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Kodiak compressor-based recirculating chillers are the ideal solution when you need precise temperature control or cooling below ambient temperature. Kodiak chillers offer outstanding performance and high reliability as well as quiet operation and ease-of-use.

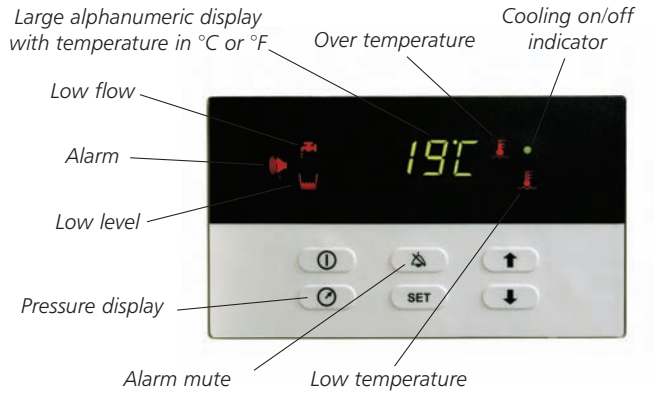
- **Precise temperature control:** Our custom PID controller and advanced refrigeration control circuit ensure that the Kodiak maintains ±0.1°C (0.2°F) stability.
- **Quiet operation:** The components inside the Kodiak have been performance-matched for quiet operation. In addition, vibration-isolation of the compressor (and pump in RC006–RC045) and foam padding on panels minimize vibration noise.
- **Many options and features:** The Kodiak was designed for flexibility—a wide variety of pumps, controllers, and additional safety and monitoring features allow you to tailor a Kodiak to your specific application.
- **High reliability:** We are so confident that our Kodiak chillers will provide years of trouble-free operation that we offer a 2-year warranty.
- **Advanced ergonomic design:** Our chillers look as good as the equipment they cool. Our industry-leading industrial design is as functional as it is attractive.
- **CE certified and ITSNA tested to UL 61010A-1 (RC006 – RC045) or MET tested to UL 1995 (RC095–RC115)**

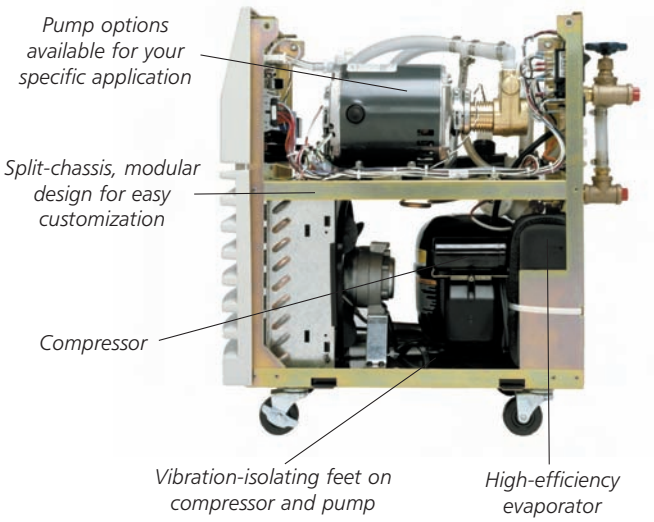
Custom Spotlight:

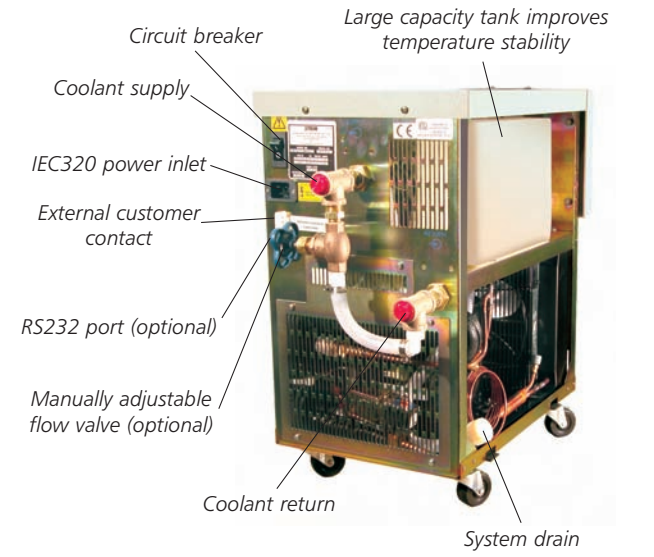
Lytron's custom products leverage existing standard products as well as previously designed custom products. Using these industry-proven technologies, we can reduce your time to market while giving you the customizations, quality, and reliability you need. This custom water-cooled chiller handles specialty cooling fluid and is MET and CE compliant.

See page 8 for more custom cooling systems.

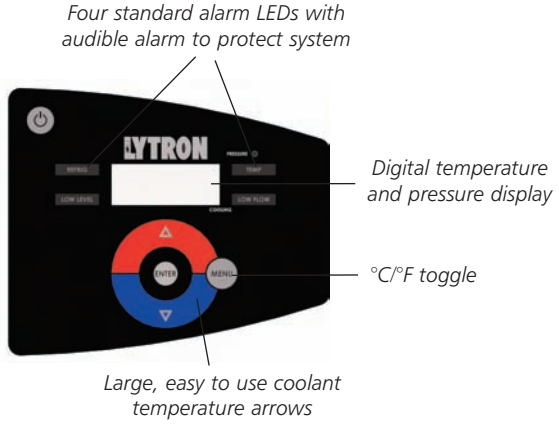
RC006 – RC045

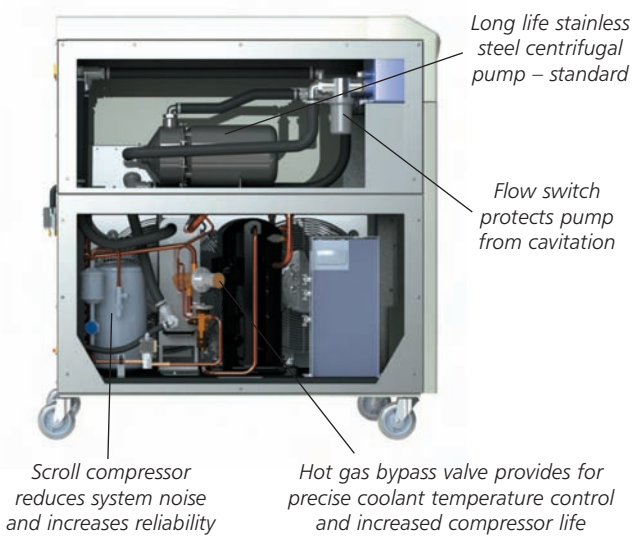


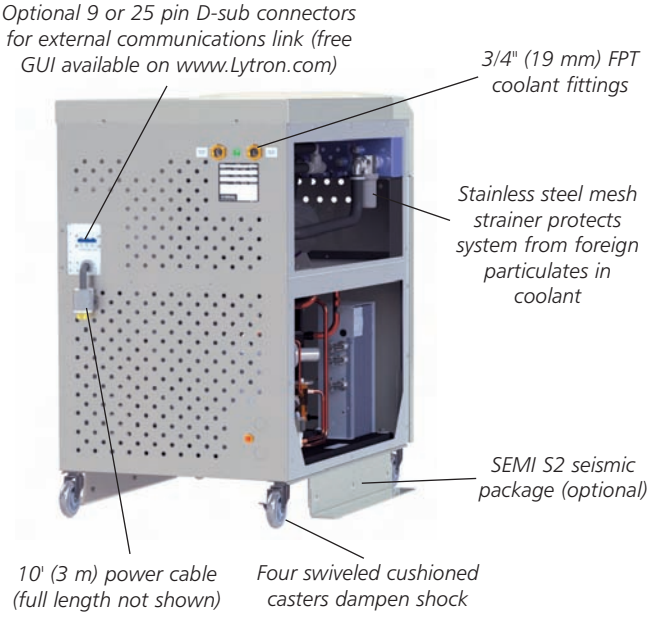




RC095 – RC115

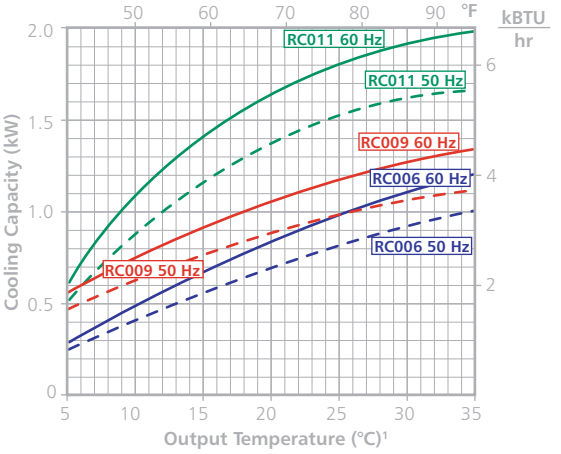




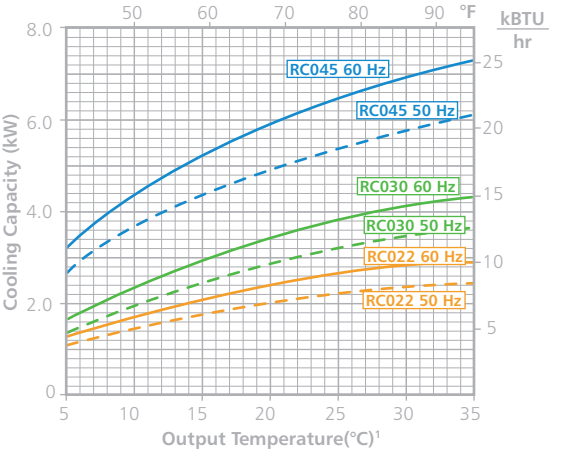


Thermal Performance Graphs

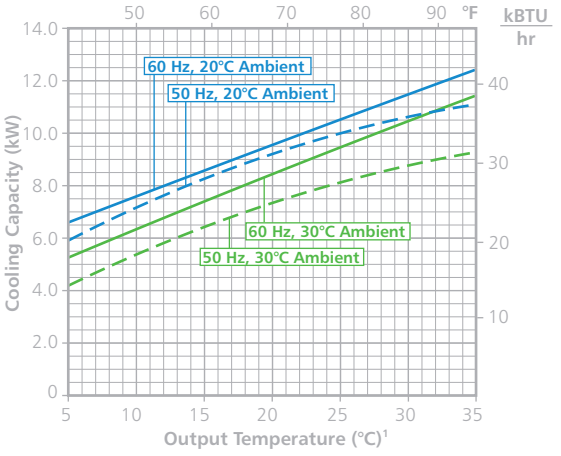
RC006-RC011 Performance



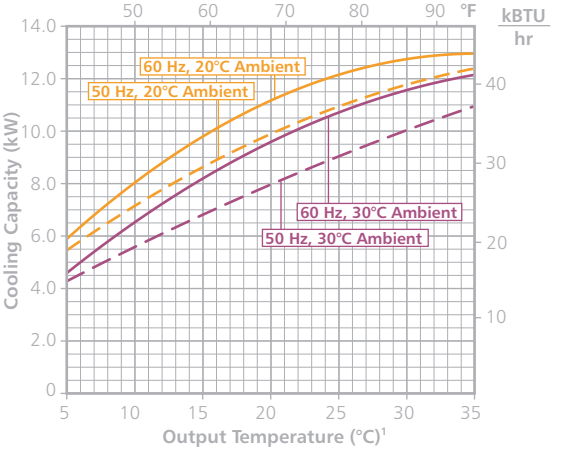
RC022-RC045 Performance



RC095 Performance



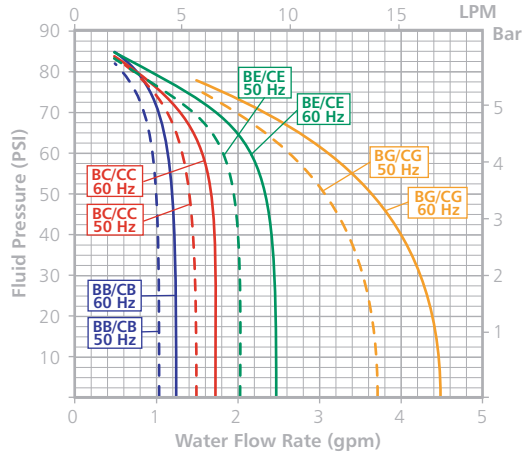
RC115 Performance



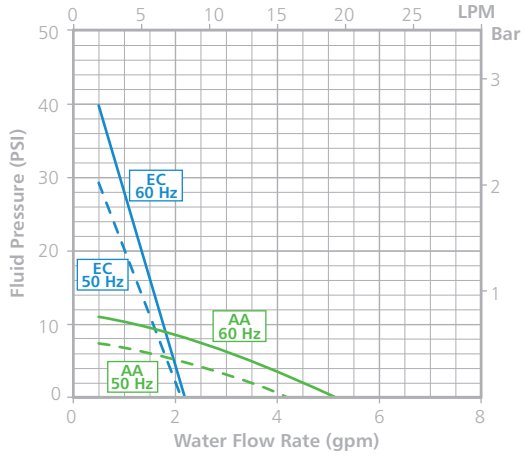
¹ Temperature represents output temperature of water assuming 20°C ambient air conditions. Performance subject to change due to variations such as fluid type or operating conditions.

System Pump Graphs[1]

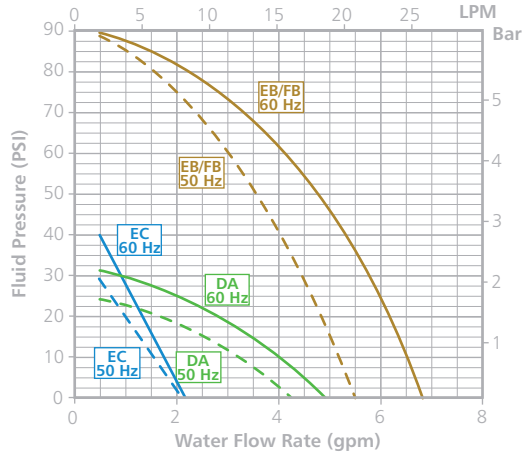
Kodiak Positive Displacement Pumps[2,3]



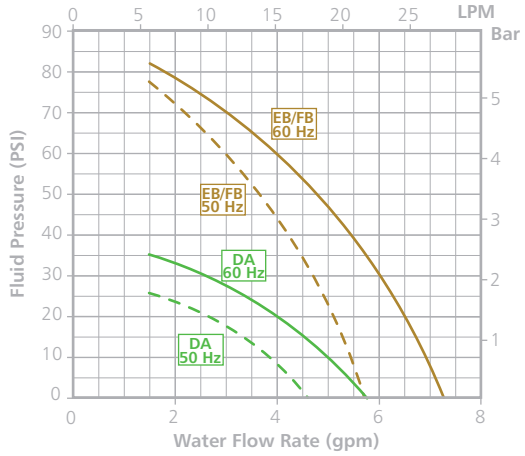
RC006-RC009 Centrifugal and Turbine Pumps



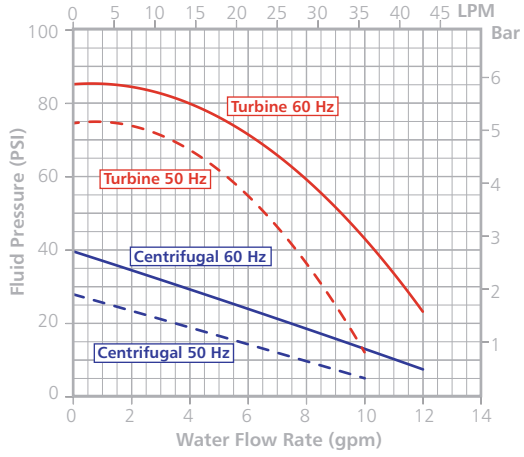
RC011-RC022 Centrifugal and Turbine Pumps



RC030-RC045 Centrifugal and Turbine Pumps



RC095-RC115 Centrifugal and Turbine Pumps



[1] Includes pressure drop through chiller. See pumps overview on www.Lytron.com for guidance on selecting a pump.

[2] Pressure relief is factory set at 90 psi (6.2 bar). Other settings available upon request.

[3] BG/CG pumps can be operated at flow rates as low as 0.5 gpm (1.9 lpm) for the RC011 and RC022.

First select your model number

Next, pick an electrical configuration

Now, select a pump

Continue on next page

		RC006	RC009	RC011	RC022	RC030	RC045	RC095	RC115
Cooling capacity[1]	W kBTU/Hr	825 2.8	1050 3.6	1650 5.6	2400 8.2	3450 11.8	5900 20.1	9600 32.7	11000 37.5
Compressor capacity	HP	¼	⅓	½	¾	1	1½	3½	
Temperature stability[1, 2]		± 0.1°C							
Fluid connections		½″ FNPT						¾″ FNPT	
Reservoir capacity		1 gal/4 liters		2 gal/8 liters		6 gal/23 liters		1.75 gal (6.5 liters)	
Coolant temperature range		40°F to 95°F/5°C to 35°C						39°F to 95°F/4°C to 35°C	
Ambient temperature range		50°F to 95°F/10°C to 35°C						41°F to 95°F/5°C to 35°C	
Dimensions (W x D x H)	inches mm	12.5 x 19.0 x 22.0 318 x 483 x 559		14.8 x 24.5 x 26.5 376 x 623 x 673		21.4 x 27.8 x 31.9 543 x 705 x 810		32.0 x 43.0 x 45.0 813 x 1092 x 1143	
Weight	dry lbs (kg)	97 (44)	100 (45)	122 (55)	166 (75)	260 (118)	270 (122)	517 (235)	
Electrical configurations and full load amperage[3]									
G03: 115V, 60 Hz, 1ph	Amps	9.9	12.2	14.3	n/a	n/a	n/a		
H03: 230V, 50 Hz, 1ph	Amps	4.5	5.3	6.3	9.5	13.7	17.2		
J03: 208/230V, 60 Hz, 1ph	Amps	n/a	5.8	7.4	10.0	14.5	19.6		
M01: 200-220V, 50 Hz, 3 ph; 208-230V, 60 Hz, 3 ph	Amps							22.2	22.2
R01: 460V, 60 Hz, 3 ph	Amps							11.0	11.0
T01: 380V, 50 Hz, 3 ph	Amps							11.0	11.0
Pump options (visit www.Lytron.com for guidance on selecting a pump; refer to page 17 for system pump graphs)									
BB: PDP[4], Brass, 1.3 gpm/4.9 lpm		●	●	●	●				
BC: PDP[4], Brass, 1.8 gpm/6.8 lpm		○	○	○	○				
BE: PDP[4], Brass, 2.3 gpm/8.7 lpm		○	○	○	○				
BG: PDP[4], Brass, 4.3 gpm/16.3 lpm				○	○	●	●		
CB: PDP[4, 5], Stainless Steel, 1.3 gpm/4.9 lpm		○	○	○	○				
CC: PDP[4, 5], Stainless Steel, 1.8 gpm/6.8 lpm		○	○	○	○				
CE: PDP[4, 5], Stainless Steel, 2.3 gpm/8.7 lpm		○	○	○	○				
CG: PDP[4, 5], Stainless Steel, 4.3 gpm/16.3 lpm				○	○	○	○		
AA: Centrifugal, 1/20 HP[6]		○	○						
DA: Centrifugal, ¼ HP[6]				○	○	○	○		
DF: Centrifugal, 1.5 HP[6]								●	●
EC: Turbine, ⅛ HP[6]		○	○	○	○				
EB: Turbine, ½ HP[6]				○	○	○	○		
ED: Turbine, Bronze, 1.5 HP[6]								○	○
FB: Turbine, Stainless Steel, ½ HP[6]				○	○	○	○		
FD: Turbine, Stainless Steel, 1.5 hp[6]								○	○

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Select your controller

	RC006	RC009	RC011	RC022	RC030	RC045	RC095	RC115
Controller options (visit www.Lytron.com for a full description of these options)								
Package 1[7]: Digital temperature display, calibration offset, low flow shut-off, auto-restart, °C/°F toggle.	○	○	○	○	○	○		
Package 2: Package 1 plus digital pressure sensing, low level, low/high temperature, pressure display, audible alarm and alarm mute, fault shut-off (toggle on/off), relay contacts.	●	●	●	●	●	●		
Package 3: Package 2 plus RS232.	○	○	○	○	○	○		
Package 4: Digital temperature and pressure display, low level, low/high temp, low/high refrigerant pressure visual/audible alarms, low coolant flow and low refrigerant pressure shut off, auto-restart, and °C/°F toggle.							●	●
Package 5: Same as Package 4 plus 25 pin D connector with DC signal for low flow, low level, low/high temperature alarms.							○	○
Package 6: Same as Package 4 plus 9 pin D connector with RS-232 communication.							○	○
Package 7: Same as Package 5 with RS-485 communication.							○	○
Package 8: Same as Package 5 with 4-20mA remote set point and retransmission.							○	○
Package 9: Same as Package 5 with 0-10VDC remote set point and retransmission.							○	○
Package A: Same as Package 4 plus RJ45 connector with Ethernet communication.							○	○

Add any additional options

Available options (visit www.Lytron.com for a full description of these options)								
External flow valve	○	○	○	○	○	○	○	○
External pressure relief valve	○	○	○	○	○	○	○	○
Anti-siphon system	○	○	○	○	○	○	○	○
Air filter	○	○	○	○	○	○	●	●
5 micron coolant filter[8,9]	○	○	○	○	○	○	○	○
Heater[10]			○	○	○	○		
Internal insulation package	○	○	○	○	○	○	○	○
Low temperature operation[11]		○	○	○	○	○	○	○
Water-cooled condenser			○	○	○	○	○	○
0.1°C set point	○	○	○	○	○	○		
Deionization package[8,12]	○	○	○	○	○	○	○	○
High purity plumbing	○	○	○	○	○	○	○	○
PAO compatibility			○[10]	○	○	○		
Remote start[13]	○	○	○	○	○	○	○	○
SEMI S2 and F47 compliance							○	○

● = standard ○ = available option [1] At 20°C setpoint, 20°C ambient, 60Hz input supply [2] Assumes stable load [3] With standard pump [4] PDP = Positive Displacement Pump [5] Only available with high purity plumbing [6] Actual flow rate depends on system pressure drop. See pumps overview on www.Lytron.com for information on how to calculate flow rate [7] 5 piece min order [8] Not available with AA and DA pump [9] For RC095 and RC115, ships loose to allow protection of the chiller or customer's equipment [10] Not available in G03 electrical configuration [11] Requires internal insulation package [12] Recommended when selecting higher purity option [13] Included in controller packages 5-9 and A

To arrive at a part number

RC011 G03 BB 2 M___

RC011 chiller with G03 (115V, 60 Hz, 1ph) electrical configuration, a BB pump, and controller package 2

Customization options (A 4 digit option code will be assigned at time of order, based on selected options. Leave blank if no additional options selected.)

Use our product selector at www.Lytron.com to automatically select the right chiller based on your specifications.

Selecting a Recirculating Chiller

Selecting the proper recirculating chiller is a function of four factors:

1. Heat load generated by the device being cooled (Q)
2. Maximum acceptable temperature of the fluid exiting the heat source (T_{OUT})
3. Fluid flow rate ($\dot{v}$)
4. Ambient operating conditions

Often, an equipment manufacturer will specify the cooling capacity, set point temperature, and flow rate of the required chiller. In this case, selecting a chiller is easy. Simply mark the intersection of the desired cooling capacity and the set point temperature on the chiller graph. Any chiller with a performance curve above or equal to this point will provide enough capacity. Next, use the pump graph to select a pump that meets the desired flow rate.

Example:
A chiller needs to supply 2 gpm at 20°C to an x-ray tube that generates 2,000 W of heat. The power supply is 60 Hz. Marking this point on the chiller graph (Fig 1) we can see that an RC022 would be an appropriate choice. From looking at the pump curves (Fig 2) we see that a BE pump would provide the necessary flow rate. For more examples, please visit www.Lytron.com.

Fig 1: RC022-RC045 Performance

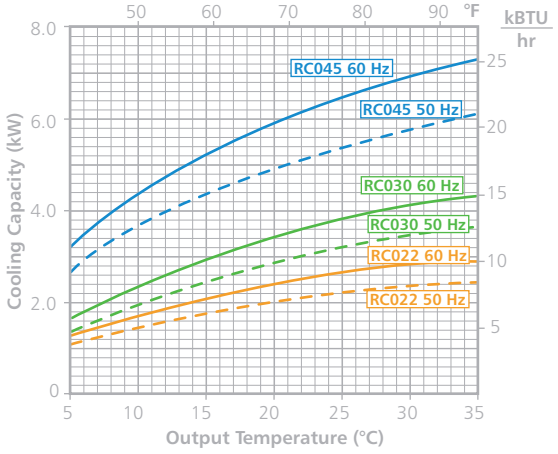
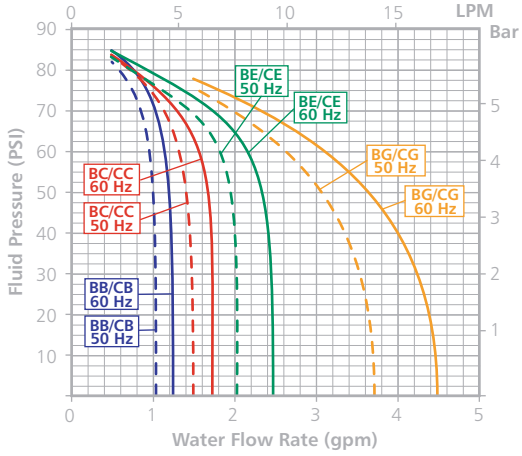
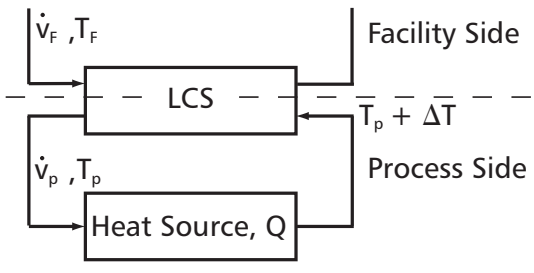


Fig 2: Kodiak Positive Displacement Pumps



Selecting a Liquid-to-Liquid Cooling System

In most LCS sizing applications, we know the temperature of the facility water (T_F), the desired process set point temperature (T_p), the flow rate through the process ($\dot{v}_p$) and the heat load of the process, Q. To determine the required capacity, Q/ITD, we first need to calculate the change in temperature, ΔT, through the process. We can do this either by using the heat capacity graphs found on www.Lytron.com or by solving the heat capacity equation:



$$Q = \dot{m} C_p \Delta T$$

Next, we calculate Q/ITD to find the required cooling capacity. Q is the process heat load. ITD, the Initial Temperature Difference, is the difference in temperature between the warm return water, (T_p+ ΔT), and the cold facility water (T_F).

$$\frac{Q}{ITD} = \frac{\dot{m} C_p \Delta T}{T_p + \Delta T - T_F}$$

Finally, refer to the LCS performance graph to determine the facility process flow rate required to achieve the calculated Q/ITD.

Example:

A solder reflow oven requires a process set point of 20°C. The heat load is 10 kW and the process water flow rate is 5 gpm. The facility water is at 10°C.

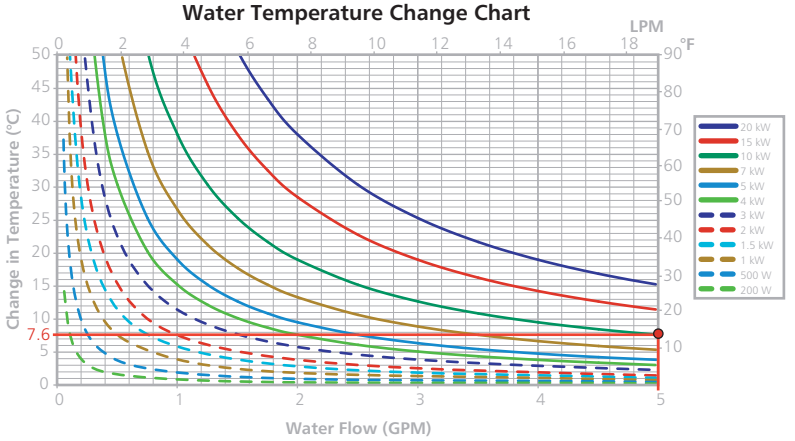
Using heat capacity graphs, which can be found on www.Lytron.com, we find that the ΔT through the process is approximately 7.6°C for the condition 10 kW at 5 gpm.

We can now solve for Q/ITD as follows:

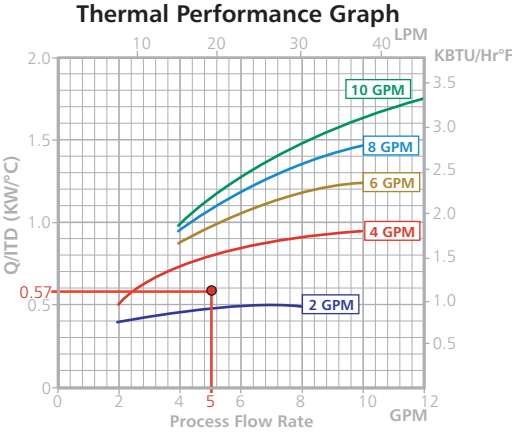
$$\frac{Q}{ITD} = \frac{10\ kW}{20°C + 7.6°C - 10°C} = 0.57\ \frac{kW}{°C}$$

Referencing the LCS performance graph, we can see that a facility flow rate above 2 gpm will meet the required performance.

Water Temperature Change Chart



Thermal Performance Graph



Selecting a Modular Cooling System (MCS)

To select the correct MCS, you first need to determine Q/ITD. Q is the heat load, and ITD is the Initial Temperature Difference, or the difference between the MCS liquid inlet temperature and the ambient air temperature. Then, using the MCS performance graph, draw a horizontal line at the calculated Q/ITD value and a vertical line at the process flow rate. If the intersection of those is on or below the system curve, it will meet the required thermal capacity. Finally, check that the pump will provide sufficient flow rate.

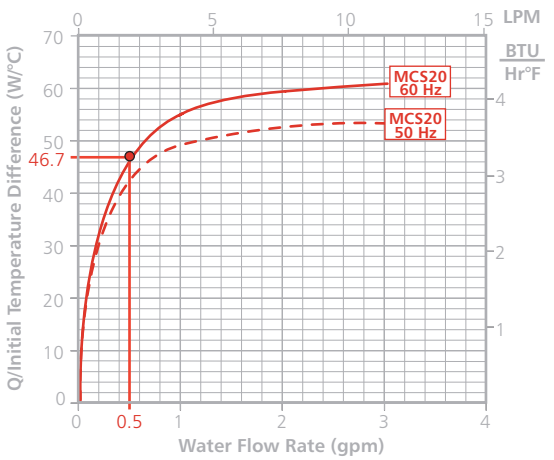
Example:

A laser produces 700 W of waste heat. The water temperature exiting the laser should be less than 35°C. Ambient room temperature is 20°C. The laser equipment requires a flow rate of at least 1 gpm. Which MCS system should be selected? First, determine Q/ITD:

$$Q/ITD = 700\ W/(35°C\text{-}20°C) = 46.7\ W/°C$$

Using the thermal performance graph, you can see that at flow rates above 0.5 gpm, the MCS20 will provide adequate performance. The standard BB pump offers a flow rate of 1.3 gpm so it will work well.

Thermal Performance



MCS Positive Displacement Pumps