Pneumatic High-Viscosity Filtration System
Instruction Manual

P/N: 61512 – 04/09

Pneumatic High Viscosity Filtration Systems

PN: 61512 14 April, 2009 rev A

36933 Pneumatic Hand Cart HV Filtration System
36934 Pneumatic Hand Held HV Filtration System

Customer Satisfaction:

Trico Corporation is proud of its commitment to quality. All Trico products are guaranteed against defects in workmanship and materials for as long as you own them. Under this guarantee, free repair or replacement will be made to your satisfaction. Normal wear and tear or misuse is not covered under this warranty. For prompt service contact Trico customer Service at 1-800-558-7008.

Introduction

Thank- you for purchasing one of our Pneumatic Flirtation Systems. Attempting to filter high viscosity oil with a lower viscosity systems result in low viscosity units operating primarily in bypass mode where little if any of the high-viscosity oil is filtered. These types of units are not designed to work with higher pressures required to push high viscosity fluids through the system.

Trico's Pneumatic High-Viscosity Gear and Lube Oil Filtration Systems are specifically designed for high viscosity fluids associated mainly with gear oils and can filter up to 7500 SUS @ 100°F. (1600cSt @40°C) To ensure that equipment receives the cleanest possible oil to increase life expectancy, Trico's filtration systems provide two-stage filtration. Oil flows through the primary particulate filters first before continuing to the second set filter elements where additional particulate and water is removed.

Please read through these instructions carefully to learn how to operate and maintain your Pneumatic High Viscosity Filter Systems correctly.

Pneumatic Motor Operation and Maintenance:

Pneumatic motors are beneficial because they can operate in hot, corrosive, and wet environments without damage, and are unaffected by continuous stalling or overload. Compressed air offers special advantages that make pneumatic motors quite desirable: it's readily available in many plants, it's clean, and it can be connected with simple low-pressure air line. Pneumatic motors are operated by compressed air, the expansion of which creates a cooling effect. As a result, the temperature of the pneumatic motor will not exceed the temperatures of the surrounding atmosphere or the air delivered at the inlet.

A pneumatic motor slows down when load increases. Its torque increases at the same time until it matches the load. Therefore, the Trico High Viscosity Pneumatic Filtration system continues to provide increased torque until it stalls due to fluid viscosity within the pump, then maintains the stalled condition and can remain there for indefinite periods without harming the motor. By contrast, a stalled electric motor without overload protection soon burns out, and hydraulic motors will overheat.

During a stall, Trico High Viscosity Pneumatic Filtration system continues to applying torque and resumes rotation only when the stall is overcome by reducing the load. Pneumatic Filtration system motor usually wears out slowly over time, producing less power as they wear. Because of this, maintenance can be planned well in advance.

Maintenance and repairs are generally fairly simple as is testing and checking. Air entering the FRL must be clean and dry for efficient operation of the pneumatic motor as well as to prevent motor damage. Lubrication is critical for efficient operation and long life of the pneumatic motor. Lubrication also prevents corrosion of a motor's interior, since moisture is often present in plant air lines.

Symptoms of a malfunctioning rotary motor are slow operation or low torque capability, or both. Problems can stem from one or more of our sources: dirt or foreign materials in the motor, corrosion, and improper lubrication.

Operating instructions:

1. Ensure filter elements are tightened for a proper seal after shipping
2. Insert the suction wand assembly (hose connected near the pump) or connect to the supply fluid drum/ reservoir. Maximum operating temperature is less than 150°F.
3. Insert the outlet wand assembly (hose connected after the 2nd filter) or connect to the transferring drum/reservoir. If filtering oil on existing equipment reservoirs, locate the inlet wand away from the outlet wand to prevent a direct flow path.
4. Fill the FRL reservoir (Filter, Regulator, Lubricator) located on the back of the cart to the proper level with SAE 10W high detergent or non-detergent motor oil. For food processing applications, White Rex 425 food grade motor oil is FDA approved.
5. Adjust lubricator to feed 1 drop of oil for every 50 CFM of air while the unit is running, or 1 drop of oil per continuous minute of run time for high speed or continuous duty usage. Do not over oil or exhaust air may become contaminated.
6. Connect the air supply to the filter cart FRL. Check the oil level daily.
7. Clean the compressed air connection with low pressure air to remove any dirt from the line before connecting to the FRL.

   WARNING:

   The maximum surface temperature of the air motor should not exceed 266ºF/130ºC. Do not continue to operate the motor if the measured surface temperature exceeds temperature stated.
8. Check air motor intake and exhaust filters after first 500 hours of operation. Clean filters and determine how frequently filters should be checked during future operation. This one procedure will help assure the motor's performance and service life.

9. Verify that air supply is maintained at 100psi or below by reading the pressure gage located on the FRL unit. Regulators are preset at 100psi operating pressure. They are lock and unable to be adjusted.
   Note tampering with the locked FRL regulator will void product warranty.
10. When using hose clamps to secure fittings, make sure that are tightened before operation.
11. It is helpful to install an inline ball valve before the connection to the FRL to quickly turn the air supply to the motor on and off. Different fluid viscosities will apply different resistance to the pump and motor assembly in turn motor speed will fluctuate.
    Note: motor will gradually increase in sped at startup until maximum torque is applied at operating flow. Motor RPM will increase and decrease with the increase or decrease of suction and lift head.
12. The condition of the filter elements should be monitored by the pressure gages located on the filter head or on the gage panel. When differential pressures read 40 psi, turn off the air supply and replace filter elements.

NOTE:

Trico High Viscosity filtration systems are equipped with two pressure gages to monitor pressure across the filter. It is recommended that the filter element be replaced when the differential pressure reaches 40 psi. Filter housings have a 42psi differential bypass.

13. Trico Filtration systems are equipped with two sample ports. For most accurate results, do not sample into an open bottle. Use a vacuum bottle sampler with plunger removed.
14. The 3 gpm filter cart is equipped with a bypass valve and piping. This valve should be kept in the fully closed position when using the filters. Use the bypass for removal of old/used oil only. Turn Handle until it is parallel with the cart frame for filtration mode. Turn handle until it is fully perpendicular to the cart frame for by-pass mode.

Filter Selection and Run Time

Filter selection is determined by what cleanliness level is recommended for your oil. The selection of the appropriate cleanliness level should be based on the operational and environmental conditions as well as recommended manufacture specifications. Consult your equipment manufacture whenever possible. A guideline of gear oil cleanliness is included in the next section.

Start with a larger filter and work your way down. A common mistake is over-filtering contaminated oils. The finer the filter, the more frequent the replacement of the element

will be required. Generally speaking as the oil viscosity increases the filter size should get larger because cleanliness levels are less.

Run time is determined when the filtration unit is used in a kidney loop filtration and works best when oil is filtered six to ten turns of the reservoir volume. To calculate the minimum hours of operation use the following formula:

Min. Hours = Reservoir Gallons x turn over / (180gph)
*Multiply this number by 3 for hand held Min Hours

Max Hours = Min. Hours x 2

In rare cases, or extremely dirty oil, additional run time may be needed.

Design Information:

High Viscosity Pneumatic Hand Held	
Max Flow Rate	1 GPM
Max Pneumatic Motor Speed	3000 rpm
Max. Inlet Vacuum	15in of Mercury
Hose Size	.75” ID by 6’ length
Max Operating Temperature (F)	110 continuous ~ 150 limited use
Max Supply Air Pressure	120psi
Preset FRL Air Pressure	100psi
Pump By-Pass	78 psi
Filter By-Pass	43 psi
Maximum Viscosity	1600 cSt. / 7500 SUS
Seal and Gasket Material	Viton

High Viscosity Pneumatic Cart	
Max Flow Rate	3 GPM
Max Pneumatic Motor Speed	3000 rpm
Max. Inlet Vacuum	8in of Mercury
Hose Size	1.25” ID by 6’ length
Max Operating Temperature (F)	110 continuous ~ 150 limited use
Max Supply Air Pressure	120psi
Preset FRL Air Pressure	100psi
Pump By-Pass	105 psi
Filter By-Pass	43 psi
Maximum Viscosity	1600 cSt. / 7500 SUS
Seal and Gasket Material	Viton

ISO CLEANLINESS RATING

Lubricating oils stored in bulk containers can contain contaminates. Ordinarily it has been thought that lubricant stored in drums prior to use were contaminant-free. However, it is now been learned that it is beneficial to filter lubricant even prior to its use as the original container can impart impurities to the lubricant prior to its first use. The majority of rotating equipment is manufactured to a class 2 or class 3 fit typical of most industrial operations. Hydraulic components and rotary screw compressors tend to have tighter tolerances in the sliding and rotating elements. Clearances in components are used to establish cleanliness requirements. The best source for cleanliness requirements is from the equipment manufacturer. In general, as the viscosity of the oil increases the cleanliness level decreases. Below is a general guideline for cleanliness levels.

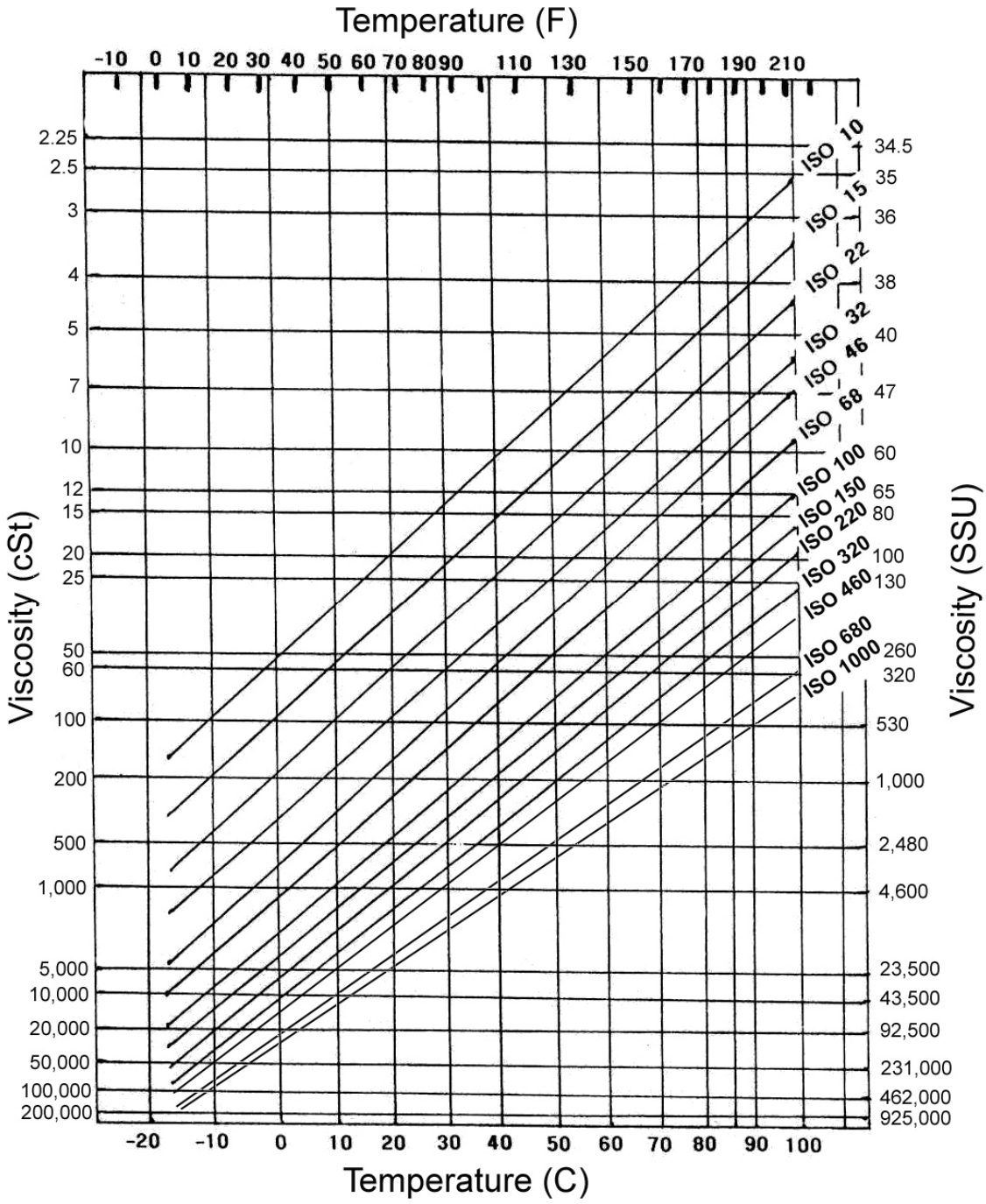
ISO Oil Grade Classification	Cleanliness Code (R4/R6/R14)
32	16/14/11
46	16/14/11
68	17/14/12
100	18/15/13
150	18/15/13
220	19/16/14
320	19/16/14
460	19/16/14
680	20/18/14

Determining the ISO Cleanliness level of equipment requires analysis of the running lubricating oil. Our **Predict** analysis laboratories can provide you with an accurate indication of the ISO Cleanliness level of your lubricating oil before and after filtration. Each number in the ISO code represents the micron range of particulate in which the count lies within ($R_{4\ microns}$/ $R_{6\ microns}$/ $R_{14\ microns}$). ***Example: 19/16/14, the 19 code shows that count of 4 micron particle lies between 5,000 and 2,500 per ml of fluid.***

ISO 320
19/16/14

ISO Number	Particle Count per ml of fluid		
25	160,000	to	320,000
24	80,000	to	160,000
23	40,000	to	80,000
22	20,000	to	40,000
21	10,000	to	20,000
20	5,000	to	10,000
19	2,500	to	5,000
18	1,300	to	2,500
17	640	to	1,300
16	320	to	640
15	160	to	320
14	80	to	160
13	40	to	80
12	20	to	40
11	10	to	20
10	5	to	10
9	2.5	to	5
8	1.3	to	2.5

TEMPERATURE VS. VISCOSITY



Trouble Shooting:

Symptom	Possible Cause(s)	Corrective Action
Pump noise	Cavitation or Aeration	Ensure that open end of suction tube remains completely below surface of liquid
		Check hose and fittings for leaks
		Increase suction hose diameter reducing velocity of fluid
No outlet flow	Clogged suction tube/ discharge line	Clean suction tube/ discharge line
	By-Pass valve in between the open and closed position	Check to make sure by-pass valve is fully open or closed
No Air supply to motor	No Air Supply	Check air supply, ensure that is between 100psi and 120psi
	Defective Regulator/ clogged FRL	Remove air line after FRL and check for air flow, clear FRL of obstruction. **Note: Air pressure is preset and locked at 100psi tampering with this locked regulator setting will void the warranty.**
Motor Hesitation	Fluid Viscosity to high or debris build up within motor	Check fluid viscosity Inspect and flush motor with pneumatic flushing solvent.
Motor will not run or runs at low speed	Internal rust or debris build up	Inspect and flush the motor if it is operating slowly or Inefficiently, with pneumatic flushing solvent
	Motor vanes are jammed	Have motor serviced.
Motor runs well then slows down or runs at low speed	Restricted exhaust	Check exhaust for obstruction or damage causing restriction
Motor runs Hot	Bearing failure	Have motor serviced

Replacement Parts

Description	QTY	Part Number
Cart / 3 micron Beta 200 filter	6	36972
Cart / 10 micron Beta 200 filter	6	36973
Cart / 20 micron Beta 200 filter	6	36974
Cart / Water 10 micron nominal filter	6	36975
Hand Held / 3 micron Beta 200 filter	12	36976
Hand Held / 10 micron Beta 200 filter	12	36977
Hand Held / Water 10 micron nominal filter	12	36978
Cart / Wand Assembly	1	22489
Hand Held / Wand Assembly	1	22490