

PRODUCT DATA

## Turbo Controller



***A compact turbo controller with a large clear graphical display, an intuitive user interface and serial communications providing full remote control and data logging functions via a new windows™ based PC programme.***

The controller automatically recognizes and supports one 24V turbomolecular pump from the EXT range. Cooling and vent valve support is provided directly from the controller. Backing pump control is provided for a compact 24V diaphragm pump (on 200W versions only), or where greater pumping speeds are required, mains backing pumps (up to E2M28) may be controlled via an optional relay box. The relay box can also be used to control a mains heater band and backing line isolation valve.

Time delays and normal speed signals may be used to control events such as turbo start and there is a comprehensive selection of protection and safety interlock features.

The TIC turbo controller may be either rack or bench mounted and provides a useful hub for the flexible operation of a wide range of vacuum system configurations.

# FEATURES & BENEFITS

- **Universal turbo & instrument controller**

TIC automatically recognizes and controls one 24V turbomolecular pump from either the DX or EXDC ranges. The 200W version provides sufficient power to ensure optimum performance of larger 255 turbos. DX turbos have full serial communication with TIC and may be both configured and report status via TIC.

- **Backing pump support**

Both mains and 24V backing pumps may be controlled by TIC. The 200W version supports the new XDD1 dry diaphragm pump. For larger vacuum systems both the 100W and 200W versions may control mains backing pumps, including XDS10 and up to E2M28, via the optional relay box.

- **Relay options**

The optional external relay box enables mains backing pumps to be controlled and also provides interfaces for a turbo heater band, a backing line isolation valve and a logic bypass. All relay boxes include a logic bypass facility for further system integration.

- **Simple system configuration**

In most instances, TIC systems may be simply and quickly configured using the range of standard cables on offer, there is therefore no need for the customer to prepare loom assemblies or relay boxes and special interfaces.

- **Compact instrument**

TIC is packaged in a compact case and may be panel or rack (1/4 19" rack 3U) mounted. With the addition of the bezel it becomes an attractive bench-top instrument.

- **Clear, easy to use graphical user interface**

The large 128 x 64 pixel backlit graphics LCD and mobile phone style menu system simplifies programming and with a choice of summary screens excellent visibility of displayed parameters is assured.

- **Universal power supply**

TIC will operate from mains supplies with voltages between 90 and 264V ac, and frequencies between 47 and 63Hz. No user intervention being required.

- **Serial communications**

To enable complete integration into PC and PLC controlled processes, all TIC variants include RS232 and RS485 interfaces as standard.

- **Windows™ PC programme**

TIC is supplied with a new Windows™ PC programme which enables full setup and control from a PC using the RS232 interface.

- **Software upgrades**

As new compatible products are released, TIC software may be simply upgraded using the special utility supplied with the Windows™ PC programme. TIC software upgrades will be made available via e-mail and the Internet.

# CONFIGURATION EXAMPLES

**FIGURE 1**

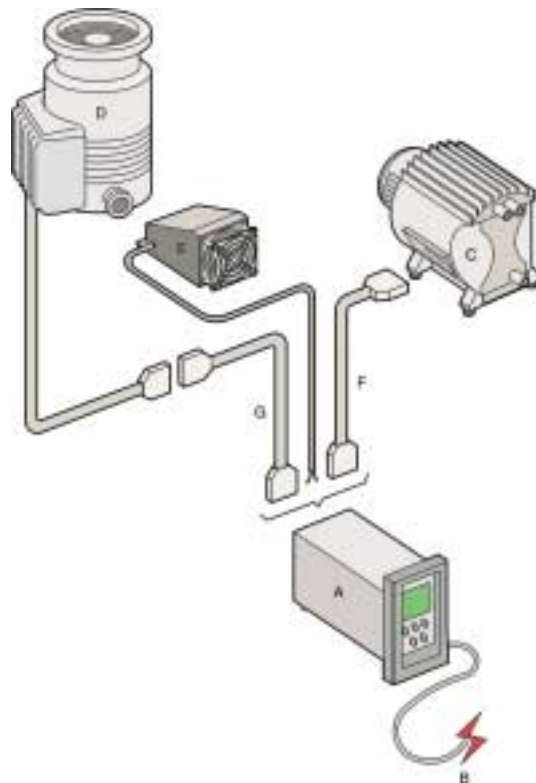
Figure 1 represents the simplest TIC 24V dry system configuration available.

In this set-up the 200W TIC provides all the power and control for the whole vacuum system, consisting of the new EXT75DX turbo and XDD1 diaphragm pump.

The system is configured and controlled locally by the TIC.

ITEM	DESCRIPTION	PART NUMBER
A	TIC Turbo Cont 200W RS232 *	D397-12-000
B	2m UK Mains Cable	D400-13-025
C	XDD1 24V dc Diaphragm Pump	A746-01-991
D	EXT75DX ISO63	B722-41-000
E	ACX75 Air-Cooler	B580-53-075
F	XDD/DX/EXDC Extension Cable 2M	D397-00-836
G	XDD/DX/EXDC Extension Cable 2M (optional)	D397-00-836

\*When using an XDD1 pump, the turbo should be subjected to a start delay.



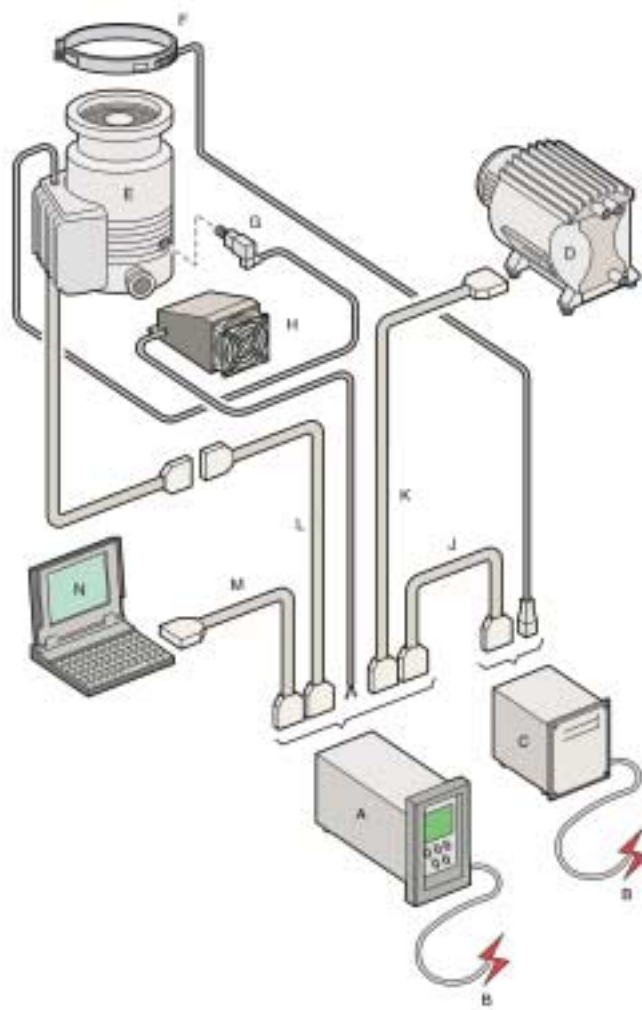
# CONFIGURATION EXAMPLES

**FIGURE 2**

Figure 2 shows a system similar to that shown in Fig 1, but in this case for improved ultimate vacuum, bakeout is required, as is remote configuration and monitoring.

Again, a 200W TIC drives the 24V pumps, but the heater band is controlled through the mains relay box. The PC is used for remote configuration and data logging.

ITEM	DESCRIPTION	PART NUMBER
A	TIC Turbo Cont 200W RS232	D397-12-000
B	2m UK Mains Cable	D400-13-025
C	TIC Relay Box Sml Bkg	D397-11-805
D	XDD1 24V dc Diaphragm Pump	A746-01-991
E	EXT75DX ISO63	B722-41-000
F	BX70 Heater Band 240V 60W	B580-52-060
G	TAV5 Vent Valve	B580-66-010
H	ACX75H Air-Cooler	B580-53-075
J	TIC Logic Interface Cable 2m	D397-00-833
K	XDD/DX/EXDC Extension Cable 2M	D397-00-836
L	XDD/DX/EXDC Extension Cable 2M (optional)	D397-00-836
M	TIC RS232 Interface Cable 2m (optional)	D397-00-834
N	PC with RS232 Interface (optional)	N/A



# CONFIGURATION EXAMPLES

**FIGURE 3**

Figure 3 shows a vacuum system with a larger throughput requirement than in Fig 1.

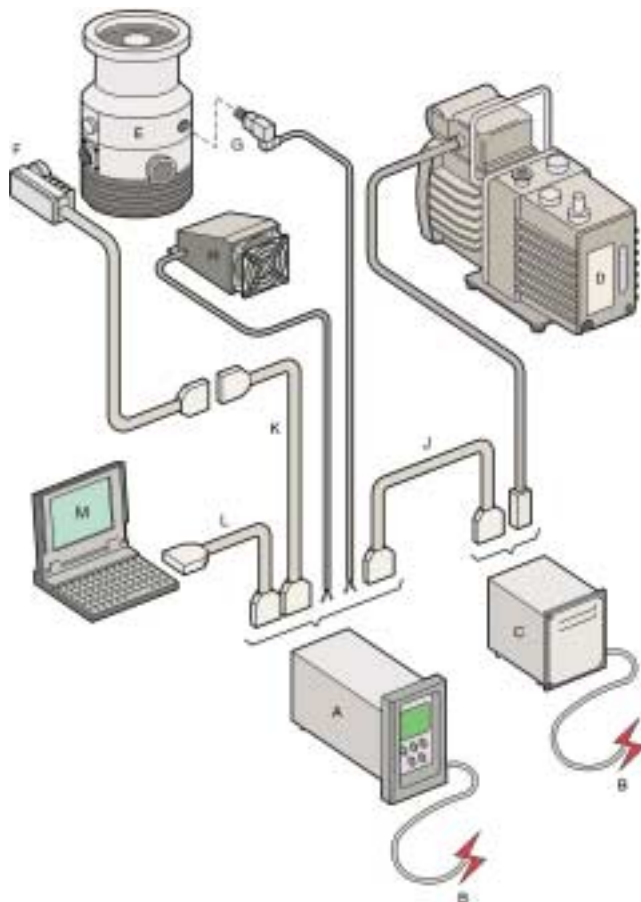
The 100W TIC provides power and control for an EXT70H\* turbo via a 24V EXDC80 and air-cooler.

Backing is provided by an E2M1.5, which is controlled through the mains relay box (C).

The Windows™ PC programme manages system configuration and data logging.

ITEM	DESCRIPTION	PART NUMBER
A	TIC Turbo Cont 100W RS232	D397-11-000
B	2m UK Mains Cable	D400-13-025
C	TIC Relay Box Sml Bkg	D397-11-805
D	E2M1.5 Pump 1-phase	A371-22-919
E	EXT70H DN63ISO-K 24V	B722-21-991
F	EXDC80 24V	D396-45-000
G	TAV5 Vent Valve	B580-66-010
H	ACX75 Air-Cooler	B580-53-075
J	TIC Logic Interface Cable 2m	D397-00-833
K	XDD/DX/EXDC Extension Cable 2M (optional)	D397-00-836
L	TIC RS232 Interface Cable 2m (optional)	D397-00-834
M	PC with RS232 Interface (optional)	N/A

\* A 24V EXT-255H and EXDC160 combination could replace the EXT70H and EXDC80 for greater pumping speed. However, the 200WTIC (D397-12-000) would be required to achieve the fastest ramp-up.




# SPECIFICATION

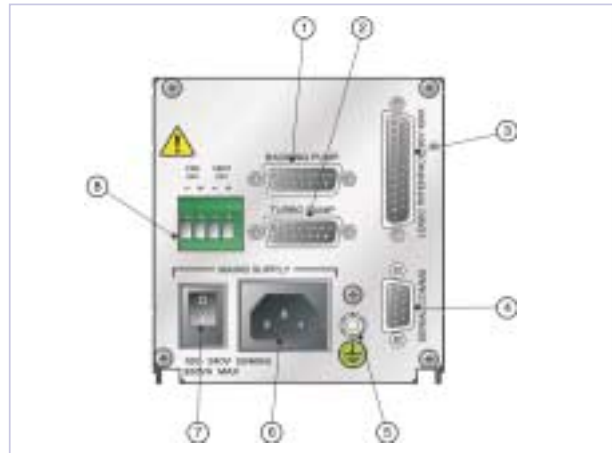
## EXTERNAL INTERFACES



Display - 128 x 64 pixel backlit graphics LCD

Front panel keypad control functions include:

- |   |                     |   |                  |
|---|---------------------|---|------------------|
|  | Scroll up button    |  | Menu/Back button |
|  | Scroll down button  |  | Cycle button     |
|  | Enter/Select button |   |                  |



- |   |   |                   |
|---|---|-------------------|
| 1 | Backing pump 24V *                                  | 15-way 'D' socket |
| 2 | Turbo pump 24V                                      | 15-way 'D' socket |
| 3 | Logic Interface                                     | 25-way 'D' socket |
| 4 | RS232/485   | 9-way 'D' socket  |
| 5 | Earth stud  | M4                |
| 6 | Mains input   | CEE/IEC 320 plug  |
| 7 | Mains on/off switch                                 |                   |
| 8 | Auxiliary vent valve and fan terminals (24V supply) | 4-way screw term  |

\* Available on 200W versions only.

## EXTERNAL INTERFACES AND CONFIGURATION OPTIONS IN DETAIL

### • Display Interface

TIC software is structured through a series of easily accessible screens, similar to a mobile telephone.

TIC automatically recognises which turbo is connected and displays the appropriate information on the default summary screen. Scrolling and selecting accesses the control and set-up menus for each item.

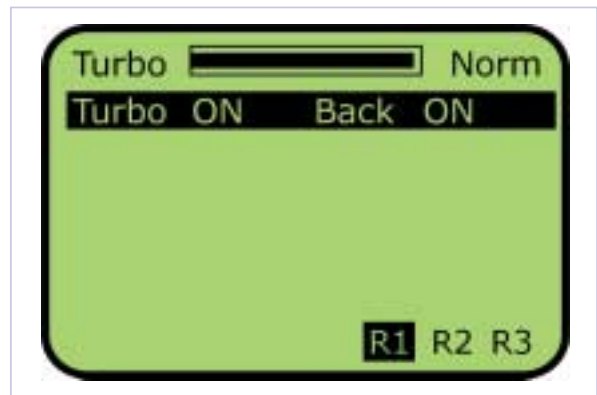
Turbo speed is shown as a proportion of full speed by a bar graph. "Norm" indicates that the turbo has reached its Normal Speed, whilst forward or reverse facing chevrons indicate acceleration and deceleration.

Two levels of password protection are available, effectively restricting or preventing unauthorised intervention

Pump status is displayed, giving a clear indication of what is currently happening in the vacuum system.

In the event of an error occurring, TIC will display either a WARNING or flash an ALARM. A warning advises of a condition outside normal parameters, requiring no action, but an alarm must be cleared before normal operation may resume.

The three setpoint relays, which are highlighted when tripped, may be linked to turbo speed.



### • Backing pump 24V *(For mains backing pump support, see below)*

200W turbo supporting TIC variants recognize and control the following 24V backing pumps: XDD1

# SPECIFICATION

## EXTERNAL INTERFACES AND CONFIGURATION OPTIONS IN DETAIL

- **Turbo pump 24V**

Turbo supporting TIC variants recognize and control the following turbo pumps:

S = Slow ramp, F = Fast ramp, N/A = Not available

TURBO PUMP OPTIONS	TIC VARIANT	
	100W	200W
EXT75DX	F	F
EXT70H & EXDC80	F	F
EXT255H & EXDC80 *	S	S
EXT255H & EXDC160	N/A	F

\* Ramp speed is limited by the use of the EXDC80.

- **Logic Interface**

The logic interface connector includes the functions listed below. It may be used either to link to system relays, a higher-level control system, or an optional relay box. By utilising the relay box pass-through connector, a combination of a higher-level control system and relay box may be used.

CONTROL INPUTS	
Turbo start/stop* / Turbo standby / Backing pump start/stop*	Closed when Low: < 0.5V dc
System interlock SYSI	Open when High: 4 to 24V dc
CONTROL OUTPUTS	
Vent valve control	O/C 24V dc 100mA
Heater band control	O/C 24V dc 50mA
Backing pump control	O/C 24V dc 100mA
Air cooler	O/C 24V dc 200mA
STATUS OUTPUTS	
Analogue output	0-10V dc
Set point A, B, C	O/C 24V dc 50mA
Turbo normal speed / Alarm	O/C 24V dc 50mA

\* Start/stop commands are "edge triggered".

- **Serial Interface**

The TIC has two built-in communications protocols, RS232 and RS485. These may be used either to interface to a PLC or, using the Windows™ PC software package supplied, connected to a PC for full monitoring and control of a TIC system.

- **Mains Input**

	TIC Turbo Controller Instruments 100W RS232	TIC Turbo Controller Instruments 200W RS232
Electrical supply	90 to 264V ac 47 to 63 Hz	
Power consumption (MAX)	215VA	350VA
Peak inrush current	10.3A @ 110V ac 23.0A @ 230V ac	
Fuse	TIC is self-protecting and has no user replaceable fuse The unit will recover when the overload is removed	
Earth stud	M4	

- **Auxiliary Terminals**

Air cooling fan	24V dc 3W MAX	ACX70, ACX75 & ACX250H
Vent valve	24V dc 2W MAX	TAV5 & TAV6

- **Interface Cables**

Use cables as specified in 'Ordering Information'.

# SPECIFICATION

## DIMENSIONS, MOUNTING OPTIONS AND WEIGHT

- Dimensions**

### Electronics housing

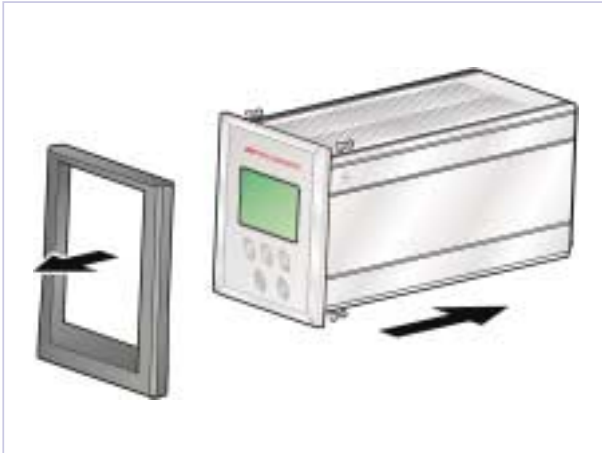
110 mm high x 105 mm wide x 245 mm deep

### Front panel

106 mm wide x 128 mm high

Bench and...

...rack mounting options (1/4 19" 3U sub rack)



- Weight**

TIC Instrument Controller 100W RS232 2.75 Kg

TIC Instrument Controller 200W RS232 3.5 Kg

## COMMON INFORMATION FOR TIC AND RELAY BOXES

### OPERATING AND STORAGE DATA

Operating temperature

+0° to +40° C

Storage temperature

-30° to +70° C

Maximum ambient operating humidity

90% RH non-condensing at 40° C

Maximum operating altitude

3000m

### STANDARDS

Electrical design

EN 61010-1

Electromagnet compatibility

EN 61326 (Industrial location, Class B Emissions)

Enclosure rating

IP20

# SPECIFICATION

## RELAY BOX (OPTIONAL)

- General description**

A range of relay boxes has been developed to allow TIC to operate mains backing pumps and accessories.

The mains backing pump relay controls a backing line isolation valve, such that when the backing pump is switched off the isolation valve closes.

The relay box is connected to the TIC via the logic interface connector, which is also provided with a bypass connector for interfacing with OEM equipment.

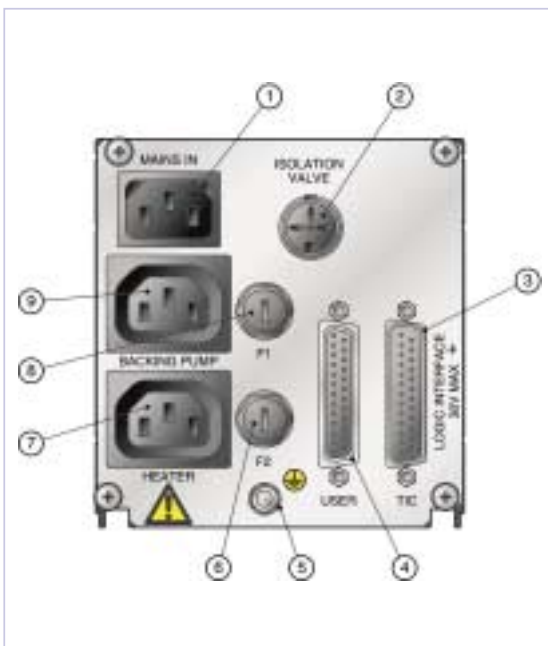
- Relay box options**

	HEATER BAND & BACKING LINE ISOLATION VALVE	SMALL BACKING PUMP	LARGE BACKING PUMP
TIC Relay Box Sml Bkg	✓	✓	
TIC Relay Box Inst & Lge Bkg *	✓	✓	✓

\* large backing pump variant currently available as non-standard only.

- Compatible mains backing pumps and accessories**

Small backing pumps	E2M0.7 & 1.5, RV3, 5, 8 & 12, XDSC5 & 10, XDS5 & 10, ESDP12 & 30
Large backing pumps	As above + E1M18, E2M18 & E2M28
Heater band	BX70 & BX250
Backing line isolation valve	LCPV16EKA & LCPV25EKA



1 Mains input	CEE/IEC 320 socket
2 Backing line isolation valve	3-way DIN socket
3 Logic interface (from TIC)	25-way 'D' socket
4 Logic bypass (to PC, PLC etc.)	25-way 'D' socket
5 Earth stud	M4
6 Heater band fuse	
7 Heater band	CEE/IEC 320 socket
8 Mains backing pump fuse	
9 Mains backing pump	CEE/IEC 320 socket

# WINDOWS™ PC PROGRAMME

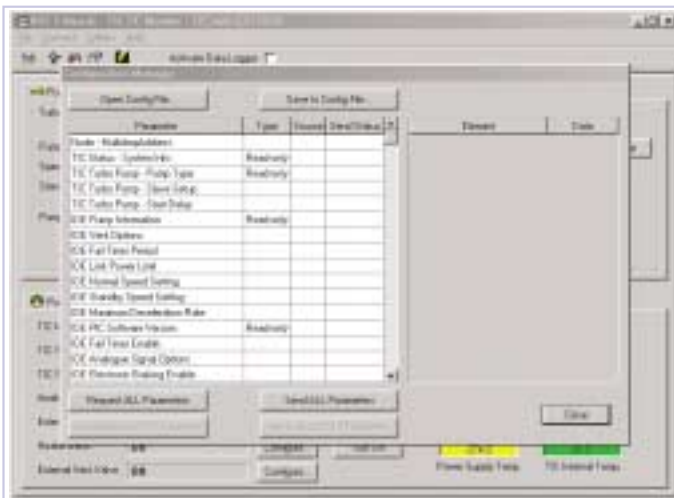
## WINDOWS™ PC PROGRAMME



TIC is supplied with a fully functional Windows™ based PC software, which replicates and adds to the TIC embedded control menus.

The PC software enables TIC systems to be configured, controlled and monitored from a single PC.

A useful data logging facility is also included, which saves user selectable parameters to file (in.csv format) for later analysis using suitable software.



TIC system configurations may be created and saved for use at a later date, thus saving programming time.

The PC software includes an upgrade utility, which enables the TIC embedded software to be upgraded over the serial link from files supplied electronically.

# ORDERING INFORMATION

ORDERING INFORMATION	
PRODUCT DESCRIPTION	ORDERING INFORMATION
<b>CONTROLLERS (SUPPLIED WITH MANUALS &amp; SOFTWARE)</b>	
TIC Turbo Controller 100W RS232	D397-11-000
TIC Turbo Controller 200W RS232	D397-12-000
<b>RELAY BOXES (SUPPLIED WITH A SET OF MATING CONNECTORS)</b>	
TIC Relay Box Small Backing	D397-11-805
<b>CABLES</b>	
<b>Mains cables (TIC and relay box supply)</b>	
2m UK plug	D400-13-025
2m USA plug	D400-13-120
2m Northern European plug	D400-13-030
<b>Mains cables (relay box to RV and XDS type pumps)</b>	
TIC Mains cable IEC320 M/F 2m	D397-00-831
TIC Mains cable IEC320 M/F 5m	D397-00-832
<b>Interface cables</b>	
TIC Logic Interface Cable 2m	D397-00-833
TIC RS232 Interface Cable 2m	D397-00-834
<b>24V Pump extension cables (use with EXDC, DX &amp; XDD1 type pumps)</b>	
XDD/DX/EXDC Extention Cable 1m	D397-00-835
XDD/DX/EXDC Extention Cable 2m	D397-00-836
XDD/DX/EXDC Extention Cable 5m	D397-00-837
<b>OTHER ACCESSORIES AND SUPPORTING PRODUCTS</b>	
TIC front bezel kit (spare)	D397-00-822

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<http://www.bocedwards.com>  
Publication No: D397-11-895

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