

MDC
Motorized focal
point positioner
User Manual



Altechna

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Introduction

MDC software is installed using “MDC (ENC) Setup.exe”. After installation all you need to do is open “MDC (ENC).exe” file. This is your dedicated software for divergence control of motorized focal point positioner. Schematic explanatory picture of MDC working principle is depicted in fig. 1:

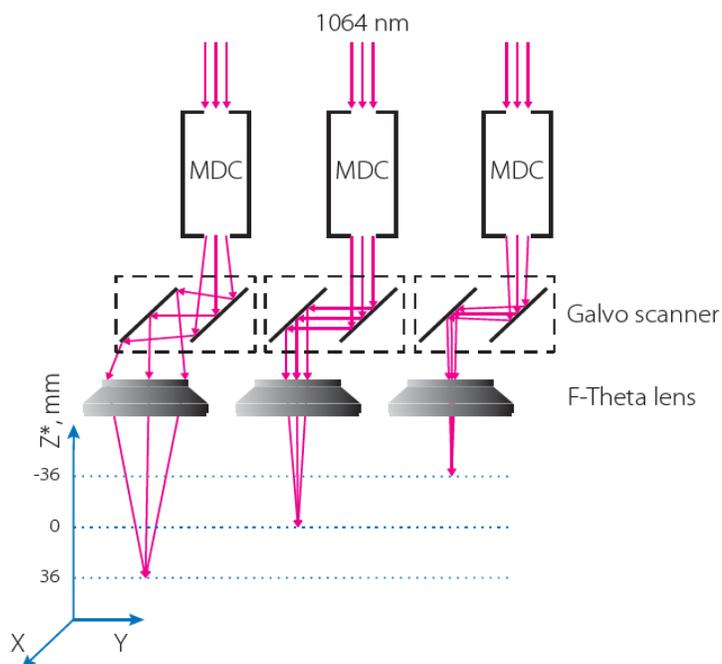


Fig. 1. Explanatory picture of MDC working principle

*using 1064 nm laser source and F=+163 mm F-Theta lens when $\varnothing 3$ mm (at $1/e^2$ intensity level) entrance beam has $M^2=1$ and 1 mrad divergence.

1. To run the software

In order to run the software, you should double click the “MDC (ENC).exe” file. Then you will be greeted by MDC selector window (see fig. 2):

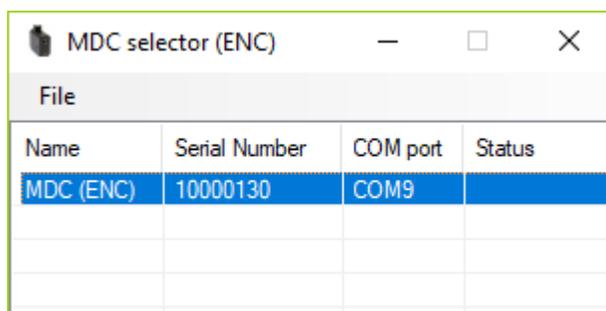


Fig. 2. MDC selector window.

You can select your device here by choosing the correct COM port.

2. Modify extremum values

MDC software was simplified and enabled to have divergence values as positions (see Fig. 4). Here you have a slider and two divergence positions: the lowest (diverging beam) and the highest (converging beam). Values are expressed in *mrad* and they highly depend on individual laser output beam parameters:

- Divergence;
- Diameter;
- Wavelength;
- M^2 .

Primary values are set for collimated 532 nm wavelength input beam with $M^2=1$. Divergence ranges for usually used setup can be found in Fig. 3:

Wavelength, nm	Focus range, mm	Divergence adjustment range, mrad
355	± 32	from -0.6 to +5.5
532	± 34	from -0.8 to +4.9
1064	± 36	from -0.9 to +4.4

Fig. 3. Beam divergence ranges using MDC device and F=+163 mm F-Theta lens when $\varnothing 3$ mm (at $1/e^2$ intensity level) entrance beam has $M^2=1$ and 1 mrad divergence.

For individual laser parameters, divergence ranges can be calculated by our engineers. Please contact our team for more information.

When ranges are known, they can be manually set by going to “Options” > “Preferences” and then entering “Divergence edge values” (see Fig. 4 and Fig. 5).

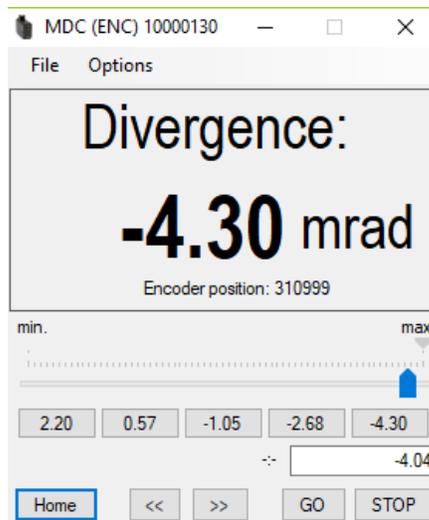


Fig. 4. MDC software main window.

After low and high values are set correctly you will be able to move to any other value in between just by entering it in the field “Enter required value” and pressing “GO”. You can also use arrows to move left or right.

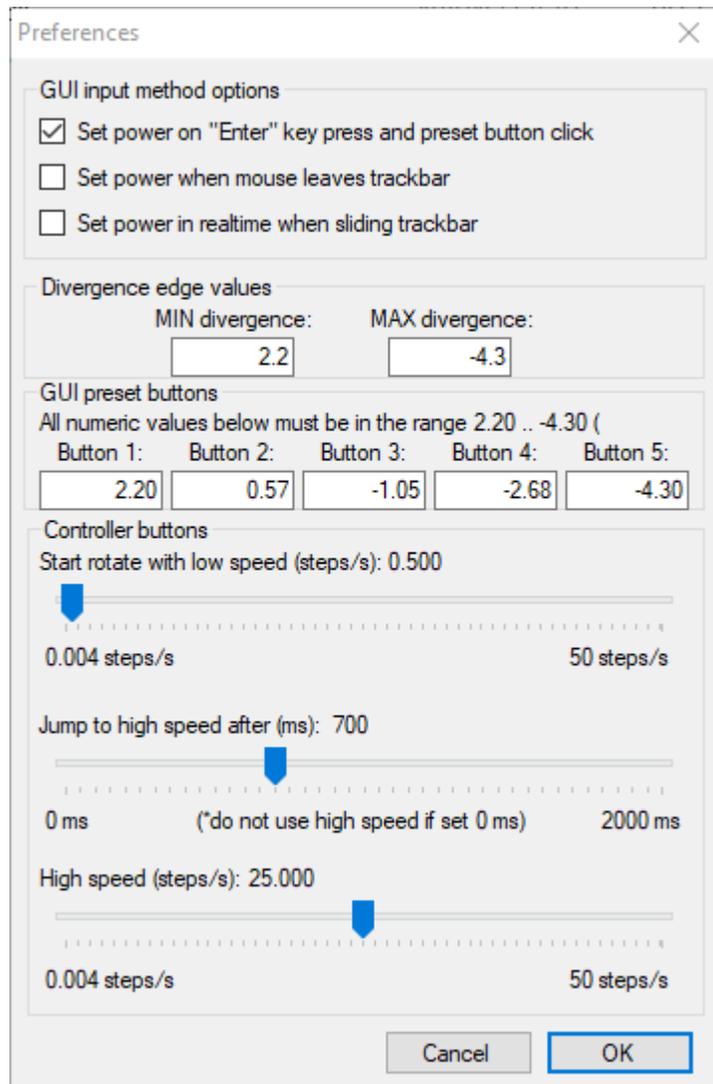


Fig. 5. Changing the extreme values in software.

In “Preferences” window you can choose button values, change speed when moving with physical buttons and change trackbar settings.

You can rename your device by going “Options” > “Rename device”.

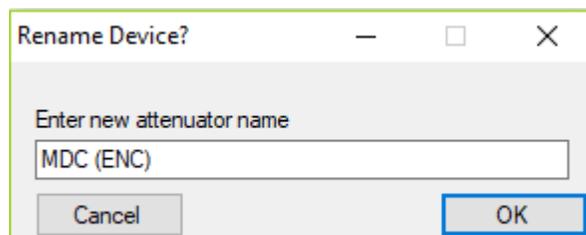


Fig. 7. Changing the name of the device.

3. Communication protocol

3.1 Protocol description

Controller can be controlled from the PC using serial connection (COM-port). COM-port parameters are fixed controller-side:

Speed:	115200 baud;
Frame size:	8 bits;
Stop-bits:	2 bits;
Parity:	none;
Flow control:	none;
Byte receive timeout:	400 ms;
Bit order:	little endian;
Byte order:	little endian.

3.2 Command execution

All data transfers are initiated by the PC, meaning that the controller waits for incoming commands and replies accordingly. Each command is followed by the controller response, with rare exceptions of some service commands. One should not send another command without waiting for the previous command answer.

Commands are split into service, general control and general information types.

Commands are executed immediately. Parameters which are set by Sxxx commands are applied no later than 1ms after acknowledgement.

Command processing does not affect real-time engine control (PWM, encoder readout, etc).

Both controller and PC have an IO buffer. Received commands and command data are processed once and then removed from buffer. Each command consists of 4-byte identifier and optionally a data section followed by its 2-byte CRC. Data can be transmitted in both directions, from PC to the controller and vice versa. Command is scheduled for execution if it is a legitimate command and (in case of data) if its CRC matches. After processing a correct command controller replies with 4 bytes - the name of processed command, followed by data and its 2-byte CRC, if the command is supposed to return data.

For more information about serial commands, command types and communication examples please see „Serial COM.pdf“.

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