User guide

Control program for the controller SMS60 (LabView5.0)

Important !
Before you put the system with the help of this guidance into operation, read please the operating instruction for the step motor controller SMS60.

Software

The software is an extracting file on the diskette. After unpacking the file, files will be copied on your disk into the directory "C:\OWIS\SMS60\LabView". There is no setup program and you do not need to install anything.
The files are stored in this directory and a subdirectory “functions”.
The file “sms60demo.vi” is a demo application, another VI’s are its SubVI’s. The folder “functions” contains VI’s for a motor control. They are connected with the functions from Dll “sms60.dll”. The Dll is a interface between the driver und the VI’s. The National Instruments gpib driver are applicable under Win9x, WinNT, Win2000 and WinXP.
If you use the gpib interface, you must install the appropriate gpib drivers and the gpib board on your computer!!!
Please note, you need a special cable for the controller connection to a pc. One can order the gpib cable by National Instruments and the serial cable can be ordered by OWIS, it is also possible to build it by your self. One will find the pinning in the file „readme.txt“.
The program was written with the resolution of 1024x768 pixel in 24Bit depth of shade and tested under Win9x, WinNT, Win2000 and WinXP. We ask you to select these adjustments for optimal operability of the graphic card.

Program logon

Constituents

The program consists of 84 vi’s and one dll. The primary are:

- sms60demo.vi - the main application to control your motors;
- sms60.dll - the DLL, which provides functions for the control.

The user surfaces

You will deal mainly with two different surfaces. When you start the program, there the dialog “Set interface” will appear where you can define the interface.
The main application (sms60demo.vi) is needed for positioning.
The menu *Extras* offers you additional opportunities:

1. One can set pitch, full steps per revolution and gear reduction for each axis, which is necessary for positioning in mm or degrees (submenu *Stage attributes*).
2. To read and set axis parameters (submenu *Axis parameters*).
3. To read version number of the firmware (submenu *Firmware*).
4. To read state information of the controller (submenu *Sysinfo*).
5. To read and change limit switch configuration for each single axis (submenu *Limit switches*).

6. To read and set linear speed and rpm for each single axis, but one should set first stage attributes (submenu *Speed values*).
7. To test joystick mode (submenu *Joystick*).
8. To read and set axis encoder position (submenu *Encoder*).

The menu *Move* contains two dialogs, which allows positioning in a 1..3 dimensional grid: *Zigzag* and *Meander*.
The menu "*?*" contains the submenu "*Info*" with information about the program version.
You will find all surfaces in the appendix (Fig. 1-10).

Functions
The functions (VI's) in folder "functions" are intended for control. They are connected with the Dll functions. The file "Sms60func.hlp" has to everyone a detailed description.
For function validation all VI's have a additional return value (*WriteReadOK)*.
For selection of the read and write functions some VI's have a additional input parameter (*WriteRead*).

Programming flowchart

Start program
Start the VI *sms60demo.vi*.
First the dialog "Set interface" will appear. It consists of the button *Interface*, the control *GeneralTimeout*, two parameter blocks (serial and gpib interface) und two buttons (*OK* and *CANCEL*). The button *Interface* enables a accordingly parameter block. Here one can select new interface values. The control *GeneralTimeout* defines a time-out for the controller communication (when controller doesn't answer during this time, a message box appears, please check SMS60).
With the button *OK* one confirms new values. After that the initializing routine starts. It checks the selecting values and tries to communicate with the controller. When all is valid, then the main application appears. In error case you get a message, the indicator *Error* with a error code will be visible (s. Sms60func.hlp, function SMS60_InitInterface). Please input new values und try it again.
With the button *CANCEL* one can close the dialog and terminate the program.

How to operate with the main application "SMS60 control".
The window is divided into 3 different areas.

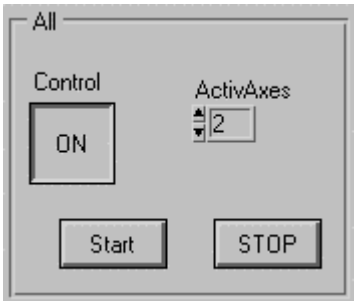

Fig.1

The 1.Part (s.Fig.1) is intended for control of all axes:

Button **Control**	- switch all axes On or Off (default: On)
Control **ActivAxes**	- set the number (n) of active axes (from 1 to n)
Button **Start**	- start all active axes (go to position)
Button **STOP**	- stop all engines

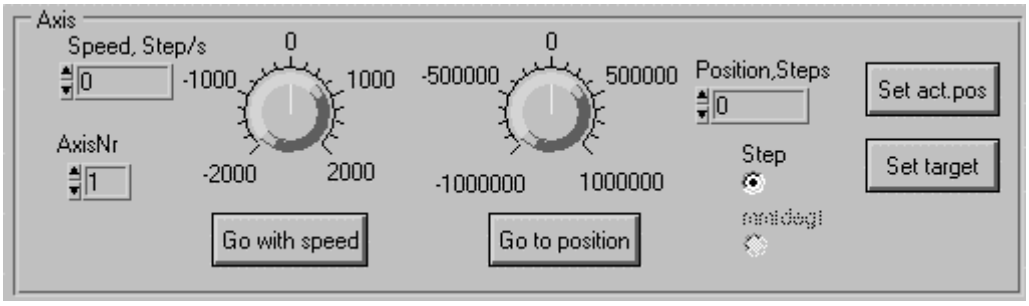

Fig.2

The 2.Part (s.Fig.2) is intended for control of one axis:

Control **AxisNr**	- select motor to be controlled
Knob **Speed, Step/s**	- select new position value in increments
Knob **Speed, mm/s**	- select new position value in mm(deg)
Button **Go with speed**	- start drive with constant speed for the selected motor (*Control AxisNr*)
Button **Go to position**	- start drive to target position for the selected motor (*Control AxisNr*)
Knob **Position, Steps**	- select new position value in microsteps
Knob **Position, mm**	- select new position value in mm(deg) (!!! before you must set correct stage attributes)

For a fast input - *Knob*, for a precise input - *Digital Display.*

Radio buttons

Step und **mm(deg)**	- define unit for positioning, before it's necessary to set stage attributes (submenu Stage attributes)
Button **Set act.pos**	- set current position for the selected motor (*Control AxisNr*)
Button **Set target**	- set target position for the selected motor (*Control AxisNr*)

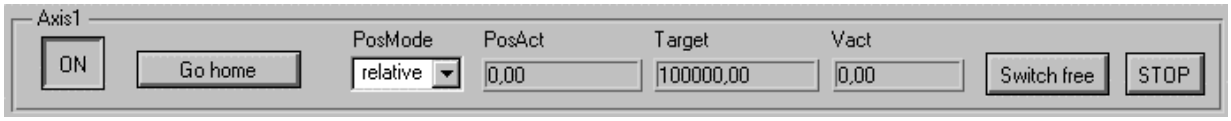

Fig.3

The 3.Part (Fig.3) is intended for the individual axes (motors):

Button **Axis1**	- switch motor On or Off (default: On)
Button **Go home**	- drive to reference limit switch
Dlg Ring **Posmode**	- set positioning mode (*relative*, *absolute*)
Indicator **PosAct**	- display current motor position
Indicator **Target**	- display target position of the motor
Indicator **Vact**	- display current speed of the motor
Button **Switch free**	- drive from limit switch
Button **STOP**	- stop motor

How to operate with the dialog „Stage attributes" (submenu *Stage attributes*).
The stage attributes for the selected motor (*Control AxisNr*) will be displayed.
Please select new stage attributes. Click the button *Set* to set values. With the button *Close* one can close the dialog.

How to operate with the dialog "Axis parameters" (submenu *Axis parameters*).
The axis parameters for the selected motor (*Control AxisNr*) will be displayed.

Frequency

Control - display and select frequency

! Alternative one can set it in the dialog “Speed values”.

Free frequency

Control - display and select drive frequency from limit switch

Lock frequency

Control - display and select drive frequency to limit switch

Acceleration

Control - display and select acceleration (in internal controller units from 1 to 8191)

Phase current reduction

Control - display and select phase current reduction (in %)
Check box - display state of phase current reduction
Check box **Reference..** - indicate, if the axis has done a valid reference motion already
Button **Set** - set last changed axis parameter
Button **Close** - terminate dialog

How to operate with the dialog „Sysinfo“ (submenu *Sysinfo*).
The state information of the controller will be displayed.

Controller state

Check box **Move..** etc. - display state byte value

Stop state

Indicator - display stop state value
Button **?** - display message box with the detailed information

Reference state

Indicator - display reference state value
Button **?** - display message box with the detailed information

Button **Reset** - set controller in the start state
Button **Master reset** - set controller in the factory state, all parameters will be set to default
Button **Close** - terminate dialog

How to operate with the dialog „Limit switches“ (submenu *Limit switches*).
The limit switch configuration for the selected axis (*Control AxisNr*) will be displayed.

Configuration

Check box **MINSTOP** etc. - define corresponding limit switch of the axis (available/ not available)
Check box **Low, High** - define limit switch mask of the axis (polarity: high/ low active)

State

Check box **MINSTOP** etc. - display state of the corresponding limit switch of the axis (activated/ not activated)
Indicator **Limit switch..** - display limit switch hysteresis value
Button **Save conf** - set limit switch configuration of the axis
Button **Close** - terminate dialog

How to operate with the dialog „Joystick control“ (submenu *Joystick*).
One can test joystick mode.

axis X

Check box **1..6**	- select axis X for joystick positioning
Indicator **PosAct**	- display current motor position of the axis X
Indicator **Fact**	- display current speed of the axis X
Control **JoyF**	- display and select speed of the axis X

axis Y

Check box **1..6**	- select axis Y for joystick positioning
Indicator **PosAct**	- display current motor position of the axis Y
Indicator **Fact**	- display current speed of the axis Y
Control **JoyF**	- display and select speed of the axis Y

direction X

Check box	- display and set direction of the axis X for joystick positioning

direction Y

Check box	- display and set direction of the axis Y for joystick positioning
Button **Joystick Off(On)**	- switch joystick mode on or off
Button **Set joystick axes**	- set axes for joystick positioning
Button **Set joystick freq.**	- set last changed axis speed
Button **Close**	- terminate dialog

How to operate with the dialogs „Move zigzag“ and „Move meander“ (menu *Move*, submenu *Zigzag* and *Meander*).
With the controls *AxisNr* one defines axes for positioning. The values must be not equal (for example: x=1, y=2, z=3 – true; x=y=z=1 – false).
With the controls *StepNumber* one defines a number of the steps for positioning. The value (=0) means this axis will be ignored during positioning.
With the controls *StepLength* one defines a step length the for the corresponding axis (mm or degrees).
The value *SleepTime* defines a time-out at any point of the grid (0...N ms).
With the button *Start* one starts a positioning. With the button *Stop* one breaks a positioning at any time. With the button *Close* one can close the dialog.

Appendix

Figure 1. „sms60demo“

Figure 2.1. Interface dialog „serial interface“

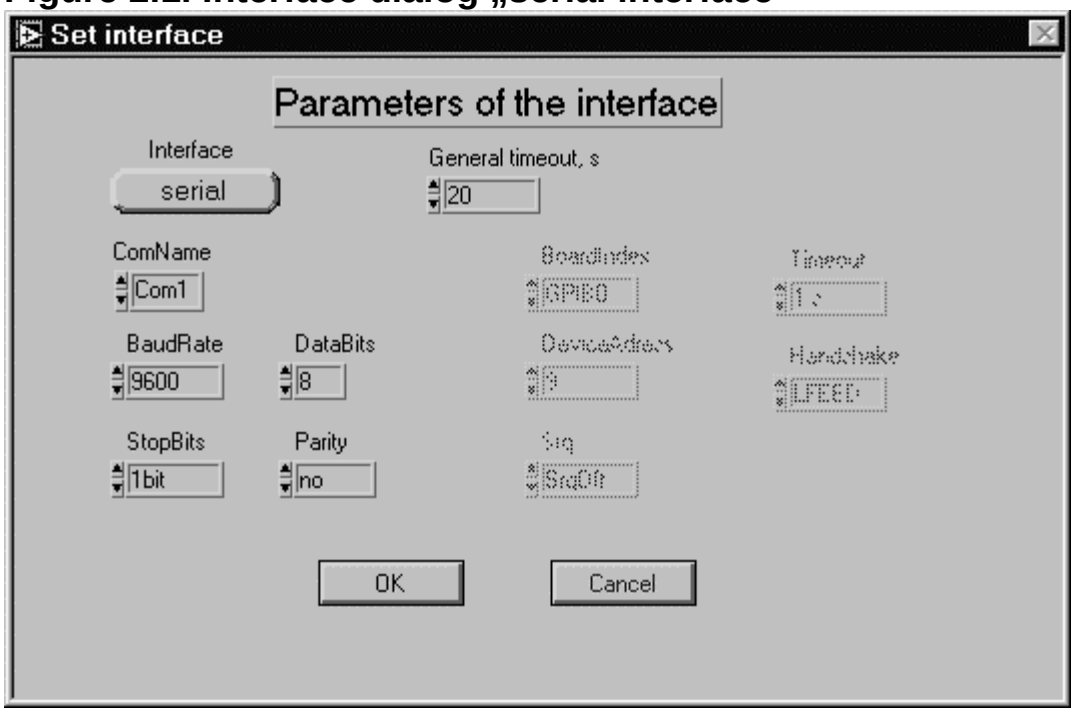

Figure 2.2. Interface dialog „GPIB interface“

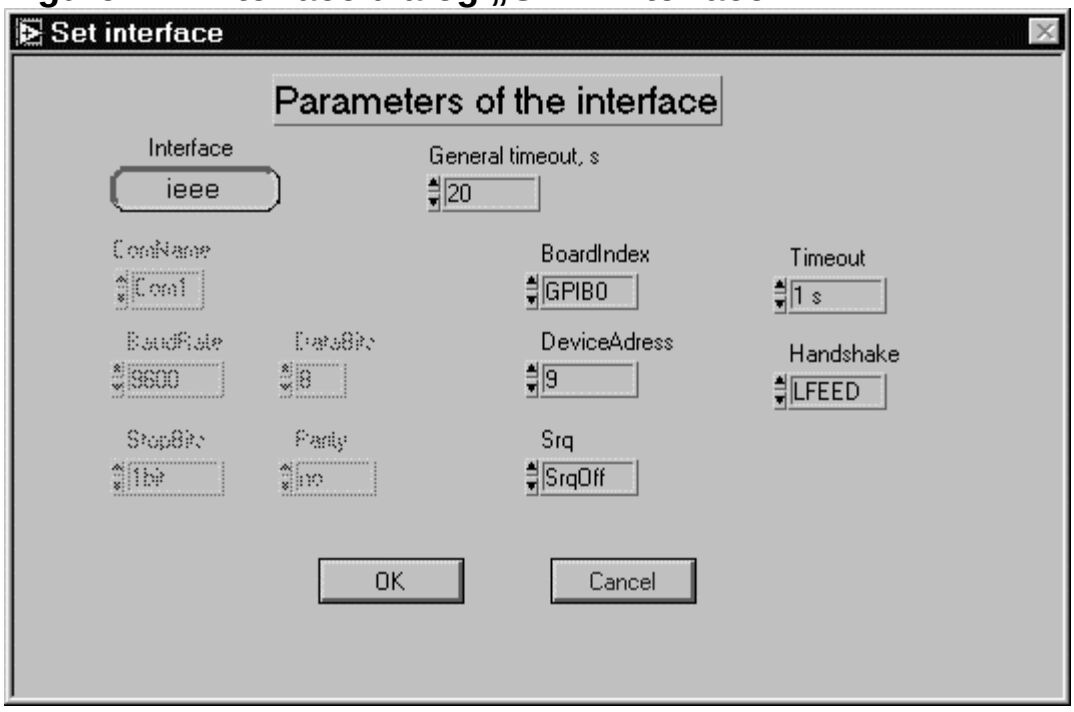

Figure 3. „Axis parameters”

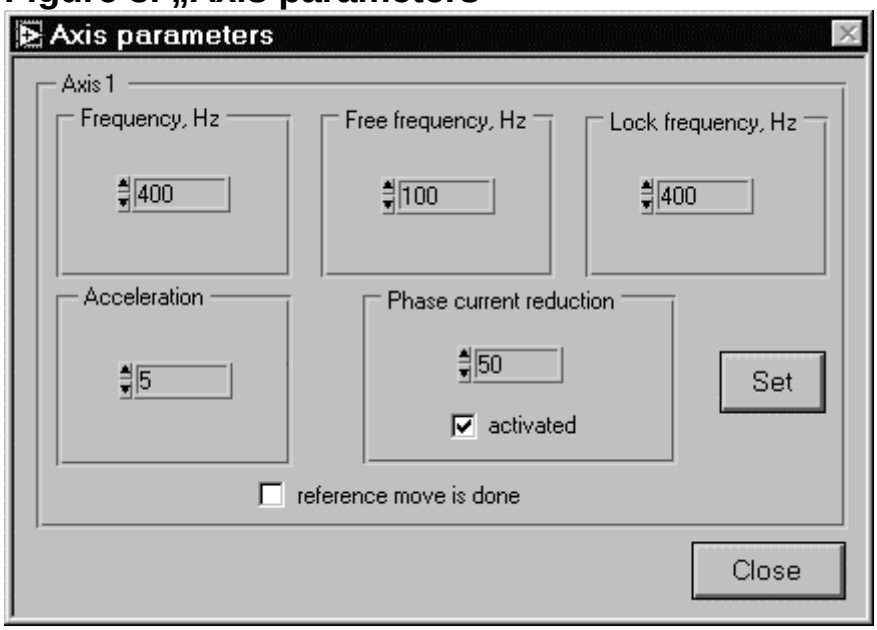

Figure 4. „Stage attributes“

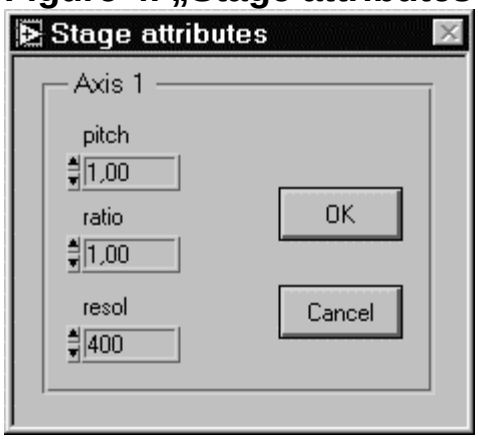

Figure 5. „Speed values“

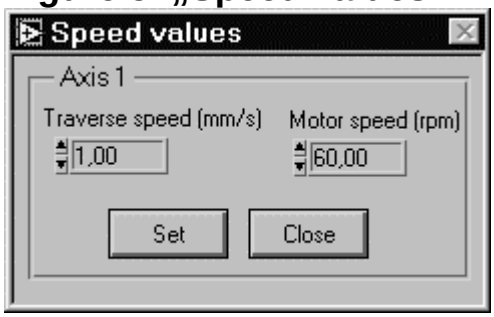

Figure 6. „Sysinfo”

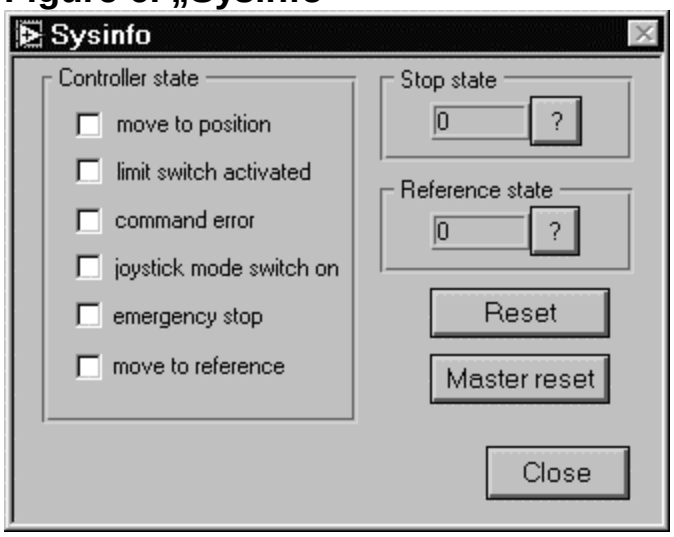

Figure 7. „Limit switches”

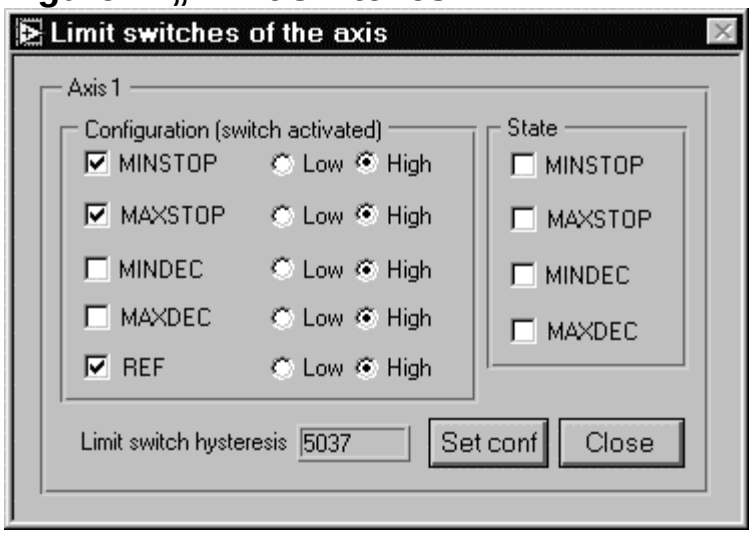

Figure 8. „Joystick control”

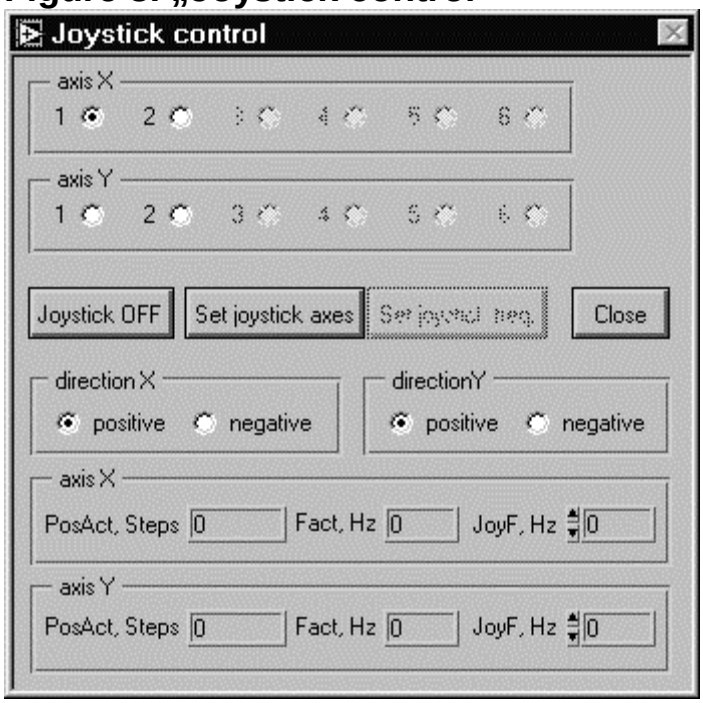

Figure 9. „Move zigzag”

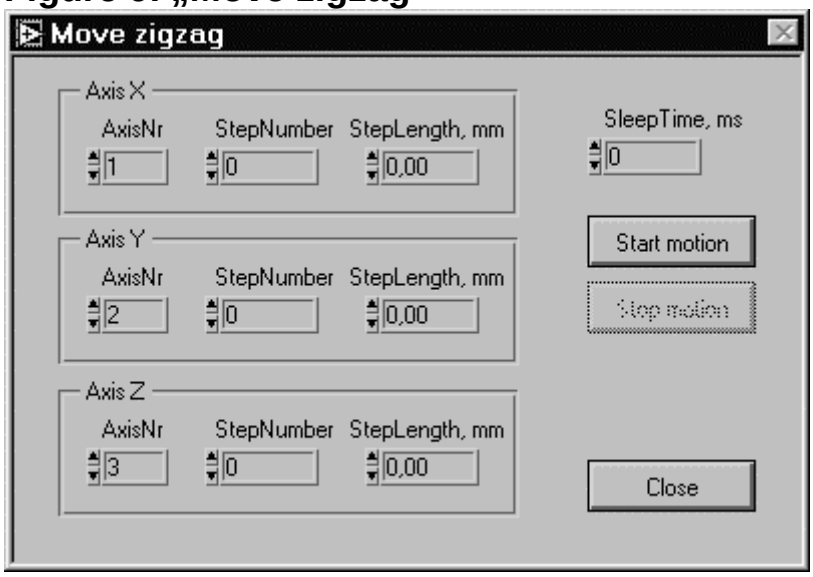
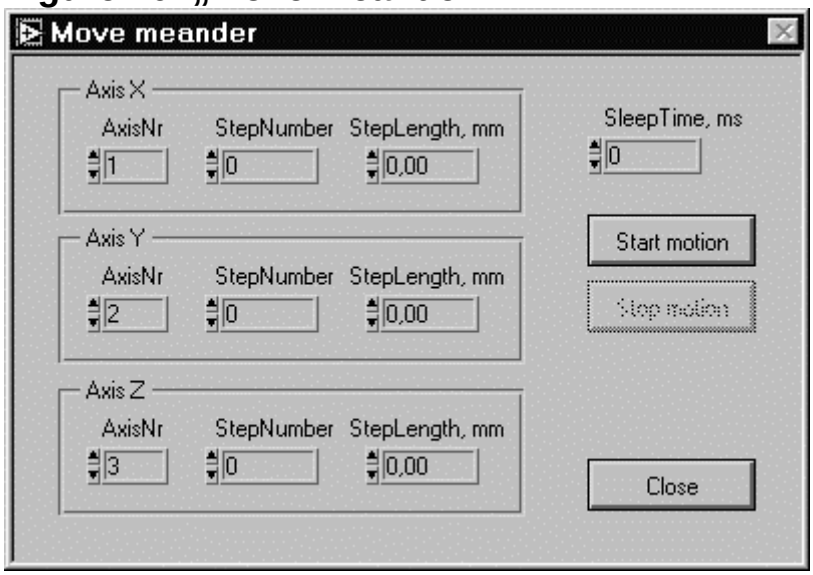
Figure 10. „Move meander”