

NOTICE - UNLESS OTHERWISE SPECIFIED, DIMENSIONS AND OTHER DATA ARE IN INCHES. UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES. UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES. UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES.

1010784

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 15068	12-22-64	WK
A	REVISED PER TDRR 16051	2/9/65	WK

**REQUIREMENTS:**

1. GENERAL:
  - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
  - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404, CLASS 2.
  - C. UNITS SHALL BE CAPABLE OF MEETING ALL QUALIFICATION REQUIREMENTS SPECIFIED IN ND 1002046 UNLESS MODIFIED OR AMENDED BY DESIGN REQUIREMENTS OF THIS DRAWING. ALL ELECTRICAL REQUIREMENT LEVELS AS LISTED ON THIS DRAWING SHALL TAKE PRECEDENCE OVER THOSE LISTED IN ND 1002046. THE CLASSIFICATION OF THIS RELAY SHALL BE GENERAL PURPOSE.
  - D. THIS UNIT SHALL MEET ALL APPLICABLE PARAGRAPHS OF MIL-R-5757 WITH THE FOLLOWING QUALIFICATIONS.
  - E. PRESERVATION, PACKAGING, PACKING AND CONTAINER MARKING PER ND 1002215, CLASS 1, CODE 1. (THERE ARE NO CRITICAL FUNCTIONING OR CLOSELY TOLERANCED SURFACES AS DESCRIBED IN ND 1002215).

**2. INSPECTION AND ACCEPTANCE:**

- A. MECHANICAL REQUIREMENTS:
  - (1) LEAD MATERIAL: SHALL BE THE LENGTH SPECIFIED AND SHALL BE IRON NICKEL ALLOY, COPPER CLAD, ANNEALED, GOLD PLATED (DUMET) WIRE LEADS PER ND 1015401. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
  - (2) MARKING: UNIT SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE FOLLOWING:
    - MANUFACTURER'S NAME OR SYMBOL
    - MANUFACTURER'S PART NUMBER
    - NASA DRAWING NUMBER, DASH NUMBER, AND REVISION LETTER
    - RATED COIL VOLTAGE
    - DATE CODE
    - COIL RESISTANCE
    - CIRCUIT DIAGRAM
  - (3) SEALING: (100% INSPECTION) SEAL TEST III EXCEPT THE MAXIMUM LEAK RATE SHALL BE  $10^{-8}$  cc/SEC.
- B. ELECTRICAL REQUIREMENTS:
  - (1) PULL-IN VOLTAGE: SEE TABLE I.
  - (2) DROP-OUT VOLTAGE: SEE TABLE I.
  - (3) CONTACT RESISTANCE: (100% INSPECTION) .05 OHM MAXIMUM BEFORE AND DURING LIFE (.10 OHMS MAXIMUM AFTER LIFE) WHEN MEASURED WITH 100 MILLIAMPS FROM A SIX (6) VOLT DC SOURCE. (THE CONTACTS SHALL NOT SWITCH THE MEASURING LOAD).

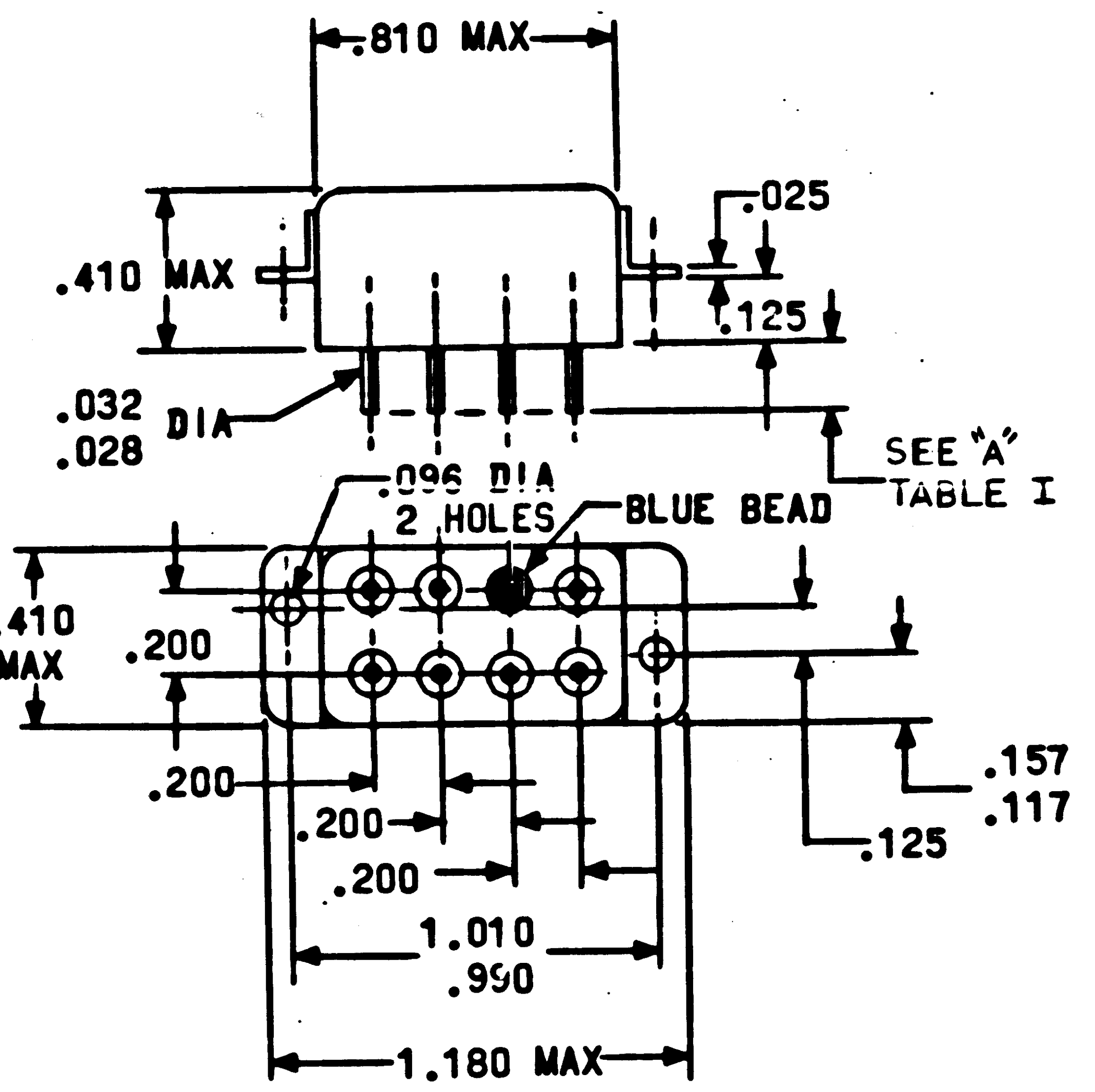


FIGURE 1

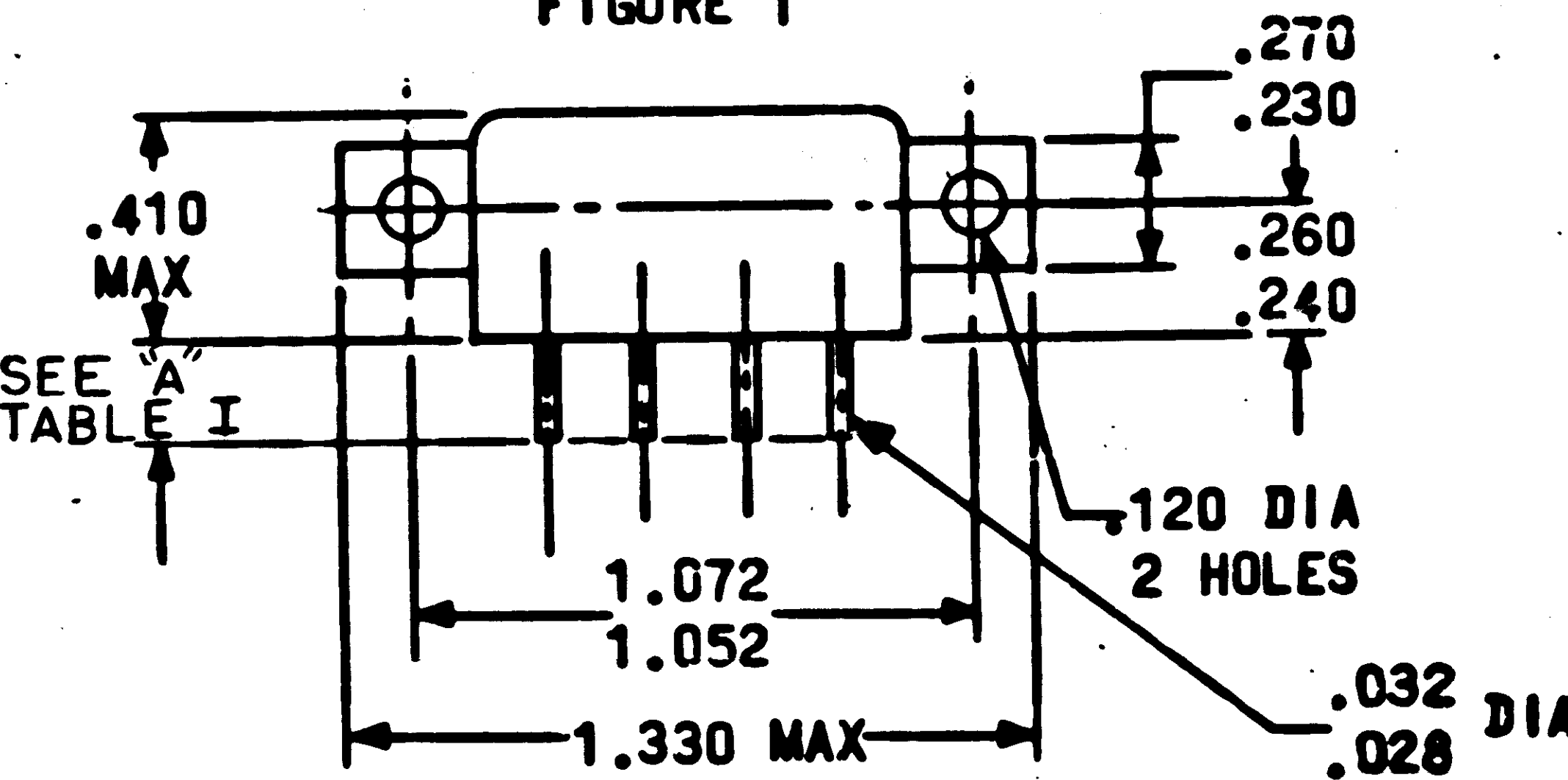
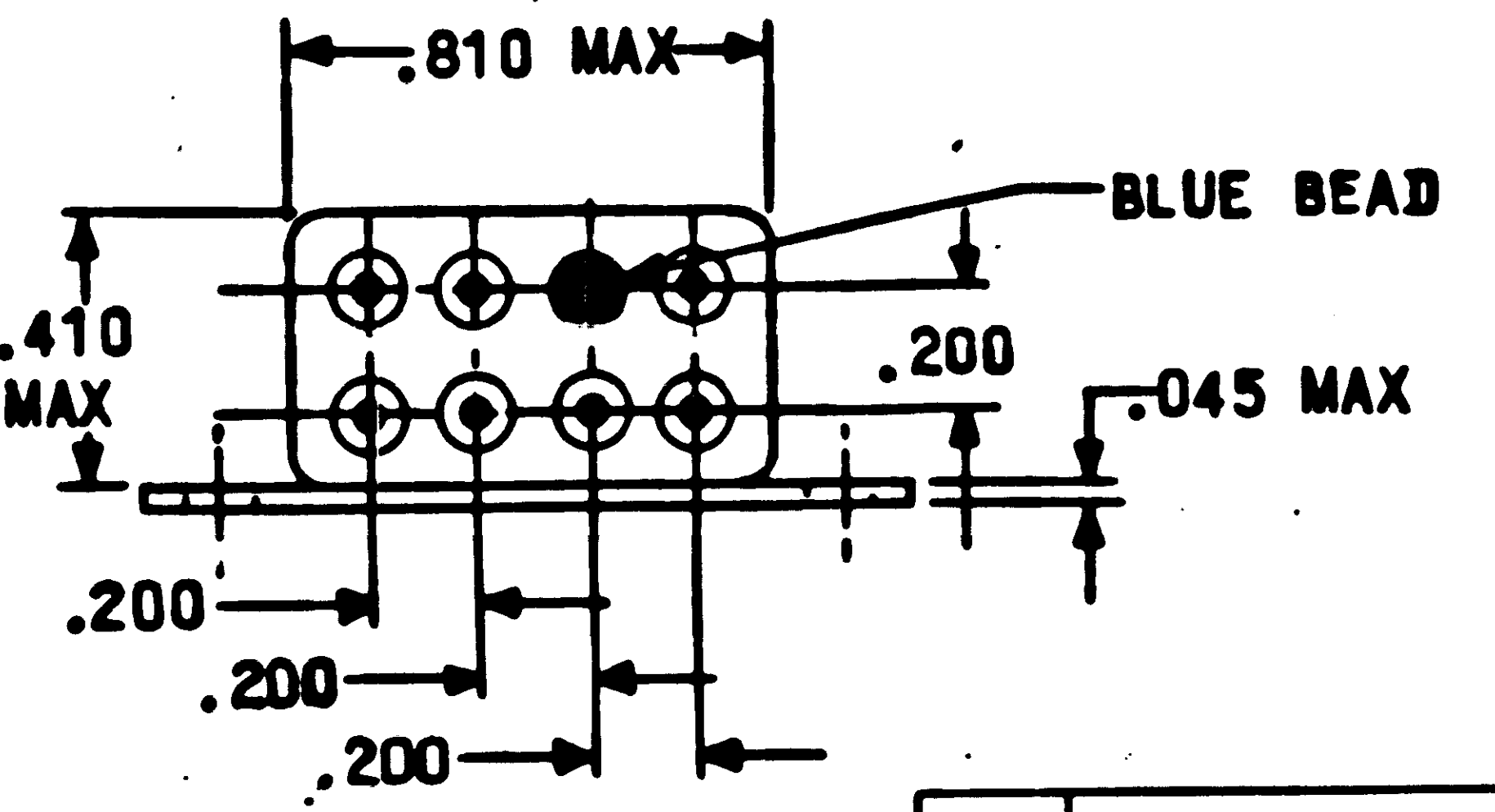


FIGURE 2



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			
MIT INSTRUMENTATION LAB CAMBRIDGE, MASS Contract NAS 9-497		MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
DRAWN <i>R. J. ...</i> DATE 7/10/64 CHECKED <i>Ed Foster</i> 8 Jun 64 APPROVAL <i>Berketwol</i> 4 Dec 64 APPROVAL <i>J. ...</i> 12/22/64		RELAY, ARMATURE (GENERAL PURPOSE)	
SEE REQUIREMENTS		SPECIFICATION CONTROL DRAWING	
HEAT TREATMENT NONE		CODE IDENT NO. SIZE C	NASA DRAWING NO. 1010784
FINAL FINISH NONE		SCALE NONE	WT SHEET 1 OF 4

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER



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1010784

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 15068	12-22-64	[Signature]
A	REVISED PER TDRR 16051	2/9/65	[Signature]

**REQUIREMENTS: (CONTINUED)**

- (4) DIELECTRIC STRENGTH: SHALL WITHSTAND FOR ONE MINUTE THE FOLLOWING POTENTIALS AT THE INDICATED LEVELS, WITHOUT ARCING, DAMAGE, OR BREAKDOWN.
  - (a) SEA LEVEL: 1000 VOLTS RMS 60 CPS BETWEEN,
    1. CONTACT TERMINALS AND COIL TERMINALS,
    2. CONTACT TERMINALS AND CASE,
    3. CIRCUITS
  - (b) SEA LEVEL: 500 VOLTS RMS 60 CPS BETWEEN,
    1. OPEN CONTACT TERMINALS OF EACH CIRCUIT (RELAY BOTH ENERGIZED AND DEENERGIZED)
    2. COIL TERMINALS AND CASE.
  - (c) ALTITUDE: 300 VOLTS RMS 60 CPS BETWEEN,
    1. ALL TERMINALS AND CASE.
    2. ALL TERMINALS
- (5) INSULATION RESISTANCE: 1000 MEGOHMS MINIMUM, USING A 500 VOLT DC TEST POTENTIAL APPLIED BETWEEN
  - (a) COIL TERMINALS, COMMONLY CONNECTED, AND CASE
  - (b) EACH NORMALLY OPEN CONTACT AND CASE
  - (c) EACH MOVABLE, OR "COMMON", CONTACT AND CASE (WITH COIL DEENERGIZED)
  - (d) ALL CONTACT TERMINALS, COMMONLY CONNECTED, AND THE COIL TERMINALS.
- (6) OPERATE TIME: 5 MILLISECONDS MAXIMUM OVER THE AMBIENT TEMPERATURE RANGE.
- (7) RELEASE TIME: 5 MILLISECONDS MAXIMUM OVER THE AMBIENT TEMPERATURE RANGE.
- (8) CONTACT BOUNCE TIME: 2 MILLISECONDS MAXIMUM OVER THE AMBIENT TEMPERATURE RANGE. (CONTACT BOUNCE TIME IS NOT TO BE INCLUDED IN OPERATE AND RELEASE TIME).

**3. DESIGN REQUIREMENTS:**

- A. AMBIENT TEMPERATURE RANGE: -65°C TO +125°C
- B. COIL RESISTANCE: SEE TABLE I
- C. LIFE: WHEN TESTED AT ANY OF THE ABOVE RATINGS, OR BETWEEN THE MAXIMUM RATING AND THE MINIMUM RATING, FOR 100,000 CYCLES, OVER THE AMBIENT TEMPERATURE RANGE, THERE SHALL BE NO FAILURES AS DEFINED IN ND 1002046 AND THERE SHALL BE NO CONTACT RESISTANCE READING GREATER THAN 1 OHM DURING ANY CYCLE.
- D. TERMINAL STRENGTH: 3 LBS MINIMUM AXIAL PULL
- E. ENVIRONMENTAL LEVELS:
  - (1) TEMPERATURE:
    - (a) HIGH: +125°C
    - (b) LOW: -65°C
  - (2) THERMAL SHOCK: -65°C TO +125°C
  - (3) VIBRATION: 10-2000 CPS, 20 G
  - (4) SHOCK: 50 G, 11 MILLISECONDS

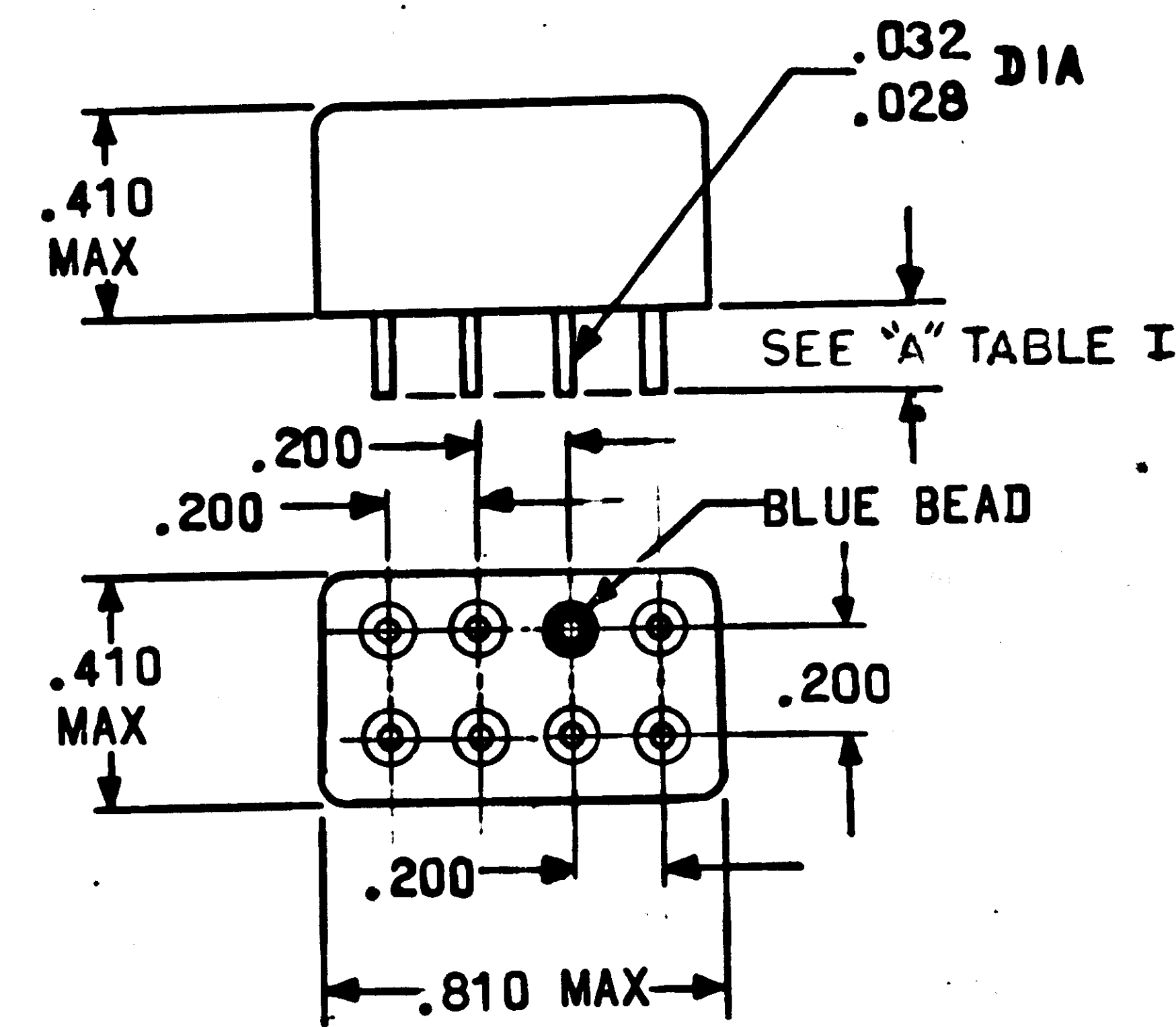


FIGURE 3

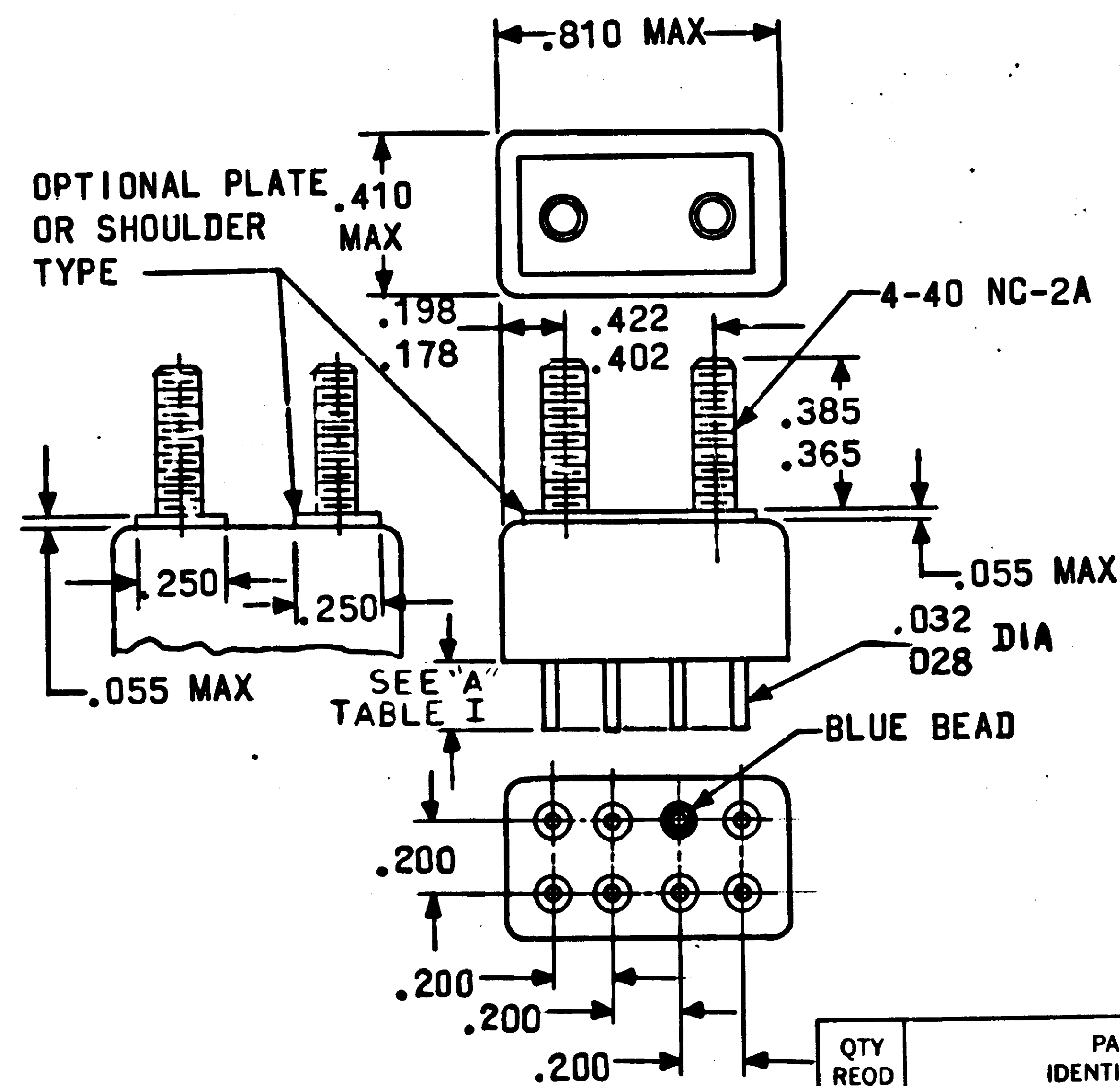


FIGURE 4

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	MIT INSTRUMENTATION LAB	MANNED SPACECRAFT CENTER
TOLERANCES ON	CAMBRIDGE, MASS NAS 9-497.	HOUSTON, TEXAS
FRACTIONS DECIMALS ANGLES	DWG. NO. _____ CONTRACT _____	
± ± ±	DRAWN <i>[Signature]</i> DATE <i>10/26/64</i>	RELAY, ARMATURE
DO NOT SCALE THIS DRAWING	CHECKED <i>[Signature]</i> 8 JUL 64	(GENERAL PURPOSE)
MATERIAL	APPROVAL <i>[Signature]</i> 4 DEC 64	SPECIFICATION CONTROL DRAWING
HEAT TREATMENT	MIT APPROVAL <i>[Signature]</i> 12-22-64	CODE IDENT NO. _____ SIZE <b>C</b> NASA DRAWING NO. <b>1010784</b>
FINAL FINISH		SCALE _____ WT _____ SHEET 2 OF 4
NEXT ASSY USED ON APPLICATION		

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			
		MIT INSTRUMENTATION LAB CAMBRIDGE, MASS NAS 9-497.	
		MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
		RELAY, ARMATURE (GENERAL PURPOSE)	
		SPECIFICATION CONTROL DRAWING	
		CODE IDENT NO. _____ SIZE <b>C</b> NASA DRAWING NO. <b>1010784</b>	
		SCALE _____ WT _____ SHEET 2 OF 4	



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V	1010784	REVISIONS			
		SYM	DESCRIPTION	DATE	APPROVAL
		-	INITIAL RELEASE CLASS A PER TDRR 15068	12-22-64	WK
A	REVISED PER TDRR 16051	1/9/65	WK		

REQUIREMENTS: (CONTINUED)

- (5) ACCELERATION: 20 G
- (6) ALTITUDE: 70,000 FEET
- (7) HUMIDITY: 10 CYCLES
- (8) (SALT SPRAY TESTS AS REFERENCED IN MIL-R-5757 ARE NOT APPLICABLE.)
- F. CONTACT FORM AND SWITCHING ACTION: 2 FORM C CONTACTS (2 PDT)
- G. COIL VOLTAGE: SEE TABLE I
- H. CONTACT RATINGS: (MAXIMUM AMPERES PER POLE) NORMALLY OPEN OR NORMALLY CLOSED.
- J. COIL DISSIPATION: 1.5 WATTS MAX AT +125°C
- K. CASE MATERIAL: CUPRO-NICKEL

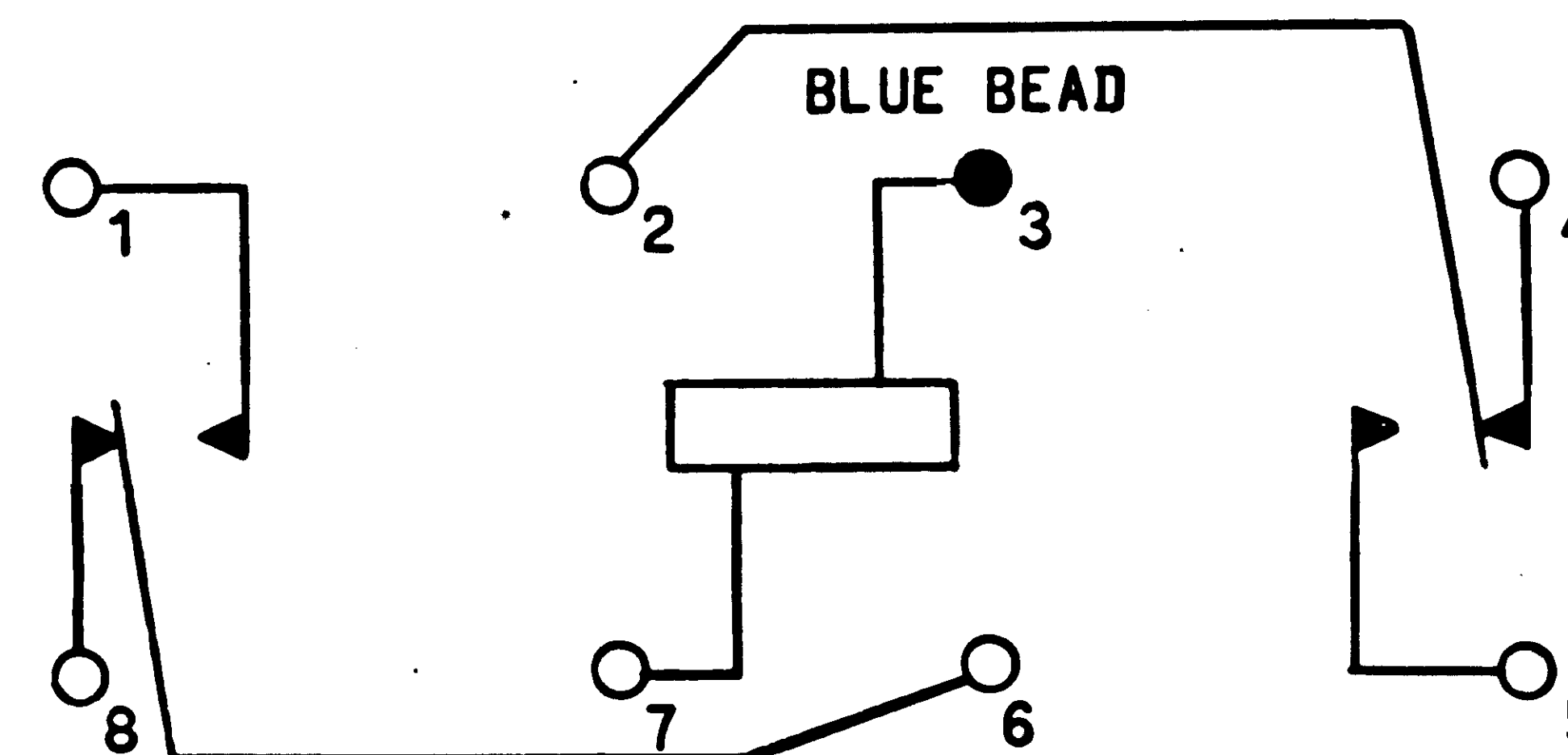
	28 VDC	115 VRMS, 60 CPS	115 VRMS, 400 CPS	115/200 VRMS, 60 CPS	115/200 VRMS, 400 CPS
RESISTIVE	2.0	1.0	1.0	0.5	0.75
INDUCTIVE	0.5	0.5	0.75	0.5	0.75
LAMP	0.5	0.5	0.5	0.3	0.3
MINIMUM	0.1				

NOTE 2 (SHEET 3)  
NOTE 1 (SHEET 3)

4. SPECIAL CONDITIONING:

A. MISS TEST:

- (1) THE MANUFACTURER SHALL SUBJECT ALL RELAYS TO 5000 OPERATIONS UNDER THE FOLLOWING CONDITIONS:
  - (a) 30 MICROAMPERES MAXIMUM CURRENT
  - (b) 50 MILLIVOLTS MAXIMUM VOLTAGE
  - (c) 50 OHMS MAXIMUM CONTACT RESISTANCE PER CONTACT PAIR.
  - (d) RATED COIL VOLTAGE APPLIED
  - (e) 5 CPS MAXIMUM SWITCHING SPEED
- (2) CONTACT RESISTANCE, PULL-IN AND DROP-OUT VOLTAGE SHALL BE MEASURED BY THE MANUFACTURER AFTER THE 5000 CYCLE TEST AND JUST PRIOR TO SHIPMENT. CERTIFICATION OF THESE MEASUREMENTS SHALL BE FURNISHED TO THE USER. THE MANUFACTURER SHALL ALSO FURNISH THE USER A TABULATION SHOWING THE NUMBER OF RELAYS SUBJECTED TO THE 5000 CYCLE TEST, THE NUMBER OF RELAYS FAILING DURING THE 5000 CYCLE TEST AND THE TIME OR CYCLE TO FAILURE. ONE COPY OF THIS INFORMATION SHALL BE FURNISHED WITH EACH SHIPMENT OF PARTS.



SCHEMATIC A  
CONTACTS SHOWN DE-ENERGIZED  
(NUMBERS FOR REF. ONLY)

NOTES:

- 1. INDUCTIVE LOAD LIMITED BY  $\leq .003 \text{ SEC } \frac{L}{R}$ , WL = 100 M J  
POWER FACTOR 50% FOR AC
- 2. ALL AC RATINGS ARE GIVEN FOR UNGROUNDED CASE ONLY.

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LIST OF MATERIALS			
MIT INSTRUMENTATION LAB CAMBRIDGE, MASS NAS 9-497		MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
DRAWN <i>R.W. Turner</i> 7 JUL 64 CHECKED <i>Ed Foster</i> 8 JUL 64 APPROVAL <i>Beeson</i> 4 Dec 64		RELAY, ARMATURE (GENERAL PURPOSE)	
DO NOT SCALE THIS DRAWING		SPECIFICATION CONTROL DRAWING	
MATERIAL		CODE IDENT NO.	SIZE
HEAT TREATMENT		NASA DRAWING NO.	
NEXT ASSY		C 1010784	
USED ON		SCALE	WT
APPLICATION		SHEET 3 OF 4	
FINAL FINISH		MIT APPROVAL <i>W. J. Rhine</i> 12-22-64	



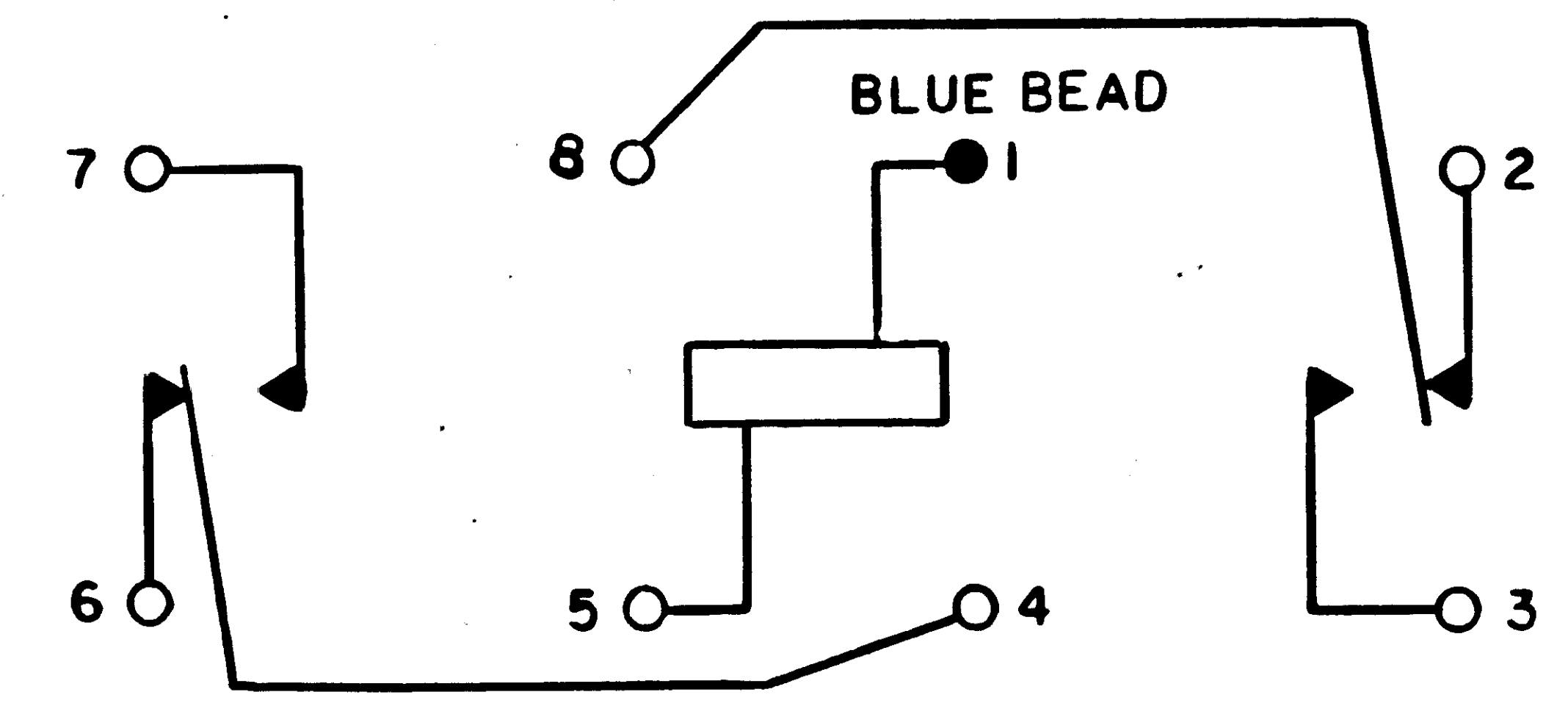
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A	REVISED PER TDRR 16051	2/9/65	WJK

TABLE I

DASH NO.	SCHEMATIC NO.	FIGURE NO.	NOMINAL RATED COIL VOLTAGE (VOLTS DC)	PULL-IN VOLTAGE (VOLTS DC)			DROP-OUT VOLTAGE (VOLTS DC)			COIL RESISTANCE RANGE AT +25°C (OHMS)	PIN LENGTH "A"
				MAX (OVER AMBIENT TEMP RANGE)	MINIMUM (AT +25°C)	MIN (OVER AMBIENT TEMP RANGE)	MAX (OVER AMBIENT TEMP RANGE)	MIN (OVER AMBIENT TEMP RANGE)			
-1	A	1	28.0	18.0	9.0	5.0	14.0	1.0	745 TO 990	1.00 MIN	
-2	A	2	28.0	18.0	9.0	5.0	14.0	1.0	745 TO 990	1.00 MIN	
-3	A	3	28.0	18.0	9.0	5.0	14.0	1.0	745 TO 990	1.00 MIN	
-4	A	4	28.0	18.0	9.0	5.0	14.0	1.0	745 TO 990	1.00 MIN	
-5	A	1	12.0	9.3	4.1	2.3	7.2	0.41	170 TO 235	1.00 MIN	
-6	A	2	12.0	9.3	4.1	2.3	7.2	0.41	170 TO 235	1.00 MIN	
-7	A	3	12.0	9.3	4.1	2.3	7.2	0.41	170 TO 235	1.00 MIN	
-8	A	4	12.0	9.3	4.1	2.3	7.2	0.41	170 TO 235	1.00 MIN	
-9	B	3	28.0	18.0	9.0	5.0	14.0	1.0	745 TO 990	.210/.190	



SCHEMATIC B  
CONTACTS SHOWN DE-ENERGIZED  
(NUMBERS FOR REF ONLY)

THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
	TOLERANCES ON FRACTIONS DECIMALS ANGLES
	DO NOT SCALE THIS DRAWING
	MATERIAL
	HEAT TREATMENT
NEXT ASSY	USED ON
APPLICATION	FINAL FINISH

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			
MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. NAS 9-497		MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
DRAWN <i>R.W. Turner</i> DATE <i>7 JUL 64</i>		RELAY ARMATURE (GENERAL PURPOSE)	
CHECKED <i>Ed Foster</i> 8 Jun 64			
APPROVAL <i>Beccenthal</i> Dec 64			
APPROVAL <i>J. J. Kinn</i> 12/22/64		SPECIFICATION CONTROL DRAWING	
NASA APPROVAL <i>W. R. Kinn</i> 12-22-64		CODE IDENT NO.	NASA DRAWING NO.
MIT APPROVAL <i>W. R. Kinn</i> 12/22/64		SIZE <b>C</b>	<b>1010784</b>
		SCALE	WT
		SHEET 4 OF 4	