Panasonic

Bangkok Welding (Thailand)

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6 Axis Articulated Arc Welding Robots

TAWERS Series

April 2014

TM/TL Series — Continuously Evolving TAWERS Robotic Welding

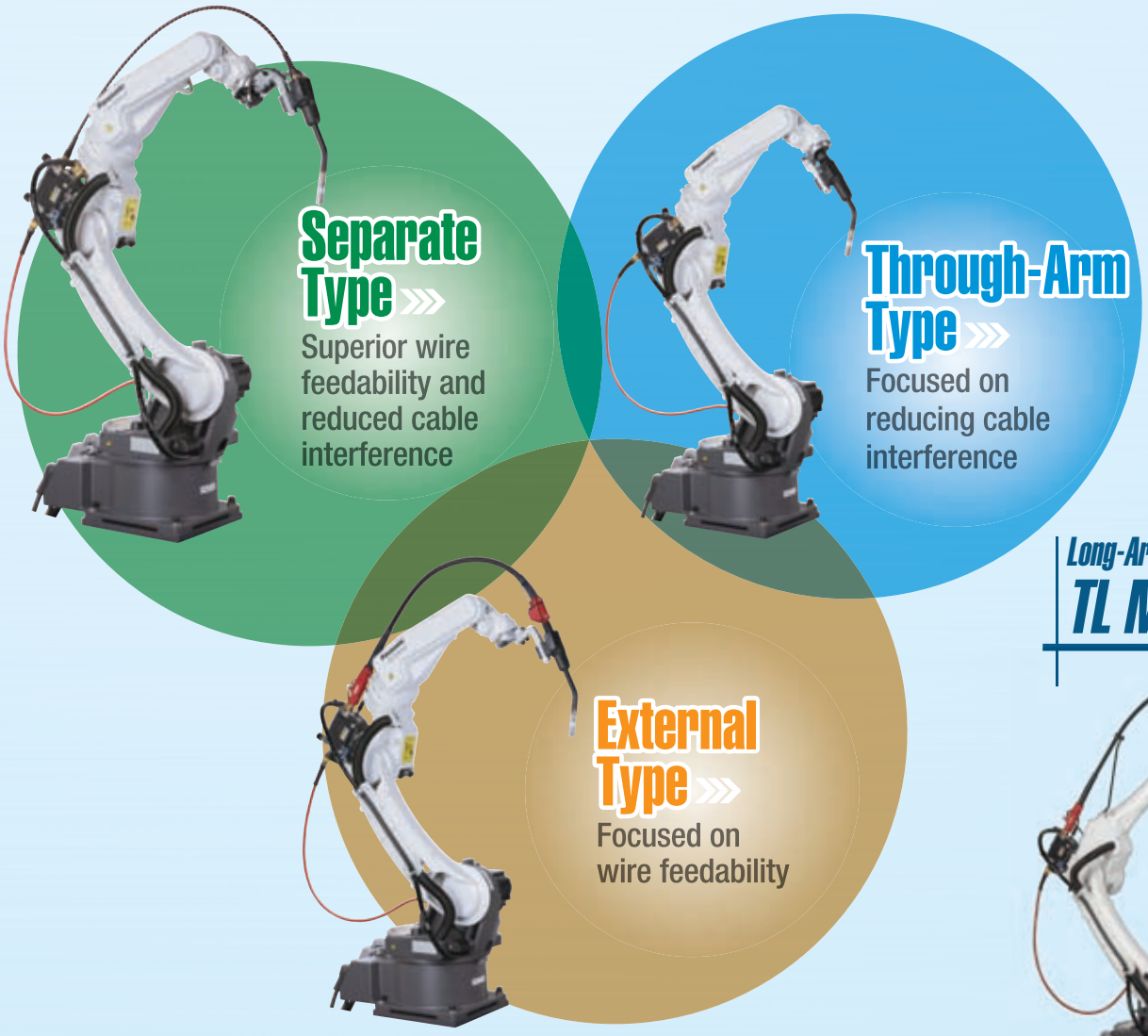
The Arc Welding Robot System

TAWERS

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

Increased Motion Speed

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



Long-Arm & High Payload Type
TL Manipulators

TAWERS WGⅢ/WGHⅢ

Robot Systems with Integrated Welding Power Source Technology

TM series

Torch type selectable to fit your application!

WGⅢ/WGHⅢ

TM-1400WGⅢ

Separate Type

Through-Arm Type

TM
1100
1400
1800

External Type

TL series

Long-arm & high payload!

WGⅢ/WGHⅢ

TL
1800
2000

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

External Type

■Manipulator Lineup (as of April 2014)

	TM series			TL series	
	1100	1400	1800	1800	2000
Separate	○	○	○	–	–
Through-Arm	○	○	○	–	–
External	○	○	–	○	○
Payload	6 kg			8 kg	6 kg

Rated Welding Output:
WGⅢ: 350 A @ 80 % duty cycle (CV). 350 A @ 60 % duty cycle (pulse).
WGHⅢ: 450 A @ 100 % duty cycle (CV/pulse)

A variety of features specialized for arc welding

Feature 1 (TM/TL) Enhanced Basic Performance

Fastest in Industry as of April 2014*

Increased Motion Speed

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

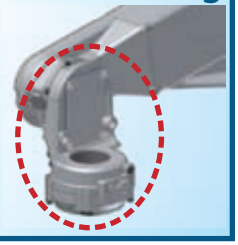
Extended Reach

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

Feature 2 (TM) Arm Specialized for Welding

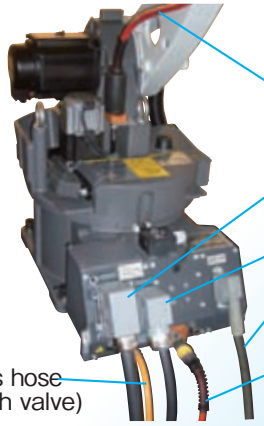
Cantilever Structure

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.

*According to our own research

TAWERS WGⅢ/WGHⅢ

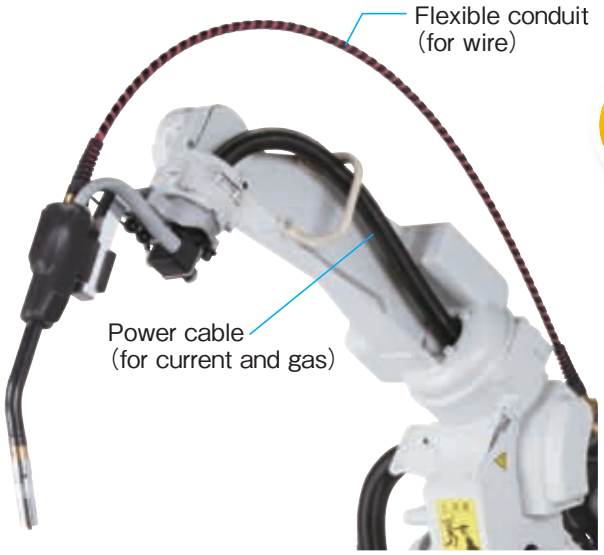
Robot Systems with Integrated Welding Power Source Technology

In addition to Through-Arm Type and External Type,

A third choice—Separate Type

WGⅢ/WGHⅢ

TM
1100
1400
1800

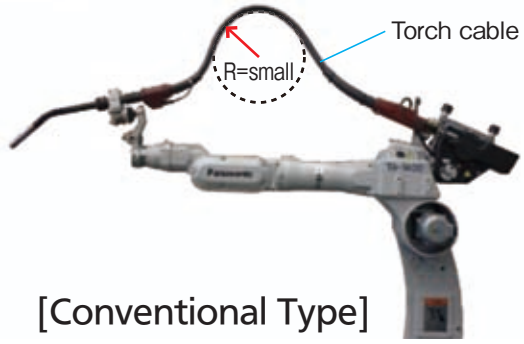


High Wire Feedability
Less Cable Interference

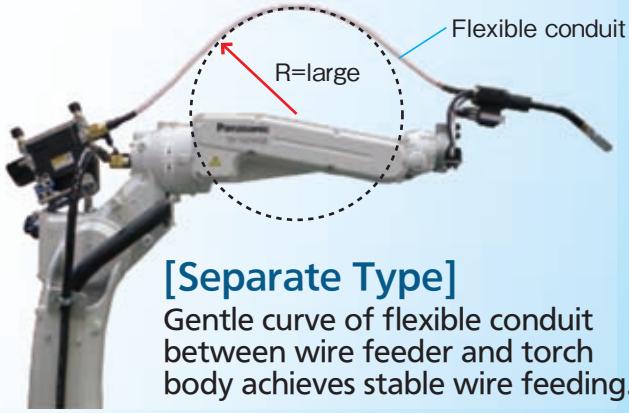
Separate Type—

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.

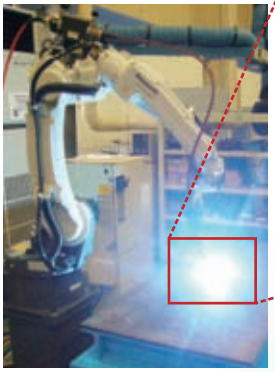
Feature 2 Through-Arm Power Cable

[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.

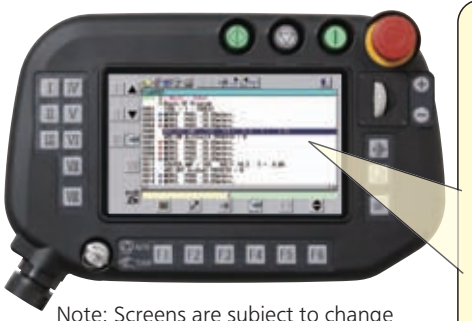
TAWERS WGⅢ/WGHⅢ

Robot Systems with Integrated Welding Power Source Technology

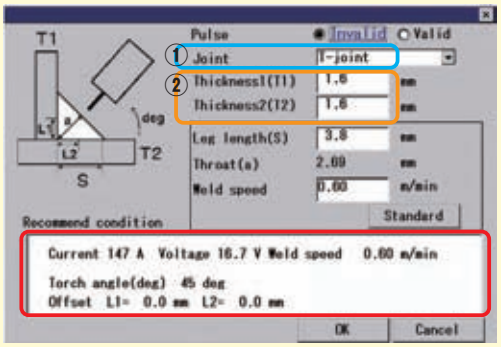
"Weld Navigation" allows easy parameter setting (Standard)

Weld Navigation

Easy setting with Teach Pendant



Note: Screens are subject to change without notice.



Note: Torch angle and aiming point also calculated

Two Easy Steps:

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

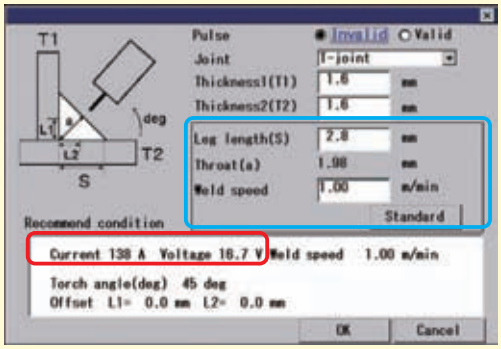
2. Select plate thicknesses. That's all!

Rich welding parameter database developed through our long experience

"Weld Navigation" reduces parameter setting time.

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.

WGⅢ controller with high performance

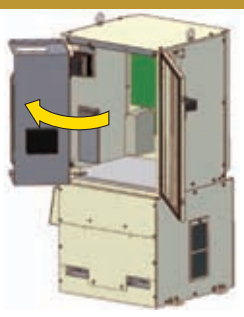
- Compared to the conventional model, 6 times faster main CPU and 4 times more memory capacity reduce start-up time by 50% to **about 30 seconds.**

WGⅢ

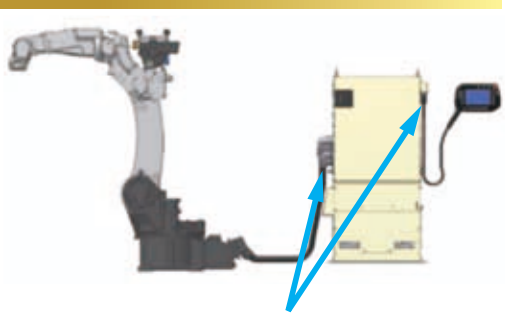
WGHⅢ

Improved maintenability

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



Swivel rack



Cables with connectors on both ends

TAWERS
WGⅢ/WGHⅢ

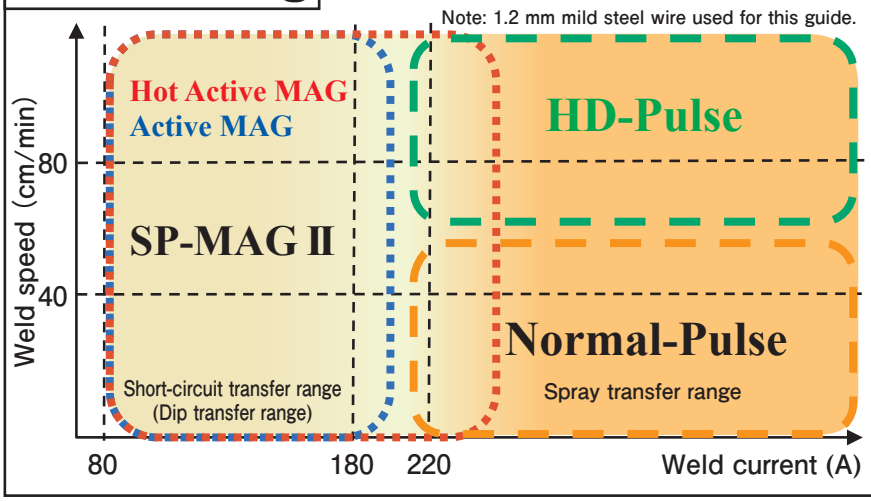
TAWERS Technology— Various Welding Processes

- **SP-MAGⅡ** for short-circuit mixed gas welding on thin plates
- **HD-Pulse** for high-speed and low-spatter in high-current pulsed mixed gas welding
- **MTS-CO_2** for CO_2 welding

TAWERS Welding Process Guide

MAG welding

Standard



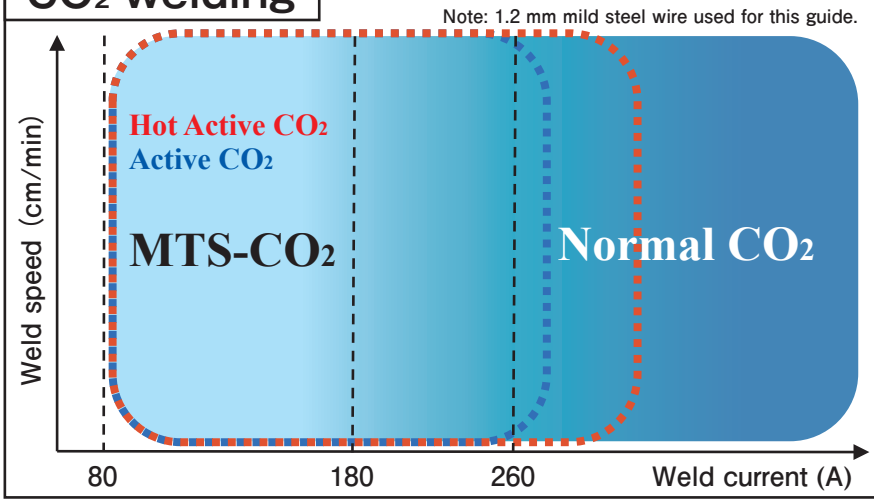
SP-MAG Ⅱ
Secondary switching and SP/HS control achieve stable arc and low spatter welding.
Low spatter in low-current range

HD-Pulse
Short-circuit transfer (1 pulse-1 dip) minimizes undercuts in high speed welding.
Low spatter and high speed in high-current range

Normal-Pulse
Droplet transfer (1 pulse-1 drop) achieves low spatter.
Low spatter in high-current range

CO_2 welding

Standard



MTS-CO_2
MTS control added to SP-MAG technology reduces spatter of CO_2 welding.
Low spatter in low-current range

APPLICATION TYPE

Active Wire Feed Process (AWP)

Achieves even lower spatter with high-precision control of wire feed speed.

Active MAG
Active CO_2

Active TAWERS

See the page of "Active TAWERS" for details.

TAWERS
WGⅢ/WGHⅢ

TAWERS Technology— Various Welding Processes

- **SP-MAGⅡ** for short-circuit mixed gas welding on thin plates
- **MTS-CO₂** for CO_2 welding

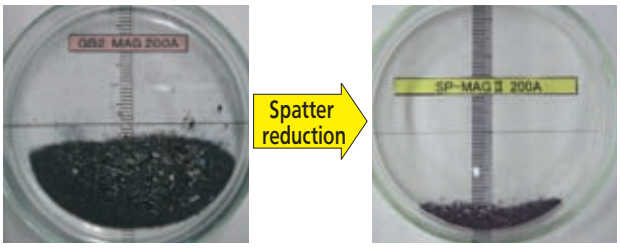
SP-MAG Ⅱ (Super-imposition Control)

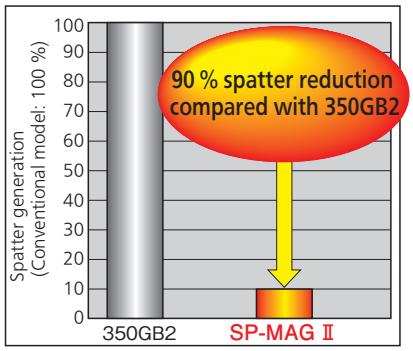
Greatly reduces spatter in mixed gas (MAG) welding on thin plates

Welding waveform control achieves low spatter in short-circuit transfer range.

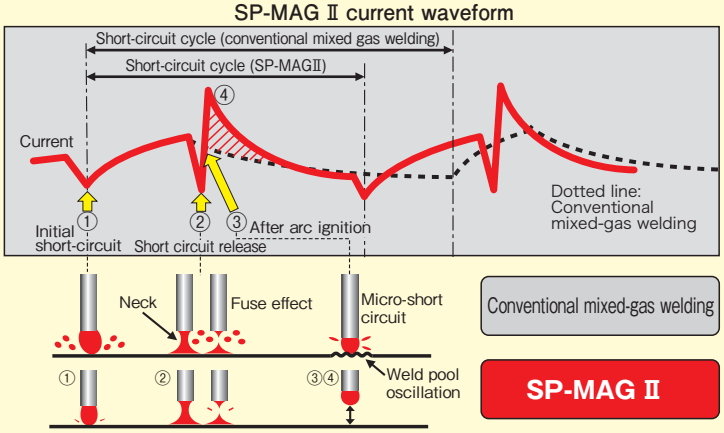
■ Spatter comparison (1 minute at 200 A)

Conventional welder (350GB2) TAWERS (SP-MAG Ⅱ)





Recommended Panasonic wire YM-51MT used.



① **Initial short-circuit control**
Detects initial short-circuit and then the secondary switching* circuit reduces weld current rapidly to prevent micro-short circuit that causes spatter.

② **Neck control**
Detects a neck of the droplet and then the secondary switching* circuit reduces weld current rapidly to prevent fuse effect that causes spatter.

③ **HS control**
Suppresses weld pool oscillation and prevents micro-short circuit that causes spatter.

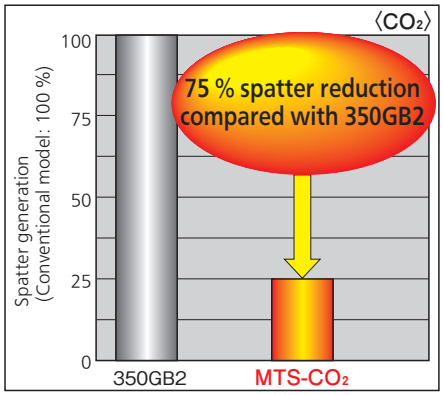
④ **SP control**
Superimposes the current immediately after a short-circuit release and allows for higher wire-melting speed. This makes the next short circuit smooth and also makes the short-circuit cycle shorter.

*Secondary switching is the spatter reduction process that rapidly reduces weld current immediately before and after shot-circuit and allows for smooth transitions between arc and short circuit.

MTS-CO_2 (Metal Transfer Stabilization Control)

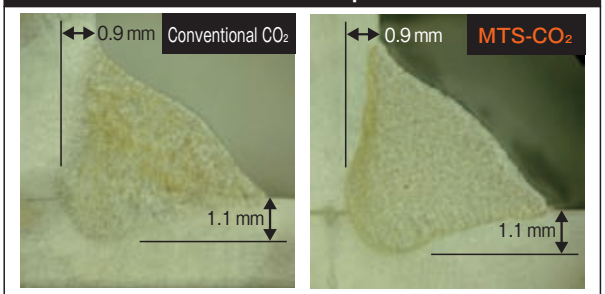
Reduces spatter by up to 75 % using inexpensive CO_2 gas

MTS control added to SP-MAG technology reduces spatter of CO_2 welding.



CO_2 welding delivers uniform pan-bottom shaped penetration.

Penetration comparison



・Joint: Fillet ・Base metal: 2.3 mm mild steel SPCC ・Weld current: 120 A
・Weld speed: 0.3 m/min ・Wire: YGW12 (1.2 mm) ・Shielding gas: CO_2

Conventional CO_2 process (350GB2)

MTS-CO_2

TAWERS WGⅢ/WGHⅢ

TAWERS Technology— Various Welding Processes

- **Normal pulse** for ultra-low spatter welding
- **HD-Pulse** for high-speed and low-spatter welding

HD-Pulse (Hyper Dip-Pulse Control)

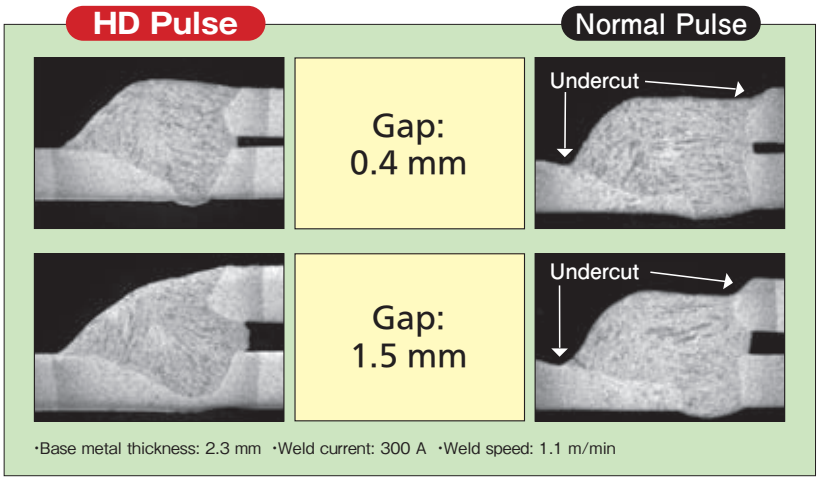
Achieves high-speed pulsed welding

Short and narrow arc prevents undercuts during high-speed welding.

■HD-Pulse advantages:

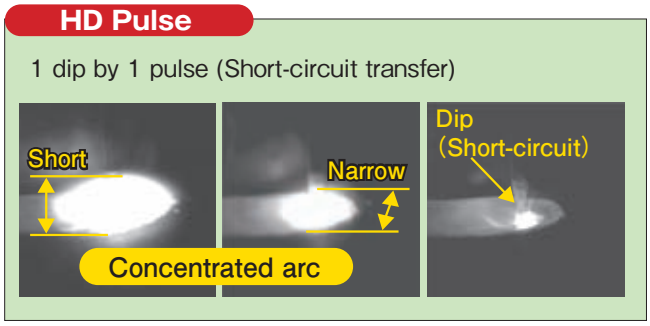
- Preventing undercuts during high speed welding.
- Dip (Short circuit) transfer enabling lower heat input with better gap handling capability.
- Precisely controlled dip timing reducing spatter.

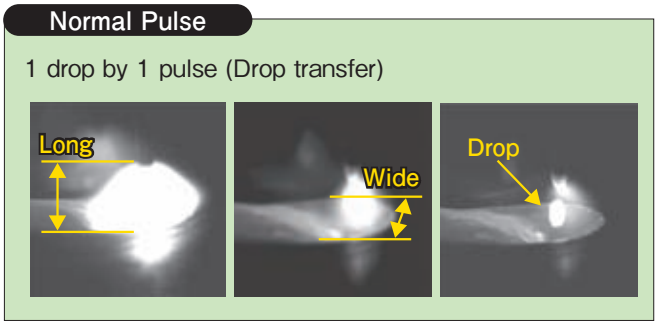
■High speed welding



Preventing undercuts with ideal penetration!

■Type of the droplet transfer





■Spray transfer range: 280 A or more

Weld process	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 in high-current range.
- **Normal-pulse disadvantage:** Undercuts in high-speed welding.

HD-Pulse process is ideal for high-current and high-speed welding.

TAWERS WGIII/WGHIII

Standard Features

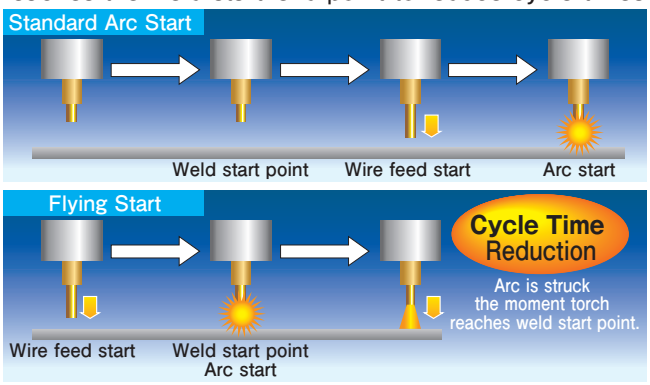
External Communication (Ethernet)

Production and Quality Control on LAN

The LAN connection allows you to share welding data with other robots and improve production and quality control.

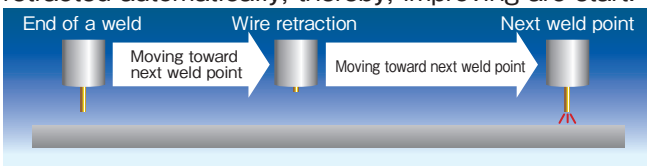
Flying Start

Executes arc-on/off programs a little before the torch reaches the weld start/end point to reduce cycle times.



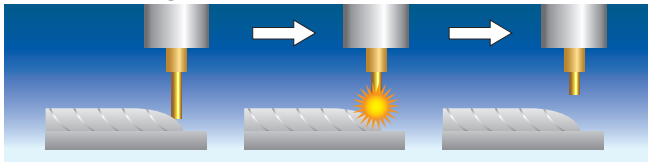
Wire Auto Retract

As the robot moves to weld start points, the wire is retracted automatically; thereby, improving arc start.



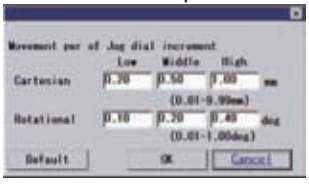
Wire Stick Auto Release (for CO_2/MAG)

Automatically detects a wire stuck at the end of a weld and re-ignites the arc to release the wire.



Pitch Movement ("Jog settings")

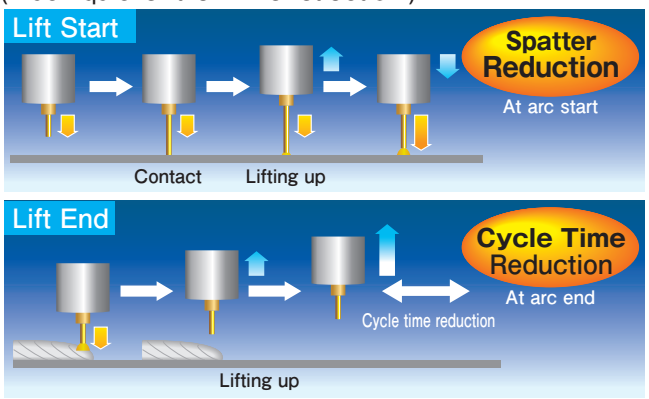
This function enables robot movement at a pre-set distance by every click of the jog dial. This is useful when working in narrow, constricted spaces or in fine-tuning robot position.



Lift Start / Lift End

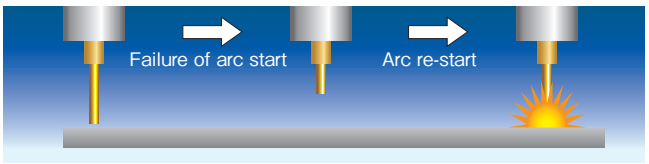
Quality Weld Starts and Ends. Spatter and Cycle Time Reduction.

The robot lifts up the welding torch quickly at the start and end of the weld. By coordinating the robot motion with the welding waveform and wire feed control, quality and cycle time are improved.
(Much quicker than wire retraction.)



Arc Start Retry (for CO_2/MAG)

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



Torch Angle Display (Teach Pendant)

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

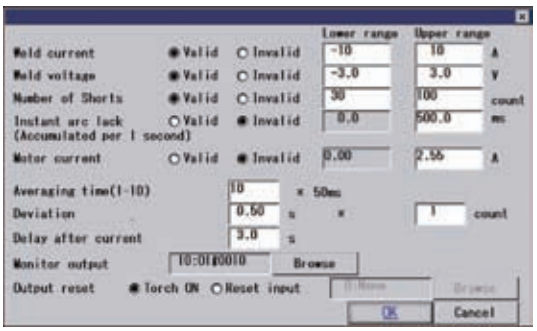
Program Test

In Teach mode, operator can safely verify taught program including welding without switching to Auto mode.

Optional Features

Weld Data Management

Big progress toward ideal production and quality control.
Samples weld data with a interval of up to 50 micro seconds, allowing high-precision monitoring and status/error output. The data can be stored and used for quality control.

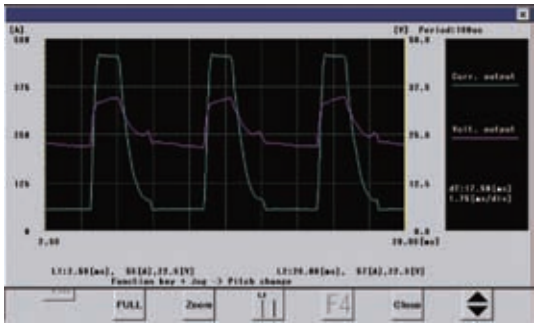


Weld Monitor — Standard

Monitors data such as weld current, voltage and wire feed speed constantly and warns when abnormality is detected.

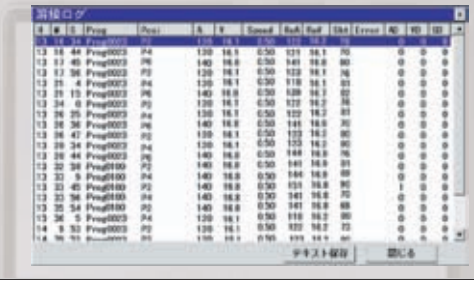
Weld Data Management — Optional Software

- **Weld Monitoring** (Expanded function)
  Up to 50 weld monitoring conditions can be defined.
- **Weld Data Logging/Recording**
  Data such as weld current, voltage and wire feed speed can be logged according to the preset triggers. The log data can be graphed on the teach pendant and recorded on SD memory card.



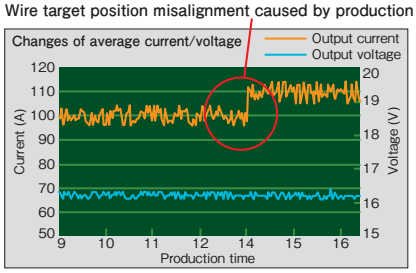
Welding Data Log — Optional Software

Logs data of weld sections. The log data can be saved for analysis.



Example of log data analysis

Wire target position misalignment caused by production lot change



Available for defect rate reduction

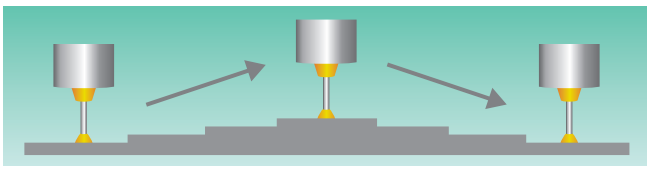
More advanced welding system available

Utilize features such as external communication and large capacity memory.

Auto Extension Control — Optional Software

Compensates heat distortion or teaching error of odd-shaped work.

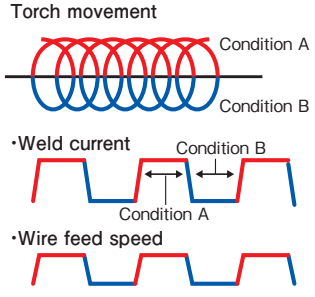
Robots detects changes in wire extension and compensates automatically.



Synchronous Weaving Low Pulse (Spiral Weaving Included)

【Spiral weaving movement】

Torch movement



- ·Synchronizes weld current, wire feed speed and weaving completely.
- ·Alternates condition A/B during weaving, which is ideal for welding of different thickness plates. (One for thin plate, the other for thick plate)

Cooperative Multi-Robot Control

Allows cooperative control between two robots.

Active TAWERS WGⅢ

APPLICATION TYPE

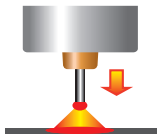
Innovative Ultra-Low Spatter Process

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

High-precision wire feed control achieves lower spatter welding.

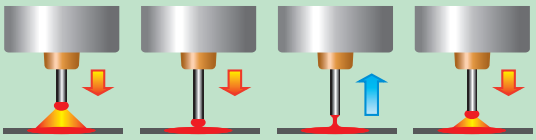
AWP is an innovative process that greatly reduces spatter by combining waveform control and wire feed control. It produces much less spatter than TAWERS SP-MAG or MTS-CO_2 process.

Conventional Process



Constant speed wire feed.
Limit in spatter reduction.

Active Wire Feed Process



Continuous back and forth wire feed.
Spatter reduction by stable short-arc cycle.

WGⅢ

TM	TL
1100	1800
1400	2000
1800	

・TM: Separate or Through-arm
・TL: External

System for High-Precision Wire Feed

Servo Pull Torch

YT-CET351T**

+

Wire Booster

YW-PCF041

+

Active Wire Feed Process Software

YA-1TPMW1

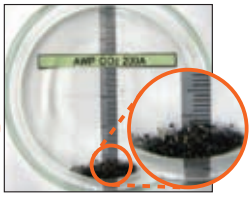
Consult us for details.

Greatly reduced spatter generation! Minimizing spatter size!

CO_2 gas welding

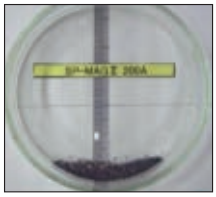
TAWERS CO_2

Active TAWERS

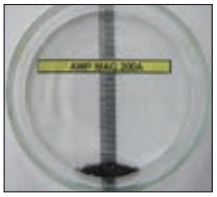


Mixed gas (MAG) welding

TAWERS SP-MAGⅡ

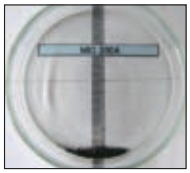


Active TAWERS

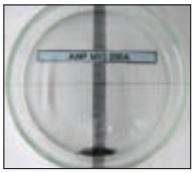


Stainless steel MIG welding

TAWERS SP-MAGⅡ

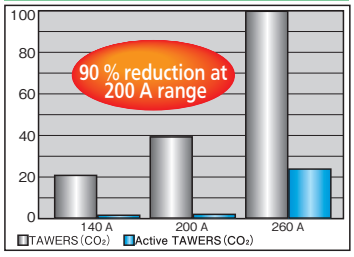


Active TAWERS

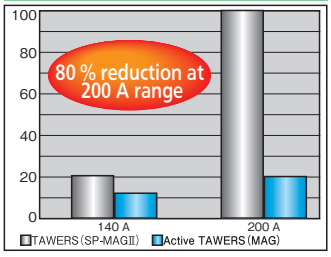


70 % reduction at 200 A range

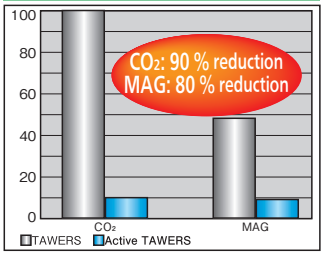
CO_2 gas welding



Mixed gas (MAG) welding

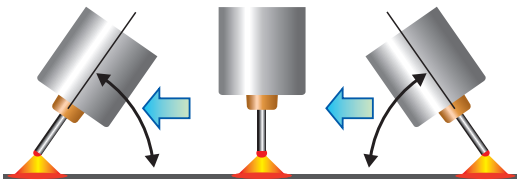


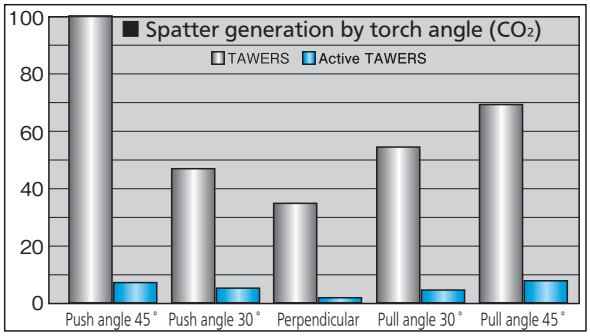
Arc starting



- Reduces spatter sticking to workpieces by minimizing spatter size.
- Improves product quality and reduces the time to remove spatter or clean the floor.
- Effective on gap welding of thin stainless steel plates, preventing burn through.

Suppresses the increase of spatter caused by torch angle changes





Active TAWERS WGⅢ

APPLICATION TYPE

Lower Spatter, More Deposition, and Deeper Penetration for Wider Applications

Hot Active Wire Feed Process (Hot-AWP)

Hot-AWP (Hot-Active Wire Feed Process)

Takes full advantage of the Active TAWERS performance by combining control for higher wire acceleration/deceleration and new welding waveform control.

Active TAWERS

Hot Active Software

Just add to Active TAWERS.

WGⅢ

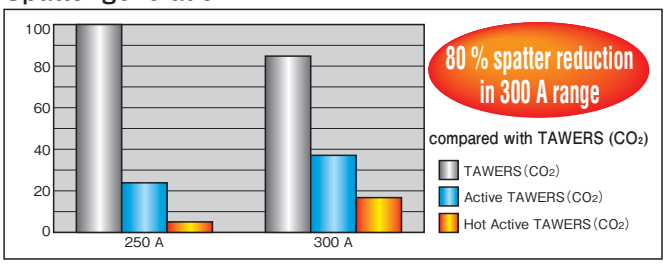
TM	TL
1100	1800
1400	2000
1800	

・TM: Separate or Through-arm
・TL: External

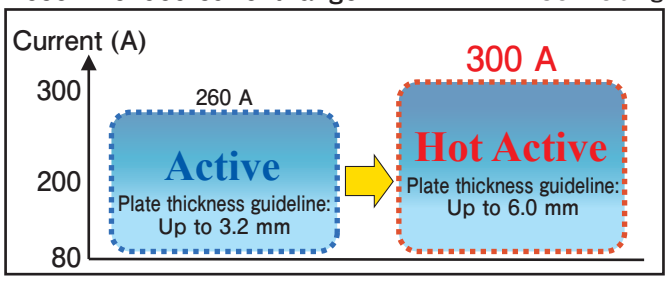
Low-spatter performance enhanced from Active TAWERS. Wider current range!

CO_2 welding

Spatter generation

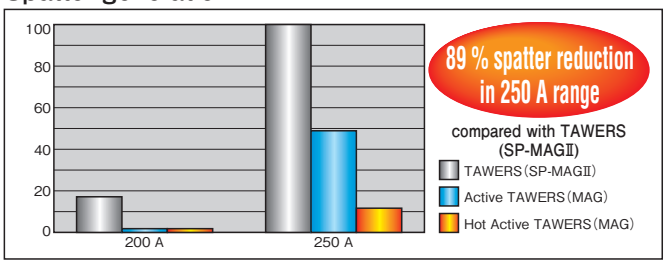


Recommended current range — CO_2 welding

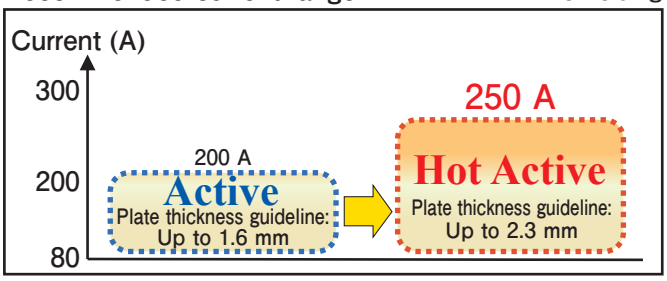


MAG welding

Spatter generation



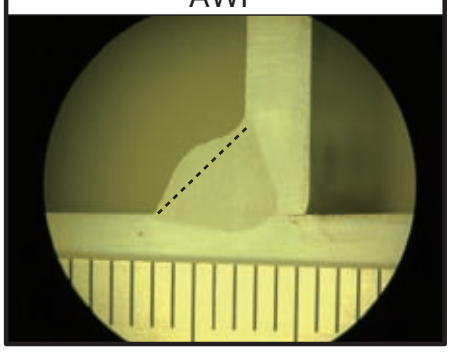
Recommended current range — MAG welding



More deposition and more heat input improve bead shape!

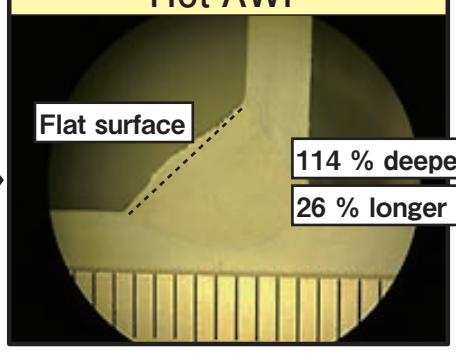
・Leg length ・Penetration ・Bead shape

AWP



More Deposition
More Heat Input

Hot-AWP



Weld conditions: ・Joint: Fillet ・Base metal: Mild steel SPCC (t3.2 mm) ・Weld current: 250 A ・Weld speed: 60 cm/min ・Wire: YGW12 (1.2 mm) ・Shielding gas: CO_2

APPLICATION TYPE

Active Wire Process (AWP) Also Available on Aluminum

Active TAWERS Aluminum

Active TAWERS's low-spatter performance is applied to aluminum MIG.

System for High-Quality Aluminum Welding

Servo Pull Torch + Wire Booster + Active Aluminum Software

YT-MET351T**

YW-PCF041

Consult us for details.

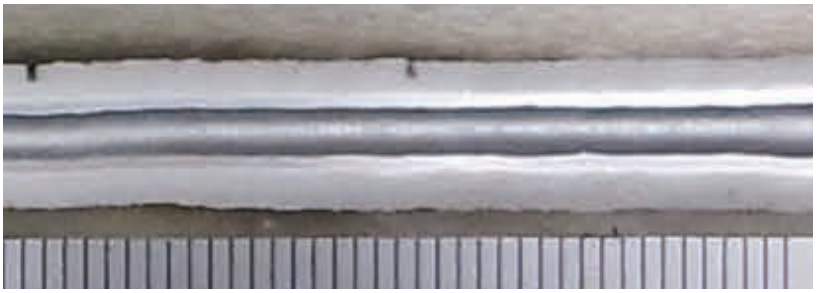
WGIII

TM	TL
1100	1800
1400	2000
1800	

・TM: Separate or Through-arm
・TL: External

Ultra-thin plate capability superior to AC pulse welding

Great for 1 mm sheet aluminum welding.

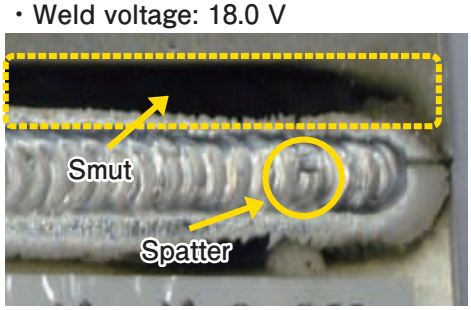
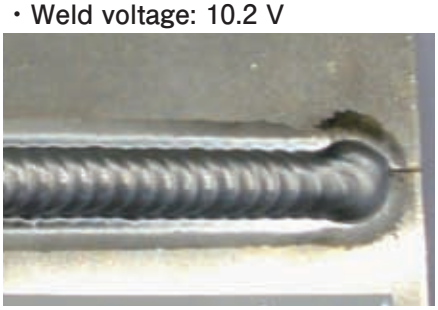


Welding conditions:
・Base metal: A5052
・Plate thickness: 0.6 mm
・Joint: Butt
・Weld current: 50 A
・Weld speed: 150 cm/min

Active Wire Process for aluminum MIG! Less spatter and smut!

AWP's low-spatter performance proven in mild steel is applied to aluminum.
Short arc length by short-circuit transfer welding suppresses smut formation.

Comparison between beads of the same width

	Conventional TAWERS (DC pulse)	Active TAWERS Aluminum
Bead appearance	・Weld current: 50 A ・Weld voltage: 18.0 V	・Weld current: 96 A ・Weld voltage: 10.2 V
		
	Spatter adhesion, smut formation, concave bead	Good bead appearance

Reduction of Spatter and Smut

Weld conditions: ・Base metal: A5052 ・Joint: Lap ・Weld speed: 30 cm/min ・Plate thickness: 1.5 mm x 1.5 mm ・Spiral weaving (2.0 Hz)

TAWERS Zi-Tech

APPLICATION TYPE

Zinc-Coated Steel Welding Technology

Solution to Reduce Spatter and Blowholes

Zinc-Coated Steel Welding Solution Using Solid Wire!

FEATURE Reduce Spatter and Blowholes with TAWERS Zi-Tech.

TAWERS Zi-Active	TAWERS Zi-Pulse
WGⅢ	WGⅢ/WGHⅢ
TM: 1100, 1400, 1800	TM: 1100, 1400, 1800
TL: 1800, 2000	TL: 1800, 2000

・TM: Separate or Through-arm
・TL: External

Effective for welding zinc-coated welding. Greatly reduced spatter and blowholes!

TAWERS Zi-Active

—Solution Using Active TAWERS

- Uses standard welding wire. (1.2 mm solid wire)
- Uses CO_2 gas. (Active Wire Feed Process)
- Effective on a wide range of coating weight from 45 to 190 g/m^2.

TAWERS Zi-Pulse

—Solution Using Standard TAWERS

- Uses standard welding wire. (1.2 mm solid wire)
- Uses mixed gas of 90 % Argon and 10 % CO_2. (HD-Pulse Weld Process)
- Effective on a wide range of coating weight from 45 to 60 g/m^2.

System for Both High-Quality and Low Running Costs

Servo Pull Torch + Wire Booster + Zi-Active Software

YT-CET351T**

YW-PCF041

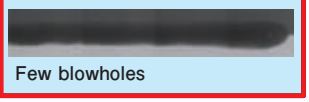
Optional Software for High-Quality Welds and High Productivity

Standard TAWERS (WGⅢ)

TAWERS Zi-Pulse Software

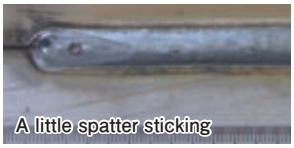
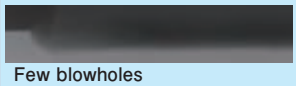
Just add to standard TAWERS (TM/TL series).

75 to 95 % Spatter Reduction Compared with Conventional CO_2 Process

	Coating Weight: 190 g/m^2	
	Conventional TAWERS CO_2	TAWERS Zi-Active (Active CO_2)
Bead Appearance	 A lot of spatter sticking	 Little spatter sticking
X-Ray Image	 A lot of blowholes	 Few blowholes

Weld Conditions: ・Wire: YM-50 (1.2 mm) ・Joint: Lap ・Gas: CO_2
・Weld Current: 220 A ・Weld Speed: 50 cm/min
・Plate Thicknesses: 2.3 mm x 2.3 mm

30 to 60 % Spatter Reduction Compared with Mixed Gas of 80 % Ar+20 % CO_2

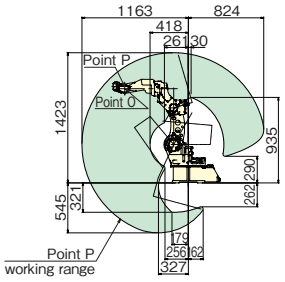
	Coating Weight: 45 g/m^2	
	80 % Argon/20 % CO_2	90 % Argon/10 % CO_2 (Zi-Pulse)
Bead Appearance	 A little spatter sticking	 Little spatter sticking
X-Ray Image	 A lot of blowholes	 Few blowholes

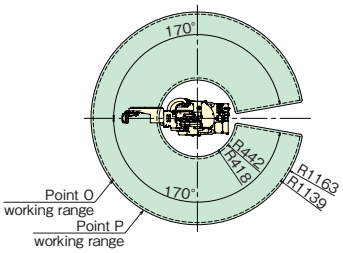
Weld Conditions: ・Wire: YM-51MT (1.2 mm) ・Joint: Lap ・Weld Current: 230 A
・Weld Speed: 80 cm/min
・Plate Thicknesses: 2.0 mm x 2.0 mm

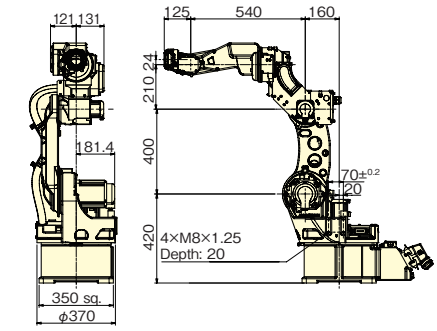
Dimensions & Work Envelope

(Unit: mm)

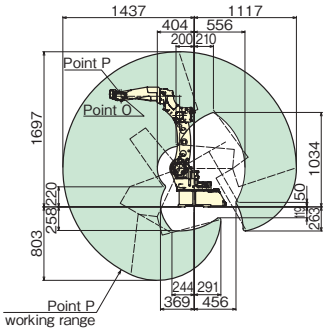
Short Type
TM-1100

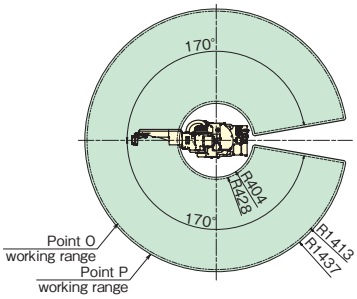


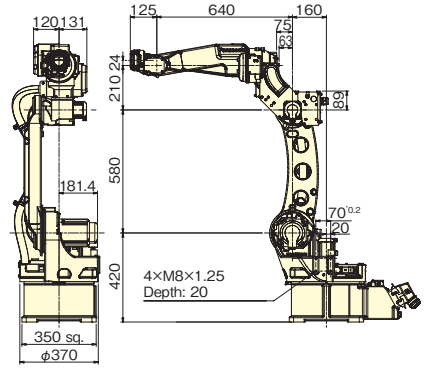




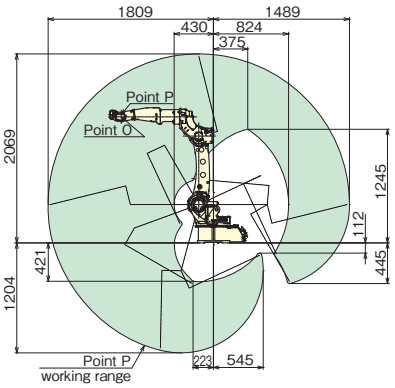
Standard Type
TM-1400

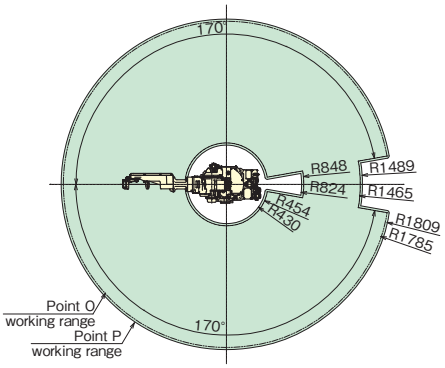


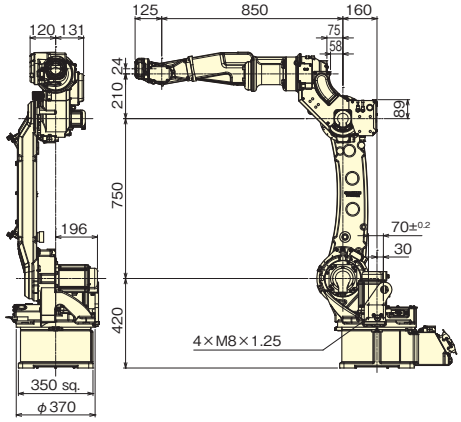




Long Type
TM-1800







■ Manipulator General Specifications

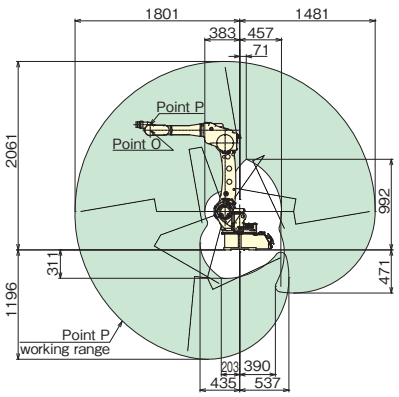
Model		TM-1100	TM-1400	TM-1800	TL-1800	TL-2000
Type		Short arm	Standard arm	Long arm	Long arm	Long arm
Structure		6 axis articulated				
Payload		6 kg			8 kg	6 kg
Maximum Reach		1 163 mm	1 437 mm	1 809 mm	1 801 mm	1 999 mm
Minimum Reach		418 mm	404 mm	430 mm	383 mm	491 mm
Working Range		745 mm	1 033 mm	1 379 mm	1 418 mm	1 508 mm
Max. Motion Speed	RT (Rotating trunk)	225°/s		195°/s	195°/s	
	UA (Upper arm)	225°/s		197°/s	197°/s	
	FA (Forearm)	225°/s		205°/s	205°/s	
	RW (Rotating wrist)	425°/s		425°/s	385°/s	
	BW (Bending wrist)	425°/s		425°/s	375°/s	
	TW (Twisting wrist)	629°/s		629°/s	624°/s	
Position Repeatability		±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	215 kg	215 kg	216 kg

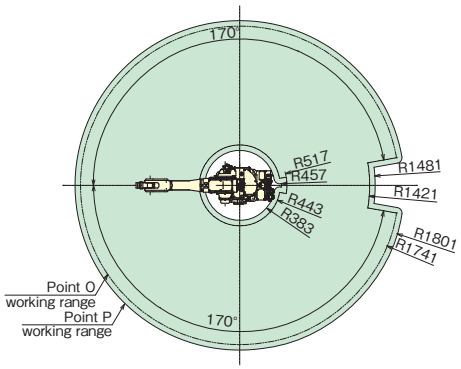
*Ceiling mount type is factory optional.

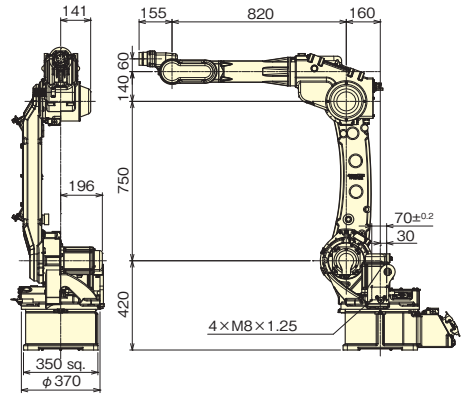
Dimensions & Work Envelope

(Unit: mm)

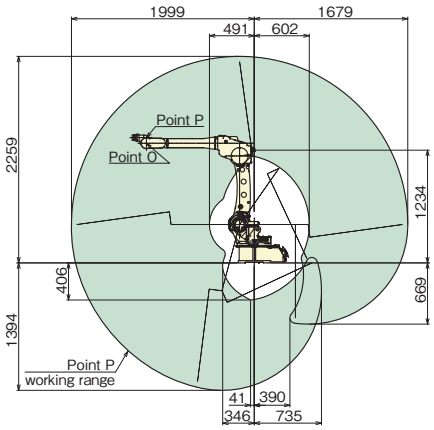
Long Type
TL-1800

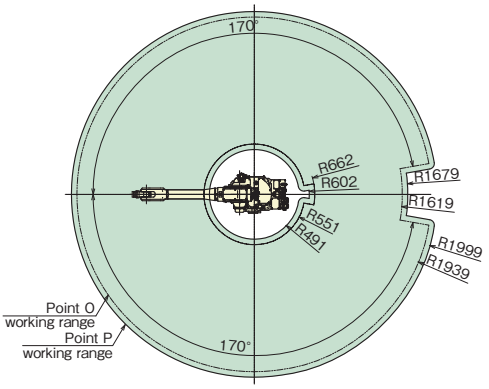


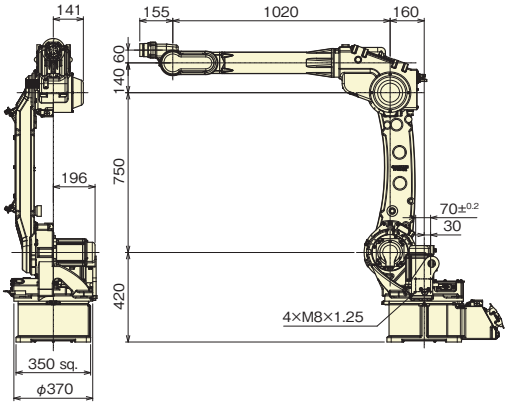




Long Type
TL-2000







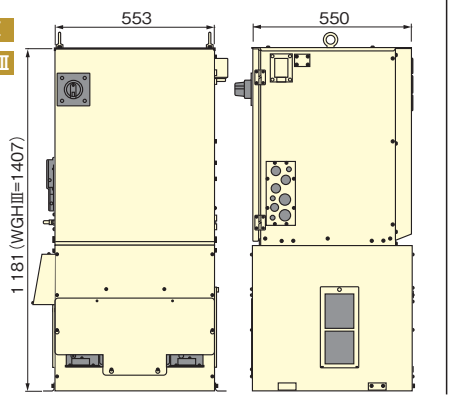
■Controller / Welder Technical Specifications

Model	WGⅢ	WGHⅢ
Dimensions*	W 553 mm x D 550 mm x H 1181 mm	W 553 mm x D 550 mm x H 1407 mm
Weight**	135 kg	171 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 V AC±20 V AC, 22 kVA, 50/60 Hz	3 phase, 200 V AC±20 V AC, 30.5 kVA, 50/60 Hz
Welding Process	CO_2 / MAG / Stainless steel MIG / Pulse MAG / Stainless pulse MIG	
Output Current Range	30 to 350 A DC	30 to 450 A DC
Output Voltage Range	12 to 36 V DC	12 to 42 V DC
Duty Cycle	CV: 80 % @ 350 A Pulse: 60 % @ 350 A	100 %

*Protruding portions not included. **Teach pendant and connection cable not included.

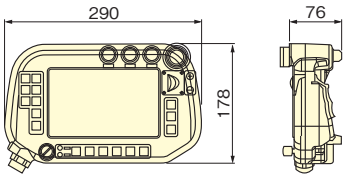
■Controller (with power unit)

WGⅢ
WGHⅢ
(mm)



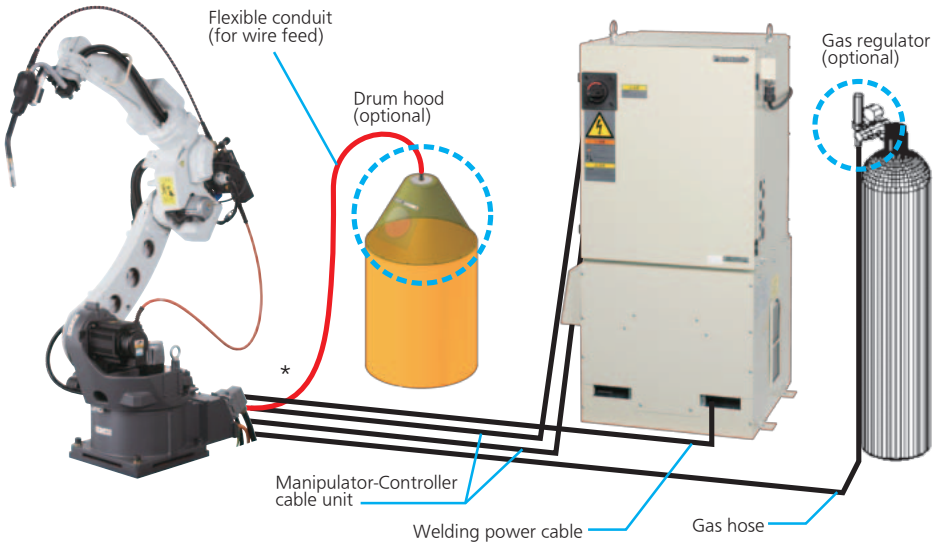
■Teach Pendant

WGⅢ
WGHⅢ
(mm)



■Connection Diagram

TM-1400WGⅢ (Separate Type)

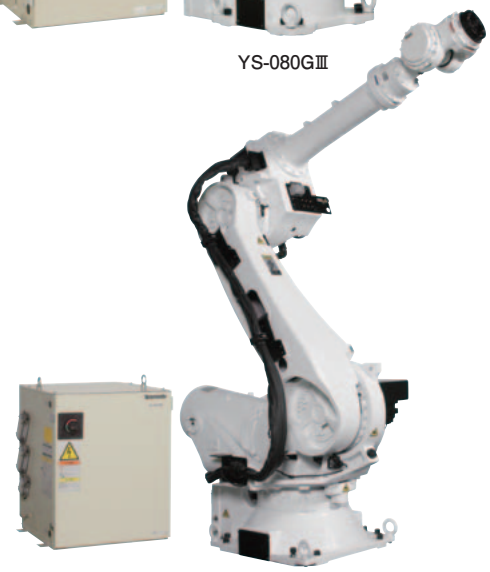


*For use with drum packing wire only.

Large Robot Series (GⅢ Controller)

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

YS-080GⅢ



HS-200GⅢ/HS-165GⅢ

● 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

● 80 kg, 165 kg, and 200 kg payload types available

■Manipulator General Specifications

Model		YS-080GⅢ	HS-165GⅢ	HS-200GⅢ
Type		6 axis articulated robot		
Payload		80 kg	165 kg	200 kg
Working Range	RT (Rotating trunk)	±180 °		
	UA (Upper arm)	-90 ° to +155 °	+80 ° to -65 °	
	FA (Forearm)	-180 ° to +230 °	+230 ° to -135 °	
	RW (Rotating wrist)	±360 °		
	BW (Bending wrist)	±125 °	±130 °	±125 °
	TW (Twisting wrist)	± 360 °		
Max. Motion Speed	RT (Rotating trunk)	170° /s	105° /s	95° /s
	UA (Upper arm)	140° /s	105° /s	95° /s
	FA (Forearm)	160° /s	105° /s	95° /s
	RW (Rotating wrist)	230° /s	150° /s	135° /s
	BW (Bending wrist)	230° /s	145° /s	120° /s
	TW (Twisting wrist)	350° /s	220° /s	190° /s
Weight		620 kg	1 250 kg	1 270 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

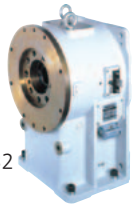
Name		Positioner unit	
Model		YA-1RJC62	YA-1RJC72
Applicable Robot		Panasonic robots TM/TL series with GⅢ/WGⅢ controller	
Payload		300 kg	500 kg
Max. Speed	Rotation	190.0°/s (31 r/min)	165.0°/s (27 r/min)
	Tilt	125.5°/s (20 r/min)	90.0°/s (15 r/min)
Operating Range	Rotation	-36 000 ° to +36 000 ° (with 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

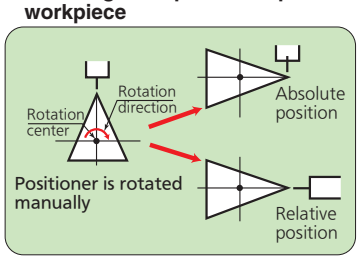
■Specifications

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	-36 000 ° to +36 000 ° (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

Harmonizer

Simple teaching

■Teaching example of complicated workpiece



- **Easy welding speed settings.**
  Welding speed can be set directly from robot regardless of pipe diameters. It eliminates complicated calculation and reduces teaching time.
- **Greatly reduced teaching points. (compared with conventional systems)**
  Linear, circular interpolations and weaving movement are now available while rotating work with the positioner. This allows easy torch positioning for complicated workpieces and high precision welding with minimum teaching points.
- **Optimum welding position.**
  Optimum torch angle for the best bead shape is ensured by specifying the torch position to the workpiece from either absolute or relative position.
- **Easy system settings.**
  System can be set on site and adjustable by the user.

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 workpiece shape creation
- Graphic import function (standard)
- Multiple robot control
- Windows XP (SP3 or later), VISTA (SP2 or later), 7

FA Technical Centers

Feel the excellent performance of TAWERS

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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 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.

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

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