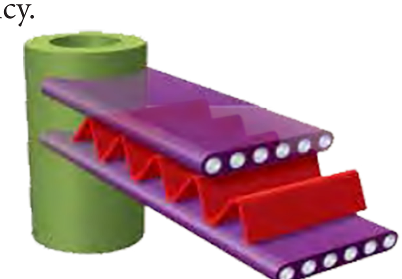
Microchannel Charging and quick reference sheet

What is Microchannel ?

The Microchannel coil is constructed of aluminum microchannel tubing and enhanced aluminum fins for reduced size and increased efficiency.

How does the Microchannel coil work?

A: The Microchannel Coil Construction creates a superior heat exchange surface that allows a smaller unit to provide more performance in less space.



Computer-rendered cross section of MicroChannel Coil

How do I clean the Microchannel coil?

A: The Microchannel coil is easy to clean just takes mild non-acid coil cleaner and water. In most cases just water will do the trick.

How do I charge a unit that has a Microchannel Coil?

With the advent of MicroChannel condenser coils, a number of advantages over conventional coils include higher efficiency, smaller size, and environmental friendliness due to lower amount of refrigerant required to achieve the same cooling capacity. Due to the reduced charge volume, MicroChannel coils tend to be less tolerant of improper charge amounts. While this charging procedure should be used for all coil technologies, it is particularly important for MicroChannel based cooling systems.

Tools and Materials

Vacuum pump capable of achieving < 500 micron vacuum – (the pump should be charged with fresh oil following each use).

Micron gauge – capable of reading 500 microns or less.

Gauge manifold set for appropriate refrigerant.

Weight scale for measuring refrigerant charge.

Tape measure – to measure line set distances.

Calculator & notepad – to execute and document calculations.

Industry-approved refrigerant recovery equipment.

Split System – New Installation

Step 1 – Verify system integrity. Verify line set and indoor side system integrity by conducting a static test (400psig with dry nitrogen), and confirm there are no leaking braze joints. Check with soap solution. Repair leaks as required. After verification, release nitrogen from system.

Step 2 – Evacuation. Install manifold gauge set to condensing unit service valves. Take center hose of gauge set and attach to the micron gauge. Connect 4th hose from micron gauge to inlet side of vacuum pump. Start the vacuum pump, turn on the micron gauge, and open both manifold valves to the back seated position. Pull a vacuum on the system until micron gauge reads 500 microns or less. When achieved, close the vacuum pump inlet valve and shut off the vacuum pump. Monitor system pressure. Once 500 microns is attained, close manifold gauge set; remove the micron gauge and 4th hose. If 500 microns cannot be achieved, inspect all refrigeration hoses and repeat steps 1 and 2.

Step 3 – Determine charge volume addition (over and above name plate volume). For factory matched systems, determine volumetric system charge adder based on line set and indoor coil calculations from outdoor unit tech guides. Line set volumes are determined using the Comfort Cooling Piping Program available on UPGnet, or use the Piping Application Guide (247077-UAD-H-0209). Please note that the charge volume assumptions due to residual liquid in the gauge set hoses should be incorporated into the calculation.

Step 4 – Setup refrigerant. Make sure the refrigerant the the cylinder contains sufficient refrigerant to complete the charge addition. Connect the refrigerant cylinder to center hose on manifold set. Open the the the cylinder valve and purge hose to gauge manifold set. Place cylinder on scale oriented to charge in liquid phase and calibrate scale to "zero".

Step 5 – Introduce condenser charge to the system. Allow vacuum to pull in refrigerant until equalization occurs by cracking liquid service valves, then open service valves to balance the rest of the charge while unit is running. Open liquid valve on unit and back seat. Open suction valve on unit and back seat. Replace both service valve caps, hand tight and then tighten with a wrench. Wait until the charge equalizes through the system (about 2 minutes). **Note: GAW14L - Initial charge amount must be weighed into liquid line.**

Step 6 – Start system. Obtain indoor wet bulb reading. This reading is a key input to the factory charging chart posted in the Installation manual and on the unit electrical cover, which is used to determine proper charge. Set the thermostat for cooling call and energize system. Observe system for nominal airflow and condensing unit operation. Let the unit stabilize for 10 minutes. Depending on indoor loading conditions, run time should be extended until indoor wet bulb is within the range of the charging chart
(note: depending on the indoor temperature, this process could take up to several hours).

Step 7 – Introduce calculated charge volume addition (This is the amount of charge calculated in step 3). Slowly open suction manifold valve and monitor refrigerant scale until volumetric charge adder is met. Remember to add ounces for volume present in hoses to avoid overcharging the system. (On Pkg equip refer to charging chart in the installation manual)
Step 8 – Validate charge value is correct and system is operating properly. Continue to monitor the system until stabilized, typically 10-15 minutes. Please refer to the charging charts on the condensing unit to determine proper subcooling (for TXV applications) or superheat (for orifice applications). The charts are based on outdoor ambient conditions. The subcooling and superheat charts on Figures 1 and 2 are examples of how to validate the correct charge and make further fine-tuning adjustments, if necessary.
Step 9 – Record your data. Record the total system charge line set length and date on inside panel. This should be done adjacent to wiring diagram. This will be useful for the next service technician. Document required startup & commissioning data in factory provided startup sheet.

Charging Chart Examples

These examples of superheat & subcooling charging charts (Figures 1 & 2, respectively) are referred to in the attached procedures. Please note these are examples only. Refer to the chart supplied with the outdoor unit for actual superheat and subcooling values, and the installation manual for detailed step-by-step instructions.

Figure 1: Example Superheat (Orifice) Chart

Superheat Charging Chart																
Outdoor	Suction Pressure (psig)															
Ambient	117	120	123	126	129	132	135	138	141	144	147	150	153	156	159	162
DB (°F)	Suction Temperature (°F)															
65	58	62	65	68	71	--	--	[illegible]	--	--	--	--	--	--	--	--
70	55	58	61	65	68	71	--	[illegible]	--	--	--	--	--	--	--	--
75	--	54	58	61	64	67	70	[illegible]	--	--	--	--	--	--	--	--
80	--	--	53	57	60	63	67	70	--	--	--	--	--	--	--	--
85	--	--	--	53	56	60	63	66	70	--	--	--	--	--	--	--
90	--	--	--	--	53	56	59	62	65	68	--	--	--	--	--	--
95	--	--	--	--	--	53	56	59	62	65	68	--	--	--	--	--
100	--	--	--	--	--	--	53	56	59	62	65	68	--	--	--	--
105	--	--	--	--	--	--	--	53	56	59	61	64	67	--	--	--
110	--	--	--	--	--	--	--	--	54	56	59	62	64	67	--	--
115	--	--	--	--	--	--	--	--	--	55	57	60	62	65	67	--
120	--	--	--	--	--	--	--	--	--	--	56	58	60	62	64	66
125	--	--	--	--	--	--	--	--	--	--	--	56	58	60	62	64

In this example, suction pressure is 138 psig and outdoor ambient temperature is 95 degrees F. Suction temperature is inclusive of superheat of 11 degrees (from P/T chart interpolation).
Based on the chart, if suction temperature is less than 59 degrees, then charge should be removed. If suction temperature is more than 59 degree, charge should be added. Add/remove charge in 1 ounce increments and let sta-bilize for 10 minutes. Repeat process until proper suction temperature is reached.

Figure 2: Example Subcooling (TXV) Chart

Subcooling Charging Chart				
Outdoor	Indoor Wet Bulb (°F)			
Ambient	57	62	67	72
DB (°F)	Liquid Pressure (psig) at Base Valve			
65	207(5)	208(5)	21[illegible](6)	214(7)
70	228(6)	228(6)	23[illegible](7)	233(8)
75	250(7)	250(7)	25[illegible](8)	255(8)
80	274(8)	273(8)	27[illegible](9)	278(9)
85	299(9)	298(9)	302(10)	302(10)
90	326(10)	324(10)	329(11)	328(11)
95	354(11)	352(11)	358(12)	356(12)
100	384(12)	381(12)	388(13)	386(12)
105	415(13)	413(13)	419(14)	417(13)
110	448(14)	445(14)	453(15)	449(14)
115	482(15)	479(14)	488(15)	484(15)
120	518(16)	515(15)	524(16)	519(15)
125	555(16)	553(16)	563(17)	557(16)

In this example, liquid pressure is 329 psig and outdoor ambient temperature is 90 degrees F.

Based on the chart, subcooling is 11 degrees at 67 degrees F indoor wet bulb and 90 outdoor ambient. If liquid pressure is less than 329 psig, then charge should be added. If liquid pressure is more than 329 psig, then charge should be removed. Add/remove charge in 1 ounce increments and let stabilize for 10 minutes. Repeat process until proper liquid pressure is reached.

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