Service Manual

NightOWL II

LB 983

ID-No. 40508SA2
Rev. 03 17.09.2010

BERTHOLD TECHNOLOGIES

Contents

1. Installation

Each instrument comes with the following accessories:

Manual (either in German or English, depending on your order)
indiGO software with ”Calibration Data” on a memory stick
Power cord (depending on the country)
USB or network cable (depending on the camera version)

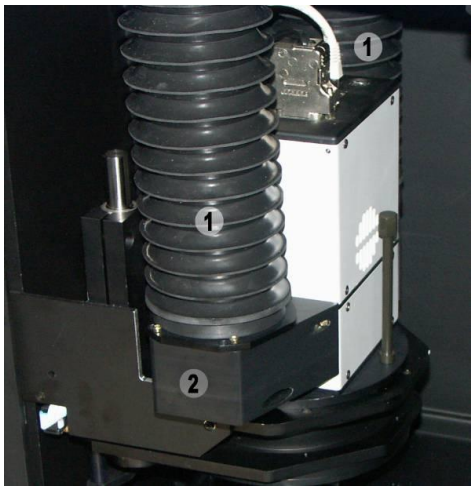
The camera is packed separately. The camera case contains:

Camera
Mounting screws
Ethernet cable (RJ-45) or USB cable

1.1 Camera installation (Ethernet version)

Place the camera on the camera holder showing the NightOWL logo on the camera to the front. Fix the camera using the two fastening screws as shown on the picture.
The two bellows (1) are fixed to the camera adapter (2) with special magnets.
The Ethernet cable (RJ-45 connector) and the power supply connector are plugged in at the upper plate of the camera.

1.2



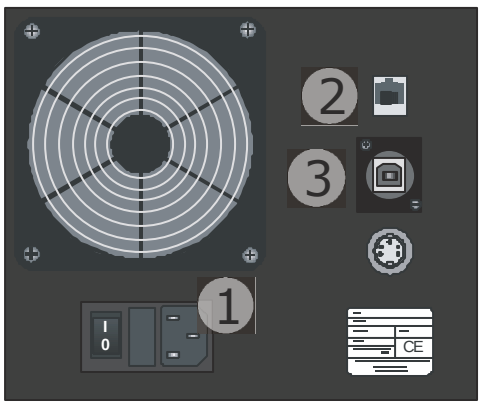
Camera installation (USB version)

The NC 100u uses the USB bus to transfer images and camera control. To install the camera just place the camera on the camera plate facing the "FRONT" label to the front.

Fix the camera with the 2 fastening screws (3). The power supply (4) is connected through a 7 pin Tuchel connector. This connector is on the camera face plate and connects to the power supply connector on the camera plate.
The air adapter (1) is fixed to the camera by a megnet, as well as the air bellow (2).
When uninstalling the camera remove the power adapter to avoid damage during transport.
The USB plug is also located at the face plate of the camera. The cables should be arranged as shown in the image above.

1.3 Connecting the instruments

Connect the instruments as follows:
PC -> *NightOWL (rear panel)*
Power -> Mains socket (1)
LAN port -> LAN socket (2)
(RJ-45 cable) and / or
USB port -> USB socket (3)

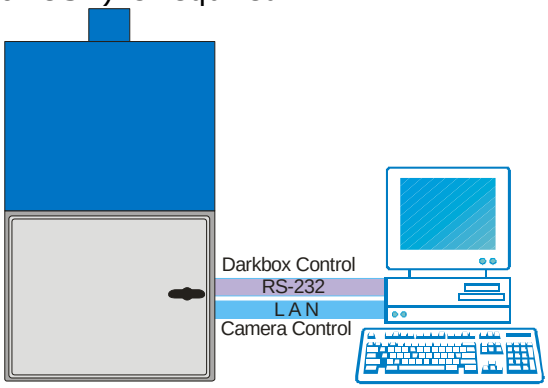


Check to make sure that the system voltage indicated on the instruments matches the line voltage.
Connect all three instruments (PC, monitor, NightOWL) via *one* connector strip to the mains

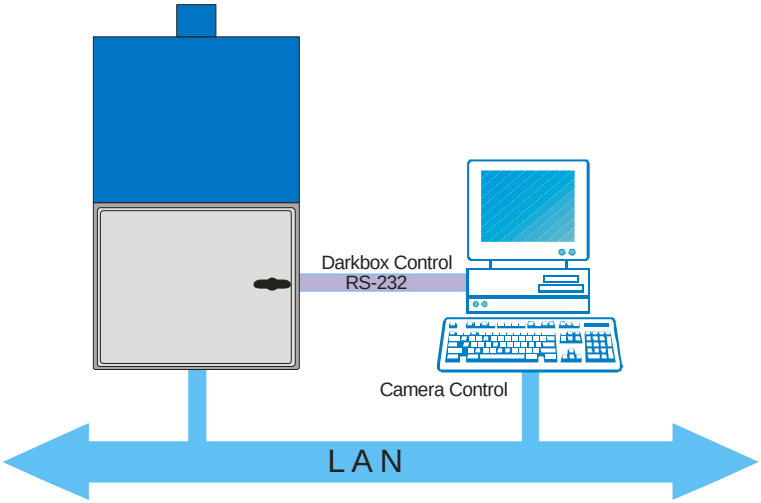
supply and turn the instruments on.

1.4 Connecting the PC (Ethernet)

The NightOWL camera transfers the image information using the Ethernet bus. If the NightOWL is directly connected to the Ethernet interface card of the PC, a so called "cross-over cable" is required (included with the shipment). This cable is plugged into the network adapter on the PC, which is usually implemented on the PC motherboard. If LAN access is required (internet, mail, network printer) an additional network adapter (PCI, PCI Express or USB) is required.



In case the NightOWL should be connected via LAN using the wall socket or a network switch, a regular patch cable is needed. Please keep the local IP address range in mind to avoid IP address collisions. The direct connection between NightOWL and PC is preferred.



To connect the NightOWL to the PC an Ethernet card with RJ-45 connectors is required. Most PCs have such a port already "on board". If not or if the network adapter is already in use, a regular PCI, PCI Express or USB network adapter (100 MBits) is re-

quired. To install the network adapter, please refer to the corresponding operation manual.
For a proper communication with the NightOWL, the IP address of the PC must be set in the range of 192.168.1.xxx (except 192.168.1.117 -> default IP address of the NightOWL camera).To setup the IP address of the PC, please refer to the manual of the used operating system.

1.5 Connecting the PC (USB)

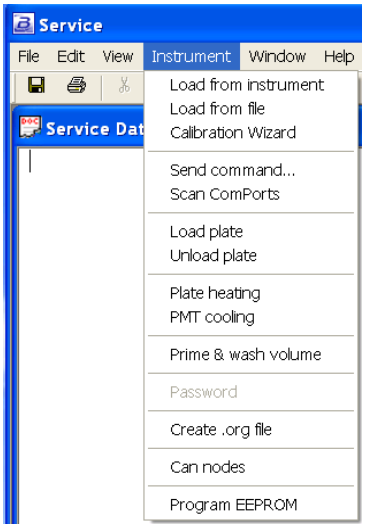
The USB version is easier to connect. Just use the supplied USB-cable to connect the NightOWL to the PC.
After switching on the NightOWL the PC is recognizing new devices and asks for drivers. The required drivers (camera and USB <-> serial converter) are located on the installation CD in the /drivers subdirectory.

1.6 USB Mode programming

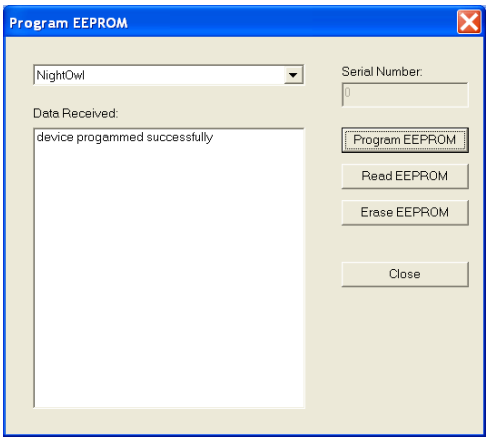
When a NightOWL II was used with WinLight and the user wants to upgrade to indiGO the mode of the USB communication must be changed.
WinLight used the internal USB to serial converter in native mode. That means the internal EEPROM of the converter chip was not programmed specially. When plugging in the NightOWL it was detected as USB to Serial converter. Using indiGO the communication mode was changed which requires the programming of the EEPROM. This is done using the service software. Before running the service software, make sure the following entries are in the service.ini file:

```
[Settings]
ProgramEEprom=1

[EEprom2]
Manufacturer=BertholdTech
ManufacturerId=BT
Description=NightOwl
SerialNumber=BT040508
ProductId=0xB5F2
```



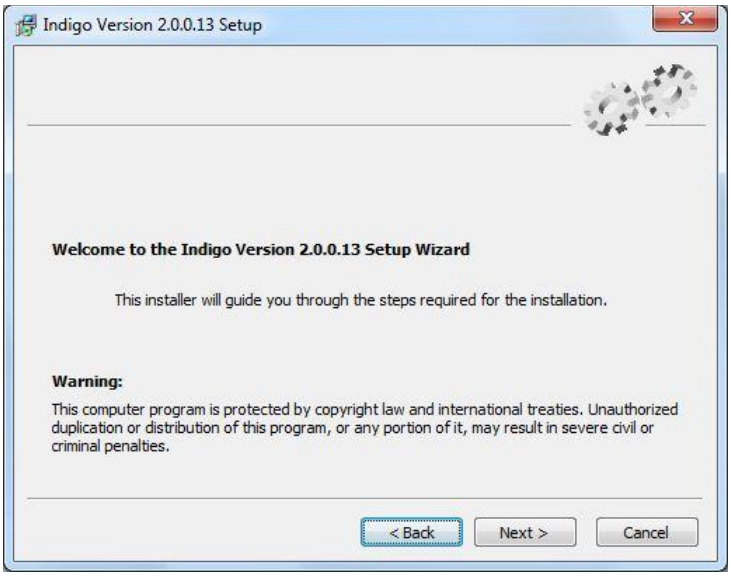
This mode requires the use of specifically modified Berthold Technologies drivers. Otherwise the device driver cannot be installed successfully because of a different vendor ID of the USB device. Run the service software and scan the com port to identify the NightOWL (with not programmed EEPROM). If found select the NightOWL entry in the found instruments list and select "Program EEPROM" from the "Instrument" menu.
The programming dialog box will pop up. Click on "Read EEPROM" to check if the communication is OK and the chip is not programmed.



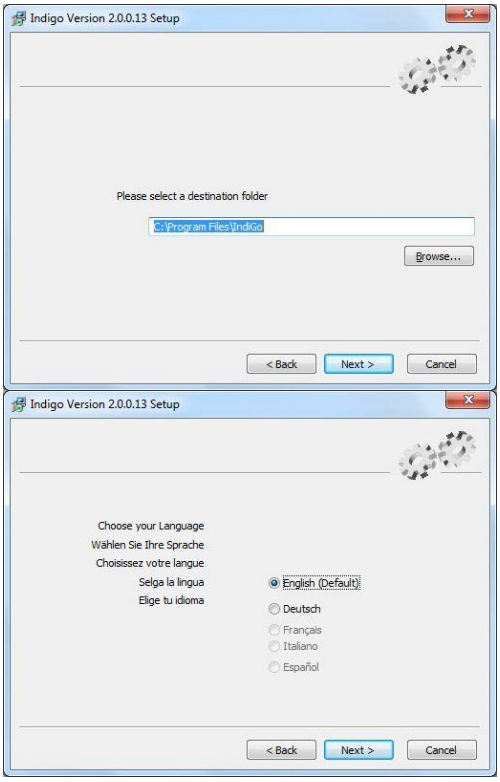
When the readout was successful select the NightOWL from the list of devices and click on "Program EEPROM".
A successful programming is confirmed in the text area (device programmed successfully). Now the NightOWL is programmed and after power cycling the instrument (switch off, wait 5 seconds, switch on) the device will be identified as (Berthold Technologies NightOWL). In addition a NightOWL Serial Port is used to be compatible with the WinLight software.

1.7 Software installation (indiGO)

The indiGO software is included on the enclosed USB stick or CD. Keep this media in a secure place. You will need it again for program updates or new installation.
For the operation of the NightSHADE the indiGO software version 2.00 or higher is necessary.
We recommend using Windows XP SP3 or Windows 7 as operating system. Older operating systems are not supported.
To start the installation program Click on the file SETUP.EXE on the data carrier. After launching the installation program a welcome screen appears:



After the welcome screen the folder for the software installation must be defined. If possible confirm the suggested folder.
To get to the next screen asking for the language of the indiGO user interface (at them moment only English available) click on **[Next]**



Depending on the hardware you use a default selection of system filters might be available and can be installed through the setup. If you want to install the default filters tick the box **"Install default filters"**.

In this case the default systems filter management file will be copied to your computer. If you reinstall the software the current active systems filter management file will be overwritten.

Note: Since the setup will install virtual device drivers for the NightShade hardware on your computer the Windows-system might show a warning that a signature of a Windows driver cannot be verified. In this case allow the setup to install these Windows drivers.

Important Note: To install these drivers and the software, you need administrator privileges.
indigo is only tested on WinXP/Vista Windows7 32 bit systems.

1.8 Shipping instructions

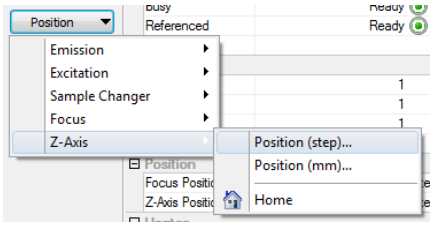
The NightOWL II must be shipped with the camera removed and the foam piece laid on the bottom plate fixed with the camera lift as shown on Figure 2:

Figure 2 Transport holder

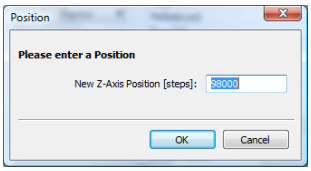
Figure 1 foam piece

Proceed as follows:

- Remove all filters from the filter wheel (empty wheel mounted) and other accessories from the instrument and place the foam piece on the base plate as shown in Figure 1
- Move the camera (z-axis) into the low position (step 98000) using the service software or indiGO. Klick on Device State..., select Position and choose Z-Axis and Position from the dropdown menu.



- Enter 98000 steps at the prompt and press OK to move the camera to the shipping position.
- The camera drive will block the foam piece and locks the base plate.
- Switch off the NightOWL II and do not turn it on again since it will move back to the home position.



- Remove the air adapters from the camera, open the 2 thumb

screws left and right of the camera, unplug the USB cable and Power supply and carefully take out the camera.
- Fix the transport holder for the air adapters as shown on Figure 3. Use the grey spacers to avoid touching the lens.

Figure 3 fixing screw with spacer

- Clip the air adapters to the holder so that they are magnetically fixed.
- Remove the power supply cable from the instrument and place it in the camera box.
- Unscrew the noise killer at the top rear side of the NightOWL and place it in the camera box.
- Close the front door and put the NightOWL in the flight case. Close all Butterfly locks
- Make sure that the blank transport flange without gas connectors is mounted because the NightOWL will not fit into the box with gas flange. Watch the position of the flange in the flight case (recess). See Figure 4

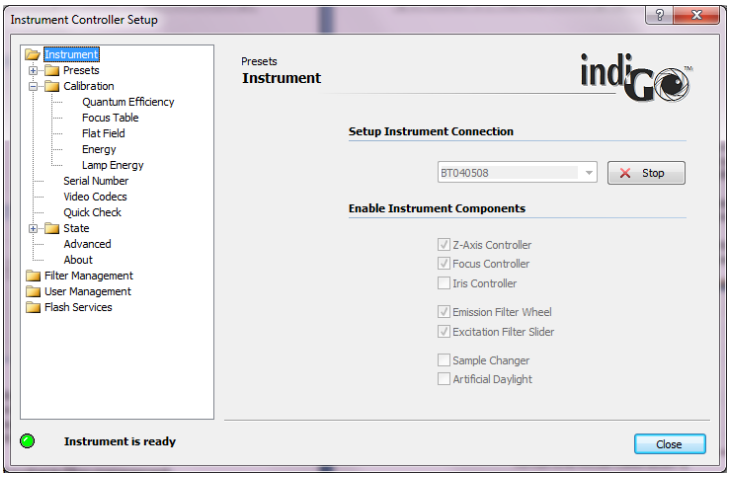
Figure 4 NightOWL in flight case

2. Calibration

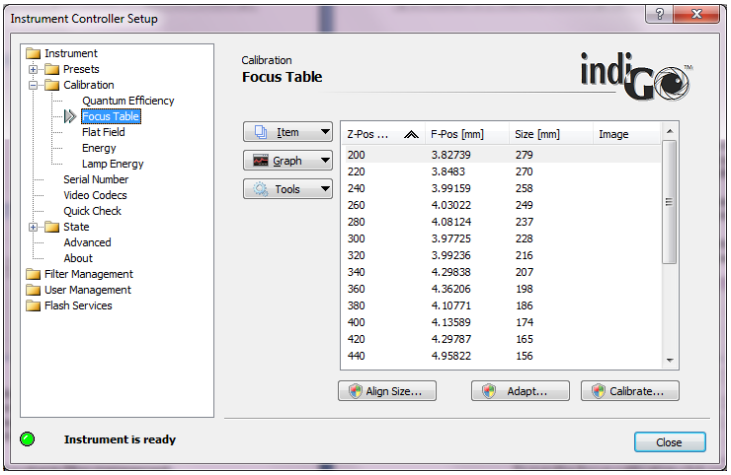
2.1 Focus calibration

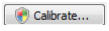
To run the focus calibration a focus target is required. This sheet can be found at the end of this document. When printing out the focus target make sure, the scale shown on the target is really 20cm as this will be used in the calibration.
Cut the left border off and place the focus target on the bottom plate that the center of the star is in the center of the image.

Right click on the indigo instrument controller and login (setup) as service user (login: "onki"; password "onki"). The backend of indiGO will show up:

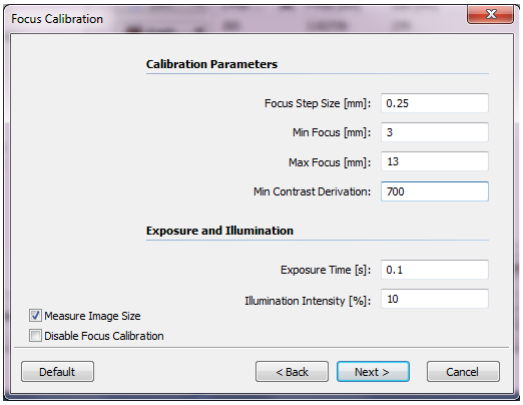


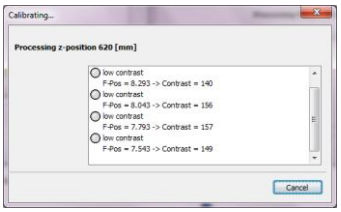
To run the focus calibration click on the item "Focus Table" in the Calibration section. The current focus table will show up.



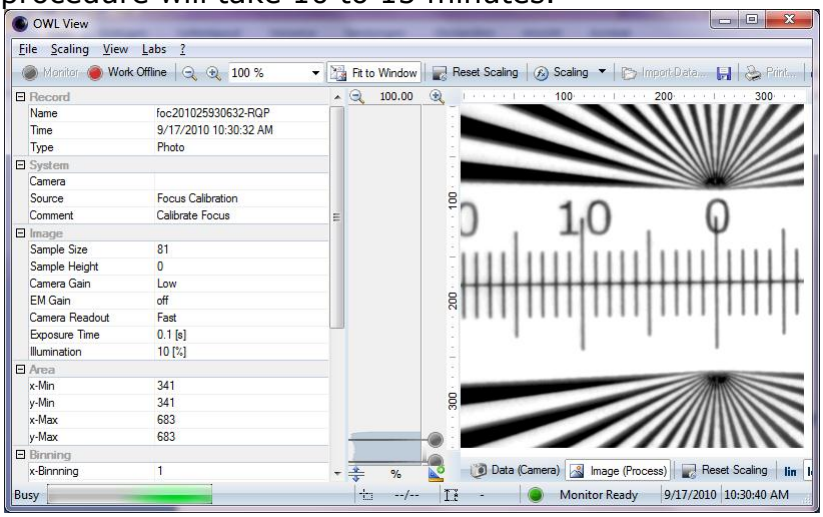
A new calibration will be performed by clicking on 

Use the default settings as shown below. The calibration procedure starts after clicking on 





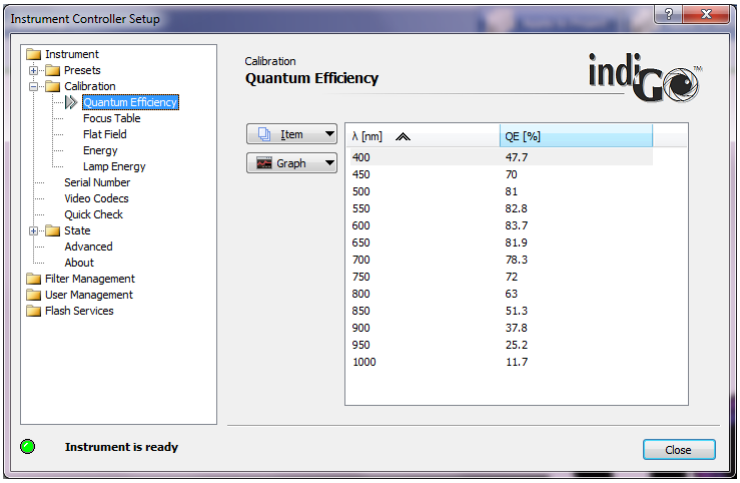
To see the live calibration images, launch The OWLview Tool from indiGO Open OWL View... and enable the monitor mode by clicking on the Monitor icon. Modify the scaling if required to see details. The whole procedure will take 10 to 15 minutes.



In case of contrast problems modify the contrast deviation or the illumination intensity. It is also possible to recalibrate a single position in the focus table. To do so right click the desired position and select "recalibrate" from the list.
In order to "fine tune" the calibration it might be useful to rerun the calibration a second time using a smaller focus step size to get better precision in the large scale images.

2.2 Quantum Efficiency

The quantum efficiency table describes the spectral efficiency of the CCD chip. The table can be accessed by selecting "Quantum Efficiency" from the Calibration section.

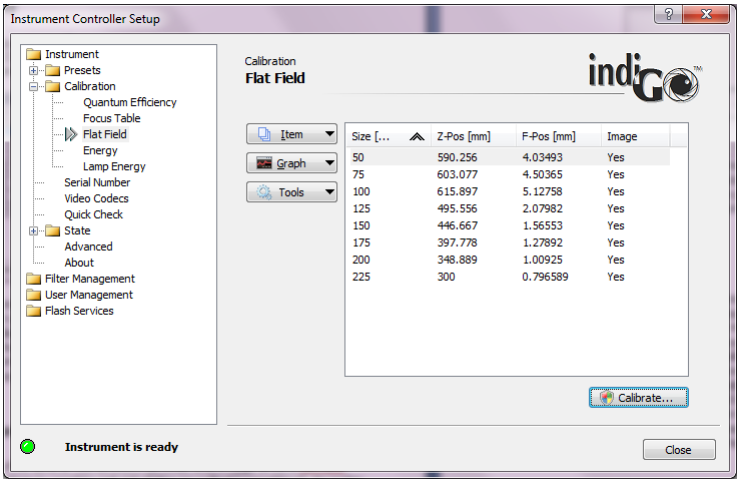


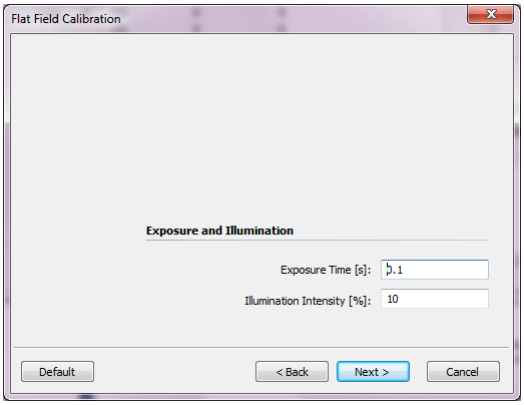
Depending on the camera used, this table might be different. When using a NC 100 camera the quantum efficiency table should look like as shown in the image. If no quantum efficiency entries are shown, import the default values for the system (instrument ID number – packet number) using the "Import configuration" function in the "State - Advanced" section.

2.3 Flat field calibration

Since the lens is not uniform all over the image area a flatfield correction is used to get rid of the so called "vignetting". In order to run the flat field calibration a clean white sheet of paper or plastic is required (size min 270 x 270mm).
Place the white sheet on the bottom plate that the whole image area is covered by the sheet.
To access the calibration, click on "Flat Field" in the calibration section.

Start the calibration by clicking on Calibrate... . The standard parameters should be used:



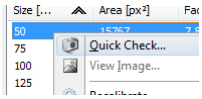


The calibration procedure starts after clicking on Next >
During the flat field calibration the system takes a photo of the white sheet in the positions listed in the table and creates a flat field correction curve.

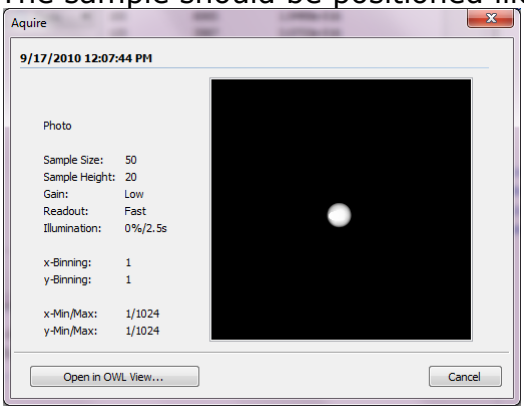
2.4 Energy Calibration

The NightOWL camera is movable to allow large as well as small image sizes without moving the sample. Without energy calibration the intensity measured with the NightOWL might be different at high and low positions due to physical rules. To compensate this, an energy calibration must be performed. A calibration light Standard with known light intensity (ID 29687) is required to run the energy calibration.
The light standard is supplied by the CAN-connectors located at the rear right side inside the dark box. The standard must be placed on the base plate so that the white overload well (E9) is centered in the image.

To check the positioning, select the item in the list with the smallest sample size, right click and select “Quick Check”.

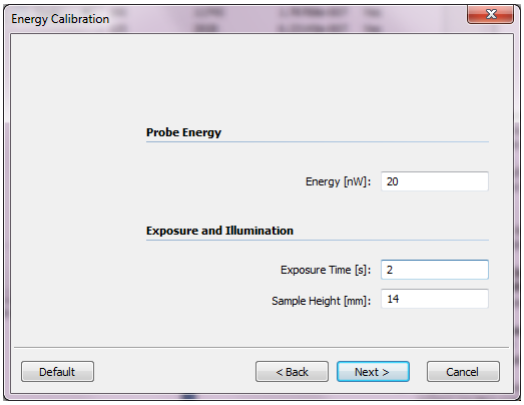


The sample should be positioned like this:



Start the calibration by clicking on

. The standard parameters should be used:



The calibration procedure starts after clicking on 

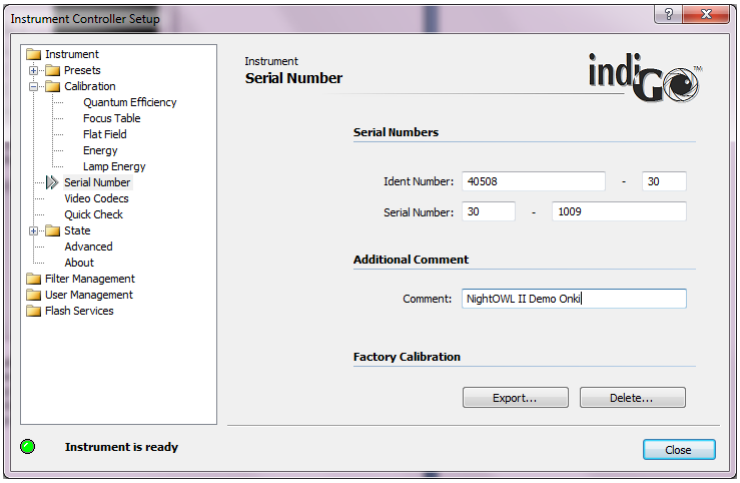
The Berthold light standards are adjusted and certified to 20nW.

During the energy calibration the system takes images of the light standard in the positions listed in the table and creates an energy correction curve.

Check the calibtration images after the procedure using “View Image” from the context menu if the exposure was not over-range. Use a shorter exposure time if required (1s, 500ms). The signal of the strongest image should be around 10000cts.

2.5 Calibration data

When all calibrations are done the calibration and configuration data must be backed up to an external storage device (USB Stick). This can be done in the Serial function of the Calibration section.



Fill in the instrument ID number, packet number and serial number and click on Export... to copy the calibration and configuration data to a memory stick. Select the destination on the upcoming dialog.

Store the memory stick in a safe location. Loosing this data requires a new calibration in case of a new software installation. The calibration data is stored in the /owlctrl/data subdirectory of the program data directory. In Windows XP this folder can be found in C:\Documents and Settings\All Users\Application Data. In Vista and Windows 7 the program data is located in C:\Program Data.

2.6 Other Data Files

In the /owlCtrl/data directory other configuration files are located as well. The function is explained below.

- owlCtrl.usr – This file contains all registered users. Do not modify.
- owlCtrl.flt – Filter configuration for excitation and emission.
- owlCtrl.cdc – Video codecs list for video file creation.

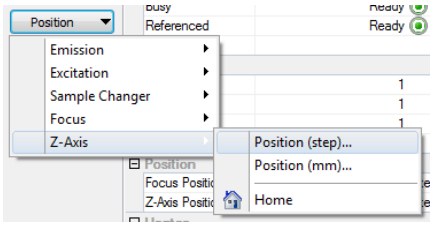
- owlCtrl.trc – Communication Protocol file. Might be useful to send in case of any instrument/communication problems.
- Indigo.net – User data and web update information. Do not modify update information if not instructed since online update might not work after modification.
- owlCtrl.cnf – Contains the entire hardware configuration and calibration oft he current system. This file is being renamed after the import of the original file (e.g. 040508-30-1010.cnf.
  In folder /cdrv some default configuration files are located in case of a new calibration or when no dedicated calibration file is available.

3. CCD Camera

3.1 Dismantling the Camera

Positioning the camera at working height

- Make sure that no accessories are placed on the base plate to avoid a collision
- Move the camera (z-axis) into the low position (step 98000) using the service software or indiGO. Klick on Device State..., select Position and choose Z-Axis and Position from the dropdown menu.



- Enter 98000 steps at the prompt and press OK to move the camera to the shipping position.

Pull mains plug before dismantling camera!

Dismantling the camera

- Pull mains plug!
- Unscrew both fastening screws that fix the camera on the transport unit.
- Remove the 2 air tubes by loosening the locking screw on the side of the air adapter and removing the air tubes. The rings are fixed with a magnet so turning the adapter will loosen the ring from the adapter.
- Carefully lift out the camera from above.
- Detach the power supply cable from the camera by opening both connector screws first and then pulling the connector out of the camera socket.
- Remove the Ethernet cable by pressing down the stopper before unplugging the cable. Do not apply too much pressure to the cable to prevent damage of the socket. In case of a USB version just unplug the USB connector.

Proceed in reverse order to install the camera.

4. Sample Chamber

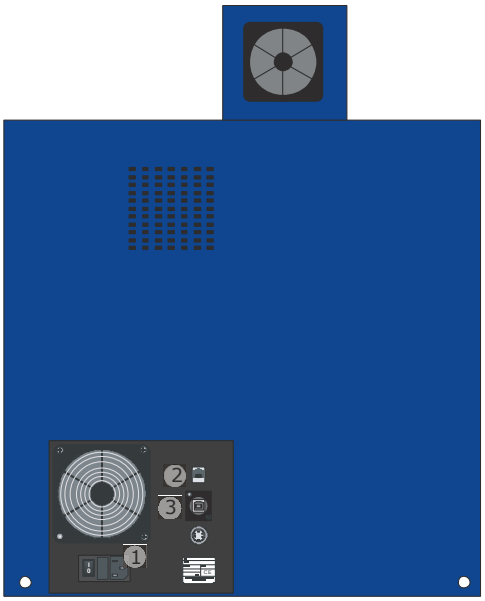
4.1 Taking Off/Attaching the Cover

The cover has to be taken off to have access to the camera electronics. Generally, two people are needed to take off the cover. Proceed as follows.

Taking the cover off

- Exit indiGO and switch NightOWL II off.
- Unplug all cables from the rear panel including the mains supply.
- Fold out handles on the side.
- Push in white push buttons right and left on the instrument rear panel until the cover is released.

Figure 4-1: Rear panel of cover



- Carefully take off cover from above. Hold the cover horizontally to rule out that it gets jammed.
- Put the cover down in a safe place.

Before re-attaching the cover, make sure that all cables are fixed.

Attaching the cover

- Carefully lower cover from above, holding it vertically.

- Insert retention bolts into the catches foreseen for this purpose.
- Push down the cover from above until all four bolts lock into place with an audible click.

4.2 System Electronics

The system electronics includes the power supply and the connection board which connects the system components with each other; the cable for the sensor and other servo components are connected to the connection board.
The power supply supplies a D.C. voltage of the following voltages:
+7.5V/ 4A (cooling power for USB camera).
+12V/ 6A (supply voltage / cooling power for Ethernet cameras.
+15V/ 1A (supply voltage for USB camera).
-15V/ 1A (supply voltage for USB camera).
+24V/ 13A (power supply for NightOWL components).
The voltages can be checked at the terminal of the power supply. They are accessible from the rear side of the NightOWL.

Figure 4-2: View into the system electronics (with cover re-

The function of the different connectors on the motherboard is described in the table below.

Table 5-1: connection board connectors

Connector	Function
ST1	CAN Output to dark room (focus, ex filter, heater)
ST2	Connector from CPU
ST3	USB connector (to hub)
ST4	n.c.
ST5	CAN Output (Fluorescence, Z-drive, ex filter)
ST6	LED 1 (photographic illumination)
ST7	LED 3 (photographic illumination)
ST8	Fan on rear panel
ST9	n.c.
ST10	n.c
ST11	Door sensor
ST12	LED 2 (photographic illumination)
ST13	LED 4 (photographic illumination)
ST14	Power supply input (from mains switch / fuse)
ST15	n.c.
ST16	Socket output / Fluorlight source (PC controlled)
ST17	Socket output for sample chamber (constant current)
ST18/	Ethernet connector (from switch)
ST19/20	MOXA board (serial <-> LAN converter
ST21	Fan on top of dark room
ST22	n.c.

The drawing below shows a schematic layout of the connectionboard.

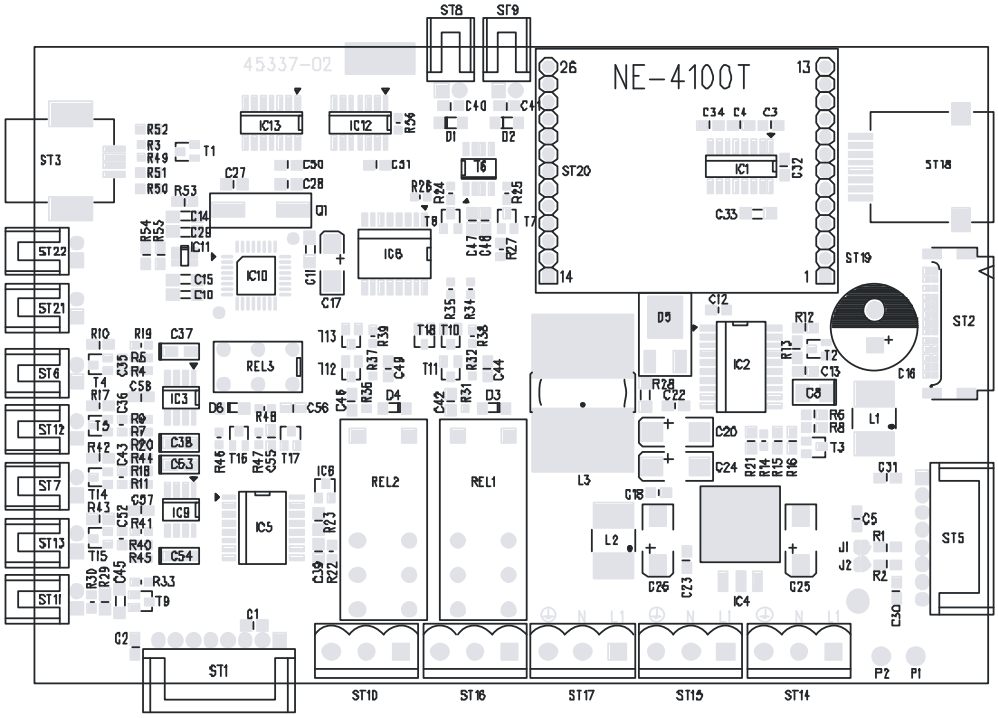
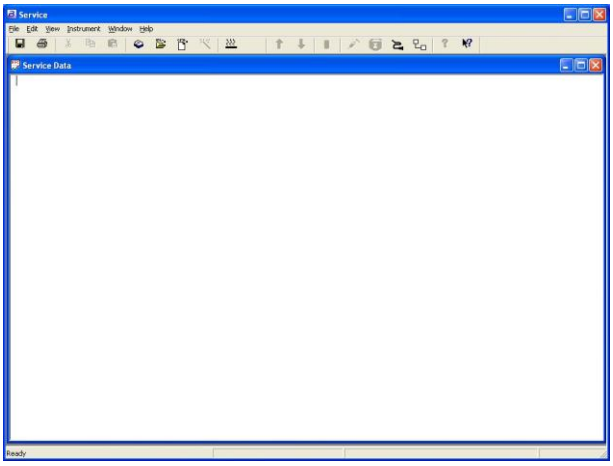


Figure 4-3: View onto connection board

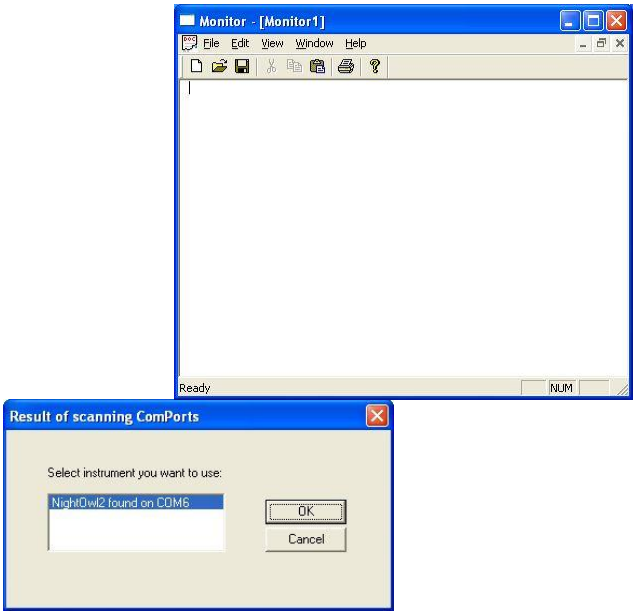
4.3 Service Software

4.3.1 Start software

The service software is used to check the function of the NightOWL without using the WinLight software. In addition it allows checking and configuring the CAN nodes who are controlling the instrument hardware such as stepper motors, the halogen lamp or the heating device.
The service software is available on the Berthold FTP-server. Make sure that the latest version is being used to avoid problems. By running SERVICE.EXE the service software is starting.



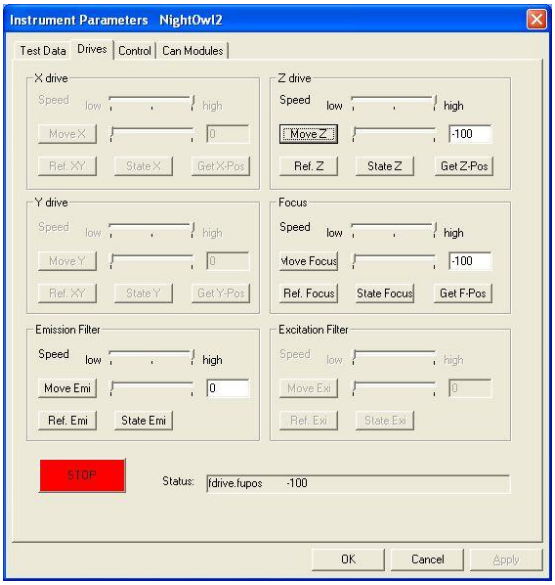
The main menu will appear.
The first step to get connected to the NightOWL is to find the used COM-port. Select **[Scan ComPorts]** in the **[Instrument]** menu.



This will start a scanning run to locate the NightOWL. If the scan was successful a message box will appear.
This shows that a NightOWL II was found on COM6. The Com port number can vary from computer to computer since it's depending on the individual configuration of the system.
Now the service software is ready to communicate with the NightOWL.

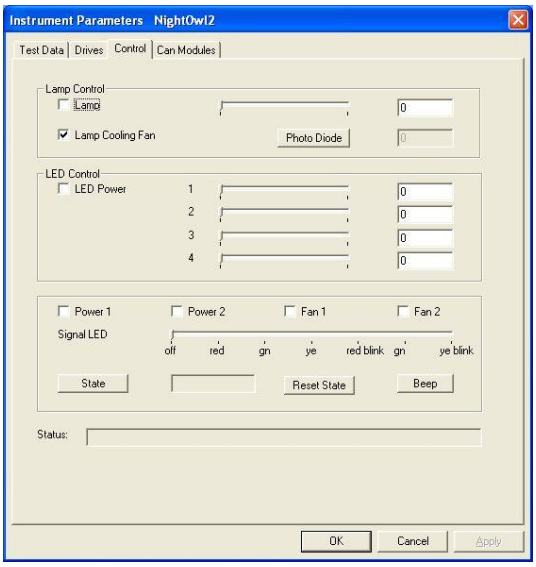
4.3.2 Check drives

To check the drives (camera, focus, excitation, emission), the halogen lamp or the temperature controlled sample carries select **[Load from instrument]** from the **[Instrument]** menu. All current parameters will be downloaded from the instrument. This will take a couple of seconds. After successfully downloading all parameters the following dialog box will show up:
The first page only shows data which is relevant to the final testing of the system.



On the "Drives" tab you can check if the motors for moving the camera (z-drive), the focus motor (focus) or the motors the filter slider and wheel are working correctly.
With the upper slider in each box you can select the motor speed. By moving the lower slider and pressing the **[Move Z]** you can move the camera drive in the defined position. **[Ref. Z]** will send a command to initialize the Z-drive which means the Z-drive runs into the home position (upper position). The current status of the drive can be fetched using the **[State Z]** button. The current position will be displayed after clicking on **[Get Z-pos]**
The other drives are controlled in the same way using the corresponding box.

4.3.3 Check halogen lamp



The halogen lamp can be checked using the "Control" tab.
In the upper box the lamp intensity can be selected with the slider. The checkbox **[Lamp cooling fan]** enables or disables the cooling fan above the lamp module.

In the box located in the middle section of the dialog box the LEDs for photographic epi illumination can be tested. The check box **[LED Power]** enables or disables the LEDs. The four sliders can be used to change the lamp intensity individually.

In the lower box the fans as well as other switched outputs can be tested. With the slider the different states of the Power LED can checked. With the button **[Beep]** the internal beeper can be tested.

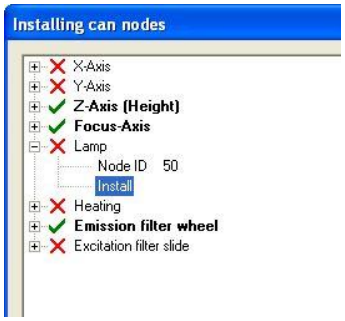
4.3.4 CAN modules

A summary of the found CAN modules can be seen in the "Can Modules" tab.

4.3.5 CAN node installation

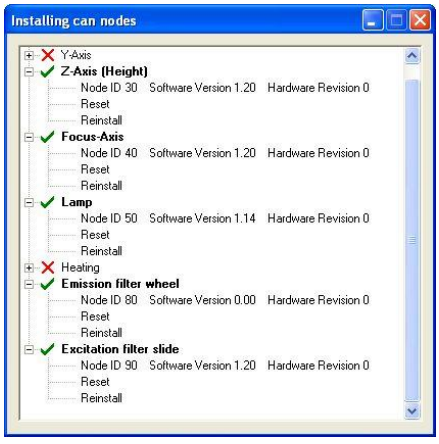
If it's required to install a CAN the function [CAN nodes] in the [Instrument] menu must be used.

After calling this function the software downloads the current status from the instrument. If the download was successful the CAN nodes are listed in a box.



All installed CAN nodes are labeled with a green hook. To install a new CAN node, just click on **[Install]** in the corresponding section of the desired CAN node. A warning message will show up.

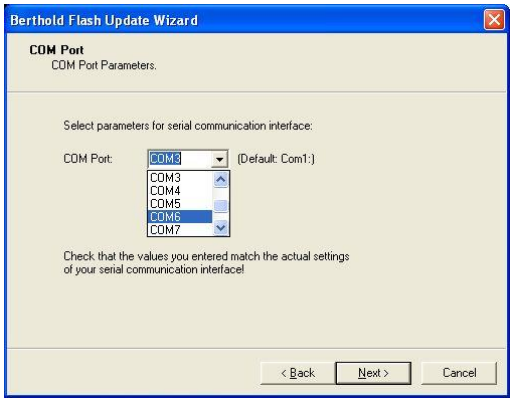
After confirming the installation, the procedure will start. The installation will be terminated with a complete reboot of the system.
When the reboot is done the new module will appear with a green hook in the list.



4.4 Firmware update

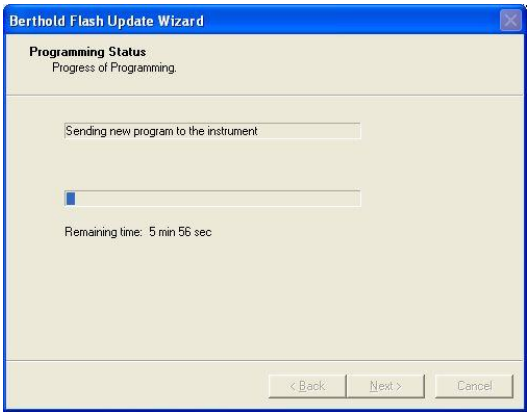
The firmware update can be performed without opening the instrument using the FlashWizard tool.
The FlashWizard is a flashing tool which transfers the new firmware into the instrument memory and manages the update automatically.
The FlashWizard can be downloaded from the Berthold FTP-server.
Start the FlashWizard by running FLASHWIZ.EXE. A welcome page will appear. Click on the **[Next]** Button to get to the following page.

If the instrument is properly connected to the PC, the communication drivers are installed and the instrument is turned on you can click on **[Next]** to see the dialog box below.

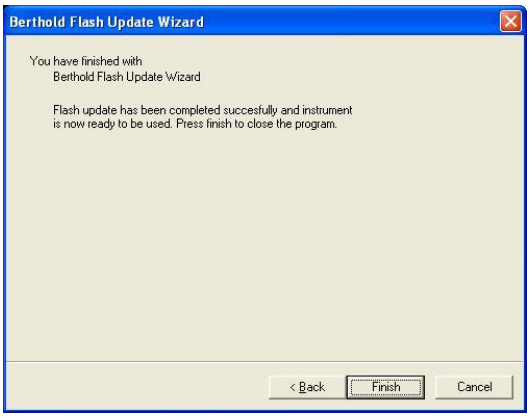


In this Dialog box you have to select the Com port, where the NightOWL is connected to. Although we are using the USB or Ethernet to communicate with the NightOWL there is always a virtual Com port installed in the system. Check your Windows device manager to find out the correct COM port.
Select the required COM port and click on **[Next]** to continue.

The FlashWizard tries to connect to the instrument. If the communication works, the firmware upload will start automatically.



The whole procedure will take approx. 6 Minutes.
After the firmware upload and flash the instrument reboots.
If the update process is finished the dialog box shows the following.



Clicking on the **[Finish]** button will close the FlashWizard.

4.5 Fluorescence Illumination

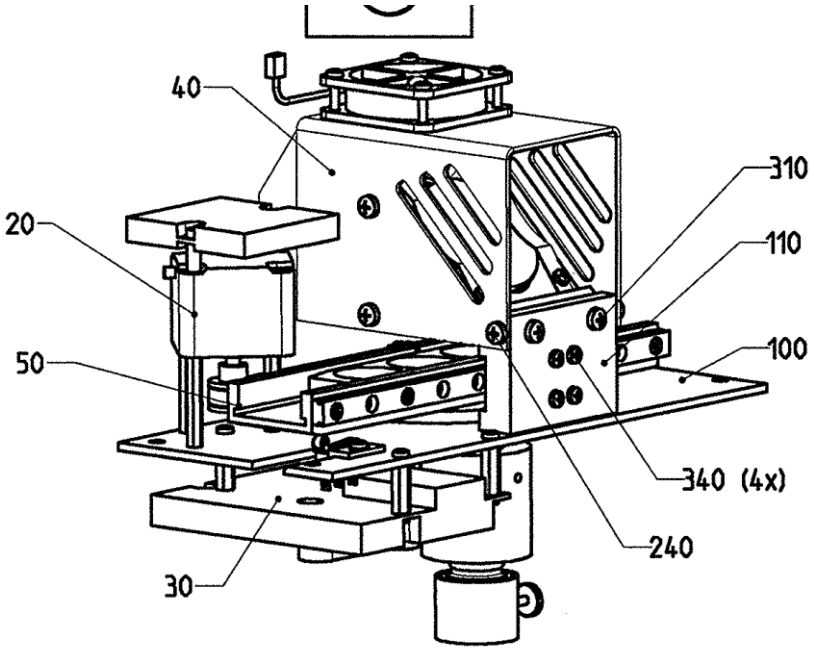
4.5.1 General

Halogen lamp as light source

The fluorescence function allows you to excite fluorescence in the 400.. 800 nm range. Thus, a large number of colors can be used with NightOWL™. Using suitable filter sets, the excitation light is filtered out of the spectrum of the halogen light source. A second filter in front of the lens blocks the excitation light and permits only the fluorescence light to pass.
The exitation filters are located on a filter slider carrying 4 filters while the emission filters are placed on a filter wheel in front of the lens.
The fluorescence light source is using a feedback sensor after the filter to regulate the lamp intensity. This guarantees a constant light output even when the lamp intensity is decreasing due to aging effects.

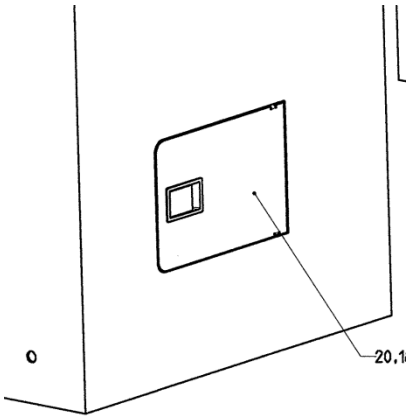
4.5.2 Design

The light source is installed on a plate which is fixed by 4 screws at the lower right side of the mounting plate. Light enters the sample chamber via a feed through port. From there, the filtered light is passed on to the sample via a double swan-neck light guide, a ring light or a dual line light.
Due to the flexible arrangement, this can be done optimally for each sample format.



The emission filter wheel is placed in front of the lens; it carries the filters for the fluorescence light. The light guide is fixed by a knurled screw, and can be removed when it is not used. If the fluorescence light source is switched off, the light path is blocked by a special barred position using a lid to avoid incoming light.

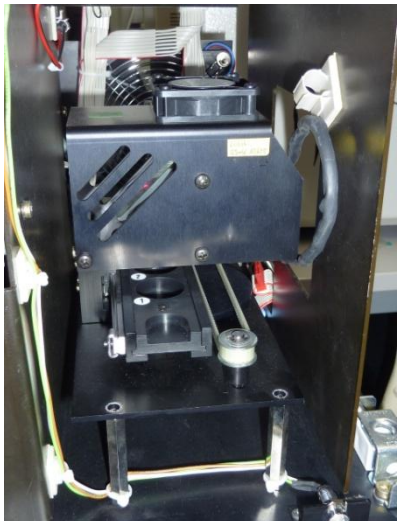
4.5.3 Lamp replacement



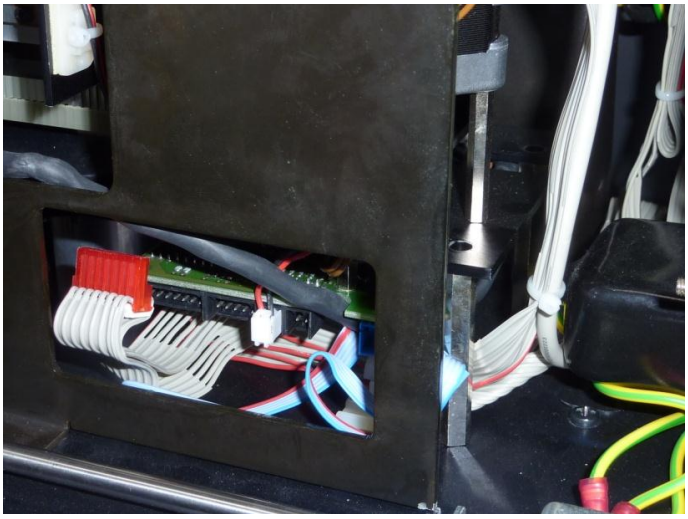
The halogen lamp has a limited service life of approx. 300 hours.
A Osram lamp type 64617 with 75W and 24V is used (Id Nr. 50218).
Before replacing the lamp, disconnect the instrument from mains.
Open the service flap located on the right side of the instrument.
Take out defective lamp from above and pull off connection cable.
Plug connection cable onto new lamp and install lamp from above.
Close the service flap.
Switch on the instrument to check the lamp. A new Filter teach in procedure is required to ensure proper results. Please see the indiGo manual for more information.

4.5.4 Module replacement

In some cases it might be necessary to replace the whole fluorescence lamp module.
To get access to the module the top cover must be removed (see. 4.1).



The whole module is fixed with only 4 screws (2 at the front, 2 at the rear). These screws can be opened using a 4mm Allen key. Before removing the module the 2 red CAN connectors, one below the halogen board and the other at the filter slider motor), as well as the blue connector from the optical sensor must be removed.



Make sure the cable holder who fixes the cable of the halogen bulb is unlocked as well. The module must be lifted up slightly to unlock the board from the optical outlet underneath the module. After lifting it up it can be carefully removed to the front.
The replacement module is inserted from the front. It must be inserted carefully and centered with the optical output to ensure the proper function. The connectors can be reconnected after fixing the 4 screws.
It is recommended to perform a function test of the lamp module (see 4.3.3) before attaching the top cover. A new Filter teach in

procedure is required to ensure proper results. Please see the indiGo manual for more information.

5. Cleaning and Maintenance Work

5.1 Cleaning the camera compartment

The camera compartment should be cleaned using a mild detergent and a lint-free tissue or a vacuum cleaner. To this end, the bottom plate can be removed by holding it at both sloping edges on the side. Two magnets hold the bottom plate.

5.2 Cleaning the camera

☐ Clean the camera only with pressurized air spray or optical paper!

☐ Remove the camera for cleaning. (see 3.1)

Do not remove the camera cable to allow camera control.
Start an acquisition with long exposure time via the software. This opens the camera shutter at the bottom, so that you can remove dirt particles.
Careful: do not damage the shutter!
Clean the camera with pressurized air spray.

Installation of camera

Fix the camera with both screws to the transport unit. The socket must face towards the camera lift.

5.3 Replacing the air filter

Depending on how dirty the air filter is, it should either be cleaned or replaced.

Remove the black ventilator cover on the rear of the instrument (connection plate) and clean the filter (blow it out or wash it) or replace it.

5.4 Replacing the fuse

The mains fuses are located on the *Night Owl* rear panel. The fuse holder and the mains connection socket are one unit.

Replacing fuses

Pull the power cord.
Insert a screwdriver from both sides into the opening of the fuse inset.

With the screwdrivers, pull out the fuse inset.
Replace the fuses (make sure they match the required line voltage).
Insert the fuse holder again until it clicks into place.

☐ Use only fuses that match the value and the line voltage indicated on the instrument.

5.5 Setting the door sensor

In case the sensor on the doorframe should be displaced and there is no contact although the door is closed, you can easily readjust the sensor in no time:
Open locking screw at the bottom of the sensor (1.5mm Allen key).
Using a thin tool (nail) push the small bolt forward from behind so that the closed door will touch the sensor.
Close locking screw again. The sensor must not prevent the door from closing!

5.6 Trouble shooting

What to do if a collision occurs?

When the camera lift has run onto the bottom of the acquisition chamber or a sample, a micro switch stops the lift movement; if this happens, the lift will move slowly up to free from the collision via the software (if you select 'Yes' in the dialog). Then select [**Home Position**] to move the camera lift to the home position; Make sure that the obstructing object is not causing any further problem (check sample size and height).

5.6.1 Camera lift sits on sample carrier

What to do when a collision occurs?

Slightly raise the resilient bottom of the camera lift and pull out the sample carrier.
Now turn down the lift slightly, the micro switch is triggered and the blockage is removed.
Power cycle the instrument to reboot.

5.6.2 Camera lift sits on bottom of acquisition chamber

Turn the spindle on the camera transport unit to the right so that the lower level of the camera transport unit moves up. This will create so much clearance that the blockage is removed and the camera can be controlled again via the software.
Power cycle the instrument to reboot.

5.6.3 Camera lift hits ceiling of acquisition chamber

Take the bottom plate out of the acquisition chamber. You can hold it at both sloping edges on the side.
Turn the spindle that moves the lower level of the camera transport unit to the left. This will move the lift down slightly so that the blockage is removed and the camera can be controlled again via the software.
Power cycle the instrument to reboot.

6. Appendix

6.1 Technical data

Camera
Peltier/air-cooled CCD slow scan camera
C-Mount adapter
Image scale and focus can be changed by moving the camera up and down via software.

Noise
Readout: ≈ 8 e^- RMS

Exposure time
from milliseconds to hours

Binning of pixels
Variable in X- and Y-direction to increase the sensitivity

Temperature
Ambient temperature during operation:
10° to 35°C

Operating temperature of Peltier element
200 k (reached within about 25 min)

Ambient temperature during storage:
-20° to 70°C

No condensation

Lens
Standard: 25m f = 0.95

Illumination
adjustable via software

Automation port
4 digital outputs and 2 digital inputs, controlled via software
3 analog outputs, controlled via software
1 mains socket in the acquisition chamber, controlled via software

Dimensions
Acquisition device:
600 mm x 1020 mm x 400 mm (WxHxD)

Camera head:
110 mm x 250 mm x 110 mm

Sample chamber (inside):
400 mm x 380 mm x 450 mm

Weight
approx. 85 kg

Operating voltage
94,5 to 240 VAC

Computer
Minimum requirements:
PC of industry standard with 1.5 GHz Pentium processor
512 MB RAM
Graphics mode, 1208 x 1024, true color
17" color monitor
Windows XP
2 Free USB ports
RJ-45 Ethernet port (depending on camera type)

6.2 Spare parts list

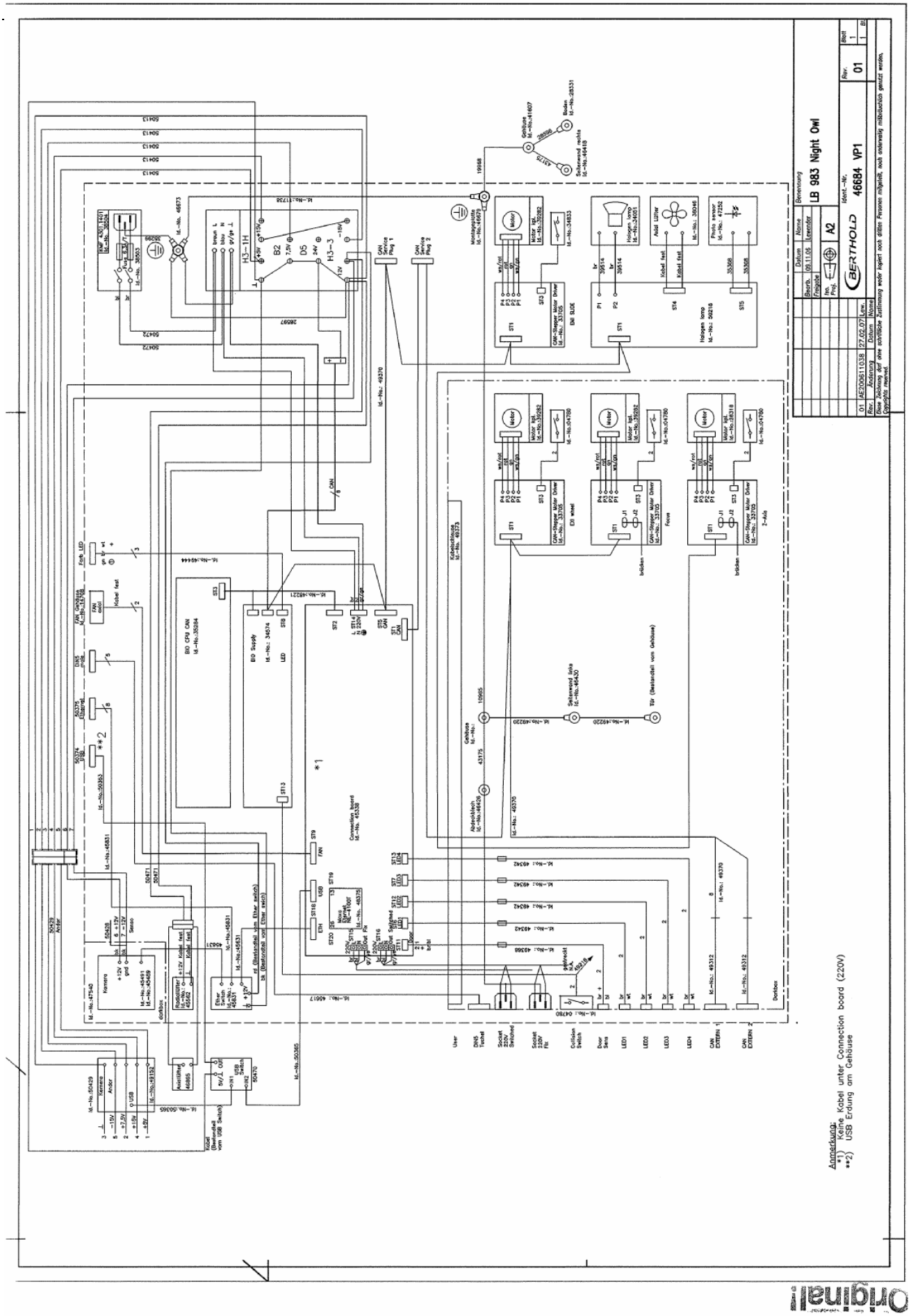
Table 6-1
Spare parts list

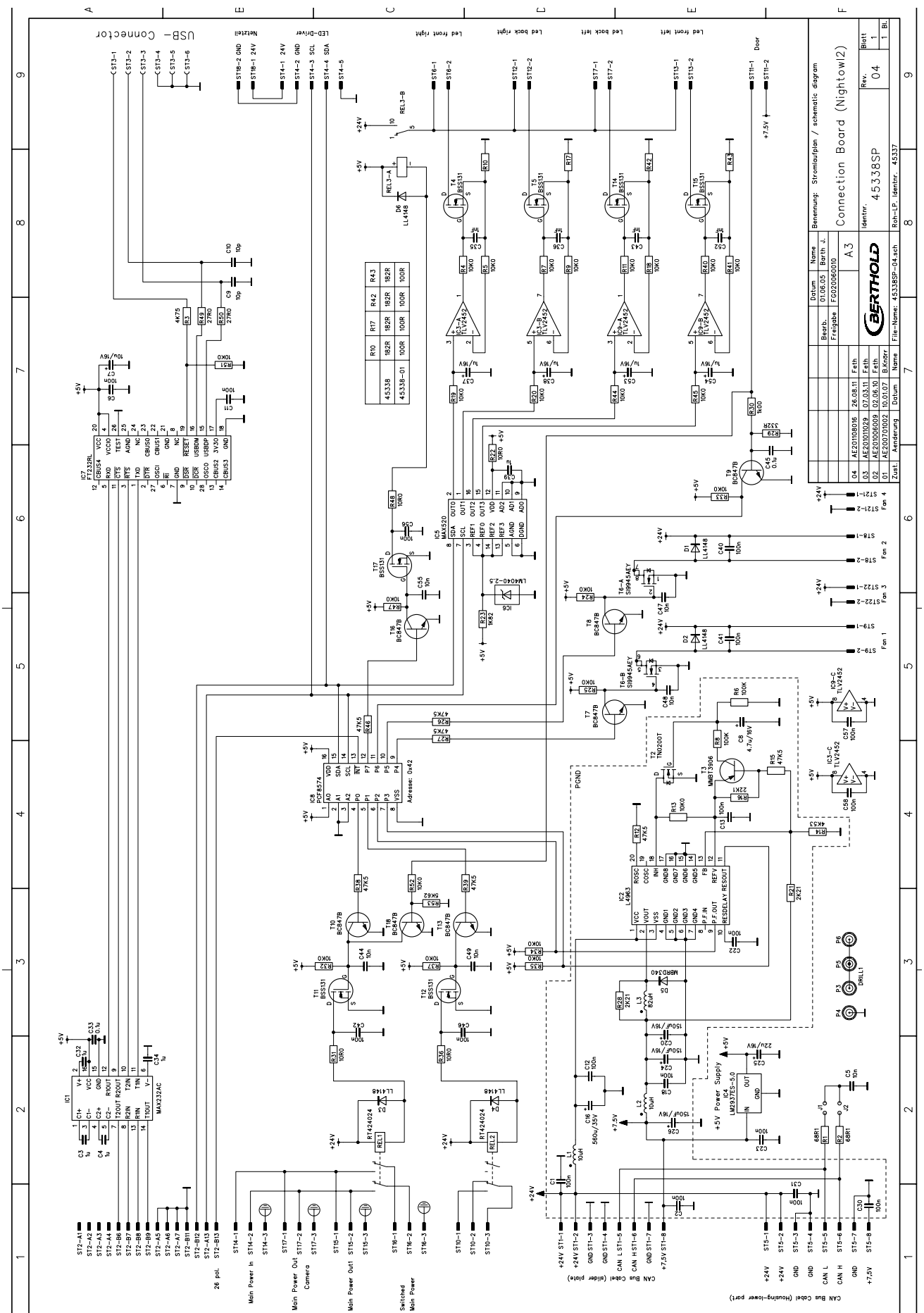
Description	ID No.
Power supply	50370
Retractable measuring table	46417
Fluorescence light module	46662
Light bulb for fluorescence light source	50218
LED for photographic illumination	45194
Connection board	45338
CPU with CAN add on	35263
CAN supply board	34574
CAN stepper control board	33705
CAN heater driver board	36242
Filter wheel (emission)	46482-99
Filter slider (excitation)	46613
Door sensor	28270
Top cover cpl.	46442
Noise absorber	47034
Lens Xenon 0,95/25mm (NC100)	48868
Lens MeVis-C 1.6/25	48867
Blind plug for light guide feed through	29684
Sample holder microplate	28409
Sample holder Petri dish	28406
Sample holder blank	28407
Stepper motor focus	28624
Stepper motor camera lift	28625
Door handle	28336
camera drive cpl.	46527
Heating module cpl.	50507
Connection cable for heating module	51225

6.3 Wiring diagrams

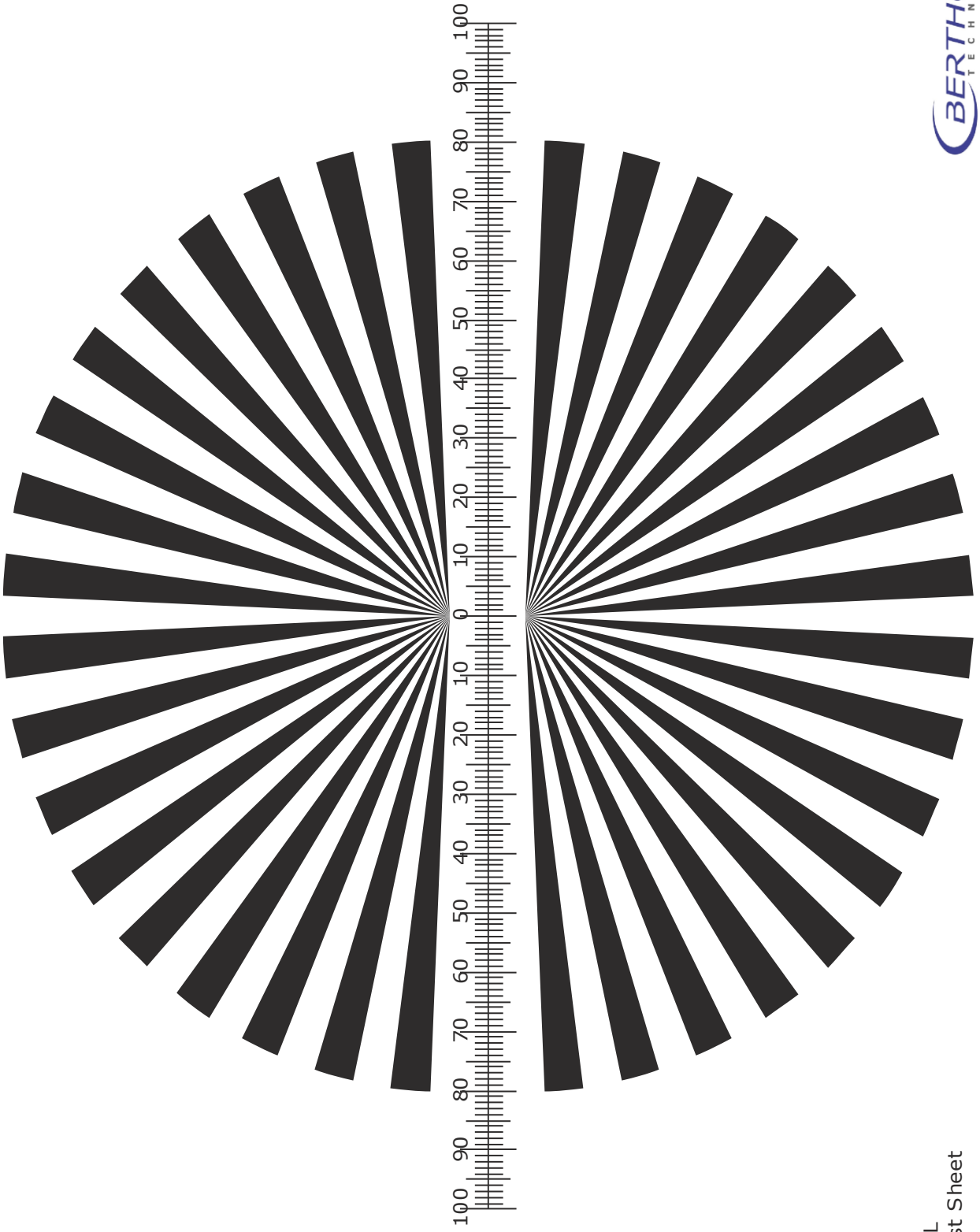
On the following pages you'll find the wiring diagrams below:

Wiring diagram LB 983 NightOWL II
Wiring diagram Connection board


LB 983 Night Owl
BERTHOLD
Ident.-Nr. 46684 VP1
Rev. 01
A2
Anmerkung:
*1) Keine Kabel unter Connection board (220V)
**2) USB Erdung am Gehäuse


Connection Board (Nightowl2)
45338SP
04
Bearb.
Freigabe
Datum
Name
01.06.05
Barth J.
FG020060010
A3
Benennung: Stromlaufplan / schematic diagram
Ident-Nr.
Rev.
Blatt
1
1 Bl.
Roh-LP: Identnr.: 45337
File-Name: 45338SP-04.sch
Datum
Name
Änderung
Zust.
04 AE201108016 26.08.11 Feth
03 AE201011929 07.03.11 Feth
02 AE201006603 02.06.10 Feth
01 AE200701002 10.04.07 Feth
R10 R17 R42 R43
182R 182R 182R 100R
45338 182R 182R 100R 100R
45338-01 100R 100R 100R 100R
USB- Connector
Netzteil
LED-Driver
Led front right
Led back right
Led back left
Led front left
Door
Main Power In
Main Power Out
Camera
Main Power Out1
Switched Main Power
CAN Bus Cabel (slider plate)
CAN Bus Cabel (housing-lower part)
26 pol.
Fan 1
Fan 2
Fan 3
Fan 4
POND
+5V Power Supply
Adresse: 0x42
Diese Zeichnung darf ohne schriftliche Zustimmung weder kopiert noch dritten Personen mitgeteilt, noch anderweitig mißbräuchlich genutzt werden. Copyrights reserved

Calibration Sheet
Please make sure that the distance
on the calibration sheet is 200mm after printing out.



NightOWL
Focus Test Sheet

Index