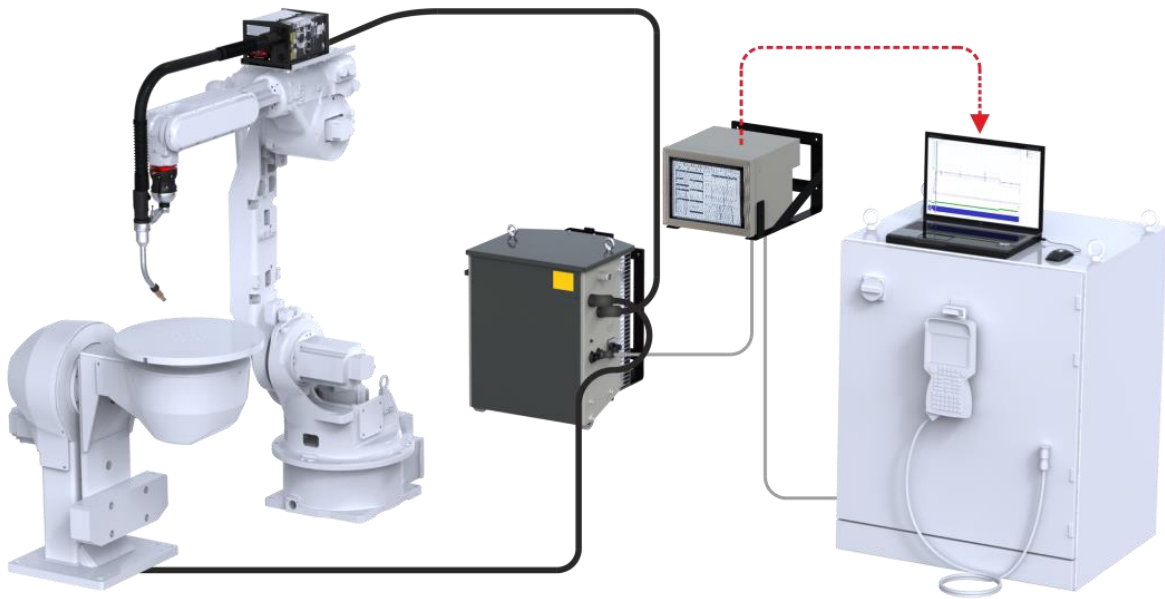# Weld Process Controllers

Overview of functions

Content

Weld Process Controllers – system design

The weld process control concept ranges from weld process controllers with touchscreen and weld data visualization up to the cost-effective entry-level solution Q9S (integrated into the power source)

The universal weld process controllers (Q1, Q9S, Q80, Q84r, Q84s) calculate the optimal parameters for each welding process. Only basic data such as material, wire type, wire feed speed and type of gas must be entered. These determine the proper welding voltage for short - or spray - arc or the parameters for the pulse process. Furthermore, a digital control unit calculates the ideal current source characteristics for each welding process. The controllers have an auto compensation to stabilize the arc. Here, the voltage is adjusted in case of distance changes to the component to keep the penetration stability.

In addition to the cost-optimized variant Q9S for installation in the power source, SKS welding process controls are flexible in placing within the welding cell: for optimal operation and high flexibility.

With the Q1Tool and Q8Tool software, our controls are well prepared for future applications. The software supplied with the controls is free of charge.

The Software solution provides the basis for a precise and comprehensive process control. Included in the scope of delivery of our welding process controls is a professional software package. The Q8Tool software is designed for administration, i.e. all service and data recording functions are available to users with an easy-to-use software.

Q84r Weld Process Controller

Absolute modularity: With the Q84r weld controller you can operate up to 4 weld machines from a central point. With a maximum of four pluggable Q81 weld cards, plugged into its internal slots, the Q84r can be configured for best profitable efficiency. The graphical design of the large touchscreen is following the proven software design of the Q8Tool. Thus it provides a really intuitive interface. With VNC, the weld controller can be remote controlled from other computers, and provides full access on the welding equipment. The offered modularity particularly brings advantages in pricing an ease of use; especially in welding cells with several welding machines. The Q81 weld cards have the same functionality as a Q80 weld controller.

Technical specifications

- Processes/features: GMAW(MIG/MAG), I-Pulse, U-Pulse, KF-Pulse, PlasmaTIG, Dual Wire, microMIG, microMIG-cc, DP-Fast, Synchroweld, Networking
- Digital parameter selection: 992 programs (per weld process card), max. 4 weld process cards
- Materials: Steel, CrNi, Al, CuSi
- Q8TOOL Software (Weld Data Administration/Network), VNC remote control
- Innovative graphical usability concept with 10" touch screen
- General functions: Visualization and saving of measurements, alarm messages
- Monitoring functions: Weld current monitoring, auto compensation, arc and ignition monitoring, motor current, gas and water monitoring
- Ports: RJ45 Ethernet, SPW-Bus, SD card slot
- Wall mounting

Available versions of Q84r Weld Process Controller	
Description	**Part number**
Q84r Weld Process Controller with one (1) weld card	77-7310-00
Q84r Weld Process Controller with two (2) weld cards	77-7320-00
Q84r Weld Process Controller with three (3) weld cards	77-7330-00
Q84r Weld Process Controller with four (4) weld cards	77-7340-00

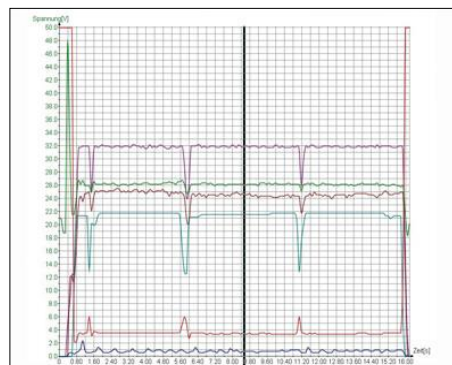| Mounting parts for Q84r Weld Process Controller	
Description	**Part number**
Bracket for Q84r for mounting onto power source LSQ5	77-7240-01
Bracket for Q84r for wall mounting	77-7240-02
Bracket for Q84r for mounting into the robot cabinet	77-7240-05

Overview Q84r replacement parts and accessories	
Description	**Part number**
Connection cable Q84r/s 5m with open end for ext. power supply (option)	77-3305-00
USB adapter for SD/microSD Card (option)	91-8-1
Touch pen for Q80/Q84r/Q84s (replacement part)	77-7240-03
SD Card for Q80/Q84r/Q84s (replacement part)	91-8-6
Plug for external power supply Q84r/Q84s (replacement part)	77-7240-96

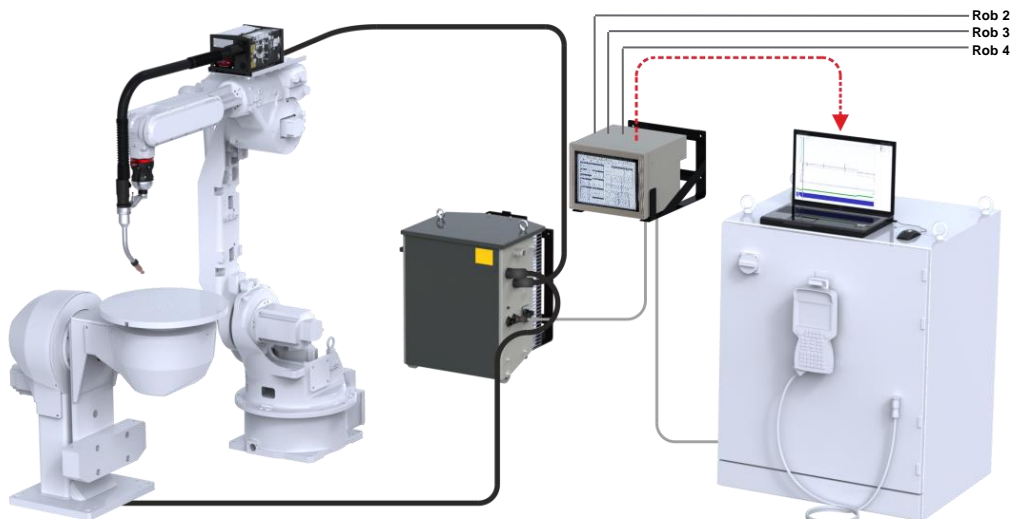# Q84r Weld Process Controller

Administration of parameters

With the Q8Tool software the Q84r can be programmed over the integrated network interface with a PC. The welding parameters are clearly displayed. In addition, the software supports Q8Tool network functionalities in the Q84r.

The measured values can easily be displayed within the software Q8Tool.

Example configuration

Example configuration with a Q84r in a Power Clutch Weld Package

Views of the Q84r Weld Process Controller

Front view of the Q84r Weld Process Controller

Back view of the Q84r Weld Process Controller

Q84s Weld Process Controller

Modular control concept: the Q84s weld process controller offers the possibility to control of up to four welding machines from a central point. It has four card slots that are built into the system. With process controller cards (Q81 weld card) it can be equipped for controlling up to four weld systems. The user interface is a large full-color graphical touch screen with an intuitive interface, which is modeled after the industrial proven software Q8Tool. The surface can easily be operated from other computers via a VNC client and offers full access to the weld equipment. Especially in welding cells, with several welding machines, this modularity benefits in price and ease of use. The Q81 weld process cards are full-value weld process controllers. The Q84s has a compact design.

Technical specifications

- Processes/features: GMAW(MIG/MAG), I-Pulse, U-Pulse, KF-Pulse, PlasmaTIG, Dual Wire, microMIG, microMIG-cc, DP-Fast, Synchroweld, Networking
- Digital parameter selection: 992 programs (x4), max. 4 weld process cards
- Materials: Steel, CrNi, Al, CuSi
- Q8TOOL Software (Weld Data Administration / Network), VNC remote control
- Innovative graphical usability concept with 7" touch screen
- General functions: Visualization and saving of measurements, alarm messages
- Monitoring functions: Weld current monitoring, auto compensation, arc and ignition monitoring, motor current, gas and water monitoring
- Ports: RJ45 Ethernet, SPW-Bus, SD card slot
- Touch Screen
- Wall mounting
- Screen rotatable 180° by software for flexible mounting

Q84s Weld Process Controllers	
Description	**Part number**
Q84s Weld Process Controller with one (1) weld card	77-7410-00
Q84s Weld Process Controller with two (2) weld cards	77-7420-00
Q84s Weld Process Controller with three (3) weld cards	77-7430-00
Q84s Weld Process Controller with four (4) weld cards	77-7440-00

Mounting parts for Q84r Weld Process Controller	
Description	**Part number**
Bracket for Q80/Q84s for mounting onto power source LSQ5	77-7240-06

Overview Q84s replacement parts and accessories	
Bezeichnung	**Artikelnummer**
Connection cable Q84r/s 5m with open end for ext. power supply (option)	77-3305-00
USB adapter for SD/microSD Card (option)	91-8-1
Touch pen for Q80/Q84r/Q84s (replacement part)	77-7240-03
SD Card for Q80/Q84r/Q84s (replacement part)	91-8-6
Plug for external power supply Q84r/Q84s (replacement part)	77-7240-96

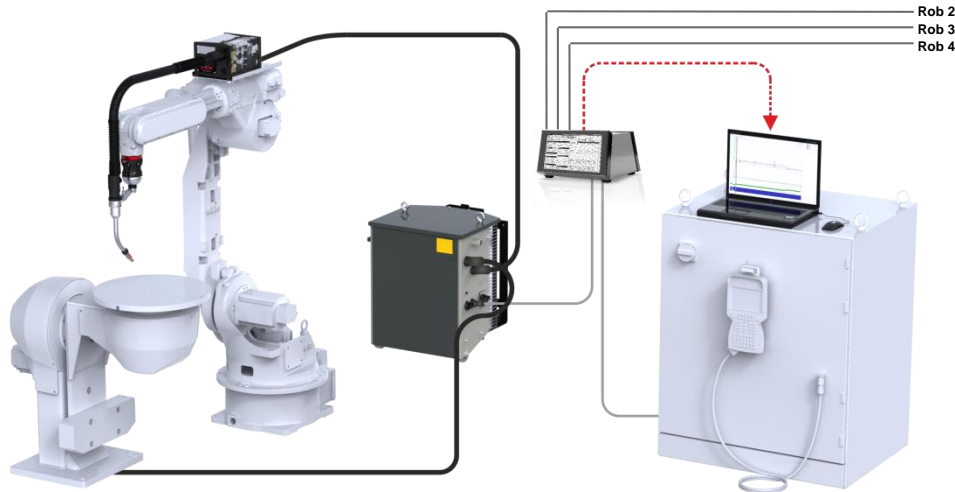# Q84s Weld Process Controller

Administration of parameters

With the Q8Tool software the Q84s can be programmed over the integrated network interface with a PC. The welding parameters are clearly displayed. In addition, the software supports Q8Tool network functionalities in the Q84s.

The measured values can easily be displayed easily with the software Q8Tool.

Example configuration

Example configuration with a Q84s in a Power Clutch Weld Package

Views of the Q84s Weld Process Controller

Front view of the Q84s Weld Process Controller

Back view of the Q84s Weld Process Controller

Q80 Weld Process Controller

The Q80 is the alternative to the Q84r/s.
It has the same functionality/features as a single weld card of the Q84r/s - optimized for a single weld machine.
With the universal Q80 all parameters and values needed for the weld task can be optimally calculated.

Technical specifications

- Processes/Features: GMAW(MIG/MAG), I-Pulse, U-Pulse, KF-Pulse, PlasmaTIG, Dual Wire, microMIG, microMIG-cc, DP-Fast, Synchroweld, Networking
- Digital program selection: 992 programs
- Materials: Steel, CrNi, Al, CuSi
- Q8TOOL Software (Weld Data Administration / Network), VNC remote control
- General functions: Visualization and saving of measurements, alarm messages
- Monitoring functions: Weld current monitoring, auto compensation, arc and ignition, monitoring, motor current, gas and water monitoring
- Ports: RJ45 Ethernet, SPW-Bus, SD card slot
- Innovative graphical usability concept with 7" touch screen
- Wall mounting
- Screen rotatable 180° by software for flexible mounting

Q80 Weld Process Controllers	
Description	**Part number**
Q80 Weld Process Controller	77-7260-00

Mounting parts for Q84r Weld Process Controller	
Description	**Part number**
Bracket for Q80/Q84s for mounting onto power source LSQ5	77-7240-06

| Overview Q80 replacement parts and accessories	
Description	**Part number**
USB adapter for SD/microSD Card (option)	91-8-1
Touch pen for Q80/Q84r/Q84s (replacement part)	77-7240-03
SD Card for Q80/Q84r/Q84s (replacement part)	91-8-6

Q80 Weld Process Controller

Administration of parameters

With the Q8Tool software the Q80 can be programmed over the integrated network interface with a PC. The welding parameters are clearly displayed. In addition, the software supports Q8Tool network functionalities in the Q80.

The measured values can easily be displayed within the software Q8Tool.

Example configuration
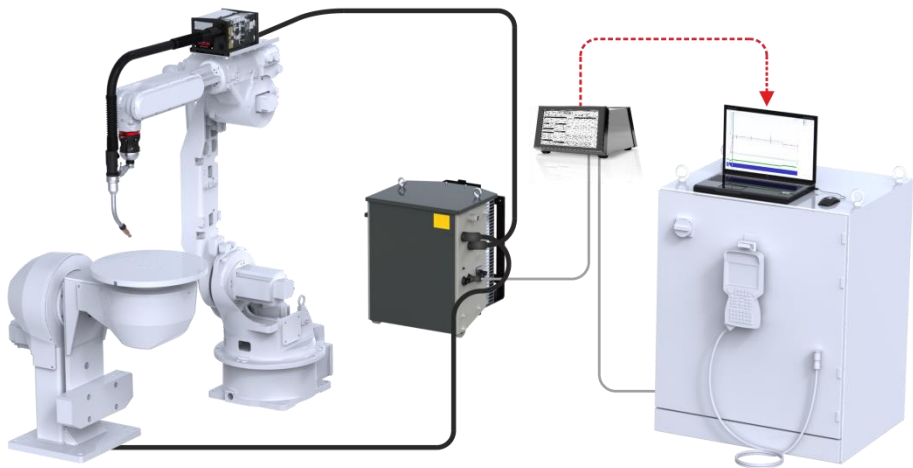
Example configuration with a Q80 in a Power Clutch Weld Package

Views of the Q80 Weld Process Controller

Front view of the Q80 weld process controller

Back view of the Q80 weld process controller

Q9S Weld Process Controller

The Q9S is the alternative to the Q80 or the Q84r/s.
It has the same functionality/features as a single weld card of the Q84r/s - optimized for a single weld machine.
With the universal Q9S all parameters and values needed for the weld task can be optimally calculated.

Technical specifications

- Processes/Features: GMAW(MIG/MAG), I-Pulse, U-Pulse, KF-Pulse, PlasmaTIG, Dual Wire, microMIG, microMIG-cc, DP-Fast, Synchroweld
- Digital program selection: 992 programs
- Materials: Steel, CrNi, Al, CuSi
- Q8TOOL Software (local Weld Data Administration)
- Integrated into the Frontsheet of the LSQ-Power Source
- Working Modes:
  - Job-Mode (Program-/Parameter selection)
  - Robot-Adjustment-Mode (Wire Feed and arc length controlled by the robot)
- General functions: Visualization of measurements (on LCD-Screen), alarm messages
- Monitoring functions: Weld current monitoring, auto compensation, arc and ignition monitoring, motor current, gas and water monitoring
- Ports: SPW-Bus (internal), USB, Fieldbus

Q9S Weld Process Controllers

Description	Part number
Power Source LSQ5 with Q9S Weld Process Controller Fieldbus Ethernet/IP	77-1185-711
Power Source LSQ5 with Q9S Weld Process Controller Fieldbus Profinet CU	77-1185-712
Power Source LSQ3 with Q9S Weld Process Controller Fieldbus Ethernet/IP	77-1184-711
Power Source LSQ3 with Q9S Weld Process Controller Fieldbus Profinet CU	77-1184-712

Overview Q9S replacement parts and accessories

Description	Part number
Cable USB-Slave for connection PC to Controller (option)	91-8-2-01

LSQ3 / LSQ5 Power Source for Q9S Weld Process Controller

The LSQ series ensures the optimum arc energy. It uniquely adjusts to different weld processes.
Unlike conventional power sources with inverter technology, the LSQ5 with Direct Control Technology controls its switching transistors without any fixed clock frequency according to the needs of the weld process.

Overview LSQ5 and LSQ3 Power Sources

Power Source	LSQ5(-CCC)	LSQ3(-CCC)	LSQ3A
Power 60% duty cycle	420 A (400 A)	340 A	340 A
Processes	MSG	MSG	MSG
Weight	49 kg	37 kg	37 kg
Power Supply	3x400/480 V (switchable)	3x400 V	3x480 V
Wall mounting	Ja (optional)	Ja (integrated)	Ja (integrated)
Conformities	CE, CSA, UL, (CCC)	CE, (CCC)	CE

Q9S Weld Process Controller

Administration of parameters

With the Q8Tool software the Q9S can be programmed via the integrated USB interface with a PC. The welding parameters are clearly displayed.

Example configuration

Example configuration with a Q9S in a Power Clutch Weld Package at a Cobot application

Views of the Q9S Weld Process Controller

Front view of the Q9S weld process controller integrated to a LSQ5 Power Source

Back view of the LSQ5 Power Source with integrated Q9S weld process controller

Q1 Weld Process Controller for manual welding

Modern GMAW(MIG/MAG) robotic arc welding technology meets the highest quality requirements, which hand welding technology must face. The constant desire for complete automation, are facing technical feasibility and cost of complex component geometries. In many applications it is therefore technically and economically feasible, in the sense of the pareto principle (80-20 rule) to weld the remaining percentages manually. However, here the same high quality is required, such as in robotic arc welding.

Technical specifications

- Processes/Features: GMAW(MIG/MAG), I-Pulse, U-Pulse, KF-Pulse
- Manual job selection: 14 Jobs
- Materials: Steel, CrNi, Al, CuSi
- Q1Tool Software (local Weld Data Administration)
- General functions: Display of measurements (LCD), alarms
- Monitoring functions: Motor current monitoring
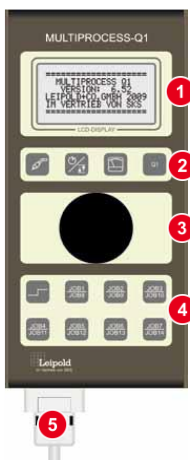- Connections: D-Sub 9 pol. (SKS specific)

Q1 Weld Process Controller	
Description	**Part number**
Q1 Weld Process Controller	77-7250-00

Overview Q1 replacement parts and accessories	
Description	**Part number**
Q1 USB cable (option)	77-7250-10

Operation of the Q1 Weld Process Controller

① Display
Multiline display for good readability

② Control buttons
Control buttons for direct function access

③ Rotary switch
Rotary switch for comfortable menu and parameter selection

④ Job buttons
Job buttons for direct selection of individual welding programs

⑤ SPW/USB port
SPW/USB port for connection with the welding system (Power Source) or with a PC. With a USB adapter cable, the Q1 can easily be configured

Display of Q1
①Navigation line

②Cursor

③Status line

Q1 Weld Process Controller for manual welding

Semi Automatic Machine (SAM)

The Semi Automatic Machine Weld Package consists of a trolley with Power Feeder PF5, the LSQ power source as well as a holder for the control Q1. The Q1Tool software is included. The trolley is prepared for wire feeding directly from the drum, but can also be equipped with a wire spool holder. So this is highly configurable.

The free Q1Tool software allows easy administration of the hand control from a standard PC or notebook (reading, writing and saving the welding parameters, up to documentation capabilities). The hand control can be configured independently of the welding machine with pre-definable parameters. With the simple duplication of the welding parameters, hand welding stations can be configured fast and easy.

Example Configuration

For making available the robot welding quality for hand welding applications, SKS has developed a Weld Package (Semi Automatic Machine) for hand welding. This was realized with the proven components of the robot application.

Q1 Weld Process Controllers for hand welding	
Description	**Part number**
Semi Automatic Machine with Q1 / LSQ5(-CCC) / Power Pin-Connector	On request
Semi Automatic Machine with Q1 / LSQ5(-CCC) / Euro-Connector	On request
Semi Automatic Machine with Q1 / LSQ3(-CCC) / Power Pin-Connector (Optional with LSQ3A)	On request
Semi Automatic Machine with Q1 / LSQ3(-CCC) / Euro-Connector (Optional with LSQ3A)	On request

Views of Q1 Weld Process Controller for Hand Welding

Q1 Weld Process Controller connected to a SAM Weld Package

Q1Tool Software

SKS software solutions lay the cornerstone for precise and comprehensive process control. Our Weld Process Controllers (including Q1, Q9S, Q80, Q84r and Q84s) come with a professional software package.

The associated free software tool allows the read Q1 and Q1 playing of the controls. With the USB adapter cable that is connected directly to the computer, the power supply via USB. All parameters are clearly displayed in an intuitive form. Both, individual jobs as well as the complete content of the weld process controller can be saved on a computer and restored on a weld process controller.

Screenshot of the Q1Tool software
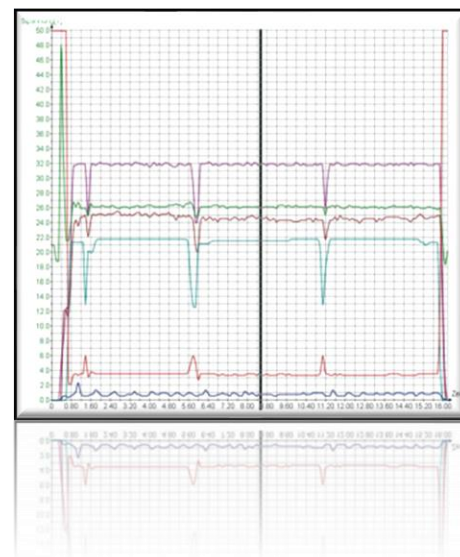
Q8Tool Software

Connected working with the software Q8Tool

The Q8Tool comes with additional network functionality. Via Ethernet interfaces, the welding process controllers can be directly integrated into existing corporate networks. The result: A complete documentation of the welding data to object-oriented welding data documentation: **TRACEABILITY.**

Working locally with Q8Tool software

The Q8Tool software allows the implementation of a precise, comprehensive process control. With this software, welding parameters can be additionally saved and administered on a PC for documentation purposes. Besides basic functions as the reading, modifying and documenting of welding parameters, new welding parameters can be created and transmitted to the SKS Weld Process Controller. Welding parameters such as current, voltage, wire feeding speed can be easily managed using the software. The integrated recording of measured values visualizes the aforementioned welding parameters (graphically/numerically). Additionally, the functions of the auto compensation feature and the Synchroweld process (heat input per unit length, TCP speed) are shown on the display. Both, individual jobs as well as the complete content can be stored on the computer and restored on the controller.

Content that has been stored is portable, and the set-up of new systems or the upgrading of existing systems to integrate new technologies is made much easier. Up and above this, the Q8Tool software allows the reading and exporting of measured values and alarm messages. The graphical and numerical recording of measured values allows for quick identification and optimization of parameters for new work pieces. Thus, users are getting a powerful tool to analyze and document their welding processes.

In addition to creating, storing, saving, and transmitting of programs, the Q8Tool software has extensive visualization capabilities. The Q8Tool software also supports comprehensive network functionalities.

Networking of Weld Process Controllers

Advanced functionality offers our Q8Tool software. In conjunction with the software Q8Tool, our weld process controllers (Q80 and Q84r/s) can be directly integrated into existing corporate networks via their Ethernet interfaces.
The result: A complete documentation of the welding data with traceability function.

Standard Documentation

During the production process, all relevant data of the weld process controllers can be recorded with the Q8Tool software on a standard windows PC.

Live Documentation

For further processing of the weld data, a DCOM software interface can be added. This provides access and many possibilities of analyzing recorded data as well as live data.

With the SKS Welding data documentation, many possibilities open up for further processing and the use of data.
All RELEVANT data can be documented and evaluated
→ **TRACEABILITY.**
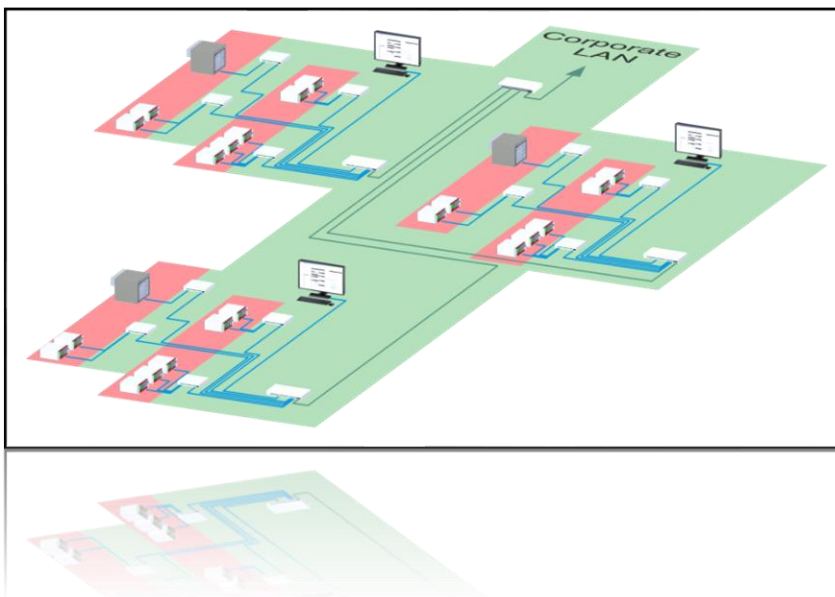
Networking of welding machines with the Q8Tool software in a corporate network.

Weld Data Documentation (DCOM)

Perfect Integrate into your applications

The Distributed Component Object Model is an interface defined by Microsoft to allow the communication of the COM technology via a network. With this upgradable interface for Q8Tool software, an access to the data stream of the Q8Tool service from external applications is provided (e.g. MS Office, Visual Basic, etc.). The data can be further processed and visualized online with standard programs.

Interface to DCOM – Advantages

- Software interface provides full access to the data stream.
- Easy processing of the data with standard software for customer specific and supplementary reports.
- Online evaluation for better reaction times
- Relevant data can be selected from the entire data stream: transparency for relevant process data.

Dongle for DCOM Interface

Description	Part number
KEY4COM Version „Time" – 90 day license	77-7201-00
KEY4COM Version „Life" – permanent license	77-7201-01

Networking of welding machines with the Q8Tool software and processing of the data using the DCOM interface in a corporate network.
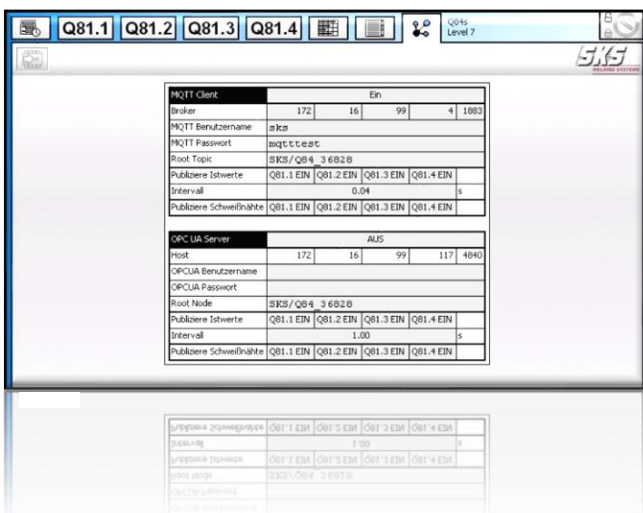
MQTT & OPC UA

Perfect Integrate into your applications

The MQTT- (Message Queuing Telemetry Transport) and the OPC UA-protocol (Open Platform Communications Unified Architecture) are efficient and reliable solutions for the Internet of Things (IoT). By enabling devices and applications to reliably exchanging data even within unstable network structures – a basic requirement for realization of Industry 4.0. By integration of MQTT and OPC UA in our weld process controllers customers and developers are able to exploit the full potential of the Internet of Things. The integration is also available as an update for existing controllers.

Weld Process Controllers with MQTT & OPC UA Function	
Description	**Part number**
Weld Process Controller Q80 with MQTT & OPC UA	77-7260-001
Weld Process Controller Q84R w. 1 weld card / MQTT & OPC UA	77-7310-001
Weld Process Controller Q84R w. 2 weld cards / MQTT & OPC UA	77-7320-001
Weld Process Controller Q84R w. 3 weld cards / MQTT & OPC UA	77-7330-001
Weld Process Controller Q84R w. 4 weld cards / MQTT & OPC UA	77-7340-001
Weld Process Controller Q84S w. 1 weld cards / MQTT & OPC UA	77-7410-001
Weld Process Controller Q84S w. 2 weld cards / MQTT & OPC UA	77-7420-001
Weld Process Controller Q84S w. 3 weld cards / MQTT & OPC UA	77-7430-001
Weld Process Controller Q84S w. 4 weld cards / MQTT & OPC UA	77-7440-001

MQTT/OPC UA configuration screen of the weld process controller

i   Update/Upgrade program for existing weld process controllers of Q80 & Q84r/s series available.

Weld Process Controllers: Overview of functions

Weld Process Controllers: Overview of functions					
Connections / Interfaces	**Q1**	**Q9S**	**Q80**	**Q84s***	**Q84r***
USB (local)	✓	✓	-	-	-
Ethernet / UDP	-	-	✓	✓	✓
OPC UA / MQTT	-	-	✓	✓	✓
SPW bus connection (L700)	✓	Internal	✓	✓	✓
SD card slot	-	-	✓	✓	✓

Programs	**Q1**	**Q9S**	**Q80**	**Q84s***	**Q84r***
START	✓	✓	✓	✓	✓
Weld programs	14	744	744	744(x4)	744(x4)
Filling of end crater	✓	P7	P7	P7	P7
END	End pulse	✓	✓	✓	✓
Programs total	14	992	992	992(x4)	992(x4)

Processes	**Q1**	**Q9S**	**Q80**	**Q84s***	**Q84r***
MIG/MAG (GMAW)	✓	✓	✓	✓	✓
I-Pulse	✓	✓	✓	✓	✓
U-Pulse	✓	✓	✓	✓	✓
KF-Puls	✓	✓	✓	✓	✓
PlasmaTIG (TIG-DC + TIG-Pulse)	-	✓	✓	✓	✓
Dual Wire	-	✓	✓	✓	✓
microMIG / microMIG-cc	-	✓	✓	✓	✓
DP-Fast	-	✓	✓	✓	✓

General functions	**Q1**	**Q9S**	**Q80**	**Q84s***	**Q84r***
Display of measurement values	✓	✓	✓	✓	✓
Saving of measurement values	-	-	✓	✓	✓
Display of alarms	✓	✓	✓	✓	✓
Saving of alarms	-	-	✓	✓	✓
Synchroweld	-	✓	✓	✓	✓
Touch screen-HMI	-	-	✓	✓	✓
Expandable to up to four Q81 weld cards	-	-	-	✓	✓
Wall mounting	-	✓	✓	✓	✓

Monitoring funcitons	**Q1**	**Q9S**	**Q80**	**Q84s***	**Q84r***
Weld current monitoring (current window)	-	✓	✓	✓	✓
Auto compensation	-	✓	✓	✓	✓
Arc monitoring	-	✓	✓	✓	✓
Ignition monitoring	-	✓	✓	✓	✓
Motor current monitoring	✓	✓	✓	✓	✓
Gas monitoring	✓	✓	✓	✓	✓
Water monitoring	✓	✓	✓	✓	✓

PC functions	**Q1**	**Q9S**	**Q80**	**Q84s***	**Q84r***
Administration of weld parameters (local)	✓	✓	✓	✓	✓
Central administration and recording of weld data	-	-	✓	✓	✓
Remote administration via VNC	-	-	✓	✓	✓

- : Function not available   ✓ : Function available
* : Denoted functionality is for a Q84r/s configuration with a single Q81 weld card.

www.sks-welding.com

Subject to Change.