Welding robot systems for structural steel from Japan’s leading welding company “KOBELCO”

Kobe Steel, the only welding solutions company that develops all of its own original welding robots, welding power supplies and welding wires aims to be your No.1 partner for structural steel fabrication.

ASSURING
Through our in-depth understanding of the welding process, our aim is to make a system that fabricators can trust and use with confidence
- We provide robot systems that contribute to the quality and control of the production process
- We allow support for new processes and new standards

TRUSTWORTHY
We continually pursue the optimization of structural steel welding
- We aim for the best welding quality that meet certification standards and type approval for architectural structural steel
- We provide support for a wide range of structural steel welding technologies and production processes

EFFICIENT
Contributing to cost reduction through fast and high efficiency welding
- By raising the percentage of welding automation, we aim to increase the number of welds that can be robot-welded
- Our robot is adaptable to numerous applications thus increasing the rate of return on its investment

EASY
Our welding robot system is user friendly such that anyone can operate it from day one of its installation
- Our aim is to supply a robot system that requires minimum pre-operation setting up
- Minimal data input and simplified supervision ensures the workload of the operator
The advantages of REGARC™ welding and constant voltage welding combined to give high-quality welding.

What is REGARC™?

The REGARC™ process featuring our new power supply, REGARCB™ ABS500 achieves systematic and smooth droplet transfer for global transfer through our original current/voltage wave form controller (patented).

Wire for REGARC™

- Optimized to reduce slag volume and slag removal for carbon dioxide multi-pass welding
- Superior conductivity, adherence resistivity and wire feedability made possible through REGARC™ unique waveform control.
- Compatible with conventional constant voltage welding 490MPa level (YGW11)
  550MPa level (YGW18)

System characteristics

1. Reduces production time
   Low spatter means less frequent cleaning and because of reduction in spatter adhering to the work, the robot operation time and post-treatment time can be significantly reduced. Combined with the reduction in air cut time as a result of the new software, robot operation time reduction up to 20% can be expected for a column plate thickness of 22mm/287kn, 400mm/71.75mm diameter (compared to our competitors). *Time reductions may vary due to plate thickness or diameter.
   In addition, an automated contact chip change is supplied as standard so chip changes are carried out automatically during operation resulting in increased continuous operability.

2. High quality welding
   Since the average current can be reduced as a result of the faster wire melting rate in the REGARC™ welding process, the maximum heat input can be minimized. In addition, by switching between REGARC™ welding and constant voltage welding for each weld pass or during welding, each part can be welded appropriately.

3. Environment friendly and energy saving welding
   Even whilst the wire melting rate is being increased, with our proprietary process, the average current can be lowered thereby reducing the energy consumption compared to conventional constant voltage welding (a 5% reduction in power consumption can be achieved for the same wire feed rate).
   Furthermore, by reducing the over-heat time for melting, the amount of fumes generated can be reduced.

![Typical high wire melting speed](image)

Comparison between generated fumes (Amount of fumes according to wire feed rate)

- REGARC™: About 10% increase in wire feed rate at the same current
- About 25% decrease in current at the same wire feed rate

REGARC™ Optimal plate thickness

- HSS-Column welding
  - Plate thickness: 9 – 40mm / 0.35 – 1.57mm
- Round pipe welding
  - Plate thickness: 9 – 40mm / 0.35 – 1.57mm

![2-ARC welding robot system for steel core connection](image)

2-ARC welding robot system for steel core connection

- Spatter on nozzle (Typical)
  - Spatter comparison test

![Conventional vs REGARC™ application](image)

Conventional vs REGARC™ application

- Cross section of weld bead and weld penetration (Typical)

REGARC™ wire welding

- REGARC™ mode
- Constant voltage mode

![Comparison between generated fumes (Amount of fumes according to wire feed rate)](image)

Types of REGARC™ Welding Robot Systems

<table>
<thead>
<tr>
<th>System</th>
<th>Compact/Structural Steel Connection</th>
<th>Welding Robot System</th>
<th>Structural Steel Connection</th>
<th>Welding Robot System</th>
<th>Structural Steel Large Assembly</th>
<th>Welding Robot System</th>
<th>Robotic Welding/Structural Steel Connection</th>
<th>Welding Robot System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire weight</td>
<td>MAX: 650kg / 1430b</td>
<td>MAX: 1000kg / 2205b</td>
<td>MAX: 2000kg / 4401b</td>
<td>MAX: 3000kg / 6614b</td>
<td>MAX: 3000kg / 6614b</td>
<td>MAX: 3000kg / 6614b</td>
<td>MAX: 3000kg / 6614b</td>
<td>MAX: 3000kg / 6614b</td>
</tr>
<tr>
<td>Other</td>
<td>Chip changer not included</td>
<td>Chip changer included</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The conventional constant voltage mode can be used for applications other than the above.
Structural Steel Large Assembly Welding Robot System

- Enhanced functionality and expandability

Welding points

| HSS-Column | Round pipe column | SRC column |
| HSS-Column core | SRC core | Variable diaphragm core | Round pipe core |
| Connection | Beams | Opening | H-column |

- Example of column large assembly system connection process
- Example of column large assembly system beam process
- Example of cut-out base process
- Example of horizontal process base frame view

Features

1. Feature to realize unobserved operation for extended periods
   - Nozzle cleaner, nozzle auto changer, wire cutter, chip chopper (available for PESGAR only) come as standard
   - The arc start pre-check function and crater arc start combination feature reduces arc start errors
   - The slow down start feature and wire stick removal feature control arc CR/UF time stoppage
   - Slag automated removal equipment can be installed (option)

2. Applicable to a wide variety of work, increased plant operation rate
   - S-form column, SRC column (H-column), round pipe column, box column can all be handled
   - Applicable to column epoxy coating machines (non-crack fabrication methods)
   - Applicable also to bracket welding (horizontal welding) for column through-box column, SR column (H-column)
   - Applicable also to core connector welding, connection welding

3. High quality welding
   - Read appearance corresponding to JASSO and heat control conditions, in-pas temperature management, handling feature and robot model certification are also applicable
   - The automatic measurement of corner radius and corner gap means that even work with variations can be welded appropriately

4. Simple operation
   - Easy-to-understand input screen makes it easy to create data
   - The home automatic measurement feature allows the robot to automatically measure the column position

5. Existing delivered systems can be upgraded to 2 arcs (robots)
   - Adding a robot and solder to an existing column large assembly system can upgrade the system to a 2-ARC welding system

Some variations of Structural Steel Large Assembly System
Structural Steel Large Assembly “2-ARC” Welding Robot System

- Significant increase in productivity per unit area

Reference layout plan

Central diaphragm is simultaneously welded.

Example of benefits of automatic welding

1 robot (1st position)
1 robot (2nd position)
3 welders work overtime until 19,800 for 2 columns

Applicable range

System type 1GT800MP2 1ST-1000MP2 2OT-1000MP2 3OT-1000MP2
HSS Column diameter 250~800mm / ±8.4~31.5in 250~1000mm / ±8.4~39.37in 250~1000mm / ±8.4~39.37in 250~1000mm / ±8.4~39.37in
Pipe diameter 250~810mm / ±8.4~31.5in 250~1016mm / ±8.4~40.0in 250~1016mm / ±8.4~40.0in 250~1016mm / ±8.4~42.24in
Column maximum weight / welding applicable range 10t~13ton / 42.7t 15t~13ton / 42.7t 20t~13ton / 42.7t 30t~13ton / 42.7t
Joint number Maximum 4 joint and base plate
Applicable Column Round pipe
plate Round pipe
thickness 9~12mm (in 1mm pitches) 9~12mm (in 1mm pitches) 9~12mm (in 1mm pitches) 9~12mm (in 1mm pitches)
Application to column plate thickness (option) 96~138mm / ±1.77, 1.97in
Gap range 4~7mm / 0.16~0.27in
Gap difference tolerance for 2-weld joints 6mm / 0.24in

Features

1. Welding time halved
- Welding time is halved compared to single Arc welding systems
- In addition to welding, wire cut, sensing function and slag removal is automatically executed by 2 robots at the same time.

Plate thickness, 9mm/0.35in, 250mm/9.84in square, 6 joint, semi-automated arc generation rate of 70%

2. Welding different route gaps
- To weld different initial cross-sections within the same welding time, the welding ampereage, arcing/vosage and welding speed are automatically c luxurated.

Handles gaps up to 6mm/0.24in! 
*(A single pass may apply depending on the configuration)

3. Applicable also for columns with different plate thickness or diameter
- Different sizes (plate thickness, diameter) can be welded simultaneously with 2-ARC welding system.
- Same joint type, same plate thickness only possible with 2-ARC. *

Columns with different plate thickness/diameter (image of mock-up)

4. Applicable to a variety of work with improved operational efficiency
- Different sizes (plate thickness, diameter) can be welded simultaneously with 2-ARC welding system.
- Same joint type, same plate thickness only possible with 2-ARC. *
Multi-work Structural Steel Connection Welding Robot System

- Multi-purpose for high operational efficiency
- Reference layout plan

Welding points
- HSS-Column core
- SRC core
- Round pipe core
- Inner diaphragm

Features
1. Multi-purpose and operational efficiency achieved
   - Applicable to respective types of columns, connection, inner diaphragm and SRC shaft
   - Due to continuous operations of different types or multiple works, long operation times would be possible.
2. Simple input of data for each type of work
   - A simple interactive input screen not just for cores but also for all connections, inner diaphragms and SRC shafts
   - Work measurement and time inputs are lowered to reduce time and prevent input errors.
3. Continuous operation for various works
   - Using the reserved operation function, numerous works of different types can be set at once, allowing for continuous operation.

Reference installation points for each type of connection and inner diaphragm and corresponding image

Applicable range

<table>
<thead>
<tr>
<th>Type</th>
<th>Diameter</th>
<th>Applicable plate thickness</th>
<th>Applicable to thick plate thickness</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSS-Column</td>
<td>250<del>600mm / 9.84</del>31.5mm</td>
<td>9, 12, 16, 19, 22, 25, 28, 32, 36, 40mm / Max 0.5mm / Min 1.57mm</td>
<td>45, 50mm / 3, 5, 7, 10mm</td>
<td>180<del>500mm / 11.05</del>10.37mm</td>
</tr>
<tr>
<td>Round pipe</td>
<td>250<del>600mm / 9.84</del>31.5mm</td>
<td>9, 12, 16, 19, 22, 25, 28, 32, 36, 40mm / Max 0.5mm / Min 1.57mm</td>
<td>45, 50mm / 3, 5, 7, 10mm</td>
<td>180<del>500mm / 11.05</del>10.37mm</td>
</tr>
<tr>
<td>SRC</td>
<td>250<del>1100mm / 9.84</del>43.01mm</td>
<td>10<del>400mm / 3.94</del>15.71mm</td>
<td>9<del>32mm / 0.35</del>1.26mm</td>
<td>700<del>1000mm / 27.56</del>39.37mm</td>
</tr>
</tbody>
</table>

Connection:

<table>
<thead>
<tr>
<th>Type</th>
<th>Flange width</th>
<th>Flange thickness</th>
<th>Beam structure</th>
<th>Connection step</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-Connection</td>
<td>250<del>1100mm / 9.84</del>43.01mm</td>
<td>10<del>400mm / 3.94</del>15.71mm</td>
<td>9<del>32mm / 0.35</del>1.26mm</td>
<td>700<del>1000mm / 27.56</del>39.37mm</td>
</tr>
<tr>
<td>SRC-Connection</td>
<td>250<del>1100mm / 9.84</del>43.01mm</td>
<td>10<del>400mm / 3.94</del>15.71mm</td>
<td>9<del>32mm / 0.35</del>1.26mm</td>
<td>700<del>1000mm / 27.56</del>39.37mm</td>
</tr>
</tbody>
</table>

Inner diaphragm:

<table>
<thead>
<tr>
<th>Type</th>
<th>Column core internal diameter</th>
<th>Inner diaphragm depth</th>
<th>Inner diaphragm thickness</th>
<th>Column core height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner diaphragm</td>
<td>260<del>1000mm / 7.87</del>99.37mm</td>
<td>Column inner diameter 175mm / 6.88mm</td>
<td>10<del>32mm / 0.35</del>1.26mm</td>
<td>Below 1000mm / 39.37mm</td>
</tr>
</tbody>
</table>

SRC shaft:

<table>
<thead>
<tr>
<th>Type</th>
<th>Flange width</th>
<th>Flange/web thickness</th>
<th>Shaft length</th>
<th>Flange gap separation</th>
<th>Flange aperture</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRC shaft</td>
<td>100<del>400mm / 3.94</del>15.71mm</td>
<td>8<del>25mm / 0.32</del>0.98mm</td>
<td>1000<del>3000mm / 39.37</del>118.11mm</td>
<td>Within 800mm / 31.5mm</td>
<td>Within 1000mm / 39.4mm</td>
</tr>
</tbody>
</table>

Note: Installation case works with connection length of 2400mm installed in 2 rows. Distances between connection points: 0.1m to 0.5m.
Full-package Structural Steel Connection Welding Robot System

- Connections are “fully” finished by “one set” —
- With the addition of various positioners, a variety of work can be handled

**Features**

1. **Connections are fully completed in one set**
   - A crane is not required for work reversal
   - Diaphragm x beam flange (inside/outside) and beam web edge material welding is carried out continuously

2. **Simple operation**
   - The only inputs are diameter, flange thickness and leg length
   - Flange thickness and attachment point do not need to be entered

**Applicable range**

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection height</td>
<td>300<del>800mm / 11.81</del>31.5in</td>
</tr>
<tr>
<td>Size</td>
<td>Below 2400mm / 94.49in</td>
</tr>
<tr>
<td>Diaphragm diameter</td>
<td>240<del>650mm / 9.45</del>25.59in</td>
</tr>
<tr>
<td>Beam flange width</td>
<td>100<del>400mm / 3.94</del>15.75in</td>
</tr>
<tr>
<td>Step dimension</td>
<td></td>
</tr>
<tr>
<td>Mass</td>
<td>Below 2.0t / 4409lb</td>
</tr>
</tbody>
</table>

*SRC connection are also applicable

*The general applicable, single applicable, and increment used the applicable range: connection face stop.

**Application example**

- Outside flange welding
- Inside flange welding
- Web welding

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Structural Beam Welding Robot System

- Automation of beam welding is achieved —

**Features**

1. **Turn welding**
   - The flange terminal and scalp interior are senso and the positional accuracy of the angles are detected to ensure quality turn welding

2. **Position for beams**
   - In order to weld stiffener and flange, the beam is instated by the positioner, and the robot approaches the beam from directly above to reduce residual welding.
   - Rotating the Beam horse tip to back does not require a crane, thus reducing time.

3. **Alternate welding function**
   - Stiffener welding is done alternately on the front and rear, reducing warping due to the thermal strain or warpage.

4. **Rotation correction function**
   - If a support is attached at an angle, the deviation in rotation will be accounted for during welding.
   - After detecting the terminal position of the component arm by sensing, a welding program for the part is made to enable real-time corrections to be made during welding by an auto-tracing.

**Introduction merit** (operation time): Stiffener SP X 3 sheets X both sides + support plate PL X 3 sheets X single side

<table>
<thead>
<tr>
<th>Beam</th>
<th>SP</th>
<th>PL</th>
<th>Operation time</th>
<th>Arc time (%)</th>
<th>Semi automatic (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1200mm x 400mm</td>
<td>161/0.63in</td>
<td>161/0.63in</td>
<td>04:14:24</td>
<td>03:05:24 (72.9%)</td>
<td>10:17:54 (30.0%)</td>
</tr>
<tr>
<td>1800mm x 400mm</td>
<td>141/0.55in</td>
<td>141/0.55in</td>
<td>03:07:54</td>
<td>01:58:54 (63.3%)</td>
<td>06:36:12 (30.0%)</td>
</tr>
<tr>
<td>3000mm x 400mm</td>
<td>121/0.47in</td>
<td>121/0.47in</td>
<td>02:35:30</td>
<td>01:26:30 (55.6%)</td>
<td>04:49:12 (30.0%)</td>
</tr>
</tbody>
</table>

*Production time and area were calculated and measured while at other attachments.

**Applicable range**

<table>
<thead>
<tr>
<th>Applicable points</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beam web x stiffener</td>
<td>Handles beams up to 400<del>800mm / 15.75</del>31.5in beam floor position of 1400mm / 55.12in.</td>
</tr>
<tr>
<td>Beam flange x stiffener</td>
<td>Includes turn welding (positioner used).</td>
</tr>
<tr>
<td>Beam web x stiffener plate</td>
<td>Separation between beam flange from 16mm / 0.63in upwards.</td>
</tr>
<tr>
<td>Beam web x stiffener plate/through hole</td>
<td>Through hole diameter 100<del>600mm / 3.94</del>23.62in.</td>
</tr>
<tr>
<td>Beam web x stiffener plate (round type)</td>
<td>Separation between beam flange from 350mm / 13.78in upwards.</td>
</tr>
</tbody>
</table>
Structural Steel Connection Welding Robot System

Welding points

- HSS-Column core
- Deformed diaphragm core
- Round pipe core
- SRC core
- Tapered core

Features

1. Realizing unobserved operation for extended periods
   - A maximum of 18 fixtures can be welded continuously
   - Nozzle cleaner, nozzle auto-changer, wire cutter, crap changer (NEGARC only) come as standard
   - The arc start pre-check function and crater-arc start combination feature reduce arc start errors
   - The slow-down start feature and wire stick removal feature control arc ON/OFF time stoppages
   - Automatic slag removal equipment can be installed (option)

2. Applicable to a variety of work, improved operational efficiency
   - Optimal for round pipe, SRC or other types of core

3. High quality welding
   - Seaa appearance corresponding to JIS, Inconel, 100% weld, post-welding inspection
   - The automatic measurement of corner radius and corner gap means that work with variations can be welded accurately

4. Simple operation
   - Easy-to-use interface input screen makes it easy to create data

5. Existing delivered systems can be upgraded to a 2-ARC welding system
   - 2-ARC welding is possible by adding a robot and slider to an existing core connector welding system

Features

1. Welding time halved
   - Similar to the 2-ARC of the column large assembly system, the time at a conventional system can be halved.
   - Apart from welding, wire cut and sensing related work or bag removal is also executed by a robot simultaneously.

2. High efficiency and space saving
   - The welding time at the core can be significantly reduced with just the occupied space of a Single ARC system.

3. Welding different root gap
   - A welding current to weld different groove cross-sections within the same amount of welding time.

4. Applicable to different column plate thicknesses or diameters
   - Assumed sizes (plate thickness, diameter) can be welded simultaneously with 2-ARC welding system.

5. Core connection clamp with counter-strain feature
   - The connection clamp for conventional clamp surface plate is improved and prevents diaphragm bevels breaking (galvanised)

Applicable range

<table>
<thead>
<tr>
<th>System type</th>
<th>2t specification</th>
<th>3t specification</th>
<th>4t specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSS-Column diameter</td>
<td>200<del>800mm / 7.87</del>31.5in</td>
<td>250<del>800mm / 9.84</del>31.5in</td>
<td>250<del>1000mm / 9.84</del>39.37in</td>
</tr>
<tr>
<td>Pipe diameter</td>
<td>200<del>813mm / 7.87</del>32.0in</td>
<td>250<del>813mm / 9.84</del>32.0in</td>
<td>250<del>1016mm / 9.84</del>40in</td>
</tr>
<tr>
<td>Length/connection points</td>
<td>300<del>3000mm / 11.81</del>118.11in / max of 9 (18joints)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applicable plate thickness</td>
<td>Column 9,12,16,19,22,25,28,32,36,40mm / Min 0.35mm Max 1.57mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Round pipe 9,12,16,19,22,25,28,32,36,40,45,50,55,60mm / Min 0.35mm Max 2.36mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SRC 9~32 (in 1mm Pitch), 36,40,45,50,55,60mm / Min 0.35mm Max 2.36mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Column plate thickness (optional) 45,50mm / 1.77, 1.97in</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Note: 1. Core connection clamp (required as a separate option) 2. Attachment jig for core attachments other than square diaphragms will be required additionally
Note: 2. See ref for the appropriate pipe thickness of column and round pipes by NEGARC)
Compact Structural Steel Connection Welding Robot System

- Small space, big effect!

Welding points
- HSS-Column core
- Round pipe core
- SRC core
- Tape core
- Connection
- SRC Connection (core type)
- SRC Connections

Features
1. Space saving and easy operation
   - The equipment only occupies 1.8m × 3.0m / 6.0ft × 9.8ft
   - The robot automatically measures the outer radius or core corners by the corner radius sensing function and eliminates the need for tedious work and improves quality.
   - Easy-to-understand input screen makes it easy to create data
2. High quality welding
   - Weld appearance corresponding to JIS56 and heat control conditions, in-pass temperature management, handling feature and robot model certification are also applicable
   - The automatic measurement of corner radius and corner gap means that work with variations can be welded appropriately
3. Connection data can be input easily
   - Since the input of detailed dimensions is not needed, production time including set-up time can be significantly reduced
   - Easier to prevent function failure, surface step-upocrability function and a 1/2 round-trip multi-pass welding function reduces time and errors during assembly and negates the need for repair welding after robot welding
4. Realizing unobserved operation for extended periods
   - Nozzle cleaner, nozzle auto change function, and wire feeder become standard
   - Welding of core connection is also possible
   - The arc at the pre-check function and crater-arc start combination feature reduces arc start errors
   - The slow-down start feature and wire stick removal feature control arc ON/OFF time stoppages
5. Applicable to a variety of work, improving operational efficiency.
   - Optional for round pipe, SRC or other types of core
   - Connection range welding can also be applied for step connections

Application example
- Core connection welding
- Round pipe core welding
- SRC core welding
- Surface step sensing and burn through prevention function
- Burn through prevention function (Example)

Example of benefits of automating
Subject work: S-form column (400mm / 15.75in core, 164 / 6.5in)

<table>
<thead>
<tr>
<th>Semi-automated welding</th>
<th>2 pieces per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>1st piece</td>
</tr>
<tr>
<td>Lunch/break</td>
<td>1st piece</td>
</tr>
<tr>
<td>Core</td>
<td>2nd piece</td>
</tr>
<tr>
<td>Core</td>
<td>3rd piece</td>
</tr>
<tr>
<td>Core</td>
<td>4th piece</td>
</tr>
<tr>
<td>Core</td>
<td>5th piece</td>
</tr>
<tr>
<td>Core</td>
<td>6th piece</td>
</tr>
<tr>
<td>Average fabrication time</td>
<td>3.9hrs per piece</td>
</tr>
</tbody>
</table>

Robot welding
6 pieces per day

<table>
<thead>
<tr>
<th>Core</th>
<th>1st piece</th>
<th>2nd piece</th>
<th>3rd piece</th>
<th>4th piece</th>
<th>5th piece</th>
<th>6th piece</th>
<th>Average fabrication time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>1st piece</td>
<td>2nd piece</td>
<td>3rd piece</td>
<td>4th piece</td>
<td>5th piece</td>
<td>6th piece</td>
<td>1.7hrs per piece</td>
</tr>
</tbody>
</table>

Applicable core, connection shape/dimensions

- Core
  - Type: HSS-Column
  - Diameter: 200 ~ 800mm / 8 ~ 31.5in
  - Plate thickness: 9, 12, 16, 19, 22, 25, 28, 32, 36, 40mm / Min 0.55in ~ Max 1.57in
  - Plate thickness handling: 45, 50mm (options: 47.7, 57.1in)
  - Connection range: 1/2 round-trip multi-pass welding function

- Round pipe
  - Diameter: 200 ~ 800mm / 8 ~ 31.5in
  - Plate thickness: 9, 12, 16, 19, 22, 25, 28, 32mm / Min 0.55in ~ Max 3.06in
  - Plate thickness handling: 36, 40, 45, 45.5, 50, 50mm / Min 1.42in ~ Max 2.36in

- Tape (option)
  - Diameter: 200 ~ 800mm / 8 ~ 31.5in
  - Plate thickness: 9, 12, 16, 19, 22, 25, 28, 32mm / Min 0.55in ~ Max 2.36in

- SRC form
  - Cross section dimensions: 2.25 ~ 7000mm / 0.09 ~ 275.6in
  - Flange length: 100 ~ 4000mm / 3.94 ~ 157.5in
  - Range thickness: 9, 12, 16, 19, 22, 25, 28, 32mm / Min 0.55in ~ Max 3.06in

Note: Core connection clamp is required for a separate option. Note: 2) Attachment jig for core attachments other that square diaphragm will be required additionally.

- Connection
  - Type: 5-form connection, SRC form connection, 2 connections placed
  - Flange thickness and connection thickness

- Flange thickness
  - 150 ~ 700mm / 9.8 ~ 27.6in
  - 700mm and over / 36, 40, 45, 50mm / Min 0.55in ~ Max 1.57in
  - 150 ~ 400mm / 3.94 ~ 15.75in

- Connection thickness
  - 150 ~ 275.6mm / 0.06 ~ 10.8in
  - 200 ~ 400mm / 0.79 ~ 15.75in
  - 400 ~ 157.5mm / 15.75 ~ 6.2in
1 Structural Steel Navigation

Useful for checking production progress and aiding planning and making quotes

- Checking production progress: Management of robot welding progress and improving the process prior to welding
- Displays robot operation progress. Production progress can be checked both on the shop floor as well as from the office through a network connection.
- Estimation: calculation feature - Eliminates wastage and enables high precision process planning to be made

Apart from tacit time, wire usage etc can be calculated to enable high precision process planning and cut down production wastage

2 Process report software (option)

Management of input can be executed for the entire welding line thus increasing reliability.

- The welding current, arc voltage and welding speed are fed back through the robot during welding and can be displayed real-time on the PC monitor.
- After welding, the heat input can be calculated based on the data stored in the PC and a report can be generated.

Software quick-glance table

<table>
<thead>
<tr>
<th>Software name</th>
<th>Large assembly</th>
<th>Automatic</th>
<th>Connections</th>
<th>Compact</th>
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<tbody>
<tr>
<td>HRCARc™ HSS Column welding</td>
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<td>HRCARc™ pipe welding</td>
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<td>ASB500 welding method</td>
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<td>HSS Column welding</td>
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<td>Inner diaphragm welding</td>
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<td>NBWP method</td>
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<td>Beam welding</td>
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<td>Pipe core welding (only for Single-MMC)</td>
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<td>SBC through-throat horizontal welding</td>
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<td>HSS Column plate thickness (in mm)</td>
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</table>

Note: ○ = Only compatible with welding power supply ASB500

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All work data can be easily viewed in diagram form while inputting

1. Column large assembly welding  
   (Corresponding system: Large assembly 2-ARC/Single ARC)

2. Core welding  
   (Corresponding system: Large assembly 2-ARC/Single ARC, Core connection 2-ARC/Single ARC, Full-package multi, Compact)

3. Connection welding  
   (Corresponding system: column large assembly, Full-package multi, Compact)

4. Inner diaphragm welding  
   (Corresponding system: Full-package multi)

5. SRC shaft welding  
   (Corresponding system: Multi)

6. Beam welding  
   (Corresponding system: Large assembly, Beam)

Supporting stable operation

Peripheral equipment

Peripheral equipment for continuous un-supervised operation

- Nozzle auto changer
- Wire cutter
- Slag automatic cleaning equipment

- Nozzle cleaner
- Chip changer
- The robot automatically removes slags, which improves continuous operation as well as prevents failures.
- Core connector clamp

Welding power supply SENSARC™ series

- SENSARC™ AB500 (for robot welding only)
- Minimum spatter CO2 welding process
- SENSARC™ equipped
- Automated switching between REGAR™ and constant voltage
- Improved maintainability through digital control

Certified robot type

Kobe Steel, Ltd.’s structural steel welding system for all equipment has obtained the Japanese Robot Association’s certification of Architectural steel welding robot and therefore officially approved for industrial use.

Robot specific solid wire FAMILIARC™ MG-R series

As an overall manufacturer of welding products, Kobe Steel, Ltd. develops and produces specific wires for robots.
With superior sensing ability compared to normal wire, slags reduction in contribute to superior re-arcing. This is the perfect solid wire for robots.  
(MG-R series: MG-5GR, MG-5SR, MG-56R, MG-5GR(N), MG-56R(N))
KOBE STEEL, LTD.

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