

# High Power Scanner

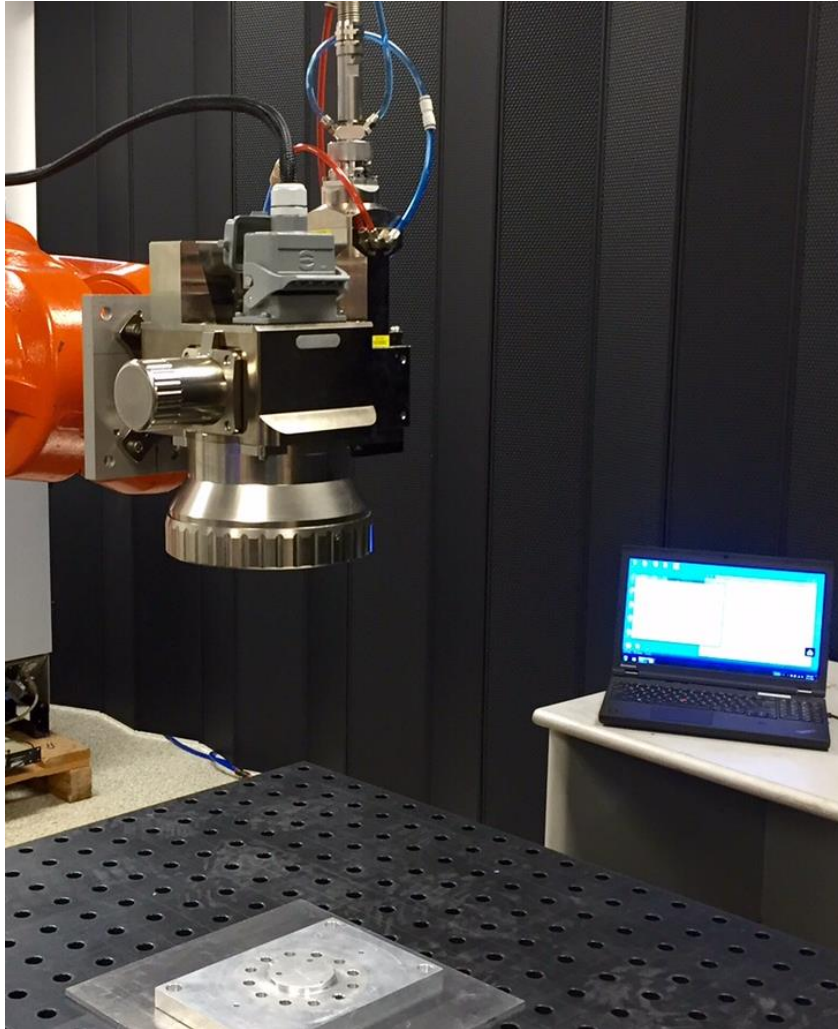
## Quick Start Manual



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Applications Engineers

# Set Up Overview

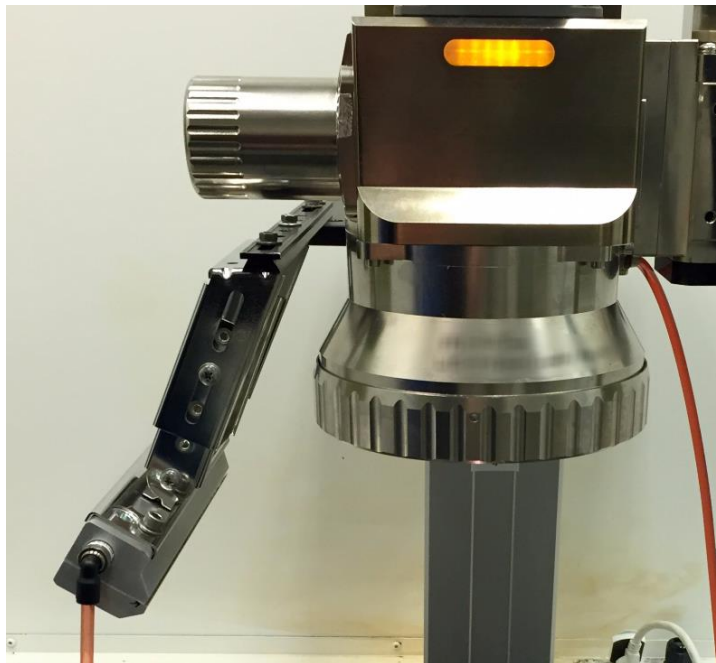
- The delivery fiber is connected to the scanner via a standard QBH connector.



- IPGWeld-software is used to control the scanner and the laser.

# Set Up Requirements

- Two power supplies for the scanner:
  - 24 V / 10 A for the galvos
  - 24 V / 3 A for housekeeping(See wiring diagrams for further details)
- Water cooling for the scanner head:
  - DI water, temperature 25-30 C
  - Flow rate minimum 0.75 l/min
- Air knife is recommended to protect the cover slide window from contamination:



# Power supply

## Power connector

The power connector is a DB 5W5, located on the scanner controller, and it is supplied with the laser



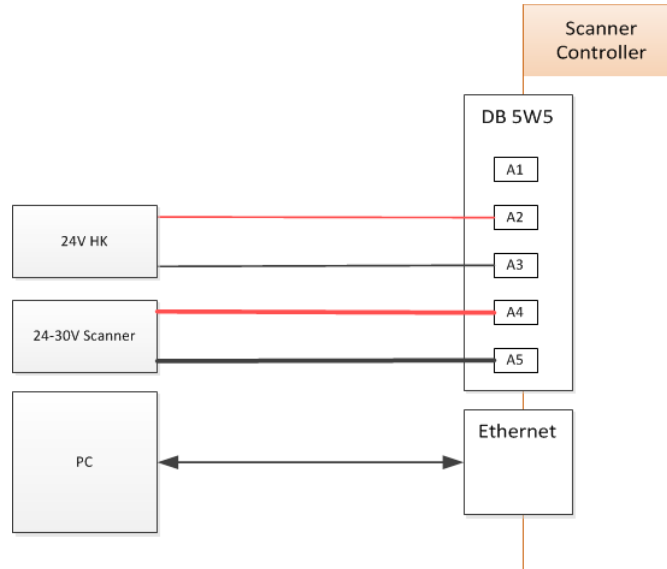
## Power Requirements and Power Pinout

System	Voltage	Current
Laser HK	24V +/- 5%	< 1A
Scanner	24-30V +/- 5%	10A Peak - 2A Average

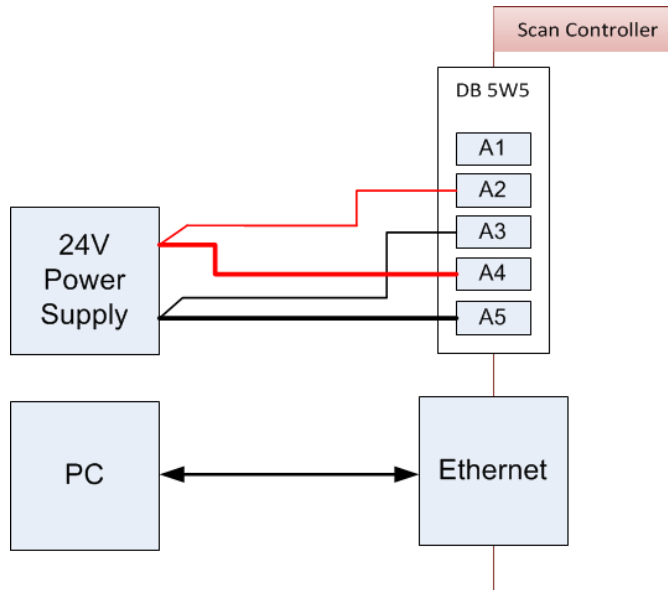
Pin	Function	Description
A1	Not Used	
A2	+V Laser HK	House Keeping Power 24V
A3	Return	Return For HK
A4	+V Scanner	Isolated Scanner Power (+V)-(-V) = 24V to 30V
A5	-V Scanner	

# Power Supply Configurations

## Configuration 1 – Separate Supply



## Configuration 2 – Single Supply

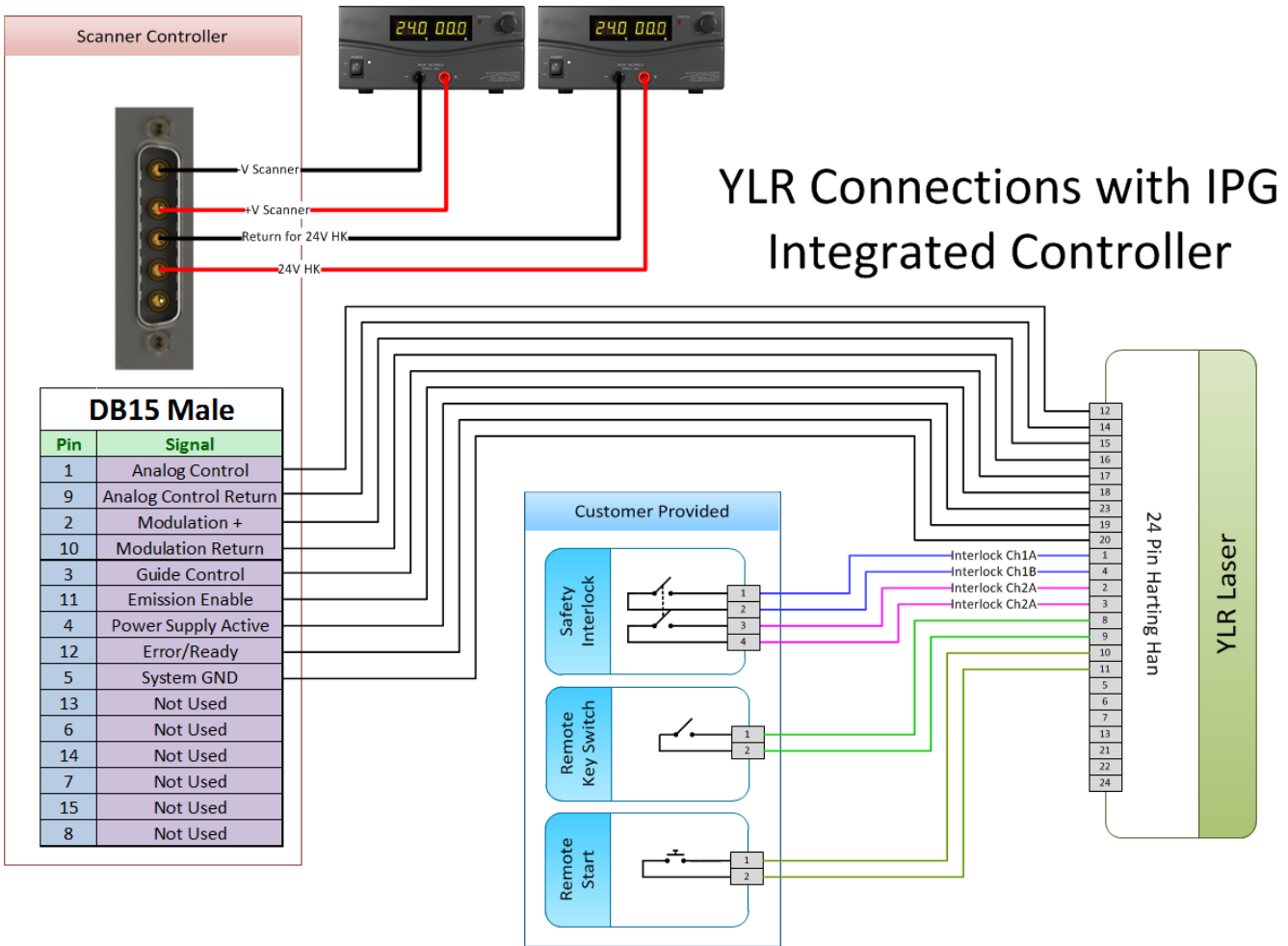


Notes:

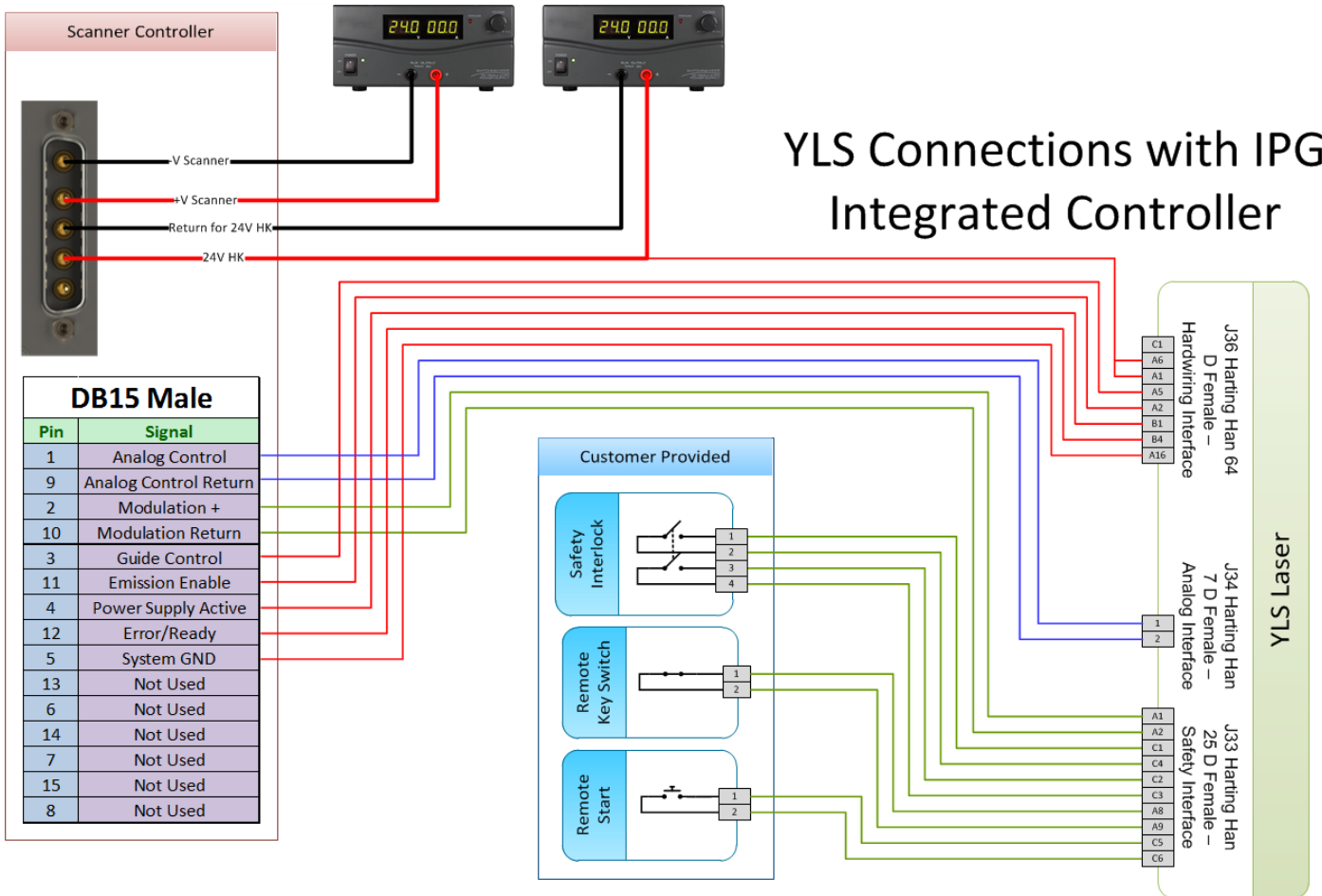
1. Power supply must have excellent transient response
2. Power supply return must not be connected to earth ground

# Wiring - YLR lasers

Customer is responsible for making additional cabling based on the schematics below. All connectors are supplied with laser, customer must supply only wires. The wiring is different depending on the laser source used.



# Wiring – YLS Lasers



## YLS Connections with IPG Integrated Controller

- Optionally, Remote Key Switch can be a NO contact, but laser will not power up in REM mode if this contact is open
- Pin C1 of connector J36 can also be used along with Remote Start. After Remote Start is pulsed ON for the first time (or if the E-Stop has been reset), the laser can be turned on and off by a HIGH or LOW signal on C1
- The above schematic does not display the beam switch selection pins, but a beam switch channel must be selected prior to starting the laser, otherwise a **Interlock Error** will occur. In order to clear the error, a functioning BS channel must be selected and the laser must be reset, either through LaserNet or using the reset pin
- If any signal output from the laser is required, 24V must be supplied to B15 on connector J36. Please check laser manual for details



# Software Requirements

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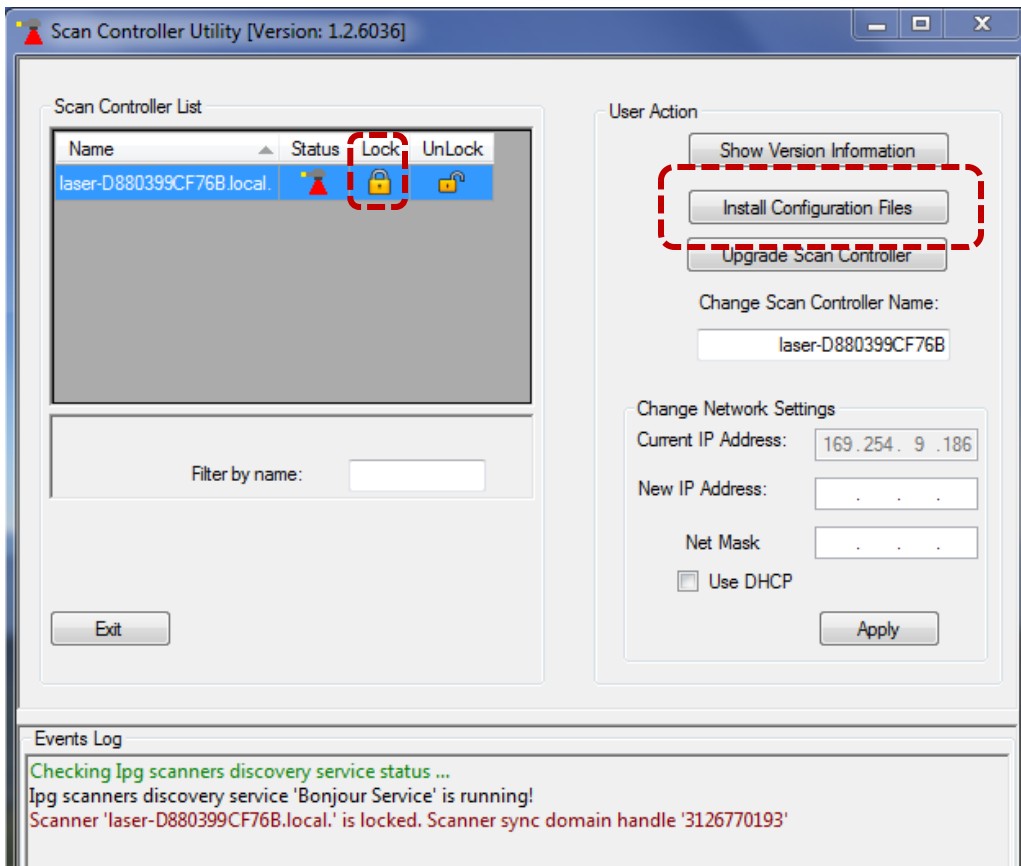
- The required programs can be downloaded on <http://software.ipgphotonics.com/>
- Go to “Welder”-subfolder and download and install the following programs:
  - ScanPack
  - IPGWeld
  - Scan Controller Utility



# Configuration Files

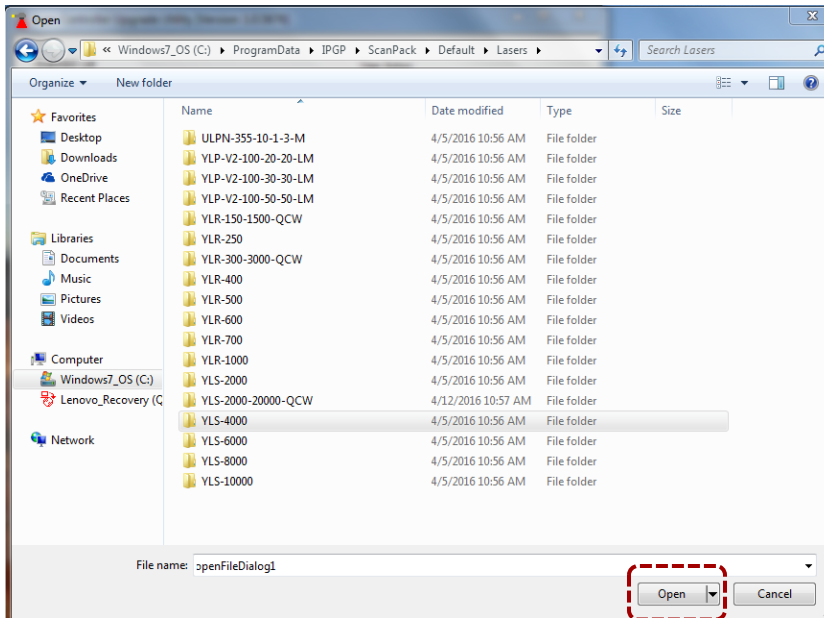
Before you start running the scanner via IPGWeld, open Scan Controller Utility to select a correct configuration file for your laser:

1. Hit “Lock”-button for the scanner in the menu. Once locked, select “Install Configuration Files”

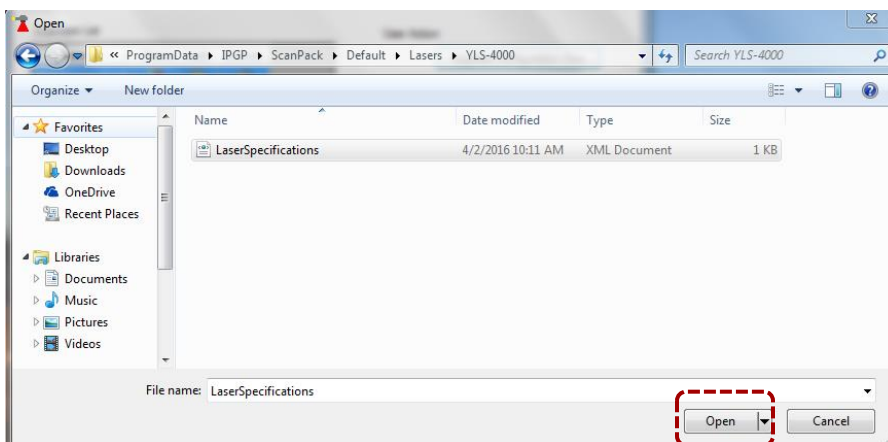


# Configuration Files

2. In the Open-window, go to C:\ProgramData\IPGP\ScanPack\Default\Lasers\ and select the laser from the list appropriately:

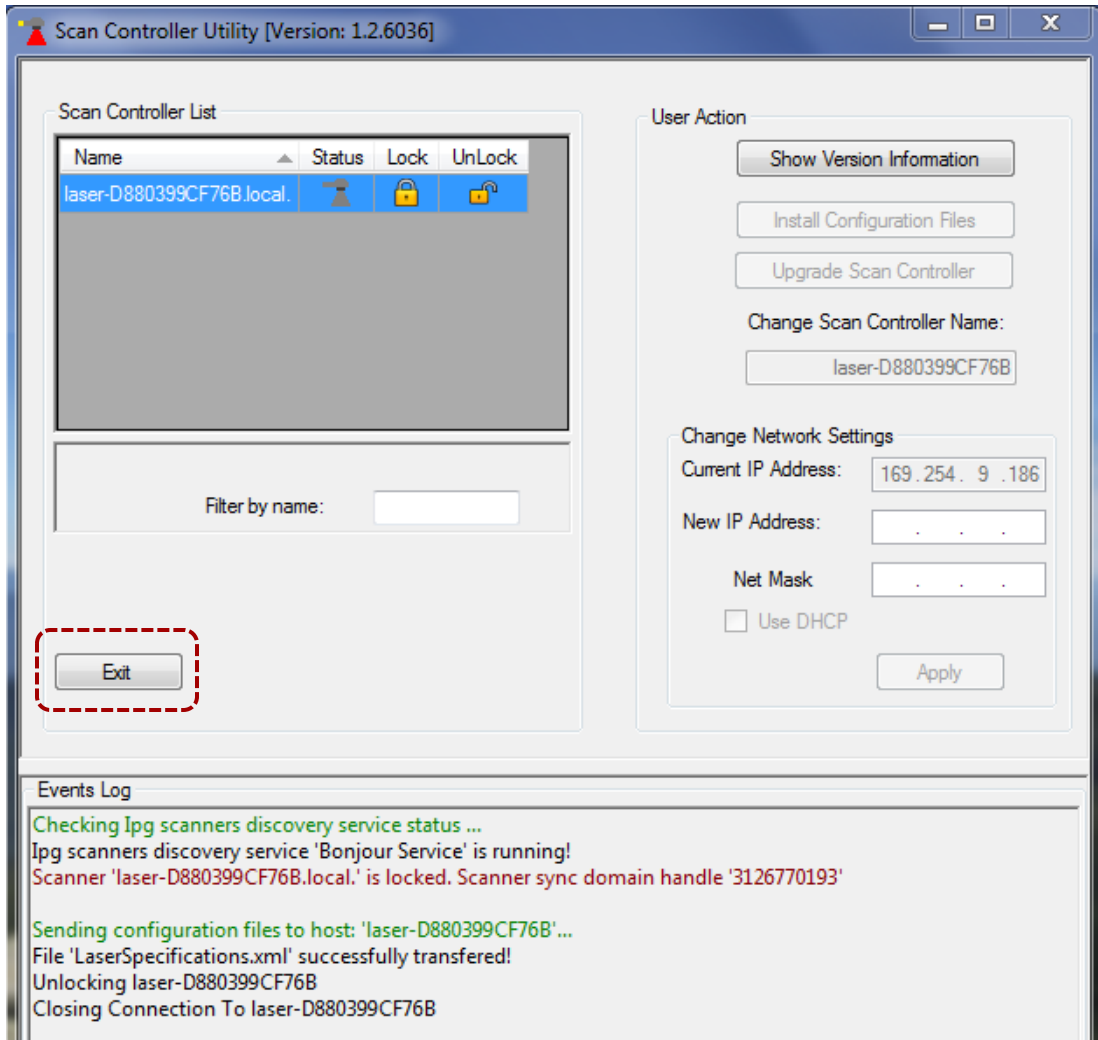


3. Under the Laser-folder, select “LaserSpecifications”-file and hit “Open”.



# Configuration Files

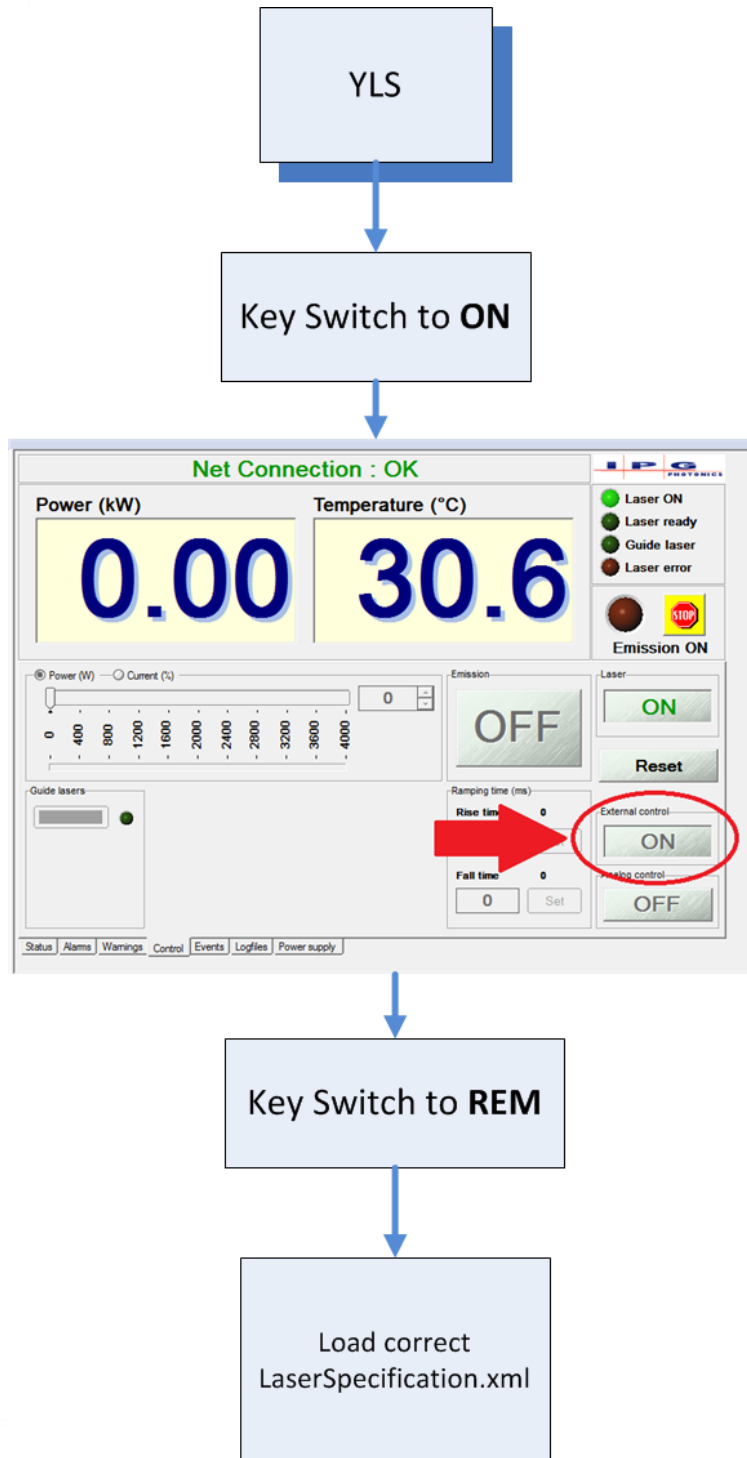
4. Once the configuration file has been transferred, the program will unlock the scanner (see Events Log in the window). After this, hit “Exit” to close Scan Controller Utility:





# Laser Source Setup - YLR

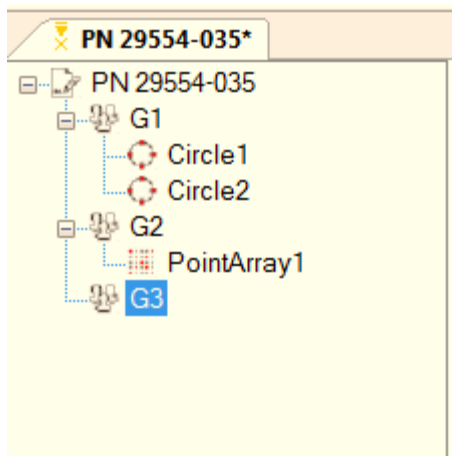


# Laser Source Setup - YLS



# IPGWeld – Getting Started

- Open a new worksheet by Ctrl+N or by hitting  button
- The structure of the welding job is shown in the Job Explorer-tab. Each job is divided in groups (G) of objects. You can create new groups by Ctrl+G or hitting Create Group button in the toolbar 



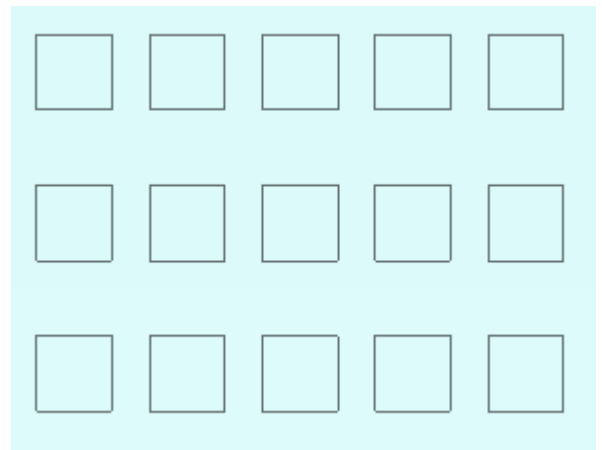
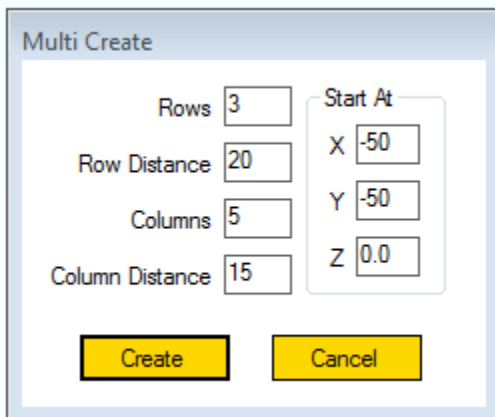
- Before drawing / importing a new object in the workspace, select a group in the Job Explorer (if none of the groups is selected, the drawing tools will be disabled).

# Drawing Tools

- In the Tools-menu, as well as on the toolbar, you can find drawing tools for basic shapes, like lines, circles, points and spirals:



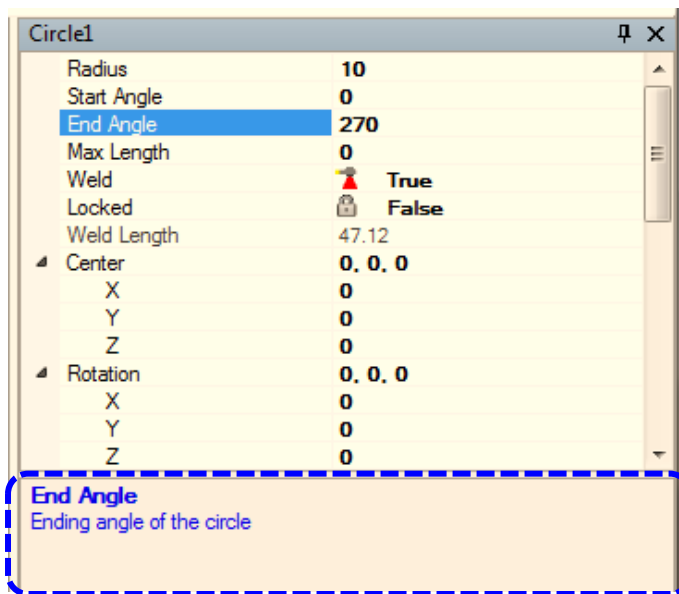
- To create arrays / draw duplicates of an object, hit Ctrl-button and select the feature from the toolbar. This opens Multi Create-window, where you can define the number of the objects to be drawn as well as the spacing between them. For example:



- Once the array has been created, the properties each object can still be modified separately (see pages 17-21).

# Drawing Tools

- Vector files (.dxf, .dwg and .stl formats) can be imported using “DXF” and “STL” functions under the Tools-menu.
- Once the object has been drawn / imported, its properties (size, location, etc.) can be modified in the Parameter-window:



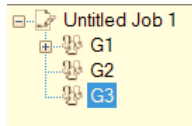
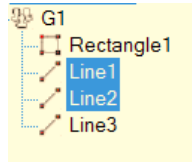
- When a certain parameter is highlighted in the menu, an explanation on this feature is given in the info box below.



# Editing Tools

- Under Edit-menu, you can find Copy- (Ctrl+C) and Paste-functions (Ctrl+V). To copy-and-paste an object in the workspace:

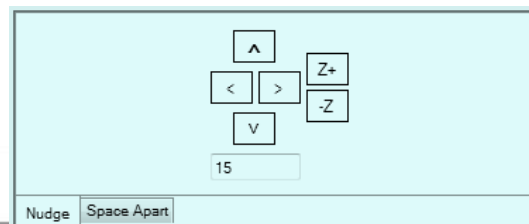
- Highlight the desired object(s) in the Job Explorer-tab
- Hit Copy / Ctrl+C
- Select a group in the Job Explorer-tab, where you want to paste the copied objects
- Hit Paste / Ctrl+V



- To remove an object from the workspace, highlight the object in the Job Explorer-tab and hit Delete.
- To move objects in the workspace:
  - If moving a single object, you can select the object and modify its location coordinates in the Properties-window:

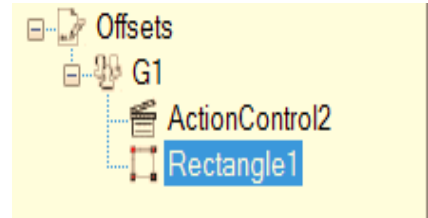
Center	-12, 4, 0
X	-12
Y	4
Z	0

- If moving multiple objects, highlight the desired features in the Job Explorer-tab. A Nudge-tool appears on the right side of the workspace. Using the arrows you can move the selected objects in x-, y- and z-direction:



# Offsets

- To create an object with the offset-functionality, add an “ActionControl” in the group, before the object with offset. If using the offset feature for two or three axes, add one ActionControl for each.



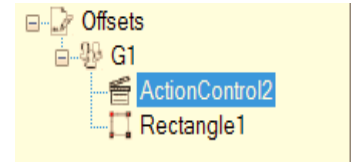
- To enable the offset-feature for the object, go to Properties-window and set “Apply Offsets” to “True”. New menus (Offset X, Offset Y, Offset Z) will open up:

Apply Offsets	True
Offset X	True
Offset X Register	Variable_1
Offset Y	False
Offset Z	False

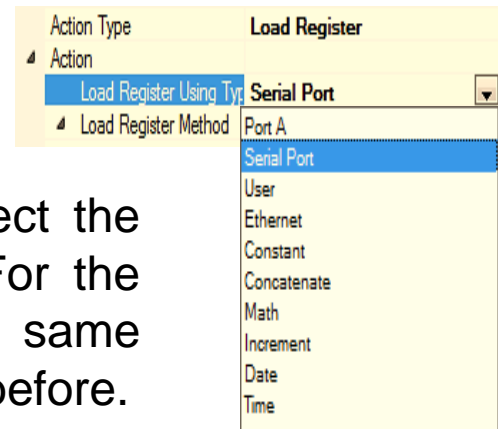
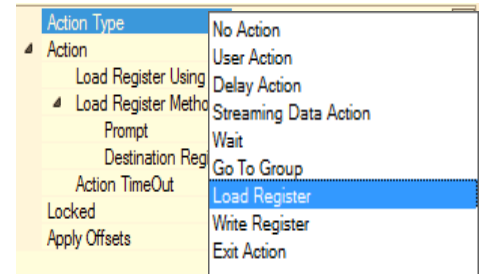
- For each offset enabled, choose a variable (#1...#10) from the drop menu.

# Offsets (continued)

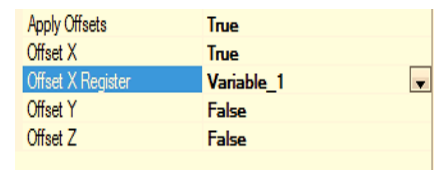
- Once the offset registers for the object have been chosen, select the ActionControl in the Job Explorer-tab. The offset input method can now be configured in the Properties-window.



- For Action Type, choose “Load Register” from the drop menu:
- Based on your set up, select a desired “Load Register Method” from the following drop menu:

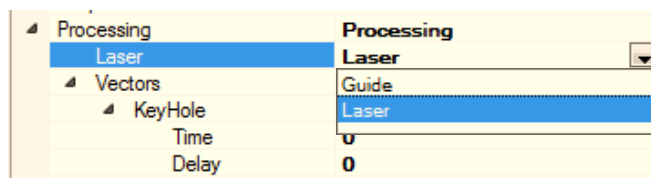


- For the chosen load method, select the settings based on your system. For the “Destination Register”, choose the same variable as you set for your object before.
- Set “Apply Offsets” to “True” and adjust the offset register settings so, that they match with the settings chosen for the object.



# Welding Parameters

- The welding parameters can be modified in the Properties-window:
  - In the drop menu under Processing-tab, you can define the beam to be used for each object in the workspace. If there are features you don't want to weld (e.g. alignment marks), select "**Guide**" in this drop menu. For features to be welded, select "**Laser**":



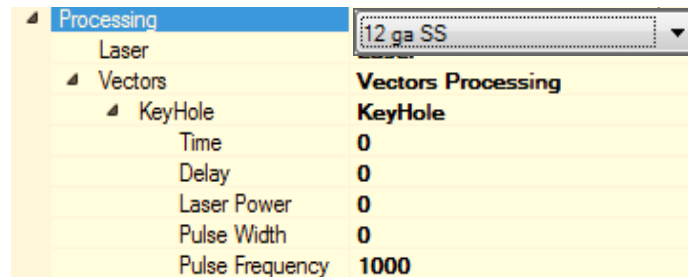
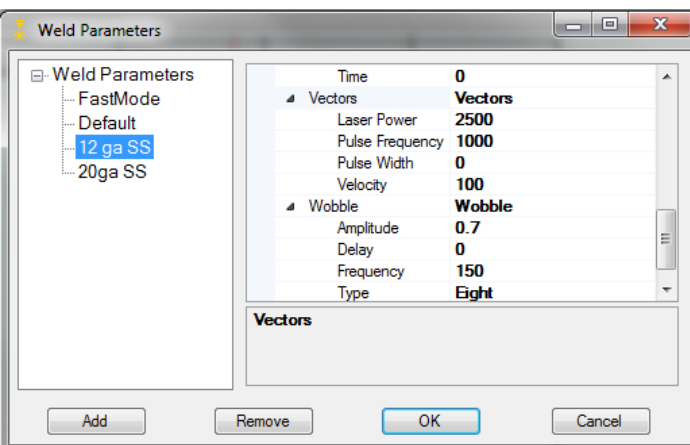
- **KeyHole**-parameters (duration, laser power & pulsing settings) can be used to initiate the keyhole in the workpiece before the actual welding process starts. This option is beneficial when narrow, deep penetration welds are preferred.
- **Vectors**-parameters define the process settings (welding speed, laser power & pulsing settings) for the actual weld.

# Welding Parameters

- Fine tuning options for welding parameters:
  - **Wobble:** Four different wobble modes (Circle, Line, Figure 8, Figure  $\infty$ ) with various amplitudes and frequencies can be used to improve the quality and consistency of the weld.
  - **Power ramping:** Select an object in the Job Explorer-tab and hit Energy Offset-button. Energy Offset-window opens up. Here you can create ramp up- / ramp down profiles for the laser power used in the welding process.



- Hint: You can create a welding parameter database for frequently used materials / parameters:
  - Go to View / Welding Parameters. In this window you can save welding parameter profiles.
  - Once you have saved a set of process parameters in this window, you can choose this welding profile in the Processing-drop menu – the fields for the welding parameters will then be autofilled.

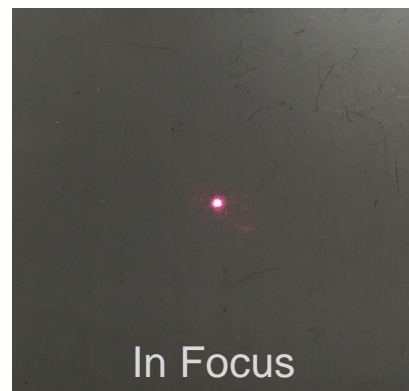
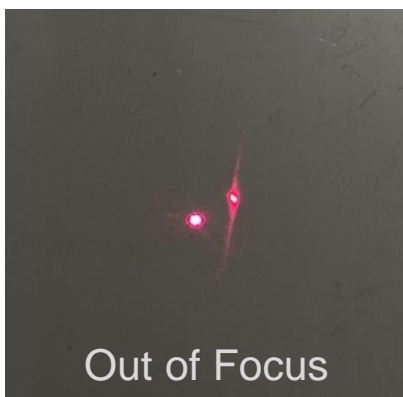


# Focus Height Settings

- The scanner head has a focus lens with 415 mm focal length.
- The focal zero point can be defined by using the guide beam of the laser and the “focus guide beam”:
  - Turn on both guide beams by hitting Toggle Focus Guide-button (or F7):



- Looking at the workpiece, if the guide beams are overlapping, the focus height is correct. If the guide beams are separated, adjust the height of the workpiece (or scanner), until the guide beams overlap:

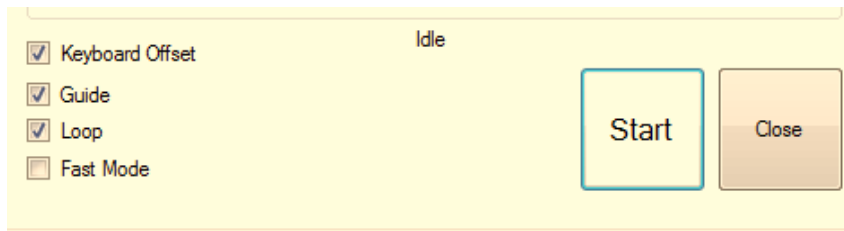


# Previewing & Welding

- Hit the Start Welding-button (or F5) – Welding-window opens up:



- If “Guide”-option is unchecked, the program will be run in the actual welding mode – firing the laser using the parameters defined on pages 20-21.



- If “Guide”-option is checked, “Keyboard Offset”-option appears. If you start running the welding preview with this option enabled, you can adjust the position of your object using Ctrl- and arrow-buttons on the keyboard.
- After this, when you close the Welding-window, the program will prompt for confirmation for the new position:

