

UNIVERSAL SOLVENT HEATER

Circulation Heater

A cast-in circulation heater with a full array of special features to safely heat volatile solvents.



The Universal Solvent Heater from Cast Aluminum Solutions (CAS) has been designed and tested to perform at the highest levels when heating volatile, low-flashpoint solvents.

The USH features efficient low-watt-density heating elements cast into an aluminum body that also contains two helical-coiled stainless steel tubes; a small cooling tube for water (to reduce solvent temps below flashpoint), and a larger solvent tube (passivated & electro-polished). Solvents are sequestered in this tube, never contacting the heating elements, which prevents contamination and reduces the risk of explosion.

Three J-Type thermocouples sense solvent inlet, outlet and heater core temperatures. A snap-action high limit switch provides safe shutdown of the unit. The electrical enclosure is explosion proof (NEMA 7). To protect it from corrosion, the body is Teflon® coated. This is the ultimate solvent heating device.

APPLICATIONS:

- Semiconductor Wet Process Systems
- Wafer Cleaning Equipment
- Heating of Photoresist Removal Solvents
- Acid Heating
- Heating Low Flashpoint Solvents
- Safe Heating of Media in Environments Containing Flammable or Explosive Vapors



SPECIFICATIONS:

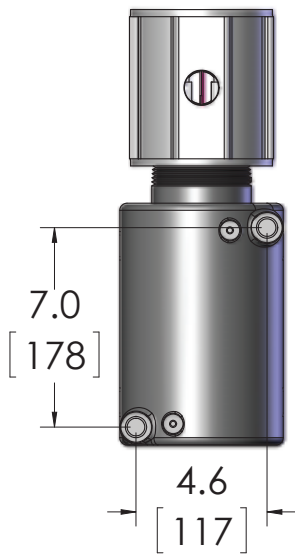
- Power:
 - 6 kW Total to 8 kW Total
 - Voltage Range: 208 - 480 V
 - Max Line Current: 30 A per circuit
- Tubing (Solvent Tube):
 - .750" OD (3/4") (19.1 mm)
 - .065" Wall (1.7 mm)
 - Overall Process Tube Length: 115.5" (2934 mm)
 - 316L Stainless Steel, Passivated & Electro-Polished
- Tubing (Cooling Tube):
 - .250" OD (1/4") (6.3 mm)
 - .035" Wall (0.9 mm)
 - Overall Process Tube Length: 86.25" (2190 mm)
 - 316L Stainless Steel
- Max Pressure: 3300 psi (227 bar)
- Enclosures:
 - NEMA 7 (explosion-proof)
(Class 1, Div. 1 and 2, Groups B, C and D)
- Max Working Temperatures: 392°F (200°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:
 - Two J-Type Thermocouples (cast in)
 - One J-Type Thermocouple (removable)
 - Snap Action High Limit Switch (with auto reset)
- Fittings:
 - Solvent Tube: Flaretek®-Compatible or Swagelok® VCR
 - Cooling Tube: NPT or Swagelok® VCR
- Accessories:
 - Insulating Jacket

FEATURES & BENEFITS:

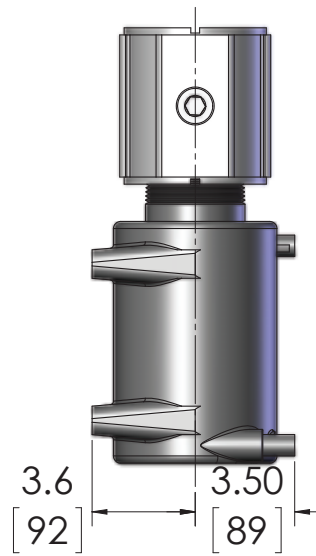
- Provides Safe & Efficient Heating Low Flashpoint Solvents
- Solvents Never Contact Heating Elements
(isolated fluid path reduces possibility of explosion & contamination)
- NEMA 7 Explosion-Proof Electrical Enclosure
- Design is Self-Draining (eliminating trapped debris)
- Solvent Tubes are Passivated and Electro-Polished
- Cooling Tube Quick Reduces Heat Below Flashpoint
- Equipped with 3 Thermocouples & 1 Limit Switch
- Compatible with High Pressure Applications

UNIVERSAL SOLVENT HEATER Circulation Heater

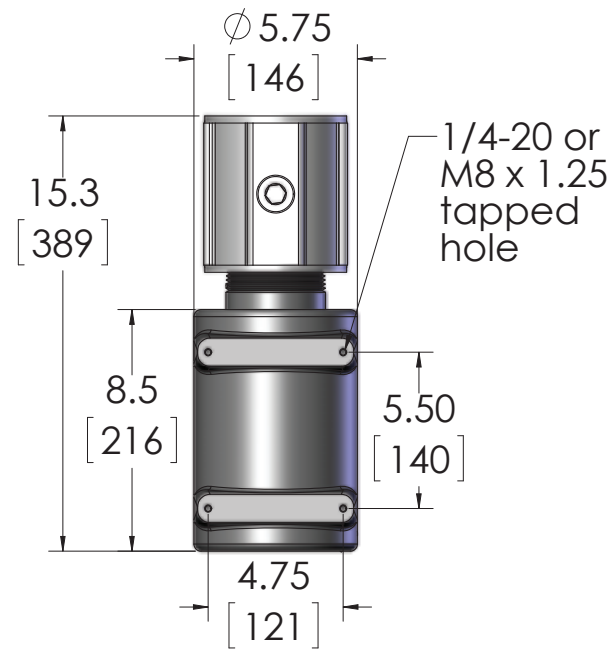
FRONT VIEW



SIDE VIEW

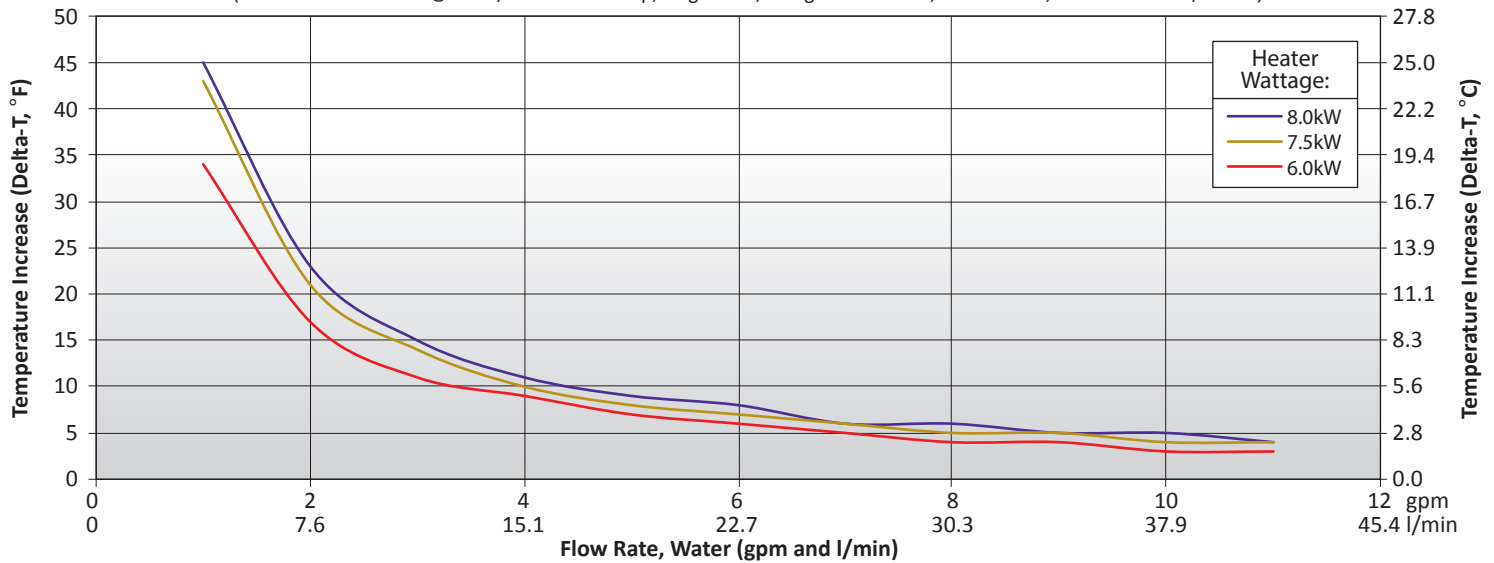


REAR VIEW



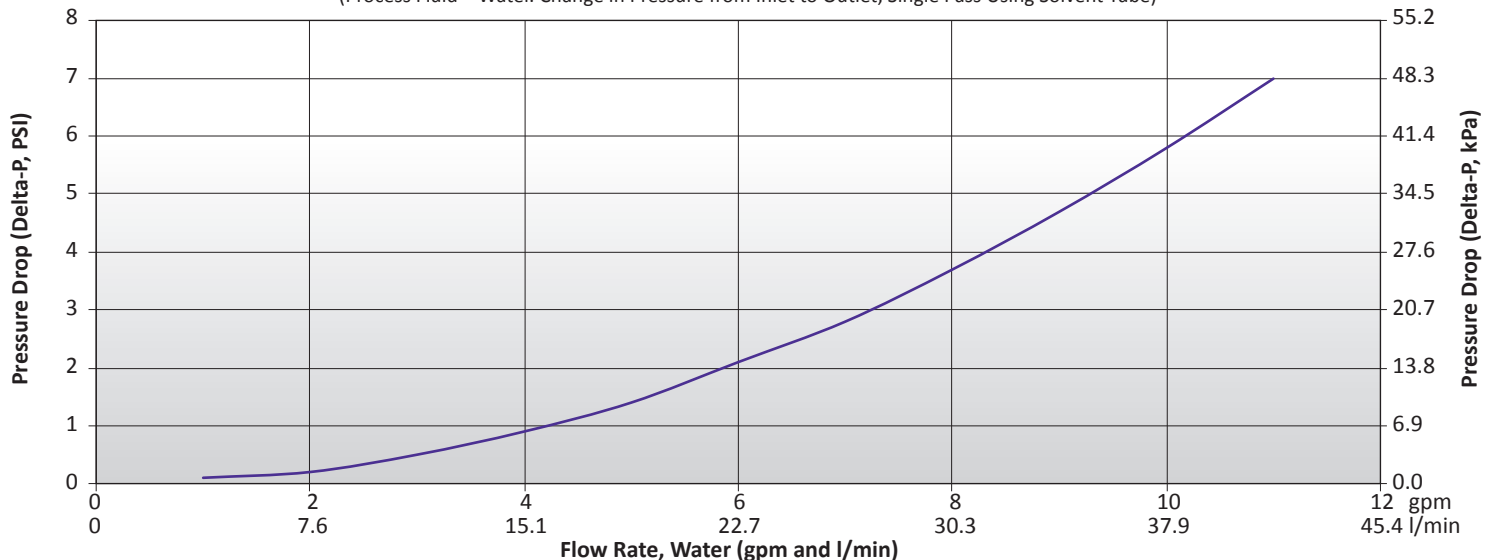
Universal Solvent Heater Heating Profile: Delta-T Water

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

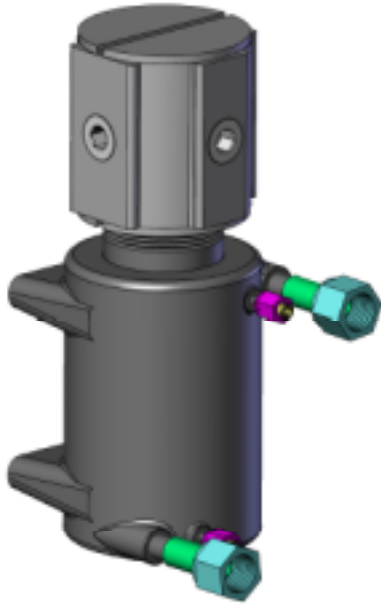


Universal Solvent Heater Heating Profile: Delta-P Water

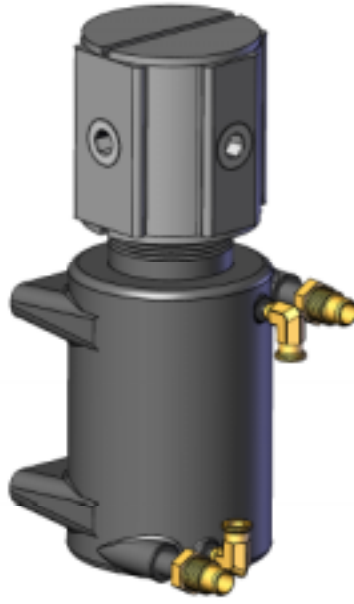
(Process Fluid = Water. Change in Pressure from Inlet to Outlet, Single Pass Using Solvent Tube)



**SWAGELOK® VCR FITTINGS
ON SOLVENT TUBE AND COOLING TUBE**



**FLARETEK®-COMPATIBLE FITTINGS
ON SOLVENT TUBE AND
NPT 90° ELBOW FITTINGS ON COOLING TUBE**

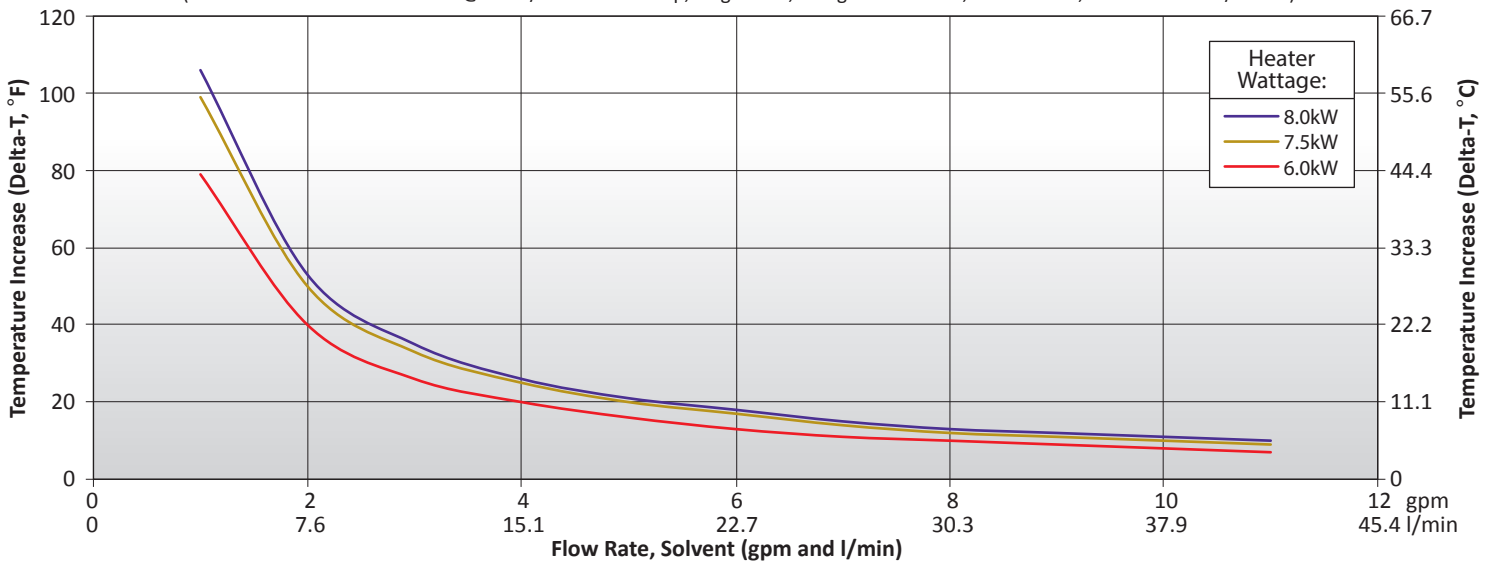


Tube Fittings to Meet Any Need

Our Universal Solvent Heater offers an array of high-performance tube fittings. Each fitting was chosen for its ability to meet the unique specifications of solvent heating applications.

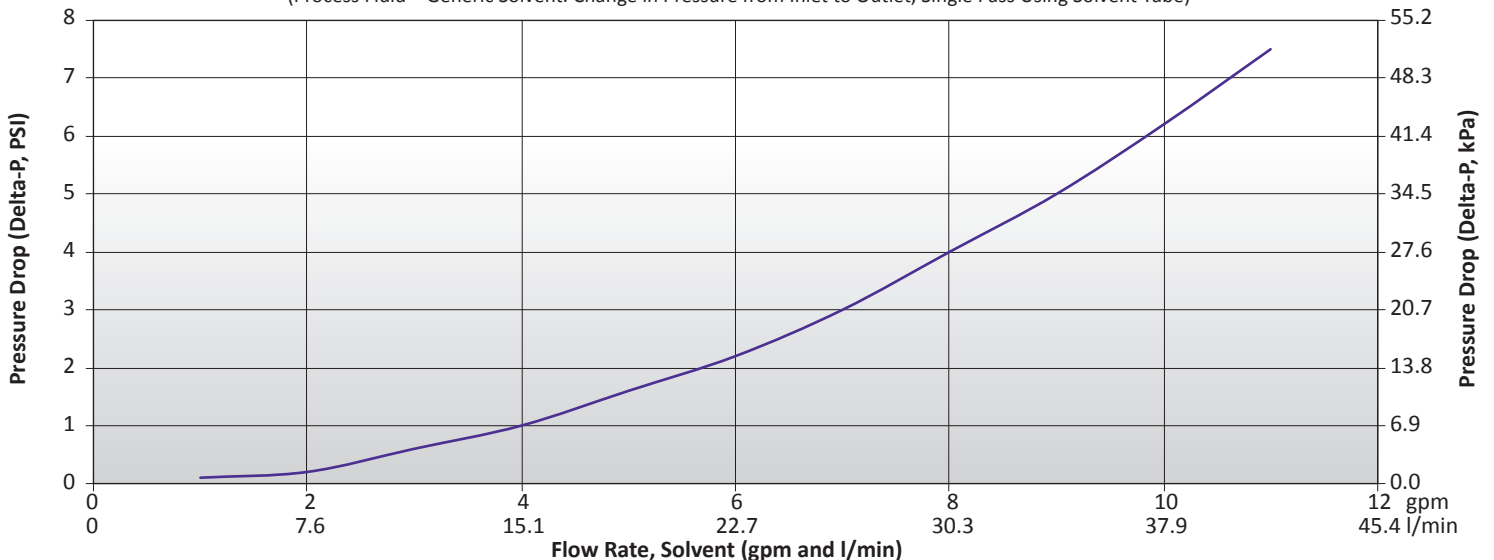
Universal Solvent Heater Heating Profile: Delta-T Solvent

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



Universal Solvent Heater Heating Profile: Delta-P Solvent

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



UNIVERSAL SOLVENT HEATER 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.

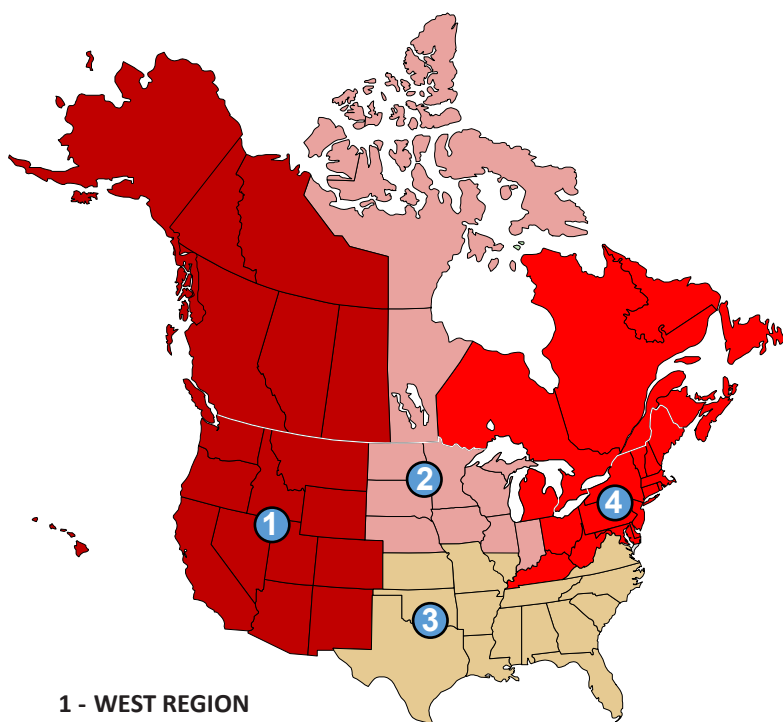
Our multi-discipline team of engineers and technicians works closely with customers to develop practical solutions to complex process challenges. We utilize industry standard applications such as Finite Element Analysis (FEA), SolidWorks® 3-D CAD technology, and a range of structural analysis & thermal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



1 - WEST REGION
Tel: 714-935-2999

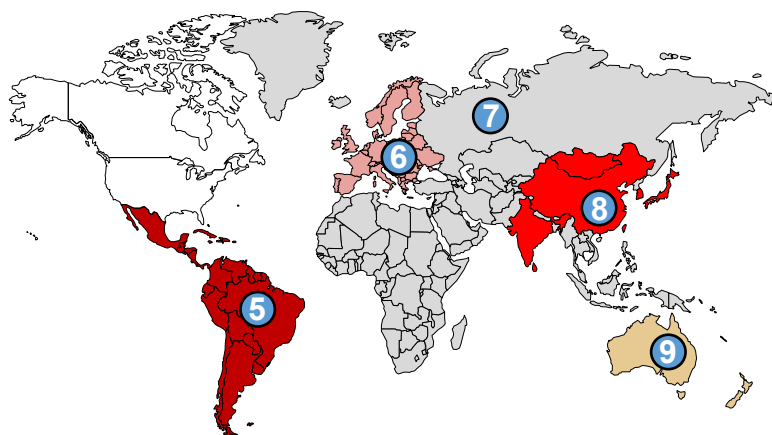
2 - MIDWEST REGION
Chicago Tel: 847-458-1500
Minneapolis Tel: 952-892-9222

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



**5 - MEXICO, CENTRAL
and SOUTH AMERICA**
Tel: +52 442-256-2200

6 - EUROPE
France
Tel: +33 (0) 1-41-32-79-70

Germany
Tel: +49 7253-9400-0

Italy
Tel: +39 02-458-8841

Spain
Tel: +34 91-675-1292

United Kingdom
Tel: +44 115-964-0777

7 - RUSSIA, AFRICA & MIDDLE-EAST
Tel: +1 630-879-2696

8 - ASIA
China
Tel: +86 21-3532-8532

Japan
Tel: +81 3-3518-6630

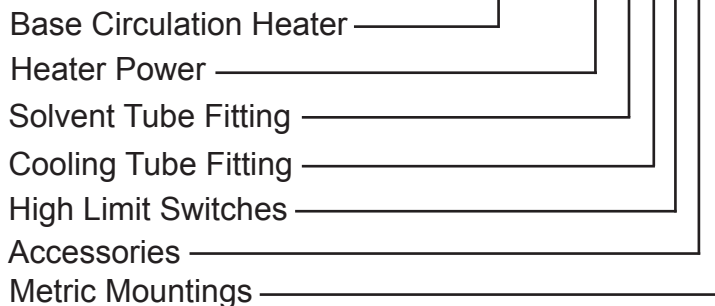
Korea
Tel: +82 2-2169-2600

Taiwan
Tel: +866 7-288-5168

India
Tel: +91 40-666-12700

9 - AUSTRALIA & NZ
Tel: +61 3-9335-6449



BX8J5N100A-BCDEF**Building a Universal Solvent Heater Part Number**

Use these graphs to build your Universal Solvent Heater
Assigning numbers for sections A, B, C, D and E.

If you need metric mountings, assign "M" to section F.
If metric mounts are not required, leave section F blank.

For assistance, please contact CAS directly.

VOLTAGE, POWER, CIRCUIT TYPE

| Section "A" | Volts (V) | Watts (kW) | Circuit Type | Amps (A) per circuit |
|-------------|-----------|------------|---------------------------|----------------------|
| A | 208 | 8 | TWO SINGLE-PHASE CIRCUITS | 19.2 |
| C | 208 | 6 | TWO SINGLE-PHASE CIRCUITS | 14.4 |
| E | 208 | 7.5 | ONE THREE-PHASE WYE | 20.8 |
| B | 240 | 8 | TWO SINGLE-PHASE CIRCUITS | 16.7 |
| D | 240 | 6 | TWO SINGLE-PHASE CIRCUITS | 12.5 |
| F | 240 | 7.5 | ONE THREE-PHASE WYE | 18.0 |
| G | 380 | 7.5 | ONE THREE-PHASE WYE | 11.4 |
| H | 480 | 7.5 | ONE THREE-PHASE WYE | 9.0 |

SOLVENT TUBE FITTING

| Section "B" | Description |
|-------------|---|
| 1 | FLARETEK®-COMPATIBLE, 1" OD, 20 THREADS PER INCH, MALE / PAIR |
| 2 | SWAGELOK® VCR FITTINGS / PAIR |

COOLING TUBE FITTING

| Section "C" | Description |
|-------------|---|
| 1 | NPT (NATIONAL PIPE THREAD) FITTINGS, 1/4", 90° ELBOW, FEMALE / PAIR |
| 2 | SWAGELOK® VCR FITTINGS / PAIR |

SNAP ACTION HIGH LIMIT SWITCHES

Pilot duty only

| Section "D" | Switch |
|-------------|--------------------------------|
| 1 | AUTOMATIC RESET, 212°F (100°C) |
| 2 | AUTOMATIC RESET, 365°F (185°C) |

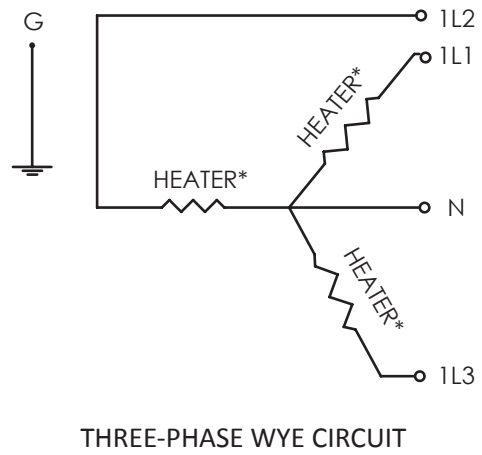
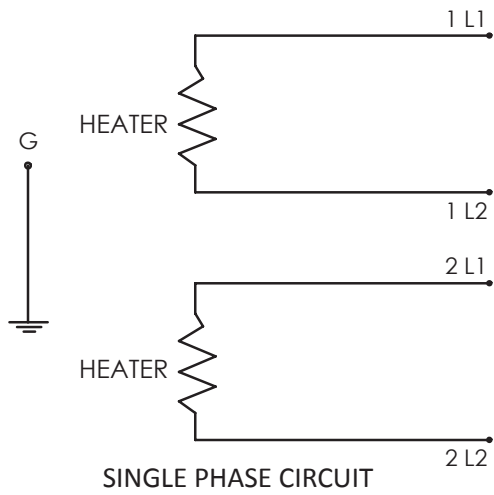
ACCESSORIES

| Section "E" | Component |
|-------------|--|
| 0 | NONE |
| 1 | INSULATION JACKET, MAXIMUM TEMPERATURE 400°F (204°C) |

METRIC MOUNTING HOLES

*Place an "M" in section F if metric mounting holes are required.
If standard Imperial mounting holes are desired, section F can be left blank*

| Section "F" | Metric Mounting Holes |
|-------------|--|
| M | M8 x 1.25 Metric Tapped Mounting Holes |



Universal Solvent Heater Available Circuit Types

The Universal Solvent Heater 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).



UNIVERSAL SOLVENT HEATER WITH SWAGELOK® FITTINGS ON BOTH THE SOLVNET TUBE AND THE SMALLER COOLING TUBE.



UNIVERSAL SOLVENT HEATER WITH FLARETEK®-COMPATIBLE FITTINGS ON SOLVENT TUBE AND NPT FITTINGS ON COOLING TUBE

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 you work through part number configurations, provide engineering advice, and ensure customers purchase the heater most appropriate for their particular application.

CAS Engineers are accustomed to working closely with customers to generate accurate calculations and models. We have a range of powerful tools at our disposal, including Finite Element Analysis (FEA) software, 3-D CAD applications, and infra-red thermal testing.

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



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