

Robot Controller Options

A wide range of integrated controller options are available to reduce development time.

Vision Guide

Compatible controllers

RC700A RC620+ RC180 RC90 T3

Vision Guide – Powerfully Simple Robot Guidance

- Built to make vision guided robot applications easy, while driving high precision and performance
- Drag & Drop user interface for building robust vision solutions quickly
- Powerful set of intelligent vision objects simplify vision application development
- Single development environment for both robot and vision (no communications setup between robot and vision system)
- Only 3 SPEL+ Language commands (VRUN, VGET, VSET) for working with vision sequences
- Full set of Wizard based calibration tools for fixed and mobile camera calibration
- Step Wizard to help new users easily select the vision tool(s) they need
- Fast vision processing times with support for up to 10 MP GigE cameras
- Color cameras and color vision tools supported
- Code reader supports a wide variety of standard bar and 2D code formats

Specifications

Available Vision Solutions

CV2-S (Standard Vision Processing)
CV2-H (High Speed Vision Processing)
PV1 (Customer supplied PC)

Cameras Supported

GigE Std Resolution: 640x480 (0.3MP)
GigE Med Resolution: 1600x1200 (2MP)
GigE High Resolution: 2560x1920(5MP)
GigE Ultra High Resolution: 3664 x 2748(10MP)
GigE Color Camera: 2560x1920(5MP)

USB 2 Std Resolution: 640x480 (0.3MP)
USB 2 Med Resolution: 1280x1024 (1.3MP)
USB 2 High Resolution: 2560x1920 (5MP)
USB 2 Med Resolution Color: 1280x1024 (2MP)
USB 2 High Resolution Color: 2560x1920 (5MP)

Robot to Camera Calibrations

Mobile Camera (mounted on robot)
Fixed Upward
Fixed Downward

Max Number of Cameras

GigE: (4) per CV2
USB: (2) per CV2

Controllers Supported:

CV2: RC700A, RC90
CV1: RC180, RC620
PV1: RC700A, RC620, RC180, RC90
*See Epson for CV1 and PV1 Vision details

Vision Tools

Vision Find Tools

-Geometric Search
-Polar Search
-Normalized Correlation
-Blob Analysis
-Edge Finder
-Line Finder
-Arc Finder

Vision Inspection Tools

-Line Inspector
-Arc Inspector
-Defect Finder
-Color Match

Vision Construction Tools

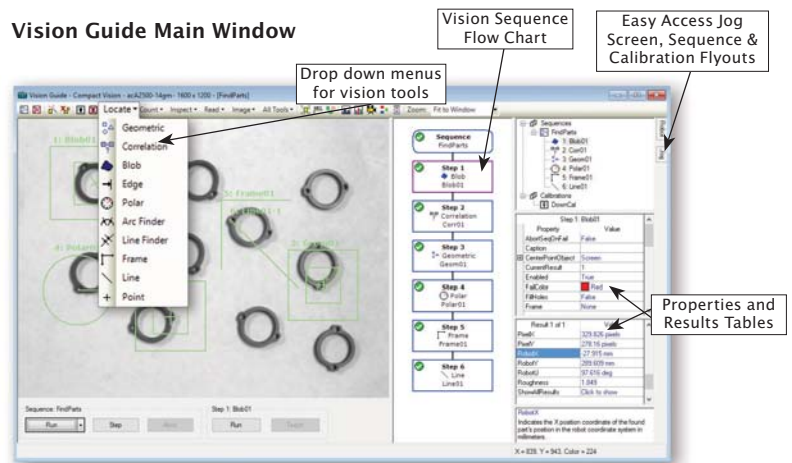
-Frames
-Lines
-Points

Other Vision Tools

-Code Reader (bar and 2D)
-OCR
-Histogram
-Statistics
-Image Operation Tools



Vision Guide Main Window



RC+ 7.0 API

Compatible controllers

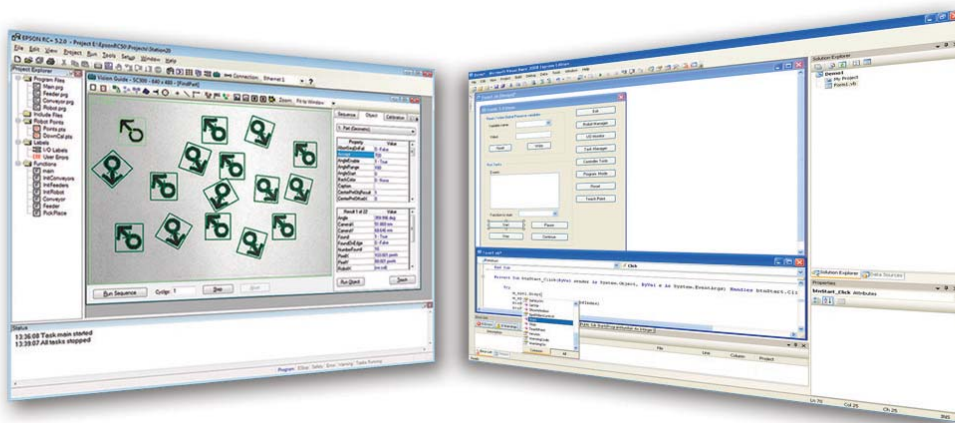
RC700A RC90 T3

VB Guide

RC620+ RC180 RC90

Program and Execute Robot Applications in a Familiar Windows OS Environment

- Robots can be controlled using Visual Basic®, Visual C++®, Visual C#®, LabVIEW™, and other third-party programming languages
- Robot status and variable values can be captured
- Vision Guide Integration for easy image display on user GUI's
- Third-party .NET interface and database design tools can also be used for program development
- The following Epson RC+ windows and dialogs can be called from within a .NET application:
 - Robot Manager
 - I/O Monitor
 - Task Manager
 - Maintenance Dialog
 - Simulator
 - Force Monitor



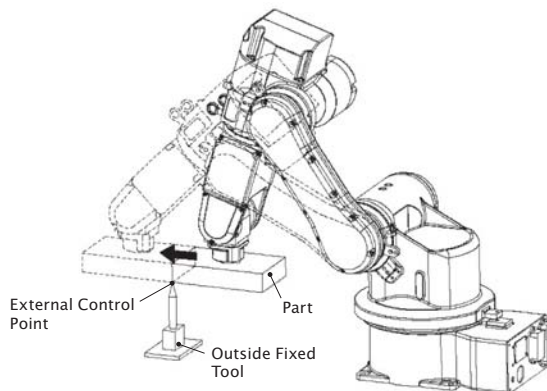
ECP

Compatible controllers

RC700A RC620+ RC180 RC90 T3

External Control Point Operation for Precise Positioning Without Complex Calculations

- For processes requiring the workpiece to be moved against a fixed tool, external control points can be used to ensure precise positioning
- Up to 15 external control points can be set



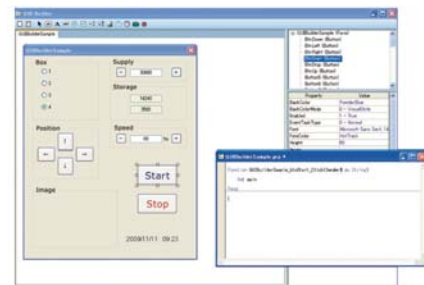
Robot Controller Options

GUI Builder

Compatible controllers

RC700A RC620+ RC180 RC90 T3

- Easily create a Graphic User Interface for Operators
- Fully integrated within Epson RC+ Development Environment
- Create GUI's without Visual Studio or other 3rd party software tools
- Create and debug GUI forms from your Epson RC+ Project
- Form and Control Events are Executed as SPEL+ Tasks
- Works with RC700A, RC620+, RC180, and RC90 Controllers

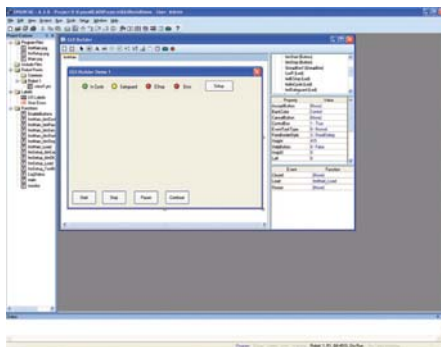


Steps to use GUI Builder

GUI Builder provides the tools for the easy creation of graphical user interfaces from within the popular Epson RC+ Development Environment. It is a popular option for users that need a simple GUI and do not want to deal with the complexity of a 3rd party product such as Visual Studio. Even users that have never before created a GUI can easily make one with GUI Builder. By integrating the GUI Builder toolset inside of the Epson RC+ Development Environment, users can work from one development environment, which helps reduce overall development time. For users that want to create more complex GUI's, it is suggested to use Epson VB Guide or RC+ 7.0 API along with Microsoft Visual Studio or another platform which supports .Net library usage.

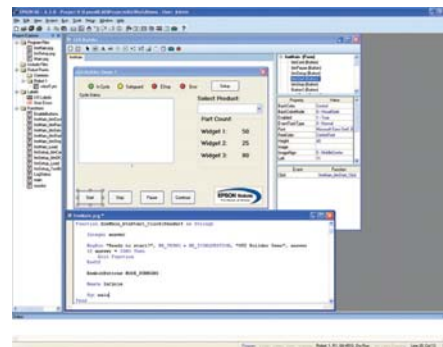
STEP 1

Create a new form and click the Button control from the GUI Builder Toolbar and drag it to the form.



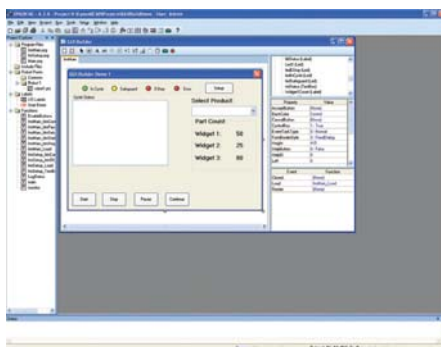
STEP 2

Double click the button and the code editor will appear. Add the SPEL+ code you want to execute when the button is clicked from your application.



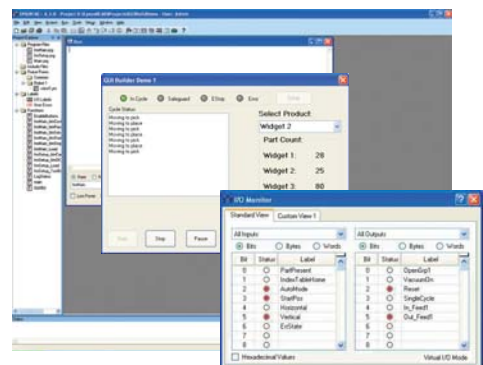
STEP 3

Add more graphics components on your form and associated SPEL+ code as required for your application.



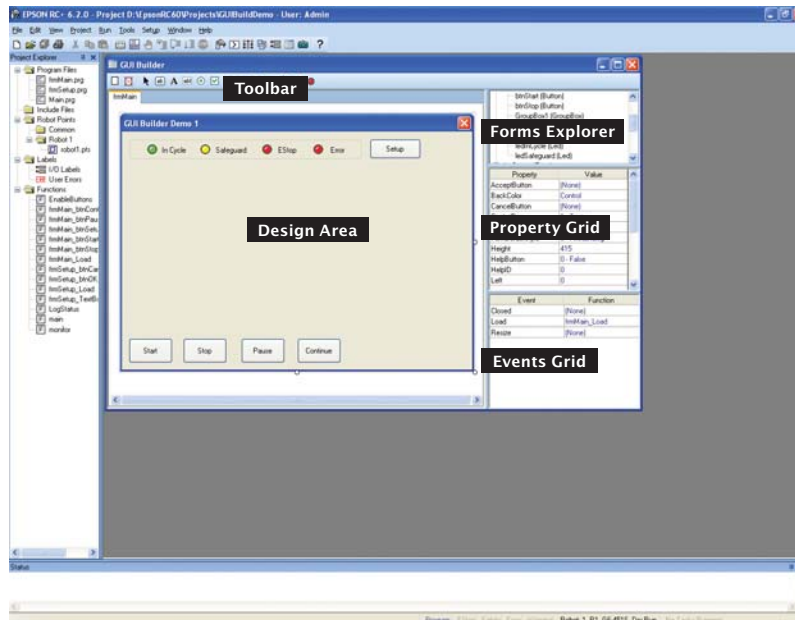
STEP 4

Run the application from the Epson RC+ Run Window or set to have the GUI come up automatically. You can also bring up RC+ dialogs like the I/O monitor shown here.



Parts of the GUI Builder Window

GUI Builder has 5 main areas of use when creating and modifying user GUI's. These include: Toolbar Buttons, Design Area, Forms Explorer, Property Grid and Events Grid. (See graphic below)



■ GUI Builder Area Definitions

Design Area

This is where forms are displayed at design time. Each opened form is displayed on its own tab. You can easily switch between forms by clicking on the tab or double clicking the form in the forms explorer.

Toolbar Buttons

Contains the various controls to be put on a GUI Builder Form. Many of the common controls are supported such as button, label, textbox, radio button, checkbox, etc. However, there are also some Epson unique controls to help reduce development time for items routinely needed for robot systems. Some of these unique controls include the video box control (to display Vision Guide Image display window) and the LED control (to interface with Epson Robot I/O).

Forms Explorer

A tree that contains each form for the current project and its associated controls. When a new form or control is created, it is added to the tree. Double clicking on a form opens the form in its own tab in the design area.

Property Grid

Used to display and edit form and control properties. When you select a form or control, the associated properties are displayed in the grid. You can edit the values for properties thus changing the characteristics of the specific control.

Events Grid

Used to display and change the events for the associated form or control. Each event has a user function (written in SPEL+ code) that is called when the event occurs. This gives the user complete flexibility to program what happens when specific events occur.

Security

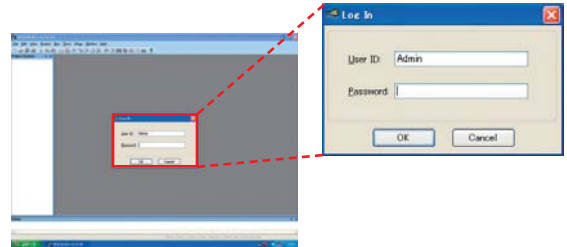
Compatible controllers

RC700A RC620+ RC90 T3

Restrict User Access to Programming Functions for Greater Safety and Security*

- Password-based protection levels can be set to restrict access to some parts of the Epson RC+ system
- Helps prevent accidental or unauthorized alteration of control programs when multiple operators need to have access to basic controls
- Keeps a log of every time changes are made to source code

*Standard on RC700A and RC90 controllers



Force-Sensing

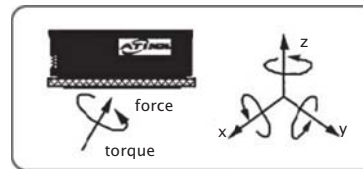
Compatible controllers

RC700A RC620+ RC90

Integrated Force-Sensing Technology for Realtime Force Control

- Allows you to easily integrate force-sensing capability into your control programs*
- Force/torque values can be set for just one axis, or all six
- Trigger values can be set to stop robot motion when a specific force level is reached
- Up to two sensors can be mounted; data from sensors can be shared by multiple programs

*ATI Industrial Automation, Inc. force/torque components must be purchased separately



OCR

Compatible controllers

RC700A RC620+ RC90 T3

Optical Character Recognition of Text on Parts and Labels

- For use with optional Vision Guide system
- Enables you to specify the font, font size, and number of characters of text that you want to read from an image
- A font creation function lets you create SEMI fonts and user-defined fonts from imaged characters or ASCII conversion files

PG Motion System

Compatible controllers

RC700A RC620+ RC90

Control Peripheral Devices for Fully Integrated Process Automation*

- Epson RC+ software and pulse generator (PG) cards enable control of multiple third-party drives and motors
- PG robots and standard Epson RC+ system robots can be operated simultaneously, and controlled using the same commands
- PG cards can be used to control X/Y tables, sliders, rotary tables, and a wide range of other production/inspection line peripherals
- Each PG card has 4 channels, and can support from 1 to 4 robots. Up to 4 cards can be installed

*Drivers and motors for third party devices not included

Teach Pendant TP1

Compatible controllers
RC700A **RC620+** **RC180** **RC90**

Versatile Control with Just a Few Keystrokes

- IP65-rated enclosure is sealed against oil and dust for reliable operation in adverse conditions
- Shock-resistant construction helps protect unit from impact damage
- Universal design ensures ease of use for both right-handed and left-handed operators
- Connects directly to operator unit or controller interface card (Interface is built-in on RC180/RC620 controllers)
- Menu can be displayed in English, German, French, or Japanese
- Can step through programs even when safety door is open



Teach Pendant TP2

Compatible controllers
RC700A **RC180** **RC90** **T3**

Easy-to-Use Pendant for Teaching

- Universal design ensures ease of use for both right-handed and left-handed operators
- Connects directly to operator unit or controller interface card



Teach Pendant TP3

Compatible controllers
RC700A **T3**

A Teach Pendant and Operating Pendant in One

- 10" color touchscreen panel
- 1280 x 800 high definition screen resolution
- User-friendly GUI
- Ability to make robot parameter changes
- High speed test mode
- IP65-rated enclosure is sealed against oil and dust for reliable operation in adverse conditions
- Shock-resistant construction helps protect unit from impact damage
- Universal design ensures ease of use for both right-handed and left-handed operators

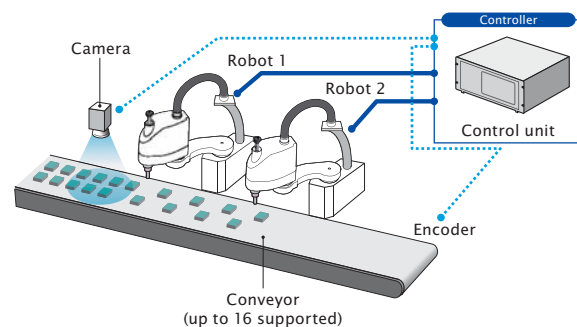


Conveyor Tracking

Compatible controllers
RC700A **RC620+** **RC90**

Precision Tracking for High-Productivity Pick-and-place Operation

- Supports vision or sensor based conveyor tracking
- Vision system with Vision Guide software detects moving parts for pick-and-place handling
- Multi-conveyor, multi-effector setups are supported
- Can automate manual kitting/packaging tasks and help maintain productivity with continuous conveyor operation. Can also be used for workpiece assembly
- Simple start/stop program execution



DVD Drive

Compatible controllers
RC620+

The Convenience of a Built-In DVD Multi-Drive

- The RC620+ controller can be equipped with a DVD drive for easy program installation and data recording

Option Unit

Compatible controllers
RC180

Interface Cards Expand Your System Options

- Each option unit holds 2 interface cards; up to 2 option units can be mounted (4 interface cards total)

RAID Option

Compatible controllers
RC620+

RAID Support for Enhanced Backup Data Integrity*

- RAID support for high-integrity data backup

*Factory default option

Memory Expansion

Compatible controllers
RC620+

Give Your Controller a Memory Boost

- CPU memory can be increased from 1GB to 2GB

Fieldbus I/O (Master)

Compatible controllers
RC700A RC620+ RC90 T3

Bidirectional High-Speed Peripheral Connectivity

- Support for DeviceNet®, PROFIBUS®, and Ethernet/IP® networked peripherals (1024-point I/O)

Emergency Stop Switch

Compatible controllers
RC700A RC620+ RC180 RC90
T3

Helps Prevent Injuries and Damage

- Immediately stops robot operation in emergency situations



Operator Panel OP1

Compatible controllers
RC180

Easy Connectivity and Touchscreen Control

- Controller and error status display
- Oil- and dust-resistant construction
- Simple start/stop program execution



IP65 protection

RS-232C Cards

Compatible controllers
RC700A RC620+ RC180 RC90

Expanded Serial Port Connectivity

- 4-port (for RC180/RC620+ controllers) and 2-port (for RC700A/RC90 controllers) RS-232C cards to connect serial interface devices



I/O Expansion Cards

Compatible controllers
RC700A RC620+ RC180 RC90

Expanded Input/Output Flexibility

- 32-point I/O (for RC180/RC620+ controllers) and 24 inputs/16 outputs (for RC700A/RC90 controllers) expansion cards



Fieldbus I/O (Slave)

Compatible controllers
RC700A RC620+ RC180 RC90
T3

High-Speed Peripheral Connectivity

- Support for DeviceNet®, PROFIBUS®, CC-Link®, Ethernet/IP®, and PROFINET® networked peripherals (256-point I/O)

I/O Cable Kit

Compatible controllers
RC700A RC620+ RC180 RC90
T3

Cables and Connectors for Easy Connectivity with no Soldering Required

- A wide range of I/O cables and connectors are available



External Wiring Units

Compatible robot manipulators

G6	G10	G20
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Simplifies Wiring when Mounting End Effector Options

- Enables easy, on-site connection of external wiring by users
- Ideal for connecting Vision Guide system camera cables or other wiring



Tool Adapters

Compatible robot manipulators

G1	G3	G6	G10	G20	LS3	LS6	LS20	T3	RS3	RS4
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Enhances Handling/Processing Versatility and Simplifies End Effector Changes

Brake Release Units

Compatible robot manipulators

N2	C3	C4	C8	S5
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Enables Brake Release so Robot Arm Can be Moved by Hand When Power is Switched Off

Power and Signal Cables

Compatible robot manipulators

G1	G3	G6	G10	G20	LS3	LS6	LS20	RS3	RS4	N2	C3	C4	C8	S5
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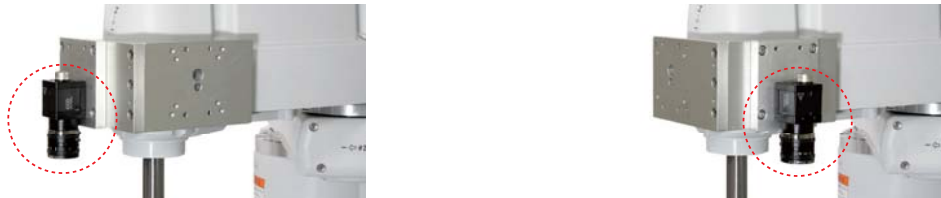
Standard 3m Cables, or Optional 5m and 10m Cables for Greater Freedom in Controller and Robot Placement

Camera Mounting Bracket

Compatible robot manipulators

G3	G6	G10	G20	LS3	LS6	LS20	T3	RS3	RS4	N2	C3	C4	C8	S5
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Securely Mount Machine Vision System Camera to Robot Arm



Bracket design varies according to robot; please specify model when ordering.

RC620+ DU Drive Unit

Compatible robot manipulators

G1	G3	G6	G10	G20	RS3	RS4	C3	S5
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An External Drive Unit to Increase the Number of Robots that Can be Controlled with a Single RC620+ Controller



RC700A DU Drive Unit

Compatible robot manipulators

G1	G3	G6	G10	G20	RS3	RS4	N2	C3	C4	C8	S5
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An External Drive Unit to Increase the Number of Robots that Can be Controlled with a Single RC700A Controller



Options Quick-Reference Table

Controller Options					
	RC700A	RC620+	RC180	RC90	T3
Teach Pendant (TP1)	●	●	●	●	—
Teach Pendant (TP2)	●	—	●	●	●
Teach Pendant (TP3)	●	—	—	—	●
Conveyor Tracking	●	●	—	●	—
PG Cards (Ext Axis Control)	●	●	—	●	—
DVD Drive	—	●	—	—	—
Option Unit	—	—	●	—	—
RAID Option	—	●	—	—	—
Memory Expansion	—	●	—	—	—
Operator Panel (OP1)	—	—	●	—	—
Emergency Stop Switch	●	●	●	●	●
RS-232C Cards	●	●	●	●	—
I/O Expansion Cards	●	●	●	●	—
Fieldbus I/O (Slave)	●	●	●	●	●
Fieldbus I/O (Master)	●	●	—	●	●
I/O Cable Kit	●	●	●	●	●

Software Options					
	RC700A	RC620+	RC180	RC90	T3
Vision Guide (5.0)	—	—	●	●	—
Vision Guide (6.0)	—	●	—	—	—
Vision Guide (7.0)	●	—	—	●	●
VB Guide 5.0	—	—	●	●	—
VB Guide 6.0	—	●	—	—	—
RC+API 7.0	●	—	—	●	●
ECP	●	●	●	●	●
GUI Builder 5.0	—	—	●	●	—
GUI Builder 6.0	—	●	—	—	—
GUI Builder 7.0	●	—	—	●	●
Security	● (Standard function)	●	—	● (Standard function)	● (Standard function)
Force Sensing	●	●	—	●	—
OCR	●	●	—	●	●

Robot Manipulator Options												
	G1	G3	G6	G10 /G20	LS3/LS6 /LS20	T3	RS3 /RS4	N2	C3	C4	C8	S5 /S5L
External Wiring Units	—	—	●	●	—	—	—	—	—	—	—	—
Tool Adapters	●	●	●	●	●	●	●	—	—	—	—	—
Brake Release Units	—	—	—	—	—	—	—	●	●	●	●	●
Power and Signal Cables	●	●	●	●	●	—	●	●	●	●	●	●
Camera Mounting Bracket	—	●	●	●	●	●	●	●	●	●	●	●
External Drive Units	●	●	●	●	—	—	●	●	●	—	—	●