Lead Screw Test

Date Completed: _____

Performed By: _____

Specifications Tested

#	Specification	Unit of Measure	Target Value	Comments
S5	Limits of travel in each direction	cm	1	Specification is provided for range of motion of the manipulator. In order for the manipulator to achieve 1cm of motion the lead screw need to travel 2.3 cm.
S6	Speed of travel	mm/s	0.5	Motor rated at 22rpm. Theoretical max speed is 0.116 mm/s
S7	Resolution	µm	< 0.1	The resolution of the lead screw must be 0.23 µm in order for the manipulator to obtain a resolution of 0.1 µm.
S8	System backlash	rev	< 1	Theoretically there should be no backlash at the lead screw. The majority of the backlash introduced in the hydraulic system.
S13	Systems full range of motion can be operated in safely	Binary	Yes	

Document History

Revision	Description	Date
1	Document Created	10/28/2012

Equipment

___ Lead screw and motor assembly
___ Power supply for controls and motor
___ Computer to control motor
___ Stop watch
___ Ruler
___ Micrometer

Sections (Can be completed and combined as necessary)

- Part I: Limits of travel, speed of travel and safe operation
- Part II: System backlash and drift
- Part II: Resolution

Lead Screw Test

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Part I: Limits of travel and safe operation

_____ 1. Attach lead screw to motor coupling

_____ 2. Move lead screw nut to the furthest rear position (motor-side)

_____ 3. Mark position of lead screw nut

_____ 4. Move lead screw nut to furthest forward position and use the stop watch to find the time it takes to complete the full distance.

_____ 5. Mark position of lead screw nut and measure the distance between the start and end position

_____ 6. Repeat for all axes

Measurement	**Units**	**Value**
Distance between start and end position	mm	

Sign off on section completion before continuing:_____

Lead Screw Test

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Part II: System backlash

_____ 1. Mark initial position of lead screw nut

_____ 2. Move lead screw forward ten revolutions

_____ 3. Move lead screw backward ten revolutions

_____ 4. Mark end position of lead screw nut

_____ 5. Calculate the degrees of backlash and repeat for all the axes

Measurement	**Units**	**Value**
Backlash	Degrees	

Sign off on section completion before continuing:_____

Lead Screw Test

Date Completed: _____

Performed By: _____

Part III: Resolution

_____ 1. Move lead screw nut backwards till backlash is eradicated

_____ 2. Mark position of lead screw nut

_____ 3. Rotate motor full 20 revolutions to move lead screw backwards

_____ 4. Mark position of lead screw nut and measure the distance between the start and end position

Measurement	**Units**	**Value**
Distance between start and end position	mm	

Sign off on section completion before continuing:_____

Lead Screw Test

Date Completed: _____

Performed By: _____

Part IV: Speed of Travel

_____ 1. Mark initial position of lead screw nut

_____ 2.Time the motors running at max. speed for 10 revolutions

_____ 3.Mark final position of lead screw nut

Measurement	**Units**	**Value**
Speed of travel	mm/s	

Sign off on section completion before continuing:_____