

JEFFREY		MINING PRODUCTS	JEFFREY MINING PRODUCTS 274 EAST 1ST AVE. COLUMBUS, OHIO 43201			THIS DRAWING CONTAINS CONFIDENTIAL INFORMATION AND IS THE EXCLUSIVE PROPERTY OF JEFFREY MINING PRODUCTS. NEITHER THE DRAWING OR ITS CONTENTS ARE TO BE USED, REPRODUCED, OR DISCLOSED IN WHOLE OR PART, WITHOUT PRIOR WRITTEN CONSENT FROM JEFFREY MINING PRODUCTS.								
DRAWING NO. 523A592			SHEET NO. 1	PART 36 MACHINE APPROVAL NUMBERS THAT USE THIS CHECKLIST: 31-123-0,-1 31-106-0,-1 31-111-0										
DRAWN K.DERRICK		DATE 4/29/87		R E V	A 6/17/87 KD	B 8/3/87 KD	C 2/28/91 WM	D 4/18/97 KT						
CHECKED K.DERRICK		DATE 4/29/87												

THIS BLOCK FOR MSHA USE ONLY.
ES # _____
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ELECTRICAL SYSTEM PERMISSIBILITY CHECKLIST

LISTED BELOW ARE THE ITEMS AND FUNCTIONS THAT MUST BE MAINTAINED FOR THE ELECTRICAL SYSTEM TO BE CONSIDERED PERMISSIBLE. FOR A COMPLETE EQUIPMENT PERMISSIBILITY EVALUATION, THIS CHECKLIST MUST BE USED IN CONJUNCTION WITH A MACHINE CHECKLIST AND A POWER SYSTEM CHECKLIST.

ALL INSPECTIONS AND TESTS SHALL BE PERFORMED IN FRESH AIR

A. ALL ELECTRICAL ENCLOSURES MUST MEET THE FOLLOWING:

- *1. () ALL ELECTRICAL ENCLOSURES ARE INTACT (NOT CRACKED OR BROKEN); THE HEADLIGHT LENSES ARE NOT LOOSE.
- *2. () ALL ELECTRICAL ENCLOSURES HAVE AN MSHA PLATE ATTACHED THAT IS CLEARLY STAMPED WITH AN MSHA CERTIFICATION NUMBER (X/P NUMBER). THESE NUMBERS AGREE WITH THOSE LISTED IN TABLE 1.
- *3. () USE FEELER GAUGES OF THE APPROPRIATE SIZE TO INSURE THE CLEARANCES BETWEEN THE ENCLOSURES LISTED IN TABLE 1 AND THEIR CORRESPONDING COVERS ARE NOT EXCEEDED.
- 4. () ALL JOINTS FORMING THE FLAME ARRESTING PATHS (FLANGES AND COVERS) ARE SMOOTH AND FREE FROM RUST, CORROSION, AND PITTING.

*(WEEKLY) DESIGNATES THOSE INSPECTION CHECKS THAT MUST BE PERFORMED DURING THE WEEKLY MAINTENANCE EXAMINATION IN ACCORDANCE WITH 30 CFR, SECTION 75.1914

TABLE 1

TEST SHEET TITLE: ELECTRICAL SYSTEM PERMISSIBILITY CHECKLIST					MINE SAFETY & HEALTH ADMINISTRATION APPROVED PRINT. NO DEVIATION OR REVISION IS LEGAL UNTIL APPROVED BY MSHA		
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<u>ENCLOSURE</u>	<u>ITEM NO. ON MACHINE LAYOUT DIAGRAM</u>	<u>X/P NUMBER</u>	<u>MAXIMUM ALLOWABLE CLEARANCE IN INCHES</u>
HEADLIGHTS	4	X/P-1468-30 OR X/P-1468-31 X/P-3493-0 OR X/P-3221-0 OR ALT.X/P-3493-1	N/A <u>.002</u> <u>.002</u> <u>.002</u>
HEADLIGHT SWITCH BOX	2	X/P-2166-0	<u>.003</u>
ALTERNATOR	1	X/P-1622-4 OR ALT. X/P-3809-0	<u>.006</u> <u>.006 & (.004 COVER END)</u>
CONNECTION BOX	3	X/P-2940-0	<u>.003</u>
CONNECTION (OPT)	5	X/P-1683-5	<u>.003</u>

B. CABLES CONNECTING ELECTRICAL COMPONENTS MUST CONTINUE TO BE:

- *1. () CLAMPED IN PLACE TO PREVENT UNDUE MOVEMENT.
- *2. () PROTECTED FROM MECHANICAL DAMAGE BY POSITION, FLAME RESISTANT HOSE CONDUIT, METAL TUBING, OR TROUGHS.
NOTE: FLEXIBLE OR THREADED RIGID METAL CONDUIT IS NOT ACCEPTABLE.
- *3. () NOT SUBJECT TO ABRASION FROM SHARP CORNERS OR EDGES.
- *4. () ISOLATED FROM HYDRAULIC LINES AND COMPONENTS.
- *5. () ISOLATED FROM FUEL LINES.
- *6. () FLAME RESISTANT IF NOT ENCLOSED IN HOSE CONDUIT. THIS IS INDICATED BY "MSHA" MARKINGS ON THE CABLE.

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C. HOSE CONDUIT IS:

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*1. () SECURELY CLAMPED AT BOTH ENDS AND MSHA MARKINGS ARE PRESENT AND APPEAR AS "FLAME-RESISTANT, US MSHA, US MESA, OR USBM 2G- ()".

D. FASTENERS AND MOUNTS:

- *1. () ALL ELECTRICAL SYSTEM COMPONENTS ARE SECURELY MOUNTED.
- *2. () ALL THREADED COVERS ARE SECURED FROM LOOSENING BY A LOCKING SCREW, WIRE, OR OTHER MEANS.
- *3. () LOCKWASHERS OR EQUIVALENT DEVICES ARE PROVIDED FOR ALL BOLTS, SCREWS, OR STUDS THAT SECURE PARTS OF THE EXPLOSION-PROOF ENCLOSURES.
- *4. () NONE OF THE FASTENINGS USED FOR JOINTS ON THE EXPLOSION-PROOF ENCLOSURES ARE USED FOR ATTACHING NON-ESSENTIAL PARTS OR FOR MAKING ELECTRICAL CONNECTIONS.
- *5. () HEADLIGHTS ARE GUARDED AS SHOWN IN FIGURES 1 AND 2.

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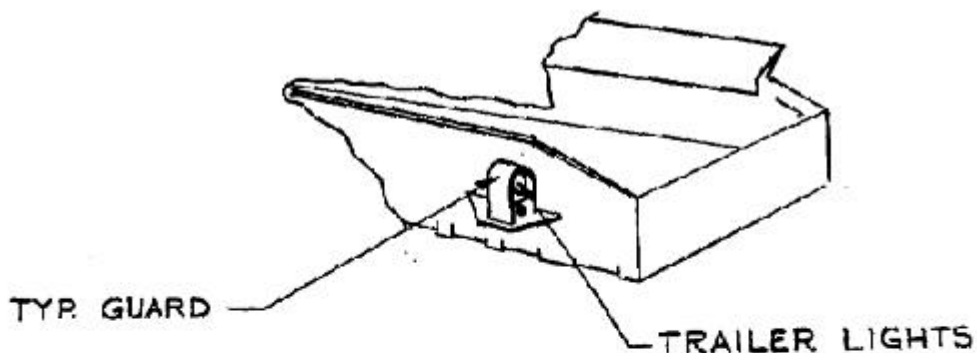


FIGURE 1

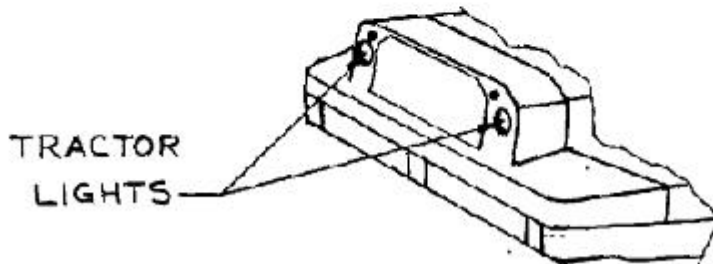


FIGURE 2

E. LEAD ENTRANCES (PACKING GLANDS): (APPLIES TO "X/P" ENCLOSURES ONLY

- *1. () ALL LEAD ENTRANCES (PACKING GLANDS) ARE ASSEMBLED SO THAT THE CABLE JACKET PENETRATES INTO THE ENCLOSURE AND WHEN TIGHTENED, A 1/8" MINIMUM

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CLEARANCE REMAINS BETWEEN THE PACKING NUT AND STUFFING BOX (FIGURE 3).

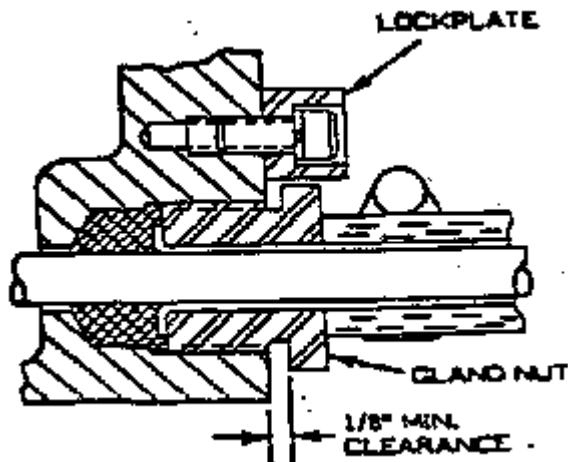


FIGURE 3

- *2. () ALL PACKING NUTS AND STUFFING BOXES ARE SECURED FROM LOOSENING BY A LOCKING SCREW, WIRE OR OTHER MEANS (FIGURE 3). ALL UNUSED LEAD ENTRANCES ARE CLOSED WITH METAL PLUGS WHICH ARE SECURED IN PLACE BY SPOT WELDING, BRAZING, OR EQUIVALENT (FIGURE 4).

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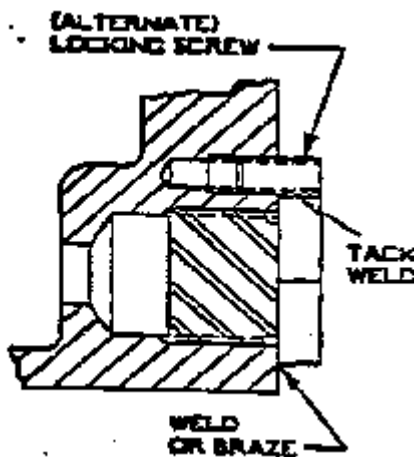


FIGURE 4

F. HEADLIGHTS:

- *1. () ARE INSTALLED AT EACH END OF THE MACHINE.
- *2. () LENSES ARE NOT CRACKED, BROKEN, OR LOOSE.
- *3. () EACH HEADLIGHT IS SECURELY INSTALLED, GUARDED AND OPERABLE.

G. HEADLIGHT SWITCH:

- *1. () THE HEADLIGHT SWITCH MUST OPERATE PROPERLY. VERIFY BY STARTING THE ENGINE, OPERATING THE SWITCH AND ASCERTAINING ITS OPERATION - TURNS THE FRONT AND REAR HEADLIGHTS ON AND OFF. THE SWITCH MUST NOT CONTROL OR OPERATE ANY ELECTRICAL CIRCUITS OTHER THAN THE HEADLIGHTS.

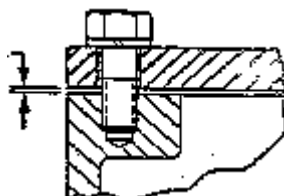
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- *2. () HEADLIGHT SWITCH IS SECURELY IN PLACE.

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- *3. () HEADLIGHT GLANDS ARE SEALED AND ASSEMBLED SO THAT THE CABLE JACKET PENETRATES INTO THE ENCLOSURE AND WHEN TIGHTENED, A 1/8 INCH MINIMUM CLEARANCE REMAINS BETWEEN PACKING NUT AND THE STUFFING BOX (FIGURE 3).
- *4. () ALL UNUSED LEAD ENTRANCES ARE CLOSED WITH METAL PLUGS WHICH ARE SECURED IN PLACE BY SPOT WELDING, BRAZING, OR EQUIVALENT (FIGURE 4).
- *5. () HEADLIGHT SWITCH COVER IS PROPERLY INSTALLED WITH ALL BOLTS AND LOCKWASHERS IN PLACE AND TIGHT (FIGURE 5).



MAX .003

FIGURE 5

H. CONNECTION BOX AND OPTIONAL CONNECTION BOX

- *1. () CONNECTION BOX IS SECURELY IN PLACE.
- *2. () CONNECTION BOX GLANDS ARE SEALED AND ASSEMBLED SO THAT THE CABLE JACKET PENETRATES INTO THE ENCLOSURE AND WHEN TIGHTENED, A 1/8" MINIMUM CLEARANCE REMAINS BETWEEN PACKING NUT AND THE STUFFING BOX (FIGURE 3).
- *3. () CONNECTION BOX COVER IS PROPERLY INSTALLED WITH ALL BOLTS AND LOCKWASHERS IN PLACE AND TIGHT (FIGURE 5).

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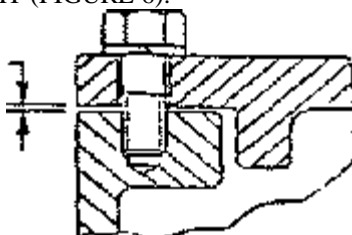
- 4. () INSURE THAT ALL INTRINSICALLY SAFE CIRCUIT WIRING DOES NOT INTERMINGLE WITH NONINTRINSICALLY SAFE CIRCUITS.

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I. ALTERNATOR:

- *1. () "ALTERNATOR HOUSING" IS SECURELY IN PLACE.
- *2. () "ALTERNATOR HOUSING GLANDS" ARE SEALED AND ASSEMBLED SO THAT THE CABLE JACKET PENETRATES INTO THE ENCLOSURE AND WHEN TIGHTENED, A 1/8 INCH MINIMUM CLEARANCE REMAINS BETWEEN PACKING NUT AND THE STUFFING BOX (FIGURE 3 OR 4).
- *3. () "ALTERNATOR COVER" IS PROPERLY INSTALLED WITH ALL BOLTS AND LOCKWASHERS IN PLACE AND TIGHT (FIGURE 6).



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FIGURE 6

J. OTHER ELECTRICAL PERMISSIBILITY CHECKS:

THE FOLLOWING CHECKS MAY BE PERFORMED WHEN AN ELECTRICAL ENCLOSURE HAS BEEN DISASSEMBLED FOR WHATEVER REASON, OR IF THERE IS CAUSE TO BELIEVE A PROBLEM EXISTS WITHIN THE ENCLOSURE.

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- 1. () ELECTRICAL CONNECTIONS INSIDE THE ELECTRICAL ENCLOSURES ARE SECURE (NOT LOOSE) AND ARE INSULATED WHERE SPACE IS LIMITED. IN ADDITION, EACH HEADLIGHT UNIT IS ELECTRICALLY "GROUNDED" TO THE MACHINE FRAME BY A

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SEPARATE CONDUCTOR IN THE HEADLIGHT CABLE. THE GROUND WIRES ARE NOT BROKEN AND ARE SECURELY ATTACHED TO EACH HEADLIGHT. TO VERIFY THE ABOVE, REMOVE THE ELECTRICAL ENCLOSURE COVERS; DISCONNECT THE GROUND WIRE ATTACHED TO EACH HEADLIGHT; USE AN OHMMETER OR SIMILAR DEVICE TO VERIFY CONTINUITY BETWEEN THE GROUND WIRE AND THE FRAME OF THE MACHINE FOR EACH HEADLIGHT.

2. () THE ENGINE-DRIVEN ALTERNATOR LIGHTING SYSTEM INCLUDES A SEPARATE TWO-POLE SWITCH WHICH CONTROLS THE OPERATION OF THE HEADLIGHTS. THE SWITCH IS WIRED SUCH THAT ALL POWER CONDUCTORS IN THE CABLE(S) SUPPLYING ELECTRICAL ENERGY TO THE HEADLIGHTS ARE DEENERGIZED WHEN THE SWITCH IS PLACED IN THE "OFF" POSITION. TO VERIFY THE ABOVE, REMOVE THE COVER FROM THE ELECTRICAL ENCLOSURE HOUSING THE HEADLIGHT SWITCH; REMOVE THE TWO MAIN POWER WIRES (FROM THE ALTERNATOR) FROM THE SWITCH TERMINALS; PLACE THE SWITCH OPERATOR IN THE "OFF" POSITION; USE AN OHMMETER OR SIMILAR INSTRUMENT TO VERIFY THAT THE INPUT POWER WIRE TERMINALS ON THE SWITCH ARE DISCONNECTED FROM ALL OTHER WIRES ATTACHED TO THE SWITCH TERMINALS; RECONNECT THE POWER WIRES TO THE SWITCH TERMINALS.

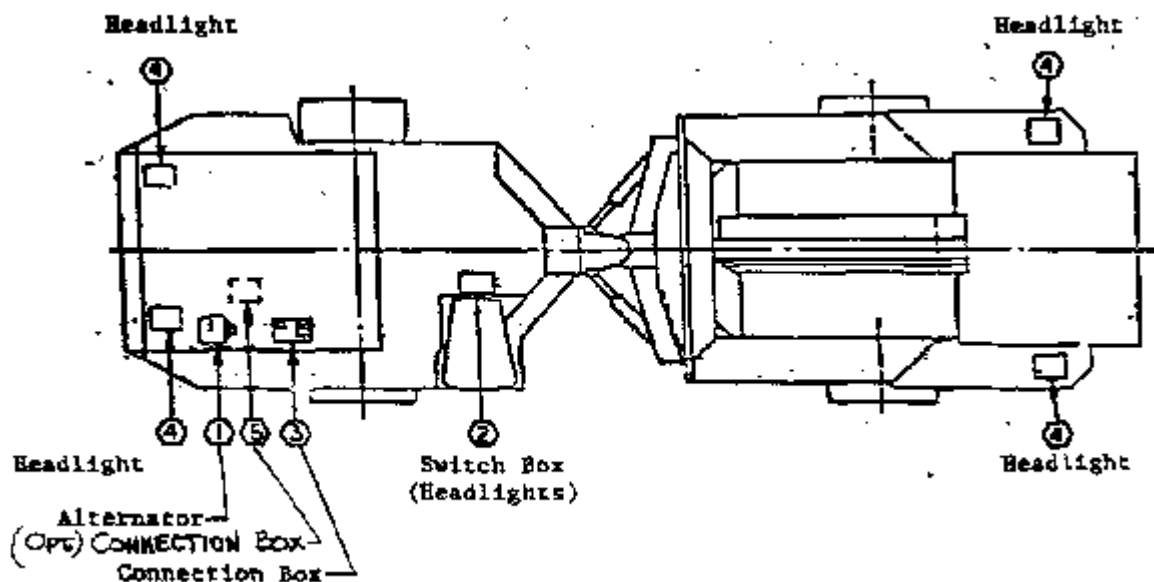
3. () FUSES OR CIRCUIT BREAKERS ARE INSTALLED, IN THE WIRING LOCATED INSIDE THE ALTERNATOR HOUSING, FOR SHORT CIRCUIT PROTECTION OF EACH POWER CONDUCTOR IN THE LIGHTING SYSTEM.

TO VERIFY THE ABOVE, DISASSEMBLE THE ALTERNATOR ENCLOSURE; EXAMINE THE WIRING AND EACH FUSE OR CIRCUIT BREAKER. VERIFY THAT A FUSE, OR CIRCUIT BREAKER NOT EXCEEDING 15 AMPS, IS INSTALLED IN EACH POWER CONDUCTOR OF THE OF THE ALTERNATOR CABLE.

4. () PROPER BULBS HAVE BEEN INSTALLED IN THE HEADLIGHTS.
TO VERIFY THE ABOVE, DISASSEMBLE THE HEADLIGHTS; A 13 OR 12 VOLT AND 50 OR 60 WATT BULB IS INSTALLED.

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MACHINE LAYOUT DRAWING

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