

Instruction Manual

Adjustable Vacuum Interlock Switch VS16K

Description	Item Number
Adjustable Vacuum Interlock Switch VS16K	D059-15-000





Declaration of Conformity

We, Edwards
Manor Royal,
Crawley,
West Sussex RH10 9LW, UK

declare under our sole responsibility that the product(s)

Adjustable Vacuum Switch
VS16K

D059-15-000

to which this declaration relates is in conformity with the following standard(s) or other normative document(s)

EN61010-1:2001

Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use - Part 1: General Requirements.

following the provisions of

2006/95/EC
2004/108/EC

Low Voltage Directive.
Electromagnetic Compatibility Directive.

L. G. Marini

Mr L Marini, Technical Manager

19-FEB-2009 EASTBURDE

Date and Place

This product has been manufactured under a quality system registered to ISO9001

Contents

Section	Page
1	INTRODUCTION 1
1.1	Scope and definitions 1
1.2	Description 1
2	TECHNICAL DATA 2
2.1	Operating conditions 2
2.2	Performance 2
2.3	Mechanical data 2
2.4	Electrical data 2
2.5	Product item number 3
3	INSTALLATION 4
3.1	Unpacking and inspection 4
3.2	General 4
3.3	Connection to the Vacuum System 4
3.4	Connection to the Electrical Circuit 4
4	OPERATION 6
4.1	Adjustment 6
5	MAINTENANCE 7
6	STORAGE AND DISPOSAL 8
6.1	Storage 8
6.2	Disposal 8
	Index 9

For return of equipment, complete the HS Forms at the end of this manual.

Illustrations

Figure	Page
1 Vacuum switch plug connections	5
2 Dimensions of VS16K vacuum switch	7

Tables

Table	Page
1 Maximum switch ratings	2

1 INTRODUCTION

1.1 Scope and definitions

This manual provides installation, operation and maintenance instructions for the Edwards VS16K Adjustable Vacuum Switch. Read this manual before attempting to install and operate the VS16K.

This manual contains essential safety information which supplements the safety features of the VS16K. Safety procedures are highlighted as WARNING and CAUTION instructions. You must obey these instructions. The use of WARNINGS and CAUTIONS is defined below.



WARNING

Warnings are given where failure to observe the instruction could result in injury or death to people.

CAUTION

Cautions are given where failure to observe the instruction could result in damage to the equipment, associated equipment and process.

1.2 Description

The Edwards VS16K adjustable vacuum switch contains a pressure sensitive diaphragm which operates a non latching snap action microswitch. The switch can be used to operate an electrical circuit when the system pressure rises or falls through an operator-determined pressure set point between 30 and 1000 mbar.

The diaphragm is enclosed within the vacuum switch housing which is surrounded by atmospheric pressure and is coupled to the vacuum system by a NW16 Flange. The absolute switch point pressure will therefore vary by the same amount as the atmospheric pressure. This must be allowed for when setting the switch point close to the low pressure end of the range.

The vacuum switch is factory set to operate at about 30 mbar on falling pressure.



WARNING

This switch should not be used for safety critical applications. For many interlock applications the Edwards IS16K may be more suitable.

2 TECHNICAL DATA

2.1 Operating conditions

Temperature range - operating	-5°C to 40°C
Temperature range - storage	-20°C to 70°C
Relative humidity (non condensing)	10 to 90%
Maximum operating altitude	3000 m
Installation category (IEC1010)	2 (IEC664/664A)
Pollution category (IEC1010)	2
Enclosure rating	IP40

2.2 Performance

Leak rate	<1 x 10 ⁻⁹ mbar litre/sec ⁻¹
Maximum overpressure	1 bar gauge (2 bar absolute)
Switch point range	30 to 1000 mbar
Switch point differential	less than 30 mbar

2.3 Mechanical data

Weight (unpacked)	0.5 kg
Weight (packed)	0.6 kg
Vacuum connection	NW16 Flange
Volume added to vacuum system	7 cm ³
Materials exposed to vacuum system	Stainless steel and Armco 17/7PH

2.4 Electrical data

Electrical connection	mPm 283 plug
Accessory supplied	mPm 183 mating electrical socket

Maximum switch ratings for different loads and voltages:

Table 1 - Maximum switch ratings

Volts a.c. 50/60Hz	Resistive Load Amps	Motor Load (HP)
125	10	0.125
250	10	0.25
d.c. volts		
125	0.5	-
250	0.25	-

2.5 Product item number

Description	Item Number
Adjustable vacuum switch	D059-15-000

3 INSTALLATION

3.1 Unpacking and inspection

Remove all packing materials and protective covers and check the VS16K for damage. If the VS16K is damaged, notify your supplier and the carrier in writing within three days; state the Item Number of the VS16K together with your order number and your supplier's invoice number. Retain all packing materials for inspection. Do not use the VS16K.

3.2 General

The vacuum switch should be mounted as close as possible to the point at which the pressure is to be measured. Use a short branch tube with an internal diameter no less than that of the switch vacuum connection. Long, narrow and angled connections can cause significant errors.

This equipment is not protected from dripping water from above, unless mounted with the vacuum flange pointing downwards.

3.3 Connection to the Vacuum System



WARNING

Do not allow the internal pressure to be higher than 1 bar gauge (2 bar absolute). If the pressure in your system can be higher than 1 bar gauge, you must fit a suitable pressure relief valve. Overpressure of the switch could cause injury to persons.

The vacuum switch may be mounted in any orientation but mounting with the vacuum switch vertical will prevent the possibility of debris falling into the vacuum port and affecting the performance of the switch.

3.4 Connection to the Electrical Circuit



WARNING

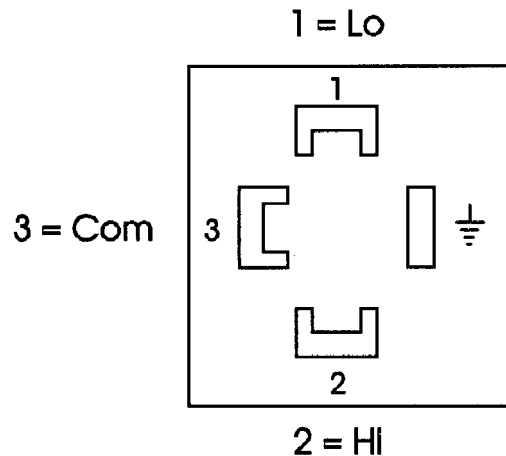
Ensure that the electrical installation of the Vacuum Switch conforms with your local and national safety requirements. It must be connected to a suitably fused and protected electrical supply and a suitable earth point.

CAUTION

Ensure that the circuit connected to the vacuum switch is suitably fused to prevent the switch contact rating being exceeded. The fuse rating must not exceed 10 amps.

Connect the vacuum switch to the equipment using the four pole mPm connector supplied. The contacts on this connector are internally wired as follows:-

Figure 1 - Vacuum switch plug connections



Earth Connection.

Com

Common.

Lo

Contact made when system pressure is lower than set point.

Hi

Contact made when system pressure is higher than set point.

CAUTION

To ensure that the socket cable gland strain relief is effective a cable with a minimum diameter of 6 mm must be used.

Select a three or four core cable of a rating suitable for the power supply to be switched. One core should be coloured green/yellow for the earth connection.

Thread the cable through the cable gland on the mPm socket cover and connect to the appropriate terminals as shown on the diagram.

Tighten the cable gland and connect the socket to the switch using the sealing gasket and locking screw provided.

4 OPERATION

4.1 Adjustment

The pressure at which the switch operates is controlled by the adjusting screw located under the removable plug located on the top of the vacuum switch cover.

Turning the screw clockwise reduces the switch point pressure.

The following procedure can be used to set, change or measure the switch point at any time:-

1. Externally disconnect the electrical supply from the vacuum switch.
2. Set and maintain the system pressure, measured by a vacuum gauge, to the desired switch point pressure.
3. Unscrew and remove the mPm socket. Remove the plug covering the adjusting screw.
4. Connect an electrical continuity meter between the pin marked 'com' and The pin marked 'Hi' or 'Lo' as appropriate to the application.
5. Turn the adjusting screw until the switch just operates.
6. Change the system pressure and check the operation of the vacuum switch.

Note: The switching differential (between rising and falling pressure) is about 30 mbar.

7. Repeat steps 5 and 6 as necessary.
8. Replace the plastic plug and reconnect the mPm socket.
9. Reconnect the electrical supply.

5 MAINTENANCE

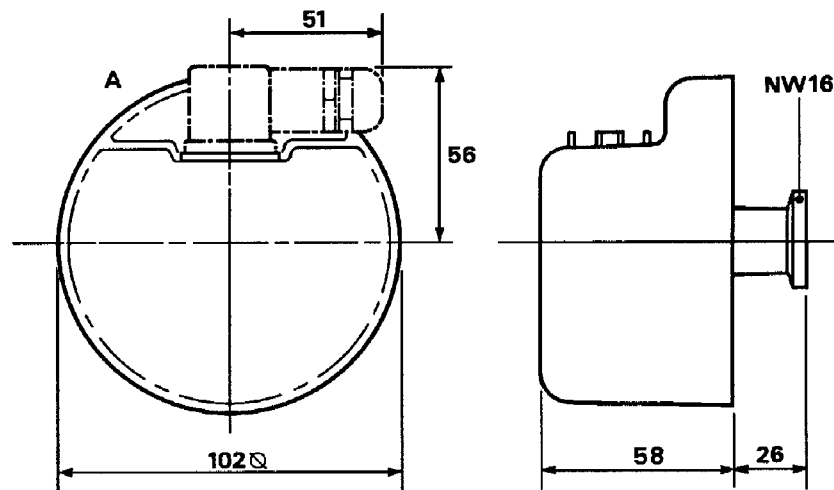


WARNING

Ensure that maintenance is done by a suitably trained and supervised technician. Obey your local and national safety requirements.

1. To ensure correct operation this vacuum switch should be tested once per year or every 10 000 cycles whichever is sooner. This may be done by carrying out steps 1, 2, 3, 4 and 6 in Section 4.1.
2. The outer surfaces of the switch may be cleaned by wiping with a dry cloth. Avoid the use of solvents that may attack the moulded cover.
3. This product contains no user serviceable parts.

Figure 2 - Dimensions of VS16K vacuum switch



6 STORAGE AND DISPOSAL

6.1 Storage

Store in a cool dry place. Do not exceed the limits specified in [Section 2](#).

6.2 Disposal

Dispose of the switch in accordance with any local or national safety requirements.

Particular care must be taken if the switch has been used in a hazardous environment.

Index

A

Adjustment6

C

Connection to the Electrical Circuit4

Connection to the Vacuum System4

D

Description1

E

Electrical data2

G

General4

I

INSTALLATION4

Introduction1

M

MAINTENANCE7

Mechanical data2

O

Operating conditions2

OPERATION6

P

Performance2

Product item number3

S

Scope and definitions1

STORAGE AND DISPOSAL8

T

TECHNICAL DATA2

U

Unpacking and inspection4

This page intentionally blank.

This page intentionally blank.

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 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 67/548/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 airfreight.

PROCEDURE

1. Contact Edwards and obtain a Return Authorisation Number for your equipment.
2. Complete the Return of Edwards Equipment - Declaration (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 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.
5. 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 box.
8. E-mail via scan, fax or post a copy of the original with signature of the Declaration (HS2) to Edwards. The Declaration must arrive before the equipment.
9. Give a copy of the Declaration (HS2) to the transporter. You must tell your transporter if the equipment is contaminated.
10. Seal the original Declaration in a suitable envelope: attach 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 EQUIPMENT PACKAGE.

Return of Edwards Equipment - Declaration

Return Authorisation Number: _____

You must:

- Know about all of the substances which have been used and produced in the equipment before you complete this Declaration
- Read the Return of Edwards Equipment - Procedure (HS1) before you complete this Declaration
- Contact Edwards to obtain a Return Authorisation Number and to obtain advice if you have any questions
- Send this form to Edwards before you return your equipment as per the procedure in HS1

SECTION 1: EQUIPMENT

Manufacturer's Product Name _____

Manufacturer's Part Number _____

Manufacturer's Serial Number _____

Has the equipment been used, tested or operated?

YES Go to Section 2 NO Go to Section 4

IF APPLICABLE:

Tool Reference Number _____

Process _____

Failure Date _____

Serial Number of Replacement Equipment _____

SECTION 2: SUBSTANCES IN CONTACT WITH THE EQUIPMENT

Are any substances used or produced in the equipment:

- Radioactive, biological or infectious agents, mercury, poly chlorinated biphenyls (PCBs), dioxins or sodium azide? (if YES, see Note 1) YES NO
- Hazardous to human health and safety? YES NO

Note 1: Edwards will not accept delivery of any equipment that is contaminated with radioactive substances, biological/infectious agents, mercury, PCB's, dioxins or sodium azide, unless you:

- Decontaminate the equipment
- Provide proof of decontamination

YOU MUST CONTACT EDWARDS FOR ADVICE BEFORE YOU RETURN SUCH EQUIPMENT

SECTION 3: LIST OF SUBSTANCES IN CONTACT WITH THE EQUIPMENT

Substance name	Chemical Symbol	Precautions required (for example, use protective gloves, etc.)	Action required after a spill, leak or exposure

SECTION 4: RETURN INFORMATION

Reason for return and symptoms of malfunction: _____

If you have a warranty claim: • who did you buy the equipment from? _____

• give the supplier's invoice number _____

SECTION 5: DECLARATION

Print your name: _____ Print your job title: _____

Print your organisation: _____

Print your address: _____

Telephone number: _____ Date of equipment delivery: _____

I have made reasonable enquiry and I have supplied accurate information in this Declaration. I have not withheld any information, and I have followed the Return of Edwards Equipment - Procedure (HS1).

Signed: _____ Date: _____

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

This page intentionally blank.

UNITED KINGDOM

Manor Royal
 Crawley
 West Sussex, RH10 9LW
 Tel:
 Office +44 1293 528844
 Sales & Service 08459 21 22 23
 Fax:
 Office +44 1293 533453
 Sales & Service +44 1293 534149

AMERICAS

301 Ballardvale Street
 Wilmington, MA 01887
 Tel +1 978 658 5410
 Fax +1 978 658 7969
 Toll Free (USA only):
 Tel +1 800 848 9800

CANADA

5860 Chedworth Way
 Mississauga, Ontario
 Canada, L5R 0A2
 Tel +1 800 387 4076
 Fax +1 905 501 1225

BRAZIL

Rua Bernardo Wrona, 222
 02710-060, Sao Paulo, SP
 Brasil
 Tel +55 11 3952 5000
 Fax +55 11 3965 2766

ITALY

Via Carpaccio 35
 20090 Trezzano sul Naviglio
 Milan
 Office +39 02 48 4471
 Sales +39 02 48 447242
 Service +39 02 48 447217
 Fax +39 02 48 401638

BELGIUM

Bergensesteenweg 709
 B 1600 Sint-Pieters-Leeuw
 Tel + 32 2 3630030
 Fax + 32 2 3630064

GERMANY

Ammerthalstraße 36
 85551 Kirchheim
 Munich
 Tel:
 Sales 0 800 000 14 56
 Service 0 800 000 14 57
 Fax:
 Office +49 89 99191899
 Sales & Service +49 89 99191888

FRANCE

125 Avenue Louis Roche
 92238 Gennevilliers, Cedex
 Paris
 Tel:
 Office +33 147 98 24 01
 Sales +33 141 21 12 56
 Service +33 141 21 12 45
 Fax:
 Office +33 147 98 44 54
 Sales & Service +33 141 21 12 38

INDIA

203 Surya Kiran Building
 19 Kasturba Gandhi Marg
 New Delhi - 110 001
 India
 Tel +91 11 4151 0065
 Fax +91 11 4151 0245

ISRAEL

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

CHINA

23 Fu Te Road(N)
 Wai Gao Qiao Free Trade Zone
 Pudong, Shanghai
 200131, China
 Tel +86 21 5866 9618
 Fax +86 21 5866 9993

JAPAN

1078-1, Yoshihashi
 Yachiyo-shi, Chiba
 Japan, 276-8523
 Tel +81 47 458 8831
 Fax +81 47 458 8835

SINGAPORE

42 Loyang Drive
 Loyang Industrial Estate
 Singapore 508962
 Tel +65 6546 8408
 Fax +65 6546 8407

TAIWAN

No. 434 Chung-Hwa Road
 Toufen Town, Miaoli County
 351 Taiwan
 Tel +886 37 611422
 Fax +886 37 611401

KOREA

Daewoo Engineering Building
 5th Floor
 9-3 Sunae-dong
 Bundang-gu, Sungnam City
 Kyungki-do, Korea
 Tel +82 31 716 7070
 Fax +82 31 738 1001

AUSTRALIA

1688 Ipswich Road
 Rocklea Qld, 4106
 Australia
 Tel: +61 4 0199 1193
 Fax: +61 2 9886 9249

PLEASE CONTACT ANY OF THE ABOVE FOR DETAILS OF OTHER SALES AND SERVICE CENTERS IN YOUR AREAS.

Edwards and the Edwards logo are trade marks of Edwards Limited
 © Edwards Limited 2007

WWW.EDWARDSVACUUM.COM
INFO@EDWARDSVACUUM.COM

