



Rotary Vane Air Compressors

**Operation
And Maintenance
Manual**

For Models

750

1000

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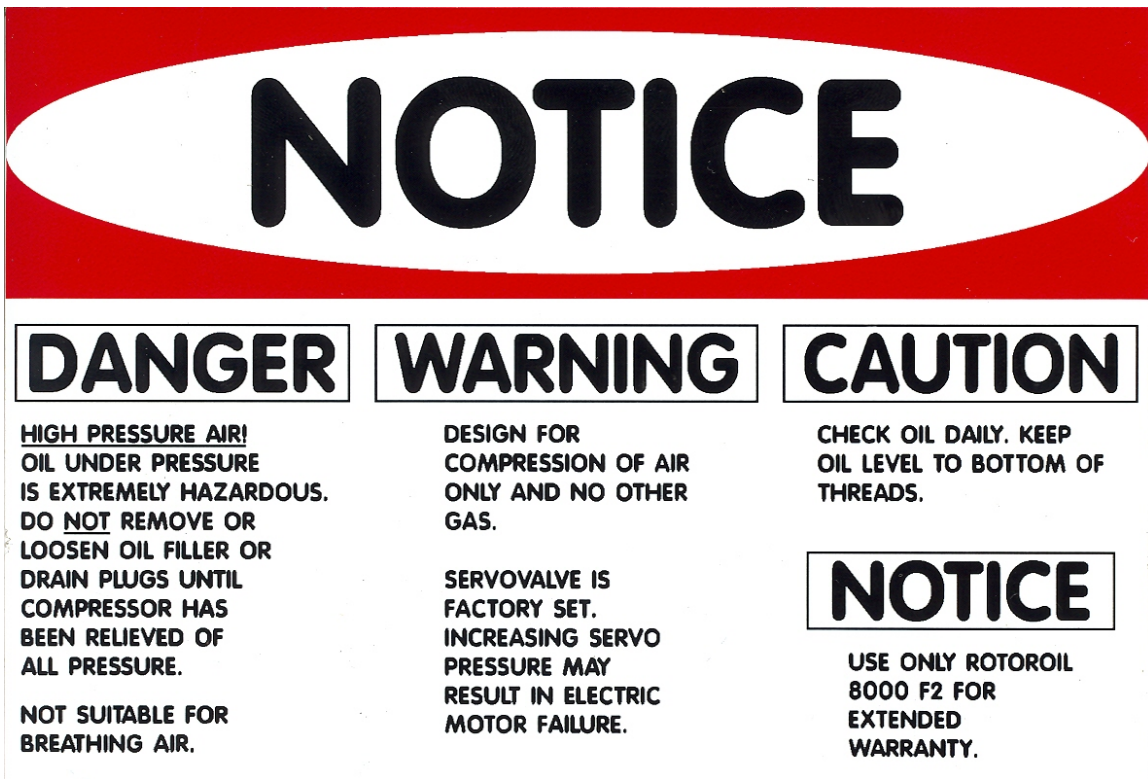
INTRODUCTION

Mattei Compressors are oil-sealed, rotary sliding vane compressors directly driven by an electric motor. This manual contains only operating and maintenance instructions and is not intended as an overhaul manual. Anyone installing, operating and maintaining the compressor should familiarize themselves with the contents of this manual.

Mattei Compressors have been designed and manufactured to the highest standards and regular maintenance will ensure long and reliable operation.

If you require additional information not contained in this manual, please contact your Mattei distributor or the Mattei Service Department (410)-521-7020.

Fig.1 WARNING DECALS ON COMPRESSOR



CAUTION

This operating manual contains information that is vital to the safe operation of the compressor. Read the manual carefully before attempting any operation, and closely follow all instructions. Failure to do so may result in injury.

WARNING

The compressor oil temperature may be checked by filling the hole on the oil filler plug with oil and then inserting a thermometer. **The oil temperature should never exceed 212°F.**

PRINCIPLES OF OPERATION

Atmospheric air is drawn through the inlet air filter (1) and intake valve (2) into the compression chambers formed by sliding vanes (3). The vanes slide in rotor slots cut in the rotor (4), which in turn is eccentrically-mounted within the stator (5). As the rotor turns, the vanes slide in and out of the slots and are kept in contact with the stator wall by centrifugal force. The air is compressed through the contraction in volume of the chambers formed by the vanes, rotor, and stator wall.

Throughout the compression cycle, the oil carries out the four vital functions of lubricant, sealant, control fluid and coolant. However, after compression, it is necessary to remove the oil that has been previously injected (6).

The air/oil mixture passes from the compression chamber into the oil chamber, where most of the oil is separated from the air via a labyrinth (7). The rest of the air/oil mixture passes into the final separation stage (8) and the oil is returned to the intake through the oil return valves (9). Only clean air is delivered to the point of usage (10).

Fig.2 OPERATING PRINCIPLE OF ROTARY VANE COMPRESSOR

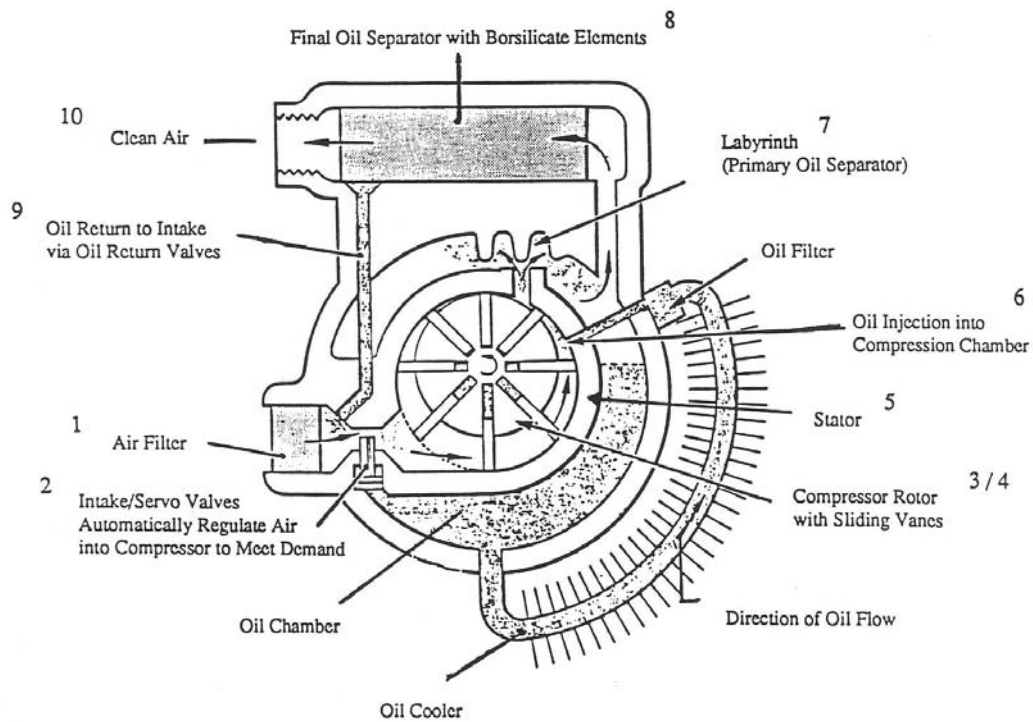


Table 1 Technical Specifications for EM Units

| | EM 150 | EM 200 | EM 250 | EM 300 | EM 400 | EM 500 | EM 600 | EM 750 | EM 1000 |
|-------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Capacity (CFM) | 59 | 71 | 100 | 120 | 150 | 215 | 265 | 335 | 460 |
| Rated Pressure (PSI) | 115 | 115 | 115 | 115 | 115 | 115 | 100 | 100 | 100 |
| Noise Level (dBA) | 74 | 76 | 81 | 81 | 81 | 81 | 87 | 90 | 90 |
| Oil Capacity (GAL) | 1.45 | 1.45 | 3.45 | 3.45 | 3.45 | 5.0 | 5.0 | 9.75 | 9.75 |
| Operating Speed (RPM) | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| Weight (LBS) | 594 | 616 | 752 | 770 | 790 | 1470 | 1518 | 2046 | 2222 |
| Length (IN) | 57.4 | 57.4 | 62.25 | 62.25 | 66.1 | 75.9 | 79.1 | 89 | 93.7 |
| Width (IN) | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 28.75 | 29.5 | 32.1 | 35 |
| Height (IN) | 39.4 | 39.4 | 45.25 | 45.25 | 45.25 | 50.6 | 50.6 | 49.0 | 49.0 |
| Discharge Connection | 1" | 1" | 1 1/4" | 1 1/4" | 1 1/4" | 1 3/4" | 1 3/4" | 1 3/4" | 2 1/4" |
| Control Circuit (V) | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| Cooling Air Flow (CFM) | 1130 | 1130 | 2013 | 2013 | 2013 | 3780 | 5159 | 5159 | 6350 |
| Total Heat Rejection (BTU/HR) | 40982 | 49518 | 73422 | 83674 | 97336 | 143430 | 172457 | 218560 | 288567 |

Table 2 Technical Specifications for EMS Units

| | EMS 150 | EMS 200 | EMS 250 | EMS 300 | EMS 400 | EMS 500 | EMS 600 | EMS 750 | EMS 1000 |
|-------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|----------|
| Capacity (CFM) | 59 | 71 | 100 | 120 | 150 | 215 | 265 | 335 | 460 |
| Rated Pressure (PSI) | 115 | 115 | 115 | 115 | 115 | 115 | 100 | 100 | 100 |
| Noise Level (dBA) | 65 | 65 | 68 | 68 | 68 | 68 | 70 | 72 | 72 |
| Oil Capacity (GAL) | 1.45 | 1.45 | 3.45 | 3.45 | 3.45 | 5.0 | 5.0 | 9.75 | 9.75 |
| Operating Speed (RPM) | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| Weight (LBS) | 837 | 868 | 1059 | 1073 | 1097 | 2041 | 2156 | 2838 | 3058 |
| Length (IN) | 58.25 | 58.25 | 58.25 | 58.25 | 58.25 | 71.65 | 71.65 | 83.5 | 83.5 |
| Width (IN) | 30.75 | 30.75 | 30.75 | 30.75 | 30.75 | 39.4 | 39.4 | 42.5 | 42.5 |
| Height (IN) | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 68.1 | 68.1 | 76.8 | 76.8 |
| Discharge Connection | 1" | 1" | 1 1/4" | 1 1/4" | 1 1/4" | 1 3/4" | 1 3/4" | 1 3/4" | 2 1/4" |
| Control Circuit (V) | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| Cooling Air Flow (CFM) | 1130 | 1130 | 2013 | 2013 | 2013 | 3780 | 5159 | 5159 | 6350 |
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INSTRUMENT PANEL (Refer to Figure 3 next page)

All compressor models are equipped with a sophisticated solid state control system. A comprehensive control panel is mounted on the front of the unit and includes the following:

- **Button-OFF/STOP**
 - This stops the machine manually. The green off light lights when the unit is stopped manually: in this condition it acts as “main on” (electrical power on to the compressors) warning light. It is switched off when the unit is started
- **Button-MANUAL/START**
 - This starts the machine manually. The yellow light is on during manual operation and is switched off when the machine is not running.
- **Button-AUTOMATIC/START**
 - This starts the machine for automatic operation. During this phase the yellow light is on.
- **Button-RESET**
 - This returns the compressor to normal operation after it has been stopped by one of the safety switches.
 - The red light is on as well as the other alarm warning lights: to switch them off, press the RESET button when normal working conditions are restored.
- **Yellow light-STOPPING**
 - The yellow warning light switches on when the automatic stop procedure commences. The light switches off when line pressure decreases sufficiently or when the compressor is stopped
- **Yellow light-OFF LOAD**
 - The yellow warning light is always on during off-load running. During automatic operation it switches off when the compressor comes on load or when the units is automatically stopped.
- **Red light-AIR INTAKE FILTER BLOCKED (optional)**
 - The red warning light switches on when the filter is clogged but will not stop the machine. The intake filter must be cleaned or replaced. To switch off the light, push the RESET button.
- **Red light-OIL SEPARATOR BLOCKED (optional)**
 - The red warning light switches on when the compressed air pressure drops through the separator filters and reaches the maximum allowed value (set at 14/5 psi/1Bar pressure differential), but will not stop the machine. The filters must be replaced. To switch off the light, push the RESET button.
- **Red light-LOW OIL LEVEL (For EMS 500/600/750/1000 only) (This is a two stage alarm)**
 - The red warning light switches on when the oil level reaches the first alarm point; in this condition the machine is not stopped. When the second alarm point is reached, the oil level is dangerously low and the machine will stop with the red light still on. In both cases, it is necessary to top off the oil level then push the RESET button.
 - **NOTE**
 - The compressor must be stopped immediately and the fault corrected when this light comes on.
 - Daily check of the oil is still the primary compressor protection
 - Compressor failure due to low oil level is not a warrantable failure
- **Red light-HIGH TEMPERATURE**
 - The red light switches on when the oil temperature inside the compressor exceeds 212°F and the machine stops. Check for cause of over temperature and correct, then wait until the oil temperature falls to its normal level and push the RESET button. *(For models 500/600/750/1000, there is also an RSU air outlet temperature shutdown at 212°F).*
- **Red light-MAIN MOTOR OVERLOAD**
 - The red light switches on when, due to overload, the motor temperature exceeds the maximum permitted value and the compressor will stop. This is thermistor controlled.

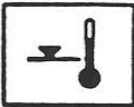


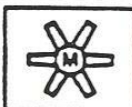
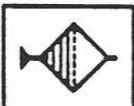
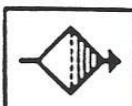

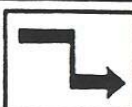

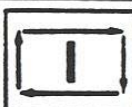


Check for cause of overload and correct, then wait until the motor temperature falls to its normal value and press the RESET button.

- If motor protection is by means of a thermal relay, the red light will switch on when current drawn by the motor is excessive. Check for cause of overload and correct. The lamp switches off when the thermal relay (inside the starter) is reset manually and the RESET button is pressed.
- **Red light-FAN MOTOR OVERLOAD (for EMS models only)**
 - The red light switches on when, due to overload, the safety overload inside the electrical control box trips. Check for cause of overload and correct. The safety overload must be reset manually and then the RESET button must be pressed.

WARNING: In order to avoid some false signals occasionally caused by sudden variation of operating conditions when starting the unit, certain alarms have been delayed and are activated 20 seconds after start up.

They are: **-Intake Filter Blocked** **-Low Oil Level**
 -Oil Separator Blocked **-High Temperature**

Fig. 3 INSTRUMENT PANEL

| | | | | | |
|------------------------|---|---|---|---|------------------------|
| HIGH TEMPERATURE |  | ○ | ○ |  | MAIN MOTOR OVERLOAD |
| LOW OIL LEVEL |  | ○ | ○ |  | MOTOR FAN OVERLOAD |
| INTAKE FILTER CLOGGING |  | ○ | ○ |  | OIL SEPARATOR CLOGGING |
| STOPPING |  | ○ | ○ |  | OFF LOAD |
| MANUAL |  | ○ | ○ |  | AUTOMATIC |
| OFF |  | ○ | ○ |  | RESET |

CONTROLS

EMERGENCY STOP BUTTON

In case of emergency, stop the compressor immediately by pushing the Emergency Stop button and electrically isolate the compressor. Correct the fault that caused you to push the button. To release the emergency stop button, rotate in the direction of the arrow and push the red RESET button.

REMOTE CONTROLS

The electronic card/printed circuit board allows the compressor to be connected to a centralized control unit or a remote control board by means of terminals marked "H". The electronic car (see Fig. 4) can also supply remote "machine on" and "machine failure" signals. Contact the Mattei Service Department for further details.

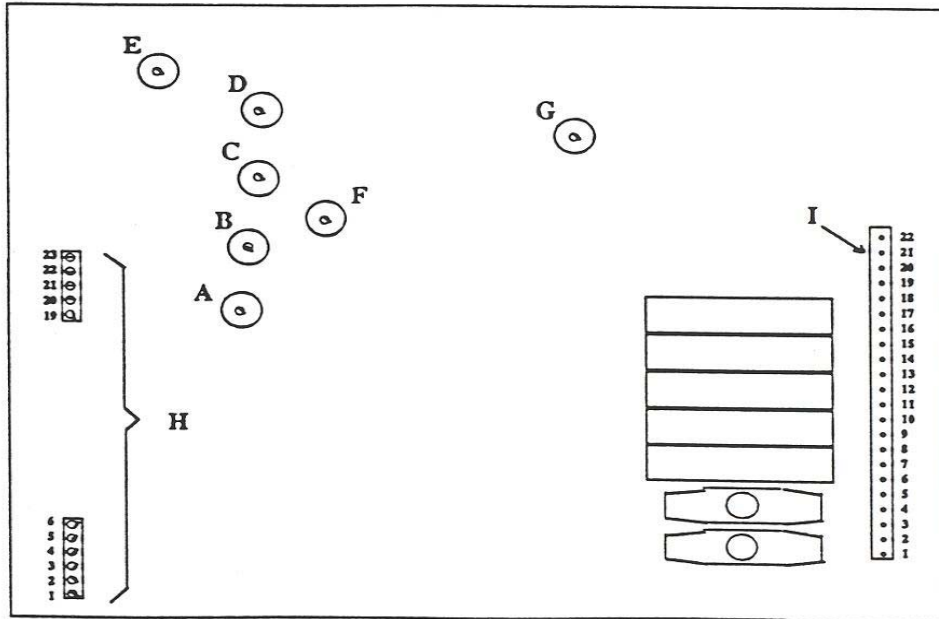
CONTROLS

The electronic card (PC board) incorporates a series of timers and is connected to several pressure switches and solenoid valves, which monitor and control the compressor running mode depending on air demand.

Timer settings (see Fig. 4) (Not all machines use all features on the PC board)

| | | |
|---|-------|-------------|
| A=start delay timer | about | 8 seconds |
| B=Star Delta timer | about | 2.5 seconds |
| C=stop timer (T1) | about | 2 minutes |
| D=stop timer (T2) | about | 15 minutes |
| E=solenoid valve closing delay timer | about | 1 second |
| F=stop delay timer | about | 3 seconds |
| G=timer for delayed activation Of safety devices when starting | about | 20 seconds |
| H=connection for remote operation and indication | | |
| I=terminal strip | | |

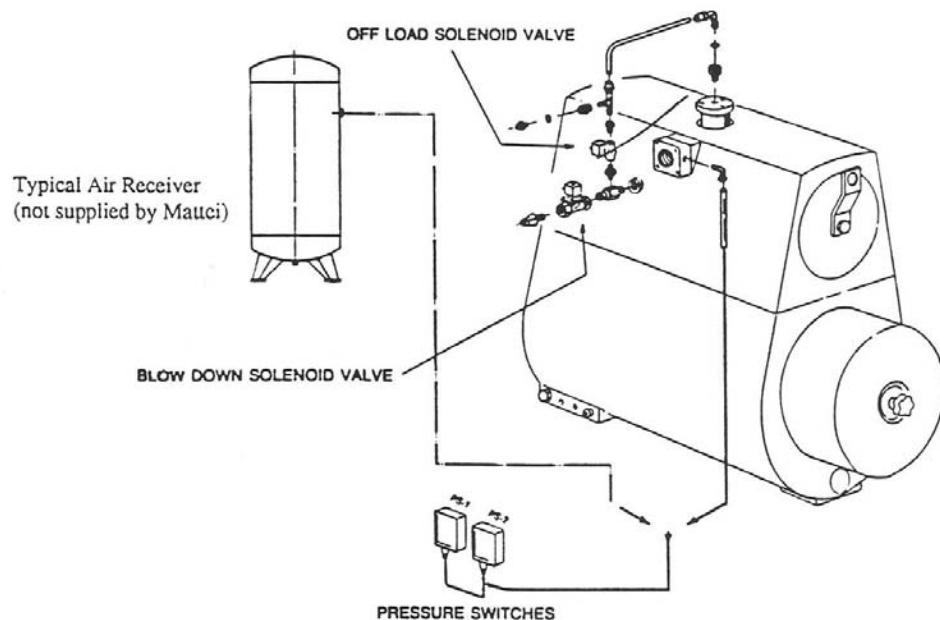
Fig. 4 PC Board



CONTROL SWITCHES and SOLENOID VALVES

- High temperature switch.
 - Stops the motor when the oil temperature reaches 212°F.
- Off-load solenoid valve.
 - Delivers pressure to the minimum pressure valve in order to off-load compressor.
- Blow-down solenoid valve.
 - Allows a quick exhaust of the inside pressure before starting the motor.
- Pressure switch PS1.
 - Provides upper limit for automatic operating, allows full load operation of the compressor and controls the stop timer
- Pressure switch PS2.
 - Provides lower limit for automatic operating and re-starts the compressor.
- Blocked air intake filter switch. (Optional)
 - Operated the blocked intake filter light should the intake filter be blocked.
- Blocked separator differential pressure switch. (Optional)
 - Operates the blocked separator element light if the separator element becomes blocked.
- Low oil level gauge/switch. (Optional on EMS 500/600/750/1000)
 - Monitors oil level in the chamber and operates in two stages
 - Stage 1: Low oil level light illuminated
 - Stage 2: Compressor stops

Fig. 5 Pressure Switches and Solenoid Valves



COMPRESSOR OPERATION

Compressor can be set for manual or automatic operation.

The selection must be made when starting the unit by depressing the proper button. In both cases stopping is by means of the “stop” button.

When pressing the start button, compressor will start after about 8 seconds. When pressing the stop button compressor will stop after a 3 second delay. This delay allows the solenoid valve to unload the compressor.

1) MANUAL OPERATION

- a. In “manual” operation the air flow is regulated by the servovalve/intake valve system. The compressor runs continuously and pressure switches PS1 and PS2 are overridden.

2) AUTOMATIC OPERATION

- a. In “automatic” operation compressor cycling is controlled by PS1 and PS2 pressure switches. When line air pressure falls to PS2 setting, the Minimum Pressure Valve opens, increasing air flow. When line pressure rises to PS1 setting, the Minimum Pressure Valve shuts, stopping air flow.
- b. During “automatic” operation, when air consumption is greatly reduced or stopped, the compressor will “auto-idle” and if this continues, the compressor will automatically stop. When air demand returns, the compressor will re-start automatically.

DESCRIPTION OF AUTOMATIC OPERATION

1) No air demand

- a. If through lack of air demand, the line pressure rises to the value of PS2 max, the off-load solenoid valve is de-energized and the minimum pressure valve closes: in this way the compressor runs off-load. At the same time the stop timer and the stop delay timer start counting times T1 and T2 respectively.
- b. Any air demand will cause a fall in line pressure; if this pressure reaches the value of PS1 minimum before the time T1, then the T1 timer is cancelled, the compressor does not stop and continues running off-load until pressure falls to the value of PS2 min.
- c. At this stage the T2 timer is also cancelled, the off-load solenoid valve is energized, the minimum pressure valve is released and compressor comes on-load to meet the air demand.
- d. The T2 timer stops the compressor in case the air consumption stops completely after the T1 timer has been cancelled.
- e. If the line pressure remains over the value of PS1 minimum for the time T1, then the compressor stops and inside pressure exhausts gradually to atmospheric pressure.

2) Air demand increases after the compressor shuts down

- a. When the line pressure reaches the value of PS2 minimum, the compressor starts after an 8 second delay, during which time the blow down solenoid valve is energized to allow quick venting of the residual inside pressure.

Note: If there is a continuous air loss or usage the unit will never shut down completely in automatic since the line pressure will drop below PS2 within the set 15 minutes. In this case there is no advantage to running the unit in automatic and it should be switched to manual mode.

OFF LOAD RUNNING WITH AUTO IDLE (Auto idle no applicable to all models.)

When the pressure causes the contacts of PS1 to open, compressors fitted with the auto-idle mechanism will vent the internal pressure down to 2.3 bar, thus reducing power consumption.

Fig. 6 shows the schematic flow of the line pressure, both during manual and automatic operation.

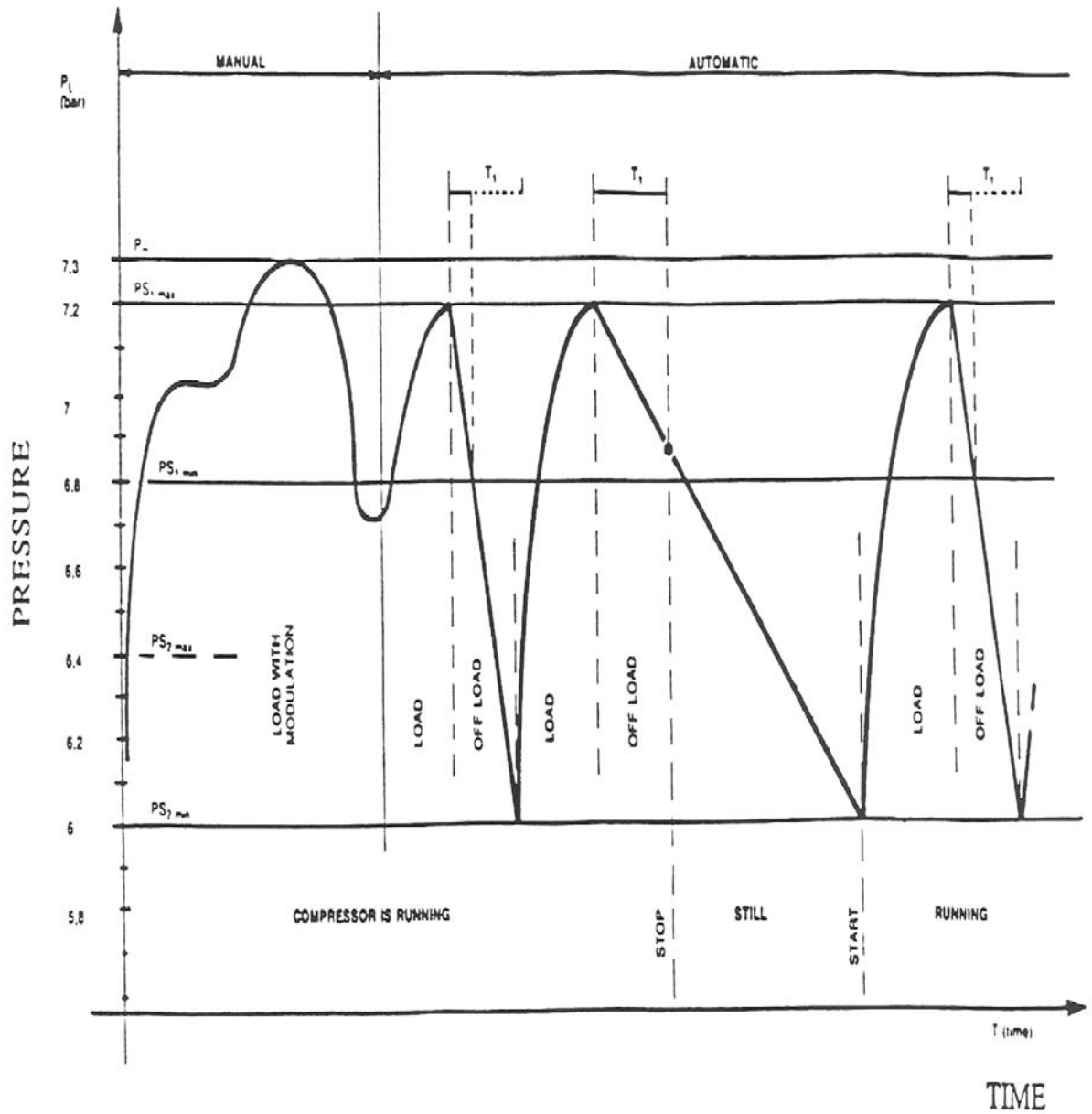
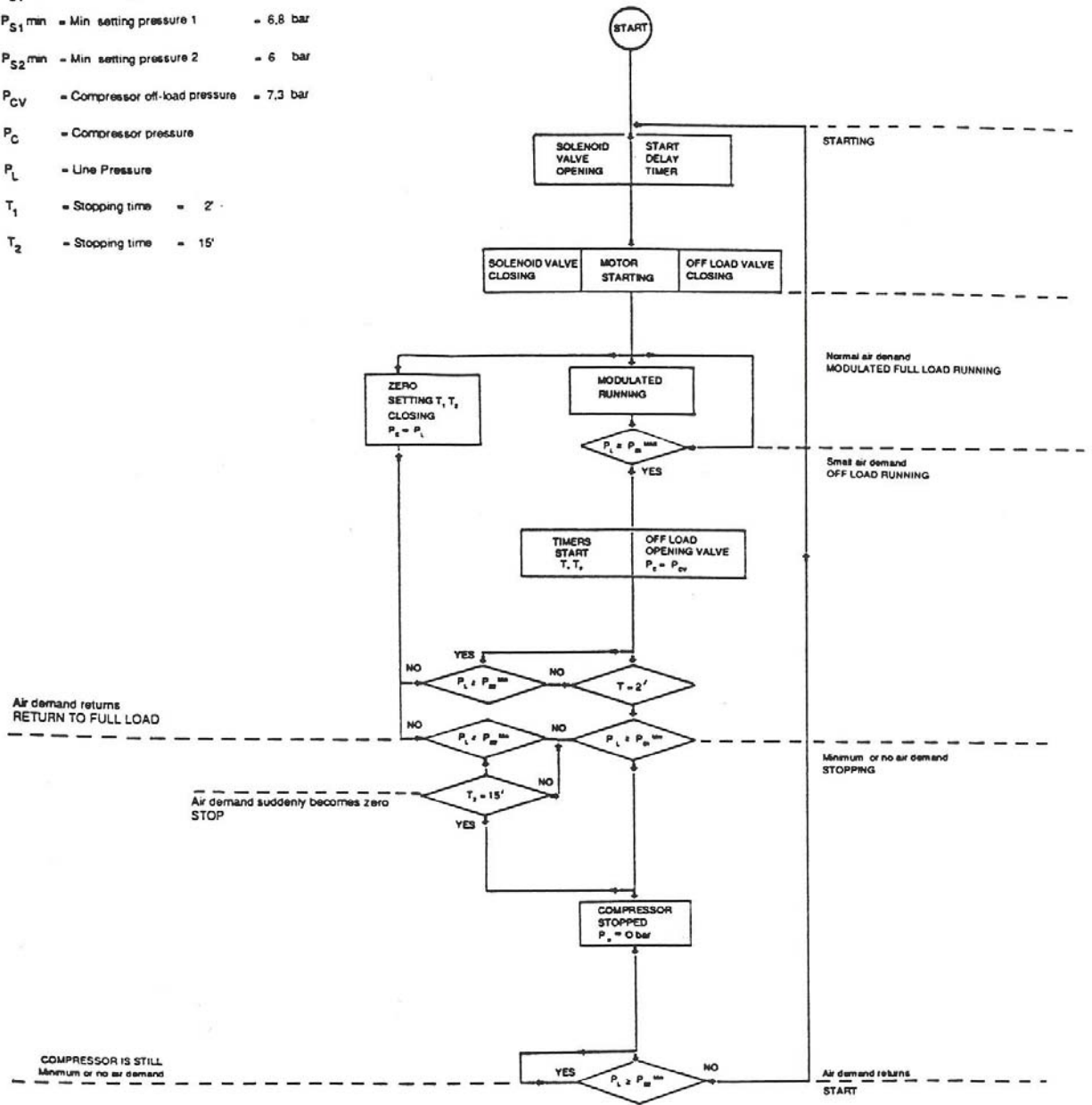


Fig 7. Automatic Operation by Means of 2 Pressure Switches

- $P_{S1\ max}$ = Max setting pressure 1 = 7.2 bar
- $P_{S1\ min}$ = Min setting pressure 1 = 6.8 bar
- $P_{S2\ min}$ = Min setting pressure 2 = 6 bar
- P_{CV} = Compressor off-load pressure = 7.3 bar
- P_C = Compressor pressure
- P_L = Line Pressure
- T_1 = Stopping time = 2'
- T_2 = Stopping time = 15'



LUBRICATION SYSTEM

The lubricant in the Mattei Rotary Vane Compressor provides four vital functions:

- 1) Lubrication
 - a. Utilizing a differential pressure, the lubrication system eliminates the requirement for a separate oil pump. Air pressure acting on oil in the chamber forces oil through drilled passageways to critical wearing surfaces (i.e., main bearings).
- 2) Seals
 - a. Oil injected into the rotor stator unit creates a seal between the sliding vane tip and the stator wall to lubricate and seal individual compression chambers.
- 3) Cools
 - a. Oil injected into the rotor stator unit dissipates the heat of compression and allows efficient operation.
- 4) Controls
 - a. Pressurized oil in the chamber acts on servo/unloader valves to control air intake. Air flow is matched to air demand providing efficient off-load operation.

To meet all four design criteria, Mattei has developed a special Mattei lubricant, 8000F2, for use in rotary compressors

Warning: It is important that the compressor oil be of the recommended type, and that this oil, as well as the air filter, oil filter and air/oil separator elements, be inspected and replaced as stated in this manual.

Mattei's extended Limited Warranty requires the use of Mattei oil (currently 8000F2).

Please note that all Mattei compressors are factory tested and supplied with oil, which must be changed after 500 hours of operation.

INSTALLATION

1) Locating the compressor

- a. Place the compressor in a well-ventilated environment away from any sources of heat. The unit is designed to operate in ambient temperatures up to 100°F. For temperatures greater than this, consult your authorized distributor.

DANGER: Hot oil under pressure can cause injury, death or property damage. Ascertain that the compressor is shut down, disconnected from the main electrical supply, and relieved of all pressure before starting any work on the compressor

- b. The compressor oil temperature may be checked by filling the hole on the oil filler plug with oil and then inserting a thermometer. **The oil temperature should never exceed 212°F.**
- 2) To ensure effective cooling-**DO NOT**
 - a. Position the compressor so that the air-cooled radiator is within 7 feet of a wall or large obstruction.
 - b. Place compressor in a confined area such that the hot air will not be allowed to disperse.
 - 3) Always place the compressor in a position that allows easy access to perform standard maintenance procedures. Avoid all inclines and ascertain that the compressor is level in both directions
 - 4) All Mattei compressor packages are equipped with air-cooled after-coolers and separator drains. Separate installation of air dryers and filters is recommended to help protect downstream equipment and devices.
 - 5) All installation wiring should be handled by a licensed electrician who is familiar with such procedures. Always refer to the wiring diagram.
 - 6) Electrical Connections
 - a. Ascertain that wire sizes, power supply, and disconnects are suitable to operate compressor.
 - b. Check for the correct voltage supply

WARNING: All compressors must be wired such that they rotate clockwise when viewed from the motor end. Operation of the compressor in the wrong direction for more than 10 seconds may cause serious damage. To change direction or rotation, reverse two of the three main cables on the terminal board.

DISCHARGE AIR LINES

If the Mattei compressor is operating in conjunction with other compressors, especially reciprocating, a check valve should be fitted between the two to isolate the Mattei compressor. **Always size the pipe properly to minimize the pressure drop.** Piping should also be kept as straight and as short as possible to minimize potential leakage spots. (See tables below)

All main air piping should slope away from the compressor to properly drain condensate. When vertical piping is used, a drip leg should be installed.

A flexible hose with an air gun should be fitted near the compressor to assist in periodic cleaning of both the oil cooler and the air cooler.

Pipes for delivery of air to individual stations should always be branched off from the upper side of the main air supply.

PIPING REQUIREMENTS FOR AIR DISTRIBUTION SYSTEMS

Pipe size used should be large enough to keep the pressure drop between the tank and the point of use to a minimum. All piping should slope to an accessible moisture drain point.

The main airline should not be smaller than the compressor outlet size. For long lines, sizes shown at right are recommended.

Outlets should be taken from the top of the mainline (tees facing up) to keep moisture out.

Check all piping and fittings regularly to avoid leaks in the system. Filters, regulators, and other accessories should also be properly maintained.

PIPE SIZES FOR COMPRESSED AIR LINES
Length of Pipe Lines in Feet

| Air CFM | 25 | 50 | 75 | 100 | 150 | 200 | 250 | 300 |
|---------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1-5 | 1/2" | 1/2" | 1/2" | 1/2" | 1/2" | 1/2" | 1/2" | 1/2" |
| 6-10 | 1/2 | 1/2 | 1/2 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 |
| 11-15 | 1/2 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 |
| 16-20 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 |
| 21-25 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 1 | 1 | 1 |
| 26-30 | 3/4 | 3/4 | 3/4 | 3/4 | 1 | 1 | 1 | 1 |
| 31-35 | 3/4 | 3/4 | 1 | 1 | 1 | 1 | 1 | 1 |
| 36-40 | 3/4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 41-59 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 60-79 | 1 | 1 | 1 | 1 | 1 1/4 | 1 1/4 | 1 1/4 | 1 1/4 |
| 80-100 | 1 1/4 | 1 1/4 | 1 1/4 | 1 1/4 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 |

VOLUME OF AIR FOR CYLINDERS
In cubic feet for single acting. For double acting, multiply by 2. Multiply by cycle/minute to get CFM

| CYL BOR | Stroke (inches) | | | | | |
|---------|-----------------|--------|-------|-------|-------|-------|
| | 2 | 4 | 6 | 8 | 10 | 12 |
| 2 | .00364 | .00727 | .0109 | .0145 | .0182 | .0218 |
| 2 1/2 | .00568 | .01137 | .0171 | .0228 | .0284 | .0343 |
| 3 | .00818 | .0164 | .0246 | .0327 | .0409 | .049 |
| 3 1/4 | .0112 | .0222 | .0435 | .0445 | .0556 | .0666 |
| 4 | .0145 | .029 | .0681 | .058 | .0725 | .087 |
| 5 | .0228 | .045 | .0825 | .091 | .114 | .136 |
| 6 | .0328 | .065 | .0938 | .131 | .164 | .197 |

AIR FLO (CFM)
THROUGH ORIFICE OR JET

| PSI | Orifice or Jet Size | | | |
|-----|---------------------|-------|------|-------|
| | 1/64 | 1/16 | 1/8 | 1/4 |
| 10 | .084 | 1.36 | 5.45 | 21.8 |
| 25 | .133 | 2.16 | 8.6 | 34.5 |
| 50 | .225 | 3.64 | 14.5 | 58.2 |
| 80 | .330 | 5.32 | 21.2 | 85.0 |
| 100 | .400 | 6.45 | 25.8 | 103.0 |
| 120 | .470 | 7.58 | 30.2 | 121.0 |
| 150 | .570 | 9.20 | 36.7 | 147.0 |
| 200 | .760 | 12.20 | 48.7 | 195.0 |

STARTUP AND CALIBRATION

1) Starting

- a. Confirm that the supply voltage coincides with that on the compressor nameplate.

NOTE: Never remove or loosen the oil fill plug until all pressure has been released from the compressor. Then open safety valve before removing the plug to release any residual air.

- b. Check oil level. Ensure that it is filled to overflowing.

CAUTION: Before starting the compressor, be sure this manual has been completely read and understood with particular attention paid to ALL warnings.

- c. Press the MANUAL or AUTOMATIC button to start the compressor. All models have a delayed start of about 8 seconds to ensure unloaded starting.
- d. On the first start up, check that rotation is in the direction of the arrow on the motor case, i.e. clockwise when viewed from the motor end. If this is not the case, stop the compressor immediately and reverse 2 of the main electrical supply leads.

Note: Continued rotation of the compressor in the wrong direction for more than 10 seconds will seriously damage the unit.

2) Stopping

- a. Press the “off” button whether in Manual or Automatic operation. The compressor will stop with a 3 second delay period to ensure an off-load condition.

NOTE: The emergency stop button should not be used to stop the compressor during standard operation.

3) Calibration

- a. Manual Mode
 - i. To adjust the operating pressure in the manual mode requires adjustment of the servovalve only. (In manual, the pressure switches and timers are cut out of the circuit)
 - ii. To adjust the servovalve located on the side of the oil chamber under the oil filter, (Note: Location may vary. Check the applicable arrangement drawing for your compressor.), loosen the locking nut and turn the adjusting screw. Turn the screw clockwise to increase pressure; counterclockwise to decrease

pressure. With the air discharge closed (compressor off-load), a pressure gauge setting of 105-11- PSI is recommended.

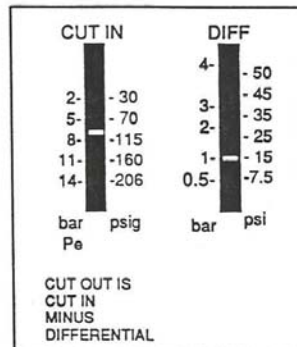
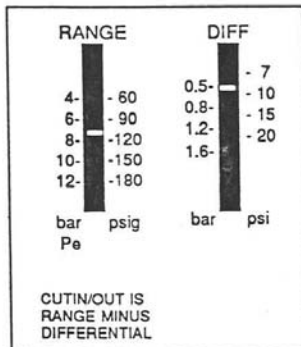
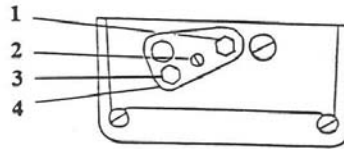
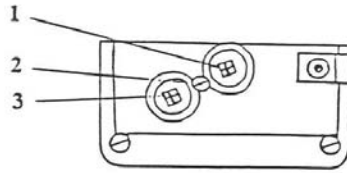
iii. When pressure is properly adjusted, retighten locking nut.

b. Automatic Mode

- i. The pressure switches should be calibrated as follows:
 - 1. PS1: this pressure switch should be set 1.5-3 PSI lower than the compressor servovalve setting.
 - 2. PS2: this pressure switch should be set 17-20 PSI lower than the PS1 maximum value
 - 3. The pressure differential should be 5.7-7.1 PSI for both pressure switches.
- ii. To adjust the pressure switches, loosen the lock screws (2) and, for PS2, remove the safety plate (4). The settings can now be adjusted by turning screws (1) and (3) as appropriate. The values set can be read from the scales on the front of the pressure switches.

Fig 8A. Pressure Switch PS1

Fig 8b. Pressure Switch PS2



NOTE: (7.5 not shown on actual instrumentation)

MAINTENANCE

WARNING: Before performing any maintenance work on the compressor, be sure all pressure is relieved from compressor and system and the unit is disconnected from the power source.

The following table is a summary of the routine maintenance operations necessary to guarantee the long life and safe operation of the compressor.

| | Daily | Weekly or Every 50 Hrs. *see below | Every 2 mos. or 500 Hrs. *see below | Every 6 mos. or 1500 Hrs. *see below | Every 10 mos. or 2000 Hrs. *see below | Every 12 mos. or 5000 Hrs. *see below | Every 12 mos. or 8000 Hrs. *see below |
|--|-------|---------------------------------------|--|---|--|--|--|
| Check oil level | X | | | | | | |
| Check condensate separator for correct operation | X | | | | | | |
| Clean intake filter | | X | | | | | |
| Clean radiator/coolers | | X | | | | | |
| Change Oil (see first note below) | | | X** | | | X*** | |
| Clean oil filter | | | | X | | | |
| Replace oil return valves | | | | X | | | |
| Change air filter | | | | | X | | |
| Change oil separator elements | | | | | | | X |
| Grease electric motor bearing, if applicable (see table 3) | | | | | | | |

NOTES:

- Break in oil must be changed after first 500 operating hours.
- Oil filter requires cleaning after first 500 operating hours.
- Oil return valves require cleaning after first 500 operating hours.
- ***Time periods are based on normal operating conditions. When the unit is operating in an adverse environment, maintenance should be performed more frequently. When in doubt, contact Mattei Service Department.***

* More frequent changes may be necessary depending on operating conditions.

** When approved petroleum based oil is used

*** Only when Mattei (currently 8000F2) oil is used.

The following are brief instructions on how to perform the above simple maintenance operations.

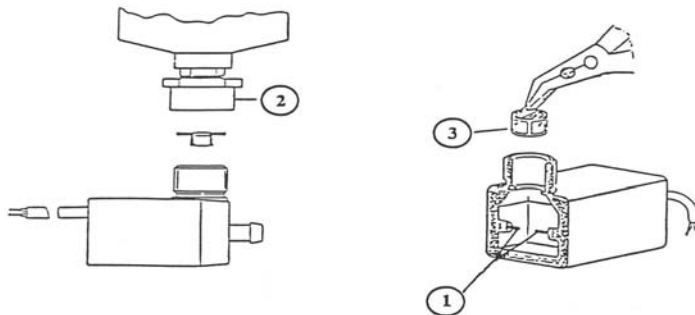
WARNING: Before performing any maintenance work on the compressor, ascertain that the unit is not under pressure. Wait until the air pressure gauge reads zero, and then lift the safety valve lever to discharge all pressure.

Also, the main electric disconnect switch must be open and red-tagged to remain open while maintenance is being performed.

Failure to follow above instructions may result in serious bodily injury or death.

1. CONDENSATE SEPARATOR (see fig. 9)
 - a. A condensate separator and drain is fitted on the aftercooler of each unit. During compressor operation the solenoid valve opens approximately every two minutes (or four minutes in some models) and remains open until all water is discharged. Two internal electrodes detect the lack of water and close the valve instantaneously. The presence of oil or dirt may interrupt the conductivity between these two electrodes and hence even though the solenoid will continue to open every 2 (or 4) minutes, it will not remain open long enough to drain sufficient water. If this is the case:
 - i. Undo lock nut (2) and remove solenoid valve.
 - ii. Remove and clean or replace filter (3).
 - iii. Clean electrodes (1).
 - iv. Reassemble, taking care not to cross the solenoid valve and lock nut.

Fig. 9 Drain Solenoid Valve Maintenance



2. AIR INTAKE FILTER (see fig. 10)
 - a. Remove nut (1) from filter cover.
 - b. Remove cover (2).
 - c. Remove nut (3) and plate (4) holding filter (5).
 - d. Remove and clean or replace filter element (5).
 - e. Refit filter (5), plate (4), and nut (3).
 - f. Lock assembly in place with nut.

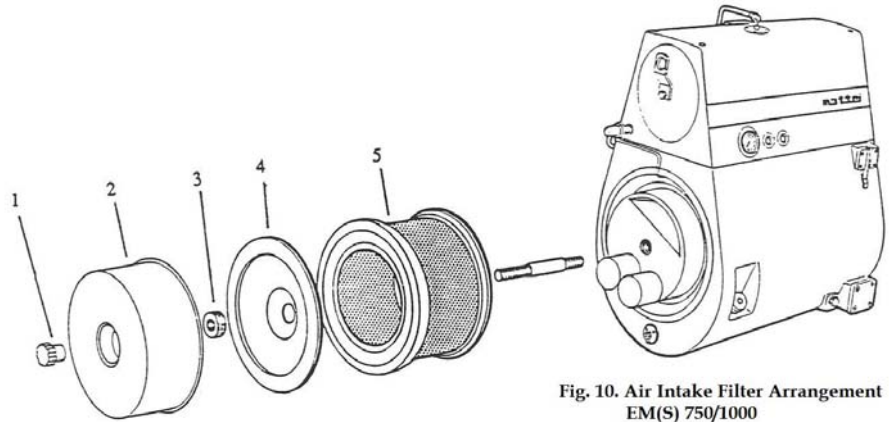


Fig. 10. Air Intake Filter Arrangement
EM(S) 750/1000

3. RADIATOR/COOLERS
 - a. On a Mattei rotary vane compressor both oil and air are cooled in air blast external radiators. ***In order to maintain effective cooling, the radiator and piping must be kept clean.*** The radiators can easily be cleaned with a jet of clean dry compressed air.
4. OIL CHANGE (see Fig. 11) (Location of oil drain plug and filter may vary by model.)

CAUTION: Do not loosen or remove any plugs until all pressure is relieved from the system and the pressure gauge reads zero. Raise safety valve lever to ensure all pressure has been relieved.

- a. Unscrew and remove oil filler plug (1).
- b. Remove oil drain plug (2) from underside of the oil chamber.
- c. Drain oil.
- d. Fit with new seal (3) to oil drain plug, replace and tighten
- e. Fill compressor with oil until overflowing
- f. Fit new seal (4) to oil fill plug, replace and tighten
- g. Let compressor operate for about 10 seconds to allow oil to circulate.
- h. Stop the compressor and relieve all pressure.
- i. Check oil level and top off to overflowing.
5. OIL FILTER (see Fig 11.) **NOTE:** When the compressor is first installed the oil filter must be cleaned after first 500 hours.
 - a. Drain oil as per OIL CHANGE instructions.
 - b. Remove caphead screws (5) and filter cover (6).

- c. Extract oil filter element (8).
- d. Clean the element with appropriate solvent.
- e. Clean filter housing with clean cloth.
- f. Refit element into housing.
- g. Fit new O-rings (7) to filter and refit.
- h. Fill with oil as per OIL CHANGE instructions.
- i. Check that there are no leaks.

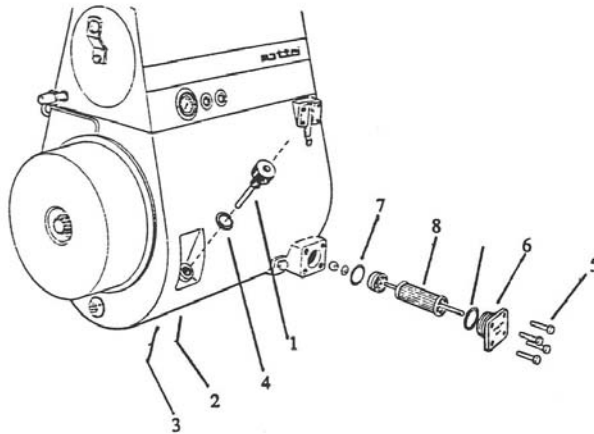


Fig. 11 Oil Filler/Filter Arrangement
EM(S) 750/1000

6. OIL RETURN VALVES (see Fig. 12.) **NOTE: When the compressor is first installed the oil return valves should be cleaned after first 500 hours.**
 - a. Remove circlip (1), sight window (2) and seal ring (3) from the seat.
 - b. Remove valve (4) and gasket (5) using appropriate socket wrenches.
 - c. Examine ORV's and, if blocked, replace. **NOTE ORDER OF DISASSEMBLY.**
 - d. Refit valve and gasket into housing.
 - e. Refit new seal ring (3), sight window (2), and circlip (1) if necessary.

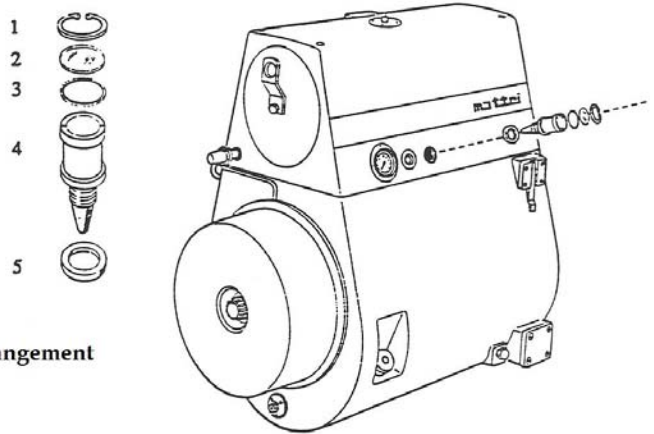


Fig. 12 Oil Return Valve Arrangement
EM(S) 750/1000

7. ELECTRIC MOTOR

- a. The bearings of the electric motors on the EM(S)400-1000 compressors should be greased as indicated in the table below.

Electric Motor Maintenance

| EM/EMS | To Be Greased Every |
|--------|---------------------|
| 400 | 4200 hours |
| 500 | 3800 hours |
| 600 | 3800 hours |
| 750 | 3800 hours |
| 1000 | 3800 hours |

User's Notes

MATTEI ROTARY VANE COMPRESSORS

FAULT FINDING GUIDE

WARNING: Never attempt any remedy without first ensuring that all internal pressure has been released and compressor is isolated from the main electrical supply.

Failure to comply with this warning may cause injury.

OVER PRESSURE

| SYMPTOM | CAUSE | SOLUTION |
|--|--|--|
| Rapid pressure rise until safety valve blows. | Valve adjusted incorrectly, set too high. | Adjust. |
| | Oil flow from servo to intake valve is blocked and/or servo valve piston is sticking | Strip and clean or replace. |
| With outlet closed, safety valve blows quickly. Also quick blowback on stopping. | Unloader valve is not closing but non-return valve shuts quickly on stopping. | Strip and clean or replace unloader valve. |
| Slow pressure rise, safety valve blows. Oil mist blows through intake on stopping. | Unloader valve seat is damaged. Allows leakage of air to intake. | Replace seat. |
| Slow pressure rise. | Air is passing seal to the intake. Vacuum relief piston seal damaged. | Replace seal. |
| Oil blowback when compressor is stopped. | Air passing around seal into stator. Seal rings on intake valve housing damaged. | Replace seals |
| Others: High power absorption and overheating | | NOTE: Check that safety valve is adjusted correctly. |

LOW FLOW RATE

| SYMPTON | CAUSE | SOLUTION |
|--|---|---|
| Low pressure. | Intake filter clogged. | Replace element. |
| Pressure normal but lack of air flow. | Separator elements clogged with oil because: | Change separator elements and : |
| | ORV's need cleaning. | Clean or replace ORV's |
| | Compressor was tipped on side. | Drain oil. |
| | Water mixing with oil- (compressor too cold) | Seat thermal bypass valve. |
| | Oil carbonizing-too hot | Isolate cause for excessive heat. |
| | Blocked airflow at outlet. Minimum pressure valve malfunctioning. | Remove and clean or replace. |
| Low gauge pressure. | Servo valve sticking open. Keeps intake valve partially closed. | Remove and clean. |
| No pressure. | No airflow. Vanes not sliding. | Thick carbonized oil causes blades to jam in slots. Clean or replace RSU. |
| | Servo valve setting too low. | Adjust. |
| | Leaky air lines. | Check and repair lines. |
| Compressor overheating. (see over heating) | Airflow blocked. Thermal unloader bolts closed. | Identify cause, correct and replace thermobolt. |

OVER HEATING

| SYMPTOM | CAUSE | SOLUTION |
|--|---|---|
| High temperature switch activated, thermobolt shut. Oil carbonizing. | Lack of airflow through the cooler. Oil cooler blocked or dirty. | Clean cooler and remove any blockage. |
| | High ambient temperature. | Relocate compressor in cooler ambient. |
| Carbonization and excessive oil carryover. | Oil not capable of absorbing heat and not providing proper lubrication. | Drain oil and use approved lubricant. |
| Low flow rate. | Incorrect end clearance. Too large a clearance creates double staging; too little, excessive friction. | Check clearance and reset. |
| High temperature switch activated. High power absorption. | Oil return valves remain open. High pressure air backing into RSU creates double staging. | Clean or replace valves. |
| Carbonization and excess friction. | Not enough oil to absorb heat. | Fill compressor to proper level after thoroughly checking compressor. |
| High temperature switch activated. | Oil passageways blocked (I.e., cooler, filter, thermal bypass). Oil not circulating, lubricating, and absorbing heat. | Locate blockage and remove. |
| High temperature switch activated. Down on flow. | Vacuum relief valve piston seal damaged and high pressure air leaking to intake. | Replace piston seal |
| High Power Absorption. High temperature switch activated. | Air passing from delivery to intake chamber causing double staging due to excessive wear of stator. | Replace stator and blades. |

EXCESSIVE OIL CARRYOVER

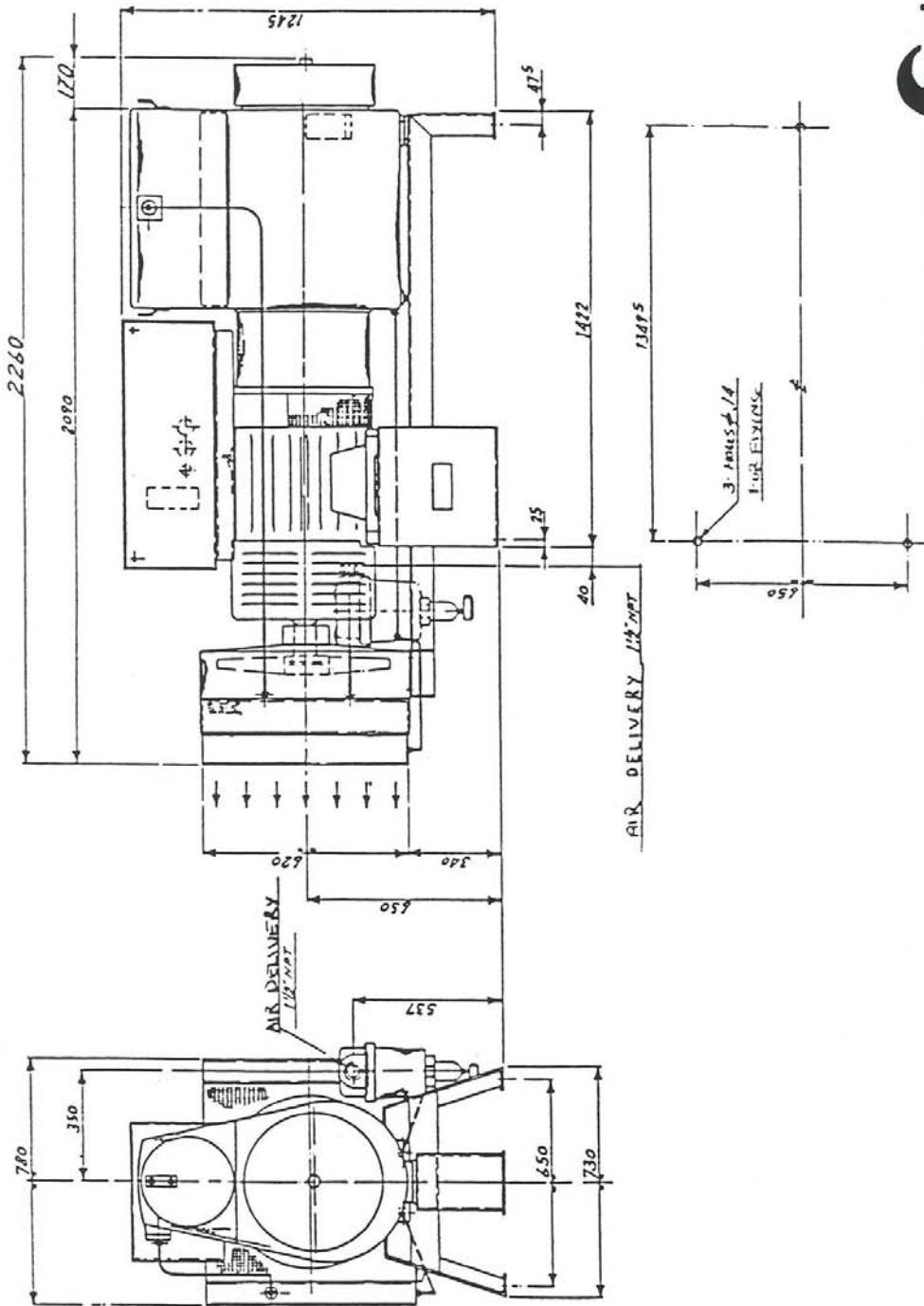
| SYMPTOM | CAUSE | SOLUTION |
|---------------------------|---|---|
| Excessive oil downstream. | Separator elements are loose, cracked, or seated incorrectly. | Replace elements or seals and install correctly |
| Heavy oil consumption. | Seals damaged. | Replace seals. |

EXCESSIVE NOISE

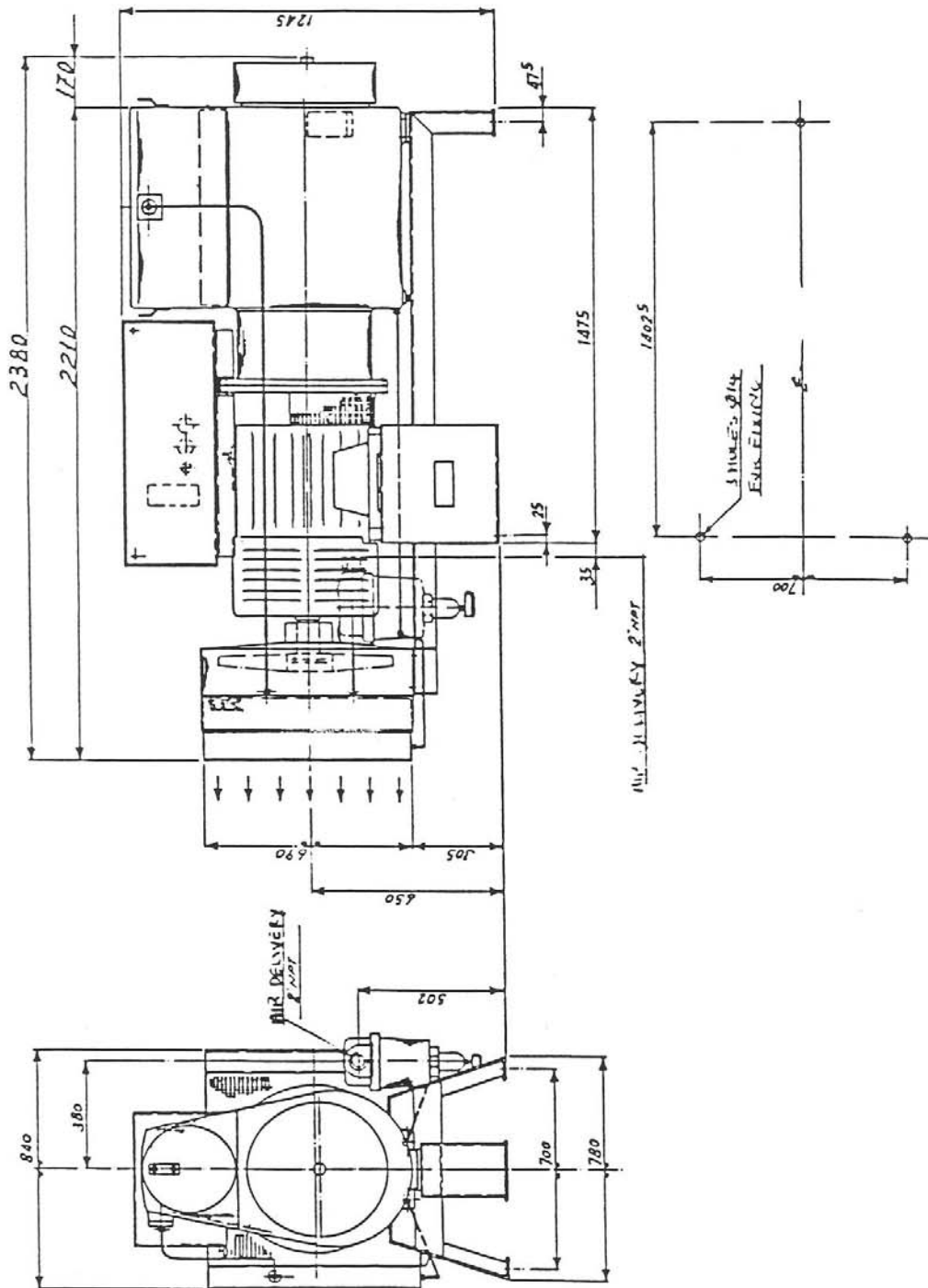
| SYMPTOM | CAUSE | SOLUTION |
|---------------------------|---|-----------------------------------|
| Excessive knocking noise. | Vacuum relief valve damaged. Excessive vacuum created, causing instability of blades. | Remove and clean or replace. |
| Excessive rattling. | Rubber bushings damaged on motor half coupling. Metal pins are rattling with compressor half coupling. | Replace pins and check alignment. |

OVERALL DIMENSIONS

RECOMMENDED SPARE PARTS

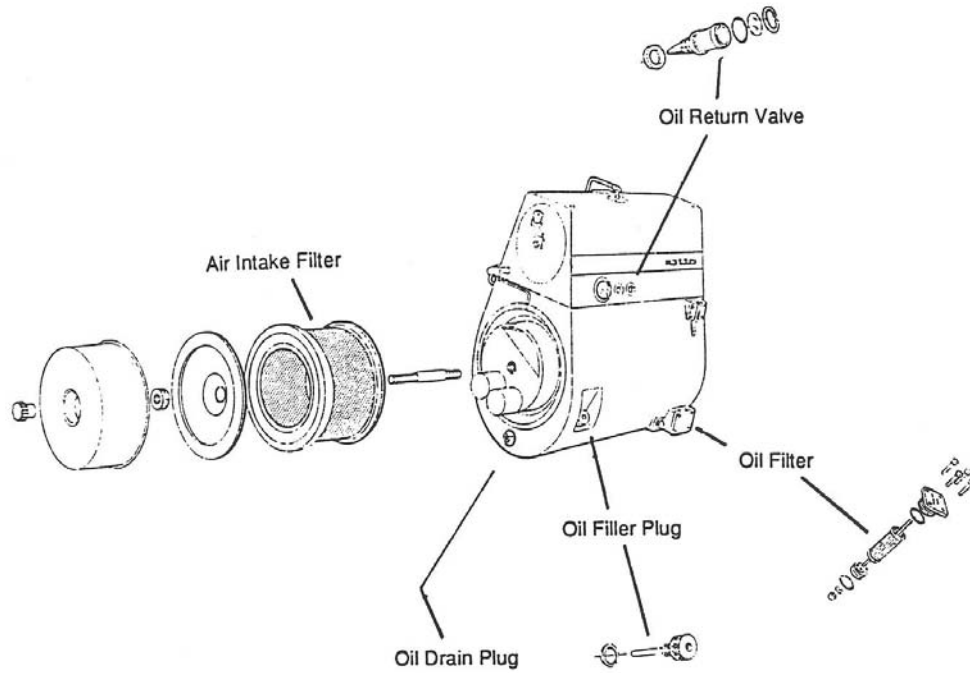


Overall Dimensions EM 750
(Millimeters)



Overall Dimensions EM 1000
(Millimeters)





| PARTS TO REPLACE DURING MAINTENANCE | | | |
|--|--------------|----------|------------|
| POSITION | DESCRIPTION | QUANTITY | P/N |
| OIL RETURN VALVE | GASKET | 2 | SK7ORV |
| | O-RING | 2 | SK7ORV |
| | VALVE | 2 | SK7ORV |
| AIR INTAKE FILTER | ELEMENT | 1 | CR21D13011 |
| OIL FILLER PLUG | SEAL RING | 1 | NGR384532N |
| OIL FILTER | SUPPORT RING | 1 | NOGC06350V |
| | COVER RING | 1 | NGOC06509V |
| OIL DRAIN PLUG | SEAL RING | 1 | NGR243032N |