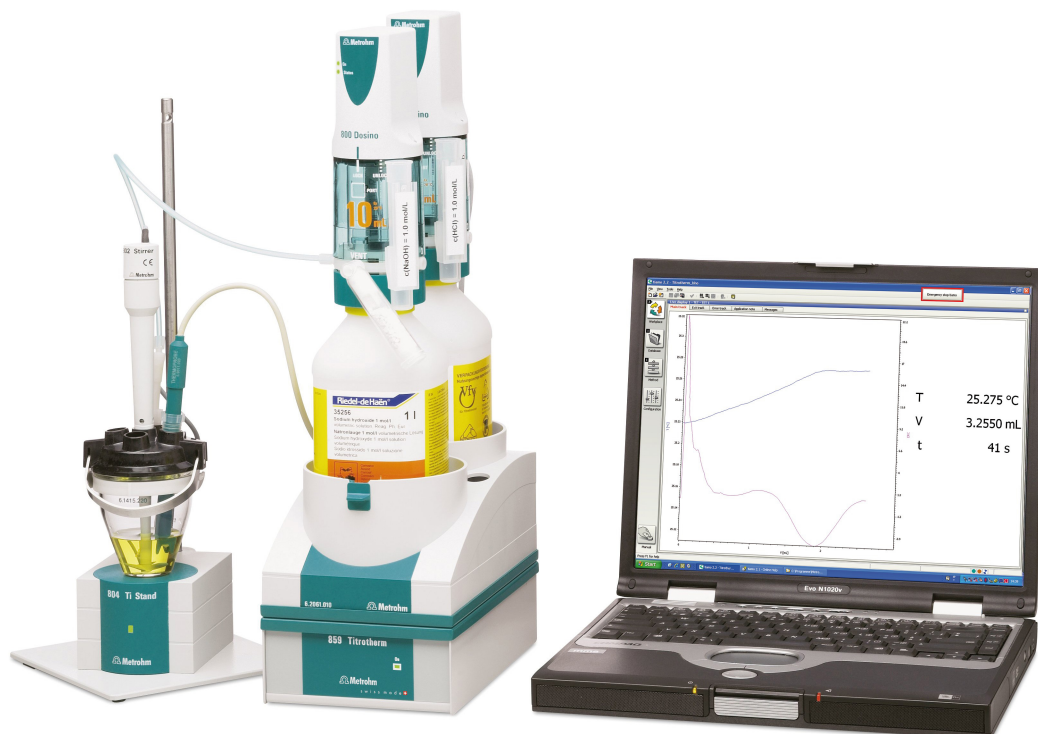


859 Titrotherm



Manual
8.859.8001EN



Metrohm AG
CH-9100 Herisau
Switzerland
Phone +41 71 353 85 85
Fax +41 71 353 89 01
info@metrohm.com
www.metrohm.com

859 Titrotherm

Manual

Teachware
Metrohm AG
CH-9100 Herisau
teachware@metrohm.com

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Although all the information given in this documentation has been checked with great care, errors cannot be entirely excluded. Should you notice any mistakes please send us your comments using the address given above.

Documentation in additional languages can be found on <http://products.metrohm.com> under **Literature/Technical documentation**.

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1 Introduction

The 859 Titrotherm is a Metrohm titrator for thermometric titration. Thermometric titration can be utilized where potentiometric indication is either not possible or possible only to a limited extent.

For the theory and application possibilities of thermometric titration, we recommend the monograph: Thomas Smith, *Practical thermometric titrimetry*, Metrohm AG, **2006** (Order No. 8.036.5003).

1.1 The 859 Titrotherm in the Titrando system

The 859 Titrotherm is a component of the modular Titrando system. Operation is carried out with a computer containing the software ***tiamo***[™] (starting with Version 2.2).

A Titrando system can contain numerous, various kinds of instruments. The following figure provides an overview of the peripheral devices you can connect to the 859 Titrotherm.

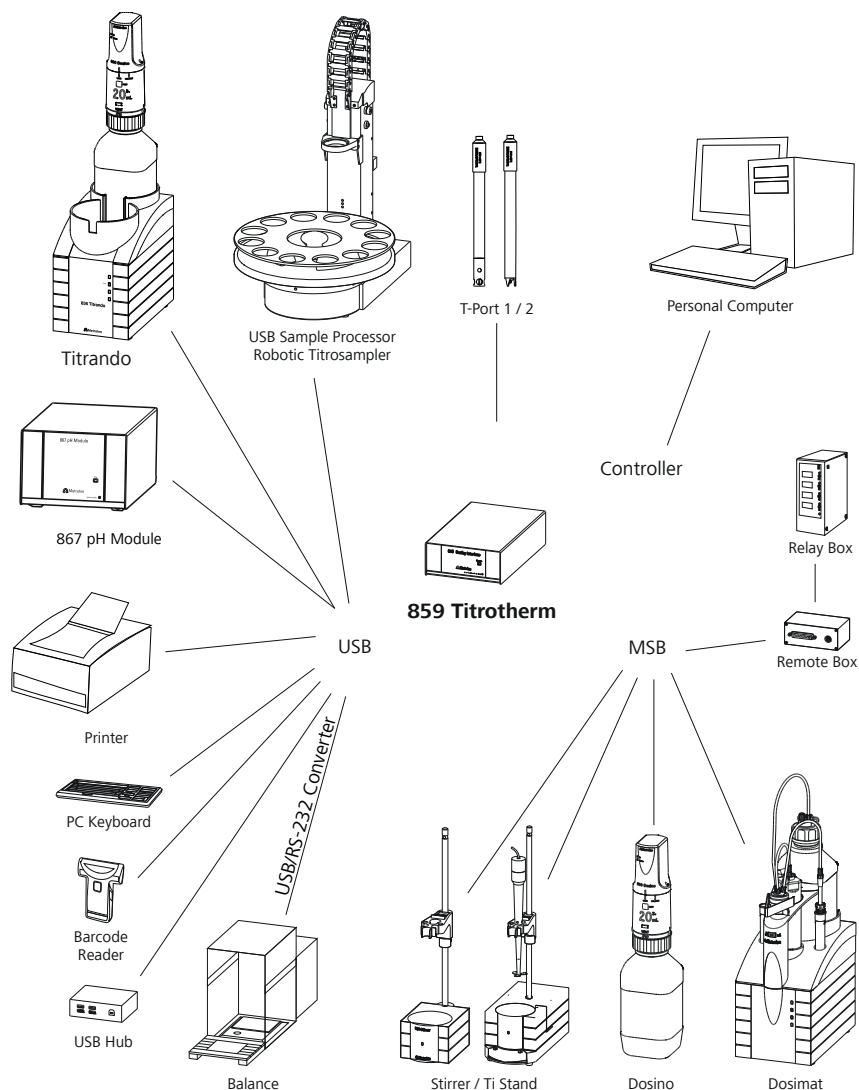


Figure 1 The 859 Titrotherm in the Titrand system

You can request information on special applications in the "Application Bulletins" and "Application Notes"; available free of charge via the Metrohm representative responsible.

Updating the device software is described in the tiamo help.

1.2 Instrument description

The 859 Titrotherm has the following characteristics:

- **Operation**
Operation is carried out using the high-performance PC software *tiamo*[™], Version 2.2 or higher.
- **MSB connectors**
Four MSB connectors (Metrohm Serial Bus) to control dosing devices (Dosimat with exchange unit or Dosino with dosing unit), stirrer or titration stand 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, Titrando, Dosing Interface, etc.) can be connected.
- **Measuring interface**
Measuring interface with two connectors for two temperature sensors (Thermoprobes).

1.2.1 Titration modes, dosing commands and other commands

- **TET**
Thermometric endpoint titration. The reagent addition takes place continuously at a constant dosing rate.
- **Dosing commands**
The following commands for dosing can be selected:
 - **ADD** (adding a predefined volume)
 - **PREP** (rinsing the cylinder and tubings of an exchange or dosing unit)
 - **EMPTY** (for emptying cylinder and tubings)
 - **LQH** (for executing complex dosing tasks)
- **Other commands**
 - **STIR** (stirrer control)
 - **SCAN** (scanning remote signals)
 - **CTRL** (setting remote signals)

1.2.2 Intended use

The 859 Titrotherm is designed for usage as a titrator in analytical laboratories. Its main area of application is the determination of ions in aqueous and nonaqueous media. The 859 Titrotherm uses the method of thermometric titration.

This instrument is suitable for processing chemicals and flammable samples. The usage of the 859 Titrotherm therefore requires that the user has basic knowledge and experience in the handling of toxic and caustic sub-



stances. Knowledge with respect to the application of the fire prevention measures prescribed for laboratories is also mandatory.

1.3 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.

1.3.1 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 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 a possible damage of instruments or instrument parts.

**Note**

This symbol marks additional information and tips.

1.4 Safety instructions

1.4.1 General notes on safety

**Warning**

This instrument may only be operated in accordance with the specifications in this documentation.

This instrument has 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.

1.4.2 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.



Mains voltage



Warning

An incorrect mains voltage can damage the instrument.

Only operate this instrument with a mains 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.

Always pull the mains cable out of the mains connection socket before connecting or disconnecting electrical appliances on the rear panel of the instrument.

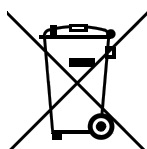
1.4.3 Working with liquids



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.

1.4.4 Recycling and disposal



This product is covered by European Directive 2002/96/EC, WEEE – Waste from Electrical and Electronic Equipment.

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

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

2 Overview of the instrument

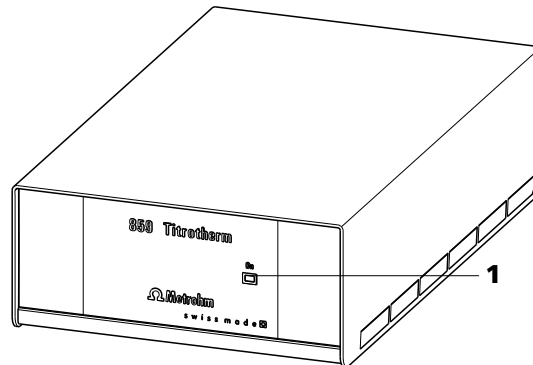


Figure 2 Front 859 Titrotherm

1 LED "On"

Lights up when the device and a computer are connected to the mains and switched on.

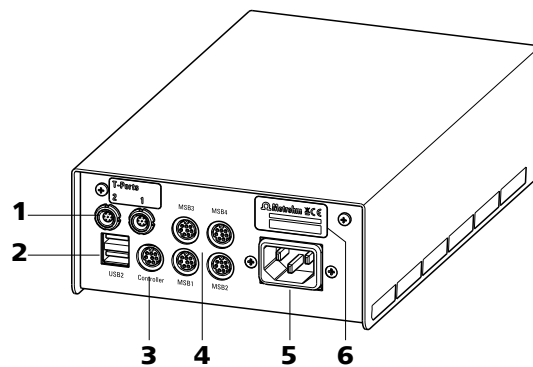


Figure 3 Rear 859 Titrotherm

1 Measuring interface: T-Port 1 and 2
For connecting two Thermoprobes.

3 Controller connector (Controller)
Connector for a PC with installed PC software. Mini DIN, 9-pin.

5 Mains connection socket

2 USB connector (USB 1 and USB 2)
USB ports (type A) for connecting printer, keyboard, barcode reader, additional Titrados, 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 Type plate
Contains specifications concerning mains voltage, instrument type and serial number.

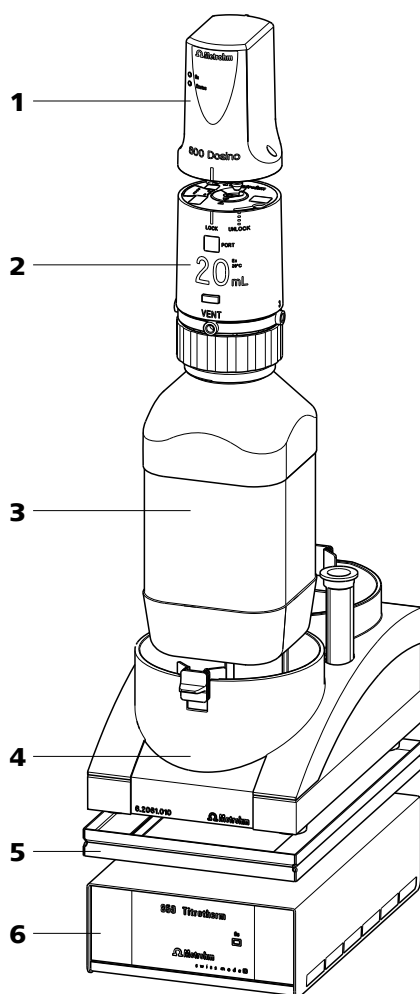


Figure 4 859 Titrotherm with titration accessories

1 800 Dosino Dosing drive for the titrant.	2 Dosing unit (6.3032.XXX) With cylinder sizes 2, 5, 10, 20, 50 mL.
3 Bottle (6.1608.XXX)	4 Bottle holder for Dosinos (6.2061.010)
5 Stacking frame (6.2065.000)	6 859 Titrotherm

3 Installation

3.1 Setting up the instrument

3.1.1 Packaging

The instrument is supplied in highly protective special packaging together with the separately packed accessories. Keep this packaging, as only this ensures safe transportation of the instrument.

3.1.2 Checks

Immediately after receipt, check whether the shipment has arrived complete and without damage by comparing it with the delivery note.

3.1.3 Location

The instrument has been developed for operation indoors and may not be used in explosive environments.

Place the instrument in a location of the laboratory which is suitable for operation, free of vibrations, protected from corrosive atmosphere, and contamination by chemicals.

The instrument should be protected against excessive temperature fluctuations and direct sunlight.

3.2 Connecting a computer

The 859 Titrotherm requires a USB connection to a computer in order to be able to be controlled by a PC 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 device.

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

Cable connection and driver installation

A driver installation is required in order to ensure that the 859 Titrotherm is recognized by the PC software. To accomplish this, you must comply with the procedures specified. The following steps are necessary:

1 Install the software

- Insert the PC software installation CD and carry out the installation program directions.



- Exit the program if you have started it after the installation.

2 Establish the cable connections

- Connect all peripheral devices to the instrument .
- Connect the 859 Titrotherm to the mains supply if you have not already done this.
The "On" LED on the 859 Titrotherm 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.

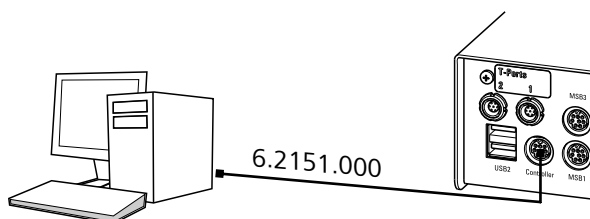


Figure 5 Connecting the computer

The instrument is recognized. The driver installation is carried out differently, depending on the version of the Windows operating system used.

- Either the required driver is installed automatically, or an installation wizard is started.

3 Follow the instructions of the installation wizard.

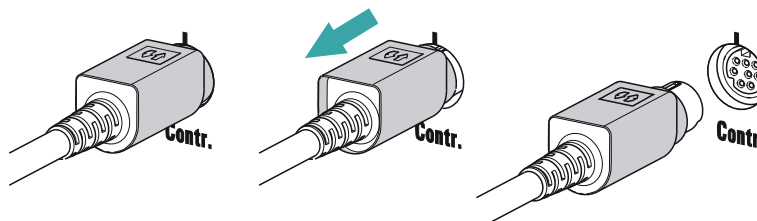
The "On" LED on the 859 Titrotherm lights up when the driver installation has been exited and the instrument is ready for operation.

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



Note

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 will first need to pull back the outer plug sleeve marked with arrows.



Registering and configuring the instrument in the PC software

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

1 Set up the instrument

- Start the PC 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 PC 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 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 device. 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 devices that can be connected to an MSB socket, along with a number of different cabling variations.

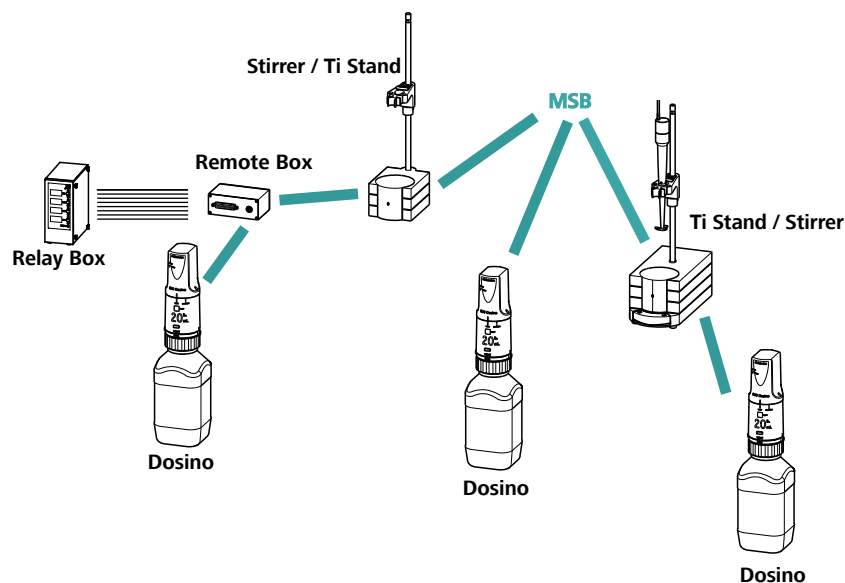


Figure 6 MSB connections

The question of which peripheral devices are supported depends on the control device.



Note

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.
- Type 700 Dosino dosing devices cannot be connected together with other MSB instruments on a shared connector. These dosing devices must be connected separately.



Caution

Exit the control software before you plug MSB instruments in. When the control device is switched on, it automatically recognizes which instrument is connected at which MSB connector. 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

Four dosing devices can be connected to the instrument (**MSB 1 to MSB 4**).

The types of dosing devices that are supported are:

- 700 Dosino
- 800 Dosino
- 805 Dosimat

Proceed as follows:

1 Connect the dosing device

- Exit the control software.
- Connect the connection cable to one of the sockets marked with **MSB** on the rear of the 859 Titrotherm.
- Start the control software.

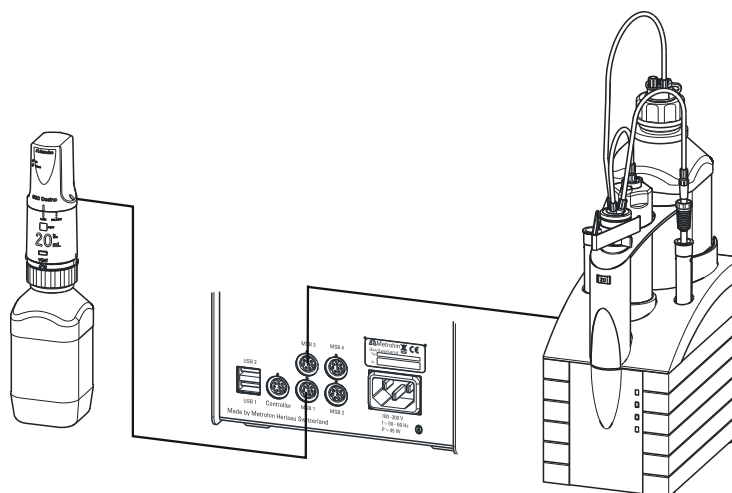


Figure 7 Connecting a dosing device

3.3.2 Connecting a stirrer or titration stand

You can use the magnetic stirrers 801 Stirrer or 803 Ti Stand (stirring "from below") or the 804 Ti Stand with a propeller stirrer 802 Stirrer (stirring "from above").

Connect a stirrer or a titration stand as follows:

1 Connect 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 859 Titrotherm.



- If desired, connect the propeller stirrer to the stirrer socket (with stirrer symbol) of the titration stand.
- Start the control software.

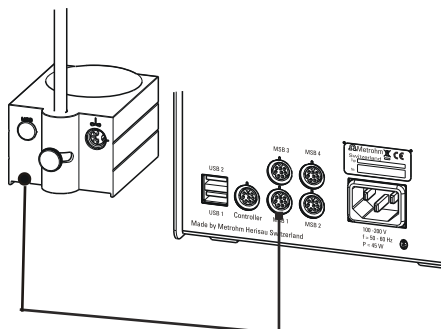


Figure 8 Connecting an MSB stirrer

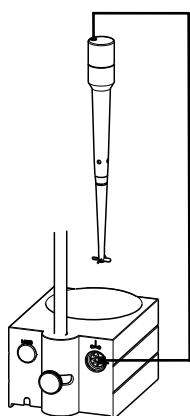


Figure 9 Propeller stirrer and titration stand

3.3.3 Connecting a Remote Box

Instruments that are controlled via remote lines and/or which send control signals via remote lines can be connected using 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 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. No exchange of data is possible, however.

Proceed as follows:

1 Connect 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 device.
- Start the control software.

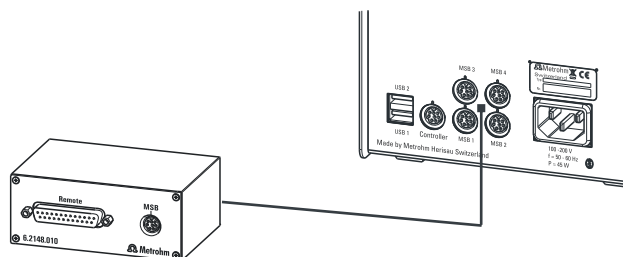


Figure 10 Connecting a Remote Box

You can, for example, connect an 849 Level Control (fill level monitoring in a canister) or a 731 Relay Box (switch box for 230/110 volt alternating current sockets and low-voltage direct current outlets). 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 (see Chapter 6.3, page 24).

3.4 Connecting USB devices

Additional Metrohm devices, such as USB Sample Processors, Dosing Interfaces, Titrandos, etc. can be connected to the 859 Titrotherm.

Proceed as follows:

- 1 Connect one 6.2151.000 connecting cable with one end (8-pin Mini DIN plug) to the **Controller** connector of the Metrohm device.
- 2 Connect the other end of the connecting cable to the connector **USB1** or **USB2** of the 859 Titrotherm.

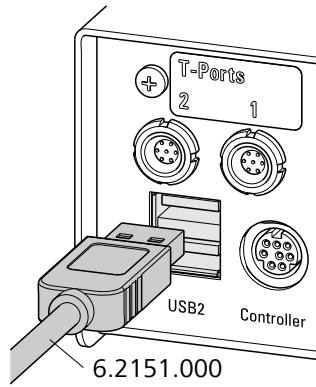


Figure 11 Connecting USB devices to the 859 Titrotherm

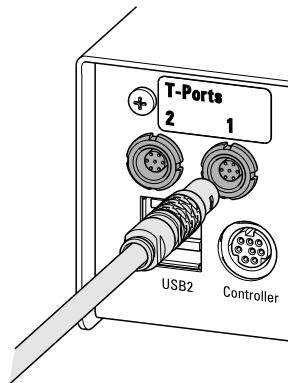
This way, several Metrohm devices can be connected with one another and be controlled simultaneously from one PC software.

3.5 Connecting a sensor

Connect the Thermoprobe as follows:

- 1 Plug the Thermoprobe plug into the **T-Port 1** or **T-Port 2** socket of the 859 Titrotherm.

Note the orientation of the plug.



Connecting a Thermoprobe

In order to disconnect the sensor, the outer plug sleeve on the plug must first be retracted.

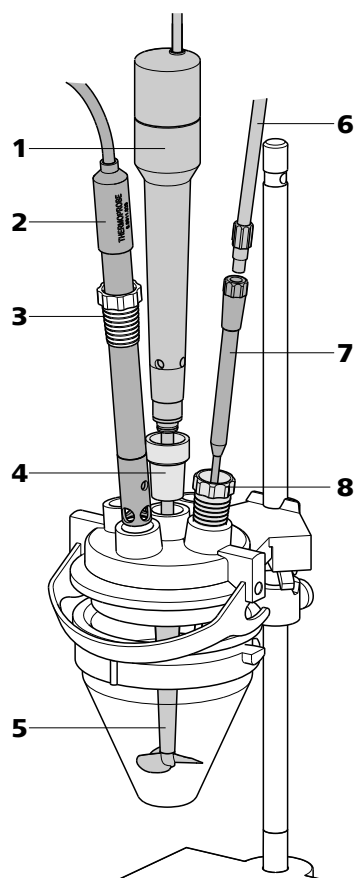


Note

Never use the cable to pull out the sensor!

3.6 Setting up the titration cell

Install the titration cell in accordance with the following figure:



1 Propeller stirrer (802 Stirrer)

Connect the stirrer to the stirrer connector on the rear of the titration stand.

2 Sensor Thermoprobe (6.9011.020 or 6.9011.040)

Connect the sensor at **T-Port 1** (or T-Port 2) to the rear side of the 859 Titrotherm.

3 SGJ sleeve (6.1236.050)

SGJ 14/12 mm Material: PE.

4 SGJ intermediate cone (6.2727.010)

For the 802 Stirrer.

5 Stirring propeller (6.1909.010)

L= 96 mm, Material: PP.

6 FEP tubing (6.1805.100)

Connect the tubing (40 cm) to Port 1 on the dosing unit.

7 Antidiffusion tip M6 (6.1543.200)

L=151 mm, Material: ETFE/FEP.

8 Link stopper (6.1446.030)

Material: ETFE.

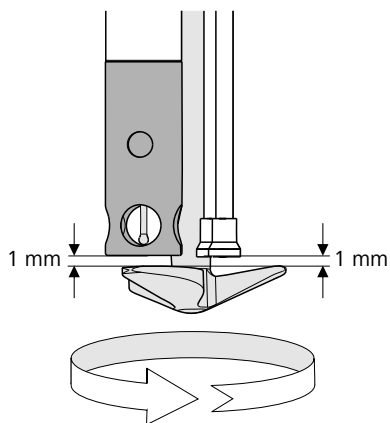


Figure 12 Positioning the Thermoprobe

The sensor should be installed in accordance with the above figure. A high stirring rate is very important. Please ensure that there is a sufficient amount of liquid in the vessel so that the sensor is immersed at least 1 cm, even when the solution is being stirred at high speed. A visible stirring funnel must result.

4 Handling and maintenance

4.1 General notes

4.1.1 Care

The 859 Titrotherm requires appropriate care. Excess contamination of the instrument may result in functional disruptions and a reduction in the life-time of the 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 mains connection socket) should be protected from contamination.



Caution

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

4.1.2 Maintenance by Metrohm Service

Maintenance of the 859 Titrotherm is best carried out as part of an annual service performed by specialist personnel of the Metrohm company. If working frequently with caustic and corrosive chemicals, a shorter maintenance interval could be necessary.

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



4.2 Quality Management and validation with Metrohm

Quality Management

Metrohm offers you comprehensive support in implementing quality management measures for instruments and software. Further information on this can be found in the brochure «**Quality Management with Metrohm**» available from your local Metrohm agent.

Validation

Please contact your local Metrohm agent for support in validating instruments and software. Here you can also obtain validation documentation to provide help for carrying out the **Installation Qualification** (IQ) and the **Operational Qualification** (OQ). IQ and OQ are also offered as a service by the Metrohm agents. In addition, various application bulletins are also available on the subject, which also contain **Standard Operating Procedures** (SOP) for testing analytical measuring instruments for reproducibility and correctness.

Maintenance

Electronic and mechanical functional groups in Metrohm instruments can and should be checked as part of regular maintenance by specialist personnel from Metrohm. Please ask your local Metrohm agent regarding the precise terms and conditions involved in concluding a corresponding maintenance agreement.



Note

You can find information on the subjects of quality management, validation and maintenance as well as an overview of the documents currently available at www.metrohm.com/com/ under **Support**.

5 Troubleshooting

5.1 Problems

Problem	Cause	Remedy
LED "On" is not illuminated although the instrument is connected to the mains.	<i>The computer has not been switched on yet or the plugs are not correctly plugged in.</i>	Check the plug connections and switch on the computer.
LED "Status" is flashing fast.	<i>The data of the dosing unit cannot be read because the data chip has been damaged mechanically or by chemicals.</i>	Have the data chip replaced by the Metrohm Service. Until the data chip is being replaced you can remove the data chip yourself in order to be able to still use the dosing unit. The cylinder volume is automatically recognized nevertheless, but no data can be read from the dosing unit or be saved on it anymore.
	<i>The dosing drive is overloaded because the piston or the valve disc is jammed.</i>	<p>Exit tiamo™ and then restart it. The dosing device will be initialized at this time. If the error is not rectified by these actions, attempt to remove the dosing drive.</p> <p>If this is not possible, proceed as follows:</p> <ol style="list-style-type: none"> 1. Exit tiamo™. 2. Press the locking button of the dosing unit and remove the distributor. Turn it upside down in its entirety. 3. Start tiamo™ and initiate 'Filling' in the manual control. If the rotation of the stopcock is clearly audible, then the dosing unit, with Dosino attached, can be reattached to the distributor. 4. Place the dosing unit with Dosino attached upright on the distributor, align marking rib to marking rib, and rotate the dosing unit to the left until the spring clip snaps audibly into place. Now you should be able to remove the Dosino from the dosing unit.



Warning

The temperature sensor is very sensitive and can be considerably damaged by contact with fingers or objects.



Warning

The PTFE protective sleeve of the 6.9011.020 cannot and must not be dismantled.

The sensor must always be stored in a dry place. After each sample series, rinse the sensor with water or other cleaning solutions.

6.2 Maximum dosing and filling rate

The maximum dosing rate and maximum filling rate for the dosing unit depend on the cylinder volume:

Cylinder volume	Maximum rate
2 mL	6.67 mL/min
5 mL	16.67 mL/min
10 mL	33.33 mL/min
20 mL	66.67 mL/min
50 mL	166.00 mL/min

Independent of the cylinder volume, values ranging from 0.01 to 166.00 mL/min can always be entered. When the function is carried out the rate will be, if necessary, decreased automatically to the highest possible value.



6.3 Remote interface

The 6.2148.010 remote box allows devices to be controlled which cannot be connected directly to the MSB interface of the 859 Titrotherm.

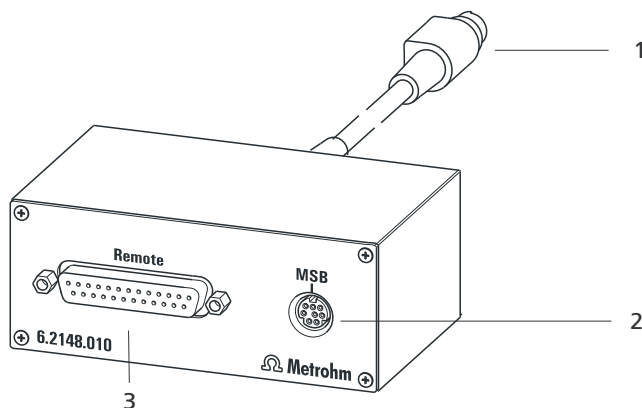


Figure 14 Connectors of the remote box

1 Cable

For connecting the 859 Titrotherm.

2 MSB connector

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

3 Remote connector

For connecting devices with a remote interface.

6.3.1 Pin assignment of the remote interface

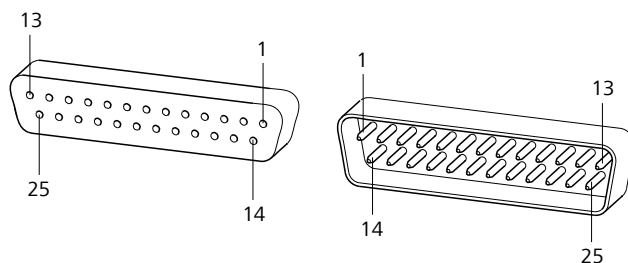
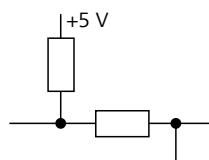


Figure 15 Pin assignment of the remote socket and plug

The above presentation of the pin assignment of a Metrohm remote interface applies not only for the remote box, but also for all Metrohm devices with 25-pin D-Sub remote connection.

Inputs



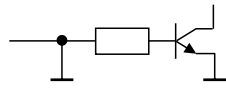
approx. 50 k Ω Pull-up

$t_p > 20$ ms

active = low, inactive = high

The input lines can be scanned with the **SCAN** command.

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 output lines can be set with the **CONTROL** command.

Table 1 Inputs and outputs of the remote interface

Assignment	Pin No.	Assignment	Pin No.
Input 0	21	Output 0	5
Input 1	9	Output 1	18
Input 2	22	Output 2	4
Input 3	10	Output 3	17
Input 4	23	Output 4	3
Input 5	11	Output 5	16
Input 6	24	Output 6	1
Input 7	12	Output 7	2
0 volts / GND	14	Output 8	6
+5 volts	15	Output 9	7
0 volts / GND	25	Output 10	8
		Output 11	13
		Output 12	19
		Output 13	20



7 Technical specifications

7.1 Measuring interface NTC 10 kOhm

<i>Measuring range</i>	-10...+50 °C
<i>Resolution</i>	0.00001 °C
<i>Measuring cycle</i>	20 ms at 50 Hz mains frequency
<i>Measurement imprecision</i>	±0.1 °C

7.2 Interfaces and connectors

<i>Controller connector</i>	USB Upstream port (9-pin Mini DIN socket) for connecting a computer for controlling the instrument.
<i>MSB connectors MSB1...MSB4</i>	Four 9-pin Mini DIN sockets for connecting dosing devices (Dosino/ Dosimat), stirrers, etc.
<i>USB connectors 1/2</i>	Two USB Downstream Ports (Type A sockets), each 500 mA, for connecting Metrohm instruments or USB peripheral devices of other manufacturers.

7.3 Mains connection

<i>Voltage</i>	100...240 V (±10 %)
<i>Frequency</i>	50...60 Hz
<i>Power consumption</i>	maximum 45 W
<i>Fuse</i>	Electronic overload protection

7.4 Safety specifications



This instrument fulfills the following electrical safety requirements:

CE designation in accordance with the EU directives:

- 2006/95/EC (Low Voltage Directive, LVD)
- 2004/108/EC (EMC Directive, EMC)



Federal Inspectorate for Heavy Current Installations ESTI (Accreditation Number SCESp 033)

- Safety mark for certification type 2 in accordance with NEV (type testing with market monitoring, EMC conformity)

Design and testing

According to EN/IEC 61010-1, UL 61010-1, CSA-C22.2 No. 61010-1, degree of protection IP20, protection class I.

Safety instructions

This document contains safety instructions which have to be followed by the user in order to ensure safe operation of the instrument.

7.5 Electromagnetic compatibility (EMC)

Emission

Standards fulfilled:

- EN/IEC 61326-1
- EN/IEC 61000-6-3
- EN 55022 / CISPR 22

Immunity

Standards fulfilled:

- EN/IEC 61326-1
- EN/IEC 61000-6-2
- EN/IEC 61000-4-2
- EN/IEC 61000-4-3
- EN/IEC 61000-4-4
- EN/IEC 61000-4-5
- EN/IEC 61000-4-6
- EN/IEC 61000-4-11
- EN/IEC 61000-4-14



7.6 Ambient temperature

<i>Nominal function range</i>	+5...+45 °C
<i>Storage</i>	-20...+60 °C
<i>Transport</i>	-40...+60 °C

7.7 Reference conditions

<i>Ambient temperature</i>	+25 °C (± 3 °C)
<i>Relative humidity</i>	≤ 60 %
<i>Instrument status</i>	Instrument in operation at least 30 min
<i>Validity of the data</i>	After adjustment

7.8 Dimensions

<i>Width</i>	142 mm
<i>Height</i>	64 mm
<i>Depth</i>	230 mm
<i>Weight</i>	2.0 kg
<i>Material</i>	
<i>Housing</i>	Metal housing, surface-treated

8 Warranty (guarantee)

Metrohm guarantees that the deliveries and services it provides are free from material, design or manufacturing errors. The warranty period is 36 months from the day of delivery; for day and night operation it is 18 months. The warranty remains valid on condition that the service is provided by an authorized Metrohm service organization.

Glass breakage is excluded from the warranty for electrodes and other glassware. The warranty for the accuracy corresponds to the technical specifications given in this manual. For components from third parties that make up a considerable part of our instrument, the manufacturer's warranty provisions apply. Warranty claims cannot be pursued if the Customer has not complied with the obligations to make payment on time.

During the warranty period Metrohm undertakes, at its own choice, to either repair at its own premises, free of charge, any instruments that can be shown to be faulty or to replace them. Transport costs are to the Customer's account.

Faults arising from circumstances that are not the responsibility of Metrohm, such as improper storage or improper use, etc. are expressly excluded from the warranty.





9 Accessories



Note

Subject to change without notice.




9.1 Scope of delivery 2.859.1010

Qty.	Order no.	Description	
1	1.800.0010	800 Dosino	
1	1.802.0010	802 Stirrer	
1	1.804.0010	804 Ti Stand	
1	1.859.0010	859 Titrotherm	
1	6.1414.010	Titration vessel lid with 5 openings	
	Material:	PPS	
	SGJ size:	A-14/15	
1	6.1415.210	Titration vessel / 10-90 mL	
	Material:	Clear glass	
	Height (mm):	80	
	Outer diameter (mm):	78	
	Volume (mL):	10 ... 90	

Qty.	Order no.	Description	
1	6.1546.030	Piston tongs For the PTFE pistons of the dosing unit.	
1	6.1909.010	Stirring propeller / 96 mm Stirring propeller, fitting length from lower edge of the ground joint: 96 mm. For usage in beakers with 722, 802 propeller stirrer. Material: PP	
1	6.2013.010	Clamping ring For support rods with a diameter of 10 mm. Material: Metal Width (mm): 20 Height (mm): 16	
1	6.2026.010	Stand plate with support rod Complete, with support rod, total length 42 cm. For when using the magnetic swivel stirrer 649, 728 alone (without Dosimat). Width (mm): 166 Height (mm): 420 Outer diameter (mm): 10 Length (m): 166	






Qty.	Order no.	Description	
1	6.2036.000	Mounting ring for titration vessels Material: Plastic	
1	6.2151.000	Cable USB A – Mini DIN 8-pin Controller cable. Length (m): 1.8	
1	6.2621.070	Hexagon key 5 mm Length (mm): 80	
1	6.2621.130	Hexagon key 2 mm 2 mm.	

Qty.	Order no.	Description	
1	6.2727.010	SGJ intermediate cone	
		For reference and auxiliary electrodes in the measuring and titration vessel with the lid 6.1414.010.	
		Material: PP	
		Outer diameter (mm): 18 Inner diameter (mm): 12 Length (mm): 25	
1	6.3032.210	Dosing unit 10 mL	
		Dosing unit with integrated data chip with 10 mL glass cylinder and light protection, mountable to a reagent bottle with ISO/DIN GL 45 glass thread. FEP tubing connection, antidiffusion buret tip. Volume (mL): 10	
1	6.6056.231	tiamo™ 2.3 Light CD: 1 license	
		tiamo™ 2.3 light PC program for controlling a titration system. Up to two devices can be connected, graphical method editor with numerous templates, layout manager for modifying the screen surface, professional database with reevaluation, powerful report generator, no parallel titration, no data export, 1 license, dialog languages German, English.	
1	6.9011.020	Thermoprobe for 859 Titrotherm	
		Temperature sensor made of glass for thermometric titration with the 859 Titrotherm for aqueous or nonaqueous solutions.	
		Shaft material: Glass	
		Shaft material addition: PTFE	
		Measuring range: 0 ... 60	
		Measuring unit: °C	
		Shaft diameter top (mm): 12	
		Shaft diameter bottom (mm): 12	
		Shaft length to head (mm): 125	
		Minimum immersion depth (mm): 20	
		Electrode plug-in head: Fixed cable (l = 1.2 m) with 7-pin Lemo plug	
1	6.2122.0x0	Mains cable with C13 line socket IEC-60320-C13	
		Cable plug according to customer requirements.	
		Switzerland: Type SEV 12 6.2122.020	
		Germany, ...: Type CEE(7), VII	



Qty.	Order no.	Description
		6.2122.040
	USA, ...:	Type NEMA/ASA
		6.2122.070
1	8.859.8001DE	859 Titrotherm Manual

9.2 Optional accessories

Qty.	Order no.	Description
1	6.1450.210	PFA titration vessel / 10 to 90 mL
		For ultratrace analysis and for solutions containing fluoride.
	Material:	PFA
	Height (mm):	88
	Outer diameter (mm):	77
	Volume (mL):	10 ... 90
		
1	6.1543.210	Stopper with three buret tips
		Stopper with three buret tips for connecting three M6 tubes.
	SGJ size:	SGJ 14
		
1	6.1575.150	Dosing unit complete / 5 mL
		For dosing solvents or solutions with Dosinos.
	Material:	ETFE
	Note, Material:	Cylinder
	Material 2:	PVDF
	Note, Material 2:	Housing
	Volume (mL):	5
		

Qty.	Order no.	Description	
1	6.2061.010	Bottle holder for Dosinos Bottle holder for up to two Dosinos, mounted on 1 L reagent bottles.	
1	6.2065.000	Stacking frame for 846 Dosing Interface, 856 Conductivity Module, 867 pH Module For holding the Reagent Organizer on the Dosing Interface.	
1	6.3032.120	Dosing unit 2 mL Dosing unit with integrated data chip with 2 mL glass cylinder and light protection, mountable to a reagent bottle with ISO/DIN GL 45 glass thread. FEP tubing connection, antidiffusion buret tip. Volume (mL): 2	
1	6.3032.150	Dosing unit 5 mL Dosing unit with integrated data chip with 5 mL glass cylinder and light protection, mountable to a reagent bottle with ISO/DIN GL 45 glass thread. FEP tubing connection, antidiffusion buret tip. Volume (mL): 5	
1	6.3032.220	Dosing unit 20 mL Dosing unit with integrated data chip with 20 mL glass cylinder and light protection, mountable to a reagent bottle with ISO/DIN GL 45 glass thread. FEP tubing connection, antidiffusion buret tip. Volume (mL): 20	
1	6.3032.250	Dosing unit 50 mL Dosing unit with integrated data chip with 50 mL glass cylinder and light protection, mountable to a reagent bottle with ISO/DIN GL 45 glass thread. FEP tubing connection, antidiffusion buret tip. Volume (mL): 50	



Qty.	Order no.	Description
1	6.9011.040	HF Thermoprobe for 859 Titrotherm
		Thermoprobe for the 859 Titrotherm for titration in media containing HF.
		Shaft material: PP
		Shaft material addition: Epoxy
		Measuring range: 0 ... 60
		Measuring unit: °C
		Shaft diameter top (mm): 12
		Shaft diameter bottom (mm): 12
		Shaft length to head (mm): 125
		Minimum immersion depth (mm): 15
		Electrode plug-in head: Fixed cable (l = 1.2 m) with 7-pin Lemo plug



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