

Quick Start Guide

EXPT Pumping Station



Description	Item Number
EXPT Pumping Station	B723-00-000



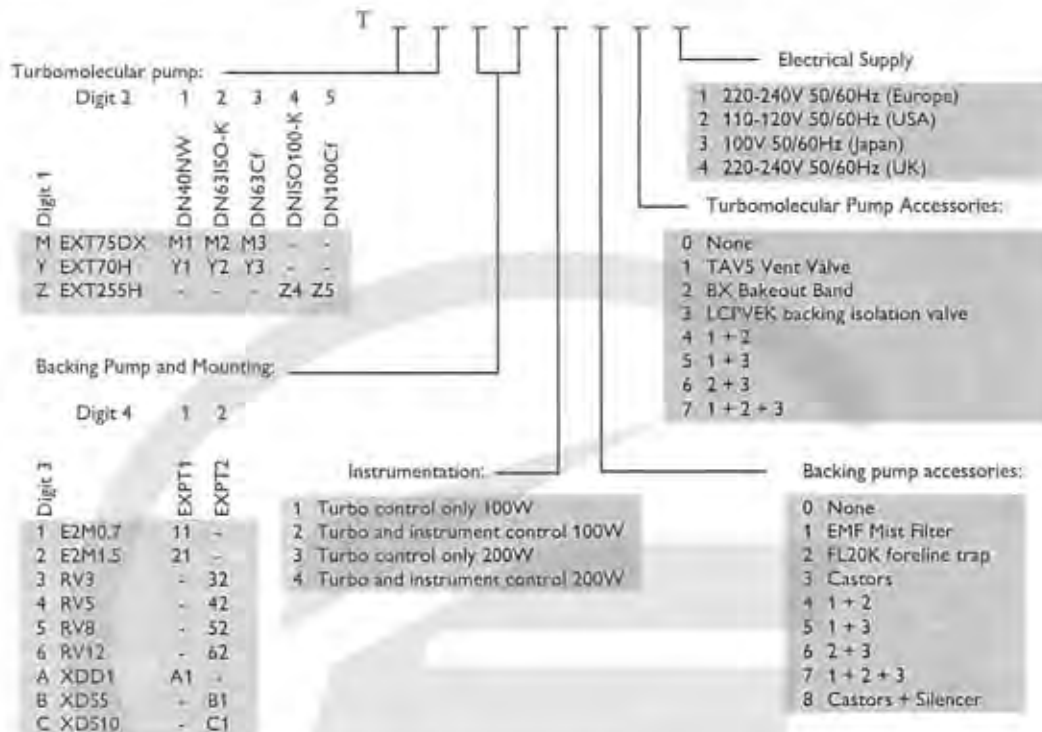


Declaration of Conformity

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

declare under our sole responsibility that the product(s)

EXPT1 and EXPT2 Combined Outfits configured using the following matrix structure:



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

- | | |
|-----------------------|---|
| EN ISO 12100-2 (2003) | Safety of Machinery – Basic Concepts, General Principles for Design. |
| EN61010-1 (2001) | Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use* |
| EN1012-2 | Compressors and Vacuum Pumps – Safety Requirements, Parts 2: Vacuum Pumps. |
| EN61326 | Electrical Equipment for Measurement, Control and Laboratory Use – |
| Immunity, Class A | EMC Requirements. |
| Emissions | |

* The pumps comply with EN61010-1 (2001) when installed in accordance with the instruction manual supplied with the pumps.

following the provisions of

- | | |
|------------|--|
| 73/023/EEC | Low Voltage Directive. |
| 89/336/EEC | Electromagnetic Compatibility Directive. |
| 89/392/EEC | Machinery Safety Directive. |

Dr. J. D. Watson, Director of Technology

25 MAY 2004 DUNGESS HILL _____

Vacuum Equipment and Exhaust Management Product Divisions

Date and Place

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

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1 Introduction

1.1 Scope and definitions

This manual provides installation and operation instructions for the Edwards EXPT Pumping Station. For full instructions, you must use the EXPT Pumping Station main manual B723-00-880.

Read this manual before you install and operate the EXPT Pumping Station. 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.

A full list of Supplementary Publications is provided with the main manual B723-00-880.

The Supplementary Publications you receive also contain WARNING and CAUTION instructions. When you install and operate the EXPT Pumping Station, you must refer to these Supplementary Publications and obey all of the WARNING and CAUTION instructions which they contain.

The units used throughout this manual conform to the SI international system of units of measurement.

The following IEC warning labels appear on the product and in the manual.



Warning - refer to accompanying documentation.



Warning - risk of electric shock.



Warning - hot surfaces.

1.2 Description

1.2.1 General description of the EXPT pumping station major components

For the general description of the major components used on the EXPT Pumping Station, click on the appropriate instruction manual reference against each product type.

Diaphragm pump	XDD1 (A746-01-885)
Rotary vane pumps	E2M0.7 / E2M1.5 (A371-22-880 Section 1.2) RV3 / RV5 / RV8 / RV12 (A652-01-880 Section 1.2)
Turbomolecular pumps	EXT70H / EXT255H 24 V (B722-20-880 Section 1.2) EXT75DX / EXT255DX (B722-40-880 Section 1.2)
Scroll pumps	XDS5 / XDS10 (A726-01-880 Section 1.2)
TIC controller	Turbo controller (D397-12-880 Section 1.2) Turbo instrument controller (D397-22-880 Section 1.2)

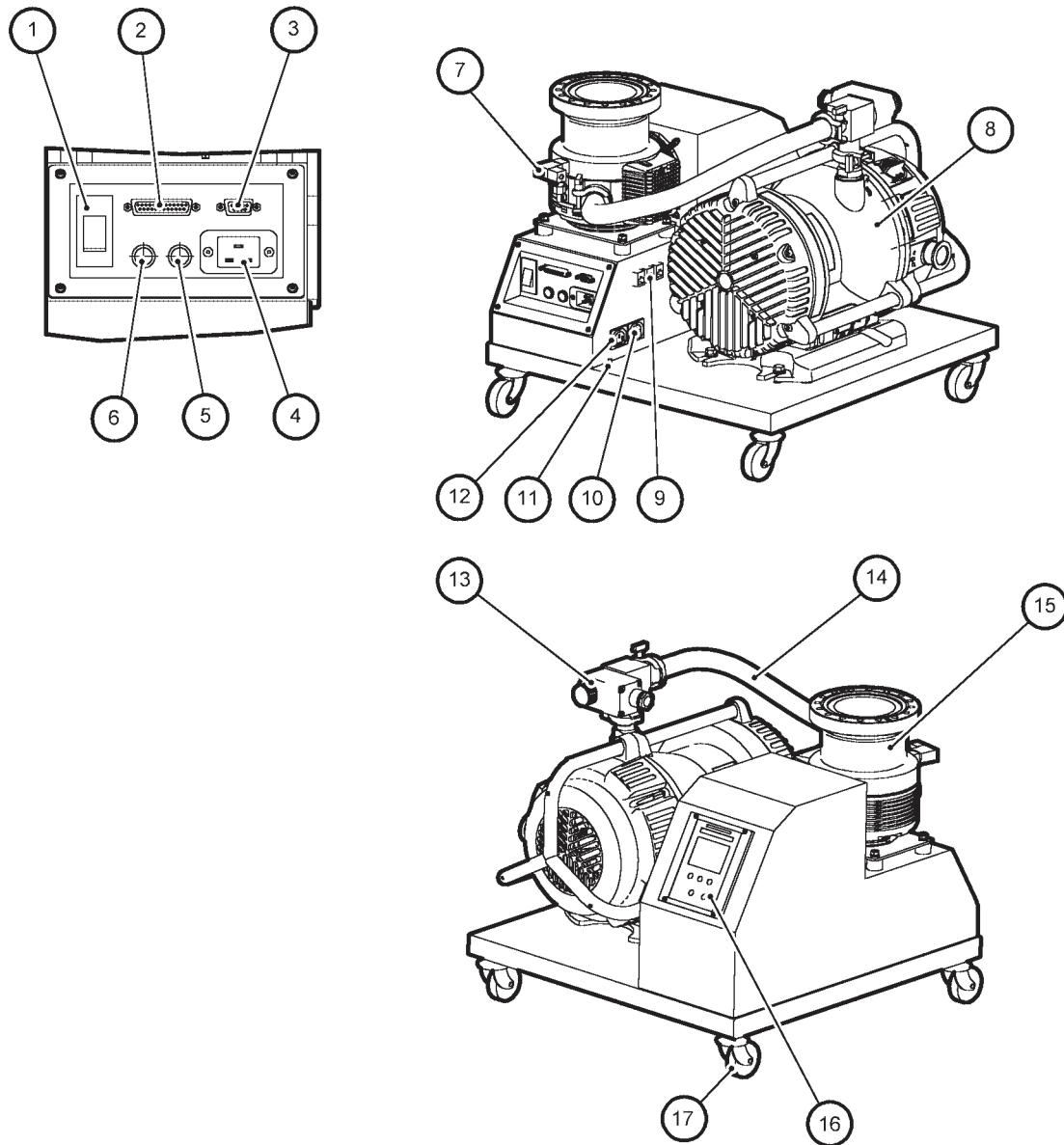
1.2.2 Electrical protection

The EXPT Pumping Station has a double-pole thermal circuit breaker which provides short circuit protection. The backing pump and TIC Controller both have overload protection.

1.2.3 Accessories

A wide range of standard accessories is available for the major components of the EXPT Pumping Station; refer to the main manual B723-00-880.

Figure 1 - Components of the EXPT pumping station (typical system shown)



- | | |
|---|---|
| 1. Mains ON/OFF | 13. Backing line valve |
| 2. Logic interface | 14. Flexible bellows |
| 3. Serial communications port | 15. Turbomolecular pump |
| 4. Mains input | 16. TIC controller |
| 5. Heater fuse | 17. Castors (standard on EXPT2 systems) |
| 6. Backing pump fuse | |
| 7. TAV vent valve | |
| 8. Backing pump | |
| 9. Vacuum gauge inputs | |
| 10. Backing pump supply | |
| 11. Earth stud | |
| 12. Heater supply (turbomolecular pump remote use only) | |

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2 Technical data

For the mass of the unit, refer to the main manual B723-00-880. System protection (to IEC 34-5:1981) is IP20.

2.1 Electrical data

Table 1 - Electrical data

Backing pump	TIC controller	Supply voltage 50/60Hz	Current (A)		Maximum power kW
			Full load	Start *	
XDD1	100W	100	4.67		0.355
		110-120	4.04		
		220-240	2.07		
	200W	100	6.02		0.49
		110-120	5.14		
		220-240	2.57		
E2M0.7	100W	110-120	4.34	8.14	0.365
		220-240	2.27	4.07	
	200W	110-120	5.44	9.24	0.5
		220-240	2.77	4.57	
E2M1.5	100W	110-120	5.54	14.44	0.435
		220-240	2.67	6.77	
	200W	110-120	6.64	15.54	0.57
		220-240	3.17	7.27	
RV3 / 5	100W	100	8.15	33.94	0.575
		110-120	7.04	20.875	
		220-240	3.67	16.87	
	200W	100	9.5	43.1	0.71
		110-120	8.14	35.04	
		220-240	4.17	17.37	
RV8 / 12	100W	100	10.35	36.44	0.825
		110-120	10.24	22.375	
		220-240	5.27	19.27	
	200W	100	11.7	45.6	0.96
		110-120	11.34	37.54	
		220-240	5.77	19.77	
XDS5 / 10	100W	100	10.75		0.575
		110-120	9.64		
		220-240	4.87		
	200W	100	12.1		0.71
		110-120	10.74		
		220-240	5.37		

Note: * If the EXPT Pumping Station uses a rotary vane pump, the system may draw up to the start current value shown in Table 1. You must use a slow blow fuse to prevent unnecessary fuse failures, the start current could typically last for several seconds and generally occurs when the rotary vane pump oil is cold.

2.2 Operating data

2.2.1 Operating conditions

Table 2 - Operating conditions

General items	Reference data
Ambient operating temperature range	0 °C to 35 °C
Ambient storage temperature range	-30 °C to 70 °C
Maximum ambient operating humidity	Max 90% RH non cond at 40 °C
Maximum operating altitude	3000 m max.

2.2.2 Earthing data

Table 3 - Earthing data

General items	Reference data
Earth stud	M5

2.2.3 Electrical connections and fuse ratings

Your system comes fully supplied with fuses and a plug as defined by your product number selected. For full details, refer to the main manual B723-00-880.

2.2.4 Gauge connections

If you wish to use gauges with your system, refer to the following tables for details of connections. If you wish to change any of the supplied connections, please refer to the main manual B723-00-880 for the options.

Table 4 - Gauge connections

General items	Reference data
Active gauge connectors	
Connector type	FCC/RJ45, 8-way
Power supply	24 V d.c.
Logic interface	
Connector type	25-way sub-miniature 'D' type socket
Power supply	24 V d.c.
Serial communications	
Connector type	9-way sub-miniature 'D' type socket

3 Unpack and install

3.1 Safety



WARNING

Obey the safety instructions given below and take note of appropriate precautions. If you do not, you can cause injury to people and damage to equipment.

- When you refer to a manual supplied as a Supplementary Publication, you must obey all of the WARNING and CAUTION instructions in the manual.
- A suitably trained and supervised technician must install the EXPT Pumping Station.
- Check that all the required parts are available and of the correct type before you start work.
- Ensure that the installation technician is familiar with the safety procedures which relate to the products pumped. Wear the appropriate safety-clothing when you come into contact with contaminated components.
- Isolate the other components in your system from the electrical supply so that they cannot be operated accidentally.
- Do not reuse 'O' rings and Co-Seals if they are damaged.
- Dispose of components, grease and oil safely (refer to the main manual B723-00-880).
- Take care to protect sealing-faces from damage.
- Leak-test the system after installation and seal any leaks found.

3.2 Unpack and inspect

Remove the outer cover and all packing materials, remove the protective covers from the inlet and outlet ports, inspect the system for any damage. If the EXPT Pumping Station is damaged, notify your supplier and the carrier in writing within three days; state your order number and invoice number. Retain all packing materials for inspection. Do not use the EXPT Pumping Station if it is damaged. Check that your package contains the items listed in Table 5. If any item is missing, notify your supplier within three days.

If the EXPT Pumping Station is not to be used immediately, replace the protective covers. Store the EXPT Pumping Station in suitable conditions as described in the main manual B723-00-880.

Table 5 - Checklist of components

Qty	Description	Check (✓)
1	EXPT Pumping Station	<input type="checkbox"/>
1	Instruction Manual Package	<input type="checkbox"/>
1	Logic Interface Interlock D-Connector	<input type="checkbox"/>
1	TMP Flange Inlet Seal	<input type="checkbox"/>
1	Rotary Pump Oil (RV/E2M pumps only)	<input type="checkbox"/>
1	XDS Silencer (optional on systems with XDS pumps)	<input type="checkbox"/>

3.3 Locate the EXPT pumping station



WARNING

Heavy objects can cause muscle strain or back injury. It is advisable to use suitable lifting equipment when moving the EXPT Pumping Station.



WARNING

(Applicable for systems with base castors) For your safety, both front castors must be locked when the system is in operation. If you do not and the turbomolecular pump seizes, movement of the system may damage equipment and injure people.

CAUTION

When lifting the EXPT Pumping Station, do not attempt to support the mass of the system from the backing pump.

CAUTION

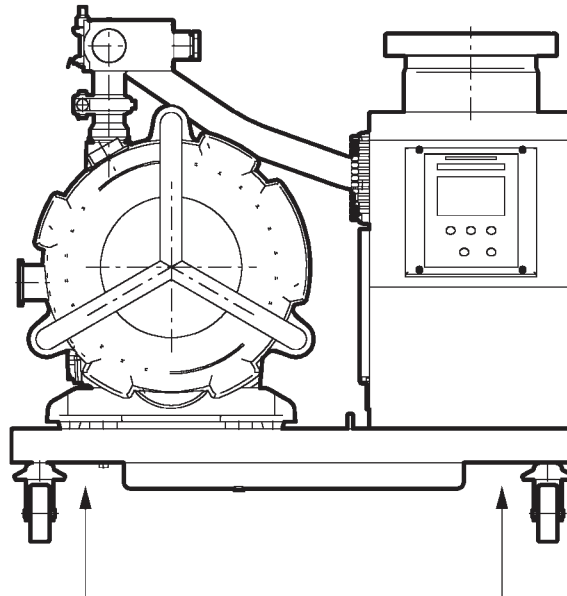
When lifting the EXPT Pumping Station, always use slings with sufficient length to prevent damage of the system components.

Before attempting to lift the EXPT Pumping Station, move the system (on its pallet) close to the operating position. Ensure that you provide a firm level base before removing the system from its pallet. It is advisable to always use mechanical lifting equipment when moving the heavier EXPT2 systems. Use slings around the base of the system from front to back, make sure each sling is routed between the castors or feet and the base guides to prevent slippage. Alternatively use straps with lifting hooks. Refer to [Figure 2](#) which shows where to locate the slings or lifting hooks.

CAUTION

When locating the EXPT Pumping Station, care should be taken not to restrict the ventilation grid located under the base of the system. Failing to observe this may result in over heating of the controller and the turbomolecular pump.

Figure 2 - Position the lifting slings/lifting hooks



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3.4 Fill the rotary pump with oil

If the EXPT Pumping Station uses a EM or RV series rotary or rotary vane pump you must fill it with the correct quantity of oil (supplied with the equipment) before you operate the equipment, as described in the pump Instruction Manual.

3.5 XDS scroll pump silencer

The silencer is used to reduce exhaust noise during pump down and gas ballast operations. This part may be ordered and supplied (not fitted) with the system or can be ordered as an optional extra. To fit the silencer, follow the instructions in manual A505-97-880.

3.6 Fit accessories (optional)

If you wish to fit accessories to the EXPT Pumping Station, fit them now, before you start to install the EXPT Pumping Station into your vacuum system. Install accessories as described in the instruction manuals supplied with the accessories. Refer to the main manual B723-00-880 for further information on the accessories available and for specific fitting instructions to fit the accessories to the EXPT Pumping Station.

Note: *The use of water coolers and BX bake-out bands on the EXPT Pumping Station is not permitted. If you wish to fit these accessories, it is advisable to install the turbomolecular pump away from the EXPT Pumping Station. For further details regarding turbomolecular pump remote mounting please contact Edwards UK.*

3.7 Connect the EXPT pumping station to your vacuum system



WARNING

If you install your vacuum system directly onto the EXPT Pumping Station, the centre of gravity of the mass must be above and within 300 mm of the centre line.

Note: If the vacuum system is to be supported by the EXPT Pumping Station, the mass of the vacuum system must not be greater than the maximum mass which can be supported by the turbomolecular pump (refer to the EXPT Pump Instruction Manual). Use the co-seal or copper gasket (supplied with the equipment) with a suitable clamp to secure to the vacuum system. Alternatively you may wish to use a pipeline to connect the vacuum system to the inlet of the turbomolecular pump. Refer to the EXPT Pump Instruction Manual for further details.

3.8 Connect to your exhaust extraction system

Note: For further information, refer to the instruction manual which corresponds to the backing pump fitted to your EXPT Pumping Station.

3.9 Connect the electrical supply



WARNING

Ensure that the electrical installation of the EXPT Pumping Station 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.



WARNING

Ensure the mains cord is routed so as not to cause a trip hazard.

Check that your electrical supply is suitable for this equipment. Refer to [Table 1](#) for the electrical requirements for this equipment. The EXPT Pumping Station is supplied with an electrical cable which includes a moulded IEC connector fitted at one end, the other end of the cable will be fitted with a moulded plug suitable for connection to the local electrical supply.

3.10 Additional earth bonding

The electrical supply cable normally provides protective earthing for electrical safety. If this is not the case, or if additional earth bonding is required, the earth stud located on the base at the rear of the EXPT Pumping Station should be connected to your vacuum system.

3.11 Configure the EXPT pumping station

As supplied, the TIC Controller has been reconfigured for the TIC Pumping Station to suit most vacuum applications and will:

When the TIC System ON is selected:

- Switch on both the backing pump and the turbomolecular pump *.
- Close the TAV vent valve.
- Open the backing valve.

When the TIC System OFF is selected:

- Switch off both the backing pump and the turbomolecular pump.
- Close the backing valve.

EXDC pump controllers:

- Open the TAV vent valve fully after the turbomolecular pump has slowed to 50% of its rotational speed.

DX pump controllers:

- Open the TAV vent valve (controlled venting) from 100 - 50% rotational speed, and then open fully from 50% of full rotational speed.

Note: The TAV vent valve and LCPVEK backing valve are optional extras.

Note: The TIC Controller factory settings have been changed to provide a standard operation for the EXPT Pumping Station, if you replace the TIC Controller you should reconfigure the set up options to suit your application, refer to the TIC instruction manual for further details.

Note: * If your EXPT Pumping Station uses an XDD1 diaphragm pump, the turbomolecular pump drive will be delayed for two minutes while the backing pump reduces the pressure to a suitable level, this is typical for a five litre volume and will prevent the turbomolecular pump from running under high pressure for a prolonged period. This delay is adjustable (refer to the TIC instruction manual) and is recommended for system volumes >2 litres, refer to Figure 4 in the main manual B723-00-880 to estimate the turbomolecular start delay if you know your system volume.


3.12 Commission the installation





WARNING

Do not operate the system with the exhaust pipeline blocked. For example, if your EXPT Pumping Station uses a rotary vane pump, oil mist may be discharged from the oil mist filter and cause injury to people.

After you have installed the EXPT Pumping Station, use the following procedure to test the system.

1. Make sure that all the electrical connections are secure.
2. Switch on the electrical supply and your exhaust-extraction system (if available).
3. Turn ON the EXPT Pumping Station using the ON/OFF switch positioned on the rear panel.
 - Wait for the TIC to self-test.
 - Press the 'Cycle' button  twice; this will start the backing pump and turbomolecular pump.

For full TIC operation, refer to the main manual B723-00-880.
4. Inspect the vacuum, exhaust and pipeline connections and check that there are no leaks. Seal if any leaks are found.
5. Wait until the turbomolecular pump has reached full speed. Select the 'Menu' button , a solid bar at the top of the screen denotes full speed. For full details, refer to the main manual B723-00-880. Select OFF on the front panel of the TIC Controller again by pressing the 'Cycle' button  twice; check that both pumps stop.

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4 Operation

4.1 Use of the backing pump controls

If the backing pump has a mode selector and or gas-ballast control, refer to the appropriate backing pump instruction manual to optimise the performance of the pump for your application.

4.2 Start-up

- Follow the procedure described in 'Commission the installation' (Section 3.12, steps 1 to 3 inclusive).

4.3 Shut-down

- Follow the procedure described in 'Commission the installation' (Section 3.12, step 5).
- Switch off the ON/OFF rocker switch located on the equipment rear panel.
- Remove the electrical mains supply from the equipment.

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5 Maintenance, storage and disposal

Refer to the main manual B723-00-880.

5.1 Spares and accessories

Refer to the main manual B723-00-880.

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