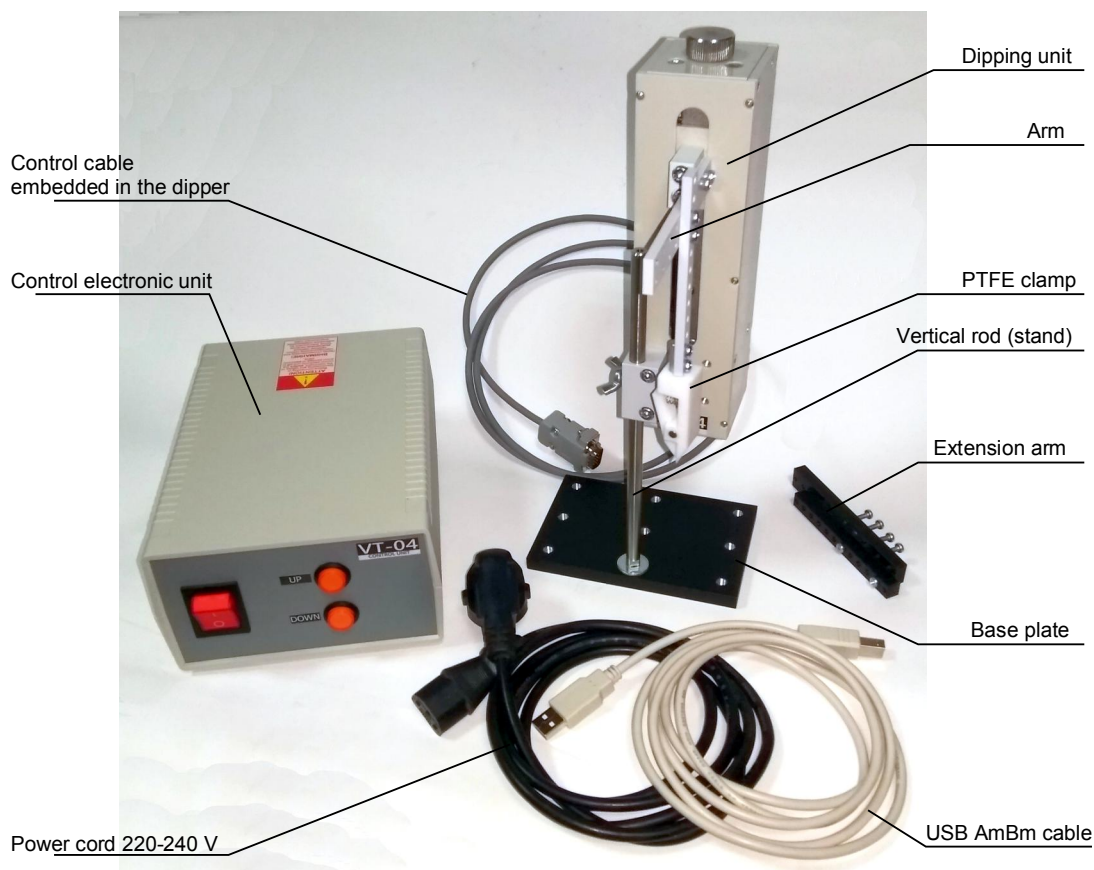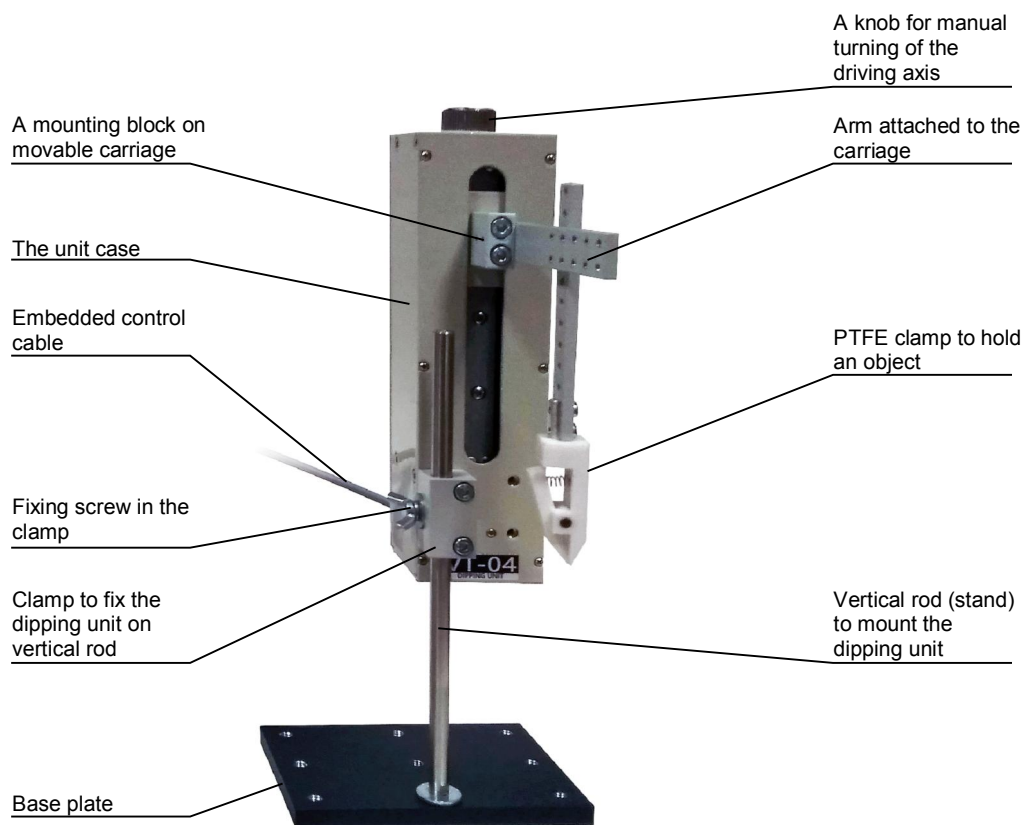MICROTESTMACHINES Co.

Automated dipper mechanism
VT-04

Installation of VT-04 mechanism

Complete set of automated dipper mechanism VT-04 includes the dipping unit (with embedded control cable), control electronic unit, set of cables for connecting the electronic unit to electric mains (220-240 V 50 Hz) and to host PC (USB AmBm cable). Additional accessories are vertical stand (rod on flat base) for mounting the dipping unit, metal arm with PTFE clamp for the object hanging and extension set of plastic arm that may be used either instead of metal arm or as an extension arm if attached to the metal arm.

Control cable embedded in the dipper

Control electronic unit

Dipping unit

Arm

PTFE clamp

Vertical rod (stand)

Extension arm

Base plate

Power cord 220-240 V

USB AmBm cable

Delivery set of automated dipper mechanism VT-04

A mounting block on movable carriage

A knob for manual turning of the driving axis

Arm attached to the carriage

The unit case

Embedded control cable

PTFE clamp to hold an object

Fixing screw in the clamp

Clamp to fix the dipping unit on vertical rod

Vertical rod (stand) to mount the dipping unit
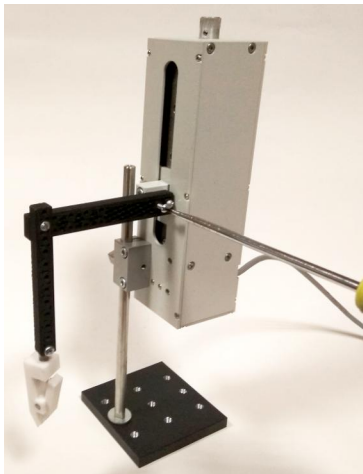
Base plate

Elements of the dipping unit

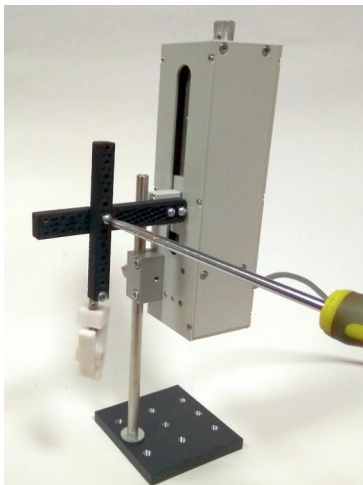Some minor assembling will be necessary after the unpacking the delivery set.

1. Screw vertical rod into a hole on base plate

2. Mount the dipping unit on the vertical rod (stand) and fix its position with a fixing screw in the clamp.

3. Using two screws attach arm to the mounting block of movable carriage.

4. Adjust position of vertical element with PTFE clamp on the arm if necessary.

After dipping unit assembly, connect the embedded control cable from the dipper to socket on rear side of control electronic unit. And connect the control electronic unit to host PC with the USB AmBm cable from the set. Using power cord, connect the control electronic unit to electrical network (220…240 V 50 Hz).

Installation of software to run VT-04

      The automated dipper mechanism VT-04 operates under control from host PC. Connection of control electronic unit with host PC is provided via USB-port emulating COM-port.

      Official site to download latest drivers for USB-to-COM system: https://www.ftdichip.com/FTDrivers.htm.

      It may appear that old versions of the drivers fit your host PC better. Some old releases are also available at:

http://microtm.com/download/CDM_v2.12.24_WHQL_Certified.zip
http://microtm.com/download/CDM2.08.30WHQLCertified.zip
http://microtm.com/download/CDM2-12-18.RAR
http://microtm.com/download/CDMv2.10.00WHQLCertified.exe

      To install USB-to-COM drivers, unpack the driver installation pack in a temporary folder on hard disk and switch on the device (control electronic unit). After this first turning on, host PC will find new device and ask for drivers. Provide the driver installation wizard with correct path to the driver installation pack in a temporary folder and system will be installed.

      After the USB-to-COM driver installation check number of port that system assigned for the new device. Open branch 'Ports (COM & LPT)' in the computer Device Manager (Control panel – System – Device manager):
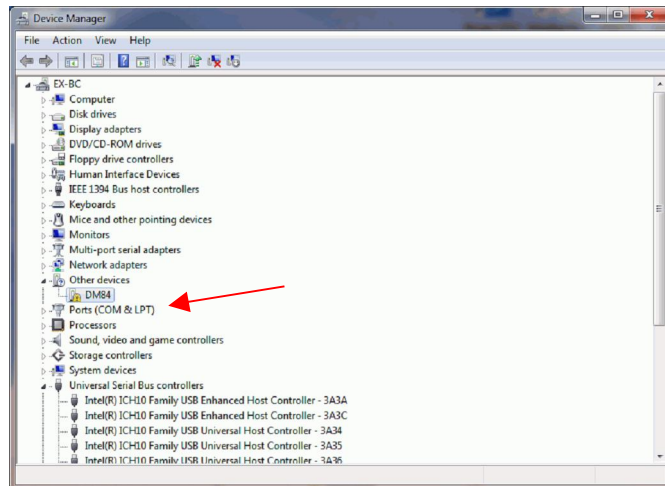
and remember the number of newly appeared device entitled 'USB Serial Port (COM#)', for example, COM9 as in the picture below.
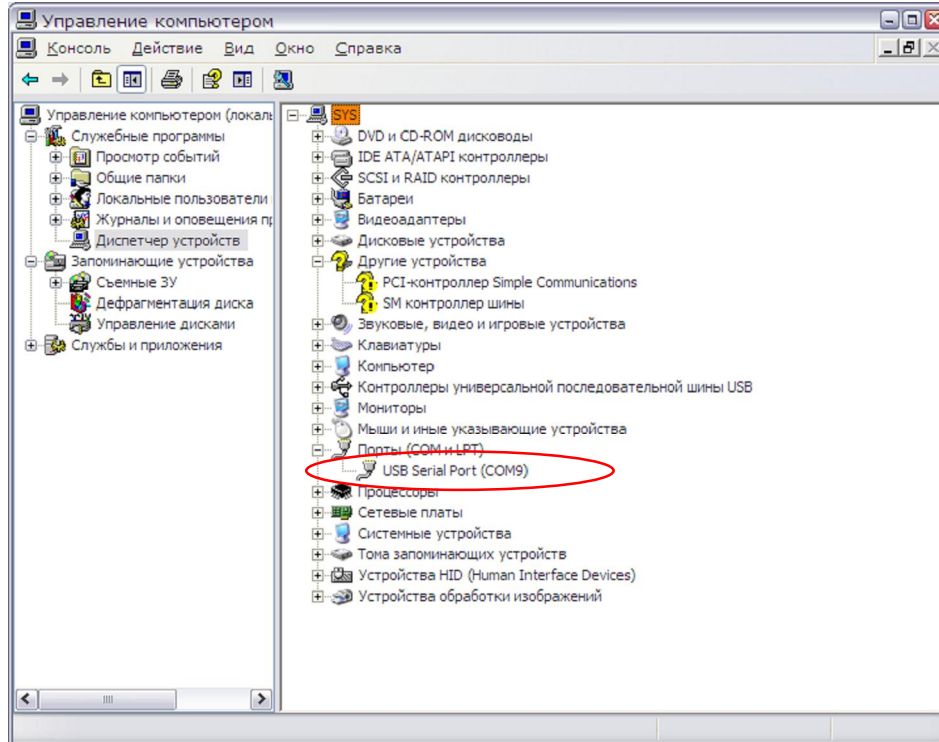

      To run the dipper from host PC use specialized program that is available for download from:
http://microtm.com/download/vt-04_ctrl_inst.zip

This archive is an installation package. Please, unpack it in an empty temporary folder on the computer hard disk and run file setup.exe. After finishing the setup procedure, control program can be started with conventional ways used in Windows.

Control program for VT-04

VT-04 control program panel and its elements are shown in the figure below:
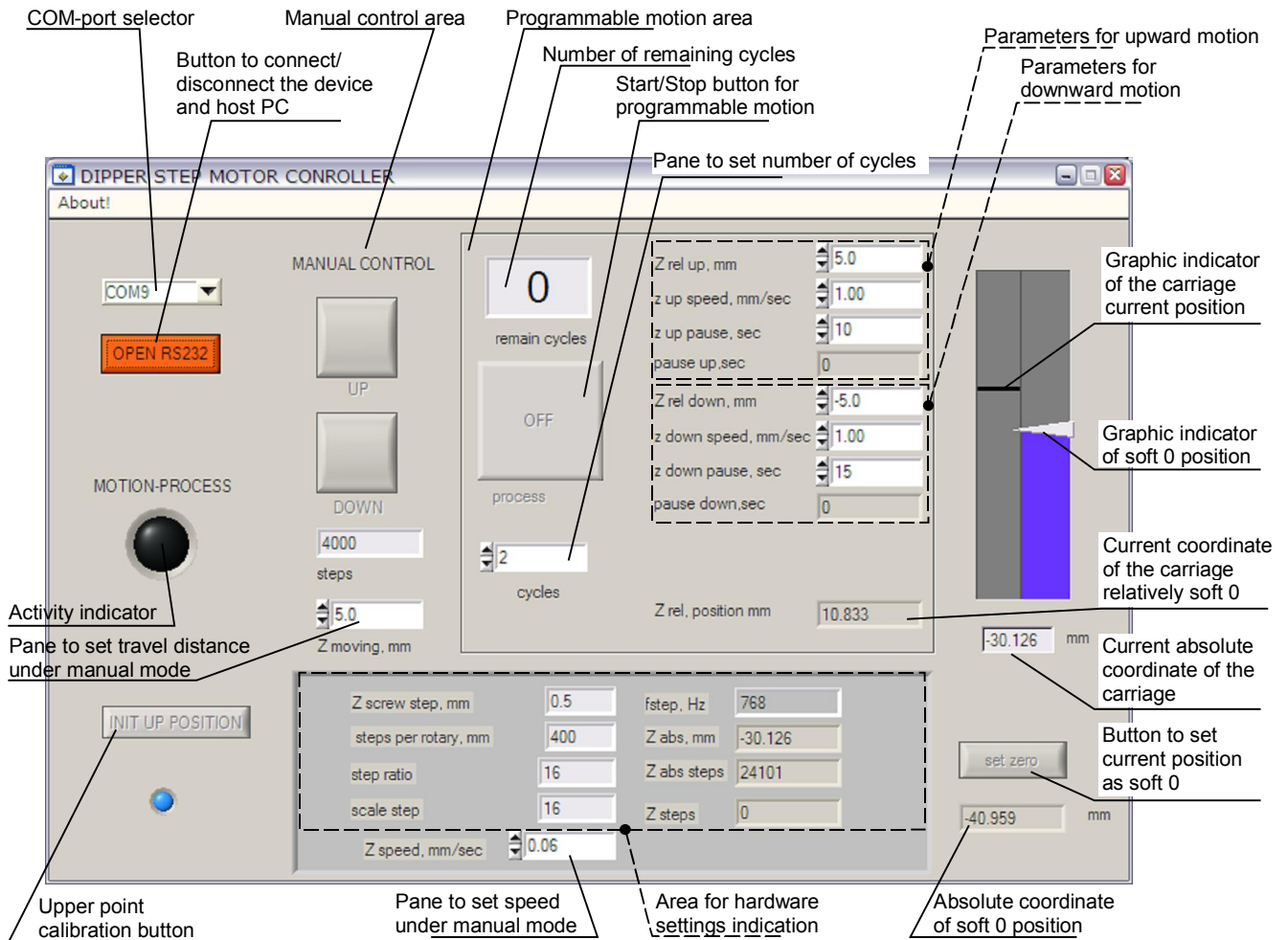
[The program start]

Before the control program start, switch the control electronic unit on. After switching the hardware on, wait a couple of seconds and start the control program. In the folder where the control program was installed, run executable file 'serial.exe'.

In the control program panel, firstly, select correct COM-port in the port selector (corresponding to 'USB Serial Port (COM#)' in Device Manager). Secondly, press button 'OPEN RS232' to connect the device with host PC. About correct connection system will notify you with label "Device found / dipper control board ready!!!":
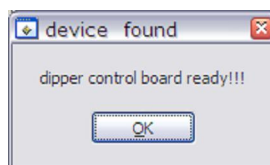
and the port connection button will change color to green with inscription 'CLOSE RS232'.

Note: If correct connection was not installed, check number of the selected COM-port and repeat the program start procedure waiting more between the device switching on and the control program start.

Example of the program panel after the device connection is shown below
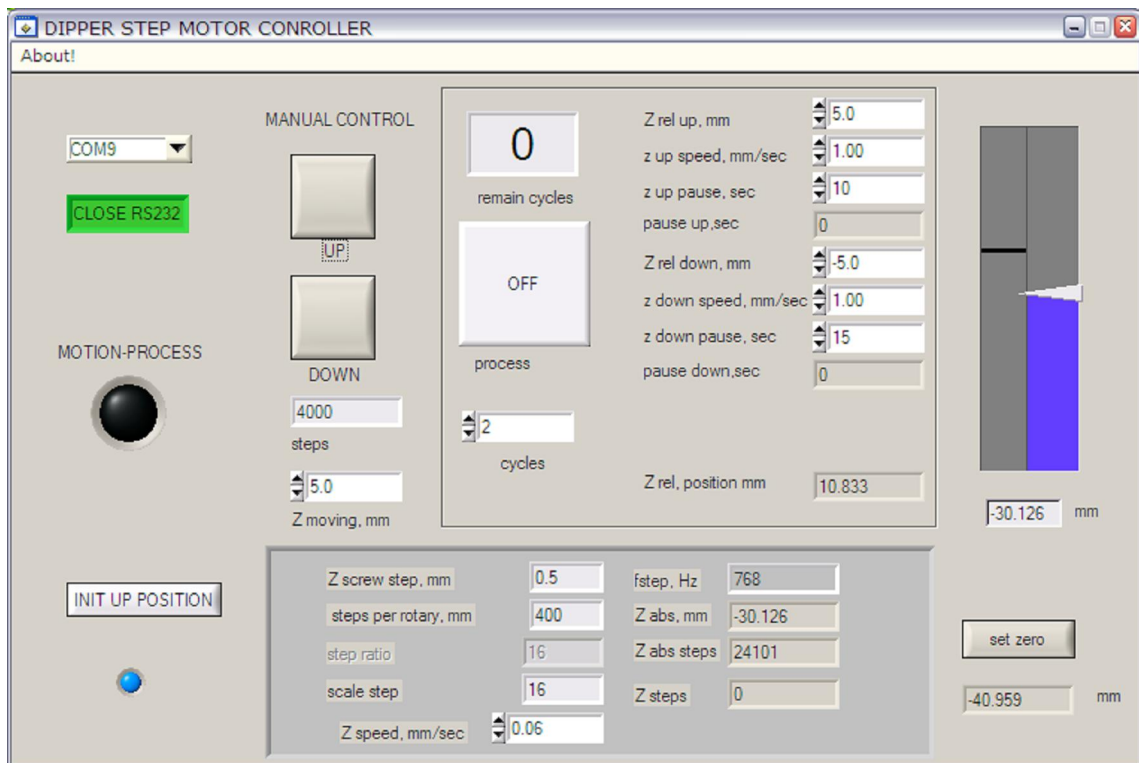
[Upper point calibration]

Upper point calibration should be performed at first run of the device, after positioning of the carriage with knob on the dipper top and after moving the carriage with service buttons on control electronic unit when system does not trace performed steps (distances). To start the upper point calibration procedure, press button 'INIT UP POSITION' and wait till carriage reach its upper position and stop with limit switch.

[Manual operation mode]

For simple vertical motion of the dipper arm for certain distance you may use manual control option – buttons 'UP' and 'DOWN' in 'MANUAL CONTROL' area. Distance of vertical displacement of the carriage (arm) after pressing corresponding button is set in pane 'Z moving, mm'. Indicator 'steps' automatically shows number of steps that the stepper motor performs to cover the distance. Speed of the arm (carriage) translation is set in pane 'Z speed, mm/sec'. Numbers in the panes throughout the program panel may be entered by typing them in the pane or searching with the small up and down buttons left to the pane.

Motion with the preset parameters will start at pressing button 'UP' or 'DOWN' after which the activated button will change color to red (see figure below). To stop the motion before full distance covering, press the active button again or press spacebar on the keyboard of the host PC.

6
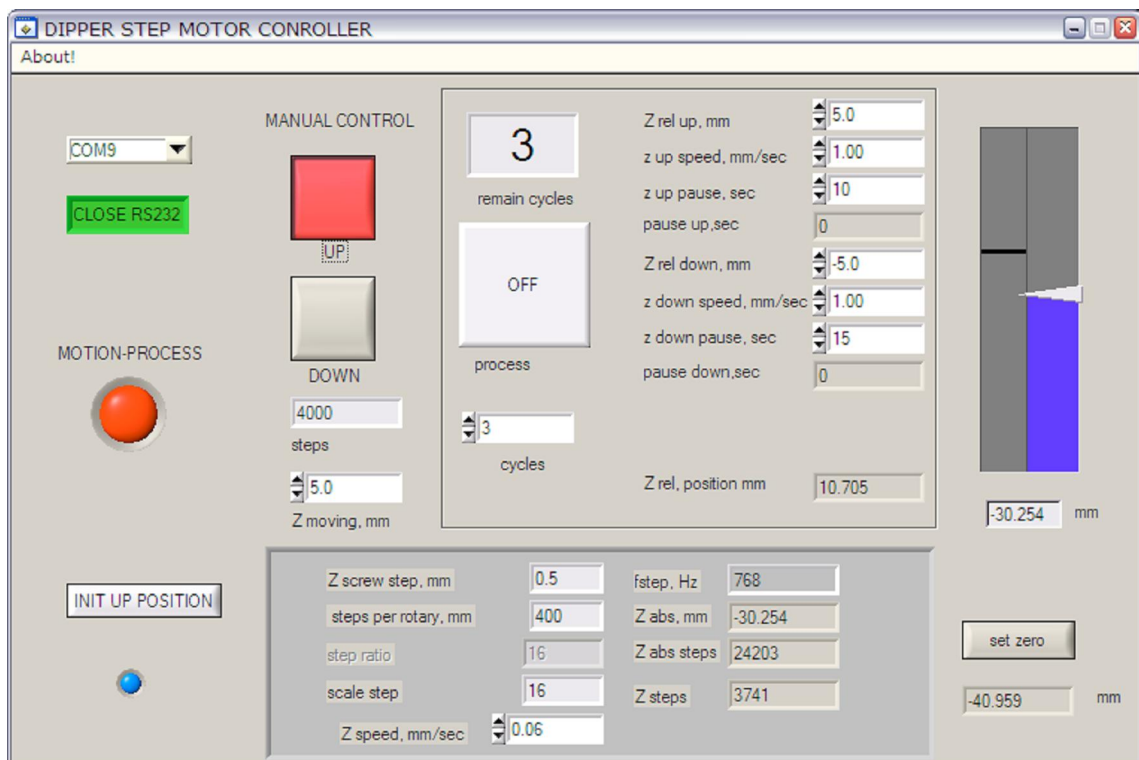
Using buttons of manual control you may, for example, position the arm with attached object at necessary height (e.g. liquid in a vessel) and then set this position as soft 0 by pressing button 'set zero'. That will simplify assignment of coordinates for the object dipping and lifting under programmable operation mode.

[Programmable operation mode]

Automated dipper VT-04 provides possibility for multicycle operation with preset parameters separately for upward and downward movement of the arm (carriage). All necessary parameters should be set in Programmable motion area of the control program panel (see example below).
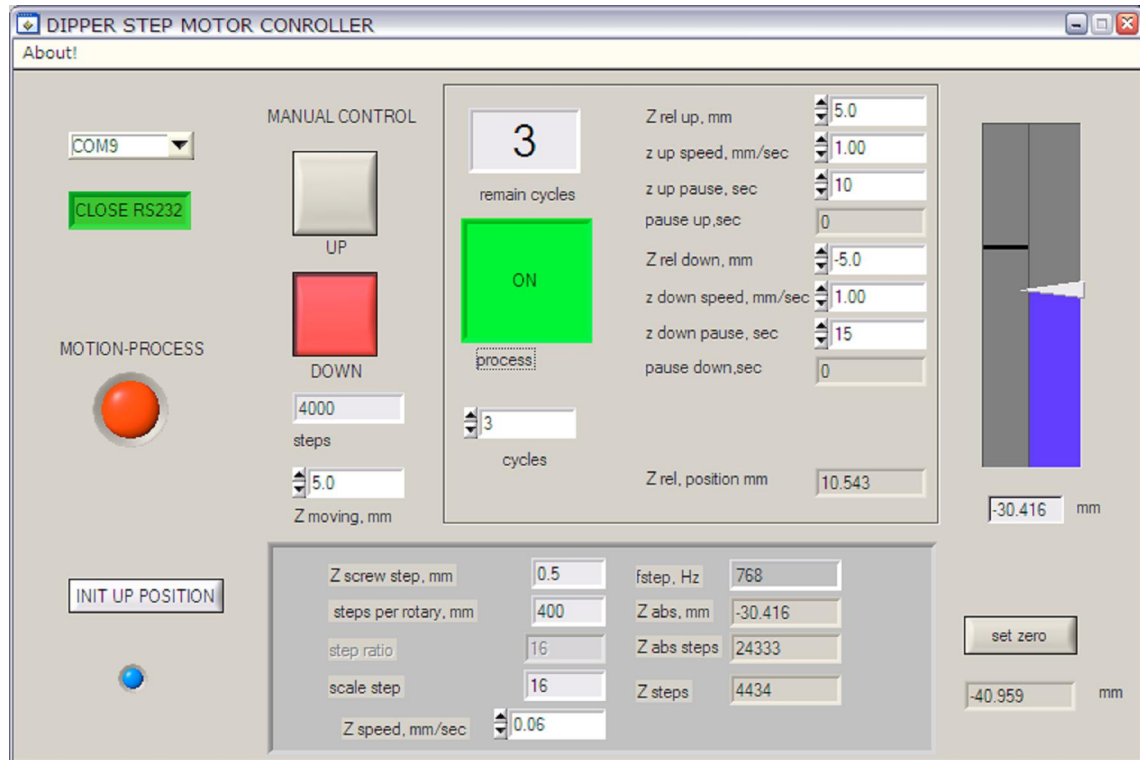
Enter in pane 'cycles' number of dipping/lifting cycles planned to perform. Other parameters are as follows:

Z rel up, mm – coordinates of upper point (relatively cutrrent soft zero) of the carriage cycle motion.
z up speed, mm/sec – speed at which the arm (carriage) will travel upward to the position set by 'Z rel up, mm'.
z up pause, sec – pause in movement that will be performed by the mechanism in upper point of the cycle (set by
        'Z rel up, mm').
pause up, sec – counter for pause performed in upper point of the cycle; the counter starts when the pause begins.

Z rel down, mm – coordinates of lower point (relatively current soft zero) of the carriage cycle motion.
z down speed, mm/sec – speed at which the arm (carriage) will travel downward to the position set by 'Z rel down, mm'.
z down pause, sec – pause in movement that will be performed by the mechanism in lower point of the cycle (set by
        'Z rel down, mm').
pause down, sec – counter for pause performed in lower point of the cycle; the counter starts when the pause begins.

To start the programmable motion with the preset parameters, press 'process' button (with inscription 'OFF' in its middle showing its current state). The cycle process will start and the button change color to green (inscription in the button middle will change to 'ON'). Note that buttons in manual control area will change their state correspondingly to currently performed motion, i.e. when carriage goes down button 'DOWN' comes to activated state (red color). If carriage goes up, button 'UP' comes to activated state (red color). You may stop the process fulfillment by pressing the activated buttons or spacebar on the host PC keyboard.

[Exiting program]

Before exiting the control program it is recommended to disconnect from the device by pressing button 'CLOSE RS232'.
It is recommended to disconnect from the device before switching the control electronic unit off as well.