

NOTICE - UNLESS GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY FOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY MANNER SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONFERRING ANY RIGHTS OR PERMISSION TO REPRODUCE, COPY, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

C 1010784

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 15068	12-22-64	W.R.
A	REVISED PER TDRR 16051	2/9/65	W.R.
B	REVISED PER TDRR 23137	10/14/65	W.R.
C	REVISED PER TDRR 24076	4/23/65	W.R.

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 IRG 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).

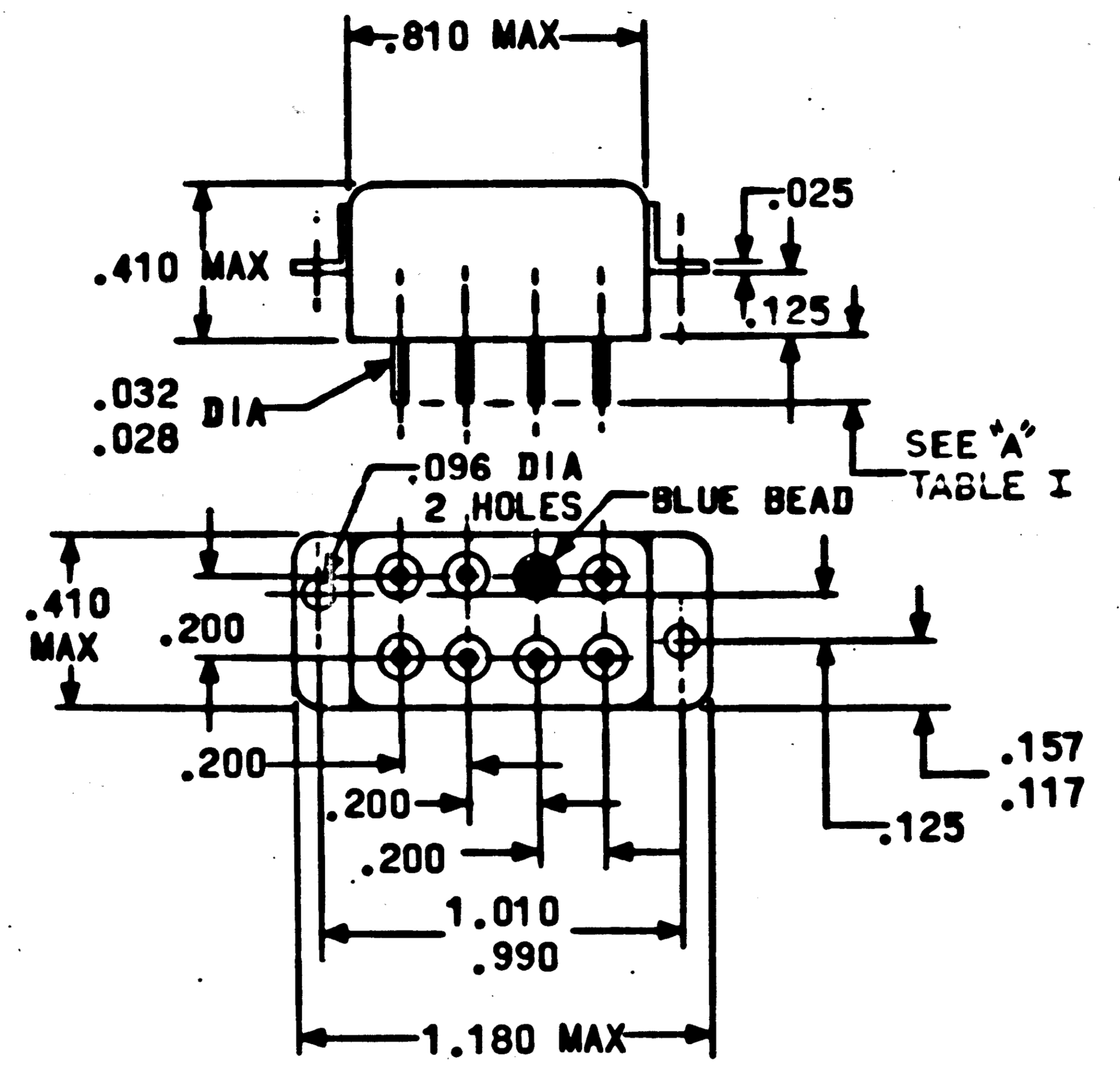


FIGURE 1

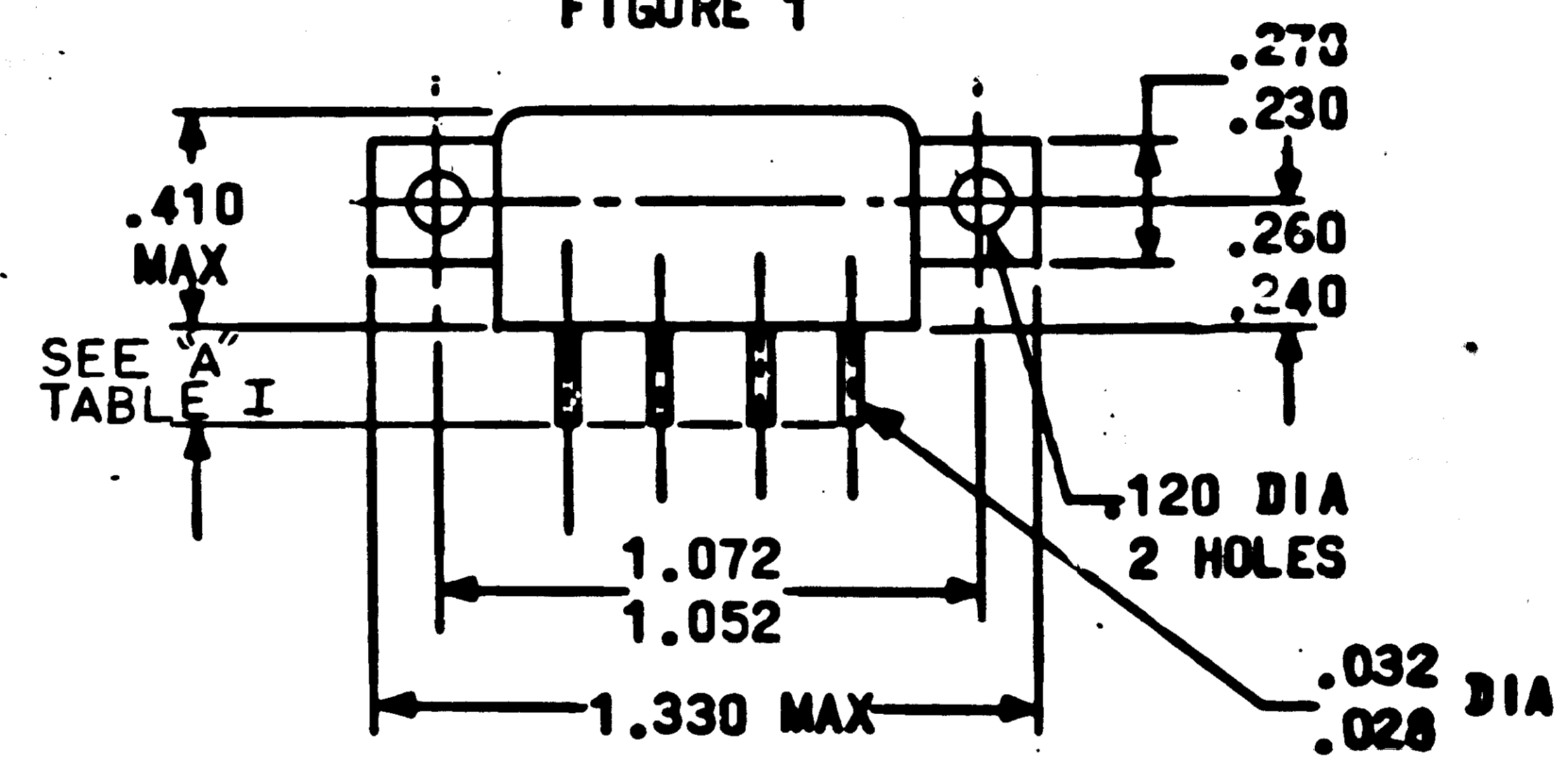


FIGURE 2

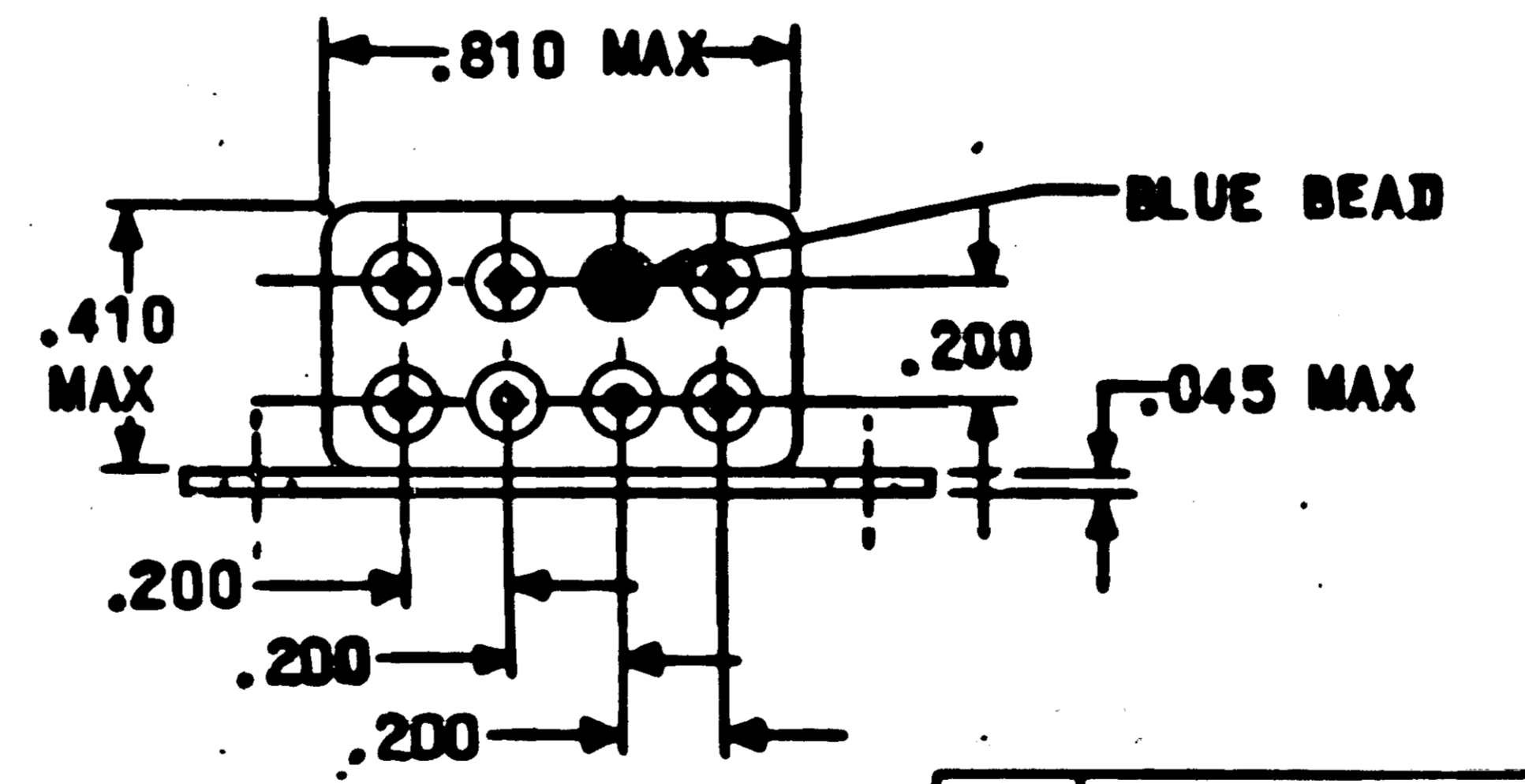


FIGURE 3

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

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	
TOLERANCES ON	
FRACTIONS	DECIMALS
± .010	± .02
DO NOT SCALE THIS DRAWING	
MATERIAL	SEE REQUIREMENTS
HEAT TREATMENT	NONE
FINAL FINISH	NONE
NEXT ASSY	USED ON
APPLICATION	

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. Zimmerman</i> DATE <i>7/21/64</i>		RELAY, ARMATURE (GENERAL PURPOSE)	
CHECKED <i>Ed Foster</i> 8 Jul 64		SPECIFICATION CONTROL DRAWING	
APPROVAL <i>Bergthol</i> 4 Dec 64		CODE IDENT NO.	SIZE
APPROVAL <i>J. J. ...</i> 12/22/64			C
NASA APPROVAL <i>W. J. ...</i> 6-22-64		NASA DRAWING NO.	1010784
MIT APPROVAL <i>W. J. ...</i> 12/22/64		SCALE NONE	WT
		SHEET 1	OF 4

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1010784

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 15068	12-22-64	WJH
A	REVISED PER TDRR 16051	2/9/65	WJH
B	REVISED PER TDRR 23137	11/14/65	WR
C	REVISED PER TDRR 24076	11/23/65	WJH

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,
- CONTACT TERMINALS AND COIL TERMINALS,
 - CONTACT TERMINALS AND CASE,
 - CIRCUITS
- (b) SEA LEVEL: 500 VOLTS RMS 60 CPS BETWEEN,
- OPEN CONTACT TERMINALS OF EACH CIRCUIT (RELAY BOTH ENERGIZED AND DEENERGIZED)
 - COIL TERMINALS AND CASE.
- (c) ALTITUDE: 300 VOLTS RMS 60 CPS BETWEEN,
- ALL TERMINALS AND CASE,
 - ALL TERMINALS
- (5) INSULATION RESISTANCE: 1000 MEGOHMS MINIMUM, USING A 500 VOLT DC TEST POTENTIAL APPLIED BETWEEN
- COIL TERMINALS, COMMONLY CONNECTED, AND CASE
 - EACH NORMALLY OPEN CONTACT AND CASE
 - EACH MOVABLE, OR "COMMON", CONTACT AND CASE (WITH COIL DEENERGIZED)
 - ALL CONTACT TERMINALS, COMMONLY CONNECTED, AND THE COIL TERMINALS.
- (6) OPERATE TIME: 5 MILLISECOND MAXIMUM OVER THE AMBIENT TEMPERATURE RANGE.
- (7) RELEASE TIME: 5 MILLISECOND MAXIMUM OVER THE AMBIENT TEMPERATURE RANGE.
- (8) CONTACT BOUNCE TIME: 2 MILLISECOND 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:
- TEMPERATURE:
 - HIGH: +125°C
 - LOW: -65°C
 - THERMAL SHOCK: -65°C TO +125°C
 - VIBRATION: 10-2000 CPS, 20 G
 - SHOCK: 50 G, 11 MILLISECOND

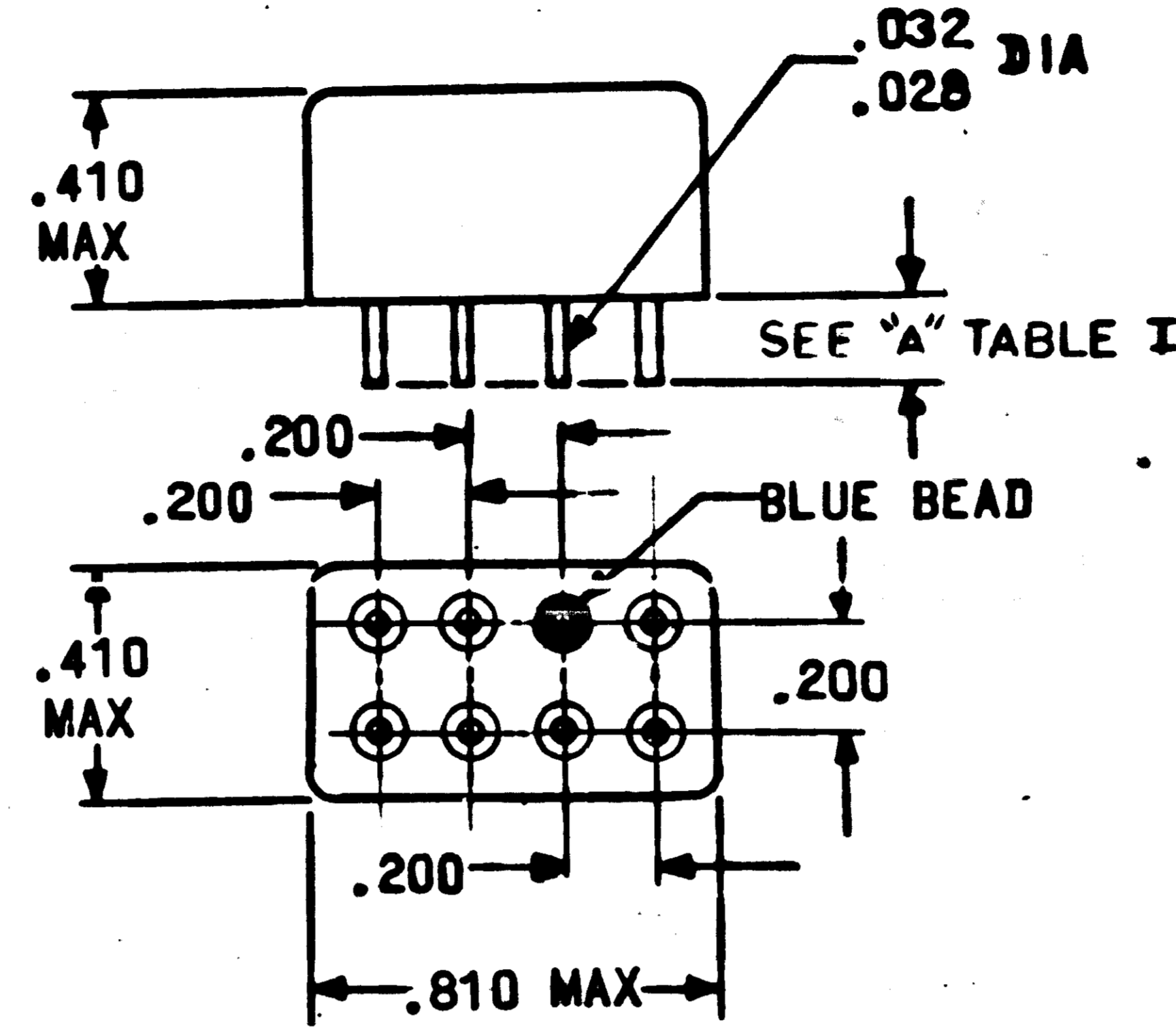


FIGURE 3

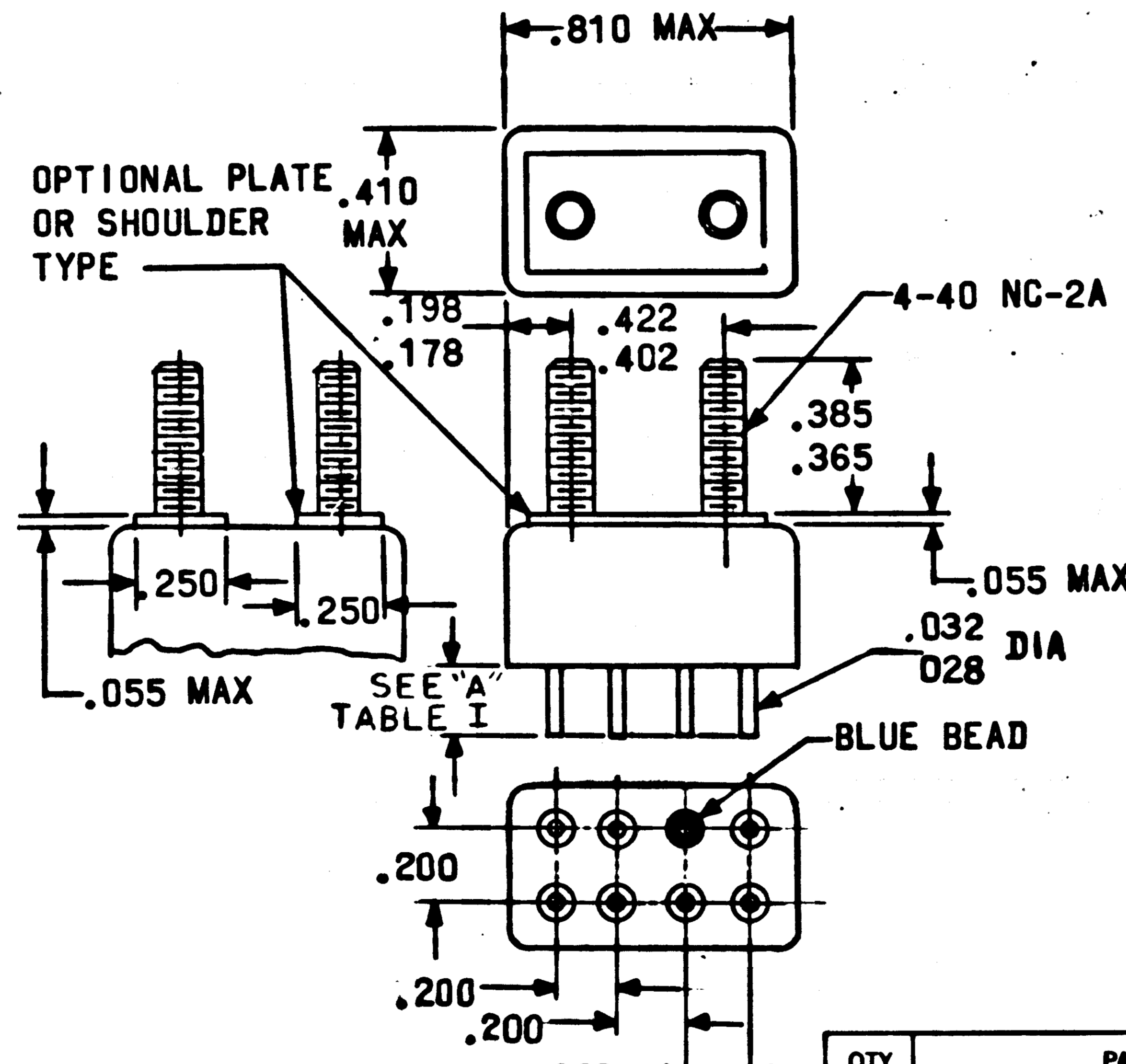


FIGURE 4

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			
NASA APPROVAL		CODE IDENT NO.	SIZE
MIT APPROVAL		C	1010784
APPLICATION		SCALE	WT
			SHEET 2 OF 4

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
±	±	±

DO NOT SCALE THIS DRAWING

MATERIAL

HEAT TREATMENT

FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS. NAS 9-497.

CONTRACT

DRAWN *[Signature]* DATE

CHECKED *[Signature]* DATE

APPROVAL *[Signature]* DATE

NASA APPROVAL *[Signature]* DATE

MIT APPROVAL *[Signature]* DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RELAY, ARMATURE
(GENERAL PURPOSE)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. C

SIZE 1010784

SCALE

WT

SHEET 2 OF 4

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1010784 C

REVISIONS			
BY	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 15068	12-22-64	WJK
A	REVISED PER TDRR 16051	1/19/65	WJK
B	REVISED PER TDRR 23137	10/14/65	WJK
C	REVISED PER TDRR 24076	11/23/65	WJK

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.

LOAD VOLTAGE	28 VDC		115 VRMS, 60 CPS		115 VRMS, 400 CPS		115 / 200 VRMS, 60 CPS		115 / 200 VRMS, 400 CPS	
	NOMINAL	PULL-IN	NOMINAL	PULL-IN	NOMINAL	PULL-IN	NOMINAL	PULL-IN	NOMINAL	PULL-IN
RESISTIVE	2.0	2.0	1.0	0.6	1.0	1.0	0.5	0.3	0.75	0.5
INDUCTIVE	0.5	0.5	0.5	0.5	0.75	0.5	0.5	0.25	0.75	0.25
LAMP	0.5	0.5	0.5	0.2	0.5	0.2(0.5)	0.3	0.2	0.3	0.2
MINIMUM	0.1	0.1	-	-	-	-	-	-	-	-

NOTE 2 (SHEET 3)

NOTE 1 (SHEET 3)

J. COIL DISSIPATION: 1.5 WATTS MAX AT +125° C. #5 VRMS, 400 CPS
 K. CASE MATERIAL: CUPRO-NICKEL

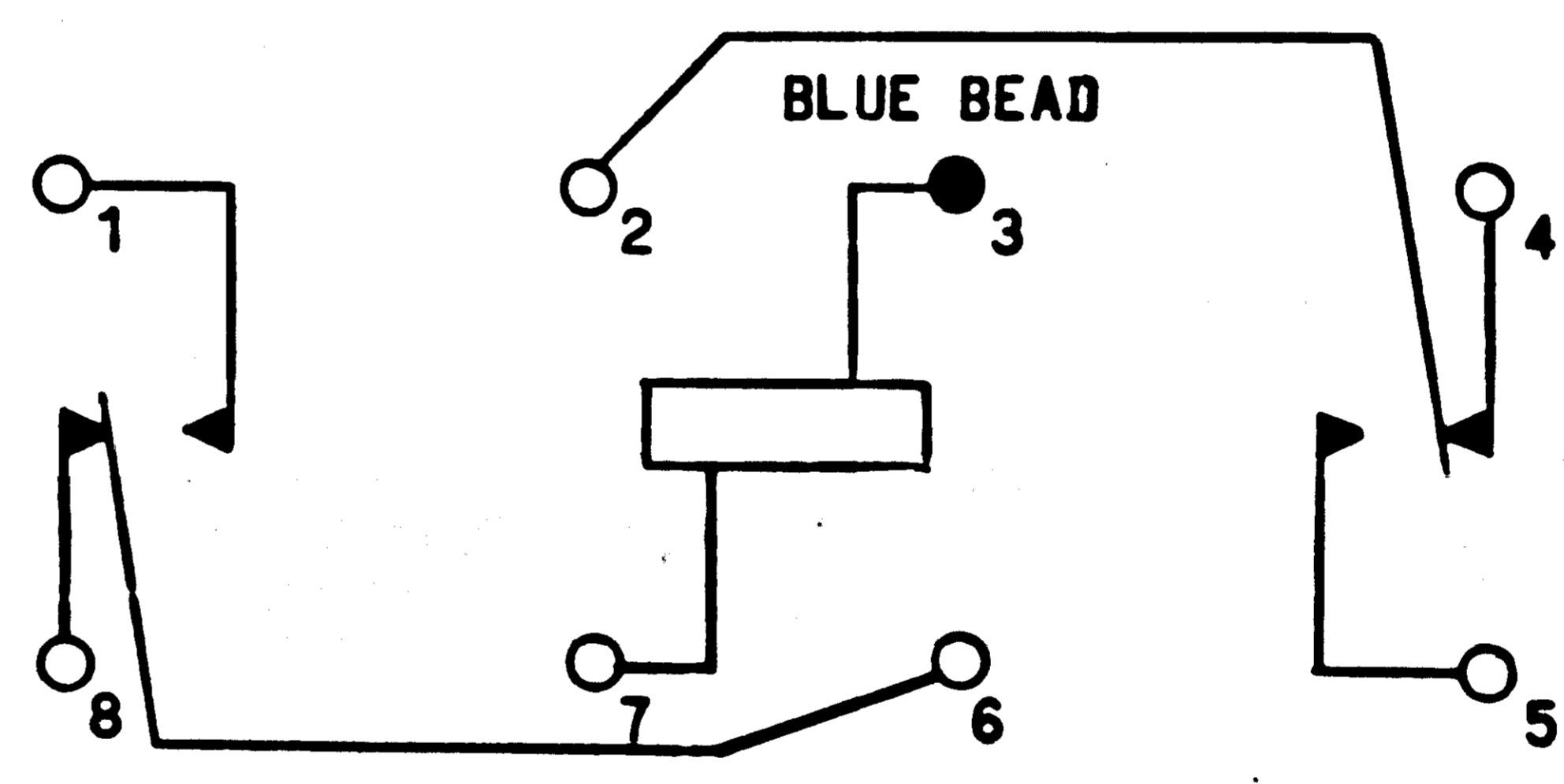
4. SPECIAL CONDITIONING:

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 $\leq .008 \text{ SEC } \frac{L}{R}$, WL = 100 M J
 POWER FACTOR 50% FOR AC

2. ALL AC RATINGS ARE GIVEN FOR UNGROUNDED CASE ONLY.

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

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			
MIT INSTRUMENTATION LAB CAMBRIDGE MASS 02139 CONTRACT		MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
DRAWN: <i>R. W. Timmer</i> 7/20/64 CHECKED: <i>Ed Foster</i> 8/10/64 APPROVAL: <i>Beane</i> 4 Dec 64 APPROVAL: <i>J. J. Kinn</i> 12/22/64		RELAY, ARMATURE (GENERAL PURPOSE)	
NASA APPROVAL: <i>W. J. Rhine</i> 12-22-64 MIT APPROVAL: <i>W. J. Rhine</i> 12/22/64		SPECIFICATION CONTROL DRAWING NASA DRAWING NO. 1010784	
SCALE		CODE IDENT NO. SIZE C	SHEET 3 OF 4

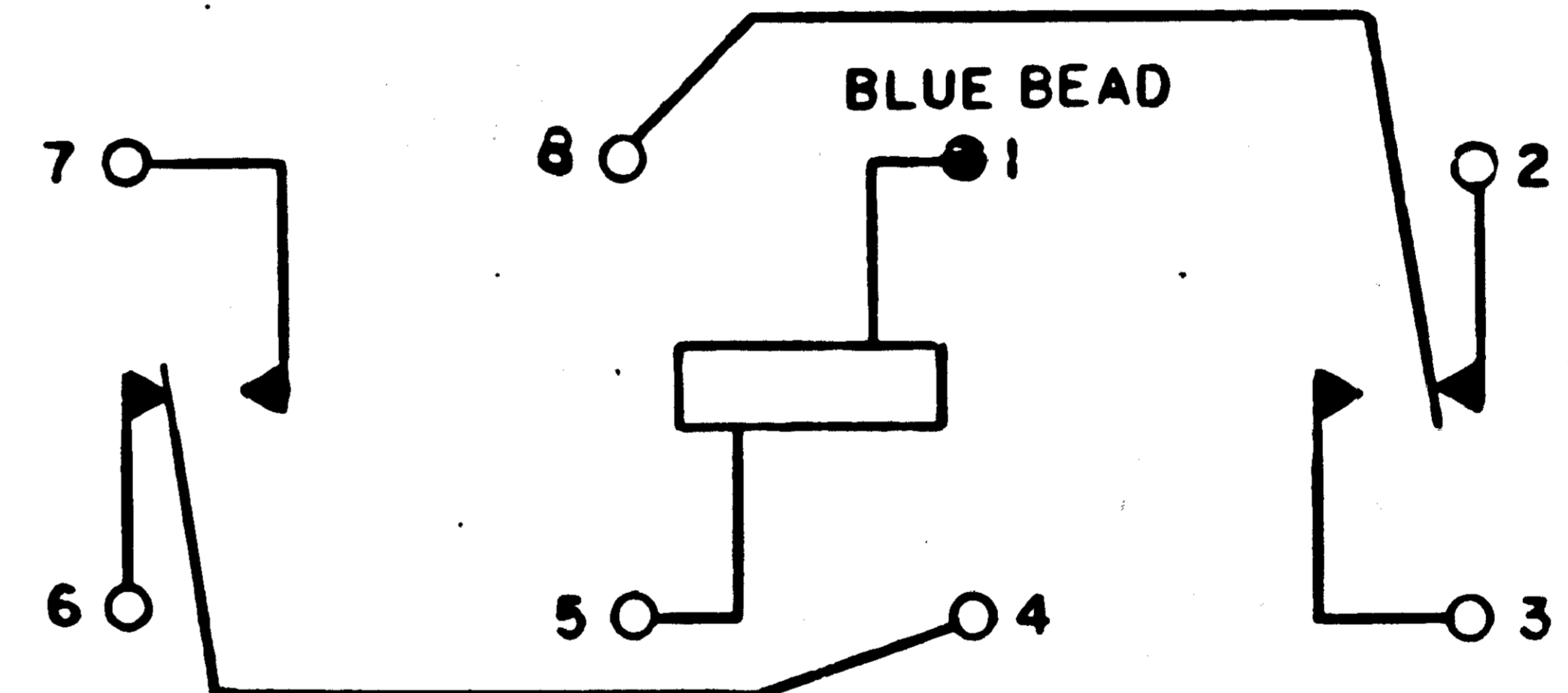
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1010784

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
-	INITIAL RELEASE CLASS A PER TDRR 15068	12/22/64	WJK
A	REVISED PER TDRR 16051	2/9/65	WJK
B	REVISED PER TDRR 23137	10/19/65	WJK
C	REVISED PER TDRR 24076	11/23/65	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
-10	B	3	28.0	19.2	9.0	5.0	18.0	1.0	1350 TO 1650	.210/.190



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

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

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.L. Turner</i> DATE <i>7/20/64</i>		RELAY ARMATURE (GENERAL PURPOSE)	
CHECKED <i>Ed Foster</i> DATE <i>8/10/64</i>			
APPROVAL <i>J.J. Kenna</i> DATE <i>12/22/64</i>		SPECIFICATION CONTROL DRAWING	
NASA APPROVAL <i>W.D. Rhine</i> DATE <i>12-22-64</i>		CODE IDENT NO.	NASA DRAWING NO.
MIT APPROVAL <i>W.D. Rhine</i> DATE <i>12-22-64</i>		C	1010784
APPLICATION		SCALE	WT
			SHEET 4 OF 4

MASTER

1010784