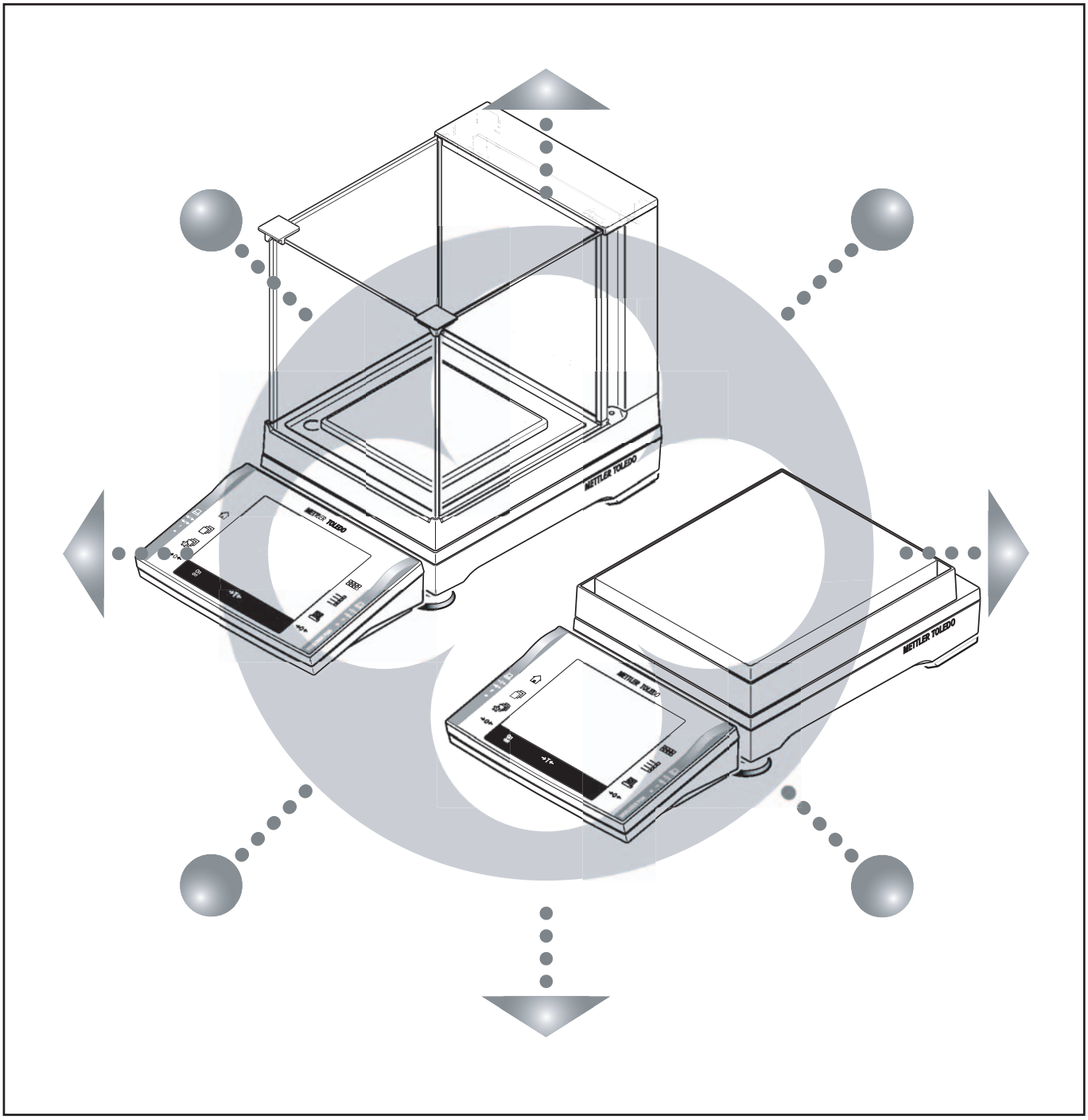
Solution Guide

METTLER TOLEDO
Excellence Plus XP Precision Balances



Contents

1 XP Precision Balances and the USB data interface

Can computers with a USB interface be connected to a METTLER TOLEDO XP Precision Balance?

Yes, all computers equipped with a USB interface can be connected to a METTLER TOLEDO XP Precision balance with a standard USB to RS232 converter, connected to the balance's RS232 interface. The full functionality of the classic RS-RS connection remains available.

Please refer to the following notes for more detailed information.

1.1 Connecting a XP balance to a USB interface (USB slave)

When connecting a balance with a computer, the computer takes over the command (is the "Master"), telling the balance what to do. The balance becomes the data supplier, following the commands of the "Master". The balance is now the "Slave" (or server).

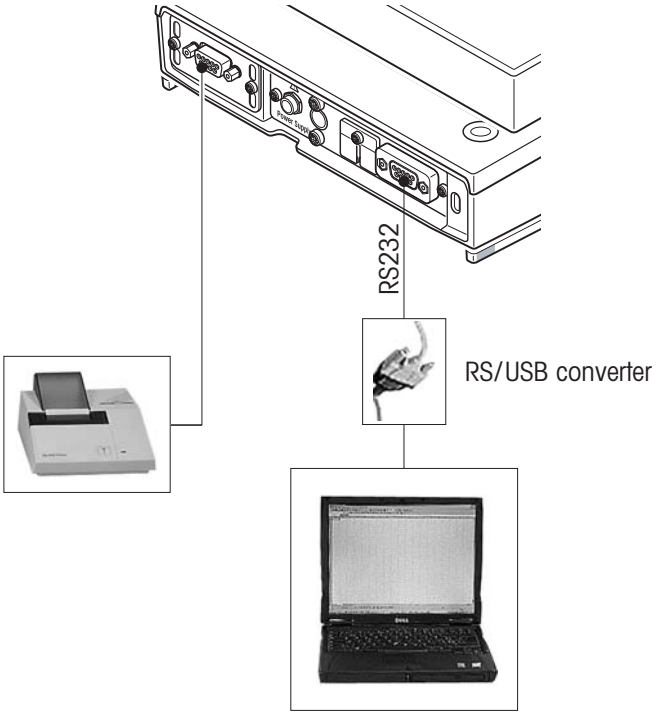
Every PC or Laptop with a USB interface can be connected to a XP Precision Balance.

USB to RS-232 converters are country specific products, requiring the installation of software on the computer. This software is supplied together with the USB to RS-232 converter. We recommend that the converter is purchased at your local electronic or PC supplier. METTLER TOLEDO has specified and tested appropriate RS-232 converters (Section 1.6).

1.2 Setting up a XP balance with a computer and a printer

Using printers in conjunction with a computer and an XP balance is no problem. The most common way to set up such a system is outlined below. Please refer to the following drawings.

1.2.1 Connection of Laptop with USB interface and use of a METTLER TOLEDO Printer



1.3 Benefits

- USB interfaces and cables are fully supported. You get all the benefits of the USB interface – e.g. the possibility just to plug it in and the computer recognizes it or the possibility to simply configure the USB interface.
- The entire data transmission remains unchanged compared to a RS232 interface based solution.
- The second interface of the balance (option slot) remains available for other purposes.

1.4 Hints and Recommendations

- The USB interface is designed for the office environment. It is not well suited for the use in rugged industrial environments.

1.5 Accessories / Part Numbers / Specifications

Accessories	Description	Order-Nr.
RS-USB converter	RS232 to USB converter	Purchase locally according to specification below
RS232 Option for XP balance	Option for installation in option slot of balance	11132500
Extension cable RS	Cable from balances RS232 Interface to RS-USB converter Length = 1 m	11101051

1.6 Specification USB to RS-232 converter

Many products are available on the market. To ensure correct functionality of the USB to RS-232 converter in conjunction with MT XP balances, we recommend the use of devices according to the following specification:

Function		Specification
Connectors	RS-232	DB-9 Male

METTLER TOLEDO has chosen a widely used USB to RS-232 converter as reference. With the following model in–depth tests have been performed.

Product: USB to RS-232 converter "**UC-232 A**"

Company: ATEN International Co. Ltd Taipeh Taiwan R.O.C **www.aten.com**

1.7 Disclaimer

MT cannot guarantee the correct performance of 3rd party products. It is therefore the responsibility of the customer to validate, correct system operation. Validation support and services are available from METTLER TOLEDO.

2 Weighing Magnetic Samples

2.1 Problem

When magnetic samples are weighed, or if a magnetic stirring rod is weighed with the sample, the result determined by the balance can deviate from the true weight value.

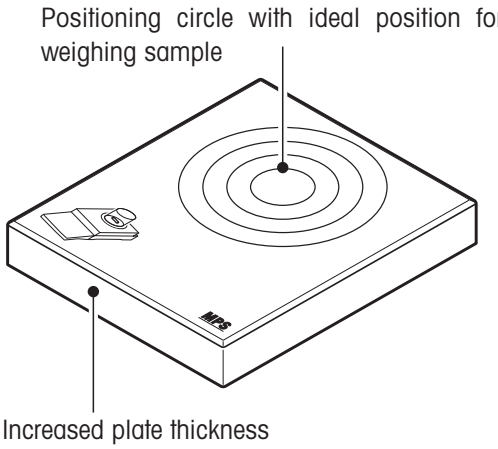
2.2 Solution: the new MPS weighing pan

For the new Excellence Plus XP precision balances, METTLER TOLEDO has developed a special weighing pan, the Magnetic Protection Shield (MPS), which reduces the effects of magnetic interference to a minimum. For the first time, this gives the user a professional solution for magnetic samples. Comparsion of the weight deviations with those on balances without an MPS weighing pan impressively demonstrates the benefits of this innovation.

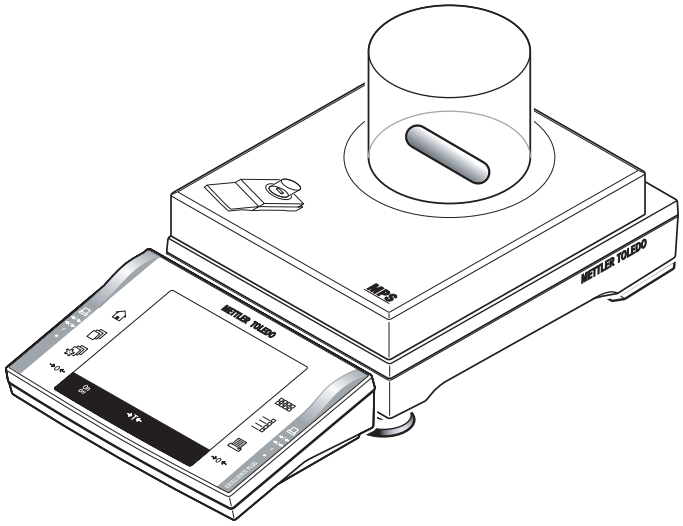
2.3 Solution description

The standard weighing pan of the Excellence Plus XP precision balance can be exchanged by the user for the MPS weighing pan which is available as an accessory. The MPS weighing pan is made from magnetically conducting chrome steel with an increased thickness (1.5 mm instead of 0.8 mm). For magnetic samples the ideal position for the weighing sample is determined, and indicated by a positioning circle. The weighing cell is largely screened against magnetic forces from the sample.

MPS (**M**agnetic **P**rotection **S**hield) weighing pan



Excellence Plus XP precision balance with MPS weighing pan (weighing in glass beaker with magnetic stirring rod).



2.4 The effect of magnetic stirring rods on the weighing result

The following table shows the effect of magnetic stirring rods on the weighing result. Use of the MPS weighing pan on Excellence Plus XP precision balances reduces deviations from the true weighing value to a minimum. The results obtained are much better than with PM or PR balances.

			Deviation with various magnetic stirring rods (g) (Mean value of 10 measurements)				
							
Balancemodel	**Manufacturer**	**Weighing pan**	**40 x 14 mm**	**30 x 7 mm**	**60 x 9 mm**	**40 x 19 mm**	**50 x 20 mm**
METTLER TOLEDO	**XP6002S**	**MPS**	**0.04**	**0.01**	**0.04**	**0.02**	**0.04**
METTLER TOLEDO	XP6002S	Standard	0.16	0.06	0.27	0.09	0.35
METTLER TOLEDO	PM4800	Standard	0.19	0.06	0.24	0.05	0.34
METTLER TOLEDO	PR8002	Standard	0.19	0.07	0.25	0.10	0.29
Non-MT balance	–	Standard	1.94	0.41	3.00	3.09	4.19

2.5 Ordering information

Accessories for the following balances	**MPS weighing pan**	**Part number**
0.1 g XP4001S, XP6001S, XP8001S, XP10001S	190 x 223 mm	11131542
10 mg (also for Delta Range models) XP4002S, XP6002S, XP8002S, XP10002S	170 x 205 mm	11131541
≥ **1 mg** Individual measures required (e.g. below-the-balance weighing)	–	–

2.6 Remarks

The MPS pan cannot be used on the XP1202S balance.

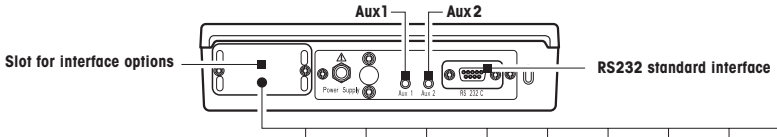
On certified balances, the maximum capacity is reduced because of the heavier weighing pan.

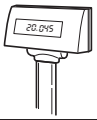
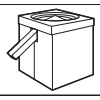
2.7 Notes

When the MPS weighing pan for magnetic samples is used on 0.1 g or 10 mg Excellence Plus XP precision balances, spacing attachments made from wood or cork, or weighing below the balance, are no longer necessary. For balances with 1 mg resolution, individual solutions are still important. A feedthrough for below-the-balance weighing is included as standard on METTLER TOLEDO balances.

3 Connectivity

With the XP line, the fixed RS232 interface and one oft the interface options can be used simultaneously. Independent of this, the two outputs Aux1 and Aux2 can also be used.



	METTLER TOLEDO and third-party devices	Designation Order no.	LC	BTS	RS	PS/2	MM	Ethernet	USB[1]	Aux1	Aux2
	**Barcode reader** Information transmitted to the balance AC adapter 230V (EU) AC adapter 115V (USA)	**BCS-RS** 21900879 21900882 21900883 **BCS-PS/2** 21900880	❺		❶	❸					
	**Printer** GLP, GMP printer with setting possibilities for header with time, date, identification and serial number	**BT-P42** 11132540 **RS-P42** 229265	❺	❷	❶						
	**Auxiliary display as benchtop version** BLD = LCD display, backlight AD = Fluorescence display	**RS/LC-BLD** 224200 **LC-AD** 229140 **BT-BLD** 11132555	❹ ❹	 ❷	❶						
	**Auxiliary display as stand version** BLDS = LCD display, backlight AD = Fluorescence display	**RS/LC-BLDS** 11132630 **LC-ADS** 229150	❹ ❹		❶						
	**LC-IO Relay interface** Input/output module for management of up to 8 dispensing or control systems.	**LC-IO** 21202217	❹		❶						
	**LV11 Automatic feeder** Automatic feder for small items	**LV11** 21900608	❹		❶						
	**LC-FS Foot/hand switch** For operation of the balance by hand or foot. 1 selectable function	**LC-FS** 229060	❸								
	**ErgoSens (Optical sensor)** External, for hands off operation, analogue SmartSens.	**ErgoSens** 11132601								❸	❸
	Compatibility to (older) MT devices with MiniMettler interface Peripherals see laboratory catalog, page 143						●				
	**Laptop**		❺	❷	❶			●	❶[1]		
	**PC keyboard**					❸					

Legende: 1) RS/USB converter is required (third-party device).

❶ Cable 11101051

❷ Wireless connection (bluetooth)

❸ Fixed cable

❹ Cable 229116 (length = 5 m); additional cable: 229161 (length = 1 m), 229115 (length = 2 m)

❺ It is possible to connect instruments with RS interface with the LocalCan (LC) interface.
You need the cable LC-RS9: 229065 (length = 2 m)

4 Switch contacts and input aids

4.1 Problem

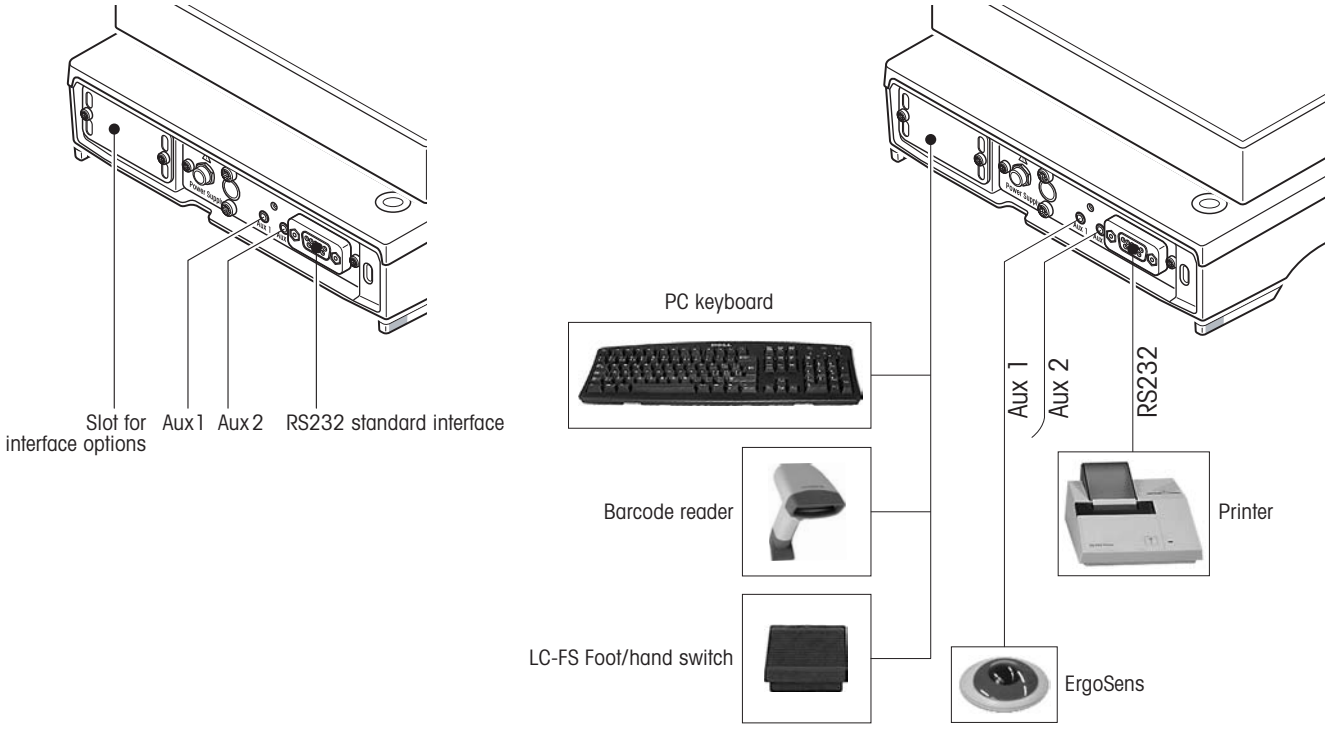
Balances are used for highly diverse applications. In many cases, the work procedures can be simplified by the use of switch contacts and input aids. For toxic applications or to increase efficiency, for example, balances may be tared with a foot switch (switch contact). A further typical application is initiation of the print command from a remote key. Depending on the application, different interfaces are needed simultaneously.

4.2 Solution: maximum flexibility of data interfaces and outputs

The ExcellencePlus XP precision balance offers freely configurable outputs for switch contacts. These allow the balance to be operated from any chosen location via freely selectable contacts and input aids (e.g. foot switch and ErgoSens). The flexibility of the data interfaces is retained, since the two input aids can be connected via separate outputs (Aux 1, Aux 2), for more details see operating instructions "XP Precision Balances", section 14.5. With the ExcellencePlus XP, touchless commands (definable in the operating menu of the balance) are possible as standard through SmartSens. The new ErgoSens, a freely placeable operating element, offers the same functionality within a radius of up to 60 cm. A practical feature is that the functionality defined by the user is displayed graphically.

Further input aids can be easily connected to the balance by use of the additional interface option (slot). Via PS/2, RS232, or LocalCan, connection is possible of, for example, a foot switch, a keyboard, or a barcode scanner. Alternatively, the additional interface option can be used for connecting other external instruments.

4.3 Connection of switch contacts and input aids (examples)



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