

# Instruction Manual



## *QDP Accessories: Q Series 3 Exhaust Pressure Module*

<i>Description</i>	<i>Item Number</i>
<i>Q Series 3 Exhaust Pressure Module</i>	<i>A528-50-000</i>

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## Associated publications

Publication title	Publication Number
Q Controller	A380-00-880
QDP Gas Module	A528-05-880
QDP Drystar Pumps	A528-40-880

# 1 INTRODUCTION

## 1.1 Scope and definitions

This manual provides installation, operation and maintenance instructions for the BOC Edwards Q Series 3 Exhaust Pressure Module accessory for the QDP Drystar Pumps.

Read this manual before you install and operate your Q Series 3 Exhaust Pressure Module. Important safety information is 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 ATEX directive implications



This equipment is fitted with the ATEX compliance label shown above. This only applies when the Exhaust Pressure Module is fitted to the QDP pump. **The ATEX directive does not apply to the Exhaust Pressure Module on its own.**

For full details regarding the ATEX directive, see the QDP Drystar Vacuum Pumps instruction manual: A528-40-880 (Issue P or later).

For further information, please contact BOC Edwards: refer to the Addresses page at the end of this manual for details of your nearest BOC Edwards company.

### 1.3 Description

The Q Series 3 Exhaust Pressure Module is intended for use with a BOC Edwards QDP Drystar Pump fitted with a QDP Gas Module. The Q Series 3 Exhaust Pressure Module provides the following nitrogen supplies to the QDP pump :

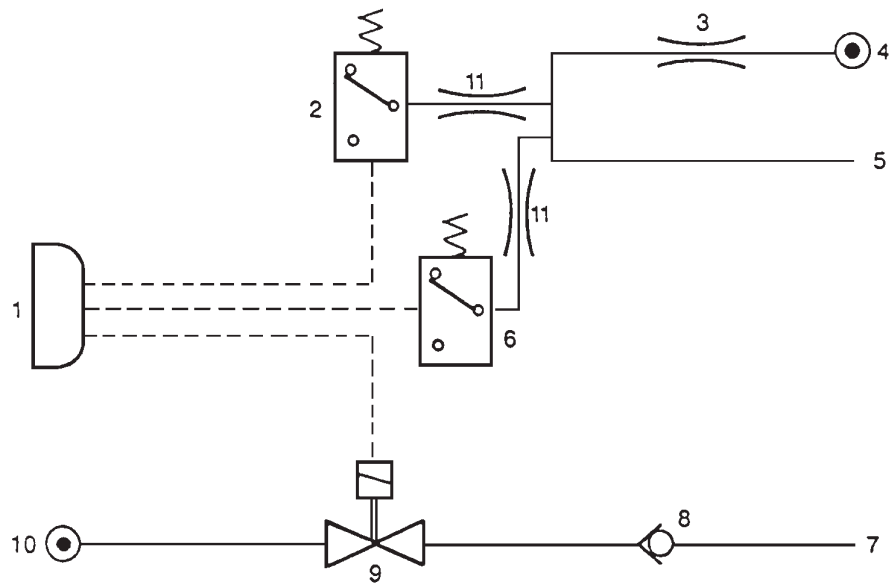
- Exhaust-purge
- Inlet-purge.

Nitrogen gas is routed to the pump through  $\frac{1}{4}$  inch pipelines. A schematic diagram of the Q Series 3 Exhaust Pressure Module is given in Figure 1.

The nitrogen supply for the inlet-purge is connected to the front of the Exhaust Pressure Module. The nitrogen supply passes through a solenoid-valve inside the Module and is then connected to the QDP pump. The inlet-purge can be switched on and off by this valve which is controlled by your control equipment.

The nitrogen supply for the exhaust-purge comes from the auxiliary nitrogen outlet on the QDP Gas Module. This auxiliary nitrogen outlet is connected to the exhaust-purge nitrogen inlet on the Exhaust Pressure Module. The pressure in this pipeline is monitored by two pressure-switches (with gold contacts) in the Exhaust Pressure Module. One pressure-switch gives a pressure warning signal and the other pressure-switch gives an over-pressure signal. These signals are used to control the electrical supply and the nitrogen supply to the QDP pump.

The 17-way connector at the end of the electrical cable (which is on the back of the Exhaust Pressure Module) is connected to the auxiliary connector on the QDP Gas Module. The electrical supply for the inlet-purge solenoid-valve comes through this cable. This cable also carries the signals from the pressure-switches, which pass back through the Gas Module and are available on the 19-way connector on the Gas Module.



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----- Electrical cables  
 \_\_\_\_\_ Gas lines

1. 17-way electrical connector
2. Exhaust pressure-switch (warning)
3. Restrictor
4. Exhaust-purge nitrogen inlet (from QDP Gas Module)
5. Exhaust-purge nitrogen outlet (to QDP pump)
6. Exhaust pressure-switch (over-pressure)
7. Inlet-purge nitrogen outlet (to QDP pump)
8. Check-valve
9. Solenoid-valve
10. Inlet-purge nitrogen inlet
11. Snubbing restrictor

Figure 1 - Schematic diagram of the Q Series 3 Exhaust Pressure Module

## 2 TECHNICAL DATA

Dimensions	See Figure 2
Mass	1.5 kg
Maximum ambient operating temperature	40 °C
Nitrogen supply connection	<sup>1</sup> / <sub>4</sub> inch Swagelok fittings
17-way electrical connector	CA3106E20-29P/F80
Solenoid-valve	
Operating voltage	24 V a.c., 50 or 60 Hz
Rating	<b>50 Hz</b> <b>60 Hz</b>
Holding	18 VA    15 VA
Inrush	29 VA    24 VA
Exhaust pressure-switches	
Electrical supply	24 V a.c. or 24 V d.c.
Switch rating (24 V a.c. supply)	
Maximum current	1 A inductive 1 A resistive
Minimum current	20 mA
Switch rating (24 V d.c. supply)	
Maximum current	0.5 A inductive 1 A resistive
Minimum current	20 mA
Operating pressure	
Warning	5.0 psi ± 0.6 psi
Over-pressure	8.0 psi ± 0.6 psi
Hysteresis (maximum)	1.3 psi
Maximum inlet-purge pressure	10 psig

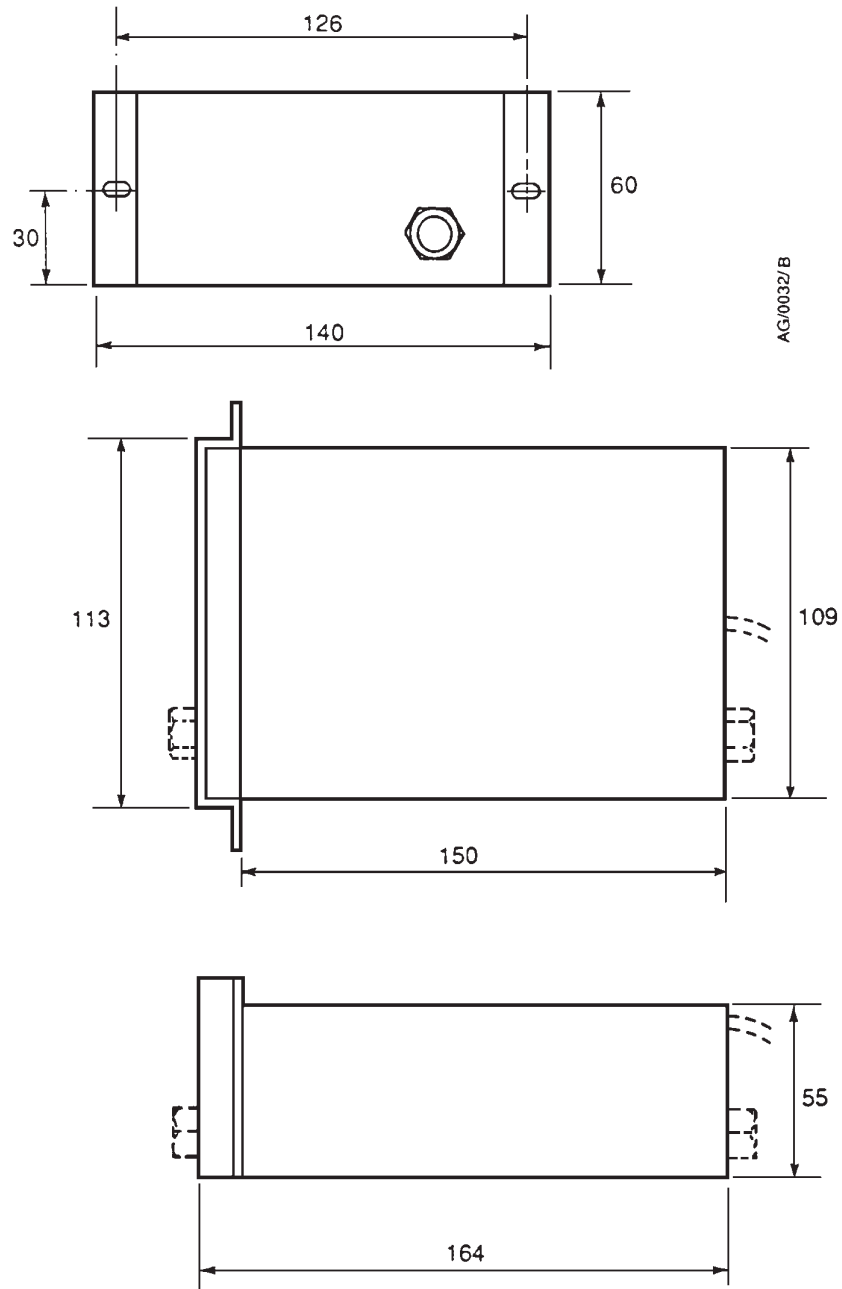


Figure 2 - Q Series 3 Exhaust Pressure Module dimensions (mm)



### 3 INSTALLATION

#### 3.1 Unpack and inspect

Remove all packing materials and protective covers and check the Q Series 3 Exhaust Pressure Module.

If the Q Series 3 Exhaust Pressure Module is damaged, notify your supplier and the carrier in writing within three days; state the Item Number of the Exhaust Pressure Module together with your order number and your suppliers invoice number. Retain all packing materials for inspection. Do not use the Q Series 3 Exhaust Pressure Module if it is damaged.

Check that your package contains the items listed in Table 1. If any of these items is missing, notify your supplier in writing within three days.

Qty	Description	Check (✓)
1	Q Series 3 Exhaust Pressure Module	<input type="checkbox"/>
1	Fitting-kit	<input type="checkbox"/>
1	Connecting pipe	<input type="checkbox"/>

Table 1 - Checklist of items

If the Q Series 3 Exhaust Pressure Module is not to be used immediately, replace the protective covers. Store the Q Series 3 Exhaust Pressure Module in suitable conditions, as described in Section 6.1.

#### 3.2 System design

<p><b>WARNING</b></p> <p>You must incorporate the design features detailed below in your system. If you do not, you can cause injury to people and damage to your equipment.</p>
--

##### 3.2.1 Inlet-purge

To ensure that your vacuum system cannot be over-pressured by the nitrogen supply to the inlet-purge, you must design your vacuum and control systems so that :

- the parts of your vacuum system which are not suitable for positive pressures are isolated when the pump is not in use and the inlet-purge nitrogen supply is switched on

or :

- the electrical supply to the inlet-purge solenoid-valve (through the Gas Module) is connected so that the valve is closed when the QDP pump is switched off.

### 3.2.2 Exhaust pressure-switches

Both normally-open and normally-closed outputs are available from the pressure-switches. To ensure that the exhaust pressure is monitored correctly, you must connect the signal outputs from the exhaust pressure-switches so that :

- the warning signal gives an indication that the pressure of the exhaust-purge nitrogen supply is too high
- the over-pressure signal switches off the pump. (Note that, if you have installed your Gas Module correctly, this will also switch off the nitrogen supply to the Gas Module.)

### 3.3 Configure the Q Series 3 Exhaust Pressure Module (if necessary)

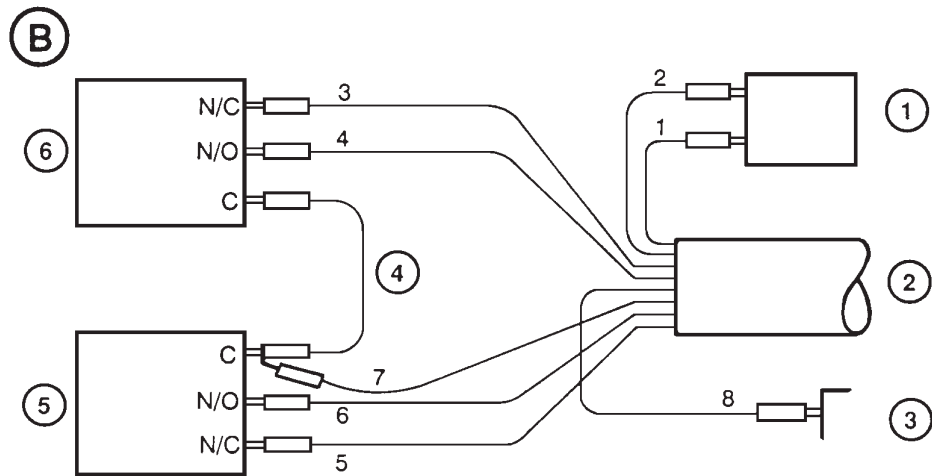
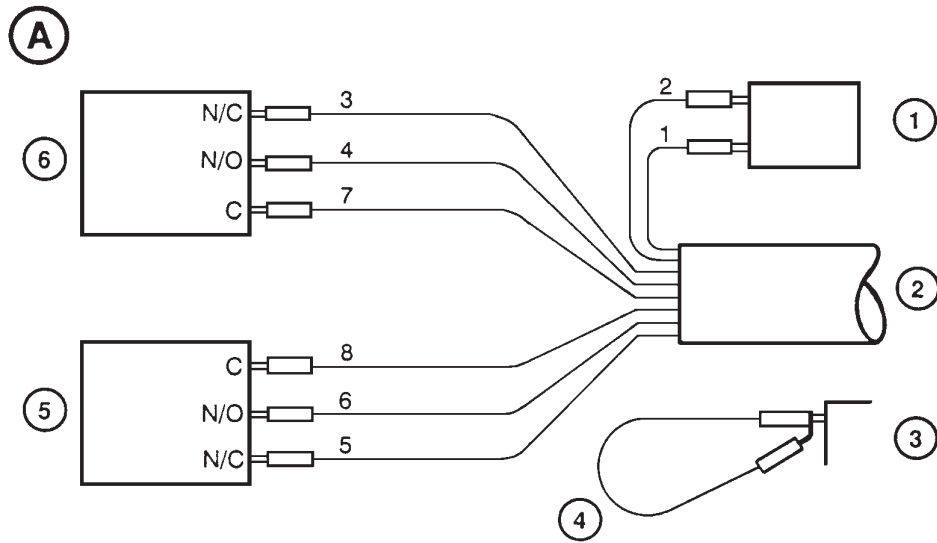
**CAUTION**

If you reconfigure the Exhaust Pressure Module, ensure that all the electrical connections are secure before you use the Exhaust Pressure Module.

The Q Series 3 Exhaust Pressure Module as supplied is configured for use with control systems which require individual common wires to each pressure-switch. This configuration is shown in Figure 3, detail A. Text on the back panel of the Q Series 3 Exhaust Pressure Module identifies this configuration (see Figure 4, detail A), which is suitable for use with Q Controllers with Item Numbers A381-xx-xxx.

If you want to use the Q Series 3 Exhaust Pressure Module with a Q Controller with an Item Number of A380-xx-xxx, you must reconfigure the Exhaust Pressure Module so that the pressure-switches have a shared common wire; use the following procedure:

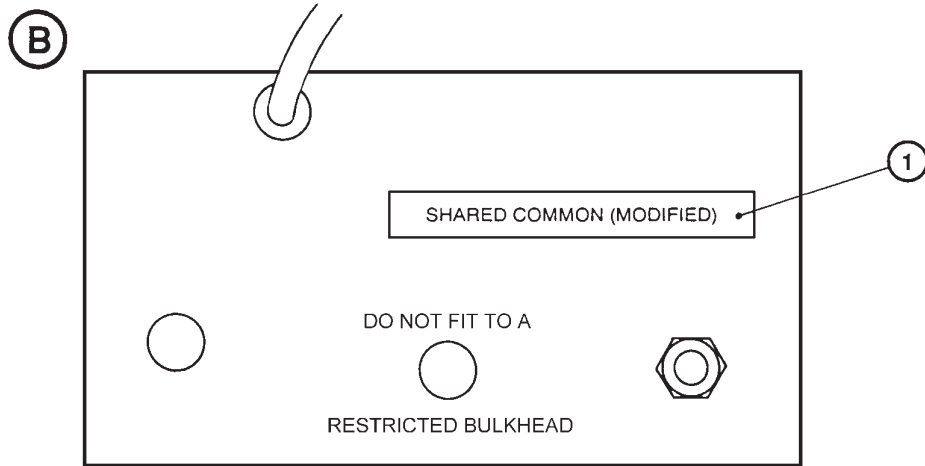
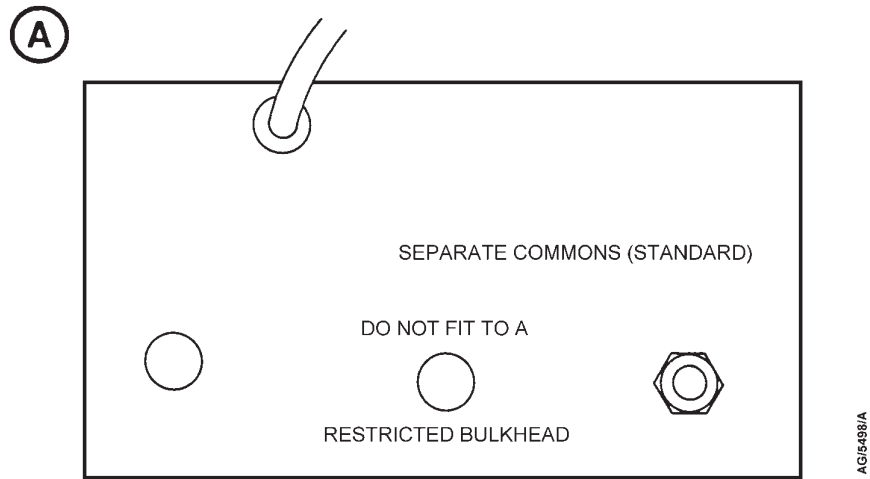
1. Remove the cover from the Q Series 3 Exhaust Pressure Module.
2. Refer to Figure 3. Unplug the link lead (4) from the parking terminal (3) and unplug the male connector from the male/female connector on the lead.
3. Unplug wire 8 from the common terminal on the warning pressure-switch (5). Plug wire 8 onto the parking terminal (3).
4. Unplug wire 7 from the common terminal on the over-pressure pressure-switch (6).
5. Plug the male connector on the link lead onto the common terminal on the over-pressure pressure-switch (6).
6. Plug the male/female connector on the link lead onto the common terminal on the warning pressure-switch (5).
7. Plug wire 7 (removed from the pressure-switch in Step 4 above) onto the male/female connector on the link lead.
8. Peel off one of the self-adhesive labels from the inside of the cover of the Q Series 3 Exhaust Pressure Module. Place the label over the configuration text on the rear panel of the Q Series 3 Exhaust Pressure Module; refer to Figure 4, detail B.
9. Refit the cover on the Q Series 3 Exhaust Pressure Module.



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- |     |   |    |                                      |
|-----|---|----|--------------------------------------|
| A   | Configuration as supplied               | 1. | Solenoid-valve                       |
| B   | Configuration for use with Q Controller | 2. | 8-core electrical cable              |
|     |   | 3. | Parking terminal                     |
| N/C | Normally-closed                         | 4. | Link lead with male/female connector |
| N/O | Normally-open                           | 5. | Warning pressure-switch              |
| C   | Common                                  | 6. | Over-pressure pressure-switch        |

Figure 3 - Schematic wiring diagram of the Q Series 3 Exhaust Pressure Module



- A Q Series 3 Exhaust Pressure Module configured for use with control systems which require separate common wires (as supplied)
  - B Q Series 3 Exhaust Pressure Module configured for use with Q Controller
1. Self-adhesive label

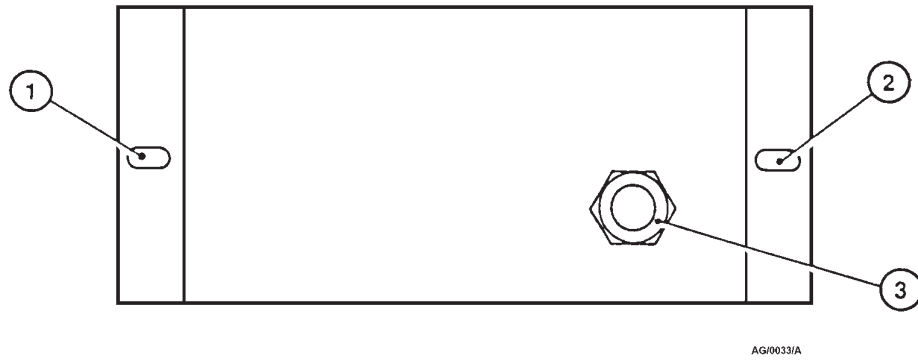
Figure 4 - Configuration label

### 3.4 Install the Exhaust Pressure Module on the pump

When the Q Series 3 Exhaust Pressure Module is installed in the frame of the QDP pump, the Exhaust Pressure Module inlet-purge and exhaust-purge nitrogen outlets are designed to align and engage with the nitrogen pipelines on the pump. Figures 5 and 6 show the location of components of the Exhaust Pressure Module. Where necessary, refer to the instruction manuals supplied with your QDP pump and your QDP Gas Module.

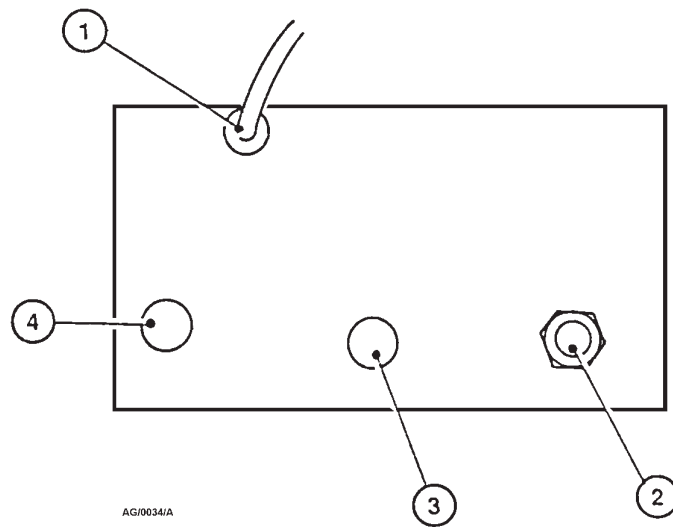
Use the procedure below to fit the Q Series 3 Exhaust Pressure Module.

1. Switch off the pump, if it is in use.
2. Remove the two blanking plugs from the inlet-purge and exhaust-purge nitrogen pipeline terminations on the QDP pump.
3. If there is a restricted bulkhead fitting (identified by an external O ring) in the exhaust purge pipeline, replace the fitting with the unrestricted bulkhead fitting supplied in the fitting-kit.
4. Align the Exhaust Pressure Module in the pump frame. Make sure that the exhaust-purge and inlet-purge nitrogen pipeline terminations on the back of the Exhaust Pressure Module (Figure 6, items 2 and 3) are in-line with the nitrogen pipelines on the pump.
5. Use the two screws supplied to secure the Exhaust Pressure Module in position.
6. Tighten the inlet-purge and exhaust-purge nitrogen pipeline connectors.
7. Fit the connecting pipe supplied to the exhaust-purge inlet on the Exhaust Pressure Module (Figure 6, item 4) and to the auxiliary nitrogen outlet on the QDP Gas Module. This pipe passes through a cut-out in the gas services panel.



1. Fixing screw
2. Fixing screw
3. Inlet-purge nitrogen inlet

Figure 5 - Q Series 3 Exhaust Pressure Module : front panel



1. Electrical cable
2. Exhaust-purge nitrogen inlet
3. Exhaust-purge nitrogen outlet
4. Inlet-purge nitrogen outlet

Figure 6 - Q Series 3 Exhaust Pressure Module : rear view

### 3.5 Make the electrical connections

**CAUTION**

Do not exceed the pressure-switch ratings stated in Section 2. If you do, you can damage the Exhaust Pressure Module.

*Note: Ensure that when you connect the signals from the pressure-switches to your control equipment, you do not exceed the switch ratings specified in Section 2. If your control equipment does not meet the specifications in Section 2, contact your supplier or BOC Edwards for advice.*

The 17-way connector on the electrical cable (Figure 6, item 1) is connected to the auxiliary connector on the back of the Gas Module. A 19-way connector on the front of the Gas Module is connected to your control equipment.

The QSeries 3 Exhaust Pressure Module uses 8 of the connections in the 17-way connector. These are detailed in Table 2. Note that the same pin letters are used for these signals on the 19-way connector from the Gas Module.

Use the procedure below to make the electrical connections:

1. Pass the electrical cable through the cut-out at the top of the gas services panel on the QDP pump.
2. Ensure that the QDP pump is switched off and then plug the 17-way connector at the end of the electrical cable into the auxiliary connector on the back of the Gas Module.
3. Connect the signals from the exhaust-purge pressure-switches (which are available on the 19-way connector on the front of the Gas Module) to your control system so that the warning signal gives an indication that the pressure of the exhaust-purge nitrogen supply is too high and the over-pressure signal switches off the pump.

Pin letter	Wire number	Signal
A	1	} Inlet-purge solenoid-valve
B	2	
C	3	normally closed } Exhaust pressure-switch
D	4	normally open } over-pressure signal
E	5	normally closed } Exhaust pressure-switch
F	6	normally open } warning signal
G	7	return, exhaust pressure-switch, over-pressure signal
H	8	return, exhaust pressure-switch, warning signal

Table 2 - Electrical connector pin usage (as supplied)

### 3.6 **Connect the nitrogen supply**

Use  $\frac{1}{4}$  inch Swagelok fittings to connect your inlet-purge nitrogen supply to the nitrogen inlet (Figure 5, item 3). Do not turn the nitrogen supply on yet.

### 3.7 **Leak-test the system**

**WARNING**

Leak-test the system after installation and seal any leaks found to prevent leakage of hazardous substances out of the system and leakage of air into the system.

After you have installed the Q Series 3 Exhaust Pressure Module, leak-test the installation and seal any leaks found. Hazardous substances which leak from the installation will be dangerous to people and there will be a danger of explosion if air leaks into the installation.



## **4 OPERATION**

1. Turn on the nitrogen supply to the inlet-purge.
2. Use the procedure in the QDP Gas Module instruction manual to set up and operate the nitrogen supply to the exhaust-purge.

## **5 MAINTENANCE**

The Q Series 3 Exhaust Pressure Module contains no parts which can be serviced by the user. To maintain the Q Series 3 Exhaust Pressure Module in normal use, do the following checks when you maintain the QDP pump :

- Check that the nitrogen pipelines are secure
- Check that the electrical connections are secure and that the electrical cable is not damaged.

## **6 STORAGE AND DISPOSAL**

### **6.1 Storage**

Store the Q Series 3 Exhaust Pressure Module as described below.

1. Remove the Q Series 3 Exhaust Pressure Module from the QDP pump (if fitted).
2. Place protective covers over the nitrogen connectors and electrical connectors.
3. Store in cool dry conditions until required for use. When required, prepare and install the Q Series 3 Exhaust Pressure Module as described in Section 3.

### **6.2 Disposal**

Dispose of the Q Series 3 Exhaust Pressure Module and any components removed from it safely in accordance with all local and national safety requirements.

## Return of BOC Edwards Equipment - Procedure

### INTRODUCTION

Before returning your equipment, you must warn BOC 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 BOC Edwards before you dispatch the equipment.** It is important to note that this declaration is for BOC 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 BOC Edwards. You must send independent proof of decontamination (for example a certificate of analysis) to BOC Edwards with the Declaration (HS2). Phone BOC 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 BOC Edwards and obtain a Return Authorisation Number for your equipment.
2. Complete the Return of BOC 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 BOC 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. Fax or post a copy of the Declaration (HS2) to BOC 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.**

