KELTECH INCORPORATED
A Subsidiary of Bradley

CN Series - Large Industrial Heaters

Tankless Water Heating Solutions

- 36 - 144 kW (122,800 - 491,300 BTUs)
- Certified Lead-Free Design
- Pressure Drop Advantage
- Variable Temp Heat Exchanger
- NEMA 4 enclosure standard
- Independent Safeties
- ETL and cETL certified to UL and CSA Standards
- Liquid-Cooled Solid State Relays
- Internal fusing (included) adds safety and permits single power connection
- Door cutoff switch
- Emergency stop button
- ASME and NB Certified Options available
- Freeze protection options available

Standard Equipment

Tankless Water Heating Specifications

Keltech, Inc. CN-Series Tankless Water Heaters are designed to accommodate most heavy industrial fluid heating applications where demand is 36kW - 144kW and flow rates from 1.5 to 50 GPM are required. Standard units: activation flow ≥ 1.5 GPM. CN-Series are designed for environments requiring precise temperatures to 160° as an alternative to boilers. CN-Series units are suited to applications where 480V and 600V 3-Phase Delta is required and 1" connections are available. NEMA 4X and explosion proof purge system options available.

Construction

Temperature Controller

Keltech's 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 Keltech design ensures greater protection, durability and resistance to scaling from hard water because water is only heated when flowing; this means sediment will not collect in the heat exchanger.

Solid State Relays

The liquid cooled solid state relays provide 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.

Electrical

The CN-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). Keltech protects each side of each heating element with fusing.

Cabinet Enclosure

The floor-mounted standard cabinet enclosure is NEMA 4 rated and made from 14 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. The NEMA 4X enclosure can also be specified with 316 stainless steel.

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 no more 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

ETL listed to NFPA 496, 2013 Edition (Requires EXP2 Option)

cETL listed to CSA-C22.2 No. 88

Certified to NSF/ANSI 372

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.

HLW

ASME certification available. Keltech units 58kW (200,000 btu) and higher are the only electric tankless water heaters National Board certified with the HLW stamp. (Requires HLW or HLW-TE Option)

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Product Options

Fused Disconnect
Internal fused disconnect interlocks with enclosure door when energized, prohibiting access to a live cabinet. Select the FDS option for an additional level of safety and convenience at the heater location.

Freeze Protection
Keltech offers two levels of freeze protection for outdoor installations. ENHT offers protection to -20°F (-28°C). The ENHT30 offers protection to -30°F (-34°C). Each level of protection utilizes the normal heater supply voltage. No additional dedicated circuit to the unit is required during field installation. Freeze protection (ENHT option) includes an internally insulated NEMA 4/4X enclosure and thermostatically controlled forced air heater to maintain internal temperatures above freezing.

ENHT options also include a connection point for DCS monitoring. In the event of a power interruption or ENHT system failure when internal enclosure temperatures reach 40°F (4.4°C) or lower, the unit will notify a facilities control/monitoring system that the unit is unable to maintain freeze protection. Regardless of state of power to the unit, this warning notifies maintenance personnel and provides an opportunity to correct the condition before any damage occurs to the unit.

Ground Fault
Optional equipment protection ground fault senses leakage current to ground >1 Amp. In the event a fault is detected, this device will terminate the high voltage power supply to heating elements and disable operation of the unit. Fault status is communicated EXTERNALLY at the control interface. Personnel may also test the Ground Fault system and reset any nuisance trips without opening the cabinet.

Explosion Proof Purge System
Keltech's 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, Keltech independently tests and 3rd party certifies all finished product with EXP2 to comply with NFPA 496.

ASME Heat Exchanger
Keltech offers any product above 200,000 btu equivalent (58kw+) the option to be fitted with internal plumbing certified to Section IV of the ASME Boiler and Pressure Vessel Code - an industry exclusive certification. HLW certification represents not only an approved design and method of construction, but an intensively audited construction and documentation process that concludes with a pressure test witnessed by an ASME official. Upon completion of this process, each heat exchanger is issued a unique serial number for registration in the National Board. This information is supplied with the unit via Form "HLW-6 Manufacturer Data Report" for verification and reference by local inspection officials. The HLW options also include additional features such as dry-fire protection, stainless steel bulkheads and boiler drain valve, adding an extra level of quality and durability to Keltech heaters.

Select the HLW-TE option for deionized or mild corrosive applications requiring a HLW (ASME) Pressure Vessel. The TE2 option, which provides a Xylan Fluoropolymeric Coating, is not available with the ASME heat exchanger.

Building Management System Integration
The D1 option transfers control of the heater to a Building Management System (BMS). The heater is no longer adjusted or controlled at the heater location. 4-20mA input for integration with BMS.

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
36	480	43	6
36	600	35	8
54	480	65	4
54	600	52	6
63	480	76	4
63	600	61	6
72	480	87	3
72	600	69	4
108	480	132	1
108	600	104	2
126	480	151	1/0
126	600	121	1
144	480	174	2/0
144	600	139	1/0

CN Pressure Drop Advantage

	Pressure Drop														
GPM	1	2	3	4	5	6	8	10	15	20	25	30	40	45	50
36 - 126 kW PSI	2	2	2	3	3	4	5	6	10	16	23	32	55	69	84
144 kW PSI	0.2	0.4	1	1	1	1	2	3	5	8	11	16	26	33	40
L-MIN	3.8	7.6	11.3	15.1	18.9	22.7	30.2	37.8	56.7	75.6	94.5	113.4	151.2	170.1	189
36 - 126 kW BAR	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.7	1.1	1.6	2.2	3.8	4.7	5.8
144 kW BAR	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.3	0.5	0.8	1.1	1.8	2.3	2.8

Recommend -PD option

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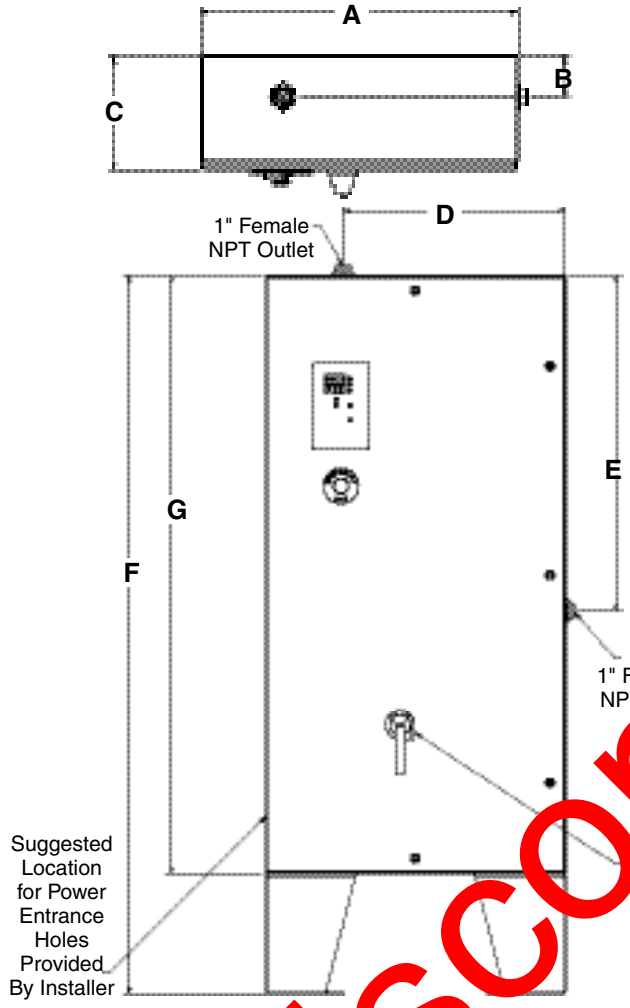
CN Series - Dimensions

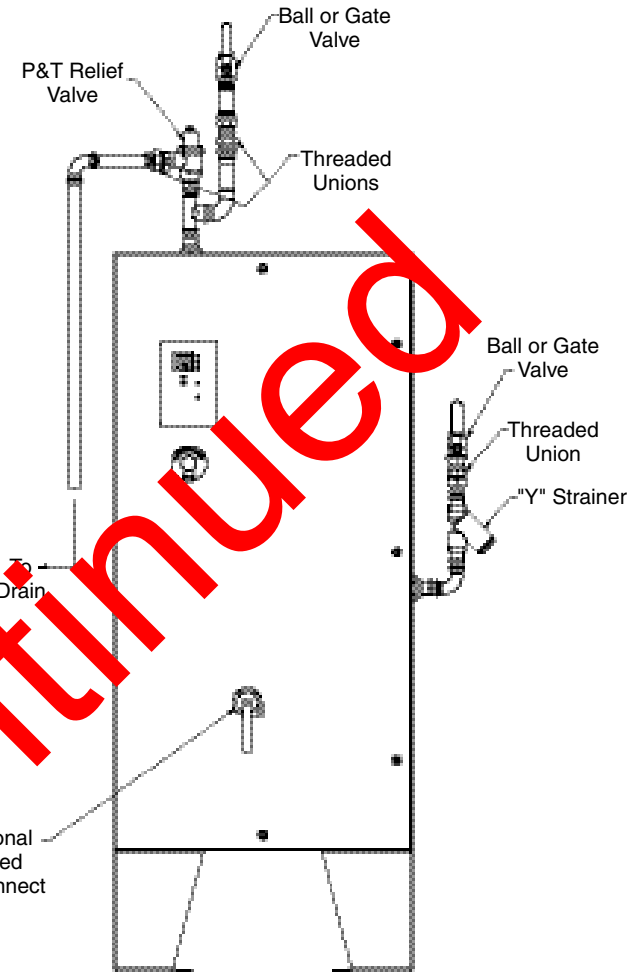
(mm)

☑ *Select product options shown. Other options available.*



Suggested Installation Configuration

Components provided by installer unless otherwise specified. Reference the product options sections or contact your local Bradley Representative for product options.



	Dim. "A"	Dim. "B"	Dim. "C"	Dim. "D"	Dim. "E"	Dim. "F"	Dim. "G"
36kW	24" (610) ❶	3.4" (86)	10 13/16" (275)	16" (406)	31¼" (794)	60" (1524)	48" (1219)
54kW	24" (610) ❶	3.4" (86)	10 13/16" (275)	16" (406)	31¼" (794)	60" (1524)	48" (1219)
63kW	24" (610) ❸	3.4" (86)	10 13/16" (275)	16" (406)	31¼" (794)	72" (1829)	60" (1524)
72kW	30" (762) ❶	3.8" (97)	10 13/16" (275) ❷	22" (559)	39¾" (1010)	60" (1524)	48" (1219)
108kW	30" (762) ❶	3.8" (97)	10 13/16" (275) ❷	22" (559)	39¾" (1010)	60" (1524)	48" (1219)
126kW	30" (762) ❶	3.8" (97)	10 13/16" (275) ❷	22" (559)	39¾" (1010)	72" (1829)	60" (1524)
144kW	30" (762) ❶	3.8" (97)	10 13/16" (275) ❷	22" (559)	39¾" (1010)	72" (1829)	60" (1524)

❶ +6" (152) for fused disconnect and freeze protection options

❷ +2" (51) for fused disconnect and freeze protection options

❸ +6" (152) for NEMA 4X, and/or fused disconnect and/or freeze protection options

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kW Calculator

CN Series (kW): 36, 54, 63, 72, 108, 126, 144

Temperature ΔºF (ºC)

Flow GPM	Flow L-MIN	10º (6º)	15º (8º)	20º (11º)	25º (14º)	30º (17º)	35º (19º)	40º (22º)	45º (25º)	50º (28º)	55º (31º)	60º (33º)	65º (36º)	70º (39º)	75º (42º)	80º (44º)	85º (47º)	90º (50º)	95º (53º)	100º (56º)	105º (58º)	110º (61º)	115º (64º)	120º (67º)	125º (69º)	130º (72º)	135º (75º)	140º (78º)
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	54	54	54	54
3	11.3	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	54	54	54	54	54	54	54	54	63	63	63	63
4	15.1	36	36	36	36	36	36	36	36	36	36	36	54	54	54	54	54	54	54	63	63	72	72	72	108	108	108	108
5	18.9	36	36	36	36	36	36	36	36	54	54	54	54	54	54	63	63	72	72	108	108	108	108	108	108	108	108	108
6	22.7	36	36	36	36	36	36	36	54	54	54	54	63	63	72	72	108	108	108	108	108	108	108	108	126	126	126	126
7	26.5	36	36	36	36	36	36	54	54	54	63	63	72	72	108	108	108	108	108	108	108	126	126	126	144	144	144	144
8	30.2	36	36	36	36	36	54	54	54	63	72	72	108	108	108	108	108	108	126	126	126	144	144	144	-	-	-	-
9	34.0	36	36	36	36	54	54	54	63	72	108	108	108	108	108	108	126	126	126	144	144	-	-	-	-	-	-	-
10	37.8	36	36	36	54	54	54	63	72	108	108	108	108	108	126	126	126	144	144	-	-	-	-	-	-	-	-	-
12	45.4	36	36	36	54	54	63	72	108	108	108	108	126	126	144	144	-	-	-	-	-	-	-	-	-	-	-	-
15	56.7	36	36	54	63	72	108	108	108	126	126	144	144	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	75.6	36	54	63	108	108	108	126	144	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	94.5	54	63	108	108	126	144	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	113.4	54	72	108	126	144	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	132.3	54	108	108	144	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	151.2	63	108	126	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	170.1	72	108	144	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	189.0	108	126	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Recommend 144 kW for minimal pressure drop

ASME Certification Availabl

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

How to Size a Heater

1. Calculate Delta-T (ΔT).
   Set point temp - coldest ground water temp = ΔT ΔT = _____
2. Select kW required by using chart or formula below.
   Peak demand in GPM x ΔT x .1465 = kW kW = _____
3. Confirm voltage and phase available on site. Voltage and Phase = _____
4. Confirm minimum flow. Minimum Flow = _____

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Tankless Water Heating Solutions

Standard Product - CN Series

36kW Large Industrial Heaters
- ☐ **CN363/480D** Three Phase 36kW, 480V Large Industrial Heater
- ☐ **CN363/600D** Three Phase 36kW, 600V Large Industrial Heater

54kW Large Industrial Heaters
- ☐ **CN543/480D** Three Phase 54kW, 480V Large Industrial Heater
- ☐ **CN543/600D** Three Phase 54kW, 600V Large Industrial Heater

63kW Large Industrial Heaters
- ☐ **CN633/480D** Three Phase 63kW, 480V Large Industrial Heater
- ☐ **CN633/600D** Three Phase 63kW, 600V Large Industrial Heater

72kW Large Industrial Heaters
- ☐ **CN723/480D** Three Phase 72kW, 480V Large Industrial Heater
- ☐ **CN723/600D** Three Phase 72kW, 600V Large Industrial Heater

108kW Large Industrial Heaters
- ☐ **CN1083/480D** Three Phase 108kW, 480V Large Industrial Heater
- ☐ **CN1083/600D** Three Phase 108kW, 600V Large Industrial Heater

126kW Large Industrial Heaters
- ☐ **CN1263/480D** Three Phase 126kW, 480V Large Industrial Heater
- ☐ **CN1263/600D** Three Phase 126kW, 600V Large Industrial Heater

144kW Large Industrial Heaters
- ☐ **CN1443/480D** Three Phase 144kW, 480V Large Industrial Heater
- ☐ **CN1443/600D** Three Phase 144kW, 600V Large Industrial Heater

☑ **Heaters listed above can be down rated in 380, 400 and 415 volts.**

Product Options

☐	**D1**	4-20mA Input for Integration with Facility Controls
☐	**ENHT**	Freeze Protection to -20°F
☐	**ENHT30**	Freeze Protection to -30°F
☐	**EXP2**	Explosion Proof Class1/Division2
☐	**FDS**	Internal Fused Disconnect
☐	**GF**	Ground Fault Package
☐	**HLW**	ASME Heat Exchanger (63kW and Higher Only)
☐	**HLW-TE**	ASME Heat Exchanger for use with deionized water or mild corrosive fluid applications (63kW and HIgher Only)
☐	**N4X**	NEMA-4X Enclosure - Stainless Steel
☐	**PD**	Replaces standard 1" flow switch with 1-1/2" flow switch
☐	**T190**	High Temperature Package_____ (Specify temp of 160°F to 190°F)
☐	**TE**	PFA Teflon® coated heat exchanger with bright annealed stainless steel elements, FDA Approved (Use for deionized water or mild corrosive fluid applications)
☐	**TE2***	Xylan Fluoropolymeric coated heat exchanger with bright annealed stainless steel elements, FDA Approved for Food Contact (Use for deionized water applications)

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

*TE2 not available with HLW. Select HLW-TE for deionized or mild corrosive applications requiring HLW (ASME) Pressure Vessel

Installation Accessories

☐	**BSPP**	Stainless steel thread adapter converts NPT to BSPP
☐	**PR**	Pressure and temperature relief valve
☐	**PRS**	ASME Pressure relief valve, stainless steel
☐	**YS**	Y-Strainer
☐	**YSS**	Y-Strainer, stainless steel

☑ **Keltech Tankless Water Heaters are non-cancelable, non-refundable and non-returnable.**

☑ **Verify ASME Code applicability for all installations 58kW (200,000 btu) and higher.**

Enhanced Performance Tuning

Please select your type of application. Keltech will precisely "tune" your heater specifically to your application for the highest level of performance at no additional charge.

- ☐ **Process Heating**
- ☐ **Potable**
- ☐ **Boosting**
- ☐ **Re-Circulating**

Application Attributes (MANDATORY)

Coldest ground water temperature:_____

Minimum Flow:_____

Maximum Flow:_____

Set point temperature:_____

Delta T Calculation

Set Point Temperature - Coldest Incoming Water Temperature = Minimum Delta T for Application

Model Number Configuration

CN____/____D____-____-____-____-____-____-____

List applicable option codes alphabetically. Do not include Installation Accessories in configuration.

Customer Signoff_____

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