AURACOOL ECONOMIZER TECHNOLOGY ®

Due to manufacturer's policy of continuous product improvement, the manufacturer reserves the right to make changes without notice. Drawings in this submittal are representations of the equipment shown. Contact the factory for specific unit drawings.

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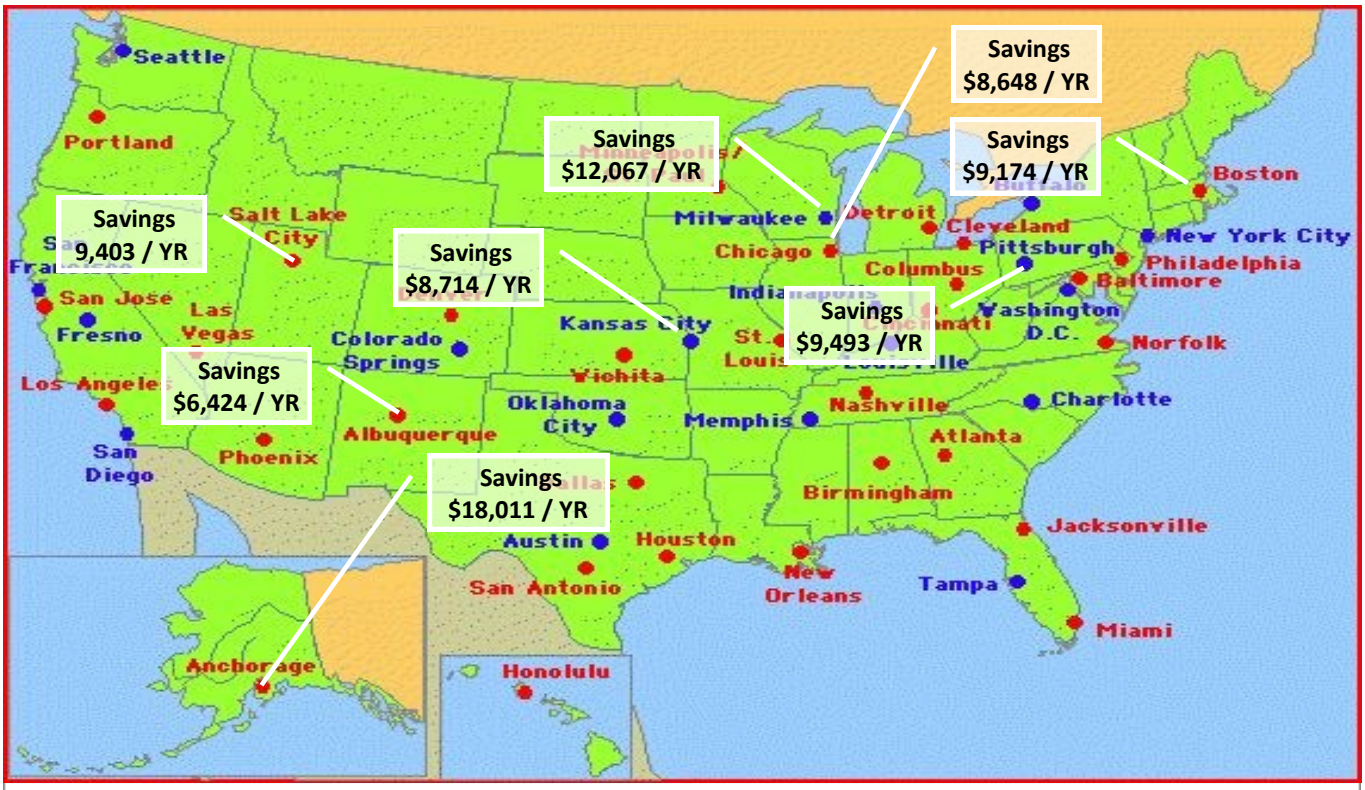
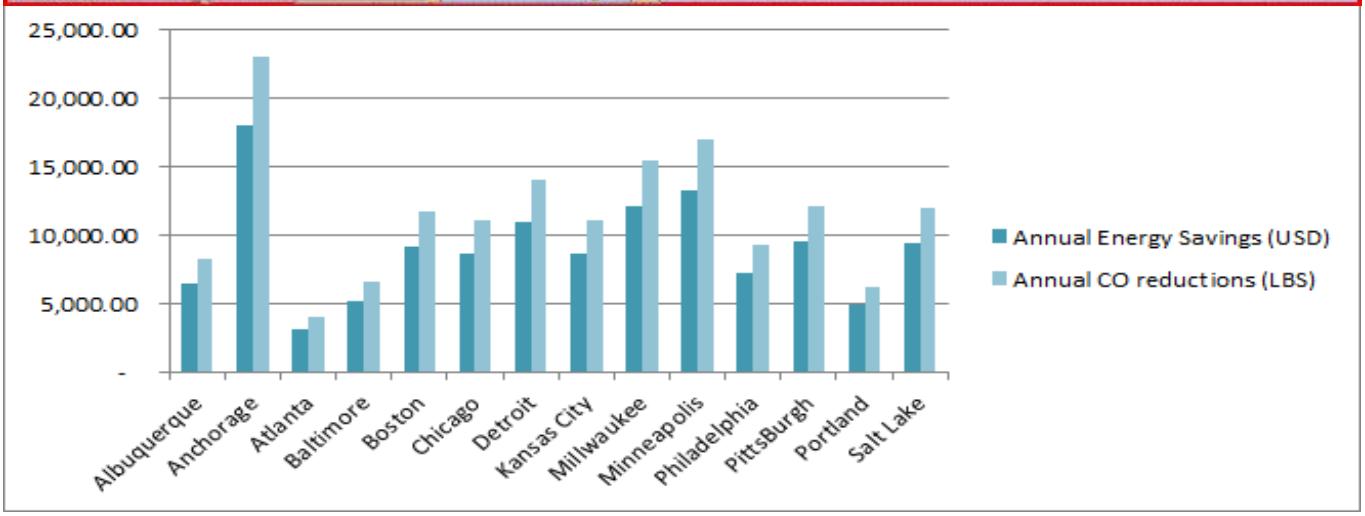
AURACOOL ECONOMIZER TECHNOLOGY ®

United States Savings Map





Research Criteria: Legacy AuraCool Model AES600-T5-R1, plumbed in a "Chiller Parallel" configuration connected to a Legacy PAC760D3-T5-Z package chiller equipped with Dual Copeland ZR380KCE Scroll compressors. Chiller running 40% P.G. with a process return of 55F (12.7 C). Site is a 24/7/365 operation with chiller loading ranging from 90% to 95%.

Data was calculated using Legacy's XL based Energy Audit tool (V2.2). Historical average high and low temperature data for each city was acquired by www.weather.com. **Free copies of Legacy's Chiller Energy Audit tool are available at www.legacychillers.com**

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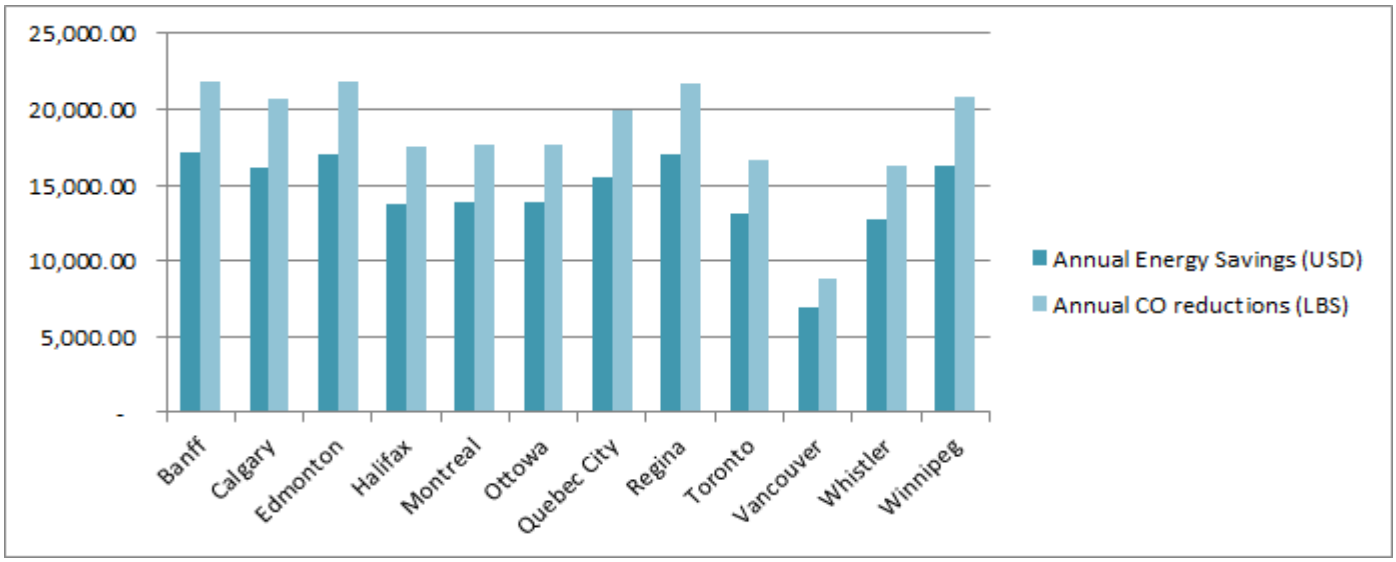
Canada Savings Map



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AURACOOL ECONOMIZER TECHNOLOGY®

Introduction

What is an Economizer?

The term Economizer, as used in the HVAC industry outlines the process of using a readily available cooling medium, such as outdoor air, to exchange heat at a low cost. The ultimate goal of an Economizer is to reduce the need to deploy higher cost cooling systems, such as refrigeration compressors, to achieve the cooling effect. In response to ever increasing electrical grid demand, many municipalities have mandated higher energy efficiencies for US businesses and this trend is sure to continue. Economizers have historically been a cost effective way to help meet such mandates while providing a good return on investment.

Legacy Chiller System's AuraCool Economizer System has transformed common fluid coolers to a new level by integrating the latest Bacnet digital control technology. Since Legacy's introduction of the Economizer System in 2007 customers have enjoyed KWH reductions up to 50% while dramatically reducing carbon footprint.

Why retrofit chillers with AuraCool Economizer Technology?

For process applications, chillers have been used for a variety of specialty and MISSION CRITICAL applications such as MRI, Lasers, Semiconductors, Advanced Military systems, Data Centers and Surgical Rooms.

One of the key advantages of using process chillers over direct expansion cooling is that chillers can offer enhancements in overall system efficiency while offering very tight temperature control.

Running parallel to popular air-side Economizers used in commercial air-conditioning, there is a new emerging market for chiller based (or water-side) Economizers. Until recently, deployment of Economizers on chillers have been limited to larger tonnage (150 tons and up) applications mainly due to costs associated with controlling the Economizer systems to deploy at the right time under optimal environmental conditions.

In early 2004, Legacy Chiller Systems took a close look at large scale production of Economizers for chiller applications. We found there was a market for deployment of Economizer technology on small to medium size chiller applications. After three years of product development, Legacy was successfully awarded a US Patent for process chiller based Economizer Systems. Since initially going to market with integrated Economizer systems as an option on production chillers, the demand for such technology has been impressive. In 2011, Legacy will introduce its AuraCool line of retrofit Economizer systems that can be used on any brand process chiller application with impressive R.O.I.

Industry Quotes

Data Center professionals must look beyond the short term-"the perception that designing for efficiency equates to a larger up-front investment"-and realize the big efficiency and cost picture: "the lower the PUE, the shorter the ROI on your investment"

Sun Microsystems, 2008

A water-side Economizer system can go a long way in achieving project design goals where an air-side Economizer is impractical for such applications as Data Centers, historic buildings, or where structural or aesthetic constraints are an issue.

Carl C. Schultz, P.E ,V.P. Advanced Engineering Consultants

AURACOOL ECONOMIZER TECHNOLOGY ®

Nomenclature

Example:	AES 70 T4 R1	
AES	Auracool Economizer System	
70	Nominal Capacity MBTUH	Ex . 70 = 70,000 BTUH, etc.
T4	Electrical Requirements:	S2 = 208-230/1/60 T3 = 208-230/3/60 T4 = 460-480/3/60 T5 = 575/3/60 T9 = 380/3/50
R1	Design Revision 1	

Notes:

1. Nominal capacity ratings are based on 55F entering glycol, 40F entering air. P.G. glycol at 40% concentration. For more information on performance under a variety of operating conditions, see capacity tables.
2. If you are new to the AuraCool Economizer product line, review ALL information provided in order to make the proper selections. If you have any questions contact Legacy Chiller System Engineering.

Selection Procedure

When researching any capital investment, care should be taken to select the correct equipment for the job. As with investments in energy efficiency, the decision maker must also consider return on investment or ROI. Since the AuraCool Economizer system uses outdoor air as an alternate cooling medium, as opposed to operating mechanical refrigeration, ever changing environmental and operating conditions can have a dramatic impact on savings.

Fortunately, Legacy Chiller Systems has developed a FREE Chiller Energy Audit tool to help our customers quickly determine the cost effectiveness of using AuraCool Economizer Technology. Using this tool, customers can input project specific data and quickly view output data such as estimated savings and carbon footprint reductions. To get a copy of the Chiller Energy Audit tool contact Legacy Chiller Systems at the number below or go to: http://www.legacychillers.com

Once you have downloaded and installed the Chiller Energy Audit tool, we recommend following these steps:

Step #1 - Determine your cooling needs: There are many applications for AuraCool Economizer Technology. One of the most common is to increase operating efficiency of an existing process chiller system. If this is the case, we recommend that you review purchase documents or contact the chiller manufacturer to find out the nominal cooling capacity of the equipment. If you have a custom application, we recommend that you contact Legacy's support line for assistance.

Step#2 - What's your process set-point?: Across the many potential applications for AuraCool Economizer Technology, your process fluid setpoint is key to creating savings opportunities. For example, an increase in your process set-point by only one degree F can increase Economizer performance as much as 10%. In this step, we recommend that you research your particular process application to determine the highest possible set-point. In some key markets, such as Data Centers, we have seen trends to increase process set-points that are creating new and significant AuraCool savings opportunities.

Step#3 - What's your current power consumption?: If you are currently using a mechanical cooling system (such as a chiller) to cool your process fluid, you will need to acquire the refrigeration compressor operating voltage and actual amp draw of your existing equipment. If your are considering AuraCool Economizer Technology for a new installation, you can consult the compressor manufacturer's website to determine amp draws under a variety of operating conditions.

Step#4 - What's your operating conditions?: Knowing your operating condition is very important. For example, if you run a 24/7 operation and expect to have constant supply of process fluid you will have significantly more energy savings opportunities compared to an 8-5, M-F operation. Within your operating hours, you also need to estimate average load on your current cooling system. In the case of a chiller, knowing how long your compressors are actually running is also valuable information.

Step#5 - What's your electrical company up to? Using a recent electrical bill, find out what you are currently paying for each Kilo-watt-hour (Kwh) you are using. It is also helpful to determine how your specific utility generates its power. For example, if your power supplier generates power using mainly coal, the GREEN benefits of AuraCool Economizer Technology would be significantly higher as compared to solar, wind or nuclear.

Step #6 - Using the Chiller Energy Audit tool : Once you have collected the information in steps 1 - 5, it's time to input your data into the Chiller Energy Audit tool. In just a few minutes you will have detailed potential energy savings and environmental impact data. NOTE: If you are not 100% sure of the numbers being generated by the Chiller Energy Audit Tool, call Legacy Support to go over your data. **We are here to help**.

Step #7 - Selecting AuraCool Economizer Technology: The final step is to use the data you have collected to select the proper AuraCool Economizer model to meet your needs. Using the latest AuraCool Economizer performance tables you have the information to select the ideal system to meet your needs.

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Standard Features and Options

Standard Features (all models)

- ETL Listed
- Delta DSC/DAC 1146E microprocessor controlled
- BACNET compatible
- RJ-45 Ethernet port connection for easy network connection
- Belimo 3-WAY mixing valve
- Heavy Duty, fuse protected control transformers
- Commercial / Industrial grade control I/O's
- Durable galvanized steel construction
- High efficiency copper tube aluminum fin coils
- Heavy Duty base frame with fork lift slots
- Factory performance tested

Available Options (most models)

- Delta HMI touch screen interface STANDARD firmware allowing easy onsite AuraCool Economizer performance review and edits.
- Delta HMI touch screen interface ENHANCED web server firmware. Connect your building's intranet to the HMI. Using a dedicated IP address and any standard Internet browser review and edit AuraCool Economizer performance from anywhere. Note, for access outside local gateway special firewall port forward will need to be programmed by building I.T. personnel.
- Legacy's ORCA LITE remote PC software package with USB security key
- Chiller interface card with input sensors

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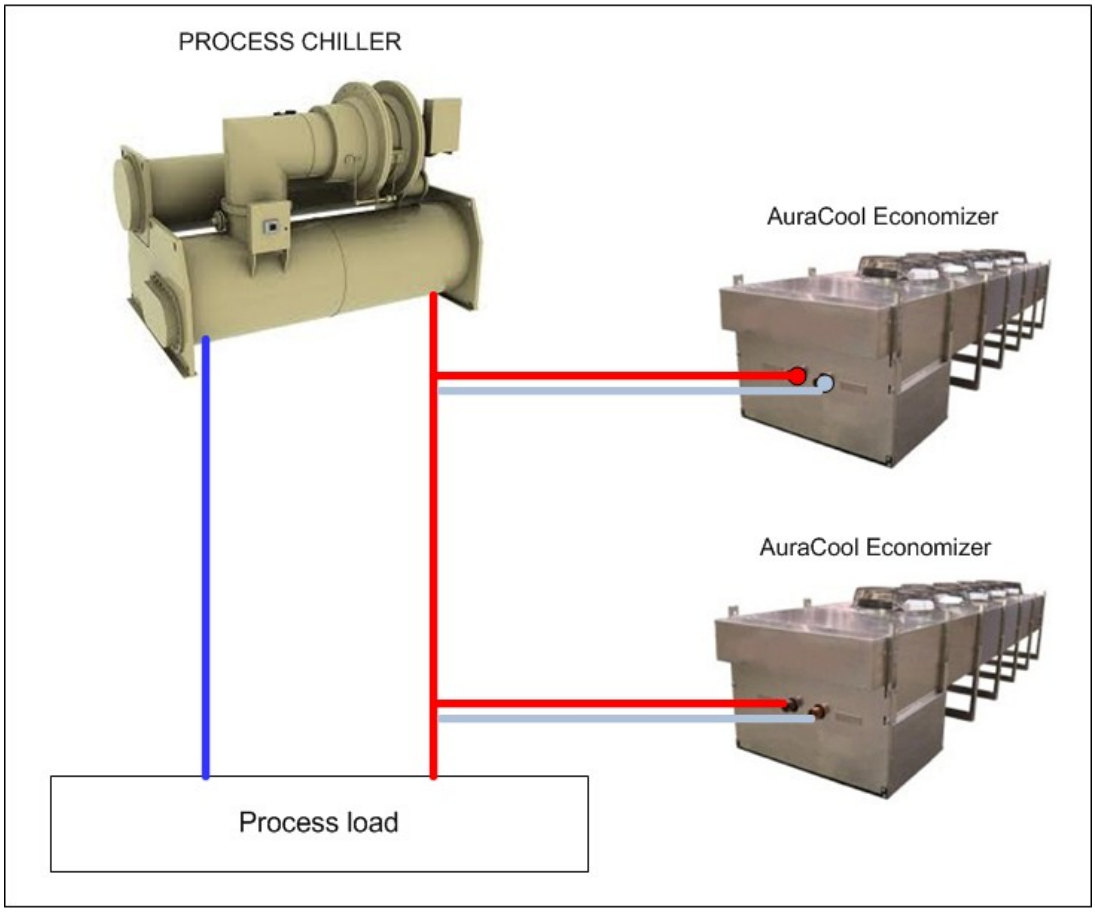
Typical System Layouts - Chiller Parallel



Parallel Configuration: Since the AuraCool Economizer system can potentially be retrofit onto any process chiller application, a parallel plumbing configuration can be ideal.

Additional items to consider for **PARALLEL** system layouts:

1. Estimated delta P calculations provided consider the AuraCool Economizer system ONLY. All other pressure drops including (but not limited to) chiller, process, piping, fittings and filters need to be accounted for when calculating externally mounted system pumps.
2. Selection of an optional booster pump should be considered to offset the Delta P of the AuraCool Economizer system.

Always consider working with a qualified mechanical engineer to assure proper AuraCool Economizer and booster pump selections.

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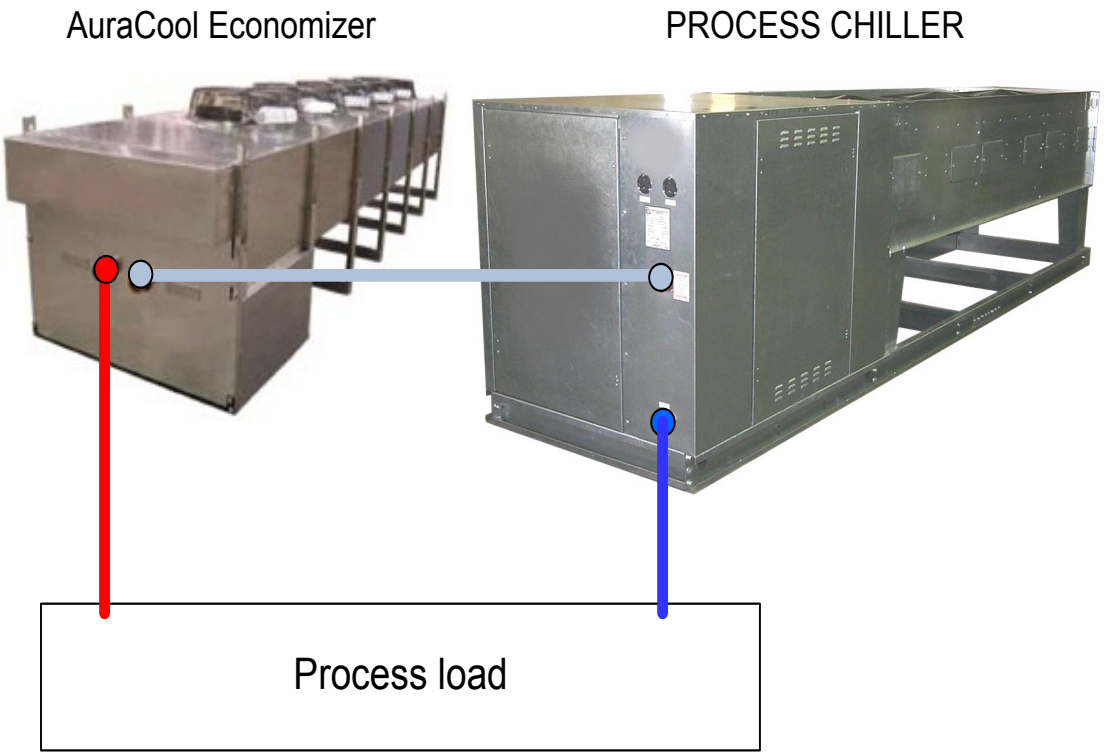
Typical System Layouts - Chiller Series



Series Configuration: For new design build projects, installing AuraCool Economizer Technology in series with process flow can be ideal provided Delta P through AuraCool is considered when selecting pumps. Please review Delta P tables for more information.

Additional items to consider for **SERIES** configuration:

1. During AuraCool valve change over between mechanical to economizer modes, variations in delta P through AuraCool will occur. Such variations can cause intermittent trips of chillers flow safety systems.
2. Estimated delta P calculations provided consider the AuraCool Economizer system ONLY. All other pressure drops including (but not limited to) chiller, process, piping, fittings and filters need to be accounted for when calculating externally located system pumps.
3. Selection of an AuraCool Economizer optional booster pump should be considered to offset the Delta P of the AuraCool system and to potentially boost flow should deficiencies exist in the external pumping system.

Always consider working with a qualified mechanical engineer to assure proper AuraCool Economizer and booster pump selections.

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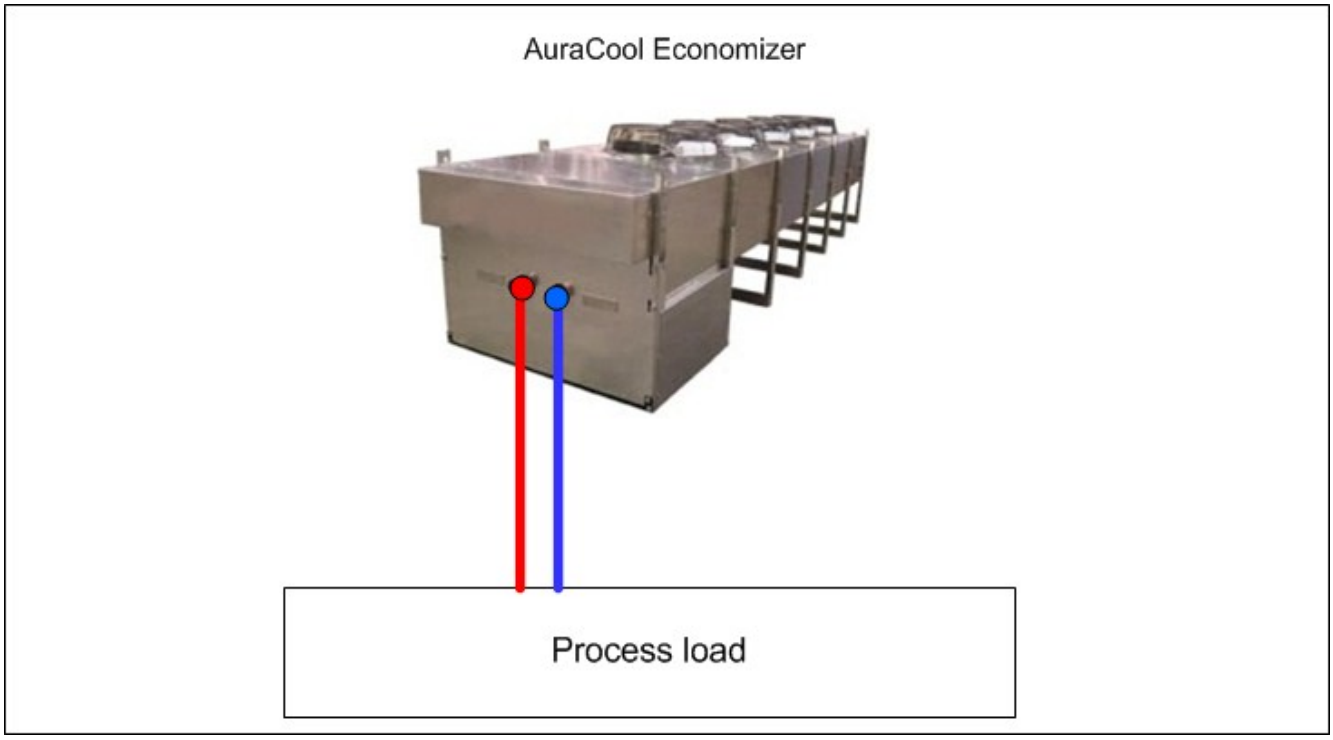
Typical System Layouts - Process Primary Cooling



Primary Cooling Configuration: For high temperature process applications AuraCool Economizers can also be used as a primary cooling system provided that adequate Delta T exists between the process and the outdoor ambient air temperature. Since an AuraCool Economizers do not use mechanical refrigeration, it can accommodate inlet temperatures much higher than a chiller.

Additional items to consider for **Primary Cooling Configuration** system layouts:

1. Estimated delta P calculations provided consider the AuraCool Economizer system ONLY. All other pressure drops including (but not limited to) chiller, process, piping, fittings and filters need to be accounted for when calculating externally mounted system pumps.
2. When selecting an optional booster pump for a primary cooling configuration designers must consider:

   A.External Pressure Drop: Booster pump selected must consider ALL external pressure drops.
   B.System Volume: Minimum system volume of 3.0 x nominal AuraCool GPM is recommended. For nominal AuraCool Economizer GPM (by model) consult Delta P tables.

Always consider working with a qualified mechanical engineer to assure proper AuraCool Economizer and booster pump selections.

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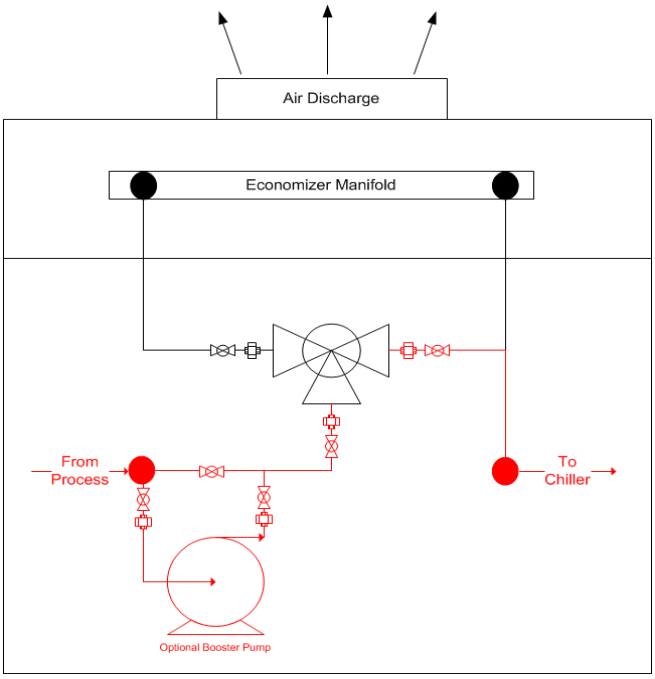
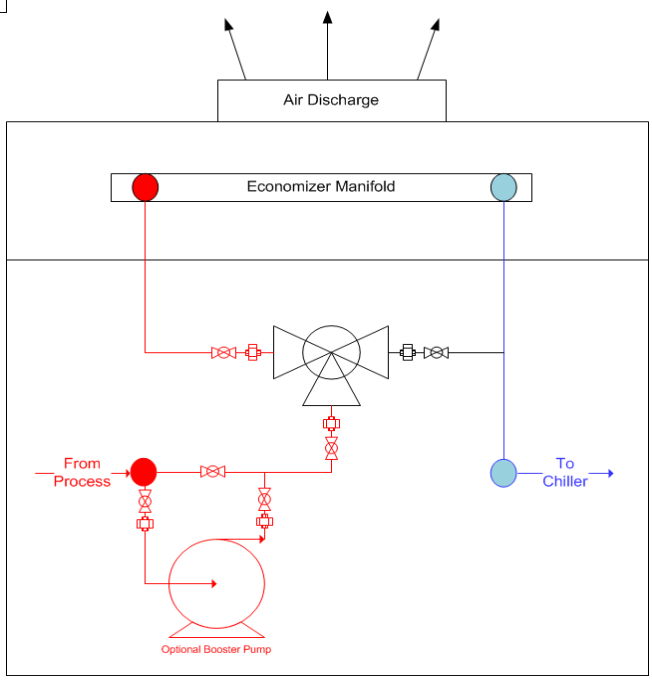
Basic Plumbing Diagram

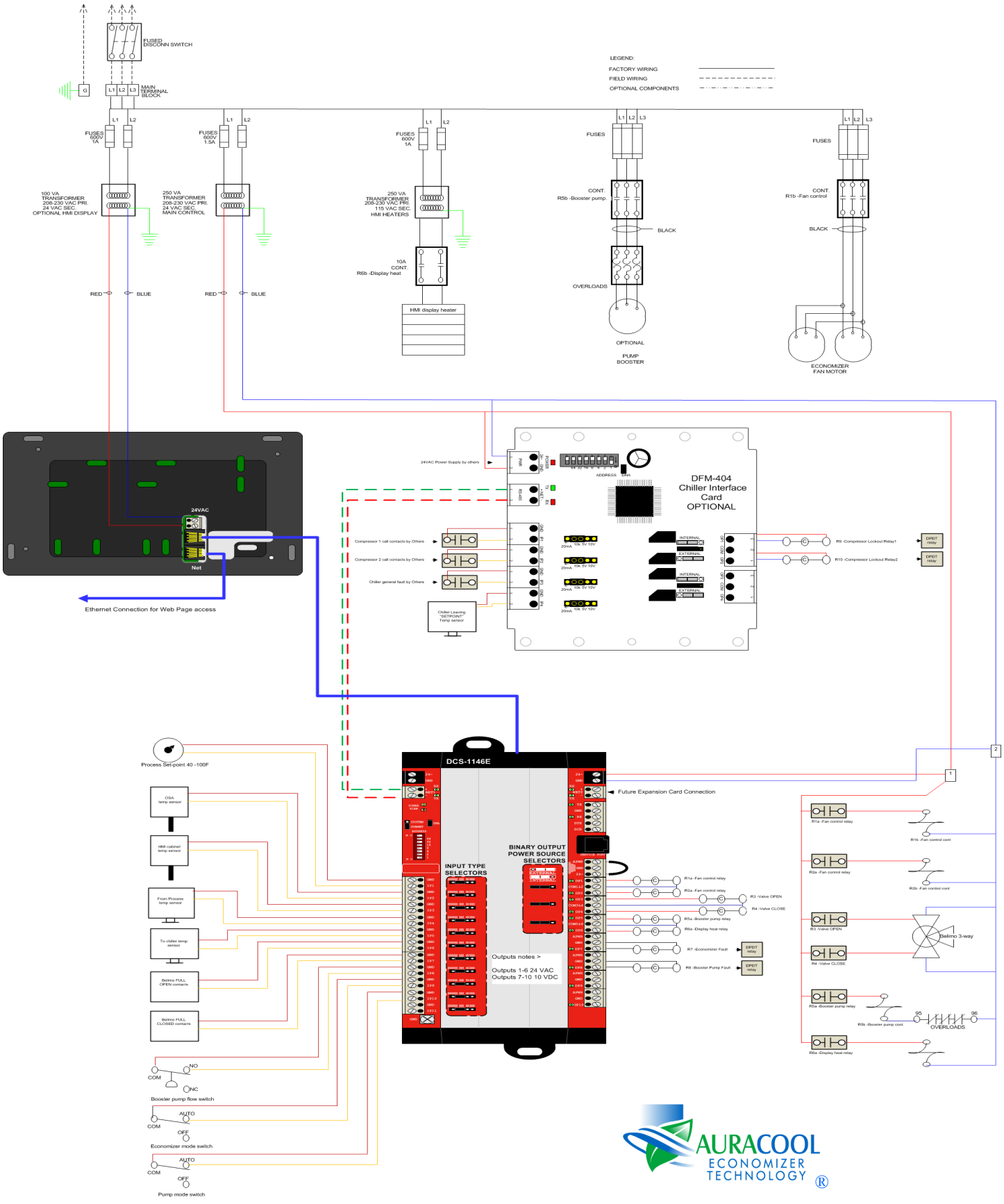


Mechanical Cooling Mode: The drawings to the LEFT shows the AuraCool Economizer running in mechanical cooling mode. When outdoor and process load conditions cannot provide an energy savings opportunity that exceed the operational cost to run powered devices, process fluid will simply continue down the chiller return line.

Economizer Mode: The drawings to the RIGHT shows AuraCool running in Economizer mode. When outdoor and process conditions provide an energy savings opportunity that exceed the operational cost to run powered devices, process fluid is automatically diverted from the chiller return line to exchange heat with ambient air. When in Economizer mode, all aspects of performance are stored within the AuraCool's advanced power electronics. Savings data can be recalled using Legacy's optional BacNet desktop interface of HMI touch pad.



Basic Electrical Diagram



Dimensional and Electrical Specifications

MODEL AES-	(1) BTUH	CFM	(2) Flow Rate	(3) Delta PSI	LENGTH IN.	WIDTH IN.	HEIGHT IN.	FLUID CONN.	ECONOMIZER FAN(S) QTY	HP	FLA	MCA	MOP	WT. LBS
50-S2-R1	52,125	6,450	13	7.6	71	43	62	1.5" FPT	1	.50	3.9	15	15	371
50-T3-R1										.33	2.6			
50-T4-R1										.33	1.3			
120-S2-R1	120,875	20,500	30	6.1	185	43	62		3	.5	11.7	15	15	807
120-T3-R1										.33	7.8			
120-T4-R1										.33	3.9			
150-T3-R1	152,450	21,900	38	4.1	172	45	56	2.0" FPT	2	1.5	7.0	16	30	1,154
150-T4-R1											3.5	15	15	
200-T3-R1	198,500	20,700	50	5.7				2.5" FPT			7.0	16	30	1,257
200-T4-R1											3.5	15	15	
280-T3-R1	288,000	31,800	72	10.2	219				3		7.0	23	30	1,771
280-T4-R1											3.5	15	20	
385-T3-R1	386,750	42,400	97	6.3	288				4		7.0	30	45	
385-T4-R1											3.5	15	20	2,357
480-T3-R1	481,250	67,000	120	10.6	219	88			6		7.0	44	60	3400
480-T4-R1											3.5	22	30	
600-T3-R1	601,500	74,500	151	10.3	291				8		7.0	58	70	4,485
600-T4-R1											3.5	29	35	
735-T3-R1	737,250	71,310	185	10.5							7.0	58	70	4828
735-T4-R1											3.5	29	35	
850-T3-R1	859,750	124,400	215	9.2	426				12		7.0	86	100	7,529
850-T4-R1											3.5	43	50	

(1) All BTUH ratings are based on 55F inlet, 40F ambient, 30% propylene glycol (PG). (2) Nominal flow rate (GPM) is 3.0 times nominal cooling tonnage. (3) Delta P is calculated using standards of (1) & (2).

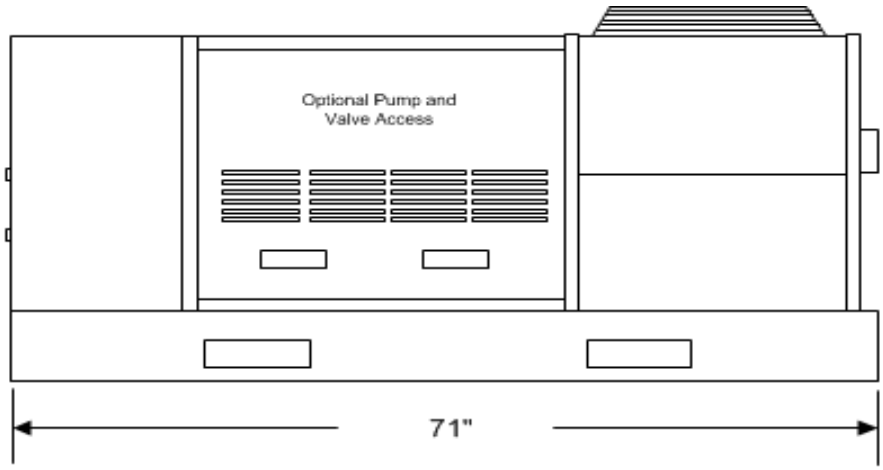
AURACOOL ECONOMIZER TECHNOLOGY ®

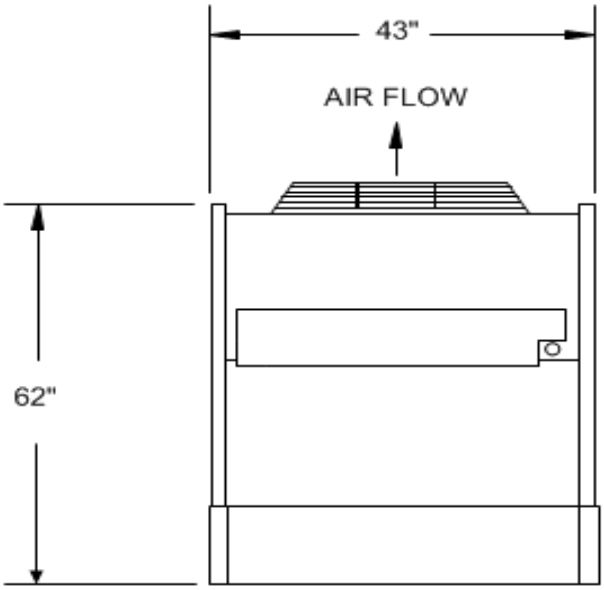
List Pricing

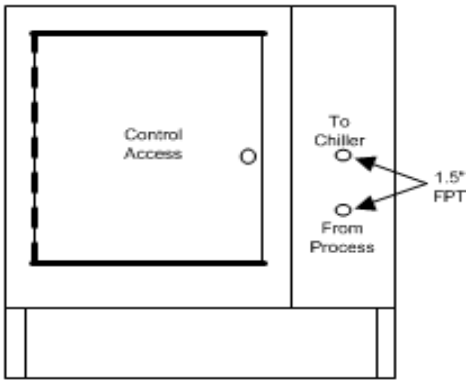
AuraCool Economizer Systems										
Legacy Model#	AES-50	AES-120	AES-150	AES-200	AES-280	AES-385	AES-480	AES-600	AES-735	AES-850
Standard Model List Price	10,635.66	15,427.03	17,805.34	21,595.97	26,272.69	32,183.47	41,811.48	54,459.76	62,424.43	87,421.31
Factory Installed Options										
Booster Pump - 3/4 HP (1MS - Curve D)	$ 1,375.00	$ 1,375.00								
Booster Pump - 1.0 HP (1MS - Curve C)	$ 1,550.00	$ 1,550.00	$ 1,550.00							
Booster Pump - 1.5 HP (1MS - Curve B)	$ 1,778.00	$ 1,778.00	$ 1,778.00	$ 1,778.00	$ 1,778.00					
Booster Pump - 2.0 HP (1MS - Curve A)	$ 2,125.00	$ 2,125.00	$ 2,125.00	$ 2,125.00	$ 2,125.00					
Booster Pump - 3.0 HP (2MS - Curve A)	$ 2,245.00	$ 2,245.00	$ 2,245.00	$ 2,245.00	$ 2,245.00	$ 2,245.00	$ 2,245.00	$ 2,245.00	$ 2,245.00	
Booster Pump - 5.0 HP (2MS - Curve G)	$ 2,775.00	$ 2,775.00	$ 2,775.00	$ 2,775.00	$ 2,775.00	$ 2,775.00	$ 2,775.00	$ 2,775.00	$ 2,775.00	$ 2,775.00
Booster Pump - 7.5 HP (7SH - Curve E)			$ 3,525.00	$ 3,525.00	$ 3,525.00	$ 3,525.00	$ 3,525.00	$ 3,525.00	$ 3,525.00	$ 3,525.00
Booster Pump - 10 HP (7SH - Curve C)				$ 4,275.00	$ 4,275.00	$ 4,275.00	$ 4,275.00	$ 4,275.00	$ 4,275.00	$ 4,275.00
Graphical Touchpad Interface - Standard	$ 1,475.00	$ 1,475.00	$ 1,475.00	$ 1,475.00	$ 1,475.00	$ 1,475.00	$ 1,475.00	$ 1,475.00	$ 1,475.00	$ 1,475.00
Graphical Touchpad Interface - Enhanced	$ 1,845.00	$ 1,845.00	$ 1,845.00	$ 1,845.00	$ 1,845.00	$ 1,845.00	$ 1,845.00	$ 1,845.00	$ 1,845.00	$ 1,845.00
PC graphics Package with USB KEY	$ 425.00	$ 425.00	$ 425.00	$ 425.00	$ 425.00	$ 425.00	$ 425.00	$ 425.00	$ 425.00	$ 425.00
Additional USB KEYS each	$ 85.00	$ 85.00	$ 85.00	$ 85.00	$ 85.00	$ 85.00	$ 85.00	$ 85.00	$ 85.00	$ 85.00
Chiller Interface Card with chiller LWT sensor	$ 695.00	$ 695.00	$ 695.00	$ 695.00	$ 695.00	$ 695.00	$ 695.00	$ 695.00	$ 695.00	$ 695.00

(1) All BTUH ratings are based on 55F inlet, 40F ambient, 40% propylene glycol (PG). (2) Nominal flow rate (GPM) is 3.0 times nominal cooling tonnage. (3) Delta P is calculated using standards of (1) & (2).

Submittal Drawings
Model: AES-50

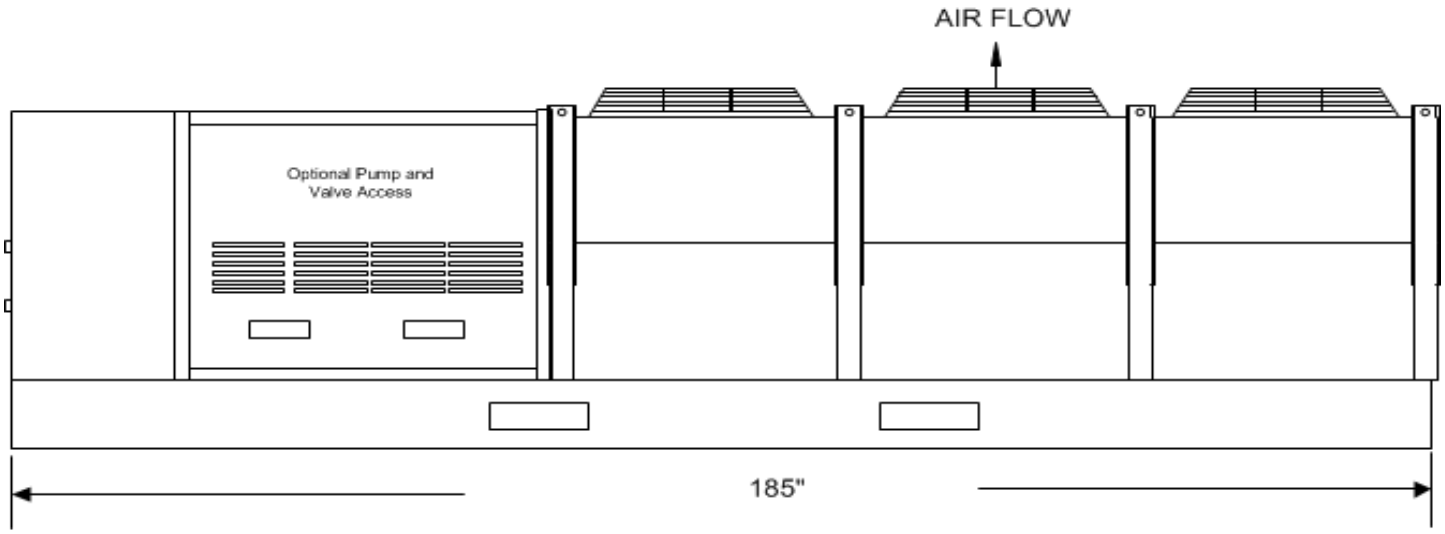


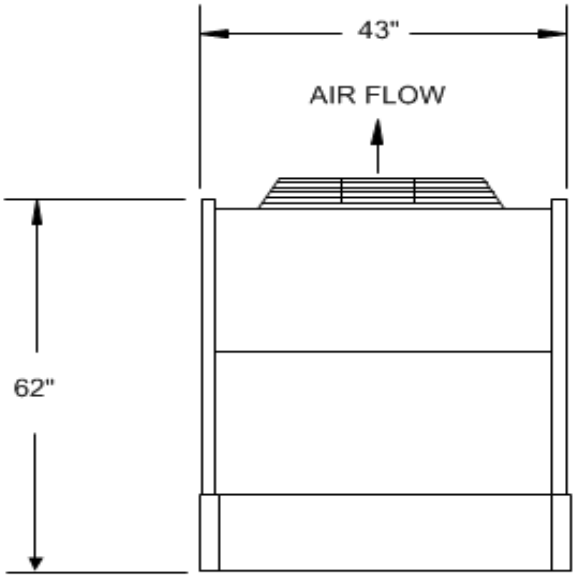


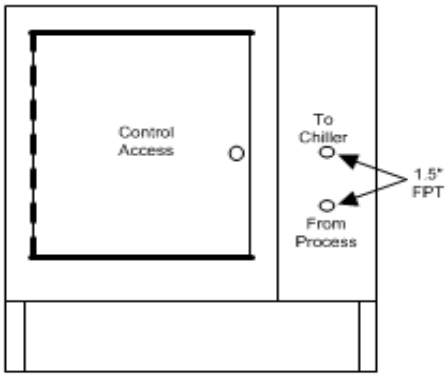


AURACOOL ECONOMIZER TECHNOLOGY ®	LEGACY CHILLER SYSTEMS				
	AuraCool Economizer System Mo#AES-50				
Drawn by: MKing	SIZE	FSCM NO	DWG NO		REV 1
Copyright – Legacy Chiller Systems 2011	SCALE	Not to scale		SHEET	1 OF 1

Submittal Drawings
Model: AES-120

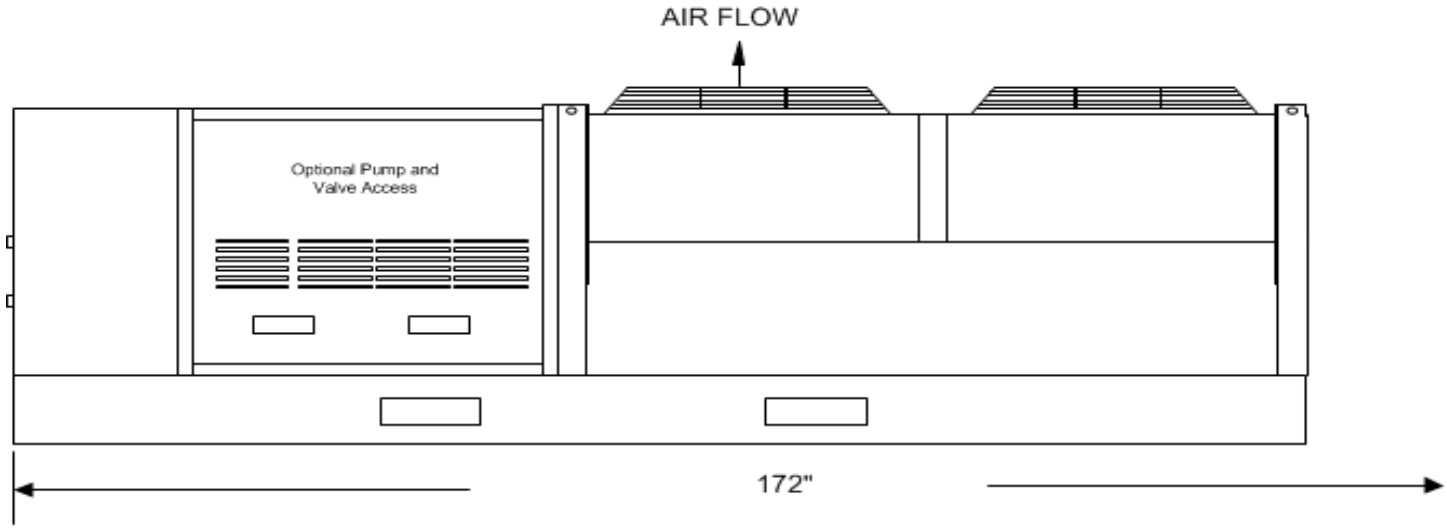


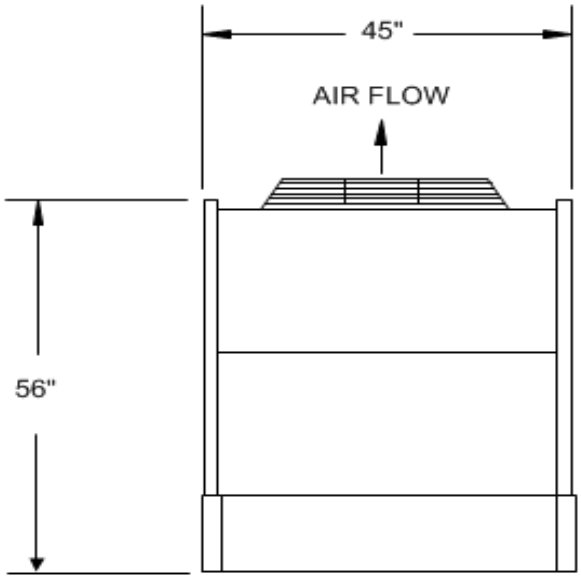


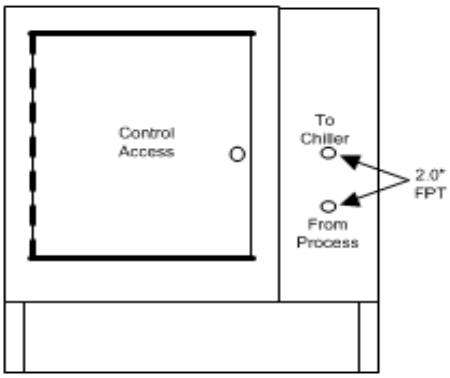


AURACOOL ECONOMIZER TECHNOLOGY ®	LEGACY CHILLER SYSTEMS AuraCool Economizer System Mo#AES-120			
Drawn by: MKing	SIZE	FSCM NO	DWG NO	REV 1
Copyright – Legacy Chiller Systems 2011	SCALE Not to scale		SHEET 1 of 1	

Submittal Drawings
Model: AES-150

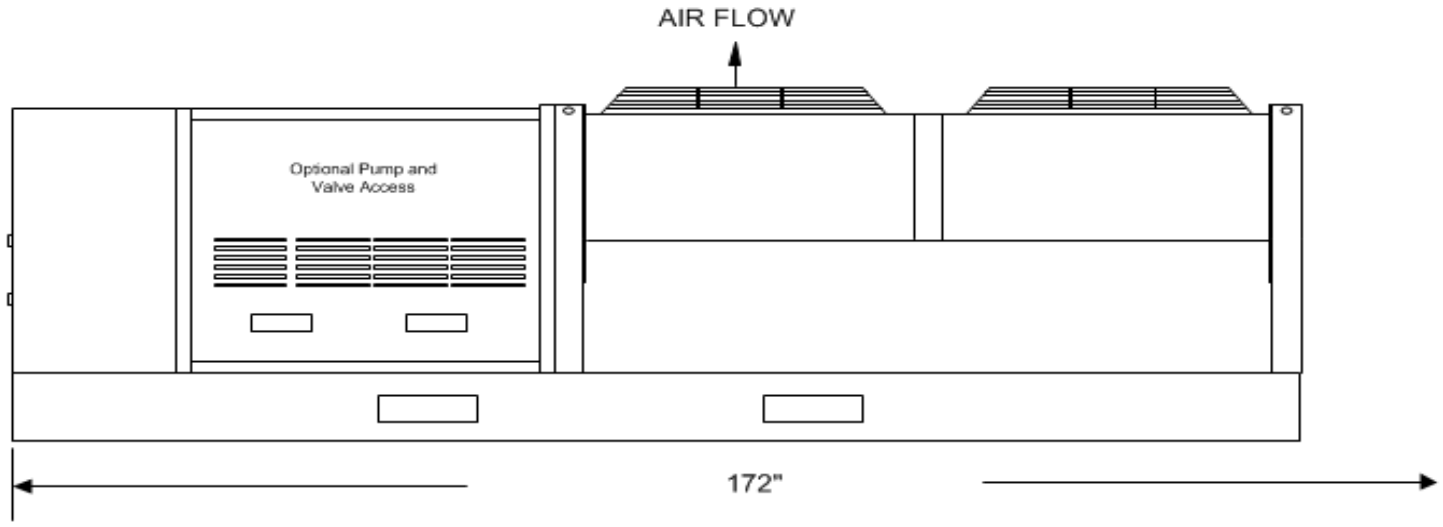


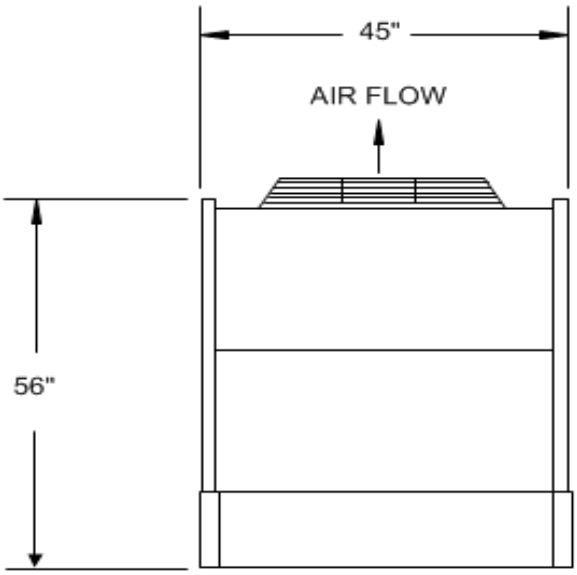


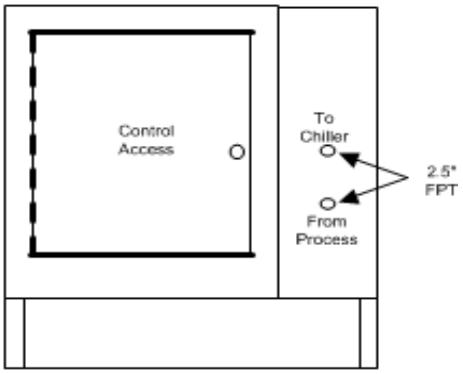


AURACOOL ECONOMIZER TECHNOLOGY ®	LEGACY CHILLER SYSTEMS AuraCool Economizer System Mo#AES-150			
Drawn by: MKing	SIZE	FSCM NO	DWG NO	REV 1
Copyright – Legacy Chiller Systems 2011	SCALE Not to scale			SHEET 1 of 1

Submittal Drawings
Model: AES-200







AURACOOL ECONOMIZER TECHNOLOGY®	LEGACY CHILLER SYSTEMS AuraCool Economizer System Mo#AES-200			
Drawn by: MKing	SIZE	FSCM NO	DWG NO	REV 1
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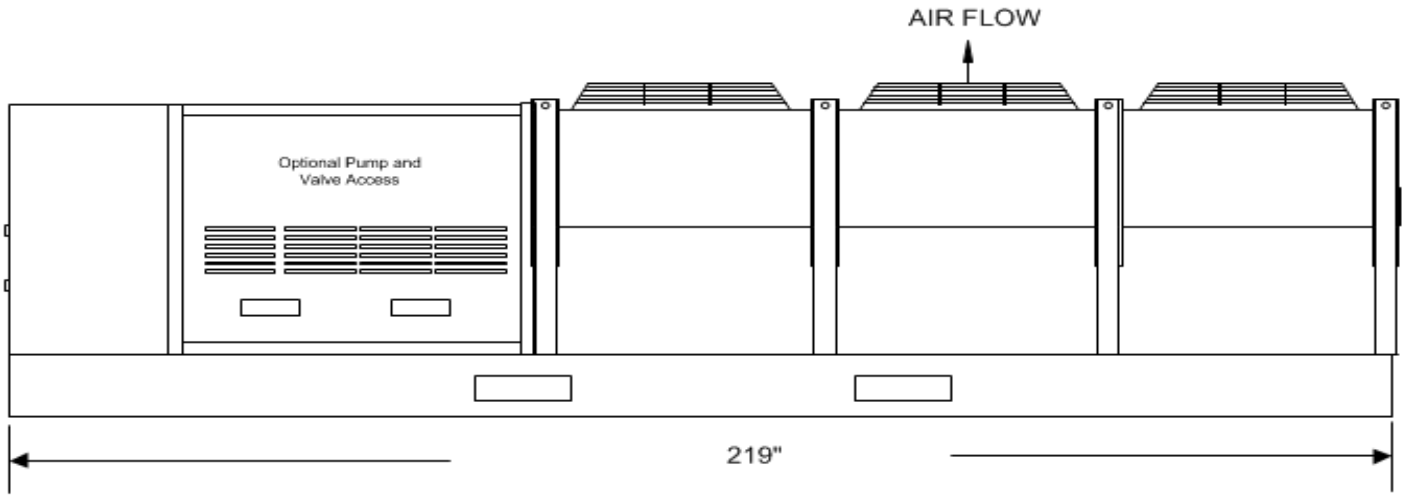
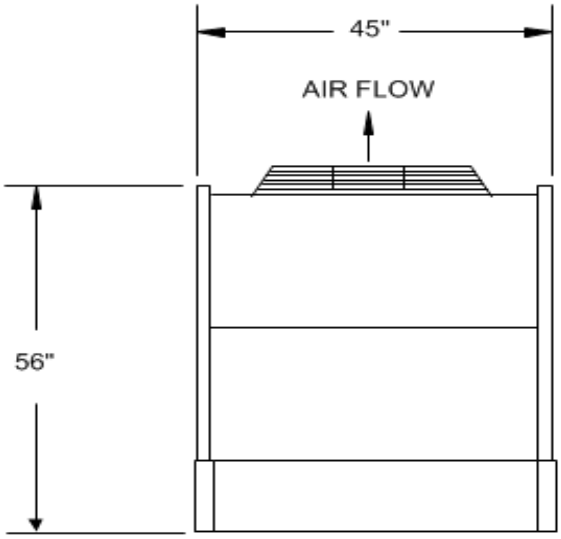
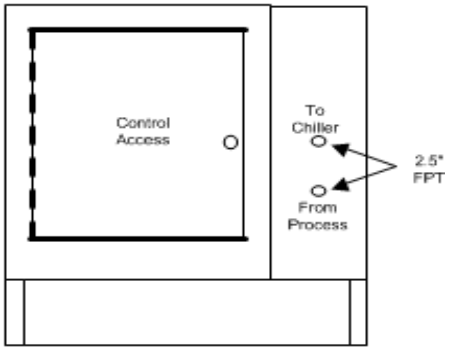
Submittal Drawings
Model: AES-280







AURACOOL ECONOMIZER TECHNOLOGY ®	LEGACY CHILLER SYSTEMS				
	AuraCool Economizer System Mo#AES-280				
Drawn by: MKing	SIZE	FSCM NO	DWG NO		REV 1
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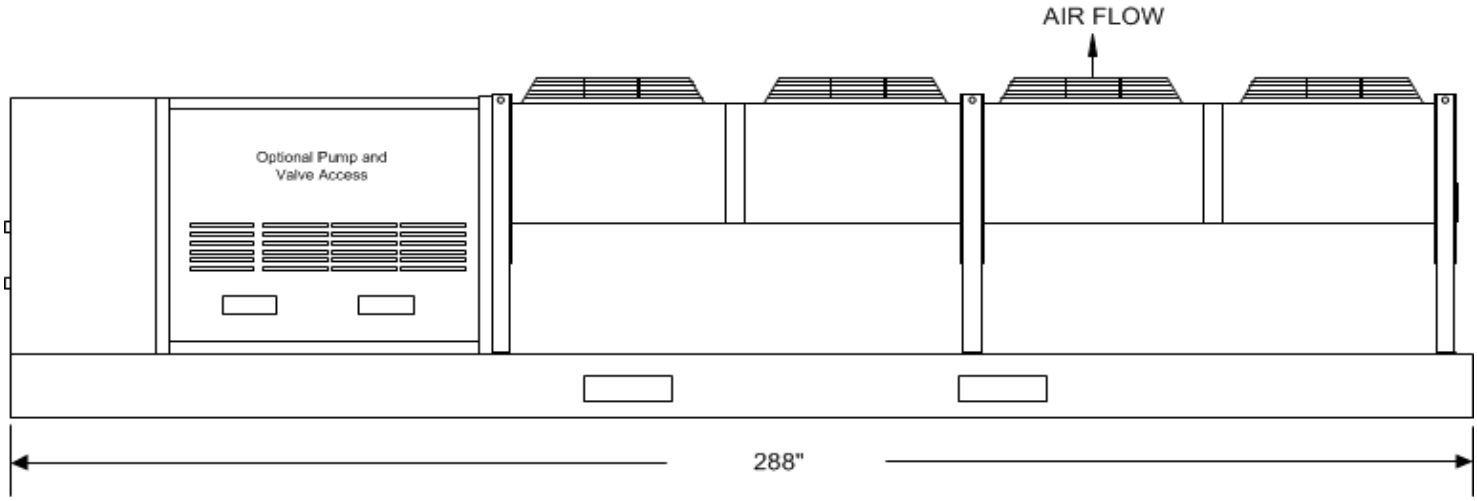
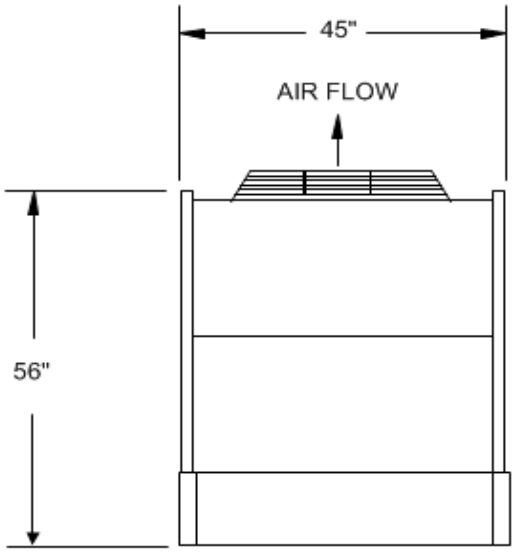
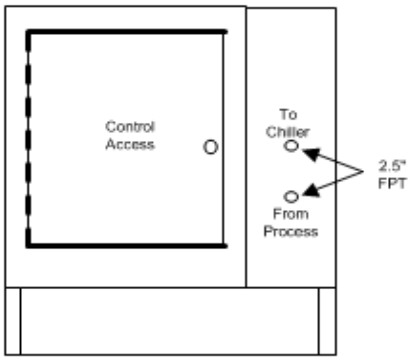
Submittal Drawings
Model: AES-385







AURACOOL ECONOMIZER TECHNOLOGY ®	LEGACY CHILLER SYSTEMS				
	AuraCool Economizer System Mo#AES-385				
Drawn by: MKing	SIZE	FSCM NO	DWG NO		REV 1
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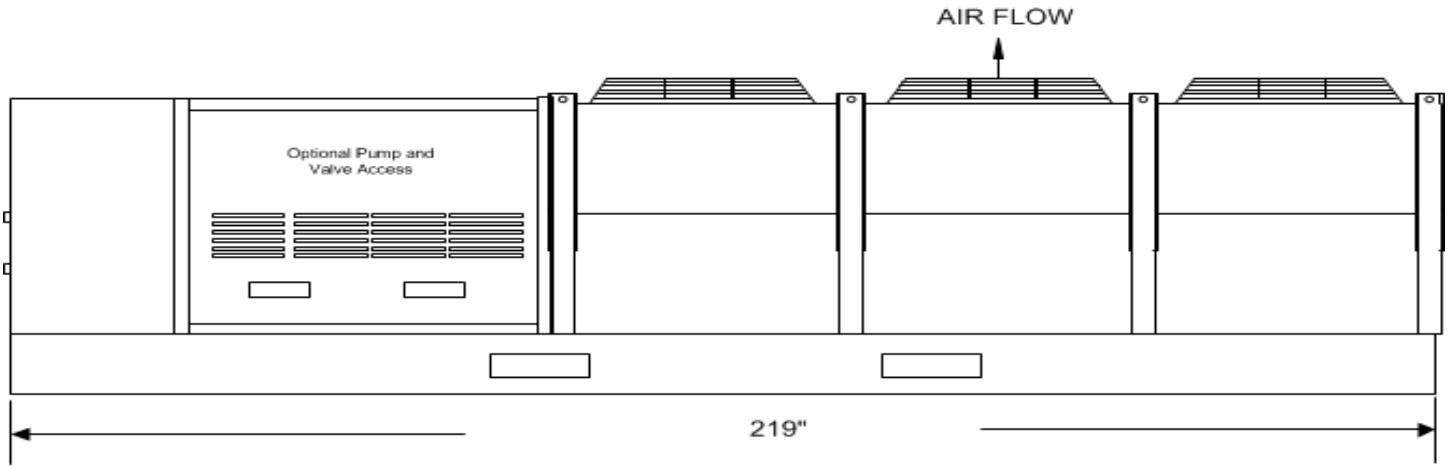
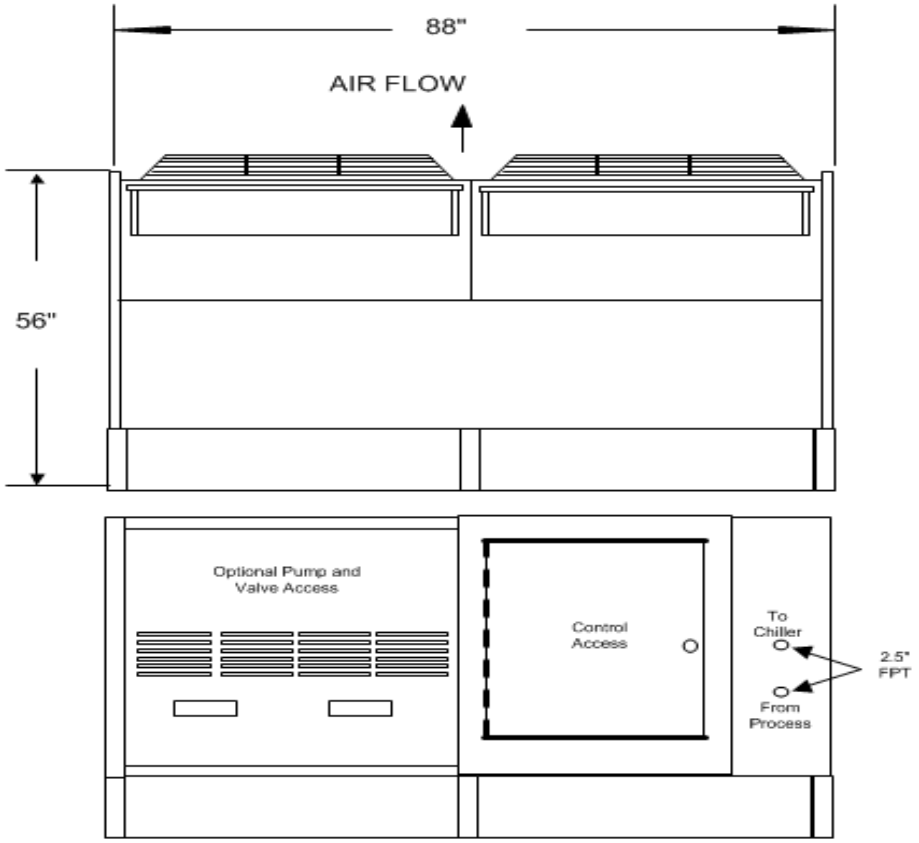
Submittal Drawings
Model: AES-480





AURACOOL ECONOMIZER TECHNOLOGY ®	LEGACY CHILLER SYSTEMS — AuraCool Economizer System Mo#AES-480			
Drawn by: MKing	SIZE	FSCM NO	DWG NO	REV 1
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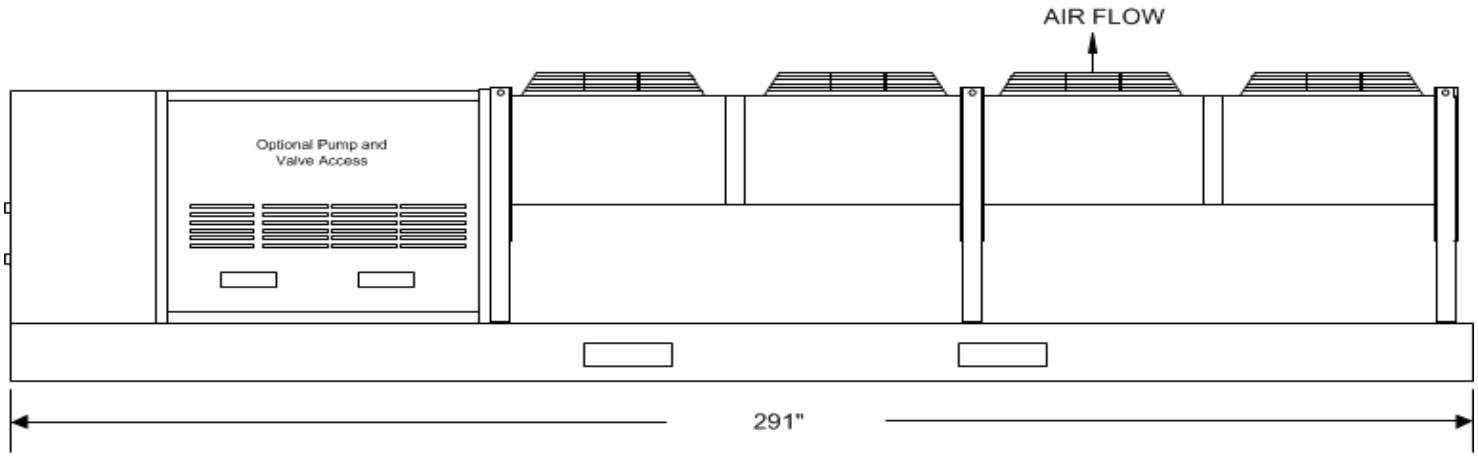
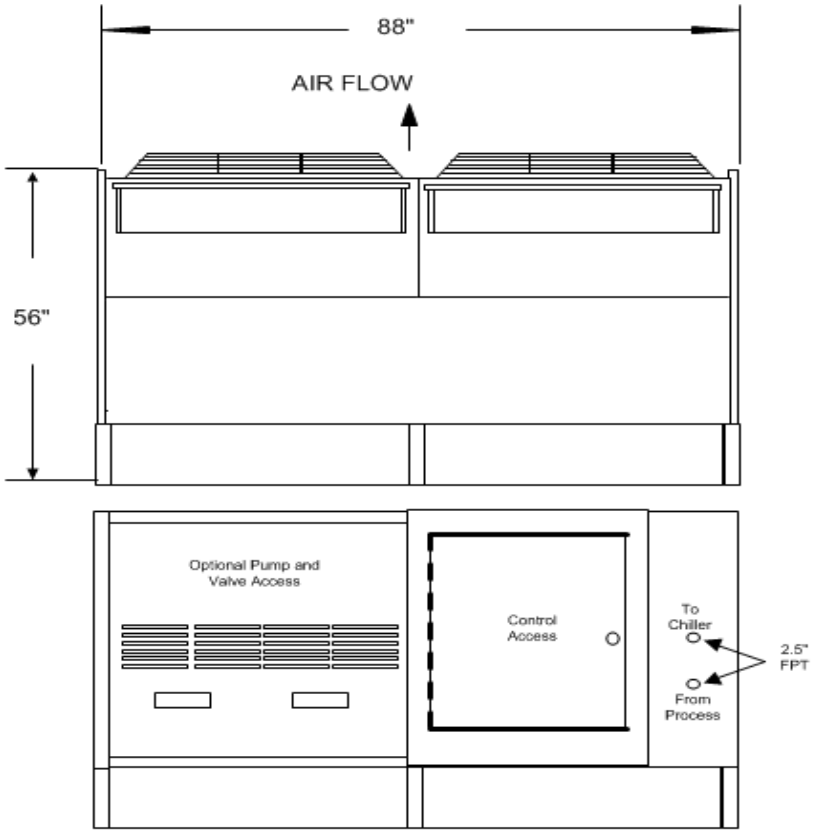
Submittal Drawings
Model: AES-600





AURACOOL ECONOMIZER TECHNOLOGY ®	LEGACY CHILLER SYSTEMS			
	AuraCool Economizer System Mo#AES-600			
Drawn by: MKing	SIZE	FSCM NO	DWG NO	REV 1
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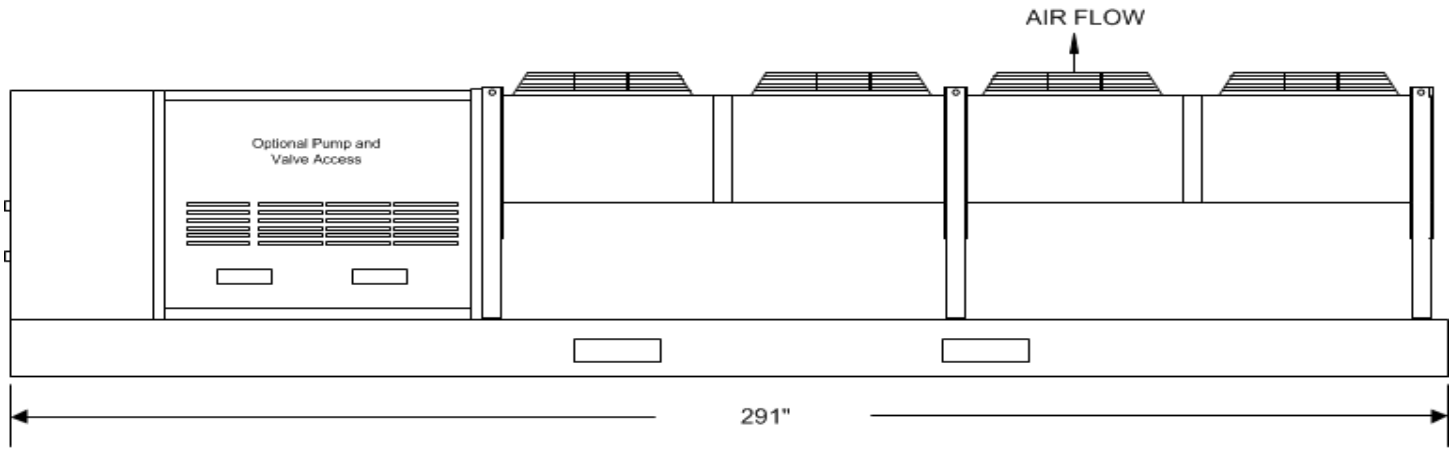
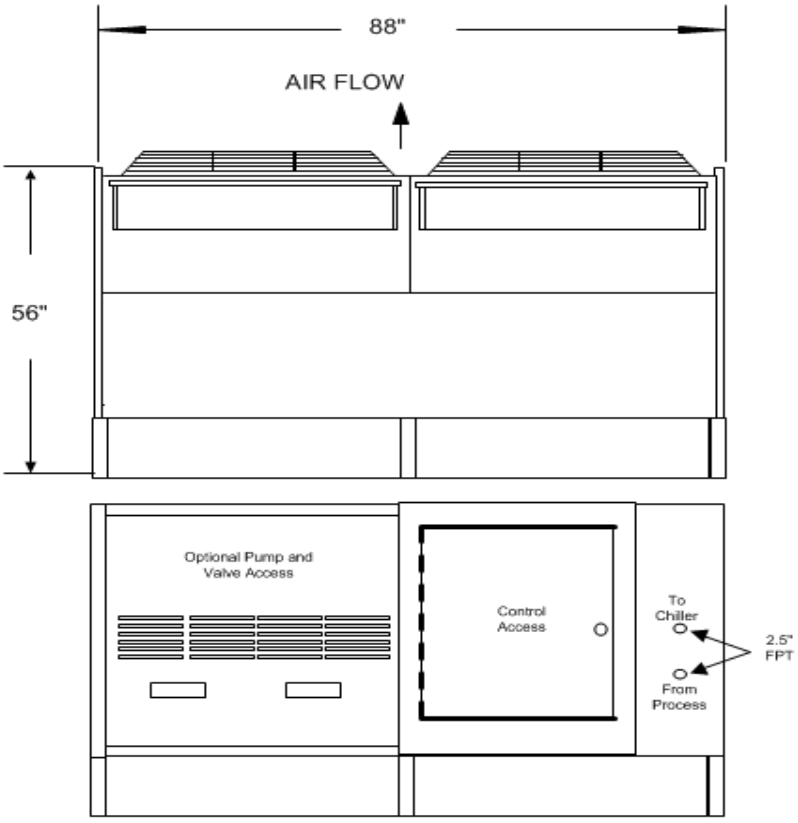
Submittal Drawings
Model: AES-735





AURACOOL ECONOMIZER TECHNOLOGY®	LEGACY CHILLER SYSTEMS			
	AuraCool Economizer System Mo#AES-735			
Drawn by: MKing	SIZE	FSCM NO	DWG NO	REV 1
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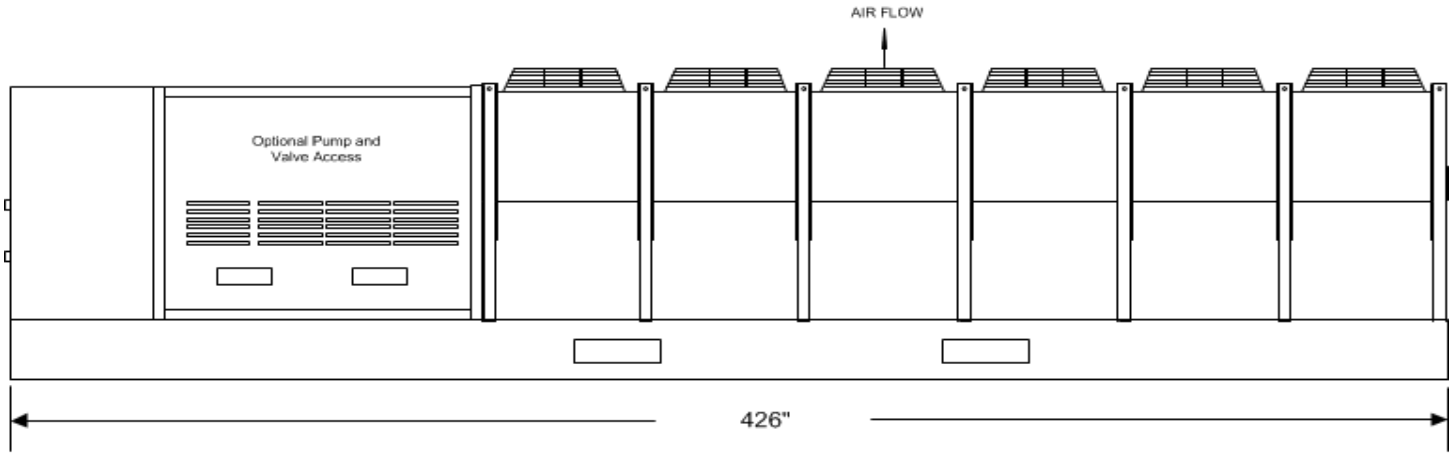
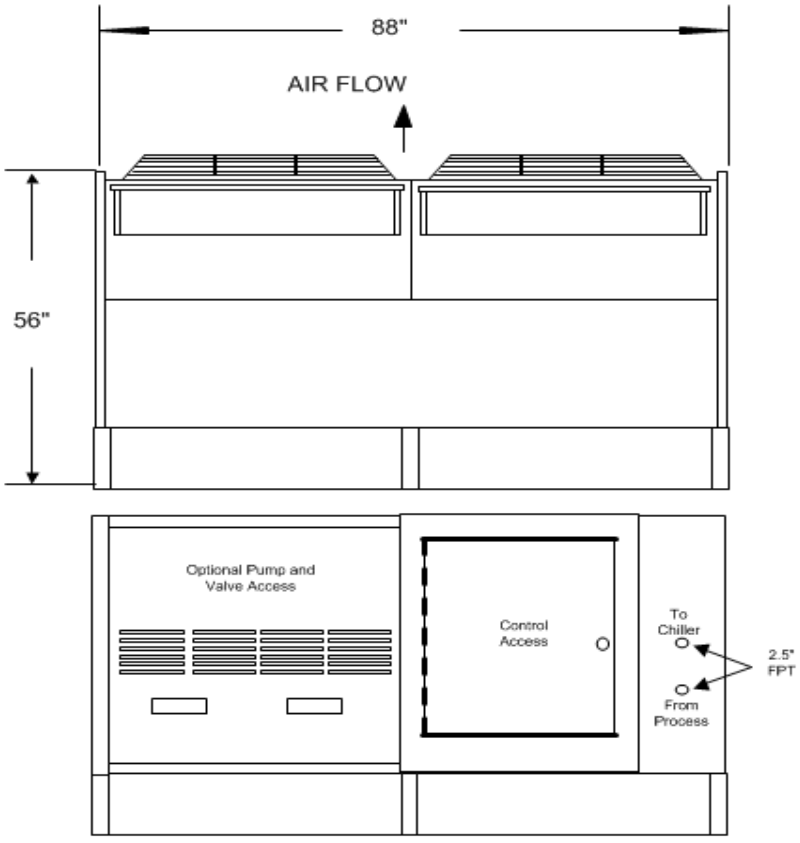
Submittal Drawings
Model: AES-850





AURACOOL ECONOMIZER TECHNOLOGY ®	LEGACY CHILLER SYSTEMS				
	AuraCool Economizer System Mo#AES-850				
Drawn by: MKing	SIZE	FSCM NO	DWG NO		REV 1
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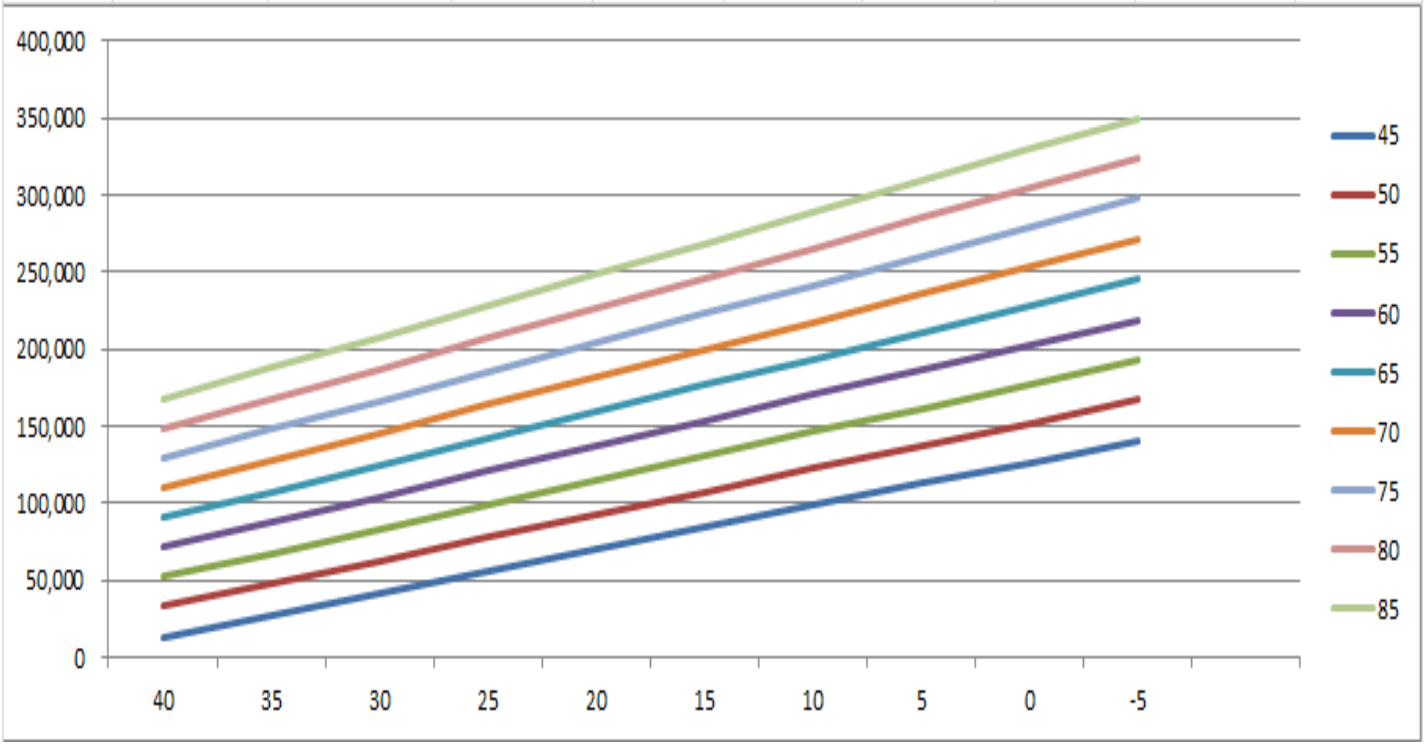
Performance Table
Model: AES-50

AuraCool Inlet Fluid Tempurature (F)

AuraCool Inlet Air Temperature (F)

	45	50	55	60	65	70	75	80	85
40	13,700	32,913	52,125	71,338	90,550	109,763	128,975	148,188	167,400
35	27,844	47,826	67,808	87,790	107,772	127,754	147,736	167,718	187,700
30	41,989	62,740	83,492	104,243	124,994	145,746	166,497	187,249	208,000
25	56,133	77,654	99,175	120,696	142,217	163,738	185,258	206,779	228,300
20	70,278	92,568	114,858	137,149	159,439	181,729	204,019	226,310	248,600
15	84,422	107,482	130,542	153,601	176,661	199,721	222,781	245,840	268,900
10	98,567	122,396	146,225	170,054	193,883	217,713	241,542	265,371	289,200
5	112,711	137,310	161,908	186,507	211,106	235,704	260,303	284,901	309,500
0	126,856	152,224	177,592	202,960	228,328	253,696	279,064	304,432	329,800
-5	141,000	167,138	193,275	219,413	245,550	271,688	297,825	323,963	350,100

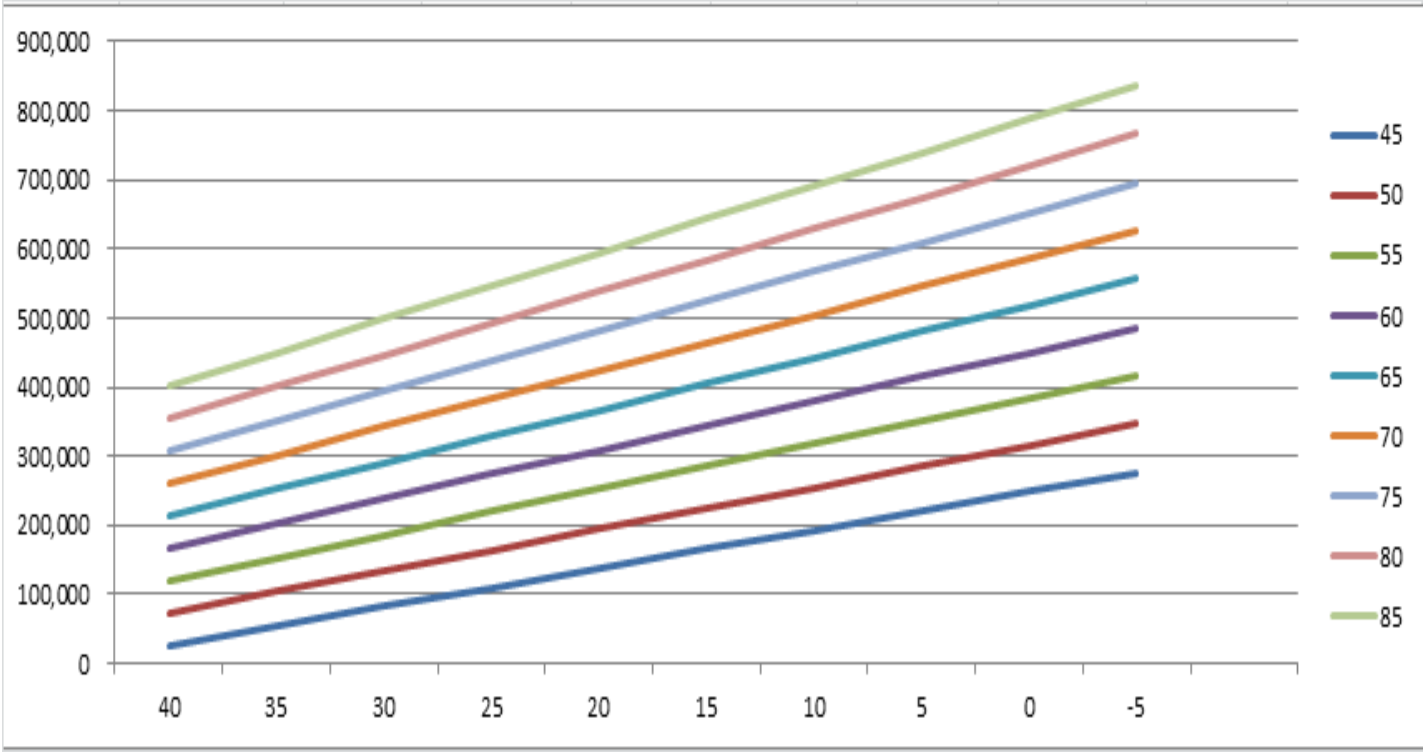


Using this table: The **RED** values in the table above represents the AuraCool Economizer inlet air temperature (F). The **BLUE** values in the table above represent your process fluid inlet temperature (F) to AuraCool. Within the performance table, we have marked the capacity standard for this model. All capacities were calculated using 30% Propylene Glycol (PG) at a nominal flow rate (GPM) of 3.0 times nominal cooling tonnage.

Performance Table
Model: AES-120

AuraCool Inlet Fluid Tempurature (F)

AuraCool Inlet Air Temperature (F)	45	50	55	60	65	70	75	80	85
40	27,000	73,938	120,875	167,813	214,750	261,688	308,625	355,563	402,500
35	54,667	104,163	153,658	203,154	252,650	302,146	351,642	401,138	450,633
30	82,333	134,388	186,442	238,496	290,550	342,604	394,658	446,713	498,767
25	110,000	164,613	219,225	273,838	328,450	383,063	437,675	492,288	546,900
20	137,667	194,838	252,008	309,179	366,350	423,521	480,692	537,863	595,033
15	165,333	225,063	284,792	344,521	404,250	463,979	523,708	583,438	643,167
10	193,000	255,288	317,575	379,863	442,150	504,438	566,725	629,013	691,300
5	220,667	285,513	350,358	415,204	480,050	544,896	609,742	674,588	739,433
0	248,333	315,738	383,142	450,546	517,950	585,354	652,758	720,163	787,567
-5	276,000	345,963	415,925	485,888	555,850	625,813	695,775	765,738	835,700

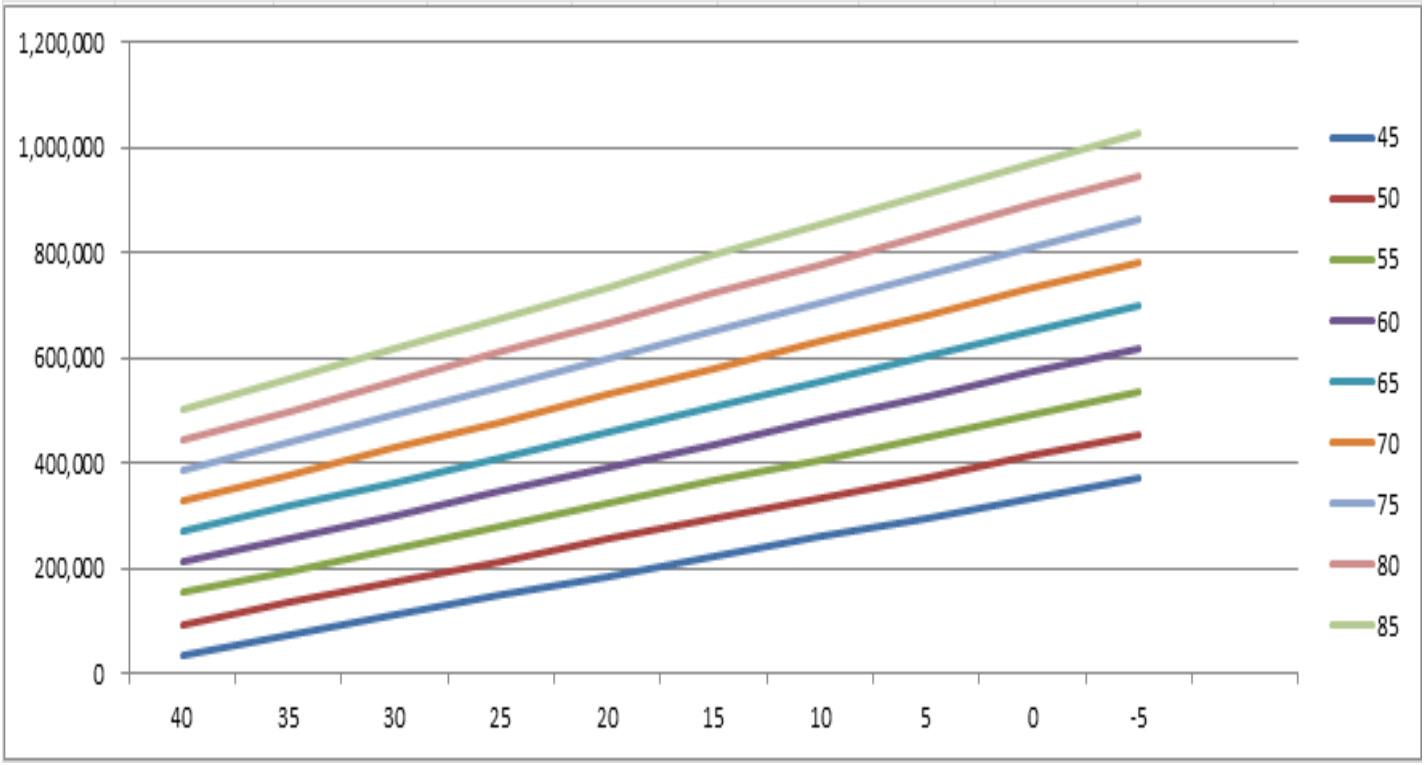


Using this table: The **RED** values in the table above represents the AuraCool Economizer inlet air temperature (F). The **BLUE** values in the table above represent your process fluid inlet temperature (F) to AuraCool. Within the performance table, we have marked the capacity standard for this model. All capacities were calculated using 30% Propylene Glycol (PG) at a nominal flow rate (GPM) of 3.0 times nominal cooling tonnage.

Performance Table
Model: AES-150

AuraCool Inlet Fluid Tempurature (F)

AuraCool Inlet Air Temperature (F)	45	50	55	60	65	70	75	80	85
40	36,400	94,425	152,450	210,475	268,500	326,525	384,550	442,575	500,600
35	73,511	134,250	194,989	255,728	316,467	377,206	437,944	498,683	559,422
30	110,622	174,075	237,528	300,981	364,433	427,886	491,339	554,792	618,244
25	147,733	213,900	280,067	346,233	412,400	478,567	544,733	610,900	677,067
20	184,844	253,725	322,606	391,486	460,367	529,247	598,128	667,008	735,889
15	221,956	293,550	365,144	436,739	508,333	579,928	651,522	723,117	794,711
10	259,067	333,375	407,683	481,992	556,300	630,608	704,917	779,225	853,533
5	296,178	373,200	450,222	527,244	604,267	681,289	758,311	835,333	912,356
0	333,289	413,025	492,761	572,497	652,233	731,969	811,706	891,442	971,178
-5	370,400	452,850	535,300	617,750	700,200	782,650	865,100	947,550	1,030,000

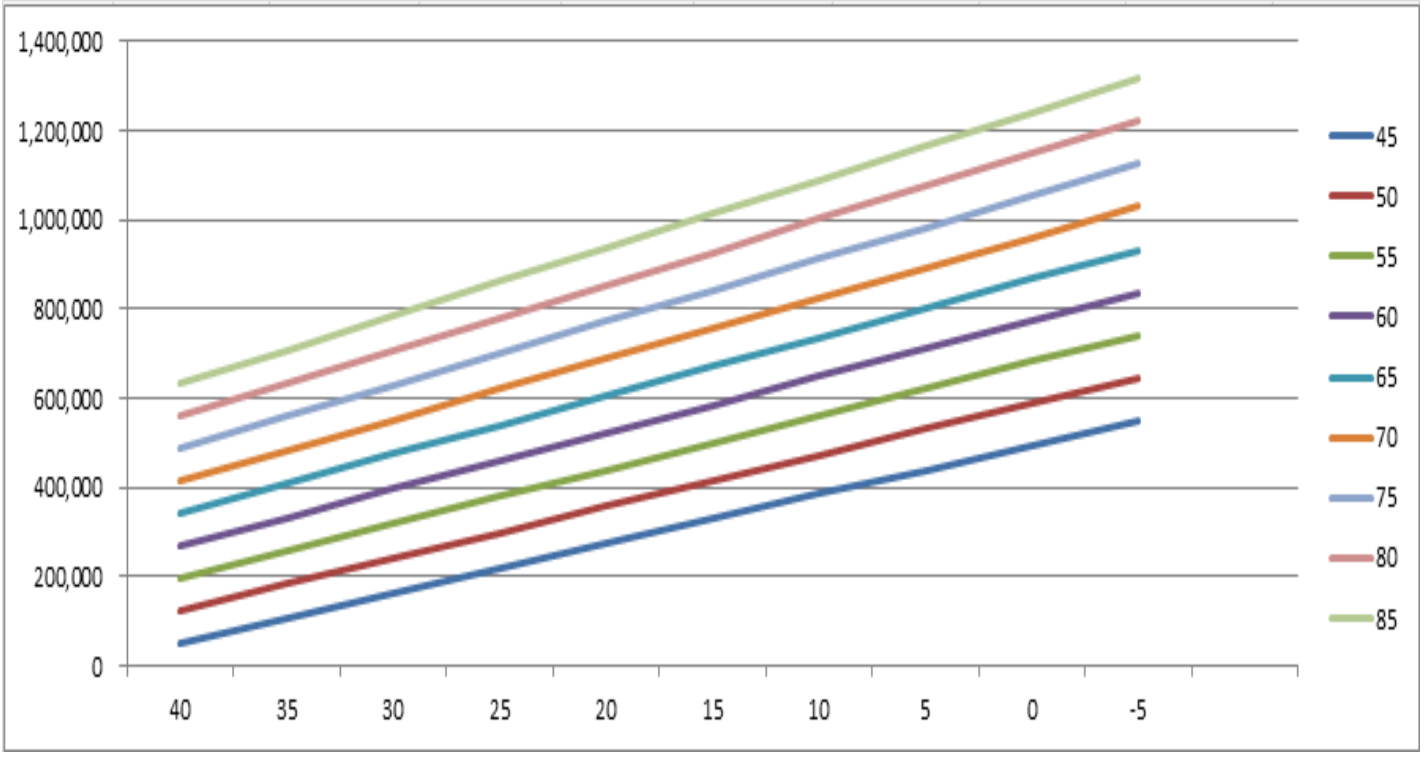


Using this table: The **RED** values in the table above represents the AuraCool Economizer inlet air temperature (F). The **BLUE** values in the table above represent your process fluid inlet temperature (F) to AuraCool. Within the performance table, we have marked the capacity standard for this model. All capacities were calculated using 30% Propylene Glycol (PG) at a nominal flow rate (GPM) of 3.0 times nominal cooling tonnage.

Performance Table
Model: AES-200

AuraCool Inlet Fluid Tempurature (F)

AuraCool Inlet Air Temperature (F)	45	50	55	60	65	70	75	80	85
40	53,500	125,988	198,475	270,963	343,450	415,938	488,425	560,913	633,400
35	108,700	183,782	258,864	333,946	409,028	484,110	559,192	634,274	709,356
30	163,900	241,576	319,253	396,929	474,606	552,282	629,958	707,635	785,311
25	219,100	299,371	379,642	459,913	540,183	620,454	700,725	780,996	861,267
20	274,300	357,165	440,031	522,896	605,761	688,626	771,492	854,357	937,222
15	329,500	414,960	500,419	585,879	671,339	756,799	842,258	927,718	1,013,178
10	384,700	472,754	560,808	648,863	736,917	824,971	913,025	1,001,079	1,089,133
5	439,900	530,549	621,197	711,846	802,494	893,143	983,792	1,074,440	1,165,089
0	495,100	588,343	681,586	774,829	868,072	961,315	1,054,558	1,147,801	1,241,044
-5	550,300	646,138	741,975	837,813	933,650	1,029,488	1,125,325	1,221,163	1,317,000

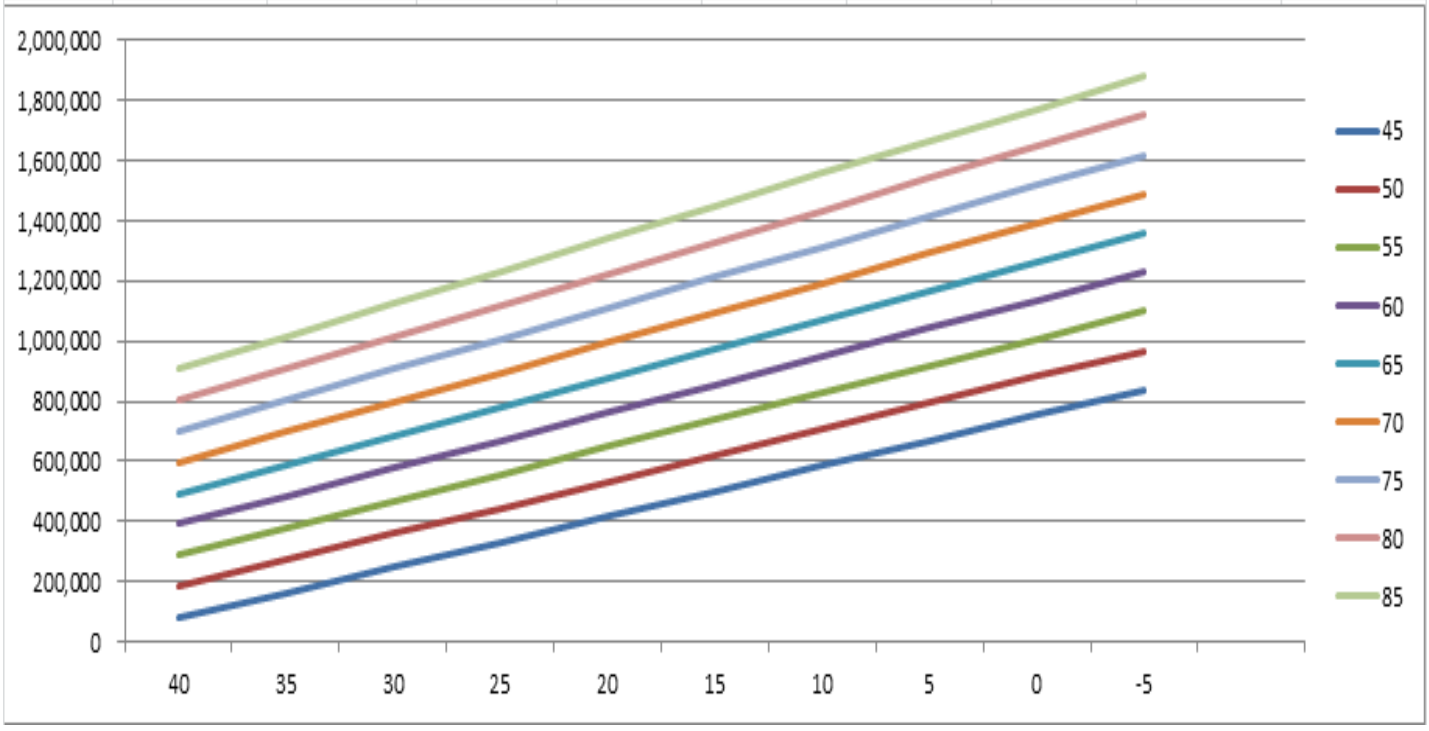


Using this table: The **RED** values in the table above represents the AuraCool Economizer inlet air temperature (F). The **BLUE** values in the table above represent your process fluid inlet temperature (F) to AuraCool. Within the performance table, we have marked the capacity standard for this model. All capacities were calculated using 30% Propylene Glycol (PG) at a nominal flow rate (GPM) of 3.0 times nominal cooling tonnage.

Performance Table Model: AES-280

AuraCool Inlet Fluid Tempurature (F)

AuraCool Inlet Air Temperature (F)	45	50	55	60	65	70	75	80	85
40	81,500	184,738	287,975	391,213	494,450	597,688	700,925	804,163	907,400
35	165,556	271,808	378,061	484,314	590,567	696,819	803,072	909,325	1,015,578
30	249,611	358,879	468,147	577,415	686,683	795,951	905,219	1,014,488	1,123,756
25	333,667	445,950	558,233	670,517	782,800	895,083	1,007,367	1,119,650	1,231,933
20	417,722	533,021	648,319	763,618	878,917	994,215	1,109,514	1,224,813	1,340,111
15	501,778	620,092	738,406	856,719	975,033	1,093,347	1,211,661	1,329,975	1,448,289
10	585,833	707,163	828,492	949,821	1,071,150	1,192,479	1,313,808	1,435,138	1,556,467
5	669,889	794,233	918,578	1,042,922	1,167,267	1,291,611	1,415,956	1,540,300	1,664,644
0	753,944	881,304	1,008,664	1,136,024	1,263,383	1,390,743	1,518,103	1,645,463	1,772,822
-5	838,000	968,375	1,098,750	1,229,125	1,359,500	1,489,875	1,620,250	1,750,625	1,881,000

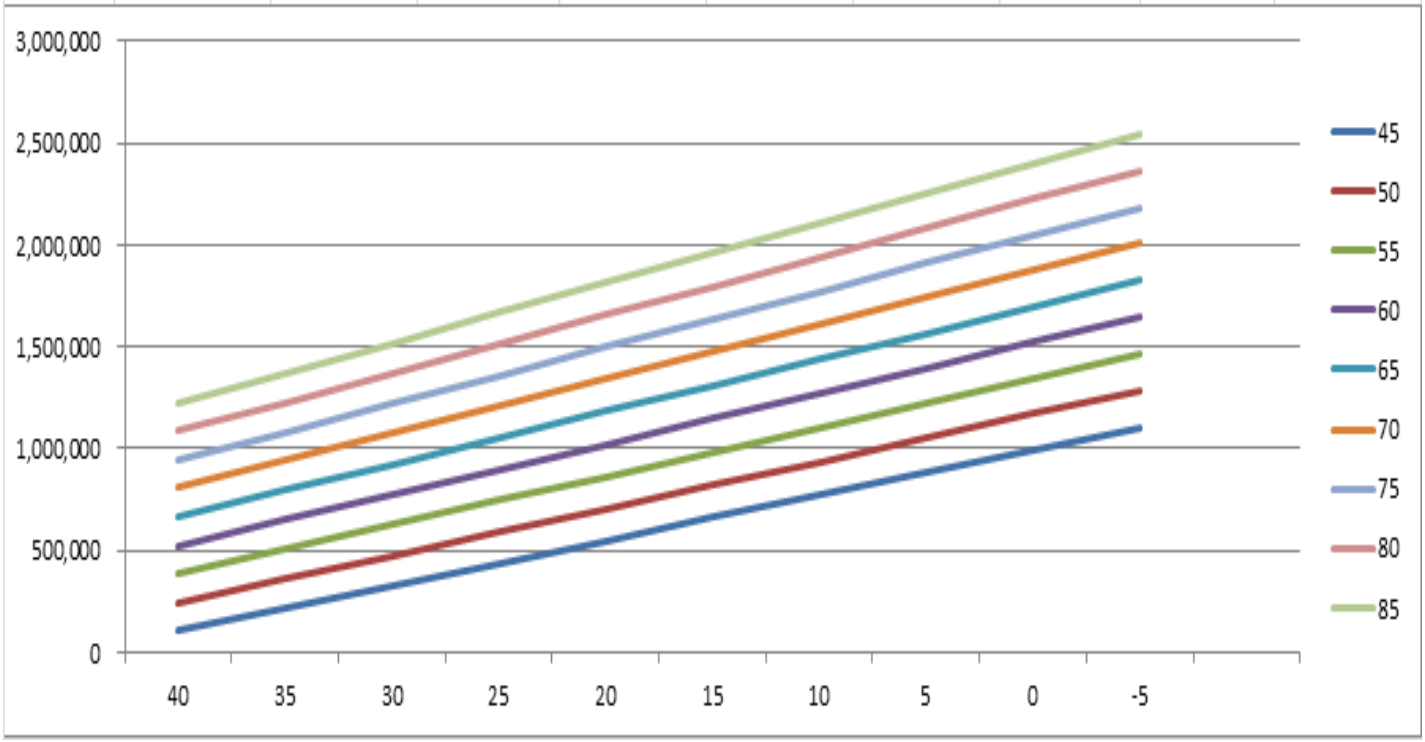


Using this table: The **RED** values in the table above represents the AuraCool Economizer inlet air temperature (F). The **BLUE** values in the table above represent your process fluid inlet temperature (F) to AuraCool. Within the performance table, we have marked the capacity standard for this model. All capacities were calculated using 30% Propylene Glycol (PG) at a nominal flow rate (GPM) of 3.0 times nominal cooling tonnage.

Performance Table
Model: AES-385

AuraCool Inlet Fluid Tempurature (F)

AuraCool Inlet Air Temperature (F)	45	50	55	60	65	70	75	80	85
40	107,000	246,875	386,750	526,625	666,500	806,375	946,250	1,086,125	1,226,000
35	217,889	362,236	506,583	650,931	795,278	939,625	1,083,972	1,228,319	1,372,667
30	328,778	477,597	626,417	775,236	924,056	1,072,875	1,221,694	1,370,514	1,519,333
25	439,667	592,958	746,250	899,542	1,052,833	1,206,125	1,359,417	1,512,708	1,666,000
20	550,556	708,319	866,083	1,023,847	1,181,611	1,339,375	1,497,139	1,654,903	1,812,667
15	661,444	823,681	985,917	1,148,153	1,310,389	1,472,625	1,634,861	1,797,097	1,959,333
10	772,333	939,042	1,105,750	1,272,458	1,439,167	1,605,875	1,772,583	1,939,292	2,106,000
5	883,222	1,054,403	1,225,583	1,396,764	1,567,944	1,739,125	1,910,306	2,081,486	2,252,667
0	994,111	1,169,764	1,345,417	1,521,069	1,696,722	1,872,375	2,048,028	2,223,681	2,399,333
-5	1,105,000	1,285,125	1,465,250	1,645,375	1,825,500	2,005,625	2,185,750	2,365,875	2,546,000

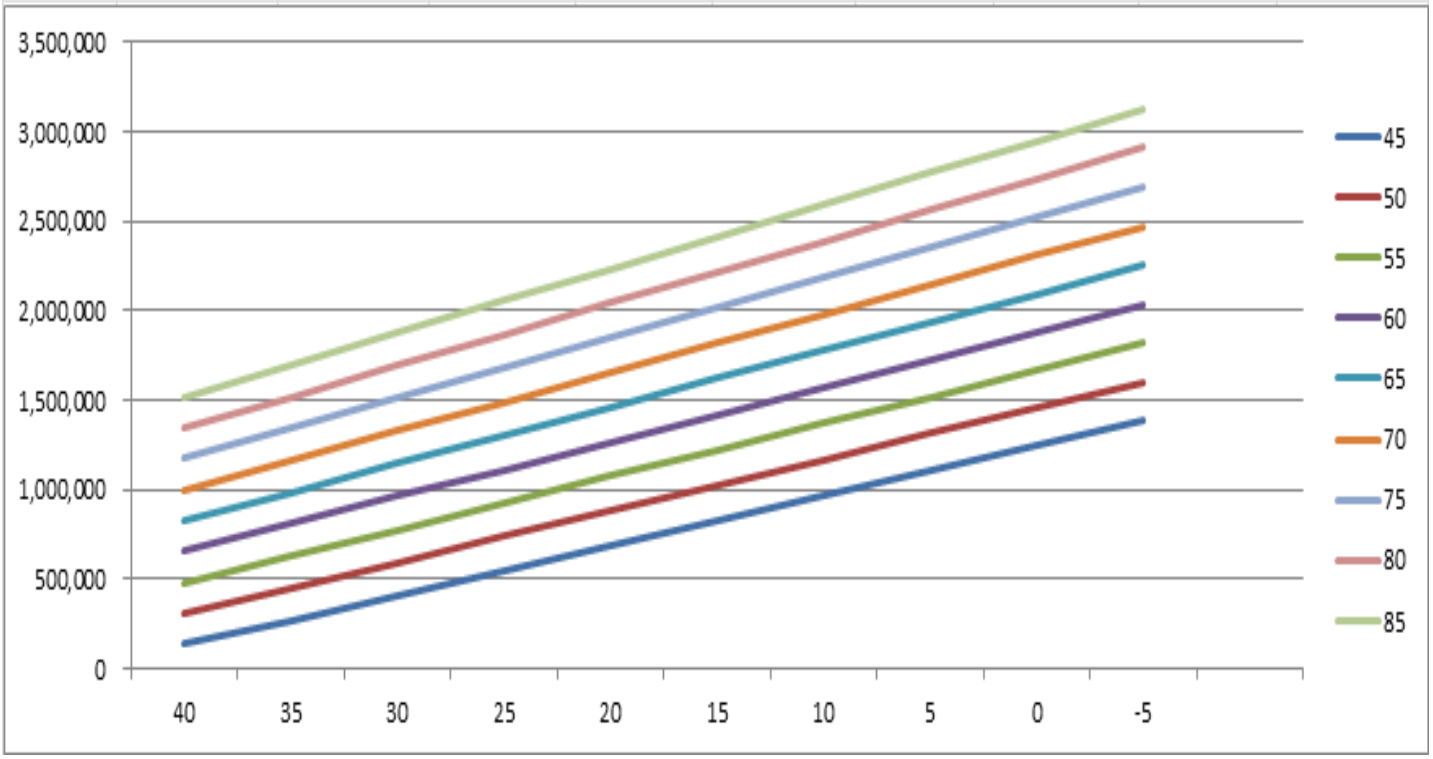


Using this table: The **RED** values in the table above represents the AuraCool Economizer inlet air temperature (F). The **BLUE** values in the table above represent your process fluid inlet temperature (F) to AuraCool. Within the performance table, we have marked the capacity standard for this model. All capacities were calculated using 30% Propylene Glycol (PG) at a nominal flow rate (GPM) of 3.0 times nominal cooling tonnage.

Performance Table
Model: AES-480

AuraCool Inlet Fluid Tempurature (F)

AuraCool Inlet Air Temperature (F)	45	50	55	60	65	70	75	80	85
40	135,000	308,125	481,250	654,375	827,500	1,000,625	1,173,750	1,346,875	1,520,000
35	273,556	451,681	629,806	807,931	986,056	1,164,181	1,342,306	1,520,431	1,698,556
30	412,111	595,236	778,361	961,486	1,144,611	1,327,736	1,510,861	1,693,986	1,877,111
25	550,667	738,792	926,917	1,115,042	1,303,167	1,491,292	1,679,417	1,867,542	2,055,667
20	689,222	882,347	1,075,472	1,268,597	1,461,722	1,654,847	1,847,972	2,041,097	2,234,222
15	827,778	1,025,903	1,224,028	1,422,153	1,620,278	1,818,403	2,016,528	2,214,653	2,412,778
10	966,333	1,169,458	1,372,583	1,575,708	1,778,833	1,981,958	2,185,083	2,388,208	2,591,333
5	1,104,889	1,313,014	1,521,139	1,729,264	1,937,389	2,145,514	2,353,639	2,561,764	2,769,889
0	1,243,444	1,456,569	1,669,694	1,882,819	2,095,944	2,309,069	2,522,194	2,735,319	2,948,444
-5	1,382,000	1,600,125	1,818,250	2,036,375	2,254,500	2,472,625	2,690,750	2,908,875	3,127,000



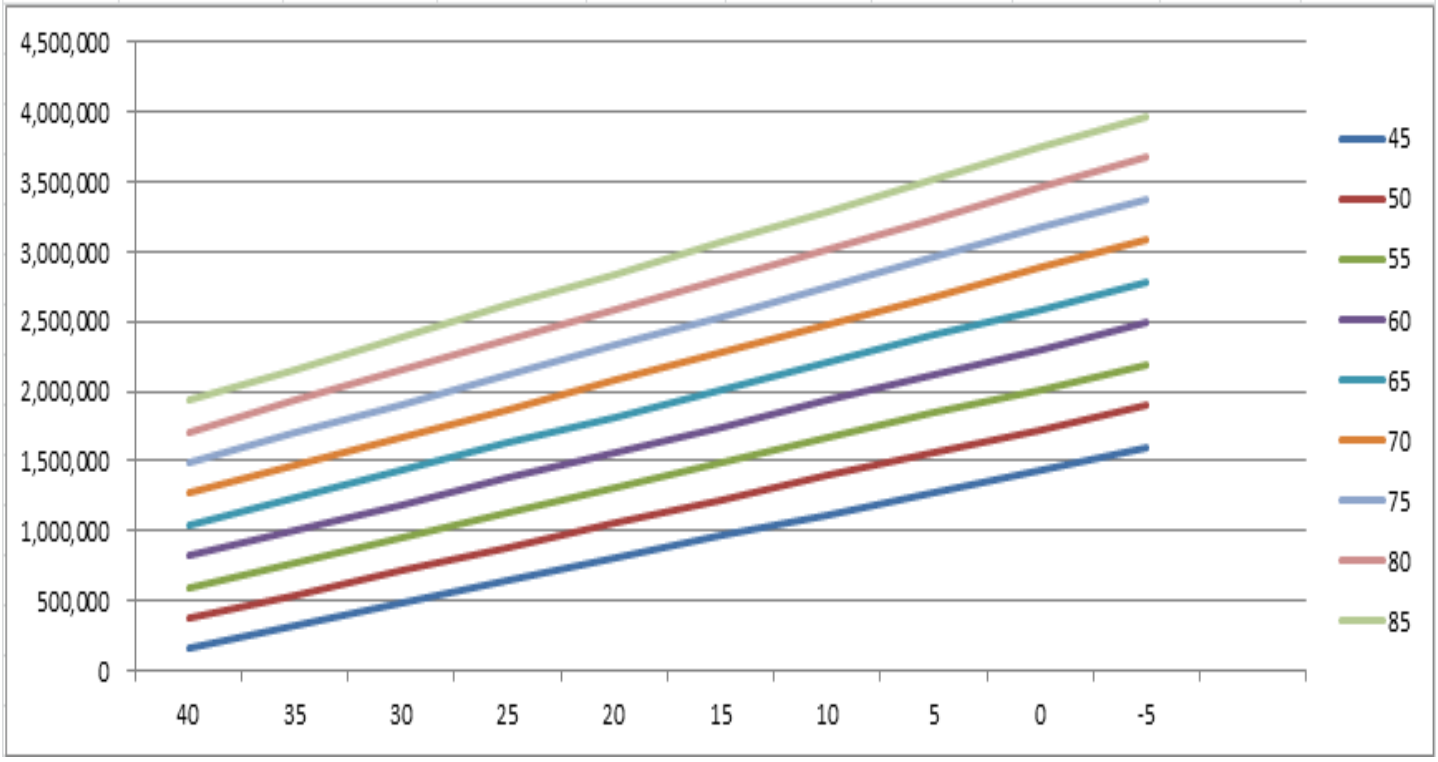
Using this table: The **RED** values in the table above represents the AuraCool Economizer inlet air temperature (F). The **BLUE** values in the table above represent your process fluid inlet temperature (F) to AuraCool. Within the performance table, we have marked the capacity standard for this model. All capacities were calculated using 30% Propylene Glycol (PG) at a nominal flow rate (GPM) of 3.0 times nominal cooling tonnage.

Performance Table
Model: AES-600

AuraCool Inlet Fluid Tempurature (F)

AuraCool Inlet Air Temperature (F)

	45	50	55	60	65	70	75	80	85
40	157,000	379,250	601,500	823,750	1,046,000	1,268,250	1,490,500	1,712,750	1,935,000
35	318,000	548,389	778,778	1,009,167	1,239,556	1,469,944	1,700,333	1,930,722	2,161,111
30	479,000	717,528	956,056	1,194,583	1,433,111	1,671,639	1,910,167	2,148,694	2,387,222
25	640,000	886,667	1,133,333	1,380,000	1,626,667	1,873,333	2,120,000	2,366,667	2,613,333
20	801,000	1,055,806	1,310,611	1,565,417	1,820,222	2,075,028	2,329,833	2,584,639	2,839,444
15	962,000	1,224,944	1,487,889	1,750,833	2,013,778	2,276,722	2,539,667	2,802,611	3,065,556
10	1,123,000	1,394,083	1,665,167	1,936,250	2,207,333	2,478,417	2,749,500	3,020,583	3,291,667
5	1,284,000	1,563,222	1,842,444	2,121,667	2,400,889	2,680,111	2,959,333	3,238,556	3,517,778
0	1,445,000	1,732,361	2,019,722	2,307,083	2,594,444	2,881,806	3,169,167	3,456,528	3,743,889
-5	1,606,000	1,901,500	2,197,000	2,492,500	2,788,000	3,083,500	3,379,000	3,674,500	3,970,000

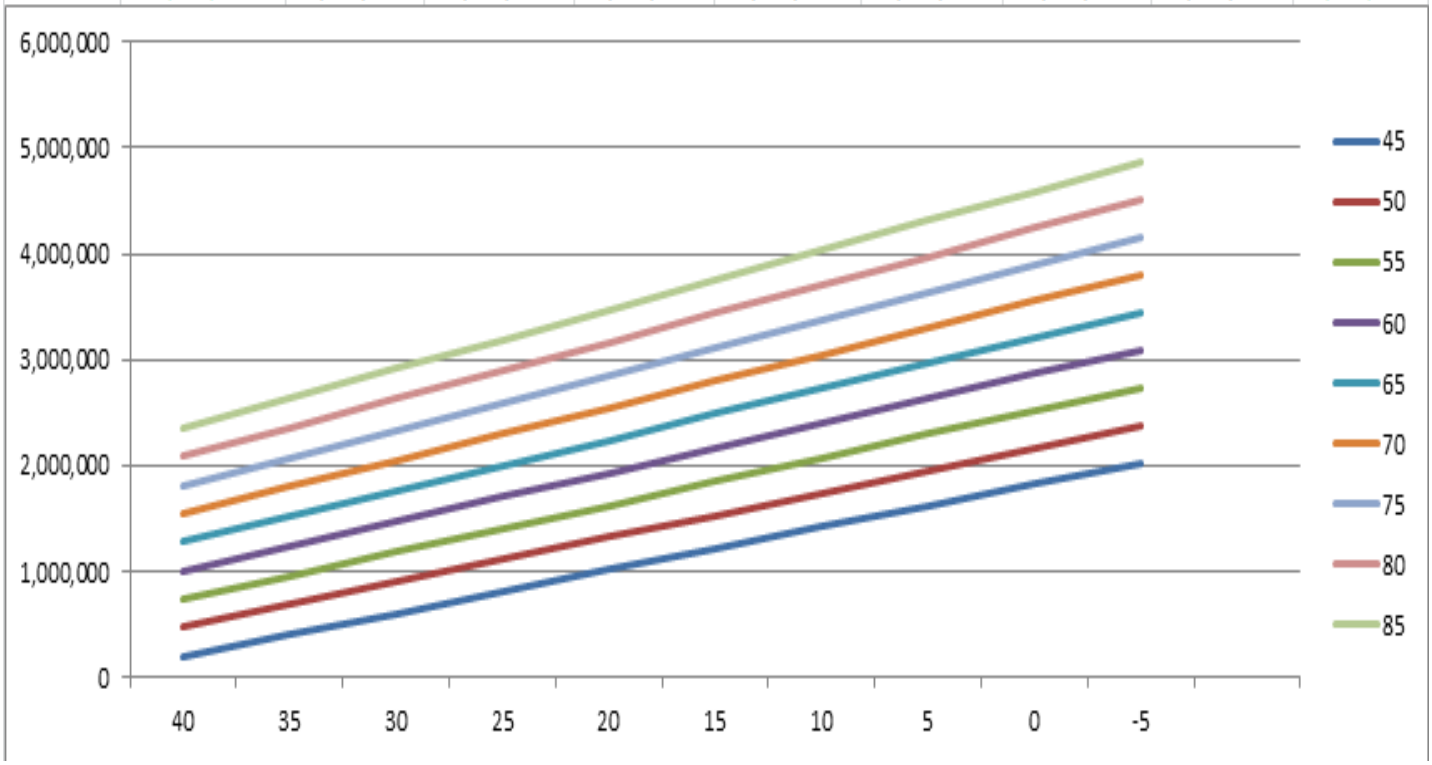


Using this table: The **RED** values in the table above represents the AuraCool Economizer inlet air temperature (F). The **BLUE** values in the table above represent your process fluid inlet temperature (F) to AuraCool. Within the performance table, we have marked the capacity standard for this model. All capacities were calculated using 30% Propylene Glycol (PG) at a nominal flow rate (GPM) of 3.0 times nominal cooling tonnage.

Performance Table
Model: AES-735

AuraCool Inlet Fluid Tempurature (F)

AuraCool Inlet Air Temperature (F)	45	50	55	60	65	70	75	80	85
40	198,000	467,625	737,250	1,006,875	1,276,500	1,546,125	1,815,750	2,085,375	2,355,000
35	401,556	680,667	959,778	1,238,889	1,518,000	1,797,111	2,076,222	2,355,333	2,634,444
30	605,111	893,708	1,182,306	1,470,903	1,759,500	2,048,097	2,336,694	2,625,292	2,913,889
25	808,667	1,106,750	1,404,833	1,702,917	2,001,000	2,299,083	2,597,167	2,895,250	3,193,333
20	1,012,222	1,319,792	1,627,361	1,934,931	2,242,500	2,550,069	2,857,639	3,165,208	3,472,778
15	1,215,778	1,532,833	1,849,889	2,166,944	2,484,000	2,801,056	3,118,111	3,435,167	3,752,222
10	1,419,333	1,745,875	2,072,417	2,398,958	2,725,500	3,052,042	3,378,583	3,705,125	4,031,667
5	1,622,889	1,958,917	2,294,944	2,630,972	2,967,000	3,303,028	3,639,056	3,975,083	4,311,111
0	1,826,444	2,171,958	2,517,472	2,862,986	3,208,500	3,554,014	3,899,528	4,245,042	4,590,556
-5	2,030,000	2,385,000	2,740,000	3,095,000	3,450,000	3,805,000	4,160,000	4,515,000	4,870,000

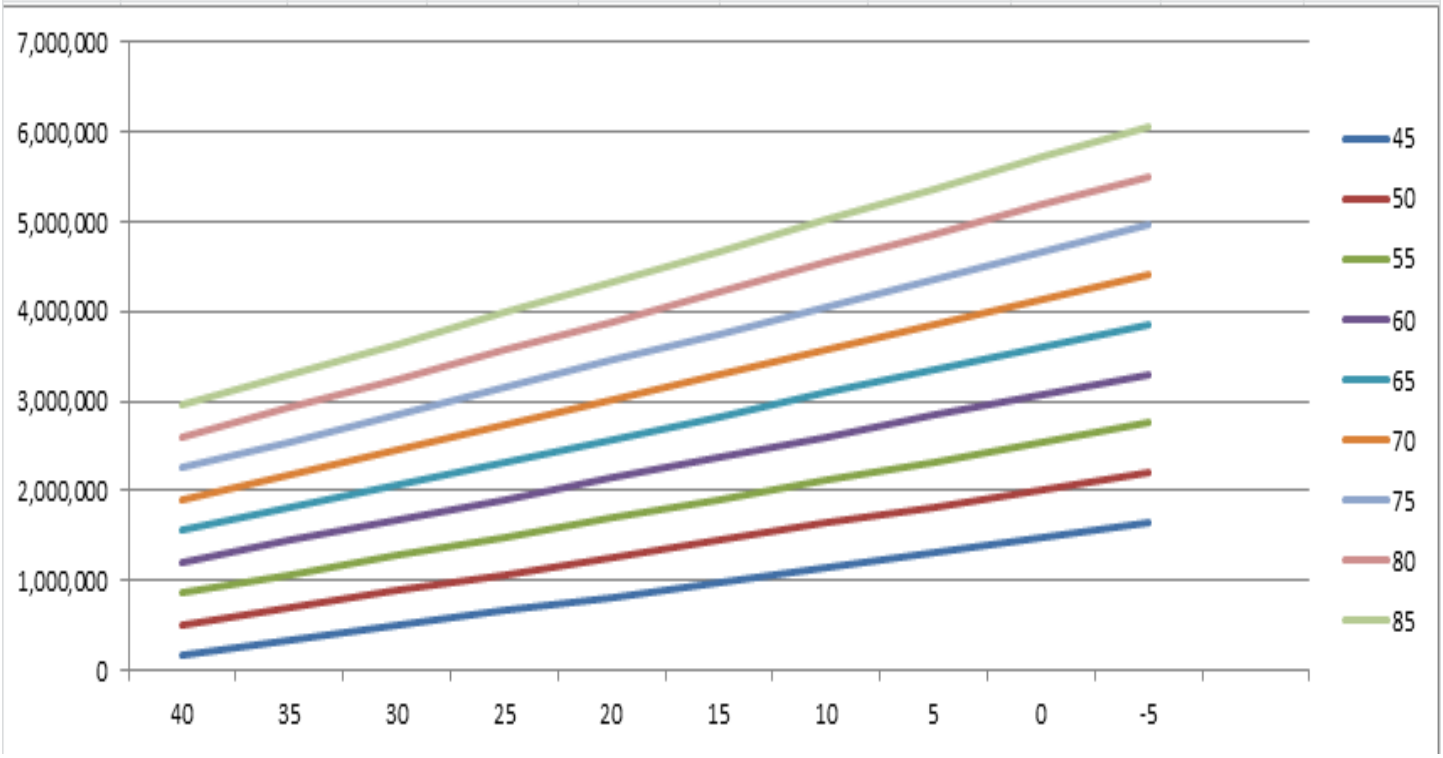


Using this table: The **RED** values in the table above represents the AuraCool Economizer inlet air temperature (F). The **BLUE** values in the table above represent your process fluid inlet temperature (F) to AuraCool. Within the performance table, we have marked the capacity standard for this model. All capacities were calculated using 30% Propylene Glycol (PG) at a nominal flow rate (GPM) of 3.0 times nominal cooling tonnage.

Performance Table
Model: AES-850

AuraCool Inlet Fluid Tempurature (F)

AuraCool Inlet Air Temperature (F)	45	50	55	60	65	70	75	80	85
40	163,000	511,375	859,750	1,208,125	1,556,500	1,904,875	2,253,250	2,601,625	2,950,000
35	328,222	699,139	1,070,056	1,440,972	1,811,889	2,182,806	2,553,722	2,924,639	3,295,556
30	493,444	886,903	1,280,361	1,673,819	2,067,278	2,460,736	2,854,194	3,247,653	3,641,111
25	658,667	1,074,667	1,490,667	1,906,667	2,322,667	2,738,667	3,154,667	3,570,667	3,986,667
20	823,889	1,262,431	1,700,972	2,139,514	2,578,056	3,016,597	3,455,139	3,893,681	4,332,222
15	989,111	1,450,194	1,911,278	2,372,361	2,833,444	3,294,528	3,755,611	4,216,694	4,677,778
10	1,154,333	1,637,958	2,121,583	2,605,208	3,088,833	3,572,458	4,056,083	4,539,708	5,023,333
5	1,319,556	1,825,722	2,331,889	2,838,056	3,344,222	3,850,389	4,356,556	4,862,722	5,368,889
0	1,484,778	2,013,486	2,542,194	3,070,903	3,599,611	4,128,319	4,657,028	5,185,736	5,714,444
-5	1,650,000	2,201,250	2,752,500	3,303,750	3,855,000	4,406,250	4,957,500	5,508,750	6,060,000



Using this table: The **RED** values in the table above represents the AuraCool Economizer inlet air temperature (F). The **BLUE** values in the table above represent your process fluid inlet temperature (F) to AuraCool. Within the performance table, we have marked the capacity standard for this model. All capacities were calculated using 30% Propylene Glycol (PG) at a nominal flow rate (GPM) of 3.0 times nominal cooling tonnage.

AuraCool Economizer Pressure Drop (Delta P) Tables

AuraCool Economizer pressure drops provided in the tables below are estimated and subject to change without notice. Nominal condition shown in BOLD on each chart. Please refer to Typical System Layouts page for more information on how Delta P can impact system performance.

PG %	AuraCool - AES50 - GPM						
		6	8	**11**	14	17	21
	25	2.09	2.46	2.83	3.19	3.56	3.92
	30	2.40	2.73	3.06	3.39	3.72	4.05
	35	2.70	3.00	3.30	3.59	3.89	4.19
	40	3.01	3.27	**3.53**	3.79	4.05	4.32
	45	3.31	3.54	3.77	3.99	4.22	4.45
	50	3.92	4.05	4.19	4.32	4.45	4.58

PG %	AuraCool - AES120 - GPM						
		14	19	**25**	31	39	49
	25	2.04	2.40	2.75	3.11	3.47	3.82
	30	2.34	2.66	2.98	3.30	3.63	3.95
	35	2.63	2.92	3.21	3.50	3.79	4.08
	40	2.93	3.19	**3.44**	3.70	3.95	4.20
	45	3.23	3.45	3.67	3.89	4.11	4.33
	50	3.82	3.95	4.08	4.20	4.33	4.46

PG %	AuraCool - AES150 - GPM						
		18	24	**32**	40	50	63
	25	0.97	1.14	1.31	1.48	1.65	1.82
	30	1.11	1.26	1.42	1.57	1.73	1.88
	35	1.25	1.39	1.53	1.66	1.80	1.94
	40	1.39	1.52	**1.64**	1.76	1.88	2.00
	45	1.54	1.64	1.75	1.85	1.96	2.06
	50	1.82	1.88	1.94	2.00	2.06	2.12

PG %	AuraCool - AES200 - GPM						
		23	31	**41**	51	64	80
	25	1.33	1.56	1.79	2.02	2.26	2.49
	30	1.52	1.73	1.94	2.15	2.36	2.57
	35	1.71	1.90	2.09	2.28	2.47	2.65
	40	1.91	2.07	**2.24**	2.40	2.57	2.74
	45	2.10	2.24	2.39	2.53	2.68	2.82
	50	2.49	2.57	2.65	2.74	2.82	2.90

PG %	AuraCool - AES280 - GPM						
		34	45	**60**	75	94	117
	25	3.01	3.54	4.07	4.59	5.12	5.65
	30	3.45	3.93	4.40	4.88	5.36	5.83
	35	3.89	4.32	4.74	5.17	5.60	6.02
	40	4.33	4.71	**5.08**	5.46	5.83	6.21
	45	4.77	5.09	5.42	5.75	6.07	6.40
	50	5.65	5.83	6.02	6.21	6.40	6.59

PG %	AuraCool - AES385 - GPM						
		46	61	**81**	101	127	158
	25	2.27	2.66	3.06	3.46	3.85	4.25
	30	2.60	2.96	3.31	3.67	4.03	4.39
	35	2.93	3.25	3.57	3.89	4.21	4.53
	40	3.26	3.54	**3.82**	4.11	4.39	4.67
	45	3.59	3.83	4.08	4.32	4.57	4.82
	50	4.25	4.39	4.53	4.67	4.82	4.96

PG %	AuraCool - AES480 - GPM						
		56	75	**100**	125	156	195
	25	4.56	5.36	6.16	6.95	7.75	8.55
	30	5.22	5.95	6.67	7.39	8.11	8.83
	35	5.89	6.54	7.18	7.83	8.47	9.12
	40	6.55	7.12	**7.69**	8.26	8.83	9.40
	45	7.22	7.71	8.21	8.70	9.20	9.69
	50	8.55	8.83	9.12	9.40	9.69	9.97

PG %	AuraCool - AES600 - GPM						
		70	94	**125**	156	195	244
	25	6.85	8.05	9.25	10.45	11.65	12.85
	30	7.85	8.94	10.02	11.11	12.19	13.28
	35	8.85	9.82	10.79	11.77	12.74	13.71
	40	9.85	10.71	**11.57**	12.42	13.28	14.14
	45	10.85	11.59	12.34	13.08	13.82	14.56
	50	12.85	13.28	13.71	14.14	14.56	14.99

PG %	AuraCool - AES735 - GPM						
		87	116	**154**	193	241	301
	25	8.09	9.51	10.92	12.34	13.75	15.17
	30	9.27	10.55	11.83	13.11	14.39	15.68
	35	10.45	11.60	12.74	13.89	15.03	16.18
	40	11.63	12.64	**13.65**	14.66	15.68	16.69
	45	12.81	13.69	14.56	15.44	16.32	17.19
	50	15.17	15.68	16.18	16.69	17.19	17.70

PG %	AuraCool - AES850 - GPM						
		101	134	**179**	224	280	350
	25	7.89	9.27	10.65	12.04	13.42	14.80
	30	9.04	10.29	11.54	12.79	14.04	15.29
	35	10.19	11.31	12.43	13.55	14.67	15.78
	40	11.35	12.33	**13.32**	14.30	15.29	16.28
	45	12.50	13.35	14.21	15.06	15.92	16.77
	50	14.80	15.29	15.78	16.28	16.77	17.26

G&L Pumps

MCS

MCS Series End Suction Centrifugal Pumps

Bombas Centrífugas de Succión Final Serie MCS

Goulds Pumps
ITT Industries

A Full Range of Product Features
Un producto con una amplia gama de características

Superior Materials of Construction: AISI 304 and 316L stainless steel liquid handling components for corrosion resistance, quality appearance, and improved strength and ductility.

High Efficiency Impeller: Enclosed impeller with unique floating seal ring design maintains maximum efficiencies over the life of the pump without adjustment.

Casing: Stainless steel construction with NPT threaded, centerline connections, easily accessible vent, prime and drain connections with stainless steel plugs.

Mechanical Seal: Standard John Crane seal with carbon ceramic faces, BUNA elastomers, and stainless metal parts. Optional high temperature and chemical duty seals available.

Motors: NEMA standard open drip-proof, totally enclosed fan cooled enclosures. Rugged ball bearing design for continuous duty under all operating conditions.

Materiales superiores de construcción: *Los componentes para el manejo de líquidos son de acero inoxidable AISI 304 y 316L, lo que brinda resistencia a la corrosión, calidad y mayor forta leza y ductilidad.*

Impulsor de eficiencia superior: *El impulsor encerrado con un diseño único de anillo de sello flotante, mantiene a máxima eficiencia durante toda la vida útil de la bomba sin necesidad de ajustes.*

Carcasa: *Construcción de acero inoxidable con rosca NPT, conexiones centrales y conexiones de ventilación, cebado y drenaje de fácil acceso y tapones de acero inoxidable.*

Sello mecánico: *John Crane estándar con superficies de sellado de carbono/cerámica, elastómeros BUNA y componentes de metal inoxidable. También se encuentran disponibles sellos opcionales para altas temperaturas y manejo de productos químicos.*

Motores: *Estándar NEMA abiertos resguardados o totalmente encerrados con recinto enfriado por ventilador. Cojinete de bolas de sólido diseño para trabajo continuo bajo cualquier condición de operación.*

MCS Product Line Numbering System
Sistema de numeración de la línea de productos MCS

Example Product Code,
Ejemplo código del producto

1 MS 1 C 1 E 0

Mechanical Seal and O-ring
0 = Pre-engineered standard
For optional mechanical seal modify catalog order no. with seal code listed below.

Sello mecánico y anillo 'O'
0 = Estándar aprobado
Para sello mecánico opcional modificar el número de orden del catálogo con el código del sello según la siguiente tabla.

John Crane Mechanical Seal (⅜" seal), *Sello Mecánico John Crane (sello de ⅜")*

Seal Code, *Código del Sello*	Rotary, *Rotativo*	Stationary, *Estacionario*	Elastomers, *Elastómeros*	Metal Parts, *Partes Metálicas*	Part No., *Pieza Número*	Casing O-Ring, *Carcasa Anillo 'O'*
0	Carbon, *Carbono*	Ceramic, *Cerámica*	BUNA	18-8SS	10K10	BUNA
2		Sil-Carbide, *Carburo de silicona*	EPR	316 SS	10K18	EPR
3		Ceramic, *Cerámica*	Viton		10K24	Viton
4		Sil-Carbide, *Carburo de silicona*	Viton		10K55	
5	Sil-Carbide, *Carburo de silicona*		EPR		10K81	EPR
6			Viton		10K62	Viton

Impeller Option Code . . . No Adder Required
For optional impeller diameters modify catalog order no. with impeller code listed below. Select optional impeller diameter from pump performance curve.

Código del Impulsor Opcional . . . No se requiere adición
Para impulsores con diámetros opcionales modificar el número de orden del catálogo con el código del impulsor indicado a continuación. Escoger el impulsor con diámetro opcional de la curva de funcionamiento de la bomba.

Impeller Code, *Código del Impulsor*	Pump Size, *Tamaño de la Bomba*		
	1 x 1¼ – 6	1¼ x 1½ – 6	1½ x 2 – 6
	Diameter	Diameter	Diameter
K	–	6⅛	–
G	–	5 15/16	5⅜
H	–	5½	5
A	6⅛	5¼	4¾
B	5¾	5 1/16	4⅝
C	5 3/16	4⅞	4⅜
D	4¾	4⅝	4 1/16
E	4 7/16	4¼	3⅝
F	4 1/16	3⅜	–

Driver, *Motor*
1 = 1 PH, ODP 4 = 1 PH, TEFC
2 = 3 PH, ODP 5 = 3 PH, TEFC

HP Rating, *Capacidad en HP*
C = ½ HP E = 1 HP G = 2 HP J = 5 HP
D = ¾ HP F = 1½ HP H = 3 HP

Driver: Hertz/Pole/RPM,
Motor: Hercios/Polo/RPM
1 = 60 Hz, 2 pole, 3500 RPM
4 = 50 Hz, 2 pole, 2900 RPM

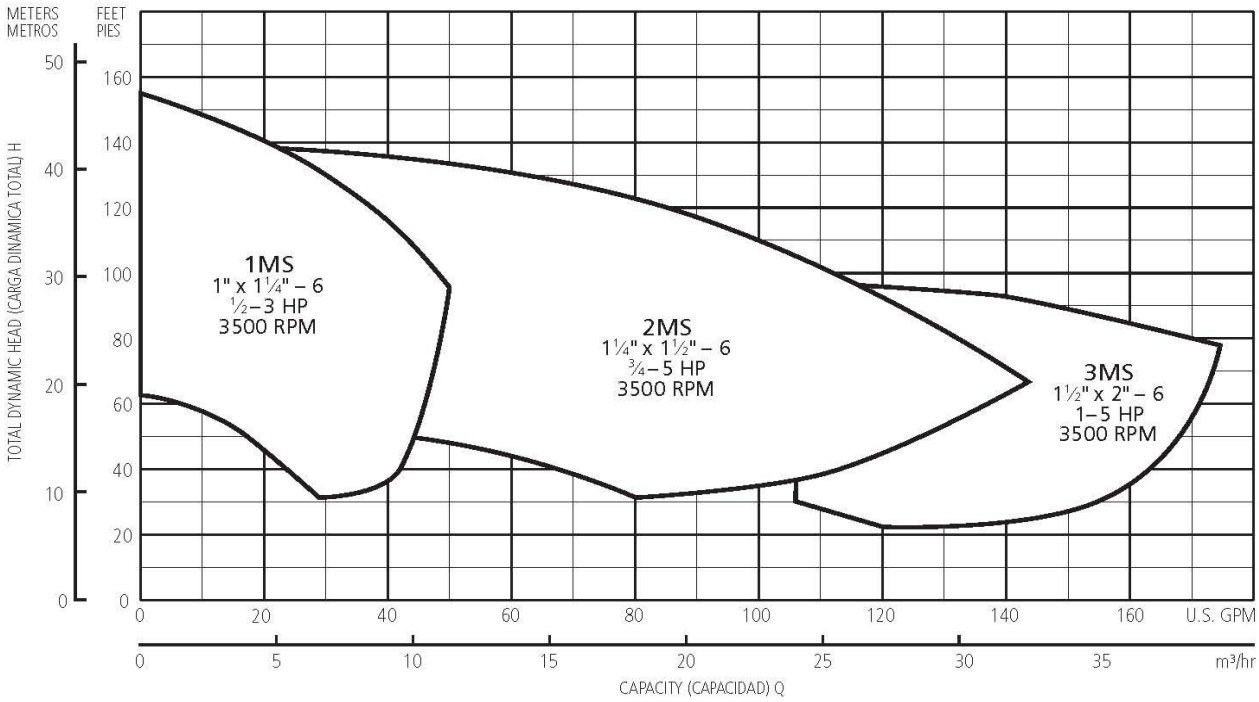
Material
MS = Stainless steel, *Acero inoxidable*

Pump Size, *Tamaño de la bomba*
1 = 1 x 1¼ – 6 2 = 1¼ x 1½ – 6 3 = 1½ x 2 – 6

The various versions of the MCS are identified by a product code number on the pump label. This number is also the catalog number for the pump. The meaning of each digit in the product code number is shown at right.

Las diferentes versiones de la MCS se identifican con un número de código de producto en la etiqueta de la bomba. Este número es también el número de catálogo de la bomba. El significado de cada dígito en el código del producto se muestra a la derecha.

Performance Coverage (60 Hz)
Rango de operación (60 Hz)



NOTES:
Not recommended for operation beyond printed H-Q curve.

For critical application conditions consult factory.

Not all combinations of motor, impeller and seal options are available for every pump model. Please check with G&L Pumps on non-cataloged numbers.

All standard 3500 RPM ODP and TEFC motors supplied by Goulds Pumps, have minimum of 1.15 service factor. Standard catalog units may utilize available service factor. Any motors supplied other than Goulds Pumps check available service factor.

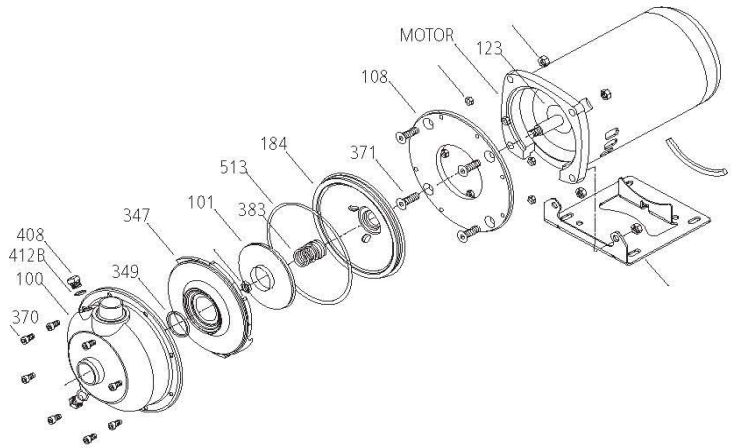
NOTAS:
No se recomienda para funcionamiento superior al indicado en la curva H-Q.

Para condiciones de aplicaciones críticas consultar con la fábrica.

No todas las combinaciones de motor, impulsor y sellos se encuentran disponibles para todos los modelos de bomba. Por favor consultar con G&L Pumps sobre los números no catalogados.

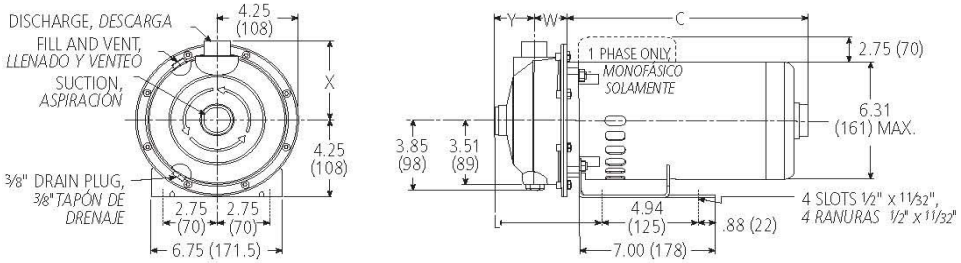
Todos los motores estándar de 3500 RPM, ODP (abiertos resguardados) y TEFC (totalmente encerrados con enfriamiento forzado) provistos por Goulds Pumps tienen un factor mínimo de servicio de 1,15. Las unidades estándar de catálogo pueden utilizar el factor de servicio disponible. Verificar el factor de servicio disponible de todo motor no provisto por Goulds Pumps.

MCS Close Coupled Pump Major Components: Materials of Construction
Materiales de construcción de los principales componentes de la bomba MCS de acoplamiento cerrado



Item No., *Parte No.*	Description, *Descripción*	Materials, *Materiales*
100	Casing, *Carcasa*	AISI 316L SS, *AISI 316L Acero inoxidable*
101	Impeller, *Impulsor*	
108	Motor adapter, *Adaptador del motor*	Aluminum, *Aluminio*
123	Deflector, *Deflector*	BUNA-N
184	Seal housing, *Alojamiento del sello*	AISI 316L SS, *AISI 316L Acero inoxidable*
347	Guidevane, *Difusor*	
349	Seal ring, guidevane; *Anillo del sello, difusor*	BUNA-N
370	Socket head screws, casing; *Encajes de tornillos, carcasa*	AISI 410 SS, *AISI 410 Acero inoxidable*
371	Bolts, motor; *Bulones, motor*	Steel, *Acero*
383	Mechanical seal, *Sello mecánico*	see chart, *ver tabla*
408	Drain and vent plug, casing; *Tapones de drenaje y ventilación, carcasa*	AISI 316L SS, *AISI 316L Acero inoxidable*
412B	O-ring, drain and vent plug; *Anillo 'O', tapón de drenaje y ventilación*	Viton
513	O-ring, casing; *Anillo 'O', carcasa*	
Motor *Motor*	NEMA standard, 56Y flange; *NEMA estándar, brida 56Y*	

MCS Close Coupled – Dimensions, Weights and Specifications
MCS Acople Cerrado – Dimensiones, pesos y especificaciones



Clockwise rotation viewed from drive end. *Rotación en dirección de las agujas del reloj visto desde el extremo del motor.*

NOTES:
1. Pumps will be shipped with top vertical discharge as standard. For other orientations, remove casing screws, rotate to desired position, and tighten 6mm screws to 5 – 6 lbs./ft.(6.8-8 N•m).
2. Dimensions in inches and millimeters (mm). Weight in pounds and kilograms (kg).
3. Motor dimensions may vary with motor manufacturer.
4. Not to be used for construction purposes unless certified.

NOTAS:
1. Las bombas se entregan con la descarga vertical superior estándar; para una orientación diferente, retirar los tornillosde la carcasa, hacer girar hasta la posición deseada y ajustar los bulones de 6 mm a 5-6 libras/pie (6,8-8 N-m).
2. Dimensiones en pulgadas y milímetros (mm), peso en libras y kilogramos (kg).
3. Las dimensiones del motor pueden variar de acuerdo al fabricante.
4. No utilizar para fines de construcción a menos que estén certificadas.

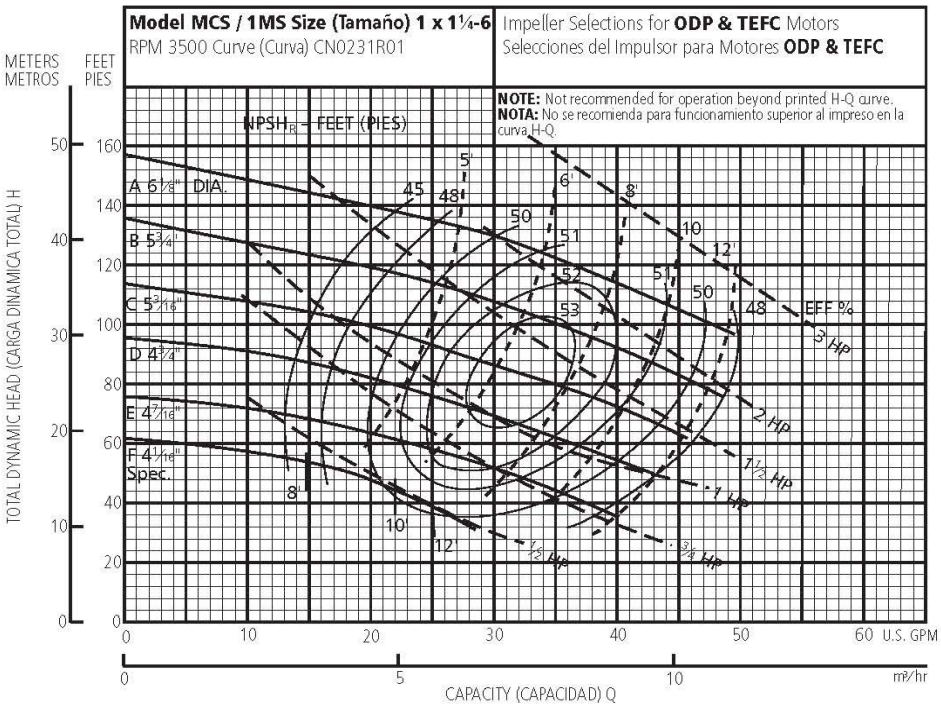
Dimensions and Weights – Determined by Pump, *Dimensiones y peso – Determinados por la bomba*

Pump, *Bomba*	Suct., *Aspiración*	Disch., *Descarga*	HP	W	X	Y	L	Wt. Less Motor, *Peso sin motor*
1 MS	1.25 (32)	1.00 (25)	½-3	1.65 (42)	4.38 (111)	2.00 (51)	5.38 (137)	6 (2.7)
2 MS	1.50 (38)	1.25 (32)	¾-5	2.09 (53)	4.50 (114)	2.12 (54)	5.94 (151)	7 (3.2)
3 MS	2.00 (51)	1.50 (38)	1-5	2.09 (53)	4.62 (117)	2.12 (54)	5.12 (130)	7 (3.2)

Dimensions and Weights – Determined by Motor, *Dimensiones y peso – Determinados por el motor*

HP	Motor Length and Weights, *Longitud y peso del motor*							
	1 Phase, *Monofásicos*				3 Phase, *Trifásicos*			
	ODP		TEFC		ODP		TEFC	
	C	Weight, *Peso*	C	Weight, *Peso*	C	Weight, *Peso*	C	Weight, *Peso*
½	10.88 (276)	24 (10.9)	11.56 (294)	30 (13.6)	10.38 (264)	24 (10.9)	10.31 (262)	19 (8.6)
¾	10.88 (276)	26 (11.8)	12.38 (315)	33 (14.9)	10.62 (270)	25 (11.3)	11.06 (281)	21 (9.5)
1	11.62 (295)	27 (12.2)	12.31 (313)	37 (16.8)	11.12 (282)	26 (11.8)	11.06 (281)	23 (10.4)
1½	13.62 (346)	28 (12.7)	13.56 (344)	40 (18.1)	11.62 (295)	28 (12.7)	11.38 (289)	29 (13.1)
2	12.62 (321)	30 (13.6)	13.56 (344)	42 (19)	11.62 (295)	31 (14)	12.81 (327)	36 (16.3)
3	12.44 (316)	36 (16.3)	14.31 (363)	48 (21.7)	12.38 (315)	34 (15.4)	15.06 (383)	40 (18.1)
5	14.03 (356)	48 (21.7)	—	—	14.03 (356)	46 (20.8)	—	—

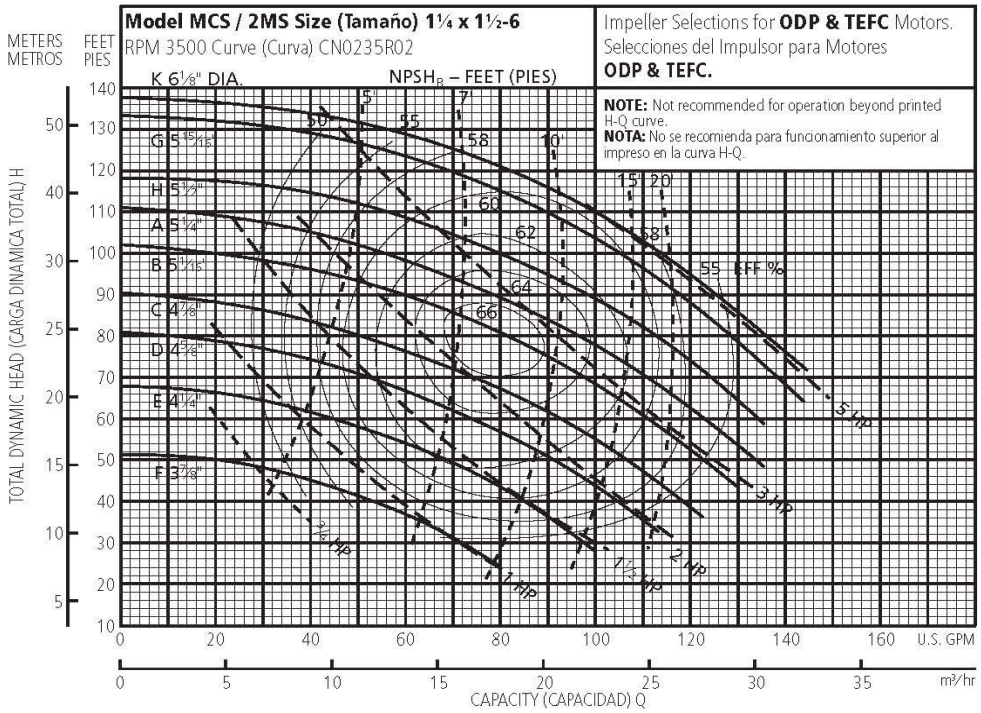
Performance Curves – 60 Hz, 3500 RPM
Curvas de desempeño – 60 Hz, 3500 RPM



Ordering Code, *Código de Pedido*	Standard HP Rating, *Capacidad HP estándar*	Imp. Dia.
F	½	4¹⁄₁₆" spec.
E	½	4⁷⁄₁₆
D	¾	4¾
C	1	5³⁄₁₆
B	1½	5¾
A	2	6⅛

NOTE: Although not recommended, the pump may pass a ¹⁄₁₆" sphere.

NOTA: *Si bien no se recomienda, la bomba puede pasar una esfera de ¹⁄₁₆".*

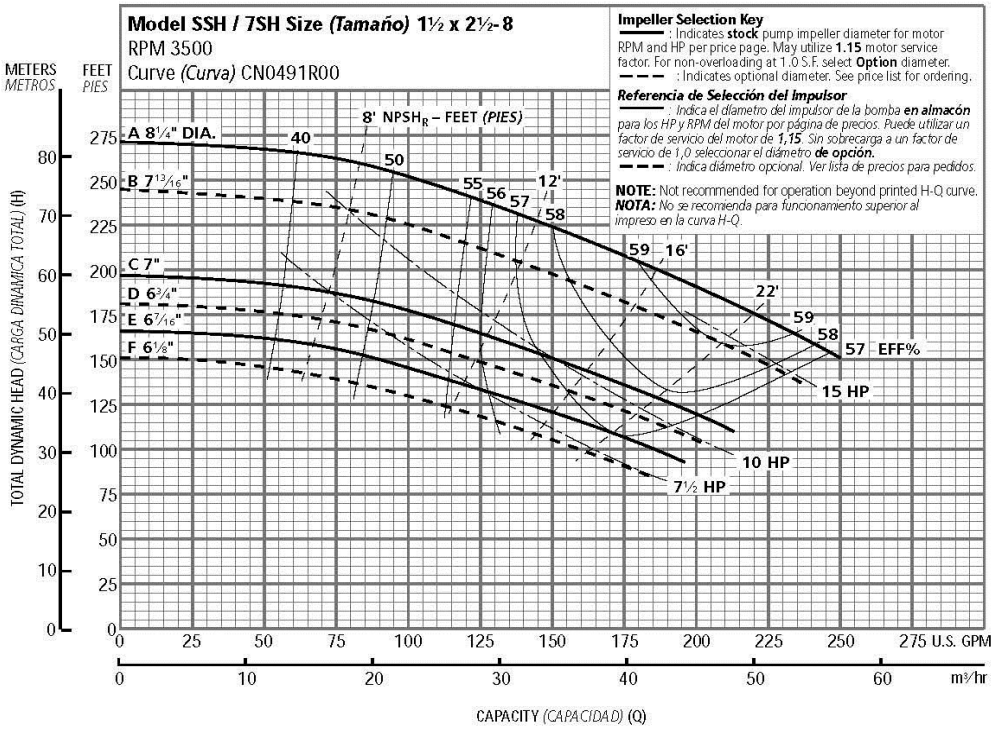


Ordering Code, *Código de Pedido*	Standard HP Rating, *Capacidad HP estándar*	Imp. Dia.
F	¾	3⅞"
E	1	4¼
D	1½	4⅝
C	2	4⅞
B	3	5¹⁄₁₆
A	3	5¼
H	5	5½
G	5	5¹⁵⁄₁₆
K	5	6⅛

NOTE: Although not recommended, the pump may pass a ³⁄₁₆" sphere.

NOTA: *Si bien no se recomienda, la bomba puede pasar una esfera de ³⁄₁₆".*

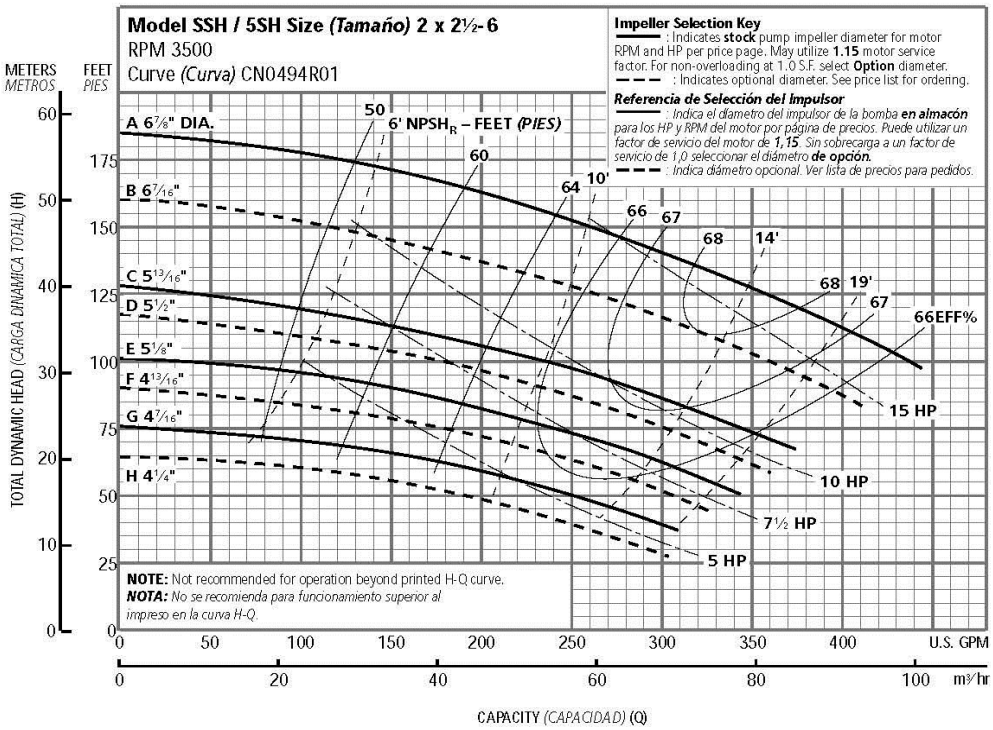
Performance Curves – 60 Hz, 3500 RPM
Curvas de Funcionamiento – 60 Hz, 3500 RPM



Optional Impeller, *Impulsor Opcional*		
Impeller Code, *Código del Impulsor*	Dia., *Diá.*	Motor HP, *HP del motor*
A	8¼"	15
B	7 13/16	15
C	7	10
D	6¾	10
E	6 7/16	7½
F	6⅛	7½

NOTE: Pump will pass a sphere to 3/16" diameter.

NOTA: *La bomba pasará una esfera a 3/16" diámetro.*



Optional Impeller, *Impulsor Opcional*		
Impeller Code, *Código del Impulsor*	Dia., *Diá.*	Motor HP, *HP del motor*
A	6⅞"	15
B	6 7/16	15
C	5 13/16	10
D	5½	10
E	5⅛	7½
F	4 13/16	7½
G	4 7/16	5
H	4¼	5

NOTE: Pump will pass a sphere to 5/32" diameter.

NOTA: *La bomba pasará una esfera a 5/32" diámetro.*

B3...VS Series, 3-Way, Ball Valve
Bronze Body, Stainless Steel Ball and Stem

BELIMO

- 316 Stainless Ball and Stem
- Reinforced PTFE seats and stuffing box
- Blow-out proof stem design
- Adjustable packing gland

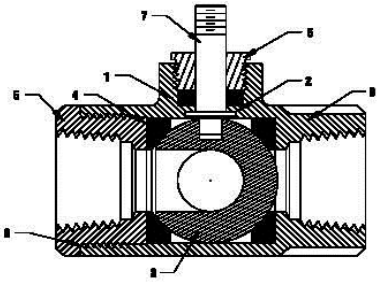
Application

These threaded valves are designed to provide modulating or two position control of hot or chilled water.

Typical applications include reheat coils, VAV terminal control, unit ventilators, and air handlers, especially in areas which have minimum profile requirements.

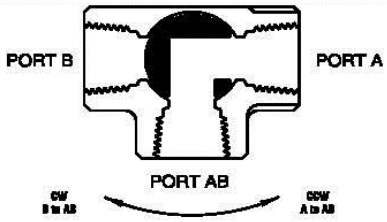
- 400 PSIG WOG, Cold Non-Shock

Technical Data	
Media	chilled or hot water, glycol
Flow characteristic	modified equal percentage
Action	90° rotation A to AB open CCW, B to AB open CW
Sizes	½", ¾", 1", 1¼", 1½", 2"
Type of end fitting	SAE NPT (female connection)
Materials:	
1 Stem Packing	PTFE
2 Stem Bearing	PTFE
3 Ball	316 Stainless Steel
4 Seat (x2)	PTFE w/ Durafill
5 Retainer	B16 (½" - 1") Brass B584 (1¼" - 2") Brass
6 Gland	ASTM B16 Brass
7 Stem	316 Stainless steel
8 Jam Nut	PTFE (1¼"" - 2")
9 Body Seal	B584-C84400 Bronze



Pressure rating	400 psig WOG
Media temp. range	-22°F to 250°F (-30°C to 120°C)
Close-off pressure	400 psig @ 100°F
Maximum differential pressure (ΔP)	<75 psig

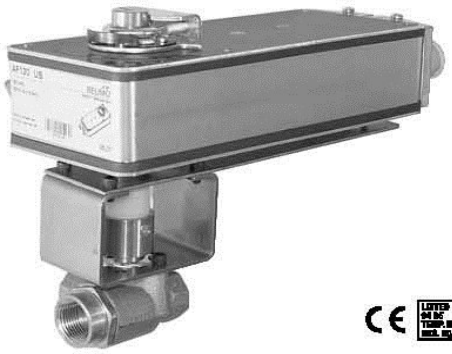
Flow Patterns



Cv	Valve Nominal Size Inches	DN [mm]	Type 3-way NPT	Suitable Return Actuators: Spring LF	Spring NF	Non-Spring LM
4.8	½	15	B315VS	LF	NF	LM
11	¾	20	B320VS	NF		NM Series
21	1	25	B325VS	AF Series		
33	1¼	32	B332VS			AM
49	1½	40	B340VS			GM Series
91	2	50	B350VS			

AF Actuators, On/Off

BELIMO

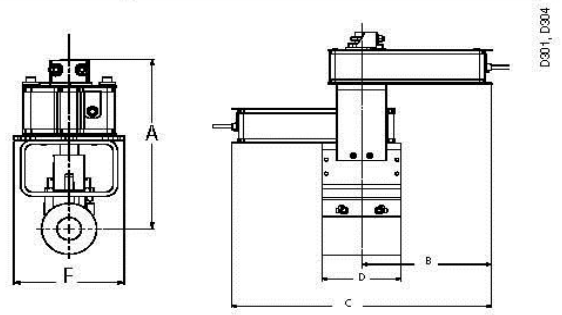


Models

AF24 US
AF24-S US w/built-in Aux. Switches
AF120 US
AF120-S US w/built-in Aux. Switches

Technical Data		
Control		on/off
Power consumption		
AF24(-S) US	running	5 W
	holding	1.5 W
AF120(-S) US	running	6 W
	holding	2.3 W
Transformer sizing		10 VA, class 2 power
Electrical connection (-S model has 2 cables)		½" conduit connector 3 ft [1m], 18 GA appliance cables
Electrical protection		120 V actuators double insulated
Overload protection		electronic throughout 0° to 95° rotation
Angle of rotation		95°
Position indication		visual indicator
Manual override		hex crank
Running time	control	150 seconds independent of load
	spring	<20 seconds
Ambient temperature		-22° F to 122° F [-30° C to 50° C]
Housing		NEMA 2 / IP54
Agency listings		UL 873, CSA C22.2 No. 24 certified, CE
Noise level		max. 45 dB(A)
AF...-S US		
Auxiliary switches		2 x SPDT, 7A (2.5A) @ 250 VAC, UL listed, one switch is fixed at +5°, one is adjustable 25° to 85° (double insulated)

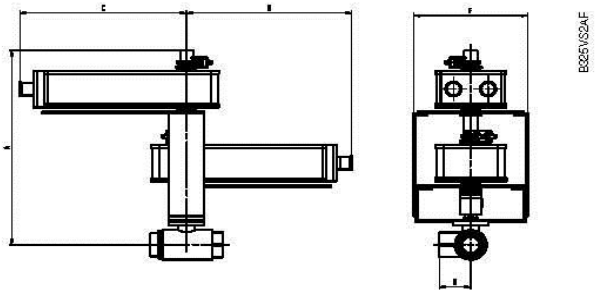
Dimensions with 2-Way Valve



Valve Body	COP	Valve Nominal Size Inches	DN [mm]	Dimensions (Inches) A	B	C	D	F
B2100VS-68	200	1	25	8.00	8.00	8.00	3.60	4.60
B2125VS-48	100	1¼	32	8.00	8.00	8.00	4.00	4.60
B2150VS-84	200	1½	40	8.00	8.00	8.00	4.40	4.60
B2200VS-108	200	2	40	8.00	8.00	8.00	4.70	4.60
2*B2150VS-177	400	1½	50	14.00	8.00	8.00	4.80	5.60
2*B2200VS-389	100	2	20	14.00	8.00	8.00	5.40	5.60
B2125VSS-48	1000	1¼	25	8.00	8.00	8.00	4.00	4.60
B2150VSS-84	1000	1½	32	13.00	8.00	8.00	4.40	4.60
B2200VSS-108	400	2	40	8.00	8.00	8.00	5.50	4.60
2*B2200VSS-108	1000	2	50	14.00	8.00	8.00	5.50	5.60
2*B2250VSS-503	200	2½	50	14.00	8.00	8.00	6.80	4.60
2*B2300VSS-370	200	3	80	14.00	8.00	8.00	6.80	5.60

*Dual mounted actuators.

Dimensions with 3-Way Valve



Valve Body	COP	Valve Nominal Size Inches	DN [mm]	Dimensions (Inches) A	B	C	D	E	F
B320VS	200	¾	20	7.00	2.00	8.00	3.56	1.88	3.86
B325VS	75	1	25	7.00	2.00	8.00	3.56	1.88	3.86
B332VS	75	1¼	32	7.00	2.00	8.00	4.13	2.07	6.25
*B325VS	200	1	25	7.00	2.00	8.00	3.56	1.88	3.86
*B332VS	200	1¼	32	7.00	2.00	8.00	4.13	2.07	6.25
*B340VS	75	1½	40	15.00	3.00	8.00	4.44	2.25	6.25
*B350VS	75	2	50	15.00	3.00	8.00	5.38	2.75	6.25

*Dual mounted actuators.

BELIMO

G7...(S) 3-way Mixing Flanged Globe Valve, Bronze or Stainless Steel Trim

Application

This valve is typically used in Large Air Handling Units on heating or cooling coils. This valve is suitable for use in a hydronic system with variable flow.

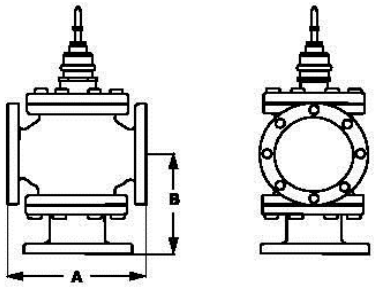
Valve Nominal Size		Type	Suitable Actuators			
C_v	Inches	3-way Flanged	Non-Spring	Spring		Electronic Fail-Safe
68	2½	G765(S)	NVG	AF	AFX Series	GK Series
91	3	G780(S)	GM Series			
190	4	G7100(S)				
280	5	G7125(S)				
340	6	G7150(S)				

Technical Data

	G7	G7...S
Service	chilled or hot water, 60% glycol	chilled or hot water, 60% glycol
Flow characteristic	linear	
Action	stem up - open B to AB	
Sizes	2½" to 6"	
End fitting	125 lb. flanged	
Materials		
Body	iron	iron
Seat	bronze	stainless steel
Stem	stainless steel	stainless steel
Plug	bronze	stainless steel
Packing	NLP (no lip packing)	TFE V-ring
ANSI class	ANSI 125	
Leakage	Class III	
Max inlet		
Water	150 psi (1034kPa) @ 250°F	150 psi (1034kPa) @ 250°F
Media temperature		
Water	32°F to 300°F (0°C to 148°C)	32°F to 350°F (0°C to 176°C)
Maximum ΔP*		
Water	25 psi (172kPa)	50 psi (340kPa)
Rangeability	50:1	

*(50% or more open)

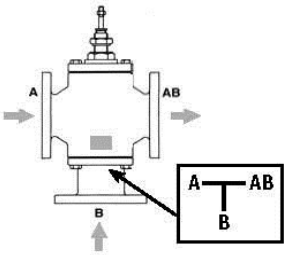
Dimensions



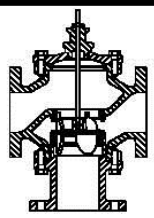
D169-G72N

Valve Body	Valve Nominal Size Inches	DN [mm]	Dimensions (Inches [mm]) A	B
G765(S)	2½"	[65]	9" [229]	7.12" [181]
G780(S)	3"	[80]	10" [254]	8" [203]
G7100(S)	4"	[100]	13" [330]	9.87" [251]
G7125(S)	5"	[125]	15.75" [400]	9.25" [235]
G7150(S)	6"	[150]	17.75" [451]	9.87" [251]

G7...(S) 3-way Flow Patterns



Flow Pattern is marked on valve.



Stem Up = Open B to AB

Piping

The valves should be mounted in a weather-protected area in a location that is within the ambient limits of the actuator. Allow sufficient room for valve with actuator and for service. For the NV Series, allow 6" for cover removal and 12" for complete actuator removal. The G6/G7 preferred mounting position of the valve is with the valve stem vertical above the valve body, for maximum life. However, the assemblies can be mounted with valve stem vertical above the valve or up to 45 degrees in relation to the horizontal pipe. The actuators should never be mounted underneath the valve, as condensation can build up and result in a failure of the actuators. Do not reverse flow direction.

GMB24-3-X1 Actuators, On/Off, Floating Point

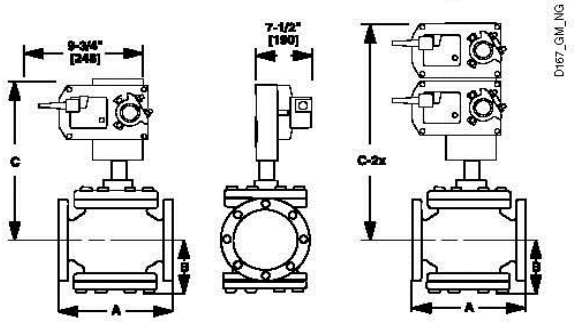
BELIMO

Models

GMB24-3-X1
2xGMB24-3-X1

Technical Data		
Power supply		24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption	running	4 W
	holding	2 W
Transformer sizing		6 VA (Class 2 power source)
Electrical connection		☐ 3 ft [1m] 18 GA plenum rated cable ½" conduit connector
Overload protection		electronic throughout stroke
Control		On/Off, Floating Point
Angle of rotation		95°
Direction of rotation		reversible with switch
Position indication		reflective visual indicator (snap-on)
Running time		150 seconds, constant independent of load
Humidity		5 to 95% RH non-condensing
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Housing		NEMA 2/IP54 with cable entry down
Housing material		UL94-5V (flammability rating)
Agency listings		cULus acc. to UL 60730-1A/-2-14, CAN/CSA E60730-1, CSA C22.2 No. 24-93, CE acc. to 89/336/EEC
Noise level		<45 dB(A)
Quality standard		ISO 9001

Dimensions with G6/G6C ANSI 125 and G6 ANSI 250 Series 2-Way Valve



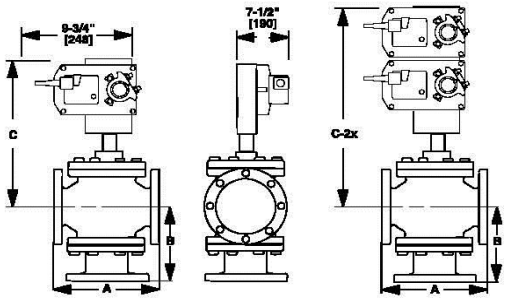
Valve Body	Valve Nominal Size Inches	DN [mm]	Dimensions (Inches [mm]) A	B	C
G6 ANSI 125	2½"	65	9.00" [229]	4.75" [121]	13.50" [343]
G6 ANSI 125	3"	80	10.00" [254]	5.37" [136]	13.93" [355]
G6 ANSI 250	2½"	65	9.62" [244]	4.75" [121]	13.50" [343]
G6 ANSI 250	3"	80	10.75" [273]	5.37" [136]	13.93" [355]
G6C ANSI 125	4"	100	13.00" [330.2]	6.87" [175]	15.50" [394]
G6C ANSI 125	5"	125	15.75" [400]	7.87" [200]	16.12" [410]
G6C ANSI 125	6"	150	17.75" [451]	8.50" [216]	16.75" [425]

Valve Body	Valve Nominal Size Inches	DN [mm]	Dimensions (Inches [mm]) A	B	C-2x
G6 ANSI 125	2½"	65	9.00" [229]	4.75" [121]	18.25" [464]
G6 ANSI 125	3"	80	10.00" [254]	5.37" [136]	19.18" [487]
G6 ANSI 250	2½"	65	9.62" [244]	4.75" [121]	18.25" [464]
G6 ANSI 250	3"	80	10.75" [273]	5.37" [136]	19.18" [487]

BELIMO

GMB24-3-X1 Actuators, On/Off, Floating Point

Dimensions with G7 and G7D ANSI 125/250 Series 3-Way Valve

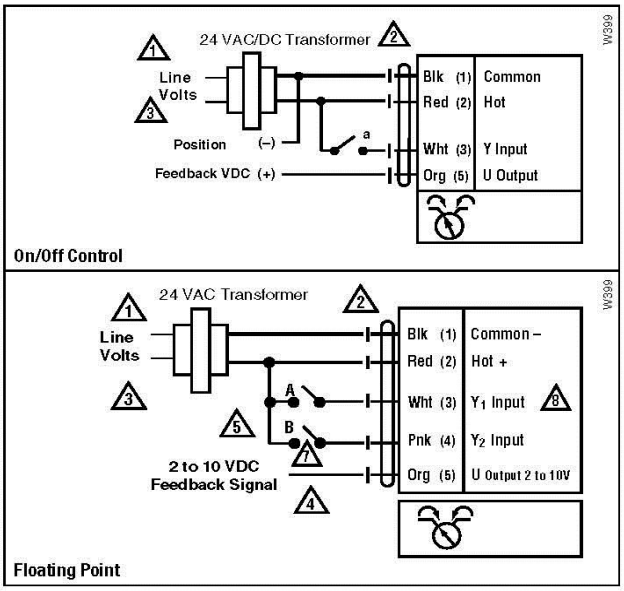


	Valve Nominal Size		Dimensions (Inches [mm])		
Valve Body	Inches	DN [mm]	A	B	C
G7 & G7D ANSI 125	2-1/2"	65	9.00" [229]	7.12" [181]	13.87" [352]
G7 & G7D ANSI 125	3"	80	10.00" [254]	8.00" [203]	14.43" [367]
G7 & G7D ANSI 125	4"	100	13.00" [330]	9.87" [251]	15.50" [394]
G7D ANSI 125	5"	125	12.00" [305]	10.50" [267]	14.12" [359]
G7D ANSI 125	6"	150	14.12" [359]	11.12" [282]	15.12" [505]
G7 & G7D ANSI 250	2-1/2"	65	9.62" [244]	7.37" [187]	13.87" [352]
G7 & G7D ANSI 250	3"	80	10.75" [273]	8.37" [213]	14.43" [367]
G7 & G7D ANSI 250	4"	100	13.62" [346]	10.25" [260]	15.50" [394]
G7D ANSI 250	5"	125	12.87" [327]	11.00"[279]	14.12" [359]
G7D ANSI 250	6"	150	14.50" [368]	11.50" [292]	15.12" [505]

	Valve Nominal Size		Dimensions (Inches [mm])		
Valve Body	Inches	DN [mm]	A	B	C-2x
G7 ANSI 125	2-1/2"	65	9.00" [229]	7.12" [181]	18.62 [473]
G7 ANSI 125	3"	80	10.00" [254]	8.00" [203]	19.18 [487]
G7 ANSI 125	4"	100	13.00" [330.2]	9.87" [251]	20.25 [514]
G7 ANSI 125	5"	125	15.75" [400]	9.25" [235]	18.87 [480]
G7 ANSI 125	6"	150	17.75" [451]	9.87" [251]	19.87 [505]
G7 ANSI 250	2-1/2"	65	9.62" [244]	7.37" [187]	18.75 [476]
G7 ANSI 250	3"	80	10.75" [273]	8.37" [213]	19.37 [492]
G7 ANSI 250	4"	100	13.62" [346]	10.25" [260]	20.37 [517]
G7 ANSI 250	5"	125	16.62" [422]	10.37" [264]	19.25 [489]
G7 ANSI 250	6"	150	18.62" [473]	11.00 [279]	19.75 [502]

Wiring Diagrams

1. Provide overload protection and disconnect as required.
2. Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.
3. Actuators may also be powered by 24 VDC.
4. Position feedback cannot be used with Triac sink controller. The actuator internal common reference is not compatible.
5. Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.
7. Contact closures A & B also can be triacs. A& B should both be closed for triac source and open for triac sink.
8. For triac sink the common connection from the actuator must be connected to the hot connection of the controller.



Wiring Diagrams for Multiple On/Off, Floating Point Actuators

1. Provide overload protection and disconnect as required.
2. Actuators may be connected in parallel. Power consumption and input impedance must be observed.
3. Actuators may also be powered by 24 VDC.
4. Set reversing switch (CCW-CW) (A-B) as required by control logic and control range..