



INSTALLATION, OPERATION, AND MAINTENANCE MANUAL  
WELKER LABORATORY MIXING SKID

**MODEL**  
MSTCCA

**DRAWING NUMBER**  
AD406CC

**MANUAL NUMBER**  
IOM-136

**REVISION**  
Rev. C, 7/16/2020

## TABLE OF CONTENTS

	<b>SAFETY</b>	<b>3</b>
<b>1.</b>	<b>PRODUCT INFORMATION</b>	<b>4</b>
1.1	Introduction	4
1.2	Product Description	4
1.3	Specifications	5
1.4	Equipment Diagrams	6
<b>2.</b>	<b>INSTALLATION &amp; OPERATION</b>	<b>8</b>
2.1	Before You Begin	8
2.2	Installing the MSTCCA	8
2.3	Installing the TCC to the MSTCCA	9
2.4	Operation	10
<b>3.</b>	<b>MAINTENANCE</b>	<b>11</b>
3.1	Before You Begin	11
3.2	Maintenance	12
3.3	Cleaning the TCC Using the MSTCCA	12
	<b>APPENDIX</b>	<b>14</b>
	A: Referenced or Attached Documents	14

# IMPORTANT SAFETY INFORMATION

## READ ALL INSTRUCTIONS



Notes emphasize information and/or provide additional information to assist the user.



Caution messages appear before procedures that could result in damage to equipment if not observed.



Warning messages appear before procedures that could result in personal injury if not observed.

*This manual is intended to be used as a basic installation and operation guide for the Welker Laboratory Mixing Skid, MSTCCA. For comprehensive instructions, please refer to the IOM Manuals for each individual component. A list of relevant component IOM Manuals is provided in Appendix A of this manual.*

*The information in this manual has been carefully checked for accuracy and is intended to be used as a guide for the installation, operation, and maintenance of the Welker equipment described in this manual. Correct installation and operation, however, are the responsibility of the end user. Welker reserves the right to make changes to this manual and all products in order to improve performance and reliability.*

### BEFORE YOU BEGIN

Read these instructions completely and carefully.

**IMPORTANT** - Save these instructions for local inspector's use.

**IMPORTANT** - Observe all governing codes and ordinances.

**Note to Installer** - Leave these instructions with the end user.

**Note to End User** - Keep these instructions for future reference.

Installation of this Laboratory Mixing Skid is of a mechanical nature.

Proper installation is the responsibility of the installer. Product failure due to improper installation is not covered under the warranty.

If you received a damaged Laboratory Mixing Skid, please contact a Welker representative immediately.

**Phone:** 281.491.2331

**Address:** 13839 West Bellfort Street  
Sugar Land, TX 77498

### 1.1 Introduction

We appreciate your business and your choice of Welker products. The installation, operation, and maintenance liability for this equipment becomes that of the purchaser at the time of receipt. Reading the applicable *Installation, Operation, and Maintenance (IOM) Manuals* prior to installation and operation of this equipment is required for a full understanding of its application and performance prior to use.\*

If you have any questions, please call Welker at 1-281-491-2331.

*\*The following procedures have been written for use with standard Welker parts and equipment. Assemblies that have been modified may have additional requirements and specifications that are not listed in this manual.*

### 1.2 Product Description

The Welker MSTCCA Laboratory Mixing Skid is designed specifically for use with Welker TCC Transportable Crude Oil Containers to provide a quality sample for basic sediment and water (BS&W) monitoring.

Over time, sample collected in a TCC may stratify. The MSTCCA will mix the contents of the connected TCC to achieve a homogeneous and representative sample. In addition, the MSTCCA is capable of cleaning the TCC after use.

*Welker may custom design the MSTCCA to suit the particular application and specifications of each customer.*

### 1.3 Specifications



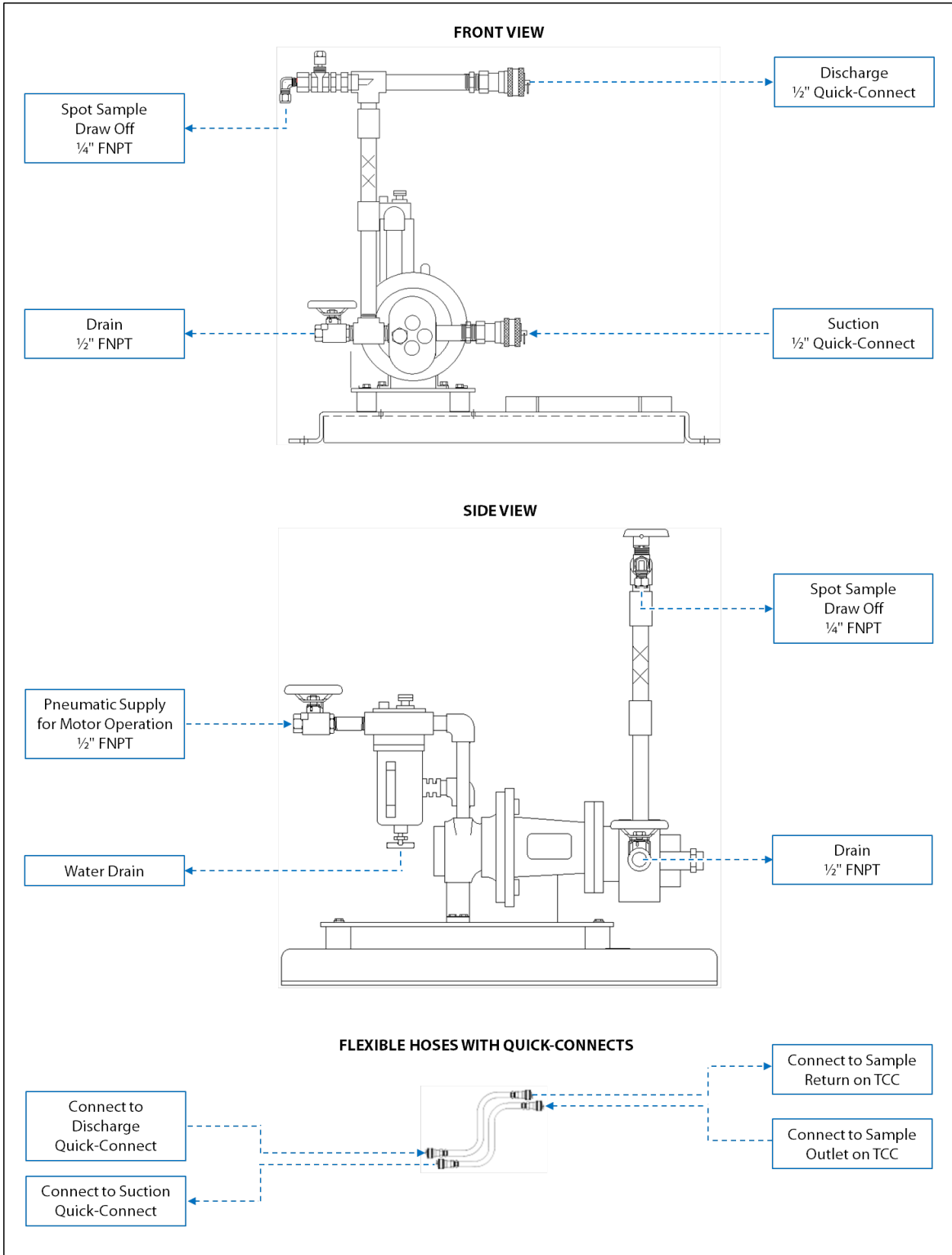
The specifications listed in this section are generalized for this equipment. Welker can modify the equipment according to your company's needs. **Please note that the specifications may vary depending on the customization of your equipment.**

**Table 1: MSTCCA Specifications**

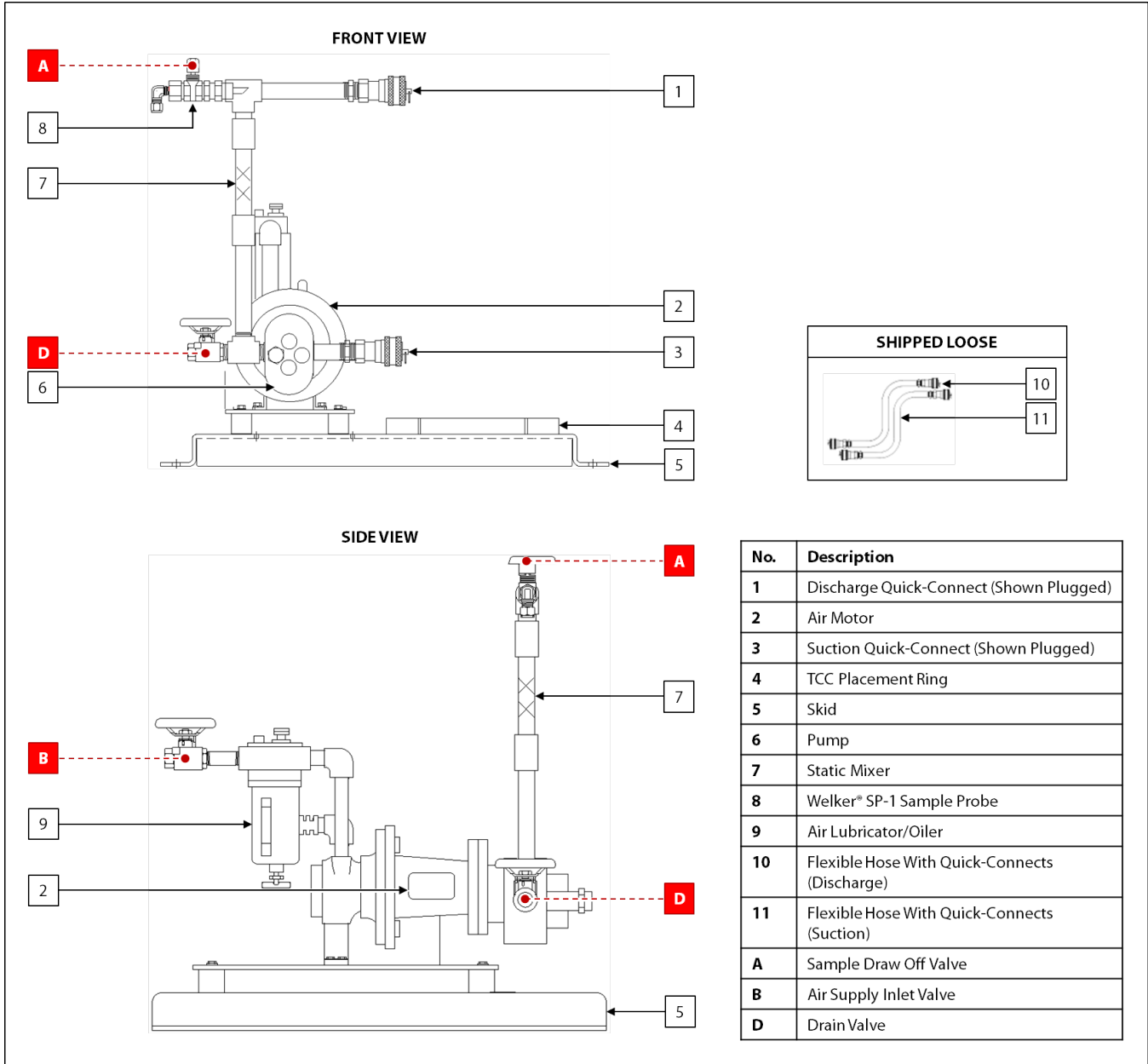
<b>Applications</b>	Mixing Contents of Welker TCC Cleaning Welker TCC
<b>Materials of Construction</b>	Carbon Steel Skid With Carbon Steel Fittings
<b>Maximum Allowable Operating Pressure</b>	100 psig @ -4 °F to 100 °F (6 barg @ -20 °C to 37°C)
<b>Connections</b>	<b>Discharge:</b> ½" Quick-Connect <b>Drain:</b> ½" FNPT <b>Pneumatic Supply to Motor:</b> ½" FNPT <b>Spot Sample Draw Off:</b> ¼" FNPT <b>Suction:</b> ½" Quick-Connect
<b>Utility Requirement</b>	Regulated Pneumatic Supply
<b>Dimensions</b>	24" x 28" (Length x Width)
<b>Features</b>	Air Lubricator/Oiler Air Motor Flexible Hoses With Quick-Connects Placement Ring for Welker TCC Transportable Crude Oil Container Pump With Internal Relief Sample Draw Off Valve Static Mixer
<b>Industry Standards</b>	API Chapter 8 ASTM D4177 ISO 3171

# 1.4 Equipment Diagrams

## Figure 1: MSTCCA Connections Diagram



**Figure 2: MSTCCA Diagram**



## SECTION 2: INSTALLATION & OPERATION

### 2.1 Before You Begin



After unpacking the unit, check the equipment for compliance and any damage that may have occurred during shipment. Immediately contact a Welker representative if you received damaged equipment.



When sealing fittings with PTFE tape, refer to the proper sealing instructions for the brand used.



The Welker MSTCCA will ship skid-mounted and "hard-tube" connected with manufacturer-supplied fittings and hardware. However, the customer will need to supply some tubing and fittings in order to complete the installation of the system.

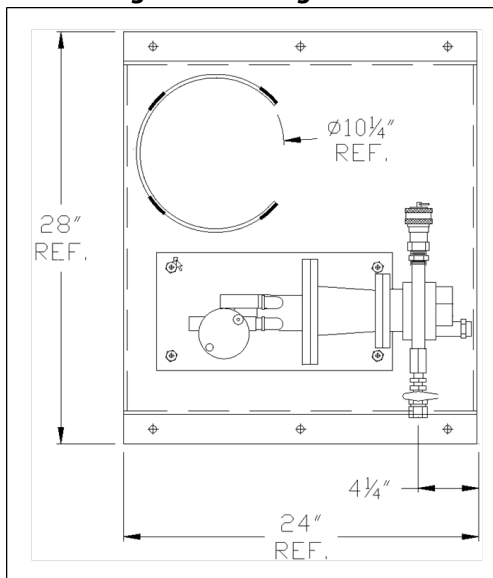


These instructions are written with the assumption that the Welker MSTCCA is being used to mix the contents of a Welker TCC Transportable Crude Oil Container. While it is possible to use the MSTCCA and the TCC with equivalent third-party equipment, the MSTCCA has been designed to take full advantage of the features of the TCC to provide a quality sample for basic sediment and water (BS&W) monitoring.

### 2.2 Installing the MSTCCA

1. Install the MSTCCA to the desired location as close as possible to the regulated pneumatic supply source.
2. Mount the MSTCCA to the desired location in accordance with the bolting pattern (*Figure 3*).

**Figure 3: Bolting Pattern**



3. Connect a grounding wire to the MSTCCA to safely ground the skid.
4. Using 1/2" tubing, connect from the customer pneumatic supply with on/off valve to air supply inlet valve B (*Figure 1*).
5. Using tubing or pipe, connect from drain valve D to an appropriate draining location or sump (*Figure 1*).



6. As necessary, fill the reservoir of the air lubricator/oiler to the maximum fill line with oil compatible with the seal material (*Figure 2*). Refer to the *Installation, Operation, and Maintenance (IOM) Manual* for the air lubricator/oiler for instructions on filling the reservoir and for recommendations on the type of oil to use.
7. Regulate the pneumatic supply to no more than 100 psig (6 barg). Refer to the *Installation, Operation, and Maintenance (IOM) Manual* for the air motor for information on the relationship between pneumatic supply pressure, motor speed, torque, and horsepower.

### 2.3 Installing the TCC to the MSTCCA



A pressure relief valve is required on the sample container.



Welker recommends grounding all containers to prevent static shock.

1. Ensure that the lid of the TCC is properly closed. Refer to the *Installation, Operation, and Maintenance (IOM) Manual* for the TCC for instructions on properly closing the lid of the TCC.



If the lid of the TCC is not properly closed before operation, the sample may be compromised. An improperly closed lid may allow water to enter or vapors to escape the sample.

2. Place the TCC on the skid.
3. Position the TCC within the placement ring so that the sample outlet and sample return quick-connects on the TCC point toward the suction and discharge quick-connects on the MSTCCA.
4. Using one (1) of the provided flexible hoses with quick-connects, connect from the suction quick-connect on the MSTCCA to the sample outlet on the bottom of the TCC (*Figure 1* and *Figure 2*). The quick-connects will audibly click into place.
5. Using the other provided flexible hose with quick-connects, connect from the discharge quick-connect on the MSTCCA to the sample return on the top of the TCC (*Figure 1* and *Figure 2*). The quick-connects will audibly click into place.

## 2.4 Operation



DO NOT operate the MSTCCA unless the flexible hoses with quick-connects are connected to the TCC and the TCC is filled with sample or cleaning solvent. Operating the MSTCCA when the TCC is not properly installed or when the TCC is empty could damage the pump and motor.

1. Ensure that all valves are closed.
2. Ensure that the MSTCCA is connected to the pneumatic supply.
3. Ensure that drain valve D is connected to an appropriate draining location or sump (*Figure 1*).
4. Ensure that the TCC is properly connected to the MSTCCA.
5. Ensure that the lid of the TCC is properly closed. Refer to the *Installation, Operation, and Maintenance (IOM) Manual* for the TCC for instructions on properly closing the lid of the TCC.



If the lid of the TCC is not properly closed before operation, the sample may be compromised. An improperly closed lid may allow water to enter or vapors to escape the sample.

6. Open air supply inlet valve B, and then open the on/off valve on the customer pneumatic supply (*Figure 2*).
7. As necessary, refer to the *Installation, Operation, and Maintenance (IOM) Manual* for the air motor for information on the relationship between pneumatic supply pressure, motor speed, torque, and horsepower.
8. Allow the contents of the TCC to mix in accordance with company policy.



Take care not to overmix the sample, as overmixing can push out the light ends, create an emulsion, and heat the sample.

### Taking a Spot Sample



Welker recommends grounding all containers to prevent static shock.

9. Open sample draw off valve A (*Figure 2*).
10. Hold an atmospheric container under the spot sample draw off to collect sample as it purges (*Figure 1*).
11. Once the spot sample draw off has been purged, replace the atmospheric container being held under the spot sample draw off with a graduated beaker.
12. Allow the graduated beaker to fill to the desired volume, and then close sample draw off valve A (*Figure 2*).



Consult company policy for the volume of sample required for testing.

13. After extracting the required amount of sample, proceed to *Section 3.3, Cleaning the TCC Using the MSTCCA*, to clean the MSTCCA and TCC while the MSTCCA is still operating.

### 3.1 Before You Begin

1. **Welker recommends that the MSTCCA and the TCC be cleaned after each use.** If the TCC is stored for some time prior to use, the TCC may need to be cleaned prior to use.
2. **Welker recommends that the unit have standard yearly maintenance under normal operating conditions.** In cases of severe service, dirty conditions, excessive usage, or other unique applications that may lead to excess wear on the unit, a more frequent maintenance schedule may be appropriate.
3. Prior to maintenance or disassembly of the unit, it is advisable to have a repair kit available for repairs of the system in case of unexpected wear or faulty seals.



New seals supplied in spare parts kits should be lightly lubricated before being installed to ease the installation of the seals and reduce the risk of damage when positioning them on parts. Wipe excess lubricant from the seals, as it may adversely affect analytical instrument results.



For sample-exposed seals, Welker recommends non-hydrocarbon-based lubricants, such as Krytox®. For non-sample-exposed seals, Welker recommends either non-hydrocarbon-based lubricants or silicone-based lubricants, such as Molykote® 111.



After the seals are installed, the outer diameter of shafts and inner diameter of cylinders may be lubricated to allow smooth transition of parts.

4. All maintenance and cleaning of the unit should be performed on a smooth, clean surface.
5. Welker recommends having the following tools available for maintenance. Please note that the exact tools required may vary by model.
  - a. Adjustable Wrench
  - b. Hex Key Set
  - c. Seal Pick
  - d. Tubing Cutters

## 3.2 Maintenance

1. During operation, monitor the MSTCCA for leaks. If leaks are present, halt operation and repair as necessary.
2. Occasionally, a system component may need to be repaired or removed for manufacturer's recommended maintenance. To perform maintenance on components:
  - a. Depressurize the MSTCCA and close all valves.
  - b. Turn OFF all pneumatics to the MSTCCA.
  - c. Drain the contents of the MSTCCA to a safe recovery system or sump.
  - d. Disconnect the tubing and piping and remove individual components for maintenance.
  - e. For complete and proper maintenance on individual components, refer to their respective *Installation, Operation, and Maintenance (IOM) Manual*. A list of component *Installation, Operation, and Maintenance (IOM) Manuals* is available in *Appendix A, Referenced or Attached Documents*, in this manual.
  - f. After performing necessary maintenance on component parts, reconnect all instrument tubing and piping.
  - g. Install the MSTCCA according to the instructions in *Section 2.2, Installing the MSTCCA*.
3. Clean the TCC and MSTCCA. See *Section 3.3, Cleaning the TCC Using the MSTCCA*, for instructions.

## 3.3 Cleaning the TCC Using the MSTCCA



DO NOT operate the MSTCCA unless the flexible hoses with quick-connects are connected to the TCC and the TCC is filled with sample or cleaning solvent. Operating the MSTCCA when the TCC is not properly installed or when the TCC is empty could damage the pump and motor.

### Cleaning the TCC

1. With the TCC installed to the MSTCCA and the MSTCCA still operating, open drain valve D (*Figure 2*). Allow the contents of the TCC and MSTCCA to pump through the system to the sump.
2. Once draining is complete, close drain valve D (*Figure 2*).
3. Close the on/off valve on the customer pneumatic supply, and then close air supply inlet valve B (*Figure 2*).
4. Open sample draw off valve A to depressurize the TCC, and then close valve A (*Figure 2*).



The TCC must be depressurized before opening the lid of the TCC. Removing the lid of the TCC under pressure could cause severe injury.

5. Open the lid of the TCC.
6. Fill the TCC half full with cleaning solvent.



Welker recommends cleaning the TCC with a quick-evaporating solvent, such as acetone. Refer to the appropriate company policy for the approved quick-evaporating solvent. Use chemical solvents safely, following all personal protective equipment (PPE) and usage directions listed on the solvent label and Material Safety Data Sheet (MSDS).

7. Close the lid of the TCC. Refer to the *Installation, Operation, and Maintenance (IOM) Manual* for the TCC for instructions on properly closing the lid of the TCC.
8. Open air supply inlet valve B, and then open the on/off valve on the customer pneumatic supply (*Figure 2*).
9. Allow the cleaning solvent to circulate through the system for approximately two (2) minutes or until any sample remaining in the system is diluted.

10. Open drain valve D and allow the contents of the TCC and MSTCCA to pump through the system to the sump (*Figure 2*).
11. Once draining is complete, close drain valve D (*Figure 2*).
12. Close the on/off valve on the customer pneumatic supply, and then close air supply inlet valve B (*Figure 2*).
13. Repeat steps 4–12 until the cleaning solvent runs clear when drained.

### **Disconnecting the TCC From the MSTCCA**

14. Ensure that the on/off valve on the customer pneumatic supply and air supply inlet valve B are closed (*Figure 2*).
15. Disconnect the discharge flexible hose with quick-connects from the sample return on the TCC (*Figure 2*). The discharge flexible hose with quick-connects may remain connected to the MSTCCA.
16. Disconnect the suction flexible hose with quick-connects from the sample outlet on the TCC (*Figure 2*). The suction flexible hose with quick-connects may remain connected to the MSTCCA.
17. Manually remove the TCC from the skid.

### **Drying the TCC**

18. Depressurize the TCC.



The TCC must be depressurized before opening the lid of the TCC. Removing the lid of the TCC under pressure could cause severe injury.

19. Open the lid of the TCC.
20. Carefully dry the inside of the TCC with a clean, dry cloth.
21. Close the lid of the TCC. Refer to the *Installation, Operation, and Maintenance (IOM) Manual* for the TCC for instructions on properly closing the lid of the TCC.
22. The cleaned TCC may be installed to a sampling system. If the TCC will be stored prior to use, tape, cap, or plug the ports on the TCC to prevent moisture and/or insects from entering.

## APPENDIX A: REFERENCED OR ATTACHED DOCUMENTS

Welker *Installation, Operation, and Maintenance (IOM) Manuals* suggested for use with this unit:

- IOM-035: Welker SP-1, SP-1W, SP-2, SP-3, and SP-5 Sample Probes
- IOM-117: Welker TCC-1 Transportable Crude Oil Container
- IOM-197: Welker TCC-5 Transportable Crude Oil Container
- IOM-206: Welker TCC-2 Transportable Crude Oil Container
- IOM-207: Welker TCC-3 Transportable Crude Oil Container
- IOM-208: Welker TCC-10 Transportable Crude Oil Container

Other *Installation, Operation, and Maintenance (IOM) Manuals* suggested for use with this unit:

- Apollo Valves 73A-100 Series Carbon Steel Ball Valve (Welker IOM-V151)
- BSM Pump Corporation S-Series Rotary Gear Pumps (Welker IOM-V323)
- Globe Airmotors B.V. Pneumatic Vane Motors (Welker IOM-V326)
- Norgren L74M and L74C Micro-Fog® and Oil-Fog Tool Lubricators (Welker IOM-V325)
- Parker Hannifin Corporation Ball and Plug Valves (Welker IOM-V213)
- Parker Hannifin Corporation Hose, Fittings and Equipment (Welker IOM-V162)
- Parker Hannifin Corporation Instrumentation Quick Coupling Products (Welker IOM-V293)

Welker drawings and schematics suggested for use with this unit:

- Assembly Drawing: AD406CC

