

FlexLine

Superior Paint Process System



ABB

Ultimate precision Perfect results

Higher efficiency, improved finish quality, lower cost and reduced emissions are all more easily achieved through ABB's FlexLine™ paint process system.

The FlexLine™ system

The fully integrated paint process system FlexLine™ combines all the advantages of the cutting-edge ABB Technologies, from our powerful paint robots to our original paint application equipment and paint distribution. With every detail engineered and tuned for perfect results, the FlexLine™ system takes precision and reliability to a higher level. By choosing a fully integrated FlexLine™ solution from ABB, you will have one responsible partner with in-depth knowledge of the entire paint process.

High finish quality

ABB's Paint Saving Technology ensures a uniform film build with a specified thickness over the entire object.

Increased paint and solvent savings

The shortest possible distance between the applicator and vital paint regulation equipment reduces paint and solvent waste significantly.

Unsurpassed flexibility

ABB's Hollow Wrist Technology makes our paint robots among the most versatile and easy to program robots in the industry.

Fast installation

ABB's pre-configured Function Packages are designed to have your system up and running very quickly.

Increased productivity

ABB's Superior Control Technology allows program optimisation without interrupting production, and is surprisingly easy to learn and to operate.

Global service network

Another good reason for choosing ABB and a guarantee for maximum system up-time.





The ABB high finish quality is reflected on some of the world's nicest cars.

A life-long global partner

ABB is one of the leading suppliers of paint solutions worldwide. With a long history and a clear vision of the future we aim to be a life-long partner to our customers.

One of our car manufacturing customers states that "ABB was chosen due to a good relationship and extremely promising test results." This customer trusted our reliability and good quality as the best way of increasing their paint system availability.

We have built strong relationships with some of the world's largest automotive manufacturers, and are

represented on three continents. A fast installation process based on our standardised but flexible function packages, smooth system compatibility and proven reliability, has made them choose ABB as their longterm partner.

ABB is also the only company capable of providing a global network of local customer service resources, offering instant access to service technicians fully qualified in all core aspects of flexible automation. Thus we provide everything you need to optimise your precision paint process investment.

FlexLine™ combines the cutting

Abb's Paint Saving Technology:

Intelligent solutions

The IRB 5400 process robot has been optimised for low material waste and fast process control. Vital paint regulation equipment is placed as close to the applicator as possible.



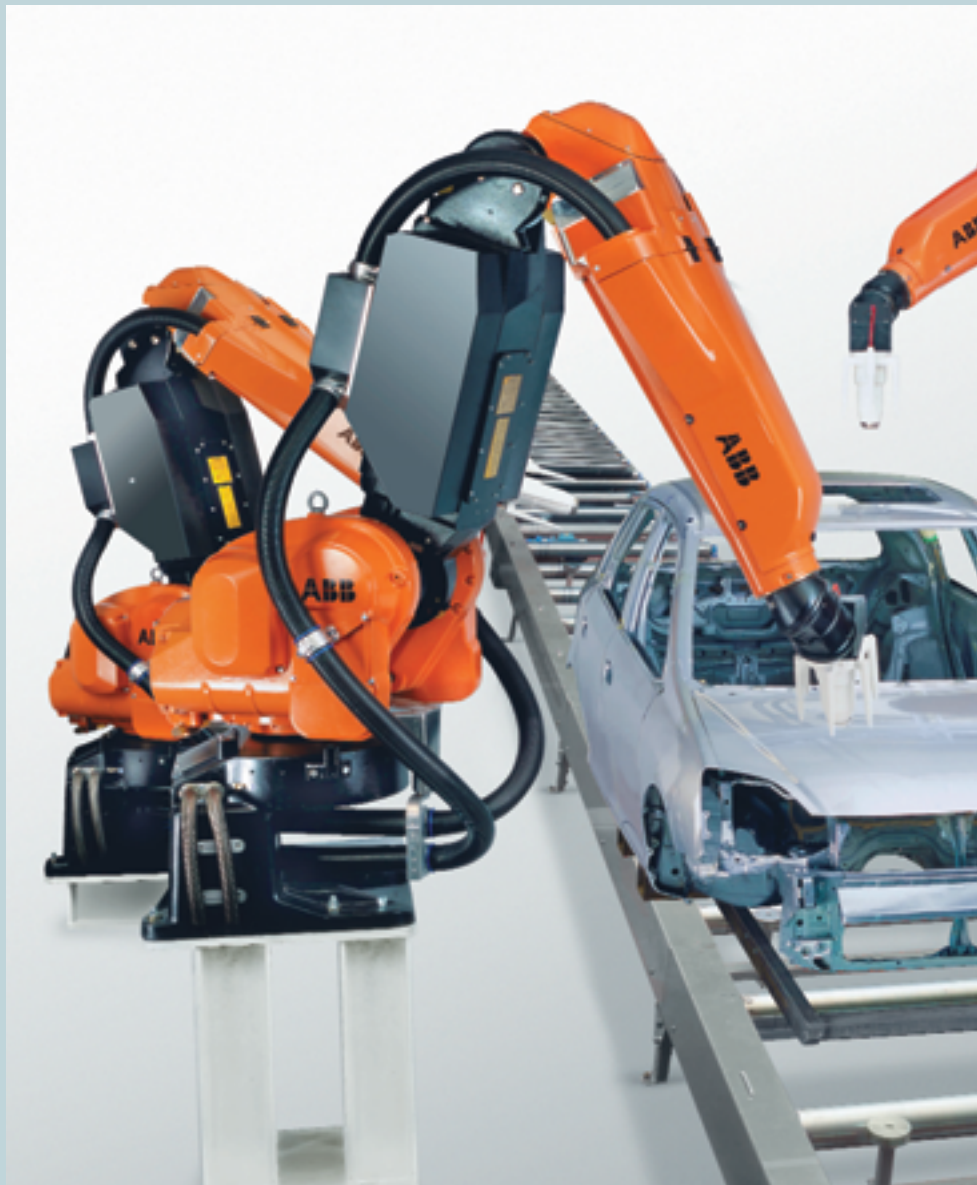
Efficient paint process

IPS, our Integrated Process System, features closed loop regulation and high speed control for paint and air flow adjustments. IPS ensures a uniform film build with a specified thickness over the entire object.

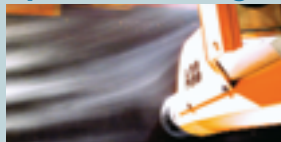


High finish quality

Our paint application equipment has been optimised for all parts of the painting process. Our range includes conventional highly efficient and precise guns and bells, and top-of-the-line G1 FlexBell with ABB Metabell™ technology. The Metabell™ function combines the high transfer efficiency of a bell with the versatility of a conventional air spray gun, giving the G1 FlexBell unsurpassed metallic finish quality and transfer efficiency.



Optimised design



Extensive lab measurements and real-life tests are used to optimize design and paint process efficiency. The robots are even tested and tuned in wind tunnels to minimise booth air flow disturbance caused by the high speed arm movements.

High serviceability

The process robot has been designed for optimum serviceability and reduced MTTR. Because of this the main process components are easily accessible and easy to replace.



edge ABB Technologies



ABB's Hollow Wrist Technology:

140° unsurpassed flexibility

With 140° rotation capability in any



direction, the Hollow Wrist allows full coating of even the most complex parts. The straight design of the wrist increases durability and reliability.

ABB's Hose Routing Technology:

Reduced hose wear

By routing all hoses through the new riser of the IRB 5400-02 series, the system takes up less space in the paint booth.

The Hose Routing Technology used for

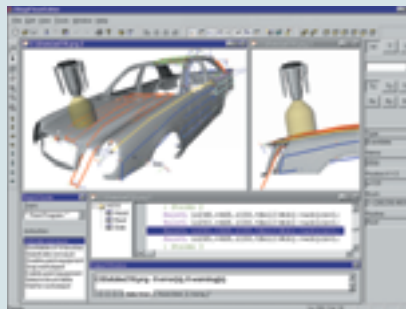


the IRB 5400 also improves safety and reduces hose wear.

ABB's Superior Control Technology:

User friendliness

Our powerful software packages, CAP and FlexUI including the ShopFloor Editor, allow for easy programming without interrupting production. ABB's RAPID Programming Language is easy to use with powerful paint commands and process control. Flexible communication interfaces make it easy to adapt to any environment.



ABB's Global Controller Platform reduces training, service and engineering cost. Operation and service costs are kept to a minimum.

Built to fit your needs

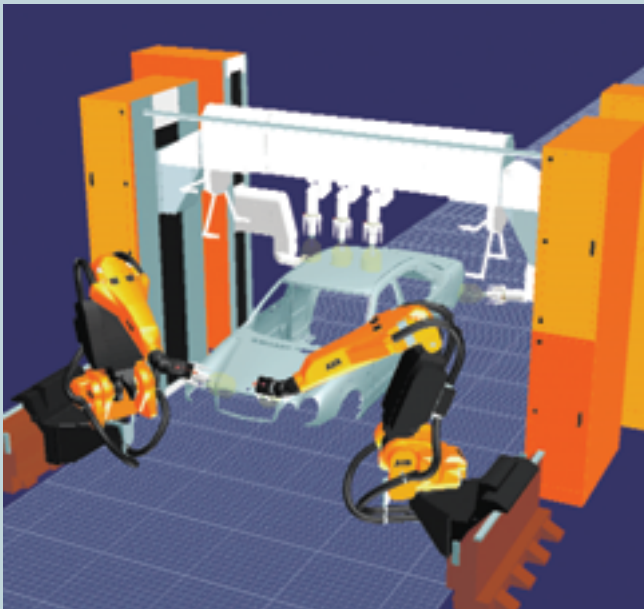
The FlexLine™ system provides paint solutions which maximise your performance and minimize your costs.

The FlexLine™ system ensures consistent quality in application of prime coat, base coat and clear coat. As your partner in painting ABB can provide complete solutions to meet your precision painting needs with maximum flexibility.



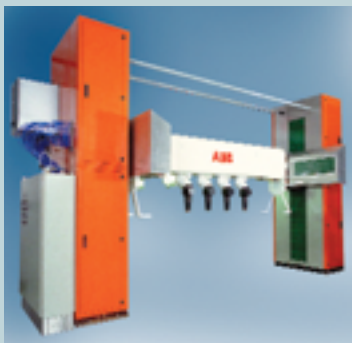
IRB 5400-02, Process robot

- Integrated paint equipment and pump motors in horizontal arm
- Flexible hose routing solution all the way down through the foot unit
- Powerful mechanics & drive system, high acceleration and high speed
- Large work-envelope
- Available on rail systems



SidePainter™, TopPainter™ and IRB 5400-02 for exterior painting

The IRB 5400-02, the SidePainter™ and the TopPainter™ provide automotive manufacturers with cost-effective, flexible and reliable solutions for exterior painting. Combined they have the flexibility of robots, the capacity of SiTo and the transfer efficiency of the MetaBell technology. All three systems include integrated high voltage controller, integrated bell speed control, and full IPS with in-arm process control and integrated pump servo motors.



IRB 5640, TopPainter™

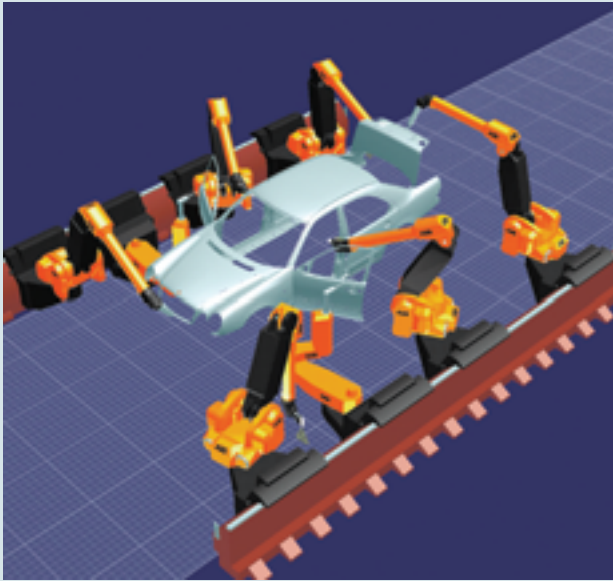
- 5 or 6 axis
- Standard or extended tracking
- Atomisers mounted on wrist
- Individual tilting of bells
- Servo controlled bell indexing



IRB 5610, SidePainter™

- 3 axis, Direct Transmissions
- Large space for Paint Handling Equipment
- Large work-envelope 2600 mm x 700 mm

ABB's interior painting solutions



IRB 5400-04
FlexPainter™ on in-
booth rail.



IRB 5400-03
FlexPainter™ on
clean-wall rail.

IRB 5400-02
FlexPainter™, floor
mounted.



The cost saving IRB 5400-series

The time and paint savings of the IRB 5400-series will impress you.

By integrating colour change valves, pumps, flow sensors and air- and paint regulators into the arm of the IRB 5400, we have made the IRB 5400 one of the most reliable, costeffective paint process robots in its class.

The FlexPainter™ series consists of IRB 5400-02 FlexPainter™, IRB 5400-03 FlexPainter™ on clean-wall rail and IRB 5400-04 FlexPainter™ on in-booth rail.

IRB 5400-series characteristics

- Slim arm
- Flexible Hollow Wrist
- Large work-envelope
- Powerful mechanics & drive system
- High load capacity
- Full IPS system
- High acceleration and high speed
- Uniform performance
- Endless rotation axes 4 and 5
- Rail systems with minimum disturbance of booth air flow
- Easy programming

IRB 5300, Door openers

Our door, hood and lid openers can be customised for the individual FlexLine™ system. The unique physical construction of these robots enables them to exactly follow the movement of the doors.

- The IRB 5300-series robots are delivered with
 - 3 or 4 axes
 - Floor mounted, on clean-wall or on in-booth rail
 - Conveyor tracking
 - Full servo control, smooth and flexible motion

IRB 5400 TECHNICAL DATA

SPECIFICATION IRB 5400

Handling capacity	15 kg	
Number of axes	IRB 5400-02	6
	IRB 5400-03	7
	IRB 5400-04	7

Axis movements	Working range	Max. speed
Axis		
1. Rotation	300° / 170° with riser foot	137°/s
2. Vertical arm	160°	137°/s
3. Horizontal arm	150°	137°/s
4. Inner wrist	Unlimited	440°/s
5. Wrist bend	Unlimited	430°/s
6. Outer wrist	920°	600°/s
Pose accuracy (Repeatability)	0,15 mm	
Path accuracy	Ø 6 mm (+/- 3 mm)	
Rail system	Length 2m, 3m, 3.5m, 4m, 4.5m, ...	
Pose accuracy (Repeatability)	0,1 mm	
Velocity	1.5 m/s	

ELECTRICAL CONNECTION

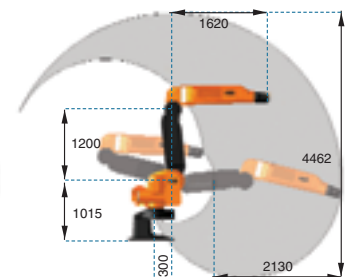
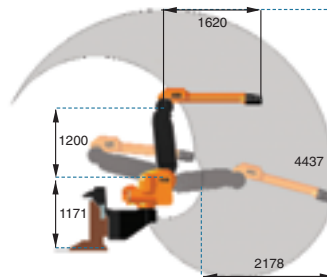
Supply voltage	Stand by	< 300 W
Power consumption	Production (6 axis machine)	< 700 W
	Production (7 axis machine)	< 1500 W
	Max. peak	4500 W

PHYSICAL

Dimensions		
Robot footprint	Standard foot unit	660 mm * 750 mm
	Riser foot unit	660 mm * 775 mm
Robot main axes	Base	660 (High), Ø 1130 mm
	Vertical arm	1200 mm
	Horizontal arm	1620 mm
Cabinet	Height	1280 mm
	Width	800 mm
	Depth	550 mm
Weight	Standard robot excl. foot unit	790 kg
	Process robot excl. foot unit	820 kg
	Standard foot unit	150 kg
	Riser foot unit	240 kg
	Clean wall rail trolley	360 kg
	In Booth rail trolley	340 kg
	Clean wall rail element (2m)	680 kg
	In Booth rail element (2m)	700 kg
	Robot controller	240 kg

ENVIRONMENT

Explosion protection		
North America	Class 1, Division 1, Group C&D	
Japan	IIGT4	
Europe	II B T4 (Zone 1)	
EMC	Electro Magnetic Compatibility certificate	
Ambient temperature	Robot unit	5-45°C
	Robot controller	5-52°C
Relative humidity	Max. 95% Non condensing	
Degree of protection	Protection standards	IEC 529
	Robot unit	IP 67
	Wrist	IP 54
	Robot controller	IP 54



USER INTERFACES

Operator panel	In cabinet or external
Programming unit	EExi protected. Portable, joystick and keyboard
	Display 16 lines * 40 characters
	Graphical 240 * 320 pixels
	Distributed intelligence
	Configurable on screen menus
Safety	EMY stop, Enable device, General mode stop, Auto mode stop, Test mode stop, Cabin interlock

MACHINE INTERFACES

Digital inputs/outputs	512/512
Analogue inputs/outputs	16/12
Remote I/O	Interbus-S 64/64
	Allan Bradley RIO 128/128
	Profibus DP 128/128
	CC Link 128/128
Serial Channels	RS-232, RS-422, RS-485
Network	Ethernet NFS/FTP
	RAP Robot Application protocol
	FactoryWare interface
	High speed IPS link
	Real Time Data Logger
	3,5" MS-DOS format
Diskette drive	
BASEWARE	
BaseWare OS	Robot Operating System, multitasking capability
RAPID	Powerful application programming language
Conveyor tracking	Accurate synchronisation of robotic motion, paint process regulation and the moving object. For both linear and circular objects in any direction

PROCESSWARE

IPS	Integrated Process System. Unique system for closed loop regulation and high speed control for paint and air flow adjustments. Based on open, flexible and adjustable architecture philosophy
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PC TOOLS

CAP	A Computer Aided Painting package containing ShopFloor Editor and RobView
ShopFloor Editor	Off-Line editing of programs using 3D graphics for path and process tuning
ColourChange Editor	Graphical programming and tuning of colour change sequences
RobView	Monitoring of robots and process in production. Easy design of user screens
FlexUI	Custom built GUI application for system supervision and control, based on standard ABB libraries



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