C173-LG
Thank you for choosing a laser marking system for your marking applications.

SIC MARKING systems contribute to improve the traceability of your products while complying with the industrial standards.

We would like to welcome you as a user of our systems.

This guide contains the installation and use instructions of the laser marking type machines. We recommend that you read it carefully before installing the system.

Please contact our technical department for any further information.
DESCRIPTION

1. **SCHEMATIC**

Marking system C173-LG is composed of 3 main elements:

- Control rack (A)
- Marking head (C)
- Optical fiber (B)
- Cabinet (D)
1.1. **Control Rack (A)**

- **Function**: Generate and drive the laser signal

- **Elements**
  - Laser source (emission and amplification)
  - Control system for the laser source and the galvanometric head
  - Human/Machine interface
  - Security items linked to laser marking
  - Connection for external communication
  - Power supplies for all components

1.2. **Marking head (C)**

- **Function**: Orientate and focalize the laser signal to realize the mark.
1.3. Optical fiber

- **Function**
  Control the laser signal between the laser source and the marking head.

- **Elements**
  - 3 meter laser fiber fixed on the control rack and on marking head.
2. CHARACTERISTICS

2.1. Control rack

- **Dimensions - weight**
  - 19 inches rack – 6U
  - Width x Height x Depth: see appendix
  - Weight: 30 kg (rack with laser source)

- **Power supply**
  - Class I system: ground connection compulsory
  - Single phase nominal voltage 115V – 60Hz
  - Voltage variation: +/- 10%
  - Maximum power: 750 VA
  - Protection: 2 time-delay fuses 5x20 – 6.3 A

  In case of variation bigger than 10%, you should use an online converter to guarantee the power supply quality.

- **Environment**
  - Protection rate: IP20
  - Using temperature: 0 to +42°C
  - Storage temperature: -10 to +60°C
  - 85% humidity without condensing

- **Laser source**
  - **Power laser**
    - Class: class IV conforming with standard NF EN 60825-1
    - Average power: 20 W
    - Peak power: 10 kW max
    - Pulse duration: 110 ns
    - Frequency: 20 – 80 kHz
    - Wavelength: 1060 nm (invisible)

  - **Guiding laser**
    - Class: class II
    - Power: 0.3 - 5 mW
    - Wavelength: 660 nm (Red laser)
2.2. Marking head

- **Dimensions - weight**
  - Width x Height x Depth: see appendix
  - weight: 3 kg

- **Power supply**
  - From the control rack

- **Environment**
  - temperature of use: 0 to +50°C
  - Storage temperature: -10 to +60°C
  - 85% humidity without condensing

- **Marking**
  - Marking area: 170 x 170 mm
  - Working distance: see appendix
  - material: need validation with marking tests according to following recommendations:

  Laser C173LG should not be used with copper parts or with other material which have high light-reflection coefficient (potential damages to the laser source).

2.3. Optical fiber

- **Dimensions**
  - Length: 3 meters

- **Mechanical**
  - Minimum bend radius for the fiber 100 mm

  THE OPTICAL FIBER cannot be unplugged.

  DO NOT OVERBEND THE OPTICAL FIBER. MINIMAL CURVATURE RADIUS.
3. **FUNCTIONALITIES**

3.1. **Security loops and maintenance mode**

The marking system C173LG integrates two security loops: « emergency stop » and “door security”.

3.1.1 **Emergency stop loop (AU)**

1/ **Type**

Two-way emergency stop with transversal short circuit detection and manual rearming.

2/ **Usage**

Emergency stop of the system.

   *Remarks: during emergency stop, only the laser source is off power.*

3/ **Details of use**

   a) **Initialization of the emergency stop loop**

      ➢ **When**
      • When we switch on the control rack
      Or
      • After each opening of the loop (activation of the emergency stop).
      ➢ **Initial conditions**
      • Emergency stop button unlocked
      • Maintenance mode inactive (key switch « maintenance » on 0)
      ➢ **Actions**
      • Press the « init » button on the front of the control rack
      ➢ **Reactions**
      • Manual rearming of the emergency stop relay in the control rack
      • Closing of the two dry contacts "emergency stop out1" and "emergency stop out2" (I/O connector)
      • Closing of “system initialize” dry contact.
      • allows the laser source to be turned ON
      ➢ **Lighting indications**
      • « init » blue lighting on (front of the control rack)
      ➢ **Remarks**
      • Rearming of the system is realized on low/high signal.
      • In maintenance mode, it’s impossible to rearm the emergency stop

   b) **Opening of the emergency stop loop**

      ➢ **When**
      • Anytime, For any dangerous situation
Conditions
- none

Actions
- Press the emergency stop button in the front of the control rack
  Or
- Press on an external emergency stop button if necessary wiring has been done (see example of wiring in appendix)

Reactions
- Opening of two dry contacts "emergency stop out1" and "emergency stop out2"
- Opening of "system initialize" dry contact
- Switch off the laser source

Lighting indications
- « init » blue lighting off (front of the control rack)

4/ Wiring
See appendix: example of wiring

3.1.2 Door security loop

1/ Type
Two-way emergency stop with transversal short circuit detection and automatic rearming.

2/ Usage
Management of door for parts to mark (vertical door as example)

3/ Details of use

a) Opening of the door security loop

  Conditions
  - Initialized system
  - Door closed
  - Maintenance mode inactive (key switch « maintenance » on 0)

  Actions
  Opening of the door (opening of the "door security IN1" and "door security IN2" wired circuits)

  Reaction
  - Opening of the "door closed or maintenance mode" dry contact (I/O connector)
  - Locking of the laser emission
  - Switch off the laser source

  Lighting indications
  None

Remarks
- In some cases, for the automatic loading and unloading of the part (with part detection wired on the door security loop), the switching off of the laser source could be shunted. In this case, the risks analysis of the integrator will define all additional elements needed to guarantee the protection of the operators (notably during the set-up operations).
• The installation of the shunt should be realized on the internal connector of the control rack. This action should be realized by a trained technician.

b) Closing of the door security loop

- Conditions
  - Initialized system
  - Door opened
  - Maintenance mode inactive (key switch « maintenance » on 0)

- Actions
  Closing of the door (closing of the "door security IN1" and "door security IN2" wired circuits)

- Reactions
  - Closing of dry contact "door closed or maintenance mode" (I/O connector)
  - Unlocking of stop circuit of the laser source
  - Switch on the laser source

- Lighting indications
  None

- Remarks
  Rearming of the door security loop is realized with low/high signal on the two-way of “door security”.

4/ Wiring
See appendix: example of wiring

3.1.3 Maintenance mode

a) Activation of maintenance mode

- Conditions
- Initialized system

- Actions
  Maintenance mode active (key switch « maintenance » on 1)

- Reactions
  - Laser source switch off
  - Closing of the "door closed or maintenance mode " dry contact (I/O connector)
  - Closing of the "maintenance mode " dry contact (I/O connector)

- Lighting indications
  Front of the rack: Yellow lighting « MAINTENANCE » on
  4-light lantern: Orange light flashes
b) Laser shot in maintenance mode

- **Conditions**
  - Maintenance mode active

- **Actions**
  - Press and hold the button « manual LASER ON » (Switches ON the laser source)
  - Press the button "manual marking" (starts laser shot)

- **Reactions**
  - Switch on the laser source
  - Start a cycle is impossible with the external “START” command of the I/O connector

- **Lighting indications**
  - 4-light lantern: Red light on

- **Remarks**
  - If you release the button « manual LASER ON », the laser source is switched off but the system doesn’t stop the cycle.
  - The red light is still on during a cycle even if the laser source is off.
  - Commands "manual LASER ON " and "manual marking" are available on the I/O connector (see appendix)
### 3.2. Control rack front panel description

<table>
<thead>
<tr>
<th>Indication</th>
<th>Material</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMERGENCY STOP</td>
<td>Emergency stop palm button</td>
<td>Opening of the emergency stop loop and stopping of the laser emission (laser source is switched off)</td>
</tr>
</tbody>
</table>
| POWER ON          | White lighting             | Indicates the status of the power supply:  
  - Lighting off: no power supplied to system  
  - Lighting on: power supplied to system    |
| LASER ENABLED     | Green lighting             | Indicates the status of the laser source:  
  - Lighting off: no power supplied to laser source or error  
  - Lighting on: laser source ready to mark |
| INIT              | Blue lighting              | Indicates the status of Emergency Stop  
  - Lighting off: emergency stop relay is not rearmed  
  - Lighting on: emergency stop relay rearmed |
| INIT              | White lighting push button | Push button to rearm the emergency stop relay. One action of the button rearms the emergency stop line.  
  If “INIT” lighting doesn’t turn on, the emergency stop line is opened or “MAINTENANCE” key switch is on “I” position. |
| **LASER I/O** | **Red lighting** | Indicates if the laser source is power supplied:  
• Lighting off: no power supplied to laser source  
• Lighting on: power supplied to laser source  
To power supply the laser source, you should:  
• Power supply the system (white lighting on)  
• Put “LASER ON/OFF” key switch on “1” position  
• Put MAINTENANCE” key switch on “0” position  
• Initialize the system (blue lighting on) |
| **MANUAL MARKING** | **Key switch** | Activates the power supply of the laser source  
Key switch on “0” position: laser source not power supplied  
Key switch on “1” position: power supplied to laser source if all security loops are ok.  
(emergency stop relay rearmed and maintenance mode inactive) |
| **MAINTENANCE** | **Yellow lighting** | Indicates the laser mode  
• Lighting off: standard mode  
• Lighting on: maintenance mode |
| **MAINTENANCE** | **Key switch** | Selection of the laser mode  
Key switch on “0” position: standard mode  
Key switch on “1” position: Maintenance mode  
In maintenance mode:  
• Door security is inactive  
• Laser source is not power supplied  
• I/O start command inactive  
• Starting of marking cycle is possible by pressing and holding the « MANUAL LASER ON » button and by pressing at the same time the button “MANUAL MARKING”. If you release the button « MANUAL LASER ON », the laser source is switched off but the system doesn’t stop the cycle. A new cycle can be realized with a new impulsion on the ”MANUAL MARKING” button. |
| **MANUAL LASER ON** | **Black push button** | Push button to activate the laser source in maintenance mode  
Pressure should be maintained on the button to activate the power supply. |
| **MANUAL MARKING** | **White push button + “1”** | Push button to start a cycle in maintenance mode  
A new cycle can be realized with a new impulsion on this button. This button is inactivated in standard mode. |
| **RESET** | **Black push button + “0”** | Push button to initialize the laser system  
Action needed before and after using of the PC and software. |
3.3. Control rack rear panel description

<table>
<thead>
<tr>
<th>Indication</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>INPUT / OUTPUT</td>
<td>Connection for security loop and I/O</td>
</tr>
<tr>
<td>XY-GALVA</td>
<td>Galvanometric head signal (X and Y drivers)</td>
</tr>
<tr>
<td>POWER GALVA</td>
<td>Galvanometric head power supply</td>
</tr>
<tr>
<td>LANTERN</td>
<td>4-light lantern connector</td>
</tr>
<tr>
<td>USB</td>
<td>USB connection for PC driven installation</td>
</tr>
<tr>
<td>RS232</td>
<td>RS232 connection (for standalone version only)</td>
</tr>
<tr>
<td>FILE SELECTION</td>
<td>File selection connection (for standalone version only)</td>
</tr>
</tbody>
</table>
### 3.4. I/O connector details

<table>
<thead>
<tr>
<th>Function</th>
<th>Designation</th>
<th>Output</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency stop button</td>
<td>emergency stop IN1</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>emergency stop IN2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Door closed sensor</td>
<td>door security IN1</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>door security IN2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start cycle (standard mode)</td>
<td>START</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Stop cycle</td>
<td>STOP</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>System Initialization</td>
<td>init rack control</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Laser source power supply activation</td>
<td>Manual laser on</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Start cycle (maintenance mode)</td>
<td>manual marking</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Emergency stop status</td>
<td>initialized system</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td><strong>System status:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laser source activated</td>
<td>system ready</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>System initialized</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software ready</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cycle in progress</td>
<td>Cycle in progress</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td><strong>Laser source status:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no power supplied to source</td>
<td>laser source default</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Damaged source</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency lines status</td>
<td>emergency stop out1</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>emergency stop out2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Door security loop status</td>
<td>door closed or maintenance mode</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Maintenance mode status</td>
<td>maintenance mode</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>
### 3.5. 4-light lantern description

<table>
<thead>
<tr>
<th>Color</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>On: system ready and no cycle</td>
</tr>
<tr>
<td></td>
<td>Off: System not ready or cycle in progress</td>
</tr>
<tr>
<td>Orange (steady)</td>
<td>On: power supplied to Laser source</td>
</tr>
<tr>
<td></td>
<td>Off: no power supplied to Laser source</td>
</tr>
<tr>
<td>Red</td>
<td>On: cycle in progress, laser shot</td>
</tr>
<tr>
<td></td>
<td>Off: No cycle</td>
</tr>
<tr>
<td>Orange (flashing)</td>
<td>On: Maintenance mode</td>
</tr>
<tr>
<td></td>
<td>Off: Standard mode</td>
</tr>
</tbody>
</table>
4. **INTEGRATION ADVICES**

During an integration study for I100L-G, you should take care about:

Power supply should be conform to (USA) - 50/60Hz or your need to use a converter.

Respect environment temperature of control rack and marking head (see characteristics)

The configuration of the installation should be compatible with the integration of the control rack and of the marking head. Don’t forget, the fiber is not removable (length: 3m).

The protection of the system should be tight for all rays (direct or indirect) of the laser.

Do not orientate the laser signal in direction of operators (in the direction of door for example).

The system should avoid any risks for the fiber (mechanical shocks). The optical fiber should be guided from the rack up to the marking head.

4-light lantern should be always visible for all operators, in any mode (standard and maintenance).

If the marking area is not close to the control rack panel, the integrator should realize an external control panel close to the marking area (see I/O connections).

A fumes extractor is necessary to be in accordance with laser safety regulations.

In all cases, the integrator should validate that the system (laser and integration) is in accordance with the specification of the standards NF EN 60825-1, NF EN 11553-1 and other local laser regulation.
INSTALLATION

1. **Unpacking**

Except for delivery realized by our own services, the system is delivered in a dedicated package. This package should be conserved for under warranty exchange or repairs.

Unwrap all elements carefully, especially the optical fiber.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>THE OPTICAL FIBER cannot be unplugged</td>
</tr>
<tr>
<td></td>
<td>DO NOT OVERBEND THE OPTICAL FIBER. MINIMAL CURVATURE RADIUS 100mm.</td>
</tr>
<tr>
<td></td>
<td>DO NOT PUT FINGERS ON OPTICAL ITEMS</td>
</tr>
</tbody>
</table>
2. **Installation**

- Install the control rack by taking care about the fiber path.
- Install the marking head on the dedicated mounting support.
- Connect the galvanometric head and the control rack (X-Y GALVA and POWER GALVA)
- Connect the PC using the USB cable.
- Connect the security loops with the I/O connector (see appendix)
- Connect the power cord to the rack (115VAC – 15A)
- Connect the 4-light lantern to the “LANTERN” connector
- Install sticker of indications concerning the laser risks (in accordance with standard NF EN 60825-1 or equivalent)

```
MAXIMUM LENGTH OF CABLE PC-RACK : 4 METERS
```

**BEFORE USING SYSTEM, READ ALL SECURITY REQUIREMENTS AND BE SURE THAT ALL OPERATORS ASSIMILATE THESE REQUIREMENTS**
# USING

## 1. Security

| ![Warning Symbol] | **SIC Marking laser** is a class IV laser with 20W power (10 kW peak power) and with a 1060nm wavelength. It's the highest risks level. Integration of INTEGRATED SIC MARKING LASER (WITH CONTROL RACK AND OPTICAL HEAD) and the conformity to actual regulation is under the responsibility of the integrator.

In standard mode, the laser system should be associated to a class I laser. In this way, the integrator must guarantee the security lines of the installation (emergency stop and door security).

Avoid eyes or skin exposition with direct and diffused rays. Risks for human include permanent loss of eyesight.

Never look in the direction of the main rays’ axis.

Avoid all exposition to laser radiation.

| ![Warning Symbol] | **PROTECTIVE GLASSES (EN 207 and EN 208) WEARING IS OBLIGATORY FOR LASER EMISSION HIGHER THAN CLASS I AND II – PARTICULARLY DURING MAINTENANCE MODE OF SIC MARKING SYSTEM.**

| ![Warning Symbol] | **DO NOT AIM THE LASER RAY TOWARD PEOPLE, DOORS OR WINDOWS.**

DUE TO THE TECHNOLOGY USED (FIBER LASER); SYSTEM SHOULD NOT BE POWERED ON IF ALL ELEMENTS OF THE SYSTEM ARE NOT INTEGRATED IN THE CORRECT LOCATION. IT’S PARTICULARLY THE CASE FOR THE OPTICAL HEAD. (SEE COMPONENTS DESCRIPTION)

| ![Warning Symbol] | **DO NOT REMOVE COVERS OR SHORT CIRCUIT SECURITY.**


<table>
<thead>
<tr>
<th><strong>EMERGENCY STOP</strong></th>
<th>IS LOCATED ON THE CONTROL RACK. THE LENGTH OF THE FIBER IS 3 METERS. IF NEEDED, THE INTEGRATOR SHOULD INSTALL AN EMERGENCY STOP BUTTON ACCESSIBLE FOR THE OPERATOR (FOR INTEGRATED SYSTEM).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ONLY TRAINED PEOPLE</strong></td>
<td>SHOULD PERFORM ELECTRICAL INSTALLATION OR REPAIR ON SIC MARKING SYSTEM.</td>
</tr>
<tr>
<td><strong>IN CASE OF DOUBTS</strong></td>
<td>ON THE GOOD USE OF THE SYSTEM OR FOR ACCIDENT, INFORM IMMEDIATELY THE RESPONSIBLE OF THE LASER SECURITY OR ALL OTHER CONCERNED PEOPLE.</td>
</tr>
<tr>
<td><strong>Guiding red pointer</strong></td>
<td>Class II laser, 0.3 – 0.5mW power, wavelength: 670nm</td>
</tr>
<tr>
<td><strong>Be careful:</strong></td>
<td>several material as copper or high light-reflection coefficient material can permanently damage the laser source.</td>
</tr>
<tr>
<td><strong>When using PC software,</strong></td>
<td>do not set up the system with frequency smaller than 20kHz. This frequency can damage internal components.</td>
</tr>
<tr>
<td><strong>Laser marking</strong> can generate fumes and toxic dust (see standard NF EN 11553-1 and (USA))</td>
<td></td>
</tr>
<tr>
<td><strong>Do not open the control rack</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Use in non explosive environment.</strong></td>
<td></td>
</tr>
</tbody>
</table>
Security labels

LASER CLASSE 4:
PUISSANCE MOYENNE : 20 W Max
PUISSANCE CRÊTE : 10 kW Max
DURÉE DE PULSION : 110 ns
FREQUENCE DE REPETITION : 20 – 80 kHz
LONGUEUR D’ONDE : 1055-1070 nm

GUIDE LASER CLASSE 2:
LONGUEUR D’ONDE : 600 – 700 nm
PUISSANCE : 0.3 – 5 mW
SUIVANT NORME EN 60825-1 : 2001

(Front panel of control rack)

OUVERTURE LASER CLASSE 4

Laser guide : classe 2
Ne pas regarder dans le faisceau même à l’œil nu
SUIVANT NORME EN 60825-1 : 2001

(Marking head)
2. **Use**

2.1. **Standard mode**

2.1.1 **System power on**
- Switch the control rack ON
  - Turn on the main switch – White lighting “POWER ON” is on
  - Press the INIT button to initialize the emergency stop loop – Blue lighting “INIT” is on.
  - Turn on the laser source (key switch « LASER ON ») – Red lighting « LASER I/O » on the front panel and Orange lighting on 4-light lantern are on.
  - Give 1 minute warm-up.
- Switch the PC ON
- Start the marking software (see software manual for more details)

*Remarks: It's very important to respect the steps of start-up to initialize correctly all elements of the laser system. In case of problem, switch off all system and restart.*

2.1.2 **System switch off**
To stop the system:
- Exit from the marking software
- Switch off the laser source (key switch LASER I/O on "O" position)
- Switch off the control rack with the main switch.
2.2. Maintenance mode

This mode allows to use the laser without security loops.

2.2.1 Selection of maintenance mode

- Initialize the control rack
- Switch on the laser source (key switch « LASER I/O » on « 1 » position)
- Select the maintenance mode (key switch « MAINTENANCE » on « 1 » position)

2.2.2 Marking in maintenance mode

- Press and hold the button « MANUAL LASER ON » (button on control rack front panel)
- Press the button "MANUAL MARKING" (starts laser shot)

2.2.3 Go back to normal mode

- Select the standard mode (key switch « MAINTENANCE » on « 0 » position)

<table>
<thead>
<tr>
<th>IN THIS MODE, PROTECTION MUST BE WORN BY OPERATORS (GLASSES AND CLOTHES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>!</td>
</tr>
</tbody>
</table>

When on Standard operation, do not let the key on the « MAINTENANCE » key switch of the control rack.
3. **INTRODUCTION**

Laser marking systems have been developed and realized especially to meet the needs of our clients who want a machine which is:
- Performing,
- Robust,
- Reliable,
- Ergonomic.

It requires very little maintenance and if you observe the preventive maintenance recommendations, you will increase the life-expectancy of your machine.

However, if a problem of any kind should occur, please refer to this manual, which will help you solve the problem.

4. **AFTER-SALES SERVICE**

Please contact our local distributor first.
To find out about our local distributor, you can check our website: www.sic-marking.com
If you cannot reach our distributor, please call SIC MARKING at +33.4.72.54.80.00.

SIC MARKING or its distributor offers the following services:

- **Phone support**

Please do not hesitate to contact us for any technical problem.

- **On-site intervention**

We can help you install, set up the machine on-site, as well as repair it and provide personal training.

- **Maintenance contract**

Thanks to the maintenance contract, we provide regular maintenance of your marking machine.
5. **PREVENTIVE MAINTENANCE**

To keep the system in good working order, these simple cares must be observed:

- avoid dust and abrasive grit on protective glass of f-Theta lens
- regularly clean the protective glass of marking head using dry soft cloth
- No intervention is to foresee on the laser source.

| During cleaning operations, shut OFF control rack |

6. **TROUBLESHOOTING**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Check</th>
<th>solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>system initialization impossible</td>
<td>check that :</td>
<td>unlock emergency stops and turn &quot;MAINTENANCE&quot; key switch on &quot;0&quot;</td>
</tr>
<tr>
<td>and emergency stops are unlocked</td>
<td>and &quot;MAINTENANCE&quot; key switch is on &quot;0&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;LASER I/O&quot; red lighting does not enlighten</td>
<td>check that :</td>
<td>unlock emergency stops and turn &quot;MAINTENANCE&quot; key switch on &quot;0&quot;</td>
</tr>
<tr>
<td>and system is initialized</td>
<td>and &quot;LASER I/O&quot; key switch is on &quot;1&quot;</td>
<td></td>
</tr>
<tr>
<td>and &quot;MAINTENANCE&quot; key switch is on &quot;0&quot;</td>
<td>and door security is locked</td>
<td></td>
</tr>
<tr>
<td>&quot;LASER ENABLED&quot; green lighting does not enlighten</td>
<td>check that :</td>
<td>stop system and replace cabling</td>
</tr>
<tr>
<td>and &quot;LASER I/O&quot; red lighting is ON</td>
<td>and door security is locked</td>
<td></td>
</tr>
<tr>
<td>laser driver software does not detect control rack</td>
<td>check that :</td>
<td>restart system following start-up sequence</td>
</tr>
<tr>
<td>and USB cabling is OK (length : 4 m max)</td>
<td>and step-by-step start-up in good sequence (1st rack – 2nd PC – 3rd software)</td>
<td></td>
</tr>
<tr>
<td>poor quality of marks</td>
<td>check that :</td>
<td>correct settings of software especially for &quot;pens&quot; and factors (%speed, %power)</td>
</tr>
<tr>
<td>and focal distance is correct</td>
<td>and marking head lens is clean</td>
<td></td>
</tr>
<tr>
<td>and part surface is clean (no grease or surface contaminant)</td>
<td>and door security is locked</td>
<td></td>
</tr>
</tbody>
</table>
1. **DIMENSIONS**

1.1. Control rack
RACK DE COMMANDE LASER OEM SANS SOURCE NI BOITIER DE PILOTAGE
CONTROL RACK WITHOUT SOURCE AND CONTROL BOARDS

caisset rackable type 19" - 6U
19" - 6U rack

Poids / weight : 21kg
1.2. Marking head
2. **Spare Parts List**
### 3. Connectors

#### 3.1. INPUT/OUTPUT connector

Female Sub-D37 connector located at rear of the control rack

<table>
<thead>
<tr>
<th>Pins</th>
<th>Designation</th>
<th>type</th>
<th>Output</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+24Vcc</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>2</td>
<td>+5Vcc</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>3</td>
<td>Emergency Stop IN1</td>
<td>Dry contact between 3 and 4</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Emergency Stop IN2</td>
<td>Dry contact between 5 and 6</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Door Security IN1</td>
<td>Dry contact between 7 and 8</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Door Security IN2</td>
<td>Dry contact between 9 and 10</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Ground</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>System initialized</td>
<td>Free potential between 12 and 13</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>START</td>
<td>See wiring diagram</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>15</td>
<td>STOP</td>
<td>See wiring diagram</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>16</td>
<td>System ready</td>
<td>Free potential between 16 and 17</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Cycle in progress</td>
<td>Free potential between 18 and 19</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Laser source error</td>
<td>Free potential between 20 and 21</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Emergency Stop out1</td>
<td>Free potential between 22 and 23</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Emergency Stop out2</td>
<td>Free potential between 24 and 25</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Door closed or Maintenance mode</td>
<td>Free potential between 26 and 27</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>init rack control</td>
<td>Dry contact between 28 and 29</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Maintenance mode</td>
<td>Free potential between 30 and 31</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Shifted power supply – only in maintenance mode (24V on pin 37)</td>
<td>See wiring diagram</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>36</td>
<td>Laser shot – only in maintenance mode (shot : 0V on pin 36)</td>
<td>See wiring diagram</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>32 to 35</td>
<td></td>
<td>NC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Remarks:

- EXTERNAL EMERGENCY STOP: see wiring sample
  if you don’t use the external emergency stop, you must realize shunts between pins 3 – 4 and 5 – 6.

- DOOR SECURITY: see wiring sample

- « START » and « STOP » see wiring sample

- « SYSTEM INITIALIZED »: Free potential between pins 12 and 13 (NO type)
  Closed contact: System initialized

- « SYSTEM READY »: Free potential between pins 16 and 17 (NO type)
  Closed contact: System ready

- « CYCLE IN PROGRESS »: Free potential between pins 18 and 19 (NO type)
  Closed contact: Cycle in progress

- « SOURCE LASER ERROR »: Free potential output between pins 20 and 21 (NC type)
  Closed contact: Laser source error or no power

- « DOOR CLOSED or MAINTENANCE MODE »: Free potential output between pins 26 and 27 (NC type)
  Closed contact: Door closed or maintenance mode

- « MAINTENANCE MODE »: Free potential output between pins 30 and 31 (NO type)
  Closed contact: maintenance mode using

- OEM rack shifted initialization:
  - Same function than the push button init (BPI)
  - Initialization realized with circuit closing between pins 28 and 29
3.2. Connector RS232
Female Sub-D 9 connector located at rear of the control rack

<table>
<thead>
<tr>
<th>Pins</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>RXD</td>
</tr>
<tr>
<td>3</td>
<td>TXD</td>
</tr>
<tr>
<td>5</td>
<td>Ground</td>
</tr>
</tbody>
</table>

3.3. LANTERN connector
Female Sub-D 9 connector located at rear of the control rack

<table>
<thead>
<tr>
<th>Pins</th>
<th>Designation</th>
<th>Lantern</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>maintenance mode</td>
<td>Flashing orange</td>
</tr>
<tr>
<td>2</td>
<td>cycle in progress, laser shot in progress</td>
<td>Red</td>
</tr>
<tr>
<td>3</td>
<td>Laser source on</td>
<td>Orange</td>
</tr>
<tr>
<td>4</td>
<td>System ready</td>
<td>Green</td>
</tr>
<tr>
<td>9</td>
<td>Ground</td>
<td></td>
</tr>
</tbody>
</table>

3.4. POWER GALVA connector
Female Sub-D 3W3 + 20A contact (FCI) at rear of the control panel

<table>
<thead>
<tr>
<th>Pins</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>-16VDC</td>
</tr>
<tr>
<td>A2</td>
<td>0</td>
</tr>
<tr>
<td>A3</td>
<td>+16VDC</td>
</tr>
</tbody>
</table>
3.5. FILE SELECTION connector

Female Sub-D 15 connector at rear of the control rack (standalone version only)

<table>
<thead>
<tr>
<th>Pins</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>input n°1</td>
</tr>
<tr>
<td>2</td>
<td>input n°2</td>
</tr>
<tr>
<td>3</td>
<td>input n°3</td>
</tr>
<tr>
<td>4</td>
<td>input n°4</td>
</tr>
<tr>
<td>5</td>
<td>input n°5</td>
</tr>
<tr>
<td>6</td>
<td>input n°6</td>
</tr>
<tr>
<td>7</td>
<td>input n°7</td>
</tr>
<tr>
<td>8</td>
<td>input n°8</td>
</tr>
<tr>
<td>9</td>
<td>Driving board initialization</td>
</tr>
<tr>
<td>10</td>
<td>Ground</td>
</tr>
<tr>
<td>11</td>
<td>5VDC</td>
</tr>
</tbody>
</table>

Remarks:

For standalone configuration, the function “driving board initialization” allows to reboot the control board of the laser. This is necessary to switch between “USB” and “RS232” mode (see details in FEB-1 manual).

This is possible:
- With “RESET” button located on the front panel of the control rack.
- With a NC dry contact installed between pin 9 and 11 of the connector.

If “RESET” is not wired, you must install the jumper delivered with the system.

3.6. USB connector

B type USB connector