

THE ROTOVANE ADVANTAGE

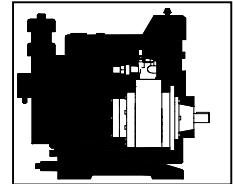


JoTEK



ENVELOPE SIZE

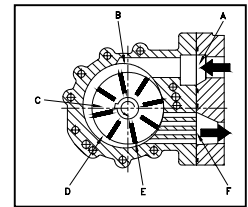
The RotoVane compressor is smaller than equivalent capacity reciprocating machines. The compressor can be fitted into confined spaces with the oil separator mounted remotely. It is also easier to handle on installation.



SOFT START

As the vanes are retracted on shut down by their passage through the nip area, the compressor is internally unloaded at start-up and has a low starting torque. This offers advantages, as external unloading devices are not needed to allow motors or engines to be started when directly coupled.

- A. Suction port
- B. Non circular computer generated stator profile
- C. Rotor
- D. Compression cell
- E. Retracted blades
- F. Discharge port



LEVEL OF VIBRATION

There are virtually no out-of-balance forces in the RotoVane compressor and it has a critical speed well above its maximum operating speed of 4,000 rpm. As it is an eight vane design, the level of torque fluctuation per revolution is small. These characteristics offer significant advantages in the application of the compressor.

RUGGEDNESS

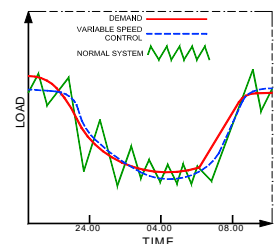
The compressor has few moving parts and, with the shaft mounted on taper roller bearings, is very rugged. This, combined with the low stress on the parts, gives the compressor a long operating life. All the materials in the compressor have been qualified by extensive test programs for operation with the refrigerants published.

Design Life for Major Components

- Bearing life: 80,000 hrs
- Vane life: 10 years
- Profile life: 10 years
- Shaft Seal life: 5 years

SYSTEM CONTROL - VARIABLE SPEED

The RotoVane compressor is a variable speed device. The capacity is linear with the rotational speed, and the COP is not affected until the speed is less than 1500 rpm. This allows for a very smooth capacity controlled system, as opposed to a typical staged compressor.



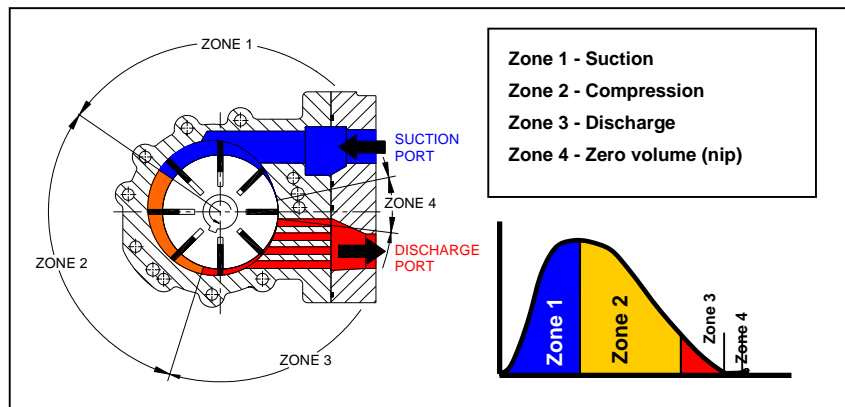
GENERAL DESIGN

The RotoVane compressor is an eight cell sliding vane rotary compressor. Its strength lies in its simplicity. This robust design will handle many different applications and offer many options and features that are not available on other compressors which typically, OEMs have to design around.

The basic function of the RotoVane Compressor is as follows:

As the rotor and blades are spun around, the gas is drawn into the suction area (Zone 1) and captured by one cell when the vanes are at maximum extension. Compression occurs as the cell rotates towards discharge in Zone 2. Discharge occurs when the cell is exposed to the discharge port in Zone 3. The cell decreases to almost zero volume as it goes through the nip in Zone 4 and returns to suction in Zone 1.

The RotoVane compressor is a fixed volume ratio machine. The volume ratio is defined as the volume of the full cell in Zone 1 divided by the volume of the cell at the end of Zone 2 just prior to discharge. The volume ratio of individual compressors depends on the application; high temperature applications require a low volume ratio and low temperature a high volume ratio. This is to counteract the effects of over and under compression.



The profile of the stator, which allows rapid vane extension to suction after the nip and then a gradual compression, helps to minimize the internal leakage of the compressor

BLADES (VANES)

The eight cell design optimizes the vane friction for minimal internal leakage. The vanes are held against the stator (body) by centrifugal action and seal adjacent cells from each other.

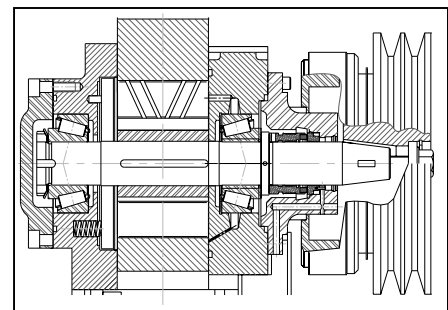


The vanes are manufactured from a patented carbon fiber compound that has a better strength to weight ratio than steel or aluminum alloys, minimizing the tip loading while giving a high strength in bending. This material has a low coefficient of friction which combined with hydrodynamic lubrication ensures long vane life.



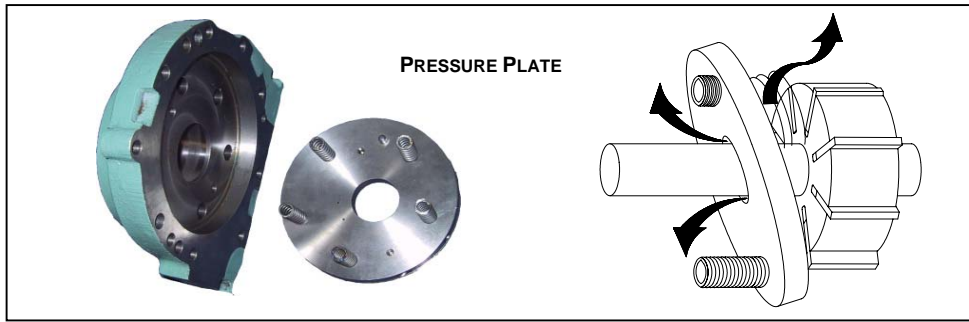
ROTOR / SHAFT

The rotor is free to float on the shaft. The rotor shaft assembly is located by taper roller bearings allowing tight end clearances resulting in low internal leakage. This also eliminates any alignment requirements during assembly. It minimizes shaft movement, improving seal performance.



PRESSURE PLATE

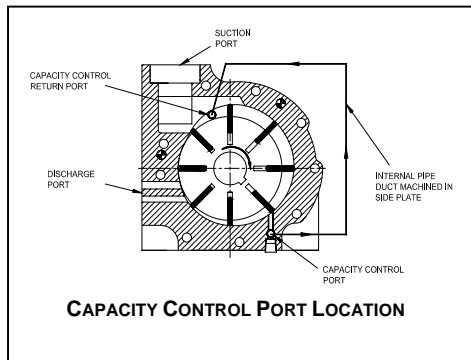
The compressor has a pressure plate as the non-drive end side face.



The pressure plate prevents hydraulic lock up of the compressor in the unlikely event that this occurs at start-up. It also allows liquid slugs to pass through the compressor without damaging it, during the infrequent times that this event occurs.

CAPACITY CONTROL

The capacity of the compressor can be varied by means of the capacity control port. This feature is available on the transport model (RT) when typically, the compressor is driven off the main power take off (PTO) and the resulting compressor speed/capacity cannot be regulated to the required load.



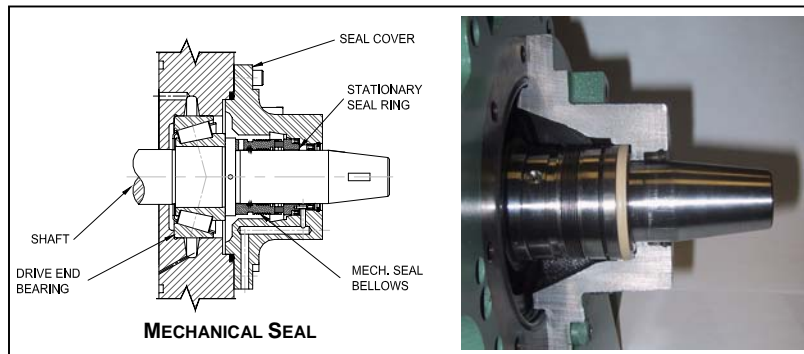
Internal passages connect the port, by way of a pilot operated valve, with the suction area.

When the valve is closed, the compressor pumps all the gas collected at suction around to discharge.

When the valve is open, the port returns some of the gas from the cell at the port location to suction and the pressure in this cell approaches suction pressure. The capacity of the compressor is reduced by the ratio of this cell volume to that of the volume of the cell at suction. For a port located to give a 50% reduction in capacity there is an associated power reduction of 30%.

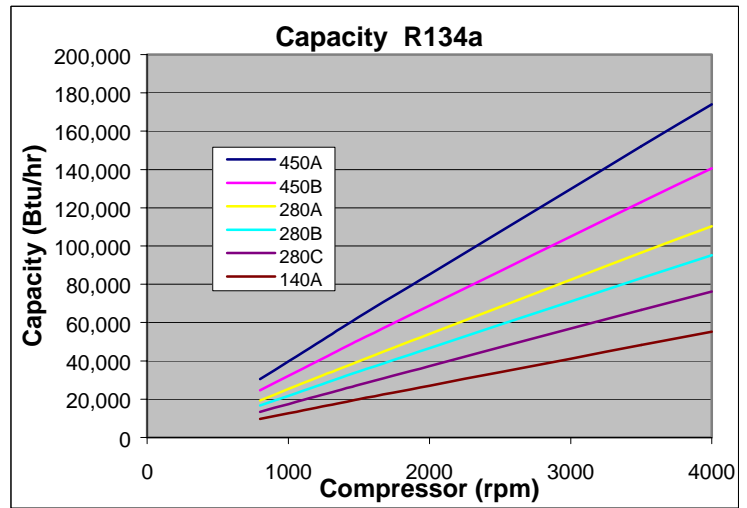
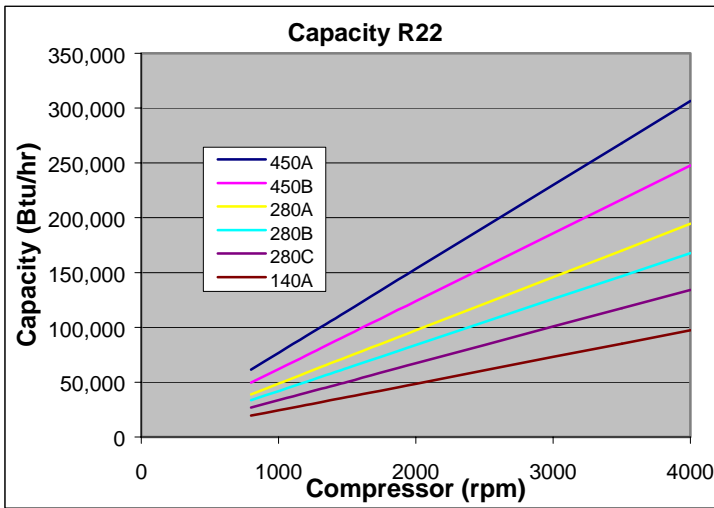
SHAFT SEAL

The shaft seal is a bellows disc plate design that was tailored to the compressor resulting in a long seal life and near zero leakage rates and oil floodback on shut down.



The result is a compressor that competes in performance with the best of reciprocating, screw and scroll technology over the range of applications. This is achieved with a compressor that is less complex than screw or scroll and with significantly fewer components than a reciprocating compressor.

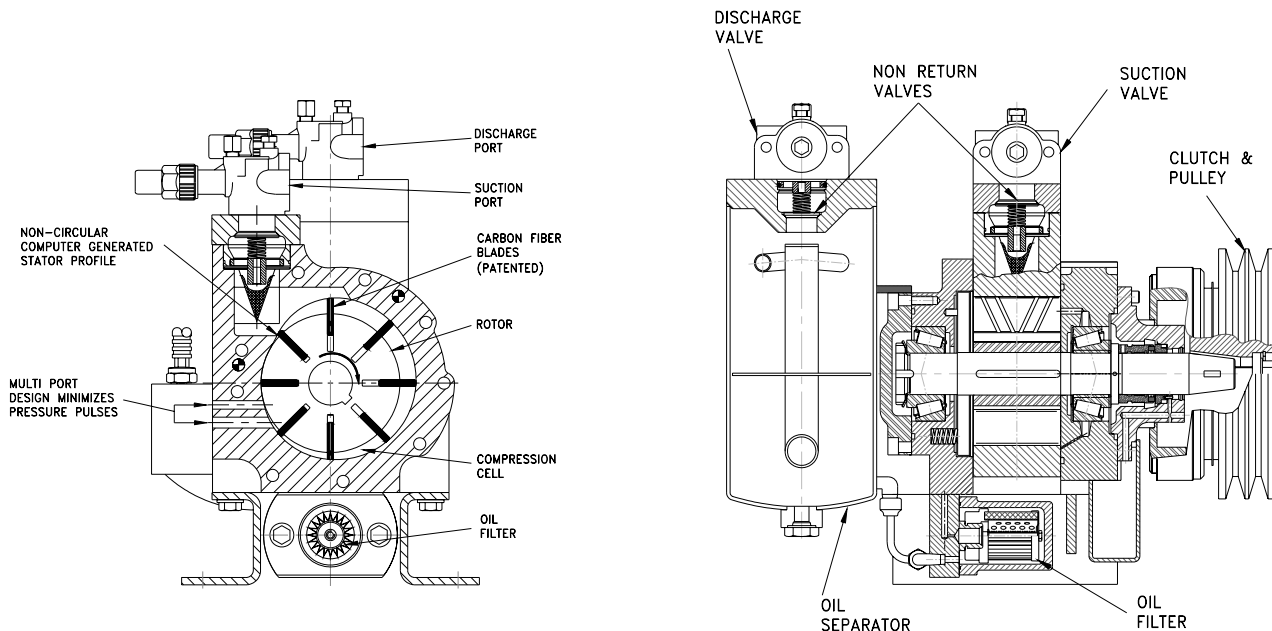
PERFORMANCE



R22	SIZE	Capacity (kW) (Btu/hr)		Power (kW) (hp)		Mass Flow (kg/s) (lb/m)	
		1800rpm	3600rpm	1800rpm	3600rpm	1800rpm	3600rpm
		1800rpm	3600rpm	1800rpm	3600rpm	1800rpm	3600rpm
@ 5/55 °C, 20°C Superheat, 0 Subcooling Low	RC450A	40.4	80.9	13.8	27.6	0.27	0.54
	RC450B	31.6	63.1	11.2	22.4	0.21	0.42
	RC280A	23.6	47.2	8.8	17.5	0.16	0.31
	RC280B	21.5	42.9	7.7	15.4	0.14	0.29
	RC280C	15.8	31.6	5.9	11.8	0.10	0.20
	RC140A	12.5	24.9	4.3	8.7	0.08	0.17

R134a	SIZE	Capacity (kW) (Btu/hr)		Power (kW) (hp)		Mass Flow (kg/s) (lb/m)	
		1800rpm	3600rpm	1800rpm	3600rpm	1800rpm	3600rpm
		1800rpm	3600rpm	1800rpm	3600rpm	1800rpm	3600rpm
@ 5/55 °C, 20°C Superheat, 0 Subcooling Low	RC450A	26.1	52.1	9.4	18.9	0.19	0.37
	RC450B	21.0	42.0	7.8	15.7	0.15	0.30
	RC280A	15.8	31.6	6.0	12.0	0.11	0.23
	RC280B	13.5	27.0	5.2	10.4	0.10	0.19
	RC280C	10.3	20.6	4.1	8.1	0.07	0.14
	RC140A	8.0	16.1	3.0	6.1	0.06	0.12

CROSS SECTION OF RT450ROTOVANE COMPRESSOR





TYPICAL INSTALLATIONS

Bus Transport

Compact Design
True Variable Speed
Soft Start



Rail Transport

Compact Design
True Variable Speed
Soft Starts
Quiet



Freezer and Refrigeration Systems

Staged/Variable Speed
System Control
Economized – Low Temp
Efficiency



Ammonia Systems

Versatile

Heat Pumps

Single Dwelling
Office Building

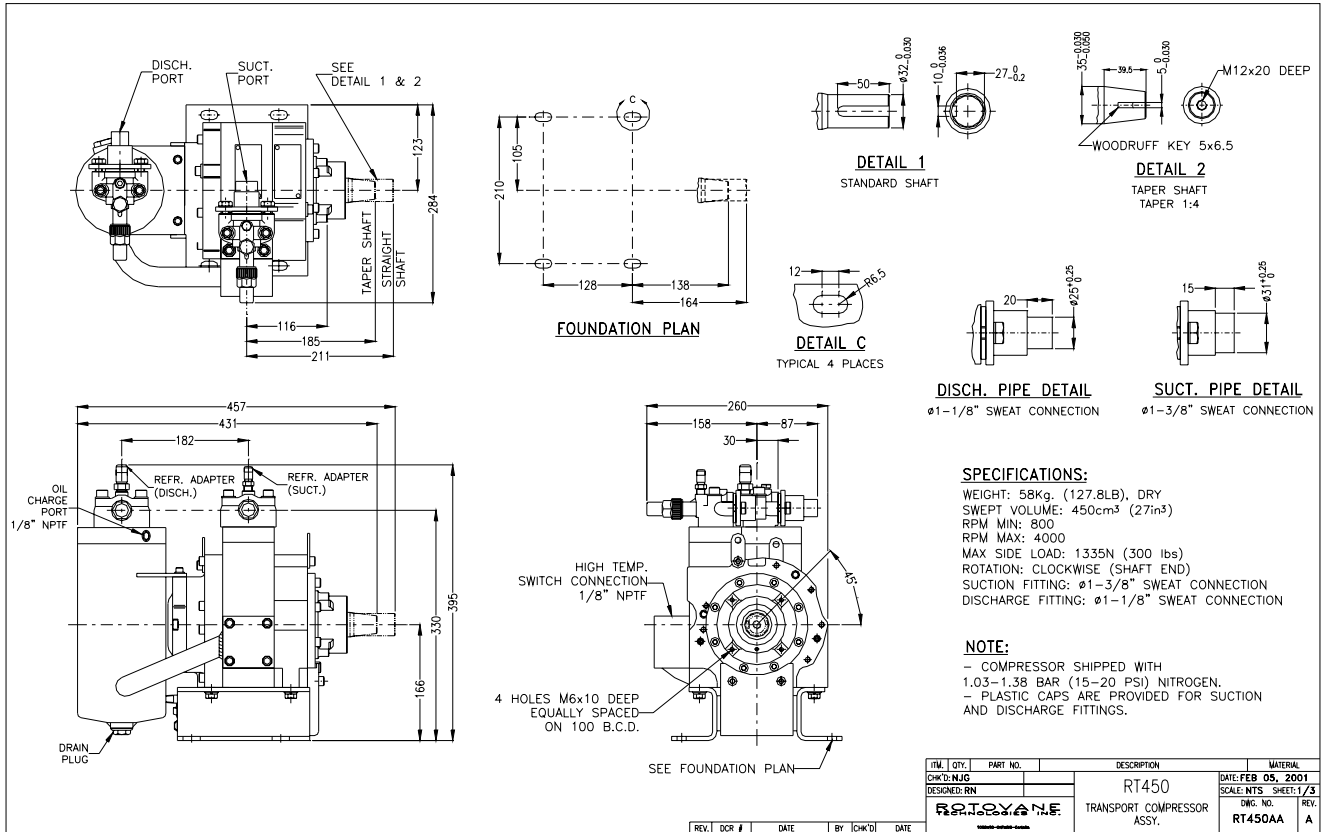


Marine Applications

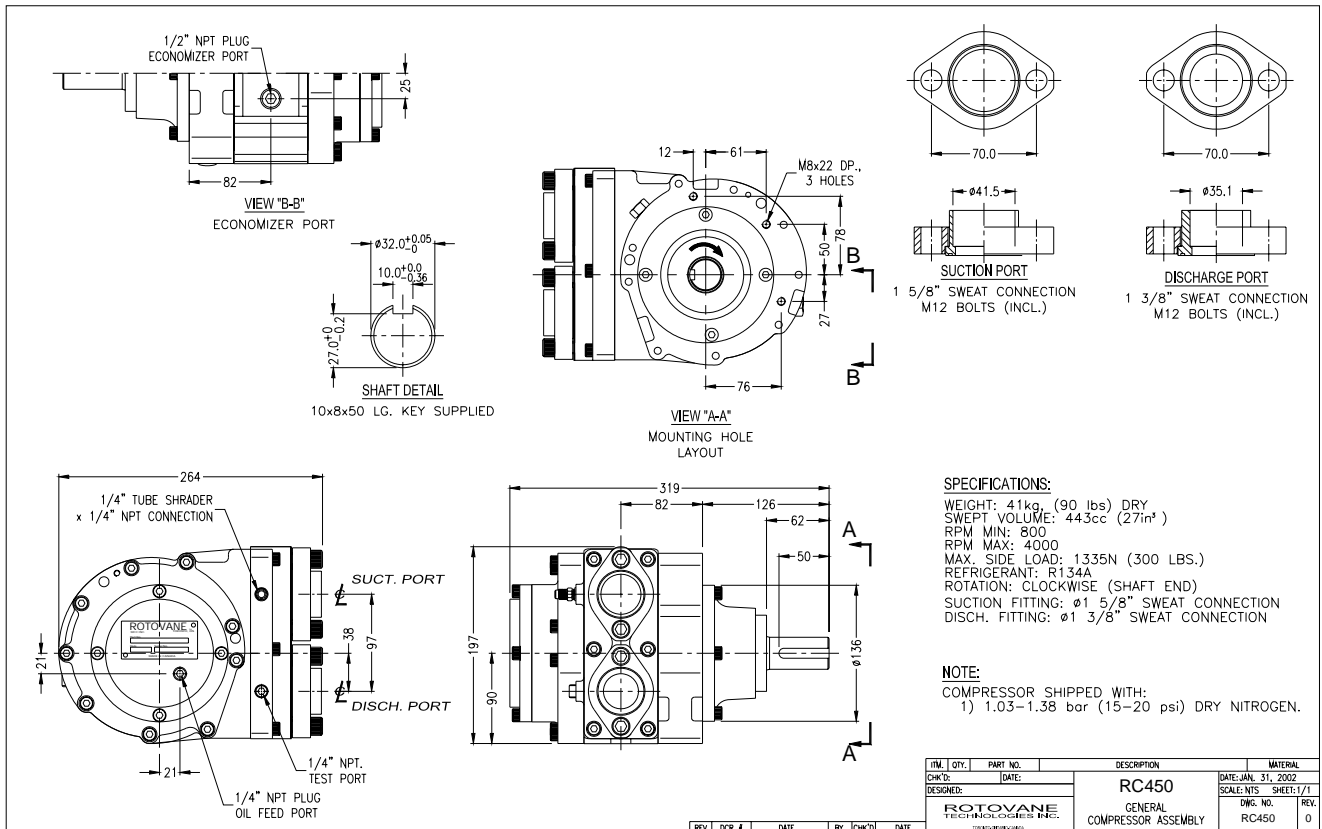
Quiet/Low Vibration
Not Motion Sensitive



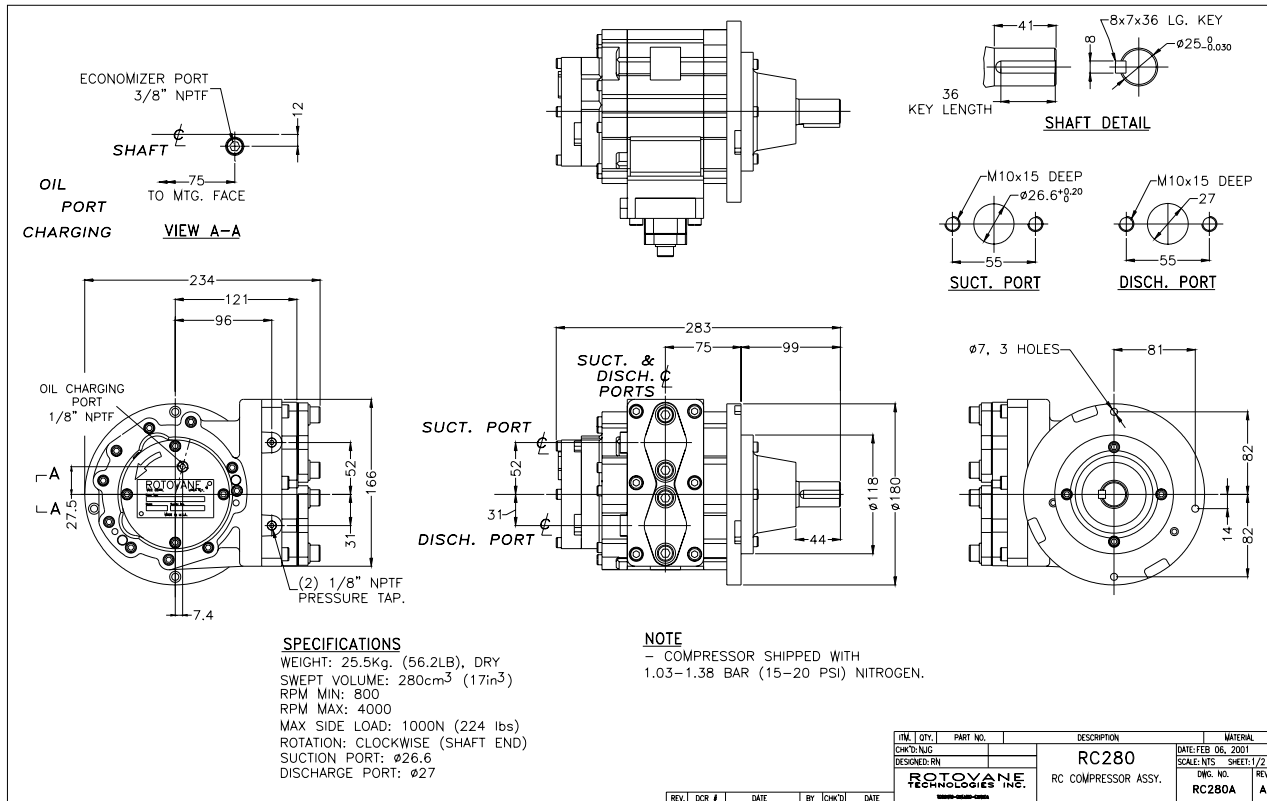
RT450 COMPRESSOR



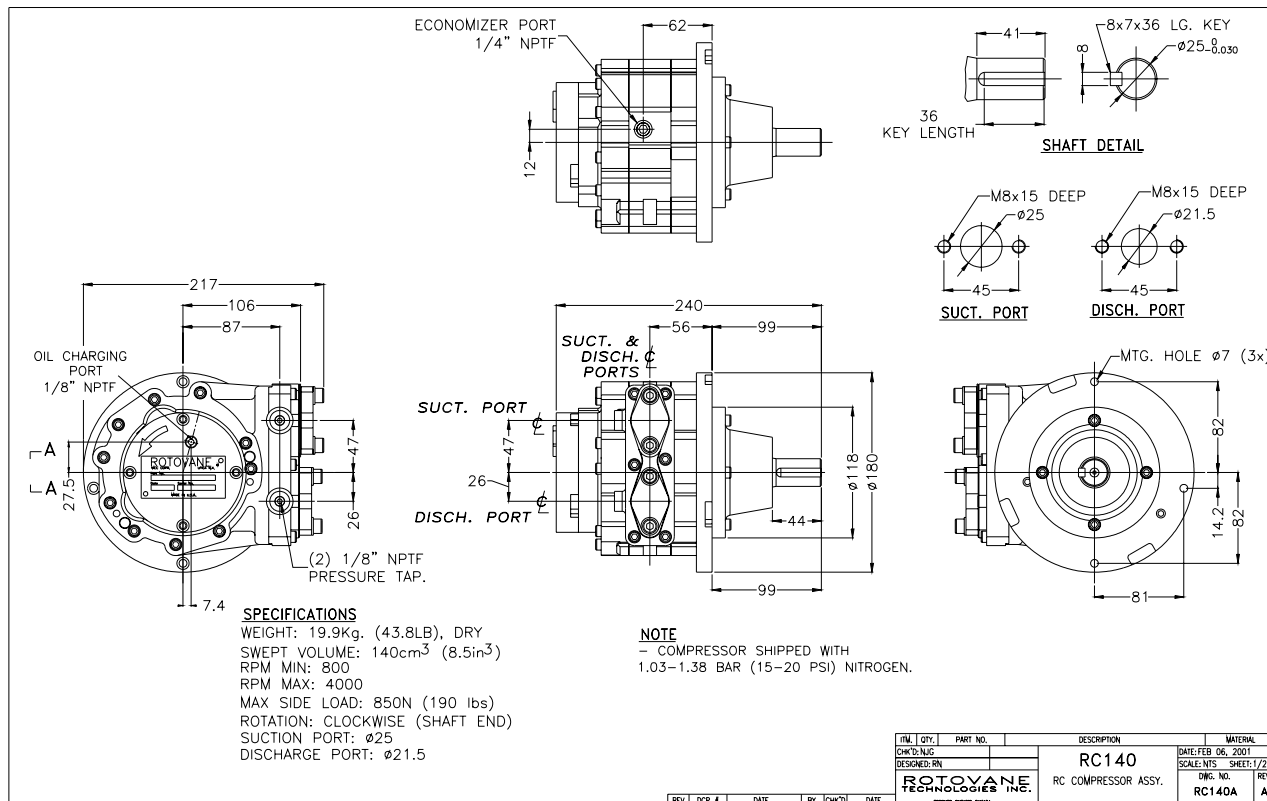
RC450 COMPRESSOR



RC280 COMPRESSOR



RC140 COMPRESSOR



ROTOVANE COMPRESSOR

MODEL NUMBER SPECIFICATION DATA

The RotoVane Compressor is available in three basic frame sizes and two different model types. These are further sub divided into various swept volumes (see table), giving incremental increases in capacity.

Nom. Size	TRANSPORT	R-SERIES	Swept Vol. M ³ /hr
450	RT450A	RC450A	80.4
	RT450B	RC450B	65.0
280	-	RC280A	51.0
	-	RC280B	44.0
	-	RC280C	35.2
140	-	RC140A	25.5

MODEL	RT450	RC450	RC280	RC140
Maximum discharge pressure (Bar g)	24	24	24	24
Maximum discharge temperature (°C)	100	100	100	100
Maximum speed (rpm)	4000	4000	4000	4000
Minimum speed (rpm)	800	800	800	800
Overall dimension				
Length (mm)	457	319	283	240
Width (mm)	284	264	217	217
Height (mm)	395	197	180	180
Drive shaft diameter				
Straight (mm)	32	32	25	25
Tapered (mm)	35 (4:1)	--	--	--
Weight (kg)	58	41	25.5	20
Connection sizes				
Suction	35 mm	41 mm	25 mm	25 mm
Discharge	28 mm	35 mm	21.5mm	21.5mm

RotoVane Transport and R-series models shown.

Note:

- The RT450 come complete with Oil separator and filter.
- The RC 280 and RC140 are the same except for the length.



RT450



RC140



RC280



RC450

MODEL NUMBERING SYSTEM

RT 450 B H S / C G O C

Model Type:

RC = R Type
RT = Transport

Size: (Compressor size)

450 = RTC 13/14 = R7/8
280 = R 5/6
140 = R 3 / 4

Profile: (Swept Volume – see table)

A = Full size profile
B = Mid size profile
C = Small size profile

Volume Ratio:

H = High (5:1 Vi for high compression ratios – lower evap temp)
L = Low (3:1 Vi for low compression ratios – higher evap temp)

Rotation: (At shaft end)

S = Standard = Clockwise
R = Reverse = Counter Clockwise

Economizer Port/ Capacity Control:

E = Economizer Port
C = Capacity Control (Transport model only)
N = None

Refrigerant Type:

A = Ammonia
G = Other

Oil Supplied:

O = Oil Supplied with unit
D = Dry, oil to be added by user

Unit Configuration:

C = Clutch/pulley
M = Motor set
N = Bare Shaft

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