MODS Dichroic Select Data Sheet

General Description
The MODS Dichroic Select mechanism is a 3 position rotary mechanism that selects which channel of MODS is being used. The 3 configurations of MODS are: blue channel only, red channel only, and combined blue and red channel. The mechanism is a 3 position indexed rotary device which can be driven to any position in any direction (CW or CCW). When the Dichroic Select Drum reaches its selected destination the drive current is turned off and the Dichroic Select Drum is held in place by a spring loaded detent roller. The position of the Dichroic Select Drum is identified by means of a “Position Valid” bit which is TRUE when the wheel is in a detented position and “Binary Code” bits which indicate the Dichroic Select Drum position with a binary number. The “Position Valid” bit and “Binary Code” bits are produced by inductive proximity sensors activated by slots in the Dichroic Select drive gear face.

Topology
Indexed Rotary
**Drive Motor**

Motor Type: Size 23 Step motor, 200 full steps per revolution  
Part #: Superior # KML062F07  
Rated Current: 3.3 amps/phase parallel (RMS)  
Rated Holding Torque: 250 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 = 60 Acceleration Current = 60% ~ 4.2 amps peak  
- MRC = 60 Run Current = 3.0 amps *1.4 =4.2 amps (4.2/7 = 60% )  
- MHC = 0 Motor Hold Current is zero  
- ACLT=1 linear acceleration (default)  
- ACCL=DECL = 50 acceleration rate (rev/sec^2)  
- VM= ?? running speed (rev/sec)

**Motor Controller I/O Connections**

- Vpull: not used  
- GND: 24 volt Gnd  
- I/O 21: 1’s LSB of Position code bit  
- I/O 22: 2’s LSB of Position code bit  
- I/O 23: not used  
- I/O 24: not used  
- I/O 25: not used  
- I/O 26: “Position Valid” sensor

**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 detecting “Position Valid” hole and “Position Code” slots.

***Sensor faces should be positioned 0.010” from gear face.

Connection for P&F E0 Sensors (3 wire)

- Brown +24 volts  
- Blue 24 volt ground  
- Black to input of controller
**Output Devices**

None
**Drive Mechanics**
The motor for the Dichroic Select was chosen for its ability to overcome the holding force of the
detent and drive the Dichroic Select to its next position. The spring for the detent was chosen for
its ability to overcome the cogging torque of the motor and back-drive the Dichroic Select into its
docked position.

**Dichroic Select motion**
Pinion = 18 teeth
Gear = 369 teeth
Gear Ratio = (369/18) = 20.5
Full Steps Between mirror positions = 1/4 Rev (20.5)(200 Steps/Rev) = 1025 Steps
Full Steps Between mirror & open = 1/2 Rev (20.5)(200 Steps/Rev) = 2050 Steps

**Performance**
Typical Travel Time 11 seconds per position
Position Repeatability ?? micron error
Position Hysteresis ?? micron

**Software Notes**