

The new IRB 6400

Now you get even more



ABB Flexible Automation



The new IRB 6400 – your best performer:

More performance
More adaptability
More reliability

The demands of modern industry require high production rates, reduced lead times, smaller inventories and lower costs. And these demands are continuously growing.

This means short workcycle times, rapid change-overs, consistently high process quality and reliable process-optimised equipment. These were the driving forces in the design criteria for the IRB 6000 series back in 1990 and also the key issues behind the new IRB 6400. Of 70,000 installed ABB robots, more than 20,000 are from the IRB 6400 series. We found no need to invent the wheel over again – but rather a reason to continue the success and give you even more.

Presenting the new IRB 6400, offering more performance, adaptability and reliability.

More performance for higher production rates and top quality parts

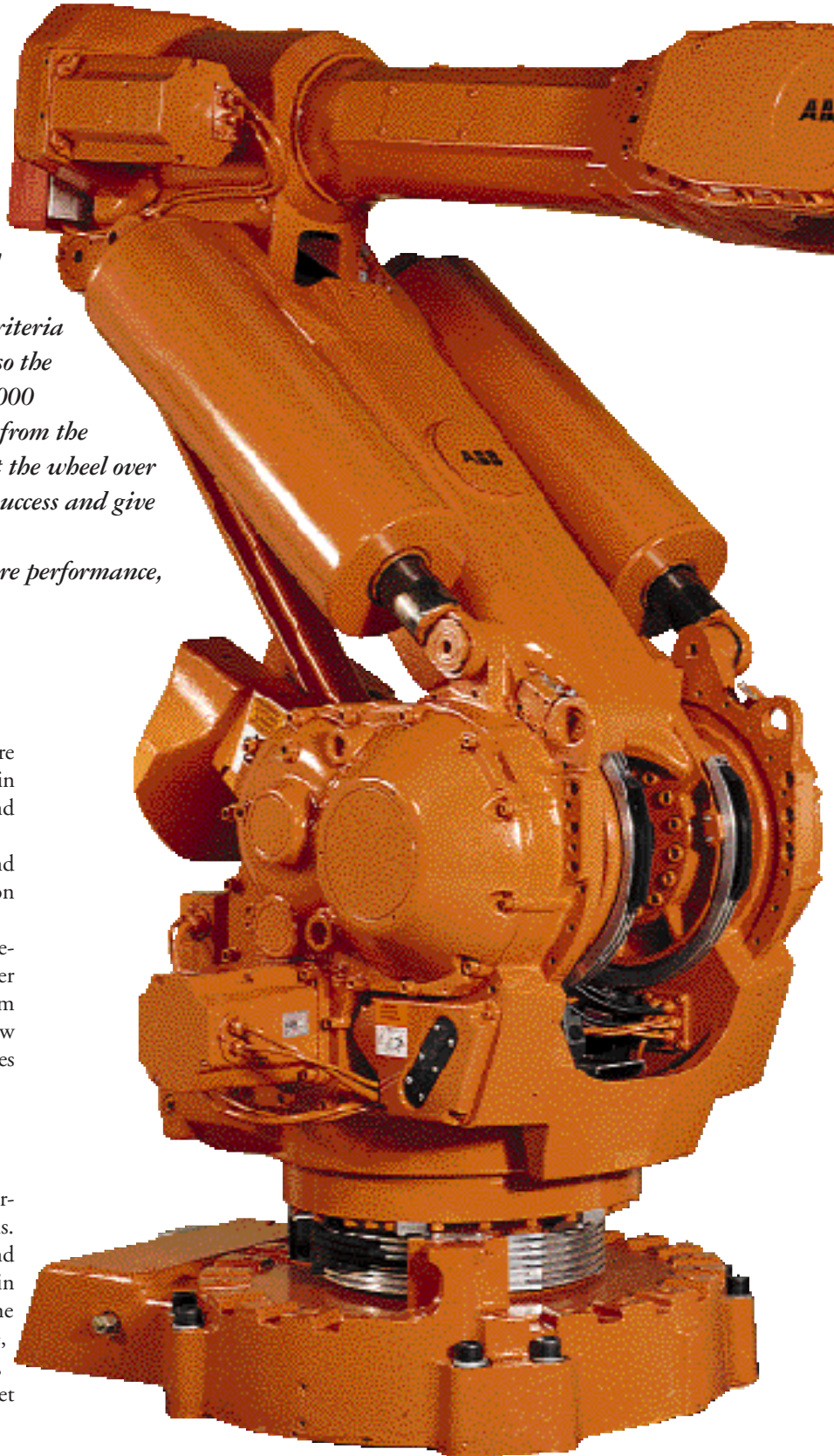
The new IRB 6400 series is 20% faster than before – with low energy consumption. The advantage lies in the balanced construction, optimised drive-trains and the advanced dynamic model based servo control.

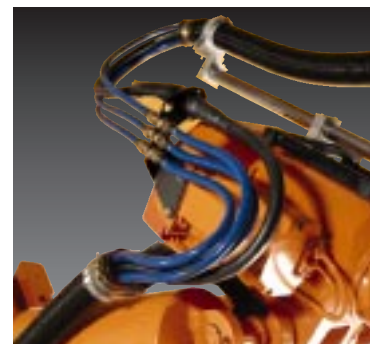
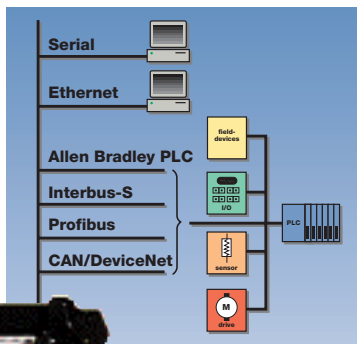
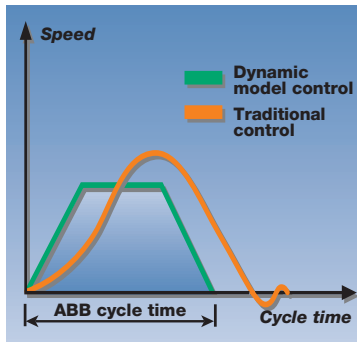
QuickMove™ functions and automatic load and inertia identification ensure the highest acceleration and speed over the entire workcycle.

TrueMove™ functions offer accurate paths, independent of speed. The repeatability has been further improved from 0.15 mm to an outstanding 0.1 mm with help of the very rigid design. Together with new functionality, this results in the highest production rates of high quality parts that the industry can offer.

More adaptability to meet your specific needs

The new mechanical design with much smaller interference radius allows for more compact installations. The integrated process media is readily exchanged and a 2.5 meter overarm is changed to a 3.0 meter arm in less than 30 minutes. The robot can be calibrated one axis at a time, if this is more convenient. Extensive, standard communication possibilities include I/Os, serial channels, Interbus-S, Profibus, CAN/DeviceNet and Ethernet.





More reliability for outstanding availability and safety

The new IRB 6400 is a robust, all-steel construction with high material strength. The arms are mechanically balanced and equipped with double bearings.

Advanced motion control together with collision detection reduce the collision force to one third, thus reducing the risk of tool and workpiece damage. Process cabling is integrated through the robot base.

Extensive recovery actions under pre-defined conditions and operator safety features also ensure that the risk for damage or injury is minimised.

The MTBF (Mean Time Between Failure) has been steadily increased since the introduction of the IRB 6000 series in 1991. The new IRB 6400 has been designed for an MTBF of more than 50,000 hours.

Focused applications

The IRB 6400 series is developed for focused industries and applications in order to obtain maximum performance, adaptability and reliability.

Spot welding

The IRB 6400 robot family is optimised for spot welding applications. The compact body has a very small interference radius and the welding cabling is well protected and easily replaced within 15 minutes. The position switches for axis 1, 2 and 3 are accessible for easy adjustment of the arm motion limits. Alternative load/reach capability is readily obtained through fast change of the upper arm (less than 30 minutes). High production rates are obtained through excellent speed and accuracy and a long operating life through the rugged construction.

Machine and press tending

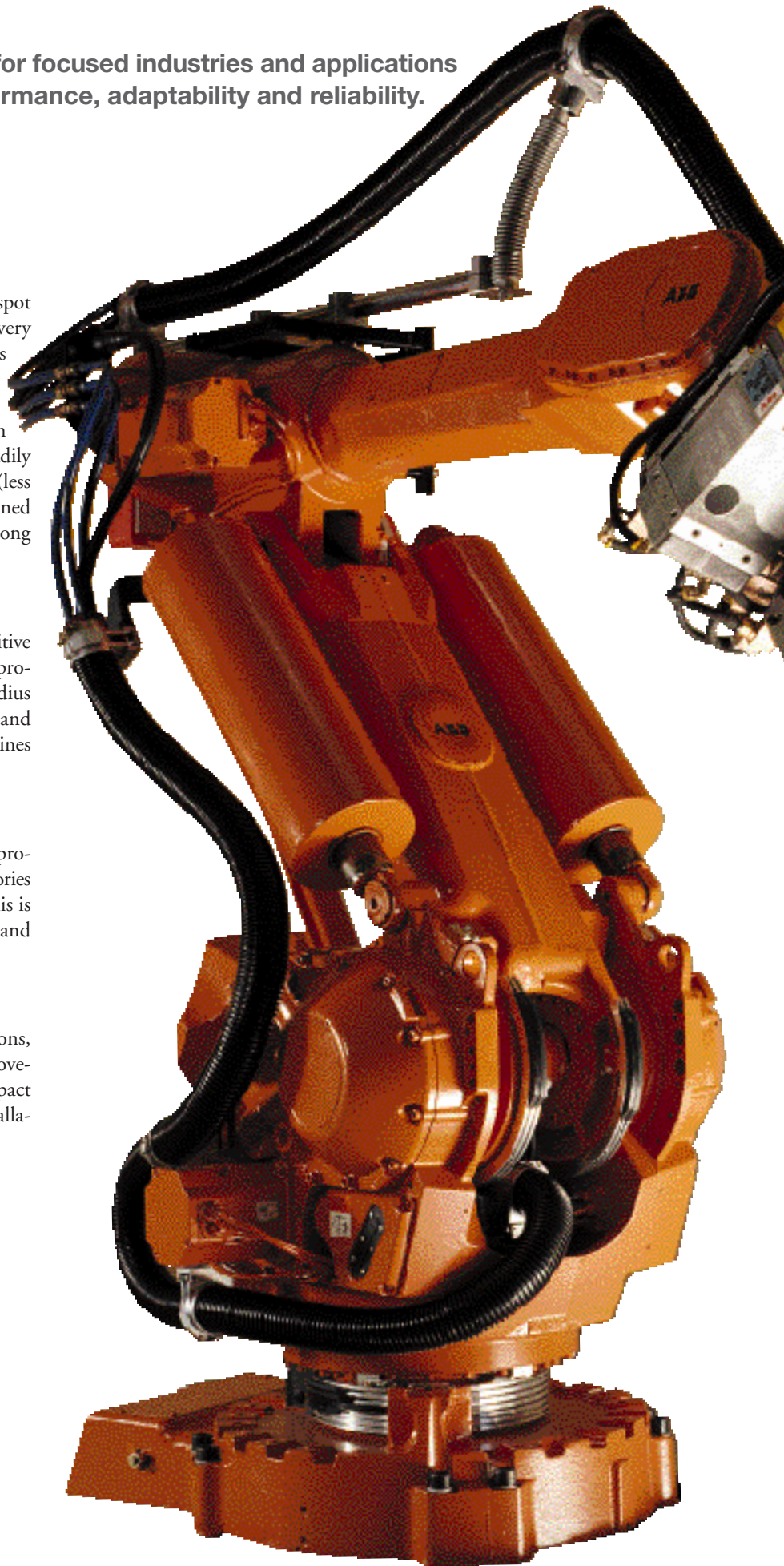
Monotonous and heavy lifts are reduced at competitive costs. The IRB 6400 is easily integrated in the production cell thanks to its compact interference radius in combination with long reach. Great flexibility and high MTBF guarantee that expensive process machines are utilised as many hours as possible.

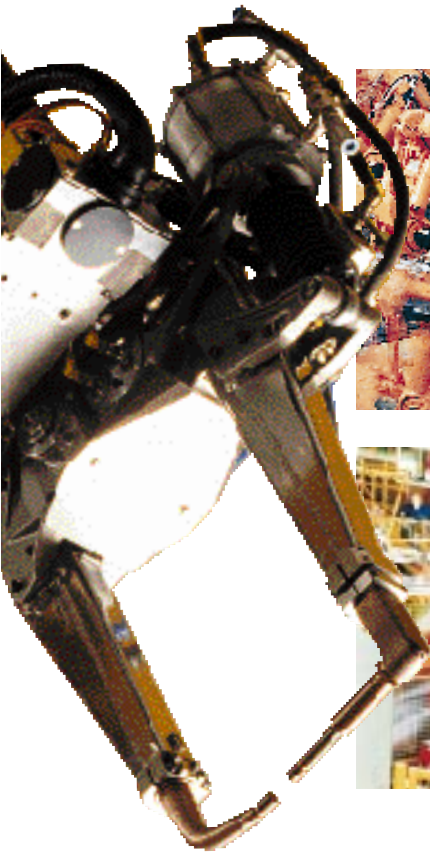
Material handling

In material handling, the IRB 6400 offers high production rates, reduced lead times and smaller inventories giving faster turnover of capital and materials. This is thanks to its high speeds, compact turning radius and long reach with high load capability.

Palletizing/packaging

The IRB 6400 is easily fit into packaging applications, thanks to its large working range. The fast axis movement allow high speed palletizing. The compact interference radius further simplifies flexible installations in compact areas.





Assembly

The high accuracy together with the use of a robot vision system is ideal for assembly of large objects such as windcreens, wheels, engine parts, etc. Variants in load and reach capability give a wide choice for the application. The workcycle times can be adjusted for optimum production, without reducing the accuracy of the programmed path.

Grinding/Polishing

The load/reach capability and the soft-servo functionality together with the high accuracy make the robot series ideal for grinding and polishing of large objects. The robots are robust and are available with increased protection against aggressive environments. The excellent robot performance and the programming adaptability allow for high production rates with high product quality.

Foundry applications

The robots play an important role in modern foundries, offering high accuracy and the flexibility needed. The robust design and special foundry protection, with IP 67 wrist protection as standard, make the robot an excellent work horse in dirty and hostile environments. Speed and accuracy are obtained also for heavy parts thanks to a handling capacity of up to 200 kg.

Software tools and application-dedicated software

BaseWare Operating System

The IRB 6400 robot series is supplied with BaseWare Operating System software. A highly configurable system featuring TrueMove and QuickMove functions delivering superior performance in your applications.

A range of PC-tools for user-adapted functionality

ABB offers a range of tools for training, programming, monitoring and simulation. Using QuickTeach™ you can learn how to program and operate an ABB robot using an emulated control pendant. ProgramMaker™ is a collection of powerful PC applications which allows you to develop and maintain robot programs and configuration files off-line while taking full advantage of the Windows user environment.

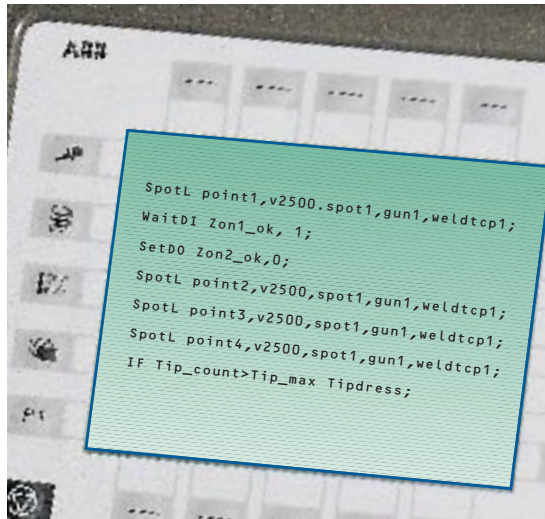
Effective monitoring and troubleshooting are crucial. FactoryWare™ enables you to create an on-line Windows-based graphical operator interface of the installation on your PC.

Using our simulation solutions, you can be sure that your investment is optimised – before you actually invest. RobotStudio™ allows fast and easy creation of robot programs without requiring access to the robot itself, simulating robot movements and cycle times. Using digital 3D replicas of the robots and their environment, programming and fine tuning of a robot station can be carried out quickly and efficiently off-line on a PC.

Advanced application-dedicated software

Advanced functionality is offered through application-dedicated ProcessWare™ software packages. SpotWare™ for spot welding comprises a large number of dedicated spot welding functions. It is a simple yet powerful product that allows you to handle both positioning of the robot, process control and monitoring in the same instruction. Cycle times are shortened through closing of the welding gun in advance and through starting the movement of the robot immediately after a spot weld is completed.

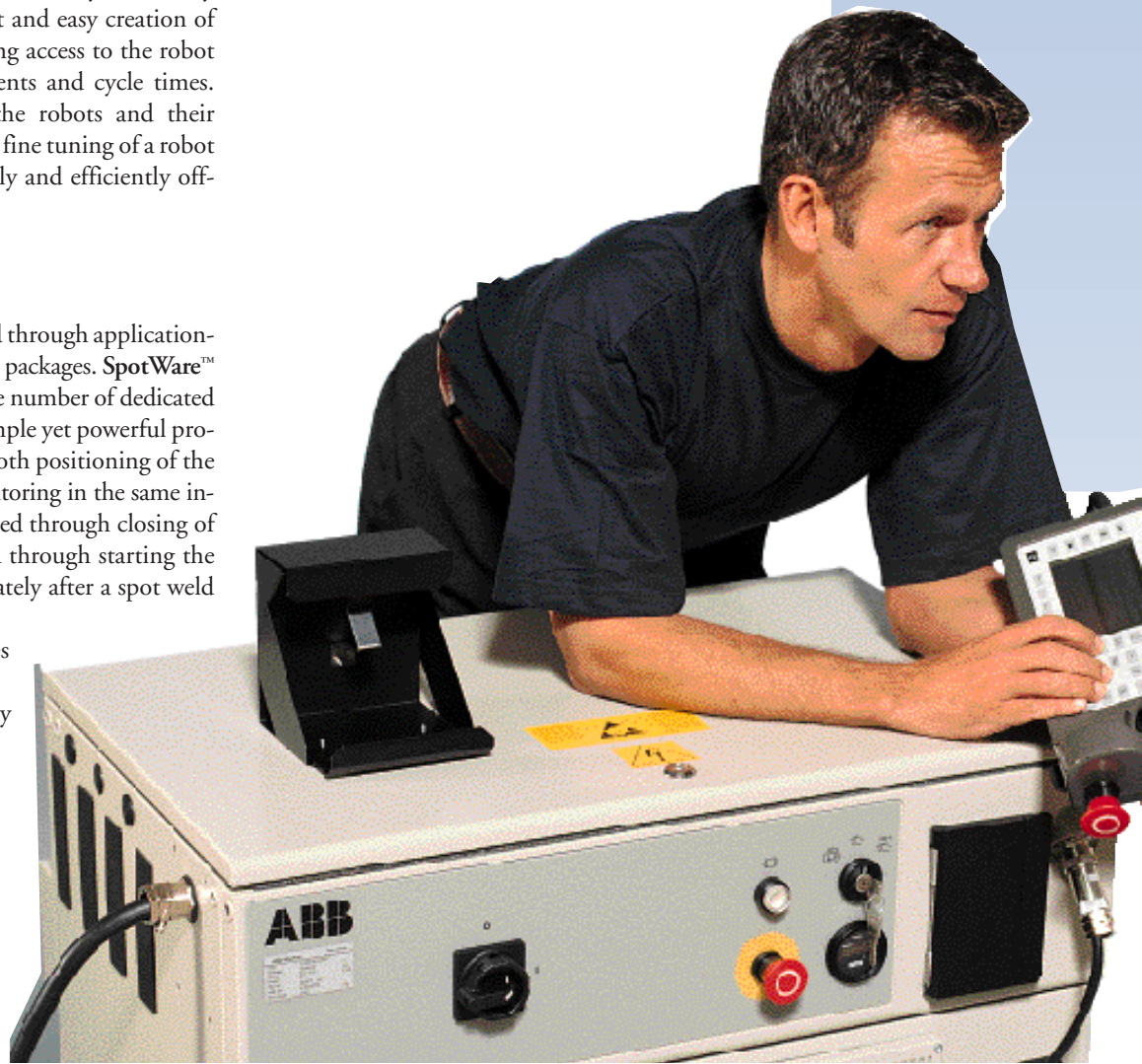
I/O signals, timing sequences and weld error actions are easily configured. Up to four stationary welding guns can be controlled from one robot controller.



Programming with the robot language RAPID results in easy-to-read displays with user-adapted texts.

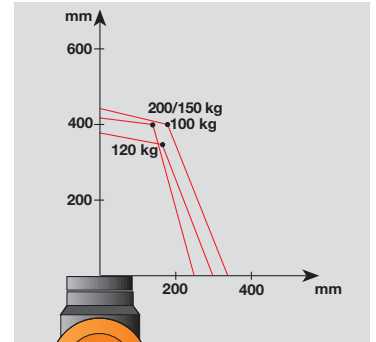
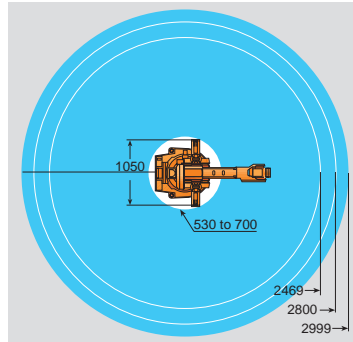
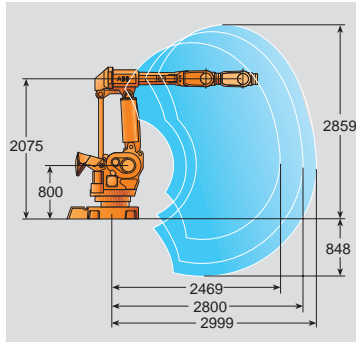
Example of functionality

- Adaptation to different welding guns
- Adaptation to different weld timers
- Collision detection
- Soft servo on all axes
- Automatic load identification for optimum acceleration
- Control/monitoring of the robot motion within defined "world zones"
- Multi tasking
- Conveyor tracking
- Error recovery routines

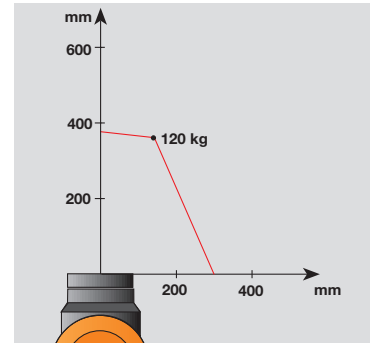
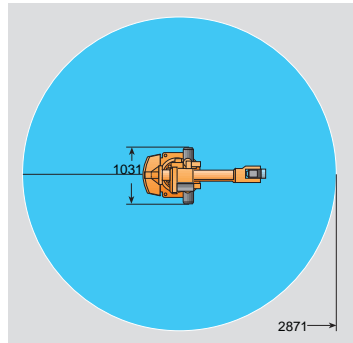
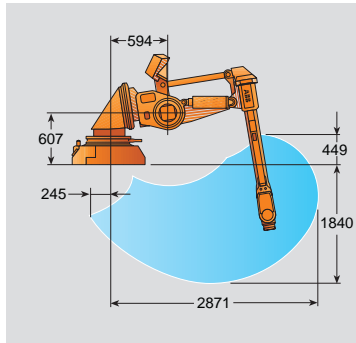


Working range and Load diagram

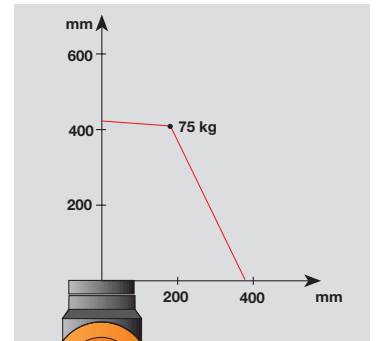
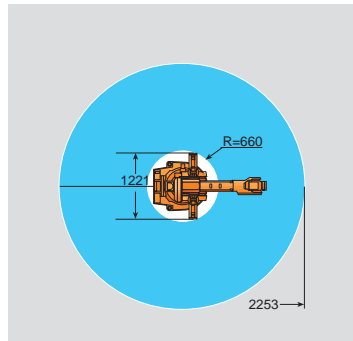
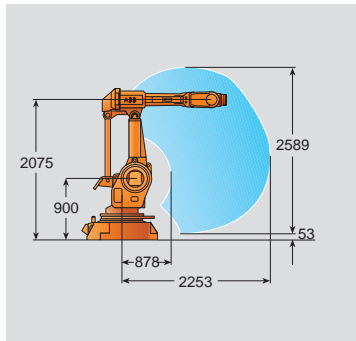
IRB 6400R and IRF 6400R



IRB 6400S



IRB 6400PE



Main process area	Spot welding, Machine and press tending, Palletizing, Material handling, Assembly, Grinding, Polishing						Spot welding and Machine tending	Poke welding
Robot	IRB 6400R and IRF 6400R						IRB 6400S	IRB 6400PE
Mounting	Floor						Shelf	Floor
Reach	3.0 m	2.5 m	2.5 m	2.8 m	2.5 m	2.8 m	2.9 m	2.25 m
Handling capacity	100 kg	120 kg	150 kg	150 kg	200 kg	200 kg	120 kg	5000 N



Technical data

IRB 6400 industrial robot series

SPECIFICATION

Robot versions IRB and IRF	Reach to 5 th axis	Handling capacity	Remarks
6400R/3.0-100	3.0 m	100 kg	
6400R/2.5-120	2.5 m	120 kg	
6400R/2.5-150	2.5 m	150 kg	
6400R/2.8-150	2.8 m	150 kg	
6400R/2.5-200	2.5 m	200 kg	
6400R/2.8-200	2.8 m	200 kg	
6400S/2.9-120	2.9 m	120 kg	Shelf
6400PE	2.25 m	5000 N	Poke welding

IRF robots are sealed and have protective coatings for foundry-type applications.

Supplementary load	
3.0-100, 2.8-200, 2.5-120, 2.5-150, 2.5-200 and 2.8-150	50+320 kg
Others	35+320 kg

Number of axes	
Robot manipulator	6
External devices	6

Integrated signal supply	
	10 poles 50 V DC 2 poles 250 V AC 2 CAN-Buses

Integrated air supply	
	Max. 10 bar

PERFORMANCE

Position repeatability	
2.5-120 and 2.5-150	±0.1 mm
Others	±0.15 mm

Path repeatability at 1 m/s (based on ISO path)	
2.5-120 and 2.5-150	±1.0 mm
Others	±1.5 mm

Max. TCP velocity on ISO-plane	
	>2-3 m/s

Max. TCP acceleration on ISO-plane	
	>10 m/s ²

Axis working range				
	Axis	Shelf	PE	Others
Positioning	1 Rotation	360°	360°	360°
	2 Arm	130°	140°	155°
	3 Arm	108°	133°	138°
Reorientation	4 Wrist	600°	400°	600°
	5 Bend	240°	240°	240°
	6 Turn	600°	600°	600°

Axis maximum speed, °/s						
	Axis	2.5-120 3.0-100	2.5-150 2.5-200 2.8-150	2.8-200	PE	Shelf
Positioning	1 Rotation	110	100	90	70	100
	2 Arm	100	90	70	70	100
	3 Arm	100	90	70	70	100
Reorientation	4 Wrist	210	120	110	210	210
	5 Bend	150	120	110	150	150
	6 Turn	210	190	110	210	210

Max. force, PE	
	5000 N

ELECTRICAL CONNECTIONS

Supply voltage	200-600 V, 50/60 Hz
Rated power, supply transformer	7.2 - 7.8 kVA

PHYSICAL

Dimensions	
Manipulator base	
IRB and IRF	1070 x 1050 mm
IRB 6400S	1044 x 922 mm
IRB 6400PE	1044 x 922 mm
Cabinet, H x W x D	950 x 800 x 540 mm

Weight	
Robot manipulator	
6400PE	1600 kg
Others	2060 - 2390 kg
Robot controller	240 kg

ENVIRONMENT

Ambient temperature	
Manipulator	5 - 50°C
Controller	5 - 52°C

Relative humidity	Max. 95%
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Degree of protection	
IRF versions	IP 67 - IP 55
Others and controller	IP 54 (wrist IP 55)

Noise level	Max. 70 dB (A)
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Safety	Double circuits with supervision, emergency stops and safety functions, 3-position enable device
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Emission	EMC/EMI-shielded
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MAN-MACHINE-INTERFACES

Operators' panel	In cabinet or external
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Control pendant	Portable with joystick and keypad. Display 16 lines x 40 characters. Window style communication. Enabling device, back lighting.
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Languages	Choice between 10 national languages
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PC-Software	"The S4C software on your PC" QuickTeach training Off-line programming VirtualRobot simulation Monitor and control of robots from PC
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RRS Simulation	From simulation companies
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MACHINE INTERFACES

Digital inputs/outputs	Up to 512, 24 V DC, 120 V AC or relay outputs
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Analogue inputs/outputs	Up to 120, ±10 V and ±20 mA
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Serial channels	One RS 232 and one RS 422
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Remote I/O	Allen Bradley PLC
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Network	Ethernet
Fieldbus	CAN Interbus-S Profibus

Process interfaces	Media signals and welding cabling on upper arm Built-in welding timer
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Diskette drive	3.5" MS-DOS
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Robot vision	OptiMaster
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Data and dimensions may be changed without notice.



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