

# Service Manual

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**LAST REVISION 08/98**

SUPERSEDES FORMS: 180.72-NM • 180.72-NM2 • 180.72-RP • YA77-401



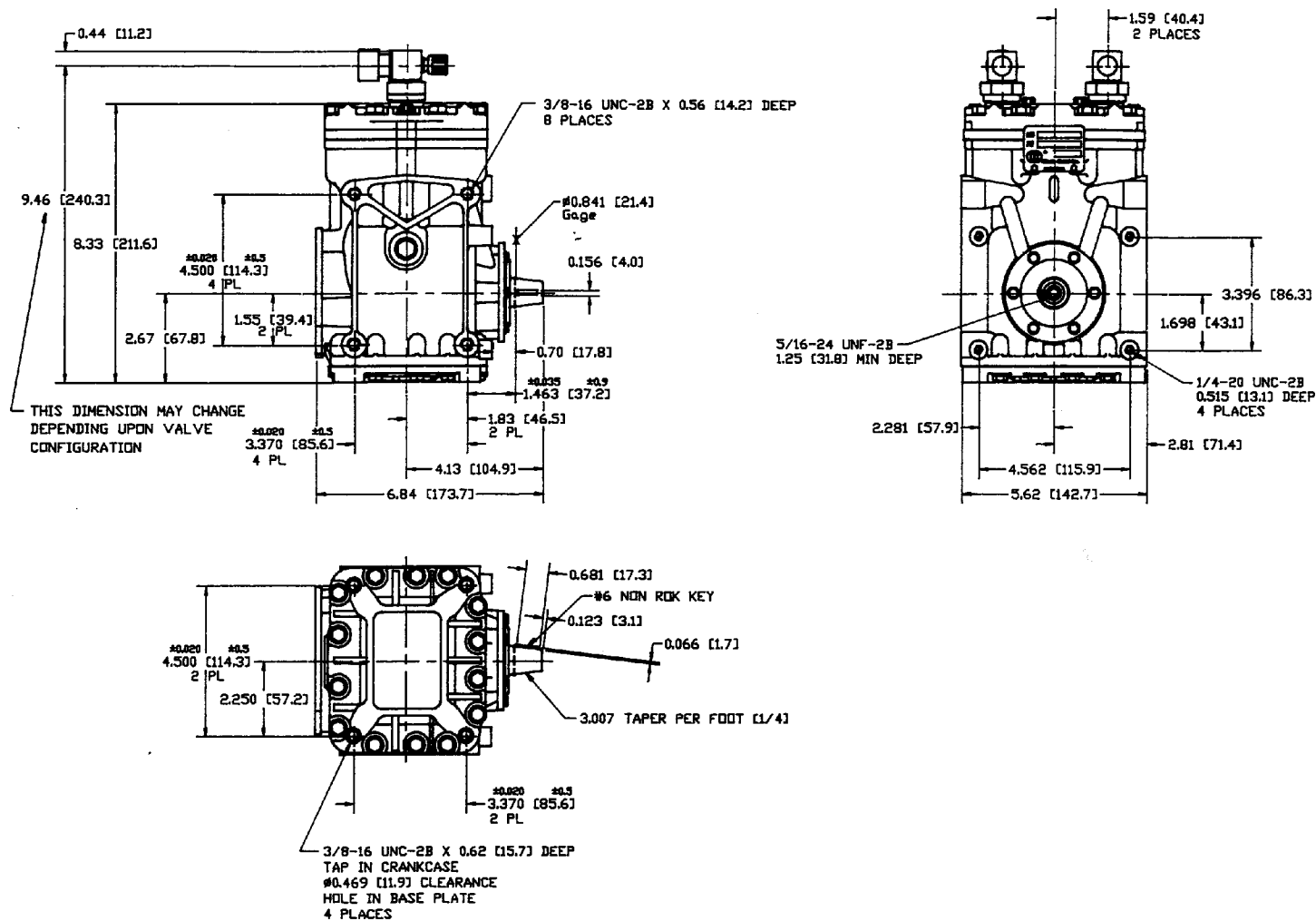
**Climate Control Inc.**

**A DEMIRCO COMPANY**



# Compressor Specifications

## Heavy Duty Models



DIMENSIONS: IN. (mm)

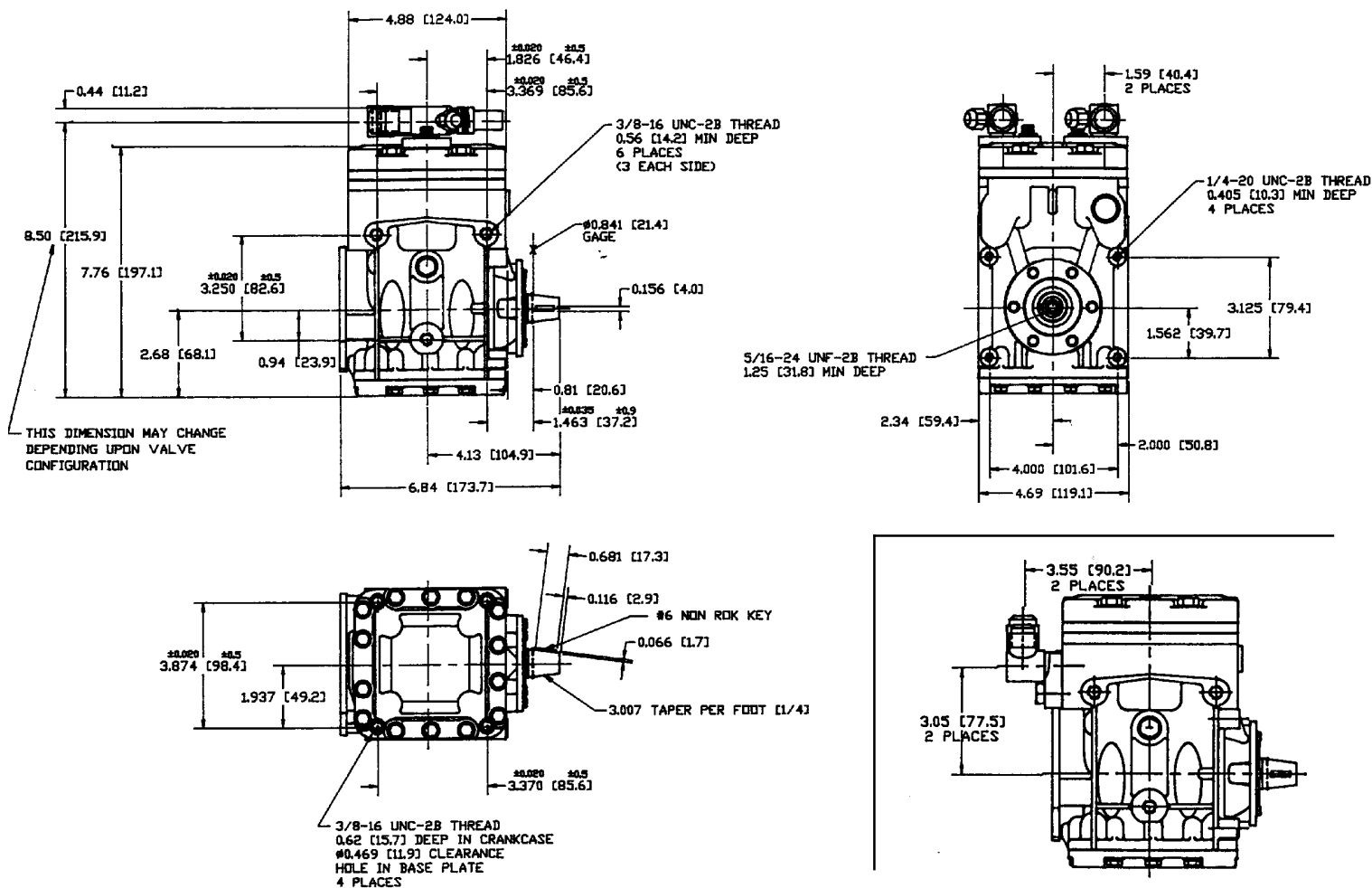
SPECIFICATIONS	206	209	210
No. Cylinders	2	2	2
Bore, in. (mm)	1.875 (47.63)	1.875 (47.63)	1.875 (47.63)
Stroke, in. (mm)	1.105 (28.07)	1.573 (39.95)	1.866 (47.40)
Disp., cu. in./rev. (cc/rev)	6.10 (100)	8.69 (142)	10.3 (169)
R.P.M. - Max.	6000	6000	6000
Refrigerant	R-12, 22, 502, 134a & new blends	R-12, 22, 502, 134a & new blends	R-12, 22, 502, 134a & new blends
Initial Oil Charge, fl. oz. (ml)*	14 (413)	14 (413)	14 (413)
Weight, lbs. (kg)	14.6 (6.6)	14.6 (6.6)	14.6 (6.6)
Lubrication	Splash and Positive Pressure and Oil Return Through Suction Side		

\*R-12 Heavy Duty models contain 12 fl. oz. (355 ml). \*R-134a Heavy Duty models contain 14 fl. oz. (413 ml). Some OEM specifications are as high as 17 fl. oz. (503 ml).



# Compressor Specifications

## Super-Compact ("Mini") Models



DIMENSIONS: IN. (mm)

NOTE: Super-Compact models are designed to have the fittings on the top or from the rear (low profile).

SPECIFICATIONS	SC 206	SC 209
No. Cylinders	2	2
Bore, in. (mm)	1.875 (47.63)	1.875 (47.63)
Stroke, in. (mm)	1.105 (28.07)	1.573 (39.95)
Disp., cu. in./rev. (cc/rev)	6.10 (100)	8.69 (142)
R.P.M. - Max.	6000	6000
Refrigerant	R-12, 22, 502, 134a & new blends	R-12, 22, 502, 134a & new blends
Initial Oil Charge, fl. oz. (ml)*	12 (355)	12 (355)
Weight, lbs. (kg)	13.0 (5.9)	13.3 (6.0)
Lubrication	Splash and Positive Pressure and Oil Return Through Suction Side	

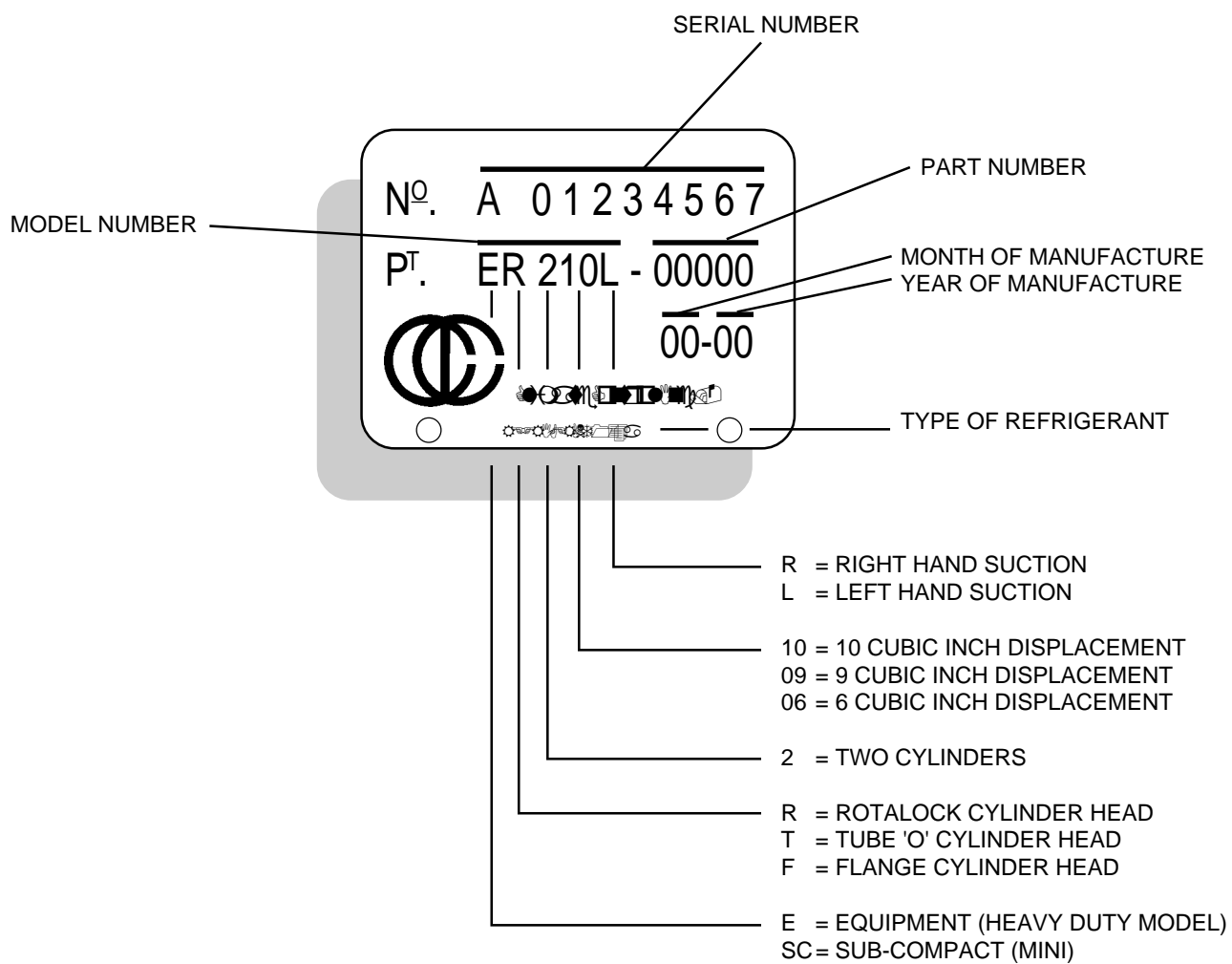
\*Some OEM specifications are as high as 15 fl. oz. (444 ml).



# Compressor Identification

The metal nameplate located at the top front of the compressor serves as a means of identification. The location permits viewing the nameplate with the clutch installed.

Data inscribed on the nameplate includes the serial number, combination model/part number, date of manufacture, and type of refrigerant.





# Features

**TRUE UNIVERSAL MOUNT** — Can be installed and operated in any position from horizontal left to horizontal right as received. No field adjustments are necessary. If the compressor is mounted horizontally, the suction side should be on top.

**UNIVERSAL ROTATION** — Compressor rotation can be clockwise or counter-clockwise. No field adjustments are necessary.

**LUBRICATION SYSTEM** — A splash lubrication system provides more than adequate lubrication to the front and rear crankshaft bearings, connecting rods and cylinder walls. Positive pressure differential between the crankcase and the suction intake is utilized to provide lubrication to the front shaft seal.

**TWO OIL PLUGS** — One on each side of the crankcase, permits easy checking of crankcase oil level regardless of mounting position.

**EXTERNAL CLUTCH MOUNT** — Four bosses on the seal end of the crankcase provide accommodation for mounting the clutch. Simplifies field replacement of compressor shaft seals.

**SERVICEABILITY** — All components readily accessible and removable with standard tools.

- Crankcase — Light weight die cast noncorrosive aluminum.
- Cylinder Liners — Cast iron, permanently cast into crankcase body. Precision honed finish.
- Head — Die cast aluminum.
- Base — Die cast aluminum.
- Piston — Die cast aluminum fitted with cast iron piston rings for optimum wear.
- Connecting Rods — Die cast aluminum, heavy cross section, super-finished surfaces, assembly doweled for positive alignment.
- Crankshaft — Cast ductile iron. Large connecting rod and main bearing areas.
- Bearings — High load capacity ball type bearings for longer life at heavy loads and high speed.
- Valves — Swedish steel suction and discharge valves mounted on ground valve plate.
- Shaft Seal — Carbon face seal specially designed for high speed operation.
- Gaskets — Neoprene composite fiber gaskets used to seal base plate and valve plate. Rubber coated metal gaskets used to seal cylinder head.



# Installation

The compressor mounting bracket must be rigidly secured to the vehicle engine. It is recommended to use at least six 3/8" - 16 UNC bolts of proper length to secure the compressor to the mounting brackets. Mounting with the side mounting holes is preferred over the bottom mounting holes. Lock washers must be used with all mounting bolts.

Refer to pages 2 and 3 for compressor dimensions and physical data.

Very important factors in compressor installation are correct pulley alignment and proper belt tension. The compressor flywheel, or clutch, must be in perfect alignment with the drive pulley on the engine and any auxiliary idler or belt adjustment pulley arrangements. It is important to be sure that the shaft key is in place on the shaft and the flywheel bolt is drawn tight, when installing a flywheel or clutch. The pulley alignment may be checked by holding a 1/2" dia. (12-13 mm) rod - 2 to 3 feet (0.6 to 0.9 m) long - firmly in the V groove of the flywheel or clutch making sure the rod falls squarely in the driver pulley grooves. A further check may be made by seeing that the belt, as it goes from pulley to pulley, comes off the pulley grooves perfectly straight and that there are no side-way bends in the belt, as it approaches or leaves the pulleys. Only high quality reinforced belts

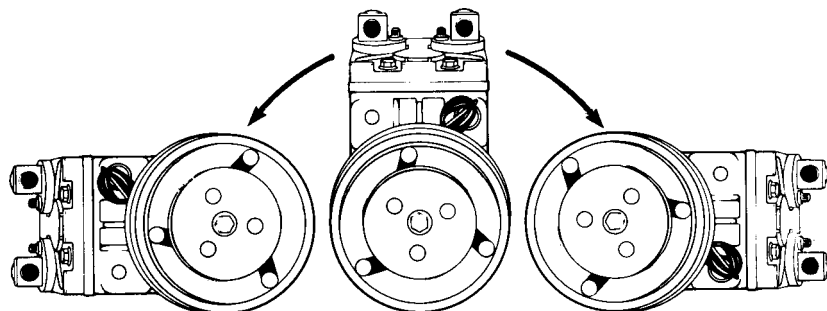
should be used.

The belt tension adjustment should be made so the belt is taut, but not too taut to create excessive bearing loads. Due to the pulsating load created by the compressor, the belt tension must be greater than for a normal steady load. Belt tension can be accurately determined with the use of a belt tension gauge which gives a direct reading of belt load as determined by the deflection. A belt tension of 100-120 lbs. (45-54 kg) is considered normal.

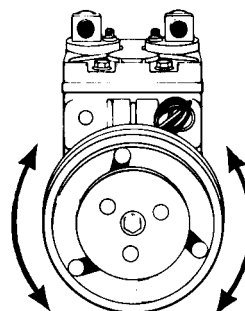
After approximately 30 minutes of operation time, the belt should stretch to a normal operation point and a further check for proper tension should be made. Good alignment and belt tension are important to insure long belt life, quiet operation, and to maintain top system performance.

The discharge and suction line connections must be made to the proper compressor service valves or fittings. The word DISCH. on the cylinder head designates the discharge service valve port. The word SUCTION on the cylinder head designates the suction service valve port. Because the compressor will move, or float, with the engine upon acceleration, rigid connections to the compressor should be avoided, and suitable flexible refrigerant lines, which will permit compressor movement without causing excessive tubing strain, should be used.

**180 degree, left to right orientation**



**Clockwise or counterclockwise rotation**



NOTE: CCI recommends that when positioning compressor at full 90° horizontal, suction side should be on "top".



# Inspection

## OIL CHARGE

If the quantity of oil is unknown, the compressor oil level must be checked at the time of installation and again after the system has been fully charged with refrigerant and the system has been operated and balanced out to the desired compartment interior temperature.

Make the initial oil level check after the compressor is mounted on the mounting bracket and before initial refrigerant charge.

Remove one oil fill plug with its "O" ring, either plug on a vertical mount installation, the upper plug on horizontal mount installations.

**LEFT HAND MOUNTING:**  
CHECK OIL WHEN NON ROK SHAFT KEY IS DOWN.

**RIGHT HAND MOUNTING:**  
CHECK OIL WHEN NON ROK SHAFT KEY IS UP.

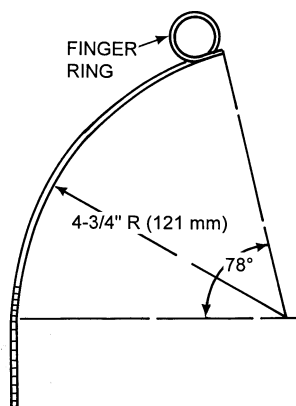


FIG. 1-OIL DIP STICK

The oil dip stick, Fig. 1, can be made locally (or purchased, page 15) and is suitable for use on all compressors in any mounting position. If made locally, it can be formed from 1/8" dia. X 8-5/16" (3 mm dia x 210 mm) long stock, preferably non ferrous material which is not subject to corrosion. Notched ends are helpful in visibly detecting the oil depths.

## OIL TYPE

When adding or changing oil, use only proper oil. Keep the oil storage container tightly capped at all times.

### Refrigerant

R-12, R-22 }  
R-502 }

R-134a

Other Refrigerants

### Acceptable Lubricants

Mineral Oil, Zerol 150,  
Zerice S-68, P.O.E.

Polyol Ester (P.O.E.) P.A.G.

Consult Factory

The Table below shows the crankcase oil charge in fluid ounces (and ml) at various dip stick measurements for both horizontal and vertical mounts. The oil charge after the system is stabilized should be maintained with 6 fluid ounces (177 ml) minimum and 8 to 12 fluid ounces (237 to 355 ml) for best results.

## OIL CHARGE vs. DIP STICK DEPTH

### HEAVY DUTY & STANDARD MODELS

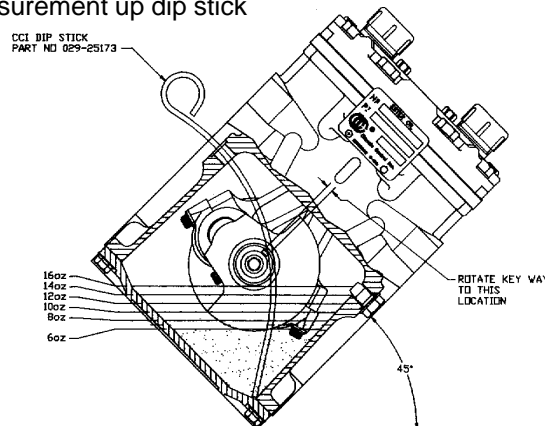
	Horizontal Mount	Vertical Mount	*45° Mount
6 fl. oz. (177 ml)	13/16" (21 mm)	7/8" (22 mm)	1 5/8" (41 mm)
8 fl. oz. (237 ml)	1" (25 mm)	1" (25 mm)	1 13/16" (46 mm)
10 fl. oz. (296 ml)	1-3/16" (30 mm)	1-1/8" (29 mm)	2" (51 mm)
12 fl. oz. (355 ml)	1-5/8" (41 mm)	1-7/16" (37 mm)	2 1/4" (57 mm)
14 fl. oz. (414 ml)	1-13/16" (46 mm)	1-11/16" (43 mm)	2 7/16" (62 mm)
16 fl. oz. (473 ml)	1-15/16" (49 mm)	1-7/8" (48 mm)	2 5/8" (67 mm)

### SUPER COMPACT ("MINI") MODELS

	Horizontal Mount	Vertical Mount
6 fl. oz. (177 ml)	3/4" (19 mm)	1" (25 mm)
8 fl. oz. (237 ml)	1" (25 mm)	1-1/4" (32 mm)
10 fl. oz. (296 ml)	1-3/16" (30 mm)	1-1/2" (38 mm)
12 fl. oz. (355 ml)	1-7/16" (37 mm)	1-13/16" (46 mm)
14 fl. oz. (414 ml)	1-3/4" (44 mm)	2-1/16" (52 mm)

## \*OIL LEVEL AT 45°

Measurement up dip stick





The compressor oil level should never be permitted to go below the minimum oil level of 6 fluid ounces (177 ml). If oil must be added, the oil should be added until the level is 12 fluid ounces (355 ml). An excessive amount of oil is detrimental to the proper functioning of the entire system.

If a compressor replacement is made on a system which has been in operation, the oil charge of the new compressor should not exceed 12 fluid ounces (355 ml), unless specified by the OEM manufacturer.

When inserting the oil fill plug, the sealing "O" ring is slipped over the oil fill plug threads in such a manner that the "O" ring is not twisted. Insert the oil plug in the oil fill opening and tighten the plug snug. If the plug leaks, do not attempt to stop the leak by over tightening the oil check plug. A leak may be caused by dirt under the "O" ring or on the seat, a fractured "O" ring, or a damaged seat on the oil fill plug or oil fill opening. To stop leaks at the oil fill plug, correct the mechanical damages and insert a new "O" ring.

It must be remembered that the 206, 209 and 210 models are high speed compressors and satisfactory operation depends on proper lubrication.

## LEAK CHECK EQUIPMENT

Most of the electronic leak checkers now on the market are capable of locating very small refrigerant leaks. Since open type bolted and flanged compressors have a permissible leak rate of one ounce per year, it then becomes quite important that the leak check equipment used be calibrated to pick up only those leaks which are in excess of the permissible one ounce per year limit. Since shaft seals depend upon oil for lubrication and sealing, it is quite natural to find oil in the shaft cavity.

This oil is heavily laden with refrigerant and electronic equipment would pick up this refrigerant and indicate it as a leak. When checking the shaft seal for leakage, the refrigerant-laden oil must first be flushed from the seal cavity with a solvent which does not affect the operation of the electronic leak equipment. Caution: some of the more common solvents contain chemical compositions which affect the operation of the leak detector equipment.

The major point to consider in any electronic type leak detection equipment is to be able to positively calibrate the equipment to the permissible leak rate and then to use the equipment as explained by its manufacturer. The speed at which the probe is moved is very important in locating the larger than permissible leaks.

## EVACUATION, LEAK TESTING, ADJUSTMENT

The instructions contained in the installation and service manual of the air conditioning system manufacturer should be followed in evacuating and charging the system and for adjustment of all controls.

After charging, the entire system should be checked for leaks with a leak detector.

## ROTATION-SPEED

The compressor may be operated in either a clockwise or counter-clockwise direction of rotation. No field adjustments are necessary. The compressor is designed for operation between 500 and 6,000 rpm maximum. (4000 rpm continuous rating).





**Climate Control Inc.**

**A DEMIRCO™ Company**

2120 N. 22nd Street  
Decatur, Illinois 62526  
Telephone: 217-422-0055  
FAX: 217-422-4323  
[www.ccicompressor.com](http://www.ccicompressor.com)

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