

DATE	SYM	REVISION RECORD	AUTH.	DRN	CHK	DATE	SYM	REVISION RECORD	AUTH.	DRN	CHK
8/16/01	G	Redrawn as per CS402, Rev. G Drawing (11/13/82)	LNC	WN	DP						
		and PMC Bulletin 106									
6/9/10	H	Sheet 4 Revised and Redrawn	DZP	WJN	DZP						

SPECIFICATIONS

MECHANICAL

1. **OUTLINE AND DIMENSIONS.** The outline and dimensions are as specified on Figure 1.
2. **MARKING.** Adjustable cam switches are marked with the manufacturer's name and manufacturer's part number, as a minimum.
3. **SHAFT END PLAY.** 0.001 inches maximum.
4. **SHAFT PILOT RUNOUT.** 0.001 inches maximum, T.I.R.
5. **MAKE - BREAK DIFFERENTIAL.** 1.0° maximum.
6. **OPERATING TORQUE.** 1.0 oz.- in. maximum per switch.
Peak torque occurs at switch actuation. With all switches in a multi-switch unit set to identical on - off positions, the total maximum torque will not exceed $n \times 1.0 \text{ oz.- in.}$; (where n is the number of switches in the stack.) With different switch settings the total maximum torque may be as low as $0.5 \times n \times 1.0 \text{ oz.- in.}$, depending upon the specific on - off setting and number of switches.
7. **SHAFT SUPPORTS.** Shaft rotates on precision ball bearings.
8. **SWITCH DWELL ANGLE.** Continuously adjustable from 3° to 357° of shaft rotation.
9. **SWITCH SETTINGS.** Refer to Figure 2 for adjusting switch closure angle.
 - a. Switch settings are infinitely adjustable with respect to shaft.
 - b. Switch settings are independent of other switches in stack.
 - c. Adjustments can be made while shaft is either stationary or rotating.

10. **MATERIALS.** The materials are as specified in the following paragraphs. When a definite material is not specified, the material used will enable the rotary switch to meet the performance specifications of this drawing.
 - a. Shaft: Type 303 Stainless steel
 - b. Microswitch Contacts: Silver alloy or silver plated. Optional gold and/or gold bifurcated contacts are available.
 - c. Housing: 2024-T351 Aluminum alloy.
 - d. Hardware: Type 18-8 Stainless steel.
 - e. Bearings: Corrosion resistant, sealed or shielded ball bearings permanently lubricated. (AIS 144 OC Stainless steel)
11. **FINISH.**
 - a. Housing: Anodized aluminum (Mil-A-8625 Type 1)
 - b. Shaft: Passivated (Mil QQ-P-35 Type 2)

TOLERANCES (EXCEPT AS NOTED)		PRECISION MECHANISMS CORPORATION			
DECIMAL		SCALE	DRAWN BY		
± .005		1:1	APPROVED BY		
FRACTIONAL	PART NUMBER & TITLE				
± 1/64	CS402-"N", SWITCH, CAM, ADJUSTABLE				
ANGULAR	DATE	SIZE	DRAWING NUMBER		REV.
± 2°	8 /16 /01	A	106235		H
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SPECIFICATIONS (Continued)

ELECTRICAL

1. SWITCHES. Honeywell Microswitch 22SM426-T
(Other Honeywell Microswitch types are available to suit particular applications and electrical requirements.)
2. AC VOLTAGE RATING. 115/230 volts AC at 5 amps, inductive and resistive.
3. DC VOLTAGE RATING. 30 volts DC
 - a. 5 amps resistive from sea level to 50,000 feet.
 - b. 3 amps inductive at sea level.
 - c. 2.5 amps inductive at 50,000 feet.
4. INRUSH CURRENT. 24 amps maximum.
5. CONTACT RESISTANCE. Will not exceed 1 percent of the total load resistance.
6. SWITCH CIRCUITRY. SPDT, see Figure 3 for schematic.
7. TERMINAL FINISH. All external terminals are plated for soldering.
(Other types of terminations are available to suit a particular application and electrical requirement.)

OPERATING

1. TEMPERATURE. - 65° F. to +250° F.

OPTIONS

- a. Non-standard shaft extensions.
- b. Double-ended shaft extensions for mounting dial or indicator.
- c. Ultra low differential microswitches.
- d. Multi-switch units mounted in gear train mechanisms using potentiometers and/or resolvers.

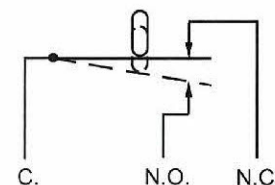


Figure 3
Switch Schematic

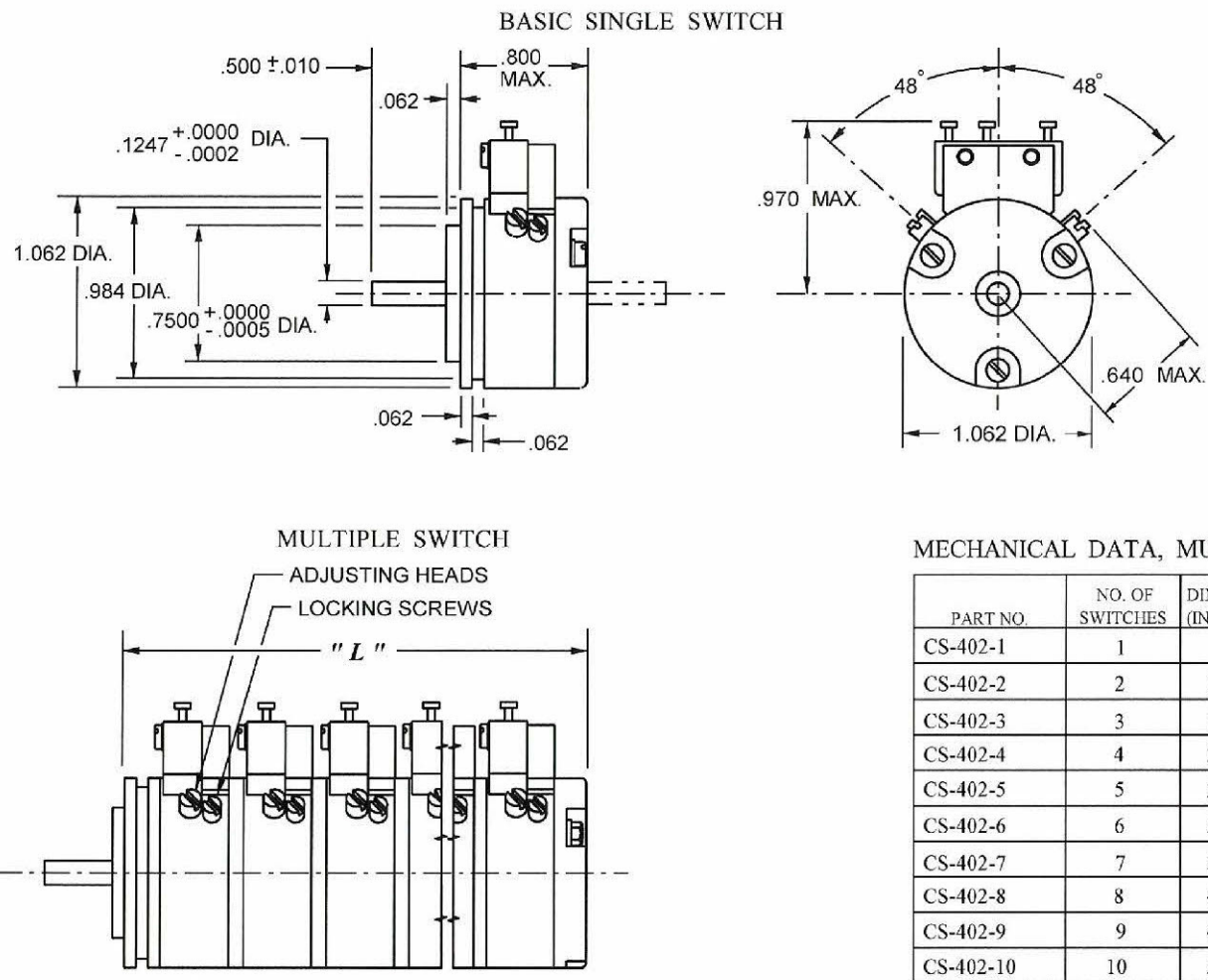
SIZE
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REV.
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MECHANICAL DATA, MULTIPLE STACK UNITS

PART NO.	NO. OF SWITCHES	DIM. "L" (IN., MAX.)	INERTIA (OZ. IN. SEC. ²)	WT. (OZ.)
CS-402-1	1	.800	0.6×10^{-5}	1.4
CS-402-2	2	1.300	1.2×10^{-5}	2.1
CS-402-3	3	1.800	1.8×10^{-5}	2.8
CS-402-4	4	2.300	2.5×10^{-5}	3.5
CS-402-5	5	2.800	3.1×10^{-5}	4.3
CS-402-6	6	3.300	3.7×10^{-5}	5.0
CS-402-7	7	3.800	4.3×10^{-5}	5.7
CS-402-8	8	4.300	4.9×10^{-5}	6.5
CS-402-9	9	4.800	5.5×10^{-5}	7.2
CS-402-10	10	5.300	6.1×10^{-5}	8.0

Figure 1
Outline and Dimensions

ADJUSTING PROCEDURE FOR CS-402 CAM SWITCH

1. FOR SWITCH CLOSURE ANGLE " α " OF 182° OR LESS
WIRE TO "COMMON" (C) AND "NORMALLY OPEN" (N.O.)
(REFERENCE DIAGRAM PRINTED ON END CAP)
2. ROTATE SHAFT TO RIG POSITION AND CONNECT
OHMMETER OR TEST LIGHT TO COMMON (C) AND
NORMALLY OPEN (N.O.)



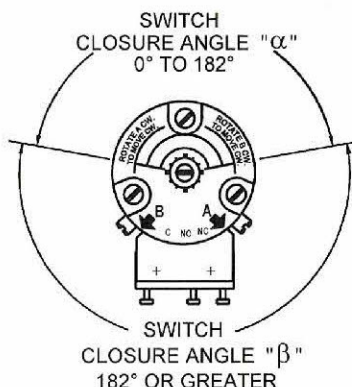
Microswitch closed position

3. LOCK SHAFT AGAINST ROTATION.
4. LOOSEN LOCKING SCREW "A".
- * 5. TURN ADJUSTING HEAD "A" CW UNTIL SWITCHING
POINT IS REACHED.
6. **CAUTION:** - IF SOLID RESISTANCE IS NOTED WHILE
TURNING ADJUSTING HEAD "A" - **STOP:** -
TIGHTEN LOCKING SCREW "A"
LOOSEN LOCKING SCREW "B" AND TURN
ADJUSTING HEAD "B" CW ONE FULL REVOLUTION.
TIGHTEN LOCKING SCREW "B"
7. LOOSEN LOCKING SCREW "A" AND RESUME
CW ROTATION OF ADJUSTING HEAD "A" UNTIL
SWITCHING POINT IS REACHED, THEN TIGHTEN
LOCKING SCREW "A".
8. ROTATE SHAFT TO SECOND SWITCHING POINT. LOOSEN
ADJUSTING HEAD LOCKING SCREW "B" AND ROTATE
ADJUSTING HEAD "B" CW OR CCW UNTIL SWITCHING POINT
IS REACHED.
9. RESUME ABOVE PROCEDURE IF SWITCHING POINTS
HAVE NOT BEEN REACHED.
10. UNLOCK SHAFT AND ROTATE TO NEXT ANGULAR POSITION
TO ADJUST FOLLOWING MICRO SWITCH SWITCHING POINTS.
(REPEAT PROCEDURE FOR REMAINING MICRO SWITCHES).

NOTE:

SWITCHING CLOSURE ANGLES FOR BOTH " α " AND " β " CAN BE ADJUSTED TO ZERO
WHICH RESULTS IN NO SWITCH ACTUATION. MINIMAL CLOSURE ANGLE MUST BE
MAINTAINED WHEN "CHASING" AN ANGLE TO A NEW POSITION - CHASING ANGLE
DIAGRAM IS PRINTED ON SWITCH END CAP.

RED LINE ON SHAFT AND PRINTED DIAL ON END CAP INDICATES APPROXIMATE
POSITION OF SHAFT.



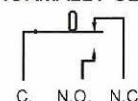
UNIT HAS INTERNAL STOPS AT
0° AND 182°.
DO NOT OVER -TORQUE ADJUSTING
HEADS. DO NOT EXCEED 16.0 OZ. IN.

BACK OFF LOCKING SCREW ONLY
SO THAT ADJUSTING HEAD IS
SLIGHTLY FRICTIONED.

WHEN ROTATING ONE ADJUSTING
HEAD, THE OPPOSITE ADJUSTING
HEAD MUST BE LOCKED.

DO NOT OVER TORQUE LOCKING
SCREWS. TIGHTEN SLIGHTLY PAST
FULLY COMPRESSED LOCK
WASHER.

1. FOR SWITCH CLOSURE ANGLE " β " OF 182° OR GREATER
WIRE TO "COMMON" (C) AND "NORMALLY CLOSED (N.C.)
AND ADJUST IN (360° - β) (REFERENCE DIAGRAM
PRINTED ON END CAP)
2. ROTATE SHAFT TO RIG POSITION AND CONNECT
OHMMETER OR TEST LIGHT TO COMMON (C) AND NORMALLY
CLOSED (N.C.)



Microswitch closed position

3. LOCK SHAFT AGAINST ROTATION.
4. LOOSEN LOCKING SCREW "A".
- * 5. TURN ADJUSTING HEAD "A" CW UNTIL SWITCHING
POINT IS REACHED.
6. **CAUTION:** - IF SOLID RESISTANCE IS NOTED WHILE
TURNING ADJUSTING HEAD "A" - **STOP:** -
TIGHTEN LOCKING SCREW "A"
LOOSEN LOCKING SCREW "B" AND TURN
ADJUSTING HEAD "B" CW ONE FULL REVOLUTION.
TIGHTEN LOCKING SCREW "B"
7. LOOSEN LOCKING SCREW "A" AND RESUME
CW ROTATION OF ADJUSTING HEAD "A" UNTIL
SWITCHING POINT IS REACHED, THEN TIGHTEN
LOCKING SCREW "A".
8. ROTATE SHAFT TO SECOND SWITCHING POINT. LOOSEN
ADJUSTING HEAD LOCKING SCREW "B" AND ROTATE
ADJUSTING HEAD "B" CW OR CCW UNTIL SWITCHING POINT
IS REACHED.
9. RESUME ABOVE PROCEDURE IF SWITCHING POINTS
HAVE NOT BEEN REACHED.
10. UNLOCK SHAFT AND ROTATE TO NEXT ANGULAR POSITION
TO ADJUST FOLLOWING MICRO SWITCH SWITCHING POINTS.
(REPEAT PROCEDURE FOR REMAINING MICRO SWITCHES).

* ½ TURN OF ADJUSTING HEAD MOVES THE ANGLE
APPROXIMATELY 30°

Figure 2

SIZE	DRAWING NUMBER	REV.
A	106235	H
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