# Specification of the technical function „Temperature“

SIMATIC PCS 7

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# Table of contents

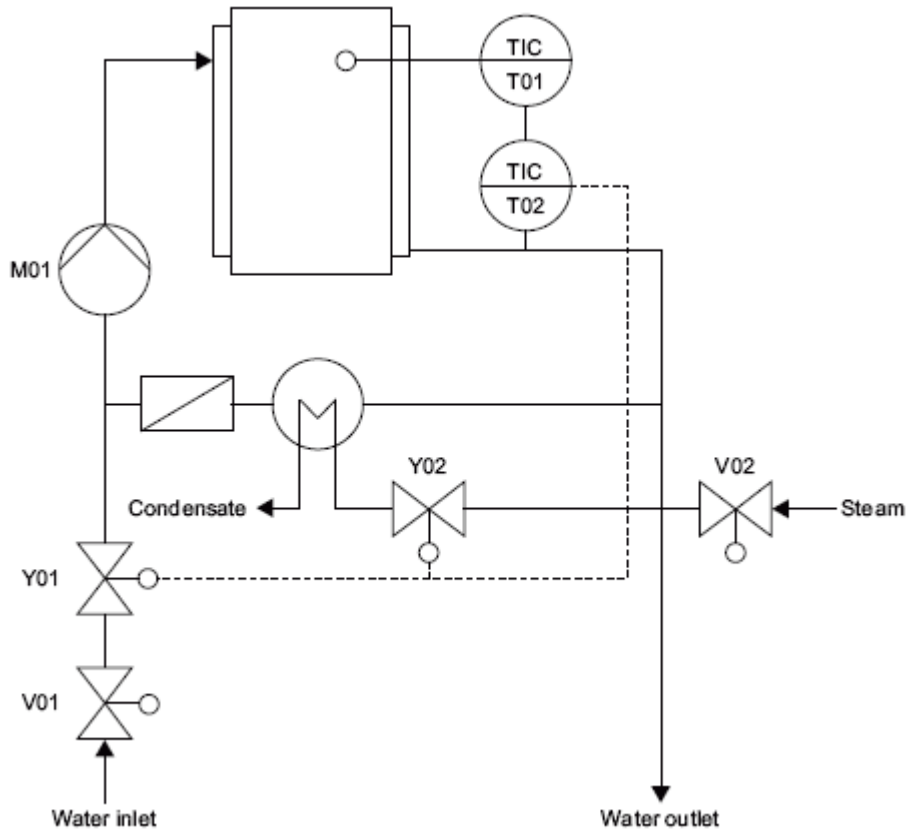
# 1 Introduction

## 1.1 Purpose of the requirement specification

This specification is used to describe the tempering basic function.

## 1.2 P&I Diagram

Figure 1-1






## 1.3 CM configuration

Table 1-1

| Name | I/O name | CM | Description | Optional |
|---|---|---|---|---|
| M01 | M01 | MOTOR | Pump | |
| V01 | V01 | VALVE | Inlet valve | |
| V02 | V02 | VALVE | Heating steam valve | |
| T01 | T01 | CTRL_PID | Primary temperature controller | |
| T02 | T02 | CTRL_PID | Secondary temperature controller | |

# 2 Execution behavior

In chemical processes a time-dependent temperature control of the product vessel is required. Therefore the equipment must ensure fast heat input or heat removal. To achieve this, a pressurized water circulation system is used in which a pump circulates the water in the jacket system.

The cooling water is heated indirectly by a heat exchanger. The required temperature is controlled by the steam pressure with a steam inlet control valve. The condensate is removed over a steam trap.

The temperature is controlled by a cascade control. The reference variable for the master (primary) controller is the internal temperature of the vessel and controls the valves for steam and cooling water. The follower (secondary) controller is designed as a split-range controller. The control valves are therefore not controlled by the EM. They operate in the “set externally” mode.

The cascade control is open depending on the level of the vessel. This means that if the tank level no longer ensures that the temperature sensors are immersed in the product, the controller outputs generated from the internal temperature in the master controller are no longer used as a setpoint for the slave controller, but a switchover to direct setpoint input from the EM is performed.

The EM is self-terminating.

Parameter:

- Temperature in °C
- Temperature tolerance in °C
- Hold time in minutes

# 3 System functions

1. The safety position of the individual basic function elements is defined as follows:
   - Pump M01 => Off
   - Inlet valve V01 => Closed
   - Heating steam valve V02 => Closed
   - Primary temperature controller TIC01 => Off
   - Secondary temperature controller TIC02 => Off
2. Manual operator control of the basic function elements must be possible only in the initial state and in hold.

# 4 Connections

The basic function forms the connection between control module level and batch level.

This requires that control module level and batch level be provided with a defined interface by the basic function.

# 5 History

Table 5-1

| Version | Date | Modifications |
|---|---|---|
| V1.0 | 04/2009 | First version |
| V2.0 | 08/2012 | Update Design& PCS 7 V8.0 |
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