Warnings and Handling Instructions

Please read before using the SmarAct positioning system

SmarAct GmbH
Schuette-Lanz-Strasse 9
D-26135 Oldenburg

Tel.: +49 (0) 441 8008 79-0
Fax: +49 (0) 441 8008 79-21

eMail: info@smaract.de
www.smaract.de

Document Version 1.0-B
08/07/13

1 Warnings

Danger - Hazardous Voltage

SmarAct controllers are capable of generating high output currents at high voltages. They may cause serious or even lethal injury if used improperly.

- Do never touch any part that might be connected to an output with a high voltage.
- Do not connect products from other manufacturers to the output connectors.

Output connectors with dangerous signals are labelled with the following symbol:

This is true for the main controllers as well as for MCS sensor modules:

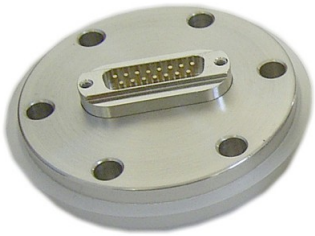
At the inner side of vacuum feedthroughs we cannot attach a warning sticker. Nevertheless, the same dangerous high power output signals are at the pins that are connected to the controllers.

Proprietary Cabling

SmarAct positioning systems are typically delivered with all cables, including vacuum feedthroughs and plugs. These systems have been tested before shipment to allow you a fast setup of the system. In case a proprietary cabling is required, e.g. a feedthrough, which is already installed, we can prepare the cabling, too, if we have got the appropriate pin assignment. Please note that any warranty is void in case a different cable or feedthrough is used than agreed on.

SmarAct is offering two standard feedthrough types: Lemo-compatible feedthroughs and DSUB-type feedthroughs, which are both welded into flanges. Both feedthroughs have straight pins.

DN40CF flange with three Lemo-compatible feedthroughs



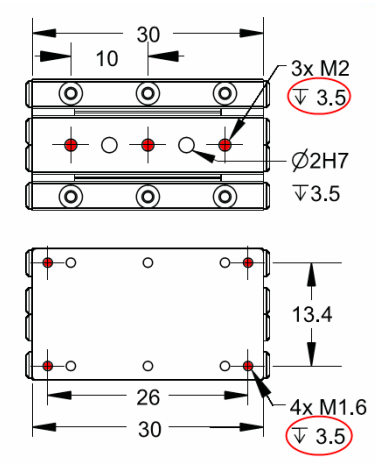
DN40CF flange with DSUB15 feedthrough

Never use a “gender changer” to emulate a feedthrough

2 Handling Instructions

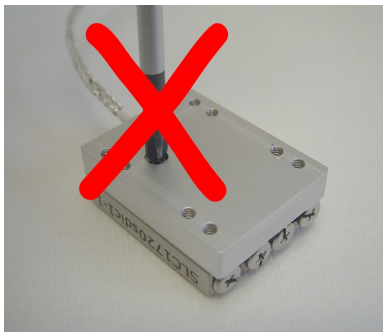
Respect Screw-in Depths

For some positioners, the **allowable screw-in depths** are quite small. By using too long screws, you may hit internal components and damage the positioner. Therefore, measure the screw length beforehand and shorten the screws, if necessary. The screw-in depth are given in the drawings of the current catalogue. If you are not sure that the screw will fit please contact the SmarAct sales team.



Screw-in depths for an SLC-1730 positioner

Never loosen screws that hold the guideways



Never loosen screws that adjust the actuator

Do Not Diassemble Positioners

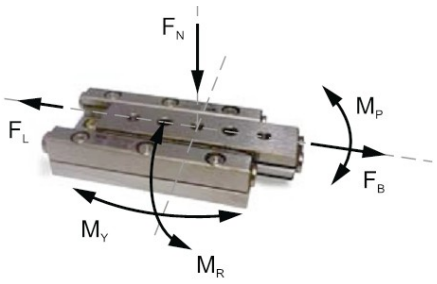
Disassembling a positioner will **destroy its preload** and the connection between the actuator and the slide. We also recommend not to disassemble a **manipulation system**,which consists of several positioners. Therefore, the screws of the positioners and manipulators are sealed with a droplet of TorrSeal.

Keep Torques and Forces Low

Generally, caution should be used **to not apply high torques or forces to the slides** with respect to the guides. The max. forces and torques are given in the cataloue. For non-magnetic positioners (ending -NM) the values should be devided by 2. Therefore, if a device shall be mounted to a positioner, please **hold the positioner directly** and not indirectly via other positioners which are connected to it. E.g. when mounting something to the Z positioner of an XYZ manipulator hold the Z positioner directly and not the base.

Load	
F_N:	50 N
Blocking force F_B:	3.5 N
F_L (for vertical movement):	1 N
M_P:	1.2 Nm
M_Y:	0.3 Nm
M_R:	0.6 Nm

Forces and torques for an SLC-1730 positioner (catalogue)



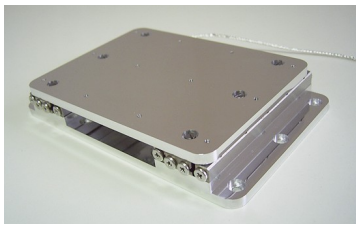
Definition and forces and torques of a linear positioner

Avoid using the alignment pins of the guideways (e.g. 2H7 in the picture above) because inserting alignment pins may lead to too high forces.

Mount Positioners on a Flat Surface

Please take care that the **surface** where you mount a positioner is **flat** and **clean**. A flat surface can typically be achieved by milling with tolerance class “fine” (DIN-ISO 2768-1: f) A surface that is bown may bow the base of the positioner and lead to play or too high tension in the guideway.

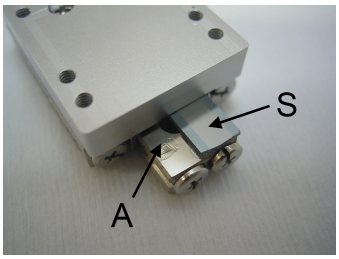
If you are planning to mount two positioners in a **gantry-like configuration** make sure that they are **well-aligned** to move parallel. Misaligned positioners can damage the guideways of the positioners.



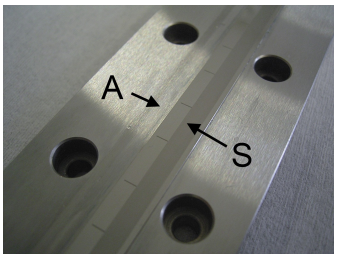
Two SLC-2475 positioners mounted in a gantry-like configuration

Do Not Touch the Sensor Scale

Neither the sensor head nor the scale should be touched since this could affect its operation or damage it. Fingerprints shall be removed by wiping carefully with isopropanol-tinctured cotton buds.



Actuator friction surface (A) and sensor scale of an SLC-1720 positioner



Actuator friction surface (A) and sensor scale of an SLL42 positioner

Do Not Remove Grease

For applications in atmosphere pressure or in high vacuum we use a vacuum compatible grease, which ensures a long lifetime of the positioners. **Do not remove the grease** because the actuator can get stuck or show too much wear otherwise.

Keep the Positioners Clean

The positioning system must be kept clean to ensure a long lifetime. Therefore, please **avoid** using them in a **dusty or humid environment**. Especially the guideways and the sensor system can be damaged when there is contamination in the positioner.

Wear Gloves

The positioners consist of steel parts that should not be touched with bare hands. Therefore, **gloves** should be worn when handling positioners or manipulators. Fingerprints may be removed by wiping carefully with isoprop.-tinctured cotton buds.

Take Care of the Surfaces

When working with a screwdriver or other **tools** please be careful such that you **do not hit the surface** of the positioners or connecting elements. Please take care **not to scratch any surface**, e.g. while mounting something to the manipulator. Removing scratches is time-consuming and sometimes impossible.

Take Care of the Cables

The cables are attached directly at the positioners and **special care** should be taken **not to damage the cables**. For most of the positioner series repairing a cable is very time-consuming and expensive.

Bake UHV Systems at <130°C

Only UHV systems can be baked to achieve a very low pressure. The absolute max. bake-out temperature is up to 150°C and we recommend to keep **below 130°C**.

Keep the Operation Temperature Low in Vacuum Systems

Since the heat convection is low in vacuum systems please ensure that the systems do not overheat. For this we recommend to use **step frequencies of 5kHz** or lower and to use the **power-save mode** for the sensors. When shipping systems for vacuum applications we preset these parameters and recommend to work with the same settings when programming proprietary software. In addition, we recommend to ensure a good thermal contact to a heat sink in the vacuum chamber, e.g. the base of the setup.

For calculating the expected heat dissipation we are using the following formula:

$$P \approx \frac{\pi}{4} \cdot \tan(\delta) \cdot f \cdot C \cdot U^2$$

with the dielectric loss factor *tan(δ)=10%* and the piezo capacity being *C=65nF* for standard systems and 200nF for UHV systems. The thermal dissipation of the sensor is in the range of 170 mW when the sensor is enabled and is reduced to 4mW when the sensor is in power-save mode and the positioner is not moving.

Use the SmarAct Power Supply

SmarAct controllers are delivered with an appropriate power supply. Please use this power supply to avoid damages by too high voltage.

The MCS-3C-USB-TAB controller with the sticker on the underside showing that a power supply with 12V output voltage and a power rating of 24W must be used.

Plug Connectors Completely

When connecting the plugs please make sure that all **plugs are inserted completely**. Lock D-SUB plugs with the screws and check that the Lemo plugs are locked with the push-pull mechanism (they snap in). Please do not use too much force for plugs at vacuum flanges.

Switch off the Controller before Connecting Cables

SmarAct controllers are not hot-pluggable and must be **switched off** before connecting the cables.

Calibrate after Connecting a Positioner

SmarAct controllers are using a calibration and correction routine to increase the accuracy of the position calculation. Before shipping a positioning system we typically label the connectors in a way that they can be plugged unambiguously and calibrate the system with this configuration.

Nevertheless, a channel must be **recalibrated** in the following cases:

- if the **mechanical setup is changed**, i. e. if different or new positioners are connected to different channels,
- or if a **sensor type is changed**.

Safety Precaution: During the calibration the positioner will perform a movement in the range of up to several mm. Sensor types that are referenced via mechanical end stops (e.g. “M”, linear positioners with micro sensor) are even moved to the end stop as part of the calibration routine. As a safety precaution, make sure that the positioner has enough freedom to move without damaging other equipment.

You can **trigger a calibration** routine via the operation controls of the controller, if available, or via a software tool (e.g. MCSConfiguration for the MCS)