SARMAAFARIN

Air Cooled Liquid Chillers

AEROACOUSTIC

ISO 9001

Certificate No.: 9190.C308

FORM SSI - 30XD (1400)

30XD

060-640

(211 to 2250 Nominal KW)
60 to 640 Nominal Tons

INTRODUCTION

SarmaAfarin Aeroacoustic 30XD series have compatible design to meet the efficiency demands of today and the future by providing premium air-cooled chiller packages for contractors, consulting engineers and building owners.

30XD Features:

- Positive displacement, twin screw compressor.
- Chlorine free R-134a HFC Refrigerant
- Quiet AeroAcoustic axial condenser fan system
- Easy to use Comfort Link controls and monitor.
- Foot print Most efficient air cooled models.
- Full load ESEER up to 10.9 and COP up to 3.5 so that might exceeds the EN energy requirement as A+.
- The AeroAcoustic 30XD chillers deliver superior efficiency through the entire operating range to keep costs and demand charges down.
- Compatible with Standard & harsh Condition in that tolerate high temperature condition.

Description

30XD liquid chillers are the premium solution for industrial and commercial applications where installers, consultants and building owners require optimal performances and maximum quality.
The 30XD liquid chillers are designed to meet current and future requirements in terms of energy efficiency and operating sound levels. They use the best technologies available today.

- Twin-rotor screw compressors with a variable capacity valve
- Low noise generation fans
- PLC based control system
- Electronic expansion vale

Features/Benefits

Very Economical Operation

Extremely high full load and part load energy efficiency due to:

- New twin-rotor screw compressor equipped with a high efficiency motor and a variable capacity valve that permits exact matching of the cooling capacity to the load
- Efficient air cooled condenser with variable frequency drive (VFD)
- Electronic expansion device permitting operation at a lower condensing pressure and improved utilization of the evaporator heat exchange surface (superheat control)

Low Operation Sound Levels

- Compressors
  - Oil separator integrated in the compressor casing
  - Suction piping with flexible connections to prevent noise and vibration transmission
  - Compressor sound box (optional)

- Condenser section
  - Condenser coil in V-shape with an open angle, allowing quieter air flow across the coil
  - Low-noise axial fans
  - Rigid fan mounting preventing start-up noise
  - Fan diffuser (optional)

Easy and Fast Installation

- Ready to be connected to centrifugal low or high-pressure water pump (as required), based on the pressure loss of the hydronic installation.
  - Can be equipped by costumer with single or dual pump (as required) with operating time balancing and automatic changeover to the back-up pump if a fault develops
  - Thermal insulation for higher efficiency
  - Equipped with anti-freeze to prevent ice-forming in the cooler
  - Factory wired and ready to be connected to power

- Simplified electrical connections
  - Main disconnect switch with high trip capacity
  - Transformer to supply the integrated control circuit (400/24V)

- Fast commissioning
  - Systematic factory operation test before shipment
  - Quick-test function for step-by-step verification of the instruments, expansion devices, fans and compressors.

Environmental Care

- Refrigerant R134a as HFC group
- Leak-tight refrigerant circuit
  - Reduction of leaks as no refrigerant connection is made at site
  - Verification of pressure transducers and temperature sensors without transferring refrigerant charge
  - Discharge shut-off valve and liquid line service valve for simplified maintenance

PLC based Control

PLC Controller is an advanced numeric control system that combines intelligence with great operating simplicity. The control constantly monitors all machine parameters and precisely manages the operation of compressors, electronic expansion devices, fans and evaporator water pump for optimum energy efficiency

■ Energy management
- Leaving or entering cooler water temperature controls chiller on/off.
- Continuously control compressor capacity to match required load
- Chiller PLC system can be integrated with building management system (BMS)

■ Ease-of-use
- User interface with large screen for intuitive access to the operating parameters. The information is in clear text

Absolute Reliability

■ Screw Compressors
- Industrial-type screw compressors with oversized bearings and motor cooled by suction gas
- All compressor components are easily accessible on site minimizing down-time
- Protection increased by an electronic board

■ Air condenser
- Copper tube aluminum fin, mechanically expanded to eliminate bond resistance

■ Evaporator
- Thermal insulation wit high quality insulators for perfect resistance to external aggression

■ Auto-adaptive control
- Control algorithm prevents excessive compressor cycling

■ Exceptional endurance tests
- Partnerships with specialized laboratories and use of limit simulation tools (finite element calculation) for the design of critical components
- Transport simulation test in the factory, based on a military standard and equivalent to 4000 km by truck
- Salt mist corrosion resistance test in the laboratory for increased corrosion resistance

Benefits of Screw Compressors

Compact Screws are of two shaft rotary displacement design with newly-developed profile geometry. The main parts of these compressors are the two rotors which are fitted into a closed housing. The rotors are precisely located at both ends in rolling contact bearings (radial and axial) which, in conjunction with the generously sized oil supply chambers, provides optimum emergency running characteristics.

Owing to the specific design this type of compressor does not require any working valves. To protect against reverse running when the compressor is switched off (expansion operation) a check valve is incorporated in the discharge chamber (this valve does not however replace any check valves).

A primary benefit is that the compressors are started slowly, requiring more than six minutes to go from a stop to full-speed condition. This reduces vibration and compressor stresses for longer life. If liquid refrigerant is present at the compressor intake, the slow acceleration easily moves the liquid out without damaging the compressor.

Fully equipped

■ Capacity control/start unloading
■ Discharge shut-off valve
■ Suction flange with brazing/welding bushing
■ Check valve in discharge gas outlet
■ Insertion type oil heater with sleeve
■ Oil sight glass
■ Oil service valve
■ Suction gas filter with large surface area and fine mesh
■ Internal pressure relief valve, an internal pressure relief valve is fitted as burst protection.
■ Less vibration
■ Fewer moving parts

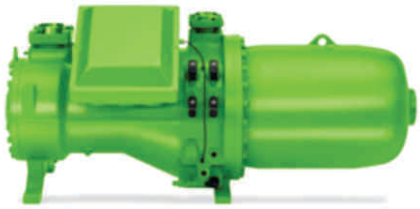


Figure 1-Bitzer Compact Screw Compressor (CSH Series)

Compressor Sound Box

SSI Compressor Soundproof box is designed to reduce the noise of compressors. The box has removable door that allows for easy access to the air compressor and components. This compressor sound proof box is ideal for any place in which the noise is a major issue and can be supplied by SSI as an option.

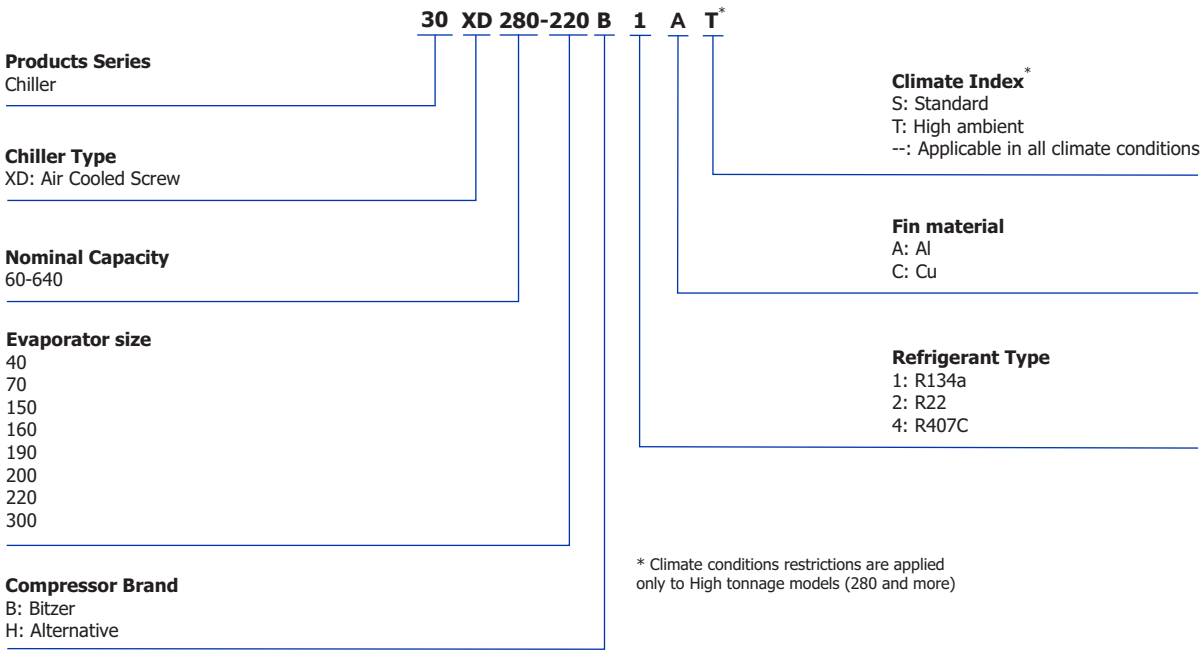
Condenser Fan Diffuser

A new axial fan diffuser is designed to boost the pressure increase of fan impeller which leads to fan efficiency improvement and thus noise emission reduction. 30XD chillers can be equipped with these diffusers in noise-sensitive applications upon customer request.

Factory Testing

All SSI Applied screw chillers are factory-tested prior to shipment. Operating and safety controls are checked for correct settings and operation. This testing helps reduce field start-up issues and maintain critical construction schedules.

Model number nomenclature



* Climate conditions restrictions are applied only to High tonnage models (280 and more)

AHRI CAPACITY RATING (English and SI UNITS)

UNIT 30XD	Capacity		Power	Full Capacity	
	kWR	TONS	kW	COP	EER
60-40	123	35	37	3.32	11.32
80-40	163	46	51	3.23	11.01
100-70	217	62	61	3.55	12.10
120-70	246	70	72	3.42	11.66
140-160	294	84	85	3.48	11.86
160-160	351	100	103	3.42	11.66
180-160	396	113	117	3.40	11.58
200-200	443	126	125	3.54	12.09
220-200	475	135	133	3.57	11.88
235-200	503	143	138	3.65	11.68
250-220	535	152	148	3.61	12.11
265-220	556	157	160	3.48	12.02
280-220S	623	177	180	3.53	12.04
300-220S	677	192	192	3.19	10.88
320-300S	771	219	215	3.59	12.25
340-300S	800	228	223	3.58	12.23
360-300S	859	244	233	3.68	12.56
390-300S	907	258	254	3.57	12.18
420-300S	955	272	275	3.47	11.85
420-380S	1041	296	273	3.81	12.99
450-380S	1096	312	293	3.74	12.75
480-380S	1150	327	313	3.73	12.73
520-380S	1194	340	332	3.67	12.54
560-380S	1238	352	350	3.60	12.28
600-380S	1279	364	366	3.53	12.05
640-380S	1320	375	381	3.46	11.82
280-220T	452	129	246	1.84	6.28
300-220T	491	140	258	1.90	6.49
320-300T	556	158	276	2.01	6.89
340-300T	595	169	285	2.08	7.11
360-300T	640	182	298	2.15	7.33
390-300T	678	193	328	2.07	7.06
420-300T	716	204	357	2.00	6.84
420-380T	767	218	360	2.13	7.27
450-380T	817	232	381	2.14	7.32
480-380T	867	246	402	2.16	7.36
520-380T	887	252	429	2.07	7.06
560-380T	908	258	456	1.98	6.79
600-380T	954	271	471	2.03	6.91
640-380T	1000	284	486	2.06	7.02

LEGEND

COP - Coefficient of Performance
EER - Energy Efficiency Ratio
kWR - kilowatt of Refrigeration

1. Rated in accordance with AHRI Standard 550/590 at standard rating conditions.
2. Standard rating conditions are as follows:
   Chilled Water Entering Temperature: 54°F, Leaving Temperature: 44°F
   Condenser Entering Air Dry Bulb Temperature in S series: 95°F (35°C)
   Condenser Entering Air Dry Bulb Temperature in T series: 125°F (52°C)
   Fouling Factor: 0.00010 hr×ft^2°F/Btu (0.000018 m^2×°C/W)

PHYSICAL DATA

UNIT 30XD		60-40	80-40	100-70	120-70	140-160	160-160	180-160	200-200	220-200	235-200	250-220	265-220
weight(lb)*	Al Fin	5765	6614	6677	8950	9874	12677	12715	14226	14288	15505	16030	16082
	Cu Fin	5897	6746	6810	9148	10072	12942	12979	14557	14619	15902	16426	16479
Refrigerant		R134a											
Compressor	Bitzer	CSH Series											
	Total Oil Chg .(gal)	4	5.8	2*2.7	2*4	2*4	2*5.8	2*5.8	2*5.8	2*5.8	5+5.8	2*5	2*5
	Alternative	Applicable											
	%CAP Circuit 1	100	100	50	50	50	50	50	45	50	47	50	47
	%CAP Circuit 2	0	0	50	50	50	50	50	55	50	53	50	53
	No. Control Steps	4	4	8	8	8	8	8	8	8	8	8	8
Cooler	Type	Shell & Tube With Enhanced Copper Tubes											
	Working Pressure (Psig)	Refrigerant Side=235							Water Side=150				
	Shell, Net Volume (gal)	16	16	22	22	51	51	51	46	46	46	60	60
	Model (10SAX)	040	040	070	070	160	160	160	200	200	200	220	220
	Water Connection (in)	3	3	4	4	6	6	6	6	6	6	6	6
Eco**	30XD	NA											
Condenser	Type	Fin & Tube, V-Type											
	Condenser Fan	Axial 800 mm diameter, Vertical discharge											
	Quantity	4	4	4	6	6	8	8	10	10	12	12	12
	Total Air Flow(CFM) *1000	43.6	43.6	43.6	65.4	65.4	87.2	87.2	109.0	109.0	130.8	130.8	130.8
	Power/Fan	≈2											
	Fan RPM	910											
	Row/FPI	4/14											
	Total face area (Sq. Ft)	95.0	95.0	95.0	142.6	142.6	190.1	190.1	237.6	237.6	285.1	285.1	285.1
Dimension*	Length(in.)	126	126	126	173	173	220	220	267	267	315	315	315
	Width(in.)	91.1											
	Height(in.)	103.3											

*The weight and dimensions of units are approximate and may be subject to change.
**Economizer

Cooler Model	10SAX	040	070	150	160	190	200	220	300
Shell Net. Vol. ↑	gal	16	22	53	51	60	46	60	106
Shell OD	inch	10 ¾	12 ¾	18	16	18	18	18	20
Shell Length *	inch	81 ¾	81 ¾	81 ¾	107 ⅜	107 ⅜	81 ¾	107 ⅜	147⅝
Refrigerant Ckts.	No.	1	2	1	2	1	2	2	2
Max. Design Working Pressure	psig	Refrigerant Side: 235					Water Side: 150		
Water Inlet & Outlet Connection	inch	3 ASA**	4 ASA	6 ASA	6 ASA	6 ASA	6 ASA	6 ASA	10 ASA
Cooler Drain Connection	inch	¾ MPT	¾ MPT	¾ MPT	¾ MPT	¾ MPT	¾ MPT	¾ MPT	¾ MPT

↑ Includes nozzles.

*Between tube sheets.
**ASA (American Standard Association) flat face flange.

PHYSICAL DATA

UNIT 30XD		280-220	300-220	320-300	340-300	360-300	390-300	420-300	420-380	450-380	480-380	520-380	560-380	600-380	640-380
weight(lb)*	30XD-S Al Fin	17536	19825	22534	23913	25002	25175	25348	28303	28401	28501	30210	31458	31597	31736
	30XD-S Cu Fin	17999	20355	23063	24508	25663	25836	26009	29097	29195	29295	31070	32384	32523	32662
	30XD-T Al Fin	16063	18443	22364	23738	24820	24983	25145	25941	27240	28280	28789	29122	30434	31463
	30XD-T Cu Fin	16460	18906	22894	24333	25482	25644	25806	26602	27968	29074	29582	29916	31293	32389
Refrigerant		R134a													
Compressor	Bitzer	CSH Series													
	Total Oil Chg .(gal)	10	13	16	16	16	16	16	16	16	16	16.5	17	17	17
	Alternative	Applicable													
	%CAP Circuit 1	50	54	50	53	50	54	50	50	53	50	54	50	53	50
	%CAP Circuit 2	50	46	50	47	50	46	50	50	47	50	46	50	47	50
	No. Control Steps	8													
Cooler	Type	Shell & Tube With Enhanced Copper Tubes													
	Working Pressure (Psig)	Refrigerant Side=235								Water Side=150					
	Shell, Net Volume (gal)	60	60	106	2×53	2×53	2×53	2×53	2×60	2×60	2×60	2×60	2×60	2×60	2×60
	Model (10SAX)	220	220	300	2×150	2×150	2×150	2×150	2×190	2×190	2×190	2×190	2×190	2×190	2×190
	Water Connection (in)	6	6	10	6	6	6	6	6	6	6	6	6	6	6
Eco**	30XD-S	Available													
	30XD-T	NA													
Condenser	Type	Fin & Tube, V-Type													
	Condenser Fan	Axial 800 mm diameter, Vertical discharge													
	Quantity														
	30XD-S	14	16	16	18	20	20	20	24	24	24	26	28	28	28
	30XD-T	12	14	16	18	20	20	20	20	22	24	24	24	26	28
	Total Air flow (CFM)* 1000 30XD-S	152.6	174.4	174.4	196.2	218.0	218.0	218.0	261.6	261.6	261.6	283.4	305.2	305.2	305.2
	Total Air flow (CFM)* 1000 30XD-T	130.8	152.6	174.4	196.2	218.0	218.0	218.0	218.0	239.8	261.6	261.6	261.6	283.4	305.2
	Power/Fan	≈2													
	Fan RPM	910													
	Row/FPI	4/14													
	Total face area (Sq. Ft)														
	30XD-S	332.6	380.2	380.2	427.7	475.2	475.2	475.2	570.2	570.2	570.2	617.8	665.3	665.3	665.3
	30XD-T	285.1	332.6	380.2	427.7	475.2	475.2	475.2	475.2	522.7	570.2	570.2	570.2	617.8	665.3
Dimension*	Length(in.)														
	30XD-S	362.2	409.4	409.4	456.7	503.9	503.9	503.9	598.4	598.4	598.4	645.7	692.9	692.9	692.9
	30XD-T	315.0	362.2	409.4	456.7	503.9	503.9	503.9	503.9	551.2	598.4	598.4	598.4	645.7	692.9
	Width(in.)	91.1													
	Height(in.)	103.3													

*The weight and dimensions of units are approximate and may be subject to change.
**Economizer

PERFORMANCE DATA

LCWT: 44 F *	30XD																	
R134a	CONDENSER ENTERING AIR TEMPRATURE (F)																	
MODEL 30XD	85			95			105			115			120			125		
	CAP. (TON)	COMP. POWER INPUT (KW)	COOLER FLOW RATE (GPM)	CAP. (TON)	COMP. POWER INPUT (KW)	COOLER FLOW RATE (GPM)	CAP. (TON)	COMP. POWER INPUT (KW)	COOLER FLOW RATE (GPM)	CAP. (TON)	COMP. POWER INPUT (KW)	COOLER FLOW RATE (GPM)	CAP. (TON)	COMP. POWER INPUT (KW)	COOLER FLOW RATE (GPM)	CAP. (TON)	COMP. POWER INPUT (KW)	COOLER FLOW RATE (GPM)
60-40	37.5	33.2	90.0	34.9	37.0	83.8	32.1	41.4	77.1	29.2	46.6	70.1	27.1	50.4	65.1	26.2	52.0	62.9
80-40	49.4	45.4	118.5	46.4	50.6	111.5	43.4	67.1	104.1	40.1	64.6	96.2	37.7	70.5	90.5	36.7	73.4	88.0
100-70	66.1	55.1	158.6	61.7	61.1	148.0	57.0	68.0	136.8	52.1	75.9	125.1	48.7	82.2	116.8	47.1	85.1	113.2
120-70	75.0	64.2	180.2	70.0	71.6	168.0	64.6	80.0	155.0	58.8	89.9	141.2	56.1	95.3	134.6	53.1	101	127.4
140-160	90.0	75.9	216.0	83.7	84.6	200.8	76.9	94.7	184.6	69.9	106.2	167.7	64.7	115.2	155.4	62.5	119.3	150.0
160-160	106.1	91.9	254.8	99.7	102.6	239.3	92.9	115.2	222.9	85.7	130.1	205.7	80.5	142.0	193.1	78.2	147.5	187.6
180-160	119.7	104.3	287.3	112.5	116.6	270.0	104.9	131.0	251.8	96.9	147.9	232.6	91.1	161.5	218.6	88.5	167.8	212.4
200-200	134.6	112	323	125.9	125	302.2	116.6	140.3	279.8	107.2	158.4	257.3	102.5	168.5	246	97.7	179.3	234.5
220-200	144	118.9	345.6	134.6	132.7	323	124.7	149.1	299.3	114	168.0	273.6	108.8	179.1	261.1	103.9	190.5	249.4
235-200	151.8	123.7	364.3	142.6	138	342.3	132.2	154.8	317.3	121.5	174.7	291.6	116.3	185.9	279.2	112.0	197.9	268.8
250-220	161.7	132.7	388	151.7	147.9	364.1	140.4	166	336.9	128.8	187.2	309.1	123.1	199.2	295.9	117.3	212	281.4
265-220	167.6	142.6	402.3	157.3	159.3	377.5	146.6	179	351.8	135.4	202	325	129	215	309.6	123.1	229	295.4

PERFORMANCE DATA

LCWT: 44 F *	30XD-S											
R134a	CONDENSER ENTERING AIR TEMPRATURE (STANDARD) F											
MODEL 30XD	85			95			105			115		
	CAP. (TON)	COMP. POWER INPUT (KW)	COOLER FLOW RATE (GPM)	CAP. (TON)	COMP. POWER INPUT (KW)	COOLER FLOW RATE (GPM)	CAP. (TON)	COMP. POWER INPUT (KW)	COOLER FLOW RATE (GPM)	CAP. (TON)	COMP. POWER INPUT (KW)	COOLER FLOW RATE (GPM)
280-220	191.7	166.7	460	177.4	179.5	425.8	165	201	396	153.2	227	367.7
300-220	204.1	172.5	489.8	192.4	192	461.8	179.3	214.6	430.4	165.8	240.7	397.9
320-300	234.1	193.2	561.8	219.1	214.6	525.9	203.3	239.2	488	184	267.1	441.6
340-300	242.1	201.6	581	227.6	223.3	546.2	211.6	247.8	507.8	194.9	276.3	467.8
360-300	259.2	211.6	622	244.3	233.4	586.4	227.5	258	546	209.7	286.6	503.2
390-300	273	229.3	655.2	257.9	254.2	619	240.7	282.3	577.6	223.2	314.1	535.6
420-300	286.8	247	688.4	271.5	275	651.6	253.8	306.6	609.2	236.7	341.6	568
420-380	313.3	246	752	296	273.4	710.4	277.5	304.4	666	257.8	338.8	618.8
450-380	330.1	263.7	792.2	311.5	293.2	747.6	291.8	326.4	700.2	270.9	363.4	650.2
480-380	346.8	281.4	832.4	327	313	784.8	306	348.4	734.4	284.0	388	681.6
520-380	360.2	299.5	864.4	339.5	331.7	814.8	317.8	367.7	762.8	294.9	408	707.8
560-380	373.5	317.6	896.4	352	350.4	844.8	329.7	387	791.2	305.8	428	734
600-380	386	331	926.4	363.7	365.7	872.8	340.8	404.5	818	316.6	448	759.8
640-380	398.5	344.4	956.4	375.3	381	900.8	352	422	844.8	327.3	468	785.6

LEGEND

LCWT -Leaving chilled water temperature
CAP. -Capacity, tons of refrigeration
kW -Compressor motor Input at rated voltage (kW)

*Cooler water temperature rise of 10F
-For other rating conditions please contact SSI sales department.

PERFORMANCE DATA

LCWT: 44 F *												
R134a	CONDENSER ENTERING AIR TEMPRATURE (HIGH AMBIENT) F											
MODEL 30XD	115			118			122			125		
	CAP. (TON)	COMP. POWER INPUT (KW)	COOLER FLOW RATE (GPM)	CAP. (TON)	COMP. POWER INPUT (KW)	COOLER FLOW RATE (GPM)	CAP. (TON)	COMP. POWER INPUT (KW)	COOLER FLOW RATE (GPM)	CAP. (TON)	COMP. POWER INPUT (KW)	COOLER FLOW RATE (GPM)
280-220	142.2	216.6	341.2	138.2	224.8	331.6	132.7	236.4	318.5	128.5	245.6	308.4
300-220	152.7	229	366.4	148.9	237.3	357.4	143.4	249	344.2	139.5	257.9	334.8
320-300	174	250	417.6	170.1	255.8	408.2	163.3	267.2	392	158	275.8	379.2
340-300	185.8	255.3	446	181	264	434.4	173.9	275.9	417.4	169.1	285.3	405.8
360-300	199	266.4	477.5	194.3	275.4	466.4	186.8	287.8	448.4	182	297.8	436.8
390-300	210.9	293.5	506.2	205.5	303.3	493.2	198	316.7	475.2	192.8	327.4	462.6
420-300	222.5	320.6	534	216.7	331.2	520	209.2	345.6	502	203.5	357.6	488.4
420-380	239	323.4	573.6	232.8	334	558.8	224.3	348.6	538.4	218	360.6	523.2
450-380	254.5	342.4	610.8	248	353.6	595.2	239	369.1	573.6	232.3	380.9	557.4
480-380	270	361.4	648	263.2	373.2	631.6	253.7	389.6	608.8	246.5	402	591.6
520-380	276.2	385.7	662.8	270.1	397.6	647.8	259.8	415.8	623.4	252.3	429	605.6
560-380	282.3	410	677.6	276.0	422	662.4	265.8	442.2	638	258.2	456	619.6
600-380	296.8	423	712.4	290.0	436	696	279.2	456	670	271.3	471	651
640-380	311.3	436	747.2	303.3	450	728	292.5	470	702	284.3	486	682.4

30XD-T

LEGEND

LCWT -Leaving chilled water temperature
CAP. -Capacity, tons of refrigeration
kW -Compressor motor Input at rated voltage (kW)

*Cooler water temperature rise of 10F
-For other rating conditions please contact SSI sales department.

DIMENSIONS

Figure 2-30XD units dimensions

30XD	Width (W) = 2314 (mm) Height(H) = 2614 (mm)					
	60-40	80-40	100-70	120-70	140-160	160-160
Length L(mm)	3188	3188	3188	4387	4387	5588
Weight (Kg) Al Fin	2615	3000	3029	4060	4479	5750
Weight (Kg) Cu Fin	2675	3060	3089	4150	4569	5870

30XD	Width (W) = 2314 (mm) Height(H) = 2614 (mm)					
	180-160	200-200	220-200	235-200	250-220	265-220
Length L(mm)	5588	6787	6787	7988	7988	7988
Weight (Kg) Al Fin	5767	6453	6481	7033	7271	7295
Weight (Kg) Cu Fin	5887	6603	6631	7213	7451	7475

30XD-S	Width (W) = 2314 (mm) Height(H) = 2614 (mm)						
	280	300	320	340*	360*	390*	420*
Length L(mm)	9187	10389	10389	11587	12789	12789	12789
Weight (Kg) Al Fin	7954	8993	10222	10847	11341	11419	11498
Weight (Kg) Cu Fin	8164	9233	10462	1117	11641	11719	11798

*In units with more than 16 condenser fans, the chiller will be shipped in 2 separate parts (each part includes one circuit) and power box may be wider than chiller.

DIMENSIONS

30DX-S	Width (W) = 2314 (mm)						
	Height (H) = 2614 (mm)						
	421*	450*	480*	520*	560*	600*	640*
Length L(mm)	15189	15189	15189	16388	17590	17590	17590
Weight-AL Fin (kg)	12838	12883	12928	13703	14269	14332	14395
Weight-Cu Fin (kg)	13198	13243	13288	14093	14689	14752	14815

30DX-T	Width (W) = 2314 (mm)						
	Height (H) = 2614 (mm)						
	280	300	320	340*	360*	390*	420*
Length L(mm)	7988	9187	10389	11587	12789	12789	12789
Weight-AL Fin (kg)	7286	8366	10145	10767	11258	11332	11406
Weight-Cu Fin (kg)	7466	8576	10385	11037	11558	11632	11706

30DX-T	Width (W) = 2314 (mm)						
	Height (H) = 2614 (mm)						
	421*	450*	480*	520*	560*	600*	640*
Length L(mm)	12789	13988	15189	15189	15189	16388	17590
Weight-AL Fin (kg)	11767	12356	12828	13059	13210	13805	14271
Weight-Cu Fin (kg)	12067	12686	13188	13419	13570	14195	14691

*In units with more than 16 condenser fans, the chiller will be shipped in 2 separate parts (each part includes one circuit) and power box may be wider than chiller.

ELECTRICAL DATA

30XD MODELS With R134a (380V-PW/Y/Δ-50Hz)		
UNIT 30XD	UNIT 30XD	
	TOTAL POWER(KW)	FLA(Amps)
60 ~ 40	61.46	108.8
80 ~ 40	83.26	138.8
100 ~ 70	94.76	168.2
120 ~ 70	119.04	209.8
140 ~ 160	133.64	233.4
160 ~ 160	166.52	277.6
180 ~ 160	187.52	321.6
200 ~ 200	203.2	352.7
220 ~ 200	215	376
235 ~ 200	230.98	405.8
250 ~ 220	243.08	427.8
265 ~ 220	258.28	453.3
280 ~ 220 (S)	277.35	486.6
280 ~ 220 (T)	273.48	478.8
300 ~ 220 (S)	298.14	520.4
300 ~ 220 (T)	294.26	512.6
320 ~ 300 (S,T)	315.04	546.4
340 ~ 300 (S,T)	334.62	577.2
360 ~ 300 (S,T)	354.2	608
390 ~ 300 (S,T)	380.5	658
420 ~ 300 (S,T)	406.8	708
420 ~ 380 (S)	414.56	723.6
420 ~ 380 (T)	406.8	708
450 ~ 380 (S)	438.56	763.6
450 ~ 380 (T)	434.68	755.8
480 ~ 380 (S,T)	462.56	803.6
520 ~ 380 (S)	492.44	855.4
520 ~ 380 (T)	488.56	847.6
560 ~ 380 (S)	522.32	907.2
560 ~ 380 (T)	514.56	891.6
600 ~ 380 (S)	541.32	942.2
600 ~ 380 (T)	537.44	934.4
640 ~ 380 (S,T)	560.32	977.2

FLA - full load Amps

For selection of contactors, cables and fuses the MOC and MKW must be considered.

Pressure Drop

In shell and tube heat exchangers, both excessively high and excessively low fluid flow rates should be avoided. Excessively high fluid flow rates and correspondingly high tube velocities will result in high fluid pressure drop, high pumping power, and potentially tube erosion or corrosion damage.

Excessively low fluid flow rates and correspondingly low velocities should also be avoided as they will result to poor heat transfer, high compressor power, sedimentation and tube fouling.

In the following diagrams, the pressure drop of evaporator is displayed in terms of water flow rate.

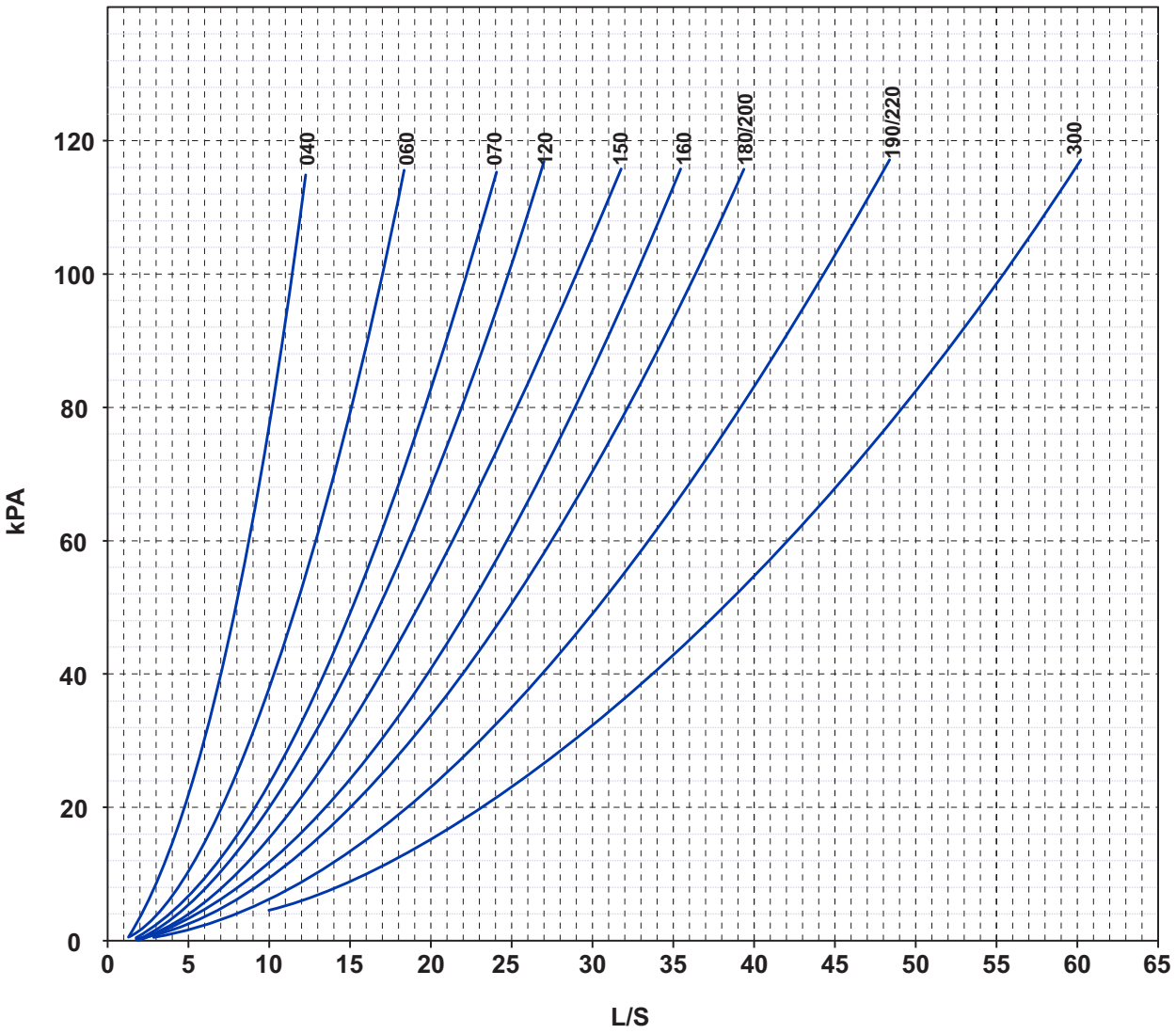


Figure 3 - Cooler pressure drop, SI units

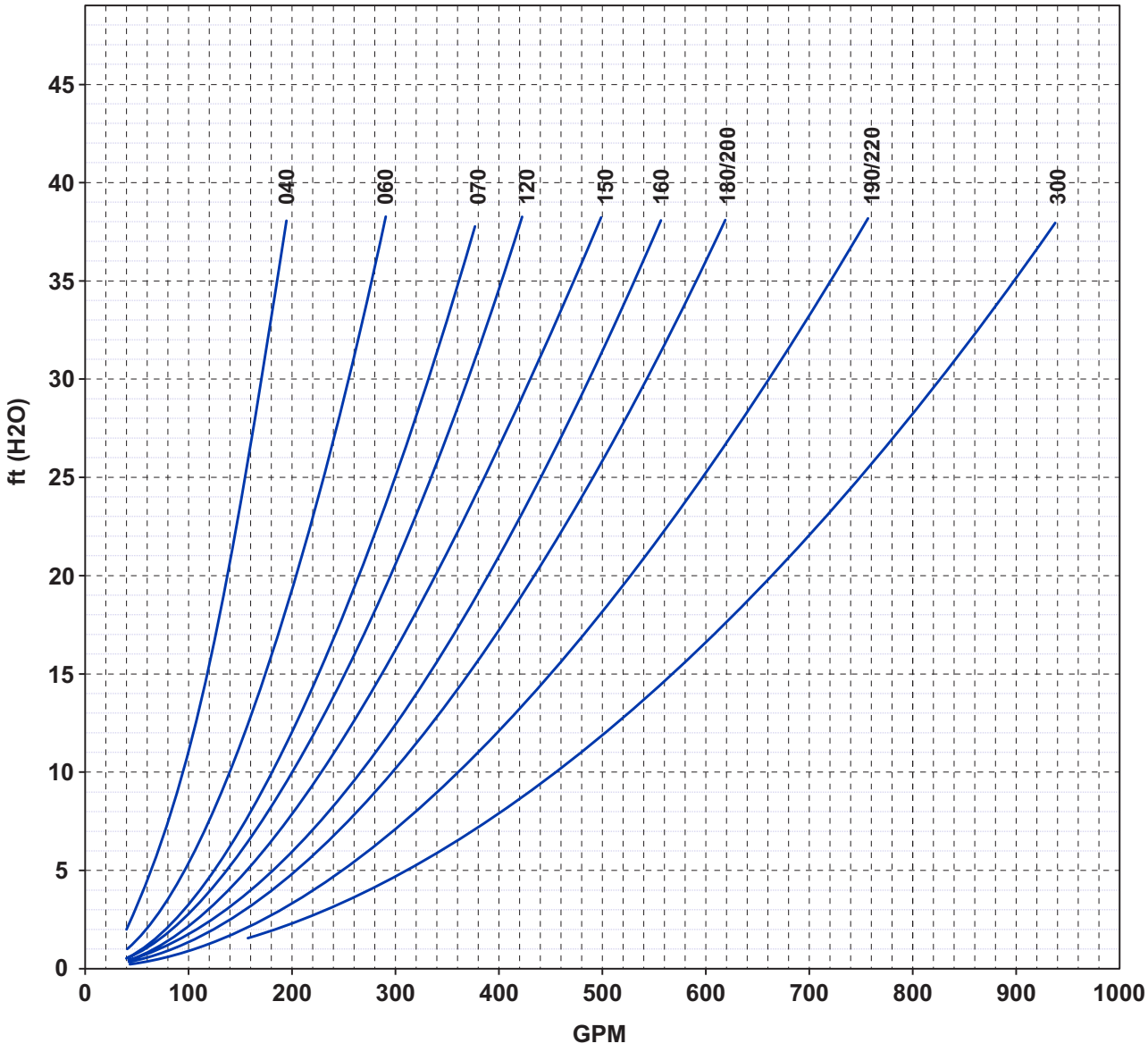
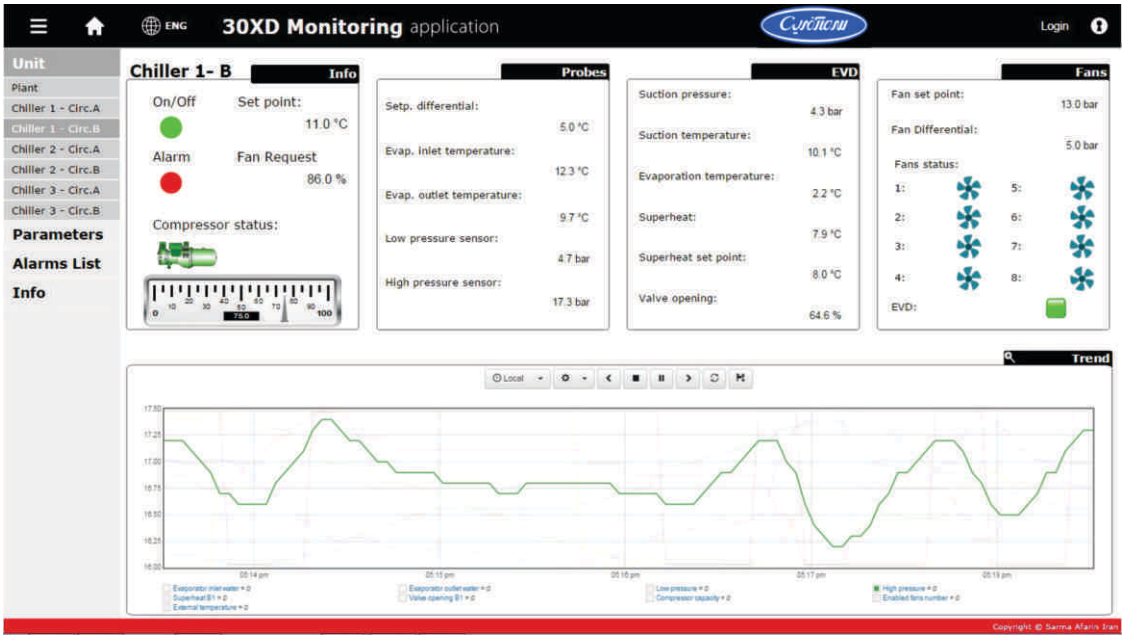


Figure 4 - Cooler pressure drop, English units

REMOTE MONITORING SYSTEM

The remote monitoring system is provided by Sarmaafarin on its chillers and packages on request of customers. By directly connecting the monitoring system to the main control unit, all information and alarms can be transmitted to any location via a fixed connection line. Real time monitoring of operating conditions on installed units, recording of data in abnormal situations, maintenance management and setting desired temperature in the home from a smart phone, are just some of many opportunities provided to designers and users of home systems at any time and from anywhere. Storing customer information for at least one year has a significant impact on the proper functioning and operational life of the system, making it easier to maintain the system.



Features and Benefits of Monitoring

- Observation of important parameters at any moment
- Displaying the current status of system on a chart based on live data
- Recording important values in the case of abnormal events
- Quick diagnosis of system faults and troubleshooting from anywhere
- Customized pages for the customer
- Selecting important parameters, notifications and warnings by the custom
- Applicable settings via PC or Smart phone
- Different access levels with specific passwords for users
- Collecting and building an annual archive of information

Chiller location and clearances

Do not locate near sound sensitive areas without proper acoustic consideration. For applications requiring mounting a chiller on a building rooftop, consideration should be given to using rubber-in-shear or spring isolators to minimize structure-borne transmission. Unit must be level when installed to ensure proper oil return to the compressors.

Clearances must be provided around chillers for airflow, service and local code requirements. See dimensional drawings for specific unit clearance requirements. Ensure adequate clearance between adjacent chillers is maintained.

A minimum of 10 ft (3.0 m) is recommended.

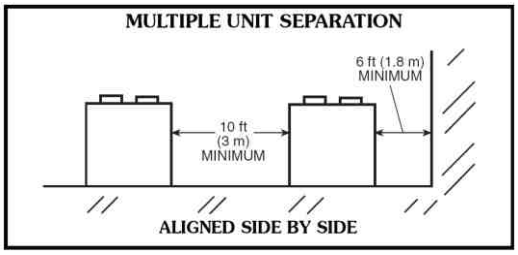
Chiller fan discharge must be at least as high as adjacent solid walls. Installation in pits is not recommended.

Minimum clearances

The recommended minimum clearance to ensure proper airflow through the condenser coils and to allow fan maintenance is as shown below.

Acceptable clearance between the chiller and a single wall may be reduced to 3 ft (914.4 mm) on one side or end opposite the control panel without sacrificing performance.

Clearances between chillers in dual chiller applications may be reduced to 6 ft (1.8 m) on one side without sacrificing performance.



Strainers

A screen strainer with a minimum screen size of 20 mesh must be installed a maximum of 10 ft (3.0 m) from the unit to prevent debris from damaging internal tubes of the cooler.

Over sizing chillers

Over sizing chillers by more than 15% at design conditions must be avoided as the system operating efficiency is adversely affected (resulting in greater or excessive electrical demand). When future expansion of equipment is anticipated, install a single chiller to meet present load requirements and add a second chiller to meet the additional load demand. It is also recommended that 2 smaller chillers be installed where operation at minimum load is critical. The operation of a smaller chiller loaded to a greater percentage over minimum is preferred to operating a single chiller at or near its minimum recommended value.

Minimum load control should not be used as a means to allow over sizing chillers. Minimum load control should be given consideration where substantial operating time is anticipated below the minimum unloading step.

Cooler water temperature

1. Maximum leaving chilled water temperature (LCWT) for the unit is 60 F (15.5 C). Unit can start and pull down with up to 95 F (35 C) entering-water temperature. It is recommended that entering-water temperature not exceed 70 F (21.1).

2. Minimum LCWT for a standard unit is 40 F (4.4 C). For leaving-water temperatures below 39.9 F (4.4 C) an inhibited antifreeze solution is required. Application of chiller at leaving fluid temperatures lower than 30 F (–1.1 C) is possible by ordering the factory installed medium temperature brine option.

NOTE: Water flowing through cooler should not exceed 100 F (37.8 C).

Cooler flow/range

Ratings and performance data in this publication are for a cooling temperature rise of 10° F (5°C). The 30XD chillers may be operated at a different temperature rise, providing flow limits are not exceeded and corrections to system guidelines are made. For minimum and maximum cooler flow rates, see the Minimum and Maximum Cooler Flow Rates table. A high flow rate is generally limited by the maximum pressure drop that can be tolerated by the unit.

The 30XD chillers are designed for a full load temperature rise of 5° to 20° F (2.8° to 11.1° C). To obtain the rating if a temperature rise other than 10° F (5°C) is used consult with SARMAAFARIN.

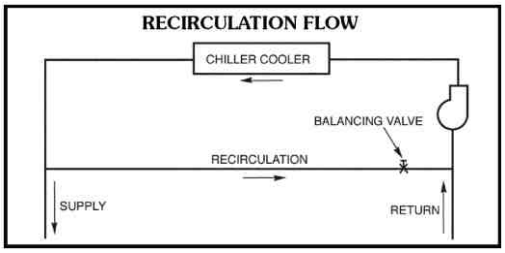
Minimum cooler flow (maximum cooler temperature rise) —

The minimum cooler flow for standard units is shown in the Minimum and Maximum Cooler Flow Rates table. When system design conditions require a lower flow (or higher rise) than the minimum allowable cooler flow, follow the recommendations below.

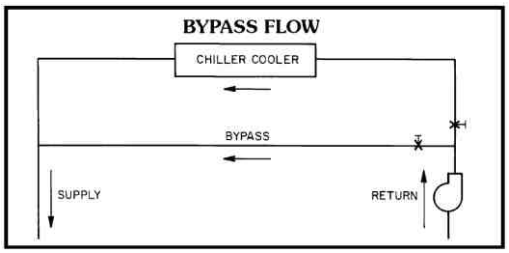
a. Multiple smaller chillers may be applied in series, each providing a portion of the design temperature rise.

b. Cooler fluid may be recalculated to raise the flow rate to the chiller. The mixed temperature entering

the cooler must be maintained to a minimum of at least 5° F (2.8° C) above the LCWT and a maximum of no more than 20° F (11.1° C) above the LCWT.
NOTE: Recirculation flow is shown below.



Maximum cooler flow — The maximum cooler flow (approximately 5° F [2.8° C] rise) results in a practical maximum pressure drop through cooler.
Return fluid may bypass the cooler to keep the pressure drop through the cooler within acceptable limits. This permits a higher delta T with lower fluid flow through cooler and mixing after the cooler.

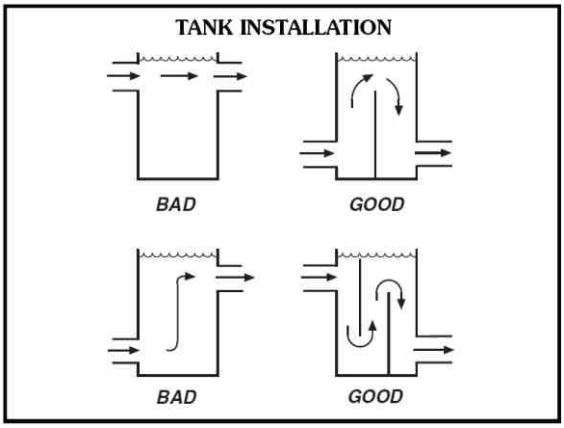


Variable cooler flow rates

Variable rates may be applied to a standard chiller. The unit will, however, attempt to maintain a constant leaving chilled water temperature. In such cases minimum flow
must be in excess of minimum flow given in the Minimum and Maximum Cooler Fluid Flow Rates table, and minimum loop water volume must be in excess of 3 gallons per ton (3.2 l/kW). Flow rate must change in steps of less than 10% per minute. Apply a minimum of 6 gal. per ton (6.5 l/kW) water loop volume if flow rate changes more rapidly.

Water loop volume

The volume in circulation must equal or exceed 3 gal. per nominal ton (3.2 l/kW) of cooling for temperature stability and accuracy in normal air conditioning applications. In process cooling applications, or for operation at ambient temperature below 32 F (0° C) with low loading conditions, there should be from 6 to 10 gal. per ton (6.5 to 10.8 l/kW). To achieve this volume, it is often necessary to install a tank in the loop.
Tank should be baffled to ensure there is no stratification
and that water (or brine) entering tank is adequately mixed with liquid in the tank



Cooler fouling factor

The fouling factor used to calculate tabulated ratings is 0.0001 ft2 hr °F/Btu (.000018 m2 °C/W). As fouling factor is increased, both unit capacity and EER decrease.
The impact of the fouling factor on performance varies significantly with chiller size and application conditions.

Cooler freeze protection

Freeze protection for the cooler is standard on all 30XD air-cooled chillers. Use cooler heater if require. Since power is sometimes lost for extended periods during winter storms, freeze protection provided by heater tapes will be effective only if a back-up power supply can be assured for the unit's control circuit, heater and cooler pump. If not protected with an anti-freeze solution, draining the cooler and outdoor piping is recommended if the system will not be used during freezing weather conditions.
Two conditions that must be considered when determining antifreeze concentration are both leaving water set point and ambient freeze conditions. Both of these parameters can help determine the recommended concentration level. Higher concentration must be used to adequately protect the machine.

NOTE: Use only antifreeze solutions approved for heat exchanger duty.

For applications in which the leaving fluid temperature set point is less than 40 F (4.4 C), a suitable inhibited antifreeze solution must be used. The solution concentration must be sufficient to protect the chilled water loop to a freeze protection (first crystals) concentration of at least 15° F (8.3° C)

below the leaving fluid temperature set point.
If the chiller refrigerant or fluid lines are in an area where ambient conditions fall below 34 F (1.1º C), it is highly recommended that an antifreeze solution be added to protect the unit and fluid piping to a temperature of 15º F (8.3° C) below the lowest anticipated ambient temperature.
Select concentration based on either burst or freeze protection as dictated by the application. If the chiller does not operate during the winter, and a start-up is not expected, a burst protection concentration is recommended. This concentration may not be high enough to pump the fluid through the unit. Burst protection is typically a lower concentration that will provide better performance from the machine. If the chiller does operate during winter, a freeze protection concentration is recommended. This concentration will be high enough to keep the fluid in a condition that it can be pumped at low ambient conditions.
Consult glycol fluid manufacturers for burst protection recommendations and fluid specifications.

High ambient temperature operation

High outdoor ambient chiller start-up and operation is possible for standard 30XD chillers at ambient temperatures up to 125.6 F (52 °C) at nominal voltage. For applications approaching these temperatures, it may be advisable to select the high ambient temperature option to increase fan airflow.

Low ambient temperature operation

Units will start and operate down to 32 F (0° C) as standard. Operation to –20 F (–29 C) requires optional low ambient head pressure control as well as wind baffles (field fabricated and installed to all units for operation below 32 F [0° C]) if wind velocity is anticipated to be greater than 5 mph (8 km/h). Inhibited propylene glycol or other suitable corrosion-resistant antifreeze solution must be field supplied and installed in all units for unit operation below 34 F (1.1 C). Solution must be added to fluid loop to protect loop down to 15° F (8.3° C) below minimum operating ambient temperature. Concentration should be based on expected minimum temperature and either “Burst” or “Freeze” protection levels. At least 6 gal. per ton (6.5 l/kW) of water volume is the recommended minimum for a moderate system load.

Altitude correction factors

Correction factors must be applied to standard ratings at altitudes above 2000 ft (609.6 m) using the following multipliers:

Altitude		Capacity Multiplier	Compressor Power Multiplier
(ft)	(m)		
2,000	609.6	0.99	1.01
4,000	1219.2	0.98	1.02
6,000	1828.8	0.97	1.03
8,000	2438.4	0.96	1.04
10,000	3048	0.95	1.0

Condenser airflow — Airflow restrictions on units with standard fans will affect the unit capacity, condenser head pressure, and compressor power input. Correction factors to be applied for external static restrictions up to 0.2 in. wg (50 Pa) are as follows:

External Static		Capacity Multiplier	Compressor Power Multiplier
In. Wg	Pa		
0.0	0.0	1.000	1.00
0.1	25	0.986	1.01
0.2	50	0.968	1.03

Multiple chillers

Where chiller capacities greater than can be supplied by a single 30XD chiller are required, or where stand-by capability is desired, chillers may be installed in parallel or series.
Units may be of the same or different sizes with this piping arrangement. However, for parallel chiller applications, cooler flow rates must be balanced to ensure proper flow to each chiller.
Unit software is capable of controlling two units as a single plant by making use of the dual chiller control feature.
If the dual chiller algorithm is used, and the machines are installed in parallel, an additional chilled water sensor must be installed for each chiller (to provide the required hardware, a dual chiller accessory kit is available from the factory).
Install one thermistor and well per chiller in the common leaving water header. Chillers installed in series do not require additional sensors.
Parallel chiller control with dedicated pumps is recommended.
The chiller must start and stop its own water pump located in its own piping. Check vales are required at the discharge of each pump.
If pumps are not dedicated for each chiller, then isolation valves are required. Each chiller must open and close its own isolation valve through the unit control (the valve must be connected to the pump outputs).

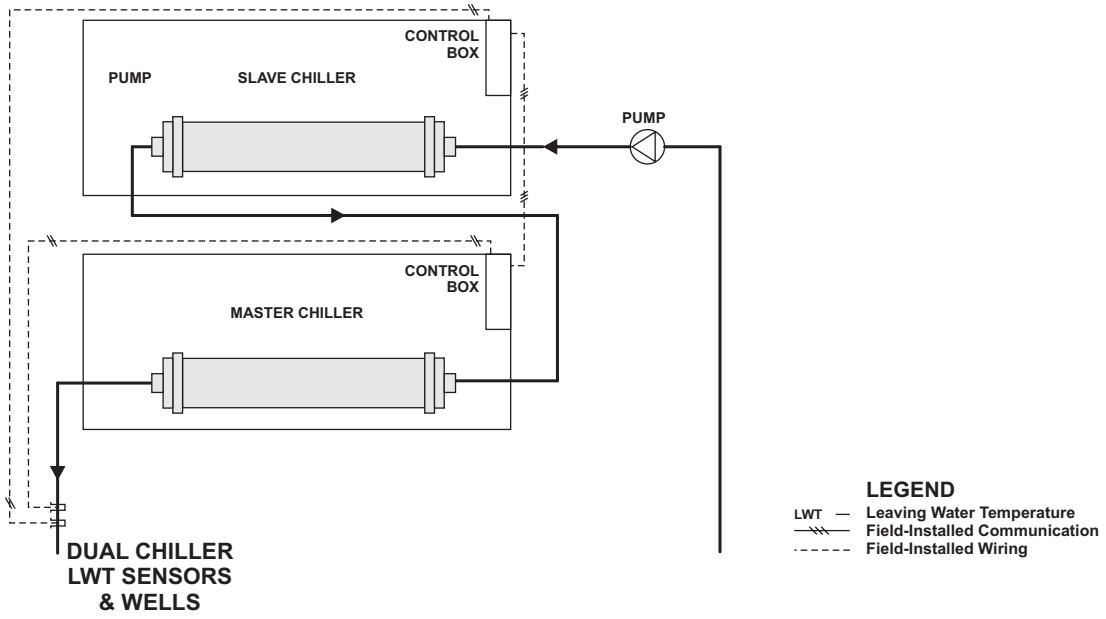
Dual chiller control

There are several advantages to this type of control:
• Redundancy (multiple circuits)
• Better low load control (lower tonnage capability)
• Lower rigging lift weights (2 machines rather than 1 large machine)
• Chiller lead-lag operation (evens the wear between the two machines)

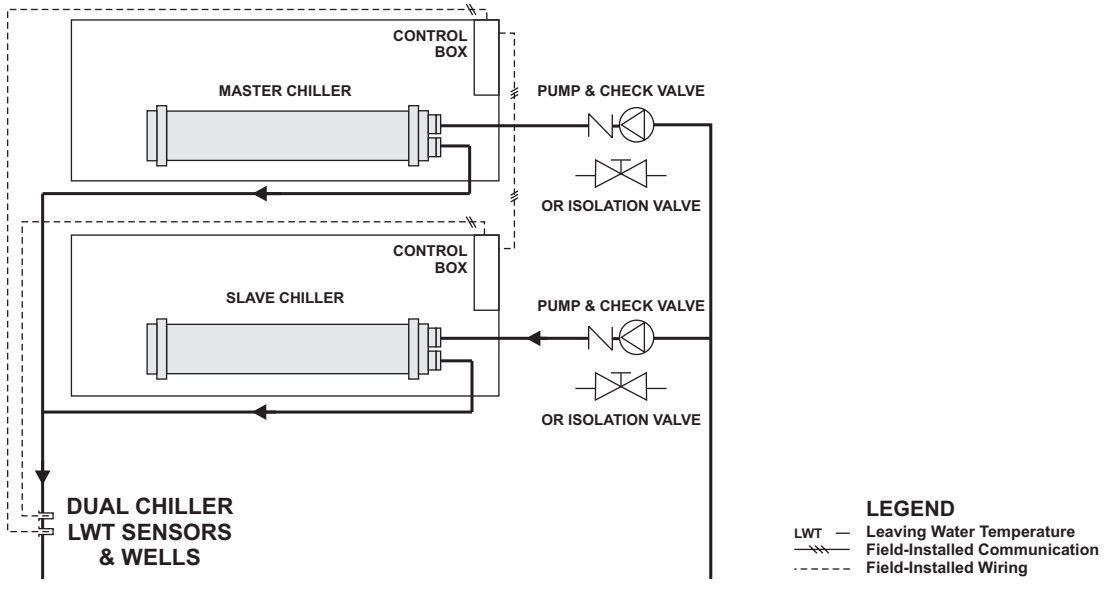
Parallel dual chiller operation — Parallel chiller operation is the recommended option for dual chiller control. In this case, each chiller must control its own dedicated pump or isolation valve. Balancing valves are recommended to ensure proper flow in each chiller. Two field supplied and installed leaving water temperature sensors are required, one for each module, for this function to operate properly.
Consider adding additional isolation valves to isolate each chiller to allow for service on a machine, and still allow for partial capacity from the other chiller.

Series dual chiller operation — Series chiller operation is an alternate control. Certain applications might require that the two chillers be connected in series.

PARALLEL DUAL CHILLER OPERATION



PARALLEL DUAL CHILLER OPERATION



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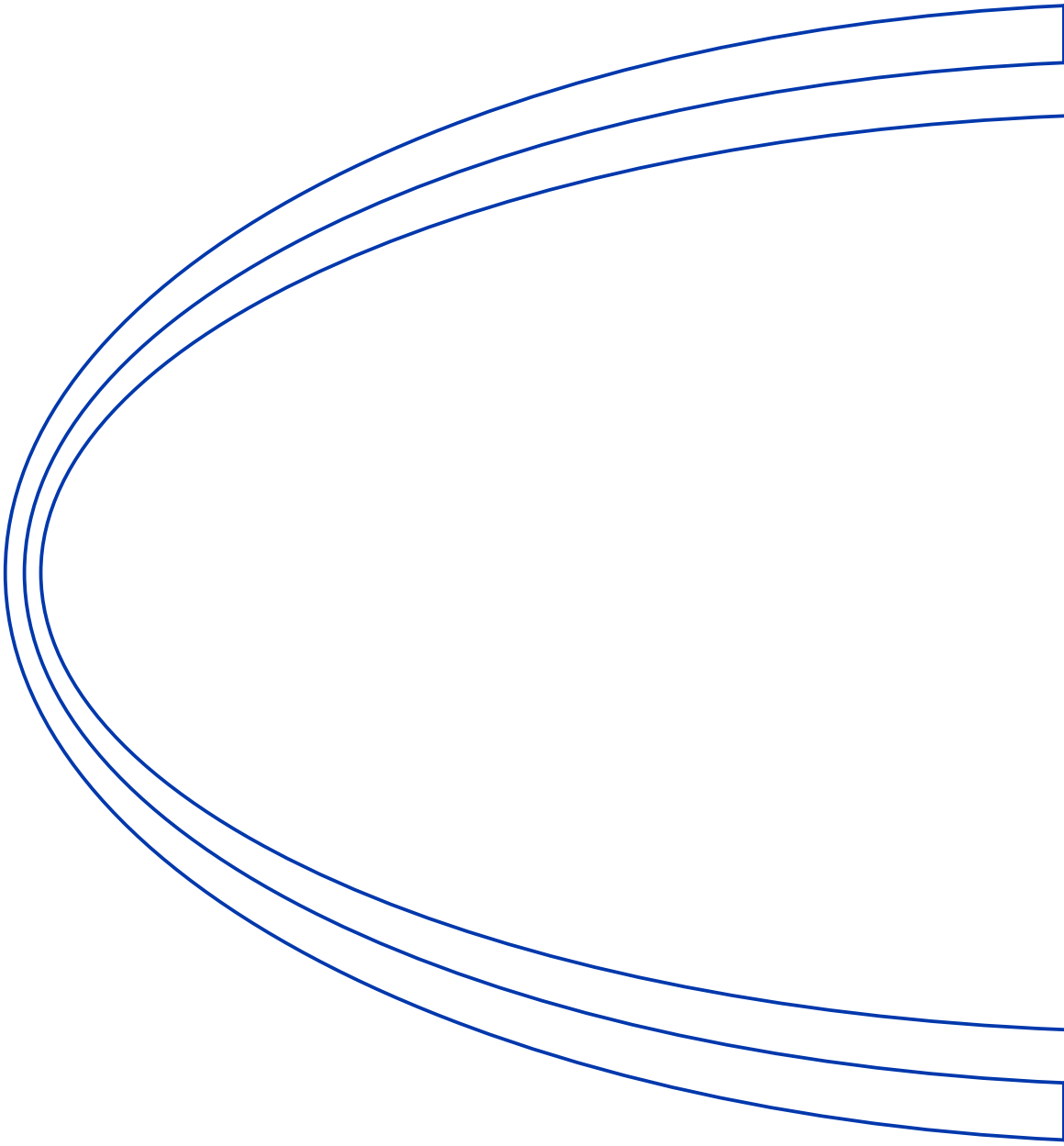

Sanaye Sarmaafarin Iran

شرکت صنایع سرما آفرین ایران

(کریر ترموفریگ)

No. 194, W. Khorramshahr (Apadana) Ave., TEHRAN-15337, P. O. BOX: 13145-1799 Tel: 88762038 Fax: 88762033 www.sarmaafarin.com

سهروردی شمالی، خیابان خرمشهر، شماره ۱۹۴، تهران - ۱۵۳۷۷، صندوق پستی: ۱۷۹۹-۱۳۱۴۵ تلفن: ۸۸۷۶۲۰۳۸ فاکس: ۸۸۷۶۲۰۳۳