Automation for a Changing World

Delta SCARA Robots

www.deltaww.com
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
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
## Specifications SCARA Robots

### DRS40L Series

<table>
<thead>
<tr>
<th>Model</th>
<th>DRS40L3SS1BN002</th>
<th>DRS40L3SSADN003</th>
<th>DRS40L3SO1BN002</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Axes</strong></td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Installation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Arm Length (X + Y)</strong></td>
<td>400 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rated / Max. Payload</strong></td>
<td>1 kg / 3 kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Maximum Speed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J1 + J2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J3</td>
<td>4710 mm / sec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>J4</td>
<td>1250 mm / sec</td>
<td>1875° / sec</td>
<td>625° / sec</td>
</tr>
<tr>
<td><strong>Range of Motion</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J1</td>
<td></td>
<td>±130°</td>
<td></td>
</tr>
<tr>
<td>J2</td>
<td></td>
<td>±146.6°</td>
<td></td>
</tr>
<tr>
<td>J3</td>
<td></td>
<td>150 mm</td>
<td></td>
</tr>
<tr>
<td>J4</td>
<td></td>
<td>±360°</td>
<td></td>
</tr>
<tr>
<td><strong>Standard Cycle Time</strong></td>
<td></td>
<td></td>
<td>0.42 sec</td>
</tr>
<tr>
<td><strong>Repeatability</strong></td>
<td>J1 + J2</td>
<td></td>
<td>±0.01 mm</td>
</tr>
<tr>
<td>J3</td>
<td></td>
<td>±0.01 mm</td>
<td></td>
</tr>
<tr>
<td>J4</td>
<td></td>
<td>±0.01°</td>
<td></td>
</tr>
<tr>
<td><strong>Rated / Max. Push Force (J3)</strong></td>
<td></td>
<td>100 / 250N</td>
<td></td>
</tr>
<tr>
<td><strong>Rated/ Max. Allowable Inertia Moment (J4)</strong></td>
<td>0.0091 kg-m²</td>
<td></td>
<td>0.055 kg-m²²</td>
</tr>
<tr>
<td><strong>User Wiring</strong></td>
<td></td>
<td>15 Pin D-Sub</td>
<td></td>
</tr>
<tr>
<td><strong>User Tubing</strong></td>
<td></td>
<td>ø4 mm x 2, ø6 mm x 1</td>
<td></td>
</tr>
<tr>
<td><strong>Weight (Without Controller)</strong></td>
<td></td>
<td>16 kg</td>
<td></td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Ambient Temperature</strong></td>
<td></td>
<td>5°C ~ 40°C</td>
<td></td>
</tr>
<tr>
<td><strong>Storage Temperature</strong></td>
<td></td>
<td>-25°C ~ 55°C</td>
<td></td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
<td></td>
<td>0 ~ 90% RH (non-condensing)</td>
<td></td>
</tr>
</tbody>
</table>

*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).*

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### Ordering Information

#### DRS40L Series

<table>
<thead>
<tr>
<th>DRS</th>
<th>40</th>
<th>L</th>
<th>3</th>
<th>S</th>
<th>S</th>
<th>1</th>
<th>B</th>
<th>N</th>
<th>002</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Company/ Product/ Robot Type</strong></td>
<td><strong>Arm Length</strong></td>
<td><strong>Level</strong></td>
<td><strong>Max. Payload</strong></td>
<td><strong>Z-Axis Stroke (Horizontal Stroke)</strong></td>
<td><strong>R-Axis Speed Reduction Ratio</strong></td>
<td><strong>Generation</strong></td>
<td><strong>Controller</strong></td>
<td><strong>Teach Pendant</strong></td>
<td><strong>Identification</strong></td>
</tr>
<tr>
<td>D : DELTA</td>
<td>40 : 400 mm</td>
<td>L : Lite</td>
<td>3 : 3 kg</td>
<td>S : 150 mm</td>
<td>S : Standard (1/16)</td>
<td>O : Optional (1/48)</td>
<td>A : CE</td>
<td>B : Servo drive (Cable length 3 m)</td>
<td>D : CE controller (Cable length 3 m)</td>
</tr>
<tr>
<td>R : Robot</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S : SCARA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>002 : Standard 4 Axes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>003 : CE model 4 Axes</td>
<td></td>
</tr>
</tbody>
</table>
### DRS60L Series

<table>
<thead>
<tr>
<th>Model</th>
<th>DRS60L6SN1BN302</th>
<th>DRS60L6SO1BN002</th>
<th>DRS60L6OS1BN002</th>
<th>DRS60L6SS1BN002/ DRS60L6SS1BN003</th>
<th>DRS60L3SS1BN502</th>
<th>DRS60L3SS1BN002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Axes</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Installation</td>
<td>Table-top</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arm Length (X + Y)</td>
<td>600 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated / Max. Payload</td>
<td>2 kg / 6 kg</td>
<td></td>
<td>1 kg / 3 kg</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Maximum Speed**

<table>
<thead>
<tr>
<th>Component</th>
<th>J1 + J2</th>
<th>J3</th>
<th>J4</th>
<th>J5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>5000 mm / sec</td>
<td>1100 mm / sec</td>
<td>600° / sec</td>
<td>N.A.</td>
</tr>
<tr>
<td>Reduction</td>
<td>4050 mm / sec</td>
<td>1250 mm / sec</td>
<td>2000° / sec</td>
<td>600° / sec</td>
</tr>
</tbody>
</table>

**Range of Motion**

<table>
<thead>
<tr>
<th>Component</th>
<th>J1</th>
<th>J2</th>
<th>J3</th>
<th>J4</th>
<th>J5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke</td>
<td>±133°</td>
<td>±153°</td>
<td>200 mm</td>
<td>±360°</td>
<td>N.A.</td>
</tr>
<tr>
<td>Distance</td>
<td>±114°</td>
<td>±148°</td>
<td>300 mm</td>
<td>N.A.</td>
<td>±360°</td>
</tr>
</tbody>
</table>

**Standard Cycle Time**

<table>
<thead>
<tr>
<th>Component</th>
<th>J1 + J2</th>
<th>J3</th>
<th>J4</th>
<th>J5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>0.39 sec</td>
<td>0.45 sec</td>
<td>0.72 sec</td>
<td>N.A.</td>
</tr>
</tbody>
</table>

**Repeatability**

<table>
<thead>
<tr>
<th>Component</th>
<th>J1 + J2</th>
<th>J3</th>
<th>J4</th>
<th>J5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variation</td>
<td>±0.015 mm</td>
<td>±0.01 mm</td>
<td>±0.01°</td>
<td>±0.01°</td>
</tr>
</tbody>
</table>

**Rated / Max. Push Force (J3)**

| Component | 150 N / 350N | N.A. | 100N / 250N | N.A. |

**Rated/ Max. Allowable Inertia Moment (J4)**

| Component | N.A. | 0.07 kg-m² | 0.01 kg-m² | 0.009 kg-m² |

**User Wiring**

| Component | 15 Pin D-Sub |

**User Tubing**

| Component | ø4 mm x 1, ø6 mm x 2 | ø4 mm x 2, ø6 mm x 1 |

**Weight (Without Controller)**

| Component | 20 kg | 21 kg | 22 kg |

**Environment**

<table>
<thead>
<tr>
<th>Component</th>
<th>Ambient Temperature</th>
<th>Storage Temperature</th>
<th>Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition</td>
<td>5ºC ~ 40ºC</td>
<td>-25ºC ~ 55ºC</td>
<td>0 ~ 90% RH (non-condensing)</td>
</tr>
</tbody>
</table>

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

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## DRS60L Series

<table>
<thead>
<tr>
<th>DRS</th>
<th>60</th>
<th>L</th>
<th>6</th>
<th>S</th>
<th>S</th>
<th>1</th>
<th>B</th>
<th>N</th>
<th>002</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>DELTA</td>
<td>002 : Standard 4 Axes</td>
<td>302 : 4 Axes</td>
<td>502 : 5 Axes</td>
<td>003 : CE 4 Axes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>Robot</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>SCARA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Company/ Product/ Robot Type**

<table>
<thead>
<tr>
<th>Component</th>
<th>Arm Length</th>
<th>Level</th>
<th>Max. Payload</th>
<th>Max. Stroke Horizontal Stroke</th>
<th>Generation</th>
<th>Controller</th>
<th>Teach Pendant</th>
<th>Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>DELTA</td>
<td>60 : 600 mm</td>
<td>Lite</td>
<td>6 : 6 kg</td>
<td>S : 200 mm O : 300 mm</td>
<td>S : Standard (1/15) N : Non O : Optional (1/50)</td>
<td>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)</td>
<td>N : Non</td>
</tr>
</tbody>
</table>
## Specifications SCARA Robots
### DRS50 / 70L Series

<table>
<thead>
<tr>
<th>Model</th>
<th>DRS50L6SS1BN002</th>
<th>DRS50L6SO1BN002</th>
<th>DRS50L6OS1BN002</th>
<th>DRS70LSS1BN002</th>
<th>DRS70L3SO1BN002</th>
<th>DRS70L3OS1BN002</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Axes</strong></td>
<td><strong>4</strong></td>
<td><strong>Installation</strong></td>
<td>Table-top</td>
<td><strong>Arm Length (X + Y)</strong></td>
<td>500 mm</td>
<td>700 mm</td>
</tr>
</tbody>
</table>

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

### Ordering Information
#### DRS50 / 70L Series

<table>
<thead>
<tr>
<th>DRS</th>
<th>50/70</th>
<th>L</th>
<th>6</th>
<th>S</th>
<th>S</th>
<th>1</th>
<th>B</th>
<th>N</th>
<th>002</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Company/ Product/ Robot Type</strong></td>
<td><strong>Arm Length</strong></td>
<td><strong>Max. Payload</strong></td>
<td><strong>Z-Axis Stroke (Horizontal Stroke)</strong></td>
<td><strong>R-Axis Speed Reduction Ratio</strong></td>
<td><strong>Generation</strong></td>
<td><strong>Controller</strong></td>
<td><strong>Teach Pendant</strong></td>
<td><strong>Identification</strong></td>
<td></td>
</tr>
<tr>
<td>D : DELTA</td>
<td>50 : 500mm</td>
<td>6 : 6 kg</td>
<td>S : 200 mm</td>
<td>O : 300 mm</td>
<td>S : Standard (1/15)</td>
<td>O : Optional (1/50)</td>
<td>A : CE</td>
<td>B : Servo drive (Cable length 3 m)</td>
<td>K : Servo drive (Cable length 5 m)</td>
</tr>
</tbody>
</table>
DRS60H Series (To be launched)

<table>
<thead>
<tr>
<th>Model</th>
<th>DRS60H6SS1BN002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Axes</td>
<td>4</td>
</tr>
<tr>
<td>Installation</td>
<td>Ceiling mounted</td>
</tr>
<tr>
<td>Arm Length (X + Y)</td>
<td>600 mm</td>
</tr>
<tr>
<td>Rated / Max. Payload</td>
<td>2 kg / 6 kg</td>
</tr>
<tr>
<td>Maximum Speed</td>
<td></td>
</tr>
<tr>
<td>J1 + J2</td>
<td>J3</td>
</tr>
<tr>
<td>5000 mm/s</td>
<td>1100 mm/sec</td>
</tr>
<tr>
<td>Range of Motion</td>
<td></td>
</tr>
<tr>
<td>J1</td>
<td>J2</td>
</tr>
<tr>
<td>±130°</td>
<td>±150°</td>
</tr>
<tr>
<td>Standard Cycle Time *</td>
<td>0.39 sec</td>
</tr>
<tr>
<td>Repeatability</td>
<td>J1 + J2</td>
</tr>
<tr>
<td>±0.015 mm</td>
<td>±0.01 mm</td>
</tr>
<tr>
<td>Rated / Max. Push Force (J3)</td>
<td>150 N / 350 N</td>
</tr>
<tr>
<td>Rated / Max. Allowable Inertia Moment (J4)</td>
<td>0.01 kg-m²</td>
</tr>
<tr>
<td>User Wiring</td>
<td>15 Pin D-Sub</td>
</tr>
<tr>
<td>User Tubing</td>
<td>ø4 mm x 1, ø6 mm x 2</td>
</tr>
<tr>
<td>Weight (Without Controller)</td>
<td>23 kg</td>
</tr>
<tr>
<td>Environment</td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature</td>
<td>5°C ~ 40°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-25°C ~ 55°C</td>
</tr>
<tr>
<td>Humidity</td>
<td>0 ~ 90% RH (non-condensing)</td>
</tr>
</tbody>
</table>

*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**

<table>
<thead>
<tr>
<th>DRS60H6SS1BN002</th>
<th>002</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Company</strong></td>
<td><strong>Product</strong></td>
</tr>
<tr>
<td>D : DELTA</td>
<td>R : Robot</td>
</tr>
</tbody>
</table>
External Dimensions and Workable Space

DRS40L Series

DRS50L Series

DRS60L Series
DRS70L Series

External Dimensions and Workable Space

<table>
<thead>
<tr>
<th>Series</th>
<th>Model Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRS40L Series</td>
<td>DRS40L3SS1BN002</td>
</tr>
<tr>
<td></td>
<td>DRS40L3OS1BN002</td>
</tr>
<tr>
<td></td>
<td>DRS40L3SSADN003</td>
</tr>
<tr>
<td>DRS60L Series</td>
<td>DRS60L6SS1BN002</td>
</tr>
<tr>
<td></td>
<td>DRS60L6SO1BN002</td>
</tr>
<tr>
<td></td>
<td>DRS60L6OS1BN002</td>
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<td>DRS60L6SSADN003</td>
</tr>
<tr>
<td></td>
<td>DRS60L6SN1BN302</td>
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<tr>
<td>DRS60H Series</td>
<td>DRS60H6SS1BN002</td>
</tr>
<tr>
<td>DRS60L3 Series</td>
<td>DRS60L3SS1BN002</td>
</tr>
<tr>
<td>DRS60L3 5 Axes</td>
<td>DRS60L3SS1BN502</td>
</tr>
<tr>
<td>DRS50L Series</td>
<td>DRS50L6SS1BN002</td>
</tr>
<tr>
<td></td>
<td>DRS50L6SO1BN002</td>
</tr>
<tr>
<td></td>
<td>DRS50L6OS1BN002</td>
</tr>
<tr>
<td>DRS70L Series</td>
<td>DRS70L6SS1BN002</td>
</tr>
<tr>
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<td>DRS70L6SO1BN002</td>
</tr>
<tr>
<td></td>
<td>DRS70L6OS1BN002</td>
</tr>
</tbody>
</table>
**Product Features**

*High Repeatability, Excellent Precision, Linearity and Verticality*

<table>
<thead>
<tr>
<th>Product</th>
<th>Payload</th>
<th>Standard cycle time</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRS40L Series</td>
<td>1 kg</td>
<td>0.42 sec</td>
</tr>
<tr>
<td>DRS60L Series</td>
<td>1 kg</td>
<td>0.39 sec</td>
</tr>
</tbody>
</table>

**Standard cycle time:**
Time required for robot to move back and forth 300mm horizontally and 25mm vertically

<table>
<thead>
<tr>
<th>Product</th>
<th>DRS40L</th>
<th>DRS60L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arm Length</td>
<td>400 mm</td>
<td>600 mm</td>
</tr>
<tr>
<td>Max. Payload (Payload)</td>
<td>3 kg</td>
<td>6 kg</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.01 mm</td>
<td>±0.015 mm</td>
</tr>
</tbody>
</table>

**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

► 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

► Direct Teaching (Lead by Hand)

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

### Human Machine Interface (HMI)
- Handheld Teach Pendant (DTS)
- PAD
- PC

### Machine Vision System (DMV)

### Robot Controller (DCS)

### Servo Drive ASD-A2-FN series

### Servo Motor ECMA

### SCARA Robot series

#### Ordering Information

<table>
<thead>
<tr>
<th>Type</th>
<th>Model</th>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robot Control Cable</td>
<td>DWSEP1003</td>
<td>3m robot control cable</td>
<td>Included (Various lengths available for different applications)</td>
</tr>
<tr>
<td></td>
<td>DWSEP1005</td>
<td>5m robot control cable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DWSEP1010</td>
<td>10m control cable</td>
<td></td>
</tr>
<tr>
<td>Peripheral Devices</td>
<td>3534518800</td>
<td>Optional system digital I/O (SYS.DIO) module, 1m cable included</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3534518900</td>
<td>Optional standard digital I/O (SYS.DIO) module, 1m cable included</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3081422700</td>
<td>Optional 1m connection cable for system digital I/O (SYS.DIO)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3081734900</td>
<td>1m CANopen connection cable</td>
<td>Recommended for extended D/I/O module connection</td>
</tr>
<tr>
<td></td>
<td>3864267000</td>
<td>3m CANopen connection cable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3864999300</td>
<td>10m CANopen connection cable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ASD-DMC-RM32MN</td>
<td>Remote 32 points DI</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ASD-DMC-RM64MN</td>
<td>Remote 64 points DI</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ASD-DMC-RM32NT</td>
<td>Remote 32 points DO</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ASD-DMC-RM64NT</td>
<td>Remote 64 points DO</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ASD-A2-0121-FN</td>
<td>100W drive</td>
<td>Recommended for extended drive connection</td>
</tr>
<tr>
<td></td>
<td>ASD-A2-0221-FN</td>
<td>200W drive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ASD-A2-0421-FN</td>
<td>400W drive</td>
<td></td>
</tr>
</tbody>
</table>

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

*Industries: Consumer electronics, electrical/electronics, food and beverages, rubber and plastics, metal fabrication
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

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

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

Control Power Input
Connects DC24V power supply

System I/O Terminal (SYS. DIO)

Dimensions of the Robot Controller

1) Dimensions are in millimeters (inches);
2) Dimensions and weights of the robot controller may be revised without prior notice

175.2mm (177.7mm)
54.7mm
80mm
303.9mm
127mm
4-Ø5.5mm
Screw: M4*0.7; Torque: 14 kgf-cm

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

<table>
<thead>
<tr>
<th>DCS Series</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power Supply</strong></td>
<td></td>
</tr>
<tr>
<td>Phase / Voltage</td>
<td>Single phase: 200-230Vac, 5A</td>
</tr>
<tr>
<td>Control Power Supply</td>
<td>22-24Vdc, 5A</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td></td>
</tr>
<tr>
<td>(W) x (H) x (D) mm / Weight</td>
<td>175 mm x 300 mm x 159 mm / 5.6 kg</td>
</tr>
<tr>
<td><strong>Cooling Method</strong></td>
<td>Fan cooling</td>
</tr>
<tr>
<td><strong>External Optical Scale or Encoder</strong></td>
<td>A, B, and Z format</td>
</tr>
<tr>
<td><strong>Robot Control</strong></td>
<td></td>
</tr>
<tr>
<td>Programming Language</td>
<td>Delta robot language</td>
</tr>
<tr>
<td>Motion Mode</td>
<td>Point-to-point motion, linear interpolation, circular interpolation</td>
</tr>
<tr>
<td>Memory Capacity</td>
<td>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</td>
</tr>
<tr>
<td><strong>Input / Output</strong></td>
<td></td>
</tr>
<tr>
<td>Standard I/O</td>
<td>User I/O: 24 sets of inputs and 12 sets of outputs System I/O: 8 sets of outputs and 8 sets of inputs</td>
</tr>
<tr>
<td><strong>Communication Interface</strong></td>
<td></td>
</tr>
<tr>
<td>Ethernet</td>
<td>One channel</td>
</tr>
<tr>
<td>RS-232 / RS-485</td>
<td>One connecting port (allows switching between two communication protocols)</td>
</tr>
<tr>
<td>DMCNET</td>
<td>One channel</td>
</tr>
<tr>
<td>USB Host</td>
<td>Two connecting ports</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td></td>
</tr>
<tr>
<td>Installation</td>
<td>Indoor (avoid direct sunlight), no corrosive liquid and gas (avoid oil mist, flammable gas, dust)</td>
</tr>
<tr>
<td>Altitude</td>
<td>Altitude 1000m or lower above sea level</td>
</tr>
<tr>
<td>Atmospheric Pressure</td>
<td>86kPa ~ 106kPa</td>
</tr>
<tr>
<td>Ambient Temperature</td>
<td>0°C ~ 55°C (If ambient temperature is above 45°C, cooling is required)</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-20°C ~ 65°C</td>
</tr>
<tr>
<td>Humidity</td>
<td>0 ~ 90% RH (non-condensing)</td>
</tr>
<tr>
<td>Vibration</td>
<td>9.80665m/s² (1G) less than 20Hz, 5.88m/s² (0.6G) 20 to 50Hz</td>
</tr>
<tr>
<td>IP Rating</td>
<td>IP20</td>
</tr>
<tr>
<td>Power System</td>
<td>TN system*1</td>
</tr>
<tr>
<td>Safety Certifications</td>
<td>IEC/EN 61800-5-1, UL 508C, RCM</td>
</tr>
</tbody>
</table>

*1 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

Weight: 720g (without cable)

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

<table>
<thead>
<tr>
<th>Model</th>
<th>DTS-1FD</th>
<th>DTS-1GD</th>
<th>DTS-2FM</th>
<th>DTS-2GM</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCD Module</td>
<td>Display Type: 7” Widescreen TFT LCD</td>
<td>Colors: 65536</td>
<td>Backlight: LED Back Light</td>
<td>Backlight Lifetime (Hr)(^1): 20,000</td>
</tr>
<tr>
<td></td>
<td>Resolution (pixels): 800 x 480</td>
<td></td>
<td>Backlight: LED Back Light</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Backlight Luminance (cd/m²): 450</td>
<td></td>
<td>Backlight Lifetime (Hr)(^1): 20,000</td>
<td></td>
</tr>
<tr>
<td>Arithmetic-Logic Unit (ALU)</td>
<td>CPU: 400 MHz</td>
<td>Flash ROM (Bytes): 128MB</td>
<td>Backup Memory (Bytes): 16MB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RAM (Bytes): 64MB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buzzer</td>
<td>Multi-tone Frequency (2K ~ 4K Hz) / 80dB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connector</td>
<td>Connector: D-Sub (25 pin)</td>
<td>Military (17 pin)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real Keys</td>
<td>15 keys</td>
<td>21 keys</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB</td>
<td>1 USB Client Ver 2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>SD card (support SDHC)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethernet</td>
<td>1 Port(^2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Function Key</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable Length</td>
<td>5 m</td>
<td>10 m</td>
<td>5 m</td>
<td>10 m</td>
</tr>
<tr>
<td>Emergency Stop Switch</td>
<td>IEC60947-5-1, EN60947-5-1, IEC60947-5-5, EN60947-5-5, UL 508, CSA C22.2 No.14, GB 14085.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Standard</td>
<td>CE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection Rating</td>
<td>IP55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage Endurance(^3)</td>
<td>22-28Vdc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waterproof Degree</td>
<td>24Vdc terminal and FG terminal: 500Vac, 1min Power Consumption</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Consumption(^5)</td>
<td>5.6W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backup Battery</td>
<td>3V lithium CR2450 x 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backup Battery Life</td>
<td>5 years or more at 25°C, may vary due to temperature and usage condition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation Temperature</td>
<td>0°C ~ 40°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-20°C ~ +60°C, 10% ~ 90% RH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation Environment</td>
<td>10% ~ 90% RH (0 ~ 40°C), 10% ~ 55% RH (41 ~ 50°C), pollution degree 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration Resistance</td>
<td>Conforms to IEC61131-2, 5Hz<del>8.3Hz 3.5mm, 8.3Hz</del>150Hz 1G</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock Resistance</td>
<td>Conforms to IEC60068-2-27, 11ms, 15G Peak , X, Y, Z direction for 6 times</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions W x H x D (mm)</td>
<td>257.4 x 170.3 x 71.8 (Emergency stop button and hook included)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>750g (Wire excluded)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>DT</th>
<th>S</th>
<th>1</th>
<th>F</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>D : Delta</td>
<td>S : SCARA</td>
<td>1 : Generation 1 (15 Key)</td>
<td>F : Cable length 5m</td>
<td>D : D-Sub</td>
</tr>
<tr>
<td>T : Teach Pendant</td>
<td></td>
<td>2 : Generation 2 (21 Key)</td>
<td>G = Cable length 10m</td>
<td>M : CE military model</td>
</tr>
</tbody>
</table>
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