Panasonic
BUSINESS

6 Axis Articulated Arc Welding Robots

TS/TM/TL (GⅢ) Series

March 2019

TM Manipulators That Support Both External & Through-Arm Torch Cable Routing

TS Manipulators with Space Saving

TL Manipulators with Long Arm

TS/TM/TL Series GIII

Combination with Full Digital Welding Power Source Achieves Stable and High Quality Welding

TM series

Torch type selectable to fit your application!

TM
1100
1400
1600
1800
2000

Separate Type

Through-Arm Type

External Type

TS series

Space saving & high payload!

TS-950

TS
800
950

Payload
8 kg
TS-800/950

External Type

Through-Arm Type

TL series

Long-arm & high payload!

TL
1800
2000

Payload
TL-1800: 8 kg
TL-2000: 6 kg

External Type

■Manipulator Lineup (as of March 2019)

	TS series		TM series					TL series	
	800	950	1100	1400	1600	1800	2000	1800	2000
Separate	–	–	○	○	○	○	○	–	–
Through-Arm	○	○	○	○	○	○	○	–	–
External	○	○	○	○	–	–	–	○	○
Payload	8 kg		6 kg		4 kg	6 kg		8 kg	6 kg

A variety of features specialized for arc welding

Feature 1 (TM/TL) Enhanced Basic Performance

Increased Motion Speed

TM-1400: Speed of main 3 axes increased by 22 % on average. (approx. 42°/s more than TA type)

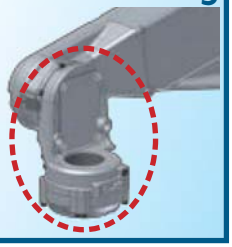
Extended Reach

TM-1400: 1 437 mm (63 mm more than TA type)

Feature 2 (TS/TM) Arm Specialized for Welding

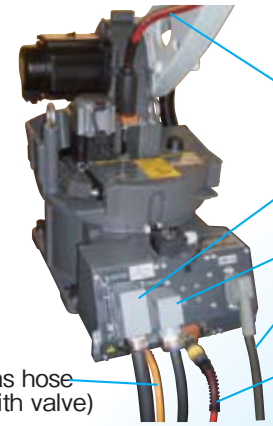
Cantilever Structure

makes arm compact and improves accessibility to workpieces.



Feature 3 (TM/TL) Structure Specialized for Welding

Clean Cable Management!



**For use with drum packing wire only.

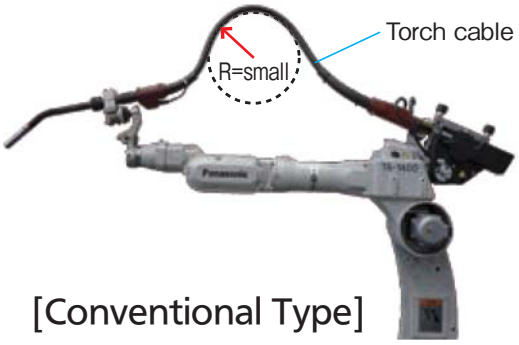
In addition to Through-Arm Type and External Type,

A third choice—Separate Type (TM series)

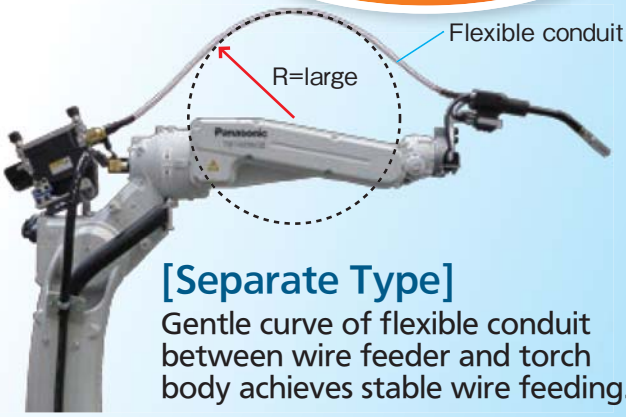
High Wire Feedability
Less Cable Interference

Revolutionary new type of arc welding robot with advantages of both Through-Arm Type and External Type.

Feature 1 External Flexible Conduit



[Conventional Type]



[Separate Type]

Gentle curve of flexible conduit between wire feeder and torch body achieves stable wire feeding.

Feature 2 Through-Arm Power Cable

[Conventional Type]

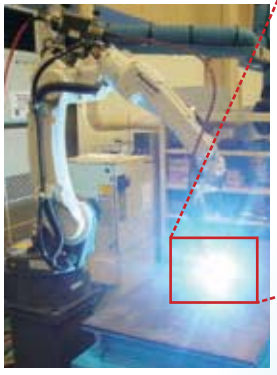
Power cable interference can occur depending on the welding position.

[Separate Type]

Through-arm power cable reduces cable interference.

An example of circumferential welding

Suppresses twist of wire!



Reduces target position error at weld start and end points!

New type welding robot achieves even higher quality welds.

TS/TM/TL Series GIII

Advanced Hardware and Software Improve Performance

GIII controller with high performance

- Faster CPU reduces start-up time to **about 30 seconds**. (50 % reduction from previous model)
- Optional memory allows storing 800,000 teaching points in addition to the standard 40,000 points.

GIII

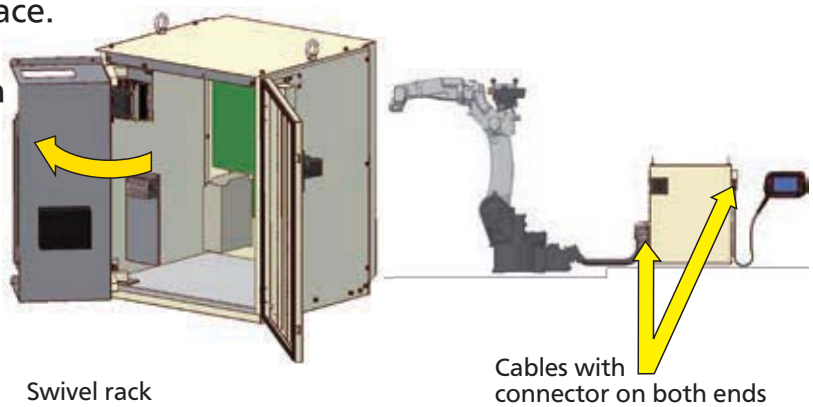
Teach pendant with enhanced operability

Same basic operation procedure with G2 Series model
Easy to use Windows based operation

- Light weight design under 1 kg (0.99 kg) giving you less stress during teaching
- Liquid crystal LED back light improving impact resistance
- USB and SD memory interface realizing great expandability
- Increased number of function keys (four to eight), enabling same action with less key strokes during teaching

Improved maintainability

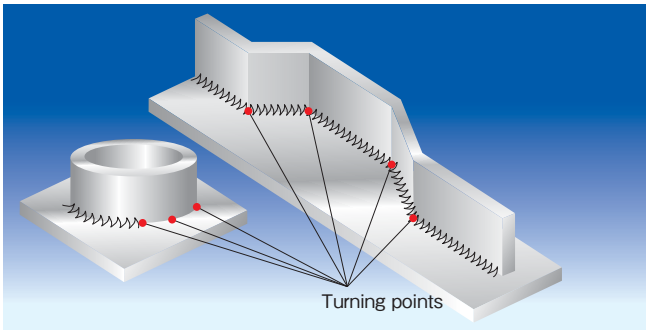
- Swivel rack in the case makes maintenance easy and saves space.
- Cables with connectors on both ends reduce Cable exchange time.



Standard Features

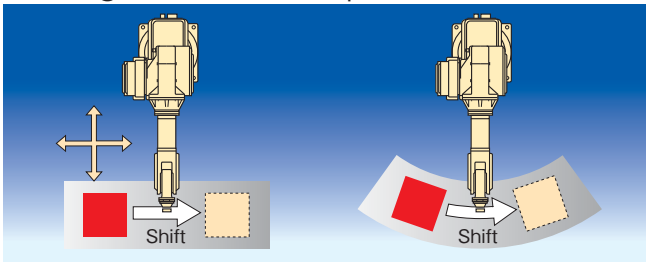
Weaving Function (6 patterns)

You just have to teach the starting point, amplitudes, turning points and ending point. Teaching time will be reduced.



Parallel Shift + RT Axis Rotating

Teaching time of same workpieces is reduced.

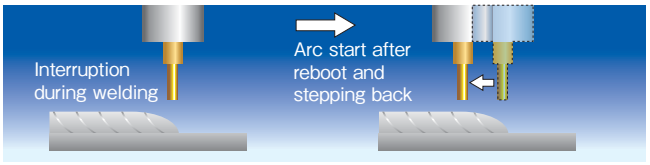


Torch Angle Display (Teach Pendant)

Torch angle is displayed on the screen, making it possible to reduce teaching time and obtain consistent bead appearance.

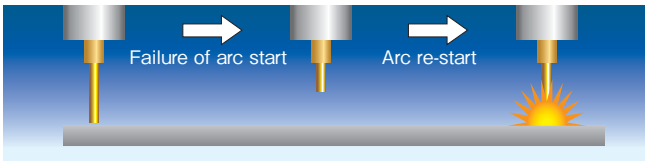
Overlap Function (CO_2/MAG welding)

In case of interruption during welding, the torch is stepped back by reboot and resumes the welding from the welding end point.



Arc Start Retry (CO_2/MAG welding)

Detecting a failure of arc start, the robot automatically starts arc ignition again.



Optional Features

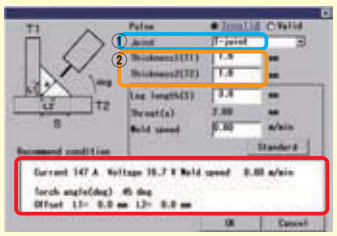
"Weld Navigation" allows easy parameter setting

Easy setting with Teach Pendant

Note: Screens are subject to change without notice.

Rich welding parameter database developed through our long experience

"Weld Navigation" reduces parameter setting time.



Note: Torch angle and aiming point also calculated

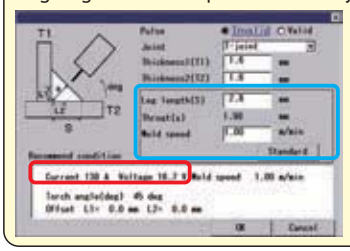
Two Easy Steps:

1. Select weld joint. The figure changes according to the joint.

2. Select plate thicknesses. That's all!

The right parameters automatically

Leg length and weld speed are also adjustable.



Weld Navigation recalculates weld current and voltage according to the changes.

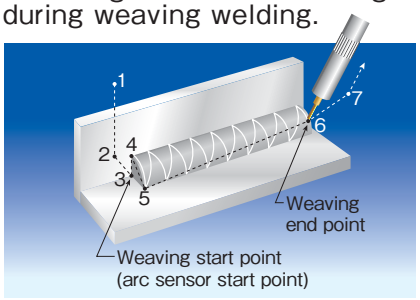
Notes: ·Parameters by Weld Navigation are guideline only and do not guarantee welding result.
·Consult us for material and processes available with Weld Navigation.

Weld Navigation

Model: 350GZ4

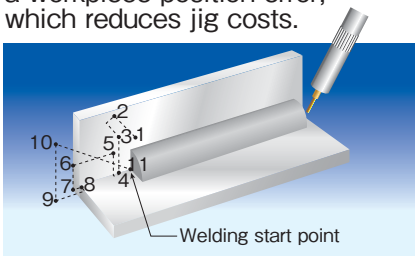
Arc Sensor

The sensor corrects deviation from the taught weld line by detecting weld current changes during weaving welding.



Touch Sensor

The welding wire touches the workpiece and compensates a workpiece position error, which reduces jig costs.



Expansion

Multi-Mechanism Control

Controls maximum 6 groups of robots and external axes in parallel.

Cooperative Multi-Robot Control

Allows cooperative control between two robots.

Units

·Analog I/O Expansion Unit ·Relay Connection Unit
·Terminal Block Conversion Unit ·External Power Input Unit

CO_2/MAG/MIG Robot System (GⅢ)

Combination with Full Digital Welding Power Source Achieves Stable and High Quality Welding

CO_2/MAG/MIG welding robot system selectable to fit your application

Full Digital CO_2/MAG welding machines GZ4 series

SP-MAG (Super-imposition Control)

TS	TM	TL
800	1100	1800
950	1400	2000
	1600	
	1800	
	2000	

350GZ4 500GZ4

Equipped with TAWERS's SP Control Praised by Many of Our Customers

SP-MAG benefits:

- Reduced spatter (Reduced removal work)
- Shorter short-circuit cycle suited for high speed welding
- Shorter arc length for good bead appearance

TM-1400GⅢ (Separate)

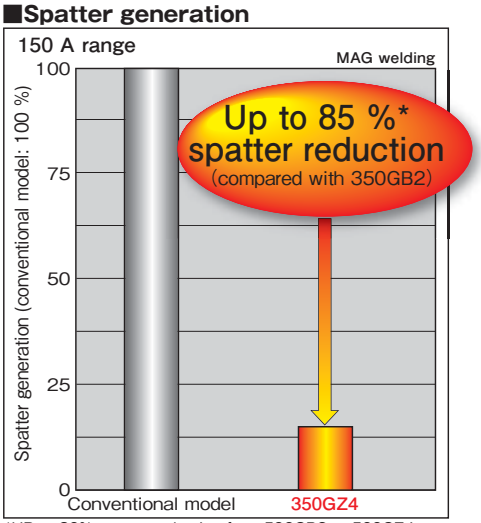
Good bead appearance and low spatter even in high speed welding

Note: Optional parts are necessary to connect GZ4 to robot.

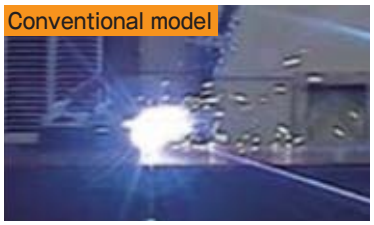
MAG welding (220 A)
- Joint: Fillet ・Base metal: Mild steel SPCC (t2.3 mm) ・Weld current: 220 A
- Weld speed: 100 cm/min ・Wire size: 1.2 mm (YM-50MT)
- Shielding gas: MAG (80 % Ar + 20 % CO_2)

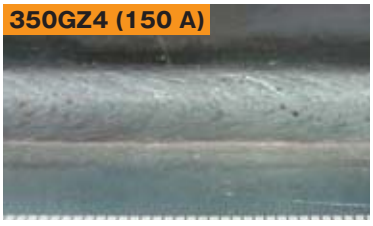
MIG welding (180 A)
- Joint: Fillet ・Base metal: SUS308(t1.5 mm) ・Weld current: 180 A
- Weld speed: 80 cm/min ・Wire size: 1.2 mm (Y308Lsi)
- Shielding gas: MIG (98 % Ar + 2 % O_2)

■Spatter generation



*UP to 80% spatter reduction from 500GB2 to 500GZ4 in 250 A range





- Joint: Fillet ・Base metal: Mild steel SPCC (t2.3 mm) ・Weld current: 150 A
- Weld speed: 50 cm/min ・Wire size: 1.2 mm (YM-50MT)
- Shielding gas: MAG (80 % Ar + 20 % CO_2)

Full Digital Controlled Welding Machine

FULL DIGITAL

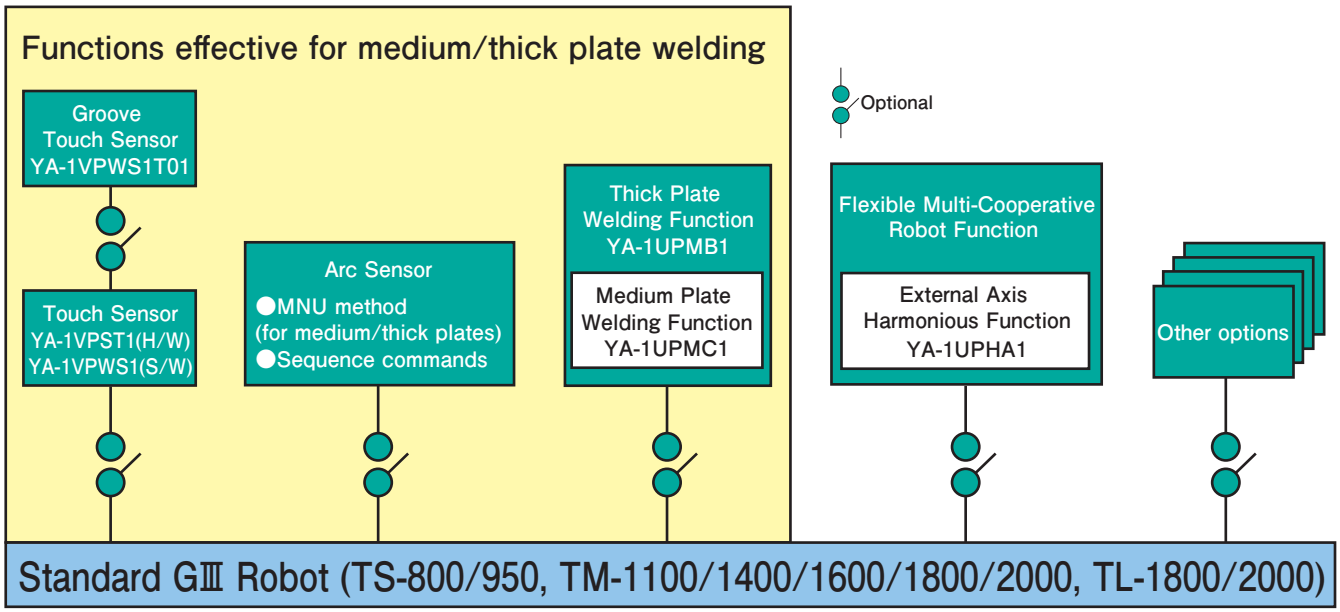
CO_2/MAG/MIG Welding Machine Lineup for High Quality Welds

350GZ4 500GZ4 350VR1TA1 500VR1TA1 400VP1TA1

Medium/Thick Plate Welding Robot System (GIII)

Optional Functions Effective for Medium and Thick Plates

Medium/Thick Plate Welding System



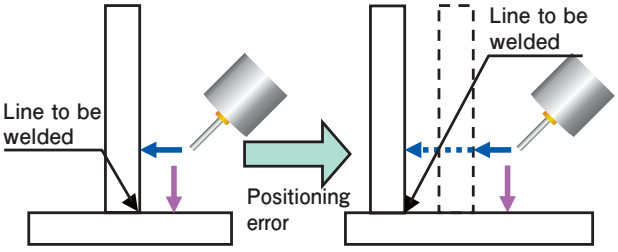
Consult us for details.

Examples

How Touch Sensor works

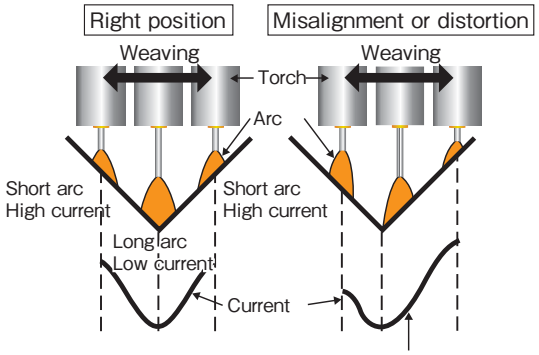
Touches base metal and determines line to be welded.

Detects positioning error and determines line to be welded again.



How Arc Sensor works

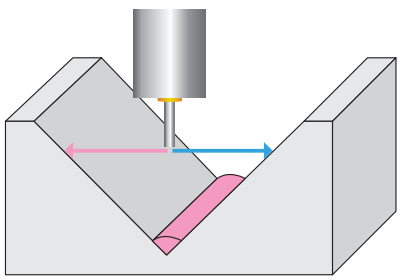
Detects misalignment or distortion and compensate it.



A deviation of weaving center from joint center changes balance of current changes.

Groove Touch Sensor Function

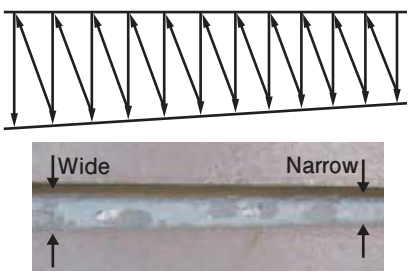
Senses groove width and center, and compensates misalignment.



Variable Weaving Function

Thick Plate Welding Function (YA-1UPMB1)

Supports changes of groove width.
Controls deposited metal amount and maintains uniform bead height.



TIG Robot System (GⅢ)

High Quality Welding in Combination with Full Digital Welding Power Source

Robotic TIG welding system selectable to fit your application

Model Selection Guide

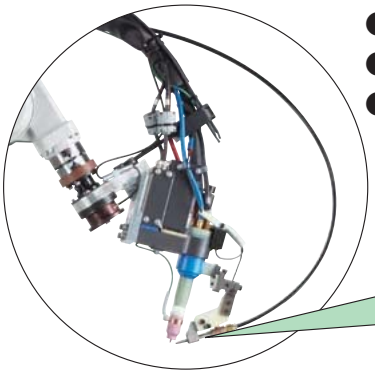
Type	Material	Filler wire dia. (mm)	Welding power source	Robot
Autogenous TIG (no filler)	Stainless steel	—	300BZ3	TS-800 TS-950 TM-1100 TM-1400 TL-1800
	Stainless steel Aluminum	—	300BP4 500BP4	
Filler TIG	Stainless steel	1.2	300BZ3	TS-800 TS-950 TM-1100 TM-1400 TL-1800
	Stainless steel Aluminum	1.2	300BP4 500BP4	
Rotary filler TIG	Stainless steel	1.2	300BZ3	TL-1800
	Stainless steel Aluminum	1.2	300BP4 500BP4	

Notes:
・An external axis controller is necessary for rotary filler TIG welding.

TS	TM	TL
800 950	1100 1400	1800

Rotary filler TIG Welding Robot System
TL-1800GⅢ

Features of Rotary TIG Filler Unit



- Optimum welding position
- High precision filler wire feed
- Improved workpiece accessibility

Filler wire tip position is adjustable in all directions.

TIG welding torch lineup

YT-TCT201
・Air-cooled
・35 % duty cycle at 200 A

YT-TCT401
・Water-cooled
・60 % duty cycle at 400 A

Full Digital Controlled Welding Machine

FULL DIGITAL

TIG Welding Machine Lineup That Offers High Quality Welding

AC/DC TIG welding machine

300BP4

500BP4

DC TIG welding machine

300BZ3

Small Type Arc Welding Robots

TS Series

Payload: 8 kg TS-800/950

TS-800　　TS-950

Various welding styles

【TW axis: Hollow arm】
Torch type selectable between through-arm and external

【Separate wire feeder】
Free layout

Improve small work productivity

●Space saving

48 % smaller footprint
(example of one customer, compared with our TM-1100)

Floor/Wall/Ceiling mount
(Ceiling mount type is special specification.)

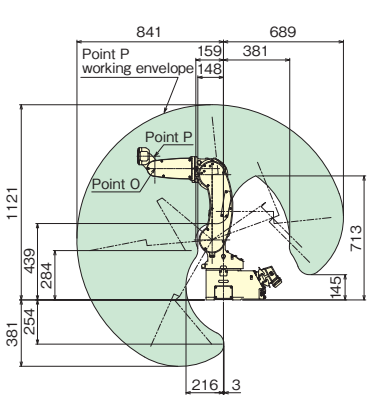
●High speed despite 8 kg payload

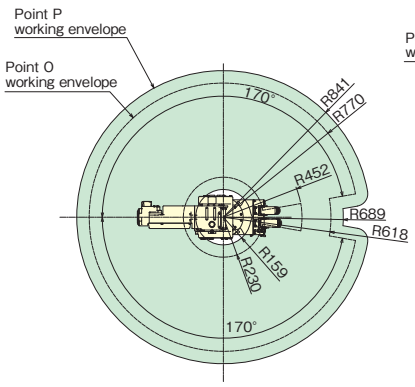
Maximum motion speed: 540°/s
(average for all axes)

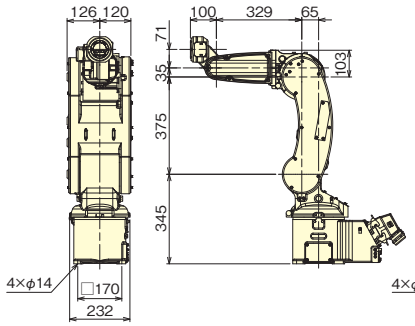
Dimensions & Work Envelope

For working envelope of point O, consult us.　　(Unit: mm)

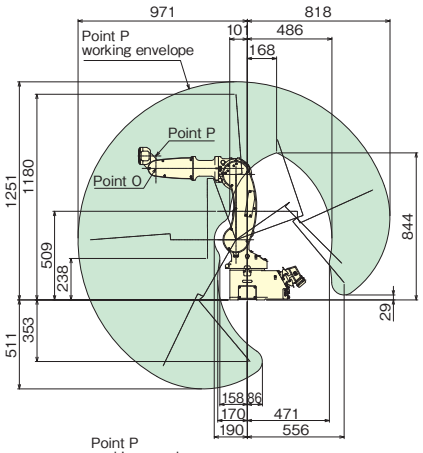
Short Type TS-800

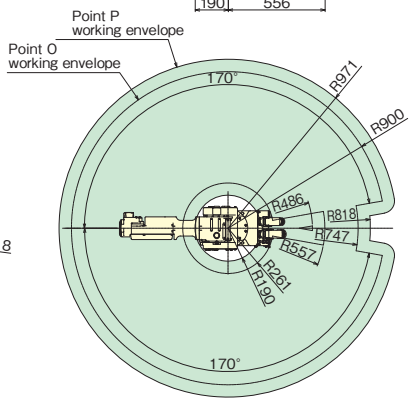


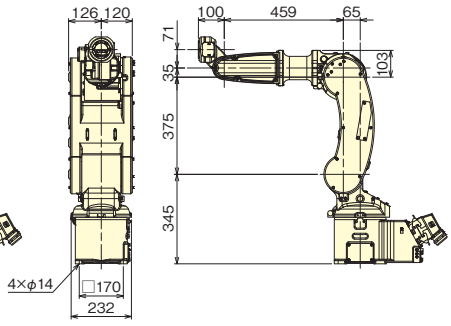




Short Type TS-950







■Manipulator General Specifications

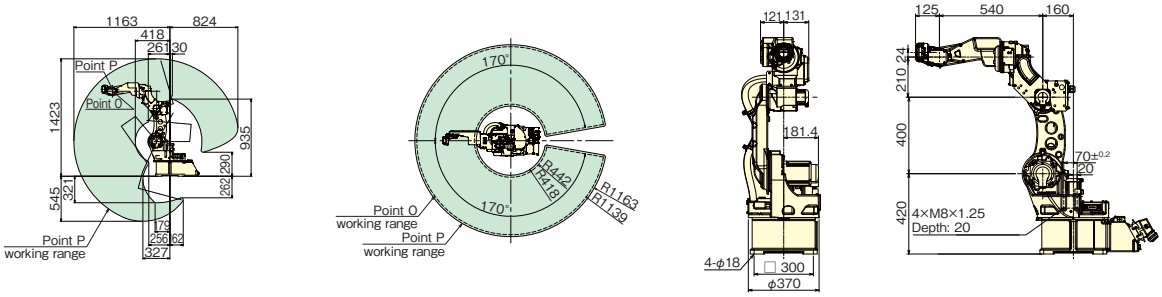
Model		TS-800	TS-950
Type		Short arm	Short arm
Structure		6 axis articulated	
Payload		8 kg	
Maximum Reach		841 mm	971 mm
Minimum Reach		159 mm	190 mm
Working Range		682 mm	781 mm
Max. Motion Speed	RT (Rotating Trunk)	326°/s	
	UA (Upper Arm)	326°/s	
	FA (Forearm)	510°/s	
	RW (Rotating Wrist)	518°/s	
	BW (Bending Wrist)	518°/s	
	TW (Twisting Wrist)	1 040°/s	
Position Repeatability		±0.05 mm	
Motors	Total Power	2 100 W	
	Brakes	All axes	
Mounting		Floor/Ceiling*1/Wall*2	
Weight		55 kg	56 kg

*1: Ceiling mount type is factory optional.
*2: •Setting by service personnel is necessary. •Working range of RT axis is limited.

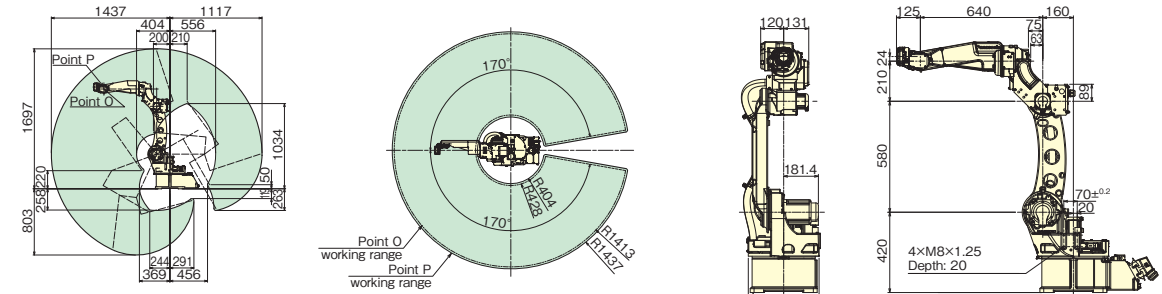
Dimensions & Work Envelope

(Unit: mm)

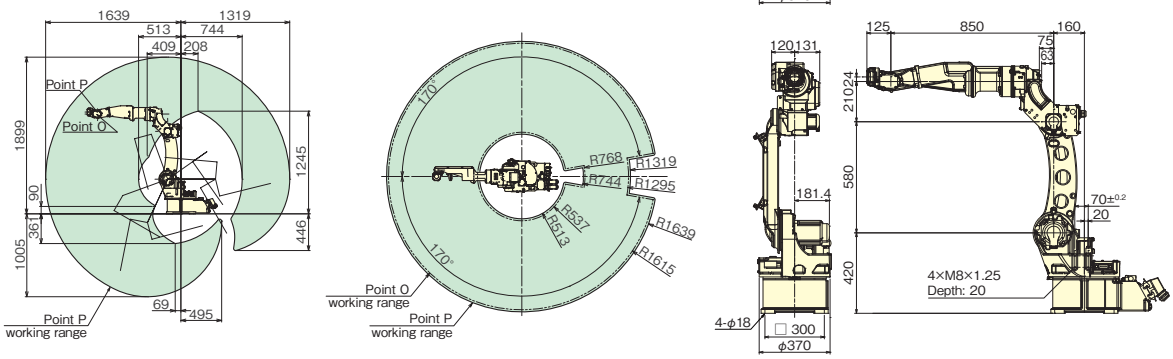
Short Type TM-1100



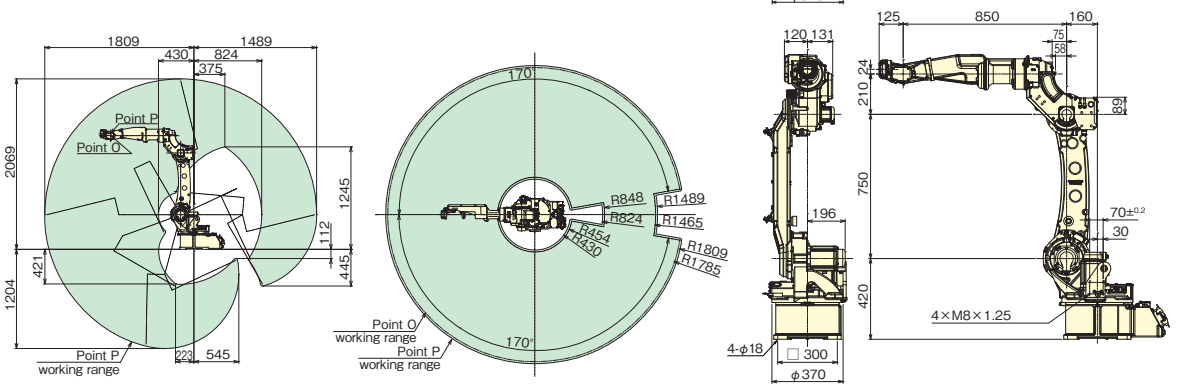
Standard Type TM-1400



Middle Type TM-1600



Long Type TM-1800



■ Manipulator General Specifications

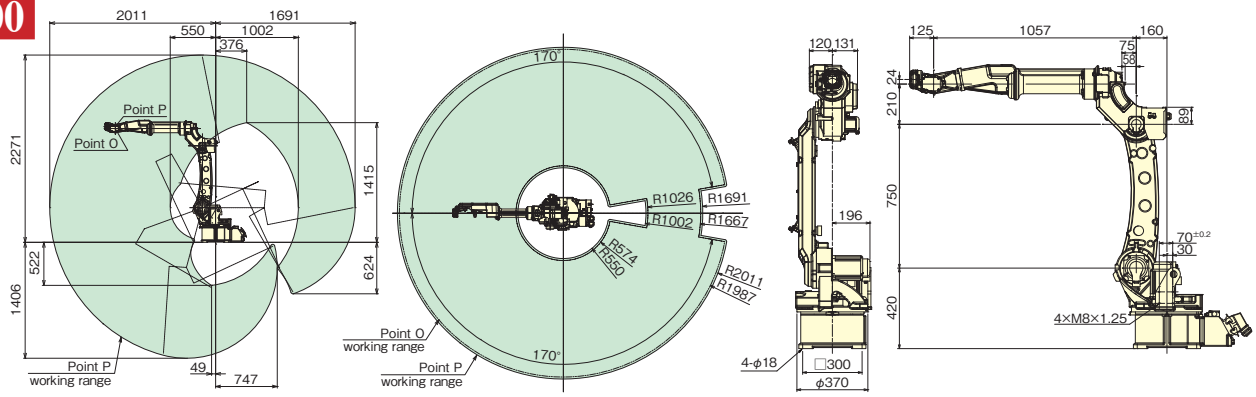
Model		TM-1100	TM-1400	TM-1600	TM-1800	TM-2000	TL-1800	TL-2000
Type		Short arm	Standard arm	Middle arm	Long arm	Long arm	Long arm	Long arm
Structure		6 axis articulated						
Payload		6 kg		4 kg	6 kg		8 kg	6 kg
Maximum Reach		1 163 mm	1 437 mm	1 639 mm	1 809 mm	2 011 mm	1 801 mm	1 999 mm
Minimum Reach		418 mm	404 mm	513 mm	430 mm	550 mm	383 mm	491 mm
Working Range		745 mm	1 033 mm	1 126 mm	1 379 mm	1 461 mm	1 418 mm	1 508 mm
Max. Motion Speed	RT (Rotating trunk)	225°/s		210°/s	195°/s		195°/s	
	UA (Upper arm)	225°/s		210°/s	197°/s		197°/s	
	FA (Forearm)	225°/s		215°/s	205°/s		205°/s	
	RW (Rotating wrist)	425°/s		425°/s	425°/s		385°/s	
	BW (Bending wrist)	425°/s		425°/s	425°/s		375°/s	
	TW (Twisting wrist)	629°/s		629°/s	629°/s		624°/s	
Position Repeatability		±0.08 mm				±0.10 mm	±0.08 mm	±0.15 mm
Motors	Total Power	3 400 W			4 700 W		5 050 W	
	Brakes	All axes						
Mounting		Floor / Ceiling*						
Weight		156 kg	170 kg	180 kg	215 kg	217 kg	215 kg	216 kg

*Ceiling mount type is factory optional.

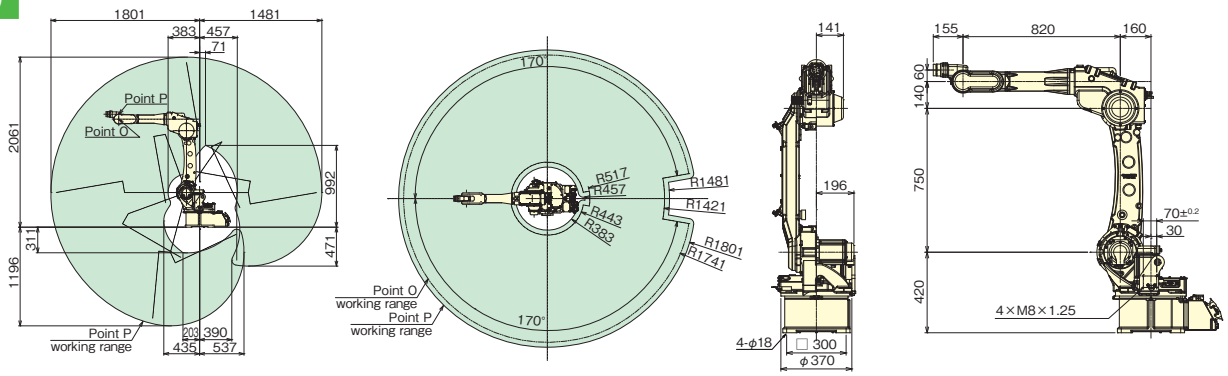
Dimensions & Work Envelope

(Unit: mm)

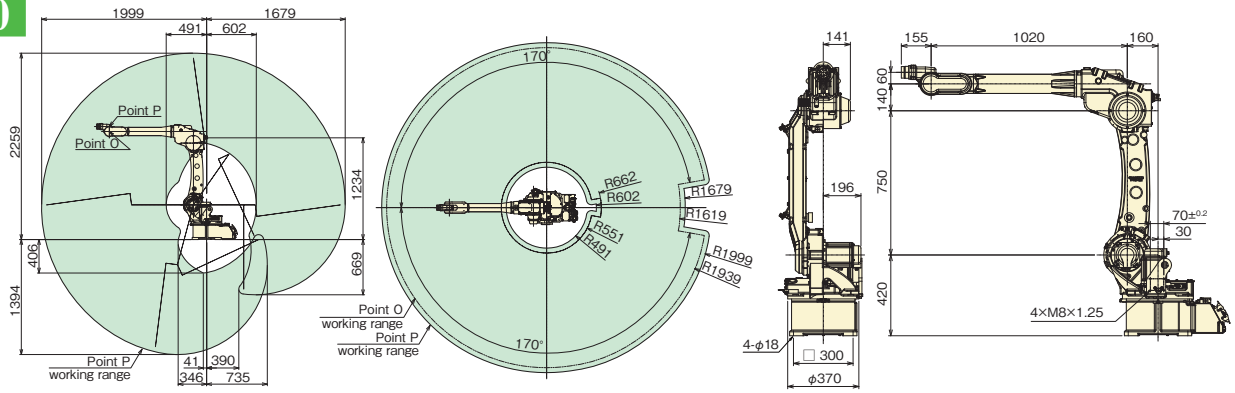
Long Type TM-2000



Long Type TL-1800



Long Type TL-2000

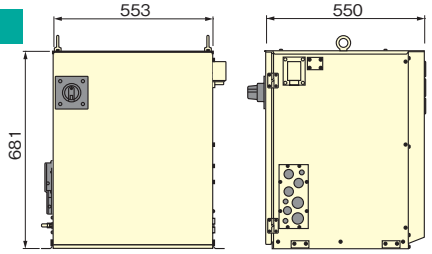


■Controller Specifications

■Controller

GⅢ

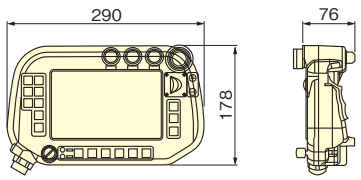
(mm)



■Teach pendant

GⅢ

(mm)



Model	GⅢ
Dimensions*1	W 553 mm x D 550 mm x H 681 mm
Weight*2	60 kg
Memory Capacity	40 000 points
Position Control	Software servo control
External Memory	Teach Pendant: one SD memory card slot, Two USB 2.0 ports (USB 2.0 Hi-Speed not supported)
Control Axes	6 axes simultaneously (Max.27 axes)
Input and Output	Input: 40 points (Optionally expandable up to 2048 points) Output: 40 points (Optionally expandable up to 2048 points)
Input Power	3 phase, 200/220 VAC±20 V, 3 kVA, 50/60 Hz

*1: Protruding portions not included.

*2: Teach pendant and connection cables not included.

Large Robot Series (GⅢ Controller)

Great material handling capability! Coordinated multi-robot movement for flexible system without jig.

YS-080GⅢ

HS-220GⅢ

● Coordinated movement with WGⅢ/GⅢ robot(s)

Allows to build flexible system without jig.

Maximum configuration:
・Arc welding robot x 2
・Large robot x 1

● GⅢ controller for large robots

Same operation, maintenance and options as conventional robots

■Manipulator General Specifications

Model			YS-080GⅢ	HS-220GⅢ
Type			6 axis articulated robot	
Payload			80 kg	220 kg
Working Range	RT (Rotating trunk)		±180 °	±178 °
	UA (Upper arm)		-80 ° ~ +155 °	-65 ° ~ +80 °
	FA (Forearm)	Referenced from Horizontal	-140 ° ~ +230 °	-130 ° ~ +230 °
		Referenced from upper arm	-80 ° ~ +180 °	-73° ~ +190 °
	RW (Rotating wrist)		±360 °	±360 °
	BW (Bending wrist)		±125 °	±128 °
	TW (Twisting wrist)		±360 °	±360 °
Max. Motion Speed	RT (Rotating trunk)		170°/s	120°/s
	UA (Upper arm)		140°/s	105°/s
	FA (Forearm)		160°/s	110°/s
	RW (Rotating wrist)		230°/s	145°/s
	BW (Bending wrist)		230°/s	145°/s
	TW (Twisting wrist)		350°/s	220°/s
Weight			645 kg	955 kg

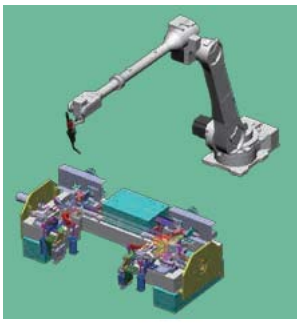
3m ARM WELDING ROBOT

● Conventional technologies “GⅢ controller & Wire feeder” are adopted

High quality welding in combination with Full Digital welding power source

● Realize the simple system (External axis is unnecessary)

● Suitable for larger work (application example)



for Beam axle type suspension system
【Maximum Reach for Welding : 3 281 mm】

GⅢ-HH020L

■Manipulator General Specifications

Model		HH020L
Payload		20 kg
Structure		6 axis articulated
Working Range	RT (Rotating trunk)	±180 °
	UA (Upper arm)	+180 ° ~ -65 °
	FA (Forearm)	+260 ° ~ -160 °
	RW (Rotating wrist)	±195 °
	BW (Bending wrist)	±135 °
	TW (Twisting wrist)	±360 °
Max. Motion Speed	RT (Rotating trunk)	175°/s
	UA (Upper arm)	175°/s
	FA (Forearm)	180°/s
	RW (Rotating wrist)	360°/s
	BW (Bending wrist)	380°/s
	TW (Twisting wrist)	600°/s
Position Repeatability		±0.15 mm
Maximum Reach		3 281 mm
Weight(Approx.)		535 kg

Tilt-Rotate Positioners High-Speed Type R Series

Two types available:
300 kg and
500 kg payload

- 1.8 times faster maximum speed compared with the conventional models.
- Smallest-in-class footprint of 780 × 500 mm. (300 kg payload model)
- Easier installation with three selectable cable outlet positions.

■Specifications

Name		Positioner unit	
Model		YA-1RJC62	YA-1RJC72
Applicable Robot		Panasonic robots TM/TL series with GⅢ/WGⅢ controller	
Payload		300 kg	500 kg
Max. Speed	Rotation	190.0°/s (31 r/min)	165.0°/s (27 r/min)
	Tilt	125.5°/s (20 r/min)	90.0°/s (15 r/min)
Operating Range	Rotation	-3 600° to +3 600° (with multi-rotation data reset function)	
	Tilt	-135° to +135°	
Allowable Moment	Rotation	323 N·m	392 N·m
	Tilt	882 N·m	1 274 N·m
Position Repeatability		±0.05 mm (R=250 mm)	
Hollow Shaft Diameter		55 mm	
Allowable Welding Current		500 A @ 60 % duty cycle	
Weight		285 kg	
Applicable Welding Process		CO_2/MAG/MIG/TIG	
External Axis Controller Type		Internal/External	

Single-axis positioners

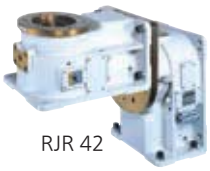
Payload:
250/500 kg

RJB 12/22

Payload:
1000 kg

RJB 32

Side mount 2-axis positioners



RJR 42

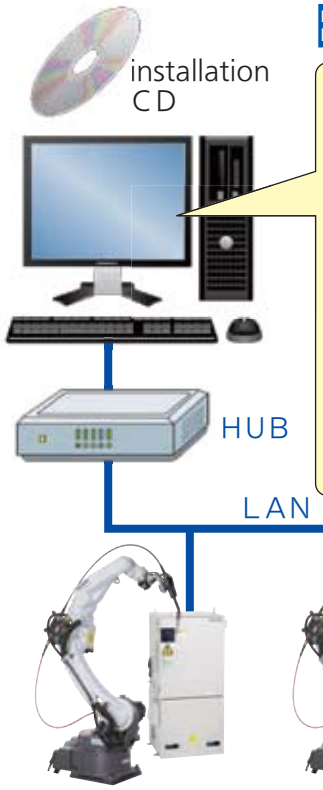
RJR 52

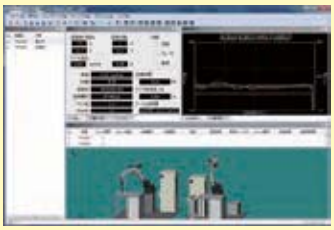
■Specifications

Name	Positioner unit		
Model	YA-1RJB12	YA-1RJB22	YA-1RJB32
Applicable Robot	Panasonic robots TM/TL series with GⅢ/WGⅢ controller		
Payload	250 kg	500 kg	1 000 kg
Max. Rotational Speed	190°/s (31.6 r/min)	120°/s (20 r/min)	120°/s (20 r/min)
Operating Range	-3 600° to +3 600° (with multi-rotation data reset function)		
Allowable Torque	196 N·m	490 N·m	1 470 N·m
Allowable Moment	1 470 N·m	1 470 N·m	6 125 N·m
Position Repeatability	±0.05 mm (R=250)		
Hollow Shaft Diameter	55 mm	55 mm	75 mm
Brakes	Provided		
Allowable Welding Current	500 A @ 60 % duty cycle		
Weight	125 kg		255 kg
Applicable Welding Process	CO_2/MAG/MIG/TIG		
External Axis Controller Type	Internal/External		External

Production Management Function Real-Time Monitoring on PC.

Effective for Monitoring Robot Operation and Production Progress.





Robot operation monitoring

Monitors robot movement and welding waveform in real time, which allows to improve welding posture and conditions.

Remote TP Viewer

Monitors Teach Pendant (TP) screen in real time, whitch allows to share information away from welding site.

Notes:
- An optional license is necessary for each robot.
- The network environment and devices (including PC) must be prepared by the customer.
- Up to 10 robots can be connected to one PC.
- It is not possible to connect to the external network (e.g., connection from factory LAN to the Internet).
- WGⅢ, WGHⅢ, and GⅢ controllers of software version 20.00 or later are applicable. (TIG is not supported.)

FA Technical Centers

Feel the excellent performance of TAWERS

FATC(Tangshan)

FATC(Shanghai)

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● Other FATC : Wuhan, Queretaro, Bowin, Jakarta, Hanoi, Detroit, Columbus

Welding and Robot College

We support development of highly skilled welding operators.

Workshops:
- Robot
- MAG/MIG
- TIG
- Special training

Consulting

Professional staff offer technical solutions.

Qualifications:
- Welding coordination personnels (including first class)
- JIS qualified welding operators
- Metal materials inspectors
- International welding license holders

Process Development

Process verification prior to system installation.

Case Examples:
- New factory weld processing
- Improvement of existing processes
- Develop new welding solutions

We provide products that are friendly to the environment.

As an earth-friendly company, Panasonic Corporation discourages the use of hazardous substances in our products. The products of Panasonic Corporation comply with the European RoHS directive.

Safety precautions ● Before attempting to use any welding product always read the manual to ensure correct use.

Panasonic

Range of Welding Equipment: MMAW | MIG/MAG | TIG | Plasma Cutting | Welding Accessories | Welding Robots

Panasonic has set-up its own state-of-the-art welding equipment manufacturing facility at Jhajjar near Gurugram, Haryana, India.

For more information and service related queries please write to:
welding.info@in.panasonic.com, Psfsin.enquiry@in.panasonic.com

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Catalog No. IRTMTL-GIII

Printed in Japan [2019.3] 5-003P