

Specification of the technical function „Discharge”

SIMATIC PCS 7

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1 Introduction

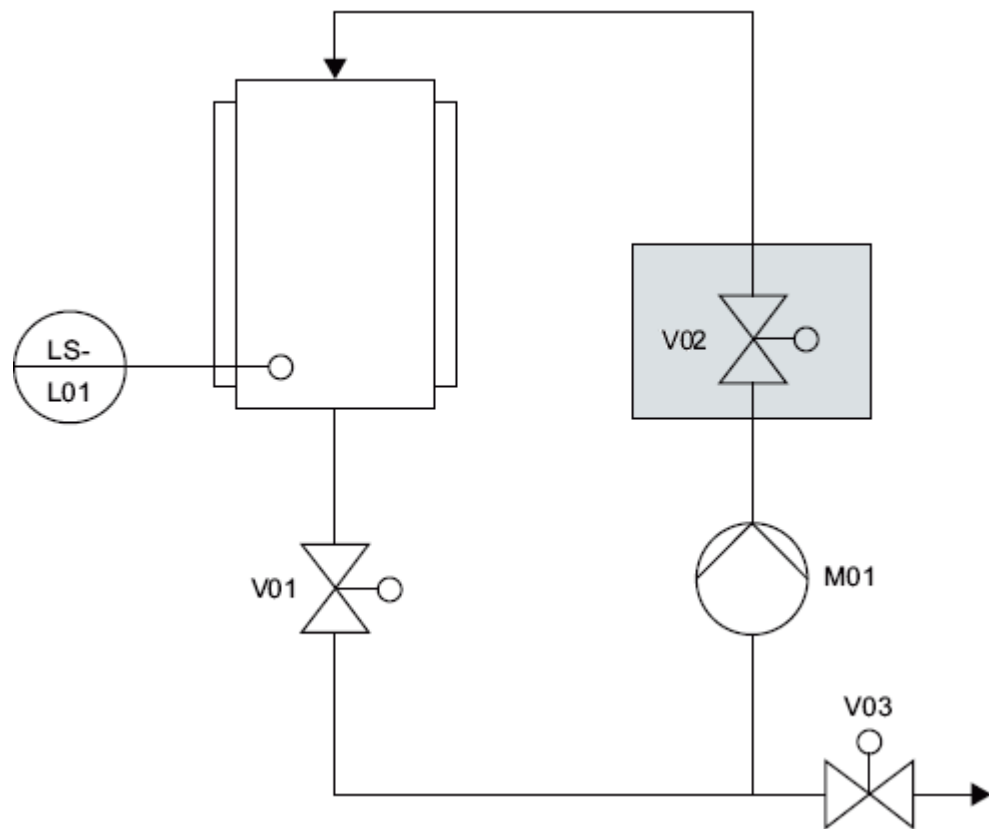
1.1 Purpose of the requirement specification

This specification is used to describe the basic function draining/emptying with three functions:

1. Tank capacity draining
2. Tank capacity emptying
3. Capacity intertank

1.2 P&I Diagram

Figure 1-1



Note The optional V02 measuring point is grayed out.

1.3 Control Module (CM) configuration

Table 1-1

| Name | I/O name | CM | Description | optional |
|------|----------|-------|--------------------|----------|
| M01 | M01 | MOTOR | Pump | |
| V01 | V01 | VALVE | Bottom drain valve | |
| V02 | V02 | VALVE | Intertank valve | x |
| V03 | V03 | VALVE | Drain valve | |
| Y01 | Y01 | VALVE | | |
| Y02 | Y02 | VALVE | | |

2 Execution behavior

This equipment module (EM) controls the removal of the product or input material from a tank.

Control Strategy 1: „Discharge“

The discharge control strategy discharges a certain amount of material from the vessel.

It receives a request to open the discharge path by another technical function (e.g., “Dosing with valve control”) and keeps it open until the request is cancelled. This ensures a precisely discharged amount that is controlled by the Dosing with control valve EM. If the vessel is empty before the request is retracted, a message is sent and the EM changes to hold.

The following path is to be set:

- Bottom drain valve and drain valve open, pump on.
- All other paths are to be closed.
- The control strategy is self-terminating.
- Parameter: The control strategy has no parameters

Control Strategy 2: „Drain“

The drain control strategy empties the entire vessel. Once the vessel is empty, the EM receives the signal to complete over a process value.

The following path is to be set:

- Bottom drain valve and drain valve open, pump on.
- All other paths are to be closed.
- A change to the „capacity intertank transfer“ is to be possible.
- The control strategy is self-terminating.
- Parameter: The control strategy has no parameters

Control strategy 3: „Circulation“

Some products must be kept constantly on the move to prevent them from hardening. To achieve this, the product is taken from the vessel and returned to the vessel by a pump. A circulation is produced that keeps the product moving constantly.

The following path is to be set:

- Bottom drain valve and intertank valve open, pump on.
- All other paths are to be closed.
- A change to the „Tank draining“ and „Tank emptying“ functions is to be possible.
- The control strategy is self-terminating.
- Parameters: Pumping time in minutes.

3 System functions

1. The safety position of the individual basic function elements is defined as follows:
 - Pump M01 => Off
 - Bottom drain valve V01 => Closed
 - Pump valve V02 => Closed
 - Drain valve V03 => Closed
 - Filling valve V04 => Closed
2. Manual operator control of the basic function elements must be possible only in the initial state and in hold.
3. If there is no fault condition, you always have to wait for a checkback message when controlling basic function elements.

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 V7.1/ V8.0 |
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