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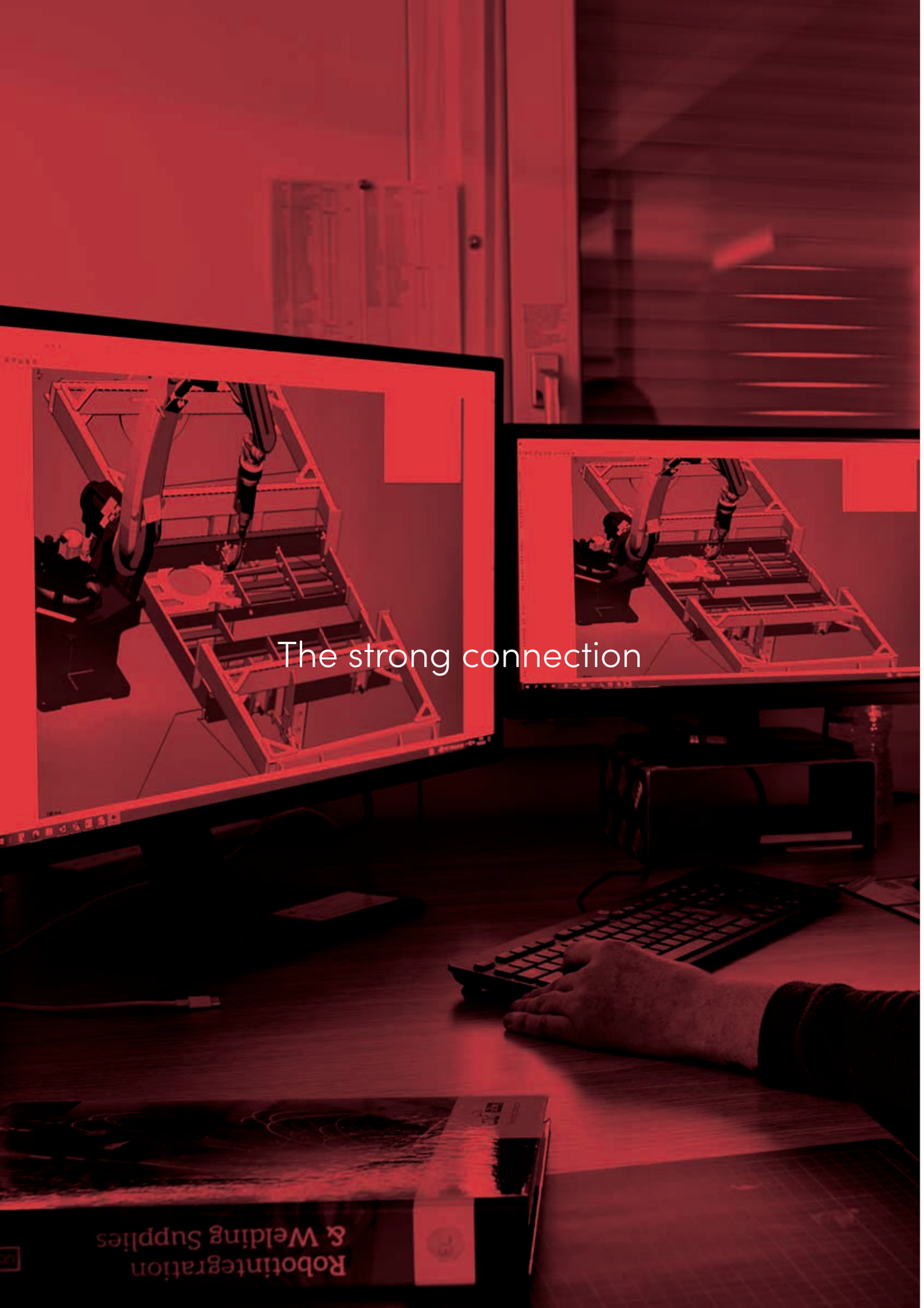
Software solutions



Valk Welding software solutions

To achieve maximum efficiency from your robot installation, the interaction between human and machine is particularly important. Valk Welding has developed various software solutions that provide both fast control of the robot and communication with your employees.

DTPS 6

QPT 8

CMRS 9

ARP 12

SFC 14

MIS 16

Valk Welding Partner Zone 18

From people to robot and back

The diagram to the right shows the different actions and solutions that Valk Welding can offer in terms of software.

Programming the robot.

DTPS

QPT

CMRS

ARP

SFC

Structuring, managing and planning the production process. Additionally, internal communication regarding the production process is possible.

MIS

Monitoring the robot system, welding process, and end product.

Customer

Planner

ARC-EYE

Operator

DTPS

Desktop Programming and Simulation Software

DTPS (Desktop Programming and Simulation Software) is a fully-fledged 3D CAD/CAM system for programming and simulating the welding path of Panasonic arc welding robots. The offline programming software replaces programming with a teach pendant (an advanced remote control) directly on the robot. As a result, production does not have to be interrupted for programming and a maximum switch-on time of welding robot systems can be achieved. Programmers can program the most complex workpieces with the help of DTPS without having to stop the welding robot. After importing a workpiece from a CAD system, the work planner indicates the welding positions including the desired welding parameters. Because the software offers a powerful 3D simulation with collision detection, the programs can be checked down to the finest detail before they are sent to the control of the welding robot. In addition, the jigs and positioner frames can be designed and tested. DTPS forms the basis for several software programs.

DTPS facts

- DTPS offers full support for importing 2D and 3D CAD files into your virtual robotic system.
- DTPS is a powerful engineering and testing tool.
- DTPS calculates cycle times.
- Conversion of existing programs to new installations or other workstations is possible.
- Powerful 3D simulation with collision detection.
- Programs are interchangeable between the Valk Welding robot systems.
- DTPS is 100% compatible with all generations of controllers.
- Existing robot programs can easily be adapted.

Watch our video

How DTPS works

System definition by Valk Welding
Because every setup is unique, it is first defined by the specialists of Valk Welding in the 3D environment before it is put into use.

Design products in 3D or import existing products from a CAD system
Within DTPS, you have all the tools you need to draw every workpiece in 3D. Existing drawings from other CAD systems, with the extensions WRL, XGL, ZGL, 3DXML, STL, IGES or DXF, can be imported.

Programming the robot
You can easily move the robot with the cursor, or you can click on the parts that need to be welded. This way, you can also program the Quick Touch wire search. Welding parameters can easily be determined using the unique standard Weld Navigation function.

Checking
The program can be checked through a full simulation of the movements and can be checked for collisions.

Send and start
Send programs to the robot and start production.

A few notable features:

- The internal CAD system has been expanded to include new entities and many new functions.
- The installation editor with standard components has made the engineering of new systems much quicker and easier.
- Programming the weld lines with automatic addition of points in free space.
- Linking a powerful welding parameter database to the welding motion.
- Extensive possibilities for editing programs.
- All imaginable manipulations of programs for robot positions.
- Extensive possibilities for file management.
- Programs are interchangeable with other Valk Welding robot systems.
- File transfer via Ethernet.
- Export AVI files of created programs.

DTPS in short

DTPS - Desktop Programming and Simulation Software is a fully-fledged 3D CAD/CAM system for programming and simulating the welding path on Panasonic arc welding robots. The offline programming software replaces programming with a teach pendant directly at the robot. As a result, production does not have to be interrupted for programming and a maximum switch-on time of welding robot systems can be achieved.

QPT

Quick Programming Tool

The software engineers at Valk Welding are constantly working on the development of tools to speed up the programming process. In addition to the standard possibilities offered by DTPS, Valk Welding has enabled further acceleration of the programming process within product families with the help of Quick Programming Tools (QPT). This results in considerable time savings during work preparation.

QPT is a macro module within DTPS that allows existing programming blocks to be copied, scaled, multiplied, and combined with other programming blocks. In this way, repetitive operations do not have to be programmed over and over again. Especially companies with their own products can work significantly more efficiently with this.

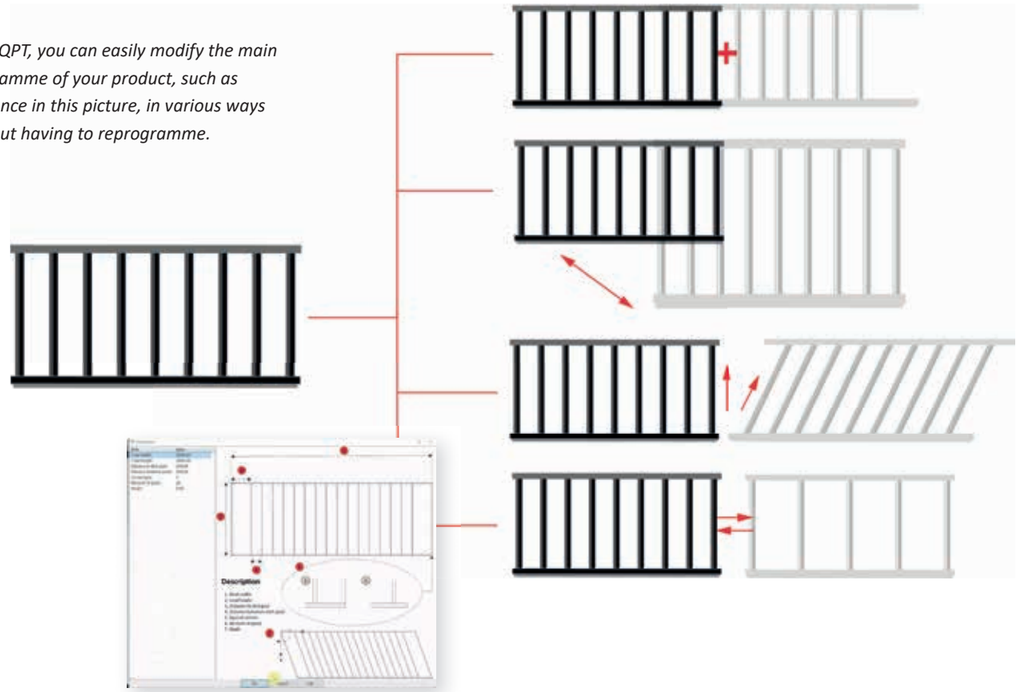
QPT in short

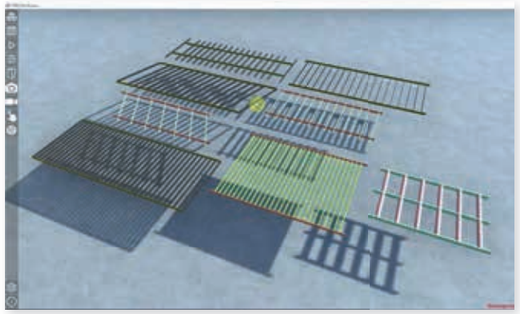
Using Quick Programming Tools (QPT) speeds up the programming process within product families. In work preparation, this results in significant time savings.

In the case of an order, certain data describing the product must be collected. This data can be entered in an Excel file, or an input screen displayed in DTPS. Using QPT, it is then possible to automatically generate programs and to send them to the robot. Some of the data that can be entered includes the width and height of the product, the number of subparts, the type of subpart, and the location. In this way, it is possible to go from order to production with just a few clicks.

In practice, operators work with one main program, which defines the macros for repetitive specific operations. By applying the main program to multiple stations, operators can enter the desired product dimensions themselves without having to reprogram the welding program. When adjustments are made to the master program, all settings, such as welding parameters and torch position, are automatically adjusted.

With QPT, you can easily modify the main programme of your product, such as the fence in this picture, in various ways without having to reprogramme.





QTP library

Through years of experience, the software engineers at Valk Welding have developed a QPT macro library that can support programmers during programming. Some examples of macros include:

- Macro for importing welding tables created by Valk Welding.
- Macro for converting a welding program to a search program.
- Macro for renumbering search buffers.
- Macro for shifts not supported by DTPS
- Etc.

A programmer installs the QPT library using an installer. After installation, all available macros are ready to use.

CMRS

Custom Made Robot Software

Valk Welding develops Custom Made Robot Software (CMRS solutions) to realise a fully automated welding process in addition to DTPS. CMRS is the connecting factor between different software components. CMRS integrates all of the involved software into one working solution. This allows us to provide and develop customized solutions for your installation. Thus, CMRS is a collection of software components that collectively perform a function that they cannot perform separately. CMRS makes single-piece production on welding robots profitable.

Some application areas of CMRS are :

- Automatic generation of complete robot programs based on recipes.
- Linking database systems to robot systems, such as ERP and warehouse systems.
- Linking to standard solutions, such as DTPS, QPT, Excel, ShopFloorControl, ARP.
- Controlling and integrating semi- and/or fully-automatic welding jigs and robots.
- Controlling and integrating specific hardware, such as QR, Barcode, RF-ID and vision systems.
- Automating the loading and unloading of the welding cell by means of Automatic Guided Vehicles (AGV).
- Developing simple human-machine interfaces in case of complex robotic processes.
- Engineering and realisation of custom software for process/ company-specific robot solutions and R&D tracks.
- Structuring and modeling more complex robot automation issues together with your own engineering.

CMRS saves time, increases productivity, and optimises the production process.

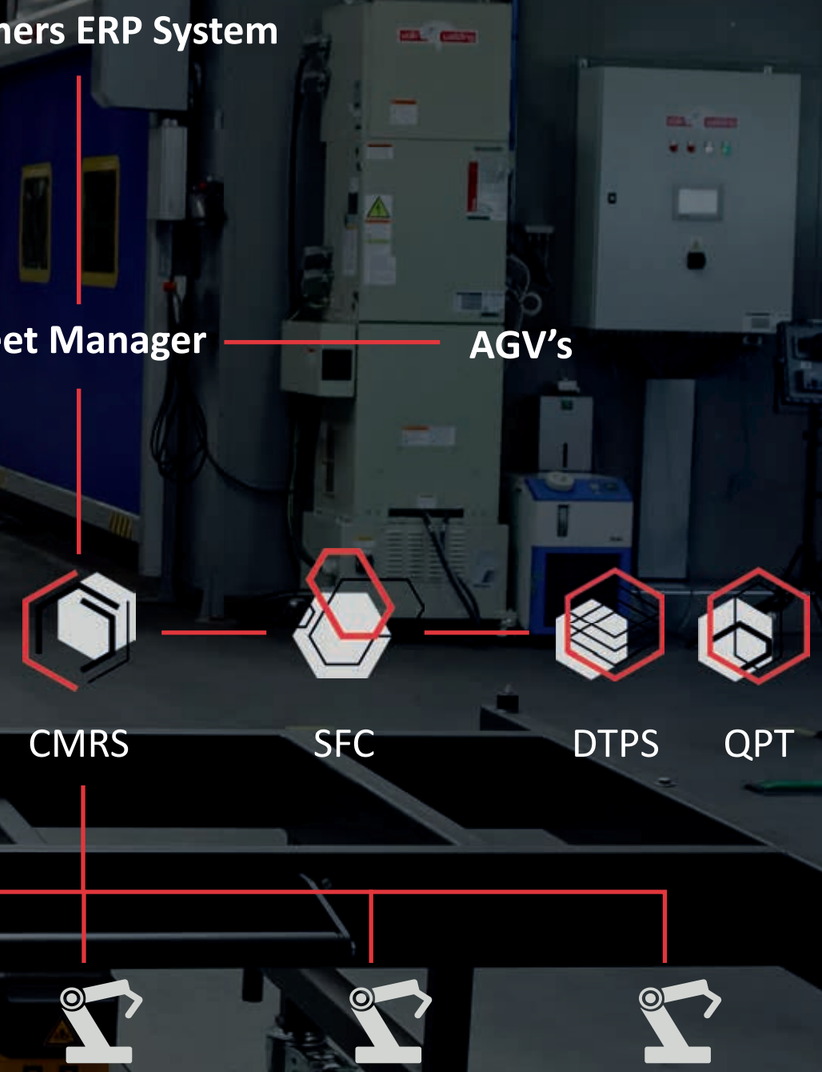
CMRS in short

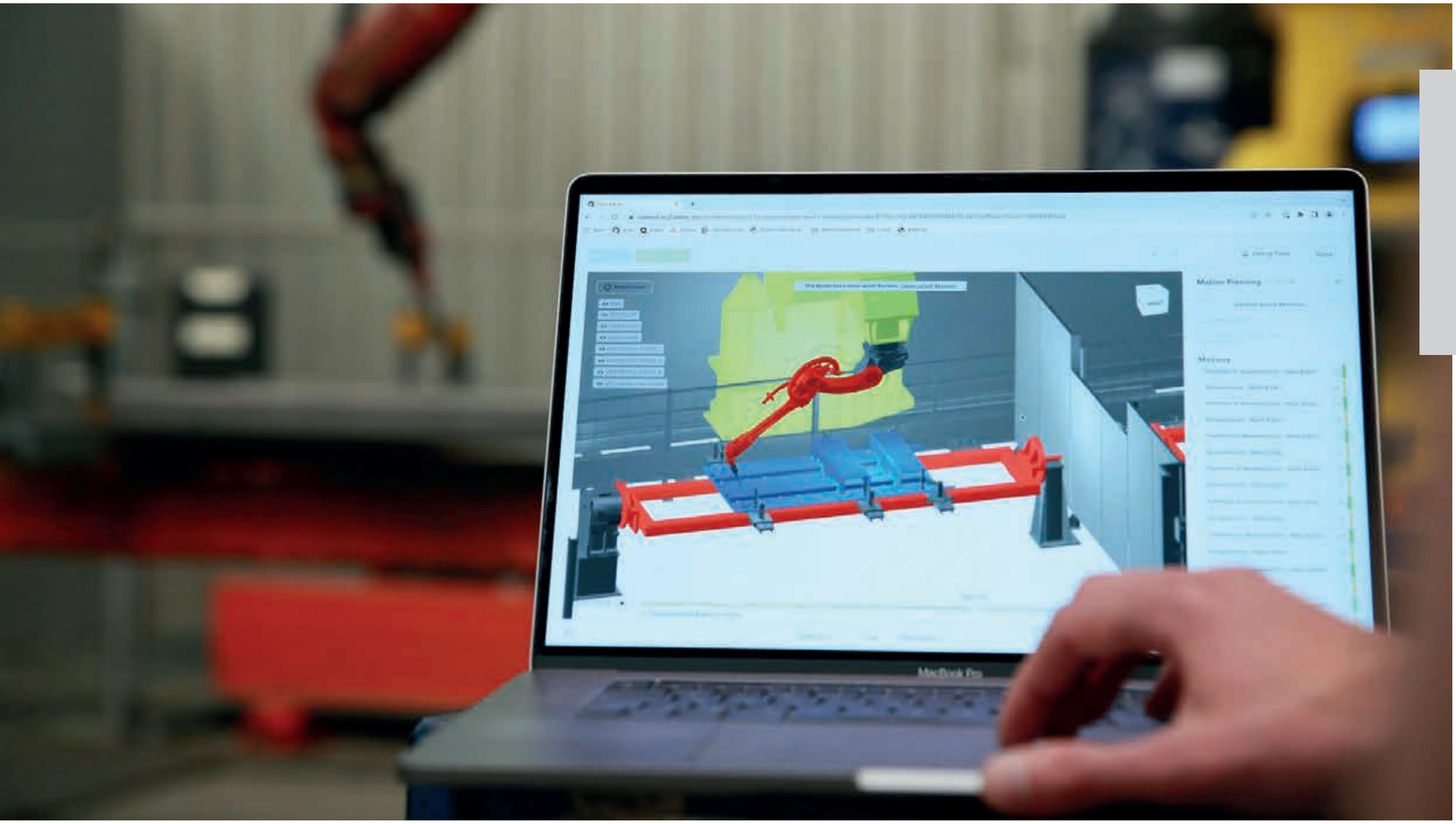
CMRS is the connecting link between different software components. CMRS integrates all the software involved into one working system.

Valk Welding software controls 24- hour unmanned production at Meijer Metal

When employees at Meijer Metal in the Frisian town of Sint Jacobiparochie begin their workday in the morning, the welding robots have been producing throughout the night. Four welding robot cells are loaded and unloaded by AGVs, operating unmanned 24/7. In doing so, the company is building the factory of the future, in which much of the handling will be automated.

Watch the video to see this solution in practice.





Model Based Definition

ARP is a way for Valk Welding to keep up with developments around Model Based Definition (MBD), a way to effectively use 3D models with product data in 3D CAD software. We aim to eventually be able to extract welding information and welding parameters directly from an MBD file and thus speed up automatic robot programming.

ARP in short

ARP is software for offline programming that reduces programming time. The programs are generated and simulated automatically. After that the programs are imported into DTPS and can be sent directly to the robot for production.

ARP

Automatic Robot Programming

Automatic Robot Programming (ARP) is a collection of solutions with which we simplify the process of offline programming and speed it up to ten times. Thus, we not only dramatically increase the efficiency of this process, but we also make welding automation of single piece production attractive. This is because the ARP software automatically generates and simulates welding programs from 3D CAD files or other information sources, which also means that you do not need extensive programming knowledge.

How it works

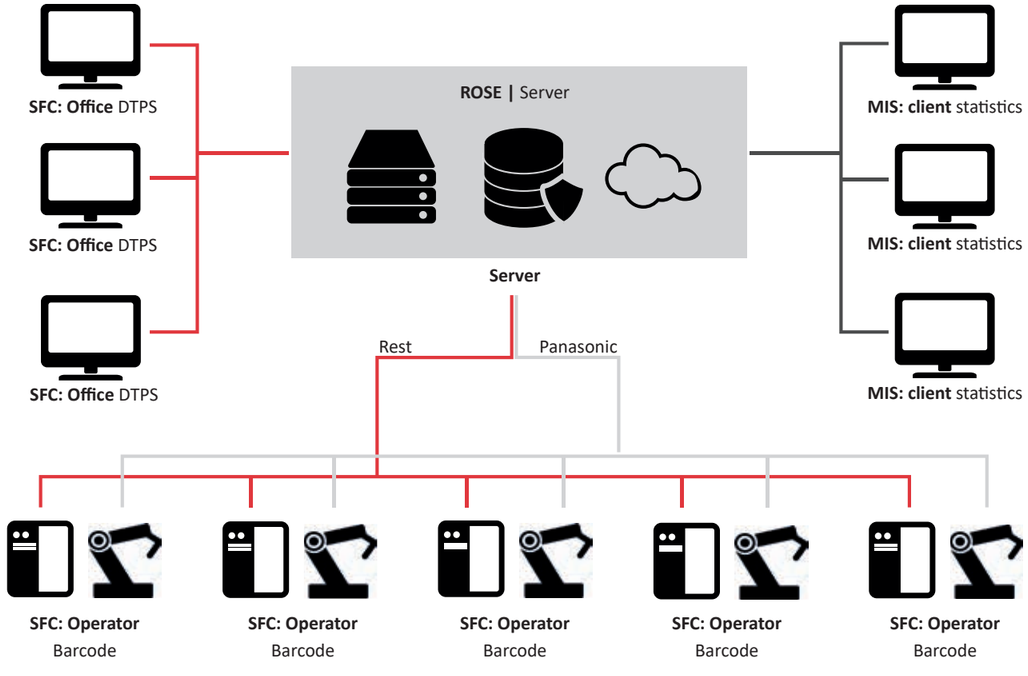
To generate welding programs, the ARP software requires welding specifications and information about the product to be welded. Therefore, for example, you import a 3D CAD file with weld information into ARP and confirm the locations where welding is to take place. Then, for each welding seam location, the software checks whether the torch and the welding part will collide and corrects these cases automatically. After this, the robot program can be generated, where the software automatically determines the start and end positions of each weld, and the touch sense points at each weld. The program is imported into DTPS and can now be sent directly to the robot for production.

SFC

Shop Floor Control

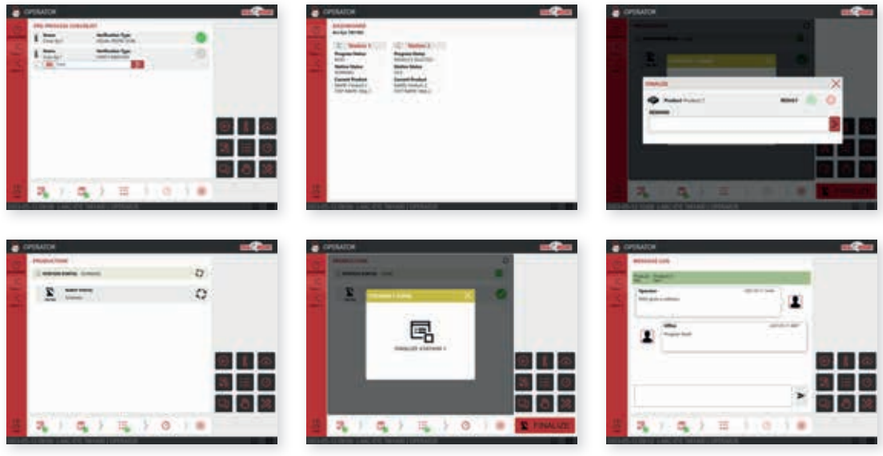
Shop Floor Control, or SFC, is an application to automate, structure, and manage the office and workshop environment of the robotic welding process. SFC automates from planning to operator instructions. The platform makes use of the ability of the Panasonic robots to retrieve and send live data. SFC is certainly a valuable addition for companies with multiple workstations or welding robot installations.

SFC ensures clear and transparent communication within the company. Production can be fed through barcodes or pre-planned products that will be produced. The operator then uses the barcode or scheduled production batch to automatically provide the robot installation with the correct and most recent set of robot programs. Using a chat function, any improvements can be passed on to the programmer. These chats are automatically linked to the production in question. This means that the programmer does not always have to be present on site. Everything is transparent, time-bound and recorded in the correct context.



SFC in short

Shop Floor Control, or SFC, is an application to automate, structure, and manage the office and shop floor environment of the robotic welding process. From planning to operator instructions.



The platform consists of 3 different components, the SFC: Server, the SFC: Office and the SFC: Operator.

- SFC: Server runs on your server and is responsible for the communication between the robots and the different components. The server provides a central network location for your robot data and the version management of your programs and robot installations.
- SFC: Office can be used by all your DTPS computers on the network to prepare work including programs for the robots on your shop floor and beyond. The ability to group similar robot installations allows you to program generically and easily test and schedule your programs for multiple robots at the same time. The SFC: Office software converts and verifies your programs using DTPS-macros and offers a high degree of flexibility.
- SFC: Operator runs on a computer at each robot installation and forms the control panel of your production process. The operator can select the product by means of the (bar) code and send the right robot programs to the robot.

The production can also be split into multiple phases, with verification actions added during each step. For example, at the start of the production step, the operator must first scan a barcode on the jig or perform a visual check and fill in the checklist.
To further support the operator in production, documents or web pages can be linked to the production step. This makes it possible, for example, to offer work drawings or work instructions.

To keep the line between the workshop and the office short, there is a built-in messaging system. The messages arrive at the SFC application and are automatically linked to the product and the phase. This is an effective way to communicating comments.

In short, SFC provides these 3 pillars:

A managed factory control:

- Simple grouping of similar robot installations.
- Generic programming at group level.
- Automatic program conversion and verification between group members.
- Version control for installation definitions and robot programming.

A structured workflow:

- Barcode for product selection and verification.
- Phasing of production.
- Checklists and feedback verification.
- Direct communication log between operator and programmer environment.

Automation of the process:

- The desktop environment prepares the programs, books them and links them to a barcode.
- The shop floor environment scans the barcode, performs the checks, and starts the process.
- SFC provides direct communication with the robot, keeps track of the entire process, and ensures that the right programs automatically enter the robot.

MIS

Management Information System

The Management Information System (MIS) is a software program developed by Valk Welding that gives companies full real-time insight into what is happening with the robotic installations that are in production. From a PC, phone or a tablet, in production or on the road.

Companies with multiple welding robots in use want more and more insight and control at the management level into performance, process progress, maintenance, and welding data. This data is needed to make timely adjustments to the process and increase efficiency, as well as to record weld quality for each product. The second generation of the Management Information System (MIS) that Valk Welding has developed for this purpose, provides the solution.

The main reason for Valk Welding to further develop the Management Information System (MIS) lies in the sharp rise of the number of customers with multiple welding robots in use. Along with this, the need for more control over production has also increased.

- When and for how long is a robot at a standstill?
- What is the reason for the downtime?
- How high is the robot's duty cycle time?
- Do the cycle times match the time study?
- Can I collect and record welding data?

These are all data that the production management wants to be able to manage. The ability to collect and record all welding data also offers a solution in terms of product liability.

MIS runs on ROSE (Robot Object SErver), on which the Valk Welding Shop Floor Control (SFC) solution also runs.

Watch our video

Realtime data from the server

The data from the robot controls is transmitted in real time to the central server, enabling monitoring, data analysis, traceability, and data logging. MIS visualizes this information in the form of graphs and tables. Valk Welding has developed several widgets that allow companies to put together their own dashboard, specifically tailored to the company's needs.

Monitoring

Companies receive a dashboard with a complete overview of annual totals across all systems. These annual totals include the number of hours, turn-on time, welding hours, number of programs processed, welding wire consumption, and more.

Robot Analysis

- A complete and up-to-date overview of Key Performance Indicators (KPIs) for each individual welding robot system.
- A detailed overview per period.
- Daily insight into log data, including any deviations that may have occurred.
- Detailed analysis options.

Product traceability

All data can be retrieved at product level and over a specific period. Based on this data, the product can be checked before it goes to the next step in the production process. A data log is recorded for each product. The datalog includes a series of welding data in chronological order.

Service management

MIS provides insight into the condition of the installation so that companies can perform preventive and timely maintenance. For example, consider the amount of pressure that is on each axis of a robot. In this way, it becomes clear which axis requires preventive maintenance.

Support from Valk Welding

MIS has been fully developed in-house by Valk Welding and is therefore directly supported by Valk Welding.

ROSE

Robot Object Server

ROSE is the name of the service on which SFC (Shop Floor Control) and MIS (Management Information System) can be switched on. MIS and SFC can be used separately or simultaneously. This depends on the customer's preferences.

For more information about SFC, see the following pages.

MIS in short

MIS is a program with which a company can have real time full insight into what happens with robot installations that are in production. Viewable from a PC, mobile phone or tablet, at the facility or on the road.

Valk Welding Partner Zone:

a complete platform for your software

To better and more swiftly cater to customers using Valk Welding software, both presently and in the future Valk Welding presents the Partner Zone. This online communication platform provides access to all information about our software solutions, including DTPS, QPT, ARC-EYE laser tracking camera with Adaptive Welding, MIS, and SFC.

Updates and libraries

The Partner Zone was created to provide customers with even better service. Targeted access allows each customer to quickly access the right information. For example, MIS users will find the latest widgets, DTPS users with a support contract will download tools that allow them to program more efficiently, and customers with a laser vision system will find the latest information on the ARC-EYE. The Partner zone provides one place where customers can find all the important software and documentation.

The strong connection

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