



Automation for a Changing World

## Delta SCARA Robots



**enertronic**  
PROYECTOS Y  
SUMINISTROS S.A.

**DELTA**  
DELTA ELECTRONICS, INC.

## Smart Robot for Upgraded Industries

Current trends affecting manufacturing industries include labor shortage, harsh environment, short commodity cycles, small-volume and large variety orders, and frequent changeovers. In response, production lines need more smart, agile and flexible workstations. For example, electronics manufacturing processes have to be executed fast and precisely to shorten time and enhance efficiency. Delta's Selective Compliance Assembly Robot Arm (SCARA) is your best choice to reduce labor cost and strengthen manufacturing flexibility.

Delta SCARA features sensor-less compliance control functions and offers excellent speed, linearity, verticality and repeatability to rapidly and precisely perform operation tasks such as insertion, assembly, screw locking, loading and unloading, pick-and-place, stacking and packaging. The automatic process path planning function fulfills industry needs for conveyor tracking processes such as glue dispensing, deburring, coating and soldering. With the aid of Delta's machine vision systems, it can perform smart identification, inspection and sorting to effectively reduce defect rates for consistent quality delivery.

When matched with control units and other peripheral devices such as servo systems, machine vision systems and linear modules, Delta SCARA becomes a highly integrated workstation for industries such as consumer electronics, electrical/electronics, rubber and plastics, packaging, metal fabrication and others. It satisfies both standalone and workstation applications, enabling flexible modularized production lines with consistently good quality to achieve smart and efficient production.

A new industrial revolution is moving towards smart manufacturing and factories. To meet customers' needs, Delta continues to provide innovative and efficient robot solutions as part of our "Automation for a Changing World".

- ▶ **Sensor-less compliance control**
- ▶ **High repeatability, excellent precision, linearity and verticality**
- ▶ **Widely applied in various applications and industries**





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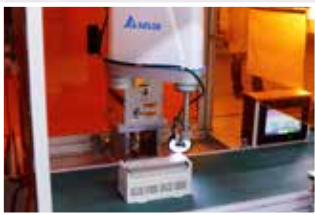
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## Successful Applications

Delta SCARA has been successfully applied to improve production line efficiency and yield rates for consistent quality delivery

**Industries:** Electrical/electronics, rubber and plastics, packaging, and metal fabrication

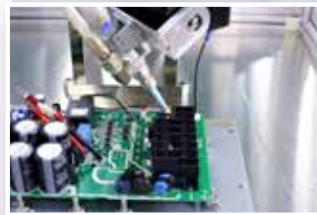
**Applications:** Insertion, screw locking, assembly, glue dispensing, coating, soldering, load and unload, pick-and-place, stacking, packaging, and inspection



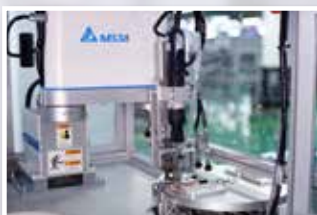
Product Inspection



Soldering



Glue Dispensing



Screw Locking



Touch Screen Inspection

## Specifications SCARA Robots

### DRS40L Series

Model		DRS40L3SS1BN002 DRS40L3SSADN003	DRS40L3SO1BN002
Number of Axes		4	
Installation		Table-top	
Arm Length ( X + Y )		400 mm	
Rated / Max. Payload		1 kg / 3 kg	
Maximum Speed	J1 + J2	4710 mm / sec	
	J3	1250 mm / sec	
	J4	1875° / sec	625° / sec
Range of Motion	J1	±130°	
	J2	±146.6°	
	J3	150 mm	
	J4	±360°	
Standard Cycle Time *		0.42 sec	
Repeatability	J1 + J2	±0.01 mm	
	J3	±0.01 mm	
	J4	±0.01°	
Rated / Max. Push Force (J3)		100 / 250N	
Rated/ Max. Allowable Inertia Moment (J4)		0.0091 kg-m <sup>2</sup>	0.055 kg-m <sup>2</sup>
User Wiring		15 Pin D-Sub	
User Tubing		ø4 mm x 2, ø6 mm x 1	
Weight (Without Controller)		16 kg	
Environment	Ambient Temperature	5°C ~ 40°C	
	Storage Temperature	-25°C ~ 55°C	
	Humidity	0 ~ 90% RH (non-condensing)	

\*When carrying a payload of 1kg and reciprocating 25mm in vertical and 300mm in horizontal directions under an operating temperature of 25°C and within a humidity of 45% ~ 65% RH (non-condensing).

## Ordering Information

### DRS40L Series

DRS	40	L	3	S	S	1	B	N	002
Company/ Product/ Robot Type	Arm Length	Level	Max. Payload	Z-Axis Stroke (Horizontal Stroke)	R-Axis Speed Reduction Ratio	Generation	Controller	Teach Pendant	Identification
D : DELTA R : Robot S : SCARA	40 : 400 mm	L : Lite	3 : 3 kg	S : 150 mm	S : Standard (1/16) O : Optional (1/48)	A : CE 1: 1st Generation	B : Servo drive ( Cable length 3 m ) K : Servo drive ( Cable length 5 m ) D : CE controller(Cable length 3m)	N : Non	002 : Standard 4 Axes 003 : CE model 4 Axes

## DRS60L Series

Model		DRS60L6SN1BN302	DRS60L6SO1BN002	DRS60L6OS1BN002	DRS60L6SS1BN002/ DRS60L6SSADN003	DRS60L3SSS1BN502	DRS60L3SS1BN002
Number of Axes		3	4	4	4	5	4
Installation		Table-top					
Arm Length ( X + Y )		600 mm					
Rated / Max. Payload		2 kg / 6 kg				1 kg / 3 kg	
Maximum Speed	J1 + J2	5000 mm / sec					4050 mm / sec
	J3	1100 mm / sec					1250 mm / sec
	J4	N.A.	600° / sec	2000° / sec			1875° / sec
	J5	N.A.				600 ° / sec	N.A.
Range of Motion	J1	±133°					±114°
	J2	±153°					±148°
	J3	200 mm		300 mm	200 mm		150 mm
	J4	N.A.	±360°				
	J5	N.A.				±360°	N.A.
Standard Cycle Time *		0.39 sec				0.45 sec	0.72 sec
Repeatability	J1 + J2	±0.015 mm					±0.015 mm
	J3	±0.01 mm					±0.01 mm
	J4	N.A.	±0.01 °				±0.01°
	J5	N.A.				±0.01°	N.A.
Rated / Max. Push Force (J3)		150 N / 350N				N.A	100N / 250N
Rated/ Max. Allowable Inertia Moment (J4)		N.A.	0.07 kg-m²	0.01 kg-m²			0.009 kg-m²
User Wiring		15 Pin D-Sub					
User Tubing		ø4 mm x 1, ø6 mm x 2					ø4 mm x 2, ø6 mm x 1
Weight (Without Controller)		20 kg				21 kg	22 kg
Environment	Ambient Temperature	5°C ~ 40°C					
	Storage Temperature	-25°C ~ 55°C					
	Humidity	0 ~ 90% RH (non-condensing)					

\*When carrying a payload of 1 kg and reciprocating 25mm in vertical and 300mm in horizontal directions under an operating temperature of 25°C and within a humidity of 45% ~ 65% RH (non-condensing).

## Ordering Information

### DRS60L Series

DRS	60	L	6	S	S	1	B	N	002
Company/ Product/ Robot Type	Arm Length	Level	Max. Payload	Z-Axis Stroke (Horizontal Stroke)	R-Axis Speed Reduction Ratio	Generation	Controller	Teach Pendant	Identification
D : DELTA R : Robot S : SCARA	60 : 600 mm	L : Lite	6 : 6 kg 3 : 3 kg	S : 200 mm O : 300 mm	S : Standard (1/15) N : Non O : Optional (1/50)	A : CE 1: 1st Generation	B : Servo drive (Cable length 3 m) K : Servo drive (Cable length 5 m) D: CE controller(Cable length 3m)	N : Non	002 : Standard 4 Axes 302 : 3 Axes 502 : 5 Axes 003 : CE 4 Axes

# Specifications SCARA Robots

## DRS50 / 70L Series

Model		DRS50L6SS1BN002	DRS50L6SO1BN002	DRS50L6OS1BN002	DRS70LSS1BN002	DRS70L3SO1BN002	DRS70L3OS1BN002
Number of Axes		4					
Installation		Table-top					
Arm Length ( X + Y )		500 mm			700 mm		
Rated / Max. Payload		2 kg / 6 kg					
Maximum Speed	J1 + J2	4400 mm / sec			5500 mm / sec		
	J3	1100 mm / sec					
	J4	2000° / sec	600° / sec	2000° / sec	2000° / sec	600° / sec	2000° / sec
Range of Motion	J1	±133°					
	J2	±153°					
	J3	200 mm	200 mm	300 mm	200 mm	200 mm	300 mm
	J4	±360°					
Standard Cycle Time *		0.39 sec			0.40 sec		
Repeatability	J1 + J2	±0.015 mm					
	J3	±0.01 mm					
	J4	±0.01°					
Rated / Max. Push Force (J3)		150 N / 350 N					
Rated/ Max. Allowable Inertia Moment (J4)		0.01 kg-m <sup>2</sup>	0.07 kg-m <sup>2</sup>	0.01 kg-m <sup>2</sup>	0.01 kg-m <sup>2</sup>	0.07 kg-m <sup>2</sup>	0.01 kg-m <sup>2</sup>
User Wiring		15 Pin D-Sub					
User Tubing		ø4 mm x 2, ø6 mm x 2					
Weight (Without Controller)		18.5 kg			20 kg		
Environment	Ambient Temperature	5°C ~ 40°C					
	Storage Temperature	-25°C ~ 55°C					
	Humidity	0 ~ 90% RH (non-condensing)					

\*When carrying a payload of 1kg and reciprocating 25mm in vertical and 300mm in horizontal directions under an operating temperature of 25°C and within a humidity of 45% ~ 65% RH (non-condensing).

## Ordering Information

### DRS50 / 70L Series

DRS	50/70	L	6	S	S	1	B	N	002
Company/ Product/ Robot Type	Arm Length	Leve	Max. Payload	Z-Axis Stroke (Horizontal Stroke)	R-Axis Speed Reduction Ratio	Generation	Controller	Teach Pendant	Identification
D : DELTA R : Robot S : SCARA	50 : 500mm 70 : 700mm	L : Lite	6 : 6 kg	S : 200 mm O : 300 mm	S : Standard (1/15) O : Optional (1/50)	A : CE 1: 1st Generation	B : Servo drive (Cable length 3 m) K : Servo drive (Cable length 5 m)	N : Non	002 : Standard 4 Axes

## DRS60H Series (To be launched)

Model		DRS60H6SS1BN002
Number of Axes		4
Installation		Ceiling mounted
Arm Length ( X + Y )		600 mm
Rated / Max. Payload		2 kg / 6 kg
Maximum Speed	J1 + J2	5000 mm / s ec
	J3	1100 mm / sec
	J4	2000° / sec
Range of Motion	J1	± 130°
	J2	± 150°
	J3	200 mm
	J4	± 360°
Standard Cycle Time *		0.39 sec
Repeatability	J1 + J2	± 0.015 mm
	J3	± 0.01 mm
	J4	± 0.01°
Rated / Max. Push Force (J3)		150 N / 350 N
Rated/ Max. Allowable Inertia Moment (J4)		0.01 kg-m <sup>2</sup>
User Wiring		15 Pin D-Sub
User Tubing		Ø4 mm x 1, Ø6 mm x 2
Weight (Without Controller)		23 kg
Environment	Ambient Temperature	5°C ~ 40°C
	Storage Temperature	-25°C ~ 55°C
	Humidity	0 ~ 90% RH (non-condensing)

\*When carrying a payload of 1kg and reciprocating 25mm in vertical and 300mm in horizontal directions under an operating temperature of 25°C and within a humidity of 45% ~ 65% RH (non-condensing).

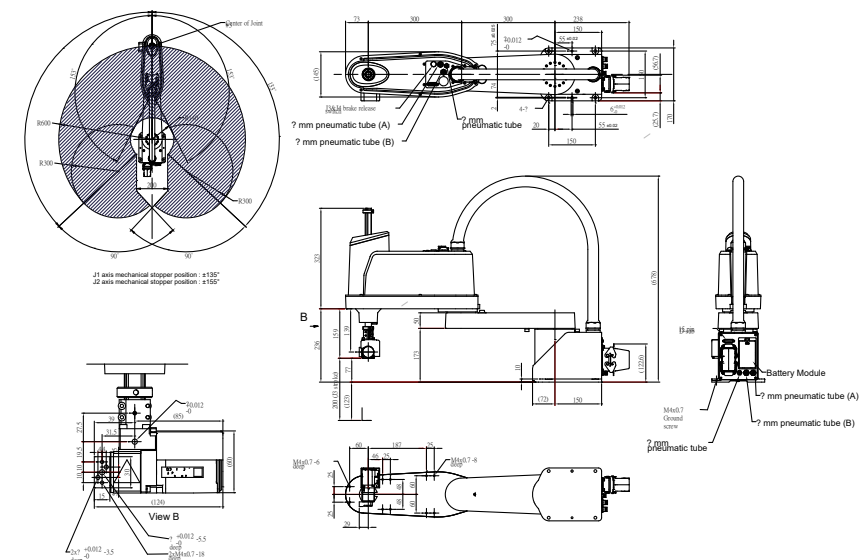
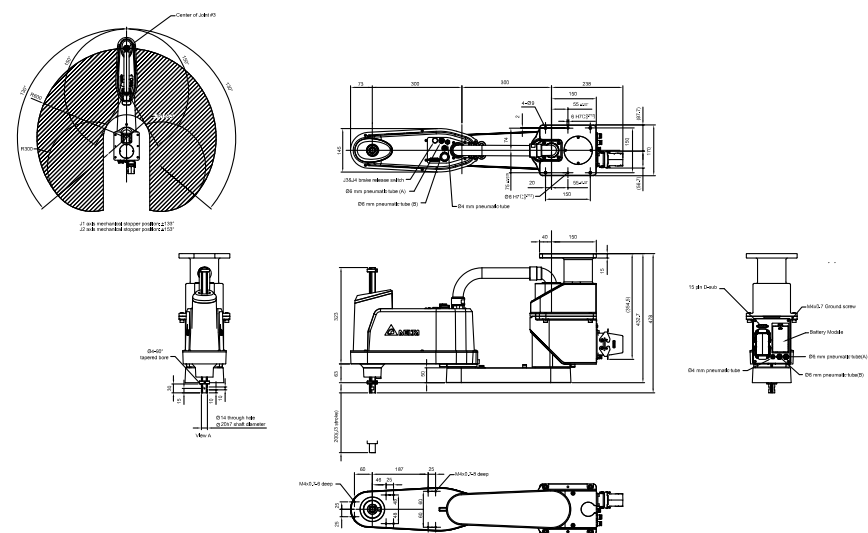
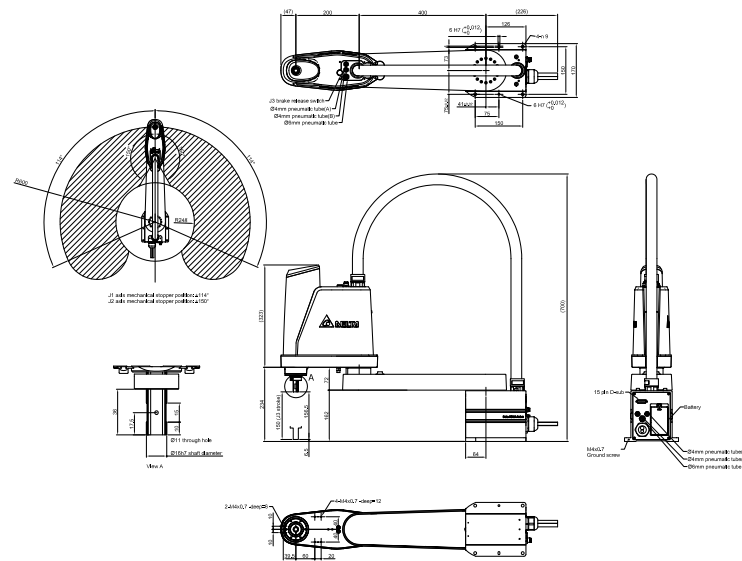
## Ordering Information

### DRS60H Series

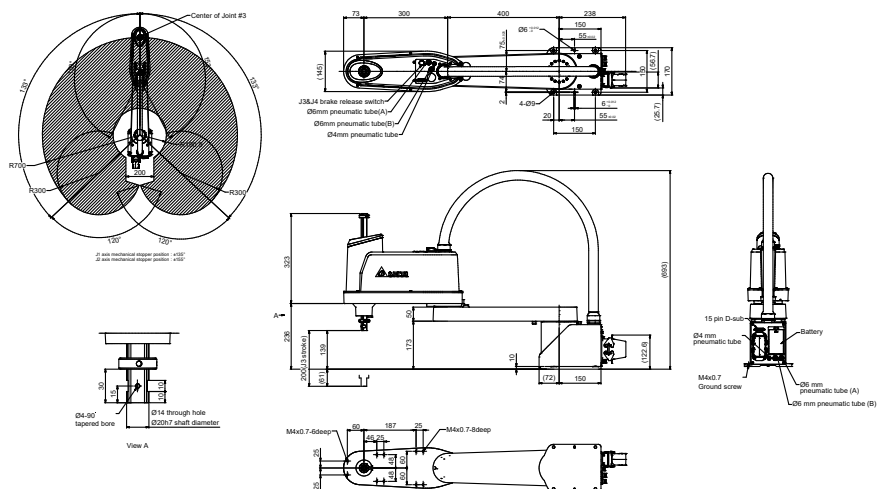
DRS	60	H	6	S	S	1	B	N	002
Company/ Product/ Robot Type	Arm Length	Leve	Max. Payload	Z-Axis Stroke (Horizontal Stroke)	R-Axis Speed Reduction Ratio	Generation	Controller	Teach Pendant	Identification
D : DELTA R : Robot S : SCARA	60 : 600 mm	H : Hang	6 : 6 kg	S : 200 mm	S : Standard (1/15)	1	B : Servo drive (Cable length 3 m) K : Servo drive (Cable length 5m)	N : Non	002 : Standard 4 Axes







## DRS70L Series



## External Dimensions and Workable Space

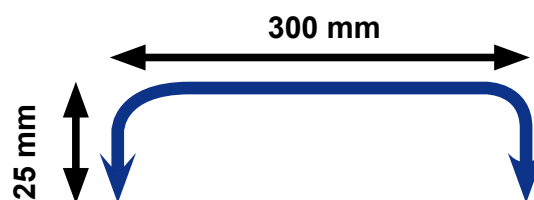
Series	Model Name
DRS40L Series	DRS40L3SS1BN002 DRS40L3OS1BN002 DRS40L3SSADN003
DRS60L Series	DRS60L6SS1BN002 DRS60L6SO1BN002 DRS60L6OS1BN002 DRS60L6SSADN003 DRS60L6SN1BN302
DRS60H Series	DRS60H6SS1BN002
DRS60L3 Series	DRS60L3SS1BN002
DRS60L3 5 Axes	DRS60L3SS1BN502
DRS50L Series	DRS50L6SS1BN002 DRS50L6SO1BN002 DRS50L6OS1BN002
DRS70L Series	DRS70L6SS1BN002 DRS70L6SO1BN002 DRS70L6OS1BN002

## Product Features

High Repeatability, Excellent Precision, Linearity and Verticality



Product	Payload	Standard cycle time
DRS40L Series	1 kg	0.42 sec
DRS60L Series	1 kg	0.39 sec



Product	DRS40L	DRS60L
Arm Length	400 mm	600 mm
Max. Payload (Payload)	3 kg	6 kg
Repeatability	±0.01 mm	±0.015 mm

**Standard cycle time:**

**Time required for robot to move back and forth 300mm horizontally and 25mm vertically**

## Sensor-less Compliance Control Function



**Sensor-less compliance control achieves smooth insertion within the deviation of the motor torque range**

*\*Insertion performance may differ depending on workpiece hardness.*

## Simple and Easy Operation

### ► Multiple Teaching Methods



PAD



Teaching Pendant



PC

### ► User-friendly Robotic Integration Software

- Built-in standard testing modules for quick testing (E.g. I/O points and motors)
- Standard modular program design for easy robot motion programming, high maintainability and low maintenance cost
- Integrates customer's UI tools to ensure the uniqueness and completeness of individual robotics systems

Simulation Module



Programming Module



Built-in Testing Module



Customized UI Module



\* UI = User Interface

### ► Direct Teaching (Lead by Hand)



Positions are directly taught and controlled by hand, and recorded by SCARA



Adopts Delta Machine Vision Systems  
DMV2000 / DMV1000



## Robotic Integration Software

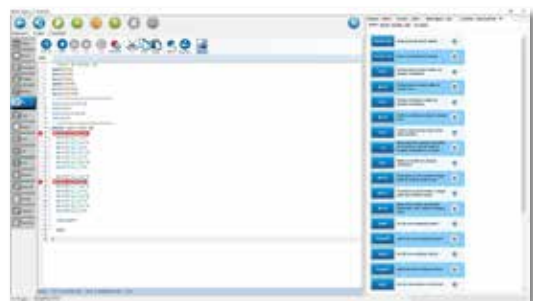
### DRAStudio Features

- Easy programming for various applications
- Creates an offline simulation environment for robots
- Supports articulated robots operation



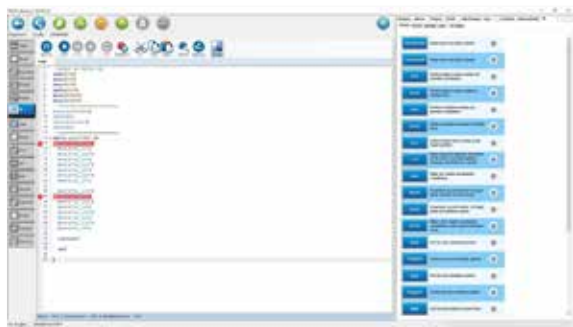
### Friendly Programming Environment

- Quick and easy graphical programming
- Simplified programming languages and shorter commands to fulfill quick operation
- Integrates data and signals of peripheral devices to configure user-defined interface



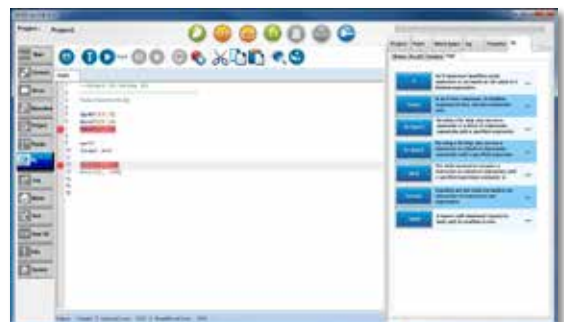
### Various Robot Motion Commands and Parameter Setting Environment

- Motion commands : MovJ, MovP, MovL, MovPR, MovLR, MArc, Mcircle, Lift
- Motion parameters : SpdJ, AccJ, DecJ, SpdL, AccL, DecL, Accur



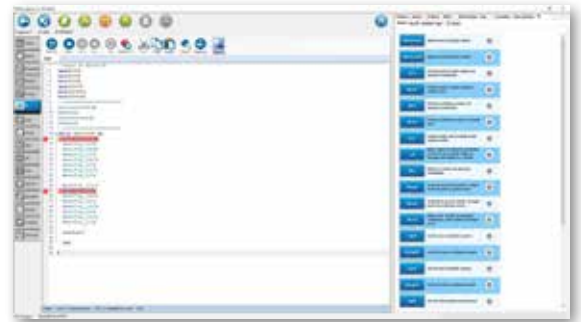
### Process Control Environment Setting

- Process control commands : if...then...end, while...do...end, for .....do...end, function, repeat



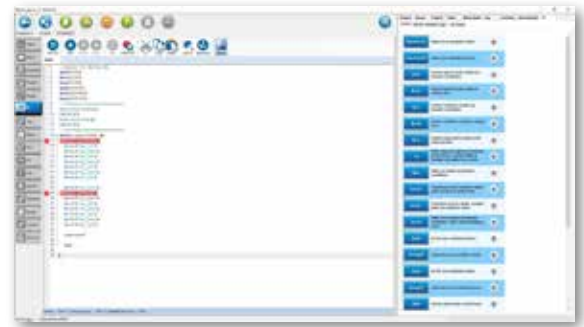
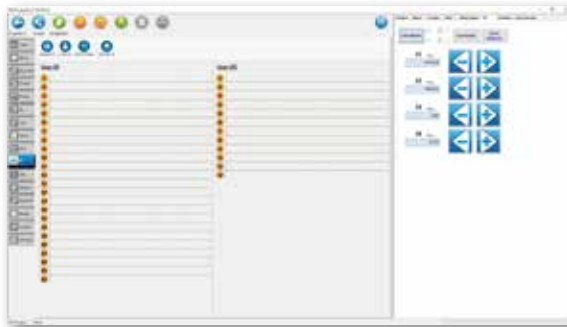
## Coordinate System Environment Setting

- Coordinate commands : SetUF, ChangeUF, SetTF, ChangeTF
- Positioning commands : SetGlobalPoint, CopyPoint, ReadPoint, WritePoint, RobotX, RobotY, RobotZ, RobotRz, RobotHand



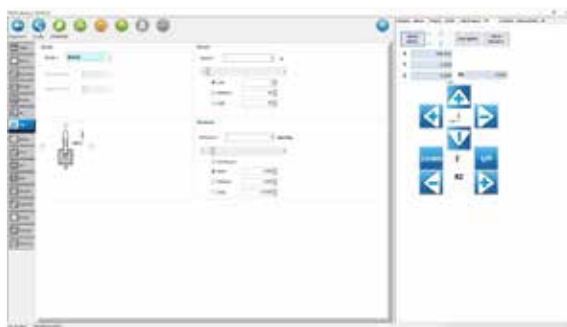
## Digital I/O Control Setting

- Provides digital I/O control commands and monitoring



## Coordinate System and Movement Recording Function

- Provides coordinate system ( Joint / Tool / User / World) to teach robots movements
- Records real-time robot teaching movement for positioning verification



## Workable Space Setting

- Up to 10 sets of 3D cylinder and rectangle shape workable space
- Limit robotic movement for safety



## Robotic Integration Software

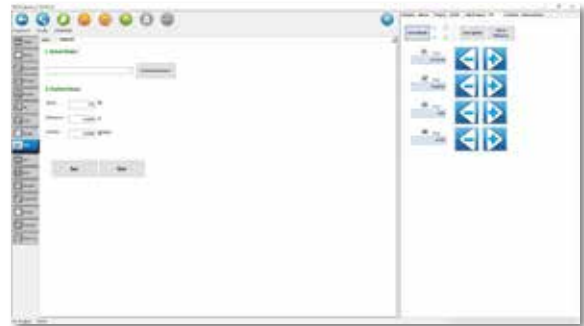
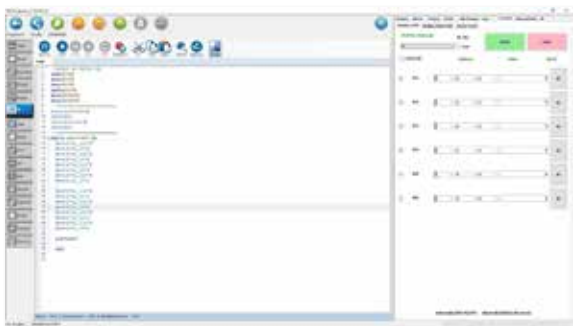
### Tool Setting and User Interface

- Simple parameter setting
- Various user interface settings for easy integration



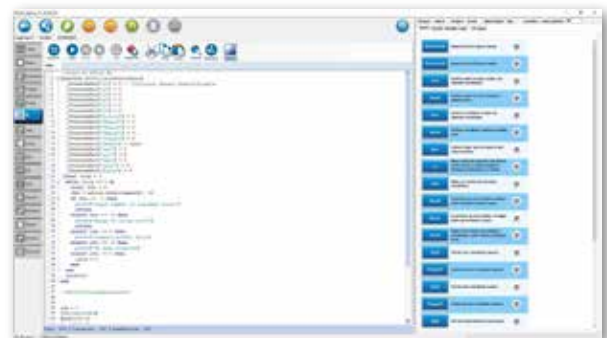
### Fast Payload Adjustment and Information Transmission

- Quick payload setting to optimize robot systems
- Real-time monitoring information exchange between robot and peripheral devices for system efficiency



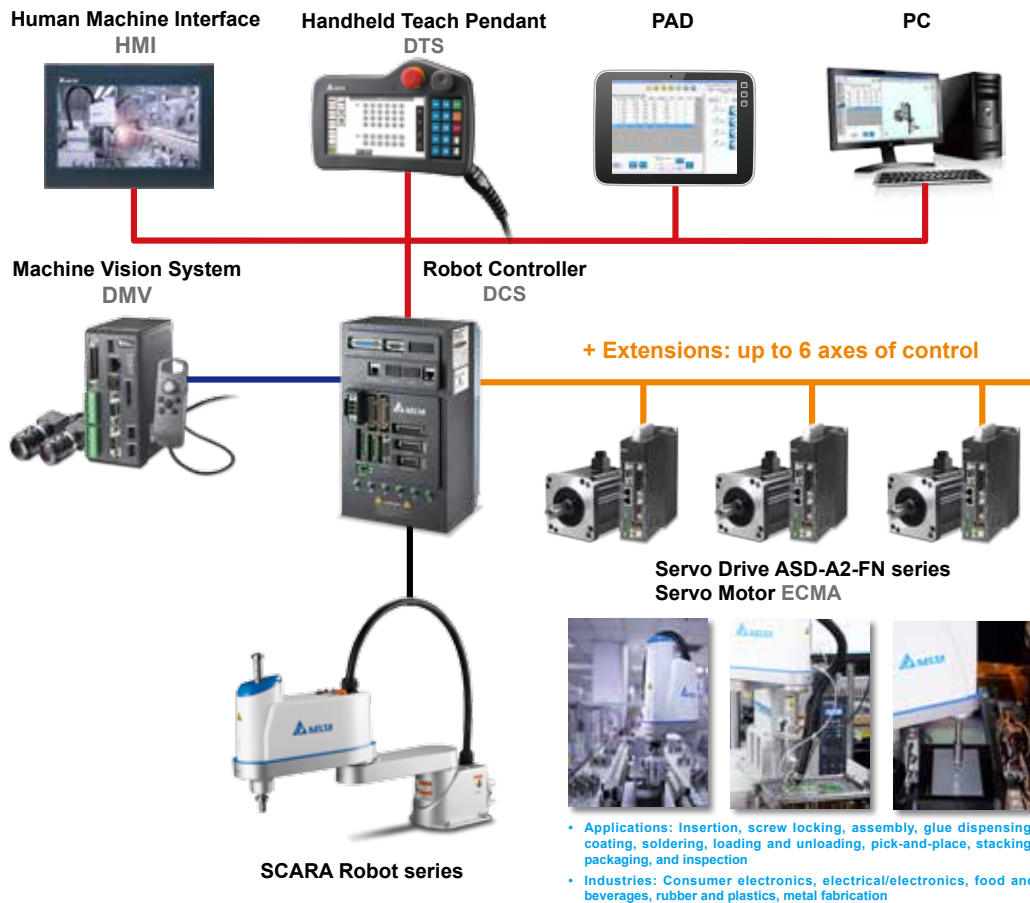
### Sample Code and Templates for System Integration

- Adopt templates including vision sample code for customized applications



## SCARA Robot Workstation Solution

- ▶ The highly flexible robotic workstation integrates control units and other peripheral devices
- ▶ Easy integration with machine vision systems achieves smart identification, inspection and automatic adjustment for consistent quality delivery



## Ordering Information

Type	Model	Specification	Description
Robot Control Cable	DWSEP1003	3m robot control cable	Included ( Various lengths available for different applications)
	DWSEP1005	5m robot control cable	
	DWSEP1010	10m control cable	
Peripheral Devices	3534518800	Optional system digital I/O (SYS.DIO) module, 1m cable included	Recommended for extended DI/O module connection
	3534518900	Optional standard digital I/O (SYS.DIO) module, 1m cable included	
	3081422700	Optional 1 m connection cable for system digital I/O (SYS.DIO) No soldering required, number mark on the other side	
	3081734900	1m CANopen connection cable	
	3864267000	3m CANopen connection cable	
	3864999300	10m CANopen connection cable	
	ASD-DMC-RM32MN	Remote 32 points DI	
	ASD-DMC-RM64MN	Remote 64 points DI	Recommended for extended drive connection
	ASD-DMC-RM32NT	Remote 32 points DO	
	ASD-DMC-RM64NT	Remote 64 points DO	
	ASD-A2-0121-FN	100W drive	
	ASD-A2-0221-FN	200W drive	
	ASD-A2-0421-FN	400W drive	



## Exterior of the Robot Controller

## Teach Pendant Connection Port

## High-speed Communication and Software Port

- Ethernet: connects PCs or notebooks, capable of accessing data through DROE software
- USB1, USB2: Directly connects to USB flash drives
- DMCNET: Connects DMCNET peripherals

### Main Circuit Terminal (RS)

Connects 200-230Vac, 50/60Hz  
commercial power supply

### Brake Control Digital Output Terminal (BRK.DIO)

**STO I/O Terminal**  
(Safe Torque Off)

Connects a certified safety relay or switch for controlling STO I/O signals

## STO I/O Terminal (Safe Torque Off)

Connects a certified safety relay or switch for controlling STO I/O signals

## Control Power Input

Connects DC24V power supply

### System I/O Terminal (SYS. DIO)

## Serial Communication Port

For Modbus communication control,  
supporting RS-485 / RS-232 serial  
communication

## LED Display

The 5 digit, 7 segment LED displays the controller status or fault codes

### Servo Motor Output (U, V, W)

Connects servo motors. Never connect the output terminal to main circuit power as the drive may be damaged beyond repair if incorrect cables are connected to the output terminals

### Standard I/O Terminal (STD. DIO)

## Full-closed Loop Control Interface (EXT. ENG)

Feeds back the position signals of the full closed linear scale and encoder for controlling A, B, Z phase signals

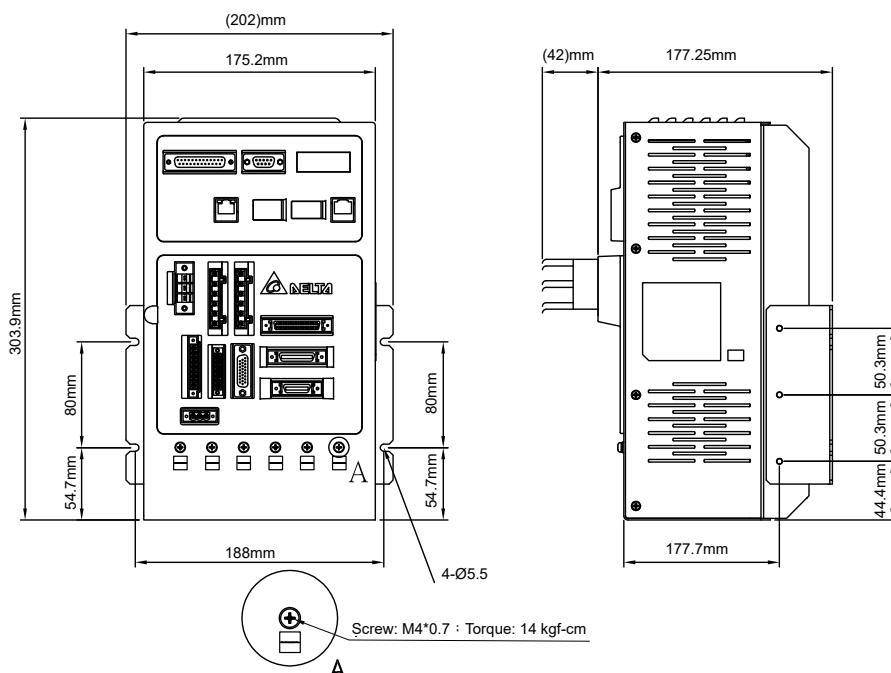
### Motor Encoder Interface (MOTOR. ENC.)

The encoder signals of four servo motors

## Ground Terminal

Grounding wire of power supply and servo motor




## Dimensions of the Robot Controller



 **NOTE**

- 1) Dimensions are in millimeters (inches);  
Weights are in kilograms (kg) and pounds (lbs)
- 2) Dimensions and weights of the robot controller may  
be revised without prior notice

## Specifications of the Robot Controller

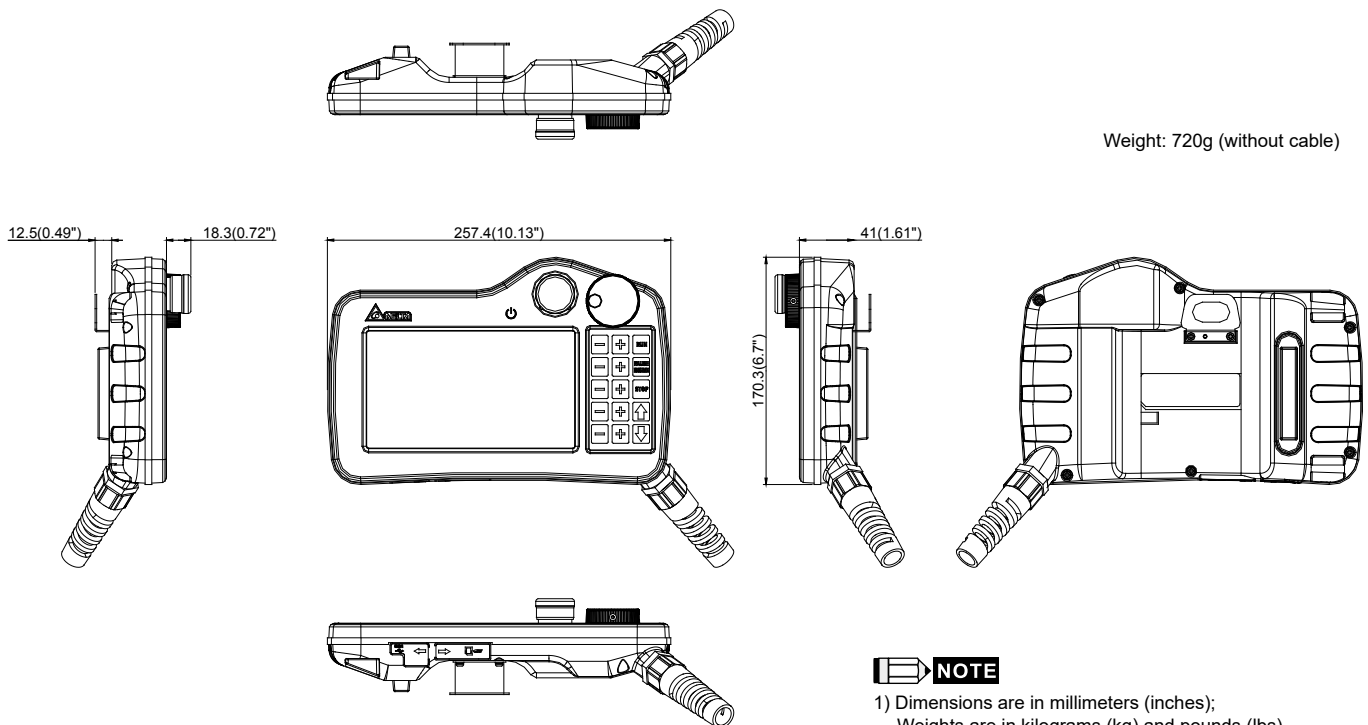
DCS Series		
Power Supply	Phase / Voltage	Single phase: 200-230Vac, 5A
	Control Power Supply	22-24Vdc, 5A
Dimensions (W) X (H) X (D) mm / Weight		175 mm x 300 mm x 159 mm / 5.6 kg
Cooling Method		Fan cooling
External Optical Scale or Encoder		A, B, and Z format
Robot Control	Programming Language	Delta robot language
	Motion Mode	Point-to-point motion, linear interpolation, circular interpolation
	Memory Capacity	20MB: for program editing and data 16KB: for PLC SV/DV variables (without power failure detection) 60KB: for PLC DH variables (with power failure detection) 1K location point for universal variables (shared among different programs) Up to 32K location point for programming
Input / Output	Standard I/O	User I/O: 24 sets of inputs and 12 sets of outputs System I/O: 8 sets of outputs and 8 sets of inputs
Communication Interface	Ethernet	One channel
	RS-232 / RS-485	One connecting port (allows switching between two communication protocols)
	DMCNET	One channel
	USB Host	Two connecting ports
Environment	Installation	Indoor (avoid direct sunlight), no corrosive liquid and gas (avoid oil mist, flammable gas, dust)
	Altitude	Altitude 1000m or lower above sea level
	Atmospheric Pressure	86kPa ~ 106kPa
	Ambient Temperature	0C ~ 55°C (If ambient temperature is above 45°C, cooling is required)
	Storage Temperature	-20°C ~ 65°C
	Humidity	0 ~ 90% RH (non-condensing)
	Vibration	9.80665m/s <sup>2</sup> (1G) less than 20Hz, 5.88m/s <sup>2</sup> (0.6G) 20 to 50Hz
	IP Rating	IP20
	Power System	TN system <sup>*1</sup>
Safety Certifications		IEC/EN 61800-5-1, UL 508C, RCM   

<sup>\*1</sup> TN system: A power distribution system having one point directly earthed, the exposed conductive parts of the installation being connected to that points by a protective earth conductor.

## Handheld Teach Pendant DTS



## Dimensions



**NOTE**

- 1) Dimensions are in millimeters (inches);  
Weights are in kilograms (kg) and pounds (lbs)
- 2) Dimensions and weights of the teaching pendant may  
be revised without prior notice

## Specifications of the Handheld Teach Pendant

Model	DTS-1FD	DTS-1GD	DTS-2FM	DTS-2GM
LCD Module	Display Type : 7" Widescreen TFT LCD Resolution (pixels) : 800 x 480 Backlight Luminance (cd/m2) : 450			
Arithmetic-Logic Unit (ALU)	Colors : 65536 Backlight : LED Back Light Backlight Lifetime (Hr) <sup>1</sup> : 20,000			
Buzzer	CPU : 400 MHz Flash ROM (Bytes) : 128MB RAM (Bytes) : 64MB Backup Memory (Bytes) : 16MB			
Connector	Multi-tone Frequency ( 2K ~ 4K Hz ) / 80dB			
Real Keys	Connector: D-Sub (25 pin)			
USB	Military (17 pin)			
SD	15 keys			
Ethernet	1 USB Client Ver 2.0			
Function Key	SD card (support SDHC)			
Cable Length	1 Port <sup>2</sup>			
Emergency Stop Switch	15			
3-Position Operation Switch	5 m			
Safety Standard	10 m			
Protection Rating	5 m			
Voltage Endurance <sup>*3</sup>	10 m			
Waterproof Degree	5 m			
Power Consumption <sup>*5</sup>	10 m			
Backup Battery	3V lithium CR2450 x 1			
Backup Battery Life	5 years or more at 25°C, may vary due to temperature and usage condition			
Operation Temperature	0°C ~ 40°C			
Storage Temperature	-20°C ~ +60°C, 10% ~ 90% RH			
Operation Environment	10% ~ 90% RH ( 0 ~ 40°C ), 10% ~ 55% RH ( 41 ~ 50°C ), pollution degree 2			
Vibration Resistance	Conforms to IEC61131-2, 5Hz~8.3Hz 3.5mm, 8.3Hz~150Hz 1G			
Shock Resistance	Conforms to IEC60068-2-27, 11ms, 15G Peak , X, Y, Z direction for 6 times			
Dimensions W x H x D (mm)	257.4 x 170.3 x 71.8 (Emergency stop button and hook included)			
Weight	750g (Wire excluded)			

Note: 1) The half-life of the backlight is defined as the original luminance being reduced by 50% when the maximum driving current is supplied to the HMI.

2) Built-in isolated power circuit

3) Adopting isolated power supplies is suggested

4) The value of the power consumption indicates the electrical power consumed by HMI with no peripheral devices connected. To ensure normal operation, it is recommended using a power supply with a capacity 1.5~2 times the value of the power consumption.

## Ordering Information

### DTS Series

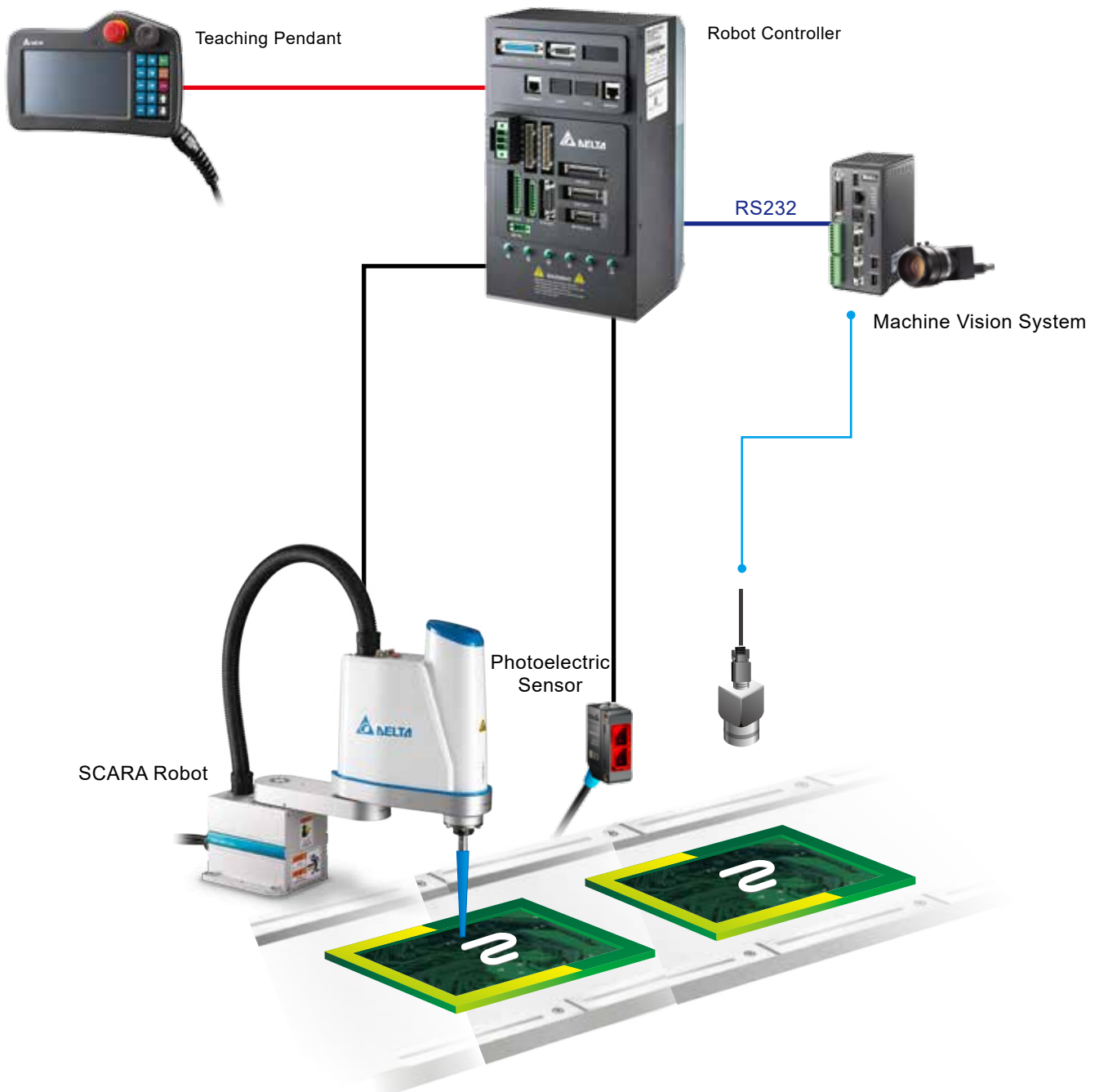
DT	S	1	F	D
Company/ Product	Category	Generation	Cable Length	Connector specification
D : Delta T : Teach Pendant	S : SCARA	1 : Generation 1 (15 Key)	F : Cable length 5m	D : D-Sub
		2 : Generation 2 (21 Key)	G = Cable length 10m	M : CE military model



## Successful Applications

### Conveyor Tracking and Glue Dispensing Solution

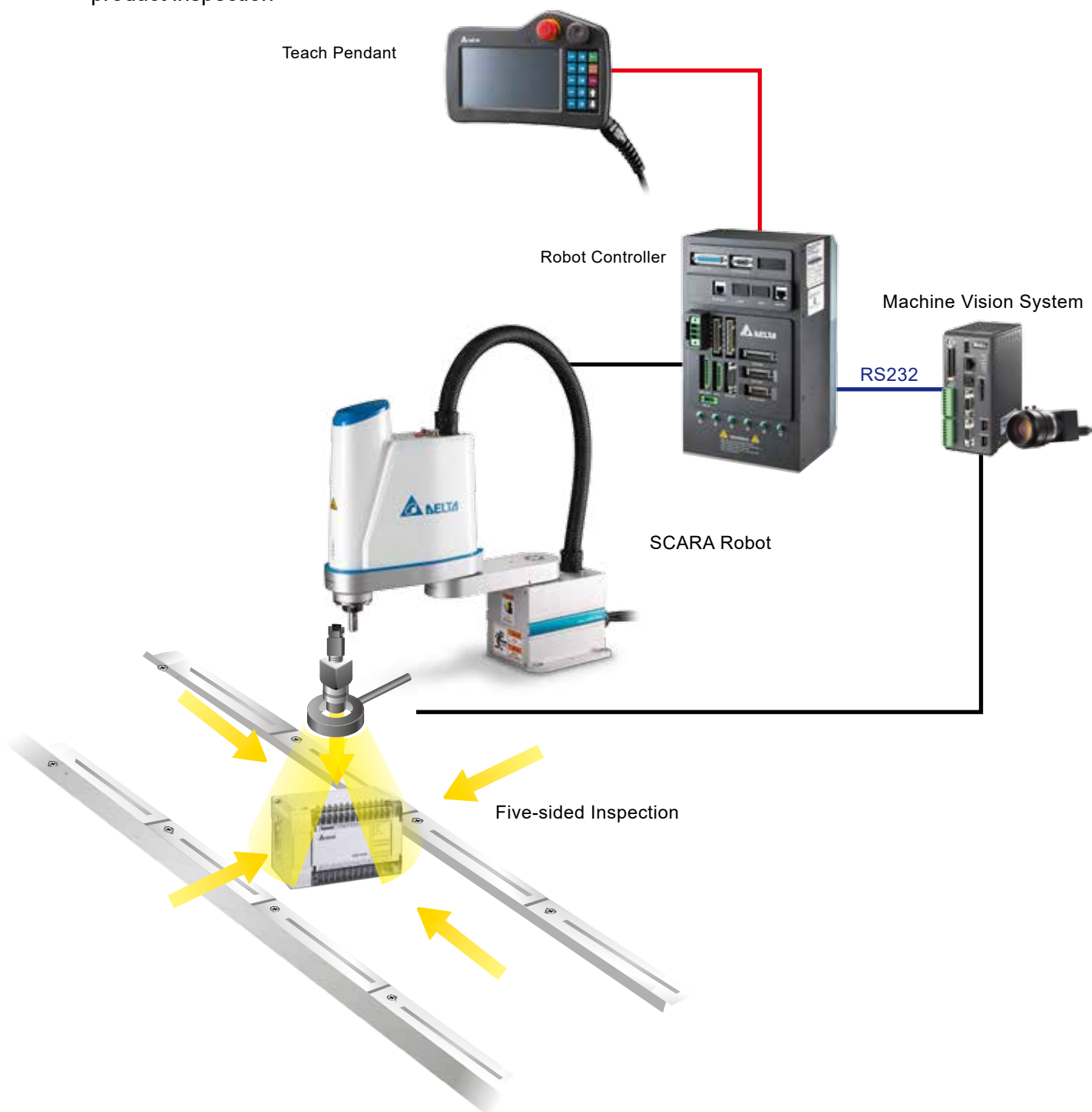
- SCARA provides fixture-less conveyor tracking
- Synchronizes the robot and motion of the conveyor without stopping it to enhance production efficiency
- The PC-Software consists of secondary development platform for easy and flexible customization
- General communication interface easily connects different machine vision systems and modules
- Simple system structure for easy configuration
- The solution adopts Delta industrial automation products for easy integration and maintenance



## Successful Applications

### Five-sided Product Inspection Solution

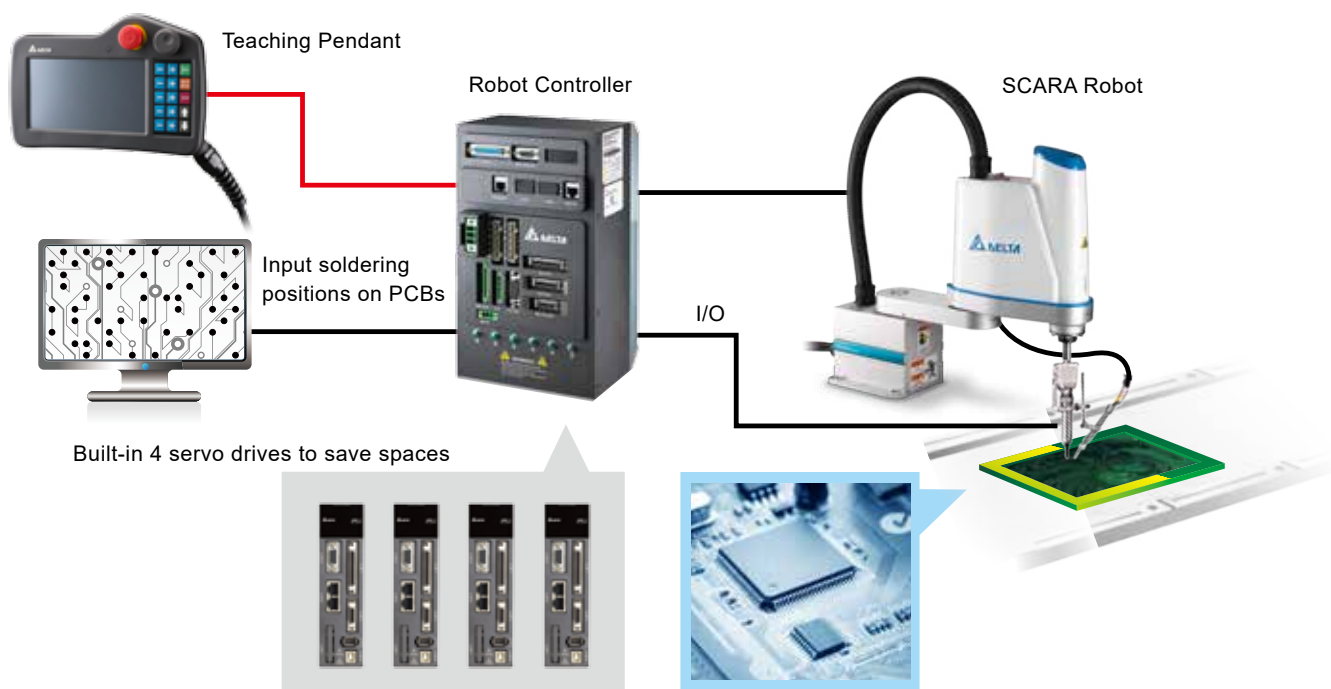
- Robot controller with servo drive integrated saves spaces and wiring
- Matches with machine vision system for flexible robot movement and easy interchangeable product inspection
- Adopts one communication protocol and simple wiring configuration with high reliability
- Links to MES System for optimized manufacturing and interchangeable production
- The solution adopts Delta industrial automation products for easy integration and maintenance



## Successful Applications

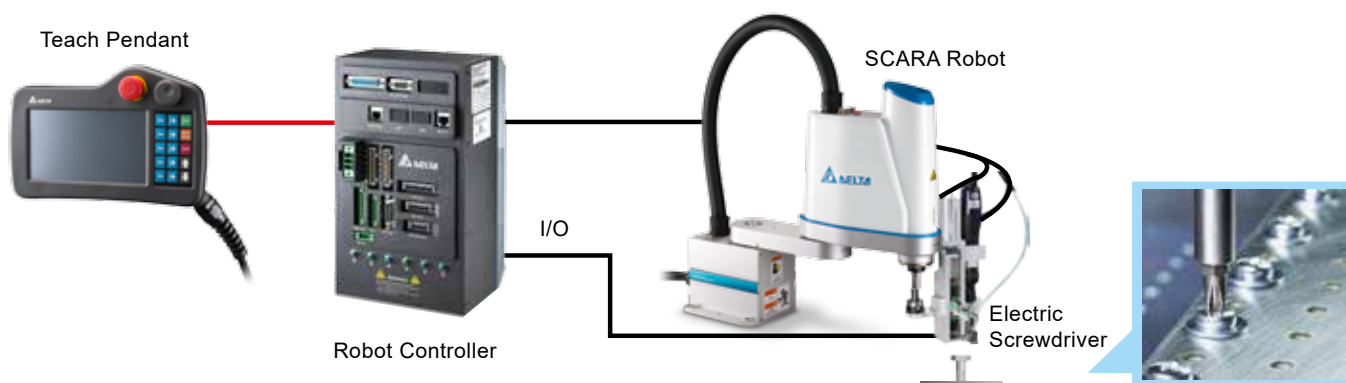
### Robotic Soldering Solutions

- Robot controller with servo drive integrated saves spaces and wiring
- Use soldering software to transform positions of solder holes in CAD PCB files for robots to achieve fast interchangeable production
- Auto calibration function compensates deviation caused by tool changes
- The solution adopts Delta industrial automation products for easy integration and maintenance



### Automatic Screw-locking Solution

- Robot controller with servo drive integrated saves spaces and wiring
- SCARA delivers consistent quality with high repeatability
- Flexible robot teaching movement and motion control for interchangeable production
- The solution adopts Delta industrial automation products for easy integration and maintenance





Automation for a Changing World

# Delta Articulated Robots DRV Series



DESIGN  
AWARD  
2018



**enertronic**  
PROYECTOS Y  
SUMINISTROS S.A.

 **DELTA**  
DELTA ELECTRONICS, INC.



## Smart Robots for Industry Upgrades

In this age of smart automation for production lines and factories, industrial robots are applied to accomplish dangerous tasks, save manpower cost, improve flexibility for manufacturing and shorten operation time.

Delta's latest articulated robots DRV Series with robot controller DCV Series facilitate smooth integration with other Delta peripheral devices to establish simple and easy-to-operate systems for robot control. Delta's highly integrated robot workstations enable excellent production efficiency and reduce labor costs.

With excellent flexibility, the 6-axis articulated robots have two different working ranges to meet a variety of application demands. The robots can be widely used in industries such as 3C, electronics and electrical engineering, metal processing, rubber and plastics, as well as applications including inspection, assembling, glue dispensing, machine tending, packaging, soldering, and load/ unload. Delta's DRV Series is your best partner for moving towards Industry 4.0.

**H**igh Flexibility

**H**ollow Wrist

**M**ultiple Installations

**U**ser-Friendly Interface

**E**asy-to-Operate

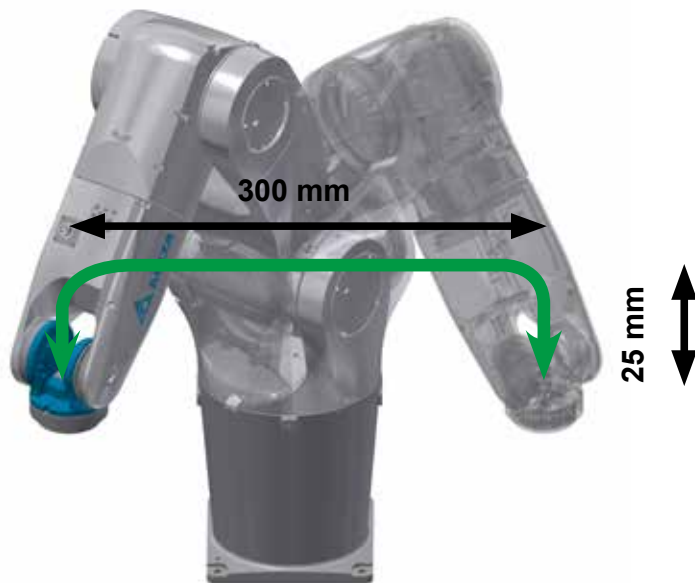
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## Product Features

### Excellent Speed & Repeatability



**Fixed Distance (300mm / 25mm)**

Model	Payload (kg)	C/T (sec)
DRV70L Series	1 kg	0.32 sec
DRV90L Series	1 kg	0.35 sec
DRVA1L Series	1 kg	0.48 sec
DRVA4L Series	1 kg	0.54 sec

### Hollow-wrist Design for Cable Routing

**Non-hollow Design:**  
Tangled cables hinder robot operation



**Hollow Design:**  
Enhanced cable reliability

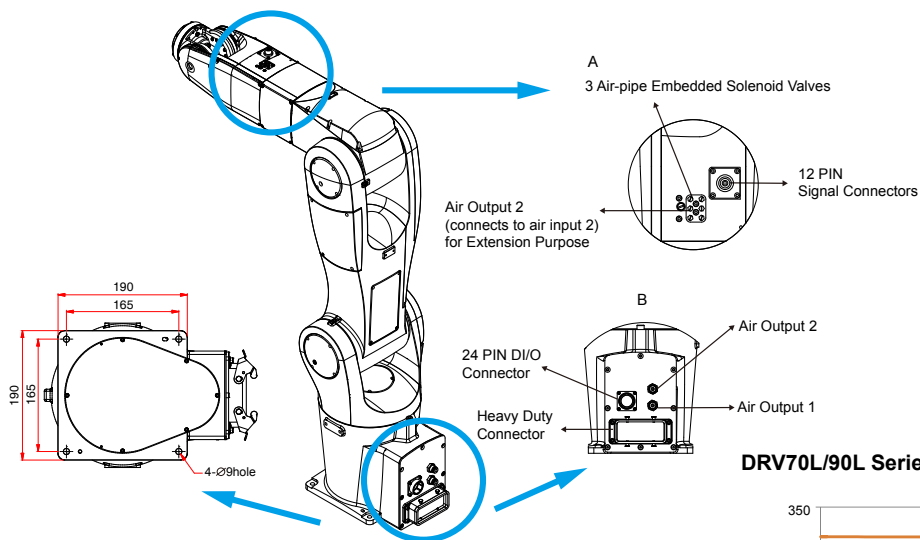


## Table-top, Ceiling-mount, and Wall-mount Installations

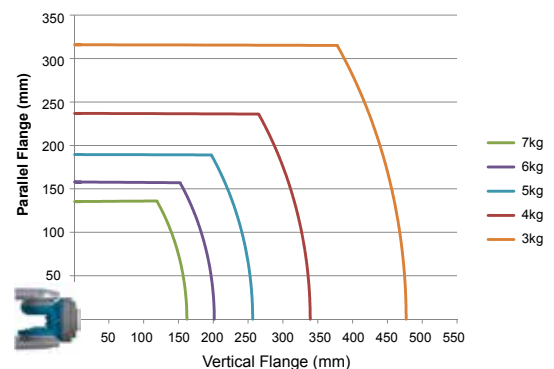
High installation flexibility fulfills production line demands and enhances efficiency



## Compact Design for Easy Installation and Fast Production Line Application

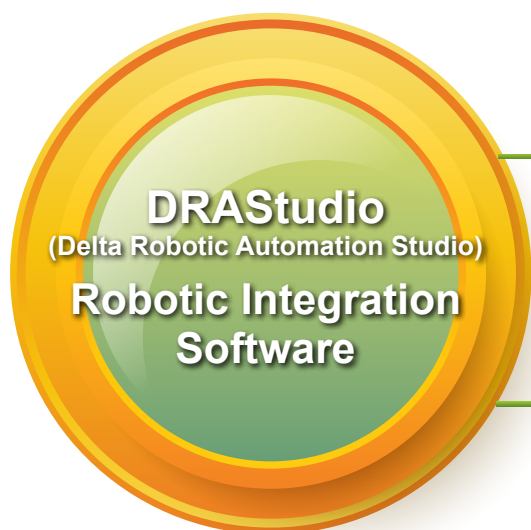


DRV70L/90L Series Payloads and Center of Gravity Graph



## Product Features

### User-Friendly Interface



Convenient for Project Management

Instant Feedback Remote Maintenance

Simple Programming Languages

#### DRASudio Intuitive interfaces



#### Real-time support via complete customer feedback interface



#### Categorized projects and models for easy management



#### Intuitive coding environment with drag and drop functions





## Easy-to-Operate

### User-defined IO Functions

- Multiple DI/Os for real-time monitoring and operation
- Total system development with external equipment via serial connection



### Easy Setup for Fast Integration

- Provides 9 user frames and tool frames



### Wide Range of Motion Setting for Enhanced Safety and Reliability



Diversified Motion Commands

Simple Inspection & Quick Maintenance

Optimized Parameter Settings

# Product Specifications

## DRV Series

Model		DRV70L Series	DRV90L Series	DRVA1L Series	DRVA4L Series
Number of Axes		6			
Max. Working Range		710 mm	900 mm	1,111mm	1,411mm
Max. Payload		7 kg			
Motion Range	J1	±170°			
	J2	+133° / -105°	+135° / -105°	+135° / -105°	
	J3	+60° / -205°			
	J4	±190°			
	J5	±120°			
	J6	±360°			
Max. Speed	J1	450° / sec	370° / sec	240° / sec	200° / sec
	J2	340° / sec	260° / sec	220° / sec	165° / sec
	J3	510° / sec	410° / sec	295° / sec	220° / sec
	J4	550° / sec		465° / sec	
	J5	550° / sec		480° / sec	
	J6	820° / sec		705° / sec	
Max. Composite Speed		11,000 mm / sec	10,600 mm / sec	9,400 mm / sec	9,100 mm / sec
Allowable inertia	J4	0.47 kg*m <sup>2</sup>			
	J5	0.47 kg*m <sup>2</sup>			
	J6	0.15 kg*m <sup>2</sup>			
Allowable moment	J4	16.6 Nm			
	J5	16.6 Nm			
	J6	9.4 Nm			
Repeatability		±0.02 mm	±0.03 mm	±0.04mm	±0.05mm
Standard Cycle Time <sup>*1</sup>		0.32 sec	0.35 sec	0.48 sec	0.54 sec
Installations		Table-top, ceiling-mount, wall-mount <sup>*2</sup>			
Built-in Design		With 1 12Pos. circular connector for sensor connections and 2 ø6 pneumatic tubes (one for the embedded 3 sets of solenoid valves, one for extension)			
IP Rating <sup>*3</sup>		IP40 (Standard) / IP65 (Optional) <sup>*4</sup>		IP65 (Standard)	
Environment	Ambient Temperature	0°C ~ 40°C			
	Humidity	20 ~ 85 %RH			
	Vibration	0.5 G			
Weight		37 kg	39 kg	76 kg	82 kg
Robot Controller		DCV Series			

\*1: When carrying a payload of 1kg and reciprocating 25 mm in vertical and 300 mm in horizontal directions, under an operating temperature of 25°C and within a humidity of 45% - 65% RH.

\*2: For wall-mount installation, please contact our local sales/distributors.

\*3: The environment resistance can be altered for different applications. For special IP standard or wrist models, please contact local sales / distributors.

\*4: Please contact local sales / distributors for optional IP65 models

# Product Specifications

## DCV Series

DCV Series		
<b>Power Supply</b>		Single-phase: 200-230Vac+PE, 50/60Hz, 15A
<b>Dimensions (W) x (H) x (D) / Weight</b>		383 mm x 223 mm x 406 mm / 22 kg
<b>Cooling Method</b>		Fan Cooling
<b>Robot Control</b>	<b>Programming Language</b>	Delta robot language
	<b>Motion Mode</b>	Point-to-point motion, linear interpolation, and circular interpolation
	<b>Memory Capacity</b>	20MB: for programming editor and data users 1K location point is available for global variables (allows it to be shared among different programs) 30K location point is available for all programming editors
<b>Digital Input (DI) / Output (DO)</b>	<b>Standard DI/O</b>	System DI/O : 7 sets of DI, 8 sets of DO User DI/O: 24 sets of DI, 12 sets of DO
<b>Communication Interface</b>	<b>Ethernet</b>	One channel, RJ-45
	<b>DMCNET</b>	One channel, RJ-45, connects with Delta DMCNET products
	<b>RS-232 / RS-485</b>	One connecting port, D-sub 9P/Female
	<b>Teach Pendant</b>	One circular connector
	<b>Safety</b>	8 PIN circular connector Provides dual channels for emergency stop and connection with other safety components
	<b>Ext .Encoder</b>	D-sub 37P / Female, provide 1 external encoder feedback signals
	<b>DC Power</b>	3 PIN circular connector, provide DI/O options to meet diverse needs
	<b>Power IN</b>	3 PIN terminal block connector for power supply
	<b>Robot</b>	Multipole connectors / Female
<b>Environment</b>	<b>Installed Location</b>	Indoors (avoid direct sunlight), no corrosive liquid and gas (avoid fumes, flammable gas and dust)
	<b>Altitude</b>	1000m or lower above sea level
	<b>Atmospheric Pressure</b>	86 ~ 106 kPa
	<b>Ambient Temperature</b>	0 ~ 40°C (If ambient temperature is above 45°C, forced cooling will be required)
	<b>Humidity</b>	0 ~ 90% RH (non-condensing)
	<b>Vibration</b>	9.80665 m/s <sup>2</sup> (1G) less than 20 Hz, 5.88 m/s <sup>2</sup> (0.6G) 20 - 50 Hz
	<b>IP Rating</b>	IP20
	<b>Power System</b>	TN system: A power distribution system having one point directly earthed, the exposed conductive parts of the installation being connected to that point by a protective earth conductor.

# Product Specifications

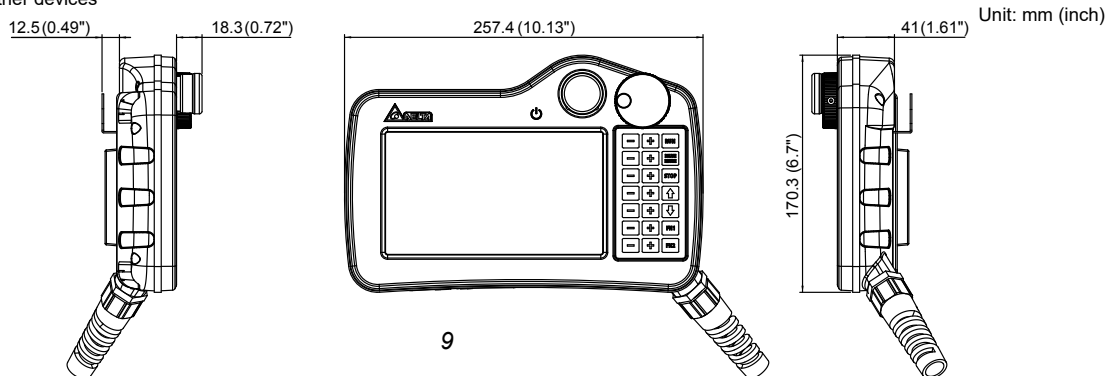
## DTV Series

Model		DTV-2FM	DTV-2GM
LCD Display	Panel	7" TFT LCD (65535 colors)	
	Resolution	800 x 480 pixels	
	Backlight	LED Back Light (under temperature 25°C half-life period > 20k hrs) <sup>*1</sup>	
	Range	154.08 x 85.92 mm	
Operating System		Delta Real Time OS	
CPU		32-bit RISC micro-controller	
Flash ROM		Flash ROM 128 MB (OS System: 30MB / Backup: 16MB / User Application: 82MB)	
Power-Off Memory		16M bytes ROM, 128K bytes SRAM	
Buzzer		Multi-tone frequency ( 2K - 4K Hz ) / 85dB	
Network Interface		10/100 Mbps auto detection (built-in isolating circuit) <sup>*2</sup>	
Communication Port		N/A	
Memory Card		SD / SDHC	
USB		1 USB Client Ver 2.0	
Emergency Stop Switch		Standards: IEC60947-5-1, EN60947-5-1, IEC60947-5-5, EN60947-5-5, UL 508, CSA C22.2 No.14, GB 14085.5	
3-Position Operation Switch		Standards: EN/IEC60947-5-8, IEC60947-5-1, EN60947-5-1, JIS C8201-5-1, UL508, CSA C22.2 NO. 14 Applications: ISO12100-1, -2/EN12100-1, -2, IEC60204-1/EN60204-1, ISO11161/prEN11161, ISO10218/EN775, ANSI/RIA R15.06, ANSI B11.19	
MPG		Rated voltage: < DC 24V	
		Resolution: 50(P/R)	
		Output wave: square wave	
		Output phase: A, B	
		A, B phase difference: 90° ± 45°	
		Max. frequency response: 200Hz	
Buttons		21	
Cable Length		5 m	10 m
Calendar		Built-in	
Cooling Method		Natural Cooling	
Safety Approval		CE	
Protection Rating		IP55	
Work Voltage		DC +24V (±15%) (Supplied by SELV circuits, isolated from MAINS by double insulation)	
Insulation Endurance		AC500V 1 min (between DC24V terminal and FG terminal)	
Power Consumption		5.6W <sup>*3</sup>	
Backup Battery Life		3V lithium CR2450 × 1	
Backup Battery Life		More than 5 years at 25°C (according to temperature and usage condition)	
Operating Temperature		0°C - 40°C	
Storage Temperature		-10°C - 60°C	
Operating Environment		10% - 90% RH (0 - 40°C), 10% - 55% RH (41 - 50°C); Pollution degree 2	
Vibration Resistance		Conforms to: IEC61131-2; Continuous: 5Hz-8.3Hz 3.5mm, 8.3Hz-150Hz 1G	
Shock Resistance		Conforms to IEC60068-2-27; 11ms, 15G Peak , X, Y, Z direction for 6 times	
Dimensions (W) x (H) x (D) mm		257.4 x 170.3 x 71.8 (with emergency stop switch and hook)	
Weight		750g (without cable)	

\*1 Half-life period: Under max. drive current, when the back light's brightness diminishes to half of the max brightness it is defined as the half-life period. The life-time period is estimated under 25°C moist working environment.

\*2 Resistance of the isolating circuit: 1500V high voltage surge / 1 min

\*3 Without extension of other devices



## Model Introduction

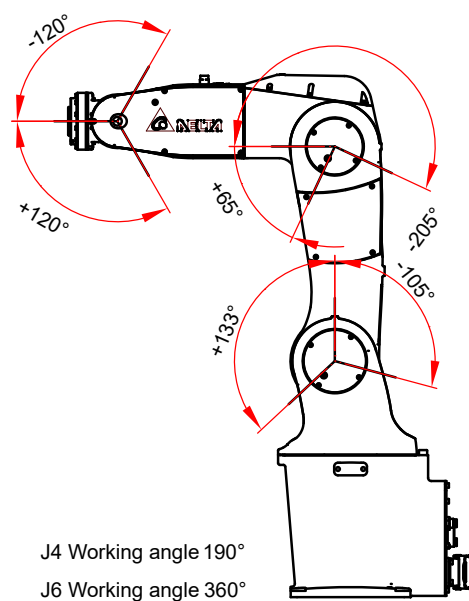
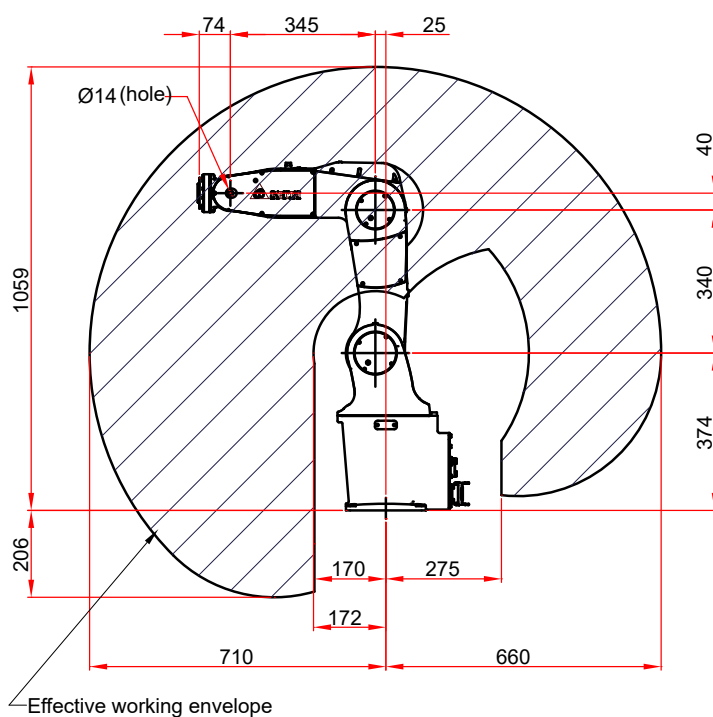
## DRV Series

DRV	90	L	7	A	6	3	1	3	N
Company/ Product/ Robot Type	Max. Working Range	Series	Max. Payload	IP Rating	Number of Axes	version	Wiring	Robot Cable	Accessories
D : Delta R : Robot V : Vertical	70 : 710 mm	L : Lite	7 : 7 kg	A : IP40 B : IP65 D:CE/IP40	6 : 6 axes		1 = Standard	3 = 3m	N = No teach pendant
	90 : 900 mm							5 = 5m	
	A1 : 1,111mm								
	A4 : 1,411mm								

## Dimensions - DRV Series

## Range of Motion

## DRV70L Series

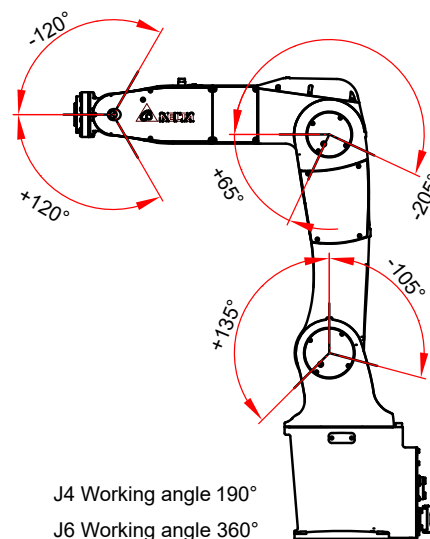
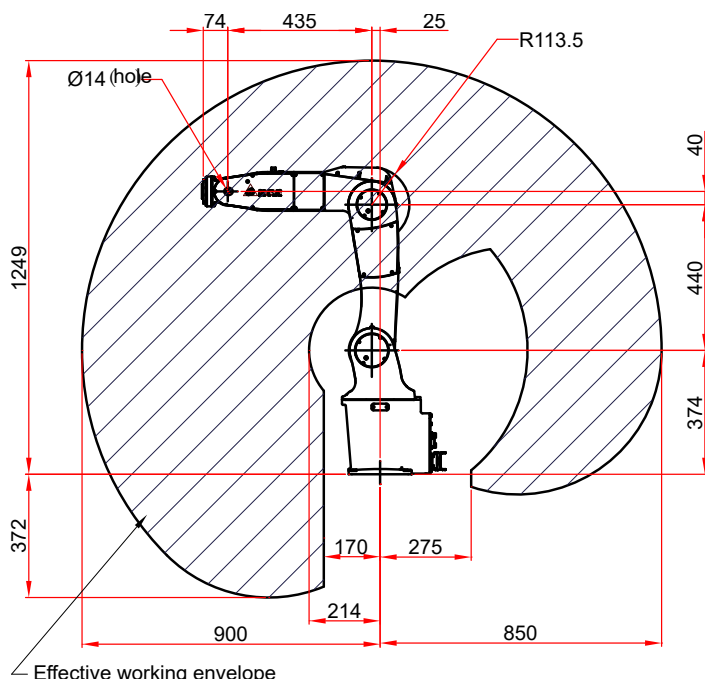




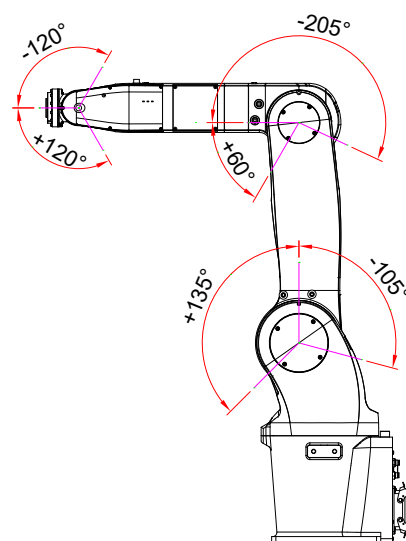
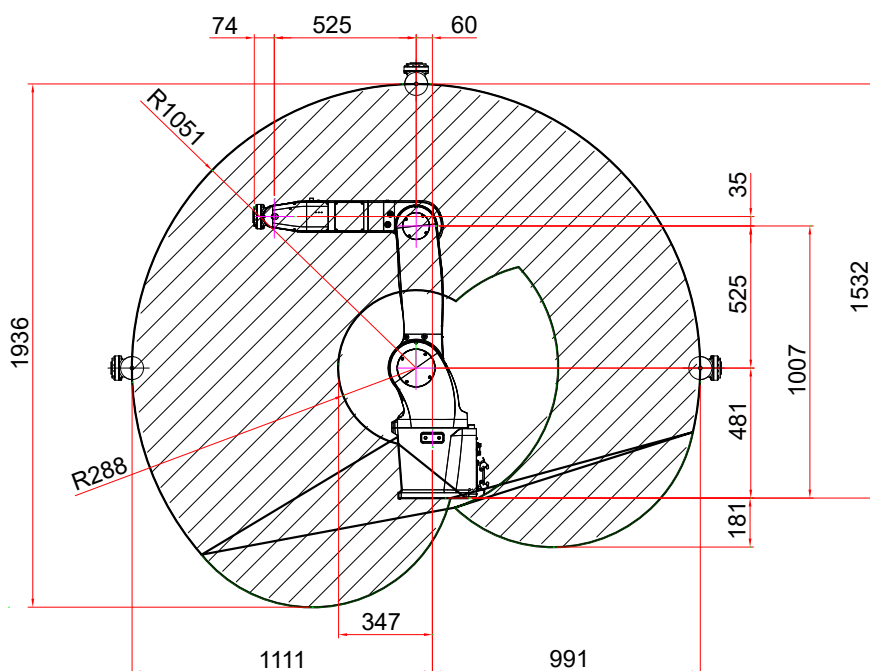
## Dimensions - DRV Series

### Range of Motion

#### DRV90L Series



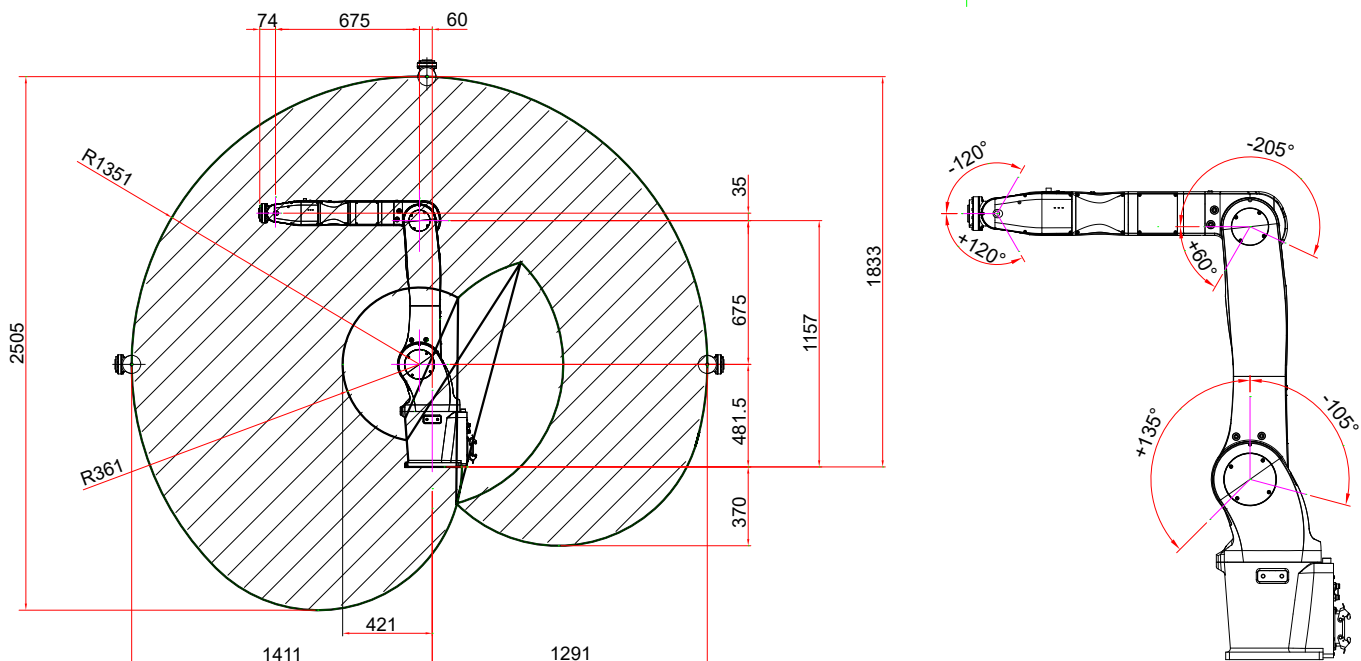
#### DRVA1L Series



## Dimensions - DRV Series

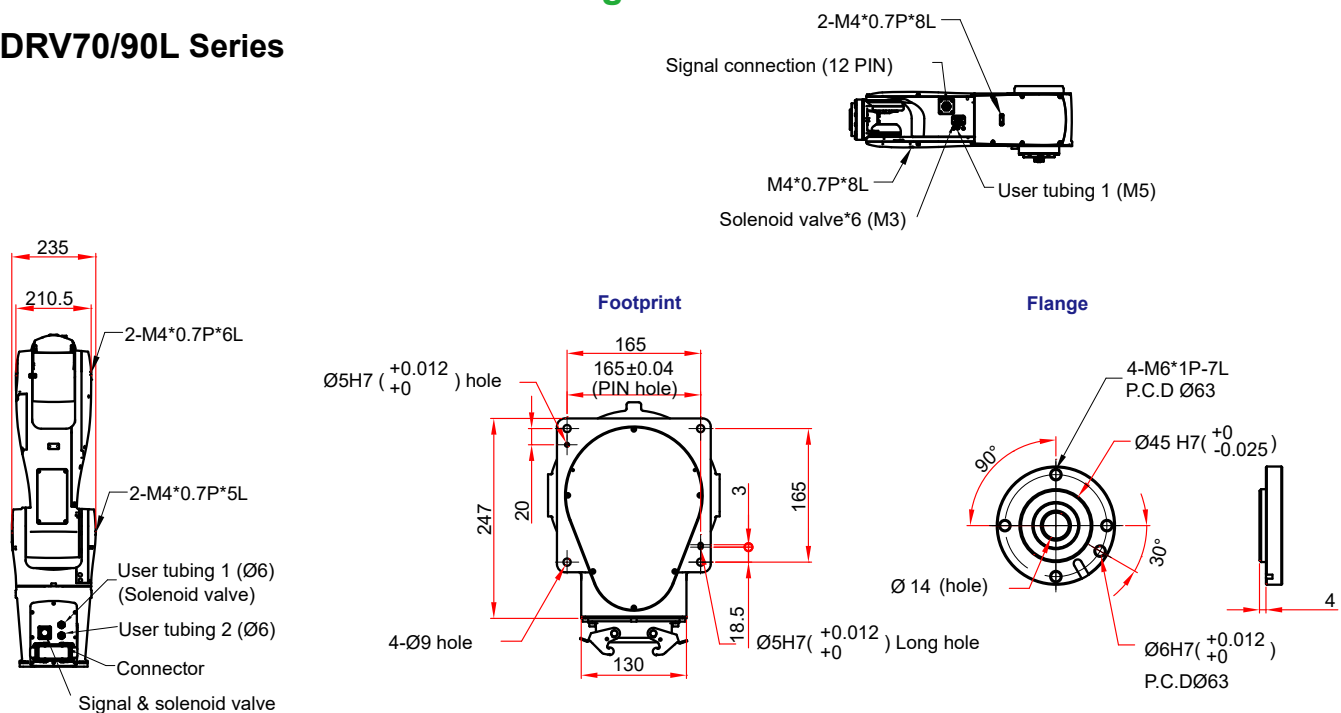
### Range of Motion

#### DRVA4L Series



### External Dimensions and Mounting Holes

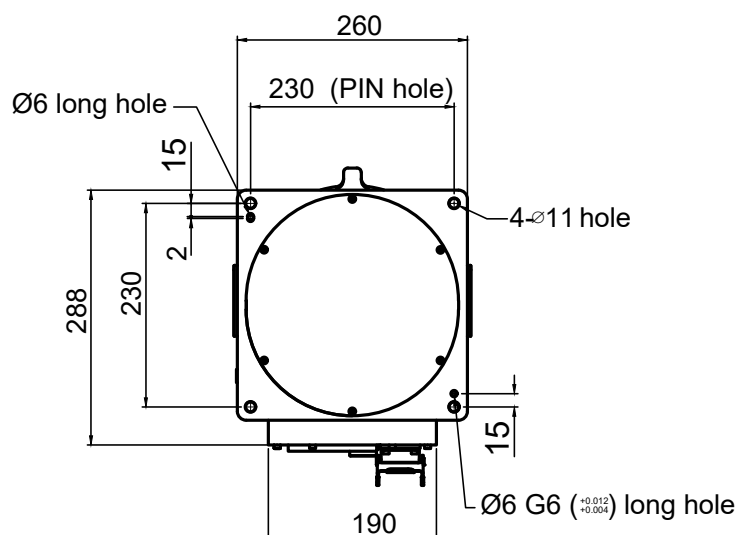
#### DRV70/90L Series



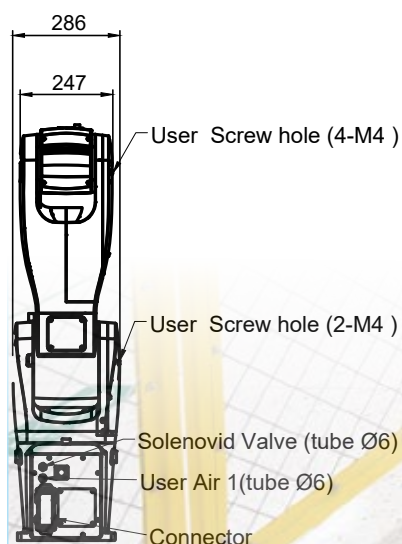
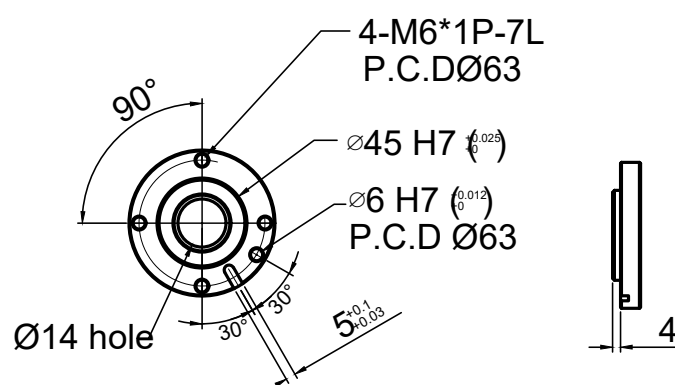
## Dimensions - DRV Series

### External Dimensions and Mounting Holes DRVA1L/DRVA4L Series

BASE FIX DRAWING



FLANGE DRAWING



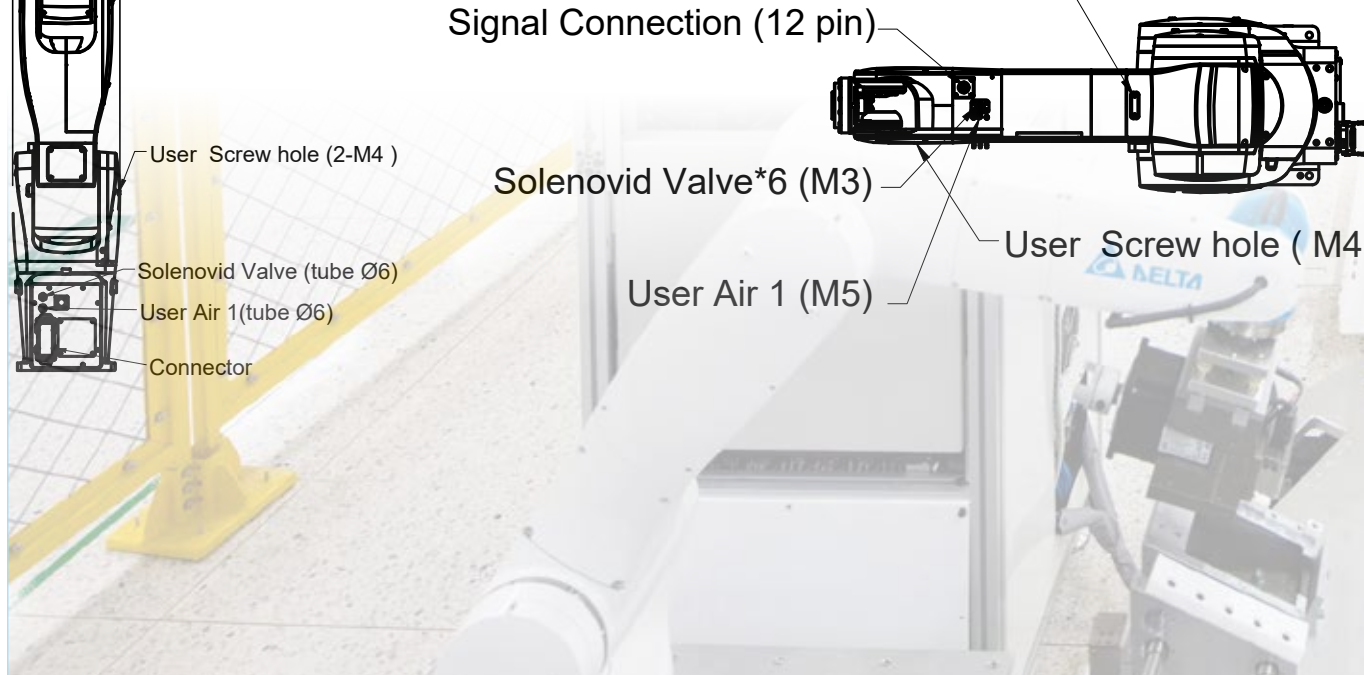
User Screw hole (2-M4 )

Signal Connection (12 pin)

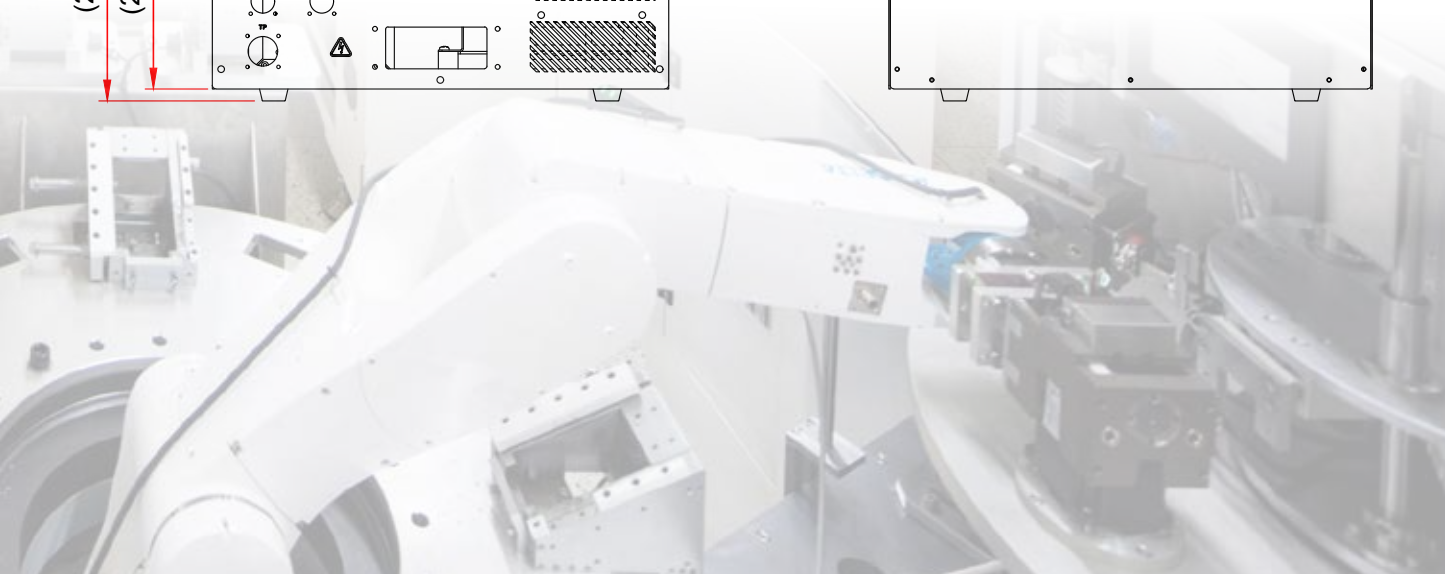
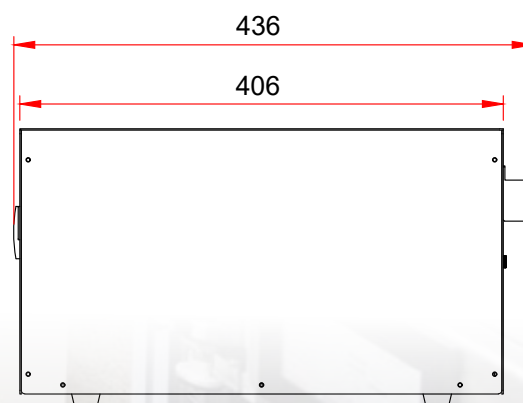
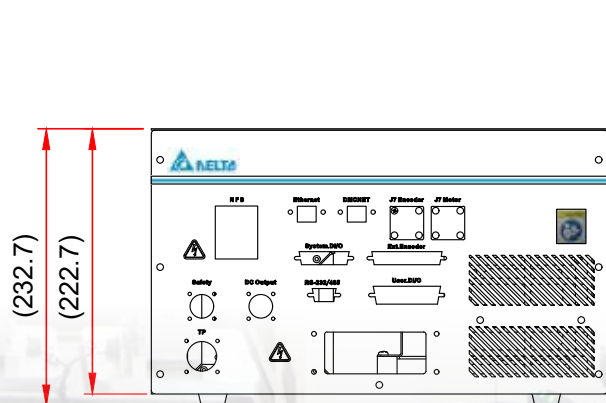
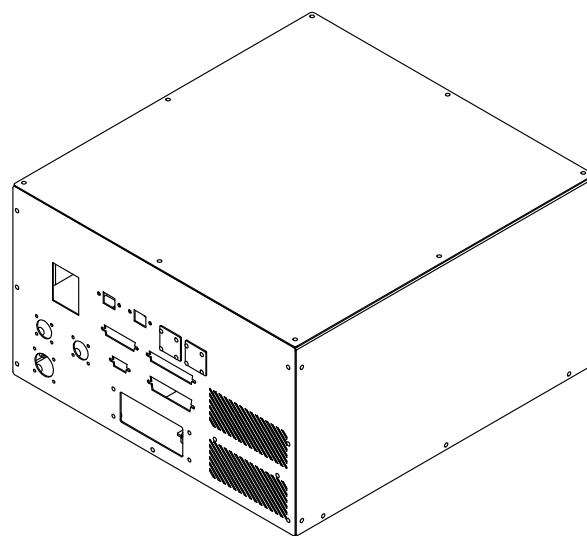
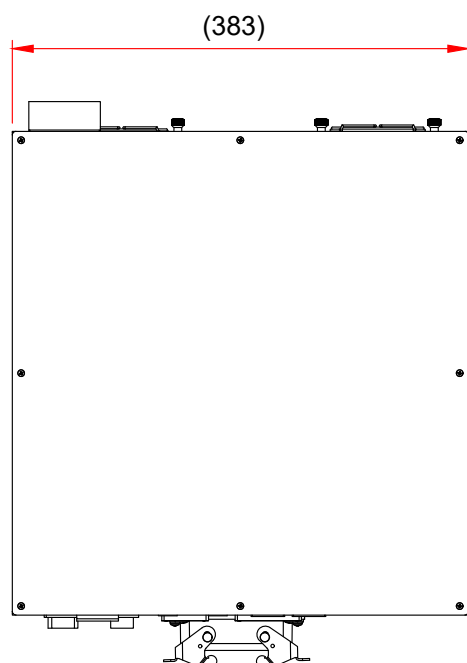
Solenoid Valve\*6 (M3)

User Air 1 (M5)

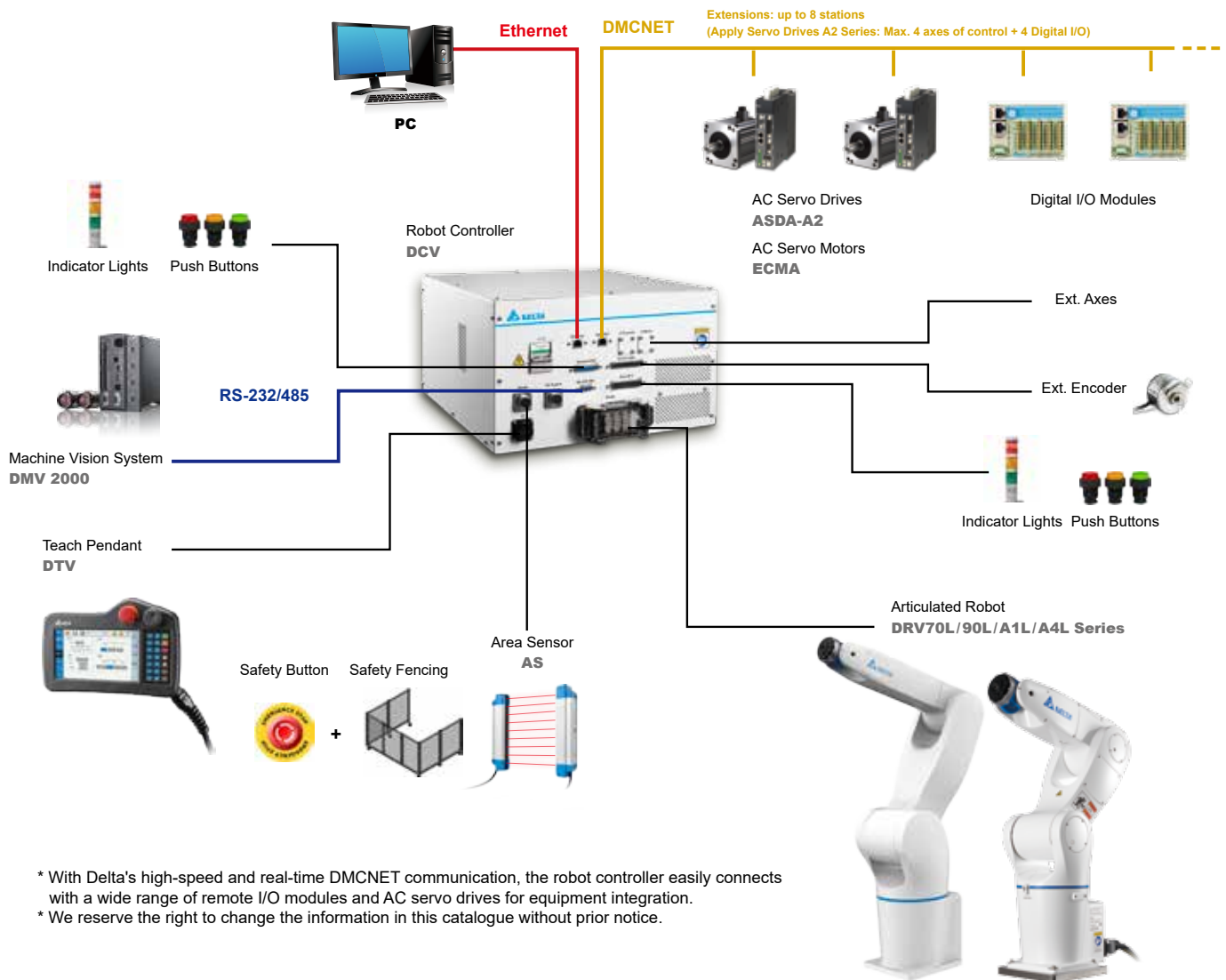
User Screw hole ( M4 )



## Dimensions - DVC Series



## Robot Controller Interface DRV Series



## Applications



Load/Unload



Machine Tending



Assembly



Insertion



Inspection



Screw-driving



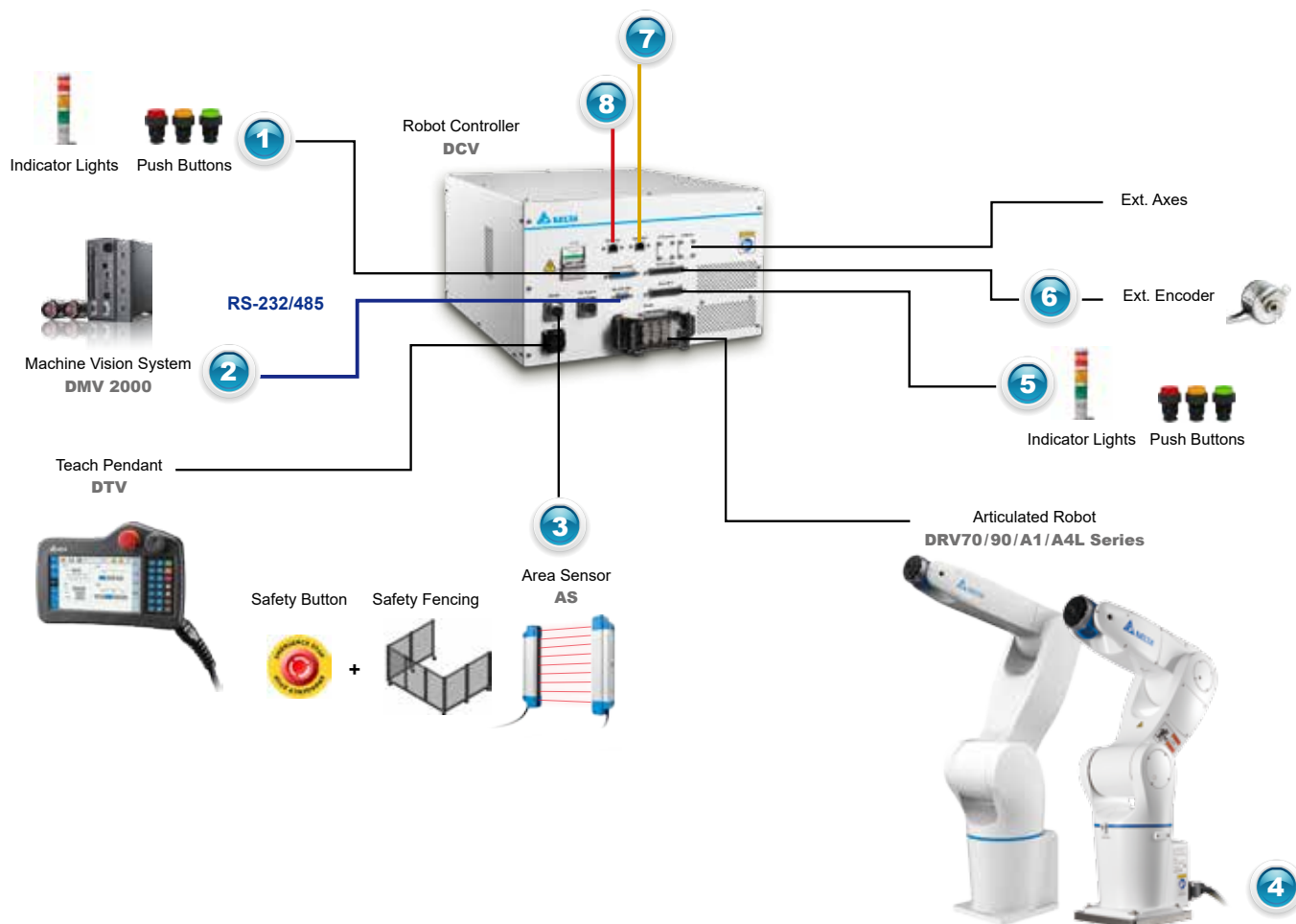
## Ordering Information

Category	Model	Specifications	Description
Delta Articulated Robot DRV70L Series	DRV70L7A6313N	710mm/7Kg, IP40 (with DCV controller/ DRASstudio software), 3M standard robot cable	Multiple cable length and IP rating available
	DRV70L7A6315N	710mm/7Kg, IP40 (with DCV controller/ DRASstudio software), 5M standard robot cable	
	DRV70L7B6213N	710mm/7Kg, IP65 (with DCV controller/ DRASstudio software), 3M standard robot cable	
	DRV70L7B6215N	710mm/7Kg, IP65 (with DCV controller/ DRASstudio software), 5M standard robot cable	
	DRV70L7D6213N	CE type, 710mm/7Kg, IP40 (with DCV controller/ DRASstudio software), 3M standard robot cable	
	DRV70L7D6215N	CE type, 710mm/7Kg, IP40 (with DCV controller/ DRASstudio software), 5M standard robot cable	
Delta Articulated Robot DRV90L Series	DRV90L7A6313N	900mm/7Kg, IP40 (with DCV controller/ DRASstudio software), 3M standard robot cable	
	DRV90L7A6315N	900mm/7Kg, IP40 (with DCV controller/ DRASstudio software), 3M standard robot cable	
	DRV90L7B6213N	900mm/7Kg, IP65 (with DCV controller/ DRASstudio software), 3M standard robot cable	
	DRV90L7B6215N	900mm/7Kg, IP65 (with DCV controller/ DRASstudio software), 5M standard robot cable	
	DRV90L7D6213N	CE type, 900mm/7Kg, IP40 (with DCV controller/ DRASstudio software), 3M standard robot cable	
	DRV90L7D6215N	CE type, 900mm/7Kg, IP40 (with DCV controller/ DRASstudio software), 5M standard robot cable	
Delta Articulated Robot DRVA1L Series	DRVA1L7B6113N	1,111mm/7Kg, IP65 (with DCV controller/ DRASstudio software), 3M standard robot cable	Coming soon
	DRVA1L7B6115N	1,111mm/7Kg, IP65 (with DCV controller/ DRASstudio software), 5M standard robot cable	
Delta Articulated Robot DRVA4L Series	DRVA4L7B6113N	1,411mm/7Kg, IP65 (with DCV controller/ DRASstudio software), 3M standard robot cable	
	DRVA4L7B6115N	1,411mm/7Kg, IP65 (with DCV controller/ DRASstudio software), 5M standard robot cable	
Teach Pendant	DTV-2FM	21-key / 5M / Military connector	Suggested optional devices for DRV operation
	DTV-2GM	21-key / 10M / Military connector	

## Ordering Information

Category	Model	Specifications	Description
<b>Teach Pendant</b>	DTV-2FM	21-key / 5m / military connector	Suggested optional devices for DRV operation
	DTV-2GM	21-key / 10m / military connector	
<b>Optional Accessories (Electrical Control)</b>	3081425800	SYS extension cord	Reduce wiring time
	3081425700	User. DIO extension cord / 3m / no deflection	
	3081427100	RS-232/485 extension cord / 3m / no deflection	
	3081735000	Safety extension cord / 3m / no deflection	
	3081734700	Signal extend cable / 5m / no deflection	
	3081734800	Signal extend cable / 7m / no deflection	
	3081734900	Signal extend cable / 12m / no deflection	
	3081427000	Ext.Encoder extension cord / 3m / no deflection	
	3534815500	System DIO/1M + transfer module	
	3534815600	Ext.Encoder/1M + transfer module	
	3534815700	USER DIO/1M + transfer module	
	3864267000	CANopen communication cable / 1m	Optional devices to connect DI/O extension modules
	3864999300	CANopen communication cable / 3m	
	3864896200	CANopen communication cable / 10m	
	ASD-DMC-RM32MN	Remote 32 points (DI)	
	ASD-DMC-RM64MN	Remote 64 points (DI)	
	ASD-DMC-RM32NT	Remote 32 points (DO)	
	ASD-DMC-RM64NT	Remote 64 points (DO)	Optional devices to connect servo drives
	ASD-A2-0121-FN	100W Servo Drive	
	ASD-A2-0221-FN	200W Servo Drive	
	ASD-A2-0421-FN	400W Servo Drive	
<b>Optional Accessories (Hardware)</b>	DMV1000-80GX	Delta Machine Vision DMV1000	Integrated with Delta's Machine Vision Systems (DMV) for different applications; for more information, please refer to DMV brochures Standard accessory with the whole-set robot
	3534538100	Accessory kits	

## Optional Accessory System Structure



Category	Model	Specifications
1	3081425800	SYS extension cord
2	3081427100	RS-232 / 485 extension cord / 3m / no deflection
3	3081735000	Safety extension cord / 3m / no deflection
4	3081734700	Signal extend cable / 5m / no deflection
5	3081425700	User. DIO extension cord / 3m / no deflection
6	3081427000	Ext. encoder extension cord / 3m / no deflection
7	ASD-DMC-RM32MN	Remote 32 points (DI)
	ASD-DMC-RM64MN	Remote 64 points (DI)
	ASD-DMC-RM32NT	Remote 32 points (DO)
	ASD-DMC-RM64NT	Remote 32 points (DO)
	ASD-A2-0121-FN	100W Servo Drive
	ASD-A2-0221-FN	200W Servo Drive
	ASD-A2-0421-FN	400W Servo Drive
8	3864267000	CANopen communication cable / 1m
	3864999300	CANopen communication cable / 3m
	3864896200	CANopen communication cable / 10m