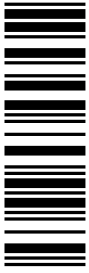


L-force *Runtime Software*



Software Manual

9400



Technology application "actuator – torque"

Overview of the technical documentation for Servo Drives 9400

Project planning, selecting & ordering

- ☐ 9400 Hardware Manual
- ☒ Catalogue / electronic catalogue (DSC - Drive Solution Catalogue)

Mounting & wiring

- ☒ MA 9400 StateLine/HighLine
- ☒ MA for communication module
- ☒ MA for extension module
- ☒ MA for safety module
- ☒ MA for accessories
- ☒ MA for remote maintenance components

Parameter setting

- ☒ BA keypad
- ☐ SW for Lenze »Engineer« software
- ☐ SW for controller (9400 StateLine/HighLine)
- ☐ SW for regenerative power supply module
- ☐ KHB for communication module
- ☐ SW for extension module
- ☐ SW for safety module
- ☐ SW for Lenze technology application
- ☐ SW 9400 function library

← This documentation

Configuring

- ☐ SW for Lenze »Engineer« software
- ☐ SW for controller (9400 HighLine)
- ☐ KHB for communication module
- ☐ SW for extension module
- ☐ SW for safety module
- ☐ SW for Lenze technology application
- ☐ SW 9400 function library

← This documentation

Commissioning of the drive

- ☒ Commissioning guide
- ☐ SW for controller (9400 StateLine/HighLine)
- ☐ Remote Maintenance Manual

Networking

- ☐ KHB for communication medium used

Legend:

- ☒ Printed documentation
- ☐ Online documentation (PDF/Engineer online help)

Abbreviations used:

- BA Operating Instructions
- KHB Communication Manual
- MA Mounting Instructions
- SW Software Manual

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1 About this documentation

This documentation contains information about the technology application "Actuator – torque" for the Servo Drives 9400 series.



Note!

This documentation supplements the mounting instructions supplied with the controller, the hardware manual and the software manual for the controller.

The Mounting Instructions contain safety information which must be observed!

The information in this documentation applies to:

Technology application	Appl. ID	Required runtime software licence
Actuator – torque	100202101	Available in every license stage

The technology application can be used with the following controllers:

Product series	Type designation	From hardware version	From software version
9400 Servo Drives	E94AxHExxx	PD	1.35

Target group

This documentation is directed at qualified personnel according to IEC 364.

Document history

Version			Description
1.0	04/2007	TD05	First edition
1.1	10/2008	TD05	New subchapter " Parameterisable function blocks "

1.1 Conventions used

This documentation uses the following conventions to distinguish between different types of information:

Type of information	Writing	Examples/notes
Numbers		
Decimal separator	Point	The decimal point is always used. Example: 1234.56
Text		
Program name	» «	The Lenze PC software »Engineer«...
Window pane	<i>Italics</i>	The <i>Message window</i> ... / The <i>Options</i> dialog box...
Control element	Bold	The OK button... / The Copy command... / The Properties tab... / The Name input field...
Sequence of menu commands		If the execution of a function requires several commands, the individual commands are separated by an arrow: Select File→Open to...
Keyboard command	< Bold >	Use < F1 > to open the Online Help. If a command requires a combination of keys, a "+" is placed between the key symbols: Use < Shift >+< ESC > to...
Program listings	Courier	<pre>IF var1 < var2 THEN a = a + 1 END IF</pre>
Keyword	Courier bold	
Hyperlink	<u>Underlined</u>	Optically highlighted reference to another topic. It is activated with a mouse click in this online documentation.
Symbols		
Page reference	( 5)	Optically highlighted reference to another page. It is activated with a mouse click in this online documentation.
Step-by-step instructions		Step-by-step instructions are indicated by a pictograph.

1.2 Definition of notes used

The following signal words and symbols are used in this documentation to indicate dangers and important information:

Safety instructions

Layout of the safety instructions:



Danger!

(characterises the type and severity of danger)

Note

(describes the danger and suggests how to avoid the danger)

Pictograph	Signal word	Meaning
	Danger!	Danger of personal injury through dangerous electrical voltage Indicates an impending danger that may lead to death or severe personal injury if the corresponding measures are not taken.
	Danger!	Danger of personal injury through a general source of danger Indicates an impending danger that may lead to death or severe personal injury if the corresponding measures are not taken.
	Stop!	Danger of material damage Indicates a potential danger that may lead to material damage if the corresponding measures are not taken.

Application notes

Pictograph	Signal word	Meaning
	Note!	Important note for trouble-free operation
	Tip!	Useful tip for easy handling
		Reference to another document

2 Brief description

When the technology application "actuator – torque" is used the drive creates a torque to be specified independent of the motor speed. A superimposed speed limitation prevents the drive from accelerating in an uncontrolled mode. The torque setpoint and torque limit value are the main setpoint values of the application.

- ▶ The setpoint of the motor torque can be specified for both directions. The drive accordingly acts in a driving or braking way. With a unipolar setpoint the effective direction can be changed via the digital input DI3.
- ▶ After the enable of the torque-controlled operation via the digital input DI2 the creation of the torque is controlled via a ramp generator starting from the current torque.
- ▶ The torque limit value to be specified refers to the freely setting direction of rotation with positive torque. Based on the current motor speed the internal speed limit value is also led to the setpoint via a ramp generator after enable.
- ▶ If the specified speed limit value directly corresponds to the line speed, the internal limit value can be increased by entering an offset in C03008.
- ▶ The speed limit value in negative direction of rotation equals, according to amount, the limit value for the positive direction of rotation.
- ▶ If the speed of the drive is inside the limitations, the motor generates the specified torque.
- ▶ If the positive or negative speed limit value (for CW or CCW rotation) is reached, the drive changes to the speed-controlled operation. The set speed limit values are not exceeded.

Basic drive functions

- ▶ A quick stop can be activated via the digital input DI1.
- ▶ A manual control is provided for the setting-up operation. It is enabled via the digital input DI6. The digital inputs DI7 and DI8 activate parameterisable setpoints for both directions of rotation.
- ▶ The basic function "limiter" enables the travel range to be monitored via limit switches.
- ▶ When a brake is available the brake control opens and closes the brake.

Application range

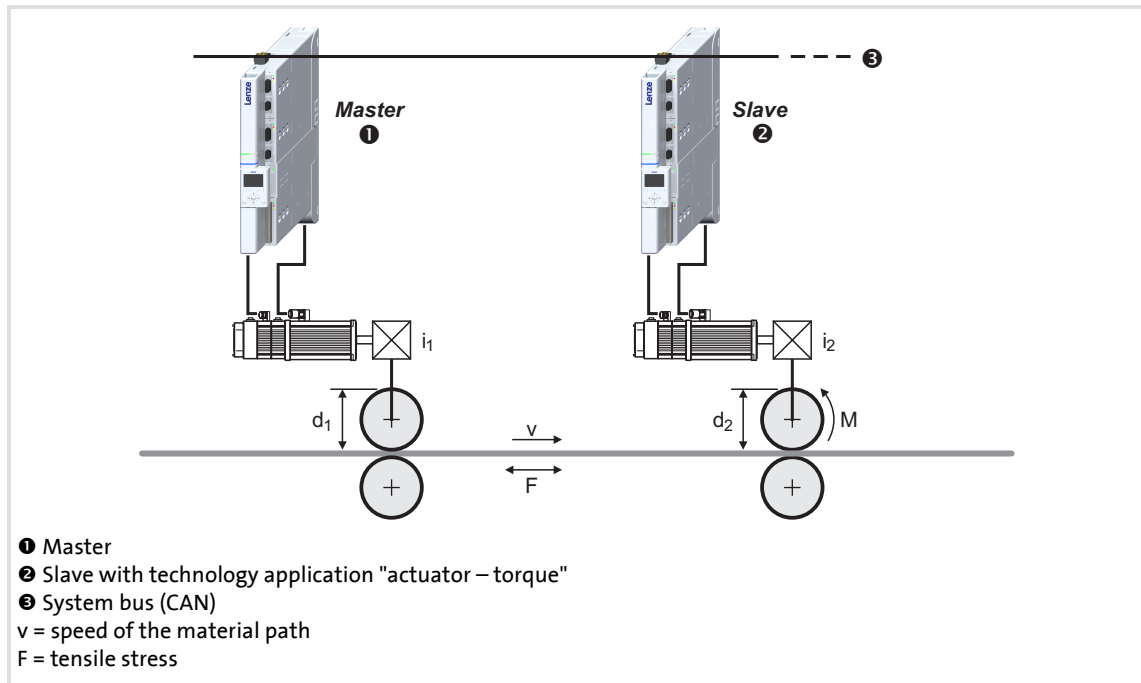
- ▶ Slave drives for material transport
 - Chain conveyors
 - S-shaped frame structure
 - Bilateral tandem drives
- ▶ Test facilities
 - Test benches for tensile stress
 - Motor test benches
 - Brake assemblies
- ▶ Support of higher-level technology solutions for e.g. traction-controlled winders

Required license/delivery

- ▶ Available in every license stage.
- ▶ The technology application is saved at program memory location 3 in the memory module and can be selected from the »Engineer« application catalog.

3 Application example

Conveyor drive with adjustable tension

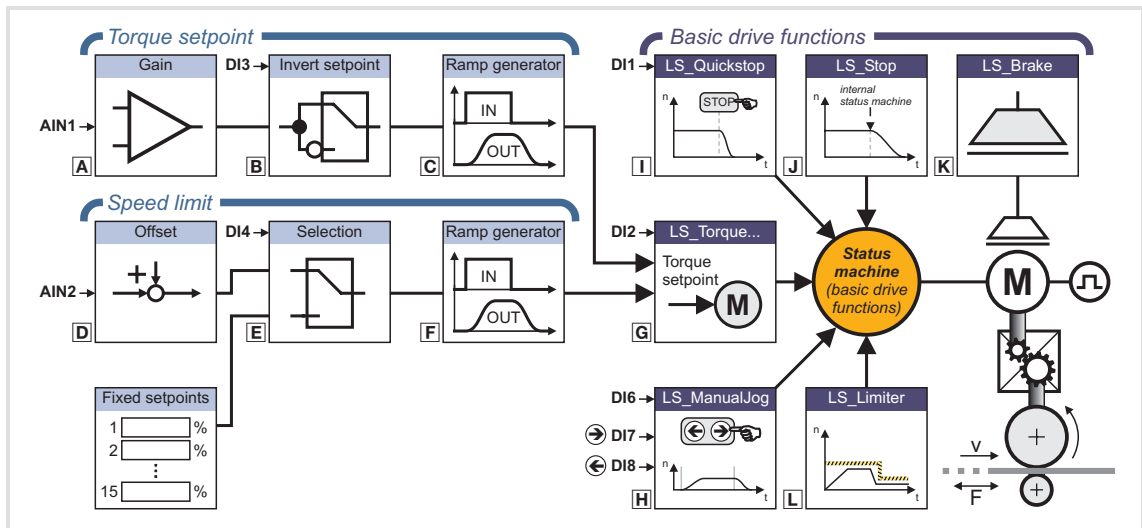


[3-1] Example: Conveyor drive with adjustable tension

- The master drive is operated speed-controlled and determines the speed of the material path.
- The slave drive with the standard technology application "actuator – torque" ensures that a certain minimum tensile stress is complied with between master and slave drive. When torque-controlled, the slave drive is permanently able to follow the speed specified by the master drive.

4 Parameter setting & configuration

4.1 Basic signal flow



[4-1] Signal flow of the TA "Actuator – torque" (schematic diagram)

Torque setpoint conditioning

- Ⓐ Setpoint gain
- Ⓑ Setpoint inversion
- Ⓒ Ramp generator

Speed limit value conditioning

- Ⓓ Offset
- Ⓔ Selection of analog input/fixed setpoints
- Ⓕ Speed profile generator

Basic drive functions

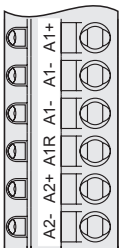
- Ⓖ Torque follower
- Ⓗ Manual jog
- Ⓘ Quick stop
- Ⓙ Stop
- Ⓚ Brake control (optional)
- Ⓛ Limiter (optional)

4.2 Assignment of the I/O terminals

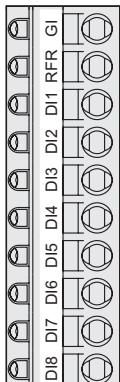
4.2.1 Setpoint and control signals

The following tables contain the Lenze assignment of the analog and digital inputs for the "Actuating drive - torque" technology application.

Analog inputs

Terminal X3	Signal (Lenze setting)
	AI1- AI1+ Torque setpoint ▶ Torque setpoint conditioning (14)
	AI2- AI2+ Speed limit value ▶ Speed limit value conditioning (16)

Digital inputs

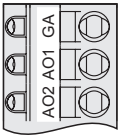
Terminal X5	Signal (Lenze setting)														
	DI1 Quick stop - If DI1 is set to LOW level, the drive is decelerated to standstill within the deceleration time set for the quick stop function independent of the setpoint selection. - If the quick stop function is deactivated, the defined torque is available again, as the case may be, an acceleration via the set acceleration time of the speed limit value is effected. ▶ Quick stop (📖 22)														
	DI2 Enable torque follower ▶ Torque follower (📖 20)														
	DI3 Invert torque setpoint														
	DI4 Activate fixed setpoint 1 Instead of the selection via the analog input 2 the fixed setpoint 1 is used as speed limit value. ▶ Change-over to fixed setpoint (📖 17)														
	DI5 Reset error By means of a LOW-HIGH edge an existing error status can be reset if the cause of the fault is removed.														
	DI6 Manual jog ▶ Manual jog (📖 21)														
	<table><tr><th>DI7</th><th>DI8</th><th>Function</th></tr><tr><td>LOW</td><td>LOW</td><td>Stop</td></tr><tr><td>HIGH</td><td>LOW</td><td>Manual control in positive direction</td></tr><tr><td>LOW</td><td>HIGH</td><td>Manual control in negative direction</td></tr><tr><td>HIGH</td><td>HIGH</td><td>- (previous state remains active)</td></tr></table>	DI7	DI8	Function	LOW	LOW	Stop	HIGH	LOW	Manual control in positive direction	LOW	HIGH	Manual control in negative direction	HIGH	HIGH
DI7	DI8	Function													
LOW	LOW	Stop													
HIGH	LOW	Manual control in positive direction													
LOW	HIGH	Manual control in negative direction													
HIGH	HIGH	- (previous state remains active)													

4.2.2 Actual value and status signals

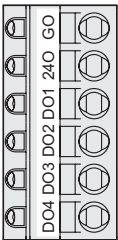
The following tables contain the Lenze assignment of the analog and digital outputs for the "Actuating drive - torque" technology application.

- The default signal configuration if required can be easily changed by parameterising the multiplexer parameters assigned.

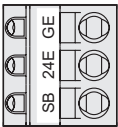
Analog outputs

Terminal X3	Signal (Lenze setting)	Signal configuration
	AO1 Current speed of the motor shaft • Scaling: $\pm 10 \text{ V} \equiv$ motor reference speed (C00011)	C03110/1
	AO2 Filtered torque setpoint • Scaling: $\pm 10 \text{ V} \equiv$ Motor reference torque (C00057/2)	C03110/2

Digital outputs

Terminal X4	Signal (Lenze setting)	Signal configuration
	DO1 Status "Drive ready" • DC-bus voltage is available and no error has occurred.	C03100/1
	DO2 Status "Torque follower enabled" • The torque follower has been enabled via the digital input DI2.	C03100/2
	DO3 Status "Torque follower in limitation" • If the torque follower is enabled, the torque setpoint or the current setpoint are within the limitation.	C03100/3
	DO4 Status "Error active acknowledgement is required" • A monitoring function with the error response "Error" or "Quick stop by trouble" has been activated and the controller is in the status "Error active" or "Quick stop by trouble active".	C03100/4

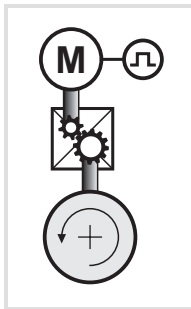
State bus

Terminal X2	Signal (Lenze setting)	Signal configuration
	SB Status "Torque follower in limitation" • If the torque follower is enabled, the torque setpoint or the current setpoint are within the limitation. • The state bus is put in the "error" status.	C03100/5

Display elements

User LED	Signal (Lenze setting)	Signal configuration
	Status "Torque follower enabled" • The torque follower has been enabled via the digital input DI2.	C03100/6

4.3 Machine parameters



The machine parameters describe e.g. the motor end of the mechanics used.

The setting of the machine parameters in the »Engineer« is carried out on the **Application parameters** tab in the dialog level *Overview* → *Drive interface*.



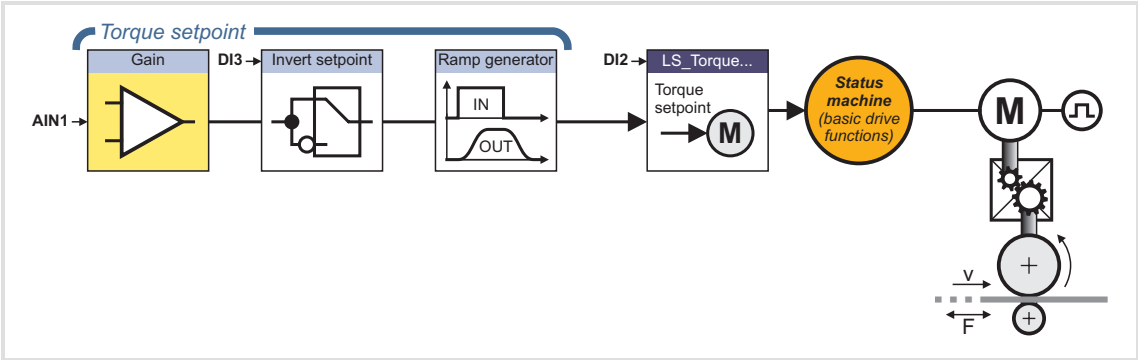
Tip!

In the »Engineer« the most important machine parameters can be adapted to the machine on the **Application parameter** tab directly in the topmost *Overview* dialog level:

Short overview of machine parameters

Parameter		Lenze setting	
		Value	Unit
C00173	Mains voltage	400/415	V
C00174	Undervoltage (LU) threshold	285	V
C00600	Resp. to DC bus overvoltage	Trouble	
C02520	Gearbox factor numerator: Motor	1	
C02521	Gearbox factor denom: Motor	1	
C02527	Motor mounting direction	Motor rotating CW	
C02570	Position control structure	Phase control	
C02522	Gearbox factor num.: Pos. enc.	1	
C02523	Gearbox factor denom.: Pos. enc.	1	
Description of the mechanics (load, tool)			
C02528	Traversing range	Unlimited	
C02524	Feed constant	360.0000	unit
C02525	Unit	°	
C02526	User-defined unit	°	
C02533	Time unit	s	
C00273/1	Motor moment of inertia	Motor-dependent	kg cm ²
C00273/2	Load moment of inertia	0.00	kg cm ²

4.4 Torque setpoint conditioning



[4-2] Torque setpoint conditioning (schematic diagram)

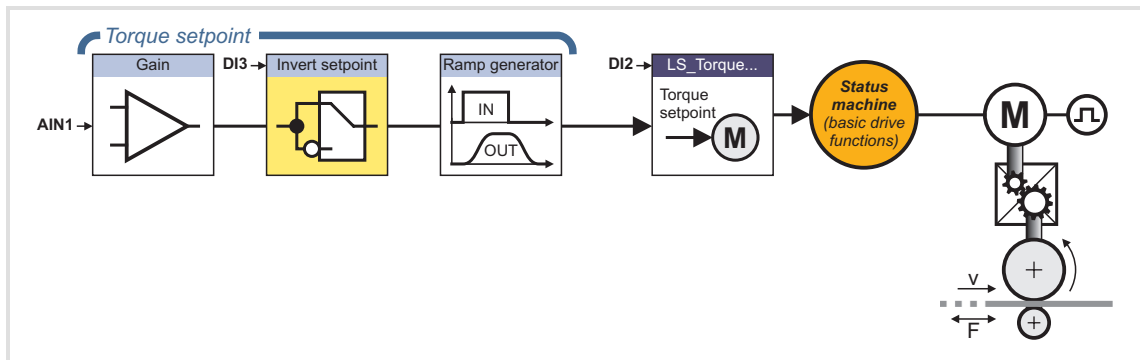
The torque setpoint is defined in the Lenze setting via the analog input 1 and take place in both directions (bipolar) and accordingly the drive acts in a driving or braking manner.

► Parameter setting: **Application parameters** tab → dialog level *Overview*

Parameter		Lenze setting	
		Value	Unit
C03002	Setpoint gain	100.00	%

Setpoint inputs of the function		Signal configuration (Multiplexer parameters)
Lenze setting	Setpoint input	
AIN 1	→ Torque setpoint	C03000

4.4.1 Setpoint inversion



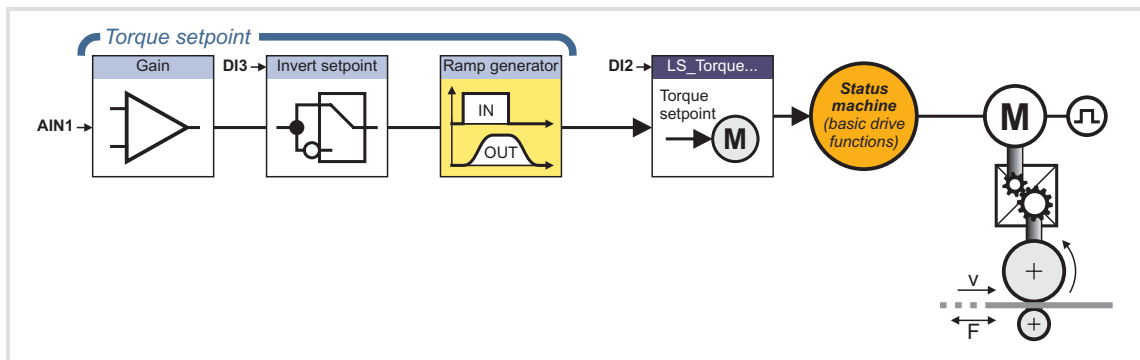
[4-3] Setpoint inversion (schematic diagram)

Via the digital input DI3 the effective direction of the (bipolar) setpoint can be inverted, if required.

► Parameter setting: **All parameters** tab → category *Actuator - torque* → *Multiplexer*

Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
DIGIN 3	→ Invert setpoint	C03003

4.4.2 Ramp generator



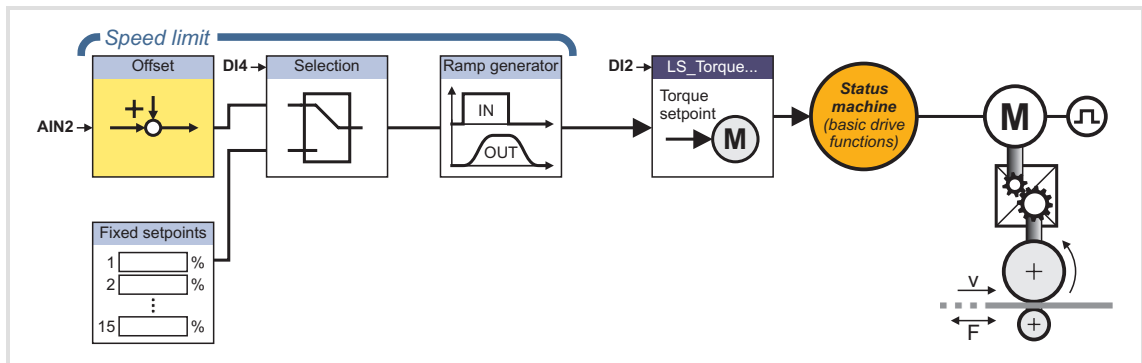
[4-4] Ramp generator (schematic diagram)

In order to avoid setpoint step-changes the torque setpoint passes a ramp generator with a parameterisable acceleration/deceleration and S-ramp time before it is transmitted to the basic drive function "Torque follower".

► Parameter setting: **Application parameters** tab → dialog level *Overview*

Parameter		Lenze setting	
		Value	Unit
C03550	Acceleration / deceleration time	0.010	s
C03551	S-ramp time	0.001	s

4.5 Speed limit value conditioning



[4-5] Speed limit value conditioning (schematic diagram)

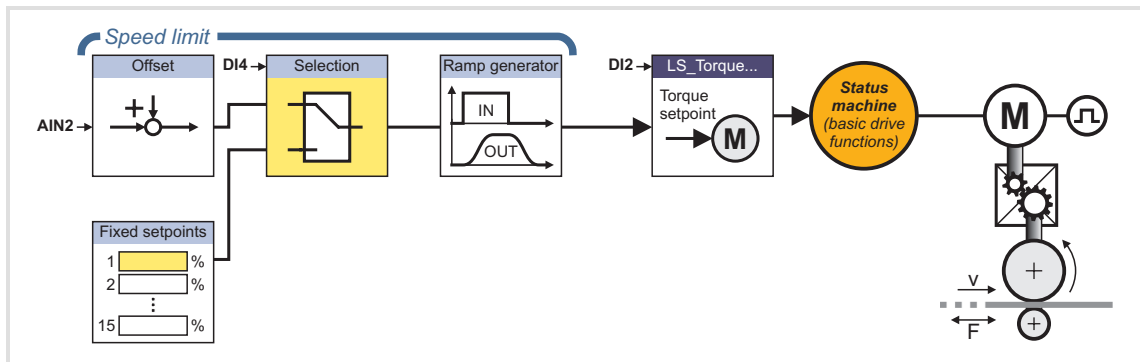
The speed limit value is defined in the Lenze setting via the analog input 2.

- ▶ The defined speed limit value refers to the direction of rotation which can be set freely with positive torque.
- ▶ The speed limit value in negative direction of rotation equals, according to amount, the limit value for the positive direction of rotation.
- ▶ If the speed of the drive is inside the limitations, the motor generates the specified torque.
- ▶ If the positive or negative speed limit value (for CW or CCW rotation) is reached, the drive changes to the speed-controlled operation. The set speed limit values are not exceeded.
- ▶ If the specified speed limit value directly corresponds to the line speed, the internal limit value can be increased by entering an offset in C03008.
- ▶ Parameter setting: **Application parameters** tab → dialog level *Overview*

Parameter		Lenze setting	
		Value	Unit
C03008	Offset for limit speed	0.00	%

Setpoint inputs of the function		Signal configuration (Multiplexer parameters)
Lenze setting	Setpoint input	
AIN 2	→ Upper limit speed	C03006
Inverse upper limit speed	→ Lower speed limit value	C03171

4.5.1 Change-over to fixed setpoint



[4-6] Additional offset for the speed limit value (schematic diagram)

Via the digital input DI4 a change-over to a parameterisable fixed setpoint can take place.

► Parameter setting: **Application parameters** tab → dialog level *Overview*

Parameter		Lenze setting	
		Value	Unit
C03500/1	Fixed setpoint 1	10.00	%

Control inputs of the function		Signal configuration (Multiplexer parameters)
Lenze setting	Control input	
DIGIN 4	→ Activate fixed setpoint 1	C03009/4

Use of further fixed setpoints

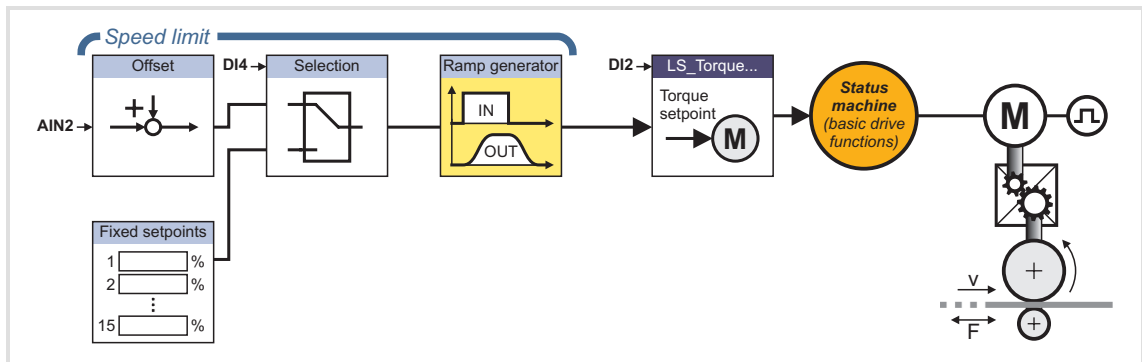
A total of 15 different fixed setpoints can be parameterised. For the selection of the fixed setpoints 2 ... 15 the selection inputs are to be assigned with the corresponding signals. The selection of the fixed setpoints is carried out in a binary coded manner.

► Parameter setting: Tab **Application parameters** → dialog level *Overview* → *Ramp generator* → *All fixed setpoints*

Parameter		Lenze setting	
		Value	Unit
C03500/1	Fixed setpoint 1	10.00	%
C03500/2	Fixed setpoint 2	0.00	%
C03500/...	Fixed setpoint ...	...	...
C03500/15	Fixed setpoint 15	0.00	%

Control inputs of the function		Signal configuration (Multiplexer parameters)
Lenze setting	Control input	
DIGIN 4	→ Activate fixed setpoint 1	C03009/4
FALSE	→ Activate fixed setpoint 2 a	C03009/5
FALSE	→ Activate fixed setpoint 4 a	C03009/6
FALSE	→ Activate fixed setpoint 8 a	C03009/7

4.5.2 Speed ramp generator



[4-7] Ramp generator (schematic diagram)

In order to avoid setpoint step-changes the speed limit value passes a ramp generator with a parameterisable acceleration and deceleration time before it is transmitted to the basic drive function "Torque follower".

► Parameter setting: **Application parameters** tab → dialog level *Overview*

Parameter		Lenze setting	
		Value	Unit
C03502	Basic acceleration time	1.000	s
C03503	Basic deceleration time	1.000	s
C03010	Profile mode	Linear ramps	

Use of further ramp parameter sets

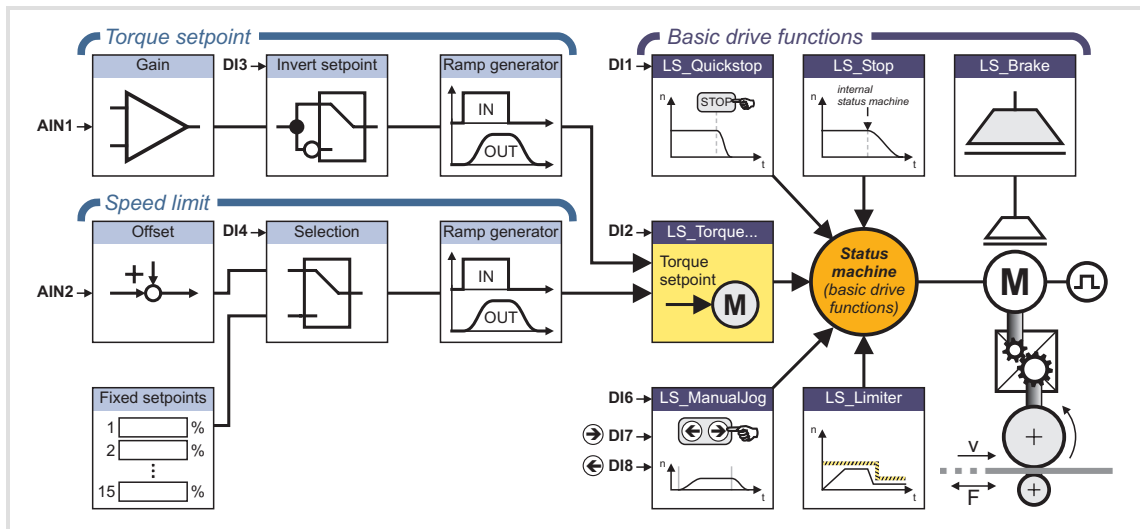
If required, 15 further ramp parameter sets can be parameterised. For the selection of the ramp parameter sets 1 ... 15, the selection inputs are to be assigned with the corresponding signals. The selection of the ramp parameter sets is carried out in a binary coded manner.

- Parameter setting: Tab **Application parameters** → dialog level *Overview* → *Ramp generator* → *All ramp parameters*

Parameter		Lenze setting	
		Value	Unit
C03512/1	Acceleration time 1	0.000	s
C03512/...	Acceleration time ...	...	...
C03512/15	Acceleration time 15	0.000	s
C03513/1	Deceleration time 1	0.000	s
C03513/...	Deceleration time ...	...	...
C03513/15	Deceleration time 15	0.000	s
C03514/1	S-ramp time 1	0.000	s
C03514/...	S-ramp time	...	...
C03514/15	S-ramp time 15	0.000	s

Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
FALSE	→ Activate ramp parameter set 1 a	C03009/8
FALSE	→ Activate ramp parameter set 2	C03009/9
FALSE	→ Activate ramp parameter set 4	C03009/10
FALSE	→ Activate ramp parameter set 8 a	C03009/11

4.6 Torque follower

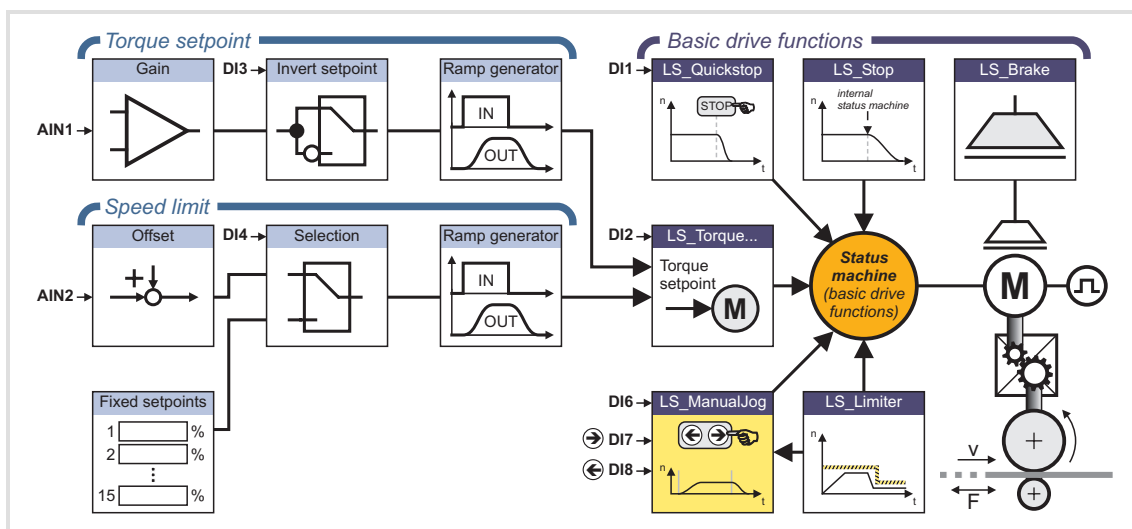


[4-8] Basic function "Torque follower" (schematic diagram)

The torque-controlled operation is requested via the digital input DI2. If no other basic function and error state are active, the torque-controlled operation is enabled.

- The build-up of the defined torque is controlled via a ramp generator based on the current torque.
- Based on the current motor speed the internal speed limit value is also led to the setpoint via a ramp generator after the operation is enabled.
- If the enable of the torque-controlled operation is reset via the digital input DI2, the drive is decelerated to standstill via an independent profile generator of the basic function "Stop".

4.7 Manual jog



[4-9] Basic function "Manual jog" (schematic diagram)

For the setting-up operation the basic function "Manual jog" is available. It is requested via the digital input DI6. If no other basic function and error status are active, enable is carried out and the manual jog via the digital inputs DI7 and DI8 is possible.

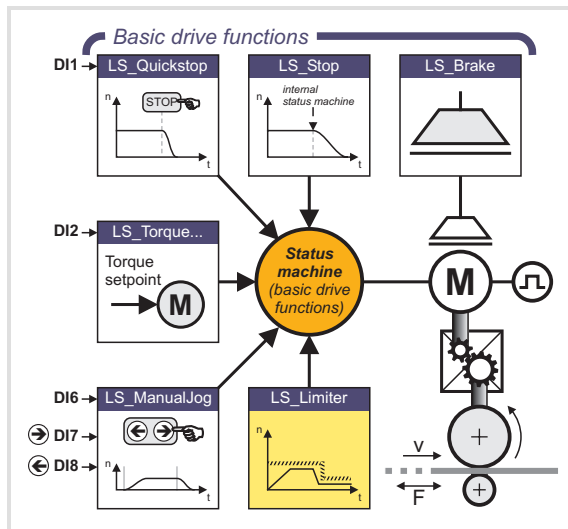
► Parameter setting: **Application parameters** tab → dialog level *Overview* → *Manual jog*

Parameter		Lenze setting	
		Value	Unit
C02620	Manual jog: Speed 1	360.0000	unit/s
C02621	Manual jog: Speed 2	720.0000	unit/s
C02622	Manual jog: Acceleration	360.0000	unit/s ²
C02623	Manual jog: Deceleration	1440.0000	unit/s ²
C02624	Manual jog: S-ramp time	0.100	s

Control inputs of the function		Signal configuration (Multiplexer parameters)
Lenze setting	Control input	
DIGIN 6	→ Request manual jog	C03155/1
DIGIN 7	→ Activate positive manual jog	C03155/2
DIGIN 8	→ Activate negative manual jog	C03155/3
FALSE	→ Activate 2. speed	C03155/4

4.9

Limiter



[4-11] Basic function "Limiter" (schematic diagram)

The basic function "Limiter", where applicable, by means of limit switches monitors travel range limits.

In the case of homing, positioning and manual jog the basic function "Limiter" if required provides for the compliance with kinematic limit values.

**Note!**

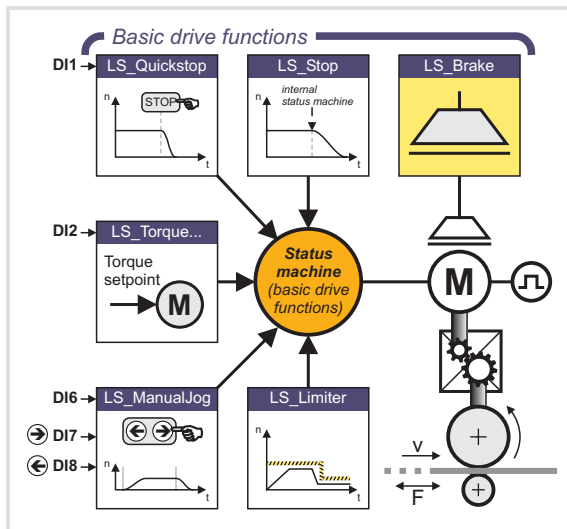
The parameterised limit values are not effective for the basic functions "speed follower", "torque follower", and "position follower"!

For the exceeding of the limit values an error response can be set.

► Parameter setting: **Application parameters** tab → dialog level *Overview* → *Limiter*

Parameter		Lenze setting	
		Value	Unit
Only for homing, positioning and manual jog			
C02702	Limitations are active	Deactivated	
C02703	Max. speed	3600.0000	unit/s
C02705	Max. acceleration	3600.0000	unit/s ²
C02706	Min. S-ramp time	100	ms
C02707	Permissible direction of rotation	Positive and negative	
Control inputs of the function		Signal configuration	
Lenze setting	Control input	(Multiplexer parameters)	
FALSE	→ Positive limit switch	C03150/1	
FALSE	→ Negative limit switch	C03150/2	

4.10 Brake control



[4-12] Basic function "Brake control" (schematic diagram)

The basic function "Brake control" serves to the wear free control and monitoring of a holding brake.

In the simplest case, an optionally available brake module is used.

Alternatively the holding brake can also be controlled and monitored via the digital inputs/outputs.



Note!

In the Lenze setting the brake control is switched off to reach a safe status after mains connection.

► Parameter setting: **Application parameters** tab → dialog level *Overview* → *Brake control*

Parameter		Lenze setting	
		Value	Unit
C02580	Operating mode of brake	Brake control off	
C02581	Brake activation threshold	50	rpm
C02582	Brake response to pulse inhibit	Activate brake immediately	
C02583	Status input monitoring	Not active	
C02585	Brake control polarity	Not inverted	
C02586	Starting torque 1	0.00	Nm
C02587	Starting torque 2	0.00	Nm
C02588	Starting torque source	Starting torque 1/2	
C02589	Brake closing time	100	ms
C02590	Brake opening time	100	ms
C02591	Waiting time - status monitoring	100	ms
C02593	Waiting time - brake activation	0.000	s
C02594	Test torque	0.00	Nm
C02595	Permissible angle of rotation	5	°
C02596	Grinding speed	100	rpm
C02597	Accel./decel. time - grinding	1.000	s
C02598	Grinding ON time	0.5	s
C02599	Grinding OFF time	0.5	s

Control/setpoint inputs of the function		Signal configuration
Lenze setting	Control/setpoint input	(Multiplexer parameters)
FALSE	→ Open brake (release)	C03165/1
FALSE	→ Activate starting torque 2	C03165/2
FALSE	→ Keep open brake at standstill	C03165/3
FALSE	→ Brake status signal	C03165/4
FALSE	→ Activate brake test	C03165/5
FALSE	→ Grind brake	C03165/6
0 %	→ Additional torque	C03166

4.11 Signal configuration

4.11.1 Drive and motor interface

If required, the preset signal configuration of the control and setpoint inputs of the drive and motor interface can be easily reconfigured per parameter setting of the assigned multiplexer parameters.

Drive interface

Signal (Lenze setting)	Control input	Signal configuration
FALSE	→ Set controller inhibit	C03130/1
FALSE	→ Set error	C03130/2
Axis control word bit 00	→ Switch on drive	C03130/3
DIGIN 5	→ Reset error 1	C03130/4
Axis control word bit 07	→ Reset error 2	C03130/5
FALSE	→ Reset error 3	C03130/6

Motor interface

Signal (Lenze setting)	Setpoint input	Signal configuration
100 %	→ Upper torque limit value	C03141/1
-100 %	→ Lower torque limit value	C03141/2
100 %	→ Adaptation of mass inertia	C03141/3

4.11.2 Output ports

If required, the preset signal configuration of the output ports can be easily reconfigured per parameter setting of the assigned multiplexer parameters.

Output port "LPortAxisOut1"

The output port **LPortAxisOut1** is intended for the connection with a following axis.

Signal (Lenze setting)	Output port	Signal configuration
Axis status word		
• Application-specific signals can be supplemented.		
Drive ready	→ Axis status word bit 00	C03120/1
FALSE	→ Axis status word bit 01	C03120/2
Operation enabled	→ Axis status word bit 02	C03120/3
Error is active	→ Axis status word bit 03	C03120/4
FALSE	→ Axis status word bit 04	C03120/5
Quick stop is active	→ Axis status word bit 05	C03120/6
Drive is ready to start	→ Axis status word bit 06	C03120/7
Warning is active	→ Axis status word bit 07	C03120/8
FALSE	→ Axis status word bit 08	C03120/9
FALSE	→ Axis status word bit 09	C03120/10
FALSE	→ Axis status word bit 10	C03120/11
Motor control in limitation	→ Axis status word bit 11	C03120/12
FALSE	→ Axis status word bit 12	C03120/13
FALSE	→ Axis status word bit 13	C03120/14
FALSE	→ Axis status word bit 14	C03120/15
FALSE	→ Axis status word bit 15	C03120/16
Setpoints for horizontal communication		
Filtered torque setpoint	→ Axis-Port Out 1	C03124/1
	Scaling: $16384 \equiv 2^{14} \equiv 100\% \text{ motor reference torque (C00057/2)}$	
Upper speed limit value	→ Axis-Port Out 2	C03124/2
	Scaling: $1073741824 \equiv 2^{30} \equiv 100\% \text{ motor reference speed (C00011)}$	

Output port "LPortStatus1"

The output port **LPortStatus1** is intended for the connection with a higher-level control.

Signal (Lenze setting)	Output port	Signal configuration
Status word 1		
Drive ready	→ Status word 1 bit 00	C03121/1
FALSE	→ Status word 1 bit 01	C03121/2
Operation enabled	→ Status word 1 bit 02	C03121/3
Error is active	→ Status word 1 bit 03	C03121/4
FALSE	→ Status word 1 bit 04	C03121/5
Quick stop is active	→ Status word 1 bit 05	C03121/6
Drive is ready to start	→ Status word 1 bit 06	C03121/7
Warning is active	→ Status word 1 bit 07	C03121/8
FALSE	→ Status word 1 bit 08	C03121/9
FALSE	→ Status word 1 bit 09	C03121/10
FALSE	→ Status word 1 bit 10	C03121/11
Motor control in limitation	→ Status word 1 bit 11	C03121/12
FALSE	→ Status word 1 bit 12	C03121/13
FALSE	→ Status word 1 bit 13	C03121/14
FALSE	→ Status word 1 bit 14	C03121/15
FALSE	→ Status word 1 bit 15	C03121/16

Output port "LPortStatus2"

Signal (Lenze setting)	Output port	Signal configuration
Status word 2		
FALSE	→ Status word 2 bit 00	C03122/1
FALSE	→ Status word 2 bit 01	C03122/2
FALSE	→ Status word 2 bit 02	C03122/3
FALSE	→ Status word 2 bit 03	C03122/4
FALSE	→ Status word 2 bit 04	C03122/5
FALSE	→ Status word 2 bit 05	C03122/6
FALSE	→ Status word 2 bit 06	C03122/7
FALSE	→ Status word 2 bit 07	C03122/8
FALSE	→ Status word 2 bit 08	C03122/9
FALSE	→ Status word 2 bit 09	C03122/10
FALSE	→ Status word 2 bit 10	C03122/11
FALSE	→ Status word 2 bit 11	C03122/12
FALSE	→ Status word 2 bit 12	C03122/13
FALSE	→ Status word 2 bit 13	C03122/14
FALSE	→ Status word 2 bit 14	C03122/15
FALSE	→ Status word 2 bit 15	C03122/16

4.12 Application error messages

For the output of application-specific error messages an FB instance *L_DevApplErr1* of the function block **L_DevApplErr** is available.

- Via the 8 boolean inputs up to 8 different application error messages with parameterisable module ID, error ID and error response can be activated by the application.

Error message		Error ID	Error response
1	Torque follower in limitation	8001	Warning locked
2	-	8000	Error
3	-	8000	Error
4	-	8000	Error
5	-	8000	Error
6	-	8000	Error
7	-	8000	Error
8	-	8000	Error

- Parameter setting: **All parameters** tab

Parameter		Lenze setting
C05900	Module ID	980
C05901/1...8	Error ID 1 ... 8	See table above
C05902/1...8	Error response 1 ... 8	See table above

Reset of error message

In the Lenze setting the digital input DI5 for resetting (acknowledging) an error message is connected to the input *DI_bResetError1* of the drive interface.

4.13 Parameterisable function blocks

This subchapter lists all relevant parameterisable function blocks of the technology application and the corresponding parameters in alphabetical order.

4.13.1 L_DevApplErr1

Is an instance of	Function		
L_DevApplErr	Error handling ▶ Application error messages (📖 29)		

Parameter	Possible settings			Information
C03900	980		999	Module ID
C03901/1...8	0		65535	Error ID
C03902/1...8				Error response
	0	None		
	1	Fault		
	2	Trouble		
	3	Quick stop by trouble		
	4	Warning locked		
	5	Warning		
	6	Information		

4.13.2 SpeedRamp

Is an instance of	Function		
L_SdSpeedSet	Ramp generator for speed limit value ▶ Speed limit value conditioning (📖 16)		

Parameter	Possible settings			Information
C03500/1...15	-200.00	%	200.00	Fixed setpoint 1...15
C03501	0		15	Active setpoint • Read only
C03502	0.000	s	1000.000	Basic acceleration time • Initialisation: 1.000 s
C03503	0.000	s	1000.000	Basic deceleration time • Initialisation: 1.000 s
C03504	0.000	s	10.000	Basic S-ramp time • Initialisation: 0.100 s
C03507				Polarity of <i>bStop</i> input
	0	Active HIGH		
	1	Active LOW		
C03508	0.00	%	100.00	Setpoint tolerance reached • Initialisation: 1.00 %

Parameter	Possible settings			Information
C03512/1...15	0.000	s	1000.000	Acceleration time 1...15 • Initialisation: 0.000 s
C03513/1...15	0.000	s	1000.000	Deceleration time 1...15 • Initialisation: 0.000 s
C03514/1...15	0.000	s	1000.000	S-ramp time 1...15 • Initialisation: 0.000 s
C03515	0		15	Active ramp parameters • Read only
C03520				Profile mode • Read only
	0	Profile generation with linear ramps • Referred to the reference speed (C00011).		
	1	Profile generation with jerk limitation (S-shaped ramps)		
	10	Profile generation with linear ramps • Referred to the reference speed (C00011). • At an edge change at the input <i>bStop</i> referred to the current setpoint (constant time). • The setpoint applied at the input <i>dnExtSpeedSetpoint_n</i> is used as the start value.		
C03521	-200.00	%	200.00	Setpoint at the input • Read only
C03522	-200.00	%	200.00	Target setpoint • Read only
C03523	-200.00	%	200.00	Setpoint at the output • Read only
C03524				Status "Target setpoint reached" • Read only
	0	Target setpoint not yet reached		
	1	Target setpoint reached		
C03525	0.000	rpm	50000.000	Load reference speed • Read only
C03526	0.000	rpm	50000.000	Load setpoint speed • Read only
C03527	0.0000	Unit/t	214000.0000	Reference speed • Read only
C03528	-214000.0000	Unit/t	214000.0000	Setpoint speed • Read only
C03529	Character string from <i>AxisData</i>			Speed unit • Read only
C03537	-200.00	%	200.00	External setpoint • Display of input signal <i>dnExtSpeedSetpoint_n</i> .
C03538	-200.00	%	200.00	Current motor speed • Display of input signal <i>dnActualMotorSpeed_n</i> .
C03539/1				Invert setpoint • Display of input signal <i>blInvertSetpoint</i> .
	0	Setpoint not inverted		
	1	Setpoint inverted		

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Parameterisable function blocks

Parameter	Possible settings	Information
C03539/2		Hold setpoint output
	0 Setpoint output enabled	• Display of input signal <i>bHoldOutput</i> .
	1 Hold setpoint output	
C03539/3		Activate stop
	0 Stop not active	• Display of input signal <i>bStop</i> .
	1 Stop requested	
C03539/4...7		Activate fixed setpoint 1 ... 8
	0 Jog input not active	• Display of input signals <i>bJog1</i> ... <i>bJog8</i> .
	1 Jog input active	
C03539/8...11		Activate ramp parameter 1 ... 8
	0 Ti input not active	• Display of input signals <i>bTi1</i> ... <i>bTi8</i> .
	1 Ti input active	
C03539/12		Load external setpoint
	0 Loading not active	• Display of input signal <i>bLoadExtSpeedSetpoint</i> .
	1 Load external setpoint	
C03539/13		Load motor speed
	0 Loading not active	• Display of input signal <i>bLoadActualMotorSpeed</i> .
	1 Load motor speed	

4.13.3 TorqueRamp

Is an instance of	Function
L_SdRampGenerator	Ramp generator for torque setpoint ▶ Ramp generator (15)

Parameter	Possible settings	Information
C03550	0.001 s 1000.000	Acceleration / deceleration time • Initialisation: 0.010 s
C03551	0.001 s 10.000	S-ramp time • Initialisation: 0.001 s
C03552	-200.000 % 200.000	Setpoint at the input • Display of input signal <i>dnIn_n</i> .
C03553	-200.000 % 200.000	Setpoint at the output • Display of output signal <i>dnOut_n</i> .



Your opinion is important to us

These instructions were created to the best of our knowledge and belief to give you the best possible support for handling our product.

If you have suggestions for improvement, please e-mail us to:

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Thank you for your support.

Your Lenze documentation team



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