WELDING ROBOT

ARC MAN™

WELDING SYSTEMS LINEUP

KOBE STEEL, LTD.
The ARCMAN™ improves the quality of welding work.
- Detects changes in conditions during welding work and compensates for these changes in real time.
- Equipped with a weaving function that ensures deep weld penetration.
- Optimal welding conditions can be set for each pass.

The ARCMAN™ contributes to reducing the cost of welding work.
- Can perform tandem welding or single welding, thereby maintaining a high operating ratio.
- Can perform multi-layer welding in each direction, thereby shortening the welding time.
- Coordinated movement function enables to work in tandem with the positioner, thereby reducing robot teaching time.
CONSTRUCTION MACHINERY

Swing Frame – ①

Center Frame – ②

Arm – ③

Boom – ④

- The four manipulators operate in a coordinated manner in order to achieve a significant reduction in welding time.
- Welding can be performed vertically, thus eliminating the need for positioners and workpiece clamping jigs.
- Our groove-width tracking function compensates for variations in the groove width during welding and regulates the amount of deposited metal in order to achieve high quality welds.

BRIDGES AND WATER GATES

Bridge and Water Gate – ⑤

Twin Gantry Type System for Bridge Panel – ⑥

- This configuration employs a long arm robot with a compact carriage, which can handle welding of main girders of widths up to 3 m.
- Two-dimensional CAD data can be converted to three-dimensional data, and teaching data can be created automatically using proprietary software.
- A pair of robots mounted in opposed positions to achieve highly-efficient twin welding. Good-shape weld beads can be achieved even for box welding.
- Functions for monitor-less operation enable continuous automatic welding.

- Tracking the groove width reduces the number of sensing points required.
- Tandem welding reduces the cycle time by about 40% compared to single welding.
- Controlling the welding conditions for the leading and trailing wires is easy, and ensures smooth surface weld beads and sufficient weld penetration.
- This is a simple configuration featuring a long arm ARCMAN™ XL robot without slider.
- High efficiency is achieved with a drop-axis positioner, which adopts the optimum welding position for inclined welding lines, together with overhead-suspended tandem welding.
- This reduces the working space and can be used for both small and large assemblies by traversing between the face plates.
Examples of the ARCMAN™ being applied for production

**RAILROAD CARS**

**Truck Parts**

- High quality, good-shaped weld beads can be achieved with three-dimensional welding lines by employing a see-saw type positioner with cooperative control function and groove-width tracking function.

**Truck Frame**

- With a drop-axis positioner, the vertical motion axis enable the work position to be set lower.
- ARCMAN™ offline Teaching System can efficiently generate teaching data for complicated assemblies.

- Vertical position weld appearance
- Bead appearance

**OTHER MACHINERY PARTS**

**Press Machine/Frame**

- Utilizing three-dimensional CAD data, ARCMAN™ offline Teaching System can easily generate teaching programs for assemblies with particular diversified designs.
- Our compact tandem torch enables multi-pass welding up to maximum depth of 80 mm, thereby significantly reducing the welding time.

**Forklift Parts/Mast Supports**

- This configuration enables higher efficiency operation of a single system though a pair of opposing positioners.
- The operator can use the positioners semi-automatically to complete a residual welding line whilst the assembly is mounted on the positioner.

**Standard-Positioner Combined**

- ARCMAN™ MP plus drop-axis two-motion-axis positioner (rotation and tilt)
The ARCMAN™ improves the quality of welding work.

■ Groove-Width Tracking

- The weaving width and welding speed can be corrected by detecting real time groove width variations. This reduces the sensing points thereby contributing to cycle time reduction.
- The height of weld reinforcements can be made uniform and the bead width of the cover pass can be regulated.

■ Laser Root-Gap Measuring System

- This function uses a laser to gauge the gap and automatically selects the welding conditions from within the data bank.
- This system selects the lamination technique, determines the wire positioning, and makes the decision on whether or not to weld according to the measured results.

■ Arrowhead-Pattern Weaving Function

- This function can be applied for vertical-up welding.
- This function can be used together with the arc sensor.
- This function can also be applied to second passes and beyond in multi-pass welding.

■ Data Bank Function and Pass-by-Pass Torch Angle Setting Function

- Up to 499 kinds of welding conditions can be registered.
- This function operates with the teaching points at the weld start and end only, while the optimum torch angle can be set for each pass.
The ARCMAN™ contributes to reducing the cost of welding work.

### Tandem Arc Welding System

- Automatic select function for welding conditions
  Once the type of groove, plate thickness, or target leg length have been set, this function automatically selects the optimum welding parameters.
- Data bank for welding conditions
  Welding conditions for the leading and trailing wires can be verified, edited and stored via the data bank screen.

### Dual-arc sensor function

- Misalignment of trailing wire
  Wire curvature
  The curvature of the trailing wire fluctuates during welding.
  Teaching error
  The leading wire is correctly positioned but the trailing wire is misaligned.
  Misalignment of the trailing wire

- Sensing directions of dual-arc sensor
  Sensing directions (right-left, up-down, and rotation).

- The dual arc sensor detects changes in the currents of the leading and trailing wires, adjusts misalignments of the leading wire, and corrects misalignments of the trailing wire, as well as function in the same way when the leading and trailing wires are operated in reverse. This improves the weld quality and reduces the need for repair welding.

### Round-Trip Multi-Pass Welding Function

- Since this function performs continuous welding while arc welding is currently being performed, it does not give rise to defects when welding is started or erroneous arc starting. Moreover, since it does away with crater treatment in the middle of arc welding it shortens the time this takes.
- The multi-pass welding, which intermittently performs round-trip horizontal fillet-welding, improves the bead shape because it disperses the weld-start convexity.

### Coordinated Welding Function

- This function synchronizes and coordinates the manipulator and positioner, thereby maintaining a constant welding speed and position.
- Maintaining the welding groove in the optimal position improves and stabilizes the weld quality.
**MANIPULATOR**

**Model: ARCMAN™ GS**

**Features:**
- The latest models.
- Features two models with enclosed cable.
- The 1st model with cables enclosed in the upper arm offers the greatest range of motion in its class.
- The 2nd model with cables enclosed in the wrist can perform both single and tandem welding by changing the welding torch.

**Model: ARCMAN™ MP**

**Features:**
- Standard model with state-of-the-art welding technologies.

**Model: ARCMAN™ XL mk II**

**Features:**
- Due to its large size and extensive range of motion, the need for a slider may be eliminated, or the size of the slider significantly reduced.

**Model: ARCMAN™ SR**

**Features:**
- Compact size to cover an extensive work area in conjunction with slider.

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**CONTROLLER**

**CA-Type Controller**

**Teaching Pendant**

**SOFTWARE**

**ARCMAN Off-line Teaching System**

**Features:**
- Function for retrieving data from different work model.
- Errors in teaching data can be detected.

**AP-SUPPORT (ARCMAN™ Production Support System)**

**Features:**
- Program for production improvement (productivity, weld quality, and cycle time).
- Help identify possible causes of stop troubles.
- Automatically records informations of working data.
**WELDING POWER SOURCES**

**SENSARC™**

**AB500** (designed for robots)
- High-performance digitally-controlled welding power source.
  - Suitable for medium to thick plate welding with various welding modes.
  - Digital control makes maintenance easier.
  - Equipped with the extra-low spatter CO₂ welding process REGARC™.

**SENSARC™**

**LS350D**
- Digitally-controlled welding power source featuring extra-low spatter.
  - The spatter emission rate can be as low as one-third of conventional inverter-controlled power sources.
  - Developed by integrating current-waveform control with digital control.

**SENSARC™**

**UC500**
- High-performance CO₂/MAG welding power source.
  - Unsurpassed performance with instant arc starting.
  - Excellent high-speed welding capability.
  - Stable arc in low to high current ranges.

**GLOBAL NETWORK**

**KOBE WELDING OF TANGSHAN CO., LTD.**

Company Profile
Sales & Production of Solid Wires for Carbon Steel.
161, Huai Road, Tangshan New & Hi-Tech Development Zone, Tangshan, Hebei 063025 People's Republic of China
TEL: +86-315-3852806 FAX: +86-315-3852829

**KOBE WELDING OF EUROPE B.V.**

Company Profile
Sales & Production of Flux-Cored Wire(FCW), Eletrode NO. 9622, PN Heerlen, The Netherlands
TEL: +31-45-547-1101 FAX: +31-45-547-1100

**KOBE WELDING OF QINGDAO CO., LTD.**

Company Profile
Sales & Production of Flux-Cored Wire for Carbon Steel.
South 6th Rd, and West 35th Rd, FUYUAN Industrial Estate, South 6th Rd, and West 35th Rd, FUYUAN Industrial Estate, Qingdao Development Area, Qingdao 266555 People's Republic of China
TEL: +86-532-8359-3000 FAX: +86-532-8359-3300

**KOBE WELDING OF SHANGHAI CO., LTD.**

Company Profile
Sales & Technical Support of Welding consumables, sales & maintenance support of Welding system.
4-52 Industrial Park No.2609, Shanghai 200052 People’s Republic of China
TEL: +86-21-6191-7850 FAX: +86-21-6191-7851

**KOBE WELDING INDIA PVT. LTD.**

Company Profile
Sales of Welding consumables.
Unit No. 409, Corporate Suites MG Road Gurgaon, 500, Soi 1, Bangpoo Industrial Estate, Sukhumvit Road, Praeksa, Muang, Samutprakarn 10280, Kingdom of Thailand.
TEL: +66-2324-0588 FAX: +66-2324-0797

**KOBE WELDING (MALAYSIA) SDN. BHD.**

Company Profile
Sales & Production of Covered Electrode for Mild Steel.
Plot 502, Jalan Perusahaan Baru, Kawasan Perusahaan Perusahaan, 1320000, Malaysia
TEL: +60-3-659796 FAX: +60-3-659796

**KOBE WELDING MARKETING OF KOREA CO., LTD.**

Company Profile
Sales of Welding Consumables.
RM 1014, Busan Digital Valley 132-7, Gwamun Dong, Seo-gu, Busan 617-100, Republic of Korea
TEL: +82-51-329-8999 FAX: +82-51-329-8949

**KOBE WELDING OF KOREA CO., LTD.**

Company Profile
Sales & Production of Flux-Cored Wire for Carbon Steel.
67, Choryang-dong, Uichang-gu, Changwon-si, Gyeongnam, People's Republic of Korea
TEL: +82-55-352-6686 FAX: +82-55-352-7798

**KOBE WELDING OF AMERICA INC.**

Company Profile
Sales of Flux-Cored Wire(FCW) Solid Wires for Carbon Steel.
11, 20 Pandan Avenue Jurong, Singapore 609387 Republic of Singapore
UNIT NO. 409, CORPORATE SUITES MG ROAD GURGAON, 500, SOI 1, BANGPOO INDUSTRIAL ESTATE, SUKHUMVIT ROAD, PRAEKSA, MUANG, SAMUTPRAKARN 10280, KINGDOM OF THAILAND.
TEL: +65-6268-2711 FAX: +65-6264-1751

**THAI-KOBE WELDING CO. LTD.**

Company Profile
Sales & Production of Covered Electrodes.
958 Soi 1 Bangprao Industrial Estate, Sukhumvit Road, Praeksa, Muang, Samutprakarn 10280, Kingdom of Thailand.
TEL: +66-2324-0588 FAX: +66-2324-0797

**KOBE MIG WIRE(THAILAND)CO., LTD.**

Company Profile
Sales & Production of Solid Wires.
14, Finger, 958 Soi 1, Bangprao Industrial Estate, Sukhumvit Road, Praeksa, Muang, Samutprakarn 10280, Kingdom of Thailand.
TEL: +66-2324-0588 FAX: +66-2324-0797

**SUPPLEMENTARY EQUIPMENT**

- Automatic nozzle-changing device
- Nozzle-cleaning device
- Automatic slag-removal device
- Plasma cutting torch

We encourage you to check the latest information on our homepage.

KOBE STEEL, LTD.
http://www.kobe.co.jp/english/welding/

KOBE WELDING
http://www.kobelco-welding.jp/