Tavan Sarma

Computer Room Air Conditioning (CRAC)

New Edition

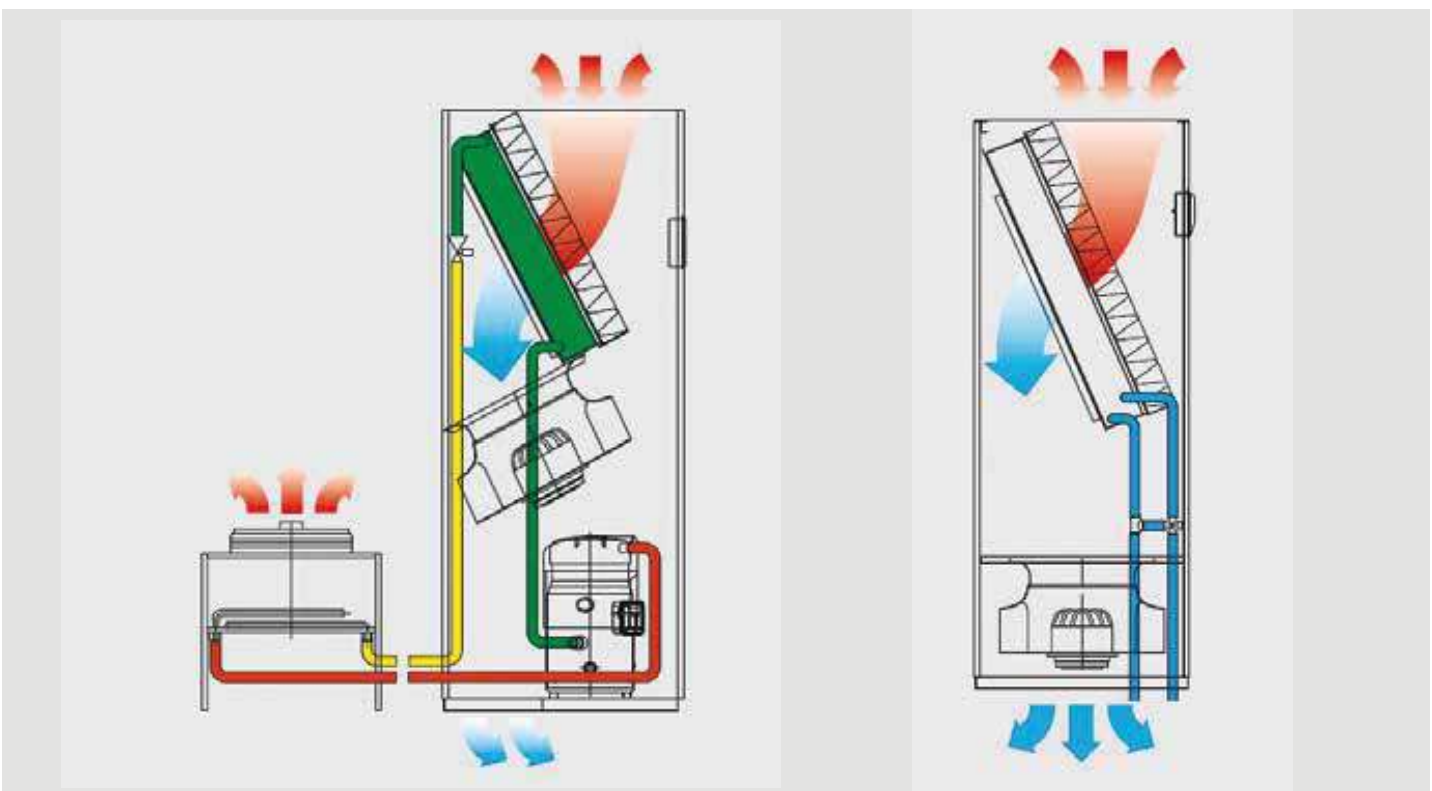
R 22 R 407C R 410

Packaged cooling and air-conditioning system:

Precision or in-room air conditioning system is one of the products that Tavan Sarma group has started to produce in cooperation with foreign partners since its inception, especially for installation in sensitive centers and computer sites. By transferring design know-how to Iran and using domestic resources, Tavan Sarma group can produce cooling systems that are fully compliant with global standards.

The main feature of this cooling system is that it uses a raised floor to distribute the cold. The cool air generated by the in-room cooling systems is passed through the raised floor and then blown out through the raised floor vents at the front door of the racks. The servers draw in this air, and the hot air coming out from the back of the racks is captured by the in-room cooling system.

There are two types of systems: Systems based on gaseous refrigerant (DX) and systems based on water refrigerant (chilled water).



Frontal air delivery FRONT FLOW

Up Flow air delivery UP FLOW

Displacement air delivery DISPLA CEMENT

Down Flow air delivery DOWN FLOW

Values and Features

- Precision and reliability
- High utilization factor
- Various models
- Reduction of energy consumption
- Compact
- Intelligent control system
- Possibility of control and monitoring via network
- High efficiency
- Eco-friendly

Continuous operation

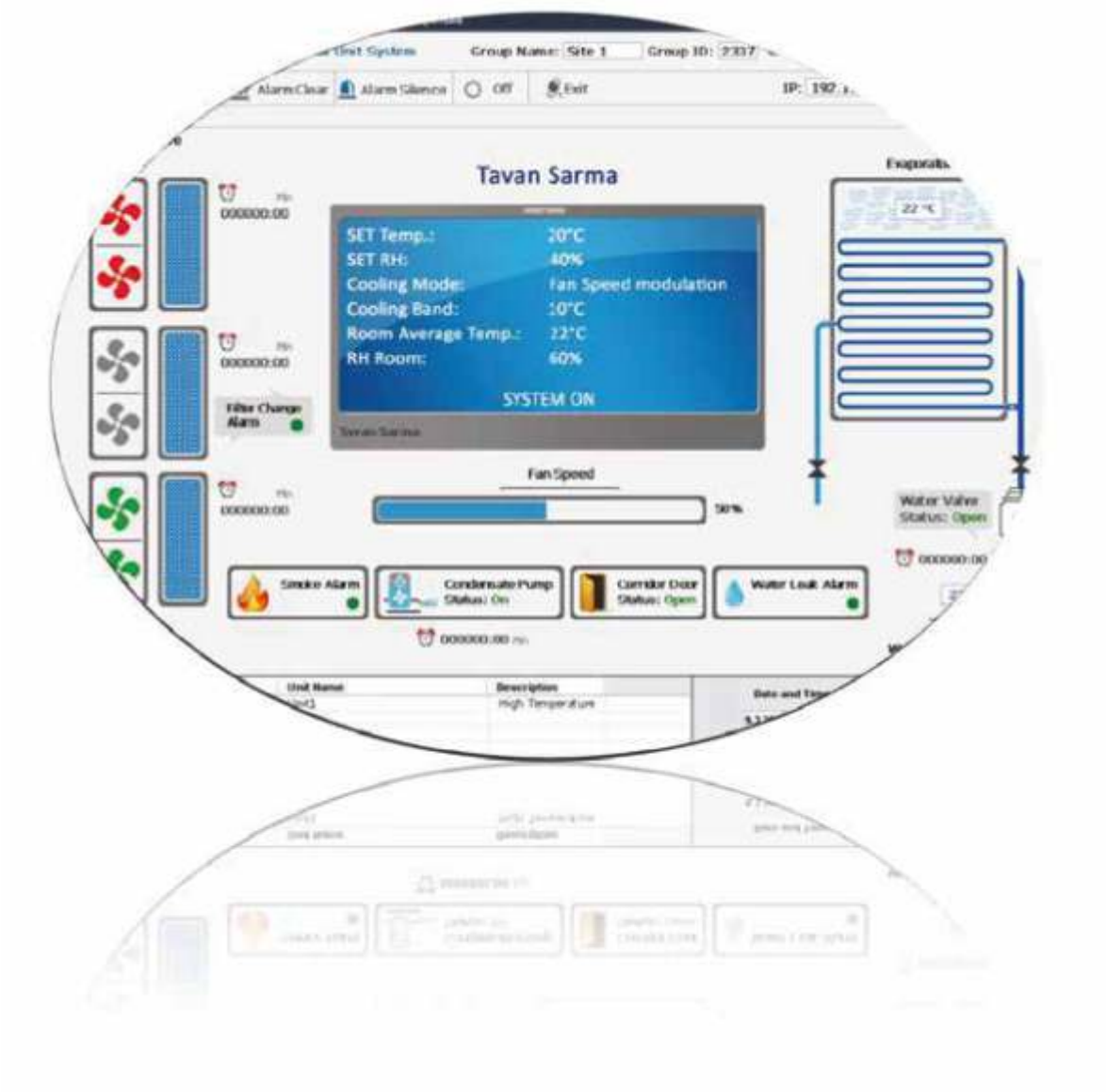
TS cooling systems can operate continuously 24/7/365 without interruption in all environmental conditions from dry to humid and from -20°C to +53°C, generating cold and regulating humidity in the room.

Precise control

As the name of this type of system indicates, this system is equipped with a special microprocessor and can produce cooling and humidity with a high precision of up to 0.1°.

Control and Monitoring

The microprocessor embedded in this system is capable of connecting to all control and monitoring networks via SNMP and Modbus protocols. The application software of this system can be installed on the central computer, and in this application, the cooling systems of a center can be graphically controlled and monitored.



Technologies used

Nowadays, reducing the cost of energy consumption in sensitive centers is one of the main objectives of system designers. In this regard, one of the most important objectives in the development of the TS cooling system was the use of technologies that, in addition to maintaining the main advantages of this device, provide the lowest energy consumption, the highest efficiency, and the highest reliability factor.

R 410

R 407C

R 22

- Refrigerant: R22 or R407C or R410
- Scroll compressors
- Electronic expansion valve
- EC Motor
- 3-way and 2-way pressure independent control valves
- PIVV (in water-chilled models)
- Humidifier of ultrasonic or hot steam type
- Touch Screen Keyboard and Display
- Backward fans

Electronic expansion valve (EEV)

The use of this type of valve allows the manufactured equipment to always be at the cutting edge of cooling system technology. This innovation allows very precise electronic control of the refrigerant flow in the circuit, resulting in greater efficiency and optimal use of the capacity of the unit.

Since this valve is controlled directly by the microprocessor, with the precise control of superheat we increase the COP of the unit in conditions where the outside temperature is low, and therefore the system operates with a much lower condensing pressure than the old mechanical valves.

The use of these types of valves also allows the dehumidification of the system without air volume reduction.

EC fans

The use of EC fans makes it possible to increase the efficiency of the device with low energy consumption. The advantages of using these fans include the following:

- Reduction of power consumption by 45% in chilled water cooling systems and by 60% in DX cooling systems
- Control of fan speed and adjustment of other fan functional features is performed by the integrated microprocessor.

Various models

TS cooling systems are designed to be installed in any condition to take advantage of their capabilities. To this end, designers have always been careful to provide selectable and optional items that allow this product to be used in most limited conditions. The optional alternatives include the following.

- Capacity from 14 to 113 kW
- The possibility to use different fans
- The possibility to choose a filter with different grades
- The possibility to use acoustic panels
- The possibility of manufacturing with one or more cooling cycles
- The possibility of manufacturing in several parts
- The possibility of manufacturing as left- and right-handers

DOWN FLOW

Down flow air delivery: in this system, hot air is drawn in through the roof of the unit, and then cool air is passed through the raised floor at a suitable height.

UP FLOW

Up flow air delivery: In this system, the cool air is distributed through the roof of the unit and the hot air is drawn from the front of the unit

DISPLA CEMENT

Displacement air delivery: In this system, cool air is distributed from the front of the unit and hot air is drawn from the roof of the unit.

Table of chilled water cooling systems capacity

Chilled Water Precision Air Conditioning						
Model	TSCW5D TSCW5U TSCW5DL	TSCW10D TSCW10U TSCW10DL	TSCW15D TSCW15U TSCW15DL	TSCW20D TSCW20U TSCW20DL	TSCW30D TSCW30U TSCW30DL	TSCW45D TSCW45U TSCW45DL
Blower fan type	Forward*					
Air flow rate (CFM)	3000	6000	11000	12000	15000	18000
Air flow rate (m^3/h)	5100	10200	18600	20400	25400	30500
Number of Fans	1	1	2	2	3	3
Constant external pressure (Pa)	50	50	50	50	50	50
Total capacity (kW)	20	37	55	72	106	158
Sensible capacity (kW)	16	31	47	63	94	140
Number of refrigeration cycles	1	1	1	1	1	1
Unit input power (kW)	9.2	11.4	12.5	13.3	18	19
Pressure drop in coil and 3-Way valve (kPa)	45	53	60	65	65	95
Required flow rate (l/s)	2.7	3.5	5	5.5	5.5	8.9
Inlet Air Temperature (°C)	24	24	24	24	24	24
Relative humidity (%)	50	50	50	50	50	50
Inlet water temperature (°C)	10	10	10	10	10	10
Outlet water temperature (°C)	15	15	15	15	15	15
Size of inlet and outlet pipes (inches)	1 ½"	2"	2"	2 ½"	2 ½"	2 ½"
Dimensions (L*W*H)	198*83*83	198*90*150	198*90*200	198*90*220	198*90*260	198*90*280
Weight (kg)	260	350	400	430	620	710

TS: Tavan Sarma Group

D: Down Flow Air Delivery

U: Up Flow Air Delivery

DL: Displacement Air Delivery

*The Fan between forward and backward type is optional.

The unit with higher capacities than indicated in the above table can be designed and manufactured on request.

Water-cooled packaged air conditioning unit equipped with forward fan

Table of the direct expansion (DX) cooling system capacity

Refrigerant	R22, R407C					
Model	TS5MD	TS10D	TS10MD	TS15MD	TS20MD	TS30MD
	TS5U	TS10U	TS10MU	TS15MU	TS20MU	TS30MU
	TS5DL	TS10DL	TS10MDL	TS15MDL	TS20MDL	TS30MDL
Expansion valve	Thermostatic					
Blower fan type	Forward*					
Air flow rate (CFM)	3000	6000	6000	11000	12000	15000
Air flow rate (m^3/h)	5100	102000	10200	18600	20400	25400
Number of Fans	1	1	2	2	2	3
Constant external pressure (Pa)	50	50	50	50	50	50
Total capacity (kW)	18	32	36	46	65	106
Sensible capacity (kW)	16	29	32	42	59	98
Number of refrigeration cycles	1	1	2	2	2	2
Number of compressors	1	1	2	2	2	2
Dimensions (L*D*H)	198*83*83	198*93*130	198*78*213	198*93*253	198*93*253	198*93*253
Condenser type (46°C)	ACC4	ACC8	ACC4	ACC6	ACC8	ACC12
Condenser type (49°C)	ACC6	ACC10	ACC6	ACC8	ACC10	ACC15

TS: Tavan Sarma Group

M: Modular

D: Down Flow Air Delivery

U: Up Flow Air Delivery

DL: Displacement Air Delivery

*The Fan between forward and backward type is optional.

**In order to use the backward fan, the number of fans changes to 2 instead of 3.

Return air temperature: 25°C

RH: 35%

- The unit with higher capacities than indicated in the above table can be designed and manufactured on request.

Table of the new direct expansion (DX) cooling systems capacity

Refrigerant	R22, R407C					
Model	TS5DN	TS10DN	TS10MDN	TS15MDN	TS20MDN	TS30MDN
	TS5UN	TS10UN	TS10MUN	TS15MUN	TS20MUN	TS30MUN
	TS5DLN	TS10DLN	TS10MDLN	TS15MDLN	TS20MDLN	TS30MDLN
Expansion valve	Electronic					
Blower fan type	Forward*					
Air flow rate (CFM)	3000	6000	6000	11000	12000	15000
Air flow rate (m^3/h)	5100	102000	10200	18600	20400	25400
Number of Fans	1	1	2	2	2	3
Constant external pressure (Pa)	50	50	50	50	50	50
Total capacity (kW)	18	32	36	46	65	106
Sensible capacity (kW)	16	29	32	42	59	100
Number of refrigeration cycles	1	1	2	2	2	2
Number of compressors	1	1	2	2	2	2
Dimensions (L*D*H)	198*83*83	198*93*130	198*78*213	198*94*220	198*94*260	198*94*260
Condenser type (46°C)	ACC6	ACC8	ACC6	ACC8	ACC10	ACC12
Condenser type (49°C)	ACC8	ACC10	ACC8	ACC10	ACC12	ACC15

TS: Tavan Sarma Group

M: Modular

D: Down Flow Air Delivery

U: Up Flow Air Delivery

DL: Displacement Air Delivery

N: New Version

*The Fan between forward and backward type is optional.

Return air temperature: 25°C

RH: 35%

- The unit with higher capacities than indicated in the above table can be designed and manufactured on request.

Packaged air conditioning unit with gas refrigerant equipped with a forward fan

Packaged air conditioning unit with gas refrigerant equipped with backward fan

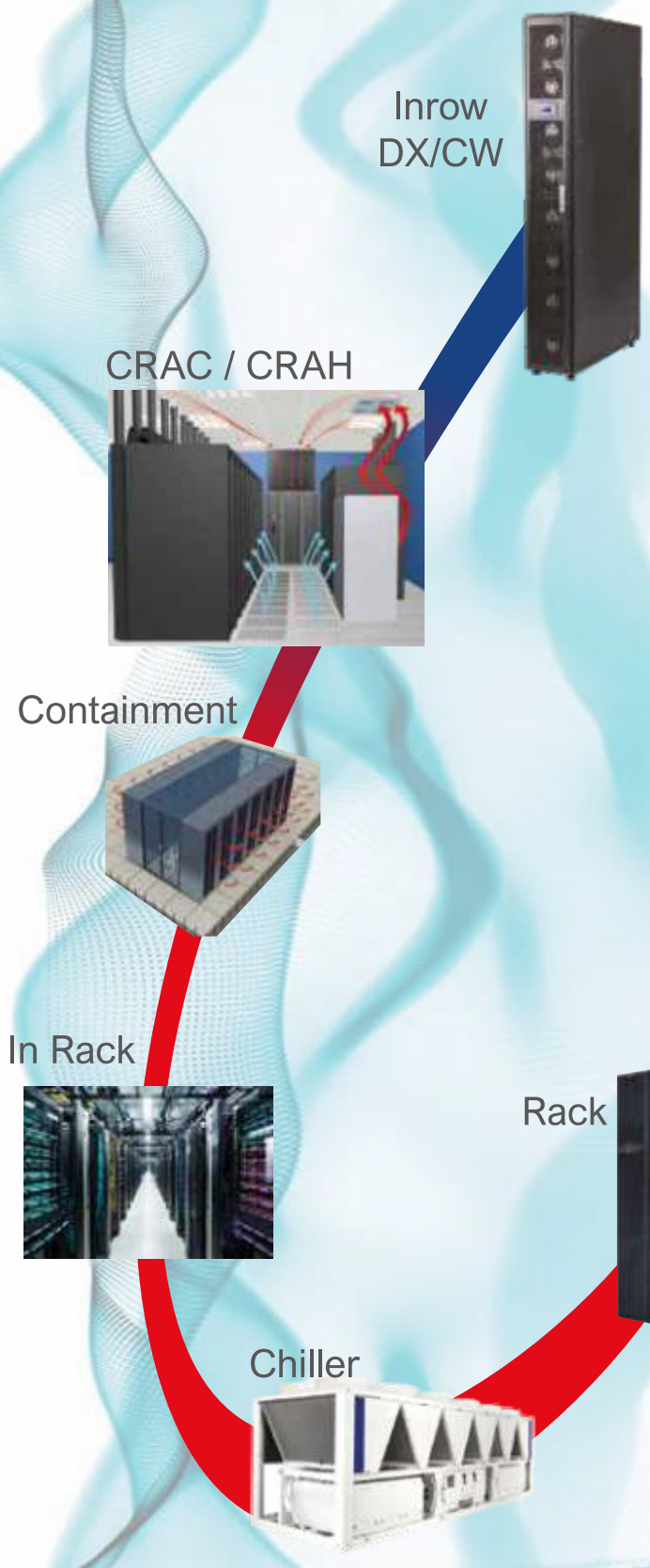
Specifications of condensers

Cooling Capacity (kW)	22	28	36	42	50	70
Air Flow Rate (CFM)	10000	11000	12000	12000	18000	24000
Air Flow Rate (CFM)	17000	18700	20400	20400	30600	40800
Noise (dB)	64	64	68	68	70	70
Length (cm)	130	137	155	200	232	310
Width (cm)	88	93	108	108	108	108
Height (cm)	95	95	95	95	95	95
Weight (kg)	120	140	160	180	200	300

Tavan Sarma Group
Data Center Cooling Solution

TAVAN SARMA GROUP DATA CENTER COOLING SOLUTION

Design, Production, and Implementation of Cooling Systems for Sensitive Centers



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