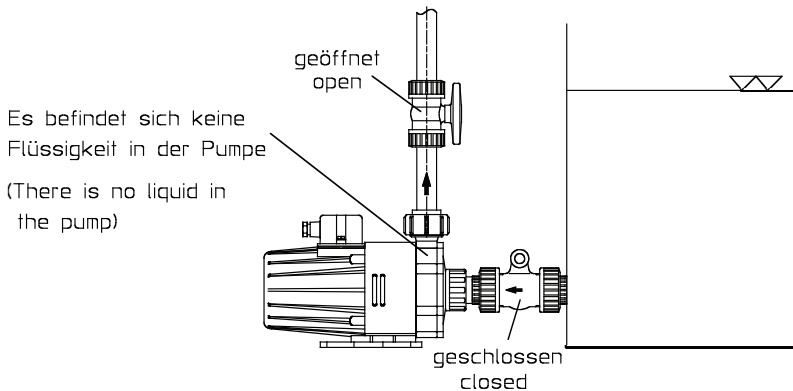


## DRY-RUNNING:

**Definition:** “Dry-running” means, there is no liquid in the pump, the suction pipe is closed.

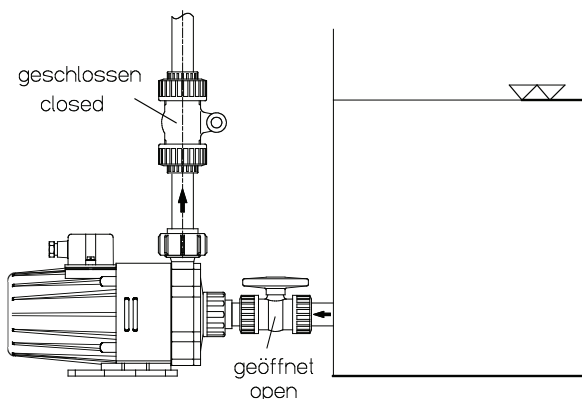


[Fig. 1: Centrifugal pump in “dry-running” operation]

In this case the pump impeller does not produce any frictional heat, this emerges exclusively in the bearing of the pump. As this increase in temperature with the RM-TS product line is very low (max. 5 °C), it can be neglected and the pump will not be damaged.

## HOT-RUNNING:

**Definition:** “Hot-running” describes the increase in temperature of a fluid which is caused by a closed pressure- and/or suction pipe. Liquid is circulating within the pump, however, this liquid is not transported out of the pump housing and so the heat can not be transferred by the fluid. During circulating within the pump housing the fluid will be heated. This increase in temperature can be so high that damages at the pump parts may be caused.



The quantity of heat which is caused by the friction of the impeller can **only** be transferred by an open valve in the pressure pipe by liquid exchange when the valve in the suction pipe is opened at the same time.

In order to avoid an increase in temperature, a marginal opening of the pressure-side valve, so that approx. 0,5 l/min. may pass, is already sufficient.

As this kind of increase in temperature is **independent of the bearing** of the pump, a damage caused by running hot can only be avoided by the installation of, for example, our electronic pump protection RPR-Control-100.

**Safe to run dry product lines:**

RM2 – TS  
 RM3 – TS  
 RM4 – TS  
 RM4.5 – TS  
 RM5 – TS

**Capacities:**

Hmax: 60 mWS  
 Qmax: 1500 l/min.

**Motor output:**

0,090 kW up to 15 kW

**Typical examples of dry-running conditions in practice and their impact on “normal standard” and on RM-TS pumps:**

Dry-running conditions:	Impact on magnetically coupled centrifugal pumps of “normal standard” design	Impact on the new RM-TS pumps safe to run dry
A mechanic checks the sense of rotation of the pump although there is no fluid in the pump housing.	Depending on the size of the pump and how long the check takes (some minutes), the pumps are often already defective or broken down when being installed.	<b>NONE!</b> As soon as the pump is filled with fluid, it works without being damaged.
When the pump is started, the valve in the suction line is still closed.	Depending on the size of the pump and how long the valve remains closed, the pumps are often defective or even broken down.	<b>NONE!</b> As soon as the valve is open, the pump works without being damaged.
The suction line tank runs dry and the level controller is defective or not available. The pump runs dry until the operating personnel realises that the tank is empty.	Depending on the size of the pump and how long it runs dry, it will be damaged sooner or later.	<b>NONE!</b> As soon as the pump is filled with fluid, it continues to work without being damaged.
Suction and pressure lines cannot be evacuated.	Depending on the size of the pump, these lines are often already defective or broken down when the pump is installed.	<b>NONE!</b> Even under difficult operating conditions, the pump works impeccably.

**Protection of system processes**

To protect the overall system from process interruptions, it might be necessary all the same to have a “lack of fluid” indicated so that appropriate measures can be taken immediately. Therefore, we recommend installing an additional electronic pump protection device. These protectors are available in various designs.