Operating Manual
BlueCure FL

Please read this user manual carefully before initial operation.

IMPORTANT!
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Tool Crib Supervisors

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Contents

1. Safety Instructions ............................................................................................4-7

2. General Information ..........................................................................................8-9
   2.1 Pollution Limitations (RoHS) ........................................................................8
   2.2 Chemicals Directive (REACH) ........................................................................8
   2.3 Product Recycling (WEEE)...........................................................................8
   2.4 Standards and Regulations .........................................................................8
   2.5 Unpacking and Inspection .........................................................................9

3. Functionality ........................................................................................................9

4. Technical Specifications ....................................................................................10

5. Installation ....................................................................................................11-16
   5.1 SPS Connection ....................................................................................12-13
   5.2 Power Supply Connection .......................................................................14
   5.3 Possible Connection Scenarios .............................................................15-16

6. On/Off Control ..................................................................................................16

7. Intensity of the Radiation ................................................................................17

8. Maintenance .....................................................................................................18

9. Accessories .......................................................................................................18

10. Troubleshooting ..............................................................................................19

A. Appendix .......................................................................................................20
   A.1 Drawing of the BLUE CURE FL-8.0W-125X20-WC-395.............................20

Service Address ................................................................................................Back Cover

Warranty ...........................................................................................................Back Cover
1. Safety Instructions

Prior to initial operation of the device, it is necessary to follow the operating and safety instructions. Identical to the standard ANSI Z535.4, the symbols used below are defined in the standard ISO 3864-2 and represent various warning levels.

Safety symbols – warning against injury hazards.

**DANGER:** This symbol indicates a direct hazard to the life and health of persons!

**WARNING:** This symbol indicates a potential hazard to the life and health of persons.

**CAUTION:** This symbol indicates a potentially dangerous situation.

The BlueCure LED lamps are equipped with various protection devices, which comply with international safety standards, in order to ensure the safe use of the device.

**CAUTION!**

**Attention:** Never operate the device while open or damaged or with loose or missing protection devices.
Symbol Safety Instructions

- Read the precautions in the instructions

UV-LIGHT
- Read the precautions in the instructions

CAUTION
- Hazardous UV LED rays
- Use only with shield
- Protect your eyes and skin from the UV rays

The BlueCure lamps are high-intensity UV LED emitting devices for industrial applications. To achieve short hardening times of the UV hardened materials, intense UV radiation is necessary.

The standard CEI/IEC 62471 describes the photobiological safety standards for lamps and LED devices. The actual classification is based on the purpose for which the device is used. The operating personnel can ensure safe use of the product through appropriate safety devices and shields that prevent direct eye contact with the UV radiation.
Classification of hazards:
The classification describes the potential risks that could occur depending on the purpose of the application and the length of irradiation. The risks must be assessed and classified depending on the use of the UV LED light source.

The measurement distance for the classification of hazards is set at 200 mm according to IEC 62471.

The risks groups defined in IEC 62471:

**Risk-free** means that, based on this standard, there is no health hazard through irradiation.

**Risk Group 1 – Low risk**
Does not pose an irradiation hazard under normal performance and use.

**Risk Group 2 – Medium risk**
No hazard based on the natural human reaction to a very intense glare or generation of heat.

**Risk Group 3 – High risk**
Can be hazardous even in the case of brief exposure to irradiation.

⚠️ **CAUTION!**

**Attention:** The BlueCure lamp emits UV and brief visible light with an intense glare. Never look at the UV light source without UV protective glasses.

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Spectral distribution
BlueCure lamps are classified as a risk group 3 in accordance with IEC 62471 when in the vicinity and when looking directly at the source of the radiation. When integrating the source of radiation into a production system, the risk must generally be ranked as low to medium if the appropriate distances from the user are ensured or risk-free in the case of appropriately specified integration schemes.

Looking directly at the light source is dangerous, therefore, it is imperative to wear safety glasses, e.g. UVEX SCT orange lenses.

The BlueCure lamps are classified as class 3B LEDs in accordance with the international standard IEC 60825-1:2001. Contrary to laser devices, there is NO requirement to register devices of this type with a professional association or trade control. Hiring a laser protection commissioner in the company is NOT necessary.

Primarily organizational and technical protective measures have to be met in areas in which class 3B LED devices are operated. If this is not possible, appropriate eye protection devices, protective clothing or protective gloves must be provided for work in this area within a distance <1.5 meters from the light source in order to protect eyes and skin. Eye protection must be provided for work in the area within a distance of 1.5 to 3 meters from the point of the LED where light is emitted. Skin protection measures are no longer necessary in this case due to the extremely low intensity of the radiation.

The maximum permissible value for the UV exposition is 83 J/cm² for a wavelength of 395 nm.

The described lamps are operational resources for use in industrial facilities. Those responsible for the safety of the systems must therefore ensure that

- Work on or in the proximity of the BlueCure lamps is conducted only by sufficiently qualified personnel.
- These persons already have access to the user manual and other product documentation, etc. and are required to comply with these documents consistently when executing the respective operations.

**CAUTION!**

**Note:** Qualified personnel are persons who, due to their training, experience and instruction, as well as their knowledge of relevant standards, provisions, accident prevention regulations and operating conditions, have been authorized by the person responsible for the safety of the system to perform the required tasks and, in the process, can identify and prevent potential risks (definitions for specialists according to VDE 105 or ICE 364).
2. General Information

2.1 Pollution Limitations (RoHS)

According to our knowledge and the information made available to us, the BlueCure lamps do not contain materials, for which there are limitations according to RoHS Directives, above the following specified limits related to the respectively used homogenous material:

- Lead (Pb) < 0.1 weight %
- Mercury (Hg) < 0.1 weight %
- Chromium-VI (Cr VI) < 0.1 weight %
- Poly brominated biphenyls (PBB) or poly brominated biphenyl ethers (PBDE) < 0.1 weight %
- Cadmium (Cd) < 0.1 weight %

2.2 Chemicals Directive (REACH)

Nordson EFD ensures that the BlueCure products are not subject to the EU Guidelines of the Chemicals Directive (REACH).

Furthermore, with regard to the planned candidate list of substances of very high concern (SVHC) – issued on October 10, 2008 – Nordson EFD declares that, to the best of our knowledge, the BlueCure products do not contain SVHC of more than 0.1% of the weight of the device.

2.3 Product Recycling (WEEE)

The product may not be disposed of as normal waste; rather it must be recycled.

The BlueCure lamps must be returned to Nordson EFD for disposal or recycling.

2.4 Standards and Regulations

The BlueCure lamp device conforms to the following harmonized standards and regulations:

- IEC 60825 -1 (2001)
- IEC 61010 -1 (2001)
- RoHS
- 89/336/EMC; as amended by 92/31/EEC 93/68/EEC 98/13/EEC
2.5 Unpacking and Inspection

After removal from the packaging, please inspect the delivery for completeness and to ensure that its operating conditions are consistent with the information on the rating plate.

The warranty for the products from Nordson EFD is based solely on the general terms and conditions in their current version.

3 Functionality

BlueCure lamps are high-intensity sources of UV radiation without the usual disadvantages of UV devices: heating of the surface of the component through heat emission, very high energy use or generation of ozone through brief UV radiation. The usable UV intensity correlates to that of a mercury-vapor lamp with frequent electrical power consumption.

The BlueCure lamps are comprised of closely arranged semi-conductor light emitting diodes that are combined with highly developed micro-optics and a very efficient cooling system in a so-called MOEMS (Micro-Opto-Electro-Mechanical System). The result is sources of high-intensity UV radiation that present an efficient, safe and environmentally-friendly alternative to commercial UV systems while simultaneously offering an extremely long operational lifespan.

The device is immediately operational after being turned on and can be switched on and off depending on the demand. The BlueCure lamps can be controlled via a primary controller (SPS) and therefore easily integrated into a production system.
4 Technical Specifications

**BLUE CURE FL-8.0W-125X20-WC**

**Outer dimensions L x W x H**
(including the tube for the cooling connection) 135 x 49 x 76 mm

**Dimensions of the light-emitting window** 125 mm x 20 mm

**Maximum intensity of radiation** 8.0 W/cm²

**Fastening thread - broad sides** 2x M3 x 0.5 each; maximum 6 mm deep; Tightening torque: maximum 0.36 Nm
Axial force: maximum 85 kN

**Fastening thread - long sides** 4x M2.5 x 0.45 each; maximum 5 mm deep; Tightening torque: maximum 0.9 Nm
Axial force: maximum 85 kN

**Weight** 0.48 kg

**Operational voltage** +48 V DC

**Power consumption** 25 A

**Power supply** BLUE CURE POWER AC-48V-32.0A

**Operational temperature** +10°C to +40°C

**Humidity** maximum of 80 % rel. humidity, non-condensing at +30°C

**Area of use** Below 2000 meters of elevation

**Storage temperature** -20 to +85°C

**Cooling** Liquid cooled

**Connection for the coolant intake and outlet** 1x brass tube each; Ø 9.5 mm

**Coolant** softened water with anti-algae additive

**Cooling output** minimum of 1000 W

**Through-flow rate** minimum of 4 to 6 liters/min.

**Coolant temperature at the intake** maximum of +20°C

**Coolant pressure** maximum of 8.3 bar

**Loss of pressure in the light source** 0.14 bar at 4 liters/min.
0.27 bar at 6 liters/min.
with a coolant temperature of +20°C respectively

**Gauge of the coolant lines** 10/8 hose line

**Material of the coolant lines** PE, PU, nylon
5 Installation

The lamps are provided with threaded inserts on the bottom for the purpose of mounting (see drawings in the appendix). Damage to the source of radiation may occur if the permissible maximum values for mounting the lamps are exceeded.

Please note that the light source must be grounded if it is mounted or integrated in a system using the fastening threads.

The lamp is connected to the liquid cooling system using the appropriate connections and its functionality and seals are checked. In conclusion, it is connected to the power source (Phoenix Contact 5-pin plug) and the DB15 interface for transferring data between SPS and the lamp.

Prior to initial operation of lamp, the proper attachment of all connections must be inspected.

⚠️ CAUTION!

Attention: Do not operate the lamp without coolant.
# 5.1 SPS Connection

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
<th>Signal Level</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>---</td>
<td>---</td>
<td>Do not connect</td>
</tr>
<tr>
<td>2</td>
<td>Input Lamp output</td>
<td>0 to +5 V DC</td>
<td>The desired lamp output is achieved depending on the input voltage (+5 V = 100%, +1 V = 20%). The smallest input voltage for the proper function of the lamp is +1 V.  Note: A connection with pin 6 results in 100% output in the case of Rin 10 kΩ.</td>
</tr>
<tr>
<td>3</td>
<td>Input Turn on lamp with high signal</td>
<td>0 or +5 V DC</td>
<td>TTL (Transistor-Transistor-Logic): 0 to +0.4 V DC = Lamp off (open input = off) +3.5 to +5 V DC = Lamp on Note: Beyond the listed values, the lamp operates in an undefined condition.</td>
</tr>
<tr>
<td>4</td>
<td>Input Turn on lamp with low signal</td>
<td>0 or +5 V DC</td>
<td>TTL (Transistor-Transistor-Logic): 0 to +0.4 V DC = Lamp on +3.5 to +5 V DC = Lamp off (open input = off) Note: Beyond the listed values, the lamp operates in an undefined condition.</td>
</tr>
<tr>
<td>5</td>
<td>Output Temperature fault</td>
<td>0 or +5 V DC</td>
<td>Open commutator TTL output: 0 to +0.4 V DC = temperature fault +3.5 to +5 V DC = no temperature fault Leakage current: maximum 5 mA (see diagram following this table) Note: Beyond the listed values, the lamp operates in an undefined condition. The pins 5 and 11 can be connected with each other for a common error output (see explanation and diagram following this table). The remarks regarding the use of the output under 7 Intensity of the Radiation must also be complied with.</td>
</tr>
<tr>
<td>6</td>
<td>Output +5 V DC</td>
<td>+5 V DC</td>
<td>The reference voltage is only intended for the operation of the lamp. Improper use of this voltage for other purposes can cause damage to the lamp. Connect pin 6 with pin 2 for a constant 100% lamp output.</td>
</tr>
<tr>
<td>7</td>
<td>Emergency shut-off functionality</td>
<td>0 or +5 V DC</td>
<td>For the connection to a latch circuit at the facility. 0 to +0.4 V DC = release +3.5 to +5 V DC = no release Note: Beyond the listed values, the lamp operates in an undefined condition. If a latch circuit is not present at the facility, pin 7 must be connected with a ground pin (pin 14).</td>
</tr>
<tr>
<td>8</td>
<td>Reference mass</td>
<td>0 V DC</td>
<td>---</td>
</tr>
<tr>
<td>9</td>
<td>Reference mass</td>
<td>0 V DC</td>
<td>---</td>
</tr>
<tr>
<td>10</td>
<td>Reference mass</td>
<td>0 V DC</td>
<td>---</td>
</tr>
<tr>
<td>11</td>
<td>Output SLM error</td>
<td>0 or +5 V DC</td>
<td>Open commutator TTL output: 0 to +0.4 V DC = error +3.5 to +5 V DC = no error Leakage current: maximum 5 mA (see diagram following this table) Note: Beyond the listed values, the lamp operates in an undefined condition. The pins 5 and 11 can be connected with each other for a common error output (see explanation and diagram following this table).</td>
</tr>
<tr>
<td>12</td>
<td>---</td>
<td>---</td>
<td>Do not connect</td>
</tr>
<tr>
<td>13</td>
<td>---</td>
<td>---</td>
<td>Do not connect</td>
</tr>
<tr>
<td>14</td>
<td>Reference mass</td>
<td>0 V DC</td>
<td>---</td>
</tr>
<tr>
<td>15</td>
<td>Output Temperature monitor</td>
<td>0 to +7.5 V DC</td>
<td>The output voltage is proportional to the SLM of the cooling element. The value should not exceed +5 V DC. Conversion factor: 0.1 V/°C (e.g. +30 °C = 3.0 V DC).</td>
</tr>
</tbody>
</table>
**CAUTION!**

**Note:** All input and output signals of the lamp must have the same ground as the +48 V DC power supply.

Temperature fault and SLM error diagram ‘Open commutator TTL output’

If desired, pins 5 and 11 can be joined together for a single error as an output signal.

**CAUTION!**

**Attention:** Both outputs ‘Pin 5 and 11’ are not short-circuit-proof and may carry a maximum of 5 mA.

If multiple light sources are used together simultaneously, the following pins can be looped through:

- **Pin 2**  
  Input – amp output

- **Pin 3 or 4**  
  Input – turn on lamp with a high or low signal

- **Pin 5**  
  Output temperature fault

- **Pins 8, 9, 10, 14**  
  References masses

- **Pin 11**  
  Output SLM error

- **Pin 7**  
  Emergency shut-off functionality

Do not connect the following pins for any reason:

- **Pin 6**  
  Output +5 V DC

- **Pin 15**  
  Output temperature monitor
5.2 Power Supply Connection

The BlueCure lamp is connected with the power supply via a respective cable. A 5-pin plug from Phoenix Contact is used for the connection (Type: PC5/5-STF1-7,62).

Connect the power supply cable of the lamp to the power supply according to the instructions provided by the manufacturer of the power supply.

⚠️ CAUTION!

**Attention:** Do not plug in or disconnect the plug while under voltage. For this purpose, turn the power supply off first.

### Pin Functions and Signal Levels

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
<th>Signal Level</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>V+</td>
<td>Input voltage</td>
<td>+47 to +49 V DC</td>
<td>+48 V DC input to the power supply of the lamp; cable color: red</td>
</tr>
<tr>
<td>V-</td>
<td>Reference mass</td>
<td>0 V DC</td>
<td>Grounding for +48 V DC power supply of the lamp; cable color: black</td>
</tr>
<tr>
<td>PE</td>
<td>Grounding (PE)</td>
<td>0 V DC</td>
<td>Cable color: green or green-yellow</td>
</tr>
<tr>
<td>V-</td>
<td>Reference mass</td>
<td>0 V DC</td>
<td>Grounding for +48 V DC power supply of the lamp; cable color: black</td>
</tr>
<tr>
<td>V+</td>
<td>Input voltage</td>
<td>+47 to +49 V DC</td>
<td>+48 V DC input to the power supply of the lamp; cable color: red</td>
</tr>
</tbody>
</table>
5.3 Possible Connection Scenarios

Scenario 1:
- Simple on/off (no SPS)
- 100% intensity (not adjustable)
- No monitoring of errors and temperature
- No emergency shut-off functionality

Scenario 2:
- Simple on/off (no SPS)
- Adjustment of the intensity from 20 to 100%
- No monitoring of errors and temperature
- Temperature monitoring via an external voltmeter
- No emergency shut-off functionality
6 On/Off Control

The BlueCure lamps can be turned on or off in less than 50 ms via a control voltage; for this reason, a shutter is not necessary. The lamp will only be activated if it is needed.

⚠️ CAUTION!

Attention: If the lamp is not needed, turn it off to prevent heat from building. Even if the surface of the lamp does not heat up, high temperatures may develop in the area surrounding the lamp (e.g. every material in the direct proximity, for which there is no air circulation).
7 Intensity of the Radiation

BlueCure lamps are flood lamps. Therefore, the highest intensity is achieved as close as possible to the radiation window of the lamp. A typical distance between the light source and the substrate to be exposed is approx. 5 mm.

Lamps with a wavelength-peak of 395 nm emit light within the wavelength range of 380 to 420 nm.

With an increasing distance between the light source and the substrate, the intensity of the radiation as a function decreases. The specified maximum intensity is measured directly on the glass surface of the light-emitting window.

The output capacity of the water-cooled lamps is directly influenced by the temperature of the coolant and the water through-flow quantity. The irradiance will slightly increase with cooler operational temperatures, e.g. when first turning the lamp on.

Because the coolant extensively cools the cooling element of the lamp in certain operating conditions (for expelling heat), condensation may form in the lamp behind the glass of the light-emitting window after the lamp is turned off and the cooler continues to run.

We recommend monitoring the temperature continually via pin 15 of the DB15 plug (Output Temperature Monitor). If the measured temperature deviates from the usual operational conditions by more than 10 to 15 °C, this could be an indication that significant changes have occurred in the operating environment of the lamp.

Every lamp is additionally equipped with an internal temperature switch in order to prevent overheating and, thus, damaging the lamp. If the maximum temperature is exceeded, the lamp will automatically shut off. After re-cooling, it will automatically turn back on when it has reached a lower temperature level. It is imperative to comply with the operational temperature and coolant temperature at the inlet specified (see 4 Technical Specifications).
8 Maintenance

The glass surface where the light is emitted should be occasionally inspected for potential contaminants and, if necessary, cleaned. Use a soft cloth soaked in alcohol for this. Do not flood the lamp with cleaning liquid in the process.

The maintenance of the cooling system is primarily geared toward the used refrigeration unit. When using decalcified water with an anti-algae additive, no maintenance to the cooling circuit should be expected. However, if calcium and algae deposits do occur, we recommend the following process for cleaning the lamps:

1. Run a solution consisting of vinegar and decalcified water (Mixing ratio 1:1 n. weight) through the lamp for 15 minutes
2. In the next step, run a pure vinegar solution through in the opposite direction for 15 minutes.
3. Next, run decalcified water through for 15 minutes.
4. Finally, run decalcified water through in the opposite direction for 15 minutes.

⚠️ CAUTION!

Attention: Do not use additives or cleaning solutions that contain salts or chlorine.

9 Accessories

The BlueCure lamps can be operated by using an adapter attachment with fiber optics or liquid light conductors, which enable a localized exposure with high-intensity UV light even on areas that are difficult to access.

Please contact us for more detailed information.
## Troubleshooting

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Component</th>
<th>Potential Cause and Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>The lamp does not emit any light</td>
<td>Power supply</td>
<td>- Check whether all cables are connected to the power supply properly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- For this, follow the respective instructions of the power supply manufacturer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Check whether the power supply is plugged in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Check whether the voltage from the power supply to the source of radiation is +48 V DC</td>
</tr>
<tr>
<td>Temperature fault</td>
<td></td>
<td>If the lamp displayed a temperature fault, no light will be emitted until the lamp has reached a safe operating temperature. (see also: Water-cooling below)</td>
</tr>
</tbody>
</table>
| SPS control                                  |                   | See 5.1 ‘SPS Connection’ for troubleshooting the interface DB15. It is possible to test-run the lamp without SPS. Turn on the lamp with full intensity with the following bridges to the DB15 interface:
|                                              |                   | - Turn on the lamp with a low signal: Bridge between pin 4 and pin 10                                 |
|                                              |                   | - Emergency shut-off functionality: Bridge between pin 7 and grounding pin 14                       |
|                                              |                   | - Lamp output: Bridge between pin 2 and pin 6                                                       |
| SLM error                                    |                   | - Check the wiring of the DB15 connection; see 5.1 ‘SPS Connection’ for this.                        |
|                                              |                   | - If the outlet pin 11 from the DB15 is applied to the ground (0 to +0.4 V DC), then it is possible that an internal fuse was set off. For further information, contact Nordson EFD. |
| Temperature increase of the lamp by more than 15°C | Water-cooling  | - Check for the proper coolant through-flow                                                            |
|                                              |                   | - Check the coolant temperature at the coolant inlet of the lamp (maximum +20 °C)                   |
|                                              |                   | - If the lamp briefly (< 5 minutes) displayed a temperature fault, check whether the temperature of the lamp is less than +40 °C. To determine the internal temperature of the lamp, you will need a voltmeter. Measure on pin 15 against the ground (+2 V = +20 °C). |
| Film on the inside of the glass window of the lamp | Water-cooling  | Check the environmental conditions of the light source for potential signs of condensation. The film could be formed by the collection of condensation on the inside of the lamp. |
A. Appendix

A.1 Drawing of the BLUE CURE FL-8.0W-125X20-WC-395
NORDSON EFD ONE YEAR LIMITED WARRANTY

Nordson EFD products are warranted for one year from date of purchase to be free from defects in material and workmanship (but not against damage caused by misuse, abrasion, corrosion, negligence, accident, faulty installation or by dispensing material incompatible with equipment) when the equipment is installed and operated in accordance with factory recommendations and instructions. Nordson EFD will repair or replace free of charge any part of the equipment thus found to be defective, on authorized return of the part prepaid to our factory during the warranty period. In no event shall any liability or obligation of Nordson EFD arising from this warranty exceed the purchase price of the equipment. This warranty is valid only when oil-free, clean, dry, filtered air is used.

Nordson EFD makes no warranty of merchantability or fitness for a particular purpose. In no event shall Nordson EFD be liable for incidental or consequential damages.