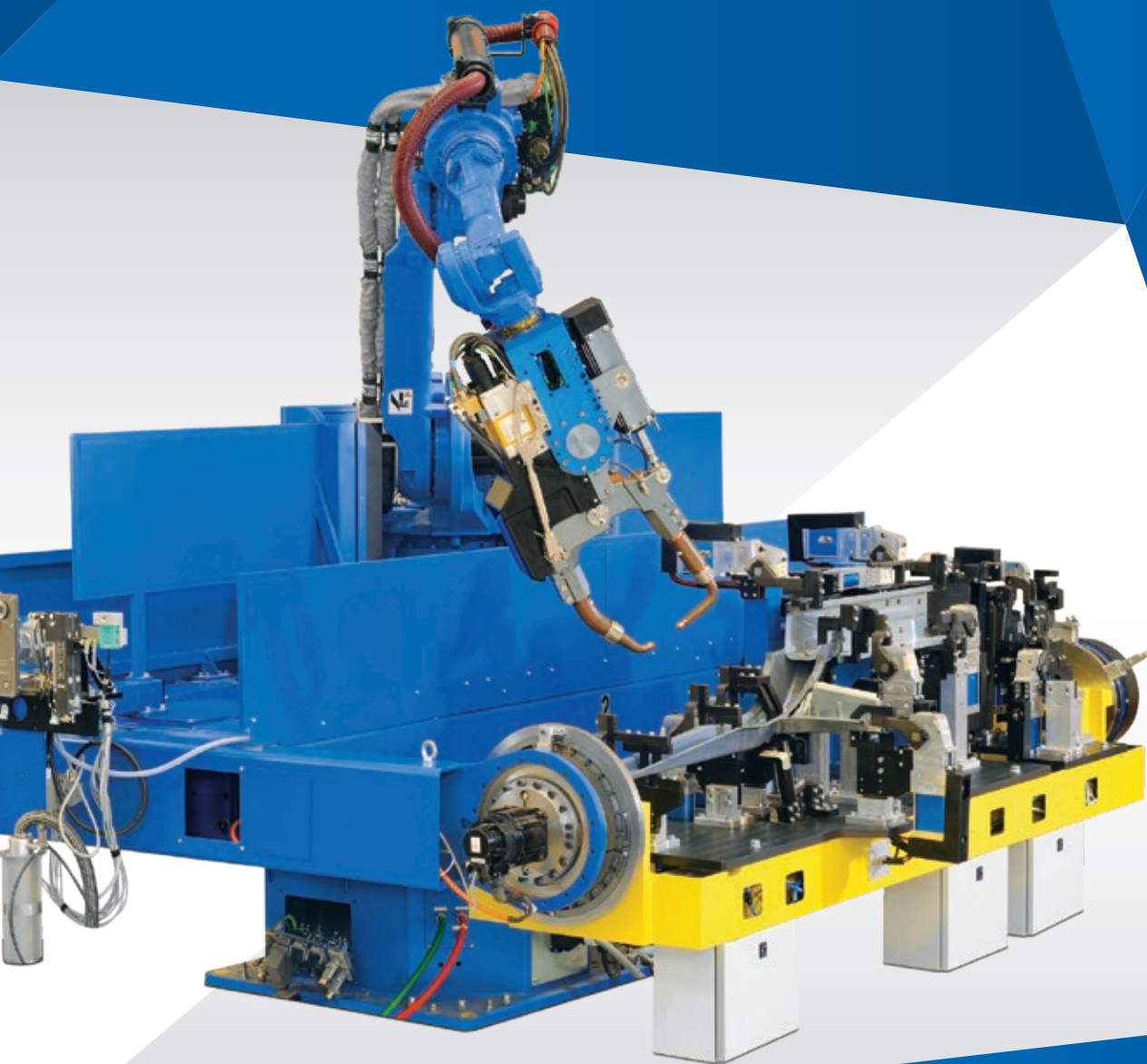


YASKAWA

MOTOMAN Spot Welding Solutions

MOTOMAN SP-series / YRC1000 Robot Controller



Robotics – European Operations



Yaskawa

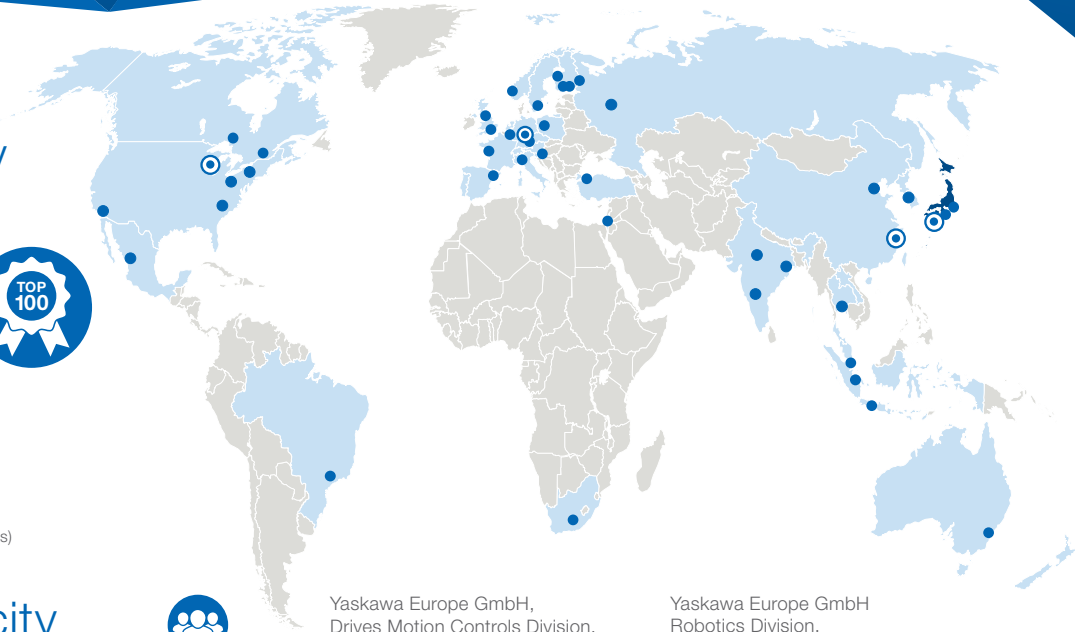
A leading Global Company – A European Player

A Global Company

- Top 100 Global Innovator
6x Winner from 2016 to 2021*
- More than 500.000 Robots sold around the world
- More than 100 European Channel Partner
- Network of System Integrators



* Clarivate Analytics (former part of Thomson Reuters)



Engineering Capacity in Europe

Application Engineering

- Machine Solutions
- Application Adaption
- Training & Support

> 2010 > > > > 2021 >

Product Development

- Firmware, Communication
- Hardware, Mechanics
- Safety Solutions
- Software Tools
- Chip Development



Yaskawa Europe GmbH,
Drives Motion Controls Division,
Location Eschborn, Germany



Yaskawa Europe GmbH
Robotics Division,
Allershausen, Germany



Yaskawa Europe GmbH,
Environmental Energy Division,
Helsinki, Finland



Yaskawa Europe GmbH,
Drives Motion Controls Division,
Location Herzogenaurach, Germany

The European Production Sites

Glasgow, Scotland
Production of drives and servo products



Ribnica, Slovenia
European systems and robot systems



Torsås, Sweden
Assembly of controllers, positioners and portals



Allershausen, Germany
European systems and robot systems

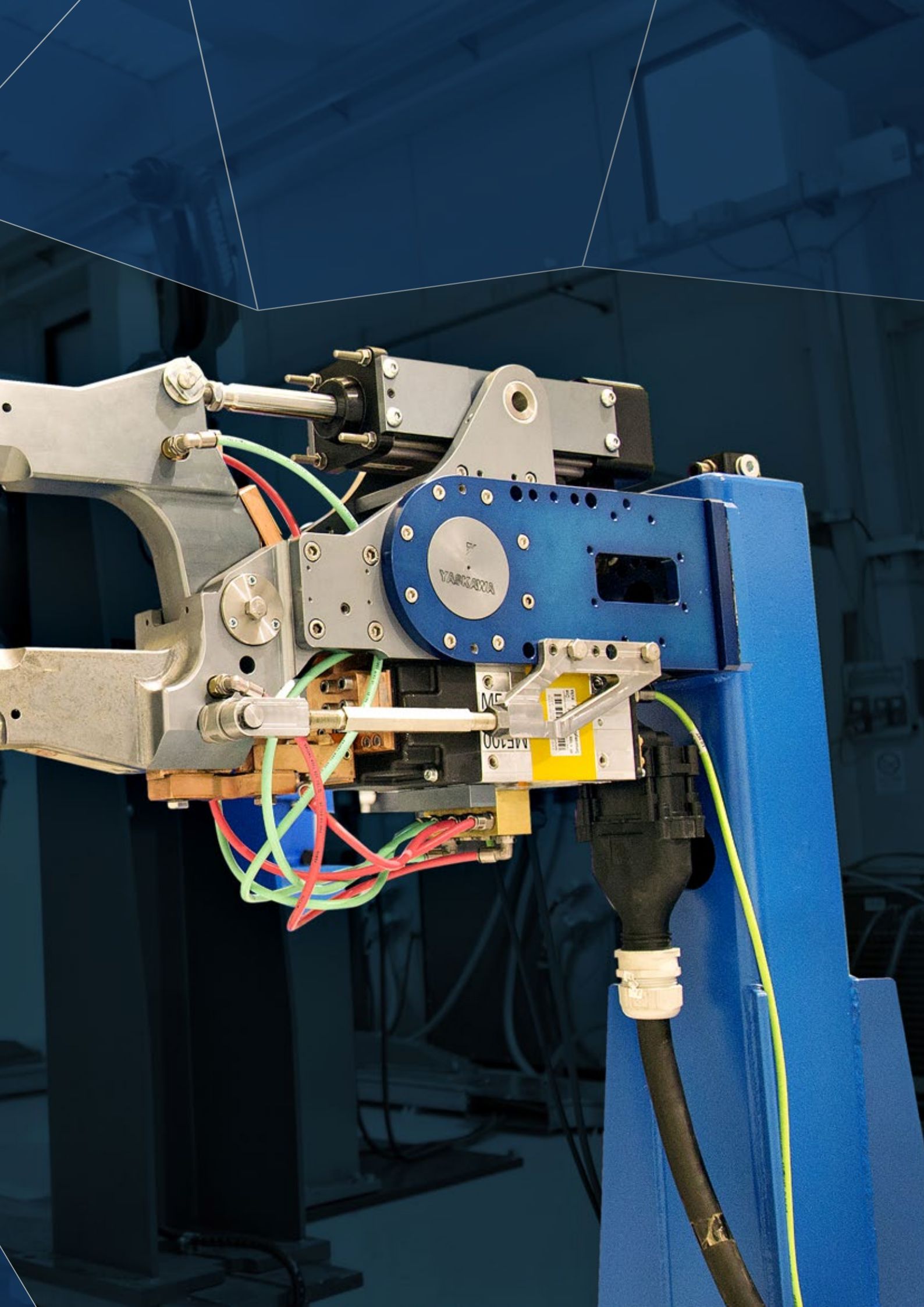


Kočevje, Slovenia
Robot manufacturing and R&D center



A close-up photograph of a robotic spot welding system. The central focus is a large, curved, copper-colored electrode arm, which is part of a robotic assembly. The arm is connected to a metal base with several bolts. In the background, another robotic arm is visible, and the overall scene is set in a factory environment with a blue-tinted background. The text "Spot Welding Systems" is overlaid in white on the lower left portion of the image.

Spot Welding Systems

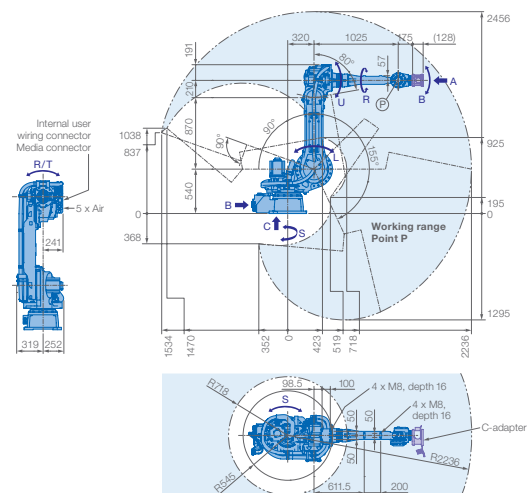


Specifications SP-series

SP80



Controlled by
YRC1000



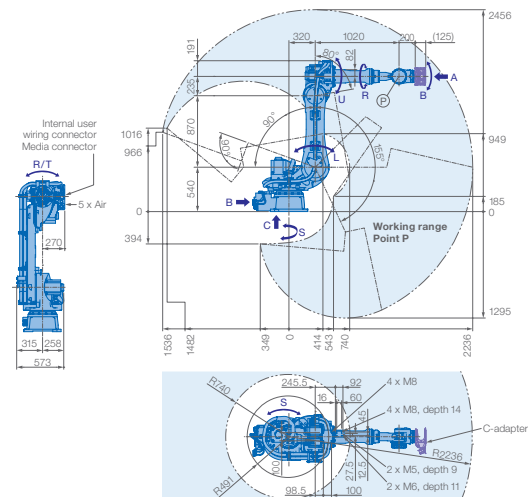
| Specifications SP80 | | | | | | |
|---------------------|--------------------------|---------------------|-----------------------|--|-----------------------------|----------|
| Axes | Maximum motion range [°] | Maximum speed [°/s] | Allowable moment [Nm] | Allowable moment of inertia [kg · m ²] | Controlled axes | 6 |
| S | ±180 | 170 | – | – | Max. payload [kg] | 80 (88*) |
| L | +155/–90 | 140 | – | – | Repeatability [mm] | ±0.03 |
| U | +90/–80 | 160 | – | – | Max. working range R [mm] | 2236 |
| R | ±205 (±360*) | 230 | 389 (408*) | 28 (30*) | Temperature [°C] | 0 to +45 |
| B | ±120 (±125*) | 230 | 389 (408*) | 28 (30*) | Humidity [%] | 20 – 80 |
| T | ±180 (±360*) | 350 | 206 | 10.3 (11*) | Weight [kg] | 630 |
| | | | | | Power supply, average [kVA] | 4.0 |

* without C-adapter

SP100



Controlled by
YRC1000



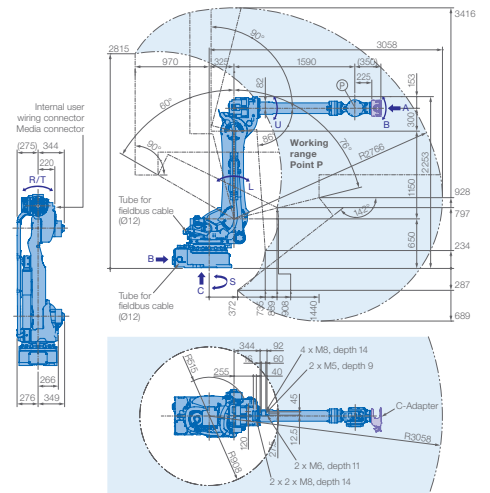
| Specifications SP100 | | | | | | |
|----------------------|--------------------------|---------------------|-----------------------|--|-----------------------------|------------|
| Axes | Maximum motion range [°] | Maximum speed [°/s] | Allowable moment [Nm] | Allowable moment of inertia [kg · m ²] | Controlled axes | 6 |
| S | ±180 | 140 | – | – | Max. payload [kg] | 100 (110*) |
| L | +155/–90 | 110 | – | – | Repeatability [mm] | ±0.03 |
| U | +90/–80 | 130 | – | – | Max. working range R [mm] | 2236 |
| R | ±205 (±360*) | 175 | 696 (721*) | 58 (60*) | Temperature [°C] | 0 to +45 |
| B | ±120 (±125*) | 175 | 696 (721*) | 58 (60*) | Humidity [%] | 20 – 80 |
| T | ±205 (±360*) | 255 | 294 | 33 (33.7*) | Weight [kg] | 660 |
| | | | | | Power supply, average [kVA] | 5.0 |

* without C-adapter

SP165-105



Controlled by
YRC1000



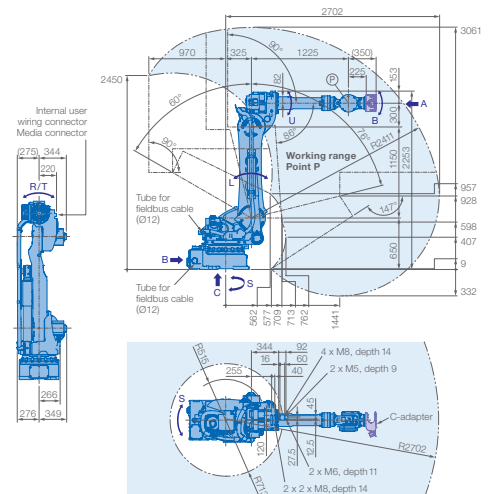
| Specifications SP165-105 | | | | | | |
|--------------------------|--------------------------|---------------------|-----------------------|--|-----------------------------|------------|
| Axes | Maximum motion range [°] | Maximum speed [°/s] | Allowable moment [Nm] | Allowable moment of inertia [kg · m ²] | Controlled axes | 6 |
| S | ±180 | 125 | – | – | Max. payload [kg] | 105 (120*) |
| L | +76/–60 | 115 | – | – | Repeatability [mm] | ±0,05 |
| U | +90/–86 | 125 | – | – | Max. working range R [mm] | 3058 |
| R | ±210 (±360*) | 182 | 834 (883*) | 77 (79*) | Temperature [°C] | 0 to +45 |
| B | ±125 (±130*) | 175 | 834 (883*) | 77 (79*) | Humidity [%] | 20 – 80 |
| T | ±210 (±360*) | 265 | 520 | 40 | Weight [kg] | 1090 |
| | | | | | Power supply, average [kVA] | 5.0 |

* ohne C-Adapter

SP165



Controlled by
YRC1000



| Specifications SP165 | | | | | | |
|----------------------|--------------------------|---------------------|-----------------------|--|-----------------------------|------------|
| Axes | Maximum motion range [°] | Maximum speed [°/s] | Allowable moment [Nm] | Allowable moment of inertia [kg · m ²] | Controlled axes | 6 |
| S | ±180 | 125 | – | – | Max. payload [kg] | 165 (180*) |
| L | +76/–60 | 115 | – | – | Repeatability [mm] | ±0,05 |
| U | +90/–86 | 125 | – | – | Max. working range R [mm] | 2702 |
| R | ±210 (±360*) | 182 | 951 (1000*) | 88 (90*) | Temperature [°C] | 0 to +45 |
| B | ±125 (±130*) | 175 | 951 (1000*) | 88 (90*) | Humidity [%] | 20 – 80 |
| T | ±210 (±360*) | 265 | 618 | 46.3 | Weight [kg] | 1020 |
| | | | | | Power supply, average [kVA] | 5.0 |

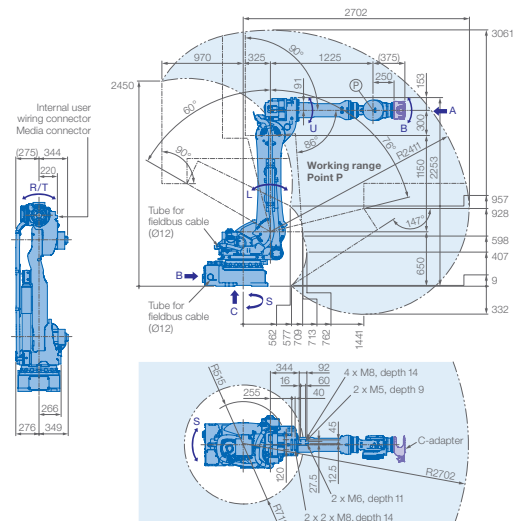
* without C-adapter

Specifications SP-series

SP210



Controlled by
YRC1000



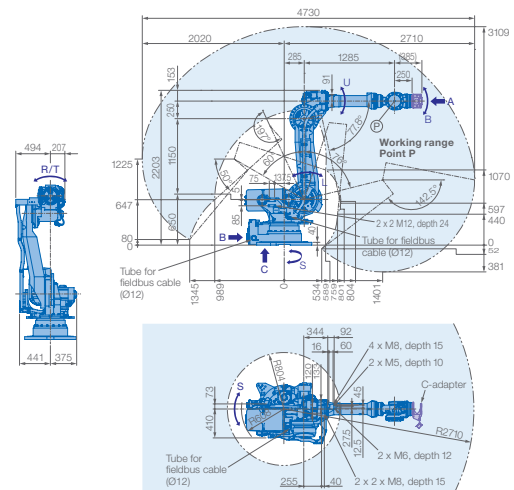
| Specifications SP210 | | | | | | |
|----------------------|--------------------------|---------------------|-----------------------|--|-----------------------------|------------|
| Axes | Maximum motion range [°] | Maximum speed [°/s] | Allowable moment [Nm] | Allowable moment of inertia [kg · m ²] | Controlled axes | 6 |
| S | ±180 | 120 | – | – | Max. payload [kg] | 210 (225*) |
| L | +76/–60 | 97 | – | – | Repeatability [mm] | ±0.05 |
| U | +90/–86 | 115 | – | – | Max. working range R [mm] | 2702 |
| R | ±210 (±360*) | 145 | 1323 (1372*) | 143 (145*) | Temperature [°C] | 0 to +45 |
| B | ±125 | 145 | 1323 (1372*) | 143 (145*) | Humidity [%] | 20 – 80 |
| T | ±210 (±360*) | 220 | 735 | 84 | Weight [kg] | 1080 |
| | | | | | Power supply, average [kVA] | 5.0 |

* without C-adapter

SP235



Controlled by
YRC1000



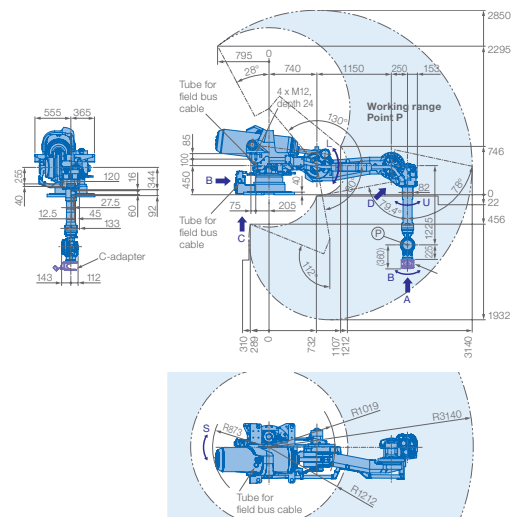
| Specifications SP235 | | | | | | |
|----------------------|--------------------------|---------------------|-----------------------|--|-----------------------------|------------|
| Axes | Maximum motion range [°] | Maximum speed [°/s] | Allowable moment [Nm] | Allowable moment of inertia [kg · m ²] | Controlled axes | 6 |
| S | ±180 | 100 | – | – | Max. payload [kg] | 235 (250*) |
| L | +76/–60 | 90 | – | – | Repeatability [mm] | ±0.05 |
| U | +197/–77.8 | 97 | – | – | Max. working range R [mm] | 2710 |
| R | ±205 (±360*) | 120 | 1333 (1385*) | 315 (317*) | Temperature [°C] | 0 to +45 |
| B | ±120 (±125*) | 120 | 1333 (1385*) | 315 (317*) | Humidity [%] | 20 – 80 |
| T | ±180 (±360*) | 190 | 735 | 200 | Weight [kg] | 1345 |
| | | | | | Power supply, average [kVA] | 5.0 |

* without C-adapter

SP150 / SP185R



Controlled by
YRC1000



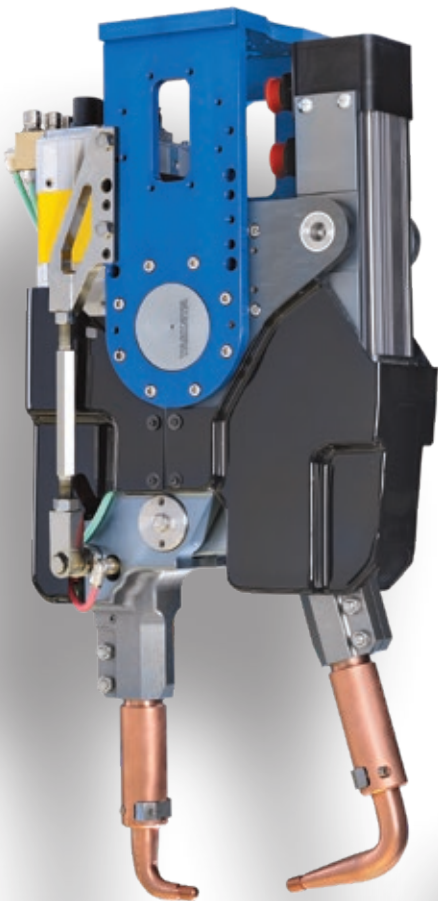
Specifications SP150R

| Axes | Maximum motion range [°] | Maximum speed [°/s] | Allowable moment [Nm] | Allowable moment of inertia [kg · m ²] | Controlled axes | 6 |
|------|--------------------------|---------------------|-----------------------|--|-----------------------------|--------------|
| S | ±180 | 105 | – | – | Max. payload [kg] | 151.5 (165*) |
| L | +130/–80 | 105 | – | – | Repeatability [mm] | ±0,05 |
| U | +78/–79.4 | 105 | – | – | Max. working range R [mm] | 3140 |
| R | ±205 (±360*) | 175 | 868 (921*) | 83 (85*) | Temperature [°C] | 0 to +45 |
| B | ±120 (±130*) | 150 | 868 (921*) | 83 (85*) | Humidity [%] | 20 – 80 |
| T | ±180 (±360*) | 240 | 490 | 45 | Weight [kg] | 1760 |
| | | | | | Power supply, average [kVA] | 5.0 |

* without C-adaptor



Spot Welding Gun Range

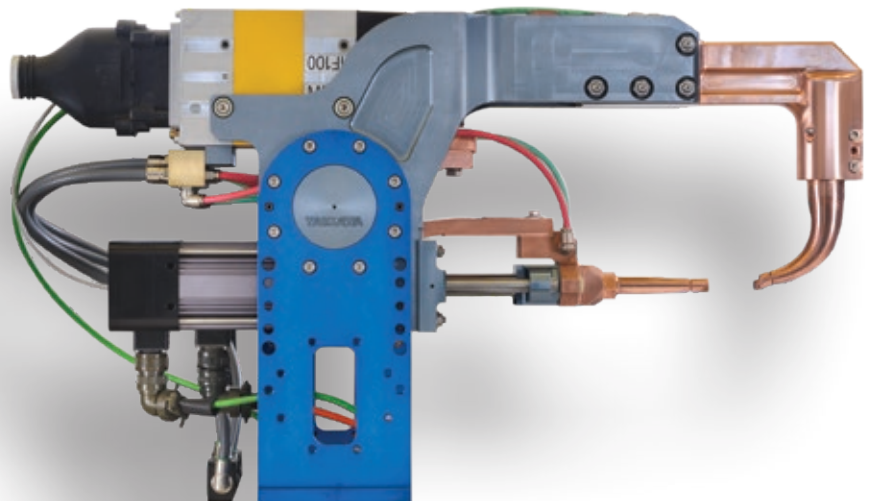


The new range of spot welding guns was developed by Yaskawa and has an extremely low weight. Carefully designed down to the smallest detail, it allows you to use robot with lower capacity.

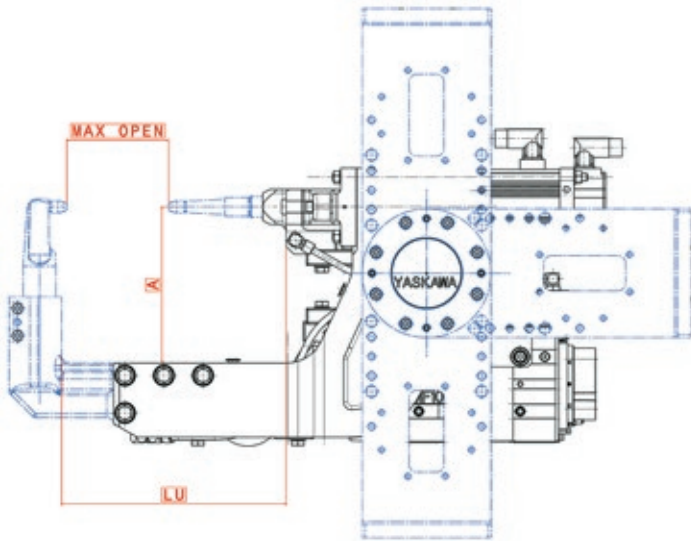
These features allow us to make a wide range of guns with different openings, reach and wrist mounting, depending on the item to be welded.

KEY BENEFITS

- No pneumatic system
- It consists of three components (gun body, transformer and motor) for maximum simplicity of the structure
- The cables can be connected sideways to ensure better rotation of the wrist of the robot
- Lower energy consumption
- Can be mounted on a robot with lower weight
- Easier to install
- Standardization of the gun with greater customization options starting from the standard solution



Gun C

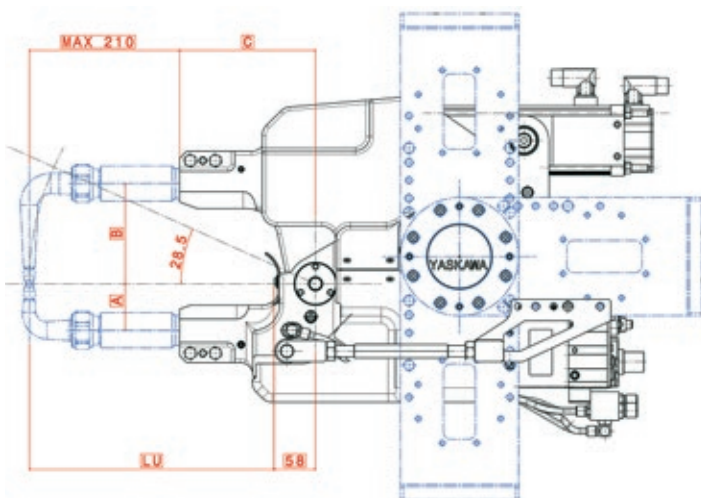


| Arm center distance | | |
|---------------------|-----|-----|
| A | 200 | 300 |

| LU Usabele opening [mm] | Electrode force Max. load [daN] | Max. opening Max. open [mm] |
|-------------------------|---------------------------------|-----------------------------|
| 250 | 450 | 130 |
| 300 | 450 | 130 |
| 350 | 450 | 130 |

| Possible combinations (family size) | |
|-------------------------------------|-----|
| Gun | A |
| BGJ-200 | 200 |
| BGJ-300 | 300 |

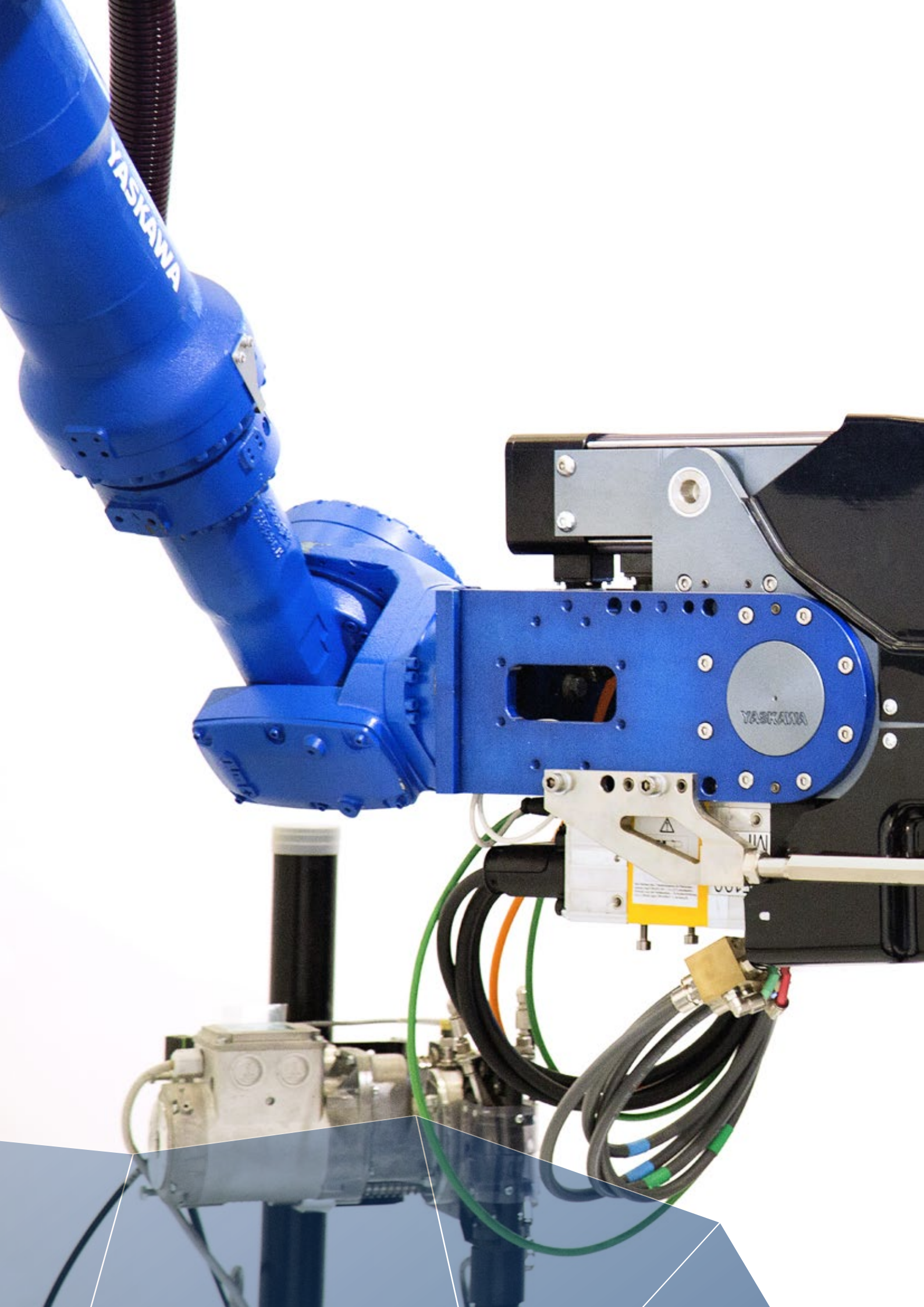
Gun X

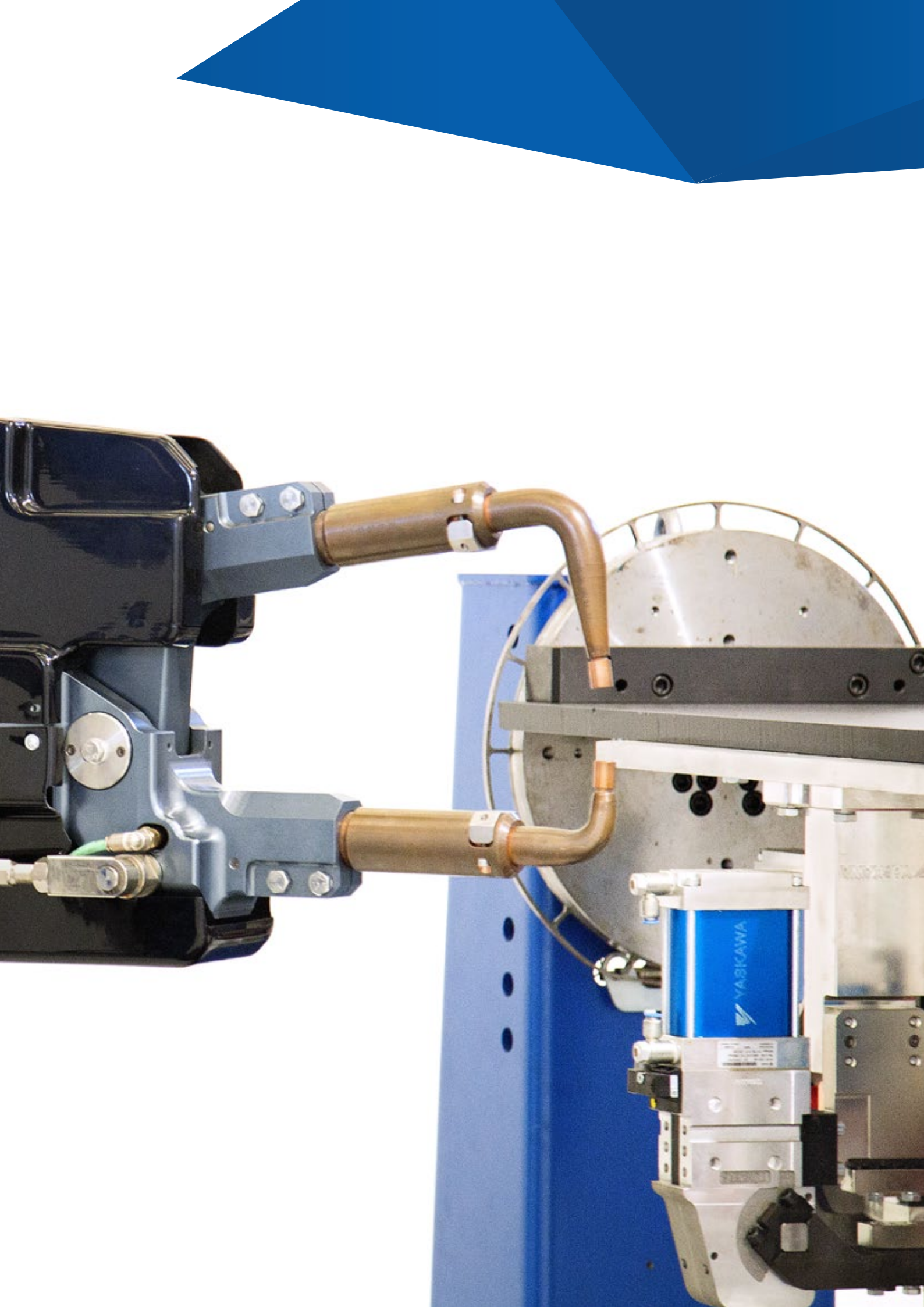


| Arm center distance and length | | | |
|--------------------------------|-----|-----|-----|
| A | 64 | 125 | 150 |
| B | 100 | 140 | 250 |
| C | 190 | 290 | — |

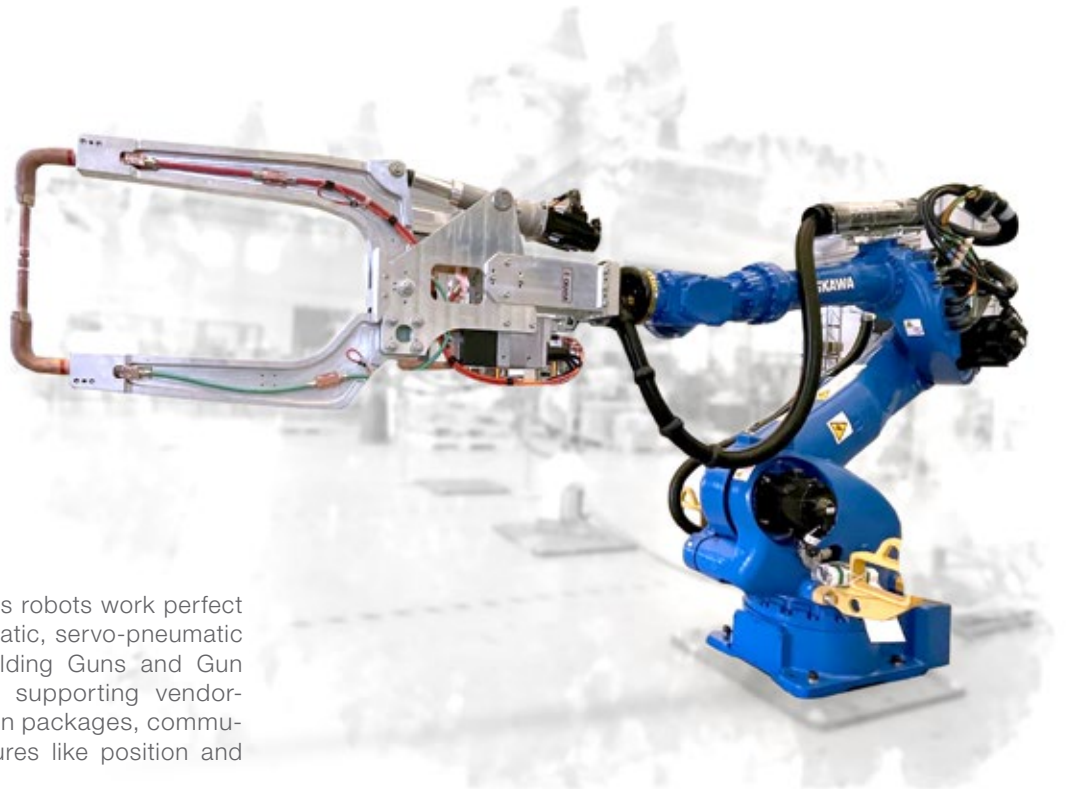
| Possible combinations (family size) | | | |
|-------------------------------------|-----|-----|-----------|
| Gun | A | B | C |
| BGX-65-100-190 BGX-65-100-290 | 65 | 100 | 190 / 290 |
| BGX-65-140-190 BGX-65-140-290 | 65 | 140 | 190 / 290 |
| BGX-65-250-190 BGX-65-250-290 | 65 | 250 | 190 / 290 |
| BGX-125-100-190 BGX-125-100-290 | 125 | 100 | 190 / 290 |
| BGX-125-140-190 BGX-125-140-290 | 125 | 140 | 190 / 290 |
| BGX-125-250-190 BGX-125-250-290 | 125 | 250 | 190 / 290 |
| BGX-150-100-190 BGX-150-100-290 | 150 | 100 | 190 / 290 |
| BGX-150-140-190 BGX-150-140-290 | 150 | 140 | 190 / 290 |
| BGX-150-250-190 BGX-150-250-290 | 150 | 250 | 190 / 290 |

| LU Usabele opening [mm] | Electrode force Max. load [daN] | | Max. opening Max. open [mm] |
|-------------------------|---------------------------------|----------------|-----------------------------|
| 250 | 530 (C = 190) | N.O. (C = 290) | 144 |
| 300 | 500 (C = 190) | N.O. (C = 290) | 167 |
| 350 | 450 (C = 190) | 500 (C = 290) | 190 |
| 400 | 380 (C = 190) | 450 (C = 290) | 214 |
| 450 | 320 (C = 190) | 380 (C = 290) | 238 |



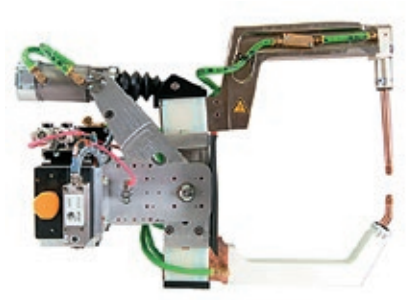
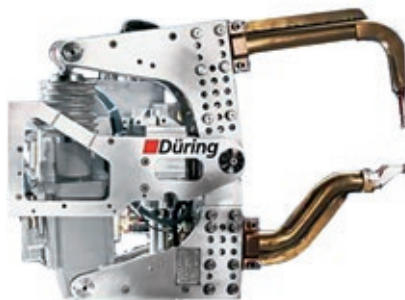
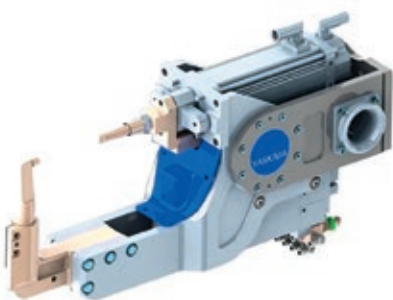


3rd Party Spot Welding Guns



MOTOMAN GP and SP Series robots work perfect with a large variety of pneumatic, servo-pneumatic and servo-electric Spot Welding Guns and Gun Controllers on the market, supporting vendor-specific functions, application packages, communication interfaces and features like position and arm bending compensation.

Please ask for more details.



Dresspack

- Spot Welding gun wiring from robot base to wrist – 35 mm² power cord, water pipe PUR 12, motor, encoder, signal cables
- Spot Welding connection from robot base to YRC1000 controller (length 10 metres) – 2 pipes PUR 12, power cord 35 mm²
- Various dresspack suppliers available



YRC1000 Cabinet and Welding Box

- For MOTOMAN YRC1000 Controller
- Force and Stroke parametrization with robot teach pendant
- BOSCH PSI6000 Middel frequency inverter 1000Hz in additional cabinet YRC1000
- BOS6000 user interface
- System I/O and spot signal will be managed by VIPA module inside spot box
- Max. weld current 36kA

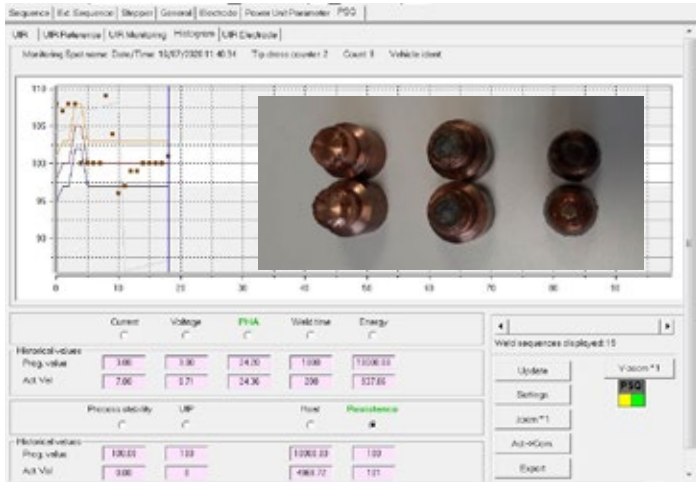


UIR Quality Controls with BOSCH

(Software Bos6000)

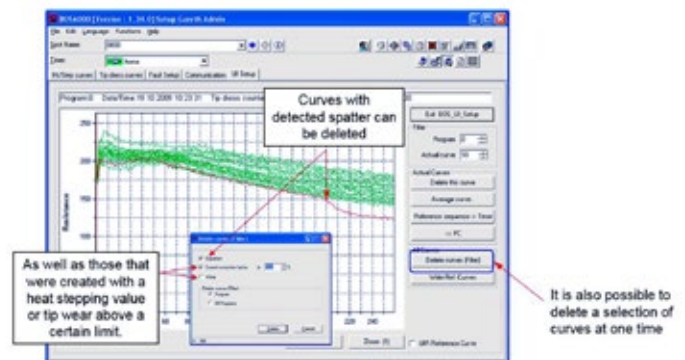
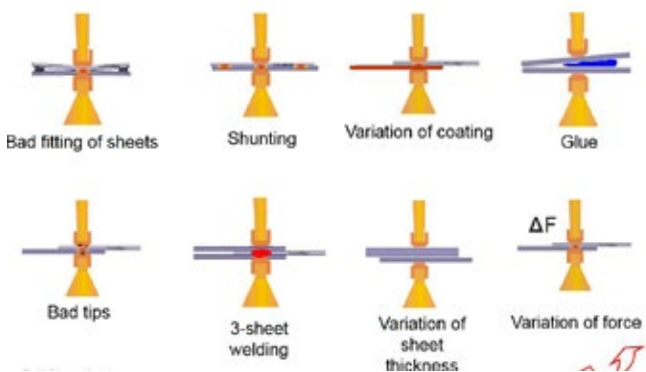
Thanks to the installation of the PSQ Option Function with relative activation of the "Check Resistance" it is possible to avoid the execution of waste pieces following wrong dressing positions, breakage of the electrode holder, even partial breakage of the RAVITEX cutter.

Thanks to the installation of the PSQ Option Function with its Micro SD Card, to the recording of the optimal curves following the factory quality controls, it is possible to activate the welding quality control adaptation, thus being able to control the nominal and minimum diameter of the weld core.



UIR: Compensation of Disturbances

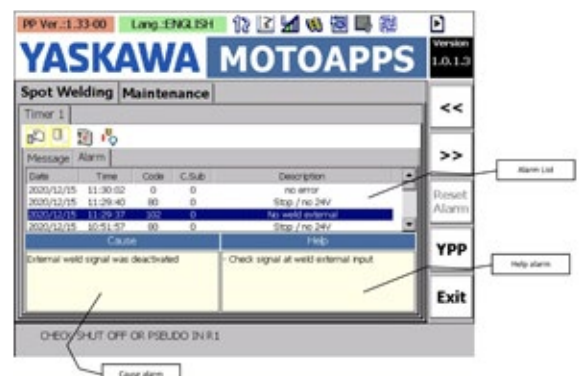
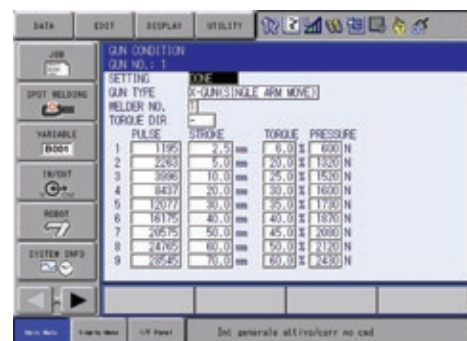
HEXROTH Bosch Group



Motorgun Software

Communication software for the welding timer and the gun motor guarantees a high quality welding process due to integration and complete dialogue between all items managed as a unique Yaskawa brand product.

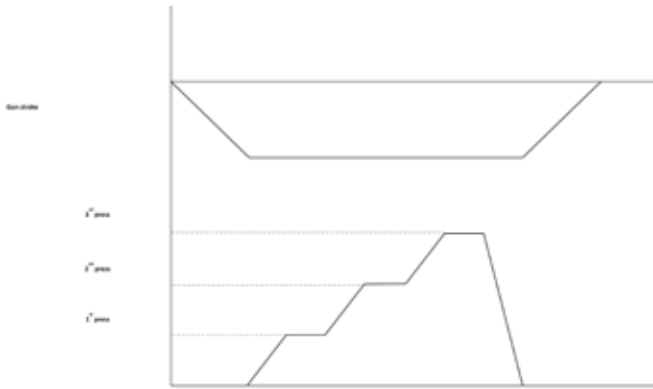
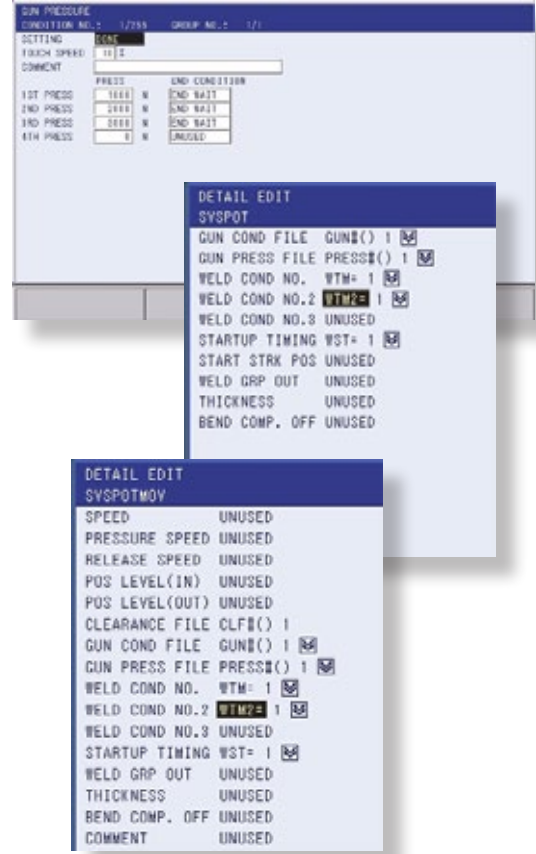
- Easy to set up: a few steps to configure communication with the welding timer
- Easy to set calibration, configuration page dedicated to calibration of gun and motor
- Contains functions that enable self-learning



Multi Step Pressure Function

The multistep pressure function is an extension of the conventional welding commands SVSPOT / SVSPOTMOV. After the gun is closed, the power source can be started up to four times with different pressure values and welding conditions, enabling high quality spot welding.

- Multiple pressure values (and welding conditions) during one spot welding operation can be applied
- Enhanced welding process control

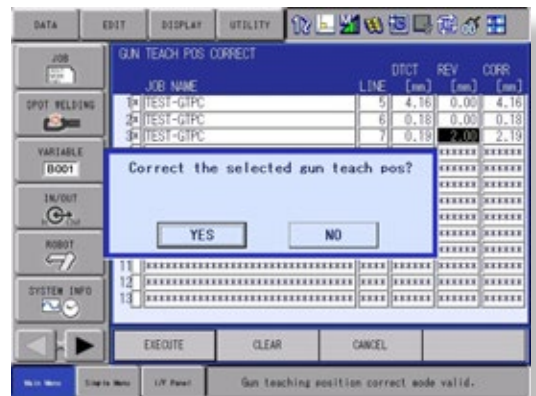


Gun Teaching Position Correction Function

Correction of previously taught gun positions (SVSPOTMOV instruction) by "workpiece search motion" with moveable electrode.

The function can be used to automatic correction of workpiece misalignment in the tool coordinate Z axis direction.

- Reduction of teaching time
- Improvement of weld quality



Type of Configurations

800510-10 – Gun on Floor

Configuration component:

- Robot handling + YRC1000
- Welding box
- Gun floor
- Inverter
- Oscillating tip dresser
- Mediapannel

Configuration particularly suitable in cases where it is not possible to complete the sequence of points on the equipment due to the clutter of the locks. In this case, the robot equipped with a gripper, which has reduced dimensions compared to the equipment, picks up the element from the tool and brings it under the SPOT gun fixed on the ground column, which completes the sequence of points.



800510-20 – Gun on Robot

Configuration component:

- Robot spot + YRC1000
- Welding box
- Gun on robot
- Inverter
- Tip dresser

Classical configuration for a standard cell where the robot equipped with SPOT gun welds the elements that are loaded on equipment which can be fixed on a workbench, rotating base or positioner

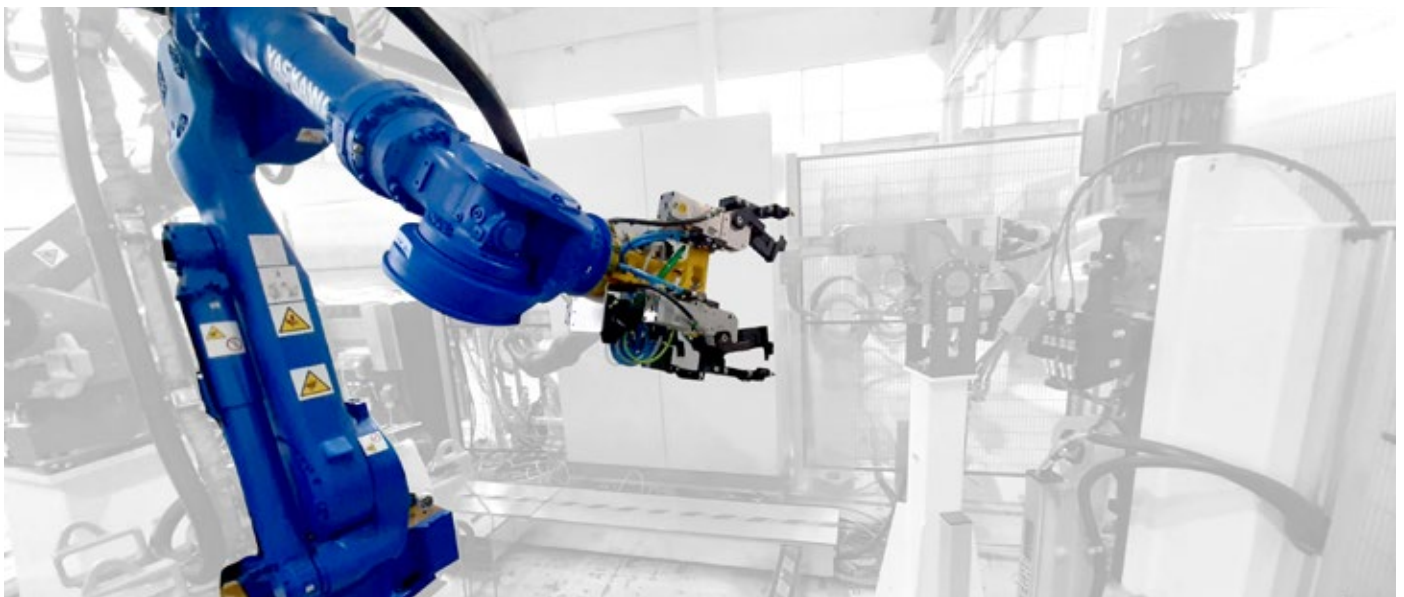
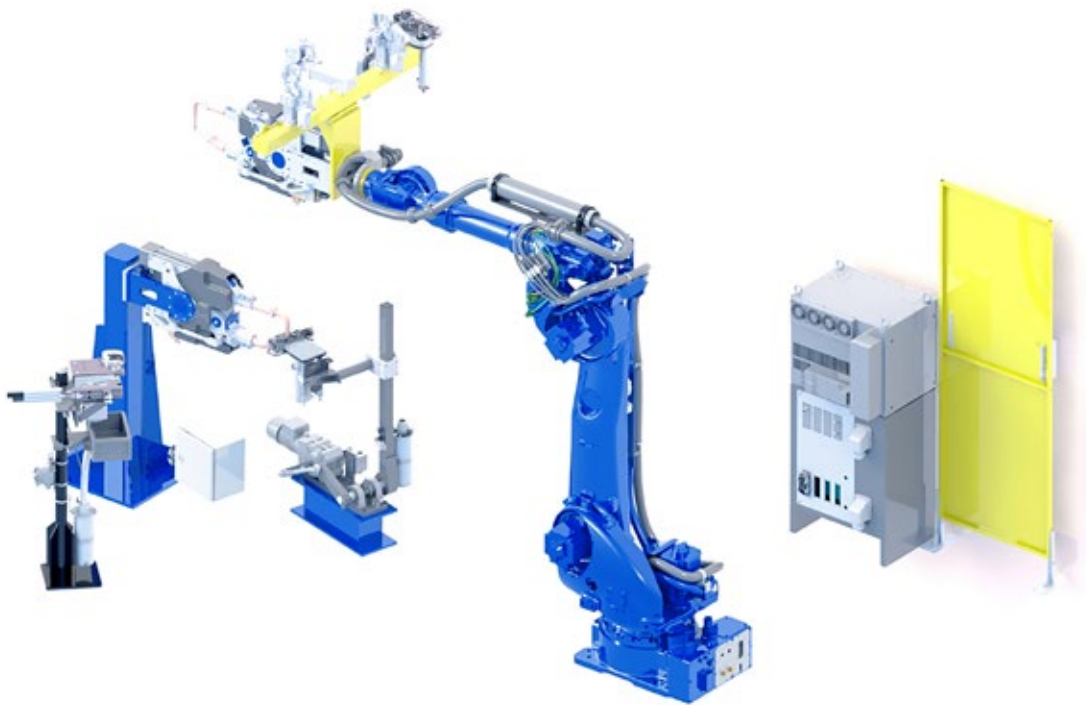


800150-30 – Gun on Floor + Gun on Robot

Configuration component:

- Robot spot/handling + YRC1000
- Welding box
- Gun on robot
- Gun floor
- Inverter
- Tip dresser
- Oscillating tip dresser

Complete configuration that groups the two previous ones in a single solution. The robot, equipped with SPOT gun and gripper, welds the elements that are loaded on equipment that can be fixed on a workbench, rotating base or positioner. At the end of this cycle, the same robot with the gripper picks up the element from the tool and brings it under the fixed SPOT gun on the ground column, which completes the sequence of points.



Recovery System

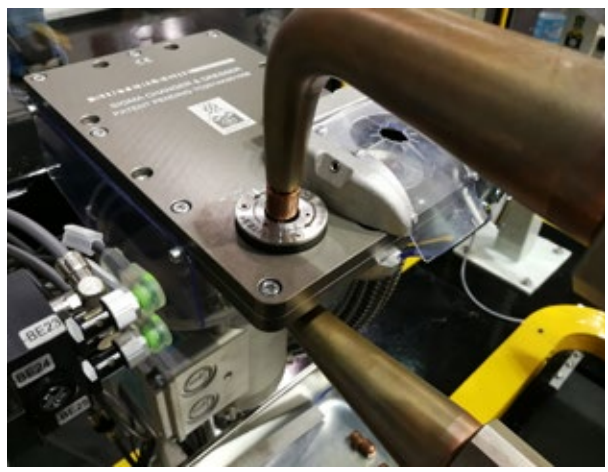
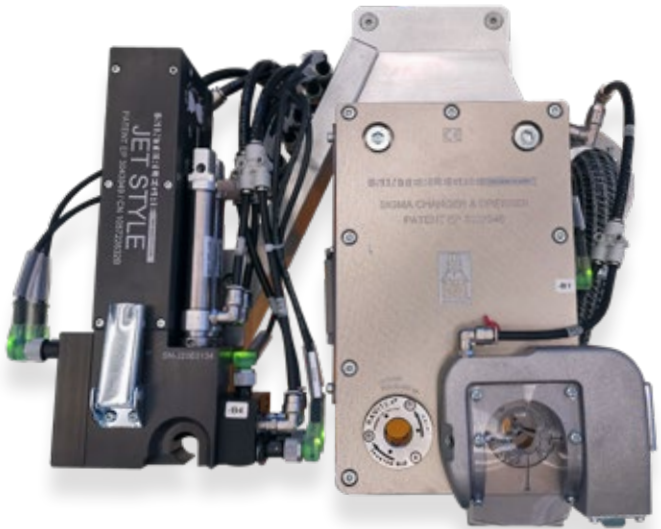
Water recovery system for cups change



The recovery system is a device that creates a vacuum inside the cooling circuit of the clamp to avoid water leakage and flooding during the electrode change, whether it is done manually or automatically. It is placed between the cooling water supply and return pipes, coming from the factory, and the panel at the base of the robot where the fittings leading to the internal cooling circuit of the clamp are located.

Suggested with automatic cups changer

The automatic cups changer, is used in case of a fully automated workstation, where the electrode change is performed automatically. The electrodes are placed in a magazine next to the dressing unit and the electrodes on the gun are replaced by an automatic extraction and replacement system.



Customer Service and Support.

From the Initial Concept to the Turnkey System.

With more than 40 years of experience in system development and engineering, and wide-ranging expertise in robot technology, Yaskawa offers an all-round package tailored to your needs. Consulting also receives high priority: even if you have only a vague notion of how your workpiece is to be welded, Yaskawa will draw up a concept for you, integrate the required components and present you with a solution that will fire your imagination.



Consulting

- In-process engineering services



Testing

- 3D simulation
- Prototyping and pre-series production on test systems
- Performance of welding trials
- Quality control by macrosections



Training

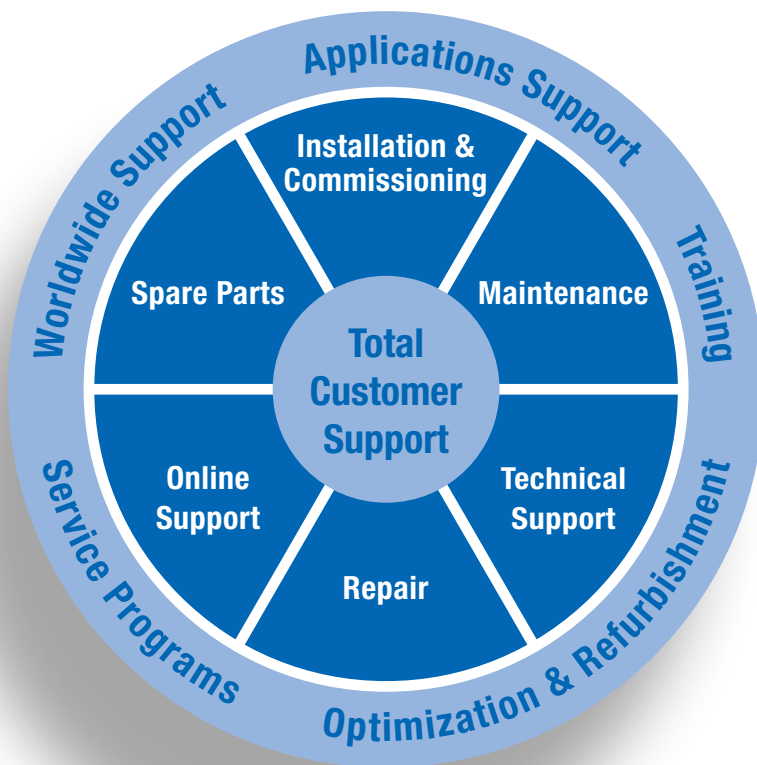
- Operator training on site or in our Academies
- Welding training














Service

- Maintenance and repair
- Overhauls and refurbishments

Total Customer Support



-  Process Optimization & Product Modernization
-  Support for Product Application
-  Installation & Implementation
-  Service, Warranty & Maintenance Contracts
-  Preventive Maintenance
-  Training
-  Repair
-  Detailed Reporting
-  Spare Parts
-  Inventory & Logistics Programm
-  Error Analysis & Troubleshooting

Yaskawa supports you throughout the entire product lifecycle with service products and services tailored to your needs.

The 360° all around support, the TOTAL CUSTOMER SUPPORT, not only refers to the Yaskawa products and systems but also to your applications and processes.

Through our global service network, Yaskawa is always close to you to ensure your success, because ...

... customer satisfaction is our top priority!

YASKAWA GROUP

- AT Yaskawa Austria
Schwechat/Wien
+43(0)1-707-9324-15
- CZ Yaskawa Czech s.r.o.
Rudná u Prahy +420-257-941-718
- DK Yaskawa Danmark
Løsning +45 7022 2477
- ES Yaskawa Ibérica, S.L.
Viladecans/Barcelona +34-93-6303478
- FR Yaskawa France SARL
Le Bignon +33-2-40131919
- FI Yaskawa Finland Oy
Turku +358-(0)-403000600
- GB Yaskawa UK Ltd.
Banbury +44-1295-272755
- IT Yaskawa Italia s.r.l.
Torino +39-011-9005833
- IL Yaskawa Europe Technology Ltd.
Rosh Ha'ayin +972-3-9004114
- NL Yaskawa Benelux B.V.
Eindhoven +31-40-2895500
- PL Yaskawa Polska Sp. z o.o.
Wrocław +48-71-7928670
- RU Yaskawa Europe Holding AB
Moskva +46-480-417-800
- SE Yaskawa Nordic AB
Torsås +46-480-417-800
- SI Yaskawa Slovenia
Ribnica +386-1-8372-410
- TR Yaskawa Turkey Elektrik
Ticaret Ltd. Sti.
İstanbul +90-216-5273450
- ZA Yaskawa Southern Africa (PTY) Ltd
Johannesburg +27-11-6083182

DISTRIBUTORS

- BG ATRI ROBOTICS Ltd.
Stara Zagora +359 899 625 160
Kammarton Bulgaria Ltd.
Sofia +359-02-926-6060
- EE RKR Seadmed OÜ
Tallinn/Estonia +372-68-35-235
- GR Gizelis Robotics
Schimatari Viotias +30-2262057199
- HU Flexman Robotics Kft
Budapest +36 1 259 0981
- LT Profibus UAB
Panevezys +370-45-518575
- NO Skala Robotech AS
Lierstranda +47-32240600
- PT ROBOPLAN Lda
Aveiro +351-234 943 900
- RO NORMANDIA S.R.L.
Braşov +40 268 549 236



Yaskawa Headquarters

Yaskawa Europe GmbH
Robotics Division
Yaskawastraße 1
85391 Allershausen, Germany
Tel. +49 (0) 8166/90-0
Fax +49 (0) 8166/90-103

Yaskawa Academy and sales office Frankfurt

Yaskawa Europe GmbH
Robotics Division
Hauptstraße 185
65760 Eschborn, Germany
Tel. +49 (0) 6196/77725-0
Fax +49 (0) 6196/77725-39

robotics@yaskawa.eu
www.yaskawa.eu

All drawing dimensions in mm.
Technical data may be subject to change without previous notice.
Please request detailed drawings at robotics@yaskawa.eu.

MOTOMAN Spot Welding Solutions
B-05-2022, A-No. 180662

YASKAWA