

NEW

CAT-SRTP-2003 (0)

SARAVEL ROOFTOP PACKAGED A/C UNIT 3 to 10 tons



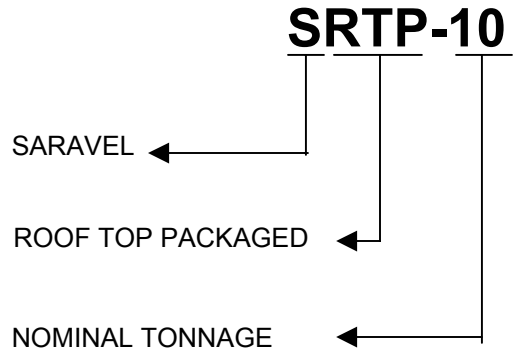
Nomenclature:

SRTP-10

SARAVEL

ROOF TOP PACKAGED

NOMINAL TONNAGE



Introduction

SARAVEL rooftop packaged a/c units are designed to deliver air conditioning for restaurants, banks, shops, and residential buildings. With main duct work and branch takeoffs installed, the unit is quickly installed on a suitable curb and with connections to electrical utilities, full operational capacity is attained. Nominal capacities are 3, 6, 8 and 10 tons of refrigeration.

A significant feature of the rooftop packaged a/c units is the air delivery capabilities to the various zones as planned in the engineering design of the space. Conventional split type units can only recirculate indoor air in a limited envelope with no provisions for fresh air other than air change due to frequent opening of windows and doors. Supply and return air ducts can deliver and recirculate conditioned air with exact proportions to the various zones. With appropriately sized fresh air intake grille installed in the return air duct, SARAVEL rooftop packaged a/c units supply the fresh requirements as well.

Features and Benefits

All units are factory assembled, evacuated, charged, and fully run tested before packing for shipment.

Cabinet

The exterior cabinet and interior panels are constructed of galvanized steel and pre-painted with baked enamel prior to assembly. Single side access for service is standard on all units.

The fan and coil section is completely insulated with fire resistant poly-foam insulation.

The base of the unit shall have provisions for forklift and crane lifting.

Air Flow

Standard arrangement is horizontal air discharge and intake. Bottom intake and discharge is optional. In both cases U-shaped air flow allows for improved static capabilities.

Standard motor is 3-speed motor (except for 10 tons model) with further capabilities for field adjustments.

Compressors

At the heart of SARAVEL rooftop packaged a/c unit are highly efficient compliant scroll compressors mounted on isolated compressor rails and each compressor is mounted on 4 independent vibration isolators.

On 10 tons unit, two independent compressor circuits provide precise comfort control, improved efficiency, and back-up capability

Coils

Direct expansion (DX) and condenser coils are constructed of seamless copper tubes mechanically expanded into corrugated, waffle type fin plates with choice of materials including Aluminum or Copper fins.

Coil leak test is preformed in the factory at 350 Psig for both evaporator and condenser coils. Sloped condensate drain pan is offered with standard end drain capability.

SARAVEL also offers Blygold[®] special corrosion treatment on both condenser and DX coils as an option for applications where the corrosive nature of the surrounding air might cause damage to the coils.

Field installed, duct mounted electrical heater are offered as option.

Filters

One inch washable filters are easily pulled from the filter rack for inspection and service work.

Controls

Units are equipped with valuable safety controls designed to monitor and protect the unit. The safeties include:

- High-pressure switch
- Internal compressor overload protection
- Freeze protection thermostat
- Refrigerant filter drier

Units are completely factory wired with necessary controls and contactor pressure lugs or terminal block for power wiring.

Specification and Rating:

TABLE 1:

	Model	SRTP-3	SRTP-6	SRTP-7.5	SRTP-10
Capacity	Nominal cooling (Tons)	3	6	7.5	10
	Total Cooling capacity (Btu/Hr) *	30,000	63,000	78,000	126,000
	Sensible Cooling capacity (Btu/Hr) *	22,500	45,500	57,000	90,000
	Nominal Air Flow (CFM) **	1,000	2,100	2,800	4,100
Physical And Electrical Data	Voltage (V) / Phase / HZ	220 / 1 / 50	380 / 3 / 50		
	Nominal Total Power (KW)	4.6	5.8	6.9	11.4
	Nominal Total Current (Amp)	20.5	16.3	20.4	29.1
	Starting Current (Amp)	73	70.5	94	70.5
	Compressor	Scroll Hermetic			
	Type	Scroll Hermetic			
	Quantity	1			2
	Nominal Power (HP)	3	6	7.5	6
	Condenser Coil				
	Face Area (sqft)	9.9	21.1	25.6	52.8
	Row / FPI / Tube / Fin	2 / 14 / 3/8" Cu or Al			
	Condenser Fan	Axial Fan With External Rotor Motor			
	Type	Axial Fan With External Rotor Motor			
	Quantity	1			
	Size (mm) / Speed (rpm)	500 / 900	560 / 900	630 / 900	710 / 900
	Sound power level (dBA)	65	74	77	78
	Air Flow (CFM)	2800	4600	5800	8200
	Nominal Power (KW)				
	Evaporator Coil				
	Face Area (sqft)	2.9	4.7	5.2	9.1
	Row / FPI / Tube / Fin	3 / 14 / 3/8" Cu / Al			
	Evaporator Fan	Centrifugal DWDI With Embedded Motor			
	Type	Centrifugal DWDI With Embedded Motor			
Quantity	1				
Size (inch) / Speed (rpm)	9/9 / 900	10/10 / 1400	12/12 / 900	12/12 / 900	
Sound power level (dBA)	63	66	66	78	
Air Flow (CFM) **	1,000	2,100	2,800	4,100	
Nominal Power (KW)	1/3	3/4	3/4	1.5	
Evaporator Filter	1" Washable				
Unit Dimension (L / W / H) (m)	1.1 / 1 / 0.83	1.6 / 1.4 / 0.83	1.8 / 1.55 / 0.83	2 / 1.5 / 1.57	
Unit Operating Weight (Kg)	170	280	350	550	

* Cooling capacity is based on ARI 210, 95°F ambient temperature, 80°F DB / 67°F WB indoor air temperature at air flow at 0.35" external static pressure. For other temperatures and external static pressure apply correction factors.

** Air flow is at 0.35" external static pressure. For other external static pressure apply correction factor.

Selection Rating correction :

TABLE 2:

External Static Pressure (inch)	0.3	0.35	0.4
CFMF for SRTP-3 model	1.15	1	0.7
CFMF for SRTP-6 model	1.03	1	0.9
CFMF for SRTP-7.5 model	1.08	1	0.9
CFMF for SRTP-10 model	1.15	1	0.7

TABLE 3:

CFMF	0.7	0.87	0.9	1	1.05	1.15
F1	0.87	0.95	0.99	1	1.02	1.04
STF1	0.85	0.95	0.97	1	1.04	1.06

TABLE 4:

Outdoor Ambient temperature (DB °F)	65	75	85	95	105	115
F2	1.17	1.11	1.06	1	0.92	0.83
STF2	0.91	0.94	0.97	1	1.04	1.05

TABLE 5:

Altitude (ft)	2,500	5,000	7,500	10,000
F3	0.98	0.96	0.94	0.92
STF3	0.92	0.85	0.78	0.71

TABLE 6:

Indoor Air Wet Bulb temperature (WB °F)	59	63	67	71
F4	0.9	0.92	1	1.07
STF4	1.5	1.3	1	0.6

TABLE 7:

Indoor Air Dry Bulb temperature (DB)	70	75	80	85
STF5	0.6	0.8	1	1.2

Actual air flow=Nominal air flow x CFMF (CFM correction factor)

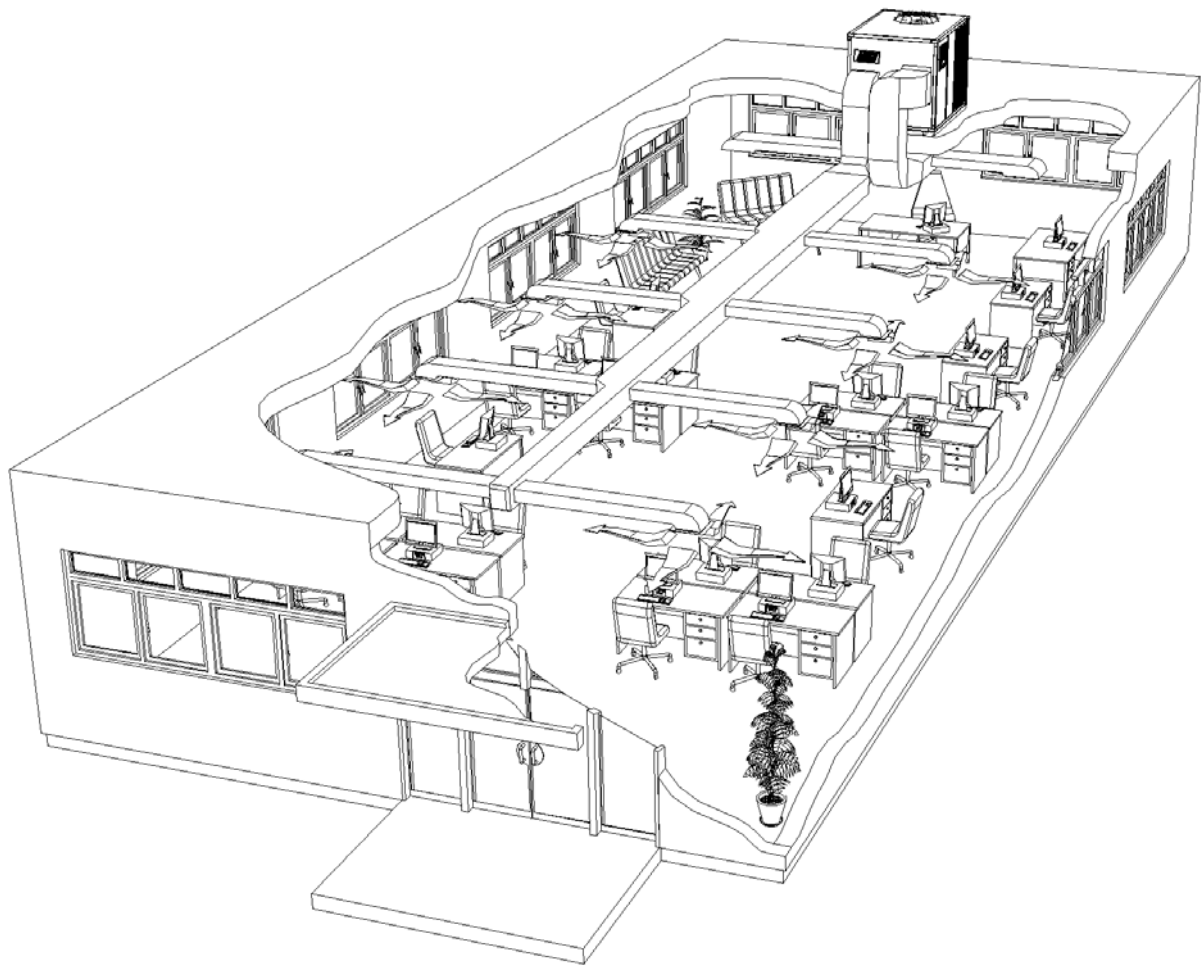
$$\text{Total cooling load} = \frac{\text{Required total cooling load}}{F1 \times F2 \times F3 \times F4}$$

$$\text{ST (Sensible to total cooling load)} = \frac{\text{Required ST}}{\text{STF1} \times \text{STF2} \times \text{STF3} \times \text{STF4} \times \text{STF5}}$$

$$\text{Required ST} = \frac{\text{Required sensible cooling load}}{\text{Required total cooling load}}$$

F1..F4 are total cooling load correction factor

STF1..STF4 are sensible to total cooling load correction factor



Selection Example:

Space: Bank office building

Area: $300 \text{ m}^2 = 3228 \text{ ft}^2$

City: Tehran

Altitude: 4000 ft

Outdoor air summer temperature:
100°F DB/ 75°F WB

Indoor design air temperature:
78°F DB/ 63°F WB
(According to ASHRAE comfort zone)

Fresh air required: 25%

Required total cooling load: 8.97 ton=107600
btu/hr

Required sensible cooling load: No idea
(360 ft²/ton, 1 ton=12000 btu/hr according to
ASHRAE pocket handbook cooling load check
figures.)

Selection:

Return indoor air temperature:
(Return air mixed with 25% fresh air)
 $0.25 \times 100^\circ\text{F} + 0.75 \times 78^\circ\text{F} = 84^\circ\text{F DB}$
 $0.25 \times 75^\circ\text{F} + 0.75 \times 63^\circ\text{F} = 66^\circ\text{F WB}$

First assume no cfm correction factor for
external static pressure, so from:
TABLE 2: CFMF=1
TABLE 3: F1=1 , STF1=1

Then with interpolating from:
TABLE 4: F2=0.96 , STF2=1.02
TABLE 5: F3=0.97 , STF3=0.88
TABLE 6: F4=0.98 , STF4=1.08
TABLE 7: STF5=1.16

So:

$$\begin{aligned} \text{Total cooling load} &= \frac{\text{Required total cooling load}}{F1 \times F2 \times F3 \times F4} \\ &= \frac{107600}{1 \times 0.96 \times 0.97 \times 0.98} = 118241 \text{ btu/hr} \end{aligned}$$

Then from TABLE 1: Select SRTP-10 model
with total cooling capacity of 126000 btu/hr

Now according to SRTP-10 nominal air flow =
4100 cfm and duct sizing data , we may obtained
0.38" W.G. external static pressure, so from:
TABLE 2: CFMF=0.87
TABLE 3: F1=0.95 , STF1=0.95

Again:

$$\begin{aligned} \text{Total cooling load} &= \\ &= \frac{107600}{0.95 \times 0.96 \times 0.97 \times 0.98} = 125116 \text{ btu/hr} \end{aligned}$$

Then from TABLE 1: Again select SRTP-10
model with total cooling capacity of 126000 btu/hr

$$\begin{aligned} \text{Actual air flow} &= \text{Nominal air flow} \times \text{CFMF} \\ &= 4100 \times 0.87 = 3570 \text{ cfm} \end{aligned}$$

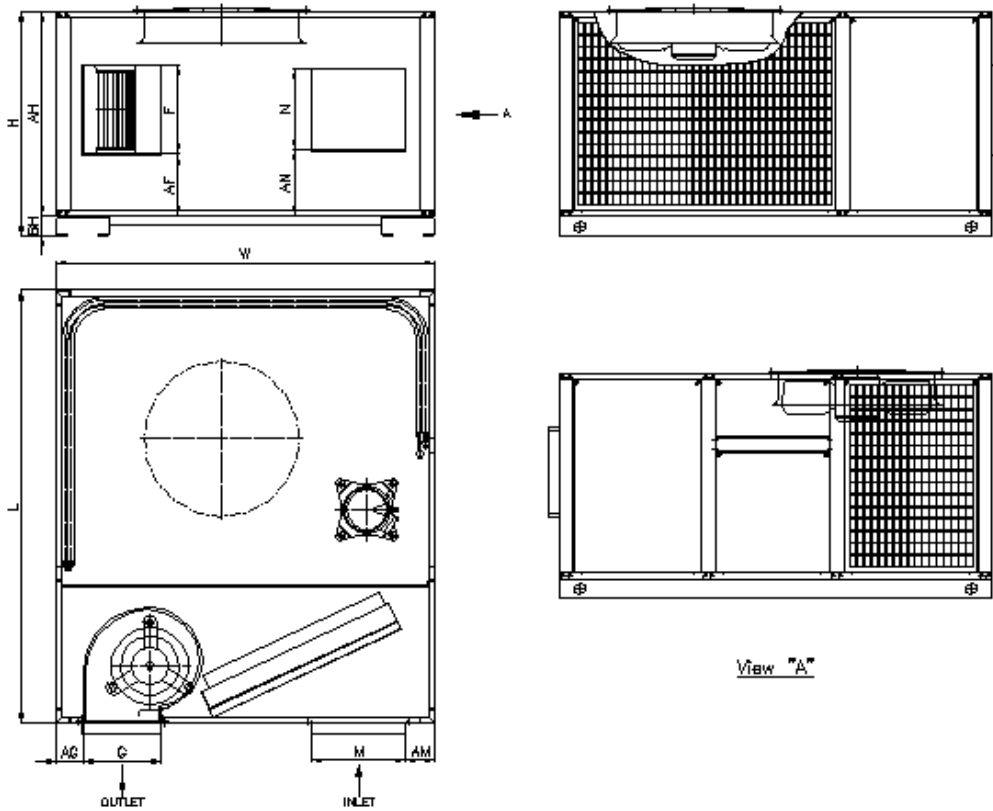
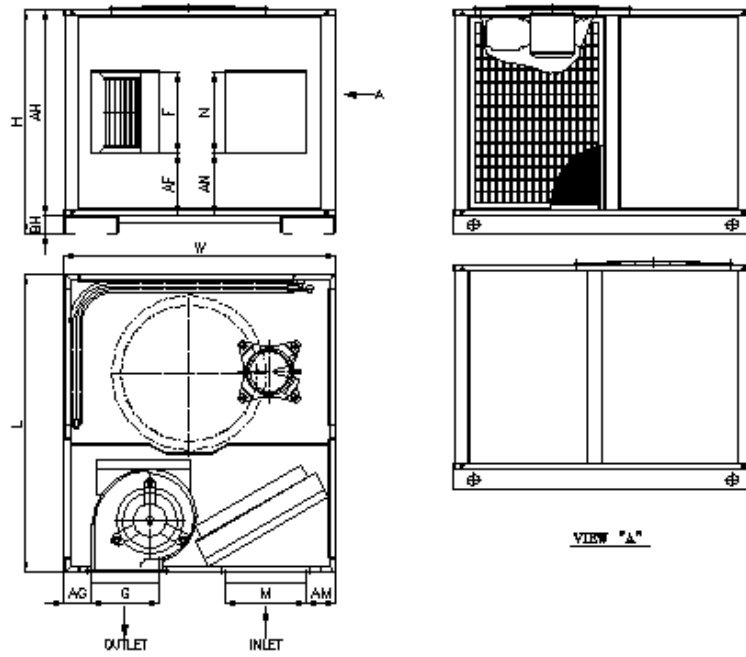
If Required sensible cooling load was known:

$$\text{Required ST} = \frac{\text{Required sensible cooling load}}{\text{Required total cooling load}}$$

$$\begin{aligned} \text{ST} &= \frac{\text{Required ST}}{\text{STF1} \times \text{STF2} \times \text{STF3} \times \text{STF4} \times \text{STF5}} \\ &= \frac{\text{Required ST}}{0.95 \times 1.02 \times 0.88 \times 1.08 \times 1.16} = \frac{\text{Required ST}}{0.76} \end{aligned}$$

Then from TABLE 1: ST of SRTP-10 model would
be checked also.

Dimension:



MODEL	L	W	H	AH	BH	AF	F	AG	G	AM	M	AN	N
SRTP-3	1100	1000	830	760	70	231	300	100	250	110	350	231	300
SRTP-6	1600	1400	830	760	70	231	330	100	286	110	346	245	300
SRTP-7.5	1800	1550	830	760	70	165	330	100	286	110	346	245	300
SRTP-10	2000	1500	1570	1500	70	510	471	155	404	100	450	450	600

Engineering Note:

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