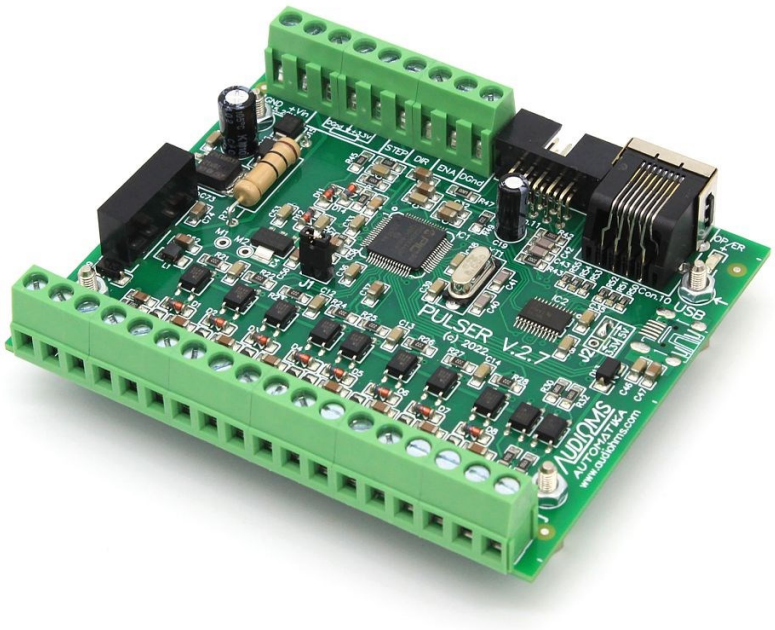
PULSER

Programmable motor motion path generator



User's manual

AUDIOMS AUTOMATIKA

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1 DESCRIPTION

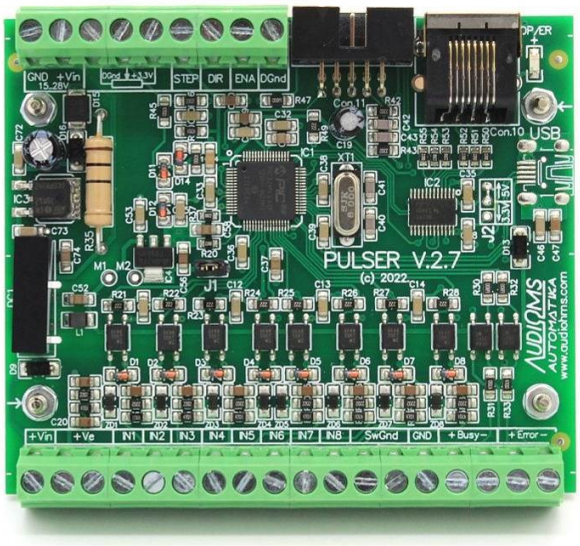

Figure 1.1 Pulser

PULSER is a programmable motion path generator/controller and it is intended for managing the execution of simple motion paths by generating STEP/DIR/ENA control signals. It is used together with the motor drive to control position of the motor (Figure 1.1).

The trapezoidal speed profile is used to generate motor motion path. This means that PULSER takes into account the set of parameters, such as: acceleration, deceleration, maximum frequency of STEP pulses, number of pulses, direction of movement, etc.

Control of the motor positioning is reduced to activating the digital input lines by means of buttons or via a basic purpose PLC.

Programming the PULSER is very easy with the free software. The programmed sequences are stored in the EEPROM memory on board microcontroller.

The selection of the programmed movement path for motor is made through one of the seven inputs for selection of the work program, inputs from IN1 to IN7. Upon the arrival of a pulse at one of the inputs for selecting the work program, the execution of the program is started and the "Busy" output is activated. The pulse can be generated by an external button or by an external PLC. When the program is finished, the “Busy” output is deactivated. In this way, PULSER signals that it has completed the execution of the program and is ready for the next activation of one of the programs.

If an error occurs during the execution of the program, the generation of control pulses is interrupted, that is, the motor driver will stop. In this case, the “Error” output will be activated and the “OP/ER” LED will flash.

2 TECHNICAL SPECIFICATIONS

Function	Description
Number of digital inputs	8 optoisolated inputs - 7 inputs for generation of motion paths sequences - 1 ALL STOP input All digital inputs are for +24V logic level
Number of analog inputs	1
Analog input range	0 – 3.3 V
Number of control axis	1
Type of output signals	STEP, DIR and ENABLE
Output signal level	TTL
Maximum STEP signal frequency	500 kHz
Number of status outputs	2 (Error and Busy)
Type of status outputs	Optoisolated, open collector
Power supply	8 – 24 VDC / 100 mA (reverse polarity protection)
Dimensions	100 mm x 80 mm x 30 mm
Weight	~ 70 g

NOTE: Shown specifications are subject to change without prior notice

3 AVAILABLE CONNECTORS AND PULSER CONNECTION

Figure 3.1 shows connectors position on Pulser. For programming the Pulser, it is recommended to use the isolation interface for programming IPI-USB, which is connected to the Pulser via the programming port (Figure 3.1), and to the PC via the USB connector.

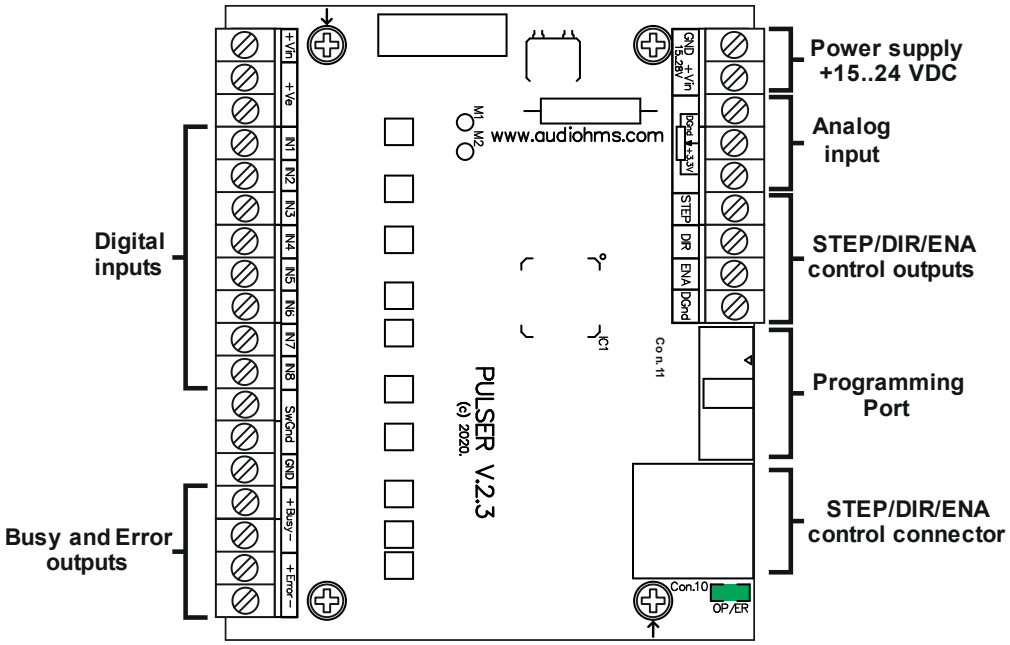

Figure 3.1 Available connectors on Pulser and their function

Figure 3.2 and Figure 3.3 provide recommended Pulser wiring diagrams.

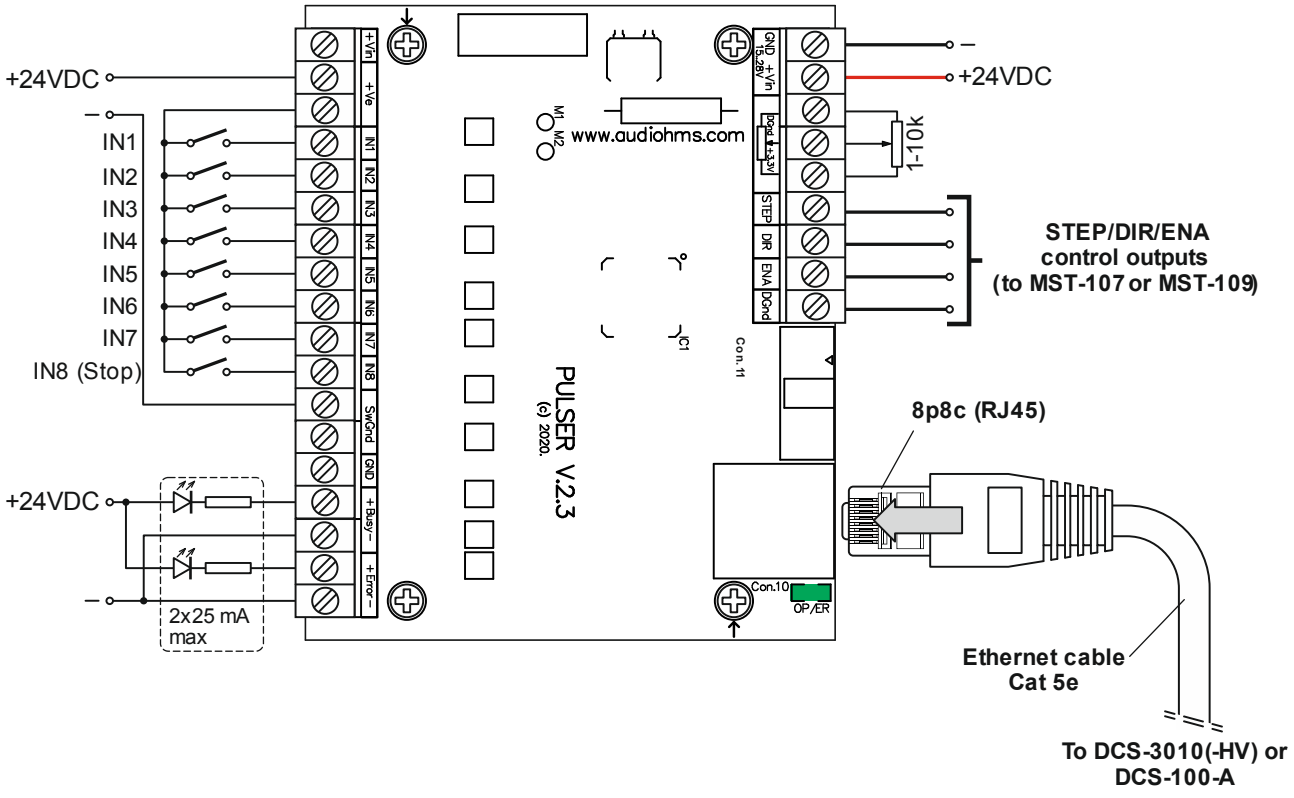

Figure 3.2 Recommended wiring diagram for the case of opto-isolated input lines (IN1 – IN8)

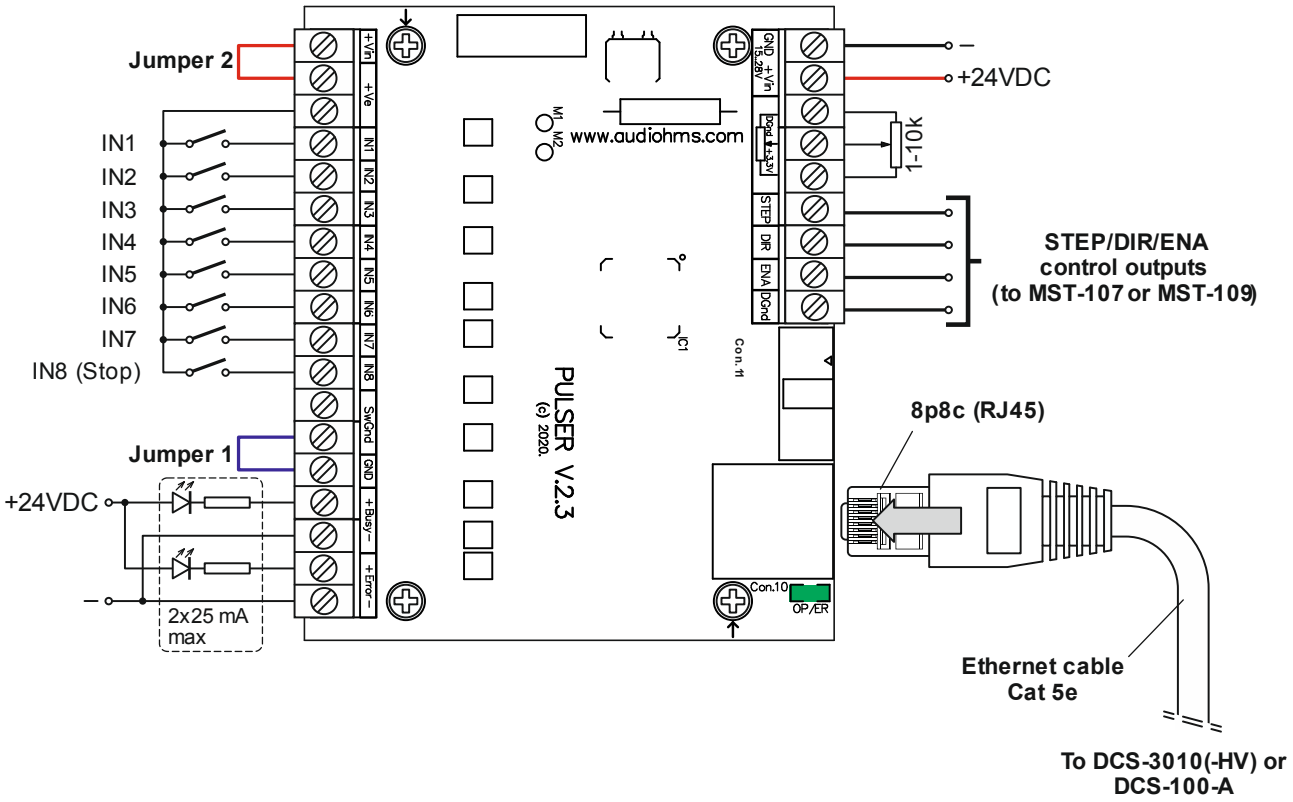

Figure 3.3 Recommended wiring diagram for the case when the input lines (IN1 - IN8) are powered directly from the Pulser power line

IMPORTANT NOTE: It is necessary to place jumpers J1 and J2 in their positions

LED indicators on Busy and Error lines is optional.

4 CONFIGURATION SOFTWARE

The configuration software is used to define the programs that are assigned to the active keys IN1-IN7. The selection of available programs is classified into tabs – groups of choices (Figure 4.1):

- Switch function,
- Analog speed control,
- Inc/Dec control and
- Jog with speed control.

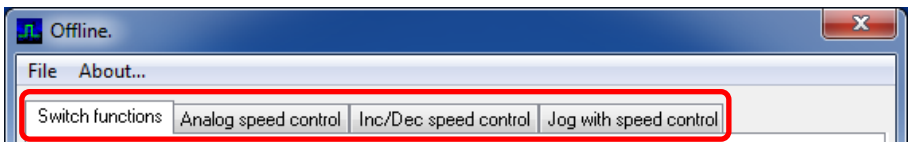

Figure 4.1 Available tabs for program selection

Programming of the PULSER is done using Windows configuration software which is available for free on www.audiohms.com. For programming, you need to connect the computer and the PULSER with a standard USB A/B cable, which is used to connect a computer and a USB printer. After programming the PULSER, the connection to the PC is no longer needed and the PULSER can work independently. The PULSER configuration is stored on onboard microcontroller EEPROM memory.

4.1 Choice “Switch function”

The **Switch function** group (Figure 4.2 – Switch function tab) provides the possibility that each of the seven program selection inputs, IN1-IN7, can be independently associated with any of the following programs:

- Go,
- Go&Return,
- Go while pressed,
- Go until stop,
- Go until limit and
- Go between limits.

The eighth input IN8 (Stop) is used to stop the program that is currently being executed.

Each of the inputs can be activated independently. If the execution of the previously activated program is in progress, PULSER will not accept the activation of the next program.

It is possible to realize from one to seven movement programs. If the user only needs one program, he will configure and activate only one input. If it needs two programs, it will configure and activate two inputs, etc.

4.1.1 Program “Go”

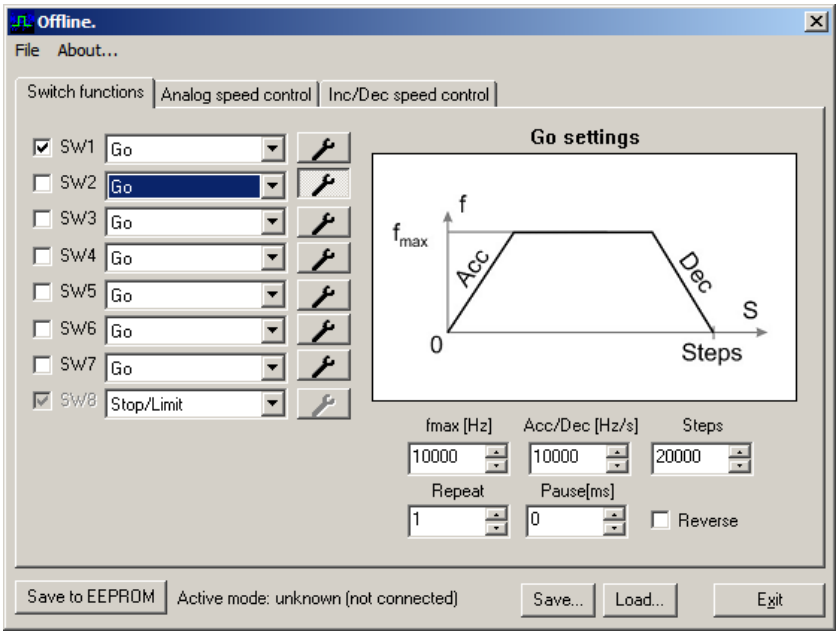

Figure 4.2 Adjustments for program “Go”

Program “Go” (Figure 4.2) is used to generate the desired number of STEP pulses. Upon arrival of the activation signal on input, STEP and DIR control signals are generated. Parameters that could be adjusted are: Acceleration, deceleration, maximum pulse generation frequency, direction of rotation, total number of generated steps, number of repetitions and duration of pause between repetitions.

4.1.2 Program “Go&Return”

The “Go&Return” program generates an exact number of STEP pulses in one and then in the other direction of rotation (Figure 4.3).

Upon the arrival of the input control signal, STEP pulses are generated to one direction, a pause is made and the generation of control STEP pulses to the opposite direction is continued. Acceleration and deceleration, the total number of generated steps in one direction, the duration of the pause, the total number of generated motor steps in the opposite direction, the maximum frequency of generation of STEP pulses during movement in one or the opposite direction, the number of repetitions and the duration of the pause between repetitions are set.

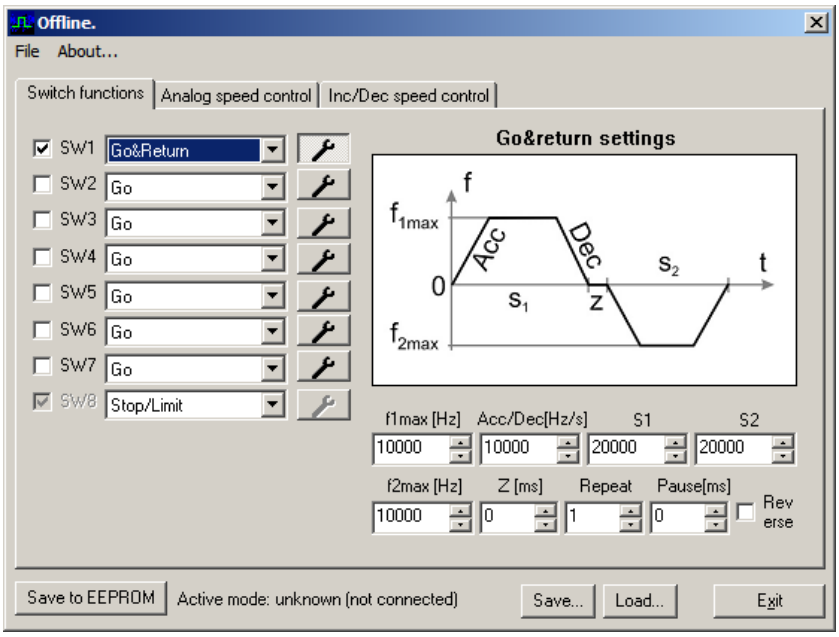

Figure 4.3 Adjustments for program “Go&Return”

4.1.3 Program “Go while pressed”

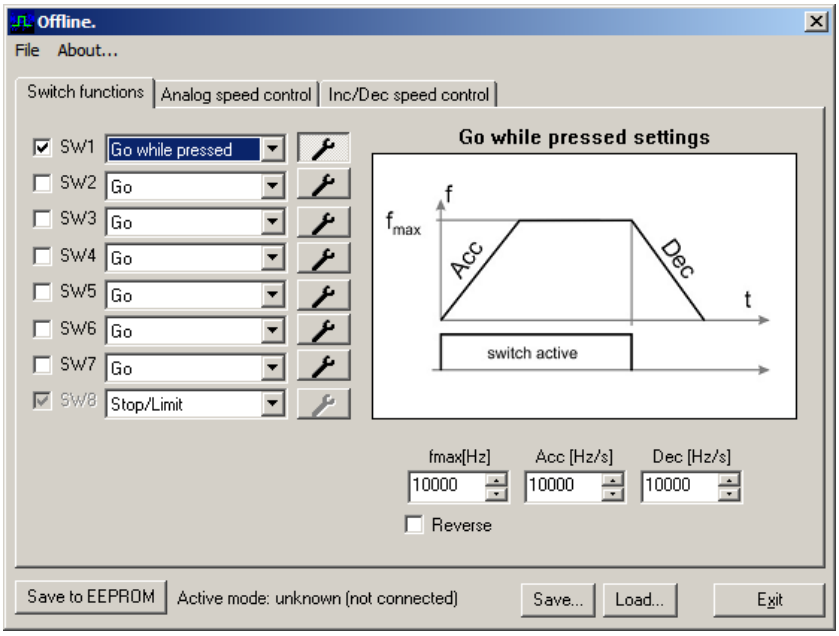

Figure 4.4 Adjustments for program “Go while pressed”

The “Go while pressed” program (Figure 4.4) generates STEP pulses as long as a positive voltage is present at the program selection control input. Acceleration, deceleration, direction of rotation and maximum frequency of STEP pulse generation are set.

4.1.4 Program “Go until stop”

If the “Go until stop” program is selected, when a positive pulse arrives at the selected control input, the STEP pulses is generated until a positive pulse is applied to the IN8-STOP input (Figure 4.5). After that, the generation of STEP pulses slows down. Acceleration, deceleration, direction of rotation and maximum frequency of STEP pulse generation are parameters to be set.

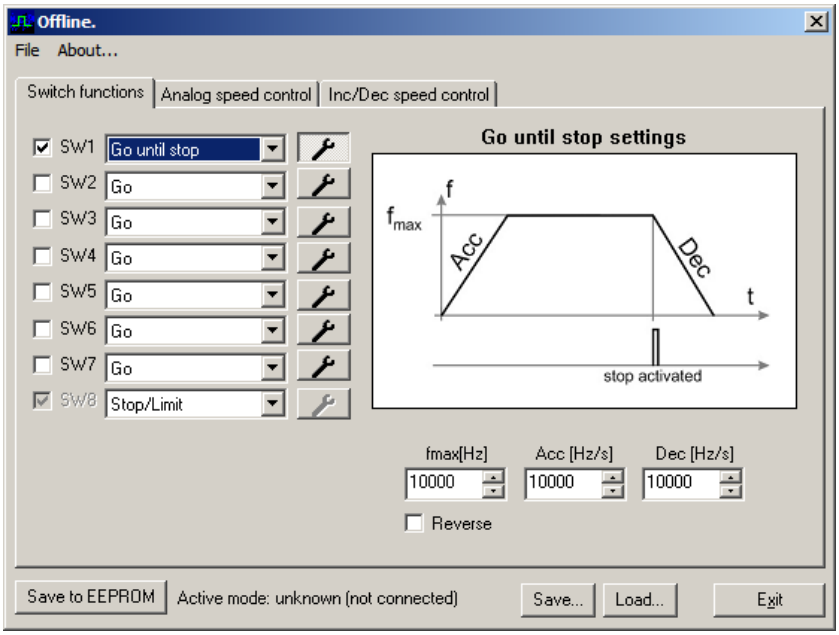

Figure 4.5 Adjustments for program “Go until stop”

4.1.5 Program “Go until limit”

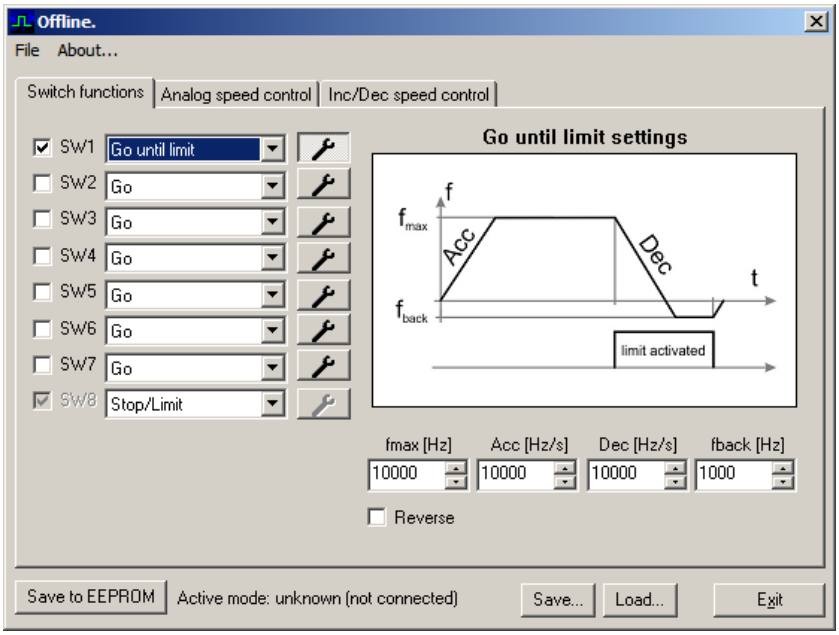

Figure 4.6 Adjustments for program “Go until limit”

The “Go until stop” program (Figure 4.6) is suitable motor referencing – taking the starting position. The limit switch is connected to the input IN8-STOP. When a positive pulse appears at the program selection input, a control STEP pulses are generated in one direction until the limit switch is activated. After that, a STEP pulses are generated in the opposite direction until limit switch is deactivated when motor decelerates and stops. Acceleration, deceleration, direction of rotation, maximum frequency of generation of STEP pulses in one direction and in the opposite direction are parameters to be set.

4.1.6 Program “Go between limits”

The "Go between limits" program generates STEP pulses after activating the input on which the mentioned program is selected (in this case, SW1 – Figure 4.7). The maximum frequency, the acceleration/deceleration value, as well as the limit switches that lead to a change in the direction of rotation (in this case, SW2 and SW3) are set.

It is also possible to change the movement speed between the two limit switches using a potentiometer. In order to ensure this, it is necessary to select the "Manual speed" option, after which the field fmin [Hz] becomes active, in which it is possible to set the minimum value of the movement speed.

Stopping the movement is achieved by activating the STOP switch at input SW8.

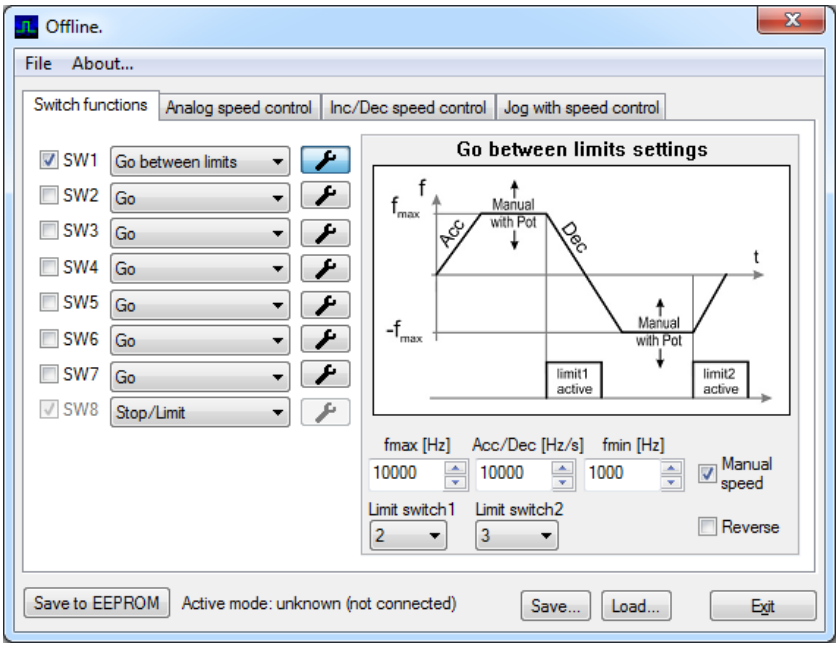

Figure 4.7 Adjustments for program “Go between limits”

4.2 Program “Analog speed control”

The “Analog speed control” mode is available by selecting the corresponding tab in the configuration software (Figure 4.8).

When a positive pulse appears at the program selection input (Start switch - Figure 4.8), the control STEP pulses are generated, where the frequency of the pulse depends on the voltage level at the analog input of the Pulser and the set of parameters. The maximum frequency of STEP pulse generation, acceleration/deceleration, Threshold zone, the input that activates movement and the initial direction of rotation are parameters to be set.

The recommended way to generate an analog signal is via a potentiometer. Figure 3.2 shows the position of connectors for wiring the potentiometer to the Pulser.

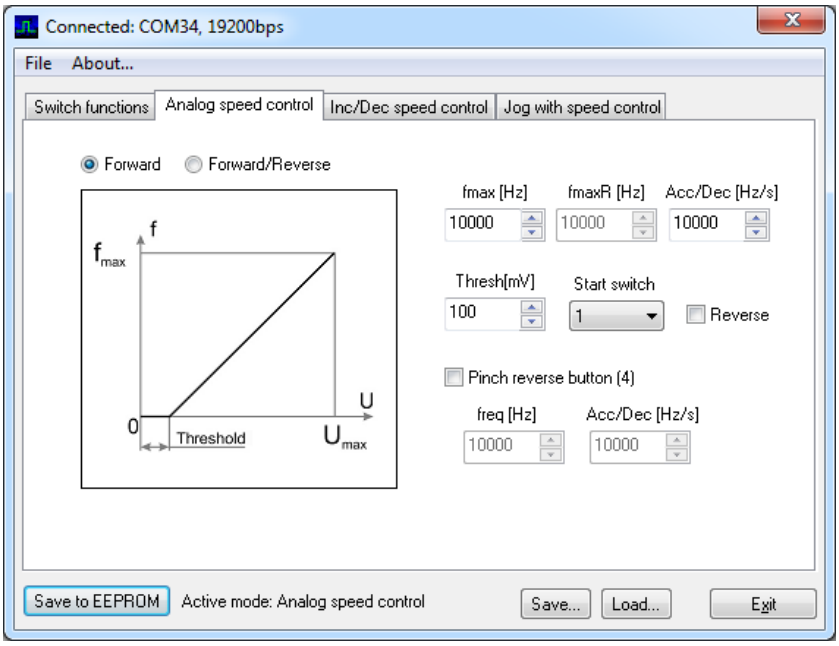

Figure 4.8 Parameter settings for “Analog speed control” – Forward

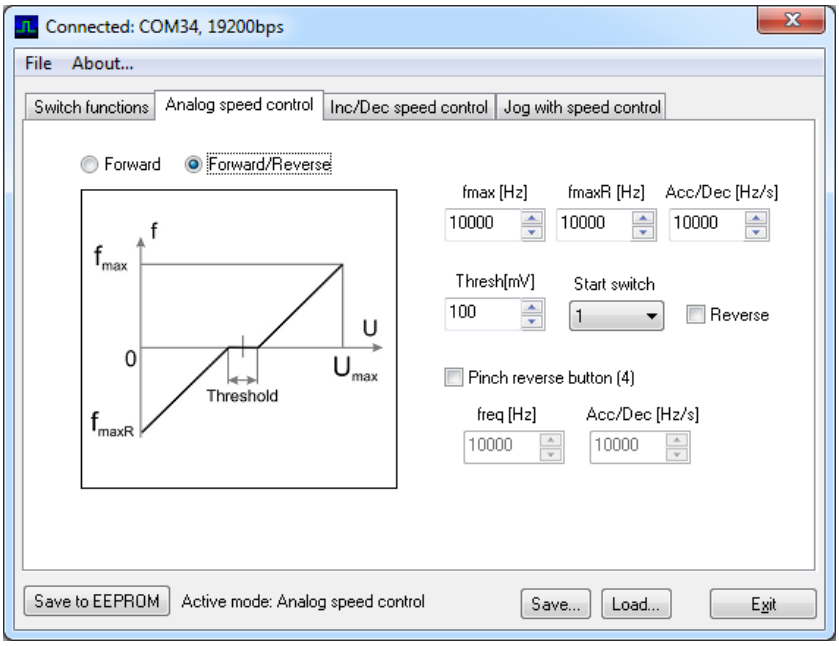

Figure 4.9 Parameter settings for „Analog speed control“ – Forward/Reverse

The “Analog speed control” program provides the option of turning the engine in one direction (Forward – Figure 4.8) or in both directions (Forward/Reverse – Figure 4.9).

4.3 Program “Inc/Dec speed control”

The “Inc/Dec speed control” program is available in the associated tab selection in the configuration software (Figure 4.10). In this operating mode, the digital inputs for Start (IN1), Increment (IN2), Decrement (IN3) and Stop (IN8) are fixed. The dialog gives the possibility to set: the maximum frequency of STEP pulses, the increase (increment) of the number of revolutions, the initial frequency of STEP pulses, as well as the acceleration/deceleration during the change of the frequency of STEP pulses. It is possible to set whether the motor will turn in one direction (Forward) or in both directions (Forward/Reverse).

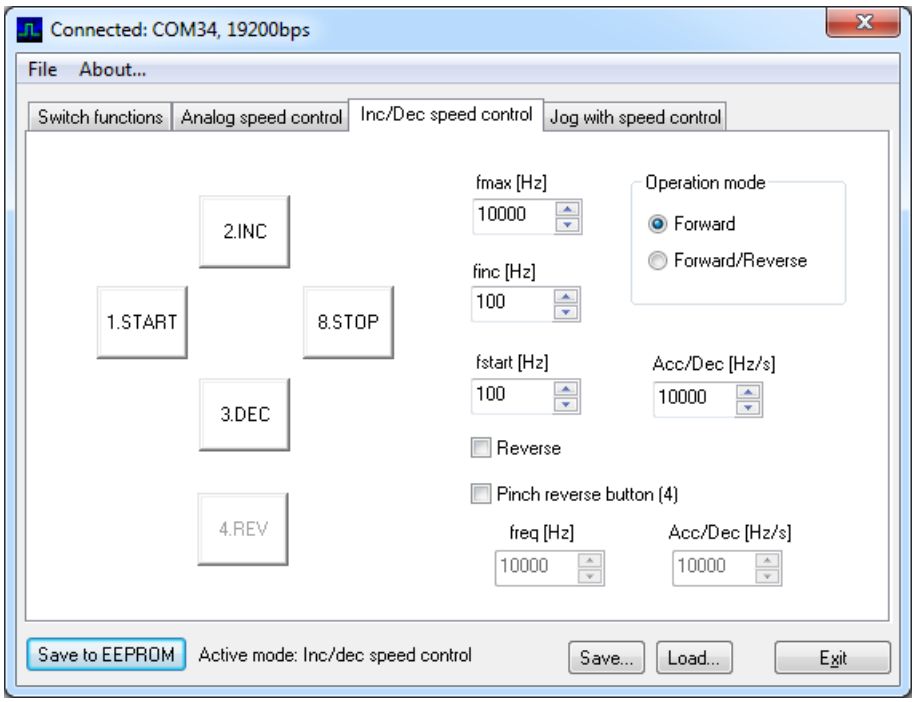

Figure 4.10 Parameter settings for “Inc/Dec speed control” mode

4.4 Program “Jog with speed control”

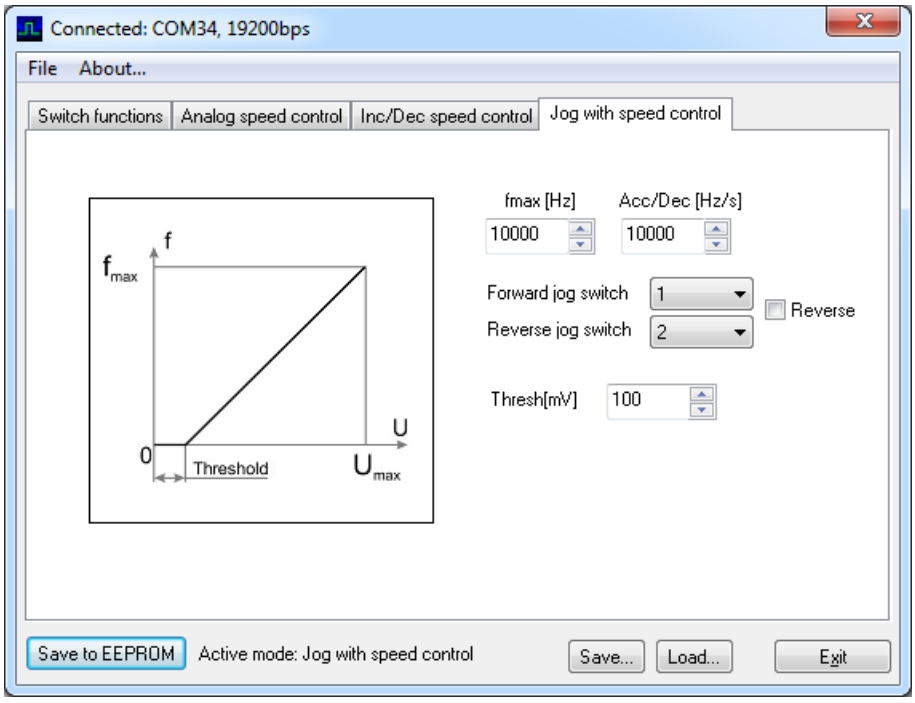

Figure 4.11 Parameter settings for “Jog with speed control” mode

“Jog with speed control” control mode (Figure 4.11) is similar to the Jog mode on CNC machines. The motor is started via two buttons (first for one direction and second button for the other direction), while the movement speed is defined via an analog input (potentiometer).

The dialog gives the possibility to set: maximum frequency of STEP pulse generation, acceleration/deceleration during the change of STEP pulse frequency, selection of inputs that will activate the movement of the motor in one or the other direction, as well as the inactive zone (Threshold) of the analog input.

DOCUMENT REVISION:

- Ver. 1.0, December 2023, Preliminary version
- Ver. 2.0, June 2024, Added Program “Go between limits”, as well as the ability to configure multiple limit switches