

**Panasonic**  
ideas for life

6 axis articulated arc welding robot

**TAWERS** Series

2011-6

# The Arc Welding Robot System **TAWERS**

“Experts in productivity”  
advancing weld technology to a higher level !



**Welding  
Navigation**

“Welding Navigation”  
realizing easier weld development

Panasonic pursues “Only one” in welding.

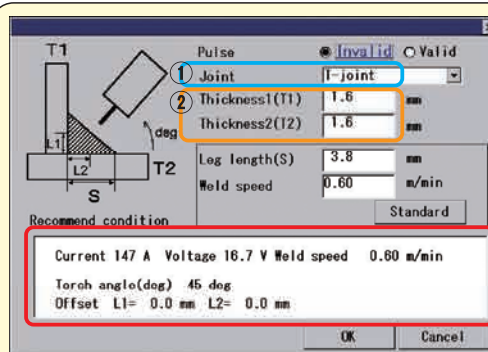
### “Welding Navigation”, easy weld parameter setting! Standard



#### Easy setting through Teach Pendant



※screen images are subject to change without notice.



※Torch angle and aiming point also calculated

#### Two easy steps

① Select weld joint  
Joint image changes automatically



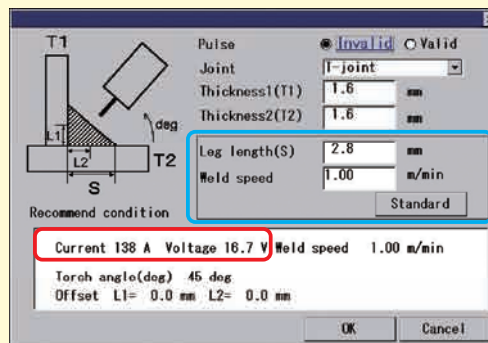
(image of various Joint types)

② Select plate thickness  
That's all.

#### Recommended parameters automatically calculated

“Leg length” and “Weld speed” adjustable for further development

“Welding Navigation”  
saves weld  
development time



When weld speed is increase, “Welding Navigation” will automatically recalculate parameters for better productivity

※Parameters from “Welding Navigation” are for guideline purpose only, does not guarantee welding result

### 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 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

# TAWERS WGIII

Embedded Arc Control  
technology  
Robot controlled welding machine

“High performance manipulator” optimized for the arc welding !

Variety of manipulator for arc welding suitable for all different welds

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

TA-WGIII

TB-WGIII

1000
1400
1600
1800
1900

1400
1800



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

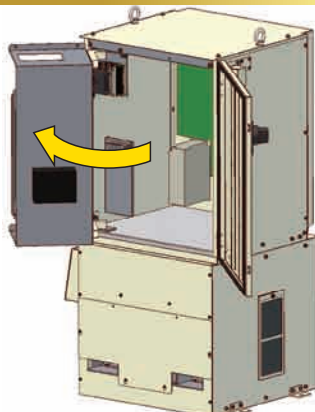


WGIII

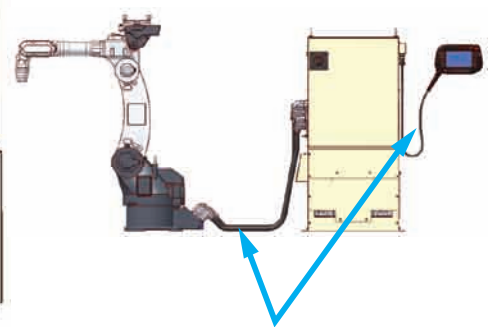
Better and easier maintenance !

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 II

## TAWERS technology Various welding processes!

SP-MAG II for mixed gas short-arc weld

MTS-CO<sub>2</sub> for CO<sub>2</sub> gas weld

### SP-MAG II

(Super-imposition Control)

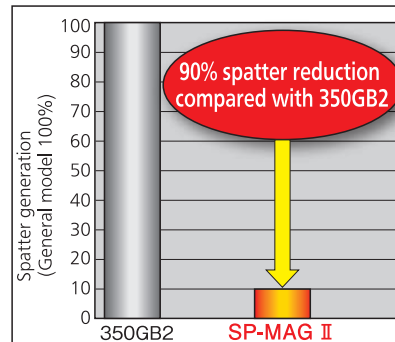
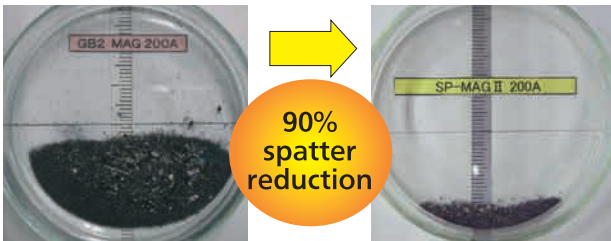
Low spatter mixed gas (MAG) process for thin material !

Advanced short-arc waveform control greatly reducing spatter !

#### Spatter comparison (200A / 1min.)

General welder (350GB2)

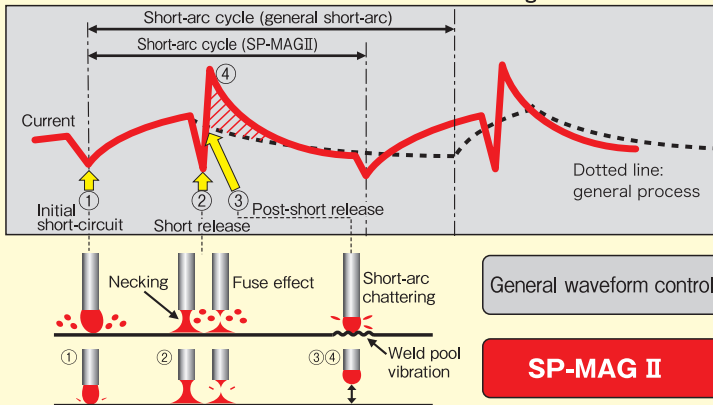
TAWERS (SP-MAG II)



Recommended wire  
YM-51MT/Panasonic



#### SP-MAG II current waveform image



#### ① Initial short-circuit control

Weld current rapidly reduced after accurate short-circuit detection controlled by secondary switching※1 circuit. This process confirms full short-circuit and prevents unexpected chattering which generates spatter.

#### ② Necking control

After neck detection, weld current rapidly reduced using secondary switching※1 circuit thus reducing spatter generation caused by fuse affect.

#### ③ HS control

Suppressing weld pool vibration preventing spatter generation.

#### ④ SP control

Super-imposing current after short release will accelerate wire melting speed, assuring smooth transition to next shorting. Short-arc cycle also shortened realizing more crisp arc.

※1 Secondary switching

Spatter reduction technology, rapidly reducing weld current during short to arc or arc to short transition maintaining stable arc.

### MTS-CO<sub>2</sub>

(Metal Transfer Stabilization Control)

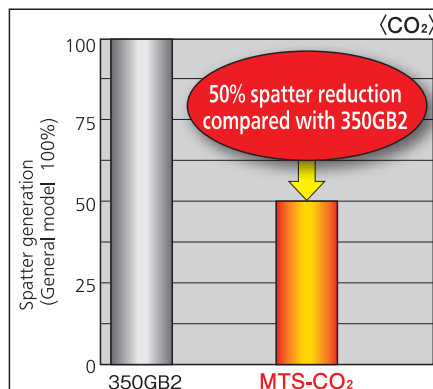
50% spatter reduction using inexpensive CO<sub>2</sub> gas !

“MTS control” on top of “SP-MAG” technology, reducing spatter unique with CO<sub>2</sub> gas !

General CO<sub>2</sub> process (350GB2)

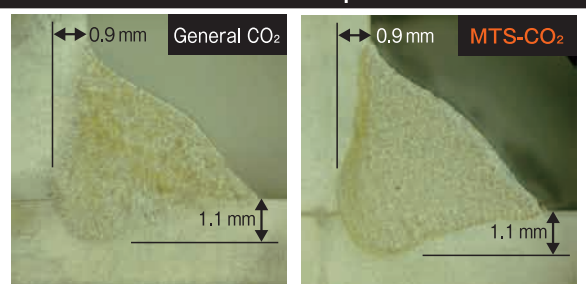


MTS-CO<sub>2</sub>



CO<sub>2</sub> advantage, reliable pan bottom-shaped penetration

#### Penetration comparison



Fillet joint, Mild steel SPCC (t2.3 mm / 120 A)

Weld speed : 0.3m/min, Weld wire : YGW12 (1.2 mm dia.) CO<sub>2</sub> gas

Normal pulse for super low spatter weld  
HD-Pulse for high-speed, low spatter weld

### HD-Pulse

(Hyper Dip-Pulse Control)

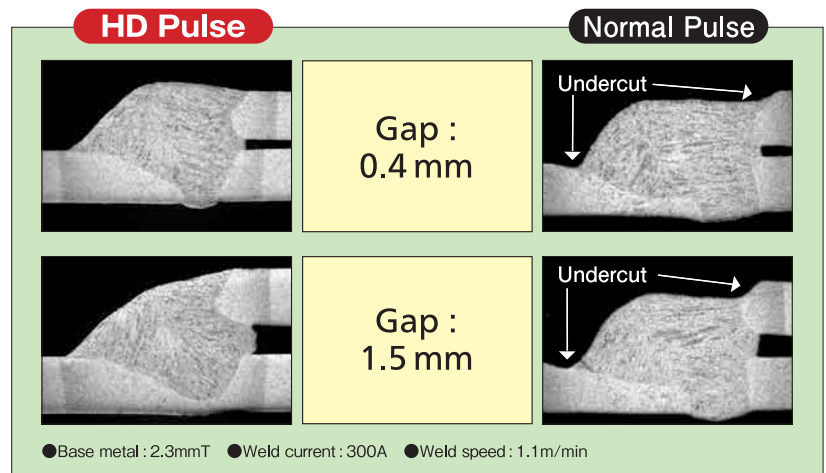
### Realized high speed pulse welding !

Preventing undercuts during high speed welding

#### ■ "HD-Pulse" advantage

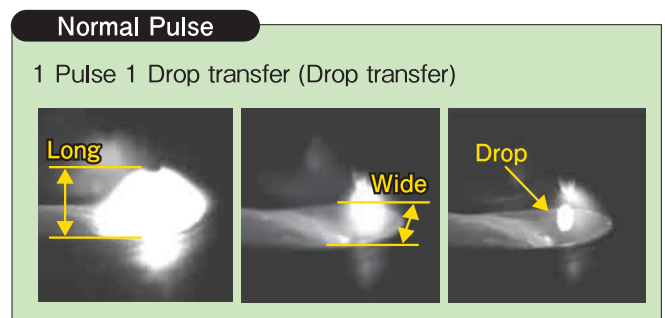
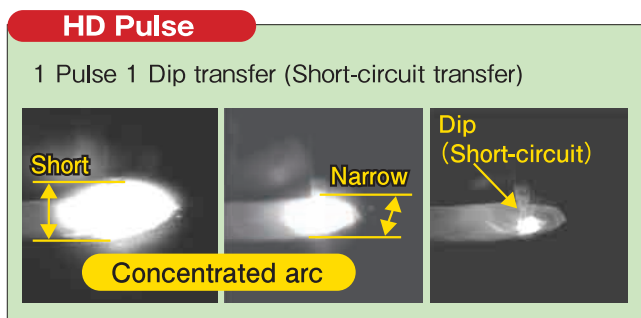
- Preventing undercuts during high speed welding.
- Dip (Short circuit) transfer enabling lower heat input with better gap handling capability.
- Accurately controlled dip timing reducing spatter generation.

#### ■ High speed welding



### Preventing undercuts with ideal penetration !

#### ■ Type of the droplet transfer



Weld process	Spray range 280A~		
	SP-MAG II	Normal-Pulse	HD-Pulse
Weld speed	good	good	excellent
Spatter	good-fair	excellent	good
Penetration pattern	fair	good-fair	excellent
Undercut	fair	fair	excellent
Heat input	fair	fair	good
Gap handling	fair	fair	good
Overall	fair	fair	excellent

● **SP-MAG II disadvantage :**  
Spatter at high current range.

● **Normal-pulse disadvantage :**  
Undercut during high speed welding.

**HD-Pulse**  
advanced high current, high speed welding

# Active TAWERS WGIII

**APPLICATION TYPE**

Innovative super low spatter process!

## Active Wire Feed Process (AWP) (Active Wire Feed Process)

**NEW**

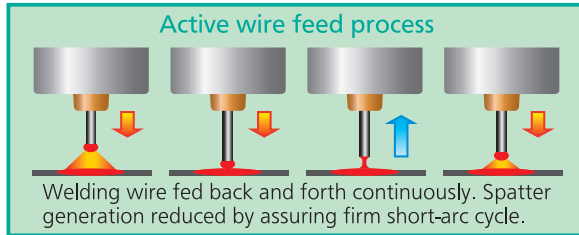
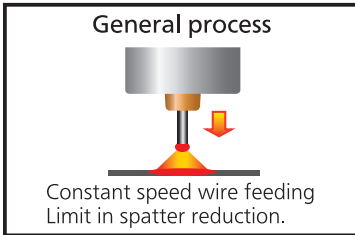
Realizing low spatter welding by precisely controlling wire feed speed.

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-CO<sub>2</sub>.

**TA-WGIII TB-WGIII**

1000  
1400  
1600  
1800  
1900

1400  
1800

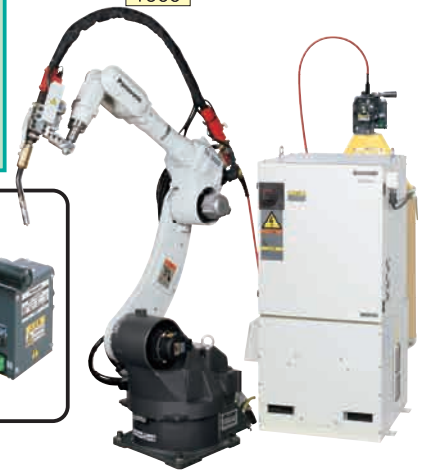


Push-pull system enabled accurate wire control

Servo Pull Feeder



Wire Booster



## Greatly reduced spatter generation! Minimizing spatter size!

### CO<sub>2</sub> gas welding

[TAWERS CO<sub>2</sub>]



[Active TAWERS]



### Mixed gas (MAG) welding

[TAWERS SP-MAGII]

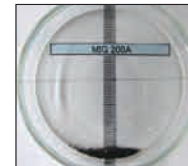


[Active TAWERS]

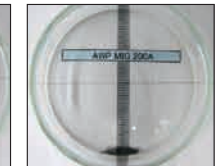


### Stainless steel MIG welding

[TAWERS SP-MAGII]

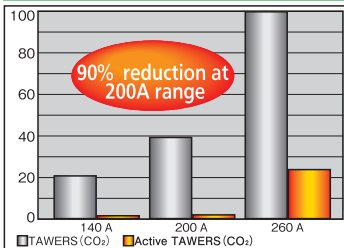


[Active TAWERS]

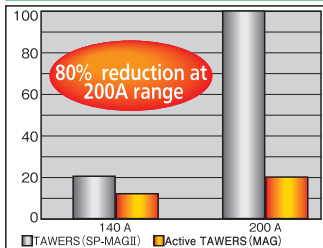


70% reduction at 200 A range

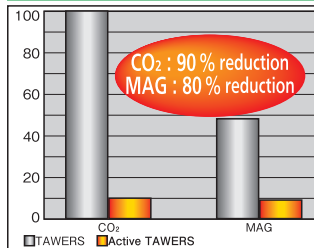
### CO<sub>2</sub> gas welding



### Mixed gas (MAG) welding

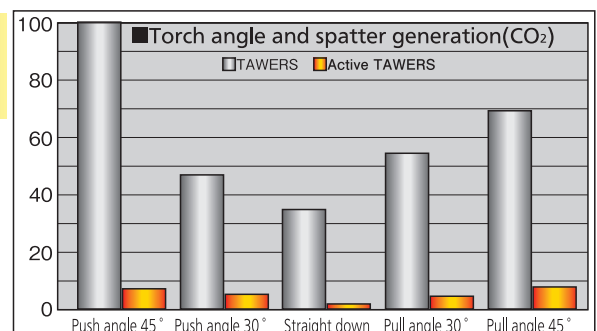
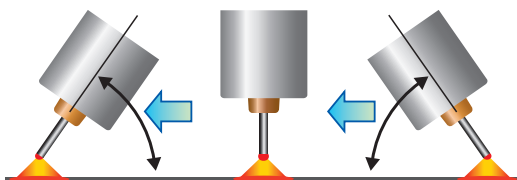


### Arc Start



- Fine spatter size prevents spatter sticking to work piece.
- Improving quality, 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 manipulator line up



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

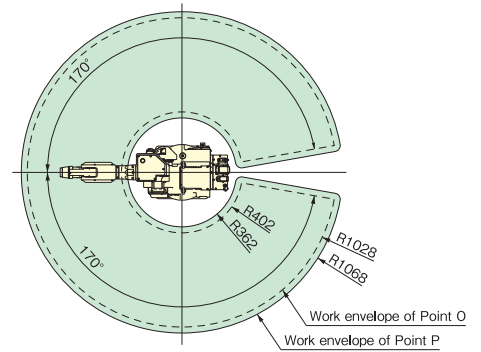
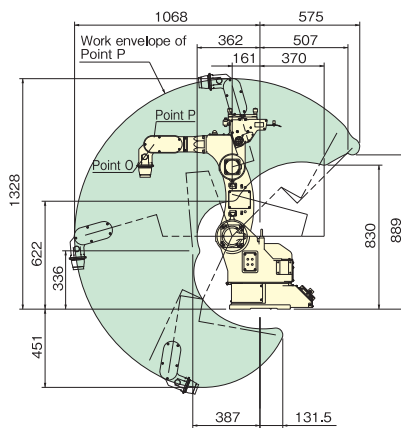
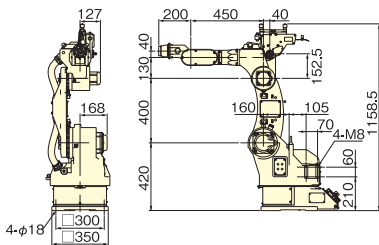
## Dimensions & Work envelope

< Manipulators >

### Short arm type

### TA-1000

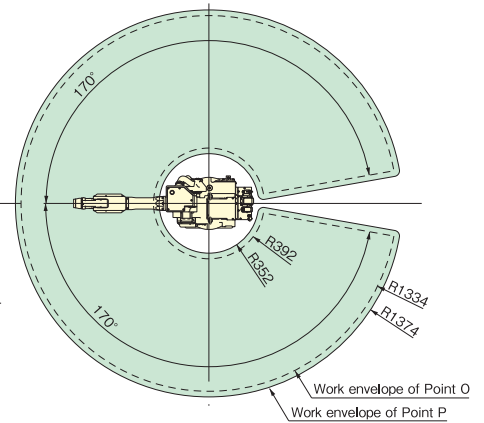
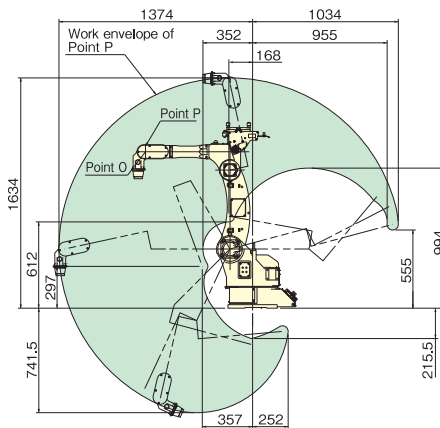
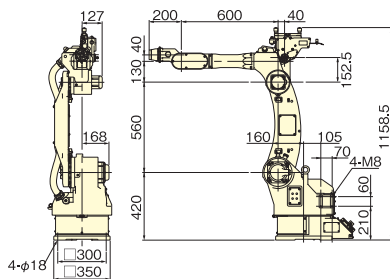
Max. Reach : 1068mm



### Standard arm type

### TA-1400

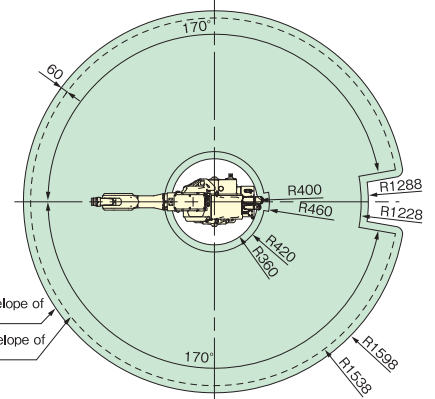
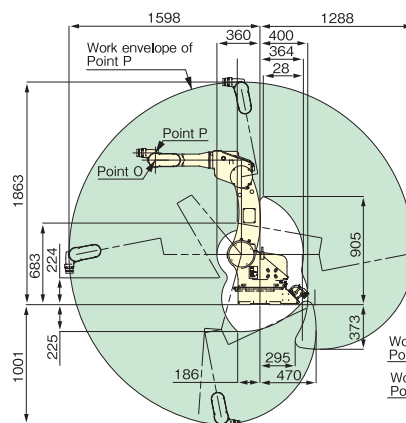
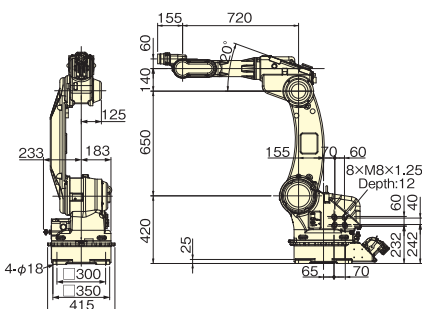
Max. Reach : 1374mm



### Middle arm type

### TA-1600

Max. Reach : 1598mm

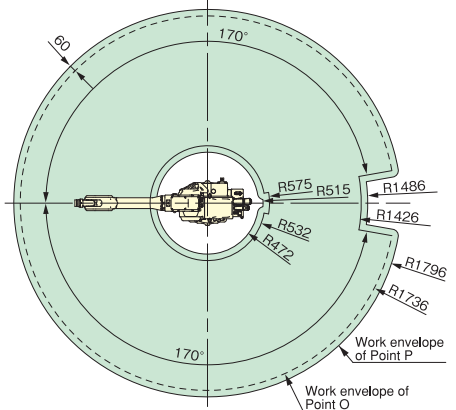
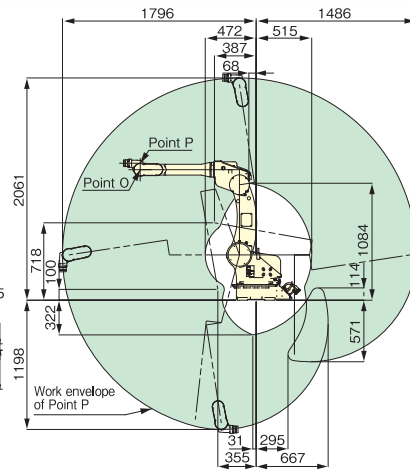
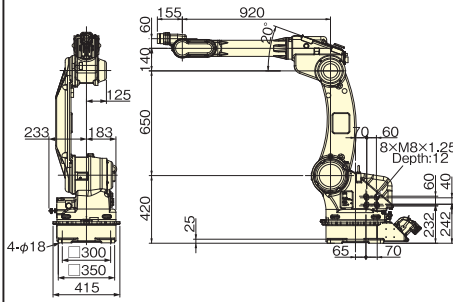




Long arm type

**TA-1800**

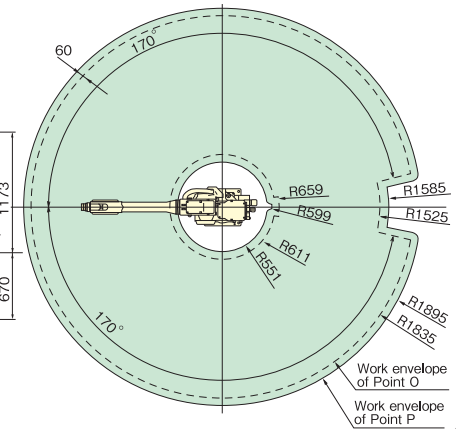
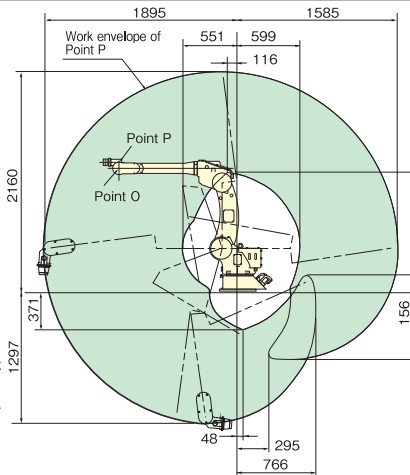
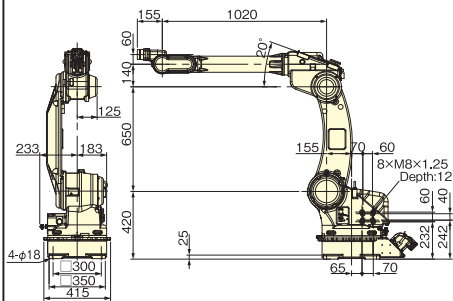
Max. Reach : 1796mm



Long arm type

**TA-1900**

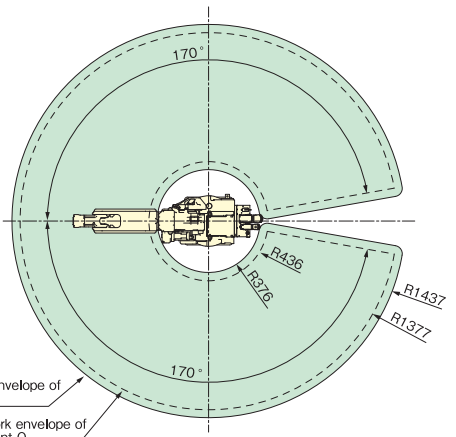
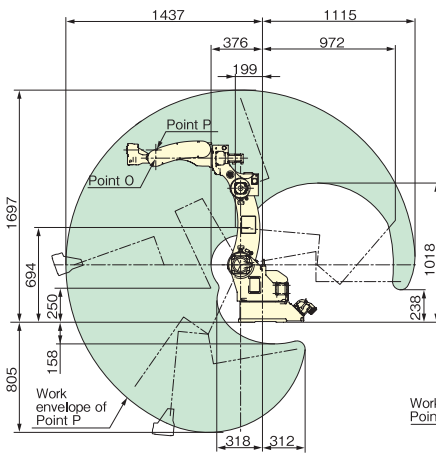
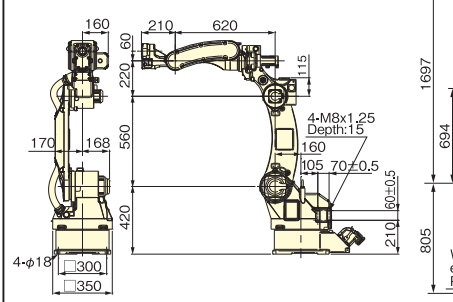
Max. Reach : 1895mm



Torch cable integrated type

**TB-1400**

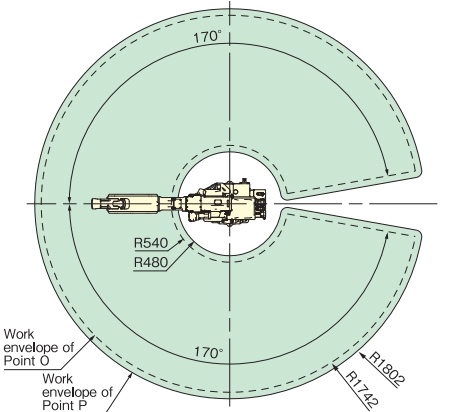
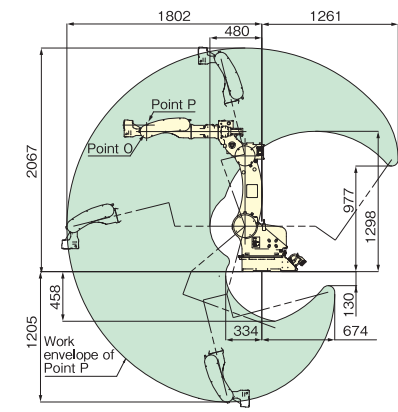
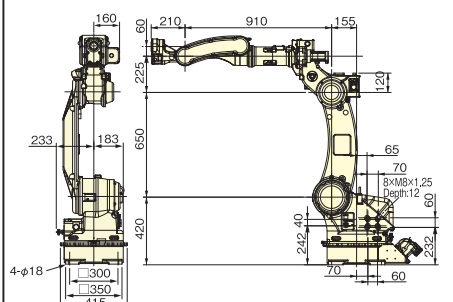
Max. Reach : 1437mm



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							
Degree of freedom		6							
Maximum 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			±0.15 mm or less		±0.1 mm or less		
Brake		All axis are provided with brakes							
Installation position		Floor, Ceiling (factory option)							
Weight of manipulator		About 145 kg	About 161 kg	About 203 kg	About 204 kg		About 171 kg	About 214 kg	

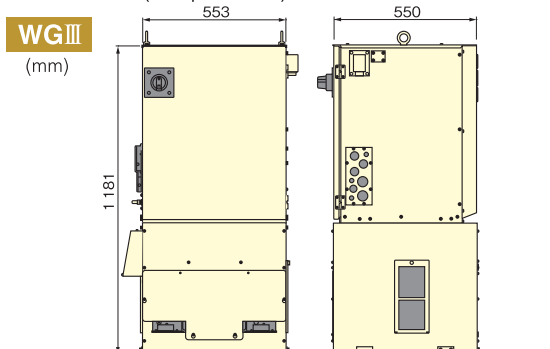
## Specifications

<Controller>

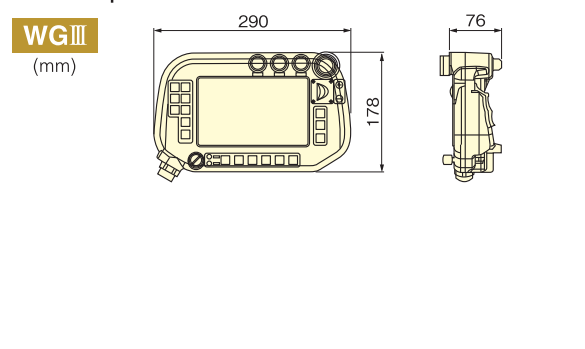
Model	WGIII
Dimensions (mm)※1	(W)553×(D)550×(H)1181
Weight (kg)※2	135
Memory capacity	40,000 points
Position control method	Software servo control
External memory	Teach Pendant : SD memory card slot and USB2.0(Hi-speed not supported)2 ports
The number of control axes	6 axes simultaneously (Max.27 axes)
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 <sub>2</sub> /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 (10 min. interval)	80% for GMAW and 60% for pulse GMAW

※1 : Protruding portions not included ※2 : Excluding the Teach Pendant and connecting cable

### Controller (with power unit)



### Teach pendant



## DTPS III 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	1274 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 <sub>2</sub> /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

### 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	1470 N·m
Allowable moment	1470 N·m	1470 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 (Duty cycle : 60%)		
Weight	125 kg		255 kg
Applicable welding methods	CO <sub>2</sub> /MAG/MIG/TIG		
External axis controller types	Built-in or external type		External type

## Side mount 2 axes positioner



RJR 41



RJR 51



### 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.



JQA-1179



### Safety precautions

- Before attempting to use any welding product always read the manual to ensure correct use.

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TEL:86-315-3206066 FAX:86-315-3206070  
<http://pwst.panasonic.cn>

**Panasonic Factory Solutions Company of America**  
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TEL:1-847-637-9700 FAX:1-847-637-9601  
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Catalogue No. **IRTAW-WGIII.AAA**

Printed in Japan [2011.6] 2-010S