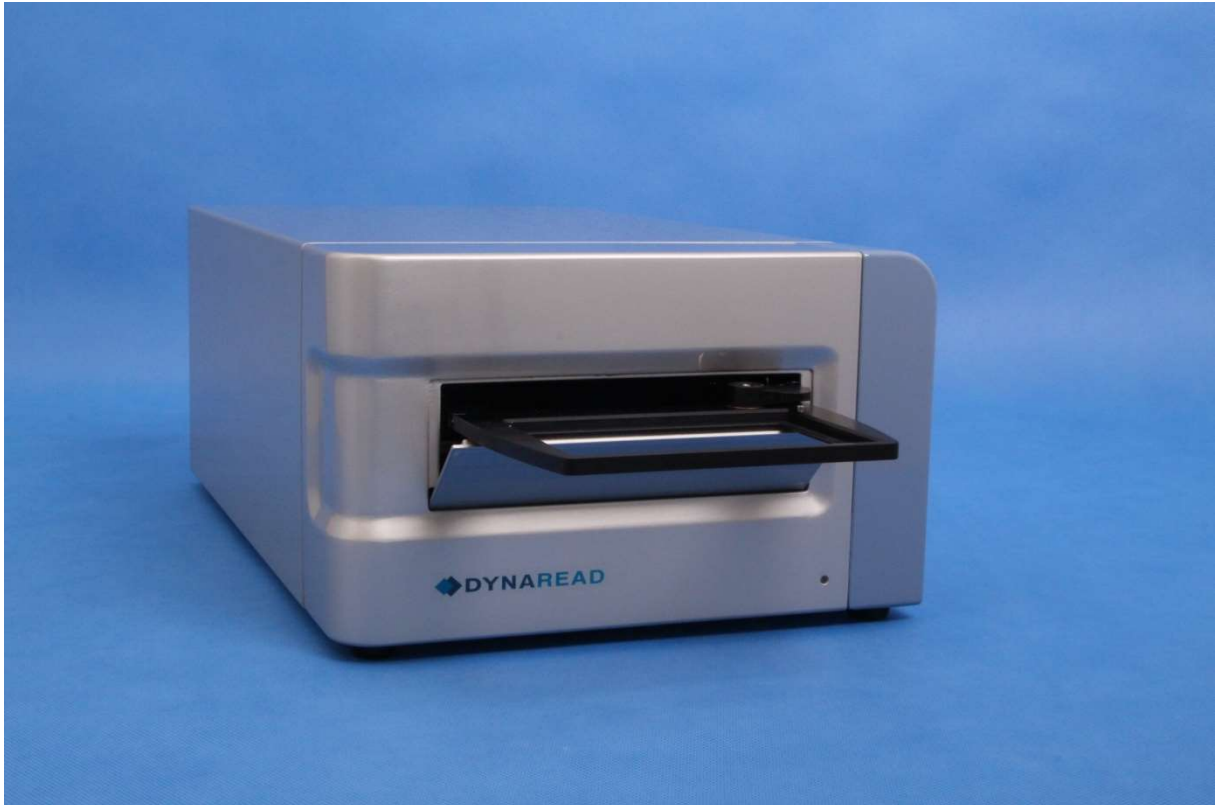# DYNAREAD Photometer
Model 5206

Service manual

Manufacturer:

DYNEX TECHNOLOGIES, spol. s r.o.

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Revision table

Revision	Date	Changes
0	28. 4. 2017	First official edition

Content

1. Technical data

Instrument parameters:

Range of wavelengths	370 – 790 nm
Measuring range	0,000 – 4,000 OD
Precision	0,000 – 2,000 OD ≤ 1.0% or 0,002 OD
	2,000 – 4,000 OD ≤ 1.5%
Measurement deviation	0,000 – 2,000 OD CV ≤ 1.0% or 0,002 OD
	2,000 – 4,000 OD CV ≤ 1.5%
Bandwidth FWHM	10 nm
Optical parameters	12 channels + reference channel
Light source	LED
Plate movement	Axis Y
Plates	Standard 96-well microtiter plates
Control	External PC (not included)
Communication interface	USB
Reading speed for one filter	10 s
Power supply	120-230V, 50-60 Hz
Power consumption	30 W max
Fuses	1600 mA/250V
Working conditions	Temperature 15 to 30°C, RH max 80%
Dimensions	425 x 280 x 176 (length x width x depth) mm
Weight	5,4 kg

2. Instrument maintenance

2.1 Instrument cleaning

The instrument does not require any routine maintenance. Clean the surface of the instrument with conventional disinfectants. Do not use organic solvents. Clean the optic only with a dry brush without using organic solvents.

2.2. Regular check

Tools: calibration plate **ND-52-13**
calibration plate **ND-52-14**

To check the correct function, please control the reading positions with the calibration plate ND-52-13. Choose any wavelength for the measurement. The measured value in all positions should not exceed OD 0.2. Use the calibration plate ND-52-14 to control the optical paths. Compare the OD values with the calibration sheet supplied with the calibration plate.

If the results are different, make the settings in the following chapter.

3. Instrument settings

3.1. Settings of drive mechanics and optics
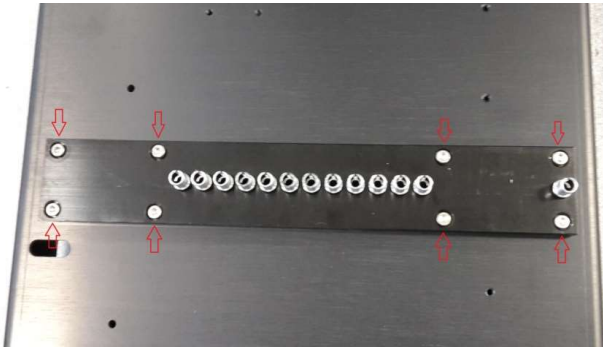
Tools: calibration plate **ND-52-15**

- loosen the screws for mounting the optics block and the travel rail (see Pic. 1 and Pic. 2)
- insert the calibration plate into the frame, then insert the thorns through the holes in the plate in the openings for the first and last optical channel (see Pic. 3)
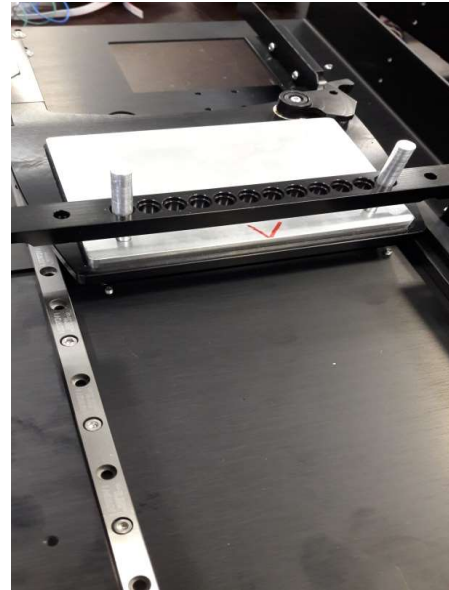- tighten the screws for mounting the optic block and the travel rail
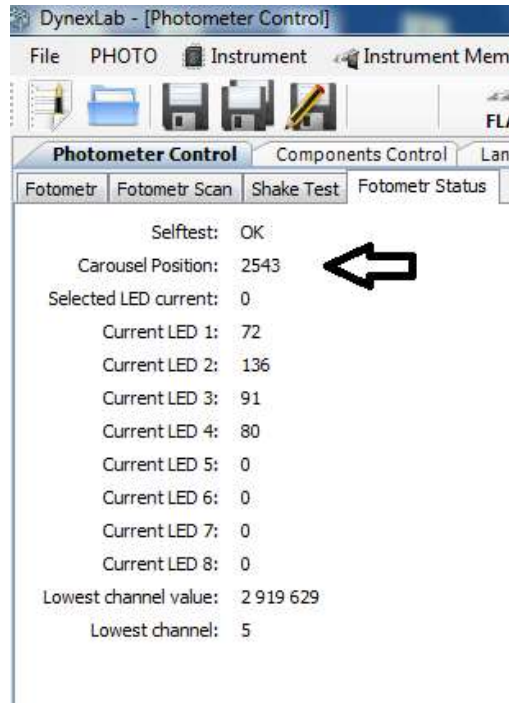
Pic. 1
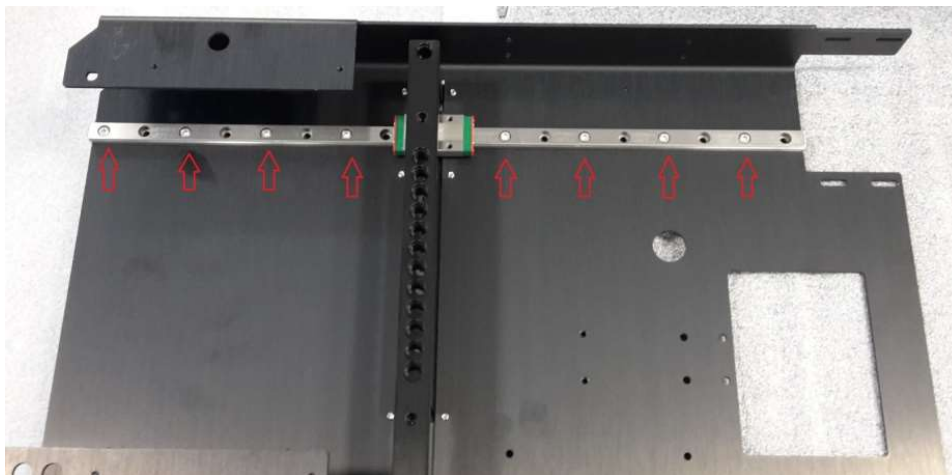
Pic. 2	Pic. 3

3.2. Correction settings for home position and carousel

- run the Dynlab SW
- go to the card Photometer Control - Fotometr Status
- rotate the carousel manually from the rear to the right to the mechanical stop and subtract the current coordinate „Carousel Position" (see Pic. 4).

Pic. 4

- run the „Components Control" -> „Parameters" -> load file – select the file and open the iparams
- on the card „Motors Calculation" subtract the current offset „Offset Carousel"
- calculate the new value of the correction according to the formula:

Current coordinate „Carousel Position" – 80 + current correction „Offset Carousel"

- assign the new calculated correction into the „Offset Carousel" (see Pic. 5)

Pic. 5

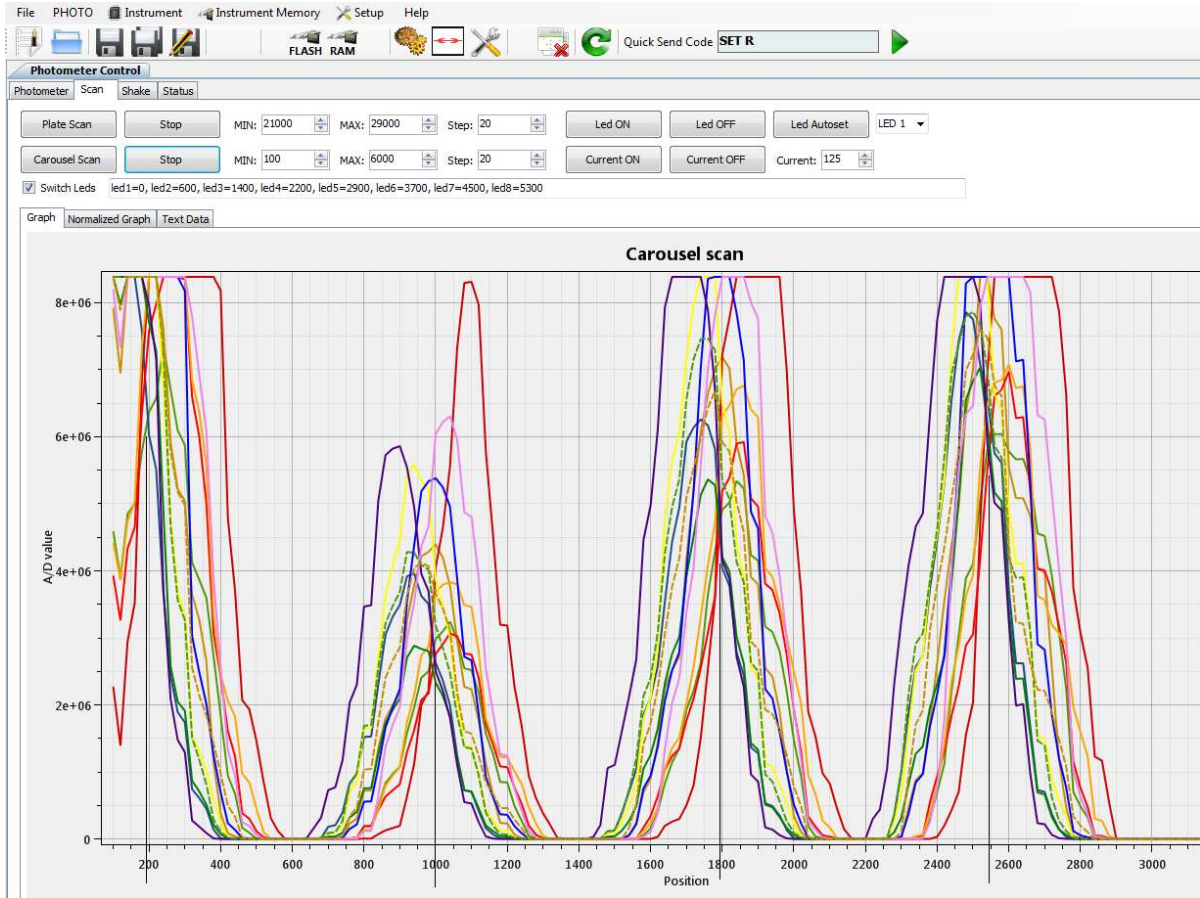## 3.3. Settings of carousel coordinates for each LED

- run the Dynlab SW
- go the card „Photometr Scan"
- run the „Carousel scan"
- in the graph, subtract the coordinates of the intersection of the weakest channels for the individual LEDs (see Pic. 6)

Pic. 6

- run the „Components Control" -> „Parameters" -> load file – select the file and open photometer iparams
- go to the „LED Coordinates" and put the coordinates into the appropriate positions (see Pic. 7)

Pic. 7

Index	Name	FLASH Value	File Value
R1020	Coordinate LED1	180	350
R1021	Coordinate LED2	980	1160
R1022	Coordinate LED3	1780	1960
R1023	Coordinate LED4	2545	2750
R1024	Coordinate LED5	3350	3540
R1025	Coordinate LED6	4150	4150
R1026	Coordinate LED7	4960	4960
R1027	Coordinate LED8	5800	5800

3.4. Settings the reading positions

Tools: calibration plate **ND-52-13**

- run the Dynlab SW

- go to the „Photometer Control" -> „Photometer Scan"

- insert the calibration plate ND-52-13 into the instrument

- run „Plate scan"

- in the graph, subtract the value between the leading edge of the sensor and the peak of the curves for individual series A to H (see Pic. 8)

Pic. 8
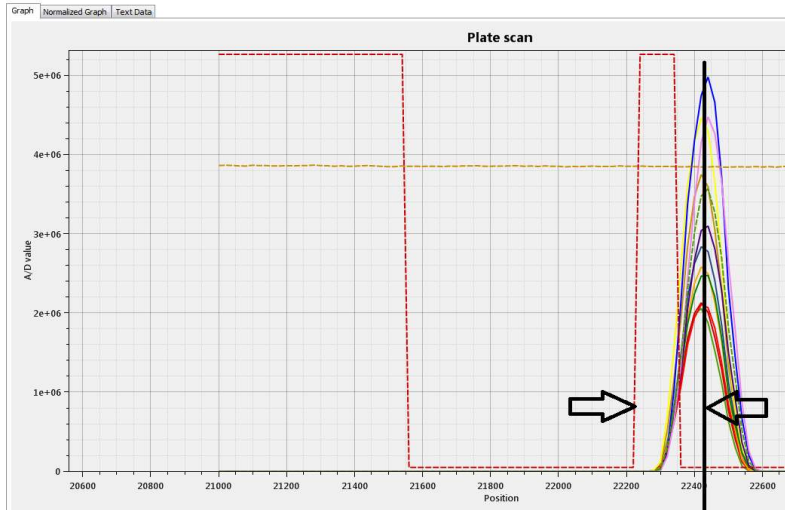
- run „Components Control" -> „Parameters" - load file – select the file and open the photometer iparams

- enter the values in the appropriate positions in the „SLS" (see Pic. 9)

Pic. 9

Index	Name	FLASH Value	File Value
R1070	SLS 1	300	440
R1071	SLS 2	320	440
R1072	SLS 3	360	440
R1073	SLS 4	340	440
R1074	SLS 5	340	450
R1075	SLS 6	340	450
R1076	SLS 7	340	450
R1077	SLS 8	360	450
R1078	Average samples	10	10

4. Replacement or addition of LEDs with appropriate wavelength

4.1. Addition of the wavelength

- insert the cartridge with the appropriate wavelength into the carousel to the free position, secure with the locking screw and connect the connector (see Pic. 10)

Pic. 10
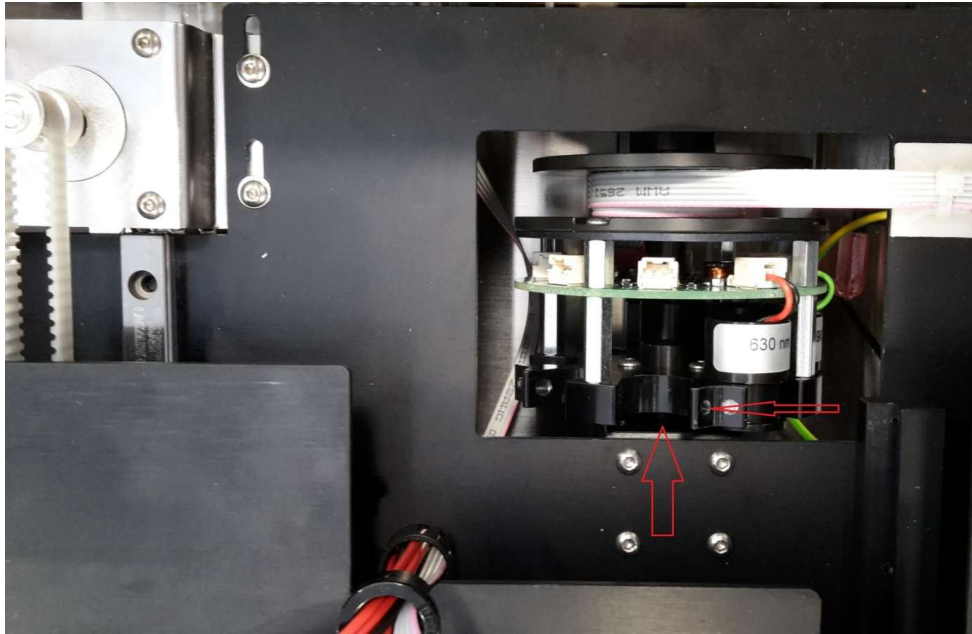
- run the Dynlab SW -> „Components Control" -> „Parameters" -> load file – select the file and open the photometer iparams
- on the card „LED Wavelength", assign the added wavelength to the appropriate position
- run the „Carousel scan" and subtract the coordinate of the carousel for the added wavelength (see chapter 3.3) and put this coordinate into the card „LED coordinates"

4.2. Replacement of LED with the same wavelength

- loosen the locking screw in the carousel, disconnect the connector and remove the LED cartridge
- insert the new LED cartridge into the same position
- run the Dynlab SW -> „Components Control" -> „Parameters" -> load file – select the file and open the photometer iparams
- run the „Carousel scan" and subtract the coordinate of the carousel for the changed wavelength (see chapter 3.3) and put this coordinate into the card „LED coordinates"

5. Electric block diagram
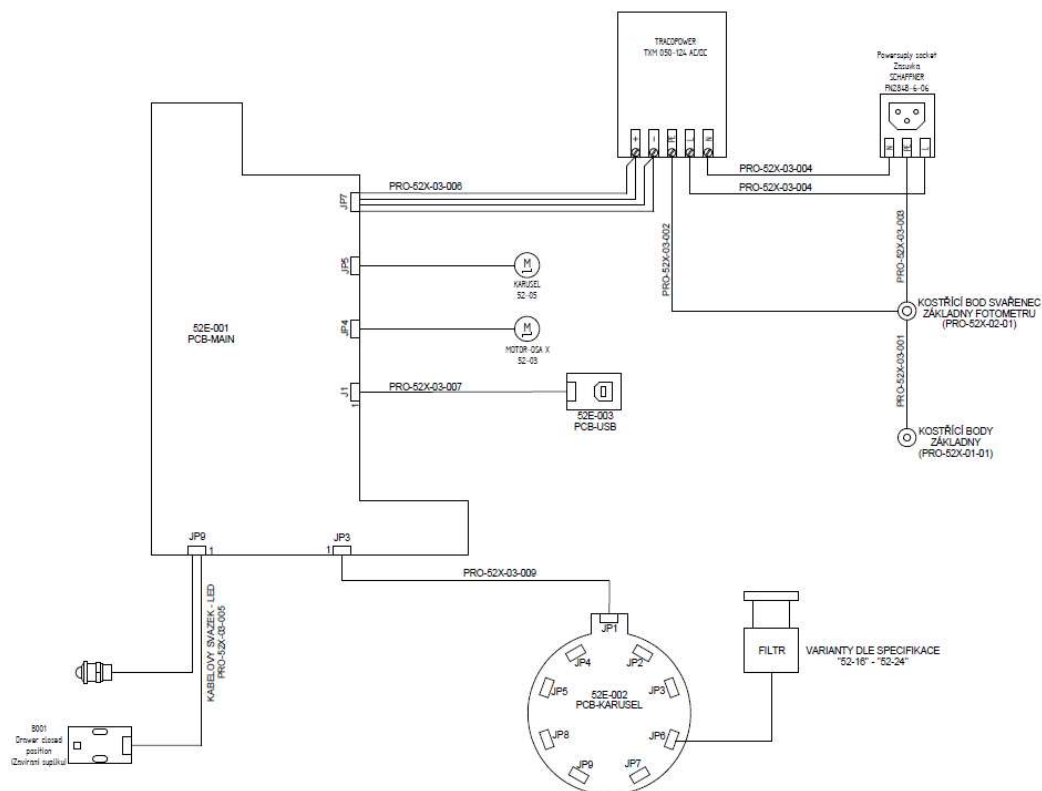
6. Error codes and signaling

6.1. Photometer status

The photometer status is signalled on the front panel by LED.

Particular states −   LED flashes green   no selftest is performed
                         LED illuminated green   selftest performed without errors
                         LED illuminated red   error found during selftest

6.2. Error identification

- run the Dynlab SW -> „Set debug windows"
- run the selftest
- the errors identified in the selftest are shown in the bottom left window (see Pic. 11). Identification of the errors according to the table.

Pic. 11
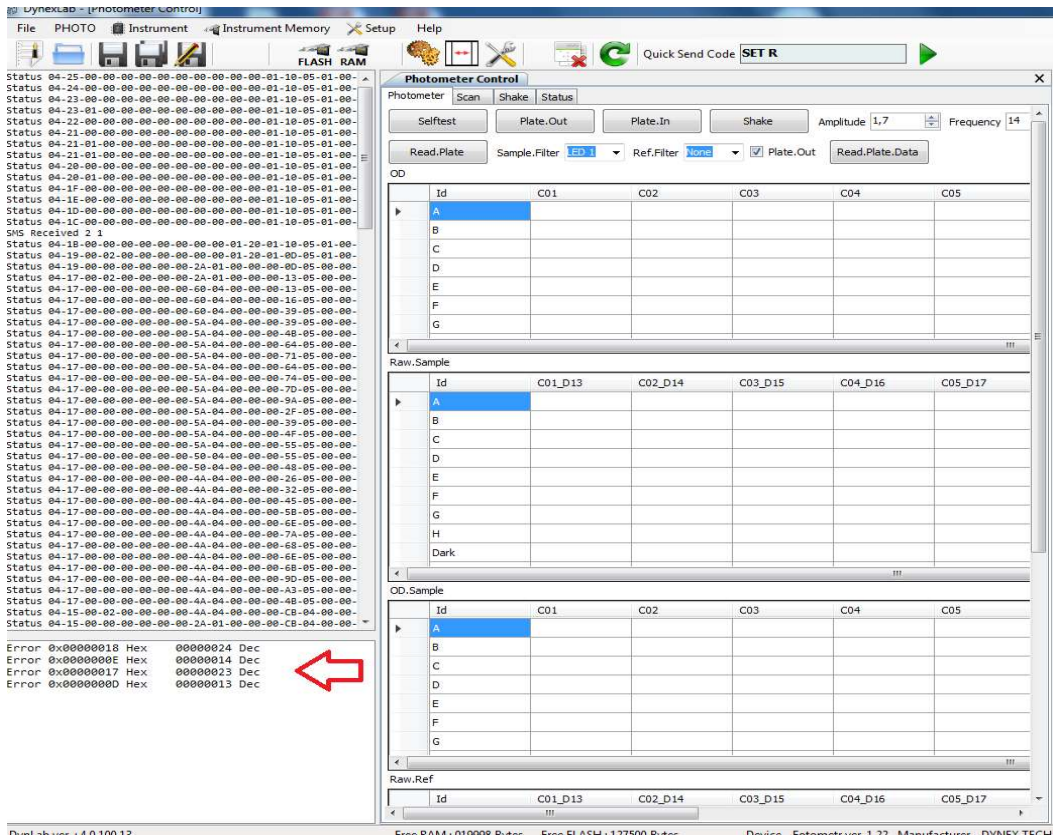
Error number	Description
1	Not leaving the home sensor X
2	Timeout of ramp on home sensor X
3	X travel: sensor lights up at the start/finis hor does not fit the number of edges from the sensor
11	Position out of limit LED 1
12	Position out of limit LED 2
13	Position out of limit LED 3
14	Position out of limit LED 4
15	Position out of limit LED 5
16	Position out of limit LED 6
17	Position out of limit LED 7
18	Position out of limit LED 8
21	Current setting error LED 1
22	Current setting error LED 2
23	Current setting error LED 3
24	Current setting error LED 4
25	Current setting error LED 5
26	Current setting error LED 6
27	Current setting error LED 7
28	Current setting error LED 8

| 30 | Dark background limit exceeded |

7. Firmware upgrade

Upgrading the firmware or segments of program can only be done after release of a higher version from the manufacturer.

7.1. Firmware upgrade

- run the Dynlab SW -> „Instrument Memory" – select the firmware location and start upgrading

7.2. Segments upgrade

- place new segments into the folder :C\Dynlabfoto\segments
- connect a photometer to a PC
- run the program Dynlab -> Flash