New as of: 11.2001

sirona
The Dental Company

C1+

Service Manual

English

IMPORTANT:

- **In case of faults which you are unable to eliminate with the help of this manual, please contact our Customer Service.**
- **It is essential that you take this Service Manual with you for every visit to a customer.**

Furthermore, you must always have the spare parts list and wiring diagrams with you as well.

You can order additional copies of this Service Manual under

- Order Number **59 06 610** from our department **DZA TU** in Bensheim.

See reverse side of manual for address.

D 3386.076.01.01.02 11.2001

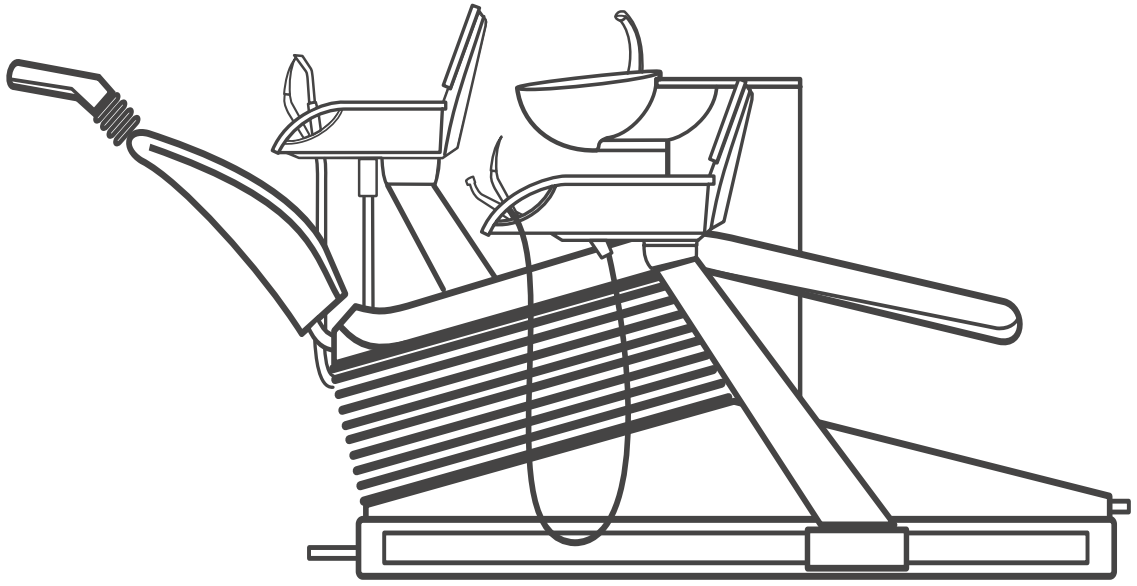
New as of: 11.2001

sirona
The Dental Company

C1+

Service Manual

English



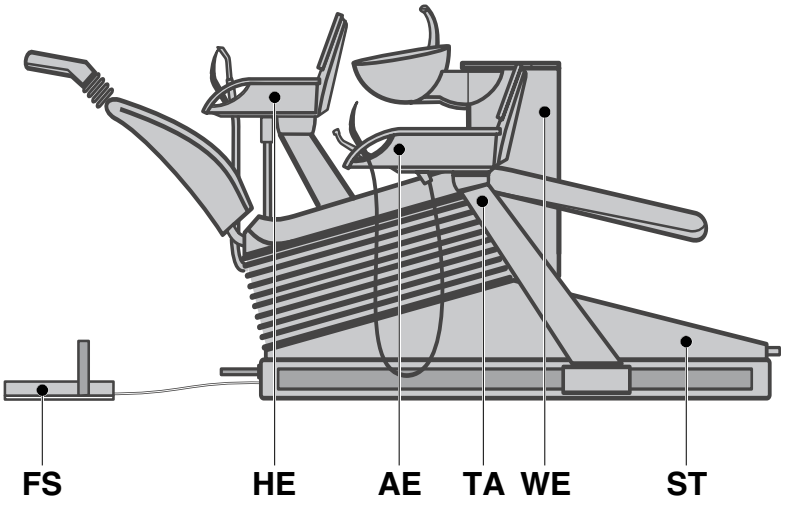
Contents

sirona
The Dental Company

1 Overview of modules and PCBs

C1+

1 Overview of modules and PCBs



Component	PCB / Module			
Dentist element (AE)	PS	=	Control panel	
	AG	=	Base plate	
	IR	=	Flexible PCB	
	AVL	=	Supply for lamp C1^{+}	
	AD2	=	Camera module	
	ACI	=	HF adapter,	from C1^{+}
	HF+	=	HF module,	from C1^{+}
	AJ	=	Control module	
	AS	=	SPRAYVIT module	
	AL	=	Siromot module	
	AV	=	Distributor light module	
	AH	=	Solenoid valve and heater module	
	AU	=	SIROSON module	
	AO	=	HF modulation module,	model 96
	AC	=	Output stage for SIROTOM	
Support arm (TA)	TS	=	Support arm control	
Assistant element (HE)	PS	=	Control panel	
	AJ	=	Control module	
	AS	=	SPRAYVIT module	
	IR	=	Flexible PCB	
	HG	=	Base plate	
Water unit (WE)	WS	=	Control PCB	
Patient chair (ST)	SE	=	Chair output stage	
	SS	=	Control ST	
	NS	=	Power supply PCB	
	SA	=	Connection box control	
	NM	=	Monitor power supply	
	SVC	=	Video PCB	
	SL	=	Wiring PCB	
	KS	=	4-way foot switch	
Foot switch (FS)	AF	=	Foot switch plate	

sirona
The Dental Company

2 Important notes

C1+

2.1 Technical data

Model designation C1+

Power supply 230V~ 50Hz,
115V~ 50/60Hz

Nominal current 4.5A at 230V,
9.5A at 115V

2.2 Warnings and safety notes

Caution! Prior to opening the unit, connecting a measuring instrument or replacing parts: Switch the unit OFF.

Operating safety: To guarantee the operating safety, the use of mobile radio telephones in the practice or hospital area must be prohibited.

Troubleshooting: If you encounter difficulties **search in the error catalog first and follow the procedure described in it**.

2.3 Minimum configuration

C1 serial no. < 3000

C1 component	PCB	Software version
Dentist panel / Assistant panel	**PS /** Control panel	**>= 1.6**
Dentist element / Assistant element	**AJ /** Dentist element control	**>= 1.9**
Water unit	**WS /** Water unit control	**>= 1.9**

C1 serial no. > 3000

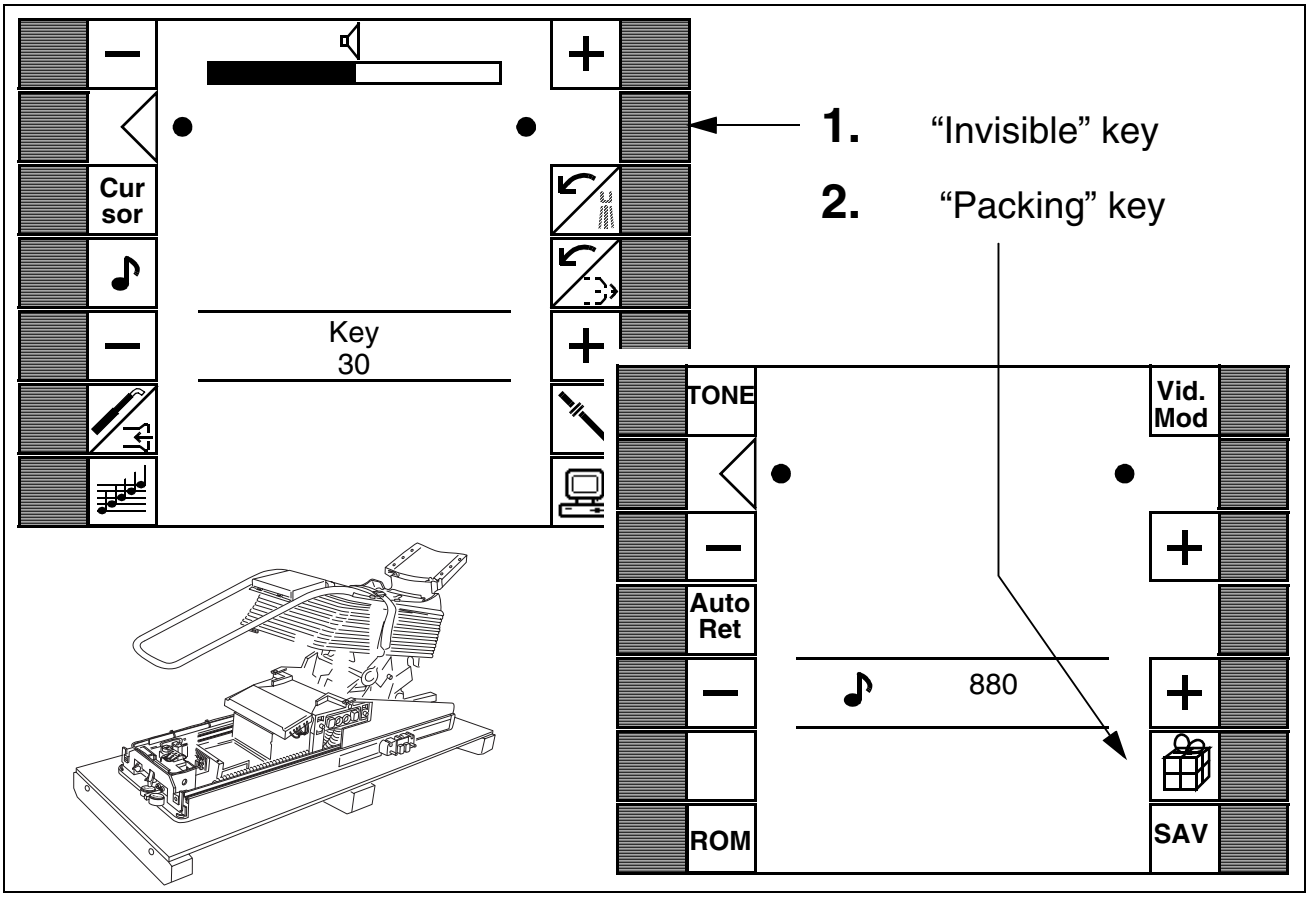
C1 component	PCB	Software version
Water unit	**WS**	**>= 2.1**

C1+ serial no. > 10 000

C1+ component	PCB	Software version
Dentist panel / Assistant panel	**PS /** Control panel	**>= 2.3**
Dentist element / Assistant element	**AJ /** Dentist element control	**>= 2.5**
Connection box	**SA /** Connection box control	**>= 3.0**
Patient chair	**SS /** Chair control	**>= 2.5**
Water unit	**WS /** Water unit control	**>= 3.0**

2.4 Packing position for repackaging

To repack the chair (e.g., for transport to a trade fair), move it to the position shown.



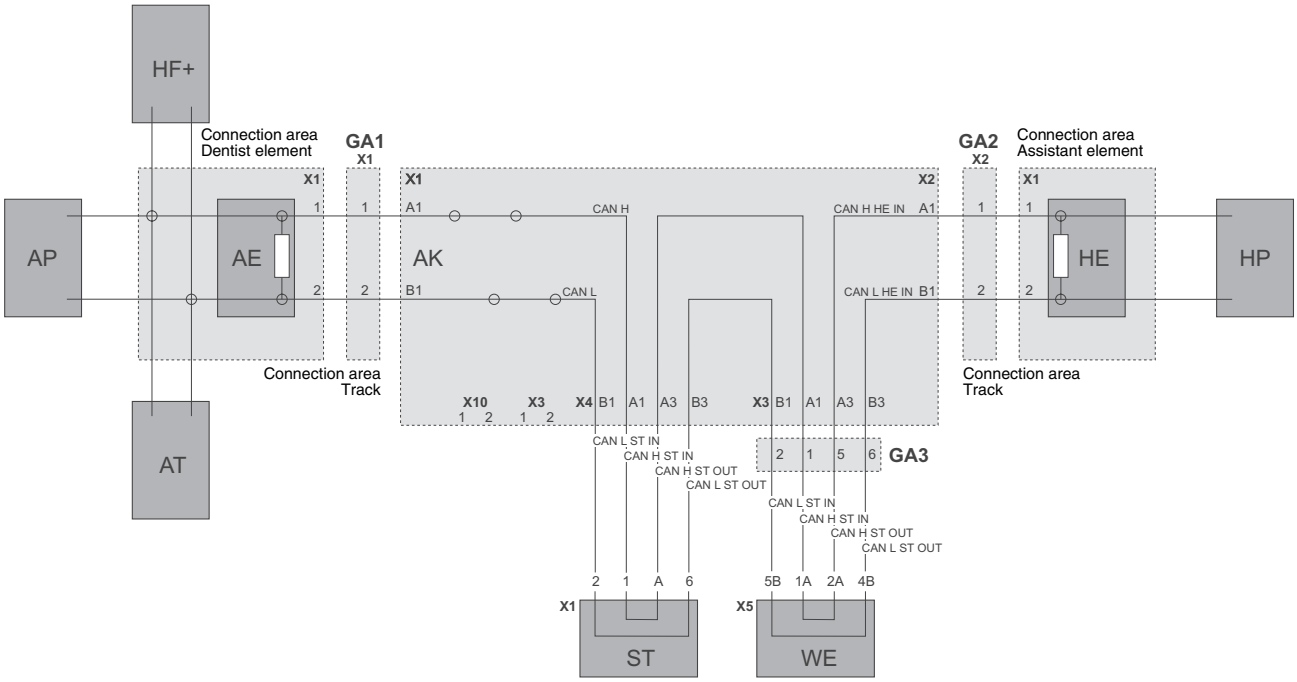
To do this, press the following keys:
1. "Invisible" key in basic settings dialog 2
2. "Packing position" key
The chair now moves to the packing position automatically.

sirona
The Dental Company

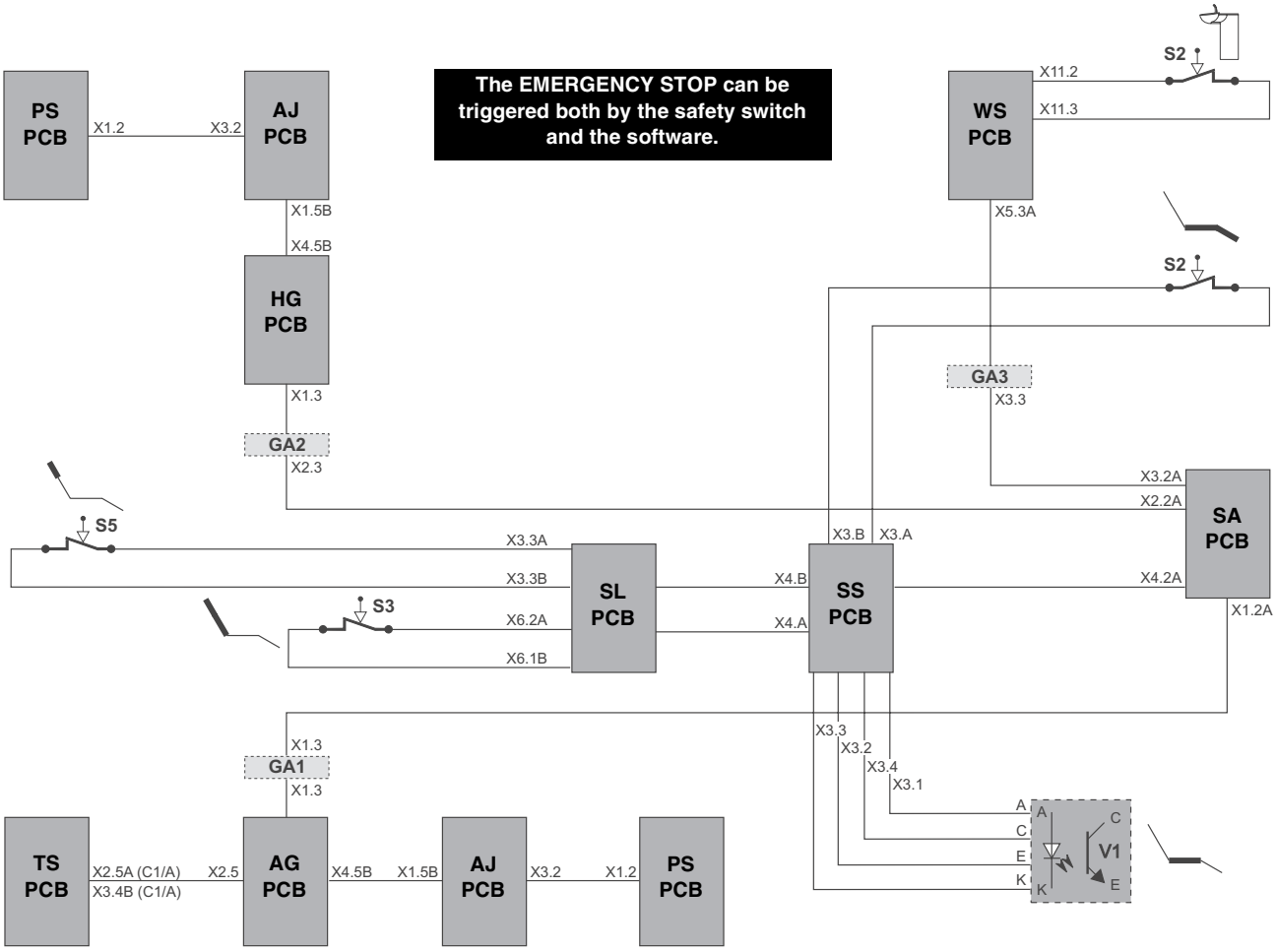
3 Wiring diagrams

C1+

3.1 Wiring diagram of CAN bus



3.2 EMERGENCY STOP wiring diagram



sirona
The Dental Company

4 User-defined settings

C1+

4 User-defined settings

The following user-defined settings must be made after replacing PCBs or software on the C1.

Component (PCB / software)	User-defined settings
Dentist element PCB AJ Also in case of software upgrade from version < 1.6 to version >= 1.6 and from version < 2.0 to version >= 2.0	**Instrument settings for all function levels** **SPRAYVIT L:** Instrument light, water and air temperature **SIRONA motor:** Speed, instrument light, direction of rotation, cooling media, direct starter, foot switch control **Turbine:** Instrument light, cooling media **SIROSON L:** Intensity, instrument light **SIROTOM:** Cutting current, coagulation current **POLYLUX:** Exposure time, soft start (ON / OFF) **Holder assignment for saline solution** (in case of missing Sprayvit light and water heater generate 20 pump strokes) **In case of camera integration:** video mode
Dentist panel AP	**Panel-specific settings:** Brightness, contrast, keyboard sensitivity, audio signal volume, key clicking tone (ON / OFF), timer settings, simplified programs (ON/OFF), cursor (ON/OFF) SIROTOM operating and alarm tone, preselection of key position for direction of rotation/cooling medium/chip blower in instrument program. Sivision / bell switch-over version 1.7 or higher In case of secondary monitor function, PC dialog (ON/OFF). Different tones for each row of keys (ON/OFF).
Assistant element PCB AJ Also in case of software upgrade from version < 1.6 to version >= 1.6 and from version < 2.0 to version >= 2.0	**SPRAYVIT L:** Instrument light, water and air temperature **POLYLUX**: Exposure time Functionality of the 4-way foot switch for Polylux and suction function version 2.0 or higher
Assistant panel HP	**Panel-specific settings:** Brightness, contrast, keyboard sensitivity, audio signal volume, key clicking tone (ON / OFF), timer settings, simplified programs (ON/OFF) Sivision / bell switch-over version 1.7 or higher
Water unit PCB WS Also in case of software upgrade	**SIROLUX:** Brightness, reflector stage, SIROLUX switching condition in relation to chair position, tumbler filling quantity, tumbler filling (ON/OFF) when approaching S position, suction intensity, possibly time and date
Patient chair PCB SS	**Chair positions:** User, user size, treatment position (sitting/standing)
Connection box PCB SA Also in case of software upgrade	Track positions of dentist element Cuspidor flushing time, cuspidor flushing (ON/OFF) when approaching S position, 4-way foot switch functionality (switch-over headrest/backrest), Type of key for bell or free key (key/switch)

Component (PCB / software)	User-defined settings
Support arm control PCB TS Also in case of software upgrade	Support arm position excluding track Intensity of saline solution pump

sirona
The Dental Company

5 Error catalog

C1+

5 Error catalog

Compo-nent	Description of problem	Cause	Corrective action
Dentist element	**Loss of instrument programs.** After removing the instruments, the factory settings are displayed for all levels and holders. Sprayvit light switched off. **Service code message: AE 7F**	Software error PCB AJ of version <2.0	Replace AJ software. Part No.: 54 33 375
Dentist element	**Instrument failure** Dentist panel closes the instrument dialog. Instrument functions Motor Scaler Turbine SIROTOM including media spray, water and instrument light are shut off, if active. After depositing and removing again, normal function.	Error while reading hose coding following, e.g., electromagnetic interference or contact problems on hose coupling. Software version PCB AJ in dentist element <1.8.	Replace AJ software. Part No.: 54 33 375 Check and correct (if necessary) the position of the SIROTOM flange (if available). Do not overlap or cross the cables.
Dentist element	**Instrument failure** Instruments Motor Scaler SIROTOM do not function when activated. Media spray, water and instrument light are switched when activated. After depositing and removing again, same error. Can only be remedied by switching on/off.	Software error on PCB AJ in dentist element, in case of very short instrument removal, e.g., due to oscillating motion of the thin SIROTOM hose. Software version PCB AJ in dentist element <1.8.	Replace AJ software. Part No.: 54 33 375
Dentist element	**Instrument failure SIRONA motor** The instrument Sirona motor interrupts its function or does not function when activated. Media spray, water and instrument light remain switched on or are switched when activated. After depositing and removing again, normal function. **Service code message: AE 00 6B**	The software of PCB AL (Siromot module) detects open motor load circuits in very smooth motors. Software version PCB AL in dentist element <3.6.	Replace AL software. Part No.: 54 33 383
Dentist element	**Sirona motor runs on for too long**	Software PCB AL in dentist element <3.7	Replace AL software. Part No.: 54 33 383
Dentist element	**Scaler switches off again after 1–2 seconds.** Scaler dialog is closed.	Water on the flange due to leaks in hose or heater. Residual moisture due to thermal disinfection	Remedy leaks. Remedy moisture.

Compo-nent	Description of problem	Cause	Corrective action
Dentist element	**Performance of scaler is reduced or fluctuating, or no performance.** High-frequency whistling.	Old sealing compound of piezo is brittle. Electrical contacts in handpiece are broken.	Replace handpiece
Dentist element	**Whistling tone from dentist element when activating a bur instrument**	Pressure setting too low MV11 Module	Replace membrane and check input pressure, pressure = 4.3 bar +/- 0.1 (in case Sprayvit flow is active) Replace MV11. Replace module.
Dentist element	**Motor/turbine, immediate cooling/ driving air** After removing the motor, turbine cooling/driving air is immediately on, or after releasing the foot switch **cooling/ driving air and spray, if any, are not switched off.** After depositing the instrument everything is switched off. **Occurs on all motors/turbines**, possibly only from time to time	Solenoid valve MV11 is caught.	Replace solenoid valve MV11.
Dentist element	**Motor/turbine, low air outlet.** After removing the motor, turbine or after releasing the foot switch, **low air outlet**. After depositing the instrument everything is switched off. **Does not occur on exactly one motor/ turbine.**	Defective membrane in the module of the instrument for which the error does **not** occur.	Replace membrane and check input pressure. Pressure = 4.3 bar +/- 0.1 (in case SPRAYVIT flow is active).
Dentist element	**No air and no water on one bur instrument.**	MV21-X on module defective (X – holder no.)	Replace MV21.X.
Dentist element	**Dripping instruments.**	White break on “auto” valve of module due to excessive screwing torque or spring force too low. Filter tissue of heater is dissolved. Precipitation in the heater element.	“Auto” valve has been reworked, replace “auto” valve, do not tighten too hard. Check filter in heater. Check filter in heater and replace it, if necessary, and rinse water pipes. (Defective filter and information to Bensheim) Replace heater and rinse water pipes.

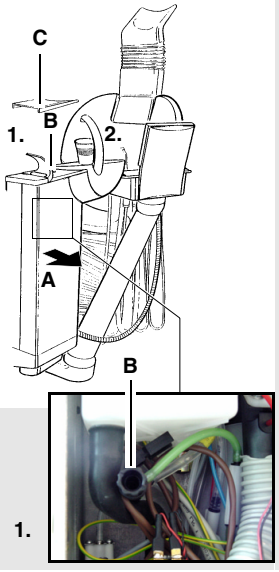
5 Error catalog

Compo-nent	Description of problem	Cause	Corrective action
Dentist element	**No instrument dialog when removing instruments.**	Instrument in holder 5 or 6 has not been deposited properly. Instrument tray bent (holder is not aligned with light barrier) Transparency of ZEG hose	Information for the customer. Install a new instrument tray Hose change in progress
Dentist element	**SPRAYVIT 4000 occasionally without water.** (Air is still available)	Contact problem or humidity on base of air heater in valve body. Consequence: SPRAYVIT is not detected by dentist element.	Temporary measure: Clean air heater (remove also solder residue) and tighten contact terminals.
Dentist element	**Moist air on SPRAYVIT.** Some water is ejected when the air key is pressed.	Damaged o-rings on Sprayvit nozzle, due to sterilization and lack of maintenance.	Replace o-rings on Sprayvit nozzle.
Dentist element	**SPRAYVIT L handpiece becomes hot.** Both heater cartridges heat up when only one key is pressed. Air heater and SPRAYVIT L heat up immediately after removing the instrument. Valve body is burnt.	Water in SPRAYVIT hose.	Replace hose and replace valve body, if necessary.
Dentist element	**Assistant element Polylight cannot be selected using the dentist panel.** Software PCB AJ assistant element version 2.0	Software error in PCB AJ version 2.0	Replace AJ software. Part No.: 54 33 375
Dentist element	**Chair and AE travel to position "0" when an instrument is removed.** Cursor is switched off (M1 mode), panel in chair program, "FS down" activated	Software error dentist panel / assistant panel	No solution as of yet. Serial no. <3000: Software version on PCB PS >= 1.8 Serial no. >3000: Software version on PCB PS >= 1.7
Support arm control	**Dentist element does not reach programmed position.** Program key must be pressed several times. **Service code message in AT/HP: 40 04** (RESET AT) – frequent in C1/96).	PCB TS reset because watchdog tolerance is too high. PCB TS: **Serial no. >3000:** Hardware <2.1, Software <1.5 **Serial no. <3000:** Hardware <1.3	Replacement of PCB TS. Part No.: 46 96 931 - **Serial no. >3000** Part No.: 46 85 231 - **Serial no. <3000**
Support arm control	**Support arm does not swivel in joint 1, Motor 1 is running** (Serial no.: <3000)	Pertinax pinion of joint 1 defective Slipping clutch of joint 1 skids	Install new motor 1 with metal pinion Replace slipping clutch of joint 1

Compo-nent	Description of problem	Cause	Corrective action
Support arm control	**Support arm does not swivel in joint 1, Motor 1 is running** Furthermore, a knocking noise can be heard (serial no.: >3000)**.**	Gear Z70 is damaged, because motor 1 has not been inserted deep enough or grub screw is missing in lower support arm bearing.	Replace lower support arm bearing entirely. Rep. no. 5433623
Support arm control	**Support arm motors run on.** Support arm motors keep running for a few seconds after reaching the programmed position.	Pot. target value is outside the movement range	Check the fastening and fitting of the potentiometers, then try to travel to the corresponding program positions again and press the save key.
Support arm control	**Support arm motor 1 does not reach programmed position.** Program key must be pressed twice	Slipping clutch of joint 1 has not been tightened enough at factory Only serial no.: >3000	Tighten slipping clutch with a screwdriver, as necessary. Factory setting: 20 +- 5N
		Slipping clutch of joint 1 too weak only serial no.: <3000	Replace slipping clutch of joint 1. Installation instructions currently being drafted
Support arm control	**Unit head drops when an additional load is applied.**	Spring weight compensation not properly set.	Tighten the spring using allen screw on spring arm. **Remarks:** The slipping clutch of the height adjustment is exclusively required to dampen the spring force. It is preset at the factory and can be adjusted slightly in exceptional cases. Generally, the following applies: Always tighten the spring for weight - force adjustment.
Support arm control	**The unit head keeps falling back to the lowest position.**	Slipping clutch torn off.	Dismount the slipping clutch. When the driving pin is not hammered in deep enough, drive it in and then mount back the slipping clutch with an undamaged groove.
		Slipping clutch has burst due to excessive tightening	Replace slipping clutch. Rep. no. 3319501
Support arm control	**Unit head does not swivel, motor is running.**	The grub screw used to attach the pinion to the back-geared motor 3 is loose.	Tighten the grub screw and secure with Loctite. (The back-geared motor must be dismounted to do this)
Assistant element	**Polylight cannot be started.** After removing the instrument the timer in the assistant panel does not switch over to the Polylight values and the Polylight cannot be started.	Software error PCB AJ software, assistant element. Polylight detection in case of an old Polylight (without electronics) using fan current defective. Software version on PCB AJ, Assistant element <1.9.	Replace AJ software (basic retrofit kit).
Assistant element	**Polylight light power is not in green range** when measured with Translux Test.	Fiber optic is not properly inserted or locked in place in the module.	Pull out the fiber optic and insert it again, until it catches.
		Lamp has air leaks so that the quartz tube has become opaque.	Replace the halogen lamp. Only use selected Osram Xenophot HLX bulbs.
		Lamp has not been inserted properly.	Lamp must lie flat against the heat sink, place the lug on the lamp in the notch intended for this purpose.
		Dirt in filter of lamp module, at light entrance or exit of fiber optic and of handpiece.	Clean all interfaces with ethanol

Compo-nent	Description of problem	Cause	Corrective action
Assistant element	**Short total failure.** SIROLUX (unit model), film viewers, if any, are shut off and must be switched on again. The suction and separator function are interrupted for 2–4 seconds and start up by themselves again. **Service code message in AP/HP: 40 08**	Software error on PCB WS, which can lead to a RESET of the module when filling the water tank and the disinfectant injection. **Serial no. <3000:** Software version on PCB WS <1.9. **Serial no. >3000:** Software version on PCB WS <2.1.	Replace AJ software. Part No.: 54 33 391
Water unit	**Amalgam separator full message too early.** Panel display amalgam and continuous tone, rotor not filled yet (total weight of rotor <500 g)	Software version on PCB WS <2.0.	Replace WS software. Part No.: 54 33 391
Water unit	**Amalgam separator goes over to fault mode, loud noises and vibration from amalgam separator.** Amalgam is flashing and intermittent beeping tone. **Service code message: WE 06**	Driver bolt defective. Bearing damage on motor (audible) due to leak in pump	Replace amalgam drive. Replace amalgam drive.
Water unit	**Amalgam separator goes over to fault mode.** Amalgam is flashing and intermittent beeping tone. (loud drive noise, rustling or standstill) **Service code WE: 5C** Drive below target speed	Motor is blocking Bearing in lower part is defective Rotor axle is defective Drain is blocked up Suction from lower part is blocked up	Replace the amalgam drive. Check the rotor's operation (must run smoothly) replace lower part, if necessary. Replace rotor Check siphon and drain, clean them if necessary. Check the hose path Clean suction channel in lower part of amalgam separator.
Water unit	**There is barely any water arriving to the tumbler filling**.	Media pipe is clogged due to precipitation in the heater element.	Replace heater, clean media pipes, if necessary.
Water unit	**Tumbler filling does not work from time to time.**	Software version on PCB WS <2.4. Float switch in mixing tank is caught.	A solution is being worked out. Replace float switch.
Water unit	**Vibrations of the amalgam separator**	Amalgam separator has been mounted stressed Defective rotor or flyweight Suction from lower part is blocked up Transport safety device has not been removed.	Position all connections to amalgam separator so as to leave 1mm clearance in all directions from amalgam separator, Replace rotor Clean suction channel Remove the transport safety device

Compo-nent	Description of problem	Cause	Corrective action
Water unit	**Tumbler falls into cuspidor**	Slope of cuspidor too steep	Reduce slope of cuspidor, if possible Order silicone mat free of charge Part No.: 54 46.443 Use of tumblers with hollow bottom
		Vibrations of the amalgam separator	See: **Vibrations of the amalgam separator**
Water unit	**Cuspidor does not drain off** intermittent beeping tone **Service code WE: 07**	Clogged drain, def. water detector, air pressure too low	Check drain and air pressure; Clean water detector or replace, if necessary; If everything is in order, reduce the flow of the cuspidor flushing
Water unit	**Water escapes from water unit**	Leaks on tumbler plug adapter	Replace sealing ring in plug adapter Part No.: 70 36 189 (red o-rings)
		Water escapes from mixing tank overflow, Clogged or badly positioned drain	Check slope of drain, Clean the siphon
Water unit	**Suction does not switch off or is delayed**	MV 33 is caught	Replace MV 33
Water unit	**Water unit is deformed in left-handed version**	Lack of stiffness in left-handed version	Retrofit reinforcing plate Part No.: 47 08 272
Water unit	**Disinfectant consumption too high**	Metering valve is leaking	Replace the metering valve Part No.: 14 35.580
Water unit	**Flushing water quantity:** **too low** **too high**	Control nozzle not properly adjusted	**1. Adjusting cuspidor flushing:** For **right-handed version** – Remove side panel **A** of water unit and adjust control nozzle **B** until the bottom of the cuspidor is flushed evenly. Remount back side panel **A** of water unit. For **left-handed version** – Remove cover **C**. Lift rubber cover and adjust control nozzle **B** using a coin until the bottom of the cuspidor is flushed evenly. Refit the cover. **2.** Check the swivel-back motion of the cuspidor: – Swivel the cuspidor into the movement range of the chair – Press the manual chair button and start the chair program consecutively The cuspidor must always swivel back into the starting position automatically
Patient chair	**Leaks in connection box**	Counter nut on ceramic valve is loose	Tighten the nut, fix by a lock nut and secure with locking varnish
Patient chair	**No chair motion after switching on.** Serial no.: <3000 Chair output stage version: Hardware PCB SE 1.0 **Service code message: ST 03 37 (also 01 01)**	Output stage relay is caught.	Replace PCB SE - Version 1.1.



Compo-nent	Description of problem	Cause	Corrective action
Patient chair	**No chair motion after switching on** only in cooled treatment center **Service code message: ST 02 00 to 02 05**	Temperature sensibility of PCB SS, Software version on PCB SS <2.0	Replace the software on PCB SS
Patient chair	**Chair does not reach programmed position.** Program key must be pressed several times, particularly when travelling to S or 0 position. No service code message in ST. Software PCB SS <1.8.	EMERGENCY STOP activated by EMERGENCY STOP sensory mechanism.	Replace software for diagnostics PCB SS, version >= 2.0 to recognize source of EMERGENCY STOP. Serial no.: <3000, Part No.: 54 33 680 Serial no.: >3000, Part No.: 54 33 409
		Defective or badly adjusted safety switch for foot part, or defective cable. **Service code ST 09 11**, EMERGENCY STOP activated by safety switch for foot part.	Adjust or replace the switch or cable. (Switch must only switch shortly before the upper end stop and must not be charged in the lower end stop).
		Defective safety switch for backrest, or defective cable or backrest mechanics jammed. **Service code ST 09 13**, EMERGENCY STOP activated by free lift switch of backrest.	Replace the switch or cable. Eliminate the stiffness of the backrest.
Patient chair	**Chair does not reach programmed position.** Program key must be pressed several times, or chair does not leave position. EMERGENCY STOP relay is switching. **Service code message in AP/HP: 40 04** (RESET AT) **No service code message in ST.** (more frequent for serial no.: >3000)	PCB TS is RESET due to excessively high watchdog tolerance.	Replace PCB TS.
		PCB TS: **C1/96, Serial no. >3000:** Hardware: <2.1, software: <1.5	**Serial no.: >3000**, Part No.: 46 96 931
		C1/A: Serial no. <3000: Hardware: <1.3	**Serial no.: <3000**, Part No.: 46 85 231
Patient chair	**Chair does not reach programmed position. Service code message: 08 0X; X = 0...2**	Broken wire in the motor sensor circuit (L16) Serial no. <3000.	Replace motor sensor circuit (L16).
		Contacts pushed back on connector X15 on motor circuit (L16).	Check contacts.
		Potentiometer 0–2 defective.	Switch the potentiometers between each other and check if error is reproduced, replace the potentiometer, if necessary
Patient chair	**Chair does not reach programmed position. Service code message: 08 03**	Potentiometer 3 no longer moves into gear due to worn sword rollers	Install roller kit Part No.: 54 33 870
Patient chair	**Chair does not travel to programmed position.**	Unintentional call of the factory programs, mostly with foot switch. (Display with icon ⇥|⇤ in odontogram)	Information to customers.

Compo-nent	Description of problem	Cause	Corrective action
Patient chair	**Chair keeps travelling when key is released on the panel.** Does not occur with operation using foot switch.	Keyboard sensitivity in dentist/assistant panel set too high.	Adjust the keyboard sensitivity in the service dialog of the panel (value must be greater). If this is not successful, please contact DCC Bensheim.
Patient chair	**Chair does not travel to zero position. Chair does not budge.** 0 key on panel is not active (gray without frame).	Not all instruments in dentist element are recognized as deposited.	Deposit instruments properly. If a stylized instrument appears in the chair program dialog under the inactive 0 key, go to the instrument dialog and deposit the corresponding instrument. If no stylized instrument is displayed, then check the SPRAYVIT light barrier.
Patient chair	**Chair starts travelling uncontrollably** If the chair is moved to a treatment position from the zero position using the HP, the AP remains in the zero position dialog. After removing and depositing an instrument, the AP remains in the zero position dialog. In this situation, the forward foot switch starts the movement to the starting position.	Software error in panel Serial no. <3000: Software version on PCB PS <1.8 Serial no. >3000: Software version on PCB PS <1.7	Serial number <3000: Software version on PCB PS >= 1.8 (Part No. 54 33 474) Serial number >3000: Software version on PCB PS >= 1.7 (Part No. 54 33 482)
Patient chair	**Programmed 4-way foot switch assignment (tilting part / backrest) is lost after switching off (serial no. <3000)**	Software error PCB SA1.3 the hardware settings on X12 are reused after switching on	Set 4-way foot switch assignment on X12, Jumper X12.1-4 set: Movement of back rest, Jumper not set: Tilting part motion
Patient chair	**Chair drives are getting louder**	Lack of lubrication between spindle and spindle nut Chair drive defective	Lubricate the spindle with grease 622 Part No. 18 73 947 Chesterton Replace chair drive
Patient chair	**Backrest squeaks when travelling or starting.**	Slip-in guides.	Do not lubricate! Adjust the slip-in guides with a clearance of about 0.2mm, or replace slip-in guides.
Patient chair	**Noises on the dentist element track.**	Uneven ground. Axle of the deflection roll. Belt tension too weak	Install compensation disks. Lubricate or replace the deflection axle, if necessary. Check belt tension and adjust, if necessary.
Dentist panel Assistant panel	**The key on the panel gets stuck.**	Sensitivity setting or temperature sensitivity of the piezo keys.	Set the keyboard sensitivity in the service dialog of the panel (value must be greater). If this is not successful, contact DCC Bensheim.

Compo-nent	Description of problem	Cause	Corrective action
Dentist panel Assistant panel	**Panel switches to reduced user dialog by itself.** If the foot switch is turned to the right after removing an instrument at the time the display changes, the key for the manual chair dialog remains active in the reduced or non-reduced instrument dialog until the changeover is made.	Software error on PCB PS Serial no. <3000: Software version on PCB PS <1.6 Serial no. >3000: Software version on PCB PS <1.5	Serial number <3000: Software version on PCB PS >= 1.8 Serial no. >3000: Software version on PCB PS >= 1.7
SIROLUX	**Sirolux switches off for a few minutes.** Switching of thermal switch due to overheating.	Software version WS <2.0 The temperature guard responds too early Maladjustment of the heat protection Lamp too deep in the thermal shield	Update software WS, (or reduce reflector factor to max. 4) Check the color of the supply cable of the temperature guard (recognizable after removing the handpiece). If it is yellow, replace the temperature guard (new: supply cable orange) Part No.: 47 08 108 Adjust the heat protection (instructions see list of spare parts) Check focus (see Operating Instructions)
SIROLUX	**SIROLUX switches off immediately after having been switched on**.	Circuitry goes over to current limitation and switches off. Software version installed on PCB WS 2.2.	Replace WS software. Part No.: 54 33 391
SIROLUX	**Glass tube cannot be fitted** Serial no. 6000–7569	Tolerance problems	Replace glass tube Part No.: 51 72 494

sirona
The Dental Company

6 Reading service codes

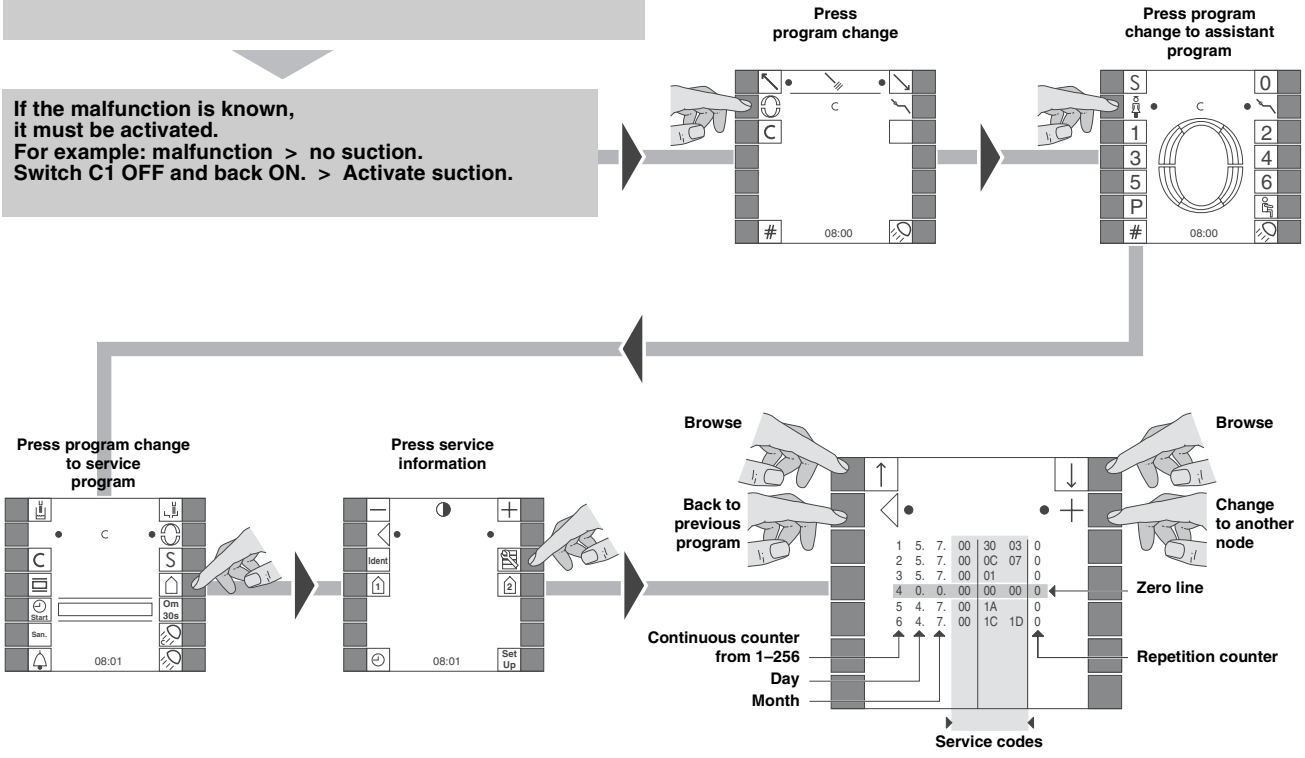
C1+

6.1 Reading the service codes on the dentist panel

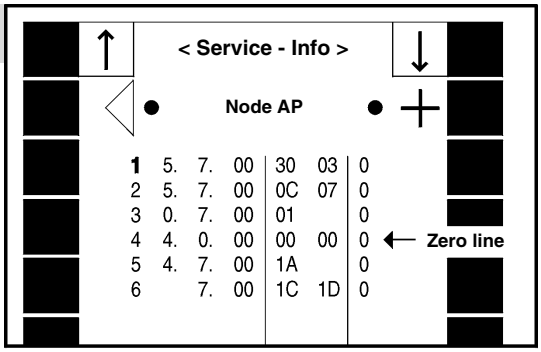
CAUTION!
Prior to starting troubleshooting the C1 treatment center must be switched OFF and back ON again.

Now, actuate all functions of the treatment center once:
- All instruments (removal and start)
- Both chair programs
- Cuspidor flushing and tumbler filling
- Remove ejector

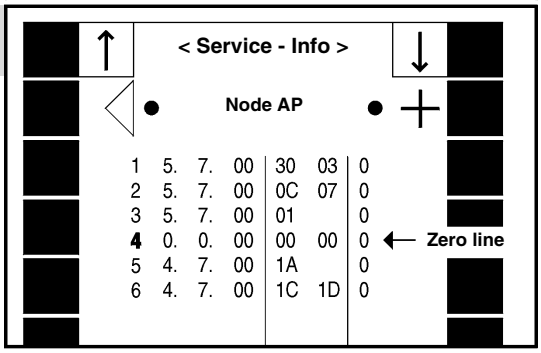
If the malfunction is known,
it must be activated.
For example: malfunction > no suction.
Switch C1 OFF and back ON. > Activate suction.



Only the **service codes above** the **zero line** must be taken into account for troubleshooting. The **most up-to-date service code** can be found in **line 1**.

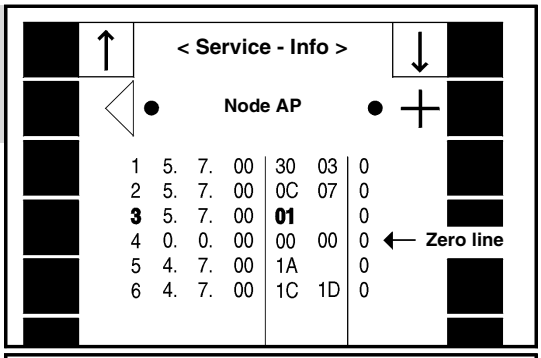


If the **zero line** is in **line 1**, the **queried node** (PCB) **is in order electrically**.



If there are **service codes above** the **zero line**, these must be analyzed as follows:

A Evaluate the service code above the zero line (line **3** in this example). The service code for this node (**AP**) can be found in the numbers between both vertical lines (01 in this example).

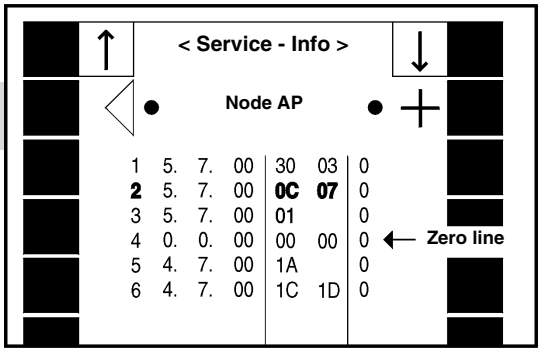


NOTE

If the vertical lines do not appear, the minimum configuration is not available (see chapter 2, section 2.3). In this case, refer to the service code list of the corresponding node. In the beginning of this list there is a reference to the column where you will find the service code!

B Take the corrective action for service code **01** (error_high) from the service code list.
An "H" after the service code indicates a hexadecimal number and should be disregarded.

C Evaluate the second service code above the zero line (in line 2 in this example, 0C 07).



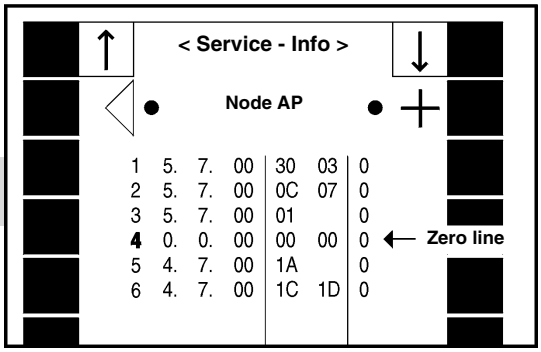
D Take the measure for service code 0C (error_high) 07 (error_low) from the service code list.

E Evaluate all additional service codes above the zero line as described in A–D.

F Check and evaluate all other nodes in the same way.

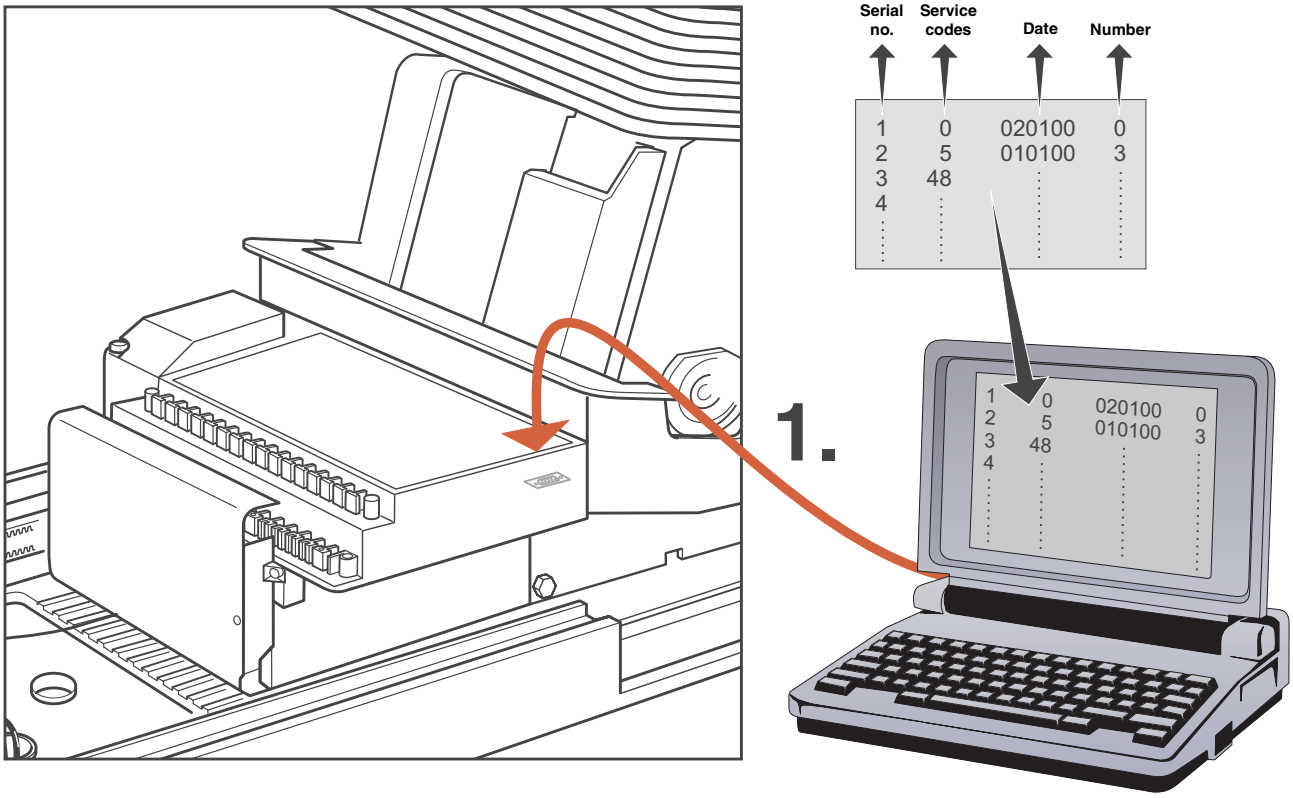
G Once the error has been eliminated successfully, switch the unit OFF and back ON.

H Actuate all the functions of the treatment center once:
- All instruments (removal and start)
- Both chair programs
- Cuspidor flushing and tumbler filling
- Remove ejector



I When the service codes are queried in all nodes, the zero line must appear as line 1.

6.2 Reading service codes with PC connection to C1+



Program: Hyperterminal

Bits per second:	9 600
Stop bit:	1
Data bits:	8
Parity:	none
Protocol:	none

1. Connect the PC to C1+ using the serial interface.
2. Once the terminal program (e.g., Hyperterminal) has been started, press the **ENTER key** to cause the connection box to send the service codes to the notebook.

Only implemented for SA software > 3.0!

sirona
The Dental Company

7 Service code listings

C1+

7.1 Abbreviations / service code listings

ADC	Analog-Digital Converter
AE	Dentist element
AG	Dentist element system board
AJ	Dentist element control module
AK	Connection box
AL	Siromot module
AO	HF modulation module
AP	Dentist panel
AS	Dentist element support arm
AT	Sprayvit module
CAN	Controlled Area Network
EEPROM	Electrically Erasable Programmable Read Only Memory
EPROM	Erasable Programmable Read Only Memory
PCB	Printed Circuit Board
FS	Foot switch
HE	Assistant element
HF	High frequency
HG	Assistant element system board
HP	Assistant panel
HW	Hardware
KL	Holder
LCD	Liquid Crystal Display
LED	Light Emitting Diode
M	Motor
Med_GV	Medizinische Geräteverordnung (Directive for medical devices)
MV	Solenoid valve
NA	Emergency Stop
NS	Power supply control module
Pot.	Potentiometer
RAM	Random Access Memory
ROM	Read Only Memory
SA	Connection box control module
SE	Chair output stage
SS	Chair control module
ST	Chair
SW	Software
TS	Support arm control module
U	Voltage
US	Ultrasound
WE	Water unit
WS	Water unit control module

7.2 Service code of PCB (SA) in connection box AK

7.2.1 SW version: 2.0 - 3.0

The service code (error_high) can be found in column 5 of the panel display.
(error_low) xx: disregard

error_ high	error_ low	Description of service code	Corrective action (engineer)
0h	xx	Zero error line	For analysis purposes only
1h	xx	Wrong reference voltage	! Replace PCB SA
2h	xx	At least one of the four input circuits of the foot switch is defective according to self-test	! Check all 4 input circuits of the foot switch (SA, X6.A1 to X6.A4 against X6.A5). 5V present on all of them? NO: Unplug connector X6. OK Examine/repair foot switch and cable NO: Replace PCB SA
3h	xx	At least one of the four input circuits of the 4-way foot switch is defective according to self-test	! Check all 4 input circuits of the 4-way foot switch (X12.2; X12.5; X12.6 and X12.7 against X12.3). 5V present on all of them? NO: Unplug connector X12. OK: Check 4-way foot switch and cable NO: Replace PCB SA
4h	xx	EMERGENCY STOP test failed (activation of EMERGENCY STOP could not be verified)	! Replace PCB SA
5h	xx	PIO fault detected	! Replace PCB SA
6h	xx	Software cannot be executed on PCB	Use compatible software! Inform Hotline
7h	xx	Relay PCB not recognized by PCB SA	? Relay PCB is missing or open circuit between PCB SA (X18.B3) and relay PCB (X1.3B)? NO: Replace PCB SA
8h	xx	Cannot write to CAN RAM	! Replace PCB SA
9h	xx	CAN communication impossible/faulty, BUS OFF condition has been detected If error persists: CAN module defective, CAN wiring defective	? Error occurs only once: Fault exists NO: Query using Ident dialog: All nodes available? YES: Replace PCB SA NO: Open circuit, see CAN wiring diagram
0Ah	xx	Input circuit of service key defective according to self-test	! Replace PCB SA
0Bh	xx	Input circuit of power supply fan defective according to self-test	No action required, service information only
0Ch	xx	Tmax input circuit defective according to self-test	No action required, service information only
0Dh	xx	Overload input circuit defective according to self-test	No action required, service information only
0Eh	xx	Power fail input circuit defective according to self-test	No action required, service information only
0Fh	xx	Input circuit of foot switch identification defective according to self-test	! Replace PCB SA
10h	xx	When writing to EEPROM no acknowledgement is received after authorized writing time	! Replace PCB SA
11h	xx	Cannot write/write properly to EEPROM	! Replace PCB SA
12h	xx	Comparison of RAM with mirrored RAM (in EEPROM) defective, EEPROM read/write error	! Replace PCB SA
13h	xx	EEPROM buffer capacity overflow	! Replace PCB SA
14h	xx	Read timeout on serial interface	No action required, service information only
15h	xx	Write timeout on serial interface	No action required, service information only
16h	xx	ADC BUSY signal authorized active time exceeded, ADC defective	! Replace PCB SA
17h	xx	No potential variation on burr during self-test, external error in foot switch potentiometer circuit, ground contact.	! Check foot switch potentiometer circuit NO: Replace PCB SA
18h	xx	No potential variation on burr during self-test, external error in AE potentiometer circuit	Check AE travel track potentiometer circuit NO: Replace PCB SA
19h	xx	Unused service code	
1Ah	xx	8V supply voltage outside tolerance Power supply failure, short-circuit, blown fuse, connector	! Check fuse F6 on NS ! Check 8V circuit SA X5.2 -> NS X2.2
1Bh	xx	12V supply voltage outside tolerance Power supply failure, short-circuit, blown fuse, connector	No action required, service information only

error_ high	error_ low	Description of service code	Corrective action (engineer)
1Ch	xx	16V supply voltage outside tolerance Power supply failure, short-circuit, blown fuse, connector	! Check fuse F7 on NS ! Check 16V circuit SA X5.3 -> NS X2.3
1Dh	xx	24V supply voltage outside tolerance Power supply failure, short-circuit, blown fuse, connector	! Check fuse F8 on NS ! Check 24V circuit SA X5.4 -> NS X2.4
1Eh	xx	32V supply voltage outside tolerance Power supply failure, short-circuit, blown fuse, connector	! Check fuse F9 on NS ! Check 32V circuit SA X5.5 -> NS X2.5
1Fh	xx	48V supply voltage outside tolerance Power supply failure, short-circuit, blown fuse, connector	! Check fuse F10 on NS ! Check 48V circuit SA X5.6 -> NS X2.6
20h	xx	Overload condition detected	For information only. Output stage power of chair is reduced automatically
21h	xx	Power fail detected in power supply	No action required, service information only
22h	xx	Temperature exceeded in AK power supply (Tmax)	No action required, service information only
23h	xx	Unknown service command will be ignored	Incompatible service command in system or in link to diagnostics system. Inform Hotline!
24h	xx	Service command will be ignored, incorrect parameter	Incompatible service command in system or in link to diagnostics system. Inform Hotline!
25h	xx	For version 1.x only	No action required, inform Hotline!
26h	xx	8V supply voltage below tolerance, Power supply failure, short-circuit, blown fuse, connector	! Check fuse F6 on NS ! Check 8V circuit SA X5.2 -> NS X2.2
27h	xx	Unused service code	
28h	xx	MV35 current limiting active. External short-circuit	! Unplug connector X14 ? Error persists when cuspidor flushing is activated YES: Replace PCB SA NO: Check circuit SA X14.1 -> X14.2 MV35
29h	xx	Output circuit of cuspidor flushing valve signal (MV35) defective I_load required: =0, Actual: >0	? Cuspidor flushing active without key activation YES: Replace PCB SA NO: Check circuit SA X14.1 -> X14.2 MV35
2Ah	xx	MV35 current too low. External open circuit.	! Activate cuspidor flushing; measure voltage between SA X14.1 and X14.2 ? U = 24V: Check circuit MV35 ? U = 0V: Replace PCB SA
2Bh	xx	Unused service code	
2Ch	xx	Magnetic coupling travel track AT, current limiting active. External short-circuit	! Unplug connector X19 ? Error persists when the coupling is activated YES: Replace PCB SA NO: Check circuit SA X19.4 -> X19.5 magnetic coupling
2Dh	xx	Output circuit of magnetic coupling travel track AT signal defective I_load required: =0, Actual: >0	? Coupling active without key activation YES: Replace PCB SA NO: Check circuit SA X19.4 -> X19.5 magnetic coupling
2Eh	xx	Magnetic coupling travel track AT, current too low External open circuit.	! Activate coupling; measure voltage between CBC X19.4 and X19.5 ? U = 24V: Check magnetic coupling circuit ? U = 0V: Replace PCB SA
2Fh	xx	Unused service code	
30h	xx	Suction pump relay, current limiting active. Short-circuit: Connector pins, contacts fused, coil defective	! Unplug connector X18 on PCB SA ? Error occurs when the relay is activated YES: Replace PCB SA NO: Re-insert X18 and unplug connector X1 on relay PCB ? Error persists when the relay is activated YES: Wiring defective NO: Relay PCB defective
31h	xx	Output circuit of relay suction pump signal defective I_load required: =0, Actual: >0	? Relay active without key activation YES: Replace PCB SA NO: Check circuit SA X18.A1 -> X18.A4 relay suction pump
32h	xx	Relay suction pump, current too low. Open circuit.	! Activate relay; measure voltage between SA X18.A1 and X18.A4 ? U = 24V: Check circuit between SA X18.A1 and X18.A4 ? U = 0V: Replace PCB SA
33h	xx	Unused service code	

error_ high	error_ low	Description of service code	Corrective action (engineer)
34h	xx	Free relay current limiting active. Short-circuit: Connector pins, contacts fused, coil defective	! Unplug connector X18 on PCB SA ? Error occurs when the relay is activated YES: Replace PCB SA NO: Re-insert X18 and unplug connector X1 on relay PCB ? Error persists when the relay is activated YES: Wiring defective NO: Relay PCB defective
35h	xx	Output circuit of free relay signal defective I_load required: =0, Actual: >0	? Relay active without key activation YES: Replace PCB SA NO: Check circuit SA X18.A1 -> X18.A2 free relay
36h	xx	Free relay current too low. Open circuit.	! Activate relay; measure voltage between SAX18.A1 and X18.A2 ? U = 24V: Check circuit between SA X18.A1 and X18.A2 ? U = 0V: Replace PCB SA
37h	xx	Unused service code	
38h	xx	Bell relay current limiting active. Short-circuit: Connector pins, contacts fused, coil defective	! Unplug connector X18 on PCB SA ? Error occurs when the relay is activated YES: Replace PCB SA NO: Re-insert X18 and unplug connector X1 on relay PCB ? Error persists when the relay is activated YES: Wiring defective NO: Relay PCB defective
39h	xx	Output circuit of bell relay signal defective I_load required: =0, Actual: >0	? Relay active without key activation YES: Replace PCB SA NO: Check circuit SA X18.A1 -> X18.A3 bell relay
3Ah	xx	Bell relay current too low. Open circuit.	! Activate relay; measure voltage between SA X18.A1 and X18.A3 ? U = 24V: Check circuit between SA X18.A1 and X18.A3 ? U = 0V: Replace PCB SA
3Bh	xx	Unused service code	
3Ch	xx	Ozone fan (1) driver circuit, current limiting active. External short-circuit	! Unplug connector X15 ? Error persists when the ozone fan is activated YES: Replace PCB SA NO: Check SA X15.1 -> X15.3 ozone fan
3Dh	xx	Output circuit of ozone fan signal defective I_load required: =0, Actual: >0	? Ozone fan active without key activation YES: Replace PCB SA NO: Check SA X15.1 -> X15.3 ozone fan
3Eh	xx	Ozone fan (1) driver circuit, current too low. External open circuit.	! Activate ozone fan; measure voltage between SA X15.1 and X15.3 ? U = 24V: Check ozone fan circuit ? U = 0V: Replace PCB SA
3Fh	xx	Unused service code	
40h	xx	Output signal RESERVE1 is not used	No action required, service information only
41h	xx	Output signal RESERVE1 is not used	No action required, service information only
42h	xx	Output signal RESERVE1 is not used	No action required, service information only
43h	xx	Unused service code	
44h	xx	VB direction relay, current limiting active. Short-circuit: Relay contacts fused, coil defective	! Replace PCB SA
45h	xx	Output circuit of VB direction relay signal defective I_load required: =0, Actual: >0	! Replace PCB SA
46h	xx	VB direction relay driver, current too low Open circuit.	! Replace PCB SA
47h	xx	Unused service code	
48h	xx	MV56 (ozone) driver current limiting active. External short-circuit	! Unplug connector X15 ? Error persists when the air purifier is activated YES: Replace PCB SA NO: Check circuit SA X15.1 -> X15.4 MV56
49h	xx	Output circuit of MV56 signal defective I_load required: =0, Actual: >0	? Air purifier active without key activation YES: Replace PCB SA NO: Check circuit SA X15.1 -> X15.4 MV56
4Ah	xx	MV56 driver current too low. External open circuit.	! Activate air purifier; measure voltage between SA X15.1 and X15.4 ? U = 24V: Check MV56 circuit ? U = 0V: Replace PCB SA
4Bh	xx	Unused service code	

error_ high	error_ low	Description of service code	Corrective action (engineer)
4Ch	xx	High voltage generator relay, current limiting active. Short-circuit: Connector pins, contacts fused, coil defective	! Unplug connector X18 on PCB SA ? Error occurs when the relay is activated YES: Replace PCB SA NO: Re-insert X18 and Unplug connector X1 on relay PCB ? Error persists when the relay is activated YES: Wiring defective NO: Relay PCB defective
4Dh	xx	Output circuit of high voltage generator relay signal defective I_load required: =0, Actual: >0	? Relay active without key activation YES: Replace PCB SA NO: Check circuit SA X18.A1 -> X18.A5 high voltage relay
4Eh	xx	High voltage generator relay, current too low. Open circuit	! Activate relay; measure voltage between SA X18.A1 and X18.A5 ? U = 24V: Check circuit between SA X18.A1 and X18.A5 ? U = 0V: Replace PCB SA
4Fh	xx	Unused service code	
50h	xx	MV1 driver (water tank or ozone tank 1) current limiting active. External short-circuit	! Unplug connector X14 ? Error persists when MV1 is activated YES: Replace PCB SA NO: Check circuit SA X14.1 -> X14.4 MV1
51h	xx	Output circuit of MV1 signal (water tank or ozone tank 1) defective I_load required: =0, Actual: >0	? MV1 active without key activation YES: Replace PCB SA NO: Check circuit SA X14.1 -> X14.4 MV1
52h	xx	MV1 driver (water tank or ozone tank 1) current too low. External open circuit.	! Activate MV1; measure voltage between SA X14.1 and X14.4 ? U = 24V: Check MV1 circuit ? U = 0V: Replace PCB SA
53h	xx	Unused service code	
54h	xx	MV51 driver (ozone tank 2) current limiting active. External short-circuit	! Unplug connector X24 ? Error persists when MV51 is activated YES: Replace PCB SA NO: Check circuit SA X24.1 -> X24.2 MV51
55h	xx	Output circuit of MV51 signal (ozone tank 2) defective I_load required: =0, Actual: >0	? MV51 active without key activation YES: Replace PCB SA NO: Check circuit SA X24.1 -> X24.2 MV51
56h	xx	MV51 driver (ozone tank 2) current too low. External open circuit.	! Activate MV51; measure voltage between SA X24.1 and X24.2 ? U = 24V: Check MV51 circuit ? U = 0V: Replace PCB SA
57h	xx	Unused service code	
58h	xx	HE travel track magnetic coupling driver, current limiting active. External short-circuit	No action required, service information only
59h	xx	Output circuit of HE travel track magnetic coupling signal defective I_load required: =0, Actual: >0	No action required, service information only
5Ah	xx	HE travel track magnetic coupling driver, current too low. External open circuit.	No action required, service information only
5Bh	xx	Unused service code	
5Ch	xx	Reserve_1 driver current limiting active. External short-circuit	No action required, service information only
5Dh	xx	Output circuit of Reserve_1 signal defective I_load required: =0, Actual: >0	No action required, service information only
5Eh	xx	Reserve_1 driver current too low. External open circuit.	No action required, service information only
5Fh	xx	Unused service code	
60h	xx	Reserve_2 driver current limiting active. External short-circuit	No action required, service information only
61h	xx	Output circuit of Reserve_2 signal defective I_load required: =0, Actual: >0	No action required, service information only
62h	xx	Reserve_2 driver current too low. External open circuit.	No action required, service information only
63h	xx	Unused service code	
64h	xx	Unused service code	
65h	xx	Unused service code	
66h	xx	Unused service code	

error_ high	error_ low	Description of service code	Corrective action (engineer)
67h	xx	Unused service code	
68h	xx	Unused service code	
69h	xx	Unused service code	
6Ah	xx	Unused service code	
6Bh	xx	Unused service code	
6Ch	xx	Unused service code	
6Dh	xx	Unused service code	
6Eh	xx	Input circuit of VB-AE detection defective according to self-test result	! Check input circuit of VB-AE detection (X11.1 and X11.3) NO: Replace PCB SA
6Fh	xx	Input circuit of Kfs function acknowledgement defective according to self-test result	! Check input circuit of KFS acknowledgement (X12.1 and X12.3) NO: Replace PCB SA
70h	xx	Input circuit of ozone detection defective according to self-test result	! Check input circuit of ozone acknowledgement (X15.6 and X15.7) NO: Replace PCB SA
71h	xx	Input circuit of power supply fan defective according to self-test result	! Check input circuit of power supply fan (X23.B4 and X23.B6) NO: Replace PCB SA
72h	xx	Input circuit of Reserve_Input (RSVIN) defective according to self-test result	! Check input circuit of Reserve_Input (RSVIN) (X22.5 and X22.6) NO: Replace PCB SA
73h	xx	Unused service code	
74h	xx	Unused service code	
75h	xx	Unused service code	
76h	xx	Unused service code	
77h	xx	Unused service code	
78h	xx	AE travel track motor driver, current limiting active. External short-circuit	! Unplug connector X19 ? Error persists when the motor is activated YES: Replace PCB SA NO: Check circuit SA X19.1 -> X19.2 motor
79h	xx	Output circuit of AE travel track motor signal defective I_load required: =0, Actual: >0	? Motor active without key activation YES: Replace PCB SA NO: Check circuit SA X19.1 -> X19.2 motor
7Ah	xx	AE travel track motor driver, current too low. External open circuit.	! Activate motor, measure voltage between SA X19.1 and X19.2 ? U = 24V: Check motor circuit ? U = 0V: Replace PCB SA
7Bh	xx	Unused service code	
7Ch	xx	For version 1.x only	No action required, inform Hotline!
7Dh	xx	For version 1.x only	No action required, inform Hotline!
7Eh	xx	For version 1.x only	No action required, inform Hotline!

7.2.2 SW version: 1.1- 1.3

The service code (error_high) can be found in column 5 of the panel display.

xx: disregard

error_ high	error_ low	Description of service code	Corrective action (engineer)
0h	xx	Zero error line	For analysis purposes only
01h	xx	For versions > 2.x only	No action required, inform Hotline!
02h	xx	Input circuit of foot switch defective according to self-test	? Check circuit SA X6.4B against X6.1A, 6.2A, X6.3A, X6.4A: 5V present? OK: Check/repair foot switch and cable NO: Replace PCB AK
03h	xx	For versions > 2.x only	No action required, inform Hotline!
04h	xx	Unused service code	
05h	xx	PIO fault detected	! Replace PCB SA
06h	xx	For versions > 2.x only	No action required, inform Hotline!
07h	xx	For versions > 2.x only	No action required, inform Hotline!
08h	xx	Cannot write to CAN RAM	! Replace PCB SA
09h	xx	CAN communication impossible/faulty, BUS OFF condition has been detected If error persists: CAN module defective, CAN wiring defective	? Error occurs only once: Fault exists NO: Query using Ident dialog: All nodes available? YES: Replace PCB SA NO: Open circuit, see CAN wiring diagram
0Ah	xx	Input circuit of service key defective according to self-test	! Replace PCB SA
0Bh	xx	Input circuit of power supply fan defective according to self-test	No action required, service information only
0Ch	xx	Tmax input circuit defective according to self-test	No action required, service information only
0Dh	xx	Overload input circuit defective according to self-test	No action required, service information only
0Eh	xx	Power fail input circuit defective according to self-test	No action required, service information only
0Fh	xx	Service code not valid for this version	No action required, service information only
10h	xx	When writing to EEPROM no acknowledgement is received after authorized writing time	! Replace PCB SA
11h	xx	For versions > 2.x only	No action required, service information only
12h	xx	Comparison of RAM with mirrored RAM (in EEPROM) defective, EEPROM read/write error	! Replace PCB SA
13h	xx	EEPROM buffer capacity overflow	No action required, service information only
14h	xx	Read timeout on serial interface	No action required, service information only
15h	xx	Write timeout on serial interface	No action required, service information only
16h	xx	ADC BUSY signal authorized active time exceeded, ADC defective	! Replace PCB SA
17h	xx	No potential variation on burr during self-test, external error in foot switch potentiometer circuit, ground contact.	! Check foot switch potentiometer circuit NO: Replace PCB SA
18h	xx	No potential variation on burr during self-test, external error in AE potentiometer circuit	Check AE travel track potentiometer circuit NO: Replace PCB SA
19h	xx	Unused service code	
1Ah	xx	8V supply voltage outside tolerance (+/- 10%), Power supply failure, short-circuit, blown fuse, connector!	! Check fuse F6 on NS Check 8V circuit SA X5.2 -> NS X2.2
1Bh	xx	12V supply voltage outside tolerance (+/-10%), Power supply failure, short-circuit, blown fuse, connector!	No action required, service information only
1Ch	xx	16V supply voltage outside tolerance (+/-10%), Power supply failure, short-circuit, blown fuse, connector	! Check fuse F7 on NS ! Check 16V circuit SA X5.3 -> NS X2.3
1Dh	xx	24V supply voltage outside tolerance (+/-10%), Power supply failure, short-circuit, blown fuse, connector	! Check fuse F8 on NS ! Check 16V circuit SA X5.3 -> NS X2.3
1Eh	xx	32V supply voltage outside tolerance (+/-10%), Power supply failure, short-circuit, blown fuse, connector	! Check fuse F9 on NS ! Check 32V circuit SA X5.5 -> NS X2.5
1Fh	xx	48V supply voltage outside tolerance (+/-10%), Power supply failure, short-circuit, blown fuse, connector	! Check fuse F10 on NS ! Check 48V circuit SA X5.6 -> NS X2.6

error_ high	error_ low	Description of service code	Corrective action (engineer)
20h	xx	Overload condition detected	for information only, for chair: reduction of output stage power
21h	xx	Power fail detected in power supply	No action required, service information only
22h	xx	Tmax exceeded	No action required, service information only
23h	xx	Unknown service command will be ignored	Incompatible service command in system or in link to diagnostics system, Inform Hotline!
24h	xx	Service command will be ignored, incorrect parameter	Incompatible service command in system or in link to diagnostics system, Inform Hotline!
25h	xx	No potential variation on AD input during self-test, External error on 4-way foot switch circuit. Open circuit, external resistors defective	Check circuit of 4-way foot switch SA X12.6+7 -> 4-way foot switch via R5
26h	xx	For version 2.x only	No action required, inform Hotline!
27h	xx	Unused service code	
28h	xx	MV35 current limiting active. External short-circuit	! Unplug connector X14 ? Error persists when cuspidor flushing is activated YES: Replace PCB SA NO: Check circuit SA X14.1 -> X14.2 MV35
29h	xx	Output circuit of cuspidor flushing valve signal (MV35) defective I_load required: =0, Actual: >0	? Cuspidor flushing active without key activation YES: Replace PCB SA NO: Check circuit SA X14.1 -> X14.2 MV35
2Ah	xx	MV35 current too low. External open circuit.	! Activate cuspidor flushing; measure voltage between SA X14.1 and X14.2 ? U = 24V: Check circuit MV35 ? U = 0V: Replace PCB SA
2Bh	xx	Unused service code	
2Ch	xx	Magnetic coupling travel track AT, current limiting active. External short-circuit	! Unplug connector X19 ? Error persists when the coupling is activated YES: Replace PCB SA NO: Check circuit SA X19.4 -> X19.5 magnetic coupling
2Dh	xx	Output circuit of magnetic coupling travel track AT signal defective I_load required: =0, Actual: >0	? Coupling active without key activation YES: Replace PCB SA NO: Check circuit SA X19.4 -> X19.5 magnetic coupling
2Eh	xx	Magnetic coupling travel track AT, current too low External open circuit.	! Activate coupling; measure voltage between SA X19.4 and X19.5 ? U = 24V: Check magnetic coupling circuit ? U = 0V: Replace PCB SA
2Fh	xx	Unused service code	
30h	xx	Suction pump relay, current limiting active. Short-circuit: Connector pins, contacts fused, coil defective	! Replace PCB SA
31h	xx	Output circuit of relay suction pump signal defective I_load required: =0, Actual: >0	! Replace PCB SA
32h	xx	Relay suction pump, current too low. Open circuit.	! Replace PCB SA
33h	xx	Unused service code	
34h	xx	Free relay current limiting active. Short-circuit: Connector pins, contacts fused, coil defective	! Replace PCB SA
35h	xx	Output circuit of free relay signal defective I_load required: =0, Actual: >0	! Replace PCB SA
36h	xx	Free relay current too low. Open circuit.	! Replace PCB SA
37h	xx	Unused service code	
38h	xx	Bell relay current limiting active. Short-circuit: Connector pins, contacts fused, coil defective	! Replace PCB SA
39h	xx	Output circuit of bell relay signal defective I_load required: =0, Actual: >0	! Replace PCB SA
3Ah	xx	Bell relay current too low. Open circuit.	! Replace PCB SA
3Bh	xx	Unused service code	
3Ch	xx	Not generated in version 1.x	No action required, inform Hotline!
3Dh	xx	Not generated in version 1.x	No action required, inform Hotline!

error_ high	error_ low	Description of service code	Corrective action (engineer)
3Eh	xx	Not generated in version 1.x	No action required, inform Hotline!
3Fh	xx	Unused service code	
40h	xx	Not generated in version 1.x	No action required, inform Hotline!
41h	xx	Not generated in version 1.x	No action required, inform Hotline!
42h	xx	Not generated in version 1.x	No action required, inform Hotline!
43h	xx	Unused service code	
44h	xx	MV57 driver current limiting active. External short-circuit	! Unplug connector X15 ? Error persists when the ozone valve is activated YES: Replace PCB SA NO: Check circuit SA X15.1 -> X15.5 MV57
45h	xx	Output circuit of MV57 signal defective I_load required: =0, Actual: >0	? Ozone valve active without key activation YES: Replace PCB SA NO: Check circuit SA X15.1 -> X15.5 MV57
46h	xx	MV57 driver current too low. External open circuit.	! Activate ozone valve measure voltage between SA X15.1 and X15.5 ? U = 24V: Check MV57 circuit ? U = 0V: Replace PCB SA
47h	xx	Unused service code	
48h	xx	MV56 driver current limiting active. External short-circuit	! Unplug connector X15 ? Error persists when the air purifier is activated YES: Replace PCB SA NO: Check circuit SA X15.1 -> X15.4 MV56
49h	xx	Output circuit of MV56 signal defective I_load required: =0, Actual: >0	? Air purifier active without key activation YES: Replace PCB SA NO: Check circuit SA X15.1 -> X15.4 MV56
4Ah	xx	MV56 driver current too low. External open circuit.	! Activate air purifier; measure voltage between SA X15.1 and X15.4 ? U = 24V: Check MV56 circuit ? U = 0V: Replace PCB SA
4Bh	xx	Unused service code	
4Ch	xx	High voltage generator relay, current limiting active. Short-circuit: Connector pins, contacts fused, coil defective	! Unplug connector X15 ? Error persists when the high voltage generator relay is activated YES: Replace PCB SA NO: Check circuit SA X15.1 -> X15.2 relay
4Dh	xx	Output circuit of high voltage generator relay signal defective I_load required: =0, Actual: >0	? High voltage generator relay active without key activation YES: Replace PCB SA NO: Check circuit SA X15.1 -> X15.2 relay
4Eh	xx	High voltage generator relay current too low. Open circuit.	! Activate high voltage generator relay; measure voltage between SA X15.1 and X15.2 ? U = 24V: Check relay circuit ? U = 0V: Replace PCB SA
4Fh	xx	Unused service code	
50h	xx	MV1 driver (water tank or ozone tank 1) current limiting active. External short-circuit	! Unplug connector X14 ? Error persists when MV1 is activated YES: Replace PCB SA NO: Check circuit SA X14.3 -> X14.4 MV1
51h	xx	Output circuit of MV1 signal (water tank or ozone tank 1) defective I_load required: =0, Actual: >0	? MV1 active without key activation YES: Replace PCB SA NO: Check circuit SA X14.3 -> X14.4 MV1
52h	xx	MV1 driver (water tank or ozone tank 1) current too low. External open circuit.	! Activate MV1; measure voltage between SA X14.3 and X14.4 ? U = 24V: Check MV1 circuit ? U = 0V: Replace PCB SA
53h	xx	Unused service code	
54h	xx	MV51 driver (ozone tank 2) current limiting active. External short-circuit	! Unplug connector X24 ? Error persists when MV51 is activated YES: Replace PCB SA NO: Check circuit SA X24.1 -> X24.2 MV51
55h	xx	Output circuit of MV51 signal (ozone tank 2) defective I_load required: =0, Actual: >0	? MV51 active without key activation YES: Replace PCB SA NO: Check circuit SA X24.1 -> X24.2 MV51
56h	xx	MV51 driver (ozone tank 2) current too low. External open circuit.	! Activate MV51; measure voltage between SA X24.1 and X24.2 ? U = 24V: Check MV51 circuit ? U = 0V: Replace PCB SA

error_ high	error_ low	Description of service code	Corrective action (engineer)
57h	xx	Unused service code	
58h	xx	HE travel track magnetic coupling driver, current limiting active. External short-circuit	No action required, service information only
59h	xx	Output circuit of HE travel track magnetic coupling signal defective I_load required: =0, Actual: >0	No action required, service information only
5Ah	xx	HE travel track magnetic coupling driver, current too low. External open circuit.	No action required, service information only
5Bh	xx	Unused service code	
5Ch	xx	Reserve_1 driver, current limiting active. External short-circuit	No action required, service information only
5Dh	xx	Output circuit of Reserve_1 signal defective I_load required: =0, Actual: >0	No action required, service information only
5Eh	xx	Reserve_1 driver, current too low. External open circuit.	No action required, service information only
5Fh	xx	Unused service code	
60h	xx	Reserve_2 driver, current limiting active. External short-circuit	No action required, service information only
61h	xx	Output circuit of Reserve_2 signal defective I_load required: =0, Actual: >0	No action required, service information only
62h	xx	Reserve_2 driver, current too low. External open circuit.	No action required, service information only
63h	xx	Unused service code	
64h	xx	Unused service code	
65h	xx	Unused service code	
66h	xx	Unused service code	
67h	xx	Unused service code	
68h	xx	Unused service code	
69h	xx	Unused service code	
6Ah	xx	Unused service code	
6Bh	xx	Unused service code	
6Ch	xx	Unused service code	
6Dh	xx	Unused service code	
6Eh	xx	For versions > 2.x only	No action required, inform Hotline!
6Fh	xx	For versions > 2.x only	No action required, inform Hotline!
70h	xx	For versions > 2.x only	No action required, inform Hotline!
71h	xx	For versions > 2.x only	No action required, inform Hotline!
72h	xx	For versions > 2.x only	No action required, inform Hotline!
73h	xx	Unused service code	
74h	xx	Unused service code	
75h	xx	Unused service code	
76h	xx	Unused service code	
77h	xx	Unused service code	
78h	xx	AE travel track motor driver, current limiting active. External short-circuit	! Unplug connector X19 ? Error persists when the motor is activated YES: Replace PCB SA NO: Check circuit SA X19.1 -> X19.2 motor for short-circuit
79h	xx	Output circuit of AE travel track motor signal defective I_load required: =0, Actual: >0	? Motor active without key activation YES: Replace PCB SA NO: Check circuit SA X19.1 -> X19.2 motor
7Ah	xx	AE travel track motor driver, current too low. External open circuit.	! Activate motor; measure voltage between SA X19.1 and X19.2 ? U = 24V: Check motor circuit ? U = 0V: Replace PCB SA
7Bh	xx	Unused service code	
7Ch	xx	HE travel track motor driver, current limiting active. External short-circuit	No action required, service information only

error_ high	error_ low	Description of service code	Corrective action (engineer)
7Dh	xx	Output circuit of HE travel track motor signal defective I_load required: =0, Actual: >0	No action required, service information only
7Eh	xx	HE travel track motor driver, current too low. External open circuit.	No action required, service information only

7.3 Service messages of PCB (AJ) in dentist element AE

7.3.1 SW version: 1.4 - 2.5

There are both two-digit and four-digit service codes.
Two-digit service codes (error_high) can be found in column 5 on the panel display.
Four-digit service codes consist of the entries in column 5 (error_high) and column 6 (error_low) on the panel.

Service codes are displayed in HEX format
(error_low) xx: disregard

error_ high	error_ low	Description of service code	Corrective action (engineer)
00h	xx	Zero error line	For analysis purposes only
01h	xx	Control module: Cannot address/write to CAN RAM	! Replace PCB AJ ! Check cable path CANH AJ X1.21A -> AG X4.21A -> AG X1.1 -> chair GA1 X1.1 -> SA X1.1A ! Check cable path CANL AJ X1.21B -> AG X4.21B -> AG X1.2 -> chair GA1 X1.2 -> SA X1.2A
02h	xx	EEPROM software control module AE error	If the error occurs several times between C1 power-on / power-off: ! Replace PCB AJ
03h	xx	48V supply voltage outside tolerance Power supply failure, short-circuit, blown fuse, connector	! Check fuse F5 on NS ! 48V cable path; AJ -> AG -> chair GA1 -> NS X1.6
04h	xx	24V supply voltage outside tolerance Power supply failure, short-circuit, blown fuse, connector	! Check fuse F3 on NS ! 24V cable path; AJ -> AG -> chair GA1 -> NS X1.4
05h	xx	16V supply voltage outside tolerance Power supply failure, short-circuit, blown fuse, connector	! Check fuse F2 on NS ! 16V cable path; AJ -> AG -> chair GA1 -> NS X1.3
06h	xx	Control module: RAM error	! Replace PCB AJ
07h	xx	Control module: ROM error	! Replace PCB AJ
08h	xx	At least one actuator output is short-circuited to the ground, control module defective. Subsequent service code shows output.	! Replace PCB AJ NO: Replace PCB AV ! Search for ground contact on AG X4 or AG X8
09h	xx	Output driver stage defective Relay KL1 output: Required: High; Actual: Passive	Remove PCB AJ ?12V on connector X4.15B ? YES: AJ defective NO: Replace PCB AV ?12V on connector X4.15B? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AV and AJ
0Ah	xx	Output driver stage defective Relay KL2 output: Required: High; Actual: Passive	Remove PCB AJ ?12V on connector X4.13B ? YES: AJ defective NO: Replace PCB AV ?12V on connector X4.13B ? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AV and AJ
0Bh	xx	Output driver stage defective Relay KL3 output: Required: High; Actual: Passive	Remove PCB AJ ?12V on connector X4.14A ? YES: AJ defective NO: Replace PCB AV ?12V on connector X4.14A ? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AV and AJ
0Ch	xx	Output driver stage defective Relay KL4 output: Required: High; Actual: Passive	Remove PCB AJ ?12V on connector X4.14B ? YES: AJ defective NO: Replace PCB AV ?12V on connector X4.14B ? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AV and AJ

error_ high	error_ low	Description of service code	Corrective action (engineer)
0Dh	xx	Output driver stage defective Relay KL5 output: Required: High; Actual: Passive	Remove PCB AJ ?12V on connector X4.15A ? YES: AJ defective, NO: Replace PCB AV ?12V on connector X4.15A ? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AV and AJ
0Eh	xx	Output driver stage defective Motor normal output: Required: High; Actual: Passive	! Replace PCB AJ
0Fh	xx	Output driver stage defective Motor SLS output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.13A ? YES: AJ defective, NO: Replace PCB AL ?5V on connector X4.13A ? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AL and AJ
10h	xx	Output driver stage defective Saline output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.19A ? YES: AJ defective, NO: Replace PCB AH ?5V on connector X4.19A ? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AH and AJ
11h	xx	Output driver stage defective US output: Required: High; Actual: Passive	Remove PCB AJ ?8V on connector X4.12A ? YES: AJ defective, NO: Replace PCB AG; reuse old PCB AJ
12h	xx	Output driver stage defective HF output: Required: High; Actual: Passive	! Replace PCB AJ
13h	xx	Output driver stage defective Polylight start-up output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.8B ? YES: AJ defective, NO: Replace PCB AS ?5V on connector X4.8B ? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AS and AJ
14h	xx	Output driver stage defective Polylight on output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.9B ? YES: AJ defective, NO: Replace PCB AS ?5V on connector X4.9B ? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AS and AJ
15h	xx	Output driver stage defective Sprayvit on output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.9A ? YES: AJ defective, NO: Replace PCB AS ?5V on connector X4.9A ? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AS and AJ
16h	xx	Output driver stage defective Heater off output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.8A ? YES: AJ defective, NO: Replace PCB AH ?5V on connector X4.8A ? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AH and AJ
17h	xx	Output driver stage defective Serial off output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.16A ? YES: AJ defective, NO: Replace PCB AH ?5V on connector X4.16A ? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AH and AJ

error_ high	error_ low	Description of service code	Corrective action (engineer)
18h	xx	Output driver stage defective Saliva ejector speed output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.17A ? YES: AJ defective, NO: Replace PCB AH ?5V on connector X4.17A ? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AH and AJ
19h	xx	Output driver stage defective Strobe / suction hose output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.19B ? YES: AJ defective, NO: Replace PCB AH ?5V on connector X4.19B ? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AH and AJ
1Ah	xx	Output driver stage defective OE MV/optional suction instr. output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.17B ? YES: AJ defective, NO: Replace PCB AH ?5V on connector X4.17B ? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AH and AJ
1Bh	xx	Output driver stage defective SregL/SV air output: Required: High; Actual: Passive	! Replace PCB AJ
1Ch	xx	Output driver stage defective SregW/SV water output: Required: High; Actual: Passive	! Replace PCB AJ
1Dh	xx	Output driver stage defective Light on output: Required: High; Actual: Passive	Remove PCB AJ ?12V on connector X4.6B ? YES: AJ defective, NO: Replace PCB AV ?12V on connector X4.6B ? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AV and AJ
1Eh	xx	Foot switch input circuit defective Error on PCB control module	! Replace PCB AJ
1Fh	xx	Serial_input input circuit defective	! Replace PCB AJ NO: Replace PCB AH Check cable path X1.16B -> X4.16B -> X9.13A -> X1.13A
20h	xx	Sprayvit input circuit defective (possible errors on PCB: AJ, AG or AS)	Remove PCB AS ?5V on connector X5.17A ? YES: AS defective, NO: Replace PCB AJ ?5V on connector X5.17A ? YES: Insert old PCB AS NO: Replace PCB AG; reuse old PCBs AS and AJ
21h	xx	RxD - receive line input circuit defective. Error on PCB control module	! Replace PCB AJ
22h	xx	Heater temperature input circuit defective, (possible errors on PCB: AJ, AG or AH)	Remove PCB AH ?5V on connector X9.16B ? YES: AH defective, NO: Replace PCB AJ ?5V on connector X9.16B ? YES: Insert old PCB AH NO: Replace PCB AG; reuse old PCBs AH and AJ
23h	xx	Heater current limiter input circuit defective, (possible errors on PCB: AJ, AG or AH)	Remove PCB AH ?5V on connector X9.17A ? YES: AH defective, NO: Replace PCB AJ ?5V on connector X9.17A ? YES: Insert old PCB AH NO: Replace PCB AG; reuse old PCBs AH and AJ
24h	xx	EMERGENCY STOP input circuit logic defective HW input circuit defective, control module	(see also AP service messages) ! Replace PCB AJ
25h	xx	DA converter defective	! Replace PCB AJ
26h	01h	Driver stage LED holder 1 on PCB control module or IR transmitter diode defective	Does error 2601 to 2606 occur? ? YES: Connector X4 plugged in incorrectly NO:! Unplug connector X4 PCB AJ, switch unit off/on ? YES: ! Replace PCB AJ NO: ! Flexible cable or AR defective

error_ high	error_ low	Description of service code	Corrective action (engineer)
26h	02h	Driver stage LED holder 2 on PCB control module or IR transmitter diode defective	Does error 2601 to 2606 occur ? YES: Connector X4 plugged in incorrectly NO: !Unplug connector X4 PCB AJ, switch unit off/on ? YES: ! Replace PCB AJ NO: ! Flexible cable or AR defective
26h	03h	Driver stage LED holder 3 on PCB control module or IR transmitter diode defective	Does error 2601 to 2606 occur ? YES: Connector X4 plugged in incorrectly NO: !Unplug connector X4 PCB AJ, switch unit off/on ? YES: ! Replace PCB AJ NO: ! Flexible cable or AR defective
26h	04h	Driver stage LED holder 4 on PCB control module or IR transmitter diode defective	Does error 2601 to 2606 occur? ? YES: Connector X4 plugged in incorrectly NO: !Unplug connector X4 PCB AJ, switch unit off/on ? YES: ! Replace PCB AJ NO: ! Flexible cable or AR defective
26h	05h	Driver stage LED holder 5 on PCB control module or IR transmitter diode defective	Does error 2601 to 2606 occur? ? YES: Connector X4 plugged in incorrectly NO: !Unplug connector X4 PCB AJ, switch unit off/on ? YES: ! Replace PCB AJ NO: ! Flexible cable or AR defective
26h	06h	Driver stage LED holder 6 on PCB control module or IR transmitter diode defective	Does error 2601 to 2606 occur? ? YES: Connector X4 plugged in incorrectly NO: !Unplug connector X4 PCB AJ, switch unit off/on ? YES: ! Replace PCB AJ NO: ! Flexible cable or AR defective
27h	xx	Unused service code	
28h	xx	Unused service code	
29h	xx	Unused service code	
2Ah	xx	Unused service code	
2Bh	xx	Unused service code	
2Ch	07h	Multiplexer J7 on PCB control module defective	! Replace PCB AJ
2Ch	08h	Multiplexer J8 on PCB control module defective	! Replace PCB AJ
2Ch	09h	Multiplexer J9 on PCB control module defective	! Replace PCB AJ
2Dh	xx	Unused service code	
2Eh	xx	Unused service code	
2Fh	xx	Unused service code	
30h	xx	Only for version 1.0–1.3 (Polylight without integrated power stage)	
31h	xx	Sprayvit in current limiting mode, overload	Connect Sprayvit handpiece from HE! ?OK: Replace heater cartridge NO: ! Replace PCB AS ?OK: NO: !Replace PCB AJ NO: Hotline
32h	03h	External short-circuit in Polylight fan circuit Output driver defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Fan runs without activation -> ! Replace PCB AH ? Fan does not function -> ! Replace fan
32h	0Bh	External short-circuit in circuit MV11 Output driver driving air valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Driving air valve active without key activation ? YES: Replace PCB AH NO: Activate driving air valve, measure voltage on MV11 X2.7A / X2.7B ? U = 24V: ! Replace MV11 ? U = 0V: ! Replace PCB AH
32h	0Ch	External short-circuit in circuit MV12 Output driver chip blower valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Chip blower active without key activation ? YES: Replace PCB AH NO: Activate chip blower valve, measure voltage on MV12 X2.8A / X2.8B ? U = 24V: ! Replace MV12 ? U = 0V: ! Replace PCB AH
32h	0Dh	External short-circuit in circuit MV13 Output driver spray air valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Spray air active without key activation ? YES: Replace PCB AH NO: Activate spray air valve, measure voltage on MV13 X2.11A / X2.11B ? U = 24V: ! Replace MV13 ? U = 0V: ! Replace PCB AH

error_ high	error_ low	Description of service code	Corrective action (engineer)
32h	16h	External short-circuit in circuit MV22 Output driver ultrasound valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Ultrasound active without key activation YES: Replace PCB AH NO: Activate ultrasound valve, measure voltage on MV22 X2.6A / X2.6B ? U = 24V: ! Replace MV22 ? U = 0V: ! Replace PCB AH
32h	17h	External short-circuit in circuit MV23 Output driver ultrasound air valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Ultrasound air active without key activation ? YES: Replace PCB AH NO: Activate ultrasound air valve, measure voltage on MV23 X2.10A / X2.10B ? U = 24V: ! Replace MV23 ? U = 0V: ! Replace PCB AH
32h	18h	External short-circuit in circuit MV24 Output driver Sprayvit water valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Sprayvit water active without key activation ? YES: Replace PCB AH NO: Activate Sprayvit water valve, measure voltage on MV24 X2.5A / X2.5B ? U = 24V: ! Replace MV24 ? U = 0V: ! Replace PCB AH
32h	19h	External short-circuit in circuit MV25 Output driver Sprayvit air valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Sprayvit air active without key activation ? YES: Replace PCB AH NO: Activate Sprayvit air valve, measure voltage on MV25 X2.5A / X2.9B ? U = 24V: ! Replace MV25 ? U = 0V: ! Replace PCB AH
32h	D3h	External short-circuit in circuit MV21.1 Output driver module solenoid valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Driving air valve active without key activation ? YES: Replace PCB AH NO: Activate module solenoid valve, measure voltage on MV21.1 X2.1A / X2.1B ? U = 24V: ! Replace MV21.1 ? U = 0V: ! Replace PCB AH
32h	D4h	External short-circuit in circuit MV21.2 Output driver module solenoid valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Driving air active without key activation ? YES: Replace PCB AH NO: Activate module solenoid valve, measure voltage on MV21.2 X2.2A / X2.2B ? U = 24V: ! Replace MV21.2 ? U = 0V: ! Replace PCB AH
32h	D5h	External short-circuit in circuit MV21.3 Output driver module solenoid valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Driving air valve active without key activation ? YES: Replace PCB AH NO: Activate module solenoid valve, measure voltage on MV21.3 X2.3A / X2.3B ? U = 24V: ! Replace MV21.3 ? U = 0V: ! Replace PCB AH
32h	D6h	External short-circuit in circuit MV21.4 Output driver module solenoid valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Driving air valve active without key activation ? YES: Replace PCB AH NO: Activate module solenoid valve, measure voltage on MV21.4 X2.4A / X2.4B ? U = 24V: ! Replace MV21.4 ? U = 0V: ! Replace PCB AH
33h	xx	Ultrasound module is missing (during operation)	! Re-insert US module NO: Replace PCB AJ
34h	xx	HF module is missing (during operation)	! Re-insert HF module NO: Replace PCB AJ
35h	xx	HF output stage module is missing (during operation)	! Re-insert HF module NO: Replace PCB AJ
36h	xx	Sprayvit PCB is missing	! Insert PCB AS
37h	xx	Distributor and light module is missing (during operation)	! Re-insert distributor and light module NO: Replace PCB AJ
38h	xx	Sprayvit module is missing (initialization)	! Insert PCB AS
39h	xx	Communication between AJ and AS not possible	!Replace PCB AJ NO: ! Replace PCB AS
3Ah	xx	Sprayvit module does not start within the specified time	! Replace PCB AS
3Bh	xx	Communication error between AJ and AS	If it has occurred several times: ! Replace PCB AJ NO: Replace PCB AS

error_ high	error_ low	Description of service code	Corrective action (engineer)
3Ch	xx	Sprayvit module detects overload	? Power fail active. ? YES: Ignore NO: Connect second Sprayvit 96, ? Is there an error? ? YES: ! Replace PCB AS NO: ! Sprayvit defective
3Dh	xx	External open circuit in Sprayvit pot. circuit	Connect second Sprayvit 96, is there an error? ? YES: Check ground wire AJ X2.1B and Sprayvit flange, Pin 9, is there an error? NO: Open circuit AS X2.1 to Sprayvit flange, Pin 4 or AS X2.3 to holder 1, Pin 2
3Eh	xx	Unused service code	
3Fh	xx	External open circuit in Sprayvit water circuit	? High resistance between holders 3+4 Sprayvit ? YES: Water heater cartridge defective NO: Open circuit AS X2.4 to Pin 3 Sprayvit or AS X2.5 to Pin 7 Sprayvit
40h	xx	External open circuit in Sprayvit air circuit	? High resistance between holders 2+4 Sprayvit ? YES: Air heater cartridge defective NO: Open circuit AS X2.6 to Pin 2 Sprayvit or AS X2.5 to Pin 7 Sprayvit
41h	xx	Relay on PCB AS defective	! Replace PCB AS
42h	xx	Overvoltage detected on 8V or 24V	! Check 8V and 24V on power supply NO: ! Replace PCB AJ
43h	03h	Polylight fan in AE: External open circuit Connector, cable	? 24V on X2.1A and X2.12B AH OK: Search for open circuit on Polylight fan circuit NO: Replace PCB AH
43h	0Bh	MV11: External open circuit. Connector, cable	? 24V on X2.1A and X2.7B AH OK: Search for open circuit on circuit MV11 NO: Replace PCB AH
43h	0Ch	MV12: External open circuit. Connector, cable	? 24V on X2.1A and X2.8B AH OK: Search for open circuit on circuit MV12 NO: Replace PCB AH
43h	0Dh	MV13: External open circuit. Connector, cable	? 24V on X2.1A and X2.11B AH OK: Search for open circuit on circuit MV13 NO: Replace PCB AH
43h	16h	MV22: External open circuit. Connector, cable	? 24V on X2.1A and X2.6B AH OK: Search for open circuit on circuit MV22 NO: Replace PCB AH
43h	17h	MV23: External open circuit. Connector, cable	? 24V on X2.1A and X2.10B AH OK: Search for open circuit on circuit MV23 NO: Replace PCB AH
43h	18h	MV24: External open circuit. Connector, cable	? 24V on X2.1A and X2.5B AH OK: Search for open circuit on circuit MV24 NO: Replace PCB AH
43h	19h	MV25: External open circuit. Connector, cable	? 24V on X2.1A and X2.9B AH OK: Search for open circuit on circuit MV25 NO: Replace PCB AH
43h	D3h	MV21_1: External open circuit. Connector, cable	? 24V on X2.1A and X2.1B AH OK: Search for open circuit on circuit MV21.1 NO: Replace PCB AH
43h	D4h	MV21_2: External open circuit. Connector, cable	? 24V on X2.1A and X2.2B AH OK: Search for open circuit on circuit MV21.2 NO: Replace PCB AH
43h	D5h	MV21_3: External open circuit. Connector, cable	? 24V on X2.1A and X2.3B AH OK: Search for open circuit on circuit MV21.3 NO: Replace PCB AH
43h	D6h	MV21_4: External open circuit. Connector, cable	? 24V on X2.1A and X2.4B AH OK: Search for open circuit on circuit MV21.4 NO: Replace PCB AH
44h	xx	Control module HW-SW adaptation error	! Replace PCB AJ
45h	xx	Configuration problem Sprayvit module/control module HW-SW adaptation error	! Replace PCB AS or AJ
46h	xx	Configuration problem Siromot module/control module HW-SW adaptation error	! Replace PCB AL or AJ
47h	xx	Configuration problem distributor - light module/ control module HW-SW adaptation error	! Replace PCB AV or AJ
48h	xx	Configuration problem heater module/control module HW-SW adaptation error	! Replace PCB AH or AJ

error_ high	error_ low	Description of service code	Corrective action (engineer)
49h	xx	Unused service code	
4Ah	xx	Configuration problem ultrasound module/control module HW-SW adaptation error	! Replace PCB AU or AJ
4Bh	xx	Configuration problem HF modulation module/ control module HW-SW adaptation error	! Replace PCB AO or AJ
4Ch	xx	Configuration problem HF output stage module/ control module HW-SW adaptation error	! Replace PCB AC or AJ
4Dh	xx	Configuration problem HF+ module/control module HW-SW adaptation error	! Replace PCB HF, AJ or PS
4Eh	xx	Unused service code	
4Fh	xx	Status bit alarm set in AO module. Alarm bit active = alarm tone active (HF has set alarm bit and has been switched off or has switched itself off with the active alarm tone)	Observe service codes 51_xx!!!
50h	xx	HF module is locked	Observe subsequent service codes
51h	01h	HF module: Duty cycle for output stage voltage is too high	? Is an HF module missing NO: ! Replace PCB AC NO: ! Replace PCB AO
51h	02h	HF module: Duty cycle for output stage voltage is too low	? Is an HF module missing NO: ! Replace PCB AC
51h	03h	HF module: Output stage voltage is too high	No action required, service information only
51h	04h	HF module: Output stage voltage is too low	No action required, service information only
51h	05h	HF module: Maximum output stage voltage exceeded	? Is an HF module missing NO: ! Replace PCB AO
51h	06h	HF module: Current below minimum operating current	? Is an HF module missing NO: ! Replace PCB AC
51h	07h	HF module: Maximum current of output stage exceeded	! Replace PCB AC
51h	0Ch	HF module: 16V voltage too low	Check 16V on power supply F2 OK: Check 16V on slot AO X1.6A/B OK: Replace PCB AO
51h	0Dh	HF module: 16V voltage too high	Check 16V on power supply F2 OK: Check 16V on slot AO X1.6A/B OK: Replace PCB AO
51h	10h	HF module: 32V voltage is too low	Check 32V on power supply F4 OK: Check 32V on slot AO X1.4A/B OK: Replace PCB AO
51h	11h	HF module: 32V voltage is too high	Check 32V on power supply F4 OK: Check 32V on slot AO X1.4A/B OK: Replace PCB AO
51h	19h	HF module: RxD input test switch defective.	? HF can be activated ? YES: ! Ignore error NO: ! Replace PCB AO
51h	1Ah	HF module: FOOT SWITCH input does not switch	! Check foot switch cable AO X1.10A
51h	1Bh	HF module: FOOT SWITCH input test switch defective	? HF can be activated ? YES: ! Ignore error NO: ! Replace PCB AO
51h	1Ch	HF module: EMERGENCY STOP input does not switch	! Check emergency stop cable AO X1.9B
51h	1Dh	HF module: EMERGENCY STOP input test switch defective	? HF can be activated ? YES: ! Ignore error NO: ! Replace PCB AO
51h	21h	The software does not match the modulation module	! Replace PCB AO
51h	22h	The two HF modules do not match	? Old software version 1.0 installed ? YES: Ignore service message NO: Install compatible output stage
51h	23h	HF module: Maximum duty time of HF has been exceeded => alarm	Remained on foot switch for longer than 1 min.; no error
51h	24h	HF module: Maximum operating current exceeded; output overload => alarm	No action required, service information only
51h	25h	HF module: HW-based current-voltage limitation active	No action required, service information only
51h	26h	HF module: Short-circuit switching transistor V1 or transistor is switched through statically by another defective component	? Is an HF module missing NO: ! Replace PCB AC NO: ! Replace PCB AO

error_ high	error_ low	Description of service code	Corrective action (engineer)
51h	27h	HF module: Switching transistor V1 defective and does not switch or the control is defective	? Is an HF module missing NO: ! Replace PCB AO NO: ! Replace PCB AC
51h	30h	HF module: 16V voltage too low when HF is active	No action required, service information only
51h	31h	HF module: 16V voltage too high when HF is active	No action required, service information only
51h	34h	HF module: 32V voltage too low when HF is active	No action required, service information only
51h	35h	HF module: 32V voltage too high when HF is active	No action required, service information only
51h	96h	HF surgery: Foot switch signal FS (error during plausibility check between HW signal and CAN message)	Check FS cable from AK, PCB SA (X1.4A) to HF module, PCB HF, (X2.3B). OK: Check CAN connection from HF module to AE
51h	97h	HF surgery voltage monitoring: 5 Volt (plausibility check) outside tolerance when HF is active	Replace PCB HF
51h	98h	HF surgery voltage monitoring: UH (plausibility check) outside tolerance when HF is active	Replace PCB HF
51h	99h	HF surgery voltage monitoring: UP (plausibility check) outside tolerance	Replace PCB HF
51h	9Ah	HF surgery voltage monitoring: KT (limit value check) heat sink temperature of power transistor too high, will be switched off	HF output stage overloaded, if it occurs several times despite short-time operation, replace PCB HF
51h	9Bh	HF surgery: CAN communication monitoring, timing problem on CAN bus	If it occurs several times, replace PCB HF module
51h	9Ch	HF surgery: HF hardware monitoring error (self-test module, startup)	Replace PCB HF
51h	9Dh	HF surgery:	Standby
51h	9Eh	HF surgery:	Standby
51h	9Fh	HF surgery: Error due to watchdog RESET, which has been triggered, has restarted the controller and performed re-initialization	Replace PCB HF
51h	A0h	AE detects that HF module does not respond (stand-by operation)	Check CAN bus connection from AE to HF module
51h	A1h	AE detects a communication problem with the HF module when HF is active (interference on CAN BUS, intensity values sent and received do not match)	Check CAN bus connection from AE to HF module OK: Replace HF module
51h	A2h	AE detects missing or defective acknowledgement of previously sent HF start command	Check CAN bus connection from AE to HF module OK: Replace HF module
52h	xx	Communication between control module AJ and panel interrupted for >1 sec.	CAN connection defective, HF operation is locked, panel signals alarm beep, Hotline!
53h	xx	Communication with HF module is impossible YES: ? Does AE issue service code 12-- (YES: ! Replace PCB AJ NO: ! Check cable X1.11B -> AO X1.13A (OK: ! Replace PCB AO))	Check continuity on both communication cables + ground: AO X1.12B -> AJ X1.11A + AO X1.12A -> AJ X1.10B; OK: ? Check 8V on AO X1.7A/B (5V LED lights up) OK: ? Does the RESET LED light up ? YES: ? Does AE issue service code 12- ? YES: !Replace PCB AJ NO: !Check cable X1.11B->AOX1.13A
54h	04h	Wrong module mounted in slot 4 instead of the corresponding control module	! Insert PCB AJ in slot 4
54h	05h	Wrong module mounted in slot 5 instead of the corresponding Sprayvit module	! Check PCB AS in X5 ? Continuity X4.7A -> X5.10A and X4.22A -> X5.17B OK: Replace PCB AJ
54h	06h	Wrong module mounted in slot 6 instead of the corresponding Siromot module	! Check PCB Siromot in X6 ? Continuity X4.7A -> X6.11A and X4.22A -> X6.17B OK: Replace PCB AJ
54h	07h	Wrong module mounted in slot 7 instead of the corresponding Siromot module	! Check PCB AL in X7 ? Continuity X4.7A -> X6.11A and X4.23A -> X7.17B OK: Replace PCB AJ
54h	08h	Wrong module mounted in slot 8 instead of the corresponding distributor - light module	! Check PCB AV in X8 ? Continuity X4.7A -> X8.11A and X4.23A -> X8.17B OK: Replace PCB AJ
54h	09h	Wrong module mounted in slot 9 instead of the corresponding MV+ heater module	! Check PCB AH in X9 ? Continuity X4.7A -> X9.10A and X4.24A -> X9.17B OK: Replace PCB AJ

error_ high	error_ low	Description of service code	Corrective action (engineer)
54h	0Ah	Wrong module mounted in slot 10 instead of the corresponding Med_GV module	! Check PCB Med_GV in X10 ? Continuity X4.7A -> X10.13A and X4.24A -> X10.26B OK: Replace PCB AJ
54h	0Bh	Wrong module mounted in slot 11 instead of the corresponding ultrasound module	! Check PCB AU in X11 ? Continuity X4.7A -> X11.11A and X4.25A -> X11.17B OK: Replace PCB AJ
54h	0Ch	Wrong module mounted in slot 12 instead of the corresponding HF_modulation module	! Check PCB HF MOD in X12 ? Continuity X4.7A -> X12.11A and X4.25A -> X12.17B OK: Replace PCB AJ
54h	0Dh	Wrong module mounted in slot 13 instead of the corresponding HF_output stage module	! Check PCB HF output stage in X13 ? Continuity X4.7A -> X13.11A and X4.26A -> X13.17B OK: Replace PCB AJ
55h	xx	Communication with camera module impossible (does not respond to request over the serial interface)	!Check contact of PCB AD2 with system board AG via slot X10 OK: Replace PCB AD2
56h	xx	Camera module is missing	! Insert PCB AD2
57h	xx	Unused service code	
58h	xx	Unused service code	
59h	xx	Unused service code	
5Ah	xx	Unused service code	
5Bh	xx	Unused service code	
5Ch	xx	Unused service code	
5Dh	xx	Unused service code	
5Eh	xx	Heater in current limiting mode, overload	? Is the service code displayed every time Sprayvit is activated NO: Have the heater tolerances on PCB AS be set again ? YES: Replace Sprayvit NO: Replace PCB AS
5Fh	xx	Loc. comm. error with MV/heater module AH	! Replace PCB AH NO: ! Replace PCB AJ
60h	xx	Loc. serial interface timeout	! Check fuse F2 on NS ! 16V cable path; AJ -> AG -> chair GA1 -> NS X1.3 NO: Replace PCB AJ
61h	xx	Checksum error, memory access error	! Replace PCB AJ
62h	xx	Loc. serial interface wrong acknowledgement	Warning only
63h	xx	No RESET by watchdog after discontinuation of triggering by uP	! Replace PCB AJ
64h	xx	Hose connection codes OK, US handpiece is missing or defective	! Replace PCB AU
65h	xx	HW error on PCB US medium frequency outside tolerance	! Replace PCB AU
66h	xx	RAM defective	! Replace PCB AU
67h	xx	EPROM defective	! Replace PCB AU
68h	xx	Window frequency faulty	! Replace PCB AU
69h	xx	US switching condition does not meet the requirements (on/off)	! Replace PCB AU
6Ah	xx	Communication with US module impossible	! Check fuse F2 on NS ! 16V cable path; AJ -> AG -> chair GA1 -> NS X1.3 NO: Replace PCB AJ
6Bh	xx	Motor does not revolve	for Siromot software version <= 3.6: ! Check cable path X7.11B -> X6.11B -> X5.14B -> X9.10B -> X4.7B AJ Otherwise: Check motor and hose
6Ch	xx	Siromot module RAM defective.	! Replace PCB AL
6Dh	xx	Siromot module EPROM defective	! Replace PCB AL
6Eh	xx	Siromot module preset PWM faulty	! Replace PCB AL
6Fh	xx	Output voltage of H bridge faulty	! Replace PCB AL
70h	xx	32V supply voltage of Siromot module outside tolerance	! Check AE fuse F4 on NS OK: Are X7.4A + B (32V) and X7.8A + B (ground) measured on AE connector ? YES: Ignore message NO: Are X1.5 (32V) and X1.8 (ground) measured on NS? ? YES: Check cable NO: Check power supply
71h	xx	Direction of rotation detected in the Siromot module does not correspond to the direction of rotation set on the panel	Warning notice, in case it occurs several times! Hotline

error_ high	error_ low	Description of service code	Corrective action (engineer)
72h	xx	Instr. motor switching condition does not meet the requirements (on/off)	! Replace PCB AL
73h	xx	Switching condition (EMK or RI comp.) does not meet the EMK requirements	! Replace PCB AL
74h	xx	CAN BUS OFF condition has been detected	? Error occurs only once: Fault exists NO: Query using Ident dialog: All nodes available? ? YES: Replace PCB AJ NO: Open circuit, see CAN wiring diagram
75h	01h	No Sprayvit in holder 1	Check instrument in holder 1
75h	02h	No motor or turbine in holder 2	Check instrument in holder 2
75h	03h	No motor or turbine in holder 3	Check instrument in holder 3
75h	04h	No motor or turbine in holder 4	Check instrument in holder 4
75h	05h	No motor/turbine or US in holder 5	Check instrument in holder 5
75h	06h	No US, HF or Polylight in holder 6	Check instrument in holder 6
76h	xx	Unused service code	
77h	xx	An active instrument has been deposited or has been unscrewed from flange	Warning notice, no corrective action
78h	xx	Unused service code	
79h	xx	Unused service code	
7Ah	xx	Unused service code	
7Bh	xx	Communication with Siromot module impossible	Check continuity on both comm. cables + ground: AL X1.12B -> AJ X1.11A + AL X1.12A -> AJ X1.10B; OK: ? Check 8V on AO X1.7A/B (V35, LED 8V lights up) OK: ? Does RESET LED V30 light up ? YES: !Replace PCB AJ NO: ! Replace PCB AL
7Ch	xx	MV+ heater module is missing	! Re-insert PCB AH NO: Replace PCB AJ
7Dh	xx	Unused service code	

7.3.2 SW version: 1.0 - 1.3

There are both two-digit and four-digit service codes.
Two-digit service codes (error_high) can be found in column 5 on the panel display.
Four-digit service codes consist of the entries in column 5 (error_high) and column 6 (error_low) on the panel.

Service codes are displayed in HEX format
(error_low) xx: disregard

error_ high	error_ low	Description of service code	Corrective action (engineer)
0h	xx	Zero error line	For analysis purposes only
1h	xx	Control module: Cannot address/write to CAN RAM	! Replace PCB AJ ! Check cable path: AJ X1.21A -> AG X4.21A -> AG X1.1 -> chair GA1 X1.1 -> SA X1.1A ! Check cable path: AJ X1.21B -> AG X4.21B -> AG X1.2 -> chair GA1 X1.2 -> SA X1.2A
2h	xx	EEPROM software control module AE error	! Replace PCB AJ
3h	xx	48V supply voltage outside tolerance power supply failure, short-circuit, blown fuse, connector	! Check fuse F5 on NS ! 48V cable path; AJ -> AG -> chair GA1 -> NS X1.6
4h	xx	24V supply voltage outside tolerance power supply failure, short-circuit, blown fuse, connector	! Check fuse F3 on NS ! 24V cable path; AJ -> AG -> chair GA1 -> NS X1.4
5h	xx	16V supply voltage outside tolerance power supply failure, short-circuit, blown fuse, connector	! Check fuse F2 on NS ! 16V cable path; AJ -> AG -> chair GA1 -> NS X1.3
6h	xx	Control module: RAM error	! Replace PCB AJ
7h	xx	Control module: ROM error	! Replace PCB AJ
8h	xx	At least 1 output of the solenoid valves is short-circuited to the ground, control module defective	! Replace PCB AJ NO: Replace PCB AV ! Search for ground contact on AG X4 or AG X8
9h	xx	Output driver stage defective, relay KL1 output: Required: High; Actual: Passive	See error tree
0Ah	xx	Output driver stage defective, relay KL2 output: Required: High; Actual: Passive	See error tree
0Bh	xx	Output driver stage defective, relay KL3 output: Required: High; Actual: Passive	See error tree
0Ch	xx	Output driver stage defective, relay KL4 output: Required: High; Actual: Passive	See error tree
0Dh	xx	Output driver stage defective, relay KL5 output: Required: High; Actual: Passive	See error tree
0Eh	xx	Output driver stage defective, motor normal output: Required: High; Actual: Passive	! Replace PCB AJ
0Fh	xx	Output driver stage defective, motor SLS output: Required: High; Actual: Passive	See error tree
10h	xx	Output driver stage defective, saline output: Required: High; Actual: Passive	See error tree
11h	xx	Output driver stage defective, US output: Required: High; Actual: Passive	See error tree
12h	xx	Output driver stage defective, HF output: Required: High; Actual: Passive	! Replace PCB AJ
13h	xx	Output driver stage defective, Polylight start-up output: Required: High; Actual: Passive	See error tree
14h	xx	Output driver stage defective, Polylight on output: Required: High; Actual: Passive	See error tree
15h	xx	Output driver stage defective, Sprayvit on output: Required: High; Actual: Passive	See error tree
16h	xx	Output driver stage defective, heater off output: Required: High; Actual: passive	See error tree
17h	xx	Output driver stage defective, serial off output: Required: High; Actual: Passive	See error tree
18h	xx	Output driver stage defective, saliva ejector speed output: Required: High; Actual: Passive	See error tree

error_ high	error_ low	Description of service code	Corrective action (engineer)
19h	xx	Output driver stage defective, strobe/suction hose output: Required: High; Actual: Passive	See error tree
1Ah	xx	Output driver stage defective, OE MV/optional suction instr. output: Required: High; Actual: Passive	See error tree
1Bh	xx	Output driver stage defective, SregL/SV air output: Required: High; Actual: Passive	! Replace PCB AJ
1Ch	xx	Output driver stage defective, SregW/SV water output: Required: High; Actual: Passive	! Replace PCB AJ
1Dh	xx	Output driver stage defective, light on output: Required: High; Actual: Passive	See error tree
1Eh	xx	Foot switch input circuit defective Error on PCB control module	! Replace PCB AJ
1Fh	xx	Serial_input input circuit defective Error on PCB control module	! Replace PCB AJ NO: Replace PCB AH Check cable path X1.16B -> X4.16B -> X9.13A -> X1.13A
20h	xx	Sprayvit input circuit defective Error on PCB control module	See error tree
21h	xx	RxD - receive line input circuit defective. Error on PCB control module	! Replace PCB AJ
22h	xx	Heater temperature input circuit defective Error on PCB control module	See error tree
23h	xx	Heater current limiter input circuit defective Error on PCB control module	See error tree
24h	xx	Input circuit of EMERGENCY STOP logic defective HW input circuit defective, control module	(see also service messages AP) ! Replace PCB AJ
25h	xx	Control module, control voltage defective	! Replace PCB AJ
26h	1	Driver stage LED holder 1 on PCB control module defective	! Replace PCB AJ
26h	2	Driver stage LED holder 2 on PCB control module defective	! Replace PCB AJ
26h	3	Driver stage LED holder 3 on PCB control module defective	! Replace PCB AJ
26h	4	Driver stage LED holder 4 on PCB control module defective	! Replace PCB AJ
26h	5	Driver stage LED holder 5 on PCB control module defective	! Replace PCB AJ
26h	6	Driver stage LED holder 6 on PCB control module defective	! Replace PCB AJ
2Ch	7	Multiplexer J7 on PCB control module defective	! Replace PCB AJ
2Ch	8	Multiplexer J7 on PCB control module defective	! Replace PCB AJ
2Ch	9	Multiplexer J7 on PCB control module defective	! Replace PCB AJ
30h	xx	Polylight in current limiting mode, overload	
31h	xx	Sprayvit in current limiting mode, overload	! Replace PCB AJ
32h	11	External short-circuit in circuit MV11 Output driver driving air valve defective Output becomes active -> I load > Imax Output passive -> I load > 0	? Driving air valve active without key activation YES: Replace PCB AH NO: Activate driving air valve, measure voltage on MV11 X2.7A / X2.7B ? U = 24V: ! Replace MV11 ? U = 0V: ! Replace PCB AH
32h	12	External short-circuit in circuit MV12 Output driver chip blower valve defective Output becomes active -> I load > Imax Output passive -> I load > 0	? Chip blower active without key activation YES: Replace PCB AH NO: Activate chip blower valve, measure voltage on MV12 X2.8 / X2.8B ? U = 24V: ! Replace MV12 ? U = 0V: ! Replace PCB AH
32h	13	External short-circuit in circuit MV13 Output driver spray air valve defective Output becomes active -> I load > Imax Output passive -> I load > 0	? Spray air active without key activation YES: Replace PCB AH NO: Activate spray air valve, measure voltage on MV13 X2.11A / X2.11B ? U = 24V: ! Replace MV13 ? U = 0V: ! Replace PCB AH

error_ high	error_ low	Description of service code	Corrective action (engineer)
32h	211	External short-circuit in circuit MV21.1 Output driver module solenoid valve defective Output becomes active -> I load > Imax Output passive -> I load > 0	? Driving air valve active without key activation YES: Replace PCB AH NO: Activate module solenoid valve, measure voltage on MV21.1 X2.1A / X2.1B ? U = 24V: ! Replace MV21.1 ? U = 0V: ! Replace PCB AH
32h	212	External short-circuit in circuit MV21.2 Output driver module solenoid valve defective Output becomes active -> I load > Imax Output passive -> I load > 0	? Driving air valve active without key activation YES: Replace PCB AH NO: Activate module solenoid valve, measure voltage on MV21.2 X2.2A / X2.2B ? U = 24V: ! Replace MV21.2 ? U = 0V: ! Replace PCB AH
32h	213	External short-circuit in circuit MV21.3 Output driver module solenoid valve defective Output becomes active -> I load > Imax Output passive -> I load > 0	? Driving air valve active without key activation YES: Replace PCB AH NO: Activate module solenoid valve, measure voltage on MV21.3 X2.3A / X2.3B ? U = 24V: ! Replace MV21.3 ? U = 0V: ! Replace PCB AH
32h	214	External short-circuit in circuit MV21.4 Output driver module solenoid valve defective Output becomes active -> I load > Imax Output passive -> I load > 0	? Driving air valve active without key activation YES: Replace PCB AH NO: Activate module solenoid valve, measure voltage on MV21.4 X2.4A / X2.4B ? U = 24V: ! Replace MV21.4 ? U = 0V: ! Replace PCB AH
32h	22	External short-circuit in circuit MV22 Output driver ultrasound valve defective Output becomes active -> I load > Imax Output passive -> I load > 0	? Ultrasound active without key activation YES: Replace PCB AH NO: Activate ultrasound valve, measure voltage on MV22 X2.6A / X2.6B ? U = 24V: ! Replace MV22 ? U = 0V: ! Replace PCB AH
32h	23	External short-circuit in circuit MV23 Output driver ultrasound air valve defective Output becomes active -> I load > Imax Output passive -> I load > 0	? Ultrasound air active without key activation YES: Replace PCB AH NO: Activate ultrasound air valve, measure voltage on MV23 X2.10A / X2.10B ? U = 24V: ! Replace MV23 ? U = 0V: ! Replace PCB AH
32h	24	External short-circuit in circuit MV24 Output driver Sprayvit water valve defective Output becomes active -> I load > Imax Output passive -> I load > 0	? Sprayvit water active without key activation YES: Replace PCB AH NO: Activate Sprayvit water valve, measure voltage on MV24 X2.5A / X2.5B ? U = 24V: ! Replace MV24 ? U = 0V: ! Replace PCB AH
32h	3	External short-circuit in fan circuit Output driver defective Output becomes active -> I load > Imax Output passive -> I load > 0	? Fan runs without activation -> ! Replace PCB AH ? Fan does not function -> ! Replace fan
33h	xx	Ultrasound module is missing (during operation)	! Re-insert US module NO: Replace PCB AJ
34h	xx	HF module is missing (during operation)	! Re-insert HF module NO: Replace PCB AJ
35h	xx	HF output stage module is missing (during operation)	! Re-insert Polylight module NO: Replace PCB AJ
36h	xx	Polylight module is missing (during operation)	! Re-insert distributor and light module NO: Replace PCB AJ
37h	xx	Distributor and light module is missing (during operation)	! Re-insert US module NO: Replace PCB AJ
43h	11	MV11: External open circuit, connector, cable	? 24V on X2.1A and X2.7B AH OK: Search for open circuit on circuit MV11 NO: Replace PCB AH
43h	12	MV12: External open circuit, connector, cable	? 24V on X2.1A and X2.8B AH OK: Search for open circuit on circuit MV12 NO: Replace PCB AH
43h	13	MV13: External open circuit, connector, cable	? 24V on X2.1A and X2.11B AH OK: Search for open circuit on MV13 NO: Replace PCB AH
43h	211	MV21.1: External open circuit, connector, cable	? 24V on X2.1A and X2.1B AH OK: Search for open circuit on MV21.1 NO: Replace PCB AH
43h	212	MV21.2: External open circuit, connector, cable	? 24V on X2.1A and X2.2B AH OK: Search for open circuit on MV21.2 NO: Replace PCB AH

error_ high	error_ low	Description of service code	Corrective action (engineer)
43h	213	MV21.3: External open circuit, connector, cable	? 24V on X2.1A and X2.3B AH OK: Search for open circuit on MV21.3 NO: Replace PCB AH
43h	214	MV21.4: External open circuit, connector, cable	? 24V on X2.1A and X2.4B AH OK: Search for open circuit on MV21.4 NO: Replace PCB AH
43h	22	MV22: External open circuit, connector, cable	? 24V on X2.1A and X2.6B AH OK: Search for open circuit on MV22 NO: Replace PCB AH
43h	23	MV23: External open circuit, connector, cable	? 24V on X2.1A and X2.10B AH OK: Search for open circuit on MV23 NO: Replace PCB AH
43h	24	MV24: External open circuit, connector, cable	? 24V on X2.1A and X2.5B AH OK: Search for open circuit on MV24 NO: Replace PCB AH
43h	25	MV25: External open circuit, connector, cable	? 24V on X2.1A and X2.9B AH OK: Search for open circuit on MV25 NO: Replace PCB AH
43h	3	Fan 3 in AE: External open circuit, connector, cable	? 24V on X2.1A and X2.12B AH OK: Search for open circuit on Polylight fan circuit NO: Replace PCB AH
45h	xx	Sprayvit module HW-SW adaptation error	! Replace PCB AS
46h	xx	Siromot module HW-SW adaptation error	! Replace PCB AL
47h	xx	Distributor light module HW-SW adaptation error	! Replace PCB AV
48h	xx	MV heater module HW-SW adaptation error	! Replace PCB AH
49h	xx	MEDGV test module HW-SW adaptation error	! Replace PCB AT
4Ah	xx	Ultrasound module HW-SW adaptation error	! Replace PCB AU
4Bh	xx	HF modulation module HW-SW adaptation error	! Replace PCB AO
4Ch	xx	HF output stage module HW-SW adaptation error	! Replace PCB AC
54h	5	Wrong module mounted in slot 5 instead of the corresponding Sprayvit module	! Check PCB AS in X5 ? Continuity X4.7A -> X5.10A and X4.22A -> X5.17B OK: Replace PCB AJ
54h	6	Wrong module mounted in slot 6 instead of the corresponding Siromot module	! Check PCB Siromot in X6 ? Continuity X4.7A -> X6.11A and X4.22A -> X6.17B OK: Replace PCB AJ
54h	7	Wrong module mounted in slot 7 instead of the corresponding Siromot module	! Check PCB AL in X7 ? Continuity X4.7A -> X6.11A and X4.23A -> X7.17B OK: Replace PCB AJ
54h	8	Wrong module mounted in slot 8 instead of the corresponding distributor light module	! Check PCB AV in X8 ? Continuity X4.7A -> X8.11A and X4.23A -> X8.17B OK: Replace PCB AJ
54h	9	Wrong module mounted in slot 9 instead of the corresponding MV+ heater module	! Check PCB AH in X9 ? Continuity X4.7A -> X9.10A and X4.24A -> X9.17B OK: Replace PCB AJ
54h	10	Wrong module mounted in slot 10 instead of the corresponding Med GV module	! Check PCB Med.GV in X10 ? Continuity X4.7A -> X10.13A and X4.24A -> X10.26B OK: Replace PCB AJ
54h	11	Wrong module mounted in slot 11 instead of the corresponding ultrasound module	! Check PCB AU in X11 ? Continuity X4.7A -> X11.11A and X4.25A -> X11.17B OK: Replace PCB AJ
54h	12	Wrong module mounted in slot 12 instead of the corresponding HF modulation module	! Check PCB HF MOD in X12 ? Continuity X4.7A -> X12.11A and X4.25A -> X12.17B OK: Replace PCB AJ
54h	13	Wrong module mounted in slot 13 instead of the corresponding HF output stage module	! Check PCB HF output stage in X13 ? Continuity X4.7A -> X13.11A and X4.26A -> X13.17B OK: Replace PCB AJ
5Eh	xx	Heater in current limiting mode, overload	! Measure current between X14.3 and X14.1 ? I>4.5A ! Check heater circuit ? I<4.5A ! Replace PCB AH
5Fh	xx	Loc. comm. error with PCB MV	
60h	xx		! Check fuse F2 on NS ! 16V cable path; AJ -> AG -> chair GA1 -> NS X1.3 NO: Replace PCB AJ
61h	xx	Local RS232 checksum	Warning only
62h	xx	Loc. serial interface wrong acknowledgement	Warning only

error_ high	error_ low	Description of service code	Corrective action (engineer)
63h	xx	No RESET by watchdog after discontinuation of triggering by uP	! Replace PCB AJ
64h	xx	Hose connection codes OK, US handpiece is missing or defective	! Replace PCB AU
65h	xx	HW error on PCB, US medium frequency outside tolerance	! Replace PCB AU
66h	xx	RAM defective	! Replace PCB AU
67h	xx	EPROM defective	! Replace PCB AU
68h	xx	Window frequency faulty	! Replace PCB AU
69h	xx	Communication error between control module and US module via serial interface	! Replace PCB AU
6Ah	xx	Communication with US module impossible	! Check fuse F2 on NS ! 16V cable path; AJ -> AG -> chair GA1 -> NS X1.3 NO: Replace PCB AJ
6Bh	xx	Preset speed is not reached	! Check cable path: X7.11B -> X6.11B -> X5.14B -> X9.10B -> X4.7B AJ
6Ch	xx	Siromot module RAM defective	! Replace PCB AL
6Dh	xx	Siromot module EPROM defective	! Replace PCB AL
6Eh	xx	Siromot module preset PWM faulty	! Replace PCB AL
6Fh	xx	Output voltage of H bridge faulty	! Replace PCB AL
70h	xx	32V supply voltage of Siromot module outside tolerance	! Check AE fuse F4 on NS OK: Measure X7.4A + B 32V and X7.8A + B ground on AE connector OK: Measure X1.20 32V and X1.15 ground on chair GA1 OK: measure X1.5 32V and X1.8 ground on chair NS
71h	xx		
72h	xx	Switching condition does not meet the requirements	! Replace PCB AL
73h	xx	Switching condition (EMK or RI comp.) does not meet the EMK requirements	! Replace PCB AL
74h	xx	CAN communication impossible/faulty, BUS OFF condition has been detected	? Error occurs only once: Fault exists NO: Query using Ident dialog: All nodes available? YES: Replace PCB AJ NO: Open circuit, see CAN wiring diagram
75h	1		
75h	2		
75h	3		
75h	4		
75h	5		
75h	6		
7Bh	xx	Communication with Siromot module impossible	
7Ch	xx	MV+ heater module is missing	! Re-insert PCB AH NO: Replace PCB AJ
7Dh	xx	MED GV module is missing	! Replace PCB AJ
7Eh	xx	Siromot module is missing	! Re-insert module AL NO: Replace PCB AJ
7Fh	xx	NOTE ONLY (for development purposes!!)	For development purposes only

7.4 Service messages of PCB (PS) in dentist panel AP

7.4.1 SW version: 1.0 - 2.4

Remark/Note:
There are both two-digit and four-digit service codes.
Two-digit service codes (error_high) can be found in column 5 on the panel display.
Four-digit service codes consist of the entries in column 5 (error_high) and column 6 (error_low) on the panel.
Service codes are displayed in HEX format
(error_low) xx: disregard

error_ high	error_ low	Description of service code	Corrective action (engineer)
00h	xx	Zero error line	For analysis purposes only
01h	xx	Video controller register defective	! Replace panel on which error was displayed
02h	xx	Video controller produces no READY signal	! Replace panel on which error was displayed
03h	xx	For development purposes only	No action required, service information only
04h	xx	For development purposes only	No action required, service information only
05h	xx	For development purposes only	No action required, service information only
06h	xx	For development purposes only	No action required, service information only
07h	xx	For development purposes only	No action required, service information only
08h	xx	For development purposes only	No action required, service information only
09h	xx	For development purposes only	No action required, service information only
0Ah	xx	For development purposes only	No action required, service information only
0Bh	01h	Minimum configuration error: Connection box (AK) does not respond	? Error also appears on HP panel YES: Replace PCB SA NO: Check CAN wiring using the wiring diagram and CAN error messages
0Bh	02h	Minimum configuration error: Dentist element (AE) does not respond	? Error also appears on HP panel YES: Replace PCB AJ NO: Check CAN wiring using the wiring diagram and CAN error messages
0Bh	03h	Minimum configuration error: Dentist panel does not respond	? Error also appears on HP panel YES: Replace dentist panel NO: Check CAN wiring using the wiring diagram and CAN error messages
0Bh	07h	Minimum configuration error: Patient chair does not respond	? Error also appears on HP panel YES: Replace PCB SS NO: Check CAN wiring using the wiring diagram and CAN error messages
0Bh	08h	Minimum configuration error: Water unit does not respond	? Error also appears on HP panel YES: Replace PCB WE NO: Check CAN wiring using the wiring diagram and CAN error messages
0Ch	01h	Error during start-up EMERGENCY STOP test of connection box	? Error occurs in connection with other EMERGENCY STOP test errors YES: Check EMERGENCY STOP wiring NO: Replace PCB SA
0Ch	02h	Error during start-up EMERGENCY STOP test of dentist element	? Error occurs in connection with other EMERGENCY STOP test errors YES: Check EMERGENCY STOP wiring NO: Replace PCB AJ
0Ch	03h	Error during start-up EMERGENCY STOP test of dentist panel	? Error occurs in connection with other EMERGENCY STOP test errors YES: Check EMERGENCY STOP wiring NO: Replace dentist panel
0Ch	04h	Error during start-up EMERGENCY STOP test of dentist element support arm	? Error occurs in connection with other EMERGENCY STOP test errors YES: Check EMERGENCY STOP wiring NO: Replace PCB TS
0Ch	05h	Error during start-up EMERGENCY STOP test of assistant unit	? Error occurs in connection with other EMERGENCY STOP test errors YES: Check EMERGENCY STOP wiring NO: Replace PCB AJ

error_ high	error_ low	Description of service code	Corrective action (engineer)
0Ch	06h	Error during start-up EMERGENCY STOP test of assistant panel	? Error occurs in connection with other EMERGENCY STOP test errors YES: Check EMERGENCY STOP wiring NO: Replace assistant panel
0Ch	07h	Error during start-up EMERGENCY STOP test of patient chair	? Error occurs in connection with other EMERGENCY STOP test errors YES: Check EMERGENCY STOP wiring NO: Replace PCB SS
0Ch	08h	Error during start-up EMERGENCY STOP test of water unit	? Error occurs in connection with other EMERGENCY STOP test errors YES: Check EMERGENCY STOP wiring NO: Replace PCB WE
0Ch	09h	Error during start-up EMERGENCY STOP test of assistant support arm. For development purposes only	No action required, service information only
0Ch	0Ah	Error during startup EMERGENCY STOP test of foot switch. For development purposes only	No action required, service information only
0Ch	0Bh	Error during start-up EMERGENCY STOP test of ceiling slider. For development purposes only	No action required, service information only
0Ch	0Ch	Error during start-up EMERGENCY STOP test of tray support arm. For development purposes only	No action required, service information only
0Dh	xx	CAN error detected during self-test. Cannot write to CAN register	! Replace PCB TS
0Eh	xx	Video RAM defective. Cannot write to RAM cell	! Replace panel on which error occurred
0Fh	xx	RAM defective. Cannot write to RAM cell	! Replace panel on which error occurred
10h	xx	Random generator for LCD defective	! Replace panel on which error occurred
11h	xx	PIC chip does not respond properly or at all	! Replace panel on which error occurred
12h	xx	Power fail signal detected	No action required, service information only
13h	xx	Power fail signal does not lead to RESET after 10s -> erroneous triggering	No action required, service information only
14h	xx	AK does not assign service channel. Error memory cannot be retrieved from AK, yet AK is recognized	Inform Hotline
15h	xx	CAN connection with AK interrupted after communication has already been established. CAN bus defective, component disconnected/defective	! Check function of AK OK: Error occurs frequently: Check the CAN bus using the CAN bus wiring diagram NO: Replace PCB SA If the error occurs in combination with 4001h, it is not necessary to check the CAN bus. Replace PCB SA
16h	xx	CAN connection with AE interrupted after communication has already been established. CAN bus defective, component disconnected/defective	! Check function of dentist element OK: Error occurs frequently: Check the CAN bus using the CAN bus wiring diagram NO: Replace PCB AJ If the error occurs in combination with 4002h, it is not necessary to check the CAN bus. Replace PCB AJ
17h	xx	CAN connection with AP interrupted after communication has already been established. CAN bus defective, component disconnected/defective	! Check function of dentist panel OK: Error occurs frequently: Check the CAN bus using the CAN bus wiring diagram NO: Replace dentist panel If the error occurs in combination with 4003h, it is not necessary to check the CAN bus. Replace dentist panel
18h	xx	CAN connection with AT interrupted after communication has already been established. CAN bus defective, component disconnected/defective	! Check function of support arm OK: Error occurs frequently: Check the CAN bus using the CAN bus wiring diagram NO: Replace PCB TS If the error occurs in combination with 4004h, it is not necessary to check the CAN bus. Replace PCB TS
19h	xx	CAN connection with HE interrupted after communication has already been established. CAN bus defective, component disconnected/defective	! Check function of assistant element OK: Error occurs frequently: Check the CAN bus using the CAN bus wiring diagram NO: Replace PCB AJ If the error occurs in combination with 4005h, it is not necessary to check the CAN bus. Replace PCB AJ
1Ah	xx	CAN connection with HP interrupted after communication has already been established. CAN bus defective, component disconnected/defective	! Check function of assistant panel. OK: Error occurs frequently: Check the CAN bus using the CAN bus wiring diagram NO: Replace assistant panel If the error occurs in combination with 4006h, it is not necessary to check the CAN bus. Replace assistant panel

error_ high	error_ low	Description of service code	Corrective action (engineer)
1Bh	xx	CAN connection with ST interrupted after communication has already been established. CAN bus defective, component disconnected/defective	! Check function of patient chair control OK: Error occurs frequently: Check the CAN bus using the CAN bus wiring diagram NO: Replace PCB SS If the error occurs in combination with 4007h, it is not necessary to check the CAN bus. Replace PCB SS
1Ch	xx	CAN connection with WE interrupted after communication has already been established. CAN bus defective, component disconnected/defective	! Check function of water unit OK: Error occurs frequently: Check the CAN bus using the CAN bus wiring diagram NO: Replace PCB WS If the error occurs in combination with 4008h, it is not necessary to check the CAN bus. Replace PCB WS
1Dh	xx	CAN connection with HT interrupted after communication has already been established. CAN bus defective, component disconnected/defective. For development purposes only	No action required, service information only
1Eh	xx	CAN connection with FS interrupted after communication has already been established. CAN bus defective, component disconnected/defective. For development purposes only	No action required, service information only
1Fh	xx	CAN connection with DG interrupted after communication has already been established. CAN bus defective, component disconnected/defective. For development purposes only	No action required, service information only
20h	xx	CAN connection with TT interrupted after communication has already been established. CAN bus defective, component disconnected/defective. For development purposes only	No action required, service information only
21h	xx	EMERGENCY STOP activated by uP -> signal not detected. EMERGENCY_STOP logic defective	! Replace panel on which error occurred
22h	xx	Power_fail input circuit defective	If no impairment of chair functions can be detected, no action is required. Otherwise inform Hotline.
23h	xx	Panel control does not recognize keyboard. Connector, wiring defective.	! Check connectors between panel control and keyboard element in AP. NO: Replace panel on which error was displayed
24h	xx	LCD offset voltage -30V defective	! Replace panel on which error occurred
25h	xx	Power supply defective, overload, connector	! Check fuse F1 on NS OK: Measure voltages on panel X1.7 (gray) and X1.8 (red) 8V U approx. 8V: Replace panel U << 8V: Check cable path AJ X3.8 -> X4.3A+B AJ -> X1.17 AG -> GA1 X1.17 -> LS X1.2
26h	xx	LCD does not light up, bias voltage generator defective, no oscillation in DC/DC converter	! Replace panel on which error occurred
27h	xx	Error in bias voltage generator. DC/DC converter oscillates at wrong frequency.	! Replace panel on which error occurred
28h	xx	Unused service code	
29h	xx	Unused service code	
2Ah	xx	Unused service code	
2Bh	xx	Unused service code	
2Ch	xx	Unused service code	
2Dh	xx	Unused service code	
2Eh	xx	Unused service code	
2Fh	xx	Unused service code	
30h	03h	Undetermined node does not release EMERGENCY STOP channel or EMERGENCY STOP is permanently active due to ground contact.	During startup, simultaneously with service message 31 03 ! Disconnect EMERGENCY STOP wiring of all components one after the other until the PCB which pulls EMERGENCY STOP to Low is singled out (i.e., the error no longer occurs) -> replace PCB NO: Look for ground contact in EMERGENCY STOP wiring.
31h	01h	EMERGENCY STOP channel is not released by AK after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK.	! Replace PCB SA

error_ high	error_ low	Description of service code	Corrective action (engineer)
31h	02h	EMERGENCY STOP channel is not released by AE after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK.	! Replace PCB AJ
31h	03h	EMERGENCY STOP channel is not released by AP after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK.	Error occurs individually: Replace dentist panel With preceding service code 30 03: see 30 03
31h	04h	EMERGENCY STOP channel is not released by AT after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK.	! Replace PCB TS
31h	05h	EMERGENCY STOP channel is not released by HE after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK.	! Replace PCB AJ
31h	06h	EMERGENCY STOP channel is not released by HP after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK.	! Replace assistant panel
31h	07h	EMERGENCY STOP channel is not released by ST after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK.	! Replace PCB SS
31h	08h	EMERGENCY STOP channel is not released by WE after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK.	! Replace PCB WS
31h	09h	EMERGENCY STOP channel is not released by HT after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK. For development purposes only	No action required, service information only
31h	Ah	EMERGENCY STOP channel is not released by FS after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK. For development purposes only	No action required, service information only
31h	Bh	EMERGENCY STOP channel is not released by DG after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK. For development purposes only	No action required, service information only
31h	Ch	EMERGENCY STOP channel is not released by TT after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK. For development purposes only	No action required, service information only
32h	01h	Node AK reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK.	Check EMERGENCY STOP wiring from AK to patient chair for continuity and ground contact NO: EMERGENCY STOP input circuit in AK is defective ! Replace PCB SA
32h	02h	Node AE reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK.	Check EMERGENCY STOP wiring from AE to patient chair for continuity and ground contact NO: EMERGENCY STOP input circuit in AE is defective ! Replace PCB AJ
32h	03h	Node AP reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK.	Check EMERGENCY STOP wiring from AP to patient chair for continuity and ground contact NO: EMERGENCY STOP input circuit in AP is defective ! Replace PCB PS
32h	04h	Node AT reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK.	Check EMERGENCY STOP wiring from AT to patient chair for continuity and ground contact NO: EMERGENCY STOP input circuit in AT is defective ! Replace PCB TS
32h	05h	Node HE reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK.	Check EMERGENCY STOP wiring from HE to patient chair for continuity and ground contact NO: EMERGENCY STOP input circuit in HE is defective ! Replace PCB AJ
32h	06h	Node HP reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK.	Check EMERGENCY STOP wiring from HP to patient chair for continuity and ground contact NO: EMERGENCY STOP input circuit in HP is defective ! Replace PCB PS
32h	07h	Node ST reports error or no respond at all, but EMERGENCY STOP wiring in panel is OK.	Check EMERGENCY STOP wiring from ST to patient chair for continuity and ground contact NO: EMERGENCY STOP input circuit in ST is defective ! Replace PCB SS

error_ high	error_ low	Description of service code	Corrective action (engineer)
32h	08h	Node WE reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK.	Check EMERGENCY STOP wiring from WE to patient chair for continuity and ground contact NO: EMERGENCY STOP input circuit in WE is defective ! Replace PCB WS
32h	09h	Node HT reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK.	EMERGENCY STOP input circuit in HT is defective, Node does not exist yet, no corrective action
32h	0Ah	Node FS reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK.	EMERGENCY STOP input circuit in FS is defective, Node does not exist yet, no corrective action
32h	0Bh	Node DG reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK.	EMERGENCY STOP input circuit in DG is defective, Node does not exist yet, no corrective action
32h	0Ch	Node TT reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK.	EMERGENCY STOP input circuit in TT is defective, Node does not exist yet, no corrective action
33h	01h	Node AK reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK.	EMERGENCY STOP wiring from AK to panel is interrupted or has ground contact
33h	02h	Node AE reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK.	EMERGENCY STOP wiring from AE to panel is interrupted or has ground contact
33h	03h	Node AP reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK.	EMERGENCY STOP wiring from AP to panel is interrupted or has ground contact
33h	04h	Node AT reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK.	EMERGENCY STOP wiring from AT to panel is interrupted or has ground contact
33h	05h	Node HE reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK.	EMERGENCY STOP wiring from HE to panel is interrupted or has ground contact
33h	06h	Node HP reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK.	EMERGENCY STOP wiring from HP to panel is interrupted or has ground contact
33h	07h	Node ST reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK.	EMERGENCY STOP wiring from ST to panel is interrupted or has ground contact
33h	08h	Node WE reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK.	EMERGENCY STOP wiring from WE to panel is interrupted or has ground contact
33h	09h	Node HT reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK. For development purposes only	No action required, service information only
33h	0Ah	Node FS reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK. For development purposes only	No action required, service information only
33h	0Bh	Node DG reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK. For development purposes only	No action required, service information only
33h	0Ch	Node TT reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK. For development purposes only	No action required, service information only
34h	01h	In connection with code 3301h and 3101h: AK has connected EMERGENCY STOP channel to ground during test and did not release it	? Is the EMERGENCY STOP channel grounded (measure between X1.2A and ground potential on PCB SA)? NO: Ignore YES: ! Replace PCB SA
34h	02h	In connection with code 3302h and 3102h: AE has connected EMERGENCY STOP channel to ground during test and did not release it	? Is the EMERGENCY STOP channel grounded (measure between X1.B5 and ground potential on PCB AJ)? NO: Ignore YES: ! Replace PCB AJ
34h	03h	In connection with code 3303h and 3103h: AP has connected EMERGENCY STOP channel to ground during test and did not release it	? Is the EMERGENCY STOP channel grounded (measure between X2.2 and ground potential on PCB PS)? NO: Ignore YES: ! Replace PCB PS
34h	04h	In connection with code 3304h and 3104h: AT has connected EMERGENCY STOP channel to ground during test and did not release it	? Is the EMERGENCY STOP channel grounded (measure between X2.5 (C1-A) / X3.B4 (C1-B) and ground potential on PCB TS)? NO: Ignore YES: ! Replace PCB TS

error_ high	error_ low	Description of service code	Corrective action (engineer)
34h	05h	In connection with code 3305h and 3105h: HE has connected EMERGENCY STOP channel to ground during test and did not release it	? Is the EMERGENCY STOP channel grounded (measure between X1.B5 and ground potential on PCB AJ)? NO: Ignore YES: ! Replace PCB AJ
34h	06h	In connection with code 3306h and 3106h: HP has connected EMERGENCY STOP channel to ground during test and did not release it	? Is the EMERGENCY STOP channel grounded (measure between X2.2 and ground potential on PCB PS)? NO: Ignore YES: ! Replace PCB PS
34h	07h	In connection with code 3307h and 3107h: ST has connected EMERGENCY STOP channel to ground during test and did not release it	? Is the EMERGENCY STOP channel grounded (measure between X2.D and ground potential on PCB SS)? NO: Ignore YES: ! Replace PCB SS
34h	08h	In connection with code 3308h and 3108h: WE has connected EMERGENCY STOP channel to ground during test and did not release it	? Is the EMERGENCY STOP channel grounded (measure between X5.3A and ground potential on PCB WS)? NO: Ignore YES: ! Replace PCB WS
34h	09h	In connection with code 3309h and 3109h: HT has connected EMERGENCY STOP channel to ground during test and did not release it. For development purposes only	No action required, service information only
34h	0Ah	In connection with code 330Ah and 310Ah: FS has connected EMERGENCY STOP channel to ground during test and did not release it. For development purposes only	No action required, service information only
34h	0Bh	In connection with code 330Bh and 310Bh: DG has connected EMERGENCY STOP channel to ground during test and did not release it. For development purposes only	No action required, service information only
34h	0Ch	In connection with code 330Ch and 310Ch: TT has connected EMERGENCY STOP channel to ground during test and did not release it. For development purposes only	No action required, service information only
35h	01h	Node AK does not respond to request to perform EMERGENCY STOP test and the EMERGENCY STOP channel does not respond either.	? If node exists in IDENT menu, or if service codes of the node can be retrieved: YES: Ignore NO: ! Replace PCB SA
35h	02h	Node AE does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either.	? If node exists in IDENT menu, or if service codes of the node can be retrieved: YES: Ignore NO: ! Replace PCB AJ
35h	03h	Node AP does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either.	? If node exists in IDENT menu, or if service codes of the node can be retrieved: YES: Ignore NO: ! Replace PCB PS
35h	04h	Node AT does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either.	? If node exists in IDENT menu, or if service codes of the node can be retrieved: YES: Ignore NO: ! Replace PCB TS
35h	05h	Node HE does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either.	? If node exists in IDENT menu, or if service codes of the node can be retrieved: YES: Ignore NO: ! Replace PCB AJ
35h	06h	Node HP does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either.	? If node exists in IDENT menu, or if service codes of the node can be retrieved: YES: Ignore NO: ! Replace PCB PS
35h	07h	Node ST does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either.	? If node exists in IDENT menu, or if service codes of the node can be retrieved: YES: Ignore NO: ! Replace PCB SS
35h	08h	Node WE does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either.	? If node exists in IDENT menu, or if service codes of the node can be retrieved: YES: Ignore NO: ! Replace PCB WS
35h	09h	Node HT does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either. For development purposes only	No action required, service information only
35h	0Ah	Node FS does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either. For development purposes only	No action required, service information only

error_ high	error_ low	Description of service code	Corrective action (engineer)
35h	0Bh	Node DG does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either. For development purposes only	No action required, service information only
35h	0Ch	Node TT does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either. For development purposes only	No action required, service information only
36h	01h	Response from node AK is incomprehensible, contents undefined	No conclusions possible concerning EMERGENCY STOP wiring, temporary interference, in case it occurs frequently: ! Hotline
36h	02h	Response from node AE is incomprehensible, contents undefined	No conclusions possible concerning EMERGENCY STOP wiring, temporary interference, in case it occurs frequently: ! Hotline
36h	03h	Response from node AP is incomprehensible, contents undefined	No conclusions possible concerning EMERGENCY STOP wiring, temporary interference, in case it occurs frequently: ! Hotline
36h	04h	Response from node AT is incomprehensible, contents undefined	No conclusions possible concerning EMERGENCY STOP wiring, temporary interference, in case it occurs frequently: ! Hotline
36h	05h	Response from node HE is incomprehensible, contents undefined	No conclusions possible concerning EMERGENCY STOP wiring, temporary interference, in case it occurs frequently: ! Hotline
36h	06h	Response from node HP is incomprehensible, contents undefined	No conclusions possible concerning EMERGENCY STOP wiring, temporary interference, in case it occurs frequently: ! Hotline
36h	07h	Response from node ST is incomprehensible, contents undefined	No conclusions possible concerning EMERGENCY STOP wiring, temporary interference, in case it occurs frequently: ! Hotline
36h	08h	Response from node WE is incomprehensible, contents undefined	No conclusions possible concerning EMERGENCY STOP wiring, temporary interference, in case it occurs frequently: ! Hotline
36h	09h	Response from node HT is incomprehensible, contents undefined. For development purposes only	No action required, service information only
36h	0Ah	Response from node FS is incomprehensible, contents undefined. For development purposes only	No action required, service information only
36h	0Bh	Response from node DG is incomprehensible, contents undefined. For development purposes only	No action required, service information only
36h	0Ch	Response from node TT is incomprehensible, contents undefined. For development purposes only	No action required, service information only
37h	xx	Unused service code	
38h	xx	Unused service code	
39h	xx	Unused service code	
3Ah	xx	Unused service code	
3Bh	xx	Unused service code	
3Ch	xx	Unused service code	
3Dh	xx	Unused service code	
3Eh	xx	Unused service code	
3Fh	xx	Unused service code	
40h	01h	RESET of AK component during normal operation	Check supply voltage (8V) of AK component OK: Error on PCB, !Replace PCB SA
40h	02h	RESET of AE component during normal operation	Check supply voltage (8V) of AE component OK: Error on PCB, !Replace PCB AJ
40h	03h	RESET of AP component during normal operation	Check supply voltage (8V) of AP component OK: Error on PCB, !Replace dentist panel
40h	04h	RESET of AT component during normal operation	Check supply voltage (8V) of AT component OK: Error on PCB, !Replace PCB TS
40h	05h	RESET of HE component during normal operation	Check supply voltage (8V) of HE component OK: Error on PCB, !Replace PCB AJ
40h	06h	RESET of HP component during normal operation	Check supply voltage (8V) of HP component OK: Error on PCB, !Replace assistant panel
40h	07h	RESET of ST component during normal operation	Check supply voltage (8V) of ST component OK: Error on PCB, !Replace PCB SS
40h	08h	RESET of WE component during normal operation	Check supply voltage (8V) of WE component OK: Error on PCB, !Replace PCB WS
40h	09h	RESET of HT component during normal operation. For development purposes only	No action required, service information only
40h	Ah	RESET of FS component during normal operation. For development purposes only	No action required, service information only

error_ high	error_ low	Description of service code	Corrective action (engineer)
40h	Bh	RESET of DG component during normal operation. For development purposes only	No action required, service information only
40h	Ch	RESET of TT component during normal operation. For development purposes only	No action required, service information only
41h	xx	First connection of node AK to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up	? Can AK service codes be retrieved YES: Ignore error NO: ! Replace PCB SA
42h	xx	First connection of node AE to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up	? Can AE service codes be retrieved YES: Ignore error NO: ! Replace PCB AJ
43h	xx	First connection of node AP to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up	? Can AP service codes be retrieved YES: Ignore error NO: ! Replace PCB PS
44h	xx	First connection of node AT to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up	? Can AT service codes be retrieved YES: Ignore error NO: ! Replace PCB TS
45h	xx	First connection of node HE to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up	? Can HE service codes be retrieved YES: Ignore error NO: ! Replace PCB AJ
46h	xx	First connection of node HP to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up	? Can HP service codes be retrieved YES: Ignore error NO: ! Replace PCB PS
47h	xx	First connection of node ST to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up	? Can ST service codes be retrieved YES: Ignore error NO: ! Replace PCB SS
48h	xx	First connection of node WE to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up	? Can WE service codes be retrieved YES: Ignore error NO: ! Replace PCB WS
49h	xx	First connection of node HT to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up. For development purposes only	No action required, service information only
4Ah	xx	First connection of node FS to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up. For development purposes only	No action required, service information only
4Bh	xx	First connection of node DG to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up. For development purposes only	No action required, service information only
4Ch	xx	First connection of node TT to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up. For development purposes only	No action required, service information only
4Dh	xx	Unused service code	
4Eh	xx	Unused service code	
4Fh	xx	Unused service code	
50h	xx	The software used cannot be executed on PCB PS	Use compatible software, inform Hotline
51h	01h	Node AK already available on CAN bus, but does not respond to version query	? Can node service codes be retrieved YES: Ignore error code NO: Check CAN wiring to node, ? OK YES: ! Replace PCB SA
51h	02h	Node AE already available on CAN bus, but does not respond to version query	? Can node service codes be retrieved YES: Ignore error code NO: Check CAN wiring to node, ? OK YES: ! Replace PCB AJ
51h	03h	Node AP already available on CAN bus, but does not respond to version query	? Can node service codes be retrieved YES: Ignore error code NO: Check CAN wiring to node, ? OK YES: ! Replace PCB PS
51h	04h	Node AT already available on CAN bus, but does not respond to version query	? Can node service codes be retrieved YES: Ignore error code NO: Check CAN wiring to node, ? OK YES: ! Replace PCB TS
51h	05h	Node HE already available on CAN bus, but does not respond to version query	? Can node service codes be retrieved YES: Ignore error code NO: Check CAN wiring to node, ? OK YES: ! Replace PCB AJ

error_ high	error_ low	Description of service code	Corrective action (engineer)
51h	06h	Node HP already available on CAN bus, but does not respond to version query	? Can node service codes be retrieved YES: Ignore error code NO: Check CAN wiring to node, ? OK YES: ! Replace PCB PS
51h	07h	Node ST already available on CAN bus, but does not respond to version query	? Can node service codes be retrieved YES: Ignore error code NO: Check CAN wiring to node, ? OK YES: ! Replace PCB SS
51h	08h	Node WE already available on CAN bus, but does not respond to version query	? Can node service codes be retrieved YES: Ignore error code NO: Check CAN wiring to node, ? OK YES: ! Replace PCB WS
51h	09h	Node HT already available on CAN bus, but does not respond to version query. For development purposes only	No action required, service information only
51h	0Ah	Node FS already available on CAN bus, but does not respond to version query. For development purposes only	No action required, service information only
51h	0Bh	Node DG already available on CAN bus, but does not respond to version query. For development purposes only	No action required, service information only
51h	0Ch	Node TT already available on CAN bus, but does not respond to version query. For development purposes only	No action required, service information only

7.5 Service codes of PCB (TS) support arm in dentist element

7.5.1 SW version: 1.4 - 1.5

Remark/Note:
The service code (error_high) can be found in column 5 of the panel display.
(error_low) xx: disregard

error_ high	error_ low	Description of service code	Corrective action (engineer)
0h	xx	Zero error line	For analysis purposes only!
1h	xx	Unused service code	
2h	xx	Unused service code	
3h	xx	Unused service code	
4h	xx	Unused service code	
5h	xx	EMERGENCY STOP input circuit detected on permanent low e.g., EMERGENCY STOP input circuit on PCB TS is defective, no EMERGENCY STOP pull-up on PCB SS	? EMERGENCY STOP wiring PCB TS X3B.4 on low potential NO: ! Replace PCB TS YES: Remove PCB TS X3, ? EMERGENCY STOP wiring PCB SS X1.3 on low potential NO: ! Replace PCB TS YES: ! Unplug EMERGENCY STOP wiring of all components one after the other until the error is found
6h	xx	Node activates EMERGENCY STOP, but this is not detected on the port input	Error on PCB: ! Replace PCB TS
7h	xx	EMERGENCY STOP input remains active after test (low potential)	! Replace PCB TS
8h	xx	Cannot write to CAN register	! Replace PCB TS
9h	xx	CAN communication impossible/faulty, CAN module defective, CAN cable defective	? Error occurs only once: Fault exists ? Several times: Replace PCB TS
Ah	xx	Unused service code	
Bh	xx	Unused service code	
Ch	xx	Unused service code	
Dh	xx	Unused service code	
Eh	xx	Unused service code	
Fh	xx	Unused service code	
10h	xx	When writing to EEPROM no acknowledgement is received after authorized writing time	! Replace PCB TS
11h	xx	Unused service code	
12h	xx	Comparison of RAM with written EEPROM content faulty, EEPROM read/write error	! Replace PCB TS
13h	xx	EEPROM buffer capacity overflow	For development purposes only
14h	xx	EEPROM does not send information to uP concerning data sent within the preset time interval	For development purposes only
15h	xx	Write timeout on serial interface	For development purposes only
16h	xx	ADC BUSY signal authorized active time exceeded, ADC defective	! Replace PCB TS
17h	xx	Unused service code	
18h	xx	No potential variation on burr after travel and self-test, external error on potentiometer 1 circuit	! Check whether pot. 1 (bottom) and cables are fitted properly NO: Replace pot. 1
19h	xx	No potential variation on burr after travel and self-test, external error on potentiometer 2 circuit	! Check whether pot. 2 (center) and cables are fitted properly NO: Replace pot. 2
1Ah	xx	No potential variation on burr after travel and self-test, external error on potentiometer 3 circuit	! Check whether pot. 3 (top) and cables are fitted properly NO: Replace pot. 3
1Bh	xx	Unused service code	
1Ch	xx	Unused service code	
1Dh	xx	24V supply voltage outside tolerance. Power supply failure, short-circuit, blown fuse, connector	! Check fuse F3 on NS ! Check 24V cable path TS X3.4 -> AG 3A.4 -> X1.16 AG -> GA1 X1.16 -> NS X1.4
1Eh	xx	Unused service code	

error_ high	error_ low	Description of service code	Corrective action (engineer)
1Fh	xx	Unused service code	
20h	xx	Unused service code	
21h	xx	Power fail occurs in power supply	Warning only, check power supply
22h	xx	Unused service code	
23h	xx	Service command received unknown to support arm	For development purposes only
24h	xx	Unused service code	
25h	xx	Unused service code	
26h	xx	Unused service code	
27h	xx	Unused service code	
28h	xx	Unused service code	
29h	xx	Unused service code	
2Ah	xx	Unused service code	
2Bh	xx	Unused service code	
2Ch	xx	Unused service code	
2Dh	xx	Unused service code	
2Eh	xx	Unused service code	
2Fh	xx	Unused service code	
30h	xx	MOTOR_1 (turn arm) external short-circuit detected by SW	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: Unplug connector X6. ? Error persists when motor1 is activated YES: Replace PCB TS NO: Check circuit TS X6.1 -> X6.3 M1
31h	xx	MOTOR_1 (turn arm) not activated Required: Current=0, Actual: Current > 0	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: ? Motor 1 active without key activation YES: Replace PCB TS NO: Check circuit TS X6.1 -> X6.3 motor 1
32h	xx	MOTOR_1 (turn arm) load too small. External open circuit.	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: Switch off power on C1, check continuity of cables TS X6.1 and X6.3 to motor1 NO: Replace PCB TS NO: Replace motor 1
33h	xx	MOTOR_1 (turn arm) external short-circuit detected by HW	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: Unplug connector X6. ? Error persists when motor 1 is activated YES: Replace PCB TS NO: Check circuit TS X6.1 -> X6.3 M1
34h	xx	MOTOR_2 (up/down) external short-circuit detected by SW	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: Unplug connector X7 ? Error persists when motor 2 is activated YES: Replace PCB TS NO: Check circuit TS X7.1 -> X7.3 M2
35h	xx	MOTOR_2 (up/down) not activated Required: Current=0, Actual: Current > 0	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: ? Motor 2 active without key activation YES: Replace PCB TS NO: Check circuit TS X7.1 -> motor X7.3 motor 2
36h	xx	MOTOR_2 (up/down) load too small. External open circuit.	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: Switch off power on C1, check continuity of cables TS X7.1 and X7.2 to motor 2 NO: Replace PCB TS NO: Replace motor 2

error_ high	error_ low	Description of service code	Corrective action (engineer)
37h	xx	MOTOR_2 (up/down) external short-circuit detected by HW	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: Unplug connector X7 ? Error persists when motor 2 is activated YES: Replace PCB TS NO: Check circuit TS X7.1 -> X7.3 M2
38h	xx	MOTOR_3 (turn head) external short-circuit detected by SW	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: Unplug connector X8 ? Error persists when motor 3 is activated YES: Replace PCB TS NO: Check circuit TS X8.1 -> X8.3 M3
39h	xx	MOTOR_3 (turn head) not activated Required: Current=0, Actual: Current > 0	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: ? Motor 3 active without key activation YES: Replace PCB TS NO: Check circuit TS X8.1 -> X8.3 motor 3
3Ah	xx	MOTOR_3 (turn head) load too small. External open circuit.	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: Switch off power on C1, check continuity of cables TS X8.1 and X8.3 to motor 3 NO: Replace PCB TS NO: Replace motor 3
3Bh	xx	MOTOR_3 (turn head) external short-circuit detected by HW	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: Unplug connector X8 ? Error persists when motor 3 is activated YES: Replace PCB TS NO: Check circuit TS X8.1 -> X8.3 M3
3Ch	xx	Unused service code	
3Dh	xx	Unused service code	
3Eh	xx	Unused service code	
3Fh	xx	Unused service code	
40h	xx	SW cannot be executed on HW. Defective interface between HW and SW	!Use compatible software, inform Hotline
41h	xx	Unused service code	
42h	xx	Unused service code	
43h	xx	Unused service code	
44h	xx	Unused service code	
45h	xx	Unused service code	
46h	xx	Unused service code	
47h	xx	Unused service code	
48h	xx	Unused service code	
49h	xx	Unused service code	
4Ah	xx	Unused service code	
4Bh	xx	Unused service code	
4Ch	xx	Unused service code	
4Dh	xx	Unused service code	
4Eh	xx	Unused service code	
4Fh	xx	Unused service code	
50h	xx	MOTOR for NACL pump external short-circuit detected by SW	Unplug connector X4 ? Error persists when the pump is activated YES: Replace PCB TS NO: Check circuit TS X4.1 -> X4.3 for short-circuit (pump, cable)
51h	xx	MOTOR for NACL pump not activated Required: Current=0, Actual: Current > 0	? NACL pump active without key activation YES: Replace PCB TS NO: Check circuit TS X4.1 -> X4.3 NACL pump
52h	xx	MOTOR for NACL pump load too small. External open circuit.	Activate NACL pump, measure voltage on PCB TS between X4.1 and X4.3 ? U = 24V: Cable, connector, pump defective ? U=0V: !Replace PCB TS

7.5.2 SW version: 1.0, 1.2 - 1.3

Remark/Note:
The service code (error_high) can be found in column 5 of the panel display.
(error_low) xx: disregard

error_ high	error_ low	Description of service code	Corrective action (engineer)
0h	xx	Zero error line	For analysis purposes only!
1h	xx	Unused service code	
2h	xx	Unused service code	
3h	xx	Unused service code	
4h	xx	Unused service code	
5h	xx	Unused service code	
6h	xx	Unused service code	
7h	xx	Unused service code	
8h	xx	Cannot write to CAN register	! Replace PCB TS
9h	xx	CAN communication impossible/faulty, CAN module defective, CAN cable defective	? Error occurs only once: Fault exists ? Several times: Replace PCB TS
Ah	xx	Unused service code	
Bh	xx	Unused service code	
Ch	xx	Unused service code	
Dh	xx	Unused service code	
Eh	xx	Unused service code	
Fh	xx	Unused service code	
10h	xx	When writing to EEPROM no acknowledgement is received after authorized writing time	! Replace PCB TS
11h	xx	Unused service code	
12h	xx	Comparison of RAM with written EEPROM content faulty, EEPROM read/write error	! Replace PCB TS
13h	xx	EEPROM buffer capacity overflow	For development purposes only
14h	xx	EEPROM does not send information to uP concerning data sent within the preset time interval	For development purposes only
15h	xx	Write timeout on serial interface	For development purposes only
16h	xx	ADC BUSY signal authorized active time exceeded, ADC defective	! Replace PCB TS
17h	xx	Unused service code	
18h	xx	No potential variation on burr after travel and self-test, external error on potentiometer 1 circuit	! Check whether pot. 1 (bottom) and cables are fitted properly NO: Replace pot. 1
19h	xx	No potential variation on burr after travel and self-test, external error on potentiometer 2 circuit	! Check whether pot. 2 (center) and cables are fitted properly NO: Replace pot. 2
1Ah	xx	No potential variation on burr after travel and self-test, external error on potentiometer 3 circuit	! Check whether pot. 3 (top) and cables are fitted properly NO: Replace pot. 3
1Bh	xx	Unused service code	
1Ch	xx	Unused service code	
1Dh	xx	24V supply voltage outside tolerance Power supply failure, short-circuit, blown fuse, connector	! Check fuse F3 on NS ! Check 24V cable path: TS X3.4 -> AG 3.4 -> X1.16 AG -> GA1 X1.16 -> NS X1.4
1Eh	xx	Unused service code	
1Fh	xx	Unused service code	
20h	xx	Unused service code	
21h	xx	Power fail occurs in power supply	Warning only, check power supply
22h	xx	Unused service code	
23h	xx	Service command received unknown to support arm	For development purposes only
24h	xx	Unused service code	
25h	xx	Unused service code	
26h	xx	Unused service code	
27h	xx	Unused service code	

error_ high	error_ low	Description of service code	Corrective action (engineer)
28h	xx	Unused service code	
29h	xx	Unused service code	
2Ah	xx	Unused service code	
2Bh	xx	Unused service code	
2Ch	xx	Unused service code	
2Dh	xx	Unused service code	
2Eh	xx	Unused service code	
2Fh	xx	Unused service code	
30h	xx	MOTOR 1 (turn arm) external short-circuit	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: Unplug connector X4 ? Error persists when M1 is activated YES: Replace PCB TS NO: Check circuit TS X4.1B -> X4.2B M1
31h	xx	MOTOR 1 (turn arm) not activated Required: Current=0, Actual: Current > 0	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: ? Motor 1 active without key activation YES: Replace PCB TS NO: Check circuit TS X4.1B -> X4.2B motor 1
32h	xx	MOTOR 1 (turn arm) load too small. External open circuit.	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: Switch off power on C1, check continuity of cables TS X4.1B and X4.2B to motor 1 NO: Replace PCB TS NO: Replace motor 1
33h	xx	Unused service code	
34h	xx	MOTOR 2 (up/down) external short-circuit	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: Unplug connector X4 ? Error persists when M2 is activated YES: Replace PCB TS NO: Check circuit TS X4.3B -> X4.4B M2
35h	xx	MOTOR 2 (up/down) not activated Required: Current=0, Actual: Current > 0	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: ? Motor 2 active without key activation YES: Replace PCB TS NO: Check circuit TS X4.3B -> X4.4B motor 2
36h	xx	MOTOR 2 (up/down) load too small. External open circuit.	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: Switch off power on C1, check continuity of cables TS X4.3B and X4.4B to motor 2 NO: Replace PCB TS NO: Replace motor 2
37h	xx	Unused service code	
38h	xx	MOTOR 3 (turn head) external short-circuit	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: Unplug connector X4 ? Error persists when motor 3 is activated YES: Replace PCB TS NO: Check circuit TS X4.5A -> X4.5B M3
39h	xx	MOTOR 3 (turn head) not activated. Required: Current=0, Actual: Current > 0	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: ? Motor 3 active without key activation YES: Replace PCB TS NO: Check circuit TS X4.5A -> X4.5B motor 3
3Ah	xx	MOTOR 3 (turn head) load to small. External open circuit.	Program the program, move arm manually, Execute program: Function of all motors? YES: Ignore error NO: Switch off power on C1, check continuity of cables TS X4.5A and X4.5B to motor 3 NO: Replace PCB TS NO: Replace motor 3
3Bh	xx	Unused service code	

error_ high	error_ low	Description of service code	Corrective action (engineer)
3Ch	xx	Unused service code	
3Dh	xx	Unused service code	
3Eh	xx	Unused service code	
3Fh	xx	Unused service code	
40h	xx	SW cannot be executed on HW. Defective interface between HW and SW	!Use compatible software, inform Hotline

7.6 Service messages of PCB (AJ) on the assistant panel

7.6.1 SW version: 1.4 - 2.5

Remark/Note:
There are both two-digit and four-digit service codes.
Two-digit service codes (error_high) can be found in column 5 on the panel display.
Four-digit service codes consist of the entries in column 5 (error_high) and column 6 (error_low) on the panel.

Service codes are displayed in HEX format
(error_low) xx: disregard

error_ high	error_ low	Description of service code	Corrective action (engineer)
00h	xx	Zero error line	For analysis purposes only
01h	xx	Control module: Cannot address/write to CAN RAM	! Replace PCB AJ ! Check CANH cable path AJ X1.21A -> AG X4.21A -> AG X1.1 -> chair GA1 X1.1 -> SA X1.1A ! Check CANL cable path AJ X1.21B -> AG X4.21B -> AG X1.2µ-> chair GA1 X1.2 -> SA X1.2A
02h	xx	EEPROM software control module AE error	If the error occurs several times between C1 power-on / power-off: ! Replace PCB AJ
03h	xx	48V supply voltage outside tolerance Power supply failure, short-circuit, blown fuse, connector	! Check fuse F5 on NS ! 48V cable path; AJ -> AG -> chair GA1 -> NS X1.6
04h	xx	24V supply voltage outside tolerance Power supply failure, short-circuit, blown fuse, connector	! Check fuse F3 on NS ! 24V cable path; AJ -> AG -> chair GA1 -> NS X1.4
05h	xx	16V supply voltage outside tolerance Power supply failure, short-circuit, blown fuse, connector	! Check fuse F2 on NS ! 16V cable path; AJ -> AG -> chair GA1 -> NS X1.3
06h	xx	Control module: RAM error	! Replace PCB AJ
07h	xx	Control module: ROM error	! Replace PCB AJ
08h	xx	At least one actuator output is short-circuited to the ground, control module defective. Subsequent service code shows output.	! Replace PCB AJ NO: Replace PCB AV ! Search for ground contact on AG X4 or AG X8
09h	xx	Output driver stage defective Relay KL1 output: Required: High; Actual: Passive	Remove PCB AJ ?12V on connector X4.15B? YES: AJ defective NO: Replace PCB AV; ?12V on connector X4.15B? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AV and AJ
0Ah	xx	Output driver stage defective Relay KL2 output: Required: High; Actual: Passive	Remove PCB AJ ?12V on connector X4.13B? YES: AJ defective NO: Replace PCB AV; ?12V on connector X4.13B? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AV and AJ
0Bh	xx	Output driver stage defective Relay KL3 output: Required: High; Actual: Passive	Remove PCB AJ ?12V on connector X4.14A? YES: AJ defective NO: Replace PCB AV; ?12V on connector X4.14A? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AV and AJ
0Ch	xx	Output driver stage defective Relay KL4 output: Required: High; Actual: Passive	Remove PCB AJ ?12V on connector X4.14B? YES: AJ defective NO: Replace PCB AV; ?12V on connector X4.14B? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AV and AJ
0Dh	xx	Output driver stage defective Relay KL5 output: Required: High; Actual: Passive	Remove PCB AJ ?12V on connector X4.15A? YES: AJ defective NO: Replace PCB AV; ?12V on connector X4.15A? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AV and AJ
0Eh	xx	Output driver stage defective Motor normal output: Required: High; Actual: Passive	! Replace PCB AJ

error_ high	error_ low	Description of service code	Corrective action (engineer)
0Fh	xx	Output driver stage defective Motor SLS output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.13A? YES: AJ defective, NO: Replace PCB AL; ?5V on connector X4.13A? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AL and AJ
10h	xx	Output driver stage defective Saline output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.19A? YES: AJ defective NO: Replace PCB AH; ?5V on connector X4.19A? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AH and AJ
11h	xx	Output driver stage defective US output: Required: High; Actual: Passive	Remove PCB AJ ?8V on connector X4.12A? YES: AJ defective NO: Replace PCB AG; reuse old PCB AJ
12h	xx	Output driver stage defective HF output: Required: High; Actual: Passive	! Replace PCB AJ
13h	xx	Output driver stage defective Polylight start-up output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.8B? YES: AJ defective NO: Replace PCB AS; ?5V on connector X4.8B? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AS and AJ
14h	xx	Output driver stage defective Polylight on output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.9B? YES: AJ defective NO: Replace PCB AS; ?5V on connector X4.9B? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AS and AJ
15h	xx	Output driver stage defective Sprayvit on output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.9A? YES: AJ defective NO: Replace PCB AS; ?5V on connector X4.9A? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AS and AJ
16h	xx	Output driver stage defective Heater off output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.8A? YES: AJ defective NO: Replace PCB AH; ?5V on connector X4.8A? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AH and AJ
17h	xx	Output driver stage defective Serial off output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.16A? YES: AJ defective NO: Replace PCB AH; ?5V on connector X4.16A? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AH and AJ
18h	xx	Output driver stage defective Saliva ejector speed output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.17A? YES: AJ defective NO: Replace PCB AH; ?5V on connector X4.17A? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AH and AJ
19h	xx	Output driver stage defective Strobe / suction hose output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.19B? YES: AJ defective NO: Replace PCB AH; ?5V on connector X4.19B? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AH and AJ
1Ah	xx	Output driver stage defective OE MV/optional suction instr. output: Required: High; Actual: Passive	Remove PCB AJ ?5V on connector X4.17B? YES: AJ defective NO: Replace PCB AH; ?5V on connector X4.17B? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AH and AJ
1Bh	xx	Output driver stage defective SregL/SV air output: Required: High; Actual: Passive	! Replace PCB AJ
1Ch	xx	Output driver stage defective SregW/SV water output: Required: High; Actual: Passive	! Replace PCB AJ
1Dh	xx	Output driver stage defective Light on output: Required: High; Actual: Passive	Remove PCB AJ ?12V on connector X4.6B? YES: AJ defective NO: Replace PCB AV; ?12V on connector X4.6B? YES: Insert old PCB AJ NO: Replace PCB AG; reuse old PCBs AV and AJ

error_ high	error_ low	Description of service code	Corrective action (engineer)
1Eh	xx	Foot switch input circuit defective Error on PCB control module	! Replace PCB AJ
1Fh	xx	Serial_input input circuit defective	! Replace PCB AJ NO: Replace PCB AH Check cable path X1.16B -> X4.16B -> X9.13A -> X1.13A
20h	xx	Sprayvit input circuit defective (possible errors on PCB: AJ, AG or AS)	Remove PCB AS ?5V on connector X5.17A? YES: AS defective NO: Replace PCB AJ; ?5V on connector X5.17A? YES: Insert old PCB AS NO: Replace PCB AG; reuse old PCBs AS and AJ
21h	xx	RxD - receive line input circuit defective. Error on PCB control module	! Replace PCB AJ
22h	xx	Heater temperature input circuit defective, (possible errors on PCB: AJ, AG or AH)	Remove PCB AH ?5V on connector X9.16B? YES: AH defective NO: Replace PCB AJ; ?5V on connector X9.16B? YES: Insert old PCB AH NO: Replace PCB AG; reuse old PCBs AH and AJ
23h	xx	Heater current limiter input circuit defective, (possible errors on PCB: AJ, AG or AH)	Remove PCB AH ?5V on connector X9.17A? YES: AH defective NO: Replace PCB AJ; ?5V on connector X9.17A? YES: Insert old PCB AH NO: Replace PCB AG; reuse old PCBs AH and AJ
24h	xx	EMERGENCY STOP input circuit logic defective HW input circuit defective, control module	(see also AP service messages) ! Replace PCB AJ
25h	xx	DA converter defective	! Replace PCB AJ
26h	01h	Driver stage LED holder 1 on PCB control module or IR transmitter diode defective	Does error 2601 to 2606 occur? YES: Connector X4 plugged in incorrectly NO:! Unplug connector X4 PCB AJ, switch unit off/on YES: ! Replace PCB AJ NO: ! Flexible cable or AR defective
26h	02h	Driver stage LED holder 2 on PCB control module or IR transmitter diode defective	Does error 2601 to 2606 occur? YES: Connector X4 plugged in incorrectly NO: !Unplug connector X4 PCB AJ, switch unit off/on YES: ! Replace PCB AJ NO: ! Flexible cable or AR defective
26h	03h	Driver stage LED holder 3 on PCB control module or IR transmitter diode defective	Does error 2601 to 2606 occur? YES: Connector X4 plugged in incorrectly NO: !Unplug connector X4 PCB AJ, switch unit off/on YES: ! Replace PCB AJ NO: ! Flexible cable or AR defective
26h	04h	Driver stage LED holder 4 on PCB control module or IR transmitter diode defective	Does error 2601 to 2606 occur? YES: Connector X4 plugged in incorrectly NO: !Unplug connector X4 PCB AJ, switch unit off/on YES: ! Replace PCB AJ NO: ! Flexible cable or AR defective
26h	05h	Driver stage LED holder 5 on PCB control module or IR transmitter diode defective	Does error 2601 to 2606 occur? YES: Connector X4 plugged in incorrectly NO: !Unplug connector X4 PCB AJ, switch unit off/on YES: ! Replace PCB AJ NO: ! Flexible cable or AR defective
26h	06h	Driver stage LED holder 6 on PCB control module or IR transmitter diode defective	Does error 2601 to 2606 occur? YES: Connector X4 plugged in incorrectly NO: !Unplug connector X4 PCB AJ, switch unit off/on YES: ! Replace PCB AJ NO: ! Flexible cable or AR defective
27h	xx	Unused service code	
28h	xx	Unused service code	
29h	xx	Unused service code	
2Ah	xx	Unused service code	
2Bh	xx	Unused service code	
2Ch	07h	Multiplexer J7 on PCB control module defective	! Replace PCB AJ
2Ch	08h	Multiplexer J8 on PCB control module defective	! Replace PCB AJ
2Ch	09h	Multiplexer J9 on PCB control module defective	! Replace PCB AJ
2Dh	xx	Unused service code	
2Eh	xx	Unused service code	
2Fh	xx	Unused service code	
30h	xx	Only for version 1.0–1.3 (Polylight without integrated power stage)	

error_ high	error_ low	Description of service code	Corrective action (engineer)
31h	xx	Sprayvit in current limiting mode, overload	Connect Sprayvit handpiece of AE! ?OK: Replace heater cartridge NO: ! Replace PCB AS ?OK: NO: !Replace PCB AJ NO: Hotline
32h	03h	External short-circuit in Polylight fan circuit Output driver defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Fan runs without activation -> ! Replace PCB AH ? Fan does not function -> ! Replace fan
32h	0Bh	External short-circuit in circuit MV11 Output driver driving air valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Driving air valve active without key activation YES: Replace PCB AH NO: Activate driving air valve, measure voltage on MV11 X2.7A / X2.7B ? U = 24V: ! Replace MV11 ? U = 0V: ! Replace PCB AH
32h	0Ch	External short-circuit in circuit MV12 Output driver chip blower valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Chip blower active without key activation YES: Replace PCB AH NO: Activate chip blower valve, measure voltage on MV12 X2.8A / X2.8B ? U = 24V: ! Replace MV12 ? U = 0V: ! Replace PCB AH
32h	0Dh	External short-circuit in circuit MV13 Output driver spray air valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Spray air active without key activation YES: Replace PCB AH NO: Activate spray air valve, measure voltage on MV13 X2.11A / X2.11B ? U = 24V: ! Replace MV13 ? U = 0V: ! Replace PCB AH
32h	16h	External short-circuit in circuit MV22 Output driver ultrasound valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Ultrasound active without key activation YES: Replace PCB AH NO: Activate ultrasound valve, measure voltage on MV22 X2.6A / X2.6B ? U = 24V: ! Replace MV22 ? U = 0V: ! Replace PCB AH
32h	17h	External short-circuit in circuit MV23 Output driver ultrasound air valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Ultrasound air active without key activation YES: Replace PCB AH NO: Activate ultrasound air valve, measure voltage on MV23 X2.10A / X2.10B ? U = 24V: ! Replace MV23 ? U = 0V: ! Replace PCB AH
32h	18h	External short-circuit in circuit MV24 Output driver Sprayvit water valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Sprayvit water active without key activation YES: Replace PCB AH NO: Activate Sprayvit water valve, measure voltage on MV24 X2.5A / X2.5B ? U = 24V: ! Replace MV24 ? U = 0V: ! Replace PCB AH
32h	19h	External short-circuit in circuit MV25 Output driver Sprayvit air valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Sprayvit air active without key activation YES: Replace PCB AH NO: Activate Sprayvit air valve, measure voltage on MV25 X2.5A / X2.9B ? U = 24V: ! Replace MV25 ? U = 0V: ! Replace PCB AH
32h	D3h	External short-circuit in circuit MV21.1 Output driver module solenoid valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Driving air valve active without key activation YES: Replace PCB AH NO: Activate module solenoid valve, measure voltage on MV21.1 X2.1A / X2.1B ? U = 24V: ! Replace MV21.1 ? U = 0V: ! Replace PCB AH
32h	D4h	External short-circuit in circuit MV21.2 Output driver module solenoid valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Driving air valve active without key activation YES: Replace PCB AH NO: Activate module solenoid valve, measure voltage on MV21.2 X2.2A / X2.2B ? U = 24V: ! Replace MV21.2 ? U = 0V: ! Replace PCB AH
32h	D5h	External short-circuit in circuit MV21.3 Output driver module solenoid valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Driving air valve active without key activation YES: Replace PCB AH NO: Activate module solenoid valve, measure voltage on MV21.3 X2.3A / X2.3B ? U = 24V: ! Replace MV21.3 ? U = 0V: ! Replace PCB AH

error_ high	error_ low	Description of service code	Corrective action (engineer)
32h	D6h	External short-circuit in circuit MV21.4 Output driver module solenoid valve defective Output becomes active -> I_Load > Imax Output passive -> I_Load > 0	? Driving air valve active without key activation YES: Replace PCB AH NO: Activate module solenoid valve, measure voltage on MV21.4 X2.4A / X2.4B ? U = 24V: ! Replace MV21.4 ? U = 0V: ! Replace PCB AH
33h	xx	Ultrasound module is missing (during operation)	! Re-insert US module NO: Replace PCB AJ
34h	xx	HF module is missing (during operation)	! Re-insert HF module NO: Replace PCB AJ
35h	xx	HF output stage module is missing (during operation)	! Re-insert HF module NO: Replace PCB AJ
36h	xx	Sprayvit PCB is missing	! Insert PCB AS
37h	xx	Distributor and light module is missing (during operation)	! Re-insert distributor and light module NO: Replace PCB AJ
38h	xx	Sprayvit module is missing (initialization)	! Insert PCB AS
39h	xx	Communication between AJ and AS not possible	!Replace PCB AJ NO: ! Replace PCB AS
3Ah	xx	Sprayvit module does not start within the specified time	! Replace PCB AS
3Bh	xx	Communication error between AJ and AS	If it has occurred several times: ! Replace PCB AJ NO: Replace PCB AS
3Ch	xx	Sprayvit module detects overload	? Power fail active. YES: Ignore NO: Connect second Sprayvit 96, Is there an error? YES: ! Replace PCB AS NO: ! Sprayvit defective
3Dh	xx	External open circuit in Sprayvit pot. circuit	Connect second Sprayvit 96, Is there an error? YES: Check ground wire AJ X2.1B and Sprayvit flange, Pin 9 Is there an error? NO: Open circuit AS X2.1 to Sprayvit flange, Pin 4 or AS X2.3 to holder 1, Pin 2
3Eh	xx	Unused service code	
3Fh	xx	External open circuit in Sprayvit water circuit	? High resistance between holders 3+4 Sprayvit YES: Water heater cartridge defective NO: Open circuit AS X2.4 to Pin 3 Sprayvit or AS X2.5 to Pin 7 Sprayvit
40h	xx	External open circuit in Sprayvit air circuit	? High resistance between holders 2+4 Sprayvit YES: Air heater cartridge defective NO: Open circuit AS X2.6 to Pin 2 Sprayvit or AS X2.5 to Pin 7 Sprayvit
41h	xx	Relay on PCB AS defective	! Replace PCB AS
42h	xx	Overvoltage detected on 8V or 24V	! Check 8V and 24V on power supply NO: ! Replace PCB AJ
43h	03h	Polylight fan in AE: External open circuit, connector, cable	? 24V on X2.1A and X2.12B AH OK: Search for open circuit on Polylight fan circuit NO: Replace PCB AH
43h	0Bh	MV11: External open circuit, connector, cable	? 24V on X2.1A and X2.7B AH OK: Search for open circuit on MV11 NO: Replace PCB AH
43h	0Ch	MV12: External open circuit Connector, cable	? 24V on X2.1A and X2.8B AH OK: Search for open circuit on MV12 NO: Replace PCB AH
43h	0Dh	MV13: External open circuit Connector, cable	? 24V on X2.1A and X2.11B AH OK: Search for open circuit on MV13 NO: Replace PCB AH
43h	16h	MV22: External open circuit Connector, cable	? 24V on X2.1A and X2.6B AH OK: Search for open circuit on MV22 NO: Replace PCB AH
43h	17h	MV23: External open circuit Connector, cable	? 24V on X2.1A and X2.10B AH OK: Search for open circuit on MV23 NO: Replace PCB AH
43h	18h	MV24: External open circuit Connector, cable	? 24V on X2.1A and X2.5B AH OK: Search for open circuit on MV24 NO: Replace PCB AH

error_ high	error_ low	Description of service code	Corrective action (engineer)
43h	19h	MV25: External open circuit Connector, cable	? 24V on X2.1A and X2.9B AH OK: Search for open circuit on MV25 NO: Replace PCB AH
43h	D3h	MV21_1: External open circuit Connector, cable	? 24V on X2.1A and X2.1B AH OK: Search for open circuit on MV21.1 NO: Replace PCB AH
43h	D4h	MV21_2: External open circuit Connector, cable	? 24V on X2.1A and X2.2B AH OK: Search for open circuit on MV21.2 NO: Replace PCB AH
43h	D5h	MV21_3: External open circuit Connector, cable	? 24V on X2.1A and X2.3B AH OK: Search for open circuit on MV21.3 NO: Replace PCB AH
43h	D6h	MV21_4: External open circuit Connector, cable	? 24V on X2.1A and X2.4B AH OK: Search for open circuit on MV21.4 NO: Replace PCB AH
44h	xx	Control module HW-SW adaptation error	! Replace PCB AJ
45h	xx	Configuration problem Sprayvit module/control module HW-SW adaptation error	! Replace PCB AS or AJ
46h	xx	Configuration problem Siromot module/control module HW-SW adaptation error	! Replace PCB AL or AJ
47h	xx	Configuration problem distributor - light module/ control module HW-SW adaptation error	! Replace PCB AV or AJ
48h	xx	Configuration problem heater module/control module HW-SW adaptation error	! Replace PCB AH or AJ
49h	xx	Unused service code	
4Ah	xx	Configuration problem ultrasound module/control module HW-SW adaptation error	! Replace PCB AU or AJ
4Bh	xx	Configuration problem HF modulation module/ control module HW-SW adaptation error	! Replace PCB AO or AJ
4Ch	xx	Configuration problem HF output stage module/ control module HW-SW adaptation error	! Replace PCB AC or AJ
4Dh	xx	Configuration problem HF+ module/control module HW-SW adaptation error	! Replace PCB HF, AJ or PS
4Eh	xx	Unused service code	
4Fh	xx	Status bit alarm set in AO module. Alarm bit active = alarm tone active (HF has set alarm bit and has been switched off or has switched itself off with the active alarm tone)	Observe service codes 51_xx!!!
50h	xx	HF module is locked	Observe subsequent service codes
51h	01h	Duty cycle for output stage voltage is too high	? Is an HF module missing NO: ! Replace PCB AC NO: ! Replace PCB AO
51h	02h	Duty cycle for output stage voltage is too low	? Is an HF module missing NO: ! Replace PCB AC
51h	03h	Output stage voltage is too high	No action required, service information only
51h	04h	Output stage voltage is too low	No action required, service information only
51h	05h	Maximum output stage voltage exceeded	? Is an HF module missing NO: ! Replace PCB AO
51h	06h	Current below minimum operating current	? Is an HF module missing NO: ! Replace PCB AC
51h	07h	Maximum current of output stage exceeded	! Replace PCB AC
51h	0Ch	16V voltage is too low	Check 16V on power supply F2 OK: Check 16V on slot AO X1.6A/B OK: Replace PCB AO
51h	0Dh	16V voltage is too high	Check 16V on power supply F2 OK: Check 16V on slot AO X1.6A/B OK: Replace PCB AO
51h	10h	32V voltage is too low	Check 32V on power supply F4 OK: Check 32V on slot AO X1.4A/B OK: Replace PCB AO

error_ high	error_ low	Description of service code	Corrective action (engineer)
51h	11h	32V voltage is too high	Check 32V on power supply F4 OK: Check 32V on slot AO X1.4A/B OK: Replace PCB AO
51h	19h	RxD input test switch defective.	? HF can be activated YES: ! Ignore error NO: ! Replace PCB AO
51h	1Ah	FOOT SWITCH input does not switch	! Check foot switch cable AO X1.10A
51h	1Bh	FOOT SWITCH input test switch defective	? HF can be activated YES: ! Ignore error NO: ! Replace PCB AO
51h	1Ch	EMERGENCY STOP input does not switch	! Check EMERGENCY STOP cable AO X1.9B
51h	1Dh	EMERGENCY STOP input test switch defective	? HF can be activated YES: ! Ignore error NO: ! Replace PCB AO
51h	21h	The software does not match the modulation module	! Replace PCB AO
51h	22h	The two HW modules do not match	? Old software version 1.0 installed YES: Ignore service message NO: Install compatible output stage
51h	23h	Maximum duty time of HF has been exceeded => alarm	Remained on foot switch for longer than 1 min.; no error
51h	24h	Maximum operating current exceeded; Output overload => alarm	No action required, service information only
51h	25h	HW-based current-voltage limitation active	No action required, service information only
51h	26h	Short-circuit of switching transistor V1 or transistor is switched through statically by another defective component	? Is an HF module missing NO: ! Replace PCB AC NO: ! Replace PCB AO
51h	27h	Switching transistor V1 defective and does not switch or the control is defective	? Is an HF module missing NO: ! Replace PCB AO NO: ! Replace PCB AC
51h	30h	16V voltage too low when HF is active	No action required, service information only
51h	31h	16V voltage too high when HF is active	No action required, service information only
51h	34h	32V voltage too low when HF is active	No action required, service information only
51h	35h	32V voltage too high when HF is active	No action required, service information only
51h	96h	HF surgery: Foot switch signal FS (error during plausibility check between HW signal and CAN message)	Check FS cable from AK, PCB SA (X1.4A) to HF module, PCB HF, (X2.3B). OK: Check CAN connection from HF module to AE
51h	97h	HF surgery voltage monitoring: 5 Volt (plausibility check) outside tolerance when HF is active	Replace PCB HF
51h	98h	HF surgery voltage monitoring: UH (plausibility check) outside tolerance when HF is active	Replace PCB HF
51h	99h	HF surgery voltage monitoring: UP (plausibility check) outside tolerance	Replace PCB HF
51h	9Ah	HF surgery voltage monitoring: KT (limit value check) heat sink temperature of power transistor too high, will be switched off	HF output stage overloaded, if it occurs several times despite short-time operation, replace PCB HF
51h	9Bh	HF surgery: CAN communication monitoring, timing problem on CAN bus	If error occurs several times, replace PCB HF
51h	9Ch	HF surgery: HF hardware monitoring error (self-test module, startup)	Replace PCB HF
51h	9Dh	HF surgery:	Standby
51h	9Eh	HF surgery:	Standby
51h	9Fh	HF surgery: Error due to watchdog RESET, which has been triggered, has restarted the controller and performed re-initialization	Replace PCB HF
51h	A0h	AE detects that HF module does not respond (stand-by operation)	Check CAN bus connection from AE to HF module
51h	A1h	AE detects a communication problem with the HF module when HF is active (interference on CAN BUS, intensity values sent and received do not match)	Check CAN bus connection from AE to HF module OK: Replace HF module

error_ high	error_ low	Description of service code	Corrective action (engineer)
51h	A2h	AE detects missing or defective acknowledgement of previously sent HF start command	Check CAN bus connection from AE to HF module OK: Replace HF module
52h	xx	Communication between control module AJ and panel interrupted for >1 sec.	CAN connection defective, HF operation is locked, panel signals alarm beep, Hotline!
53h	xx	Communication with HF module is impossible YES: ? Does AE issue service code 12-- (YES: ! Replace PCB AJ NO: ! Check cable X1.11B -> AO X1.13A (OK: ! Replace PCB AO))	Check continuity on both comm. cables + ground: AO X1.12B -> AJ X1.11A + AO X1.12A -> AJ X1.10B; OK: ? Check 8V on AO X1.7A/B (LED 5V lights up) OK: ? Does RESET LED light up YES:? Does AE issue service code 12- YES: !Replace PCB AJ, NO: !Check cable X1.11B->AOX1.13A
54h	04h	Wrong module mounted in slot 4 instead of the corresponding control module	! Insert PCB AJ in slot 4
54h	05h	Wrong module mounted in slot 5 instead of the corresponding Sprayvit module	! Check PCB AS in X5 ? Continuity X4.7A -> X5.10A and X4.22A -> X5.17B OK: Replace PCB AJ
54h	06h	Wrong module mounted in slot 6 instead of the corresponding Siromot module	! Check PCB Siromot in X6 ? Continuity X4.7A -> X6.11A and X4.22A -> X6.17B OK: Replace PCB AJ
54h	07h	Wrong module mounted in slot 7 instead of the corresponding Siromot module	! Check PCB AL in X7 ? Continuity X4.7A -> X6.11A and X4.23A -> X7.17B OK: Replace PCB AJ
54h	08h	Wrong module mounted in slot 8 instead of the corresponding distributor and light module	! Check PCB AV in X8 ? Continuity X4.7A -> X8.11A and X4.23A -> X8.17B OK: Replace PCB AJ
54h	09h	Wrong module mounted in slot 9 instead of the corresponding MV+ heater module	! Check PCB AH in X9 ? Continuity X4.7A -> X9.10A and X4.24A -> X9.17B OK: Replace PCB AJ
54h	0Ah	Wrong module mounted in slot 10 instead of the corresponding Med_GV module	! Check PCB Med.GV in X10 ? Continuity X4.7A -> X10.13A and X4.24A -> X10.26B OK: Replace PCB AJ
54h	0Bh	Wrong module mounted in slot 11 instead of the corresponding ultrasound module	! Check PCB AU in X11 ? Continuity X4.7A -> X11.11A and X4.25A -> X11.17B OK: Replace PCB AJ
54h	0Ch	Wrong module mounted in slot 12 instead of the corresponding HF_modulation module	! Check PCB HF MOD in X12 ? Continuity X4.7A -> X12.11A and X4.25A -> X12.17B OK: Replace PCB AJ
54h	0Dh	Wrong module mounted in slot 13 instead of the corresponding HF_output stage module	! Check PCB HF output stage in X13 ? Continuity X4.7A -> X13.11A and X4.26A -> X13.17B OK: Replace PCB AJ
55h	xx	Communication with camera module impossible (does not respond to request over the serial interface)	!Check contact of PCB AD2 with system board AG using slot X10 OK: Replace PCB AD2
56h	xx	Camera module is missing	! Insert PCB AD2
57h	xx	Unused service code	
58h	xx	Unused service code	
59h	xx	Unused service code	
5Ah	xx	Unused service code	
5Bh	xx	Unused service code	
5Ch	xx	Unused service code	
5Dh	xx	Unused service code	
5Eh	xx	Heater in current limiting mode, overload	? Is the service code displayed every time Sprayvit is activated NO: Have the heater tolerances on PCB AS be set again YES: Replace Sprayvit NO: Replace PCB AS
5Fh	xx	Loc. comm. error with MV/heater module AH	! Replace PCB AH NO: ! Replace PCB AJ
60h	xx	Loc. serial interface timeout	! Check fuse F2 on NS ! 16V cable path; AJ -> AG -> chair GA1 -> NS X1.3 NO: Replace PCB AJ
61h	xx	Checksum error, memory access error	! Replace PCB AJ
62h	xx	Loc. serial interface wrong acknowledgement	Warning only
63h	xx	No RESET by watchdog after discontinuation of triggering by uP	! Replace PCB AJ
64h	xx	Hose connection codes OK, US handpiece is missing or defective	! Replace PCB AU

error_ high	error_ low	Description of service code	Corrective action (engineer)
65h	xx	HW error on PCB US medium frequency outside tolerance	! Replace PCB AU
66h	xx	RAM defective	! Replace PCB AU
67h	xx	EPROM defective	! Replace PCB AU
68h	xx	Window frequency faulty	! Replace PCB AU
69h	xx	US switching condition does not meet the requirements (on/off)	! Replace PCB AU
6Ah	xx	Communication with US module impossible	! Check fuse F2 on NS ! 16V cable path; AJ -> AG -> chair GA1 -> NS X1.3 NO: Replace PCB AJ
6Bh	xx	Motor does not revolve	for Siromot software version <= 3.6: ! Check cable path X7.11B -> X6.11B -> X5.14B -> X9.10B -> X4.7B AJ Otherwise: No action required
6Ch	xx	Siromot module RAM defective	! Replace PCB AL
6Dh	xx	Siromot module EPROM defective	! Replace PCB AL
6Eh	xx	Siromot module preset PWM faulty	! Replace PCB AL
6Fh	xx	Output voltage of H bridge faulty	! Replace PCB AL
70h	xx	32V supply voltage of Siromot module outside tolerance	! Check AE fuse F4 on NS OK: Are X7.4A + B (32V) and X7.8A + B (ground) measured on AE connector YES: Ignore message NO: Are X1.5 (32V) and X1.8 (ground) measured on NS? YES: Check cable NO: Check power supply
71h	xx	Direction of rotation detected in the Siromot module does not correspond to the direction of rotation set on the panel	Warning notice, in case it occurs several times! Hotline
72h	xx	Instr. motor switching condition does not meet the requirements (on/off)	! Replace PCB AL
73h	xx	Switching condition (EMK or RI comp.) does not meet the EMK requirements	! Replace PCB AL

7.6.2 SW version: 1.0 - 1.3

Remark/Note:
There are both two-digit and four-digit service codes.
Two-digit service codes (error_high) can be found in column 5 on the panel display.
Four-digit service codes consist of the entries in column 5 (error_high) and column 6 (error_low) on the panel.

Service codes are displayed in HEX format
(error_low) xx: disregard

error_ high	error_ low	Description of service code	Corrective action (engineer)
0h	xx	Zero error line	For analysis purposes only
1h	xx	Control module: Cannot address/write to CAN RAM	! Replace PCB AJ ! Check path AJ X1.21A -> HG X4.21A -> HG X1.1 -> chair GA2 X2.1 -> SA X2.1A ! Check path AJ X1.21B -> HG X4.21B -> HG X1.2 -> chair GA2 X2.2 -> SA X2.2A
2h	xx	Software control module AE write/read/checksum error EEPROM	! Replace PCB AJ
3h	xx	48V supply voltage outside tolerance; power supply failure, short-circuit, blown fuse, connector = +/-10% +/- 1.5 LSB	! Check fuse F20 on NS ! 48V cable path; AJ -> HG -> chair GA2 -> NS X4.6
4h	xx	24V supply voltage outside tolerance; power supply failure, short-circuit, blown fuse, connector = +/-10% +/- 1.5 LSB	! Check fuse F18 on NS ! 24V cable path; AJ -> HG -> chair GA2 -> NS X4.4
5h	xx	16V supply voltage outside tolerance; power supply failure, short-circuit, blown fuse, connector = +/-10% +/- 1.5 LSB	! Check fuse F17 on NS ! 16V cable path; AJ -> HG -> chair GA2 -> NS X4.3
6h	xx	Control module: Cannot write to RAM cell, double addressing, control module	! Replace PCB AJ
7h	xx	Control module: Wrong ROM checksum	! Replace PCB AJ
8h	xx	At least one MV output is short-circuited to the ground, control module	! Replace PCB AJ ! Search for ground contact on HG X4 or X8
9h	xx	Output: Direction of rotation active -> output trans. Required: High; Actual: Passive	AE error cannot occur in HE in normal situation ! Replace PCB AJ in case of impaired operation
Ah	xx	Output: Relay KL2 active -> Output trans. Required: High; Actual: Passive	AE error cannot occur in HE in normal situation ! Replace PCB AJ in case of impaired operation
Bh	xx	Output: Relay KL3 active -> Output trans. Required: High; Actual: Passive;	AE error cannot occur in HE in normal situation ! Replace PCB AJ in case of impaired operation
Ch	xx	Output: Relay KL4 active -> Output trans. Required: High; Actual: Passive	AE error cannot occur in HE in normal situation ! Replace PCB AJ in case of impaired operation
Dh	xx	Output: Relay KL5 active -> Output trans. Required: High; Actual: Passive;	AE error cannot occur in HE in normal situation ! Replace PCB AJ in case of impaired operation
Eh	xx	Output: Motor normal active -> Output trans. Required: High; Actual: Passive	AE error cannot occur in HE in normal situation ! Replace PCB AJ in case of impaired operation
Fh	xx	Output: Motor SLS active -> Output trans. Required: High; Actual: Passive;	AE error cannot occur in HE in normal situation ! Replace PCB AJ in case of impaired operation
10h	xx	Output: Saline on active -> Output trans. Required: High; Actual: Passive	AE error cannot occur in HE in normal situation ! Replace PCB AJ in case of impaired operation
11h	xx	Output: US on active -> Output trans. Required: High; Actual: Passive;	AE error cannot occur in HE in normal situation ! Replace PCB AJ in case of impaired operation
12h	xx	Output: HF on active -> Output trans. Required: High; Actual: Passive	AE error cannot occur in HE in normal situation ! Replace PCB AJ in case of impaired operation
13h	xx	Output: Polylight start-up active -> Output trans. Required: High; Actual: Passive;	AE error cannot occur in HE in normal situation ! Replace PCB AJ in case of impaired operation
14h	xx	Output: Polylight on active -> Output trans. Required: High; Actual: Passive	AE error cannot occur in HE in normal situation ! Replace PCB AJ in case of impaired operation
15h	xx	Output: Sprayvit on active -> Output trans. Required: High; Actual: Passive;	AE error cannot occur in HE in normal situation ! Replace PCB AJ in case of impaired operation
16h	xx	Output: Heater off active -> Output trans. Required: High; Actual: Passive;	AE error cannot occur in HE in normal situation ! Replace PCB AJ in case of impaired operation
17h	xx	Output: Serial off active -> Output trans. Required: High; Actual: Passive	! Replace PCB AJ NO: Search for ground contact in path X4.16A -> trans. V13 HG

error_ high	error_ low	Description of service code	Corrective action (engineer)
18h	xx	Output: Speed/saliva ejector active -> Output trans. Required: High; Actual: Passive;	! Replace PCB AJ NO: Search for ground contact in path X4.17A -> trans. V8 HG
19h	xx	Output: Strobe / suction hose active -> Output trans. Required: High; Actual: Passive	! Replace PCB AJ NO: Search for ground contact in path X4.19B -> trans. V9 HG
1Ah	xx	Output: OE MV/optional suction instr. active -> Output trans. Required: High; Actual: Passive;	! Replace PCB AJ NO: Search for ground contact in path X4.17B -> trans. V10 HG
1Bh	xx	Output: SregL/SV air active -> Output trans. Required: High; Actual: Passive	! Replace PCB AJ NO: Search for ground contact in path X4.18A -> trans. V11 HG
1Ch	xx	Output: SregW/SV water active -> Output trans. Required: High; Actual: Passive;	! Replace PCB AJ NO: Search for ground contact in path X4.18B -> trans. V12 HG
1Dh	xx	Output: Light on active -> Output trans. Required: High; Actual: Passive;	See error tree
1Eh	xx	Foot switch input circuit defective	! Replace PCB AJ
1Fh	xx	Serial interface input circuit defective	! Replace PCB AJ NO: Low on X4B.16 OK: Check vacuum switch on PCB HG
20h	xx	SV VOR/Imax input circuit defective	! Replace PCB AS NO: Replace PCB AJ ! Check for ground contact on cable path X4A.10 -> X5.17A HG
21h	xx	RxD receive line input circuit defective	! Replace PCB AJ
22h	xx	Heater temperature input circuit defective	See error tree
23h	xx	Heater current limiter input circuit defective	See error tree
24h	xx	EMERGENCY STOP input circuit logic defective EMERGENCY STOP cannot be switched	(see also HP service messages) ! Replace PCB AJ
26h	1	Driver stage LED holder 1 defective (connector X4.1)	! Replace PCB AJ
26h	2	Driver stage LED holder 2 defective (connector X4.4)	! Replace PCB AJ
26h	3	Driver stage LED holder 3 defective (connector X4.5)	! Replace PCB AJ
26h	4	Driver stage LED holder 4 defective (connector X4.6)	! Replace PCB AJ
26h	5	Driver stage LED holder 5 defective	! Replace PCB AJ
26h	6	Driver stage LED holder 6 defective	! Replace PCB AJ
2Ch	7	Multiplexer J7 defective	! Replace PCB AJ
2Ch	8	Multiplexer J7 defective	! Replace PCB AJ
2Ch	9	Multiplexer J7 defective	! Replace PCB AJ
30h	xx	Polylight in current limiting mode, overload	! Replace PCB AJ NO: ? Error also on AE YES: Replace PCB SA NO: Unplug connector X2.4A SA NO: Check cable path for ground contact HG X1.7 -> GA2 X2.7 -> SA X2.4A
31h	xx	Sprayvit in current limiting mode, overload	! Replace PCB AJ
32h	4	External short-circuit in Polylight fan circuit Output driver of Polylight defective Output becomes active -> Required: I Load>Imax output passive ->Actual: I load >0:	? Polylight active without key activation YES: Replace PCB HG NO: Unplug connector X7 HG; Activate Polylight, measure voltage between X7.1 and X7.2 ? U=24V: Replace fan ? U=0V: Replace PCB HG and search for short-circuit on fan path
32h	31	External short-circuit in circuit MV31 output driver of saliva ejector control valve defective Output becomes active -> Actual: I load>Imax output passive -> Actual: I load >0	? Saliva ejector control valve is active without key activation YES: Replace PCB HG NO: Unplug connector X8 HG; activate control valve, measure voltage between X8.1A and X8.1B ? U=24V: Replace MV31 ? U=0V: Replace PCB HG and search for short-circuit on path MV28
32h	32	External short-circuit in circuit MV32 output driver of suction hose control valve defective Output becomes active -> Actual: I load>Imax output passive -> Actual: I load >0	? Suction hose control valve is active without key activation YES: Replace PCB HG NO: Unplug connector X8 HG; activate control valve, measure voltage between X8.2A and X8.2B ? U=24V: Replace MV32 ? U=0V: Replace PCB HG and search for short-circuit on path MV32

error_ high	error_ low	Description of service code	Corrective action (engineer)
32h	36	External short-circuit in circuit MV36 output driver of additional suction defective Output becomes active -> Actual: I load>Imax output passive -> Actual: I load >0	? Additional suction is active without key activation YES: Replace PCB HG NO: Unplug connector X8 HG; activate control valve, measure voltage between X8.3A and X8.3B ? U=24V: Replace MV36 ? U=0V: Replace PCB HG and search for short-circuit on path MV36
32h	38	External short-circuit in circuit MV38 output driver of solenoid valve for Sprayvit defective Output becomes active -> Actual: I load>Imax output passive -> Actual: I_Load >0	? Solenoid valve for Sprayvit is active without key activation YES: Replace PCB HG NO: Unplug connector X8 HG; activate control valve, measure voltage between X8.5A and X8.5B ? U=24V: Replace MV38 ? U=0V: Replace PCB HG and search for short-circuit on path MV38
43h	4	Polylight fan; external open circuit.	? Measure 24V between X7.1 and X7.2 HG OK: Search for open circuit in fan circuit NO: Replace PCB HG
43h	31	MV31 control valve of saliva ejector; external open circuit.	? Measure 24V between X8.1A and X8.1B HG OK: Search for open circuit in circuit MV31 NO: Replace PCB HG
43h	32	MV32 control valve of suction hose; external open circuit.	? Measure 24V between X8.2A and X8.2B HG OK: Search for open circuit in circuit MV32 NO: Replace PCB HG
43h	36	MV36 additional suction; external open circuit.	? Measure 24V between X8.3A and X8.3B HG OK: Search for open circuit in circuit MV36 NO: Replace PCB HG
43h	38	MV38 solenoid valve of Sprayvit; external open circuit.	? Measure 24V between X8.5A and X8.5B HG OK: Search for open circuit in circuit MV38 NO: Replace PCB HG
45h	xx	Sprayvit module HW-SW adaptation error	! Replace PCB AS
54h	5	Wrong module mounted in slot 5 instead of the corresponding Sprayvit module	! Check PCB AS in X5 HG ? Continuity X4A.22 -> X5B.17 HG ! Replace PCB AJ
63h	xx	No RESET by watchdog after discontinuation of triggering by uP	! Replace PCB AJ
74h	xx	CAN communication impossible/faulty, detection of a CAN BUS condition	? Error occurs only once: Fault exists NO: Query using Ident dialog: All nodes available? YES: Replace PCB AJ NO: Open circuit, see CAN wiring diagram
75h	1	No Sprayvit in holder 1	Does not occur normally. Ignore!
75h	6	No Polylight in holder 6	Does not occur normally. Ignore!
7Fh	xx	NOTE	For development purposes only

7.7 Service codes of PCB (PS) on the assistant panel

7.7.1 SW version: 1.0 - 2.4

Remark/Note:
There are both two-digit and four-digit service codes.
Two-digit service codes (error_high) can be found in column 5 on the panel display.
Four-digit service codes consist of the entries in column 5 (error_high) and column 6 (error_low) on the panel.

Service codes are displayed in HEX format
(error_low) xx: disregard

error_ high	error_ low	Description of service code	Corrective action (engineer)
00h	xx	Zero error line	For analysis purposes only
01h	xx	Video controller register defective	! Replace panel on which error was displayed
02h	xx	Video controller produces no READY signal	! Replace panel on which error was displayed
03h	xx	For development purposes only	No action required, service information only
04h	xx	For development purposes only	No action required, service information only
05h	xx	For development purposes only	No action required, service information only
06h	xx	For development purposes only	No action required, service information only
07h	xx	For development purposes only	No action required, service information only
08h	xx	For development purposes only	No action required, service information only
09h	xx	For development purposes only	No action required, service information only
0Ah	xx	For development purposes only	No action required, service information only
0Bh	01h	Minimum configuration error: Connection box (AK) does not respond	? Error also appears on HP panel YES: Replace PCB SA NO: Check CAN wiring using the wiring diagram and CAN error messages
0Bh	02h	Minimum configuration error: Dentist element (AE) does not respond	? Error also appears on HP panel YES: Replace PCB AJ NO: Check CAN wiring using the wiring diagram and CAN error messages
0Bh	03h	Minimum configuration error: Dentist panel does not respond	? Error also appears on HP panel YES: Replace dentist panel NO: Check CAN wiring using the wiring diagram and CAN error messages
0Bh	07h	Minimum configuration error: Patient chair does not respond	? Error also appears on HP panel YES: Replace PCB SS NO: Check CAN wiring using the wiring diagram and CAN error messages
0Bh	08h	Minimum configuration error: Water unit does not respond	? Error also appears on HP panel YES: Replace PCB WE NO: Check CAN wiring using the wiring diagram and CAN error messages
0Ch	01h	Error during start-up EMERGENCY STOP test of connection box	? Error occurs in connection with other EMERGENCY STOP test errors YES: Check EMERGENCY STOP wiring NO: Replace PCB SA
0Ch	02h	Error during start-up EMERGENCY STOP test of dentist element	? Error occurs in connection with other EMERGENCY STOP test errors YES: Check EMERGENCY STOP wiring NO: Replace PCB AJ
0Ch	03h	Error during start-up EMERGENCY STOP test of dentist panel	? Error occurs in connection with other EMERGENCY STOP test errors YES: Check EMERGENCY STOP wiring NO: Replace dentist panel
0Ch	04h	Error during start-up EMERGENCY STOP test of dentist element support arm	? Error occurs in connection with other EMERGENCY STOP test errors YES: Check EMERGENCY STOP wiring NO: Replace PCB TS
0Ch	05h	Error during start-up EMERGENCY STOP test of assistant unit	? Error occurs in connection with other EMERGENCY STOP test errors YES: Check EMERGENCY STOP wiring NO: Replace PCB AJ

error_ high	error_ low	Description of service code	Corrective action (engineer)
0Ch	06h	Error during start-up EMERGENCY STOP test of assistant panel	? Error occurs in connection with other EMERGENCY STOP test errors YES: Check EMERGENCY STOP wiring NO: Replace assistant panel
0Ch	07h	Error during start-up EMERGENCY STOP test of patient chair	? Error occurs in connection with other EMERGENCY STOP test errors YES: Check EMERGENCY STOP wiring NO: Replace PCB SS
0Ch	08h	Error during start-up EMERGENCY STOP test of water unit	? Error occurs in connection with other EMERGENCY STOP test errors YES: Check EMERGENCY STOP wiring NO: Replace PCB WE
0Ch	09h	Error during start-up EMERGENCY STOP test of assistant support arm For development purposes only	No action required, service information only
0Ch	0Ah	Error during start-up EMERGENCY STOP test of foot switch For development purposes only	No action required, service information only
0Ch	0Bh	Error during start-up EMERGENCY STOP test of ceiling slider For development purposes only	No action required, service information only
0Ch	0Ch	Error during start-up EMERGENCY STOP test of tray support arm, For development purposes only	No action required, service information only
0Dh	xx	CAN error detected during self-test. Cannot write to CAN register	! Replace PCB TS
0Eh	xx	Video RAM defective. Cannot write to RAM cell	! Replace panel on which error occurred
0Fh	xx	RAM defective. Cannot write to RAM cell	! Replace panel on which error occurred
10h	xx	Random generator for LCD defective	! Replace panel on which error occurred
11h	xx	PIC chip does not respond properly or at all	! Replace panel on which error occurred
12h	xx	Power fail signal detected	No action required, service information only
13h	xx	Power fail signal does not lead to RESET after 10s -> erroneous triggering	No action required, service information only
14h	xx	AK does not assign service channel. Error memory cannot be retrieved from AK, yet AK is recognized	Inform Hotline
15h	xx	CAN connection with AK interrupted after communication has already been established. CAN bus defective, component disconnected/defective	! Check function of AK OK: Error occurs frequently: Check the CAN bus using the CAN bus wiring diagram NO: Replace PCB SA. If the error occurs in combination with 4001h, it is not necessary to check the CAN bus. Replace PCB SA
16h	xx	CAN connection with AE interrupted after communication has already been established. CAN bus defective, component disconnected/defective	! Check function of dentist element OK: Error occurs frequently: Check the CAN bus using the CAN bus wiring diagram NO: Replace PCB AJ. If the error occurs in combination with 4002h, it is not necessary to check the CAN bus. Replace PCB AJ
17h	xx	CAN connection with AP interrupted after communication has already been established. CAN bus defective, component disconnected/defective	! Check function of dentist panel OK: Error occurs frequently: Check the CAN bus using the CAN bus wiring diagram NO: Replace dentist panel. If the error occurs in combination with 4003h, it is not necessary to check the CAN bus. Replace dentist panel
18h	xx	CAN connection with AT interrupted after communication has already been established. CAN bus defective, component disconnected/defective	! Check function of support arm OK: Error occurs frequently: Check the CAN bus using the CAN bus wiring diagram NO: Replace PCB TS. If the error occurs in combination with 4004h, it is not necessary to check the CAN bus. Replace PCB TS
19h	xx	CAN connection with HE interrupted after communication has already been established. CAN bus defective, component disconnected/defective	! Check function of assistant element OK: Error occurs frequently: Check the CAN bus using the CAN bus wiring diagram NO: Replace PCB AJ. If the error occurs in combination with 4005h, it is not necessary to check the CAN bus. Replace PCB AJ

error_ high	error_ low	Description of service code	Corrective action (engineer)
1Ah	xx	CAN connection with HP interrupted after communication has already been established. CAN bus defective, component disconnected/defective	! Check function of assistant panel OK: Error occurs frequently: check the CAN bus using the CAN bus wiring diagram NO: Replace assistant panel. If the error occurs in combination with 4006h, it is not necessary to check the CAN bus. Replace assistant panel
1Bh	xx	CAN connection with ST interrupted after communication has already been established. CAN bus defective, component disconnected/defective	! Check function of patient chair control OK: Error occurs frequently: Check the CAN bus using the CAN bus wiring diagram NO: Replace PCB SS. If the error occurs in combination with 4007h, it is not necessary to check the CAN bus. Replace PCB SS
1Ch	xx	CAN connection with WE interrupted after communication has already been established. CAN bus defective, component disconnected/defective	! Check function of water unit OK: Error occurs frequently: Check the CAN bus using the CAN bus wiring diagram NO: Replace PCB WS. If the error occurs in combination with 4008h, it is not necessary to check the CAN bus. Replace PCB WS
1Dh	xx	CAN connection with HT interrupted after communication has already been established. CAN bus defective, component disconnected/defective. For development purposes only	No action required, service information only
1Eh	xx	CAN connection with FS interrupted after communication has already been established. CAN bus defective, component disconnected/defective. For development purposes only	No action required, service information only
1Fh	xx	CAN connection with DG interrupted after communication has already been established. CAN bus defective, component disconnected/defective. For development purposes only	No action required, service information only
20h	xx	CAN connection with TT interrupted after communication has already been established. CAN bus defective, component disconnected/defective. For development purposes only	No action required, service information only
21h	xx	EMERGENCY STOP activated by uP -> signal not detected. Error in EMERGENCY STOP logic.	! Replace panel on which error occurred
22h	xx	Power_fail input circuit defective	If no impairment of chair functions can be detected, no action required. Otherwise inform Hotline.
23h	xx	Panel control does not recognize keyboard. Connector, wiring defective.	! Check connectors between panel control and keyboard element in HP. NO: Replace panel on which error was displayed
24h	xx	LCD offset voltage -30V defective	! Replace panel on which error occurred
25h	xx	Power supply defective, overload, connector	! Check fuse F1 on NS OK: Measure voltages on panel X1.7 (gray) and X1.8 (red) 8V U approx. 8V: Replace panel U << 8V: Check cable path AJ X3.8 -> X4.3A+B AJ -> X1.17 AG -> GA1 X1.17 -> LS X1.2
26h	xx	LCD does not light up, bias voltage generator defective. No oscillation in DC/DC converter	! Replace panel on which error occurred
27h	xx	Error in bias voltage generator. DC/DC converter oscillates at wrong frequency.	! Replace panel on which error occurred
28h	xx	Unused service code	
29h	xx	Unused service code	
2Ah	xx	Unused service code	
2Bh	xx	Unused service code	
2Ch	xx	Unused service code	
2Dh	xx	Unused service code	
2Eh	xx	Unused service code	
2Fh	xx	Unused service code	
30h	03h	Undetermined node does not release EMERGENCY STOP channel, or EMERGENCY STOP is permanently active due to ground contact.	During startup, simultaneously with service code 31 03 ! Disconnect EMERGENCY STOP wiring of all components one after the other until the PCB which pulls EMERGENCY STOP to Low is singled out. (i.e., the error no longer occurs) -> replace PCB NO: Look for ground contact in EMERGENCY STOP wiring.

error_ high	error_ low	Description of service code	Corrective action (engineer)
31h	01h	EMERGENCY STOP channel is not released by AK after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK.	! Replace PCB SA
31h	02h	EMERGENCY STOP channel is not released by AE after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK.	! Replace PCB AJ
31h	03h	EMERGENCY STOP channel is not released by AP after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK.	Error occurs individually: Replace dentist panel With preceding service code 30 03: see 30 03
31h	04h	EMERGENCY STOP channel is not released by AT after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK.	! Replace PCB TS
31h	05h	EMERGENCY STOP channel is not released by HE after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK.	! Replace PCB AJ
31h	06h	EMERGENCY STOP channel is not released by HP after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK.	! Replace assistant panel
31h	07h	EMERGENCY STOP channel is not released by ST after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK.	! Replace PCB SS
31h	08h	EMERGENCY STOP channel is not released by WE after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK.	! Replace PCB WS
31h	09h	EMERGENCY STOP channel is not released by HT after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK. For development purposes only	No action required, service information only
31h	Ah	EMERGENCY STOP channel is not released by FS after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK. For development purposes only	No action required, service information only
31h	Bh	EMERGENCY STOP channel is not released by DG after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK. For development purposes only	No action required, service information only
31h	Ch	EMERGENCY STOP channel is not released by TT after service EMERGENCY STOP test. EMERGENCY STOP wiring in treatment center is OK. For development purposes only	No action required, service information only
32h	01h	Node AK reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK.	Check EMERGENCY STOP wiring from AK to patient chair for continuity and ground contact NO: Emergency Stop input circuit in AK is defective ! Replace PCB SA
32h	02h	Node AE reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK.	Check EMERGENCY STOP wiring from AE to patient chair for continuity and ground contact NO: Emergency Stop input circuit in AE is defective ! Replace PCB AJ
32h	03h	Node AP reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK.	Check EMERGENCY STOP wiring from AP to patient chair for continuity and ground contact NO: Emergency Stop input circuit in AP is defective ! Replace PCB PS
32h	04h	Node AT reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK.	Check EMERGENCY STOP wiring from AT to patient chair for continuity and ground contact NO: Emergency Stop input circuit in AT is defective ! Replace PCB TS
32h	05h	Node HE reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK.	Check EMERGENCY STOP wiring from HE to patient chair for continuity and ground contact NO: Input circuit of Emergency Stop in HE is defective ! Replace PCB AJ

error_ high	error_ low	Description of service code	Corrective action (engineer)
32h	06h	Node HP reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK.	Check EMERGENCY STOP wiring from HP to patient chair for continuity and ground contact NO: Input circuit of Emergency Stop in HP is defective ! Replace PCB PS
32h	07h	Node ST reports error or no respond at all, but EMERGENCY STOP wiring in panel is OK.	Check EMERGENCY STOP wiring from ST to patient chair for continuity and ground contact NO: Input circuit of Emergency Stop in ST is defective ! Replace PCB SS
32h	08h	Node WE reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK.	Check EMERGENCY STOP wiring from WE to patient chair for continuity and ground contact NO: Input circuit of Emergency Stop in WE is defective ! Replace PCB WS
32h	09h	Node HT reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK. For development purposes only	No action required, service information only
32h	0Ah	Node FS reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK. For development purposes only	No action required, service information only
32h	0Bh	Node DG reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK. For development purposes only	No action required, service information only
32h	0Ch	Node TT reports error or does not respond at all, but EMERGENCY STOP wiring in panel is OK. For development purposes only	No action required, service information only
33h	01h	Node AK reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK.	EMERGENCY STOP wiring from AK to panel is interrupted or has ground contact
33h	02h	Node AE reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK.	EMERGENCY STOP wiring from AE to panel is interrupted or has ground contact
33h	03h	Node AP reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK.	EMERGENCY STOP wiring from AP to panel is interrupted or has ground contact
33h	04h	Node AT reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK.	EMERGENCY STOP wiring from AT to panel is interrupted or has ground contact
33h	05h	Node HE reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK.	EMERGENCY STOP wiring from HE to panel is interrupted or has ground contact
33h	06h	Node HP reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK.	EMERGENCY STOP wiring from HP to panel is interrupted or has ground contact
33h	07h	Node ST reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK.	EMERGENCY STOP wiring from ST to panel is interrupted or has ground contact
33h	08h	Node WE reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK.	EMERGENCY STOP wiring from WE to panel is interrupted or has ground contact
33h	09h	Node HT reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK. For development purposes only	No action required, service information only
33h	0Ah	Node FS reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK. For development purposes only	No action required, service information only
33h	0Bh	Node DG reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK. For development purposes only	No action required, service information only
33h	0Ch	Node TT reports in software that EMERGENCY STOP test is OK, but NL on panel is not OK. For development purposes only	No action required, service information only
34h	01h	In connection with code 3301h and 3101h: AK has connected EMERGENCY STOP channel to ground during test and did not release it	? Is the EMERGENCY STOP channel grounded (measure between X1.2A and ground potential on PCB SA)? NO: Ignore YES: ! Replace PCB SA

error_ high	error_ low	Description of service code	Corrective action (engineer)
34h	02h	In connection with code 3302h and 3102h: AE has connected EMERGENCY STOP channel to ground during test and did not release it	? Is the EMERGENCY STOP channel grounded (measure between X1.B5 and ground potential on PCB AJ)? NO: Ignore YES: ! Replace PCB AJ
34h	03h	In connection with code 3303h and 3103h: AP has connected EMERGENCY STOP channel to ground during test and did not release it	? Is the EMERGENCY STOP channel grounded (measure between X2.2 and ground potential on PCB PS)? NO: Ignore YES: ! Replace PCB PS
34h	04h	In connection with code 3304h and 3104h: AT has connected EMERGENCY STOP channel to ground during test and did not release it	? Is the EMERGENCY STOP channel grounded (measure between X2.5 (C1-A) / X3.B4 (C1-B) and ground potential on PCB TS)? NO: Ignore YES: ! Replace PCB TS
34h	05h	In connection with code 3305h and 3105h: HE has connected EMERGENCY STOP channel to ground during test and did not release it	? Is the EMERGENCY STOP channel grounded (measure between X1.B5 and ground potential on PCB AJ)? NO: Ignore YES: ! Replace PCB AJ
34h	06h	In connection with code 3306h and 3106h: HP has connected EMERGENCY STOP channel to ground during test and did not release it	? Is the EMERGENCY STOP channel grounded (measure between X2.2 and ground potential on PCB PS)? NO: Ignore YES: ! Replace PCB PS
34h	07h	In connection with code 3307h and 3107h: ST has connected EMERGENCY STOP channel to ground during test and did not release it	? Is the EMERGENCY STOP channel grounded (measure between X2.D and ground potential on PCB SS)? NO: Ignore YES: ! Replace PCB SS
34h	08h	In connection with code 3308h and 3108h: WE has connected EMERGENCY STOP channel to ground during test and did not release it	? Is the EMERGENCY STOP channel grounded (measure between X5.3A and ground potential on PCB WS)? NO: Ignore YES: ! Replace PCB WS
34h	09h	In connection with code 3309h and 3109h: HT has connected EMERGENCY STOP channel to ground during test and did not release it. For development purposes only	No action required, service information only
34h	0Ah	In connection with code 330Ah and 310Ah: FS has connected EMERGENCY STOP channel to ground during test and did not release it. For development purposes only	No action required, service information only
34h	0Bh	In connection with code 330Bh and 310Bh: DG has connected EMERGENCY STOP channel to ground during test and did not release it. For development purposes only	No action required, service information only
34h	0Ch	In connection with code 330Ch and 310Ch: TT has connected EMERGENCY STOP channel to ground during test and did not release it. For development purposes only	No action required, service information only
35h	01h	Node AK does not respond to request to perform EMERGENCY STOP test and the EMERGENCY STOP channel does not respond either.	? If node exists in IDENT menu, or if service codes of the node can be retrieved: YES: Ignore NO: ! Replace PCB SA
35h	02h	Node AE does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either.	? If node exists in IDENT menu, or if service codes of the node can be retrieved: YES: ignore NO: ! Replace PCB AJ
35h	03h	Node AP does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either.	? If node exists in IDENT menu, or if service codes of the node can be retrieved: YES: Ignore NO: ! Replace PCB PS
35h	04h	Node AT does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either.	? If node exists in IDENT menu, or if service codes of the node can be retrieved: YES: Ignore NO: ! Replace PCB TS
35h	05h	Node HE does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either.	? If node exists in IDENT menu, or if service codes of the node can be retrieved: YES: Ignore NO: ! Replace PCB AJ
35h	06h	Node HP does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either.	? If node exists in IDENT menu, or if service codes of the node can be retrieved: YES: Ignore NO: ! Replace PCB PS

error_ high	error_ low	Description of service code	Corrective action (engineer)
35h	07h	Node ST does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either.	? If node exists in IDENT menu, or if service codes of the node can be retrieved: YES: Ignore NO: ! Replace PCB SS
35h	08h	Node WE does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either.	? If node exists in IDENT menu, or if service codes of the node can be retrieved: YES: Ignore NO: ! Replace PCB WS
35h	09h	Node HT does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either. For development purposes only	No action required, service information only
35h	0Ah	Node FS does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either. For development purposes only	No action required, service information only
35h	0Bh	Node DG does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either. For development purposes only	No action required, service information only
35h	0Ch	Node TT does not respond to request to perform EMERGENCY STOP test and EMERGENCY STOP channel does not respond either. For development purposes only	No action required, service information only
36h	01h	Response from node AK is incomprehensible, contents undefined	No conclusions possible concerning EMERGENCY STOP wiring, temporary interference, ! Hotline
36h	02h	Response from node AE is incomprehensible, contents undefined	No conclusions possible concerning EMERGENCY STOP wiring, temporary interference, ! Hotline
36h	03h	Response from node AP is incomprehensible, contents undefined	No conclusions possible concerning EMERGENCY STOP wiring, temporary interference, ! Hotline
36h	04h	Response from node AT is incomprehensible, contents undefined	No conclusions possible concerning EMERGENCY STOP wiring, temporary interference, ! Hotline
36h	05h	Response from node HE is incomprehensible, contents undefined	No conclusions possible concerning EMERGENCY STOP wiring, temporary interference, ! Hotline
36h	06h	Response from node HP is incomprehensible, contents undefined	No conclusions possible concerning EMERGENCY STOP wiring, temporary interference, ! Hotline
36h	07h	Response from node ST is incomprehensible, contents undefined	No conclusions possible concerning EMERGENCY STOP wiring, temporary interference, ! Hotline
36h	08h	Response from node WE is incomprehensible, contents undefined	No conclusions possible concerning EMERGENCY STOP wiring, temporary interference, ! Hotline
36h	09h	Response from node HT is incomprehensible, contents undefined. For development purposes only	No action required, service information only
36h	0Ah	Response from node FS is incomprehensible, contents undefined. For development purposes only	No action required, service information only
36h	0Bh	Response from node DG is incomprehensible, contents undefined. For development purposes only	No action required, service information only
36h	0Ch	Response from node TT is incomprehensible, contents undefined. For development purposes only	No action required, service information only
37h	xx	Unused service code	
38h	xx	Unused service code	
39h	xx	Unused service code	
3Ah	xx	Unused service code	
3Bh	xx	Unused service code	
3Ch	xx	Unused service code	
3Dh	xx	Unused service code	
3Eh	xx	Unused service code	
3Fh	xx	Unused service code	
40h	01h	RESET of AK component during normal operation	Check supply voltage (8V) of AK component OK: Error on PCB, replace PCB SA
40h	02h	RESET of AE component during normal operation	Check supply voltage (8V) of AE component OK: Error on PCB, replace PCB AJ

error_ high	error_ low	Description of service code	Corrective action (engineer)
40h	03h	RESET of AP component during normal operation	Check supply voltage (8V) of AP component OK: Error on PCB, replace dentist panel
40h	04h	RESET of AT component during normal operation	Check supply voltage (8V) of AT component OK: Error on PCB, replace PCB TS
40h	05h	RESET of HE component during normal operation	Check supply voltage (8V) of HE component OK: Error on PCB, replace PCB AJ
40h	06h	RESET of HP component during normal operation	Check supply voltage (8V) of HP component OK: Error on PCB, replace assistant panel
40h	07h	RESET of ST component during normal operation	Check supply voltage (8V) of ST component OK: Error on PCB, replace PCB SS
40h	08h	RESET of WE component during normal operation	Check supply voltage (8V) of WE component OK: Error on PCB, replace PCB WS
40h	09h	RESET of HT component during normal operation. For development purposes only	No action required, service information only
40h	Ah	RESET of FS component during normal operation. For development purposes only	No action required, service information only
40h	Bh	RESET of DG component during normal operation. For development purposes only	No action required, service information only
40h	Ch	RESET of TT component during normal operation. For development purposes only	No action required, service information only
41h	xx	First connection of node AK to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up	? Can AK service codes be retrieved? YES: Ignore error NO: ! Replace PCB SA
42h	xx	First connection of node AE to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up	? Can AE service codes be retrieved? YES: Ignore error NO: ! Replace PCB AJ
43h	xx	First connection of node AP to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up	? Can AP service codes be retrieved? YES: Ignore error NO: ! replace PCB PS
44h	xx	First connection of node AT to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up	? Can AT service codes be retrieved? YES: Ignore error NO: ! Replace PCB TS
45h	xx	First connection of node HE to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up	? Can HE service codes be retrieved? YES: Ignore error NO: ! Replace PCB AJ
46h	xx	First connection of node HP to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up	? Can HP service codes be retrieved? YES: Ignore error NO: ! Replace PCB PS
47h	xx	First connection of node ST to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up	? Can ST service codes be retrieved? YES: Ignore error NO: ! Replace PCB SS
48h	xx	First connection of node WE to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up	? Can WE service codes be retrieved? YES: Ignore error NO: ! Replace PCB WS
49h	xx	First connection of node HT to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up For development purposes only	No action required, service information only
4Ah	xx	First connection of node FS to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up For development purposes only	No action required, service information only
4Bh	xx	First connection of node DG to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up For development purposes only	No action required, service information only
4Ch	xx	First connection of node TT to CAN after Emergency Stop test phase has been started is made too late, timeout during power-up For development purposes only	No action required, service information only
4Dh	xx	Unused service code	
4Eh	xx	Unused service code	
4Fh	xx	Unused service code	
50h	xx	The software used cannot be executed on PCB PS	Use compatible software, inform Hotline
51h	01h	Node AK already available on CAN bus, but does not respond to version query	? Can node service codes be retrieved? YES: Ignore error code NO: Check CAN wiring to node, ? OK YES: ! Replace PCB SA

error_ high	error_ low	Description of service code	Corrective action (engineer)
51h	02h	Node AE already available on CAN bus, but does not respond to version query	? Can node service codes be retrieved? YES: Ignore error code NO: Check CAN wiring to node, ? OK YES: ! Replace PCB AJ
51h	03h	Node AP already available on CAN bus, but does not respond to version query	? Can node service codes be retrieved? YES: Ignore error code NO: Check CAN wiring to node, ? OK YES: ! Replace PCB PS
51h	04h	Node AT already available on CAN bus, but does not respond to version query	? Can node service codes be retrieved? YES: Ignore error code NO: Check CAN wiring to node, ? OK YES: ! Replace PCB TS
51h	05h	Node HE already available on CAN bus, but does not respond to version query	? Can node service codes be retrieved? YES: Ignore error code NO: Check CAN wiring to node, ? OK YES: ! Replace PCB AJ
51h	06h	Node HP already available on CAN bus, but does not respond to version query	? Can node service codes be retrieved? YES: Ignore error code NO: Check CAN wiring to node, ? OK YES: ! Replace PCB PS
51h	07h	Node ST already available on CAN bus, but does not respond to version query	? Can node service codes be retrieved? YES: Ignore error code NO: Check CAN wiring to node, ? OK YES: ! Replace PCB SS
51h	08h	Node WE already available on CAN bus, but does not respond to version query	? Can node service codes be retrieved? YES: Ignore error code NO: Check CAN wiring to node, ? OK YES: ! Replace PCB WS
51h	09h	Node HT already available on CAN bus, but does not respond to version query. For development purposes only	No action required, service information only
51h	0Ah	Node FS already available on CAN bus, but does not respond to version query. For development purposes only	No action required, service information only
51h	0Bh	Node DG already available on CAN bus, but does not respond to version query. For development purposes only	No action required, service information only
51h	0Ch	Node TT already available on CAN bus, but does not respond to version query. For development purposes only	No action required, service information only

7.8 Service codes of PCB (SS) chair control

7.8.1 SW version: 1.1 - 2.5

Attributes:
0: Warning
2: Chair movement locked for 1.5 sec during normal operation.
3: Chair movement locked until power-off during normal operation.
4: Chair movement locked for 1.5 sec during normal operation and service.
5: Chair movement locked until power-off during normal operation and service.

Remark/Note:
The four-digit service codes consist of the codes displayed in column 4 (error_high) and column 5 (error_low) on the panel in the service code menu; attributes are shown in column 6.

Service codes are displayed in HEX format
(error_low) xx: disregard

error_ high	error_ low	Description of service code	Corrective action (engineer)
00h	00h	Zero error line	For analysis purposes only
00h	01h	Software cannot be executed on available chair control hardware.	Error occurs after software change ! Check configuration of treatment center in IDENT menu OK: Replace PCB SS
00h	02h	Software cannot be executed on available output stage hardware	Error occurs after software change ! Check configuration of treatment center in IDENT menu OK: Replace PCB SE
00h	03h	No RESET by watchdog once uP triggering has been suspended	! Replace PCB SS
01h	00h	EMERGENCY STOP not active after SW_EMERGENCY_STOP has been triggered	! Replace PCB SS
01h	01h	EMERGENCY_STOP_ACTUAL input circuit, connector pin defective, EMERGENCY STOP relay permanently closed = no EMERGENCY STOP,	! Measure low on X2.F to X2.B SS OK: Replace PCB SS NO: Check wiring X2.F SS -> X3.1B SS OK: Replace PCB SE
01h	02h	Input circuit overload, connector pin error, permanent state of overload, self-test circuit error	! Measure low on X1.4 to X2.B SS OK: Replace PCB SS NO: Check wiring X1.4 SS -> X4.2B AK -> AK X23.5A -> X10.1B NS OK: Replace PCB NS
01h	03h	Check 5V on input circuit, connector pin error, no 5V at output stage, self-test circuit error	! Check fuse F21 on NS ? 8V on PCB SE X4.1 and X4.2, LED +5V lights up NO: Replace PCB SE ? Low on X2.6 to X2.B SS OK: Replace PCB SS NO: Check wiring SS 2.6 -> X3.4B SE
01h	04h	Input circuit defective	? Low on X2.5 to X2.B SS OK: Replace PCB SS NO: Check wiring X2.4 SS -> X3.2B SE OK: Replace PCB SE
01h	08h	EMERGENCY STOP input circuit defective	? High-low change during power-up on X1.3 to X2.B SS NO: Replace PCB SS NO: Unplug connector X3.2A SE NO: Replace PCB SE NO: Unplug connectors X1.2A X2.2A X3.2A X4.2A AK one after the other NO: Replace PCB AK NO: Check ground contact X1.3 SS -> X4.2 AK
01h	09h	EMERGENCY_STOP_ACTUAL input circuit, external short-circuit, EMERGENCY STOP relay permanently active or error on PCB SS	? High on X2.F to X2.B SS OK: Replace PCB SS NO: ? Check wiring X2.F SS -> X3.1B SE OK: Replace PCB SE

error_ high	error_ low	Description of service code	Corrective action (engineer)
01h	0Ah	Power supply overload input circuit defective, PCB error	? High on X1.4 to X2.B SS OK: Replace PCB SS NO: ? Check wiring X1.4 SS -> 4.2B AK -> AK X23.5A -> X10.1B NS OK: Replace PCB NS
01h	0Bh	Check 5V input circuit at output stage, PCB error	? Does LED 5V V621 (green) SE light up? NO: Check 8V power supply X5.2 to ground from NS, check fuse F21 OK: ? Low on SS X2.6 to X2.B OK: Replace PCB SS NO: Replace PCB SE
01h	0Ch	Serial interface passive -> Required: high; Actual: Low; external short-circuit, Self-test circuit error	? High on X2.5 to X2.B SS OK: Replace PCB SS NO: Check wiring X2.5 SS -> X3.2B SE OK: Replace PCB SE
01h	20h	Tilt switch input circuit defective, cause: position error = switch active, open circuit (wiring, connector pin), PCB error	! Jumper between X3.2 SS and X3.4 SS ? EMERGENCY STOP relay is switching NO: Replace PCB SS OK: Check tilt switch circuit
01h	21h	Input circuit of toeboard safety switch defective; cause: position error = switch active, open circuit (wiring, connector pin), PCB error	!Actuate toeboard safety switch. Does the EMERGENCY STOP relay switch? YES: Switch unit on/off NO: Jumper between X3.B and X3.A ? Does LED V35 light up? YES: Replace PCB SS NO: Check toeboard EMERGENCY STOP circuit
01h	22h	Input circuit of backrest safety switch defective; cause: position error = switch active, open circuit (wiring, connector pin), PCB error	Activate backrest. Does the EMERGENCY STOP relay switch? YES: Switch unit on/off NO: Jumper between X4.6 and X4.B Does LED V35 light up? YES: Replace PCB SS NO: Check backrest EMERGENCY STOP circuit SS X4.6 + X4.B -> SL X1.3B + X1.4B -> from S2 X6.1B + X6.2A -> S3
01h	23h	Input circuit of headrest safety switch defective; cause: position error = switch active, open circuit (wiring, connector pin), PCB error	Activate headrest: Does the EMERGENCY STOP relay switch? YES: Switch unit on/off NO: Unplug connector X3 SL ? Continuity between X4.6 and X4.A ? NO: Check switch S5 + wiring, YES: Jumper between X1.3B + X1.4A, Does the EMERGENCY STOP relay switch? YES: Replace PCB SL, NO: Check wiring SL X1.4A->X4.A SS + SL X1.3B->X4.6 SS
01h	26h	Input circuit of tilt switch defective. TST_SNSRK becomes active -> Required: High; Actual: low, cause: ground contact in wiring, pendulum or self-test circuit defective	! Jumper between X3.2 SS and X3.4 SS ? Switch unit off/on, error persists? NO: Tilt switch circuit YES: Replace PCB SS
01h	27h	Input circuit of toeboard safety switch defective; cause: ground contact wiring, self-test circuit defective	! Check continuity between SS X3.B and SS X3.A OK: Replace PCB SS NO: Check toeboard safety switch circuit
01h	28h	Input circuit of backrest safety switch defective; cause: ground contact wiring, self-test circuit defective	! Check continuity between SS X4.6 and SS X4.B OK: Replace PCB SS NO: Check backrest safety switch circuit
01h	29h	Input circuit of headrest safety switch defective; cause: ground contact wiring, self-test circuit defective	! Check continuity a<< SS X4.6 and SS X4.A OK: Replace PCB SS NO: Check headrest safety switch circuit
01h	30h	Driver stage Mot4_Mot5 signal defective; V31 defective, PCB error	! Replace PCB SS
01h	31h	Driver stage signal defective; PCB error	! Replace PCB SS
01h	32h	Driver stage TST_EMERGENCY_STOP signal defective; actual: high; V31 defective, PCB error	! Replace PCB SS
01h	33h	Driver stage RST_ASIC signal defective; actual: high; V31 defective, PCB error	! Replace PCB SS
01h	34h	Driver stage TST_SNSRK signal defective; V32 defective, PCB error	! Replace PCB SS
01h	36h	Driver stage Mot4_Mot5 signal defective	! Replace PCB SS
01h	37h	Driver stage signal defective	! Replace PCB SS
01h	38h	Driver stage TST_EMERGENCY_STOP signal defective	! Replace PCB SS

error_ high	error_ low	Description of service code	Corrective action (engineer)
01h	39h	Driver stage RST_ASIC signal defective	! Replace PCB SS
01h	3Ah	Driver stage TST_SNSRK signal defective	! Replace PCB SS
01h	3Eh	At least one output on connector X2.1 to X2.4 is open	Open circuit in at least one wire on connector X2
01h	3Fh	All outputs inactive -> TST_OUTPUT signal Required: High; Actual: Low; Cause: at least 1 output circuit defective	! Replace PCB SS
01h	40h	In self-test phase, EMERGENCY STOP is set and cannot be switched off. Error also occurs during EMERGENCY STOP test by emergency shutdown of other modules.	! Only replace PCB SS if this error occurs several times. If error only occurs once -> service information only
01h	41h	EMERGENCY STOP hardware defective	! Replace PCB SS
01h	42h	EMERGENCY STOP hardware defective; error also occurs during EMERGENCY STOP test by emergency shutdown of other modules.	! Only replace PCB SS if this error occurs several times. If error only occurs once -> service information only
01h	43h	EMERGENCY STOP hardware defective; error also occurs during EMERGENCY STOP test by emergency shutdown of other modules.	! Only replace PCB SS if this error occurs several times. If error only occurs once -> service information only
01h	44h	EMERGENCY STOP sensor signal defective	! Check if connectors X3 and X4 fit properly NO: Replace PCB SS
01h	45h	Sensor system interlocking signal, output circuit defective	! Replace PCB SS
01h	46h	NMI active, EMERGENCY STOP activation faulty in self-test phase	No action required, service information only
01h	47h	EMERGENCY STOP was not stored	! Replace PCB SS
01h	48h	EMERGENCY STOP storage cannot be disabled	! Replace PCB SS
01h	50h	Free lift sensor system (backrest, tilting part, toeboard) has not switched during the emergency "up" function	? Chair movement no longer possible YES: Switch unit off and on; ? Does one of the errors 01 21 to 01 23 or 09 11 to 09 14 occur? YES: See corresponding message NO: Check safety switches, wiring and free lift mechanism
02h	00h	Input circuit error or ADC pot. (J7) channel_0 fault, Pot. not connected or input circuit defective	! Unplug connector SS X5 ! Check pot. 0 circuit X5.5 X5.6 X5.F OK: Replace PCB SS
02h	01h	Input circuit error or ADC pot. (J7) channel_1 fault, pot. not connected or input circuit defective	! Unplug connector SS X5 ! Check pot.1 circuit X5.A X5.B X5.C OK: Replace PCB SS
02h	02h	Input circuit error or ADC pot. (J7) channel_2 fault, pot. not connected or input circuit defective	! Unplug connector SS X5 ! Check pot. 2 circuit X5.1 X5.2 X5.3 OK: Replace PCB SS
02h	03h	Input circuit error or ADC pot. (J7) channel_3 fault, pot. not connected or input circuit defective	! Unplug connector SS X5 ! Check pot. 3 circuit X4.3 X4.C X4.5 OK: Replace PCB SS
02h	04h	Input circuit error or ADC pot. (AN3, uP) channel_4 fault, pot. not connected or input circuit defective	! Unplug connector SS X5 ! Check pot. 4 circuit X4.3 X4.4 X4.5 OK: Replace PCB SS
02h	05h	Input circuit error or ADC pot. (AN2, uP) channel_5 fault, pot. not connected or input circuit defective	! Unplug connector SS X5 ! Check pot. 5 circuit X4.5 X4.2 X4.3 OK: Replace PCB SS
02h	10h	Pot. fault, ADC defective. Channel 0	Note: In connection with positioning error (08 xx): potentiometer or wiring defects possible.
02h	11h	Pot. fault, ADC defective. Channel 1	Note: In connection with positioning error (08 xx): potentiometer or wiring defects possible.
02h	12h	Pot. fault, ADC defective. Channel 2	Note: In connection with positioning error (08 xx): potentiometer or wiring defects possible.
02h	13h	Pot. fault, ADC defective. Channel 3	Note: In connection with positioning error (08 xx): potentiometer or wiring defects possible.
02h	14h	Pot. fault, ADC defective. Channel 4	Note: In connection with positioning error (08 xx): potentiometer or wiring defects possible.
02h	15h	Pot. fault, ADC defective. Channel 5	Note: In connection with positioning error (08 xx): potentiometer or wiring defects possible.

error_ high	error_ low	Description of service code	Corrective action (engineer)
02h	20h	Reference voltage generation error	! Replace PCB SS
02h	21h	Error in internal ADC on uP	! Replace PCB SS
02h	22h	Max. permissible conversion time of the internal or external ADC exceeded during self-test phase	! Replace PCB SS
02h	30h	MIN value of pot. 0 too low, Uref not available on pot. 0	Open circuit on Uref wiring to pot., check wiring X5.5 on PCB SS to pot. 0 (4.5V)
02h	31h	MIN value of pot. 1 too low, Uref not available on pot. 1	Open circuit on Uref wiring to pot., check wiring X5.A on PCB SS to pot. 1 (4.5V)
02h	32h	MIN value of pot. 2 too low, Uref not available on pot. 2	Open circuit on Uref wiring to pot., check wiring X5.1 on PCB SS to pot. 2 (4.5V)
02h	33h	MIN value of pot. 3 too low, Uref not available on pot. 3	Open circuit on Uref wiring to pot., check wiring X4.3 on PCB SS to pot. 3 (4.5V)
02h	34h	MIN value of pot. 4 too low, Uref not available on pot. 4	Open circuit on Uref wiring to pot., check wiring X4.3 on PCB SS to pot. 4 (4.5V)
02h	35h	MIN value of pot. 5 too low, Uref not available on pot. 5	Open circuit on Uref wiring to pot., check wiring X4.3 on PCB SS to pot. 5 (4.5V)
02h	40h	MAX value of pot. 0 too high, Reference ground not available on pot. 0	Open circuit on reference ground wiring to pot., check wiring X5.F on PCB SS to pot. 0 (0.5V)
02h	41h	MAX value of pot. 1 too high, Reference ground not available on pot. 1	Open circuit on reference ground wiring to pot., check wiring X5.C on PCB SS to pot. 1 (0.5V)
02h	42h	MAX value of pot. 2 too high, Reference ground not available on pot. 2	Open circuit on reference ground wiring to pot., check wiring X5.3 on PCB SS to pot. 2 (0.5V)
02h	43h	MAX value of pot. 3 too high, Reference ground not available on pot. 3	Open circuit on reference ground wiring to pot., check wiring X4.5 on PCB SS to pot. 3 (0.5V)
02h	44h	MAX value of pot. 4 too high, Reference ground not available on pot. 4	Open circuit on reference ground wiring to pot., check wiring X4.5 on PCB SS to pot. 4 (0.5V)
02h	45h	MAX value of pot. 5 too high, Reference ground not available on pot. 5	Open circuit on reference ground wiring to pot., check wiring X4.5 on PCB SS to pot. 5 (0.5V)
03h	00h	Communication error between PCB SS (uP) and PCB SE (ASIC), channel 0	Only after frequent recurrences and in connection with chair malfunction Check wiring SS X2.5 -> SE X3.2B and SS X2.2 -> SE X3.3A OK: Replace PCB SS NO: Replace PCB SE
03h	01h	Communication error between PCB SS (uP) and PCB SE (ASIC), channel 1	Only after frequent recurrences and in connection with chair malfunction Check wiring SS X2.5 -> SE X3.2B and SS X2.2 -> SE X3.3A OK: Replace PCB SS NO: Replace PCB SE
03h	02h	Communication error between PCB SS (uP) and PCB SE (ASIC), channel 2	Only after frequent recurrences and in connection with chair malfunction Check wiring SS X2.5 -> SE X3.2B and SS X2.2 -> SE X3.3A OK: Replace PCB SS NO: Replace PCB SE
03h	03h	Communication error between PCB SS (uP) and PCB SE (ASIC), channel 3	Only after frequent recurrences and in connection with chair malfunction Check wiring SS X2.5 -> SE X3.2B and SS X2.2 -> SE X3.3A OK: Replace PCB SS NO: Replace PCB SE
03h	04h	Communication error between PCB SS (uP) and PCB SE (ASIC), channel 4	Only after frequent recurrences and in connection with chair malfunction Check wiring SS X2.5 -> SE X3.2B and SS X2.2 -> SE X3.3A OK: Replace PCB SS NO: Replace PCB SE
03h	05h	Max. number of authorized comparison errors (send-receive) reached, communication with output stage will be switched off	Observe service codes issued before the communication errors ! Check wiring SS X2.5 -> SE X3.2B and SS X2.2 -> SE X3.3A OK: Replace PCB SS NO: Replace PCB SE
03h	06h	Send timeout reached Controller port (serial) defective	! Replace PCB SS NO: Check wiring SS X2.5 -> SE X3.2B and SS X2.2 -> SE X3.3A NO: Replace PCB SE
03h	15h	Communication error between PCB SS (uP) and PCB SE (ASIC) (error bit channel_0 set by ASIC)	Only after frequent recurrences and in connection with chair malfunction Replace PCB SE NO: Check wiring SS X2.5 -> SE X3.2B and SS X2.2 -> SE X3.3A NO: Replace PCB SS

error_ high	error_ low	Description of service code	Corrective action (engineer)
03h	16h	Communication error between PCB SS (uP) and PCB SE (ASIC) (error bit channel_1 set by ASIC)	Only after frequent recurrences and in connection with chair malfunction Replace PCB SE NO: Check wiring SS X2.5 -> SE X3.2B and SS X2.2 -> SE X3.3A NO: Replace PCB SS
03h	17h	Communication error between PCB SS (uP) and PCB SE (ASIC) (error bit channel_2 set by ASIC)	Only after frequent recurrences and in connection with chair malfunction Replace PCB SE NO: Check wiring SS X2.5 -> SE X3.2B and SS X2.2 -> SE X3.3A NO: Replace PCB SS
03h	18h	Communication error between PCB SS (uP) and PCB SE (ASIC), (error bit channel_3 set by ASIC)	Only after frequent recurrences and in connection with chair malfunction Replace PCB SE NO: Check wiring SS X2.5 -> SE X3.2B and SS X2.2 -> SE X3.3A NO: Replace PCB SS
03h	19h	Communication error between PCB SS (uP) and PCB SE (ASIC) (error bit channel_4 set by ASIC)	Only after frequent recurrences and in connection with chair malfunction Replace PCB SE NO: Check wiring SS X2.5 -> SE X3.2B and SS X2.2 -> SE X3.3A NO: Replace PCB SS
03h	1Ah	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_0)	Only after frequent recurrences and in connection with chair malfunction Check wiring SS X2.5 -> SE 3.2B and SS X2.2 -> SE X3.3A OK: Replace PCB SE NO: Replace PCB SS
03h	1Bh	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_1)	Only after frequent recurrences and in connection with chair malfunction Check wiring SS X2.5 -> SE 3.2B and SS X2.2 -> SE X3.3A OK: Replace PCB SE NO: Replace PCB SS
03h	1Ch	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_2)	Only after frequent recurrences and in connection with chair malfunction Check wiring SS X2.5 -> SE 3.2B and SS X2.2 -> SE X3.3A OK: Replace PCB SE NO: Replace PCB SS
03h	1Dh	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_3)	Only after frequent recurrences and in connection with chair malfunction Check wiring SS X2.5 -> SE 3.2B and SS X2.2 -> SE X3.3A OK: Replace PCB SE NO: Replace PCB SS
03h	1Eh	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_4)	Only after frequent recurrences and in connection with chair malfunction Check wiring SS X2.5 -> SE 3.2B and SS X2.2 -> SE X3.3A OK: Replace PCB SE NO: Replace PCB SS
03h	20h	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_0)	! Replace PCB SS NO: Check wiring SS X2.5 -> SE 3.2B and SS X2.2 -> SE X3.3A OK: Replace PCB SE
03h	21h	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_1)	! Replace PCB SS NO: Check wiring SS X2.5 -> SE 3.2B and SS X2.2 -> SE X3.3A OK: Replace PCB SE
03h	22h	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_2)	! Replace PCB SS NO: Check wiring SS X2.5 -> SE 3.2B and SS X2.2 -> SE X3.3A OK: Replace PCB SE
03h	23h	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_3)	! Replace PCB SS NO: Check wiring SS X2.5 -> SE 3.2B and SS X2.2 -> SE X3.3A OK: Replace PCB SE
03h	24h	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_4)	! Replace PCB SS NO: Check wiring SS X2.5 -> SE 3.2B and SS X2.2 -> SE X3.3A OK: Replace PCB SE
03h	25h	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_0)	Only after frequent recurrences and in connection with chair malfunction Check wiring SS X2.5 -> SE 3.2A and SS X2.2 -> SE X3.3A OK: Replace PCB SE NO: Replace PCB SS

error_ high	error_ low	Description of service code	Corrective action (engineer)
03h	26h	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_1)	Only after frequent recurrences and in connection with chair malfunction Check wiring SS X2.5 -> SE 3.2A and SS X2.2 -> SE X3.3A OK: Replace PCB SE NO: Replace PCB SS
03h	27h	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_2)	Only after frequent recurrences and in connection with chair malfunction Check wiring SS X2.5 -> SE 3.2A and SS X2.2 -> SE X3.3A OK: Replace PCB SE NO: Replace PCB SS
03h	28h	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_3)	Only after frequent recurrences and in connection with chair malfunction Check wiring SS X2.5 -> SE 3.2A and SS X2.2 -> SE X3.3A OK: Replace PCB SE NO: Replace PCB SS
03h	29h	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_4)	Only after frequent recurrences and in connection with chair malfunction Check wiring SS X2.5 -> SE 3.2A and SS X2.2 -> SE X3.3A OK: Replace PCB SE NO: Replace PCB SS
03h	2Ah	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_0)	! Check wiring SS X2.5 -> SE 3.2A and SS X2.2 -> SE X3.3A OK: Replace PCB SS NO: Replace PCB SE
03h	2Bh	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_1)	! Check wiring SS X2.5 -> SE 3.2A and SS X2.2 -> SE X3.3A OK: Replace PCB SS NO: Replace PCB SE
03h	2Ch	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_2)	! Check wiring SS X2.5 -> SE 3.2A and SS X2.2 -> SE X3.3A OK: Replace PCB SS NO: Replace PCB SE
03h	2Dh	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_3)	! Check wiring SS X2.5 -> SE 3.2A and SS X2.2 -> SE X3.3A OK: Replace PCB SS NO: Replace PCB SE
03h	2Eh	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_4)	! Check wiring SS X2.5 -> SE 3.2A and SS X2.2 -> SE X3.3A OK: Replace PCB SS NO: Replace PCB SE
03h	30h	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_0)	! Check wiring SS X2.5 -> SE 3.2A and SS X2.2 -> SE X3.3A OK: Replace PCB SE NO: Replace PCB SS
03h	31h	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_1)	! Check wiring SS X2.5 -> SE 3.2A and SS X2.2 -> SE X3.3A OK: Replace PCB SE NO: Replace PCB SS
03h	32h	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_2)	! Check wiring SS X2.5 -> SE 3.2A and SS X2.2 -> SE X3.3A OK: Replace PCB SE NO: Replace PCB SS
03h	33h	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_3)	! Check wiring SS X2.5 -> SE 3.2A and SS X2.2 -> SE X3.3A OK: Replace PCB SE NO: Replace PCB SS
03h	34h	Communication error between PCB SS (uP) and PCB SE (ASIC), (channel_4)	! Check wiring SS X2.5 -> SE 3.2A and SS X2.2 -> SE X3.3A OK: Replace PCB SE NO: Replace PCB SS
03h	35h	UART triggers error interrupt - controller error	! Replace PCB SS if this error persists
03h	36h	Communication with output stage is stopped because 5V is not available	? 5V supply voltage available on PCB SE, LED V621 +5V lights up NO: Measure 8V on SE X4.1 and X4.2 OK: Replace PCB SE NO: Check wiring and fuse F21 on NS
03h	37h	EMERGENCY_STOP_ACTUAL (signal from chair output stage) not activated within required time period	! Replace PCB SE
03h	38h	EMERGENCY_STOP_ACTUAL not disabled within required time period	! Check 24V, 48V on PCB SE OK: Replace PCB SE
03h	39h	During EMERGENCY STOP test EMERGENCY STOP simulation is active, then simulation is inactive -> Actual: EMERGENCY STOP remains active	! If error persists: Replace PCB SE Check wiring SS X2.F and X2.D -> SE X3.2A and X3.1B NO: Replace PCB SS

error_ high	error_ low	Description of service code	Corrective action (engineer)
03h	3Ah	Motor channel 0: ASIC detects 48V outside tolerance -> motor cannot be operated. Will be queried if EMERGENCY STOP is not active. Note: If there are errors on all 5 channels: Result of movement stop while chair is moving	! Check 48V on PCB SE F600. Does V600 light up? YES: Replace fuse F600 NO: Check wiring SE X4.9 -> NS P48 Check 48V output on NS
03h	3Bh	Motor channel 1: ASIC detects 48V outside tolerance -> motor cannot be operated. Will be queried if EMERGENCY STOP is not active. Note: If there are errors on all 5 channels: Result of movement stop while chair is moving	! Check 48V on PCB SE F601. Does V601 light up? YES: Replace fuse F601 NO: Check wiring SE X4.9 -> NS P48 Check 48V output on NS
03h	3Ch	Motor channel 2: ASIC detects 48V outside tolerance -> motor cannot be operated. Will be queried if EMERGENCY STOP is not active. Note: If there are errors on all 5 channels: Result of movement stop while chair is moving	! Check 48V on PCB SE F602. Does V602 light up? YES: Replace fuse F602 NO: Check wiring SE X4.9 -> NS P48 Check 48V output on NS
03h	3Dh	Motor channel 3: ASIC detects 48V outside tolerance -> motor cannot be operated. Will be queried if EMERGENCY STOP is not active. Note: If there are errors on all 5 channels: Result of movement stop while chair is moving	! Check 48V on PCB SE F603 Does V603 light up? YES: Replace fuse F603 NO: Check wiring SE X4.9 -> NS P48 Check 48V output on NS
03h	3Eh	Motor channel 4: ASIC detects 48V outside tolerance -> motor cannot be operated. Will be queried if EMERGENCY STOP is not active. Note: If there are errors on all 5 channels: Result of movement stop while chair is moving	! Check 48V on PCB SE F604. Does V604 light up? YES: Replace fuse F604 NO: Check wiring SE X4.9 -> NS P48 Check 48V output on NS
03h	40h	Current limiting simulation not detected by ASIC, I_max=0, channel_0	! Replace PCB SE
03h	41h	Current limiting simulation not detected by ASIC, I_max=0, channel_1	! Replace PCB SE
03h	42h	Current limiting simulation not detected by ASIC, I_max=0, channel_2	! Replace PCB SE
03h	43h	Current limiting simulation not detected by ASIC, I_max=0, channel_3	! Replace PCB SE
03h	44h	Current limiting simulation not detected by ASIC, I_max=0, channel_4	! Replace PCB SE
03h	45h	Max. motor current simulation not detected by ASIC; I_Mot != maximum, channel_0	! Replace PCB SE
03h	46h	Max. motor current simulation not detected by ASIC; I_Mot != maximum, channel_1	! Replace PCB SE
03h	47h	Max. motor current simulation not detected by ASIC; I_Mot != maximum, channel_2	! Replace PCB SE
03h	48h	Max. motor current simulation not detected by ASIC; I_Mot != maximum, channel_3	! Replace PCB SE
03h	49h	Max. motor current simulation not detected by ASIC; I_Mot != maximum, channel_4	! Replace PCB SE
03h	4Ah	ASIC generates no EMERGENCY STOP after 500ms when simulating I_max or I_Mot; channel_0 (during EMERGENCY STOP test)	! Replace PCB SE
03h	4Bh	ASIC generates no EMERGENCY STOP after 500ms when simulating I_max or I_Mot; channel_1 (during EMERGENCY STOP test)	! Replace PCB SE

error_ high	error_ low	Description of service code	Corrective action (engineer)
03h	4Ch	ASIC generates no EMERGENCY STOP after 500ms when simulating I_max or I_Mot; channel_2 (during EMERGENCY STOP test)	! Replace PCB SE
03h	4Dh	ASIC generates no EMERGENCY STOP after 500ms when simulating I_max or I_Mot; channel_3 (during EMERGENCY STOP test)	! Replace PCB SE
03h	4Eh	ASIC generates no EMERGENCY STOP after 500ms when simulating I_max or I_Mot; channel_4 (during EMERGENCY STOP test)	! Replace PCB SE
03h	50h	ASIC generates no EMERGENCY STOP; channel_0	! Replace PCB SE
03h	51h	ASIC generates no EMERGENCY STOP; channel_1	! Replace PCB SE
03h	52h	ASIC generates no EMERGENCY STOP; channel_2	! Replace PCB SE
03h	53h	ASIC generates no EMERGENCY STOP; channel_3	! Replace PCB SE
03h	54h	ASIC generates no EMERGENCY STOP; channel_4	! Replace PCB SE
03h	55h	ASIC detects I_max and activates EMERGENCY STOP, I_max for t>500ms, cause: sluggish drive, etc.	? Service code appeared during movement YES: Evaluate other service codes NO: Unplug connector SE X1.12 + X1.10 OK: Motor 0 blocked or short-circuit in wiring or motor NO: Replace PCB SE
03h	56h	ASIC detects I_max and activates EMERGENCY STOP, I_max for t>500ms, cause: sluggish drive, etc.	? Service code appeared during movement YES: evaluate other service codes NO: Unplug connector SE X1.9 + X1.7 OK: Motor 1 blocked or short-circuit in wiring or motor NO: Replace PCB SE
03h	57h	ASIC detects I_max and activates EMERGENCY STOP, I_max for t>500ms, cause: sluggish drive, etc.	? Service code appeared during movement YES: evaluate other service codes NO: Unplug connector SE X1.6 + X1.4 OK: Motor 2 blocked or short-circuit in wiring or motor NO: Replace PCB SE
03h	58h	ASIC detects I_max and activates EMERGENCY STOP, I_max for t>500ms, cause: sluggish drive, etc.	? Service code appeared during movement YES: evaluate other service codes NO: Unplug connector SE X1.3 + X1.1 OK: Motor 3 blocked or short-circuit in wiring or motor NO: Replace PCB SE
03h	59h	ASIC detects I_max and activates EMERGENCY STOP, I_max for t>500ms, cause: sluggish drive, etc.	? Service code appeared during movement YES: evaluate other service codes NO: Unplug connector SE X2 OK: M 4/5 blocked or short-circuit in wiring or motor NO: Replace PCB SE
03h	5Ah	Motor channel 0: No voltage at output, e.g. fuse blown or jumper defective	! Check fuse F600 6.3A on PCB SE (LED V600 lights up = fuse blown) ? LED V605 +48V lights up YES: Replace PCB SE NO: Check 48V supply voltage from power supply unit
03h	5Bh	Motor channel 1: No voltage at output, e.g. fuse blown or jumper defective	! Check fuse F601 6.3A on PCB SE (LED V601 lights up = fuse blown) ? LED V605 +48V lights up YES: Replace PCB SE NO: Check 48V supply voltage from power supply unit
03h	5Ch	Motor channel 2: No voltage at output, e.g. fuse blown or jumper defective	! Check fuse F602 6.3A on PCB SE (LED V602 lights up = fuse blown) ? LED V605 +48V lights up YES: Replace PCB SE NO: Check 48V supply voltage from power supply unit
03h	5Dh	Motor channel 3: No voltage at output, e.g. fuse blown or jumper defective	! Check fuse F603 6.3A on PCB SE (LED V603 lights up = fuse blown) ? LED V605 +48V lights up YES: Replace PCB SE NO: Check 48V supply voltage from power supply unit
03h	5Eh	Motor channel 4: No voltage at output, e.g. fuse blown or jumper defective	? LED V604 +24V lights up YES: Replace PCB SE NO: Check 24V supply voltage of NS F23

error_ high	error_ low	Description of service code	Corrective action (engineer)
03h	60h	Motor channel 0: Voltage is applied, but no current is present (e.g. open output)	! If this error persists with no functional fault: ! Check wiring to motor 0, check motor 0 NO: Replace PCB SE
03h	61h	Motor channel 1: Voltage is applied, but no current is present (e.g. open output)	! If this error persists with no functional fault: ! Check wiring to motor 1, check motor 1 NO: Replace PCB SE
03h	62h	Motor channel 2: Voltage is applied, but no current is present (e.g. open output)	! If this error persists with no functional fault: ! Check wiring to motor 2, check motor 2 NO: Replace PCB SE
03h	63h	Motor channel 3: Voltage is applied, but no current is present (e.g. open output)	! If this error persists with no functional fault: ! Check wiring to motor 3, check motor 3 NO: Replace PCB SE
03h	64h	Motor channel 4: Voltage is applied, but no current is present (e.g. open output)	! If this error persists with no functional fault: ! Check wiring to motor 4, check motor 4 NO: Replace PCB SE
03h	65h	Motor channel 5: Voltage is applied, but no current is present (e.g. open output) Note: May also occur due to lack of self-inhibition	! If this error persists with no functional fault: ! Check wiring to motor 5, check motor 5 NO: Replace PCB SE
03h	6Ah	Motor channel 0: Not activated, yet voltage and current can be measured (e.g. low impedance FETs, PCB error)	! Replace PCB SE
03h	6Bh	Motor channel 1: Not activated, yet voltage and current can be measured (e.g. low impedance FETs, PCB error)	! Replace PCB SE
03h	6Ch	Motor channel 2: Not activated, yet voltage and current can be measured (e.g. low impedance FETs, PCB error)	! Replace PCB SE
03h	6Dh	Motor channel 3: Not activated, yet voltage and current can be measured (e.g. low impedance FETs, PCB error)	! Replace PCB SE
03h	6Eh	Motor channel 4: Not activated, yet voltage and current can be measured (e.g. low impedance FETs, PCB error)	! Replace PCB SE
03h	70h	Motor channel 0: No voltage at output, yet short-circuit current is flowing. Current limiting is displayed. See also service code 05 00	Note: Replace software on PCB SS, software version >= 2.0
03h	71h	Motor channel 1: No voltage at output, yet short-circuit current is flowing. Current limiting is displayed. See also service code 05 01	Note: Replace software on PCB SS, software version >= 2.0
03h	72h	Motor channel 2: No voltage at output, yet short-circuit current is flowing. Current limiting is displayed. See also service code 05 02	Note: Replace software on PCB SS, software version >= 2.0
03h	73h	Motor channel 3: No voltage at output, yet short-circuit current is flowing. Current limiting is displayed. See also service code 05 03	Note: Replace software on PCB SS, software version >= 2.0
03h	74h	Motor channel 4: No voltage at output, yet short-circuit current is flowing. Current limiting is displayed. See also service code 05 04	Note: Replace software on PCB SS, software version >= 2.0
03h	75h	Motor channel 5: No voltage at output, yet short-circuit current is flowing. Current limiting is displayed. See also service code 05 05	Note: Replace software on PCB SS, software version >= 2.0
04h	00h	Soft-timer table overflow	System error: report to factory
05h	00h	Current limiting motor channel_0 active Error occurs in connection with 03 70.	! Unplug connector on motor 0 OK: Replace motor 0 NO: Check wiring X1.21 + X1.10 from SE to motor 0 OK: Replace PCB SE
05h	01h	Current limiting motor channel_1 active. Error occurs in connection with 03 71	! Unplug connector on motor 1 OK: Replace motor 1 NO: Check wiring X1.9 + X1.7 from SE to motor 1 OK: Replace PCB SE

error_ high	error_ low	Description of service code	Corrective action (engineer)
05h	02h	Current limiting motor channel_2 active. Error occurs in connection with 03 72	! Unplug connector on motor 2 OK: Replace motor 2 NO: Check wiring X1.6 + X1.4 from SE to motor 2 OK: Replace PCB SE
05h	03h	Current limiting motor channel_3 active. Error occurs in connection with 03 73.	! Unplug connector on motor 3 OK: Replace motor 3 NO: Check wiring X1.3 + X1.1 from SE to motor 3 OK: Replace PCB SE
05h	04h	Current limiting motor channel_4 active. Error occurs in connection with 03 74.	! Unplug connector X2 from PCB SE OK: Replace PCB SE NO: Unplug connector X4 on SL OK: Check M4 + wiring from PCB SL X4 to M4 NO: Check wiring SE X2.3 + X2.4 -> SL X2.4 + X 2.3 -> X4.1 + X4.3
05h	05h	Current limiting motor channel_5 active. Error occurs in connection with 03 75.	! Unplug connector X2 from PCB SE OK: Replace PCB SE NO: Unplug connector X3 pin 3.1A + 3.1B + 3.2A OK: Check M5 + wiring from PCB SL NO: Check wiring SE X2.1 + X2.2 -> SL X2.1 + X2.2 -> X3.1A + X3.2A
05h	06h	Power supply unit overloaded.	Power supply unit is defective or loose connection
06h	00h	CAN RAM error (cannot write)	! Replace PCB SS
06h	01h	CAN communication impossible/faulty, BUS OFF condition has been detected	? Error occurs only once: Fault exists NO: Query using Ident dialog: All nodes available? YES: Replace PCB SS NO: Open circuit, see CAN wiring diagram
07h	00h	EEPROM write buffer overflow	System error: report to factory
07h	01h	EEPROM checksum error	Note: If error persists after power-on: Replace PCB SS
07h	02h	Error stack end not found. Data error in EEPROM area	Note: If error persists after power-on: Replace PCB SS
07h	03h	EPROM factory settings are older than EEPROM data	Note: factory settings stored are more recent than those of the current software version
07h	04h	Error in data region of EEPROM	! If error persists, replace PCB SS
07h	05h	Error in error stack, defective EEPROM memory cell	! If error persists, replace PCB SS
08h	00h	Motor channel 0 positioning error; difference between required-actual value too great	! Check pot. 0, OK? NO: Replace pot. YES: Check pot. cable, OK? NO: Replace cable YES: Replace PCB SS
08h	01h	Motor channel 1 positioning error; difference between required-actual value too great	! Check pot. 1, OK? NO: Replace pot. YES: Check pot. cable, OK? NO: Replace cable YES: Replace PCB SS
08h	02h	Motor channel 2 positioning error; difference between required-actual value too great	! Check pot. 2, OK? NO: Replace pot. YES: Check pot. cable, OK? NO: Replace cable YES: Replace PCB SS
08h	03h	Motor channel 3 positioning error; difference between required-actual value too great	! Check pot. 3, OK? NO: Replace pot. YES: Check pot. cable, OK? NO: Replace cable YES: Replace PCB SS
08h	04h	Motor channel 4 positioning error; difference between required-actual value too great	! Check pot. 4, OK? NO: Replace pot. YES: Check pot. cable, OK? NO: Replace cable YES: Replace PCB SS
08h	05h	Motor channel 5 positioning error; difference between required-actual value too great	! Check pot. 5, OK? NO: Replace pot. YES: Check pot. cable, OK? NO: Replace cable YES: Replace PCB SS
09h	00h	Panel transmits SW EMERGENCY STOP, but no HW EMERGENCY STOP (in NMI input). EMERGENCY STOP wiring defective	Check EMERGENCY STOP cable of HE + AE -> chair
09h	01h	Error in input circuit of EMERGENCY STOP sensor system	! Replace PCB SS

error_ high	error_ low	Description of service code	Corrective action (engineer)
09h	11h	EMERGENCY STOP during chair movement triggered by toeboard safety switch	If the error occurs in connection with movement errors, check function of the safety switch and replace it, if necessary
09h	12h	EMERGENCY STOP during chair movement triggered by safety switch of tilting part	If the error occurs in connection with movement errors, check function of the safety switch and replace it, if necessary
09h	13h	EMERGENCY STOP during chair movement triggered by backrest safety switch	If the error occurs in connection with movement errors, check function of the safety switch and replace it, if necessary
09h	14h	EMERGENCY STOP during chair movement due to tilt switch	If the error occurs in connection with movement errors, check function of the tilt switch and replace it, if necessary
09h	20h	Information: The current movement has been stopped by activation of the cuspidor safety switch.	None
09h	21h	5 sec timeout for cuspidor safety switch inactivity exceeded during the operating phase	? Does error occur in connection with error no. 40, 41, or 42 in the water unit YES: refer to them NO: Check whether compressed air is available at valve MV43 or whether the cuspidor jams (sluggishness)
0Ah	00h	Tilt switch at rear not active although it should be active according to pot. information	For internal factory test only
0Ah	01h	Tilt switch at rear prematurely active (according to pot. info)	For internal factory test only
0Ah	02h	Tilt switch at front not active although it should be active according to pot. information	For internal factory test only
0Ah	03h	Tilt switch at front prematurely active (according to pot. info)	For internal factory test only
0Bh	00h	Envelope exceeded in lower region S0 Consequence of other errors: Drive output stage 03xx or position error 08xx and 02xx (08xx: 0800 - 0802, 02xx: 0200 - 0202)	Read and evaluate preceding service codes.
0Bh	01h	Envelope exceeded in lower region S1. Consequence of other errors: Drive output stage 03xx or position error 08xx and 02xx (08xx: 0800 - 0802, 02xx: 0200 - 0202)	Read and evaluate preceding service codes.
0Bh	02h	Envelope exceeded in lower region S2. Consequence of other errors: Drive output stage 03xx or position error 08xx and 02xx (08xx: 0800 - 0802, 02xx: 0200 - 0202)	Read and evaluate preceding service codes.
0Bh	03h	Envelope exceeded in lower region S3. Consequence of other errors: Drive output stage 03xx or position error 08xx and 02xx (08xx: 0800 - 0802, 02xx: 0200 - 0202)	Read and evaluate preceding service codes.
0Bh	04h	Envelope exceeded in lower region S4. Consequence of other errors: Drive output stage 03xx or position error 08xx and 02xx (08xx: 0800 - 0802, 02xx: 0200 - 0202)	Read and evaluate preceding service codes.
0Bh	05h	Envelope exceeded in lower region S5. Consequence of other errors: Drive output stage 03xx or position error 08xx and 02xx (08xx: 0800 - 0802, 02xx: 0200 - 0202)	Read and evaluate preceding service codes.
0Bh	06h	Envelope exceeded in lower region (S0 -> S6). Consequence of other errors: Drive output stage 03xx or position error 08xx and 02xx (08xx: 0800 - 0802, 02xx: 0200 - 0202)	Read and evaluate preceding service codes.
0Bh	10h	Max. permissible shearing angle for axis 0 exceeded Generation according to travel functions	? Chair tilted very far to the back around axis 0 ! Inspect pot. 0 visually for damage and check its proper fit, read and evaluate immediately preceding service codes
0Bh	11h	Under min. permissible shearing angle for axis 0 Generation according to travel functions	? Chair tilted very far to the front around axis 0 ! Inspect pot. 0 visually for damage and check its proper fit, read and evaluate immediately preceding service codes
0Bh	12h	Max. permissible shearing angle for axis 1 exceeded Generation according to travel functions	? Chair tilted very far to the back around axis 1 ! Inspect pot. 1 visually for damage and check its proper fit, read and evaluate immediately preceding service codes
0Bh	13h	Under min. permissible shearing angle for axis 1 Generation according to travel functions	? Chair tilted very far to the front around axis 1 ! Inspect pot. 1 visually for damage and check its proper fit, read and evaluate immediately preceding service codes
0Bh	14h	Max. permissible shearing angle for axis 2 exceeded Generation according to travel functions	? Chair tilted very far to the back around axis 2 ! Inspect pot. 2 visually for damage and check its proper fit, read and evaluate immediately preceding service codes

error_ high	error_ low	Description of service code	Corrective action (engineer)
0Bh	15h	Under min. permissible shearing angle for axis 2 Generation according to travel functions	? Chair tilted very far to the front around axis 2 ! Inspect pot. 2 visually for damage and check its proper fit, read and evaluate immediately preceding service codes
0Bh	16h	Max. permissible shearing angle for axis 3 exceeded Generation according to travel functions	? Backrest tilted very far to the back ! Inspect pot. 3 visually for damage and check its proper fit, read and evaluate immediately preceding service codes
0Bh	17h	Under min. permissible shearing angle for axis 3 Generation according to travel functions	? Backrest tilted very far to the front ! Inspect pot. 3 visually for damage and check its proper fit, read and evaluate immediately preceding service codes
0Bh	18h	Max. permissible sword telescoping exceeded Generation according to travel functions	? Sword telescoped very far ! Inspect pot. 4 visually for damage and check its proper fit, read and evaluate immediately preceding service codes
0Bh	19h	Under min. permissible sword retraction Generation according to travel functions	? Sword retracted very far ! Inspect pot. 4 visually for damage and check its proper fit, read and evaluate immediately preceding service codes
0Bh	1Ah	Max. permissible shearing angle of axis 5 (headrest) exceeded Generation according to travel functions	? Headrest tilted very far back read and evaluate immediately preceding service codes
0Bh	1Bh	Under min. permissible shearing angle of axis 5 (headrest) Generation according to travel functions	? Headrest tilted very far to the front read and evaluate immediately preceding service codes
0Bh	20h	Max. permissible angle to horizontal exceeded for axis 2 (seat angle). See 0B00-0B06	Position outside of the permissible movement limits (error result) ! Analyze corresponding service code recorded prior to first occurrence
0Bh	21h	Under min. permissible angle to horizontal for axis 2 (seat angle). See 0B00-0B06	Position outside of the permissible movement limits (error result) ! Analyze corresponding service code recorded prior to first occurrence
0Ch	00h	Channel 0: ADC error (for functional tests only)	! Replace PCB SS
0Ch	01h	Channel 1: ADC error (for functional tests only)	! Replace PCB SS
0Ch	02h	Channel 2: ADC error (for functional tests only)	! Replace PCB SS
0Ch	03h	Channel 3: ADC error (for functional tests only)	! Replace PCB SS
0Ch	04h	Channel 4: ADC error (for functional tests only)	! Replace PCB SS

7.9 Service codes of PCB (WS) in the water unit

7.9.1 SW version: 1.0, 1.1 - 1.9, 2.0 - 2.4, 3.0

Remark/Note:
The service code (error_high) can be found in column 5 on the panel display.
(error_low) xx: disregard

error_ high	error_ low	Description of service code	Corrective action (engineer)
0h	xx	Zero error line	For analysis purposes only
1h	xx	PCB error, ZPRAM defective	! Replace PCB WS / Replace ZPRAM (J9)
2h	xx	Comparison of real-time clock with generated tick time causes errors. Real-time clock defective, clock was set	? Has the clock been set very recently? NO: ! Replace PCB WS / Replace ZPRAM (J9)
3h	xx	Water unit detects that ozonization is available (coding jumper X9), but cannot detect AK (coding jumper X15)	! Check AK X15.6 - X15.7 and WE X9.2A - X9.5B jumper
4h	xx	Emergency stop test defective (activation of emergency stop could not be verified)	! Replace PCB WS
5h	xx	PIO defective, PCB error	! Replace PCB WS
6h	xx	Analysis detects that no rotor is present in centrifuge	? Rotor in centrifuge YES: Replace PCB WS
7h	xx	Flow valve does not open within the specified time interval after it has been released by the uP. No compressed air in treatment center or flow valve/ flow sensor defective	? Compressed air available YES: 24V (between X8.1 + X8.2) present? YES: Check circuit MV37; OK? YES: Short-circuit the pressure sensor input (X8.3 and X8.4), Switch unit off/on, error persists? YES: Replace PCB WS, NO: Open circuit in pressure sensor circuit
8h	xx	Unused service code	
9h	xx	CAN communication impossible/faulty. CAN module defective, CAN wiring defective	? Error only occurs once: Fault exists NO: Query using Ident dialog: All nodes present? YES: Replace PCB WS NO: Open circuit, see CAN wiring diagram
Ah	xx	Water tank level (DS31) input signal or sensor 53_T1 (DS53, ozonization) faulty according to self-test result	Replace PCB WS
Bh	xx	Disinfectant level (DS32) input signal or sensor 51_T1 (DS51, ozonization) faulty according to self-test result	Replace PCB WS
Ch	xx	DVGW detection input signal faulty according to self-test result	Replace PCB WS
Dh	xx	Reedkontak_2 pump (DS34) input signal faulty according to self-test result	Replace PCB WS
Eh	xx	Reedkontak_1 pump (DS33) input signal faulty according to self-test result	Replace PCB WS
Fh	xx	Cuspidor water alarm (DN30) input signal faulty according to self-test result	Replace PCB WS
10h	xx	Quarter-turn type switch (S3, central) input signal faulty according to self-test result	Replace PCB WS
11h	xx	Separator sensor (DS30) input signal faulty according to self-test result	Replace PCB WS
12h	xx	Sensor 52 tank 2 (DS52, ozonization) input signal faulty according to self-test result	Replace PCB WS
13h	xx	Sensor 54 tank 2 (DS54, ozonization) input signal faulty according to self-test result	Replace PCB WS
14h	xx	Light barrier (MG3) input signal faulty according to self-test result	Replace PCB WS
15h	xx	Unused service code	
16h	xx	Max. conversion time of ADC exceeded	! Replace PCB WS
17h	xx	Error in centrifuge drive, no light barrier signals, e.g. blocked motor.	? Is the centrifuge running after you start it (start cuspidor flushing)? YES: Replace PCB WS NO: Replace centrifuge

error_ high	error_ low	Description of service code	Corrective action (engineer)
18h	xx	It looks as if pump is idling. Mixing tank is empty, water feed is clogged	? AK filter clogged NO: Check water feed (connection box -> mixing tank -> pump, AB -> AF2 -> MV1)
19h	xx	When filling mixing tank, the maximum filling time is exceeded. Water feed to mixing tank clogged.	? AK filter clogged NO: Check water feed (connection box -> mixing tank -> pump, AB -> AF2 -> MV1) NO: Replace level sensor (SW version 2.4 and higher), Otherwise ignore error
1Ah	xx	Water piping system is leaking at some point after the pump. Pump runs although no water valve is active.	Check water piping system (pump hose -> MV34 heater and pump hose -> connection box)
1Bh	xx	Cannot write to CAN RAM	! Replace PCB WS
1Ch	xx	Unused service code	
1Dh	xx	Unused service code	
1Eh	xx	16V supply voltage outside tolerance Power supply failure, short-circuit, blown fuse.	! Check fuse F12 on NS ! Check 16V circuit WS X3.3 -> GA3 X3.18 -> NS X3.3
1Fh	xx	24V supply voltage outside tolerance Power supply failure, short-circuit, blown fuse, connector.	! Check fuse F13 on NS ! Check 24V circuit WS X3.6 -> GA3 X3.16 -> NS X3.4
20h	xx	Unused service code	
21h	xx	Temperature sensor input circuit defective according to self-test for test active (required =): 0.5V<U_sensor<1V	! Check temperature sensor input circuit X14.5 and X14.6 WS NO: Replace PCB WS
22h	xx	Self-test: Temperature sensor input signal U_sensor > 4.5V. External error, open circuit on connector, cable, wrong NTC	! Check temperature sensor input circuit X14.5 X14.6 WS NO: Replace PCB WS
23h	xx	Service command received is unknown	Incompatible service command in system or in link to diagnostics system. Inform Hotline!
24h	xx	Parameters of received service command are unknown	Incompatible service command in system or in link to diagnostics system. Inform Hotline!
25h	xx	Pump works asymmetrically. Diaphragm defective.	! Check whether pump is running quietly YES: Replace PCB WS NO: Replace pump
26h	xx	Unused service code	
27h	xx	Timeout while attempting to swing back cuspidor	!Does error occur in connection with error no. 40, 41 or 42? YES: refer to them NO: Check whether compressed air is available at valve MV43 or whether the cuspidor jams (sluggishness)
28h	xx	Output signal MV3 disinfectant tank level, current limiting active. Overload, external short-circuit	! Unplug connector X10 ? Error persists when MV3 is activated YES: Replace PCB WS NO: Check circuit WS X10.1A -> X10.1B MV3
29h	xx	Output signal MV3 disinfectant tank level, signal output circuit defective. Required: I = 0A Actual: I>0A	? MV3 active without key activation YES: Replace PCB WS NO: Check circuit WS X10.1A -> X10.1B
2Ah	xx	Output level MV3 disinfectant tank level, open circuit. Open circuit on connector pins, cable, MV coil	! Activate MV3; measure voltage between WS X10.1A and X10.1B ? U = 24V +/- 15% YES: Check circuit MV3 NO: Replace PCB WS
2Bh	xx	Unused service code	
2Ch	xx	Output signal MV33 unit selector current limiting active. Overload, external short-circuit	! Unplug connector X12. ? Error persists when MV33 is activated YES: Replace PCB WS NO: Check circuit WS X12.1 -> X12.4 MV33
2Dh	xx	Output signal MV33 signal output circuit defective. Required: I = 0A, Actual: I>0A	? MV33 active without key activation YES: Replace PCB WS NO: Check circuit WS X12.1 -> X12.4
2Eh	xx	Open circuit on output signal MV33. Open circuit on connector pins, cable, MV coil	! Activate MV33; measure voltage between WS X12.1 and X12.4 ? U = 24V +/-15% YES: Check circuit MV33 NO: Replace PCB WS
2Fh	xx	Unused service code	

error_ high	error_ low	Description of service code	Corrective action (engineer)
30h	xx	Output signal MV34 tumbler current limiting active. Overload, external short-circuit	! Unplug connector X11 ? Error persists when MV34 is activated YES: Replace PCB WS NO: Check circuit WS X11.1 -> X11.4 MV34
31h	xx	Output signal MV34 signal output circuit defective. Required: I = 0A, Actual: I>0A	? MV34 active without key activation YES: Replace PCB WS NO: Check circuit WS X11.1 -> X11.4
32h	xx	Open circuit on output signal MV34. Open circuit on connector pins, cable, MV coil	! Activate MV34; measure voltage between WS X11.1 and X11.4 ? U = 24V +/-15% YES: Check circuit MV34 NO: Replace PCB WS
33h	xx	Unused service code	
34h	xx	Output signal MV37 flow valve, current limiting active. Overload, external short-circuit	! Unplug connector X8 ? Error persists when MV37 is activated YES: Replace PCB WS NO: Check circuit WS X8.1 -> X8.2 MV37
35h	xx	Output signal MV37, signal output circuit defective. Required: I = 0A, Actual: I>0A	? MV37 active without key activation YES: Replace PCB WS NO: Check circuit WS X8.1 -> X8.2
36h	xx	Output signal MV37, external open circuit. Open circuit on connector pins, cable, MV coil	! Activate MV37; measure voltage between WS X8.1 and X8.2 ? U = 24V +/-15% YES: Check circuit MV37 NO: Replace PCB WS
37h	xx	Unused service code	
38h	xx	Output signal MV40 air (pump), current limiting active. Overload, external short-circuit	! Unplug connector X6. ? Error persists when MV40 is activated YES: Replace PCB WS NO: Check circuit WS X6.3 -> X6.4 MV40
39h	xx	Output signal MV40 air (pump), signal output circuit defective. Required: I = 0A, Actual: I>0A	? MV40 active without key activation A: Replace PCB WS NO: Check circuit WS X6.3 -> X6.4
3Ah	xx	Output signal MV40 air (pump) open circuit. Open circuit on connector pins, cable, MV coil	! Activate MV40; measure voltage between WS X6.3 and X6.4 ? U = 24V +/-15% YES: Check circuit MV40 NO: Replace PCB WS
3Bh	xx	Unused service code	
3Ch	xx	Output signal MV52 ozonized water tank_1, current limiting active. Overload, external short-circuit	! Unplug connector X10 ? Error persists when MV52 is activated YES: Replace PCB WS NO: Check circuit WS X10.1A -> X10.1B MV52
3Dh	xx	Output signal MV52 ozonized water tank_1, signal output circuit defective Required: I = 0A, Actual: I>0A	? MV52 active without key activation YES: Replace PCB WS NO: Check circuit WS X10.1A -> X10.1B
3Eh	xx	Output signal MV52 ozonized water tank_1, open circuit. Open circuit on connector pins, cable, MV coil	! Activate MV52; measure voltage between WS X10.1A and X10.1B ? U = 24V +/-15% YES: Check circuit MV52 NO: Replace PCB WS
3Fh	xx	Unused service code	
40h	xx	Output signal MV53 or MV43 cuspidor, current limiting active. Overload, external short-circuit	! Unplug connector X10 ? Error persists when MV53/MV43 is activated YES: Replace PCB WS NO: Check wiring WS X10.2A -> X10.2B MV53/MV43
41h	xx	Output signal MV53 or MV43 cuspidor, signal output circuit defective. Required: I = 0A, Actual: I>0A	? MV53/MV43 active without key activation YES: Replace PCB WS NO: Check wiring WS X10.2A -> X10.2B
42h	xx	Output signal MV53 or MV43 cuspidor, open circuit. Open circuit on connector pins, cable, MV coil	! Activate MV53/MV43; measure voltage between WS X10.2A and X10.2B ? U = 24V +/-15% YES: Check circuit MV53/MV43 NO: Replace PCB WS
43h	xx	Unused service code	

error_ high	error_ low	Description of service code	Corrective action (engineer)
44h	xx	Output signal MV54 ozone gas feed water tank_1, current limiting active. Overload, external short-circuit	! Unplug connector X10 ? Error persists when MV54 is activated YES: Replace PCB WS NO: Check circuit WS X10.3A -> X10.3B MV54
45h	xx	Output signal MV54 ozone gas feed water tank_1, signal output circuit defective. Required: I = 0A, Actual: I>0A	? MV54 active without key operation YES: Replace PCB WS NO: Check circuit WS X10.3A -> X10.3B
46h	xx	Output signal MV54 ozone gas feed water tank_1, open circuit. Open circuit on connector pins, cable, MV coil	! Activate MV54; measure voltage between WS X10.3A and X10.3B ? U = 24V +/-15% YES: Check circuit MV54 NO: Replace PCB WS
47h	xx	Unused service code	
48h	xx	Output signal MV55 ozone gas feed water tank_2, current limiting active. Overload, external short-circuit	! Unplug connector X10 ? Error persists when MV55 is activated YES: Replace PCB WS NO: Check circuit WS X10.4A -> X10.4B MV55
49h	xx	Output signal MV55 ozone gas feed water tank_2, signal output circuit defective. Required: I = 0A, Actual: I>0A	? MV55 active without key activation YES: Replace PCB WS NO: Check circuit WS X10.4A -> X10.4B
4Ah	xx	Output signal MV55 ozone gas feed water tank_2, open circuit. Open circuit on connector pins, cable, MV coil	! Activate MV55; measure voltage between WS X10.4A and X10.4B ? U = 24V +/-15% YES: Check circuit MV55 NO: Replace PCB WS
4Bh	xx	Unused service code	
4Ch	xx	Current limiting in driver circuit of heater active. External short-circuit, connector, cable, heater	! Remove pin X14.1 from connector X14, plug in connector X14 ? Error persists when heater is activated YES: Replace PCB WS NO: Check circuit WS X14.1A -> X14.3 heater
4Dh	xx	Driver circuit of heater defective. Required: I = 0A, Actual: I>0A	? Heater active without key activation YES: Replace PCB WS NO: Check circuit WS X14.1A -> X14.3
4Eh	xx	External open circuit, heater, connector, cable defective, excess temperature protection active	! Activate heater; measure voltage between WS X14.1 and X14.3 ? U = 24V +/-15% YES: Check heater circuit NO: Replace PCB WS
4Fh	xx	Unused service code	
50h	xx	Output signal film viewer, current limiting active. Overload, external short-circuit	! Remove pin X15.2A from connector X15, plug in connector X15 ? Error persists when film viewer is activated YES: Replace PCB WS NO: Check circuit WS X15.2A -> X15.2B film viewer
51h	xx	Output signal film viewer, signal output circuit defective. Required: I = 0A, Actual: I>0A	? Film viewer active without key activation YES: Replace PCB WS NO: Check circuit WS X15.2A -> X15.2B
52h	xx	Output signal film viewer, external open circuit. Open circuit on connector pins, cable; lamp defective	! Activate film viewer; measure voltage between WS X15.2A and X15.2B ? U = 24V +/-15% YES: Check film viewer circuit NO: Replace PCB WS
53h	xx	Unused service code	
54h	xx	Unused service code	
55h	xx	Cuspidor safety switch input circuit faulty according to self-test result	Check cuspidor safety switch input circuit X11.2, X11.3 NO: Replace PCB WS
56h	xx	Reserve 2 input signal faulty according to self-test result	Replace PCB WS
57h	xx	Test circuit on PCB faulty according to self-test result	Replace PCB WS
58h	xx	Film viewer identification input signal defective according to self-test result	Replace PCB WS
59h	xx	Centrifuge identification input signal defective according to self-test result	Replace PCB WS
5Ah	xx	Unused service code	
5Bh	xx	Unused service code	

error_ high	error_ low	Description of service code	Corrective action (engineer)
5Ch	xx	Speed in start-up phase too low. Overload, excessive rotor friction,	! Check centrifuge
5Dh	xx	Speed in control phase too low. Unexpected load lasting for a long time (>10 seconds)	Centrifuge jammed mechanically or drain clogged
5Eh	xx	Maximum filling time of mixing tank exceeded (First fill-up after power-on)	Filter in AK, supply feed to mixing tank clogged
5Fh	xx	Unused service code	
60h	xx	Software cannot be executed on the available hardware	Use compatible software, inform Hotline
61h	xx	32V supply voltage outside tolerance Power supply failure, short-circuit, blown fuse.	! Check fuse F14 on NS ! Check 32V cable path WS X3.4 -> GA3 X3.20 -> NS X3.5
62h	xx	Checksum error in non-volatile memory chip	ZPRAM defective, ! If this occurs several times between C1 power-on / power-off: Replace PCB WS
63h	xx	Unused service code	
64h	xx	Unused service code	
65h	xx	Unused service code	
66h	xx	Unused service code	
67h	xx	Unused service code	
68h	xx	Unused service code	
69h	xx	Unused service code	
6Ah	xx	Unused service code	
6Bh	xx	Unused service code	
6Ch	xx	Unused service code	
6Dh	xx	Unused service code	
6Eh	xx	Sirolux output signal, current limiting active. Overload, external short-circuit	! Unplug connector X1 ? Error persists when Sirolux is activated YES: Replace PCB WS NO: Check circuit WS X1.1 -> X1.2 Sirolux
6Fh	xx	Sirolux output signal, signal output circuit defective. Required: I = 0A, Actual: I>0A	? Sirolux active without key activation YES: Replace PCB WS NO: Check circuit WS X1.1 -> X1.2 Sirolux
70h	xx	Open circuit on Sirolux output signal. Open circuit on connector pins, cable; lamp defective	! Activate Sirolux; measure voltage between WS X1.1 and X1.2 ? 11V <U< 24V and LED V18 active YES: Check Sirolux circuit NO: Replace PCB WS
71h	xx	Measured Sirolux output voltage does not match the preset PWM voltage	If it occurs several times when Sirolux is activated: Replace PCB WS
72h	xx	Centrifuge motor output signal current too high. Overload, external short-circuit...	! Remove pin X2.3 from connector X2, plug in connector X2 ? Error persists when centrifuge is activated YES: Replace PCB WS NO: Check circuit WS X2.1 -> X2.3 centrifuge motor
73h	xx	Centrifuge motor output signal, signal output circuit defective. Required: I = 0A, Actual: I>0A	? Centrifuge motor runs without activation signal YES: Replace PCB WS NO: Check circuit WS X2.1 -> X2.3 centrifuge motor
74h	xx	Open circuit on centrifuge motor output signal. Open circuit on connector pins, cable; motor defective	! Activate centrifuge motor; measure voltage between WS X2.1 and X2.3 ? 10V <U< 24V and LED V14 active YES: Check centrifuge motor circuit NO: Replace PCB WS
75h	xx	Measured centrifuge output voltage does not match the preset PWM voltage	If it occurs several times when the centrifuge is activated: Replace PCB WS

We reserve the right to make any alterations which may be due to technical improvements.

D 3386.076.01.01.02 11.2001
Sprache: Englisch
Ä.-Nr.: 000 000
Printed in Germany
Imprimé en Allemagne

Sirona Dental Systems GmbH

Fabrikstraße 31
D-64625 Bensheim
Germany
www.sirona.de

Bestell-Nr.
Order No. **59 06 628 D 3386**
No. de cde.
No de pedido