

Manual

CPP1 serial USB pump driver version 2

Prerequisite

If you want to control the pumps using a standalone program, use the program **JT Pump Driver** that you got from our sales team.

Alternatively you can use any other program that can establish a serial connection via USB and send serial commands.

In the following it is described how to operate the pumps using the program JT Pump Driver in combination with the pump driver firmware version 1.3.

General features

The pump driver Version 2 is available in a 2-pump and 4-pump configuration.

Dimensions for the 2-pump configuration (mm): 27 x 32 x 14

Dimensions for the 4-pump configuration (mm): 27 x 32 x 18

Connector (Pump) : JST-SH, male

Connector (PC): USB Micro B

Cable: USB Micro B to USB Type A



Figure 1: Pump driver Version 2 connected with two CPP1 pumps.

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Connection

The pump driver is an electric circuit board that is connected and powered by a USB A to USB Micro B cable. (The cable is included in the delivery package.)

1. Connect the board to an USB port of your computer.
2. Start **JT Pump Driver**.
3. Use the menu **Connection** and select the available COM port number. If there are several USB devices available you must try out which COM port is the one of the pump driver board. (Note that usually the port COM1 is not a USB port, thus only use it if there are no other ports available.) Finally press **(Re)Connect**.

If the pump driver board is now successfully connected, the LED on the board will blink 5 times. If no connection could be established, you will get an error message.

(If you use another program than JT Pump Driver, connect to the pump driver board with these serial port settings: 9600 baud, no parity, 8 data bits, 1 stop bit, no flow control (9600, n, 8, 1, 0).)

When closing JT Pump Driver, the connection to the board will be closed and the LED on the board will blink 3 times to indicate this.

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Control

To control the pumps, set the parameters you like and press on the button **Run Pumps**. The pumps can be stopped any time by pressing the button **Stop Pumps**.

The pumps can be run in up to 6 different steps that can also be executed repeatedly. The number of repeats is set in the field **Repeat times**. If you use the option **Run until stop pressed** the steps are repeated infinite times until you click on the button **Stop Pumps**.

To use different run steps, check the option **Use** in the tab for step 2. Then you can set up parameters for this step and you also get a new tab for a possible step 3.

Note: To protect the motors, the program will automatically stop the pumps for a second if the rotation direction changes from one step to the next one. For example if the pumps should run for 5 seconds and then for 8 seconds in the opposite direction and the whole sequence repeated, the overall time for one repeat sequence is 5 s (step 1) + 1 s (stop) + 8 s (step 2) + 1 s (stop again because step 1 will be repeated) = 15 seconds.

With the button **Free Pumps** a special program is run with all connected pumps. This program might be necessary to free the pumps when they were not used for a longer time. The pumping principle is that a rotating excenter presses the silicone hose of the pump together so that the hose is closed on one point. If the excenter is not rotating for a longer time, the silicone hoses will stay closed on the position where the excenter presses it due to Van der Waals forces. To free the pump hose **Free Pumps** runs the pumps for 30 s in different directions for 10 times. If the pumps are not free afterwards you can repeat the procedure. If this does not help, you need a new pump since then the silicone hose is irreversibly mechanically damaged.

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Command syntax

If you need to control the pumps using your own software you can send commands to the pump driver board with this syntax:

Command	Description	Example	Further info
/n	Device address; default: n = 0		
Dpppp	Pump direction: p [0,1] = clockwise / counterclockwise This means that the pump rotate (counter)clockwise when looking at the front of the pumps (side with serial number)	/0S1500D0R	Pump 1 runs clockwise <i>Note:</i> The 'D' command is optional. If not given, the direction will be clockwise. 'D' has to be specified after the 'S' command
g	Start repeat sequence		
G	Repeat infinite	/0gGR	Infinite repeats
Gn	Repeat n times	/0gG5R	Repeat 5 times
lpppp	Pumps on/off: p [0,1] = pump off / on I0000: all pumps off; I1000 or I1 (if only 1 pump connected): pump 1 on; I01: pump 2 on; I1001: pump 1 and 4 on	/0I11R	Pump 1 and 2 on <i>Note:</i> There must be as many digits as pumps are connected to the driver. So if you have 4 pumps connected and want to turn on only pump 2, use I0100.
l	LED Off (lowercase 'L')	/0IR	
L	LED On	/0LR	
Mn	Wait n milliseconds	/0LM1000IR	LED on for one second
R	Execute command		
Spnnn	Pump number and corresponding voltage level: p [1,2,3,4] = pump number nnn [000-999] = (% of 3.3 V * 10) - 1 To address several pumps, use the syntax Spnnnpnnn etc.	/0S14992999R	50 % of 3.3 V (= 1.65 V) for pump 1; 100 % for pump 2
T	Terminate execution of a command	/0T	

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After sending the command string (with the trailing **R**) a CR-LF sequence (ASCII-characters #13#10 (carriage return + line feed)) has to be sent.

You can use JT Pump Driver also as command generator. By pressing the button **Generate Command** you get the command sequence according to the current settings but the command is not send to the pump driver board. You can copy the generated command from the field **Command**.

Command examples

- To run 2 pumps in contrary directions for 10 s with 1.5 V, then stop, the command is **/OS14552455D01I11M10000I00R**
- To run one pump with 1.5 V for 2 s clockwise then stop it and run pump 2 with 3.3 V counterclockwise for 5 s, repeat this 3 times, then stop both pumps, the command is **/0gS1455D0110M2000S2999D1I01M5000G3I00R**

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Troubleshooting

- Sometimes the connection to the COM port was interrupted and therefore it is no longer possible to send commands to it. Then the connection needs to be re-established. This is done by using the menu **Connection** in JT Pump Driver and there the button **(Re)Connect**. (This problem can for example happen when another USB device is plugged into the PC and a Windows driver therefore disconnects all COM ports for a second.)
- If the (re)connection to an available COM port leads to a timeout error, Windows has this COM port registered despite it had been meanwhile disconnected. (This can for example occur if Windows is restarted while JT Pump Driver is running.) To fix this:
 1. Close JT Pump Driver.
 2. Unplug the pump driver USB cable from the PC.
 3. Subsequently plug in the USB cable to the PC. (This forces Windows to re-establish the COM port.)
 4. Restart JT Pump Driver

Firmware update

If there is a new firmware available, you can update the firmware of the pump driver this way:

1. Start **JT Pump Driver**.
2. Use the menu **Misc→Firmware Update**. A dialog pops up informing you about the following steps.
3. Select the COM port number of the pump driver in the appearing dialog.
4. Select in the appearing dialog the firmware file. (It has the file name scheme "JT-PumpDriver-Firmware-x-y.bin".)
5. If the connection to the COM port was successful and the firmware file could be validated, you get the info that the firmware update is performed. This will take about 15 seconds.
Note: Assure that the USB cable is not unplugged and that you don't log off from Windows during the update. Otherwise the device can be damaged.

If the update was successful, you can directly continue your work.

If the update failed, perform the update again. If this fails too, check if the update was actually successful but is not recognized as such: Use the menu **Connection** and press **(Re)Connect**. If you still cannot use the pump driver, please contact the customer support customer.care@jobst-technologies.com.

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