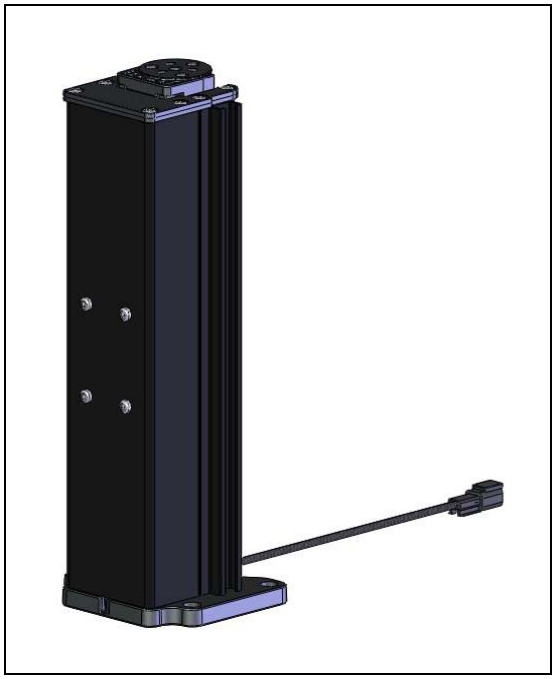
WCS-400200

Original Release: 11/17/2009 ***Williams Customer Specification***
Original Project #: 1234

Features:

- 100mm Vertical Adjustment
- 24 VDC Gear Motor
- Stainless Steel Lead Screw
- Anodized Aluminum Housing
- -40°C to + 60°C Operation
- Caterpillar P/N 344-9581



Applications:

- Control Pod Adjuster for Caterpillar M Series Motor Graders
- Proprietary to Caterpillar

Description:

The Vertical Adjuster is a single-axis positioner used to support and adjust the control pods for the motor grader. The grader has two control pods, left and right, mounted to the floor of the cab on either side of the driver's seat. The control pod is an assembly containing the arm rest, joystick, and other hand controls. The joysticks control the speed and direction of the vehicle, as well as blade position and orientation.

Each cab has two adjusters, one for each pod. The same adjuster assembly is used for both right and left hand pods. The operator uses a switch to adjust the vertical position of each individual control pod.

Absolute Maximum Electrical/Mechanical Ratings

Supply Voltage	-30 VDC to +30 VDC
Operating Temperature	-40°C to +60°C
Storage Temperature	-40°C to +85°C
Moving Load Limit	334N (75 Lb) at top center of mount plate
Static Load Limit	1335 N (300 Lb) downward load at top center of mount plate
Side Load Limit	Undefined
Moment Load Limit	580 Nm (428 ft-Lb) in each of 3 axes at top center of mount plate
Duty Cycle	Refer to Applications Information Below.

Operation of this device beyond absolute maximum ratings may result in permanent damage.

Electrical Specifications: Motor

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Voltage		23	24	29	VDC
Current Draw	24 VDC, with no load	0.1		0.9	A
	24 VDC, with 22 Lb load	0.5		1.8	A
	24 VDC, with 75 Lb load	1.0		3.6	A
Stall Current	24 VDC	6.2	6.5	8.5	A
Overload Protection		None			

Mechanical Specifications: Adjuster

Parameter	Conditions	Min.	Typ.	Max.	Units
Moving Load	Centered on mount plate		98 (22)	334 (75)	N (Lb)
Static Load in vertical direction	Centered on mount plate			1335 (300)	N (Lb)
Moment Load in all 3 axes	Centered on mount plate			580 (428)	N-m (ft-Lb)
Upward Load	Centered on mount plate			TBD	N (Lb)
Displacement, Vertical		98 (3.858)	100 (3.937)	113 (4.016)	mm (in)
Speed, time to run from one end of travel to the opposite	25 deg C, No load	5		11	Second
	25 deg C, No load	5		12	Second
Deflection	At 8” above mount plate, in fore/aft and lateral direction, under 98 N (22 Lb) load			1.5 (.059)	Mm (in)
Product Assembly Weight		3.49 (7.7)	3.63 (8.0)	3.76 (8.3)	Kg (Lb)
Life expectancy	23 deg C	15,000			cycles
	60 deg C	10,000			cycles
	45 deg C, 85% humidity	10,000			cycles
	-40 deg C	500			cycles

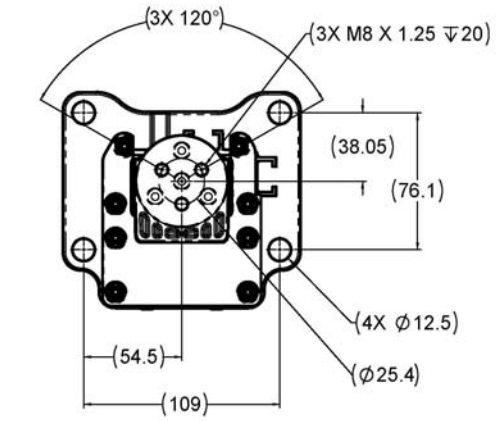
Environmental Validation

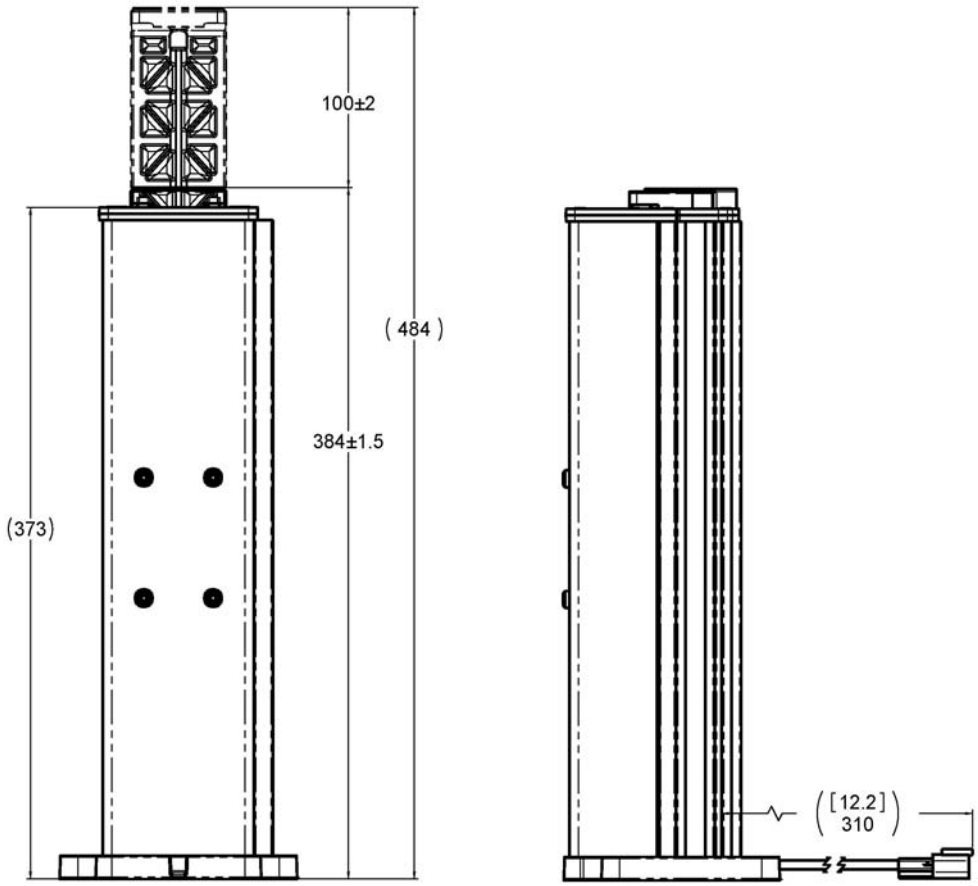
Thermal Cycle:	**Refer to Williams Spec WDS-010**
Thermal Stress:	
Thermal Shock:	
Humidity:	
Salt Spray:	
Dust Exposure:	
Chemical Immersion:	
Pressure Wash:	
Mechanical Shock:	
Vibration:	**Per Caterpillar "M2 Control POD PSD's.xls"**

Mechanical Validation

Parameter	Conditions	Min.	Units
Full Stroke Adjuster Cycles	23 deg C	15,000	cycles
Full Stroke Adjuster Cycles	60 deg C	10,000	cycles
Full Stroke Adjuster Cycles	45 deg C, 85% humidity	10,000	cycles
Full Stroke Adjuster Cycles	-40 deg C	500	cycles

Mechanical Dimensions and Characteristics (for reference only)





Applications Information:

Duty Cycle

- The adjuster is designed to support a 98N (22 Lb) control pod. When the load is higher than 98N, the duty cycle of the motors is reduced. With any load higher than 98N the adjuster may only be operated intermittently, otherwise the motors will overheat and sustain permanent damage.
- There is no limit on the duty cycle when the adjuster is supporting only the control pod, and is not run into the end stops, except for a few seconds at a time.
- When the maximum load of 75 lb is applied, the duty cycle of the vertical mechanism of the adjuster is limited to 6%. This means the adjuster can only be operated with the 75 lb load for brief periods of time, and then it can only run 6% of the time when averaged over some period of time.

Electrical Connectors and Wiring

- Connector Details – See Dwg 400200 Control Pod Adjuster
    - Mating Connector, motor – CAT connector P/N 271-5590

Referenced Documents:

- Williams Controls DWG # 400200
- Williams Controls Specification # WDS-010
- Caterpillar Specification “williams vertical spec 02 23 09.xls”

Revision History

Rev	Date	ECN#	Checked	Approved	Changes/Comments
-	11-17-09				Preliminary Draft
A	3-29-10	001928			Release to Production