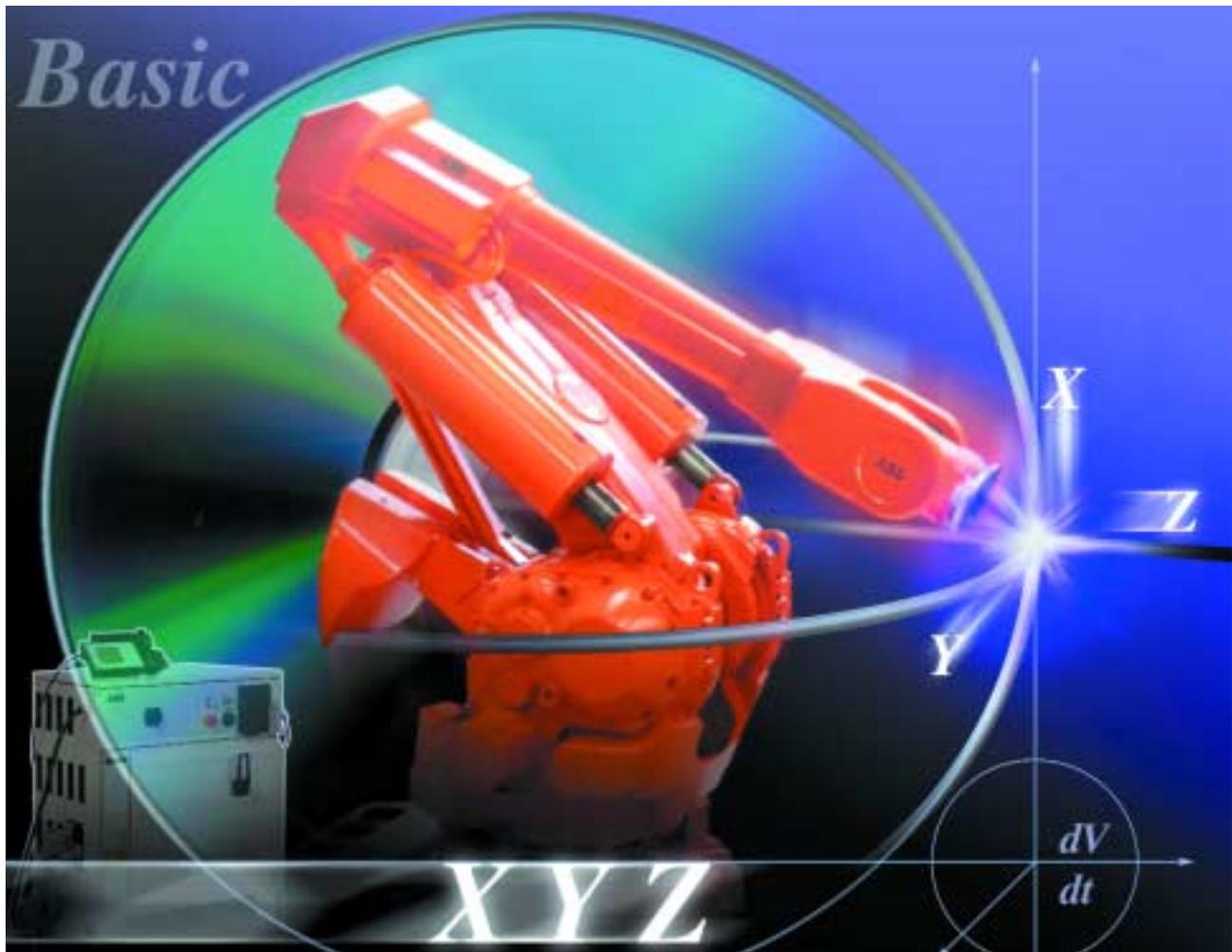


BaseWare

Industrial Robot Controller Software



Sharpen your robots' performance

BaseWare is a family of controller software designed to make you more productive and lower your cost of owning and operating a robot. The heart of this powerful and configurable software is ABB's own computer language, RAPID, a highly flexible program language and one of the most powerful software tools in the robot industry. This 'shop floor' language is included in every ABB control system and gets you on speaking terms with your robot. BaseWare has a range of additional functions and specific process applications, which add up to a complete controller-based software concept.

BaseWare ensures optimal process performance through advanced motion control whose path

holding is the most accurate on the market. ABB's continuous improvement in product reliability provides high system availability in the production process. It also offers unique personnel safety and error recovery features. With BaseWare, you will be able to effectively program your robot systems to do exactly what you want.

Key benefits

- High adaptability to your specific needs
- Fastest cycle times and highest accuracy
- Superior reliability and safety
- Extensive communications capability for integration and control

Basic Functionality

Programming language

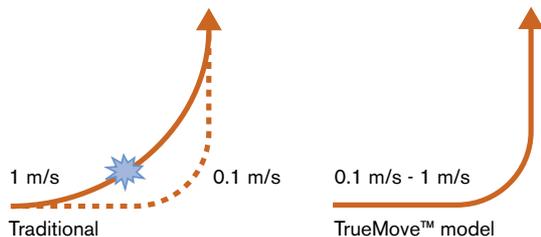
RAPID is a flexible, high-level programming language delivered with all ABB robot systems. Its basics are easy to use, while deeper layers allow you to create highly specific programs. All programs can be executed backwards and are designed to meet built-in error handling and end-user defined names on signals and variables. Programs can be 'mirrored,' which reduces programming time for symmetrical parts.

Motion Control

Motion control is the key to the robot's performance in the area of path accuracy, speed, cycle time, programmability and synchronization with external devices. By improving these parameters, users improve quality, productivity and reliability. The path accuracy of TrueMove, together with the short cycle time of QuickMove, is the cornerstone of these user benefits.

TrueMove™

TrueMove ensures that the motion path followed by the robot is the same as the one planned regardless of speed.



QuickMove™

Unique self-optimizing motion control feature, QuickMove, keeps cycle times at a minimum by ensuring maximum acceleration every moment. Tests have shown that ABB robots reach up to 25% faster cycle times than competitors.

Motion supervision

BaseWare provides you with full control of your robot's behavior and the ability to detect any problems, if something unexpected occurs.

Additional external axes

Up to 12 axes can be run from the control system. The robot main axes can be coordinated with external mechanical structures such as work-piece positioners and track-motion devices. The kinematic representation of external structures makes programming easier and quicker.

Soft Servo

In applications where materials or tools cannot be precisely positioned, the robot can be set to a Soft



ABB robots main axes can be coordinated with external mechanical structures and numerous work-piece positioners.

Servo mode. This means that the robot acts like a mechanical spring and is more elastic when encountering a certain level of resistance.

Security and safety

Motor supervision and strict speed limits make your robot safe to operate, letting you concentrate on your work. An extra built-in safety feature based on dual electrical safety chains interacting with the computer ensures that you have the circuit breakers and safety you need. An ABB security system is designed to let you decide when you need a helping hand. You can set a range of parameters..

Error handling

Errors on your production line should not necessarily mean a standstill. In such an event, you would want to get your robot back into production with as little operator intervention as possible. Using pre-defined operator dialogues, you can give the operator specific options of how the error should be handled. This exception handling is ensured through customized error handlers that can be set up to take a certain action depending on error type.

If the power supply is cut off during operation, the robot will be able to restart at the exact same position and system status as before the power failure.

I/O-System

The standard fieldbus DeviceNet is used for the robots I/O-system and, together with the ABB I/O-modules, very fast reaction time to/from I/O-signals can be achieved. Of course other ODVA-approved I/O-modules can also be used on the DeviceNet fieldbus. The robot can act both as master and slave on the DeviceNet fieldbus.

The I/O-system is easy to configure with your own naming of the I/O-signals and has a broad range of different features that can be configured or used in your RAPID-programs.

Additional Functionality

BaseWare Options

These options run on top of BaseWare, the robot's controller software. They represent a wide range of powerful tools that further increase the performance of your robot.

Advanced Functions

- Information can be transferred via RS232 and RS422/485 serial channels. With this function, these channels can be used to communicate with a PC or other external equipment (e.g. process equipment).
- Enhanced flexibility allows you to establish an output or routine at a specific position along the robot path. This position is defined in terms of distance or time. For example, a typical application is to start the closing movement of a press while the robot is moving into the press for an unload operation. The fixed position is connected to the press control and it can be trimmed to optimize cycle time.
- You can also define forbidden areas within the robot's working range. For example, when more than one robot is working in the same space, it's important that you coordinate their behavior so that they don't collide. You can also instruct the robot to stop when entering a zone defined around an obstacle in the robot working range.
- Interrupts from analog input or output signals can be used if, for example, you need to monitor activities within a cell using I/O signals from external sensors. The interrupt is triggered when a pre-defined signal level is reached. It can also be programmed to invoke a certain action.

Advanced Motion

- If the robot has rotated an axis a number of times, a simple instruction can reset the work area so that the axis doesn't have to be rotated back to the original position. This feature shortens cycle time in certain types of applications.
- If you have an additional axis, it can move completely independent of the robot movement. This function is useful if there is a need to have an additional axis rotating continuously in the robot cell.
- The path correction function enables you to add offsets to the programmed path. It can be used to follow a surface if a sensor feeds the system.
- Advanced motion also allows you to operate multiple additional axes.

Developer's Function

This option is intended for application developers requiring more advanced functions than normally available for an end user. It includes a number of instructions and functions useful for application development.

Load identification

This routine makes the robot carry out an accurate identification of the complete load data by simply shaking the tool. This identifies inertia, center of gravity and mass data. The benefit is optimized robot control.

Collision Detection

The robot motion can be stopped if defined commanded motion torque values are exceeded. The routine replaces mechanical clutches often used to protect your equipment and payload. For more detailed information, see separate datasheet.

Conveyor Tracking

This function coordinates the robot performance in relation to a work object on a conveyor line, independent of how the conveyor moves. For more detailed information, see separate datasheet.

Sensor Synchronization

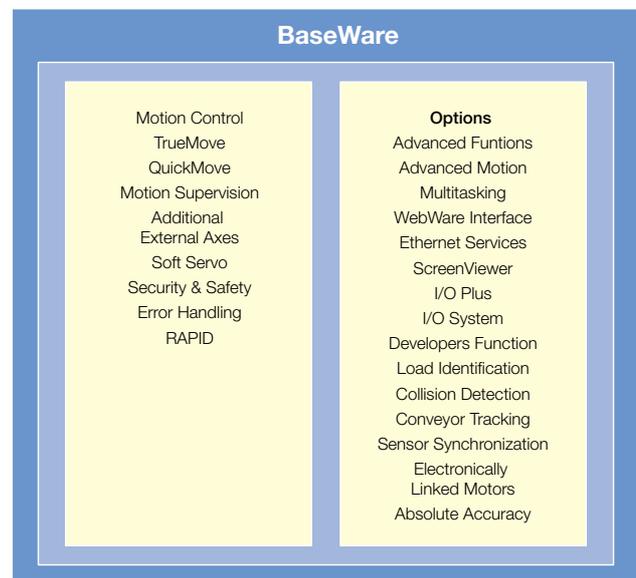
Sensor Synchronization adjusts the robot speed to an external device (e.g. a press) with the help of a sensor. This option simplifies programming, since it provides automatic sensor status check and speed adjustment.

The robot's TCP speed will be adjusted in correlation to the sensor output, so that the robot will reach the programmed RobTargets at the same time as the external device reaches a specified position.

Note that hardware components for measuring the sensor output are needed for this function. The same hardware can be used for Conveyor Tracking.

Electronically Linked Motors

This function is used to make master/slave configurations of motors, which are defined as external axes. Up to 10 slave motors can be synchronized with a master motor. Common in gantry applications



when long mechanical shafts are replaced by two different drives or simple mechanical structures like loaders or feeders, thus synchronizing the transport of material with two or several arms.

Absolute Accuracy

This option means that you install and run a perfectly accurate robot in your cell. It bridges the real robots on the factory floor with the virtual robots in your CAD environment. Clear "Calibration guidelines" help you through installation and maintenance procedures. The CalibWare PC-based software tool, together with the Calibration Cube, represent the key tools in Absolute Accuracy. For more detailed information, see separate datasheet.

Multitasking

Up to 10 background programs can be executed completely independent of the robot's main program. Background programs start automatically when the power is turned on and they continue to run even if the main program is stopped. The primary benefits are launching of operator messages and monitoring of external equipment.

ScreenViewer

This function enables execution of easy-to-use operator panels on the Teach Pendant Unit. The panels are created with a PC tool called ScreenMaker.

I/O System

In addition to the basic functionality of the I/O-system, the ABB Robot has the possibility to use other fieldbuses both as master and slave.

The master function means that the robot is controlling the fieldbus and the I/O-modules on the fieldbus and the slave function means that the robot acts as an I/O-module which is controlled by a PLC or another master robot.

There are different options to get the master and slave functionality on different fieldbuses:

- Profibus-DP with both master and slave functionality (PCI-board)
- Interbus with both master and slave functionality (PCI-board)
- Profibus-DP with slave functionality (Gateway-module connected to the DeviceNet-bus)
- Interbus-S with slave functionality (Gateway-module connected to the DeviceNet-bus)
- Allen-Bradley Remote I/O with slave functionality (Gateway-module connected to the DeviceNet-bus)

I/O Plus

I/O Plus enables communication with non-ABB I/O units that comply to the DeviceNet specification. It also includes predefined parameters for Wago and Lütze IP67 modules as well as enabling a second DeviceNet channel.

WebWare Interface

This option enables the robot to communicate with a PC using WebWare products.

Typical actions are:

- Start and stop program execution
- Transfer programs and system parameters to/from robot
- Write data and output signals
- Read data, output signals, input signals, logs, robot status and error messages
- Change robot mode

Ethernet Services

This feature includes either an NFS (Network File System) or a FTP-client (File Transfer Protocol) to access files on a corresponding server over the factory network.