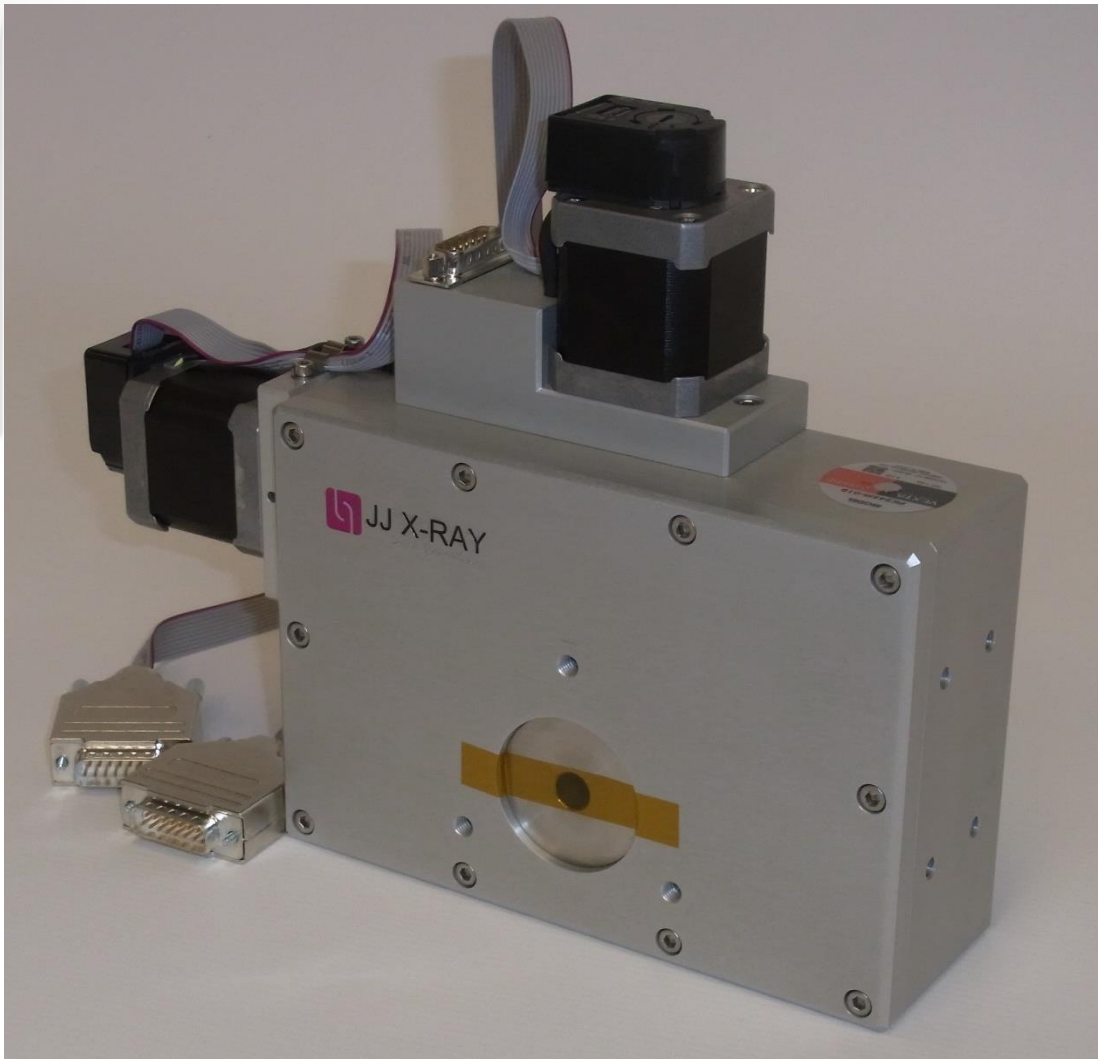
BRIEF INSTRUCTIONS
Multiple Pinhole MP10-HV



JJ X-RAY

Danish Science Design

MP10-HV

The Multible Pinhole MP10-HV is developed for applications where up to ten pinholes of different sizes are preferred over rectangular apertures or where there is a need to employ filters of different thicknesses at different times.

The motorized XY-stage moves a plate which can be configured to the customer's specification. This plate design also allows for exchanging pinholes.

The plate can be moved 55 mm horizontally and 20 mm vertically. This is usually enough for 2 rows of pinholes or filters. These plates are controlled by a high-precision guiding rail system and high-resolution stepping motors.

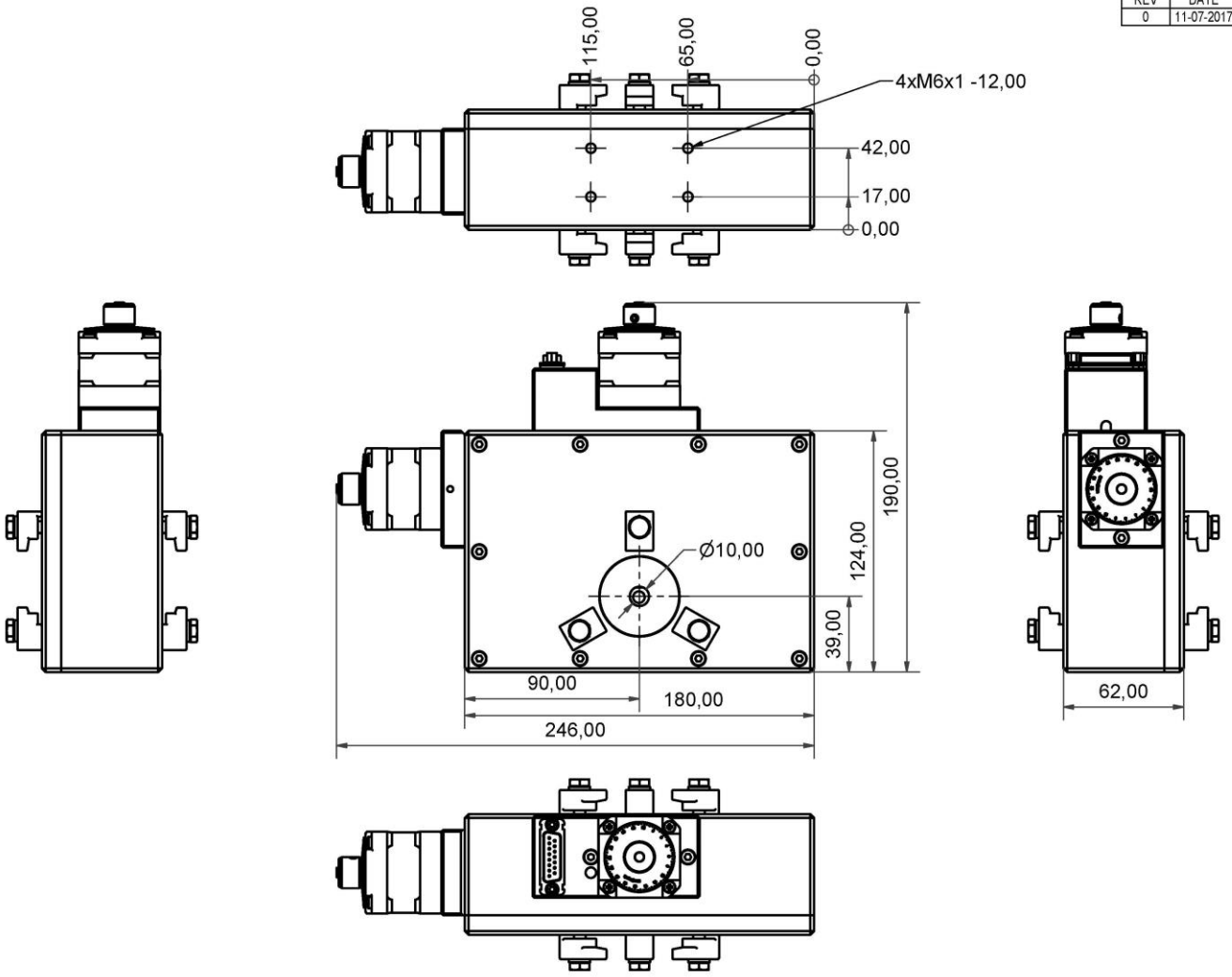
In its basic configuration, the MP10-HV is delivered with a flange-opening and tightening bolts to allow connection with KF-40 flanges.

Please notice: The version shown on the front page is with encoder option.

Technical Specifications

MP10-HV	
Aperture size	To be defined by customer
Resolution	1 micron per full step
Accuracy	± 2 micron (over 3 mm)
Vacuum	O-ring sealed, high vacuum 10^{-5} mbar, low outgassing materials
Mechanical dimension	246 mm x 190 mm x 66 mm 180 mm x 124 mm x 62 mm (housing only)
Pinholes	Defined by customer
Motors	2 phase stepping motors
Mechanical connections	M6-threaded holes on the bottom as shown on the drawing. KF-40 flange connections are provided on the body of both sides of the system
Limit switches (end-of-travel)	Included as standard on all motions
Weight	≈ 4.0 kg
Outer surface	Anodized aluminum in color nature
Guiding	High precision internal rails and carriages
Electrical connections	Microswitches coupled to motor connector (SUB-D 15 pins male)
Common options	Motors: Custom high resolution stepping motors, including IMS motors Encoders: Back-axle rotary encoders Connectors: Adaptors to other KF (NW) flanges or CF flanges can be provided

REV	DATE	APPROVE	DESCRIPTION
0	11-07-2017	HBP	



-All dimension are in mm.
-All Tolerances are accordance with ISO 2768-1 class f, unless otherwise specified.

Tolerances:
-Internal corners R0.2 max.
-Break edges 0,1 - 0,25
- $\sqrt{Rz}$ 0,4 max
-Remove all sharp edges and burrs

Date. 04-07-2017	Rev. 1	QTY.
Designer. JJ X-Ray A/S	Mass. N/A	
Surface Treatment.		
Material.		

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Remarks.

Project Name. JJ X-Ray Pinhole arr.

Scale: 1:1 | Drawing Size. A3

Title. **Pinhole**

CAD Drawing Number **023901rev1**

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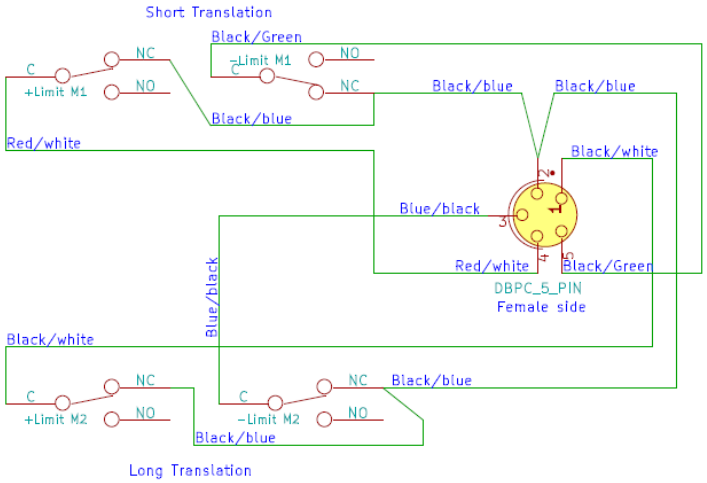
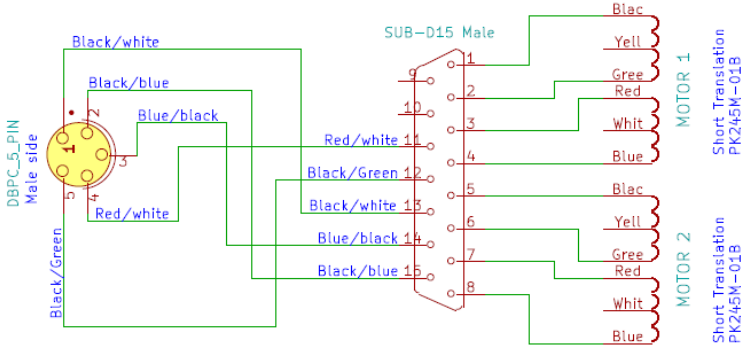
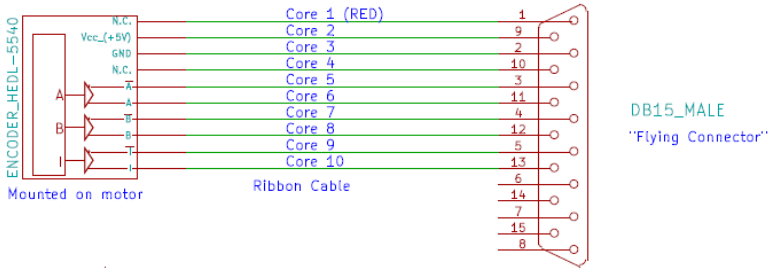
Inside pinholder



Motor flange





Motor Specifications

Motor Specifications	
Number of motors	2
Motor type	2-phase stepping motor
Manufacturer	Oriental Motors
Motor make	PK245M-01B
Step angle	0.9°
Connection type	Bipolar (Serial)
Current per phase	0.85 A/phase
Resistance	6.6 Ω/phase
Inductance	15.6 mH/phase
Limit switches	'+' and '-' end of travel

Motion Mechanism	
Type of motion	Translation
Guidance	In vacuum rails and carriages
Motor step angle	0.9°/step
Motor gear	None
Lead screw pitch	0.4 mm/rev
Scale factor	1000 steps/mm
Mechanical resolution	1 µm/step
Translation calibration	1 µm/step

Recommended Driver Settings	
The motors should be run at 0.85 A per phase. **The motors have been tested at:**	
Running speeds	**1000 steps/second**
Starting speeds	**300 steps/second**
Ramp times	**0.1 second**

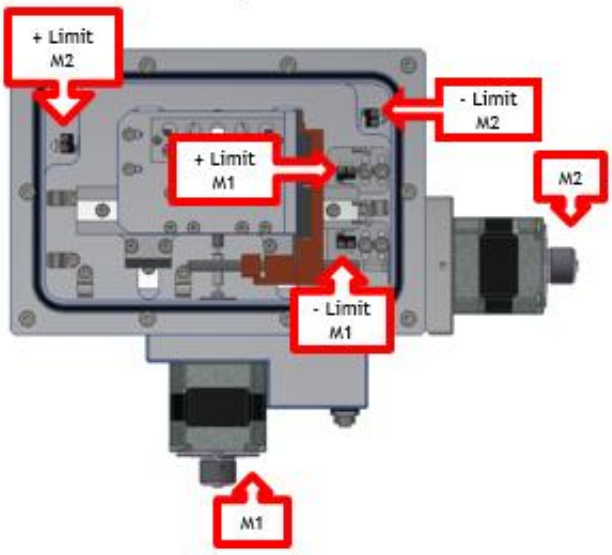
Always use “backlash correction” if available (i.e. the motor always approaches the final position from the same side). A useful backlash parameter could be 0.1 mm.

Manual Control

If for some reason, you need to move the system manually, it is possible to use the scale wheel attached to the back shaft of the motor. It is probably easiest, if this operation is done with an open cover so you can see what is going on. The manual control is not possible in versions with back shaft encoders or versions mounted with IMS motors.

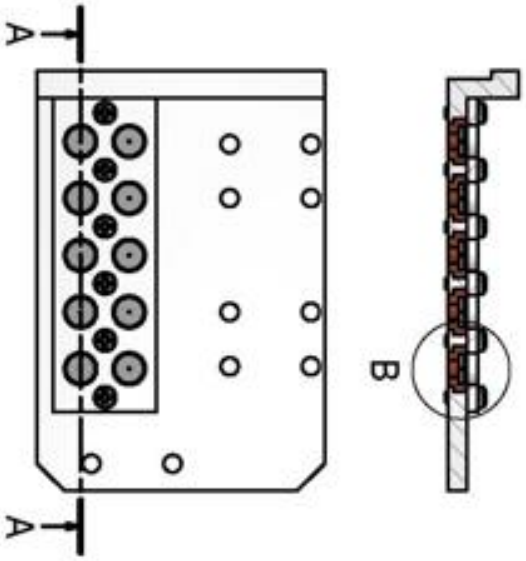
Limit Switches

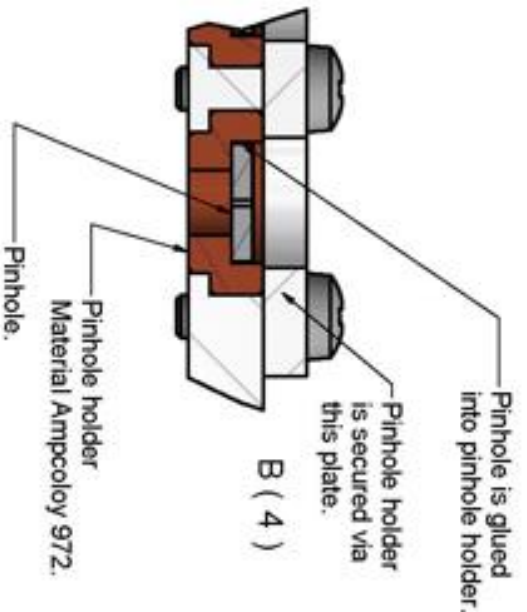
The limit switches should be wired up, if at all possible. There is always some ambiguity in the definition of the travel direction. The first time you test the pinhole aperture and cables, you should therefore open it and test the actual functioning of the limit switches. Below we show an image that may help you in determining the appropriate limit switch setup.



Mechanical overview of limit switch position

Assembly of Pinhole Holder





Trouble Shooting

The most common issues and their resolutions are:

- The motor does not move when it should (it can be silent, be jittering or be making a noise).
  - The motor is not receiving enough current. Try setting the current a bit higher (for example 10%). If problems persist check with an amp-meter to see that your driver is working properly.
  - The wiring is bad. Check cabling.
  - One of the motors' phases is burnt. Check that the resistance on all phases is the same. If not, contact us to have the system sent for repair.
  - The motor is stuck against a limit switch. Un-stick it, using the scale wheel or open the system (see manual control), and fix the limit switch issue.
- Restart the controller and the controller program.
- The system shows irreproducibility during operation.
  - The rail system may have become loose. Open the slit. Check if the rail-system is tight. Tighten screws if you need to.

Common options

- Motors: Custom high resolution stepping motors, including IMS motors.
- Encoders: Back-axle rotary encoders.
- Connectors: Adaptors to other KF (NW) flanges or CF flanges can be provided.
- Special preparation for enabling vacuum <10-6 mbar.

The JJ X-Ray Product Range

- Slit Systems (AIR,HV, UHV)
- Complete Beamline Solutions
- Spectrometers
- Refractive Optics
- Foil Collimators
- Positioning

Contact JJ X-Ray A/S

If you have any questions, concerns, request for quotations or need general advice, please feel free to contact us:

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