Operating Instructions

Oscillator Module

osc200

General description:

The oscillator module is mainly used in applications where simple motion profiles must be realized most cost efficiently. A PLC interface was implemented for the use in a wide range of applications. 6 inputs and 2 outputs (24V) are available to control each of the functions. The power drive interface features besides the pulse and direction output (for stepping motor drives) also a +/-10V interface (for servo drives). Two standard functions: "Ramp generator" and "Oscillator function" are available. In most of the applications the oscillator module is mounted open inside the user device.

Product features:

- **6 control inputs 24V/10mA, optically isolated**
  Status display via LEDs
- **2 control outputs 24V/Ri=220Ω, optically isolated**
  Status display via LEDs
- **Only one single 21...80 Volt operating voltage required**
- **All adjustments via multiple turn potentiometers**
- **All wiring connections via robust screw terminals**

Location of the control elements:

- Operating mode: Ramp generator:
  Settings:
   Min/max. frequency   (stepping motors)
   Control voltage min/max (AC, DC-Servo)
   Ramp gradient
  Inputs:
   Ramp-up(start), ramp-down, stop,
   Fast/slow, left, right
  Outputs:
   Min speed, max. speed reached

- Operating mode: Oscillator function
  Settings: Pulse frequency per Volt
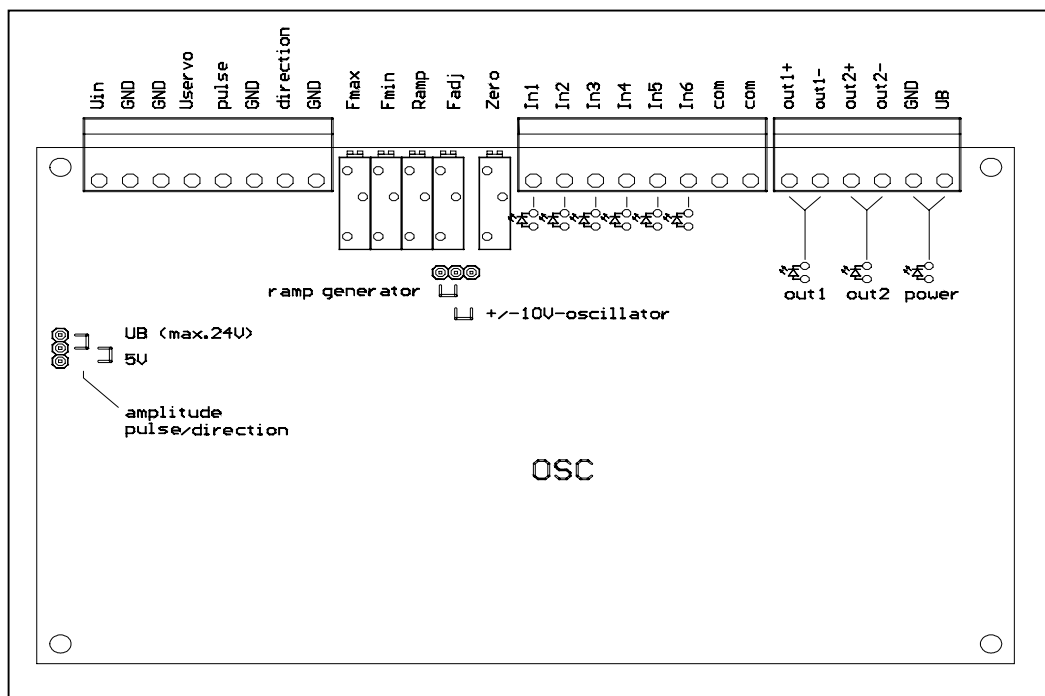 *Inputs:*   +/-10V, limit switch left/right
  Outputs: Pulse, direction
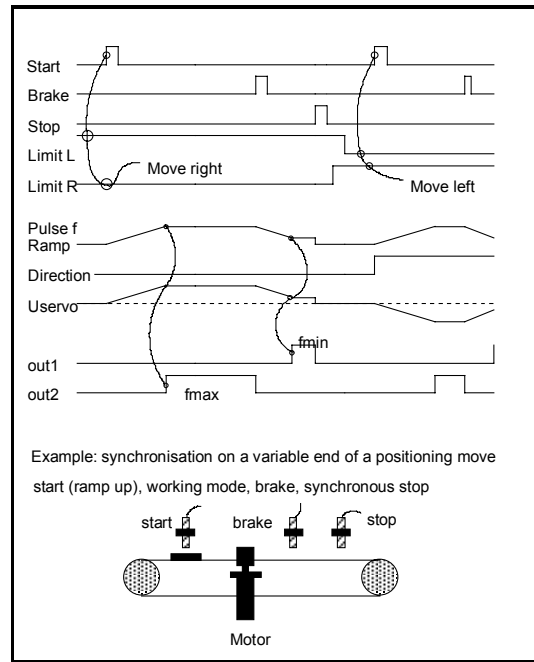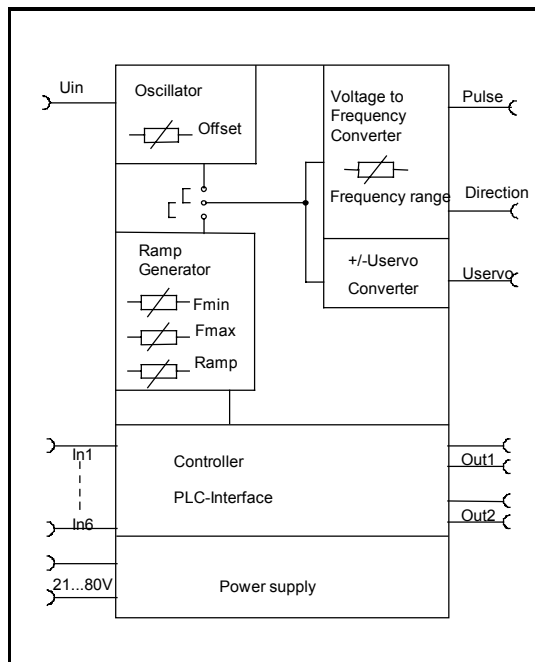   No pulse output while on limit switch

Options:
- 5V power drive signal interface
- Mounting in a top hat rail housing
- Customized control functions

Block diagram

Example: synchronisation on a variable end of a positioning move

start (ramp up), working mode, brake, synchronous stop

Operating mode: Ramp generator

Wiring diagram
Function: Ramp generator

Signal description

start: opto coupler input
An impulse (activating the opto coupler) initiates the ramp-up. The pulse frequency is increased linearly to the upper limit set with the potentiometer ''Fmax''. At the same time the amplitude of the +/-10V-NC-output signal is increased accordingly. With the potentiometer ''ramp'' the speed increase (acceleration) is adjusted. The up ramp can also be initiated while braking.

slow/fast: opto coupler input
If this input is active at the start moment, there is no ramp- up to the upper limit but an output of the minimum value. This creep speed is beneficial for reference moves or for exact positioning moves near a target position.

slowd: opto coupler input
A pulse initiates the deceleration ramp. The pulse frequency and the +/-10V-NC-output signal are reduced to a minimum that can be set with the potentiometer ''Fmin''.
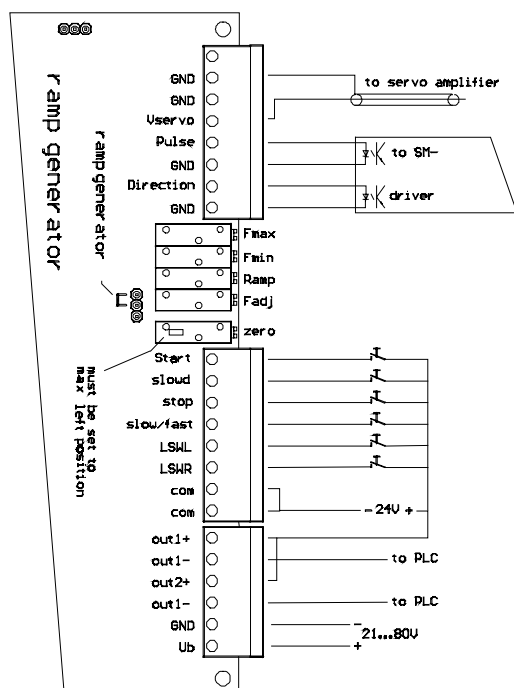
stop: opto coupler input
Activating the stop inputs interrupts any movement immediately, independently of the currently active operating mode.

LSWL: Opto coupler input
An active input signal sets the right direction. No move can be started if both "lswl" and "lswr" are active.

LSWR: Opto coupler input
An active input signal sets the left direction. No move can be started if both "lswl" and "lswr" are active.

com:
Common 0-Volt (Ground) connection for all opto coupler inputs.

out1+ out1-:   Opto coupler output
The output "out1" is active when reaching the "min. speed" condition. The output is not active in a "Stop" condition.

out2+ out2-:   Opto coupler output
The output "out2" is active when reaching the "max. speed" condition. The output is not active in a "Stop" condition.

pulse: Transistor output, active high/low
Pulse signal for all common stepping motor power drives. The signal is symmetrical. Multiple power drives inputs can be connected in parallel.

direction: Transistor output, active high/low
Direction signal for all common stepping motor power drives. The signal is symmetrical. Multiple power drives inputs can be connected in parallel.

Uservo: Analog output signal +/-10Volt
Besides the stepping motors also servo drives equipped with standard +/-10 Volt DC interface can be operated. A negative analog output signal means left speed. The movement function is identical to the one of stepping motors.

GND:
Common 0-Volt (Ground) connection

UB: Supply voltage
The oscillator module can be operated with a wide supply voltage range of 21...80 Vdc. Because of this feature it is possible to operate the module with the power drive supply voltage.

Settings

! The jumper "ramp generator" must be present

Amplitude for pulse/direction:
When setting the jumper to "5V" the signal level of the pulse and direction output signal is within 5V.

The pulse and direction output is operated with the supply voltage if the jumper is in position "Ub". This is beneficial in a 24V environment.
! Warning
Higher voltages can destroy the pulse and direction output drivers.

Fmax:
The max. speed is set with the potentiometer "Fmax". A smaller value than "Fmin" is not valid.

Fmin:
The mix. speed is set with the potentiometer "Fmin". A higher value than "Fmax" is not valid. The adjustable speed range goes down to zero.

ramp:
Adjustment of the ramp gradient (time of the speed change).

Fadj:
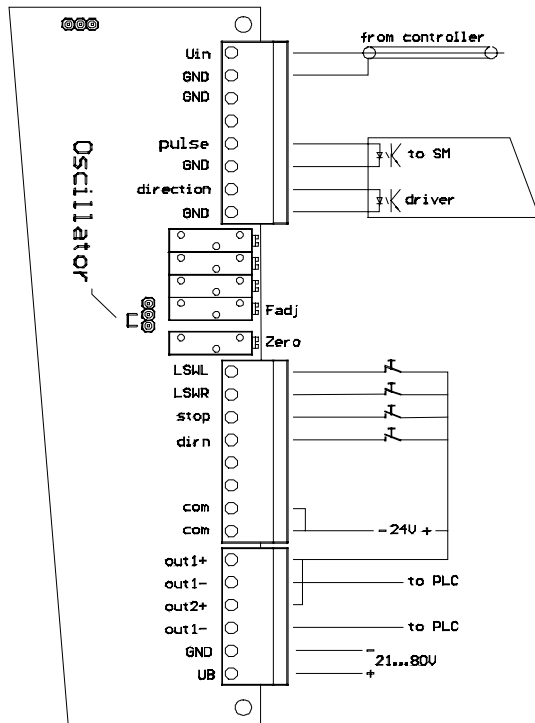The max. setting of the "Fmax" stepping frequency can be adjusted with "Fadj" to a defined value.

Zero point: ! !
In the operating mode ramp generator the potentiometer "Zero point" must be turned all the way to the left limit.
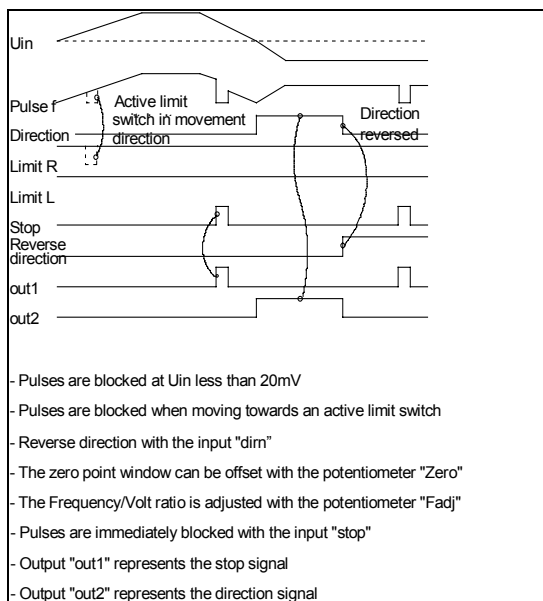
Operating mode: Oscillator

The output pulse frequency and the direction signal output are set according to the analog input voltage at Uin.

Wiring diagram

Function: Oscillator

- Pulses are blocked at Uin less than 20mV

- Pulses are blocked when moving towards an active limit switch

- Reverse direction with the input "dirn"

- The zero point window can be offset with the potentiometer "Zero"

- The Frequency/Volt ratio is adjusted with the potentiometer "Fadj"

- Pulses are immediately blocked with the input "stop"

- Output "out1" represents the stop signal

- Output "out2" represents the direction signal

Signal description

Uin:
With Uin the analog speed is set, which is then transformed into a corresponding pulse and direction signal. The transforming function is linear. The pulse output is blocked for input voltages less than 20mV to get an exact stop. A negative input voltage inverts the direction signal

pulse: Transistor output, active high/low
Pulse signal for all common stepping motor power drives. The signal is symmetrical. Multiple power drives inputs can be connected in parallel.

direction: Transistor output, active high/low
Direction signal for all common stepping motor power drives. The signal is symmetrical. Multiple power drives inputs can be connected in parallel.

LSWL: Opto coupler input
Works as a left limit switch.(NC). If input is active (no current) a move towards the left limit switch is interrupted immediately.

LSWR: Opto coupler input
Works as a right limit switch.(NC). If input is active (no current) a move towards the right limit switch is interrupted immediately.

dirn: Opto coupler input
An active input inverts the direction

stop: Opto coupler input
An active stop signal interrupts the move immediately.

com:
Common 0-Volt (Ground) connection for all opto coupler inputs.

out1+ out1-   Opto coupler output
The output "out1" is active if the input "stop" is active.

out2+ out2-   Opto coupler output
The output "out2" indicates the direction of the motor.

GND:
Common 0-Volt (Ground) connection

UB: Supply voltage
The oscillator module can be operated with a wide supply voltage range of 21...80 Vdc. Because of this feature it is possible to operate the module with the power drive supply voltage.

Settings

! The jumper "+/-10V-oscillator" must be present

Amplitude for pulse/direction:
When setting the jumper to "5V" the signal level of the pulse and direction signal is within 5V.

The pulse and direction output is operated with the supply voltage if the jumper in position "Ub". This is beneficial in a 24V environment.
! Warning
Higher voltages can destroy the pulse and direction output drivers.

Fadj:
The stepping frequency can be adjusted to a specific value for a defined input voltage Uin with "Fadj".

Zero:
With the potentiometer "Zero" it is possible to set the speed to zero, although a voltage is connected to Uin. In this case where Uin is zero a speed is already set.

Technical specifications

Supply voltage Ub:
Range:	21...80Volt (DC)
Current consumption:	approx. 50mA
Reverse polarity proof	

Analog input voltage Uin:
Range:	-10V...+10V
Input resistance :	10kΩ
Over voltage protection	50V continuously
	80V < 1 second

Analog output voltage Uservo:
Range:	-10V...+10V
Output resistance:	<100mΩ
Load current:	< 10mA
Overload protection and short circuit protected	

Pulse/direction output:
Max. switching voltage:	Ub < 30V
Max. switching current:	< 100mA
Internal resistance:	< 13Ω PTC
Signal level /10mA	1.35V...Ub-0,8V
Rise time:	> 10V/ys
Actively switching to ground and plus	
Partially short circuit protected	

Movement parameters: (approx. values)
Fmin:	0... 5kHz
Fmax:	2...20kHz
Ramp:	1Hz/ms...1kHz/ms
Oscillator:	20kHz @ 10V Uin
Fadj:	Factor 1...3 times

Opto coupler inputs:

Signal interface 24V:	Standard
Range:	18V...28V
Input current:	6,5...11mA
Delay time:	< 1ms
Reverse polarity protection	
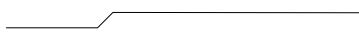
Signal interface 5V	
Range:	4,2V...6,0V
Input current:	1,0...10mA
Delay time:	< 1ms
Reverse polarity protection	

Opto coupler outputs:
Max. switching voltage:	30V
Ri:	220Ω
Saturation voltage/1mA	1,2V
Switching current:	< 100mA
With "out+" at 24V	"out-" switches to plus
with "out-" an "com"	"out+" switches to "com"
Outputs fully galvanically isolated	
Partially short circuit protected	

Signal timing

All control inputs ready before "start" > 100ys

Start:
Control input:

Board dimensions:
Without top hat rail module:	160x100x22

Versions, ordering numbers :
osc200.0xx	Function: ramp generator
osc200.1xx	Function: oscillator
osc200.x0x	Signal interface 5 Volt
osc200.x1x	Signal interface 24 Volt
osc200.xx0	Standard, board to be mount
osc200.xx1	into the top hat rail module