

# Controlling an ALM with SIMATIC S7 CPU

SIMATIC / SINAMICS

FAQ • August 2011



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<http://support.automation.siemens.com/WW/view/en/49515414>

## Question

How can you control the ALM (with Drive-CLIQ) of a SINAMICS S120 through the SIMATIC program?

## Answer

The instructions and notes listed in this document provide a detailed answer to this question.

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# 1 Objective

The SIMATIC S7-CPU and the SINAMICS S120 communicate with each other via PROFIBUS or PROFINET.

With the FB390 "ALM\_Control" block you can control the ALM through the user program of the S7 if it is connected with a Drive-CLIQ with a CU320(-2).

# 2 Overview

The S7-CPU is connected via PROFIBUS or PROFINET with the CU320(-2) of a SINAMICS S120. The ALM is connected via Drive-CLIQ with the CU.

In the SINAMICS S120 a control and status telegram can be defined for each module (CU, ALM, motor module, etc.). If this is performed for an ALM, then it can be switched on and off from the S7.

The FB390 "ALM\_Control" block checks the status of the ALM and allows the user to switch it on and off.

The block can be downloaded on the page of these FAQs. (Link see page 2.)

# 3 Communication Configuration

## 3.1 Telegram definitions

To configure the SINAMICS you can either use the STARTER software that is free of charge or one of the following (chargeable) packages:

- DRIVE ES
- S7 Technology
- SIMOTION Scout

The functionality of the STARTER is already integrated in these packages. Only one of the packages or the STARTER can be installed on a PC/PG.

When using the STARTER the configuration of the communication has to be entered twice (once for the drive and once for the PLC), the other packages synchronize it automatically.

### 3.1.1 Telegram definition with STARTER

When using the STARTER software you may have to import the GSD or the GSDML file into STEP 7.

The GSD/GSDML file for the SINAMICS S 120 can be found on the CF memory card of the SINAMICS S 120. Copy it to your configuration PC and import it in HW Config.

### Configuration in the starter

1. Open the Starter
2. Add a new infeed and select your infeed.

Figure 3-1

Configuration - SINAMICS\_S120\_CU320 - Infeed

Infeed  
 Infeed drive object - ac  
 Process data exchange  
 Summary

Infeed: Einspeisung\_1

Configure the infeed component:

Component name:

Supply voltage range:

Cooling method:

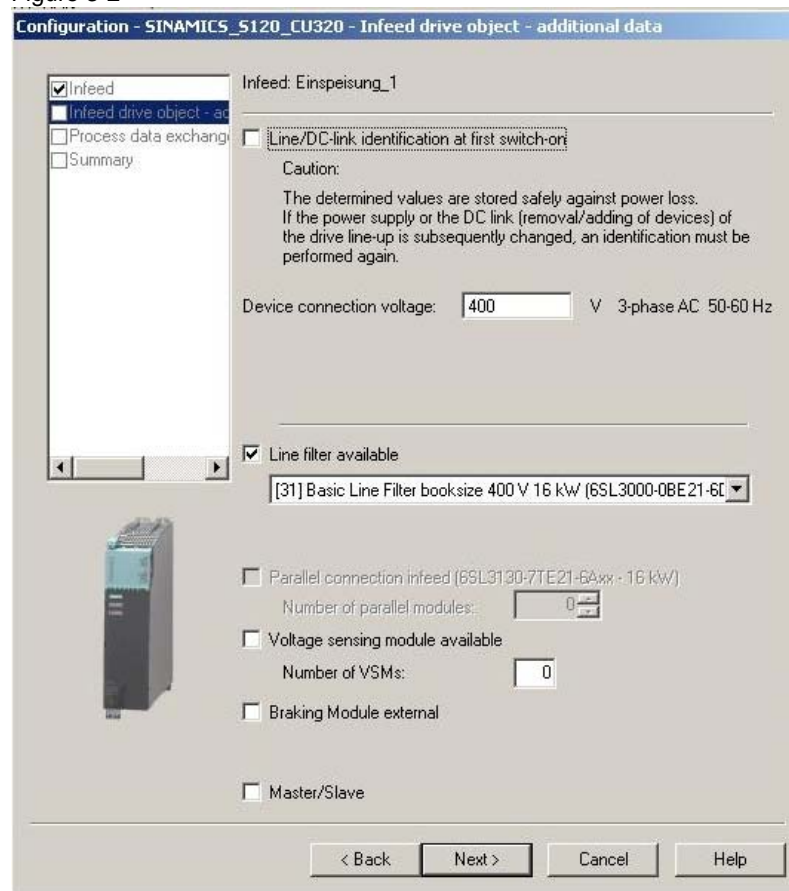
Type:

Selection

Order no.	Rated power	Rated current
6SL3130-7TE21-6Axx	16 kW	27 A
6SL3130-7TE23-6Axx	36 kW	60 A
6SL3130-7TE25-5Axx	55 kW	92 A
6SL3130-7TE28-0Axx	80 kW	133 A
6SL3130-7TE31-2Axx	120 kW	200 A
6SL3330-7TE32-1AAx	132 kW	210 A
6SL3330-7TE32-6AAx	160 kW	260 A
6SL3330-7TE33-8AAx	235 kW	380 A
6SL3330-7TE35-0AAx	300 kW	490 A
6SL3330-7TE36-1AAx	380 kW	605 A
6SL3330-7TE38-4AAx	500 kW	840 A
6SL3330-7TE41-0AAx	630 kW	985 A
6SL3330-7TE41-4AAx	900 kW	1405 A

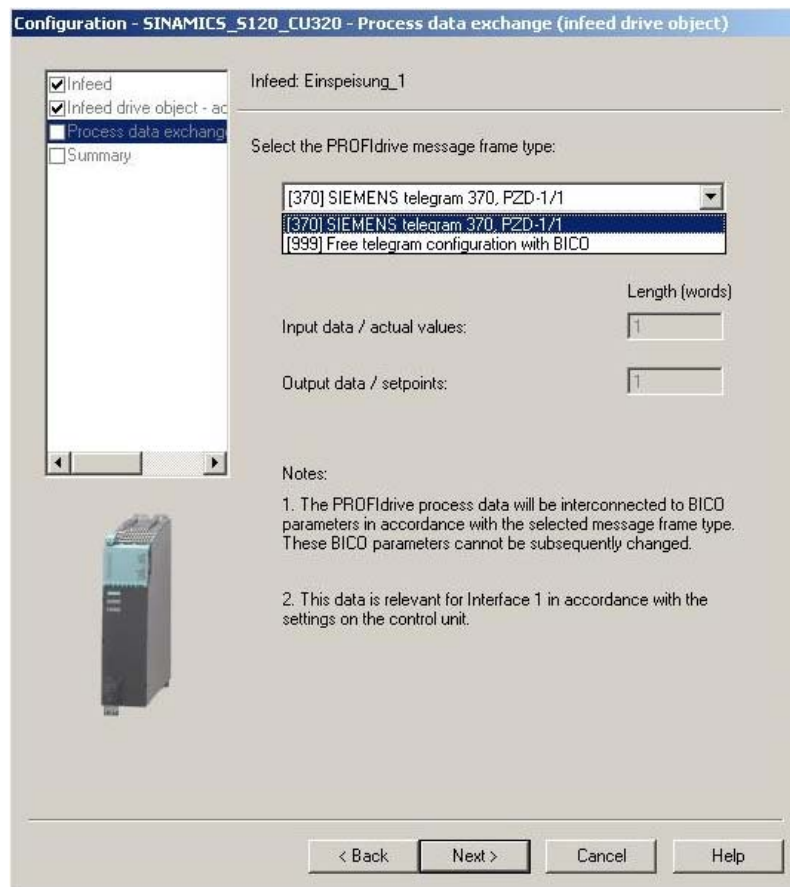
3. Configure your additional module (in the example here, a filter).

Figure 3-2



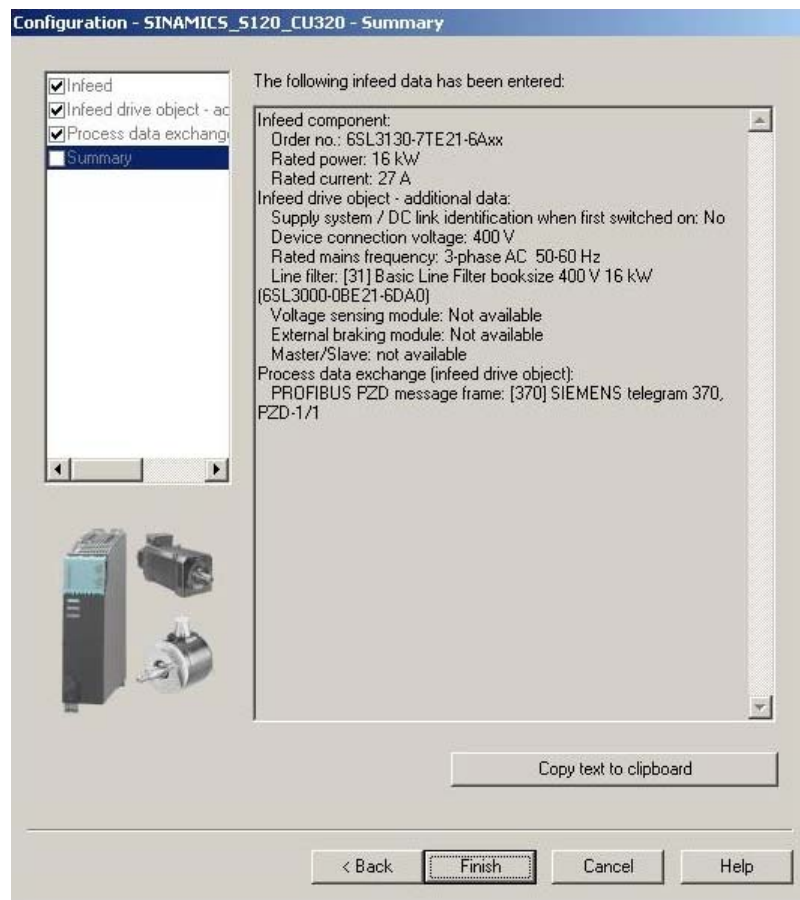
4. Configure a "SIEMENS telegram 370, PZD-1/1" for the ALM of the SINAMICS S120.

Figure 3-3



5. Complete the configuration of the infeed

Figure 3-4



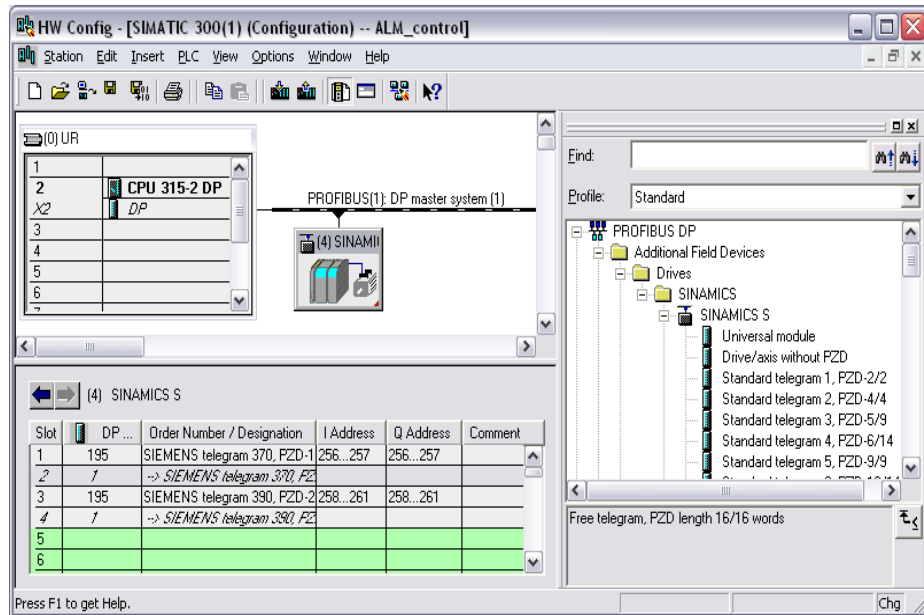
6. Also configure the necessary telegram types for your application for all the other components (e.g. motor modules).
7. Load the configuration into the SINAMICS S120, save and start "Copy RAM to ROM"



### Configuration in HW Config

8. Configure your bus system and use the entries under other field devices for the SINAMICS S 120 (e.g. „PROFIBUS\DP\Additional FIELDDEVICES\Drives\SINAMICS\SINAMICS S“)
9. Configure the same telegram configuration as previously in the STARTER:

Figure 3-5



10. Save and compile the configuration and load it to the CPU.

### 3.1.2 Telegram definition with DRIVE ES, S7 Technology or SIMOTION Scout

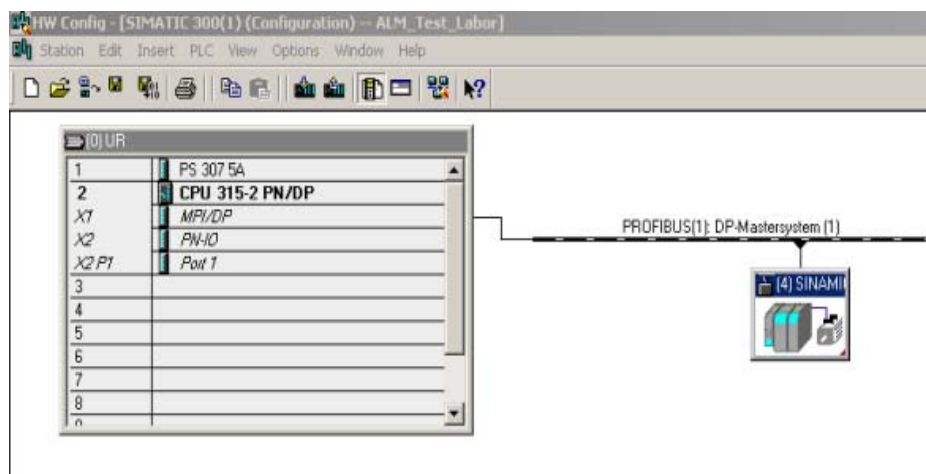
**Note** The description below applies only for all S7-CPU's without integrated technology!  
If you are using a CPU with integrated technology (CPU 31xT or CPU 317TF), the drives are connected to the technology and you have to use the PLC open blocks of S7 Technology. The following entry provides information for commissioning the S7 Technology with SINAMICS S120  
<http://support.automation.siemens.com/WW/view/en/48358172>

**Note** If you cannot find the SINAMICS firmware version you are using in the catalog of the HW Config, you may have to install a SSP (SINAMICS Support Package) first, in order to update the starter functionality in DRIVE ES, S7 Technology or SIMOTION Scout.

#### Configuration in HW Config

1. Only create the SINAMICS station in HW Config without configuring it any further:

Figure 3-6

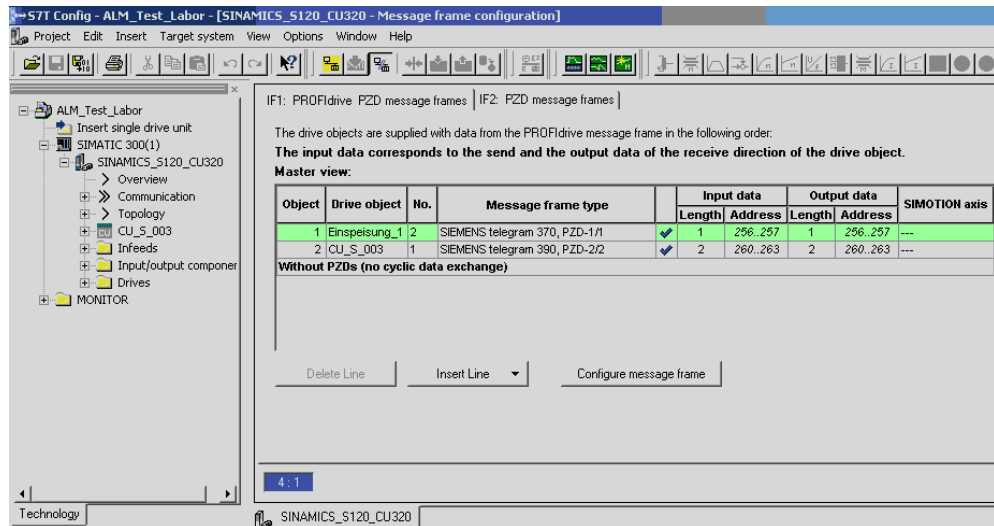


2. Save the configuration

### Configuration in Drive Monitor, S7T Config or Scout

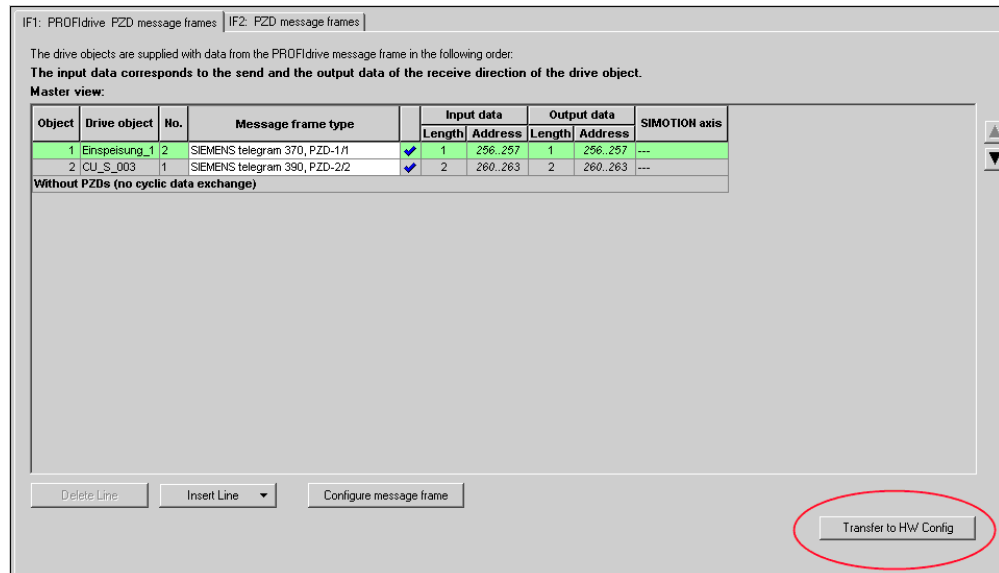
3. Go to the Drive Monitor, S7T Config or Scout.
4. Configure the message frame you need to use.

Figure 3-7



5. Then click the “Transfer to HW Config” button.

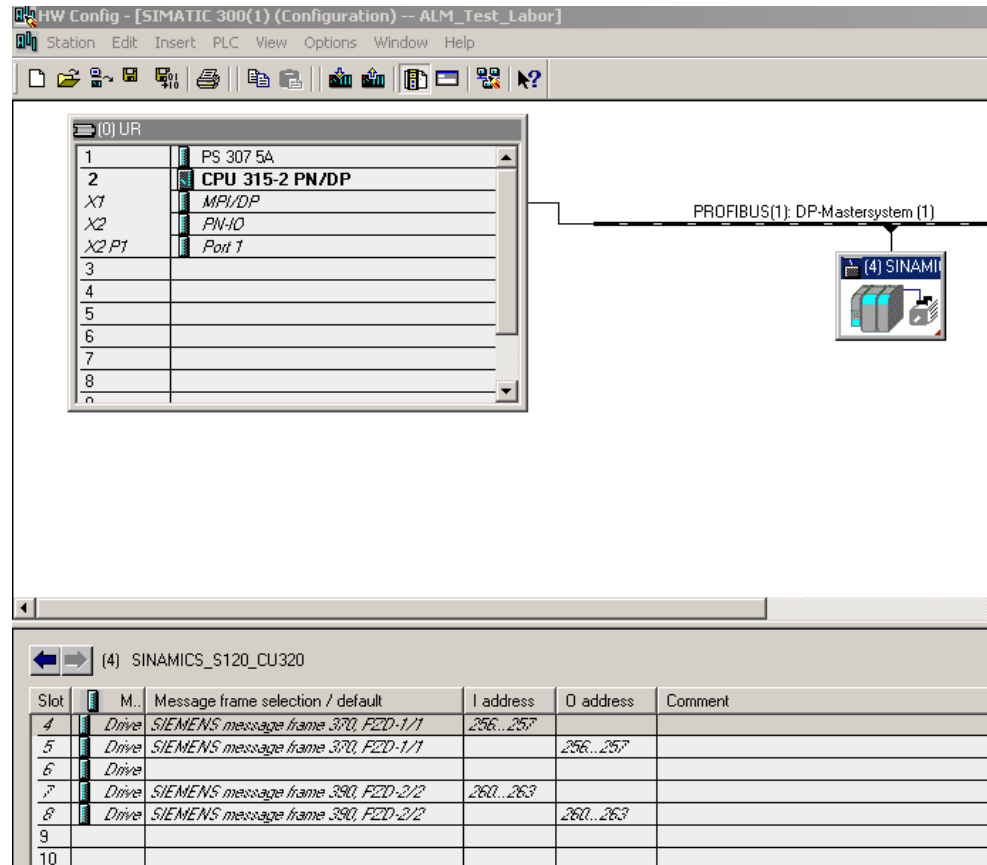
Figure 3-8



6. Save and compile the configuration and load it to the drive.

By transferring it, the configuration of the SINAMICS S120 was adjusted in HW Config:

Figure 3-9



7. Save and compile the configuration and load it to the S7 CPU.

## 4 STEP 7 Programming

Copy the FB390 "ALM\_Control" block into the block container of your SIMATIC project. Integrate the block through a cyclic call (e.g. in OB1) into your program and load the modified program into the CPU.

Figure 4-1

```
CALL "ALM_Control" , "IDB"
  ALMEnable      :=
  ALMQuitError   :=
  PZDReceive_IN :=
  ALMOn          :=
  ALMRdy         :=
  ALMError       :=
  PZDSend_OUT    :=|
```

### 4.1 Block interface

Table 4-1

Parameters	Data type	Initial value	Description																														
<b>Inputs</b>																																	
ALMEnable	BOOL	FALSE	As long as ALMEnable = TRUE, it will be attempted to switch on ALM. The ALM goes into RUN state if no error is pending that stops the enable.																														
ALMQuitError	BOOL	FALSE	If the ALM has an error, it can be acknowledged with ALMQuitError = TRUE.																														
PZDReceive_IN	WORD	W#16#0	Byte input start address of the ALM (telegram 370) from the hardware configuration e.g. PIW 256 <div data-bbox="790 1272 1364 1462" style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p>(4) SINAMICS_S120_CU320</p> <table border="1"> <thead> <tr> <th>Slot</th> <th>M..</th> <th>Message frame selection / default</th> <th>I address</th> <th>O address</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>Drive</td> <td>SIEMENS message frame 370, F2D-1/1</td> <td>256...257</td> <td></td> </tr> <tr> <td>5</td> <td>Drive</td> <td>SIEMENS message frame 370, F2D-1/1</td> <td></td> <td>256...257</td> </tr> <tr> <td>6</td> <td>Drive</td> <td></td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>Drive</td> <td>SIEMENS message frame 390, F2D-2/2</td> <td>260...263</td> <td></td> </tr> <tr> <td>8</td> <td>Drive</td> <td>SIEMENS message frame 390, F2D-2/2</td> <td></td> <td>260...263</td> </tr> </tbody> </table> </div>	Slot	M..	Message frame selection / default	I address	O address	4	Drive	SIEMENS message frame 370, F2D-1/1	256...257		5	Drive	SIEMENS message frame 370, F2D-1/1		256...257	6	Drive				7	Drive	SIEMENS message frame 390, F2D-2/2	260...263		8	Drive	SIEMENS message frame 390, F2D-2/2		260...263
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8	Drive	SIEMENS message frame 390, F2D-2/2		260...263																													
<b>Outputs</b>																																	
ALMOn	BOOL	FALSE	ALM feedback indicating that it is in operation state.																														
ALMRdy	BOOL	FALSE	Feedback whether ALM is ready to be switched on.																														
ALMError	BOOL	FALSE	An error is pending at ALM.																														
PZDSend_OUT	WORD	W#16#0	Byte output start address of the ALM (telegram 370) from the hardware configuration, e.g. PQW 256 <div data-bbox="790 1704 1364 1881" style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p>(4) SINAMICS_S120_CU320</p> <table border="1"> <thead> <tr> <th>Slot</th> <th>M..</th> <th>Message frame selection / default</th> <th>I address</th> <th>O address</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>Drive</td> <td>SIEMENS message frame 370, F2D-1/1</td> <td>256...257</td> <td></td> </tr> <tr> <td>5</td> <td>Drive</td> <td>SIEMENS message frame 370, F2D-1/1</td> <td></td> <td>256...257</td> </tr> <tr> <td>6</td> <td>Drive</td> <td></td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>Drive</td> <td>SIEMENS message frame 390, F2D-2/2</td> <td>260...263</td> <td></td> </tr> <tr> <td>8</td> <td>Drive</td> <td>SIEMENS message frame 390, F2D-2/2</td> <td></td> <td>260...263</td> </tr> </tbody> </table> </div>	Slot	M..	Message frame selection / default	I address	O address	4	Drive	SIEMENS message frame 370, F2D-1/1	256...257		5	Drive	SIEMENS message frame 370, F2D-1/1		256...257	6	Drive				7	Drive	SIEMENS message frame 390, F2D-2/2	260...263		8	Drive	SIEMENS message frame 390, F2D-2/2		260...263
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## Appendix

### 5 Block Description

#### 5.1 Description of the block networks

Table 5-1

Network	Contents	Remark
1.	Load status word of the ALM	
2.	Switch on ALM or acknowledge error	
3.	Processing the switch-on sequence of the ALM	<ul style="list-style-type: none"><li>• It is checked whether an error is pending on the ALM</li><li>• The control right of the CPU is demanded</li><li>• OUT 2 is checked</li><li>• Readiness to switch-on is checked</li><li>• The ALM is switched on</li></ul>
4.	Status request of the ALM	The status of the ALM is requested here
5.	Processing of temporary data	