	<b>CTA</b>	CTA Ref :
	Zurich actuator installation manual	EDMS id : Edition : 0.1 Date: Page : 1/6

Template doc V1.1

## Zurich actuator installation manual

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Approved by	Laboratory


List of Abbreviations			

History		
Edition	Date	Observation
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<b>Distribution</b>	SST, MST, LST, Mirrors
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### - Table of Contents -

1.1	INTRODUCTION.....	2
1.2	INSTALLATION INSTRUCTIONS.....	2
1.2.1	Actuator / fix point flange .....	2
1.2.2	Actuator clamp.....	2
1.2.3	Axes.....	3
1.2.4	Fix point.....	3
1.2.5	Electrical connection .....	4
1.3	SPARE PARTS.....	5
1.4	REFERENCES .....	6

	CTA	CTA Ref :
	Zurich actuator installation manual	EDMS id : Edition : 0.1 Date: Page : 2/6

Template doc V1.1

## 1.1 Introduction

This instruction manual explains how to install the Zurich actuator system on the corresponding telescope interface. For further information about the mechanical and electrical characteristics, programming and deliverables see document *Zurich actuator characteristics* [zac].

The flange installation of the two actuators and the fix point is the same and hence referring to the actuator flange will include both throughout this manual.

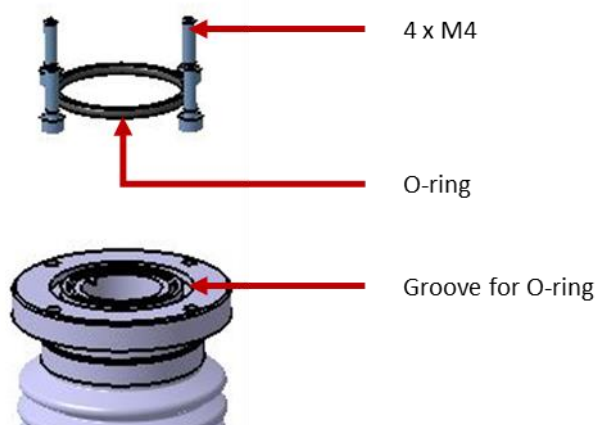
Please carefully read the following instructions before installation of the actuators and the fix point. The installation should only be executed by trained personnel.

## 1.2 Installation instructions

### 1.2.1 Actuator / fix point flange

The actuator and the fix point is only completely sealed with the electrical connector properly attached and the flange mounted on to the mirror flange using the O-ring and the four M4 screws (Figure 1).

It is mandatory to first check the O-ring and both flanges, actuator and mirror side, for damages, dents or dirt. Clean both flange surfaces and lubricate<sup>1</sup> the O-ring before installation. The O-ring should be placed into the groove of the actuator's flange. The two flanges are screwed together with four M4x16 hexagon socket head cap screws which should be tightened with a torque of 2.3 Nm (at 20°C, use corresponding tool) and diagonally. Use a lubricant<sup>2</sup> to prevent seizing of the screws.



**Figure 1: Actuator / fix point flange with O-ring and mounting screws.**


### 1.2.2 Actuator clamp

The actuator clamp (Figure 2) allows the positioning of the actuator in z-direction. The M5 screw should be tightened with a torque of 4 Nm for proper clamping. Beware that the clamp must always be tightened for operation of the actuator.

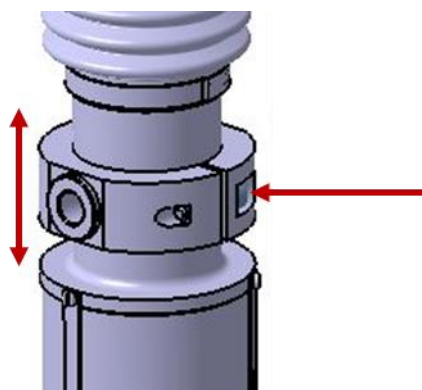
Note: Loosening of the clamp might result in jammed axes and hence an increased rotational friction.

<sup>1</sup> For instance, Molykote 111.

<sup>2</sup> For instance, METAFUX 70-81 Gleitmetall-Spray

	CTA	CTA Ref :
	Zurich actuator installation manual	EDMS id :
		Edition : 0.1
		Date:
		Page : 3/6

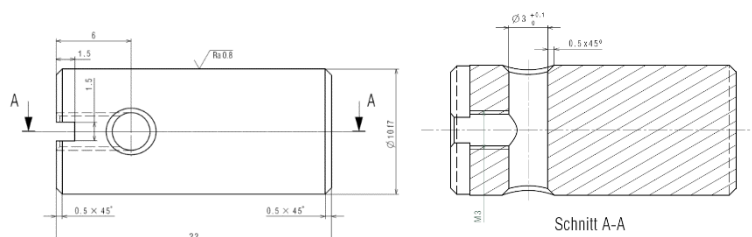
Template doc V1.1



**Figure 2:** The clamp of the actuator can be shifted after loosening of the M5 screw (right arrow).

### 1.2.3 Axes

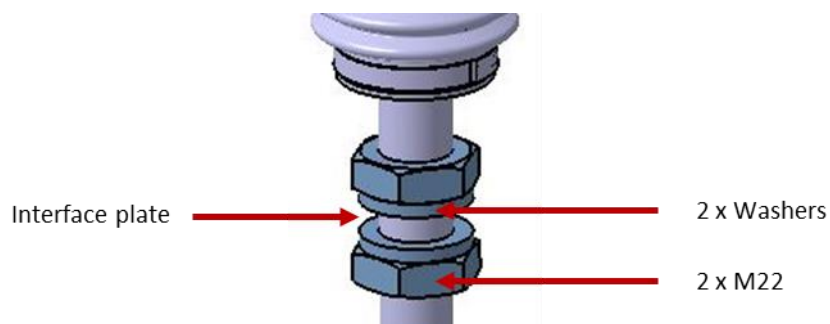
The axes (Figure 3) should slide into place without any force, assuming a tightened clamp (see 1.2.2). Use a slotted screwdriver to align the holes of the axis and the structure interface and push the spiral-roll pin through the hole.



**Figure 3:** Stainless steel (1.4404) axis with 3mm hole for pin and side-slit for alignment.


### 1.2.4 Fix point

The fix point is mounted with two M22 nuts and washers according to Figure 4. Lubricate<sup>3</sup> the thread and use a torque wrench to tighten the nuts with 270 Nm.



**Figure 4:** Fixing the fix point with nuts and washers on to the structure's interface plate.

<sup>3</sup> For instance, METAFLEX 70-81 Gleitmetall-Spray

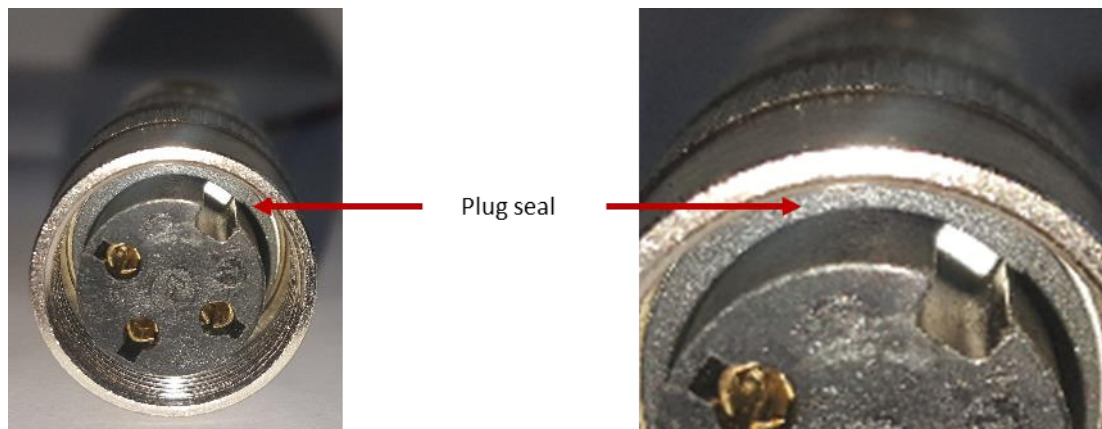
	CTA	CTA Ref :
	Zurich actuator installation manual	EDMS id :
		Edition : 0.1
		Date:
		Page : 4/6

Template doc V1.1

### 1.2.5 Electrical connection

The electrical connector / plug type is described in the actuator characteristics document [zac]. It is vital to check the existence and the integrity of the O-ring (Figure 5) located inside the plug which is attached to the power cable. The O-ring can fall out or be damaged (or old) and thus will not provide the expected water tightness of the actuator.


The plug is screwed by hand on to the connector to seal the actuator. Attention should be paid that the plug is not tilted (no proper sealing of the actuator!) and correctly and fully screwed on to the connector (see Figure 6).



**Figure 5: Power plug with internal O-ring.**



**Figure 6: Left: Correctly mounted plug. Right: Plug screw part is tilted and tightened but the plug does not seal at all!**

	<b>CTA</b>	CTA Ref :
	Zurich actuator installation manual	EDMS id : Edition : 0.1 Date: Page : 5/6


Template doc V1.1

### 1.3 Spare parts

Table 1 gives possible suppliers for spare parts.

**Table 1: List of spare parts.**

<b>Article number</b>	<b>Supplier</b>	<b>Part description</b>
1233920	Bossard	M4x16 hexagon socket head cap stainless steel (A4, DIN 912) screw
1409514	Bossard	Spiral-roll pin 3 x 22
860110.2810	Brütsch-Rüegger	O-ring D36 x s3 NBR
1241745	Bossard	M22 hex nut
1253484	Bossard	Washers
0322 03	Lumberg	Electrical connector protection cap
0322 C 16	Lumberg	O-ring Lumberg plug

	<b>CTA</b>	CTA Ref :
	Zurich actuator installation manual	EDMS id : Edition : 0.1 Date: Page : 6/6

Template doc V1.1

## 1.4 References

[zac] Zurich Actuator Characteristics, A. Gadola UZH, 2018-2019