Panasonic
ideas for life

6 axis articulated arc welding robot

TAWERS Series

2011-3

The Arc Welding Robot System TAWERS

Improving “Welding technology” with the times,
Pursuing “Manufacturing Excellence with
the latest Welding Technology” !



Welding Navigation

“Welding Navigation” is included as standard for easy operation !



Panasonic pursues “Only one” in welding.

TAWERS WG III

Welding power supply embedded robot to facilitate the selection of welding conditions.

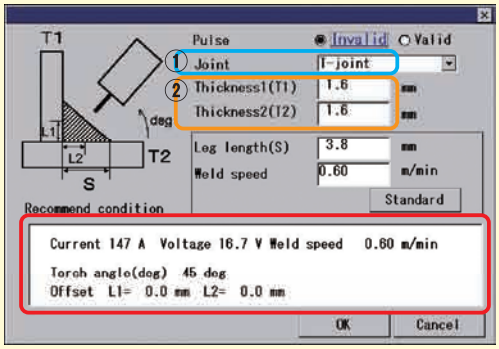
Easy setting of welding conditions with the "Welding Navigation" ! Standard

Easy setting and checking of welding conditions with Teach Pendant.

Welding Navigation NEW



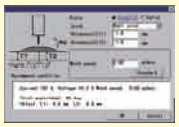
※The contents displayed on the screen are subject to change without advance notice.

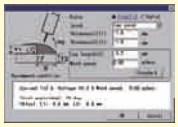


※The standard welding torch angle and target position are also displayed.

①After entering joint data, the screen is displayed in conformity with the shape.

〈Example screen displays〉





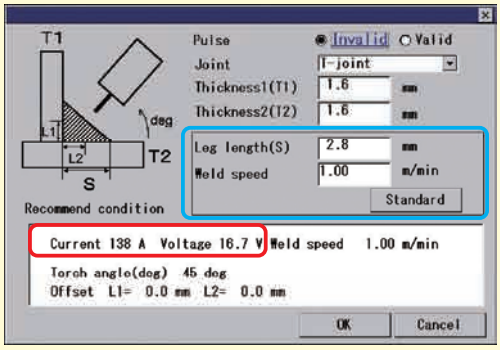
②Then,input the "plate thickness".

The welding condition data base accumulated from extensive experience is equipped as standard software.

The search for the welding conditions can be made in shorter time.

The fundamental welding conditions are automatically selected from the rich data base.

In addition,the "leg length" of a fillet weld and "welding speed" can also be adjusted.



The required electric current & voltage are automatically calculated when any of the welding conditions are changed.

※As the setting conditions displayed by the "Welding Navigation" are only the rough guideline, the satisfactory welding results are not warranted.

All new teach pendant with easier operation !

Operating function key



User function key

Same basic operation procedure with former model Windows based operation realizing easy use

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

TAWERS WGⅢ

Welding power supply embedded robot which fully controls the welding current waveform.

“High performance manipulator” optimized for the arc welding !

The extensive line up allowing the selection to meet the work sizes.

TA-WGⅢ	TB-WGⅢ
1000	1400
1400	1800
1600	
1800	
1900	

WGⅢ / rated welding power output : 350 A
Duty cycle 80% (pulse 60%)



TA-1400WGⅢ



TA-1600WGⅢ



Torch cable integrated type

TB-1400WGⅢ

All new controller with advanced performance !

- Faster and powerful CPU achieving half a minute quick boot up.
  (50% time saving compared with former model)
- Optimum kinematic calculation realizing faster acceleration and deceleration.
  (Roughly 10% air cut time reduction compared with former model)

NEW

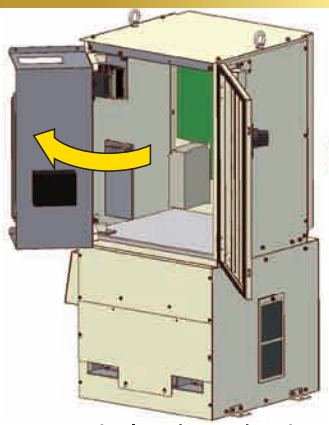


WGⅢ

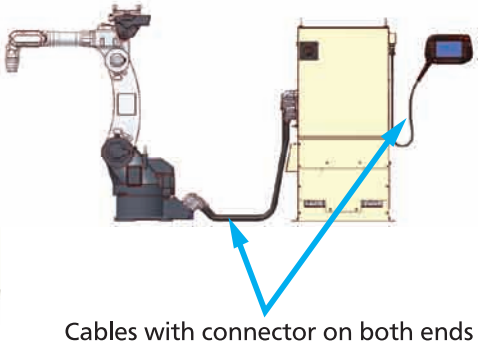
Better and easier maintenance !

NEW

- Swivel rack mechanism realizing easy maintenance and space saving at the same time.
- Cables with connectors on both ends contributing to easier and shorter robot set-up or cable exchange.



swivel rack mechanism



Cables with connector on both ends

TAWERS WG Ⅲ

TAWERS permits you to select/change the welding method at your will !

SP-MAG Ⅱ for MAG welding! (thin plate short-circuit range)
MTS-CO2 for CO_2 welding!

SP-MAG Ⅱ

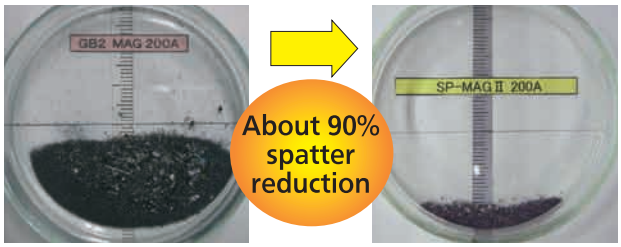
(Super-imposition Control)

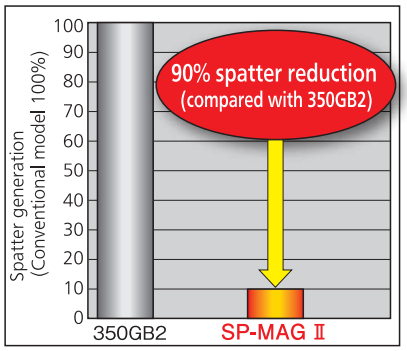
Greatly reduced spatter generation of thin plate with MAG!

Realized reduction of spatter generation in the short-circuit ranges with “welding current waveform control” technology.

■ Comparison of spatter generation (For one minute at 200 A)

Full Digital (350GB2) TAWERS (SP-MAG Ⅱ)

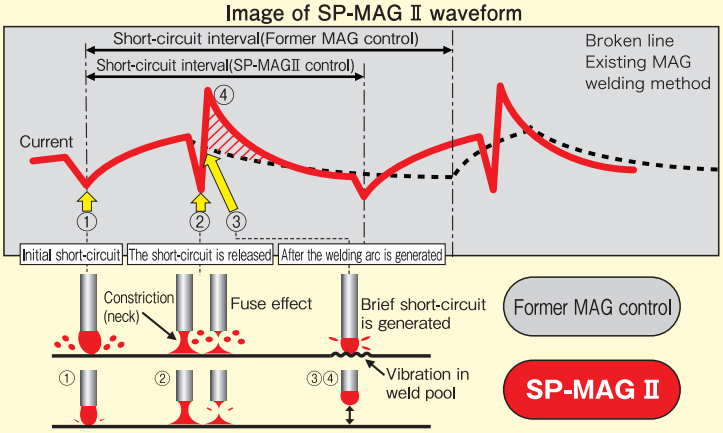




(Welding wire)
YM-51MT/Panasonic wire



(Recommended)



①Initial short-circuit control
The welding current is rapidly reduced with the highly accurate detection of short-circuit and secondary switching※1 to prevent the generation of the brief short-circuit (generation spatter) to proceed to generating the full short-circuit.

②Neck control
Constriction at the tip of the wire is detected to rapidly reduce the welding current with the secondary switching in order to prevent the fusing effect from occurring at the wire tip.

③HS control
To limit vibration in weld pool immediately after the generation of welding arc in order to prevent the generation of the brief short-circuit. (generation spatter)

④SP control
The wire tip melting speed is increased with the super imposition of the welding current immediately after the end of the short-circuit in order to have the smooth transition to the next short-circuit and also to shorten the short-circuit intervals.

※1 Secondary switching
Control method to reduce the spatter through the smooth transition to short-circuit or arc generation by rapidly reducing the welding current immediately before and after the short-circuit.

MTS-CO2

(Metal Transfer Stabilization Control)

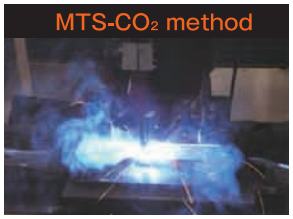
50% spatter reduction with CO_2 shielding gas !

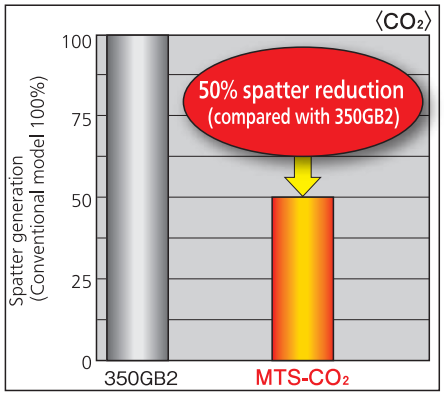
MTS control technology which can limit the generation of spatters characteristic to the CO_2 gas welding is added in addition to the technology cultivated with the “SP-MAG”.

Former method (TA and 350GB2)



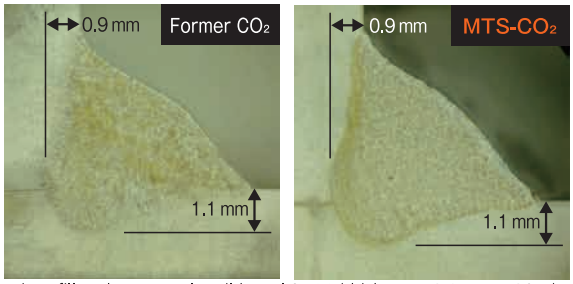
MTS-CO_2 method





Stable pan bottom-shape penetration possible only with the CO_2 welding.

Comparison of penetration



Joint : fillet, base metal : mild steel SPCC (thickness : 2.3 mm/120 A)
Welding speed : 30 cm/min.
Welding wire : YGW12 (1.2 mm dia.) CO_2

TAWERS WG Ⅲ

TAWERS permits you to select/change the welding method at your will !

Pulse MAG (high current range)
HD-Pulse for the high speed low spatter welding
Normal pulse for the low spatter welding

HD-Pulse (Hyper Dip-Pulse Control)

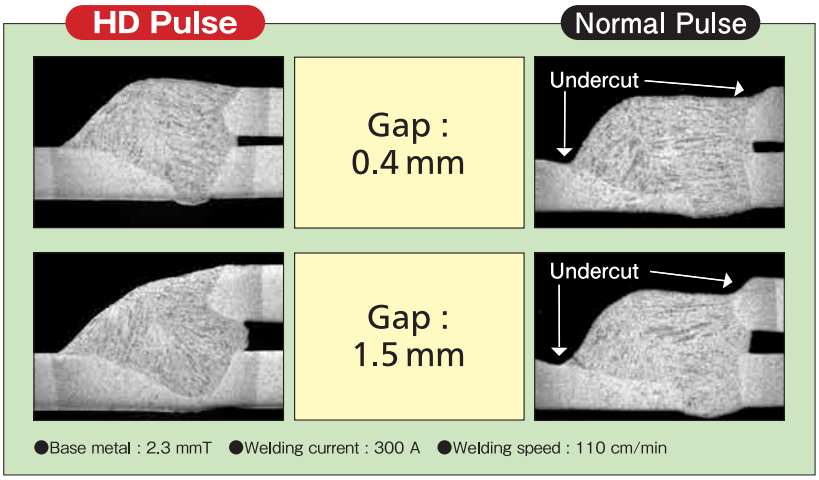
Realized the high speed pulse welding!

Controlling the generation of undercuts caused by the insufficient deposition in the high speed welding with shortened arc length and narrowed arc width.

■Advantages of "HD-Pulse" welding method

- ●Controlling the generation of undercuts in the high speed welding.
- ●Low heat input by the droplet transfer of the short-circuit. Improving the gap allowance.
- ●Realized low spatters by accurately controlling the short-circuit.

■High speed welding

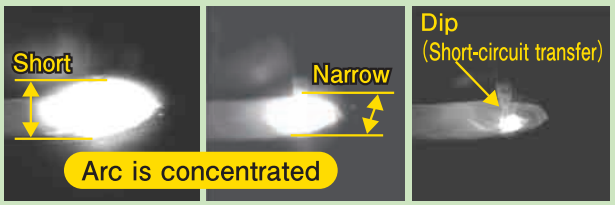


Undercut is hardly generated,realized the ideal welding method !

■Type of the droplet transfer

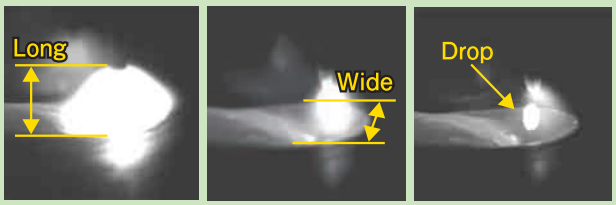
HD Pulse

Type of transfer : 1 Pulse 1 Dip (Short-circuit transfer)



Normal Pulse

Type of transfer : 1 Pulse 1 Drop (Drop transfer)



Welding methods	Spray range 280A～		
	SP-MAG Ⅱ	Normal-Pulse	HD-Pulse
Welding speed	good	good	excellent
Spatter	no good	excellent	good
Penetration shape	no good	no good	excellent
Undercut	no good	no good	excellent
Base metal heat input	no good	no good	good
Gap resistance	no good	no good	good
Overall evaluation	no good	no good	excellent

●**SP-MAG Ⅱ:**
Spatter is the problem to solve in the high current range.

●**Normal-Pulse :**
Undercut is the problem to solve in the high speed welding.

HD-pulse is most suitable for the high current and high speed welding.

Active TAWERS WG III

APPLICATION TYPE

CO_2/MAG/Stainless MIG Realized the lower spatter welding at the arc start and when the torch angle is changed.

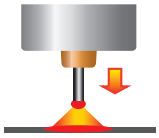
Active Wire Feed Process (AWP)

NEW

Realizing low spatter welding by precisely controlling wire feed speed.

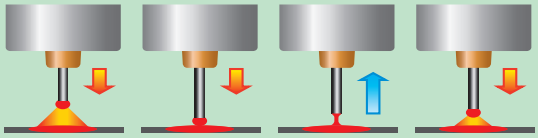
AWP is an advanced process combining waveform control and wire feed control technology together enabling limited spatter generation compared even with TAWERS SP-MAG or MTS-CO2.

【Ordinary CO_2,MAG or MIG process】



Welding wire is always fed at constant speed. Limit in spatter reduction.

【Active wire feed process】



Welding wire is fed back and forth continuously.Spatter generation is reduced by assuring firm short / arc cycle. AWP:Active Wire Feed Process

The system makes the high accuracy of wire control possible.

Servo Pull Feeder



+

Wire Booster



TA-WG III: 1000, 1400, 1600, 1800, 1900

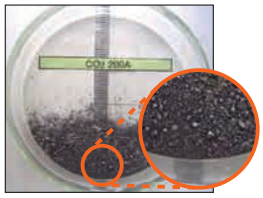
TB-WG III: 1400, 1800



Greatly reduced spatter generation! Minimizing spatter size!

CO_2 welding

【TAWERS CO_2】



【Active TAWERS】



MAG welding

【TAWERS SP-MAGII】



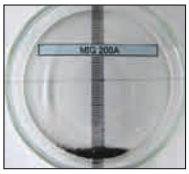
【Active TAWERS】



Stainless steel MIG welding

70% spatter reduction at 200 A range

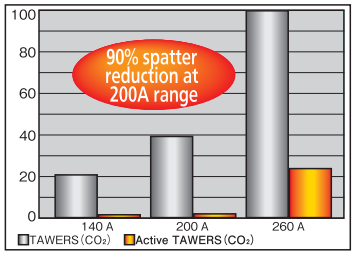
【TAWERS SP-MAGII】



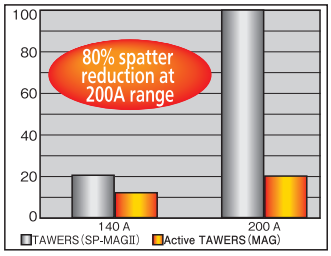
【Active TAWERS】



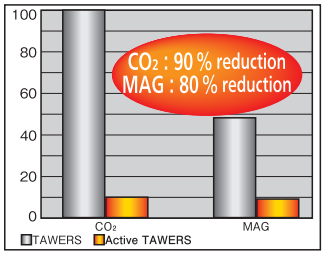
CO_2 welding



MAG welding

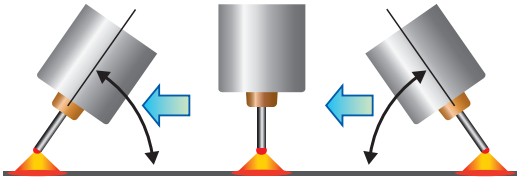


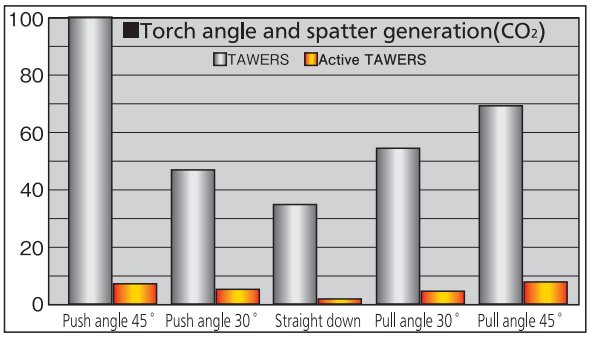
Arc Start



- Smaller spatter size decreases spatter sticking to work piece.
- Contributing to quality improvement,less spatter removal and system clean up time.
- Effective on thin stainless steel gap weld preventing burn through.

Less sensitive to torch angle changes only creating limited spatter!





WGIII series manipulators line up

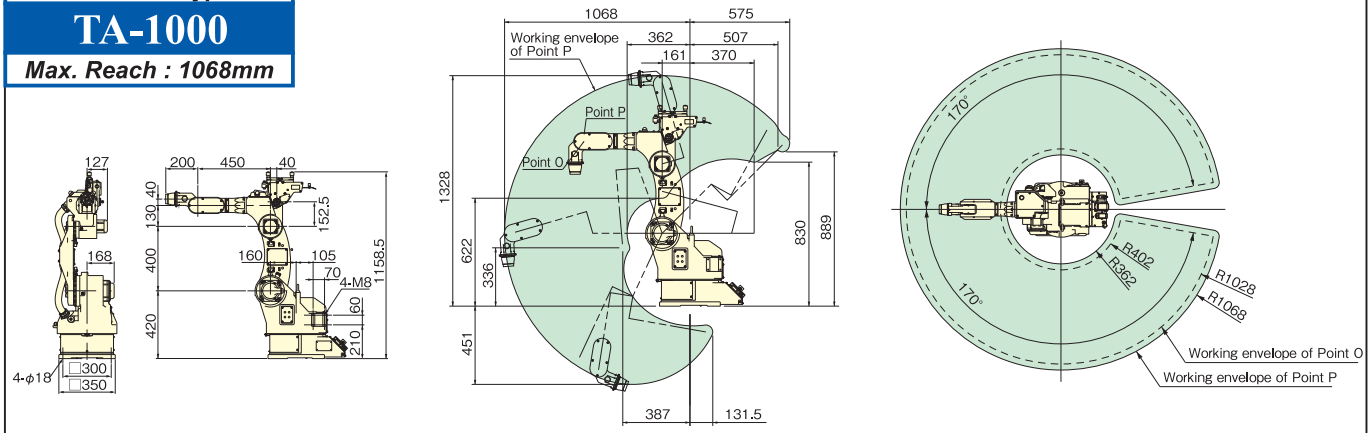


Arm type	Short	Standard	Middle	Long		Torch cable integrated	
Model	TA-1000	TA-1400	TA-1600	TA-1800	TA-1900	TB-1400	TB-1800
Max. reach	1068mm	1374mm	1598mm	1796mm	1895mm	1437mm	1802mm

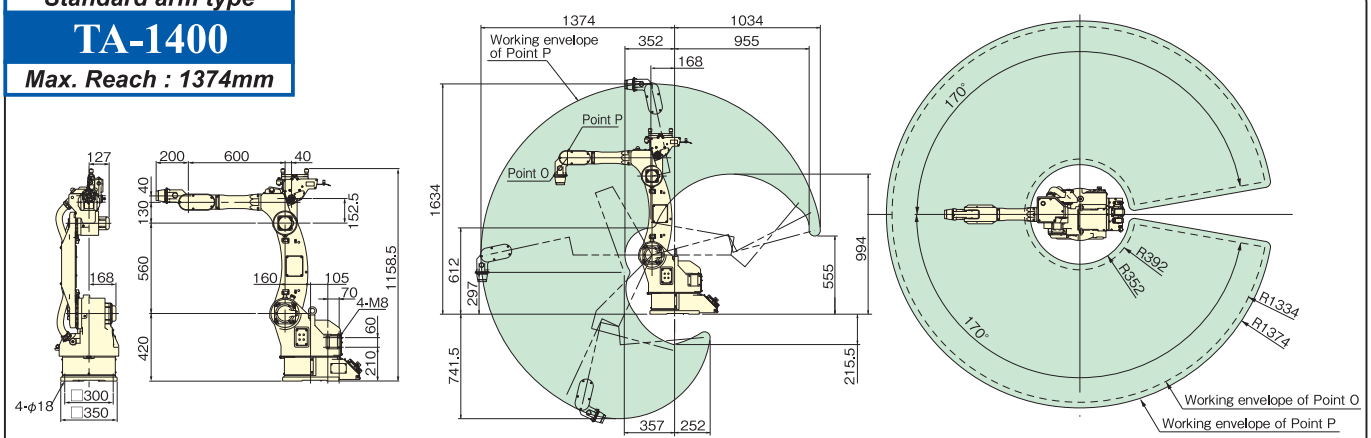
Outside dimensions & Working envelope

< Manipulators >

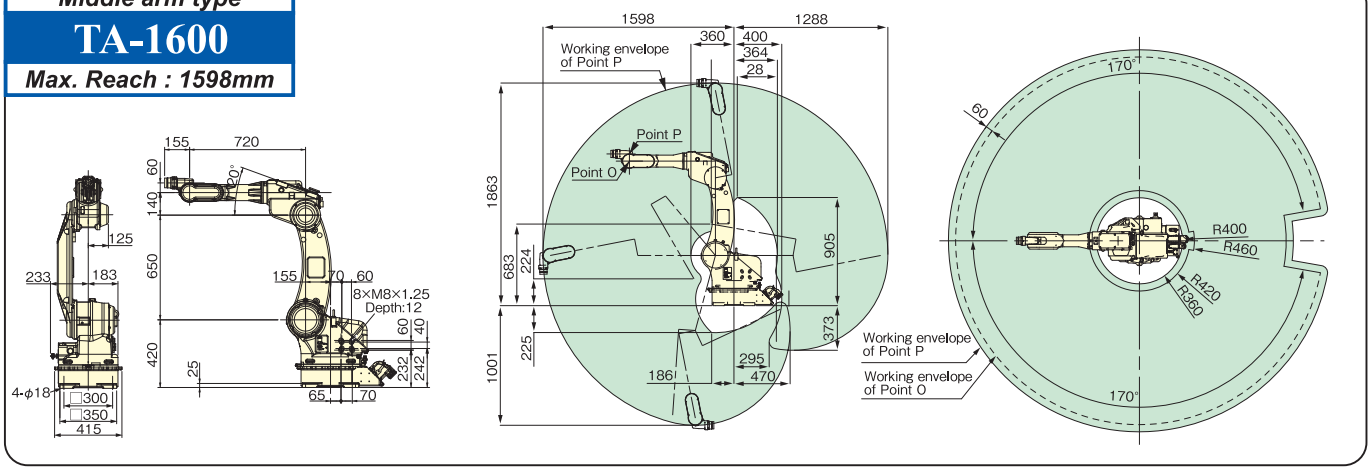
Short arm type
TA-1000
Max. Reach : 1068mm



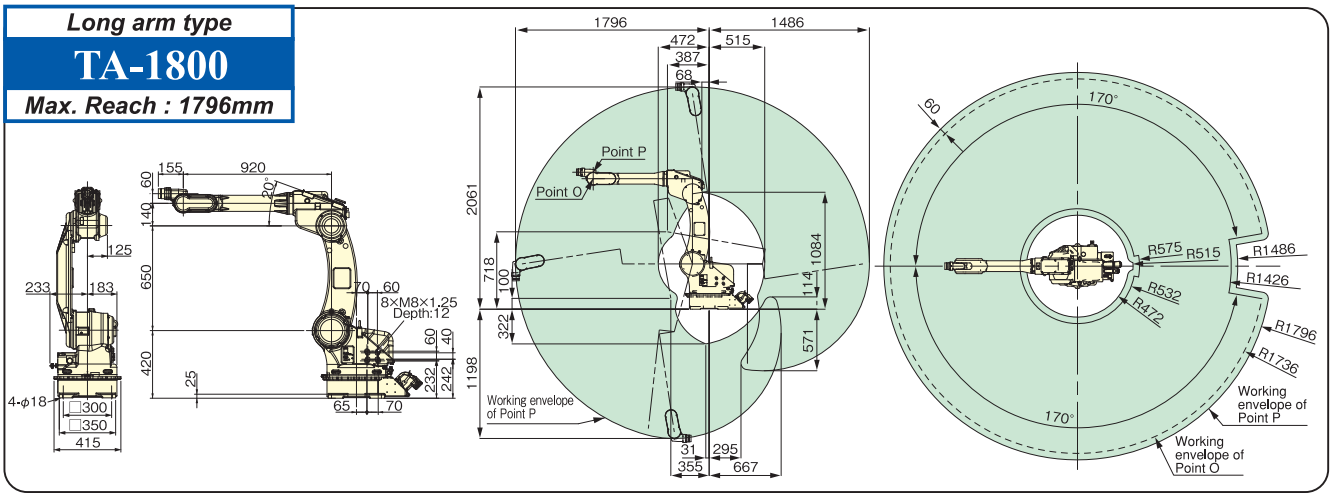
Standard arm type
TA-1400
Max. Reach : 1374mm



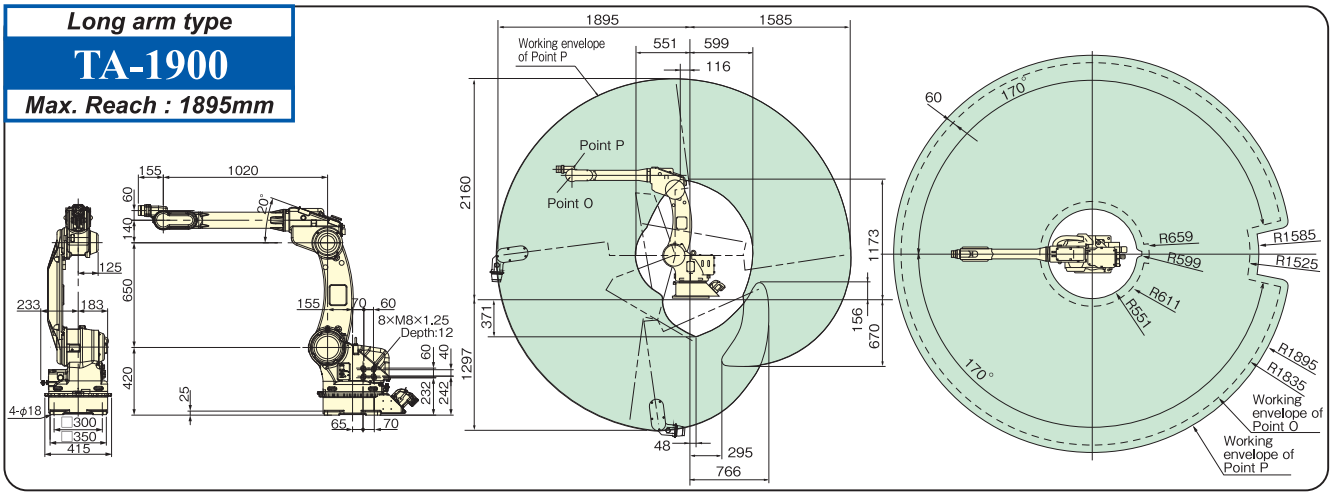
Middle arm type
TA-1600
Max. Reach : 1598mm



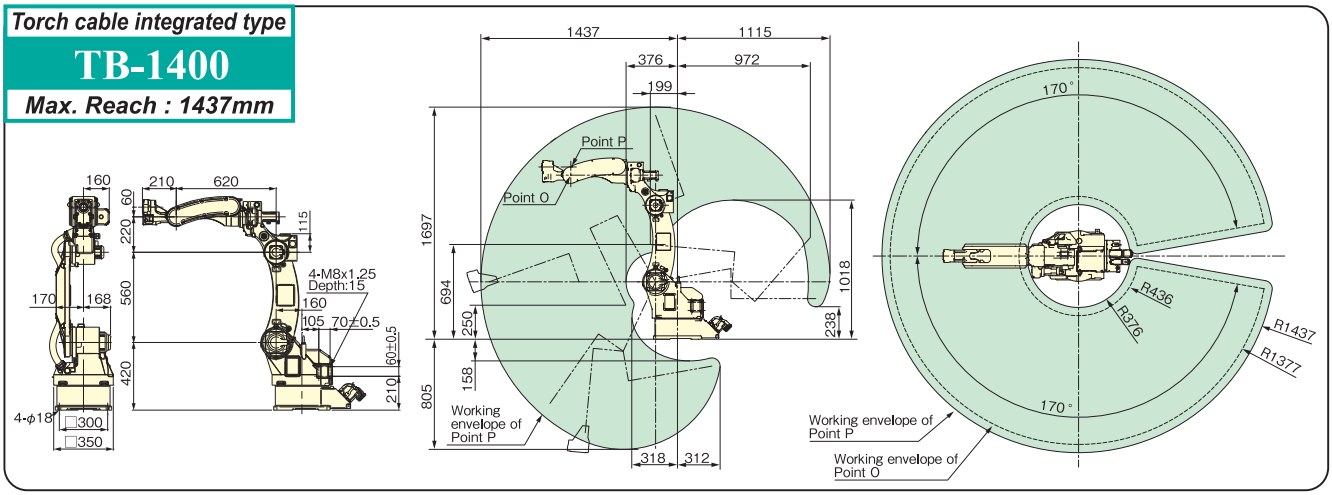
Long arm type
TA-1800
Max. Reach : 1796mm



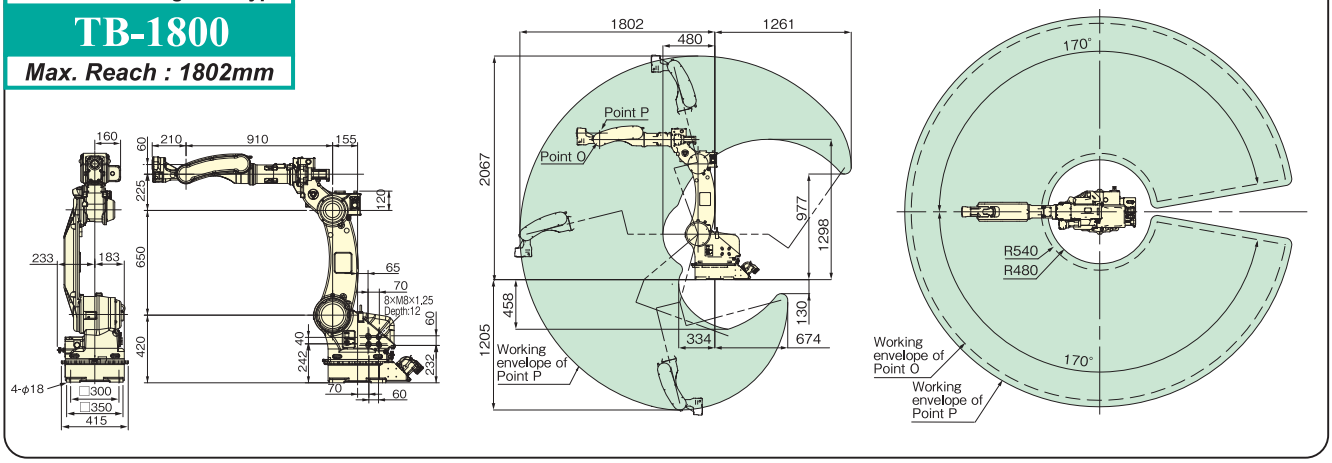
Long arm type
TA-1900
Max. Reach : 1895mm



Torch cable integrated type
TB-1400
Max. Reach : 1437mm



Torch cable integrated type
TB-1800
Max. Reach : 1802mm



Standard specifications <Manipulators>

Model			TA-1000	TA-1400	TA-1600	TA-1800	TA-1900	TB-1400	TB-1800
Type			Short arm	Standard arm	Middle arm	Long arm		Torch cable integrated	
Structure			Independent articulated						
Axes			6						
Maximum allowable payload			6 kg		8 kg		6 kg	4 kg	
Robot working area	Maximum accessible distance		1068 mm	1374 mm	1598 mm	1796 mm	1895mm	1437 mm	1802 mm
	Minimum accessible distance		362 mm	352 mm	360 mm	472 mm	551mm	376 mm	480 mm
Momentary maximum speed	Arm	Rotation(RT)	2.97 rad/s (170° /s)					2.97 rad/s (170° /s)	
		Upper arm(UA)	3.32 rad/s (190° /s)		2.97 rad/s (170° /s)			2.97 rad/s (170° /s)	
		Front arm(FA)	3.32 rad/s (190° /s)		3.05 rad/s (175° /s)			3.32 rad/s (190° /s)	3.05 rad/s (175° /s)
	Wrist	Rotating(RW)	6.46 rad/s (370° /s)		6.28 rad/s (360° /s)			5.93 rad/s (340° /s)	
		Bending(BW)	6.54 rad/s (375° /s)		6.11 rad/s (350° /s)			6.54 rad/s (375° /s)	
		Twisting(TW)	10.5 rad/s (600° /s)		9.42 rad/s (540° /s)			10.5 rad/s (600° /s)	
Positioning repetition precision			±0.1 mm or less						
Brake			All axis are provided with brakes						
Installation			Floor, Ceiling (factory option)						
Weight of manipulator			Approx.145 kg	Approx.161 kg	Approx.180 kg	Approx.185 kg		Approx.171 kg	Approx.195 kg

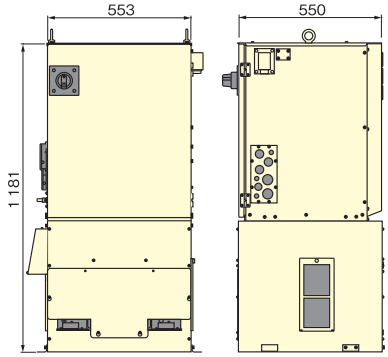
Outside dimensions and specifications <Controller>

Model	WGⅢ
Dimensions (mm)※	(W)553×(D)550×(H)1181
Weight (kg)	135
Memory capacity	40,000 points
Position control method	Software servo control
External communication interface	TP:1slot for SD memory card and 2 ports for USB
The number of control axis	6 axes simultaneously (Max.27 axes)
Input and output	Input:40 points(Option:expandable to max.2048 points) Output:40 points(Option:expandable to max.2048 points)
Input power source	3−phase, AC200V±20V, 22kVA, 50/60Hz
Welding method	CO_2/MAG/Stainless steel MIG Pulse MAG/Stainless pulse MIG
Output current adjustable range	30−350 A DC
Output voltage adjustable range	12−36 V DC
Rated duty cycle	80% for GMAW and 60% for pulse GMAW

※Not including teach pendant and robot cable

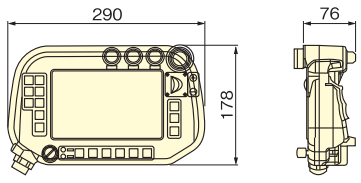
■Controller (with power unit)

WGⅢ
(mm)



■Teach pendant

WGⅢ
(mm)



DTPSⅢ Desk Top Programming & Simulation system

DTPS is a program simulation software developed exclusively for Panasonic robots.
With this software, users can create and edit robot programs and verify robot motion offline.



<Features>
- ●Useful edit function (batch conversion, shifting, etc)
- ●Highly-accurate movement simulation
- ●3D graphics
- ●Identical to robot operation
- ●Simple CAD function for work piece shape creation
- ●Graphic import function (standard)
- ●Multiple robot control ●Windows XP(SP3～), VISTA(SP2～), 7



Center mount tilt rotate positioner High speed type **R series**



Two types available with maximum capacities of 300 and 500 kg

- 80% faster maximum speed compared with former model.
- Smallest foot print (780x500mm) in the class. (300 kg type)
- Easier installation with choice of control cable outlet in three directions.

■Specifications

Name		Positioner unit	
Model		YA-1RJC61	YA-1RJC71
Applicable robots		Robot systems with Panasonic robot controllers G2 series or later models	
Maximum payload		300 kg	500 kg
Maximum output speed	Rotational	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	Rotational	±10 revolutions (with multi - rotation data reset function)	
	Tilt	−135° ~+135°	
Allowable moment	Rotational	323 N・m	392 N・m
	Tilt	882 N・m	1 274 N・m
Repeatability		±0.05 mm (R=250 mm)	
Diameter of hollow shaft		55 mm (diameter)	
Allowable welding current		500 A (Duty cycle : 60%)	
Weight		285 kg	
Applicable welding methods		CO_2/MAG/MIG/TIG	
External axis controller types		External type (G3 controller : built-in type is possible)	

Single axis positioner

Max. capacity 250/500 kg



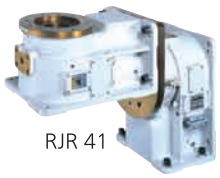
RJB 11/21

Max. capacity 1000 kg



RJB 31

Side mount 2 axes positioner



RJR 41



RJR 51

■Specifications

Name	Positioner unit		
Model	YA-1RJB11	YA-1RJB21	YA-1RJB31
Applicable robot	Robot systems with Panasonic robot controllers G2 series or later models		
Maximum payload	250 kg	500 kg	1 000 kg
Maximum output speed	180°/s (30 r/min)	96°/s (16 r/min)	120°/s (20 r/min)
Operating range	±10 revolutions (with multi - rotation data reset function)		
Allowable rotational 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
Repeatability	±0.05 mm (R=250)		
Diameter of hollow shaft	55 mm (diameter)	55 mm (diameter)	75 mm (diameter)
Brake	Provided		
Allowable welding current	500 A, 60%		
Weight	CO_2/MAG/MIG/TIG		
Applicable welding methods	125 kg		255 kg
External axis controller types	Built-in or external type		External type

We provide products that are friendly to the environment.

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

ISO 9001 JQA-1179

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

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