





Instruction Manual D026-01-880 Iss B Jan 09

### Introduction

### Scope and definitions

This manual provides installation, operation and maintenance instructions for the Edwards APG100 Active Pirani Gauge. You must use the APG100 as specified in this

Read this manual before you install and operate the APG100. Important safety information is highlighted as WARNING and CAUTION instructions; you must obey these instructions. The use of WARNINGS and CAUTIONS is defined below





The following symbols appear on the APG100:

Warning - refer to accompanying documents.

Edwards offer European customers a recycling service.

#### Description

The APG100 is a Pirani gauge which measures vacuum pressures in the range  $10^{-4}\ mbar$  to 1000 mbar. It operates using the principle of thermal conductivity in which the rate of heat loss from a heated filament is dependent on the pressure of gas surrounding the filament.

The APG100 is available in two versions: the 'M' version can measure pressure down to  $10^{-3}$  mbar and is suitable for general applications; the 'LC' version can measure pressure down to  $10^{-4}$  mbar and is also suitable for use in corrosive applications.

A general view of the gauge is shown in Figure 1. The gauge features a detachable tube which allows a replacement to be fitted in the event of contamination or failure of the filament. There are two push-button switches on the top of the gauge. The switch labelled "CAL" is used for atmosphere and vacuum calibration and the switch labelled "S/P" is used to adjust the set-point threshold.

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- 1. Electrical connecto 2. Set-point button
- 3. Cal button
- 4. Status I FD
- 5. Electronics housing
- 6. Vacuum flange
- Figure 1 General view of the APG100

# **Technical Data**

Enclosure rating

### Mechanical data

Dimensions **Refer to Figure 2** Mass: NW16 versions 85 g NW25 versions 100 g Internal volume of tube 5 cm

Performance, operating and storage conditions

IP40

Measurement range APG100-XM APG100-XLC Accuracy

APG100-XM APG100-XLC Ambient temperature Operating

Storage **Bakeout** temperature

Humidity

Maximum altitude Maximum internal pressure Filament temperature



typically ± 15 % at < 10 mbar 5 to 60 °C -30 to +70 °C 150 °C (with electronics housing removed) 80 % RH up to 31 °C decreasing

linearly to 50 % RH at 40 °C and above 3000 m (indoor use only) 10 bar absolute (9 bar gauge)

100 °C above ambient 4

#### Electrical data 15 to 30 V d.c. nominal Electrical supply voltage 13.5 V minimum 32 V maximum Maximum power consumption 1 W Max inrush current 150 mA Electrical connector FCC68 / RJ45 8-way Pressure output signal 1.9 to 9.1 V Range output < 1.8 V or output > 9.2 V Error range Min load impedance 10 kΩ Max output current 1 mA Set-point Adjustment range 1.8 to 9.2 V Hysteresis 500 mV Max external load rating 30 V d.c., 100 mA Gauge identification resistance

APG100-XM 36 kΩ APG100-XLC **43 k**Ω

# Materials exposed to vacuum

Filament APG100-XM Tungsten / Rhenium APG100-XLC Platinum / Iridium Stainless Steel 316L & 304L Tube Filter Stainless Steel 316L Other Glass, Ni, NiFe, PTFE (APG100-XLC only)

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Figure 2 - Dimensions (mm) 6

# Installation

# Unpack and inspect

Remove all packing materials and protective covers. Check the APG100. If the APG100 is damaged, notify your supplier and carrier in writing within three days: state the Item Number of the gauge together with your order number and your suppliers invoice number. Retain all packing materials for inspection. Do not use the APG100 if it is damaged.

If the APG100 is not to be used immediately, replace the protective covers. Store the APG100 in suitable conditions as . described in Technical Data section.

Fit the APG100 to a vacuum system



be fail-safe.

The APG100 can be mounted in any orientation however the gauge tubes are individually factory calibrated in nitrogen whilst vertical. For correct pressure indication in your chosen gauge orientation, the gauge should be recalibrated at atmo pressure. Edwards recommends mounting the gauge tube vertical in order to minimise the build up of process particulates

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For optimum accuracy it is recommended that both the atmosphere and vacuum adjustment is carried out before use. Refer to the Maintenance section.

To connect the APG100 to your vacuum system:

and condensable vapours within the gauge.

- Use an 'O' ring / centring-ring or Co-Seal to connect an APG100 with an NW16 or NW25 flange to a similar flange on the vacuum system.

In accordance with good practice, we recommend that your vacuum system has a secure Earth (ground) connection, and that the tube of the APG100 is electrically connected to the vacuum

### **Connect to an Edwards Controller**

The APG100 is compatible with the TIC and ADC digital controllers and the AGD analogue display from Edwards. The controllers will automatically recognise the gauge and display the measured pressure.

To connect to a Edwards controller use a cable which is minated in suitable connectors. These cables are available from Edwards. 8

Connect to your own electrical equipment



A schematic diagram of the recommended electrical connections to the APG100 is shown in Figure 4. The pins on the electrical connector are used as shown in Table 1. Refer to the Technical Data section for more detailed specifications





Table 1 - Pins on the APG100 electrical connector



1. APG100 electrical connector socket Cable electrical connector plug

- 3. Electrical supply
- Voltmeter
- 5. d.c. relay (optional)
- Back EMF suppression diode (optional) 7. Remote calibration switch (optional)

Figure 4 - Recommended electrical connections

Do not connect the electrical supply ground (pin 2) to the signal ground (pin 5). If you do, the APG100 output signal will be

When using the APG100 in an electrically noisy environm should ensure that your measuring equipment is adequately immune to interference. All Edwards controllers have adequate immunity. 10

The set-point output on pin 6 is an active low open-collector transistor suitable for driving a d.c. relay or control logic. If you connect a relay you must use a suppression diode, to protect the gauge from transient voltages ge nerated when the relay is itched off, as shown in Figure 4.

Make a connection to pin 7 if you require remote calibration. Momentarily (>50ms) connect pin 7 to pin 2 (ground) to automatically adjust the atmosphere or vacuum reading. Refer to the Maintenance section for the correct procedure.

# Operation



WARNING Do not use the APG100 to measure the pressure of explosive or flammable gasses or mixtures. The gauge contains a heated filament which normally operates around 100°C above ambient temperature. The temperature of the filam ent can be substantially higher under fault conditions.

# Pressure measurement

When the APG100 is connected to a power supply the status LED will turn amber for approximately 2 seconds. The status LED will then turn green if the gauge is operating correctly or red if an error is detected. Refer to the fault finding guide.

If the gauge is connected to -indicate the measured pressure. 11 If the gauge is connected to a Edwards controller the display will If the gauge is connected to a voltmeter convert the voltage (V)

	() 0	•
P = 1	0 <sup>(V - 6)</sup>	Pi
P = 1	0(V - 6.125)	Pi
P = 1	0 <sup>(V-4)</sup>	Pi

### For example if the measured voltage V = 4V, then the measured pressure $P = 1 \times 10^{-2}$ mbar. Refer to Figures 5 and 6.



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# Figure 6 - Voltage to pressure conversion for APG100-XLC

### Gas dependency

The APG100 is calibrated for use in nitrogen, and will read correctly with dry air, oxygen and carbon monoxide. For any other gas type a conversion is required in order to obtain the correct pressure reading. Figures 7 and 8 show the conversion for 6 common gases: nitrogen, argon, carbon dioxide, helium, krypton and neon.

If you are using a Edwards TIC controller, the gas calibration data is built into the control

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Use a stepped 'O' ring carrier or Co-Seal to connect an

APG100 with an NW16 flange to an NW10 flange.

to pressure (P) using the following equations

in mbar n Torr P in Pa

Figure 5 - Voltage to pressure conversion for APG100-XM

PLEASE CONTACT ANY OF THESE COMPANIES FOR DETAILS OF OTHER SALES AND SERVICE CENTRES IN YOUR AREA.

EUROPE UNITED KINGDOM EDWARDS Manor Royal Crawley West Sussex RH10 9LW Tel +44 (0)1293 528844 Fax +44 (0)1293 533453

CANADA EDWARDS 5975 Falbourne Street Mississauga, Ontario L5R3W6 85551 Kirchheim Canada Tel +1 800 387 4076 Fax +1 905 501 1225

ITALY EDWARDS Via Carpaccio 35 20090 Trezzano sul Naviglio Tel +39 02 48 4471 Fax +39 02 48 401638

AMERICAS USA HEADOUARTERS EDWARDS One Edwards Park 301 Ballardvale Street Wilmington, MA 01887 Tel +1 978 658 5410 Fax +1 978 658 7969 Toll free (USA only)1 800 848 9800

GERMANY EDWARDS Ammerthalstraße 36 Munich Tel +49 89 991 9180 Fax +49 89 991 91899

EDWARDS Wilhelm Klein GmbH enerstrasse 1 D-73730 Esslingen tfach 10 03 28 Tel +49 (0)711/93 18 30-0 Fax +49 (0)711/93 18 30-3

FRANCE EDWARDS 125 Avenue Louis Roche 92238 Gennevilliers, Cedex Tel +33 1 47 98 24 01 Fax +33 1 47 98 44 54

INDIA EDWARDS LTD INDIA HEADQUARTERS 203 Surya Kiran Building 19 Kasturba Gandhi Marg New Delhi - 110 001 Tel +91 11 5151 0065 Fax +91 11 5151 0245

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BELGIUM EDWARDS reg 709 Bergensesteenweg 707 B1600 Sint-Pieters-Leeuw Brussel Tel +32 2 363 0030 Fax +32 2 363 00640

ISRAEL EDWARDS ISRAEL VACUUM

5 Habarzel Boulevard Gat 2000 Industrial Zone Qiryat Gat 82000 Tel +972 8 681 0633 Fax +972 8 681 0640

IAPAN HEADQUARTERS EDWARDS 5E Sanshikaikan Buildin I-9-4 Yurakucho Chiyoda-Ku Tokyo, 100-0006 Tel +81 (0)3 6212 6771 Fax +81 (0)3 6212 6780

Figure 8 - Gas dependency of APG100-XLC

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TAIWAN, R.O.C. EDWARDS TAIWAN LIMITED EDWARDS (ASIA) No. 434 Chung hua Road Toufen Town, Miaoli County 351 Taiwan Tel +886 37 611477 Fax +886 37 611401

KOREA HEADOUARTERS SONGWON EDWARDS LTD. 5th FL. Daewoo Engineering Bldg 9-3 Sunae-d Bundang-gu, Sungnam City Kyungki-do Tel +82 31 716 7070 Fax + 82 31 738 1001

SINGAPORE 42 Loyang Drive Loyang Industrial Estate Singapore 508962 Tel +65 6546 840 Fax +65 6546 8407



For pressures below 1mbar a simple calibration factor can be used to correct for different gas types. Gas Calibration Factors (GCFs) for common gases are shown in Table 2.

### True pressure = GCF x indicated pressure

	Gas	GCF	
	He	1.1	
	Ne	1.5	
	N <sub>2</sub>	1.0	
	Ar	1.7	
	CO <sub>2</sub>	1.0	
	Kr	2.6	
!			

### Set-point adjustment

CAUTION When the 'S/P' button is pushed the gauge output will change. Do not push the 'S/P' button to adjust the setpoint if the change in output could cause a malfunction of your system.

Note: If you use a Edwards Controller the APG100 setpoint is not used.

To read the pressure at which the set-point output turns on, push the "S/P" button with an appropriate tool (see Figure 9). The signal output of the gauge will change to indicate the set-point threshold for three seconds after which the output will return to normal.

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The set-point has a fixed hysteresis of 500mV. When the measured pressure falls below the set-point pressure the transistor output changes to ON (closed). The transistor output will turn OFF when the measured pressure rises to 500mV above the set-point pressure. An external relay connected as shown in Figure 4 will turn on when the pressure falls below the set-point and turn of when the pressure rises to 500 mV above the set-point

To adjust the set-point threshold push the "S/P" button and hold it down for more than three seconds. The threshold value will increase steadily. Release the button when you reach the required value. To make finer adjustment release the button just before the required value is reached and immediately push the button as many times as required. Each time you push the button the threshold value will increase by 10mV. If during adjustment the threshold reaches the maximum value (9.2V) it will jump to the minimum (1.8V) and increase again.

If you do not need to use the set-point or if you require the set-point to be permanently off, you can adjust the threshold to 1.8V. This will ensure that the set-point does not operate. The APG100 is shipped from the factory with the threshold

The set-point can also be used to indicate that the gauge is operating correctly. If you adjust the threshold to 9.2V then the set-point output will be ON as long as the gauge is operating correctly and will turn OFF if an error is detected.

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### Figure 9 - Adjusting set-point

Error monitoring

If an error occurs during operation of the APG100 then the status LED will turn red to indicate an error and the output voltage will change to indicate the error condition. Error voltages are shown in Table 3 below. The set-point will be disabled as soon as an error is detected. Refer to the fault finding guide.

If you use a Edwards Controller then an error message will be shown on the display.

Error condition	Output (V)	TIC Display	ADC Display	AGC Display
Broken filament or tube removed	9.5	Filament Fail	Err 25	Err E
Calibration	9.6	Cal Error	Err 26	Err F

able 3 - Error indicatio Bakeout

In some UHV applications it is desirable to bake the vacuum system components in order to achieve a lower base pressure. The tube of the APG100 can be baked to 150°C, but the

- electronics housing must be removed • Referring to Figure 12, remove the electronics housing.
- · Bake the tube on your vacuum system. Do not exceed 150°C.
- Allow the tube to cool before refitting the electronics housing. 18

# Maintenance

### Atmosphere and vacuum adjustment

Every APG100 is individually adjusted before shipment, however thermal conductivity gauges can drift with time or as contamination builds up on the filament. Use the procedures outlined below to adjust the atmosphere and vacuum settings of the gauge. The frequency with which they should be repeated will vary depending on the level and nature of the conta associated with the process.



Figure 10 - Adjustment of APG100

# Atmosphere adjustment

- 1. Switch on the power supply to the APG100 and allow it to operate at atmospheric pressure for at least 10 minutes. Ensure that the green status LED is lit.
- 2. Press the 'CAL' button. The status LED will flash and the gauge will automatically adjust to read atmospheric pressure. Do not hold the 'CAL' button down for longer than 5 seconds (see 'Adjustment for new tube' below).

### Vacuum adjustment

- 1. Reduce the system pressure to  $1 \times 10^{-4}$  mbar (or below) for the APG100-XM, or to 1x10<sup>-5</sup> mbar (or below) for the
- 2. Allow the gauge to operate for at least 10 minutes.
- 3. Press the 'CAL' button. The status LED will flash and the gauge will automatically adjust to read vacuum.

# Remote adjustment

The atmosphere and vacuum adjustments can be performed remotely using a switch connected as shown in Figure 4. Follow the procedure described above, but momentarily close the the procedure described above, but instead of using the 'CAL' button on the gauge. Edwards controllers use this feature so that the atmospl vacuum readings can be automatically adjusted from the front panel of the controller

### Adjustment for new tube

If a replacement tube is fitted to the gauge it will be necessary to adjust the gauge to match the new tube. Note that this is not required unless a new tube is fitted, and it is always necessary to perform a vacuum adjustment afterwards.

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1. Switch on the power supply to the APG100.

- 2. With the gauge at atmospheric pressure, press the 'CAL' button and hold it down for longer than 5 seconds. The status LED will begin to flash red / green alternately and the gauge will automatically adjust to match the new tube. This may take several seconds.
- 3. Allow the gauge to operate at atmospheric pressure for at least 10 minutes and then repeat step 2.
- 4. It is now necessary to perform the vacuum adjustment as described above.

### Replace the filter

#### CAUTION Do not clean the interior of the gauge tube as you can damage the fila

The filter that is fitted inside the vacuum flange of the gauge provides protection from process contamination. With use the filter can become dirty or blocked, and it will be necessary to replace the filter.

- Refer to Figure 11 and follow this procedure to replace the filter.
- 1. Unplug the electrical cable, vent the vacuum system to atmospheric pressure and remove the gauge from the vacuum system
- 2. Use circlip pliers to remove the retaining circlip. Take care not to damage the sealing surface of the vacuum flange or the inside of the gauge tube.
- 3. Remove and discard the old filter.
- 4. Refit the filter into the gauge tube and refit the circlip.



3. Circlip

Figure 11 - Replacement of filter

Replace the gauge tube

If the gauge tube has become severely contaminated so that atmosphere or vacuum adjustment cannot be achieved, or if the filament is broken, then you can fit a replacement tube to the gauge.

Refer to Figure 12 and follow this procedure to replace the gauge

1. Unplug the electrical cable, vent the vacuum system to tmospheric pressure and remove the gauge from the vacuum system.

- 2. Pull the retaining clip from side of gauge.
- 3. Pull the tube from the electronics housing.
- 4. Fit the replacement tube into electronics housing, noting the correct alignment.

5. Refit the retaining clip. 22

Whenever a new tube is fitted it is necessary to adjust the gauge to match the new tube. Refer to 'Adjustment for ne



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Electronic hous Retaining clip

Gauge tube Figure 12 - Replacement of gauge tube

### Fault finding guide

1.0

mptom	Possible cause	Remedy
D not lit	Incorrect electrical supply voltage. Supply polarity reversed.	Check electrical supply and connections
essure ading correct	Vacuum leak	Leak check vacuum system
	Tube has drifted and requires adjustment	Perform the atmosphere and vacuum adjustments
	Tube contaminated	Replace the tube
uge licates libration ror	Adjustment has been attempted at an inappropriate pressure	Repeat the adjustment but make sure that the pressure is at atmosphere or good vacuum
	Wrong type of tube is fitted	Check that correct type of tube is fitted (M or LC)
	New tube has been fitted	Perform 'Adjustment for new tube'
	Tube has drifted outside permissible limits and can no longer be adjusted	Replace the tube
uge licates oken ument	Tube is missing	Fit the tube and remove then re-insert the electrical connector
	Wrong type of tube is fitted	Check that correct type of tube is fitted (M or LC)

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### **Calibration service**

A calibration service is available for all Edwards gauges. Calibration is by comparison with reference gauges, traceab National Standards. Contact Edwards for details.

### Storage and Disposal

Dispose of the APG100 and any components safely in accordance with all local and national safety and environmental requirements.

Alternatively, you may be able to recycle the APG100 and cables: contact Edwards or your supplier for advice (also see below).

The APG100 and associated cables are within the scope of the European Directive on Waste Electrical and Electronic Equipment, 2002/96/EC. Edwards offers European customers a recycling service for the APG100 and cables at the end of the product's life. Contact Edwards for advice on how to return the APG100 and cables for recycling.

Particular care must be taken if the APG100 has been contaminated with dangerous process substances.

# **Spares and Accessories**

Introduction

Edwards products, spares and accessories are available from Edwards companies in Belgium, Brazil, Canada, France, Germany, Hong Kong, Italy, Japan, Korea, Switzerland, United Kingdom, U.S.A. and a world wide network of distributors. The majority of these centres employ Service Engineers who have undergone comprehensive Edwards training courses.

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Order spare parts and accessories from your nearest Edwards company or distributor. When you order, please state for each part required:

- Model and Item Number of your equipment
- Serial number (if any) Item Numb nd description of part

Item	Num	ber	an

Spares	
Spare	Item Number
Replacement electronics housing	
APG100-XM	D026-01-800
APG100-XLC	D026-03-800
Replacement tube	
APG100-XM NW16	D026-01-801
APG100-XM NW25	D026-02-801
APG100-XLC NW16	D026-03-801
APG100-XLC NW25	D026-04-801
Replacement Filter Kit	D026-01-805
Accessories	
The cables for use with the APG100 a	re as follows. These

cables are supplied with 8-way male electrical connectors on both ends.

Cable length		Item Number
0.5 m	18 inches	D400-01-005
1 m	3 feet	D400-01-010
3 m	10 feet	D400-01-030
5 m	15 feet	D400-01-050
10 m	30 feet	D400-01-100
15 m	50 feet	D400-01-150
25 m	80 feet	D400-01-250
50 m	150 feet	D400-01-500
100 m	325 feet	D400-01-999

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supplier or Edwards.

# Return of Edwards Equipment - Procedure

INTRODUCTION Before returning your equipment, you must warn Edwards if substances you used (and produced) in the equipment can be hazardous. This information is fundamental to the safety of our Service Centre employees and will determine the procedures employed to service your equipment. Complete the Declaration (HS2) and send it to Edwards before you

Complete the Declaration (HSZ) and send it to Edwards before you dispatch the equipment. It is important to note that this declaration is for Edwards internal use only, and has no relationship to local, national or international transportation safety or environmental requirements. As the person offering the equipment for shipment, it is your responsibility to ensure compliance with applicable laws. GUIDELINES

- Equipment is 'uncontaminated' if it has not been used, or if it has only been used with substances that are not hazardous. Your equipment is 'contaminated' if it has been used with any substances classified as hazardous under EU Directive 61/548/ EEC (as amended) or OSHA Occupational Safety (29 CFR 1910).
- If your equipment has been used with radioactive substances, biological or infectious agents, mercury, polychlorinated biphenyls (PCB's), dioxins or sodium azide, you must decontaminate it before you return it to Edwards. You must send independent proof of decontamination (for example a certificate of analysis) to Edwards with the Declaration (HS2). Phone Edwards for advice.
- If your equipment is contaminated, you must either: •Remove all traces of contamination (to the satisfaction of laws governing the transportation of dangerous/hazardous substances).

•Or, properly classify the hazard, mark, manifest and ship the equipment in accordance with applicable laws governing the shipment of hazardous materials.

Note: Some contaminated equipment may not be suitable for

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the following standard	(s) or other
Nectrical equipment for e - Part 1: General req Nectrical equipment for e - Part 1: General req Nectrical equipment for e - Part 1: General req measurement, control i	i measurement, uleements. i measurement, uleements. i measurement, uleements. and laboratory use
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EN61326-2-3:2006 (Industrial location, Class 8 Emissions) EN50581:2012

2004/108/EC 2012/19/EU 2011/65/EU\*

CSA C22.2 No. 61010.1

UL 61050-1 (2<sup>rd</sup> Edition)

### PROCEDURE

- Contact Edwards and obtain a Return Authorisation Number for your equipment.
   Complete the Return of Edwards Equipment Declaration (HS2). 2 0
- (HS2). 3. If the equipment is contaminated, you must contact your transporter to ensure that you properly classify the hazard, mark, manifest and ship the equipment, in accordance with applicable laws governing the shipment of contaminated/hazardous materials. As the person contaminated/hazardous materials. As the person offering the equipment for shipment, it is your responsibility to ensure compliance with applicable law. Note: Equipment contaminated with some hazardous materials, such as semiconductor by-products, may not be suitable for airfreight - contact your transporter for
- advice.
  4. Remove all traces of hazardous gases: pass an inert gas through the equipment and any accessories that will be returned to Edwards. Where possible, drain all fluids and
- Lubricants from the equipment and its accessories.
  Seal up all of the equipment's inlets and outlets (including those where accessories were attached) with blanking flanges or, for uncontaminated product, with heavy gauge
- tape. 6. Seal equipment in a thick polythene/polyethylene bag or
- sheet. 7. If the equipment is large, strap the equipment and its accessories to a wooden pallet. If the equipment is too small to be strapped to a pallet, pack it in a suitable strong
- 8. Fax or post a copy of the Declaration (HS2) to Edwards.
- Fax or post a copy of the Declaration (HS2) to Edwards. The Declaration must arrive before the equipment.
   Give a copy of the Declaration (HS2) to the transporter. You must tell your transporter if the equipment is contaminated.
   Seal the original Declaration in a suitable envelope: attach definition of the suitable envelope.
- the envelope securely to the outside of the equipment package, in a clear weatherproof bag. WRITE YOUR RETURN AUTHORISATION NUMBER

CLEARLY ON THE OUTSIDE OF THE ENVELOPE OR ON THE OUTSIDE OF THE EOUIPMENT PACKAGE.

EDWARDS	Form
Return of Edwards	Return Authorisation No:
Equipment - Declaration	
You must:	
<ul> <li>Know about all of the subs produced in the equipm Declaration</li> </ul>	tances which have been used and ent before you complete this
<ul> <li>Read the Return of Edwar before you complete this De</li> </ul>	ds Equipment - Procedure (HS1)
<ul> <li>Contact Edwards to obtain a to obtain advice if you have a</li> </ul>	Return Authorisation Number and
<ul> <li>Send this form to Édwards b</li> </ul>	efore you return your equipment
SECTION 1	I: EQUIPMENT
Equipment/System Name	
Part Number	Serial Number
Has equipment been used, tested	l or operated? YES□Go to Section 2 NO□Go to Section 4
IF APPLICABLE:	_
Tool Reference No.	Process
Failure Date	
Serial No. of Replacement Equi	pment
SECTION 2: SUBSTANCES IN Are any substances used or pro	CONTACT WITH EQUIPMENT duced in the equipment:
<ul> <li>Radioactive, biological or chlorinated biphenyls (PCBs see Note 1)</li> </ul>	infectious agents, mercury, poly ), dioxins or sodium azide? (if YES
,	YES 🛛 NO 🗆
Hazardous to human health	and safety? YES NO
Note 1: Edwards will not accep contaminated with radioactiv agents, mercury, PCB's, dioxins	ot delivery of any equipment that is e substances, biological/infectious s or sodium azide, unless you:
<ul> <li>Decontaminate the equipm</li> </ul>	ent
<ul> <li>Provide proof of decontami</li> </ul>	nation

YOU MUST CONTACT EDWARDS FOR ADVICE BEFORE YOU RETURN SUCH EQUIPMENT

SECTION 3: LIST OF SUBST	TANCES IN CONTACT WITH
Substance name	Chemical Symbol
Precautions required	Actions required after a spi
(e.g. use protective gloves, et	c.) leak or exposure
SECTION 4: RETU	IRN INFORMATION
Reason for return and symptor	ns of malfunction
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If you have a warranty claim:	
<ul> <li>who did you buy the equipm</li> </ul>	ent from?
<ul> <li>give the supplier's invoice number</li> </ul>	Imber
SECTION 5: 0	DECLARATION
Print your name:	
Print your job title:	
Print your organisation:	
Print your address:	
Telephone number:	
Date of equipment delivery:	
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I have made reasonable enqui	iry and I have supplied accurate
information in this Declarati	on. I have not withheld an
information, and I have fol	lowed the Return of Edward
Equipment - Procedure (HS1).	
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Signed:	Date:

For printable copies of the HS2 form below please contact your

# Form HS1

Note: Please print out this form, sign it and return the signed form as hard copy.