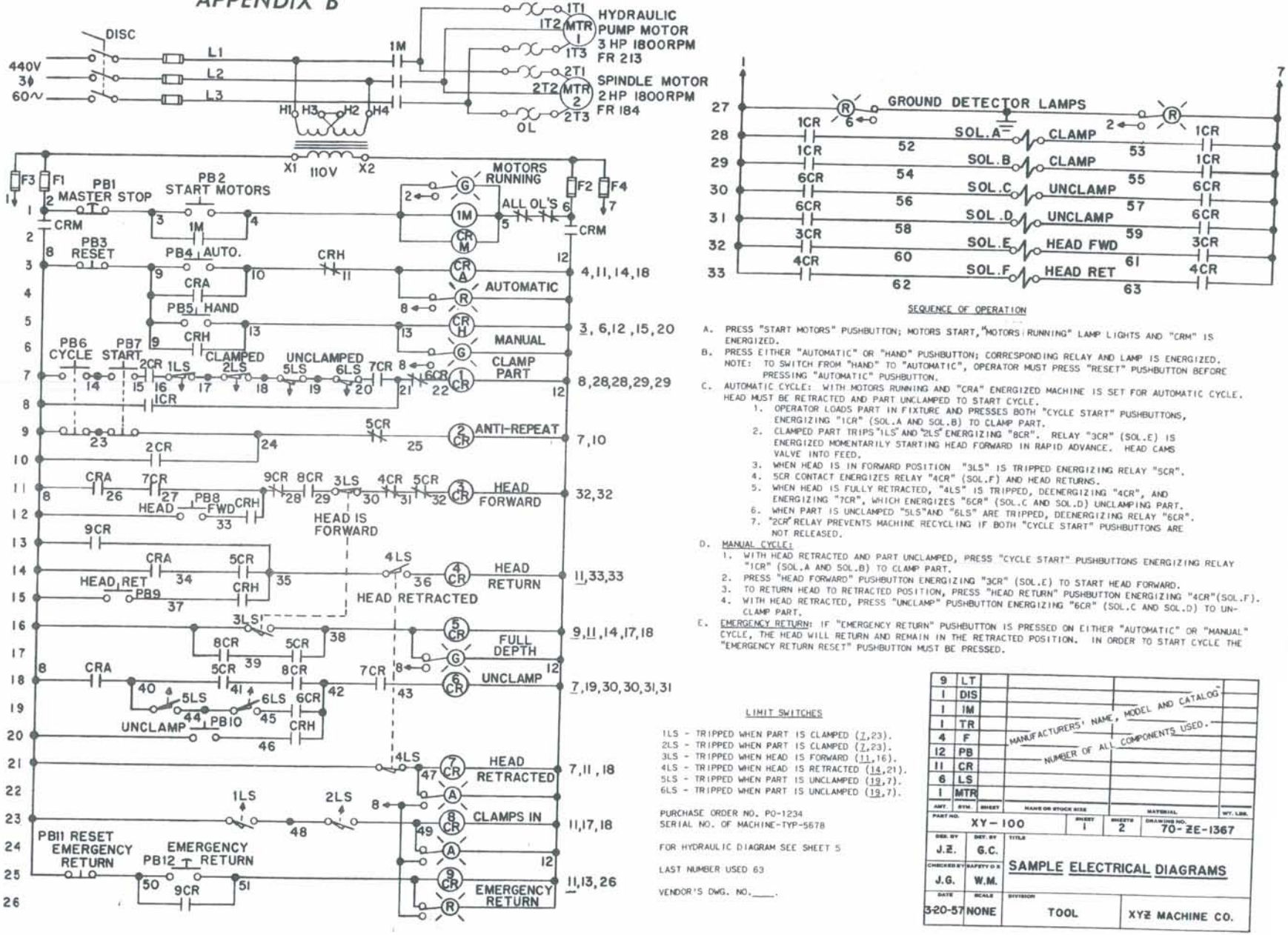
APPENDIX B

SAMPLE ELEMENTARY DIAGRAM



SEQUENCE OF OPERATION

A. PRESS "START MOTORS" PUSHBUTTON; MOTORS START, "MOTORS RUNNING" LAMP LIGHTS AND "CRM" IS ENERGIZED.

B. PRESS EITHER "AUTOMATIC" OR "HAND" PUSHBUTTON; CORRESPONDING RELAY AND LAMP IS ENERGIZED.
NOTE: TO SWITCH FROM "HAND" TO "AUTOMATIC", OPERATOR MUST PRESS "RESET" PUSHBUTTON BEFORE PRESSING "AUTOMATIC" PUSHBUTTON.

C. AUTOMATIC CYCLE: WITH MOTORS RUNNING AND "CRA" ENERGIZED MACHINE IS SET FOR AUTOMATIC CYCLE. HEAD MUST BE RETRACTED AND PART UNCLAMPED TO START CYCLE.
1. OPERATOR LOADS PART IN FIXTURE AND PRESSES BOTH "CYCLE START" PUSHBUTTONS, ENERGIZING "1CR" (SOL.A AND SOL.B) TO CLAMP PART.
2. CLAMPED PART TRIPS "1LS" AND "2LS" ENERGIZING "8CR". RELAY "3CR" (SOL.E) IS ENERGIZED MOMENTARILY STARTING HEAD FORWARD IN RAPID ADVANCE. HEAD CAMS VALVE INTO FEED.
3. WHEN HEAD IS IN FORWARD POSITION "3LS" IS TRIPPED ENERGIZING RELAY "5CR".
4. 5CR CONTACT ENERGIZES RELAY "4CR" (SOL.F) AND HEAD RETURNS.
5. WHEN HEAD IS FULLY RETRACTED, "4LS" IS TRIPPED, DEENERGIZING "4CR", AND ENERGIZING "7CR", WHICH ENERGIZES "6CR" (SOL.C AND SOL.D) UNCLAMPING PART.
6. WHEN PART IS UNCLAMPED "5LS" AND "6LS" ARE TRIPPED, DEENERGIZING RELAY "6CR".
7. "2CR" RELAY PREVENTS MACHINE RECYCLING IF BOTH "CYCLE START" PUSHBUTTONS ARE NOT RELEASED.

D. MANUAL CYCLE:
1. WITH HEAD RETRACTED AND PART UNCLAMPED, PRESS "CYCLE START" PUSHBUTTONS ENERGIZING RELAY "1CR" (SOL.A AND SOL.B) TO CLAMP PART.
2. PRESS "HEAD FORWARD" PUSHBUTTON ENERGIZING "3CR" (SOL.E) TO START HEAD FORWARD.
3. TO RETURN HEAD TO RETRACTED POSITION, PRESS "HEAD RETURN" PUSHBUTTON ENERGIZING "4CR"(SOL.F).
4. WITH HEAD RETRACTED, PRESS "UNCLAMP" PUSHBUTTON ENERGIZING "6CR" (SOL.C AND SOL.D) TO UNCLAMP PART.

E. EMERGENCY RETURN: IF "EMERGENCY RETURN" PUSHBUTTON IS PRESSED ON EITHER "AUTOMATIC" OR "MANUAL" CYCLE, THE HEAD WILL RETURN AND REMAIN IN THE RETRACTED POSITION. IN ORDER TO START CYCLE THE "EMERGENCY RETURN RESET" PUSHBUTTON MUST BE PRESSED.

LIMIT SWITCHES

1LS - TRIPPED WHEN PART IS CLAMPED (7,23).
2LS - TRIPPED WHEN PART IS CLAMPED (7,23).
3LS - TRIPPED WHEN HEAD IS FORWARD (11,16).
4LS - TRIPPED WHEN HEAD IS RETRACTED (14,21).
5LS - TRIPPED WHEN PART IS UNCLAMPED (19,7).
6LS - TRIPPED WHEN PART IS UNCLAMPED (19,7).

PURCHASE ORDER NO. PO-1234
SERIAL NO. OF MACHINE-TYP-5678

FOR HYDRAULIC DIAGRAM SEE SHEET 5

LAST NUMBER USED 63

VENDOR'S DWG. NO.____.

9	LT				
1	DIS				
1	IM				
1	TR				
4	F	MANUFACTURERS' NAME, MODEL AND CATALOG NUMBER OF ALL COMPONENTS USED.			
12	PB				
11	CR				
6	LS				
1	MTR				
AMT.	SYM.	SHEET	MAKE OR STOCK SIZE	MATERIAL	WT. LBS.

PART NO. XY-100		SHEET 1	SHEETS 2	DRAWING NO. 70-ZE-1367
DES. BY J.Z.	DET. BY G.C.	TITLE SAMPLE ELECTRICAL DIAGRAMS		
CHECKED BY J.G.	SAFETY O.K. W.M.			
DATE 3-20-57	SCALE NONE	DIVISION TOOL	XYZ MACHINE CO.	

APPENDIX A

SWITCHES

DISCONNECT	CIRCUIT INTERRUPTER	CIRCUIT BREAKER	LIMIT			
			SPRING RETURN			MAINTAINED POSITION
			NORMALLY OPEN	NORMALLY CLOSED	NEUTRAL POSITION	
			HELD CLOSED	HELD OPEN	N P	

LIQUID LEVEL		VACUUM & PRESSURE		TEMPERATURE ACTUATED		FLOW (AIR, WATER, ETC)	
NORMALLY OPEN	NORMALLY CLOSED	NORMALLY OPEN	NORMALLY CLOSED	NORMALLY OPEN	NORMALLY CLOSED	NORMALLY OPEN	NORMALLY CLOSED

SPEED (PLUGGING)		ANTI-PLUG	SELECTOR		FOOT	
			PREFERRED PUSH BUTTON TYPE	ALTERNATE DRUM TYPE	NORMALLY CLOSED	NORMALLY OPEN
F, I	F, R	F, R	1 2 3	1 2 3		

PUSH BUTTONS

SINGLE CIRCUIT		DOUBLE CIRCUIT	MUSHROOM HEAD	MAINTAINED CONTACT
NORMALLY OPEN	NORMALLY CLOSED			

TIMER CONTACTS. CONTACT ACTION RETARDED WHEN COIL IS:				GENERAL CONTACTS. STARTERS, RELAYS, ETC		
ENERGIZED		DE-ENERGIZED				
NORMALLY OPEN	NORMALLY CLOSED	NORMALLY OPEN	NORMALLY CLOSED	OVERLOAD THERMAL	NORMALLY OPEN	NORMALLY CLOSED

CONDUCTORS		COILS			
NOT CONNECTED	CONNECTED	RELAYS TIMERS, ETC	OVERLOAD THERMAL	SOLENOID	CONTROL TRANSFORMER
					H1 H3 H2 H4 X1 X2

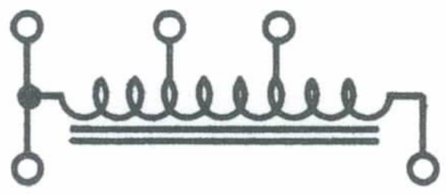
(CONTINUED)

TYPICAL GRAPHICAL SYMBOLS FOR ELECTRICAL DIAGRAMS

APPENDIX A (CONTINUED)

COILS (CONTINUED)

AUTO TRANSFORMER



REACTORS

IRON CORE

AIR CORE

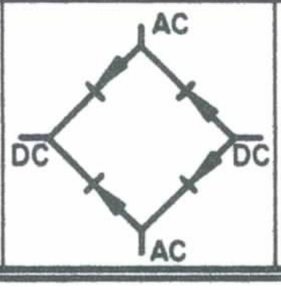
ADJUSTABLE

(SHOWN WITH IRON CORE)

RECTIFIERS

HALF WAVE

FULL WAVE



MOTORS

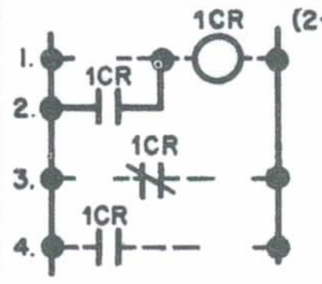
THREE PHASE

D.C. TYPES

FIELDS

ARMATURE

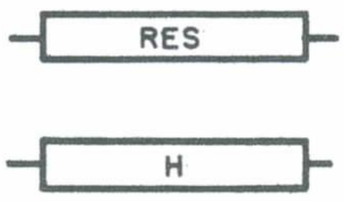
LOCATION OF RELAY CONTACTS



NUMBERS IN PARENTHESIS DESIGNATE THE LOCATION OF RELAY CONTACTS. A LINE UNDERNEATH A LOCATION NUMBER SIGNIFIES A NORMALLY CLOSED CONTACT.

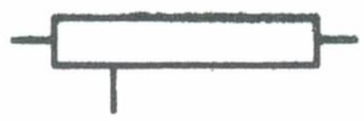
RESISTORS

FIXED



HEATING ELEMENT

TAPPED



DENOTE PURPOSE

POTENTIOMETER OR RHEOSTAT

ELECTRONIC TUBES

COLD CATHODE

VOLTAGE REG.

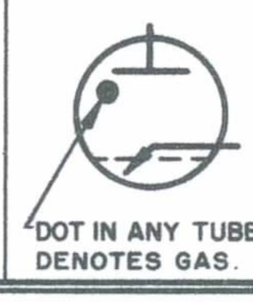
DIODE

TRIODE

TETRODE

PENTODE

IGNITRON



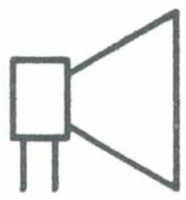
DOT IN ANY TUBE DENOTES GAS.

PHOTO-CELL

MISCELLANEOUS

FUSE (POWER OR CONTROL CIRCUIT)

HORN, SIREN, ETC

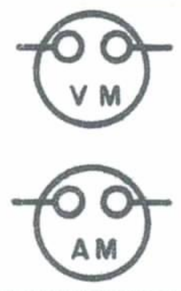


BELL OR BUZZER

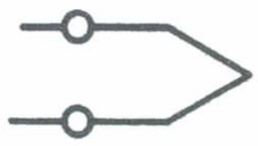
PLUG AND RECEPTACLE

METER SHUNT

METER

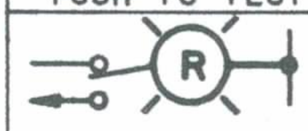


THERMOCOUPLES



LAMPS

PUSH TO TEST



DENOTE COLOR BY LETTER

BATTERY

GROUND

CAPACITOR

FIXED

ADJUSTABLE

PRINTED IN U. S. A.