MODS Darkslide Data Sheet

General Description
The MODS Darkslide is a 2 position linear mechanism that opens and closes the instrument aperture by translating two belt driven plates into or out of the light path. The rectangular opening accommodates the 6 armin square science field and the front and rear off-axis guide fields.

Topology
Two Position Linear

Rendering of Camera Focus Asm.
Drive Motor
Motor Type: Size 23 Step motor, 200 full steps per revolution, double-ended shaft
Part #: Superior # KML061F05E - D
Rated Current: 2.7 amps/phase (RMS)
Rated Holding Torque: 170 in*oz

Motor Connection Diagram (for CW rotation viewed from motor front with positive command)
A Red/White (Pin13)
A Red (Pin12)
B Black (Pin11)
B Black/White (Pin10)

Motor Controller Specifications
Manufacturer & Model: IMS MicroLYNX 7 (#MX-CS100-701)
Rated Current: 5amps RMS/phase, 7 amps peak/phase
Rated Voltage: 24 to 75 VDC
Daughterboards: None

Motor Controller Settings
MSEL = 10 10usteps/fullstep = 2000 microsteps/rev
MUNIT = 2000 sets units to (2000 usteps/rev) gives velocity and accelerations in rev/sec
MAC = 50 Acceleration Current = 50% = 3.5 amps peak
MRC = 40 Run Current = 2 amps RMS *1.4 =2.8 amps peak (2.8/7 = 40%)
MHC = 0 Motor Hold Current is zero

ACLT=1 linear acceleration (default
ACCL=DECL = 50 acceleration rate (rev/sec^2)
LDECL = 500 limit deceleration rate (rev/sec^2)
Overtravel at Limit = ScrewPitch * VM^2/(2*LDECL) = 0.30mm (pitch =75mm and VM=2 rev/sec, LDECL=500 rev/sec^2)
Beware overtravel when seeking limits, must not decelerate hard into limits
Maximum Permitted Overtravel ~ 0.5mm ~ 0.020”

VM= 2 running speed (rev/sec)
VM= 0.5 Homing speed to assert limits

Motor Controller I/O Connections
Vpull: not used
GND: 24 volt Gnd
I/O 21: CW LIMIT sensor (CW shaft rotation as viewed from motor front)
I/O 22: CCW LIMIT sensor
I/O 23: not used
I/O 24: not used
I/O 25: not used
I/O 26: not used

Input Sensors
Model P&F # NBB1.5-8GM50-E0-V3
8mm Inductive proximity sensor, Normally Open Sinking output (Type E0), 24 VDC supply
Used for CW Limit, CCW limit, and ??HOME sensors
This section will hopefully be moot with only limit sensors used!!

Note: A stainless steel clip is used for detection on position sensors; the limit sensors directly detect the aluminum darkslide plate. The difference in detection materials is used to create a larger activation gap between “In Position” and “Limit Activated” states, reducing the chance for Limits being tripped at inappropriate instances.

Sensor Setup: The spacing between the position sensor and the limit sensor should allow the position sensor to be activated without tripping the limit. However, if the position sensor fails to activate and a limit is encountered, the limit should be asserted prior to the potential collision between the darkslide plate and the position sensor.

Connection for P&F E0 Sensors (3 wire)
Brown  +24 volts
Blue  24 volt ground
Black to input of controller

**Drive Mechanics**
The darkslide plates are simultaneously driven open or closed by way of 2 timing belts. One plate is clamped to the lower side of each belt and the other plate is attached to the upper side of each belt.

The timing belts are ????? Pitch
The timing pulleys are ????? Pitch, ????? Teeth

**Darkslide motion**
The darkslide uses a 1:1 drive ratio.

**Performance**
Maximum Travel Time ?? seconds
Position Repeatability ?? micron error
Position Hysteresis ?? micron
There may be a problem with the plates moving away from the limit sensors when power is turned off leaving the mechanism in an indeterminate state. This must be remedied.

**Software Notes**