



Gesellschaft für Labor- und  
Reinraumtechnik mbH

# Symax

# Syringe Pump

## Operating Instructions

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## Operating Instructions

Thank you for choosing a Symax syringe pump system. This syringe pump system is ideally suited for industrial and research applications. It is used for

- instrumental analysis
- biotechnology and bioanalysis
- metering and mixing
- in laboratories and production.

The following pages contain instructions on the proper use and care of your system, along with information for your safety and about operation, servicing and maintenance.

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# 1 General information

## 1.1 Scope of delivery

The standard Symax syringe pump system consists of a base unit, an adjustable syringe holder, an adapter to make the electrical connections, the corresponding cables and the power supply, as well as a CD-ROM containing the control software for the system. A foot switch for externally controlling the system and a 3-way valve for automatically switching between metering and filling are available as optional extras. You can order these optional components separately. To do so, please go to our website at [www.spetec.de](http://www.spetec.de).

## 1.2 License information

The information and data for the Symax syringe pump system provided in these operating instructions were correct at the time of printing but are subject to change without prior notice.

No part of these operating instructions may be reproduced and disseminated without prior authorization.

The control software is protected by copyright. The purchaser of a Symax syringe pump system acquires solely the non-exclusive right to install this software. Other than making a backup copy, copying or other use of this software, or parts of the software, is not permitted. Spetec GmbH reserves the right to modify the software without prior notice. Customers will not be notified of changes.

Any violations of these license conditions will be prosecuted and may result in claims for compensation.

Spetec GmbH reserves all rights with respect to patent or utility model application and registration.

## **2 Safety information**

### **2.1 Obligations of the operator**

The operator of the Symax syringe pump system must ensure that they only allow people to work with the system who:

- have been instructed in the operation of the unit and the software, and
- have confirmed that they have read and understood the safety information.

### **2.2 General safety information**

#### **2.2.1 Use of original parts and accessories**

Please only use original parts and accessories to operate the Symax syringe pump system. The use of other parts may lead to malfunctions and defects. The use of non-original parts will void the warranty in the event of a defect.

#### **2.2.2 Setup location**

When setting up the Symax syringe pump system, please make sure the unit/system is placed on a level surface and that it cannot slip. When setting up the system, you should also

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ensure that there are no objects within the traversing range of the syringe carriage as they could get jammed in the path of the carriage and consequently break the carriage mechanism. Please also ensure that the ventilation slots on the underside of the unit are not covered as otherwise the stepper motor could overheat.

### **2.2.3 Changing over syringes and moving to the reference point**

If the syringe type needs to be changed, please proceed as described in section 6.1 Installing a syringe.

Remove the syringe before moving to the reference point otherwise the plunger could be pulled out of the syringe and damaged. See also section 5.5.4 Manual control.

### **2.2.4 Risk of injury**

Do not reach into the path of the syringe while the unit is turned on. A moving syringe carriage can pinch parts of the hand and cause severe injury. Please therefore ensure that an operation cannot be accidentally triggered on the unit while you are working within the traversing range (e.g. when changing over syringes).

### **2.2.5 Manual operation**

The software also supports manual control of the unit for moving the syringe carriage to specific positions, regardless of the settings. In this case, please note that it is the user's

responsibility to determine which positions to move the carriage to, and the user must also stop the syringe carriage manually. The carriage is only stopped automatically if it is moved to the reference point or if it reaches the mechanical end stops of the traversing range.

Additional manual control options are described in section 5.5.4 Manual control.

### **2.2.6 Action in the event of contamination or foreign objects**

Your Symax syringe pump system is protected against objects falling into the path of the syringe carriage. If an object nevertheless falls into the syringe carriage gap, please stop all carriage movement immediately and remove the unit from the system. It must not be operated anymore. Please contact Spetec GmbH for further instructions on how to proceed.



**The unit may be opened by Spetec GmbH authorized service personnel only, otherwise any guarantee or warranty claims are void.**

### **2.3 Intended purpose**



**This product is not a medical product and therefore must not be used on humans for medical purposes.**

Your syringe pump system is not harmful to health as long as it is used properly and for the intended purpose. As an electro-mechanical device, it must be handled with due care and diligence.

In commercial establishments, the relevant statutory accident

prevention regulations for electrical installations and equipment must be observed. Failure to observe the information provided or use of the system for anything other than the intended purpose could result in damage to or the destruction of the Symax syringe pump system. The safety of the operator could also be compromised.

## **2.4 Environmental conditions**

The maximum values as specified in the technical data must not be exceeded.

# **3 Description of the unit**

## **3.1 General description**

The Symax syringe pump system is used for high precision metering of fluids with various viscosities. Metering is by means of a linear feed which enables pulse-free operation. An individual unit or an entire system can be configured and operated from a PC. After the unit has been configured by loading a setup, stand-alone operation with a foot switch or an external controller is possible.

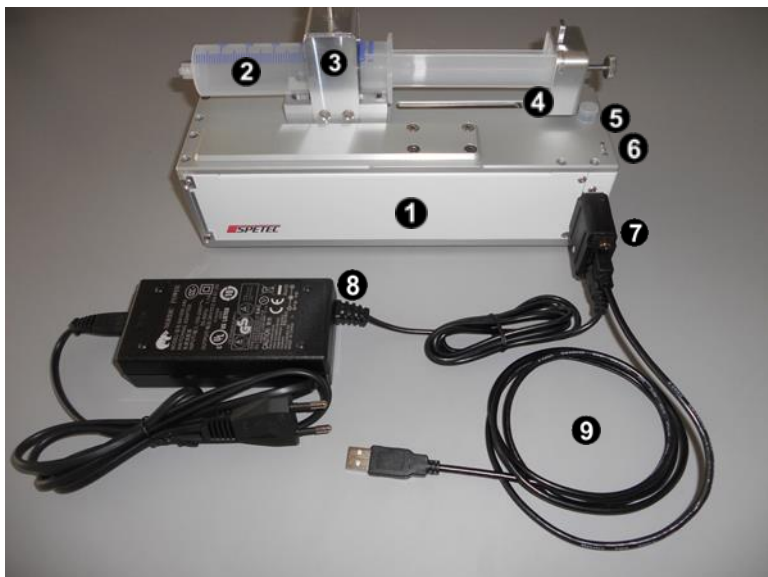
Thanks to the adjustable syringe holder, various sizes of syringe may be used. Depending on the diameter of the syringe, a locking piece can be set at different heights on the holder and a knurled screw is used to press the retaining plate against the syringe. This secures the syringe in place on the Symax syringe pump system.

For metering several different fluids, up to six units can be coupled together and operated via a USB interface. Optionally a further six units can also be operated via a second USB interface.

The system is designed for operation in enclosed rooms and at temperatures of 10-40°C.

## 4 Commissioning

### 4.1 View of the Symax II syringe pump system



The individual components:

1	Symax syringe pump, base unit
2	Syringe in the adjustable syringe holder
3	Adjustable syringe holder
4	Syringe carriage for operating the syringe plunger, with a mechanism for holding the pressure plate on the carriage using an end cap and knurled screw
5	Connection for 3-way valve (position depends on type)

6	Operating status indicator, 3 LEDs, red, yellow, green
7	Electrical adapter to connect the USB cable and the power supply
8	Power supply
9	USB cable for connecting the unit to a PC

## 4.2 System requirements

The control software Symax-Control can run on any standard computer with a USB port and the Windows XP™, Windows7™ or Windows8™ operating system.

## 4.3 Commissioning

### 4.3.1 Controls




The Symax syringe pump system has only a few controls:

- Address selector on the underside of the unit
- Optional: foot switch
- Syringe holder ③
- Optional: 3-way valve for retrofitting

### 4.3.2 LEDs

Every unit has three LEDs ⑥ which indicate the operating status of the unit.

The LEDs signify the following states:

-  Unit is switched on and ready to use
-  Solid: syringe is metering  
Flashing: syringe is filling
-  Fault

### **4.3.3 Commissioning an individual unit**

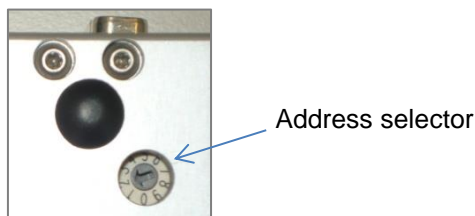
After unpacking, please perform a visual inspection of the unit to check for transport damage. If there is any visible damage do not put the unit into operation as this could result in malfunctions or further defects.

The Symax syringe pump system can be operated using any modern standard PC or laptop with a USB port and running the Windows operating system.

Proceed as follows:

1. Before connecting the adapter or cable to the unit, install the software from the CD-ROM supplied. Installation of the software is described in section 5.1 Installing the control software.
2. Use a suitable screwdriver to set the unit address on the underside of the unit. This is the address used by the software to communicate with the unit.  
Select a number from 1-6. Other numbers are not permitted and will prevent communication with the

unit.



3. Connect the adapter plug to the unit
4. Connect the USB cable to the adapter and to the PC
5. Plug in the power supply
6. Start the Symax-Control software

#### **4.3.4 Commissioning as part of a system**

Up to 6 units can be combined in one Symax syringe pump system.

The control software can be used to control a maximum of 2 systems with up to 6 units in each system.

To add a unit to the system, proceed as follows:

- Terminate any operations still running on the system
- Disconnect the system from the power supply or remove the power supply connector from the adapter
- Set the new unit to a unit address 1-6 which has not yet been used (see the previous section)
- Simply dock the new unit onto the system with the long sides together
- Reconnect the power supply or adapter
- Restart the Symax-Control software or perform a rescan



- A new window for the newly detected unit will now open in the software

**Please note:** Each unit must be set to a different unit address. To set the unit addresses, please use a suitable screwdriver to turn the address selector so that the arrow points to a number between 1 and 6 which is not yet in use on the system.



If two units have the same address, the software can no longer communicate properly with the units and the system will no longer work.

#### 4.3.5 Fitting a syringe in the adjustable syringe holder

Your Symax syringe pump system is equipped with an adjustable syringe holder which can accommodate different



sizes of syringe.

The adjustable syringe holder comprises a retaining fixture ① mounted on the unit, a top clamp ② and an end cap ③ with a reducer ④ for different syringe sizes.

To fit a syringe, proceed as follows:

- If in place, remove the top clamp and end cap.

- Now manually move the syringe carriage to the reference point (see section 5.5.4 Manual control).
- Insert the syringe and set the top clamp at the relevant height. Turn the knurled screw to secure the syringe in place in the holder.
- Now move the carriage with the pressure plate manually against the plunger and push the end cap over the syringe plunger and pressure plate, insert the relevant reducer for the size of syringe and secure everything in place by tightening the knurled screw.

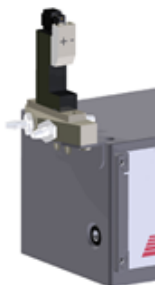


Please make sure that the syringe is well secured in the syringe holder and that the plunger is fastened securely to the carriage so that they cannot come loose during operation.



Please note that for the unit to function correctly, the syringe parameters must be entered in the setup for this unit in the control software. See 6.1.1 Entering syringe parameters

#### 4.3.6 Fitting a 3-way valve



The optional 3-way valve makes it possible to refill a syringe easily after it has been emptied. It is fitted on the end face of the unit and plugged into the connection socket. The valve is controlled via the software on the PC.

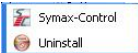


## 5 Software

### 5.1 Installing the control software

The control software Symax-Control can run on any computer with a USB port and the Windows XP® or Windows7® operating system.

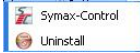
To install the software, please insert the supplied CD-ROM into the computer's CD-ROM drive. Installation will then start automatically. Please follow the on-screen instructions. The installation routine will install the software and the drivers required for communication. It will also create the "Symax-

Control" program group  and place an icon




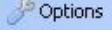
on the desktop.

### 5.2 Uninstalling the control software


The program group  includes a link for uninstalling the software. Select "Uninstall" to remove the software completely from your computer.

### 5.3 Updating the control software

The Symax control software can be updated very easily over the internet. This requires a working internet connection.

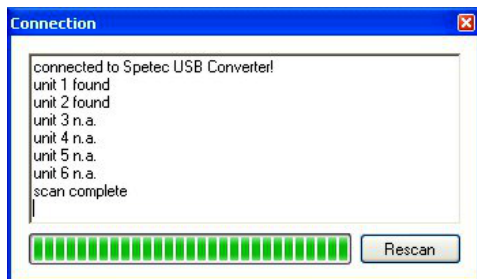
Click the  button under  to check whether a software update is available. If a newer version is available, follow the on-screen instructions to install the update.

## 5.4 Starting the application


To start the application, click on the  icon in the "Symax-Control" program group or the icon on the desktop.

During startup, the software performs a scan to detect how many individual units are connected to the system. A message will be displayed if no units are connected.

The scan window opens:



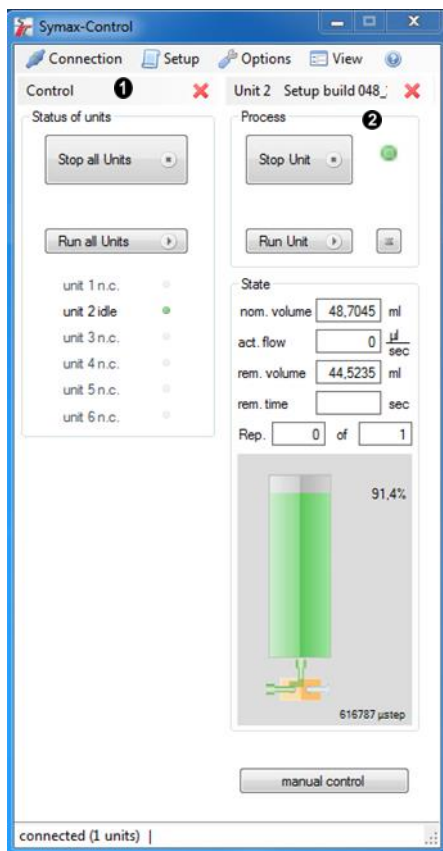
This indicates how many units were detected on the interface. If no units are found, this window remains open and allows you to perform a rescan after connecting a unit or resolving the problem.

Click  to cancel a scan. The control window then opens with limited options.



To operate 2 systems with a maximum of 6 units each, you must first insert the USB connector for the first system, start the software, and only then insert the USB connector for the second system and start the software again (2nd instance). Otherwise the USB adapters will not be correctly recognized!



## 5.5 Description of the window areas and functions



The application window consists of various panes.

**1** is the control window. This window provides an overview of all connected units, and the buttons can be used to start and stop all connected units at the same time. The individual

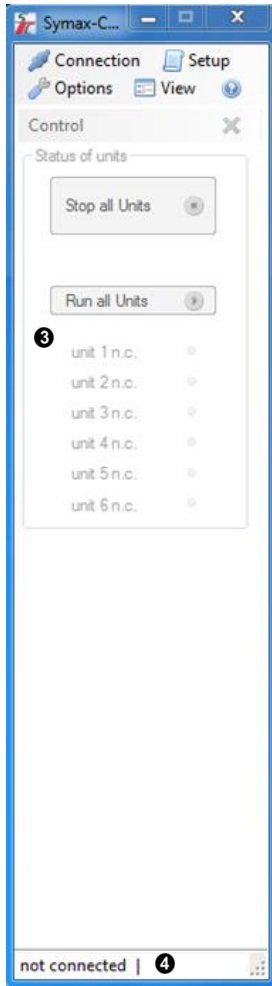
functions are described in greater detail in section 5.5.1 The control window.



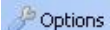


② are the unit windows. These windows show the current relevant data for each connected unit. If any are not in use, the windows can be closed individually by clicking on  and can be opened again by clicking on . A more detailed description of the data displayed and buttons is provided in the following sections.



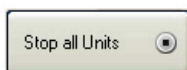
### 5.5.1 The control window

The control window is the main application window. It contains the menu bar and buttons for controlling the system as a whole.



-  **Connection** You can use this command to initiate a rescan to detect connected units or to deregister units.
-  **Setup** Opens a window to create a new setup or edit an existing setup.
-  **Options** Opens a window to set specific software parameters.
-  **View** Re-opens unit windows which were previously closed using .

The following buttons are used to control the entire system:




Stops all currently running metering/filling operations on all units connected to the system.



Starts the currently specified programs on all units connected to the system.



Important information and error messages are indicated in the status bar . For example:

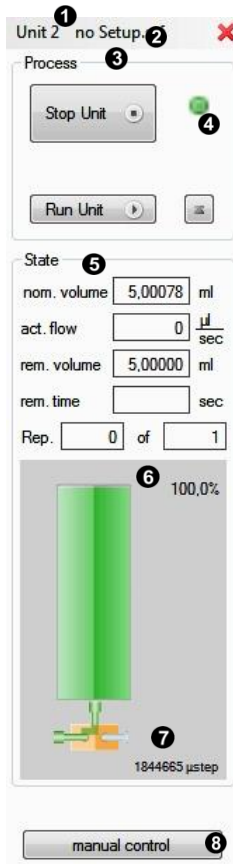
- not connected: A scan did not detect any units
- connected (x units): x units were detected on the system
- Other error messages

unit 1 idle	■
unit 2 n.c.	●
unit 3 n.c.	●
unit 4 n.c.	●
unit 5 n.c.	●
unit 6 n.c.	●

Pane ③ shows what units are connected. In the example shown, only one unit is connected and ready.

## 5.5.2 The unit window

A unit window for every unit connected is displayed beside the control window. This unit window contains information on the current unit status and buttons for controlling metering and filling operations.



### 5.5.2.1 Menu options

- 1 Shows the unit address.

- ② Shows the name of the currently loaded setup. "no Setup" indicates that no setup has been loaded yet. Clicking this button opens a window where you can select a saved setup or edit the current one.

### 5.5.2.2 The process pane

The process pane ③ contains the buttons for controlling the respective unit.



Stops the currently running metering/filling operation on the unit indicated at ①.



Starts the metering operation specified in the setup. If a metering operation cannot be completed because the remaining volume in a syringe is too small, a warning will be displayed and the metering will not be performed.



Starts a filling operation. The syringe is filled up to the volume specified in the setup.

The visual indicator ④ shows the status of the unit. See section 4.3.2 LEDs.

### 5.5.2.3 The state pane

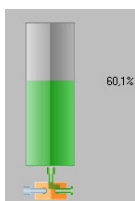
The state pane ⑤ shows the current syringe fill values.

nom. volume  ml The nominal volume in ml of the syringe specified in the setup.

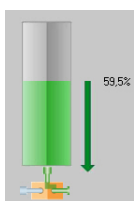
aktual flow   $\mu\text{l/s}$  The metering/fill volume per unit of time (flow rate) in  $\mu\text{l/s}$  as specified in the setup.

- rem. volume  ml    The remaining available volume in the syringe in ml.
- rem. time  sec    The remaining available time within which the remaining volume can be metered at the specified flow rate.
- Rep.  of     In automatic repeat mode, indicates the number of the current metering operation and the total number of metering operations.

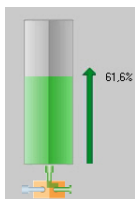
In addition to this information, the process pane also shows under **6** a pictograph of a syringe which provides a visual representation of the data to enable a quick visual check.



Standard pictograph shown when no operation is currently running. The pictograph indicates the current remaining fill volume as a percentage of the nominal fill volume.





Standard pictograph shown during a metering operation, indicated here by an arrow pointing toward the tip of the syringe. The numerical value indicates the current remaining fill volume as a percentage of the nominal fill volume.



Standard pictograph shown during a filling operation, indicated here by an arrow pointing toward the syringe plunger. The numerical value indicates the current fill

volume as a percentage of the nominal fill volume.

At the bottom of the syringe pictograph is a symbol for the (optional) 3-way valve ⑦.

If the 3-way valve is activated by means of  valve in the setup or via manual control, it shows the flow via the left  or the right  nozzle.

#### 5.5.2.4 Manual control

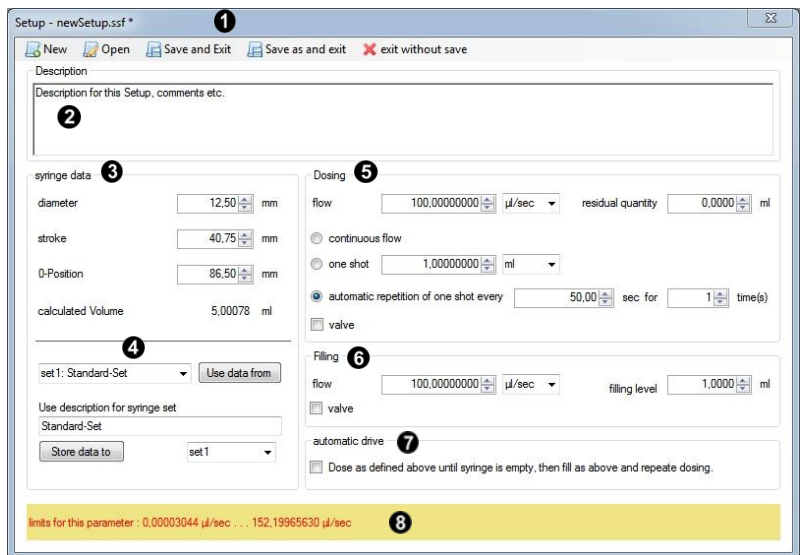
The button for activating manual control of the unit ⑧ is located at the bottom of the unit window. Clicking on this button opens the corresponding window (see section 5.5.4 Manual control) in which the syringe carriage can be controlled manually. In addition to various control buttons, the button to move the carriage to the system reference point (reference point) for calibrating the system can also be found here.


### 5.5.3 The setup window

A setup is used to configure all the important data for a syringe and for a metering/filling operation. The settings can be saved in a file.

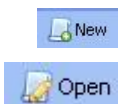


Some sample setups are located under C:/Program Files/Spetec or at your chosen installation location.



Press  on the menu bar of the control window to open the setup window. The name of the setup file currently being edited is displayed at **1**.

The menu bar in this window offers the following options:

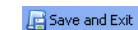
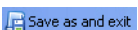



Opens a new setup for editing and saving.



Opens an existing setup file for editing.



-  Save and Exit Saves the current data.
-  Save as and exit Saves the current data in a new file.
-  Exit without save Exits setup without saving the settings.

### 5.5.3.1 Creating a setup

**Description ②:** Text describing the setup or any comments can be entered in this field. This text will also be displayed as a pop-up when you hover the mouse in the area of the Setup button ② in the unit window.

**Syringe data ③:** Definition of the syringe to be used.

The fields are as follows:

diameter	<input type="text" value="30,00"/>	mm	Inner diameter of the syringe in mm.
stroke.	<input type="text" value="72,00"/>	mm	Maximum plunger stroke in mm.
0-Position	<input type="text" value="72,00"/>	mm	Distance between the pressure plate of the syringe carriage and the pressure plate of the plunger in mm. See section 6.1.1 Entering syringe parameters.

If you wish, at ④ you can assign the specified data plus a brief description to a syringe set, which you can then save and retrieve again in another setup.

To save the data, choose the syringe set to which the data is to be assigned from the drop-down list to the right of the "Store data to" button, then click on the button.

To use the data in a stored syringe set, choose the relevant set from the drop-down list to the left of the "Use data from" button, then click on the button.

These syringe sets continue to be available even after a software update and do not need to be re-entered.

In addition to the syringe data, a setup also contains data for defining the metering/fill volumes and flow rates.

The following data can be specified in the "Dosing"  section.

flow

Sets the flow rate during metering. The unit can be set in the drop-down box on the right. As there is a maximum feed rate, there is also a maximum flow rate which can be specified here depending on the syringe. Manually specified values above the maximum or below the minimum value are automatically limited.

residual quantity  ml

The residual quantity in ml which should remain in the syringe for safety.

continuous flow

Sets continuous metering with the specified flow rate. If a metering operation is started, it will run until it is stopped again or until the syringe is empty.

one shot

Sets an absolute volume to be metered or an absolute time which elapses after each start. The operation stops automatically once the amount has been metered or the time has elapsed.

automatic repetition of one shot every  sec for  time(s)

Specifies that a metering operation is to be repeated at intervals. The parameters that can be set are the period (time in seconds) and the number of times the shot is to be repeated.

valve

Switches the 3-way valve for metering to the left or right nozzle.

The following data can be specified in the "Filling" **6** section.

flow

Sets the flow rate during filling. The unit can be set in the drop-down box on the right. As there is a maximum feed rate, there is also a maximum flow rate which can be specified here depending on the syringe. Manually specified values

above the maximum value are automatically limited.

level  ml

The maximum fill volume in ml to which the syringe is to be filled.

valve

Switches the 3-way valve for filling to the left or right nozzle.



If a 3-way valve is used, it is expedient to use one nozzle for metering and the other one for filling. This switchover can be specified in the setup by activating  valve under Dosing in the setup window, and deactivating it under Filling or vice versa.

In the "Automatic drive" section ⑦ you can specify that when "automatic repetition" mode is turned on, an empty syringe will be automatically refilled. In this case it is expedient to use a 3-way valve. The syringe will be refilled using the data specified in the "Filling" section. Please note that in this case, the minimum repetition period that can be set under "automatic repetition" must cover at least the duration of filling for at least one metering operation.

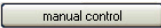
⑧ is an information field that displays the minimum and maximum values for the input field in which the cursor is currently located.

## 5.5.4 Manual control

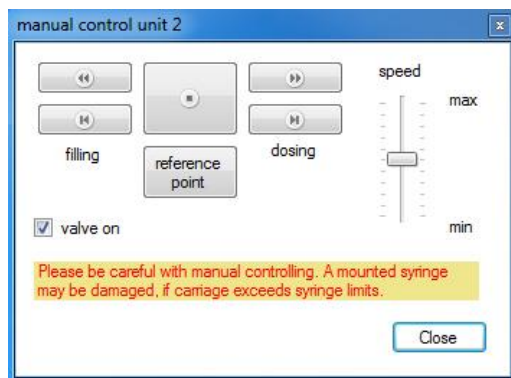
In addition to being controlled by means of a setup, every unit in the Symax syringe pump system can also be controlled manually. In some applications, it is better to control metering/filling manually. A syringe changeover may also necessitate manually moving the syringe carriage to the required position.



**The traversing range limits for the installed syringe are ignored during manual control. This can result in the syringe being damaged. Therefore never leave the unit unattended during metering/filling under manual control, and stop manual control before a syringe is damaged.**

Click the  button in the respective unit window to activate manual control.

The following window will open:



The window contains the following controls:



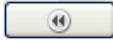
Starts a continuous metering operation/forward movement. The operation runs until you click the stop button.



Performs a metering operation/forward movement for as long as you hold down the button.



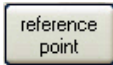
Starts a continuous filling operation/backward movement. The operation runs until you click the stop button.



Performs a filling operation/backward movement for as long as you hold down the button.



Stops the currently running operation.



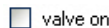
Moves the syringe carriage to the system reference point which is located approximately at the level of the unit connector.



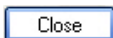
**Any installed syringes must be removed before moving the system to the reference point. When you press this button, a warning message is displayed for your safety. You must acknowledge this message.**



This setting allows you to vary the speed for manual control. The speed can only be changed before starting an operation.



Switches the (optional) 3-way valve.



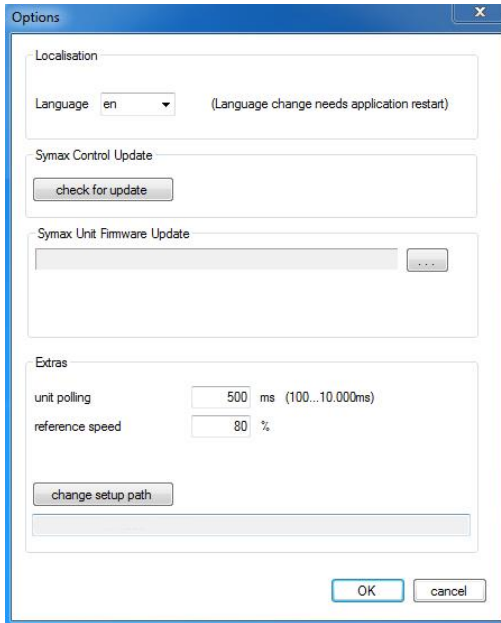
Closes the manual control window.



**For your safety, any operations that are still running are stopped when you close the manual control window.**

## 5.5.5 The options window

You can specify various application settings in the options window.



Language

Language selection. The currently available languages are English (en) and German (de). A software restart is required to activate changes to this setting.

Checks whether a new software version is available. This requires an internet connection.

Symax Unit Firmware Update

Updates the firmware in the Symax syringe pump system. Click the button to choose the firmware file to use when booting then follow the on-screen instructions.

Unit polling

Sets the interval in milliseconds at which the connected units are polled to see if they are present.

Reference speed  %

Sets the speed at which travel to the reference point is performed. You can specify values of 0-100% of the maximum possible speed.

Opens a dialog box for specifying a folder containing setup files. This setting enables you to navigate quickly to your setup files when loading or saving setups.



## 6 Operating the Symax syringe pump system

After commissioning the Symax syringe pump system, it can be put into operation. The following sections describe how best to proceed during operation in order to obtain optimal results.

### 6.1 Installing a syringe

Your Symax syringe pump system is fitted with an adjustable syringe holder.



**Before starting a metering or filling operation, it is absolutely essential for the syringe type and the syringe parameters to have been recorded in the setup for the unit and for the setup to have been loaded. Otherwise damage to the syringe might result.**

#### 6.1.1 Entering syringe parameters

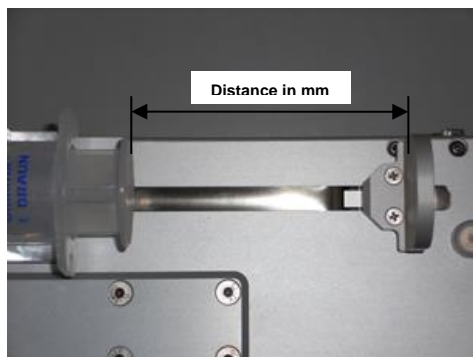
Please proceed as follows:

- Remove any installed syringe from the syringe holder.
- Refer to the syringe datasheet to determine its inner diameter and the plunger stroke, or measure these values yourself using suitable calipers.
- To set the syringe datum point (0-position), move the syringe carriage to the reference point (using



measure the distance between the plunger pressure plate (when the plunger is fully depressed) and the

syringe carriage stop (reference point). See the following image:



- Enter the syringe data in the relevant fields in the setup, and save the data in a syringe set if wished.
- Enter the rest of the data for the setup.
- Save this setup as a new file.

This completes the definition of a new syringe set.

### 6.1.2 Installing a new syringe of the same type



**If a syringe is removed from the holder and reinserted, the value for 0-Position must be adjusted accordingly in the setup. To avoid having to do this, it is advisable to use a stop to ensure that a new syringe can always be installed at the same position on the syringe holder.**

To install a new syringe of the same type, please proceed as follows (also see section 5.5.4 Manual control):

- End any current movements


- Loosen the knurled screw to release the end cap on the syringe carriage and remove the cap.
- Loosen the knurled screw on the syringe holder, unclamp the holder and remove the empty syringe.
- Manually move the syringe carriage so that the new syringe with plunger can be installed.
- Now insert the new full syringe at the same position as the previous one (indicated by a mark or stop), clamp down the holder and gently tighten the knurled screw.
- Move the syringe carriage with its pressure plate up against the plunger, fit the end cap and secure it with the knurled screw.




**Ideally you should have bled the new syringe before installing it. Alternatively, you can also stand the unit up vertically after the syringe has been installed and use manual control mode to bleed the syringe.**

## 6.2 Operation with a PC

### 6.2.1 Metering with a full syringe

- a) Create a setup for your task and save it. It is best to save the files in a separate folder containing all the setups you create.
- b) Load the setup into the corresponding unit window by clicking on the setup button  for the unit window (see section 5.5.2 The unit window). The name of the loaded setup is then shown on this button.

- c) Move to the reference point by clicking on  in the manual control window for the unit.



**Before moving to the reference point you must remove any already installed syringe from the syringe holder.**

It is not necessary to move to the reference point every time you switch the system on. It is only necessary during commissioning, or if you receive an error message prompting you to do so, or if you wish to recalibrate the unit.



**For the purpose of recalibration, it is best to perform a reference run every 4-8 hours or every shift change.**


- d) If the syringe has not been bled, you should bleed it fully before inserting it into the syringe holder. Alternatively, bleed it after insertion by standing the unit vertically and moving the syringe plunger under manual control until all the air has been removed.
- e) After bleeding, insert the syringe into the syringe holder. To do so, manually move the syringe carriage until it rests directly against the plunger pressure plate and fit the end cap.
- f) Attach the metering/filling tube to the syringe.



**Ensure that the lock connector is seated properly and securely, otherwise a leak could occur or the tube might come off altogether.**

- g) The unit is now ready for metering.

### 6.2.2 Filling an empty syringe

- a) Create or load the setup to be used in the respective unit window.
- b) Place an empty syringe with a fully depressed plunger in the syringe holder (see also the previous section). To do so, manually move the carriage so that the syringe can be inserted. Install the syringe and move the syringe carriage with its pressure plate against the plunger pressure plate. Now fit the end cap and fasten it with the knurled screw.
- c) Click on the  button in the respective unit window to start filling the syringe up to the level specified in the setup.

## 6.3 Operation using the foot switch

For optimal metering, the Symax syringe pump system offers the option of starting the system by means of a foot switch. The (optional) foot switch is connected to a free socket on the syringe pump system. Each time the foot switch is activated, metering is started on all connected units using the parameters configured on the PC.



**The syringe pump system must have been previously configured on the PC by loading a setup for the respective unit. The PC is then no longer required, as the data is stored in the unit's internal memory.**

**Please note: Automatic repetition mode is not supported when you operate the system with a foot switch.**



**If a metering operation cannot be completed, the operation will be interrupted and the red LED will come on. You should then either refill the syringe or replace it.**

## **6.4 Operation with an external controller (e.g. SPC)**

The Symax syringe pump system can also be controlled from an external system. A free port on the Symax system provides an interface for this purpose. The inputs and outputs are isolated so they can be used and evaluated as floating connections.

It is possible to trigger all the units in the system via the IN1 input so that a metering operation is started on all connected units, and to stop them again during metering via the IN2 input. IN3 starts a filling operation on all connected units according to the data specified in the setup.

The floating output provides a way of signaling the controller that at least one filling operation is currently running on the system. The longest running metering operation maintains the output signal at the low level until it has finished.



**In order to operate the system with an external controller, the syringe pump system must be configured with a PC beforehand.**



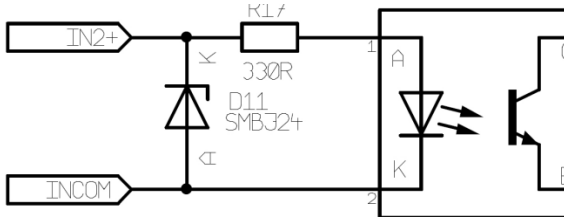
**If a metering operation cannot be completed, the red LED will come on. You should then either refill the syringe or replace it.**

The inputs and outputs must be connected in order to use an external controller. If several pumps are connected to form a system, please make sure that all the pumps respond to the trigger signals.

### 6.4.1 Connector pin assignment

Pin	Function
12	INCOM, reference potential of inputs IN, IN2, IN3
10	IN1
11	IN2
5	IN3
13	OUT1+, output
14	OUT1-, reference potential of output

### 6.4.2 Input wiring (IN1, IN2 and IN3 are identical)



Without series resistor: maximum input level 5V

With 1 kohm series resistor: maximum input level 12V

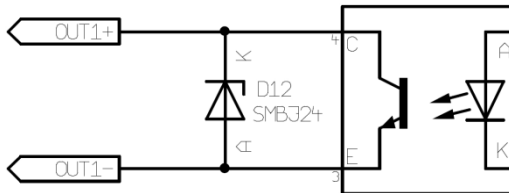
With 2.2 kohm series resistor: maximum input level 24V



**If multiple pumps are connected to form a system, the above series resistors will vary accordingly, as the inputs of all the pumps**

are connected in parallel. The series resistors should be adapted accordingly.

### 6.4.3 Output wiring



The output is wired as an open collector and must be operated with a maximum voltage of 24V. The current must be limited to a maximum of 30 mA (typically 10-15 mA) with a series resistor.



**If multiple pumps are connected to form a system, the series resistor must be adapted accordingly.**

## 6.5 Using the 3-way valve

The 3-way valve is used to switch automatically between metering and filling. The 3-way valve is switched either via the respective settings in the setup or by means of manual control.

## 6.6 Responding to error messages

Error messages are displayed in the status bar under **!** in the control window of the operating software.



To clear these error messages, hover the mouse over the error message and left-click. The error message will disappear. The message will however reappear if the error occurs again.

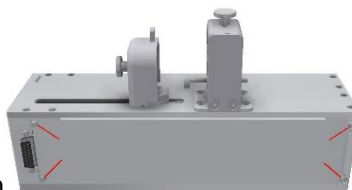
The following error messages are relevant:

<b>Error message</b>	<b>Cause</b>	<b>Resolution</b>
Error: connection to Spetec USB converter failed	The USB converter could not be initialized	Connect the USB and power supply cables
Error: setupfile x corrupt	Error in setup file "x". This setup file contains invalid data.	Create a new file
Error: setupfile x does not exist	Setup file "x" not found	Load a new setup file
Error: unit x position, needs reference drive:	The position is outside the valid range	Move to reference point

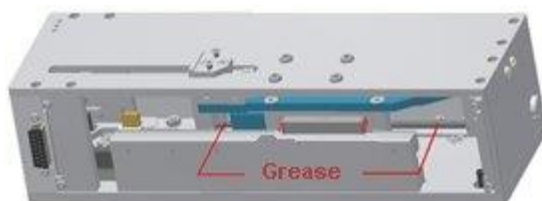
## 7 Servicing and maintenance

### 7.1 General servicing and maintenance information

After about 50000 cycles the spindle of the actuator Heydon Kerk should be serviced by the original grease Pn: 10-0001.. The individual components are designed to be maintenance-free.




Remove 4 screws and open



You should nevertheless check the syringe holder in particular at regular intervals to ensure that it is seated properly and that the screws are tight, as these could potentially come loose during operation. If necessary, tighten these screws with a suitable screwdriver.

## 8 Troubleshooting

Problem	Possible cause	Resolution
The system cannot be turned on, the  LED on the base unit is not lit	No AC power	Check AC power
	Power plug is not plugged in	Check all connectors
	The DC connector is not plugged into the adapter	
Connected units were not detected after starting the software	USB cable is not connected	Connect the cables
	Power supply is not connected to the unit	
	The same address is set on two or more units	Make sure a different address is set on the address selector for each unit connected
	Two USB adapters (for 2 systems) were already connected to ports when the software was started	Remove the USB connector for one of the two systems and start the software. After successfully starting, plug the second USB connector in again and start the software a second time.

## **9 Environmental impact and disposal**

The Symax syringe pump system from Spetec GmbH is built in compliance with the current Restriction of Hazardous Substances (RoHS) Directive.

## **10 List of parts subject to wear**

The Symax syringe pump system does not contain any parts that are subject to wear. It is maintenance-free.

## **11 Cleaning and care**

Please use a damp cloth, with a little detergent or alcohol if required, to remove dirt from the unit. Please do not use a wet cloth as this could allow moisture to penetrate into the unit.

## **12 Service**

You can contact our service department at:

Phone: +49 (0)8122 99533

Email: [spetec@spetec.de](mailto:spetec@spetec.de)

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# CE-Konformitätserklärung

According to the **Low Voltage Directive no. . 2014/35/EU**  
and the **Machinery.Directive no. 2006/42/EC**  
and the **Electromagnetic compatibility directive no.  
2014/30/EU**

Hereby we declare, that the product listed below, in the version distributed by us, meets the basic requirements of the EU directive with regards to its design and construction.

Product: Symax  
Productdescription: Syringe

## Specific applied standards:

Safety:  
EN ISO 12100:2010-11  
EN ISO 13857:2008-03  
EN 60204-1:2018-09  
EN 954-1  
EN 61310-1

Electro magnetic compatibility (EMC):  
EN 55011:2016+A1:2017, group 1, class B  
EN 61000-3-2:2014, class A  
EN 61000-6-2:2005

This declaration will loose its validity at any changes not permitted by the manufacturer.

This declaration is issued on behalf of the manufacturer:

Spetec GmbH, Am Kletthamer Feld 15, 85435 Erding

Erding, 13.02.2019 Product Manager Karl Mairoth



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