



## XYZ Mapping Tables

XY(Z)-150x150 / XY(Z)-200x150 / XYZ-150x150x100 / XYZ-200x150x100

## Installation and Operation Manual

Document Number 000-10000-130-02-1209

**Offices:**

**Ocean Optics, Inc. World Headquarters**

830 Douglas Ave., Dunedin, FL, USA 34698

Phone 727.733.2447

Fax 727.733.3962

Fax 727.733.3962

8 a.m.– 8 p.m. (Mon-Thu), 8 a.m.– 6 p.m. (Fri) EST

**Ocean Optics Mikropack**

Maybachstraße 11, D-73760, Ostfildern, Germany

Phone +49 (0)711 34 16 96-0

Fax +49 (0)711 34 16 96-85

---

<b>E-mail:</b>	<b>Info@OceanOptics.com</b>	<b>(General sales inquiries)</b>
	<b>Info@Mikropack.de</b>	<b>(Mikropack sales inquiries)</b>
	<b>Orders@OceanOptics.com</b>	<b>(Questions about orders)</b>
	<b>TechSupport@OceanOptics.com</b>	<b>(Technical support)</b>



**WARNING**

---

Dangerous Voltages Present  
Instrument should be serviced by qualified  
service personnel.

See Important Safety Notices inside.

---

—A—  
**HALMA**  
**GROUP**  
**COMPANY**

**Copyright © 2009 Ocean Optics, Inc.**

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, by any means, electronic, mechanical, photocopying, recording, or otherwise, without written permission from Ocean Optics, Inc.

This manual is sold as part of an order and subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out or otherwise circulated without the prior consent of Ocean Optics, Inc. in any form of binding or cover other than that in which it is published.

**Trademarks**

Microsoft, Windows, Windows 95, Windows 98, Windows Me, Windows NT, Windows 2000, Windows XP and Excel are either registered trademarks or trademarks of Microsoft Corporation.

**Limit of Liability**

Every effort has been made to make this manual as complete and as accurate as possible, but no warranty or fitness is implied. The information provided is on an “as is” basis. Ocean Optics, Inc. shall have neither liability nor responsibility to any person or entity with respect to any loss or damages arising from the information contained in this manual.

---

# Important Safety Notices

1. All the safety and operating instructions should be read before the unit is operated.
2. Dangerous voltages present. Instrument should be serviced by qualified service personnel.
3. Before using the power supply for the first time, check for transport damage.
4. Keep your hands away from moving parts.
5. Do not remove any safety device installed. This will void your warranty and create an unsafe operating condition.

## Warranty

Mikropack GmbH warrants to the original user of this instrument that it shall be free of any defects resulting from faulty manufacture of this instrument for a period of 12 months from the original date of shipment.

**This instrument should not be used for any Clinical or Diagnostic purposes.** Data generated in these areas is not warranted in any way by Mikropack GmbH. Any defects covered by this Warranty shall be corrected either by repair or by replacement, as determined by Mikropack GmbH.

There are no warranties that extend beyond the description herein.

This Warranty is in lieu of, and excludes, any and all other warranties or representations expressed, implied, or statutory, including merchantability and fitness, as well as any and all other obligations or liabilities of Mikropack GmbH including, but not limited to, special or consequential damages. No person, firm, or corporation is authorized to assume for Mikropack GmbH. Any additional obligation or liability not expressed provided for herein except in writing duly executed by an officer of Mikropack GmbH:

MIKROPACK GmbH  
Maybachstraße 11  
D-73760 Ostfildern

Tel.: +49 (0)711 3428088 • Fax.: +49 (0)711 3428085  
e-mail: info@mikropack.de



---

# Table of Contents

About This Manual .....	iii
Document Purpose and Intended Audience.....	iii
What's New in this Document .....	iii
Document Summary.....	iii
Product-Related Documentation .....	iii
Upgrades .....	iii
<b>Chapter 1: Setup.....</b>	<b>1</b>
Overview.....	1
Unpacking the XYZ Table .....	2
Contents .....	2
<b>Chapter 2: XYZ Mapping Table Specifications .....</b>	<b>3</b>
Operating Environment .....	3
Physical Specifications.....	4
<b>Chapter 3: Operating Instructions .....</b>	<b>5</b>
Interfacing with the XYZ Mapping Table.....	5
Demo Software .....	5
Terminal.....	6
Factory Settings .....	7
ASCII Command Set.....	7
<b>Appendix A: Service and Maintenance.....</b>	<b>17</b>
<b>Index .....</b>	<b>19</b>



---

# About This Manual

## Document Purpose and Intended Audience

This document provides you with an installation section to get your system up and running.

## What's New in this Document

This version of the *XYZ Mapping Tables XY(Z)-150x150 / XY(Z)-200x150 / XYZ-150x150x100 / XYZ-200x150x100 Installation and Operation Manual* updates the logo and the contact information.

## Document Summary

Chapter	Description
Chapter 1: <a href="#">Setup</a>	Contains a list of package contents and unpacking instructions.
Chapter 2: <a href="#">XYZ Mapping Table Specifications</a>	Contains operating environment specifications, as well as other physical details of the product.
Chapter 3: <a href="#">Operating Instructions</a>	Provides instructions for interfacing with the XYZ Mapping Table.
Appendix A: <a href="#">Service and Maintenance</a>	Provides instructions for lubricating the drive screws.

## Product-Related Documentation

You can access documentation for Ocean Optics products by visiting our website at <http://www.oceanoptics.com>. Select *Technical* → *Operating Instructions*, then choose the appropriate document from the available drop-down lists. Or, use the **Search by Model Number** field at the bottom of the web page.

You can also access operating instructions for Ocean Optics products on the *Software and Technical Resources* CD included with the system.

Engineering-level documentation is located on our website at *Technical* → *Engineering Docs*.

## Upgrades

Occasionally, you may find that you need Ocean Optics to make a change or an upgrade to your system. To facilitate these changes, you must first contact Customer Support and obtain a Return Merchandise

**About This Manual**

---

Authorization (RMA) number. Please contact an Ocean Optics Application Scientist for specific instructions when returning a product.



---

# Chapter 1

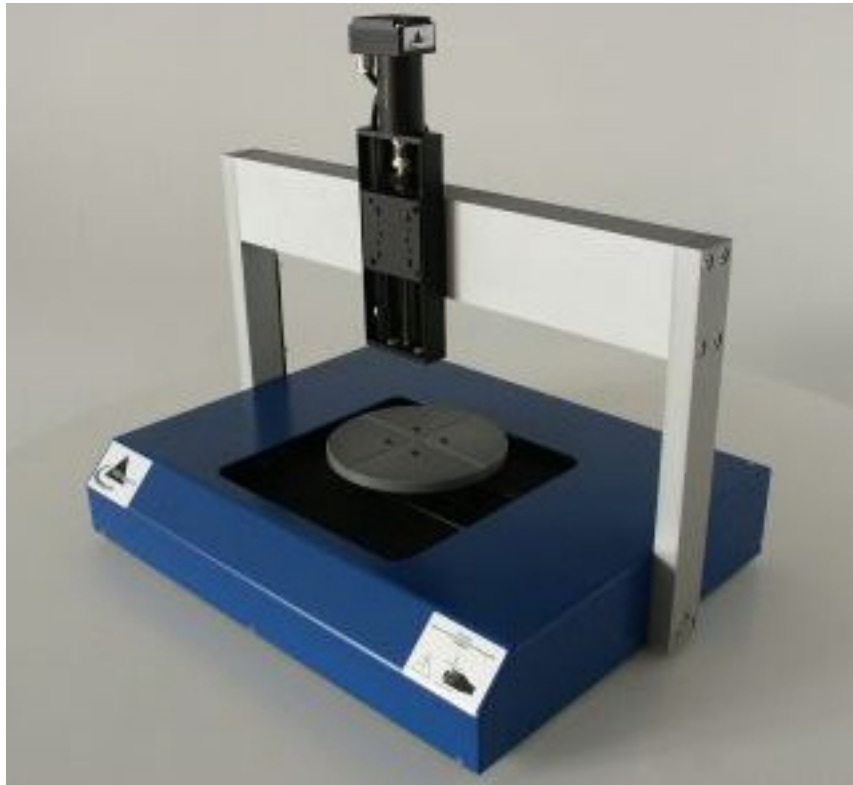
# Setup

## Overview

The XYZ Mapping Table comes with an electric motor and encoder to drive each axis, along with a CNC controller and a portal for the vertical (Z-axis) stage.

The system requires 110-240 VAC to operate, and interfaces via RS232 to PCs.

The XYZ Table makes it possible to measure every sample within an X-Y range of 150mm x 150mm or 200mm x 150mm. The resolution for the linear axes is 1 $\mu$ m, with an accuracy of 10 $\mu$ m. With the 100mm vertical stage, you can attach holders for probes and other kinds of sampling devices.



---

# Unpacking the XYZ Table

## ► Procedure

1. Unpack your Mapping table carefully. Although the stage is rigidly mounted dropping this instrument can cause permanent damage.
2. Inspect the outside of the instrument and make sure that there is no damage to your unit. In case of damage contact the dealer immediately and **DO NOT USE THE INSTRUMENT!**
3. Use this instrument in a clean laboratory environment (see [Operating Environment](#)).

## Contents

Your package should contain the following:

- Mapping table
- Power cord
- Serial connection cable (RS232)
- Software CD
- Injection with lubricant (for service)
- Demo software???

---

## Chapter 2

# XYZ Mapping Table Specifications

This section provides information on the operating environment, and electrical and mechanical data of the XYZ Mapping Table.

## Operating Environment

The following table provides information on optimizing the operating environment of your XYZ Mapping Table.

<b>Operating Environment</b>	<b>The D-2000 Unit . . .</b>
Moisture	Is designed for operation in dry rooms only.
Ventilation	Should be situated so that its location or position does not interfere with proper ventilation.
Heat	Should be situated away from any device that emits excessive heat.
Object and Liquid Entry	Should be positioned so that objects do not fall on top of the unit. Additionally, ensure that no liquids are spilled into the enclosure through openings.

# Physical Specifications

Specification	Models XY-150x150 and XY-200x150	Models XYZ-150x150x100 and XYZ-200x150x100
<b>Mechanical Data</b>		
Slides	2x ball bearings / slide recirculating ball bearings / table	2x ball bearings / slide recirculating ball bearings / table
Travel Range	150 mm x 150 mm 200 mm x 150 mm	150 mm x 150 mm x 100 mm 200 mm x 150 mm x 100 mm
Maximum Speed maximal	20 mm / sec	
Resolution	1 $\mu$ m	
Accuracy	10 $\mu$ m	
Dimensions	480 x 370 x 160 mm	480 x 370 x 470 mm
Weight	approximately 8 kg	approximately 16 kg
<b>Electrical Data</b>		
Motortype	Sine wave commutated Servomotor 3564 K 024 B C	
Motor Voltage	24 V	
Total Power Consumption	60 W	
Power Requirements		
European Version:	110–240V 50/60 Hz	
USA Version:	110–115V 50/60Hz	
Interface	RS-232, 9600 Baud	

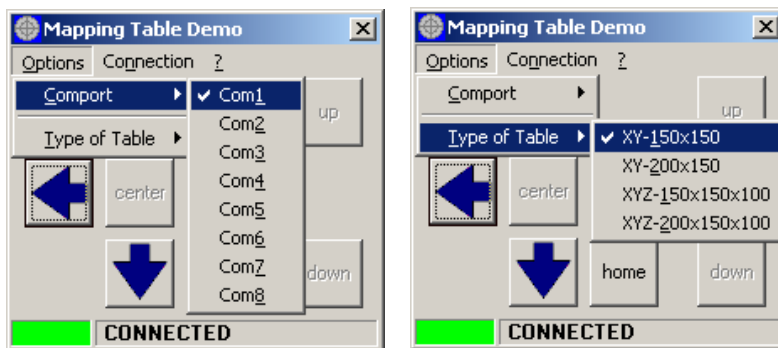
# Operating Instructions

## Interfacing with the XYZ Mapping Table

The XYZ Mapping Table can be operated by several different kinds of software:

- The Mikropack Demo software (comes with the device)
- A terminal client (such as Hyperterminal or Tera Term)
- A script in Ocean Optics OOIBase32 Platinum software

### Demo Software



Upon first start-up, the application tries to find a XY-150x150 mapping stage on Com1. These are the default settings.

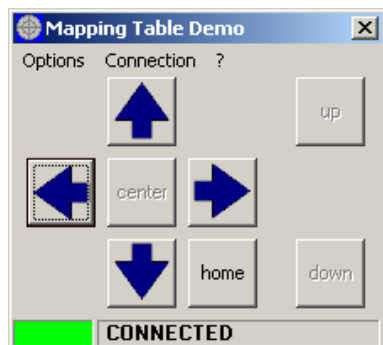
The status bar displays the status of the connection. If your settings are correct, the box displays green and “CONNECTED” appears. Otherwise, the box displays red and “NOT CONNECTED” appears.

The type of table is mainly defined by the number of axes. The length of the x-axis cannot be determined by the software. This setting in this software only takes effect on the center position.

### 3: Operating Instructions

To move the stage in the desired direction, press a mouse button over the appropriate arrow. The stage moves quickly when you press the left mouse button and slowly when you press the right mouse button.

Alternatively, you can move the stage using the keyboard.

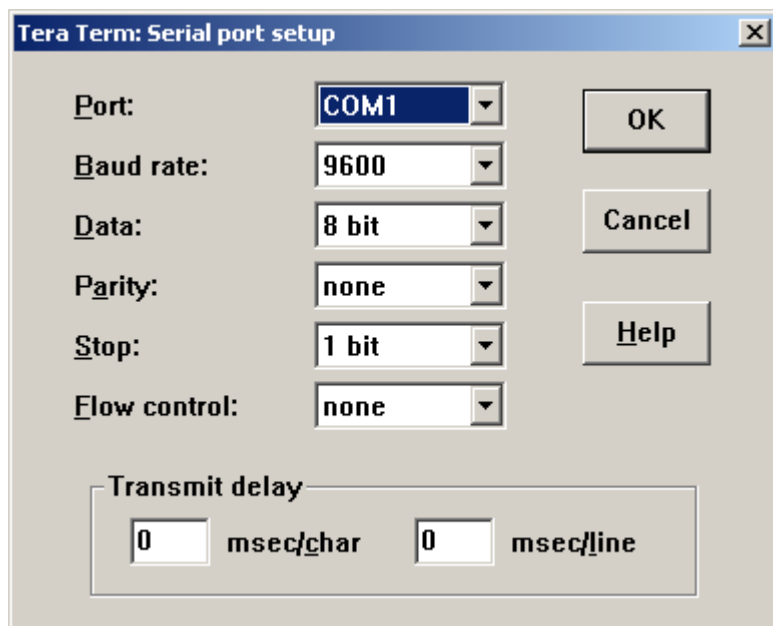


Movement of the stage	Action	
Left	Numerical pad 4	A
Right	Numerical pad 6	D
To the front	Numerical pad 2	X
To the back	Numerical pad 8	W
Up	Numerical pad 9	E
Down	Numerical pad 3	C
Home	Numerical pad 0	V
Center	Numerical pad 5	S

## Terminal

With a terminal client such as Hyper Terminal or Tera Term you can set the stage position by directly sending the commands to the stage.

The Connection settings are as follows:



## Factory Settings

The following settings can be reset in the controller by sending them to each controller via RS232. Ultimately, they must be stored in the EEPROM with the EEPsAV command.

CONTMOD	HL3	MV0
SOR0	HN1	MAV25
POHOSEQ0	CAHOSEQ	LL600000000
REFIN	ADR	LL-600000000
ANSW0	LPC2200	LPN16
HP3	LCC2200	EN
HB3	AC1100	V0
HD2	I20	DIPROG
HOSP100	POR8	
HA0	SP1000	

X-axis	Y-axis	Z-axis
NODEADR1	NODEADR2	NODEADR3

---

### Caution

The node addresses (NODEADR) cannot be reprogrammed. To restore the factory settings send the instructions listed above to the mapping table.

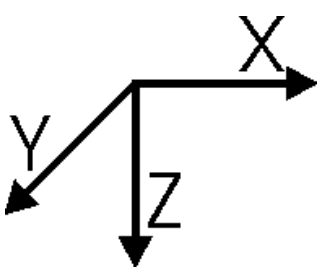
**Changing these settings can lead to malfunction or damage.**

---

## ASCII Command Set

To send a command to a certain axis you need to add the node address to the command like shown below. All commands must be completed by a carriage return (CR).

### 3: Operating Instructions

	Axis	Address node	Example	Description
	X	1	1V200[CR]	X-axis runs at constant speed of 100rpm
	Y	2	2V300[CR]	Y-axis runs at constant speed of 20rpm
	Z	3	3V10[CR]	Z-axis runs at constant speed of 10rpm
	All	All nodes	V50[CR]	All attached axes run at constant speed of 50rpm

#### Commands for Basic Settings

Command	Description	Example
DI	Disable drive Deactivates the motor	DI
EN	Enable drive Activates the motor	EN
ANSW	Asynchronous answer on/off ANSW0 – no automatic answers ANSW1 – activate automatic answers	ANSW1
LL	Load position range limits Loads range limits. The motor will not pass these limits in positioning mode. Positive values give the upper limit, negative the lower limit.	LL10000 LL-30000
APL	Activate/deactivate position limits APL1 – activate limits even while in speed control APL0 – deactivate limits	APL1
GPL	Get positive limit Calls the upper limit	GPL -> 10000
GNL	Get negative limit Calls the lower limit	GNL -> -30000
EEPSAV	Save to EEPROM Saves the actual parameters and configurations to the EEPROM. The settings remain saved even when the power supply is turned off.	EEPSAV



**Commands for Motion Control**

<b>Command</b>	<b>Description</b>	<b>Example</b>
M	Initiate motion Activates positioning mode	M
LA	Load absolute position Parameter: 1000 is equivalent to one complete rotation	LA5000
LR	Load relative position Parameter: 1000 is equivalent to one complete rotation	LR11000
V	Select velocity mode Activates velocity control and rotates with the given values	V200
GV	Get velocity Calls up command velocity	GV -> 200
NP	Notify position Motor sends "p" to the host terminal when the given position has been passed. No parameter: "p" is sent when target position is reached.	NP5000 Asynch -> p
NV	Notify velocity When the motor reaches the given velocity it transmits "v" to the host	NV200 Asynch -> v

**Commands for Velocity Control**

<b>Command</b>	<b>Description</b>	<b>Example</b>
MV	Minimum Velocity Sets the minimum speed in rpm	MV30
GMV	Get minimum velocity Calls up the minimum velocity	GMV -> 30
SOR	Source for velocity Chooses the source for velocity. SOR0: velocity from RS232	SOR0

**Commands for Evaluating Limit Switches and Homing Points**

<b>Command</b>	<b>Description</b>	<b>Example</b>
HO	Define home position Without parameter: sets the actual position to 0	HO
HP*	Hard polarity Sets the trigger edge and the polarity for the limit switches 1**: rising edge and high level 0**: falling edge and low level	HP3
HA	Home arming At an edge the position will be set to 0 1: activate 0**: deactivate	HA3
HL*	Hard limit At an edge the motor will stop 1**: activate 0**: deactivate	HL3
HN	Hard notify At an edge a "f" will be sent to the host 1**: activate 0**: deactivate	HN3
CAHOSEQ	Capture homing sequence Saves homing sequence to the intermediate memory. Actions defined with the HL, HN and HA commands will be saved	CAHOSEQ
POHOSEQ	Power on homing sequence Activate the homing sequence upon turning the motor on POHOSEQ1: activate POHOSEQ0: deactivate	POHOSEQ1
GOHOSEQ	Go homing sequence Executes the programmed homing sequence	GOHOSEQ
HOSP*	Load homing speed Range: -30000 to 30000 rpm	HOSP100
GHOSP	Get homing speed Calls up the actual homing speed	GHOSP -> 100

**Commands for Evaluating Limit Switches and Homing Points (Cont'd)**

Command	Description	Example
HB*	Hard blocking Activates hard blocking for given limit switch 1**: activate 0**: deactivate	HB3
HD*	Hard direction Sets the direction to be blocked 1**: right rotation blocked 0**: left rotation blocked	HD2
GOHIX	Go hall index Motor runs to hall zero and sets the position to 0	GOHIX
HS	Hard status A number 1-3 indicating which limit switches have activated	HS -> 3
GAHS	Get actual homing status 5 numbers with values between 0 and 3 are sent to the host. Indication the status of the limit switches HA value HL HN HB HD	GAHS -> 33300
GHSC	Get homing sequence configuration 3 numbers between 0 and 3. Indicating the settings of the homing sequence HA HL HN	GHSC -> 220

**Commands for Parameters**

Command	Description	Example
SP* ***	Load maximum speed Loads new maximum velocity (rpm) Range 0 to 30000	SP1000
GSP	Get maximum speed Calls up actual maximum velocity	GSP -> 1000

**Commands for Parameters (Cont'd)**

<b>Command</b>	<b>Description</b>	<b>Example</b>
AC*	Load new acceleration Parameter in Revolutions/s <sup>2</sup>	AC2000
GAC	Calls up acceleration	GAC -> 2000
POR*	Load proportional term (controller amplification, 0-255)	POR20
GPOR	Get proportional term	GPOR -> 20
I*	Load integral term (0-255)	I10
GI	Get integral term	GI -> 10
LPC*	Load peak current limit 0-12000 mA	LPC2000
GPC	Get peak current limit	GPC -> 2000
LCC*	Load continuous current limit 0-12000 mA	LCC1500
GCC	Get continuous current limit	GCC -> 1500

**Commands for Programming Sequences**

<b>Command</b>	<b>Description</b>	<b>Example</b>
PROGSEQ	Program sequence Defines the beginning of a program. All commands given after PROGSEQ will be sent directly to the EEPROM. The command END defines the end of the program. All commands after END will be immediately carried out.	PROGSEQ
GPROGSEQ	Get program sequence	GPROGSEQ -> <Program>
ENPROG	Enable program Starts the program. This command can be saved to the EEPROM with EEPSAV so that the program will start at power up.	ENPROG
DIPROG	Disable program, deactivates the program	DIPROG

**Request Commands**

<b>Command</b>	<b>Description</b>	<b>Example</b>
POS	Get actual position	POS -> 5000
GN	Get actual speed	GN -> 1000
GCL	Get actual current limit	GCL -> 1500
GRC	Get real current	GRC -> 800
TEM	Get temperature of motor housing	TEM -> 35
VER	Get version of controller software	VER -> Version...
NE	Notify error In case of an error the host will be signalled NE1: activate (sends "r" to the host) NE0: deactivate	NE1 Async -> r
GST	Get actual status (7 Bits) Bit 0: 1 position controller active 0 velocity controller active Bit 1: 1 velocity analog zu PWM 0 velocity given at RS-232 Bit 2: 1 velocity is PWM (Bit 1=1) 0 velocity is analog (Bit 1=1) Bit 3: 1 drive enabled 0 drive disabled Bit 4: 1 command position has been reached 0 command position has not been reached yet Bit 5: 1 positive edge at limit switch is active 0 negative edge at limit switch is active Bit 6: 1 limit switch set to high level 0 limit switch set to low level	GST -> 0101011
GFS	Get fault status (4 Bits), 0-no error, 1-error Bit 0: Overtemperature Bit 1: Current limit Bit 2: Undervoltage Bit 3: Overvoltage	GFS -> 0000

**Request Commands (Cont'd)**

Command	Description	Example
GAST	Get actual status (4 Bits) Bit 0: 1 limit switch 2 at high level 0 limit switch 2 at low level Bit 1: 1 limit switch 3 at high level 0 limit switch 3 at low level Bit 2: 1 positive values -> right rotation 0 positive values -> left rotation Bit 3: 1 power on homing sequence is running 0 power on homing sequence has ended	GAST -> 1100
GSCS	Get special configuration set (8 Bits) Bit 0: 1 Power on homing sequence is active 0 Power on homing sequence is inactive Bit 1: 1 Fault pin is an input 0 Fault pin is an output Bit 2: 1 Pulse output at fault pin (Bit 1=0) 0 Error signal at fault pin (Bit 1=0) Bit 3: 1 Fault pin is direction of rotation input (Bit 1=1) Fault pin is digital output (Bit 1=0) 0 Fault pin is limit switch input 2 (Bit 1=1) Fault pin is not digital output (Bit 1=0) Bit 4: 1 Rising edge at limit switch 2 0 Falling edge at limit switch 2 Bit 5: 1 Rising edge at limit switch 3 0 Falling edge at limit switch 3 Bit 6: 1 Program sequence is active 0 Program sequence is inactive Bit 7: 1 Automatic answer8ing is active 0 Automatic answering is inactive	GSCS -> 00000001

**Request Commands (Cont'd)**

Command	Description	Example
GES	Get enhanced status Bit 0: 0 Bit 1: 0 Bit 2: 1 Analog command current active 0 No analog command current Bit 3: 1 Position limits in all modes active 0 Position limits only in positioning mode active Bit 4: 1 Deviation error is given 0 No deviation error is given	GES -> 00001
<p>*Changing these settings can lead to malfunction and or damage.            ** 0 or 1 at the given binary position (3 -&gt; 011)            *** Setting a maximum velocity greater 1000 will damage the axes</p>		



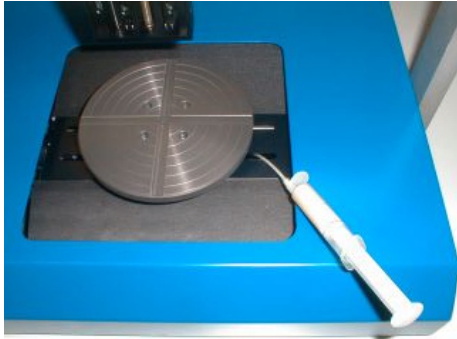


---

## Appendix A

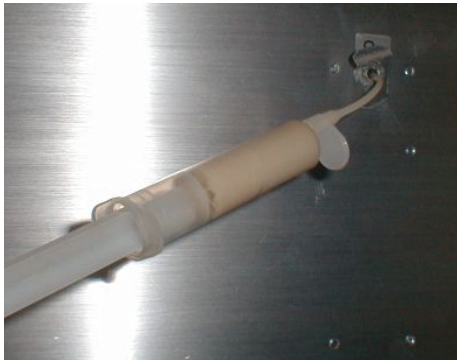
# Service and Maintenance

Though the Mapping Tables are mainly maintenance free, it may become necessary to lubricate the drive screws of all axes with the provided special lubricant (approximately once per year).



x-axis:

Drive the x-axis to center-position and bring in the tube of the injection to the drive screw and apply a little bit of lubricant to the drive screw at both sides of the slide.



y-axis:

Put the mapping table in vertical position. At the Bottom is the lubricant filler point.

Remove the label and bring in the injection tube.

Caution:

If the y-axis is running while lubricating the drive screw the tube could be destroyed by the slide.

z-axis:

Drive the slide to center-position and bring in the tube of the injection to the drive screw and apply a little bit of lubricant to the drive screw below and above the slide.



---

# Index

## A

ASCII command set, 7

## C

commands

- basic settings, 8
- homing points, 10
- limit switches, 10
- motion control, 9
- parameters, 11
- programming sequences, 12
- request, 13

## D

document

- audience, iii
- purpose, iii
- summary, iii

## F

factory settings, 7

## M

maintenance, 17

## O

operating environment, 3

## P

package contents, 2

product-related documentation, iii

## S

service, 17

setup, 1

software

- demo, 5
- terminal, 6

specifications, 3

operating environment, 3

physical, 4

## U

unpacking procedure, 2

upgrades, iii

## W

warranty, A

what's new, iii

