

Notices

Manual Part Number

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Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

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General Information

The serial interface allows the communication of the digital FRG-705, FRG-707 Agilent Cold Cathode Pirani Gauges with a PC or another appropriate controller.

The RS485C interface integrated in the gauge allows to digitally transmit measurement values and information on the gauge status as well as to make parameter settings.

NOTE

For safety information, specifications and operation instructions of the vacuum gauges refer to User Manual D0126122.

CAUTION

Data transmission errors.

Any attempt to simultaneously operate the gauge via the serial interface and the diagnostic port may result in incorrect data and data transmission errors.

Therefore, it is inadmissible to simultaneously operate the gauge via the RS485C and the fieldbus or diagnostic port.

Technical Data

NOTE

For further technical data refer to Operating Manual D0126122.

Status signal (digital output)

Supply voltage	≤30 V (dc)
Current rating	100 mA (sink)
High voltage is ON	0 V
High voltage is OFF	open

High voltage cut-in, low active (digital input)

Input voltage	≤30 V (dc)
High voltage ON	<2.5 V (dc)
High voltage OFF	>4.0 V (dc)

Data format

- Binary for the Agilent protocol
- 8 data bits
- 1 stop bit
- no parity bit
- no handshake

Baud rate & address

Table 1

Agilent protocol Connector – interface protocol	Baud rate			Address	
	Default	PID	Setting via	Default	Setting via
D sub HD, 15 pin – RS485C (gauges with PN FRG705KF25SI, FRG705CF35SI, FRG707KF25SI, FRG707CF35SI)	57600	190 (read only)	Switch <RATE>	00 _{hex}	Switches <MSD> <LSD>

Outline

Dimensions [mm]

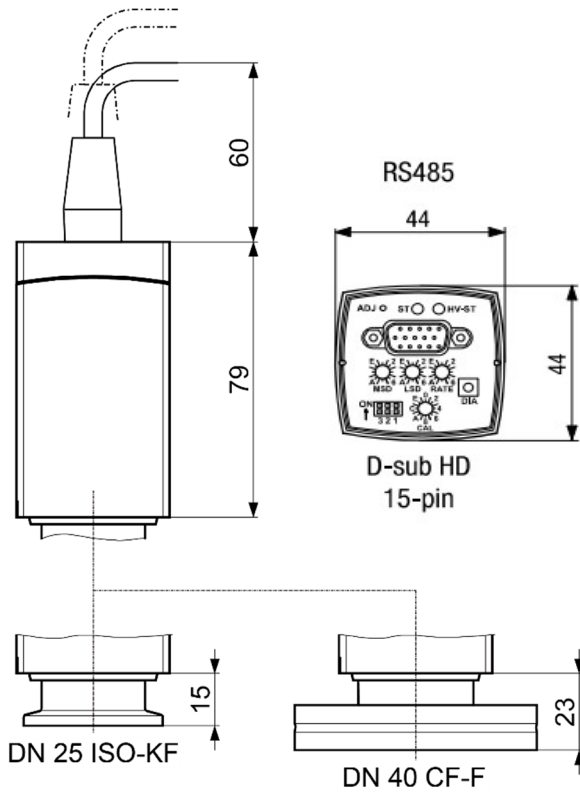
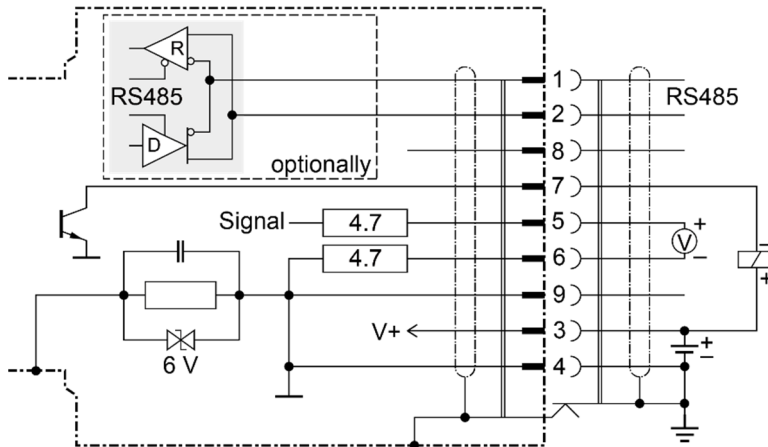


Figure 1 Outline

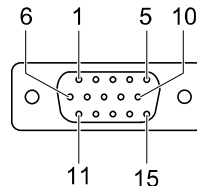
Electrical Connection

D sub HD, 15 pin (RS485C)

If no sensor cable is available, make one according to the following diagram:



- Pin 1 RS485C A-
- Pin 2 RS485C B+
- Pin 3 Supply 14.5 ... 30 V
- Pin 4 Supply Common GND
- Pin 5 Signal output
- Pin 6 Signal common
- Pin 7 Status (Gauge on = low)
- Pin 8 Not assigned
- Pin 9 reserved (internal use)
- Pin 10 ... 15 reserved



D-sub HD, 15-pin
female
soldering side

Figure 2

Protocol

Agilent Protocol

The serial interface is used in Master-Slave mode. Without a corresponding request from the Master, the device does not transmit any data. Instructions to the gauge are transmitted via binary protocol.

RS485C address <MSD>, <LSD>



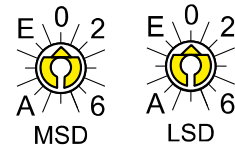
The node address is an unambiguous device address in the RS485C network.

The gauge can only communicate with the network if the node address setting is correct. Valid address range: 0 ... 255 in decimal form.

The node address setting is made on the gauge in hexadecimal form (00 ... FF_{hex}) by means of two rotary switches.

<MSD>: upper half byte setting

<LSD>: lower half byte setting



Factory setting: Node address = 00_{hex}:

When the gauge is put into operation, the firmware queries its node address.

If the node address is modified during operation it is taken over immediately.

RS485C bias + termination



The bias + termination is set with the dip switch.

Position	Function
1 on	Signal "RS-485 B+" 470 Ω pull up to +3.3 V
1 off	Signal "RS-485 B+" no bias
2 on	120 Ω termination
2 off	no termination
3 on	Signal "RS-485 A-" 470 Ω pull down to GND
3 off	Signal "RS-485 A-" no bias

Technical Information

RS485C transmission rate <RATE>



The transmission rate is set with the rotary switch <RATE>. It is only for the serial communication on the HD-sub15 connector. The rate for the DIAG connector is not selectable with this switch.

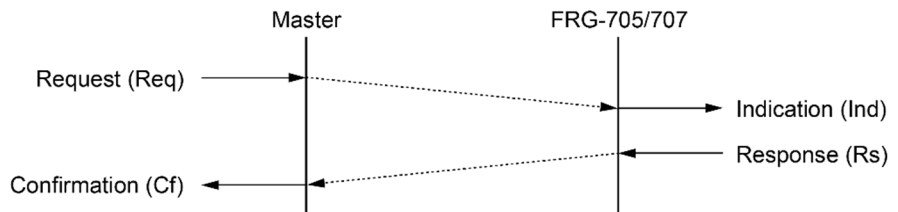
Position	Baud
1	9600
2	19200
3	38400
4	57600
0	57600 (default)
5 ... F	reserved



Factory setting: Transmission rate = 00hex.

If the transmission rate is modified during operation, a reset occurs and the new transmission rate is taken over.

Data Link Layer



The Data Link Layer uses the following terminology:

- Request (Req)** A request is an instruction (to read/or write) transmitted by the Master.
- Indication (Ind)** An indication means that the Slave (gauge) recognizes a request from the Master.
- Response (Rs)** A response is an answer from the Slave to the Master.
- Confirmation (Cf)** A confirmation is an acknowledgement of the response by the Master.

Technical Information

Protocol Frame Every protocol layer of the communication protocol is represented in a protocol frame. The maximum length per frame is 64 byte. The data field of the data link layer consists of:

- a command (Cmd)
- a parameter identifier (PID)
- a data field (Data).

The command determines whether the data transmitted are read or write requests.

Command (Cmd) There are four different command types:

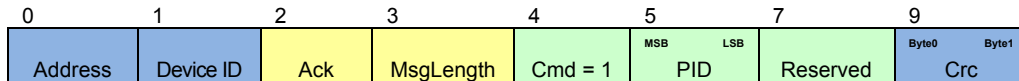
Cmd 1 Read request from the Master

Cmd 2 Read response from the gauge to a read request

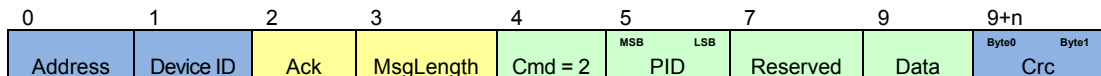
Cmd 3 Write request

Cmd 4 Write response from the gauge to a write request

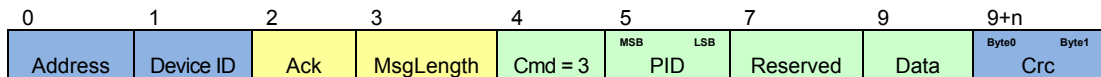
- Cmd 1: Read request from the Master



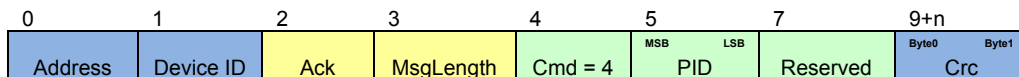
- Cmd 2: Response from the gauge to a read request



- Cmd 3: Write request from a Master



- Cmd 4: Response from the gauge to a write request



Technical Information

- Parameter Identifier (PID)** The parameter identifier (PID) addresses a defined parameter of the device.
- Data field (Data)** The data field contains the data of a request. In the case of a write request it contains the data transmitted from the Master to the gauge, in the case of a read request it contains the data to be transmitted from the gauge to the Master. Data are transmitted in Big Endian, i.e. the most significant byte is transmitted first (e.g. 0x46 0xD2 corresponds to 18130 decimal).
- Medium Access Layer** The medium access layer contains the following data fields:
- RS485C address
 - Device ID (Master 0, FRG-705 / FRG-705 4)
 - Header with Ack and Message Length (all APDU data are counted: Cmd, PID, Reserved, Data)
 - 16 bit CRC
- Communication Error** If a communication error occurs during transmission the PID is set to 0xFFFF and a data byte with the error information is added.

Byte 0, errors

Error Code	Description
1	Access error
2	Value higher max. or lower min.
3	Parameter not found
4	Length error
6	Memory access error
7	Memory access timeout

Technical Information

Protocol Description

The following parameters can be read via a serial interface.

Output pressure

PID	Name	Description	Factory setting	Min.	Max.	Type
221	Pressure	Output pressure in integer format (mbar)				LogFixs32en26
222	Pressure	Pressure in vacuum chamber in Real format. Pressure unit depends on the PID 224 setting.				Real32
224	Data Unit	Changes the pressure unit of all Real32 pressures. 0 mbar 1 Torr 2 Pascal 3 micron 4 Counts	0	0	4	Uint8

Error

PID	Name	Description	Factory setting	Min.	Max.	Type
228	Device Exception	0 No error 1 Timeout EEPROM memory access 2 EEPROM CRC error 4 EEPROM error 8 Pirani filament rupture 2048 CCIG short circuit	0			Uint32

Technical Information

General information

PID	Name	Description	Factory setting	Min.	Max.	Type
103	Reset	0 Write The sensor carries out a reset. 1 Write The sensor resets all parameters to their factory settings.		0	1	UInt8
104	Run Hours	Operating hours [0.25 h]				UInt32
207	Serial Number	Serial number			4294967295	UInt32
208	Product Name	Product name	FRG-705, FRG-707			String
209	Manufacturers Name	Name of manufacturer	Agilent			String
210	Manufacturers Model Number	Model number				String
218	Software Version	Software version				String
180	Baud Rate Diagnostic Port	9600, 19200, 38400, 57600	57600	9600	57600	UInt32
190	RS485 Baud Rate D-sub HD, 15-pin Connector (read only)					

Sensor details

PID	Name	Description	Factory setting	Min.	Max.	Type
223	Active Instance Number	Current sensor 1 CCIG sensor active 2 Pirani sensor active 3 Mixed signal range Pirani and CCIG sensor active				UInt8
33000	Pirani Full Scale	Pirani fullscale (mbar)	1000	1e-5	2047	LogFixs32en26
33001	Pirani Overrange Value	Pirani overrange status output limit (mbar)	1000	100	1500	LogFixs32en26
255	Pirani Safe State	Pressure reading in mbar that is output in the event of an error in Pirani mode 0 0 mbar 1 Pirani Full Scale value (PID 33000) is output 2 The last valid value is retained. 3 The Pirani Safe State value is output.	0	0	3	UInt8

Technical Information

PID	Name	Description	Factory setting	Min.	Max.	Type
256	Pirani Safe State Value	Pressure reading in mbar that is output in the event of an error if the Pirani Safe State is set to 3.	1e-11	1e-11	1000	LogFixs32en26
418	Pirani Adjust Flag	Executes a manual Pirani sensor adjustment. Set the value to "1" in order for the adjustment to be executed.	0	0	1	UInt8
504	CCIG Safe State	Pressure reading in mbar that is output in the event of an error in CCIG mode. 0 0 mbar 1 CCIG value is output 2 The last valid value is retained. 3 The CCIG Safe State value is output.	0	0	3	UInt8
505	CCIG Safe State Value	Pressure reading in mbar that is output in the event of an error if the CCIG Safe State is set to 3.	1e-11	1e-11	1e-1	LogFixs32en26
503	CCIG Full Scale	CCIG full scale	1E-2	1e-11	1e-1	LogFixs32en26
506	CCIG Overrange Value	If the pressure exceeds this value the measurement is invalid.	1E-2	1e-11	5e-2	LogFixs32en26
507	CCIG Underrange Value	If the pressure is below this value the measurement is invalid.	5E-9	1e-11	1e-1	LogFixs32en26
533	CCIG Ignition Status	Status of the CCIG: [0 = CCIG off, 1 = CCIG on, but not ignited yet, 3 = CCIG on and ignited]	0	0	3	UInt8

Data Format

LogFixs32enXX

To calculate the pressure value from a (signed) LogFixs32enXX value, first convert the hexadecimal value, which is read by the interface, into a decimal number. Then divide this decimal number by the factor of 2^{xx} . The result is the pressure value in mbar.

Vice versa, calculating decimal to LogFixs32enXX, logarithmize the pressure value [mbar] with base 10 and then multiply the result by the factor of 2^{xx} . Then convert this result into a hexadecimal value.

Examples for LogFixs32en26 calculations:

- Binary \rightarrow mbar (the pressure value, which is read by the interface, is e.g. 0xEE 0xCB 0xBE 0xCB):
Convert the hexadecimal pressure value 0xEE 0xCB 0xBE 0xCB into a (signed) decimal number (corresponds to 288637237 decimal). Then divide this decimal number by the factor of 226 ($288637237 / 2^{26} = 4.30103$) and then potentiate the result with the base 10 ($10^{-4.30103} = 5e 5$). The result is the pressure value in mbar (5e 5 mbar).
- mbar \rightarrow binary (e.g. set the hysteresis of the High Trip Point setpoint to e.g. 15 mbar):
Logarithmize the hysteresis 15 mbar with base 10 ($\log_{10}(15) = 1.176$) and then multiply the result by the factor of 2^{26} ($1.176 \times 2^{26} = 78926148$). Then convert this value into a hexadecimal value (78926148 decimal corresponds to 0x04 0xB4 0x51 0x44 hexadecimal).

Real32

Use, for example, the following link for the conversion of a value in Real32 format into a binary 32 IEEE 754 format:

- <https://www.h-schmidt.net/FloatConverter>
(e.g. 0x44 0x6B 0xBA 0x4D corresponds to 942.9 mbar)

Technical Information

Examples

The following examples show how read and write requests are made.

Read request
(reading a pressure)

The required parameter has PID 221.

From Master to FRG-705, FRG-707:

0	1	2	3	4	5	7	9	9+n
Address	Device ID	Ack	MsgLength	Cmd	MSB PID LSB	Reserved	Data	Byte0 Byte1 CRC
0x00	0x00	0x00	0x05	0x01	0x00DD	0x0000	-	0xAB21

From FRG-705, FRG-707 to Master:

0	1	2	3	4	5	7	9	9+n
Address	Device ID	Ack	MsgLength	Cmd	MSB PID LSB	Reserved	Data	Byte0 Byte1 CRC
0x00	0x04	0x01	0x09	0x02	0x00DD	0x0000	0x375A05BF	0xD9BB

Write request
(setting a unit)

The required parameter has PID 224. To set the unit to Torr, 1 must be written.

From Master to FRG-705, FRG-707:

0	1	2	3	4	5	7	9	9+n
Address	Device ID	Ack	MsgLength	Cmd	MSB PID LSB	Reserved	Data	Byte0 Byte1 CRC
0x00	0x00	0x00	0x06	0x03	0x00E0	0x0000	0x01	0x346D

From FRG-705, FRG-707 to Master:

0	1	2	3	4	5	7	9	9+n
Address	Device ID	Ack	MsgLength	Cmd	MSB PID LSB	Reserved	Data	Byte0 Byte1 CRC
0x00	0x04	0x01	0x05	0x04	0x00E0	0x0000	-	0x94EA

Calculating CRC

The data packages are secured with CRC16-MCRF4XX in the byte order
Crc[7...0], Crc[15...8].

CRC polynomial 0x1021

CRC initial value 0xFFFF

For settings and troubleshooting the CRC value can be calculated with the following online calculators, for example:

- http://www.sunshine2k.de/coding/javascript/crc/crc_js.html
- <http://crccalc.com>.

Technical Information

CRC Example Code

For the code integration of a CRC calculation, an example code of implementation in C# is given below.

```
using System;

class Program
{
    static void Main()
    {
        // the following test array is a valid protocol frame with crc16 at the end
        byte[] arr = new byte[] { 0x00, 0x00, 0x00, 0x05, 0x01, 0x00, 0xDD, 0x00, 0x00, 0xAB, 0x21};
        UInt16 crc;
        Boolean b;
        // Calculate the crc of the test array arr, of course without crc (therefore length minus 2)
        crc = Crc16.Create(arr, (Byte)(arr.Length - 2));
        // Check, if the test array has a correct crc at the end (it is correct, therefore the
        // returnvalue is true)
        b = Crc16.Check(arr, (Byte)arr.Length);
    }
}

public class Crc16
{
    // initial value for crc16
    public static UInt16 initial = 0xFFFF;

    // function to create a crc16
    public static UInt16 Create(Byte[] buffer, Byte length)
    {
        UInt16 crc16 = new UInt16();
        UInt16 i = 0;

        // Initial Value for CRC calculation
        crc16 = Crc16.initial;

        while (i < length)
        {
            crc16 = (UInt16)((Crc16.crc16Tab[(crc16 ^ buffer[i++]) & (Byte)0xFF]) ^ (crc16 >> 8));
        }
        return crc16;
    }
}
```

Technical Information

```
// function to check a buffer with a crc16 at the end
public static Boolean Check(Byte[] buffer, Byte length)
{
    UInt16 crc16 = Crc16.inital;
    UInt16 i = 0;
    // calculate crc for the buffer without crc
    while (i < length)
    {
        crc16 = (UInt16)((Crc16.crc16Tab[(crc16 ^ buffer[i++]) & (Byte)0xFF]) ^ (crc16 >> 8));
    }
    if (crc16 == 0)
    {
        return true;
    }
    return false;
}
// crc array
public static UInt16[] crc16Tab =
{
    0x0000, 0x1189, 0x2312, 0x329B, 0x4624, 0x57AD, 0x6536, 0x74BF,
    0x8C48, 0x9DC1, 0xAF5A, 0xBED3, 0xCA6C, 0xDBE5, 0xE97E, 0xF8F7,
    0x1081, 0x0108, 0x3393, 0x221A, 0x56A5, 0x472C, 0x75B7, 0x643E,
    0x9CC9, 0x8D40, 0xBFDB, 0xAE52, 0xDAED, 0xCB64, 0xF9FF, 0xE876,
    0x2102, 0x308B, 0x0210, 0x1399, 0x6726, 0x76AF, 0x4434, 0x55BD,
    0xAD4A, 0xBCC3, 0x8E58, 0x9FD1, 0xEB6E, 0xFAE7, 0xC87C, 0xD9F5,
    0x3183, 0x200A, 0x1291, 0x0318, 0x77A7, 0x662E, 0x54B5, 0x453C,
    0xBDCB, 0xAC42, 0x9ED9, 0x8F50, 0xFBEB, 0xEA66, 0xD8FD, 0xC974,
    0x4204, 0x538D, 0x6116, 0x709F, 0x0420, 0x15A9, 0x2732, 0x36BB,
    0xCE4C, 0xDFC5, 0xED5E, 0xFCD7, 0x8868, 0x99E1, 0xAB7A, 0xBAF3,
    0x5285, 0x430C, 0x7197, 0x601E, 0x14A1, 0x0528, 0x37B3, 0x263A,
    0xDECD, 0xCF44, 0xFDDF, 0xEC56, 0x98E9, 0x8960, 0xBBFB, 0xAA72,
    0x6306, 0x728F, 0x4014, 0x519D, 0x2522, 0x34AB, 0x0630, 0x17B9,
    0xEF4E, 0xFEC7, 0x0C5C, 0xDD5, 0xA96A, 0xB8E3, 0x8A78, 0x9BF1,
    0x7387, 0x620E, 0x5095, 0x411C, 0x35A3, 0x242A, 0x16B1, 0x0738,
    0xFFCF, 0xEE46, 0xDCDD, 0xCD54, 0xB9EB, 0xA862, 0x9AF9, 0x8B70,
    0x8408, 0x9581, 0xA71A, 0xB693, 0xC22C, 0xD3A5, 0xE13E, 0xF0B7,
    0x0840, 0x19C9, 0x2B52, 0x3ADB, 0x4E64, 0x5FED, 0x6D76, 0x7CF7,
    0x9489, 0x8500, 0xB79B, 0xA612, 0xD2AD, 0xC324, 0xF1BF, 0xE036,
    0x18C1, 0x0948, 0x3BD3, 0x2A5A, 0x5EE5, 0x4F6C, 0x7DF7, 0x6C7E,
    0xA50A, 0xB483, 0x8618, 0x9791, 0xE32E, 0xF2A7, 0xC03C, 0xD1B5,
    0x2942, 0x38CB, 0x0A50, 0x1BD9, 0x6F66, 0x7EEF, 0x4C74, 0x5DFD,
    0xB58B, 0xA402, 0x9699, 0x8710, 0xF3AF, 0xE226, 0xD0BD, 0xC134,
    0x39C3, 0x284A, 0x1AD1, 0x0B58, 0x7FE7, 0x6E6E, 0x5CF5, 0x4D7C,
    0xC60C, 0xD785, 0xE51E, 0xF497, 0x8028, 0x91A1, 0xA33A, 0xB2B3,
    0x4A44, 0x5BCD, 0x6956, 0x78DF, 0x0C60, 0x1DE9, 0x2F72, 0x3EFB,
    0xD68D, 0xC704, 0xF59F, 0xE416, 0x90A9, 0x8120, 0xB3BB, 0xA232,
    0x5AC5, 0x4B4C, 0x79D7, 0x685E, 0x1CE1, 0x0D68, 0x3FF3, 0x2E7A,
    0xE70E, 0xF687, 0xC41C, 0xD595, 0xA12A, 0xB0A3, 0x8238, 0x93B1,
    0x6B46, 0x7ACF, 0x4854, 0x59DD, 0x2D62, 0x3CEB, 0x0E70, 0x1FF9,
    0xF78F, 0xE606, 0xD49D, 0xC514, 0xB1AB, 0xA022, 0x92B9, 0x8330,
    0x7BC7, 0x6A4E, 0x58D5, 0x495C, 0x3DE3, 0x2C6A, 0x1EF1, 0x0F78
}
```

Technical Information

```
0x18C1, 0x0948, 0x3BD3, 0x2A5A, 0x5EE5, 0x4F6C, 0x7DF7, 0x6C7E,  
0xA50A, 0xB483, 0x8618, 0x9791, 0xE32E, 0xF2A7, 0xC03C, 0xD1B5,  
0x2942, 0x38CB, 0x0A50, 0x1BD9, 0x6F66, 0x7EEF, 0x4C74, 0x5DFD,  
0xB58B, 0xA402, 0x9699, 0x8710, 0xF3AF, 0xE226, 0xD0BD, 0xC134,  
0x39C3, 0x284A, 0x1AD1, 0x0B58, 0x7FE7, 0x6E6E, 0x5CF5, 0x4D7C,  
0xC60C, 0xD785, 0xE51E, 0xF497, 0x8028, 0x91A1, 0xA33A, 0xB2B3,  
0x4A44, 0x5BCD, 0x6956, 0x78DF, 0x0C60, 0x1DE9, 0x2F72, 0x3EFB,  
0xD68D, 0xC704, 0xF59F, 0xE416, 0x90A9, 0x8120, 0xB3BB, 0xA232,  
0x5AC5, 0x4B4C, 0x79D7, 0x685E, 0x1CE1, 0x0D68, 0x3FF3, 0x2E7A,  
0xE70E, 0xF687, 0xC41C, 0xD595, 0xA12A, 0xB0A3, 0x8238, 0x93B1,  
0x6B46, 0x7ACF, 0x4854, 0x59DD, 0x2D62, 0x3CEB, 0x0E70, 0x1FF9,  
0xF78F, 0xE606, 0xD49D, 0xC514, 0xB1AB, 0xA022, 0x92B9, 0x8330,  
0x7BC7, 0x6A4E, 0x58D5, 0x495C, 0x3DE3, 0x2C6A, 0x1EF1, 0x0F78  
};  
}
```

Vacuum Products Division Instructions for returning products

Dear Customer,

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

Complete the attached **Request for Return form** and send it to Agilent Technologies (see below), taking particular care to include the completed **Health and Safety** declaration Section. No work can be started on your unit until we receive a completed copy of this form.

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).

Product preparation

- Remove all accessories from the core product (e.g. inlet screens, vent valves).
- Prior to shipment and if applicable for your product, 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.
- Include a copy of the Health and Safety Declaration in the shipping documentation on the outside of the shipping box of your returning product.
- 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.
- Return only products for which the RA was issued.

Shipping

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

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

EUROPE:

Fax: 00 39 011 9979 330
Toll Free: 00 800 234 234 00

vpt-customer@agilent.com

NORTH AMERICA:

Fax: 1 781 860 9252
Toll Free: 800 882 7426, Option 3

vpl-ra@agilent.com

PACIFIC RIM:

Please visit our website for
individual office information

<http://www.agilent.com>



TERMS AND CONDITIONS

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.

- Unless otherwise pre-negotiated, 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.
- Agilent Technologies is not responsible for returning customer provided packaging or containers.
- 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.
- Products returned that have not been drained from oil will be disposed.
- A Special Cleaning fee will apply to all exposed products
- If requesting a calibration service, units must be functionally capable of being calibrated.



Vacuum Products Division
Request for Return Form

Customer information
Company:
Address:
Contact Name:
Tel:
Fax:
Email:

Equipment
Product description
Agilent PartNo
Agilent Serial No
Original Purchasing Reference
Failure description
Type of process (for which the equipment was used)

Type of return
Non Billable
Billable
Exchange
Repair
Upgrade
Demo
Calibration
Evaluation
Return for Credit
New PO # (hard copy must be submitted with this form):

Health and safety
Substances (please refer to MSDS forms)
The product has been exposed to the following substances:
Toxic
Harmful
Corrosive
Reactive
Flammable
Explosive (*)
Radioactive (*)
Biological (*)
Oxidizing
Sensitizer
Other dangerous substances
Trade name
Chemical name
Chemical Symbol
CAS Number

Goods preparation
If you have replied YES to one of the above questions. Has the product been purged?
If yes, which cleaning agent/method:
Has the product been drained from oil?
I confirm to place this declaration on the outside of the shipping box.

I declare that the above information is true and complete to the best of my knowledge and belief.
I understand and agree to the terms and conditions on page 2 of this document.

Name:
Position:
Date:
Authorized Signature:

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.

Agilent Vacuum Products Division/Sales and Service Offices

United States

Agilent Technologies

121 Hartwell Avenue
Lexington, MA 02421 - USA
Ph. +1 781 861 7200
Fax: +1 781 860 5437
Toll-Free: +1 800 882 7426
vpl-customer@agilent.com

Netherlands

Agilent Technologies Netherlands B.V.

Customer Contact Center
Laan van Langerhuize 1, toren A-8
1186 DS Amstelveen
Tel. +31 020 547 2600
Fax +31 020 654 5748
customer@agilent.com

Belgium

Agilent Technologies Belgium S.A./N.V.

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Fax +32 2 626 46 30
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Torre Jacarandá - Tamboré
Barueri, Sao Paulo CEP: 06460-040
Toll free: 0800 728 1405

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vpt-customerservice@agilent.com

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please visit our website for individual office
information
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Worldwide Web Site, Catalog and Order On- line:

www.agilent.com/chem/vacuum
Representatives in most countries

In This Book

The manual describes the following:

- Technical information

This information is subject to change without notice.

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