R290 Servicing

Service February 2020

R290: Basic concepts

To work with R290 ice makers, you need to have two R290 elements:

- R290 gas leak detector (electronic).
- A safety placard.

The rest of the elements are normal ones:

- Standard manifold set (you can use the R134 ones), use the 12” length ones.
- Tap valve for R290 tank.
- Fire extinguisher.
- Pinch off tool.
- Nitrogen tank
- Vacuum pump
- Micron gauge (need to pull a 500 micron vacuum).
- Torches (or use of non welding Lokring connectors)
- Water and soap to find leaks.
- Temporary line taps
- Tubing cutter
- Scale

R290: SERVICE KIT

R290 SERVICE KIT
1.- COMBUSTIBLE GAS METER
2.- SAFETY PLACARD
3.- CHARGING VALVE
4.- PINCHO OFF TOOL
5.- 12” REFRIGERATION HOSE

R290 SERVICING

Good practice

•R290 system uses POE oil, it is very hygroscopic. The system must not be open for more tan 15 minutes. The system vacuum must be broken with nitrogen to avoid humidity entering the unit while servicing.
•Use the gauge hoses as short as possible. We recommend to use the 305 mm (12”).
• Always replace the drier when opening the system.
•Try to recover the R290 refrigerant. If need it, it can be vented to the environment, in well ventilated areas.
•If you are replacing an element, always try to maintain the system closed with the use of pinch off tools or plugs to avoid humidity entering the system.
•Always check the drier, valves, and other elements that are removed from the system, for oil degradation, metallic elements…
•When servicing the compressor, check that there is no oil in the system.
•When nitrogen is flushed through the system, drill a hole (with a 3,18 mm drill) in the lower part of the liquid accumulator (if it is in the system) to take all the oil and R290 out. Then close it by welding.
•Check the system oil to see that it is ok.
•If the oil is degraded or contaminated, o there was an obstruction in the system, the oil must be replaced. Take out all the oil from the compressor and the system. Replace with the quantity of oil need it

R290 SERVICING

Before starting:

- ❑ Post the Danger Propane placard on the front of the cooler.
- ❑ Solder joints must not be heated (touched with a flame) to remove a component such as a compressor or filter dryer from an R290 system,
- ❑ You must use a tubing cutter to cut the connections to remove a compressor or other component in an R290 system.
- ❑ R290 must be purged from the system via the R290 recovery process before cutting into the system with a tubing cutting. Use caution as there may be residual R290 still in the system.

R290 SERVICING

Servicing R290 ITV ice makers

The steps to follow are:

- Opening the refrigeration system.
- Releasing (recovering) the charge.
- Soldering.
- Pressure testing.
- Vacuuming.
- Charging the system.
- Confirming the refrigerant charge.

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Release (recover) the R290 charge

- Even though R290 can be vented to the environment, extreme caution must be observed when purging R290 from the system.
- Since the least little spark can ignite R290, it is recommended that R290 be recovered.
- Access (piercing) valves are installed to recover the R290 charge.
- It is required to install piecing valves on both the high-side and low-side process tubes to reclaim the R290 .
- Install the saddle valves as close to the pinch off area as reasonable. Alternate type of tool for releasing refrigerant is acceptable.

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Recovering R290

Elements:

- A standard vacuum pump.
- Standard manifold set.
- Nitrogen.

- ❑ Using standard vacuum pump and gauge manifold, connect the yellow hose to the vacuum pump and blue hose to the recovery cylinder.
- ❑ Open needle valve on recovery cylinder, open valve for Blue hose on manifold, turn on vacuum pump and vacuum the recovery cylinder until a minimum of 25 hg is achieved.
- ❑ Remove the yellow hose from the vacuum pump and connect to the nitrogen tank.
- ❑ Break the vacuum, in the recovery cylinder, with 0,9 bar (13 psig) of nitrogen.

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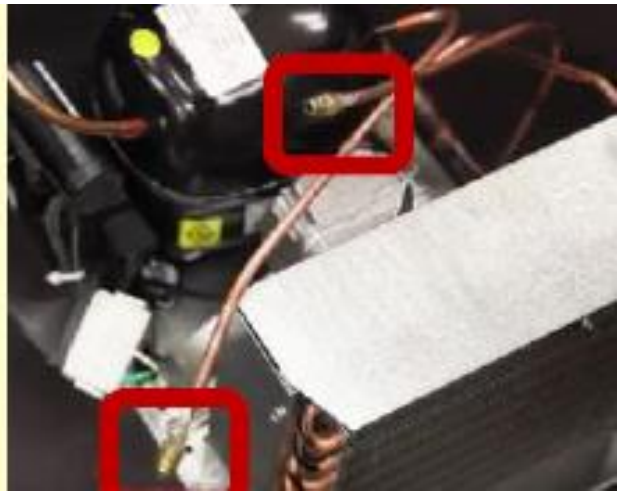
- Remove the blue hose from the recovery cylinder and open the needle valve to vent the nitrogen from the recovery tank.
- Reconnect blue hose back to the recovery cylinder.
- Move yellow hose from nitrogen tank back to vacuum pump and vacuum recovery tank again until 25 hg is achieved. Close recovery tank needle valve.
- Connect red hose to high side of refrigeration unit, blue hose to low side and yellow hose to recovery cylinder.
- Open all valves and allow refrigerant from cooler to be absorbed into filter.

R290 SERVICING

Preparing system for soldering and charging

- ❑ Solder Schrader valves onto the process tubes when you install a new compressor. *Saddle/piercing valves and Schrader valves must be removed and the process tube sealed after charge is verified*

- ❑ When soldering, allow dry nitrogen to flow through the system:
  a) Set the regulator on the nitrogen tank to 0,2 bar (3 psig) to 0,27 bar (4 psig).
  b) Install a process tube on both the high and low sides of the system to allow for the nitrogen flush and for nitrogen to flow during soldering.



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Soldering

- ❑ Assemble the copper lines and fittings.
- ❑ Connect Dry Nitrogen, with regulator set at 0,2-0,27 bar (3-4 psig), to either the high or low process tube and flush through the system for 2 minutes before soldering.
- ❑ Allow Dry Nitrogen to flow through the system at 0,2-0,27 bar (3-4 psig) during soldering.

Pressure testing and vacuuming

- ❑ After soldering, you must pressure test with Dry Nitrogen at a pressure of 12 bar (175 psig). ***Note:*** Maximum pressure for pressure testing is 14 bar (200 psig).
- ❑ Release the Dry Nitrogen pressure down to 0,07-0,14 bar (1 – 2 psig) before starting the vacuuming process.
- ❑ Vacuum the system to 500 microns (this is standard protocol)

R290 SERVICING

Charging the system

Before charging

- ❑ You must be using Refrigeration grade Propane (R290) ***Note:*** R290 does not have the odor normally associated with natural gas and propane tanks .
- ❑ When servicing an R290 system, always turn on the combustible gas leak detector and place it in the immediate work area.
- ❑ Work must be performed in a well-ventilated area.
- ❑ System can be charged with gas or liquid.

To start charging

- ❑ Determine charge from cooler data plate.
- ❑ Install access valve onto R290 tank.
- ❑ Insert R290 tank into shipping box.
- ❑ Connect yellow hose to R290 tank.
- ❑ Open tank access valve.
- ❑ Open valve on yellow hose at manifold, (if manifold has a shut-off on yellow hose).
- ❑ Place R290 on scale.
- ❑ Calibrate scale.
- ❑ Purge air from hoses.
- ❑ Open high-side valve slowly, watching scale closely, and charge system.

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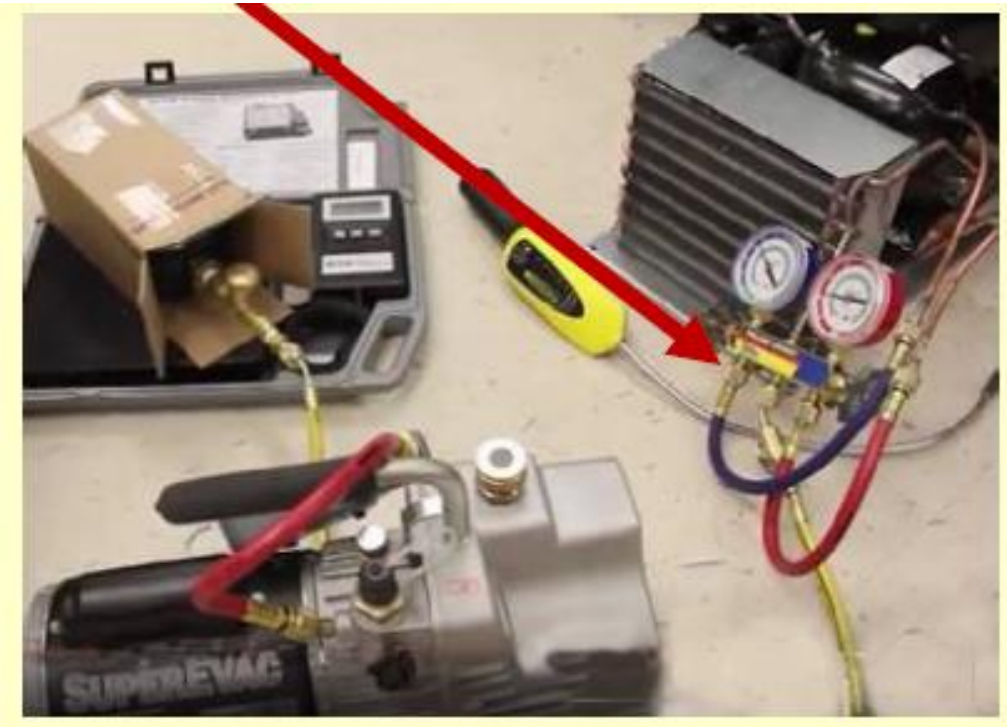
If the charge is not achieved:

- ❑ Start refrigeration compressor.
- ❑ Alllow to run for a mínimum of 1 minute.
- ❑ Complete the charging via the low/suction side of the system.



Uso del R290

Confirm refrigerant charge

- ❑ High and low pressure should be per a pressure temperature chart for R290.
- ❑ Amperage draw should be within .5 amps of cooler's data plate:
  - Excessive low amps or pressure could indicate a low charge.
  - Excessive high amps or high pressure could indicate an over charge.

R290 SERVICING

Delete Access valves

Follow normal practices when you remove access valves on R290 systems :

- ❑ One pinch with the pinch-off tool will suffice in an R290 system.
- ❑ Weld the pipe in the exitr point. .

Important Tip: Always remember, the system is charged with flammable gas. Make sure the end of the copper tube is not leaking R290 before touching with flame to seal the end of the tube with solder.

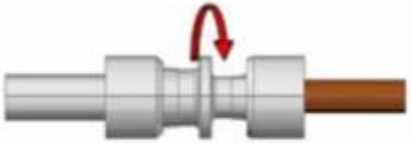
R290 SERVICING: VULKAN LOKRING

VULKAN LOKRING SYSTEM

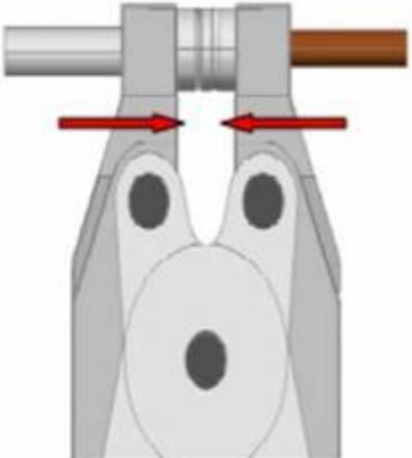
There is a Company, Vulkan, that has a tool to connect two pipes without welding.

●clean the tube ends with abrasive mat in a rotational motion around the tube

●drop sealing liquid in the ends of two connected tubes

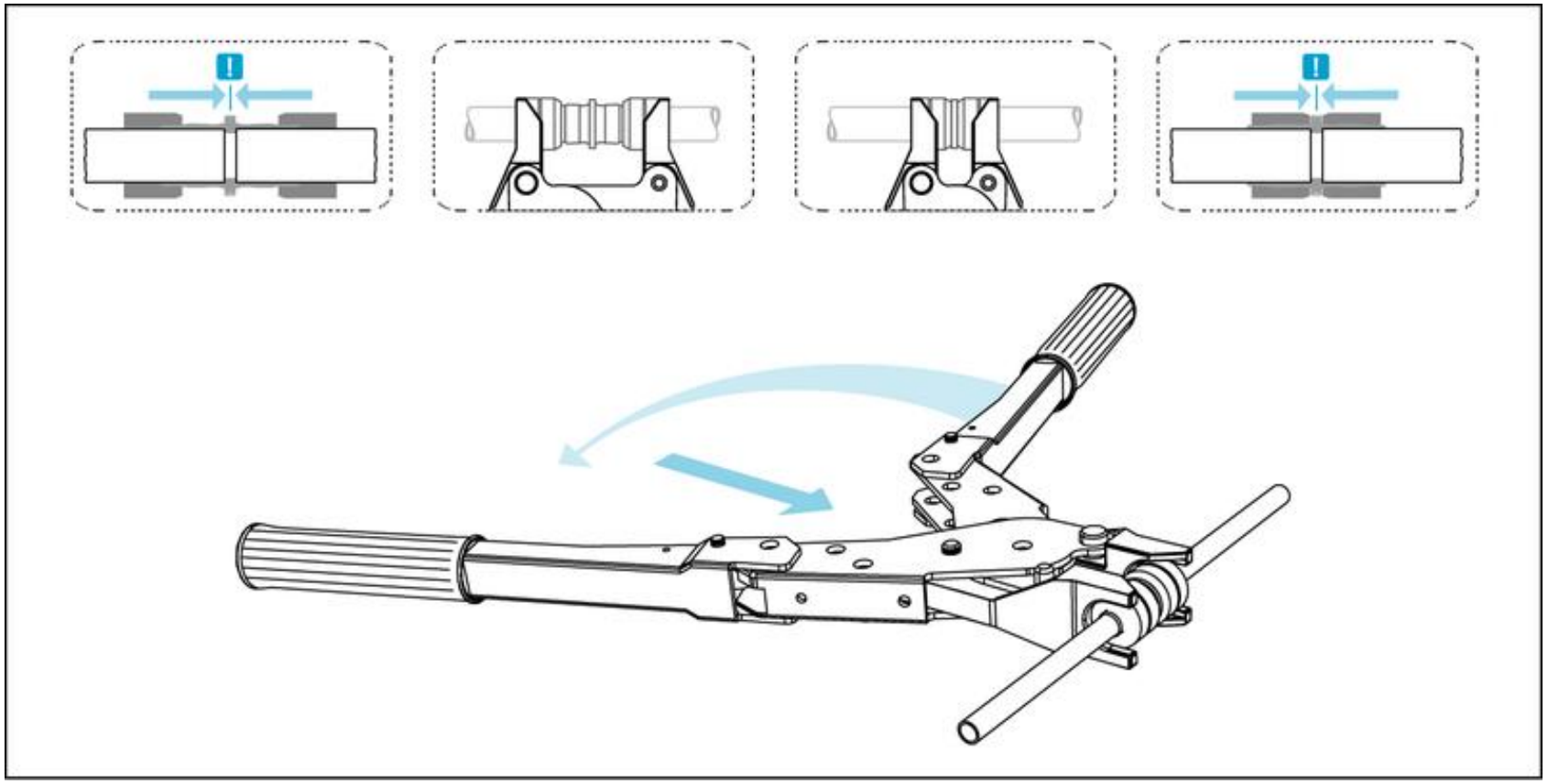


●the tube ends have to be inserted into complex ring ratated 360°



●Assembly with plier tool.

R290 SERVICING: VULKAN LOKRING



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