CCA TECHNOLOGIES

OIL MINION

Portable Oil Draining Station

Owner's Manual

Version 1.1 (Revision 7/1/2025)
Model: CCA-OIL MINION
Technical Support: 559-591-8874
Mon – Fri, 7:00am – 3:30pm PST
cca-tech.com

Contents

1.0 Introduction and Product Description

Oil draining is the most dangerous maintenance operation performed at an ammonia refrigeration facility. Oil draining, by its nature, is opening the ammonia system to the atmosphere. Limiting the potential for ammonia release during this process is of utmost importance.

CCA Technologies' Oil Minion is a portable oil draining system designed to provide a safer, more effective method for recovering refrigerant oil from ammonia system oil pots. The Oil Minion is another layer of protection in the oil draining operation, helping to maintain a somewhat closed system during proper use. The Oil Minion unit consists of the following main components:

- An oil tank to receive oil from the system
- An adsorption tank to scrub ammonia vapors from the oil tank
- An electrical pump for easy removal of the oil from the oil tank
- A meter for recording the amount of oil removed from the system
- A stainless-steel cart for transporting the unit around your facility

This manual provides comprehensive instructions for the safe and proper operation, maintenance, and troubleshooting of your Oil Minion. This manual is intended for use by experienced refrigeration maintenance personnel that have been trained to safely operate and maintain ammonia refrigeration systems.

2.0 Safety and Warning Labels

The Oil Minion unit is equipped with various warning labels that communicate critical safety information. Read and understand all labels on the unit before operation. Warning labels for the Oil Minion are shown in Figure 1.

Figure 1. Oil Minion warning labels.

2.1 On-Unit Warning Labels

- Authorized and trained personnel use only
- Oil pump (OM07) rated for 15 A, 120 V
- Oil tank (OM18) is non-pressurized
- DO NOT BLOCK adsorption tank vent (OM14)
- DO NOT PLUG the oil tank vacuum break (OM05)

2.2 Warning: Refrigerant Exposure Hazard

- Always closely follow the procedures in the refrigerant's Safety Data Sheet (SDS) and on all labels for refrigerant vessels and containers. This is essential to prevent injury or death from refrigerant inhalation or skin exposure. Be aware that certain refrigeration system service procedures may expose personnel to liquid or vaporous refrigerants.

2.3 General Operation Warnings

- Replace the water in the adsorption tank each time the oil tank reaches full capacity. Failure to do so will result in the release of ammonia into the atmosphere.
- Immediately stop the flow of refrigerant oil if ammonia is detected in the oil sight safety glass (OM02), as excessive liquid ammonia can saturate the adsorption tank and cause an ammonia release to the atmosphere.

2.4 Personal Protective Equipment (PPE)

The operation of the Oil Minion requires, at minimum, the following PPE:

- Full Face Shield
- Safety Glasses
- Chemical Resistant Apron
- Chemical Resistant Gloves
- Chemical Resistant Footwear
- Air Purifying Respirator (APR) on hand

2.5 Personnel and Equipment Requirements

- Technicians must be properly trained in the operation of the Oil Minion.
- Only use the certified hoses and valves provided on the Oil Minion unit.

2.6 Electrical Power Requirements

- The oil pump requires a 120 V, 15 A power supply.

2.7 Caution: Company Procedures

Always adhere to your company's specific procedures, including:

- Required Personal Protective Equipment (PPE) for operation.
- Standard Operating Procedures (SOPs) for oil draining and disposal.
- Aqueous ammonia disposal procedures.

3.0 Unit Components and Specifications

3.1 Dimensions

The dimensions of the Oil Minion unit are shown in Figure 2. These dimensions are given to ± 1 inch.

- Overall Height: 62 inches
- Overall Length: 55 inches
- Overall Width: 24 inches

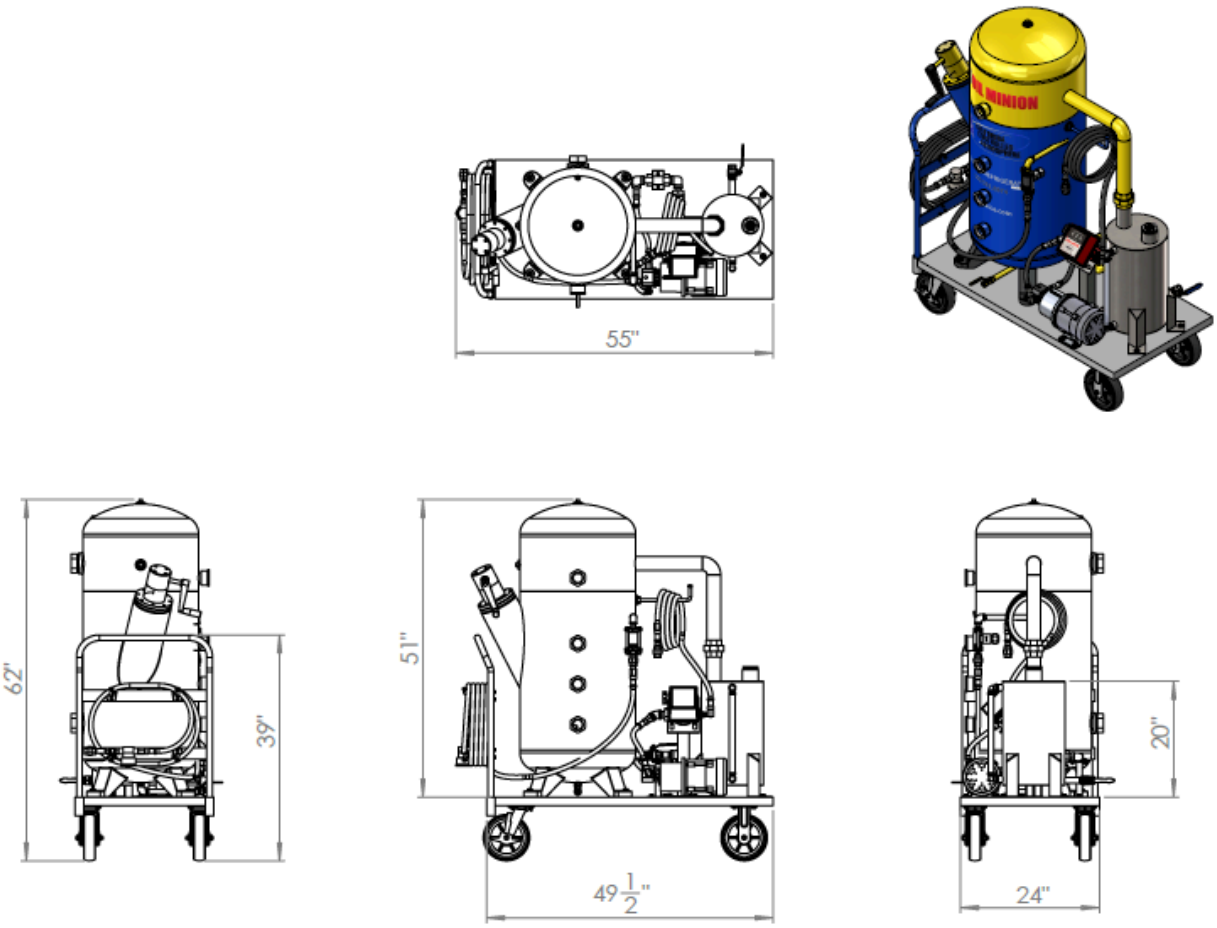

Figure 2. Oil Minion overall dimensions.

3.2 Weight

The Oil Minion weighs approximately 460lbs empty.

3.3 Components and Features

For easy identification, the critical components on the Oil Minion are labeled with a unique "OM" tag (e.g., OM01, OM02), which corresponds to the component references used throughout this manual. The following is a list of all the labeled components. Section 6.0 contains reference images for each of these tags.

OM01 – Oil drain valve
OM02 – Oil drain sight glass
OM03 – Oil drain strainer
OM04 – Oil drain check valve
OM05 – Oil tank vacuum break
OM06 – Oil pump isolation valve
OM07 – Oil pump
OM08 – Oil tank drain valve
OM09 – Oil meter
OM10 – Oil pump strainer
OM11 – Adsorption tank drain valve
OM12 – Adsorption tank
OM13 – Adsorption tank water level
OM14 – Adsorption tank vent
OM15 – Oil de-foaming gearbox
OM16 – Maximum oil level sight glass
OM17 – Oil drain hose
OM18 – Oil separator tank

4.0 System Overview

The Oil Minion's hose connects to the refrigeration system downstream of its self-closing valve. Oil and any entrained ammonia flow through the hose into the oil holding tank (OM18). Within this tank, the oil is separated from most of the entrained ammonia. An isolation valve (OM01) and a sight glass (OM02) are located at the hose inlet. This sight glass allows the operator to visually monitor the flow of refrigerant oil from the system to the holding tank.

The de-foaming gearbox (OM15) is activated by turning the handle on the side of the oil separator tank (OM18) to further aid in the separation process. Any remaining ammonia vapor is vented through the adsorption tank (OM11). This adsorption process is designed to prevent ammonia from escaping into the workspace, enhancing safety during operation.

5.0 Oil Minion Operating Procedures

This section outlines the step-by-step procedures for operating the Oil Minion safely and effectively.

5.1 Preparation and Connecting the Oil Minion to the System:

1. Ensure that the oil separator tank is empty (OM18) prior to each use.
2. Ensure that the adsorption tank (OM12) is filled with fresh water prior to each use. If filling is required, remove the adsorption tank vent (OM14) and fill the tank with fresh water to the water level line marked on the side of the tank. Do not overfill the tank. The proper air gap must be maintained between the water and the top of the tank to ensure safe and effective operation.
3. Remove the plug from the downstream side of the refrigeration system's self-closing (spring-return) valve and attach the Oil Minion's hose to the valve. Ensure a tight and secure connection. Refer to the refrigeration process P&IDs for valve numbers and locations, and be sure to follow your facility's SOPs when draining oil from the system.

5.2 Oil Draining Process:

1. Open the refrigeration system's oil drain isolation valve.
2. Open the oil drain valve (OM01).
3. Use the refrigeration system's self-closing valve to regulate the flow of oil into the Oil Minion separator tank. .
4. Continuously monitor the flow of oil through the oil drain sight glass (OM02), located directly downstream of the oil drain valve OM01. If the oil flow stops or if ammonia begins to flow, immediately close the self-closing valve. This is to limit, to the greatest extent possible, the amount of ammonia that is removed from the refrigeration system.
5. If the oil in the oil separator tank (OM18) becomes foamy during the oil draining process, turn the handle on the de-foaming gearbox (OM15) until the foam subsides.
6. Once oil flow stops and/or ammonia is detected in the oil drain sight glass (OM02), close the oil drain valve (OM01). Closing the valves limits the amount of ammonia lost from the refrigeration system during the operation. Closing the valve promptly helps prevent the water in the adsorption tank from becoming quickly saturated.
7. **Important Note:** Monitor the oil level in the oil separator tank (OM18), ensuring it does not exceed the third sight glass from the bottom of the tank (OM16).

5.3 Disconnecting the Oil Minion from the System:

1. Close the refrigeration system's oil drain isolation valve.
2. Open the self-closing valve to allow any ammonia trapped between the refrigeration system's oil drain valve and the self-closing valve to escape.
3. Once any pressure has been allowed to escape, close the self-closing valve again.

4. Disconnect the Oil Minion's hose from the refrigeration system's self-closing valve and replace the plug in the valve.

5.4 Oil Transfer and Completion:

1. **Note:** Once the separator tank is full, or the oil draining process has been completed, prepare to transfer it to an approved "used oil" storage container designated by your facility.
2. **Caution:** During the process of removing the used oil, ensure all required PPE is still worn, as the oil may still contain residual ammonia.
3. Start the procedure by resetting the oil volume meter (OM09) to zero.
4. Place the oil pump discharge hose (OM07) into the used oil container. Secure the discharge hose to prevent it from falling out when the pump is energized.
5. Open the valve (OM06) at the bottom of the oil holding tank.
6. Before applying power to the oil pump, make sure that the oil separator tank vacuum break (OM05) has not been plugged.
7. Connect the oil pump (OM07) to a 120 V, 15 A power supply. Start the oil pump. Once the oil is drained, turn off the pump.
8. Remove the hose from the oil separator tank.
9. Close the oil pump isolation valve (OM06)
10. Log the amount of oil removed from the refrigeration system.

5.5 Replacing Water in the Adsorption Tank:

1. **Note:** This procedure must be performed after draining oil from the oil separator tank and before returning the unit to service.
2. Be aware that after the oil draining procedure, the water in the adsorption tank will be saturated with ammonia. It will have become a moderate to strong solution of aqueous ammonia, which is considered a hazardous substance. Dispose of the water in accordance with your facility's hazardous materials procedures.
3. To begin the procedure, first remove the plug and connect a suitable hose to the adsorption tank drain valve (OM11). Note: This hose is not provided with the Oil Minion.
4. Open the drain valve and drain the aqueous solution into approved disposal container. When finished, close valve OM11 and replace the plug.
5. Remove the adsorption tank vent (OM14) and fill the tank with fresh water to the water level line marked on the side of the tank. Do not overfill the water in the tank.
6. Once the tank is filled, replace the adsorption tank vent (OM14).

6.0 Images

Examples of the component “OM” tags (e.g., OM01, OM02) referenced throughout this manual are shown below.

7.0 Troubleshooting Procedures

7.1 Ammonia Smell Detected

- Check the adsorption tank water level and follow the procedure for replacing with fresh water if needed.

- Check that all hose and valve connections are tight.

7.2 Oil Pump Not Working

- Verify the power source and connections to the pump.

7.3 Oil Will Not Flow Through Hose

Run through the following steps in order until the problem is corrected:

1. Check that the refrigeration system oil drain isolation valve, the self-closing valve, and oil drain valve OM01 are all in the open position. If all three valves are open and the problem persists, proceed to the following steps to check components on the Oil Minion.
2. Follow Oil Minion Operating Procedure C, “Disconnecting the Oil Minion from the System,” before proceeding to the next step.
3. Verify that there is no pressure in the oil drain hose by slowly opening the oil drain valve (OM01). Use extreme caution as a plugged strainer, or stuck check valve may trap pressurized gas or liquid in the hose.
4. Check the oil tank strainer (OM03) for any blockages. Clean the strainer if necessary.
5. Inspect the oil drain check valve (OMO4) to see if it is working properly

8.0 Maintenance

- Replace the oil drain hose when it expires (see date on hose) or if it ever becomes damaged. **DO NOT** use an ammonia hose past its expiration date or if it has visible signs of damage.
- Inspect and replace oil pump hoses as necessary.
- Clean the strainers (OM03 and OM10) at least annually or more often if needed.

9.0 Replacement Parts

The following diagram and table feature common parts and assemblies that may need to be replaced on the Oil Minion. Please call 559-591-8874 and ask for Oil Minion Technical Support for pricing and availability.

PARTS DIAGRAM

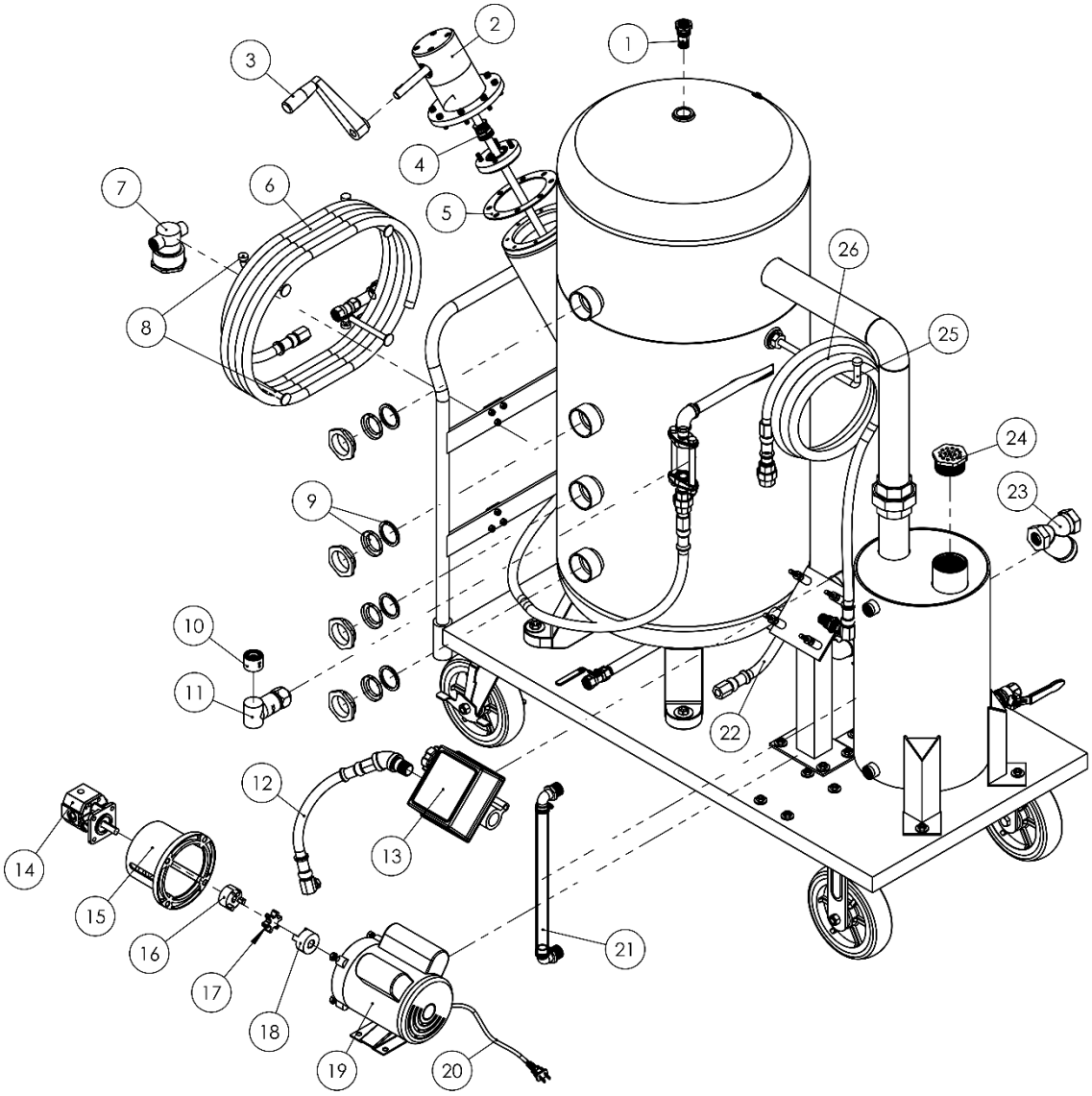

Figure 9.1 – Oil Minion Replacement Parts & Assemblies.

PARTS LIST – TABLE 9.1

ITEM NO.	PART NO.	DESCRIPTION
1	CCA.954310	Oil Tank Vacuum Breaker
2	CCA.954100	Gear Assembly
3	CCA.954160	Handle
4	CCA.954170	De-Foamer Shaft Seal
5	CCA.954172	De-Foamer Flange Gasket
6	CCA.954210	Drain Hose Assembly
7	CCA.ODSS	Oil Drain Sight Glass
8	CCA.954520	Cart Mount Hose Hanger
9	CCA.954320	Sight Glass Lens Assembly
10	CCA.954230	Oil Inlet Check Valve
11	CCA.954240	Oil Inlet Strainer
12	CCA.954410	Pump Outlet Hose Assembly
13	CCA.954420	Flow Meter
14	CCA.954436	Hydraulic Gear Pump
15	CCA.954432	Pump Motor Adaptor
16	CCA.954433	Pump Coupling Hub
17	CCA.954437	Woods Coupling
18	CCA.954435	Motor Coupling Hub
19	CCA.954434	Oil Pump Motor
20	CCA.954431	Power Cord
21	CCA.954610	Site Column Assembly
22	CCA.954480	Pump Inlet Hose Assembly
23	CCA.954490	Oil Pump Strainer
24	CCA.954620	Adsorption Tank Vent
25	CCA.954330	Tank Mount Hose Hanger
26	CCA.954500	Flow Meter Outlet Hose Assembly

10.0 Manufacturer’s Limited Warranty

CCA Technologies warrants that the equipment will, under normal and anticipated use, be free from defects in refrigeration-related parts for a period of one (1) year from the date of shipment, and be free from defects in electrical-related parts for a period of (90) days from date of shipment. Labor is not covered and shall be the sole cost and responsibility of the purchaser. The obligation of CCA Technologies under this limited warranty is limited to the supplying of parts (excluding consumables) as hereinabove specifically provided. Parts shall be new or nearly new.

CCA Technologies shall be liable to replace the applicable parts only if (i) CCA Technologies is properly notified by purchaser upon discovery of alleged defects, (ii) defective parts are returned to CCA Technologies upon authorization with all transportation charges prepaid by purchaser, (iii) CCA Technologies' examination of the parts discloses to its satisfaction that the defects were not caused by the purchaser or its agents and (iv) the parts are otherwise covered by CCA Technologies limited warranty.

Purchaser shall be responsible to select the means of transportation and bear the cost of inbound and outbound freight expense associated with any replacement parts, and all risk of associated loss attendant thereto.

Notwithstanding anything contained in the warranty to the contrary, (i) this limited warranty shall become null and void upon the use of any improper chemicals or in the event any modifications or improper service, installation or use is performed on the equipment, (ii) this limited warranty does not apply to consumable materials such as, but not limited to, filters, strainers, electrical connectors, etc., and (iii) this limited warranty is applicable only to the original purchaser, and no subsequent purchasers of this equipment from original purchaser shall be entitled to warranty whatsoever from CCA Technologies, expressed or implied.