CAST-X 4000
Circulation Heater

With up to 60 kW of power and hazloc-safe designs, CAST-X 4000 fits with many oil & gas processes.

Designed and manufactured by Cast Aluminum Solutions (CAS), CAST-X Circulation Heaters are engineered using the latest thermal modeling and finite element analysis technology. CAST-X heaters feature low-watt-density heating elements cast into aluminum bodies which also contain the helical-coiled stainless steel flowpath tubes.

The media is sequestered in these tubes, never touching the heating elements: a critical safety benefit, especially when heating explosive or sensitive media. All CAST-X units are capable of heating liquids and gases alike.

CAST-X heaters are self-draining, for safety and cleanliness. With compact, non-welded bodies, plus NEMA & ATEX enclosures, CAST-X units are small-footprint, high-output heaters that meet the needs of high-purity processes, flammable operations, and your most critical heating applications.

SPECIFICATIONS:

- Power:
  - 12.5 kW Total to 60 kW Total
  - Voltage Range: 208 - 480 V
  - Max Line Current: 50 A per circuit
- Tubing:
  - 1.0” OD (25.4 mm)
  - .083” Wall (2.1 mm)
  - Overall Process Tube Length: 212” (5384 mm) each
  - 316L Stainless Steel (standard)
  - Inconel (optional upgrade)
  - Passivated or Electro-Polished (optional upgrades)
- Max Pressure: 3100 psi (213 bar)
- Enclosures:
  - NEMA 4 (moisture-resistant)
  - NEMA 7 / ATEX (explosion-proof)
- Max Working Temperatures:
  - NEMA 4 (moisture-resistant): 572°F (300°C)
  - NEMA 7 / ATEX (explosion-proof): 662°F (350°C)

Published temperatures are for housing at 12 o’clock position; higher temps may be possible at 6 o’clock position. See factory for details.

- Sensors:
  - K or J Type Thermocouples Standard
  - RTD (resistance temperature detector)
- Available Accessories:
  - Insulating Jackets
  - Compression Fittings

APPLICATIONS:

- Distillation of Fuel Oils
- Oil and Water Separation
- Fuel Oil Preheating for Burners and Boilers
- Heating for Food and Beverage Applications
- Steam Generation and Superheating
- Fuel and Oil Heating for Test Stands
- Dry Gas Seal Applications
- Methanol to Olefin Conversion

FEATURES & BENEFITS:

- SS 316L Fluid Path is Separate from Heating Elements
  (allows safe heating of sensitive materials and prevents contamination)
- Extremely Powerful for Its Size
- Self-Draining (reduces fumes, increases safety)
- Robust Cast-In Construction (for long heater life)
- Wide Application Compatibility (including high pressure)
- Operable in Single-Tube or Dual-Tube Mode
- Dual Tube Mode Can Run in Series or Parallel

CAS CAST ALUMINUM Solutions

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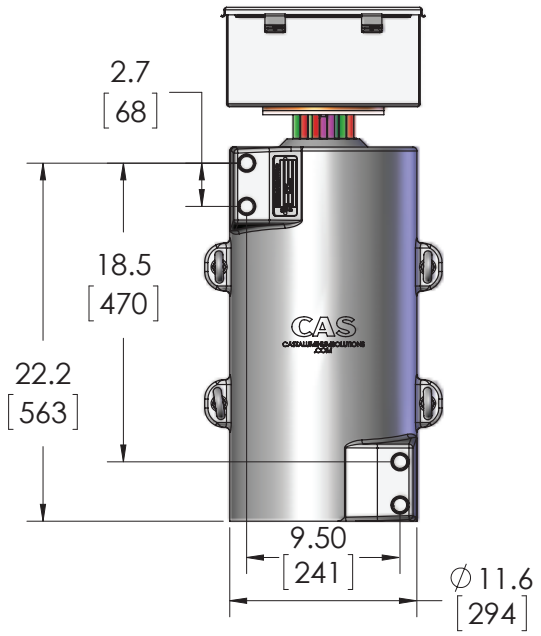
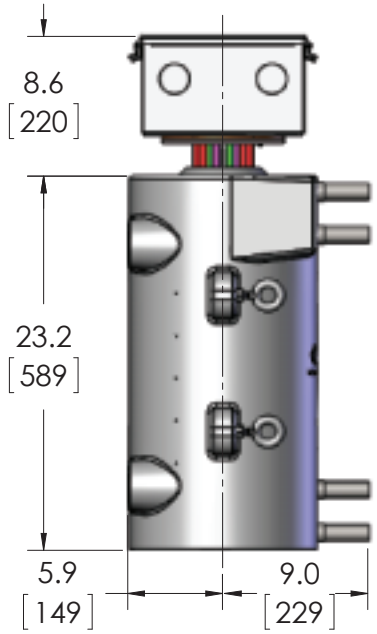
CAST-X 4000 Circulation Heater

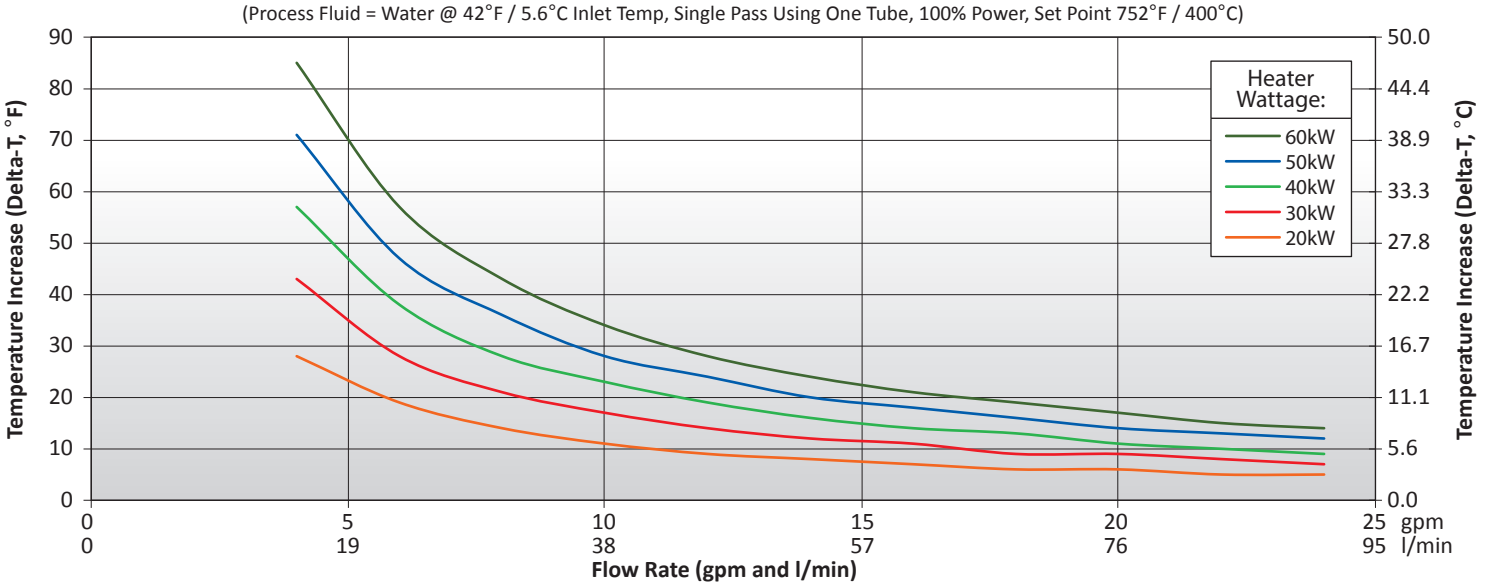
MOISTURE-RESISTANT (NEMA 4) ENCLOSURE





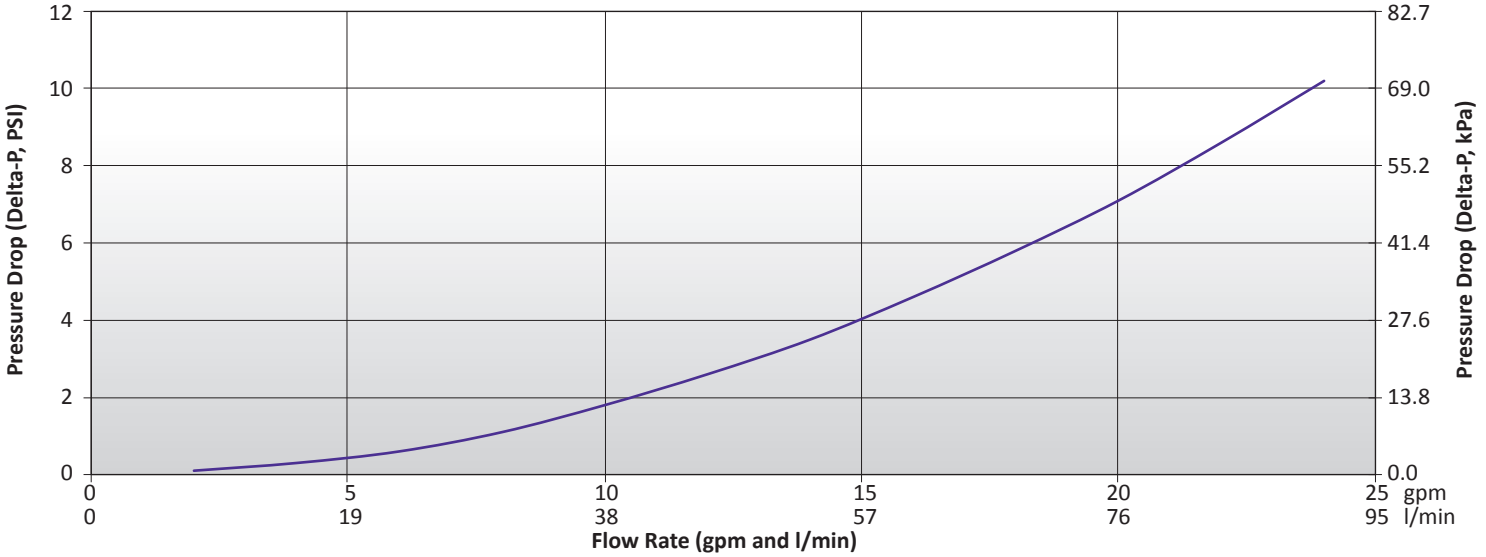
CAST-X 4000 Heating Profile: Delta-T Water

(Process Fluid = Water @ 42°F / 5.6°C Inlet Temp, Single Pass Using One Tube, 100% Power, Set Point 752°F / 400°C)

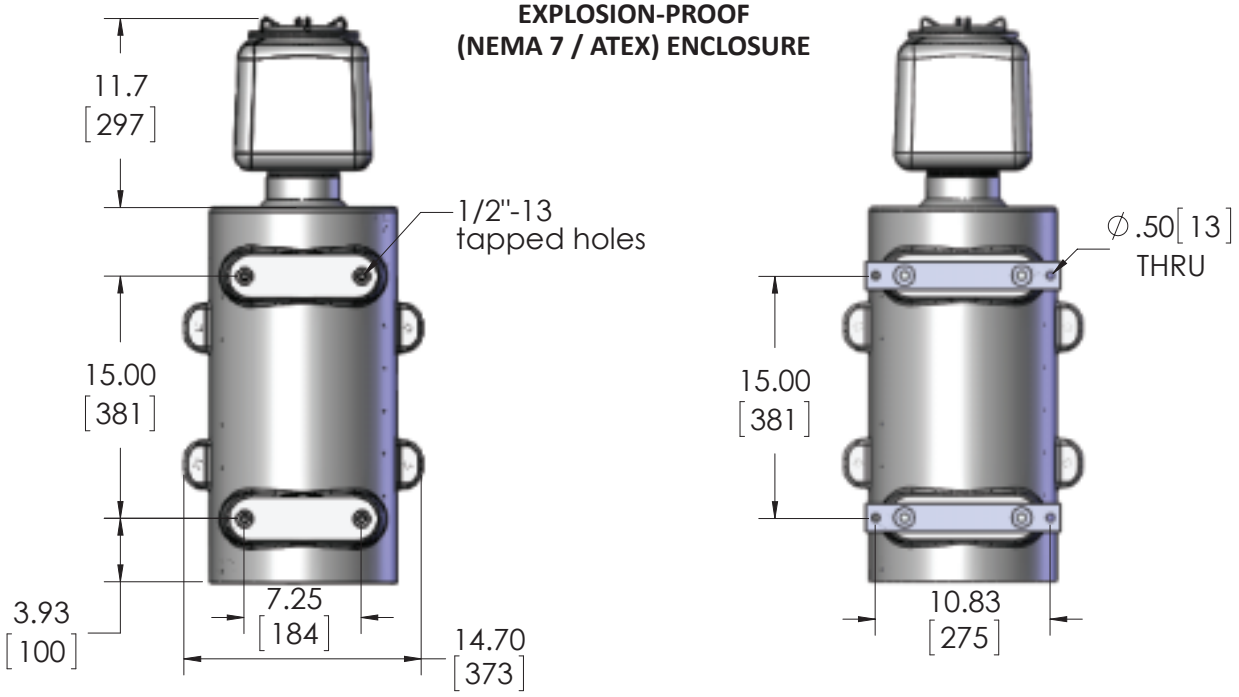


CAST-X 4000 Pressure Drop Profile: Delta-P Water

(Process Fluid = Water. Change in Pressure from Inlet to Outlet, Single Pass Using One Tube)

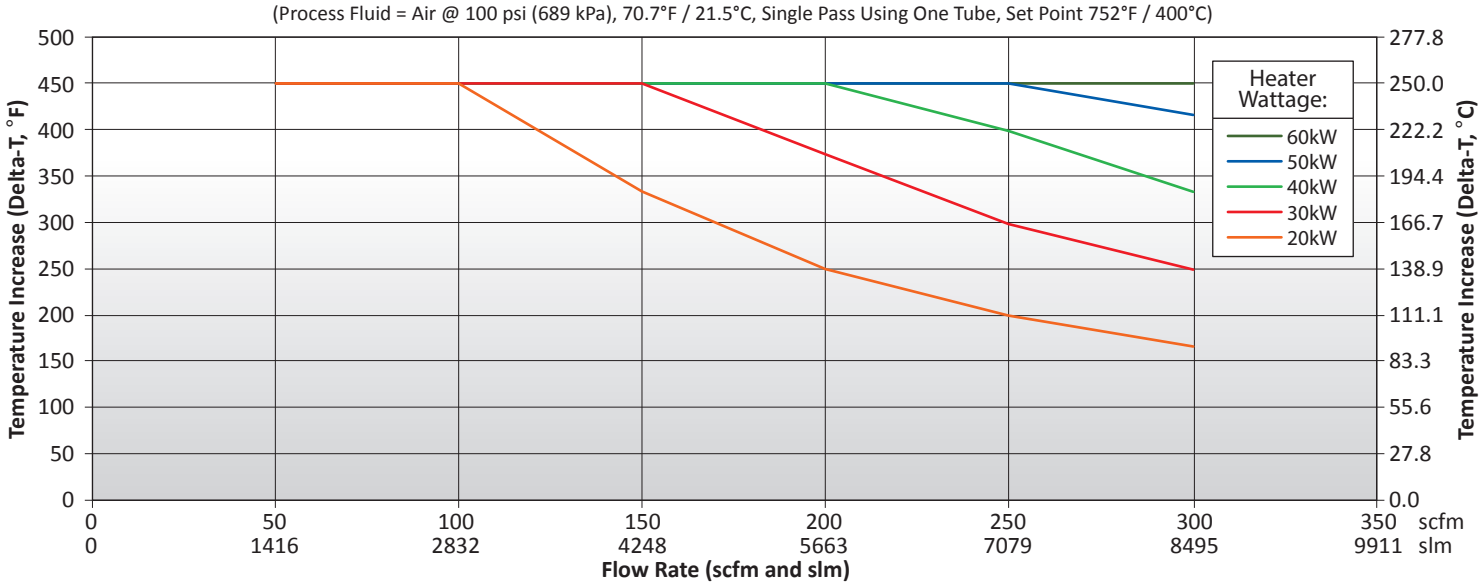


EXPLOSION-PROOF (NEMA 7 / ATEX) ENCLOSURE



CAST-X 4000 Heating Profile: Delta-T Air

(Process Fluid = Air @ 100 psi (689 kPa), 70.7°F / 21.5°C, Single Pass Using One Tube, Set Point 752°F / 400°C)



CAST-X 4000 Heating Profile: Delta-P Air

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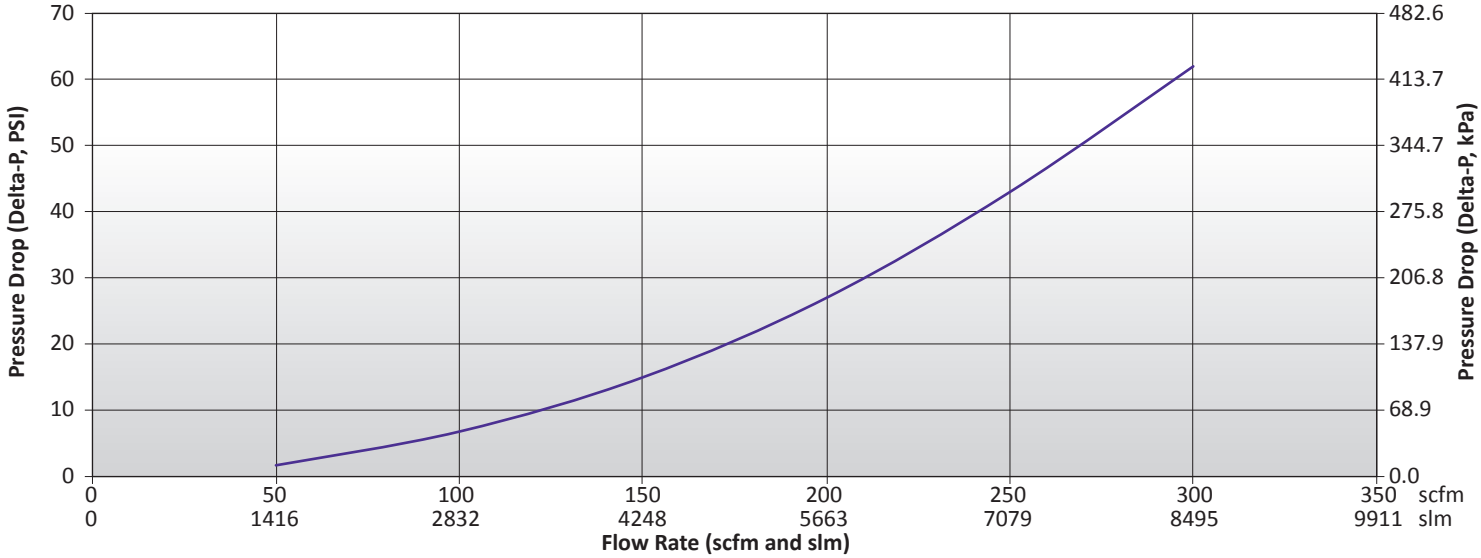


CAST-X 4000 Circulation Heater

Engineering Expertise • Speed to Market • Operational Excellence

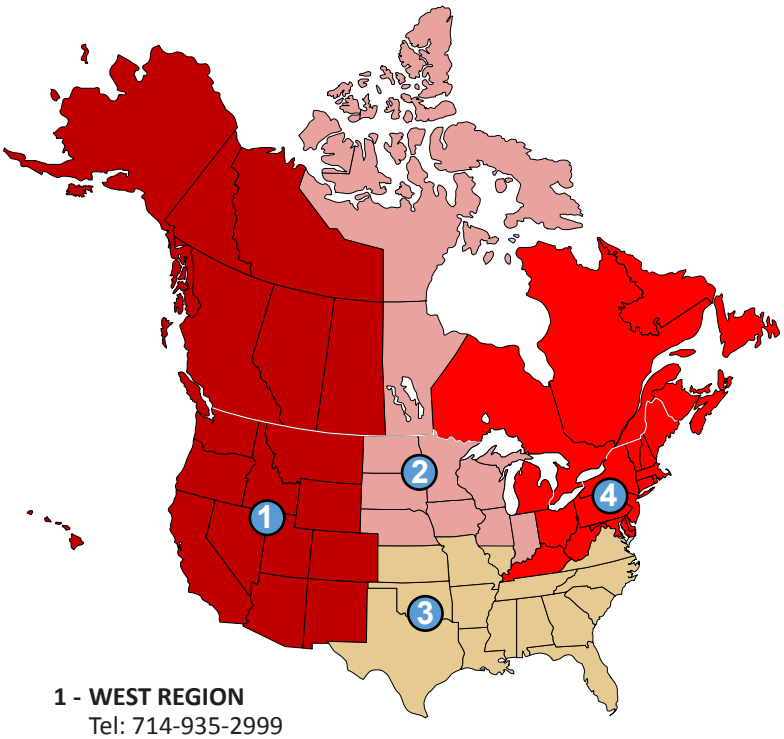
Cast Aluminum Solutions (CAS) manufactures the CAST-X line of circulation heaters, plus a broad range of heating, cooling, and non-thermal components. We are relied upon by OEMs and end-users alike throughout the semiconductor, medical device, aerospace, industrial gas, fluid-handling, food equipment, and energy markets.

Our multi-discipline team of engineers and technicians works closely with customers to develop practical solutions to complex process challenges. We utilize industry standard applications such as Finite Element Analysis (FEA), SolidWorks® 3-D CAD technology, and a range of structural analysis & thermal modeling tools.

CAS is an ISO 9001 Certified company with a fully-equipped R&D facility. Testing capabilities include X-Ray, ultrasound, helium leak, and infra-red technology, plus the latest coordinate measuring machines (CMM). Our in-house casting facility utilizes a permanent mold low-pressure casting process which reliably produces low-porosity, high-quality aluminum products. We offer an array of precision CNC machining options, finishing options such as electroless nickel plating, Teflon® coatings, clear-coat and hard-coat anodizing, plus high-value-added testing and inspection services.

Headquartered in Batavia, Illinois (just outside Chicago) we serve customers worldwide.
See the below map to locate a Sales Engineer, or contact CAS directly. We look forward to working with you.

With offices worldwide, the CAS Team of knowledgeable and experienced representatives is ready to assist with your project.



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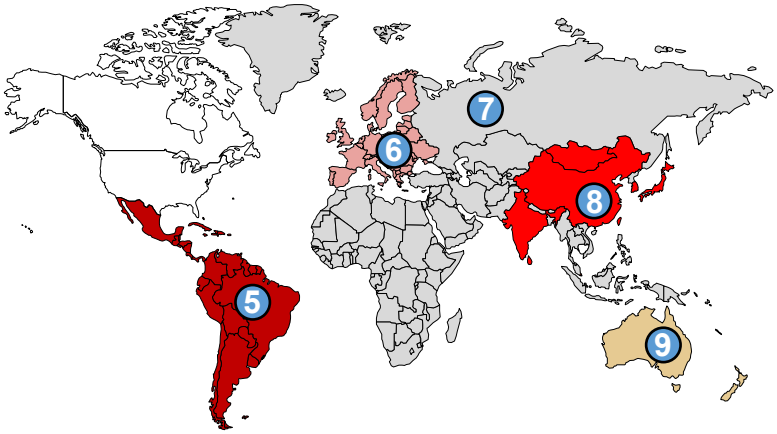
Chicago Tel: 847-458-1500
Minneapolis Tel: 952-892-9222

3 - SOUTH REGION
Tel: 678-951-8120

4 - NORTHEAST REGION
Tel: 513-398-5500

ENERGY PROCESS DIVISION
Tel: 866-948-1708

SEMICONDUCTOR DIVISION
Tel: 408-754-3370



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6 - EUROPE
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Spain
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India
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9 - AUSTRALIA & NZ
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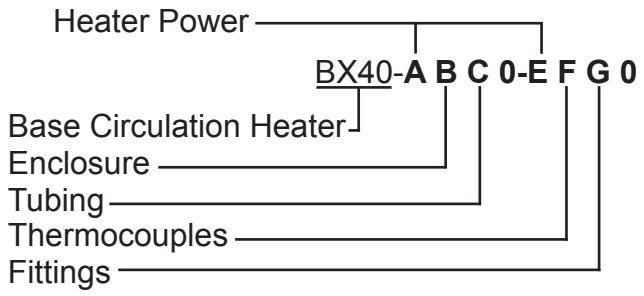


Building a CAST-X 4000 Part Number

Use the graphs below to build your CAST-X 4000. Assigning numbers for sections AE, B, C, F, and G.

For Heater Wattage, make selections in position A and E. The characters after C and G will always be "0" (zero).

For assistance, contact CAS directly.

VOLTAGE, POWER, CIRCUIT TYPE				
Volts refers to line volts (V_L). Amps refers to line current (I_L).				
Sections "A" and "E"	**Circuit Type**	**Volts (V)**	**Watts (kW)**	**Amps (A) (per circuit)**
1 1	ONE WYE CIRCUT	415	20	27.9
		400	18.6	26.9
		380	16.8	25.5
1 2	TWO WYE CIRCUITS	415	40	27.9
		400	37.2	26.9
		380	33.6	25.5
1 3	THREE WYE CIRCUITS	415	60	27.9
		400	55.8	26.9
		380	50.4	25.5
1 4	ONE DELTA CIRCUIT	240	20.1	48.3
		230	18.5	46.3
		220	16.9	44.3
		208	15.1	41.9
1 5	TWO DELTA CIRCUITS	240	40	48.3
		230	36.9	46.3
		220	33.8	44.3
		208	30.2	41.9
1 6	THREE DELTA CIRCUITS	240	60.3	48.3
		230	55.4	46.3
		220	50.6	44.3
		208	45.3	41.9
1 7	UN-WIRED WITH 8.6 Ω INDIVIDUAL HEATERS	N/A	N/A	N/A
2 1	ONE WYE CIRCUT	480	6.7	8
2 2	TWO WYE CIRCUITS	480	13.4	8
2 3	THREE WYE CIRCUITS	480	20	8
2 4	ONE DELTA CIRCUIT	480	20	24.1
		415	15	20.8
		400	13.9	20.1
		380	12.6	19.1
2 5	TWO DELTA CIRCUITS	480	40.1	24.1
		415	30	20.8
		400	27.8	20.1
		380	25.1	19.1
2 6	THREE DELTA CIRCUITS	480	60.1	24.1
		415	44.9	20.8
		400	41.7	20.1
		380	37.7	19.1
2 7	UN-WIRED WITH 34.5 Ω INDIVIDUAL HEATERS	N/A	N/A	N/A

NEMA 4 ENCLOSURE

NEMA 7 / ATEX ENCLOSURE

ENCLOSURES	
If you select "3" (RTD option), remember to select "5" on Thermocouple section	
Section "B"	**Description**
1	NEMA 4
2	NEMA 7 / ATEX
3	NEMA 7 / ATEX WITH RTDs (RESISTANCE TEMPERATURE DETECTORS)

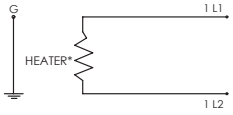
TUBING		
Option "2" is the standard option (2 stainless steel tubes)		
Section "C"	**Description**	**Number of Tubes**
1	316L STAINLESS STEEL TUBE	1
2	316L STAINLESS STEEL TUBES	2

THERMOCOUPLES		
If you select "5" (RTD option), remember to select "3" on Enclosure section		
Section "F"	**Thermocouple Type**	**Thermocouple Qty.**
1	J-TYPE	1
2	J-TYPE	2
3	K-TYPE	1
4	K-TYPE	2
5	RTDs (RESISTANCE TEMPERATURE DETECTORS)	2

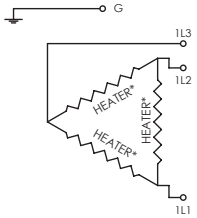
FITTINGS		
Section "G"	**Description**	**Fitting Qty.**
0	NO FITTING	0
2	SWAGELOK® COMPRESSION UNION SS-1610-6 (SHIPPED LOOSE)	2

ACCESSORIES	
These PNs are totally separate from the PNs for the heater	
Part Number	**Component**
307-0-23-1	INSULATION JACKET, MAXIMUM TEMPERATURE 986°F (530°C)
39-125-1-1	METRIC MOUNTING BARS (2): BOLT TO HEATER BODY & FEATURE 13MM THRU HOLES FOR MOUNTING (ON 275 MM CENTERS)

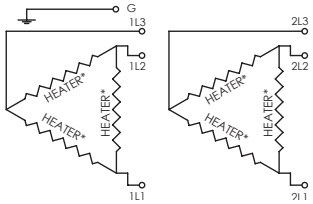
CUSTOM DESIGNS & COMPONENTS	
CAS offers several options for special tubes, sensors, and finishes. Please call a CAS Representative for a quote.	
Options	
INCONEL, MONEL OR HASTELLOY TUBES	THICK WALL TUBES
ELECTRO-POLISHED OR PASSIVATED TUBES	NPT FITTINGS



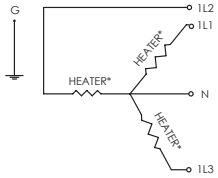
SINGLE PHASE CIRCUIT



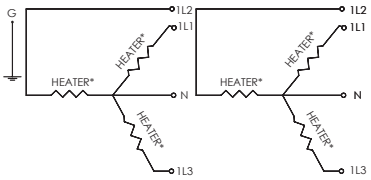
THREE-PHASE DELTA CIRCUIT



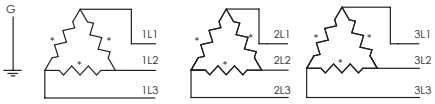
TWO THREE-PHASE DELTA CIRCUITS



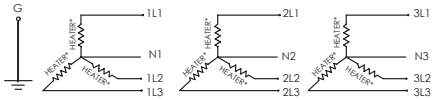
THREE-PHASE WYE CIRCUIT



TWO THREE-PHASE WYE CIRCUITS



THREE THREE-PHASE DELTA CIRCUITS



THREE THREE-PHASE WYE CIRCUITS

CAST-X 4000 Available Circuit Types

The CAST-X 4000 is manufactured with these types of circuit configurations.
*Wiring schematic only shows heater elements. Refer to I&M Manual for further details on wiring of snap-action switches (if applicable).

Need Help with Part Numbers or Engineering Calculations?

One of the key advantages of working with CAS is the accessibility of our team and ability to offer assistance. The CAS Team is ready and available to help work through part number configurations, provide engineering advice, and ensure customers purchase the heater most appropriate for their particular application.

Our mission is developing solutions, from concept to reality.
So feel free to contact the CAS Team directly:

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