

Datex-Ohmeda

Keyboard for the deoRecorder for Anesthesia, K-ARKB (rev. 00)

S/5TM Keyboard Interface Board, B-ARK (rev. 00)

ARK Barcode Reader, N-SCAN (rev. 00)

Technical Reference Manual Slot



All specifications are subject to change without notice.

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Datex-Ohmeda Inc.
30300hmeda Drive
53707-7550 MADISON, WIS
USA
Tel. +1-608-221 1551, Fax +1-608-222 9147
www.us.datex-ohmeda.com

Datex-Ohmeda Division,
Instrumentarium Corp.
P.O. Box 900, FIN-00031
DATEX-OHMEDA, FINLAND
Tel. +358 10 394 11 Fax +358 9 146 3310
www.datex-ohmeda.com
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Keyboard for the deioRecorder for Anesthesia, K-ARKB, S/5 Keyboard Interface Board, B-ARK and ARK Barcode Reader, N-SCAN

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SERVICE CHECK FORM

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INTRODUCTION

This Technical Reference Manual Slot provides information for the maintenance and service of the Datex-Ohmeda keyboard for the deioRecorder for Anesthesia, K-ARKB, the S/5 Keyboard Interface Board, B-ARK and the ARK Barcode Reader, N-SCAN. The information is applicable for the current production revisions of the devices. Later in this manual modules can be called w/o system name S/5.

Please see also related *Technical Reference Manual* for information related to system e.g. related documentation, conventions used, symbols on equipment, safety precautions, system description, system installation, interfacing, functional check and planned maintenance.

NOTE: The S/5 Keyboard Interface Board, B-ARK can only be used with S/5 Anesthesia Monitor and AS/3 Anesthesia Monitor.

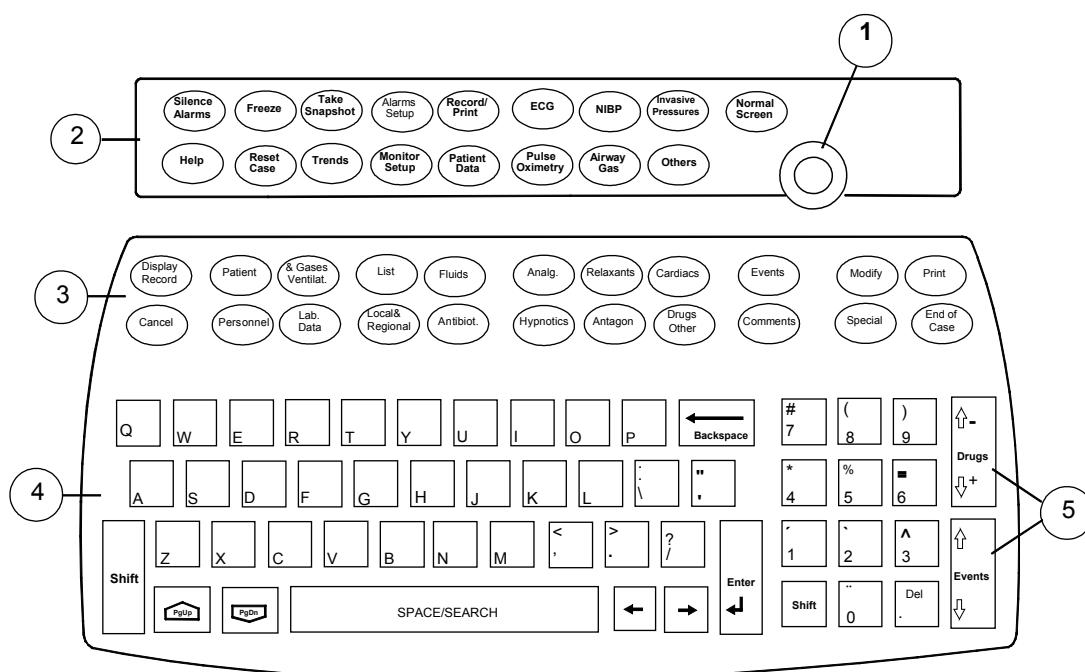


Figure 1 Keyboard for the deioRecorder for Anesthesia, K-ARKB (English version)

- (1) The ComWheel
- (2) Keys that function as the S/5 monitor's command bar. The power switch is in the monitor's Command Bar.
- (3) Keys for record keeping control.
- (4) Letter and number keys for typing in information that is not listed in the menus.
- (5) Arrow keys (Drugs, Events) for moving up or down the Event list and Event trend when the record is on the display.

Related documents

For more information about...	See
Technical issues	Technical Reference Manual, Part I
Configuration	DeioCustomizer for Anesthesia` s manual
Contents of the menus in your hospital	Contact the personnel responsible for the menu configurations in the hospital
Monitor, parameters, physiological trends, general messages and symbols on the display	Datex-Ohmeda S/5 Anesthesia Monitor, User's Guide and User's Reference Manual
Printer	The printer manual
Barcode Reader	The Barcode Reader manual

1 SPECIFICATIONS

1.1 General specifications

1.1.1 Keyboard, K-ARKB

Dimensions (W × D × H)	328 × 232 × 61 mm/12.9 × 9.1 × 2.4 in
Weight	1.3 kg/3.8 lbs.
Power	+5 V DC ±10 %, 70 mA max, supplied from S/5 AM or S/5 CM
Character set	ASCII
Communication interface	PC compatible serial line plus S/5 type serial line
Environmental requirements:	
Operating temperature	+10...+35 °C/+50...+95 °F
Storage temperature	-10...+45 °C/+14...+113 °F
Humidity	10...90 % non-condensing

1.1.2 ARK Barcode Reader, N-SCAN

Dimensions (W × L × H)	7.1 × 12.7 × 16 cm/2.8 × 5 × 6.3 in
Weight approx.	170 g/5.98 oz. (w/o cable)
Power	supplied from S/5 monitor or AS/3 AM or AS/3 CM
Light source	675 nm laser diode
Laser classifications	CDRH Class II, IEC Class 1, IEC 825 Class 2
Environmental requirements:	
Operating temperature	0...+40 °C/+32...+104 °F
Storage temperature	-40...+60 °C/-40...+140 °F
Humidity	5...95 % non-condensing
Durability	withstands 1.2 m drop to concrete

2 FUNCTIONAL DESCRIPTION

2.1 Introduction

The deioRecorder for Anesthesia is an automated anesthesia documentation system. For record keeping the deioRecorder for Anesthesia software license, the record keeping configurations from network and memory module and optionally the keyboard for the deioRecorder for Anesthesia, K-ARKB is needed.

The deioRecorder for Anesthesia is connected to a network, and run in S/5 AM or S/5 CM. Memory Module, M-MEM (N-CMMEM) is needed for data storage as a backup.

The deioRecorder for Anesthesia combines the physiological data measured by the monitor, information automatically integrated from external devices as S/5 ADU and the information entered manually using the menus into a printable anesthesia record. The record can be stored in electronic format for later review/printing and for statistical analysis.

2.2 Keyboard for the deioRecorder for Anesthesia, K-ARKB

The keyboard for the deioRecorder for Anesthesia, K-ARKB consists of the controller board, alphanumeric keyboard and membrane keyboard.

2.2.1 Controller Board

The controller board reads the status of the keyboard keys and the ComWheel, and forwards the information to the CPU board, in the monitor through RS232 serial interface.

Additionally, the board controls the LEDs on the K-ARKB front panel.

External communication

Communication with the CPU board, takes place in RS232 serial communication channel which is available in the CPU bus. There are also two bidirectional signals (Data and Clock) for PCKB format communication.

For serial communication, the keyboard for the deioRecorder for Anesthesia is connected to the S/5 Anesthesia Monitor 8-Module Frame by 9-pin-26-pin interface cable. The cable is connected to Keyboard Interface Board, B-ARK or to Display Controller board, B-DISP (or B-DHIGH), in the F-CU8.

In case of PCKB type communication, the Keyboard can be connected to the S/5 LCD Display, D-LCC10A or to the S/5 CM.

CPU

The CPU on the controller board is of a type 80C51FA and the oscillator frequency is 11.059 Mhz. There is a power-up-reset whose time constant is about 1 second.

Serial communication

The RS232 serial communication IC needs only +5 V supply voltage because it chops the necessary RS-level supply voltages to its external capacitors. A diode allows the use of two keyboards, and a pull-down resistor on the CPU board is used for pulling the corresponding line to the negative RS-level. The speed rate of the serial communication is 19.2 kbps.

LEDs

The CPU on the controller board controls the alarm LEDs according to commands received from the main CPU board.

2.2.2 Alpha-numeric keyboard

The controller board reads the status of the keys on the alphanumeric keyboard. The board are connected together with a 26-pin ribbon cable.

2.2.3 Membrane keyboard

The controller board reads the status of the keys on the membrane keyboards. The membrane keyboard and the controller board are connected together with a ribbon cable.

2.3 Keyboard Interface Board, B-ARK

The Keyboard Interface Board, B-ARK is installed in the 8-Module Frame of the S/5 Anesthesia Monitor. It has a 26-pin D-connector to which the Keyboard for the deioRecorder for Anesthesia, K-ARKB is connected. The board passes the keyboard signals to the F-CU8.

2.4 ARK Barcode Reader, N-SCAN

The Datex-Ohmeda ARK Barcode Reader, N-SCAN is an optional device to make record keeping faster by using bar codes. With the Barcode Reader user have a direct access to a menu item by reading a bar code mapped to the menu item. Barcodes can also be used for pushing and turning the ComWheel and opening the main menus (L-ARK99(A) or later).

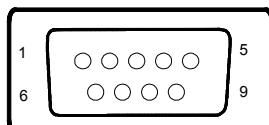
WARNING **When using the ARK Barcode Reader, N-SCAN do not stare into beam. The ARK Barcode Reader, N-SCAN is a Class 2 laser product.**

2.5 Connectors and signals

Bar Code Reader 5-pin connector on the keyboard for the deioRecorder for Anesthesia, K-ARKB

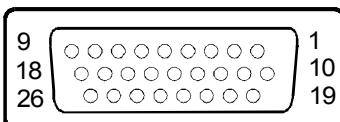
Pin No	Signal
1	PC-CLOCK
2	PC-DATA
3	N.C.
4	GND
5	+5 V

Keyboard for the deioRecorder for Anesthesia 9-pin connector on the keyboard for the deioRecorder for Anesthesia, K-ARKB



Pin No	I/O	Signal
1	I/O	PC-DATA
2	I	RX
3	O	TX
4	I	+5 V
5		GND
6	I	RESET
7	-	GND
8	-	N.C.
9	I/O	PC-CLOCK

The connector located on the Keyboard Interface Board, B-ARK



Pin No	I/O	Signal
1		N/C
2		N/C
3		N/C
4		N/C
5		N/C
6	O	Ground
7		N/C
8		N/C
9		N/C
10		N/C
11		N/C
12		N/C
13		N/C

Pin No	I/O	Signal
14		N/C
15	0	+ 5 V
16		N/C
17		N/C
18		N/C
19	I	RxD RS232
20	O	TxD RS232
21		N/C
22		N/C
23		N/C
24		N/C
25		N/C
26		N/C

The CPU bus connector (X1)

Pin No	a	b	c
1	+15 V	AGND	DGND
2	-15 V	BALE	DGND
3	SA0	SA1	DGND
4	SA2	SA3	RESET_RS485
5	SA4	SA5	-RESET_RS485
6	SA6	SA7	DATA_RS485
7	SA8	SA9	-DATA_RS485
8	SA10	SA11	TXDD_RS232
9	SA12	SA13	RXDD_RS232
10	SA14	SA15	BIT0IN
11	SA16	SA17	BIT1IN
12	SA18	SA19	TXDC
13	SA20	SA21	RXDC
14	SA22	SA23	RTSC
15	-SMEMR	-SMEMW	CTSC
16	-IOR	-IOW	TXDB
17	CLK	-RESET	RXDB
18	-IOCHRDY	IRQ10	RTSB
19	N/C_1	IRQ11	CTSB
20	N/C_2	IRQ12	TXDA
21	-SBHE	IRQ15	RXDA
22	SD0	SD1	RTSA
23	SD2	SD3	CTSA
24	SD4	SD5	LOUDSPEAKER
25	SD6	SD7	+5 V
26	SD8	SD9	+5 V
27	SD10	SD11	+5 V
28	SD12	SD13	+5 V
29	SD14	SD15	ON/STBY
30	+15 VD	-RESET_CPU	+5 V_CPU
31	+15 VD	+32 VD	REFRESH_WD
32	GNDD	GNDD	POWER_FAIL

3 SERVICE PROCEDURES

3.1 General service information

Field service of the K-ARKB Keyboard is limited to replacing faulty circuit boards or mechanical parts. The circuit boards should be then returned to Datex-Ohmeda for repair.

Datex-Ohmeda is always available for service advice. Please provide the unit serial number, full type designation, and a detailed fault description.

CAUTION The tests and repairs outlined in this section should only be attempted by trained personnel with the appropriate equipment. Unauthorized service may void warranty of the unit.

3.2 Service check

These instructions include complete procedures for a service check. The service check is recommended to be performed after any service repair. However, the service check procedures can also be used for determining possible failures.

The procedures should be performed in ascending order.

The instructions include a check form (*Appendix A*) which should be filled in when performing the procedures.

The mark  in the instructions means that the check form should be signed after performing the procedure.

The procedures are designed for monitors with software of level 00. However, most of the procedures also apply to monitors with older monitor software.

3.2.1 Recommended tools

Tool	Order No.	Notes
B-ARK		with AM
Screwdriver		

1. Disconnect the interface cable from the keyboard for the deioRecorder for Anesthesia, K-ARKB and check the cable:
 - the connector pins are clean and straight and at about the same height
 - the locking screws are intact
 - the cable is intact

Leave the cable disconnected.



2. Detach the bottom cover and check internal parts:
 - all screws are tightened properly
 - the block screws for the interface cable are in place and are tightened properly
 - the block screw threads are intact
 - the interface cable connector is clean and intact
 - all internal cables are connected properly
 - all IC's that are on sockets are attached properly
 - there are no loose objects inside

Reattach the bottom cover, reconnect and lock the interface cable to the keyboard for the deioRecorder for Anesthesia, K-ARKB.



3. Check external parts:
 - the keyboard for the deioRecorder for Anesthesia, K-ARKB plastic frame is intact
 - the front panel stickers are intact
 - the ComWheel cover is intact and is attached properly
 - all four rubber pads are in place on the bottom cover



- Install the B-ARK into the Central Unit. Connect and lock the interface cable to the B-ARK rear panel connector.
4. Switch the monitor on. Check that the LED on the upper right hand corner of the keyboard for the deioRecorder for Anesthesia, K-ARKB is lit up.



5. Enter the service menu:

Monitor Setup - Install/Service (password 16-4-34) - **Service** (password 26-23-8)

Take down the information regarding keyboard for the deioRecorder for Anesthesia, K-ARKB software.



6. Select the menu **Keyboard** with the ComWheel.
Highlight the text **Upper Led**. Check that the red alarm LED is turning on and off on the keyboard for the deioRecorder for Anesthesia when pressing the ComWheel. Check also the yellow alarm LED by selecting **Lower Led** from the menu.



7. Check the ComWheel.

Turn the ComWheel clockwise and counterclockwise and check that each step generates a sound from the loudspeaker and the corresponding values at the bottom of the menu increase.

Select **Dummy Press**. Press the ComWheel and check that the press generates a sound and the corresponding value in the menu increases.



8. Check the keyboard for the deioRecorder for Anesthesia, K-ARKB membrane keys.

Press the keys on the upper part of the Keyboard for the deioRecorder for Anesthesia one by one. Check that each key generates a sound from the loudspeaker and the corresponding text in the menu changes from yellow to red.

Press the keys on the lower part, all except the keys **Modify** and **Print**. Check that each key generates a sound from the loudspeaker, or at least the ‘Message count’ value increases in the service menu.

Press the keys **Modify** and **Print** and check that the corresponding menus open onto the screen.



9. Perform electrical safety check and leakage current test.



10. Check that the Keyboard for the deioRecorder for Anesthesia functions normally after the performed electrical safety check.



11. Clean the Keyboard for the deioRecorder for Anesthesia with suitable detergent.



- Fill in all necessary documents.

3.3 Disassembly and reassembly

The Keyboard for the deioRecorder for Anesthesia, K-ARKB is disassembled in the following way.
See the exploded view of the keyboard.

1. Disconnect the ARK keyboard - monitor cable (ARK keyboard - LCD display cable).
2. Remove four screws from the bottom of the keyboard, and detach the cover plate from the bottom plate.

4 TROUBLESHOOTING

4.1 Troubleshooting charts

4.1.1 Keyboard for the deioRecorder for Anesthesia, K-ARKB

Problem	Cause	Treatment
Keys have not effect on the display.	Cable is not connected or broken. Wrong type of cable is connected.	Connect right type of cable properly (see above).
	Loose connector inside. Component failure inside.	Detach the bottom plate and check connectors and components.
Membrane key not working.	Ribbon cable loose or broken. Keyboard cable loose or broken. D-connector pin failure. IC failure on the Controller board. RS232 communication failure on the main CPU board. NOTE: The cancel key does not respond if the menu is closed. The modify key may not work if there is no selection.	Check the items. Replace them if necessary.
Led does not light at alarm or stays lit after alarm is over.	Cable loose or broken. LED broken. Component failure on the Controller board.	Check the items. Replace them if necessary.

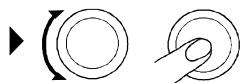
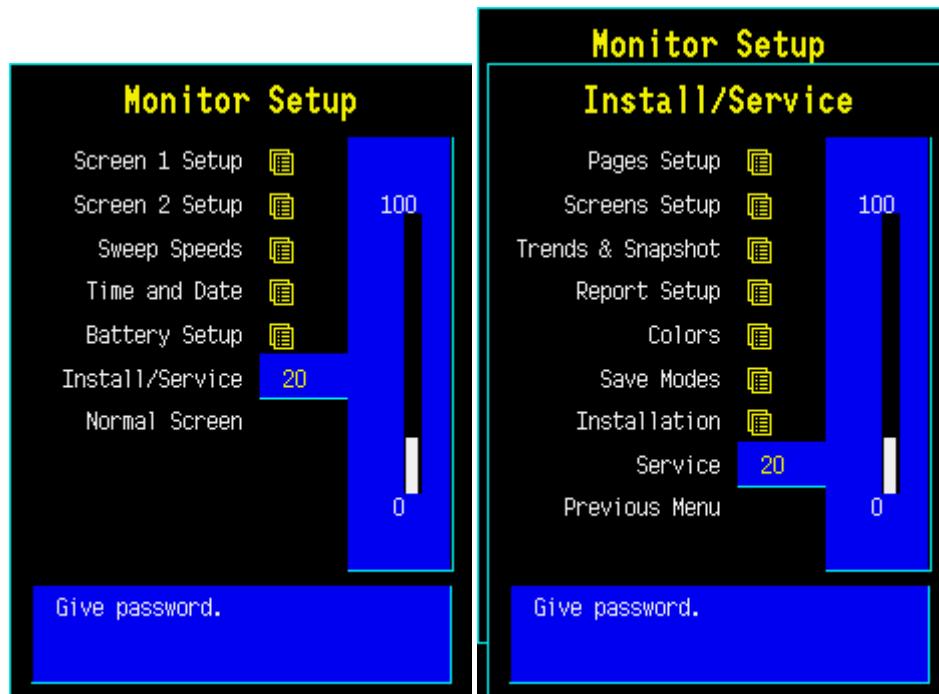
See more troubleshooting items on *User's Reference Manual*.

4.1.2 Barcode Reader

Problem	Cause	Treatment
Barcode Reader does not give a beep sound	Beep sound is OFF.	Contact personnel responsible for installing and configuring the monitors. Bar Code Beep should be ON in Monitor Setup - Install/Service - Installation - Monitor Settings menu. Password is required for the selection.
Nothing happens when trying to use the Barcode Reader.	Cable connections are not properly connected.	Confirm that the cables are properly connected.
Barcode Reader opens a Search menu but nothing else happens.	Menu directory does not have a Barcode Reader file.	Contact personnel responsible for installing and configuring the monitors.
Barcode Reader led flashes and you may hear a beep sound, but nothing else happens.	<ol style="list-style-type: none"> 1. Barcodes are not included in the configuration. 2. Barcode Reader is not correctly programmed. 3. Monitor is not connected to the network and the memory module does not have a menu card inside. 4. Monitor has an old configuration which is not updated. 5. Old software version on monitor. 	<ol style="list-style-type: none"> 1. Contact personnel responsible for installing and configuring the monitors. 2. Contact personnel responsible for installing and configuring the monitors. The Barcode Reader should be reprogrammed. See the instructions following the Barcode Reader. 3. Connect the monitor to the network or insert a menu card into the memory module. 4. Contact personnel responsible for installing and configuring the monitors. 5. Please upgrade your monitor. <p>NOTE: Possible connecting cables are 881152 and Y-piece or 8001117.</p>
Search result seems to mix different menu items.	Menu files have been modified after which they have not been recompiled with the map files.	Contact personnel responsible for installing and configuring the monitors. The menu files have to be recompiled together with the map files.

See more troubleshooting items on *Barcode Reader manual*.

5 SERVICE MENU



1. Press the **Monitor Setup** key.
2. Select **Install/Service** (password 16-4-34).
3. Select **Service** (password 26-23-8).
4. Select **Keyboard**.

5.1 Keyboard menu

A service menu for testing the command board functions and for setting the K-ARKB type.

NOTE: All counters are automatically zeroed on returning to the previous menu.

Upper Led is for testing the upper alarm LED (red) on the command board. When the text is highlighted, the upper alarm LED can be turned on and off by pressing the ComWheel.

Lower Led is for testing the lower alarm LED (yellow) on the command board. When the text is highlighted, the lower alarm LED can be turned on and off by pressing the ComWheel.

Dummy Press is for testing the ComWheel. When the text is highlighted, pressing of the ComWheel create a sound from the loudspeaker and the corresponding number on the service data field increase.

Service Data

Message count counts the number of messages that are sent out to the main CPU board.

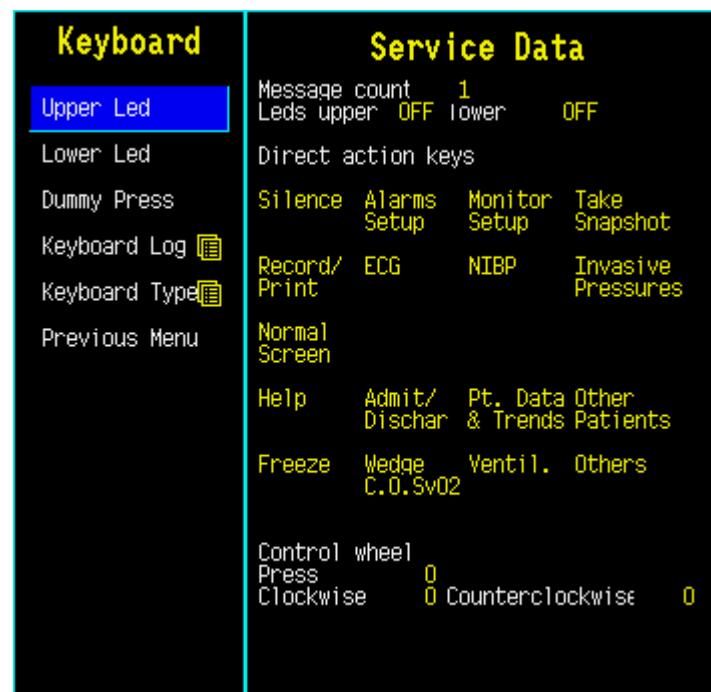
Leds upper and **lower** indicate the states of the alarm LEDs on the command board.

Direct action keys texts are indications to the command board membrane keys. When a key on the command board is pressed, the corresponding text in the menu changes its colour.

Control wheel, Press counts the ComWheel pressings.

Control wheel, Clockwise and **Counterclockwise** the ComWheel turnings.

Since shows the date and the time of the last run time reset.



5.1.1 Keyboard Log

All the keyboard presses and the commands given by the ComWheel are recorded in the Keyboard Log. The keyboard log is saved in the permanent memory of the monitor. The length of the log is 1150 events. The log is FIFO type.

Keyboard	Keyboard Log
Scroll Log	Keyboard : Keyboard Log 1999-Sep-30 08:45:39
Scroll Stat	Service Menu : Keyboard 1999-Sep-30 08:45:14
Record Log	Display : Previous Menu 1999-Sep-30 08:45:13
Record Stat	Service Menu : Display 1999-Sep-30 08:44:39
Reset Log	Keyboard : Previous Menu 1999-Sep-30 08:44:38
Previous Menu	Service Menu : Keyboard 1999-Sep-30 08:44:00
	Display : Previous Menu 1999-Sep-30 08:44:01
	Service Menu : Display 1999-Sep-30 08:44:00
	Install/Service : Service 1999-Sep-30 08:43:48
	-More-

5.1.2 Keyboard Type

Store Mask A selection for setting the Keyboard for the deioRecorder for Anesthesia's language. The selected language determines the outcome of the lower keypad.

Store Type is for setting the keyboard's type;

COM = Command Board

ARK = Anesthesia Record Keeping Keyboard

IC = Information Center Keyboard

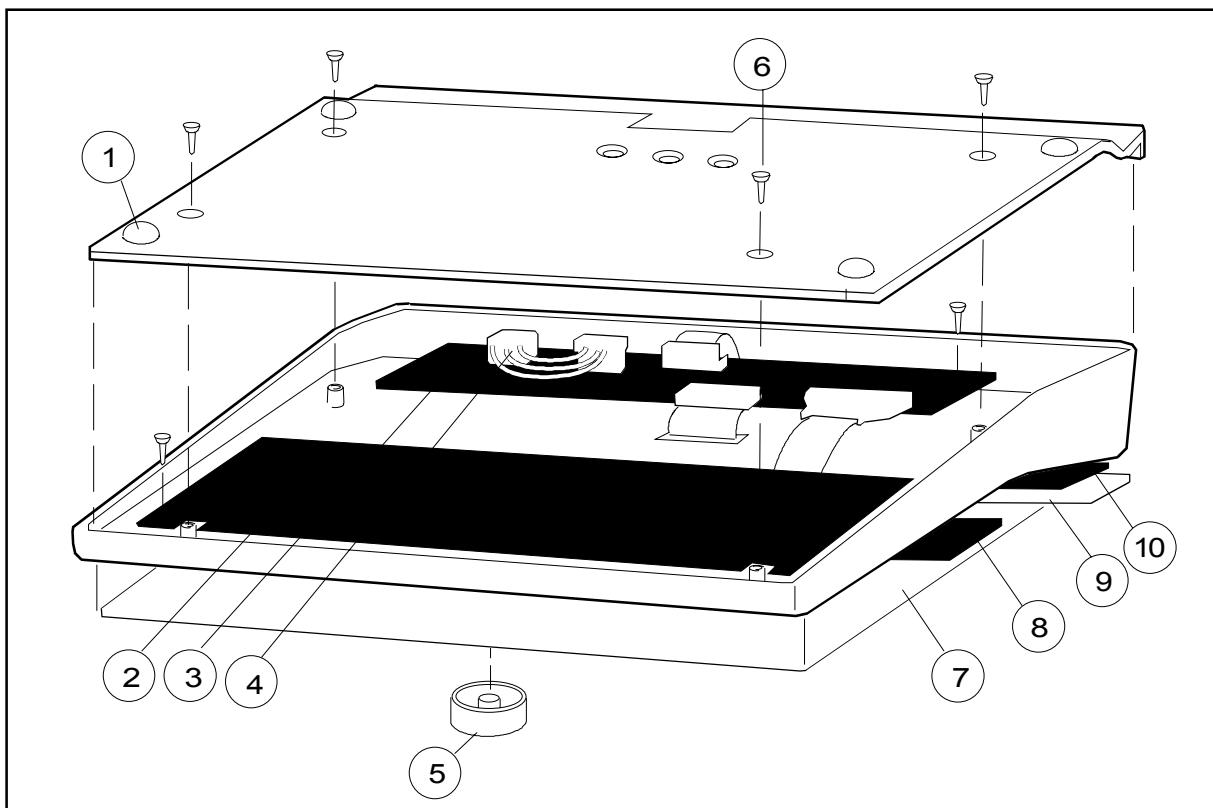
NOTE: The settings should be checked if the controller board is replaced. If settings are changed, the new settings will not be valid until the next start-up.

Keyboard	Service Data								
Keyboard Type									
Store Mask	None								
Store Type	None								
Previous Menu	<table border="1"> <tr><td>INTER</td></tr> <tr><td>GER</td></tr> <tr><td>FRENCH</td></tr> <tr><td>SCAN</td></tr> <tr><td>DEN</td></tr> <tr><td>NOR</td></tr> <tr><td>SPAIN</td></tr> <tr><td>-More-</td></tr> </table>	INTER	GER	FRENCH	SCAN	DEN	NOR	SPAIN	-More-
INTER									
GER									
FRENCH									
SCAN									
DEN									
NOR									
SPAIN									
-More-									
Select keyboard mask.									

6 SPARE PARTS LIST

6.1 Spare parts list

6.1.1 AnesthesiaKeyboard, K-ARK rev. 00



Item	Item description	Order No.
-	K-ARK upgrade spare part	893693
1	Pad	65142
2	Alpha-numeric Keyboard PC board, K-ARK (Rev. 00-01)	*884178
3	Controller board, K-ARK (rev. 00)	884177
4	Rotary wheel	879872
5	ComWheel cover and spring	879191
6	Cross cylinder-head screw M3x6	61721
8	Membrane keyboard	879964
10	Membrane keyboard	879373

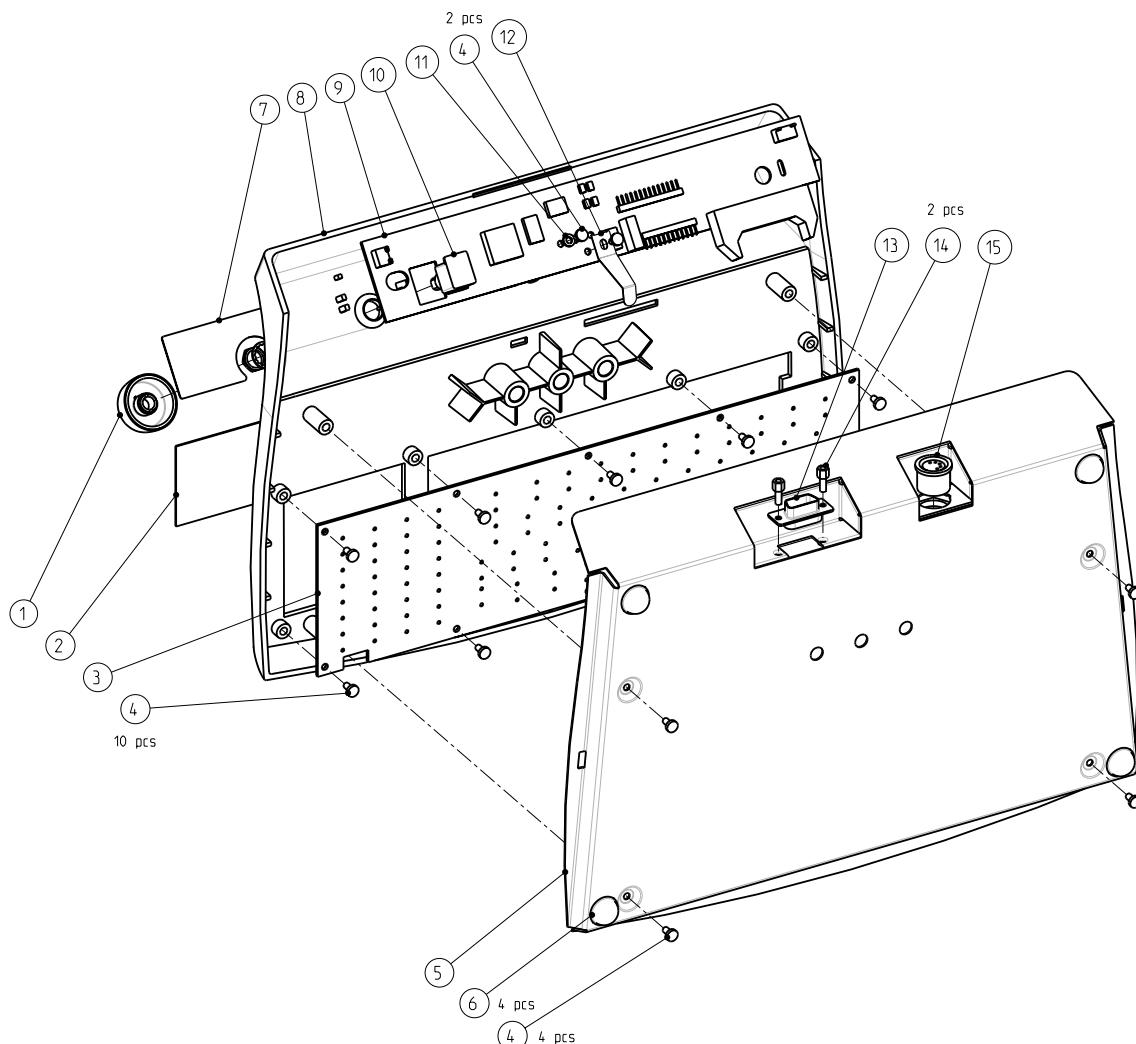
* this part is recommended for stock

6.1.2 AnesthesiaKeyboard, K-ARK rev. 01-02

Item	Item description	Order No.
3	Controller board, K-ARK (rev 01-02)	893944

New front panel stickers (see the enclosed table).

6.1.3 Keyboard for the deioRecorder for Anesthesia, K-ARKB rev. 00



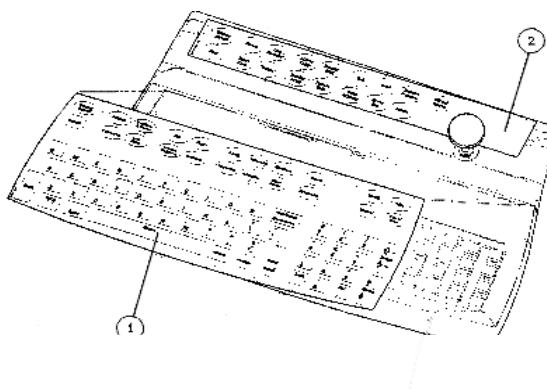
Item	Item description	Order No.
1	ComWheel, K-ANEB	898794
2	Membrane keypad, lower, K-ARKB	8000050
3	Alpha-numeric Keyboard board PC board, K-ARK	884178
4	Screw-slotted-head, fillister head, M3x6	61721
5	Bottom plate, K-ARKB	898392
6	Sticker-pad, diam 16, height 8	65142
7	Membrane keypad, upper, K-ARKB	8000006
8	Keyboard casing, K-ARKB	898391
9	Command bar board, K-ARKB	8000054
10	Opto-encoder, rotary switch, 4inch ribbon cable and connector	113291
11	Spine m3.2	63611
12	Emc plate, K-ARKB	8000960
13	D-female screwlock	640624
14	Output connector cable, K-ARKB	8000098
15	Connection cable PC-KB, K-ARKB	8000097

6.1.4 Front panel stickers

Item	Adaptation	K-ARK (Rev. 00) Order No.	K-ARK (Rev. 01) Order No.	K-ARK (Rev. 02) Order No.
9	-23- (Eng)	898368	892350	893594
9	-25- (Sca)	898369	892350	893594
9	-26- (Fin)	898370	892331	893600
9	-33- (Ger)	898371	892326	893595
9	-40- (Spa)	898372	892329	893598
9	-41- (Swe)	898373	892332	893601
9	-42- (Dnk)	898374	892199	893602
9	-43- (Fre)	898375	892327	893596
9	-44- (Dut)	898376	892328	893597
9	-45- (Fle)	898377	892328	893597
9	-46- (Ita)	898378	892330	893599
9	-47- (Nor)	--	--	893551
9	-48- (Por)	--	--	895260

Item	Adaptation	K-ARK (Rev. 00-01) Order No.	K-ARK (Rev. 02) Order No.
7	-23- (Eng)	884017	893603
7	-25- (Sca)	884632	893807
7	-26- (Fin)	888862	893609
7	-33- (Ger)	885133	893604
7	-40- (Spa)	886198	893607
7	-41- (Swe)	885916	893610
7	-42- (Dnk)	892200	893611
7	-43- (Fre)	884406	893605
7	-44- (Dut)	886282	893606
7	-45- (Fle)	886161	893114
7	-46- (Ita)	886911	893608
7	-47- (Nor)	--	893552
7	-48- (Por)	--	895261

6.1.5 S/5 front panel stickers



Item 2 (upper)	Adaptation	K-ARKB (Rev. 00) Order No.	Item 1 (lower)	K-ARKB (Rev. 00) Order No.
2	EN	898168	1	898180
2	DA	898169	1	898190
2	FR	898170	1	898182
2	NL	898171	1	898181
2	ES	898172	1	898184
2	IT	898171	1	898185
2	PT	898174	1	898186
2	FI	898175	1	898187
2	SV	898176	1	898188
2	NO	898177	1	898189
2	DE	898178	1	898181
2	JA	8000171	1	8000174
2	SCAND/EN	898168	1	898796
2	BEL/NL	898171	1	898797

6.1.6 Keyboard Interface Board, B-ARK

Item	Item description	Order No.
	Grounding plate	885198
	Block screw for cables	546096

7 EARLIER REVISIONS

Information of Anesthesia Keyboard , K-ARK rev. 00 see service manual 885 941.

Information of Anesthesia Keyboard, K-ARK rev. 02 see tech. reference manual 896 624.

Previous Bar Code Reader (by HP) rev. 00 see Technical Reference Manual 895 585.

APPENDIX A

SERVICE CHECK FORM**Keyboard for the deioRecorder for Anesthesia, K-ARKB**

Customer		
Service	Keyboard type	S/N
Service engineer	Date	



OK = Test OK



N.A. = Test not applicable



Fail = Test Failed

1. Cable	OK <input type="checkbox"/>	N.A. <input type="checkbox"/>	Fail <input type="checkbox"/>	2. Internal parts	OK <input type="checkbox"/>	N.A. <input type="checkbox"/>	Fail <input type="checkbox"/>
3. External parts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. ON -LED	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Software	KB		ComWheel				
6. Alarm LEDs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. ComWheel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Membrane keys	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Notes							

9. Electrical safety check	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10. Functioning after electrical safety check	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Final cleaning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

Notes							
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Used Spare Parts							
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Signature							
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