F Series
Light Industrial Heaters
Tankless Electric Water Heating Solutions

- 36-50 kW (122,800 - 170,600 BTU/hr.)
- Low flow activation option at 0.5 GPM (1.9 LPM)
- Certified Lead-Free Design
- Variable modulation from 0 to 100% of the rated kW
- Pressure Drop Advantage
- Ideal for High Temperature Recirculation Loop
- Standard NEMA 4 enclosure
- 3/4" connections
- Independent Safeties
- ETL and cETL certified to UL and CSA Standards
- Fan-cooled solid state relays
- Internal fusing (included) adds safety and permits single power connection



Standard Equipment

Tankless Water Heating Specifications
Laars Commercial Tankless Electric Water Heaters, Powered by Keltech™
F Series are designed to accommodate most light industrial fluid heating applications including booster applications with incoming process temperatures up to 130 degrees, demand is 36 kW-50 kW and total flow is up to 15 GPM. Standard units feature .75 GPM activation with options as low as .5 GPM. NEMA 4X and explosion proof purge system options available. F Series units are 208V (36kW only), 480V or 600V, 50/60 Hz, 3-Phase Delta.

Construction

Temperature Controller
The Laars PID Temperature Controller is more energy efficient and reliable than traditional microprocessors using staged elements. Power is infinitely variable, with no fixed inputs. The PID controller makes it possible to modulate the amount of power applied to the elements while also dispersing the required power evenly across all elements. This unique feature increases the product's life cycle.

Heating Element
Each heater features a heavy duty, low watt density, incoloy 800 sheathed resistive element. The design ensures greater protection, durability and resistance to scaling from hard water because water is only heated when flowing; this means sediment is less likely to collect in the heat exchanger.

Solid State Relays
Fan-cooled solid state relays provides silent switching, which has a fast response and works in conjunction with the PID controller to infinitely modulate and add to the life of the heater. This feature makes the F Series ideal for high temperature recirculation loops.

Electrical
The F Series requires only one service feed per unit. Includes internal fusing as standard. Internal fusing provides superior protection so the incoming circuit can be higher than 48 amps (NEC). Each heating element is protected with fusing.

Cabinet Endosure
The standard wall-mounted cabinet enclosure is NEMA 4 rated and made from 16 gauge mild steel and powder coated with ANSI 61 gray, corrosive resistant paint. The optional NEMA 4X enclosures are for harsher environments and made from 16 gauge 304 stainless steel. Optional floor standing leg kit available (LK).

Independent Safeties
The internal thermostat with auto reset high limit switch ensures that when the temperature limit is reached, the unit will power down a bank of elements; when the temperature drops back down to the set point, power is restored. The surface mounted bi-metal thermostat with manual reset acts as a fail-safe and must be manually reset before power can be restored to the elements if the temperature limit is exceeded.

Code Compliance and Certifications

Lead-Free

Products marked with the Lead-Free logo comply with the Safe Drinking Water Act (SDWA) requirements of a weighted average of less than 0.25% lead content on wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures.

ETL listed to UL499

ETL listed to UL 50E (Requires NEMA 4X Option)*

ETL listed to NFPA 496 (requires EXP2 Option)*

cETL listed to CSA-C22.2 No. 88

Standard product selections contained within this document are third party CERTIFIED to NSF/ANSI 372 meeting the Lead-Free content requirement. Any product configured with custom options will be COMPLIANT with NSF/ANSI 372 meeting the Lead-Free content requirement.

* Must be specified when ordering

Product Options

Internal Fused Disconnect and Ground Fault Package

The FDS part of this option interlocks with enclosure door when energized, prohibiting access to a live cabinet. It adds an additional level of safety and convenience at the heater location. GF senses leakage current to ground > 1 Amp. If a fault is detected, this will terminate the high voltage power supply to heating elements and disable operation of the unit.

Explosion Proof Purge System

The EXP2 option makes heaters compliant for classified areas; Class 1, Division 2, Groups A-D, T5. The Purge System requires a supply of clean instrument air or inert gas (provided by installer). This supply maintains a positive internal pressure and prevents the enclosure from filling with flammable gasses, dusts or vapors from the ambient environment. In addition to manufacturer certifications on the purge system, Laars independently tests and 3rd party certifies all finished product with EXP2 to comply with NFPA 496.

Building Management System (BMS) Integration

The D1 option has 4-20mA input and allows Building Management Systems to set temperature and view heater outlet temperature via BMS display (provided by the installer). This allows the BMS to command the temperature setting of the unit and verify unit performance with actual process values. The D1 option requires BMS input to establish a temperature setting; local adjustment of set-point per standard interface on the heater control display is not permitted.

The DC option is a RS-485 Modbus RTU and allows Building Management Systems to view heater outlet temperature and heater activation via BMS display as well as changing the temperature set-point from the BMS. This allows the BMS to command the temperature setting of the unit and verify unit performance with actual process values. Local adjustment of set-point per standard interface on the heater control display is permitted.

Alarm Selections

For critical process applications, the high/low temperature alarm (AL option) alerts you to an over or under temperature situation. The visual indicator alarm is located on the heater control panel. If the process temperature strays from the defined temperature range, an alert is sent to the controller.

Other Product Options

For additional heater options and installation accessories, reference the appropriate section at the end of this document.

Electrical Specifications for the Heater (3-Phase)

☑ All internal fuses necessary for installation are included with the unit.

Capacity (kW)	Voltage	Maximum Amperage	Minimum AWG Wire Size*	MCA	MOP
36	208	100	2	124.9	125
36	480	43	6	54.1	60
36	600	35	8	43.3	45
50	480	60	3	75.2	80
50	600	49	4	60.1	70

* Based on the NEC Table 310.16 (Formerly 310.15) for 75°C insulated copper wire @ 30°C Ambient. Aluminum wire requires larger gauges.

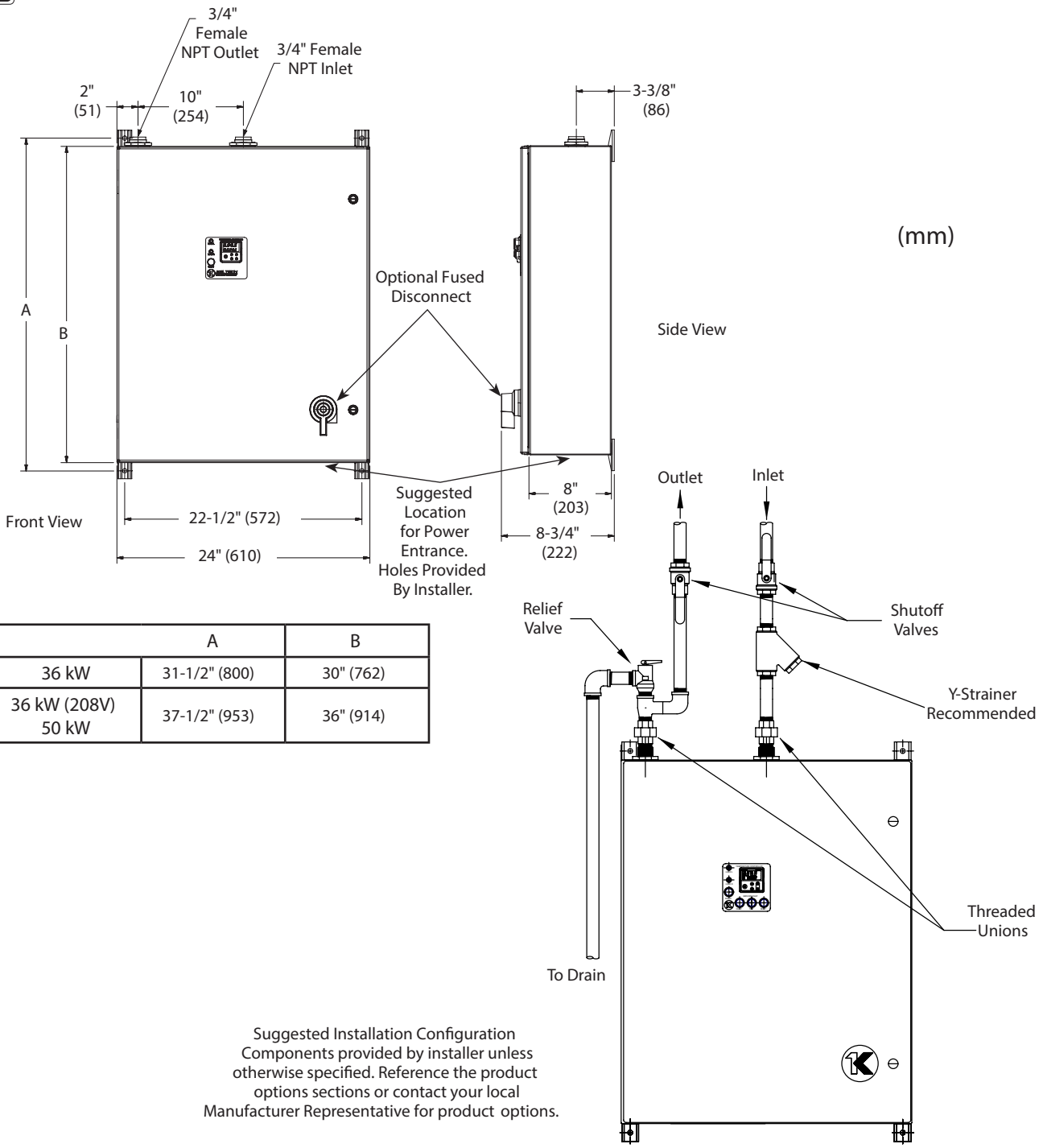
Low Pressure Drop Advantage

Pressure Drop**									
GPM	1	2	3	4	5	6	8	10	15
PSI	1	2	3	4	5	6	8	10	15
LPM	3.8	7.6	11.3	15.1	18.9	22.7	30.2	37.8	56.8
BAR	0.0	0.1	0.2	0.3	0.3	0.4	0.6	0.7	1.0

** Standard Build Configuration

F Series - Dimensions

☑ Select product options shown.



	A	B
36 kW	31-1/2" (800)	30" (762)
36 kW (208V) 50 kW	37-1/2" (953)	36" (914)

Suggested Installation Configuration
Components provided by installer unless otherwise specified. Reference the product options sections or contact your local Manufacturer Representative for product options.

kW Calculator

F Series: 36, 50 kW

Temperature Δ °F (°C)

Flow GPM	LPM	10° (6°)	15° (8°)	20° (11°)	25° (14°)	30° (17°)	35° (19°)	40° (22°)	45° (25°)	50° (28°)	55° (31°)	60° (33°)	65° (36°)	70° (39°)	75° (42°)	80° (44°)	85° (47°)	90° (50°)	95° (53°)	100° (56°)	105° (58°)	110° (61°)	115° (64°)	120° (67°)	125° (69°)	130° (72°)	135° (75°)	140° (78°)
0.75	2.8	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
1.0	3.8	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
1.5	5.7	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
2	7.6	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	50	50	50	50
3	11.3	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	50	50	50	50	50	50	-	-	-	-	-	-
4	15.1	36	36	36	36	36	36	36	36	36	36	36	50	50	50	50	50	-	-	-	-	-	-	-	-	-	-	-
5	18.9	36	36	36	36	36	36	36	36	50	50	50	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	22.7	36	36	36	36	36	36	36	50	50	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	26.5	36	36	36	36	36	36	50	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	30.2	36	36	36	36	36	50	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	34.0	36	36	36	36	50	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	37.8	36	36	36	50	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	56.8	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sizing for the proper flow rate is important. If the temperature rise requirements exceed a single F Series model, consider using multiple F Series units. Please contact your Laars Representative for additional product information.

How to Size a Heater.

1. Calculate temperature rise (also known as delta tee or ΔT).
   Setpoint temp _____ minus coldest incoming water temp _____ = ΔT ΔT = _____

2. Select kW required by using chart or formula below.
   Peak demand in GPM x ΔT x 0.1465 = kW kW = _____

3. Confirm voltage and phase available on site. Voltage & Phase _____

LAARS Heating Systems Company
POWERED BY KELTECH

F Series
Light Industrial Heaters
Tankless Electric Water Heating Solutions

1 — Brand
L = Laars

2 3 4 5 — Category
CTEF = Commercial Tankless Electric F Series

6 7 8 — Power
036 = 36kW
050 = 50kW

9 — Voltage Three Phase
K = 208**
S = 480
T = 600
** 36 kW only

10 — Enclosure Construction
D = NEMA 4 - Standard
E = NEMA 4X 304 SSTL
K = NEMA 4 & Explosion proof EXP2
M= NEMA 4 & LK Leg kit
N = NEMA 4X 304 & EXP2
R = NEMA 4X 304 & LK
*LK not available with EXP2

11 — Heat Exchanger Construction
X = Standard
T = TE - Teflon Coated HX

12 — Control
X = Standard
E = AL- Process Alarm
F = D1- 4-20mA Input
G = DC- RS-485 Modbus RTU

13 — Electrical
X = Standard
J = FDS & GF*
* 480V and up

14 — Temperature Setpoints
X = Standard (0.75 GPM & 160F)
4 = T200 High Temp
E = L5-0.5 GPM Activation
T = T200 & L5

15 — Firmware
X = Standard

16 — Language
___ = English (blank)
F = French

Installation Accessories

- ☐ **BSPP** = Stainless steel thread adapter converts NPT to BSPP (NEMA 4 or 4X only)
- ☐ **NONE** = None
- ☐ **PR** = Pressure and temperature relief valve
- ☐ **PRS** = ASME pressure relief valve, stainless steel
- ☐ **NONE** = None
- ☐ **YS** = Y-Strainer
- ☐ **YSS** = Y-Strainer, stainless steel
- ☐ **NONE** = None

Application Attributes (MANDATORY)

Coldest incoming water temperature (140F Max):_____ Maximum Flow:_____ Set point temperature:_____

Delta T Calculation: Set Point Temperature - Coldest Incoming Water Temperature = _____ (Maximum Delta T for Application)

☑ **Laars Tankless Water Heaters are built to customer specification and are therefore non-cancelable, non-refundable and non-returnable.**

Teflon is a registered trademark of E. I. du Pont de Nemours and Company

Model Number Configuration

L	C	T	E	F											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Customer Signoff _____

LAARS Heating Systems Company

Customer Service and Product Support: **800.900.9276 • Fax 800.559.1583**
Headquarters: **20 Industrial Way, Rochester, NH, USA 03867 • 603.335.6300 • Fax 603.335.3355**
9 Brigden Gate, Halton Hills, Ontario, Canada L7G 0A3 • 905.203.0600 • Fax 905.636.0666
www.Laars.com

Litho in U.S.A. © Laars Heating Systems 26-11 2170E