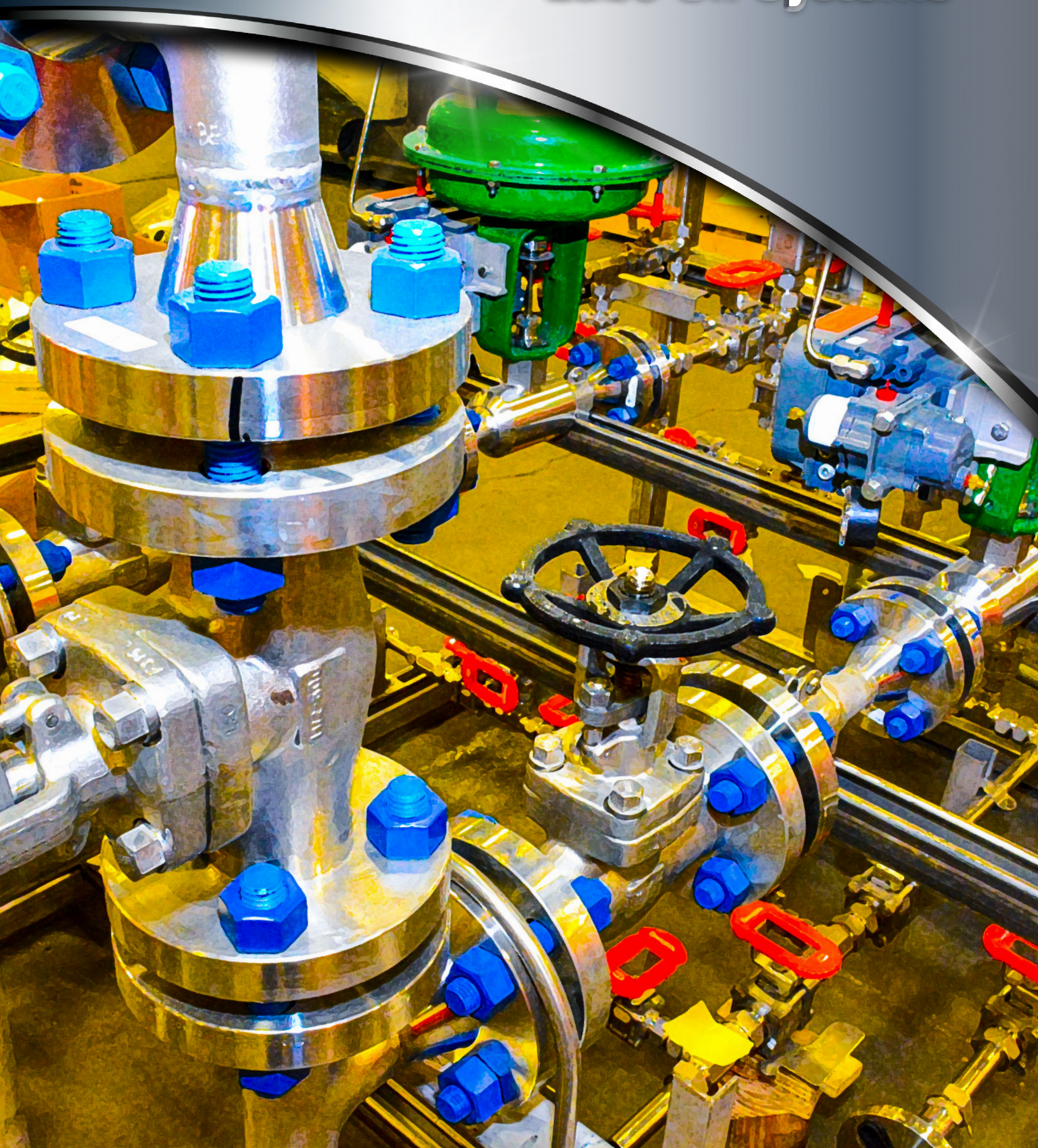


Elliott Industrial Lube Oil Systems





■ PROTECT YOUR EQUIPMENT WITH AN ELLIOTT LUBE OIL SYSTEM

Pressurized lube oil systems are integral to the reliable operation and longevity of critical production equipment and components. No one understands that better than Elliott. For nearly a century, we've been designing, engineering, manufacturing, and servicing the lubrication systems that keep the equipment running.

Elliott's pre-engineered industrial lube oil systems (ILS) will keep Elliott machines, or equipment from any other original equipment manufacturer (OEM), running at peak performance, safely and efficiently, throughout the lifetime of the equipment.

■ ENSURE EQUIPMENT AVAILABILITY WITH AN ELLIOTT STANDARDIZED LUBE OIL PACKAGE

Elliott's pre-engineered ILS delivers best-in-class quality with competitive pricing and attractive delivery times. Backed by Elliott's standard warranty, these modular units are designed for reliability and performance. Optional configurations provide the flexibility to cover a wide range of specific equipment requirements and available utilities.

Clean, conditioned oil is essential to maintaining productivity and equipment availability. Elliott ILS units supply clean, filtered oil at the optimal temperature and pressure for start-up and for all operating conditions.

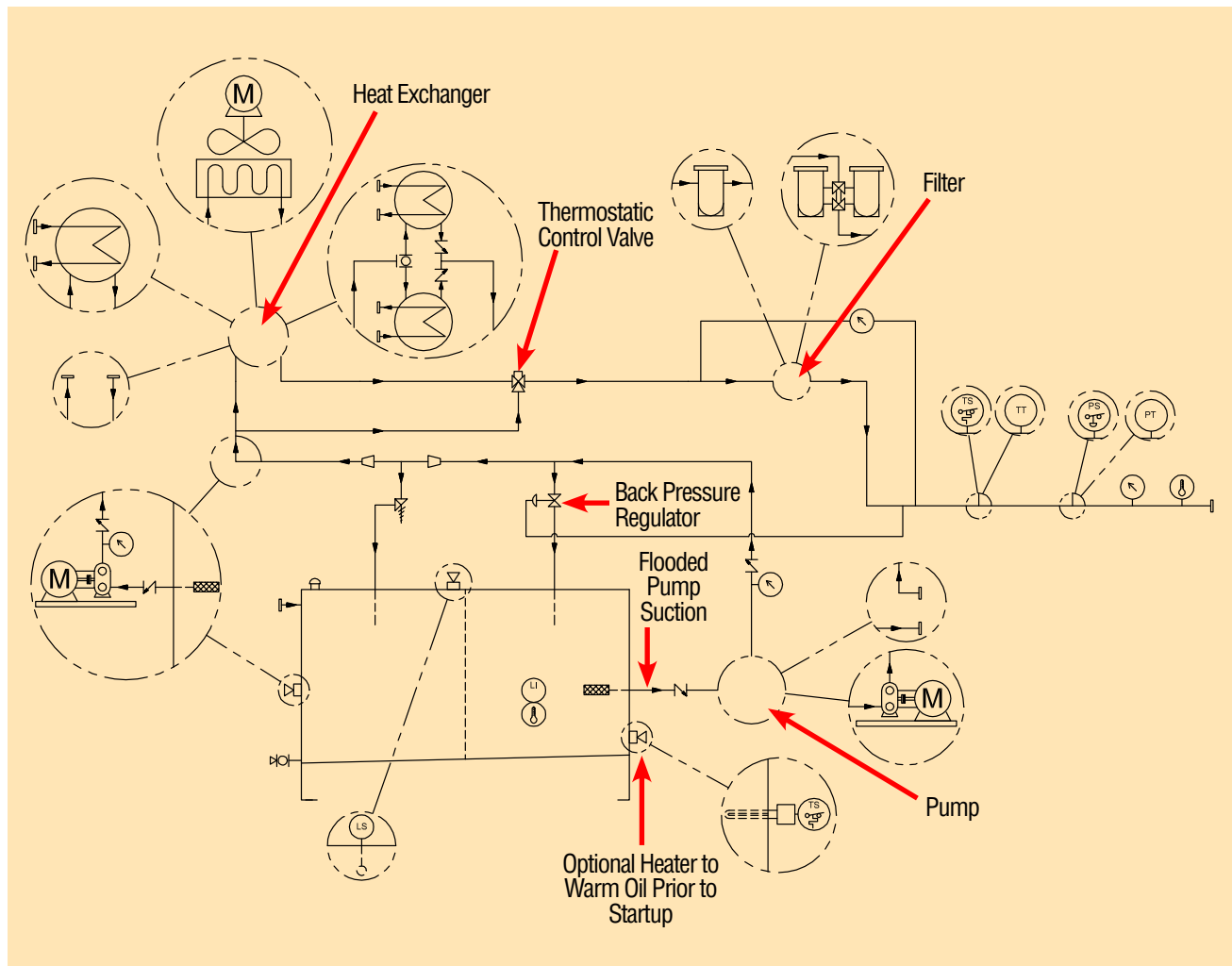
Standard Operating Ranges and Specifications for Elliott Lube Oil Systems

| | |
|--------------------------------|---|
| Ambient Operating Temperature | -29°C (-20°F) min /40°C (104°F) max |
| Delivered Lubricating Oil Flow | ISO viscosity grade 32, 46, or 68 delivered @ 120°F Other temperature settings may be available upon request |
| Oil Pressure Range | 7 - 20 psig delivered, 150 psig MAWP* |
| Electrical | Choose from NEMA 4X, general purpose (standard) or FM/UL Class 1, Div. 2 BCD areas (optional) Power required: 215-230/460V, 3-phase, 60 Hz for ILS sizes A through D; 460V, 3-phase, 60 Hz for sizes E and F |
| Tubing/Piping | ILS sizes A & B: tubing ILS sizes C, D, E, or F: piping – choose from: ♦ Painted carbon steel ♦ 304SS |
| Valves | Cast Iron/Brass |

*Static head pressure must be considered when determining delivered oil pressure requirement. To find the required oil pressure, use required equipment pressure [psig] + (height of equipment bearings above oil pump [inches] x 0.03).

■ FEATURES AND BENEFITS

- ♦ Two access hatches (manways) provide entry to the reservoir for easy maintenance inside the reservoir.
- ♦ Thermostatic control valve and back pressure regulator allow optimal control of oil pressure and temperature settings.
- ♦ Multiple pump configurations are available to accommodate variable equipment requirements.
- ♦ Pump suction is always flooded to eliminate the need for priming and to ensure suction is not lost.
- ♦ Spin-on filters are standard for the best value. Upgrade to dual filters with transfer valve for the ability to change the cartridge without shutting down the system.
- ♦ Standard economical shell & tube heat exchanger. Optional air & fan heat exchanger where cooling water supply is not available. Connections-only option available for separate off-skid cooler.
- ♦ Optional local control panel. Provides for a fully automatic self-operated system. Local control of motor and heater hand/off/auto. Audible alarms to alert personnel. With the switch option, only a main power supply is required. Otherwise, the system is ready to run out of the box.



PS = Pressure Switch

PT = Pressure Transmitter

⊖ = Pressure Gauge

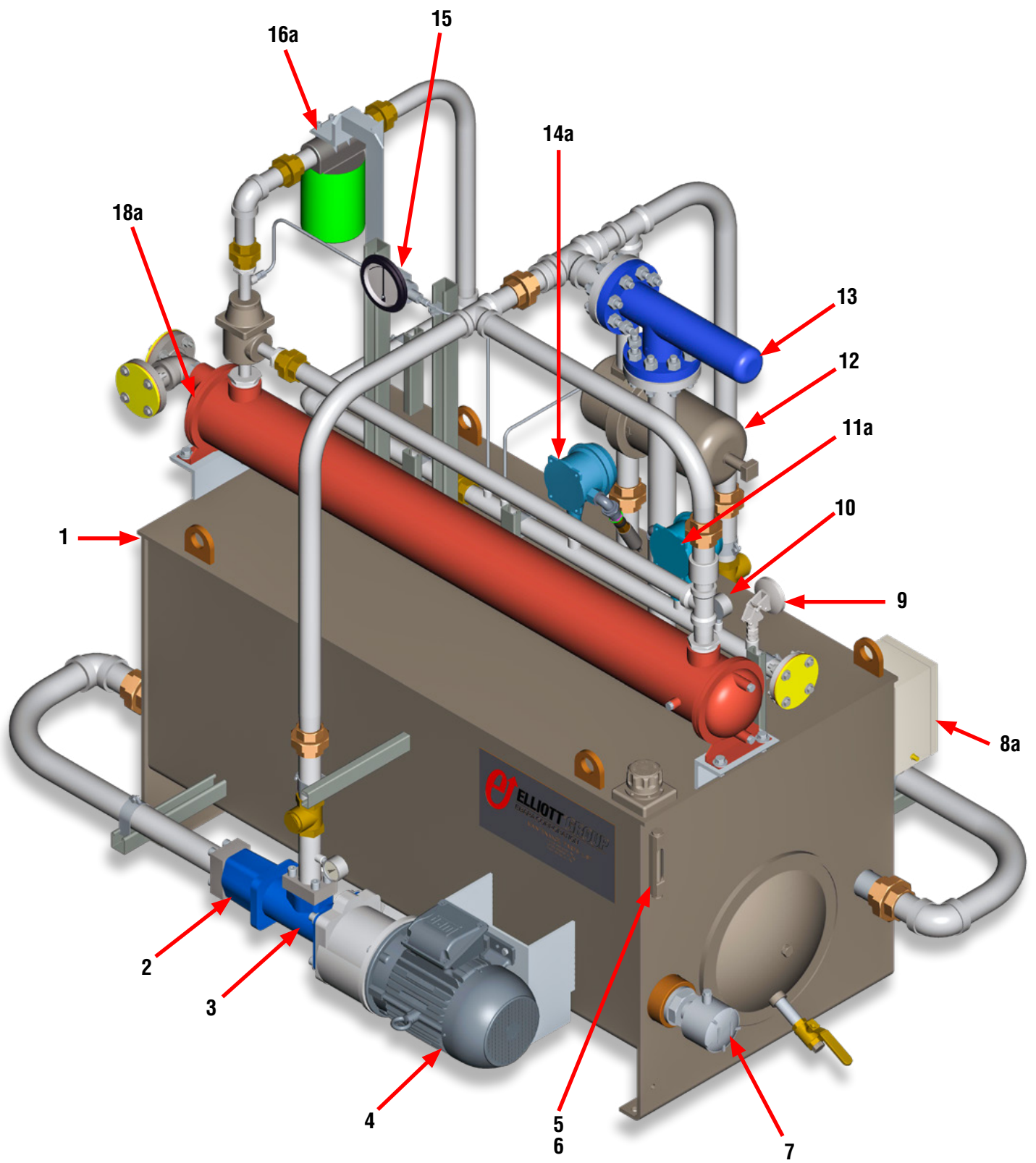
TS = Temperature Switch

TT = Temperature Transmitter

⊖ = Temperature Gauge

LS = Level Switch

LI = Level Indicator



■ TECHNICAL SPECIFICATIONS

| Item | Name | Description |
|------|--|---|
| 1 | Reservoir | 3 minute working capacity 4.5 minute retention capacity, approximately Choose from painted carbon steel or 304SS |
| 2 | Pump(s) | Cast iron C-face mounted 3 screw positive displacement |
| 3 | Pressure Gauge | Pump discharge pressure monitoring and setting of the pressure limiting valve |
| 4 | Motor(s) | Cast iron frame 3600 rpm General Purpose (with NEMA 4Xmodel) or IEEE-841 Severe Duty (with Class 1, Div 2 module) |
| 5 | Bulb Thermometer | For monitoring oil reservoir temperature |
| 6 | Sight Level Gauge | For monitoring reservoir oil level |
| 7 | Heater (option) | 20 W/in ² power density Adjustable thermostat 304SS heating elements |
| 8a | Weatherproof Junction Box (option) | UL/CSA NEMA 4X Compression molded fiberglass construction Hinged cover with fastener screws |
| 8b | Hazardous Location Junction Box (option) | NEC Class 1, Div 2, groups ABCD / Ex E increased safety / NEMA 4x / IP66 316SS construction Hinged cover with key lock |
| 9 | Stem Thermometer | For monitoring oil supply temperature |
| 10 | Pressure Gauge | For setting back pressure regulator and oil supply pressure |
| 11a | Temperature Switch (with air & fan option only) | For high temperature alarm and high temperature alarm and deactivating air & fan exchanger motor to conserve energy when oil supply temperature is in an acceptable range |
| 11b | Temperature Transmitter (with air & fan option only) | For deactivating air & fan exchanger motor to conserve energy when oil supply temperature is in an acceptable range 24 VDC with 4-20mA HART protocol |
| 12 | Back Pressure Regulator | Cast iron Spring & diaphragm |
| 13 | Pressure Limiting Valve | Cast iron Modulating Non-ASME code |
| 14a | Pressure Switch | For low oil supply pressure alarm and signaling for starting of the auxiliary oil pump |
| 14b | Pressure Transmitter (option) | For low oil supply pressure alarm and signaling for starting of the auxiliary oil pump 24 VDC with 4-20mA HART protocol |
| 15 | Differential Pressure Gauge | For monitoring filter cartridge pressure drop to evaluate cartridge changes |
| 16a | Spin-On Filter | Aluminum head Steel element can 10 Micron minimum filtration |
| 16b | Duplex Filter (option) | Cast aluminum alloy or cast iron Transfer valve Included B ₁₂ ≥ 200 minimum filtration |
| 17 | Temperature Control Valve 3-way thermostatic | Cast iron |
| 18a | Shell & Tube Heat Exchanger | Steel shell Cast iron heads Copper tubes Non-ASME code |
| 18b | Air & Fan Heat Exchanger (option) | Motor driven fan Steel fan guard Aluminum core |
| 18c | Connections Only (option) | Separate off skid cooling device |

■ ELLIOTT INDUSTRIAL LUBE OIL SYSTEM SIZING PROCEDURE

Choosing the right Elliott ILS is easy and quick. Simply select the size that matches your oil flow rate, and choose from available options to configure your industrial lube oil system.

Step 1. Determine oil flow and heat duty requirement.

Oil flow and heat duty requirements are usually provided in your equipment data sheets. If no information is available, contact us and we will assist you in determining your requirements.

Step 2. Determine heat exchanger selection.

Use the following steps to ensure proper heat exchanger selection for your specific heat duty requirements. The liquid cooled shell & tube heat exchanger is the most economical option if cooling water is available.

2a. Determine actual approach temperature.

- ◆ **For liquid cooled shell & tube heat exchangers**

- Desired oil leaving cooler (120°F) – Water inlet temperature (°F) = Actual Approach

- ◆ **For air cooled air & fan heat exchangers**

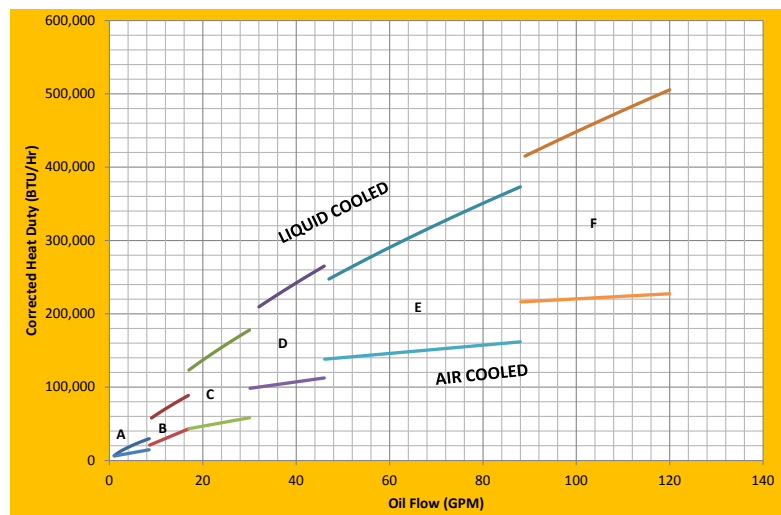
- Desired oil leaving cooler (120°F) – Maximum Ambient Temperature (°F) = Actual Approach

2b. Determine corrected heat duty.

$$\text{Corrected Heat Duty} = \text{Heat Duty (BTU/Hr)} \times \frac{30}{\text{Actual Approach}}$$

2c. Find the applicable industrial lube oil system on the flow range chart.

Plot your specific oil flow demand and corrected heat duty calculated from step 2b. If the plotted point is below the line, the selected heat exchanger will be acceptable for the operating criteria. If the plotted point is above the line, you will need to select the “N –None, nozzles only” heat exchanger option and request that a larger off skid heat exchanger be quoted separately.



Step 3. Verify pressure capabilities.

Elliott ILS can deliver 7 - 20 psig of oil pressure at the supply connection. You must account for static head pressure loss to verify that you will receive the needed oil pressure at your equipment bearings.

Measure the vertical distance from the proposed lub oil supply connection location to your equipment bearings. Head loss = measured height (inches) x 0.03.

Maximum supply pressure at bearings = 20 psig - head loss.

■ HOW TO ORDER YOUR ELLIOTT INDUSTRIAL LUBE OIL SYSTEM

Make your selections in the table below based on the selections above. Visit our website at www.elliott-turbo.com/Contacts to find the contact information for the nearest Elliott Sales Representative.

| Size | Material | Pump Configuration | Heat Exchanger | Filter |
|--|---|--|---|---|
| <input type="checkbox"/> ILS-A, 1 - 8.5 gpm <input type="checkbox"/> ILS-B, 8.5 - 16.9 GPM <input type="checkbox"/> ILS-C, 17 - 30 GPM <input type="checkbox"/> ILS-D, 30.1 - 46 GPM <input type="checkbox"/> ILS-E, 46.1 - 88 GPM <input type="checkbox"/> ILS-F, 88.1 - 120 GPM | <input type="checkbox"/> CS – Painted steel reservoir and piping <input type="checkbox"/> SS – 300 series stainless steel reservoir and piping | <input type="checkbox"/> 1S - connections for one shaft-driven <input type="checkbox"/> 1M – one motor-driven <input type="checkbox"/> SM – one motor-driven, connections for one shaft-driven <input type="checkbox"/> 2M – two motor-driven | <input type="checkbox"/> N – None, nozzles only <input type="checkbox"/> L – Water cooled <input type="checkbox"/> D – Duplex water cooled <input type="checkbox"/> A – Air cooled | <input type="checkbox"/> S – Single spin on cartridge <input type="checkbox"/> D – Duplex unit with transfer valve |

| Heater | Area Requirements | Electrical | Instrumentation Type | Instrumentation (select all that apply) |
|---|--|--|--|--|
| <input type="checkbox"/> N – None <input type="checkbox"/> H – Immersion heater in reservoir | <input type="checkbox"/> N – Non-hazardous and NEMA 4X <input type="checkbox"/> H – NEC Class 1, Div. 2 BCD and NEMA 4X | <input type="checkbox"/> N – No wiring <input type="checkbox"/> J – Instruments wired to a common junction box <input type="checkbox"/> C – Local control panel* | <input type="checkbox"/> S – Switches <input type="checkbox"/> T - Transmitters | <input type="checkbox"/> P – Pressure instrument* <input type="checkbox"/> T – Temperature instrument** <input type="checkbox"/> L – Level switch*** |

*Available with area class option N only

* Required with pump configurations SM and 2M

** Required with air cooler option

*** Required with heater option, switch only

Technical Specifications by Unit

| Size | Oil Flow gpm (l/min) | Reservoir Capacity Gallons (Liters) | Power Required Hp (kW) |
|-------|------------------------------|-------------------------------------|-------------------------------------|
| ILS-A | 1.0 to 8.5 (3.8 to 32.1) | 40 (151) | Motor = 1.5 (1.1), Heater = 4 (3) |
| ILS-B | 8.6 to 16.9 (32.2 to 64) | 80 (303) | Motor = 3 (2.2), Heater = 4 (3) |
| ILS-C | 17.0 to 30.0 (64.1 to 113.5) | 150 (568) | Motor = 5 (3.7), Heater = 4 (3) |
| ILS-D | 30.1 to 46 (133.6 to 174.1) | 200 (757) | Motor = 7.5 (5.5), Heater = 6 (4.5) |
| ILS-E | 46.1 to 88 (174.2 to 333.1) | 400 (1514) | Motor = 15 (11), Heater = 8 (6) |
| ILS-F | 88.1 to 120 (333.1 to 455) | 600 (2271) | Motor = 20 (15), Heater = 8 (6) |



Elliott Group is a global leader in the design, manufacture, and service of technically advanced centrifugal compressors, steam turbines, power recovery expanders, cryogenic pumps and expanders, and axial compressors used in the petrochemical, refining, oil & gas, liquefied gas, and process industries, as well as in power applications.

Elliott Group is a wholly owned subsidiary of Ebara Corporation, a major industrial conglomerate headquartered in Tokyo, Japan.



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T H E W O R L D T U R N S T O E L L I O T T



C O M P R E S S O R S ■ T U R B I N E S ■ C R Y O D Y N A M I C S ■ G L O B A L S E R V I C E