

# TEMPERATURE CONTROL UNIT VTO SERIES

Hot Oil Unit

- 100°F - 500°F Process Temperatures
- 1 - 7½ HP Centrifugal Pumps (20 - 100 GPM)
- 12 - 48 kW Heaters
- 3.4 sq. ft. Heat Exchanger
- Customize A Unit to Meet Your Specific Requirements



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# THE HOT OIL SYSTEM

The hot oil temperature controller is built with cast and welded components in the circulation system to minimize leaks and is suitable for use in plastics, rubber, die casting and other processes that require fluid temperatures to 500°F.

For units with up to 3 HP pumps, the unit uses a galvanized steel base on which the fluid circulating assembly and electrical cabinet is mounted. For units with 5 to 7.5 HP pumps, a tubular steel frame is provided. Most standard units use stainless steel panels to provide environmental aesthetic quality and to prevent corrosion. A hinged electrical cabinet door is standard on all units.

The unit is compatible with many industrial grade heat transfer fluids.



VTO-1230HC



## PROCESS CONNECTIONS



Standard female NPT fittings are used for all process connections. To and From process connection are supplied with shut-off valves for ease of operation, service and shut down.

## AIR-COOLED UNITS



VTO-1230HCA

Air-cooled units feature a high volume centrifugal pump with air-cooled pump seal. Units that include the cooling feature are equipped with a high temperature air-cooled heat exchanger to provide process cooling. When required, a valve opens introducing cooled fluid into the process while the fan exhausts the heat to the environment. The fan runs continuously providing a cool fluid reserve in the heat exchanger for rapid cooling on demand.

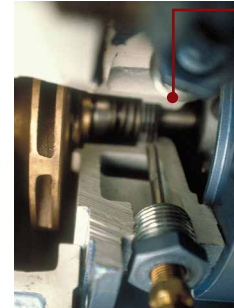
## COMPONENTS



**HEATER...** Vertical mounting of the heater allows for easy removal when service is required. The heater has a steel heater sheath for long service life with elevated oil temperatures and is flanged mounted and secured with bolts to the heating cylinder. The cylinder is bolted directly to the pump casing reducing the potential of leaks compared to threaded assemblies that are typical of competitive models.

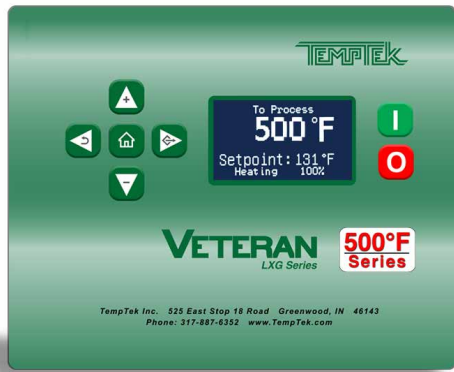


**PUMP...** A low pressure, high flow centrifugal pump eliminates the high pressure safety concerns of positive displacement oil pumps. Custom designed pump casings produces high flow with low horsepower.



**PUMP SEAL COOLING...** To maintain seal integrity and to lengthen service life, cooling is provided to the pump seal by circulating water in a cast jacket that surrounds the seal area. A limit switch monitors the water supply pressure and prevents unit operation when inadequate water supply pressure is provided.

# CONTROL INSTRUMENTS



## LXG-500

- Simple menu driven controller
- LCD display
- Home screen includes continuous set point and to process temperature.
- % Heating or Cooling indication on home screen.
- Out-of-spec alarm including standard audible signal.
- Selectable °F or °C temperature display.
- Selectable SPI or Modbus RTU communication.
- For process fluid temperature up to 500°F
- Optional: Modbus TCP communication.

Controls are microprocessor based instruments offering from basic to advanced control and monitoring functions. Developed specifically for high temperature fluid circulating temperature control units, each control instrument is built for the industrial environment. Each control instrument includes a 4 year warranty.



## LXT-500

- Touch screen simplicity
- 4.3" full color touch screen interface
- More than 25 screens with custom set-up & system monitoring information.
- Home screen includes continuous set point and to process temperature.
- % Heating or Cooling indication on home screen.
- Out-of-spec alarm including standard audible signal.
- Pump rotation monitor.
- Selectable English or Spanish language display.
- Selectable °F or °C temperature display.
- Selectable SPI or Modbus RTU communication.
- For process fluid temperature up to 500°F
- Optional: Modbus TCP communication

## LIMIT DEVICES

- **High temperature limit** prevents unit operations if process temperatures exceed 500°F.
- **Water supply pressure switch** prevents operation if the supply pressure presented to the pump seal cooling circuit is not adequate.
- **Pressure relief valve** for the cooling circuit vents excessive water pressure, which can occur during use of the optional heat exchanger.
- **Motor overload relay** protects the pump motor from excessive amperage, which can occur when the flow is higher than the pump rating.
- **Fused control circuit** is included to protect the microprocessor instrument.

## ELECTRICAL CONSTRUCTION

**NEMA 1** is the standard **REGAL** electrical construction and is suitable for the majority of applications. Components include pump motor starter with overload protection, mercury heater contactor, transformer with 110 volt fuse control circuit.

Offered as an option, Regal units can be customized to meet many electrical requirements including UL labeled electrical enclosures and NFPA 79. A fused or non-fused disconnect is optional.



**EXPANSION TANK AND RESERVOIR...** Welded of mild steel for structural integrity, the large capacity expansion tank provides space for thermal expansion during operation. The tank doubles as a storage reservoir during unit shut down. A vent is provided to protect against unit over-pressurization. A sight glass is installed on the expansion tank for visual monitoring of the fluid level. A fill port is provided on top of the tank for convenience.

**PROCESS COOLING CIRCUIT (optional)...** For process cooling, a water-to-oil heat exchanger is used. The heat exchanger was selected for its high temperature specifications. Water flow through the heat exchanger is controlled by the actuation of a solenoid valve. The solenoid valve is controlled by the control instrument. A heat exchanger with 3.5 square feet of heat transfer surface is used. Larger heat exchangers are available for added cooling capacity.



**OIL PURGE...** An oil purge assembly is supplied as standard. This feature allows for 'purging' the mold of process fluid and storing the fluid in the unit. The mold purge requires a low pressure compressed air source for operation.



# SPECIFICATIONS

MODEL VTO-		2100	2100C	2150	2150C	2200	2200C	3150H	3150C	3200	3200C	3300	3300C	4300	4300C
<b>Heater<sup>1</sup></b>	KW	12	12	12	12	12	12	16	16	16	16	16	16	24	24
<b>Heat Exchanger</b>	Sq. Ft.	--	3.5	--	3.5	--	3.5	--	3.5	--	3.5	--	3.5	--	3.5
<b>Process Pump</b>	HP	1	1	1½	1½	2	2	1½	1½	2	2	3	3	3	3
	GPM	30	30	45	45	50	50	45	45	50	50	60	60	60	60
	PSI	24	24	26	26	28	28	26	26	28	28	26	26	26	26
<b>Fluid Volume<sup>6,7</sup></b> (Approx. Gallons)	Unit	3	3	3	3	3	3	5	5	5	5	5	5	5	5
	Expansion Tank	2	2	2	2	2	2	4	4	4	4	4	4	4	4
<b>Unit Amperage<sup>2</sup></b> (Full Load) <b>@3ø/60hz</b>	230 Volts	34.8	34.8	36.4	36.4	38.0	38.0	47.0	47.0	49.0	49.0	51.0	51.0	71.0	71.0
	460 Volts	17.9	17.9	18.7	18.7	19.5	19.5	23.5	23.5	24.5	24.5	25.5	25.5	35.5	35.5
	575 Volts	14.3	14.3	14.9	14.9	15.6	15.6	18.8	18.8	19.6	19.6	20.4	20.4	28.4	28.4
<b>Unit Dimensions</b> (inches)	Height	44	44	44	44	44	44	58	58	58	58	58	58	58	58
	Width	16	16	16	16	16	16	23	23	23	23	23	23	23	23
	Depth	24	24	24	24	24	24	47	47	47	47	47	47	47	47
<b>Process Connections</b> (inches)	To / From <sup>3</sup>	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Supply / Drain <sup>4</sup>	½	½	½	½	½	½	½	½	½	½	½	½	½	½
<b>Unit Weight</b> (pounds)	Shipping <sup>5</sup>	275	275	285	285	300	300	580	580	595	585	610	610	770	770

MODEL VTO-		4500	4500C	4750	4750C	5300	5300C	5500	5500C	5750	5750C	6500	6500C	6750	6750C
<b>Heater<sup>1</sup></b>	KW	27	27	27	27	36	36	36	36	36	36	48	48	48	48
<b>Heat Exchanger</b>	Sq. Ft.	--	3.6	--	3.6	--	3.6	--	3.6	--	3.6	--	3.6	--	3.6
<b>Process Pump</b>	HP	5	5	7½	7½	3	3	5	5	7½	7½	5	5	7½	7½
	GPM	70	70	100	100	60	60	70	70	100	100	70	70	100	100
	PSI	28	28	44	44	26	26	28	28	44	44	28	28	44	44
<b>Fluid Volume<sup>6,7</sup></b> (Approx. Gallons)	Unit	5	5	5	5	8	8	8	8	8	8	8	8	8	8
	Expansion Tank	5	5	5	5	7	7	7	7	7	7	7	7	7	7
<b>Unit Amperage<sup>2</sup></b> (Full Load) <b>@3ø/60hz</b>	230 Volts	84.0	84.0	90.8	90.8	101.1	101.1	106.7	106.7	113.5	113.5	138.8	138.8	143.6	143.6
	460 Volts	42.4	42.4	45.8	45.8	50.9	50.9	53.7	53.7	57.1	57.1	68.9	68.9	72.3	72.3
	575 Volts	33.9	33.9	36.6	36.6	40.7	40.7	42.9	42.9	45.6	45.6	55.1	55.1	57.8	57.8
<b>Unit Dimensions</b> (inches)	Height	65	65	65	65	65	65	65	65	65	65	65	65	65	65
	Width	22	22	22	22	22	22	22	22	22	22	22	22	22	22
	Depth	33	33	33	33	33	33	33	33	33	33	33	33	33	33
<b>Process Connections</b> (inches)	To / From <sup>3</sup>	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Supply / Drain <sup>4</sup>	½	½	½	½	½	½	½	½	½	½	½	½	½	½
<b>Unit Weight</b> (pounds)	Shipping <sup>5</sup>	715	715	730	730	740	740	740	740	740	740	750	750	770	770

**Notes:**

1. Derate heater output by 25% for 208/3/60 operation.
2. Consult factory for 50hz operations.
3. T - to process; F - from process.
4. S - water supply; D - drain.
5. Approximate shipping weight. Selection of certain options and customer features may change the shipping weight.

**6. Typical fluid expansion rates:**

- a. Paratherm OR : 4.00% per 100°F
  - b. Paratherm NF : 3.04% per 100°F
  - c. Multitherm PG-1 : 3.10% per 100°F
  - d. Calito FG : 5.62% per 100°F
7. Do not use Multitherm 603.  
8. Models with an "H" suffix provide heating only. Models with an "HC" suffix provide cooling through the U-tube heat exchanger and heating. Cooling water must be provided from an external source.

## STANDARD FEATURES AND OPTIONS

### TANK CONSTRUCTION:

- Large capacity expansion tank
- NPT process connections with process line shut-off valves
- Oil level sight glass
- Air operated purge circuit
- Fluid drain valve
- Fluid fill port

### PUMP:

- High flow centrifugal pump
- Cast iron casing
- Water cooled pump seal
- Stainless steel motor shaft

### HEATER:

- Flanged bolt-in mount
- Vertical orientation
- Steel heater sheath
- Mercury heater contactor

### PRESSURE GAUGE:

- To process

### CABINERY/FRAME:

- Stainless steel cabinetry
- Hinged electrical cover
- Portable, on casters

### LIMIT DEVICES:

- Water supply pressure switch
- Motor overload relay
- Pressure relief valve (water)
- High temperature limit
- Fused control circuit

### ELECTRICAL:

- Process pump motor starter
- Fused transformer
- 110 volt alarm output
- 5 kAa RMS SSCR

### WARRANTY:

- 1 year parts and labor

## OPTIONS

### INSTRUMENTATION:

- SPI communications cable - 20'

### SYSTEM ALARMS:

- Audible alarm
- Visual/audible alarm beacon

### HEAT EXCHANGERS:

- Custom heat exchanger sizes

### ELECTRICAL:

- Nema 12 construction
- Special electrics

### CABINERY:

- Rear Panel Cover

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