EA014

TORQUE CALIBRATION ADAPTER

Operation Manual

Version 2.00
March 2012
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Guarantee and service

Transmille Ltd. guarantees this instrument to be free from defects under normal use and service for a period of 1 year from purchase. This guarantee applies only to the original purchaser and does not cover fuses, or any instrument which, in Transmille's opinion, has been modified, misused or subjected to abnormal handling or operating conditions.

Transmille's obligation under this guarantee is limited to replacement or repair of an instrument which is returned to Transmille within the warranty period. If Transmille determines that the fault has been caused by the purchaser, Transmille will contact the purchaser before proceeding with any repair.

To obtain repair under this guarantee the purchaser must send the instrument in its original packaging (carriage prepaid) and a description of the fault to Transmille at the address shown below. The instrument will be repaired at the factory and returned to the purchaser, carriage prepaid.

Note :
TRANSMILLE ASSUMES NO RESPONSIBILITY FOR DAMAGE IN TRANSIT

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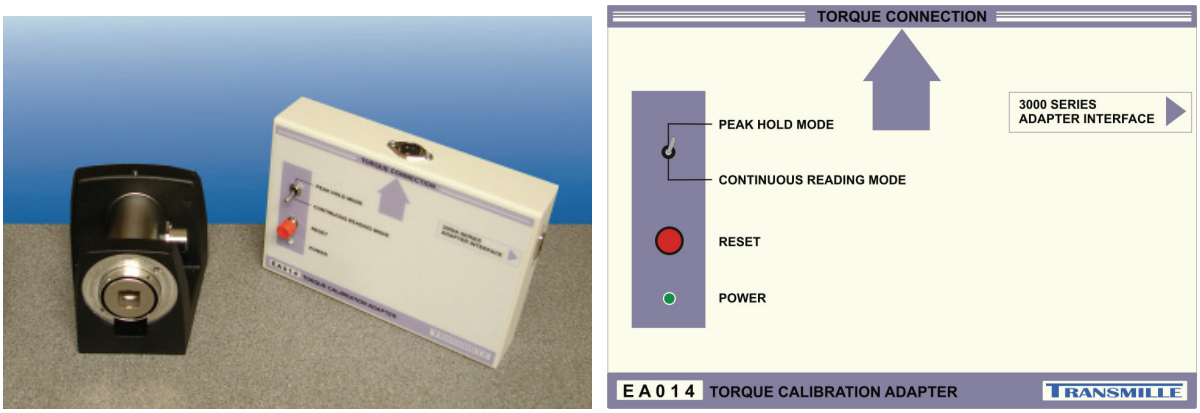
EA014 Torque Calibration Adapter

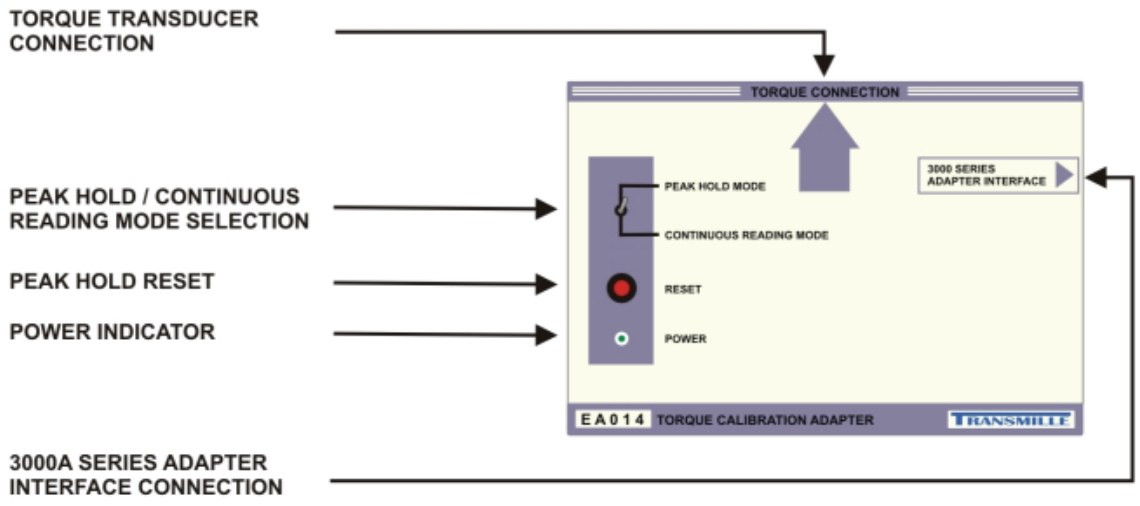


The EA014 provides an easy to use solution for the measurement of torque using external torque transducers. It incorporates built in peak hold and continuous reading functionality and connections to the 3000 Series adapter interface and a suitable torque transducer.

The operation is controlled direct from the 3000A Series or using a PC via the Virtual front panel program or ProCal software.

Main Features

- Complete solution – Interfaces with multiple transducers for maximum flexibility
- Complete with adapter unit incorporating continuous/peak hold functions
- Easy to use
- Works with 3000A Front Panel or ProCal / Virtual Front Panel Software



Connections



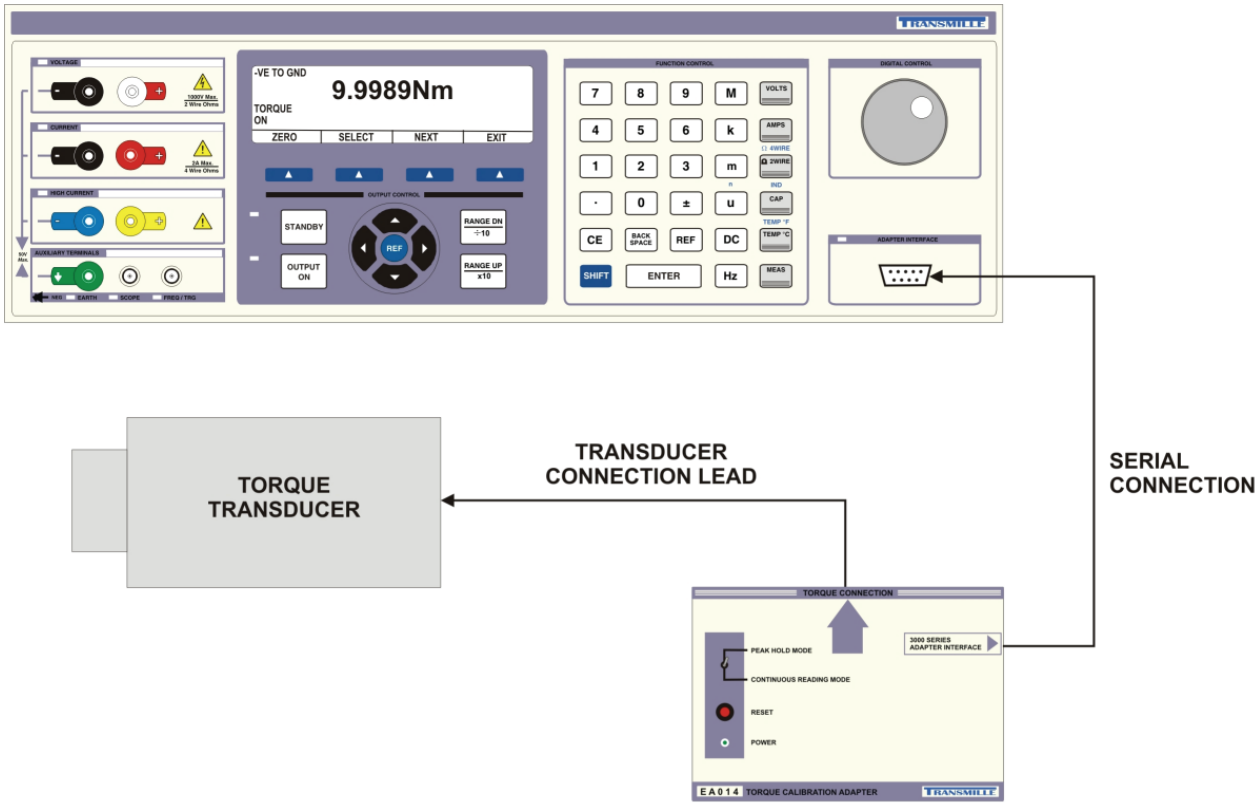
Connection to the 3000 Series adapter interface is provided via a 9-Pin D-Type connection located on the side of the adapter

Operating Notes

This section details operational and environmental considerations for the EA014 Torque Adapter. Follow these instructions when operating or storing the Torque Adapter.

Connection Recommendations

To connect the EA014 Torque Adapter to the 3000 Series multi product calibrator, use the supplied adapter interface cable.



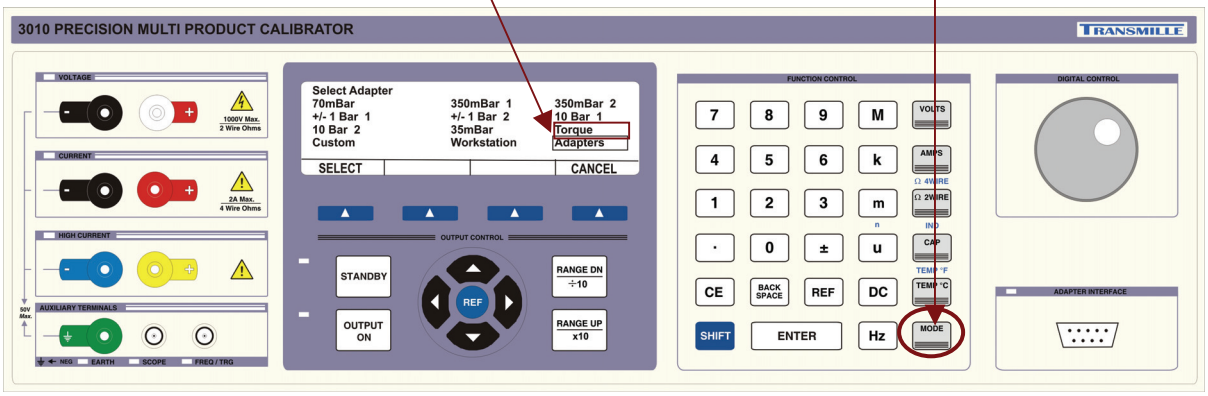
Using the EA014 from the 3000A Front Panel*

The 3000A Series calibrators provide front panel control of the EA014 Torque adapter. This can be accessed using the mode function button followed by on-screen menus as follows :

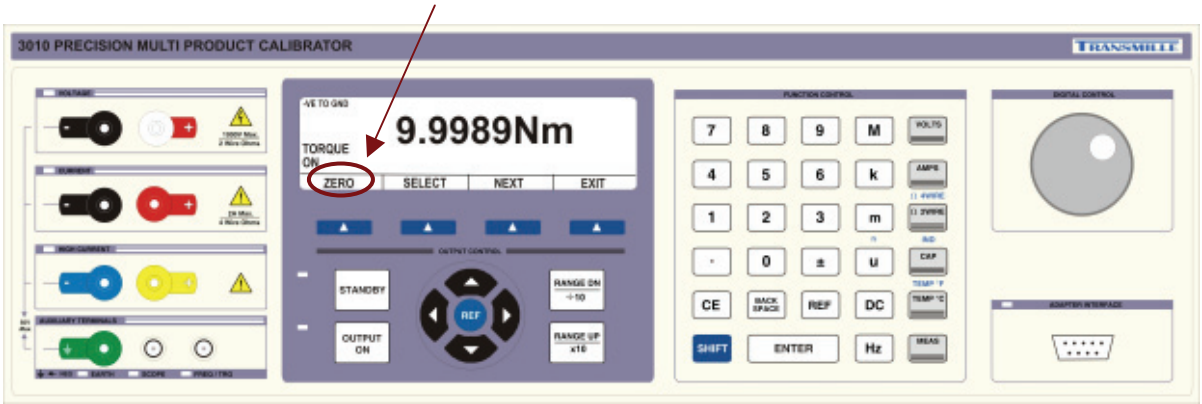
Selecting the Torque mode :

1. Press the MODE button to select the required adapter

2. Use the cursor keys to select the Torque menu item



3. After connecting the Torque adapter with associated Transducer to the 3000A Series calibrator, press the ZERO softkey to zero the reading.



4. When a torque UUT is connected and turned within the transducer socket, the measured torque force is displayed on the 3000A display.

* Note : Front panel control from 3000A series only (Models 3010A, 3041A & 3050A)

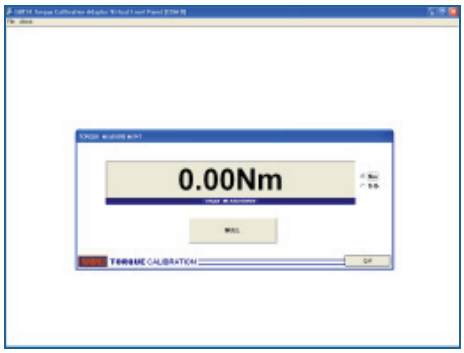
Using the EA014 with the Virtual Front Panel Software

Installing the Software

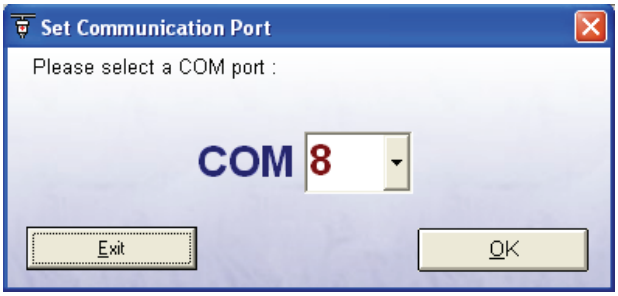
Insert the CD supplied with the EA014 Torque Adapter – this should auto run. If it does not auto run, click START -> Run then run x:\Setup.exe where x is the drive letter of your CD drive.

Once installation is complete choose START -> ALL PROGRAMS -> TRANSMILLE VFPs -> EA014 Torque Adapter to run the virtual front panel





Selecting a COM Port



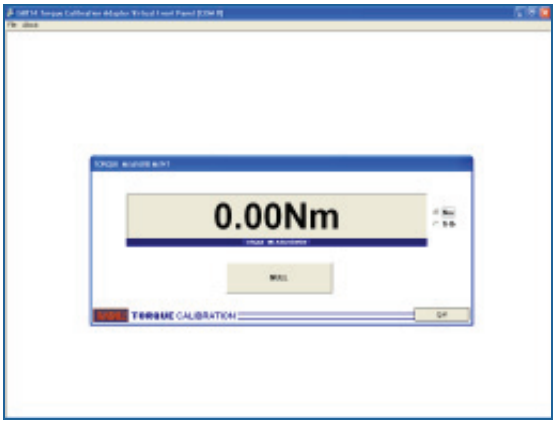
On starting the virtual front panel for the first time, a COM port selection screen will be displayed. Click on the COM port which is connected to your 3000 Series calibrator to continue.

A different COM port can be selected at any time using the Change COM button.

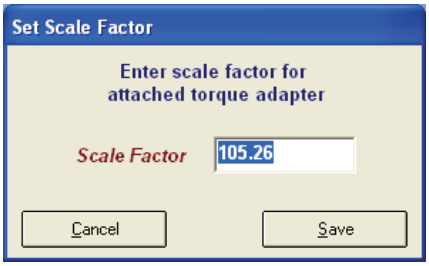
If you are using a laptop to connect to the calibrator, the COM port will usually be COM 1. A desktop computer will usually be COM 2

Operation of the Virtual Front Panel

Once the correct COM port is selected, the calibrator will be detected, and the main screen displayed :

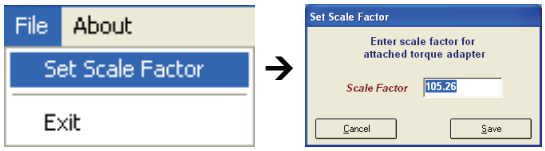


On initial start-up of the torque calibration adapter, the scale factor will be asked for :

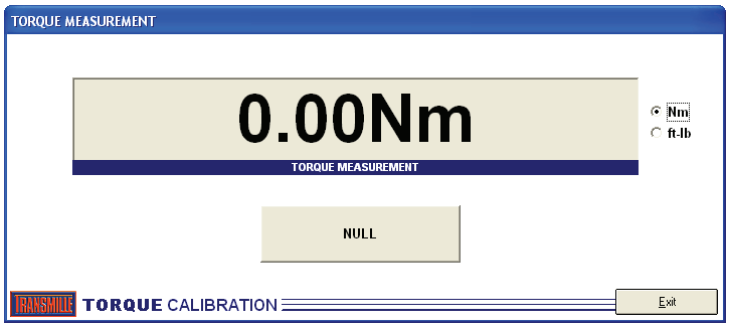


The scale factor for a torque transducer will be different depending on its calibration – the scale factor can be found detailed on the calibration certificate for the torque adapter (supplied).

Note : This scale factor can be changed at any time by selecting
File -> Set Scale Factor.



Functions : Torque Measurement



The main measurement screen displays the reading and has the following functions :

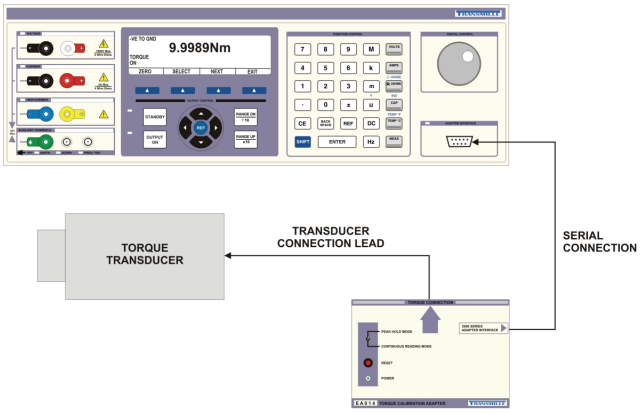
NULL : Allows zero offsets to be nulled before measurements are taken
Nm : Set units to Newton Meters
Ft-lb : Set units to foot pounds

Performing a Torque Measurement

STEP 1

Ensure the torque adapter is connected as per the diagram below.

- ❑ Set the required reading mode on the adapter (for torque wrenches use peak hold mode)
- ❑ Pres the RESET button on the adapter to clear peak hold memory
- ❑ Ensure EA014 virtual front panel scale factor for the connected transducer is correct (from calibration certificate)
- ❑ Select required units on virtual front
- ❑ Null the reading on the virtual front panel with the transducer at ZERO load (if required)



STEP 2

Apply the torque to the transducer and observe the reading displayed on the virtual front panel. For torque wrenches pressure should be applied until the torque limit point ‘click’ is heard – peak hold will retain the maximum reading obtained.

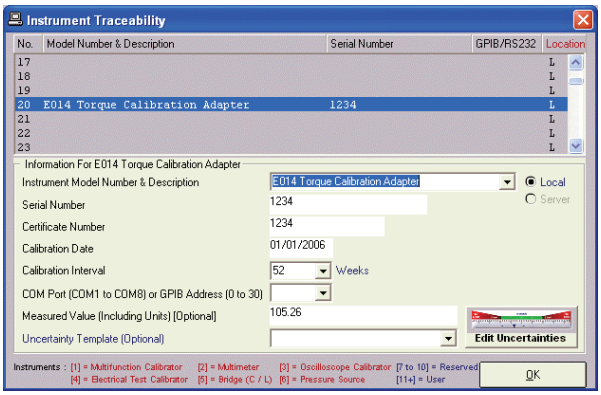
TIP : Five readings should be taken for torque wrenches and the average of these readings used as the result.

Using the EA014 Torque Calibration adapter with ProCal

A calibration procedure using a number of measurement tests can be written using the Transmille ProCal software (option). The calibrator is used to measure the output voltage from the pressure calibration adapter (0 to 9.5 Volts). This voltage can then be scaled using the formula function in ProCal to Nm.

Traceability and scale factor data for the torque adapter can be stored in ProSet.

Enter Torque Adapter in Traceable list using ProSet



Use the Instrument Traceability function in ProSet to add the torque adapter to the traceable list. This needs to include the scale factor of the pressure module used :

e.g. Scale factor for 1000Nm Torque Adapter = **105.26**

Torque adapter should be added as traceable
item 20 in the list, to match with supplied example procedures.

Instrument model number & description

A text description and model number. eg.
EA014 Torque Calibration Adapter

Serial Number

The pressure module serial number, eg. SN00001

Certificate Number

The pressure module certificate number, eg. CM00014

Calibration Date

The pressure module calibration date, eg. 01/02/2006

Calibration interval

The calibration interval in weeks, eg. 52

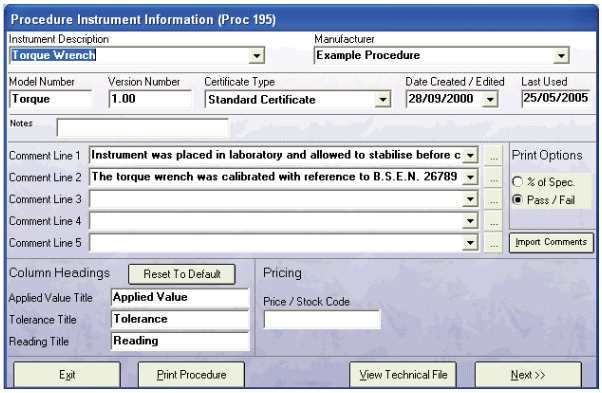
Measured Value

This should be the ***SCALE FACTOR*** **WITHOUT** units
eg. **EA014 1000Nm Torque Calibration Adapter** Scale Factor = **105.26**

Create / Edit a procedure using ProEdit

STEP 1

Create a procedure using ProEdit (select File -> Create New Procedure)

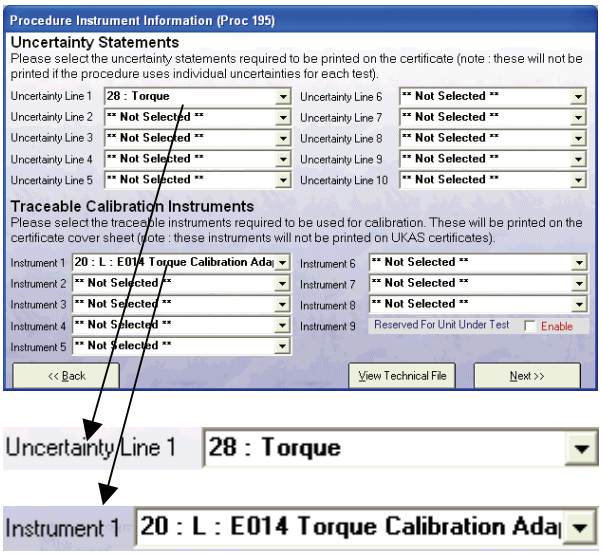


Enter instrument description, model number etc then click **NEXT >**

STEP 2

Set uncertainty line 1 to **TORQUE**
This will print out the correct uncertainty statement on the certificate.

Set Instruments to the pressure module(s) to be used in this procedure – in this example the pressure module in **position 11** in the Traceable instrument list has been selected :



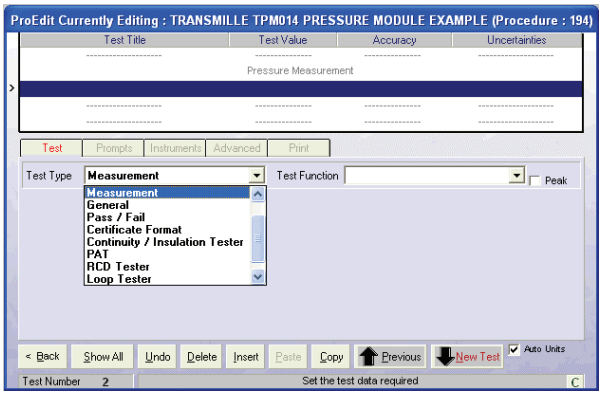
Note : This uncertainty statement can be changed using the Edit uncertainty Statements function within ProEdit

Click **NEXT >** to proceed to the test editing screen

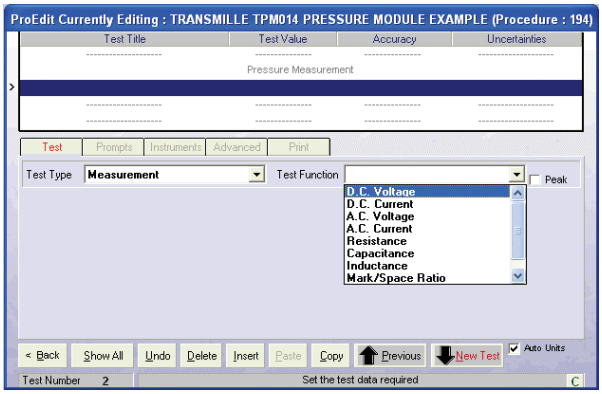
STEP 3

Create a ZERO test, to measure the ZERO output of the transducer – this will be used to subtract from subsequent tests (this test will be set as 'non-printing')

Select test type as **MEASUREMENT**



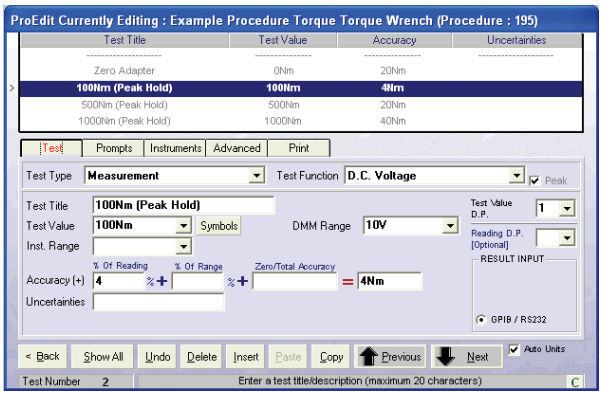
Select test function as **DC VOLTAGE** – this is selected as the signal from the torque transducer is a DC voltage signal – this test will be configured to convert this to Nm using a scale (conversion) factor.



STEP 4

Set the test details as follows – Note test 1 is a zero test, which will be used to subtract the zero of the adapter from each subsequent reading.

Test Title :	**Zero Adapter**
Test Value :	**0Nm**
Accuracy :	**20%**
DMM Range :	**10V**
Test Value D.P. :	**2**

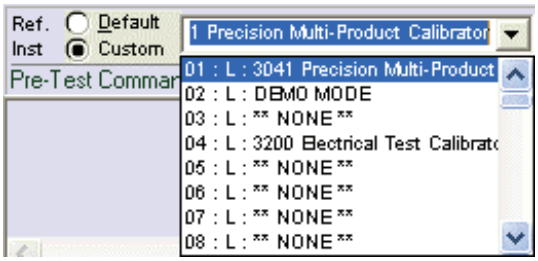


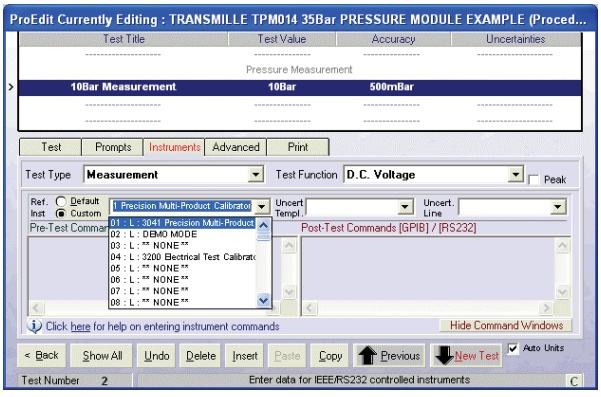
STEP 5

Select the **INSTRUMENTS** tab

Set the Ref. Inst. to
01 : L : 3050 Precision Multi-Product Calibrator

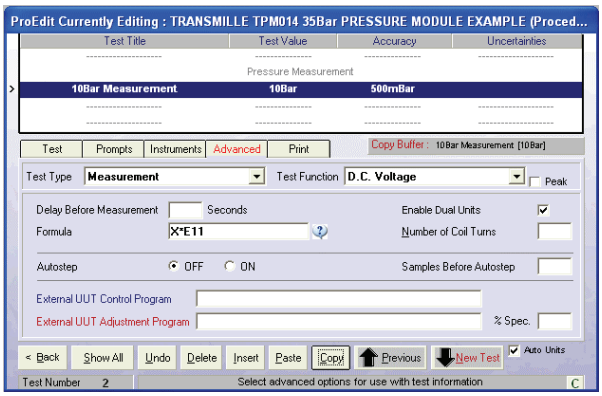
Note : If the first item in the list is not correct, this can be changed on the ProSet Traceable instrument screen.





STEP 6

Select the **ADVANCED** tab



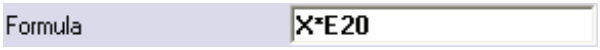
Scale Factor Calculation :

(Transducer Range) / (Output voltage)

For example a 1000Nm transducer with a 9.5 Volt output the scale factor is 1000/9.5 = 105.26.

Example Formula : 1000Nm Torque Transducer :

Set the **formula** to **X*E20**



X = Current test
E20 = Traceable instrument 20 scale factor (as set in ProSet)

Using the **Exx** command, the scale factor is used from the central instrument traceability list as created using ProSet. When the torque adapter is recalibrated the scale factor can be updated in ProSet without having to change any procedures which are using this pressure module.

Tick the **'Enable Dual Units'** option



This allows the measurement in voltage to be scaled using the formula and displayed in Bar.

STEP 7

Select the **PRINT** tab and set print type as
'**Do Not Print Test**'

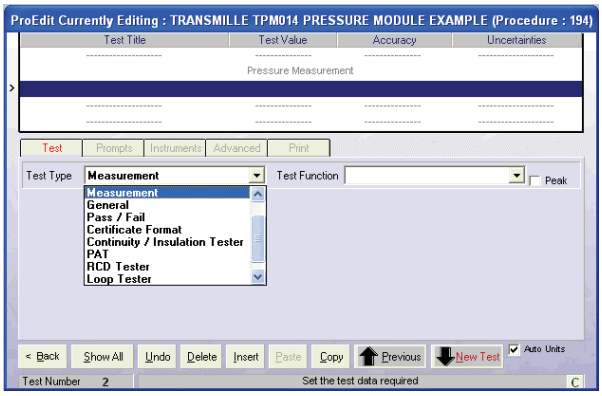


STEP 8

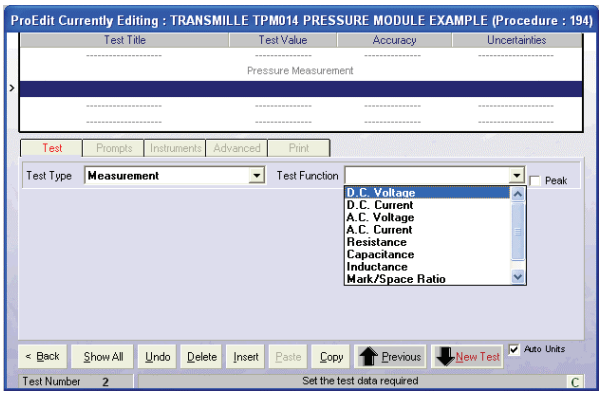


Click to create a new test

Select test type as **MEASUREMENT**



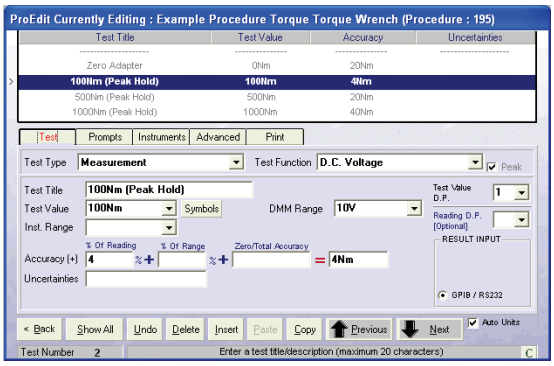
Select test function as **DC VOLTAGE** – this is selected as the signal from the torque transducer is a DC voltage signal – this test will be configured to convert this to Nm using a scale (conversion) factor.



STEP 9

Set the test details as follows – Note test 1 is a zero test, which will be used to subtract the zero of the adapter from each subsequent reading.

Test Title :	**100Nm**
Test Value :	**100Nm**
Accuracy :	**4%**
DMM Range :	**10V**
Test Value D.P. :	**2**

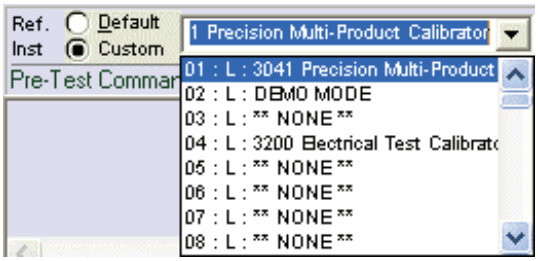


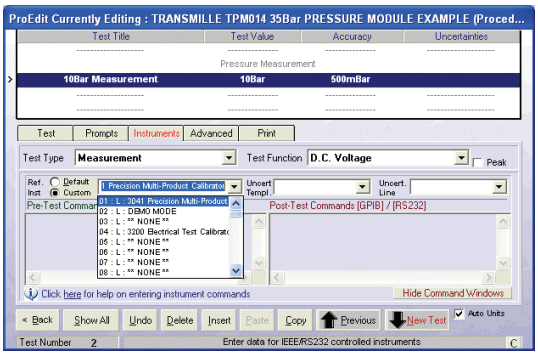
STEP 10

Select the **INSTRUMENTS** tab

Set the Ref. Inst. to
01 : L : 3050 Precision Multi-Product Calibrator

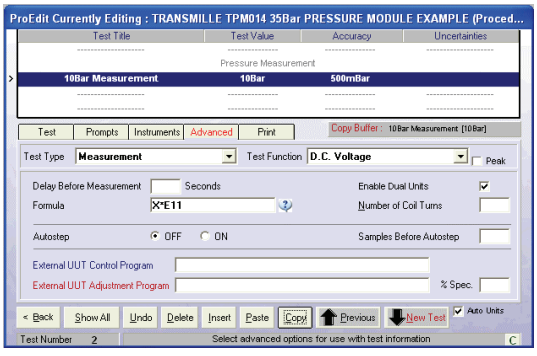
Note : If the first item in the list is not correct, this can be changed on the ProSet Traceable instrument screen.





STEP 11

Select the **ADVANCED** tab



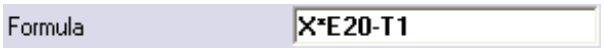
Scale Factor Calculation :

(Transducer Range) / (Output voltage)

For example a 1000Nm transducer with a 9.5 Volt output the scale factor is 1000/9.5 = 105.26.

Example Formula : 1000Nm Torque Transducer :

Set the **formula** to **X*E20-T1**



X = Current test
E20 = Traceable instrument 20 scale factor
(as set in ProSet)
-T1 = Subtracts test 1 (transducer zero)

Note : This transducer requires a zero to be performed, with test 1 of the procedure measuring the zero output – this is subtracted from subsequent tests using the formula above

Using the **Exx** command, the scale factor is used from the central instrument traceability list as created using ProSet. When the torque adapter is recalibrated the scale factor can be updated in ProSet without having to change any procedures which are using this pressure module.

Tick the **'Enable Dual Units'** option



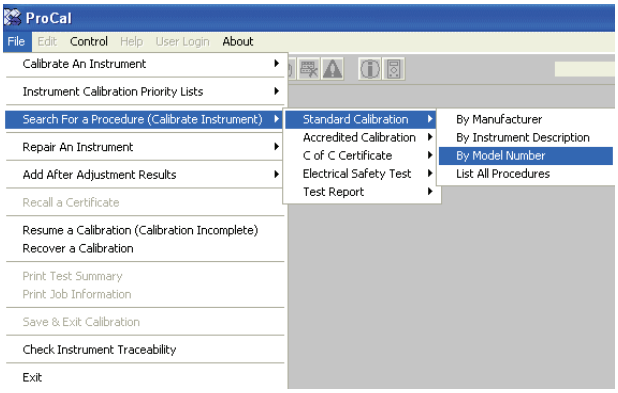
This allows the measurement in voltage to be scaled using the formula and displayed in Bar.

Running the procedure using ProCal

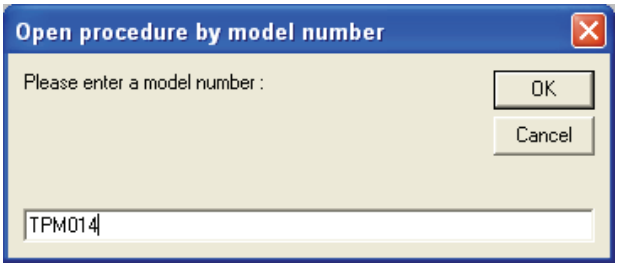
STEP 1

Start a calibration by selecting a procedure :

File > Search For a Procedure > Standard Calibration > By Model Number

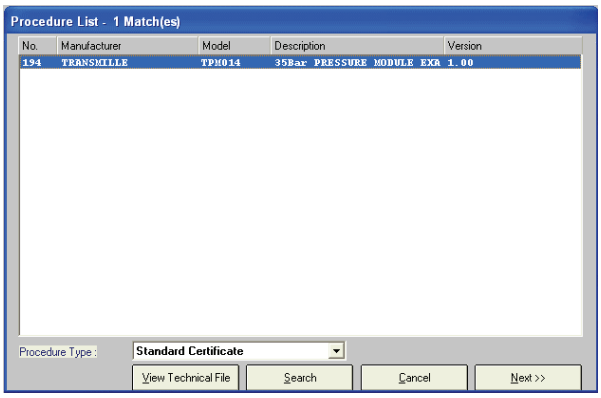


Enter instrument model number :



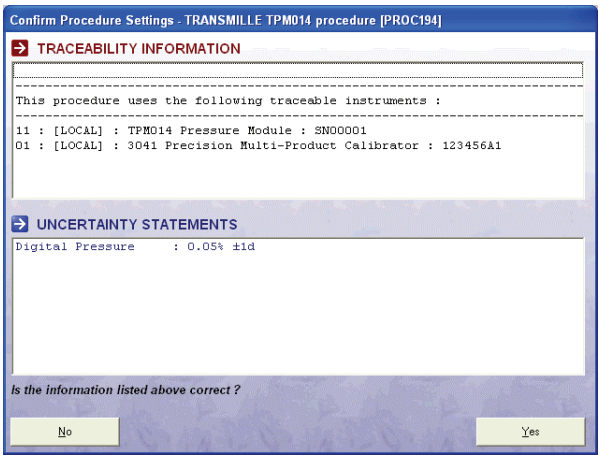
STEP 2

Select the procedure :



Click Next > to proceed

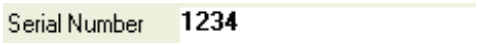
ProCal will confirm the traceable instruments and the uncertainty statements to be used :



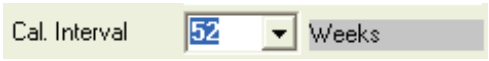
Click YES to proceed.

STEP 3

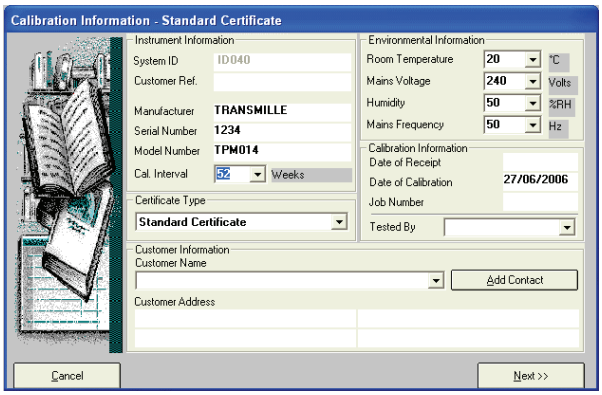
Enter the serial number



Enter the calibration interval in weeks



(or enter 'test' information for a test run – serial number and calibration interval must be entered)

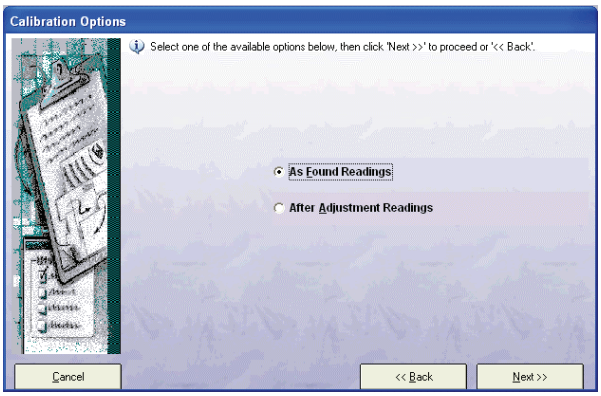


Click Next > to proceed

STEP 4

Set 'As Found' results to be taken

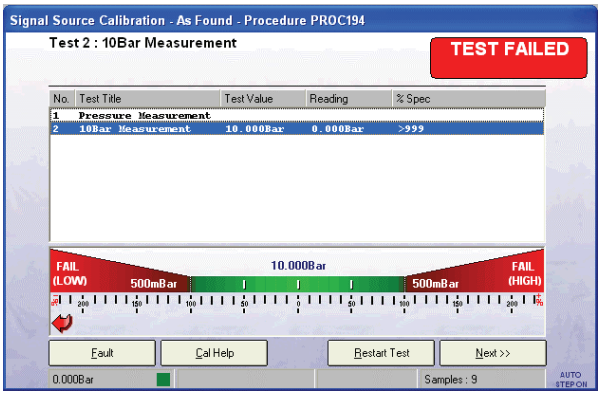




Click **Next >** to begin testing

STEP 5

The test will be displayed, measuring back from the torque adapter and displaying the value in Nm



Click **Next >** to accept the reading and finish testing.

Specifications

GENERAL SPECIFICATIONS	
Control Interface	9 Pin ‘D’ type connector for use with 3000A Series adapter interface
Dimensions	12cm x 7cm x 3.5cm
Weight	0.5kg

PERFORMANCE SPECIFICATIONS	
Measurement Range	Dependant on transducer
Accuracy	Dependant on transducer
Notes	3000A Direct • Virtual Front Panel (supplied) • ProCal Software (optional) Control

Care & Maintenance

The only maintenance instructions for the adapter is periodic cleaning. See below for details on the cleaning procedure and precautions for handling.

Cleaning the Adapter

To keep the external enclosure of the adapter in good condition, clean the outer case with a soft cloth. Do not use any liquids in cleaning the enclosure – removal of surface dust is all that is recommended.

CAUTION

Do not use cleaning fluids or solvents for cleaning as these may damage the enclosure and affect the plastic materials used in the adapter.

Handling Precautions

The adapter is designed for mechanical stability, but should not be subjected to excessive shock or be dropped. Transportation is recommended using the original packaging with avoidance of extreme changes of temperature.

Servicing Information

The adapter is provided certified from the factory, and uses external sensors for measurement and are not user repairable. If the adapter is damaged it should be returned to the factory for repair and recalibration.