# MCS220 C/CX GeN2 -MCBIII

# Service Tool Manual

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# **1** General software overview

The software baseline 30762 is intended for use on the MCB3 board in conjunction with vector-oriented motor control systems. Operation is possible for:

- synchronous (SM) motor vector control;

- controller interface via CAN-bus.

The latest released software version GAA30762BAG runs on the following PCB's (depending on application):

- GCA26800KF1 (MCS220 C Gen2) (or higher)
- GCA26800KF2 (MCS220 CX Gen2) (or higher)

# 2 Service Tool Description

## 2.1 General

The Service Tool is a pocket terminal that lets you control all elevator functions:

- Monitoring of software states, system inputs and outputs and system messages
- Setup of installation parameters
- Use of software tools.

The access of each function is controlled by the Menu System which allows convenient work with the Service Tool.

The Service Tool Manual describes the Menu System and the single Service Tool functions.

# 2.2 "Plug and See" function

The "Plug and See" function (a subfunction of the "Central Failure Management" feature) requires the following software:

- MCB3 GAA30762BAG (or higher)
- GECB GAA30780DAB (or higher)

The function is started after plugging in the service tool at the SCBC connector. If the elevator is blocked the blockage reason is displayed in the service tool w/o the need to enter any further commands. The following table shows the relationship between the blockage messages sent by the MCB3 and the MCB3 event/error logging message. Refer to chapter 5, "Event/Error Logging (M - 2 - 2)" to get further service hints.

	MCB3 error	Plug and See Message
2	SYS: DDP	DRIVE
		DDP - No LV within DDP time limit

2	CVC, EOD failura	
3	SYS: EZP failure	MCB EEPROM defect
6	SYS: E2P InvPara	DRIVE
		MCB parameter out of range
7	SYS: ParaConflkt	DRIVE
		MCB parameter conflict
10	SYS: <24V Supply	DRIVE
		No 24V supply
11	SYS: <15V Supply	DRIVE
		No 15V supply
15	SYS: 1LS + 2LS	PRS
		1LS&2LS active
21	INV: >Volt DC	DRIVE
		High DC link voltage
21	INV: >Volt DC	DRIVE
		High DC link voltage - Drive power down
22	INV: >Heat Packg	DRIVE
		Inverter overheat
23	INV: <volt dc<="" td=""><td>DRIVE</td></volt>	DRIVE
		Low DC link voltage
24	INV: Pwr Section	DRIVE
		Motor current not 0 after stop
25	INV: >Curr IGBT	DRIVE
		High inverter current
25	INV: >Curr IGBT	DRIVE
		High inverter current - Drive power down
27	INV: >Curr Motor	DRIVE
		High motor current
27	INV: >Curr Motor	DRIVE
		High motor current - Drive power down
29	INV: brake chopp	DRIVE
		DBR circuit - Drive power down
39	M C:FR w/o Learn	DRIVE
		No learn run
41	M C: MC+SafetyCh	SAFETY CHAIN
		UIB or DIB active without TCI/ERO command
42	M C: Encodr adj?	DRIVE ENCODER
		No encoder adjustment
43	M C:OCSS disabld	DRIVE
		MCB Parameter "MCB operat" active
44	M C: Chk SW Sig	DRIVE
		High SW signal in idle
44	M C: Chk SW Sig	DRIVE
		Low SW signal at start
45	M C: Chk DBD Sig	CONTACTOR
		DBD - No 24V during stop

45	M C: Chk DBD Sig	CONTACTOR
		DBD - No 0V during run
46	M C: Chk RDY Sig	DRIVE
		MCB3 READY stuck high/low
47	M C: Chk BS1/BS2	BRAKE
		BS1 stuck low before start
47	M C: Chk BS1/BS2	BRAKE
		BS2 stuck low before start
47	M C: Chk BS1/BS2	BRAKE
		BS1 and BS2 stuck low before start
47	M C: Chk BS1/BS2	BRAKE
		BS1 stuck high after start
47	M C: Chk BS1/BS2	BRAKE
		BS2 stuck high after start
47	M C: Chk BS1/BS2	BRAKE
		BS1 and BS2 stuck high after start
60	MLS: LV Missed	PRS
		LV signal not detected
61	MLS: LV lost	PRS
		LV signal detected then lost
71	DRV: >Speed	DRIVE ENCODER
		High motor speed
72	DRV: <speed< td=""><td>DRIVE ENCODER</td></speed<>	DRIVE ENCODER
		Low motor speed
78	DRV: OverId>Time	DRIVE
		Motor Current > 200% > 3 Sec
80	DRV: Phase Down	DRIVE
		Motor phase U - no current
80	DRV: Phase Down	DRIVE
		Motor phase V - no current
80	DRV: Phase Down	DRIVE
		Motor phase W - no current
80	DRV: Phase Down	DRIVE
		All motor phases - no current
80	DRV: Phase Down	DRIVE
		Current measured in only 1 motor phase
94	ADJ: EncAdj err	DRIVE ENCODER
		Encoder adjustment failure

# 2.3 Access to the MCB\_III

The MCB\_III has no own service tool connector. Service tool communication is only possible via SPBC plug (located in the E&I panel) and a functioning CAN-bus link.

When the service tool has been connected, the system menu will appear (example):

0:ALL 1:TCBC > 2:DRIVE 5:SPBC >

Press <2> to select the MCB\_III subsystem. Note: the complete description within this document refers to the MCB III subsystem only.

Press <M><M> immediately to leave the MCB\_III subsystem and return to the system menu.

For a detailed description of the system menu refer to document "System Service tool manual".

#### Note:

If the drive has been switched off (e.g. by the "power save" - feature), the MCB\_III subsystem will not response. A "Wait" message is displayed instead.

For the "power save" - feature, the drive must be "awaked" again by entering a call or by switching to ERO.

### 2.4 MCB\_III service tool menu overview



# 3 Monitor menus

### 3.1 State (M – 1 – 1)

This display is used to observe the system state. Example:

NORM	AL I	DLE	0
DRV:	Rollb	Sta	rt

**Description:** 

NORMAL	= Motion Command Mode
IDLE	= Motion Logic State
00 = floor co	punter
	Range starts from parameter "BOTTOM FLOOR" (normally = 0).
	If floor number is undefined a ** is displayed.
DRV: Rollb Start	= Actual Event Display (if applicable)

#### **Table of Motion Command Modes:**

SHT_DWN	A run is interrupted due to a fault.	
	An event display (Errlog = 2 Actual = 1) always explains the reason.	
WT_F_SF	Wait for Safety, the drive waits for DIB, UIB or both signal(s).	
NORMAL	With both active signals UIB & DIB the drive waits for a run command from the TCBC.	
RUN_UP	Normal run up	
RUN_DWN	Normal run down	
INS UP	Inspection run up Inspection run is started with UIB or DIB	
INS DWN	Inspection run down	
ES	Emergency stop,	
	during normal run the safety chain (UIB, DIB signal) has been interrupted.	

Note: The states of UIB / DIB must match to the run command: either UIB or DIB active for INS\_UP / INS\_DWN; both UIB & DIB active for RUN\_UP / RUN\_DWN.

### Table of Motion Logic States:

IDLE	Waiting for a command (Inverter power section disabled)
START	Energize BY and SW relays and premagnetization
ACC	Accelerating to NOM SPE
CONST	Normal speed or reduced speed
	generates IP signals and waits for deceleration command or 1LS / 2LS.
T DEC	Deceleration to CRE SPE
CREEP	Creep run, waiting for LV
HALT	Deceleration to zero speed, electrical stop, brake drop.

The event display is described in chapter "Event/Error logging".

Note: if "SYS: Msg lost" is displayed, too many events occurred at the same time. Not all events could be displayed. In this case refer to the actual event logging (M - 2 - 2 - 1).

#### 3.2 Input (M - 1 - 2)

This display is used to watch the state (HIGH or low) of input values. Example:

NOR	1AL	IDLE	0
UIB	DIB	<wt></wt>	

Description:

The 1st line shows the motion command & status as described in section "Status" above. The 2nd line shows a group of up to four inputs.

Uppercase letters means that the input is active; e.g. UIB: input is active uib :

input is not active.

Note: All inputs (including LOW-active inputs) are shown in their logical state (not voltage presence on input pin).

Example: car is in 1LS  $\Rightarrow$  Input pin has zero voltage  $\Rightarrow$  SVT displays active input ("1LS").

Press <GOON> / <GOBACK> to select the next / previous group of inputs.

It is possible to fade-in current event messages on display (i.e. if an error event occurs, the 2nd line will be overwritten by the event text for a short moment).

- Activate this feature by pressing <Shift> <1> (or <ON>). •
- Deactivate this feature it by pressing <Shift> <0> (or <OFF>). •

Input variable	Explanation	Pin (MCB III)
UIB	Inspection button up direction, input signal for normal run	P 1.3
DIB	Inspection button down, input signal for normal run	P 1.4
<cc dd=""></cc>	Motion Command sent by TCBC; see table below	CAN-bus
1LS	1LS deceleration switch sent by TCBC via CAN	CAN-bus
2LS	2LS deceleration switch sent by TCBC via CAN	CAN-bus
1LV	Door zone switch up	P 4.3
2LV	Door zone switch down	P 4.4
LV	Door zone (1LV and 2LV active)	
UIS	releveling	P 4.1
DIS	releveling	P 4.2
SW	Up or down signal on	-internal-
DBD	Drive&Brake disconnected	P 4.7
	(SW, BR and BY relay dropped)	
RDY	Ready signal, PWM enabled (hardware protection signal)	-internal-
BS1	Brake monitor switch 1	P 4.5
BS2	Brake monitor switch 2	P 4.6

Table of available inputs:

<cc< th=""><th> dd&gt;</th><th>Explanation</th></cc<>	dd>	Explanation	
<wt></wt>		WAIT, the drive waits for the next run command	
<tci< th=""><th></th><th>Top of Car Inspection</th></tci<>		Top of Car Inspection	
<ero< th=""><th></th><th>Electrical Recall Operation</th></ero<>		Electrical Recall Operation	
<cor< th=""><th></th><th colspan="2">Correction Run</th></cor<>		Correction Run	
<rsc< th=""><th></th><th>Rescue Run</th></rsc<>		Rescue Run	
	UP>	up direction	
	DN>	down direction	
	ST>	stop	
<goto< th=""><th>&gt;</th><th>normal run to floor number</th></goto<>	>	normal run to floor number	
<rel< th=""><th></th><th>Releveling</th></rel<>		Releveling	
	EN>	enable	
	ST>	stop	

Table of **Motion Commands** sent by TCBC via CAN-bus interface:

### 3.3 Output (M – 1 – 3)

This display is used to watch the state (HIGH or low) of output values. Example:

NORMAL		ID	LE	0
up	dn	by	IN	VD

Description:

The 1st line shows the motion command & status as described in section "Status" above. The 2nd line shows a group of up to four outputs.

Uppercase letters means that the output is active; e.g. FAN: output is active fan: output is not active.

Press <GOON> / <GOBACK> to select the next / previous group of outputs.

It is possible to fade-in current event messages on display (i.e. if an error event occurs, the 2nd line will be overwritten by the event text for a short moment).

- Activate this feature by pressing <Shift> <1> (or <ON>).
- Deactivate this feature it by pressing <Shift> <0> (or <OFF>).

### Table of available **outputs**:

Output variable	Explanation	Pin (MCB III)
UP	Run direction signal up	-internal-
DN	Run direction signal down	-internal-
BY	Brake relay	P 1.2
INVD	Inverter (PWM) disabled	-internal-
FAN	Fan relay	P 8.3
REL	Inverter relay, switches on/off the inverter	P 8.5
< Drive State		CAN-bus
SC	Speed Check	CAN-bus
Accepted Target Floor		CAN-bus
Next Commitable Floor		CAN-bus
Actual Floor >	middle between two doorzone magnets	CAN-bus

# Table of Drive States sent by MCB\_III via CAN

Command	Explanation	
<down< th=""><th>Shut Down</th></down<>	Shut Down	
<init< th=""><th colspan="2">Initialization after power on</th></init<>	Initialization after power on	
<ldle< th=""><th>Idle</th></ldle<>	Idle	
<runn< th=""><th>Running</th></runn<>	Running	
<dece< th=""><th>Decelerating</th></dece<>	Decelerating	
<targ< th=""><th>At Target</th></targ<>	At Target	
<cali< th=""><th>Calibration Run initiated by MCB</th></cali<>	Calibration Run initiated by MCB	
<wfsf< th=""><th>Wait for Safety Chain</th></wfsf<>	Wait for Safety Chain	

# 4 Test menus

### 4.1 DAC - values display (M - 2 - 1)

Some control- and sensor variables can be monitored by the Service Tool (SVT). Example:

PROFILE GENERATR	= Name of selected variable
= 950[0.1% fn]	= actual value and unit of selected variable

Press <GOON> / <GO BACK> to select the next / previous variable.

Table of available DAC values:

SVT-Display	Description
PROFILE GENERATR	Internal reference speed
SPEED	Measured speed depending on the encoder pulses
ACCELERATION	Measured acceleration depending on the encoder pulses
SPEED ERROR	Speed control error (difference between reference and measured speed)
STATOR CURRENT	Motor current (inverter output)
IGBT TEMPERATURE	IGBT heat sink temperature
DC-LINK VOLTAGE	Inverter DC link voltage

Note: a DAC - output for oscilloscope measurement is not available on the MCB\_III.

### 4.2 Selftest (M - 2 - 3)

This will perform a board selftest.

EEPROM+ PROM0

Description:

EEPROM = Self test of the EEPROM

- PROM = Self test of the PROM (FLASH or OTP devices)
- 0 = Self test was not yet executed
- ? = Executing the self test
- + = Self test O.K.
- = Self test not O.K.

After pressing **GOON>** the following selftest step is started.

# 4.3 Part number display (M - 2 - 4)

Data about the software version and package duty (example):

Press <GOON> / <GO BACK> to select the next / previous field.

OVFWW(405N)	= general info on used power section (boards)
9kW/ 480V/ 25A	= Package duty / Nom. line voltage / Nom. output current [RMS]
$\Downarrow$ <go on=""></go>	
MCB-SW:08-APR-05	= Software authorization date (example)
GAA30785AAC	= Software version (example)

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