

	DOCUMENT NAME				VERSION	UI521596
	Operating and Maintenance Handbook - MH Series Mechanical Hand				1.1	
	FILE NAME		REVISED DATE & INITIALS		REPLACE	CLASSIFICATION
UI521596		Jan 1996 MJD		-		
APPROVED BY	DATE	PREPARED BY	DATE	PAGE OF		
	-	MJD	Jan 1996	1 9		

Operating and Maintenance Handbook MH Series Mechanical Hand



REVISION	DATE	COMMENTS	INITIALS
1	Jan 1996	Original release	MJD

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UI521596		Jan 1996 MJD		-		
APPROVED BY	DATE	PREPARED BY	DATE	PAGE OF		
	-	MJD	Jan 1996	2 9		

WARRANTY

1. Subject to fair wear and tear and the due, observance of any installation user, storage, operating or maintenance instructions the Seller undertakes to replace or, at its option repair free of charge to the purchaser, any goods which the purchaser can establish are defective by reason of defective workmanship or materials which are returned to the Seller, carriage paid, within 12 months of the date of dispatch by the Seller. In the event, however, that the Seller supplies spare parts either direct, or that are fitted or installed or replaced by the Sellers' service center such spare parts will be subject to a warranty period of six months only.
2. The Purchaser cannot return any product for warranty repair without the prior approval of VACGEN and the issue of a Goods Return Number (GRN). This shall be obtained by contacting the service center at VACGEN. All returned products must be accompanied by a completed Declaration of Contamination form. Customers must, in the first instance, contact the local selling agent.
3. We reserve the right to decline to service equipment, we consider is in any way hazardous until a clearance or safety certificate, in a form satisfactory to VACGEN, has been completed and returned by the customer.

REPAIR

The following additional terms and conditions apply in the event that the customer elects to use the services of VACGEN workshop on a chargeable basis.

1. At its own cost the customer shall dispatch the equipment to the workshop, carriage paid, suitably packaged, protected and insured, bearing, a Goods Return Number (GRN) and a completed Declaration of Contamination certificate obtained from VACGEN in advance of shipment.
2. During the period that the equipment is on VACGEN premises, VACGEN will insure the equipment against all risks.
3. Vacuum Generator will provide an acknowledgement of the receipt together with an estimate of the repair charges. Such estimates are carried out on a visual basis and are therefore intended as a guide only. Formal fixed price repair quotations are available and involve the disassembly of the equipment to determine the full extent of the work necessary to restore the equipment to an acceptable standard. In the event that the customer chooses not to proceed with the repair VACGEN will make a charge to cover this examination effort.

	DOCUMENT NAME				VERSION	UI521596
	Operating and Maintenance Handbook - MH Series Mechanical Hand				1.1	
	FILE NAME		REVISED DATE & INITIALS		REPLACE	CLASSIFICATION
UI521596		Jan 1996 MJD		-		
APPROVED BY	DATE	PREPARED BY	DATE	PAGE OF		
	-	MJD	Jan 1996	3 9		

Contents

Warnings	.....	i
Important Notes	.....	ii
1.0 Introduction	.....	1
2.0 Specification	.....	1
3.0 Installation	.....	2
4.0 Construction	.....	2
5.0 Operation	.....	3
6.0 Bakeout	.....	3
7.0 Maintenance	.....	3
8.0 Fitting and Removal of the Pincer Tool	.....	3
9.0 Spares and Accessories	.....	4

	DOCUMENT NAME				VERSION	UI521596
	Operating and Maintenance Handbook - MH Series Mechanical Hand				1.1	
	FILE NAME		REVISED DATE & INITIALS		REPLACE	CLASSIFICATION
UI521596		Jan 1996 MJD		-		
APPROVED BY	DATE	PREPARED BY	DATE	PAGE OF		
	-	MJD	Jan 1996	4 9		

Warnings

Warnings: This equipment must be installed by qualified personnel.

Warnings: Refer to the Operating Instructions for the proper use and maintenance of this equipment. Failure to observe these instructions may result in safety hazards.

Warnings: It is the responsibility of the user to consider the safety requirements of hazardous materials used with this equipment and the consequence of any leakage, however caused. Consider possible reactions with materials of construction. Any equipment returned to VACGEN must have the correct Declaration of Contamination securely fastened to the outside of the packaging.

Warnings: Lubricants used in this assembly may cause irritation to sensitive skin. Wear protective clothing. Do not swallow.

If in doubt contact VACGEN.

Important Notes

Attention is drawn to the following points of which all users must be aware:

VACGEN requires a Declaration of Contamination to be included with any equipment returned for repair or service. Full details of this requirement are detailed in the Warranty section.

Do not exceed the specified bakeout temperature.

The lubricants used in this device have low toxicity, but are tenacious and may cause irritation to sensitive skin. Wash affected skin and clothing in warm water and soap. Do not swallow. Full Health & Safety literature on this, or any other compound sold through VACGEN is available on request.

The actuation unit is carefully set up and must not be tampered with in anyway, any attempt to dismantle the device, except where indicated in the Operating Instructions, will invalidate the warranty. If you are experiencing problems, seek advice from any Vacuum Generators service centre.

When disposing of the equipment or materials associated with it, ensure that the applicable regulations and safety measures are followed to reduce any environmental hazard.

Contact Address:

VACGEN, Unit A, Swallow Business Park ,Diamond Drive, Lower Dicker, BN27 4EL

	DOCUMENT NAME				VERSION	UI521596
	Operating and Maintenance Handbook - MH Series Mechanical Hand				1.1	
	FILE NAME		REVISED DATE & INITIALS		REPLACE	CLASSIFICATION
UI521596		Jan 1996 MJD		-		
APPROVED BY	DATE	PREPARED BY	DATE	PAGE OF		
	-	MJD	Jan 1996	5 9		

1.0 Introduction

The Mechanical Hand is a flexible sample transfer device for use in intermediate transfer between, for example, long travel transfer systems (e.g. linear probes) and sample stages mounted to manipulators. It can also be used for short range transfer, for sample re-arrangement, or in modular exchange systems (e.g. STM tips). The N4H series is available in a range of lengths to suit most chamber/transfer system configurations. The mounting flange is a 70mm OD conflat.

The device has a 'pistol-grip' handle which gives good grip and sensitivity during transfer and manipulation operations. There is a torque-limiting mechanism built into the pistol grip which aids positioning and extends the bellows lifetime.

A variety of pincer type end tools is available for use with the Mechanical Hand. The range includes in-line symmetrical and perpendicular parallel pincer operation; all mechanisms have full 360° continuous rotation capability. All pincer grip styles can be modified to suit specific customer needs for sample transfer. The modular range of pincer grip tools ensures that tools can be easily exchanged, or replaced, if necessary.

Both the linear and the rotary movement have locking clamps to hold the device in a particular orientation. A parking bracket is also provided. The device is shown in figure 1.

2.0 Specification

Mounting Flange:	70mm OD
Mounting Orientation:	Any
Construction:	All welded stainless steel with bellows articulation
Articulation Range:	+/- 22.5°
Z Travel range:	80mm, 150mm, 236mm or 279mm (see figure 1)
Rotation:	360° Continuous
Azimuthal Force:	10N
Maximum Rotational Torque:	0.3Nm
Bakeout Temperature:	230°C
Jaw Grip force:	Perpendicular - 10N (on samples <10mm thickness) Symmetrical -3N (74° maximum jaw opening)

	DOCUMENT NAME			VERSION	UI521596
	Operating and Maintenance Handbook - MH Series Mechanical Hand			1.1	
	FILE NAME		REVISED DATE & INITIALS		REPLACE	CLASSIFICATION
UI521596		Jan 1996 MJD		-	
APPROVED BY	DATE	PREPARED BY	DATE	PAGE OF	
	-	MJD	Jan 1996	6 9	

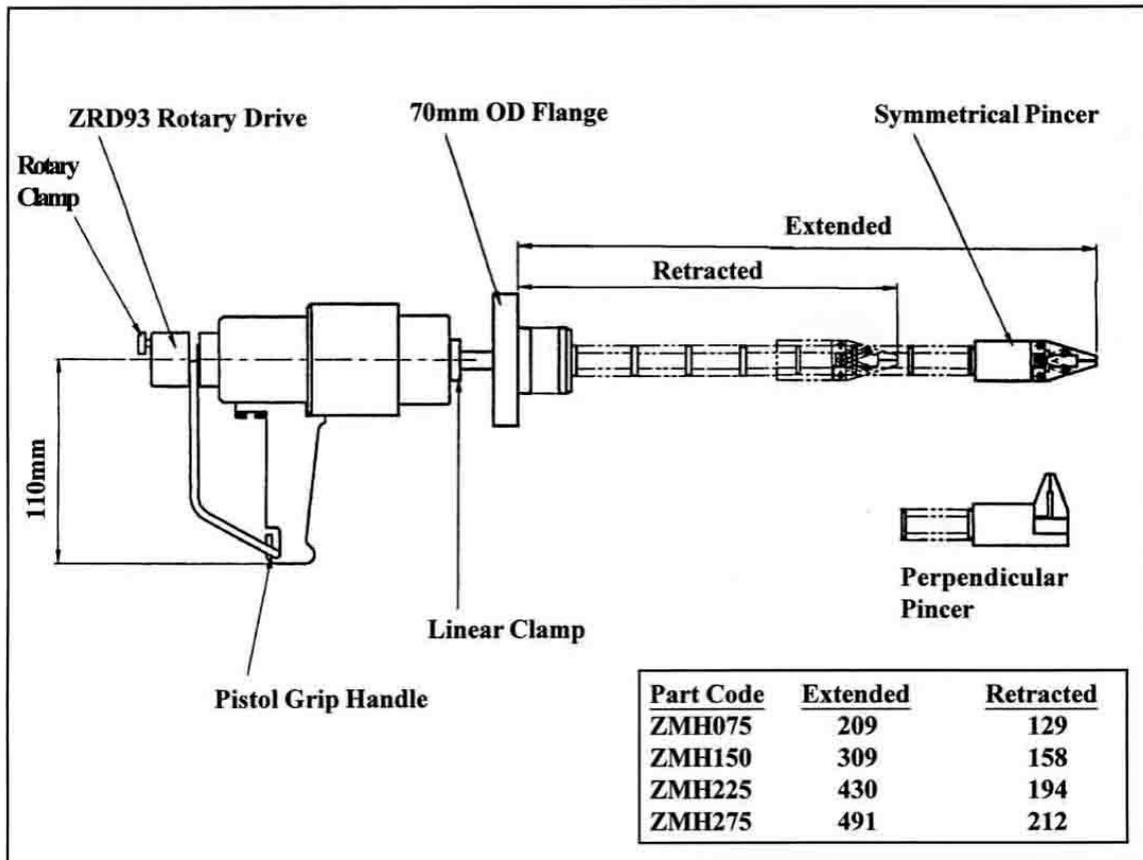


Figure 1 - The Mechanical Hand with details of extended and retracted dimensions

3.0 Installation

The MH series of Mechanical Hands can be operated when mounted in any orientation. The user must ensure that the bellows are not damaged during installation of the device on the vacuum system. Great care must be taken to ensure that the bellows cannot be forced into the chamber wall (or the intersection of the chamber wall and the port tubulation) during operation. Ideally the mounting port for the manipulator should be specifically designed to ensure that collisions cannot occur.

4.0 Construction

The vacuum envelope is constructed from stainless steel; all joints are welded. Edge-welded bellows provide the means by which the device operates; the bellows are supported by anti-squirm rings. The tilt articulation is provided by means of an aluminum bronze bearing which carries the main support rod through the centre of the device.

	DOCUMENT NAME				VERSION	UI521596
	Operating and Maintenance Handbook - MH Series Mechanical Hand				1.1	
	FILE NAME		REVISED DATE & INITIALS		REPLACE	CLASSIFICATION
UI521596		Jan 1996 MJD		-		
APPROVED BY	DATE	PREPARED BY	DATE	PAGE OF		
	-	MJD	Jan 1996	7 9		

5.0 Operation

Linear and articulated movement is achieved by moving the pistol grip until the desired in-vacuum position is achieved. The device can be held in the retracted position (e.g. to clear a sample exchange mechanism) by means of the linear clamp. This is operated by tensioning the cap head screw in the clamp. Pincer grip operation is achieved by squeezing the pistol grip.

Rotation of the pincer tool is achieved by rotation of the external knob. A torque limiting device is fitted to the pistol grip to ensure that accidental rotation of the pistol grip does not damage the linear bellows.

6.0 Bakeout

The Mechanical Hand may be baked to 230°C without dismantling. The following precautions must be observed:

- i) Heating must only be by convection.
- ii) The sensing element of the heater control system must be suspended in air near to the

Mechanical Hand: Under no circumstances should the sensing element be attached to the mechanical hand, or to any part of the vacuum system.

7.0 Maintenance

The Mechanical Hand has been designed to operate for long periods without any maintenance. It may, however, be found necessary to re-lubricate the torque limiter (using Carboflo D lubricant, VACGEN part code ZLUB07A) after around 80 hours of accumulated bakeout.

8.0 Fitting and Removal of the Pincer Tool

Assembly and removal of the pincer tools (ZJAWSY & ZJAWPE)

The pincer tools come complete with all of the circlips, bearings and fasteners necessary to enable them to be easily assembled to the Mechanical Hands as follows.

	DOCUMENT NAME Operating and Maintenance Handbook - MH Series Mechanical Hand			VERSION 1.1	UI521596
	FILE NAME UI521596		REVISED DATE & INITIALS Jan 1996 MJD	REPLACE -		CLASSIFICATION
	APPROVED BY	DATE -	PREPARED BY MJD	DATE Jan 1996	PAGE OF 8 9

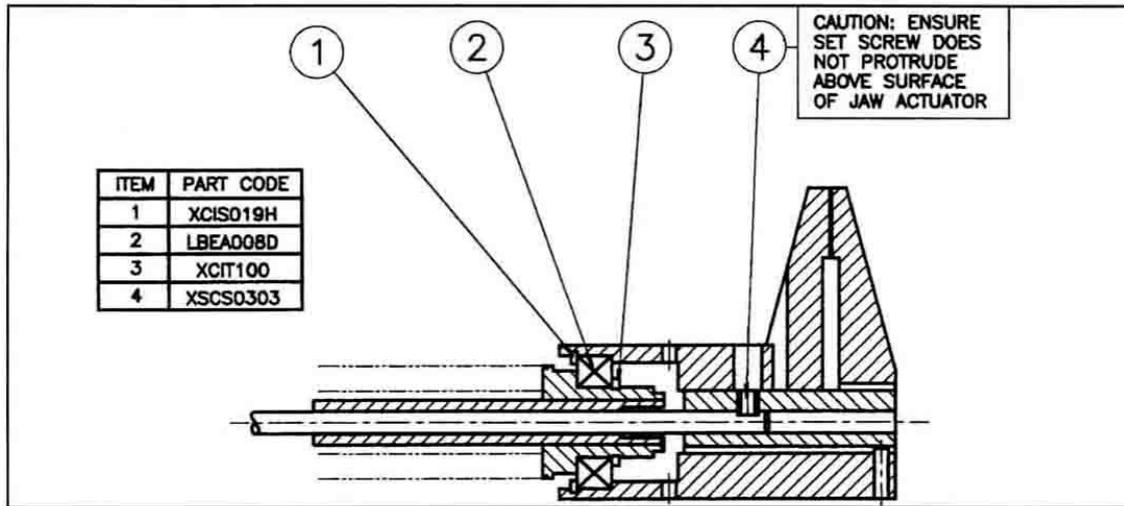


Figure 2 - Assembly and removal of the pincer tool

Assembly (ref fig 2)

- 1) Fit bearing (item 2) to Mechanical Hand end stub and hold in place with circlip (item 3).
- 2) Slide pincer tool over bearing and secure with circlip (item 1).
- 3) While holding the pincer tools jaws shut depress the pistol grip handle by not less than 1mm, then tighten the set screw (item 4). This sets the jaw opening/"gripping force".
- 4) If after assembly it is felt that more "gripping force" is required it can be increased by repeating step 3 but the pistol grip must be depressed further than the 1mm stated. It must be noted however that this will reduce the amount the jaws will open.

Removal

Removal of the pincer tools is the opposite of the assembly routine discussed above.

9.0 Spares and Accessories

Part Code	Description
ZJAWSY	Symmetrical Double-acting In-line Pincer Grip Jaws
ZJAWPE	Perpendicular Parallel-acting Pincer Grip Jaws

 VACGEN	DOCUMENT NAME Operating and Maintenance Handbook - MH Series Mechanical Hand			VERSION 1.1	UI521596
	FILE NAME UI521596		REVISED DATE & INITIALS Jan 1996 MJD	REPLACE -		CLASSIFICATION
	APPROVED BY	DATE -	PREPARED BY MJD	DATE Jan 1996	PAGE OF 9 9

Service and Repair Form

Declaration of Contamination of Equipment and Components	
<p>Servicing and repairs will only be carried out if the conditions for Servicing and Repair are complied with in full, according to the VACGEN. Conditions of Sale. A summary of these requirements are included on the inside front cover of the Operating Instructions. The manufacturer will refuse to accept any equipment without a signed declaration attached to the OUTSIDE of the packaging. This declaration can only be completed and signed by authorized and qualified staff.</p>	
1 Description of Equipment and Components	
Equipment Type.....Model Number..... Serial Number..... Your Reference Number.....	
2 Reasons for return	
.....	
.....	
3 Condition of Equipment	
YES () NO () Toxic?	YES () NO () Corrosive?
YES () NO () Explosive?	YES () NO () Biological Hazard?
YES () NO () Radioactive?	YES () NO () Other Harmful Substances?
Equipment and Components that have been contaminated, WILL NOT be accepted without written evidence of decontamination.	
5 Contamination Materials	
List all the substances, gases and by-products that may have come in contact with the equipment, giving trade name, manufacture, chemicals names or symbols. Please note that any of these listed, must be completely removed, so it is safe to handle and weld, without giving off health threatening gases. Please enter details below and/or attach data sheets	
6 Legally Binding Declaration	
I hereby declare that the information supplied on this form is complete and accurate. There by stating that the goods offer no risk to health or safety Organisation..... Name..... Country..... Job Title..... Post/ZIP code..... Telephone..... Email..... Signature..... Date.....	
Return goods to: VACGEN, Unit A, Swallow Business Park, Diamond Drive, Lower Dicker, BN27 4EL Phone: 0044 (0) 1323 379335 (Form VGF33)	