

906 Titrando



Manual

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906 Titrande

Manual

Technical Communication
Metrohm AG
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1 Introduction

1.1 The Titrand system

The Titrand is the heart of the modular Titrand system. Operation is carried out either by a Touch Control with a touch-sensitive screen ("stand-alone titrator") or by a computer with a corresponding software.

A Titrand system can contain numerous, various kinds of instruments. The following figure provides an overview of the peripheral devices you can connect to the 906 Titrand.

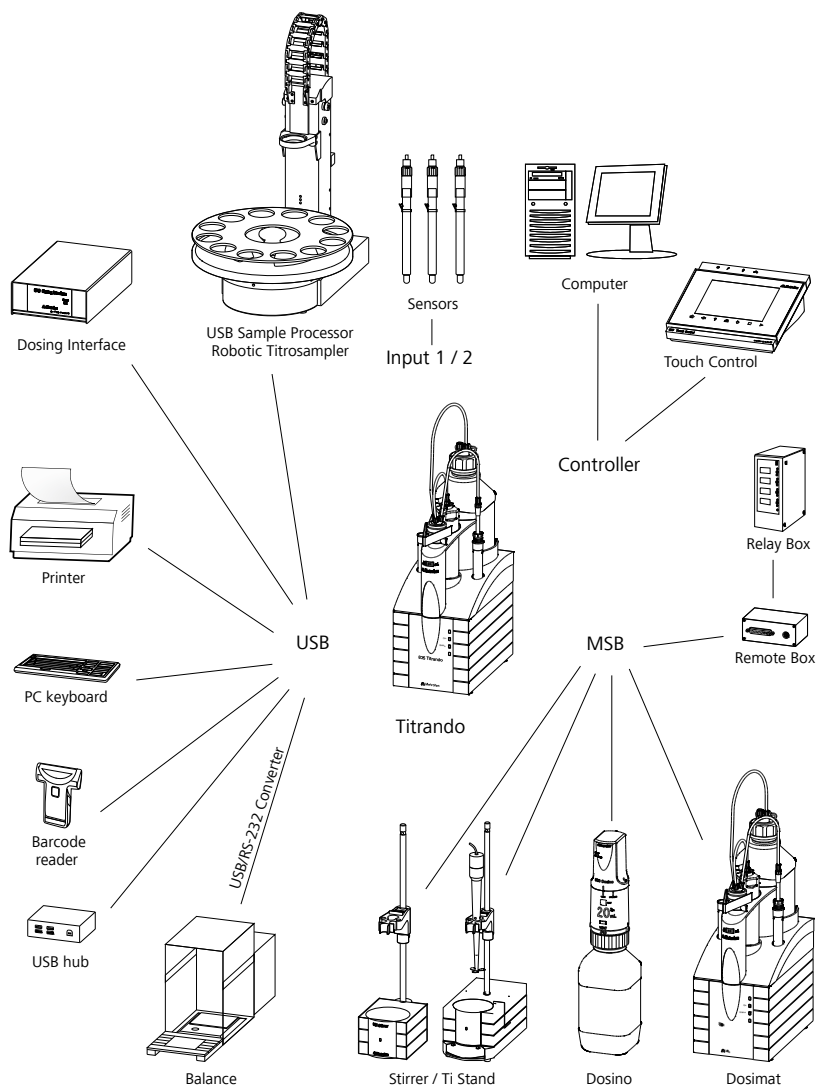


Figure 1 The Titrand system



Up to three control instruments (Titrandos, Dosing Interface, USB Sample Processor, etc.) can be controlled via USB connection during operation with the 900 Touch Control.

You can request information on special applications in the "Application Bulletins" and "Application Notes", available free of charge via the Metrohm representative responsible. Various monographs on the subjects of titration techniques and electrodes are also available.

Updating the device software is described in the help of the corresponding PC software.

1.2 Instrument description

The 906 Titrandos has the following characteristics:

- **Operation**
Operation is carried out by means of a touch-sensitive Touch Control or with a high-performance PC software.
- **Dosing**
An internal dosing drive for exchange units.
- **MSB connectors**
Four MSB connectors (Metrohm Serial Bus) for connecting dosing devices (Dosimat with exchange unit or Dosino with dosing unit), stirrers, titration stands and Remote Boxes.
- **USB connectors**
Two USB connectors, through which devices such as printers, PC keyboards, barcode readers or additional control devices (USB Sample Processor, Titrandos, Dosing Interface, etc.) can be connected.
- **Measuring interface**
Depending on the model version, one or two measuring interface(s). Each measuring interface has one measuring input each for:
 - a potentiometric electrode (pH, metal or ion-selective electrode)
 - a separate reference electrode
 - a temperature sensor (Pt1000 or NTC)
 - a polarizable electrode
 - an iConnect (measuring interface for electrodes with integrated data chip, so-called iTrodes)

1.3 Titration modes – Measuring modes – Dosing commands

The 906 Titrande supports the following titration modes, measuring modes and dosing commands:

- **DET**
Dynamic equivalence point titration. The reagent is added in variable volume steps.
Measuring modes:
 - **pH** (pH measurement)
 - **U** (potentiometric voltage measurement)
 - **Ipol** (voltametric measurement with selectable polarization current)
 - **Upol** (amperometric measurement with selectable polarization voltage)
- **MET**
Monotonic equivalence point titration. The reagent is added in constant volume steps.
Measuring modes:
 - **pH** (pH measurement)
 - **U** (potentiometric voltage measurement)
 - **Ipol** (voltametric measurement with selectable polarization current)
 - **Upol** (amperometric measurement with selectable polarization voltage)
- **SET**
Endpoint titration at one or two specified endpoints.
Measuring modes:
 - **pH** (pH measurement)
 - **U** (potentiometric voltage measurement)
 - **Ipol** (voltametric measurement with selectable polarization current)
 - **Upol** (amperometric measurement with selectable polarization voltage)
- **STAT**
Endpoint titration during which the measured value is kept constant.
Measuring modes:
 - **pH** (pH measurement)
 - **U** (potentiometric voltage measurement)

1.4 About the documentation



CAUTION

Please read through this documentation carefully before putting the instrument into operation. The documentation contains information and warnings which the user must follow in order to ensure safe operation of the instrument.

1.4.1 Symbols and conventions

The following symbols and formatting may appear in this documentation:

(5-12)

Cross-reference to figure legend

The first number refers to the figure number, the second to the instrument part in the figure.

1

Instruction step

Carry out these steps in the sequence shown.

Method

Dialog text, parameter in the software

File ► New

Menu or menu item

[Next]

Button or key



WARNING

This symbol draws attention to a possible life-threatening hazard or risk of injury.



WARNING

This symbol draws attention to a possible hazard due to electrical current.



WARNING

This symbol draws attention to a possible hazard due to heat or hot instrument parts.



WARNING

This symbol draws attention to a possible biological hazard.



CAUTION

This symbol draws attention to possible damage to instruments or instrument parts.

**NOTE**

This symbol highlights additional information and tips.

1.5 Safety instructions

1.5.1 General notes on safety

**WARNING**

Operate this instrument only according to the information contained in this documentation.

This instrument left the factory in a flawless state in terms of technical safety. To maintain this state and ensure non-hazardous operation of the instrument, the following instructions must be observed carefully.

1.5.2 Electrical safety

The electrical safety when working with the instrument is ensured as part of the international standard IEC 61010.

**WARNING**

Only personnel qualified by Metrohm are authorized to carry out service work on electronic components.

**WARNING**

Never open the housing of the instrument. The instrument could be damaged by this. There is also a risk of serious injury if live components are touched.

There are no parts inside the housing which can be serviced or replaced by the user.

Supply voltage

**WARNING**

An incorrect supply voltage can damage the instrument.

Only operate this instrument with a supply voltage specified for it (see rear panel of the instrument).

Protection against electrostatic charges



WARNING

Electronic components are sensitive to electrostatic charges and can be destroyed by discharges.

Do not fail to pull the power cord out of the power socket before you set up or disconnect electrical plug connections at the rear of the instrument.

1.5.3 Working with liquids



CAUTION

Periodically check all system connections for leaks. Observe the relevant regulations in respect to working with flammable and/or toxic fluids and their disposal.

1.5.4 Flammable solvents and chemicals

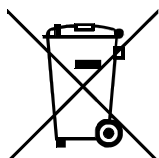


WARNING

All relevant safety measures are to be observed when working with flammable solvents and chemicals.

- Set up the instrument in a well-ventilated location (e.g. fume cupboard).
- Keep all sources of flame far from the workplace.
- Clean up spilled liquids and solids immediately.
- Follow the safety instructions of the chemical manufacturer.

1.5.5 Recycling and disposal



This product is covered by European Directive 2012/19/EU, WEEE – Waste Electrical and Electronic Equipment.

The correct disposal of your old instrument will help to prevent negative effects on the environment and public health.

More details about the disposal of your old instrument can be obtained from your local authorities, from waste disposal companies or from your local dealer.

2 Overview of the instrument

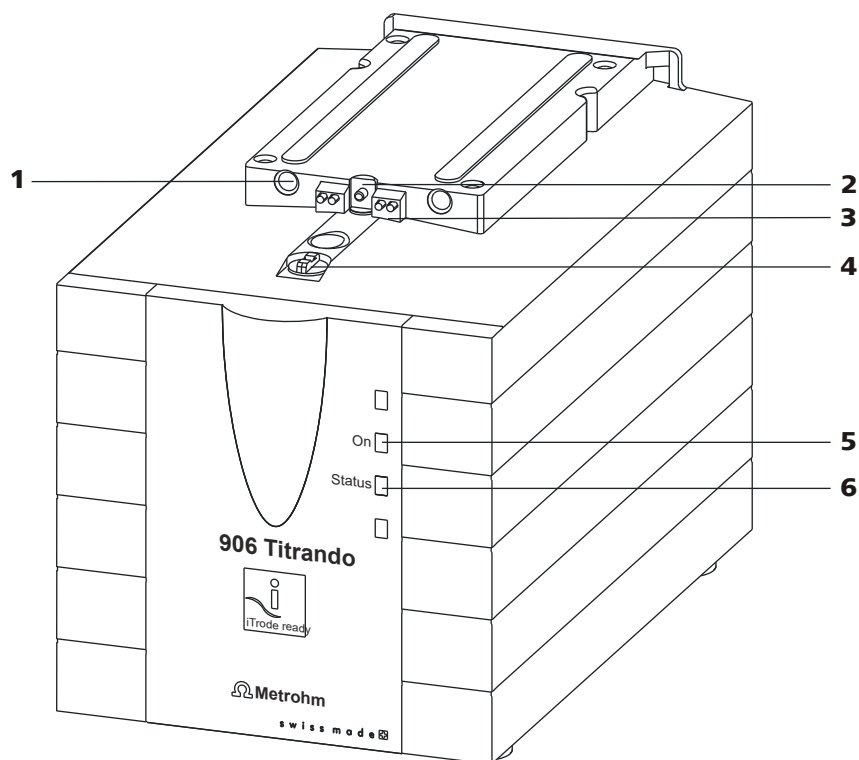


Figure 2 Front 906 Titrando

1 Guide openings

For centering the exchange unit.

3 Contact pins

For the data chip.

5 "On" LED

Lights up when the Titrando is ready for operation.

2 Piston rod

Moves the piston of the exchange unit up and down.

4 Coupling

For switching the flat stopcock.

6 "Status" LED

Shows the current status of the internal dosing drive.

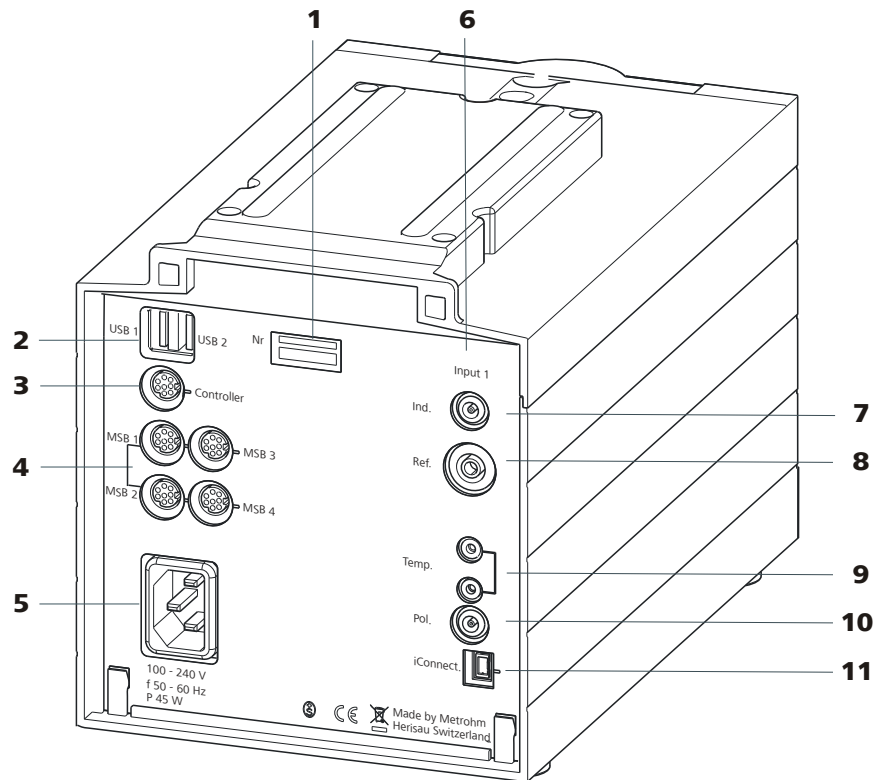


Figure 3 Rear 906 Titrand

1 Type plate

Contains specifications concerning supply voltage, instrument type and serial number.

3 Connector (Controller)

For connecting a Touch Control or a PC with installed PC software. Mini DIN, 9-pin.

5 Power socket**7 Electrode connector (Ind.)**

For connecting pH, metal or ion-selective electrodes with integrated or separated reference electrode. Socket F.

9 Temperature sensor connector (Temp.)

For connecting temperature sensors (Pt1000 or NTC). Two B sockets, 2 mm.

11 Electrode connector (iConnect)

For connecting electrodes with integrated data chip (iTrodes).

2 USB connector (USB 1 and USB 2)

USB ports (type A) for connecting printer, keyboard, barcode reader, additional Titrandos, USB Sample Processor, etc.

4 MSB connector (MSB 1 to MSB 4)

Metrohm Serial Bus. For connecting external dosing devices, stirrers or Remote Boxes. Mini DIN, 9-pin.

6 Measuring interface 1 (Input 1)**8 Electrode connector (Ref.)**

For connecting reference electrodes, e.g. Ag/AgCl reference electrode. Socket B, 4 mm.

10 Electrode connector (Pol.)

For connecting polarizable electrodes, e.g. double Pt wire electrodes. Socket F.

3.2.1.1 Connecting a Touch Control



NOTICE

The plug is protected against accidental disconnection of the cable by means of a pull-out protection feature. If you wish to pull out the plug, you first need to pull back the outer plug sleeve marked with arrows.

Connect the Touch Control as follows:

- 1 ▪ Insert the plug of the Touch Control connection cable into the **Controller** socket.

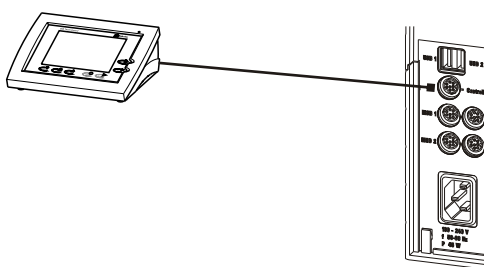


Figure 4 Connecting the Touch Control

- 2 ▪ Connect the MSB devices (*see chapter 3.3, page 15*).
- Connect the USB devices (*see chapter 3.4, page 19*).
- 3 ▪ Connect the Titrando to the power grid (*see chapter 3.2.1.2, page 12*).
- 4 ▪ Switch on the Touch Control.

The Touch Control power supply is supplied through the Titrando. Automatic system tests are performed on both instruments at the time of activation. The **On** LED on the front of the Titrando lights up when the system test has been completed and the instrument is ready for operation.

**NOTICE**

Do not use a not permitted power cord!

1 Plugging in the power cord

- Plug the power cord into the instrument's power socket.
- Connect the power cord to the power grid.

3.2.1.3 Connecting a computer

The 906 Titrande requires a USB connection to a computer in order to be able to be controlled by a computer software. Using a 6.2151.000 controller cable, the instrument can be connected directly, either to a USB socket on a computer, to a connected USB hub or to a different Metrohm control instrument.

You need administrator rights for the installation of driver software and control software on your computer.

Cable connection and driver installation

A driver installation is required in order to ensure that the 906 Titrande is recognized by the computer software. To accomplish this, you must comply with the procedures specified. The following steps are necessary:

1 Install the software

- Insert the computer software installation CD and carry out the installation program directions.
- Exit the program if you have started it after the installation.

2 Establishing the cable connections

- Connect all peripheral devices to the instrument, *see chapter 3.3, page 15*.
- Connect the instrument to the power grid if you have not already done this (*see chapter 3.2.1.2, page 12*).
The "On" LED on the 906 Titrande is not yet illuminated!
- Connect the instrument to a USB connector (type A) of your computer (see manual of your computer). The 6.2151.000 cable is used for this purpose.

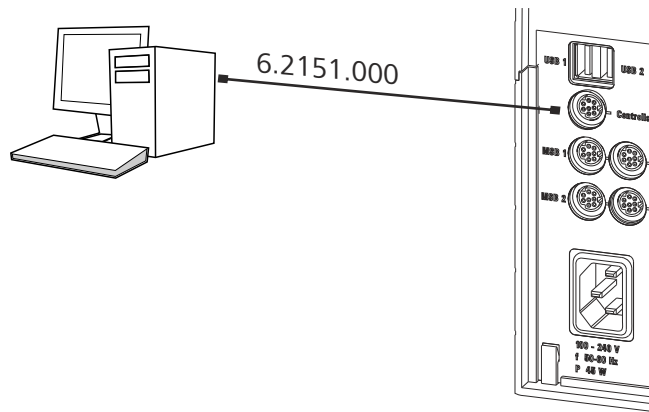


Figure 5 Connecting the computer

The instrument is recognized. Depending on the version of the Windows operating system used, the driver installation proceeds differently afterwards. Either the necessary driver software is installed automatically or an installation wizard is started.

- 3 Follow the instructions of the installation wizard.

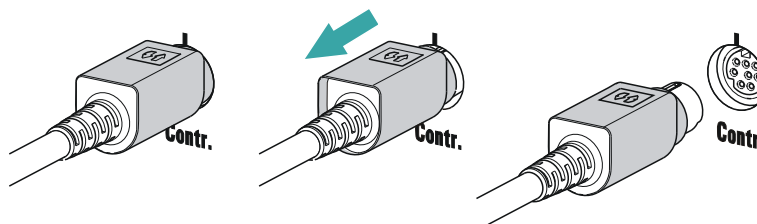
The "On" LED on the 906 Titrande lights up when the driver installation has been completed and the instrument is ready for operation.

If problems should occur during installation, contact your company's IT support team.



NOTICE

The plug on the instrument end of the 6.2151.000 controller cable is protected against accidental disconnection by means of a pull-out protection feature. If you wish to pull out the plug, you first need to pull back the outer plug sleeve marked with arrows.



Registering and configuring the instrument in the computer software

The instrument must be registered in the configuration of your computer software. Once that has been done, you can then configure it according to your requirements. Proceed as follows:

1 Setting up the instrument

- Start the computer software.
The instrument is automatically recognized. The configuration dialog for the instrument is displayed.
- Make configuration settings for the instrument and its connectors.

More detailed information concerning the configuration of the instrument can be found in the documentation for the respective computer software.

3.3 Connecting MSB devices

In order to connect MSB devices, e.g. stirrers or dosing devices, Metrohm instruments are equipped with up to a maximum of four connectors on what is referred to as the *Metrohm Serial Bus* (MSB). Various kinds of peripheral devices can be connected in sequence (in series, as a "Daisy Chain") at a single MSB connector (8-pin Mini DIN socket) and controlled simultaneously by the respective control instrument. In addition to the connection cable, stirrers and the Remote Box are each equipped with their own MSB socket for this purpose.

The following figure provides an overview of the instruments that can be connected to an MSB socket, along with a number of different cabling variations.

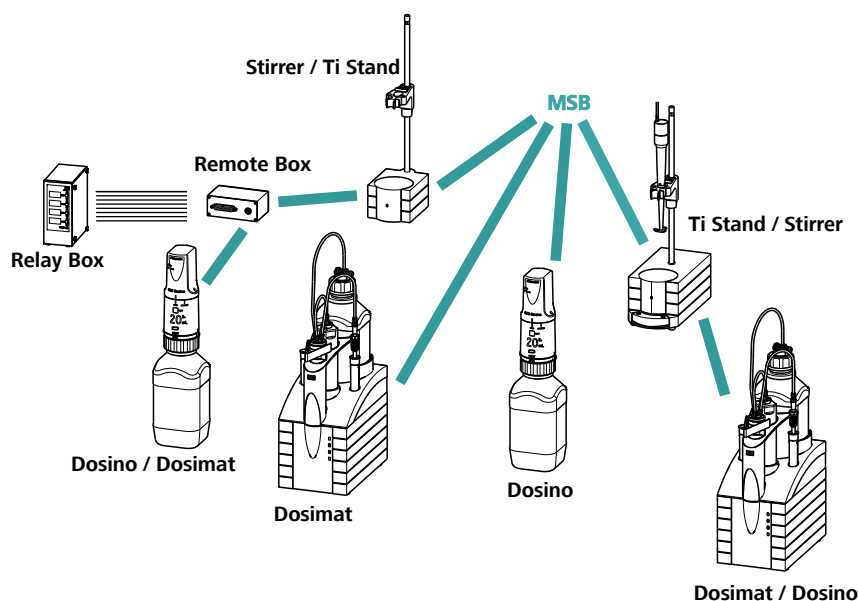


Figure 6 MSB connections

The control instrument determines which peripheral devices are supported.



NOTICE

When connecting MSB devices together, the following must be observed:

- Only one device of the same type can be used at a single MSB connector at one time.
- Dosing devices of the 700 Dosino and 685 Dosimat plus type cannot be connected together with other MSB devices on a shared connector. These dosing devices must be connected separately.



CAUTION

Exit the control software before you plug in MSB devices. When it is switched on, the control instrument automatically recognizes which device is connected to which MSB connector. The operating unit or the control software enters the connected MSB devices into the system configuration (device manager).

MSB connections can be extended with the 6.2151.010 cable. The maximum connection length permitted is 15 m.

3.3.1 Connecting a dosing device

Three dosing devices can be connected to the instrument (**MSB 2 to MSB 4**).

The types of dosing devices that are supported are:

- 800 Dosino
- 700 Dosino
- 805 Dosimat
- 685 Dosimat plus

Proceed as follows:

1 Connecting a dosing device

- Exit the control software.
- Connect the connection cable of the dosing device to one of the sockets marked with **MSB** on the rear of the control device.
- Start the control software.

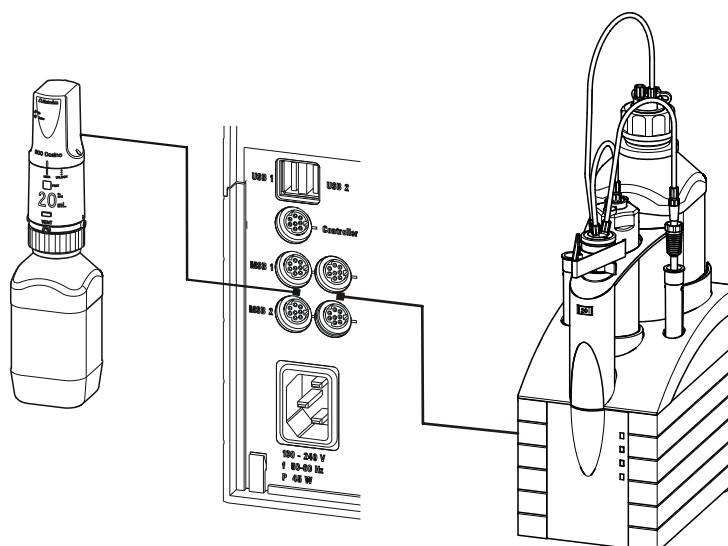


Figure 7 Connecting a dosing device

3.3.2 Connecting a stirrer or titration stand

You can use the following instruments:

These devices have a built-in magnetic stirrer (stirring "from below"):

- 801 Stirrer
- 803 Ti Stand

This device has no built-in magnetic stirrer (stirring "from above"):

- 804 Ti Stand with rod stirrer 802 Stirrer

Connect a stirrer or a titration stand as follows:

1 Connecting the stirrer or titration stand

- Exit the control software.
- Connect the connection cable of the magnetic stirrer or of the titration stand to one of the sockets marked with **MSB** on the rear of the control instrument.
- 804 Ti Stand only: Connect the rod stirrer to the stirrer connector (socket with stirrer symbol) of the titration stand.
- Start the control software.

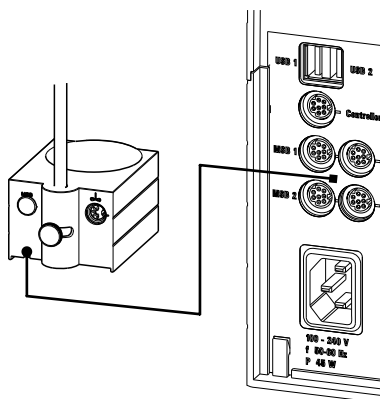


Figure 8 Connecting an MSB stirrer

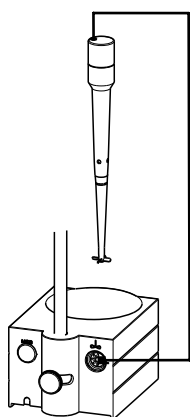


Figure 9 Connecting the rod stirrer to the titration stand

3.3.3 Connecting a Remote Box

Instruments that are controlled via remote lines and/or that send control signals via remote lines can be connected via the 6.2148.010 Remote Box. In addition to Metrohm, other instrument manufacturers also use similar connectors that make it possible to connect different instruments together. These interfaces are also frequently given the designations "TTL Logic", "I/O Control" or "Relay Control" and they generally have a signal level of 5 volts.

Control signals are understood to be electrical line statuses or electrical pulses (> 200 ms) which display the operating status of an instrument or which trigger or report an event. Sequences on a variety of instruments can thus be coordinated in a single complex automation system. However, no exchange of data is possible.

Proceed as follows:

1 Connecting the Remote Box

- Exit the control software.

- Connect the Remote Box connection cable to one of the sockets marked with **MSB** on the rear of the control instrument.
- Start the control software.

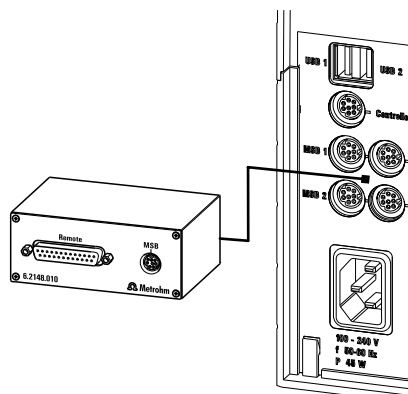


Figure 10 Connecting the Remote Box

You can connect the following instruments to the remote connector, among others:

- 849 Level Control (fill level monitoring in a canister)
- 731 Relay Box (switch box for 230/110 volt alternating current sockets and low-voltage direct current outlets)
- 843 Pump Station (for complex sample preparations or for rinsing external titration vessels)

The Remote Box also has an MSB socket at which a further MSB device, e.g. a dosing device or a stirrer, can be connected.

You will find precise information concerning the pin assignment of the interface on the Remote Box in the *appendix*.

3.4 Connecting USB devices

3.4.1 General

The 906 Titrande has two USB connectors (type A sockets) for peripheral devices with USB interfaces. The Titrande functions as a USB hub (distributor) no matter how it is operated. If you wish to connect more than two devices to the USB, you can also use an additional, commercially available USB hub.

**CAUTION**

If you operate the 906 Titrando with the aid of the Touch Control, take care to ensure that the Touch Control is switched off when you set up or disconnect connections between the various instruments. If you use a PC software to control the 906 Titrando, you should exit the program before you set up or disconnect the USB connections.

3.4.2 Connecting a USB hub

If you wish to connect more than two devices to the USB connector of the 906 Titrando, you can also use an additional commercially available USB hub (distributor). If you operate the 906 Titrando with the help of the Touch Control, then you should use a USB hub with its own power supply.

Connect the USB hub as follows:

- 1** Switch off the Touch Control and/or exit the PC software.
- 2** With the aid of the 6.2151.020 cable, connect the USB connector of the 906 Titrando (type A) with the USB connector of the hub (type B, see manual for the hub).
- 3** Switch on the Touch Control.

The USB hub is recognized automatically.

3.4.3 Connecting a printer

Printers that are connected to the 906 Titrando with Touch Control must meet the following requirements:

- Printer languages: HP-PCL (PCL 3 to 5, PCL 3GUI), Canon BJJ Commands or Epson ESC P/2
- Printer resolution: 300 dots/inch or 360 dots/inch (Epson)
- Paper size: A4 or Letter, single-sheet feed.

Connect the printer as follows:

- 1** Switch off the Touch Control.
- 2** With the aid of the 6.2151.020 cable, connect the USB connector of the 906 Titrando (type A) with the USB connector of the printer (type B, see manual for the printer).
- 3** Switch on the printer first, then the Touch Control.

- 4** Configure the printer in the device manager of the Touch Control (see Touch Control manual).

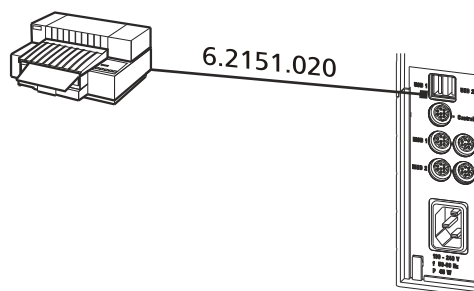


Figure 11 Connecting a printer

3.4.4 Connecting a balance

- Operation with a PC software:
 - Connect the balance directly to the serial connector (COM) of the computer. This is usually 9-pin and marked with the symbol **IOIOI**.
- Operation with Touch Control:
 - You will need the 6.2148.050 USB/RS-232 adapter to connect a balance.

The following table offers an overview of the balances that you can use together with the 906 Titrando and of which cable you will need for connection to the RS-232 interface:

Balance	Cable
AND ER, FR, FX with RS-232 interface (OP-03)	6.2125.020 + 6.2125.010
Mettler AB, AG, PR (LC-RS9)	In the scope of delivery for the balance
Mettler AM, PM, PE with interface option 016 or Mettler AJ, PJ with interface option 018	6.2146.020 + 6.2125.010 Also from Mettler: ME 47473 adapter and either ME 42500 hand switch or ME 46278 foot switch
Mettler AT	6.2146.020 + 6.2125.010 Also from Mettler: ME 42500 hand switch or ME 46278 foot switch
Mettler AX, MX, UMX, PG, AB-S, PB-S, XP, XS	6.2134.120



Balance	Cable
Mettler AE with interface option 011 or 012	6.2125.020 + 6.2125.010 Also from Mettler: ME 42500 hand switch or ME 46278 foot switch
Ohaus Voyager, Explorer, Analytical Plus	Cable AS017-09 from Ohaus
Precisa balances with RS-232-C interface	6.2125.080 + 6.2125.010
Sartorius MP8, MC, LA, Genius, Cubis	6.2134.060
Shimadzu BX, BW	6.2125.080 + 6.2125.010

Operation with Touch Control

Connect the balance as follows:

- 1 Plug in the USB plug of the USB/RS-232 adapter at the USB connector of the 906 Titrande.
- 2 Connect the RS-232 interface of the USB/RS-232 adapter with the RS-232 interface of the balance (see table for cable).
- 3 Switch on the Touch Control.
- 4 Switch on the balance.
- 5 Activate the RS-232 interface of the balance if necessary.
- 6 Configure the RS-232 interface of the USB/RS-232 adapter in the device manager of the Touch Control (see Touch Control manual).

3.4.5 Connecting a PC keyboard (only for operation with Touch Control)

The PC keyboard is used as an aid for text and numerical input.

Connect the PC keyboard as follows:

- 1 Insert the USB plug of the keyboard into one of the USB sockets of the 906 Titrande.

- 2 Switch on the Touch Control.

The keyboard is recognized automatically and entered in the device manager.

- 3 Configure the keyboard in the device manager of the Touch Control (see Touch Control manual).

3.4.6 Connecting a barcode reader

The barcode reader is used as an aid for text and numerical input. You can connect a barcode reader with USB interface.

Operation with Touch Control

Connect the barcode reader as follows:

- 1 Insert the USB plug of the barcode reader into one of the USB sockets of the 906 Titrandò.
- 2 Switch on the Touch Control.
The barcode reader is recognized automatically and entered in the device manager.
- 3 Configure the barcode reader in the device manager of the Touch Control (see Touch Control manual).

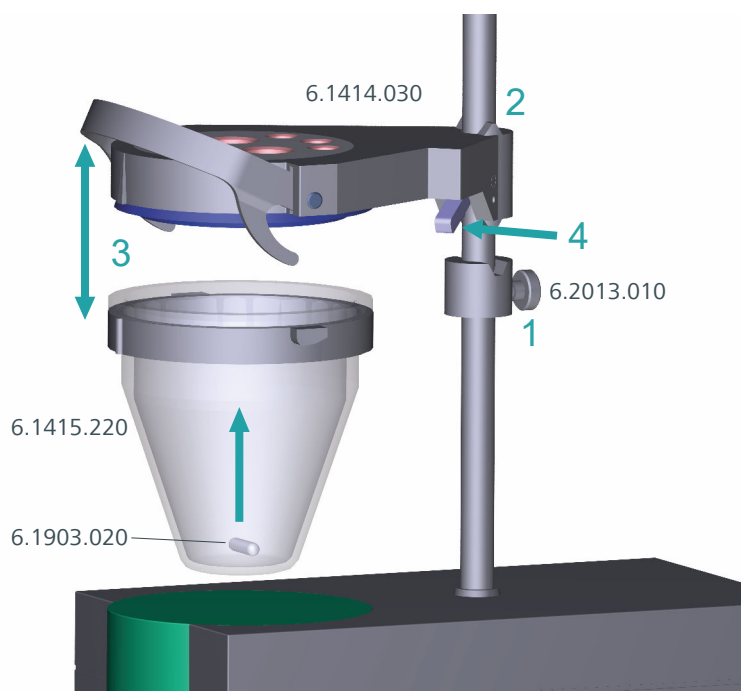
Settings on the barcode reader:

Program the barcode reader as follows (see also the manual for the barcode reader):

- 1 Switch the barcode reader to programming mode.
- 2 Specify the desired layout for the keyboard (USA, Germany, France, Spain, German-speaking Switzerland).
This setting must match the setting in the device manager (see the Touch Control manual).
- 3 Make sure that the barcode reader is set in such a way that Ctrl characters (ASCII 00 to 31) can be sent.

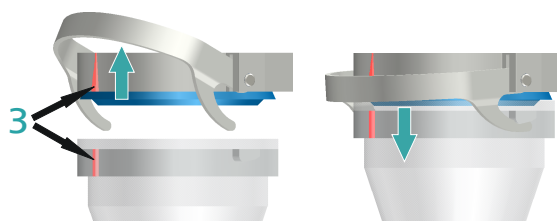
3.5.2 Titration vessel for volumetric KF titration

Mounting the KF titration cell



Proceed as follows:

- 1** Screw the 6.2013.010 clamping ring tightly to the support rod.
- 2** Fix the 6.1414.030 vessel lid of the KF titration cell (with correctly inserted sealing ring from the 6.1244.040 sealing set) to the support rod. Keep the locking lever pressed down until it can be released at the desired position.
- 3** Fasten the 6.1415.220 (or 6.1415.250) titration vessel with a 6.1903.020 (or 6.1903.030) stirring bar inside on the vessel lid. Fold back the holding bracket upwards while doing so. The markings on the vessel lid and on the plastic ring must be aligned above one another. Afterwards, press the holding bracket downwards in order to fix the titration vessel. The levers of the holding bracket must enclose the pins of the plastic ring on the titration vessel in order to ensure a secure hold.



- 4** Adjust the height of the KF titration cell by pressing the locking lever. It should almost touch the surface of the stirrer. The position can now be fixed by readjusting the clamping ring.

Once the height of the KF titration cell has been adjusted correctly, the entire cell can be raised and swiveled as required by pressing the locking lever.

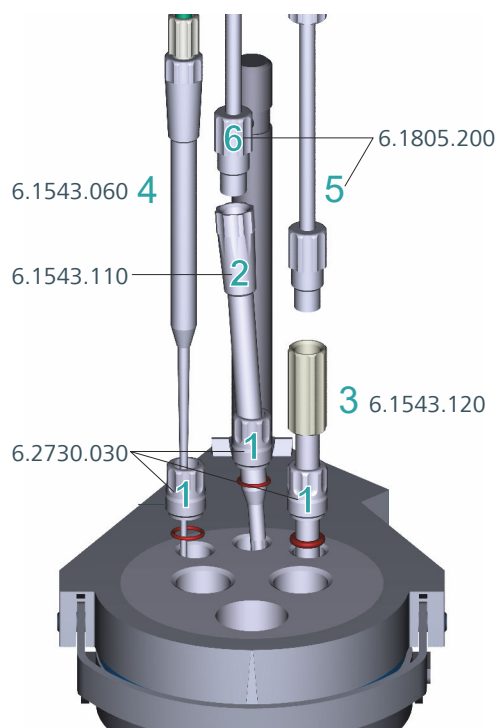
Filling the adsorber tube

Before insertion, the 6.1403.040 adsorber tube must be filled with the 6.2811.000 molecular sieve. Proceed as follows:



- 1** Insert a small cotton plug into the bottom of the adsorber tube. Do not pack the cotton too tightly.
- 2** Fill the molecular sieve up to the $\frac{3}{4}$ level.
- 3** Place a small cotton plug on the molecular sieve. Do not pack the cotton too tightly.
- 4** Seal the adsorber tube with the appropriate cover.

Inserting the dosing tip, aspiration tip and buret tip



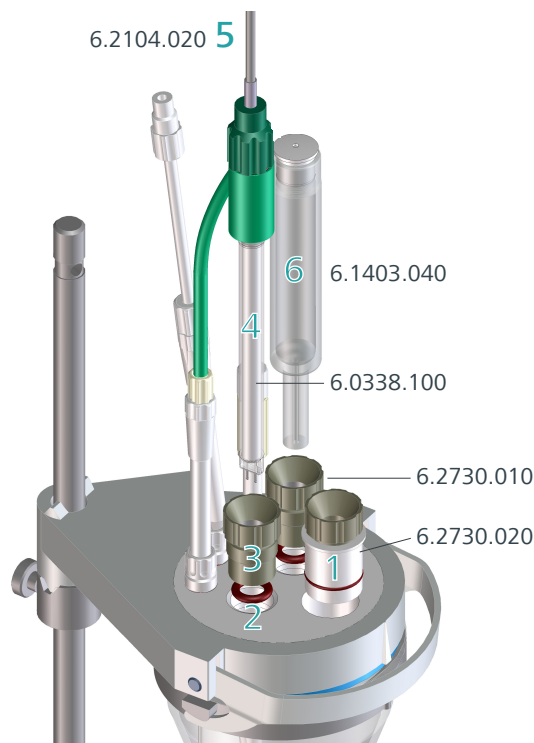
Proceed as follows:

- 1** Place the three screw nipples from 6.2730.030 (including O-rings, but without stoppers) in the rear openings of the vessel lid.
- 2** Insert the 6.1543.110 dosing tip through the screw nipple in the middle rear opening.
- 3** Insert the 6.1543.120 aspiration tip through the screw nipple in the right rear opening.
When solvent is aspirated, the end of the aspiration tip must touch the vessel base, but it must not inhibit the action of the stirring bar.
The aspiration tip can, if needed, be pulled out of the solvent.
- 4** Insert the 6.1543.060 buret tip through the screw nipple in the left rear opening.
- 5** Screw the 6.1805.200 PTFE M8 tubing of the aspiration bottle onto the aspiration tip.



- 6 Screw the 6.1805.200 PTFE M8 tubing of the solvent bottle onto the dosing tip.

Inserting electrode, adsorber tube and septum stoppers



Proceed as follows:

- 1 Introduce the 6.2730.020 septum stopper (with septum inserted) into the front opening of the vessel lid.
- 2 Insert the O-rings of the electrode and of the adsorber tube into the middle openings of the vessel lid.
- 3 Screw the two 6.2730.010 screw nipples into the openings with the O-rings. Do not screw too tightly.
- 4 Introduce the 6.0338.100 double Pt electrode into the left-hand opening and then tighten the screw nipple until it seals.
- 5 Screw the 6.2104.020 electrode cable tightly onto the electrode.

- 6 Insert the filled 6.1403.040 adsorber tube on the right of the electrode into the remaining opening and then tighten the screw nipple until it seals.

3.6 Connecting sensors

The measuring interface contains the following measuring inputs:

- **Ind.** for a potentiometric electrode (pH, metal or ion-selective electrode)
- **Ref.** for a separate reference electrode
- **Temp.** for a temperature sensor (Pt1000 or NTC)
- **Pol.** for a polarizable electrode
- **iConnect** for an iConnect (measuring interface for electrodes with integrated data chip, so-called iTrodes)

3.6.1 Connecting a pH, metal or ion-selective electrode

Connect the pH, metal or ion-selective electrode as follows:

- 1 Plug the electrode plug into the **Ind.** socket of the 906 Titrande.

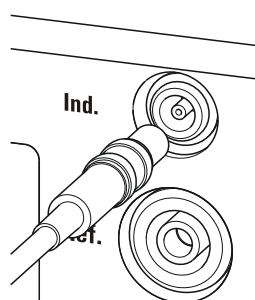


Figure 13 Connecting a pH, metal or ion-selective electrode



NOTICE

The electrode cable is protected against accidental disconnection of the cable by means of a pull-out protection. If you wish to pull out the plug again, you first need to pull back the outer plug sleeve.

3.6.2 Connecting a reference electrode

Connect the reference electrode as follows:

- 1 Plug the electrode plug into the **Ref.** socket of the 906 Titrand.

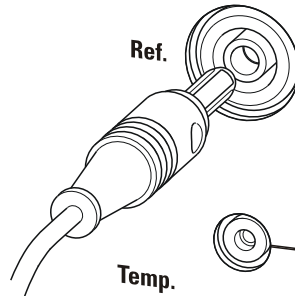


Figure 14 Connecting a reference electrode

3.6.3 Connecting a polarizable electrode

Connect the polarizable electrode as follows:

- 1 Plug the electrode plug into the **Pol.** socket of the 906 Titrand.

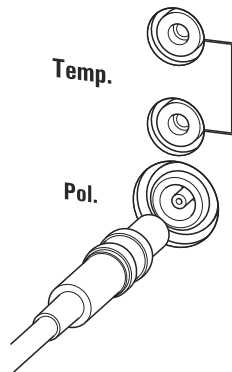


Figure 15 Connecting a polarizable electrode



NOTICE

The electrode cable is protected against accidental disconnection of the cable by means of a pull-out protection. If you wish to pull out the plug again, you first need to pull back the outer plug sleeve.

3.6.4 Connecting a temperature sensor or an electrode with integrated temperature sensor

A temperature sensor of the Pt1000 or NTC type can be connected to the **Temp.** connector.

Connect the temperature sensor or the electrode with integrated temperature sensor as follows:

- 1 Insert the plugs of the temperature sensor into the **Temp.** sockets of the Titrande.

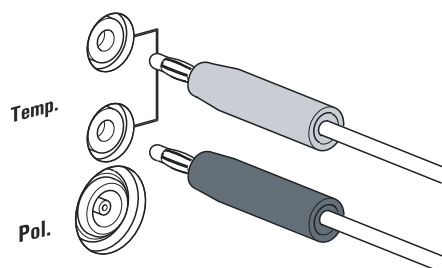


Figure 16 Connecting a temperature sensor or an electrode with integrated temperature sensor



NOTICE

Always insert the red plug into the red socket. This is the only way that shielding against electrical interference can be ensured.

3.6.5 Connecting the iConnect

The external measuring interface 854 iConnect can be connected to the **iConnect** connector.

Connecting the 6.2168.000 mini USB adapter cable to an instrument

If the mini USB adapter cable is not connected to the instrument yet, proceed as follows:

- 1 Plug the mini USB adapter cable (2) into the **iConnect** connector of the instrument (1). Observe the correct orientation (markings).

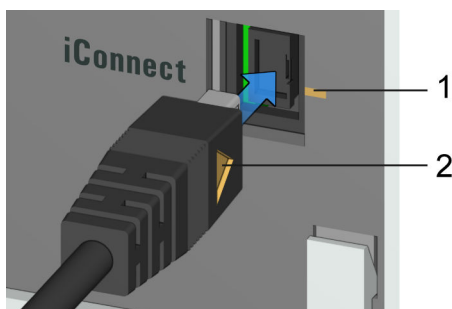


Figure 17 Plugging in the mini USB adapter cable

Depending on the instrument's model version, there may be several **iConnect** connectors.

- 2 Leave the adapter cable plugged in to protect the connector inside the instrument (1) against mechanical impact.

Connecting the 854 iConnect to the adapter cable

Make sure that the mini USB adapter cable is connected to the instrument.

The 854 iConnect can also be connected while the instrument is switched on.

- 1 Plug the plug of the 854 iConnect (3) into the socket of the mini USB adapter cable (2). Observe the correct orientation (markings).

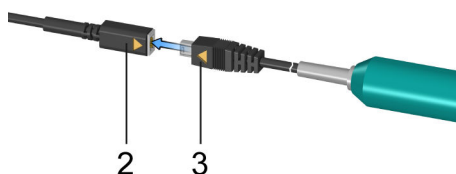


Figure 18 Plugging in the 854 iConnect

As soon as the instrument is switched on, the 854 iConnect is detected automatically and entered as measuring input into the device properties.

Connecting the electrode

The 854 iConnect is used as measuring input for iTrodes (electrodes with integrated memory chip).

Connect the electrode as follows:

- 1 Remove the protective cap of the 854 iConnect.

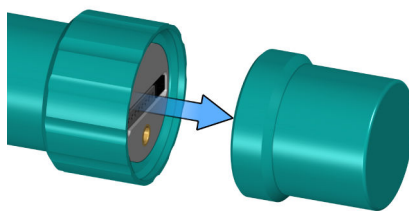


Figure 19 Removing the protective cap

- 2 Align the guide pin (5) of the electrode with the recess in the 854 iConnect (4).

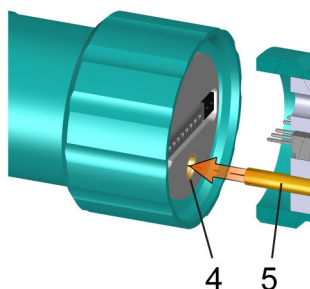


Figure 20 Aligning the guide pin

- 3 Attach the electrode to the 854 iConnect.

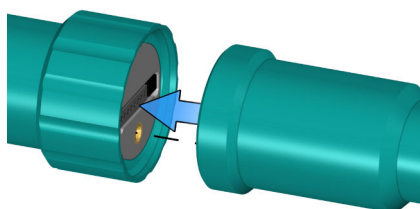


Figure 21 Attaching the electrode

The guide pin guarantees correct connection in such a way that the contact pins cannot be damaged.

- 4 Tighten the screw cap by hand.

If there is an electrode in the sensor list of the firmware or software, the electrode is detected automatically when connecting it.

**NOTICE**

Mount the protective cap again as soon as the 854 iConnect is not in use anymore and no electrode is connected.

Removing the 854 iConnect

The 854 iConnect can also be removed while the instrument is switched on.

- 1 Unplug the 854 iConnect (3) from the socket of the mini USB adapter cable (2).

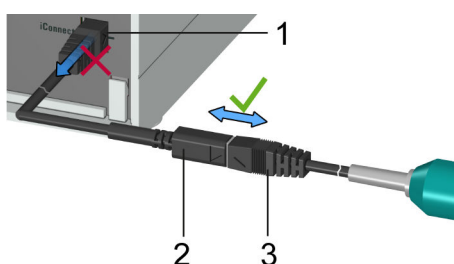


Figure 22 Unplugging the 854 iConnect

- 2 Leave the mini USB adapter cable (2) plugged into the socket of the instrument (1).

**NOTICE**

Position the mini USB adapter cable in such a way that it cannot be removed by accident.

**NOTICE**

For further information on the 854 iConnect, see *Manual iConnect 854*, article number 8.854.8002.

3.6.6 Differential potentiometry

Potentiometric measurements with high-ohm measuring chains can be disrupted by electrostatic and electromagnetic fields in media with low conductivity. Use our 6.0229.100 Solvotrode or other special electrodes for pH measurements in organic solvents. If no reliable measurements are possible with these, then a 6.5104.030 (230 V) or 6.5104.040 (115 V) dif-



ferential amplifier can be used. The differential amplifier is connected to the high-ohm measuring input (**Ind.**).

4.1.3 Karl Fischer reagents

One-component reagents

They contain all the reactive parts in a single solution – iodine, sulfur dioxide and a base, dissolved in an appropriate alcohol.

Two-component reagents

The reactive parts are distributed among two separated solutions. The titration reagent contains iodine in methanol. The KF solvent is a solution of sulfur dioxide and a base in methanol. It is used as a working medium in the KF titration cell.

4.1.4 Application of the Karl Fischer titration

The volumetric Karl Fischer titration is the method of choice for determining quantities of water between 0.1 and 100%. It has the advantage that even solid and pasty samples can be added directly to the titration vessel. In addition, various organic solvents can be used that are tailored to the respective samples.

4.1.5 Working with water standards

4.1.5.1 Certified water standards

Commercially available, certified water standards with a water content of 10.0 ± 0.1 mg/g should be used for validating the instrument as a whole, integrated system.

4.1.5.2 Practical recommendations

For validation, it is essential to work very accurately. In order to minimize any measurement inaccuracies that could occur, the sample preparation and the sample processing should proceed in accordance with a defined scheme:

- 1 Put on gloves (always with Karl Fischer titration).
- 2 Use a clean syringe.
- 3 Take a new ampoule of water standard and shake it briefly.
- 4 With a folded paper towel held between thumb and index finger, break open the ampoule at the marking.
- 5 Draw approx. 1 mL of the water standard into the syringe.



- 6** Pull the piston of the syringe up to the end and swing the syringe back and forth somewhat.

The inside of the syringe is being rinsed by water standard and freed from water contamination.

- 7** Dispose of the used water standard in a waste bottle.

- 8** Draw the rest of the water standard into the syringe, aspirating as little air as possible.

- 9** Push out any air bubbles that may be present in the syringe.

- 10** Wipe off the needle with a lint-free paper towel and cover it with the appropriate cap.

- 11** Place the syringe on the balance and press **[TARA]**.

- 12** As soon as the drift on the 906 Titrande is stable, take the syringe by hand, press **[START]** and inject approx. 1 mL of the water standard through the septum.

There are two possibilities:

- Version 1:
Inject the water standard without immersing the needle in the reagent liquid. If a little drop remains on the end of the needle, it must be aspirated back before pulling the needle out of the septum.
The water standard should not be sprayed from the syringe onto the electrode nor onto the wall of the titration vessel.
- Version 2:
Inject the water standard directly under the surface of the reagent liquid.
Take care to ensure that you do not aspirate any liquid when you withdraw the syringe from the reagent liquid.

- 13** Close the syringe with the same cap and place it back on the balance.

- 14** Read off the value displayed by the balance and enter it as sample size on the Touch Control or in the PC software (e.g. *tiamo*).

- 15** The next determination can be started as soon as the determination has been finished and the titration cell has been conditioned (drift stable) again.

4.1.6 Sample addition

This chapter contains a few notes concerning sample addition. Further notes can be found in the publications of the reagent manufacturers and in the Karl Fischer monograph published by Metrohm.

4.1.6.1 Size of the sample size

The sample weight should be small in order to be able to titrate as many samples as possible in the same electrolyte solution and in order to keep the titration time short. However, ensure that the sample contains at least 50 µg of H₂O. The following tables provide clues for the sample size.

Table 1 Approximate sample size in grams (5 mL buret)

Water content of the sample	KF reagent 1	KF reagent 2	KF reagent 5
0.5%	0.1–0.9	0.2–1.8	0.5–4.5
1.0%	0.05–0.45	0.1–0.9	0.25–2.25
5.0%		0.02–0.18	0.05–0.45
10.0%			0.03–0.22
25.0%			
50.0%			

Table 2 Approximate sample size in grams (10 mL buret)

Water content of the sample	KF reagent 1	KF reagent 2	KF reagent 5
0.5%	0.2–1.8	0.4–3.6	
1.0%	0.1–0.9	0.2–1.8	0.5–4.5
5.0%	0.02–0.18	0.04–0.36	0.1–0.9
10.0%		0.02–0.18	0.05–0.45
25.0%			0.02–0.18
50.0%			0.02–0.09

Table 3 Approximate sample size in grams (20 mL buret)

Water content of the sample	KF reagent 1	KF reagent 2	KF reagent 5
0.5%	0.4–3.6		
1.0%	0.2–1.8	0.4–3.6	
5.0%	0.04–0.36	0.08–0.72	0.2–1.8
10.0%	0.02–0.18	0.04–0.36	0.1–0.9
25.0%		0.02–0.14	0.04–0.36
50.0%			0.02–0.18

KF reagent 1: 1 mL KF reagent reacts with around 1 mg H₂O

KF reagent 2: 1 mL KF reagent reacts with around 2 mg H₂O

KF reagent 5: 1 mL KF reagent reacts with around 5 mg H₂O

4.1.6.2 Working with liquid samples

Liquid samples are added with a syringe. The samples can be injected two different ways:

- One uses a syringe with a long needle, which one immerses in the reagent during the injection.
- One uses a syringe with a short needle and aspirates the last drops back into the needle.

The best way for you to determine the injected sample amount is to reweigh the sample.

Glass syringes should be used for the **determination of traces and validations**. We recommend obtaining these from a specialized syringe manufacturer.

Highly volatile samples and samples of low viscosity should be cooled before sampling. Doing so avoids losses while working. The syringe must, however, not be cooled directly, as condensation could form. For the same reason, no air may be aspirated into a syringe into which a cooled sample has been aspirated beforehand.

Samples of high viscosity can be thinned by heating. The syringe must be heated as well. The same target can be reached by diluting with suitable solvents. In this case, the water content of the solvent has to be determined and subtracted as blank value.

Viscous samples can be added to the measuring cell with a syringe without needle. You can use the ground-joint opening for this. The best way for you to determine the added sample amount is by reweighing the sample.

4.1.6.3 Working with solid samples

If possible, solid samples are to be extracted or dissolved in a suitable solvent. The resulting solution is injected, during which a blank value correction for the solvent must be carried out.

If no suitable solvent can be found for a solid sample, or if the sample reacts with the Karl Fischer reagent, then a Karl Fischer oven should be used.

If solid samples have to be directly added to the titration cell, they can be inserted through the ground-joint opening. While doing so, take care to ensure that

- the sample releases its moisture completely.
- no side reaction with the Karl Fischer reagent takes place.
- the surface of the electrode is not covered by the sample substance (incomplete KF reaction!).
- the Pt wires of the indicator electrode do not become damaged.

4.1.7 Optimum working conditions

4.1.7.1 Drift

A constant drift in the range of $\leq 10 \mu\text{L}/\text{min}$ is all right. Lower values are, however, quite possible. Higher but stable values will still produce good results, because the drift can be compensated.

A constantly high drift can be caused by water-containing deposits in inaccessible parts of the titration vessel. In these cases, shaking the titration vessel can reduce the value. Make sure that there are no drops above the liquid level in the titration vessel.

When you work with a Karl Fischer oven, a drift $\leq 10 \mu\text{L}/\text{min}$ is all right. The drift depends on the gas flow (the smaller the gas flow, the lower the drift).

4.1.7.2 Reagent replacement

The electrolyte solution must be replaced in the following cases:

- The titration vessel is too full.
- The drift is too high, and cannot be reduced by shaking the titration vessel.

Exhausted electrolyte solution is best disposed of by aspiration. To do this, you can use, for example, an *803 Ti Stand* with built-in membrane pump. An advantage is that the titration vessel does not have to be disassembled.

In the event of severe contamination, the titration vessel can be rinsed with a suitable solvent which is also aspirated.



4.1.7.3 Indicator electrode

A new indicator electrode can take a certain warm-up time for forming the surface. During this time unexpectedly long titration times and high measurement results can occur. This phenomenon will, however, disappear after a short time of use. In order to accelerate the setting of a new indicator electrode, the 906 Titrande can be conditioned e.g. over night.

A contaminated indicator electrode can be carefully cleaned with an abrasive agent (6.2802.000 polishing set or toothpaste). After the cleaning, rinse with ethanol.

The two Pt wires of the indicator electrode should run as parallel as possible to one another. Check the Pt wires before inserting the electrode.

5 Working with the exchange unit

The exchange unit (806 Exchange Unit) has an integrated data chip that makes it possible to store data about the exchange unit and for the reagent. The data is edited in the Touch Control or in the PC software. The start-up of the exchange unit is described in the manual for the exchange unit.

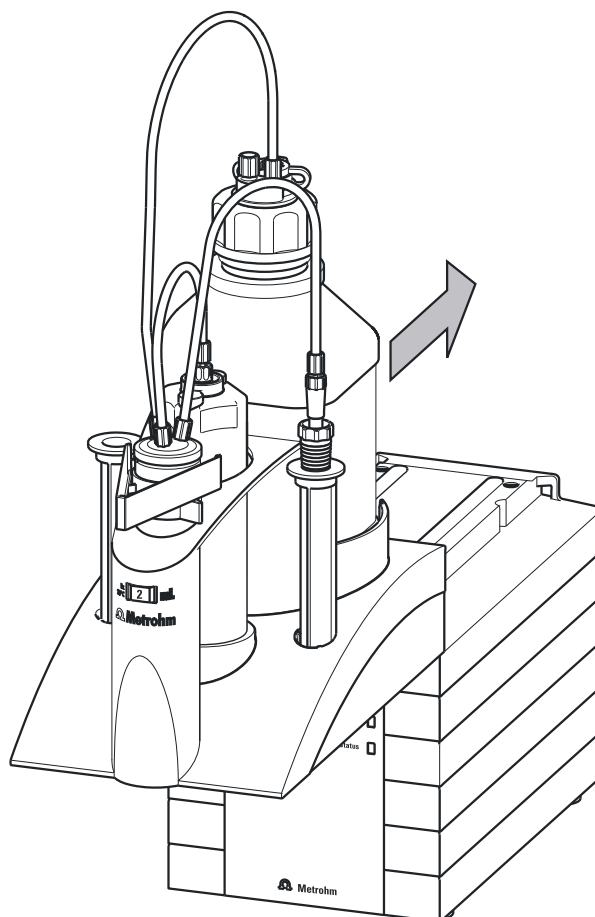


Figure 23 Attaching the exchange unit

Proceed as follows to attach the exchange unit:

- 1** Attach the exchange unit from the front onto the 906 Titrando and push it all the way to the rear.

It must snap in audibly.

If the exchange unit is attached correctly, its initialization is activated by a microswitch which is triggered by the guide bolts of the exchange unit. The exchange unit is recognized and the data is read out automatically from the data chip. The 906 Titrando carries out an



automatic rotation of the flat stopcock and then returns it to the exchange position (dosing position). The **Status** LED will be continuously illuminated once this has been accomplished.

The following table contains a summary of which operating statuses of the internal dosing device are displayed by the **Status** LED:

Status of the "Status" LED	Description
off	No exchange unit is attached.
constant illumination	The exchange unit has been correctly attached and recognized and can now be used for dosing and titration. The flat stopcock is in the exchange position, i.e. the exchange unit can be removed.
slow flashing	<ul style="list-style-type: none">▪ The exchange unit is currently being used for dosing or filling.▪ An intelligent exchange unit has been attached and the data on the integrated data chip is currently either being read out or written.
rapid flashing	Error on the dosing drive, consult the "Troubleshooting" chapter.

6 Operation and maintenance

6.1 General notes

6.1.1 Care

The 906 Titrande requires appropriate care. Excess contamination of the instrument may result in functional disruptions and a reduction in the service life of the otherwise sturdy mechanics and electronics.

Spilled chemicals and solvents should be removed immediately. Above all, the plug connections on the rear of the instrument (in particular the power socket) should be protected from contamination.



CAUTION

Although this is extensively prevented by design measures, the power plug should be unplugged immediately if aggressive media have penetrated the inside of the instrument, so as to avoid serious damage to the instrument electronics. In such cases, Metrohm Service must be informed.

6.1.2 Maintenance by Metrohm Service

Maintenance of the 906 Titrande is best carried out as part of an annual service, which is performed by specialist personnel of the Metrohm company. A shorter maintenance interval may be necessary if you frequently work with caustic and corrosive chemicals.

Metrohm Service offers every form of technical advice for maintenance and service of all Metrohm instruments.

Problem	Cause	Remedy
		<ol style="list-style-type: none"> 2. Remove and clean the exchange unit (see the chapter in the manual for the exchange unit, "Care and upkeep"). 3. Contact your local Metrohm Service department if necessary.
	<p><i>The data of the exchange unit can no longer be read.</i></p> <p><i>The data chip is damaged, either mechanically or by chemical action.</i></p>	<ul style="list-style-type: none"> ▪ Contact your local Metrohm Service department to have the data chip replaced. ▪ If necessary, remove the data chip yourself so that the exchange unit can continue to be used in the meantime.

7.2 Karl Fischer titration

Problem	Cause	Remedy
The drift is very high during conditioning.	<i>The titration cell is leaking.</i>	<ul style="list-style-type: none"> ▪ Check the seals and the septum. Replace if necessary. ▪ Replace the molecular sieve.
The drift becomes greater after each titration.	<i>The sample releases water very slowly.</i>	<ul style="list-style-type: none"> ▪ Adjust the method. ▪ Add solubility promoter. ▪ Increase the temperature (possibly using a KF oven). ▪ See technical literature.
	<i>A side reaction is taking place.</i>	<ul style="list-style-type: none"> ▪ Use special reagents. ▪ Adjust the method (increase/decrease the temperature, external extraction). ▪ See technical literature.
	<i>The pH value is no longer in the optimum range.</i>	Add buffer (see technical literature).
The titration will not be finished.	<i>The titration cell is leaking.</i>	<ul style="list-style-type: none"> ▪ Check the seals and the septum. Replace if necessary. ▪ Replace the molecular sieve.
	<i>The minimum increment is too low.</i>	Select the user-defined titration rate and increase the minimum volume increment (see manual/help of the software used).
	<i>The stop criterion is unsuitable.</i>	<p>Adjust the control parameters (see manual/help of the software used):</p> <ul style="list-style-type: none"> ▪ Increase the stop drift.

7.3 SET titration

Problem	Cause	Remedy
The titration will not be finished.	<i>The minimum dosing rate is too low.</i>	Select the user-defined titration rate and increase the minimum rate (see manual/help of the software used).
	<i>The stop criterion is unsuitable.</i>	Adjust the control parameters (see manual/help of the software used): <ul style="list-style-type: none"> ▪ Increase the stop drift. ▪ Select a short delay time.
The sample is over-titrated.	<i>The control parameters are unsuitable.</i>	Adjust the control parameters (see manual/help of the software used): <ul style="list-style-type: none"> ▪ Select Titration rate = slow. ▪ Select the user-defined titration rate and increase the control range. ▪ Select the user-defined titration rate and reduce the maximum rate. ▪ Select the user-defined titration rate and reduce the minimum rate. ▪ Stir faster. ▪ Arrange the electrode and buret tip to an optimum.
	<i>The electrode responds too slowly.</i>	Replace the electrode.
The titration time is too long.	<i>The control parameters are unsuitable.</i>	Adjust the control parameters (see manual/help of the software used): <ul style="list-style-type: none"> ▪ Select Titration rate = optimal or fast. ▪ Select the user-defined titration rate and decrease the control range. ▪ Select the user-defined titration rate and increase the maximum rate. ▪ Select the user-defined titration rate and increase the minimum rate.
The results are spread widely.	<i>The minimum dosing rate is too high.</i>	Select user-defined titration rate and decrease the minimum rate (see manual/help of the software used).
	<i>The electrode responds too slowly.</i>	Replace the electrode.



8 Appendix

8.1 Remote interface

The 6.2148.010 Remote Box allows devices to be controlled which cannot be connected directly to the MSB interface of the Titrande.

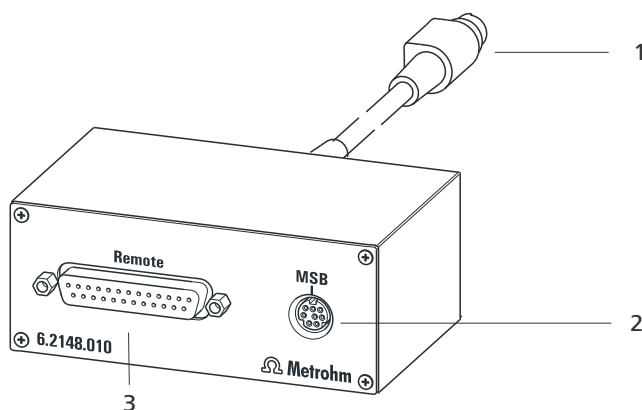


Figure 24 Connectors of the Remote Box

1 Cable

For connecting to the Titrande.

2 MSB connector

Metrohm Serial Bus. For connecting external dosing devices or stirrers.

3 Remote connector

For connecting instruments with a remote interface.

8.1.1 Pin assignment of the remote interface

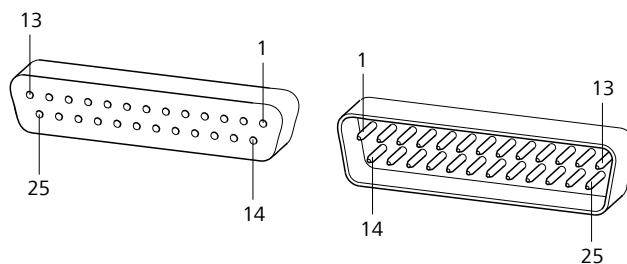
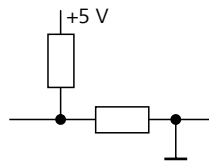


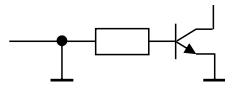
Figure 25 Pin assignment of remote socket and remote plug

The above figure of the pin assignment applies for all Metrohm instruments with 25-pin D-Sub remote connector.

Inputsapprox. 50 k Ω Pull-up

 $t_p > 20 \text{ ms}$

active = low, inactive = high

Outputs

Open Collector

 $t_p > 200 \text{ ms}$

active = low, inactive = high

 $I_C = 20 \text{ mA}$, $V_{CE0} = 40 \text{ V}$

+5 V: maximum load = 20 mA

The following tables offer information concerning the assignment of the individual pins and their function:

Table 4 Inputs and outputs of the remote interface

Assignment	Pin No.	Function*
Input 0	21	Start
Input 1	9	Stop
Input 2	22	
Input 3	10	Quit
Input 4	23	–
Input 5	11	
Input 6	24	
Input 7	12	
Output 0	5	Ready
Output 1	18	Conditioning OK
Output 2	4	Determination
Output 3	17	EOD
Output 4	3	
Output 5	16	Error
Output 6	1	
Output 7	2	Warning



Assignment	Pin No.	Function*
Output 8	6	
Output 9	7	
Output 10	8	
Output 11	13	
Output 12	19	
Output 13	20	
0 volts / GND	14	
+5 volts	15	
0 volts / GND	25	

* Signal activated only for operation with Touch Control.

Table 5 Explanation of the individual functions

Function	Explanation
Start	The current method is started at the time of activation. $t_{\text{pulse}} > 100 \text{ ms}$
Stop	The current method is canceled (Stop) at the time of activation. $t_{\text{pulse}} > 100 \text{ ms}$
Quit	The current command in the determination run will be canceled at the time of activation. $t_{\text{pulse}} > 100 \text{ ms}$
Ready	The instrument is ready to receive a start signal.
Conditioning OK	The line is set when Conditioning with SET titration and KFT titration is at OK. The line remains set until the determination is started with [START] .
Determination	The instrument performs a data-generating determination.
EOD	End of Determination. Pulse ($t_{\text{pulse}} = 200 \text{ ms}$) after a determination or after a buffer/standard solution during calibration using a Sample Processor.
Error	The line is set for error message display.

Function	Explanation
Warning	The line is set for warning message display.

9 Technical specifications

9.1 Measuring interface

Depending on the version, the 906 Titrande has one (version 2.906.0010) or two (version 2.906.0020) galvanically isolated measuring interface(s).

The measuring cycle is 100 ms for all measuring modes.

9.1.1 Potentiometry

One high-ohm measuring input (**Ind.**) for pH, metal or ion-selective electrodes and one measuring input (**Ref.**) for separate reference electrodes.

<i>Input resistance</i>	$> 1 \cdot 10^{12} \Omega$
<i>Offset current</i>	$< 1 \cdot 10^{-12} \text{ A}$ (under reference conditions)
<i>Measuring mode</i>	
<i>pH</i>	
<i>Measuring range</i>	-13 to +20 pH
<i>Resolution</i>	0.001 pH
<i>Measuring accuracy</i>	$\pm 0.003 \text{ pH}$ (± 1 digit, without sensor error, under reference conditions)
<i>Measuring mode</i>	
<i>U</i>	
<i>Measuring range</i>	-1,200 to +1,200 mV
<i>Resolution</i>	0.1 mV
<i>Measuring accuracy</i>	$\pm 0.2 \text{ mV}$ (± 1 digit, without sensor error, under reference conditions)

9.1.2 Temperature

A measuring input (**Temp.**) for temperature sensors of the Pt1000 or NTC type with automatic temperature compensation.

R (25 °C) and B value can be configured for NTC sensors.

<i>Measuring range</i>	
<i>Pt1000</i>	-150 to +250 °C
<i>NTC</i>	-5 to +250 °C (R (25 °C) = 30,000 Ω and B (25/50) = 4,100 K)

Resolution

<i>Pt1000</i>	0.1 °C
<i>NTC</i>	0.1 °C

Measuring accuracy

<i>Pt1000</i>	±0.2 °C (Applies for measuring range –20 to +150 °C; ±1 digit; without sensor error, under reference conditions)
<i>NTC</i>	±0.6 °C (Applies for measuring range +10 to +40 °C; ±1 digit; without sensor error, under reference conditions)

9.1.3 Polarizer

One measuring input (**Pol.**) for polarizable electrodes.

**Measuring mode
*I_{pol}***

Determination with adjustable polarization current

<i>Polarization current</i>	–122.5 to +122.5 µA (increment: 0.5 µA) –125.0 to +125.0 µA: non-guaranteed values, dependent on reference voltage +2.5 V
-----------------------------	--

<i>Measuring range</i>	–1,200 to +1,200 mV
------------------------	---------------------

<i>Resolution</i>	0.1 mV
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<i>Measuring accuracy</i>	±0.2 mV (±1 digit, without sensor error, under reference conditions)
---------------------------	---

**Measuring mode
*U_{pol}***

Determination with adjustable polarization voltage

<i>Polarization voltage</i>	–1,225 to +1,225 mV (increment: 25 mV) –1,250 to +1,250 mV: non-guaranteed values, dependent on reference voltage +2.5 V
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<i>Measuring range</i>	–120 to +120 µA
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<i>Resolution</i>	0.1 µA
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9.2 Internal dosing device

<i>Cylinder volume of the exchange unit</i>	1 mL, 5 mL, 10 mL, 20 mL or 50 mL
<i>Resolution</i>	20,000 steps per cylinder volume

9.3 Power connection

<i>Supply voltage</i>	100 to 240 V
<i>Frequency</i>	50–60 Hz
<i>Power consumption</i>	Maximum 45 W
<i>Fuse</i>	Electronic overload protection

9.4 Ambient temperature

<i>Nominal function range</i>	+5 to +45 °C at max. 80% relative humidity non-condensing
<i>Storage</i>	+5 to +45 °C

9.5 Reference conditions

<i>Ambient temperature</i>	+25 °C (± 3 °C)
<i>Relative humidity</i>	$\leq 60\%$
<i>Instrument status</i>	Instrument in operation at least 30 min

9.6 Dimensions

<i>Width</i>	142 mm
<i>Height</i>	227 mm
<i>Depth</i>	231 mm
<i>Weight</i>	2.9 kg (version 2.906.0010, without accessories) 3.0 kg (version 2.906.0020, without accessories)
<i>Material (housing)</i>	Poly(butylene terephthalate) (PBT)

9.7 Interfaces

USB connectors

<i>USB ports</i>	2 USB downstream ports (type A sockets), 500 mA each, for connecting peripheral devices such as printers, keyboards, barcode readers or RS-232/USB Box (Metrohm order no. 6.2148.020).
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"Controller" connector

<i>Controller port</i>	USB upstream port with auxiliary power supply (Mini DIN socket) for connecting Touch Control or computer for controlling the 906 Titrande.
<i>Touch Control</i>	With integrated Touch Control cable.
<i>Computer</i>	With 6.2151.000 cable.

MSB connectors (Metrohm Serial Bus)

<i>Dosing device</i>	Connection of a maximum of 3 external dosing devices, models Dosi-mat or Dosino (MSB 2 to MSB 4).
<i>Stirrer</i>	Connection of a maximum of 4 stirrers. Stirrer control: Switching on/off manually or coordinated with the titra-tion sequence. Speed in 15 steps and shift direction can be selected.
<i>Remote Box</i>	Connection of a maximum of 4 Remote Boxes. Remote Boxes can be used to actuate and monitor external devices.

10 Accessories

Up-to-date information on the scope of delivery and optional accessories for your product can be found on the Internet. You can download this information using the article number as follows:

Downloading the accessories list

- 1** Enter <https://www.metrohm.com/> into your Internet browser.
- 2** Enter the article number (e.g. **906**) into the search field.
The search result is displayed.
- 3** Click on the product.
Detailed information regarding the product is shown on various tabs.
- 4** On the **Included parts** tab, click on **Download the PDF**.
The PDF file with the accessories data is created.



NOTICE

Once you have received your new product, we recommend downloading the accessories list from the Internet, printing it out and keeping it together with the manual for reference purposes.

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