction must be deactivated.

Pressure unit

Unit of measured values, thresholds etc.. See Appendix (→ 76) for conversion.

	Value	
		
	⇨ mbar/bar	
	⇨ Torr (only available if Torr lock is not activated i.e. Torr is not suppressed → 🗎 46)	
	⇨ Pascal	
	⇨ Micron (=mTorr)	

A change of the pressure unit influences also the settings of the FRG-720 and FRG-730 gauges.

When selecting Micron, above 99000 Micron the readout automatically changes over to Torr. When the pressure drops below 90 Torr the instrument automatically switches back to Micron.

Correction factor

The correction factor allows the measured value to be calibrated for other gases than N_2 (→ 🗎 🕮 [1] … [6]).

Available for:

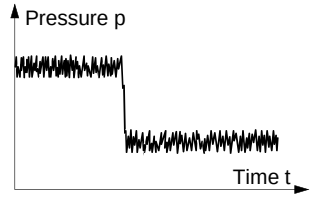
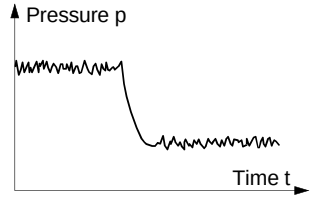
			Only for pressures
☑	Pirani	(PVG)	
☑	Pirani/Capacitive	(PCG)	<10 mbar
☑	Cold cathode/Pirani	(FRG-70x)	$<1\times10^{-2}$ mbar
☑	Hot cathode/Pirani	(FRG-720, FRG-730)	$<1\times10^{-2}$ mbar
☐	Capacitive	(CDG)	

	Value	
		
e.g.: 	⇨ No correction	
e.g.: 	⇨ Measurement value corrected by a factor of 0.10 … 10.00	

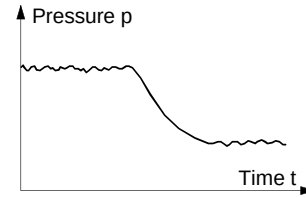
Measurement value filter

The measurement value filter permits a better evaluation of unstable or disturbed measuring signals.

The filter affects:
- ☑ the displayed measurement value
- ☐ the analog output
- ☐ the digitally transmitted measurement value of hot cathode gauges FRG-720 and FRG-730

	Value
	
	⇨ Fast: The AGC-100 responds quickly to fluctuations in measured values. As a result, it will be more sensitive to disturbed measurement signals. 
	⇨ Normal: Good relationship between response and sensitivity of the display and the switching functions to changes in the measured values. 

⇨ Slow:
The AGC-100 does not respond to small changes in measured values. As a result, it will respond more slowly to changes in the measured values.



Display resolution (digits)

Display resolution of measured values.

	Value
	
	⇨ Display • rounded to one decimal digit  • or two integrals 
	⇨ Display • rounded to two decimal digits  • or three integrals 

Transmission rate

Transmission rate of the RS232C interface.

	Value
	
e.g.: 	⇨ 9600 baud 19200 baud 38400 baud

Emission

Switching the emission on and off.

Available for:

- ☐ Pirani (PVG)
- ☐ Pirani/Capacitive (PCG)
- ☐ Cold cathode/Pirani (FRG-70x)
- ☑ Hot cathode/Pirani (FRG-730 only)
- ☐ Capacitive (CDG)

	Value
	
	⇨ the emission is switched on and off automatically by the gauge
	⇨ the emission is switched on and off by the user

Filament

Means of selection.

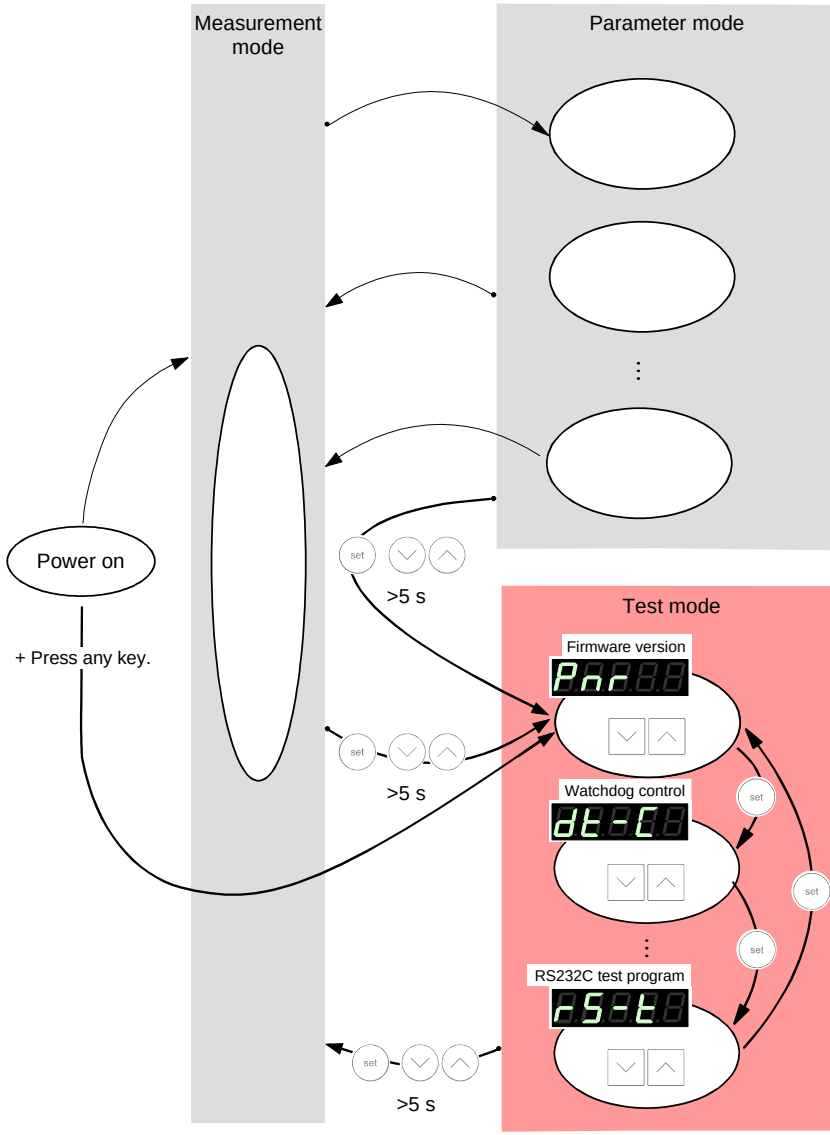
Available for:

- ☐ Pirani (PVG)
- ☐ Pirani/Capacitive (PCG)
- ☐ Cold cathode/Pirani (FRG-70x)
- ☑ Hot cathode/Pirani (FRG-730 only)
- ☐ Capacitive (CDG)

	Value
	
	⇨ the gauge automatically alternates between the filaments
	⇨ filament 1 aktive
	⇨ filament 2 aktive

4.6 Test Mode

The Test mode is used for displaying, editing and entering special parameter values for testing the AGC-100.



Selecting a parameter

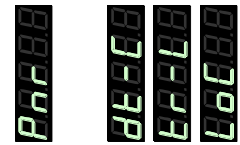
⇨ The name of the parameter

e.g.: 
Firmware version

is displayed.

→ 🗎 45

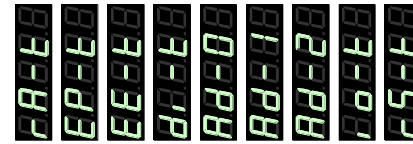
45 46



The name of the parameter is displayed as long as the key is pressed or at least for 2 s.

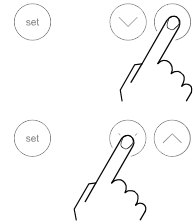
The firmware version is continuously displayed.

→ 🗎 46 47 47 48 48 49 49 50 50



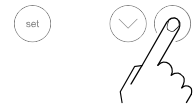
The name of the test program is displayed until it is started.

Modifying a parameter



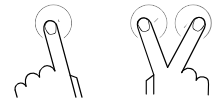
⇨ Increase/decrease the value by the defined increments.

Starting the test program



⇨ Start test program.

Changing to the Measurement mode



Press keys >5 s
(→ 🗎 29)
or
turn the unit off, wait for 10 s and then turn it on again.

4.6.1 Parameters

Firmware version

The firmware version (program version) is displayed.

	Version
	
	⇨ The two parts of the firmware number are displayed alternately.
	

The last character indicates the modification index (-, A … Z). Please mention this index when contacting Agilent in the event of a fault.

Watchdog control

Behavior of the system control (watchdog) in the event of an error.

	Setting
	
	⇨ The system automatically acknowledges error messages of the watchdog after 2 s.
	⇨ Error messages of the watchdog have to be acknowledged by the operator.

Torr lock

The pressure unit Torr can be suppressed in the corresponding parameter setting unit (→ 🗎 38).

	Setting
tr-L	
oFF	⇨ Pressure unit Torr available.
on	⇨ Pressure unit Torr not available.

Parameter setup lock

This parameter affects the parameter mode. When the lock is activated, the user can inspect but not modify parameter values.

	Setting
LoC	
oFF	⇨ Parameters can be inspected and modified
on	⇨ Parameters can be inspected only.

4.6.2 Test Programs

RAM test

Test of the main memory.

	Test sequence
rA-t	The test runs automatically one time:
run	⇨ Test in process (very briefly).
PASS	⇨ Test finished, no error found.
Err	⇨ Test finished, error(s) found. The FAIL lamp flashes.

EPROM test

Test of the program memory.

	Test sequence
	The test runs automatically one time:
	⇨ Test in process
	⇨ Test finished, no error found. After the test, a four-digit checksum (hexadecimal format) is displayed.
	⇨ Test finished, error(s) found. After the test, a four-digit checksum (hexadecimal format) is displayed. The FAIL lamp flashes.

EEPROM test

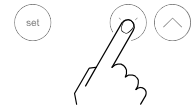
Test of the parameter memory.

	Test sequence
	The test runs automatically one time:
	⇨ Test in process (very briefly).
	⇨ Test finished, no error found.
	⇨ Test finished, error(s) found. The FAIL lamp flashes.

Display test

Test of the display.

	Test sequence
	The test runs automatically one time [1]: ⇨ First, all display elements are lit at the same time, ... ⇨ ... and then, each element is lit individually.

1)  ⇨ Stop the test sequence and activate one element after another by pressing the key once per element.

A/D converter test 0

Test of channel 0 of the analog/digital converter (with a reference voltage at the signal input of the SENSOR connector (→ 🗎 24)).

The measurement value filter affects the applied voltage. If the signal input is open, the AGC-100 displays a default value that may easily fluctuate because of the high sensitivity of the open measurement circuit.

	Test sequence
 e.g.:	⇨ Positive portion of the measurement signal in Volt

A/D converter test 1

Test of channel 1 of the analog/digital converter (with a reference voltage at the signal input of the SENSOR connector (→ 🗎 24)).

The measurement value filter affects the applied voltage. If the signal input is open, the AGC-100 displays a default value that may easily fluctuate because of the high sensitivity of the open measurement circuit.

	Test sequence
	
e.g.: 	⇨ Negative portion of the measurement signal in Volt.

A/D converter test 2

Test of channel 2 of the analog/digital converter (with a reference voltage at the signal input of the SENSOR connector (→ 🗎 24)).

The measurement value filter affects the applied voltage. If the signal input is open, the AGC-100 displays a default value that may easily fluctuate because of the high sensitivity of the open measurement circuit.

	Test sequence
	
e.g.: 	⇨ Gauge identification voltage
	⇨ No gauge connected

I/O test

Test of the two relays of the AGC-100. The program tests their switching function.

Caution

Caution: The relays switch irrespective of the pressure

Starting a test program may cause unwanted effects in connected control systems.

Disconnect all sensor cables and control system lines to ensure that no control commands or messages are triggered by mistake.

The relays switch on and off cyclically. The switching operations are indicated optically and can be heard.

The contacts are connected to the CONTROL connector on the rear of the housing (→ 24). Check the switching function with an ohmmeter.

	Test sequence
	The test runs automatically one time:
	⇨ both relays deactivated
	⇨ switching function relay
	⇨ switching function relay
	⇨ error relay
	⇨ error relay

RS232C test

Test of the RS232C interface. The AGC-100 repeats each sign transmitted by the communicating HOST.

The data transferred from/to the AGC-100 can be displayed by the computer only (→ Section 5).

	Test sequence
	The test runs automatically.

5 Communication (Serial Interface)

5.1 RS232C Interface

The serial interface is used for communication between the AGC-100 and a computer. A terminal can be connected for test purposes.

When the AGC-100 is put into operation, it starts transmitting measured values in intervals of 1 s. As soon as the first character is transferred to the AGC-100, the automatic transmission of measured values stops. After the necessary inquiries or parameter modifications have been made, the transmission of measured values can be started again with the **COM** command (→ 🗎 57).

Connection diagram, connection cable

Pin assignment of the 9-pin D-Sub connector and RS232 cable → 🗎 26.

5.1.1 Data Transmission

The data transmission is bi-directional, i.e. data and control commands can be transmitted in either direction.

Data format

1 start bit
8 data bits
No parity bit
1 stop bit
No hardware handshake

Definitions

The following abbreviations and symbols are used:

Symbol	Meaning	Dec	Hex
HOST	Computer or terminal		
[...]	Optional elements		
ASCII	American Standard Code for Information Interchange		
<ETX>	END OF TEXT (CTRL C) Reset the interface	3	03
<CR>	CARRIAGE RETURN Go to beginning of the line	13	0D
<LF>	LINE FEED Advance by one line	10	0A
<ENQ>	ENQUIRY Request for data transmission	5	05
<ACK>	ACKNOWLEDGE Positive report signal	6	06
<NAK>	NEGATIVE ACKNOWLEDGE Negative report signal	21	15

"Transmit": Data transfer from HOST to AGC-100
"Receive": Data transfer from AGC-100 to HOST

Format of pressure values

For pressure values, the following format is used:

Flow Control

After each ASCII string, the HOST must wait for a report signal (<ACK><CR><LF> or <NAK> <CR><LF>).

The input buffer of the HOST must have a capacity of at least 25 bytes.

5.1.2 Communication Protocol

Transmission format

Messages are transmitted to the AGC-100 as ASCII strings in the form of mnemonics and parameters. All mnemonics comprise three ASCII characters.

Spaces are ignored. <ETX> (CTRL C) clears the input buffer in the AGC-100.

The input is terminated by <CR> or <LF> or <CR><LF> ("end of message"), and evaluation in the AGC-100 is subsequently started.

The tables starting on 🗎 54 are applicable to the mnemonics and parameters. The maximum number of digits, the data formats and admissible value ranges are also specified there.

Transmission protocol

HOST AGC-100	Explanation
Mnemonics [and parameters] —–——>	Receives message with
<CR>[<LF>] ————–—>	"end of message"
<–-—— <ACK><CR><LF>	Positive acknowledgment of a received message

Reception format

When requested with a mnemonic instruction, the AGC-100 transmits the measurement data or parameters as ASCII strings to the HOST.

<ENQ> must be transmitted to request the transmission of an ASCII string. Additional strings, according to the last selected mnemonic, are read out by repetitive transmission of <ENQ>.

If <ENQ> is received without a valid request, the ERROR word is transmitted.

Reception protocol

HOST AGC-100	Explanation
Mnemonics [and parameters] ———> <CR>[<LF>] ———>	Receives message with "end of message"
<——- <ACK><CR><LF>	Positive acknowledgment of a received message
<ENQ> ———>	Requests to transmit
<——— Measurement values or parameters <——— <CR><LF>	Transmits data with "end of message"
:	:
<ENQ> ———>	Requests to transmit
<——— Measurement values or parameters <——— <CR><LF>	Transmits data with "end of message"

Error processing

All strings received are verified in the AGC-100. If an error is detected, a negative acknowledgment <NAK> is output. The appropriate flag is set in the ERROR word. Errors can be decoded when the ERROR word is read.

Error recognition protocol

HOST AGC-100	Explanation
Mnemonics [and parameters] ———> <CR>[<LF>] ———>	Receives message with "end of message"
***** Transmission or programming error *****	
<——— <NAK><CR><LF>	Negative acknowledgment of a received message
Mnemonics [and parameters] ———> <CR>[<LF>] ———>	Receives message with "end of message"
<——- <ACK><CR><LF>	Positive acknowledgment of a received message

5.2 Mnemonics

5.2.1 Measurement Mode

Measurement data

Transmit: **PR1** <CR>[<LF>]

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: x,sx.xxxxEsxx <CR><LF>

- Measurement value [1] [in current pressure unit]
- Status, x =
  - 0 –> Measurement data okay
  - 1 –> Underrange
  - 2 –> Overrange
  - 3 –> Sensor error
  - 4 –> Sensor off
  - 5 –> No sensor
  - 6 –> Identification error
  - 7 –> Error FRG-720, FRG-730

[1] The 3rd and 4th decimal are always 0, except for the CDG gauge.

Continuous output of measured values (RS232)

Transmit: **COM** [,x] <CR>[<LF>]

└ Mode x = 0 –> 100 ms
1 –> 1 s (default)
2 –> 1 min.

Receive: <ACK><CR><LF>

<ACK> is immediately followed by the continuous output of the measured value in the desired interval.

Receive: x,sx.xxxxEsxx y <CR><LF>

└ Measured value [1] with pressure unit

└ Status, x =
0 –> Measurement data okay
1 –> Underrange
2 –> Overrange
3 –> Sensor error
4 –> Sensor off
5 –> No sensor
6 –> Identification error
7 –> Error FRG-720, FRG-730

[1] The 3rd and 4th decimal are always 0, except for the CDG gauge.

Activating/deactivating the HV circuit and EMI

Transmit: **HVC** [,x] <CR>[<LF>]

└ Mode x = 0 –> off (default)
1 –> on

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: x <CR><LF>

└ Mode

Data output FRG-720, FRG-730, CDG

Transmit: **ITR** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: xx,xx,xx,xx,xx,xx,xx,xx <CR><LF>

└ Transmission string byte 0 … 7 in hex format (→ 🕮 FRG-720, FRG-730, CDG)

Gauge identification

Transmit: **TID** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: x <CR><LF>

└ Identification, x =
- PVG5xx (Pirani)
- PCG75x (Pirani/Capacitive)
- FRG70x (Cold cathode/Pirani)
- CDG500 (Capacitive)
- FRG720 (Hot cathode/Pirani)
- FRG730 (Hot cathode/Pirani)
- noSEn (no Sensor)
- noId (no identification)

Error status

Transmit: **ERR** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: xxxx <CR><LF>

└ x =
- 0000 –> No error
- 1000 –> Controller error (See display on front panel)
- 0100 –> NO, HWR No hardware
- 0010 –> PAR, Inadmissible parameter
- 0001 –> SYN, Syntax error

The ERROR word is cancelled when read out. If the error persists, it is immediately set again.

Reset

Transmit: **RES** [,x] <CR>[<LF>]

x = 1 –> Reset

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: [x]x,[x]x,... <CR><LF>

List of all present error messages
xx =
0 –> No error
1 –> Watchdog has responded
2 –> Task fail error
5 –> EPROM error
6 –> RAM error
7 –> EEPROM error
9 –> DISPLAY error
10 –> A/D converter error
11 –> Sensor error (e.g. filament rupture, no supply)
12 –> Sensor identification error

5.2.2 Parameter Mode

Degas

Transmit: **DGS** [,x] <CR>[<LF>]

x = 0 –> off (default)
1 –> on (3 min.)

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: x <CR><LF>

Degas status

Threshold value setting, allocation

Transmit: **SP1** [,x.xxEsx,x.xxEsx] <CR>[<LF>]

- Upper threshold [1] [in current pressure unit] (default = depending on gauge)
- Lower threshold [1] [in current pressure unit] (default = depending on gauge)

[1] Values can be entered in any format. They are internally converted into the floating point format.

Receive: <ACK><CR><LF>
Transmit: <ENQ>
Receive: x.xxxxEsxx,x.xxxxEsxx <CR><LF>

- Upper threshold [in current pressure unit]
- Lower threshold [in current pressure unit]

Switching function status

Transmit: **SPS** <CR>[<LF>]
Receive: <ACK><CR><LF>
Transmit: <ENQ>
Receive: x <CR><LF>

- Switching function x = 0 –> off, 1 –> on

Measurement range (F.S.) of capacitive gauges

The full scale value of the measurement range (Full Scale) of linear gauges has to be defined by the user; the full scale value of logarithmic gauges is automatically recognized.

Transmit: **FSR** [,x] <CR>[<LF>]

└ Measurement range, x =
- 0 –> 0.01 mbar
- 1 –> 0.01 Torr
- 2 –> 0.02 Torr
- 3 –> 0.05 Torr
- 4 –> 0.10 mbar
- 5 –> 0.10 Torr
- 6 –> 0.25 Torr
- 7 –> 0.50 Torr
- 8 –> 1 mbar
- 9 –> 1 Torr
- 10 –> 2 Torr
- 11 –> 10 mbar
- 12 –> 10 Torr
- 13 –> 100 mbar
- 14 –> 100 Torr
- 15 –> 1000 mbar
- 16 –> 1100 mbar
- 17 –> 1000 Torr
- 18 –> 2 bar
- 19 –> 5 bar
- 20 –> 10 bar
- 21 –> 50 bar

Receive: <ACK><CR><LF>
Transmit: <ENQ>
Receive: x <CR><LF>

└ Measurement range (F.S.)

Offset correction

Transmit: **OFS** [,x,x.xxxEsx] <CR>[<LF>]

- Offset [1] [in current pressure unit] (default = 0.000E0)
- Mode, x =
  - 0 –> Off (default) No offset value needs to be entered.
  - 1 –> On If no offset value has been entered, the previously defined offset value is taken over.
  - 2 –> Auto (offset measurement) No offset value needs to be entered.

[1] Values can be entered in any format. They are internally converted into the floating point format.

Receive: <ACK><CR><LF>
Transmit: <ENQ>
Receive: x,sx.xxxxEsxx <CR><LF>

- Offset [in current pressure unit]
- Mode

Measurement unit

Transmit: **UNI** [,x] <CR>[<LF>]

- x = 0 –> mbar/bar (default)
  1 –> Torr
  2 –> Pascal
  3 –> Micron

Receive: <ACK><CR><LF>
Transmit: <ENQ>
Receive: x <CR><LF>

- Measurement unit

Correction factor

Transmit: **COR** [,[x]x.xxx] <CR>[<LF>]

- [,[x]x.xxx]: 0.100 … 10.000 (default = 1.000)

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: [x]x.xxx <CR><LF>

- [x]x.xxx: Correction factor

Number of digits in the display

Transmit: **DCD** [,x] <CR>[<LF>]

- [,x]: x = 2 –> 2 digits (default); 3 –> 3 digits

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: x <CR><LF>

- x: Number of digits

Measurement value filter

Transmit: **FIL** [,x] <CR>[<LF>]

- [,x]: x = 0 –> fast; 1 –> medium (default); 2 –> slow

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: x <CR><LF>

- x: Filter time constant

Transmission rate

Transmit: **BAU** [,x] <CR>[<LF>]

x = 0 –> 9600 baud (default)
1 –> 19200 baud
2 –> 38400 baud

As soon as the new baud rate has been entered, the report signal is transmitted at the new transmission rate.

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: x <CR><LF>

x = Transmission rate

Emission

Transmit: **EUM** [,x] <CR>[<LF>]

x = 0 –> Manually
1 –> Automatically (default)

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: x <CR><LF>

Filament

Transmit: **FUM** [,x] <CR>[<LF>]

x = 0 –> Automatically (default)
1 –> Filament 1
2 –> Filament 2

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: x <CR><LF>

Save parameters to EEPROM

Transmit: **SAV** [,x] <CR>[<LF>]

x = 0 –> Save default parameters
1 –> Save user parameters

Receive: <ACK><CR><LF>

5.2.3 Test Mode

(For service specialists)

Firmware version

Transmit: **PNR** <CR>[<LF>]

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: xxx-xxx-x <CR><LF>

- -x = Modification index (-- = original version)
- Firmware number

Watchdog control

Transmit: **WDT** [,x] <CR>[<LF>]

x = 0 –> Manual error acknowledgement
1 –> Automatic error acknowledgement [1] (default)

[1] If the watchdog has responded, the error is automatically acknowledged and cancelled after 2 s.

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: x <CR><LF>

x = Watchdog control

Torr lock

Transmit: **TLC** [,x] <CR>[<LF>]

x = 0 –> off (default)
1 –> on

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: x <CR><LF>

x = Torr lock status

Parameter setup lock

Transmit: **LOC** [,x] <CR>[<LF>]

x = 0 –> off (default)
1 –> on

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: x <CR><LF>

x = Parameter setup lock status

RAM test

Transmit: **TRA** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ> Starts the test (duration <1 s)

Receive: xxxx <CR><LF>
└ ERROR word

EPROM test

Transmit: **TEP** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ> Starts the test (duration ≈10 s)

Receive: xxxx,xxxx <CR><LF>
└ Check sum (hex)
└ ERROR word

EEPROM test

Transmit: **TEE** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ> Starts the test (duration <1 s)


Do not keep repeating the test (EEPROM life).

Receive: xxxx <CR><LF>
└ ERROR word

Display test

Transmit: **TDI** [,x] <CR>[<LF>]
└ x = 0 –> Stops the test – display according to current operating mode (default)
1 –> Starts the test – all LEDs on

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: x <CR><LF>
└ Display test status

ADC test

Transmit: **TAD** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: [x]x.xxxx, x.xxxx, x.xxxx <CR><LF>

- ADC channel 2 Gauge identification [0.0000 … 5.0000 V]
- ADC channel 1 Measurement signal (negative portion) [0.0000 … 5.0000 V]
- ADC channel 0 Measurement signal (positive portion) [0.0000 … 11.0000 V]

I/O test

Transmit: **TIO** [,x] <CR>[<LF>]

- x =
  - 0 –> Stops the test (default)
  - 1 –> Setpoint relay off, error relay off
  - 2 –> Setpoint relay on, error relay off
  - 3 –> Setpoint relay off, error relay on
  - 4 –> Setpoint relay on, error relay on

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: x <CR><LF>

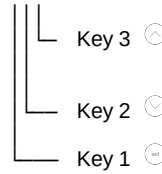
- I/O test status

Operator key test

Transmit: **TKB** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: xxx <CR><LF>



x = 0 –> Not pushed
1 –> Pushed

RS232 test

Transmit: **TRS** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ> Starts the test (repeats each character, test is interrupted with <CTRL> C).

5.2.4 Example

"Transmit (T)" and "Receive (R)" are related to the host.

T: **TID** <CR> [<LF>]	Request for gauge identification
R: <ACK> <CR> <LF>	Positive acknowledgement
T: <ENQ>	Request for data transmission
R: PVG5xx <CR> <LF>	Gauge identification
T: **SP1** <CR> [<LF>]	Request for parameters of switching function (setpoint)
R: <ACK> <CR> <LF>	Positive acknowledgement
T: <ENQ>	Request for data transmission
R: 1.0000E-09,9.0000E-07 <CR> <LF>	Thresholds
T: **SP1**,6.80E-3,9.80E-3 <CR> [<LF>]	Modification of threshold values of switching function (setpoint)
R: <ACK> <CR> <LF>	Positive acknowledgement
T: **FOL**,2 <CR> [<LF>]	Modification of filter time constant (syntax error)
R: <NAK> <CR> <LF>	Negative acknowledgement
T: <ENQ>	Request for data transmission
R: 0001 <CR> <LF>	ERROR word
T: **FIL**,2 <CR> [<LF>]	Modification of filter time constant
R: <ACK> <CR> <LF>	Positive acknowledgement
T: <ENQ>	Request for data transmission
R: 2 <CR> <LF>	Filter time constant
T: **PR1** <CR> [<LF>]	Request for measurement data
R: <ACK> <CR> <LF>	Positive acknowledgement
T: <ENQ>	Request for data transmission
R: 0,8.3400E-03 <CR> <LF>	Status and pressure
T: <ENQ>	Request for data transmission
R: 1,8.0000E-04 <CR> <LF>	Status and pressure

6 Maintenance

The product requires no maintenance.

Cleaning the AGC-100

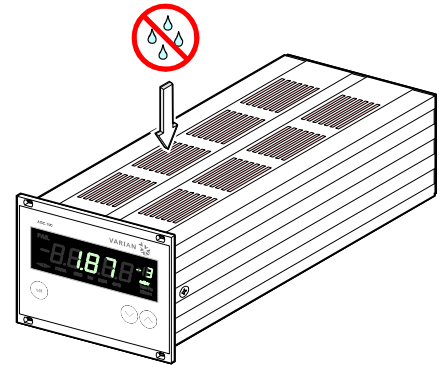
For cleaning the outside of the AGC-100, a slightly moist cloth will usually do. Do not use any aggressive or scouring cleaning agents.

DANGER

DANGER: mains voltage

Contact with live parts is extremely hazardous when liquids penetrate into the unit.

Make sure no liquids penetrate into the equipment.



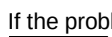
7 Troubleshooting

Error indication

and the error relay opens (→ 🗎 25).

Error messages

	Possible cause and remedy/ acknowledgement
	Parameter setup lock activated (→ 🗎 46).

	Possible cause and remedy/ acknowledgement
	Interruption or instability in sensor line or connector (Sensor error). ⇨ Acknowledge with the set key. If the problem persists,  or  is displayed

	Possible cause and remedy/ acknowledgement
	Error messages concerning FRG-720. Meaning → 🕮 [2]. 0 = no communication to the gauge 1…9 = High-Byte of Error-Byte

	Possible cause and remedy/ acknowledgement
	Error messages concerning FRG-730. Meaning → 🕮 [3]. xx = Error byte (HEX)

	Possible cause and remedy/ acknowledgement
	The AGC-100 has been turned on too fast after power off. ⇨ Acknowledge with the set key [1)].
	The watchdog has tripped because of a

	severe electric disturbance or an operating system error. ⇨ Acknowledge with the set key [1].

[1] If the watchdog is set to AUTO, the AGC-100 acknowledges the message automatically after 2 s (→ 🗎 45).

	Possible cause and remedy/ acknowledgement
rA	Main memory (RAM) error. ⇨ Acknowledge with the set key.

	Possible cause and remedy/ acknowledgement
EP	Program memory (EPROM) error. ⇨ Acknowledge with the set key.

	Possible cause and remedy/ acknowledgement
EE	Parameter memory (EEPROM) error. ⇨ Acknowledge with the set key.

	Possible cause and remedy/ acknowledgement
di	Display driver error. ⇨ Acknowledge with the set key.

	Possible cause and remedy/ acknowledgement
Ad	A/D converter error. ⇨ Acknowledge with the set key.

	Possible cause and remedy/ acknowledgement
tF	Operating system (Task Fail) error. ⇨ Acknowledge with the set key.

Technical support

If the problem persists after the message has been acknowledged for several times and/or the gauge has been exchanged, please contact your local Agilent service center.

8 Repair

Return defective products to your local Agilent service center for repair.

Agilent assumes no liability and the warranty becomes null and void if repair work is carried out by the end-user or third parties.

9 Accessories

	Ordering number
Adapter panel for installation into a 19" rack chassis adapter, height 3 U	AGC100ADPT

10 Storage

Caution

Caution: electronic component

Inappropriate storage (static electricity, humidity etc.) can damage electronic components.

Store the product in a bag or container. Observe the corresponding specifications in the technical data (→ 11).

11 Disposal

WARNING

WARNING: substances detrimental to the environment

Products or parts thereof (mechanical and electric components, operating fluids etc.) can be detrimental to the environment.

Dispose of such substances in accordance with the relevant local regulations.

Separating the components

After disassembling the product, separate its components according to the following criteria:

Non-electronic components

Such components must be separated according to their materials and recycled.

Electronic components

Such components must be separated according to their materials and recycled.

Appendix

A: Conversion Tables

Weights

	kg	lb	slug	oz
kg	1	2.205	68.522×10^{-3}	35.274
lb	0.454	1	31.081×10^{-3}	16
slug	14.594	32.174	1	514.785
oz	28.349×10^{-3}	62.5×10^{-3}	1.943×10^{-3}	1

Pressures

	N/m², Pa	bar	mbar	Torr	at
N/m², Pa	1	10×10^{-6}	10×10^{-3}	7.5×10^{-3}	9.869×10^{-6}
bar	100×10^{3}	1	10^{3}	750.062	0.987
mbar	100	10^{-3}	1	750.062×10^{-3}	0.987×10^{-3}
Torr	133.322	1.333×10^{-3}	1.333	1	1.316×10^{-3}
at	101.325×10^{3}	1.013	1.013×10^{3}	760	1

Pressure units used in the vacuum technology

	mbar	Pascal	Torr	mmWs	psi
mbar	1	100	750.062×10^{-3}	10.2	14.504×10^{-3}
Pascal	10×10^{-3}	1	7.5×10^{-3}	0.102	0.145×10^{-3}
Torr	1.333	133.322	1	13.595	19.337×10^{-3}
mmWs	9.81×10^{-2}	9.81	7.356×10^{-2}	1	1.422×10^{-3}
psi	68.948	6.895×10^{3}	51.715	703	1

Linear measures

	mm	m	inch	ft
mm	1	10^{-3}	39.37×10^{-3}	3.281×10^{-3}
m	10^{3}	1	39.37	3.281
inch	25.4	25.4×10^{-3}	1	8.333×10^{-2}
ft	304.8	0.305	12	1

Temperature

	Kelvin	Celsius	Fahrenheit
Kelvin	1	°C+273.15	(°F+459.67)×5/9
Celsius	K-273.15	1	5/9×°F-17.778
Fahrenheit	9/5×K-459.67	9/5×(°C+17.778)	1

B: Default Parameters

The following values are activated when the default parameters are loaded (→ 🗎 33):

	Default	User	
	oFF		
	5×10^{-4} mbar		
	1×10^{3} mbar		
	1000 Torr		
	oFF		
	mbar		
	1.00		
	nor		
	2 digits		
	9600		
	Auto		
	oFF		
	oFF		
	Auto		
	Auto		

C: Firmware Update

If your AGC-100 firmware needs updating, e.g. for implementing a new gauge type, please contact your local Agilent service center.

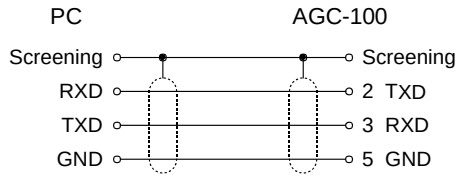
User parameters

Most of the settings you may have defined in the Parameter and Test mode will not be affected by a firmware update. To be sure, note your parameter settings before upgrading the firmware (→ 🗎 77).

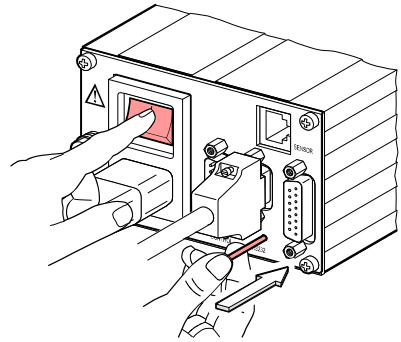
Preparing the AGC-100 for a program transfer

❶ Turn the AGC-100 off

❷ Connect the AGC-100 with the serial COM1 (COM2) interface of your PC via a 9-pin D-Sub extension cable (the firmware of the AGC-100 cannot be loaded from a Mac).



❸ With a pin (ø<2 mm) depress the switch behind the rear panel and turn the AGC-100 on.

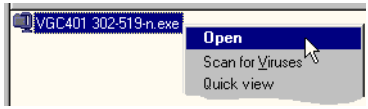


After power on, the display remains dark.

Program transfer

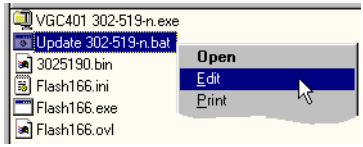
In the following instructions, the index -n is used instead of the actual index.

❶ Unpack the self extracting file *.exe or the packed file *.zip.

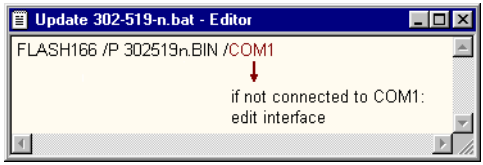


❷ If you have not connected the AGC-100 to the COM1 interface:

Open the batch file Update 302-564-n.bat, …

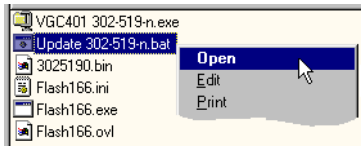


… edit the interface …

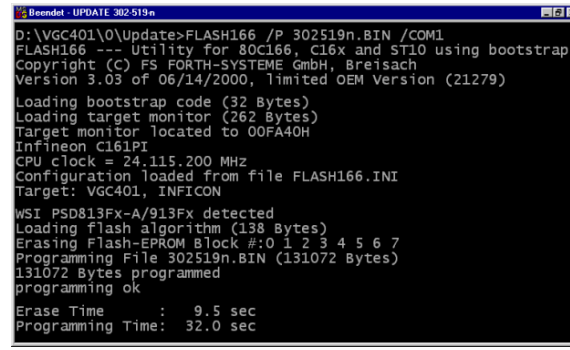


… and save the new setting.

❸ Start batch file Update 302-564-n.bat.



⇨ The new firmware is transmitted to the AGC-100.



Starting the AGC-100 with the updated firmware

If the program transfer was successful, quit the Update mode by turning the AGC-100 off.

Wait at least 10 s before turning the AGC-100 on again in order for it to correctly initialize itself.

✓ The AGC-100 is now ready for operation. To be sure, check that the current parameter settings are identical with the previously defined settings (→ 77).

D: Literature

📖 [1] www.agilent.com
Operating Manual
Inverted Magnetron Pirani Gauge
FRG-700, FRG-702
tqna74e1
Agilent Technologies, MA 02421, USA

📖 [2] www.agilent.com
Operating Manual
Bayard-Alpert Pirani Gauge
FRG-720
tqna70e1
Agilent Technologies, MA 02421, USA

📖 [3] www.agilent.com
Operating Manual
Bayard-Alpert Pirani Gauge
FRG-730
tqna72e1
Agilent Technologies, MA 02421, USA

📖 [4] www.agilent.com
Operating Manual
Pirani Standard Gauge
PVG-500, PVG-502
tqna69e1
Agilent Technologies, MA 02421, USA

📖 [5] www.agilent.com
Operating Manual
Pirani Standard Gauge
PVG-550, PVG-552
tqna79e1
Agilent Technologies, MA 02421, USA

📖 [6] www.agilent.com
Operating Manual
Pirani Capacitance Diaphragm Gauge
PCG-750, PCG-752
tqna77e1
Agilent Technologies, MA 02421, USA

📖 [7] www.agilent.com
Operating Manual
Capacitance Diaphragm Gauge
CDG-500
tqna76e1
Agilent Technologies, MA 02421, USA

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Notes

Vacuum Products Division
Instructions for returning products

Dear Customer:

Please follow these instructions whenever one of our products needs to be returned.

1) Complete the attached Request for Return form and send it to Agilent Technologies (see below), taking particular care to identify all products that have pumped or been exposed to any toxic or hazardous materials.

2) After evaluating the information, Agilent Technologies will provide you with a Return Authorization (RA) number via email or fax, as requested.
Note: Depending on the type of return, a Purchase Order may be required at the time the Request for Return is submitted. We will quote any necessary services (evaluation, repair, special cleaning, eg).

3) Important steps for the shipment of returning product:
   - Remove all accessories from the core product (e.g. inlet screens, vent valves).
   - Prior to shipment, drain any oils or other liquids, purge or flush all gasses, and wipe off any excess residue.
   - If ordering an Advance Exchange product, please use the packaging from the Advance Exchange to return the defective product.
   - Seal the product in a plastic bag, and package product carefully to avoid damage in transit. You are responsible for loss or damage in transit.
   - Agilent Technologies is not responsible for returning customer provided packaging or containers.
   - Clearly label package with RA number. Using the shipping label provided will ensure the proper address and RA number are on the package. Packages shipped to Agilent without a RA clearly written on the outside cannot be accepted and will be returned.

4) Return only products for which the RA was issued.

5) Product being returned under a RA must be received within 15 business days.

6) Ship to the location specified on the printable label, which will be sent, along with the RA number, as soon as we have received all of the required information. Customer is responsible for freight charges on returning product.

7) Return shipments must comply with all applicable Shipping Regulations (IATA, DOT, etc.) and carrier requirements.

RETURN THE COMPLETED REQUEST FOR RETURN FORM TO YOUR NEAREST LOCATION:

EUROPE:	NORTH AMERICA:	PACIFIC RIM:
Fax: 00 39 011 9979 330		
Fax Free: 00 800 345 345 00	Fax: 1 781 860 9252	please visit our website for individual
Toll Free: 00 800 234 234 00	Toll Free: 800 882 7426, Option 3	office information
vpt-customercare@agilent.com	vpl-ra@agilent.com	http://www.agilent.com

Agilent Technologies

Vacuum Products Division
Request for Return Form
(Health and Safety Certification)

Please read important policy information on Page 3 that applies to all returns.

1) CUSTOMER INFORMATION

Company Name:	**Contact Name:**
Tel: **Email:**	**Fax:**
Customer Ship To:	**Customer Bill To:**
Europe only: **VAT reg. Number:**	USA/Canada only: ☐ **Taxable** ☐ **Non-taxable**

2) PRODUCT IDENTIFICATION

Product Description	Agilent P/N	Agilent S/N	Original Purchasing Reference

3) TYPE OF RETURN (Choose one from each row and supply Purchase Order if requesting a billable service)

3A. ☐ Non-Billable ☐ Billable ➡ New PO # (hard copy must be submitted with this form):

3B. ☐ Exchange ☐ Repair ☐ Upgrade ☐ Consignment/Demo ☐ Calibration ☐ Evaluation ☐ Return for Credit

4) HEALTH and SAFETY CERTIFICATION

AGILENT TECHNOLOGIES CANNOT ACCEPT ANY PRODUCTS CONTAMINATED WITH BIOLOGICAL OR EXPLOSIVE HAZARDS, RADIOACTIVE MATERIAL, OR MERCURY AT ITS FACILITY.
Call Agilent Technologies to discuss alternatives if this requirement presents a problem.

The equipment listed above (check one):

☐ **HAS NOT** pumped or been exposed to any toxic or hazardous materials. OR

☐ HAS pumped or been exposed to the following toxic or hazardous materials. If this box is checked, the following information must also be filled out. Check boxes for all materials to which product(s) pumped or was exposed:

☐ Toxic ☐ Corrosive ☐ Reactive ☐ Flammable ☐ Explosive ☐ Biological ☐ Radioactive

List all toxic/hazardous materials. Include product name, chemical name, and chemical symbol or formula:

_____

NOTE: If a product is received at Agilent which is contaminated with a toxic or hazardous material that was not disclosed, the customer will be held responsible for all costs incurred to ensure the safe handling of the product, and is liable for any harm or injury to Agilent employees as well as to any third party occurring as a result of exposure to toxic or hazardous materials present in the product.

Print Name: **Authorized Signature:** ..... **Date:**

5) FAILURE INFORMATION:

Failure Mode (REQUIRED FIELD. See next page for suggestions of failure terms):
Detailed Description of Malfunction: (Please provide the error message)
Application (system and model):

I understand and agree to the terms of Section 6, Page 3/3.
Print Name: **Authorized Signature:** ..... **Date:**

Agilent Technologies

Vacuum Products Division
Request for Return Form
(Health and Safety Certification)

Please use these Failure Mode to describe the concern about the product on Page 2.

TURBO PUMPS and TURBO CONTROLLERS

APPARENT DEFECT/MALFUNCTION		POSITION	PARAMETERS	
• Does not start	• Noise	• Vertical	Power:	Rotational Speed:
• Does not spin freely	• Vibrations	-Horizontal	Current:	Inlet Pressure:
• Does not reach full speed	-Leak	-Upside-down	Temp 1:	Foreline Pressure:
• Mechanical Contact	-Overtemperature	-Other:	Temp 2:	Purge flow:
• Cooling defective	-Clogging	_____	OPERATING TIME:	

ION PUMPS/CONTROLLERS

• Bad feedthrough	• Poor vacuum
• Vacuum leak	• High voltage problem
• Error code on display	• Other

VALVES/COMPONENTS

• Main seal leak	• Bellows leak
• Solenoid failure	• Damaged flange
• Damaged sealing area	-Other

LEAK DETECTORS

• Cannot calibrate	-No zero/high backround
• Vacuum system unstable	• Cannot reach test mode
• Failed to start	• Other

INSTRUMENTS

• Gauge tube not working	• Display problem
• Communication failure	• Degas not working
• Error code on display	• Other

SCROLL AND ROTARY VANE PUMPS

• Pump doesn't start	• Noisy pump (describe)
• Doesn't reach vacuum	• Over temperature
• Pump seized	• Other

DIFFUSION PUMPS

• Heater failure	• Electrical problem
• Doesn't reach vacuum	• Cooling coil damage
• Vacuum leak	• Other

Section 6) *ADDITIONAL TERMS*

Please read the terms and conditions below as they apply to all returns and are in addition to the Agilent Technologies Vacuum Product Division – Products and Services Terms of Sale.

- Customer is responsible for the freight charges for the returning product. Return shipments must comply with all applicable **Shipping Regulations** (IATA, DOT, etc.) and carrier requirements.
- Customers receiving an Advance Exchange product agree to return the defective, rebuildable part to Agilent Technologies **within 15 business days.** Failure to do so, or returning a non-rebuildable part (crashed), will result in an invoice for the non-returned/non-rebuildable part.
- Returns for credit toward the purchase of new or refurbished Products are subject to prior Agilent approval and may incur a restocking fee. Please reference the original purchase order number.
- Units returned for evaluation will be evaluated, and a quote for repair will be issued. If you choose to have the unit repaired, the cost of the evaluation will be deducted from the final repair pricing. A Purchase Order for the final repair price should be issued within 3 weeks of quotation date. Units without a Purchase Order for repair will be returned to the customer, and the evaluation fee will be invoiced.
- A Special Cleaning fee will apply to all exposed products per Section 4 of this document.
- If requesting a calibration service, units must be functionally capable of being calibrated.

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