

SRC-W & SW series compressors

General design recommendation

(WA-14-02-E)

14. GENERAL DESIGN RECOMMENDATION

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14.1 General design recommendations about pipe lay out

The screw compressors can be incorporated into the system in a similar way to reciprocating compressors. Only the specific features of the oil circuit require special attention.

Pipe dimensions for short circuits is mostly determined by the nominal size of the shut off valves. The usual criteria apply with regard to flow velocities (oil return).

The pipe layout and the system construction must be designed so that the compressor cannot be flooded with oil or liquid refrigerant during off periods. For this purpose the discharge and suction lines should at first be led downwards from the compressor. As additional measures (also provides simple protection against liquid slugging during starting) for Systems with direct expansion either a swan-neck upwards after the evaporator or installation of the compressor above the level of the evaporator is required (not essential with "pump down" system). A solenoid valve should also be fitted in the liquid line directly before the expansion valve.

The use of "flooded evaporators with HCFC/HFC refrigerants requires separate oil return from the evaporator or low pressure receiver. The bleed point (preferably several) should be situated in the area of the liquid level (oil rich phase). The return should be made via the suction line, the refrigerant must however first be evaporated by means of a heat exchanger. With strongly varying liquid levels (e. g. pump systems) a bleed at the lowest point or after the circulating pump is practical the discharge line sections down to the header should have a sufficient fall to ensure free drainage discharge gas header in form of an horizontal pipe.

As a result of the preferred installation of the oil separator these plants usually allows the suction lines to be run below the level of the compressors; this is the safest solution.

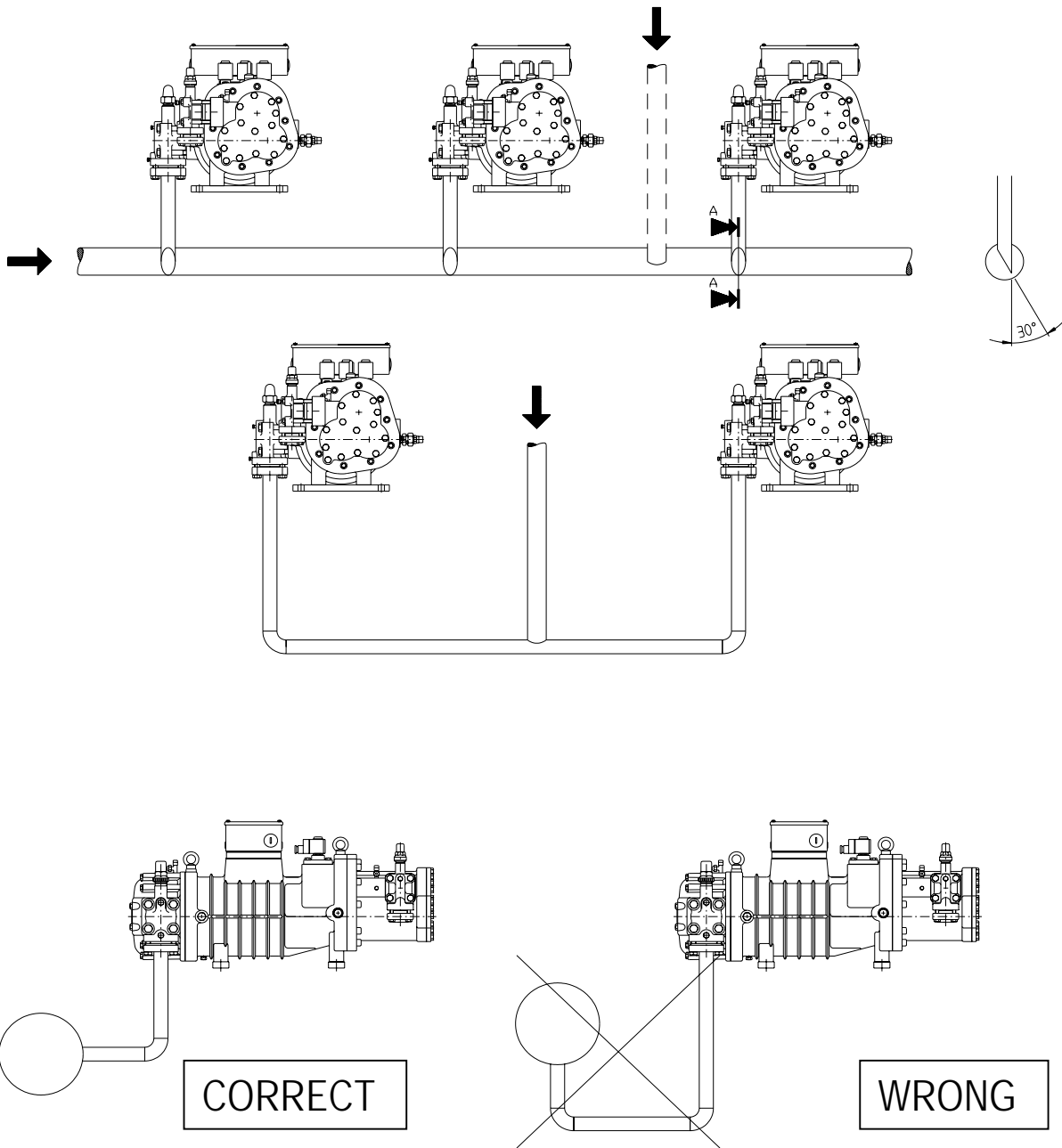
14.2 Pipe layouts and construction

Due to the low level of vibration and the small discharge gas pulsation the suction and discharge lines can usually be made without a flexible element or muffler. The pipes must however be sufficiently flexible and must not exert any strain on the compressor. Critical pipe section lengths should be avoided (also dependent upon operating conditions and refrigerant).

An oil heater is situated in the oil separator to prevent high refrigerant dilution of the oil during off periods. This is controlled by means of a thermostat, the temperature setting is 70°C. In addition a off cycle bypass is recommended which reduces the pressure in the oil separator to suction pressure during of cycle and thus reduces refrigerant saturation. Apart from this an additional start unloading is also achieved. A check valve is necessary after the oil separator and an equalising line controlled by a solenoid valve between the oil separator and the suction line (only open during off cycle). With parallel compounded compressors the solenoid valve may only be open when all compressors are switched off.

The compressor must be protected against contamination with dirt (scale, rust and phosphate deposits). For widely branched pipe systems which are difficult to inspect for contamination the use of a suction side fine filter (max. 25 µm) is necessary. In addition a generously dimensioned good quality filter drier is required to provide the system with a high degree of dehydration and chemical stability.

General pipe layout recommendation for parallel compounding (suction line):



Picture 14-A: General pipe layout recommendation for suction line