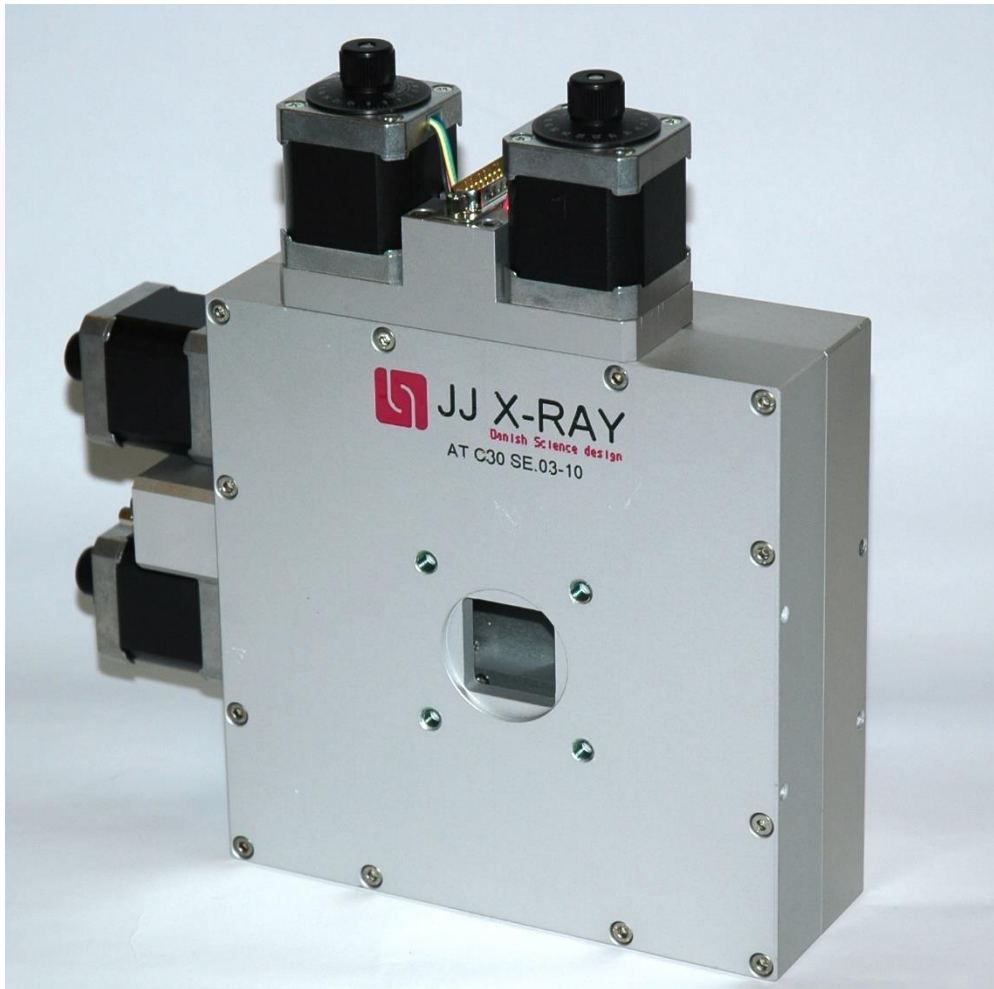


BRIEF INSTRUCTIONS For AT-C30-HV



JJ X-RAY
Danish Science Design

AT-C30-HV

The JJ X-Ray AT-C30-HV slit was developed for applications where relatively large apertures (up to 30 mm x 30 mm) and/or highly accurate slit-scans are required. Thus the AT-C30 is for customers appreciating the blade motions provided by the standard ESRF slits(AT-F7) but having found the 7 mm opening too small.

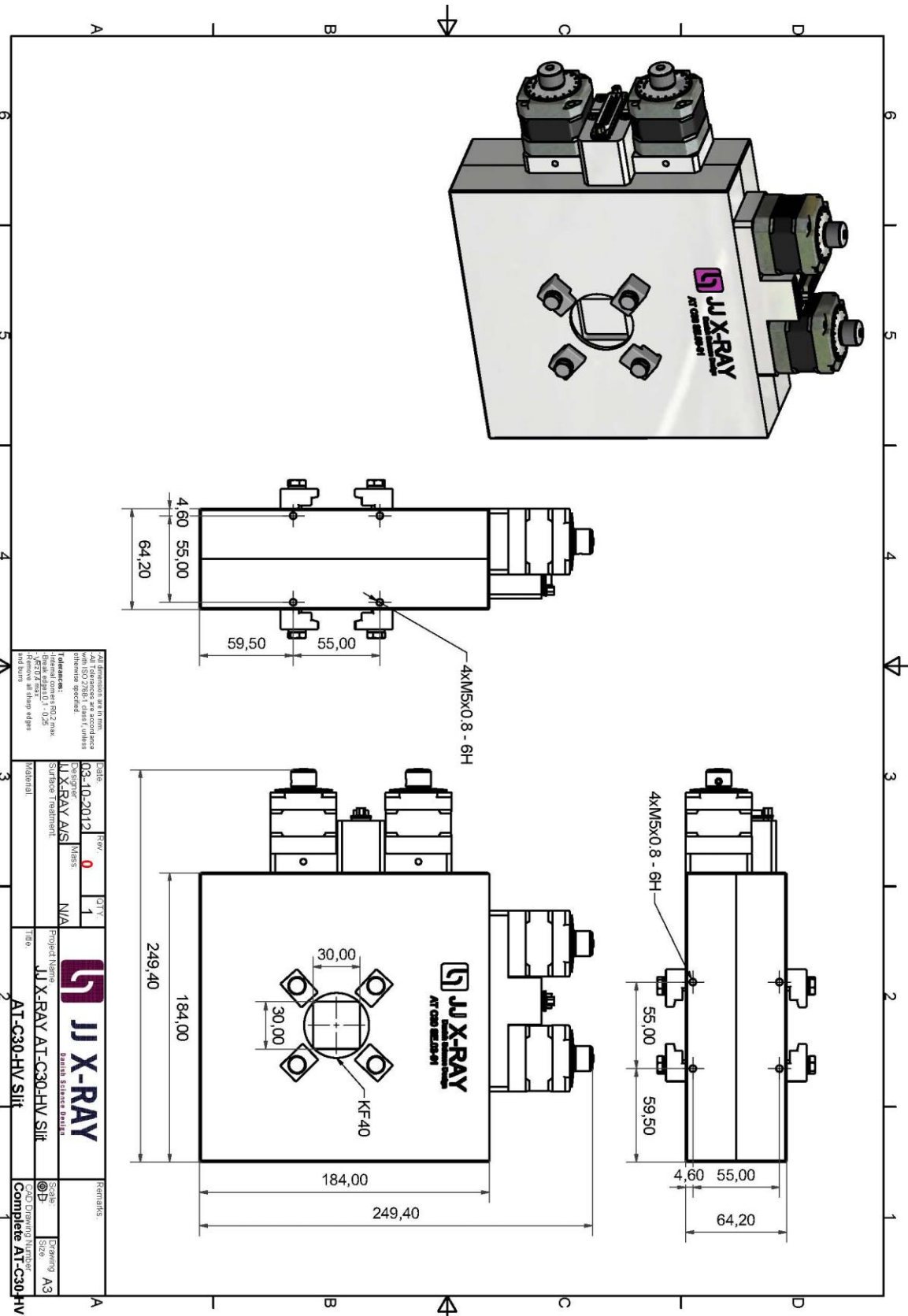
The slit system contains four motors, setting the position and the opening of the aperture. For each dimension, one motor defines the aperture opening and another one determines the aperture's position. For high precision scans with a fixed aperture, this is an advantage since only one motor is moved during a one-dimensional scan.

The blades can be installed in two configurations, either providing a curved surface of radius 16 mm or providing a knife-edge sloping at 0.5 degrees. Standard blades are polished to obtain a roughness better than 25 nm RMS.

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

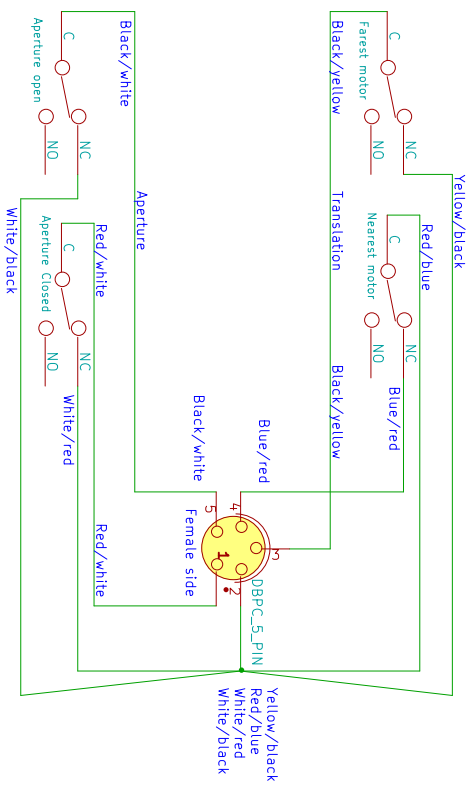
Technical Specifications

AT-C30-HV	
Aperture size	Maximum: 30 mm x 30 mm Minimum: Full Overlap
Resolution	1 micron per full step
Repeatability	< 2 micron
Accuracy	± 2 micron (over 3 mm)
Vacuum	O-ring sealed, high vacuum 10-5 mbar, low outgassing materials
Mechanical dimension	249 mm x 249 mm x 68 mm 184 mm x 184 mm x 64 mm (housing only)
Standard blades	2 mm thick tungsten carbide blades, can be mounted either with 0.5 degree knife-edge or R16 radius edge
Mechanical connections	M5-threaded holes on the sides as shown on the drawing. KF-40 flange connections are provided on the body of both sides of the slit
Limit switches (end-of-travel)	Included as standard on all motions
Weight	≈ 6.1 kg
Outer surface	Anodized aluminum in color nature
Guiding	High precision internal rails and carriages
Electrical connections	Microswitches coupled to 2 motor connectors (SUB-D 25 pins male)
Motors	2 phase stepping motors

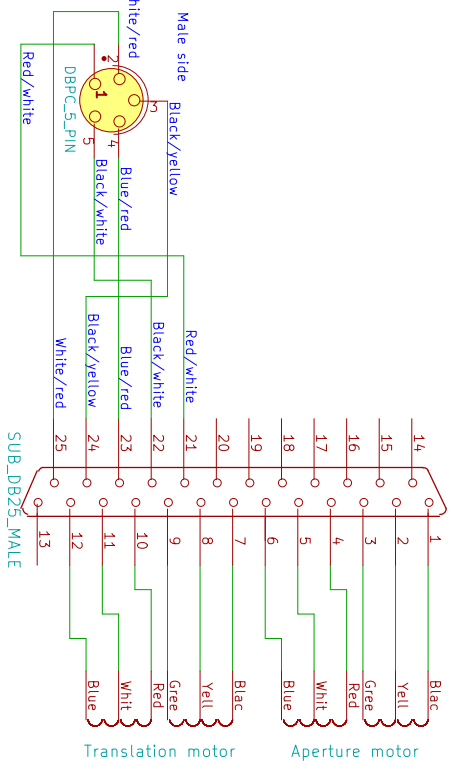


All dimensions are in millimeters. All dimensions are accordance with ISO 2768-1 class f, unless otherwise specified. Tolerances: Holes: $\pm 0,1$ max. Blind holes: $0,1 - 0,25$ max. Chamfers: $0,5 \times 45^\circ$ unless otherwise specified. Fillets: $R0,2$ max.		LOD: 1 DT: 1 REV: 0
Title: JJ X-RAY AT-C30-HV Slit Part Number: AT-C30-HV Slit	Project Name: JJ X-RAY AT-C30-HV Slit Drawing Number: AT-C30-HV Slit	Date: 03-10-2012 Version: 0 Status: MISS
Author: JJ X-RAY AIS Checked: JJ X-RAY AIS Drawn: JJ X-RAY AIS Material:	Project Name: JJ X-RAY AT-C30-HV Slit Drawing Number: AT-C30-HV Slit	Scale: A3 Drawing Size: Complete AT-C30-HV

Inside slit



Motor flange



JJ X-Ray Michael Andersen	
File: at30hv.sch	
Sheet: /	
Title: A130	Date: 23 oct 2017
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Rev: 1.0	Id: 1/1

Motor Specifications

Motor Specifications	
Number of motors	4
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

Motion Mechanism:

Type of motion	Two translations in opposite directions (aperture)
Guidance	In vacuum linear rails and carriages
Motor step angle	0.9 °/step
Lead screw pitch	2x0.4 mm/rev (left and right)
Scale factor, aperture	500 steps/mm
Mechanical resolution	1 µm/step
Aperture calibration	1 µm/step

Recommended Driver Settings	
The motors should be run <u>at 0.85 A per phase.</u> 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.

Warning:

If you are using systems/detectors that can be damaged by overexposure, where the slits are used to remove a lot of the intensity, be careful when changing aperture size since the backlash correction may result in the slit being opened significantly more than you anticipated during adjustment.

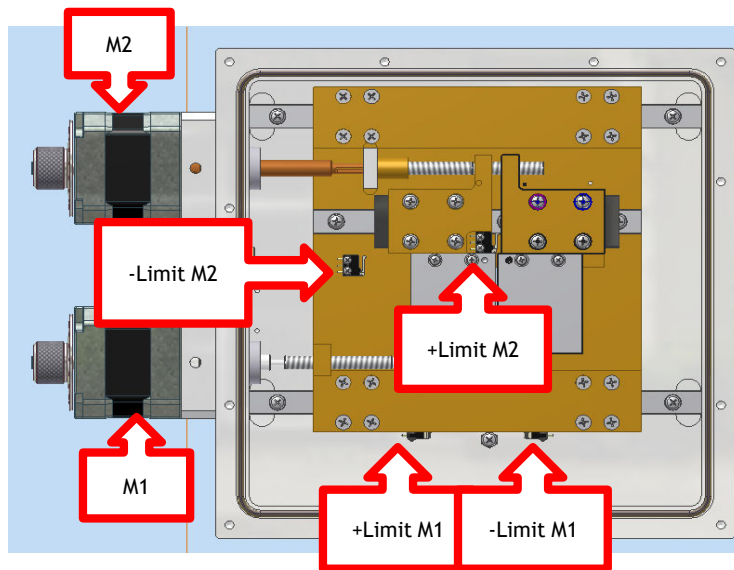
Manual Control

If for some reason, you need to move the slit blades 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 slit-versions with back shaft encoders or slit 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 slits and cables you should therefore open up the slit 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
M1 movement: Translation
M2 movement: Aperture*

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 slit sent for repair.
 - The motor is stuck against a limit switch. Un-stick it, using the scale wheel or, if an AT-slit, open the slit (see manual control), and fix the limit switch issue.
- ❏ Restart the controller and the controller program.
- ❏ The blade 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

- ❏ Blade: 4, 5 or 10 mm, other blade materials.
- ❏ 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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