

# OPERATING INSTRUCTION MANUAL

FOR NARA ROTARY VANE 2 STAGE VACUUM PUMPS, MOT-085 & MOT-140

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***IMPORTANT: THIS UNIT HAS BEEN DRAINED FOR SHIPMENT.  
DO NOT ATTEMPT TO OPERATE WITHOUT ADDING OIL.***



**\*\* Dual free voltage 110V/220V :** You may select voltage by changing the switch on the rear of vacuum pump.

**CAUTION :** 1. Try to change only after disconnecting of Pump cord.

2. Use standard tools for this work.

3. Do not try with wet hands

In order to make the best use of your investment, familiarize yourself with the new features and operating instructions before starting pump. With just routine care your Nara vacuum pump will give you years of reliable service by following proper maintenance guidelines. Nara vacuum pump are designed for deep vacuum work in refrigeration systems only.

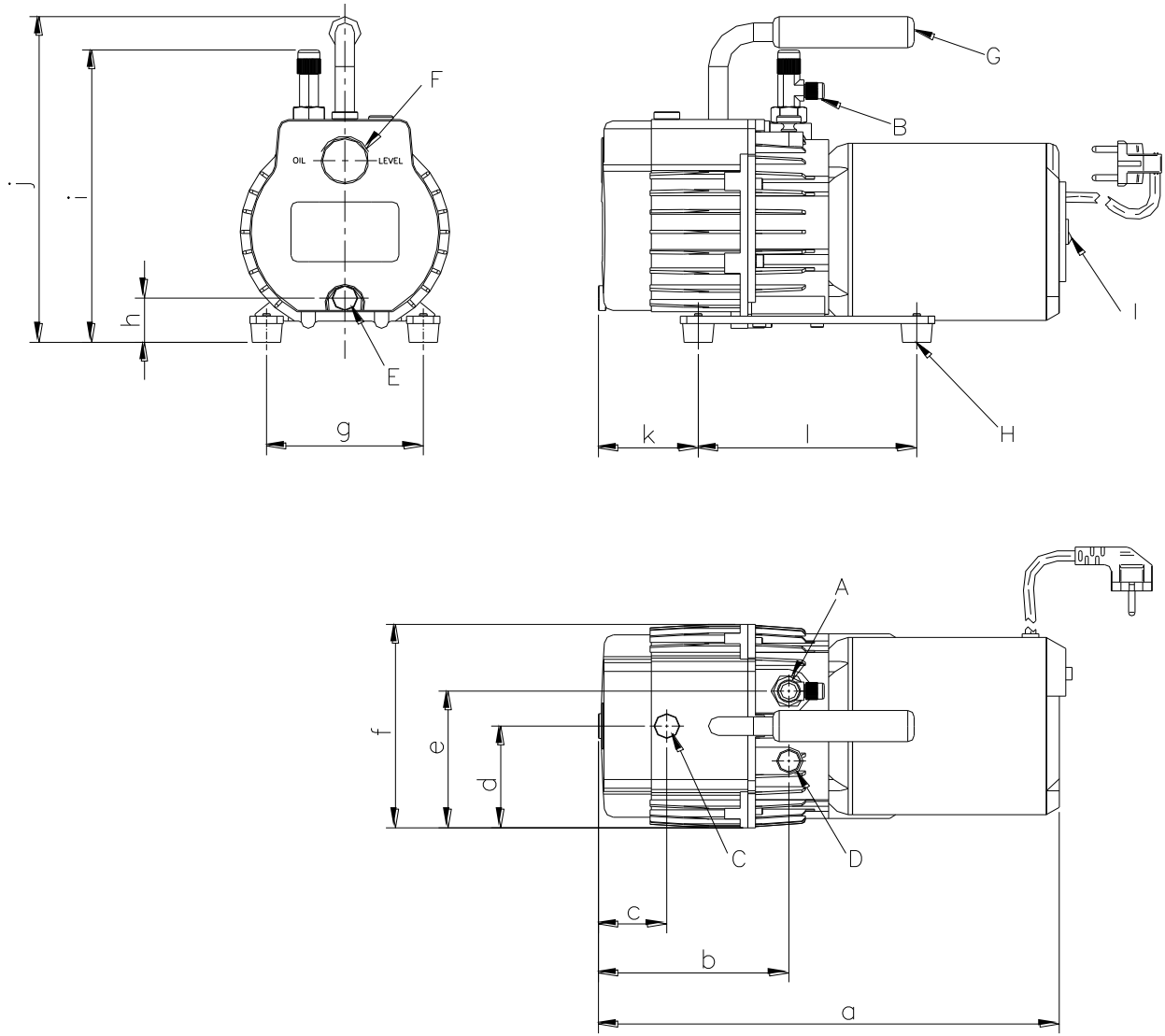
Each Nara vacuum pump has been factory tested to guarantee 25 micron or better and listed CFM performance. The serial number has been recorded. Complete and mail the Warranty Registration card within 10 days of purchase to validate your warranty. You will be notified of any technical updates.

25,400 Microns = 1"

## SPECIFICATION

		MOT-085	MOT-140	Note
Pumping speed	50Hz	70ℓ/min, 2.5 CFM	116ℓ/min, 4 CFM	
	60Hz	85ℓ/min, 3 CFM	140ℓ/min, 5 CFM	
Ultimate vacuum pressure	GB. Closed	5 x 10 <sup>-3</sup> Torr		
	GB. Open	5 x 10 <sup>-2</sup> Torr		
Motor speed	50Hz	1430 RPM		
	60Hz	1725 RPM		
Voltage/Hz		Dual voltage 110/220V, Dual cycle 50/60Hz		

□ DIMENSION



1.

Model	a	b	c	d	e	f	g	h	i	j	k	l
MOT-085	360	148	53	81	110	163	122	35	234	261	78	170
MOT-140	360	148	53	81	110	163	122	35	234	261	78	170

Unit	Explanation	
A	Input	5/8-18 UNF
B	Input	7/17-20 UNF
C	Oil fill cap & Exhaust port	
D	Gas Ballast	
E	Oil drain cap	
F	Oil sight glass	
G	Handle	
H	Rubber foot	
I	Switch	

## OIL

### Capacity

MOT-085 & MOT-140 : 660cc

Slowly add oil until oil level rises to the top of OIL LEVEL line. Replace oil fill plug.

If oil is too low, you will hear the exhaust baffle chatter. If the oil level is too high, excess oil will be blown out the exhaust.

Pump oil should be changed after each use. If system is heavily contaminated, oil may have to be changed several times during evacuation.

### Changing oil

To reach deep vacuum, Nara vacuum pump needs clean, moisture-free oil throughout evacuation. Care should be taken to avoid contact on skin and clothing when changing oil.

Used oil should be disposed of in a leakproof corrosive-resistant container.

1. After every evacuation while pump is warm and oil is thin place pump on level surface and open oil drain. Oil can be forced from the pump by opening one intake and partially blocking the exhaust with a cloth while the pump is running. Do not operate the pump for more than 20 seconds using this method.
2. Close drain. Remove oil fill cap and fill to top of OIL LEVEL line with Nara vacuum pump oil. Replace oil fill cap.

### Flushing

If the oil is badly contaminated, flushing may be necessary. Slowly pour 1/3-1/2 cup of fresh oil into the intake connection while pump is running. Repeat as required until contamination is removed from oil reservoir, pump rotors, vanes and housing. Dispose of all oil used in flushing of pump.

After evacuation, oil contains rust forming water and corrosive acids. Drain immediately while pump is warm.

## MOTOR

Pump and oil must be above 30°F. Line voltage must be equal to motor nameplate  $\pm 10\%$ .

Normal operating temperature is approximately 160°F, which is hot to the touch. Line voltage and ambient conditions will affect this somewhat. Motor has automatic resetting thermal overload protection. Nara vacuum pump is designed for continuous duty and will run for extended periods without overheating.

## OPERATION

### **IMPORTANT : DO NOT START PUMP BEFORE ADDING OIL**

The following procedures will prevent oil from being drawn into cartridge and creating hard start-up.

### Start-up

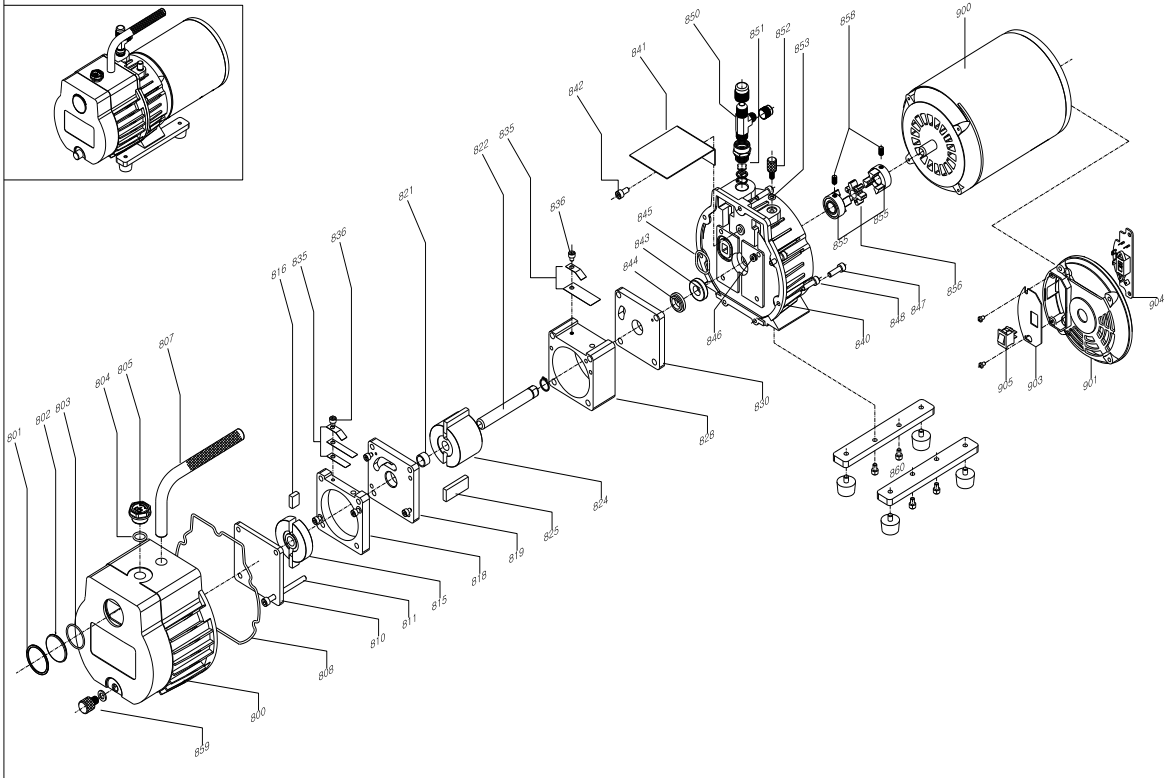
Open one intake port and isolation valve, close gas ballast valve and start pump. Make vacuum connections. Crack gas ballast valve for the first part of the evacuation procedure. After pump quiets down from initial volume of air, close valve and continue evacuating. Failure to close valve will result in poor pump performance.

### Shut-down

Close isolation valve and crack gas ballast valve. Continue running pump for 2-3 seconds. With gas ballast valve still cracked, stop pump and then close valve. Remove hose connection and cap intakes.

## PART LIST

VIEW MODEL : MOT-140  
(ULTIMATE PRESSURE 1 X 10<sup>7</sup> Torr)



No.	Part Name	MOT-085	MOT-140
800	Oil-separator	C04PH54-006A	C04PH54-006A
801	Snap-ring	I29025-0030A	I29025-0030A
802	Sight glass	G26026-001A	G26026-001A
803	O-ring	G11011-0027A	G11011-0027A
804	O-ring	G11011-0041A	G11011-0041A
805	Oil supply plug	G09032-0010A	G09032-0010A
807	Handle	C26PH54-001A	C26PH54-001A
808	O-ring	E11PH54-054A	E11PH54-054A
810	Cylinder cover-3	C02PH54-008A	C02PH54-008A
811	Hexagon flange bolt	I20006-0055A	I20006-0056A
815	Rotor-2	C02PH54-001A	C02PH54-001A
816	Vane	C06PH54-002A	C06PH54-002A
818	Cylinder	C02PH54-003A	C02PH54-003A
819	Cylinder cover-2	C02PH54-007A	C02PH54-007A
821	Bushing	C24PH54-007A	C24PH54-007A
822	Shaft	C02PH53-012A	C02PH54-012A
824	Rotor-1	C02PH53-011A	C02PH54-011A
825	Vane-1	C06PH53-012A	C06PH54-012A
828	Cylinder-1	C02PH53-004A	C02PH54-004A
830	Cylinder cover-1	C02PH54-008A	C02PH54-008A
835	Check valve	E27PH54-001A	E27PH54-001A
836	Hexagon bolt	I20006-0005A	I20006-0005A
840	Oil-separator cover	C04PH54-006A	C04PH54-006A
841	Guard	E27PH54-004A	E27PH54-004A
842	Hexagon bolt	I20006-0010A	I20006-0010A
843	Oil-seal	G11020-0007A	G11020-0007A
844	Bushing	C26PH54-002A	C26PH54-002A
845	O-ring	G11011-0026A	G11011-0026A
846	O-ring	G11011-0022A	G11011-0022A
847	Hexagon bolt	I20006-0020A	I20006-0020A
848	Hexagon bolt	I20006-0012A	I20006-0012A
850	Flare	E26PH54-005A	E26PH54-005A
851	Check body	C26PH54-008A	C26PH54-008A
852	Gas ballast plug	E26PH54-005A	E26PH54-005A
853	O-ring	G11011-0022A	G11011-0022A
855	Coupler hub	C02PH54-003A	C02PH54-003A
856	Coupler sleeve	C11PH54-013A	C11PH54-013A
858	Stud bolt	I20010-0016A	I20010-0016A
859	Drain valve	C05PH54-017A	C05PH54-017A
860	Rubber foot	G11022-0017A	G11022-0017A
900	Motor	AMH54BC	AMH54BC
901	B-Plate	C04MH541003A	C04MH541003A
903	Switch cover	E27MH54-021A	E27MH54-021A
904	Electricity plate	E21MH54-001A	E21MH54-001A
905	Rocker switch	I21023-0009A	I21023-0009A

**TROUBLE SHOOTING**

Symptom	Cause(s)	Action
Pump won't start.	<ol style="list-style-type: none"> <li>1. Power cord not plugged in securely.</li> <li>2. Motor switch not on.</li> <li>3. Pump temp. below 30°F.</li> <li>4. Inconsistent line voltage</li> </ol>	<ol style="list-style-type: none"> <li>1. Plug power cord in securely.</li> <li>2. Turn motor switch to ON position</li> <li>3. Warm up pump to 30°F and turn motor switch on.</li> <li>4. Line voltage must be within 10% of 115 volt</li> </ol>
Pump won't pull deep vacuum	<ol style="list-style-type: none"> <li>1. Contaminated oil.</li> <li>2. Oil level too low.</li> <li>3. Air leak in system being evacuated.</li> <li>4. Gas ballast O-ring dirty or cut.</li> <li>5. Pump inlet fittings missing or not tightened.</li> </ol>	<ol style="list-style-type: none"> <li>1. Change oil.</li> <li>2. Add oil.</li> <li>3. Locate &amp; repair leaks.</li> <li>4. Clean or replace O-ring.</li> <li>5. Replace or tighten.</li> </ol>
Oil drips from point where shaft enters the pump housing	Damaged oil seal.	Replace.
Pump shuts down and will not start	Thermal overload may be open	Disconnect pump from system. Wait about 15 minutes for motor to cool and turn it on again. If it cycles off again, return pump to factory for repair.
Pump cycles on and off from a completely cold start and then runs smoothly	Oil backed up into cartridge and was being cleared out. Pump has not been shutdown properly.	<ol style="list-style-type: none"> <li>1. Remove 1/4" cap.</li> <li>2. Move blank-off handle to open position.</li> <li>3. Turn pump on.</li> </ol>

**WARRANTY**

Nara vacuum pumps are warranted against defects in materials and workmanship for 1 year. All Nara products are guaranteed when used in accordance with our directions and recommendations, and we limit this warranty to the repair, replacement, or credit at invoice price(our option) of products which in our opinion are defective due to defects in workmanship and/or materials. In no case will we allow charges for labor, expense or consequential damage. Repairs performed on items out of warranty will be invoiced on a nominal basis. Contact you wholesaler for details. Should you need further assistance, contact Nara office.