HEAT EXCHANGER

MODEL 736

STAINLESS STEEL TUBES / COPPER FINS

14.0" x **21.9"** x **2.6"**

736SLJ0

687 LOWELL STREET METHUEN, MA 01844 USA

PHONE: 978.687.8844 / FAX: 978.687.2477
EMAIL: Info@ThermatronEng.com / WEB: ThermatronEng.com

MODEL 736
73 SERIES

MODEL **736** is the second largest standard size of the Thermatron Engineering **73** *SERIES* Heat Exchanger Family. Built to market-highest quality standards *MODEL* **736** features all-Stainless Steel tubing for ultra-clean or corrosive applications. *MODEL* **736** provides maximum reliability heat transfer for closed-loop cooling in medical and industrial lasers, fuel cells, instrumentation, and many diverse high-end electronics applications.

Thermatron also manufactures many custom configurations of *MODEL* **736** per specific dimensional and performance requirements. Please consult the factory for your application requirements.

736*SLJ0*

736*SLJ1*

SPECIFICATIONS

HX DESIGN:	Round tube / Wavy fin. Two tube-rows deep in air flow direction (deeper designs available upon request)
MATERIALS:	316L Stainless Steel tubes / C11000 Copper fins / 5052-H32 Aluminum shroud
SIZE:	Air flow area 21.7″ x 12.8″, standard mounting receives (6) 172 x 150 mm OVAL fans
WEIGHT:	17.9 lbs (no fans), 28.5 lbs (with fans)
FIN GEOMETRY:	Thermatron's unique riffled & corrugated wavy fin, 0.0053″ thick, stacked 17.5 fins per inch, full collared
TUBE GEOMETRY:	(16) tubes per row x (2) rows = (32) total tubes. Tubes 0.375″ OD x 0.028″ wall located on 0.750" centers. Rows located on 0.650″ centers.
TUBE CIRCUIT:	Two parallel circuits of (16) tubes each. Also available with all-series circuit or 4, 8, or 16 parallel circuits.
MAX. RECOMMENDED FLOW:	(Tap water) 8 GPM for standard two-parallel tube circuits / 16 GPM for optional four-parallel tube circuits
COOLANT COMPATIBILITY:	Corrosive coolants (Typically deionized water or other aggressive coolants)
PRESSURE TEST:	100% pressure tested at 150 PSIG Nitrogen under water.

MAX. OPERATING PRESSURE:	150 PSIG continuous duty (higher pressure ratings available upon request)
MAX. OPERATING TEMPERATURE:	316C
MAX. FAN OPERATING TEMPERATURE:	60C typical
FITTINGS:	⅜″ or ½″ OD tubes, ⅜″ or ½″ AN flare nuts, ⅜″ or ½″ hose beads, ¼″, ⅜″, or ½″ NPTF or NPTM, Metric, or any custom fitting specific to the application. All fittings also available with 90 degree bends rotated at any orientation. Alternate fittings available upon request. Brass, Stainless Steel, and other fitting materials available upon request.
STANDARD FANS:	Orion OA172SAP-11-1 (115VAC), Orion OA172SAP-22-1 (230VAC), or EBM 6424 (24VDC). Many other alternate fans are available or the heat exchanger can be provided without fans.
THERMAL PERFORMANCE:	215-to-460 W/C pending fan selection and coolant flow (see performance curves)
RoHS:	All standard **73** *SERIES* heat exchangers can be made RoHS compliant upon request. Any alternate fans, sensors, or non-standard fitting may affect RoHS compliance. Please consult the factory.

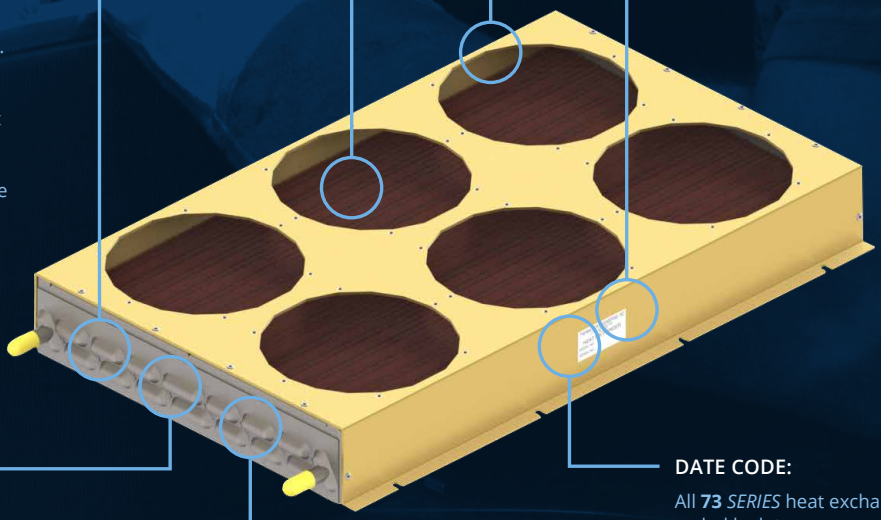
SUPERIOR CONSTRUCTION

FINS:

C11000 Copper, Oxygen-free high thermal conductivity (OFHC). Thermatron's unique riffled & corrugated wavy fin, 0.0053" thick, stacked 17.5 fins per inch. The highest thermal performer in its class worldwide. Mechanically-expanded full collar fin/tube interface for maximum heat transfer.

METAL JOINING:

All joints precision TIG welded by Thermatron experts under Argon purge to keep tube interiors free of oxidation and ensure weld integrity. Thermatron TIG welds have no known life failures after 40+ years of field operation. All **73** *SERIES* heat exchangers are 100% pressure tested at 150 PSIG Nitrogen under water. Thermatron inspectors scribe their unique ID code on every HX to confirm successful pressure test.



WETTED INTERIOR:

Tubes, manifolds, return bends, and fittings 316L Stainless Steel. All core tubes 0.375" OD x 0.028" wall thickness. Precision "1D" tube bends are supported by internal mandrels for smooth ID flow, minimizing distortion and wall thinning.

EXTERIOR:

All **73** *SERIES* heat exchanger shrouds are 5052-H32 Aluminum x 0.090" thick and have gold iridite finish.

QUALITY ASSURANCE:

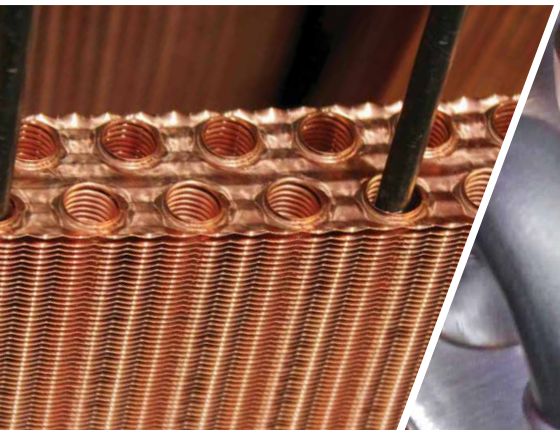
All **73** *SERIES* heat exchangers are 100% pressure tested at 150 PSIG Nitrogen under water. Thermatron inspectors scribe their unique ID code on every HX to confirm successful pressure test.

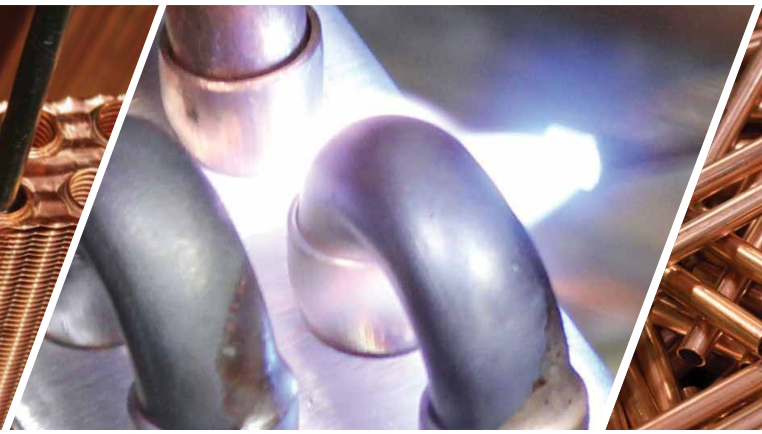
DATE CODE:

All **73** *SERIES* heat exchangers are date coded by lot.

INTERNAL CLEANLINESS:

Industry-leading internal tube cleanliness, computer grade. High temperature / high flow flushes of Liqualin, Drycid and neutralizer, followed by COBRATEC 99 flush for corrosion inhibition.





FAN SELECTION

The intersection of the heat exchanger pressure curve (black curve) with the chosen fan performance curve is the expected air flow through the heat exchanger, assuming no additional air flow restrictions other than the heat exchanger itself (e.g. cabinet blockage, ducts, bends inair loop, dust filters, etc.) As a baseline, Fans A, B and C represent standard selections for 230VAC, 115VAC, and 24VDC respectively. If higher thermal performance is required a stronger (and louder) fan option like Fan D, E, or F can be selected to increase the airflow.

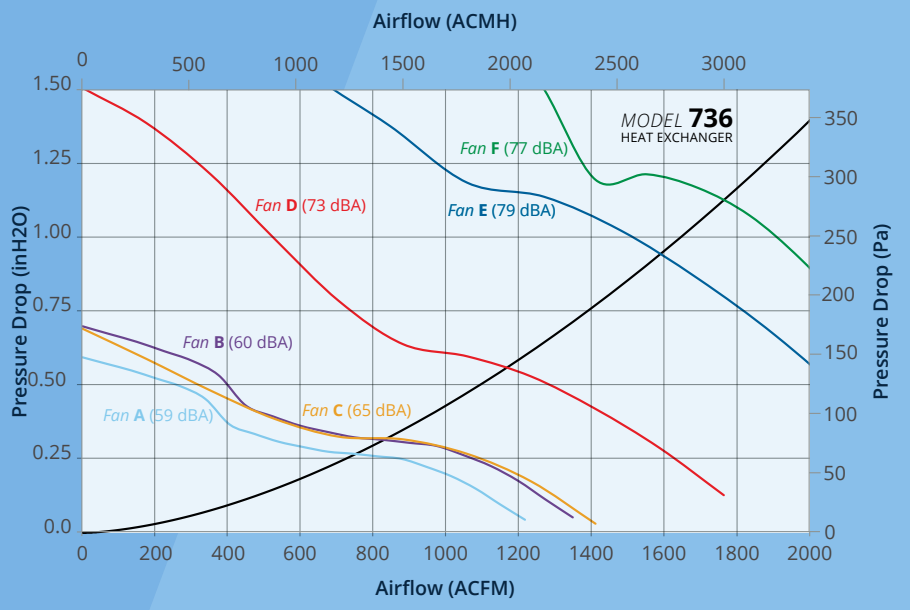
Air flow direction is available in two options (by flipping fan):

1. ***PUSH AIR*** *- Air enters fan first and exhausts through HX last. Slightly better for applications cooling the water.*
2. ***PULL AIR*** *- Air enters HX first and exhausts through fan last. Slightly better for applications cooling the air.*

Air flow direction does not affect volumetric air flow.

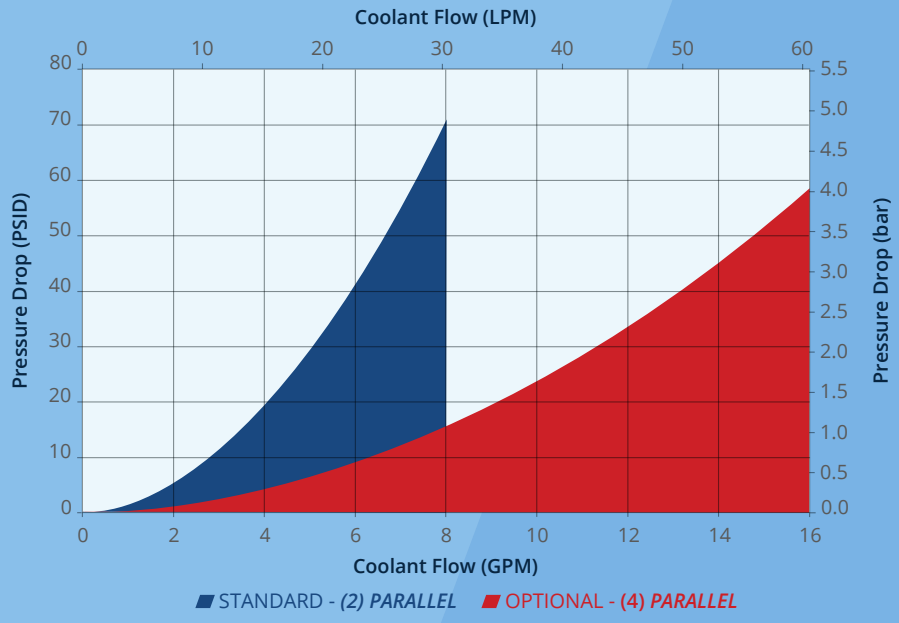
PRESSURE DROP vs. AIRFLOW

Air Properties @ 30C, 1 bar



PRESSURE DROP vs. COOLANT FLOW

Water Properties @ 40C



PUMP SELECTION

MODEL **736** Heat Exchanger standard plumbing configuration has 32 tubes connected in two parallel circuits. This is an excellent configuration for larger heat exchangers since it offers both high thermal performance and reduced coolant pressure drop as shown by the blue line. Maximum recommended flow is 8 GPM in order to avoid long-term erosion corrosion. For coolant flows > 8 GPM *MODEL* **736** can also be offered with 4, 8, or 16 parallel circuits. Splitting the flow into four parallel circuits will result in a small decrease in thermal performance of approximately 5% but increases the maximum recommended flow to 16 GPM as shown by the red line. Continuing to split the flow into more parallel circuits will result in an even lower coolant pressure drop at the expense of a greater reduction in thermal performance. Please contact Thermatron Engineering directly to discuss specific application requirements.

PERFORMANCE

Heat exchangers require some temperature difference between the entering liquid and entering air in order to transfer heat, the larger this temperature difference, the more heat can be transferred.

Thermal performance of all Thermatron Engineering heat exchangers is determined as follows:

COOLING THE WATER:

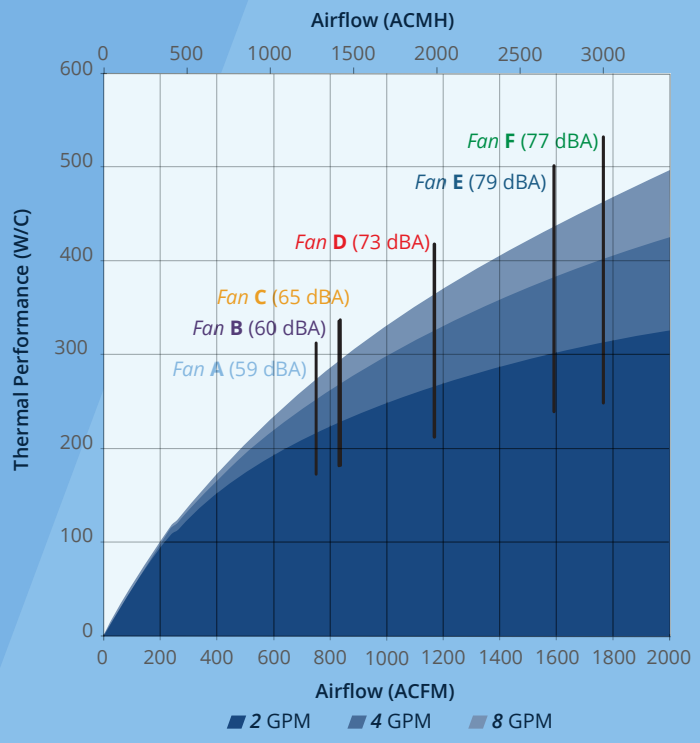
$$\text{PERFORMANCE (W/C)} = \frac{\text{Heat Load (W)}}{\text{Water Temp Enter HX (°C) - Air Temp Enter HX (°C)}}$$

COOLING THE AIR:

$$\text{PERFORMANCE (W/C)} = \frac{\text{Heat Load (W)}}{\text{Air Temp Enter HX (°C) - Water Temp Enter HX (°C)}}$$

THERMAL PERFORMANCE vs. AIRFLOW

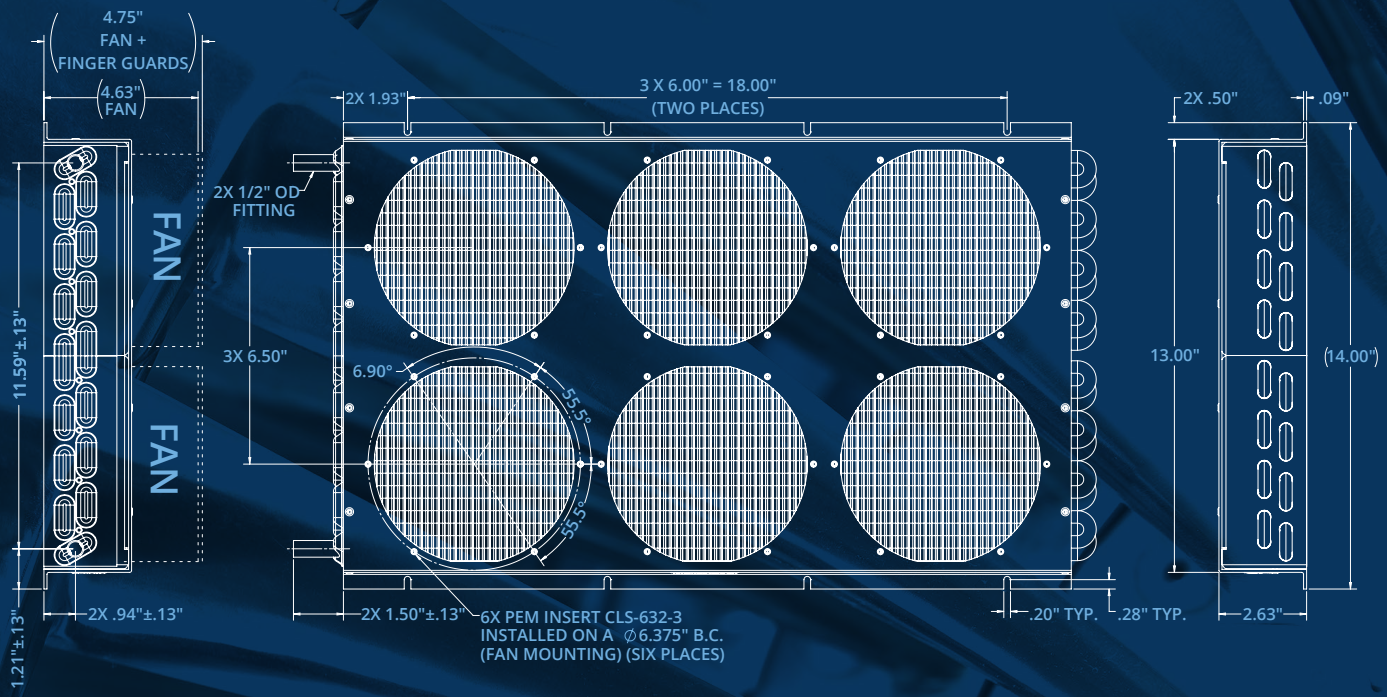
Water Properties @ 40C, Air Properties @ 30C, 1 Bar



TABULATED PERFORMANCE

HEAT EXCHANGER	FAN	FAN P/N	FAN VOLTAGE	FAN NOISE (PER FAN/TOTAL)	PRESSURE DROP & AIRFLOW	PRESSURE DROP & WATER FLOW	HEAT LOAD WHEN: (WATER TEMP IN) - (AIR TEMP IN) =			
							1C	10C	30C	50C
Model **736**	*Fan* **A**	**(6)** ORION OA172SAP-22-1	**230**VAC, **50** Hz	**51/59** dB(A)	**0.27** in H2O @ **750** ACFM	***5.1*** PSID @ ***2.0*** GPM	**215.7** W	**2157** W	**6470** W	**10784** W
						18.9 PSID @ ***4.0*** GPM	**250.9** W	**2509** W	**7526** W	**12543** W
						70.5 PSID @ ***8.0*** GPM	**272.0** W	**2720** W	**8160** W	**13600** W
Model **736**	*Fan* **B**	**(6)** ORION OA172SAP-11-1	**115**VAC, **60** Hz	**52/60** dB(A)	**0.32** in H2O @ **831** ACFM	***5.1*** PSID @ ***2.0*** GPM	**227.1** W	**2271** W	**6814** W	**11356** W
						18.9 PSID @ ***4.0*** GPM	**267.1** W	**2671** W	**8013** W	**13356** W
						70.5 PSID @ ***8.0*** GPM	**291.5** W	**2915** W	**8746** W	**14576** W
Model **736**	*Fan* **C**	**(6)** EBM 6424	**24**VDC	**57/65** dB(A)	**0.32** in H2O @ **836** ACFM	***5.1*** PSID @ ***2.0*** GPM	**227.8** W	**2278** W	**6834** W	**11390** W
						18.9 PSID @ ***4.0*** GPM	**268.1** W	**2681** W	**8042** W	**13404** W
						70.5 PSID @ ***8.0*** GPM	**292.7** W	**2927** W	**8781** W	**14634** W
Model **736**	*Fan* **D**	**(6)** EBM DV6424	**24**VDC	**65/73** dB(A)	**0.56** in H2O @ **1168** ACFM	***5.1*** PSID @ ***2.0*** GPM	**265.3** W	**2653** W	**7960** W	**13267** W
						18.9 PSID @ ***4.0*** GPM	**324.5** W	**3245** W	**9736** W	**16226** W
						70.5 PSID @ ***8.0*** GPM	**362.8** W	**3628** W	**10883** W	**18139** W
Model **736**	*Fan* **E**	**(6)** SANYO DENKI 9SG-5724P5H61	**24**VDC	**71/79** dB(A)	**0.94** in H2O @ **1591** ACFM	***5.1*** PSID @ ***2.0*** GPM	**299.3** W	**2993** W	**8979** W	**14965** W
						18.9 PSID @ ***4.0*** GPM	**380.3** W	**3803** W	**11410** W	**19016** W
						70.5 PSID @ ***8.0*** GPM	**435.7** W	**4357** W	**13072** W	**21787** W
Model **736**	*Fan* **F**	**(6)** EBM 6314/2 TDHHP-015	**24**VDC	**69/77** dB(A)	**1.13** in H2O @ **1766** ACFM	***5.1*** PSID @ ***2.0*** GPM	**310.4** W	**3104** W	**9312** W	**15520** W
						18.9 PSID @ ***4.0*** GPM	**399.7** W	**3997** W	**11991** W	**19985** W
						70.5 PSID @ ***8.0*** GPM	**462.0** W	**4620** W	**13860** W	**23100** W

TECHNICAL DRAWING (736SLJ0)



MORE STANDARD MODEL 736 DRAWINGS

736SBJ1
736SNJ0
736SPJ0
736TBJ0
736TLJ0
736TNJ0
736TPJ0

PART NUMBERING SYSTEM

FIN / TUBE MATERIAL
- **2** = CU FIN / CU TUBE
- **3** = CU FIN / SS TUBE
- **4** = SS FIN / SS TUBE
- **5** = CU FIN / CU-NI TUBE
- **6** = AL FIN / SS TUBE
- **7** = AL FIN / CU TUBE

FITTING GEOMETRY
- **M** = OTHER
- **S** = STRAIGHT
- **T** = 90° ANGLED FITTING

LTR	FAN SIZE	FAN SHAPE	FASTENER	MOUNTING PATTERN
S	80 mm	SQUARE	(4) #6-32	71.5 x 71.5 mm
M	119 mm	SQUARE	(4) #6-32	104.8 x 104.8 mm
P	172 mm	ROUND	(4) #6-32	162 mm BC
J	172 x 150 mm	OVAL	(4) #6-32	162 mm BC
T	176 mm	SQUARE	(4) #10-32	152.4 x 152.4 mm
E	225 mm	SQUARE	(4) #8-32	240 mm BC
C	254 mm	ROUND	(8) #8-32	246 mm BC
O	OTHER	OTHER	OTHER	OTHER

7 3 6 X X J X A X X

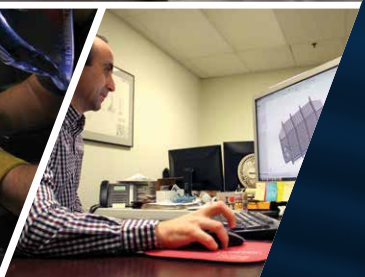
HEAT EXCHANGER SIZE
- **0** = 1 FAN (119 mm SQ)
- **1** = 2 FANS (119 mm SQ)
- **2** = 1 FAN (172 mm RND)
- **3** = 2 FANS (172 mm RND)
- **4** = 1 FAN (254 mm RND)
- **5** = 2 FANS (254 mm RND)
- **6** = 6 FANS (172 x 150 mm OVAL)
- **7** = 4 FANS (254 mm RND)

FITTING TERMINATION
- **B** = HOSE BEAD (1/2″)
- **L** = STRAIGHT TUBE (1/2″)
- **N** = 37° FLARE NUT (1/2″)
- **P** = NPT FEMALE (3/8″)
- **R** = HOSE BARB (1/2″)
- **C** = OTHER

FAN VOLTAGE
- **0** = FAN NOT SUPPLIED
- **1** = 110VAC
- **2** = 220VAC
- **3** = OTHER
- **4** = 12VDC
- **5** = 24VDC
- **6** = 48VDC

CUSTOM NUMBER
ASSIGNED BY THERMATRON

INDICATES CUSTOM AND VERSION LEVEL
ASSIGNED BY THERMATRON



CONTACT OUR EXPERTS

Our thermal experts will be happy to review your application and offer standard or custom solutions, including thermal analysis (single phase or multi-phase) and CAD drawings tailored to your special requirements...***ALL AT NO CHARGE AND WITHIN 24 HOURS!***

For many custom applications Thermatron will also ship heat exchanger prototypes for ***FREE 90-DAY CLIENT EVALUATIONS***, with purchase subject only to ***COMPLETE CLIENT SATISFACTION***, and pricing subject only to follow-on orders. Thermatron engineers will also add recommendations for fans, pumps, filters, fittings, cabinet adaptations, brackets, etc., so that you receive the best overall thermal solution the very first time...***PUT US TO THE TEST!***

For more information please contact the factory at ***978.687.8844*** or ***INFO@THERMATRONENG.COM.***