ZEISS

IOLMaster

Service Instructions

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Update information

Ausgabe / Issue	Erläuterungen / Remarks
06.10.1999	1. Ausgabe Issue 1
07.03.2000	2. Ausgabe Issue 2
29.08.2001	3. Ausgabe Issue 3

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1. Document's

This document applies to the IOLMaster biometry unit with German or English software as per drawing No. 1059-647 (German) and. 1064-064 (English).

Other applicable documents are the user's manual 1075-314, the packing instructions 1041-647/24-001 V0X and service instructions SM-30-4039-A2.

2. Delivery package

The maximum delivery package (including all accessories) comprises the following items:

- IOLMaster Biometer, German software, ready for connection .... 1059-647 or
- IOLMaster Biometer, English software, ready for connection 1064-064

Accessories (optional)

HP DeskJet 895Cxi/HP printer 1045-770
Printer cable, 3 m 0231-376
Foot switch 0401-114
Support for keyboard 1046-385
IT 3L, 230 V instrument table .... 1066-296 or
IT 3L, 120 V instrument table 1066-297
9-pin / 9-pin interface cable,   3 m 0233-024
                                                       8 m 0233-025
                                                 15 m 0233-026

3. Special tools and supplies

- Fieldmaster console with power adapter (220 V) .... 0115-810 or
- Fieldmaster console with power adapter (115 V) 0115-811
- LM2 energy detector 0113-503
- Mount (test eye) (included in IOLMaster delivery package) 1046-387
- Alignment device for IOLMaster 1078-810
- Short-circuit connector 1078-821
- LLM measuring adapter 1094-546

- F30 grease 0117-466
- GF100 grease 0117-472
- TF 50 HV grease 0117-476
- Oil 15 0117-481
- KL 44 threadlocker 0117-340

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4. Installation and startup of the IOLMaster

4.1 Unpacking

- If an instrument table is included in the delivery package, unpack it and set it up.
- Open the IOLMaster package at the top and remove the accessories carton.
- Unpack the accessories carton and check whether the consignment is complete using the delivery papers, and lay the parts out ready for use.
- Carefully remove the IOLMaster together with the styrofoam transport frame **using the carrying strap** and place it on a table top.
- Remove the transparent bag, the carrying strap, the safety lock of the headrest and styrofoam transport frame.
- Place the IOLMaster on the instrument table.
  Caution: Do **not** lift or carry the unit holding it by its measuring head, but use the base plate for transporting the unit.

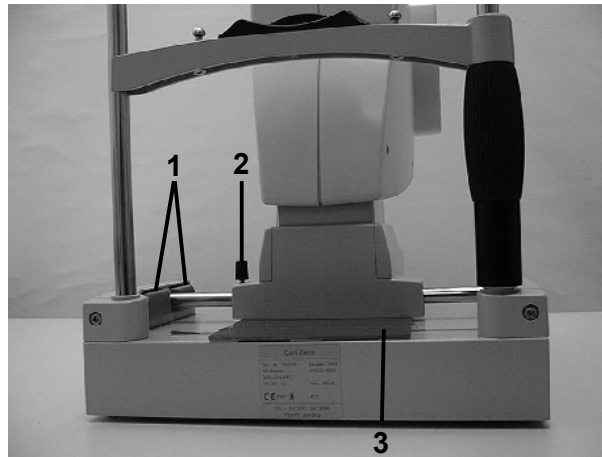## 4.2 Removing the transport locks

Fig. 1

- Remove pressure pieces ((1) Fig. 1) on the left and right from the wheel casings of the base.
- Loosen base lock ((2) Fig. 1).
- Move the unit backward (toward the user's side) as far as it will go and pull out safety lock ((3) Fig. 1) in the direction of the patient's side.
- Remove the protective film from the LC display.

4.3 Installing the IOLMaster on the instrument table

- If supplied, place the support for the keyboard on the instrument table in such a way that it rests on its rubber buffers.
- Place the IOLMaster on the instrument table or the support for the keyboard in such a way that it is centered on the table top in the transverse direction and stands in the middle between the two patient grips in the longitudinal direction. The IOLMaster is not screwed to the table.

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4.4 Connections

- Connect two cables ((1) Fig. 2a) and ((2) Fig. 2a) from the measuring head to the appropriate connectors ((3) Fig. 2b) and ((4) Fig. 2b) and tighten screws.

- Place the keyboard to the right of the unit on the instrument table or on the support for the keyboard. Pull the cable through the opening in the table top and fasten it to the bottom of the table top. Connect the keyboard cable to socket ((5) Fig. 2b) and the mouse cable either to serial interface ((6) Fig. 2b) or, using the adapter supplied, to socket ((7 Fig. 2b).

- If included in the delivery package, connect the foot switch to socket ((8) Fig. 2b) and the printer to connector ((9) Fig. 2b). If necessary, route the cable through the opening in the table top and fasten it to the bottom of the table top.

- Pull the power outlet cable of the instrument table through the opening in the table top and plug it into the IOLMaster. Connect the table to a properly grounded protective earth wall socket.

- First feed the cables with large connectors through the opening. The line voltage for the IOLMaster is self-adjusting between 100V and 240V AC.115V or 230V AC line voltage, depending on version of instrument table.
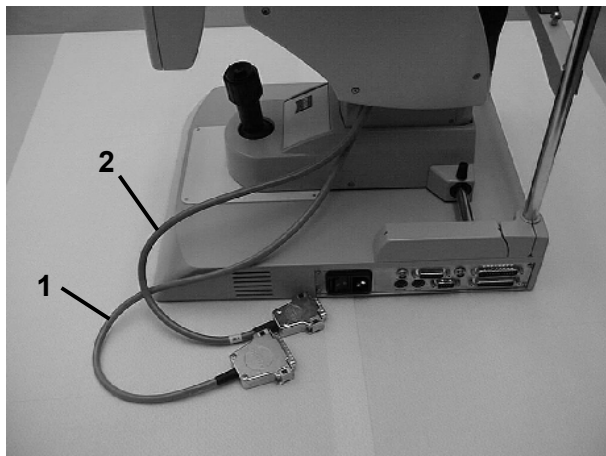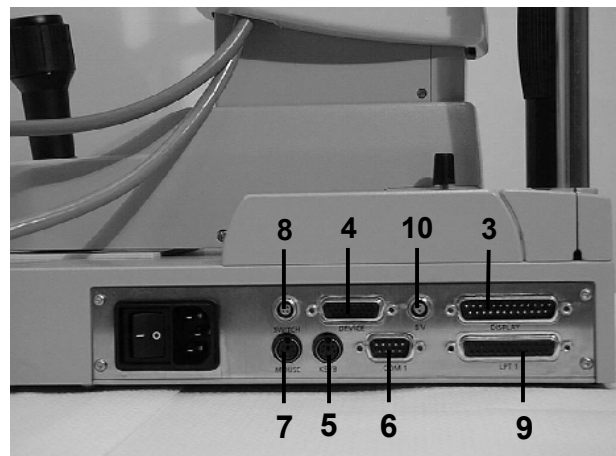

Fig. 2a

Fig. 2b

4.5 Start up

4.5.1 Function test

- Turn on the power switch.

- The unit performs an internal test. If this is successful, the unit will be ready for operation. If the test is not successful, the run-up routine will be aborted, with an appropriate error message being displayed, or the "Turn on screen" remains on.

- Create test patient file, i. e. enter at least a name, first name and date of birth (write as follows: **mm/dd/yyyy** or **mm/dd/yy** and start the "Overview" mode by pressing the <New> button.

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4.5.2 Checking the laser power

- Start the "PIO Test" program using <Options>, <Service>, password <MED586> and <System>.
- Switch off functions "overview illum. " and "fixation LED" (boxes are inactive).
- Click on the "Laser monitoring" and "100 % power" functions (see Fig. 3).

Note:
If "100 % power" is activated (full power of laser diode), do not turn on the diode for more than 5 minutes.
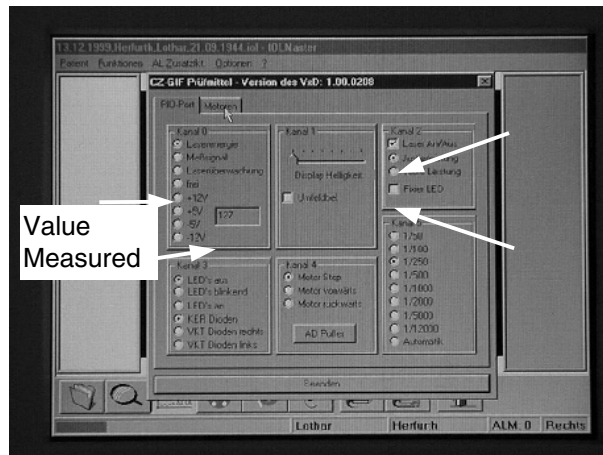

Value Measured

Fig. 3

- Connect the LM2 detector to the power meter and set the wavelength to 780 nm.
- Screw centering sleeve 1094-546 on to the power meter detector and hold the detector in front of the exit optics of the IOLMaster.
- Switch on the laser diode by clicking on the "Laser On/Off" function (see Fig. 3).
- The output power measured must be $400 \pm 20 \ \mu W$.
- Click the "Adjustment Power" function. This switches the laser diode from measurement power (100 %) to adjustment power (adjustment light).
- The output power now measured must be $40 \pm 2 \ \mu W$.

- Click on the "100 % power" function.
- Switch off the laser diode by clicking the "Laser On/Off" function.
- Note down the reading shown under Value Measured as the "Laser Off" reading.
- Switch the laser diode back on again by clicking the "Laser On/Off" function.
- Note down the reading shown under Value Measured as the 'Laser-on reading$_{100\%}$'.
- Click the "Adjustment Power" function.
- Note down the reading shown under Value Measured as 'Laser-on reading $_{Adjustment\ power}$'.
- Switch off the laser diode by clicking the "Laser On/Off" function.

- The difference between 'Laser-off' reading - 'Laser-on reading $_{100\%}$' must be 80 ± 4 increments.
- The difference between 'Laser-off reading' - 'Laser-on reading $_{Adjustment\ power}$' must be 8 ± 2 increments.

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Note:

Make sure that the "Fixation LED" function is not active (i. e. both buttons must be deactivated) before terminating the "PIO Test" program.

- Terminate the "PIO Test" program and close the service program window.

4.5.3 Checking the measuring accuracy

- Switch on the <Test Eye> function using <Options>.
- Attach the mount including the test eye on the headrest and position it at right angles to the instrument.
- Use the joystick to align unit with the test eye and focus on the eye.
- Measure the axial length (ALM), the corneal curvature (KER) and the depth of the anterior chamber (ACD) as described in the user's manual. Note down the individual readings.
- Measure the axial length and the corneal curvature a) in the center of the crosshairs, b) within the marked circle (decentered) and c) using slight defocusing, off set by approx. ±2 mm from the focussed position. Measure the depth of the anterior chamber on the left **and** right eye, to do this, reposition the asymmetric mount.
- Each of the three readings must correspond to the relevant value given on the test eye and lie within the tolerance limits specified on the test eye.
- Switch off the <Test Lens> function using <Options> after the measurement or select <New Patient> - this also switches off the <Test Lens> function.

Note:

The test eyes must be clean; clean them, if necessary.

Perform the measurements of axial length and corneal curvature using the test eye on the front of the housing ((1) Fig. 4), and the measurement of the depth of the anterior chamber using the test eye on the side of the housing ((2) Fig. 4).
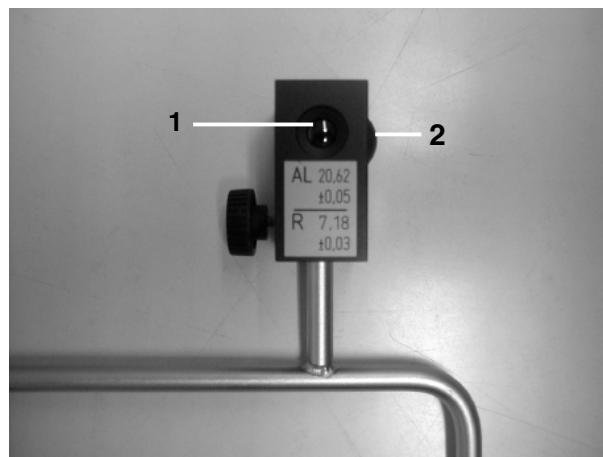

Fig. 4

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5. Changing complete spare components

Note:
Disconnect the power plug before opening the instrument. Using the test eye, check the measuring accuracy every time after opening the unit.

5.1 Changing the entire instrument

Note:

When changing the instrument and importing patient data from an old into a new instrument, you must **not call and process** the ALM values of the "old" patient data in the new instrument, as otherwise the readings measured will be falsified by the different calibration values of the new instrument. In other words: it would be best **not** to import any old patient data into the new instrument.

5.2 IOLMaster head

- Unplug two connectors ((1 and 2) Fig. 5a) from the IOLMaster head and the computer.
- Remove six screws ((3) Fig. 5a) from one side and remove the cover.
- Remove three screws ((4) Fig. 5a) from the other side and remove the cover.
- Unplug connector ((5) Fig. 5b) and cut open the cable tie.
- Remove four screws ((6) Fig. 5b) and remove the IOLMaster head.
- Remove both covers from the new head, place the head on the base, push the head backward (toward the user) as far as it will go and secure it in position by tightening screws ((6) Fig. 5b).
- Re-establish connection ((5) Fig. 5b) and attach a new cable tie.
- Re-attach the covers.
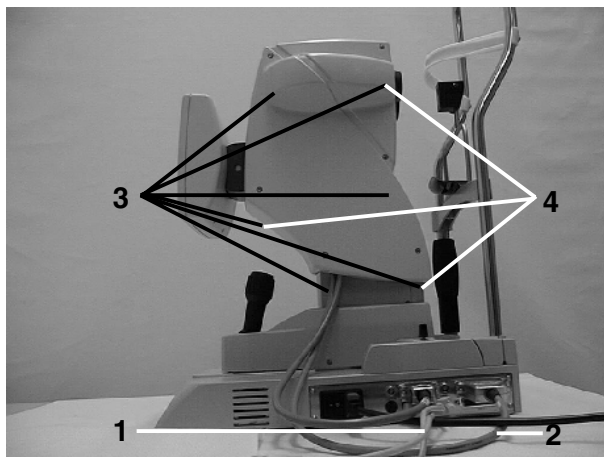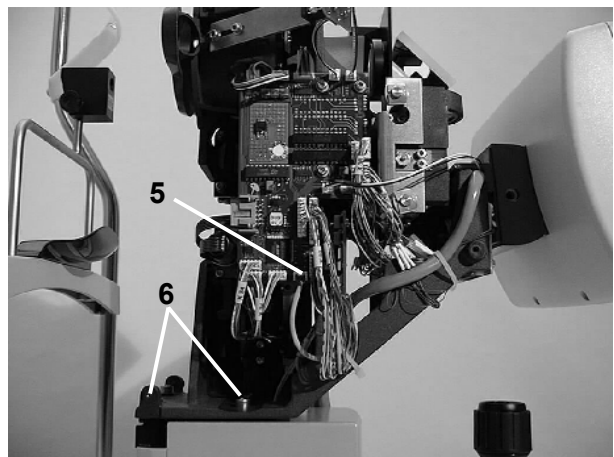- Re-establish connections ((1 and 2) Fig. 5a).

Fig. 5a

Fig. 5b

- No alignments or adjustments are necessary after the change of the IOLMaster head.
- To ensure the correct transfer of the EEPROM data from the new head, call the Service program as per point 7.7.1 and then terminate the program by clicking the "OK" button.
- Perform function test as described in point 4.5.

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Note:

When changing the measuring head, please note that the ALM values of patient data determined using an old measuring head must **not** be **called** and **processed**. The different calibration values of the new measuring head would falsify the old readings measured. This means it would be best to delete all data included in the "Data" folder as part of the measuring head change.

5.3 LC display

- Unplug connector ((1) Fig. 6a).
- Remove six screws ((2) Fig. 6a) from one side and remove the cover.
- Remove three screws ((3) Fig. 6a) from the other side and remove the cover.
- Remove the housing from connector ((1) Fig. 6a).
- Cut open cable tie ((4) Fig. 6b).
- Remove the cable clamp on the opposite side. Pull out the cable from the basic body.
- Unplug connector ((5) Fig. 6b).
- Remove two screws ((6) Fig. 6b) and remove the LC display.

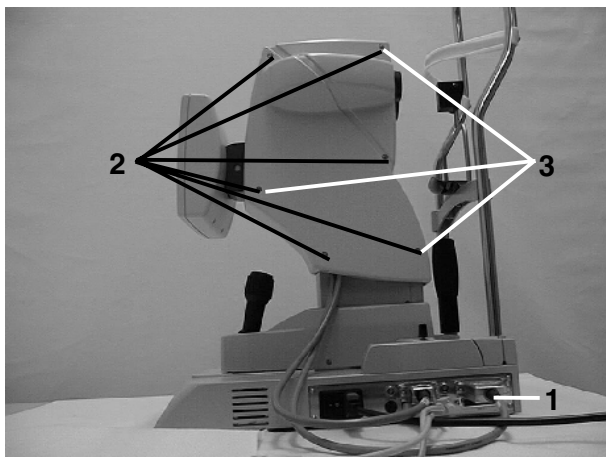

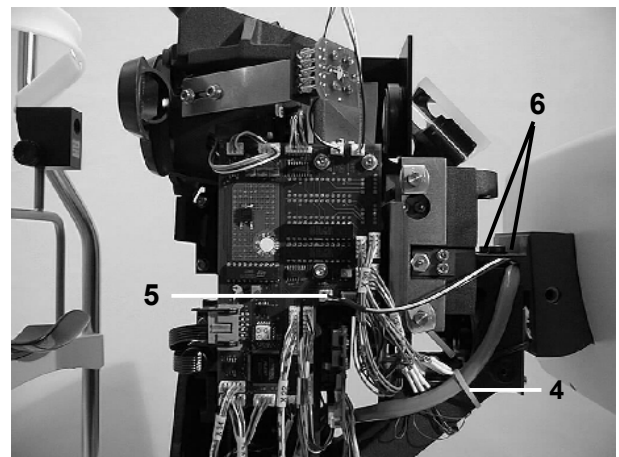Fig. 6a   Fig. 6b

- Fasten the display cable with a cable tie and the cable clamp to the basic body (remove connector housing ((1) Fig. 6a) and re-attach it after feeding the cable through the unit).
- No alignments are necessary after the LC display has been changed.
- Perform a function test.

Note:

After the LC display has been changed, it may happen that the display does not function properly (faulty synchronization and / or color defects).

In this case, these errors are mostly caused by an old-version BIOS (version 0002) on the computer PCB. To eliminate this error, you must load the BIOS version d8005 and then perform the "LOAD SETUP DEFAULTS" and "SAVE & EXIT SETUP" functions in the BIOS Setup.

Also see Service Bulletin No. 300.

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5.4 Computer

- Unplug all connectors ((1) Fig. 7a).
- Remove four screws ((2) Fig. 7a).
- Pull IOLMaster a little over the edge of the table to gain access to screws ((3) Fig. 7b). Remove the screws.
- Remove the top of the IOLMaster from the computer.
- Remove the housing cover from the new computer and mount the IOLMaster top on the new computer. Caution: Do not cant the top and do not bend the sensor switch for left/right recognition!
- Attach the cover, re-insert eight screws ((3) Fig. 7b) and tighten them.
- Mount the housing cover on the old computer.

Note:

- The user and IOL data base must be reinput, see point 7.4.11.
- The patient's data must either be reinput or retransferred from the doctor's office PC. Large patient databases are best transferred from hard disk to hard disk using the Master/Slave mode, see point 7.4.10.
- User related setups must be reinput, if required.
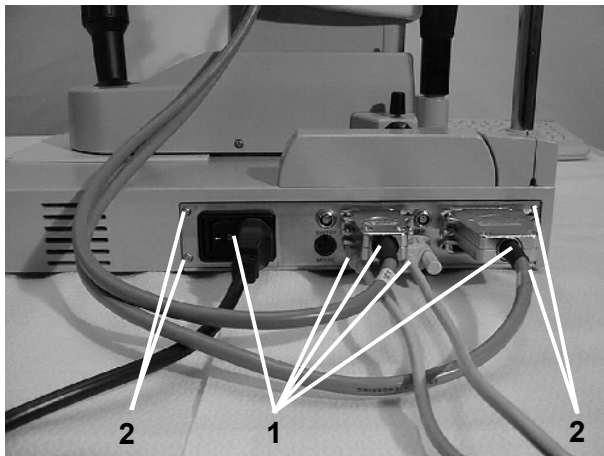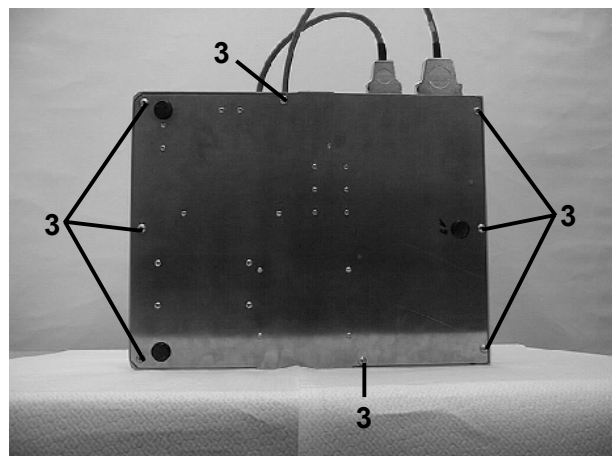- If necessary, install the printer driver.

Fig. 7a

Fig. 7b

Note:

To ensure the correct loading of the calibration values on to the hard disk after the computer has been changed, proceed as follows after the change:

1. IOLMaster program is still operative and the Service program can still be called.

- **Before** changing the computer, call the Service program and start the "Windows Explorer" via "System".
- Open the "IOLMaster" directory with a double click.
- Copy the "iol.ini" file on to a diskette inserted in drive A.
- Change the computer.

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- Switch on the IOLMaster and create a test patient file.
- Call the Service program and start the "Windows Explorer" via "System".
- Copy the "iol.ini" file from the diskette in drive A into the "C:\IOLMaster" directory (overwrite).
- Terminate the "Windows Explorer". To terminate the Service program, it is vital that you press <Esc> – only this will correctly save the calibration values on the hard disk.

2. IOLMaster program is no longer operative, making it impossible to call the Service program.
- Insert a "Windows 95" boot diskette in drive A before changing the computer (see point 7.4.1 for creating a boot diskette).
- Call BIOS Setup: press the <Del> key and hold it and switch on the IOLMaster.
- Enter the Service password.
- Call the "BIOS FEATURES SETUP" and "Boot sequence" functions.
- Change the boot sequence to "A, C, SCSI" using the <Pg up> or<Pg Dn> key; then press the <Esc> key.
- Save the new setting with the <F10> and <Y> and <Enter> keys.
- Insert a blank diskette in drive A after booting.
- Copy the "iol.ini" file on to the diskette using the DOS command "copy C:\iolmas~1\iol.ini A:".
- Change the computer.
- Switch on the IOLMaster and create a test patient file.
- Call the Service program and start the "Windows Explorer" via "System".
- Copy the "iol.ini" file from the diskette in drive A into the "C:\IOLMaster" directory (overwrite).
- Terminate the "Windows Explorer". To terminate the Service program, it is vital that you press <Esc> – only this will correctly save the calibration values on the hard disk.

- Perform function test as described in point 4.5.
- If necessary, re-install the printer driver, see point 7.4.9.2

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5.5 Base

- Remove the head of the IOLMaster as described in point 5.1.
- Unscrew both toothed racks ((1) Fig. 8) and remove the base.
- Mount the new base in reverse order.
- Re-attach the head of the IOLMaster as described in point 5.1.
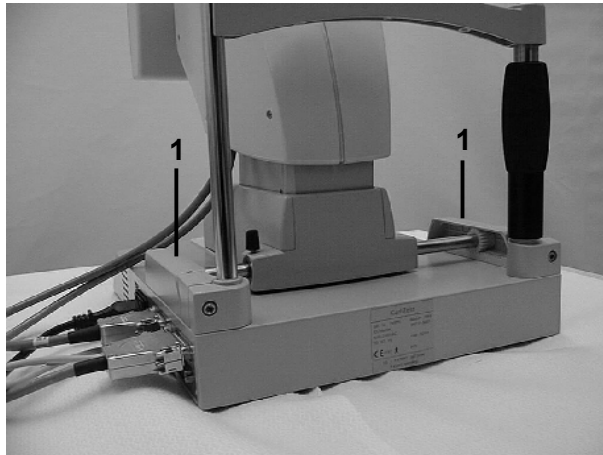- Perform function test as described in point 4.5, Startup.

Fig. 8

5.6 Headrest

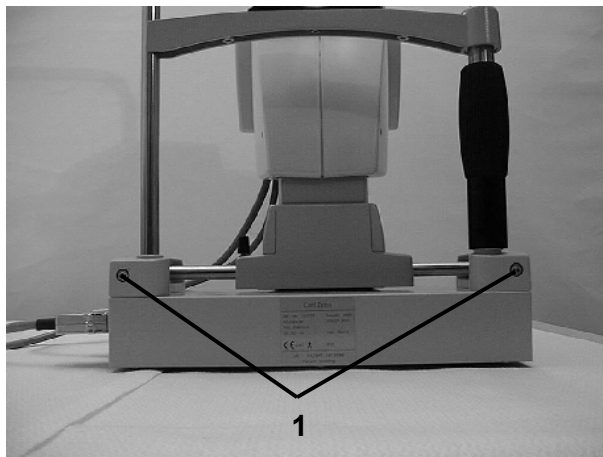- Loosen screws ((1) Fig. 9) and remove the headrest.
- Mount the new headrest.

Fig. 9

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6. Removing, installing and aligning modules

Important notes:

1. **Disconnect unit from the mains before opening it.**

2. **Always switch off the unit before removing and installing PCBs.**

3. **Handle PCBs in compliance with ESD provisions.**

4. **Never remove more than one optical module or optical component at a time.**

5. **As the necessary alignment devices are not available to field service staff, they must not remove the interferometer module in the field.**

6. **Take extraneous light influence into account when working with the unit open.**

7. **If the unit behaves unexpectedly or incorrectly or if the unit's synchronization is lost during any repair or alignment procedures, shut down the computer, switch it off and then back on again.**

8. **Do not leave the interferometer laser diode on for longer than 5 minutes in the "100 % power" mode.**

6.1 Removing and re-attaching the housing cover (left/right half)

Removal:

- Remove six screws ((1) Fig. 10a) and then the cover.
- Remove screws ((2) Fig. 10b) on the other side and then the cover.

Installation:

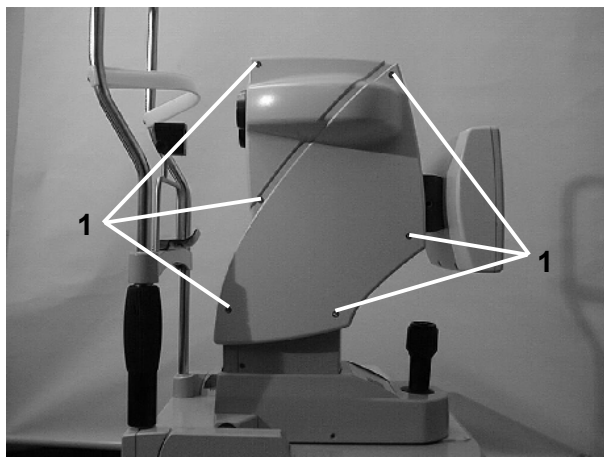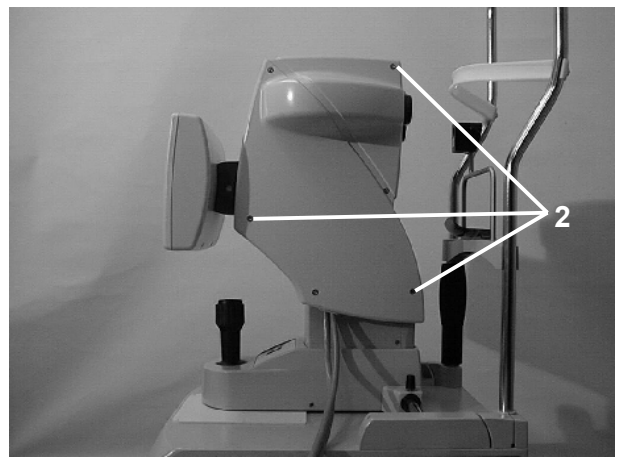- Re-attach the covers in reverse order.

Fig. 10a

Fig. 10b

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6.2 Opening and closing the computer housing

Opening:

- Disconnect plug-in connections ((1, 2, 3 and 4) Fig. 11a) and remove four screws ((5) Fig. 11a).
- Remove eight screws ((6) Fig. 11b).
- Carefully lift the upper part of the IOLMaster.

Closing:

- Carefully place the upper part of the IOLMaster back on the computer. Take care not to bend the sensor switch for the left/right switchover.
- Screw screws ((6) Fig.11b) and ((5) Fig. 11a) back in again.
- Re-establish plug-in connections.
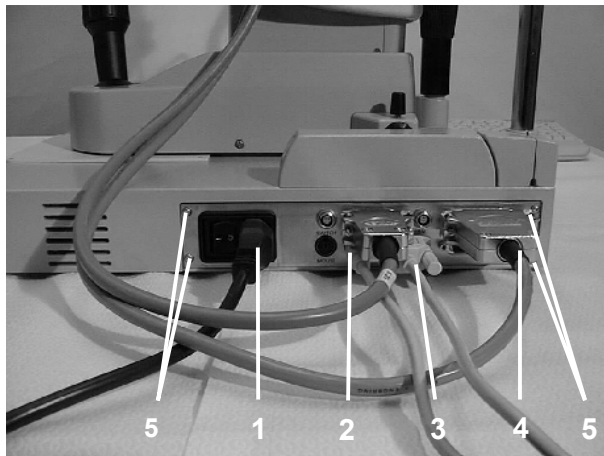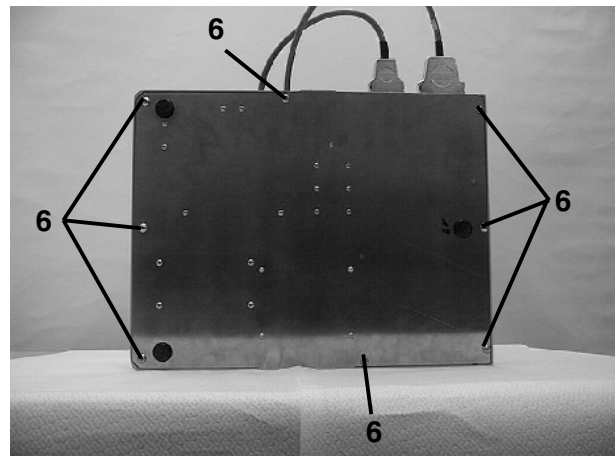- Check function of left/right change over for correct switching.

Fig. 11a

Fig. 11b

Note:

When the top of the IOLMaster is placed on the computer there is a risk of bending the support for the sensor switch which actuates the left / right recognition function.

The upper edges of the switch and the cast component of the computer must be seen to be flush (the switch may be located lower by a maximum of 0.5 mm).

Always perform a function test after assembling the unit.
In this process, make sure that the right / left switchover is functioning properly throughout the full range of the instrument base adjustment.

Caution: It is vital that you also check that the switchover functions properly at either extreme end of the range covered by the instrument base adjustment!

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6.3 Removing and installing the LC display

Removal:

- Open the unit's housing as described in point 6.1.
- Disconnect plug-in connection ((1) Fig. 12).
- Cut open cable tie ((2) Fig. 12).
- Remove the cable clamp on the opposite side of the unit.
- Loosen screws ((3) Fig. 12), remove the display and place it to the left of the unit on a table top.

Installation:

- Attach the LC display, push in the display as far as it will go and tighten screws ((3) Fig. 12).
- Fasten new cable tie ((2) Fig. 12) and re-attach the cable clamp.
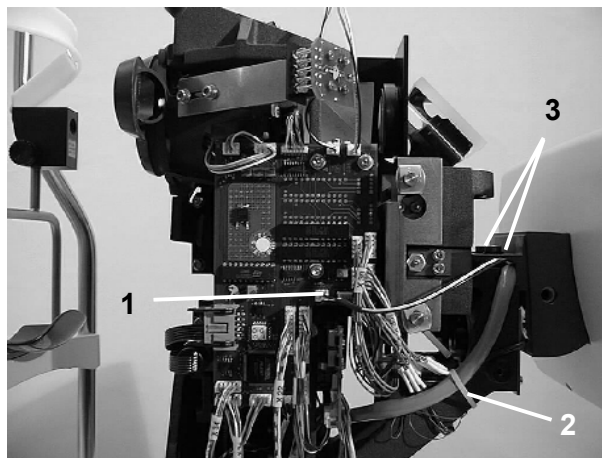- Re-establish plug-in connection ((1) Fig. 12).

Fig. 12

Removal:

- Remove both housing covers as described in point 6.1.
- Disconnect plug-in connections ((1, 2 and 3) Fig. 13a).
- Remove three screws ((4) Fig. 13b) and then the keratometer.

Fig. 13a

Fig. 13b

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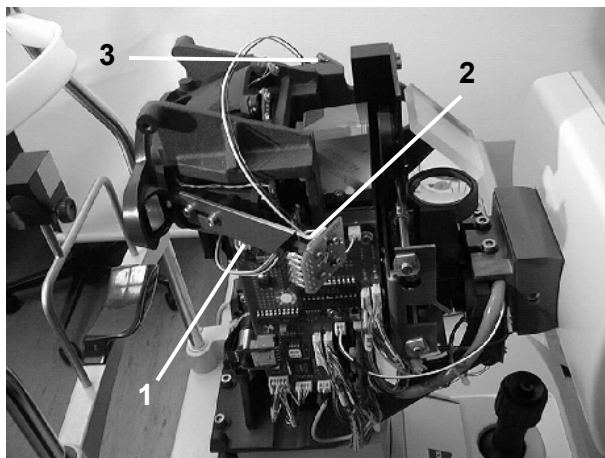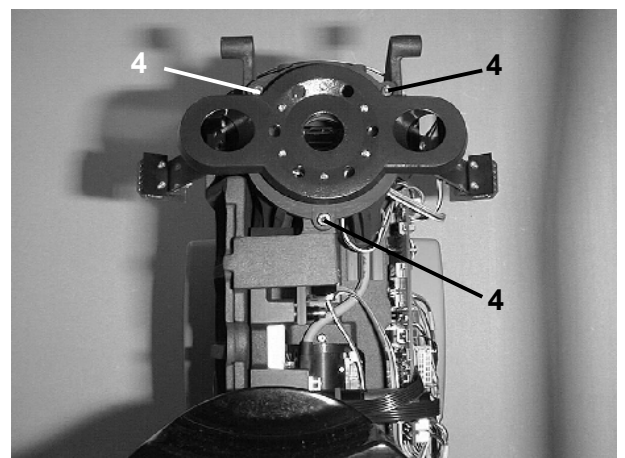SM-30-4039-A1-en   Ersatz für Ausgabe / Replaces issue: 07.03.2000   Page **16** to 58

<u>Installation:</u>
- Insert keratometer and slightly tighten three screws ((4) Fig. 13b).
- Re-establish plug-in connections ((1, 2 and 3) Fig. 13a).

<u>Alignment:</u>
- Switch on the IOLMaster and select the ALM mode.
- Align the IOLMaster in ALM mode with the test eye. Better: Attach the alignment device 1078-810 to the instrument (see fig. 14a) and swing in the test eye for KER measurement.
- Select the KER mode.
- Turn the keratometer in such a way that the two horizontal keratometer measuring points are parallel to the horizontal line of the crosshairs (see Fig. 14).
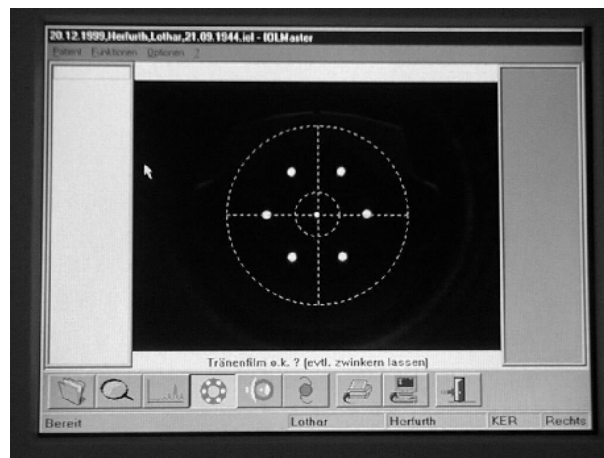

Fig. 14

- Tighten screws ((4) Fig. 13b).
- Bring the projection surface of the alignment device for the slit image into working position.
- Check the alignment of the ACD slit projectors as described in point 6.5.
- Bring the ACD test eye of the alignment device into working position.
- Using "Options", set the "Test eye" function and check the measuring accuracy of the keratometer and the accuracy of the measurement of the depth of the anterior chamber.

Fig. 14a

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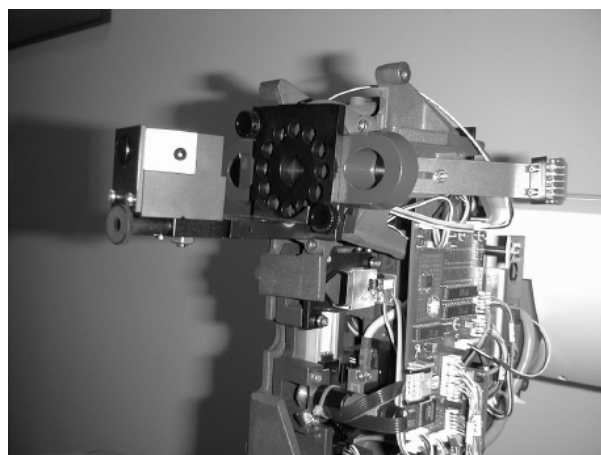SM-30-4039-A1-en   Ersatz für Ausgabe / Replaces issue: 07.03.2000   Page **17** to 58

6.5 Removing, installing and aligning the slit projector

Note:
Never remove both slit assemblies at the same time, as no reference for alignment would then be left.

Removal:
- Remove the housing cover concerned as described in point 6.1.
- Disconnect plug-in connection ((1) Fig. 15).
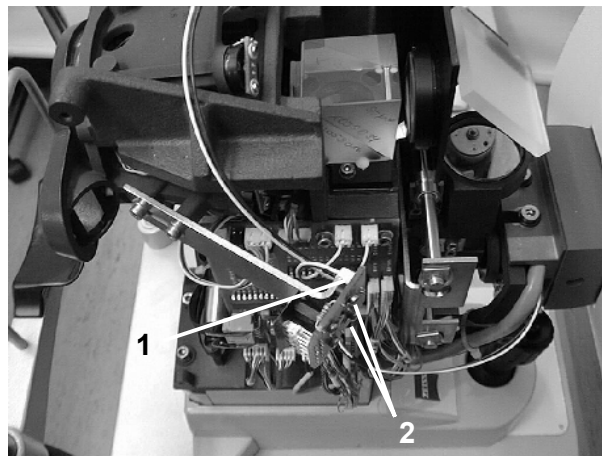- Remove screws ((2) Fig. 15) and then the slit projector.

Fig. 15

Installation:
- Insert the slit projector and slightly tighten screws ((2) Fig. 15).
- Re-establish plug-in connection ((1) Fig. 15).

Alignment:
- Switch on the IOLMaster, select the "Overview" mode. Call the Service program and "System" as described in point 7.1.1 and select the PIO Test. Close the PIO Test window and terminate the Service program. Open the PIO Test window again using the <Alt>+<Tab> PIO keys. Go to "channel 3" and switch on the **still aligned** slit projector by clicking on "ACD diodes left or right" and "LEDs on".
  Set "Exposure time" to 1/1000. Switch on "Overview illum." and switch off "Fixation LED".
  Move PIO window in such a way that the video picture is visible.
- Align the IOLMaster with a projection surface in such a way that the image of the slit is sharply defined and symmetrical to the vertical line of the crosshairs on the display. See Fig. (16) and lock the base in position, or better attach the alignment device 1078-810 to the instrument and swing in the projection surface for the slit image in working position.

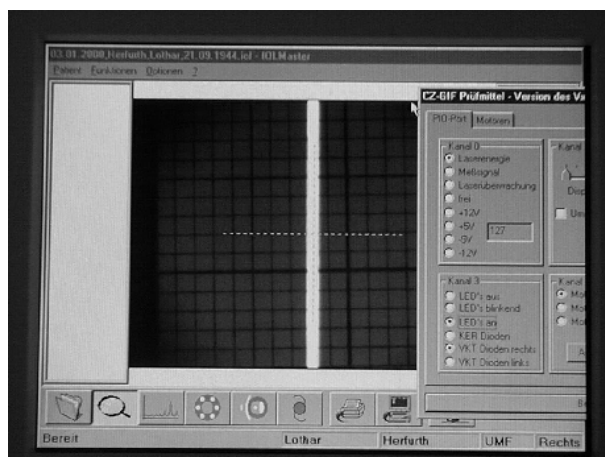Serviceanweisung   IOLMaster
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Fig. 16

- Switch on the slit projector to be aligned in the PIO Test mode, "ACD diodes left or right" on.
- Move and turn the slit projector in such a way, that the slit image is positioned symmetrically and parallel to the vertical line of the crosshairs on the display. Adjust also for minimum slit image with Tighten screws ((2) Fig. 15). The slit image must now also be sharply defined.
- Switch on the left-hand and right-hand projector alternately in the PIO Test mode. Check whether the two slit images remain coincident and are symmetrical and parallel to the vertical line of the crosshairs. In addition, both slit images must be sharply defined.
- Bring the ACD test eye of the alignment device into working position.
- Using "Options", set the "Test eye" function. Check the accuracy of the anterior chamber depth measurement.

6.6 Removing, installing and adjusting the interferometer motor

Removal:

- Remove the left-hand housing cover (viewed from user) as described in point 6.1.
- Disconnect plug-in connection ((1) Fig. 17).
- Unscrew screws ((2) Fig. 17) and remove the motor.
  Caution:
  Prevent the prism slide from dropping!

Installation:

- Insert the motor and slightly tighten screws ((2) Fig. 17).
- Position the motor in such a way that there is enough backlash between the pinion and the rack, ensuring smooth motion.
- Re-establish plug-in connection ((1) Fig. 17).

Adjustment:

- Adjust the motor speed as described in point 7.2.1.3.

Fig. 17

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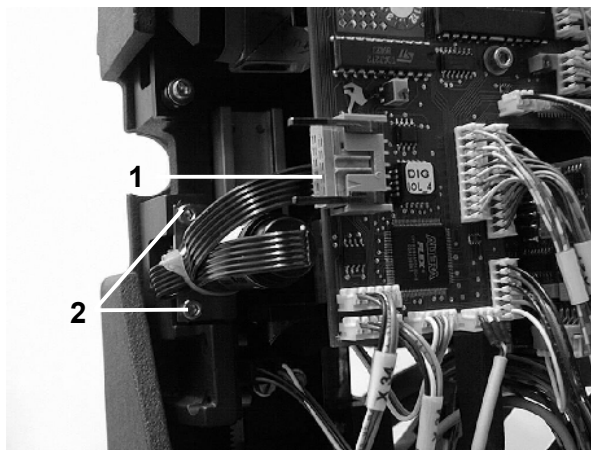SM-30-4039-A1-en   Ersatz für Ausgabe / Replaces issue: 07.03.2000   Page **19** to 58

6.7 Removing, installing and adjusting the complete APD PCB

Note:
There are two versions of APD PCB (old 1030-772 and new 1078-815). They are compatible, i.e. the old version can be replaced by the new one.

Removal:

- Remove the housing cover as described in point 6.1.
- Remove the display as described in point 6.3.
- Switch on the IOLMaster and select the "Overview" mode; switch off the IOLMaster.
- Disconnect plug-in connection ((1) Fig. 18a).
- Loosen setscrews ((2) Fig. 18b) almost all the way, but do not remove them. Do not change the position of the two opposite setscrews to ensure that a reference position for the APD board is maintained.
- If necessary, remove Digital IOL PCB as described in point 6.10, to get easier access to the screws.
- Remove three screws ((3) Fig. 18b) and pull the PCB a little toward the right (viewed from user) and disconnect the two plug-in connections from the APD PCB. Remove the PCB.
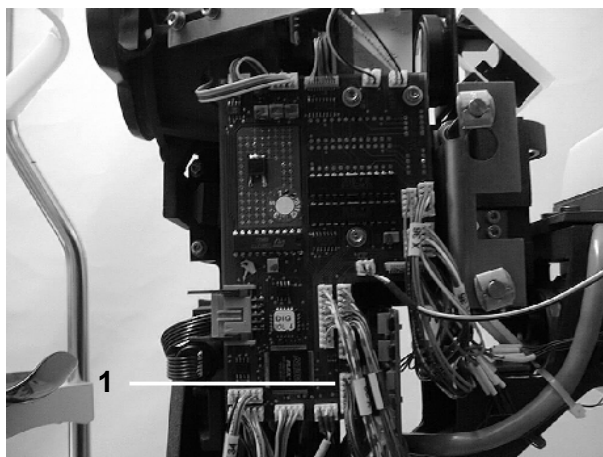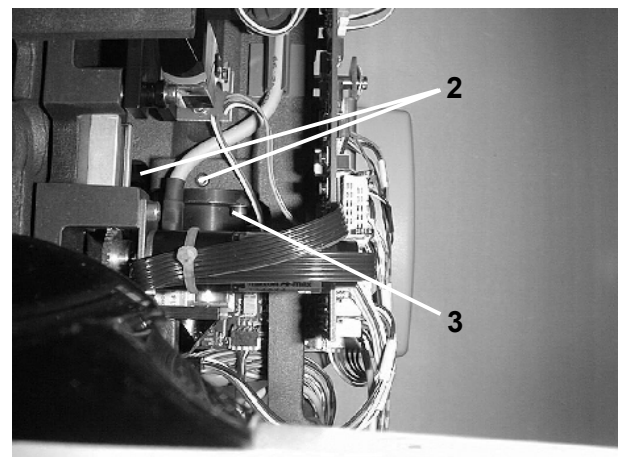

Fig. 18a

Fig. 18b

Installation:

- Insert the PCB from the right (viewed from user) a short way in the opening of the instrument carrier (components side points in the direction of the patient) and re-establish the two plug-in connections on the APD PCB. Insert the PCB all the way and slightly tighten screws
  ((3) Fig. 18b).
- Move the PCB against the non-loosened setscrews and tighten a little further.
- Re-establish plug-in connection (1) Fig. 18a.
- Re-install the Digital IOL PCB as described in point 6.10, if it was removed.

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Adjustment:

- Switch on the IOLMaster and select the ALM mode.
- Call the Service program as described in 7.1.1, select the System function and start the PIO Test.
- Close the PIO Test window, terminate the Service program and activate the ALM mode once again. Open the PIO Test window using the <Alt>+<Tab> keys and move it until the video picture is visible.
- Click "Laser on", "100 % power" and "Exposure time" "1/100".
- Align the IOLMaster with the test eye in such a way that the reflections from the cornea and the retina exactly coincide (normally, they should coincide in the center of the crosshairs). Lock the base in this position. Or better: attach the alignment device 1078-810 to the instrument and swing the ALM/KER test eye in working position.
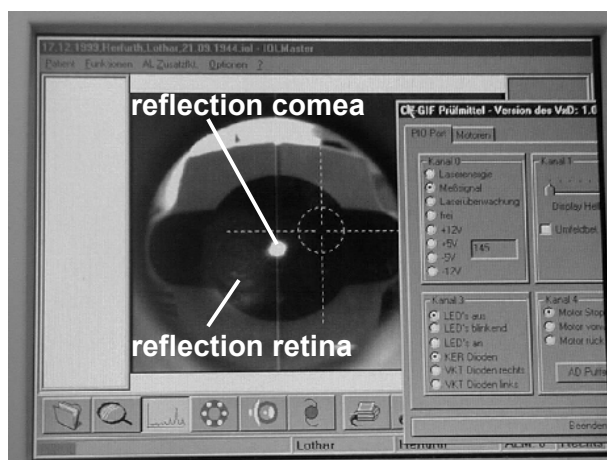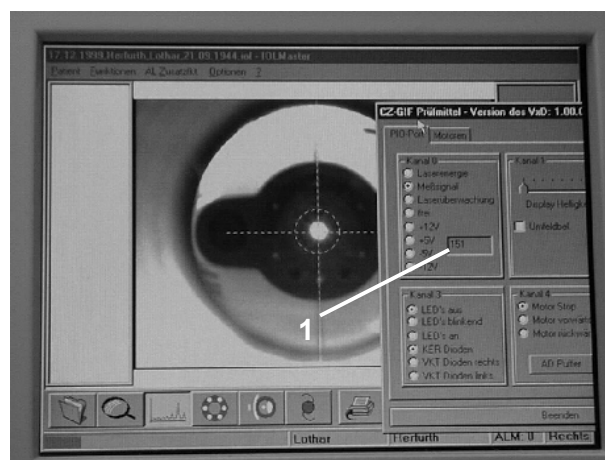

Fig. 19a

Fig. 19b

- Click "Adjustment Power" and "Measuring Signal" functions in the PIO Test.
- Slowly and carefully move the IOLMaster to the left, right, top and bottom relative to the test eye. While doing this, watch the reading of the "Measuring signal"
  ((1) Fig. 19b) and look for the maximum reading (before adjustment, this reading typically lies between 130 and 132).
- Perform the adjustment as described below, depending on where the maximum signal lies.

Note:

- **If the maximum signal appears on the left of the crosshair's center, the APD PCB must be moved to the left (as seen from the user) and vice versa.**
- **If the maximum signal appears below the crosshair's center, the APD PCB must be moved towards the user and vice versa.**
- To gain access to the rear adjusting screw (located in the user's direction), switch to the "Overview" mode after closing the PIO test window. Re-adjust the screw a little and select the "ALM" mode again. Open the PIO test window using the <Alt> + <Tab> keys.
- Repeat the adjusting procedure until the maximum signal is located on the center of the crosshairs (depending on the test eye used, the signal reading will lie between 136 and 144 or between 148 and 155).
- Check the adjustment by moving the IOLMaster from the center a little to the left, right, top and bottom; the drop in signal strength must be the same in all directions.

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- If there are minor deviations, exactly center the IOLMaster on the test eye (reflection is exactly located in the center of the crosshairs) or attach test device 1078-810 to the unit. Move the APD PCB as described in the following note.

Note:
- **Moving the APD PCB toward the left (viewed from the user) will move the maximum signal to the right of the crosshairs of the display or vice versa.**
- **Moving the APD PCB in the direction of the operator will move the maximum signal upward relative to the crosshairs of the display or vice versa.**

The adjusting screws should be moderately tightened after the adjustment has been completed.
- Tighten screws ((3) Fig. 18b).
- Re-install the LC display as described in point 6.3.
- Adjust laser monitoring as described in point 7.2.2.1. Do **not** adjust the other two potentiometers on the PCB.
- Re-install the housing cover as described in point 6.1.
- Using "Options", set the "Test eye" function and check the accuracy of the axial length measurement. Depending on the version of the laser diode installed, the reading of the SNR signal-to-noise ratio should be between 8 and 10 (laser diode version 1) and between 20 and 35 (laser diode version 2) with the test eye.

Caution:
Only check the signal-to-noise ratio when the unit is closed.

6.8 Removing, installing and aligning the CCD camera

Removal:
- Remove the housing cover as described in point 6.1.
- Remove the LC display as described in point 6.3.
- Disconnect plug-in connection ((1) Fig. 20).
- Remove four screws ((2) Fig. 20) and then the CCD camera. Remove the cable clamp from the camera cable.
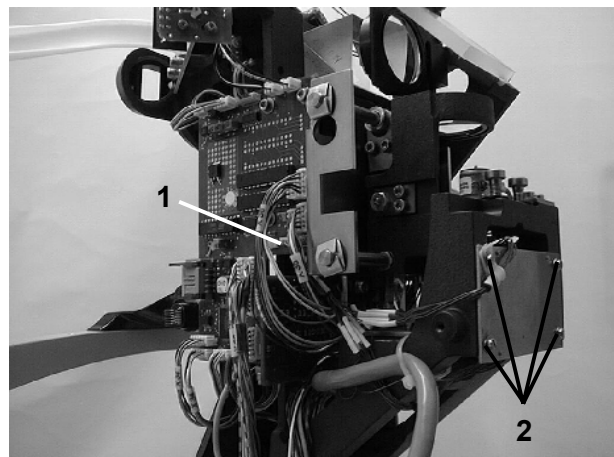
Installation:
- Attach a cable clamp. Insert the CCD camera and tighten screws ((2) Fig. 20) slightly.
- Re-establish plug-in connection ((1) Fig. 20).

Fig. 20

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<u>Alignment:</u>

- Switch on the IOLMaster and call the Service program as described in point 7.1.1, select the "System" function and start the PIO Test.
- Close the PIO Test window and terminate the Service program.
- Select the ALM mode a second time and re-open the PIO Test window using the <Alt>+<Tab> keys.
- Click "Laser on", "100 % power", "Measuring Signal" and "Exposure time" "1/100".
- Using the joystick, align the IOLMaster horizontally and vertically with the test eye in such a way that the reflections from the cornea and the retina exactly coincide and that maximum measuring signal is obtained at the same time ((1) Fig. 21b). Lock the base in position after the alignment. Or better: attach the alignment device 1078-810 to the instrument and swing the ALM/KER test eye in working position.
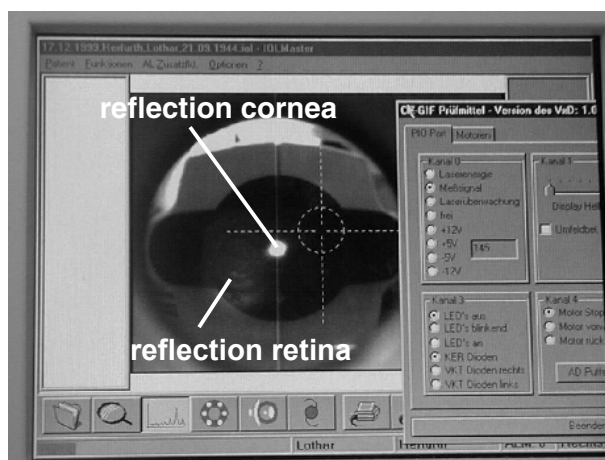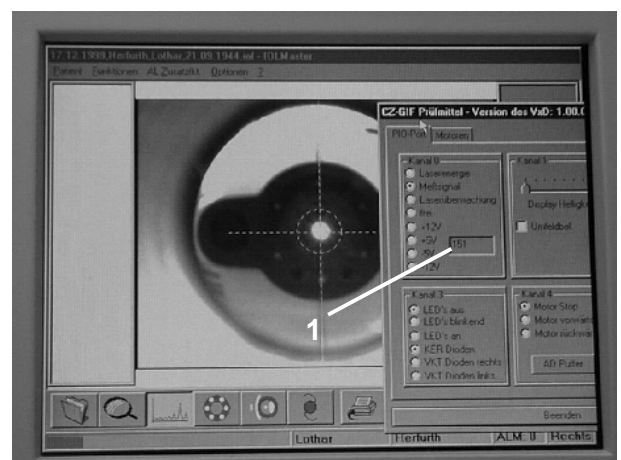

Fig. 21a

Fig. 21b

- Click the "Adjustment Power" function.
- Move the CCD camera in such a way that the crosshairs of the display and the reflection from the cornea exactly coincide. Slightly tighten screws ((2) Fig. 20).
- Close the PIO Test window.
- Select the KER mode and check whether the horizontal measurement markings of the keratometer are exactly parallel to the horizontal line of the crosshairs. If necessary, turn the CCD camera as required (take care not to change the lateral and vertical position of the camera). Tighten screws ((2) Fig. 20). Make sure that the camera is not moved in the process.
- Re-install the LC display as described in point 6.3.

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6.9 Removing and installing the control cable

Removal:

- Remove the housing cover as described in point 6.1.
- Disconnect connector ((1) Fig. 22a).
- Remove cable clamp ((2) Fig. 22a).
- Cut open cable tie ((3) Fig. 22b) and disconnect plug-in connections ((4, 5 and 6 on the APD PCB) Fig. 22b) and remove the cable.
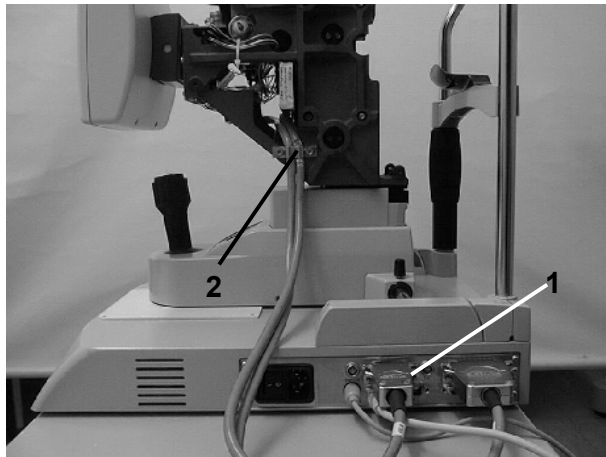
Fig. 22a
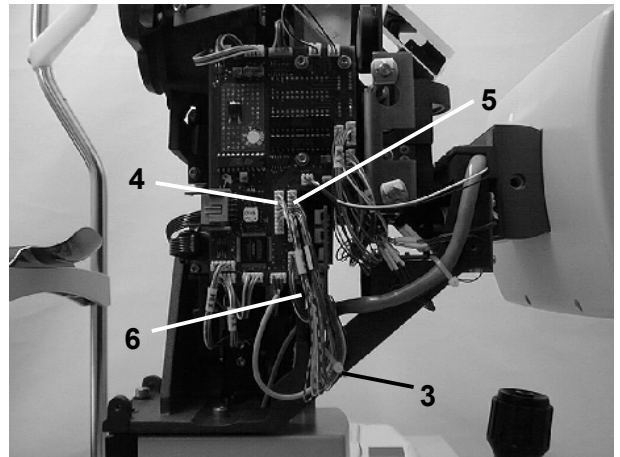
Fig. 22b

Installation:

- Install the cable in reverse order and fasten the cable with a new cable tie.

6.10 Removing, installing and adjusting the Digital IOL PCB

Note:

There are two versions of Digital IOL PCB (old 1031-843 and new 1078-792). They are **not** compatible with each other, i.e. the old version **cannot** be replaced by the new one. If the Digital IOL PCB needs to be replaced, it must be always replaced with a PCB of the same version, otherwise the **laser diode** will be **damaged**. Also see Service Bulletin No. 305.

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Removal:

- Remove the housing cover as described in point 6.1.
- Disconnect all plug-in connections from the PCB.
  Caution:
  Keep the assignment of the connectors to the relevant sockets in mind or mark the connectors / sockets, as some of the connectors fit in several sockets.
  After disconnecting connector ((1) Fig. 23), immediately plug short-circuit plug 1078-821 into the connector removed (connection of the laser diode)
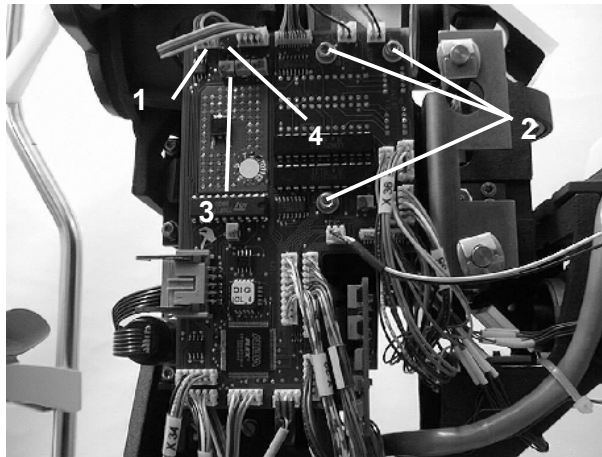- Remove three screws ((2) Fig. 23) and then the PCB.

Fig. 23

Installation:

- Tighten screw ((2) Fig. 23) of the PCB.
- Re-establish all plug-in connections.
- When you install a new Digital IOL PCB, adjust the two potentiometers ((3 and 4) Fig. 23) to their left-hand stops, i. e. give them at least 10 turns to the left.
- Adjust the laser power as described in point 7.2.1.1.
- Adjust the sensitivity of the CCD camera as described in point 7.2.1.2.
- Adjust the motor speed as described in point 7.2.1.3.
- Adjust the brightness of the surrounding field as described in point 7.2.1.4.
- Adjust the brightness of the keratometer measurement markings as described in point 7.2.1.5.

6.11 Removing and installing the axial fan

Removal:

- Open computer as described in point 6.2.
- Disconnect the cables from the fan and remove the fan.

Installation:

- Install and connect the new fan in such a way that the fan blows out of the housing.

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6.12 Removing and installing the MED 586 computer PCB and entering the password

Removal:

- Open computer as described in point 6.2.
- Remove nuts ((1) Fig. 24a), as well as bolts and nuts ((2) Fig. 24b).
- Disconnect plug-in connections ((3) Fig. 24a) and disconnect cables ((4) Fig. 24a). Make a mental note of the correct connections (polarity).
- Remove the PCBs and pull off GIF IOL PCB ((5) Fig. 24a).

Installation:

- Plug in GIF IOL PCB ((5) Fig. 24a), insert the PCBs and tighten nuts ((1) Fig. 24a) as well as bolts and nuts ((2) Fig. 24b).
- Re-establish plug-in connections ((3) Fig. 24a) and re-connect cables ((4) Fig. 24a).
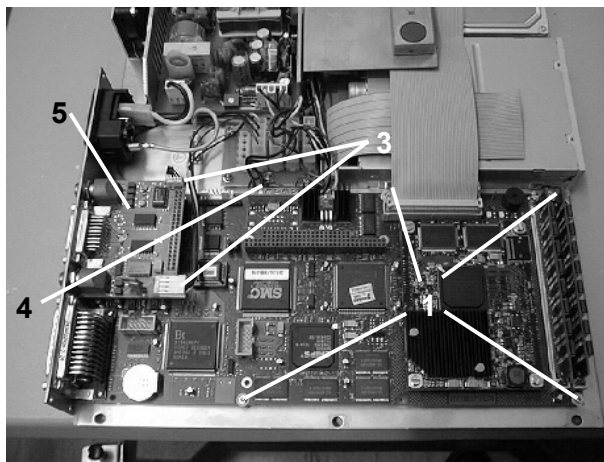
Fig. 24a
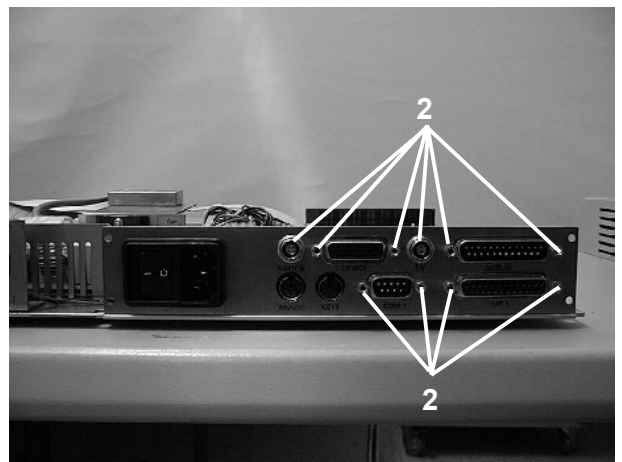
Fig. 24b

Entering the password:

- Press the <Del> key and switch on the IOLMaster at the same time. The BIOS Setup menu is being called.
- Select the "PASSWORD SETTING" function.
- Enter the "MED586" password and confirm by pressing the <Enter> key.
- Enter the "MED586" password a second time and again confirm by pressing the <Enter> key.
- Press the <F10> key.
- Press the <Y> key.
- Press the <Enter> key.

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6.13 Removing, installing and adjusting the power supply

Removal:

- Open computer as described in point 6.2.
- Disconnect plug-in connections ((1) Fig. 25).
- Remove the four screws on the bottom of the base plate.
- Remove the power supply unit.
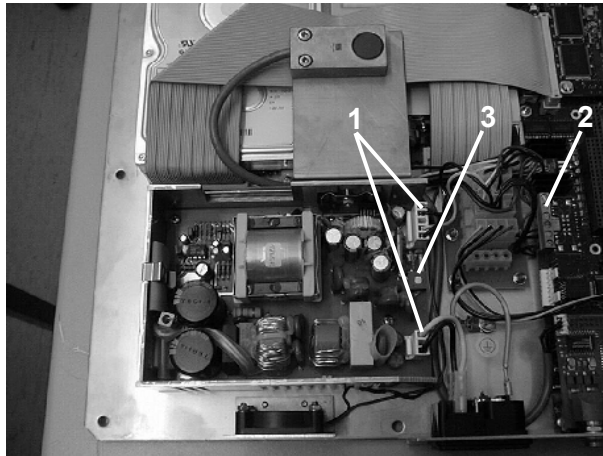
Fig. 25

Installation:

- Insert the power supply unit and lock it in position by tightening the four screws.
- Re-establish the plug-in connections.

Adjustment:

- Switch on the IOLMaster.
- Measure the +5V supply voltage at the computer PCB terminal strip ((2) Fig. 25) and adjust the voltage to 5.05 V using potentiometer ((3) Fig. 25), if necessary.

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6.14 Removing and installing the compression spring 1044-460

Removal:

- Remove housing cover as described in point 6.1.
- Open computer as described in point 6.2.
- Remove two screws ((1) Fig. 26a) and two screws ((2) Fig. 26a). Remove both covers. Remove cover ((3) Fig. 26a).
- Unscrew cable clamp ((4) Fig. 26b) and cut open cable tie ((5) Fig. 26b).
- Disconnect plug-in connection ((6) Fig. 26b) and pull out the cable downward.
- Unscrew stop screw ((7) Fig. 26b) and carefully move the height adjustment upward until the spindle and the nut are no longer in mesh.
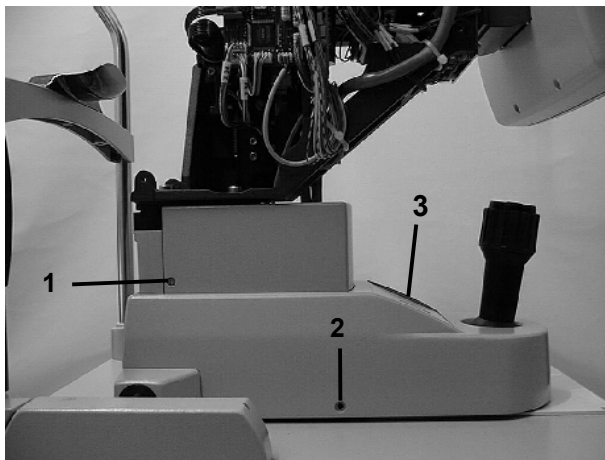- **Carefully** remove the measuring head upward – risk of compression spring jumping out!
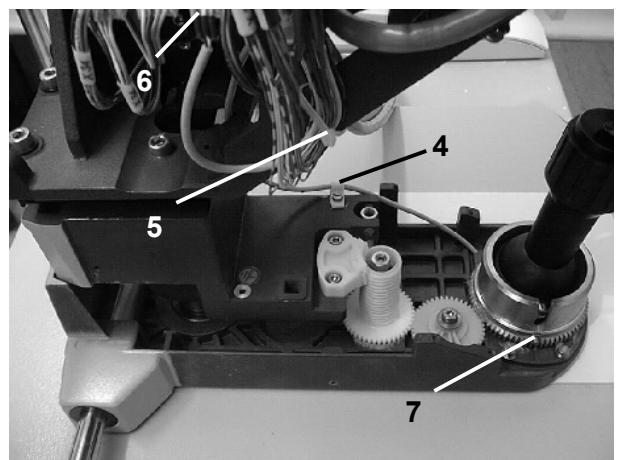

Fig 26a

Fig 26b

Installation:

- Insert the compression spring in the sleeve of the Z guideway.
- **Carefully** place the measuring head on the base from above.
- Pull the cable into the measuring head upward.
- Turn the height adjustment mechanism until the spindle and the nut are again in mesh.
- Screw stop screw ((7) Fig. 26b) back in.
- Check whether the stop has been correctly adjusted; if necessary, change the mesh of the gears as required, see point 6.15.
- Re-attach cable clamp ((4) Fig. 26b), re-establish plug-in connection ((6) Fig. 26b) and attach a new cable tie.
- Re-attach all covers of the base.

6.15 Removing and installing the spur gear with stop

Removal:

- Open computer as described in point 6.2.
- Remove two covers ((1 and 2) Fig. 27a).
- Remove screw ((3) Fig. 27b) and then the spur gear.

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Installation:

- Inserting the spur gear: Position the gear relative to the spindle or joystick in such a way that the nut runs over the end of the spindle by a third of its length at the upper stop, and that the nut is still about 4mm to 5mm away from the gear of the spindle at the lower stop.

- Enmesh the gears in such a way that they move easily but without too much backlash. Re-tighten screw ((3) Fig. 27b).
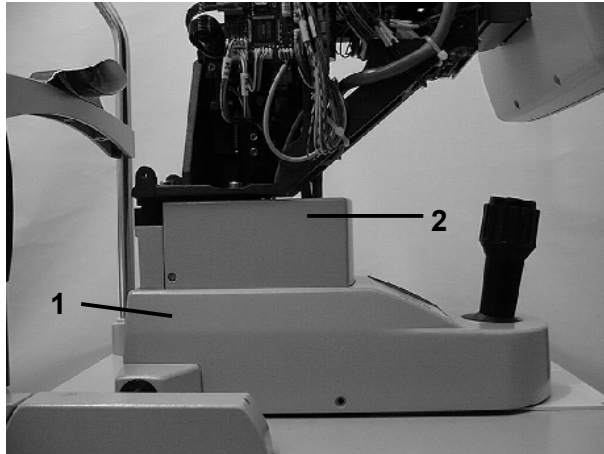
- Re-attach two covers ((1 and 2) Fig. 27a).
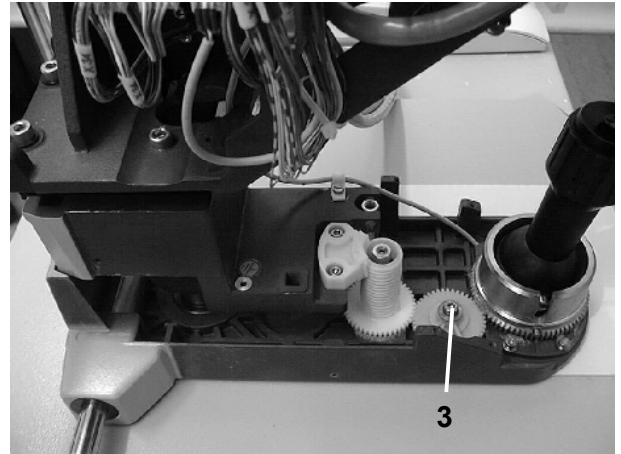

Fig. 27a

Fig. 27b

6.16 Checking and aligning the magnification changer

Preparations:

- Switch on the IOLMaster and select the "Overview" mode.

- Call the Service program as described in point 7.1.1 and select the "System" function.

- Start the "PIO Test" program and select the "Motors" function.

- Click on the "Changer" function.

- Close the PIO Test window and terminate the Service program.

- Switch several times between the "Overview" and "KER" modes; then set the "KER" mode. Align the IOLMaster with the test eye horizontally and vertically in such a way that the keratometer measurement markings are exactly symmetrical to the display crosshairs. Lock the base in position, or attach the alignment device 1078-810 to the instrument and swing ALM/KER test eye in working position.

- Using the <Alt>+<Tab> keys, call the "Motor test" again.

- Move the window in such a way that the video picture is visible and the test program in the window can be controlled, see Fig. 28.

Fig. 28

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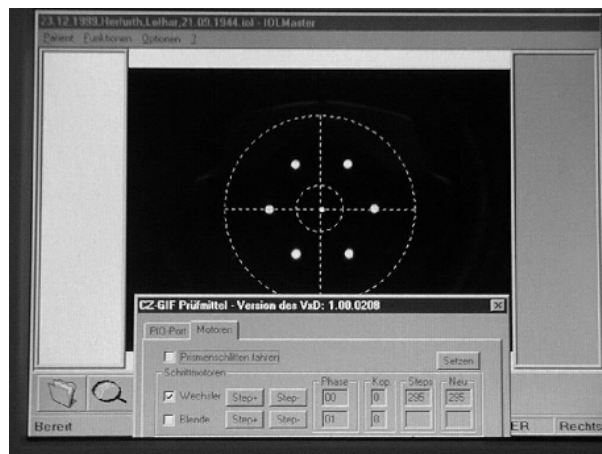SM-30-4039-A1-en   Ersatz für Ausgabe / Replaces issue: 07.03.2000   Page **29** to 58

<u>Test and alignment:</u>

- Click "Step +" several times and move the changer step by step toward the left until the "Barr" signal (light barrier) switches from 0 to 1.

- Click "Step –" several times and move the changer step by step toward the right until the "Barr" signal changes from 1 to 0.
  This change should happen 2 steps, better yet, 3 steps before the stepper motor phase "Phase" 00 is reached, i.e. at "Phase" 11 or, better, 10.
  If the light barrier is not actuated as required and described above, the position of the U-shaped light barrier ((1) Fig. 29) must be re-adjusted to the left or right. To do this, loosen screws ((2) Fig. 29) and shift the light barrier.

- In this alignment process, a horizontal displacement of the keratometer measurement markings relative to the crosshairs of the display occurs. Correct this displacement by adjusting the CCD camera position. See point 6.8.
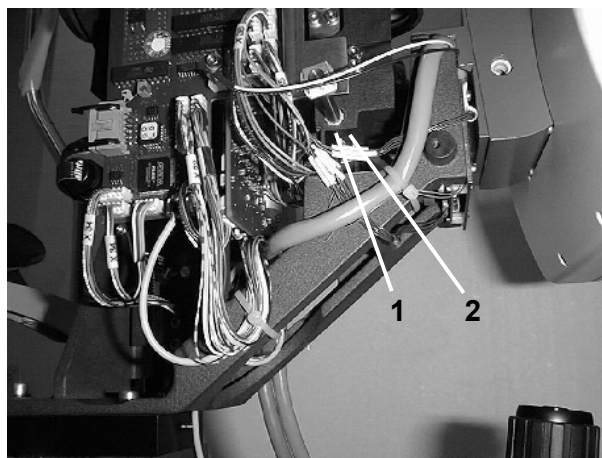
Fig. 29

- Close the Motors test window.
- Select the "Overview" mode.
- Re-open the Motor test window using the <Alt>+<Tab> keys.
- Click "Step –" several times and move the changer to the right until the "Barr" signal changes from 0 to 1.
- Click "Step +" several times and move the changer to the left until the "Barr" signal changes from 1 to 0. The light barrier should switch 2 steps, better yet, 3 steps before reaching the centric image position (light dots of Overview illumination are horizontally symmetric to the crosshairs of the display).

Fig. 30

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- If the light barrier does not switch as required, the position of actuating flag ((1) Fig. 30) must be re-adjusted in the horizontal direction. To do this, loosen screws ((2) Fig. 30) and shift the flag.
- Click "Step –" several times and move the changer to the right until the "Barr" signal changes from 0 to 1.
- Click "Step+" several times and move the changer back until the "Barr" signal switches back to 0. Check whether another 2 to 3 steps are necessary to re-position the surrounding field image in the center of the crosshairs.
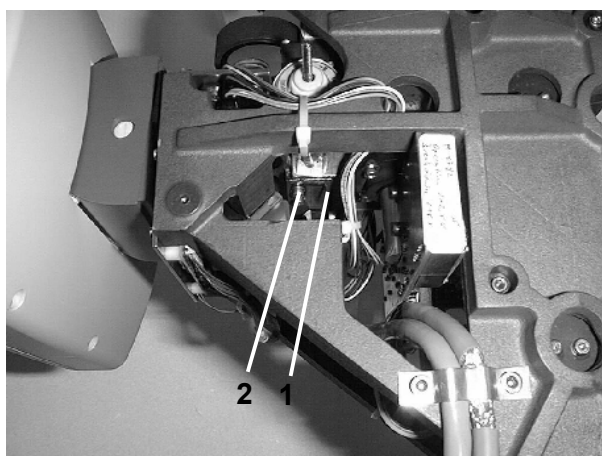 If the image is centered, the readings shown under "Steps" and "New" should be identical
  If this is not the case, save the reading shown under "New" by clicking on "Set".
  Note:
  The alignment and manual adjustment of the changer may result in the loss of the synchronization between the stepper motor and the computer. If synchronization is lost, this will show up as a large lateral shift of the image away from the crosshair when the changer is moved from one position to the other. In this case, shut down the computer, switch it off and then back on again.
- Close the "Motor test" window and switch several times between the "Overview " and the "Keratometer" modes. Make sure that the images are horizontally centered on the display crosshairs in both cases.

6.17. Removing and installing the hard disk/Saving patient data

Note:
- When the hard disk is changed, distributor PCB 1033-561 should also be changed, unless both filter capacitors on the distributor PCB have 1000 µF. Otherwise, the new hard disk may not run up correctly as a result of the higher current consumption. Also see Service Bulletin No. 300.
- To ensure that the calibration values are correctly transferred to the new hard disk when the hard disk is changed, proceed as follows:

1. The IOLMaster program is still operative and the Service program can still be called:
- Before changing the hard disk, call the Service program and start the "Windows Explorer" via "System".
- Open the "IOLMaster" directory by double-clicking it.
- Copy the "iol_ini" file on to a diskette inserted in drive A.
- Change the hard disk.
- Switch on the IOLMaster and create a test patient file.
- Call the Service program and start the "Windows Explorer" via "System".
- Copy the "iol.ini" file from the diskette in drive A into the "C:\IOLMaster" directory (overwrite).
- Terminate the "Windows Explorer". To terminate the Service program, it is vital that you press <Esc> – only this will correctly save the calibration values on the hard disk.

2. The IOLMaster program is no longer operative, making it impossible to call the Service program.
- Insert a "Windows 95" boot diskette in drive A before changing the hard disk (see point 7.4.1 for creating a boot diskette).
- Call BIOS Setup: press the <Del> key and switch on the IOL Master.
- Enter the Service password.
- Call the "BIOS FEATURES SETUP" and "Boot Sequence" functions.

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- Change the boot sequence to "A, C, SCSI" using the <Pg up> or<Pg Dn> key; then press the <Esc> key.
- Save the new setting with the <F10> and <Y> and <Enter> keys.
- Insert a blank diskette in drive A after booting.
- Copy the "iol.ini" file on to the diskette using the DOS command "copy C:\iolmas~1\iol.ini A:".
- Change the hard disk.
- Switch on the IOLMaster and create a test patient file.
- Call the Service program and start the "Windows Explorer" via "System".
- Copy the "iol.ini" file from the diskette in drive A into the "C:\IOLMaster" directory (overwrite).
- Terminate the "Windows Explorer. To terminate the Service program, it is vital that you press <Esc> – only this will correctly save the calibration values on the hard disk.
- Shut down the IOLMaster and switch it off.
- Reset the boot sequence in "BIOS SETUP" to "C only".

Preparations:

- If the computer is still functioning , call the Service program as described in point 7.1.1 and select the "System" function. Start the Windows explorer and copy the contents of the "Data" directory (folder). If the directory is smaller than 1.4 MB, copy it completely on one floppy (drive "A"); otherwise, copy the contents on to several floppies. Or print all patient's data, or transfer the data from the doctor's office PC to the IOLMaster. Switch off the IOLMaster.
- Large patient data files can also be loaded on to external ZIP drives after the appropriate driver has been installed or they can be directly copied from one hard disk to another in the Master / Slave mode, see point 7.4.10.

Removal:

- Open computer housing as described in point 6.2.
- Disconnect the two plug-in connections from the hard disk.
- Remove the four fastening screws for the hard disk on the underside of the base plate.
- It is advisable to transfer large patient data files from one hard disk to another in the Master/Slave mode, see point 7.4.10.

Installation:

- Insert the new hard disk and tighten the screws.
- Re-establish the plug-in connections.
- Close the computer housing as described in point 6.2.
- Switch on the IOLMaster, enter test patient data and call the Service program as described in point 7.1.1. Select the "System" function.
- Start the Windows explorer and copy all patient data on the floppy/floppies from drive "A" into the "Data" directory (folder) or copy the data directly from hard disk to hard disk, see point 7.4.10.
- Using the menus "Options", "Setup", "Program settings", <Program> and <Language>, select the desired language for the IOLMaster software desktop.
- Install the printer driver (the driver software must be stored on diskettes). For installation, call menus "Options", "Setup", "New printer" and then click the "Add printer" function. Then follow the Windows printer installation instructions.
- Using menus "Options", "User manager", call "Administrator" and input the user and IOL data again, see point 7.4.11.
- If necessary, install a printer driver, see point 7.4.9.2

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6.18 Removing, installing and aligning the Keratomer aperture assembly

Removal:

- Remove the housing as described in point 6.1.
- Remove the LC display as described in point 6.3.
- Disconnect plug-in connections ((1 and 2) Fig. 31).
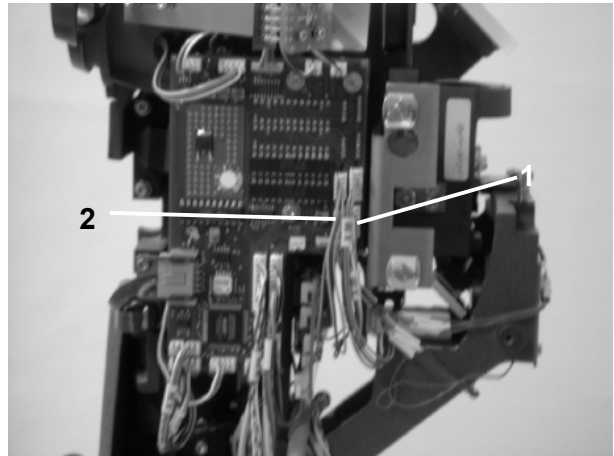
Fig. 31

- Cut open cable ties ((1 and 2) Fig. 32) .
- Unscrew screws ((3) Fig. 32) and carefully remove the aperture assembly. Make sure not to damage the aperture wing plate.
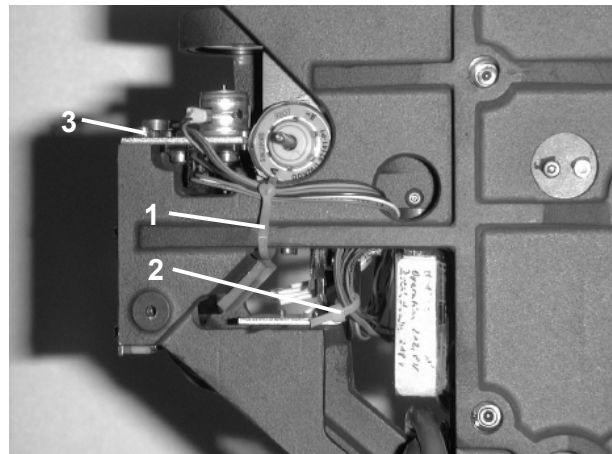
Fig. 32

Installation:

- Carefully insert the aperture assembly and fasten it loosely with screws ((3) Fig. 32).
- Re-establish the plug-in connections ((1 and 2) Fig. 31) and attach cable ties ((1 and 2) Fig. 32).

Alignment:

- Switch on the IOLMaster and select the KER mode.
- Center the unit on the test eye and focus.

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- Check the image of the keratometer measurement marks. The image must not display any reflections, see Fig. 33.
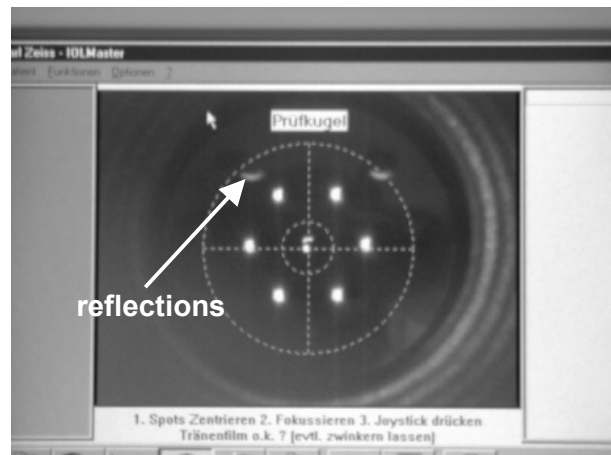
reflections

Fig. 33

- Move the aperture assembly in such a way that the keratometer measurement marks are clearly imaged without any reflections, see Fig. 34.
- Tighten screws ((3) Fig. 32).
- Move the IOLMaster to the left, right, top and bottom relative to the test eye. During this process, the measurement marks should evenly move out of the center without any reflections, while becoming weaker at the same time.
- Attach the LC display as described in point 6.3.
- Mount the housing as described in point 6.1.
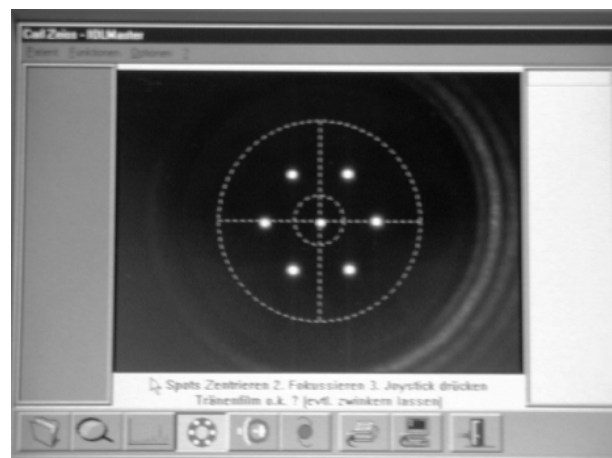
Fig. 34

6.19 Removing, installing and aligning the changer motor

- Remove the housing as described in point 6.1.
- Remove the LC display as described in point 6.3..
- Remove the aperture assembly as described in point 6.18.


- Disconnect plug-in connection ((1) Fig. 35).
- Remove nut ((2) Fig. 35).

Fig. 35

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- Remove screws ((1) Fig. 36).
- Cut open cable ties ((2) Fig. 36).
- Remove the changer motor.

Fig. 36

Installation:

- Insert the motor including the spindle and align it in such a way that the spindle is located in the center of the motor opening. Tighten screws ((1) Fig. 36) to secure the motor in position.
- Mount nut ((2) Fig. 35).

Caution:
When tightening the nut, orientate it in such a way that it does not knock against the bracket of the changer assembly when the changer is in its left position. This means that one side of the hexagonal nut must be positioned vertically to fit in the recess of the bracket.

- Re-establish plug-in connection ((1) Fig. 35).
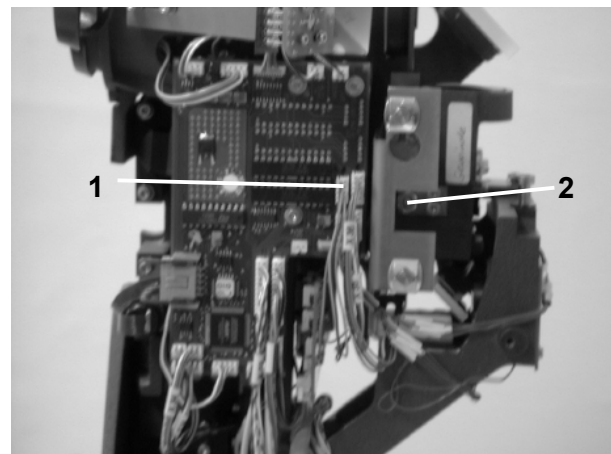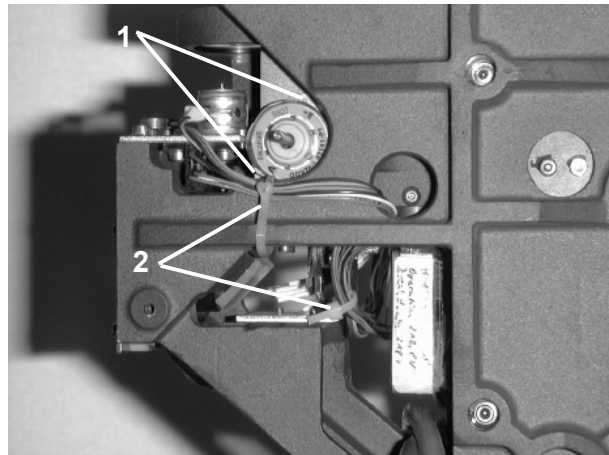- Attach cable ties (2 Fig. 36).
- Install and align the aperture assembly as described in point 6.18.

Alignment:

- Switch on the IOLMaster and select the ALM mode.
- Call the Service program as per point 7.1.1. Select the "System" function and then "PIO Test".
- Close the PIO test window and terminate the Service program.
- Re-activate the ALM mode.
- Call the PIO test using the <Alt> + <Tab> keys.
- Click the "Measuring signal" function and switch on the laser diode with "Laser on / off".
- Align the unit with the test eye using the maximum measuring signal and the position of the laser spot relative to the center of the crosshairs as a reference.
- Align the light barrier and the actuating flag as described in point 6.16.
- After aligning the light barrier and / or the actuating flag, re-adjust the ALM maximum signal in the PIO test program.
- If the position of the maximum signal (position of the laser spot relative to the crosshairs) is off-center, align the CCD camera as described in point 6.8.
- Using the <O> and <K> keys, switch several times between the overview image and the keratometer image. If the two images are not horizontally centered to within exactly ± 1 step, change the number of steps using "Step+" or "Step-" as required. Save the "New" value using "Set".
- Mount the LC display.
- Mount the housing.

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7. Electronics

7.1 Description of the Service program

7.1.1 Calling the Service program

- Click the "Options" menu and then the "Service" menu item.
- Enter the <MED586> password and press the <Enter> key.

The Service program now provides you with the following selections:
ALM, ACD, KER, Grabber, Prog and System.

7.1.1 1 ALM (Axial length measurement)

Here, all calibration values for axial length measurement are displayed; however, these values cannot be changed. For standard operation, the "Calibrate (n=1.0)" box must be inactive and the "Apply Factors" box must be active.
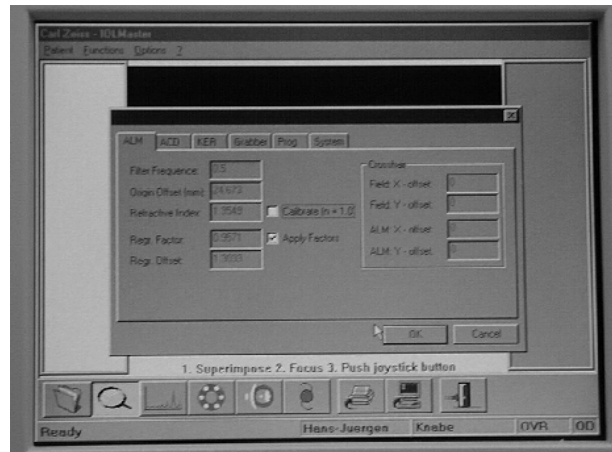
Fig. 37

7.1.1.2 ACD
(Measurement of the depth of the anterior chamber)

Here, all calibration values for the measurement of the anterior chamber depth are displayed; however, they cannot be changed. For standard operation, the "Camera Adjustment" box must be inactive.
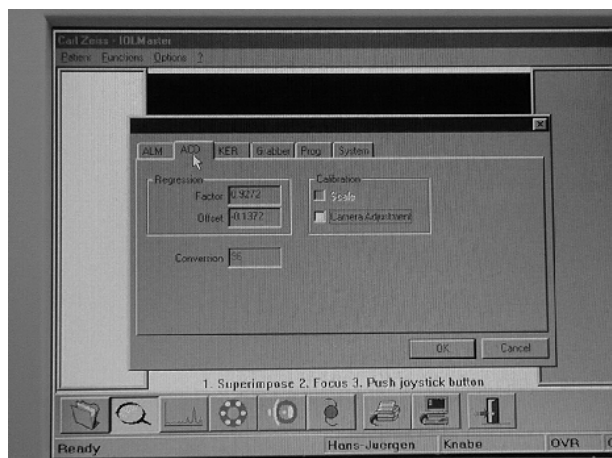
Fig. 38

7.1.1.3 KER (Keratometer measurement)

Here, all calibration values for corneal curvature measurement are displayed; however, they cannot be changed with the exception of the Keratometer refractive index. The default value is 1.332, but it can be changed by the user.

Fig. 39

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7.1.1.4 Grabber (settings of the CCD camera)

Here, the current settings (brightness, contrast and exposure time) of the CCD camera are displayed and entered. Brightness and contrast have been adjusted to medium settings (approx. 128 for brightness and approx. 258 for contrast) and should not be changed. Neither should the settings for the shutter speeds (surrounding field: 1/500, ALM 1/250, KER 1/50 and ACDM 1/50) be changed.
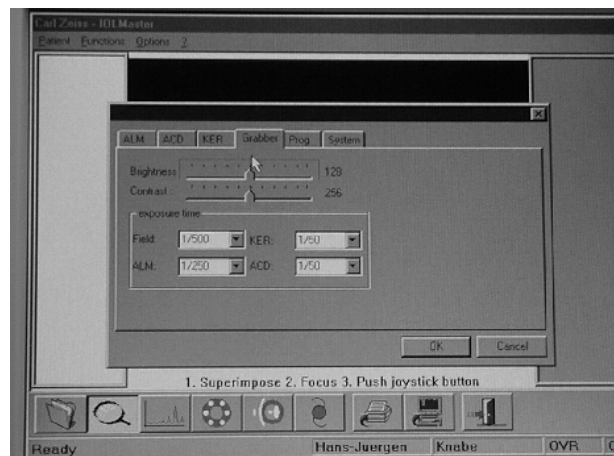
Fig. 40

7.1.1.5 Prog (settings for additional program functions)

Here, additional program functions are displayed which can also be called:

Save

The memory functions for CCD images "Grab image", "Zip Archive" and "Temporary image" which can be activated here must be deactivated for standard operation.

Output

Here, additional outputs on the screen can be activated which, however, must be deactivated in standard operation (are automatically reset when the IOLMaster is turned on).
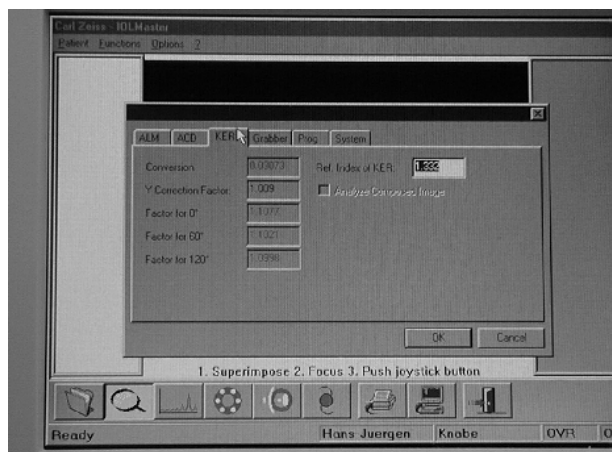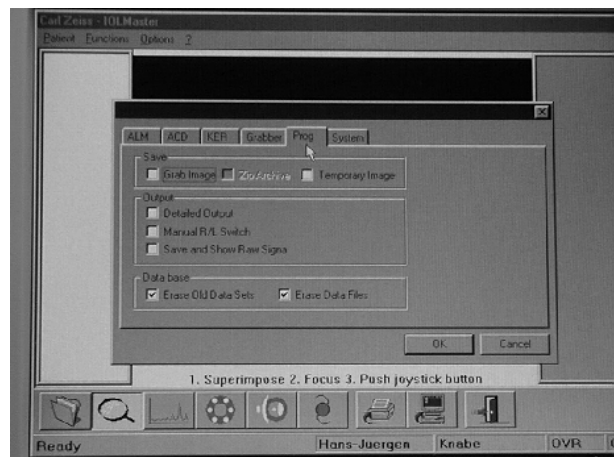

Fig. 41

Detailed Output in Keratometer measurement, the results of the five individual measurements including the average derived from them are displayed (in standard mode, the average is only shown).
Manual R/L Switch allows the measurement to be switched over from the right to the left eye with the <R> and <L> keys without any need to move the unit.
Save and Show Raw signal also shows the digitized APD signal during axial length measurement (interference signal).

Database

Allows the activation of the automatic deletion of patient files after a specific period. In standard operation, the "Erase Old Data Sets" and "Erase Data Files" boxes must be active to ensure that all datasets stored longer than the specified period are deleted.

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7.1.1.6 System (calling Windows utility programs and test programs)

The „Windows Explorer" allows the processing of files.

The „Control Panel" is used to enter and change system settings.

The speed test is used to set the speed of the interferometer motor.

"data_dbf" create / update is used to create a new "data.dbf" file.

The PIO Test is used to check the interfaces between the PC and the IOL measuring head. The PIO Test program includes the following sub-programs:
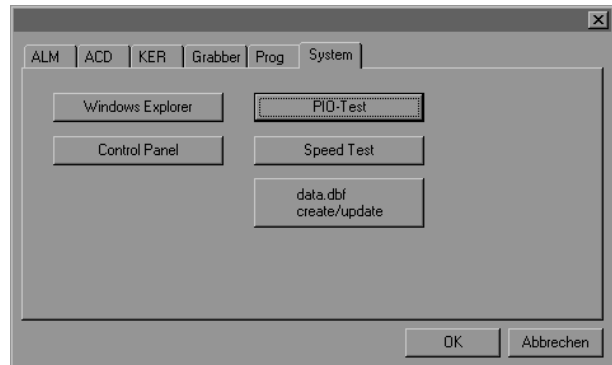
Fig. 42

7.1.1.7 PIO Test (Parallel Input / Output Test)
PIO Ports
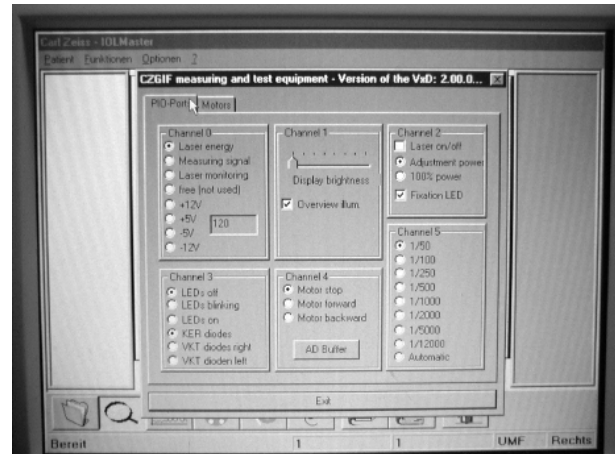
Fig. 43

Note:
When not used, the PIO Port test program switches off after approx. 5 min.
In this case, the complete program must be restarted.

<u>**Channel 0**</u>

O	Laser energy	AC signal (180 kHz) of the APD (no display).
O	Measuring signal	DC signal of the APD
O	Laser monitoring	signal of photodiode for monitoring the laser diode (80/8)
O	free (not used)	
O	+ 12 V	actual value for +12V, nominal 168 $\pm$ 9 increments
O	+ 5 V	actual value for +5V, nominal 168 $\pm$ 9 increments
O	- 5 V	actual value for –5V, nominal 88 $\pm$ 9 increments
O	- 12 V	actual value for –12V, nominal 108 $\pm$ 9 increments

XXX	display of selected digital reading

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Channel 1

Display brightness	brightness setting of display
☐ Overview illum.	switching on / off the surrounding field illumination *)

Channel 2

Note:

These functions will only be available if the ALM mode has been switched on before the start of the Service program or if the fixation LED has been switched off.

☐ Laser on / off	switching on/off the interferometer laser diode
Ο Adjustment power	interferometer laser diode is operated at 40μW
Ο 100 % power	interferometer laser diode is operated at 400μW

Caution:

Only operate the interferometer laser diode at 400μW power for a maximum of 5 min!

☐ Fixation LED	switching on/off the fixation diode *)

*) Note:

Before the PIO Port program is terminated, **switch off** both diodes or run down the IOLMaster and switch off and back on again.

Channel 3

Note:

These functions will only be available if the ALM mode has been switched on before the start of the Service program or if the fixation LED has been switched off.

Ο LEDs off	switches off all diodes specified below
Ο LEDs blinking	switches on diodes selected below; diodes blink
Ο LEDs on	switches on diodes selected below; diodes are constantly on
Ο KER Diodes	selects diodes for keratometer measurement markings
Ο VKT Diodes right	right selects diodes for right-hand slit illumination
Ο VKT Diodes left	left selects diodes for left-hand slit illumination

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Channel 4

   O Motor stop   switches off interferometer motor

   O Motor forward   interferometer motor moves prism slide upward

   O Motor backward   interferometer motor moves prism slide

       AD Buffer   do **not** click this button

Channel 5

Setting of the current exposure time of the CCD camera. After the PIO Test program has been terminated, the specified exposure time is automatically re-set for the individual modes.

Motors
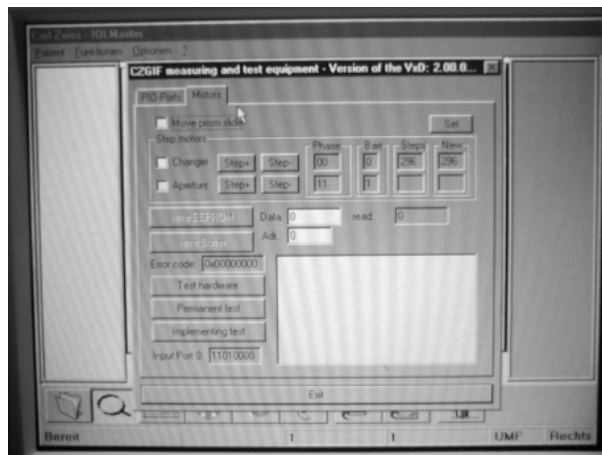
Fig. 44

Move prism slide .... constantly moves interferometer motor between upper and lower ends of its travel range.

Set .... stores the newly defined number of steps

Changer.................................. activates the checking and setting of the stepper motor for magnification changer.

Step + ... moves the changer in individual steps in positive direction (changer moves to the **left**).

Step - .... moves the changer in individual steps in negative direction (changer moves to the **right**).

Phase..................................... indicates the control phase of the two motor windings of the stepper motor (00, 01, 10 and 11).

Barr. .... indicates the switching status of the light barrier for positioning the changer.

Steps...................................... indicates the number of steps stored from one end position of the changer to the other.

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New .... indicates the number of steps required from one end position of the changer to the other. (Can be stored with the Set button).

Aperture................................. activates the check and setting of the stepper motors for the viewing aperture.

Step + ... moves the aperture in individual steps counterclockwise (3 steps for complete movement).

Step - .... moves the aperture in individual steps clockwise (3 steps for complete movement).

Phase..................................... indicates the control phase of the two motor windings of the stepper motors for the aperture (00, 01, 10 and 11).

Barr. .... indicates the switching status of the light barrier for positioning the aperture (changes from 1 to 0 when the aperture is moved into its working position with Step +).

Test Hardware........................ triggers complete movement cycles of the changer, aperture and interferometer motor, checks also the operating voltages, the laser power and the linear encoder (LIE 4) of the interferometer for correct functions, if errors occur, the relevant error messages will be displayed.

Permanent hardware test ..... as Test Hardware; however, after a pause, a new cycle is automatically started.

Implementing test .... checks the PC functions using a special test device (for factory use only)

7.1.1.8 Speed Test (checking and setting the motor speed)

The curve must lie between 80 and 700 ms at 17.75 kHz, its peaks must be located in between the two limiting lines.

Fig. 45

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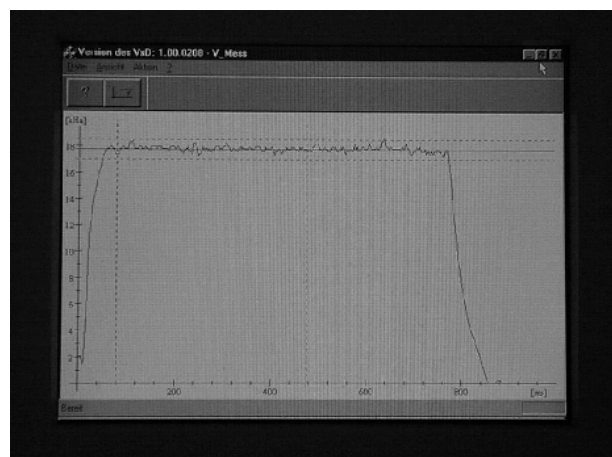SM-30-4039-A1-en   Ersatz für Ausgabe / Replaces issue: 07.03.2000   Page **41** to 58

7.1.1.9 Creating / updating a data.dbf file

To create a new "data.dbf" file if the file had to be deleted, as it was corrupted. However, the "*.iol" patient files (in the C:\Data directory) must still be uncorrupted.

- Delete the corrupted "data.dbf" file either in the "Windows Explorer" (in this case, the IOLMaster must be in the "<u>Overview"</u> mode and <u>not</u> in the "<u>New Patient</u>" mode) or on the DOS level using the "del C:\data\data.dbf" command.

- Terminate the "Windows Explorer" or switch the IOLMaster off and then back on again. Create a test patient file and then call the Service program in the overview mode via the menu "Options", "Service" and "Password".

- Call the "System" function.

- Click the "data.dbf create/update" button.
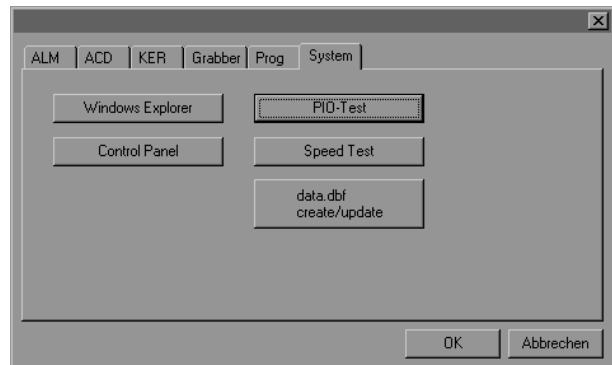
Fig. 46

- Click the "Data" directory which contains the patient data.

  - In the right-hand half of the window, a list of all patient files available is displayed.

- Click the "Create/Update" button.

  - A new "data.dbf" file is now automatically created from the patient files provided.
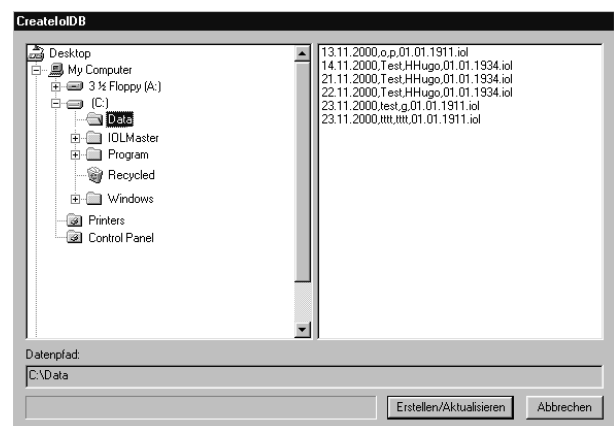
- Terminate the Service program with OK.

Fig. 47

Note:

If the "data.dbf" file is re-created, the following information, if it was ever input, is lost in the new file:
patient ID number, refraction values, visual acuity values and remarks.

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7.2 Adjusting the PCBs

7.2.1 Digital IOL PCB

7.2.1.1 Adjusting the laser power

- Switch on the IOLMaster and select the ALM mode.

- Start the Service program as described in point 7.1.1. Call the "System" function and then "PIO Test".

- Close the "PIO Test" window again.(click in free area on the screen).

- Terminate the Service program.

- Re-select the ALM mode.

- Re-open the PIO Test using the <Alt>+<Tab> keys.

- Connect the LM2 detector to the Fieldmaster and set it to 780nm.

Fig. 48

- Screw centering sleeve 1094-546 on to the LM2 detector and hold the detector in front of the exit aperture of the IOLMaster.

- Click the "Laser On" and "Adjustment Power" functions.

- Use R 28 potentiometer ((1) Fig. 48) to set the laser power to $40 \pm 2\mu W$.

- Switch to "100 % Power".

- Use R 30 potentiometer ((2) Fig. 48) to set the laser power to $400 \pm 4\mu W$.

- After adjusting the laser power also adjust the laser monitoring system as described in point. 7.2.2.1.
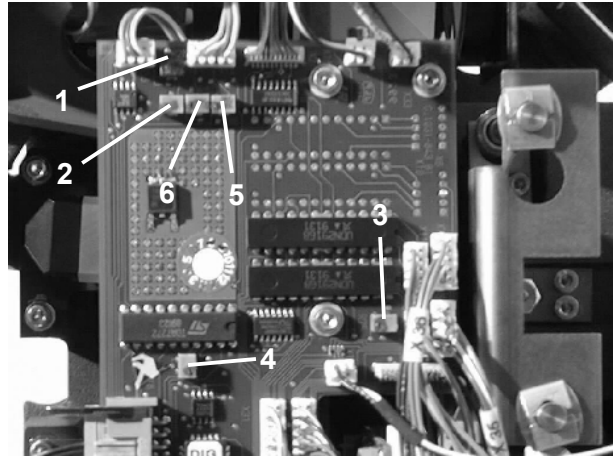
Caution:
Do not set a laser power higher than $400\mu W$. Complete the setting within 5min.

- Switch back to "Adjustment Power" immediately after completing the setting.

Note:
If the laser power is unstable, the most likely cause is that the laser diode is defective. In this case, the complete IOL measuring head must be replaced.

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7.2.1.2 Adjusting the sensitivity of the CCD camera

- Adjust the R 75 potentiometer ((3) Fig. 48) in such a way that a voltage of + 3.4V is present at the potentiometer slider, measured against ground (ground connection is the square shaped hole pattern on the Digital IOL PCB).

7.2.1.3 Adjusting the motor speed

- Switch on the IOLMaster, select the ALM mode and start the Service program as described in point 7.1.1.
- Call the "System" and "Speed Test" functions.
- Trigger a motor test run using the start button on the joystick.
- If the curve does not lie in the range required, use the R 70 potentiometer ((4) Fig. 48) to adjust the speed. Trigger a new test run every time the potentiometer has been re-adjusted.
- If the curve displays excessive peaks, the motor pinion and the toothed rack are enmeshed too closely (causing stiff motion) or movement of the prism slide is stiff.
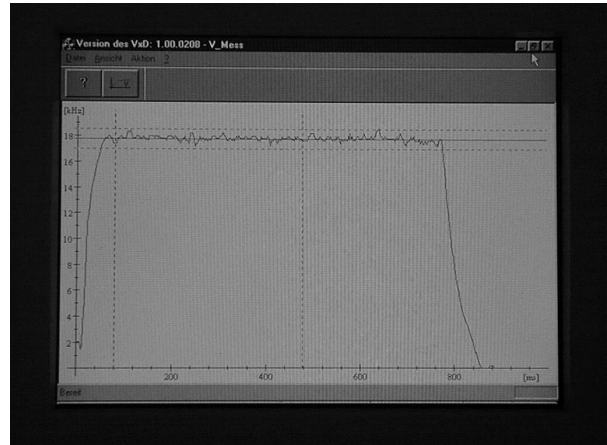
Fig. 49

7.2.1.4 Adjusting the brightness of the surrounding field illumination

- Switch on the IOLMaster and select the "Overview" mode.
- Using the "Options" menu, select the "Test eye" function.
- Use the R 86 potentiometer ((5) Fig. 48) to adjust the brightness of the surrounding field illumination in such a way that a well-illuminated image without glare of the test eye displayed.

7.2.1.5 Adjusting the brightness of the keratometer measurement markings

- Switch on the IOLMaster and select the KER mode.
- Using the "Options" menu, select function "Test eye".
- Use the R 87 potentiometer ((6) Fig. 48) to adjust the brightness of the keratometer measurement markings in such a way that they are imaged without glare with a bright center and a clearly visible but weaker halo.

Fig. 50

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7.2.2 APD PCB

7.2.2.1 Adjusting the laser monitoring system

- Switch on the IOLMaster and select the ALM mode.
- Start the Service program as described in point 7.1.1 and call the "System" and "PIO Test" functions.
- Close the "PIO Test" window again (click in free area on the screen).
- Terminate the Service program.
- Call the ALM mode a second time.
- Re-open the "PIO Test" window using the <Alt>+<Tab> keys.
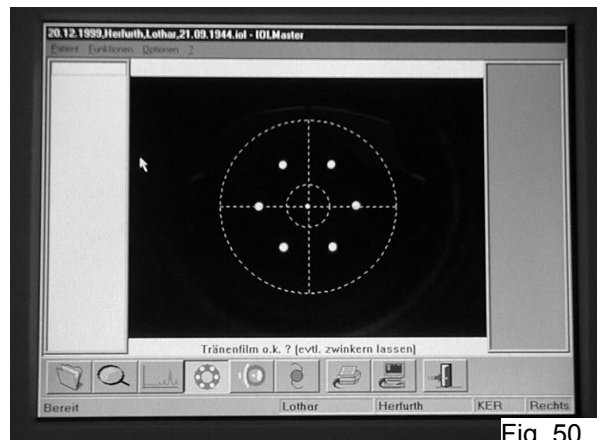- Click the „"Laser monitoring" and "100 % Power" functions. Click "Laser Off" (box inactive).

Fig. 51

- Note down measurement result as "Laser-off reading" (typical reading approx. 128).
- Click "Laser On" (box active) and note down measurement result as "Laser-on reading 100 %" (typical reading approx. 48).
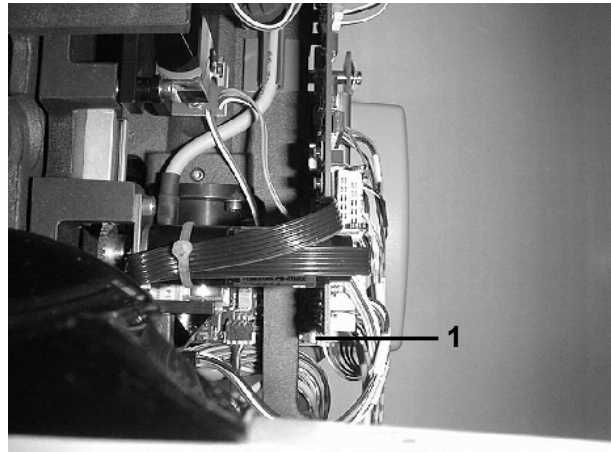
Note:

Do not operate the laser diode at "100 % Power" for more than 5 minutes.

- The difference between "Laser-off reading" – "Laser-on reading 100%" must be 80 ± 4 increments.
- If this reading is not obtained, adjust the R 25 potentiometer ((1) Fig. 51) as required.
- After the adjustment has been completed, switch to the "Adjustment Power" function and note down the measurement result as "Adjustment power reading" (typical reading approx. 120).
- The difference between the "Laser-off reading" – "Adjustment power reading" must be 8 ± 2 increments.

Notes:

Do not change the settings of the two other potentiometers on the APD PCB.

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7.3. List of error messages and tips for trouble shooting

7.3.1 Possible error messages during powering up:

Error message (plain text)	Possible cause	Remedy
Changer: optocoupler always on	The signal of the changer light barrier always is "0" (on). - Defective light barrier. - Stepper motor does not run, defective motor or digital IOL PCB. - Defective digital IOL PCB. - Defective GIF IOL PCB - Defective control cable connection.	- Change light barrier , see pt. 6.16. - Change digital IOL PCB, see pt. 6.10, or measuring head, see pt. 5.1. - Change digital IOL PCB, see pt. 6.10. - Change GIF IOL PCB. - Change or repair control cable, see pt. 6.9.
Changer: optocoupler not found	The signal of changer light barrier always is "1" (off). - Defective light barrier or connection interrupted. - Stepper motor does not run, motor or digital IOL PCB defective. - Defective digital IOL PCB. - Defective control cable connection. - Defective GIF IOL PCB	- Change light barrier, see pt. 6.16, repair connection. - Change digital IOL PCB, see pt. 6.10.or change measuring head, see pt. 5.1. - Change digital IOL PCB, see pt. 6.10. - Change or repair control cable, see pt. 6.9. - Change GIF IOL PCB.
Changer: step error in forward direction	- Faulty alignment of changer. - Defective stepper motor. - Stiff motion of changer.	- Align changer, see pt. 6.16. - Change measuring head, see pt. 5.1. - Repair changer.
Changer: step error in backward direction	- Faulty alignment of changer. - Defective stepper motor. - Stiff motion of changer.	- Align changer, see pt. 6.16. - Change measuring head, see pt. 5.1. - Repair changer.
Aperture: optocoupler always on	The signal of the changer light barrier always is "0" (on). - Defective light barrier. - Stepper motor does not run, motor or digital IOL PCB defective. - Defective digital IOL PCB. - Defective GIF IOL PCB. - Defective control cable connection - Defective GIF IOL PCB.	- Change light barrier , see pt. 6.16. - Change digital IOL PCB, see pt. 6.10, or measuring head, see pt. 5.1. - Change digital IOL PCB, see pt. 6.10. - Change GIF IOL PCB. - Change or repair control cable, see pt. 6.9. - Change GIF IOL PCB.

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Error message (plain text)	Possible cause	Remedy
Aperture: step error	- Defective stepper motor. - Stiff motion of aperture.	- Change measuring head, see pt. 5.1. - Repair aperture.
Aperture: optocoupler not found	The signal of changer light barrier always is "1" (off). - Defective light barrier or connection interrupted. - Stepper motor does not run, defective motor or digital IOL PCB. - Defective digital IOL PCB. - Defective control cable connection. - Defective GIF IOL PCB.	- Change light barrier, see pt. 6.16, or repair connection. - Change digital IOL PCB, see pt. 6.10.or change measuring head, see pt. 5.1. - Change digital IOL PCB, see pt. 6.10.. - Change or repair control cable, see pt. 6.9. - Change GIF IOL PCB.
Sledge: optocoupler don´t switch (No AL measurement possible, prism sledge does not move).	The signal of the lower light barrier on the prism slide always is "1" (off) - Defective light barrier or connection interrupted. - Defective digital IOL PCB. Interferometer does not run up. - Defective motor or connection. - Defective Digital IOL PCB.	- Change light barrier, or repair connection. - Change digital IOL PCB, see pt. 6.10. - Change the motor, see pt. 6.6, repair connection. - Change the Digital IOL PCB, see pt. 6.10.
Sledge: bottom optocoupler not found	The signal of the lower light barrier always is "1". - Defective light barrier. - Defective digital IOL PCB.	- Change lower light barrier (right). - Change digital IOL PCB, see pt. 6.10..
Sledge: upper optocoupler not found	The signal of the upper light barrier always is "1". - Defective light barrier. - Defective digital IOL PCB.	- Change upper light barrier (left). - Change digital IOL PCB, see pt. 6.10..

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Error message (plain text)	Possible cause	Remedy
LIE4: no zero pulse backward	Motor of prism slide does not run. - Defective motor or connection. - Defective digital IOL PCB. Motor of prism slide is running. - Defective digital IOL PCB. - Defective linear encoder or defective connection. - Defective control cable connection. - Defective GIF IOL PCB.	 - Change motor, see pt. 6.6. - Change digital IOL PCB, see pt. 6.10. - Change digital IOL PCB, see pt. 6.10. - Change measuring head, see pt. 5.1. or repair connection. - Change control cable, see pt. 6.9. - Change GIF IOL PCB.
LIE4: measurement length backward too short	- Defective interferometer. - Stiff motion of prism slide/ motor. - Incorrect motor speed. - Defective digital IOL PCB. - Upper or lower light barrier out of alignment.	- Change measuring head, see pt. 5.1. - Change measuring head, see pt. 5.1. Change motor, see pt. 6.6. - Adjust speed, see pt. 7.2.1.3. - Change digital IOL PCB, see pt. 6.10. - Move light barrier concerned as far upward or downward as possible, increasing the path for the slide as far as possible.
LIE4: no zero pulse forward	Motor of prism slide does not run. - Defective motor or connection. - Defective digital IOL PCB. Motor of prism slide runs. - Defective digital IOL PCB. - Defective linear encoder or defective connection - Defective control cable connection. - Defective GIF IOL PCB	 - Change motor, see pt. 6.6. - Change digital IOL PCB, see pt. 6.10. - Change digital IOL PCB, see pt. 6.10. - Change measuring head, see pt. 5.1 or repair connection. - Change control cable, see pt. 6.9. - Change GIF IOL PCB.
LIE4: measurement length forward too short.	- Defective interferometer. - Stiff motion of prism slide/ motor. - Incorrect motor speed. - Defective digital IOL PCB. - Upper or lower light barrier out of alignment.	- Change measuring head, see pt. 5.1. - Change measuring head, see pt. 5.1. Change motor, see pt. 6.6. - Adjust speed, see pt. 7.2.1.3. - Change digital IOL PCB, see pt. 6.10. - Move light barrier concerned as far upward or downward as possible, increasing the path for the slide as far as possible.

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Error message (plain text)	Possible cause	Remedy
Laser: adjustment power too low.	- Faulty adjustment of laser power. - Defective reflecting diode. - Defective digital IOL PCB. - Incorrect adjustment of laser monitoring. - Defective laser diode.	- Adjust laser power, see pt. 7.2.1.1. - Change measuring head, see pt. 5.1 - Change digital IOL PCB, see pt. 6.10. - Adjust laser monitoring as per pt. 7.2.2.1. - Change measuring head, see pt. 5.1.
Laser: adjustment power too high	- Faulty adjustment of laser power. - Defective digital IOL PCB. - Incorrect adjustment of laser monitoring. - Defective laser diode.	- Adjust laser power, see pt. 7.2.1.1. - Change digital IOL PCB, see pt. 6.10. - Adjust laser monitoring as per pt. 7.2.2.1. - Change measuring head, see pt. 5.1.
Laser: 100% power too low	- Faulty adjustment of laser power. - Defective reflecting diode. - Defective digital IOL PCB. - Incorrect adjustment of laser monitoring. - Defective laser diode.	- Adjust laser power, see pt. 7.2.1.1. - Change measuring head, see pt. 5.1. - Change digital IOL PCB, see pt. 6.10. - Adjust laser monitoring as per pt. 7.2.2.1. - Change measuring head, see pt. 5.1.
Laser: 100% power too high	- Faulty adjustment of laser power. - Defective digital IOL PCB. - Incorrect adjustment of laser monitoring. - Defective laser diode.	- Adjust laser power, see pt. 7.2.1.1. - Change digital IOL PCB, see pt. 6.10 - Adjust laser monitoring as per pt. 7.2.2.1. - Change measuring head, see pt. 5.1.
no laser switch off!	- Defective digital IOL PCB. - Defective APD PCB.	- Change digital IOL PCB, see pt. 6.10. - Change APD PCB, see pt. 6.7.
+ 12V: too low	- Defective power supply. - Defective APD PCB. - Defective GIF IOL PCB. - Defective control cable connection. - Defective digital IOL PCB.	- Change power supply, see pt. 6.13. - Change APD PCB, see pt. 6.7. - Change GIF IOL PCB. - Change or repair control cable, see pt. 6.9. - Change digital IOL PCB, see pt. 6.10.
+ 12V: too high	- Defective power supply. - Defective APD PCB. - Defective measuring head/PC connection	- Change power supply, see pt. 6.13. - Change APD PCB, see pt. 6.7. - Repair connection.
+ 5V: too low	- Defective APD PCB. - Defective GIF IOL PCB.	- Change APD PCB, see pt. 6.7. - Change GIF IOL PCB.

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Error message (plain text)	Possible cause	Remedy
+ 5V: too high	- Defective APD PCB. - Defective measuring head/PC connection.	- Change APD PCB, see pt. 6.7. - Repair connection.
- 5V: too low	- Defective APD PCB. - Defective measuring head/PC connection.	- Change APD PCB, see pt. 6.7. - Repair connection.
- 5V: too high	- Defective APD PCB.	- Change APD PCB, see pt. 6.7.
- 12V: too low	- Defective APD PCB. - Defective measuring head/PC connection	- Change APD PCB, see pt. 6.7. - Repair connection.
-12V: too high	- Defective APD PCB. - Defective power supply.	- Change APD PCB, see pt. 6.7. - Change power supply, see pt. 6.13.
Power limit reached. \nPlease call service!	Laser power too high. - Incorrect adjustment of laser power. - Defective Digital IOL PCB. - Defective APD PCB. - Defective laser diode. - Incorrect adjustment of laser monitoring.	- Perform adjustment as per pt. 7.2.1.1. - Change the Digital IOL PCB, see pt. 6.10. - Change APD PCB, see pt. 6.7. - Change measuring head, see pt. 5.1. - Adjust laser monitoring as per pt. 7.2.2.1.

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7.3.2 Possible error messages during use

Error message (plain text)	Possible cause	Remedy
ERR: no image possible.	No video image can be obtained. - Defective computer PCB (frame grabber). - Problems in IOL Master software.	 - Change computer PCB, see pt. 6.12 - Perform IOL Master update.
ERR: 0x%x, laser fixation power too strong.	Laser power too high. - Incorrectly set laser power of 40 μW. - Incorrect adjustment of laser monitoring. - Defective Digital IOL PCB. - Defective APD PCB. - Defective laser diode.	- Adjust laser power as described in pt. 7.2.1.1. - Adjust laser monitoring as described in pt. 7.2.2.1. - Change Digital IOL PCB, see pt. 6.10. - Change APD module PCB, see pt. 6.7. - Change measuring head, see pt. 5.1.
ERR: 0x%x, laser fixation power too low.	Laser power too low. - Incorrectly set laser power of 40 μW. - Incorrect adjustment of laser monitoring. - Defective Digital IOL PCB. - Defective APD PCB. - Defective laser diode.	- Adjust laser power as described in pt. 7.2.1.1. - Adjust laser monitoring as described in pt. 7.2.2.1. - Change Digital IOL PCB, see pt. 6.10. - Change APD module PCB, see pt. 6.7. - Change measuring head, see pt. 5.1.
ERR: 0x%x, laser power too strong, mesurement interrupted.	Laser power too high during measuring cycle. - Incorrectly set laser power of 400 μW. - Incorrect adjustment of laser monitoring. - Defective Digital IOL PCB. - Defective APD PCB. - Defective laser diode.	 - Adjust laser power as described in pt. 7.2.1.1. - Adjust laser monitoring as described in pt. 7.2.2.1. - Change Digital IOL PCB, see pt. 6.10. - Change APD module PCB, see pt. 6.7. - Change measuring head, see pt. 5.1.

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Error message (plain text)	Possible cause	Remedy
ERR: 0x%x, laser power too low.	Laser power too low during measuring cycle. - Incorrectly set laser power of 400 μW. - Incorrect adjustment of laser monitoring. - Defective Digital IOL PCB. - Defective APD PCB. - Defective laser diode.	- Adjust laser power as described in pt. 7.2.1.1. - Adjust laser monitoring as described in pt. 7.2.2.1. - Change Digital IOL PCB, see pt. 6.10. - Change APD module PCB, see pt. 6.7. - Change measuring head, see pt. 5.1.
ERR: 0x%x, power limit reached. \nPlease call service!	Laser power much too high (end of AD conversion range reached). - Defective Digital IOL PCB. - Defective APD PCB. - Defective laser diode.	- Change Digital IOL PCB, see pt. 6.10. - Change APD module PCB, see pt. 6.7. - Change measuring head, see pt. 5.1.
ERR: 0x%x, no zero pulse.	Zero pulse of LIE4 path-measuring encoder is missing. - Defective path-measuring encoder. - Defective Digital IOL PCB. - Connection in control cable interrupted. - Defective GIF IOL PCB.	- Change measuring head, see pt. 5.1. - Change Digital IOL PCB, see pt. 6.10. - Repair or change control cable, see pt. 6.9. - Change GIF IOL PCB.
ERR: 0x%x, data file not readable.	Corrupted patient file.	- Delete relevant file in Windows Explorer and update "data.dbf" file, see pt. 7.4.4.
ERR: 0x%x, undefined Error.	-	-

Note:
0x%x stands for the relevant error code.

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7.4 Computer

7.4.1 Creating a boot diskette

- Create a test patient file or double-click a patient name provided.
- Call the Service program via the "Options" menu.
- Select the "System" function and click "Control Panel".
- Click the "Add/Remove Programs" symbol.
- Select the "Start Up Disk" register card and click "Create Disk".
- Insert blank diskette labeled with "IOLMaster Start Diskette Windows 95 English" in drive A.
- Click the "OK" button to create the diskette.
- Terminate "Control Panel" and the Service program.

7.4.2 Changing the boot sequence

To allow the startup of the IOLMaster computer in an emergency using a boot diskette, the boot sequence must be changed as follows in the BIOS Setup:

- Switch off the IOLMaster.
- Press and hold the <Del> key and switch on the IOLMaster.
- Enter the "MED586" password.
- Select the "BIOS FEATURES SETUP" function.
- Select the "Boot Sequence" setting and set the boot sequence to "A, C, SCSI" using the <Pg Up> or <Pg Dn> keys.
- Press the <Esc> key and then <F10>.
- Insert the boot diskette in drive A.
- Press the <Y> key and then <Enter>.
- After the boot procedure, the "A:\>"prompt is displayed. Using DOS commands, you can now perform various actions.
- After completing all steps, switch off the IOLMaster and set the boot sequence to "C only" using the procedure described above.

7.4.3 Emergency update of the IOLMaster program

If it is no longer possible to load the IOLMaster program via the usual path: "Options", "Setup" and "Update", proceed as follows:

- Change the boot sequence as per point 7.4.2 and start the IOLMaster using a boot diskette.
- Copy the contents of the update diskette on to the hard disk using the DOS command "copy A:*.* C:\iolmas~1\update".
- Switch off the IOLMaster after completion of the copying procedure. Remove the diskette from the drive and switch on the IOLMaster.
- After the boot procedure, the IOLMaster program is automatically fetched from the update directory and installed.

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7.4.4 Deleting, re-creating or updating the "data.dbf" file

If the "data.dbf" file which is used as the table of contents of the patient database is corrupted, the IOLMaster will often be inoperative and stop after it has been switched on, displaying a Windows error message.
In this case, the "data.dbf" file must be deleted and created anew.

- Change the boot sequence as per point 7.4.2 and start the IOLMaster using a boot diskette.
- Delete the "data.dbf" file using the DOS command "del C:\data\data.dbf".
- Switch off the IOLMaster, remove the boot diskette from drive A and switch on the IOLMaster.
- Enter the test patient and terminate the input with <Enter>.
- Call the Service program via the "Options" menu and "Service" and password input. Click the "System" function and then "data.dbf.create//update".
- Click the "Data" directory in the directory tree now shown. A list of all patient files available is displayed in the right-hand part of the window.
- Click the "Create/Update" button. This creates a new "data.dbf" file from the patient files provided.
- Terminate the Service program with "OK".
- All patient data should now be available in the "New Patient" program part.

Note:

If the "data.dbf" file is re-created, the following information, if it was ever input, is lost in the new file:
patient ID number, refraction values, visual acuity values and remarks.

7.4.5 Deleting/generating passwords

If passwords have been forgotten or are not known, they can be deleted/generated or backup copies of the IOL databases can be made.

- Select the "Overview" mode and call the Service program via "Options", "Service" and the password.
- Select the "System" function and start the Windows Explorer.
- Double-click the "Windows" folder and start the "regedit.exe" program by double-clicking it.
- Open the "HKEY CURRENT USER", "Software", "Zeiss", "IOLMaster" and "IOLDB" folders one after the other by double-clicking them.
- Click the folder of the user concerned.
- The value shown under "Default" is the password wanted ("#" means there is no password!).
- After double-clicking "Default", you can delete the password by entering "#".
- Terminate the "regedit.exe", "Windows Explorer" and Service programs.

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7.4.6 Deleting and re-generating the optimization database.

If the "IOLDB.mdb" database is corrupted, it may be possible that no patient data for the optimization of the IOL data can be called.
In this case, the "IOLDB.mdb" file should be deleted, the IOLMaster switched off and then back on again. This results in the generation of a new optimization database using the patient file provided.

- Select the "Overview" mode and call the Service program via "Options", "Service" and the password.
- Select the "System" function and start the Windows Explorer.
- Delete the "IOLDB.mdb" file in the "C:\" basic directory.
- Terminate the "Windows Explorer" and the Service program.
- Switch the IOLMaster off and then back on again.
- An "IOLDB.mdb" optimization database is automatically generated from the patient data available during the boot procedure.

7.4.7 Changing the transfer parameters for the serial interface

- Select the "Overview" mode and call the Service program via "Options", "Service" and the password.
- Select the "System" function and start the Windows Explorer.
- Open the "IOLMaster" folder by double-clicking it.
- Double-click the "iol.ini" file to open it.
- Edit the last line "Init = 19200, n, 8, 1" of the file as required. The assignment of the inputs is as follows:
  Init = baud rate, parity, number of data bits, number of stop bits
- Save and terminate the changed file via the "File" menu.
- Terminate the "Windows Explorer" and the Service program.

Note:
The new parameter setting will not become effective until after a restart of the IOLMaster.

7.4.8 Triggering a measurement

You can trigger measurements of the IOLMaster as follows:

1. Using the pushbutton in the joystick.
2. Using a foot switch (option).
3. Using the <Strg> + <F> key combination.

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7.4.9 Printers and printer driver

7.4.9.1 Printers approved for connection to the IOLMaster:

Hewlett Packard	5 Epson
Desk Jet 695 C	Stylus Color 440
Desk Jet 895 Cxi	Stylus Color 740
Laser Jet 1100	

The following additional printers can be connected if the IOLMaster uses the V2.0 program release or a higher release:

Hewlett Packard	6 Epson
Desk Jet 930	Stylus Color 660
	Stylus Color 880

The above printers have been approved at the time of going to press of the Service Manual. If further printers are approved, you will be informed of this in a Service Bulletin.

7.4.9.2 Installing a printer driver

Please observe the following points when installing a printer driver:

1. Only load the driver necessary for the printer connected. Set the printer used as the standard printer!!!
2. The printer driver must be provided on a diskette.
3. The printer driver used must be compatible with Windows 95 and the latest version should be available.
4. If IOLMasters with German Windows are used, only install <u>German</u> printer drivers; if IOLMasters with English Windows are used, only install <u>English</u> printer drivers.

<u>Installation:</u>

- Switch off the IOLMaster, connect the printer, switch on both the IOLMaster and the printer.
- Select the "Overview" mode and call the "Add Printer" function via the "Options" and "Setup" menus.
- If additional printer symbols (additional printer drivers) are provided in addition to the "Add Printer" symbol, click on them and delete them via "File" and "Delete".
- Double-click the "Add Printer" and continue with "Next" button.
- Click the "Have Disk", insert the first installation diskette in drive A and click "OK".
- Continue the installation of the printer driver by following the instructions displayed on the screen. If possible, define the printer as the standard printer during this procedure. If this is not possible, define the printer as the standard via the "File" menu after you have finished the installation of the driver.
- Check the proper functioning of the printer after the installation of the printer driver.

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7.4.10 Transferring patient files

It is best to transfer large patient files directly from hard disk to hard disk in the Master/Slave mode.

- Remove the hard disk to be changed/the hard disk of the computer to be replaced.
- Program the hard disk removed as the slave by changing the connection of the short-circuit connector(s) (see the sticker on the hard disk).
- Connect the new hard disk/the hard disk of the new computer together with the hard disk defined as the slave to the distributor PCB and the computer PCB (make sure that you correctly connect the bus cable) using a double power supply cable and a bus cable with a twin connector (these cables are available from computer dealers).
- Switch on the IOLMaster.
- Create a test patient file and call the "Overview" mode.
- Start the Service program and click the "System" function.
- Click the "Windows Explorer" button.
- The hard disk programmed as the slave is automatically identified as the drive D by the operating system, while drive C is the master hard disk.
- Delete the empty "Data" folder on drive C (master hard disk).
- Copy or move the "Data" folder of drive D (slaved hard disk) into the "C:\" basic directory of drive C.
- Terminate the "Windows Explorer" and the Service program.
- Shut down the IOLMaster and switch it off.
- Disconnect the hard disk.
- Using the original cables, connect the new hard disk/the hard disk of the new computer and install it.
- Reprogram the slaved hard disk as the master hard disk and install it in the replaced computer, if necessary.

7.4.11 Exporting and importing the lens database

Using this function, you can export the lens data provided for all users to a new hard disk when a hard disk or a computer needs to be changed.

Exporting lens data from the old hard disk:

- Select the "Overview" mode and start the Service program.
- Click the "System" function and start the "Windows Explorer".
- Double-click the "Windows" folder to open it and start the "regedit.exe" program by double-clicking it.
- Select the "IOLDB" folder via the path "HKEY_CURRENT_USER", "Software", "Zeiss" and "IOLMaster" by double-clicking each symbol.
- Mark the "IOLDB" folder by clicking once.
- Click the "Registry" menu and then "Export Registry File".
- Enter the "IOLDB.reg" file name in the "Export Registry File" window and select "3 1/2-Floppy (A:)" under "Save in".
- Insert a blank diskette in drive A and click the "Save" button.

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- Terminate the "regedit.exe" program.
- Terminate the "Windows Explorer" and the Service program.
- Shut down the IOLMaster and switch it off.
- Change the hard disk as described in point 6.17 or the computer as described in point 5.4.

Importing lens data to the new hard disk:
- Create a test patient file and call the "Overview" mode.
- Start the Service program and call the "System" function.
- Start the "Windows Explorer".
- Double-click the "Windows" folder to open it and start the "regedit.exe" program by double-clicking it.
- Click the "Registry" menu and "Import Registry File".
- Insert the diskette containing the previously stored "IOLDB.reg" file in drive A.
- Enter the "IOLDB.reg" file name in the "Import Registry File" window and select "3 1/2-Floppy (A:)" under "Look in".
- Mark the "IOLDB.reg" file.
- Click the "Open" button.
- Acknowledge the transfer of the data with "OK".
- Terminate the "regedit.exe", "Windows Explorer" and the Service programs.

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