SINAMICS S: Positioning an S120 with S7-300/400 via PROFIBUS/PROFINET in STEP 7 with Safety Integrated via terminal

SINAMICS S120
SIMATIC S7-300/400

Short document • September 2013

Applications & Tools

Answers for industry.

SIEMENS

Siemens Industry Online Support

This article originates from the Siemens Industry Online Support. The following link takes you directly to the download page for this document:

http://support.automation.siemens.com/WW/view/de/67261457

Caution:
The functions and solutions described in this article are limited primarily to the implementation of the automation task. Please also observe that in case of networking your plant/system area with other parts of the plant, the company network or the Internet, appropriate protective measures within the framework of industrial security must be adopted. For more information, see the article ID 50203404.

http://support.automation.siemens.com/WW/view/de/50203404

You should also actively use our Technical Forum in the Siemens Industry Online Support for this topic. Discuss your questions, suggestions or problems together with our enthusiastic forum community:

http://www.siemens.de/forum-applikationen

SIEMENS

SIMATIC, SINAMICS

SINAMICS S120 Positioning connected to an S7-300/400 control

Warranty and liability

Note

The application examples in this document are not binding and do not claim to be complete regarding configuration, equipment, and any eventuality. These application examples do not represent specific customer solutions – but are only intended to provide support when it comes to typical applications. You are responsible for the proper operation of the described products. These application examples do not relieve you of your responsibility regarding the safe handling when using, installing, operating, and maintaining the equipment. By using these application examples, you agree that Siemens cannot be made liable for possible damage beyond the mentioned liability clause. We reserve the right to make changes and revisions to these application examples at any time without prior notice. If there are any differences between the suggestions made in these application examples and other Siemens publications, such as catalogs, the contents of the other document(s) take priority.

Siemens shall not be held liable for the information provided in this document.

We accept no liability for any damage or loss caused by the examples, information, programs, planning data, or performance data described in this application example, irrespective of the legal basis for claims arising from such damage or loss, unless liability is mandatory. For example, according to the product liability law, in cases of malfeasance, gross negligence, due to endangerment of life, body or health, due to assumption of a guarantee for a product's characteristics of state, due to malicious concealment of a defect or due to violation of basic contractual obligations. However, claims for indemnification based on breach of contract shall be limited to liability for damages to the contract-specific, foreseeable damages, provided there is no mandatory liability for intent, acts of gross negligence, harm to the life, body and health of human beings. Any change to the burden of proof to your disadvantage is not covered hereby.

Table of contents

1 Overview

This brief documentation shows the operating control and function mechanisms of the project sample: „*SINAMICS S: Positioning an S120 with S7-300/400 via PROFIBUS/PROFINET in STEP 7 with Safety Integrated via terminal*"

This brief documentation does not include any explanations and only shows the essential points when operating and integrating blocks into your own projects

1.1 Preconditions

In order to use the blocks of the sample project, you require the following:

• A SIMATIC S7-300/400

• A SINAMICS S120 with two drive axes

• SINAMICS S120 must be connected via PROFIBUS or PROFINET with the SIMATIC S7-300/400.

2 Using the application

The application can be operated using the variable tables of the sample project or via the HMI.

2.1 Preconditions

In the project sample, basic safety functions are activated in SINAMICS.

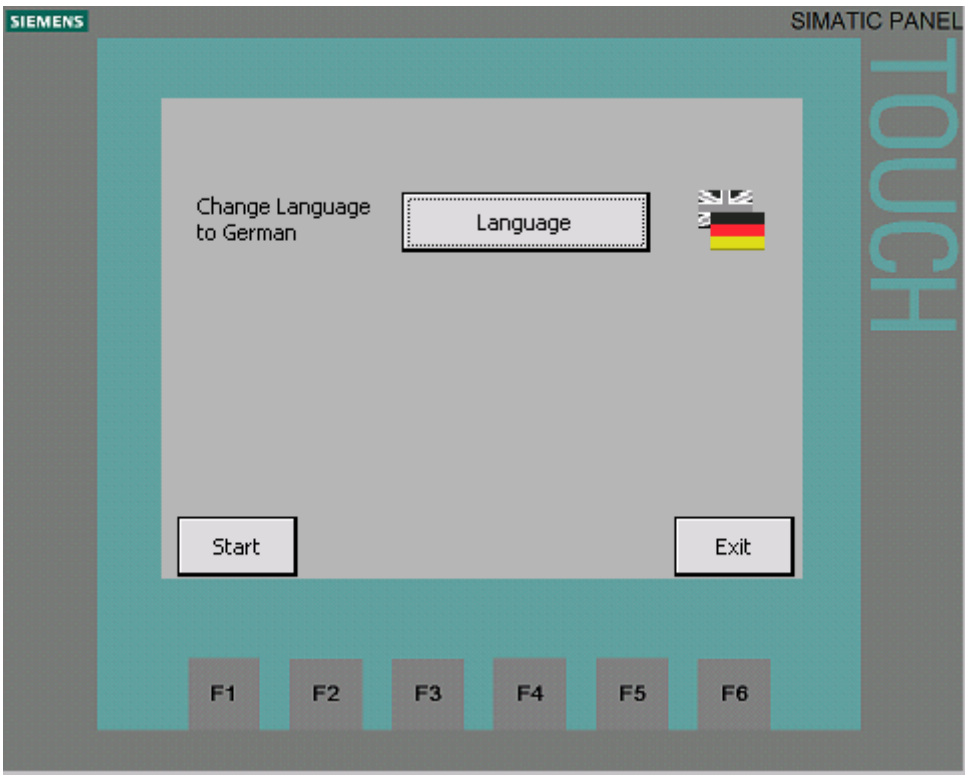
In order to be able to switch on the SINAMICS S120, 24 V must be available at the EP terminals of the motor module X21.3 and X22.3 as well as at the Control Unit X122.1.

Otherwise, the pulses are inhibited.

2.2 Using the application via HMI

2.2.1 Basic screen

Fig. 2-1



The language can be selected in the basic screen.

Exit: exits the runtime

Start: Changes to the start screen for the basic positioner

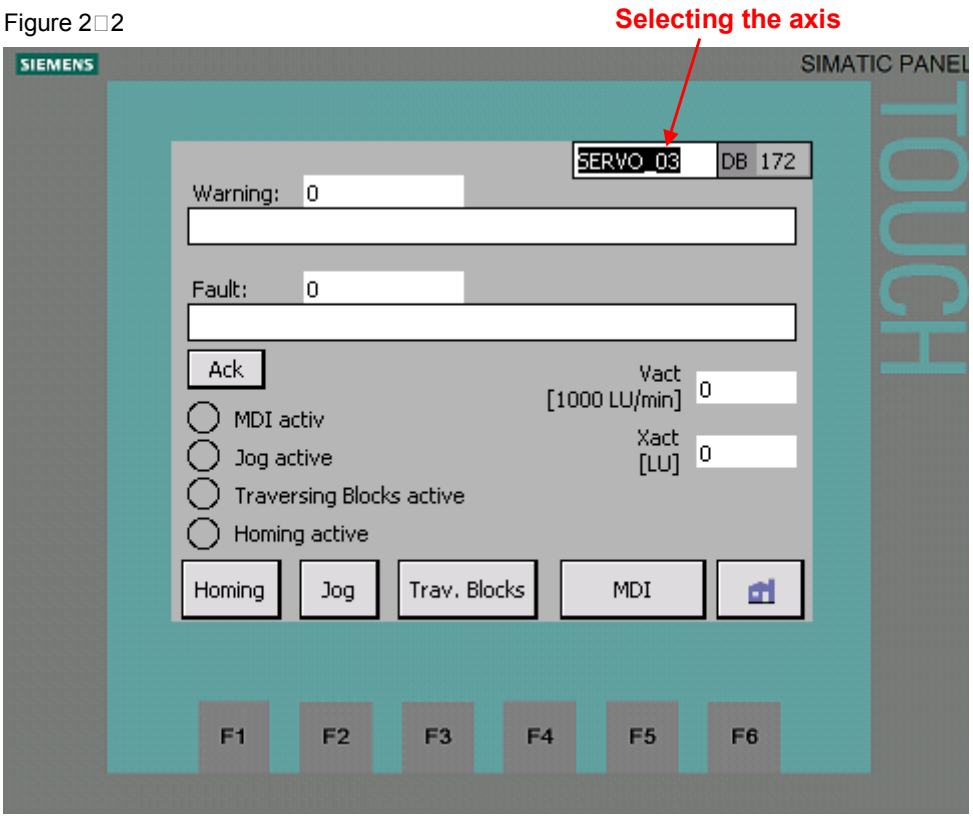
2.2.2 Selecting the axis

In all of the following screens, the axis can be selected in the topmost line. To the right of the selection, the number of the axis DB of the selected axis is displayed.

All inputs and displays are only for the displayed axis.

2.2.3 Start screen, basic positioner

Figure 2□2



Active faults and alarms of the SINAMICS S120 are displayed in the upper section of the screen with number and in plain text.

Active faults can be acknowledged with the "Ack" button.

The active operating modes of the basic positioner are displayed at the left.

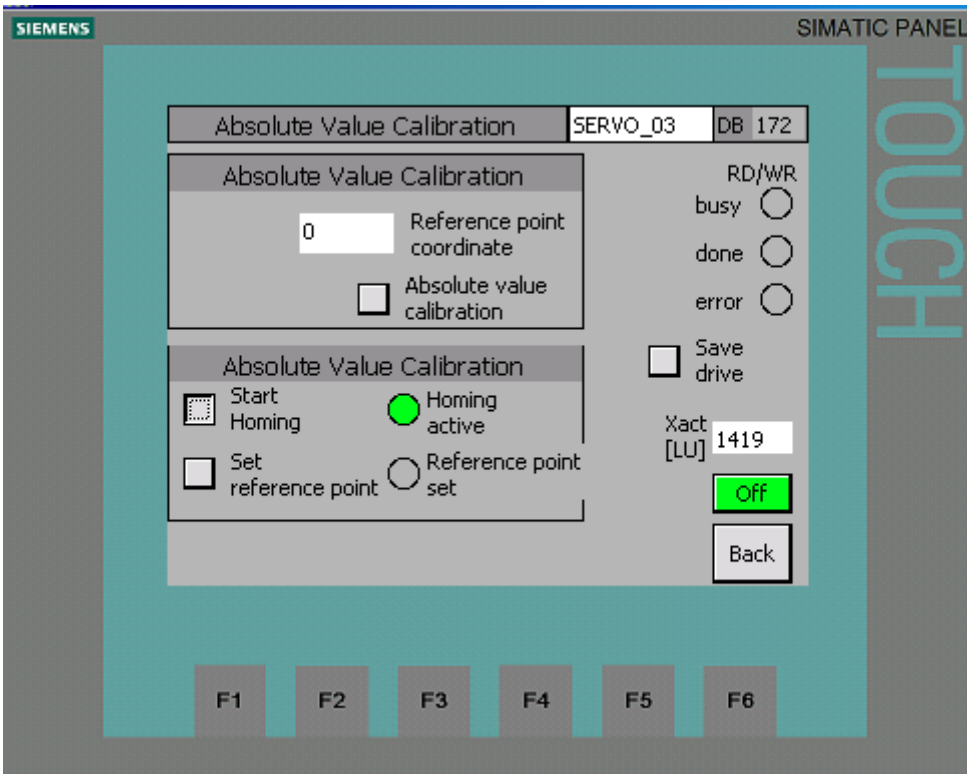
The actual position and actual velocity of the basic positioner are displayed at the right.

The screens for the operating modes can be called in the lower section. You can return to the basic screen using the "Home symbol".

2.2.4 Homing screen

Absolute encoder adjustment

Fig. 2-3



Absolute encoders, as in the example for SERVO_02, must be adjusted once after commissioning. When adjusting an absolute encoder, the position actual value is set to the specified reference point coordinate.

Absolute encoder adjustment is initiated using acyclic jobs in SINAMICS. The status of the acyclic job is displayed at the right below "RD/WR".

While an order has the status "busy", the buttons for initiating new orders are hided.

When using incremental encoders, as in the example for SERVO_03, absolute encoders cannot be adjusted.

Homing

When using incremental encoders, SINAMICS S120 must be homed after each warm restart. For SERVO_03, a reference point mark is parameterized for the encoder zero mark.

Initiating the reference point approach:

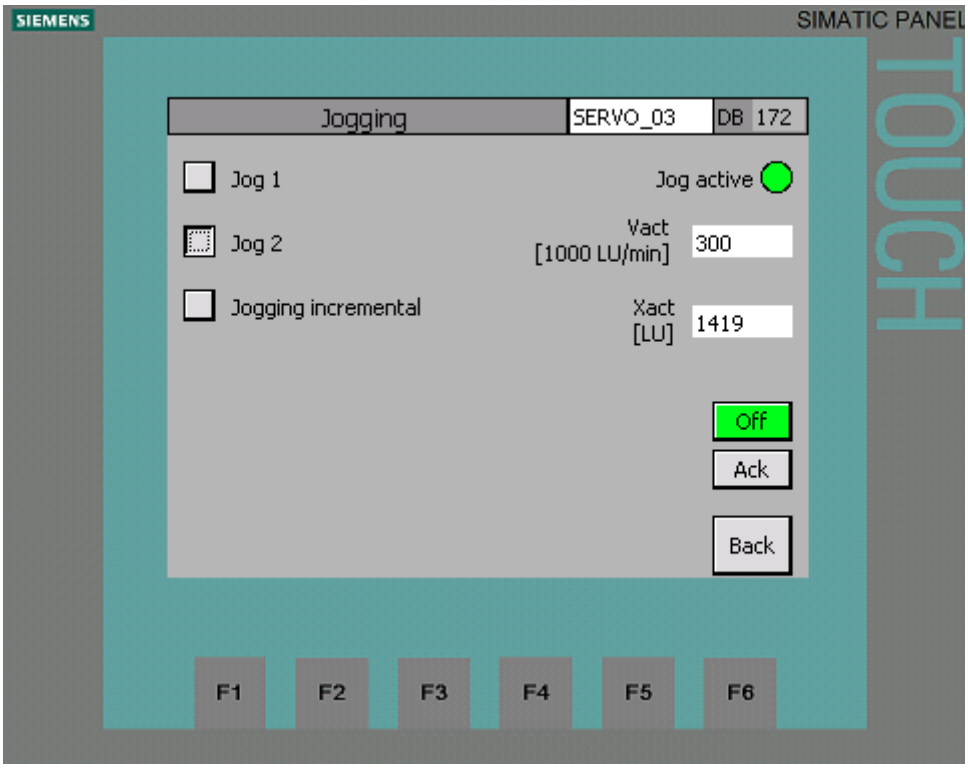
Switch on the drive with "On". If SINAMICS S120 is switched on, then the button has a green background.

Press "Start Homing" until "Reference point set" is lit.

Using the button "Set Reference point", the reference point can be set to the actual position Xact“.

2.2.5 Jogging screen

Fig. 2-4



Using the "Jog 1" and "Jog 2" buttons, the SINAMICS S120 is traversed with the parameterized speed. Incremental jogging is selected by pressing the "Jogging incremental" button.

The SINAMICS S120 can be switched on and switched off using the "On" button.

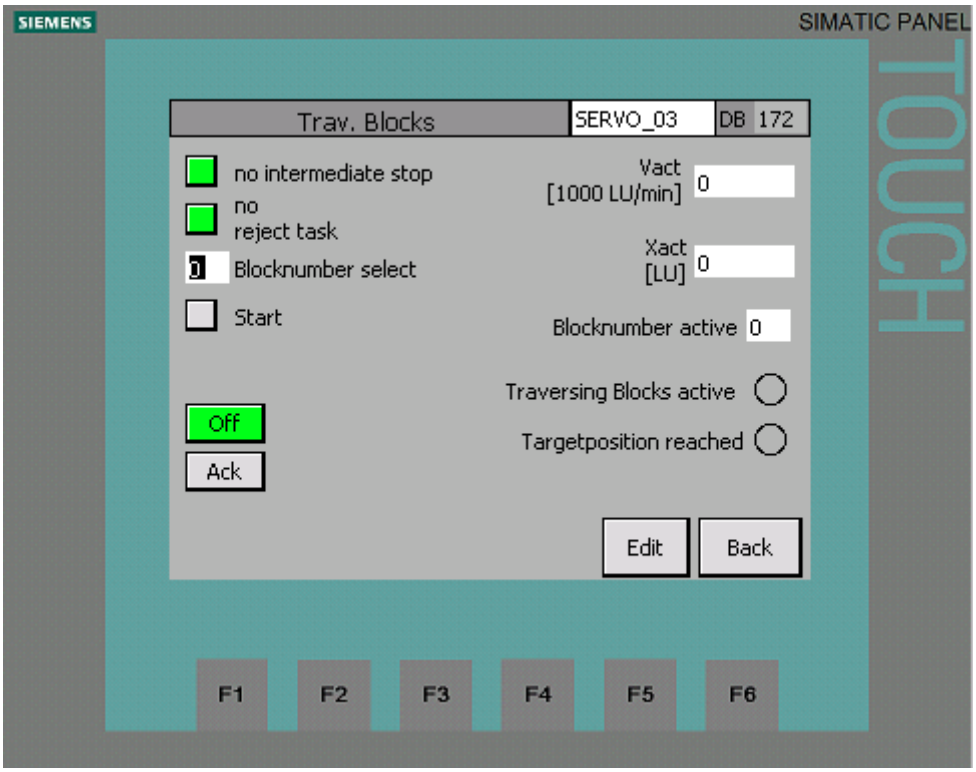
"Xact" displays the actual position in LU

"Vact" displays the actual velocity in 1000 LU/min

Faults in the SINAMICS S120 are acknowledged using the "Ack" button.

2.2.6 Traversing blocks screen

Fig. 2-5



Parameterized traversing profiles can be started from this screen.

Starting traversing tasks

In the Traversing blocks screen, the basic positioner can be operated in the traversing block mode.

For traversing motion, the "No intermediate stop" and "No reject task" must be selected.

"Block number select" sets which traversing block should be started.

The SINAMICS S120 can be switched on and switched off using the "On" button.

Faults in the drive are acknowledged using the "ACK" (acknowledge) button.

The traversing block with the selected block number is started using the "Start" button.

"Xact" displays the actual position in LU

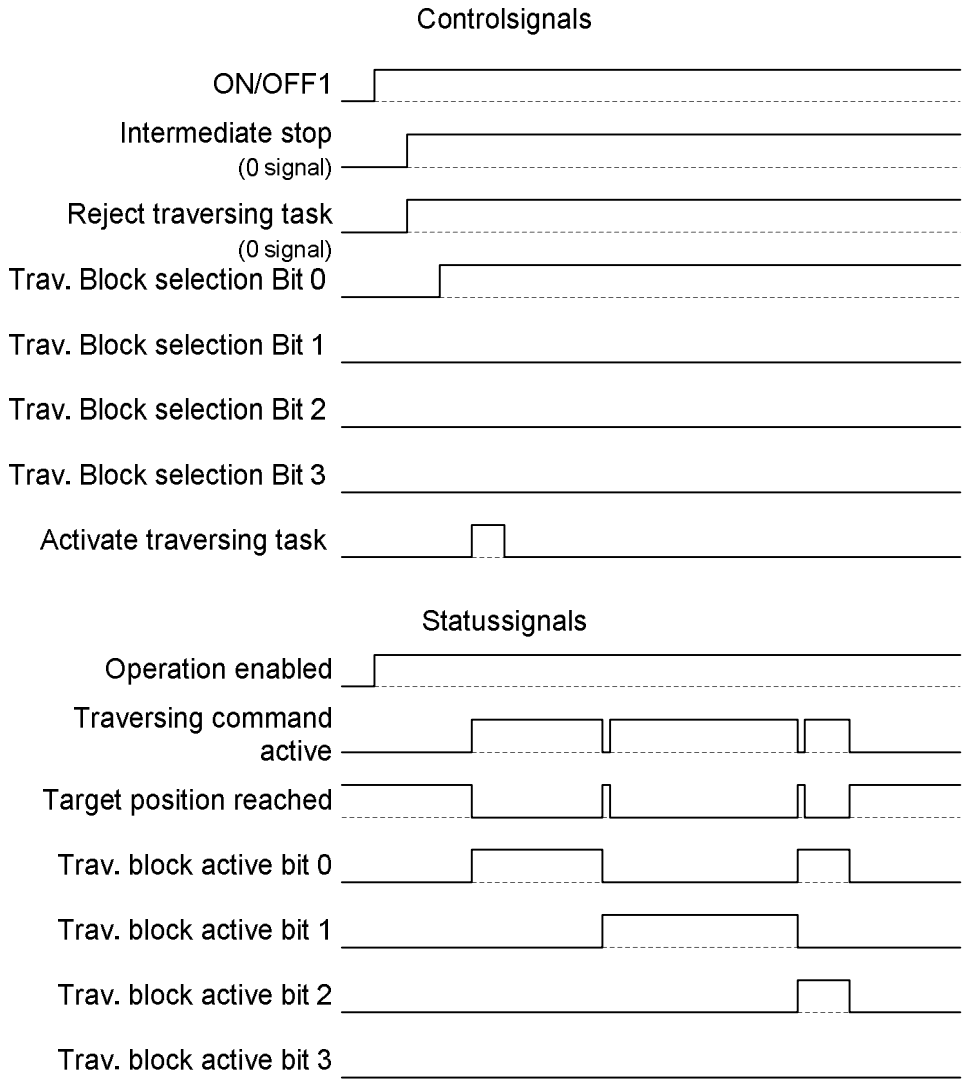
"Vact" displays the actual velocity in 1000 LU/min

"Block number active" indicates the number of the active traversing block.

The screen to read and write traversing books is called with "Editor".

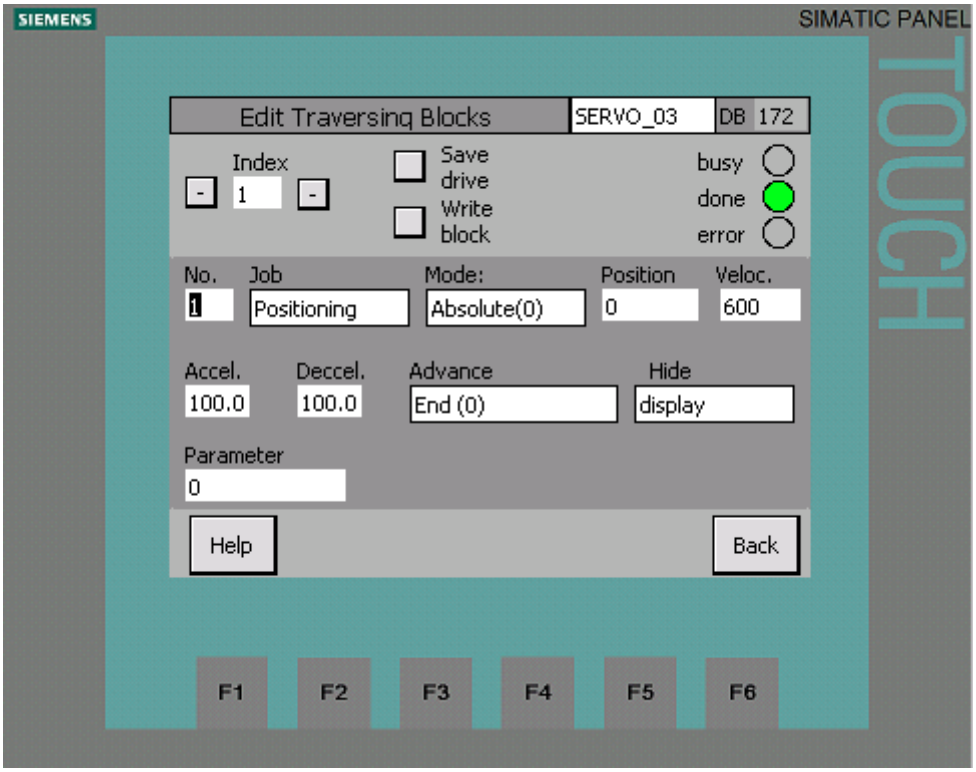
The timing of the control and status signals of a traversing profile can be seen in the following diagram. The traversing profile comprises individual traversing blocks. Progressing (advancing) between the traversing blocks is "Continue with stop"

Fig. 2-6



Reading and writing traversing blocks

Fig. 2-7



Using the editor, traversing blocks can be read and written to using acyclic jobs.

Reading out traversing blocks:

The index to be read out is set using the "-" and "+" buttons. The read request is immediately started when one of the two buttons is pressed.

The data of the traversing block that has been read out is displayed in the relevant fields.

Writing to a traversing block:

First, select the index into which the traversing block should be written. The other data are then entered in the relevant fields.

The write job is started by pressing the "Write block" button.

Copying a traversing block:

Read out the traversing block to be copied. Enter the new index using the screen keyboard, when doing this do not use the "-" or "+" buttons. The write job is started by pressing the "Write block" button.

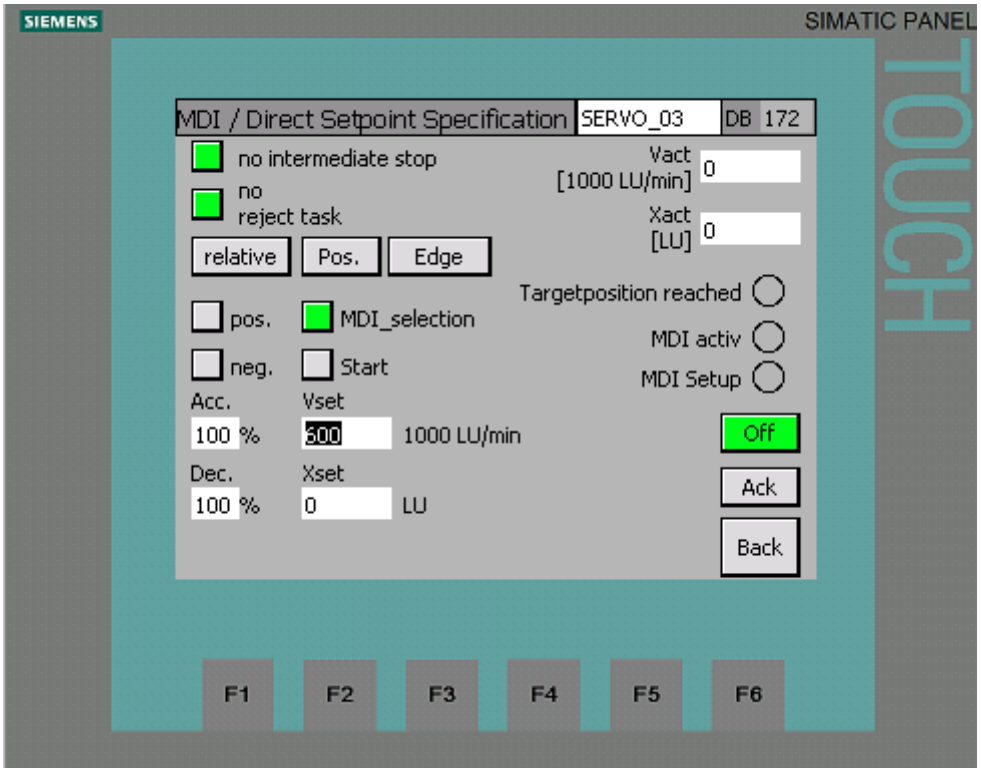
The drive parameters are backed up in the ROM of the SINAMICS S120 by pressing the "Save drive" button.

The status of the acyclic job is displayed with "busy" and "done" and "error".

While an order has the status "busy", the buttons for initiating new orders are hided.

2.2.7 Direct setpoint specification / MDI

Fig. 2-8



In the MDI screen, the basic positioner can be operated in the MDI / direct setpoint specification mode.

For traversing motion, the "No intermediate stop" and "No reject task" must be selected.

The positioning mode is set to either relative or absolute using the "relative" button.

Positioning or setting up is selected using the "Pos." button.

The setpoint transfer type is set to signal edge or continuous using the "Edge" button.

The operating mode MDI/direct setpoint specification is activated using the "MDI_selection“ button.

In the setting-up mode, the direction of rotation is specified using "pos." or "neg.".

The acceleration and deceleration override are specified in the "Acc." and "Dec." fields.

For "Vset", the setpoint velocity is entered in 1000 LU/min.

For "Xset", the setpoint position is entered in LU.

The drive can be switched on and switched off using the "On" button.

Faults in the SINAMICS S120 are acknowledged using the "Ack" button.

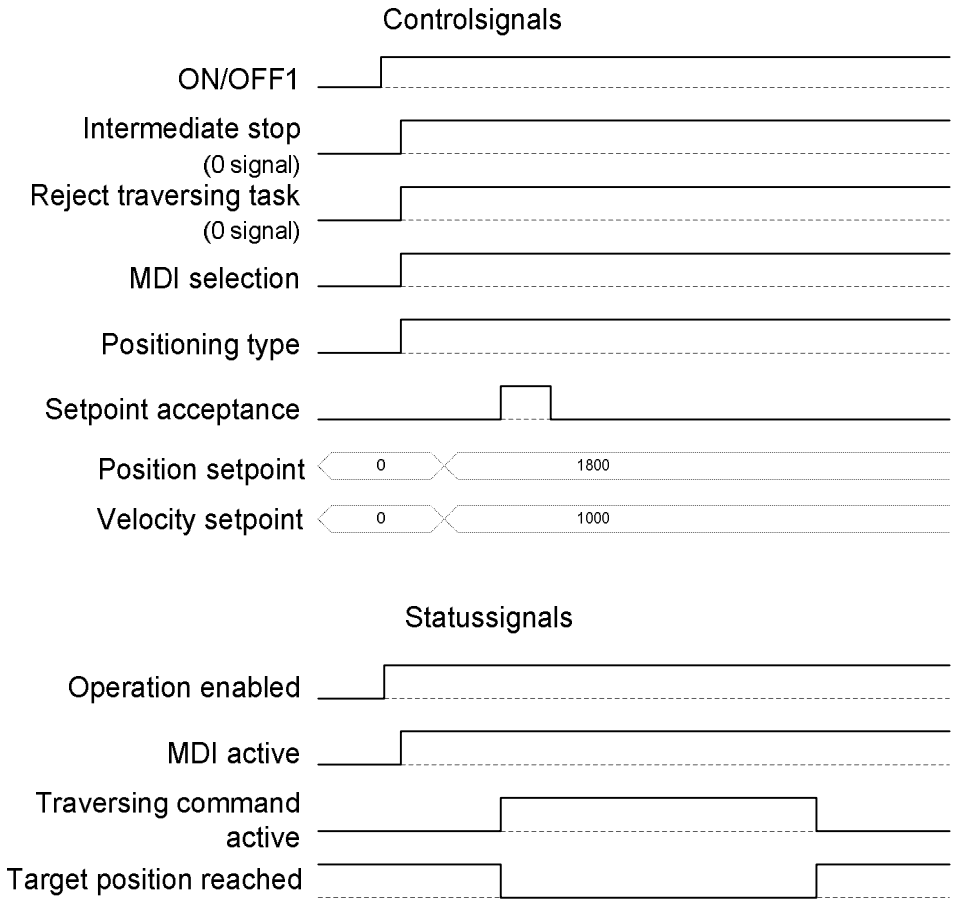
For setpoint transfer with signal edge, positioning is started using the "Start" button.

"Xact" displays the actual position in LU

"Vact" displays the actual velocity in 1000 LU/min

The timing of the control and status signals for absolute positioning can be seen in the following diagram. The setpoint is accepted with a positive signal edge of "Setpoint acceptance".

Fig. 2-9



2.3 Variable tables

Commenting out the FC10 call

Several signals are permanently controlled in the FB1 network 4. If these signals are to be controlled using variable tables, then the corresponding lines must be commented out.

Fig. 2-10

```
Netzwerk 4: Permanente Freigaben setzen
      S     DBX  173.1   AUS2
      S     DBX  173.2   AUS3
      S     DBX  173.3   Betriebsfreigabe
      S     DBX  172.2   Führung durch PLC


      L     #DBNr                        #DBNr              -- AchsDBNr
      T     #DB_int                      #DB_int
      AUF   DB [#DB_int]                 #DB_int
      S     DBX  173.1
      S     DBX  173.2
      S     DBX  173.3
      S     DBX  172.2
```

After changes are made in FB1, the block must be loaded into the SIMATIC S7-300/400.

2.3.1 Reading and writing traversing blocks

Traversing blocks can be read out and written to acyclically using the variable tables "VAT72_TVBsingle" and "VAT72_TVBblock".

Fig. 2-11 VAT72_TVBsingle

Operand	Symbol	Anzeigeformat	Statuswert	Steuerwert
DB72.DBW 16	"Axis_TVB+MDI_TLG111".Basis.single.tasksi	DEZ	30000	30000
DB72.DBW 18	"Axis_TVB+MDI_TLG111".Basis.single.Ind	DEZ	8	8
DB72.DBX 14.0	"Axis_TVB+MDI_TLG111".Basis.single.RD	BOOL	false	false
DB72.DBX 14.1	"Axis_TVB+MDI_TLG111".Basis.single.WR	BOOL	false	false
DB72.DBX 14.2	"Axis_TVB+MDI_TLG111".Basis.single.Done	BOOL	true	
DB72.DBX 14.3	"Axis_TVB+MDI_TLG111".Basis.single.busy	BOOL	false	
DB72.DBD 20	"Axis_TVB+MDI_TLG111".Basis.single.Data	DEZ	L#6	//L#45
DB72.DBX 14.7	"Axis_TVB+MDI_TLG111".Basis.single.Error	BOOL	false	
DB72.DBW 24	"Axis_TVB+MDI_TLG111".Basis.single.ErrorNumbr	HEX	W#16#0000	
DB72.DBB 134		BIN	2#1111_1111	//2#1111_1111
DB72.DBW 136	"Axis_TVB+MDI_TLG111".Basis.TraVerBlockSet.block_no	DEZ	8	8
DB72.DBD 138	"Axis_TVB+MDI_TLG111".Basis.TraVerBlockSet.position	DEZ	L#1800	L#1800
DB72.DBD 142	"Axis_TVB+MDI_TLG111".Basis.TraVerBlockSet.velocity	DEZ	L#300	L#300
DB72.DBD 146	"Axis_TVB+MDI_TLG111".Basis.TraVerBlockSet.accel_over	GLEITPUNKT	100.0	100.0
DB72.DBD 150	"Axis_TVB+MDI_TLG111".Basis.TraVerBlockSet.decel_over	GLEITPUNKT	100.0	100.0
DB72.DBW 154	"Axis_TVB+MDI_TLG111".Basis.TraVerBlockSet.command	DEZ	1	1
DB72.DBD 156	"Axis_TVB+MDI_TLG111".Basis.TraVerBlockSet.command_par	DEZ	L#0	L#0
DB72.DBW 160	"Axis_TVB+MDI_TLG111".Basis.TraVerBlockSet.mode	BIN	2#0000_0010_0010_0000	2#0000_0010_0010_0000

You can use variable table VAT72_TVsingle to read or write a traversing block in SINAMICS S120.

Writing

- Job "30000" must be located in DBW 16
- The index of the traversing block is specified in DBW 18 (n+1)
- The bits of DBW 134 are used to select which data should be transferred
- The traversing block number is specified in DBW 136
- The position setpoint is specified in DBD 138
- The velocity setpoint is specified in DBD 142
- The acceleration is specified in DBD 146
- The deceleration is specified in DBD 150
- The job of the traversing block is specified in DBW 154 (see the following tables)
- The job parameter is specified in DBD 156 (see the following tables)
- The traversing block mode is specified in DBW 160 (see the following tables)
- After all data has been written to the blocks, writing can be started with a positive edge of DBX 14.1

Reading

- Job "30000" must be located in DBW 16
- The index of the traversing block is specified in DBW 18 (n+1)
- The read job is started with a positive edge at DBX 14.0
- The values are saved in the same data area as where they were saved for the write job

Table 2-1 Significance of DBW 154 and DBD 156

Job	Job parameter
0 = error	
1 = positioning	
2 = fixed stop	[clamping torque in Nm]
3 = endless_pos	
4 = endless_neg	
5 = wait	[Wait time in ms]
6 = goto	[jump destination]
7 = set_O	[set digital output]
8 = reset_O	[reset digital output]
9 = jerk	jerk limitation 0 = off / 1 = on

Table 2-2 Significance of DBW 160

Bit 15-12	Bit 11-8	Bit 7-4	Bit 3-0	Significance
0000	0000	0000	0000	
xxxx	xxxx	xxxx	xxx0	Show traversing block
xxxx	xxxx	xxxx	xxx1	Hide traversing block
xxxx	xxxx	0000	xxxx	End (0)
xxxx	xxxx	0001	xxxx	Continue with stop (1)
xxxx	xxxx	0010	xxxx	Continue flying (2)
xxxx	xxxx	0011	xxxx	Continue external (3)
xxxx	xxxx	0100	xxxx	Continue external wait (4)
xxxx	xxxx	0101	xxxx	Continue external alarm (5)
xxxx	0000	xxxx	xxxx	Absolute (0)
xxxx	0001	xxxx	xxxx	Relative (1)
xxxx	0010	xxxx	xxxx	ABS_POS (2)
xxxx	0011	xxxx	xxxx	ABS_NEG (3)
xxxx	xxxx	xxxx	xxxx	No significance

Further information in this regard may be found in the documentation of the FB283. /8/

2.3.2 Reading and writing drive parameters

Traversing blocks can be read out and written to acyclically using the variable tables "VAT72_Parameter" and "VAT72_Para_1_10".

Further information in this regard may be found in the documentation of the FB283. /8/

2.3.3 Reading out the fault memory

The fault memory of the SINAMICS S120 can be read out using the "VAT72_Faultbuffer" variable table.

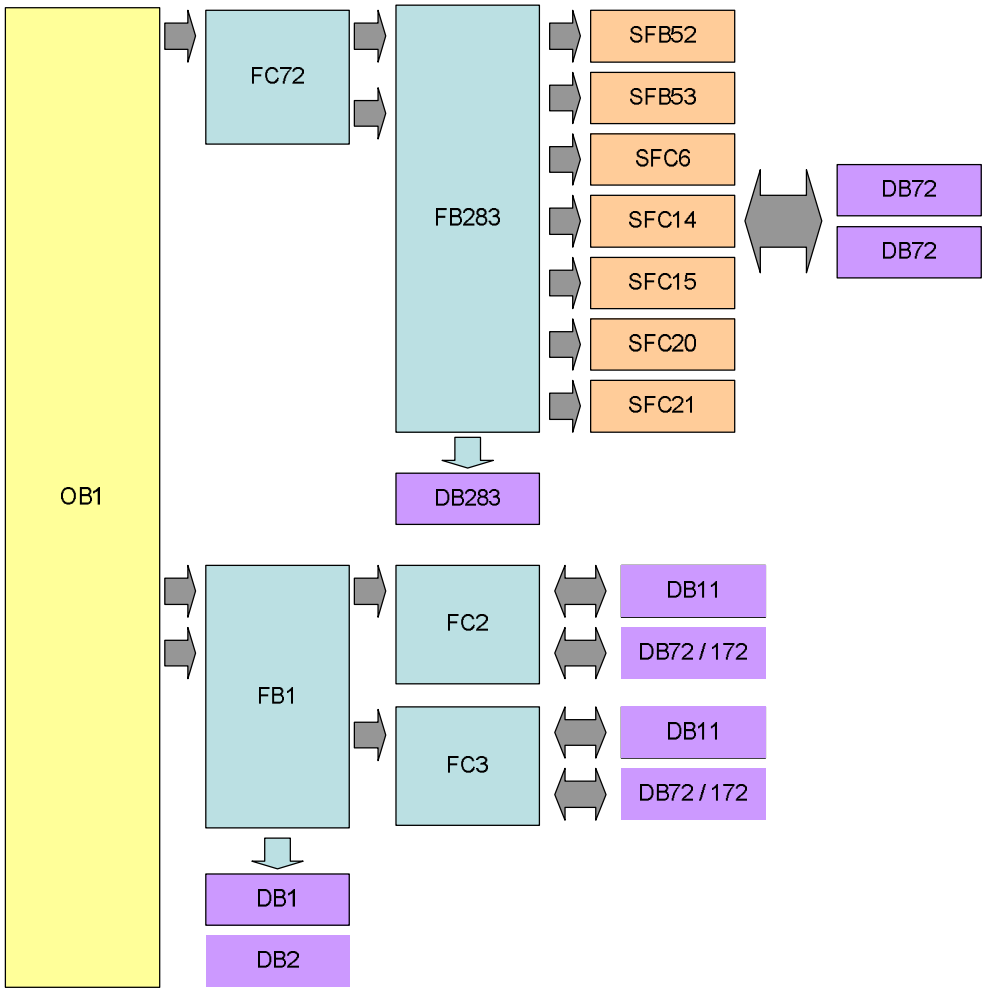
Further information in this regard may be found in the documentation of the FB283. /8/

3 Functional mechanisms of this application

3.1 SIMATIC functions

3.1.1 Overview

Fig. 3-1



The S7-300/400 program comprises the following areas:

- Data exchange with the SINAMICS S120:

  Cyclic process data exchange
  In this area, process data are sent to the SINAMICS S120 (e.g. on command and position setpoint) or received (status and actual values)

  Acyclic parameter access
  Parameters of the SINAMICS S120 are accessed in this area. (e.g. reading or writing traversing blocks)

- Preparing data
  - Converting the actual velocity for display on the HMI
  - Splitting the traversing job parameters for display and selection on the HMI

3.1.2 FC72: Communication using FB283 and SIEMENStelegram 111

Telegram 111 includes 2 communication options. One option is pure cyclic communication using the system functions. The option involves the FB 283 available to the application, which in addition to the cyclic also has an acyclic communication option.

Communication with the FB283 is discussed in this example.

So that the acyclic interface is executed only once at the same time, the „busy“ feedback of both axes will be checked in network 1. If an acyclic order is active at an axis,the buttons for initiating new acyclic orders at the HMI become hided.

Fig. 3-2 FC72 Network 1

```
0     "Axis_TVB+MDI_TLG111_S2".Basis.single.busy    DB72.DBX14.3
0     "Axis_TVB+MDI_TLG111_S3".Basis.single.busy    DB172.DBX14.3
=     "ParameterAnzeige".HideAcyclic                DB11.DBX6.2
```

For every axis one instance DB from FB283 is generated. When calling the FB283, the following data are specified for each axis:

NR_ACHS_DB:	Number of the axis DB
LADDR: LADDR_DIAG	Start of the I/O address Diagnostics address of the drive
WR_PZD:	Target area (control words/setpoints)
RD_PZD:	Target area (status words/actual values)
AXIS_NO:	Axis No. (Number of the DriveObject)

Fig. 3-3 FC72 Network 2

```
CALL  "SINA_FB" , DB283
 NR_ACHS_DB:=72
 LADDR     :=256
 LADDR_DIAG:=2038
 WR_PZD    :="Axis_TVB+MDI_TLG111_S2".MDI_Positioning.WR_PZD_POSBETR
 RD_PZD    :="Axis_TVB+MDI_TLG111_S2".MDI_Positioning.RD_PZD_POSBETR
 CONSIST   :=TRUE
 RESTART   :=TRUE
 AXIS_NO   :=B#16#2
```

Note

In this example, for the first axis "SERVO_02", the instance 283 and axis DB72 are used. For the second axis "SERVO_03" are used the instance DB284 and DB172 as axis DB.

Start of the I/O address and diagnostics address is in HW Config.

Additional information about calling FB283 is provided in the block description. /8/

Cyclic communication with FB283

OB1 only calls the FC 72. In FC 72, FB283 is called for each axis.

The structure for sending and receiving is saved in the user-defined data type (UDT_30008 _TLG111).

The variable tables, prepared with the application, are available to control the SINAMICS S120.

Operate the 1st axis in the traversing block mode (VAT72_TVB)

Operate the 2nd axis in the MDI mode (VAT72_MDI)

Acyclic communication with FB283

Acyclic communication is based on the FB 283 internal interface "single". It is only permissible to execute this once simultaneously. This is the reason that the corresponding buttons are interlocked on the HMI while the interface is communicating.

Using this job interface, it is possible:

- To read/write individual parameters
- Read out the fault memory (special job: tasksi= 30002)
- Read/write individual traversing blocks (special job: tasksi= 30000)
- Read/write traversing blocks (special job: tasksi=30001)
- Pre-assign traversing blocks 0…63 (special job: tasksi= 30011)
- Read/write up to 10 parameters (special job: tasksi= 30010)

Further, for individual special jobs, additional entries are required or outputs possible. A description can be found on the specified pages 13 – 15 of the FB 283 documentation.

Within the context of the application, four prepared variable tables are available for **parameter / traversing blocks, read and write function**. Depending on the required function/display, these tables can also be edited.

1. Reading/writing parameters (VAT72_Parameter)
2. Reading/writing several parameters (VAT72_Para_1_10)
3. Reading/writing individual traversing blocks (VAT72_TVBsingle)
4. Reading/writing several traversing blocks (VAT72_TVBblock)

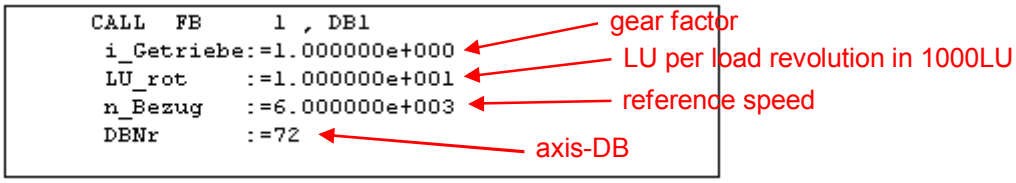
3.1.3 FB1: Preparing data for display on the HMI

Actual velocity

The speed actual value is transferred, scaled. The scaled value is converted into the actual velocity of the basic positioner in FB1.

To do this, when calling FB1, in addition to the number of the axis DB, the gearbox ratio, the position actual value resolution and the reference speed of the SINAMICS S120 must be specified.

Figure 3-4



Note

The specified values must coincide with the parameters in the SINAMICS S120!

The gearbox ratio is determined by the ratio between parameters p2504 and p2505.

The position actual value resolution is in parameter p2506.

The reference speed is in parameter p2000.

FC2 and FC3: splitting the traversing job parameters

FB283 transfers the job type, the advance (continue) condition and the visibility of a traversing block in a word. The word is split in order that these values can be individually displayed and selected. The individual values are buffered in DB11.

FC2 reads the DBW160 word of the axis DBs and writes the values into DB11.

FC3 reads the values from DB11, and writes them into word DBW160 of the axis DB.

3.2 Basic positioner

3.2.1 Tasks that can be addressed with the basic positioner

The basic positioner (EPOS) is a very comprehensive and powerful function module for closed-loop position controlled traversing of an electric drive.

It is used to position linear and rotary axes (modulo) in absolute/relative terms with motor encoder (indirect measuring system) or machine encoder (direct measuring system).

It can be activated in the SINAMICS S120 as function module.

User-friendly configuration, commissioning, and diagnostic functions for the EPOS functionality are also available in the STARTER parameterizing software.

Using the STARTER control panel, commissioning and diagnostic functionality can be controlled from a PC. It is also very helpful, especially when getting to know the individual operating modes also testing the function without having to control it from a higher-level automation system.

The position controller is also activated when activating the basic positioner. This is automatically run from the STARTER drive wizard. Further, the necessary "internal interconnections" (BICO technology) are automatically established, which are required between the EPOS and position controller (e.g. setpoints from the EPOS for closed-loop position control, axis cycle correction, etc.).

The position controller essentially comprises the following parts:

- Position actual value sensing (including the lower-level measuring input evaluation and reference mark search)
- Position controller (including limits, adaptation and pre-control calculation)

- Monitoring functions (standstill, positioning and dynamic following error monitoring, cam signals)

In addition, the following functions can be carried out using the basic positioner:

Mechanical system:

- Backlash compensation
- Modulo correction
- Position tracking

Limits:

- Velocity/acceleration/deceleration limits
- Software limit switches (traversing range limitation using position setpoint evaluation)
- Stop cams (traversing range limitation using hardware limit switch evaluation)
- Positioning/standstill monitoring
- Following error monitoring
- Two cam switching signals

3.2.2 Properties

Outstanding properties include:

- "flying" and "continuous" mode/setpoint changes while traversing
  - Without having to use handshaking
  - Including easy to use/connect
  - Including "process-shortening" transitions without axes coming to a standstill
- Can be simply connected to higher-level SIMATIC S7-300/400 control systems, also as described in this application
- Can be simply adapted as part of the application engineering and handled
- Simple traversing block handling and implementation of "fixed" traversing blocks
- Graphic configuring, commissioning and operating screen forms (tool including control panel)

3.2.3 Operating modes

EPOS has the following four operating modes (which can be toggled between for a "stationary" axis):

- Jogging (position controlled)
- Homing
- Traversing blocks
- Direct setpoint specification/MDI

Including subordinate "flying referencing" in the "jog", "traversing blocks" and "MDI/direct setpoint specification" modes.

Priority of the operating mode with respect to one another when simultaneously selected:
Jog > Reference point approach > MDI > Traversing blocks

If a different operating mode is selected while one is already active, then an alarm is issued.

3.2.3.1 Jogging

This involves position-controlled traversing of an axis with two modes that can be toggled between

1. Modes: Endless, position controlled with v set input (where the sign is evaluated)
2. Modes: Incremental jog (= where the axis is traversed through a specified "increment")

In the two modes, two selectable setpoints are available (jog 1 / 2)

3.2.3.2 Homing

Reference point approach

This is also known as "active homing".

Properties:

Fully automatic search and detection of the reference point for incremental measuring systems (encoders).

The following homing options are available:

- "Cam and encoder zero mark", "encoder zero mark" and "external zero mark (Bero)"
- "Set reference point" is also possible without travel. In this case, all operating modes must be deselected.
- Reversing cam functionality for the "cam and encoder zero mark" mode
- The start direction for the reference point approach can be specified
- Different approach velocities can be specified ("to the cams", "to the reference mark", "to the reference point"), e.g. to increase the precision for the reference mark detection
- Monitoring using maximum traversing distances/tolerance bands that can be specified, e.g. to the cam, between the cams and zero mark, distance to the zero mark
- Automatic travel for "reference point offset" regarding the reference mark and reference point coordinates that can be changed using BICO
- Automatic direction of rotation reversal at the reference cams, which means that, for example: Reversal cams or hardware limit switches (when Stop cam functionality is deactivated) can be used as reference cams (this reduces hardware costs)
  (in the START direction, which can be specified, the zero mark in front of the reference cam is valid as reference mark)

Flying homing ("passive homing")

This is also known as "passive homing".

Properties:

- Homing the axis during "standard" traversing using probe (standard setting) including possible continuous "post homing"

- This can be executed as subordinate function in the "jog", "traversing blocks" and "MDI/direct setpoint specification" modes
- Can be selected for incremental and absolute measuring systems (encoder)
- Probe selection can be switched over (2 probe inputs, pos./neg. edge can be selected)
- With "flying homing" during RELATIVE positioning, you can select whether the offset value is to be taken into account for the travel path or not.
- Possible for "post homing" evaluation of a "real/incorrect" BERO signal (inner/outer position difference "window")

3.2.3.3 Traversing blocks

It supports positioning using traversing blocks saved in the device (for a homed axis). It is also possible to write to the traversing blocks from the SIMATIC S7-300/400 into the SINAMICS S120 and read these out.

Here, 64 traversing blocks are possible, including continue (advance) conditions and specific jobs.

Properties:

- User-friendly traversing block editor
- For instance, position, velocity, acceleration and deceleration override can be separately set for each block.
- Jobs; for example:

  "Absolute/relative positioning", "ABS_POS/_NEG" (forced direction of rotation specification for modulo axes), "Endless pos / neg", "Wait" (wait time), "GOTO" (block jump), "SET_O / RESET_O" (set/reset up to two digital outputs), set jerk value, travel to fixed stop using EPOS
- It is possible to "skip" traversing blocks
- By activating a new traversing block, a block being executed can be canceled and a flying change made into the new traversing block.

The traversing blocks can also be changed when a SINAMICS S120 is operational. The changes are directly transferred the next time that the traversing block is called.

3.2.3.4 Direct setpoint specification/MDI

Properties:

Positioning/setting up with direct setpoint specifications (e.g. process data of the SIMATIC S7-300/400); continuous influence during traversing is also possible.

"Flying and continuous" setpoint transfer while an axis is moving is possible, i.e. position, velocity setpoint and override, acceleration, deceleration, forced direction of rotation specification can be changed during operation.

"Flying" change between the modes is possible while an axis is traversing:

- Mode: Setting up (endless, closed-loop position controlled, v-set input)
- Mode: Absolute/relative positioning (for modulo, also: specified direction of rotation or the shortest path)

In this mode, also in the setting up or relative positioning mode, a non-referenced axis can also be traversed.

4 References

This list does not purport to be complete and merely reflects a selection of suitable information.

Table 41

	Topic	Title/link
/1/	STEP 7 SIMATIC S7 - 300/400	Automation with STEP 7 in STL and SCL Author: Hans Berger Publicis MCD Verlag ISBN: 978-3-89578-397-5
/2/		Automation with STEP 7 in LAD and FBD Author: Hans Berger Publicis MCD Verlag ISBN: 978-3-89578-296-1
/3/		Reference manual System and Standard Functions for S7-300/400 Volume 1/2 http://support.automation.siemens.com/WW/view/de/44240604
/4/	Reference to the article	http://support.automation.siemens.com/WW/view/de/67261457
/5/	Siemens Industry Online Support	http://support.automation.siemens.com
/6/	STARTER	http://support.automation.siemens.com/WW/view/de/26233208
/7/	SINAMICS S120	SINAMICS S120 Getting Started: http://support.automation.siemens.com/WW/view/de/61604910 List Manual (parameter and error list): http://support.automation.siemens.com/WW/view/de/49383082 Drive Functions Function Manual http://support.automation.siemens.com/WW/view/de/59737625 Control Units and Additional System Components Manual http://support.automation.siemens.com/WW/view/de/59714694 Booksize Power Units Manual http://support.automation.siemens.com/WW/view/de/59715084 Commissioning Manual http://support.automation.siemens.com/WW/view/de/61616686
/8/	FB283	Toolbox V2.1 http://support.automation.siemens.com/WW/view/de/25166781

5 History

Table 51

Version	Date	Change
V1.0	04/2013	First edition
V1.1	09/2013	Locking of acyclic orders changed