Error/ warning messages/ trouble shooting S300/ S700

Error messages

Any errors that occur are shown in coded form by an error number in the LED display on the front panel. All error messages result in the BTB/RTO contact being opened, and the output stage of the amplifier being switched off (motor loses all torque), and the motor-holding brake is activated. Detailed description see parameter **_ERRCODE_**.

Operating condition (example with 3 A Regler)

			no 24V supply available
	O	3	03 = Servo amplifier with 3A current rating
P	O	3	P = power supply activated
E	O	3	E = Hardware enabled (standard operating condition)
F	1	4	F = fault (example No 14, see error table)
n	O	1	n = warning (example No 1, see table warnings)
–	S	–	AS/STO-Enable-input not wired, amplifier disabled

Status message

–			Program mode: ready
	–		Program mode: software wiill be loaded
.	.	.	Amplifier modifies the start configuration

Number	Explanation	
E	Status Message	DC-Link voltage ok. Amplifier is enabled.
P	Status Message	DC-Link voltage ok. Amplifier is disabled.
. . .	Status Message	Amplifier is updating the startup configuration
-	Status Message	Status message, no error, programming mode
- S -	AS-Enable	AS-Enable input is 0V (with disabled drive only)
F01*	Heat Sink Temperature	Heat sink temperature too high (default: 80°C)
F02*	Overvoltage	Overvoltage in DC bus link. Limit depends on the electrical supply voltage
F03*	Following Error	Message from the position controller
F04	Feedback	Cable break, short-circuit, short to ground
F05*	Undervoltage	Undervoltage in DC bus link (default: 100V)
F06*	Motor Temperature	Motor temperature too high or temp. sensor defect
F07	Internal Voltages	Internal supply voltages not ok
F08*	Overspeed	Motor runs away, speed is too high
F09	EEPROM	Checksum error
F10	Signal Failure X5	Signal failure X5 (cable break or similar)
F11	Brake	Cable break, short-circuit, short to ground
F12	Motor Phase	Motor phase missing (cable break or similar)

F13*	Ambient Temperature	Ambient temperature too high
F14	Output Stage	Fault in the power output stage
F15	I²t max.	I²t maximum value exceeded
F16*	Mains BTB/RTO	2 or 3 phases missing in the mains supply feed
F17	A/D Converter	Error in the analog-digital conversion, normally caused by extreme electromagnetic interference
F18	Regen	Regen circuit faulty or incorrect setting
F19*	DC Bus Link	DC bus link breakdown
F20	Slot Error	Slot error, depends on the type of expansion card (see ASCII command reference)
F21	Handling Error	Handling error on the expansion card
F22	Reserved	Reserved
F23	CAN-Bus Off	Severe CAN bus communication error
F24	Warning	Warning is displayed as fault
F25	Commutation Error	Commutation error
F26	Limit Switch	Hardware limit switch error on homing move
F27	AS	Operational error with -AS- , input for AS-Enable and ENABLE have been set at the same time
F28	Fieldbus Error	Fieldbus error (see ASCII command reference)
F29	Fieldbus Error	Fieldbus communication is disturbed (see ASCII command reference)
F30	Emergency Timeout	Timeout emergency stop
F31	Reserve	Reserve
F32	System Error	System software not responding correctly

* = these error messages can be cleared without a reset, by using the terminal screen and sending the ASCII command **CLRFAULT** (or button   ). If only one of these errors is present and the RESET button or the I/O RESET function is used, only the **CLRFAULT** command will be executed.

Warnings

Faults which occur, but which do not cause a switch-off of the amplifier output stage (BTB/RTO contact remains closed), are indicated in the LED display on the front panel by a coded warning number. Detailed description see parameter **STATCODE**.

Number	Designation	Explanation
E	Status Message	DC-Link voltage ok. Amplifier is enabled.
P	Status Message	DC-Link voltage ok. Amplifier is disabled.
. . .	status Message	amplifier is updating the startup configuration
- S -	AS-Enable	AS/STO-Enable input is 0V (with disabled drive only)
-	status Message	status message, no error, programming mode
n01	I²t	I²t threshold exceeded
n02	regen power	reached preset regen power limit
n03*	S_fault	exceeded preset following error limit
n04*	response monitoring	response monitoring (fieldbus) has been activated
n05	supply phase	mains supply phase missing

n06*	SW limit switch 1	passed software limit switch 1
n07*	SW limit switch 2	passed software limit switch 2
n08	motion task error	a faulty motion task was started
n09	no reference point	no reference point (Home) set at start of motion task
n10*	PSTOP	PSTOP limit-switch activated
n11*	NSTOP	NSTOP limit-switch activated
n12	motor default values loaded	only for ENDAT or HIPERFACE® : discrepancy between motor number saved in the encoder and the amplifier, motor default values loaded
n13*	expansion card	24V DC supply for I/O expansion card not ok
n14	SinCos feedback	SinCos commutation (wake & shake) not completed, will be canceled when amplifier is enabled and wake & shake carried out
n15	Reserve	Reserve
n16	summarized warning	summarized warning for n17 to n31
n17	fieldbus-sync	CAN sync is not logged in
n18	multiturn overflow	max. number of motor turns exceeded
n19	motion task ramps are limited	range overflow on motion task data
n20	invalid motion task	invalid motion task
n21	PLC program error	for details see PLC code
n22	max. motortemperatur reached	the user can shut down the process before the temperature eror will interrupt the process immediately
n23	Sin Cos feedback	warning level reached
n24	Digital I/O	configuration is not logical
n25-n31	Reserve	Reserve
n32	firmware beta version	firmware is an unreleased beta version

* = these warning messages result in a controlled shut-down of the drive (braking by emergency stop ramp)

Trouble Shooting

There may be a wide variety of reasons for the fault, depending on the conditions in your installation.
In multi-axis systems there may be further hidden causes of a fault.
Our **_customer service_** can give you further assistance with problems.

Help with Faults

Display	Meaning	Possible causes	Measures/ explanation
HMI message: Communication fault		Wrong cable used	Use null-modem cable
		Cable plugged into wrong position on servo amplifier or PC	Plug cable into the correct sockets on the servo amplifier and PC
		Wrong PC interface selected	Select correct interface
F01*	Heat Sink Temperature	Heat sink temperature too high	Max. value **_MAXTEMPH_** adjusted by manufacturer to 80°C. Decrease ambient temperature.
		Amplifier contaminated	Check / blow out ventilation slots.

			Use air filters.
		Fan defective / non-contacted	Check the air flow / fan noise; if defective, send the amplifier to the manufacturer for repair.
		Value ***MAXTEMPH*** too small	Range 20 .. 85°C, default 80°C
		No air flow due to restricted installation	Conversion of the switchgear cabinet. Install an air-conditioning unit.
		Hardware faulty	Return the servo amplifier to manufacturer for repair
F02*	Overvoltage in DC Bus Link Max. value depends on the set mains voltage	Regen energy too high	"n02" displayed beforehand. Possibly use an external braking resistor or, in the case of multiple amplifiers, connect DC links.
		Mains voltage set too low	Set the mains voltage correctly on the ***Basic Setup*** screen page
		Regen resistor configured incorrect	Set the details for the internal or external braking resistor correctly on the ***Basic Setup*** screen page
		Regen resistor wired incorrect	Check the wiring (see product manual). Internal braking resistor: Bridge must be present on the connector! External braking resistor: Bridge must be removed from the connector!
		Fuse in regen resistor defect	Replace fuse
		Braking ramps too short	Extend the braking ramps on the ***Velocity Loop*** screen page
		DC Bus not linked to other amplifiers	In the case of multiple amplifiers from the same family, connect the DC links (see product manual)
F03*	Following error message of the position controller (in ***OPMODE*** 5 or 6 only)	Axis is mechanically tight or blocked	Check the mechanical system
		Inadequate torque for the ramps set	Travel along flatter ramps (***ACC***, ***DEC***)
		Ramps in the speed controller are longer than ramps in the position controller	Lower the acceleration ramp (***ACC***) and braking ramp (***DEC***) in the speed controller
		Amplifications set too low. Axis is too undynamic	Adjust the amplification. ***Velocity Loop*** and possibly ***Position Loop*** screen pages
		Amplifications set too high. Axis oscillates.	Adjust the amplification. ***Velocity Loop*** and possibly ***Position Loop***, screen pages, insert a filter
		IPEAK (maximum current) too low	Enlarge the following error window (***Position Data*** screen page) or use a larger amplifier / motor, increase ***IPEAK***.
F04	Feedback	Short circuit, short to ground	Check the feedback cable
		Encoder defective	Exchange encoder / motor
		Contacts in connector not OK	Check contacts
		Incorrect feedback set	See ***FBTYPE***

		Incorrect / defective feedback cable	Check cable (particularly critical in the cable trailing device)
		Incompatible feedback	See *FBTYPE*
		Poorly shielded cables	Use suitable cables (see product manual)
		Feedback cable is too low	Adhere to the max. permissible cable length (see product manual)
		Coupling fault signals	Check shielding, ensure compliance with the minimum spacing between the power cables and the signal connections (see product manual)
F05*	Undervoltage	Mains contactor not connected	Wiring / Emergency stop / Control logic / ...
		Switch-on sequence not complied with	First of all switch on the power contactor which is connected via the BTB contact. Then switch the enable signal on approx. 0.5s later
		Emergency stop has cut off the mains voltage	Operator information
		VBUSMIN parameter set too low.	Adjustment of the parameter, e.g. in 48VDC applications.
		The monitor has to be switched off in some applications with *UVLTMODE*	Example: Positioning the axis in the event of mains failure.
F06*	Motor Temperature	Motor overheating	Incorrect motor parameters / Poor cooling
		Defective temperature sensor	Measure the sensor resistance. Switch: low temperature: switch closed high temperature: switch open. PTC thermistor: low temperature: low resistance high temperature: high resistance
		Connector on the feedback unit loose or feedback cable interrupted	Connector / cable control
		Motor without a temperature sensor	Installation of a bridge in the connector
		Cutoff threshold for the temperature sensor is set too low	Set the *MAXTEMPM* parameter (to the cutoff threshold, see parameter description)
		Amplifier defective	Bridge the temperature contact for testing at the resolver or SinCos interface
		Unused thermostatic switch / element	Contact *Customer Support*
F07	Internal Voltages faulty	External short circuit or overload on a power supply voltage	Disconnect all the connectors apart from 24V and check whether the error occurs again when you switch on

		24V undershot for amplifier logic	Adhere to the tolerance criteria for the 24V voltage supply (see product manual)
		Motor brake with excess current consumption.	Adhere to the maximum motor brake current (see product manual); supply brake with external voltage.
		Hardware faulty	Return the servo amplifier to manufacturer for repair
		Feedback system with excess current consumption.	Contact *Customer Support*
F08*	Overspeed	Speed in excess of permissible limit	Check the *VOSPD* (limit speed) and raise it, if necessary.
		Speed in excess of permissible limit	Reduce overswing by assigning amplification parameters
		Feedback cable is defective	(Possibly check by shaking the cable) Replace the cable
		VLIM too low	When a new motor is loaded, quicker motors with a max. of only 3,000 rpm are also entered. The end speed and overspeed have to be adapted for higher speeds.
		Motor vibrates.	Parameter adaptation
		Tables of motion tasks with a time base which is too low.	Increase target times or use a motor with a higher nominal speed
		Feedback on the incorrect motor inserted.	Check and correct assignment
		Motor phases inverted	Check the pin assignment
		Feedback incorrectly set	Set angle offset correctly (*MPHASE*)
F09	EEPROM Checksum Error	Amplifier switched off during the storage process	Re-enter parameters and save them
		Manually changed parameter record loaded with lower-case lettering.	Change the lower-case lettering to upper case
		Hardware faulty	Return the servo amplifier to manufacturer for repair
F10	Cable brake at X5	Connector / cable problem	Check connectors / cables.
		Monitor in the slave responds too soon after a restart	Set the parameter *SDLY* to 8,000. (FW 1.31 or higher)
		No differential-mode voltage signals used	Signal sources must switch between –5V and 5 V, not between 0V and 5V.
F11	Cable brake motor brake	Short circuit, short to ground	Replace the cable
		Motor cable without brake wires	Connect the right motor cable
		Motor without a brake	Set *MBRAKE* to 0
		Motor brake current consumption too low.	Raise current consumption to a minimum of 150mA (e.g. through parallel resistors).
		Hardware faulty	Return the servo amplifier to manufacturer for repair

F12	Motor Phase	Shield on the motor cable is badly attached or missing	Check the shield connections
		Strong external EMC interference	Additional design of motor shields on the mounting plate of the switchgear cabinet.
		Motor cable capacity is too high	Use a motor choke / Shorten the cable / Use cables
		Installed motor contactor does not switch on time.	Check contactor
		Installed motor contactor has burnt contacts.	Check contactor
		Hardware faulty	Return the servo amplifier to manufacturer for repair
		Motor connector not plugged in the servo amplifier or motor.	Check connector
F13*	Ambient Temperature too high	Ambient Temperature too high	Use a cooling device
		Detection faulty (usually combined with F17)	Return the servo amplifier to manufacturer for repair
		Cutoff threshold is too low	Increase *TEMPE*
		Switchgear cabinet is too warm.	Use a cooling device
F14	Output Stage	Short circuit in the motor cable	Replace motor cable
		Output stage faulty	Return the servo amplifier to manufacturer for repair
		Insulation fault in the motor	Conduct measurements with an ohmmeter between the motor phases: must be symmetrical. Measure the motor phases to the PE; it must be unending. If there is a high-voltage tester available, use it to measure the motor phases to PE.
		Motor contactor does not switch on time.	Check the switching sequence
		Motor contactor has burnt contacts.	Replace motor contactor.
		Short circuit in the electric circuit for the external braking resistor	Check, rectify short circuit
F15	I²t maximum value exceeded	Drive is mechanically tight	Check mechanical system, use a larger amplifier/motor
		Sine² ramps	Extend the acceleration/braking ramps (*ACC*, *DEC*)
		Incorrect design	Contact *Customer Support*
		Incorrect phase angle between feedback and magnet elements in the motor.	Correct the *MPHASE* , possibly reset with *ZERO*.
		Ramps are too steep	Extend the acceleration/braking ramps (*ACC*, *DEC*)
		Intervals are too short	Extend the recovery intervals between motion tasks (*Motion Tasks* screen page)
		Vibration in the current controller	Adjust the amplification of the *MLGQ* and the *KTN* reset time
		Motor has an inter-turn fault (only	Replace motor

		in the case of a partial short circuit)	
F16*	Mains BTB - 1, 2 or 3 phases of the in-feed missing	Three-phase operation is set in the case of a single-phase in-feed.	check setting on screen page ***Basic Setup***
		Phases missing from in-feed.	Check wiring/fuses/main contactor
		Special settings are required for a DC in-feed.	Contact ***Customer Support***
		Amplifier enabled even though they was no mains voltage	Amplifier only enabled when the mains voltage is switched on (comply with switch-on sequence)
F17	A/D converter error	Strong electromagnetic interference	Reduce EMC interference; check shielding and earthing. Mount devices which generate electrical fields further away from the amplifier.
		Hardware faulty	Return the servo amplifier to manufacturer for repair
F18	Regen Circuit	Regen resistor extern selected, but the internal one is used.	Check setting on screen page ***Basic Setup***
		Destroyed regen transistor	Return the servo amplifier to manufacturer for repair
F19*	DC Bus Link (can be switched off for operation with two phases mains)	There is no voltage at the power terminals.	Check and switch on power supply
		Voltage level is incorrectly configured.	Adapt ***VBUSMIN***
		Excessive load on the DC link during acceleration in combination with a soft voltage source (isolation transformer)	Adapt parameters or hardware
F20	Slot Error	Hardware error and the expansion card	In the case of expansion card I/O-14/08, check the card's external power supply unit
		Incorrect PROFIBUS card	Contact ***Customer Support***
		Firmware does not support the card which is inserted.	Contact ***Customer Support***
		Card is not inserted correctly	Remove the card and insert a new one and tighten it, following the instructions in the product manual.
		Power consumption of the plug-in card is too high.	Contact ***Customer Support***
F21	Handling Error	Software error on the expansion card	Contact ***Customer Support***
		Plug-in card not permitted	Contact ***Customer Support***
F22	Reserved	Reserved	
F23	CAN Bus	Severe CAN bus communication error.	Check CAN cable and controller
F24	Warning	Warning is displayed as fault	With the ***WMASK*** parameter you can read out which warning(s) are evaluated as errors. On the basis of this information, refer to

			the list of warning messages. The **_LASTWMASK_** parameter indicates which warning last led to F24.
F25	Commutation error (motor may have oversped) Power vector and motion are in reverse.	Wiring error in motor phases	Test motor cable fully – Adapt **_DIR_**
		Wiring error on feedback cable	Check direction of rotation in the monitor window, test feedback cable fully – Adapt **_DIR_**
		Internal clearance / oscillation of the mechanical system	Examine mechanical system and align it, if necessary
		Monitor is too sensitive	Raise **_VCOMM_** (**_VCOMM_** = **_MSPEED_** means minimum sensitivity)
		Motor cable / feedback cable from another motor plugged in.	Check and correct amplifier-motor assignment.
		Offset too high	Check resolver pole number (**_RESPOLES_**), motor pole number (**_MPOLES_**) and offset (**_MPHASE_**)
		Wake&Shake failed	Perform Wake&Shake
F26	Limit switch Homing error Hardware Limit Switch reached (defined by **_REFLS_**)	Cable brake (limit switches)	Check cable
		Limit switches connected do not belong to the axis.	Check and correct limit switch-axis assignment.
		No limit switches connected.	Disable input functions (**_Digital I/O_** screen page)
		Limit switches inverted.	Assign PSTOP and NSTOP correctly to the inputs (**_Digital I/O_** screen page)
F27	AS error	The AS-enable was switched at the same time as or later than the amplifier-enable.	Consider Switch-On sequence (see product manual)
		Cable fault (AS wiring)	Check wiring, measure cable-resistance.
F28	Fieldbus, ext. trajectory	"External trajectory" error is generated if the setpoint jump exceeds the maximum permissible value when the external position trajectory is specified.	Adaptation of the specified values (**_VLIM_** / **_PVMAX_**)
		EtherCAT: The "synchronization" error is generated if the drive cannot be synchronized during phase ramp-up or if the drive loses its synchronization in EtherCAT "Operational" state.	Check EtherCat system.
F29	Fieldbus not synchronized	Timing error	Communication problem by the controller
		Power supply	External power supply for an expansion card missed.
		Expansion card not compatible	Contact **_Customer Support_**
F30	Emergency Stop Timeout	Brake ramp too long	Decrease **_DECSTOP_**
		Peak current set too small	Increase **_IPEAK_**
		Brake time too short	Increase **_EMRGTO_**

		Amplifier too small	Select servo amplifier with higher rated/peak current
	Default 5.000ms Motor doesn't stop in the set time.		
F31	Error in Macro Program	Endless loop in macro program	Check macro program
		Overly intricate calculations in the quick tasks.	Check program. Tip: Always use "Debug on" for tests.
F32	System error, System software doesn't work correctly	Processor overloaded	Too many stations in the network/Baud rate too high/Functions too complex (PLC)
		Hardware faulty	Return the servo amplifier to manufacturer for repair

Help with Warnings

Display	Meaning	Possible causes	Measures/ explanation
n01	I²t treshold exceeds the set limit value *I2TLIM*.	Mechanical system is tight	Check the mechanical system
		Amplifier dimensions too low	Use an amplifier with a higher current
		Motor dimensions too low	Use a motor with a higher current
		Driving profile is too aggressive	Define recovery times
n02	Brake power exceeds the set limit value *PBALMAX*.	Incorrect brake power set	Check setting
		Internal brake resistance too low	Use external brake resistance, extend braking ramps (*DEC* / *DECSTOP*)
n03	Following error exceeds the set limit value *PEMAX*.	Mechanical system is tight	Check the mechanical system
		Amplifier dimensions too low	Use an amplifier with a higher current
		Driving profile is too aggressive	Define recovery times, extend ramps
		Following error set too low	Check setting
n04	Fieldbus communication monitor has responded (*EXTWD*).	During commissioning: no fieldbus connected	Disable watchdog temporarily (*EXTWD* = 0)
		In operation: communication problem	Check bus installation
n05	One of the three mains phases is missing		Check the mains connection, fuses and mains contactor
n06	Position setting for software limit switch 1 (*SWE1*) has been undershot	Axis has been moved beyond the position which has been configured as the end position	Check the position of the axis and setting of the software limit switch
n07	Position setting for software limit switch	Axis has been moved beyond the position which has been configured	Check the position of the axis and setting of the software limit switch

	2 (*SWE2*) has been exceeded	as the end position	
n08	Defective motion task	Commenced motion task does not exist (checksum is defective)	Create a new motion task
		Target position lies outside the permissible range	Check software limit switches and target positions
		Defective acceleration values	Check units and numerical values
		OPMODE does not support the function	Set correct *OPMODE*
n09	No reference point	No reference point set when a motion task is started.	Perform homing or set reference point
n10	Hardware Limit Switch PSTOP	Positive limit switch has responded	Move the axis in a negative direction from the limit switch
		Limit switch not connected	Change the parameterization of digital I/Os or connect the limit switch
		Limit switch sensor has incorrect logic.	Insert break contacts as limit switches (instead of make contacts).
n11	Hardware Limit Switch NSTOP	Negative limit switch has responded	Move the axis in a positive direction from the limit switch
		Limit switch not connected	Change the parameterization of digital I/Os or connect the limit switch
		Limit switch sensor has incorrect logic.	Insert break contacts as limit switches (instead of make contacts).
n12	Motor default values loaded	Motor numbers stored in the encoder and amplifier do not match the parameters that have been set	*SAVE* motor number to the EEPROM and with *HSAVE* to the encoder.
n13	Expansion card	24V supply for the I/O expansion card missed	Check wiring and 24V power supply
n14	SinCos-Feedback	SinCos commutation (wake&shake) not completed	ENABLE the amplifier
n16	Summarized Warning	Summarized warning for n17 to n31	See warning #
n17	Feldbus Sync	CAN sync is activated, but is not sent synchronously from the controller, if at all.	Check fieldbus settings
n18	Multiturn overflow	More than +/-2048 revolutions counted with the multiturn encoder connected	Ignore or disable monitoring with *DRVCNFG* Bit7=1
			Move motor to encode position 0 prior to installation
n19	Motion task ramps have been limited	Permissible value range exceeded by the process block data	Check the process block data
n20	Invalid motion task		Check the data from the last process block started. Also determine the process block number with *MOVE*.
n21	Warning by PLC Program	Only in the macro program in the servo amplifier	Application-specific
n22	Max. motor temperature	Alarm threshold setting exceeded, motor overloaded	Check the motor temperature.

		Mechanical system is tight/blocked	Check the mechanical system
	reached	Mechanical system is tight/blocked	Check the mechanical system
n23	Sine-Cosine Encoder	Signal amplitude is too low	Check the signal amplitude, possibly re-measure with an oscilloscope
n24	Digital Inputs	Illogical configuration	Undo the last configuration change
n32	Firmware Beta Version	For testing reasons only	No warranty by the manufacturer for error free functionality