



Important guidelines to ensure best performance

Installation
Settings
Handling
Electrostatics

The XPR106DUH How to Achieve Top Performance

METTLER TOLEDO



Introduction

The XPR106DUH analytical balance offers a very low minimum weight and level of readability similar to those of a micro-analytical balance. In contrast, it offers capacity up to 120 g, a large weighing pan, and a generous weighing chamber. This unique offering widens the possibilities of weighing applications that can be undertaken with this level of accuracy.

This guide presents a range of factors that you should take into consideration to help avoid potential sources of weighing errors and ensure you get the best performance from your XPR106DUH.



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1. Install as a Microbalance

When installing your XPR106DUH, you should apply the same criteria for a microbalance or ultra-micro balance. The weighing bench should be stable, vibration-free and in a location free from drafts. This not only ensures fast stabilization times, but, most importantly, also helps to achieve a high level of reproducibility.

2. Avoid Movement of Air

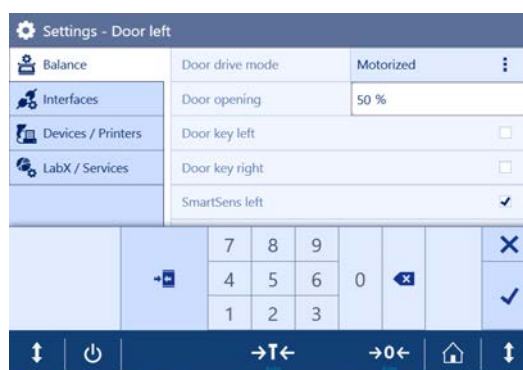
The air around the balance and particularly inside the weighing chamber should be as stable as possible. This is because any movement of the air can have an influence on the weighing pan and/or your sample and hence impact the weighing result. The less air movement, the better. If it is necessary to work in a fume hood or safety cabinet, it is recommended to reduce the airflow to the minimum possible for the application. Additionally, the balance can be enclosed within an outer draft shield to reduce the influence of air movements as much as possible.



An outer draft shield protects the weighing pan from the negative influence of air movements. (Material No. 11115915)

3. Minimize Door Opening

When placing containers and samples inside the weighing chamber, open the draft shield on one side only, not both, and open it just as far as necessary. This avoids air exchange between the weighing chamber and the exterior and helps to keep the weighing environment thermally stable. Air movement within the weighing chamber is also kept to a minimum. You can define the automatic door opening settings from the relevant menu on the balance. Open the door only for as long as necessary and keep it closed at all other times. These actions help to achieve good repeatability and fast stabilization times.



Set the automatic door to open only as far as necessary to maintain thermal equilibrium and avoid air movements.

4. Handle Containers and Samples Correctly

Always use clean tweezers and clean tare containers. Do not touch anything with your bare hands as this can transfer sweat, oils and dirt. Even when wearing gloves, you should avoid touching samples and tare containers as the transfer of heat or statics may result in an increase in stabilization time and/or influence the weight result.



Handle samples and containers correctly, particularly those susceptible to electrostatic charging (see section 8.).

5. Ensure the Weighing Pan is Inserted Correctly

The XPR106DUH has a special drip tray with a slightly lower section. The hanging weighing pan fits precisely into this section. This design prevents movement of air around the weighing pan and helps to maintain thermal stability. Due to the close fit of the two components, you must take care, when assembling them after cleaning for example, that they are correctly centered and are not touching each other. In addition, ensure that there is no dust, dirt, hair or other object mechanically bridging the weighing pan to the drip tray. This would result in incorrect results and may cause drifting. A smooth brush can be used to remove any dust or other object.



Take care that the hanging weighing pan is mounted correctly.

6. Use Filter Settings According to Your Needs and the Environment

The filter settings influence how fast the balance delivers a stable weight value. For highest accuracy and repeatability, try out the different filter settings and evaluate which combination of stability, time and reproducibility is optimal for your needs. Different settings can be stored in the so-called tolerance profiles and recalled at any time for a specific task. Note that the same balance model may require different settings depending on its location of installation and ambient conditions.

Using the environmental setting of “unstable” or “very unstable” increases statistical repeatability but results in the balance requiring longer to stabilize; a stabilization time of up to 12–15 seconds is not unusual. Although this produces more accurate results, patience is required.



Your preferred filter settings can be saved in the tolerance profiles.

7. Use the Smallest Possible Container

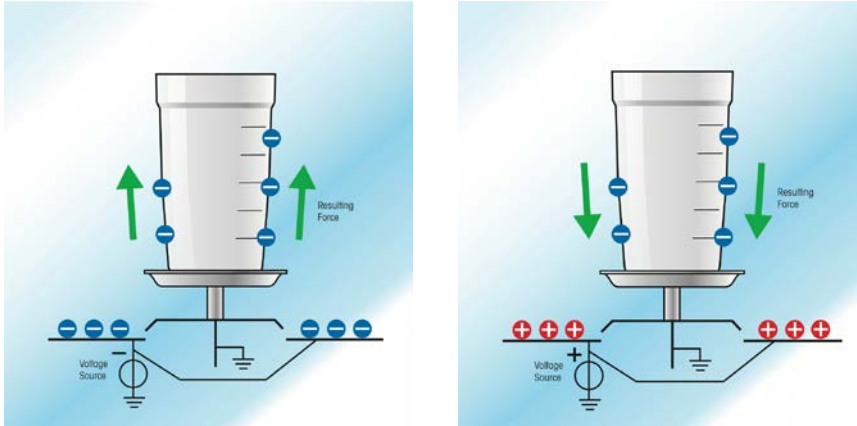
Although the XPR106DUH has a uniquely large maximum capacity, it is advisable to use a sample container as small and as light as possible. The small surface area makes the container less susceptible to environmental influences such as temperature gradients, buoyancy and air drafts. Such environmental influences generate forces on the container and cause instability and measurement errors. Containers should be acclimatized prior to use. If hot or cold containers are used, the temperature difference causes thermal instability within the weighing chamber, which may cause the weight value to drift (see also point 4.). A small, light container results in higher balance stability, faster weighing results and better repeatability.



Use sample containers as small and as light as possible.

8. Avoid and Eliminate Electrostatic Charges

Electrostatic charges build up on containers and samples through normal sample handling, making them hard to weigh. You may experience sample handling difficulties, notice problems with balance stability, or find that the weight measurement drifts. The effect on the accuracy and reproducibility of the weight measurement can be very significant. In fact, electrostatic charges are one of the biggest hidden source of weighing errors. Drift, non-repeatability of results, and balance instability are usually due to the dissipation of electrostatic charges.



Electrostatically charged samples and containers establish forces that affect balance performance and influence weighing results.

8.1. Tips to Avoid Electrostatic Charging

- Use electrically conductive or anti-static materials whenever possible.
- Avoid materials that charge easily, such as plastic spatulas and weighing boats.
- Plastic and glass vessels can quickly become charged and are therefore non-ideal materials.
- Avoid contact between dissimilar materials during sample preparation.
- Avoid unnecessary rubbing of the vessel (including touching it whilst wearing protective gloves).
- Use weighing tweezers for handling sample containers.
- Increase air humidity in air-conditioned rooms (optimum relative humidity is 45–60%).
- Pay attention that electrostatic charging occurs more frequently during winter in heated (dry) rooms.
- Ensure that the balance and the weighing pan are always earthed (all METTLER TOLEDO balances fitted with 3-pin plugs are automatically earthed).
- Avoid wearing electrically insulated footwear: use conductive shoes and earthing bands.



SmartPrep weighing funnels from METTLER TOLEDO are specifically designed to avoid electrostatic charging. (Material No. 30061260)

8.2. A Unique Solution to Detect and Eliminate Static

The XPR106DUH is equipped with the unique StaticDetect™ technology. StaticDetect automatically detects if electrostatic charges are present on the sample and calculates the degree of weighing error. If this error is above the predefined tolerance, a warning is displayed on the balance screen and the weight value is not accepted. StaticDetect can also be configured to work in conjunction with the optional internal ionizer: the ionizer can be set to activate whenever the static tolerance is exceeded, providing a fully automatic static detection and elimination system. The optional internal ionizer can be used in a manual or automatic manner to provide you complete control of the static elimination setup.



The optional internal ionizer eliminates electrostatic charges from samples and containers. (Material No. 30460823)

8.3. Other Ways to Combat Electrostatic Charges

8.3.1. Compact Ionizer

As an alternative to the internal ionizer, a compact ionizer can be mounted on the side of the balance and is suitable for removing the charge from small vessels and small sample quantities. (Material No. 30499860)



8.3.2. Freestanding U-electrode

For larger vessels and samples, a freestanding U-electrode ionizer can be placed alongside the balance. Samples and containers are simply passed through the ionizer before placing them on the balance.



SmartPrep weighing funnels from METTLER TOLEDO are specifically designed to avoid electrostatic charging. (Material No. 11140161 and 11107766)

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For more information

METTLER TOLEDO Group

Laboratory Weighing

Local contact: www.mt.com/contacts

Subject to technical changes

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