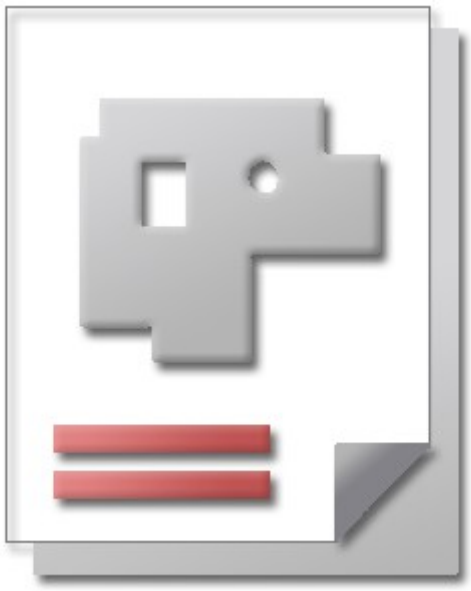
SHEET METAL CENTER Plus



Introduction

The first steps in order management

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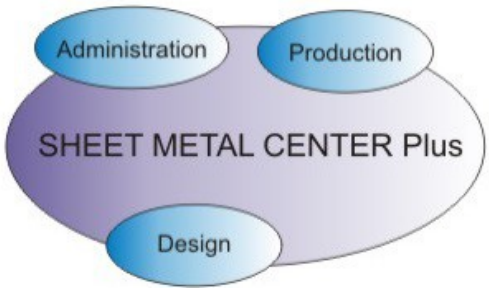
Foreword

CNC technology has come a long way since its early beginnings in the 70's, such that it would be hard to imagine modern industry without it. Demands on systems increase constantly and one of the newest requirements is for data to be shared globally amongst all systems. The development of databases and the enormous amounts of data created and stored in them arising from all areas of the metal forming industry have naturally called for enhanced sharing of widely varying data.

Introduction

SHEET METAL CENTER Plus represents the joining link between sheet metal work's management, construction and finishing branches. This includes looking after your back-office NC programing as well as your customers' front-office orders and invoices. The instant data access permitted by this system (part plans, part lists, article information, deadlines and CAD data) offers the ideal solution for any sheet metal working shop.

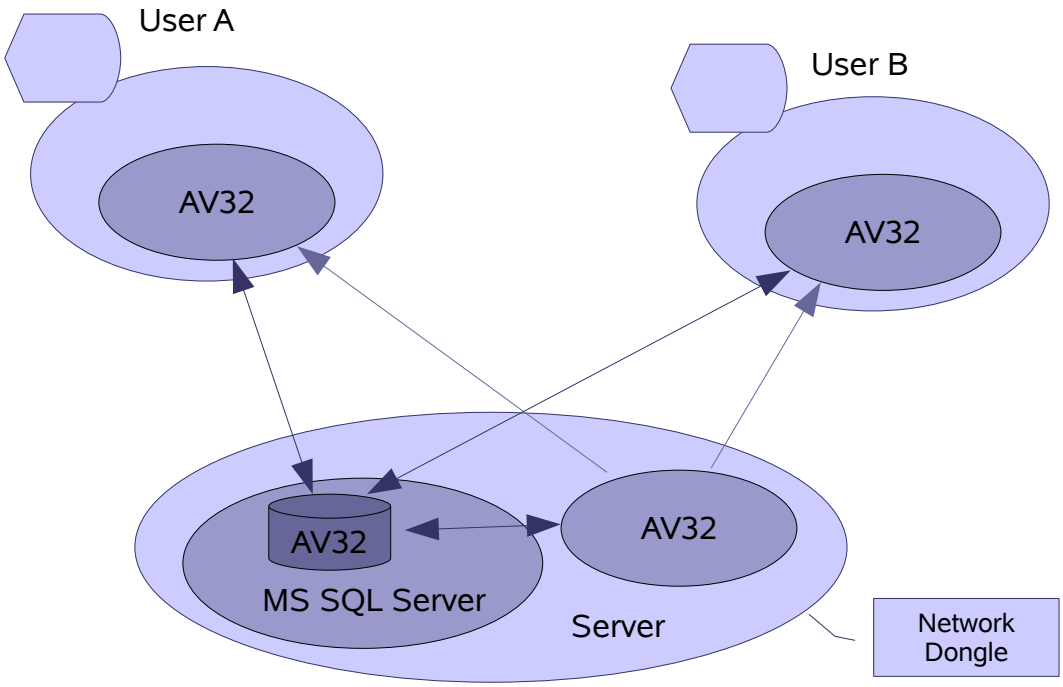
This means increased efficiency in your workflow from acceptance to completion, from software adapted individually to your company's requirements. Fiddly, time-consuming conversions of files and import/export of different data types into multiple systems are now a thing of the past.



Order Management

The order management module AV32 is the common base for constructions, jobs, sheets and nesting plans. AV32 optimizes information flow between departments. Data is stored on a central server, meaning all departments can access construction and finishing data.

AV32 offers optimal control of your workflow and material stores.



Definitions

In order to describe the program, we should first define some of the terms which will be used. These definitions will then be used throughout this document.

Article

An article is a thing which belongs to a project such as a costing quotation which does not (yet) lead to an order. Articles complete a project for parts lists and estimates.

Order

An order is the customer order for creation of a part job, as stored in your order list. An order will lead to creation of a production plan, and that then to the production of part(s).

Item

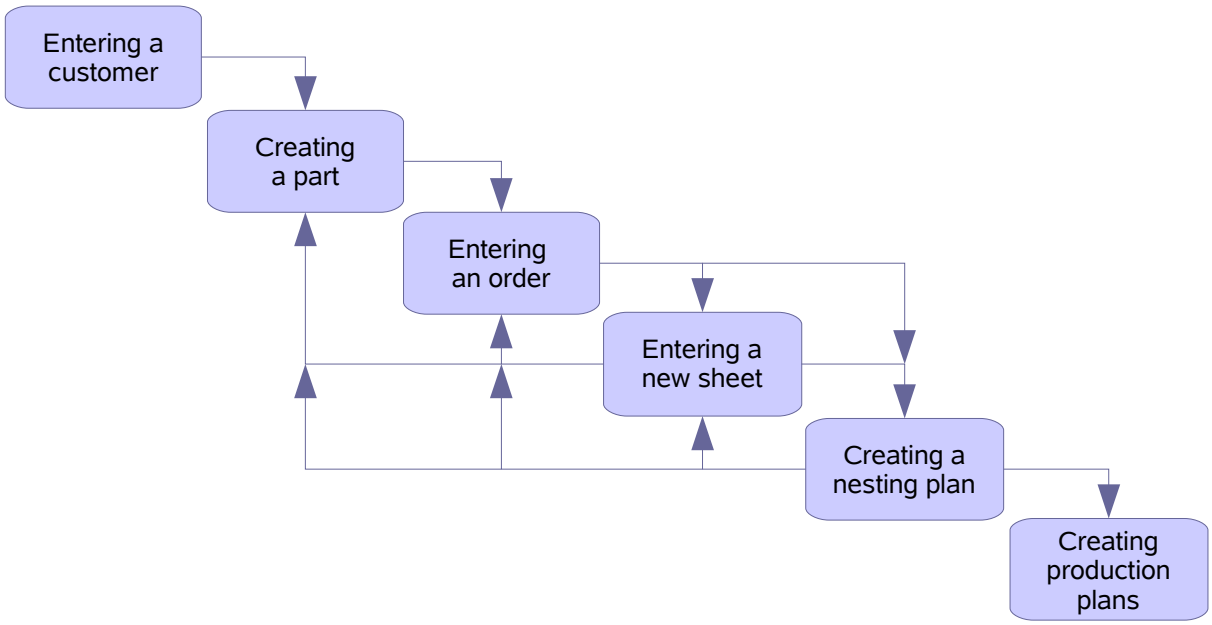
In AV32 an item can refer to a part, an article an order, or other concrete thing.

Project

A project is a collection of assemblies for a price estimate or parts list. A project can consist of various items, including orders.

Workflow

We can outline AV32's work flow as follows:

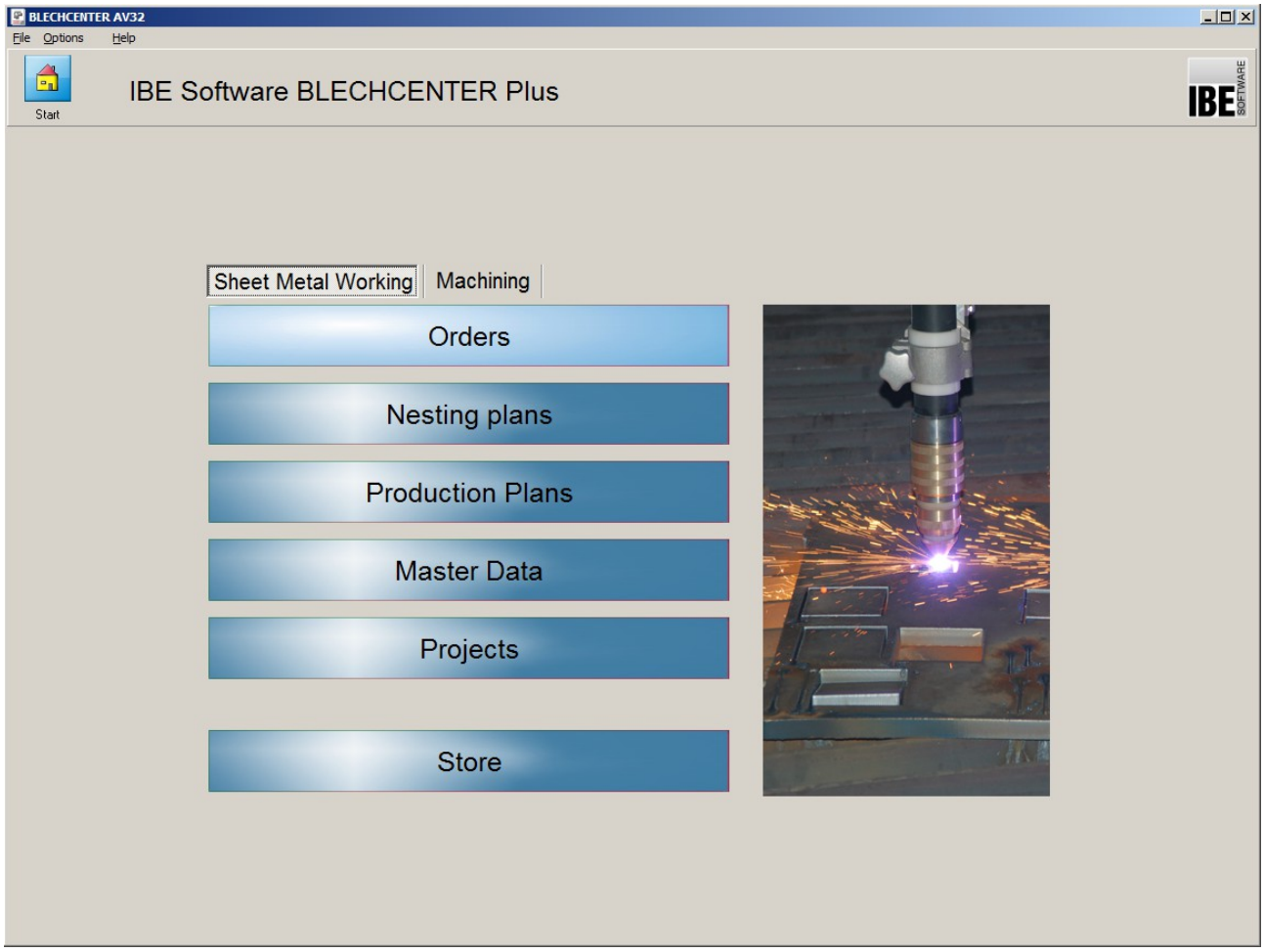


You can of course utilize each program module individually. For the most comprehensive administration, you can return to and add to existing projects, and add extra articles to an article database. Parts and sheets can be assigned the relevant machine data from the machine data module 20.

The program's workflow is very flexible in its scope. The program can be anything from a powerful engine for managing complex projects to simple application for creation of a nesting plan. The only thing you need for this program to be useful is an order for creating a part.

Program Specification

The Homepage



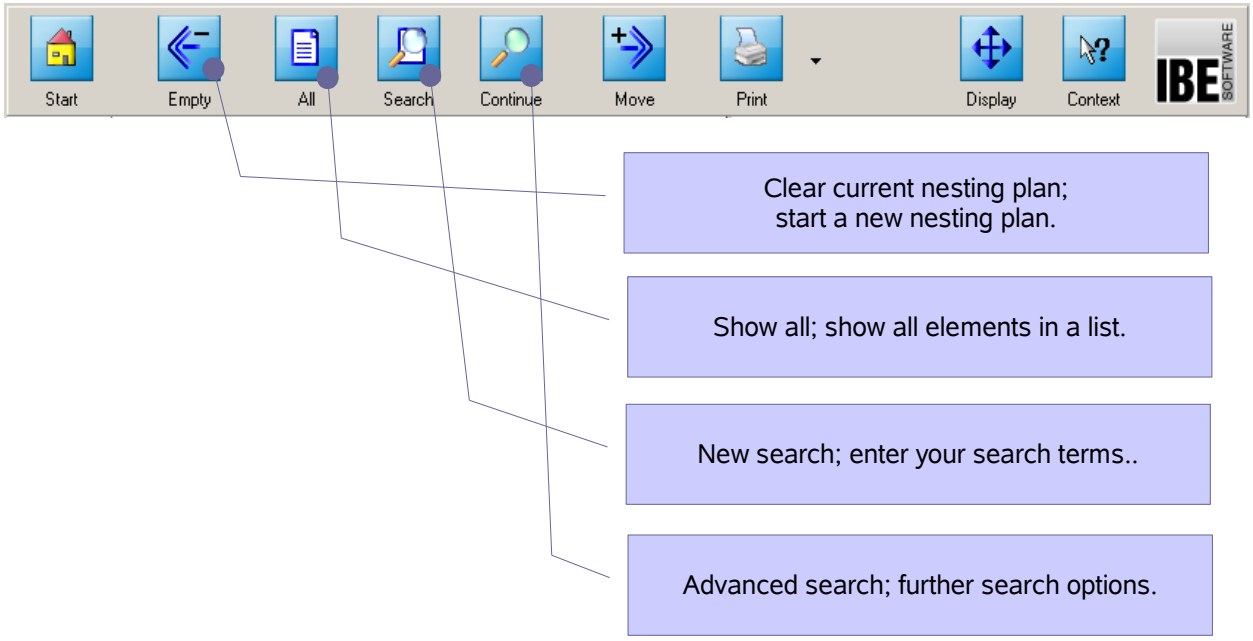
You can return to the homepage at any time by clicking .

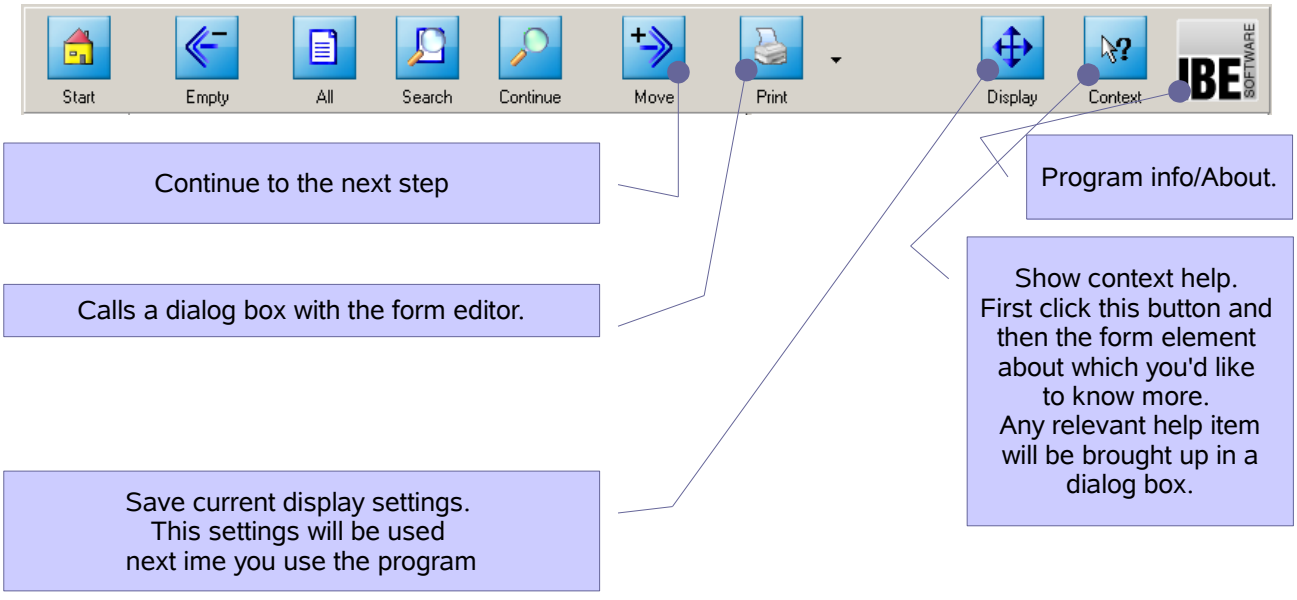
Program Workflow

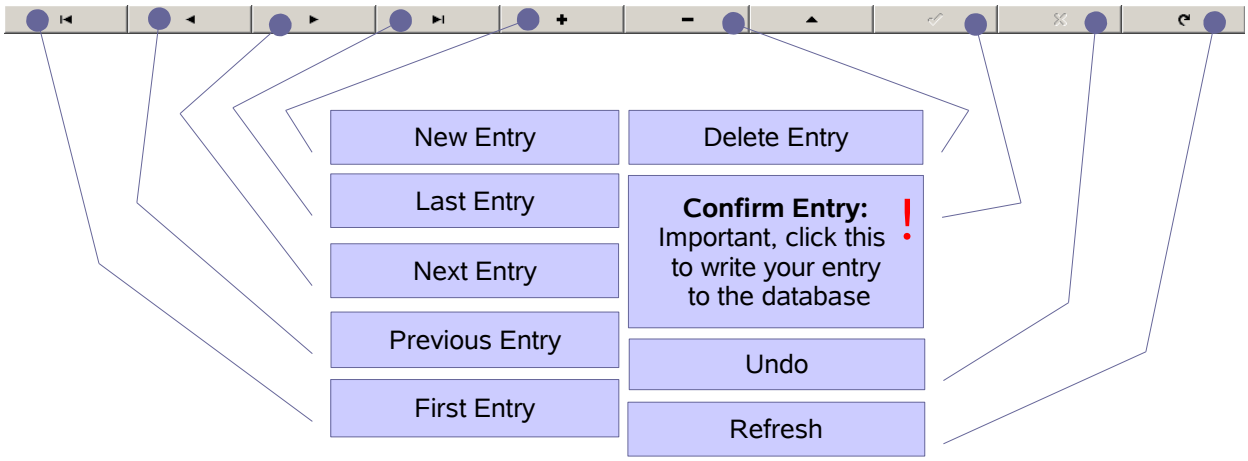
To successfully use the program, the final step is creating a nesting plan. All steps are related to the creation and use of this nesting plan. Sheets and parts are picked and reserved from the relevant databases and moved back and forth between the database and nesting plan. Nesting plans are managed internally until production – these reservations are only finalized and a production number assigned once a nesting plan becomes a production plan

General Controls

Each screen has context-sensitive forms which can be used for viewing, entering and searching. Relevant fields for searching will be highlighted in yellow. Enter the relevant search-terms and execute the search using the "return" button. Further information in the "search" chapter 21.





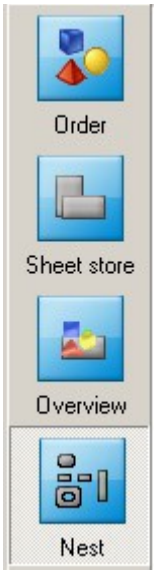


The buttons in the footer panel allow navigation of each form. You can also use them to make new entries and delete old data.

Individual Settings

The appearance of each window can vary from the description, as context-sensitive entries are also dependent on the optional components installed on your system and the settings made by each user. More on that in the "Program settings" chapter 19.

Navigation panel

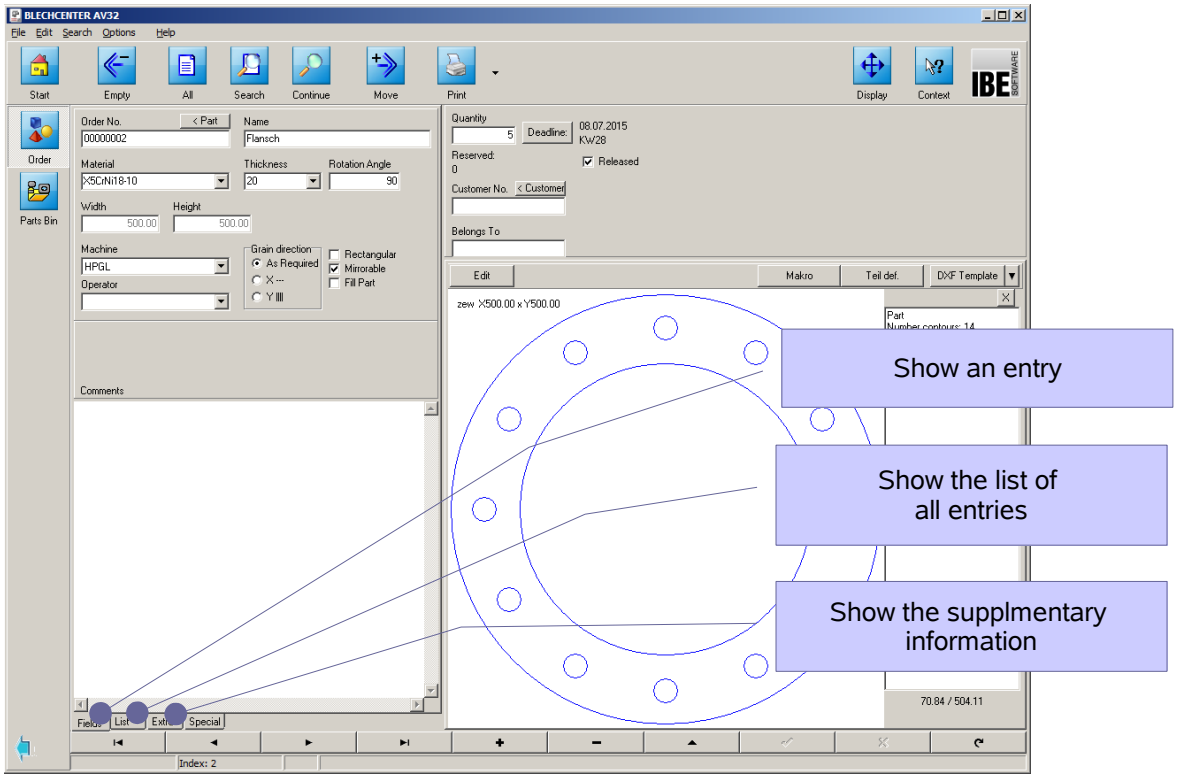


The left navigation panel shows buttons relevant to the current step.

Click the relevant button to switch to that form.

Forms in general

Forms have the same general layout in each program step.



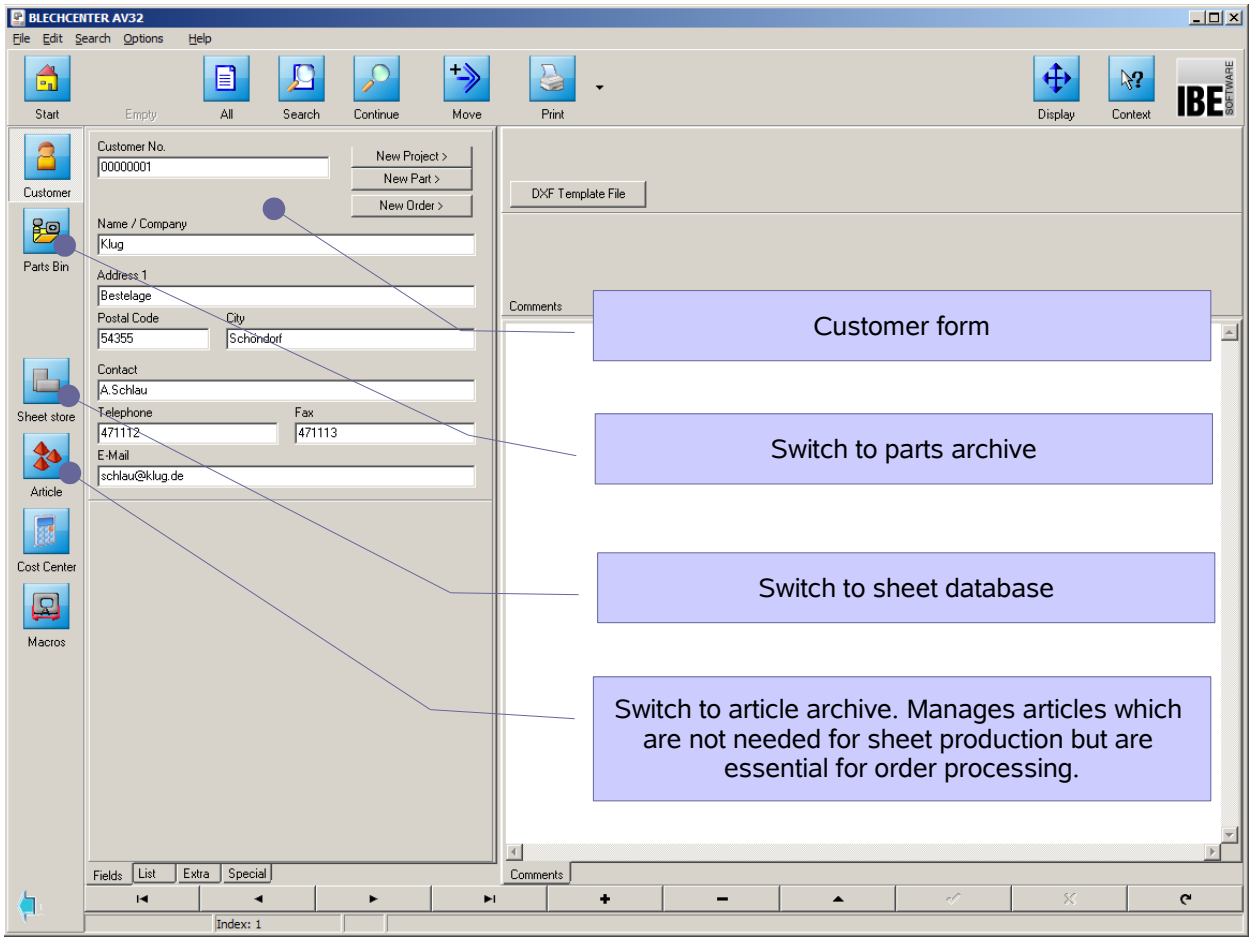
The left part of the window shows the selected data entry, a list of all entries or supplementary information about the currently selected entry. Click the relevant tab under the window to switch through displays.

The right side shows the ties you can work from this screen.

New Customers

Customers' details are saved in your database's "customers" table. Use the "customer" form to navigate this table, and view or edit your customers' data.

Select "Master data" from the homepage 5. You will jump to the "customer" form, where you can add new data.



Enter all customer data in the relevant fields and as always, remember to confirm your inputs. The customer will be automatically allocated a new customer number.

You can always access the customer page with one click on this button: .

The next step is entering a part, so click (forward) to access your parts database.

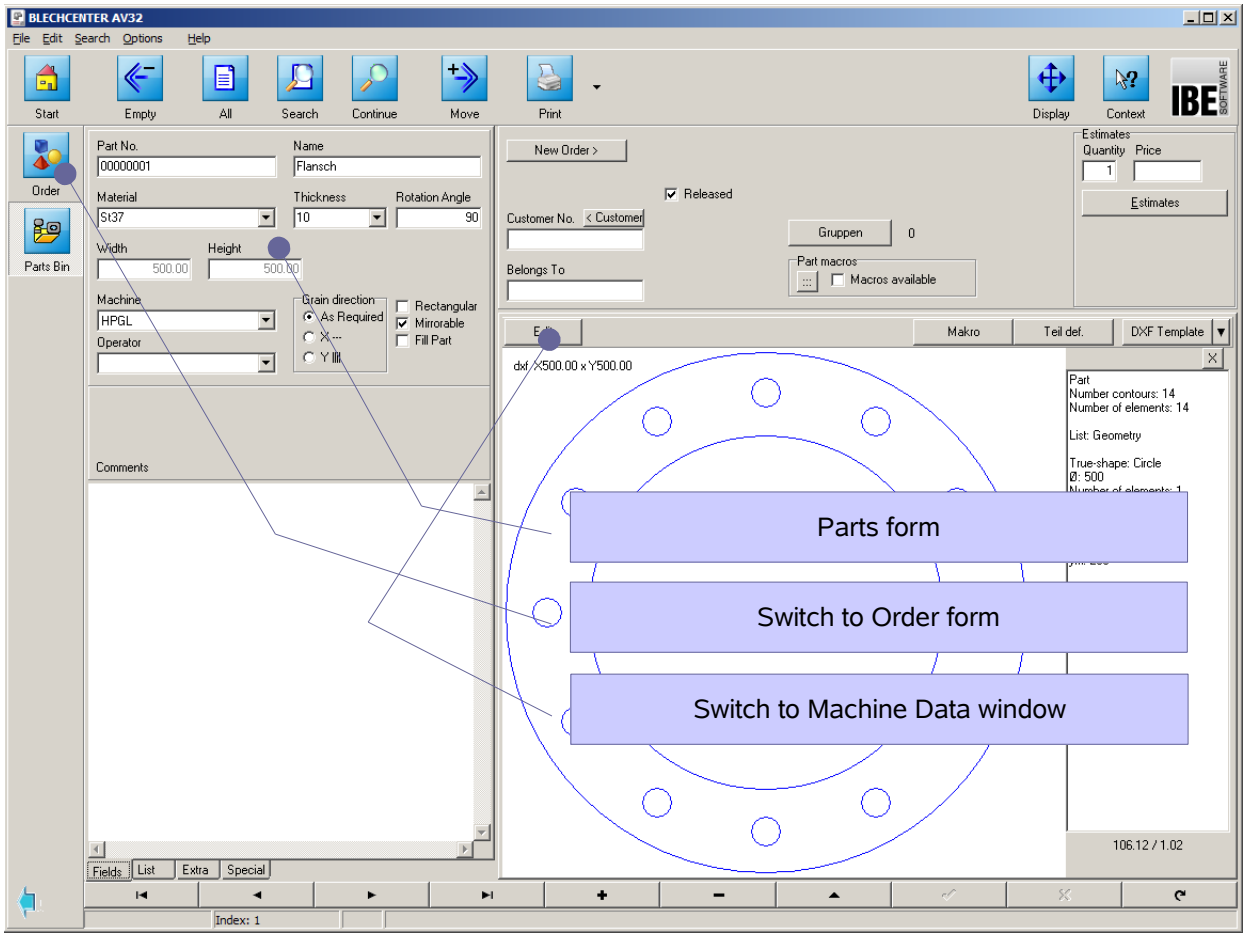
Entering your customer's information is optional; you can also continue without doing so.

New Part

All parts are saved to the "Parts" table in your database. Use the "Parts" form to navigate this table, and view or edit your parts' data.

You can always access the parts page with one click on this button: .

Press the parts button in the "Customer" form 9 or the "Orders" form 12. You will jump to the "Parts" form, where you can enter the data for a new part.



Enter all part data in the relevant field, remembering to confirm your entries by clicking the "return" button. The part will automatically be allocated a new part number.

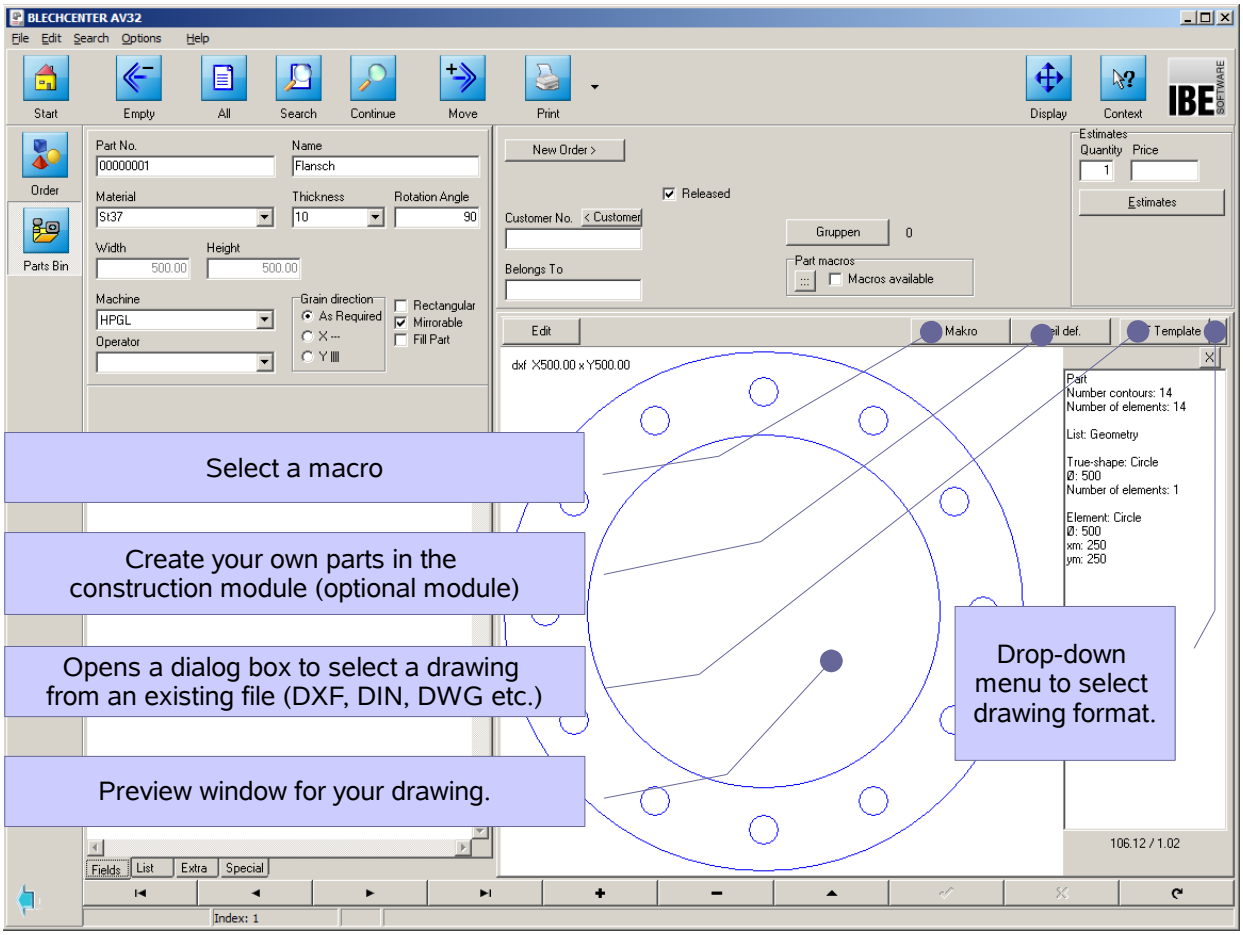
If a part is assigned to a customer it will always be linked to that customer; the customer number will be applied automatically. A part can be given machine data in the Machine Data window 20.

If a part is to be cut, you must create an order, so click 12 (forward).

Part templates

Templates for new parts can come from widely varied sources. You can use existing DXF, DIN, DWG, ESSI, DST and ZEW files, or you can use IBE's construction module to create your own parts. ZEW files are in IBE's proprietary format and contain certain special data about the drawing. The formats on offer can be seen in the pull-down menu above the preview display. The selection on offer is defined by the converters purchased with the software.

AV32 also offers a selection of predefined macros which you can dimension as required to to create your own parts which can then be saved to the parts list.



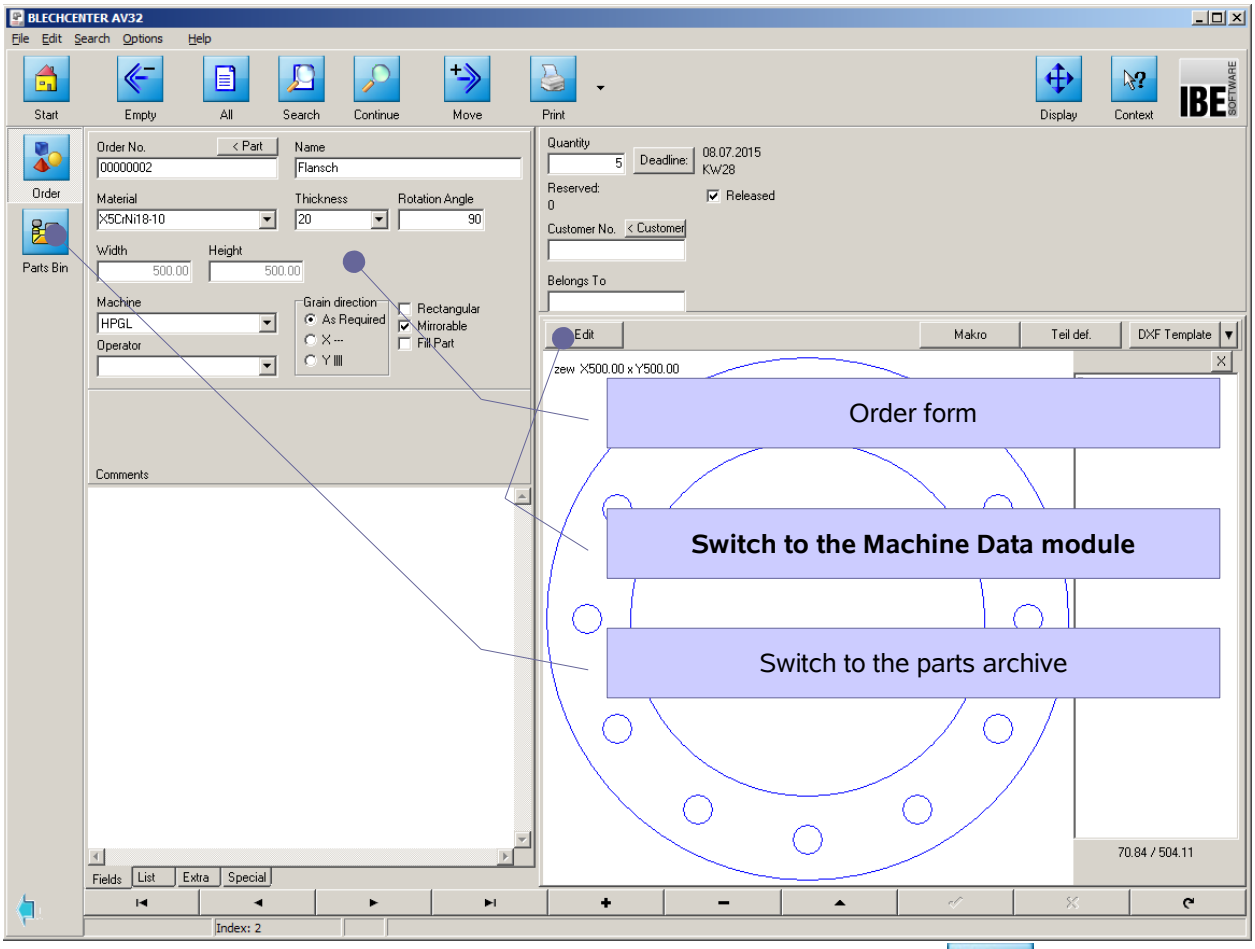
The selected/created part is displayed in the preview window. Faulty DXF files can be checked using the DXF-Checker, which will fix any errors for you.

Importing particular formats may require a converter. These can be purchased as optional extras from IBE Software.

New Order

All orders are saved to the "Orders" table in your database. Use the "Orders" form to navigate this table, and view or edit your orders' data.

Select [orders] from the homepage 5. You will jump to the “Order” form, where you can enter the data for a new order.



You can always access the order page with one click on this button: .

An order must always be created from this screen for a part to be produced. Confirm your entries using the “Return” button to save. The part will automatically be allocated a new order number. Switch to the Machine Data module 20 to allocate the machine data for your part.

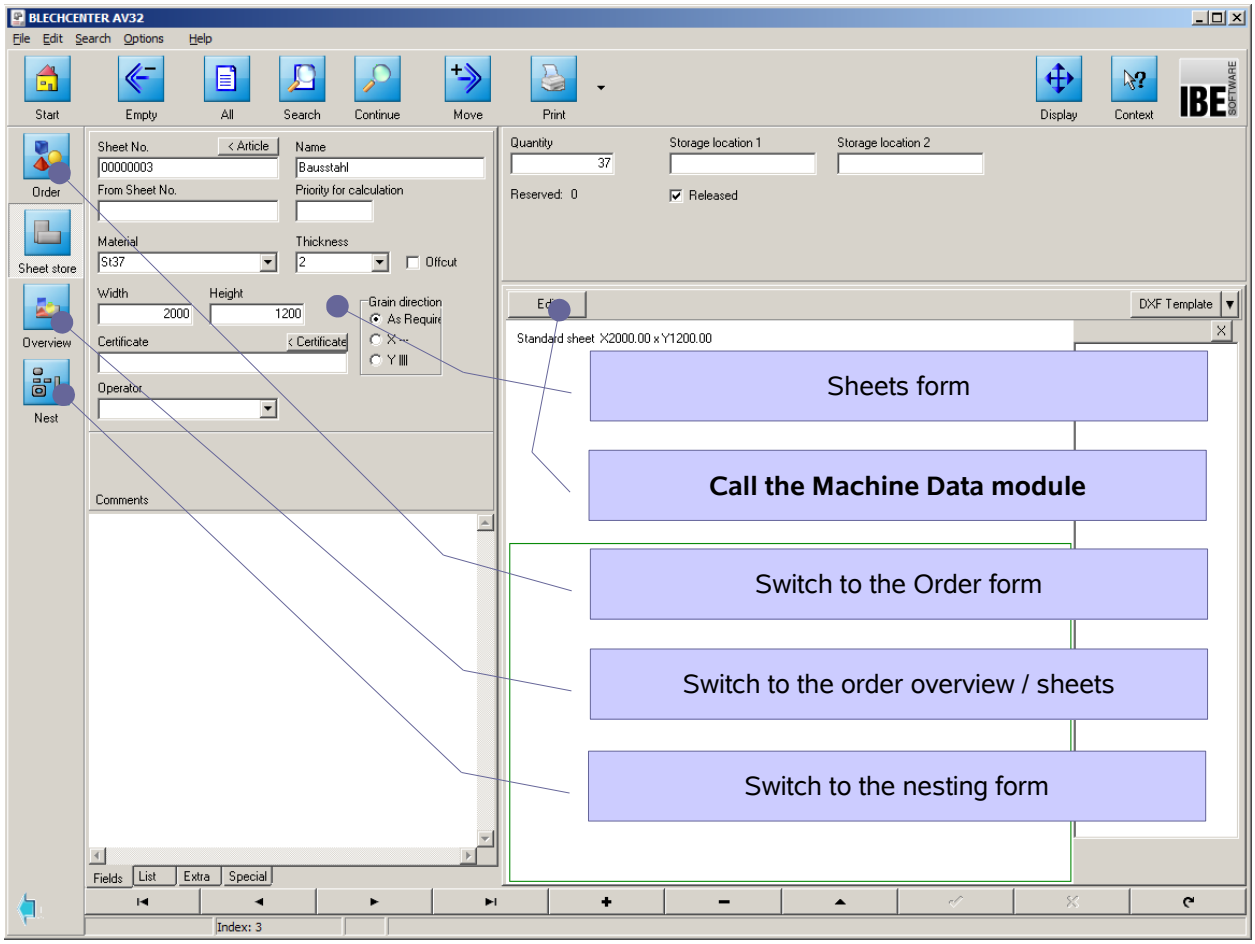
You must allocate a sheet to the order in order to nest the parts for it and proceed with production. Continue by clicking forwards.

New Sheet

All sheets are saved to the "Sheets" table in your database. Use the "Sheets" form to navigate this table, and view or edit your sheets' data.

You can always access the sheets page by clicking this button .

Click the sheets button in the “Nesting” form 16 to switch to the “Sheets” form, from which you can enter the data for a new sheet.

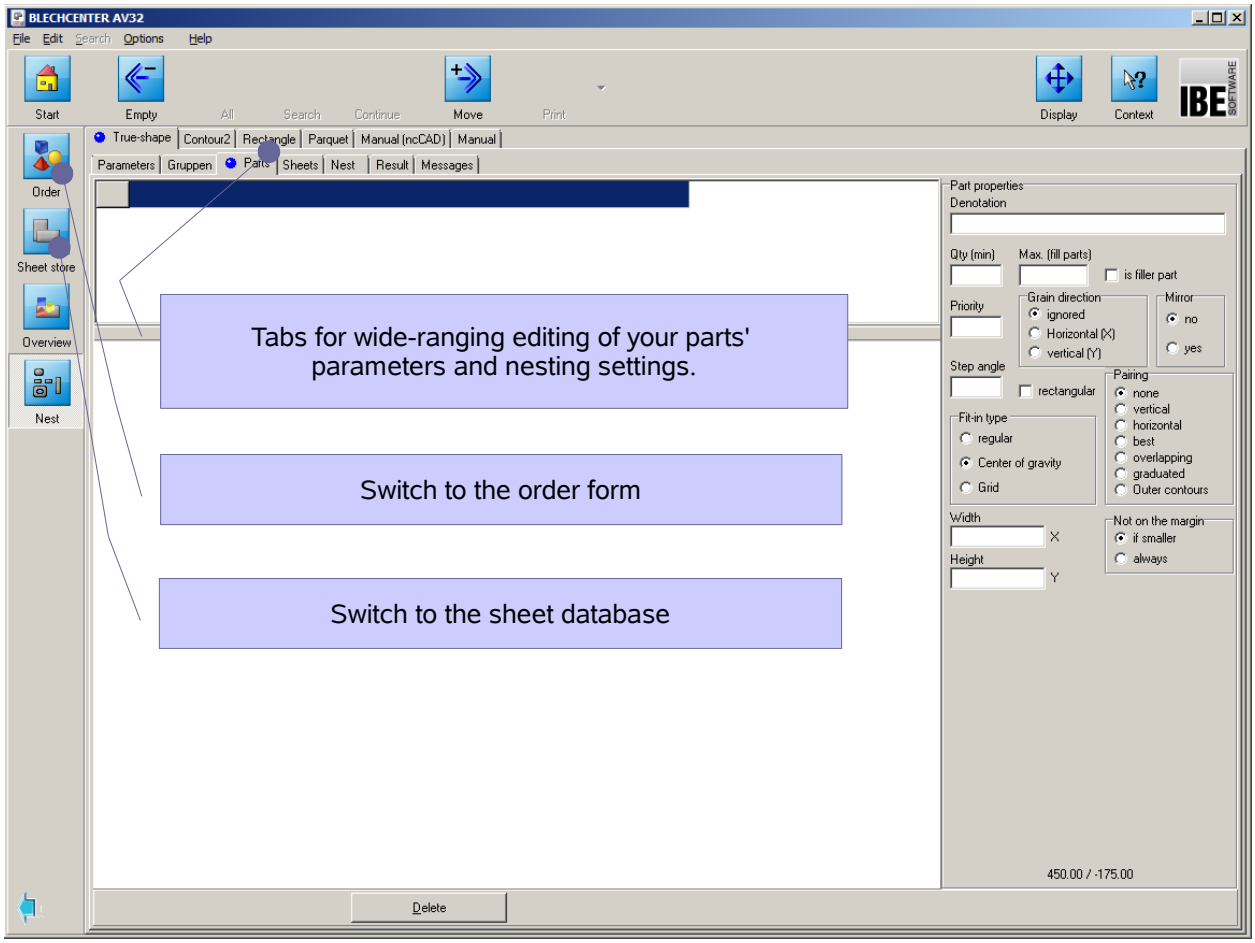


Enter all sheet data into the relevant fields of this form and confirm your entries with the “Return” button. Switch to the Machine Data module 20 to change a drawing's geometric properties as required.

You must have allocate sheets with the right dimensions in order to cut the given number of parts. Once you have selected your sheets you may continue to the nesting screen -click (forwards).

Create Nesting Plan

Once you have selected all required parts and have enough available sheets for fulfilling your order you may begin nesting the parts to the sheets. Select [nesting plans] from the homepage 5 to switch to the nesting form.



You can always access the nesting page with a click on this button: .

The tabs in the top panel lead to various screens to access all necessary settings and parameters, and to begin nesting.

Here you can change the sheet selection, and delete or insert parts. To ensure optimal material usage the program can also search your order list to see if further parts could be cut from the same material.

You must click to re-nest after each change which influences your nesting plan. You can then proceed with your nested sheets to the production phase, click (forwards).

Nesting Methods

AV32 offers many methods of organizing or “nesting” your parts onto sheets. From fully automated nesting according to your settings to fully manual nesting, the program allows you to decide your level of control.

Grid Nesting *(Option)*

Grid-nesting draws an imaginary rectangular box around your parts, and nests based on that. A special feature in AV32 is 'Guillotine' nesting, whereby the rectangular boxes are aligned such that single cuts are aligned which could also be made using a shearing machine. Offcuts can also be shredded, as required.

Parquet Nesting *(Option)*

Parquet nesting is a more efficient way of nesting a single more complex part. Parts can then be nested on space where each others' grid “boxes” would normally be. You will be offered a selection of possibilities and shown the percentage of material which is used by each. Parquet nesting allows nesting of only one type of part, so if you often need to create more than one type of part from a sheet, you should choose true-shape nesting.

True-Shape Nesting *(Option)*

True-shape nesting allows you to nest many different parts on one sheet. Parts can nestle inside each other, and smaller parts can be nested onto holes within bigger parts. You have many options to increase efficiency (Pair building, priorities, etc.) and ensure optimal usage of materials and machine time.

To make the very best use of your materials you can also have the program search your order folder for smaller parts that might fill any spare material.

Manual Nesting

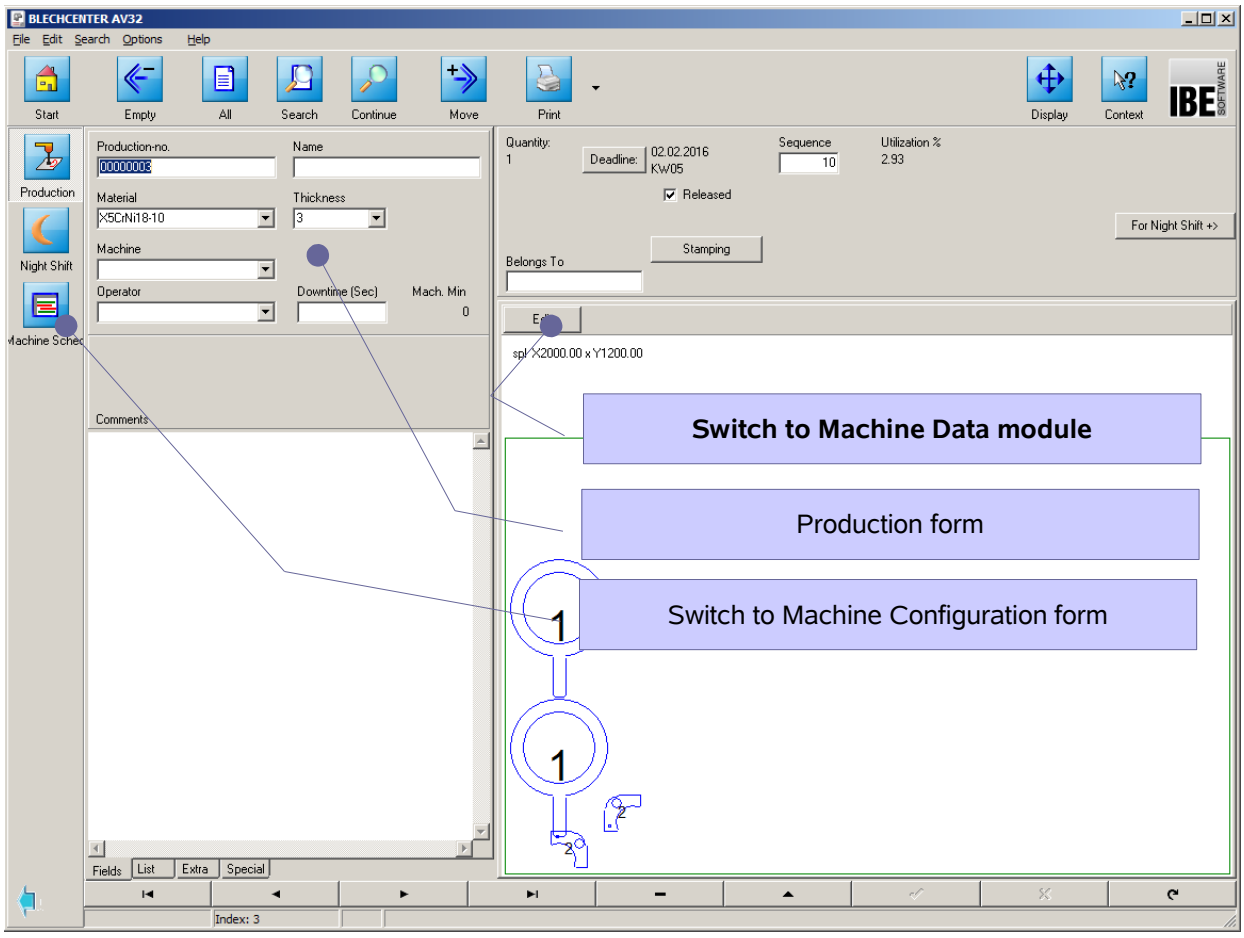
Manual nesting allows you to place varied parts on a single sheet. The program will help you set the optimal clearances between parts, and has a snap mode which takes these offsets into consideration so you won't waste material or time worrying about wasted pixels / material.

Efficiently nesting varied parts to a single sheet places a large demand on a nesting algorithm. AV32 offers particularly well-developed solutions, and for this reason most are optional to the program. Because of the value of these modules, some are license-protected by our USB dongles and must be enabled by IBE Software.

Create a Production Plan

All sheets in a nesting plan can be transferred to the production module by pressing forwards .

Select [processing plans] from the homepage 5 to switch to the production plan form. The Machine Data module allows you to apply the necessary machine settings for production. The cutting sequence is defined by a corresponding sorting.



Production can then be completed whole or by parts. Create production plans which can be allocated to multiple cutting machines and placed into their individual assignment plans. AV32 offers optimal organization, planning and usage of your multiple machines.

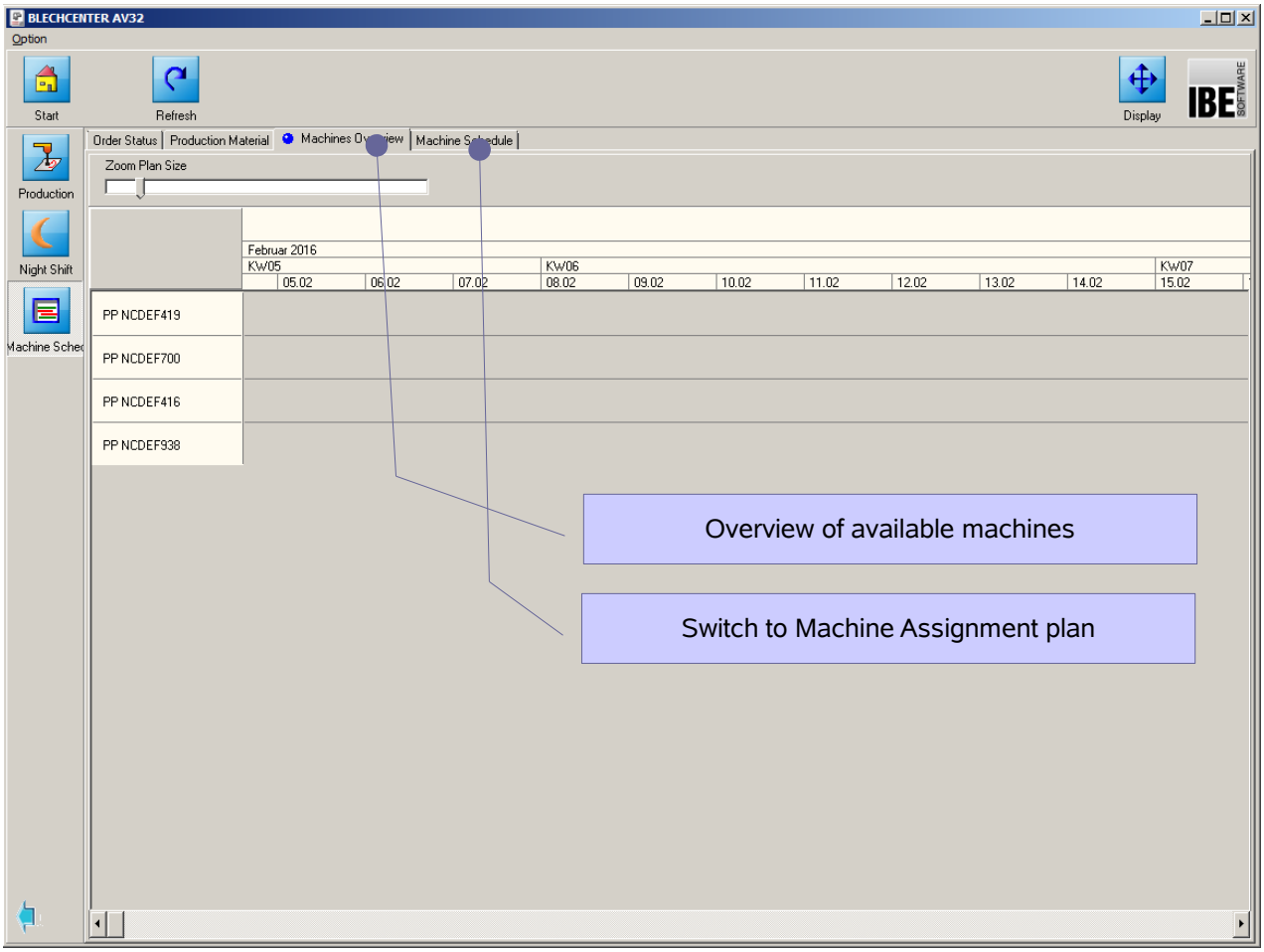
The Machine Data module 20 allows you to manually correct your nesting plans and finally create the NC coding.

Production plans can be printed for use as setup plans. Clicking to send a print job 16 opens a form editor from which you can print the setup plan.

Machine Assignment *(Option)*

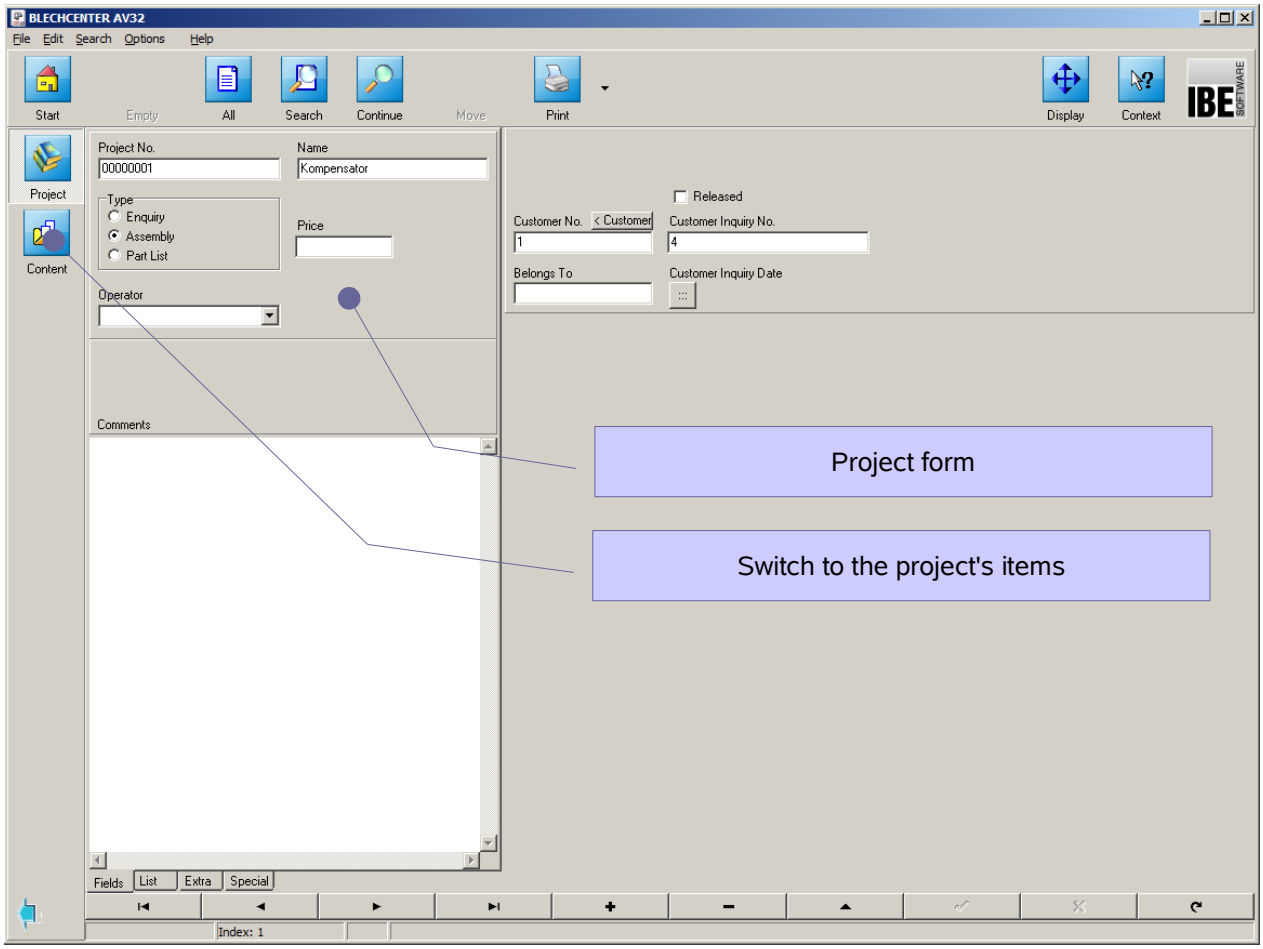
Productions or part productions which are ready to go to your machines can be saved in the machines' assignment plans, allowing you an easy overview of each machine's workload and capacity utilization.

Use the button to switch from the production form to the machine assignment form.



Projects

AV32 offers the option to create assemblies for efficiently offering a price estimate, or for parts list administration. Select [projects] from the homepage 5 and switch to the projects form.

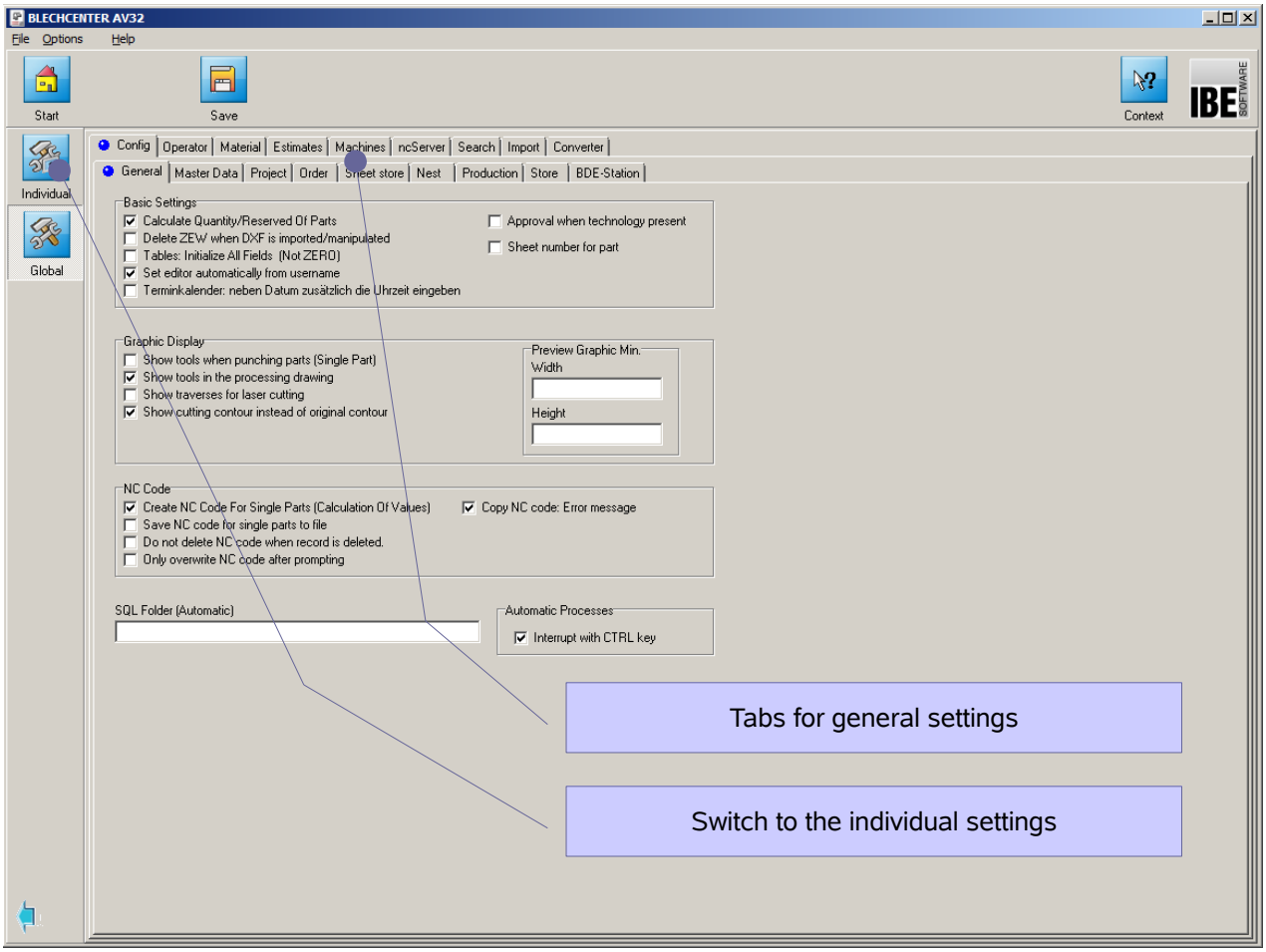


Creating a project allows you to combine and price up all the varied items of a job.

You can always access the projects page by clicking this button: .

Program Settings

The AV32 program can be adapted to the user and the runtime environment, allowing an individual optimization to each user.



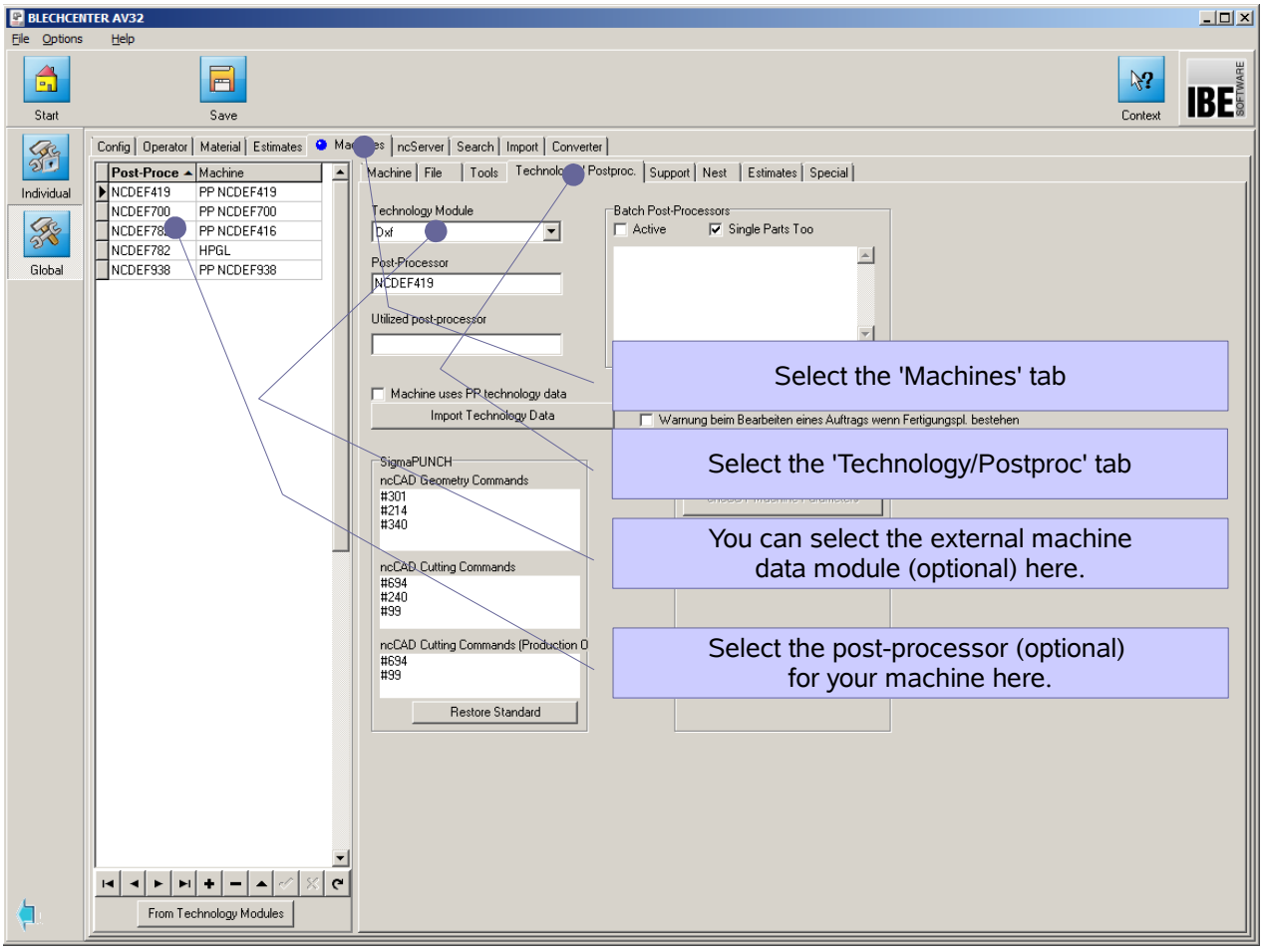
Settings are made in the general area for all users, but some can also be adapted for individual users.

All settings can be password-protected by the moderator against unauthorized changes.

Click [common setups] from the Options-menu to access this screen. There is more detailed help on the settings in the administrator's handbook.

Machine Data Module

Switch to this module to allocate machine data to parts and sheets. There are settings for this module in the general settings page, you can also add optional modules '*ncCAD32*' or '*cncCUT*'.

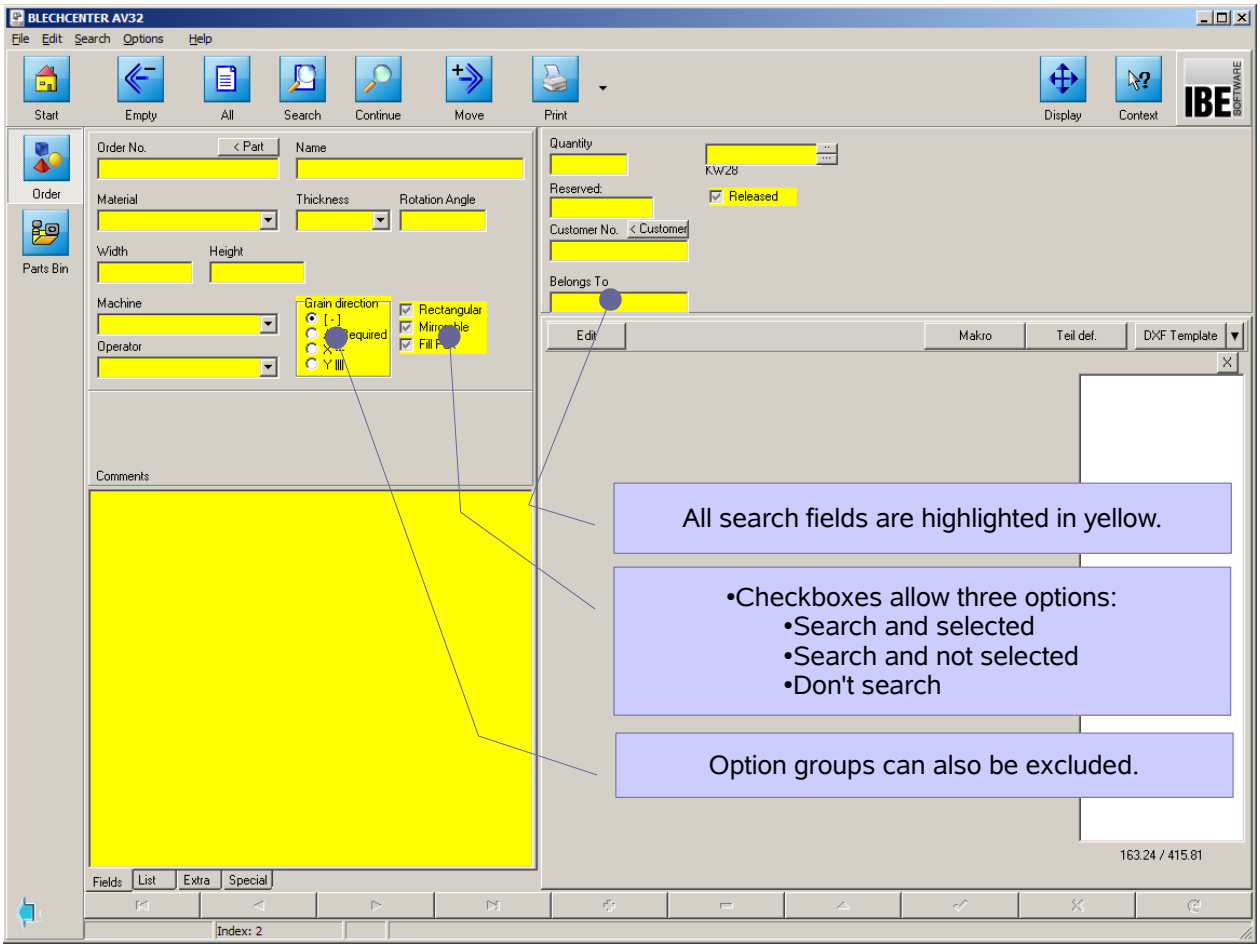


The display in this screen is defined by the optional post-processor(s) and machine data module purchased and installed.

If no machine data are required for the production of your parts, AV32 can also proceed without them. If you do this, all drawings will be handled and nested as DXF files, allowing you to forward the results to your customer for use on his own proprietary systems.

Search

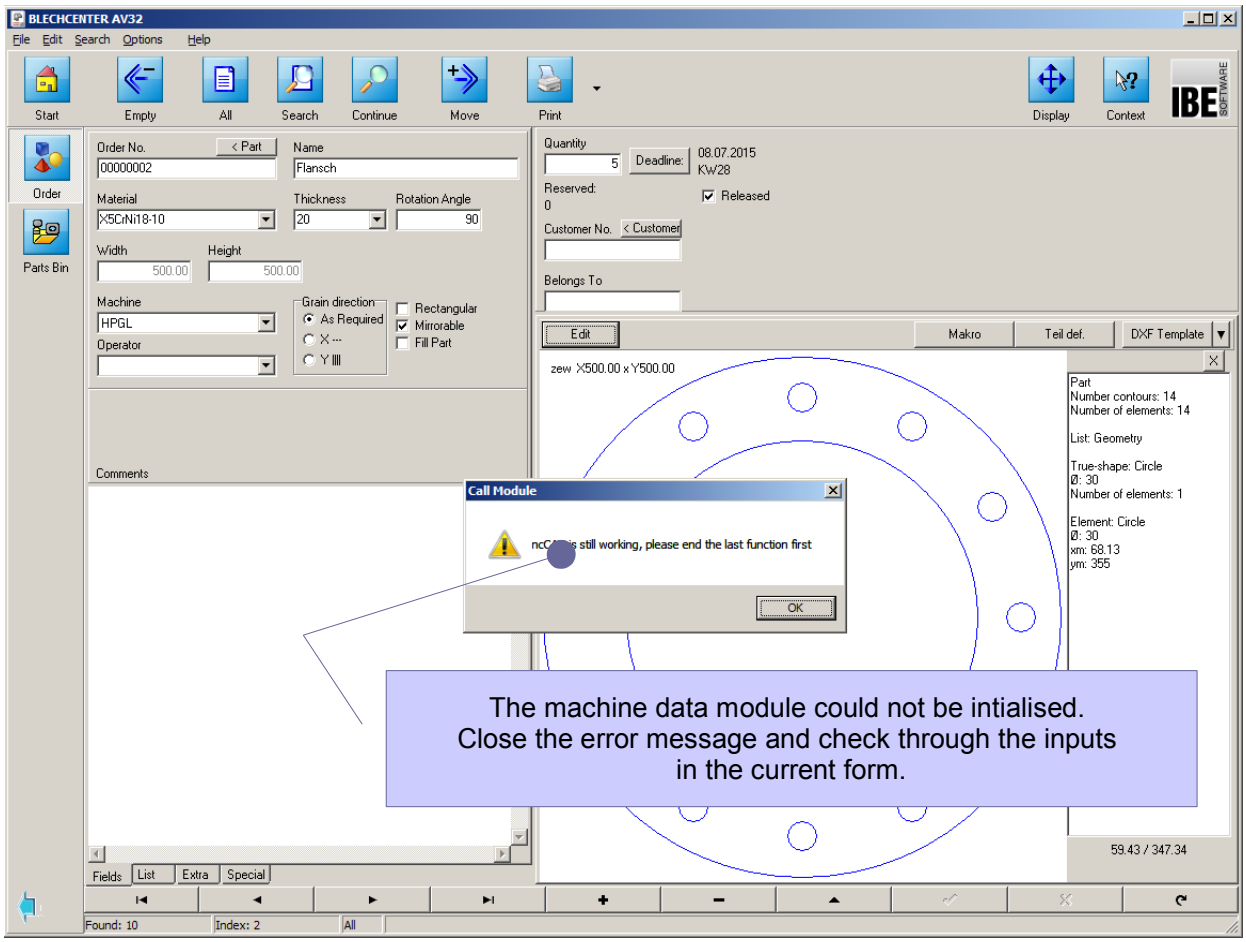
AV32 manages large amounts of data and so has a corresponding number of database entries. To allow efficient searching of this data, AV32 allows the use of jokers and logic operators.



Permissible logical operators are : >, <, >=, <=, =, <>, & and |. You may use * and % as wildcards. There is a more detailed description in the context help for this item, select [Help], [Content], [Database], [Search].

Error Messages

If AV32 gives the following error message, it is indicating that the current forms are not yet sufficiently fully completed. Certain criteria must be met in order to ultimately enable correct use of the machine data module. Dismiss the error message and check the inputs in the current form.



The inputs for material, thickness and machine are missing from the form above. Input or select all relevant values and try again – the error will no longer appear.

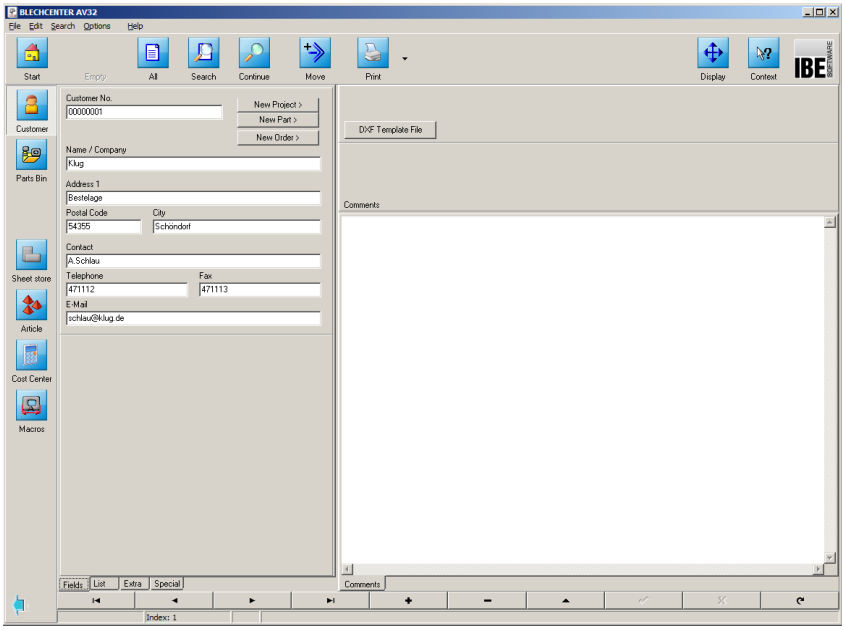
The error message displayed depends on the work step you have reached. It could be for example that the machine data module is already active or is closed, or that no machine has been selected, or that no post-processor is installed/ selected.

Example

This chapter aims to use an example to show you how the described steps fit together. The example shows you only one method of using the program. The modular construction of the application allows many ways to work which we cannot illustrate all of here. As you use the program your expertise with it will grow – this is only a guide to get you started. As your proficiency grows, *SHEET METAL CENTER Plus* will become an ever more valuable tool which you couldn't imagine doing without.

Create customer database

The first step is the creation of your customer's database entry. As your order list grows, it can be very useful to search the list by customer number for orders yet to be processed, helping you to deliver your promises on time. You can however continue without customer numbers, if your workload does not call for them.



To input a new customer entry, select:

[homepage]

[master data]

[customer]

[+].

Enter the data in the relevant fields and confirm using the return button

[✓].

The Parts Database

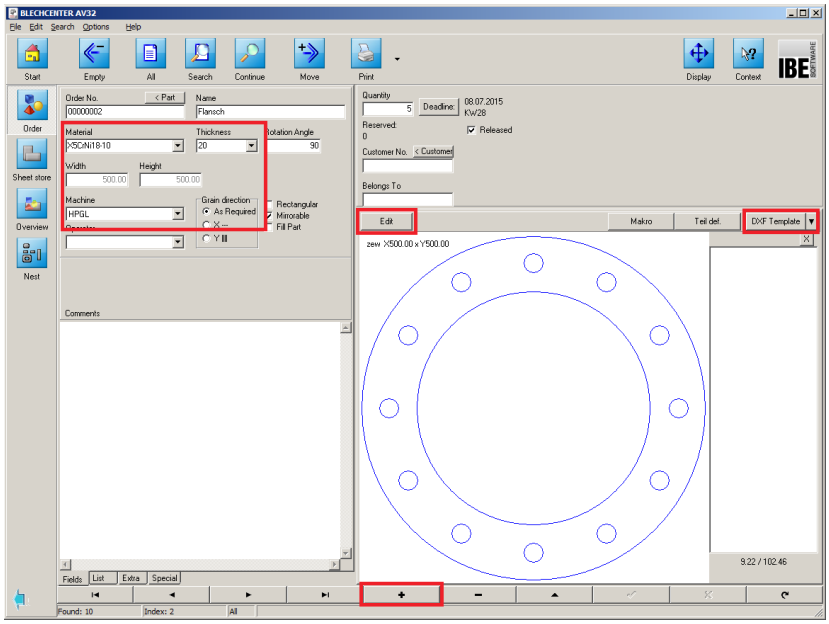
You must first have parts ready as files or macros in order to enter your orders. These parts can be collected and managed in a parts database, though it is not a requirement to have one – parts can be imported from memory sticks or the net as required. A parts database can however prove useful when making projects from assemblies.

Basic Settings for Machines and Materials

You can only get the correct results if your machine and materials are set up correctly. You will find more detailed help on this in the administrator's handbook under 'General settings'.

There must be an Order

To make your nesting plan, which leads to your production plan, you will first need to enter your order. Select the order form:



Select:
[homepage]
[orders]
[order][+].
Select a template and allocate the order to a machine. Select the material and its thickness.

[DXF template]
Select a drawing
[Machine][Material][Thickness]
You have the option to enter a customer number. Confirm by clicking

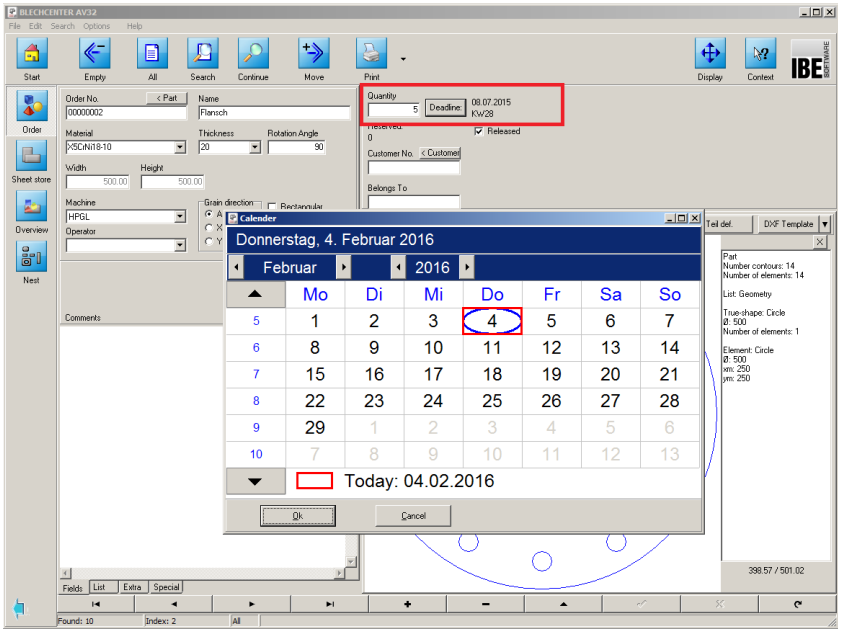
[✓].

You can apply machine data to the part by working on it in the machine data window. Select [edit] in the middle of the screen to switch to the machine data module.

Your options in that screen are dependent on the selected post-processor. Each post-processor allows different options – a water-jet cutting machine offers different options than a plasma-torch cutting machine, and these are of course reflected in the software. *SHEET METAL CENTER Plus* will always pull default settings from the post-processor, guiding you to the right decisions. The machine data window has its own online help with a wide scope, click the help button in the top-right corner to display it.

Optimize your Workflow by Entering Deadlines

You can enter projects' deadlines to optimize the use of your machines.

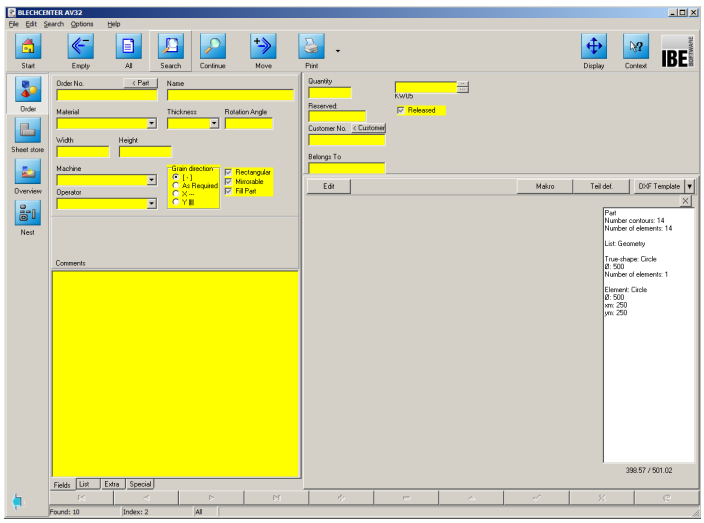


Select:
[Deadline]
Select the deadline for producing this job from the calendar.
Don't forget to enter the required number of parts!
Confirm your input by clicking [✓].

Collate Parts in Work Packets

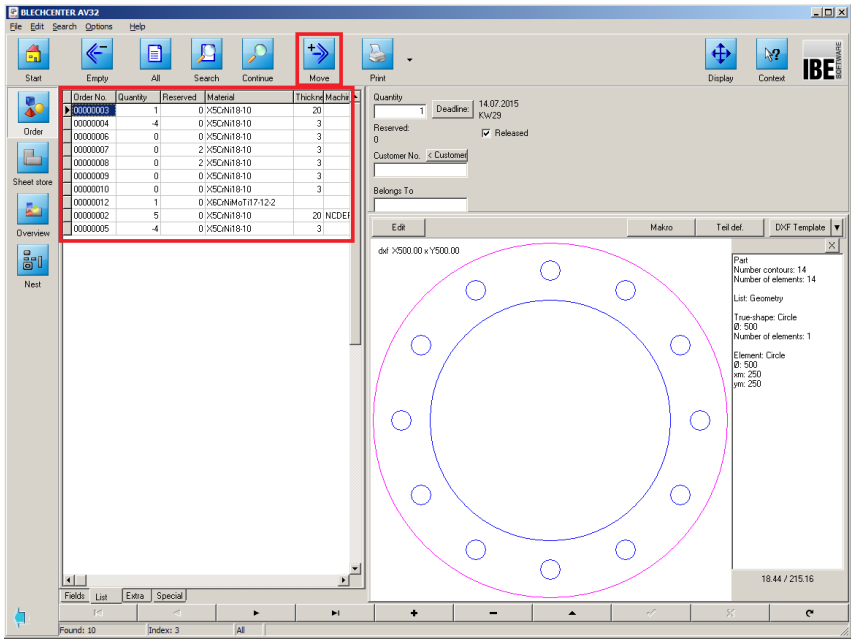
The search function allows parts from outstanding orders to be collated into work packets and placed into joined production plans. With skilled use of search criteria you can build economical packets, ensuring optimal use of your material and machines. The most important criteria are of course machine type, material type and material thickness.

You will find more detailed help on searching under the chapter for the "Search" function. You can specify your search using wildcards, logic operators, etc.



Select:
[homepage]
[nesting plans]
[search].
Set your search criteria

[search]
Select the 'list' tab.



The list shows all parts which match your search criteria.

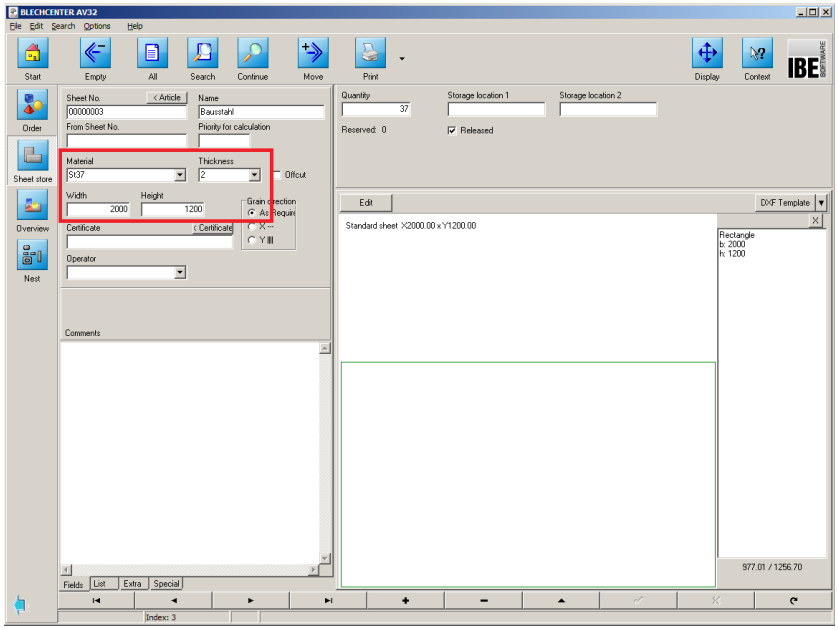
Next, put these parts in the nesting plan by clicking "forward" in the header panel.

A dialog appears to inquire the quantities of each part required, or transfer all with one click.

The parts will show as "reserved" from the main overview, so that no one else can have duplicate access.

Select your Sheets

You will need to choose a sheet as stored in your sheet database or in this example a new one entered by you for nesting your parts to.



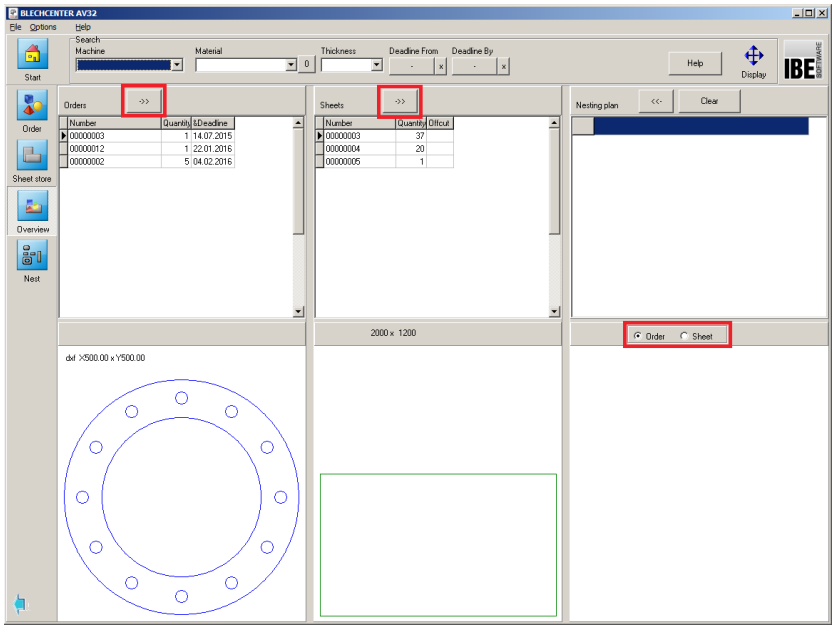
Select:
[Sheet Database][+]

Select the material and thickness, and enter the dimensions as width and height.
Enter the available quantity of sheets and *confirm you entries.*
[✓].

The 'List' tab shows all sheets in your stock.

The Nesting Plan

The foundation stones of a nesting plan are an order and some sheets. The overview shows you dependencies at a glance, and allows you to shift items to suit.



Switch to:

[Overview]

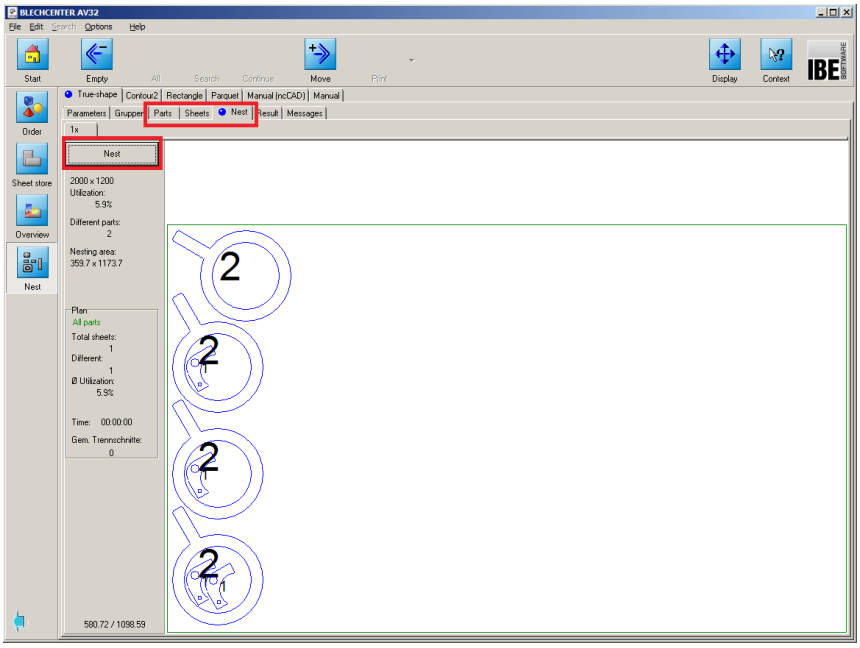
and move the orders and sheets around to make your nesting plan.

The right column shows the components of your nesting plan.

Use the selection box in between the frames on the right hand side to change the view.

Next, click [nest].

The next screen offers all available nesting options. The top row of tabs shows all installed nesting modes. The second row of tabs shows the individual items and nesting results.



Select the nesting type: [true-shape],

the [nesting] tab,

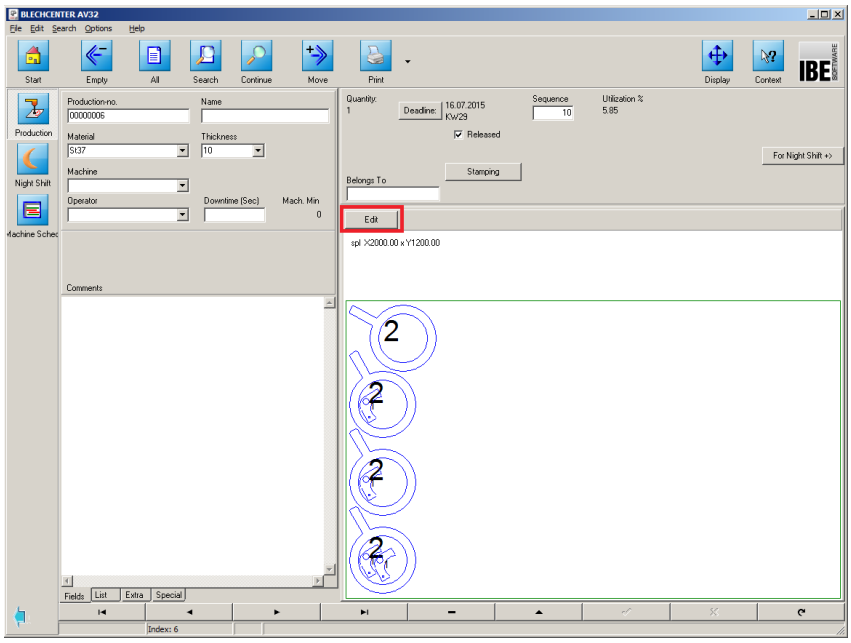
then click the [nest] button.

The results are shown in the preview window.

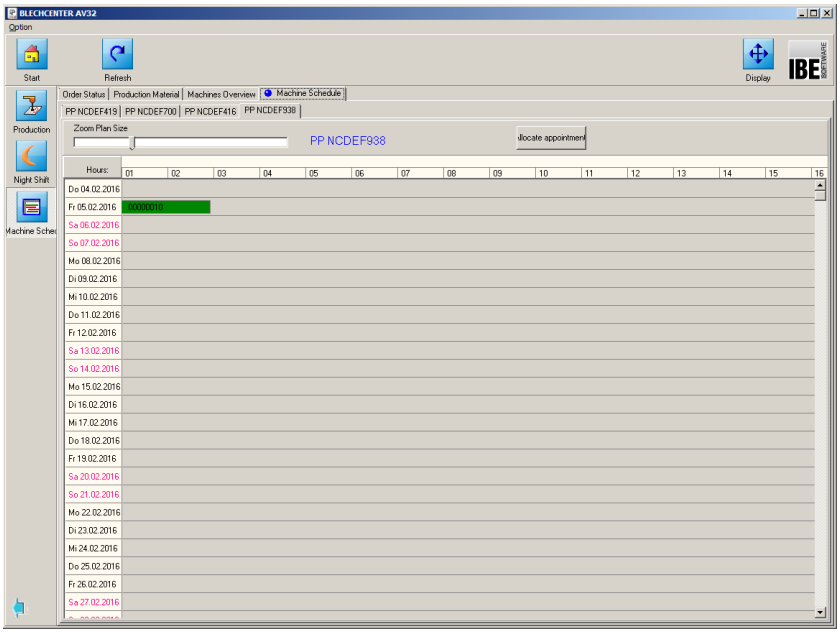
The sheets you have nested can now be transferred to your production plan one at a time or all together.

Create your NC Code

A nesting plan can be treated as a production plan once it is finalized and carried through to the production plan form.



Select:
[homepage]
[processing plans]
Select the required plan from the list and click [edit] to move on to the machine data screen and generate your NC code.



The NC code is then sent to the selected machine, and stored in its assignment plan for the allocated time.

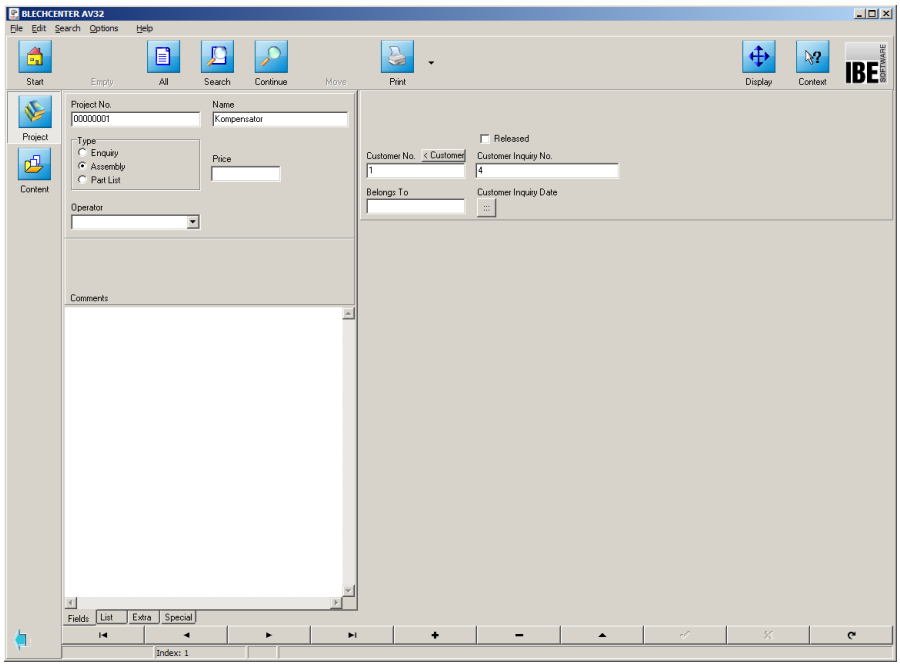
Once the sheet has been produced you can close the job. To inform the system the production was successful, click [forward] to open a dialog for closing this production.

Remaining offcuts can be placed back into your sheet database. You can also close production without work, or re-nest.

The machine assignment sheets allow you to keep optimal control of your machines, helping you to keep sight of your production deadlines and deliver your promises. You can also keep a constant eye on the machine's usage time and, if it's required, you'll get plenty of notice to reschedule productions.

Projects Create Order

AV32's project-based structure makes it a strong management tool. You can group assemblies and part lists to create price quotations, and later use these to produce the parts. You can dissolve your assemblies and create orders from the component parts, which can then be nested with parts that use the same material from any other customer, the nest plans going without delay to the production team. You can reliably monitor production times and ensure you are getting the most from your tooling.



To input a new project select:

[homepage]

[projects]

[project]

[+].

Enter a project name and select its type.

You can also assign a customer number if you wish.

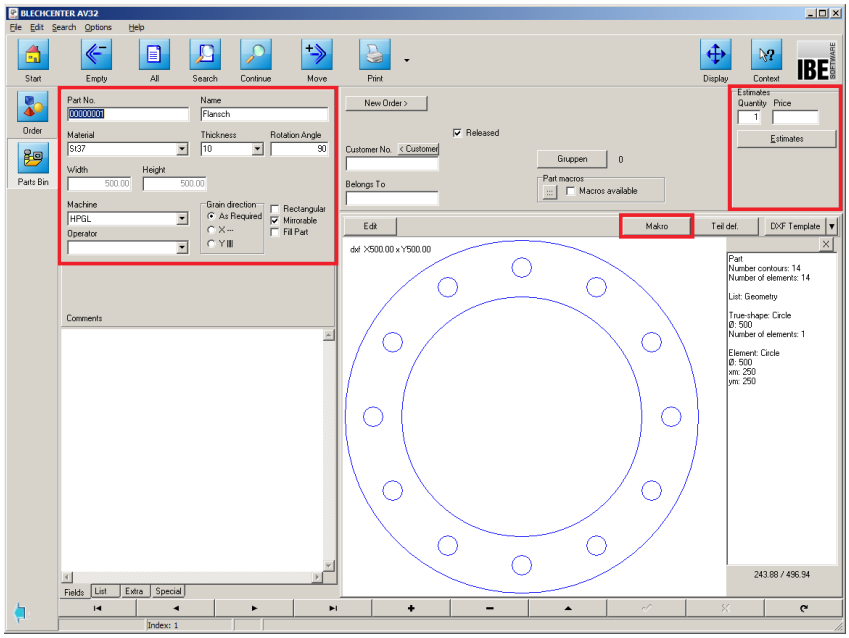
Confirm your entries

[✓].

In the example we create an assembly which contains cut parts as well as purchased-in components. The cut parts are created, placed in the parts bin and attached to the project. Purchased-in parts are held in the article database, and also attached to the project.

Place parts in the parts bin

Using a macro, we generate a flange as a cut part for our project, and place it in the parts bin. The price will be calculated for your estimate using parameters entered in the system.



To enter a new part, select:

[homepage]

[orders]

[parts bin]

[+].

Enter a part name and select the material, thickness and machine.

Select [macro] *and develop your part from the macro template.*

You must have machine data allocated in order to cut a part.

Select: [edit]

Switch to the machine data module to define each element's machine data such as lead-ins, qualities, priorities, etc.

You will need to make various inputs in order to get an accurate costing. Once these are entered, the system will calculate the part price for you based on material costs, machine time, etc.

Select:

[price estimate]

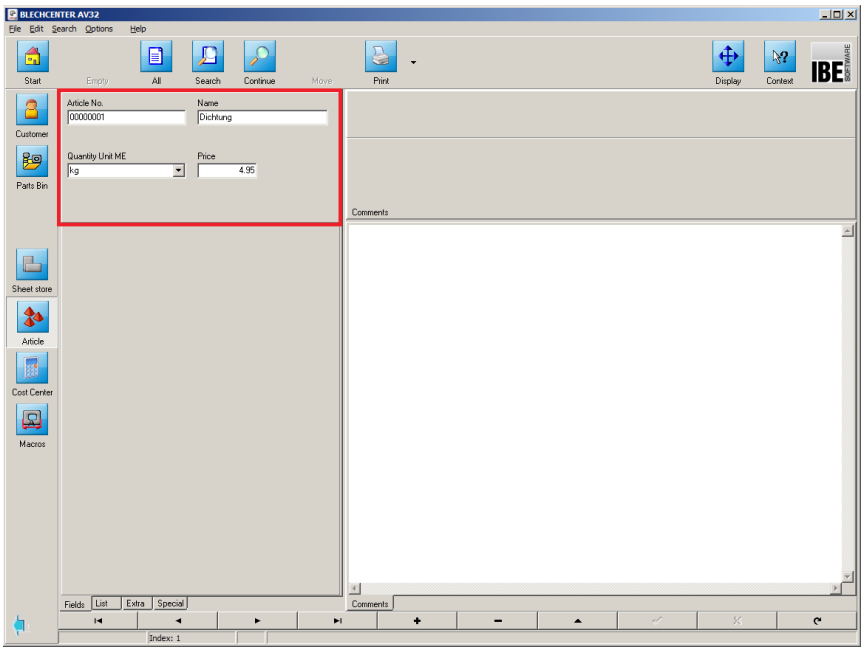
and enter the required values.

Confirm your entries to save the part to the database [✓].

Enter all parts required for the assembly in this manner, from whichever source they hail (DXF, macro, etc.).

Manage purchased-in parts

Since an assembly is generally requires bought-in items as well as cut parts, you can also keep records of these in your article database to allow you to make an accurate price estimate.



To enter an article, select:

[homepage]

[master data]

[article]

[+].

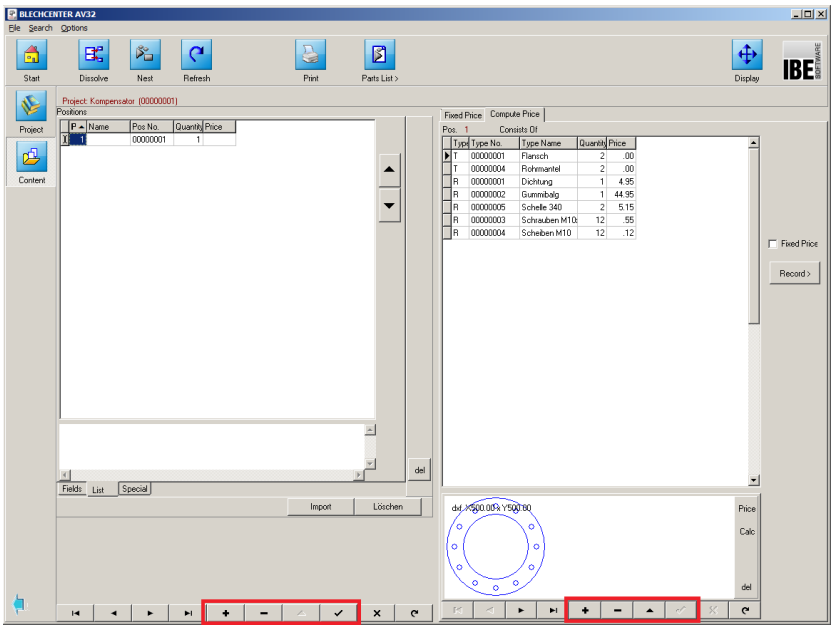
Enter an article name and price, and confirm you entry [✓].

Enter all required articles in this manner.

You can now create your assemblies from the parts and articles.

Create Assemblies

In our example we will make an assembly group representing a compensator which consists of cut flanges and tube parts joined with a rubber bellows.

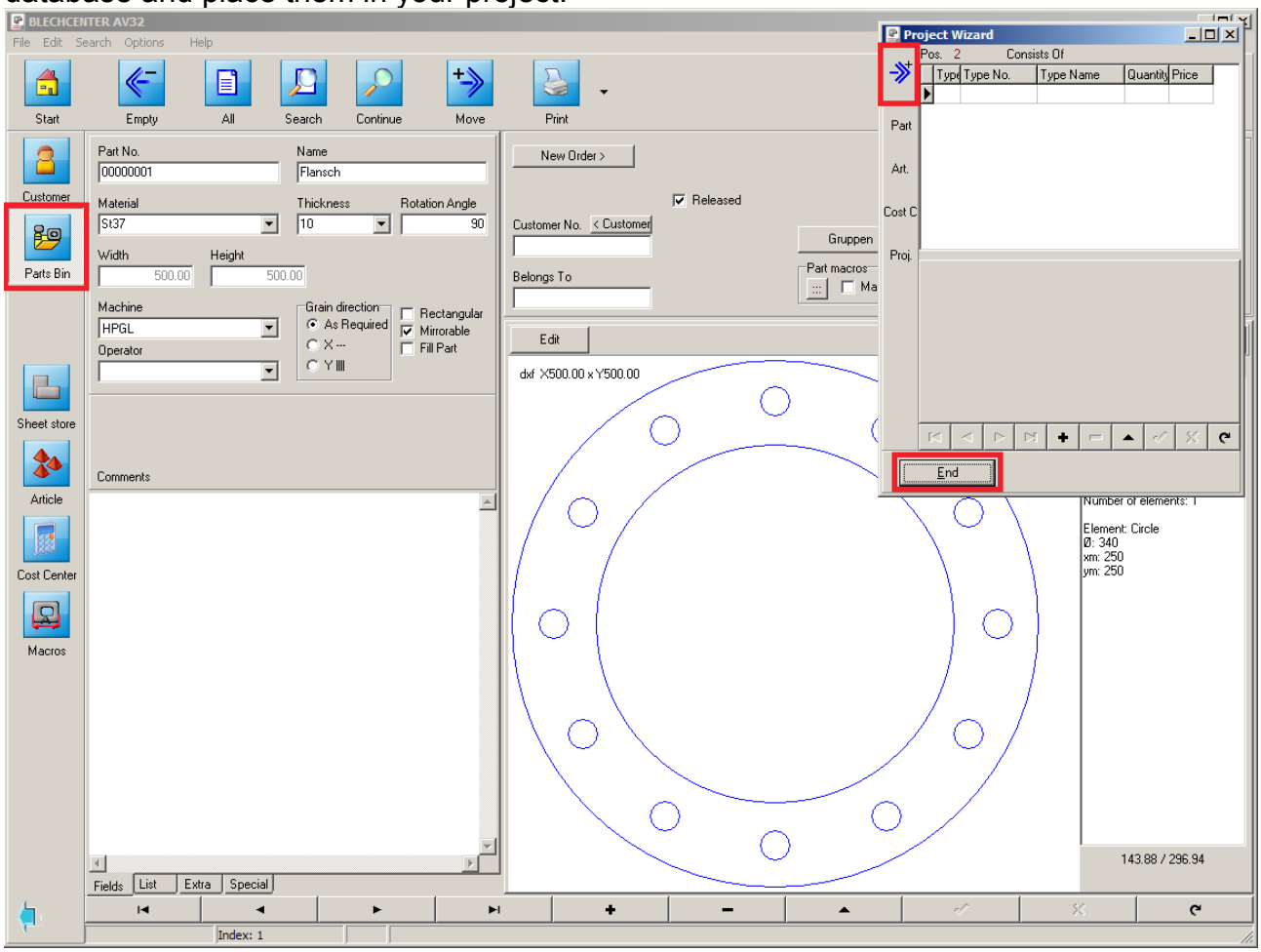


[homepage]
[projects]
[Project]
[content].

First create a new entry in the left frame by clicking [+] [✓], then populate the entry with a part or article in the right frame [+] with the project assistant's help.

The Project Assistant Helps

The project assistant helps you take parts and articles from the parts bin and article database and place them in your project.



Go to the relevant parts or articles bin in the main window, select the required item and 'forward' it to your project using the arrow button in the top-left corner of the project assistant. If your part is a cut part, the system now has enough information to give you a price estimate – press the button on the assistant's right hand side.

You can add a cost center to a project using the button on the assistant's left side. This allows you to allocate all costs that incurred to produce your assembly (hourly rates, etc.)

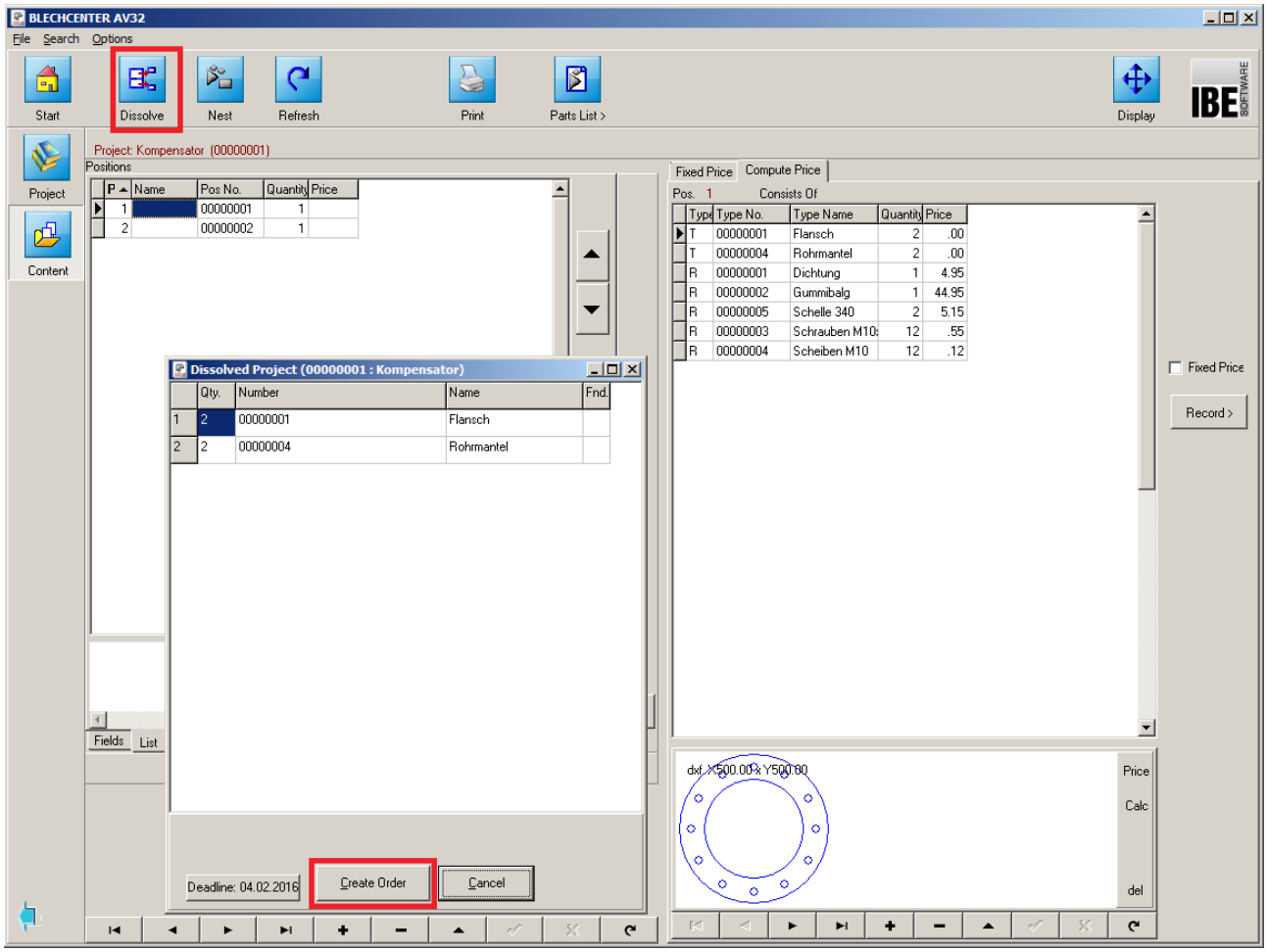
AV32 also allows you to combine whole projects together in a wider-reaching project using its items structure. Thus you can create and administer complex assemblies including sub-assemblies.

Once you have attached all items to your project, click the [end] button. If you make a price estimate for any individual part, you will also be informed the price for the whole assembly.

Dissolving Assemblies for Production

Cut parts from an assembly can be converted to production orders with just a few clicks. Select: [homepage], [projects], [project], [content].

The items in your project are shown clearly in a table. Since not all items are cut parts, you can dissolve items such as bought-in parts.



Click [dissolve] to open a dialog box for entering the quantity of parts, a further dialog box will appear with a list of the individual cut parts. To transfer the parts to orders, select [create orders]. The production deadline is shown at the bottom-left. To change this deadline, click the button and select from a calender.

You will be shown the created orders. Close the dialog box once this is done with. The orders can then be allocated machine data if this was not already done at the part level, then nested and sent for production.

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