STERLCO TEMPERATURE CONTROL UNIT

SERVICE AND INSTRUCTION MANUAL

MODEL 6414-A SAMPLE

STERLING, INC.
5200 West Clinton Avenue
Milwaukee, Wisconsin

Please note that our address and phone information has changed. Please reference this page for updated contact information.

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DESCRIPTION

The Model 6414 Sterl-Tronic temperature control unit is built to comply to JIC specifications as best they can be interpreted to apply to a portable device of this nature.

The Model 6414 Sterl-Tronic temperature control unit is a single zone unit designed to circulate water through your process and to precisely, automatically, and reliably maintain process water at the selected temperature. The operating range of the Sterl-Tronic unit is from supply water temperature up to 250° F. maximum. The unit is well suited for use with a city water supply, water from portable or central chillers, towers, or with well water.

Many new improved design features have been incorporated into the Sterl-Tronic; among them solid-state electronic thermostat, improved pump design, automatic mechanical proportioning of heating and cooling, dual electronic sensing probes, pushbutton air vent, pressure switch, and an improved circuitry design.

The relatively small total amount of water, rapidly recirculated by the Sterl-Tronic, provides assurance of a close and uniform temperature relationship between the delivery and return lines of the unit. This assures uniform and stable temperature control as well as a very even temperature throughout the work area. Also, the high rate of recirculation, combined with the large immersion heater and high cooling rate, gives the unit exceptionally fast response in bringing the process up to temperature and in making changes of settings when necessary.

THE PUMP is a 1/2 HP straight centrifugal type, bronze-fitted. It has a high output capacity with good discharge pressure and is well suited for the conditions under which the unit is designed to operate. The circulating capacity available to the user, outside the unit, is 15 GPM @ 20 psi. A special seal-flush system in the pump helps keep the seal clean thereby extending seal life. The seal itself is the finest type available for this type of service and provides an excellent combination of long wearing ability, high abrasion resistance, and heat resistance.

THE HEATER is a three phase immersion heater, 9 KW capcity, of low watt-density construction to minimize fouling and to promote longer heater life. A 4-1/2 KW low watt-density heater may be provided as an alternate.

COOLING is accomplished by automatic release of the required amount of warm water from the system to the drain. This permits an equal amount of cool water to enter the system from the plant water supply. Naturally, the plant water supply temperature will govern the minimum operating temperature of the unit. The cool water enters the system immediately ahead of each pump which blends it with system water.

THERMOSTATIC CONTROL of the system is maintained by a newly developed solid-state electronic controller with heating and cooling relay output. Two stable, wire-wound temperature sensors, one sensing the need for heating and the other sensing the need for cooling, monitor process temperatures and relay readings back to the controller. Should either of these sensors fail, the system will be protected against a rise in temperature. The solid-state design of these components assures

exceptionally precise and trouble-free operation. The single-set controller energizes either the heater or the cooling circuitry as required. A narrow band neutral zone between heating and cooling is preset into the controller.

SYSTEM TEMPERATURES are easily read on the 2-1/2" diameter vapor tension thermometer. Its long thin needle with close calibration permits the detection of small temperature variations.

ELECTRICAL: While the pump motor and heater operate on full line voltage, (either 230, 460 or 550 volt, 3 phase), the control circuit is 115 volt single phase. Control circuit voltage is provided by a single phase transformer wired across two legs of the three phase power supply. A fused disconnect switch (or circuit breaker) is provided, interlocked with the door, to interrupt the main power supply if the electrical control panel is opened. A magnetic starter with overload and high and low voltage protection is used for the pump motor. Heating and cooling control circuitry are interlocked with the pump motor starter to prevent heating and cooling when the pump is not running. The 110 V. control circuit is fused, and a therminal is available on the transformer secondary for grounding the control circuitry on delta type power supplies with a center-leg ground. The (green) flush head oiltight "START" pushbutton starts the pump motor and the (green push-to-test) "RUN" pilot indicates when it is running and power is provided to the controller. The (red) extended head oiltight "STOP" push-button stops the pump motor and de-energizes the controller.

A PUSHBUTTON VENT OR PRIME permits quick and complete purge of air from the unit, hoses and process from the operator's panel, before the unit is started. The (yellow) "VENT" pushbutton actuates the solenoid valve which permits the flow of trapped air and water out through the drain, insuring that the unit is properly filled and primed prior to startup.

PRESSURE SWITCH PROTECTION is built into each unit to insure that the unit will not start until the water supply has been turned "on" and the unit subjected to water supply pressure. This is intended to provide a measure of protection for the pump seal and the heater so that they will not be damaged through operation without water. The final measure of protection, however, must come from the operator in venting before startup. The pressure switch itself is set at approximately 6 psi prior to leaving Sterling.

INSTALLATION

There are three very important phases to the installation procedure necessary to insure optimum performance of your Model 6414 Sterl-Tronic water temperature control unit. First, a safe, well-grounded electrical power connection must be made; secondly, hoses and other fittings must be large enough to allow plenty of water to flow - not just trickle; and thirdly, an adequate water supply with sufficient pressure, and a drain with minimum back pressure, must be run to the unit.

Each of these three factors serves an important function in providing you with safe, accurate, efficient operation of your Sterl-Tronic with a minimum of maintenance.

DELIVERY AND RETURN CONNECTIONS

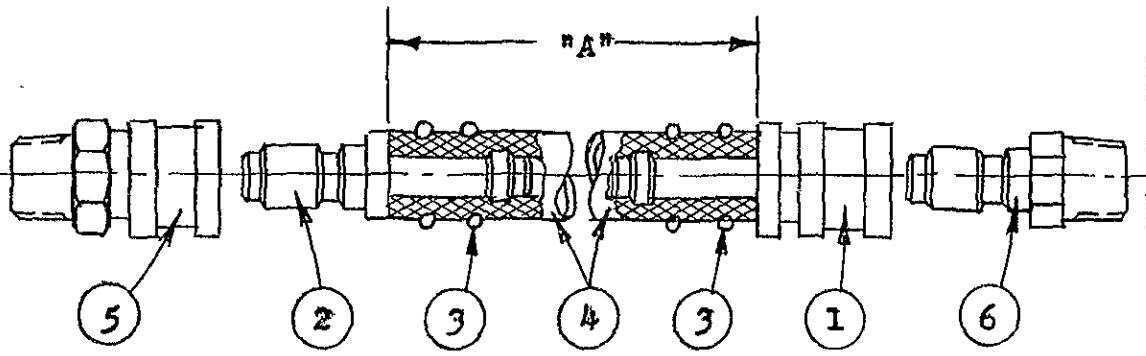
For your convenience, the delivery and return lines are brought out to 3/4" elbows at the back of the unit. This permits the user to run his hoses and fittings directly toward the process area and also serves to further isolate the water connections from the instrument panel. If supply and delivery lines smaller than 3/4" are to be used, we suggest installing tees at the 3/4" elbows and running at least two delivery and return lines in parallel from these tees. Several parallel runs are far more practical than one long serpentine run, and in many cases can make a difference between precise control and erratic operation.

It is well to bear in mind that in general the flow rate of the entire system is dependent upon the total resistance to flow. Since hoses create resistance, they should be as large in diameter as possible and as short as convenient. Even though the passages in the mold may be small, hoses and fittings with a low restriction to flow will at least help keep the total resistance to a minimum. Expressed in other terms, we might say that it is well to use the pump horsepower inside the process area and not in trying to overcome the resistance going to and from it.

The sketches on the following pages illustrate hoses and fittings which have been found quite acceptable. The hoses and fittings selected for use with the Sterl-Tronic must be well suited for operation at the temperature and pressures expected to be encountered, and must permit a free flow of water. Quick disconnect fittings with check valves in each half should be avoided, since the check valves themselves obstruct flow considerably. In many cases, the check valves can be removed from the quick disconnect rather simply.

WATER SUPPLY

The water supply connection is a 1/2" elbow at the back of the unit. It is very important that the water supply meet certain requirements. We recommend a full 1/2" hose without restricting fittings. Usable supply pressure must be in excess of 20 psig and perferably over 25 psig at the unit, if the unit is expected to operate at temperature over 200° F. This minimum pressure is necessary to keep the process water from flashing to steam at the pump inlet where water pressure is the lowest in the system. The pressure switch inside the unit will keep the unit from running until the unit has been subjected to a minimum water supply pressure.



UNLESS OTHERWISE SPECIFIED USE
± .005" TOLERANCE ON DECIMAL DIMENSIONS.
± .010" TOLERANCE ON FRACTIONAL DIMENSIONS.

Item No.	No. Parts Req.	Purch. Part No.	Name	Material
1	1	J-91-C	Socket	Hansen #4-S27, Type ST, Brass, 1/2" Hose Con.
2	1	J-91-B	Plug	Hansen #4-T27, Type ST, Steel, 1/2" Hose Con.
3	2	J-91-E	Hose Clamp	Wedgon Or Staput, Narrow Width, to Fit 27/32"O.D. Hose.
4	See Chart	J-91-F	Hose	Ortac 1/2"I.D. X 27/32" O.D. 1 Braid, (200°)
5	1	J-91-A	Socket	Hansen #4-S25, Type ST, Brass, 1/2"M.P.T. Con.
6	1	J-91-D	Plug	Hansen #4-T25, Type ST. Steel, 1/2"M.P.T. Con.

Sub. Assembly Part No.	"A" Hose Length
14289-1	17" Lg.
14289-5	5' 0" Lg.
14289-10	10' 0" Lg.
14289-15	15' 0" Lg.

USED ON | BY | DATE | CHANGE | NO. | BY | DATE | CHANGE | NO.

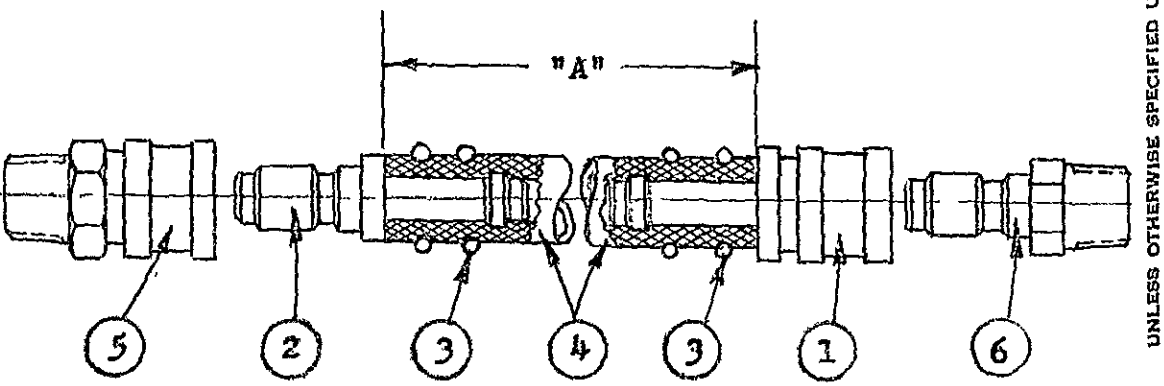
DWG. NO. 14289

DR. HWS | CH'K. HWS | DATE 1-25-56 | SCALE None | ISSUE 3 | DRG. NO. 14289

TITLE 1/2" Hose S.A. For Temp. Control Units

STERLING, INC.
MILWAUKEE, WIS.

MATERIAL
FINISH



UNLESS OTHERWISE SPECIFIED USE
± .005" TOLERANCE ON DECIMAL DIMENSIONS.
± .010" TOLERANCE ON FRACTIONAL DIMENSIONS.

Item No.	No. Parts Req.	Purch. Part No.	Name	Material
1	1	J-91-R	Socket	Hansen #6-S32, Type ST, Brass With 3/4" Hose Stem Connection.
2	1	J-91-P	Plug	Hansen #6-T32, Type ST, Steel, 3/4" Hose Stem Con.
3	2	J-91-T	Hose Clamps	Wedgon Or Stau put, Narrow Width, to Fit 1 9/32" O.D. Hose.
4	See Chart	J-91-U	Hose	#21W86 Creamery Type, 3/4" I.D. X 1 9/32" O.D. 4 Ply,
5	1	J-91-N	Socket	Hansen #6-S30, Type ST, Brass, 3/4" M.P.T. Con.
6	1	J-91-S	Plug	Hansen #6-T30, Type ST, Steel, 3/4" M.P.T. Con.

Sub. Assembly Part No.	"A" Hose Length
14339-5	5' 0" Lg.
14339-10	10' 0" Lg.
14339-15	15' 0" Lg.

USED ON | BY | DATE | CHANGE | NO.

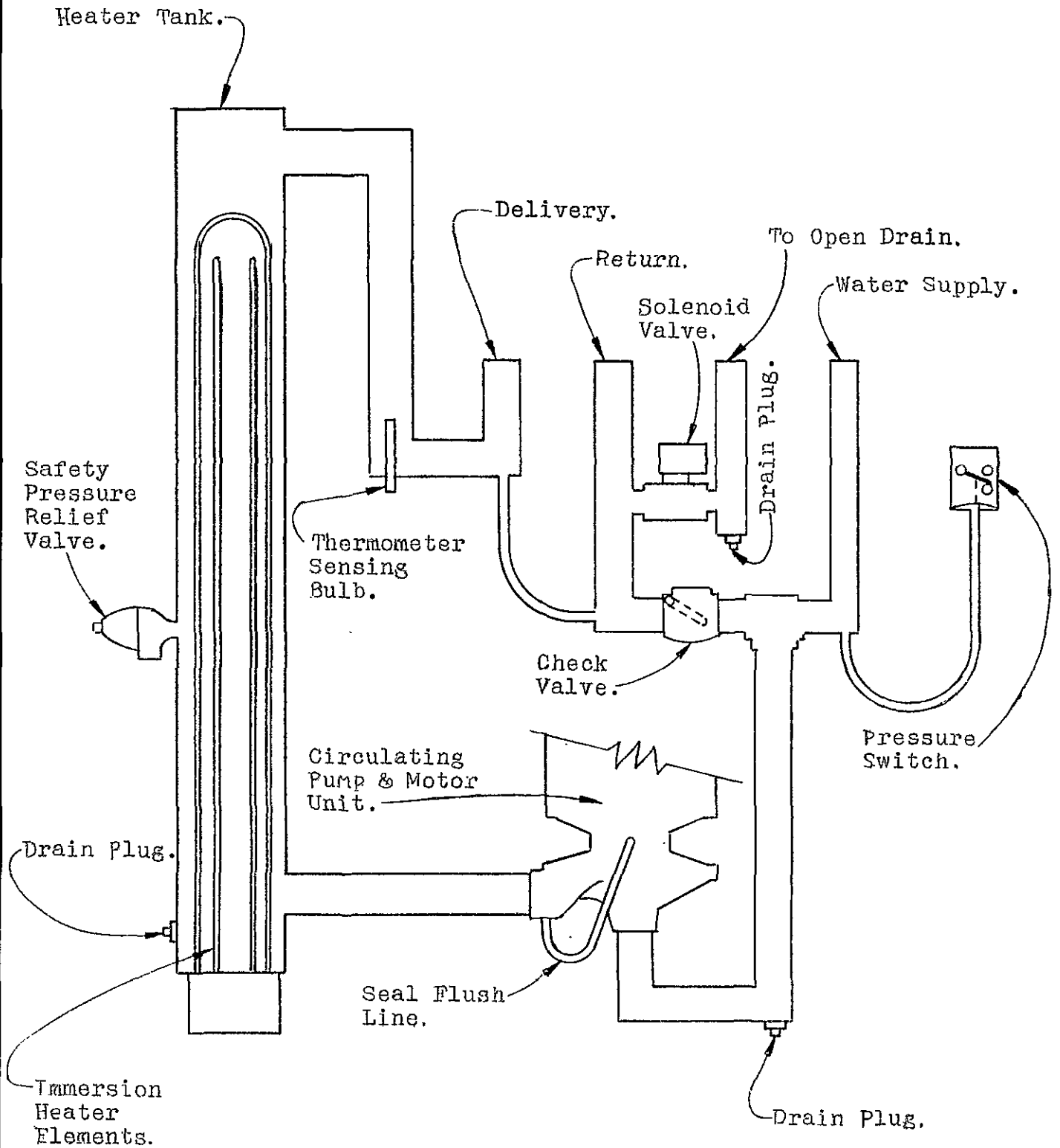
DWG. NO. 14339

MATERIAL
FINISH

STERLING, INC.
MILWAUKEE, WIS.

TITLE 3/4" Hose S. for Temp. control units

DR. HWS | CH'K. HWS | DATE 1-25-56 | SCALE None | ISSUE 2 | DRG. NO. 14339



FOR THE FOLLOWING UNITS:

6412-A

DRG. NO. 19018

ISSUE 1

SCALE None

DATE 8-26-68

CH'K.

DR. D.C.

TITLE SCHEMATIC PIPING DIAGRAM

STERLING, INC. MILWAUKEE, WIS.

DWG. NO. 19018

SPARE PARTS LIST
MODEL 6414-A STERL-TRONIC TEMPERATURE CONTROL UNITS

CONTROLS		
J-42-709	Solid State Thermostat, with 16059 potentiometer, dial and knob, without probes	$ 80.00
J-42-713	Thermistor probe - for dual installation (each)	17.00
J-17-EN	Thermometer	14.00
J-42-214	"START" Pushbutton	7.00
J-42-688	"STOP" Pushbutton	9.00
J-42-739	"VENT" Pushbutton	7.00
J-42-653	"RUN" Pilot Light, with bulb	21.00
	#55 Auto Bulb for above	.60
ELECTRICALS		
J-42-302	Starter, pump motor, Size "1" 115 V. coil	53.00
J-42-231	Heater contactor, Size 1 with 115 V. coil (for 230 V. units)	39.00
J-42-149	Heater contactor, Size 0 with 115 V. coil (for 460 V. units)	33.00
J-42-263	Pressure Switch	24.00
J-42-154	Transormer, control circuit	19.00
J-42-106	Electric Immersion Heater, 9 KW, 3 Phase, 230 Volt,	32.00
J-42-107	Electric Immersion Heater, 9 KW, 3 Phase, 460 Volt,	32.00
PUMPS-PUMP PARTS		
10410-8	Complete pump and motor assembly, ½ HP, 3 Phase, TENV (with Delco TENV motor - $113.00; G.E. TEFC motor $108.00)	102.00
16119-3	Motor and impeller assembly, ½ HP, 3 Phase, 230/460 TENV (with Delco TENV motor - $104.00; G.E. TEFC motor $ 99.00)	93.00
J-42-309	Pump motor, ½ HP, 3450 RPM, 3 Phase, 60 Cycle, 230/460 TENV (Delco TENV motor - $65.00; G.E. TEFC motor - $60.00)	54.00
J-81-M	Rotary Seal Assembly, ceramic and carbon (Part H, Form I-4100-E1)	9.50
J-18-CJ	Housing Gasket (Part K)	.25
13359	Pump impeller, standard brass (Part I)	10.00
13359-1	Pump impeller, cast iron (Part I)	17.00
J-79-B	Impeller Screw (Part J)	.20
10404	Water Slinger (Part C)	.08
13341-1	Bracket (Part E)	11.00
13801-1	Volute (Part LA)	8.50
VALVES		
J-42-631	Solenoid Valve (110 V. Coil)	
	Solenoid coil only for above	7.00
J-44-BM	Check Valve	5.70
J-44-87	Pressure Relief Valve	4.00

NOTE: WHEN ORDERING PLEASE SHOW MODEL AND SERIAL NUMBER OF STERLCO UNIT FOR WHICH PARTS ARE DESIRED. ABOVE PART NUMBERS AND PRICES APPLY TO STANDARD STERLCO PARTS. IF PARTS MADE BY OTHER SOURCES ARE REQUIRED BY CUSTOMER, THE SELLING PRICES MAY BE ADJUSTED ACCORDINGLY.

All prices are f.o.b. Milwaukee, Wisconsin. Terms are Net 30 Days. Prices are subject to change without notice.

STERLING, INC. 5200 West Clinton Avenue,
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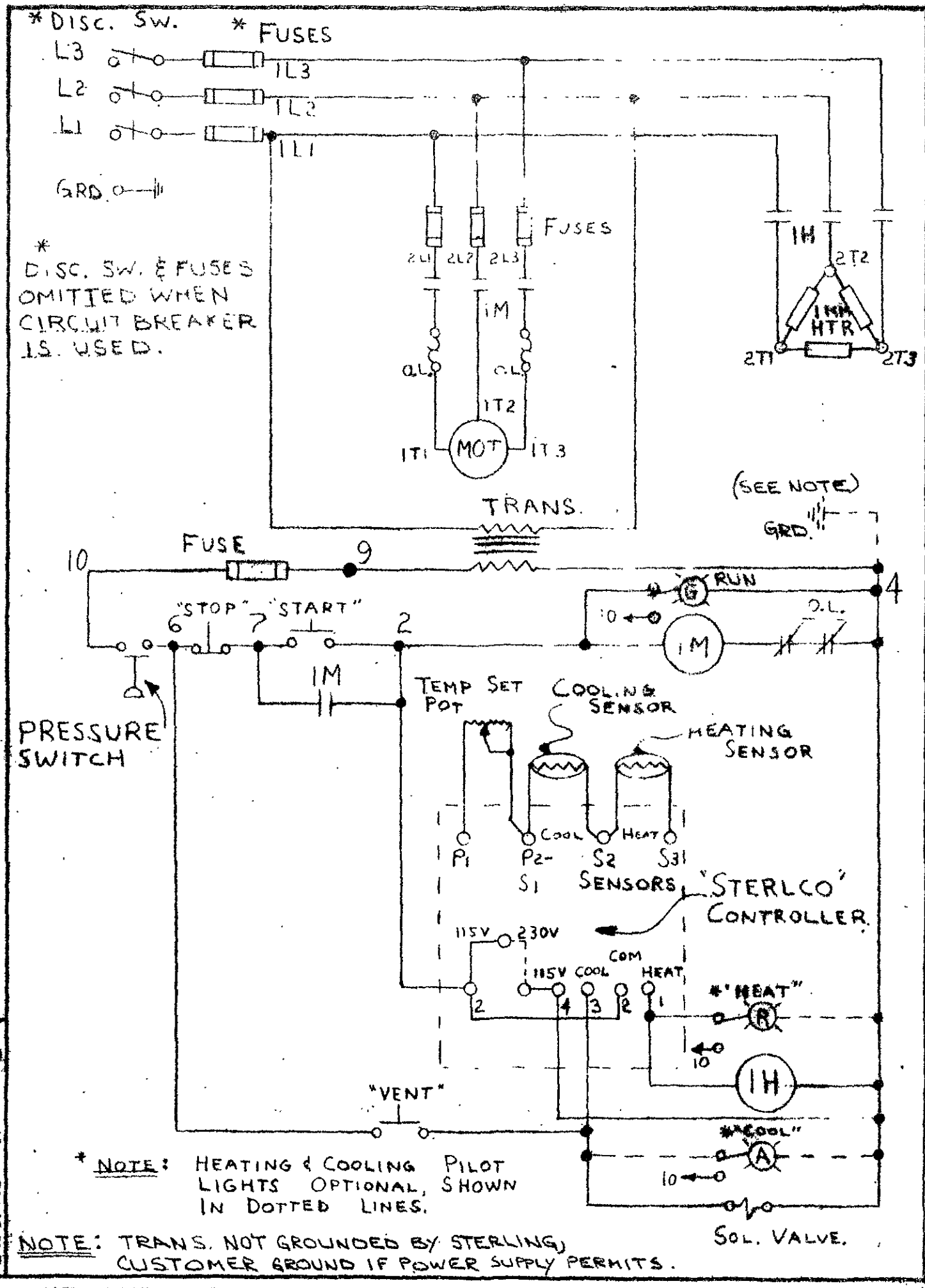

DWG. NO.	20662
ISSUE	1
SCALE	NONE
DATE	6-16-69
CH'K.	
DR.	S.P.

STERLING, INC.
MILWAUKEE, WIS.

TITLE: ELEM. WIRING DIAG. 6414

UNLESS OTHERWISE SPECIFIED USE: ± .003 TOL. FOR DECIMAL DIMENSIONS; ± .005" TOL. FOR FRACTIONAL DIMENSIONS