

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.



Handy terminal
▶ HT1/HT1-D
P.656



Support software for PC
▶ TS-Manager
P.648

TS-S2

TS-SH

TS-X

TS-P

■ Basic specifications

TS-S2/TS-SH

Item	TS-S2	TS-SH
Number of controllable axes	Single-axis	
Controllable robots	TRANSERVO series	
Current consumption	2.5A (Rating) 4.5A (Max.)	3.5A (Rating) 6.5A (Max.)
Dimensions	W30 × H162 × D82mm	W30 × H162 × D123mm
Weight	Approx. 0.2kg	Approx. 0.3kg
Input power supply	Control power supply DC24V +/-10% Main power supply DC24V +/-10%	
Control method	Closed loop vector control method	
Operating method	I/O point tracing (Positioning operation by specifying point number) / Remote command	
Operation types	Positioning, merge-positioning, push, and jog operations	
Position detection method	Resolver	Resolver with multi-turn absolute function
Resolution	20480 pulses/rev. or 4096 pulses/rev. depending on the robot	
Origin search method	Incremental	Absolute / Incremental
Points	255 points	
Point type setting	(1) Standard setting: Set speed and acceleration in percent of the respective maximum settings. (2) Custom setting: Set speed and acceleration in SI units.	
Point teaching method	Manual data input (coordinates input), Teaching, Direct teaching	
I/O interface	Selectable from the following: NPN, PNP, CC-Link, DeviceNet™, EtherNet/IP™, PROFINET	
Input	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)	
Output	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)	
External communications	RS-232C 1CH	
Safety circuit	Emergency stop input, emergency stop contact output (1 system: When the HT1 is used.)	
Options	Handy terminal HT1, HT1-D (with enable switch) Support software for PC TS-Manager	
Operating temperature / Operating humidity	0°C to 40°C, 35% to 85%RH (non-condensing)	
Storage temperature/ Storage humidity	-10°C to 65°C, 10% to 85%RH (non-condensing)	
Atmosphere	Indoor location not exposed to direct sunlight. No corrosive, flammable gases, oil mist, or dust particles	
Anti-vibration	All XYZ directions 10 to 57Hz unidirectional amplitude 0.075mm 57 to 150Hz 9.8m/s ²	
Protective functions	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	

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

Controllable robot	TS-S2/TS-SH ▶ TRANSERO P.335	TS-X ▶ FLIP-X P.289	TS-P ▶ PHASER P.267
CE marking		Field networks CC-Link DeviceNet EtherNet/IP PROFINET	

■ Model Overview

Name	TS-S2	TS-SH	TS-X/TS-P	
Controllable robot	Dedicated compact single-axis TRANSERO		TS-X: Single-axis robot FLIP-X TS-P: Linear motor single-axis PHASER	
Input power	Control power supply	DC24V +/-10%	● AC100V specifications Control power supply Single phase 100 to 115V AC +/-10%	
	Main power supply		● AC200V specifications Control power supply Single phase 200 to 230V AC +/-10% Main power supply Single phase 100 to 115V AC +/-10%	
Operating method	I/O point tracing / Remote command / Operation using RS-232C communication			
Maximum number of controllable axes	Single-axis			
Origin search method	Incremental	Absolute / Incremental	TS-X: Absolute / Incremental TS-P: Absolute / Semi-absolute	

■ Ordering method

TS-S2/TS-SH (TRANSERO)

Robot positioner	Type	I/O	Battery Note 1
S2: TS-S2	No entry: Standard	NP: NPN PN: PNP CC: CC-Link DN: DeviceNet™ EP: EtherNet/IP™ PT: PROFINET GW: With no I/O board	B: With battery (Absolute model) N: None (Incremental model)
SH: TS-SH	S: Sensor		

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

TS-X/TS-P (FLIP-X/PHASER)

Controller	Driver: Power-supply voltage/ Power capacity	Regenerative unit	LCD monitor	Input/Output Selection	Battery Note 2
TSX: TS-X	105: 100V / 100W more less 110: 100V / 200W 205: 200V / 100W more less 210: 200V / 200W 220: 200V / 400 to 600W	No entry: None R: With RGT L: With RGU-2	No entry: None L: With LCD	NP: NPN PN: PNP CC: CC-Link DN: DeviceNet™ EP: EtherNet/IP™ PT: PROFINET GW: With no I/O board	B: With battery (Absolute model) N: None (Incremental model)
TSP: TS-P					

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

TS-X/TS-P

Item	TS-X / TS-P							
	100V AC input		200V AC input					
Driver model	TS-X105 / TS-P105	TS-X110 / TS-P110	TS-X205 / TS-P205	TS-X210 / TS-P210	TS-X220 / TS-P220			
Number of controllable axes	Single-axis							
Controllable robots	TS-X: Single-axis robot FLIP-X series TS-P: Linear motor single-axis robot PHASER series							
Power capacity	400VA	600VA	400VA	600VA	1400VA			
Dimensions	W58 × H162 × D131mm							
Weight	Approx. 0.9kg							
Basic specifications	Input power supply	Single phase 100 to 115V AC +/-10% 50/60Hz		Single phase 200 to 230V AC +/-10% 50/60Hz				
	Main power supply	Single phase 100 to 115V AC +/-10% 50/60Hz		Single phase 200 to 230V AC +/-10% 50/60Hz				
Axes control	Control method	Closed loop vector control method						
	Operating method	I/O point tracing (Positioning operation by specifying point number) / Remote command						
	Operation types	Positioning, merge-positioning, push, and jog operations						
	Position detection method	TS-X: Resolver with multi-rotation absolute function TS-P: Magnetic type linear scale						
	Resolution	TS-X: 16384 pulses/rev. TS-P: 1μm						
Points	Origin search method	TS-X: Absolute / Incremental TS-P: Incremental / Semi-absolute						
	Number of points	255 points						
	Point type setting	(1) Standard setting: Set speed and acceleration in percent of the respective maximum settings. (2) Custom setting: Set speed and acceleration in SI units.						
External input/output	Point teaching method	Manual data input (coordinates input), Teaching, Direct teaching						
	I/O interface	Selectable from the following: NPN, PNP, CC-Link, DeviceNet™, EtherNet/IP™, PROFINET						
	Input	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)						
	Output	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)						
General specifications	External communications	RS-232C 1CH						
	Power supply for brake	DC24V +/-10% 300mA (prepared by the customer)						
	Safety circuit	Emergency stop input, main power input ready output, emergency stop contact output (1 system: When the HT1 is used.)						
Options	Handy terminal	HT1, HT1-D (with enable switch)						
	Support software for PC	TS-Manager						
	Operating temperature / Operating humidity	0°C to 40°C, 35% to 85%RH (non-condensing)						
	Storage temperature / Storage humidity	-10°C to 65°C, 10% to 85%RH (non-condensing)						
	Atmosphere	Indoor location not exposed to direct sunlight. No corrosive, flammable gases, oil mist, or dust particles						
Protective functions	Anti-vibration	All XYZ directions 10 to 57Hz unidirectional amplitude 0.075mm 57 to 150Hz 9.8m/s²						
	Protective structure	Position detection error, power module error, temperature error, overload, overvoltage, low voltage, excessive position deviation, overcurrent, motor current error						
		IP20						



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

■ TS-X / TS-P specification selection table

Some specifications are automatically determined by the robot model.

TS-X

		T4LH/ C4LH	T5LH/ C5LH	T6L/ C6L	T9	T9H	F8/ C8	F8L/ C8L	F8LH/ C8LH	F10/ C10	F10H	F14/ C14	F14H/ C14H	GF14XL	F17/ C17	F17L/ C17L	GF17XL	F20/ C20	F20N	N15/ N15D	N18/ N18D	B10	B14	B14H	R5	R10	R20	
Power supply voltage / Current sensor	TS-X	105	●	●	●	●		●	●	●		●										●	●	●	●	●	●	
		110					●				●		●	●													●	
		205	●	●	●	●		●	●	●	●		●										●	●	●	●	●	●
		210					●				●		●	●														●
		220																				●	●	●	●	●	●	
Regenerative unit	No entry (None)				(1)	(2)				(1)	(2)	(1)	(2)	(3)		(6)	(3)	(4)	(5)	(6)	(3)	(4)	(5)	(6)	(3)	(4)	(5)	(6)
	R (RGT)				(1)	(2)				(1)	(2)	(1)	(2)	(3)		(6)	(3)	(4)	(5)	(6)	(3)	(4)	(5)	(6)	(3)	(4)	(5)	(6)

(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.

(4) Regenerative unit is needed if using at maximum speeds exceeding 1000mm per second.

(5) Regenerative unit is needed if using at maximum speeds exceeding 1250mm per second.

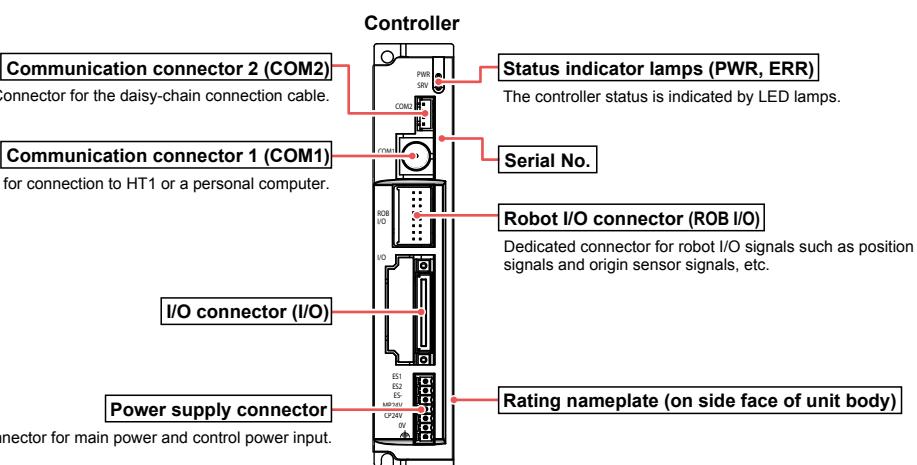
(6) Regenerative unit is needed if using at maximum speeds exceeding 750mm per second.

TS-P

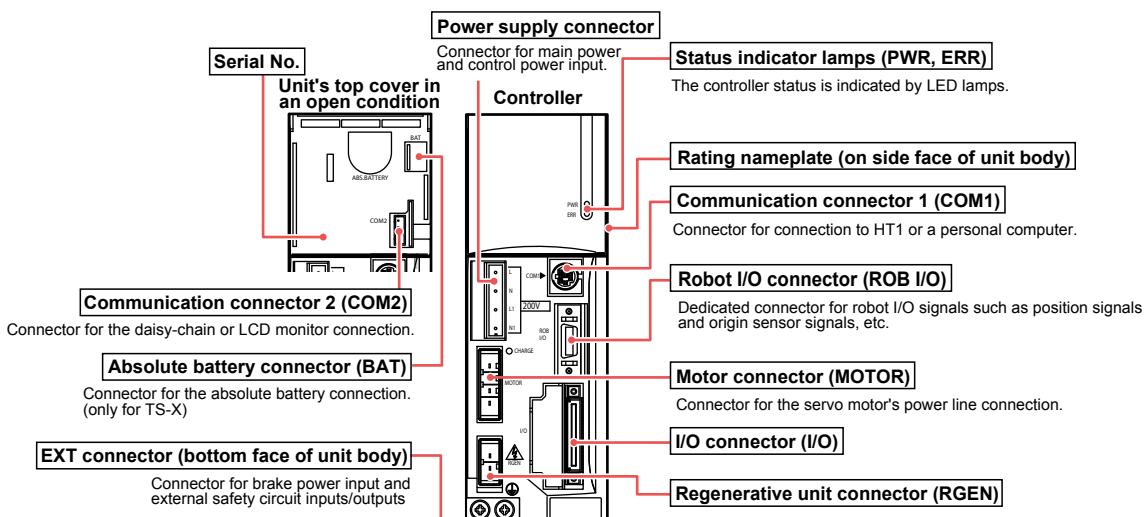
		MF7/7D	MF15/15D	MF20/20D	MF30/30D	MF75/75D
Power supply voltage / Current sensor	TS-P	105				
		110	●	●	●	
		205				
		210	●	●	●	
		220			●	●
Regenerative unit	No entry (None)	●	●			
	R (RGT)			●	●	
R (RGU-2)						●

■ Part names

TS-S2/TS-SH

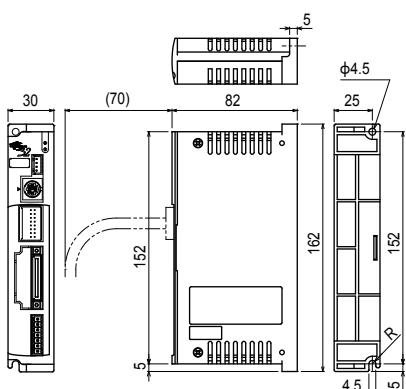


TS-X/TS-P

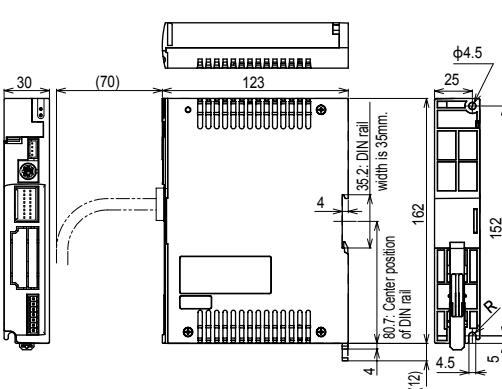


Dimensions

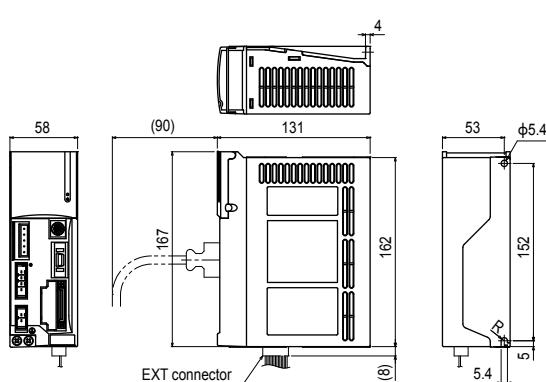
TS-S2



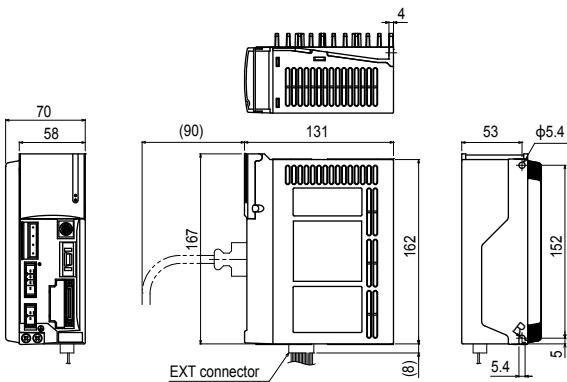
TS-SH



TS-X/TS-P (105/110/205/210)



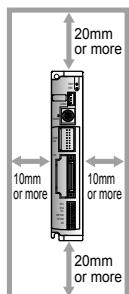
TS-X/TS-P (220)



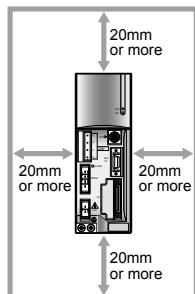
Installation conditions

- Install the TS-S2/TS-SH/TS-X/TS-P inside the control panel.
- Install the TS-S2/TS-SH/TS-X/TS-P on a vertical wall.
- 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)

TS-S2/TS-SH



TS-X/TS-P



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.

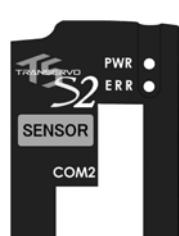
TS-S2 / TS-SH (Standard specifications)

"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

Linear conveyor
modules

LCMR200

Single-axis robots

GX

Linear conveyor
modules

LCM100

SCARA robots

YK-X

Single-axis robots

Robonity

Linear motor
single-axis robots

PHASER

Single-axis robots

FLIP-X

single-axis robots

TRANSEROV

Compact
Cartesian robots

XY-X

Pick & place
robots

VP-X

CLEAN

CONTROLLER

INFORMATION

Robot
positioner

Pulse string
driver

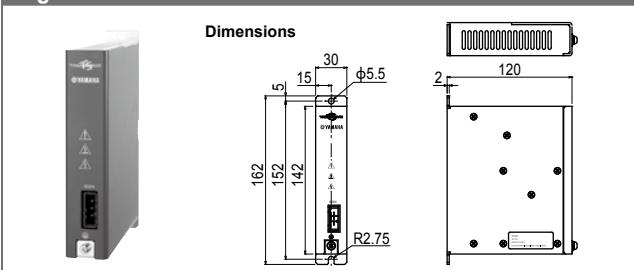
Robot
controller

RCXIVY2+
Electric
gripper

Option

Regenerative unit RGT/RGU-2

Regenerative unit RGT

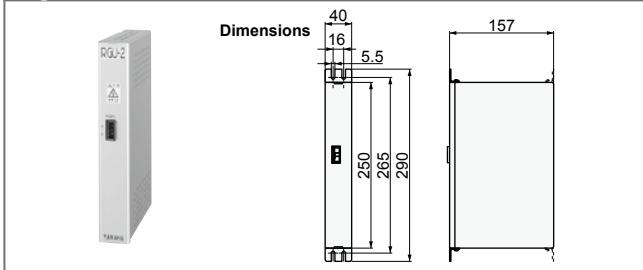


Basic specifications

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)

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 RGU-2



Basic specifications

Item	RGU-2 TS-P
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)

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.

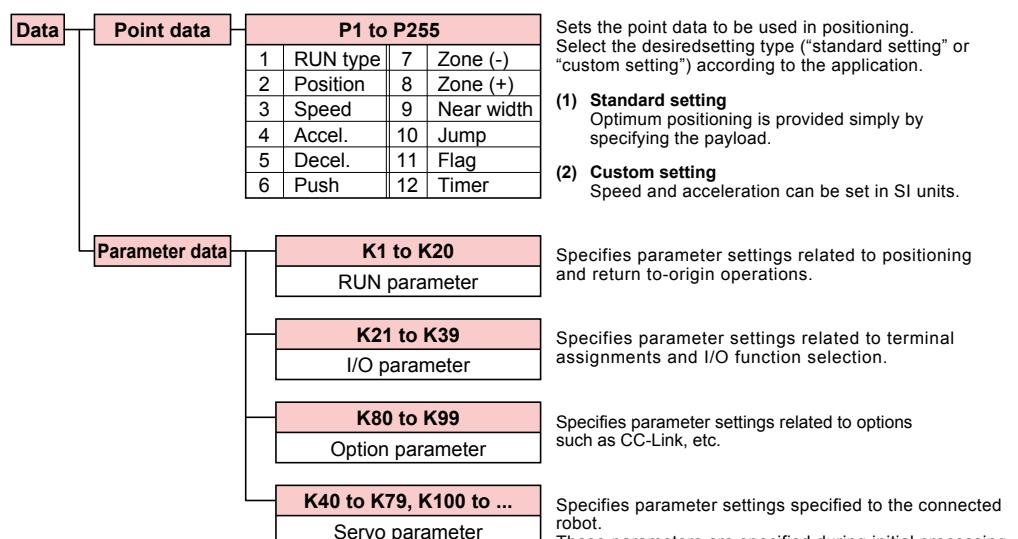
Point data

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/s²) 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



Point data

Point data item list

P1 to P255	
Item	Description
1 RUN type	Specifies the positioning operation pattern.
2 Position	Specifies the positioning target position or movement amount.
3 Speed	Specifies the positioning speed.
4 Accel.	Specifies the positioning acceleration.
5 Decel.	Specifies the positioning deceleration (as a percentage of the acceleration).
6 Push	Specifies the electrical current limit value for "Push" operations.
7 Zone (-)	Specifies the "personal zone" output range.
8 Zone (+)	Specifies the "near width" zone (distance tolerance relative to target position).
9 Near width	Specifies the "near width" zone (distance tolerance relative to target position).
10 Jump	Specifies the next movement destination, or the next merge operation merge destination point No. following positioning completion.
11 Flag	Specifies other information related to the positioning operation.
12 Timer	Specifies the waiting time (delay) after positioning completion.

"Standard setting" and "custom setting"

There are 2 setting types for point data ("standard setting" or "custom setting"). Select the desired setting type according to the application.

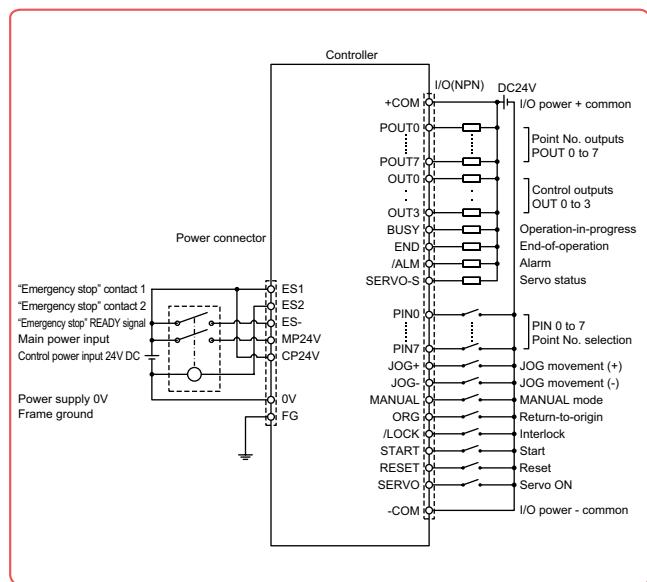
The maximum number of setting points for both setting types is 255 points (P1 to P255).

Setting Type	Description
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.

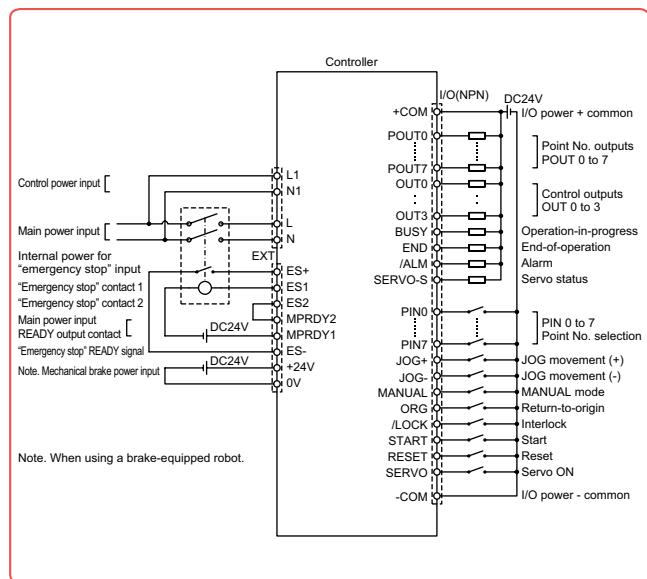


NPN type input / output wiring diagram

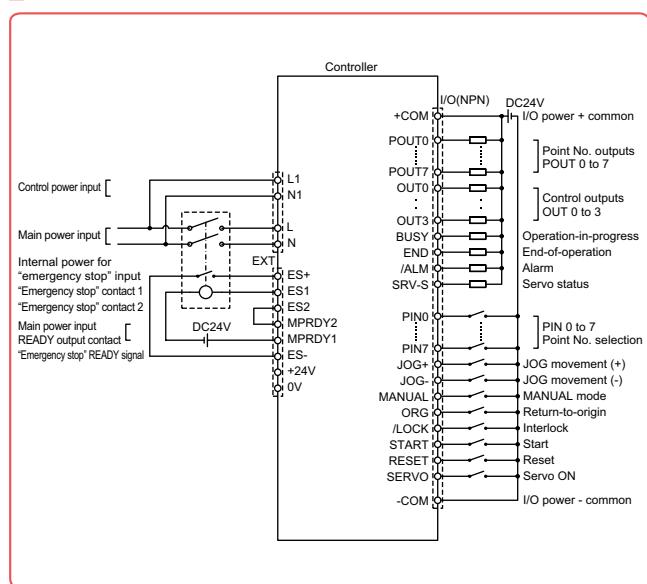
TS-S2/TS-SH



TS-X

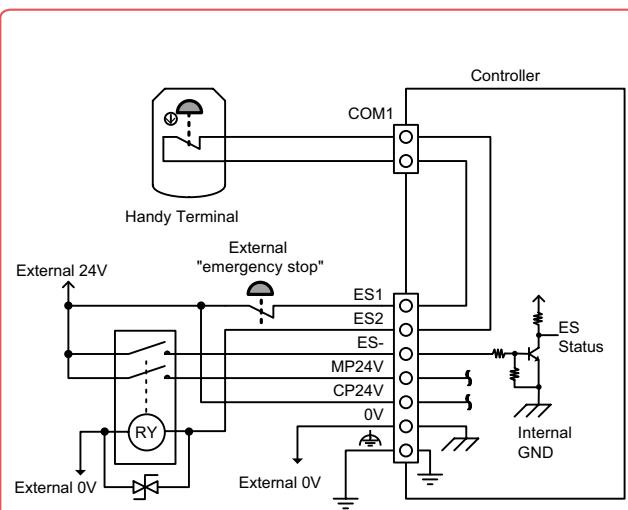


TS-P



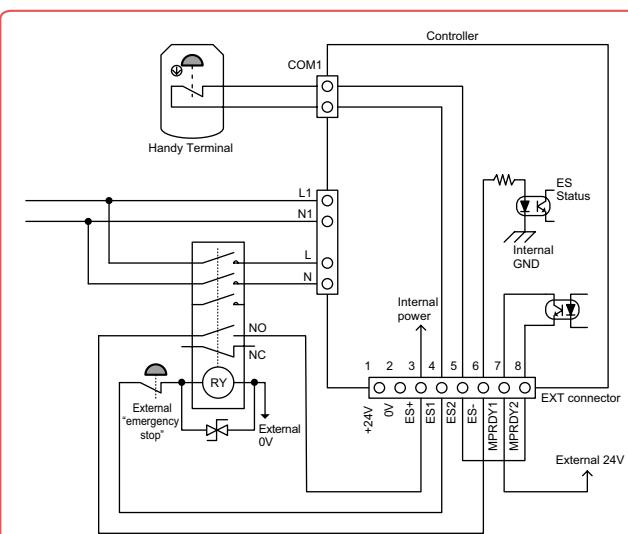
Emergency stop circuit example

TS-S2/TS-SH (power connector and host unit connection example)



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

TS-X/TS-P (EXT connector and host unit connection example)



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.715 for more information.

I/O Specifications

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



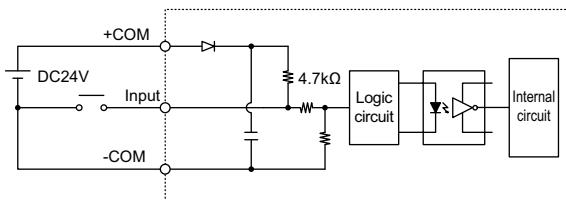
TS-S2/TS-SH/TS-X/TS-P

I/O signals (NPN / PNP)

No.	Signal Name	Description	No.	Signal Name	Description
A1	+COM	I/O power input, positive common (24VDC +/-10%)	B1	POUT0	Point No. outputs
A2			B2	POUT1	
A3	NC	No connection	B3	POUT2	
A4	NC		B4	POUT3	
A5	PIN0	Point No. select	B5	POUT4	
A6	PIN1		B6	POUT5	
A7	PIN2		B7	POUT6	
A8	PIN3		B8	POUT7	
A9	PIN4		B9	OUT0	
A10	PIN5		B10	OUT1	
A11	PIN6		B11	OUT2	
A12	PIN7		B12	OUT3	
A13	JOG+	JOG movement (+ direction)	B13	BUSY	OUT0 to OUT3 assignments include:
A14	JOG-	JOG movement (- direction)	B14	END	<ul style="list-style-type: none"> • Zone output • Personal zone output • MANUAL mode status • Return-to-origin end status • NEAR output • Movement-in-progress • Push status • Warning output
A15	MANUAL	MANUAL mode	B15	/ALM	Operation-in-progress
A16	ORG	Return-to-origin	B16	SRV-S	Operation-end
A17	/LOCK	Interlock	B17	NC	Alarm
A18	START	Start	B18	NC	Servo status
A19	RESET	Reset	B19	-COM	I/O power input, negative common (0V)
A20	SERVO	Servo ON	B20		

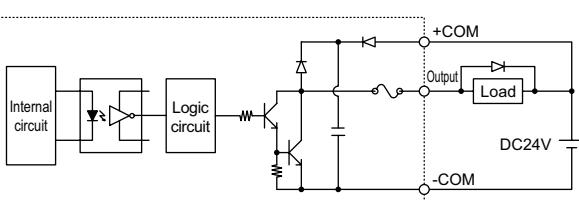
NPN type I/O circuit details

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)

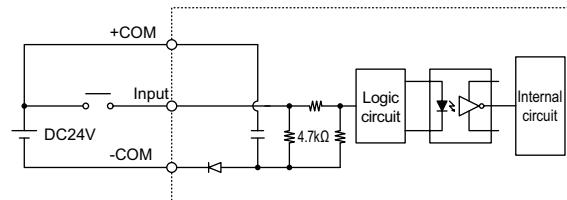
Output circuit



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

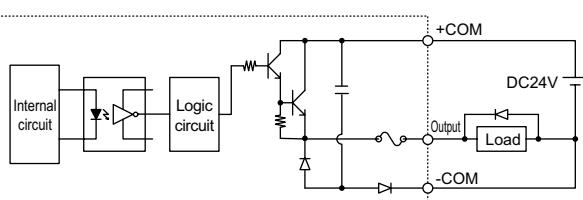
PNP type I/O circuit details

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

The icons indicated at the right end show the controllers that each component can use.

● Power connector

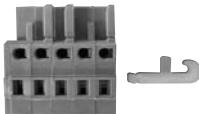


Model KCC-M4421-00

TS-S2
TS-SH
TS-SD

● Power connector (AC100V specifications)

Included when 100V model is purchased

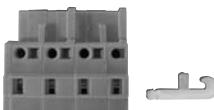


Model KCA-M5382-00

TS-X
TS-P

● Power connector (AC200V specifications)

Included when 200V model is purchased



Model KAS-M5382-00

LCC140
TS-X
TS-P
SR1-X
SR1-P
RCX320
RCX340/341

● EXT connector

For braking power and safety circuit connections.



Model KCA-M5370-00

TS-X
TS-P

● Dummy connector



Model KCA-M5163-00

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

● I/O cables (2m/20-core×2)



Model KCA-M4421-20

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

● Absolute battery

● Absolute battery basic specifications

Item	For TS-X	For TS-SH
Battery type	Lithium metallic battery	
Battery capacity	3.6V / 1,650mAh	3.6V / 2,700mAh
Data holding time	About 1 year (in state with no power applied)	
Dimensions	φ18 × L60mm	φ17 × L53mm
Weight	24g	21g



For TS-X



For TS-SH

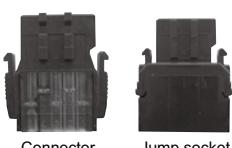
Model KCA-M53G0-10 (For TS-X)
KCA-M53G0-02 (For TS-SH)

TS-X
TS-SH
RCX320
RCX340/341
RCX3-SMU

Note. The absolute battery is subject to wear and requires replacement.
 If trouble occurs with the memory then remaining battery life is low so replace the absolute battery. The battery replacement period depends on usage conditions. But generally you should replace the battery after about 1 year counting the total time after connecting to the controller and left without turning on the power.

● CC-Link connector (CC-Link specifications)

Included when CC-Link model is purchased



Model Connector Note: KCA-M4872-00
Jump socket KCA-M4873-00

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

Note. This is a single connector type. (Insert two connectors into a branching socket.)

See next page for optional parts



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

■ Options

The icons indicated at the right end show the controllers that each component can use.

- Handy terminal HT1/HT1-D

P.656



	HT1	HT1-D
Model	3.5m 10m	KCA-M5110-0J KCA-M5110-6J
Enable switch	–	3-position
CE marking	Not supported	Applicable

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

- Support software TS-Manager

P.648



Model	KCA-M4966-0J (Japanese) KCA-M4966-0E (English)
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TS-S2
TS-SH
TS-X
TS-P
TS-SD

TS-Manager environment

OS	Windows 2000, XP (32bit), Vista, 7, 8 / 8.1, 10 (Supported version: V.1.4.5 or later) 11 (Supported version: V.1.4.5 or later)
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
Applicable controllers	TS series

Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.

- Data cables

Communication cable for TS-Manager.
Select from USB cable or D-sub cable.



Model	USB type (5m) D-Sub type (5m)	KCA-M538F-A0 KCA-M538F-01
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Note. USB driver for communication cable can also be downloaded from our website.

TS-S2
TS-SH
TS-X
TS-P
TS-SD

- Daisy chain and gateway connection cable



Model	KCA-M532L-00 (300mm)
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TS-S2
TS-SH
TS-X
TS-P
TS-SD

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



Model	KCA-M4874-00
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TS-S2
TS-SH
TS-X
TS-P

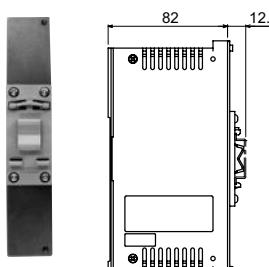
- TS-Monitor (LCD monitor) P.660



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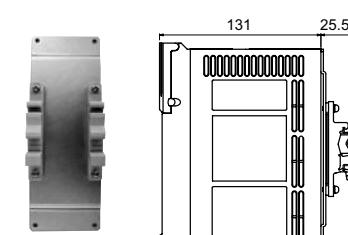
TS-X
TS-P

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



Model	For TS-S2
	KCC-M499A-00

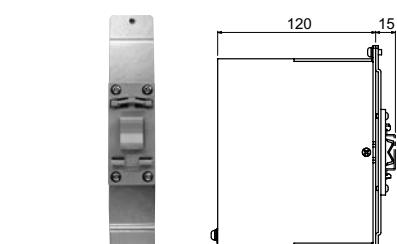
TS-S2



Model	For TS-X / TS-P
	KCA-M499A-00

TS-X

TS-P



Model	For TS-X / TS-P with RGT
	KCA-M499A-10

TS-X
TS-P