Prevac sp. z o.o.

# Manipulator service book

Version 0.1 alpha





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# **USER MANUAL**

# Manipulator

service book

Rev. 1 May 2017

## **Precision and Vacuum Technology**





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## 1 Hardware

### 1.1 Check SMCD driver

#### 1.1.1 Warning

- Axis X and Axis Y are example
- We assume that axis X line is fully functional mean: motor, cables, manipulator, smcd
- We need to diagnose SMCD for axis Y

#### **1.1.2** To check SMCD driver take the following steps:

- 1. Before start please read all points, if you are not sure how do that, please let us know.
- 2. Remember where are currently connected all the SMCD cables for axis X and axis Y. (communication, encoder, motor, limit switch).
- 3. If it is possible unmout X motor from Manipulator, after this place it on the table.
- 4. Unplug SMCD cables for axis Y from the backside of the rack(motor, encoder, communication, limit switch).
- 5. Unplug SMCD cables for axis X from the backside of the rack(motor, encoder, communication, limit switch).
- 6. Plug in SMCD cables for axis X to SMCD driver for axis Y (motor, encoder, communication, limit switch).
- 7. Try to move axis Y using Manipulator Software. (Section intended for Y axis)
  - If motor is moving, then it means that SMCD for axis Y work properly.
  - If motor is not moving, then it means that SMCD for axis Y is probably configured wrongly for the X motor, please let us know about that.
- 8. After this please connect the wires in the as it was on the beigning of the procedure (point 1).

### 1.2 How addressing SMCD devices

#### 1.2.1 Warning

- How to address SMCD devices connected to one RS485 cable.
- We consider the case where we have 4 axes (X, Y, Z, R1).



Figure 1.1: Example SMCD Hardware Configuration

• The MOXA COM port is configurate properly, Interface should be RS485 2W and Tx Mode should be "Classical".

#### 1.2.2 Go to software Settings

1. Click settings button.

Manipulator - C:\	Prevac\M	ani —	$\Box$ $\times$
File Process Opti	ons Set	up Help	
\$ \$	🗟 Z		× 🗕 🕂
Not Calib. X	No Co	mmunicatio	ר 🌔 🔍 ו
Absolute		Info	
Position: 0,000	[mm]	Current pos:	0,000 [mm]
Velocity: 1,000	[mm/s]	Target pos:	0,000 [mm]
Not Calib. Y	No Co	mmunicatio	ר 🔊 <
Absolute		Info	
Position: 0,000	[mm]	Current pos:	0,000 [mm]
Velocity: 1,000	[mm/s]	Target pos:	0,000 [mm]
Not Calib. Z	No Co	mmunicatio	า 🕨 📎
Absolute		Info	
Position: 0,000	[mm]	Current pos:	0,000 [mm]
Velocity: 4,000	[mm/s]	Target pos:	0,000 [mm]
Not Calib. R1	No Co	mmunicatio	า 🕨 💊
Absolute		Info	
Position: 0,000	[°]	Current pos:	0,000 [°]
Velocity: 4,000	[°/s]	Target pos:	0,000 [°]

Figure 1.2: Settings Button

2. Click gold padlock and confirm pop up window.

Manipulator Setup			×			
🗇 🖶 🖬 🚺 🕚						
Axes	Zalar Compensation					
Manipulator	Zalar Rotation Configuration axes Axes configuration correspond to the actual arrangement of the manipulator					
Y Z						
R1	Zalar Axis R1 : None 🗸	CCW Zalar Axis X:	None V CCW			
	Zalar Axis R2 : None 🗸	CCW Zalar Axis Y:	None V CCW			
	Zalar Axis R3 : None 🗸	CCW Zalar Axis Z:	None 🗸 🗌 CCW			
	Sample center point					
	Configuration current point of sample rotation					
	Current center position: X: 0,00 Y: 0,00	New center position	X: 0,000 Y: 0,000 Set			
	Parameters point angle					
	Configuring the pivot point of t are set in accordance wit	he sample. Please note h the direction of move	e that the coordinates ement of the axis			
	Active Zalar Move	Actual	position			
	Coordinate X:	0,000 [mm] 0.0	actual Set			
	Coordinate Y:	0,000 [mm] 0.0	actual Set			
	Sample thickness:	0,000 [mm]	Set			
			Close			

Figure 1.3: Advanced Axis Settings

3. Communication Windows for Axis.

Manipulator Setup			>
🗇 🗋 🗁 🗟 🖬 🕯	0 2		
Axes	User Axis Motor Dependence		
✓ · Manipulator ···· X 1	Motor Driver Type: SMCD	~	
	Hardware Settings: Port COM: 3 ~ Address: 210 Set	Status Imunication - Fl Motor:	FFFFFFFF
	Group: 200 Set	Encoder:	0
	Motor speed Acceleration: 1,000 [mm/s <sup>-</sup> Set	Deceleration: 1,	000 [mm/s^Set
	Encoder Encoder	Current Normal current:	1,0 [A] Set
	Numerator: 5	Motion current:	1,8 [A] Set
	Denominator: 2	Limit switches offset	to fund at
	Window size: 0,1 [mm] Set	Backward:	1,0 [mm] Set
	Steps StepsPerPey: 400 V Sat	Velocity:	0.5 [mm/s] Set
	Counter size: 2147483647 Set	Directioner	
	Limit Switch ON Limit Switch ON Limit Switch OFF	rmware : 0.0 - 0.0	Read from device
			Class

Figure 1.4: Communication Windows for Axis.

- 1 Select axis you need to address.
- 2 Go to Motor overlap.
- 3 We see "Hardware Settings" which able us to address device.

#### 1.2.3 Address Procedure

To address the one axis you must switch off all others axis connected to RS485 cable parallel, if we do not do this, more devices will be addressed in the same way, and will lose other old configuration.

1. Switch ON only the one SMCD device which you need to address (picture below).



Figure 1.5: Axis X Switch ON.

2. Go to "Hardware Settings" in software to Axis which you need to address

Manipulator Setup			×
🗇 🗋 📛 🖥 🖬 🖌	0 2		
Axes	User Axis Motor Dependence		
✓ · Manipulator	Motor Driver Type: SMCD $\checkmark$		
	Hardware Settings: Port COM: 3 VINUMICE Address: 210 Set Motor:	ation - FFFF	FFFFF
	Group: 200 Set Encoder	: 0	
	Motor speed Acceleration: 1,000 [mm/s' Set Decelerat	ion: 1,000	[mm/s^ Set
	Encoder Current	urrent: 1,0	[A] Set
	Numerator: 5 Set Motion cu	urrent: 1,8	[A] Set
	Denominator: 2 Limit switch	es offset	[mm] Cat
	Window size: 0,1 [mm] Set Forward:	0.5	[mm] Set
	Steps StepsPerRev: 400 Velocity:	0,5	[mm/s] Set
	Counter size: 2147483647 Set Directions	: 🗹 Encoder	🔅 Set
	Limit Switch Firmware Limit Switch ON Limit Switch OFF	0.0 Read	from device
			Close

Figure 1.6: Address Axis SMCD device.

- 1 Select Axis.
- 2 Go to overlap Motor.
- 3 Select "Address" value and confirm use SET (Must be other value for all SMCD devices)
- 4 Select "Group" value and confirm use SET (Should be one value for all devices on cable)
- 3. Right configuration effect we can se bellow.

🔝 Manipulator - C:\	Prevac\M	ani —		$\times$
File Process Opti	ons Set	up Help		
🕨 👂 💊 🕼	🗟   Z		~	+
Not Calib. X	otion fi	nished / OFF	LS	> <
Absolute		LINTO A	_	
Position: 0,000	[mm]	Current p	0,000	[mm]
Velocity: 1,000	[mm/s]	Target po:	0,000	[mm]
Not Calib. Y	No Co	mmunication		> %
Absolute		Info		
Position: 0,000	[mm]	Current pos:	0,000	[mm]
Velocity: 1,000	[mm/s]	Target pos:	0,000	[mm]
		<u> </u>	·	
Not Calib. Z	No Co	mmunication		> %
Absolute		Info		
Position: 0,000	[mm]	Current pos:	0,000	[mm]
Velocity: 4,000	[mm/s]	Target pos:	0.000	[mm]
			-,	
Not Calib. R1	No Co	mmunication		> %
Absolute		Info		
Position: 0,000	[°]	Current pos:	0,000	[°]
Velocity: 4,000	[°/s]	Target pos:	0,000	[°]

Figure 1.7: Right SMCD addressing.

4. Similarly for other axis, remember to switch on only axis which you will to address

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