



SEW
EURODRIVE

Manual



MOVIDRIVE® modular/system

Parameter Descriptions with MOVISAFE® CS..A Safety Card



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1 Parameter descriptions for CS..A

1.1 MOVISAFE® CS..A functions

1.1.1 General

8703.240 Fault status after start-up

Factory setting:

Value range:

- 0 = System error
- **1 = No error**

The parameter specifies whether the safety card always signals a system error that needs to be acknowledged after starting, or whether it starts up without errors if the parameters have been set correctly. As a result, the motor might turn without intervention of the user after the safety card has started up (e.g. power on, fault reset) if a travel command is pending (via bus, terminal).

8707.4 Stop function before parameter setting

Factory setting:

Value range:

- **0 = STO**

Determines which drive safety function is selected in the device as response before the "parameter setting" state.

1.1.2 Safe inputs

8704.1 Line diagnostics

Factory setting:

Value range:

- 0 = Not active
- **1 = Active**

Activates the detection of crossfaults across the safe digital inputs F-DIx by means of test pulses of the sensor supply.

8704.2 Input filter time

Factory setting: **25**

Unit: ms

Resolution: 1

Value range: 4 to 250

8704.3 Discrepancy time

Factory setting: **500**

Unit: ms

Resolution: 1

Value range: 10 to 30000

Discrepancy time between two F-DI in dual-channel use. If the two input signals do not result in a logically correct signal, this state will be tolerated for the time specified by this parameter.

8704.4 Connection type

Factory setting:

Value range:

- 0 = Single-channel
- 1 = 2-channel equivalent
- **2 = 2-channel non-equivalent**

The "connection type" column indicates the connection type set for the safety card.

8704.5 Latching function

Factory setting:

Value range:

- **0 = Not active**
- 1 = Active

Configuration of the input behavior when the F-DI level changes from "0" to "1". If latching is set to "Active", you have to acknowledge before the logic signal of the input is "1" and a drive safety function is disabled.

8704.6 Switch test function

Factory setting:

Value range:

- **0 = Not active**
- 1 = Active

If the switch test function is active, the inputs must have had the valid state for logical "0" once before an input fault can be deactivated.

- 2-channel equivalent: both F-DI low levels
- 2-channel non-equivalent: F-DI Low level, (F-DI.+1) high level

8704.7 Sensor supply pulsing

Factory setting:

Value range:

- 0 = Not active
- **1 = Active**

Supply output for connected sensors. Supply is pulsed when the parameter is set to "Active". Crossfaults can be detected for inputs that are powered by sensor supply.

8704.8 Signal monitoring

Factory setting:

Value range:

- 0 = Not active
- 2 = Factor 2
- 5 = Factor 5
- 10 = Factor 10
- **20 = Factor 20**
- 50 = Factor 50

This parameter is used to set the maximum duration for which an instable input signal is permitted.

Duration for the permitted bouncing of the contacts at the input terminal (multiplier with respect to the F-DI input filter time (index 8704.2).

1.1.3 Safe outputs**8705.1 Connection type**

Factory setting:

Value range:

- **0 = Two-pole PM switching**
- 1 = Single-pole P switching

Connection type of the safe digital output.

8705.2 Maximum test duration

Factory setting: **1000**

Unit: μ s

Resolution: 500

Value range: 500 to 5000

Maximum test duration for output diagnostics with variable test duration. Using a variable test duration, different actuators can be tested with different lining carriers (inductive, capacitive).

8705.3 Wire break detection

Factory setting:

Value range:

- **0 = Not active**
- 1 = Active

Activates the detection of open circuits in the output circuit.

1.1.4 Encoder

Selection of the encoder plus its electrical properties, such as resolution.

8708.1 Encoder type

Factory setting:

Value range:

- **0 = No encoder**
- 1 = EI7C FS
- 2 = AK0H
- 3 = AK1H
- 4 = ES7S
- 5 = EG7S
- 6 = EV7S
- 7 = AS7W
- 8 = AG7W
- 9 = AV7W

Specifies the type of the encoder in use.

8708.2 Acceleration filter time

Factory setting: **20**

Unit: ms

Resolution: 1

Value range: 10 to 100

The filter time can be used to compensate for physical fluctuations in the acceleration, or to reduce the quantization error of the evaluation method.

This parameters affects the response time, see the chapter "Response times" in the "MOVISAFE® CS..A Safety Card" manual.

8708.3 Speed filter time – sin/cos encoder

Factory setting: **1**

Unit: ms

Resolution: 1

Value range: 1 to 300

The filter time can be used to compensate for physical fluctuations in the rotational speed, or to reduce the quantization error of the evaluation method.

A filter time of ≥ 4 ms is recommended for AK0H encoders to minimize the quantization error.

This parameters affects the response time, see the chapter "Response times" in the "MOVISAFE® CS..A Safety Card" manual.

8708.4 Speed filter time – EI7C FS encoder

Factory setting: **0**

Unit: ms

Resolution: 4

Value range: 0 to 300

Filter time to determine the actual speed value for HTL encoders. The filter can be used to compensate for physical fluctuations in the rotational speed, or to reduce the quantization error of the evaluation method.

This parameters affects the response time, see the chapter "Response times" in the "MOVISAFE® CS..A Safety Card" manual.

8708.6 Counting direction

Factory setting:

Value range:

- **0 = Normal**
- 1 = Inverted

Direction of rotation of the motor.

The following settings can be made:

- Normal:

With a positive setpoint, the motor turns in clockwise direction of rotation, with a negative setpoint, it turns in counterclockwise direction of rotation.

- Inverted:

With a positive setpoint, the motor turns in counterclockwise direction of rotation, with a negative setpoint, it turns in clockwise direction of rotation.

8707.5 Minimum speed for speed function in user units

Factory setting: **500000**

Unit: $1\text{E}-4$ x user unit for speed

Resolution: 1

Value range: 100000 to 360000000

The minimum speed for speed functions is used by the following functions:

- SLI drive safety function: The braking distance is only calculated above the minimum speed.
- SS1(b), SS2(b) drive safety function: The final state becomes active when the calculated limit speed drops below the minimum speed.

8707.6 Minimum speed for acceleration function in user units

Factory setting: **500000**

Unit: $1\text{E}-4$ x user unit for speed

Resolution: 1

Value range: 100000 to 360000000

The minimum speed for acceleration functions is used by the following functions:

- SLA drive safety function: The acceleration is not monitored as long as the absolute value of the actual speed is smaller than the minimum speed.

1.1.5 F-protocol**8710.4 F-protocol type**

Factory setting:

Value range:

- **61504 = No protocol**
- 61505 = PROFIsafe
- 61506 = ISOFAST® slave

Selection of the parameterized F-protocol.

8711.1 PROFIsafe slave F-address

Factory setting: **1**

Unit:

Resolution: 1

Value range: 1 to 65534

Entry of the F-address of the PROFIsafe slave station.

8711.50 ISOFAST® slave connection ID

Factory setting: **0**

Unit:

Resolution: 1

Value range: 0 to 65534

Entry of the connection ID of the ISOFAST® protocol for safeguarding the 1:1 connection between master and slave.

8711.53 ISOFAST® slave format

Factory setting:

Value range:

- 1 = ISOFAST® 1
- 2 = ISOFAST® 2

Format of the ISOFAST® protocol on the safety card.

1.1.6 User units

The user units are adopted from the user units set for drive train 1 when setting the parameters for the CS..A safety card. Later changes of the user units in drive train 1 do not affect the user units of the CS..A safety card.

8554 User unit position

These parameters specify the properties of the user unit for the position of drive train 1.

8554.1 Numerator

Factory setting: **65536**

Unit:

Resolution: 1

Value range: 1 to 2147483647

Indicates the ratio between numerator and denominator adopted from the standard part when the CS..A safety card is started up. Later changes of the user units in drive train 1 do not affect the user units of the CS..A safety card.

8554.2 Denominator

Factory setting: **100**

Unit:

Resolution: 1

Value range: 1 to 2147483647

Indicates the ratio between numerator and denominator adopted from the standard part when the CS..A safety card is started up. Later changes of the user units in drive train 1 do not affect the user units of the CS..A safety card.

8554.3 Resolution

Factory setting:

Value range:

- 0 = 1E-00
- 1 = 1E-01
- **2 = 1E-02**
- 3 = 1E-03
- 4 = 1E-04
- 5 = 1E-05
- 6 = 1E-06
- 7 = 1E-07
- 8 = 1E-08
- 9 = 1E-09

Power of ten resolution.

8554.4 Unit

Factory setting: **revolutions**

Resolution:

Value range:

User unit set in drive train 1. This unit is also available under "PO configuration" and under "Process values".

8557 User unit speed

These parameters specify the properties of the user unit for the speed of drive train 1.

8557.1 Numerator

Factory setting: **10000**

Unit:

Resolution: 1

Value range: 1 to 2147483647

Indicates the ratio between numerator and denominator adopted from the standard part when the CS..A safety card is started up. Later changes of the user units in drive train 1 do not affect the user units of the CS..A safety card.

8557.2 Denominator

Factory setting: **1**

Unit:

Resolution: 1

Value range: 1 to 2147483647

Indicates the ratio between numerator and denominator adopted from the standard part when the CS..A safety card is started up. Later changes of the user units in drive train 1 do not affect the user units of the CS..A safety card.

8557.3 Resolution

Factory setting:

Value range:

- **0 = 1E-00**
- 1 = 1E-01
- 2 = 1E-02
- 3 = 1E-03
- 4 = 1E-04
- 5 = 1E-05
- 6 = 1E-06
- 7 = 1E-07
- 8 = 1E-08
- 9 = 1E-09

Power of ten resolution.

8557.4 Unit

Factory setting: **rev/min**

Resolution:

Value range:

User unit set in drive train 1. This unit is also available under "PO configuration" and under "Process values".

8560 User unit acceleration

These parameters specify the properties of the user unit for the acceleration of drive train 1.

8560.1 Numerator

Factory setting: **100**

Unit:

Resolution: 1

Value range: 1 to 2147483647

Indicates the ratio between numerator and denominator adopted from the standard part when the CS..A safety card is started up. Later changes of the user units in drive train 1 do not affect the user units of the CS..A safety card.

8560.2 Denominator

Factory setting: **1**

Unit:

Resolution: 1

Value range: 1 to 2147483647

Indicates the ratio between numerator and denominator adopted from the standard part when the CS..A safety card is started up. Later changes of the user units in drive train 1 do not affect the user units of the CS..A safety card.

8560.3 Resolution

Factory setting:

Value range:

- **0 = 1E-00**
- 1 = 1E-01
- 2 = 1E-02
- 3 = 1E-03
- 4 = 1E-04
- 5 = 1E-05
- 6 = 1E-06
- 7 = 1E-07
- 8 = 1E-08
- 9 = 1E-09

Power of ten resolution.

8560.4 Unit

Factory setting: **Rev/(min x s)**

Resolution:

Value range:

User unit set in drive train 1. This unit is also available under "PO configuration" and under "Process values".

1.1.7 STO/SBC drive safety function**8706.14 SBC enable**

Factory setting:

Value range:

- 0 = No
- **1 = Yes**

When enable is set to "No", the selected STO drive safety function takes effect without brake application time.

When enable is set to "Yes", the selected STO drive safety function takes effect after the brake application time.

In both cases, the outputs assigned to the SBC drive safety function are switched off immediately.

8706.15 Brake application time

Factory setting: **200**

Unit: ms

Resolution: 4

Value range: 0 to 2000

Delayed switching off of outputs assigned to the STO safety function. The setting is adopted from the "Brake application time" parameter (index 8355.4) of the drive train.

8706.16 Extended diagnostics STO

Factory setting:

Value range:

- **0 = Not active**

Extended diagnostics for the STO circuit is disabled (default).

- 1 = Test when deactivated

The test for "Extended diagnostics STO" is performed after having deactivated the STO function.

- 2 = Test when deactivated and time monitoring

Same as "Test when deactivated" option. If diagnostics has not been performed within 8 hours, the safety card will additionally issue a warning. Time monitoring works only properly if the card deactivates the STO function before each restart. The test is not performed when switching on the card.

1.1.8 SSx drive safety function

The SSx drive safety function can be used to implement the SS1 and SS2 drive safety functions defined in EN 61800-5-2. Time-relevant monitoring as well as ramp monitoring (linear and jerk-limited) is supported.

The SS1(b) function triggers motor deceleration and monitors the magnitude of motor deceleration within defined limits. The STO drive safety function is activated as soon as the motor speed drops below a specified limit value. When the limit speed is exceeded, the STO drive safety function is activated without brake application delay.

The SS1(c) function triggers motor deceleration and the STO drive safety function is triggered after a user-specific time delay.

The SS2(b) function triggers motor deceleration and monitors the magnitude of motor deceleration within defined limits. The SS2(b) function triggers the SOS drive safety function as soon as the motor speed drops below a specified limit value. A fault response (STO) is triggered if the limit value is exceeded.

The SS2(c) function triggers motor deceleration and the SOS drive safety function is triggered after a user-specific time delay.

8706.4 SSx enable

Factory setting:

Value range:

- **0 = No**
- 1 = Yes

Enable parameter of the drive safety function.

8706.5 SSx final state

Factory setting:

Value range:

- **0 = STO**
- 1 = SOS
- 2 = SLI 1
- 3 = SLI 2

Final state of the SSx drive safety function.

- STO:

The STO drive safety function is activated once the deceleration ramp is completed. This corresponds to the SS1 drive safety function.

- SOS:

The SOS drive safety function is activated once the deceleration ramp is completed. This corresponds to the SS2 drive safety function.

- SLI1/SLI2:

SLI drive safety function instance 1 or SLI instance 2 is activated once the deceleration ramp is completed.

INFORMATION



If an SSx instance is set as the fault response for a drive safety function, then the SLI drive safety function may not be set as the final state for this SSx instance.

8706.6 SSx inverter control

Factory setting:

Value range:

- **0 = Active**
- 1 = Not active

Setting of the inverter control, beginning with function selection.

When set to "Active", the safety card activates FCB 13 "Stop at application limits" in the inverter when "STO" is set as the final state (index 8706.5), and FCB 19 "Position hold control" is activated when "SOS" is set as the final state (index 8706.5).

The inverter stops the motor with the deceleration set in the "Application limit – deceleration" parameter (index 8357.12) and the jerk time ("Application limit – jerk time" parameter, index 8357.14) is used for the jerk-limited ramp.

INFORMATION

The inverter is not controlled in a safety-related manner.

8706.7 SSx ramp monitoring

Factory setting:

Value range:

- **0 = None**
- 1 = Linear
- 2 = Jerk-limited

Monitoring after activation of the SSx drive safety function.

When set to "None", the ramps are not monitored. The STO or SOS drive safety function is activated after expiry of the SSx(c) delay t_1 .

When set to "Linear" or "Jerk-limited", the ramp is monitored according to the configured ramp type.

8706.8 SSx(c) delay time t_1

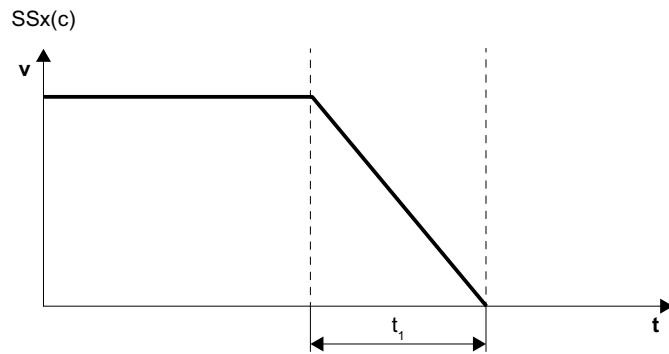
Factory setting: 0

Unit: ms

Resolution: 4

Value range: 0 to 3600000

Delay time for transition to the final state of the SSx(c) drive safety function.



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8706.9 SSx(b) monitoring delay t_2

Factory setting: 0

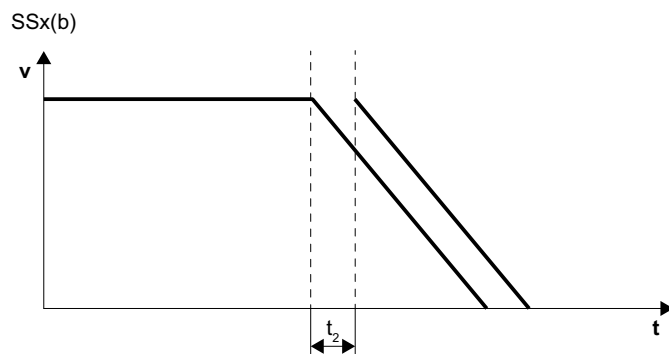
Unit: ms

Resolution: 4

Value range: 0 to 5000

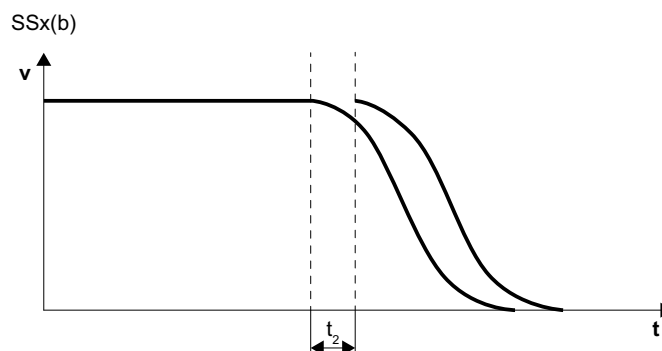
Duration between activation of the SS1(b) or SS2(b) drive safety function and start of monitoring of the stop ramp.

Linear:



24352797195

Jerk-limited



24352799627

8706.10 SSx(b) deceleration a

Factory setting: **360000**

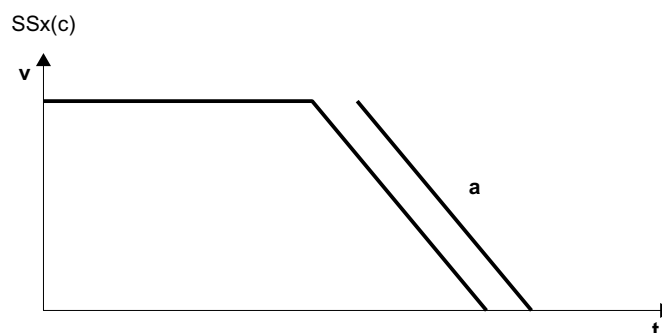
Unit: 1E-02 x user unit for acceleration

Resolution: 1

Value range: 1 to 1000000000

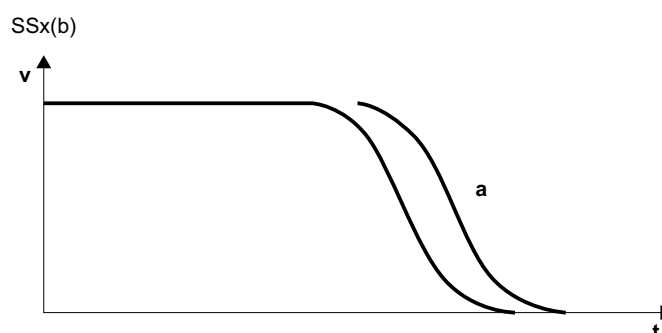
Steepness of the speed ramp to be monitored of the SS1(b) or SS2(b) drive safety function in user units.

Linear:



24352802059

Jerk-limited



24356503691

8706.11 SSx(b) jerk time t3

Factory setting: 1

Unit: ms

Resolution: 1

Value range: 0 to 2000

Adjustment of the ramp type for jerk-limited ramps of the inverter. The maximum jerk is calculated as $j_{\max} = a_{\max} / \text{jerk time}$. The duration of the ramp extends by the duration of the jerk time.

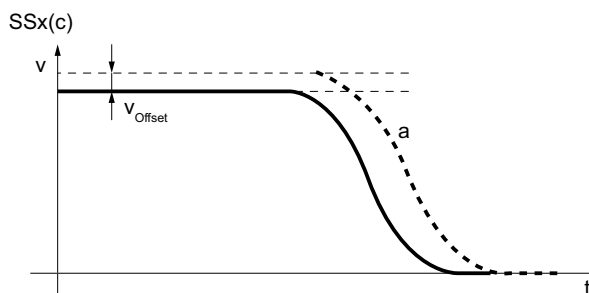
8706.13 Speed offset jerk-limitedFactory setting: **500000**

Unit: 1E-4 x user unit for speed

Resolution: 1

Value range: 0 to 360000000

Defines the difference between actual speed and limit speed when activating the SSx drive safety function when monitoring a jerk-limited ramp.



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1.1.9 SOS drive safety function

The positive and negative limit positions are calculated from the actual position detected by the encoder system and the parameterized position tolerance at the time when the SOS drive safety function is activated. As long as the drive safety function is active, the actual position is monitored for exceeding the two limit positions. The limit positions are calculated again when a fault is acknowledged after the violation of a limit value, or after an encoder fault. The actual position detected at the time when the fault is acknowledged then is the new initial position. The speed is not monitored.

When the SOS drive safety function is activated, FCB 19 "Position hold control" is activated in the basic unit.

8706.1 SOS enable

Factory setting:

Value range:

- 0 = No
- 1 = Yes

Enable parameter of the drive safety function.

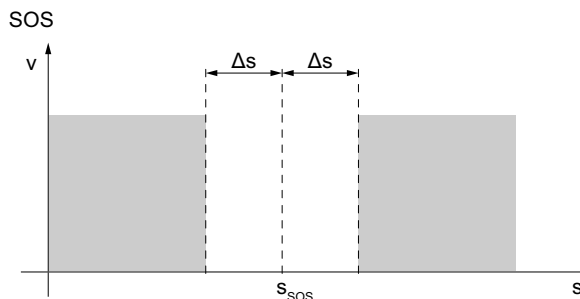
8706.2 SOS position tolerance in user unitsFactory setting: **65536**

Unit: 1/65536 in user unit

Resolution: 1

Value range: 0 to 65536

Maximum permitted movement while monitoring is active.



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1.1.10 SLS drive safety function

The SLS drive safety function monitors the actual speed for exceeding the parameterized limit speed. When the limit speed is exceeded, the parameterized fault response is triggered.

The speed filter allows for exceeding the limit speed "briefly" without triggering the fault response (see parameter *Speed filter*, index 8706.25).

Monitoring of the SLS limit speed or start of the transition ramp can be delayed using the *Monitoring delay t2* parameter. The actual speed is monitored for exceeding the parameterized maximum speed during the monitoring delay.

If the *Effective direction* parameter is set to "both", monitoring will take effect for both direction of rotations.

8706.21 SLS enable

Factory setting:

Value range:

- 0 = No
- 1 = Yes

When set to "Yes", the SLS drive safety function is enabled for this instance.

8706.20 SLS activated permanently

Factory setting:

Value range:

- 0 = Yes
- 1 = No

When the SLS drive safety function is activated permanently, the actual speed is monitored permanently for this speed.

8706.22 SLS fault response

Factory setting:

Value range:

- 0 = STO

- 1 = SSx 1
- 2 = SSx 2

Defines which drive safety function is selected in the device as the fault response when the limit speed is exceeded.

8706.23 SLS monitoring delay t₂

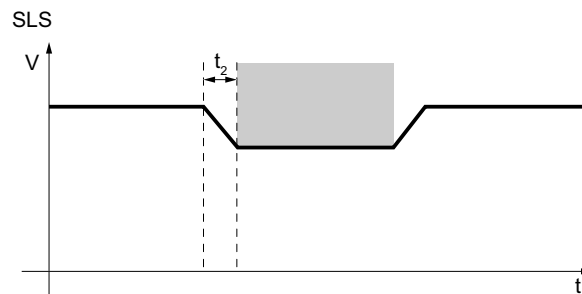
Factory setting: 0

Unit: ms

Resolution: 4

Value range: 0 to 5000

Duration between activation of the drive safety function and start of limit speed monitoring or start of the ramp. The maximum speed (index 8707.1) is monitored during this time.



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8706.24 SLS limit speed

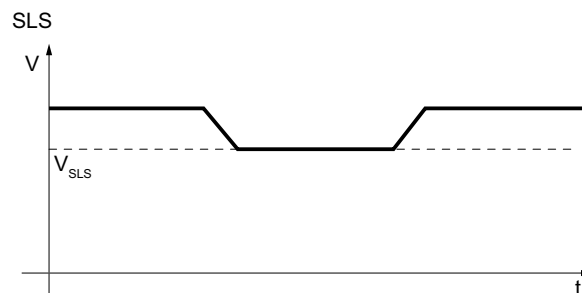
Factory setting: 1000000

Unit: 1E-4 x user unit for speed

Resolution: 1

Value range: 100000 to 360000000

SLS limit speed in user units.



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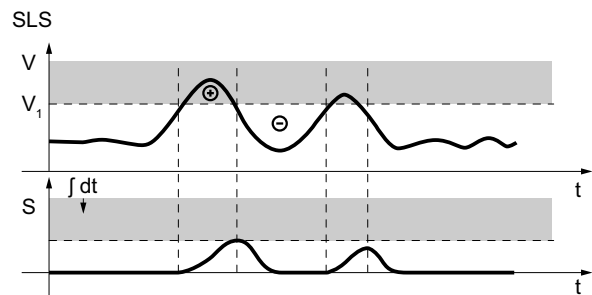
8706.25 SLS speed filter

Factory setting: **0**
 Unit: 1/65536 in user unit
 Resolution: 1
 Value range: 0 to 1073741823

Maximum permitted distance in user units by which the drive is allowed to move further than would have been possible within this time using the limit speed.

When the value is "0", the filter is not active.

When the value is greater than "0", exceeding the limit speed is integrated. If the distance is longer than the parameterized value, the set fault response will be triggered.

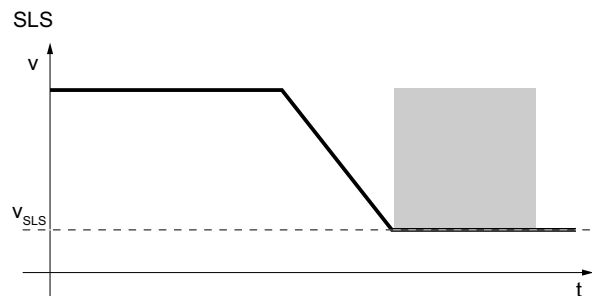


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8706.26 SLS ramp type

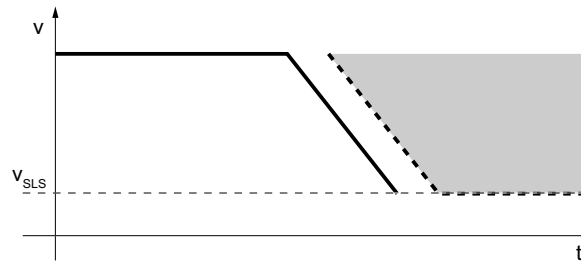
Factory setting:
 Value range:

- **0 = None**



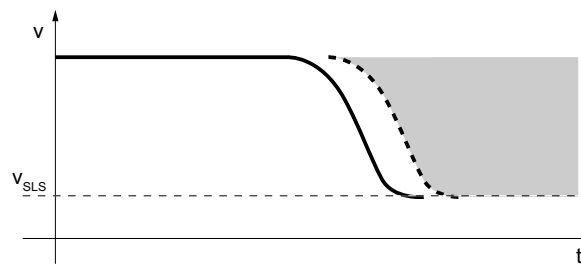
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- 1 = Linear



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- 2 = Jerk-limited



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8706.27 SLS deceleration a

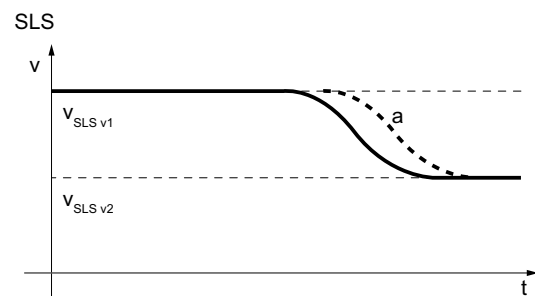
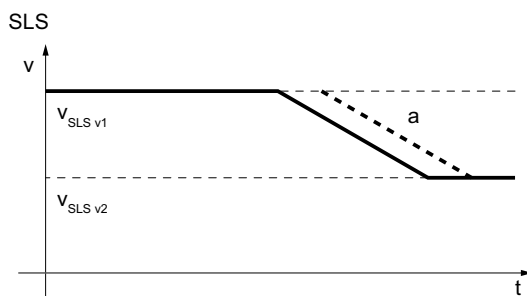
Factory setting: **360000**

Unit: 1E-02 x user unit for acceleration

Resolution: 1

Value range: 1 to 1000000000

Steepness of the transition ramp in user units.



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8706.28 SLS jerk time t3

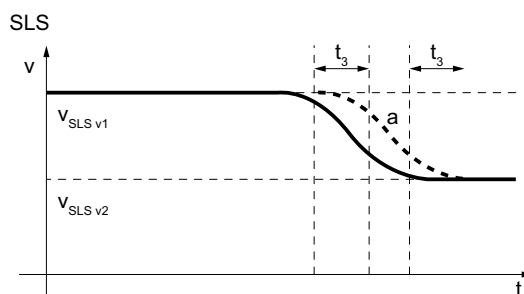
Factory setting: 1

Unit: ms

Resolution: 1

Value range: 0 to 2000

Adjustment of the ramp type for jerk-limited ramps of the inverter. The maximum jerk is calculated as $j_{\max} = a_{\max} / \text{jerk time}$. The duration of the transition ramp extends by the jerk time.



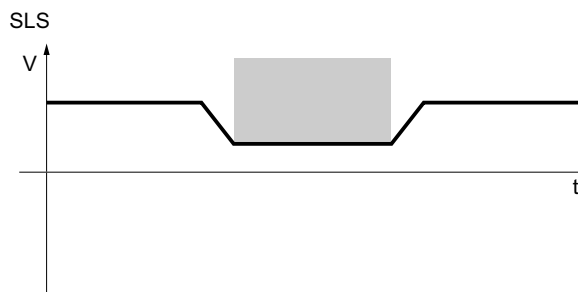
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8706.29 SLS effective direction

Factory setting:

Value range:

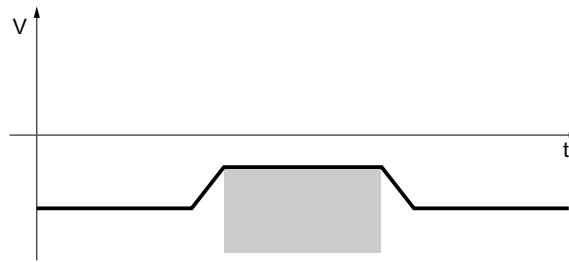
- 1 = Positive



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The limit speed and the transition ramp are only monitored for a positive direction of movement.

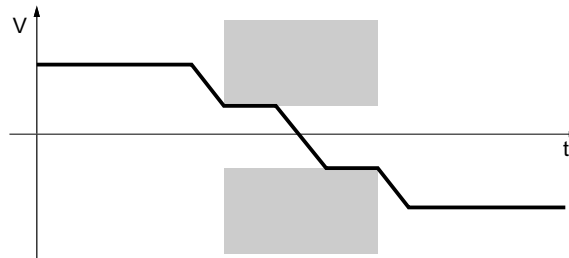
- 2 = Negative



25477243787

The limit speed and the transition ramp are only monitored for a negative direction of movement.

- 3 = Positive and negative



25477247371

The limit speed and the transition ramp are monitored for both directions of movement.

1.1.11 SSM drive safety function

The SSM function provides a safe output signal on the safe process data to indicate whether the motor speed is below a specified limit.

8706.30 SSM limit speed

Factory setting: 0

Unit: 1E-4 x user unit for speed

Resolution: 1

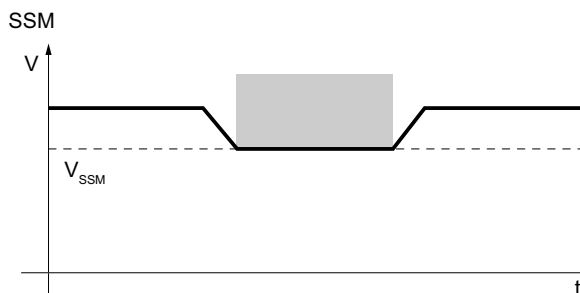
Value range: 0 to 360000000

- Set value = 0

The SSM drive safety function is not enabled.

- Set value > 0

The SSM drive safety function is enabled. The limit speed in user units is monitored.



25473160715

8706.31 SSM speed filter

Factory setting: **0**

Unit: 1/65536 in user unit

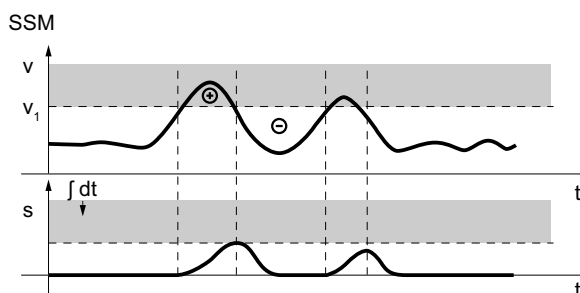
Resolution: 1

Value range: 0 to 1073741823

Maximum permitted distance in user units by which the drive is allowed to move further than would have been possible within this time using the limit speed.

Exceeding of the limit speed is integrated. If the distance is longer than the parameterized value, a signal is issued to the higher-level controller.

When the value is "0", the filter is not active. Exceeding the limit speed is immediately reported to the higher-level controller.



25473164299

8706.57 Speed hysteresis

Factory setting: **10000**

Unit: 1E-4 x user unit for speed

Resolution: 1

Value range: 0 to 360000000

The hysteresis in user units for the SSM and SSR drive safety functions prevents jitter on the process data. The drive safety function responds immediately to a violated limit value. When dropping below the limit value including the hysteresis, feedback is provided that the speed is within a valid range.

INFORMATION



Use the application only with inactive speed filter.

1.1.12 SSR drive safety function

The SSR function maintains the motor speed within specified limits. A set fault response is issued when limit values are exceeded. The drive stops with STO or SS1 drive safety function, or safe process data transmit the information that limit values were exceeded to a safety controller that triggers a fault response.

When limit values are exceeded and the fault response is STO or SSx, then the fault response must be acknowledged. No acknowledgement is required if the information that limit values were exceeded is reported to a safe controller. When the speed drops below the limit value, the status of the drive safety functions is set again taking account of the configured hysteresis (index 8706.57).

Once drive safety functions are activated, the actual speed is monitored for exceeding the maximum speed for the duration of the monitoring delay. After this time, the actual speed is monitored for leaving the range of upper and lower limit speed. Both the upper and the lower limit speed can be positive and negative.

A speed filter can be set for the SSR function. If a speed filter is set, it will be calculated separately for the upper and lower limit speed.

8706.51 SSR enable

Factory setting:

Value range:

- **0 = No**
- **1 = Yes**

When set to "Yes", the SSR drive safety function is enabled for this instance.

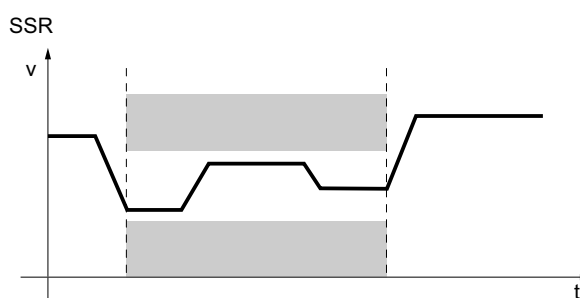
8706.50 SSR activated permanently

Factory setting:

Value range:

- **0 = Yes**
- **1 = No**

Permanent activation of the SSR drive safety function.



25473167883

8706.52 SSR fault response

Factory setting:

Value range:

- **0 = STO**
- 1 = SSx 1
- 2 = SSx 2
- 4 = Only F-PI

Defines which drive safety function is selected in the device as the fault response when the limit speed is exceeded. The value "Only F-PI" means that the overshoot is signaled in a safe manner only in the status bit of the safe process data.

8706.53 SSR monitoring delay t₂

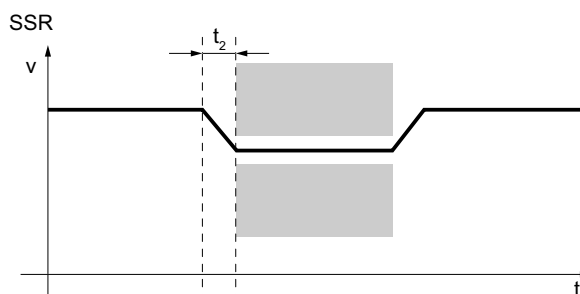
Factory setting: **0**

Unit: ms

Resolution: 4

Value range: 0 to 5000

Duration between activation of the drive safety function and start of monitoring. During this time, the speed is monitored for exceeding the maximum speed in both directions of movement.



25473217035

8706.54 SSR upper limit speed

Factory setting: **5000000**

Unit: 1E-4 x user unit for speed

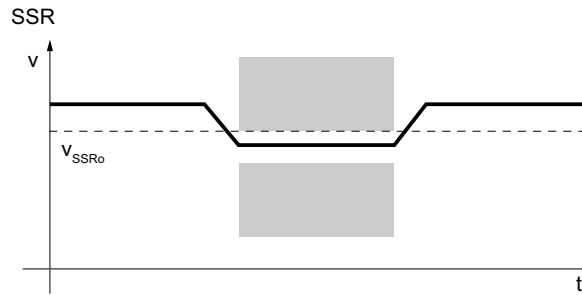
Resolution: 1

Value range: -3600000000 to 3600000000

The actual speed is monitored for leaving the range of upper and lower limit speed.

The upper limit speed can be negative and must be greater than the lower limit speed.

The absolute value of the upper limit speed must not be smaller than the minimum speed for the speed functions.



25473220619

8706.55 SSR lower limit speed

Factory setting: **-5000000**

Unit: $1E-4$ x user unit for speed

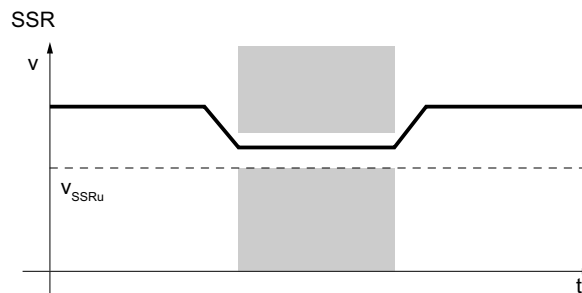
Resolution: 1

Value range: -360000000 to 360000000

The actual speed is monitored for leaving the range of upper and lower limit speed.

The lower limit speed must be smaller than the upper limit speed.

The absolute value of the lower limit speed must not be smaller than the minimum speed for the speed functions.



25473213451

8706.56 SSR speed filter

Factory setting: **0**

Unit: 1/65536 in user unit

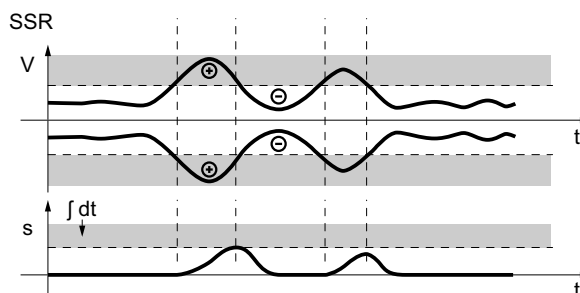
Resolution: 1

Value range: 0 to 1073741823

The speed filter is the maximum permitted distance in user units by which the drive is allowed to move further than would have been possible within this time using the limit speed.

The speed filter is calculated separately for the upper and the lower limit speed. The limit value parameter applies to the upper and lower limits.

When the value is "0", the filter is not active. If the upper limit speed is exceeded or the lower limit speed is undershot, the configured fault response will be triggered immediately.



25473237003

8706.57 Speed hysteresis

Factory setting: **10000**

Unit: 1E-4 x user unit for speed

Resolution: 1

Value range: 0 to 360000000

The hysteresis in user units for the SSM and SSR drive safety functions prevents jitter on the process data. The drive safety function responds immediately to a violated limit value. When dropping below the limit value including the hysteresis, feedback is provided that the speed is within a valid range.

INFORMATION



Use the application only with inactive speed filter.

1.1.13 SDI drive safety function

The SDI function monitors the movement in blocked direction of rotation. The STO drive safety function is activated when the configured tolerance is violated.

The function can be activated by means of a safe digital input F-DI via fast process data (SDI 1, SDI 2), or the function can be activated permanently if configured accordingly.

At the moment when the SDI drive safety function is activated, the limit position is calculated based on the actual position detected by the encoder system and the parameters *Tolerance* and *Permitted direction of movement*. The limit position is corrected for movements in the permitted direction of movement, which means the limit position is recalculated cyclically from the current actual position. This means the maximum distance to the actual position is the configured tolerance. The limit position is not corrected for movements in blocked direction of movement. A fault response is triggered when the limit position is exceeded. The limit position is calculated again when a fault is acknowledged after violation of a limit value, or after an encoder fault. The position on which the recalculation is based is the actual position detected at the time when the fault is acknowledged. The SDI function does not monitor the speed.

8706.41 SDI enable

Factory setting:

Value range:

- 0 = No
- 1 = Yes

When set to "Yes", the SDI drive safety function is enabled for this instance.

8706.40 SDI activated permanently

Factory setting:

Value range:

- 0 = Yes
- 1 = No

Permanent activation of the SDI drive safety function.

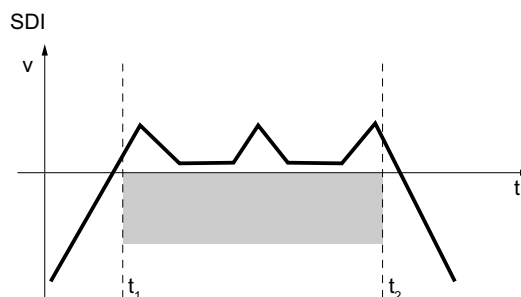
8706.42 SDI permitted direction of movement

Factory setting:

Value range:

- 1 = Positive

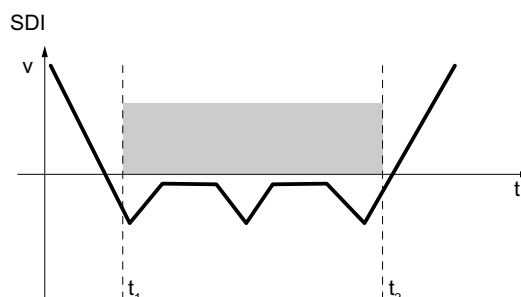
SDI permitted direction of movement.



25518782347

- 2 = Negative

SDI permitted direction of movement.



25519184523

8706.43 SDI tolerance in blocked direction of movement in user units

Factory setting: **65536**

Unit: 1/65536 in user unit

Resolution: 1

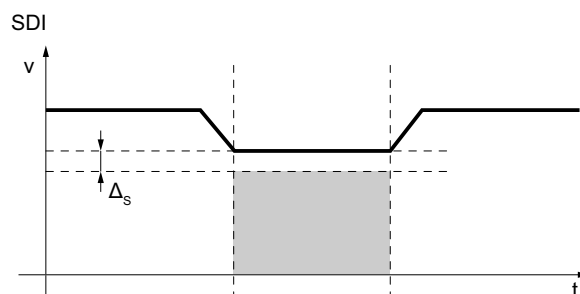
Value range: 0 to 2147326361

Permitted direction of movement in user units in blocked direction of movement.

INFORMATION



Small movement in opposite direction of the permitted direction of movement is possible even when the tolerance is set to "0" because of the encoder resolution and mechanical clearance.



25472982539

1.1.14 SLI drive safety function

The SLI function monitors whether the motor shaft exceeds the specified limit of a position increment. When this position increment is exceeded or when the braking distance in direction of movement is greater than the distance to the limit, a fault response (STO) is triggered.

In addition to activation, the SLI drive safety function needs a step enable. When SLI is activated, the SOS or STO drive safety function is activated without brake application delay using the configured stop state.

Step enable has the following effect:

- The stop state is defined
- The limit position is calculated
 - Positive limit position: Actual position + increment
 - Negative limit position: Actual position - increment

The stop state is activated immediately when step enable is revoked.

8706.60 SLI enable

Factory setting:

Value range:

- **0 = No**
- 1 = Yes

When set to "Yes", the SLI drive safety function is enabled for this instance.

8706.61 SLI increment in user units

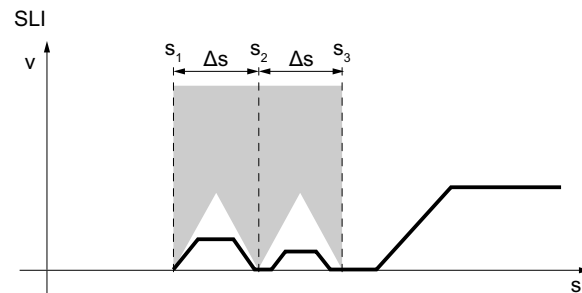
Factory setting: **32768000**

Unit: 1/65536 in user unit

Resolution: 1

Value range: 0 to 2147326361

Permitted movement in both directions of movement relative to the position in user units at the time of increment enable.



25473060875

8706.64 SLI ramp deceleration in user units

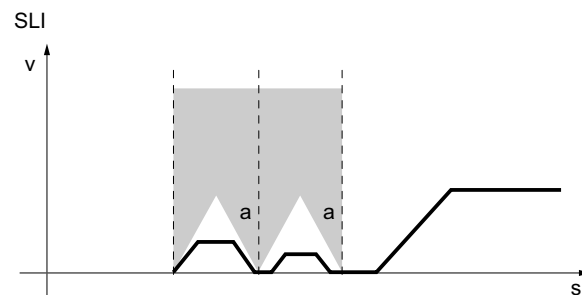
Factory setting: **360000**

Unit: 1E-02 x user unit for acceleration

Resolution: 1

Value range: 1 to 1000000000

Assumed deceleration in user units of the inverter for calculating the deceleration distance.



25473057291

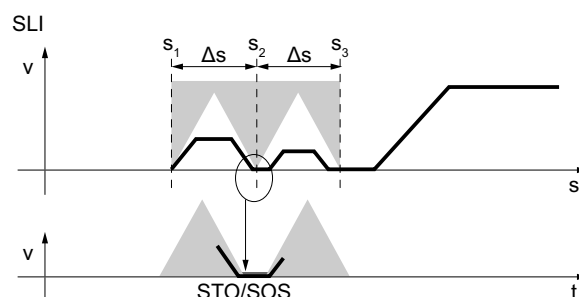
8706.66 SLI stop state

Factory setting:

Value range:

- **0 = STO drive safety function**
- **1 = SOS drive safety function**

If increment enable is not enabled, the configured drive safety function "STO" or "SOS" is activated.



25473064459

1.1.15 SLA drive safety function

The SLA function prevents the motor from exceeding the specified acceleration limit.

The actual acceleration is monitored based on the following conditions:

- The speed is greater than the configured "Minimum speed for acceleration functions" (8707.6).
- The speed is increased.

If the speed is decreased, monitoring is not active.

A fault response (8706.32) is triggered if the configured limit acceleration (8706.73) is exceeded.

8706.71 SLA enable

Factory setting:

Value range:

- **0 = No**
- **1 = Yes**

When set to "Yes", the SLA drive safety function is enabled for this instance.

8706.70 SLA activated permanently

Factory setting:

Value range:

- **0 = Yes**
- **1 = No**

Permanent activation of the SLA drive safety function.

8706.72 SLA fault response

Factory setting:

Value range:

- **0 = STO**
- 1 = SSx 1
- 2 = SSx 2
- 4 = Only F-PI

Defines which drive safety function is selected in the device as the fault response when the limit speed is exceeded.

The value "Only F-PI" means that the overshoot is signaled only in the status bit of the safe process data.

8706.73 SLA limit acceleration

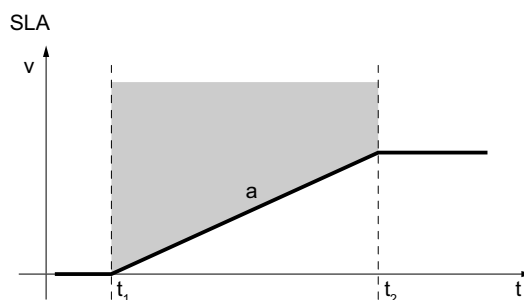
Factory setting: **300000**

Unit: 1E-02 x user unit for acceleration

Resolution: 1

Value range: 0 to 1000000000

SLA limit acceleration in user units.



25472989707

1.1.16 Function assignment

8709.1 Selected F-DO function

Factory setting:

Value range:

- 0 = None

F-DO is controlled via "safe process data". If no "safe process data" are configured, the output is open permanently.

- 1 = STO

F-DO is switched at the same time as F-DO_STO. Control via "safe process data" is not possible.

- **2 = SBC**

F-DO is used to control a brake. Control via "safe process data" is not possible.

8709.2 F-Dlx function assignment 1

Factory setting:

Value range:

- **0 = None**
- 1 = Unlatch F-DI and acknowledge faults
- 2 = Acknowledge faults
- 3 = Acknowledge latching F-DI
- 4 = Muting
- 5 = Test mode
- 6 = SLI step enable
- 7 = SBT clearance
- 8 = STO
- 9 = SOS
- 10 = SDI 1
- 11 = SDI 2
- 12 = SLA 1
- 13 = SLA 2
- 14 = SLI 1
- 15 = SLI 2
- 16 = SLS 1
- 17 = SLS 2
- 18 = SLS 3
- 19 = SLS 4
- SSR 1
- 21 = SSR 2
- 22 = SSx 1
- 23 = SSx 2

F-Dlx function assignment 1.

8709.12 F-Dlx function assignment 2

Factory setting:

Value range:

- **0 = None**
- 10 = SDI 1
- 11 = SDI 2
- 12 = SLA 1
- 13 = SLA 2
- 14 = SLI 1
- 15 = SLI 2
- 16 = SLS 1
- 17 = SLS 2
- 18 = SLS 3

- 19 = SLS 4
- 20 = SSR 1
- 21 = SSR 2

F-Dlx function assignment 2.

8709.13 F-Dlx function assignment 3

Factory setting:

Value range:

- **0 = None**
- 10 = SDI 1
- 11 = SDI 2
- 12 = SLA 1
- 13 = SLA 2
- 14 = SLI 1
- 15 = SLI 2
- 16 = SLS 1
- 17 = SLS 2
- 18 = SLS 3
- 19 = SLS 4
- 20 = SSR 1
- 21 = SSR 2

F-Dlx function assignment 3.

8709.14 F-Dlx function assignment 4

Factory setting:

Value range:

- **0 = None**
- 10 = SDI 1
- 11 = SDI 2
- 12 = SLA 1
- 13 = SLA 2
- 14 = SLI 1
- 15 = SLI 2
- 16 = SLS 1
- 17 = SLS 2
- 18 = SLS 3
- 19 = SLS 4
- 20 = SSR 1
- 21 = SSR 2

F-Dlx function assignment 4.

1.2 MOVISAFE® CS..A diagnostics

1.2.1 General

8328.1 Power-applied hours

Factory setting: **0**

Unit: min

Resolution: 1

Value range: 0 to 4294967295

Total hours in which the inverter was supplied by DC 24 V voltage, independent of the source (internal power supply or external supply). The storage cycle is 1 minute.

8321.1 Current permission level

Factory setting:

Value range:

- 10 = Observer
- **20 = Operator**
- 60 = OEM Service

Indicates the permission level active in the inverter. The permission level determines the write permission.

The following settings can be made:

- Observer: Most parameters are read only.
- Operator: Most parameters may also be written.
- OEM Service: All parameters that can be written may be written.

8700.72 Safety card state

Factory setting:

Value range:

- **0 = Initialization**
- 38913 = Parameterization
- 43010 = Operation
- 12291 = Critical fault
- 45060 = Firmware update

The parameter describes the current state of the safety card.

8703.81 Parameter setting status

Factory setting:

Value range:

- 0 = Invalid

Invalid parameter setting detected in the safety card, e.g. incompatible parameter data set. The safety card enters a safe state (STO).

This also happens after having performed the "Restore delivery state" function. The state can be canceled by transferring the data into the device using the "Assist CS.." tool.

- 1 = Valid

The parameters have been transferred correctly. The safety card can perform the configured functions. The user has not yet confirmed that the parameter setting works properly for the designated use in the application.

- 2 = Accepted

The parameters have been transferred correctly. The safety card can perform the configured functions. The user has confirmed that the parameter setting works properly for the designated use in the application.

8703.82 Error message safety parameter setting

Factory setting:

Value range:

- 0 = No message
- 1 = F-engineering aborted
- 2 = Download faulty
- 3 = Invalid iCOM version
- 4 = Incompatible parameter setting
- 5 = Implausible parameter setting
- 6 = Restore corrupt
- 7 = Safety key not initialized
- 8 = Key comparison failed

Error message relating to safety parameter setting.

8703.33 Parameterization counter

Factory setting: 0

Resolution: 1

Value range: 0 to 4294967295

Number of parameter settings made using the Assist CS.. tool.

1.2.2 Fault status

8365.1 Fault code

Factory setting: **0**

Resolution: 1

Value range: 0 to 4294967295

Currently pending fault. The fault code is structured as follows:

- Bit 8 – 15: Main fault
- Bit 0 – 7: Subfault

8700.70 Active fault class

Factory setting:

Value range:

- 0 = Critical fault
- 1 = System error
- 2 = Input fault
- 3 = Encoder fault
- 4 = Output fault
- 5 = Warning

The occurring faults are divided into 5 different fault classes. Depending on the fault class, the response described in the following table is carried out.

Fault class	Response
Critical fault	Entry in fault memory and safe state of digital inputs and outputs. No safe communication.
System error	Entry in fault memory and safe state of digital inputs and outputs.
Output fault, input fault, encoder fault	Entry in fault memory and safe state of digital inputs and outputs as applicable.
Message	Entry in fault memory, no further response.
Warning	Entry in fault memory, no further response.

1.2.3 Hardware status

8702.2 Safety card temperature

Factory setting: **0**

Unit: °C

Resolution: 1

Value range: -21474836 to 21474836

Temperature of the safety card.

8700.95 DC 12 V encoder supply

Factory setting: **0**

Unit: mV

Resolution: 1

Value range: 0 to 4294967295

Voltage of the encoder supply. Only available with parameterized encoder.

8702.3 DC 24 V encoder supply

Factory setting: 0

Unit: mV

Resolution: 1

Value range: 0 to 4294967295

Voltage of the encoder supply. Only available with parameterized encoder.

8700.94 DC 24 V supply voltage

Factory setting: 0

Unit: mV

Resolution: 1

Value range: 0 to 4294967295

DC 24 V supply voltage.

8700.92 Signal track minimum level HTL encoder

Factory setting: 0

Unit: mV

Resolution: 1

Value range: 0 to 4294967295

The minimum is generated via the level values that have been detected last for the track signal.

8700.93 Signal track maximum level HTL encoder

Unit: mV

Resolution: 1

Value range: 0 to 4294967295

The maximum is generated via the level values that have been detected last for the track signal.

8700.99 sin/cos encoder – minimum vector length of track signal

Factory setting: 0

Unit: mV

Resolution: 1

Value range: 0 to 4294967295

Minimum vector length of the vector described by sine and cosine.

8700.100 sin/cos encoder – maximum vector length of track signal

Factory setting: 0

Unit: mV

Resolution: 1

Value range: 0 to 4294967295

Maximum vector length of the vector described by sine and cosine.

1.2.4 Position function status

8700.9 STO drive safety function – status

Factory setting:

Value range:

- 0 = Instance 1 activated
- 16 = Status instance 1

Unwritten bits are currently not used.

The activation bits indicate that the STO drive safety function has been activated via safe digital input F-DI or safe process output data F-PO.

The status bits indicate that the STO drive safety function is active.

8700.5 SOS drive safety function – status

Factory setting:

Value range:

- 0 = Instance 1 activated
- 16 = Status instance 1

Unwritten bits are currently not used.

The activation bits indicate that the SOS drive safety function has been activated via safe digital input F-DI or safe process output data F-PO.

The status bits indicate that the SOS drive safety function is active and that limit values have not been violated.

8700.1 SDI drive safety function – status

Factory setting:

Value range:

- 0 = Instance 1 activated
- 1 = Instance 2 activated
- 16 = Status instance 1
- 17 = Status instance 2

Unwritten bits are currently not used.

The activation bits indicate that the SDI drive safety function has been activated via safe digital input F-DI or safe process output data F-PO.

The status bits indicate that the SDI drive safety function is active and that limit values have not been violated.

8700.3 SLI drive safety function – status

Factory setting:

Value range:

- 0 = Instance 1 activated
- 1 = Instance 2 activated

- 10 = Status instance 1
- 11 = Status instance 2
- 20 = Step enable instance 1
- 21 = Step enable instance 2

Unwritten bits are currently not used.

The activation bits indicate that the SLI drive safety function has been activated via safe digital input F-DI or safe process output data F-PO.

The status bits indicate that the SLI drive safety function is active and that limit values have not been violated.

1.2.5 Speed function status

8700.8 STOP drive safety function – status

Factory setting:

Value range:

- 0 = Instance 1 activated
- 1 = Instance 2 activated
- 16 = Status instance 1
- 17 = Status instance 2

Unwritten bits are currently not used.

The activation bits indicate that the drive safety function has been activated via safe digital input F-DI or safe process output data F-PO.

The status bits indicate that the drive safety function is active and that limit values have not been violated.

8700.4 SLS drive safety function – status

Factory setting:

Value range:

- 0 = Instance 1 activated
- 1 = Instance 2 activated
- 2 = Instance 3 activated
- 3 = Instance 4 activated
- 16 = Status instance 1
- 17 = Status instance 2
- 18 = Status instance 3
- 19 = Status instance 4

Unwritten bits are currently not used.

The activation bits indicate that the SLS drive safety function has been activated via safe digital input F-DI or safe process output data F-PO.

The status bits indicate that the SLS drive safety function is active and that limit values have not been violated.

8700.6 SSM drive safety function – status

Factory setting:

Value range:

- 0 = Instance 1 activated
- 1 = Instance 2 activated
- 2 = Instance 3 activated
- 3 = Instance 4 activated
- 16 = Status instance 1
- 17 = Status instance 2
- 18 = Status instance 3
- 19 = Status instance 4

Unwritten bits are currently not used.

The activation bits indicate that the SSM drive safety function has been activated via safe digital input F-DI or safe process output data F-PO.

The status bits indicate that the SSM drive safety function is active and that limit values have not been violated.

8700.7 SSR drive safety function – status

Factory setting:

Value range:

- 0 = Instance 1 activated
- 1 = Instance 2 activated
- 16 = Status instance 1
- 17 = Status instance 2

Unwritten bits are currently not used.

The activation bits indicate that the SSR drive safety function has been activated via safe digital input F-DI or safe process output data F-PO.

The status bits indicate that the SSR drive safety function is active and that limit values have not been violated.

1.2.6 Acceleration function status

8700.2 SLA drive safety function – status

Factory setting:

Value range:

- 0 = Instance 1 activated
- 1 = Instance 2 activated
- 16 = Status instance 1
- 17 = Status instance 2

Unwritten bits are currently not used.

The activation bits indicate that the SLA drive safety function has been activated via safe digital input F-DI or safe process output data F-PO.

The status bits indicate that the SLI drive safety function is active and that limit values have not been violated.

1.2.7 Muting status

8700.101 Drive safety function test mode

Factory setting:

Value range:

- 0 = No
- 1 = Yes

Test mode suppresses inverter control. The parameter indicates whether test mode is active (Yes) or not (No).

8703.50 Encoder fault muting status

Factory setting:

Value range:

- 0 = No
- 1 = Yes

Suppression of encoder faults. The parameter indicates whether muting is active (Yes) or not (No).

1.2.8 Inputs/outputs

8700.84 F-DI state physical level – status

Factory setting:

Value range:

- 0 = Level instance 0
- 1 = Level instance 1
- 2 = Level instance 2
- 3 = Level instance 3

F-DI terminal state filtered.

8700.82 F-DI state logic level – status

Factory setting:

Value range:

- 0 = Level instance 0
- 1 = Level instance 1
- 2 = Level instance 2
- 3 = Level instance 3
- 16 = Fault instance 0
- 17 = Fault instance 1
- 18 = Fault instance 2
- 19 = Fault instance 3

F-DI state of logic processing. The level indicates the logic state of an F-DI. If a fault is detected, the fault status is set for F-DI and the logic state remains "0" irrespective of the physical state.

8704.4 Connection type

Factory setting:

Value range:

- 0 = Single-channel
- 1 = 2-channel equivalent
- **2 = 2-channel non-equivalent**

The "connection type" column indicates the connection type set for the safety card.

8700.87 F-DO STO/x logic level – status

Factory setting:

Value range:

- 0 = F-DO STO instance 0
- 1 = F-DO instance 0
- 2 = F-DO instance 1

State of F-DOx and F-DO STO instances in output processing.

8700.91 F-DO fault status on channel A

Factory setting:

Value range:

- 0 = F-DO STO instance 0
- 1 = F-DO instance 0
- 2 = F-DO instance 1

Fault status of the bit-coded F-DO outputs on channel A for all instances.

8702.5 F-DO fault status on channel B

Factory setting:

Value range:

- 0 = F-DO STO instance 0
- 1 = F-DO instance 0
- 2 = F-DO instance 1

Fault status of the bit-coded F-DO outputs on channel B for all instances.

8703.37 Max. duration test pulse A

Factory setting: 0

Unit: µs

Resolution: 1

Value range: 0 to 4294967295

The measured last waiting time from the start of a test pulse until the response during F-DO diagnostics with variable runtime on channel A.

8702.8 Max. duration test pulse B

Factory setting: 0

Unit: µs

Resolution: 1

Value range: 0 to 4294967295

The measured last waiting time from the start of a test pulse until the response during F-DO diagnostics with variable runtime on channel B. These two diagnostic values can be used to set the parameter *Maximum test duration* (index 8705.2) in the Assist CS.. tool.

1.2.9 Process data**8700.73 F-PO user data**

Factory setting: 0

Unit:

Resolution: 1

Value range: 0 to 255

Safe process output data from the controller to the safety card.

8700.74 F-PI user data

Factory setting: 0

Unit:

Resolution: 1

Value range: 0 to 255

Safe process input data from the safety card to the controller.

1.2.10 F-protocol

8710.4 F-protocol type

Factory setting:

Value range:

- **61504 = No protocol**
- 61505 = PROFIsafe
- 61506 = ISOFAST® slave

Selection of the parameterized F-protocol.

8711.1 PROFIsafe slave F-address

Factory setting: **1**

Unit:

Resolution: 1

Value range: 1 to 65534

Entry of the F-address of the PROFIsafe slave station.

8711.50 ISOFAST® slave connection ID

Factory setting: **0**

Unit:

Resolution: 1

Value range: 0 to 65534

Entry of the connection ID of the ISOFAST® protocol for safeguarding the 1:1 connection between master and slave.

8711.53 ISOFAST® slave format

Factory setting:

Value range:

- 1 = ISOFAST® 1
- 2 = ISOFAST® 2

Format of the ISOFAST® protocol on the safety card.

8700.110 Diagnostics information on safe communication (safe bus systems)

Factory setting:

Value range:

- 0 = Driver never started
- 224 = Parameter setting error
- 1 = Waiting for connection
- 2 = Establishing connection initiated
- 3 = Error while establishing connection
- 225 = Different connection ID of communication partners
- 226 = Different format of communication partners
- 227 = Different profile of communication partners
- 228 = Faulty parameter settings/disturbances on transmission channel
- 229 = Different protocol version of communication partners
- 230 = Communication partners not compatible
- 231 = Faulty configuration signature
- 232 = Configuration does not match application
- 5 = Safe data exchange
- 6 = Safe data exchange stopped
- 7 = Safe data exchange with substitute values
- 8 = Data exchange error
- 238 = Timeout
- 15 = Connection closed

Indicates diagnostics information on safe communication (safe bus systems).

8700.111 Sequence number of sent safety telegram

Factory setting: **0**

Unit:

Resolution: 1

Value range: 0 to 4294967295

Safe communication: Sequence number of the sent safety telegram. Is used to analyze the sent telegram with respect to time.

8700.112 Data of sent telegram

Factory setting: **0**

Unit:

Resolution: 1

Value range: 0 to 255

Raw data of the sent safety telegram.

8700.113 Sequence number of received safety telegramFactory setting: **0**

Unit:

Resolution: 1

Value range: 0 to 4294967295

Sequence number of the received safety telegram. Is used to analyze the received telegram with respect to time.

8700.114 Data of received telegramFactory setting: **0**

Unit:

Resolution: 1

Value range: 0 to 255

Raw data of the received safety telegram.

8703.108 Data exchange timeout for safe communication (safe bus systems)Factory setting: **0**

Unit: ms

Resolution: 1

Value range: 0 to 4294967295

Monitoring time (timeout) configured in the master for data exchange.

8703.109 Safe communication (safe bus systems): Maximum data exchange response timeFactory setting: **0**

Unit: ms

Resolution: 1

Value range: 0 to 4294967295

Maximum measured response time of the data exchange. Is used to optimize the timeout.

8703.110 Safe communication (safe bus systems): Average data exchange response timeFactory setting: **0**

Unit: ms

Resolution: 1

Value range: 0 to 4294967295

Mean measured response time of the data exchange. Is used to optimize the timeout.

8703.111 Safe communication (safe bus systems): Minimum data exchange response time

Factory setting: **0**

Unit: ms

Resolution: 1

Value range: 0 to 4294967295

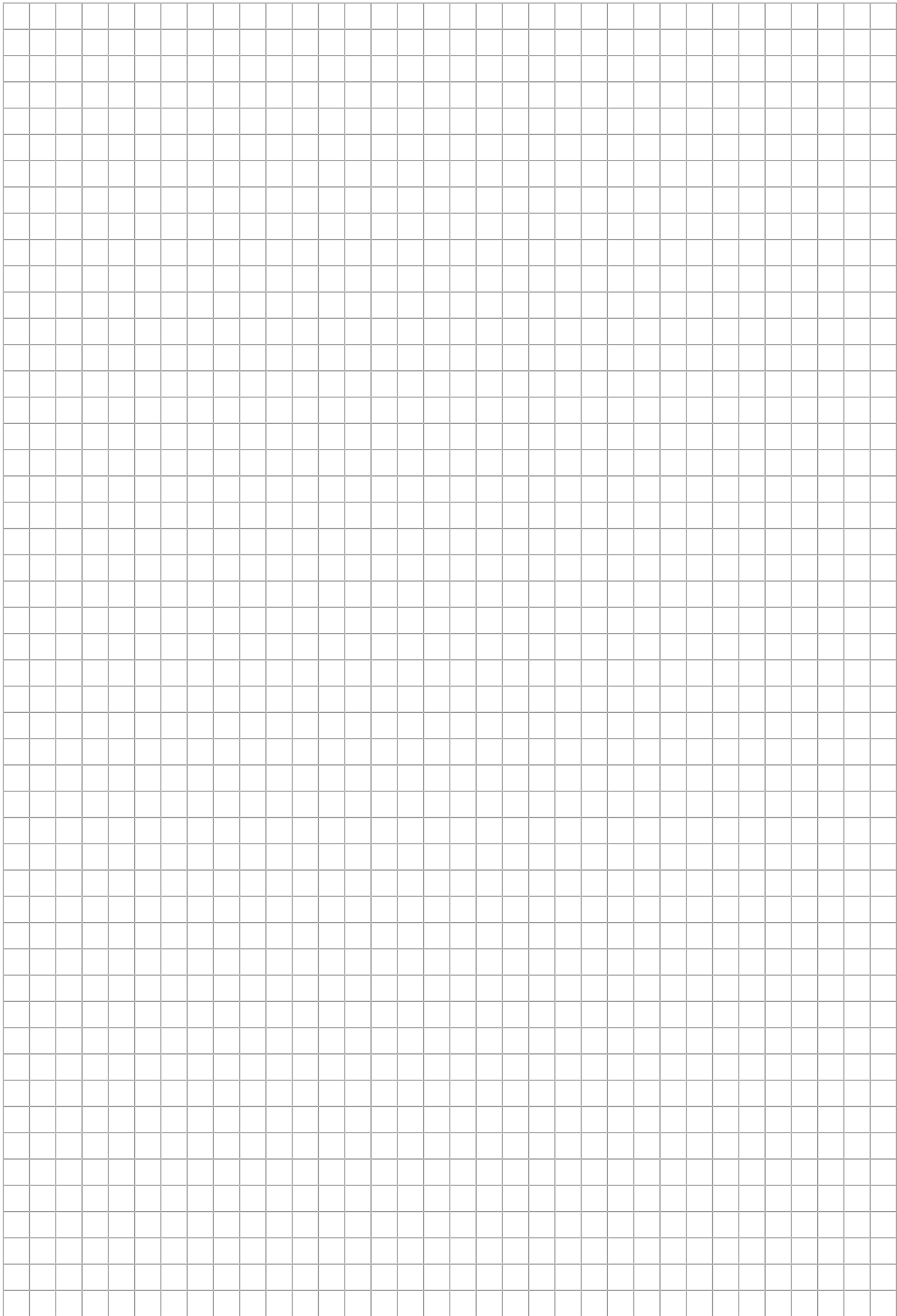
Minimum measured response time of the data exchange. Is used to optimize the timeout.

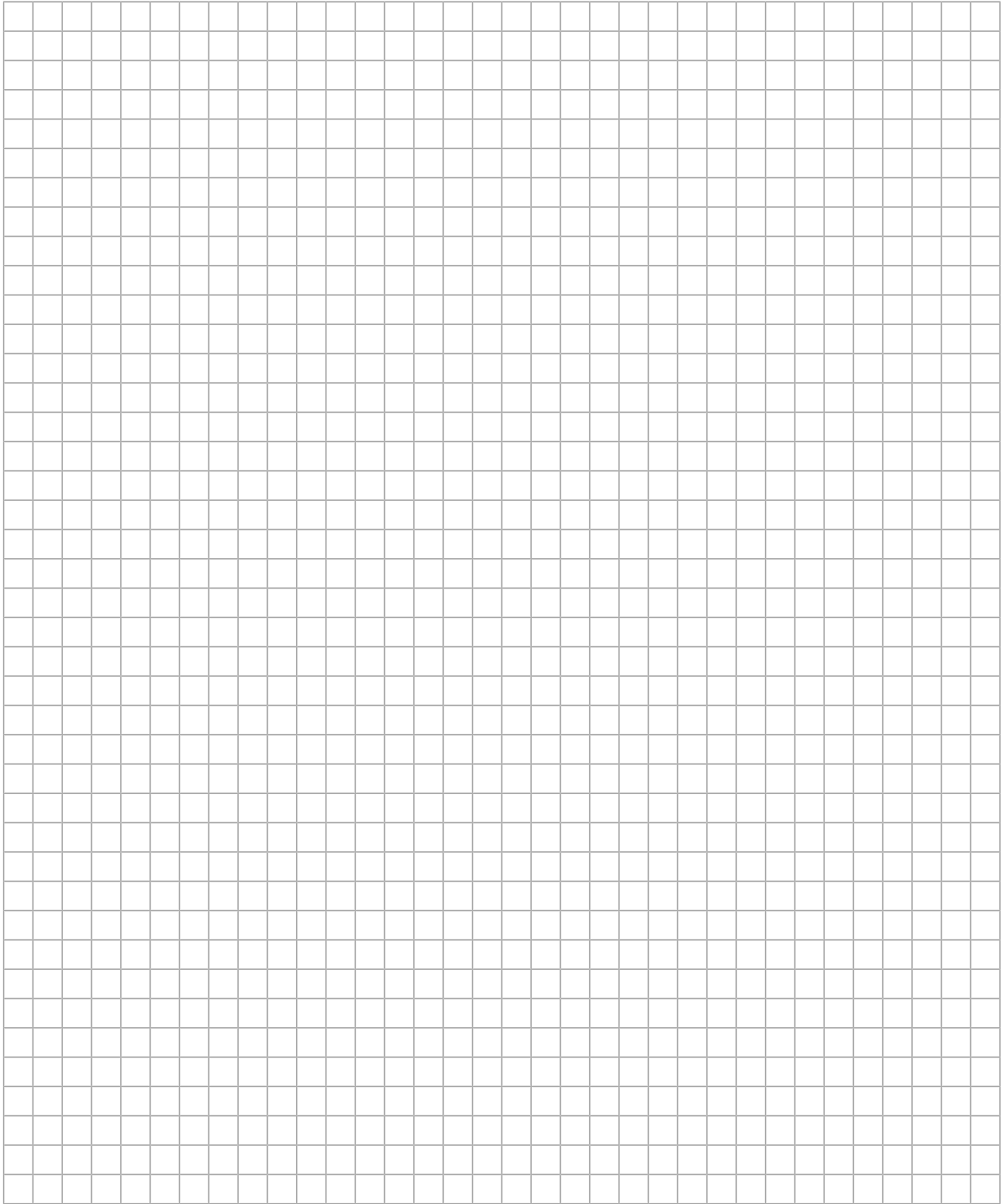
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