TS-S2/TS-SH/TS-X/TS-P

CE compliance

TS series are positioner type controllers that only performs point trace. No program is needed. Operation is simple. After setting point data, specify the point number and enter a START signal from host controller such as a PLC. Positioning or pushing operation then begins.

Main functions » P.60

Handy terminal  » HT1/HT1-D
Support software for PC » TS-Manager

Basic specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>TS-S2</th>
<th>TS-SH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of controllable axes</td>
<td>Single-axis</td>
<td></td>
</tr>
<tr>
<td>Controllable robots</td>
<td>TRANSERVO series</td>
<td></td>
</tr>
<tr>
<td>Current consumption</td>
<td>2.5A (Rating) 4.5A (Max.)</td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td>W30 × H162 × D82mm</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 0.2kg</td>
<td></td>
</tr>
<tr>
<td>Input power supply</td>
<td>Control power supply: DC24V +/-10%</td>
<td></td>
</tr>
<tr>
<td>Control method</td>
<td>Closed loop vector control method</td>
<td></td>
</tr>
<tr>
<td>Operating method</td>
<td>I/O point tracing (Positioning operation by specifying point number) / Remote command</td>
<td></td>
</tr>
<tr>
<td>Operation types</td>
<td>Positioning, merge-positioning, push, and jog operations</td>
<td></td>
</tr>
<tr>
<td>Resolution</td>
<td>20480 pulses/rev. or 4096 pulses/rev. depending on the robot</td>
<td></td>
</tr>
<tr>
<td>Origin search method</td>
<td>Incremental / Absolute</td>
<td></td>
</tr>
<tr>
<td>Points</td>
<td>255 points</td>
<td></td>
</tr>
<tr>
<td>Point type setting</td>
<td>(1) Standard setting: Set speed and acceleration in percent of the respective maximum settings. (2) Custom setting: Set speed and acceleration in SI units.</td>
<td></td>
</tr>
<tr>
<td>Point teaching method</td>
<td>Manual data input (coordinates input), Teaching, Direct teaching</td>
<td></td>
</tr>
<tr>
<td>I/O interface</td>
<td>Selectable from the following: NPN, PNP, CC-Link, DeviceNet™, EtherNet/IP™, PROFINET™</td>
<td></td>
</tr>
<tr>
<td>Servo ON (SERVO), reset (RESET), start (START), interlock (LOCK), origin search (ORG), manual mode (MANUAL), jog motion (JOG-), jog motion (JOG+), Point number selection (PIN0 to PIN7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Servo status (SRV-S), alarm (#ALM), operation end (END), operation in-progress (BUSY), control outputs (OUT0 to 3), Point number output 0 to 7 (POUT0 to POUT7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RS-232C 1CH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>External communications</td>
<td>Emergency stop input, emergency stop contact output (1 system: When the HT1 is used.)</td>
<td></td>
</tr>
<tr>
<td>Handy terminal</td>
<td>HT1, HT1-D (with enable switch)</td>
<td></td>
</tr>
<tr>
<td>Support software for PC</td>
<td>TS-Manager</td>
<td></td>
</tr>
<tr>
<td>Operating temperature / Operating humidity</td>
<td>0°C to 40°C, 35% to 95%RH (non-condensing)</td>
<td></td>
</tr>
<tr>
<td>Storage temperature/ Storage humidity</td>
<td>-10°C to 65°C, 10% to 85%RH (non-condensing)</td>
<td></td>
</tr>
<tr>
<td>Atmosphere</td>
<td>Indoor location not exposed to direct sunlight. No corrosive, flammable gases, oil mist, or dust particles</td>
<td></td>
</tr>
<tr>
<td>Anti-vibration</td>
<td>All XYZ directions 10 to 57Hz unidirectional amplitude 0.075mm 57 to 150Hz 9.8m/s²</td>
<td></td>
</tr>
<tr>
<td>Protective functions</td>
<td>Position detection error, temperature error, overload, overvoltage, low voltage, excessive position deviation, overcurrent, motor current error, motor cable faulty wiring, Excitation power failure error Note 1</td>
<td></td>
</tr>
</tbody>
</table>

Note 1. The excitation power failure error is a protection function that is available only in TS-SH.
Basic specifications

### Controller
- **Articulated robots:** YA
- **Compact single-axis robots:** TRANSERVO
- **Single-axis robots:** FLIP-X
- **Linear motor single-axis robots:** PHASER
- **XY-X:** SCARA robots
- **YK-X:** Pick & place robots
- **YP-X:** CLEAN controller

### Linear conveyor modules
- **LCM100:**

Field networks
- **CC-link:** DeviceNet, EtherNet/IP

### Basic specifications

#### Input power
- **Main power supply:** DC24V +/-10%
- **Control power supply:** DC24V +/-10%

#### Control power supply
- **Main power supply AC100V specifications:**
  - AC100 to 115V +/-10%
  - Control power supply AC100 to 115V +/-10%
- **Main power supply AC200V specifications:**
  - AC200 to 230V +/-10%
  - Control power supply AC200 to 230V +/-10%

#### Ordering method

<table>
<thead>
<tr>
<th>Model</th>
<th>TS-S2/TS-SH (TRANSERVO)</th>
<th>TS-X/TS-P (FLIP-X/Phaser)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input power</strong></td>
<td><strong>Main power supply</strong> DC24V +/-10%</td>
<td><strong>Main power supply</strong> AC100 to 115V +/-10%</td>
</tr>
<tr>
<td><strong>Control power supply</strong> DC24V +/-10%</td>
<td><strong>Control power supply</strong> AC100 to 115V +/-10%</td>
<td></td>
</tr>
<tr>
<td><strong>Operating method</strong></td>
<td>I/O point tracing / Remote command / Operation using RS-232C communication</td>
<td></td>
</tr>
<tr>
<td><strong>Maximum number of controllable axes</strong></td>
<td>Single-axis</td>
<td></td>
</tr>
<tr>
<td><strong>Origin search method</strong></td>
<td>Incremental / Absolute</td>
<td></td>
</tr>
<tr>
<td><strong>Controller</strong></td>
<td>TS-X/TS-P</td>
<td></td>
</tr>
<tr>
<td><strong>Number of controllable axes</strong></td>
<td>Single-axis</td>
<td>Single-axis</td>
</tr>
<tr>
<td><strong>Controllable robots</strong></td>
<td>TS-X: Single-axis robot FLIP-X series</td>
<td>TS-P: Linear motor single-axis robot PHASER series</td>
</tr>
<tr>
<td><strong>Power capacity</strong></td>
<td>400VA 600VA 400VA 600VA 1400VA</td>
<td></td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>W58 × H162 × D131mm W70 × H162 × D131mm</td>
<td></td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Approx. 0.9kg Approx. 1.1kg</td>
<td></td>
</tr>
<tr>
<td><strong>Input power supply</strong></td>
<td>Control power supply Single phase AC100 to 115V +/-10% 50/60Hz</td>
<td>Motor power supply Single phase AC100 to 115V +/-10% 50/60Hz</td>
</tr>
<tr>
<td><strong>Control power supply</strong></td>
<td>AC100 to 115V +/-10%</td>
<td>AC100 to 115V +/-10%</td>
</tr>
<tr>
<td><strong>Control method</strong></td>
<td>Closed loop vector control method</td>
<td></td>
</tr>
<tr>
<td><strong>Operating method</strong></td>
<td>I/O point tracing (Positioning operation by specifying point number) / Remote command</td>
<td></td>
</tr>
<tr>
<td><strong>Position detection method</strong></td>
<td>TS-X: Resolver with multi-rotation absolute function TS-P: Magnetic type linear scale</td>
<td></td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>TS-X: 16384 pulses/rev. or 20480 pulses/rev. depending on the robot TS-P: 1μm</td>
<td></td>
</tr>
<tr>
<td><strong>Origin search method</strong></td>
<td>TS-X: Absolute / Incremental TS-P: Incremental / Semi-absolute</td>
<td></td>
</tr>
</tbody>
</table>

**Note 1. Battery can only be selected for TS-SH. (Not provided for TS-S2).**

**Note 2. Battery can only be selected for TS-X. (Not provided for TS-P).**

### TSX/TS-P

<table>
<thead>
<tr>
<th>Item</th>
<th>TS-X / TS-P</th>
<th>100V AC input</th>
<th>200V AC input</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of controllable axes</strong></td>
<td>Single-axis</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Controllable robots</strong></td>
<td>TS-X: Single-axis robot FLIP-X series</td>
<td>TS-P: Linear motor single-axis robot PHASER series</td>
<td></td>
</tr>
<tr>
<td><strong>Power capacity</strong></td>
<td>400VA 600VA 400VA 600VA 1400VA</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>W58 × H162 × D131mm W70 × H162 × D131mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Approx. 0.9kg Approx. 1.1kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Input power supply</strong></td>
<td>Control power supply Single phase AC100 to 115V +/-10% 50/60Hz</td>
<td>Motor power supply Single phase AC100 to 115V +/-10% 50/60Hz</td>
<td></td>
</tr>
<tr>
<td><strong>Control power supply</strong></td>
<td>AC100 to 115V +/-10%</td>
<td>AC100 to 115V +/-10%</td>
<td></td>
</tr>
<tr>
<td><strong>Control method</strong></td>
<td>Closed loop vector control method</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operating method</strong></td>
<td>I/O point tracing (Positioning operation by specifying point number) / Remote command</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Position detection method</strong></td>
<td>TS-X: Resolver with multi-rotation absolute function TS-P: Magnetic type linear scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>TS-X: 16384 pulses/rev. or 20480 pulses/rev. depending on the robot TS-P: 1μm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note 1. Battery can only be selected for TS-SH. (Not provided for TS-S2).**

**Note 2. Battery can only be selected for TS-X. (Not provided for TS-P).**
Some specifications are automatically determined by the robot model.

### TS-X / TS-P specification selection table

<table>
<thead>
<tr>
<th>Power supply voltage</th>
<th>Current sensor</th>
<th>Regenerative unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS-X</td>
<td>105</td>
<td>(1) (2)</td>
</tr>
<tr>
<td></td>
<td>110</td>
<td>(1) (2)</td>
</tr>
<tr>
<td></td>
<td>205</td>
<td>(1) (2) (3) (4)</td>
</tr>
<tr>
<td></td>
<td>210</td>
<td>(1) (2)</td>
</tr>
<tr>
<td></td>
<td>220</td>
<td>(1) (2) (3)</td>
</tr>
</tbody>
</table>

(1) Regenerative unit is needed if using in a perpendicular position and movement stroke is 700mm or more.
(2) Regenerative unit is needed if using in a perpendicular position.
(3) The following arrangements require a regeneration unit:
  - Using in the upright position.
  - To move at a speed exceeding 1,000 mm/sec horizontally.
  - High lead (40) used horizontally.

### TS-P

<table>
<thead>
<tr>
<th>Power supply voltage</th>
<th>Current sensor</th>
<th>Regenerative unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS-P</td>
<td>105</td>
<td>R (RGU-2)</td>
</tr>
<tr>
<td></td>
<td>110</td>
<td>R (RGU-2)</td>
</tr>
<tr>
<td></td>
<td>205</td>
<td>R (RGU-2)</td>
</tr>
<tr>
<td></td>
<td>210</td>
<td>R (RGU-2)</td>
</tr>
<tr>
<td></td>
<td>220</td>
<td>R (RGU-2)</td>
</tr>
</tbody>
</table>

### Part names

**TS-S2/TS-SH**

- **Communication connector 2 (COM2)**: Connector for the daisy-chain connection cable.
- **Communication connector 1 (COM1)**: Connector for connection to HT1 or a personal computer.
- **Robot I/O connector (ROB I/O)**: Dedicated connector for robot I/O signals such as position signals and origin sensor signals, etc.
- **I/O connector (I/O)**: Connector for the absolute battery connection. (only for TS-X)
- **Power supply connector**
- **Serial No.**
- **Status indicator lamps (PWR, ERR)**: The controller status is indicated by LED lamps.
- **Rating nameplate (on side face of unit body)**

**TS-X/TS-P**

- **Communication connector 2 (COM2)**: Connector for the daisy-chain or LCD monitor connection.
- **Communication connector 1 (COM1)**: Connector for connection to HT1 or a personal computer.
- **Robot I/O connector (ROB I/O)**: Dedicated connector for robot I/O signals such as position signals and origin sensor signals, etc.
- **Motor connector (MOTOR)**: Connector for the servo motor's power line connection.
- **I/O connector (I/O)**
- **Regenerative unit connector (RGEN)**
- **Serial No.**
- **Unit's top cover in an open condition**
- **Status indicator lamps (PWR, ERR)**: The controller status is indicated by LED lamps.
- **Rating nameplate (on side face of unit body)**
- **Communication connector 1 (COM1)**: Connector for connection to HT1 or a personal computer.
- **Robot I/O connector (ROB I/O)**: Dedicated connector for robot I/O signals such as position signals and origin sensor signals, etc.
- **Motor connector (MOTOR)**: Connector for the servo motor's power line connection.
- **I/O connector (I/O)**
- **Regenerative unit connector (RGEN)**
## Installations conditions

- Install the TS-S2/TS-SH/TS-X/TS-P inside the control panel.
- Install the TS-S2/TS-SH/TS-X/TS-P in a well ventilated location, with space on all sides of the TS-S2/TS-SH/TS-X/TS-P (See fig. at right.).
- Ambient temperature : 0 to 40˚C
- Ambient humidity : 35 to 85% RH (no condensation)

## Cautions on TS-S2 / TS-SH

For the RF type sensor specifications, the controllers “TS-S2” and “TS-SH” become “TS-S2S” and “TS-SHS”, respectively.

### TS-S2 / TS-SH (Standard specifications)

“BK” label is affixed to the front of the controller.

### TS-S2S / TS-SHS (Sensor specifications)

“SENSOR” label is affixed to the front of the controller.

(Be aware that “TS-S2S” is affixed to the front of the controller.)
### TS-S2/TS-SH/TS-X/TS-P

#### Regenerative unit RGT/RRGU-2

**Regenerative unit RGT**

**Dimensions**

<table>
<thead>
<tr>
<th>Width</th>
<th>Length</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>142</td>
<td>120</td>
</tr>
</tbody>
</table>

**Data structure**

- **Parameter data**
  - K1 to K20
  - RUN parameter
  - K21 to K39
  - I/O parameter
  - K80 to K99
  - Option parameter
  - K40 to K79, K100 to...
  - Servo parameter

**Point data**

- **Point data item list**
  - P1 to P255
  - Item Description
  - 1 RUN type
  - 2 Position
  - 3 Speed
  - 4 Accel.
  - 5 Decel.
  - 6 Push
  - 7 Zone (+)
  - 8 Zone (-)
  - 9 Near width
  - 10 Jump
  - 11 Flag
  - 12 Timer

**Setting Type**

- **Standard setting**
  - Optimum positioning is provided simply by specifying the payload.
  - This setting type is suited for machining and inspection systems.

- **Custom setting**
  - Allows changing the speed and acceleration in SI units so the desired positioning operation can be set.
  - This setting type is suited for machining and inspection systems.

**Note.** Always leave an empty space (gap of about 20mm) between this unit and the adjacent controller. Also, always use the dedicated cable when connecting the controller.

#### Data overview

Point data and parameter data settings must be specified in order to operate a robot from a TS series controller.

**Point data**

- The point data used in positioning operations includes items such as the "RUN type", "Position", and "Speed", etc. Up to 255 points (P1 to P255) can be registered. There are two point data setting types: "Standard setting" type that automatically defines optimal positioning simply by specifying the payload and "Custom setting" type that allows setting the speed (mm/s) and acceleration (m/s^2) in SI units. Select the desired setting type according to the application.

**Parameter data**

- Parameter data is divided into the following categories: "RUN parameters", "I/O parameters", "option parameters", and "servo parameters".

**Data structure**

- **P1 to P255**
  - 1 RUN type
  - 2 Position
  - 3 Speed
  - 4 Accel.
  - 5 Decel.
  - 6 Push
  - 7 Zone (+)
  - 8 Zone (-)
  - 9 Near width
  - 10 Jump
  - 11 Flag
  - 12 Timer

**Sets the point data to be used in positioning.**

- Select the desired setting type ("standard setting" or "custom setting") according to the application.

  1. **Standard setting**
     - Optimum positioning is provided simply by specifying the payload.
     - This setting type is well-suited to assembly and transport applications.

  2. **Custom setting**
     - Speed and acceleration can be set in SI units.
     - Optimum positioning is provided simply by specifying the payload.

**Parameter data**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 RUN type</td>
<td>Specifies the positioning operation pattern.</td>
</tr>
<tr>
<td>2 Position</td>
<td>Specifies the positioning target position or movement amount.</td>
</tr>
<tr>
<td>3 Speed</td>
<td>Specifies the positioning speed.</td>
</tr>
<tr>
<td>4 Accel.</td>
<td>Specifies the positioning acceleration.</td>
</tr>
<tr>
<td>5 Decel.</td>
<td>Specifies the positioning deceleration (as a percentage of the acceleration).</td>
</tr>
<tr>
<td>6 Push</td>
<td>Specifies the electrical current limit value for &quot;Push&quot; operations.</td>
</tr>
<tr>
<td>7 Zone (+)</td>
<td>Specifies the &quot;personal zone&quot; output range.</td>
</tr>
<tr>
<td>8 Zone (-)</td>
<td>Specifies the &quot;near width&quot; zone (distance tolerance relative to target position).</td>
</tr>
<tr>
<td>9 Near width</td>
<td>Specifies the next movement destination, or the next merge operation merge destination point No. following positioning completion.</td>
</tr>
<tr>
<td>10 Jump</td>
<td>Specifies other information related to the positioning operation.</td>
</tr>
<tr>
<td>11 Flag</td>
<td>Specifies the waiting time (delay) after positioning completion.</td>
</tr>
<tr>
<td>12 Timer</td>
<td>Specifies parameter settings related to positioning and return-to-origin operations.</td>
</tr>
<tr>
<td>13 Option parameter</td>
<td>Specifies parameter settings related to options such as CC-Link, etc.</td>
</tr>
</tbody>
</table>

### Basic specifications

- **Item**
  - **RGT**
    - Model: KCA-M4107-0A (including cable supplied with unit)
    - Dimensions: W30 × H142 × D118mm (Not including installation stay)
    - Weight: 470g
    - Regenerative voltage: Approx. 380V or more
    - Regenerative stop voltage: Approx. 360V or less
    - Accessory: Cable for connection with controller (300mm)

- **RGU-2**
  - Model: KCA-M4107-2A (including cable supplied with unit)
  - Dimensions: W40 × H250 × D157mm
  - Weight: 0.9kg
  - Regenerative voltage: Approx. 380V or more
  - Regenerative stop voltage: Approx. 360V or less
  - Accessory: Cable for connection with controller (300mm)

**Regenerative unit RGT/RGU-2**

**Dimensions**

<table>
<thead>
<tr>
<th>Width</th>
<th>Length</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>142</td>
<td>120</td>
</tr>
</tbody>
</table>

**Option**

- Electric gripper
- Robot positioner
- Pulse string driver
- Robot controller
- iVY/iVY2

**Note.** Always leave an empty space (gap of about 20mm) between this unit and the adjacent controller. Also, always use the dedicated cable when connecting the controller.

---

**Regenerative unit RGT/RGU-2**

**Dimensions**

<table>
<thead>
<tr>
<th>Width</th>
<th>Length</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>142</td>
<td>120</td>
</tr>
</tbody>
</table>

---

**Data structure**

- **Data**
  - **Point data**
    - P1 to P255
    - 1 RUN type
    - 2 Position
    - 3 Speed
    - 4 Accel.
    - 5 Decel.
    - 6 Push
    - 7 Zone (+)
    - 8 Zone (-)
    - 9 Near width
    - 10 Jump
    - 11 Flag
    - 12 Timer

**Sets the point data to be used in positioning.**

- Select the desired setting type ("standard setting" or "custom setting") according to the application.

  1. **Standard setting**
     - Optimum positioning is provided simply by specifying the payload.
     - This setting type is well-suited to assembly and transport applications.

  2. **Custom setting**
     - Speed and acceleration can be set in SI units.
     - Optimum positioning is provided simply by specifying the payload.

### Point data

- **Point data item list**
  - P1 to P255
  - Item Description
  - 1 RUN type
  - 2 Position
  - 3 Speed
  - 4 Accel.
  - 5 Decel.
  - 6 Push
  - 7 Zone (+)
  - 8 Zone (-)
  - 9 Near width
  - 10 Jump
  - 11 Flag
  - 12 Timer

**Setting Type**

- **Standard setting**
  - Optimum positioning is provided simply by specifying the payload.
  - This setting type is well-suited to assembly and transport applications.

- **Custom setting**
  - Allows changing the speed and acceleration in SI units so the desired positioning operation can be set.
  - This setting type is suited for machining and inspection systems.

---

**Basic specifications**

- **Item**
  - **RGT**
    - Model: KCA-M4107-0A (including cable supplied with unit)
    - Dimensions: W30 × H142 × D118mm (Not including installation stay)
    - Weight: 470g
    - Regenerative voltage: Approx. 380V or more
    - Regenerative stop voltage: Approx. 360V or less
    - Accessory: Cable for connection with controller (300mm)

- **RGU-2**
  - Model: KCA-M4107-2A (including cable supplied with unit)
  - Dimensions: W40 × H250 × D157mm
  - Weight: 0.9kg
  - Regenerative voltage: Approx. 380V or more
  - Regenerative stop voltage: Approx. 360V or less
  - Accessory: Cable for connection with controller (300mm)
### NPN type input/output wiring diagram

#### TS-S2/TS-SH

[Diagram of NPN type input/output wiring for TS-S2/TS-SH]

#### TS-X

[Diagram of NPN type input/output wiring for TS-X]

#### TS-P

[Diagram of NPN type input/output wiring for TS-P]

### Emergency stop circuit example

#### TS-S2/TS-SH

[Diagram of emergency stop circuit example for TS-S2/TS-SH]

#### TS-X/TS-P

[Diagram of emergency stop circuit example for TS-X/TS-P]

Note. Always connect a surge absorber unit to the coil on the electromagnetic contactor.

Installing an external safety circuit will satisfy safety category class 4 standards. See P.615 for more information.

### I/O Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPN</td>
<td>Input 16 points, 24VDC +/-10%, 5.1mA/point, positive common Output 16 points, 24VDC +/-10%, 50mA/point, sink type</td>
</tr>
<tr>
<td>PNP</td>
<td>Input 16 points, 24VDC +/-10%, 5.5mA/point, minus common Output 16 points, 24VDC +/-10%, 50mA/point, source type</td>
</tr>
<tr>
<td>CC-Link</td>
<td>CC-Link Ver.1.10 compatible, Remote station device (1 node)</td>
</tr>
<tr>
<td>DeviceNet™</td>
<td>DeviceNet™ Slave 1 node</td>
</tr>
<tr>
<td>EtherNet/IP™</td>
<td>EtherNet/IP™ adapter (2 ports)</td>
</tr>
<tr>
<td>PROFINET</td>
<td>PROFINET Slave 1 node</td>
</tr>
</tbody>
</table>
### I/O signals (NPN / PNP)

<table>
<thead>
<tr>
<th>No.</th>
<th>Signal Name</th>
<th>Description</th>
<th>No.</th>
<th>Signal Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>+COM</td>
<td>I/O power input, positive common (24VDC +/-10%)</td>
<td>B1</td>
<td>POUT0</td>
<td>Point No. outputs</td>
</tr>
<tr>
<td>A2</td>
<td>-COM</td>
<td>No connection</td>
<td>B2</td>
<td>POUT1</td>
<td>OUT0 to OUT3 assignments include:</td>
</tr>
<tr>
<td>A3</td>
<td>NC</td>
<td>No connection</td>
<td>B3</td>
<td>POUT2</td>
<td>• Zone output</td>
</tr>
<tr>
<td>A4</td>
<td>NC</td>
<td>No connection</td>
<td>B4</td>
<td>POUT3</td>
<td>• Personal zone output</td>
</tr>
<tr>
<td>A5</td>
<td>PIN0</td>
<td>No connection</td>
<td>B5</td>
<td>POUT4</td>
<td>• MANUAL mode status</td>
</tr>
<tr>
<td>A6</td>
<td>PIN1</td>
<td>No connection</td>
<td>B6</td>
<td>POUT5</td>
<td>• Return-to-origin end status</td>
</tr>
<tr>
<td>A7</td>
<td>PIN2</td>
<td>No connection</td>
<td>B7</td>
<td>POUT6</td>
<td>• NEAR output</td>
</tr>
<tr>
<td>A8</td>
<td>PIN3</td>
<td>No connection</td>
<td>B8</td>
<td>POUT7</td>
<td>• Movement-in-progress</td>
</tr>
<tr>
<td>A9</td>
<td>PIN4</td>
<td>No connection</td>
<td>B9</td>
<td>OUT0</td>
<td>• Push status</td>
</tr>
<tr>
<td>A10</td>
<td>PIN5</td>
<td>No connection</td>
<td>B10</td>
<td>OUT1</td>
<td>• Warning output</td>
</tr>
<tr>
<td>A11</td>
<td>PIN6</td>
<td>Interlock</td>
<td>B11</td>
<td>OUT2</td>
<td>Operation-in-progress</td>
</tr>
<tr>
<td>A12</td>
<td>PIN7</td>
<td>No connection</td>
<td>B12</td>
<td>OUT3</td>
<td>Operation-end</td>
</tr>
<tr>
<td>A13</td>
<td>JOG+</td>
<td>JOG movement (+ direction)</td>
<td>B13</td>
<td>BUSY</td>
<td>Alarm</td>
</tr>
<tr>
<td>A14</td>
<td>JOG-</td>
<td>JOG movement (- direction)</td>
<td>B14</td>
<td>END</td>
<td>Servo status</td>
</tr>
<tr>
<td>A15</td>
<td>MANUAL</td>
<td>MANUAL mode</td>
<td>B15</td>
<td>/ALM</td>
<td></td>
</tr>
<tr>
<td>A16</td>
<td>ORG</td>
<td>Return-to-origin</td>
<td>B16</td>
<td>SRV-S</td>
<td></td>
</tr>
<tr>
<td>A17</td>
<td>/LOCK</td>
<td>Interlock</td>
<td>B17</td>
<td>NC</td>
<td>No connection</td>
</tr>
<tr>
<td>A18</td>
<td>START</td>
<td>Start</td>
<td>B18</td>
<td>NC</td>
<td></td>
</tr>
<tr>
<td>A19</td>
<td>RESET</td>
<td>Reset</td>
<td>B19</td>
<td>~COM</td>
<td>I/O power input, negative common (0V)</td>
</tr>
<tr>
<td>A20</td>
<td>SERVO</td>
<td>Servo ON</td>
<td>B20</td>
<td>~COM</td>
<td></td>
</tr>
</tbody>
</table>

### NPN type I/O circuit details

- **Input circuit**
  - Type: DC input (plus common type)
  - Photo-coupler isolation format
  - Load: 24VDC +/-10%, 5.1mA
  - OFF voltage: 19.6Vmin (1.0mA)
  - ON voltage: 4.9Vmax (4.0mA)

- **Output circuit**
  - Type: NPN open collector output
  - (Minus common type)
  - Photo-coupler isolation format
  - Load: 24VDC, 50mA/point

### PNP type I/O circuit details

- **Input circuit**
  - Type: DC input (minus common type)
  - Photo-coupler isolation format
  - Load: 24VDC +/-10%, 5.5mA
  - ON voltage: 19.6Vmin (4.5mA)
  - OFF voltage: 4.9Vmax (1.1mA)

- **Output circuit**
  - Type: PNP open collector output
  - (Plus common type)
  - Photo-coupler isolation format
  - Load: 24VDC, 50mA/point
Accessories and part options

TS-S2/TS-SH/TS-X/TS-P

■ Standard accessories

- **Power connector**
  - Model: KCC-M4421-00
  - (For TS-S2/TS-SH)
  - Model: KCC-M4421-00
  - (For TS-X/TS-P)

- **Power connector (AC100V specifications)**
  - Included when 100V model is purchased
  - Model: KCA-M5382-00
  - (For TS-X/TS-P)

- **Power connector (AC200V specifications)**
  - Included when 200V model is purchased
  - Model: KAS-M5382-00
  - (For TS-X/TS-P)

- **EXT connector**
  - For braking power and safety circuit connections.
  - Model: KCA-M5370-00
  - (For TS-X/TS-P)

- **Dummy connector**
  - Model: KCA-M5163-00
  - (For TS-S2/TS-SH/TS-X/TS-P)

- **I/O cables (2m/20-core×2)**
  - Model: KCA-M4421-20
  - (For TS-S2/TS-SH/TS-X/TS-P)

- **Absolute battery**
  - **Absolute battery basic specifications**
    - Battery type: Lithium metallic battery
    - Battery capacity: 3.6V/1,650mAh, 3.6V/2,750mAh
    - Data holding time: About 1 year
    - Dimensions: ϕ18 × L50mm, ϕ17 × L53mm
    - Weight: 24g, 22g
  - Model: KCA-M53G0-10 (For TS-X)
  - Model: KCA-M53G0-01 (For TS-SH)
  - Note: The absolute battery is subject to wear and requires replacement.

- **CC-Link connector (CC-Link specifications)**
  - Included when CC-Link model is purchased
  - Model: Connector: KCA-M4872-00
  - Jump socket: KCA-M4873-00
  - Note: This is a single connector type. (Insert two connectors into a branching socket.)

**See next page for optional parts**
### Options

**Handy terminal HT1/HT1-D**

- Model: KCA-M5110-0J, KCA-M5110-1J
- 3-position enable switch
- CE marking: Not supported, Applicable

**Support software TS-Manager**

- Model: KCA-M4966-0J (Japanese), KCA-M4966-0E (English)

**TS-Manager environment**

- OS: Microsoft Windows 2000 / XP / Vista (32bit/64bit) / 7 (32bit/64bit)
- CPU: Exceeding the environment recommended by the OS being used
- Memory: Exceeding the environment recommended by the OS being used
- Hard disk: Vacant capacity of more than 20MB in the installation destination drive
- Communication port: Serial (RS-232C), USB

**Data cables**

- Communication cable for TS-Manager. Select from USB cable or D-sub cable.
- Model: USB type (5m) KCA-M538F-A0, D-Sub type (5m) KCA-M538F-01
- Note: USB driver for communication cable can also be downloaded from our website.

**Daisy chain and gateway connection cable**

- Model: KCA-M532L-00 (300mm)

**CC-Link termination connector (CC-Link specifications)**

- Model: KCA-M4874-00

**TS-Monitor (LCD monitor)**

- Model: For TS-X KCA-M5119-00, For TS-P KCA-M5119-10

**DIN rail mounting bracket** (This bracket is provided in TS-SH as standard equipment.)

- Model: KCC-M499A-00, KCA-M499A-00, KCA-M499A-10