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valk welding

Software solutions

The strong connection

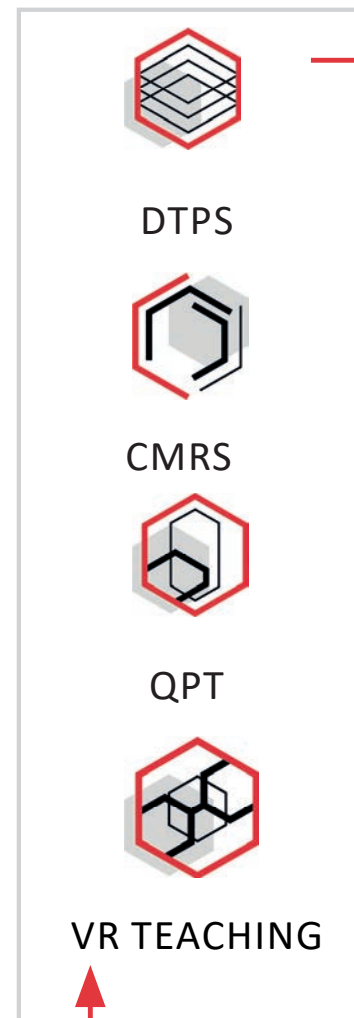# Valk Welding software solutions

**In order to get the most out of your robot system, the interaction between man and machine is very important. Valk Welding has developed several software solutions that take care of this communication.**

# From people to robot and back

If we look at the diagram on the right, we see the different actions and solutions that Valk Welding can offer.

- With the DTPS (Desktop Programming and Simulation) offline programming software , the robot can be programmed offline without production downtime. **P6-7**

- With CMRS (Custom Made Robot Software) and/or QPT (Quick Programming Tools) programming can be further automated, even to the point where human interaction is no longer necessary. **P8-9**

- With VR Teaching, the robot programmer sees the welding robot system together with the workpiece in a virtual 3D environment. The user then indicates the welding positions with a handheld torch, which is translated by the software into a program for the welding robot. **P10-11**

**DTPS**

**CMRS**

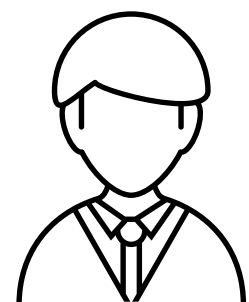**QPT**

**VR TEACHING**

**SFC**

- 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. **P14-15**

- The robots are in production but encounter differences between the theoretical design and the workpiece to be welded. The ARC-EYE CSS laser seam tracking camera corrects the programs in real time to compensate for deviations.
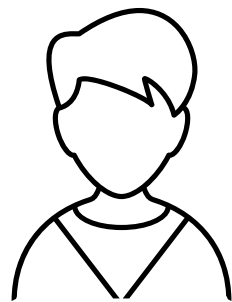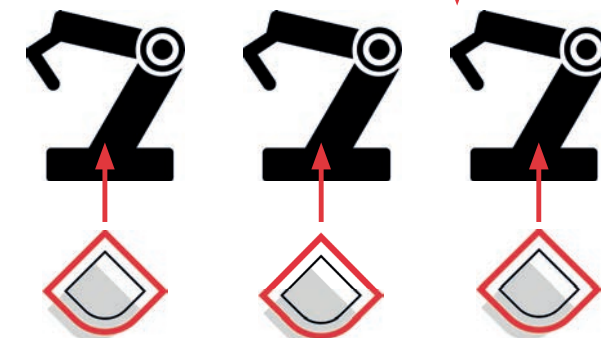
**MIS**

- During production, the relevant production data is recorded and stored using the MIS (Management Information System) software and reported with a dashboard. **P12-13**
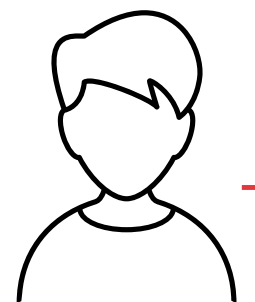
**CUSTOMER**

**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 programming automation with QPT (Quick Programming Tools), CMRS (Custom Made Robot Software) and automatic shop floor management with our SFC (Shop Floor Control) software.

### 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.

## How DTPS works?
DTPS is fast and user friendly :

**1.** *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.

**2.** *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.

**3.** *Programming the robot.*
You can easily move the robot with the cursor, or you can click on the parts 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.

**4.** Checking.
The program can be controlled by a full simulation of the movements and checked for collisions.

**5.** *Send and start.*
Send programs to the robot and start production.
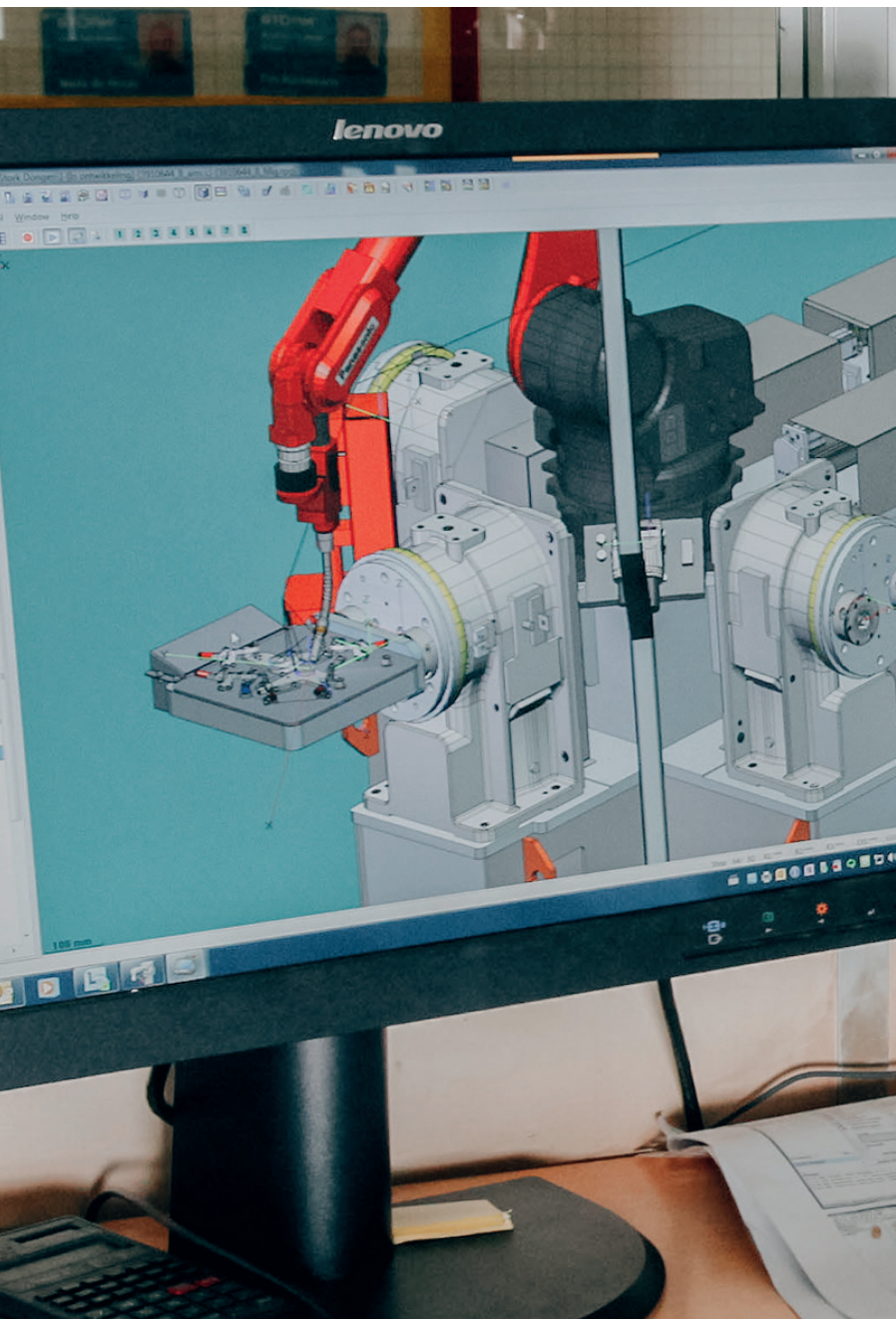
## A few notable features:
- The internal CAD system has been expanded to include new entities and many new functions.
- The installation editor with standard components has made the engineering of new systems much quicker and easier .
- Programming the weld lines with automatic addition of points in f ree 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

Valk Welding's software engineers 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 made it possible to further accelerate the programming process within product families using the help of Quick Programming Tools (QPT). This results in considerable time savings in work preparation.

QPT is a macro module within DTPS, with which you can copy, scale, multiply and combine existing programming blocks with other program blocks. This way you do not have to reprogram every recurring operation. Specifically, companies that make their own products can achieve a considerable improvement in efficiency.

In practice, a single base program is used, in which the macros for repetitive operations are defined. By rolling out the base program over several stations, operators can enter the desired product dimensions themselves without having to reprogram the welding program. Adjustments to the base program automatically change all settings such as welding parameters, torch position, and so on.

### QPT in short

QPT is a macro module within DTPS, with which you can copy, scale, multiply and combine existing programming blocks with other program blocks. This way you do not have to reprogram every recurring operation. Specifically, companies that make their own products can achieve a considerable improvement in efficiency.

# CMRS

## Custom Made Robot Software

Valk Welding develops Custom Made Robot Software (CMRS) solutions to realize a fully automatic welding process in addition to DTPS. CMRS is the connecting factor between different software components. CMRS integrates all involved software into one working unit. This enables us to deliver and develop custom made software solutions for your installation. CMRS is a collection of software components. Together the software components fulfill a function that they cannot do separately. CMRS makes the production of a single piece on the welding robots profitable.

### CMRS in short

CMRS is the connecting factor between different software components. CMRS integrates all the software involved into one working unit.

### Examples of physical placement:
- The cell control of a complex flow and/or human machine interfaces (HMI).
- Translating recipe information from a database to the machine flow and/or parametric robot programming.
- The CAD links of an AUTOCAM, WISCON, DSTV , IFC, CAD metadata.
- Controlling and integrating semi and/or fully automatic welding jigs and robots.
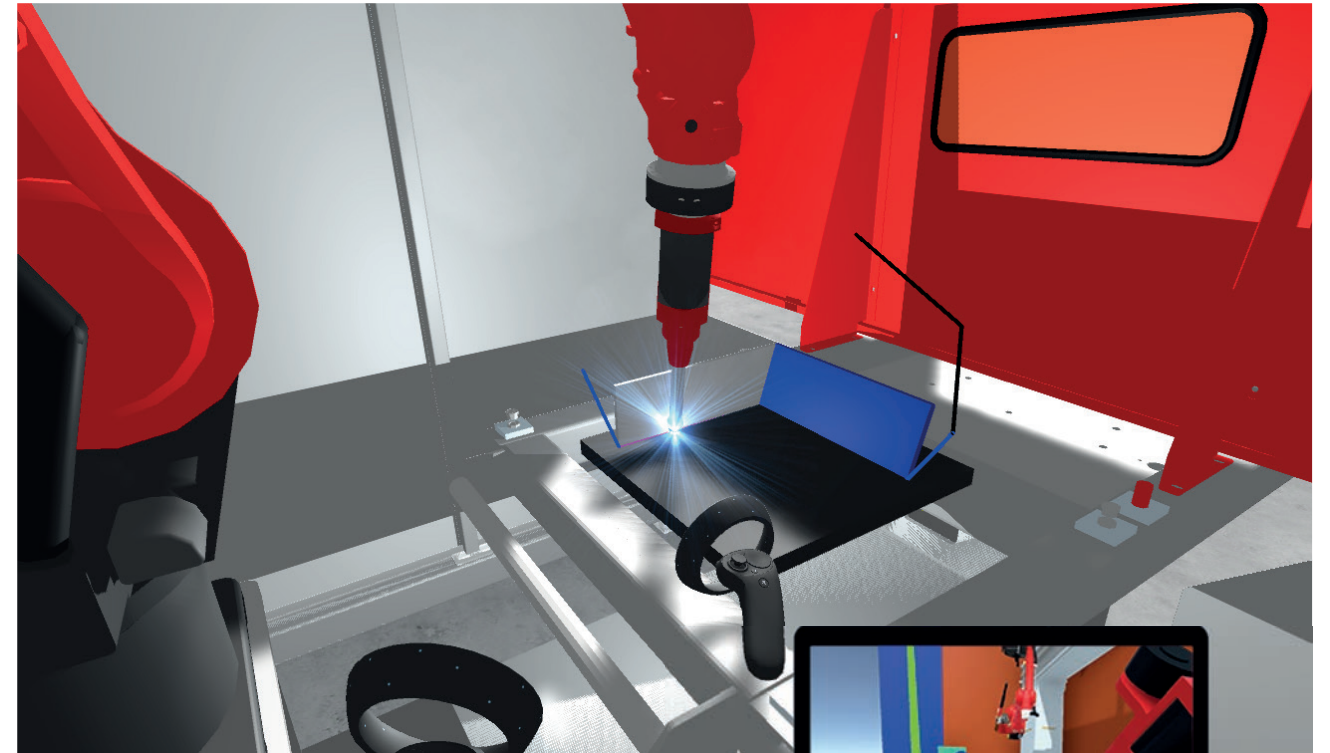- The structuring and modelling of more complex robot automation issues.

# VR teaching



## VR teaching in short

With VR Teaching, the robot programmer sees the welding robot installation together with the workpiece in a virtual 3D environment. The user indicates the welding positions with a handheld torch, which is translated by the software into a program for the welding robot.

VR Teaching bridges the gap between the popular offline programming software DTPS and the real world. The robot programmer sees the welding robot installation together with the workpiece in a virtual 3D environment. The user indicates the welding positions with a handheld torch, which is translated by the software into a program for the welding robot. This new way of programming a welding robot, also called VR Teaching, has been developed by Valk Welding as an addition to existing online, offline and Offsite Teaching methods. VR Teaching offers additional value compared to programming from behind your screen (offline), because use of the new technology gives more insight into the workpiece. VR Teaching is fully integrated with DTPS.
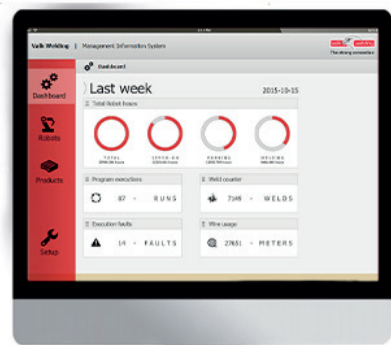




When programming offline with DTPS on the PC, the programmer sees the welding robot installation and the workpiece in a flat view of the 3D model on the screen. Virtual Reality, on the other hand, allows you to see the same environment in 3D with depth. Because sensors follow the movements of your head, the VR environment moves in the same way. In the virtual world, it is easier and faster than in DTPS to zoom in on details and in simulation mode to perform better visual inspections. There is more insight into the workpiece than from behind a screen. What programmers are used to in offline programming behind the computer, they can now do virtually but faster, simpler, and more intuitively . Moreover, with the VR glasses you do not have to stand in the production situation.

With this technology a big step has been made in transferring the years of knowledge the professionals have to a digital world with the conveniences of offline programming. Welders with the precise knowledge about torch positions and welding movements can effortlessly use this in the new technology.

VR Teaching can also be used for other applications such as the virtual testing of jigs for accessibility to the robot torch, but also for the ergonomic insertion of parts, opening and closing of clamps, etc. It also provides quick insight into cycle times and can be used to present future installations to new customers.

# MIS

## Management Information System

MIS is a program in 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. Designed for companies with multiple welding robots in use that want more insight and control at a management level over the performance, process flow, maintenance , and welding data. This data is not only necessary to be able to improve the process time and increase efficiency, but also to be able to record the welding quality per product .

- When and for how long does a robot stand still?
- What is the reason for the downtime?
- How long is the duty cycle of the robot?
- Do the cycle times correspond to the time study?
- Can I collect and record welding data?

## Realtime data from the server

The data from the robot controllers is transferred to the central server in real time, 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 with which the customer can compose their own dashboard, specifically tailored to the needs of the company.

## Monitoring

The customer gets a dashboard with a complete overview of the annual totals of all systems. These annual totals include the number of hours, switch-on time, welding hours, number of programs processed, welding wire consumed , and so on.

## Robotanalyse

- A complete and up-to-date overview of the key performance indicators for each individual welding robot installation.
- A detailed overview per period.
- Daily insight into the log data including any errors that may have occurred.
- Detailed analysis possibilities.
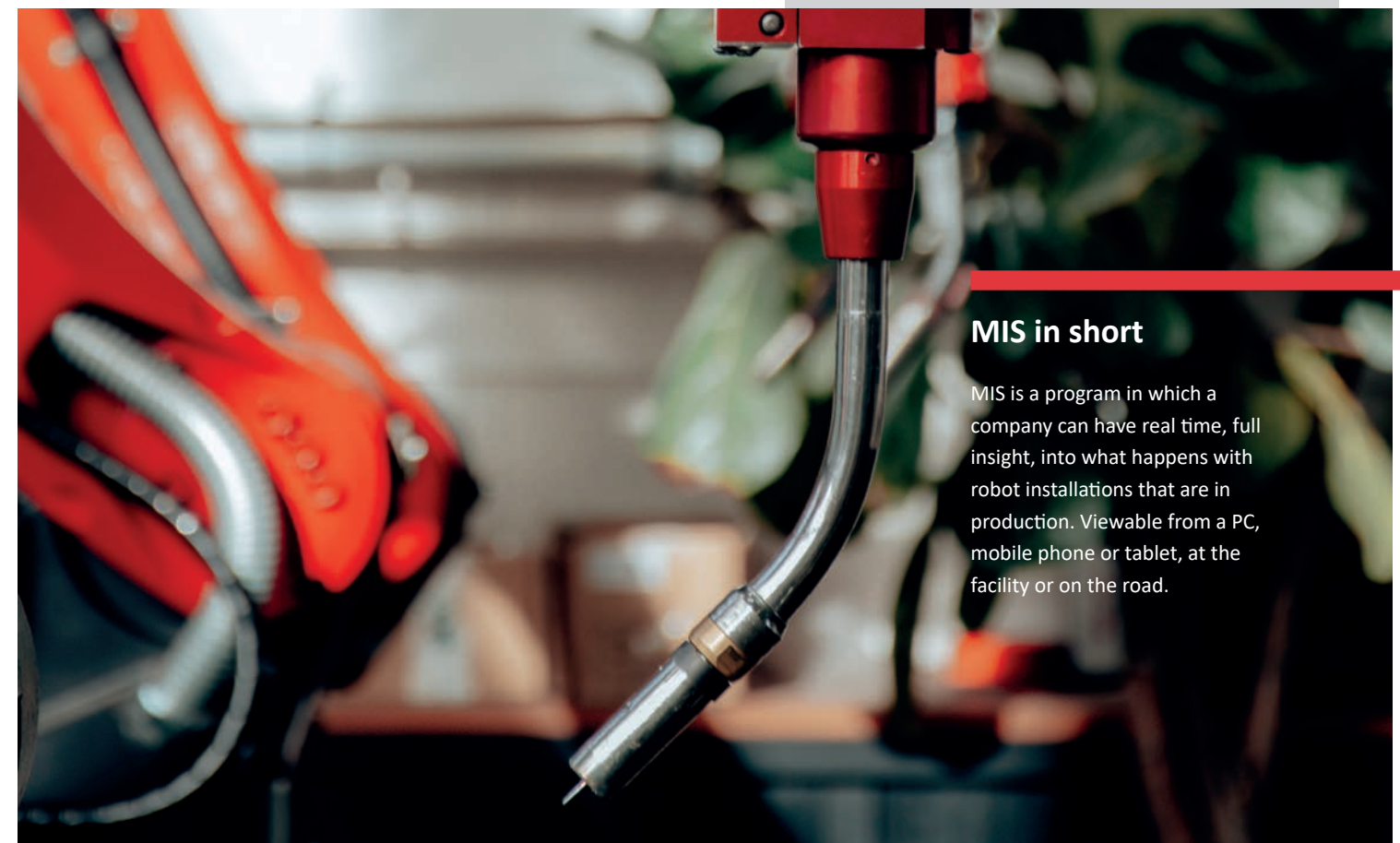
## Product Traceability

All data from the server can be retrieved at product level, 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 data log contains a series of welding data in chronological order.

# 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 wishes of the customer.

For more information about SFC, see the following pages.

## MIS in short

MIS is a program in 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.

# 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 to 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. By 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 distinct 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 large amount 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, for each step in the process verification actions can be added. 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 are automatically linked to the product and the phase. The messages arrive at the SFC application and are automatically linked to the product and the phase. This is an effective method for communicating comments.

## In short, SFC provides these 3 pillars:
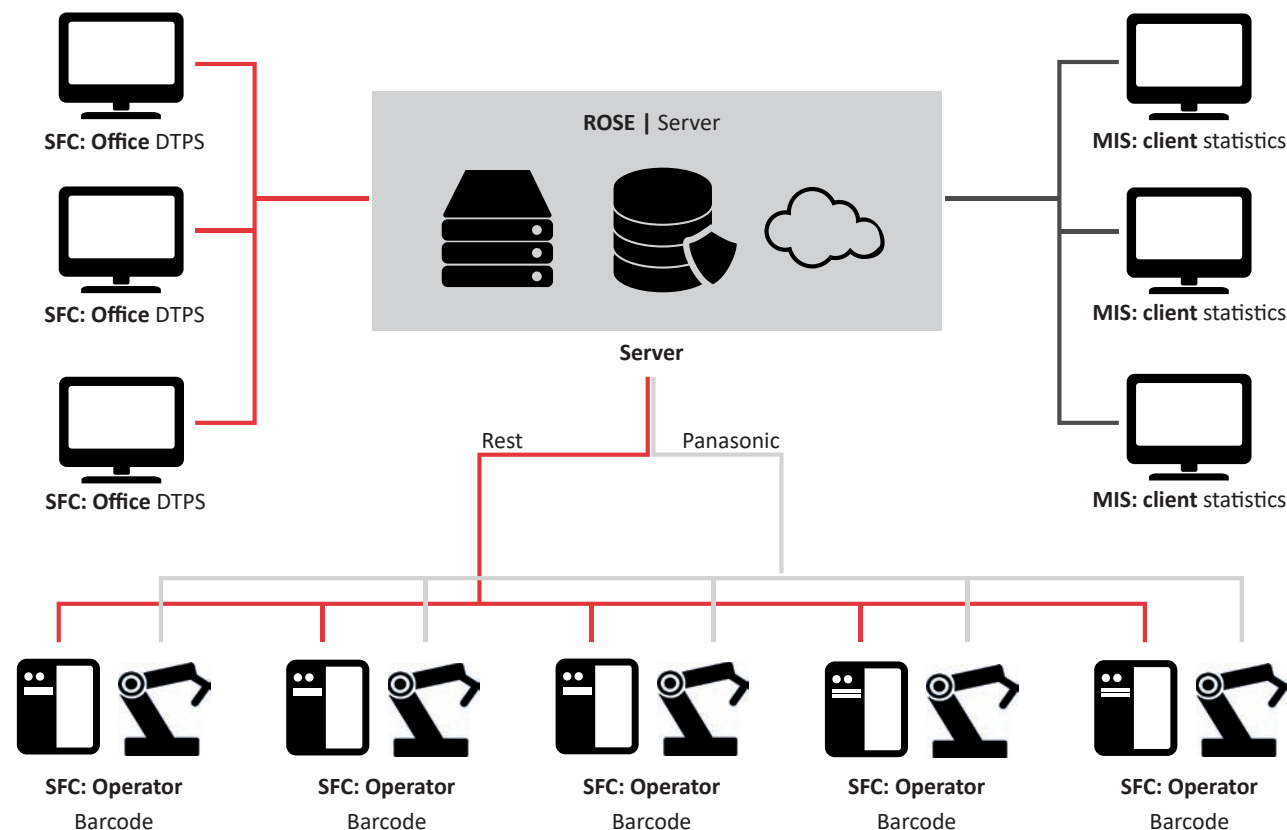
*A managed factory control:*
- Simple grouping of similar robot installations.
- Generic programming at group level.
- Automatic program conversion and verification between group members.
- Version control for installation definitions and robot programming.

*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.



SFC: Office DTPS

SFC: Office DTPS

SFC: Office DTPS

ROSE | Server

Server

Rest          Panasonic

MIS: client statistics

MIS: client statistics

MIS: client statistics

SFC: Operator
Barcode

SFC: Operator
Barcode

SFC: Operator
Barcode

SFC: Operator
Barcode

SFC: Operator
Barcode

# The strong connection

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