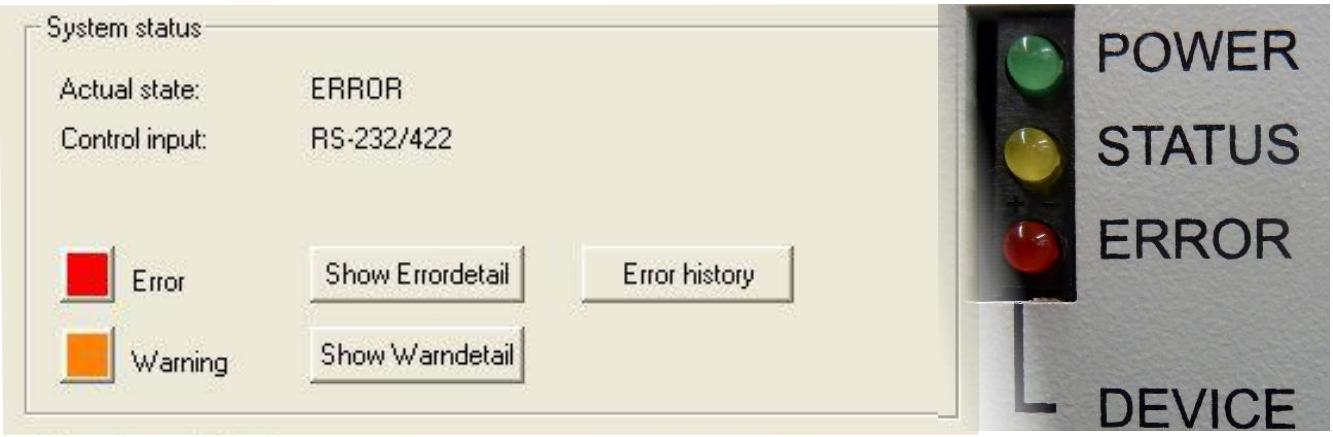
TopCon devices – Error list

For HMI / TC.RCU and Software TopControl



V11.40

1. General information

This information in this documentation corresponds to the development situation at the time of going to print and is therefore not of a binding nature. Regatron AG reserves the right to make changes at any time for the purpose of technical progress or product improvement, without stating the reasons. In general we refer to the applicable issue of our “Terms of delivery”.

Identification

Manufacturer

Information on the manufacturer	
Regatron AG	Tel. +41 71 846 67 44
Feldmuehlestrasse 50	Fax +41 71 846 67 77
9400 Rorschach	www.regatron.com
SWITZERLAND	topcon@regatron.ch

Tab. 1

Instructions

Document identification	
Identifier	TopCon devices − Error list
Error list Version	V11.40

Tab. 2

Open questions

In you have any questions, your TopCon sales partner will be pleased to be of assistance.

However, you can also reach Regatron support at the following address:

Customer support	
Regatron AG	Tel. +41 71 846 67 44
Feldmuehlestrasse 50	Fax +41 71 846 67 77
9400 Rorschach	www.regatron.com
SWITZERLAND	tc.support@regatron.ch

Tab.3 Customer support.

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2. Error list

2.1. Introduction

Division into group and detail errors

To be able to troubleshoot errors as quickly and accurately as possible, the possible errors are divided into 16 group errors. Each of these group errors is in turn broken down into 16 detail errors.

The group and detail errors can be identified by direct digital access (via TopControl or HMI/RCU). Group errors and detail errors are also indicated sequentially on the front panel via a flashing code on the red “ERROR” light emitting diode.

There is the same mechanism for warnings. They are indicated on the front panel via the yellow “STATUS” light emitting diode or can be polled via TopControl and HMI/RCU.

Acknowledging an error

On the occurrence of an error, the device remains in the ERROR state until the error is acknowledged and the device signals this state correspondingly with the digital outputs (relay) and the light emitting diodes on the front panel.

The positive edge on the **Clear Error** signal is used to acknowledge an error. The digital input provided for this purpose or the related control parameter (direct digital access) is used.

Control signals in case of an error

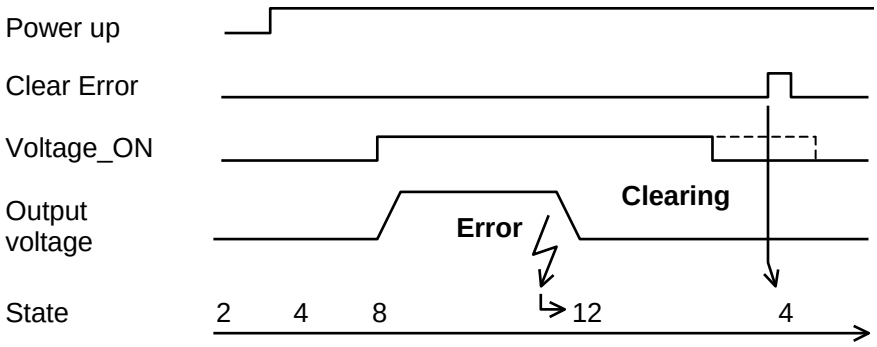


Fig. 1 Control signals in case of an error.

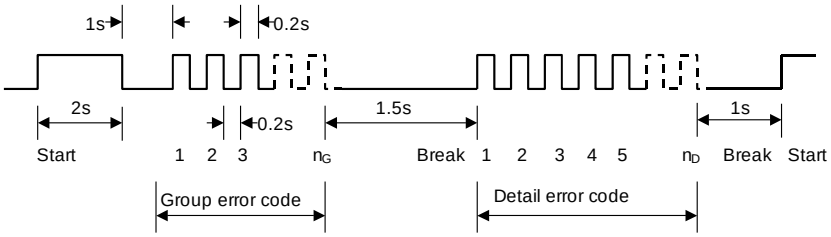
Errors and acknowledging

The warnings are also saved until they are acknowledged. The positive edge of the **Clear Error** signal is used for this purpose.

Errors can also be acknowledged via the TopControl application and via the HMI/RCU.

Error and warning indication on the front panel LEDs

The number of flashes indicates the possible reasons for the malfunction (group error and detail error). The following illustration shows a period in the indication cycle.



Errors are indicted via the red ERROR LED; warnings via the yellow STATUS LED.

Error codes and warning codes are identical. All errors and warnings are output one after the other based on the scheme above. Then the flashing sequence starts again with the first error or first warning.

The chapter lists all flashing codes and provides information on the reason for the error and how to rectify it.

2.2. Overview of group error codes and group warning codes

Indication of the reason for the malfunction

Flash code	[1] Error groups	Page
1	0) Internal	9
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15	E) Configuration 2	48
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30	V) Communication 3	72
31	W) Internal 2	68
32	X) Communication 2	76

[1] On the HMI/RCU there is not enough space to output the errors or warnings with as much detail as in TopControl. I.e. the text may be indicated truncated. The code in front of the text is however identical in TopControl and HMI/RCU

The above list provides an overview of all existing group errors. Some of the groups can also occur as warnings via the same group code.

The code prefix [0) ... X)] helps to clearly identify the error group/warning group. This code appears both in TopControl ("Show Errordetail" / "Show Warndetail" buttons) and also on the HMI/RCU (Error/Warning menu).

Overview of detail errors and detail warning codes

The following table lists all detail errors. Some of the detail errors can also occur as warnings with the same code.

The error or the warning can be identified using the flashing code in column 1 based on the number of flashes on the front panel LEDs.

The “TopControl/HMI indication” column contains the exact wording in TopControl (“Show Errordetail” / ”Show Warndetail” button). The texts are truncated on the HMI/RCU for space reasons. The errors can however be unambiguously identified from the code given first.

2.3. Error group

2.3.1. 0) Internal

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
1-1	00	Invalid system state	An invalid internal state was detected. (Used for debugging pur-pose).	In the case of repeated occurrence refer to customer support .	no
1-2	01	Invalid module state	An invalid internal state was detected. (Used for debugging pur-pose).	In the case of repeated occurrence refer to customer support .	no
1-3	02	Calculation Overflow	The internal calculation overflow is prevented.	Wrong parameters are set. Possily after a firmware update	Make sure that the correct Update-Gridfile has been used when applying the firmware update
1-4	03	Flash full	Internal non-volatile memory is full	Tried to e.g. store more function sequneces than possible.	Delete some unused function sequences an try again
1-5	04	EEPROM table write	Write error in the non-volatile memory when storing device parameters.	You have made an update from Version V4.11.33 or older to V4.11.34 or new-er.	After power up activate button "Store settings" and restart device.
1-6	05	Flash timeout	Timeout while writing or deleting a flash page.	In the case of repeated occurrence refer to customer support	no
1-7	06	ADC sequence	AD converter sequence is incorrect.	A strong EMI pulse affects the AD data stream or hardware defect.	Extensive measures to thoroughly earth the device is needed. Find the EMI sources e.g. contactors without free wheeling diodes
1-8	07	Invalid EEPROM table	Empty or invalid table of device parameters.	In the case of repeated occurrence refer to customer support.	no
1-9	08	Requested state not available	An unexpected change of state was detected. (Used for debugging purpose).	In the case of repeated occurrence refer to customer support.	no

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
1-10	09	Thyristor not switched on	The Thyristor switch for DC link load resistor isn't switched on.	Tried to switch on output (voltage-on) when DCLink voltage and/or mains voltage error limit is reached but that error was not yet reported because of a programmed delay.	Make sure mains voltage of each phase is within valid range.
1-11	0A	No active controller defined	No active system controller was defined or identified. (Used for debugging pur-pose).	In the case of repeated occurrence refer to customer support.	no
1-12	0B	ADC timeout	An internal timeout oc-curred during data acquisition.	Implied by error 06)	See above error 06)
1-13	0C	ADC DMA interrupt missing	Incomplete collection of the current status.	Implied by error 06)	See above error 06)
1-14	0D	Internal debug error		In the case of repeated occurrence refer to customer support .	
1-15	0E	Invalid interrupt routine called	An unexpected interrupt routine was called. (Used for debugging pur-pose).	In the case of repeated occurrence refer to customer support .	no
1-16	0F	Old EEPROM table loaded	The version stored in the device parameter table differs from the updated software version.	Can appear after a firmware update of the main DSP.	Make sure that the correct Update-Gridfile has been used when applying the firmware update. (See also in the manual in section software update).

2.3.2. 1) Internal (PDSP)

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
2-1	10	PDSP pack-age check-sum	System communication failed.	A strong EMI pulse.	Extensive measures to thor-oughly earth the device is needed. Find the EMI sources e.g. contactors without free wheeling diodes.
2-2	11	Wrong PDSP SW version	The version of the peripheral DSP does not support the version of the main DSP.	The peripheral DSP wasn't successfully refreshed during a software update. Newest parameters aren't loaded after a software update.	You have to follow the Soft-ware update instructions in the manual.
2-3	12	PDSP fault	An internal error occurred.	In the case of repeated occurrence refer to customer support.	no
2-4	13	Write queue overrun	An internal error occurred.	In the case of repeated occurrence refer to customer support.	no
2-5	14	Too many PDSP packages	An internal error occurred.	In the case of repeated occurrence refer to customer support.	no
2-6	15	SCI check-sum	Various errors on interface RS232.	Interference on the RS232 cable.	Extensive measures to thor-oughly earth the device is needed. Use a shorter cable. Use a shielded cable. Prevent ground loops. Use a voltaic isolated RS232 interface. Find the EMI sources e.g. contactors without free wheeling diodes.
2-7	16	SCI parity	Various errors on interface RS232.	Wrong RS232 timings are set (baud rate, stop bit, parity bit, ...).	Correct the settings according to the device manual.
2-8	17	SCI overrun	Various errors on interface RS232.	Wrong RS232 timings are set (baud rate, stop bit, parity bit, ...).	Correct the settings according to the device manual.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
2-9	18	SCI framing	Various errors on interface RS232.	Level switching on RS232 Interface while PC/Laptop is switched on/off .	Plug in the RS232 cable after booting PC/laptop and re-move it before shut-down. Update the peripherals DSP to at least version 0.11.
2-9	18	SCI framing	Various errors on interface RS232.	On host side, a wrong level for an inactive state exists, while the RS232- interface hasn't been opened	Update the peripherals DSP to at least version 0.11. Start TopControl: when running, the interface is opened. Acknowledge the error ("Clear error").
2-10	19	SCI break	Various errors on interface RS232.		
2-11	1A	Unknown SCI status bit	Undefined internal communication. (Used for debugging purpose).	In the case of repeated occurrence refer to customer support .	no
2-12	1B	Unknown CAN status bit	Undefined internal communication. (Used for debugging purpose).	In the case of repeated occurrence refer to customer support .	no
2-13	1C	Unknown PDSP package	Undefined internal communication. (Used for debugging purpose).	In the case of repeated occurrence refer to customer support .	no
2-14	1D	Package from not initialised mailbox	Received a CAN pack-age from a not initialized CAN mailbox.(Used for debugging purpose).	Occurs at start with firm-ware v4.11.30 while con-trolling at least 4 inter-connected devices. Is to be ignored in this case. In other constellations, refer to the customer support	no
2-15	1E	PDSP communication stopped	Communication to the peripheral DSP failed.	In the case of repeated occurrence refer to customer support.	no
2-16	1F	SCI timeout within a talk frame.	Timeout while receiving a TALK frame by RS232	RS232 communication was disconnected or interrupted.	See above errors 15-19
2-16	1F	SCI timeout within a talk frame.	Timeout while receiving a TALK frame by RS232	Consequence of error 18.	See above errors 15-19

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
2-16	1F	SCI timeout within a talk frame.	Timeout while receiving a TALK frame by RS232	On host side (PC) the implementation of the TALK-protocol is too slow.	All bytes of a TALK Frame have to be sent between 5 ms (peripherals DSP version V0.09 / V0.10) and 200ms (from PDSP version v0.11 upwards and devices with CTR4.20).

2.3.3. 2) Output current

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
3-1	20	i2t	Calculated loss energy [(Ilimit)2–(Iout)2] * t exceeds the limit I2tmax..	Current during some time exceeds current limit.	Adjust the current Ilimit or I^2t to load
3-2	21	Overcurrent Isek	Output current exceeds the set level during a particular delay time.	Controller overshooting caused by set value steps.	Decrease steps of set value ramp. Adapt controller parameters to the load.
3-2	21	Overcurrent Isek	Output current exceeds the set level during a particular delay time.	Controller overshooting	Decrease controller parameters
3-2	21	Overcurrent Isek	Output current exceeds the set level during a particular delay time.	Strong additional switching on of a low resistive load produces a current peak (result of the output capacitance).	A temporary voltage drop is reduced by adding an exter-nal capacitor or a serial in-ductance. After a consultation with customer support, where appropriate, increase the delay.
3-3	22	Overcurrent Iprim	The transformer current exceeds the preset level (Level is dependent on the temperature).	Controller overshooting by set value jumps.	Reduce the gradient of the set value ramp. Decreasing controller parameters.
3-3	22	Overcurrent Iprim	The transformer current exceeds the preset level (Level is dependent on the temperature).	Strong additional switching on of a low resistive load (fast and large voltage drop).	A temporary voltage drop is reduced by applying a exter-nal capacitance or serial inductance. Decrease of controller parameters.
3-3	22	Overcurrent Iprim	The transformer current exceeds the preset level (Level is dependent on the temperature).	Hardware defect.	Contact customer support
3-4	23	Gatedrive A fault	Hardware current monitoring. Detection of short circuits with immediate switching off the power stage.	Cf. “22) Overcurrent Iprim“	Cf. “22) Overcurrent Iprim“
3-5	24	Gatedrive B fault	Hardware current monitoring. Detection of short circuits with immediate switching off the power stage.	Cf. “23) Overcurrent Iprim“	Cf. “23) Overcurrent Iprim“

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
3-6	25	Overcurrent Isek (level de-rated by tem-perature)	Cut-off level of current was reduced because of high temperature (from 110% to 100% device maximum current) Cf. 21)	Cf. „21) Overcurrent Isek“	Lower ambient temperature and/or cf. „21) Overcurrent Isek“
3-7	26	TC.LIN Overcurrent	The TC.LIN output current exceeded the upper current level for a specific time.	Cf. „21) Overcurrent Isek“	no
3-8	27	TC.LIN Overload	Safe Operating Area (SOA) exceeded	Cf. „21) Overcurrent Isek“	Reduce the output current and/or drop voltage over TC.LIN.
3-9	28	Arc detection threshold reached			
3-10	29	Overcurrent Isek Q4	Output current in sink operation (Q4) exceeds the set level during a paricular time. Cf. 21)	Cf. „21) Overcurrent Isek“	
3-11	2A	Overcurrent Isek Q4 (level derated by temperature)	Cf. 25)	Cf. „21) Overcurrent Isek“	
3-12	2B	Overcurrent output inductor	Inductor current on DC output exceeds specified limit	Cf. „21) Overcurrent Isek“	
3-13	2C	Overrcurrent DC Discharge Unit	Current on DC Discharge Unit exceeds specified limit	A battery is connected to the output. The connected load violate the specified limits.	Check if no battery is connected to the ouput. Check if the connected load does not violate the specified limits.
3-14	2D	Overcurrent on customised power board	Current on customised power board exceeds specified limit	TC.ACP: Wrong parameters for the control of the H bridge	TC.ACP: Check the parameters for the control of the H bridge

2.3.4. 3) Output voltage

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
4-1	30	Overvoltage	The voltage exceeded the set level for a predefined duration.	Load rejection while voltage was already on a high level.	Activate load rejection detection. Increase the controller parameters. Use adaptive controller parameters. Add an additional external capacitor. After consultation with Top-Con support, where appropriate, increase the error delay.
4-1	30	Overvoltage	The voltage exceeded the set level for a predefined duration.	Controller overshooting	Decrease controller parameters - possibly increasing the proportional part (P Gain).
4-1	30	Overvoltage	The voltage exceeded the set level for a predefined duration.	Overshooting caused by set value steps.	Reduce the gradient of the set value ramp. Reduce controller parameters. Overshooting in open loop: use adaptive Controller pa-rameters.
4-2	31	Max. sense voltage drop reached	The difference of module voltage minus sense voltage has exceeded the set limit for a specific duration (delay).	The difference of module voltage minus sense voltage has exceeded the set limit for a specific duration (delay).	Adapt the detection level and delay to actual conditions. Possibly deactivate the detection if it is not necessary Use low resistance load feed cable. Don’t disconnect the load feed cable.
4-3	32	TC.LIN Overvoltage	The TC.LIN output voltage exceeded the over voltage limit for a specific duration.	The TC.LIN output voltage exceeded the over voltage limit for a specific duration.	Cf. 30)
4-4	33	Sense polarity	TopCon has sensed a negative sense voltage! Reverse Polarity error.	Connection with reversed polarity	Check the polarity of sense wires and polarity of the power cords.
4-5	34	RPP-Voltage unstable	TopCon had multiple faults keeping the output voltage in preconfigured limits. This is necessary to be able to switch the RPP switch	Voltage holding level too low. Extreme controller pa-rameter that led to oscillation.	Adjust controller parameters, increase the limits Perhaps parameter adjustment after contact with manufacturer.
4-6	35	RSC: Usense to high for switching	RSC: Sense voltage is over the default value to switching the Relais for configuration the switch box.	Battery to DC ouput connect or capacitor from Inverter not fully discharged	Disconnect battery or wait for discharging capacitors.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
4-7	36	Output undervoltage	The voltage fall below the set level for a predefined duration.	Controller undershooting	Decrease controller parameters - possibly increasing the proportional part (P Gain).
4-7	36	Output undervoltage	The voltage fall below the set level for a predefined duration.	Undershooting caused by set value steps.	Reduce the gradient of the set value ramp. Reduce controller parameters.
4-7	36	Output undervoltage	The voltage fall below the set level for a predefined duration.	The given reference value is too low.	Increase reference value.
4-8	37	Overvoltage DC Discharge Unit	Voltage on DC Discharge Unit exceeds specified limit	The connected load violate the specified limits.	Check if the connected load does not violate the specified limits.
4-9	38	Overvoltage on customised power board	Voltage on customised power board exceeds specified limit	TC.ACP: Wrong parameters for the control of the H bridge	TC.ACP: Check the parameters for the control of the H bridge
4-10	39	RSC: Sense missing	Sense line for measuring the switch voltage is not connected.	Sense line for measuring the switch voltage is not connected or is interrupted.	Check the Sense line.

2.3.5. 4) Supply

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
5-1	40	TC.LIN +5 V too high	Internal supply voltage is outside of the valid range.	Badly adjusted internal parameters.	Correction after a consultation with customer support.
5-1	40	TC.LIN +5 V too high	Internal supply voltage is outside of the valid range.	Hardware defect.	Contact customer support
5-1	40	TC.LIN +5 V too high	Internal supply voltage is outside of the valid range.	Subsequent error of error “07) (wrong gain values)”.	See below ,error 07)
5-2	41	TC.LIN +5 V too low	Internal supply voltage is outside of the valid range.	Badly adjusted internal parameters.	Correction after a consultation with customer support.
5-2	41	TC.LIN +5 V too low	Internal supply voltage is outside of the valid range.	Hardware defect.	Contact customer support
5-2	41	TC.LIN +5 V too low	Internal supply voltage is outside of the valid range.	Subsequent error of error “07) (wrong gain values)”.	See below ,error 07)
5-4	43	+5V too low	Internal supply voltage is outside of the valid range.	Badly adjusted internal parameters.	Correction after a consultation with customer support.
5-4	43	+5V too low	Internal supply voltage is outside of the valid range.	Hardware defect.	Contact customer support
5-4	43	+5V too low	Internal supply voltage is outside of the valid range.	Subsequent error of “24V too low/ too high”.	See below, errors 4B/4C)
5-4	43	+5V too low	Internal supply voltage is outside of the valid range.	Subsequent error of error “07) (wrong gain values)”.	See below ,error 07)
5-5	44	+5V too high	Internal supply voltage is outside of the valid range.	Badly adjusted internal parameters.	Correction after a consultation with customer support.
5-5	44	+5V too high	Internal supply voltage is outside of the valid range.	Hardware defect.	Contact customer support
5-5	44	+5V too high	Internal supply voltage is outside of the valid range.	Subsequent error of “24V too low/ too high”.	See below, errors 4B/4C)

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
5-5	44	+5V too high	Internal supply voltage is outside of the valid range.	Subsequent error of error “07) (wrong gain values)”.	See below ,error 07)
5-6	45	+15V too low	Internal supply voltage is outside of the valid range.	Badly adjusted internal parameters.	Correction after a consultation with customer support.
5-6	45	+15V too low	Internal supply voltage is outside of the valid range.	Hardware defect.	Contact customer support
5-6	45	+15V too low	Internal supply voltage is outside of the valid range.	Subsequent error of “24V too low/ too high”.	See below, errors 4B/4C)
5-6	45	+15V too low	Internal supply voltage is outside of the valid range.	Subsequent error of error “07) (wrong gain values)”.	See below ,error 07)
5-7	46	+15V too high	Internal supply voltage is outside of the valid range.	Badly adjusted internal parameters.	Correction after a consultation with customer support.
5-7	46	+15V too high	Internal supply voltage is outside of the valid range.	Hardware defect.	Contact customer support
5-7	46	+15V too high	Internal supply voltage is outside of the valid range.	Subsequent error of “24V too low/ too high”.	See below, errors 4B/4C)
5-7	46	+15V too high	Internal supply voltage is outside of the valid range.	Subsequent error of error “07) (wrong gain values)”.	See below ,error 07)
5-8	47	-15V too low	Internal supply voltage is outside of the valid range.	Badly adjusted internal parameters.	Correction after a consultation with customer support.
5-8	47	-15V too low	Internal supply voltage is outside of the valid range.	Hardware defect.	Contact customer support
5-8	47	-15V too low	Internal supply voltage is outside of the valid range.	Subsequent error of “24V too low/ too high”.	See below, errors 4B/4C)
5-8	47	-15V too low	Internal supply voltage is outside of the valid range.	Subsequent error of error “07) (wrong gain values)”.	See below ,error 07)
5-8	47	-15V too low	Internal supply voltage is outside of the valid range.	Subsequent error of “24V too low/ too high”.	Contact customer support

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
5-8	47	-15V too low	Internal supply voltage is outside of the valid range.	Subsequent error of error “07) (wrong gain values)”.	Contact customer support
5-8	47	-15V too low	Internal supply voltage is outside of the valid range.	Hardware defect.	Contact customer support
5-9	48	-15V too high	Internal supply voltage is outside of the valid range.	Badly adjusted internal parameters.	Correction after a consultation with customer support.
5-9	48	-15V too high	Internal supply voltage is outside of the valid range.	Badly adjusted internal parameters.	Correction after a consultation with customer support.
5-9	48	-15V too high	Internal supply voltage is outside of the valid range.	Subsequent error of “24V too low/ too high”.	Contact customer support
5-9	48	-15V too high	Internal supply voltage is outside of the valid range.	Subsequent error of “24V too low/ too high”.	See below, errors 4B/4C)
5-9	48	-15V too high	Internal supply voltage is outside of the valid range.	Subsequent error of error “07) (wrong gain values)”.	See below ,error 07)
5-9	48	-15V too high	Internal supply voltage is outside of the valid range.	Hardware defect.	Contact customer support
5-10	49	DC link voltage low	DC link voltage too low	Mains voltage too low.	Check mains voltage
5-10	49	DC link voltage low	DC link voltage too low. (Preset output values cannot be reached).	Feed cable cross-section to small.	Choose a cable with sufficient cross-section
5-10	49	DC link voltage low	DC link voltage too low. (Preset output values cannot be reached).	Bad contact of one or more of the mains phases connections	Check for not using a bad connection and check con-nection of cable
5-10	49	DC link voltage low	DC link voltage too low. (Preset output values cannot be reached).	Hardware defect	Contact customer support
5-11	4A	DC link voltage too high.	DC link voltage too high	Mains voltage too high	Check mains voltage
5-12	4B	+24V too low	24V mains voltage too low	24V mains voltage too low	Check mains voltage.
5-13	4B	+24V too low	24V mains voltage too low	External load of the internal 24V voltage supply too large (e.g. via X105 interface).	Reduce the load (raise resistance) so that the maximum current specified for the 24V supply is not exceeded.
5-13	4B	+24V too low	24V mains voltage too low	Hardware defect	Contact manufacturer.
5-13	4C	+24V too high	24V mains voltage too high	Mains voltage too high.	Check mains voltage.
5-13	4C	+24V too high	24V mains voltage too high.	Hardware defect	Contact customer support.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
5-14	4D	Fast voltage drop on DC link	Voltage drop at inter-mediate circuit voltage within short time (especially when additional switching on load/start).	Feed cable cross-section to small	Choose a cable with ade-quate cross-section
5-14	4D	Fast voltage drop on DC link	Voltage drop at inter-mediate circuit voltage within short time (especially when additional switching on load/start).	Failure of one main phase.	Check mains phases voltage
5-14	4D	Fast voltage drop on DC link	Voltage drop at inter-mediate circuit voltage within short time (especially when additional switching on load/start).	DC link thyristor doesn’t switch on.	Contact customer support
5-14	4D	Fast voltage drop on DC link	Voltage drop at inter-mediate circuit voltage within short time (especially when additional switching on load/start).	Hardware defect	Contact customer support
5-15	4E	TC.LIN +15V too high	Internal supply voltage is outside of the valid range.	Wrong alignment of voltage.	Correction after a consultation with customer support.
5-16	4F	TC.LIN +15V too low	Internal supply voltage is outside of the valid range.	Hardware defect	Contact customer support.

2.3.6. 5) Temperature

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
6-1	50	Rectifier temp. too high	Heat sink temperature near output rectifier too high.	Insufficient supply and exhaust air flow of cooling air. Ambient temperature too high. Load current too high (temperature rises).	Replace clogged filter. Allow supply and exhaust air sufficiently flow without limitation. Reduce ambient temperature to allowed range. Adapt load to ambient temperature (Notice the temperature derating).
6-2	51	IGBT temp. too high	Heat sink temperature near IGBT power stage too high.	Insufficient supply and exhaust air flow of cooling air. Ambient temperature too high. Load current too high (temperature rises).	Replace clogged filter. Allow supply and exhaust air sufficiently flow without limitation. Reduce ambient temperature to allowed range. Adapt load to ambient temperature (Notice the temperature derating).
6-3	52	TC.LIN K1 temp. too high	Heat sink temperature of TC.LIN output stage too high.	Supply and exhaust air flow of cooling air is restricted or the ambient temperature is too high.	Cf. 50) and 51)
6-4	53	TC.LIN K2 temp. too high	Heat sink temperature of TC.LIN output stage too high.	Supply and exhaust air flow of cooling air is restricted or the ambient temperature is too high.	Cf. 50) and 51)
6-5	54	TC.LIN PCB temp. too high	Temperature of TC.LIN PCB too high.	Supply and exhaust air flow of cooling air is restricted or the ambient temperature is too high.	Cf. 50) and 51)
6-6	55	Case Inside temp.high	Temperature inside of TopCon housing exceeds the limitsTemperature of environment (e.g. of cabinet) too high	Temperature of environment (e.g. of cabinet) too high	Increase air circulation, provide cold air intake. Cf. 50) and 51)
6-7	56	TC.LIN K1 cable break	TC.LIN Temperature Sensor K1 gives no signal	Cable break or sensor not connected	Contact customer support
6-8	57	TC.LIN K2 cable break	TC.LIN Temperature Sensor K2 gives no signal	Cable break or sensor not connected	Contact customer support
6-9	58	TC.LIN PCB cable break	TC.LIN Temperature Sensor on PCB gives no signal	Sensor not mounted	Contact customer support

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
6-10	59	Transformer temp. high	Transformer temperature exceeds the limit.	Load current too high (Notice the temperature derating).	Adapt load to ambient temperature (derating).
6-11	5A	PFC temperature high	Heat sink temperature near PFC too high.	Insufficient supply and exhaust air flow of cooling air. Ambient temperature too high. Load current too high (temperature rises).	Replace clogged filter. Allow supply and exhaust air sufficiently flow without limitation. Reduce ambient temperature to allowed range. Adapt load to ambient temperature (Notice the temperature derating).
6-12	5B	DC Discharge Unit temperature too high	DC Discharge Unit temperature exceeds the limit.	Supply and exhaust air flow of cooling air is restricted or the ambient temperature is too high.	Replace clogged filter. Allow supply and exhaust air sufficiently flow without limitation. Reduce ambient temperature to allowed range.
6-13	5C	PCB temperature high	Temperature on main controller board exceeds the limit	Insufficient supply and exhaust air flow of cooling air. Ambient temperature too high.	Replace clogged filter. Allow supply and exhaust air sufficiently flow without limitation. Reduce ambient temperature to allowed range.

2.3.7. 6) Communication

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
7-1	60	CAN bus off	CAN-Controller error.	CAN-Bus termination resistor not connected	A termination resistor is necessary on both ends of the CAN bus (X101/102 connector) when interconnecting two or more devices (otherwise only one termination needed)
7-1	60	CAN bus off	CAN-Controller error.	CAN cable isn't connected correctly.	Assure that all cables are properly connected to the devices.
7-1	60	CAN bus off	CAN-Controller error.	Not allowed Y-cabling of CAN-Bus.	Do not exceed the maximum length of 30 cm of branch line.
7-1	60	CAN bus off	CAN-Controller error.	Large noise level affects the CAN-Bus	Find noise sources and try turning them off to identify the cause.
7-1	60	CAN bus off	CAN-Controller error.	CAN-cable defect	Replace cable.
7-1	60	CAN bus off	CAN-Controller error.	Non-TopCon CAN bus subscribers interfere with the bus.	All CAN bus subscribers, which are not a TopCon-devices, TC.LIN or HMI/RCU have to be removed to identify the cause.
7-2	61	CAN error passive	CAN-Controller error.	CAN-Bus termination resistor not connected	A termination resistor is necessary on both ends of the CAN bus (X101/102 connector) when interconnecting two or more devices (otherwise only one termination needed)
7-2	61	CAN error passive	CAN-Controller error.	CAN cable isn't connected correctly.	Assure that all cables are properly connected to the devices.
7-2	61	CAN error passive	CAN-Controller error.	Not allowed Y-cabling of CAN-Bus.	Do not exceed the maximum length of 30 cm of branch line.
7-2	61	CAN error passive	CAN-Controller error.	Large noise level affects the CAN-Bus	Find noise sources and try turning them off to identify the cause.
7-2	61	CAN error passive	CAN-Controller error.	CAN-cable defect	Replace cable.
7-2	61	CAN error passive	CAN-Controller error.	Non-TopCon CAN bus subscribers interfere with the bus.	All CAN bus subscribers, which are not a TopCon-devices, TC.LIN or HMI/RCU have to be removed to identify the cause.
7-3	62	CAN write to mailbox denied	Internal conflict between DSP and CAN-Controller.	In case of repeated occurrence refer to customer support	In case of repeated occurrence refer to customer support

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
7-4	63	CAN transmission aborted	Internal conflict between DSP and CAN-Controller.	In case of repeated occurrence refer to customer support	In case of repeated occurrence refer to customer support
7-5	64	CAN receive message lost	Internal conflict between DSP and CAN-Controller.	In case of repeated occurrence refer to customer support	In case of repeated occurrence refer to customer support
7-6	65	HMI/RCU does not respond	The device with master role gets no response from interface unit HMI or RCU.	Supply voltage for a corresponding HMI / RCU too low.	Check RCU supply voltage.
7-6	65	HMI/RCU does not respond	The device with master role gets no response from interface unit HMI or RCU.	Communication interruptions.	Cf. 60) and 61)
7-7	66	CAN transmit queue overrun	Internal conflict between DSP and CAN-Controller.	Subsequent error from error 60/61): No CAN bus participant receives data. Or (if no subsequent error): Internal Problem	In the case of repeated occurrence refer to customer support (if no subsequent error).
7-8	67	Slave does not respond	The master does not receive data from all connected devices.	Communication interruptions.	Cf. 60) and 61)
7-8	67	Slave does not respond	The master does not receive data from all connected devices.	Slave was switched off	Check the mains supply of slaves.
7-9	68	RMB not connected	Optional external measuring box (RMB) is not connected	Supply voltage of RMB too low.	Check supply voltage.
7-9	68	RMB not connected	Optional external measuring box (RMB) is not connected	Optical fibre is not correctly connected.	Check the correct mounting of the optical fibre cable.
7-10	69	Slave does not get data from master	A slave does not get data from master	The master is switched off.	Check the mains supply of master
7-10	69	Slave does not get data from master	A slave does not get data from master	Communication error.	Cf. 60) and 61)
7-10	69	Slave does not get data from master	A slave does not get data from master	Error caused by a failed login or a wrong system configuration.	Cf. group errors C) and D) (if applicable note error messages of master device).

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
7-11	6A	TC.LIN does not respond	between TC.LIN and TopCon (after a previously successful communication). TC.LIN ceased sending data.	Communication error.	Reattach cable, acknowledging the error via master, device restart system.
7-12	6B	TC.LIN CAN error	General error on system CAN connection.	Communication error.	Reattach cable, acknowledging the error via master, device restart system. Further counteraction CF. 60) / 61)
7-13	6C	RS232 Watchdog error	Timeout in optional internal watchdog for RS232 interface	RS232 communication failed No watchdog reset command was sent to the device, within the configured timeout time (needs to be re-sent periodically while watchdog enabled).	Serve watchdog more often Check Communication line
7-14	6D	IBC receive communication error	Internal error on communication with IBC board		Contact customer support
7-15	6E	IBC transmit communication error	Internal error on communication with IBC board		Contact customer support
7-16	6F	IBC Talk timeout	Internal error on communication with IBC board		Contact customer support

2.3.8. 7) Internal (Modulator)

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
8-1	70	Invalid checksum (Modulator)	Wrong checksum for communication monitoring between main DSP and modulator.	Bug in firmware from version V4.12.01 to .05 Always appears at the first command Voltage ON after start-up.	Update to a newer version. In other case contact customer support.
8-1	70	Invalid checksum (Modulator)	Wrong checksum for communication monitoring between main DSP and modulator.	Strong external noise fields.	Find possible noise sources and turning off on a trial basis.
8-1	70	Invalid checksum (Modulator)	Wrong checksum for communication monitoring between main DSP and modulator.	Incorrect sync time.	Update the software, following precisely the instructions in the manual. In case of repeated failure, contact customer support.
8-1	70	Invalid checksum (Modulator)	Wrong checksum for communication monitoring between main DSP and modulator.	Hardware defect.	Contact customer support.
8-2	71	Invalid checksum (Main)	Wrong checksum for communication monitoring between main DSP and modulator.	Hardware defect.	Contact customer support.
8-2	71	Invalid checksum (Main)	Wrong checksum for communication monitoring between main DSP and modulator.	Strong external noise fields.	Find possible noise sources and turning off on a trial basis.
8-2	71	Invalid checksum (Main)	Wrong checksum for communication monitoring between main DSP and modulator.	Incompatible software versions between main DSP and modulator (Error is not acknowl-edgeable or reappears immediately).	Update the software, following precisely the instructions in the manual. In case of repeated failure, contact customer support.
8-2	71	Invalid checksum (Main)	Wrong checksum for communication monitoring between main DSP and modulator.	Incorrect sync time.	Update the software, following precisely the instructions in the manual. In case of repeated failure, contact customer support.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
8-3	72	Modulator queue overrun	Internal buffer overflow, not all data has been sent to the modulator	Internal problem	In case of repeated failure, contact customer support.
8-4	73	Transmit register full	Overflow error of sending com-munication registers.	Sequence errors due to external noise coupling.	Find possible noise sources and turning off on a trial basis.
8-5	74	Receive register full	Overflow error of receiving com-munication registers.	Sequence errors due to external noise coupling.	Find possible noise sources and turning off on a trial basis.
8-6	75	Modulator comm. Slow	Communication between modulator DSP and main DSP too slow	Contact customer support.	Contact customer support.
8-7	76	Undefined ID (Modulator)	Unknown data packages in the communication.	Incompatible software versions at main DSP and modulator	Update the software, following precisely the instructions in the manual.
8-7	76	Undefined ID (Modulator)	Unknown data packages in the communication.	Sequence errors due to external noise coupling.	Find possible noise sources and turning off on a trial basis.
8-8	77	Undefined ID (Main)	Unknown data packages in the communication.	Incompatible software versions at main DSP and modulator	Contact customer support
8-8	77	Undefined ID (Main)	Unknown data packages in the communication.	Sequence errors due to external noise coupling.	Find possible noise sources and turning off on a trial basis.
8-9	78	VZ gain too low	Internal data overflow caught during adjustment of the AD converter gain.	After a software update ensure that all supplied parameters are loaded and stored correctly.	Contact customer support
8-10	79	Iprim gain too low	Internal data overflow caught during adjustment of the AD converter gain.	After a software update ensure that all supplied parame-ters are loaded and stored correctly.	Contact customer support
8-11	7A	Still in fault condition	You tried to start the modulator manually, while still being in error state.	Acknowledge the error and retry	In the case of repeated occurrence: contact customer support .
8-12	7B	Fault on reading scope buffer	Internal error during reading the data buffer of the modulator.		In the case of repeated occurrence: contact customer support.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
8-13	7C	Modulator communication stopped	The modulator does not send any interrupt sig-nals to the main DSP.	The modulator has been stopped or is turned off.	Contact customer support
8-14	7D	Wrong Modulator Version	Modulator version does not match main DSP software (starting with firmware of main DSP v4.11.33).	The modulator has not been refreshed during software update.	Update the software, following precisely the instructions in the manual.
8-14	7D	Wrong Modulator Version	Modulator version does not match main DSP software (starting with firmware of main DSP v4.11.33).	Newest parameters aren't loaded after a software update.	Contact customer support
8-16	7F	Unknown modulator error bit	Undefined error bit in communication among main DSP and modulator.	Error as a result of external noise coupling.	Find possible noise sources and turning off on a trial basis.
8-16	7F	Unknown modulator error bit	Undefined error bit in communication among main DSP and modulator.	Incompatible software versions of main DSP und modulator.	Refer to customer support.

2.3.9. 8) Internal (AD overrange 1)

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
9-1	80	Ref Analog U overrange	AD converter value of analog voltage reference exceeds upper limit	Input voltage on analog voltage reference input too high	check reference voltage
9-2	81	Ref Analog I overrange	AD converter value of analog current reference exceeds upper limit	Input voltage on analog current reference input too high	check reference voltage
9-3	82	Ref Analog P overrange	AD converter value of analog power reference exceeds upper limit	Input voltage on analog power reference input too high	check reference voltage
9-4	83	Ref Analog R overrange	AD converter value of analog resistance reference exceeds upper limit	Input voltage on analog resistance reference input too high	check reference voltage
9-5	84	Output voltage overrange	AD converter value of the output voltage measurement exceeds upper limit.	Overvoltage	See above, error 30)
9-5	84	Output voltage overrange	AD converter value of the output voltage measurement exceeds upper limit.	Overvoltage	After consultation with the manufacturer, the error can be disabled if necessary.
9-6	85	Output current overrange	AD converter value of the output current measurement exceeds upper limit.	Overcurrent	See above, error 21)
9-6	85	Output current overrange	AD converter value of the output current measurement exceeds upper limit.	Overcurrent	After consultation with the manufacturer, the error can be disabled if necessary.
9-7	86	Sense voltage overrange	AD converter value of the sense voltage measurement exceeds upper limit	Overvoltage	See above, error 30)
9-7	86	Sense voltage overrange	AD converter value of the sense voltage measurement exceeds upper limit	Overvoltage	After consultation with the manufacturer, the error can be disabled if necessary.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
9-8	87	System voltage overrange	AD converter value of the RMB voltage measurement exceeds upper limit.	Overvoltage	See above, error 30)
9-8	87	System voltage overrange	AD converter value of the RMB voltage measurement exceeds upper limit.	Overvoltage	After consultation with the manufacturer, the error can be disabled if necessary.
9-9	88	System current overrange	AD converter of the RMB current measurement exceeds upper limit.	Overcurrent	See above, error 21)
9-9	88	System current overrange	AD converter of the RMB current measurement exceeds upper limit.	Overcurrent	After consultation with the manufacturer, the error can be disabled if necessary.
9-10	89	DC link voltage overrange	AD converter value of the DC link voltage measurement exceeds upper limit.	Overvoltage	See above, error 4A)
9-11	8A	Primary current overrange	AD converter value of the primary current (Iprim) measurement exceeds upper limit.	Overcurrent	See above, error 22)
9-13	8C	QBottom voltage overrange	AD converter value of the QBottom voltage measurement exceeds upper limit.	Overvoltage	Increase the controller parameters.
9-14	8D	Output current of customised power board overrange	AD converter value of the customised power board current measurement exceeds upper limit.	Overcurrent on customised power board	See above, error 2D)

2.3.10. 9) Internal (AD overrange 2)

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
10-1	90	+5V overrange	AD converter value of the internal supply monitoring exceeds upper limit.	Internal supply voltage too high.	See above, corresponding supply error: group error 4)
10-2	91	+15V overrange	AD converter value of the internal supply monitoring exceeds upper limit.	Internal supply voltage too high.	See above, corresponding supply error: group error 4)
10-3	92	-15V overrange	AD converter value of the internal supply monitoring exceeds upper limit.	Internal supply voltage too high.	See above, corresponding supply error: group error 4)
10-4	93	+24V overrange	AD converter value of the internal supply monitoring exceeds upper limit.	Internal supply voltage too high.	See above, corresponding supply error: group error 4)
10-5	94	IGBT temperature overrange	AD converter value of IGBT temperature sensors exceeds upper limit.	Heat sink temperature lower than approx. 0°C.	Run the device in higher ambient temperature.
10-5	94	IGBT temperature overrange	AD converter value of IGBT temperature sensors exceeds upper limit.	Temperature sensor not connected or defective.	Contact customer support.
10-6	95	Rectifier temperature overrange	AD converter value of the rectifier temperature sensor exceeds upper limit.	Temperature sensor not connected or defective.	Contact customer support.
10-7	96	Case Inside temp. overrange	AD converter value of internal temperature sensor exceeds upper limit.	Temperature sensor not connected or defective	Contact customer support.
10-8	97	PCB temperature overrange	AD converter value of PCB temperature sensor exceeds upper limit.	Temperature sensor not connected or defective	Contact customer support.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
10-9	98	Transformer temp. overrange	AD converter value of transformer temperature sensor exceeds upper limit.	Temperature sensor not connected or defective	Contact customer support.
10-10	99	PFC temperature overrange	AD converter value of PFC temperature sensors exceeds upper limit.	Heat sink temperature lower than approx. 0°C. Temperature sensor not connected or defective.	Run the device in higher ambient temperature. Contact customer support.
10-11	9A	DC Discharge Unit temperature overrange	AD converter value of DC Discharge Unit temperature sensors exceeds upper limit.	Heat sink temperature lower than approx. 0°C. Temperature sensor not connected or defective.	Run the device in higher ambient temperature. Contact customer support.

2.3.11. A) Internal (AD underrange 1)

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
A0	Ref Analog U underrange	AD converter value of analog voltage reference exceeds lower limit	Input voltage on analog voltage reference input too low	check voltage and polarity	A0
A1	Ref Analog I underrange	AD converter value of analog current reference exceeds lower limit	Input voltage on analog current reference input too low	check voltage and polarity	A1
A2	Ref Analog P underrange	AD converter value of analog power reference exceeds lower limit	Input voltage on analog power reference input too low	check voltage and polarity	A2
A3	Ref Analog R underrange	AD converter value of analog resistance reference exceeds lower limit	Input voltage on analog resistance reference input too low	check voltage and polarity	A3
A4	Output voltage underrange	AD converter value of the output voltage measurement exceeds lower limit.	Negative voltage as a result of a controller overshooting.	Reduce controller parameters.	A4
A4	Output voltage underrange	AD converter value of the output voltage measurement exceeds lower limit.	Negative voltage as an result of specific load conditions.	After a consultation with customer support this error message can possibly disabled, if there is no danger for the device.	A4

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
A5	Output current underrange	AD converter value of the output current measurement exceeds lower limit.	Negative current as a result of a controller overshooting.	Reduce controller parameters.	A5
A5	Output current underrange	AD converter value of the output current measurement exceeds lower limit.	Negative current as a result of specific load conditions.	After a consultation with customer support this error message can possibly disabled, if there is no danger for the device.	A5
A6	Sense voltage underrange	AD converter value of the sense voltage measurement exceeds lower limit.	See above, error A4)	See above, error A4)	A6
A7	System voltage underrange	AD converter value of the RMB voltage measurement exceeds lower limit.	See above, error A4)	See above, error A4)	A7
A8	System current underrange	AD converter value of the RMB current measurement exceeds lower limit.	See above, error A5)	See above, error A5)	A8
A9	DC link voltage underrange	AD converter value of DC link voltage measurement in lower limit	See above, error 49)	See above, error 49)	A9

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
AC	QBottom voltage underrange	AD converter value of the QBottom voltage measurement exceeds lower limit.	Negative voltage as a result of a controller overshooting.	Reduce controller parameters.	AC
AD	Output current of customised power board underrange	AD converter value of the customised power board current measurement exceeds lower limit.	TC.ACP: Overcurrent on customised power board.	See above, error 2D)	AD

2.3.12. B) Internal (AD underrange 2)

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
12-1	B0	+5V underrange	AD converter value of the internal supply monitoring exceeds lower limit.	Internal supply voltage too low.	See above, corresponding supply error: group error 4)
12-2	B1	+15V underrange	AD converter value of the internal supply monitoring exceeds lower limit.	Internal supply voltage too low.	See above, corresponding supply error: group error 4)
12-3	B2	-15V underrange	AD converter value of the internal supply monitoring exceeds lower limit.	Internal supply voltage too low.	See above, corresponding supply error: group error 4)
12-4	B3	+24V underrange	AD converter value of the internal supply monitoring exceeds lower limit.	Internal supply voltage too low.	See above, corresponding supply error: group error 4)
12-5	B4	IGBT temperature underrange	AD converter value of the IGBT heat sink temperature sensors exceeds lower limit.	Temperature sensor defective.	Contact customer support.
12-6	B5	Rectifier temperature underrange	AD converter value of the rectifier heat sink temperature sensors exceeds lower limit.	Temperature sensor defective.	Contact customer support.
12-7	B6	Case Inside temp. underrange	AD converter value of Case Inside temperature sensor exceeds lower limit.	Temperature sensor defective.	Contact customer support.
12-8	B7	PCB temperatur underrange	AD converter value of PCB temperature sensor exceeds lower limit.	Temperature sensor defective.	Contact customer support.
12-9	B8	Transformer temp. underrange	AD converter value of transformer temperature sensor exceeds lower limit.	Temperature sensor defective.	Contact customer support.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
12-10	B9	PFC temperature underrange	AD converter value of the PFC heat sink temperature sensors exceeds lower limit.	Temperature sensor defective.	Contact customer support.
12-11	BA	DC Discharge Unit temperature underrange	AD converter value of the DC Discharge Unit temperature sensors exceeds lower limit.	Temperature sensor defective.	Contact customer support.

2.3.13. C) Login

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
13-1	C0	Slave did not receive CFL	The slave has not received a request to log on to the system. These errors cannot be detected by the master. They only occur at the corresponding slaves.	Master device is not switched before the end of the 10s slave timeout.	Switch on the master always after all slaves, but within a 10 seconds period.
13-1	C0	Slave did not receive CFL	The slave has not received a request to log on to the system. These errors cannot be detected by the master. They only occur at the corresponding slaves.	Cable between master and slave not properly connected.	Check proper mounting of cable.
13-1	C0	Slave did not receive CFL	The slave has not received a request to log on to the system. These errors cannot be detected by the master. They only occur at the corresponding slaves.	The controller board has no supply voltage. (LED's remain dark when switching on).	In the case of repeated occurrence refer to customer support .
13-1	C0	Slave did not receive CFL	The slave has not received a request to log on to the system. These errors cannot be detected by the master. They only occur at the corresponding slaves.	Master and Slave(s) do not use the same CAN Baudrate	Contact customer support
13-1	C0	Slave did not receive CFL	The slave has not received a request to log on to the system. These errors cannot be detected by the master. They only occur at the corresponding slaves.	TopCon devices of the generation 3 and 4 (Quadro) do not support the same CAN bus	Use only devices of the same generation in a network.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
13-1	C0	Slave did not receive CFL	The slave has not received a request to log on to the system. These errors cannot be detected by the master. They only occur at the corresponding slaves.	Subsequent error of a CAN bus system error.	Cf. 60) and 61)
13-2	C1	Slave received invalid CFL	Invalid login attempt. These errors cannot be detected by the master. They only occur at the corresponding slaves.	Incompabitle firmware versions between master and slave device	Cf. C0)
13-3	C2	Slave did not receive EOL	Slave did not receive configuration data from master	Communication interruptions or subsequent fault due to unsupported protocol option within slave. See master device for more info.	See master device for more specific info about unsupported protocol options. Otherwise Cf. 60) and 61)
13-4	C3	Slave received incomplete EOL	Invalid login attempt.	Communication interruptions.	Cf. 60) and 61)
13-5	C4	TC.LIN CAN protocol version is not identical	TopCon master and TC.LIN cannot communicate with each other.	Incompatible firmware versions.	Contact the customer support to update the firmware for the corresponding devices.
13-6	C5	Master did not receive all RFL subframes from slaves	Missing CAN init data detected.	Communication interruptions while initializing phases.	Cf. 60) and 61)

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
13-7	C6	TC.LIN missing	The use of TC.LIN devices was enabled in TopCon master device, but at start-up no TC.LIN device was found.	The TOPCON Master device is unintentionally configured for operation with TC.LIN.	Disable TC.LIN on TopCon master device (requires a subsequent reboot).
13-7	C6	TC.LIN missing	The use of TC.LIN devices was enabled in TopCon master device, but at start-up no TC.LIN device was found.	TC.LIN is not switched on at all or is switched on too early or too late.	Switch on TC.LIN within a 20s duration prior to switching on the TopCon master.
13-7	C6	TC.LIN missing	The use of TC.LIN devices was enabled in TopCon master device, but at start-up no TC.LIN device was found.	TC.LIN communication cable is not plugged in or defective.	Check if cable is safely mounted and if necessary replace it with another one.
13-7	C6	TC.LIN missing	The use of TC.LIN devices was enabled in TopCon master device, but at start-up no TC.LIN device was found.	CAN terminating resistors (CAN-Term DSub jack) not plugged in.	Connect appropriate termination resistors (provided).
13-7	C6	TC.LIN missing	The use of TC.LIN devices was enabled in TopCon master device, but at start-up no TC.LIN device was found.	Internal supply of TC.LIN defective	Contact the customer support.
13-8	C7	Master did not receive all RFL subframes from HMI/RCU	Missing CAN init data detected	Communication interruptions during the initialising phase.	Cf. 60) and 61)
13-9	C8	CAN protocol version is not identical	CAN protocol or software is not identical on all devices.	The software version of all devices involved have to be compatible with that one of the master device.	The software version of all devices involved have to be compatible with that one of the master device.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
13-10	C9	Software version is not identical	CAN protocol or software is not identical on all devices.	The software version of all devices involved have to be compatible with that one of the master device.	The software version of all devices involved have to be compatible with that one of the master device.
13-11	CA	Slave CAN protocol version is not identical	CAN protocol or software is not identical on all devices.	The software version of all devices involved have to be compatible with that one of the master device.	The software version of all devices involved have to be compatible with that one of the master device.
13-12	CB	HMI/RCU CAN protocol version is not identical	The HMI/RCU version doesn't match to the current firmware.	Contact the customer support to receive a compatible version.	Contact the customer support to receive a compatible version.
Only HMI	CC	HMI/RCU did not receive CFL	A HMI/RCU has not received a request to log on to the system.	No master device has been defined.	You have to assure that a master (Module ID=0) is available.
Only HMI	CC	HMI/RCU did not receive CFL	A HMI/RCU has not received a request to log on to the system.	The controller board has no supply voltage (LED's remain dark when switching on).	In case of repeated occurrence refer to customer support.
Only HMI	CC	HMI/RCU did not receive CFL	A HMI/RCU has not received a request to log on to the system.	Master device has been switched on before the HMI/RCU is switched on.	Switch on the master always after all slaves, but within a 10 seconds period.
Only HMI	CC	HMI/RCU did not receive CFL	A HMI/RCU has not received a request to log on to the system.	Master device is not switched on until to the end of 10s HMI/RCU timeout.	Switch on the master always after all HMI/RCU devices, but within a 10 seconds period.
Only HMI	CC	HMI/RCU did not receive CFL	A HMI/RCU has not received a request to log on to the system.	Master device is not switched on until to the end of 10s HMI/RCU timeout.	Switch on the TC.MAC device earlier or update the firmware to V5.20.00 (Up to this version the timeout time is 20 seconds)
Only HMI	CC	HMI/RCU did not receive CFL	A HMI/RCU has not received a request to log on to the system.	Master slave cable or RCU cable not connected.	Check cabling for correct mounting.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
Only HMI	CC	HMI/RCU did not receive CFL	A HMI/RCU has not received a request to log on to the system.	TopCon devices of the generation 3 are only runnable with HMI firmware V11.xx.yy. TopCon devices of the generation 4 T(TopCon Quadro) are only runnable with HMI firmware V4.xx.yy or V5.xx.yy.	Dont use devices of the generation 3 with devices of the generation 4 in the same multi-unit system.
Only HMI	CC	HMI/RCU did not receive CFL	A HMI/RCU has not received a request to log on to the system.	Error resulting of a CAN bus error.	Cf. 60) and 61)
Only HMI	CD	HMI/RCU received invalid CFL	Invalid login attempt	Subsequent error to CC)	Cf. CC)
Only HMI	CD	HMI/RCU received invalid CFL	Invalid login attempt	Communications error.	Cf. 60) and 61)
Only HMI	CD	HMI/RCU received invalid CFL	Invalid login attempt	Wrong CAN protocol.	Use only compatible HMI and controller board software.
Only HMI	CE	HMI/RCU did not receive EOL	Invalid login attempt	See Error CD)	See Error CD)
Only HMI	CF	HMI/RCU received incomplete EOL	Invalid login attempt	See Error CD)	See Error CD)
13-1	C0	Slave did not receive CFL	The slave has not received a request to log on to the system. These errors cannot be detected by the master. They only occur at the corresponding slaves.	Master device is not switched before the end of the 10s slave timeout.	Switch on the master always after all slaves, but within a 10 seconds period.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
13-1	C0	Slave did not receive CFL	The slave has not received a request to log on to the system. These errors cannot be detected by the master. They only occur at the corresponding slaves.	Cable between master and slave not properly connected.	Check proper mounting of cable.

2.3.14. D) Configuration

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
14-1	D0	Slave ID or address (RSC on) not unique	Module ID or address of a slave is identical with the Module ID or address (RSC on) of a other slave.	Every slave needs a unique module ID or module address (RSC on).	Make sure that each slave has an unique numbered module ID. In operation with the option TC._RSC needs a Slave a unique module address.
14-2	D1	HMI/RCU ID not unique	The same HMI/RCU ID was assigned several times.	Every HMI/RCU needs a unique HMI ID (HMI identification).	Change the HMI ID in the HMI menu to an unique HMI ID in the multi-unit system.
14-3	D2	More than one master in system	More than one divice with module ID = 0 was detected.	In each system exactly one TopCon-Master (identified by module ID = 0) must exist.	Check the modul ID in all devices. Only in one device is a modul ID setting ID= 0 allowed.
14-4	D3	Nominal power of a slave not consistent	Nominal power setting of a devices does not match to master configuration	The nominal data of all modules in a network must be identical with that of the master device.	The nominal data of all modules in a network must be identical with that of the master device.
14-5	D4	Nominal voltage of a slave not consistent	Nominal voltage setting of a devices does not match to master configuration	The nominal data of all modules in a network must be identical with that of the master device.	The nominal data of all modules in a network must be identical with that of the master device.
14-6	D5	Nominal current of a slave not consistent	Maximal current setting of a devices does not match to master configuration	The nominal data of all modules in a network must be identical with that of the master device.	The nominal data of all modules in a network must be identical with that of the master device.
14-7	D6	Number of devices in series config. does not correspond with the given value	The number of devices in serial or parallel circuit does not match with the system configuration.	The module IDs are badly configured.	Consult manual to reconfigure module IDs to match the requirements.
14-7	D6	Number of devices in series config. does not correspond with the given value	The number of devices in serial or parallel circuit does not match with the system configuration.	default setting differs from the actual number of modules in serial or parallel connection.	Connecting the same number of devices as specified. Adapt the settings using TopControl to the actual number of devices.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
14-7	D6	Number of devices in series config. does not correspond with the given value	The number of devices in serial circuit does not match with the system configuration.	One slave at minimum was not detected as a result of a commincation or login error	Cf. 6) and C).
14-8	D7	Number of devices in parallel config. does not correspond with the given value	The number of devices in parallel circuit does not match with the system configuration.	The module IDs are badly configured.	Consult manual to reconfigure module IDs to match the requirements.
14-8	D7	Number of devices in parallel config. does not correspond with the given value	The number of devices parallel circuit does not match with the system configuration.	default setting differs from the actual number of modules in serial or parallel connection.	Connecting the same number of devices as specified. Adapt the Master settings to the actual number of devices.
14-8	D7	Number of devices in parallel config. does not correspond with the given value	The number of devices in serial or parallel circuit does not match with the system configuration.	One slave at minimum was not detected as a result of a commincation or login error	Cf. 6) and C).
14-9	D8	All slave ID's or addresses (RSC on) have to be numbered without a gap	The module IDs or addresses (RSC on) aren't numbered consecutively without gap.	The Module IDs or addresses (RSC on) aren't numbered consecutively without gap. Refer to section "network" in manual for explanation of "without gap" (e.g. in parallel connection the expression "without gap" means that IDs = 00h, 10h, 20h, … are used.) The value 'uiCAN_MaxNumModuleParallel' must be set identically in all modules. default value: 8.	The module ID according the manual and the desired configuation are set correctly.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
14-10	D9	All HMI/RCU ID's have to be numbered without a gap	The HMI IDs aren't numbered consecutively without gap. From HMI firmware V5.15.00 the ID have to be only unique	The HMI IDs aren't numbered consecutively without gap.	All HMI IDs must start with 01 and must be numbered consecutively without gap.
14-11	DA	Number of slaves does not correspond with the given value	The total number of devices doesn't match the default.	Cf. D6) and D7).	Cf. D6) and D7).
14-12	DB	Number of multiload modules does not correspond with the given value	The total number of devices doesn't match the default.	Cf. D6) and D7).	Cf. D6) and D7).
14-13	DC	Slave ID or address (RSC on) out of range	The module ID or address (RSC on) of a slave is out of the allowed range.	Not more than 8 devices can be connected in serial or parallel connection.	reduce devices
14-14	DD	Invalid HMI/RCU ID (out of range)	HMI ID is out of the allowed range.	HMI ID is out of the allowed range.	Configuration of ID to be corrected by using the HMI.
14-15	DE	TC.LIN ID invalid	TC.LIN ID is outside of the allowed range.	TC.LIN ID is outside of the allowed range.	Use TopControl connected to TC.LIN device to set TC.LIN ID to a value between 0 and 7 (including 0 and 7).
14-16	DF	TC.LIN ID not unique	TC.LIN ID exists more than once.	TC.LIN ID exists more than once.	Replace twice-assigned TC.LIN IDs.

2.3.15. E) Configuration 2

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
15-1	E0	No ReGen standard config specified	Internal parameter for operating a ReGen system has not been set.	Internal parameter for operating a ReGen system has not been set.	Contact customer support to parameterise the corresponding set value.
15-2	E1	TC.LIN not enabled	On TopCon master device TC.LIN was not set active but at power-up a TC.LIN was found.	Operating with TC.LIN favoured.	Use TopControl (version > 4.11.63) connected to Top-Con master to activate flag “TC.LIN enabled” (system configuration).
15-2	E1	TC.LIN not enabled	On TopCon master device TC.LIN was not set active but at power-up a TC.LIN was found.	Operating without TC.LIN favoured	Switch off the TC.LIN device or disconnect it from system.
15-3	E2	Nominal voltage of a TC.LIN not consistent	The nominal voltage of a TC.LIN doesn’t match the system voltage of the TopCon system.	The proposed voltage of one TC.LIN device at minimum doesn’t match to the system voltage of the TopCon system.	Use different TC.LIN or TopCon system.
15-4	E3	Invalid PLD version	Version of internal PLD does not match		Contact customer support
15-5	E4	Invalid IBC version	Version of internal IBC board does not match		Contact customer support
15-6	E5	Not all Slaves in series connection are capable of Q4	All Slaves in series connection must be of the same type (GSS or not)		Only connect all GSS or all Non-GSS Slaves in series
15-7	E6	RSC: Invalid ModuleID or ModuleAddress	RSC: Wrong module ID or module address	Wrong Configuration-file or wrong module ID setting on slave	Check the modul ID's on the slaves. Contact customer support
15-8	E7	RSC: Invalid Communication to switchbox	RSC: Choosed wrong communication to switch box		Contact customer support

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
15-9	E8	RSC: Wrong configuration number for switch box	RSC: Wrong configuration number for the switch box	Wrong Configuration-file or wrong default value of maximum configurations	Contact customer support
15-10	E9	RSC: Wrong switchboxID	RSC: Wrong switchboxID in system	SwitchboxID is 0.	Contact customer support
15-11	EA	TopCon 230VAC is not supported on all devices	The system is not configured as 230VAC system.	Master or Slave(s) in system are not configured as 230VAC TopCon.	Check if all modules in system are 230VAC TopCon's. Contact customer support
15-12	EB	Switchable Output Capacitance is not supported on all devices	The Switchable Output Capacitance option is enabled but is not supported by all devices.	At least on one slave the Switchable Output Capacitance option is not installed.	Using the system is possible with some dynamic limitation
15-13	EC	TC.P.LIN is not supported on all devices	The system is not configured as TC.P.LIN (TopCon and TC.LIN combinied in one device).	Master or Slave(s) in system are not configured as TC.P.LIN (TopCon and TC.LIN combinied in one device).	Check if all modules in system are TC.P.LIN (TopCon and TC.LIN combinied in one device). Contact customer support
15-14	ED	S3R-Mode is not supported on all devices	The system does not support the S3R-Mode.	Master or Slave(s) in system are not support the S3R-Mode.	Contact customer support
15-15	EE	Sub-Systems with GSS in series connection are not supported	Sub-Systems with GSS in series connection are not supported.	Sub-Systems with GSS are connected in series.	Check if all Sub-Systems are connected in parallel.
15-16	EF	Active rectifier is not supported	The device is configured for active rectifier mode but hardware and/or IBC firmware do not support this mode	Wrong setting or tried to run device with old hardware and/or old IBC firmware	Contact customer support

2.3.16. F) Miscellaneous

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
16-1	F0	Voltage sensing not allowed in series configuration	Enabling the sense functionality in the series operation is not allowed.	Enabling the sense functionality in the series operation is not allowed.	Contact customer support in order to enable the sense functionality in series or disable it.
16-2	F1	Wrong option code	An invalid option code was set.	An invalid option code was set.	Reset the option code to all zero and restart the device; installed software options will *not* be removed by this. If necessary contact customer support.
16-3	F2	Interlock open	Once the interlock circuit is opened, the power stage switches off.	The dummy plugs of the interfaces X105 and X101/X102 has not been wired properly.	Use the correct plugs for interface X101, X102 and X105.
16-3	F2	Interlock open	Once the interlock circuit is opened, the power stage switches off.	The interlock circuit has not been wired properly (check TopCon manual for correct cabling).	Close the interlock circuit in a different way, e.g. relais contact, external emergency OFF signal).
16-3	F2	Interlock open	Once the interlock circuit is opened, the power stage switches off.	Interlock circuit was opened by an external protection circuit.	Check the reason why the protection circuit was activated.
16-4	F3	External PWM shutdown	TC.ACP: Desat H bridge. Other devices: Switching off of the power stage was produced by an external signal.	TC.ACP: Short circuit at the output of the H bridge. Other devices: This signal is not wired to the output. Thus only a very strong EMI interference is able to trigger this error.	TC.ACP: Check if does not consist a short circuit at the output of the H bridge. Other devices: Find the EMI sources e.g. contactors without free wheeling diodes.
16-5	F4	Safety relay open	The protection circuit relay is not closed.	External emergency off circuit or interlock cabling are interrupted. In cases where the option SELV is present, this could also mean, that the voltage threshold of 60V was exceeded.	Check the reason why the emergency off circuit or interlock are interrupted.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
16-6	F5	Interlock=Lo missing	Attempt to switch VoltageON without having set interlock signal to 0-level.	Attempt to switch VoltageON without having set interlock signal to 0-level.	Ensure that the interlock signal is down to 0 level for at least 100ms prior to first voltageON signal. (ISR surveillance).
16-7	F6	Interlock closed but safety relay is open (interlock must be open too)	Clearing signal of Integrated Safety Relais (ISR) is on 0-level (emergency stop), but the interlock signal is not on 0-level	Clearing signal of Integrated Safety Relais (ISR) is on 0-level (emergency stop), but the interlock signal is not on 0-level	Ensure conjoint switching of ISR and Interlock (within 100ms)
16-8	F7	Enable signal missing	Optional enable signal not present	Optional enable signal function enabled and: VoltageOn-try with enable signal not present or enable signal removed while system is VoltageOn	Check for correct enable signal cabling (may be attached to pin 8, 18,19, 20 on X105 depending on configuration)
16-9	F8	External QBottom-PWM shutdown	Switching off of the QBottom-PWM was produced by an external signal.	This signal is not wired to the output. Thus only a very strong EMI interference is able to trigger this error.	Find the EMI sources e.g. contactors without free wheeling diodes.
16-10	F9	Collective error	TC.ACP: Collective error on customised power board.	TC.ACP: Overtemperature of the DC discharge unit or the heat sink of the H bridge, connection break in the signal or power path of the H bridge, 24V supply of the H bridge is missing.	TC.ACP: Check the temperature of the DC discharge unit and the heat sink of the H bridge, check the signal and power connections of the H bridge, check the 24V supply of the H bridge.
16-11	FA	Any Rack did not change to voltage-on or -off within specified timeout	Error specific to Multi rack controller (MRC): The Voltage On/Off command was not accepted from all TopCon devices connected.	Analogue signal for power ON input of a TopCon device works improperly.	Set value for of the debouncing time higher.Contact customer support for this.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
16-11	FA	Any Rack did not change to voltage-on or -off within specified timeout	Error specific to Multi rack controller (MRC): The Voltage On/Off command was not accepted from all TopCon devices connected.	Cabling not correct.	Check the cabling.
16-12	FB	Any Rack system has errors, or dummy plug missing	Error specific to Multi rack controller (MRC)	Error occurred in one of the TopCon devices.	See in error description of the corresponding TopCon device
16-12	FB	Any Rack system has errors, or dummy plug missing	Error specific to Multi rack controller (MRC)	Dummy plug on MRC is missing.	Ensure that unused ports of the MRC are covered by dummy plug.
16-13	FC	ReGen error	Error in an optional external energy feedback unit. Applies as well to ResAct systems.	See separate documentation of the ReGen / ResAct system.	See separate documentation of the ReGen / ResAct system.
16-14	FD	AC-Switch error	Error in the optional external switch bridge (simple variant with contactors).	See software documentation V11.09.00+.	See software documentation V11.09.00+.
16-15	FE	AC-Bridge error	Error in external TopCon bipolar switch (TopCon option ACLF).	See manual for bipolar switch ACLF.	See manual for bipolar switch ACLF.
16-16	FF	FIFO queue for actual values full	Buffer overflow while synchronising actual values in networked operation.	Subsequent error of a CAN communication error (cf. group error 6)	Cf. group error 6)

2.3.17. G) IBC System

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
17-1	G0	Powerup from watchdog reset	Internal Firmware Reset on IBC board ocurred	Internal problem	Contact customer support if not because of a user executed system reset
17-2	G1	Powerup from software reset	Internal Firmware Reset on IBC board ocurred	Internal problem	Contact customer support
17-3	G2	EEprom (queue overflow or unknown page)	Error on writing to IBC internal EEprom	Internal timing problem or hardware defect	Retry to store settings and restart device. If the error keeps occuring contact customer support
17-4	G3	IBC heatsink temperature sensor unknown	Requested IBC heatsink temperature sensor not supported	Wrong parameter or problem after firmware downgrade because the older firmware does not support newer settings	Contact customer support
17-5	G4	Heatsink temperature too high	IBC heatsink temparature too high	Insufficient cooling, ambient temperature too high	Lower ambient temperature or reduce the DC current
17-6	G5	PCB temperature too high	IBC electronic board temperature too high	Insufficient cooling, ambient temperature too high	Lower ambient temperature or reduce the DC current
17-7	G6	IBC heatsink temperature sensor missing or Clamp temperature too high	IBC heatsink temperature sensor missing or Clamp temperature too high.	Cable break or sensor defect/not connected on temperature measurement. Clamp temperature is too high.	Contact customer support
17-8	G7	Inverter heatsink temperature sensor missing	Inverter heatsink temperature sensor missing	Cable break or sensor defect/not connected on temperature measurement	Contact customer support

2.3.18. H) IBC Supply

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
18-1	H0	24V too low	24V supply on IBC board too low	See error codes 4b)/ 4C)	See error codes 4b)/ 4C)
18-2	H1	24V too high	24V supply on IBC board too high	See error codes 4b)/ 4C)	See error codes 4b)/ 4C)
18-3	H2	15V too low	15V supply on IBC board too low	See error codes 45)/ 46)	See error codes 45)/ 46)
18-4	H3	15V too high	15V supply on IBC board too high	See error codes 45)/ 46)	See error codes 45)/ 46)
18-5	H4	5V too low	5V supply on IBC board too low	See error codes 43)/ 44)	See error codes 43)/ 44)
18-6	H5	5V too high	5V supply on IBC board too high	See error codes 43)/ 44)	See error codes 43)/ 44)

2.3.19. J) IBC Communication

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
19-1	J0	Communication watchdog	Internal problem	Internal problem	Contact customer support
19-2	J1	SPI error	Internal problem	Internal problem	Contact customer support
19-3	J2	LVDS error counter	Error counter for IBC to Main DSP communication exceeded error limit		Clear error. If the error keeps occuring contact customer support

2.3.20. K) IBC Power

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
20-1	K0	Gate drive 1 (bridge)	Hardware current monitoring. Detection of short circuit on gate drive 1 on current sink power stage.	Instable controller settings for actual load or hardware defect	Check output voltage and current and adjust the controller settings to get a stable operation
20-2	K1	Gate drive 2 (bridge)	Hardware current monitoring. Detection of short circuit on gate drive 2 on current sink power stage.	Instable controller settings for actual load or hardware defect	Check output voltage and current and adjust the controller settings to get a stable operation
20-3	K2	Gate drive 3 (clamp/softstart)	Hardware current monitoring. Detection of short circuit on clamp power stage.	Instable controller settings for actual load or hardware defect	Contact customer support
20-5	K4	Overcurrent Isek	Transformer overcurrent wihle current sinking active (mean value protection)	Instable controller settings for actual load	Check output voltage and current and adjust the controller settings to get a stable operation
20-6	K5	Overcurrent IL	Overcurrent of the DC Transformer	Instable controller settings for actual load	Check output voltage and current and adjust the controller settings to get a stable operation
20-7	K6	Overcurrent Iout	Overcurrent of the DC output bars	Cf. error 21)	Cf. error 21)
20-8	K7	Overcurrent Isys	not used		Contact customer support
20-9	K8	Short circuit Isek	Transformer overcurrent (short circuit protection)	Instable controller settings for actual load or hardware defect	Check output voltage and current and adjust the controller settings to get a stable operation
20-13	KC	Overvoltage Uout	Overvoltage of the DC output bars	Cf. error 30)	Cf. error 30)
20-14	KD	Overvoltage Uclamp	Clamp voltage too high	Hardware defect or wrong settings	Contact customer support
20-15	KE	Overvoltage DC link	DC link voltage too high	Cf. error 4A)	Cf. error 4A)

2.3.21. L) IBC Inverter

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
21-1	L0	DC-Link voltage too low	DC link voltage too low	Line input voltage too low	Check mains voltage
21-2	L1	DC-Link voltage too high	DC link voltage too high	Line input voltage too high	Check mains voltage
21-3	L2	Line frequency high	Line frequency of any phase too high	Line input frequency too high Wrong AC grid settings in TopControl	Check mains voltage Check AC grid settings in TopControl
21-4	L3	Line frequency low	Line frequency of any phase too low	Line input not properly connected Wrong AC grid settings in TopControl	Check mains voltage Check AC grid settings in TopControl
21-5	L4	Line voltage high	Line voltage of any phase too high	Line input voltage too high Wrong AC grid settings in TopControl	Check mains voltage Check AC grid settings in TopControl
21-6	L5	Line voltage low	Line voltage of any phase too low	Line input not properly connected Wrong AC grid settings in TopControl	Check mains voltage Check AC grid settings in TopControl
21-7	L6	PLL	Internal problem	Internal problem	Contact customer support
21-8	L7	Switch to line timeout/failed	Required DC bus voltage is not reached		Contact customer support
21-9	L8	Cos Phi too low	Reactive current too high		Contact customer support
21-10	L9	IGBT	Overcurrent in phase L1, L2 or L3 (short circuit protection)		
21-11	LA	Overtemperature	Inverter heatsink temperature too high	Supply and exhaust air flow of cooling air is restricted or the ambient temperature is too high.	
21-12	LB	Overcurrent	Overcurrent in phase L1, L2 or L3	Overcurrent in string L1, L2 or L3	Contact customer support
21-13	LC	Self check	Internal problem	Internal problem	Contact customer support

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
21-14	LD	Phase sequence	No rotating field detected	Line input not properly connected	Check mains voltage
21-15	LE	Inverter	Sequence errors of errors L9, LB and LF	Sequence errors of errors L9, LB and LF	In case of no error L9, LB and LF exist, contact customer support
21-16	LF	Interlock	See error F2		

2.3.22. M) IBC Miscellaneous

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
22-1	M0	Interlock	See error F2		
22-2	M1	Safety relay open	See error F4		
22-3	M2	Interlock closed but safety relay is open (interlock must be open too)	See error F6		
22-4	M3	IBC error input	IBC error input set, but source is unknown		Contact customer support
22-5	M4	Inverter error input	Inverter error input set, but source is unknown		Contact customer support
22-6	M5	Tried to set undefined error	Tried to trigger an undefined error		Contact customer support
22-7	M6	Active rectifier mode is not supported	The System tried to configure IBC for active rectifier mode but the IBC Hardware is not compatible	IBC Hardware does not support active rectifier mode	Contact customer support
22-8	M7	VoltageOn not allowed when manual I/O control is enabled	VoltageOn not allowed when manual I/O control is enabled	Manual I/O control is enabled	Disable manual I/O control
22-9	M8	The control of an external fan is not supported	The control of an external fan is not supported.	IBC hardware or software do not support the control of an external fan.	Contact customer support

2.3.23. N) IBC Inverter 2

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
23-1	N0	Phase U current too high	Overcurrent in phase L1		
23-2	N1	Phase V current too high	Overcurrent in phase L2		
23-3	N2	Phase W current too high	Overcurrent in phase L3		
23-4	N3	DC comp. of phase currents too high	DC current of one phase at minimum too high (L1, L2 or L3)		
23-5	N4	Island detection on AC mains	Island detection on mains connection according to VDE AR-4105	3-phase main grid not available or switched off	Switch on 3-phase main grid

2.3.24. Q) Configuration 4

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
25-1	Q0	Requested sense operating mode is not supported by all devices	The system is configured to use a sense operating mode which is not supported by all devices	Firmware of at least one device does not support the requested mode	Firmware update (Contact customer support)
25-2	Q1	Invalid configuration of the external CAN interface	More than one of the options MAC, SubSystem, CANmp or TC.ACP are enabled.	The options MAC, SubSystem, CANmp or TC.ACP communicate via the external CAN interface. This interface can be used by only one of these options.	Enable only one of the options MAC, SubSystem, CANmp or TC.ACP. (Contact customer support)
25-3	Q2	Invalid CANmp configuration of the send properties of a message.	The CANmp configuration of the send properties of a message is invalid.	In the send properties of a message more then one or none of the properties cycle time, sync signal counter or sync signal ID is configured.	Configure one of the properties cycle time, sync signal counter or sync signal ID.
25-4	Q3	Invalid CANmp configuration of the cycle time of a message.	The CANmp configuration of the cycle time of a message is invalid.	An invalid cycle time is configured.	Configure a valid cycle time. Valid cycle times can be found in the CANmp manual.
25-5	Q4	Invalid CANmp configuration of the data length code (DLC) of a message.	The CANmp configuration of the data length code (DLC) of a message is invalid.	An invalid data length code (DLC) is configured.	Configure a valid data length code (DLC). Valid data length codes (DLC's) can be found in the CANmp manual.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
25-6	Q5	Invalid CANmp configuration of a signal.	The CANmp configuration of a signal is invalid.	All message types: A signal of a higher CANmp interface version is configured. Transmit message: An invalid transmit signal is configured. Cyclic transmit message: Signals with different signal type are configured. Receive message: An invalid receive signal is configured.	All message types: Compare the CANmp interface version of the system with the version from which the configured signal is available. If the CANmp interface versions are different a firmware update is needed (Contact customer support). Transmit message: Check if only transmit signals are configured. Cyclic transmit message: Check if only signals are configured with the same signal type. Receive message: Check if only receive signals are configured. Configure a valid signal. Valid signals can be found in the CANmp manual.
25-7	Q6	Invalid CANmp configuration of the data type of a signal.	The CANmp configuration of the data type of a signal is invalid.	An invalid data type is configured.	Configure a valid data type. Valid data types can be found in the CANmp manual.
25-8	Q7	Invalid CANmp configuration of the scale factor of a signal.	The CANmp configuration of the scale factor of a signal is invalid.	An invalid scale factor is configured.	Configure a valid scale factor. Valid scale factors can be found in the CANmp manual.
25-9	Q8	Invalid CANmp configuration of the start bit of a signal.	The CANmp configuration of the start bit of a signal is invalid.	The configured start bit is occupied by another signal. An invalid start bit is configured.	Check if the start bit is occupied only by one signal. Configure a valid start bit. Valid start bits can be found in the CANmp manual.
25-10	Q9	Invalid CANmp configuration of the CAN ID of a message.	The CANmp configuration of the CAN ID of a message is invalid.	The CAN ID is configured as a 29 bit identifier.	Configure the CAN ID as an 11 bit identifier. A configuration of the CAN ID as a 29 bit identifier is not supported.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
25-11	QA	Incompatible configuration of the device type.	There are different device types in the system that are incompatible.	Not all modules in the system are from the same device type (e.g. TC.ACP).	Check if all modules in the system are from the same device type (e.g. TC.ACP). Contact customer support
25-12	QB	Incompatible settings of the options for the DC discharge unit.	There are incompatible settings of the options for the DC discharge unit.	There are modules in the system with an incompatible setting of the options for the DC discharge unit.	Check the settings of the options for the DC discharge unit in every module. (e.g. option "1 DDU / module). Contact customer support
25-13	QC	Incompatible RPP setting in series operation	In series operation either all or no device must have RPP installed. And if RPP installed on all devices, firmware V4.21.70 or higher must be used	see description	For series operation: 1) only use devices without RPP or 2) only use devices with RPP and firmware V4.21.70 (or higher)
25-14	QD	Slave only device	The device can only be configured as a slave.	The device is configured as a master or a single device.	Configure the device as a slave. Select the module ID greater than 0.

2.3.25. R) Miscellaneous 2

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
26-1	R0	Output Power Q1 too high	Output power exceeds the set level during a particular delay time.	Controller overshooting caused by set value steps.	Decrease steps of set value ramp. Adapt controller parameters to the load.
26-1	R0	Ouptut Power Q1 too high	Output power exceeds the set level during a particular delay time.	Controller overshooting	Decrease controller parameters
26-1	R0	Ouptut Power Q1 too high	Output power exceeds the set level during a particular delay time.	Cf. "21) Overcurrent Isek" and "30) Overvoltage"	Cf. "21) Overcurrent Isek" and "30) Overvoltage"
26-2	R1	Output Power Q4 too high	Output power in sink operation (Q4) exceeds the set level during a paricular time. Cf. R0)	Cf. "R0) Output Power Q1 too high"	Cf. "R0) Output Power Q1 too high"
26-3	R2	High resolution of system reference values not supported	The system does not support the option high resolution of system reference values.	Master or Slave(s) in system do not support the option high resolution of system reference values.	Contact customer support
26-4	R3	Earth fault	The value of insulation resistance between earth and the DC ouptut bars fall below the set level.	Earth fault detected. The value of insulation resistance between earth and DC system is too low.	Check for earth fault. Check the cable insulation. Check the value of insulation resistance between earth and DC system.
26-5	R4	Output Capacitance is not switched on yet (wait time not up or voltage unstable)	Option Switchable Output Capacitance is enabled and the device was tried to switch on but the Switchable Output Capacitance has not switched on yet.	Switchable Output Capacitance switching on is only allowed after output voltage is stable for a specified time.	Make sure output voltage is stable. Wait (normally 1 minute) and try again.
26-6	R5	DC Discharge Unit power too high	Power on DC Discharge Unit exceeds specified limit	A battery is connected to the output. The connected load violate the specified limits.	Check if no battery is connected to the ouput. Check if the connected load does not violate the specified limits.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
26-7	R6	DC Discharge Unit energy too high	Energy on DC Discharge Unit exceeds specified limit	A battery is connected to the output. The connected load violate the specified limits.	Check if no battery is connected to the ouput. Check if the connected load does not violate the specified limits.
26-8	R7	DC Discharge Unit not ready (wait time not up for cooling down)	Voltage On is not allowed.	The DC Discharge Unit is not cooled down sufficiently.	Wait until the DC Discharge Unit has cooled down sufficiently.
26-9	R8	High Dynamic Lookup Table missing for S3R mode	For S3R Mode a High Dynamic Lookup Table is needed	Device is configured for S3R mode but no High Dynamic Lookup Table is available	Contact customer support
26-10	R9	Error on deleting all function generator curves at power-up	The automatic deletition of all function generator curves at power-up is enabled but could not be executed correctly.	Timing error or defect flash sector.	Contact customer support if the error keeps occurring
26-11	RA	Optimised SAR (synchronous active rectifier) mix mode not supported	To operate GSS devices with and without synchronous active rectifier within a multi-unit system the optimised SAR mix mode is recommended, but is not available	CTR (main) firmware or IBC firmware of a device does not support the optimized SAR mix mode	Make sure all devices run CTR firmware V4.21.70 (or higher) and IBC firmware V0.59 (or higher)
26-12	RB	Sense voltage drop asymmetry detected, sense voltage accuracy maybe limited	In series operating mode the sense voltage drop across the slave load cable (normally connected to DC output (-)) is much higher than on the master load cable (normally connected to DC output (+)). This may result in a limited sense voltage accuracy	Much higher impedance on the slave load cable than on the master load cable. Or an open switch in the slave load cable	Switch position of master and slave where the DC outputs are connected to the load, to make sure the higher voltage drop is on the load cable connected to the master.

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
26-13	RC	RSC: Switch box error	The RSC switch box reports an error.	RSC switch box is off. A DC contactor is broken. The status line between the controller board and the switch box is interrupted.	Check if the RSC switch box is on. Contact customer support.

2.3.26. S) Supply 2

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
27-1	S0	Input voltage too high	Input voltage is outside of the valid range.	Bad AC grid on primary side connected	Connect to a correct AC grid on primary side
27-2	S1	Input voltage too low	Input voltage is outside of the valid range.	Bad AC grid on primary side connected	Connect to a correct AC grid on primary side
27-3	S2	No supply on primary side	No AC grid on primary side connected	No AC grid on primary side connected	Connect with AC grid on primary side
27-4	S3	Input frequency too high	Input frequency is outside of the valid range.	Bad AC grid on primary side connected	Connect to a correct AC grid on primary side
27-5	S4	Input frequency too low	Input frequency is outside of the valid range.	Bad AC grid on primary side connected	Connect to a correct AC grid on primary side

2.3.27. T) Login 2

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
28-1	T0	TC.MAC Sub-System did not receive CFL	A Sub-System did not receive a logon request from TC.MAC device	No TC.MAC defined or attached	Make sure TC.MAC is switched on and attached via MAC bus to the Sub-System Master device
28-1	T0	TC.MAC Sub-System did not receive CFL	A Sub-System did not receive a logon request from TC.MAC device	MAC was switched on before Sub-System devices were switched on	Switch on TC.MAC and Sub-Systems simultaneously or Sub-Systems first and then TC.MAC (within 10 seconds)
28-1	T0	TC.MAC Sub-System did not receive CFL	A Sub-System did not receive a logon request from TC.MAC device	MAC was switched on after logon timeout in Sub-Systems occured	Switch on TC.MAC and Sub-Systems simultaneously or Sub-Systems first and then TC.MAC (within 10 seconds)
28-1	T0	TC.MAC Sub-System did not receive CFL	A Sub-System did not receive a logon request from TC.MAC device	MAC bus terminators not connected on both ends of MAC bus	Ensure MAC bus terminators are pluged into open MAC bus jacks on both ends of the MAC bus
28-1	T0	TC.MAC Sub-System did not receive CFL	A Sub-System did not receive a logon request from TC.MAC device	Cable between TC.MAC and Sub-System not properly connected.	Check proper mounting of cable.
28-1	T0	TC.MAC Sub-System did not receive CFL	A Sub-System did not receive a logon request from TC.MAC device	TC.MAC and Sub-Systems do not use the same CAN Baudrate	Contact customer support
28-2	T1	TC.MAC Sub-System received invalid CFL	A Sub-System received an incompletely or an invalid logon request from TC.MAC device	Firmware versions of TC.MAC and Sub-System(s) are not compatible	Contact customer support
28-3	T2	TC.MAC Sub-System received invalid RFL	TC.MAC device received an invalid logon response from a Sub-System	Firmware versions of TC.MAC and Sub-System(s) are not compatible	Contact customer support
28-4	T3	TC.MAC Sub-System did not receive EOL	A Sub-System did not receive a logon end from TC.MAC device	Subsequent error of a communication error on MAC bus	Ensure MAC bus terminators are pluged into open MAC bus jacks on both ends of the MAC bus

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
28-4	T3	TC.MAC Sub-System did not receive EOL	A Sub-System did not receive a logon end from TC.MAC device	Subsequent error of a communication error on MAC bus	Check proper mounting of cable.
28-4	T3	TC.MAC Sub-System did not receive EOL	A Sub-System did not receive a logon end from TC.MAC device	Firmware versions of TC.MAC and Sub-System(s) are not compatible	Contact customer support
28-5	T4	TC.MAC Sub-System received incomplete EOL	A Sub-System did not receive a complete logon end from TC.MAC device	Firmware versions of TC.MAC and Sub-System(s) are not compatible	Contact customer support
28-6	T5	Protocoll version error on TC.MAC bus	MAC bus protocol versions do not match between TC.MAC device and Sub-Systems	Firmware versions of TC.MAC and Sub-System(s) are not compatible	Contact customer support
28-7	T6	Virtual TC.LIN CAN protocol version is not identical	MAC and virtual TC.LIN cannot communicate with each other.	Incompatible firmware versions.	Contact the customer support to update the firmware for the corresponding devices.
28-8	T7	Virtual TC.LIN received incomplete EOL	A virtual TC.LIN device did not receive a complete logon end from TC.MAC device	Firmware versions of TC.MAC and virtual TC.LIN('s) are not compatible	Contact the customer support to update the firmware for the corresponding devices.
28-9	T8	Virtual TC.LIN did not receive EOL	A virtual TC.LIN device did not receive a logon end from TC.MAC device	Firmware versions of TC.MAC and virtual TC.LIN('s) are not compatible	Contact the customer support to update the firmware for the corresponding devices.

2.3.28. U) Configuration 3

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
29-1	U0	Sub-System ID or address (RSC on) in TC.MAC system not unique	More than one Sub-System in a total system have the same Sub-System ID or address (RSC on)	All Sub-System ID's or addresses (RSC on) within a TC.MAC system must be unique	Check Sub-System ID's or addresses (RSC on) by using TopControl PC software
29-2	U1	More than one TC.MAC detected	More than one TC.MAC in a total system detected	More than one TC.MAC in a TC.MAC system	Make sure only one TC.MAC is connected to a TC.MAC system
29-2	U1	More than one TC.MAC detected	More than one TC.MAC in a total system detected	Configuration error within a Sub-System	Contact customer support
29-3	U2	Nominal power of Sub-Systems not consistent	Nominal voltage not identical on all Sub-Systems	Error while Subsystem login or configuration.	
29-3	U2	Nominal power of Sub-Systems not consistent	Nominal voltage not identical on all Sub-Systems	Different number of serial devices in a Sub-System.	
29-3	U2	Nominal power of Sub-Systems not consistent	Nominal voltage not identical on all Sub-Systems	Different nominal voltage values in the devices of the Sub-Systems.	
29-4	U3	Nominal voltage of Sub-Systems not consistent	Nominal power not identical on all Sub-Systems	Error while Subsystem login or configuration.	
29-4	U3	Nominal voltage of Sub-Systems not consistent	Nominal power not identical on all Sub-Systems	Different number of devices in a Sub-System.	
29-4	U3	Nominal voltage of Sub-Systems not consistent	Nominal power not identical on all Sub-Systems	Different nominal power values in the devices of the Sub-Systems.	

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
29-5	U4	Nominal current of Sub-Systems not consistent	Maximum current not identical on all Sub-Systems	Error while Subsystem login or configuration.	
29-5	U4	Nominal current of Sub-Systems not consistent	Maximum current not identical on all Sub-Systems	Different number of serial devices in a Sub-System.	
29-5	U4	Nominal current of Sub-Systems not consistent	Maximum current not identical on all Sub-Systems	Different maximum current values in the devices of the Sub-Systems.	
29-6	U5	One or more Sub-System(s) are missing	The detected number of Sub-Systems in a total system are lower than configured.	Error while Subsystem login or configuration.	
29-6	U5	One or more Sub-System(s) are missing	The detected number of Sub-Systems in a total system are lower than configured.	Wrong MAC bus wiring.	
29-6	U5	One or more Sub-System(s) are missing	The detected number of Sub-Systems in a total system are lower than configured.	Wrong TC.MAC configuration.	
29-7	U6	One or more Sub-System(s) with invalid ID or address (RSC on)	One or more Sub-System ID's or addresses (RSC on) are outside valid range	ID AH and AL are exchanged ID AH or AL value too large	See TC.MAC manual
29-8	U7	Total number of Sub-Systems does not match with configuration	Total number of Sub-Systems does not match with the configuration of a total system	Subsequent error of error U5) or U6)	

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
29-9	U8	RSC: Invalid ModuleID or ModuleAddress in CAN-Bus from a Sub-System	RSC configuration failed on at least one Sub-System	Subsequent error of a login or configuration error within a Sub-System Configuration file not valid or does not match with given system	Check with the activated option TC.RSC, ìf the module ID 'AL' is counted upwards without any gap and the ID 'AH' = 0 is set. Check for other errors, which refer to a login or cofiguration error. Check,if the selected configuration file matches to the system topologie. Contact customer support
29-10	U9	RSC: SwitchboxID's from Sub-Systems not equal	RSC: Wrong switchboxID in a Sub-System	SwitchboxID in a Sub-System is 0 or not equal to the other Sub-Systems, or RSC not enable	Contact customer support
29-11	UA	RSC: Invalid Sub-SystemID or Sub-SystemAddress	RSC: Wrong Sub-System ID or Sub-System address	Wrong Configuration-file or Sub-SystemID	Check the Sub-System ID's with TopControl. Contact customer support
29-12	UB	TC.MAC Optionboard not installed	MAC Optionboard not installed but device is configured as MAC or MAC-Sub-System	Hardware problem or device configuration wrong	Contact customer support
29-13	UC	Virtual TC.LIN ID invalid	Virtual TC.LIN ID is outside of the allowed range.	Virtual TC.LIN device not set on value between 0 and 7 (including 0 and 7).	Use TopControl connected to Virtual TC.LIN device to set Virtual TC.LIN ID to a value between 0 and 7 (including 0 and 7).
29-14	UD	Virtual TC.LIN ID not unique	Virtual TC.LIN ID exists more than once.	The virtual TC.LIN ID in total system have to be a unique (value: 0...7)	Replace twice-assigned virtual TC.LIN IDs.
29-15	UE	Virtual TC.LIN not allowed in series configuration	Virtual TC.LIN in series operation is not allowed.	Operating with virtual TC.LIN in series configuration.	Disable the virtual TC.LIN functionality or change the configuration from series to parallel in MAC (use TopControl).

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
29-16	UF	Not all Sub-Systems are capable of Q4	All Sub-Systems must be of the same type (GSS or not).	Not all Sub-Systems are the same type (GSS or not).	Only connect GSS or Non-GSS Sub-Systems.

2.3.29. V) Communication 3

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
30-1	V0	CANB bus off	Too many errors detected on on the MAC bus	Terminators MACTERM not connected on both bus ends. The baud rate of the MAC bus matches not between all bus members . MAC bus cable defect.	Terminate the bus ends via MACTERM terminators. Exchange the MAC bus cable. Contact customer support
30-1	V0	CANB bus off	Too many errors detected on on the CANmp bus	Terminators CANmpTERM not connected on both bus ends. The baud rate of the CANmp bus matches not between all bus members . CANmp bus cable defect.	Terminate the bus ends via CAMmpTERM terminators. Exchange the CANmp bus cable. Contact customer support
30-2	V1	CANB bus error passive	Too many errors detected on on the MAC bus	Terminators MACTERM not connected on both bus ends. The baud rate of the MAC bus matches not between all bus members . MAC bus cable defect.	Terminate the bus ends via MACTERM terminators. Exchange the MAC bus cable. Contact customer support
30-2	V1	CANB bus error passive	Too many errors detected on on the CANmp bus	Terminators CANmpTERM not connected on both bus ends. The baud rate of the CANmp bus matches not between all bus members . CANmp bus cable defect.	Terminate the bus ends via CAMmpTERM terminators. Exchange the CANmp bus cable. Contact customer support
30-3	V2	CANB bus write denied	Internal problem	Internal problem	Contact customer support
30-4	V3	CANB bus message aborted	Internal problem	Internal problem	Contact customer support

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
30-5	V4	CANB bus message lost	Received data on MAC bus could not processed quickly engouh and went partly lost	Internal problem	Contact customer support
30-5	V4	CANB bus message lost	Received data on CANmp bus could not processed quickly engouh and went partly lost	Internal problem	Contact customer support
30-6	V5	CANB bus transmit queue overflow	Internal transmission buffer full	Sub-Systems on MAC bus are not able to receive data correctly. Sequent error of errors V0) / V1)	Check the cable connection. Check if the Sub-Systems are still switched on.
30-6	V5	CANB bus transmit queue overflow	Internal transmission buffer full	Subscribers on CANmp bus are not able to receive data correctly. Sequent error of errors V0) / V1). Too many messages on CANmp bus.	Check the cable connection. Check if the Subscribers are still switched on. Configure messages with a slower cycle time. Configure less messages with the same Sync-ID or Sync-Counter. Send the Sync-ID or Sync message with a slower cycle time.
30-7	V6	CANB bus receive queue overflow	Received data on MAC bus could not processed quickly engouh and went partly lost	Internal problem	Contact customer support
30-7	V6	CANB bus receive queue overflow	Received data on CANmp bus could not processed quickly engouh and went partly lost	Internal problem	Contact customer support
30-8	V7	CANB bus received unknown message	Internal problem	Internal problem	Contact customer support
30-9	V8	No data received from SubSystem(s)	TC.MAC receives no data from one Sub-System at minimum	Sub-System are switched off Sequent error of errors V0) / V1)	Check the cable connection

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
30-9	V8	No data received from SubSystem(s)	TC.MAC receives no data from one Sub-System at minimum	Sub-System are switched off Sequent error of errors V0) / V1)	Check if the Sub-Systems are still switched on.
30-10	V9	No data received from TC.MAC	One Sub-System at minimum receives no data from TC.MAC	Sequent error of a login- or configuration error.	Check if login or configuration error exists according the error description.
30-10	V9	No data received from TC.MAC	One Sub-System at minimum receives no data from TC.MAC	TC.MAC was switched off.	Check if the TC.MAC is still switched on.
30-10	V9	No data received from TC.MAC	One Sub-System at minimum receives no data from TC.MAC	Sequent error of errors V0) / V1)	Check the cable connection
30-11	VA	CANmp Watchdog error	Timeout in optional internal watchdog for the CANmp communication.	CANmp communication failed. The watchdog signal was not received within the configured timeout. The watchdog signal must be received periodically.	Check the communication line. Send the watchdog signal at shorter intervals. Set the timeout for the watchdog to a higher limit.

2.3.30. W) Internal 2

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
31-1	W0	Powerup from watchdog reset	The software executed an internal reset due to an internal watchdog timeout	Internal problems	Contact customer support
31-2	W1	TC.MAC sense connector not attached	TC.MAC sense cable not connected	Wrong configuration	Deaktivate the TC.MAC sense input. Contact customer support
31-2	W1	TC.MAC sense connector not attached	TC.MAC sense cable not connected	The TC.MAC interfaces X550.1, X500.2, X500.3 or X500.4 are not connected with a sense cable	Check if the sense connector is connected correctly
31-3	W2	Invalid Bootloader Version	Bootloader Version is invalid or too old	Actual Firmware requires a higher Bootloader version to operate correctly	Contact customer support
31-4	W3	Update firmware ignored (not loaded)	Update firmware is installed but was not loaded. Factory default firmware was loaded instead	Firmware check failed or firmware ignored to prevent compatibility issues	Contact customer support
31-16	WF	Unknown tripzone err	The powerstage was switched off automaticaly, but none of the known errors are pending	Internal problem	Contact customer support

2.3.31. X) Communication 2

Flash Code	Error	Error message TopCon (Long)	Description	Possible Cause	Counteraction
32-1	X0	CAN unknown Mailbox	Internal error detection		Contact customer support
32-2	X1	Internal Talk error with IBC	Error detected on internal communication with IBC board		Contact customer support
32-4	X3	CAN TXQueue overflow	Internal transmission buffer is full	Other devices are not able to recieve the data correctly. Sequent error of errors 60) / 61)	Check the cable connection. Check if all devices are still switched on.
32-5	X4	CAN RXQueue overflow	Internal receive buffer is full	Internal Problem	Contact customer support
32-6	X5	RS232 checksum error	See error 15		
32-7	X6	RS232 parity error	See error 16		
32-8	X7	RS232 data missed	See error 17		
32-9	X8	RS232 framing error	See error 18		
32-10	X9	RS232 break error	See error 19		
32-11	XA	RS422 timeout error	See error 1F		
32-12	XB	RS422 checksum error	See error 15		
32-13	XC	RS422 data missed	See error 17		
32-14	XD	RS422 framing error	See error 18		
32-15	XE	RS422 break error	See error 19		
32-16	XF	RS232 timeout error	See error 1F		