

KD SEMI-HERMETIC HOUSED UNITS – INSTALLATION AND OPERATION.



Installation, Commissioning and Maintenance.

The following has been issued to aid installation of the KD semi-hermetic range of low noise housed units (fitted with Bock compressors). It is important that the following is read and understood before installation is undertaken.

IMPORTANT NOTES:

Check that:-

- 1) The electrical supply available is correct for the KD unit being installed.
- 2) The equipment is sited correctly to ensure adequate airflow around it and that the discharge air is not drawn back into the unit. Min recommended distance from condenser face to wall is 300mm.
- 3) Allow sufficient space around the unit for easy access for maintenance purposes.
- 4) If the unit is installed on a roof, check that the structure is able to withstand the weight of the unit.
- 5) Ensure the location is clear of debris such as leaves, paper etc which could block the condenser.
- 6) For best noise reduction mount unit on anti-vibration mounts and away from walls, or solid objects that may accentuate the sound.
- 7) Check oil level is correct in compressor oil sight glass, add additional oil as necessary.

Installation.

The KD Semi-hermetic unit is fitted with all necessary components to minimise the installation time required on site. Units are fitted with a Bock semi-hermetic suction gas cooled HG series compressor, suction accumulator, liquid receiver, liquid liner drier/sight glass, electrical control box with contactors and electronic overcurrent relays, electrical isolator switch, crankcase heater, fan speed controller, dual HP/LP pressure switch, oil differential pressure switch, oil separator, suction and discharge vibration eliminators, external HP and LP pressure gauges, and the compressor compartment is acoustically lined. Installation should be carried out by an F-Gas certified engineer, and in accordance with recognised standards of refrigeration practice and current IEE regulations. All local codes of practice should be adhered to.

Wiring diagrams are included with the unit. The units have an inert gas holding charge when delivered. The unit should be fully evacuated and then charged with refrigerant to a clear sight glass and the expected suction and discharge pressures for the application.

The units should be sited in free air, clear of obstruction, with special attention paid to a clear air discharge from the fans to prevent warm discharge air from being drawn back into the condenser coil.

Pipework.

Refrigerant pipe routes should be kept as short and simple as practical, avoiding low points where oil can accumulate. Pipe lines should be sized to ensure the suction gas velocity is sufficient to ensure good oil return to the compressor crankcase.

All copper pipe should be dehydrated refrigeration grade only. Nitrogen should be passed through the pipework during brazing to avoid oxidation.

Suction line should be fully insulated and all pipework should be supported at a maximum of 2m intervals.

In vertical risers, the suction riser should be fitted with U trap at the bottom and the top for a rise over 3m. For larger suction risers, these traps should be fitted at 3m intervals to act as oil traps.

Evacuation.

Do not start the compressor if it is under vacuum. Do not apply any voltage, even for test purposes whilst the compressor is under vacuum.

Ensure any inert gas charge is safely released from the system.

Connect a gauge manifold to the service ports of the condensing unit.

Connect a vacuum pump and gauge to the system.

Ensure all gauge and service valve are open as required.

First evacuate the system and then include the compressor in the evacuation process. The system should be evacuated to <1.5 mbar.

A triple evacuation procedure is recommended for all new systems, or where moisture is suspected.

Refrigerant charging.

CAUTION: Wear personal protective clothing such as goggles and gloves when handling refrigerant.

Add liquid refrigerant directly to the condenser or liquid receiver to break the vacuum.

If the refrigerant needs topping up after starting the compressor, this can be done using a metering device to charge liquid refrigerant into the suction side to ensure that the no liquid returns to the compressor suction.

Avoid overcharging the system with refrigerant.

To avoid shifts in concentration, zeotropic refrigerant blends must always be filled into the system in liquid form.

When charging the system it is best to bypass the fan speed controller, this can be done by linking terminals S1 and S2 on the RGE fan speed controller. Remember to remove this link after charging the system for the fan speed controller to operate correctly.

Pre-start up.

For all installations it will be necessary to set the LP switch to ensure effective control if using a pump down cycle. This will be dependent on site conditions and application but suggested settings are shown below:

Medium Temp applications R404A/R407F/R449A	1.5 bar
Medium Temp applications R134a	0.6bar
Low Temp applications R404A/R407F/R449A	0.3bar

The HP switch is not factory set and will require adjustment to suit conditions on site, the suggested maximum cut out for R404A/R407F/R449A is 27bar, and for R134a is 18bar

The condensing unit is fitted with a Saginomiya RGE fan speed controller and this should be set to maintain the optimum condensing temperature for the application.

Check Saginomiya RGE fan speed controller dipswitches are set correctly (50Hz) and to preferred control type (Cut out or Min speed).

Check all safety and protection devices are functioning correctly, this include oil pressure switches, INT motor protection devices etc.

The INT 69G thermistor unit can be checked using a continuity meter as follows:

Gauge state	Relay position
Deactivated state	11-12
INT69 G switch-on	11-14
Remove PTC connector	11-12
Insert PTC connector	11-12
Reset after mains on	11-14

Relay position INT69 G

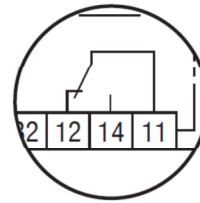


Fig. 19

- Check all moving parts are free and fan guards are secure.
- Check compressor oil level is satisfactory.
- Check all valves are in the correct operating position.
- Crankcase heater should be energised for a minimum of 12hrs before start up.

Start up.

- Run the unit and check the compressor and condenser fan operation.
- Check the system pressures, temperatures and running currents to ensure these are within the expected parameters.
- Check the compressor suction superheat this should be between 7 and 10K; adjust the expansion valve as necessary to maintain this setting.
- Check for any unusual noise or vibration and investigate the cause.
- Allow the system to run for 3-4 hours and check the compressor oil level, top up with the correct oil as required.
- The oil level should be check again after a period of 24hrs to ensure it is correct.
- Carry out a final check for any leaks and repair as necessary. Replace all panels and covers and ensure all screws are tight.
- Note the system charge and refrigerant type for future reference.
- Compressors should normally be limited to a maximum of 10 starts per hour.
- Check the running current and voltage are correct for the running conditions.

Service and maintenance.

- WARNING:** Before starting work on the unit, switch off and isolate the electrical power supply
- At regular intervals the unit should be checked for undue noise and vibration and the cause investigated.
- Check for any refrigerant or oil leaks and repair as necessary
- Check compressor oil level is correct and replenish as required.
- Check and clean the condenser coil if required. Remove any objects that may hinder airflow.
- Check all fan motors for excessive noise or vibration.
- Check all electrical wiring and tighten any loose connections.
- Check the settings and operation of all pressure switches.
- Check electrical overload settings are correct.
- Check fan speed controller settings are correct and condenser fans are operating smoothly.
- Check the system running pressures and temperatures, and suction superheat is correct.

KD Goliath Condensing units - Design Condensing Temperatures in 32°C ambient

Refrigerant R404A.

		Cooling Capacity (W) - Cond temp °C								
Evap Temp °C	10	5	0	-5	-10	-15	-20	-25	-30	
Unit Model										
PA150SM3G	-	44,000/45.4	37,800/43.4	31,600/42.2	26,300/40.6	21,600/39.2	17,500/37.9	13,900/37.1	10,800/36.1	
PA200SM3G	-	49,800/46.8	42,600/44.6	36,000/42.6	29,700/41.5	24,400/39.9	19,800/38.5	15,600/37.6	12,100/36.5	
PA250SM3G	-	60,600/44.2	51,600/42.6	43,000/41.5	35,800/39.9	29,400/39.6	23,600/37.8	18,800/36.7	14,600/35.8	
PA300SM3G	-	69,300/45.3	59,400/43.3	49,600/42.2	41,500/40.6	34,100/39.1	27,500/37.9	21,800/36.7	16,700/36.1	
SPA400SMG3	-	-	85,800/44.8	72,800/42.8	60,400/41.6	49,900/40.0	40,600/38.6	32,300/37.4	25,100/36.6	

Refrigerant R407F

		Cooling Capacity (W) - Cond temp °C								
Evap Temp °C	10	5	0	-5	-10	-15	-20	-25	-30	
Unit Model										
PA150SM3G	54,600/47.6	46,400/45.9	39,300/43.8	32,800/41.9	26,800/40.6	21,700/39.1	17,300/37.7	13,400/36.7	10,100/36.7	
PA200SM3G	62,200/49.4	52,800/47.5	44,900/45.1	37,600/42.9	30,800/41.5	25,600/37.8	19,900/38.3	15,400/37.2	11,600/36.1	
PA250SM3G	74,000/47.1	63,300/44.8	53,500/42.9	44,400/41.5	36,500/39.9	29,500/38.5	23,400/37.2	18,000/36.4	13,500/35.4	
PA300SM3G	95,200/49.0	80,900/47.1	68,700/44.8	57,500/42.6	44,900/40.8	36,600/39.2	29,200/37.8	22,700/36.9	17,200/35.9	
SPA400SMG3	123,000/49.1	106,000/46.6	88,900/44.9	74,300/42.8	60,900/41.4	49,400/36.7	39,300/38.2	-	-	

Refrigerant R449A

		Cooling Capacity (W) - Cond temp °C								
Evap Temp °C	10	5	0	-5	-10	-15	-20	-25	-30	
Unit Model										
PA150SM3G	52,600/47.7	44,900/45.3	37,900/43.2	31,400/41.8	25,800/40.1	20,900/38.7	16,600/37.4	12,900/36.5	9,780/35.5	
PA200SM3G	59,200/49.3	50,800/46.7	43,000/44.4	35,900/42.3	29,300/40.9	23,700/39.3	18,800/37.9	14,500/36.9	11,000/35.8	
PA250SM3G	72,000/46.5	61,300/44.3	51,700/42.4	42,700/41.1	35,000/39.5	28,300/38.2	22,500/36.9	17,400/36.2	13,200/35.3	
SPA400SMG3	-	-	-	-	-	-	-	-	-	

Refrigerant R134a

		Cooling Capacity (W) - Cond temp °C								
Evap Temp °C	10	5	0	-5	-10	-15	-20	-25	-30	
Unit Model										
PA150SM3G	36,500/42.6	30,400/41.3	25,200/39.7	20,500/38.4	16,400/37.5	12,900/36.4	9,860/35.5	7,350/34.7	5,260/34.1	
PA200SM3G	41,800/43.6	34,800/42.2	28,800/40.5	23,400/39.1	18,800/37.7	14,700/36.8	11,200/35.8	8,290/34.9	5,870/34.2	
PA250SM3G	49,900/41.8	41,500/40.6	34,300/39.2	27,900/37.9	22,200/37.1	17,500/36.1	13,400/35.2	9,930/34.5	7,100/33.9	
PA300SM3G	58,600/43.3	49,000/41.9	40,700/40.3	33,200/38.9	26,600/37.9	20,900/36.7	15,900/35.8	11,700/35.2	8,080/34.4	
SPA400SMG3	-	-	-	-	-	-	-	-	-	