



DOMESTIC WATER CHILLER & HEAT PUMP

Built for the Hash
Weather Conditions in the Gulf



During the harsh summers of the Gulf Area, the ambient temperature is extremely high and it can even go up to as much as 54°C, which causes the roof top tank water reach unbearable temperatures, thereby affecting various commercial and residential applications. Be it for large hotels, small villas, or for apartments, the need for chilled water in bathroom and kitchen become crucial.



ROYAL COOL Domestic Water Chiller & Heat Pumps (DWCH) Units are specially designed and built for applications in the hot summer and cold winter of the Middle East. The units work as chillers in summer and heat pumps in other seasons, offering the maximum comfort the whole year through. They chill or heat the roof top tank water to a comfortable temperature ideal for use in bathroom and kitchen, such as shower, bath, washing, cooking, drinking and cleaning etc.

ROYAL COOL DWCH UNITS PROVIDE YOU WITH AN INTEGRATED SOLUTION



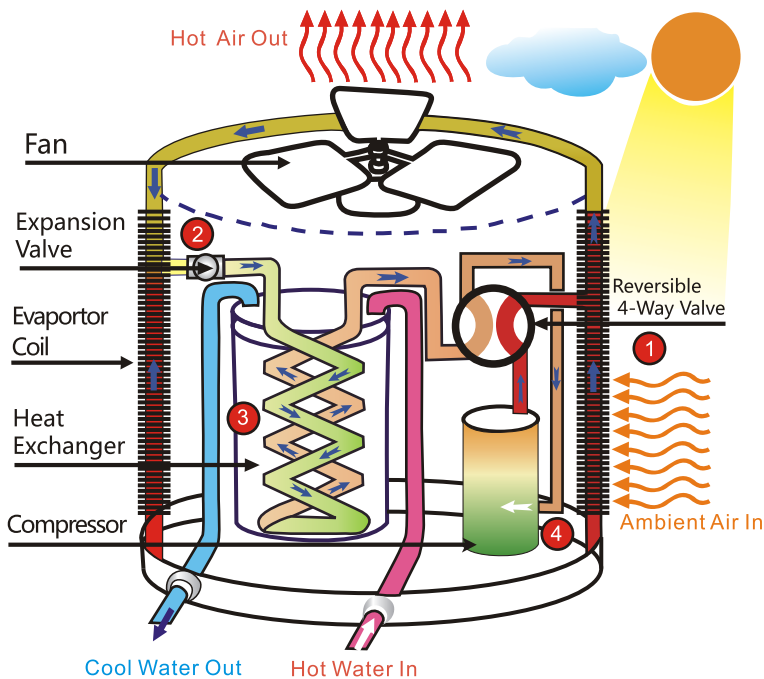
CHILLED WATER



HOT WATER

HOW DOES A DWCH UNIT WORK?

AS A CHILLER



1 STAGE ONE

The temperature of the hot gaseous refrigerant discharged from the compressor is much higher than the outside ambient air temperature. When the outside air passes across the condenser coil, the gaseous refrigerant transfers its heat to the air and condenses into liquid.

2 STAGE TWO

The liquid refrigerant passes through the expansion valve, reducing its pressure and temperature.

3 STAGE THREE

The low temperature refrigerant passes to the heat exchanger evaporator, where the actual heat transfer takes place: the refrigerant absorbs heat from the water pumped into the heat exchanger and evaporates, whereby the water temperature is reduced.

4 STAGE FOUR

The gas refrigerant is then sucked to the compressor and compressed, increasing its pressure and temperature, ready to start the whole cycle once again.

AS A HEAT PUMP

1 STAGE ONE

The heat transfer medium (the refrigerant) is colder than the outside air. As the outside air passes across the evaporator coil, the liquid refrigerant absorbs the heat and evaporates.

2 STAGE TWO

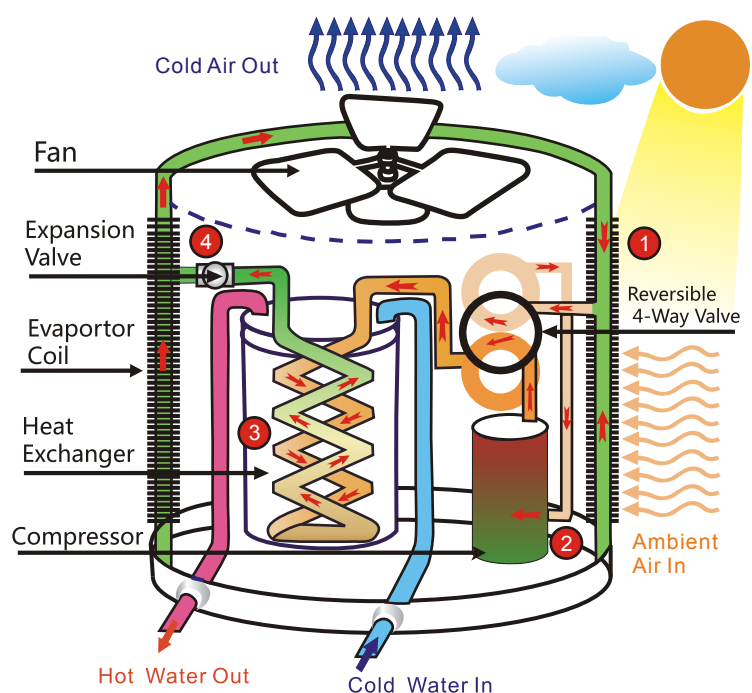
The gaseous refrigerant then passes to the compressor and is compressed. When compressed, the pressure is increased and the temperature of the vapor rises, effectively concentrating the heat.

3 STAGE THREE

The hot gaseous refrigerant passes to the heat exchanger condenser, where the actual heat transfer takes place: the intensely hot gaseous refrigerant transfers its heat to the water pumped into the heat exchanger and condenses back into a liquid.

4 STAGE FOUR

The liquid refrigerant then passes through an expansion valve, reducing its pressure and temperature, ready to start the whole cycle once again.



KEY COMPONENTS

High Efficiency Heat Exchanger

ROAYL COOL DWCH Units incorporate plate type heat exchangers that are far superior to conventional systems using copper coils, thus giving the following advantages:

- Safe and hygienic water
- High corrosion resistance due to use of SUS 316
- High pressure up to 45 bar
- High thermal efficiency
- High working temperature
- Low maintenance



High Efficiency Compressor

ROAYL COOL DWCH units use high efficiency tropical Scroll or Rotary Compressors which have the following advantages:

- High efficiency and energy saving
- Tropical for high ambient conditions
- Quiet operation due to less moving parts



Condenser Coils

Condenser coil used in the system is of fin and tube type. The condensers are properly designed for the ambient conditions through special design softwares. The fins in the condenser are blue hydrophobic coated (corrosive resistance) aluminum. The tubes are of copper. The fins used in the condenser are of corrugated fins, which increase the air heat transfer. The copper tubes are of inner-grooved type, which increases the heat transfer in the refrigerant side.



Intelligent Control

ROAYL COOL DWCH units are supplied with Micro processor based digital controller with LCD display. The control panel is completely factory wired with all accessories and terminals included.



STANDARD DWCH UNITS

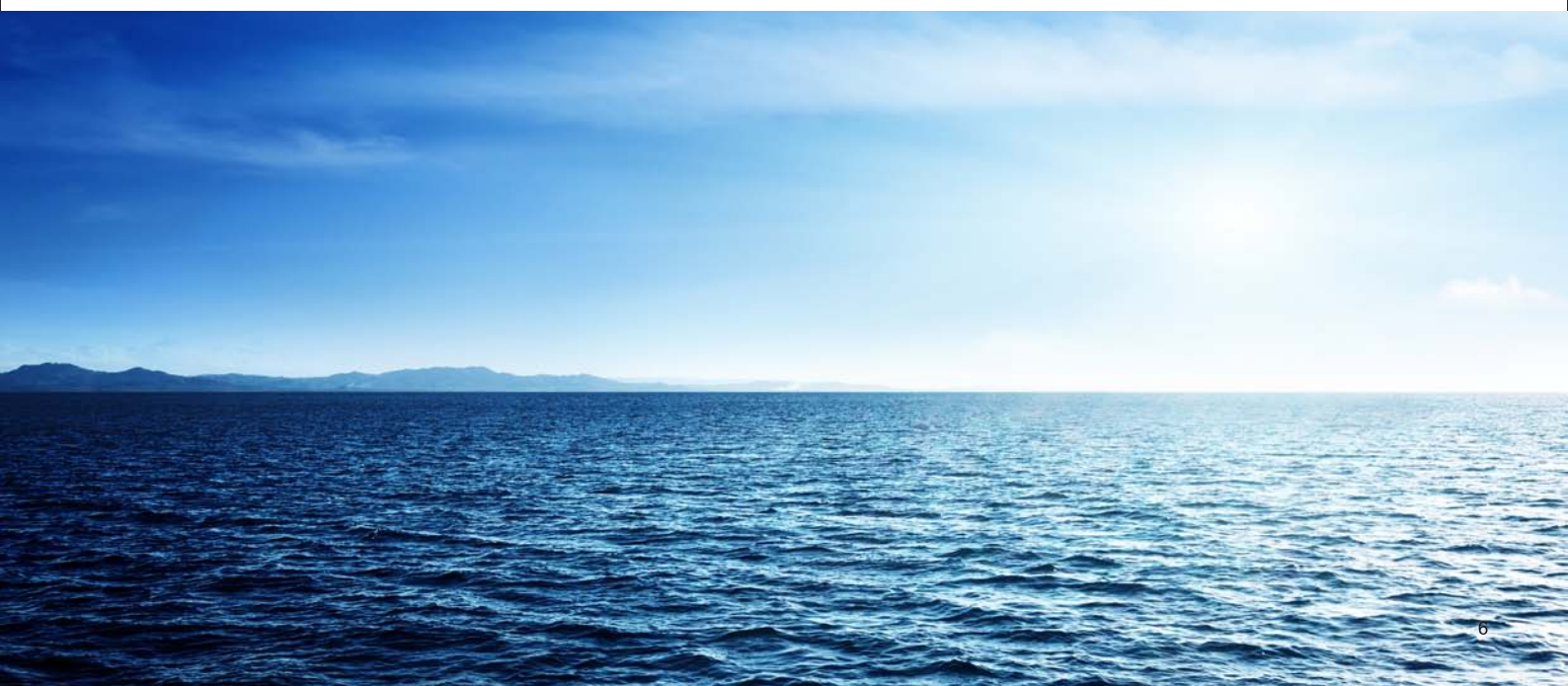
Standard DWCH Units provide two working mode selections: “Cool” & “Heat”. The units can be connected with the main storage tanks, cooling or heating the water effectively to a comfortable temperature ideal for domestic use. In “Cool” mode, the water temperature can be cooled to 8-30°C. While in “Heat” mode, the water temperature can be heated up to 60°C at a running cost of only 1/3 of the conventional electric water heater, greatly saving your energy bills.

Special Features

- Micro processor based digital controller with LCD display
- T3 compressor for high ambient conditions
- Heavy gauge galvanized steel cabinet with epoxy powder painting, for long lasting outdoor life span
- Built-in circulation water pump
- High efficiency SUS 316 plate heat exchanger, superior to copper coils for high efficiency and super corrosion resistance
- Safety protection for normal operation of the unit:
 - ▶ Compressor high pressure & lower pressure switch
 - ▶ Over heat protection
 - ▶ Entering and leaving water temperature sensor
 - ▶ Time delay for compressor on/off

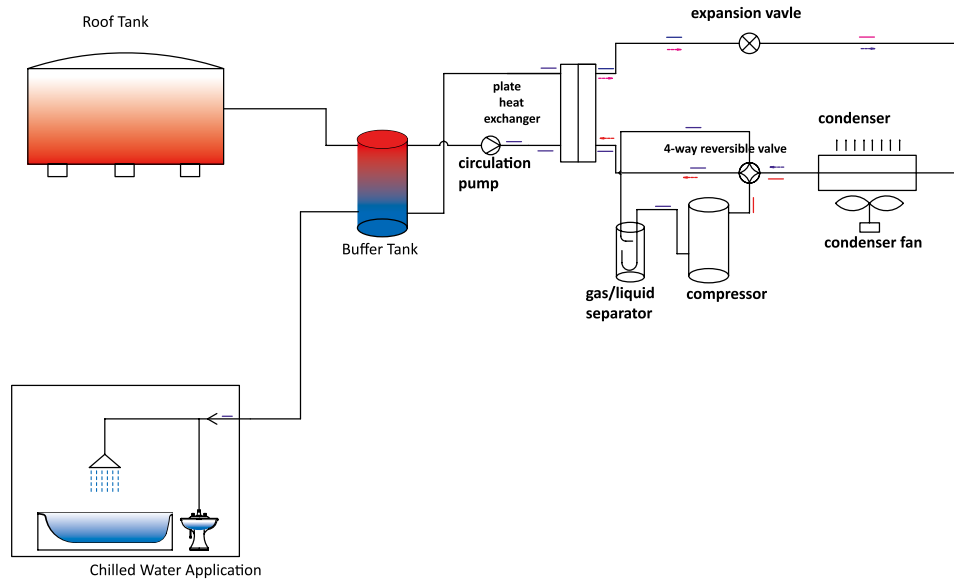
Highlights

- **Wide Capacity Range:** 1.5, 2, 2.5, 3, 4 & 5 TR
- Available for water tanks of **200-1000 gallons**
- Compatible with all types of existing tanks
- Be installed in the garden or roof
- **Powerful and Fast Operation:** produce over 200 gallons cool water or hot water per hour
- **Easy Installation:** be easily installed by a plumber or electrician to an existing tank, no need for a specialist refrigeration engineer
- **Easy Operation:** operates like a simple domestic appliance
- **Energy Saving:** saves 2/3 running cost than conventional electric heaters
- Tropical Design: to withstand the hush summer weather conditions in the Middle East
- **Warranty:** 5 years on compressor and 1 year on other operational parts.

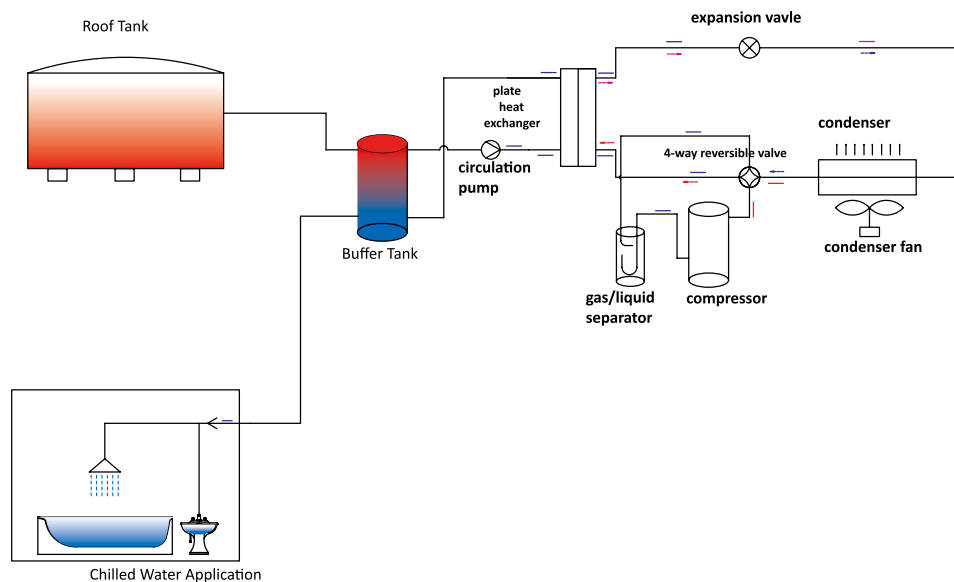


APPLICATION PRINCIPLE DIAGRAM

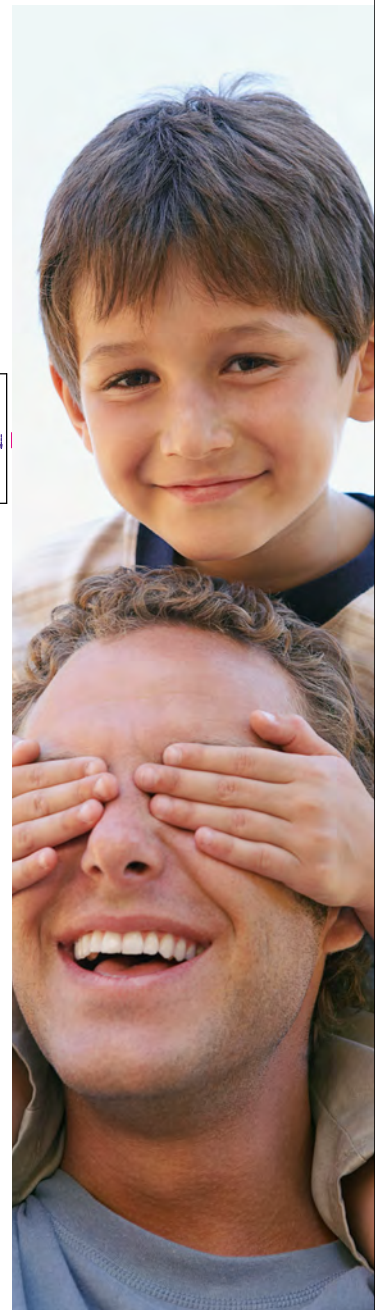
Standard DWCH System



Option 1: Roof Installation



Option 2: Ground Installation



TECHNICAL SPECIFICATIONS

Standard DWCH 50HZ



Model			DWCH-18	DWCH-24	DWC-H24V	DWC-H30V	DWCH-36V	DWCH-48V	DWCH-60V
Power Supply	-	V/Hz/Ph	220-240/50/1				380-415/50/3		
Cooling Performance @35°C	Cooling capacity	BTU/Hr	18000	24000	24000	30000	36000	48000	60000
	Power consumption	Watts	1884	2512	2512	3140	3768	5024	6280
	EER	-	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	Current	A	8.19	10.92	10.92	13.65	6.74	8.98	11.23
	Chilled water production ΔT=20°C	Gallon/hour	60	80	80	99	119	159	199
Cooling Performance @46°C	Cooling capacity	BTU/Hr	15300	20400	20400	25500	30600	40800	51000
	Power consumption	Watts	2223	2964	2964	3705	4446	5929	7411
	EER	-	2.02	2.02	2.02	2.02	2.02	2.02	2.02
	Current	A	9.67	12.89	12.89	16.11	7.95	10.60	13.25
	Chilled water production ΔT=20°C	Gallon/hour	51	68	68	85	101	135	169
Heating Performance @ 20°C DB/15°C WB	Heating capacity	BTU/Hr	21600	28800	28800	36000	43200	57600	72000
	Power consumption		1779	2371	2371	2964	3557	4743	5929
	COP	-	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	Current	A	7.73	10.31	10.31	12.89	15.47	20.62	25.78
	Hot water production ΔT=20°C	Gallon/hour	72	95	95	119	143	191	239
Suggested tank connection (capacity range)		Gallon	100-300	150-400	150-400	200-500	250-600	300-800	350-1000
Noise level	-	dB(A)	52	52	52	55	55	58	58
Controller	-	-	Micro processor based digital wire controller with LCD display						
Compressor	Type		Rotary			Scroll			
	Qty	Nos.	1						
	Refrigerant	-	R22 / R417a						
Heat exchanger (water side)	Type	-	Plate						
	Qty	Nos.	1						
	Construction Material	-	SUS 316						
Condenser fan	Type	-	Axial						
	Airflow	CFM	1471	2059	2059	3235	3235	3529	3529
	Dia x Qty	Inch x Nos.	17.7*1	17.7*1	17.7*1	24*1	24*1	24*1	24*1
Condenser motor	Output Power	Watts	130	130	130	130	130	165	165
	RPM	-	850	850	900	900	900	850	850
	Qty	Nos.	1	1	1	1	1	1	1
Condenser coil	Type		Finned tube exchanger						
	Tube dia	mm	Φ9.52						
	Row	-	2	2	2	1	2	1	2
	FPI	-	16	16	16	18	16	18	16
	Total face area	m2	14.7	28.7	28.7	35.3	35.3	47.5	74
Circulation water pump	Type	-	Centrifugal						
	Minimum flow rate	GPM(US)	3.4	4.5	4.5	5.6	6.8	9.0	11.3
	Minimum pressure head	meter	3	3	3	4.8	4.8	3	3
	Maximum flow rate	GPM(US)	9.2	9.2	9.2	22	22	27.5	27.5
	Maximum pressure head	meter	6	6	6	7.8	7.8	6	6
Water Connection	Insulation Class	IP	IP42	IP42	IP42	IP42	IP42	IP44	IP44
	Inlet	Inch	G3/4"	G3/4"	G3/4"	G1"	G1"	G1-1/2"	G1-1/2"
	Outlet	Inch	G3/4"	G3/4"	G3/4"	G1"	G1"	G1-1/2"	G1-1/2"
Dimmension: WxHxD	Net	mm	1010*307*614	1117*427*614	554*554*663	740*740*633	740*740*633	740*740*835	740*740*835
	Shipping	mm	1070*380*665	1165*480*730	575*575*660	760*760*660	760*760*660	760*760*865	760*760*865
Weight	Net	Kg	60	80	58	77	80	97	100
	Shipping	Kg	70	90	62	80	83	100	103
Stack	-	Layer(s)	4	3	3	3	3	2	2
Loading Qty	20'/40'/40'HQ	Set(s)	90/198/264	72/150/150	118/180/318	72/135/180	72/135/180	42/90/134	42/90/134



Pressurized Storage Water Tank



Capacity		150L	200L	260L	320L	400L	500L	600L
Internal Tank	Diameter	mm	Ø370	Ø470	Ø470	Ø600	Ø600	Ø600
	Wall materials	-	SUS304					
External Cabinet	Wall thickness	mm	1.0	1.2	1.2	1.5	1.5	1.5
	Diameter	mm	470	555	555	555	700	700
	Wall materials	-	Colour plate					
	Wall thickness	mm	0.6	0.6	0.6	0.6	0.6	0.6
Insulation	Materials	-	Fluorin free polyurethane					
	Thickness	mm	50.0	42.5	42.5	50.0	50.0	50.0
Water Connection size		inch	G3/4"					
Working pressure		bar	7	7	7	7	7	7
Dimension: WxDxH	Net	mm	470x1440	470x1800	555x1588	555x1820	700x1480	700x2130
	Packing	mm	550x550x1540	550x550x1890	630x630x1685	630x630x1920	780x780x1990	780x780x2280
Loading Qty			52/112/140	40/84/108	36/78/78	36/75/75	21/45/45	21/45/45

THE DESIGNS AND SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE FOR PRODUCT IMPROVEMENT





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