

# Type-R (Plan 13-SE) Installation Instructions

## Teikoku Type-R (Plan 13-SE) Reverse Circulation Pump

These instructions describe the recommended method for installation of the reverse circulation piping on Teikoku Type-R (Plan 13-SE) pumps, which are specifically designed to handle highly volatile fluids. These instructions also include recommendations for the suction pipe and the bypass pipe.

### 1. Reverse Circulation Piping

The purpose of these recommendations is to vent any vapors that form inside the reverse circulation pipe. Trapped vapors in the reverse circulation line will cause the flow through the line to stop. In the event that the flow stops, the pump will be damaged from liquid vaporization and/or overheating. Following these recommendations will allow both the vapor and liquid to flow freely back to the suction tank.

- This line must be connected to the vapor zone in the suction tank.
- Never install a check valve on this line.
- This line must be continuously rising to the suction tank.
- This line must never be down-slope at any point, as this will create vapor traps.

- The Teikoku supplied reverse circulation line orifice must be installed in this line. Controlling the required reverse circulation flow rate using a flow meter and a control valve is an option.
- Install a block valve in this line. This block valve must be 100% open at all times.
- To prevent vapor traps, use of a full port ball type valve is recommended.
- The orifice plate must be installed in vertical line.
- This line must be individual for each pump. Never combine these lines.
- Never connect this line to the suction, discharge or minimum flow lines.
- The total head of this line (HR) must never exceed the value specified on the data sheet of the pump.

### 2. Suction Pipe

- Suction pipe shall be constantly falling until it reaches the pump suction.
- If any reducer is installed in the suction line, the reducer must be eccentric and must be installed with the flat side on top.

### 3. Bypass Pipe for Venting and Minimum Flow

- This line must be continuously rising back up to the suction tank.
- If incorporated, the orifice plate shall be installed in vertical line.
- Never combine these lines.
- A block valve shall be installed in the bypass line.

Reverse Circulation Piping Layout

