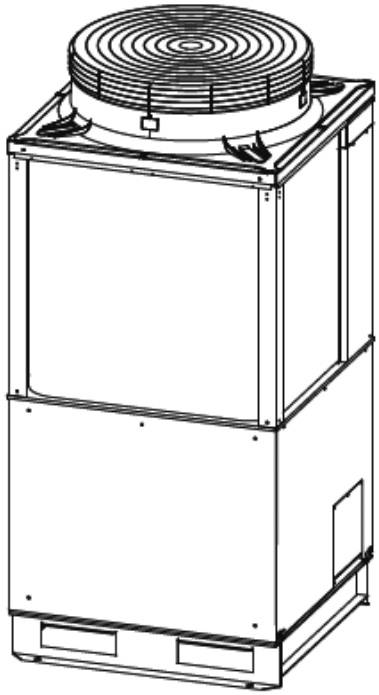
Panasonic

Outdoor Type Refrigeration Unit (Non-fluorocarbon Refrigeration Unit with CO_2 Refrigerant) Engineering Service Manual

Model No. OCU-CR1000VF8A
OCU-CR1000VF8ASL



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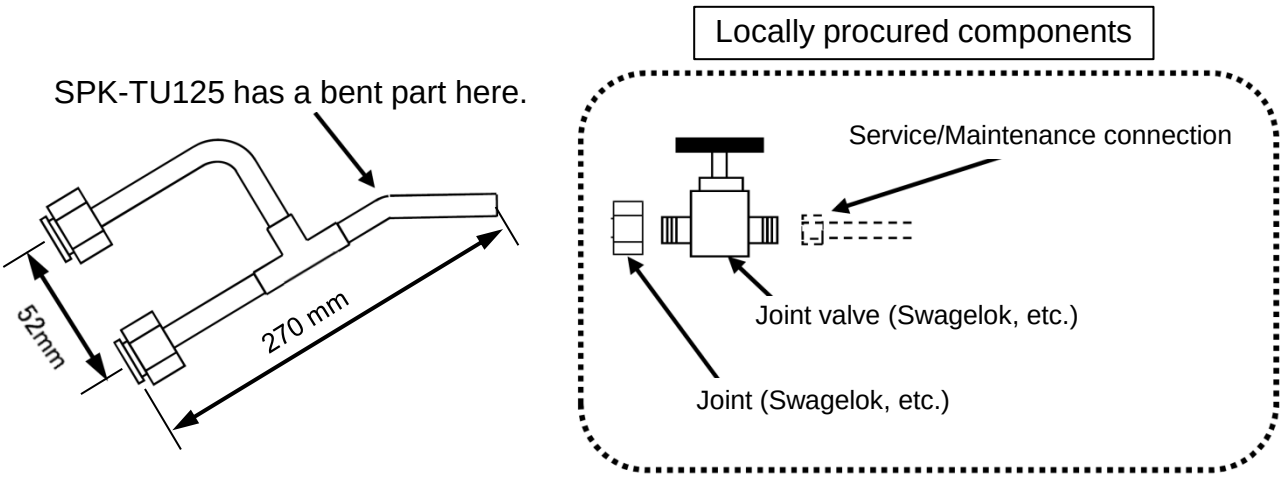
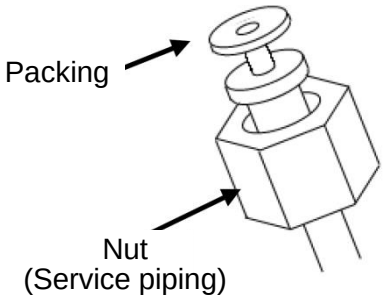
Service Piping (Separately sold components)

Service piping components are required when connecting the refrigeration unit and vacuum pump, cylinders, etc. during installation.
Use these components to connect to locally procured components.

Service piping (SPK-TU125)



Service piping (Packing attachment)

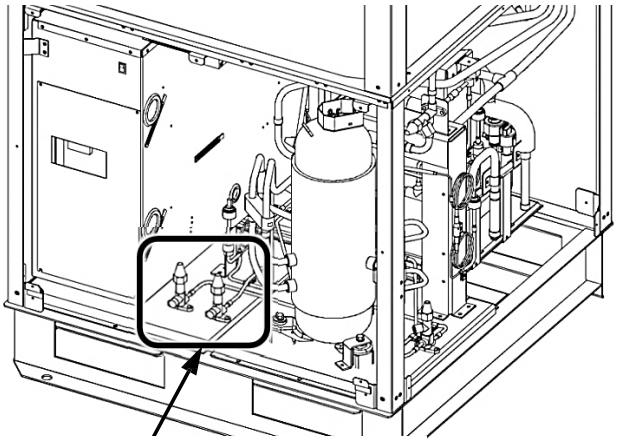


Note: 1. Install the packing by avoiding the adherence of dust.
2. Fasten the nut with fastening torque of 13 ± 1 N･m.

Service Valve Operation Method

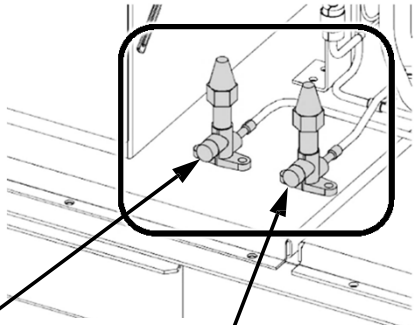
1. Location of service valves and access ports

Front of refrigeration unit



Location of service valves

Detail of access ports location



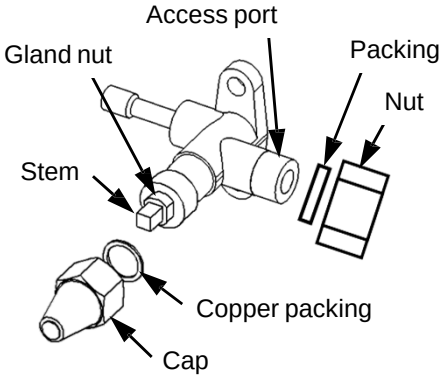
Access port of low pressure service valve

Access port of high pressure service valve

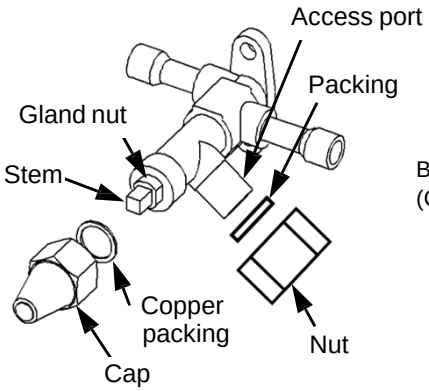
2. Method of operating service valves

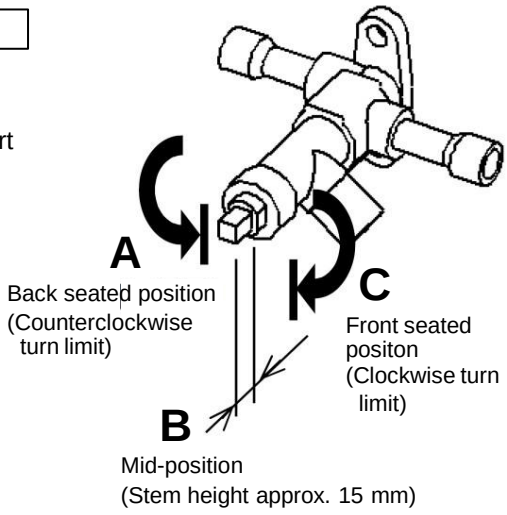
The service valves fall into two categories types as follows.

High pressure and low pressure service valve



Oil service valve





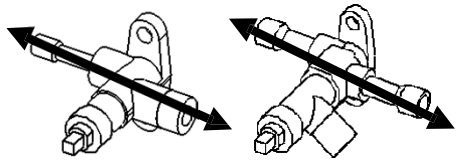
Notes: 1. Copper packing, Cap and Nut must be installed after the work. (Gas leak prevention)

2. Check Gland nut loosening of the service valves, and fasten them if any looseness exists.

3. Fastening torques are as follows.
   Cap: 30 ± 5 N･m, **Nut:** 13 ± 1 N･m, **Gland Nut:** 10 ± 1 N･m

3. Relationship between each seat position and refrigerant flow direction

A: Back seated position
(Turn the stem fully counter-clockwise)

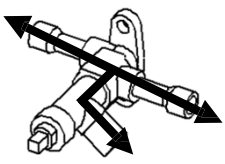


Access port is **Open**.

Access port is **Closed**.

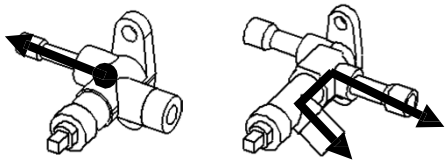
B: Mid-position
(Stem height approx. 15mm)

･High pressure side
Approx. 3 and a half turns
･Low pressure side
Approx. 3 turns



All three service valve openings are accessible.

C: Front seated position
(Turn the stem fully clockwise)



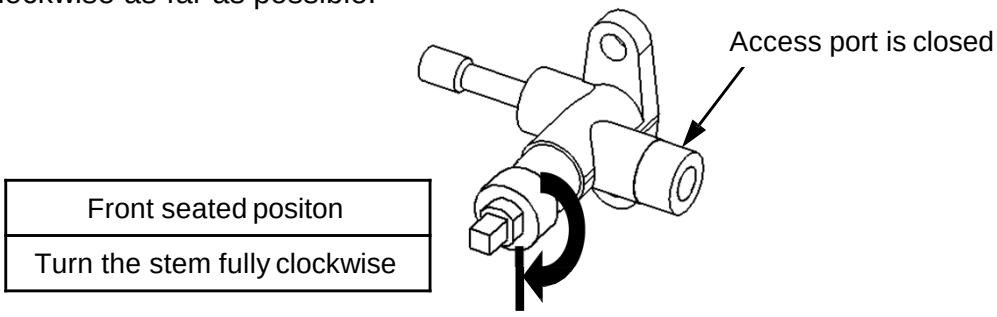
Access port is **Closed**.

Access port is **Open**.

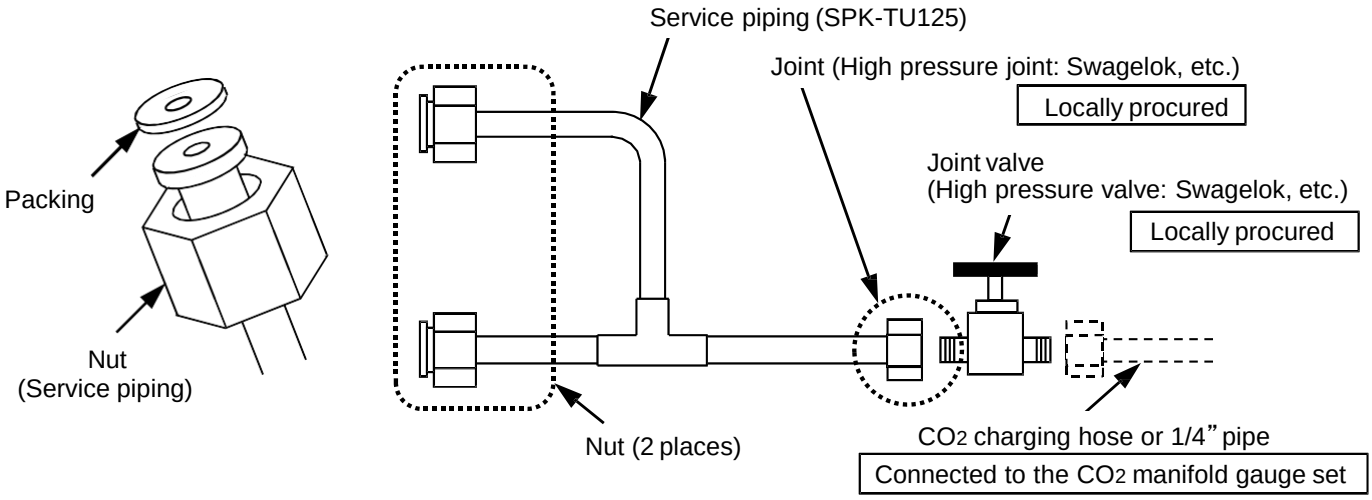
Service Pipe Connection/Disconnection Method

1. Preparation for attachment of the service piping

1) To front seat service valves, turn the stem of the high pressure and low pressure service valves clockwise as far as possible.



2) Attach a packing to the service piping (2 places).



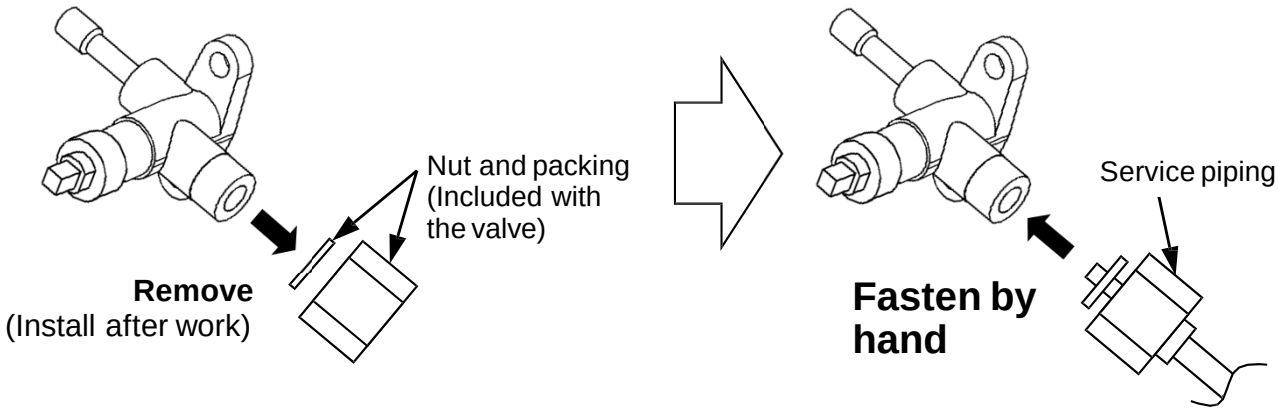
Notes: 1. Use a new packing.
2. Check that there is no adhering foreign objects.

2. Service piping attachment

1) Remove the nut and packing included with the service valve (2 places).

2) Assemble the service piping.

- Turn the nut by hand until the packing needs to be fastened with a tool.
- If it is difficult to fasten, slightly loosen the nut and gradually try to align it in parallel with the male thread of the service valve.



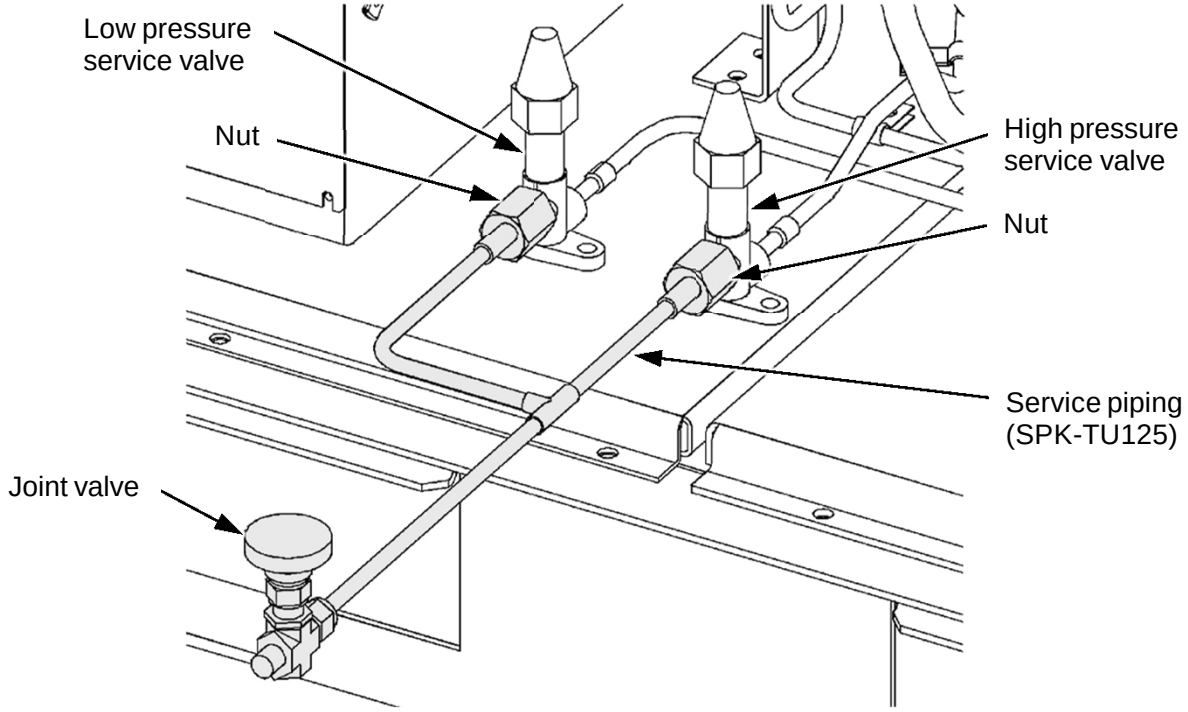
Note: Fastening the nut with a tool while the threads are not fully aligned would break the thread and lead to a gas leak.

Service Pipe Connection/Disconnection Method

3. Fastening the service piping

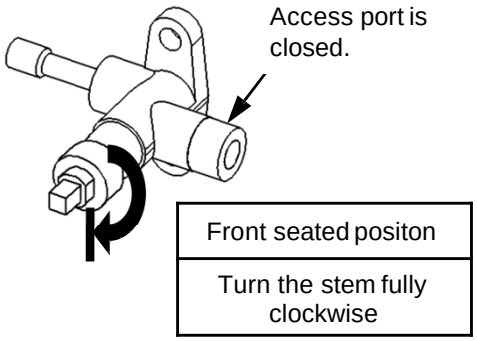
Fasten the nuts by hand up to the condition shown below, and then fasten them with a tool. Fastening torque of 13 ± 1 N•m is recommended for the nuts.

Note: Fastening the nut too tight may deform the packing.

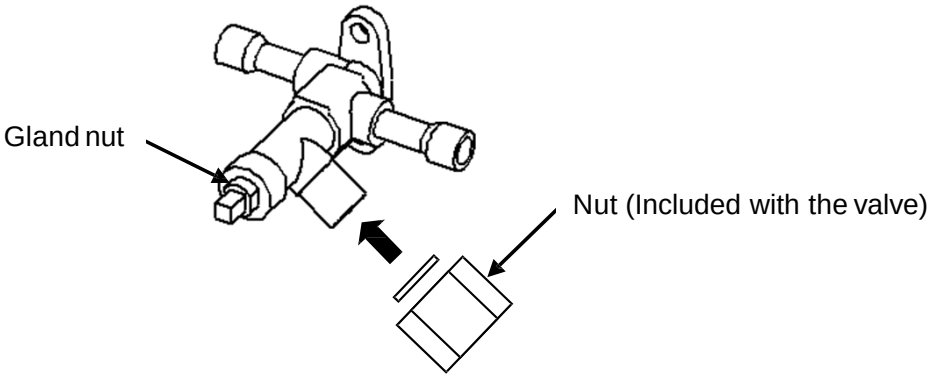


4. After completing service operation

1) After completing service operations such as evacuation and refrigerant charging, turn the stem of the high pressure and low pressure service valves clockwise as far as possible. (The access port is closed.)
2) Any remaining nitrogen or refrigerant in the service piping should be purged.
3) Detach the service piping.
   After detaching the service piping, Install the nut originally used on the service valve by hand.
   (Refer to "2. Service piping attachment".)



4) Fasten the nut by using a tool. Fastening torque of 13 ± 1 N•m is recommended. (Refer to "3. Fastening the service piping".)
5) Check the gland nut loosening of the low pressure and high pressure service valves and fasten them if any looseness exists. Fastening torque is 10 ± 2 N・m.



Evacuation Mode

1. Evacuation mode

In the evacuation mode, fully open the electronic expansion valve and solenoid valve in the refrigeration unit.

Note: If the refrigeration unit is not set to the evacuation mode, the electronic expansion valve and solenoid valve in the unit do not open, thus leading to incomplete the evacuation.

2. Evacuation mode procedure

1) Turn OFF the ground fault interrupter.

Note: The evacuation mode cannot be started with power supplied to the refrigeration unit.

2) Turn ON the operation switch (Seesaw switch S1).

3) Turn ON the DIP switch SW13-1 on the CRD2-EN-PCB.

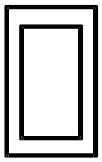
4) Set the Slide switch SW15 (“Control/Check”) on the CRD2-EN-PCB to “Check.”

5) Turn ON the ground fault interrupter. (Supply power to the refrigeration unit.)

6) The 7-segment LED indicates

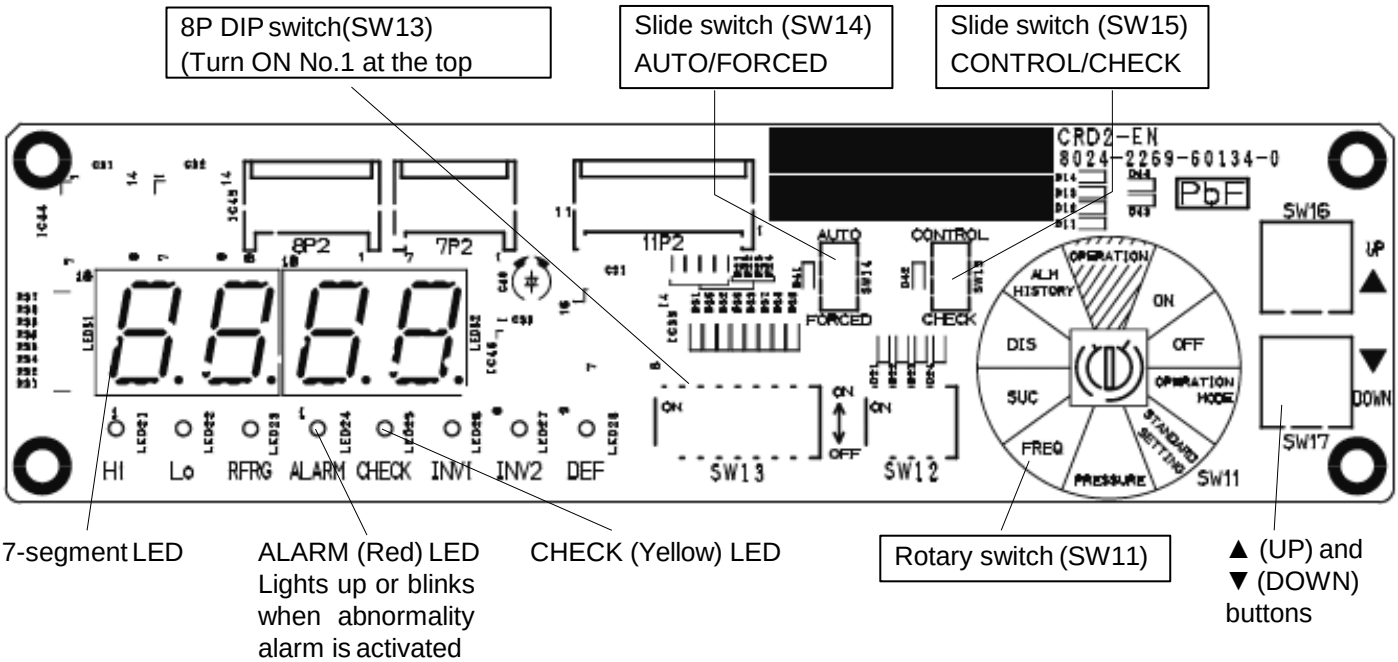
↱ Low pressure → High pressure → unit outlet pressure → Vacuum（uAcU）┐

Operation switch S1 (ON) (Attached to Electrical box)



(ON)

CRD2-EN-PCB (Attached to Electrical box)



Refrigerant Releasing Procedure

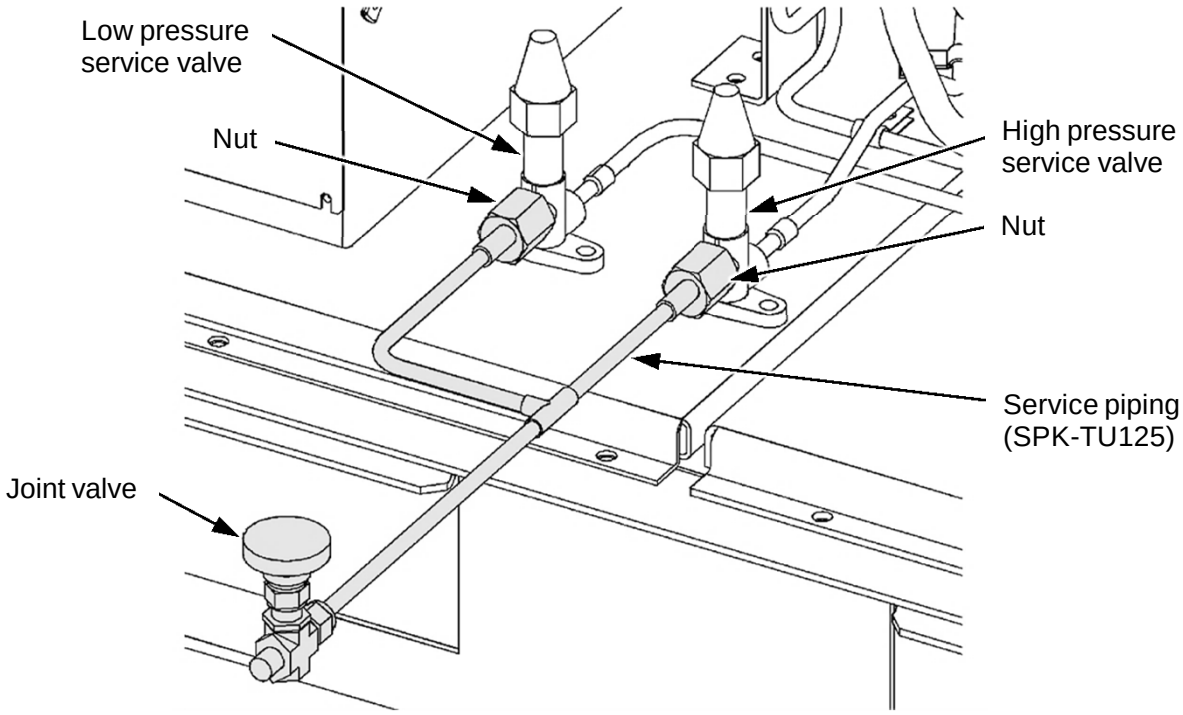
1. Preparation for refrigerant releasing

1) Check that the access ports of the high pressure and low pressure service valve have been closed. (The front seated position)

2) Attach the service piping with the joint valve in "Closed" condition.

3) Fasten the nuts by hand up to the condition shown below, and then fasten them with a tool. Fastening torque of 13 ± 1N･m is recommended for the nuts.

Note: Fastening the nut too tight may deform the packing.

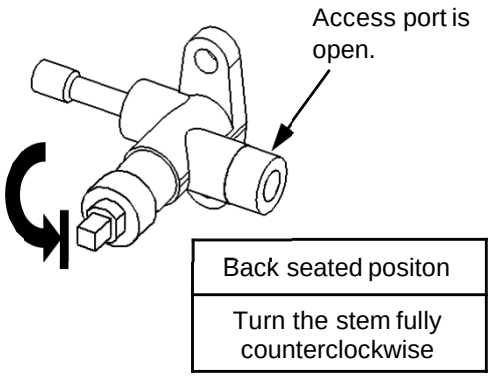


2. Refrigerant releasing

1) Set the evacuation mode.

2) Set the low pressure and high pressure service valves to the back seated position. (The access ports are open.)

3) Slowly open the joint valve to release refrigerant.



Caution

The rapid release of refrigerant could cause refrigeration oil to be released together with refrigerant.

Airtight Test Procedure

(Execute this test after competing piping work and airtight test but before starting heat insulation work)

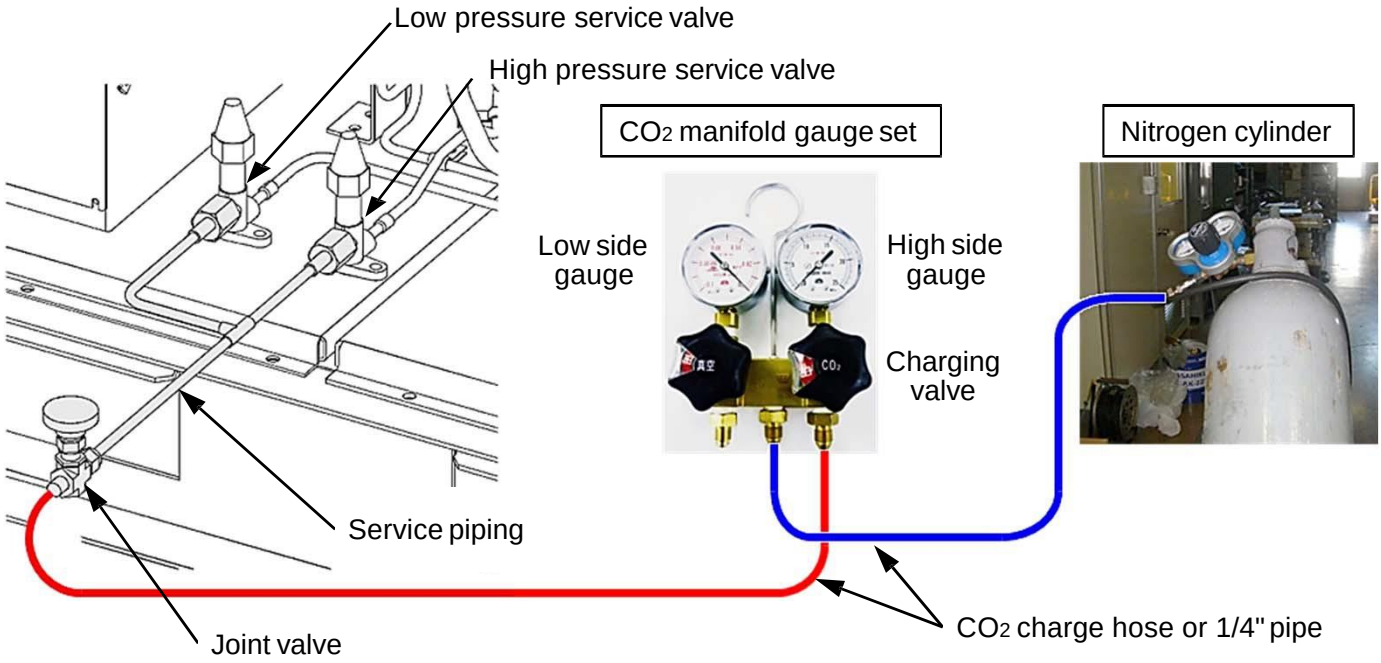
Caution

Make sure to close the vacuum valve of CO_2 manifold gauge set. Consider special local regulations and consider Installation of all equipment have to be in accordance to pressure directive 2014/68/EU and European norm EN378.

1. Preparation for airtight test

1) Connect the joint valve of the service piping (SPK-TU125) and the manifold gauge set exclusively for CO_2 refrigerant by using a CO_2 charge hose or 1/4" pipe.

2) Connect a nitrogen cylinder and the manifold gauge set by using a CO_2 charge hose or 1/4" pipe.

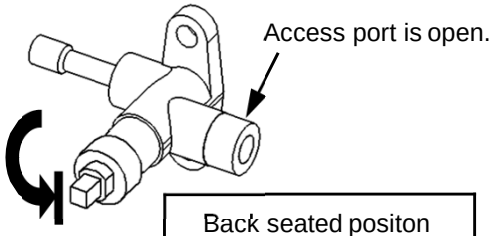


2. Airtight test

1) Set the evacuation mode in accordance with " Evacuation Mode".

2) Perform the airtight test of interconnecting pipes (the liquid line and suction line).

When performing the airtight test of interconnecting pipes, set the low pressure and high pressure service valves to the back seated position. (The access ports are open.)



Back seated positon
Turn the stem fully counterclockwise

Note: Airtight test of the refrigeration unit was completed at the time of factory shipment. Pressure testing should only be carried out by personal / companies who have necessary certification. Consider carefully local regulations and EN378.

Design pressure in Factory

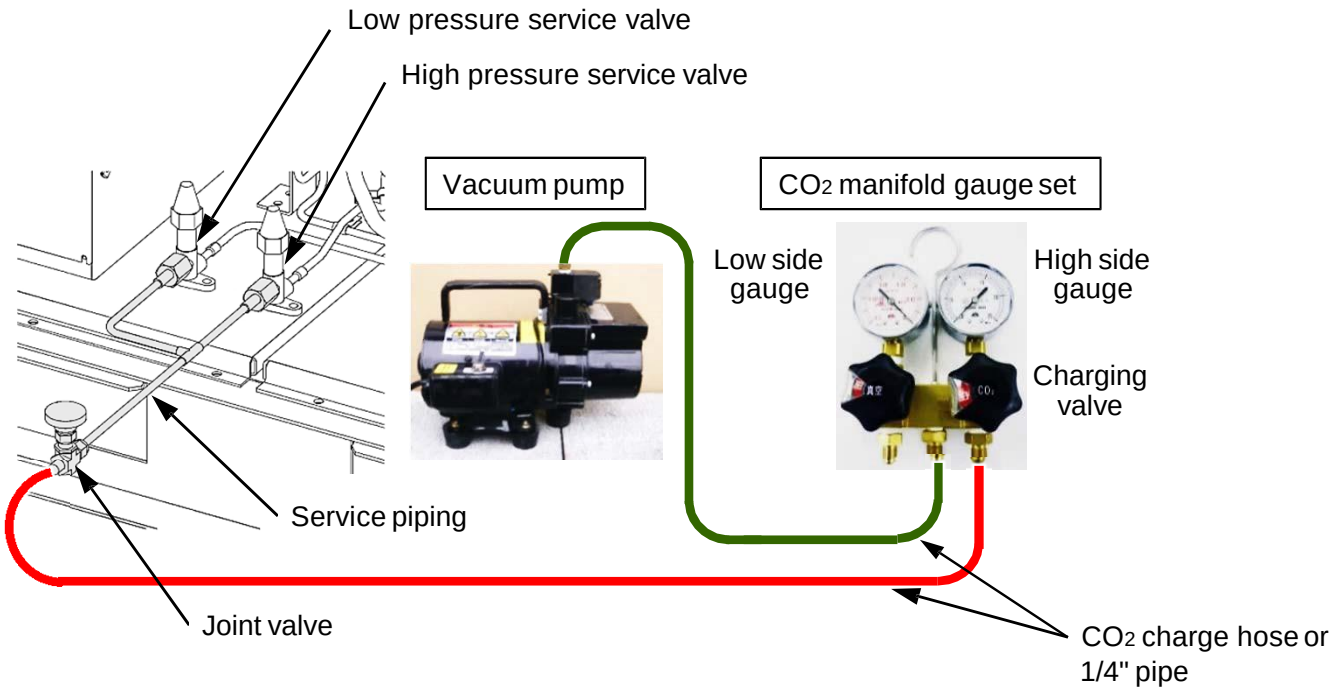
Liquid line (High pressure part)	Suction line (Low pressure part)
8MPa	8MPa

Vacuum Pump Attachment and Evacuation Procedure

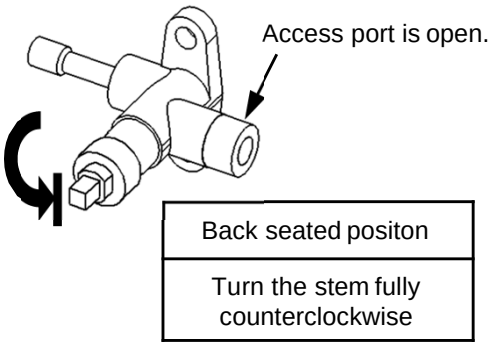
Caution **Evacuation should be performed after completing the airtight test. Please follow local regulations and EN378.**

1. Vacuum pump attachment and piping connection
   1) Connect the joint valve of the service piping (SPK-TU125) and the manifold gauge set exclusively for CO_2 refrigerant by using a CO_2 charge hose or 1/4" pipe.
   2) Connect a vacuum pump, CO_2 refrigerant cylinder, and the manifold gauge set by using a charge hose or 1/4" pipe.

      Note: The low side gauge for this operation should be able to indicate the vacuum level to be reached (-0.1MPa).



2. Evacuation
   1) Set the evacuation mode in accordance with “Evacuation Mode".
   2) Set the low pressure and high pressure service valves to the back seated position (the access ports are open), and operate the vacuum pump.
   3) Continue the evacuation until the low side gauge indication reaches -0.1MPa and continue evacuation for an additional 1 to 3 hours.



Note: When the intended vacuum level (-0.1MPa) cannot be reached after 2 hours, check the setup for any leaks.

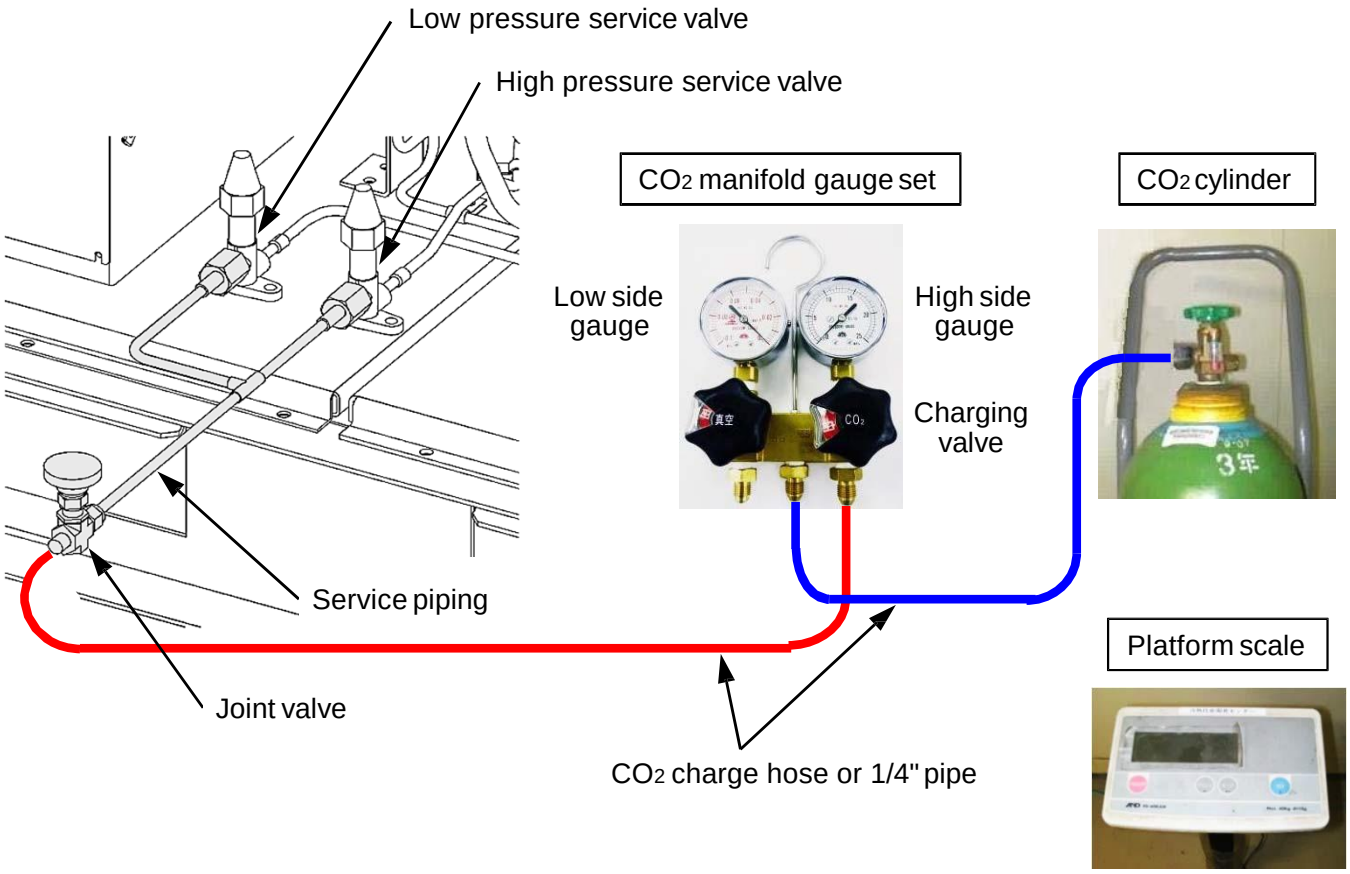
Refrigerant Charging Procedure

Caution Make sure to close the vacuum valve of CO_2 manifold gauge set.

1. Preparation for refrigerant charging

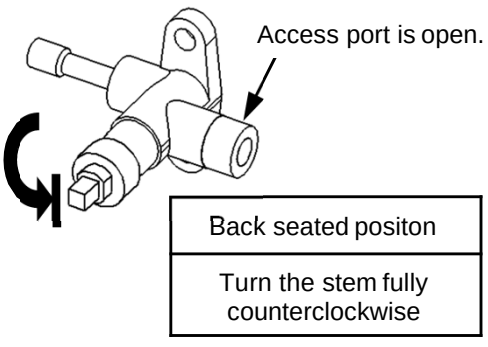
1) Connect the joint valve of the service piping (SPK-TU125) and the manifold gauge set exclusively for CO_2 refrigerant by using a CO_2 charge hose or 1/4" pipe.

2) Place a CO_2 refrigerant cylinder on a platform scale, and connect the manifold gauge set by using a CO_2 charge hose or 1/4" pipe.

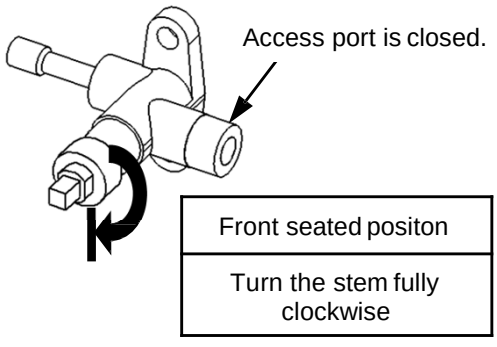


3) Check that the joint valve is closed and set the high pressure service valve to the back seated position (the access port is open), and the low pressure service valve to the front seated position.

Note: Do not charge the refrigeration unit with liquid refrigerant from the low pressure side under any circumstances.



Back seated positon
Turn the stem fully counterclockwise



Front seated positon
Turn the stem fully clockwise

4) Adjust the zero point of the platform scale.

Refrigerant Charging Procedure

2. CO_2 refrigerant grade

Charge CO_2 refrigerant (R744) that is compatible with the following specifications.

Item	Specifications
Purity	> 99.9% (volume)
Moisture	< 0.005% (volume)
Total sulfur	< 0.03ppm (weight)
Inert gas (H_2, N_2, O_2, Ar)	< 0.01% (volume)

3. Refrigerant Charging

1) With the refrigeration unit being stopped, open the joint valve and gradually charge the refrigeration unit with refrigerant in the liquid state.

   When it is difficult to adjust the charging speed by using the joint valve or the charging valve of manifold gauge set, install a capillary tube between the CO_2 refrigerant cylinder and manifold gauge set.

   Note: Do not install a capillary tube between the service piping and manifold gauge set.

2) When the liquid refrigerant no longer goes into the refrigeration unit, close the access port of the high pressure service valve (the front seated position) and make the refrigeration unit in cooling operation condition to adjust refrigerant quantity using the access port of the low pressure service valve (the back seated position).

   Note: In order to avoid overcharging, maintain the charging rate at approx. 20 g in 5 seconds.

3) After completing charging operation, close the refrigerant cylinder valve and check that the access ports of the low pressure and high pressure service valves have been closed.

4) Gradually open the purge valve of the manifold gauge set, and release the refrigerant remaining in the service piping, manifold gauge set, and charge hose (or 1/4" pipe).

   When detaching the service piping, refer to “Service Pipe Connection/Disconnection Method”.

Gas Leak Repair Procedure

1. Gas leak position identification

1) When using a liquid type leak detector
   Identify the position where oil is leaking.
   Find gas leaks by applying the liquid type leak detector and checking for foaming.

2) When using a leak detector
   Identify the position where oil is leaking.
   Detect gas leaks by bringing the leak detector probe near the identified position.

   Note: Use caution not to blow air during the detection process. Detector reacts to blown air.

2. Releasing refrigerant

Release refrigerant in accordance with “Refrigerant Releasing Procedure".

3. Brazing repair operation

1) Prepare for brazing operation.

   You will need the following tools during brazing operation:

   - Brazing burner
   - Phosphor copper solder
     If silver brazing solder is to be used, do not use any flux containing chlorine.
   - Shield plate, heat insulation plate, wet waste cloth
   - Blow and replacement nitrogen

2) Carry out brazing operation.

   Since the copper pipes used with the CO_2 refrigeration unit have a thicker wall than the HFC refrigeration unit, make sure that the melted brazing material is fully wetting the target position.

   Notes: 1. Maintain a flow of oxygen-free nitrogen through the brazing position at a very low pressure during brazing. Nitrogen displaces the air and prevents the formation of copper oxides in the brazing position.

   2. During brazing, make sure that there is no refrigeration oil residue on the surface.

4. Airtight test

Carry out the airtight test in accordance with "Airtight Test Procedure ".

5. Evacuation

Carry out the evacuation in accordance with "Vacuum Pump Attachment and Evacuation Procedure".

6. Refrigerant Charging

Charge the refrigeration unit with refrigerant in accordance with "Refrigerant Charging Procedure".

Compressor Replacement Procedure

1. Preparation for compressor replacement

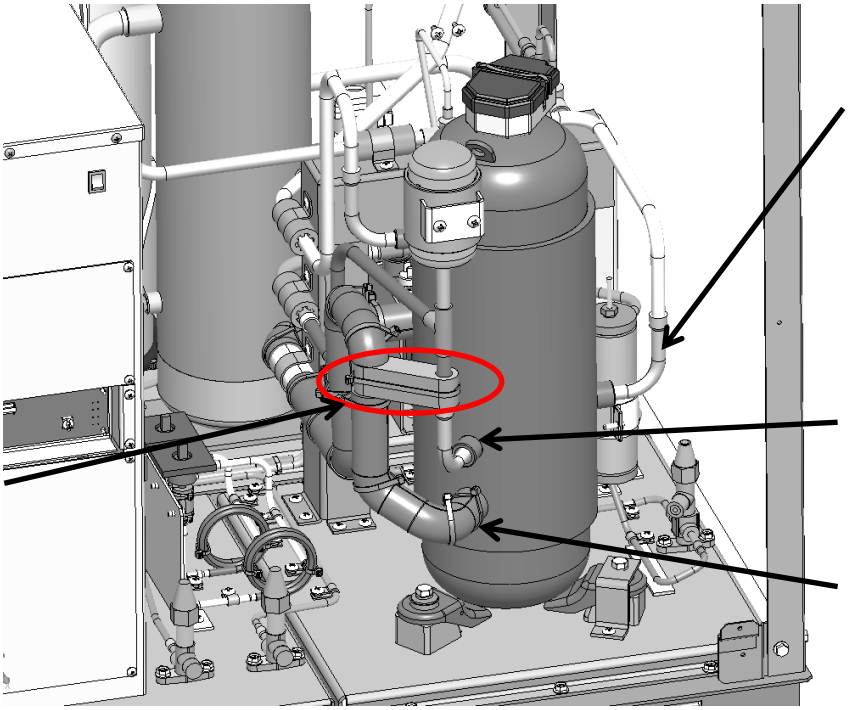
1) Release refrigerant in accordance with “Refrigerant Releasing Procedure”.

2) Remove the heat insulation material of the 1st stage suction pipe (cut out bundling ties).

3) Remove the anti-vibration rubber for the 1st stage and 2nd stage suction pipes (cut out bundling ties).

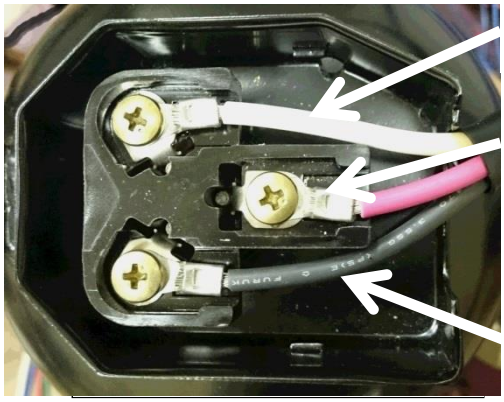
4) Remove the temperature sensor of the 2nd stage discharge pipe.

5) Remove the compressor securing bolts (3 places).



6) Turn OFF the ground fault interrupter, when the pressure indication on the control PCB reaches zero and the refrigerant release sound is no longer heard.

7) Remove the sound deadening insulation and terminal cover of the compressor, and disconnect all lead wires of U,V, and W phase from the compressor terminal block S(W) ,R and C(T).



S(W) phase lead wire (White).
Notation of circuit diagram V.

R phase lead wire (Red)
Notation of circuit diagram U.

C(T) phase lead wire (black)
Notation of circuit diagram W.

8) Disconnect the oil level switch wire connection. Trace the connection from the oil level switch.

9) Remove the crank case heater under the compressor.

Compressor Replacement Procedure

Caution For safety purposes, always wear protective gear during operations.

2. Compressor removal

1) After completing the preparation for compressor replacement, cut the compressor piping at five places (1st stage suction, 1st stage discharge, 2nd stage suction, 2nd stage discharge, and oil return) by using a pipe cutter or cable cutter.

Notes: 1. The cutting position should be on the compressor side of the welded part as follows. Cutting the refrigeration unit side would disable recovery.

2. Use sufficient caution not to deform the welded part of the pipe during cutting.

2) Remove the securing bolt, spring washer, flat washer, and protection rubber washer, etc. in three places (two places in the front and one in the back) of the compressor to be replaced.

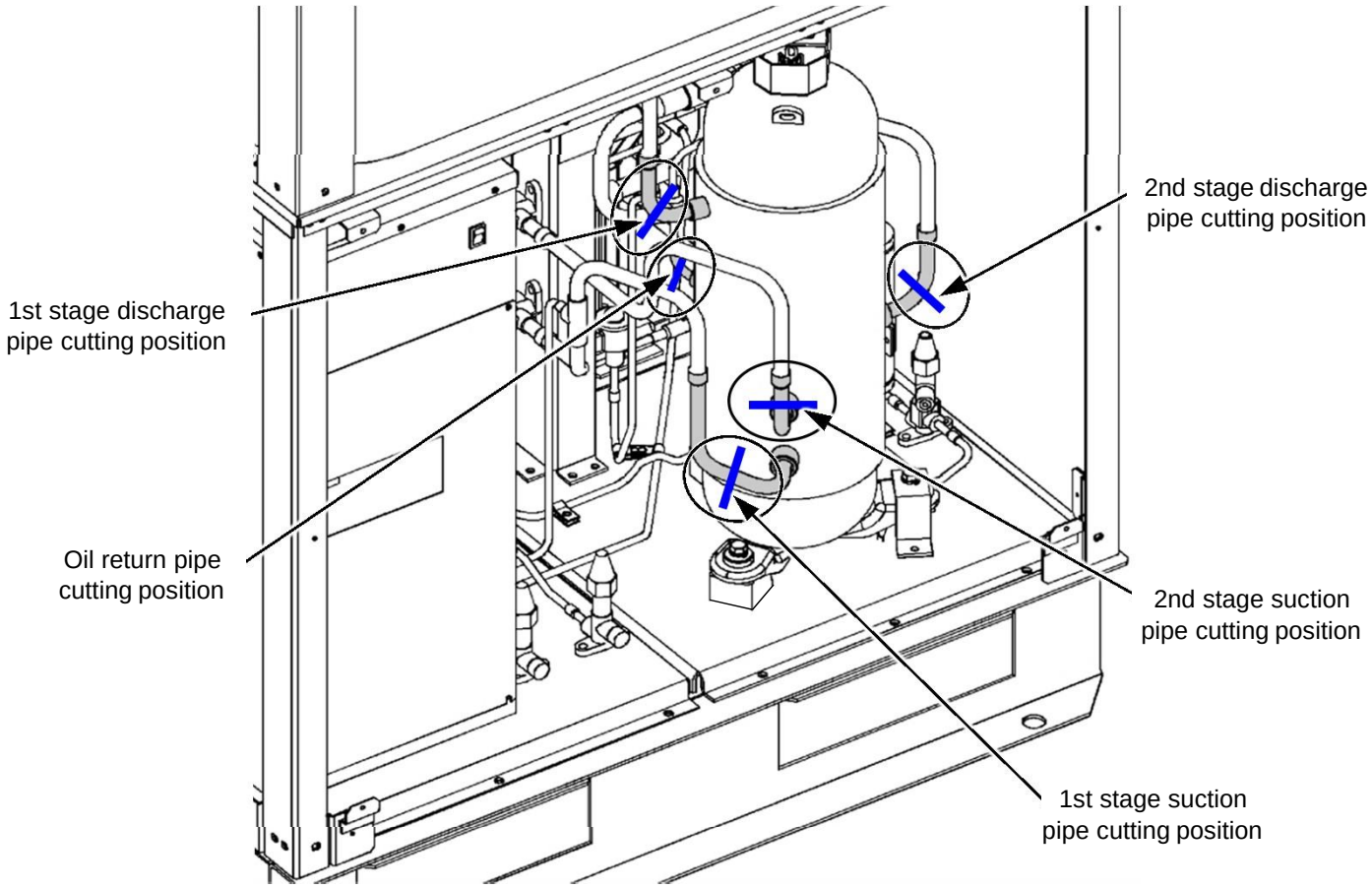
3) Remove the compressor from the refrigeration unit.

4) Remove the compressor pipe left on the refrigeration unit side by heating the cut end.

Notes: 1. In order to avoid radiation of the heating flame, make sure to cover the wiring, heat insulation material, and MOV1 (oil control electronic expansion valve) with a wet waste cloth.

2. During heating, supply nitrogen gas by using the service piping (SPK-TU125). Nitrogen displaces the air and prevents the formation of copper oxides in the heating position.

5) Remove the secured part of the piping. (Prevention of bending deformation)

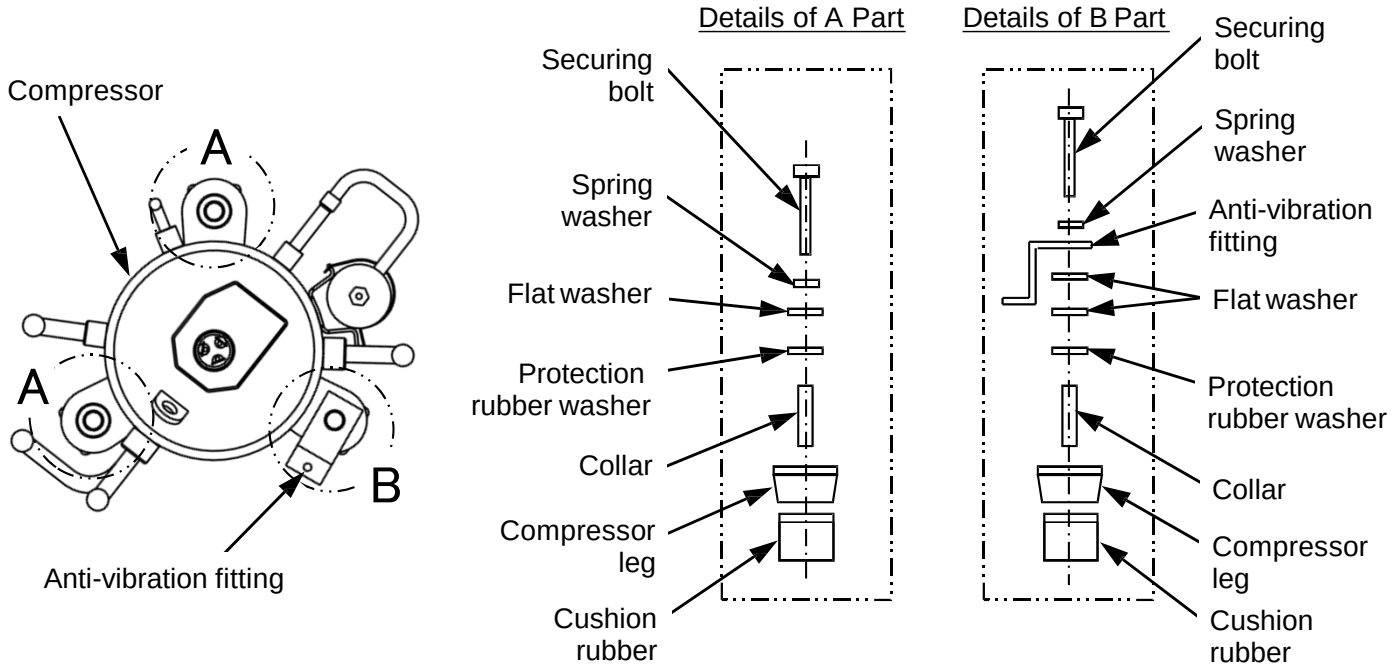


Compressor Replacement Procedure

Caution For safety purposes, always wear protective gear during operations.

3. Service compressor installation

1) Place the service compressor in its original position, and install the securing bolt, spring washer, flat washer, and protection rubber washer, etc. (three places)



2) Insert each pipe into the compressor and connect it by brazing.

Note: During brazing, supply nitrogen gas by using the service piping (SPK-TU125). Nitrogen displaces the air and prevents the formation of copper oxides in the brazing position.

3) After completing brazing, perform an airtight test of the brazed part.

4) Reconnect the removed wires in their original configuration.
- Compressor wiring, terminal cover
- Oil level switch wiring

5) Turn on the power and confirm that it is in the evacuation mode (indication of “uAcU” on the control PCB). (Refer to “Evacuation Mode”.)

6) Release the nitrogen used for the airtight test and apply evacuation.

7) During evacuation, install the remaining heat insulation materials, anti-vibration materials, etc.
- Anti-vibration rubber for suction pipe
- Discharge gas temperature sensor
- Heat insulation material
- Crank case heater
- Sound deadening insulation of the compressor

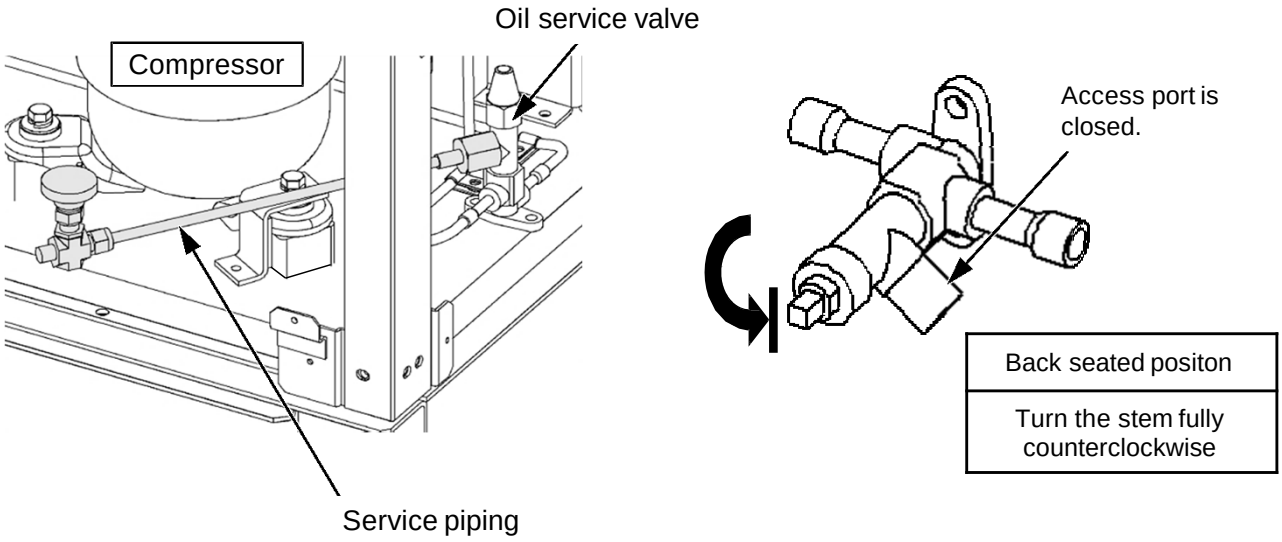
Caution Make sure that there is no contact between the sound deadening insulation of the compressor and the crank case heater.

8) After completing evacuation, charge the specified quantity of refrigerant.

Oil Replenishing Procedure

Caution Before starting the operation, perform an assessment in accordance with the Installation Instructions ”Oil Level Control and Oil Addition Assessment Criteria” in “Oil Level Control Method”.

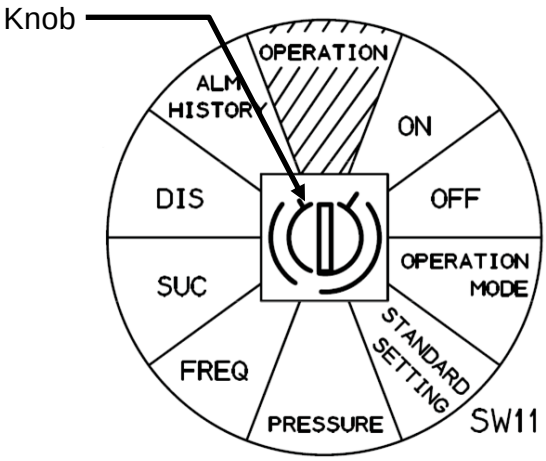
1. Turn operation switch S1 to "OFF" to stop the operation of the refrigeration unit.
2. Confirm that the access ports of the compressor oil service valve are closed (back seated position), and connect the service piping with an attached (closed) joint valve to each access port.



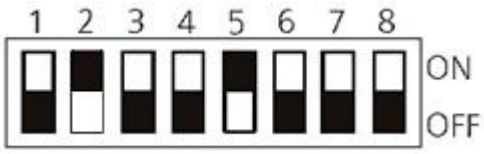
Caution When setting each service valve to the front seat, recheck in advance that there is no slack in the nut of each service valve, or in the joint of the service piping.
A loose nut or pipe joint may cause the refrigerant to leak out.

Oil Replenishing Procedure

4. Set the rotary switch (knob) on the CRD2-EN-PCB to “ON“ position, and turn ON the DIP switch 13-5, and press the ▲ button to align the opening level of the oil control electronic expansion valve (MOV1) to 480 steps, and then return the rotary switch (knob) to ”Operation” position.

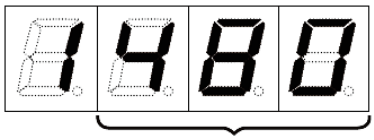


Rotary switch



DIP switch SW13

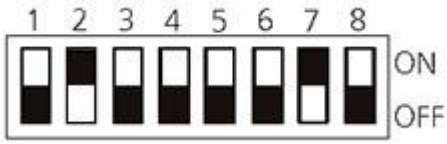
<Digital display example>



Electronic expansion valve opening
(E.g. 480 steps)

5. Slowly open the joint valve of the service piping attached to the 1st stage discharge service valve to release the refrigerant in the compressor, and then connect the extension pipe (CO_2 charging hose or 1/4” pipe) to the joint valve of the oil service valve.

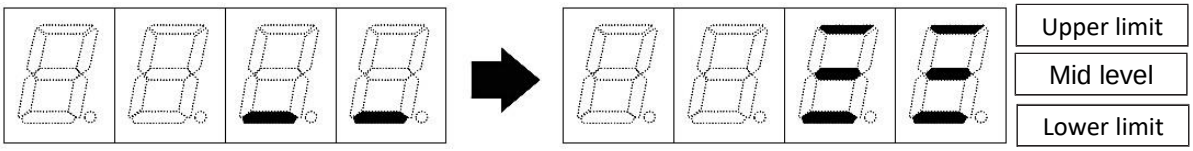
6. Set the rotary switch (knob) to “OPERATION MODE" and return the DIP switch 13-5 to OFF, and then turn ON the DIP switch 13-7 for activating “Oil level confirmation mode”.



DIP switch SW13

7. Connect the manifold gauge set exclusively for CO_2 refrigerant and vacuum pump to the service piping attached to the 1st stage discharge service valve, and while applying evacuation, open the joint valve of the oil service valve to suck up oil and add oil until the oil level reaches the upper limit.

<Digital display example> (E.g.) Oil level indication before and after adding oil



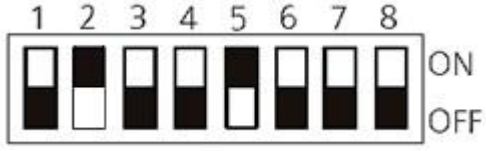
Lower limit indication

Upper limit indication

8. After adding oil, close the joint valve of the oil service valve and remove the extension pipe, and continue evacuation from the 1st stage discharge service valve. Continue evacuation until vacuum level 133 Pa (1 Torr) is reached and continue for a further 1 to 3 hours.

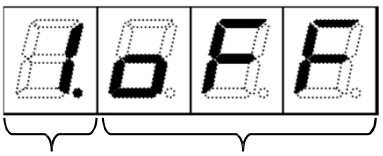
Oil Replenishing Procedure

9. Set the rotary switch (knob) to “ON” and turn ON the DIP switch 13-5 and press the ▲·▼ button until the digital display indicates “1.oFF” and then return the rotary switch (knob) to “Operation (運転)“.



DIP switch SW13

<Digital display example>

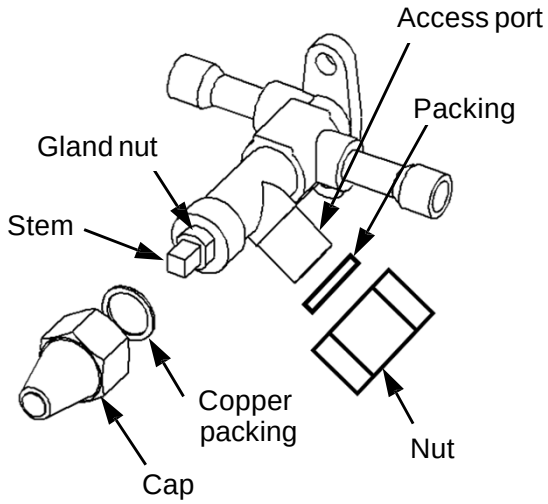


Expansion valve No.（MOV1）

Expansion valve automatic control

Caution Without the operation shown above, the oil control electronic expansion valve (MOV1) cannot return to automatic control.

10. After completing evacuation, close the joint valve of the service piping attached to the 1st stage discharge valve, and remove the manifold gauge set and then open each valve (1st stage suction, 1st stage discharge, 2nd stage suction, and 2nd stage discharge) around the compressor as well as the oil service valve (back seated positon: turn the stem of the service valve in a counterclockwise direction to close the access port).
11. Slowly open the joint valve of each service piping, and after completing the release of refrigerant in the pipes, remove the service piping and attach a nut (fastening torque: 13 ± 1 N･m) at the access port. At the end of operations, check for a loose gland nut (fastening torque: 10 ± 1 N･m) at each service valve and refasten, and then attach the cap (fastening torque: 30 ± 5 N･m).



Filter Dryer

1. Filter dryer to be applied

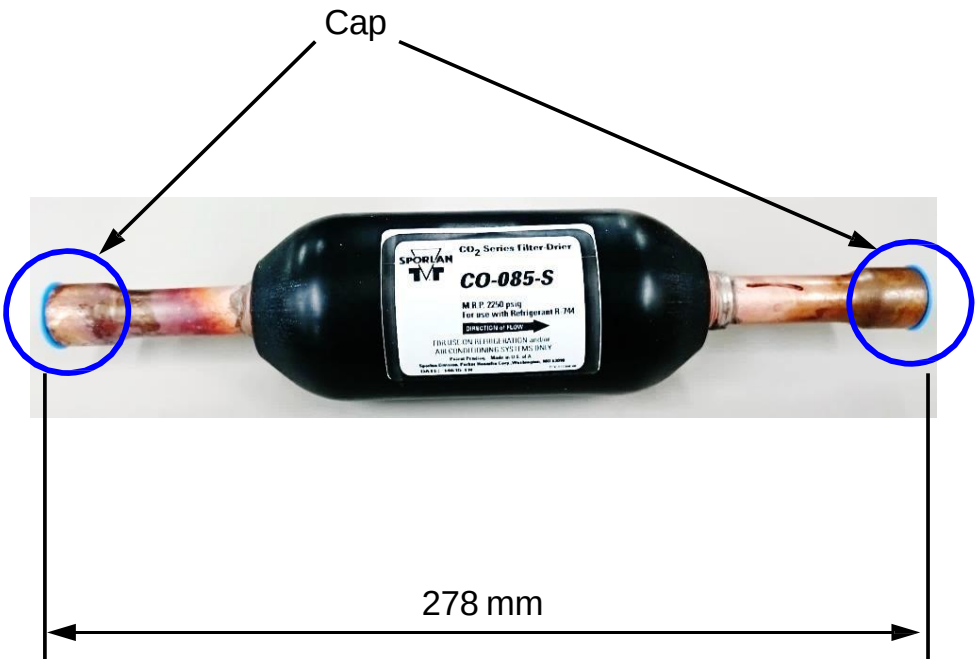
1) The filter dryer (one is shipped with each refrigeration unit) is a standard component.
2) In the case of replacement, use the same filter dryer shown below as the standard component.

Refrigeration Unit Model No.	Filter dryer Model No.	Filter dryer Type	Connection Diameter
OCU-CR1000VF8A	D-155T	CO-085-S	ϕ 15.88 mm

Caution You must not use a filter dryer for HFC refrigerant under any circumstances as it does not meet the pressure requirement.

2. Filter dryer attachment

1) The filter dryer has an expanded tip on both ends.
2) Do not remove the filter dryer cap until immediately before use.
3) Connect the filter dryer to the liquid line between the refrigeration unit outlet and the evaporator by brazing.
4) During brazing operation, protect the filter dryer from heat by covering it with wet cloths, etc.
5) Install with arrow pointing in direction of flow. Reverse flow may cause internal damage.



Suction filter

1. Suction filter to be applied

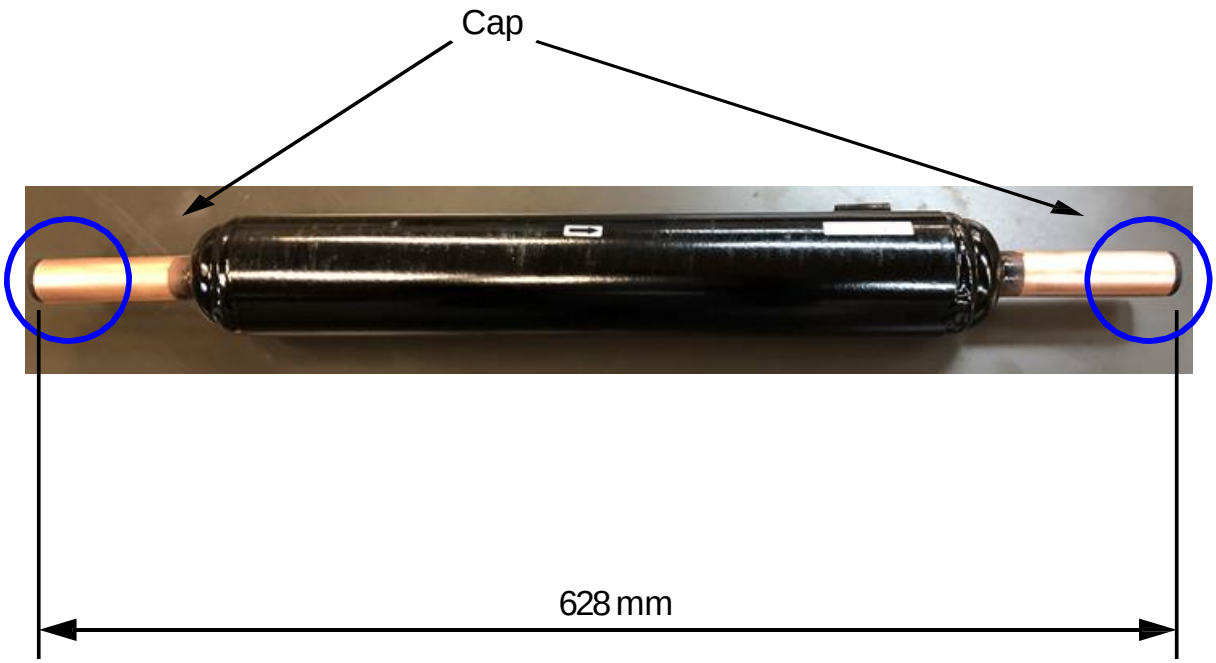
1) The suction filter (one is shipped with each refrigeration unit) is a standard component.
2) In the case of replacement, use the same Suction filter shown below as the standard component.

Refrigeration Unit Model No.	Suction filter Model No.	Connection Diameter
OCU-CR1000VF8A	S-008T	ϕ 19.05 mm

Caution You must not use a filter dryer for HFC refrigerant under any circumstances as it does not meet the pressure requirement.

2. Suction filter attachment

1) Do not remove the suction filter cap until immediately before use.
2) Connect the suction filter to the suction line between the refrigeration unit inlet and the evaporator by brazing.
3) During brazing operation, protect the filter dryer from heat by covering it with wet cloths, etc.
4) Install with arrow pointing in direction of flow. Reverse flow may cause internal damage.



Failure Diagnosis

Error Code

(1) When the rotary switch (knob) is at [OPERATION] position, the digital display on the control PCB alternately displays low pressure, high pressure and error code (E ***).

< Error Code Table >

Error code	Meaning	Cause	Correction method
E011	High pressure anomaly (7th incident)	Increased high pressure caused a high pressure anomaly.	(1) Investigate the cause of high pressure anomaly. (2) Check for the presence of any anomalies of the high pressure sensor.
E031	Discharge gas temperature anomaly (3rd incident)	Abnormal stop caused by increased discharge temperature to 118°C or higher occurred three times in two hours.	Follow the procedure shown in "Failure Diagnosis at the time of Abnormal Discharge Gas Temperature." (1) Search for the cause of increasing discharge gas temperature. (2) Check the connection of control PCB "2P4 discharge 1 connector." (3) Check the resistance value of the discharge gas temperature sensor (Refer to "Method of Checking Sensor Characteristics").
E041	Discharge gas temperature sensor anomaly	Discharge gas temperature sensor became abnormal (open circuit condition).	(1) Check the connection of control PCB "2P4 discharge 1 connector." (2) Check the resistance value of the discharge gas temperature sensor (Refer to "Method of Checking Sensor Characteristics").
E05	Low pressure sensor anomaly	Low pressure sensor became abnormal (open circuit condition).	(1) Check the connection of control PCB "3P1 low pressure connector." (2) Check the output voltage of the low pressure sensor (Refer to "Method of Checking Sensor Characteristics").
E06	High pressure sensor anomaly	High pressure sensor became abnormal (open circuit condition).	(1) Check the connection of control PCB "3P3 high pressure connector." (2) Check the output voltage of the high pressure sensor (Refer to "Method of Checking Sensor Characteristics").
E07	Suction gas temperature sensor anomaly	Suction gas temperature sensor became abnormal (open circuit condition).	(1) Check the connection of control PCB "2P9 U inlet connector." (2) Check the resistance value of the suction gas temperature sensor (Refer to "Method of Checking Sensor Characteristics").
E091	Oil level anomaly	Low oil level condition continued for 10 min.	(1) Investigate the cause of oil level anomaly. (2) Check the connection of control PCB "6P11 electronic expansion valve 1 connector." (3) Check the coil attachment condition and resistance value of the oil control electronic expansion valve (MOV1). When checking, refer to "Method of Checking the Resistance of Electronic Expansion Valve Coil and Oil Level Switch." (4) Check the oil level and add oil according to the "Oil Level Control Method."
E101	Discharge gas temperature anomaly (1st to 2nd incident)	Discharge gas temperature increased to 118°C or higher and generated an abnormal stop. Or discharge gas temperature sensor shorted.	Comply with the "Failure Diagnosis at the time of Abnormal Discharge Gas Temperature." (1) Search for the cause of increasing discharge gas temperature. (2) Check the connection of control PCB "2P4 discharge 1 connector." (3) Check the resistance value of the discharge gas temperature sensor (Refer to "Method of Checking Sensor Characteristics").
E181, E183	Inverter communication anomaly	No serial communication signal between "control PCB" and "Inverter"	Check the communication line between control PCB "5P1 connector" and Inverter "A1000/V1000 connector."
E19	Controller communication anomaly	No controller signal exists in communication.	(1) Check the communication line (control PCB "5P4, 5P5 connector"). (2) Set the communicating refrigeration unit No. to a value other than "0."
E201	Radiator temperature anomaly	Inverter radiator temperature increased to 100°C or higher and stopped abnormally.	(1) Investigate the cause of the increasing radiator temperature. (2) Check the connection of control PCB "2P31 Cooler 1 connector." (3) Check the resistance value of the radiator temperature sensor (Refer to "Method of Checking Sensor Characteristics").
E221	Radiator temperature sensor anomaly	Radiator temperature sensor became abnormal (open circuit condition).	(1) Check the connection of control PCB "2P31 Cooler 1 connector." (2) Check the resistance value of the radiator temperature sensor (Refer to "Method of Checking Sensor Characteristics").
E23	Ambient temperature sensor anomaly	Ambient temperature sensor became abnormal (open circuit condition).	(1) Check the connection of control PCB "2P8 ambient air connector." (2) Check the resistance value of the ambient temperature sensor (Refer to "Method of Checking Sensor Characteristics").
E271	Gas cooler fan motor anomaly	Gas cooler fan motor became abnormal. (The fan rotation speed significantly deviated from the set rotation speed.)	(1) Check for the presence of a fan lock, fan dislocation, etc.
E311	High pressure anomaly (1st to 6th incident)	Increased high pressure caused a high pressure anomaly.	(1) Investigate the cause of high pressure anomaly. (2) Check for the presence of any anomalies of the high pressure sensor.
E32	Refrigerant flood back alarm	Suction gas superheat (difference between "suction gas temperature" and "evaporating temperature calculated from low pressure") became 1 K or below continuously for 2 min.	Check the cause of refrigerant flood back operation.
E36	Intermediate pressure anomaly (1st to 6th incident)	Increased intermediate pressure caused an abnormal intermediate pressure.	(1) Investigate the cause of intermediate pressure anomaly. (2) Check for the presence of any anomalies of the intermediate pressure sensor.

Note※: When the controller is connected, anomaly content is sent via the communication cable.

Failure Diagnosis

Error Code

Error code	Meaning	Cause	Correction method
E37	Unit outlet pressure anomaly (1st to 6th incident)	Increased unit outlet pressure caused a unit outlet pressure anomaly.	(1) Investigate the cause of unit outlet pressure anomaly. (2) Check for the presence of any anomalies of the unit outlet pressure sensor.
E46	Intermediate pressure anomaly (7th incident)	Increased intermediate pressure caused an intermediate pressure anomaly.	(1) Investigate the cause of intermediate pressure anomaly. (2) Check for the presence of any anomalies of the intermediate pressure sensor.
E47	Unit outlet pressure anomaly (7th incident)	Increased unit outlet pressure caused a unit outlet pressure anomaly.	(1) Investigate the cause of unit outlet pressure anomaly. (2) Check for the presence of any anomalies of the unit outlet pressure sensor.
E57	Unit outlet sensor anomaly	Unit outlet temperature sensor became abnormal (open circuit condition).	(1) Check the connection of control PCB “2P5 U outlet connector.” (2) Check the resistance value of the unit outlet temperature sensor (Refer to “Method of Checking Sensor Characteristics”).
E59	Gas cooler outlet temperature sensor anomaly	Gas cooler outlet temperature sensor became abnormal (open circuit condition).	(1) Check the connection of control PCB “2P6 GC outlet connector.” (2) Check the resistance value of the gas cooler outlet temperature sensor (Refer to “Method of Checking Sensor Characteristics”).
E6X1 ~E7X1, E6X3 ~E7X3	Inverter anomaly	The inverter operation became abnormal.	Comply with the “Failure Diagnosis of Inverter Unit.” (1) Check if Power source is connected to power source terminal base. (2) Confirm whether an overload operation is taking place. (3) Check for gas cooler fan motor anomalies (E271) . (4) Check for the presence of a power source voltage drop or power missing phase. (5) Check if the compressor is locked. (6) Check if inverter A1000 output is connected to compressor. (7) Check if inverter V1000 output is connected to fan motor.
E80	Split cycle outlet temperature sensor anomaly	Split cycle outlet temperature sensor became abnormal (open circuit condition).	(1) Check the connection of control PCB “2P7 S outlet connector.” (2) Check the resistance value of the split cycle outlet temperature sensor (Refer to “Method of Checking Sensor Characteristics”).
E81	Intermediate pressure sensor anomaly	Intermediate pressure sensor became abnormal (open circuit condition).	(1) Check the connection of control PCB “3P2 intermediate pressure connector.” (2) Check the output voltage of the intermediate pressure sensor (Refer to “Method of Checking Sensor Characteristics”).
E84	Refrigerant over charge	Increased unit outlet pressure more than 7.2 MPa and continued for 5 minutes.	(1) Check and adjust the refrigerant charge amount. There is a possibility of refrigerant over charge. (2) Rapidly purging refrigerant leads to shortage of refrigerant, so gradually adjust it.
E851	Oil level switch anomaly	Oil level switch became abnormal. (Both top contact and bottom contact became short-circuited at the same time.)	(1) Check the connection of control PCB “3P22 oil level 1 connector.” (2) Check the resistance value of the oil level switch. When checking, refer to “Method of Checking the Resistance of Electronic Valve Coil and Oil Level Switch.”
E88	Unit outlet pressure sensor anomaly	Unit outlet pressure sensor became abnormal (open circuit condition).	(1) Check the connection of control PCB “3P4 U outlet connector.” (2) Check the output voltage of the unit outlet pressure sensor (Refer to “Method of Checking Sensor Characteristics”).

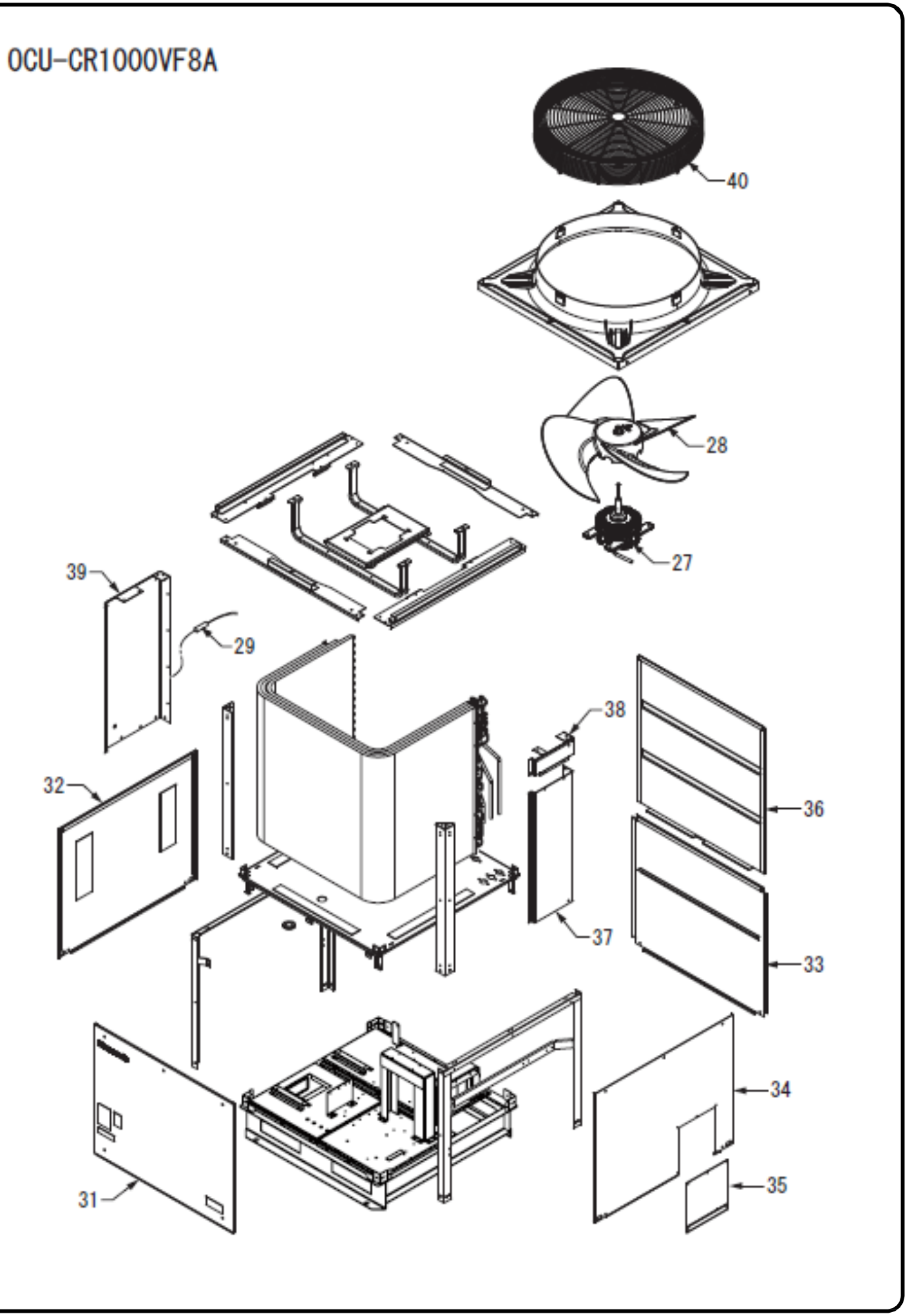
Indication	Meaning	Correction method	Remarks
Alarm (red) LED blinks	Anomaly that occurred in the past. Up to 50 past error codes are saved in the “Alarm History.”	Check the error code in the table above and eliminate the cause. Then, align the rotary switch (knob) to “Operation,” and press ▲ or turn the operation switch “OFF.” Then, LED stops blinking.	
Digital display “-CH-”	Control PCB is in the check mode.	Set control PCB slide switch SW15 to “Control.”	Set control PCB slide switch SW15 to “Check,” and DIP switch SW13-1 and SW13-6 to “ON” and supply power to enter the check mode.

Note※: When the controller is connected, anomaly content is sent via the communication cable.

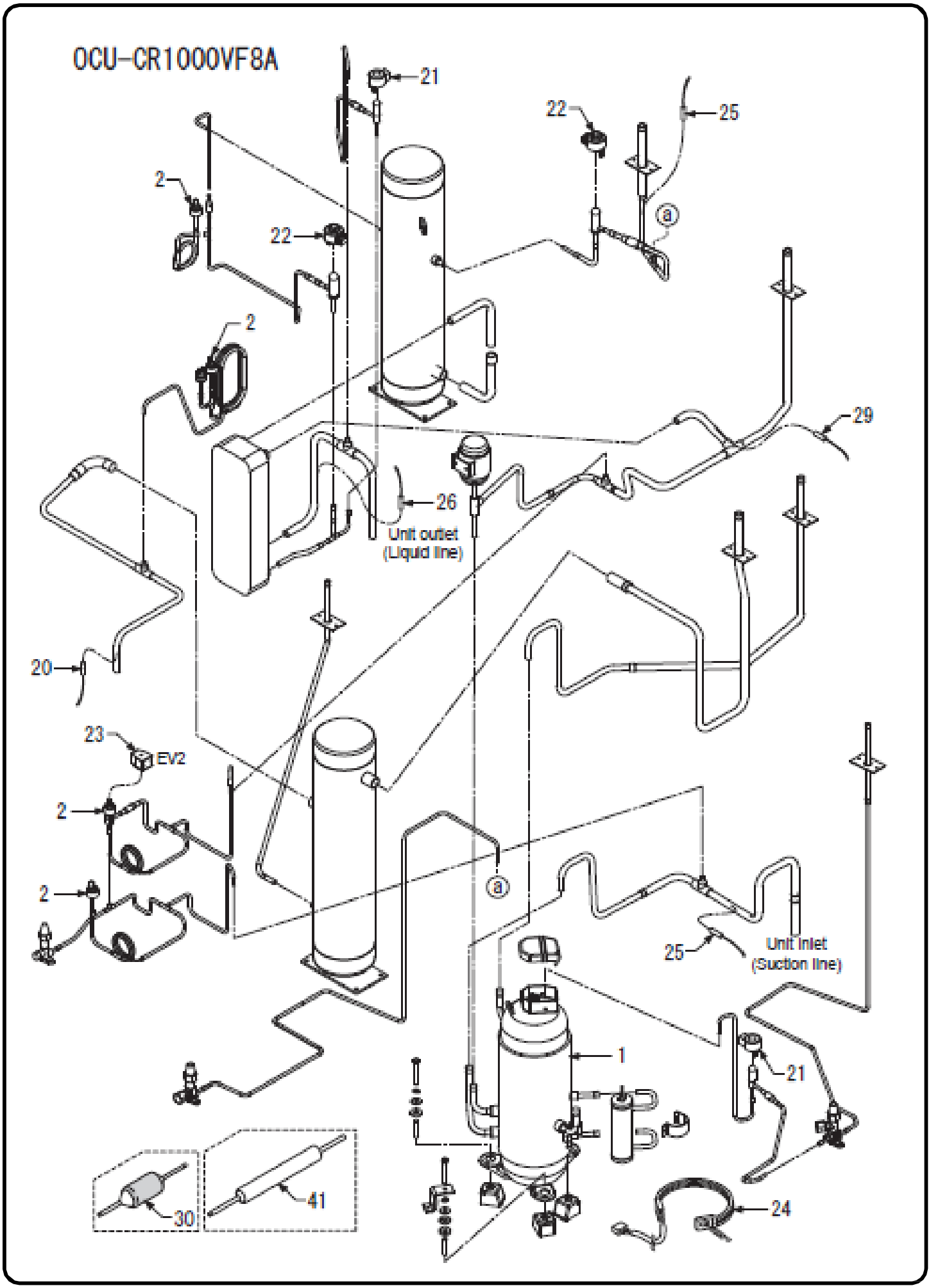
Service Parts List

Master drawing No.	Part Code	Part Name	Quantity
1	80415260R	COMPRESSOR	1
2	80225205116000	PRESSURE SENSOR	4
3	81425432097000	TERMINAL BASE	1
4	80223390031000	ADHESIVE LABEL, PET	1
5	80225324291000	TERMINAL BASE	1
6	80225324306000	TERMINAL BASE	3
7	80225324307000	TERMINAL BASE	1
8	42329696010	RELAY, AC 220/240V	3
9	80105334422520	PC BOARD/W COMPNENT	1
10	80105334408520	PC BOARD/W COMPNENT	1
11	80105334411520	PC BOARD/W COMPNENT	1
12	80205312235000	CONTROL PANEL.400V	1
13	80205312236001	CONTROL PANEL.400V	1
14	80242649600540	SOLENOID VALVE COIL	1
15	80242649600550	SOLENOID VALVE COIL	1
16	80225204130000	ROCKER SWITCH	1
17	80205305300000	FAN MOTOR	1
18	80223412154000	GUARD	1
19	80203530111001	AIR FILTER	1
20	42049602250	THERMISTOR, 0.066W	1
21	42649600421	SOLENOID VALVE COIL	2
22	42649600430	SOLENOID VALVE COIL	2
23	80205202579000	SOLENOID VALVE COIL	1
24	1FJ4H1C0082001	CRANK CASE HEATER	1
25	42049602260	THERMISTOR, 0.066W	2
26	42049602050	THERMISTOR, 0.005W	1
27	1FA4M4A0226002	DC MOTOR,750W	1
28	85402501326004	FAN	1
29	80105313129002	THERMISTOR,0.005W	2
30	80203513180000	FILTER DRYER	1
31	80203415672000	PANEL FRONT ASSY	1
32	80203414263000	PANEL SIDE ASSY	1
33	80203416236000	PANEL REAR ASSY	1
34	80203414264000	PANEL SIDE ASSY	1
35	80203414239000	PANEL SIDE ASSY	1
36	80203413827000	PANEL ASSY	1
37	80223413618001	PANEL	1
38	80203327775000	MTG PLATE ASSY	1
39	80203413715000	PANEL	1
40	80203412219000	GUARD ASSY	1
41	22211810411011	SUCTION FILTER	1
—	80203517115003	LUBRICATING OIL	1

Exploded View (OCU-CR1000VF8A)

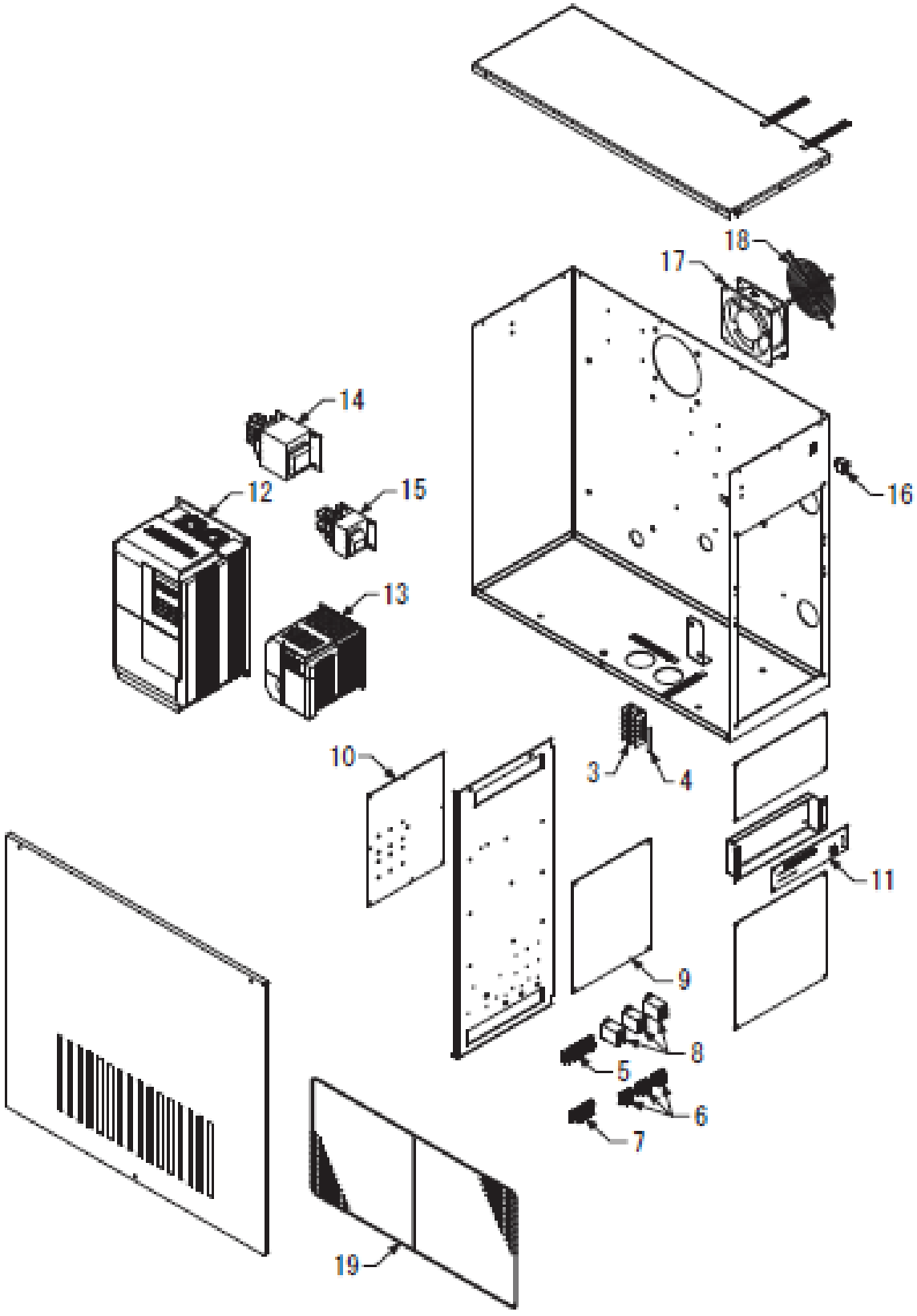


Exploded View (OCU-CR1000VF8A)



Exploded View (OCU-CR1000VF8A)

OCU-CR1000VF8A



Memo

When an accident or damage is caused by applying an installation method not described in this manual or not using the specified component, our company will not assume responsibility. If a product failure occurs by incorrect installation, the product becomes out of warranty.

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