

# Thermo Scientific KingFisher Flex

## Brief User Manual

Catalog Number N13141

Pub. No. MAN0019871 Rev. A.0



For Laboratory Use.

**Thermo**  
SCIENTIFIC

## Copyright

© 2020 Thermo Fisher Scientific Inc. All rights reserved. All (other) trademarks are the property of Thermo Fisher Scientific Inc. and its subsidiaries.

Reproduction of the accompanying user documentation in whole or in part is prohibited.

## Patents

This product is protected by the following patents: US 6447729, Method and means for magnetic particle specific binding assay, and US 6448092, Separation device for microparticles involving a magnetic rod. Thermo Scientific™ KingFisher™ Flex also has national and international patents pending.

## Disclaimer

Thermo Fisher Scientific reserves the right to change its products and services at any time to incorporate technological developments. This manual is subject to change without prior notice as part of continuous product development. Although this manual has been prepared with every precaution to ensure accuracy, Thermo Fisher Scientific assumes no liability for any errors or omissions, nor for any damages resulting from the application or use of this information. This manual supersedes all previous editions.

## No liability for consequential damages

Thermo Fisher Scientific shall not be liable for any indirect or consequential damages whatsoever arising out of the use or inability to use this product.

## Power failure

The system requires uninterrupted power supply in order to operate correctly. Thermo Fisher Scientific has no responsibility whatsoever for system malfunctions arising from power failures.

## Warranty

The Thermo Scientific™ KingFisher™ products are fully guaranteed against defective parts and materials, including defects caused by poor workmanship for a period of one year from the date of delivery.

Thermo Fisher Scientific will repair or replace defective parts or materials during the term of warranty at no extra charge for materials and labor provided that the products were used and maintained in accordance with instructions from Thermo Fisher Scientific. The warranty is invalid if products have been misused or abused.

For the warranty to be effective, the product must have been purchased either directly from Thermo Fisher Scientific or from an authorized Thermo Fisher Scientific distributor. The guarantee is not transferable to a third party without prior written approval from Thermo Fisher Scientific.

This guarantee is subject to the following exclusions:

- Any defects caused by normal wear and tear.
- Defects caused by fire, lightning, flood, earthquake, explosion, sabotage, war, riot or any other occurrence of the character listed above.
- Refurbished products that are subject to different warranty conditions.

THIS WARRANTY IS IN LIEU OF ALL OTHER EXPRESSED OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. The seller is not liable for any loss or damage arising out of or in connection with the use of the product or other indirect damages.

This Brief User Manual is a shorter version of the *Thermo Scientific™ KingFisher™ Flex User Manual*, Cat. No. N07669. The safe use of the instrument requires that all instructions are followed accordingly.

## Table of Contents

<b>Introduction to the KingFisher Flex</b> .....	<b>4</b>
Intended use .....	4
Principle of operation .....	4
Consumables .....	4
Reagents .....	4
<b>Installation</b> .....	<b>5</b>
Unpacking the instrument.....	5
Releasing the transport locks .....	6
Connecting the power supply cable.....	8
Fitting the shield plate .....	8
Fitting the heating block .....	9
Inserting the KingFisher Flex head.....	10
Operational check.....	11
Installing BindIt Software.....	11
<b>Routine Operation</b> .....	<b>12</b>
Keypad.....	12
Navigating .....	13
How to start.....	13
<b>Technical Specifications</b> .....	<b>14</b>
General specifications.....	15
Safety specifications .....	15
In conformity with the requirements.....	15

# Introduction to the KingFisher Flex

This Brief User Manual is for the KingFisher Flex instrument. It aims to give you a short introduction on installing the instrument and Thermo Scientific™ BindIt™ Software as well as starting a purification protocol from the internal software.

The complete user manuals for the KingFisher Flex instrument and BindIt Software are provided on CD, or USB, or are available to download from [www.thermofisher.com](http://www.thermofisher.com). Read the user manuals in its entirety before operating the instrument.

## Intended use

The KingFisher Flex magnetic particle processor (Figure 1) is intended for laboratory use by trained personnel. The instrument is intended for automated transfer and processing of magnetic particles in a microplate scale. Use for self-testing is excluded. It is recommended that Good Laboratory Practices (GLP) is followed to guarantee reliable analyses.

## Principle of operation

The KingFisher Flex magnetic particle processor (Figure 1) is designed for automated transfer and processing of magnetic particles in microplate format.

The patented technology of the KingFisher Flex system is based on the use of magnetic rods covered with a disposable, specially designed tip comb and plates. The instrument functions without any dispensing or aspiration parts or devices.

Before the run samples and reagents, including magnetic particles, are dispensed manually into the plates according to the corresponding instructions. The protocol that is selected by the user via the keyboard and display has already been preloaded into the onboard software. BindIt Software can be used to create and run protocols.



Figure 1. KingFisher Flex magnetic particle processor

## Consumables

For details and ordering information on plastic consumables, such as plates, tip combs, etc. used with the KingFisher Flex instrument, refer to “List of accessories and consumables” in the *KingFisher Flex User Manual* (Cat. No. N07669).

## Reagents

There is a wide selection of optimized Thermo Scientific™ KingFisher™ Pure Kits available for purification of DNA or RNA. A large variety of starting materials can be used, such as blood, cells, tissues or cell-free body fluids. The DNA or RNA purified with the KingFisher Pure Kits is of high quality and free of proteins, nucleases, and other contaminants or inhibitors. For more details, visit our website at <http://www.thermoscientific.com/kingfisher>.

Thermo Scientific Pierce Protein Research Products are available for protein applications. For more details on kits available, visit <http://www.thermoscientific.com/pierce>.

The KingFisher Flex is an open system, which gives an opportunity to also use other magnetic particle kits. The optimal magnetic particle size for the Thermo Scientific™ KingFisher™ Duo is ca. 1–10 µm.

## Installation

This chapter briefly describes the installation of the KingFisher Flex instrument.

**Warning!** *This product contains very strong permanent magnets. People wearing a pacemaker or metallic prostheses should not use this product. A pacemaker or prostheses may be affected or damaged if it comes in close contact with a strong magnetic field.*

**Caution!** *The KingFisher Flex should not be kept in close proximity to magnetic tapes, computer discs or other magnetic storage systems, such as credit cards, as these can be damaged by the strong magnetic field of the KingFisher Flex heads. Do not hold the KingFisher Flex heads close to a PC display, since this may cause damage to the display. Do not use metal tools when handling KingFisher Flex heads.*

**Caution!** *The heating block is specifically designed for the plates listed below to ensure even heating during the sample process. Using other plates than those recommended may damage the instrument and diminish the application performance.*

**Caution!** *Do not place the KingFisher Flex heads on top of the instrument or any metal surfaces. Keep the KingFisher Flex heads always in their respective plastic boxes when not in use. It is very important to keep the KingFisher Flex heads away from each other and other magnets at all times. Interference of the magnets on one another may cause serious damage to the magnets.*

## Unpacking the instrument

Move the packed instrument to its site of operation. To prevent condensation, the instrument should be left in its protective, antistatic plastic wrapping until the ambient temperature has been reached. Unpack the KingFisher Flex instrument and accessories carefully with the arrows on the transport package pointing upwards. Remove the instrument from the package and place it on a level surface. Refer to the enclosed unpacking instructions.

The following notes and instructions are sent with the instrument and are immediately available when you open the package:

- Unpacking instructions
- *Thermo Scientific™ KingFisher™ Flex Feedback Form*
- Warranty Certificate card
- Packing instructions/Packing list
- Thermo Scientific™ KingFisher™ Flex User Manual CD/USB
- Transportation discrepancy report
- BindIt Software package

**Caution!** *Do not touch or loosen any screws or parts other than those specifically designated in the instructions. Doing so might cause misalignment and will void the instrument warranty.*

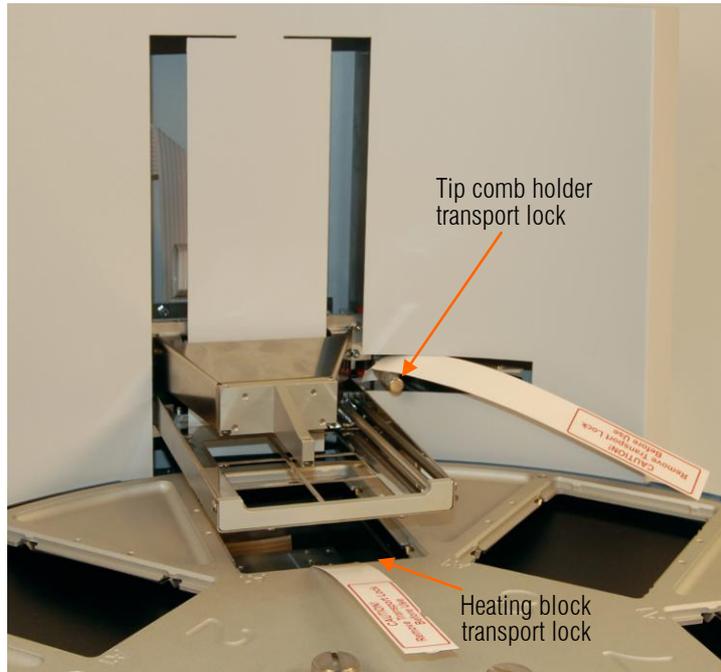
**Warning!** *The KingFisher Flex weighs approximately 28 kg [62 lbs.] without the transport package and should be lifted with care. It is recommended that two persons lift the instrument together, taking proper precautions to avoid injury.*

To lift the instrument, put your fingers under the bottom on either sides and lift it with your back straight.

## Releasing the transport locks

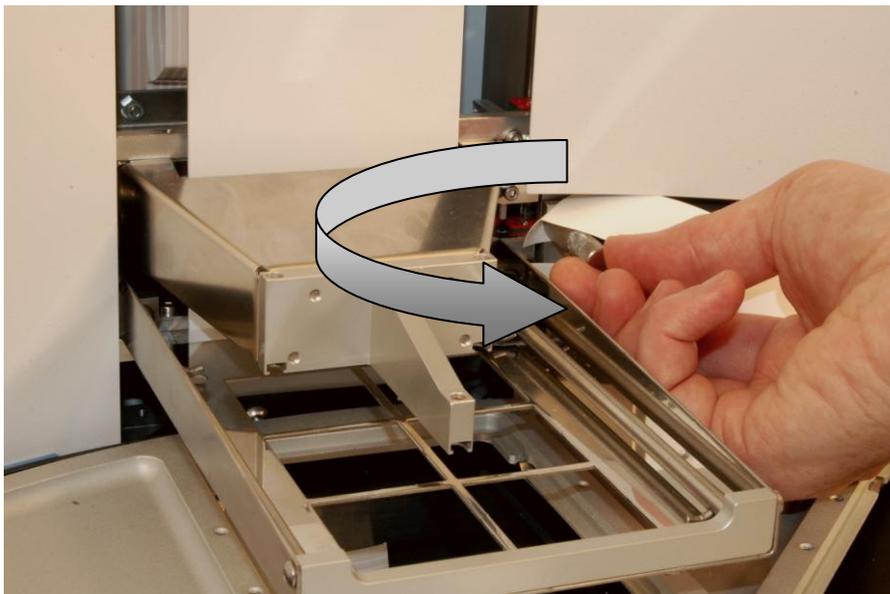
The instrument comes with two transport locks (Figure 2): the tip comb holder transport lock and the heating block transport lock. Remove both the transport locks. Make sure both the transport locks are released before you put the instrument into operation.

To release both the transport locks:



**Figure 2.** KingFisher Flex transport locks fitted

1. To remove the transport lock of the tip comb holder, take hold of the transport lock screw and firmly turn it counterclockwise according to Figure 3.



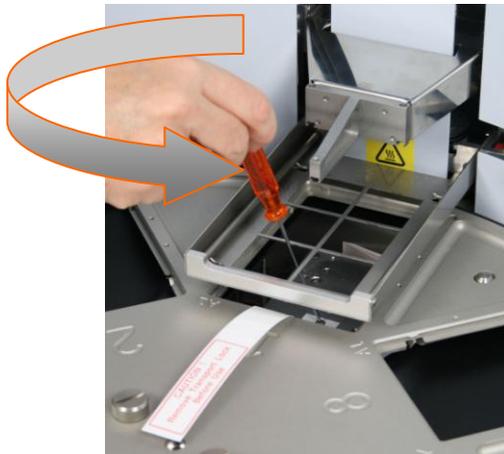
**Figure 3.** Removing the transport lock of the tip comb holder

2. Remove the transport lock by pulling it out of the hole and store it for future relocation (Figure 4). When relocating the instrument, refer to “How to refit the transport lock of the tip comb holder” in the user manual.



**Figure 4.** Tip comb holder transport lock removed

3. The transport lock of the heating block is removed according to Figure 5. Unscrew the transport lock screw counterclockwise (Figure 5). Lift the screw with the label attached (Figure 6).



**Figure 5.** Removing the transport lock of the heating block (A)

4. Remove the transport lock screw from the label (Figure 6).



**Figure 6.** Removing the transport lock of the heating block (B)

5. Then fasten the screw clockwise to its storage site on the heating block base. The two screws on the heating block base guide the heating block into the correct position.

**Note!** Keep the transport locks (Figure 4 and Figure 6) for future transportation of the instrument.

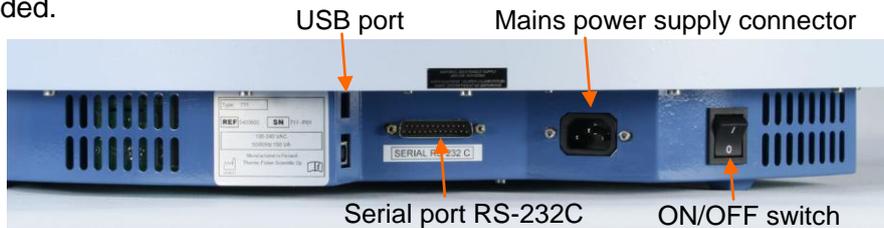
Both the transport locks have been successfully removed.

## Connecting the power supply cable

To connect the power supply cable:

**Warning!** Ensure that the mains switch (Figure 7) on the bottom left of the back/side panel is in the OFF position. Never operate your instrument from a power outlet that has no ground connection.

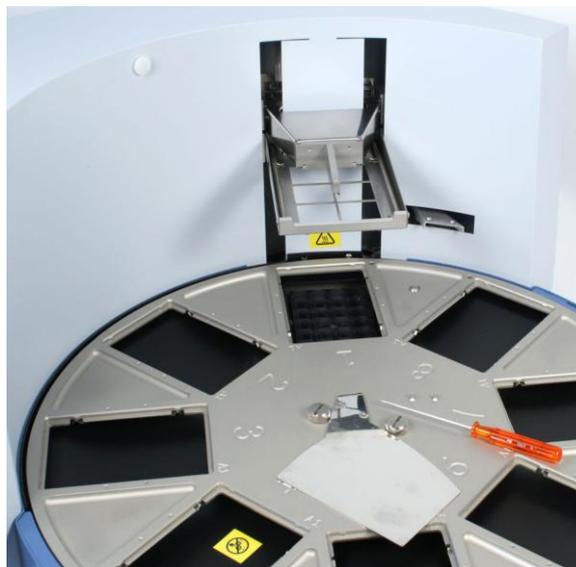
1. Connect the mains supply cable to the mains power connector (Figure 7) at the bottom left of the back/side panel. If you need to use any other type of mains supply cable than supplied, use only cables certified by the local authorities. Before you plug in the power cable, ensure that the voltage on the type label at the bottom left of the back/side panel (Figure 7) corresponds to the local voltage.
2. Connect the instrument to a correctly installed line power outlet that has a protective conductor that is grounded.



**Figure 7.** Mains power supply connector

## Fitting the shield plate

1. Ensure that the power is switched OFF.
2. The shield plate has to be installed prior to use of the instrument. Use a hexagonal screwdriver (Allen key) to fasten the two screws (Figure 8).



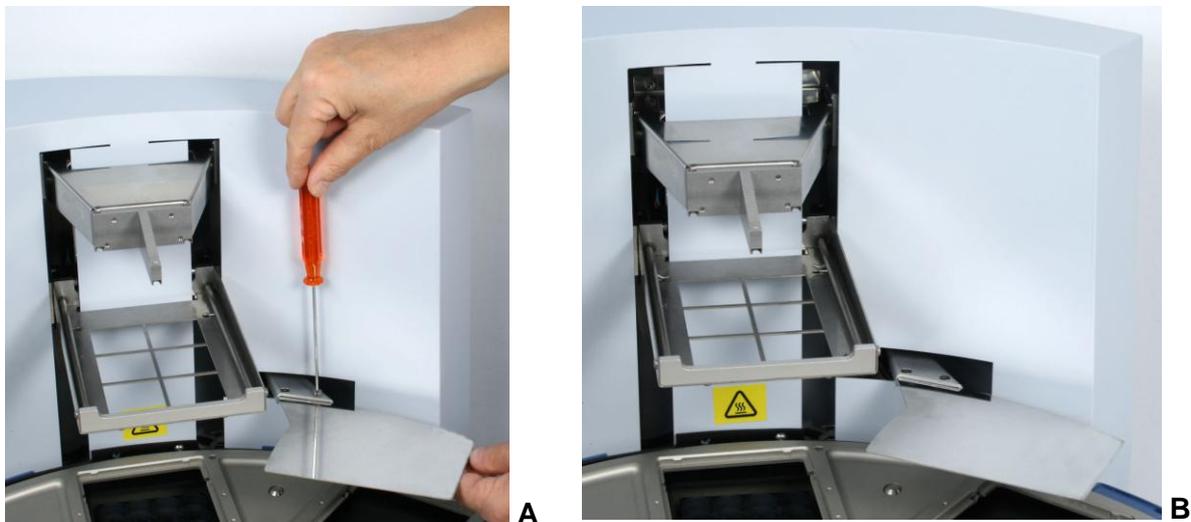
**Figure 8.** Shield plate prior to fitting

3. First insert the shield plate into its slot (Figure 9).



**Figure 9.** Inserting the shield plate

4. When fastening the two plate retaining screws (Figure 10 A), be careful not to drop them inside the instrument. Figure 10 B shows the shield plate installed.

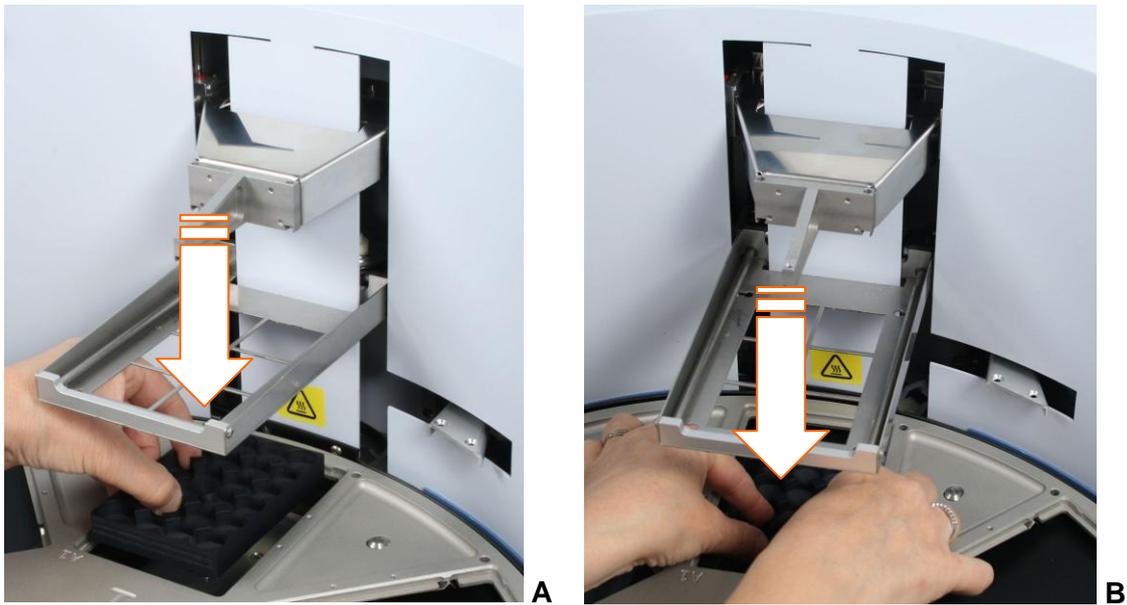


**Figure 10.** Fastening / loosening the shield plate (A) and when in place (B)

### **Fitting the heating block**

Fastening/changing the heating block is controlled by the software.

1. Choose the Change\_heatblock protocol under the **Maintenance** menu by using the up and down cursor keys.
2. Then press **START**.  
The heating block will thus rise.
3. Insert the heating block by first setting it and then pressing it hard into place (Figure 11 A and B).  
The heating block will snap into place at both ends if you have done it correctly.



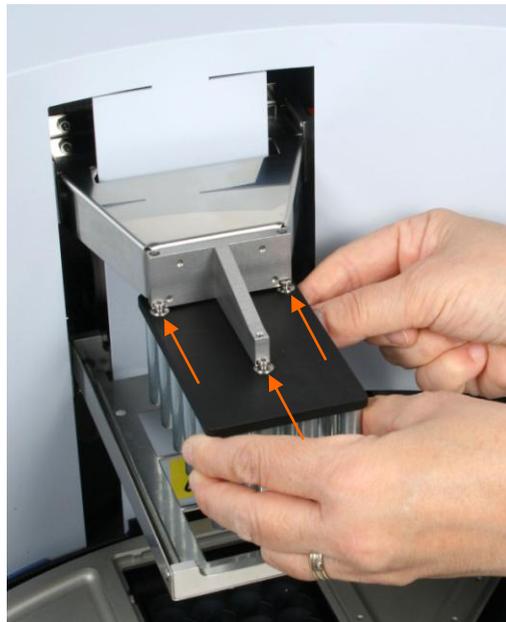
**Figure 11.** Inserting (A) and pressing the heating block into place (B)

### Inserting the KingFisher Flex head

1. Choose the Change\_magnet protocol under the **Maintenance** menu (Maintenance > Maintenance protocol > **Change\_magnet**) by using the up and down cursor keys.
2. Then press **START**.
3. Insert the KingFisher Flex head so that the three pins (shown with orange arrows) slot into place (Figure 12 and Figure 13).

When you insert the KingFisher Flex head, be careful not to damage the magnet rods against the tip comb holder frame.

4. Confirm the end of the protocol by pressing **START**.



**Figure 12.** Inserting the KingFisher Flex head



**Figure 13.** KingFisher Flex head for KingFisher 24 deep well plate fitted

## Operational check

First switch the instrument ON. The instrument performs initialization tests and adjustments. The display quickly shows the internal software version.

This happens when the initialization tests and adjustments have been completed.

It is recommended that you carry out a check run using a demo protocol to verify proper instrument operation. Run the check protocol (Check\_96dw\_tip, Check\_KF96\_tip, Check\_pcr\_tip, or Check\_24dw\_tip) under the **Maintenance** menu according to the KingFisher Flex head and plastic consumables you are using. Refer to Chapter 9: “*Ordering Information*” in the instrument user manual. If the check is all right, proceed with your own runs.

## Installing BindIt Software

Start the installation by following these instructions. For detailed instructions on installing and using BindIt Software, refer to the *Thermo Scientific™ BindIt™ Software for KingFisher Instruments User Manual* (Cat. No. N07974).

Pay attention to the following notes before you start installing the software.

**Note!** *BindIt Software cannot be installed on a network drive.*

**Note!** *You must be logged on to your computer with administrator privileges to install BindIt Software.*

1. Insert the installation CD into the CD-ROM drive, or the installation USB stick into the USB port, or open the downloaded installer file from [www.thermofisher.com](http://www.thermofisher.com).

The *BindIt Installer* dialog opens automatically.

If the dialog does not open, start the installation by double-clicking the *Setup.exe* file.

2. Close all other programs on your computer and click **Install** to begin the installation process. Click **Close** to cancel the installation and exit the installer.

**Note!** *If you have an existing instance of Microsoft SQL Server 2008 R2 Express Edition on your computer, you can choose to use the existing instance or create a new one. If you are uncertain of the compatibility, create a new instance by clicking **Yes**. If you do not wish to create a new instance, click **No**.*

**Note!** *The installation of a new database engine does not affect any other installed database engines.*

3. Click **Install** to start the Setup Wizard. The wizard guides you through the installation procedure.

Click **Next** to continue.

4. Read the end user license agreement and tick the box to accept the terms.

Click **Next** to continue. Click **Print** to print a copy of the license agreement.

5. Select the destination folder for the BindIt Software installation files.

The Setup Wizard suggests a location for the files. It is recommended to use the default file location. Click **Change** to select another folder or drive.

Click **Next** to continue.

The Setup Wizard is now ready to install BindIt Software on your computer.

6. Click **Install** to start the installation. The installation files are copied to the selected folder.

You are presented with an installation progress dialog.

7. BindIt Software has now been installed.

Click **Finish** to finalize the installation and to configure the database.

8. BindIt Installer continues by installing the database engine.

If existing SQL server instances are detected on the computer, click **Yes** to install a new instance or **No** to use an existing instance.

**Note!** *Creating several concurrent SQL server instances may slow down your computer. We recommend using an existing THERMO instance, if present.*

If no previous SQL server instances are detected, Microsoft SQL Server 2008 R2 Express Edition will be installed on to your computer.

Installing a new instance of the SQL server will take some time.

9. Check the server and database names in the *Database Configuration* dialog.

10. Click **Configure**.

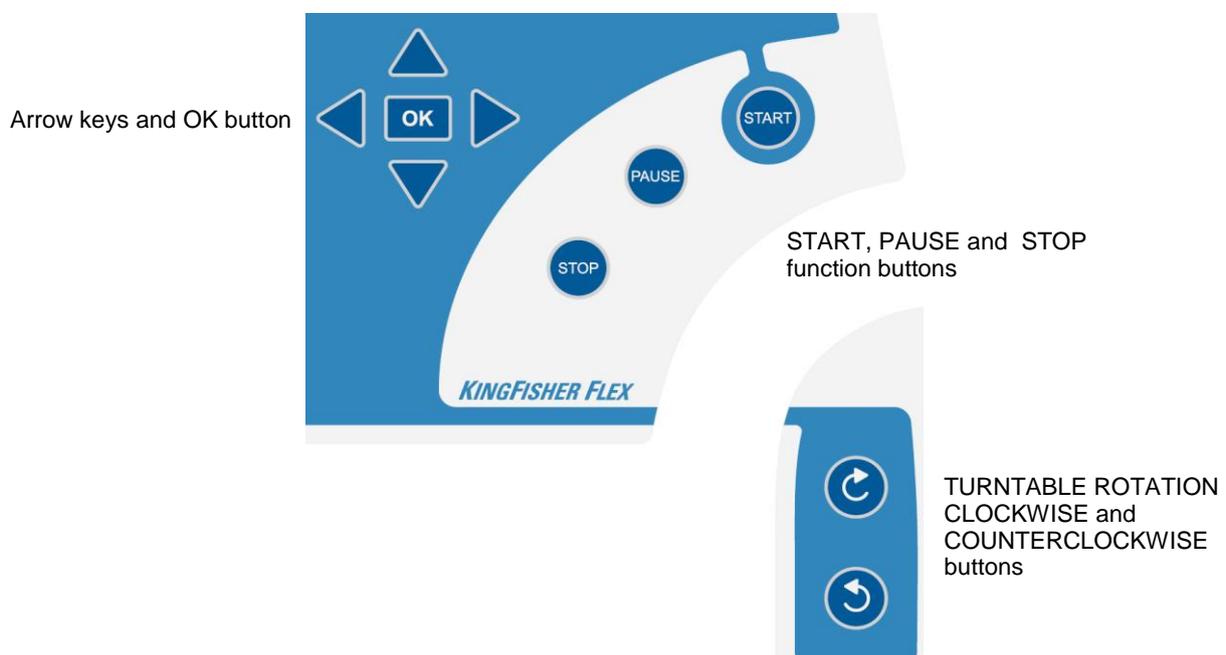
The installation proceeds with the database configuration. Wait until it has finished. This may take several minutes.

11. After the installation is complete, you will receive a confirmation message. Click **OK** to complete the installation process.

## Routine Operation

### Keypad

The relevant keys and control buttons are described in detail below (Figure 14).



**Figure 14.** Keypad of the KingFisher Flex



The arrow keys are used to select the next protocol and to navigate in the display.



To accept the selection.



To initiate the run.

To confirm a performed step in the protocol, for example, plate loading or removal.



To pause/terminate the processing step. In short:

**STOP** (paused)/ **START** (the instrument continues after a Pause step)

**STOP** (paused)/ **STOP** (the processing is terminated).



To pause the run. It will pause at the end of the ongoing processing step.



To rotate the turntable clockwise (**TURNTABLE ROTATION CLOCKWISE** button).



To rotate the turntable counterclockwise (**TURNTABLE ROTATION COUNTERCLOCKWISE** button).

## Navigating

This section visualizes navigation in the KingFisher Flex user interface.



The main view changes according to the selections you make either with the **Up** or **Down** arrow keys or the **OK** button. The available buttons and their function are shown on the info text bar.

The color of the items, for example, the icon and main view row, in the main view changes when they are selected (active/inactive).



To move from one menu to another, make sure you are in the main view of one of the menus and use the **Left** and **Right** arrow keys.

The main views of each menu tab are shown below.



Factory protocols



User protocols

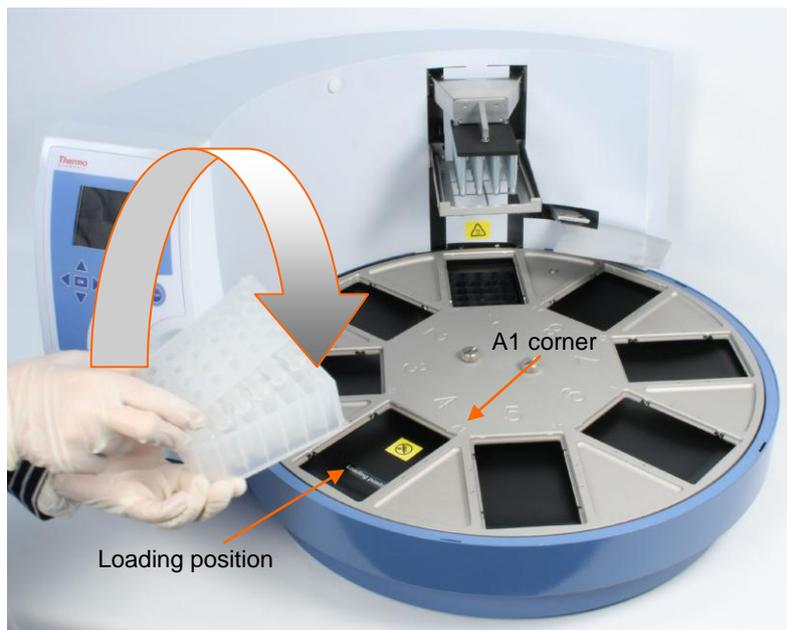


Maintenance

## How to start

1. Select a protocol by using the cursor keys and press **START** or use BindIt Software to run the desired protocol via the PC.
2. Open the sliding door if the see-through lid is in place.
3. Load the plates in the order that the protocol requests. Place the A1 well of the plate so that it is in the upper right corner. The first A1 row is consequently always in the inner circle. Once you have loaded the requested plates into the plate stations, press **START**. The tip comb always has to be placed manually onto a Thermo Scientific™ KingFisher™ plate (Figure 15). The instrument also functions with either one plate or up to eight plates depending on the amount of steps.

**Only one tip comb should be placed onto a KingFisher plate (= tip-plate) per run. Confirm the plate loading by pressing **START**.**



**Figure 15.** Combining the tip comb and KingFisher plate

The loading position, that is, plate station 4 (when the turntable is in its basic position), is labeled. The eight plate stations and the A1 positions of the eight plate stations are clearly marked on the turntable. When the instrument is in its basic position, plate station 1 is under the KingFisher Flex head. The plate station position depends on the protocol used. After the protocol has been run, note that the turntable may stop in a different position than the basic position.

4. The tip comb is automatically locked onto the tip comb holder from the tip-plate.
5. When the turntable moves, the shield plate moves over the plate situated underneath forming a protective cover.
6. Close the sliding door. The see-through lid (if in place) protects the instrument against environmental contamination.

**Note!** *The sliding door can be left open or the see-through lid can be absent if desired. This action does not break the run.*

7. After the run, remove the plate(s) according to the protocol request. Confirm each plate removal by pressing **START**.
8. Press **STOP** after completing the run.

**Warning!** *Remove any plates or tip combs still in the instrument. Dispose of all microplates and tip combs as biohazardous waste.*

## Technical Specifications

Thermo Fisher Scientific reserves the right to change any specifications without prior notice as part of our continuous product development program.

## General specifications

**Table 1.** General specifications

General specifications	
Operating conditions (indoor use)	+5°C to +40°C; maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C Indoor use only!
Mains power supply	100–240 Vac, 50/60 Hz, nominal Automatic voltage detection
Power consumption	175 VA max.; 55 VA standby

## Safety specifications

### In conformity with the requirements

**Table 2.** Safety specifications

The safety specifications are also met under the following environmental conditions in addition to or in excess of those stated in the operating conditions:	
Altitude	Up to 2000 m
Temperature	+5°C to +40°C
Humidity	Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C
Mains supply fluctuations	±10% from nominal
Installation category (overvoltage category)	II according to IEC 60664-1 (see Note 1)
Pollution degree	2 according to IEC 60664-1 (see Note 2)

**Note! 1)** The installation category (overvoltage category) defines the level of transient overvoltage which the instrument is designed to withstand safely. It depends on the nature of the electricity supply and its overvoltage protection means. For example, in CAT II which is the category used for instruments in installations supplied from a supply comparable to public mains, such as hospital and research laboratories and most industrial laboratories, the expected transient overvoltage is 2500 V for a 230 V supply and 1500 V for a 120 V supply.

**Note! 2)** The pollution degree describes the amount of conductive pollution present in the operating environment. Pollution degree 2 assumes that normally only nonconductive pollution, such as dust, occurs with the exception of occasional conductivity caused by condensation.