Technical Catalogue EKS New Gen

SEPR SEER R454B

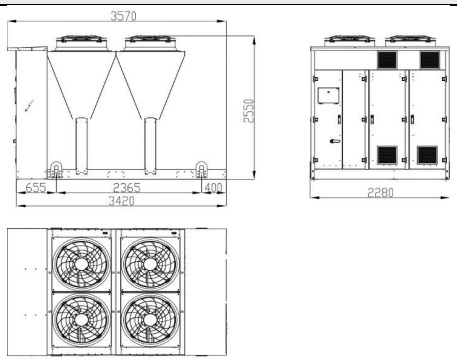
Multi-Scroll Air-Cooled Liquid Chillers

Nominal cooling capacity: 153-587 kW | 50 Hz



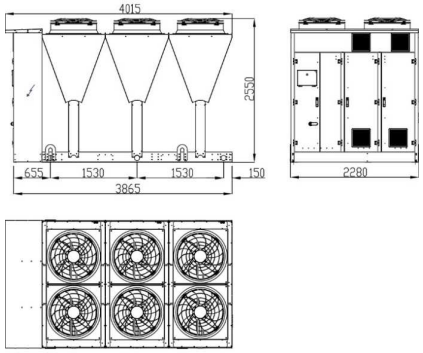
EUROKLIMAT
Let's go Natural

EKS New Gen range



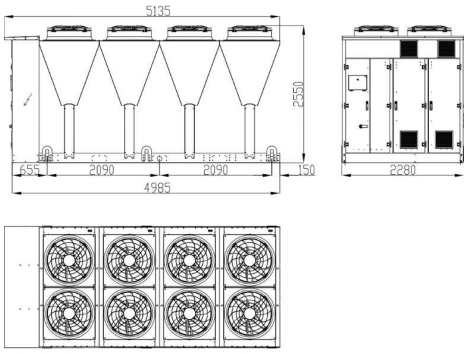
055-2-1 ⟷ 070-2-1

Cooling capacity
from 148 kW to 183 kW



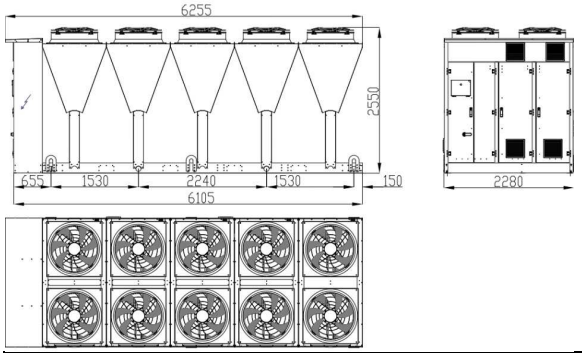
080-4-2 ⟷ 100-4-2

Cooling capacity
from 203 kW to 249 kW



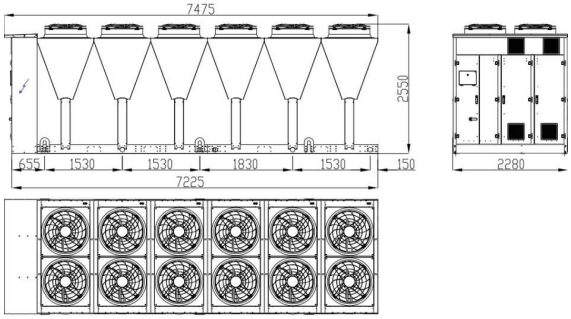
110-4-2 ⟷ 140-4-2

Cooling capacity
from 294 kW to 362 kW



160-4-2 ⟷ 180-6-2

Cooling capacity
from 403 kW to 489 kW



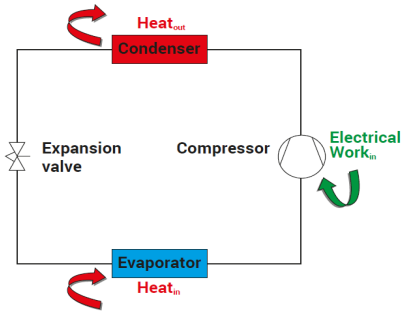
240-6-2

Cooling capacity
589 kW

Heat recovery

What is waste heat?

All air-conditioning and refrigerating systems transfer heat from one location to another through the use of electrical work. At the evaporator heat exchanger, heat is drawn into the system to provide indoor cooling while heat leaves the system in the form of wasted heat at the condenser (see figure on the side). The amount of wasted heat is higher than the cooling that the process creates.



Is it possible to save energy by recovering waste heat from chillers?

The answer is YES: this heat, which is otherwise wasted to the environment, can be used for different purposes, such as building/room heating, sanitary hot water and process heat applications.

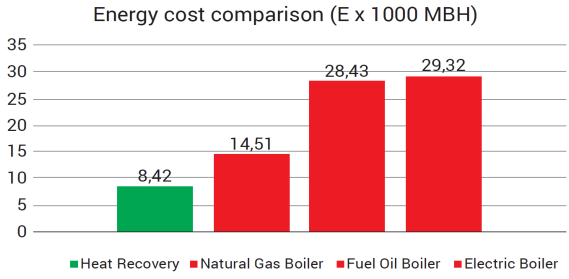
Benefits of Heat Recovery

The use of a recovery system to generate hot water can reduce the total energy needs of a building and/or a process and allows a significant increase of the global efficiency of the system.
The benefits of Heat recovery systems are several:

Increased efficiency, due to the possibility to use both chilled and hot water for different purposes. To better understand this point, we can analyze the EER (Energy Efficiency Ratio) of the unit without heat recovery system and the TER (Total Efficiency Ratio) with heat recovery system. According to its definition, the EER is the ratio between Qc (cooling capacity) and the absorbed electrical power Wel. For a unit with heat recovery system, the TER is the ratio between the sum of useful effects Qc and Qrec (cooling capacity and recovered heat) and the absorbed power.

$$EER = \frac{Q_c}{W_{el}} \qquad TER = \frac{Q_c}{W_{el}} + \frac{Q_{rec}}{W_{el}} = \frac{Q_c + Q_{rec}}{W_{el}}$$

Reduction of Energy costs: if there are simultaneous heating and cooling loads, it's possible to recover heat from chillers instead of rejecting it to the environment. This gives a double benefit: recovered heat reduces the costs of purchased heat and also reduces the ancillary power necessary to reject the heat (for example cooling towers and/or dry coolers).
A qualitative representation of the cost benefits compared to standard heat generation methods is shown below:



Reduced Environmental Emissions: energy recovery not only reduce operating costs, but also reduce emissions to the environment. Heat recovery systems allows the reduction of heat generated by burning fossil fuels (such as natural gas), and consequently the reduction of site emissions.

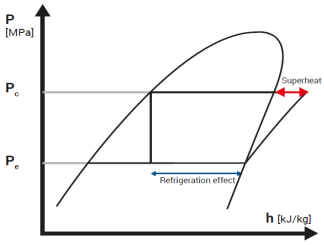
Energy codes and Government incentives: considering the benefits of the above-mentioned points, in different countries there are standards and building codes that require condenser-water heat recovery for service water heating and/or economical incentives for the installation of recovery systems.

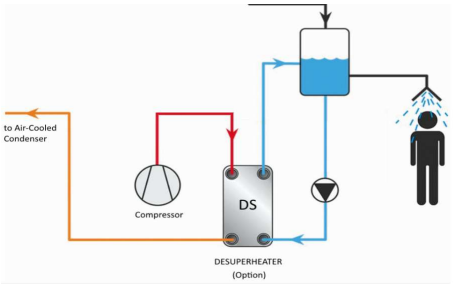
Different type of heat recovery

DESUPERHEATER

An additional BPHE (brazed plate heat exchanger) heat exchanger is installed between scroll compressor and air-cooled condenser.

Main features:
- Captures heat from superheated refrigerant, exploiting the hot discharge gas.
- It is possible to recover only a small amount of heat (up to about 20% of the condensation heat) as this exchanger only deals with the sensible and not latent exchange. The latter takes place in the air-cooled condenser.
- Hot water temperatures up to 55°C can be achieved.

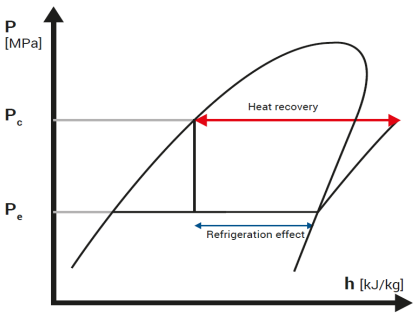




HEAT RECOVERY (TOTAL)

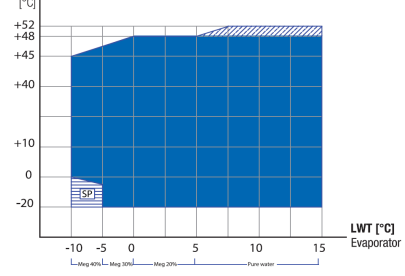
An additional BPHE (brazed plate heat exchanger) is installed in series to air-cooled condenser and the design of the refrigerant circuit allows to recover the total available condenser heat.

Main features:
- Captures heat from refrigerant condensing process.
- Compared to the DS, it is possible to recover a much greater quantity of heat because the latent heat exchange is exploited.
- Hot water temperatures up to 55°C can be achieved.

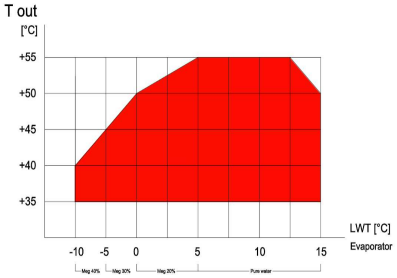


EKS New Gen operating limits

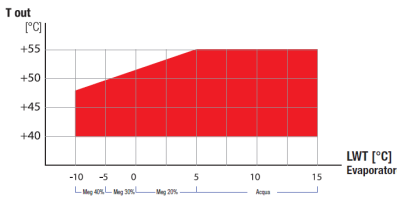
COOLING OPERATION LIMITS



HEAT RECOVERY OPERATION LIMITS



DESUPERHEATER OPERATION LIMITS



Operating area

Operating area with Heat Recovery

Operating area with desuperheater

Operating at partial load

SP - Special configuration available on request

EKS New Gen how to select

The below scheme allows you to easily select the proper configuration of EKS New Gen chiller.

EKS NG A PP/LN/AS/EC/OO 180-6-2 R454B 400/3/50

Range
EKS NG - EKS New Gen

Unit Type
A - Refrigeratore Aria/Acqua

Solution
BP - Base (brazed plate evaporator)
BS - Base (S&T evaporator)
PP - BASE-P (pump / brazed plate evaporator)
PS - BASE-P (pump / S&T evaporator)
IP - INTEGRATA (tank / pump / brazed plate evaporator)
IS - INTEGRATA (tank / pump / S&T evaporator)

Version
ST - Standard
LN - Low Noise
SL - Super Low Noise

Equipment
AS - Standard equipment
DS - Desuperheater

Fans control
EC - EC Fan

Compressors type
OO - ON-OFF compressor(s)
OI - ON-OFF compressors + 1 VFD compressor per circuit

Size

Refrigerant

Power supply

Base-P MP 1-0 OO

Hydronic kit
Base-P - Base solution with pump(s)
INTEGRATA - Solution with pump(s) and tank

Pressure Head
LP - Low Pressure head (150 kPa)
MP - Medium Pressure head (300 kPa)

Number of operating - stand-by pumps

Pump(s) control
OO - ON-OFF control

EKS New Gen

055-2-1 ⟷ 240-6-2

R454B
Refrigerant
R454B | GWP=467

Scroll
Compressor

Shell & Tube
exchanger

Axial
fan

Brazed plate
heat exchanger

SEPR

SEER

MultiScroll Air-cooled liquid chillers



Solution

B - Base
P - Base with pump
I - Integrata

Version

ST - Standard
LN - Low Noise
SL - Super Low Noise

Equipment

AS - Standard equipment
DS - Desuperheater

Cooling capacity 148 - 589 kW

Structure	Structure specifically designed for outdoor installation. Basement and frame in galvanised shaped sheet steel with a suitable thickness. All parts are polyester-powder painted to assure total weather resistance (RAL 7035 standard colour, others on request).
Compressor	Hermetic scroll compressor complete with motor over-temperature and over-current devices and protection against excessive gas discharge temperature. Fitted on rubber antivibration mounts and complete with oil charge.
EC-Fan	Premium-Axial-Fans with bionical shaped blades and high efficient EC (Electronically Commutated) external rotor motors, sealed in protection IP 54 and thermal class THCL 155. The motor efficiency class complies with IE4.
Air heat exchanger	**Microchannel** Microchannel technology increases the primary to secondary surface area ratio and reduces the tube´s air shadow to provide maximum heat exchange through our condensers. Due to their small hydraulic diameter, microchannel aluminium tubes transfer heat more efficiently than the traditional round copper tubes.
Water heat exchanger	**Plate-type** Made of AISI 316 steel complete with water differential pressure switch. Shell covered with closed-cell neoprene anti-condensate material. **Shell & tubes** All extremely efficient with low refrigerant charge and very stable operating performance due to excellent refrigerant distribution, thermally insulated by vapour-proof closed cell.
Electrical board	Switchboard made according to standards IEC 204-1/EN60204-1, complete with contactor and protection for compressor and fans. Main isolator and door interlock safety device.
Control	The microprocessor controls the unit capacity by timing the compressors and checks the operating alarms with the possibility to connect to BMS.
Refrigerant circuit	Filter dryer, moisture-liquid sight glass, electronic expansion valve, HP and LP pressure sensors and safety valve.
Water circuit	Automatic charging cock with gauge, safety valve, expansion tank, water pump(s), water tank.

MAIN ACCESSORIES

- Spring vibration isolation
- Soft start
- Compressor suction/discharge intercepting valve
- Remote control panel
- Max and min voltage relay
- Refrigerant gas HP and LP pressure gauges
- Electromechanical flow switch
- Pumping group, 1 pump
- Additional stand-by water pump
- Automatic water filling valve (closed circuit)

EKS New Gen
Technical data

EKS New Gen		055-2-1	060-2-1	070-2-1	080-4-2	090-4-2	100-4-2	110-4-2	120-4-2	140-4-2	160-4-2	180-6-2	240-6-2
Cooling mode (*P/ST//EC/OO configuration)**													
Cooling capacity [1]	[kW]	148	167	183	203	227	249	294	331	362	403	489	589
Power input (total) [1]	[kW]	46,7	53,2	59,3	64,2	72,6	81,1	92,9	106	118	128	162	195
EER [1]	-	3,17	3,14	3,09	3,16	3,13	3,07	3,16	3,12	3,07	3,15	3,02	3,02
SEPR	-	5,70	5,55	5,59	5,63	5,71	5,61	5,71	5,54	5,58	5,82	5,55	5,58
SEER - ηs,c	[- - %]	4,508 - 177,3%	4,298 - 168,9%	4,406 - 173,3%	4,339 - 170,6%	4,444 - 174,8%	4,274 - 168,0%	4,684 - 184,4%	4,488 - 176,5%	4,573 - 179,9%	4,551 - 179%	4,619 - 181,8%	4,676 - 184,0%
Cooling mode (*P/ST//EC/OI configuration - optional)**													
Cooling capacity [1]	[kW]	164	167	199	203	227	249	326	332	393	403	489	589
Power input (total) [1]	[kW]	53,5	53,3	66,9	64,2	72,6	81,2	106,0	106	133	128	162	195
EER [1]	-	3,07	3,13	2,97	3,16	3,13	3,07	3,08	3,13	2,95	3,15	3,02	3,02
SEPR	-	5,59	5,58	5,35	5,66	5,76	5,66	5,60	5,58	5,34	5,88	5,54	5,59
SEER - ηs,c	[- - %]	4,608 - 181,3%	4,531 - 178,2%	4,464 - 175,6%	4,456 - 175,3%	4,515 - 177,6%	4,501 - 177,1%	4,664 - 183,6%	4,636 - 182,4%	4,521 - 177,9%	4,743 - 186,7%	4,685 - 184,4%	4,748 - 186,9%
Cooling mode (*S/ST//EC/OO configuration)**													
Cooling capacity [1]	[kW]	149	167	181	206	229	252	297	336	366	409	490	593
Power input (total) [1]	[kW]	46,6	53,1	58,8	64,5	73,0	81,7	93,2	106	118	127	162	195
EER [1]	-	3,20	3,15	3,08	3,19	3,14	3,08	3,19	3,17	3,10	3,22	3,02	3,04
SEPR	-	5,68	5,46	5,50	5,59	5,64	5,54	5,66	5,57	5,56	5,86	5,56	5,59
SEER - ηs,c	[- - %]	4,580 - 180,2%	4,296 - 168,8%	4,436 - 174,4%	4,314 - 169,5%	4,398 - 172,9%	4,263 - 167,5%	4,689 - 184,6%	4,605 - 181,2%	4,612 - 181,5%	4,691 - 184,6%	4,713 - 185,5%	4,737 - 186,5%
Cooling mode (*S/ST//EC/OI configuration - optional)**													
Cooling capacity [1]	[kW]	165,0	167,0	196,0	206,0	229,0	252,0	327,0	336,0	397,0	409,0	490,0	593,0
Power input (total) [1]	[kW]	53,6	53,2	66,5	64,6	72,9	81,7	107,0	106,0	133,0	127,0	162,0	196,0
EER [1]	-	3,08	3,14	2,95	3,19	3,14	3,08	3,06	3,17	2,98	3,22	3,02	3,03
SEPR	-	5,58	5,50	5,29	5,62	5,70	5,62	5,57	5,61	5,34	5,95	5,56	5,60
SEER - ηs,c	[- - %]	4,682 - 184,3%	4,540 - 178,6%	4,510 - 177,4%	4,415 - 173,6%	4,451 - 175%	4,480 - 176,2%	4,652 - 183,1%	4,769 - 187,7%	4,558 - 179,3%	4,910 - 193,4%	4,775 - 188,0%	4,800 - 189,0%
Desupereather (*P/ST/DS/EC/OO configuration - optional)													
Heating capacity [2]	[kW]	40,0	47,2	52,8	53,4	63,1	69,5	79,5	93,5	105,0	111,0	152,0	177
Heat exchanger water flow [2]	[m3/h]	6,9	8,2	9,2	9,2	10,9	12,1	13,8	16,2	18,1	19,3	26,3	30,7
User circuit pressure drop [2]	[kPa]	26,3	15,1	18,1	15,6	19,5	22,7	27,9	16,8	19,7	21,4	35,0	29,8
Heat Recovery (*P/ST/HR/EC/OO configuration - optional)													
Heating capacity [2]	[kW]	184,0	210,0	233,0	251,0	284,0	315,0	365,0	417,0	461,0	505,0	630,0	760
Heat exchanger water flow [2]	[m3/h]	31,9	36,4	40,3	43,5	49,2	54,6	63,3	72,3	79,9	87,6	109,0	132,0
User circuit pressure drop [2]	[kPa]	40,7	45,1	48,8	51,8	48,8	50,9	56,4	60,7	63,8	65,9	65,1	67,1
Circuito frigorifero													
Refrigerant - GWP	-	R454B - 467											
Number of refrigerant circuits	N°	1			2								
Compressor type - quantity	- / N°	SCROLL - 2			SCROLL - 4							SCROLL - 6	
Fans type - quantity	- / N°	Axial (EC) - 4			Axial (EC) - 6			Axial (EC) - 8			Axial (EC) - 10		Axial (EC) - 12
Total air flow [1] (*P/ST/**/EC/OO)	[m³/h]	81.210	80.980	80.770	121.700	121.800	121.500	162.400	162.000	161.600	202.600	201.500	241.800
Evaporator water flow [1] (*P/ST/**/EC/OO)	[m³/h]	25,5	28,8	31,4	34,9	39,0	42,8	50,5	57,0	62,2	69,3	84,1	101,0
User circuit pressure drop [1] (*P/ST/**/EC/OO)	[kPa]	42,7	43,5	45,7	33,7	34,7	33,0	37,0	37,1	39,8	43,9	40,2	46,0
Expansion valve type	-	Electronic											
Electrical data													
Power supply (main - auxiliary services)	-	400/3/50 - 24/1/50 e 230/1/50											
Maximum absorbed power without pump	[kW]	78,8	85,8	95,8	108,0	124,0	140,0	158,0	172,0	192,0	215,0	254,0	317,0
Maximum absorbed current (full load)	[A]	131	143,6	158,6	182,6	206	229,4	261,2	287,2	317,2	353	425	520,8
Locked rotor current – LRA without pump	[A]	391	404	419	352	376	386	521	547	577	567	685	734,8
Hydronic kit - 100 kPa useful head (optional)													
Buffer tank capacity	[L]	290			470								
Pump type	-	Centrifugal											
Pump motor nominal power	[kW]	1,5	1,5	2,2	2,2	2,2	2,2	2,2	4	4	4	4	5,5
Water connections													
Size	[inch]	2 1/2" (DN65)	2 1/2" (DN65)	2 1/2" (DN65)	3" (DN80)	3" (DN80)	3" (DN80)	4" (DN100)	4" (DN100)	4" (DN100)	4" (DN100)	5" (DN125)	5" (DN125)
Sound levels (3)													
Total sound power (ST version)	[db(A)]	93	93	94	94	94	95	96	96	97	98	97	98
Total sound pressure (ST version) - at a distance of 10 m	[db(A)]	73	73	74	74	74	75	76	76	77	77	76	77
Total sound power (LN version)	[db(A)]	89	89	90	90	90	91	92	92	93	94	93	94
Total sound pressure (LN version) - at a distance of 10 m	[db(A)]	57	57	58	58	58	59	60	60	61	61	60	61
Total sound power (SL version)	[db(A)]	87	87	88	88	88	89	90	90	91	92	91	92
Total sound pressure (SL version) - at a distance of 10 m	[db(A)]	55	55	56	56	56	57	58	58	59	59	58	59
Dimensions and weights													
Lenght	[mm]	3.570	3.570	3.570	4.015	4.015	4.015	5.135	5.135	5.135	6.255	6.255	7.475
Width	[mm]	2.280	2.280	2.280	2.280	2.280	2.280	2.280	2.280	2.280	2.280	2.280	2.280
Height (versions ST - LN/SL)	[mm]	2.550 - 2.610	2.550 - 2.610	2.550 - 2.610	2.550 - 2.610	2.550 - 2.610	2.550 - 2.610	2.550 - 2.610	2.550 - 2.610	2.550 - 2.610	2.550 - 2.610	2.550 - 2.610	2.550 - 2.610
Operating weight - A BP/ST/AS/EC/OO	[Kg]	1.405	1.490	1.515	2.110	2.110	2.130	2.715	2.890	2.915	3.360	3.665	4.115
Operating weight - A BS/ST/AS/EC/OO	[Kg]	1.530	1.620	1.630	2.175	2.255	2.255	2.820	2.990	3.120	3.620	3.925	4.195
Operating weight - A BP/LN/AS/EC/OO	[Kg]	1.440	1.525	1.550	2.165	2.165	2.185	2.785	2.960	2.985	3.455	3.760	4.230
Operating weight - A BS/LN/AS/EC/OO	[Kg]	1.565	1.655	1.665	2.230	2.310	2.310	2.890	3.060	3.190	3.715	4.020	4.310
Operating weight - A BP/SL/AS/EC/OO	[Kg]	1.475	1.560	1.585	2.215	2.215	2.235	2.855	3.030	3.055	3.550	3.855	4.340
Operating weight - A BS/SL/AS/EC/OO	[Kg]	1.600	1.690	1.700	2.280	2.360	2.360	2.960	3.130	3.260	3.810	4.115	4.420

Reference conditions:

(1) Condenser air intake temperature = 35 °C - Evaporator user fluid temperature IN/OUT = 12/7 °C - User fluid: water - Condensing coil: Microchannel - Results according to UNI EN 14511-2022

(2) Plate heat exchanger user fluid temperature IN/OUT = 40/45 °C - Condenser air intake temperature = 35 °C - Evaporator user fluid temperature IN/OUT = 12/7 °C - User fluid: water - Condensing coil: Microchannel - Results according to UNI EN 14511-2022

(3) Sound power level in compliance with ISO 3744 - Sound pressure level (average) at 10 meter distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.

Connected controller

Thanks to a Multitasking Operating System and to the adoption of standard protocols, local and remote connectivity the controller used in eks chillers is the most advanced technology available.



NEW OPERATING SYSTEM

New Multitasking Operating System ensures optimal system resource usage, extended data types for user application (32bit floating point numbers) application speed increase and independent protocol engines.



CONNECTIVITY

The controller has two integrated Ethernet interfaces, three serial interfaces and two USB ports.
A great choice of communication protocols is possible (Modbus, Carel, BACNet, LON, Konnex, TCP/IP, HTTP, FTP, DHCP, DNS, NTP, SNMP and many others).

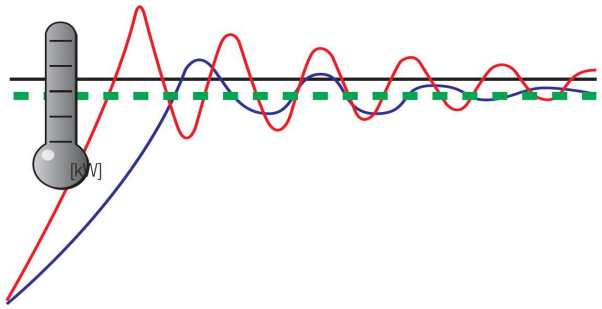
CLOUD SERVICE

Plug & Play solution for tERA platform connection. All tERA services are available just connecting the Ethernet plug to your home or office network, without the need for an external connection box.

Application software ekapt

The application software “ekapt” developed for eks chillers allows an easy access to the machine configuration and management parameters with the menu system organised by device. There are three password levels to allow three different access modes to the parameters (read only for assistance, edit for servicing, total access for the manufacturer). The main screen gives quick access to the user functions without a password (information on the status of the machine components, On-Off and machine operating mode, set points).

PID control

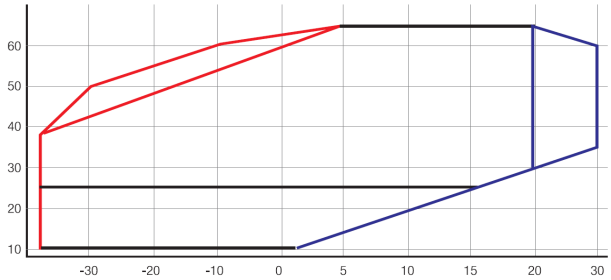


There are two types of PID control:
- PID control on start-up
- PID control during operation

The start-up control must prevent an excess of requested power.
Since at start-up the status of the load is not known but only the temperature is, the power must be entered little by little, waiting for the reaction of the system.

The control during operation must be quick in order to follow any load variations and maintain the water temperature as close to the set-point value as possible.

Compressor’s envelope management



The operating limits (hereafter defined as envelope) of the compressors are controlled.

This control cannot be disabled in order to prevent the compressor from working outside of the safety limits dictated by the manufacturer. All of the compressors inserted thus contain the envelope data. When the operating condition is outside of the envelope, the alarm delay starts counting: if the operating condition remains outside of the envelope when the delay has elapsed, a specific alarm is activated, which stops the compressor; if, on the other hand, the operating condition returns within the envelope limits, the alarm delay counter is reset.

Compressors power distribution



“ekapt” application software provides management of the power distributed to the compressors in the best way possible to increase the efficiency of the unit.

The behaviour of power distribution changes depending on the configuration, 1 or 2 circuits and the power ratio between compressors. In the event of an alarm for one compressor, the next available compressor will be turned on as a replacement if the request is high enough. For units with two circuits and prevention active in one circuit, the rotation will compensate for the limited circuit by increasing the request on the available circuit.

Web commissioning tool



Trought internet browser, inserting the IP address of the control card, it will be possible to access the “ekapt” application in order to see and edit service parameters.

The application is divided in:
Main: in which are shown the main status parameter of the unit.
Synoptic: main unit parameters, according to the circuit number and Unit live trend available.
Parameters:it is necessary to be logged-in to open the Parameter menu. It is necessary to be, at least, Service user to be able to edit all the parameters.
Alarms List: alarms list, with start and end period of the alarm.