



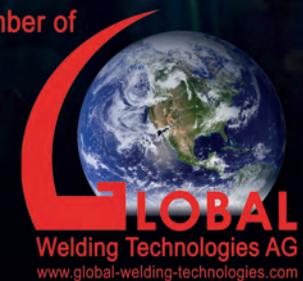
# MODULAR ROBOTIC SYSTEM RTi 400

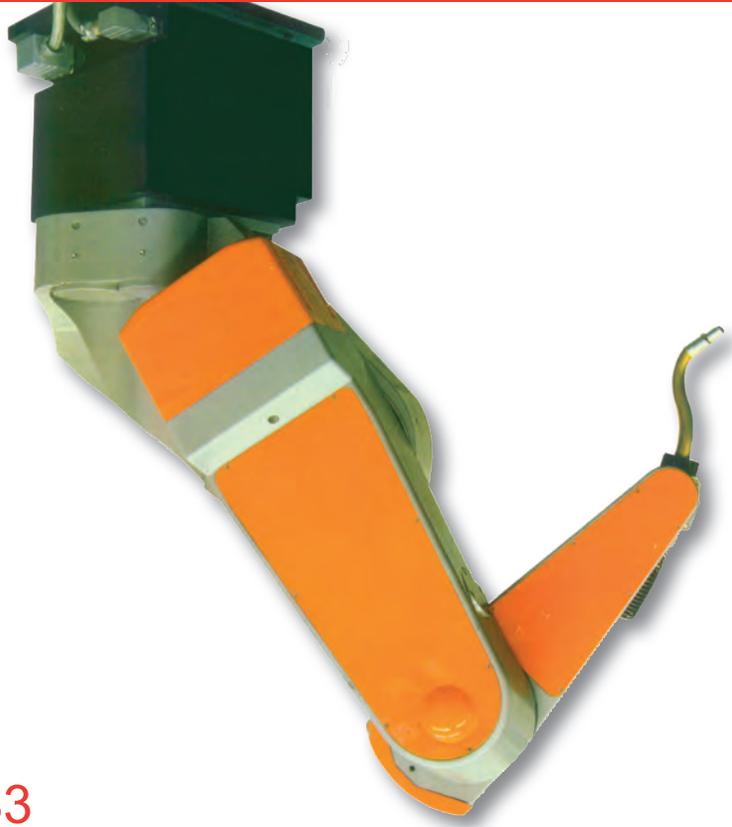
Welcome to the world of welding robots!

**igm**



A Member of





## 1983

*First five-axis igm robot - year of construction: 1983 - already had a hollow shaft for the torch hose package in the robot's wrist. Many welding units from that time are still in use today.*

## DEVELOPMENT ...

**Thirty years ago**, we developed the world's first robot suitable for industrial arc welding. Straight or circular welds of any desired length could be programmed with only 2 or 3 points, the welding speed was set directly and it could be changed during execution of the program. With its arc-controlled seam tracking function, **it was years ahead of the state of the art at the time.**

Two years later the first five-axis articulated-arm-type robot has been presented. Even at the time, it was noted for its design, which has been retained to this day, with the angular extension arm on the 1<sup>st</sup> axis with a 540° work zone. The optimal, toroidal work zone and the hollow shaft in the "wrist" of the robot for feed-through of the torch hose package are **features which have often been copied over the years, but never surpassed.**



## OF THE NEW RTi 400 SERIES

Mechanical components newly available on the market, a series of our own new system modules, and the demands of many customers for an enlarged work zone prompted the planning of a production series of welding robots comprising several different modules.

- > The incorporation of an additional rotating mount and a longer swivel arm greatly extends the work zone of articulated robots.
- > An additional swivel-arm module with another rotation axis greatly improves welding access to complex work pieces during fixed robot assembly.
- > Optimal set up of all system components permits a reduction in transfer time by up to 30% for all construction sizes.
- > For optimal usage of a newly developed camera mounted in a compact housing in the immediate vicinity of the arc, the system can be equipped with an additional rotation axis. This axis, which is fully integrated into the robot control, permits the camera to be rotated around the gas nozzle during the welding travel and thus swivelled away from obstructing work parts. Any need to remove the camera during program execution is thus reduced to a minimum.
- > 1 or 2 wire feed units together with all hose package connections and media supply lines have been integrated in the main rotation axis. Accordingly, all the gas and water supply hoses as well as all the wire guides for single-wire and tandem welding are located inside the housing.



2012

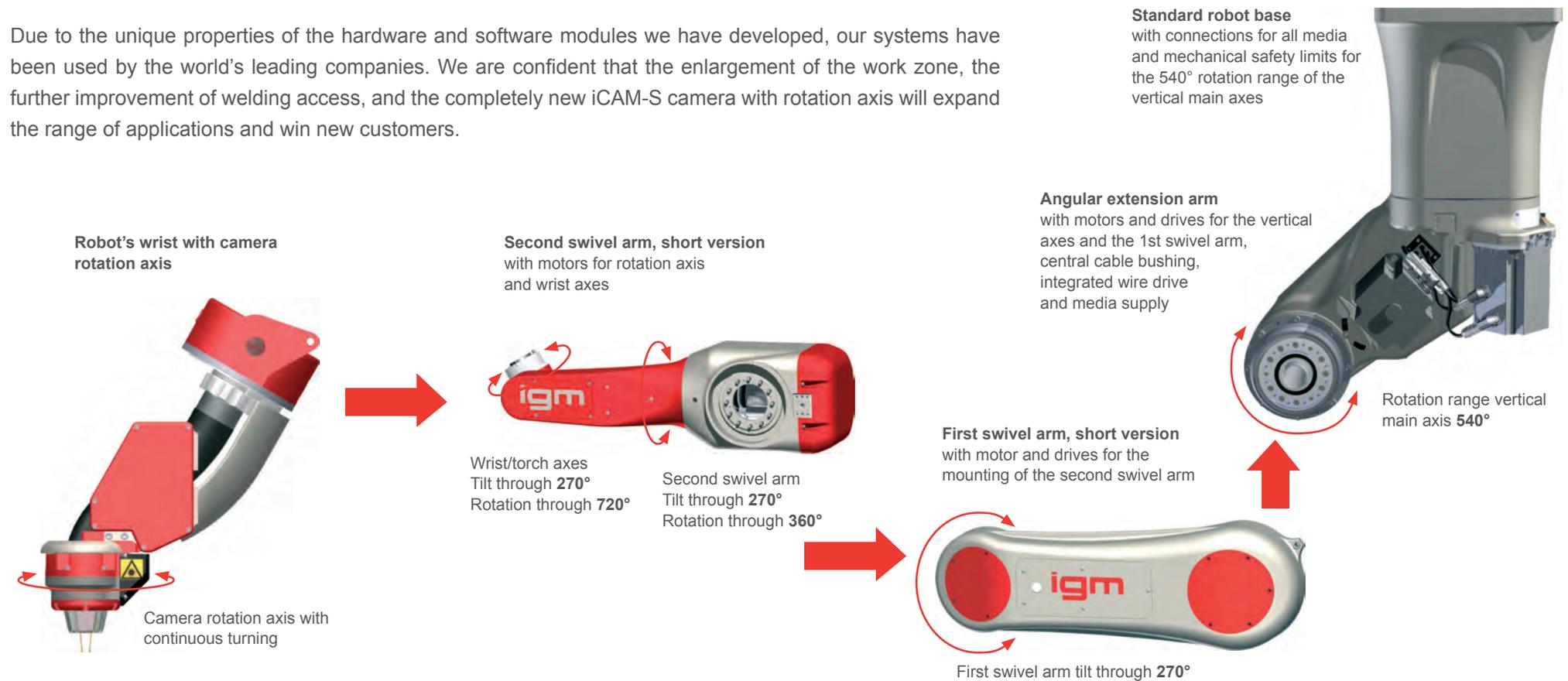
*Nine-axis articulated-arm-type robot*

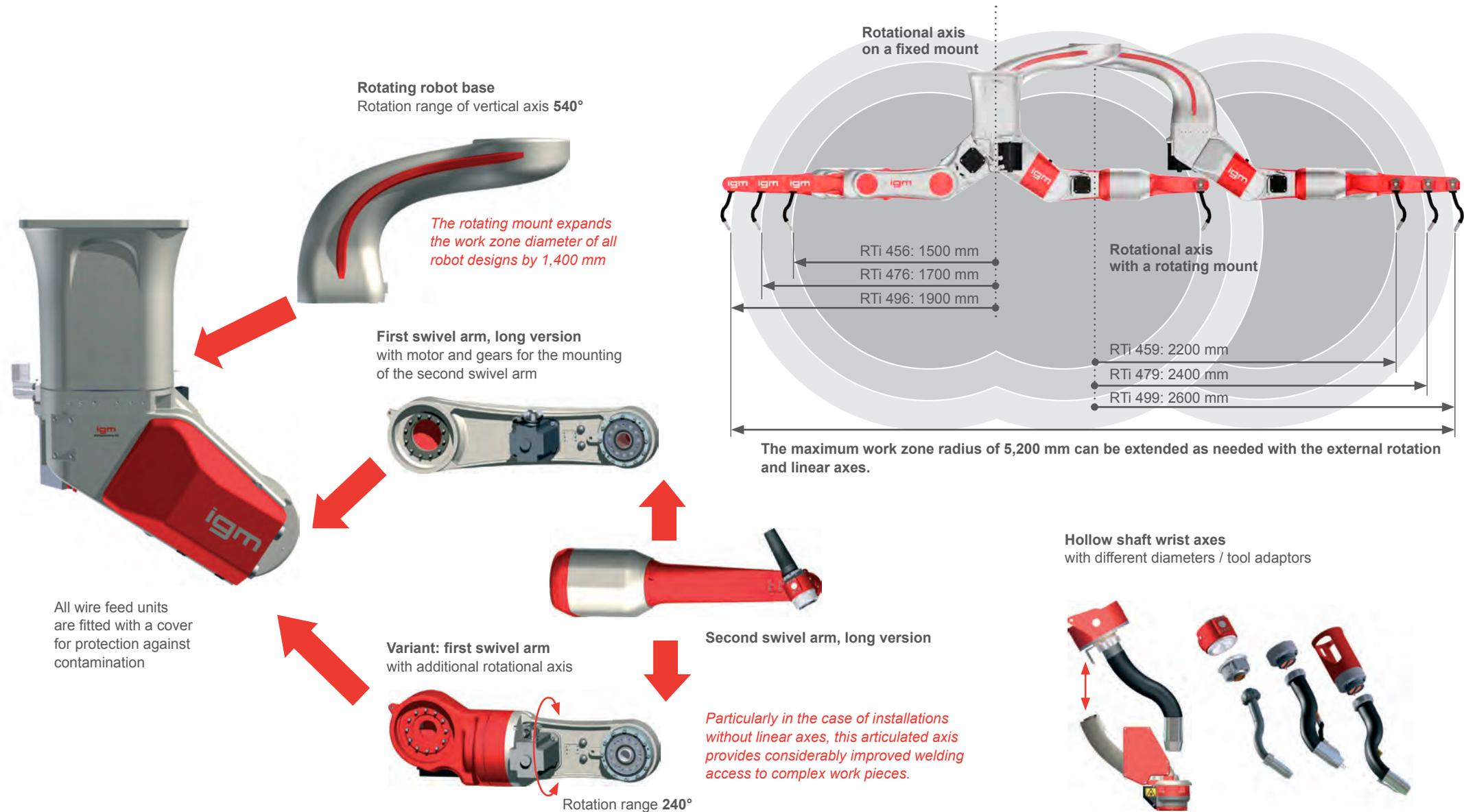
- > All the advantages typical of igm robots have been retained in full: Outstanding programming techniques with both the programming teach pendant and the offline teaching system. Large work zone and perfect welding access to seam positions due to an optimal axial geometry and holding of the welding torch in the wrist axis, implemented as a hollow shaft. The torch and the hose package are optionally interchangeable. All cables are inside the robot arms using hollow shafts.

# THE MODULES OF THE RTi 400 SERIES AND THE WORK ZONES OF THE DIFFERENT CONSTRUCTION SIZES

All the modules are suitable for standing or suspended robots.

Due to the unique properties of the hardware and software modules we have developed, our systems have been used by the world's leading companies. We are confident that the enlargement of the work zone, the further improvement of welding access, and the completely new iCAM-S camera with rotation axis will expand the range of applications and win new customers.





# WELDING EQUIPMENT AND SENSORS

## Wire Feed

- > Extremely flat design
- > Integrated in the main axis
- > Protected by cover
- > Wire guide in the axis
- > No exposed hoses
- > For single-wire and tandem welding processes
- > Fully accessible manual control push-buttons
- > Hinged medium plate
- > New central connection with quick-release coupling
- > Integrated electrical wiring



## Torch attachments and welding torches



Over 50 different MIG/MAG single torches (air-cooled and water-cooled)

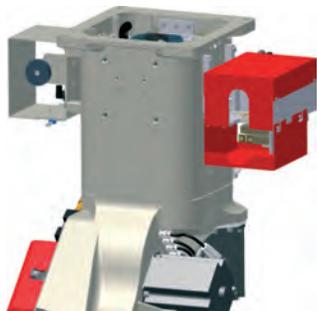
MIG/MAG tandem torches

Wire feed "TorchDrive" integrated in the hollow shaft for single and tandem welding

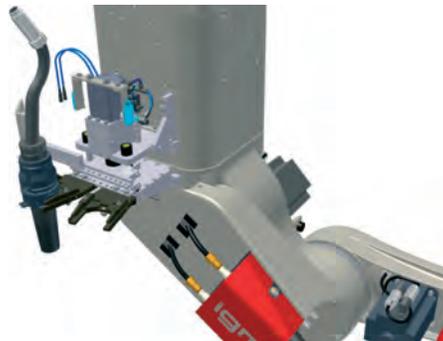
TIG torches with or without wire feed

## Torch cleaning and torch exchange system

External and internal cleaning of torch with wire cutter



Deposit device for interchangeable torch



HWS torch exchange system through the hollow shaft axis



Oxyacetylene and plasma cutting torches and various adaptors for processing tools as well as assembly and measuring



### Gas nozzle and arc seam tracking

Even 40 years ago, our special-purpose welding machines came equipped with this seam-tracking method, and with the development of our first welding robot Limat 2000 in 1981, we perfected the software for it.

### The iLS weld groove sensor

A distance sensor with linear image sensor with high image resolution scans the surface of the workpiece and recognises even the smallest joints.



### The iCAM laser camera

The camera is mounted on the wrist axis of the robot. It measures the position and volume of the weld groove online and adjusts the robot movement and the welding parameters accordingly. For the purpose of welding in narrow workpiece ranges, the camera can be repeatedly removed during the welding program.

The functions and parameters of all the sensors are entered, displayed, and optimised via the teach pendant. No additional equipment is required for programming.



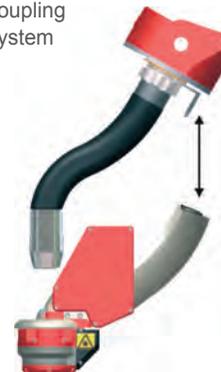
### The new iCAM-S Camera

**Exploits all the possibilities of faster electronics for an effective operating principle:**

A laser beam is continually diffracted at high frequency over the working width, while a great number of images of the workpiece surface are recorded. This irradiation and the image recording are effected through a narrow slot in the housing, which is kept clean using an air jet. By evaluating these images, the contour and position of the weld is accurately recorded without reflections causing erroneous results.

The camera is intensively water-cooled and can be moved directly around the gas nozzle on a rotation axis. The drive of this axis and the system for data transmission allow continuous rotation movement.

Holder with coupling system



Decoupling the rotation axis and camera



Camera on rotation axis for two-wire welding torches. Even in corner welds, the camera can be moved along the weld path and swivelled away from obstacles.

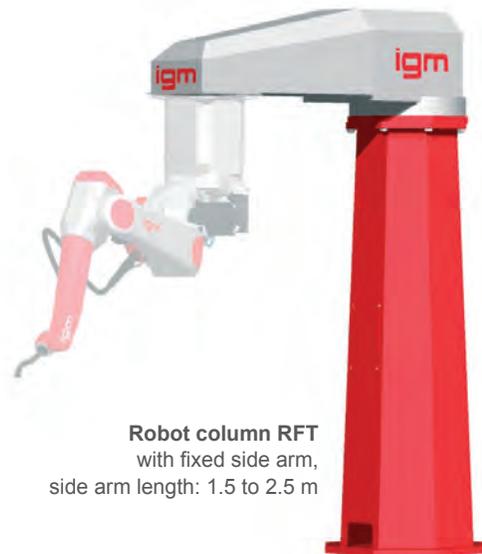


## ROBOT COLUMNS AND FLOOR-TRACKS

The modular construction of the rotary and longitudinal chassis components enable the design of robotic systems for quite different part sizes and production conditions.



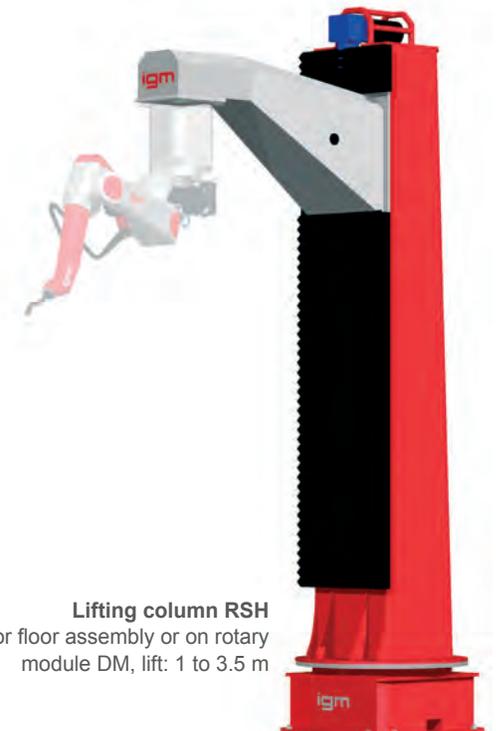
**Robot base MB**



**Robot column RFT**  
with fixed side arm,  
side arm length: 1.5 to 2.5 m



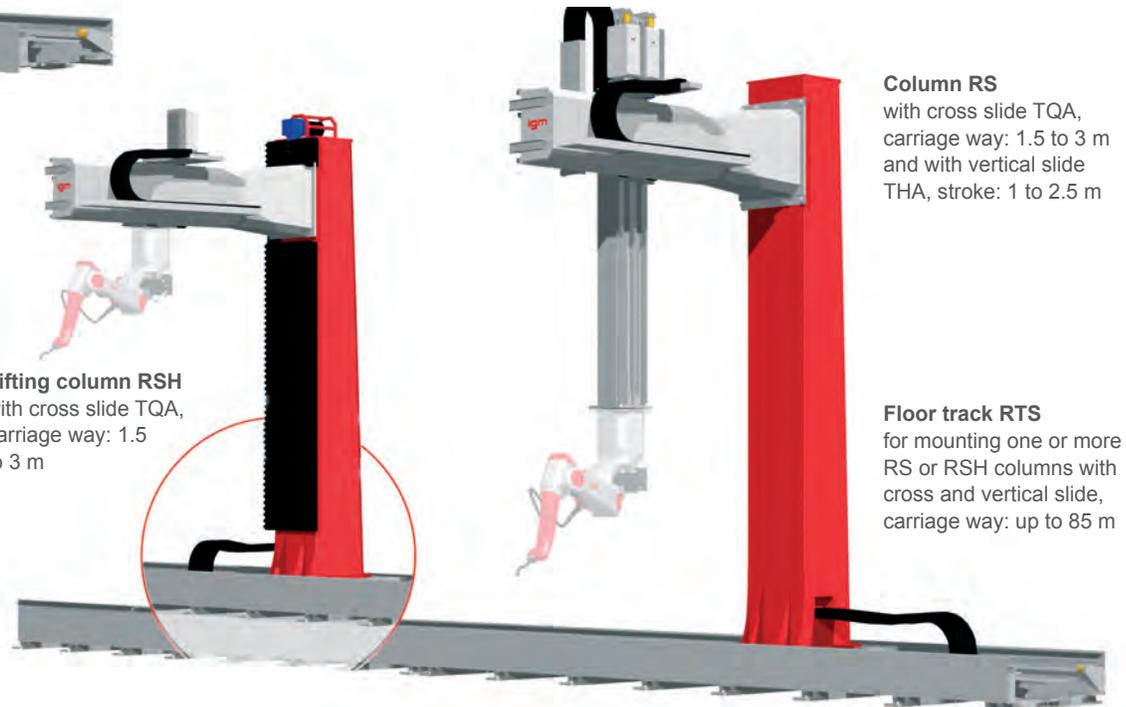
**Robot Column RST**  
with rotary arm,  
arm length: 1.5 to 2.5 m



**Lifting column RSH**  
for floor assembly or on rotary  
module DM, lift: 1 to 3.5 m



**Floor track RTS**  
for mounting one or more RST or RFT robot columns, carriage way: up to 85 m



**Lifting column RSH**  
with cross slide TQA,  
carriage way: 1.5  
to 3 m

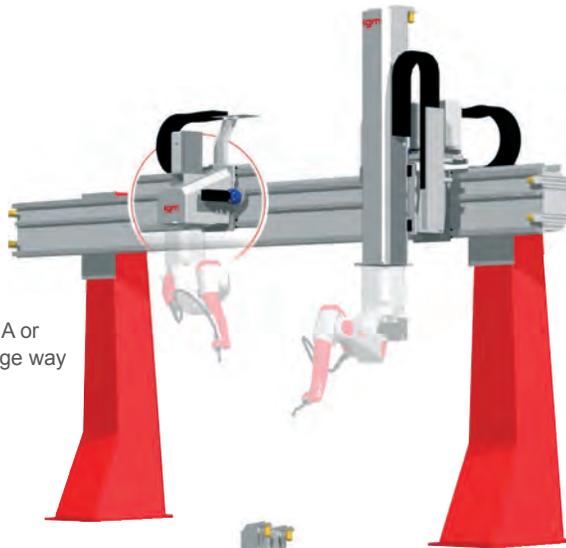
**Column RS**  
with cross slide TQA,  
carriage way: 1.5 to 3 m  
and with vertical slide  
THA, stroke: 1 to 2.5 m

**Floor track RTS**  
for mounting one or more  
RS or RSH columns with  
cross and vertical slide,  
carriage way: up to 85 m

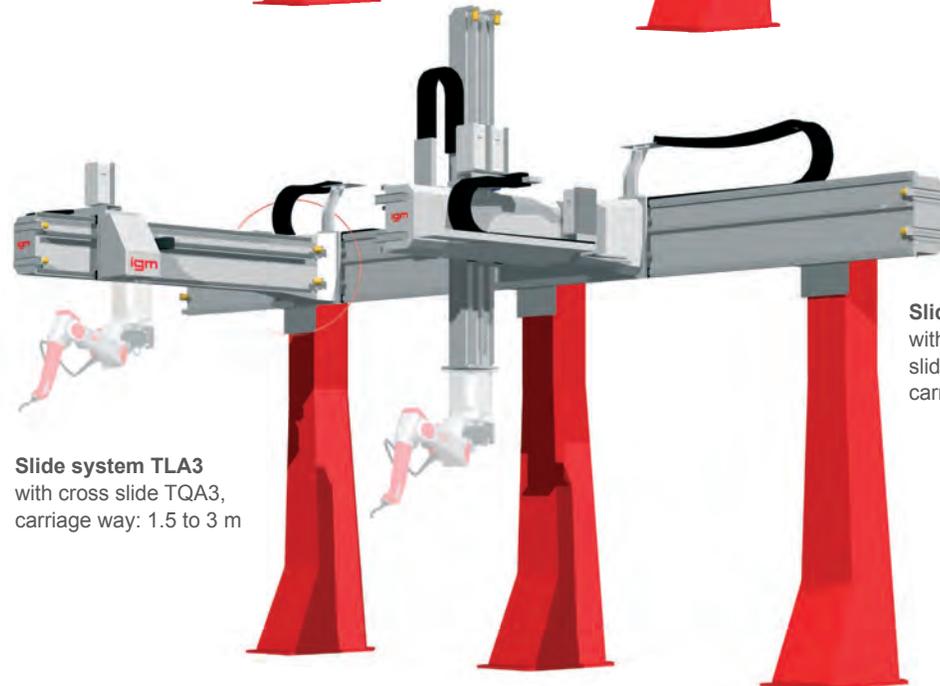


## OVERHEAD SLIDE SYSTEMS AND ROBOT GANTRIES

**Slide system TLA0**  
with vertical slide THA or carriage FW0, carriage way up to 85 m



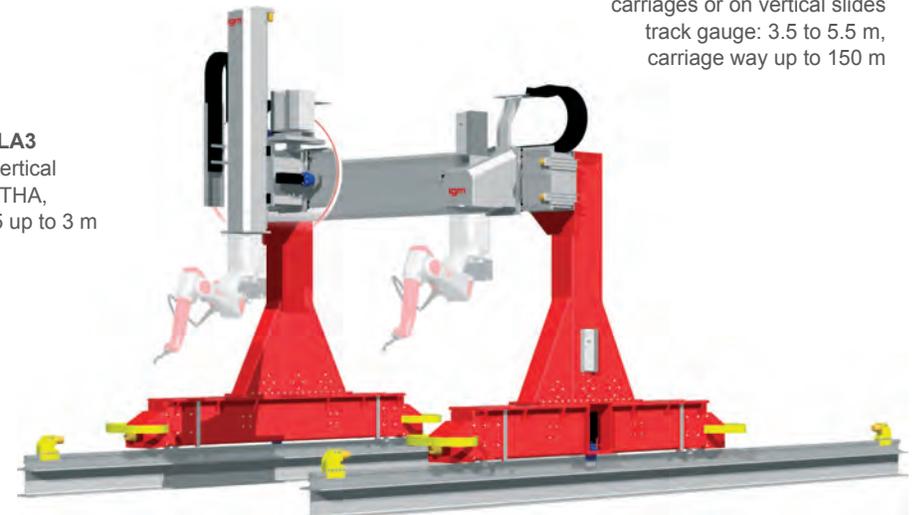
The overhead design of the slide systems permits free access for the loading of the workpiece manipulators with indoor crane or conveying system. This allows the implementation of flexible manufacturing lines in a cost-effective and space-saving manner. **Travel distances up to 150 m**

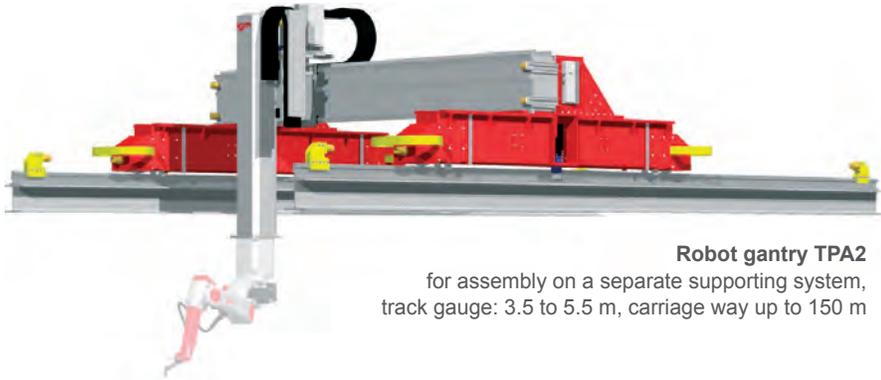


**Slide system TLA3**  
with cross slide TQA3, carriage way: 1.5 to 3 m

**Slide system TLA3**  
with cross and vertical slide TQA3 and THA, carriage way 1.5 up to 3 m

**Robot gantry TPA1**  
for one or two robots on carriages or on vertical slides track gauge: 3.5 to 5.5 m, carriage way up to 150 m

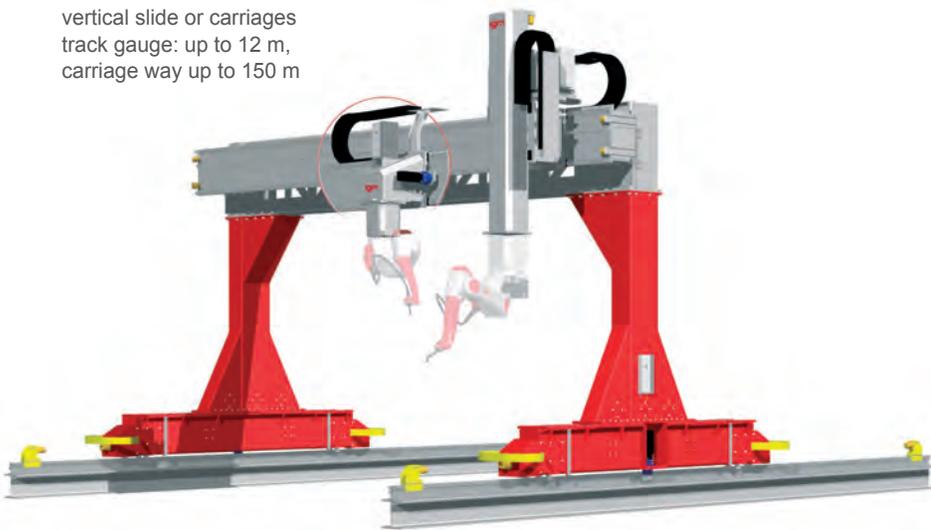




**Robot gantry TPA2**  
for assembly on a separate supporting system,  
track gauge: 3.5 to 5.5 m, carriage way up to 150 m



**Robot gantry TPA3**  
for one or two robots on  
vertical slide or carriages  
track gauge: up to 12 m,  
carriage way up to 150 m



**Robot gantry TPA4**  
for work pieces of up  
to 6 m in height, with  
vertical slide, stroke  
up to 4 m, track  
gauge: up to 12 m,  
carriage way up  
to 150 m



## WORKPIECE MANIPULATORS

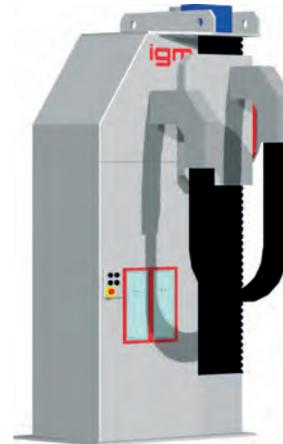
**Roller block RB**  
as tailstock for the  
rotating devices RP



**Headstock manipulator RP**  
with RFP tailstocks  
with a locking position for net loads  
between 150 and 25,000 kg



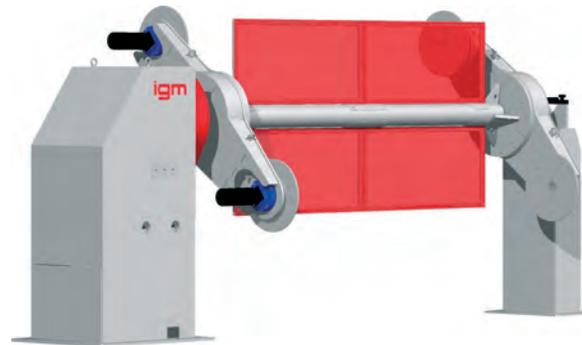
**Rotary tilting table RP2**  
net load of 150 to  
25,000 kg



**Headstock manipulator  
with lifting device RPH  
with tailstocks RFPH**  
on motor-powered  
displacement track,  
stroke of 1 to 1.5 m



**Displacement track VB for tailstocks**  
driven manually or motor-powered, carriage way: from 2 m



**3-axis turning device RP3**  
with a station load capacity of 300 to 2,000 kg

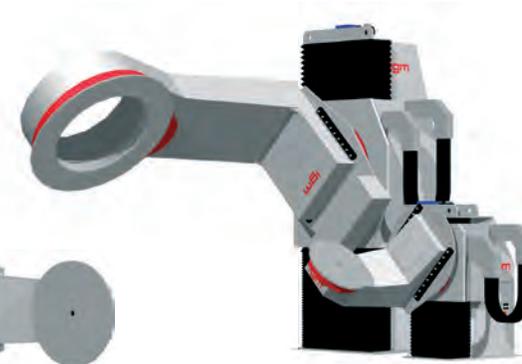


**Rotating device in swivelling C-frame**  
with a station load capacity of 300 to 4,000 kg

**L-Manipulator RWM2**  
with rotational radius of  
up to 2.3 m and net  
loads of up to 15,000 kg



**Combinations**  
of standard manipulators for  
special customer requirements



**L-Manipulator with lifting device RWM3**  
with stroke between 500 mm and 1.6 m, net  
loads of up to 15,000 kg



**Rotary table with H-frame RWV**  
for turning device with faceplate  
distance of 1,200 to 3,600 mm,  
load capacity of up to 1,000 kg  
per station

**Compact system RSX**  
with rotary arm RST and L-manipulator RWM2  
designed for welding systems with one or two  
stations, load capacity from 500 to 1,000 kg  
per station



**Compact system RRMK**  
central galleys with rotary table and head- /  
tail stock units, 2 stations, load capacity  
from 600 to 1,000 kg per station



**Compact system P2W**  
pre-engineered 2-station robot cell with  
rotary table and head- / tail stock units, load  
capacity 300 kg per station



**Rotary table with  
rotary tilting tables RP2**  
Load capacity of 500 to  
1,000 kg per station



**2-station rotary table RR**  
for the fitting of work plates  
or additional manipulators,  
load capacity of 500 to  
10,000 kg per station

# PROGRAMMING AND OFFLINE TEACHING

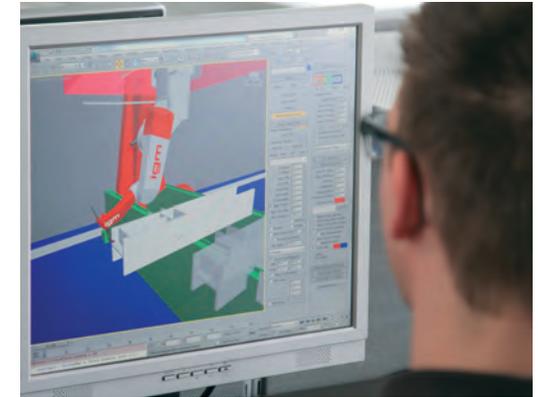
## Programming

The key unit of the RCi system, the igm teach pendant incorporates all functions for the creation and optimisation of robot programs, including all sensor functions. No additional equipment is necessary.

The lightweight teach pendant is operated via a 8.4" touch screen. On the back side there is provided a USB plug for mobile data storages.

A joystick fitted on the side of the housing is used for the quick and simple movement of the robot as well as all external rotation, slide, and manipulator axes. A choice of three different modes of operation is available:

- > Tool motion in world mode
- > Changing the tool orientation in world mode
- > Movement of tracks and external axes with fixed TCP



The simple and superior programming technique of our welding machines is a crucial factor influencing purchasing decisions for many of our customers

## Offline teaching

Offline teaching involves workpiece-oriented programming in 3D mode using a PC and simulation software. The workpiece is first imported into the programming system as 3D-CAD geometry, then the movements of the robot are determined. For path generation and definition of the processing parameters, a number of automatic functions as well as data bases stored in the control system are available.

It is a simple system using the same programming method as the robotic system in the workshop and offering the key advantage that the use of the teach pendant means the use of an identical software for all calculations. This eliminates the need for any machine parameter or robot program conversions, and all program changes on the installation can be further processed using the offline system without conversion losses.

### Features

This offline programming method integrates as a matter of course:

- > Arc-controlled seam tracking
- > iLS laser sensor
- > Automatic laser TCP-correction
- > Gas nozzle tracking with scanning of the simulated workpiece.
- > tactile TCP-correction for localisation of parts and joints
- > Torch exchange

## Additional functions

<b>RoboNet</b>	remote maintenance (via VPN)
<b>ISDES embedded</b>	welding data recording and monitoring
<b>iPAT</b>	offline manipulation and assembly of robot programs
<b>SmartStep</b>	assembling of program parts to robot step programs
<b>iSCRIPT</b>	programming language for solving the most complex tasks

## Advantages of igm offline teaching

- > Reduction of downtime by setting up programs during main production time.
- > Accessibility check and collision monitoring
- > Programming without risk of accident and with a clear view of seams difficult to access
- > Support through many automatic functions
- > Program setup with all functions corresponds to online programming
- > No additional training is necessary
- > Offline teaching can also be used as a training tool
- > CAD/CAM couplings with simple import of 3D-CAD workpiece data.
- > Support during the construction period with regard to suitable design for robotic use

# WE PLAN AND WORK FOR YOU:

At our production sites and further sales and service facilities throughout the world:



**igm Robotersysteme AG**  
Austria

AUSTRIA  
igm Robotersysteme AG  
Industriezentrum NÖ-Süd  
Strasse 2a, Objekt M8  
Industriezentrum NÖ-Süd  
Austria  
T: +43 (2236) 6706-0  
F: +43 (2236) 6706-99-101  
E: [office@igm-group.com](mailto:office@igm-group.com)  
[www.igm.at](http://www.igm.at)



**igm Robotrendszerek Kft.**  
Hungary

HUNGARY  
igm Robotrendszerek Kft.  
Ipari Park  
Csörgőfa sor 1  
9027 Győr  
Hungary  
T: +36 (96) 511 980  
F: +36 (96) 518 999  
E: [gyoer@igm-group.com](mailto:gyoer@igm-group.com)  
[www.igm.at](http://www.igm.at)



**igm Robotic Systems, Inc.**  
USA

USA  
igm Robotic Systems, Inc.  
W133 N5138 Campbell Drive  
Menomonee Falls  
WI 53051  
USA  
T: +1 (262) 783-27 20  
F: +1 (262) 783-27 30  
E: [igmusa@igmusa.com](mailto:igmusa@igmusa.com)  
[www.igmusa.com](http://www.igmusa.com)



**Beijing Aijiemo Robotic System Ltd.**  
China

CHINA  
Beijing Aijiemo Robotic System Ltd.  
No. 4 Dongdajie, Nankou  
Changping District,  
Beijing 102202  
China  
T: +86 (10) 858 61 789  
F: +86 (10) 858 61 787  
E: [office@igm-china.com](mailto:office@igm-china.com)  
[www.igm-china.com](http://www.igm-china.com)

