

TRANSIS-TRONICS, INC.

**TEC** transistor engineered components

1601 Olympic Blvd.

Santa Monica

California

Gladstone 1-1401

MARCH 1, 1962

AIR MAIL

MR. H. T. HALL  
BRIGHAM YOUNG UNIVERSITY  
PROVO, UTAH

DEAR MR. HALL:

WE ARE PLEASED TO ENCLOSE FOR YOUR CONSIDERATION A BOOKLET DESCRIBING THE PERFORMANCE AND CONSTRUCTION OF A NEW HIGH PRESSURE SYSTEM BEING OFFERED BY OUR COMPANY FOR RESEARCH USE. WE BELIEVE THAT THE TEC KILOTON HYDROPRESS, WITH ITS ACCOMPANYING PUMP AND INSTRUMENTATION, REPRESENTS A MOST USEFUL INVESTMENT FOR INSTITUTIONS AND INDUSTRIES DOING WORK IN THE HIGH PRESSURE FIELD.

THE INITIAL DESIGN OF THE PRESS WAS BY PROFESSOR GEORGE C. KENNEDY OF THE UNIVERSITY OF CALIFORNIA AT LOS ANGELES, AND THIS DESIGN HAS SINCE BEEN CONSIDERABLY REFINED AND IMPROVED. A NUMBER OF OUR PRESSES ARE ALREADY IN USE IN THIS COUNTRY; ADDITIONAL ORDERS AND INQUIRIES WE HAVE RECEIVED CONFIRM OUR BELIEF IN THE USEFULNESS THE PRESS WILL HAVE IN MANY RESEARCH APPLICATIONS. VERSIONS WHICH ARE DIFFERENT FROM THE STANDARD PRESS MAY BE MANUFACTURED FOR YOUR SPECIAL NEEDS AT MODERATE ADDITIONAL COST. THE PRICE OF THE STANDARD PRESS, ILLUSTRATED IN THE ACCOMPANYING LITERATURE, IS \$24,800, F.O.B. OUR PLANT, SANTA MONICA, CALIFORNIA.

I SHALL BE HAPPY TO ANSWER ANY QUESTIONS YOU MAY HAVE.

SINCERELY YOURS

TRANSIS-TRONICS, INC.



ROBERT BERKOVITZ

RB:B  
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TRANSIS-TRONICS, INC.  
1601 OLYMPIC BLVD.  
SANTA MONICA, CALIFORNIA

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TRANSIS-TRONICS, INC.

TRANSIS-TRONICS, INC.  
1601 OLYMPIC BOULEVARD  
SANTA MONICA, CALIFORNIA  
GLADSTONE 1-1401

### TEC KILOTON HYDROPRESS

THE BASIC DESIGN OF THE TEC "KILOTON" HYDROPRESS IS THE WORK OF DR. GEORGE KENNEDY, FORMERLY OF HARVARD UNIVERSITY, NOW AT THE INSTITUTE OF GEOPHYSICS AT U.C.L.A. THE ORIGINAL DESIGN, SINCE REFINED IN SEVERAL SIGNIFICANT RESPECTS, HAS PROVIDED CERTAIN DATA CONSIDERABLY MORE ACCURATE THAN TETRAHEDRAL OR BELT-TYPE APPARATUS PERMIT. SEE: SOME FIXED POINTS ON THE HIGH PRESSURE SCALE, IN "PROGRESS IN VERY HIGH PRESSURE RESEARCH", WILEY, NEW YORK AND LONDON, 1961. } ?

IN A PISTON-CYLINDER SYSTEM SUCH AS THE TEC HYDROPRESS, THE FULL THRUST OF THE RAM IS BORNE BY THE FACE OF THE PISTON, PERMITTING RAPID AND ACCURATE PRESSURE MEASUREMENTS. IN TETRAHEDRAL OR BELT TYPES, HIGH PRESSURES APPEAR TO BE OBTAINED EVEN IN THE ABSENCE OF A SAMPLE IN THE TEST CAVITY, IF ONE MONITORS ONLY THE THRUST ON THE RAM. IT IS FURTHERMORE IMPOSSIBLE IN THESE SYSTEMS TO MEASURE THE COMPRESSIBILITIES OF SAMPLES OR REVERSIBLE PHASE CHANGES IN SAMPLES BY VOLUME. NOT THE LEAST DIFFICULTY IS THAT OF BRINGING LEADS FROM THE APPARATUS.

IN THE TEC HYDROPRESS IT IS QUITE SIMPLE TO TRACK THE MOTION OF THE PISTON AGAINST RAM PRESSURE, SO THAT PHASE CHANGES, COMPRESSIBILITIES AND EQUATIONS OF STATE CAN READILY BE DETERMINED. PROVISION IS MADE FOR LEADING OUT A LARGE NUMBER OF WIRES FROM THE HIGH-PRESSURE CAVITY, SO THAT MANY CHARACTERISTICS OF THE SAMPLE MAY BE MONITORED DURING A RUN.

THE TEC HYDROPRESS IS DESIGNED AND ENGINEERED TO APPLY A MAIN CYLINDER THRUST OF APPROXIMATELY 1,100 TONS. WERE APPROPRIATE PISTON MATERIALS AVAILABLE, THIS FORCE WOULD CONCENTRATE ABOUT 750,000 ATMOSPHERES, OR 11 MILLION PSI ( $800,000 \text{ kg/cm}^2$ ) ON THE CROSS-SECTION AREA OF A HALF-INCH PISTON. WITH LARGER PISTON AREAS, OF COURSE, CORRESPONDINGLY SMALLER PRESSURES WOULD BE DEVELOPED. AS PROTECTION FOR THE MOTOR AND HYDRAULIC COMPONENTS, HOWEVER, OPERATING LIMITS ARE SET AT 600 TONS FOR ELECTRIC AND 800 TONS FOR MANUAL OPERATION. THE MAIN CYLINDER HAS A RADIUS OF 5 INCHES,  $\pm 0.01$ ".

THE PRESS IS NORMALLY SUPPLIED WITH ALL TOOLS REQUIRED FOR SINGLE-STAGE AND SUPPORTED-PISTON OPERATION; WITH THE TUNGSTEN CARBIDE PISTONS SUPPLIED, THE FORMER METHOD READILY PERMITS PRESSURES OF 55,000 ATMOSPHERES TO BE ACHIEVED, THE LATTER EXTENDING THIS TO APPROXIMATELY 80,000 ATMOSPHERES. WITH APPROPRIATE FURNACE ELEMENTS, TEMPERATURES OF  $1,800^{\circ}$  CENTIGRADE MAY BE MAINTAINED. THE STANDARD SAMPLE CAVITY FORMED BY THE TOOL STACK SUPPLIED IS  $\frac{1}{2}$ -INCH IN DIAMETER AND 2 INCHES IN LENGTH; MODIFICATIONS MAY BE MADE DURING MANUFACTURE TO INCREASE THESE DIMENSIONS UP TO 2 INCHES DIAMETER AND 6 INCHES IN LENGTH, AT MODERATE ADDITIONAL COST.

AN EXCEPTIONALLY RELIABLE DOUBT-ACTING PUMP OF OUR OWN DESIGN IS FITTED TO THE PRESS, FOR WHICH VARIABLE-SPEED CONTROL IS OPTIONALLY AVAILABLE.

TO COMPLEMENT THE PRESS, A STOCK OF STANDARD FURNACES AND PISTONS, AS WELL AS SPARE PARTS, WILL BE MAINTAINED AT OUR SANTA MONICA FACILITY. OUR PRODUCTION OF THESE ITEMS IN SUBSTANTIAL QUANTITY SHOULD PERMIT ECONOMICAL OPERATION BY OWNERS OF TEC PRESSES, AS WELL AS AVAILABILITY OF PARTS BY AIR SHIPMENT TO ANY PART OF THE WORLD.

THE ACCOMPANYING DRAWINGS ILLUSTRATE THE CONSTRUCTION AND METHOD OF OPERATION OF THE PRESS. THE PRESS STRUCTURE IS SUPPLIED MOUNTED UPON A STEEL PEDESTAL BASE SEVERAL INCHES THICK, WITH ANGLE BRACKETS FOR BOLTING TO A FLOOR; A CONSOLE MOUNTED ALONGSIDE THE PRESS ON THE SAME PEDESTAL CONTAINS GAUGES FOR MONITORING MAIN AND END-LOADING RAM PRESSURE, VALVES, ELECTRICAL SWITCHES, MANUAL AND ELECTRIC PUMPS, FLUID RESERVOIR AND FURNACE VOLTAGE CONTROL SYSTEM.

POWER REQUIREMENTS FOR PRESS OPERATION ARE 210-230 VOLTS, 3-PHASE, CAPABLE OF DELIVERING 40 AMPERES; INCLUDED IN THIS FIGURE IS AN ESTIMATED 10 AMPERES OF SAFETY MARGIN. THE COST OF THE PRESS IS \$24,800, F.O.B. OUR PLANT, SANTA MONICA, CALIFORNIA.\* THE DELIVERY TIME FROM RECEIPT OF PURCHASE ORDER WILL VARY BETWEEN 90 TO 180 DAYS. ALL PRESSES ARE FULLY TESTED IN OPERATION BEFORE SHIPMENT, AND ARE WARRANTED TO BE FREE OF DEFECTS IN MATERIAL OR WORKMANSHIP AND CAPABLE OF PROVIDING THE PRESSURES SPECIFIED ABOVE WITH NO PARTS OTHER THAN THOSE PROVIDED WITH THE PRESS. SINCE PRESS, CONTROL SYSTEM AND INSTRUMENTATION ARE SHIPPED AS AN INTEGRAL UNIT, AND OPERATION IS QUITE SIMPLE, NO UNIFORM PROVISION IS MADE FOR FACTORY SUPERVISION OF INSTALLATION. PERSONNEL ARE AVAILABLE, HOWEVER, TO EXECUTE OR SUPERVISE START-UP AND OPERATION, AT NOMINAL COST.

\* AS THE PRESS IS CONSTANTLY UNDER STUDY WITH THE OBJECT OF REFINING ITS DESIGN AND INCREASING ITS CAPABILITY, ITS SPECIFICATIONS AND PRICE ARE SUBJECT TO CHANGE.

TRANSIS-TRONICS, INC.  
1601 OLYMPIC BOULEVARD  
SANTA MONICA, CALIFORNIA  
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## TEC KILOTON HYDROPRESS

### INSTRUCTIONS

1. GENERAL DESCRIPTION. THE TEC KILOTON HYDROPRESS MODEL 3 IS SIMILAR IN DESIGN TO ONE USED EXTENSIVELY FOR HIGH PRESSURE RESEARCH FOR SOME YEARS PAST; EXPERIENCE GAINED WITH THE PROTOTYPE PRESS HAS BEEN APPLIED TO CONSIDERABLY EXPAND THE CAPABILITIES OF THE UNIT. THE TEC PRESS IS OF THE PISTON-CYLINDER TYPE, AND IS SUPPLIED WITH DIES AND PISTONS FOR ONE - OR TWO-STAGE OPERATION; PRESSURES UP TO 80,000 BARS (1,200,000 PSI) MAY BE OBTAINED IN VOLUMES 1/2" X 2" IN TWO-STAGE OPERATION. PRESSURES OF 55,000 BARS (725,000 PSI) MAY BE ROUTINELY ACHIEVED IN ONE-STAGE OPERATION, AT TEMPERATURES OF 1,800 DEGREES CENTIGRADE. ?

THESE PRESSURES ARE OBTAINED BY ADVANCING A HYDRAULIC RAM OF 750 TONS THRUST, WHICH PRESSES A CARBIDE PISTON INTO A SUPPORTED CARBIDE PRESSURE VESSEL. A SEPARATE RAM OF 400 TONS THRUST SUPPLIES END LOAD TO THE PRESSURE VESSEL. THE PRESS IS SUPPLIED COMPLETE WITH MANUAL AND ELECTRIC PUMP, GAUGES, TWO-STAGE DIES AND CARBIDE PISTONS AND CORES.

NOTE: DIES AND TOOLS REQUIRED FOR PRESS OPERATION ARE MAINTAINED IN STOCK AT SANTA MONICA, CALIFORNIA, BY TRANSIS-TRONICS, INC. THESE PARTS, DESIGNED ESPECIALLY FOR THE TEC KILOTON HYDROPRESS, WILL BE AVAILABLE ON SHORT NOTICE FOR REPLACEMENT PURPOSES, OR, AS IMPROVEMENTS ARE MADE, TO ENABLE PRESS OWNERS TO AVAIL THEMSELVES OF THESE CHANGES QUICKLY AND AT LOW COST.

2. LOCATION OF CONTROLS. THE PRESS IS OPERATED BY MANIPULATING THE COLOR-CODED HANDLES OF TEN HYDRAULIC VALVES, TWO ELECTRICAL SWITCHES, AND A HAND-OPERATED PUMP. THE TEMPERATURE IN THE PRESSURE VESSEL, OBTAINED BY RESISTANCE HEATING OF AN ELECTRODE (NOT SUPPLIED) WITHIN THE SPECIMEN CHAMBER, MAY BE ADJUSTED BY VARYING THE VOLTAGE SUPPLIED THROUGH THE VARIABLE RHEOSTAT MOUNTED ON THE UPPER PANEL OF THE CONTROL CONSOLE. THE HYDRAULIC VALVES ARE INSTALLED ON THE HORIZONTAL PORTION OF THE CONTROL CONSOLE; THEIR CODING AND FUNCTION ARE DESCRIBED IN SECTION 4 BELOW. THE HAND PUMP IS ATTACHED TO THE SIDE OF THE CONTROL CONSOLE.

3. SET-UP OF TOOL STACK FOR OPERATION. THE ATTACHED DRAWING (FIG. 1) SHOWS THE CORRECT METHOD OF STACKING TOOLS FOR TWO-STAGE OPERATION.

#### 4. OPERATION CHECKLIST.

1. CLOSE ALL VALVES BY TURNING CLOCKWISE. TURN OFF POWER SWITCHES FOR PUMP AND FURNACE.
2. CHECK A.C. POWER SUPPLY. THIS MUST BE 220-VOLT, 3-PHASE, CAPABLE OF DELIVERING 40 AMPERES FOR PRESS OPERATION AND A MARGIN OF SAFETY.
3. BEFORE OPERATING PRESS, REMOVE RUBBER PROTECTOR UNDERNEATH LARGE (HEISE) GAUGE POINTER.

4. OPEN HAND PUMP VALVE (BROWN) OR ELECTRIC PUMP VALVE (ORANGE). THE PRESS MUST NOT BE OPERATED UNLESS ONE OF THESE VALVES AND A PAIR OF CYLINDER MOVEMENT VALVES ARE OPEN.
5. OPEN THE PAIR OF VALVES WHICH CORRESPOND TO THE CYLINDER MOVEMENT DESIRED:

<u>MOVEMENT</u>	<u>OPEN</u>	
LOWER CYLINDER UP	RED VALVES	} AND ORANGE OR BROWN
LOWER CYLINDER DOWN	YELLOW VALVES	
UPPER CYLINDER UP	BLUE VALVES	
UPPER CYLINDER DOWN	GREEN VALVES	

6. CLOSE SAFETY SHIELD; THEN OPERATE HAND PUMP, OR THROW SWITCH TO ACTUATE ELECTRIC PUMP. TURN OFF SWITCH, THEN CLOSE VALVES, WHEN MOVEMENT IS TO BE STOPPED.
7. THE ELECTRIC PUMP IS PROTECTED BY A BLOWOUT SEAL OF 15,350 PSI RATING, JUST INSIDE THE ACCESS DOOR. AFTER REPLACING SEAL, BE CERTAIN THAT ALL AIR HAS BEEN BLED FROM BLOWOUT CHAMBER BEFORE PUMPING OIL TO CYLINDERS.

TO BLEED AIR FROM BLOWOUT CHAMBER: OPEN VALVES LABELED "ELECTRIC PUMP" (ORANGE), "MASTER RAM UP" (RED) AND "MASTER RAM OIL RETURN" (YELLOW), CLOSE ALL OTHERS. THROW SWITCH TO ACTUATE ELECTRIC PUMP, RAP BLOWOUT SEAL CHAMBER LIGHTLY UNTIL AIR BUBBLES CEASE TO PASS THROUGH TRANSPARENT PLASTIC HOSE RETURN TO RESERVOIR.

TRANSIS-TRONICS, INC.  
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 SANTA MONICA, CALIFORNIA

PARTS LIST FOR TEC KILOTON PRESS

PRESS ASSEMBLY

<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>PART NO.</u>
1	MAIN PLATEN	1001
3	LOCATOR	1002
1	LOWER RETAINING RING	1003
1	MAIN CYLINDER	1004
4	COLUMNS	1005
1	MAIN PISTON	1006
1	UPPER SEALING RING	1007
1	TOP BEARING	1008
12	HEX NUTS	1009
2	COLUMNS	1010
2	GUIDE	1011
1	HOLDING PLATEN	1012
1	BACK-UP PLATE	1013
1	MAIN PLATEN	1014
1	LOWER SEALING RING	1015
1	LOWER RETAINER	1016
1	PISTON	1017
1	HOLDING CYLINDER	1018
1	UPPER SEAL RING	1019
1	TOP BEARING PLATE	1020
1	HOLDING PLATEN	1021
1	LOWER SEAL RING	1022
3	5/8 - 18 x 6 SOCKET HEAD SCREW	1000-2
3	O RING	1000-6
3	BACK-UP RING	1000-7
12	1/2 - 20 x 1 SOCKET HEAD SCREW	1000-10
18	1/2 - 20 x 1 1/4 SOCKET HEAD SCREW	1000-11
1	O RING	1000-13
1	BACK-UP RING	1000-14
3	1/2 - 13 x 4 SOCKET HEAD SCREW	1000-20
3	BACK-UP RING	1000-25
3	O RING	1000-26
1	O RING	1000-30
1	BACK-UP RING	1000-31



TEC KILOTON PRESS  
PARTS LIST (CON'T)  
PAGE 2

PUMP

QUANTITY

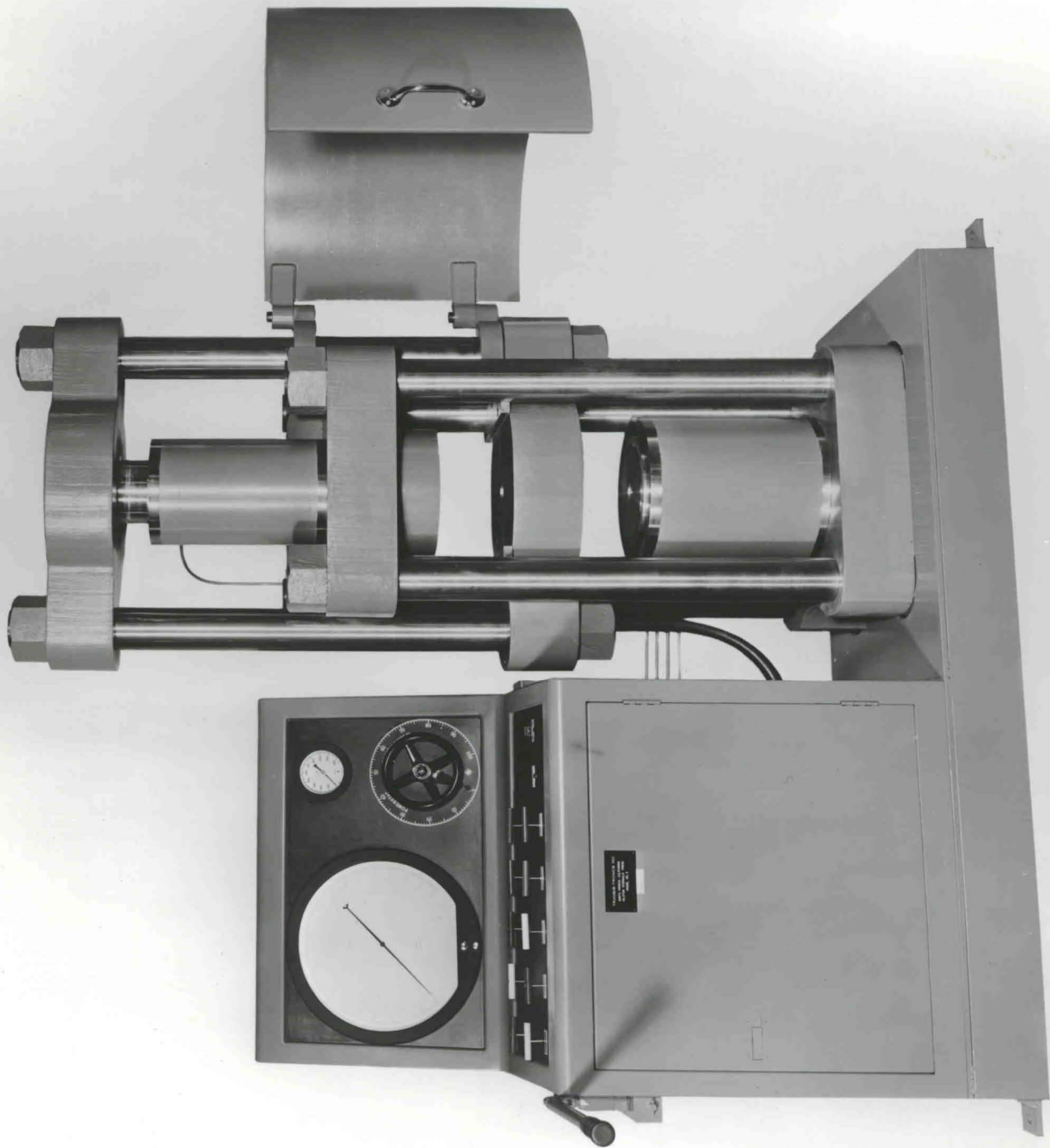
DESCRIPTION

PART NO.

1	BASE	2001
1	FLYWHEEL CRANK	2002
1	ARM CRANK	2003
1	SUB BASE	2004
2	GASKET	2005-1
4	SEAL SPACER A	2005-2
2	GLAND NUT A	2005-3
2	SPRING	2005-4
4	WASHER	2006-1
4	BACKUP RING A	2006-2
4	BACKUP RING B	2006-3
2	SEAL SPACER B	2006-4
2	GLAND NUT B	2006-5
1	SPACER ARM	2007
1	ARM A	2008-1
1	ARM B	2008-2
1	PIVOT ARM	2009
1	PISTON	2010
1	BODY A	2011
1	BODY B	2012
1	MOTOR 1 1/2 HP 68 RPM	2000-1
4	1/2 FLAT WASHER	2000-2
4	1/2 - 13 x 2 HEX HEAD BOLT	2000-3
2	5/16 - 18 x 2 SOCKET HEAD SET SCREW	2000-4
5	BOST #B810-4 BRONZE BEARING	2000-5
2	BOST #TB-814 BRONZE BEARING	2000-6
1	1/2" DIA x 1 1/4 SHOULDER SCREW	2000-7
1	1/2" FLAT WASHER	2000-8
1	1/4 x 1/4 x 2 1/2" KEY	2000-9
2	.250 BALL	2000-10
2	.500 BALL	2000-11
2	AMINCO SLEEVE 45-1316	2000-12
2	AMINCO GLAND NUT 45-1313	2000-13
4	1/2" x 1 3/8" DOWEL	2000-14
4	1/4 - 20 x 1 SOCKET SCREW	2000-15
6	1/4 - 13 c 1 3/4 SOCKET SCREW	2000-16
6	1/2 D x 2 DOWEL	2000-17
4	1/2 - 13 x 1 SOCKET SCREW	2000-18
2	GRAPHITE ROPE PACKING	2000-19
1	TRANSFORMER 110-220 V PRI 6 V SEC 5KVA	A
1	POWERSTAT 7.8 KVA 220V SERIES 1256C	B
1	CONTROL CONSOLE (TEC)	C
1	30-AMP SWITCH FOR HEATING SYSTEM	D
1	20-AMP SWITCH FOR PUMP MOTOR	E
1	#1000 JENNY HAND PUMP	F
1	PRESS PEDESTAL BASE (TEC)	G
1	FLUID RESERVOIR TANK (TEC)	H
1	20,000 PSI 4 1/2" GAUGE	I
1	30,000 PSI 16"	J

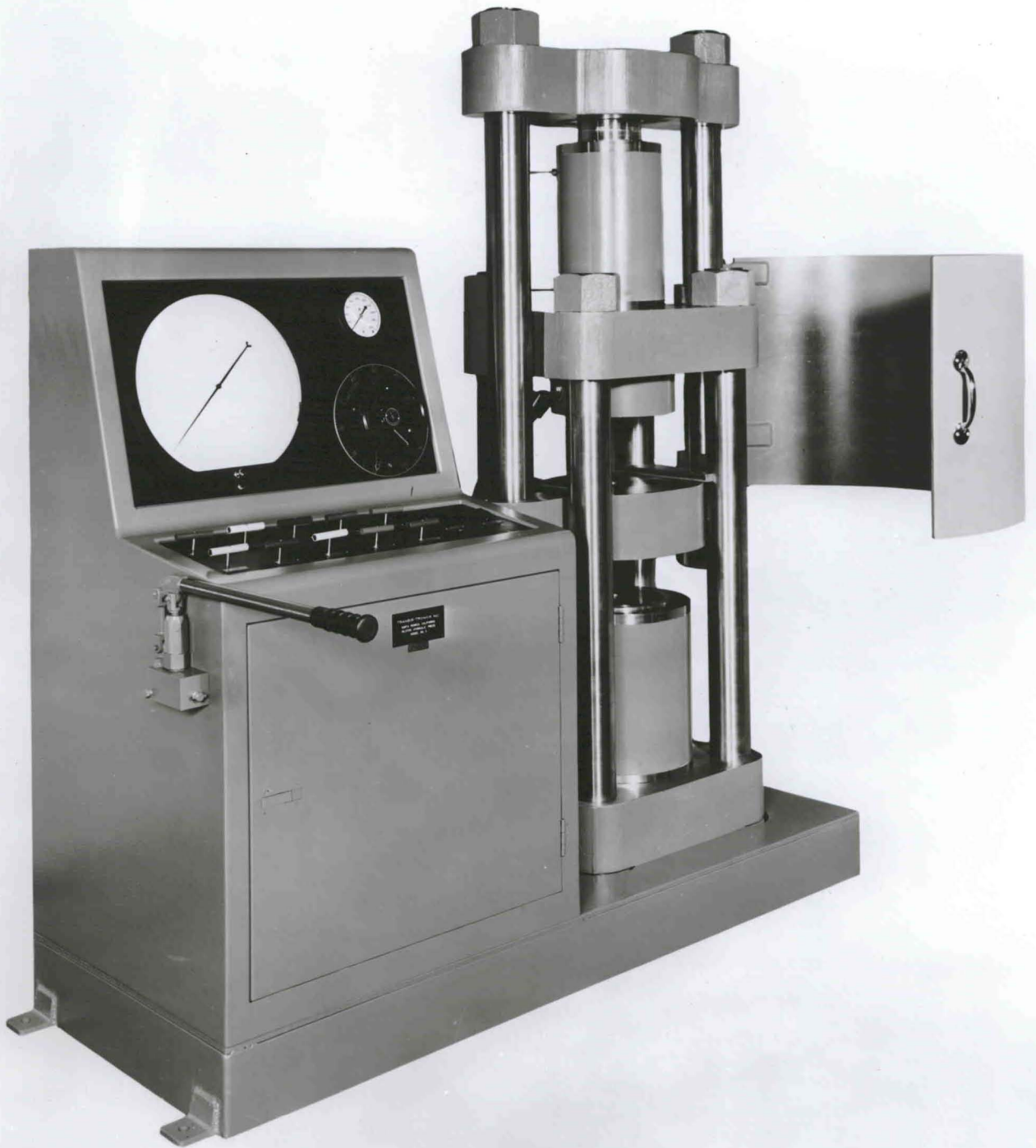
HYDRAULIC SYSTEM COMPONENTS

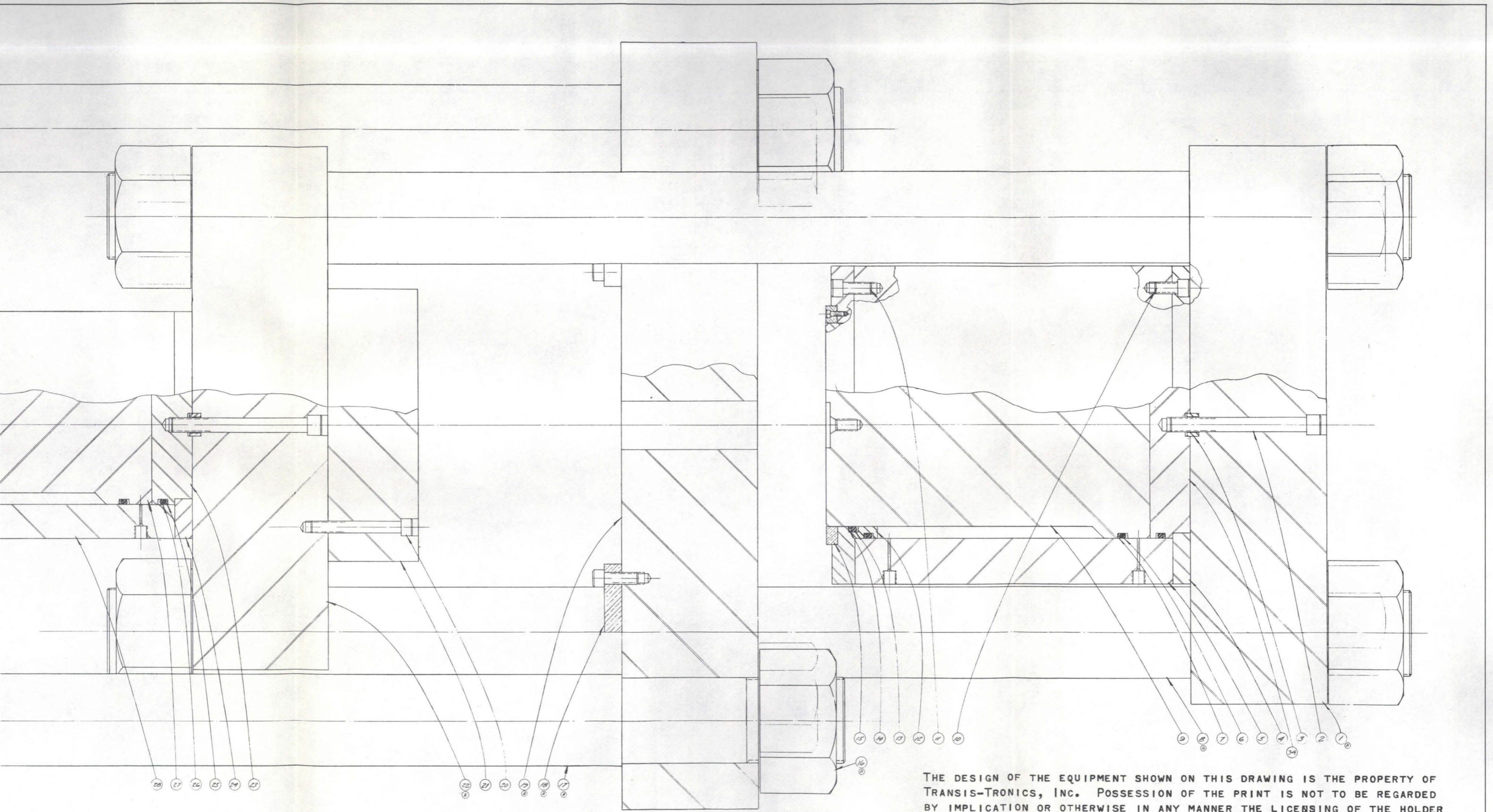
<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>PART NO.</u>
10	VALVES	K
6	TEES	L
6	ELLS	M
6	CONNECTORS	N
2	PLUGS	O
2	ADAPTERS	P
60 FT.	TUBING	Q
6	90° ELL	R
3	TEE	S
3	HALF UNIONS	T
2	HEX BUSHINGS	U
2	LOCKNUTS	V





TRANSIS-TRONICS, INC.  
SANTA MONICA, CALIFORNIA  
KILTON HYDRAULIC PRESS  
MODEL NO. 3





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