

SIGMA

Product Hand Assembly
Made Easy





SIGMA – Product Hand Assembly Made Easy

Summary

Robotas Technologies has 25 years experience of providing solutions for customers whose products have a hand assembled element. We have over 1500 installed systems around the world, for customers including Nokia, Hewlett Packard, Agilent, Intel, Westinghouse, Jabil, Venture and Parker.

SIGMA is a unique and effective aid for product hand assembly. Our customers are typically manufacturers with a wide range of products which are assembled in small / medium batches. Typical product assemblies range from cable harnesses or box build, right up to complex final products.

SIGMA gives all possible assistance to the operator. Step by step, SIGMA delivers the right part, the right tool, and the right information to help get the assembly right first time.

In the Aerospace, Defence, Medical or indeed any other sector where the highest standards of build quality is crucial, SIGMA can eliminate kitting, speed up product design and introduction, speed up product hand assembly, and significantly reduce error rates.

Build batches of ONE as efficiently as larger batches! Simply select the product to be assembled at the touch of a button, or the scan of a barcode. Working in this way will significantly reduce your set up time, assisting lean manufacturing.

The user friendly operation requires minimal training and allows even inexperienced operators to begin building your products immediately.

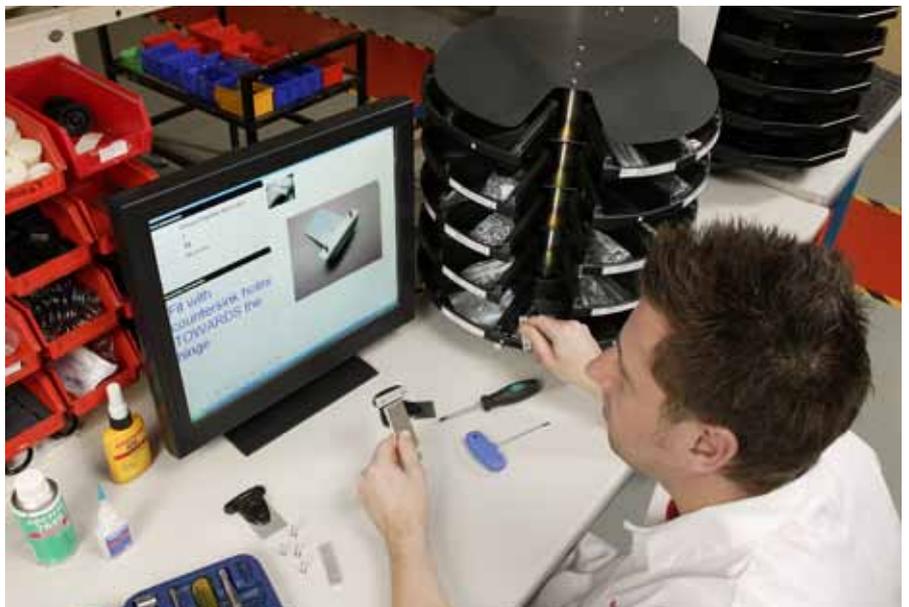


How does SIGMA work?

Operators are given broken down assembly steps, without being aware of the underlying complex sub assembly 'family tree' structure of the product they are building.

At every single step of your assembly, SIGMA:

- Delivers the correct part needed, from motorised carousels.
- Displays an image of this part for easy verification.
- Indicates the pick quantity.
- Highlights the correct tool required, by LED.
- Shows clear instructions for this assembly step, along with images or a video clip of the assembly operation.
- Offers any relevant supporting documents (such as CAD Drawings, COSHH information or standard company procedure).

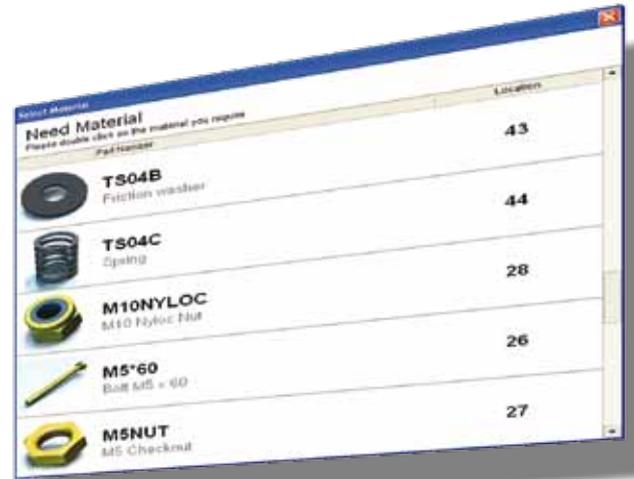




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SIGMA's Additional Features

- Redline - Harvest valuable shop floor knowledge and experience, by allowing operators to comment on the work instructions if they feel they can improve the process. If their idea is accepted, everybody can then work the improved way. This function is particularly useful for product introduction, before widespread use on the shop floor.
- Need Function – Operators pull material onto their work station directly from the stores at the click of a button if their parts are running low. Your operators never need to leave their seats, because materials personnel then satisfy the material requests from all SIGMA stations, in one trip.
- Messaging - Allow operators to exchange messages with their supervisor, without leaving their seat.
- Scrap Function – Operators can quickly record unusable material's part number, description, quantity to scrap, and the reason for scrapping. This report can be invaluable for high cost items.
- Find Function –Search the assembly by Part Number, Description or Step. Useful for re-work or checking.
- Barcode verification stages can be included to ensure parts are correct; e.g. latest firmware is incorporated.
- Traceability - Log material batch IDs, serial numbers, operator details, date and time of assembly. Record test results or other product build data. Output collected data to a label or file. This can be invaluable for ISO 9000 accreditation & traceability.
- Produce works orders and product costings. Part information including supplier details, ordering details and the exact cost of every part is contained within the parts database.
- Product design is simplified, since you have all existing part details and assembly instructions of your existing products at the touch of a button.



- Monitor the progress of each workstation against its schedule. Collect and analyse your shop floor's production data with our optional Workflow software.a



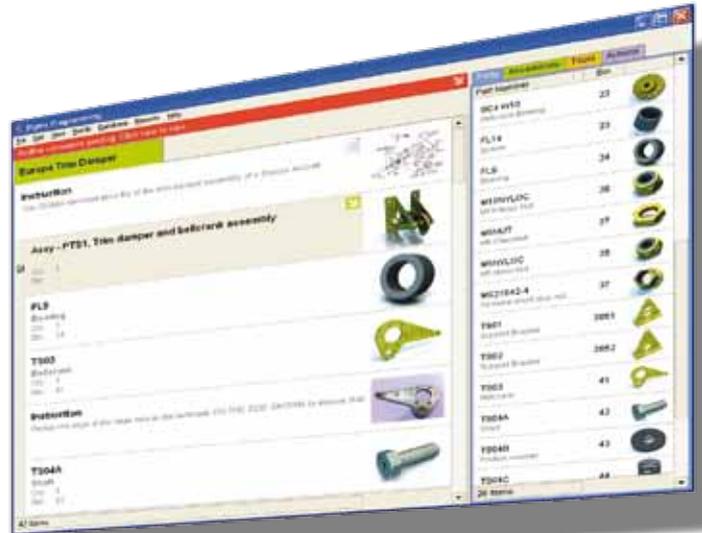
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Programming

The user friendly SIGMA programming environment with its image-based interface enables the speedy creation of the work instructions for your operators. Import your existing BOMs and current work instructions from databases, office documents, html, xml & text formats. Then quickly create your SIGMA assembly programs using your existing part and assembly information.

- Drag and drop items from your parts database to create or amend an assembly.
- Easily group parts into a sub assembly. These are then available for all other products which may use this sub assembly.
- Create both 'expanded assemblies' (where the operator will be asked to build every step) and 'non-expanded assemblies' (where the operator integrates previously built or stocked assemblies).
- Add an image to each item, to help correct identification by the operator.
- Include additional annotations and text instructions where necessary.
- Add a video clip to clearly guide your operators through complex assembly steps.
- Include specific technical documentation to any step (e.g. PDFs, CAD drawings or website links) for your operators to view for more detailed information.
- Add verification steps so that critical parts must be checked by barcode scan before they can be incorporated.
- Capture test results and determine product build path based on action limits.

Program changes can be made simply & quickly, supporting Kaizen continuous improvement. Changes to sub assemblies are instantly available in all products where it is used.





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VERTU – SIGMA CASE STUDY

Vertu is the pioneer and leading manufacturer of luxury mobile phones. Created to complement the discerning customer's lifestyle, Vertu offers tailored, luxury services in combination with the finest in design, engineering and manufacture. With three distinct collections – Signature, Ascent and Constellation – Vertu uses innovations in manufacturing technology with traditional craftsmanship, assembling each phone by hand at the company's headquarters in Church Crookham, England.

Vertu required a process whereby each craftsman could accurately and efficiently build each handset, accessing the assembly instructions unique to each particular model. The craftsmen needed to be presented with exactly the right part in the right build sequence. Vertu also wanted to find a way to significantly reduce build time to meet the time demands of its customers, without compromising the quality for which the brand is renowned. Finding a solution to these challenges was key to its business. Because SIGMA has been specifically designed to assist the hand assembly of products which absolutely must be right first time, SIGMA was the perfect solution to Vertu's challenge!

In 2006 Robotas installed the first SIGMA systems, each with touch screen monitors and barcode readers to quickly load the correct assembly program for each unique work order. Vertu has been so pleased with the benefits which the system offers their business, they now have 29 systems in operation and have plans for the installation of more systems in the future. The system also encourages



operator feedback which can be verified and used to further enhance the process, thus ensuring best practice at all times.

“SIGMA ensures that all of the benefits of hand assembly are matched with unparalleled accuracy. It is the perfect synergy of technology with the excellence delivered by our craftsmen.”

Ben Newbrook - Senior Industrial Engineer, Vertu





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SIGMA Configurations

SIGMA systems can be retrofitted to production lines with. Due to the varying nature of product assemblies, SIGMA has been specifically designed to be a modular system. SIGMA can be configured to meet your requirements, whatever your budget or application. The software, automated dispensers and specialised benches can be easily reconfigured to suit your needs.

You can select from a range of component dispensers including different sizes of storage trays. Each SIGMA system has the ability to run up to four carousels, each holding up to 50 part numbers. Therefore each SIGMA system can present 200 part numbers, in addition to 176 LED indicators on Tote Bin Arrays or even clip-on LEDs which can be fitted onto your own racking system, or to part's original packaging if this is how you wish to store your parts.

Our most popular configuration of the SIGMA system consists of the SIGMA software, a touch-screen



monitor and a single motorised carousel which can hold up to 50 of your most common part numbers.

Robotas have many years experience in ergonomic bench design. Standard SIGMA benches are available.

SIGMA Technical Specification

SIGMA is suitable for static sensitive products. Installation is easy and the machine is designed for maximum reliability and minimum maintenance.

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| Power consumption of each carousel | 70W | Air Supply | Not needed |
| Electrical requirement | 100 - 110VAC 60Hz, 220-240-VAC 50Hz, switchable. | Bench space required, excluding PC & screen | Each carousel on the SIGMA system is approximately 650mm deep x 465mm wide & 465mm high. Contact Robotas for sizes of other material dispensers. |
| Carousel Bin index Time | <2 seconds | Language | Can be set to English, French, Italian or Chinese (other languages can be added easily) |
| Up to 200 bins, in 4 carousels | Each carousel has 5 trays (450mm (17.7") in diameter), each with 10 bins. We can also supply 4 bin trays for larger items. | | |
| Bin size | Depth 58mm (2.3") x Length 131 mm (5.2") x Width 117mm (4.6") tapering to 34mm (1.3"). | | |

For more information please feel free to contact us directly, or visit our website to find your local agent's contact details (worldwide).