

SCARA ROBOT

TOSHIBA MACHINE

Wide Variations, Fast Motion and Heavy Duty

SCARA ROBOT TH SERIES

 Safety warnings

- Before using, read through and completely understand the appropriate instruction manuals.
- The contents of this catalog may be subject to change without prior notice.

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Compact
SCARA ROBOT
TH180, TH250A, TH350A



High-Speed and High-Cycle
SCARA ROBOT
THP550, THP700



High-Speed
and High-Precision SCARA ROBOT
TH450A, TH550A



High Payload Mass SCARA ROBOT
TH650A, TH850A,
TH1050A, TH1200A

The TH series, Flexible and Fast Manoeuvre of Time-Space

SCARA ROBOT

High-performance evolution in Horizontal multi-joint type robot, TH series. Eight arm-length varieties with distinctive characteristics and featuring many convenient functionalities to suit a broad range of applications.

Full line-up: From small to large range to meet a wide range of applications.

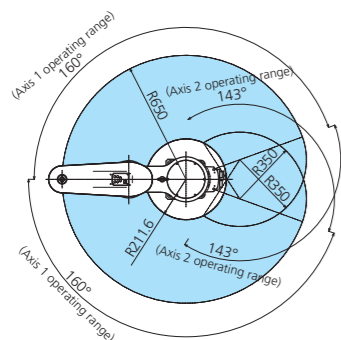
Model	Arm length	Z-axis stroke	Max. speed (Composite)	Model	Arm length	Z-axis stroke	Max. speed (Composite)
TH180	180 mm	120 mm	2 kg	TH650A	650 mm	200 mm	10 kg
TH250A	250 mm	120 mm	3 kg	TH850A	850 mm	200 mm	20 kg
TH350A	350 mm	120 mm	3 kg	TH1050A	1050 mm	200 mm	20 kg
TH450A	450 mm	150 mm	5 kg	TH1200A	1200 mm	200 mm	20 kg
TH550A	550 mm	150 mm	5 kg	THP550	550 mm	150 mm	2 kg
				THP700	700 mm	150 mm	10 kg

High speed: Fast motion for improved efficiency.

Model	Standard cycle time	Load	Max. speed (Composite)	Model	Standard cycle time	Load	Max. speed (Composite)
TH180	0.35 s	1 kg	2.6 m/s	TH650A	0.31 s	2 kg	7.52 m/s
TH250A	0.41 s	1 kg	3.53 m/s	TH850A	0.39 s	2 kg	8.13 m/s
TH350A	0.41 s	1 kg	3.24 m/s	TH1050A	0.39 s	2 kg	9.15 m/s
TH450A	0.30 s	2 kg	7.3 m/s	TH1200A	0.57 s	2 kg	7.9 m/s
TH550A	0.30 s	2 kg	6.2 m/s	THP550	0.29 s	1 kg	6.21 m/s
				THP700	0.345 s	1 kg	7.8 m/s

Wide Working Envelope

Working envelopes are widened to maximum to allow for maximum freedom in system layout.



Working Envelope of TH650A

Diversity in Standard Features

- **Wiring and piping for user-side devices:** Wiring and piping for end-effector control are built in the arm.
- **Z-axis brake release switch:** The Z-axis brake release switch is located on the arm for quick, one-touch operation.
- **7-segment display:** Error code, program step number, customized data such as process count are displayed on the controller operation panel.
- **Torque control:** Compliant to external force or obstruction, to protect workpieces and end-effectors, and for press-in work.
- **Constant speed:** Constant speed along the motion path. Effective in such applications as sealing.
- **Multi-task:** Robot motion program and I/O signals (peripheral) handling are executed in parallel, for more interactions and better time efficiency.
- **PLC function:** A built-in PLC to control peripheral equipment and touch-sensitive panel connection.

Field Networks (optional)

Various field network protocols are available, for high-speed communication and resulting in reductions in wiring. For the Ethernet (not supported by T51000), CC-Link, DeviceNet and Profibus, please request detailed manuals.

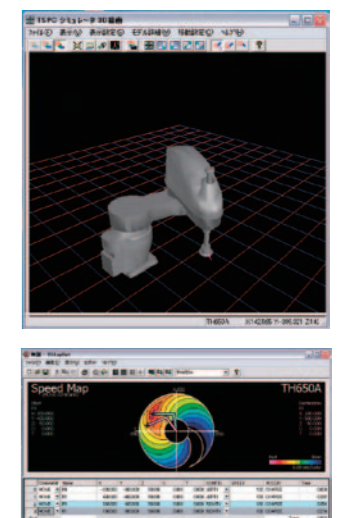
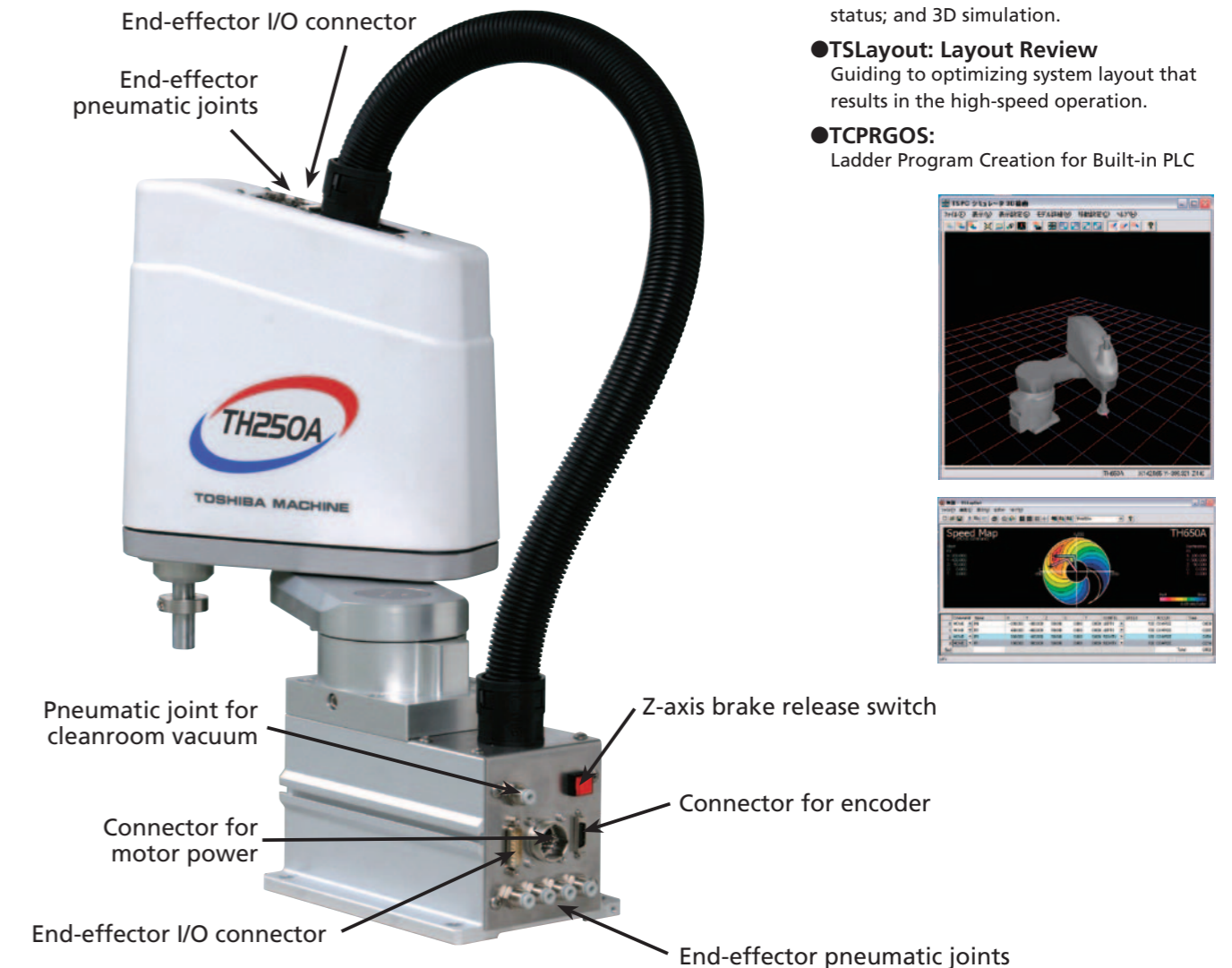
Convenient Optional Features

Option Model	Z-axis long stroke(-Z)	Protective Bellows for Z-Axis(-B)	Z-axis Cap(-C)	Ceiling-mount type(-T)	Safety Category3	Cable Extension(Max.)	Dust and Splash-Proof	Tool Flange for End Effectors Mounting	Additional 5th axis	Cleanroom Design (-CR,-CRB)
TH180	—	—	—	—	—	10 m	—	○	—	CR
TH250A	—	—	—	—	—	10 m	—	○	—	CR, CRB
TH350A	—	—	—	○	—	10 m	—	○	—	CR, CRB
TH450A	300 mm	○	○	○	○	25 m	○	○	○	CRB
TH550A	300 mm	○	○	○	○	25 m	○	○	○	CRB
TH650A	400 mm	○	○	○	○	25 m	○	standard	○	CRB
TH850A	400 mm	○	○	—	○	25 m	○	standard	○	CRB
TH1050A	400 mm	○	○	○	○	25 m	○	standard	○	CRB
TH1200A	400 mm	○	○	—	○	25 m	—	standard	○	—
THP550	300 mm	○	○	○	○	25 m	○	○	○	CRB
THP700	300 mm	○	○	—	○	25 m	○	○	—	CRB

*See page 21 for details on the options.

Supportive Software

- **TSPC: Programming Support** Program editor, grammar and syntax check, and file transfer; simple operations such as program selection and execution; Real-time monitors of variables and I/O status; and 3D simulation.
- **TSLAYOUT: Layout Review** Guiding to optimizing system layout that results in the high-speed operation.
- **TCPRGOS:** Ladder Program Creation for Built-in PLC



Compact SCARA Robot

Arm Length 180mm-350mm



High Payload Mass SCARA Robot

Arm Length 850mm-1200mm



High-Speed and High-Precision SCARA Robot

Arm Length 450mm-550mm



High-Speed and High-Cycle SCARA Robot

Arm Length 550mm-700mm

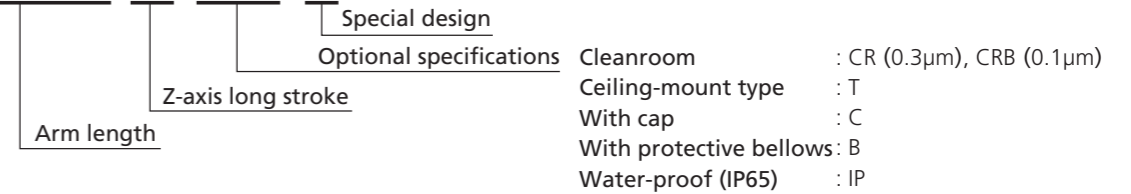


*For detailed specifications, see the respective model specifications (pages 10-21).

Model	TH180	TH250A	TH350A	TH450A	
Arm length (1st arm + 2nd arm)	180 mm (70+110)	250 mm (125+125)	350 mm (225+125)	450 mm (200+250)	
Working Envelope	Axis 1	±115°	±115°	±120°	
	Axis 2	±140°	±140°	±145°	
	Axis 3	120 mm	120 mm	120 mm	150 mm / 300 mm
	Axis 4	±360°	±360°	±360°	±360°
Maximum Speed	Axis 1	533°/s	540°/s	337.5°/s	600°/s
	Axis 2	480°/s	540°/s	540°/s	600°/s
	Axis 3	1013 mm/s	1120 mm/s	1120 mm/s	2000 mm/s
	Axis 4	1186°/s	1143°/s	1143°/s	2000°/s
Composite	2.6 m/s	3.53 m/s	3.24 m/s	7.3 m/s	
Standard Cycle Time	0.35 s (With 1 kg load)*1	0.41 s (With 1 kg load)*2	0.41 s (With 1 kg load)*2	0.30 s (With 2 kg load)*2	
Maximum Payload Mass	2 kg	3 kg	3 kg	5 kg	
Allowable Moment of Inertia	0.01 kg · m ² *3	0.017 kg · m ² *3	0.017 kg · m ² *3	0.06 kg · m ² *3	
Positioning Repeatability*4	X · Y	±0.01 mm	±0.01 mm	±0.01 mm	±0.01 mm
	Z	±0.01 mm	±0.01 mm	±0.01 mm	±0.01 mm
	Axis 4	±0.005°	±0.005°	±0.005°	±0.005°
	Axis 4	±0.005°	±0.005°	±0.005°	±0.005°
Wiring and Pneumatic Piping for Hand	5 Inputs / 4 Outputs, φ4x4 pcs.			8 Inputs / 8 Outputs, φ4x4 pcs.*5	
Cable Length	3 m (optional: max. 10 m)	3 m (optional: max. 10 m)	3 m (optional: max. 10 m)	5 m (optional: max. 25 m)	
Mass	9 kg	14 kg	14 kg	26 kg	
Controller	TS1000	TS1000	TS1000	TS3000	

Order model code

TH450A-Z-CR-S



*For details on the corresponding options, see the correspondence table in page 3.

Model	TH550A	TH650A	TH850A	TH1050A	
Arm length (1st arm + 2nd arm)	550 mm (300+250)	650 mm (300+350)	850 mm (350+500)	1050 mm (550+500)	
Working Envelope	Axis 1	±120°	±160°	±160°	
	Axis 2	±145°	±143°	±145°	
	Axis 3	150 mm / 300 mm	200 mm / 400 mm	200 mm / 400 mm	200 mm / 400 mm
	Axis 4	±360°	±360°	±360°	±360°
Maximum Speed	Axis 1	375°/s	340°/s	300°/s	300°/s
	Axis 2	600°/s	600°/s	420°/s	420°/s
	Axis 3	2000 mm/s	2050 mm/s	2050 mm/s	2050 mm/s
	Axis 4	2000°/s	1700°/s	1200°/s	1200°/s
Composite	6.2 m/s	7.52 m/s	8.13 m/s	9.15 m/s	
Standard Cycle Time	0.30 s (With 2 kg load)*2	0.31 s (With 2 kg load)*2	0.39 s (With 2 kg load)*2	0.39 s (With 2 kg load)*2	
Maximum Payload Mass	5 kg	10 kg	20 kg	20 kg	
Allowable Moment of Inertia	0.06 kg · m ² *3	0.1 kg · m ² *3	0.2 kg · m ² *3	0.2 kg · m ² *3	
Positioning Repeatability*4	X · Y	±0.01 mm	±0.01 mm	±0.01 mm	±0.01 mm
	Z	±0.01 mm	±0.01 mm	±0.01 mm	±0.01 mm
	Axis 4	±0.005°	±0.004°	±0.004°	±0.004°
	Axis 4	±0.005°	±0.004°	±0.004°	±0.004°
Wiring and Pneumatic Piping for Hand	8 Inputs / 8 Outputs, φ4x4 pcs.*5		5 Inputs / 4 Outputs, φ6x4 pcs.*5		
Cable Length	5 m (optional: max. 25 m)				
Mass	28 kg	52 kg	76 kg	80 kg	
Controller	TS3000	TS2100	TS2100	TS2100	

Model	TH1200A	THP550	THP700	
Arm length (1st arm + 2nd arm)	1200 mm (700+500)	550 mm (300+250)	700 mm (350+350)	
Working Envelope	Axis 1	±160°	±120°	±120°
	Axis 2	±145°	±145°	±145°
	Axis 3	200 mm / 400 mm	150 mm / 300 mm	150 mm / 300 mm
	Axis 4	±360°	±360°	±360°
Maximum Speed	Axis 1	240°/s	375°/s	340°/s
	Axis 2	330°/s	600°/s	600°/s
	Axis 3	1800 mm/s	2000 mm/s	2050 mm/s
	Axis 4	1000°/s	2000°/s	1800°/s
Composite	7.9 m/s	6.21 m/s	7.8 m/s	
Standard Cycle Time	0.57 s (With 2 kg load)*2	0.29 s (With 1 kg load)*2	0.345 s (With 2 kg load)*2	
Maximum Payload Mass	20 kg	2 kg	10 kg	
Allowable Moment of Inertia	0.2 kg · m ² *3	0.01 kg · m ² *3	0.1 kg · m ² *3	
Positioning Repeatability*4	X · Y	±0.03 mm	±0.015 mm	±0.02 mm
	Z	±0.02 mm	±0.01 mm	±0.02 mm
	Axis 4	±0.005°	±0.02°	±0.02°
	Axis 4	±0.005°	±0.02°	±0.02°
Wiring and Pneumatic Piping for Hand	5 Inputs / 4 Outputs, φ6x4 pcs.	8 Inputs / 8 Outputs, φ4x4 pcs.	8 Inputs / 8 Outputs, φ4x6 pcs.	
Cable Length	5 m (optional: max. 25 m)			
Mass	83 kg	26 kg	57 kg	
Controller	TS3100	TS3000	TS3100	

Standard cycle time motion pattern (coarse positioning)

*1: Horizontal 100 mm, vertical 25mm, round-trip *2: Horizontal 300 mm, vertical 25mm, round-trip Continuous operation is not possible beyond the effective load ratio.

Allowable moment of inertia

*3: Acceleration/deceleration rates may be limited according to the motion pattern, load mass and amount of offset.

Positioning repeatability

*4: The table shows unidirectional positioning repeatability at constant ambient temperature, but NOT absolute positioning accuracy.

*5: The table shows the number of input and output points of the hand wiring for the standard controller. For other details, see the respective specification pages.

Controller



Controller



Controller Specifications

SCARA Model	Controller Model	TS1000	TS2000	TS2100	TS3000	TS3100	TS2000L
TH180A		A					
TH250A		A					
TH350A		A					
TH450A			B*1		A		
TH550A			B*1		A		
TH650A			B*2	A		B	
TH850A			B*2	A		B	
TH1050A			B*2	A		B	
TH1200A						A	
THP550					A		
THP700						A	

A: Standard combination
 B: Optional combination
 *1: The servo capacity is not changed, but cycle time is slightly reduced. In addition, note that the number of input and output points is changed.
 *2: The servo capacity is decreased, so low acceleration causes a reduction in cycle time. In addition, note that the number of input and output points is changed.

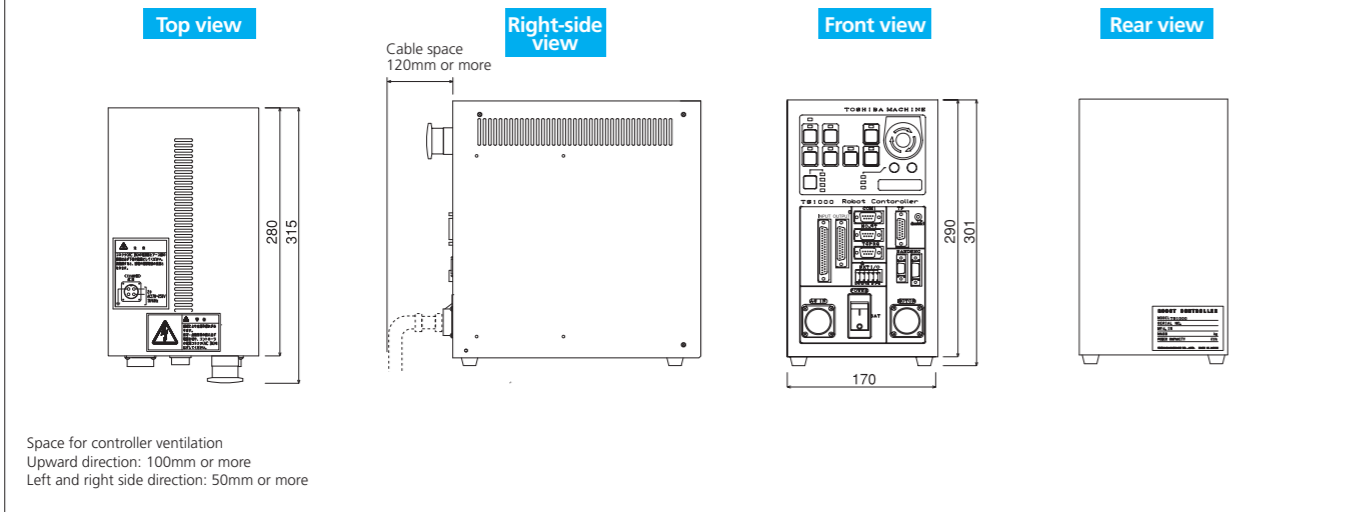
Controller Specifications

Model	TS1000	TS2000	TS2100
No. of Controlled Axes	Standard 4 axes (Maximum 5 axes: TS2000/TS2100)		
Motion Modes	PTP (point-to-point), CP (Continuous Path; Linear, Circular), Short-Cut, Arch Motion		
Position Detection	Absolute Encoders		
Storage Capacity	Approx. Total: 6400 points + 12800 steps 1program: 2000 points + 3000 steps		
No. of Registrable Programs	Maximum 256 (247 user files + 9 system files)		
Programming Language	SCOL (similar to BASIC)		
Teaching Unit	Teach pendant TP1000: Cable length 5m / Programming support PC software TSPC also available		
External I/O Signals	16 inputs / 16 outputs 8/8 can be assigned to system signals.	31+7 inputs / 22+10 outputs 7/10 can be assigned to system signals.	
Hand Control Signal	5 inputs / 4 outputs		
External Operation Signal	Input: cycle operation mode, start, stop, program reset, etc. Output: Servo ON, operation ready, fault, etc.		
Serial Communication Ports	RS232C: 2 ports		
Power Supply and Capacity	Single phase, AC190 V-250 V, 50/60 Hz, 1.1 kVA	Single phase, AC190 V-250 V, 50/60 Hz, 2.3 kVA	Three-phase, AC190 V-250 V, 50/60 Hz, 3.5-4.4 kVA**
Outer Dimensions and Mass	170W×290H×280D (mm) / 10 kg	290W×230H×280D (mm) / 12 kg	420W×230H×300D (mm) / 16 kg
Other Functions	Interruption processing, robot motion ON signal, communication processing, arithmetic operation, torque limit, PLC, self-diagnosis, etc.		
PC Software for Programming Support (optional)	TSPC: Program editor, teaching, remote operation TCPGOS: PLC sequence program creation (Supporting OS: Windows2000, WindowsXP)		
Options	Conveyor synchronization (not supported by TS1000), Additional I/O, I/O cable, position date latch function, smooth (constant speed) function, separated operation panel, network (Ethernet: Not supported by TS1000, CC-Link, DeviceNet, Profibus), CE-compliant		

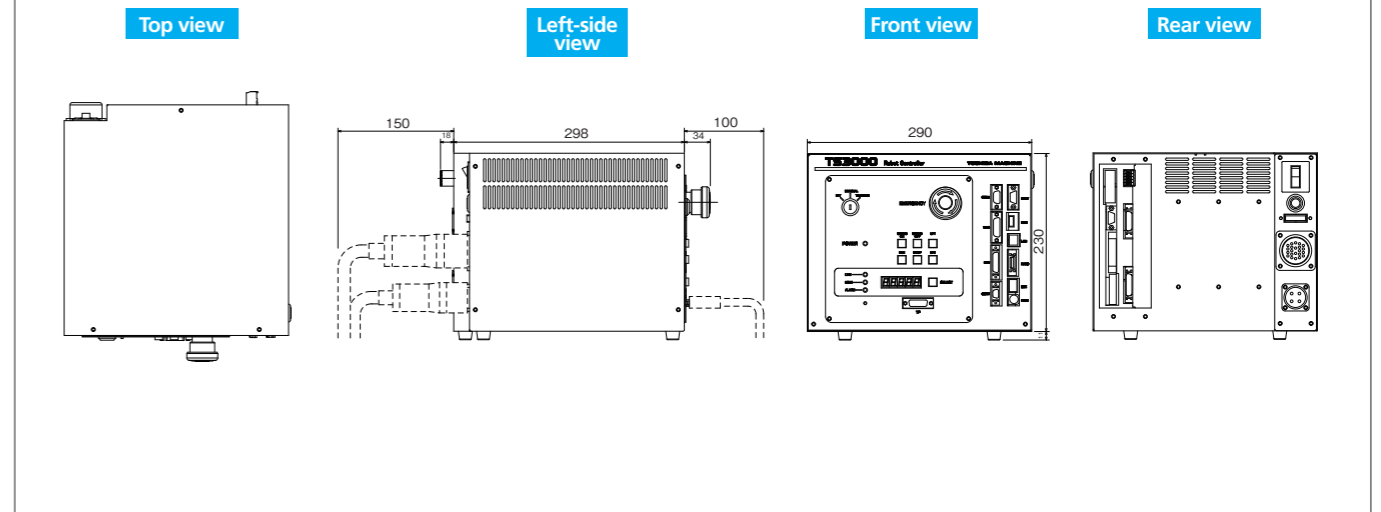
Model	TS3000	TS3100
No. of Controlled Axes	Standard 4 axes (Maximum 5 axes)	No. of simultaneously controlled axes: 8 axes (2 additional axes under development)
Motion Modes	PTP (point-to-point), CP (Continuous Path; Linear, Circular), Short-Cut, Arch Motion	
Position Detection	Absolute Encoders	
Storage Capacity	Approx. Total: 6400 points + 12800 steps 1program: 2000 points + 3000 steps	
No. of Registrable Programs	Maximum 256 (247 user files + 9 system files)	
Programming Language	SCOL (similar to BASIC)	
Teaching Unit	Teach pendant TP1000: Cable length 5m / Programming support PC software TSPC also available	
External I/O Signals	32 inputs / 32 outputs	
Hand Control Signal	8 inputs / 8 outputs	
External Operation Signal	Input: cycle operation mode, start, stop, program reset, etc. Output: Servo ON, operation ready, fault, etc.	
Serial Communication Ports	RS232C: (HOST and COM1), RS232C: (TCPG and POD), RS485: additional I/O (Max. 64 inputs and outputs), RS422: teach pendant, Ethernet: 10 Mbps	
Power Supply and Capacity	Single phase, AC200 V-240 V, 50/60 Hz, 4.8 kVA	Single phase, AC200 V-240 V, 50/60 Hz, 3.5-4.8 kVA**
Outer Dimensions and Mass	290W×230H×298D (mm) / 13 kg	420W×230H×298D (mm) / 17 kg
Other Functions	Interruption processing, robot motion ON signal, communication processing, arithmetic operation, torque limit, PLC, self-diagnosis, etc.	
PC Software for Programming Support (optional)	TSPC: Program editor, teaching, remote operation TCPGOS: PLC sequence program creation (Supporting OS: Windows2000, WindowsXP)	
Options	Conveyor synchronization, Additional I/O, I/O cable, position date latch function, smooth (constant speed) function, separated operation panel, network (Ethernet: Not supported by TS1000, CC-Link, DeviceNet, Profibus), CE-compliant	

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 -Ethernet is a registered trademark of XEROX Corp. in the U.S.A.
 -CC-Link is a registered trademark of CC-Link Partner Association.
 -DeviceNet is a registered trademark of ODVA.
 -Profibus is a registered trademark of Profibus User Organization.
 *1: The power capacity varies depending on the model of the robot.

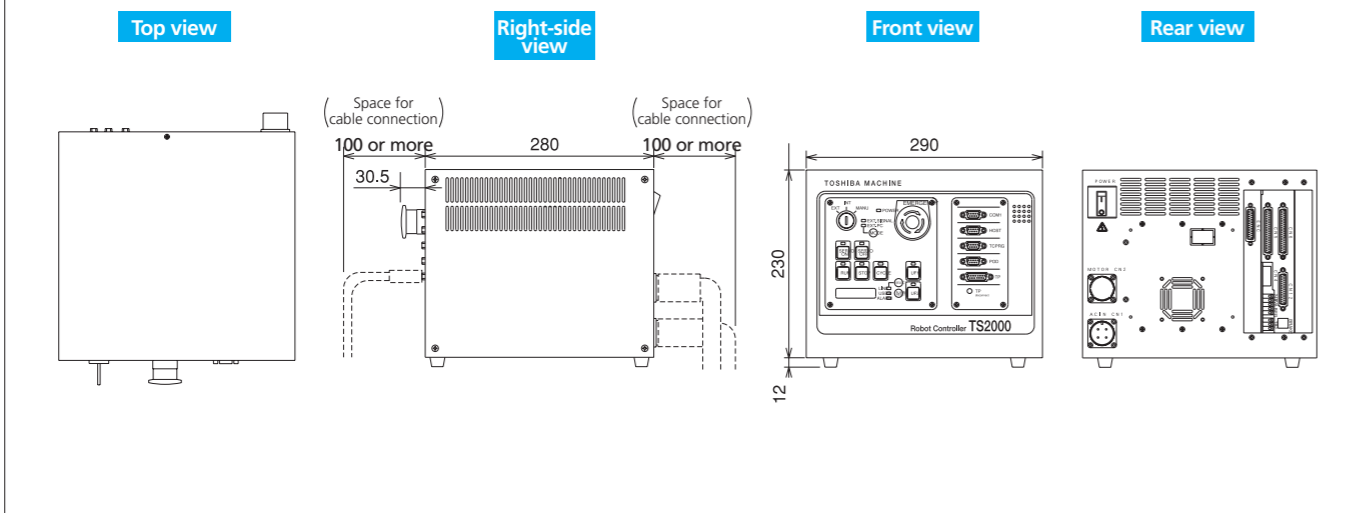
TS1000



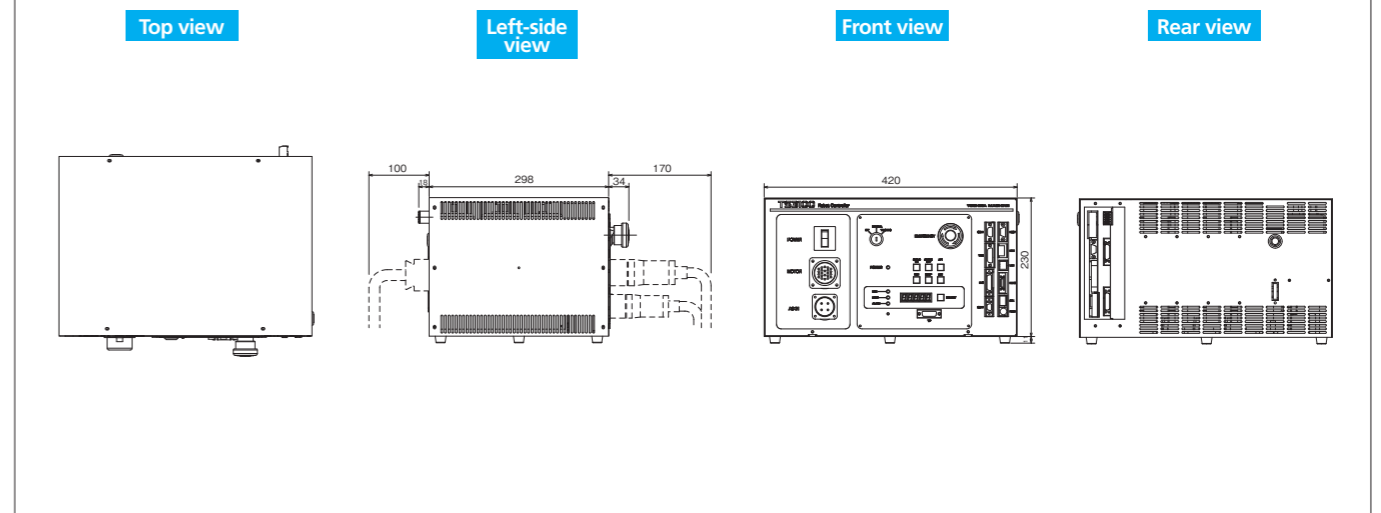
TS3000



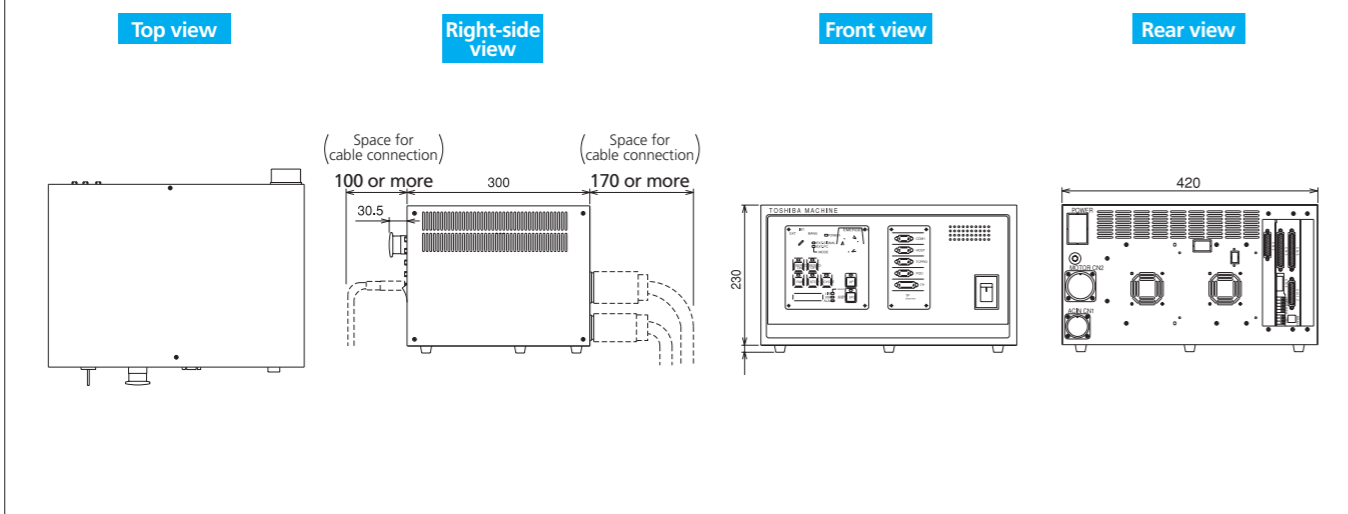
TS2000



TS3100



TS2100



Compact SCARA robot TH350A

High-Speed and High-Precision SCARA Robot TH450A



Model	TH350A	
Type	Horizontal multi-joint	
No. of controlled axes	4	
Arm length	350 mm (225 mm+125 mm)	
Working envelope	Axis 1	±115°
	Axis 2	±145°
	Axis 3 (Z-axis)	120 mm
	Axis 4 (Z-axis rotation)	±360°
Maximum speed	Axis 1	337.5°/s
	Axis 2	540°/s
	Axis 3 (Z-axis)	1120 mm/s
	Axis 4 (Z-axis rotation)	1143°/s
	Composite	3.24 m/s
Standard cycle time (with 1kg load)	0.41 s ^{*2}	
Maximum payload mass	3 kg	
Allowable moment of inertia	0.017 kgm ² ^{*3}	
Positioning repeatability	X-Y	±0.01 mm ^{*4}
	Axis 3 (Z-axis)	±0.01 mm ^{*4}
	Axis 4 (Z-axis rotation)	±0.005° ^{*4}
Hand wiring	5 inputs / 4 outputs	
Hand piping	4 pcs. (φ4)	
Robot controller cable	3 m (optional: max. 10 m)	
Mass	14 kg	

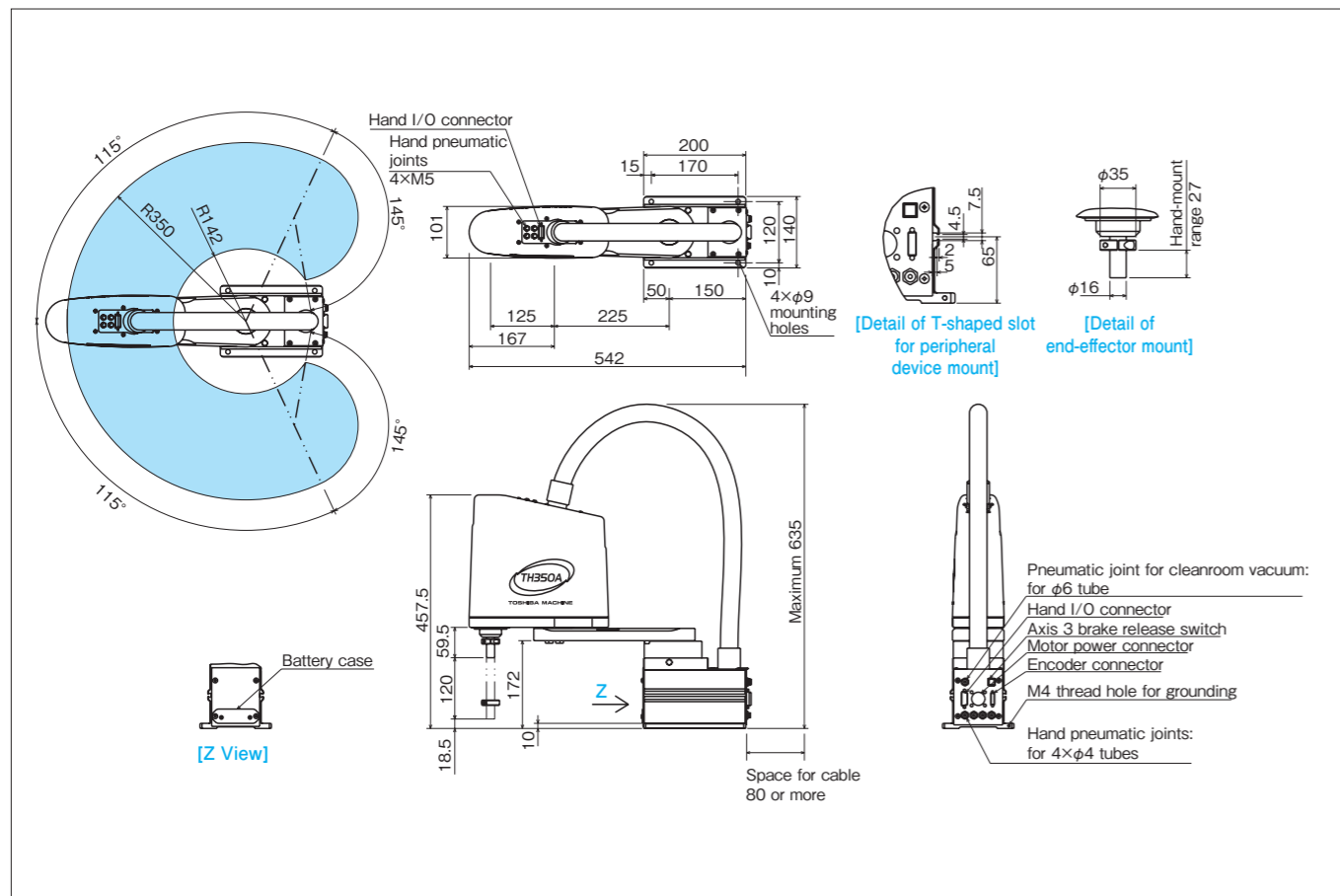
■ For *2, *3 and *4, see page 5.



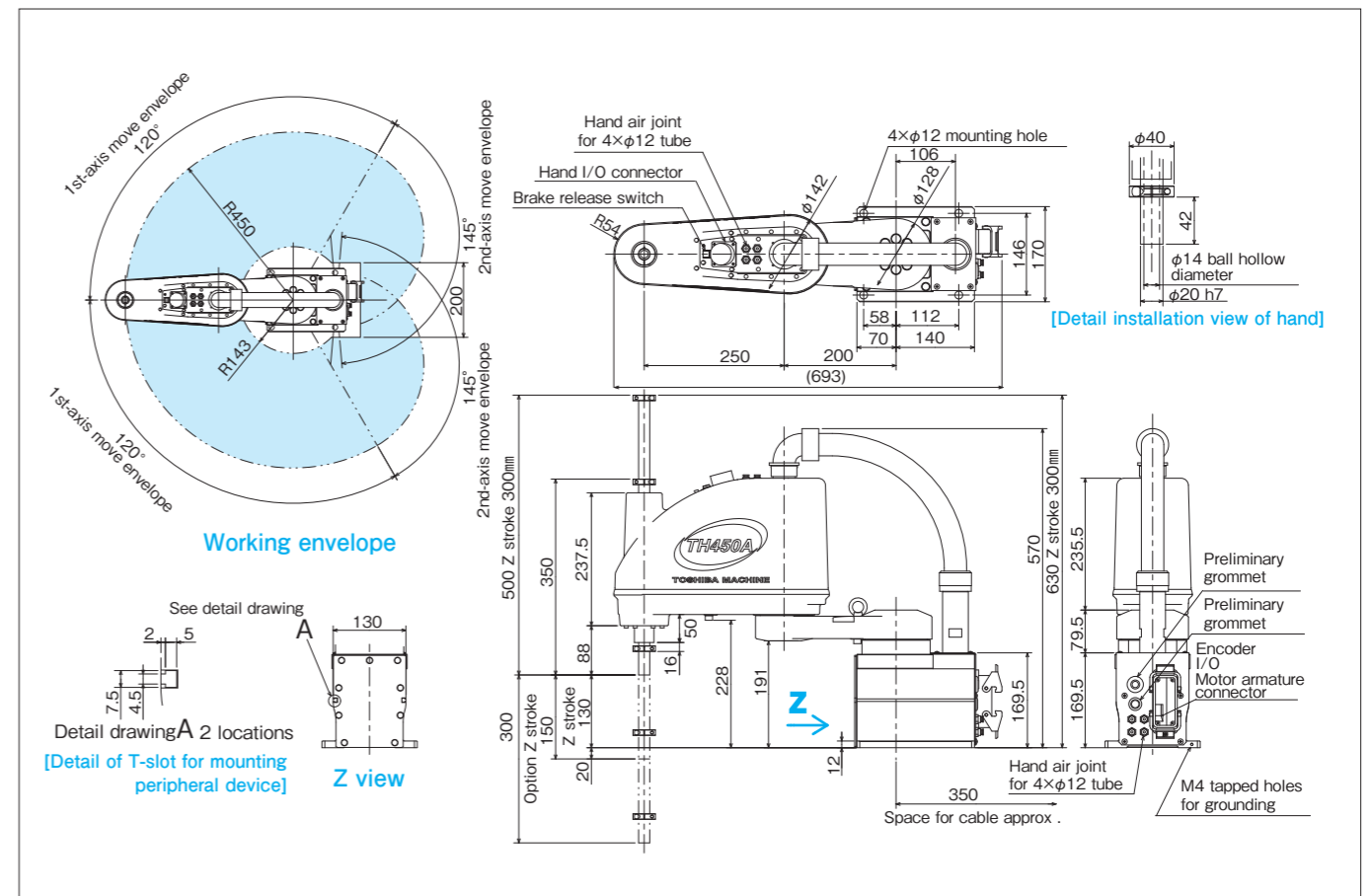
Model	TH450A	
Type	Horizontal multi-joint	
No. of controlled axes	4	
Arm length	450 mm (200 mm+250 mm)	
Working envelope	Axis 1	±120°
	Axis 2	±145°
	Axis 3 (Z-axis)	150 mm (optional: 300 mm)
	Axis 4 (Z-axis rotation)	±360°
Maximum speed	Axis 1	600°/s
	Axis 2	600°/s
	Axis 3 (Z-axis)	2000 mm/s
	Axis 4 (Z-axis rotation)	2000°/s
	Composite	7.3 m/s
Standard cycle time (with 2kg load)	0.30 s (0.33 s) ^{*2}	
Maximum payload mass	5 kg	
Allowable moment of inertia	0.06 kgm ² ^{*3}	
Positioning repeatability	X-Y	±0.01 mm ^{*4}
	Axis 3 (Z-axis)	±0.01 mm ^{*4}
	Axis 4 (Z-axis rotation)	±0.005° ^{*4}
Hand wiring	8 inputs / 8 outputs (5 inputs / 4 outputs)	
Hand piping	4 pcs. (φ4)	
Position detection	Absolute	
Robot controller cable	5 m (optional: max. 25 m)	
Mass	26 kg	

■ This model can be used with the controller TS2000 or TS3000.
For the combinations of the models and controllers, see the table in page 6.
■ The values in parentheses are applied when the controller TS2000 is used.
■ For *2, *3 and *4, see page 5.

External view



External view



High-Speed and High-Precision SCARA Robot TH550A

High payload mass type SCARA robot TH650A



Model	TH550A	
Type	Horizontal multi-joint	
No. of controlled axes	4	
Arm length	550 mm (300 mm+250 mm)	
Working envelope	Axis 1	±120°
	Axis 2	±145°
	Axis 3 (Z-axis)	150 mm (optional: 300 mm)
	Axis 4 (Z-axis rotation)	±360°
Maximum speed	Axis 1	375°/s
	Axis 2	600°/s
	Axis 3 (Z-axis)	2000 mm/s
	Axis 4 (Z-axis rotation)	2000°/s
Composite	6.2 m/s	
Standard cycle time (with 2kg load)	0.30 s (0.33 s) *2	
Maximum payload mass	5 kg	
Allowable moment of inertia	0.06 kgm ² *3	
Positioning repeatability	X-Y	±0.01 mm *4
	Axis 3 (Z-axis)	±0.01 mm *4
Axis 4 (Z-axis rotation)	±0.005° *4	
Hand wiring	8 inputs / 8 outputs (5 inputs / 4 outputs)	
Hand piping	4 pcs. (φ4)	
Position detection	Absolute	
Robot controller cable	5m (optional: Max. 25 m)	
Mass	28 kg	

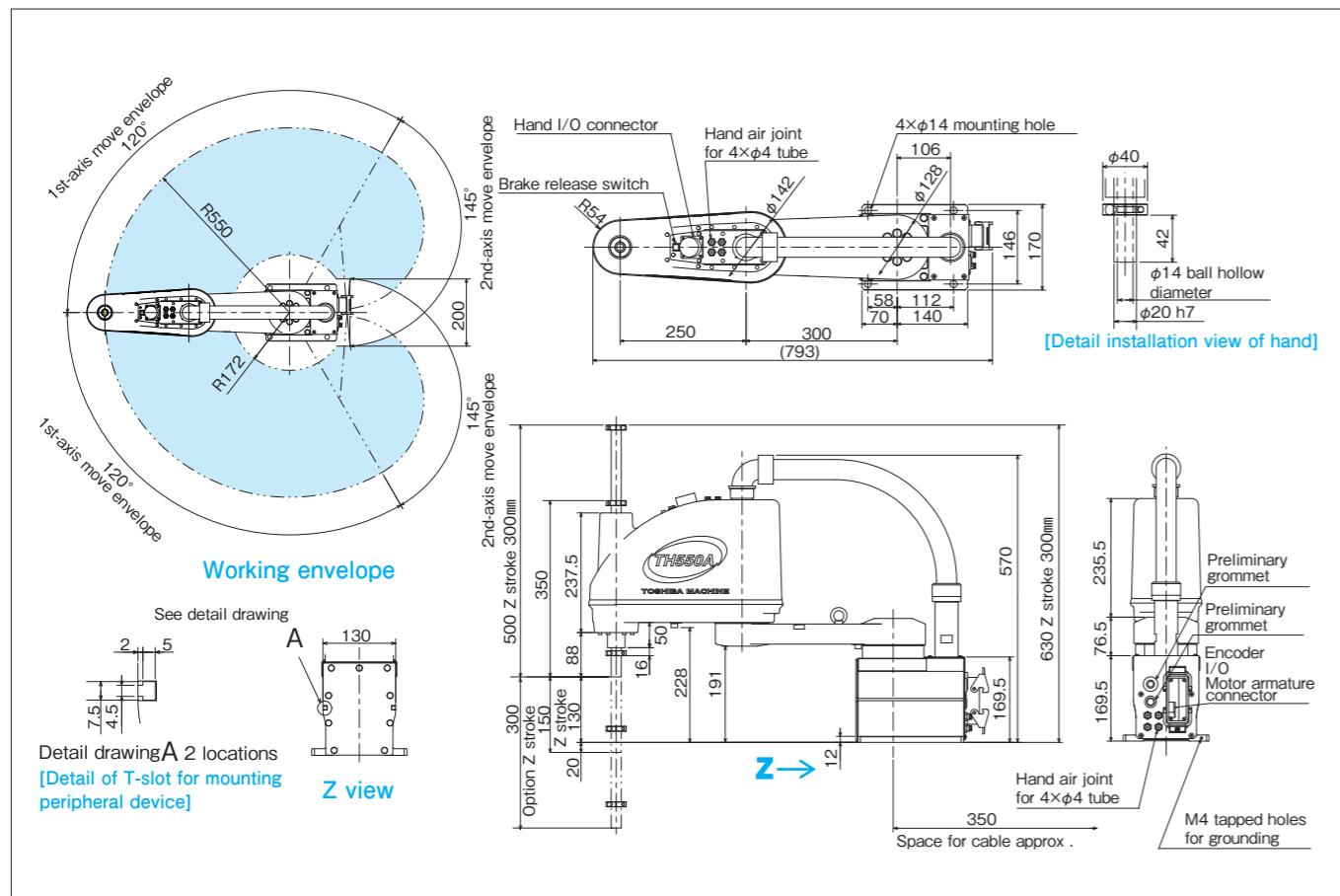
- This model can be used with the controller TS2000 or TS3000. For the combinations of the models and controllers, see the table in page 6.
- The values in parentheses are applied when the controller TS2000 is used.
- For *2, *3 and *4, see page 5.



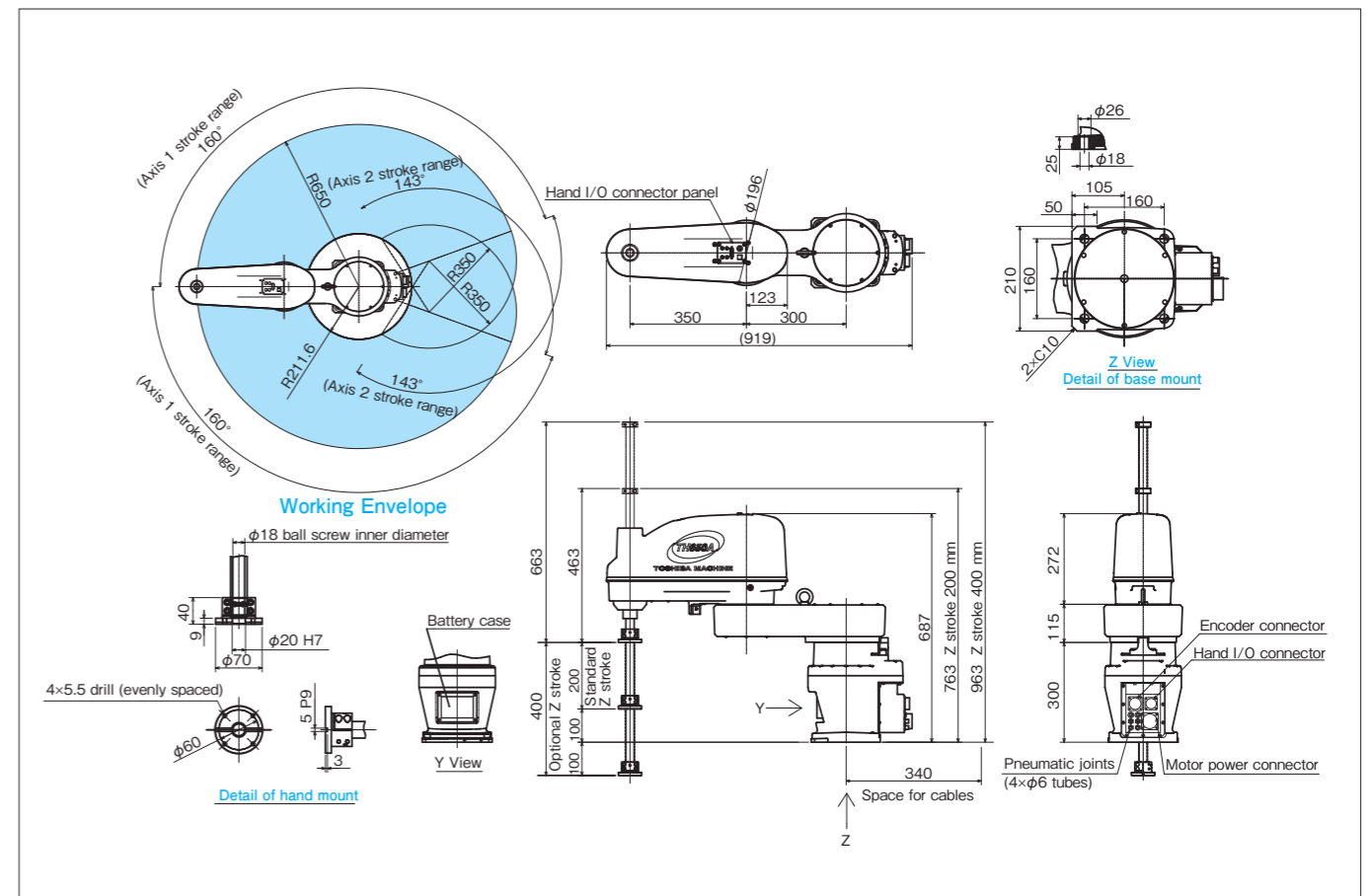
Model	TH650A	
Type	Horizontal multi-joint	
No. of controlled axes	4	
Arm length	650 mm (300 mm+350 mm)	
Working envelope	Axis 1	±160°
	Axis 2	±143°
	Axis 3 (Z-axis)	200 mm (optional: 400 mm)
	Axis 4 (Z-axis rotation)	±360°
Maximum speed	Axis 1	340°/s
	Axis 2	600°/s
	Axis 3 (Z-axis)	2050 mm/s
	Axis 4 (Z-axis rotation)	1700°/s
Composite	7.52 m/s	
Standard cycle time (with 1kg load)	0.31 s (0.36 s) *2	
Maximum payload mass	10 kg	
Allowable moment of inertia	0.1 kgm ² *3	
Positioning repeatability	X-Y	±0.01 mm *4
	Axis 3 (Z-axis)	±0.01 mm *4
Axis 4 (Z-axis rotation)	±0.004° *4	
Hand wiring	5 inputs / 4 outputs	
Hand piping	4 pcs. (φ6)	
Position detection	Absolute	
Robot controller cable	5 m (optional: max. 25 m)	
Mass	52 kg	

- This model can be used with the controller TS2000 or TS2100 or TS3100. For the combinations of the models and controllers, see the table in page 6.
- The values in parentheses are applied when the controller TS2000 is used.
- For *2, *3 and *4, see page 5.

External view



External view



High payload mass type SCARA robot TH850A

High payload mass type SCARA robot TH1050A



Model		TH850A
Type		Horizontal multi-joint
No. of controlled axes		4
Arm length		850 mm (350 mm+500 mm)
Working envelope	Axis 1	±160°
	Axis 2	±145°
	Axis 3 (Z-axis)	200 mm (optional: 400 mm)
	Axis 4 (Z-axis rotation)	±360°
Maximum speed	Axis 1	300°/s
	Axis 2	420°/s
	Axis 3 (Z-axis)	2050 mm/s (2000 mm/s)
	Axis 4 (Z-axis rotation)	1200°/s
Composite		8.13 m/s
Standard cycle time (with 2kg load)		0.39 s (0.45 s) *2
Maximum payload mass		20 kg
Allowable moment of inertia		0.2 kgm ² *3
Positioning repeatability	X-Y	±0.01 mm *4
	Axis 3 (Z-axis)	±0.01 mm *4
	Axis 4 (Z-axis rotation)	±0.004° *4
Hand wiring		5 inputs / 4 outputs
Hand piping		4 pcs. (φ6)
Position detection		Absolute
Robot controller cable		5 m (optional: max. 25 m)
Mass		76 kg

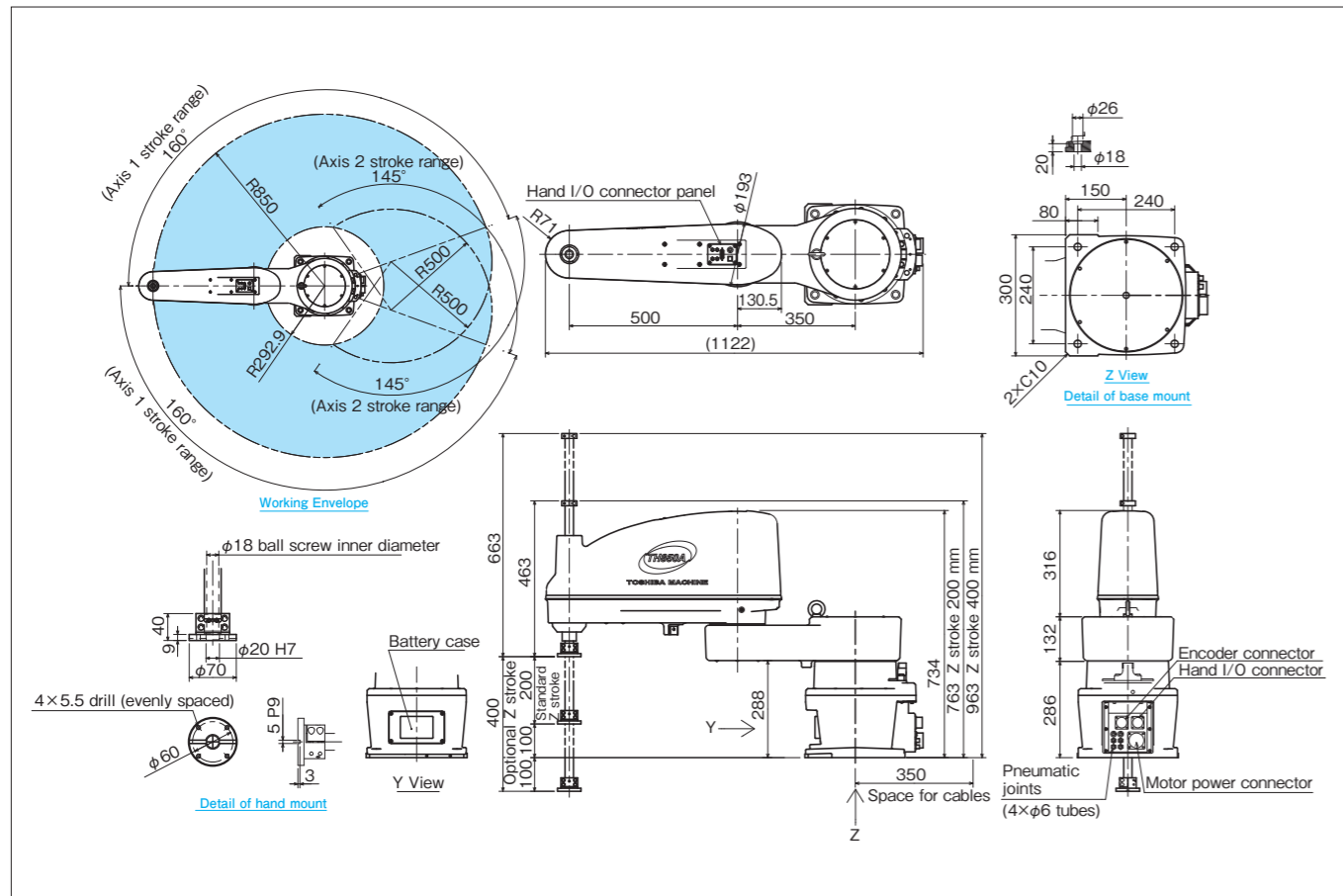
- This model can be used with the controller TS2000 or TS2100 or TS3100. For the combinations of the models and controllers, see the table in page 6.
- The values in parentheses are applied when the controller TS2000 is used.
- For *2, *3 and *4, see page 5.



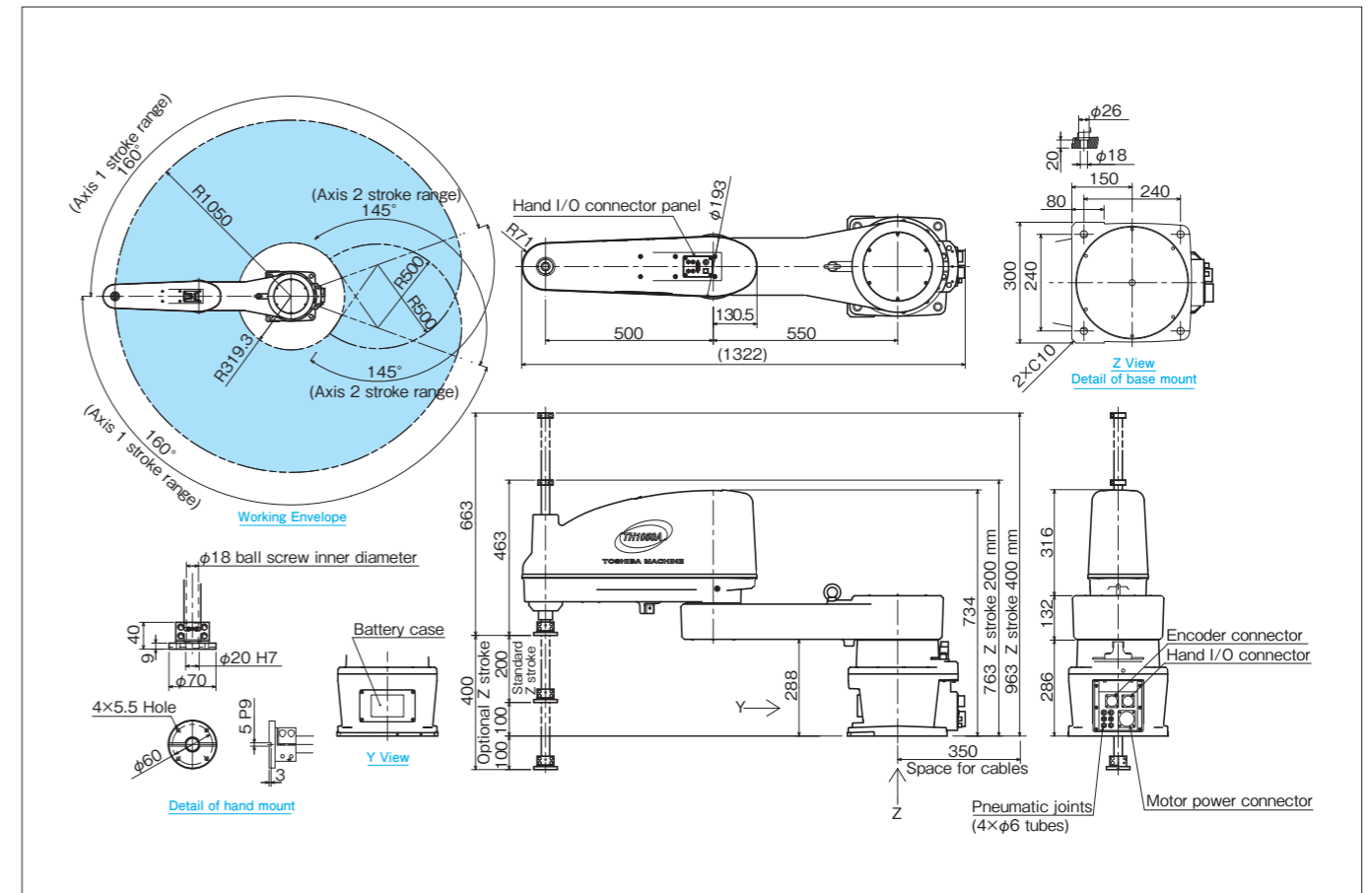
Model		TH1050A
Type		Horizontal multi-joint
No. of controlled axes		4
Arm length		1050 mm (550 mm+500 mm)
Working envelope	Axis 1	±160°
	Axis 2	±145°
	Axis 3 (Z-axis)	200 mm (optional: 400 mm)
	Axis 4 (Z-axis rotation)	±360°
Maximum speed	Axis 1	300°/s
	Axis 2	420°/s
	Axis 3 (Z-axis)	2050 mm/s (2000 mm/s)
	Axis 4 (Z-axis rotation)	1200°/s
Composite		9.15 m/s
Standard cycle time (with 2kg load)		0.39 s (0.65 s) *2
Maximum payload mass		20 kg
Allowable moment of inertia		0.2 kgm ² *3
Positioning repeatability	X-Y	±0.01 mm *4
	Axis 3 (Z-axis)	±0.01 mm *4
	Axis 4 (Z-axis rotation)	±0.004° *4
Hand wiring		5 inputs / 4 outputs
Hand piping		4 pcs. (φ6)
Position detection		Absolute
Robot controller cable		5 m (optional: max. 25 m)
Mass		80 kg

- This model can be used with the controller TS2000 or TS2100 or TS3100. For the combinations of the models and controllers, see the table in page 6.
- The values in parentheses are applied when the controller TS2000 is used.
- For *2, *3 and *4, see page 5.

External view



External view



High payload mass type SCARA robot TH1200A

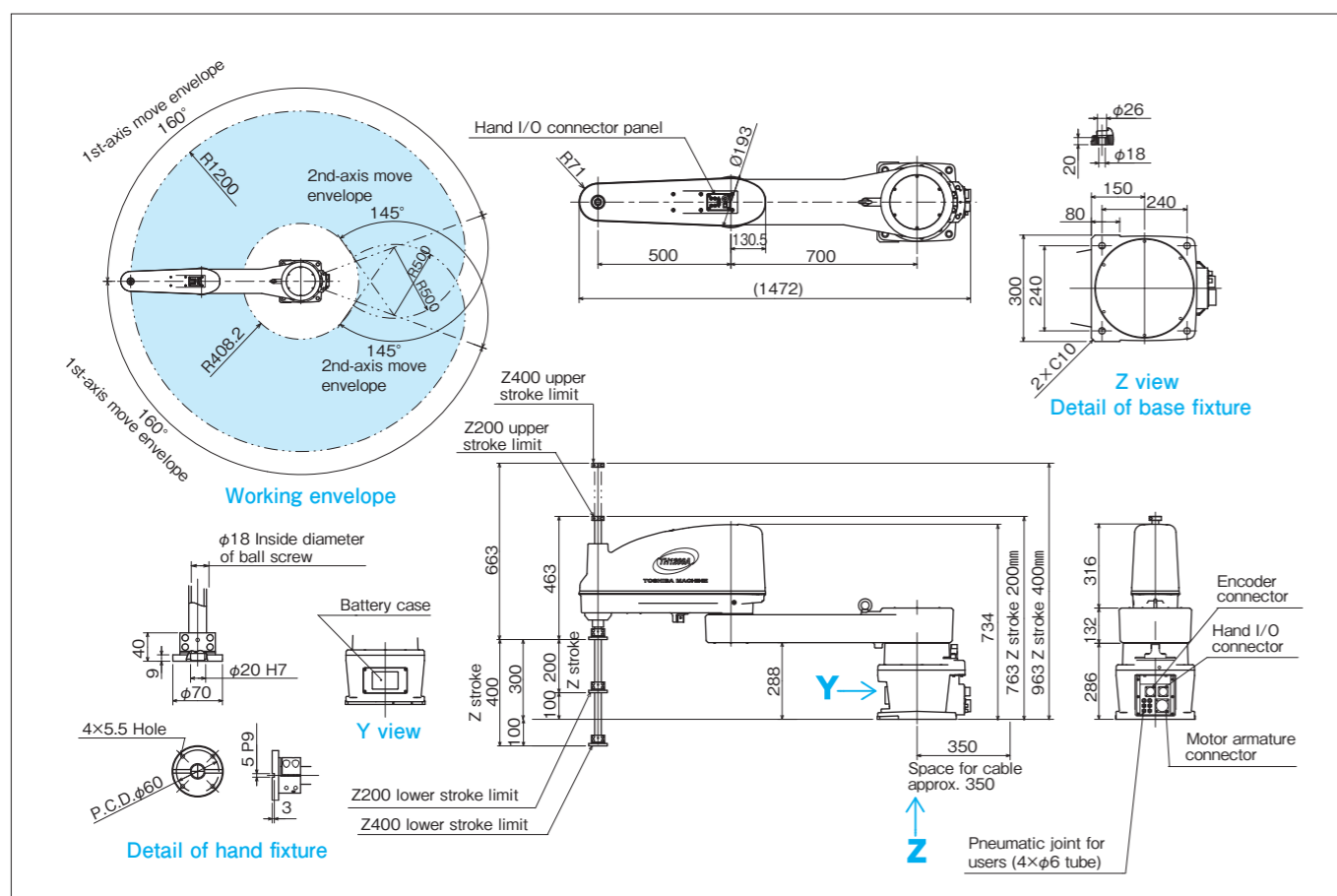
TH1200A



Model	TH1200A	
Type	Horizontal multi-joint	
No. of controlled axes	4	
Arm length	1200 mm (700 mm+500 mm)	
Working envelope	Axis 1	±160°
	Axis 2	±145°
	Axis 3 (Z-axis)	200 mm (optional: 400 mm)
	Axis 4 (Z-axis rotation)	±360°
Maximum speed	Axis 1	240°/s
	Axis 2	330°/s
	Axis 3 (Z-axis)	1800 mm/s
	Axis 4 (Z-axis rotation)	1000°/s
	Composite	7.9 m/s
Standard cycle time (with 2kg load)	0.57 s *2	
Maximum payload mass	20 kg	
Allowable moment of inertia	0.2 kgm ² *3	
Positioning repeatability	X-Y	±0.03 mm *4
	Axis 3 (Z-axis)	±0.02 mm *4
	Axis 4 (Z-axis rotation)	±0.005° *4
Hand wiring	5 inputs / 4 outputs	
Hand piping	4 pcs. (φ6)	
Position detection	Absolute	
Robot controller cable	5 m (optional: max. 25 m)	
Mass	83 kg	

■ For *2, *3 and *4, see page 5.

External view



High-Speed and High-Cycle SCARA ROBOT

THP SERIES

Realization of Long Continuous Operation at Maximum Speed

Outstanding Performance in High-Precision Processes

New Model Release



THP700

NEW

No Fatigue even from 24-Hour, High-Cycle Operation

The use of lightweight arm and the achievement of low inertia realize the highly durable models that offer a fast cycle time of 0.3-second level, and 120 cycles per minute in 24-hour continuous operation.

Application: The THP-series models are best for high-speed continuous operation to transfer items such as crystalline silicon solar cells, food products, and pharmaceutical products between conveyors and packing them in boxes.



Model		THP550
Type		Horizontal multi-joint
No. of controlled axes		4
Arm length		550 mm (300 mm+250 mm)
Working envelope	Axis 1	±120°
	Axis 2	±145°
	Axis 3 (Z-axis)	150 mm (optional: 300 mm)
	Axis 4 (Z-axis rotation)	±360°
Maximum speed	Axis 1	375°/s
	Axis 2	600°/s
	Axis 3 (Z-axis)	2000 mm/s
	Axis 4 (Z-axis rotation)	2000°/s
Composite		6.21 m/s
Standard cycle time (with 2kg load)		0.29 s *2
Maximum payload mass		2 kg (rated: 1kg)
Allowable moment of inertia		0.01 kgm ² *3
Positioning repeatability	X-Y	±0.015 mm *4
	Axis 3 (Z-axis)	±0.01 mm *4
Axis 4 (Z-axis rotation)		±0.02° *4
Hand wiring		8 inputs / 8 outputs
Hand piping		4 pcs. (φ4)
Position detection		Absolute
Robot controller cable		5 m (optional: max. 25 m)
Mass		26 kg

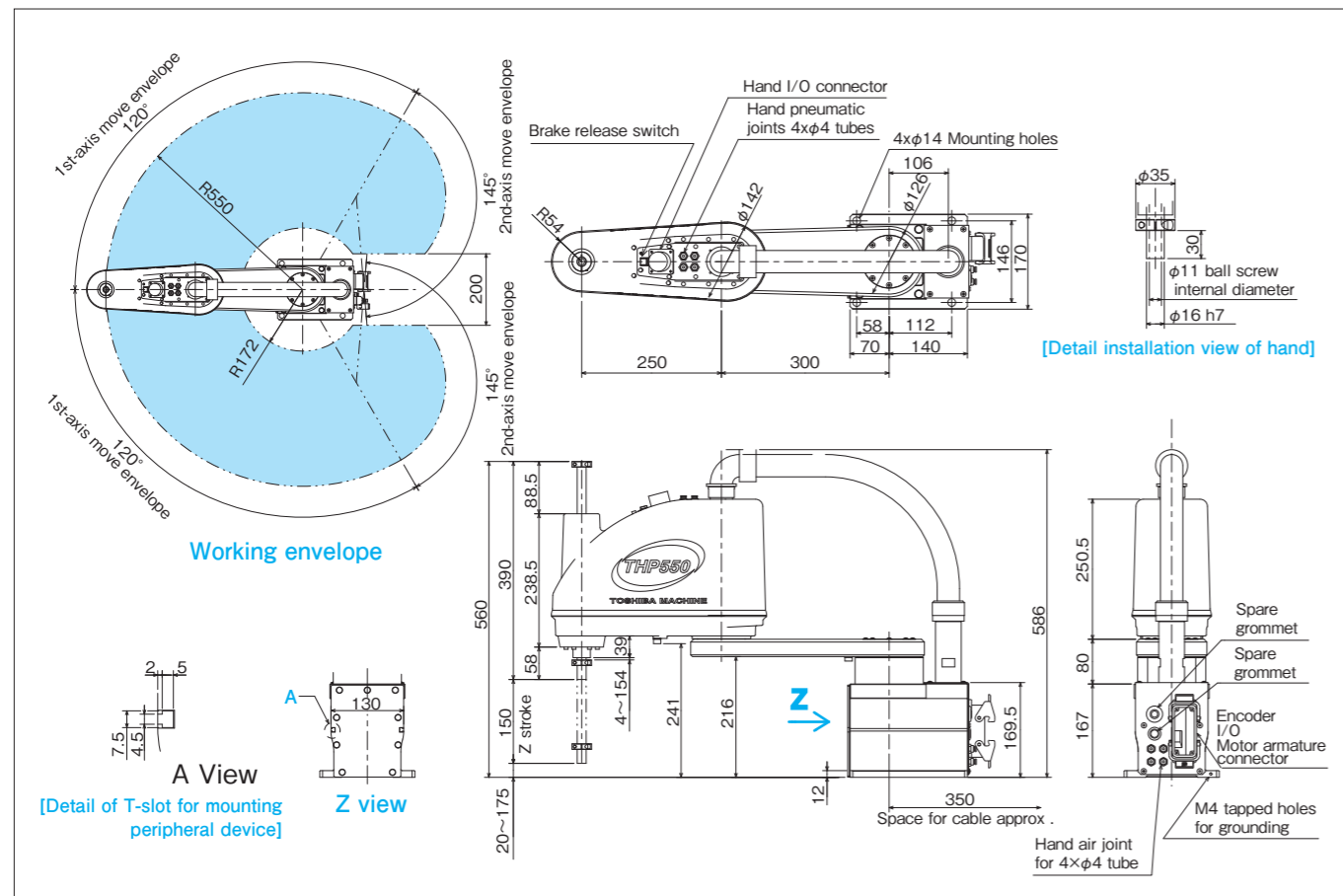
■ For *2, *3 and *4, see page 5.



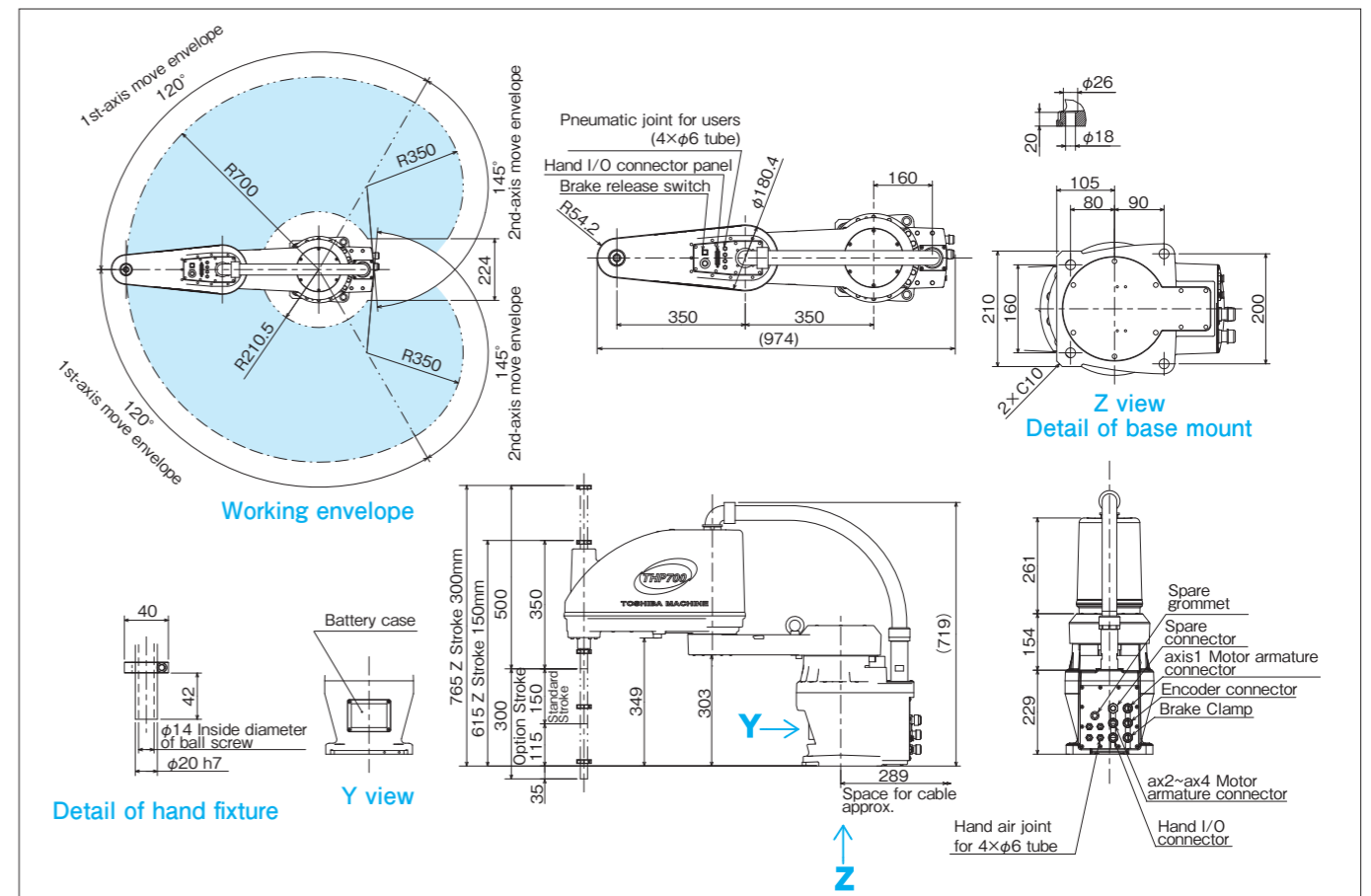
Model		THP700
Type		Horizontal multi-joint
No. of controlled axes		4
Arm length		700 mm (350 mm+350 mm)
Working envelope	Axis 1	±120°
	Axis 2	±145°
	Axis 3 (Z-axis)	150 mm (optional: 300 mm)
	Axis 4 (Z-axis rotation)	±360°
Maximum speed	Axis 1	340°/s
	Axis 2	600°/s
	Axis 3 (Z-axis)	2050 mm/s
	Axis 4 (Z-axis rotation)	1800°/s
Composite		7.8 m/s
Standard cycle time (with 2kg load)		0.345 s *2
Maximum payload mass		10 kg
Allowable moment of inertia		0.01 kgm ² *3
Positioning repeatability	X-Y	±0.03 mm *4
	Axis 3 (Z-axis)	±0.02 mm *4
Axis 4 (Z-axis rotation)		±0.02° *4
Hand wiring		8 inputs / 8 outputs
Hand piping		4 pcs. (φ6)
Position detection		Absolute
Robot controller cable		5 m (optional: max. 25 m)
Mass		57 kg

■ For *2, *3 and *4, see page 5.

External view



External view



These functional optional specifications are designed with consideration for applications, environment, and system-layout requirements.

● Z-axis long stroke (-Z)

300m: TH450A / TH550A / THP550 / THP700
400m: TH650A / TH850A / TH1050A / TH1200A

The Z-axis stroke range is extended.
Useful in an application with large up-down movements and handling of long workpieces.
(Note: If a stroke other than the above is desired, please contact us.)



● Protective Bellows for Z-Axis (-B)

TH650A-TH1050A

Protection of the Z-axis shaft lower side in an environment where liquid or chips may scatter.
(Note: The cycle time and Z-axis stroke differ from the standard specifications. Please contact us for details.)



● Z-Axis Cap (-C)

TH450A / TH550A / TH650A / TH850A /
TH1050A / TH1200A / THP550 / THP700

Protection of the Z-axis shaft upper side in an environment where liquid or chips may scatter. It also prevents intrusion and jamming by cables and other peripheral items.



● Ceiling-mount type (-T)

TH350A / TH450A / TH550A /
TH650A / TH1050A / THP550

To enable more freedom in system layout and effective use of a space, the robot is suspended from the upper side of the working area.
(Note: The working envelopes differ from the standard-type robots. Please contact us for details.)



● Optional cables length

Between robot and controller: Maximum 10m (TH180-350A)
Maximum 25m (TH450A-1200A / THP550 / THP700)
Teach pendant: Max. 15m

● Support of Safety Category 3

TH450A / TH550A / TH650A / TH850A / TH1050A / TH1200A / THP550 / THP700

The models can be equipped with optional unit TS3FB and by adding necessary safety design, thus conform to the safety category 3 that is required in the ANSI and CE marking.
(Standard design is compatible with. Safety category 2.)

● Dust-proof and splash-proof Design (-IP)

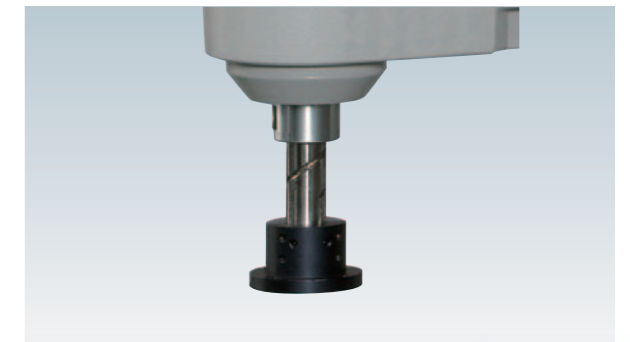
TH450A / TH550A / TH650A / TH850A / TH1050A / THP550 / THP700

Protection grade: IP65
(Note: Limitation is imposed on acceleration / deceleration rates. Please contact us for details.)

● Tool Flange for End Effectors Mounting

TH180 / TH250A / TH350A / TH450A /
TH550A / THP550 / THP700

Tool flange for securing the robot's hand is available.
Standard-equipped for TH650A and larger models.



● Additional 5th Axis (Traverse axis, Wrist axis, etc.)

TH450A / TH550A / TH650A / TH850A /
TH1050A / TH1200A / THP550

5th axis can be added for such usage as wrist axis for workpiece flip-over or moving the robot on a traverse axis.

● CAD Date Service

Robots and controllers external view drawings are available in DXF format, downloadable from our website
URL: <http://www.toshiba-machine.co.jp>



● **Cleanliness**

Cleanliness indicates air cleanliness grades, which are expressed by some standards. Our SCARA robots have optional CRB specifications which is equivalent to ISO Air Cleanliness Class 3, or CR specifications for a simple clean environment. SCARA robots with the CRB or CR specifications are useful for semiconductor and LCD manufacturing processes in which as much dust as possible should be removed. Choose a CRB-specifications or CR-specifications robot in accordance with your operating environment.



	CR Specifications	CRB Specifications
Applicable Model	TH180 / TH250A / TH350A	TH250A / TH350A / TH450A / TH550A / TH650A / TH850A / TH1050A / TH1200A / THP550 / THP700
Cleanliness	<ul style="list-style-type: none"> - In a cubic meter of air, the allowable maximum number of 0.3 μm or larger particles shall be 350. - In a cubic foot of air, the allowable maximum number of 0.3 μm or larger particles shall be 10. - The above cleanliness is applied to the area around the arm. 	<ul style="list-style-type: none"> - In a cubic meter of air, the allowable maximum number of 0.1 μm or larger particles shall be 1000. - In a cubic foot of air, the allowable maximum number of 0.1 μm or larger particles shall be 29. - Cleanliness equivalent to ISO Air Cleanliness Class 3 - The above cleanliness is applied to the area around the arm.

? 1 ft³ and 1 m³ (What's the size of a cubic foot?)

A cubic foot is a cube whose length, width, and height are all one foot (30.5 cm). The size of a cubic foot is about 1/35 of the size of a cubic meter that is generally used on high-cleanliness product markets.

● **Amount of suction**

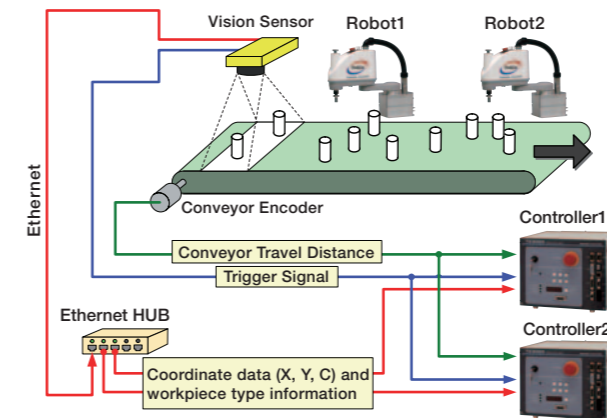
The clean specifications is achieved by sucking in the specified amount of air from the snap-on joint that is located at the base cover (base connector section). (Note: The user is requested to provide the suction unit and the air tube for suction. Bear in mind that a SCARA robot without the suction unit generates dust.)

● **Downward airflow**

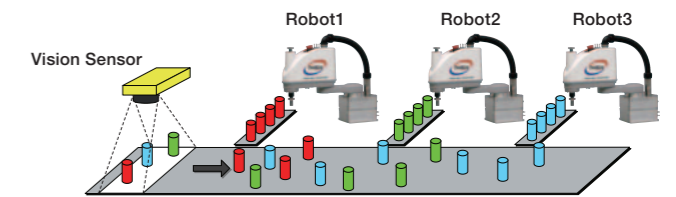
In the clean room, the downward airflow rate shall be 0.4 m/s or higher. A downward airflow rate less than 0.4 m/s can cause dust in the clean room.

Vision + Conveyor Synchronization

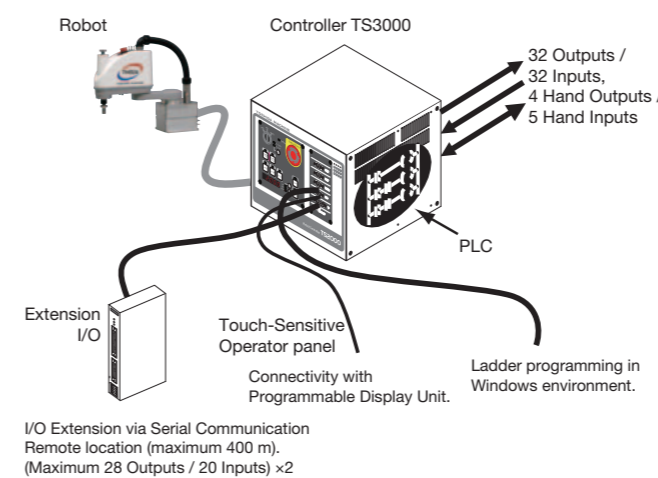
- Cost reduction by "one camera to one line" Cost reduction of the system is realized. With an off-the-shelf ethernet Hub, data from one vision sensor can be shared among two or more robot controllers.



- Effective in sorting large-quantity and many types of workpieces
 - Large quantity and many types workpieces on a conveyor can be sorted and put in boxes by multiple robots in coordination.
 - Programming is made easy with special, dedicated commands to realize efficient workpiece-handling, with such functionalities as identifications and duplicate data avoidance.)
 - Damage and breakage of workpieces are prevented by synchronization to the conveyor.



Built-in PLC

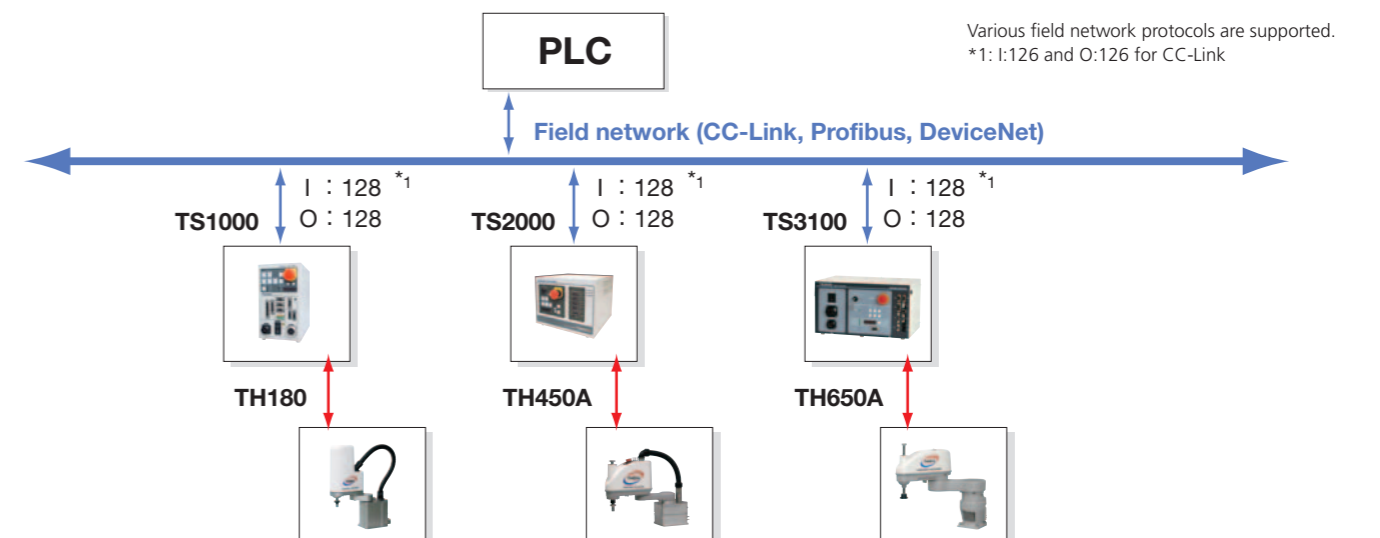


A PLC (TCmini) is built in the controllers TS1000, 2000, 2100, 3000 and 3100. Input and output signals can be handled by ladder-style programming logic, independent from robot motion.

[Features and advantages]

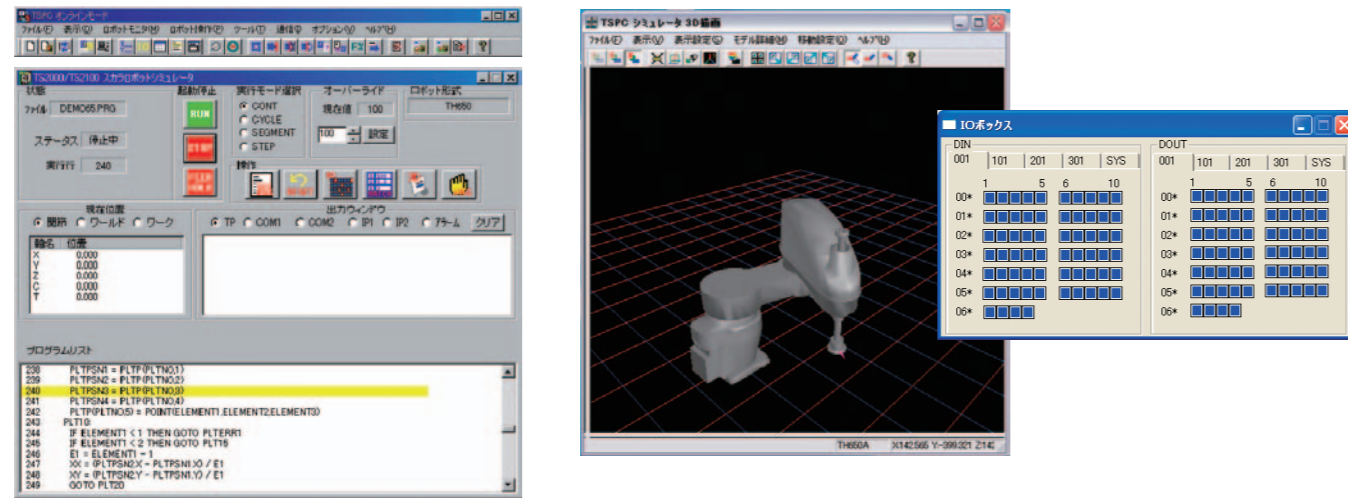
- TCmini controls input/output signals of standard I/O, extension I/O and touch-sensitive panel by ladder program and exchanges data with robot program.
- Thus, flexible system design and control of peripheral equipment is possible without the added cost of an outside host PLC.
- Creation, monitoring and debugging of ladder-logic programming with powerful programming support software TCRGOS-W (optional).
- The scan time is 5 ms per 1 K-Word (TS3000). Connection is possible with various programmable controllers and display units etc.

Field network



The following PC software tools are provided to shorten the time and increase the efficiency of system designing and installation work.

● **TSPC: For robot programming**



1. Powerful Simulation Function:

Off-line robot program creation and simulation, with simulated I/O. Lead time up to the start of robot operation can be shortened. Robot programs can be pre-checked without stopping the production line.

2. User-friendly programming environment:

Extensive help information, powerful grammar check, direct, online editing of programs in the controller memory.

3. Multi-functional monitor and support:

Monitoring functions such as active program display, position display, motion status monitor by 3D model, and alarm history display. Operation from on-screen operation panel. Connection via Ethernet (optional) is also supported.

● **TS LayOut: For cycle-time and lay-out review**

1. Instant cycle time estimation:

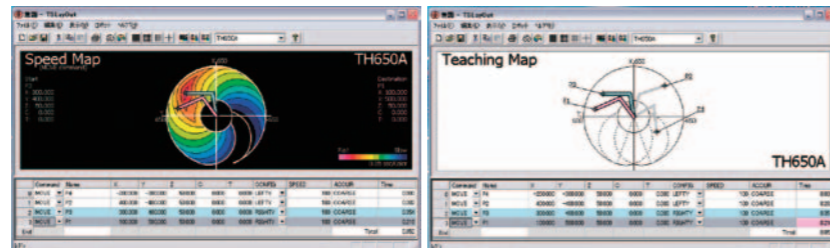
Cycle time is calculated just by pointing at a position, without using the programming language.

2. Guidance for high-speed motions:

Coloured speed map display indicates fast-motion areas from a given start position, guiding you to make the most optimized system layout.

3. Conversion to robot program:

Input positions data can be converted to a robot program just by one click on a menu.

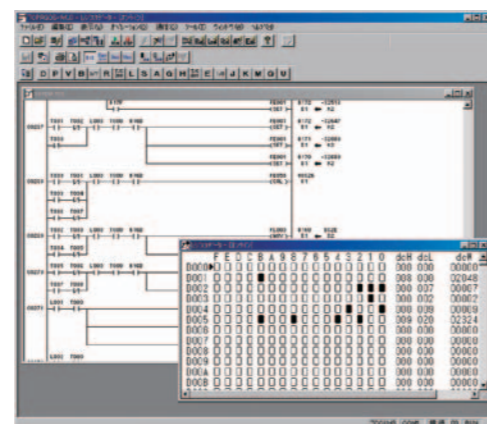


● **TCPRGOS: For programming the built-in PLC**

1. Ladder-style logic programming for the built-in PLC.

In addition to program creation, on-line monitoring of ladder program and I/O status help reduce development and debugging time.

Extensive functions such as address map display, comment display and search functions are provided.



● **High-performance Teach Pendant TP3000**

New sensation! Equipped with graphic operation keys! The teach pendant TP3000 is easy to see and operate!



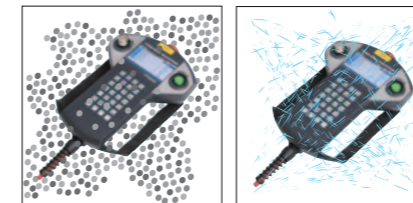
Adoption of an easy-to-view vivid color screen

Compared to our conventional teaching pendant TP1000, the TP3000 has significantly improved expression capability with the adoption of an LCD color screen.

Equipped with language association function

Language input candidates are displayed according to character input. Compared to the conventional teaching pendant TP1000, the TP3000 makes it easier to input commands more quickly.

Support for IP65



*The images shown are illustration only

Note: The controller's main body and the parts around the connector do not support the IP.

Equipped with graphic operation keys

The keyboard display changes dynamically according to the operation. Required keys can be displayed whenever they are necessary.

Outline function

The main program, subprograms and labels in the SCOL program can be displayed hierarchically so that the program structure can be viewed quickly.

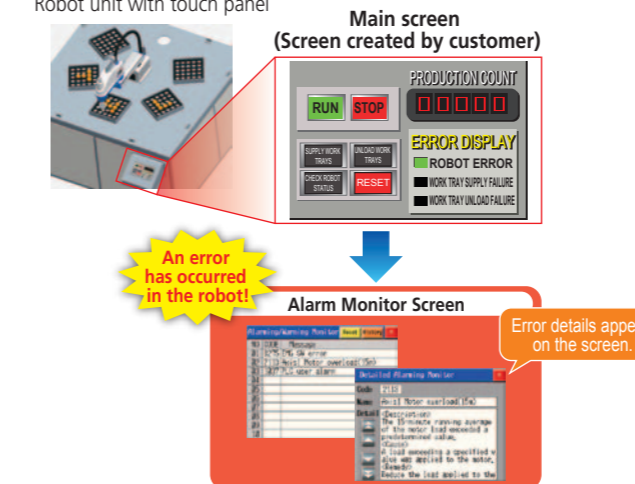
What is IP65? IP (Second characteristic numeral) (First characteristic numeral)

IP (International Protection) rating classifies and rates the degree of protection provided against the ingress of solid foreign objects (including particles and dust) and water in mechanical casings and with electrical enclosures. The first characteristic numeral indicates the level of protection that the enclosure provides against the ingress of solid foreign objects (including particles and dust). "6" means "totally dust tight" so that "the enclosure provides against the ingress of solid particles and dust". The second characteristic numeral indicates the level of protection that the enclosure provides against the ingress of water. "5" means "protection against water jets" so that "water directly projected by a nozzle against the enclosure from any direction shall have no harmful effects".

● **Support for Connection Device Samples**



Robot unit with touch panel



Connection Device Samples is a collaborative system between Toshiba Machine Co., Ltd. and Digital Electronics Corporation. It enables to check the status of the robot on the touch panel display device.

[Features and advantages]

- When an error occurs in the robot, the error information or details can be checked on the Alarm Monitor Screen (see the left figure).
- Additionally, various other screens for functions including Robot I/O Monitor, Current Position Monitor, I/O Time Chart and Connected Device Data Transfer are provided.
- The robot screens can be downloaded from the website of Digital Electronics Corporation free of charge. There is no need to create these screens and they can be used immediately after product purchase. http://www.pro-face.com/otasuke/sample/download/common/connection_robot_con_ts_e.html
- The status of the robot can be checked even by people who cannot operate the teach pendant.
- Because the information about both the robot and the system is displayed on the same display device, troubleshooting is made easier.

*For product information about the touch panel that is compatible with this system, please contact Digital Electronics Corporation. http://www.pro-face.com/otasuke/sample/detail/common/connection_robot_con_ts_e.html