Operating Manual
BlueCure FY

Please read this user manual carefully before initial operation.

IMPORTANT!
Save this Sheet.
Forward to Maintenance or Tool Crib Supervisors

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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.
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.
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.
<table>
<thead>
<tr>
<th>Outer dimensions LxWxH (without filter housing)</th>
<th>BLUE CURE FY-2.0W-25X10-AC-</th>
<th>BLUE CURE FY-4.0W-25X20-AC-</th>
<th>BLUE CURE FY-4.0W-50X20-AC-</th>
</tr>
</thead>
<tbody>
<tr>
<td>65 mm x 31 mm x 92 mm</td>
<td>110 mm x 68 mm x 200 mm</td>
<td>110 mm x 68 mm x 200 mm</td>
<td></td>
</tr>
<tr>
<td>Dimensions of the light-emitting window</td>
<td>25 mm x 10 mm</td>
<td>25 mm x 20 mm</td>
<td>50 mm x 20 mm</td>
</tr>
<tr>
<td>Maximum intensity of radiation</td>
<td>2.0 W/cm²</td>
<td>4.0 W/cm²</td>
<td>4.0 W/cm²</td>
</tr>
<tr>
<td>Fastening thread</td>
<td>2x M3x0.5; 6 mm deep; Tightening torque: maximum 0.36 Nm Axial force: maximum 0.85 kN</td>
<td>4x M3x0.5; 6 mm deep; Tightening torque: maximum 0.36 Nm Axial force: maximum 0.85 kN</td>
<td>4x M3x0.5; 6 mm deep; Tightening torque: maximum 0.36 Nm Axial force: maximum 0.85 kN and: 1x G1/4; 6 mm deep; Tightening torque: maximum 0.9 Nm Axial force: maximum 0.85 kN</td>
</tr>
<tr>
<td>Weight of the lamp</td>
<td>0.18 kg</td>
<td>1.0 kg</td>
<td>1.0 kg</td>
</tr>
<tr>
<td>Operational voltage</td>
<td>+48 V DC</td>
<td>+48 V DC</td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>1.3 A</td>
<td>10.0 A</td>
<td></td>
</tr>
<tr>
<td>Operational temp.</td>
<td>0 to +40 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humidity</td>
<td>20 to 95% rel. humidity, non-condensing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area of use</td>
<td>Below 2000 meters of elevation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20 to +85 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling</td>
<td>Electrical blower, integrated</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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 the system using the fastening threads.

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

5.1 SPS and Power Supply Connection

The BLUE CURE FY-2.0W-25X10-AC- lamp is equipped with a Molex Mini-Fit Jr. interface. The power to the lamp as well as the data exchange between SPS and the lamp is supplied through this interface.

⚠️ CAUTION

Attention: Do not plug in or disconnect the plug while under voltage. For this purpose, turn the power supply off first.
### Pin Function, Signal Level, Remark

<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>
</tbody>
</table>
| 2   | Turn on input lamp with High Signal | 0 or +5 V DC | TTL (Transistor-Transistor-Logic) input:  
0 to +0.4 V DC = lamp off (open input = off)  
+3.5 to +5 V DC = lamp on |
| 3   | Output temperature fault | 0 or +5 V DC | 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)  
Notice: Outside of the values indicated, the lamp operates in an undefined state. |
| 4   | Reference mass | 0 V DC | Mass for signals |
| 5   | Reference mass | 0 V DC | Mass for +48 V DC power supply |
| 6   | Input voltage | +47 to +49 V DC | +48 V DC input for supplying power to the lamp |

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**CAUTION**

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

Error diagram ‘Open commutator TTL output’.

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**CAUTION**

**Attention:** The output ‘Pin 3’ is not short-circuit-proof and may carry a maximum of 5 mA.
The BLUE CURE FY-4.0W-25X20-AC- and BLUE CURE FY-4.0W-50X20-AC- lamps are equipped with a DB13W3 interface. The power to the lamp as well as the data exchange between SPS and the lamp is supplied through this interface.

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.

The lamps have two monitoring functions on the back for checking the operational readiness and the switching state of the light source. The green LED indicates the operational readiness of the lamp (PWR ON) and the blue LED illuminates if the UV light is turned on (UV ON).
<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</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</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</td>
<td>0 to +10 V DC</td>
<td>The desired lamp output is achieved depending on the input voltage (+10 V = 100%, +2 V = 20%). The smallest input voltage for the proper function of the lamp is +2 V. Note: A connection with pin 6 results in 100% output in the case of Rin 10 kΩ.</td>
</tr>
<tr>
<td>5</td>
<td>Output</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.</td>
</tr>
<tr>
<td>6</td>
<td>Output</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 8 or 10).</td>
</tr>
<tr>
<td>8</td>
<td>Reference mass</td>
<td>0 V DC</td>
<td>---</td>
</tr>
<tr>
<td>9</td>
<td>Output</td>
<td>0 to +10.5 V DC</td>
<td>The output voltage is proportional to the SLM of the cooling element. The value should not exceed +8 V DC. Conversion factor: 0.1 V/°C (e.g. +30 °C = 3.0 V DC)</td>
</tr>
<tr>
<td>A1</td>
<td>Input voltage</td>
<td>+47 to +49 V DC</td>
<td>+48 V DC input to the power supply of the lamp</td>
</tr>
<tr>
<td>A2</td>
<td>Reference mass</td>
<td>0 V DC</td>
<td>Ground for the +48 V DC power supply</td>
</tr>
<tr>
<td></td>
<td>Grounding</td>
<td>0 V DC</td>
<td>---</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.

Error diagram ‘Open commutator TTL output’.

CAUTION

Attention: The output ‘Pin 5’ is not short-circuit-proof and may carry a maximum of 5 mA.

BlueCure lamp  Facility-side
5.2 Possible Connection Scenarios

The following are possible connection scenarios of the BLUE CURE FY-4.0W-25X20-AC- and BLUE CURE FY-4.0W-50X20-AC-.

Scenario 1:

- Simple on/off (no SPS)
- 100% intensity (not adjustable)
- No monitoring of errors and temperature
- No emergency shut-off functionality
Scenario 2:
- SPS-controlled
- Adjustment of the intensity from 20 to 100%
- No monitoring of errors and temperature
- No emergency shut-off functionality

S1 = On / off lamp
P1 = Intensity setting from 20 to 100%
T1 = Power supply

DB13W3 Interface
LAMP
Scenario 3:

- SPS-controlled
- Adjustment of the intensity from 20 to 100% via SPS
- Monitoring of errors and temperature via SPS
- Temperature detection via SPS
- Emergency shut-off functionality

S1 = Emergency shut-off switch
T2 = DC regulator
K1 / K2 = Optical coupler
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.

![Graph showing intensity decrease with distance](image)

The output capacity of the lamp is directly influenced by the cooling temperature. Every lamp is therefore equipped with an internal temperature switch in order to prevent overheating and, thus, damaging the lamps. 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 specified (see 4 Technical Specifications).

In the case of lamps with a temperature monitor (see 5.1 Connecting SPS and Power Supply), we recommend monitoring the temperature continually (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.
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 cooling-air inlet of the light source is equipped with an air filter. This must be replaced or cleaned as needed. The periodic interval is dependent upon the environment, in which the lamp is used.

1. Turn off the lamp and unplug the power supply cable

2. Remove the air filter according to the conditions specific to the lamp – as described below.

2.1 In the case of the BLUE CURE FY-2.0W-25X10-AC- lamp, unscrew the thumb screw of the air filter bracket, pivot the bracket upwards and then disassemble from the side.
2.2 In the case of the BLUE CURE FY-4.0W-25X20-AC- and BLUE CURE FY-4.0W-50X20-AC- lamps, remove the four screws of the air filter bracket and take off the bracket.

3. Replace the old filter with a new one or wash out soapy water. If the filter is washed, it must be completely dry prior to being reinserted.

⚠️ CAUTION

**Attention:** Do not use scouring agents to clean the filter. Never spray liquid into the filter as long as it is attached to the lamp.

4. If necessary, clean the air filter bracket with a soft cloth soaked in alcohol.

5. Reinsert the filter in the opposite order.

6. Reconnect the lamp to the power supply.

7. Now the lamp can be turned on again.
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.
A 2 Drawing of the BLUE CURE FY-4.0W-25X20-AC-395
A 3 Drawing of the BLUE CURE FY-4.0W-50X20-AC-395
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This equipment is regulated by the European Union under WEEE Directive (2002/96/EC). See www.nordsonefd.com for information about how to properly dispose of this equipment.

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.