AF1300z

Single Component Lift and Drag Balance

User Guide

TecQuipment has taken care to make the contents of this manual accurate and up to date. However, if any errors are found, please let us know so we can rectify the problem.

TecQuipment supply a Packing Contents List (PCL) with the equipment. Carefully check the contents of the package(s) against the list. If any items are missing or damaged, contact TecQuipment or the local agent.

BW/0718

TECQUIPMENT

Symbols used in this manual

NOTE		*Important information.*
CAUTION		*Failure to follow these instructions can damage the unit, other equipment, personal property or the environment.*
WARNING		***Failure to follow this instruction may cause injury.***

Contents

TECQUIPMENT

AF130z

Single Component Lift and Drag Balance

User Guide

Introduction

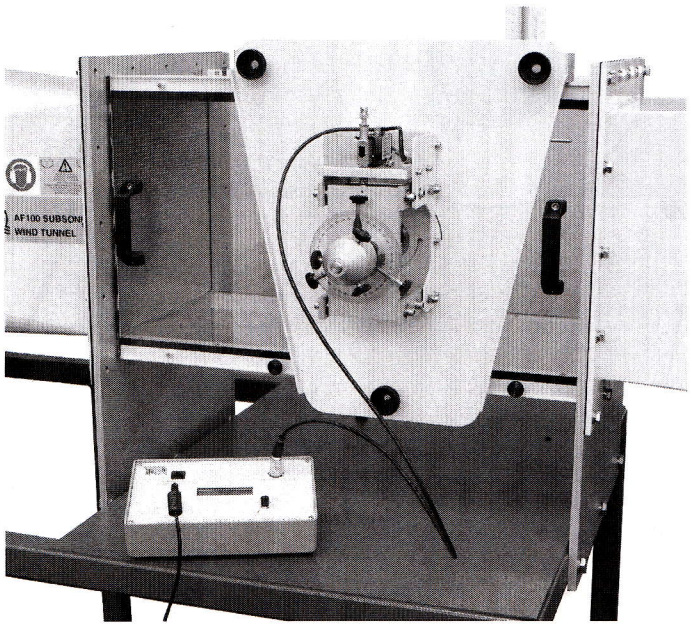


Figure 1 The AF1300z Single Component Lift and Drag Balance (Shown Mounted on a Wind Tunnel)

VDAS ***This product works with VDAS®***

The AF1300z Module works with TecQuipment's wind tunnels. It provides a means to measure and display the lift or drag on a selection of optional models. A range of suitable models are available from TecQuipment.

The module is in two parts:

- The Balance Assembly, which is mounted on a trapezoidal backplate and features a load cell. The backplate resists bending moments, so that only the force (not the moment) on the model is transmitted to the load cell.
- The Display Unit, that displays the force measured by the load cell

The Balance Assembly may be mounted underneath the working section of the wind tunnel, or to the side of the working section, by means of the back plate (supplied).

The AF1300z can be interfaced to a PC by means of the optional VDAS® (Versatile Data Acquisition System), that allows pressure measurements to be displayed, captured, graphed, conveniently tabulated, and exported to a spread sheet package for further processing.

Parts of the AF1300z

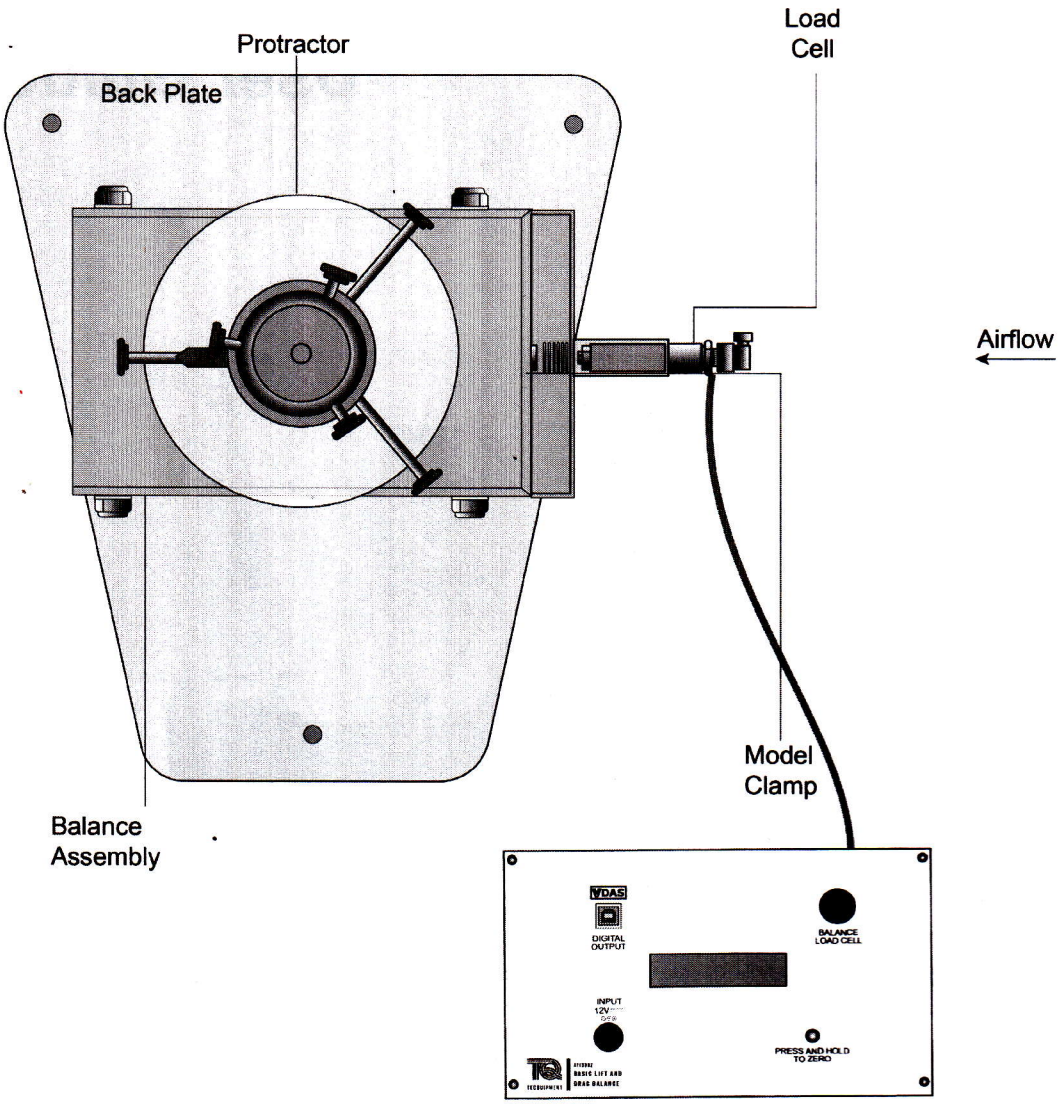
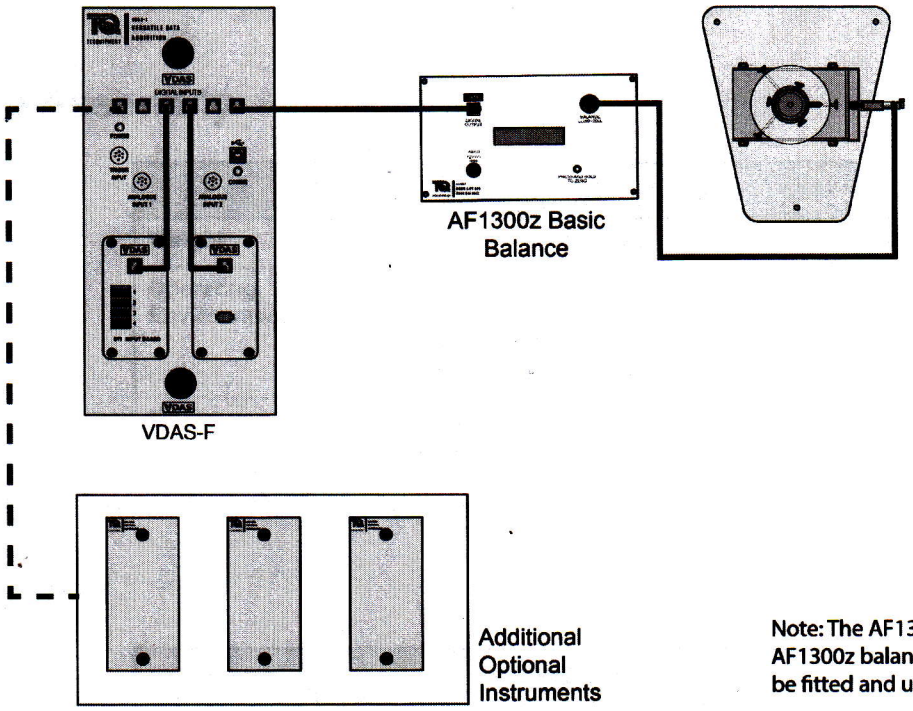


*Figure 2 Parts of the AF1300z. * The Protractor and Model Clamp are Supplied with the AF1300 Tunnel*

Optional Instrument Modules

- AF1300t - A Three Component Balance
- AFA4 - Angle Feedback Device for use with the AF1300t
- AFA5 - Differential Pressure Transducer
- AFA6 - Multi-way Pressure Display System
- AFA7 - Pitot Traverse Unit
- VDAS® - A two-part (hardware and software) automatic data acquisition system

Figure 3 shows a system diagram and how they connect to VDAS®.



Note: The AF1300t and the AF1300z balances cannot both be fitted and used at the same time.

Figure 3 System Diagram

Technical Details

Balance Assembly

Item	Details
Weight	Assembly (on back plate): 5 kg
Operating Environment	Indoor (laboratory) Altitude up to 2000 m Overvoltage category 2 (as specified in EN61010-1). Pollution degree 2 (as specified in EN61010-1).
Maximum Load	10 kg (100 N) *The load cell is rated at 20 kg

Table 1 Balance Assembly Technical Details

Display Unit

Item	Details
Weight	Unit (with power supply): 1 kg
Operating Environment	Indoor (laboratory) Altitude up to 2000 m Overvoltage category 2 (as specified in EN61010-1). Pollution degree 2 (as specified in EN61010-1).
Power Supply	12 VDC input Input 90 VAC to 264 VAC 50 Hz to 60 Hz at 1A Output 12 VDC at 5 A Centre Positive

Table 2 Display Unit Technical Details

Assembly

The terms **left**, **right, front** and **rear** of the apparatus refer to the operators' position, facing the unit.

Procedure

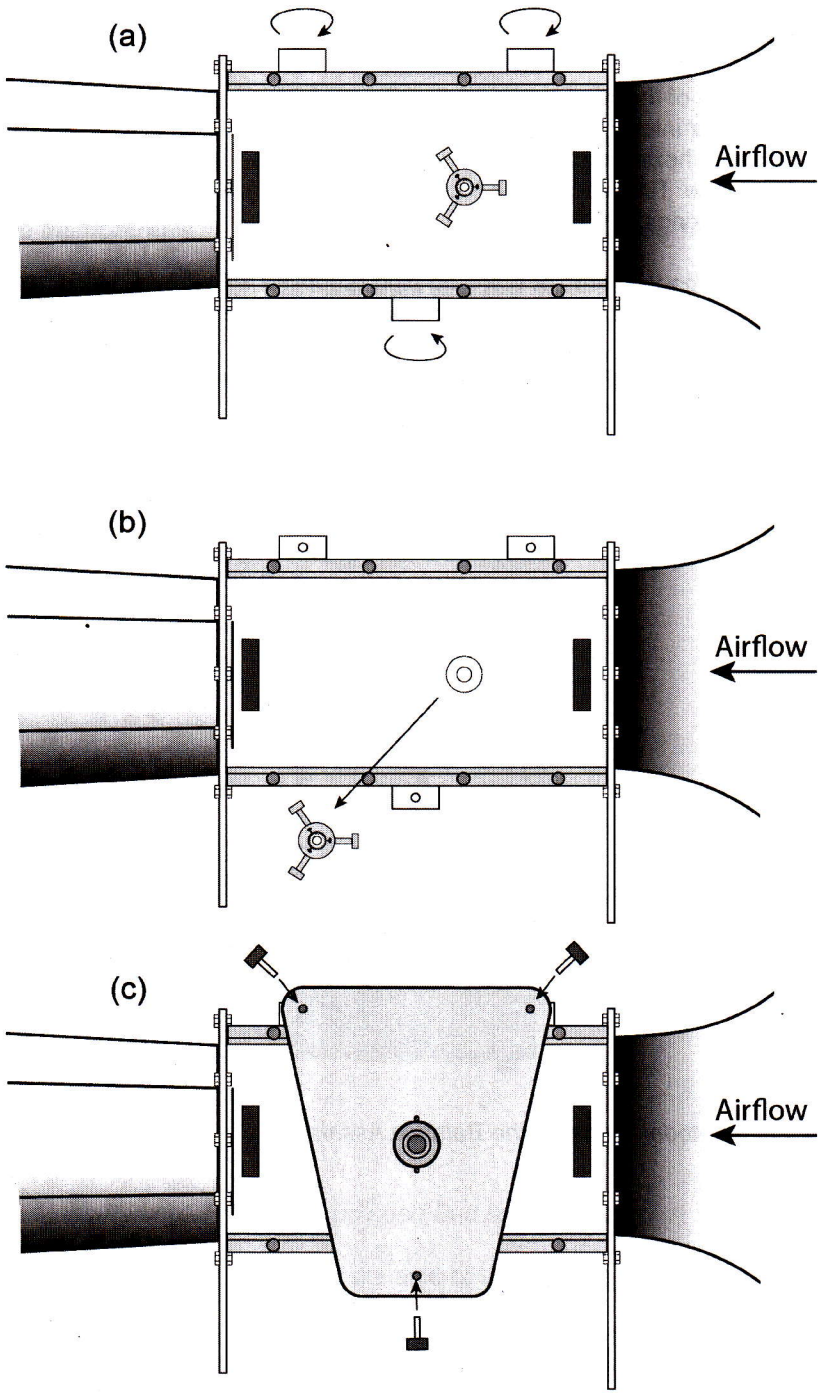


Figure 4 Fitting the AF1300z

The Balance Assembly may be mounted underneath or to the side of the working section on the AF1300 series wind tunnel. The choice is determined by the model that is to be tested.

WARNING ***Disconnect the electrical supply to the wind tunnel before installing the AF1300z.***

Side Mounting (for lift and drag measurements)

This mounting method is used for the optional aerofoil, cylinder and flat plate models.

1. Face the side of the wind tunnel so that the air flow is from right to left (fan housing is to the user's left and the air inlet is to their right). This is the 'operators side' for most experiments on the wind tunnel. Use a hexagon tool to undo the fixings of three blocks on the working section - two above and one below. Turn each block around so its fixing hole can be seen, ready for the AF1300z. Tighten the fixings of the blocks Figure 4 (a).

2. Remove the model clamp or blanking plug (supplied with the AF1300) from the middle of the clear window on the user's side of the working section Figure 4(b).

3. Use the thumbscrews and washers (supplied) to fix the trapezoidal back plate to the user's side of the working section see Figure 4(c).

4. Fit the model clamp to the Balance Assembly.

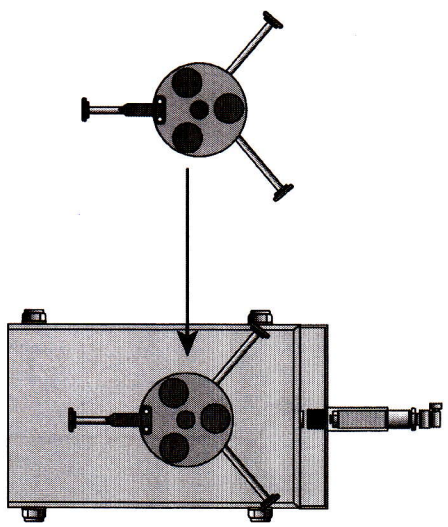


Figure 5 Fit the Model Clamp to the Balance Assembly

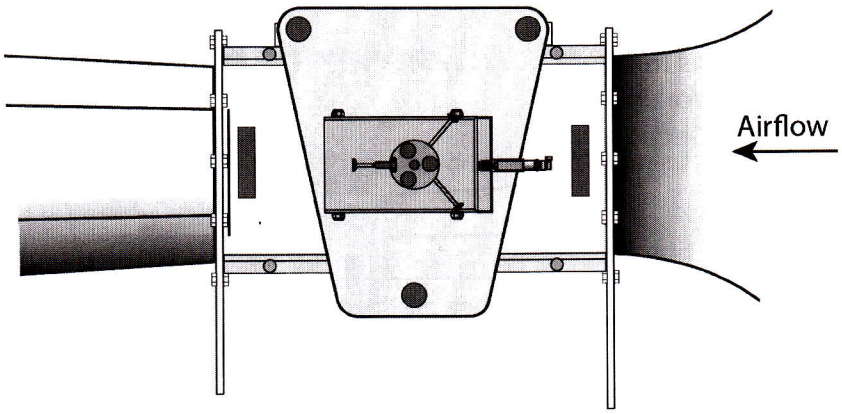


Figure 6 Use the thumbscrews and Washers to fix the Balance Assembly to the Back Plate

5. Hold the Balance Assembly onto the back plate and use the smaller thumbscrews and washers (supplied) to fix it onto the back plate. For drag measurement, fit the assembly so that the load cell is to the right (see Figure 8). For lift measurement, rotate and fix the assembly so that the load cell is to the top (see Figure 7), a ball spring mechanism will be felt and heard to lock into place when the assembly is in position.

NOTE  *When the load cell is to the right, the Balance Assembly will only measure drag, when it is vertical, it will only measure lift.*

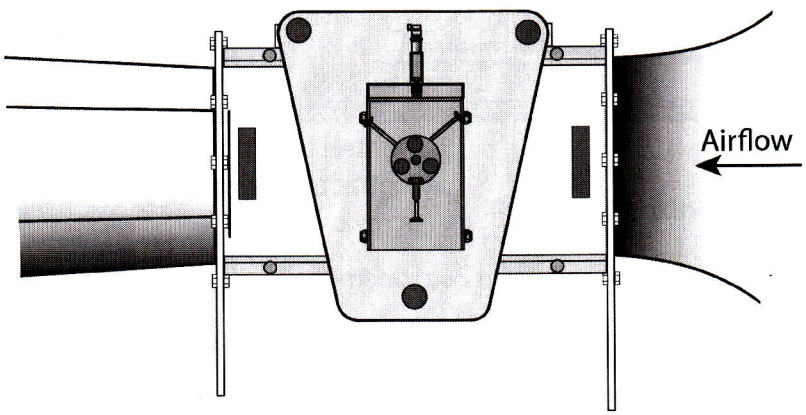


Figure 7 For Lift Measurement, Fit so that the Load Cell is Uppermost

6. Remove the clear window from the opposite side of the working section.

7. Put the model into the working section and slide its support shaft through the hole in the middle of the AF1300z Balance Assembly. Set the model to the correct angle for the tests (usually zero incidence for aerofoil models) and tighten the three thumbscrews on the Balance Assembly to clamp the model (see Figure 8).

8. Fit the protractor to the model shaft and set it to 0 degrees. Tighten the protractor clamp screws (see Figure 9). The protractor is supplied with the AF1300 wind tunnel.

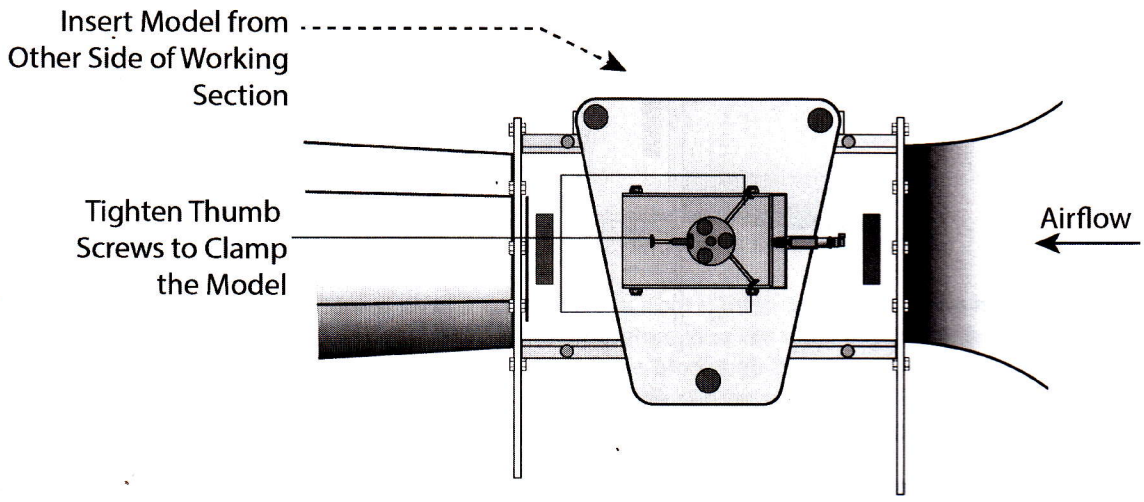


Figure 8 Insert the Model from inside the Working Section and Clamp it into Position.

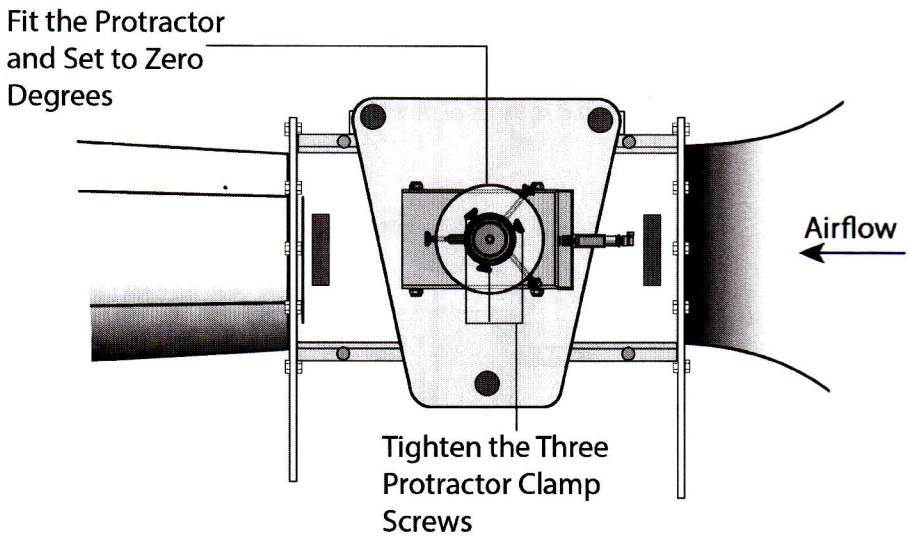


Figure 9 Fit the Protractor and Set to Zero Degrees.

9. Replace the clear window to the opposite side of the working section.

10. Connect the Display Unit as described in **Connecting to the Display Unit** on page 13.

WARNING *Always switch off the Wind Tunnel before adjusting the Balance Assembly from the lift to the drag position, or the model may be damaged.*

Mounting the Balance Underneath the Working Section (drag measurements only)

This method is used to mount model cars or buildings.

NOTE *The balance will only measure drag when it mounted underneath the working section.*

1. Remove one of the clear windows of the working section.
2. Remove the balance assembly from the triangular back plate (if necessary). Fit the model clamp (if necessary). The model clamp is supplied with the AF1300 wind tunnel.
3. Remove the blanking plug from the bottom of the working section (see Figure 10).
4. Put the balance assembly over the fixing points on the table, underneath the working section (load cell towards the air inlet) (see Figure 11).
5. From underneath the table, use the fixings (supplied) to fix the balance assembly into position (see Figure 12).

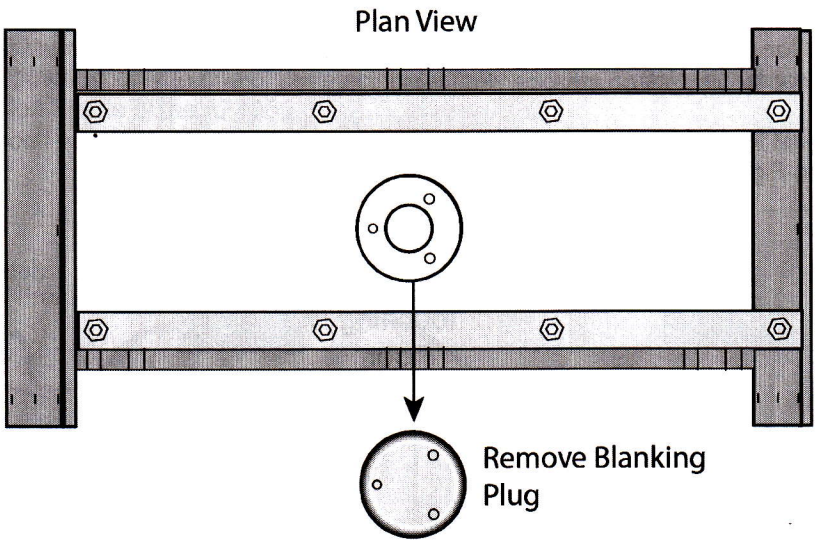


Figure 10 Remove the Blanking Plug from the Bottom of the Working Section

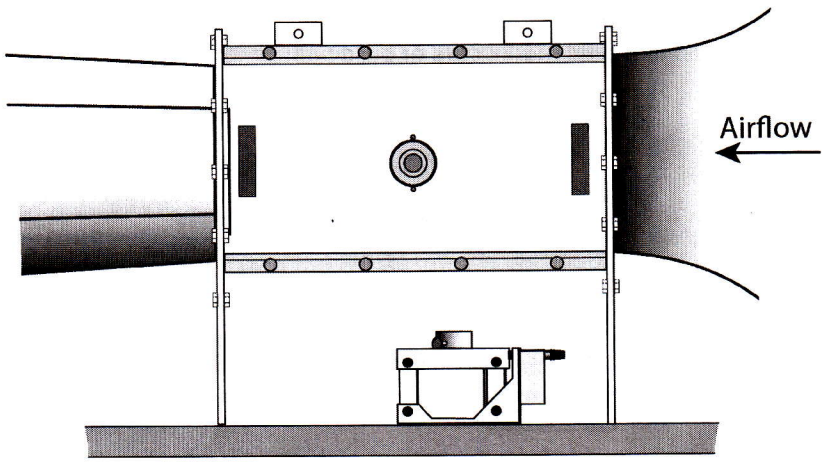


Figure 11 Put the Balance Unit on the Table Underneath the Working Section (Load Cell Towards the Inlet)

Figure 12 Reach Under the Table and Fix the Balance Assembly Into Position.

6. From inside the working section, insert the model support shaft through the bottom of the working section and into the Balance Assembly (see Figure 13). The model must face into the airflow (towards the inlet).

7. Adjust the model support shaft so that the model does not rest on the floor of the working section (see Figure 13).

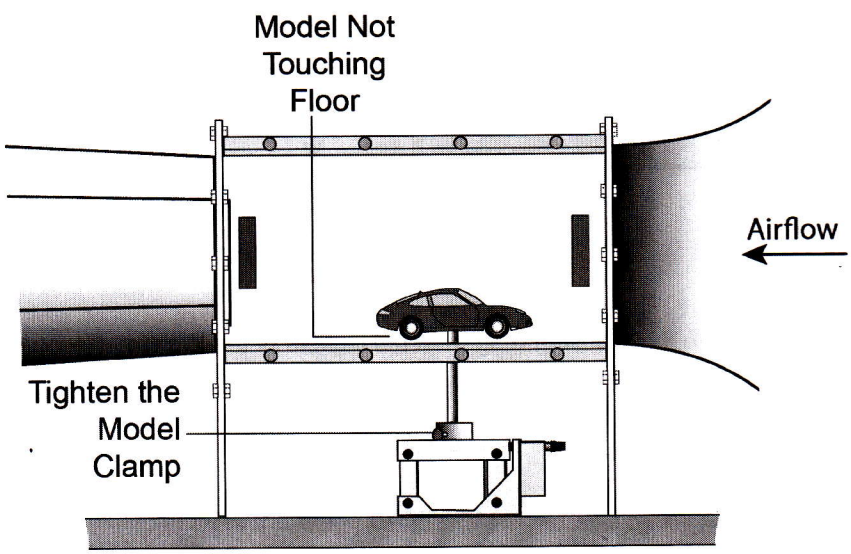


Figure 13 Insert the Model Support Shaft into the Balance Assembly (Model Car Shown - Not Included)

8. Tighten the model clamp on the Balance Assembly.

9. Refit the clear windows.

10. Connect the Display Unit as described in **Connecting to the Display Unit** on page 13.

Connecting to the Display Unit

1. Connect the cable from the Balance Assembly load cell to the socket marked 'To Balance Load Cell'.

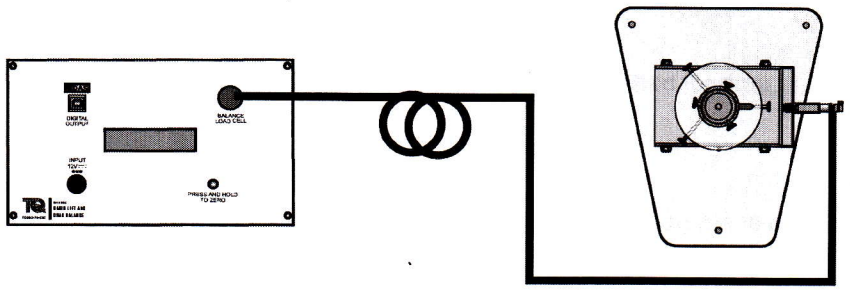


Figure 14 Connect the Plug from the Balance Assembly to the Display Unit

2. If connecting to the optional VDAS®, use one of the cables supplied with the VDAS® and connect it to the socket marked 'Digital Output' on the AF1300z Display Unit. Refer to the VDAS® manual for more details.

3. Connect the cable from the power supply (supplied) to the socket marked 'Input 12 V'.

4. Connect the power supply to one of the electrical supply sockets on the rear of the Control and Instrumentation Frame of the AF1300.

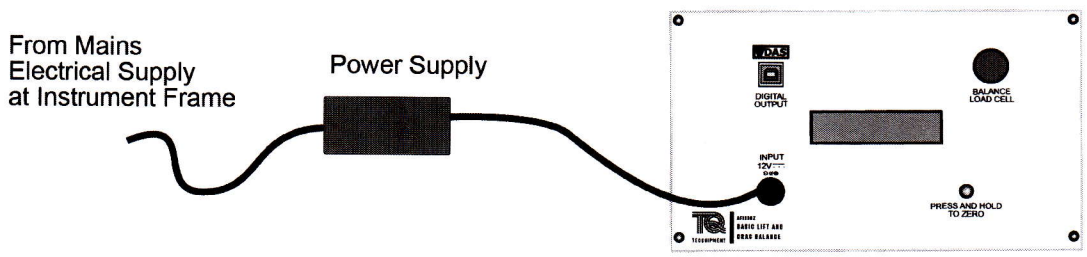


Figure 15 Connecting the Display Unit

WARNING *The mains supply connector at the Power Supply is its mains disconnect device. Make sure it is always easily accessible.*

To Use the AF1300z Module

WARNING  ***If the equipment is not used as described in these instructions, its protective parts may not work correctly.***

1. Make sure that the model is set up and the balance assembly is fitted for drag or lift measurements as described in **Assembly** on page 7.

NOTE  *When the balance is side mounted for lift and drag measurements, the models should face upstream of the wind tunnel and 'fly' upside down.*

2. Switch on the power to the Control and Instrumentation Unit of the wind tunnel.
3. The AF1300z Display Unit will show 'TecQuipment Ltd', then 'AF1300z' and the force reading.
4. Leave the Display Unit to stabilize for 5 minutes.
5. Make sure that the model is set up correctly, then press and hold the zero button for at least four seconds to re-zero the force reading.
6. Start the experiment.

Maintenance, Spare Parts and Customer Care

General

When it is not in use, disconnect the Display Unit power supply from the electrical supply.

To clean the apparatus, wipe clean with a damp cloth - do not use abrasive cleaners.

Electrical

NOTE 

Renew or replace faulty or damaged parts or detachable cables with an equivalent item of the same type or rating.

There are no replaceable electrical fuses or circuit breakers on the AF1300z apparatus.

WARNING 

The Display Unit power supply is a sealed unit. If it fails, do not attempt to repair it. Buy a replacement unit from TecQuipment.

Spare Parts

Check the Packing Contents List to see what spare parts we send with the apparatus.

If technical help or spares are needed, please contact the local TecQuipment Agent, or contact TecQuipment direct.

When asking for spares, please tell us:

- Contact Name
- The full name and address of the college, company or institution
- Contact email address
- The TecQuipment product name and product reference
- The TecQuipment part number (if known)
- The serial number
- The year it was bought (if known)

Please give us as much detail as possible about the parts needed and check the details carefully before contacting us.

If the product is out of warranty, TecQuipment will advise the price of the spare parts.

Customer Care

We hope our products and manuals are liked. If there are any questions, please contact our Customer Care department:

Telephone: +44 115 954 0155

Fax: +44 115 973 1520

email: **customer.care@tecquipment.com**

For information about all TecQuipment Products and Services, visit:

www.tecquipment.com

TEST CERTIFICATE

Product name: AF1300Z - BASIC LIFT AND DRAG BALANCE

Serial number: TQ274781-002

This apparatus has passed the comprehensive inspection and test procedures employed by TecQuipment Ltd

TECQUIPMENT

DECLARATION OF CONFORMITY

DÉCLARATION DE CONFORMITÉ / EINVERSTÄNDNISERKLÄRUNG / DECLARACIÓN DE CONFORMIDAD / DECLARAÇÃO DE CONFORMIDADE / CONFORMITEITSVERKLARING / DICHIARAZIONE DI CONFORMITÀ

Manufacturer's Name Nom du fabricant Name des Herstellers Nombre del Productor Nome do Fabricante Naam van fabrikant Denominazione del fabbricante	**TecQuipment Ltd**

Manufacturer's Address Adresse du fabricant Anschrift des Herstellers Dirección del Productor Morada do Fabricante Adres van fabrikant Indirizzo del fabbricante	**Bonsall Street** **Long Eaton** **Nottingham** **NG10 2AN** **United Kingdom**

Declares that the following product
Déclare que le produit suivant / Gibt bekannt, daß das folgende Produkt / Declara que el siguiente producto / Declara que o seguinte produto / Verklaart dat het volgende produkt / Dichiara che il prodotto seguente

Product Reference Référence produit Referenz Referencia Referência do Produto Produktverwijzing Referenza del prodotto	**AF1300Z**

Serial Number Numéro de série Seriennummer Número de serie Número de série Serienummer Numero di serie	**TQ274781-002**

Has been designed and manufactured in accordance with the following standards
A été conçu et fabriqué conformément aux normes suivantes
Wurde unter der folgenden Normen entwickelt und hergestellt
Fue designado y elaborado bajo las siguientes normas
Foi desenhado e fabricado de acordo com as seguintes normas
Is ontworpen en gefabriceerd in overeenstemming met de volgende normen
E stato progettato e fabbricato in conformità alle normative seguenti

BS EN 61010-1:2010 as applied

The product complies with the requirements of
Le produit est conforme aux exigences de
Dieses Produkt erfüllt die Anforderungen von
El producto llena los requerimientos de
O produto cumpre com os requisitos de
Het produkt voldoet aan de vereisten van
Il prodotto è conforme ai requisiti di

2014/35/EU as amended

Signed:

Date:
14/06/**2019**

Name:
Simon Woods

Position:
Managing Director