

# IRB 140 Industrial Robot

Offering new opportunities in flexible automation



**ABB**

**A powerful robot in a small package  
– the new IRB 140 industrial robot**

***B**ased on customer demands for a powerful robot in a small package, ABB introduces the new IRB 140. The new industrial robot is only 81 cm high and weighs 98 kg – but has a handling capacity of 5 kg, 6 working axes and a great reach. IRB 140 is also faster and more accurate than any other robot of its size and it has an outstanding flexibility in mounting. All together offering totally new opportunities to the world of flexible automation.*



**A powerful robot in a small package**

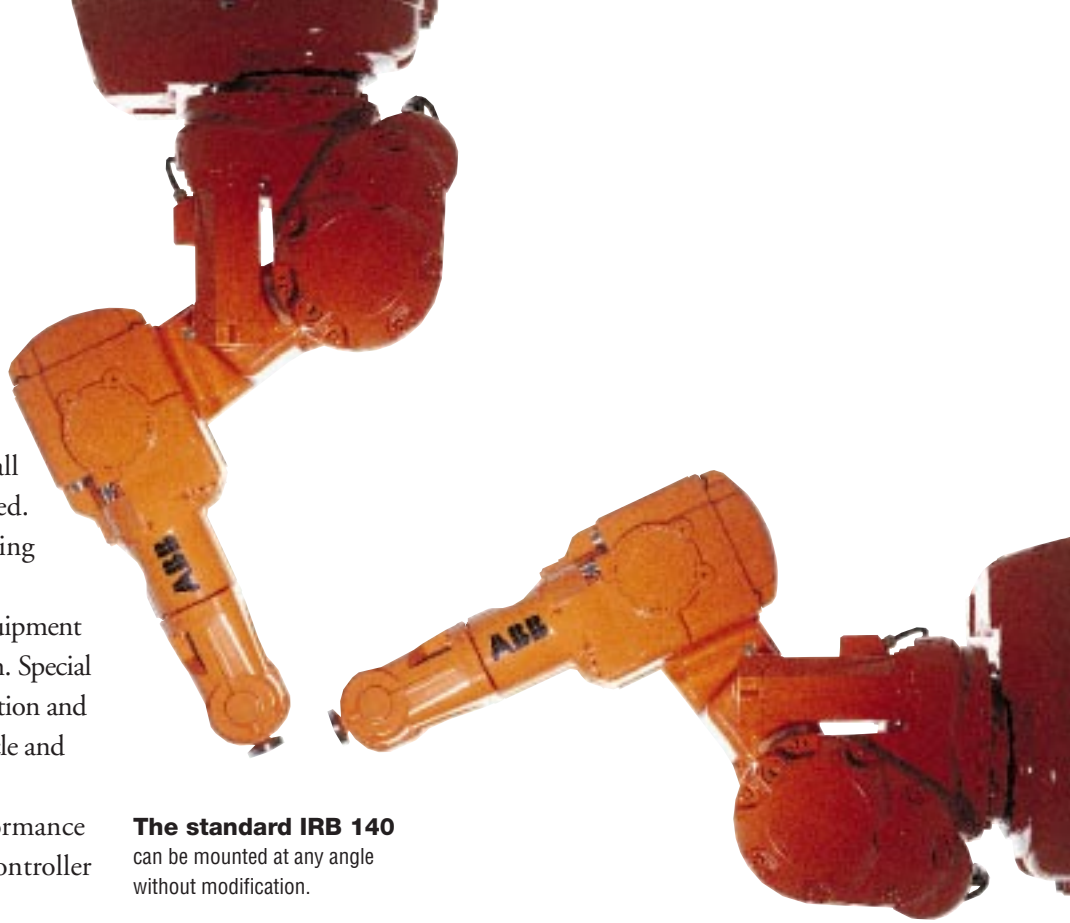
The IRB 140 offers a combination of large load capacity and acceleration in a small package. The robot is compact and flexible and will fit snugly into crowded workplaces.

## Easy to integrate

The standard IRB 140 can be foot or wall mounted at any angle, or ceiling mounted. This allows for great flexibility in arranging the layout of a production line.

Being easy to integrate with process equipment makes the IRB 140 a cost-effective solution. Special attention is paid to fast and flexible installation and start-up, easy programming of the workcycle and fast reprogramming for new tasks.

The IRB 140 matches the high performance of all ABB robots, and the same robot controller is used throughout the robot range.



**The standard IRB 140** can be mounted at any angle without modification.

## A partnership approach

ABB has more than 25 years of experience in providing robotic solutions. Through close partnership with process equipment suppliers, machine builders, system suppliers and system integrators, ABB products and systems are supplied through different channels so that the end-user gets the benefits of the combined know-how of many expert suppliers.

## Even more with the new S4Cplus robot controller

The latest S4Cplus robot controller is even more powerful than its predecessors. The robot controller allows easy integration and great communication possibilities between the robot and other equipment via digital signals or a number of available field busses. The two Ethernet interfaces allow PCs to be integrated into process information monitoring and adjustment.

Another key design factor is the open language and system configurability that allow for addition of new functionality and permit the functionality to be adapted to the user's specific needs.



**The S4Cplus robot controller** is highly configurable and allows for easy integration through extensive interfacing capabilities.

## Developed for specific processes

- Arc welding, polishing and press tending
- Aluminium die-spraying and deburring
- Small goods assembly, handling and packing
- Machine loading and unloading of inserts and parts, material handling and machine tending

### A compact robot for compact arc welding cells

The FlexArc® Compact is a self-contained skid-mounted welding cell containing an IRB 140 robot and a cell management system. It is designed to fit quickly and easily into a small space on an existing production line. It provides immediate flexibility – removing a production bottleneck or facilitating rapid change-over between jobs.

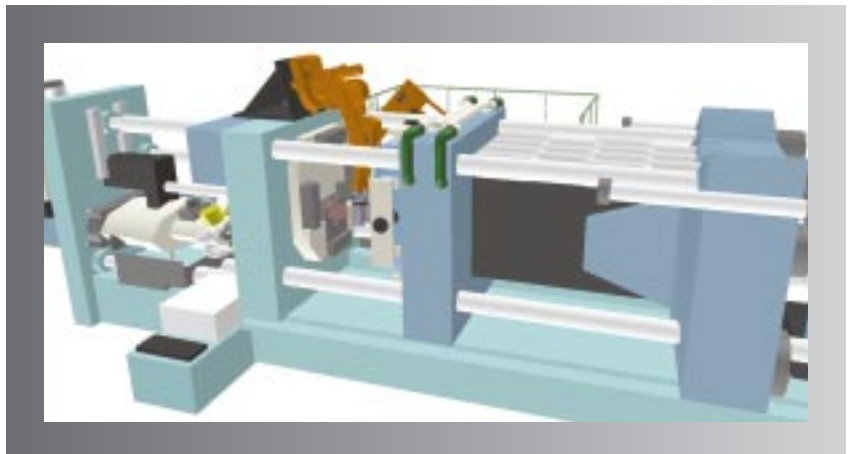
The skid is designed to fit on a standard fork-lift truck and there are single connections for power, gas and air. The unit can start work 10 minutes after arriving at the production facility.



▲ The FlexArc Compact is a self-contained skid-mounted welding cell containing the IRB 140 robot. It provides immediate flexibility – removing a bottleneck or facilitating rapid change-over between jobs.

### A totally enclosed robot for die spraying applications in Foundries

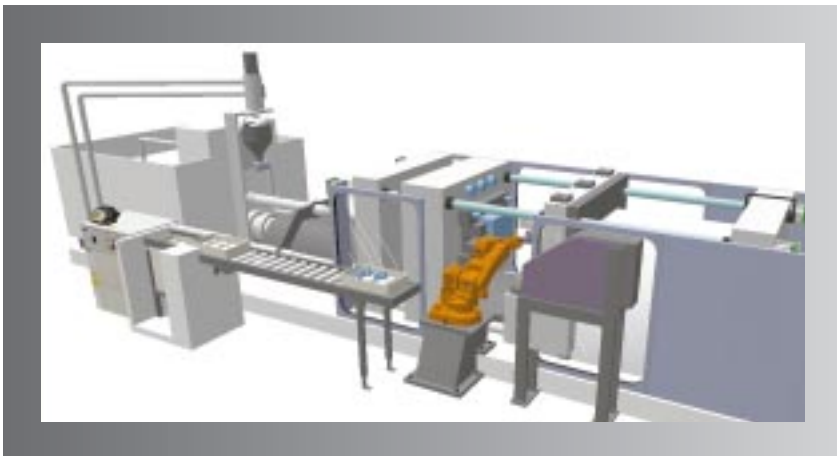
ABB offers a range of robots proven in harsh foundry environments. The new IRB 140 is available with foundry protection IP67 and is designed for mounting at any angle on foundry machines. The 5 kg load capacity and high load offset make it very suitable for die spraying in small and medium size die casting machines.



▲ The IRB 140 in protection form IP67 is suitable for die spraying in small and medium-sized aluminium die casting machines.



▲ Inverted IRB 140 robots to Clean Room 10 Standards are ideal for assembly and testing of small electronic goods. The robots are compact and are suitable for tight production lines.



▲ IRB 140 loading inserts and unloading plastic parts from an injection moulding machine. The robot can also be mounted on the injection machine or inverted on an overhead track.

### **Clean Room 10 design for Electronic Goods**

The IRB 140 moves at high speed and with very high repeatability. This together with the compact design, long reach and the ability to mount the robot in an inverted position, makes it ideal for assembly and testing lines for small electronic goods such as mobile telephones, radios etc. The robot is also suitable for packing the finished products.

### **A high performance robot for loading and unloading of plastics machines**

The IRB 140 is a perfect robot for loading inserts and unloading the moulded parts from injection moulding machines. The 5 kg load capacity allows a double gripper to both insert and unload parts in the same work cycle, speeding up the production considerably.

The 6 axes allow high accessibility around the mould and increase the flexibility of the installation.



### **◀ Simulation**

Our robotic experience together with process expertise forms the basis of our solution concepts.

These concepts are available in simulation programs where your specific solution can be proven on the PC-screen and checked for feasibility and cycle times.

# Hard facts that make a small robot powerful

The IRB 140 robot offers very high performance. The robot design together with the advanced control system give capacity and functionality previously associated with large robots. The IRB 140 is truly a powerful robot in a small package. Some features are listed below:

## QuickMove and TrueMove functions for very high performance

These well established ABB robot functions are a result of using a dynamic model to control the robot. The robot is self-tuning and always achieves the highest performance.

## Software template program

Software programs for fast and easy set-up of new welding programs are available.

## Add-on application specific software

Dedicated software that is continuously updated, including ArcWare™, ArcWare plus™, GlueWare™.

## Programmed "interrupts"

Can initiate in-loading of material, torch service and procedures for faults.

## Background programs

Up to 10 background programs can run in accordance with chosen priority.

## Extensive communications

1024 inputs/outputs, three serial channels, two Ethernet connections, two CAN/DeviceNet buses, PLC, Interbus and Profibus.

## Soft Safety Clutch

The collision force-reduction software functions as a software safety clutch.

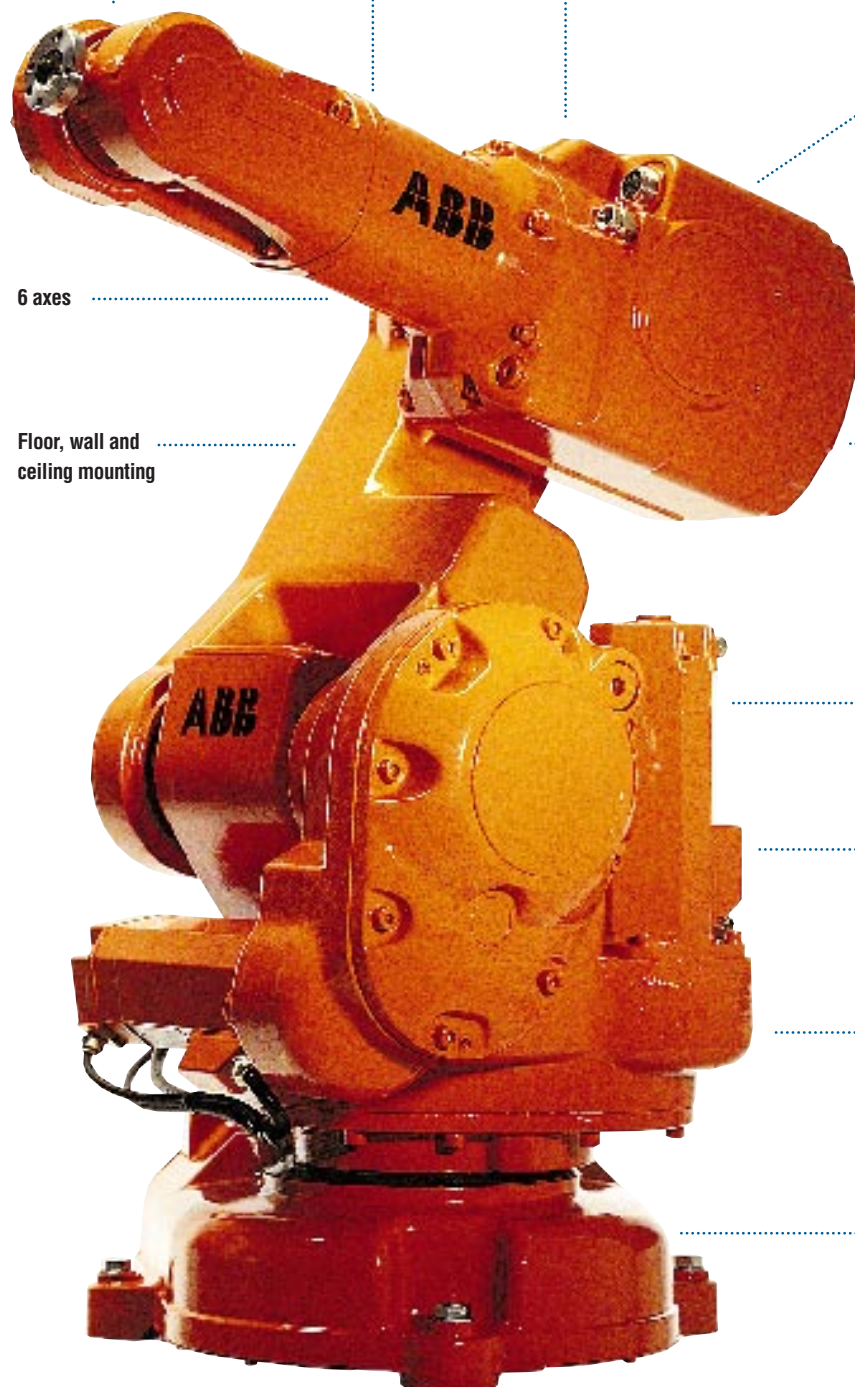
5 kg load capacity

Small size,  
large working range

High performance

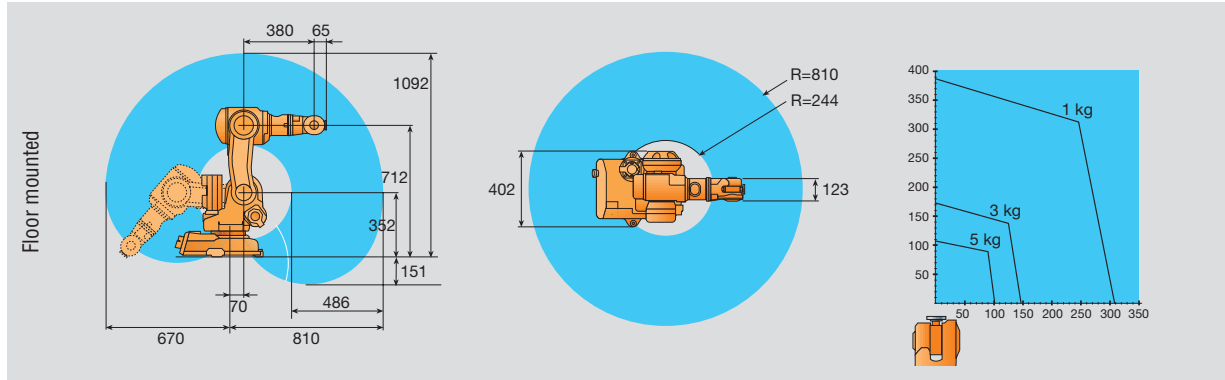
6 axes

Floor, wall and  
ceiling mounting



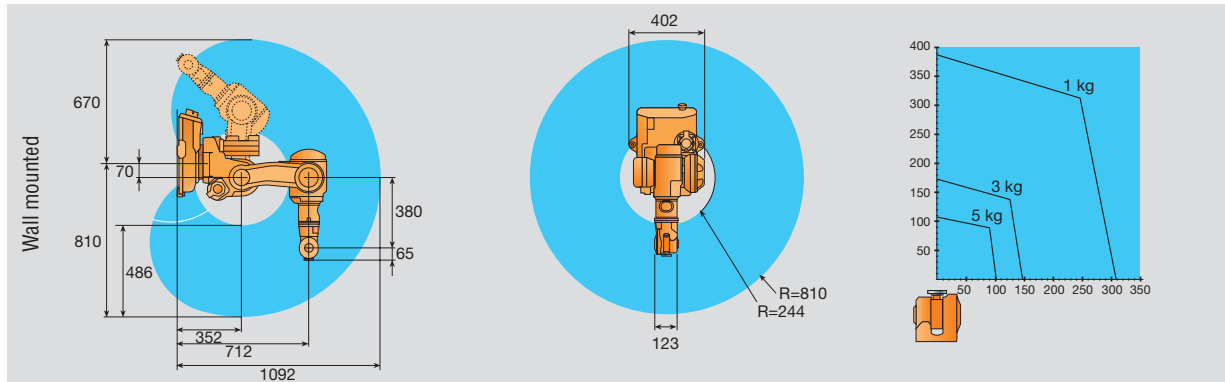
## Working range and Load diagram

Upper arm services include 12 signals and compressed air supply



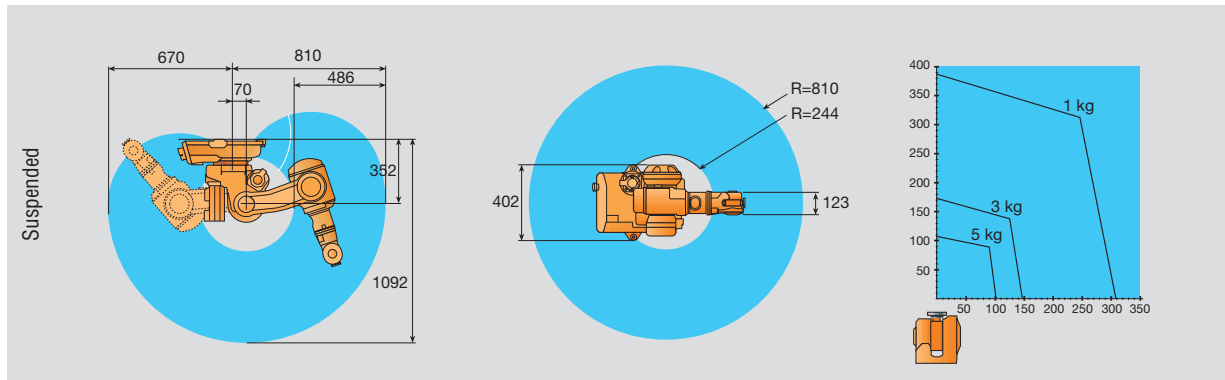
Add-on application specific software

Extensive communications



Clean Room 10 version

Totally enclosed version for harsh environments (IP67)



Working range to center of axis 5. All measurements in mm.

Easy to integrate

### Simulation

Simulation programs which use the actual robot software are available on PC for equipment feasibility studies. The programs simulate motion and cycle-time with high accuracy. The programs also facilitate robot programming and program adjustments.

High-accuracy simulation programs for PC

### Conveyor following

The conveyor following function is useful for in-loading and packing applications.

### Instant access to all software

Instant access to all supported field-buses and all editions of installed software programs.

# Technical data

## IRB 140 industrial robot

SPECIFICATION			
Robot versions	Handling capacity	Reach of 5th axis	Remarks
IRB 140	5 kg	810 mm	
IRB 140F	5 kg	810 mm	Extra protection
IRB 140CR	5 kg	810 mm	Clean Room
Supplementary load (on upper arm alt. wrist)			
on upper arm	1 kg		
on wrist	0.5 kg		
Number of axes			
Robot manipulator	6		
External devices	6		
Integrated signal supply			
	12 signals on upper arm		
Integrated air supply			
	Max. 8 bar on upper arm		
PERFORMANCE			
Position repeatability		±0.03 mm	
Axis movement			
Axis	Working range		
1, C Rotation	360°		
2, B Arm	200°		
3, A Arm	280°		
4, D Wrist	Unlimited (400° default)		
5, E Bend	240°		
6, P Turn	Unlimited (800° default)		
Movement on ISO test plane, all axes in movement			
Max. TCP velocity	2.5 m/s		
Max. TCP acceleration	20 m/s <sup>2</sup>		
Acceleration time 0-1 m/s	0.15 sec.		
ELECTRICAL CONNECTIONS			
Supply voltage		200-600 V, 50/60 Hz	
Rated power			
Transformer rating	4.5 kVA		
PHYSICAL			
Robot mounting		Floor, wall and suspended	
Dimensions			
Robot base	400 x 400 mm		
Robot controller H x W x D	950 x 800 x 620 mm		
Weight			
Robot manipulator	98 kg		
Robot controller	250 kg		
ENVIRONMENT			
Ambient temperature			
Robot manipulator	5 - 45°C		
Robot controller	5 - 52°C		
Relative humidity		Max. 95%	
Degree of protection, Manipulator			
Standard	IP54		
Foundry/Clean Room	IP67		
Clean Room	Class 10		
Controller			
	Enclosed air-over		
	Sealed computer, air-over		
	Totally enclosed		
Noise level		Max. 70 dB (A)	

Safety	Double circuits with supervision, emergency stops and safety functions, 3-position enable device
Emmission	EMC/EMI-shielded
MAN-MACHINE-INTERFACES	
Operators' panel	In cabinet or external
Teach pendant	Portable with joystick and keypad. Display 16 lines x 40 characters. Window style communication. 3 position enabling device, back lighting. 5 user-definable keys, emergency stop.
Languages	Choice of 11 national languages
PC, off-line	"The S4Cplus software on your PC" QuickTeach training on PC RobotStudio™, ProgramMaker™ VirtualRobot simulation Monitor and control of robots, FactoryWare™
PC, on-line	
RRS Simulation	From simulation companies
MACHINE INTERFACES	
Inputs/outputs	Up to 2 x 1 024 signals, 24 V DC,
Digital	120 V AC or relay outputs ±10 V and 4-20 mA
Analogue	
Serial channels	Two RS 232 and one RS 422
Networks	2 x Ethernet Allen Bradley PLC
Fieldbus	2 x CAN/Device Net Interbus-S Profibus DP
Process interfaces	Media and signals on upper arm
EXAMPLE OF ARC WELDING EQUIPMENT AND FUNCTIONALITY	
Process equipment	Weld power sources Wire feed systems Welding torches Workpiece manipulators
Example of process signal interface	Status of arc, voltage, current, water, gas, wire feed (digital input) On/off of power, gas, wire feed, error information (digital output) Value of wire feed velocity, voltage, current (analogue output)
Example of ArcWare™ functions	General power source interface Process tuning of welding parameters during program execution (hot edit) Weld-retry including "go-to-service" routine Weld error report and logging Arc start/end Material pre-heating/cooling Scrape start Crater filling Wire burnback Weaving pattern definition Monitoring of arc data, seam coordinates, wire, water, voltage, current, gas
Diskette drive	3.5" MS-DOS
Robot vision	Interface for vision

Data and dimensions may be changed without notice.



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