Automotive Body-In-White Assembly System
BIW Welding Assembly | Hemming System
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|    |                           | Checking Fixture |

Press Hemming Experience
Tabletop Hemming Experience
Robot Roller Hemming Experience
Servo Hemming Experience
Automated Body In White Assembly Line Design, Manufacture and Implementation

LPR Global specializes in automated assembly line for automotive body in white, applying various joining methods including spot welding, laser welding, sealing and hemming. Our integral automation assembly system includes main and sub assemblies welding system, pre-welding quality inspection fixture system and body in white and door assembly hemming system. We have 2 manufacturing plants in S.Korea that are both ISO 9001 certified, and a certified corporate research and development center dedicated for technology development.

Automotive Body Welding Assembly System
(Main Body Line, Floor Line, Side Line, Moving Line, Main Buck System)

Inspection Fixture System
(B.I.W (Body In White), Aperture Gauge, Moving Assembly (Door, Hood, Tail Gate, etc)

Hemming System
(Press Hemming System, Table Top Hemming System, Roller Hemming System, Servo Motor Hemming System)

• Head Plant in Ulsan Korea, 8,250 m² with a trial run space of 110m x 30m
• Second Plant in Ulsan, Korea, 3,312 m² with a trial run space of 100mx20m
• R&D center in Siheung Korea, 3000m² with a trial run area of 100m x 20m
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<tr>
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<th>Major Client(s)</th>
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</thead>
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<td>Russia</td>
<td>GM Motors</td>
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<tr>
<td>Czech</td>
<td>Hyundai Motors, Kia Motors</td>
</tr>
<tr>
<td>Turkey</td>
<td>Hyundai Motors, Karsan</td>
</tr>
<tr>
<td>Iran</td>
<td>Saipa, Iran Khodro</td>
</tr>
<tr>
<td>India</td>
<td>Hyundai Motors, TATA</td>
</tr>
<tr>
<td>S. Korea</td>
<td>Hyundai Motors, Kia Motors, GM Motors, Renault Samsung Motors</td>
</tr>
<tr>
<td>Japan</td>
<td>Nissan</td>
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<tr>
<td>Malaysia</td>
<td>Perodua, Proton</td>
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<tr>
<td>Australia</td>
<td>Holden</td>
</tr>
<tr>
<td>USA</td>
<td>Hyundai, Kia Motors</td>
</tr>
<tr>
<td>Brazil</td>
<td>Hyundai Motors</td>
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<tr>
<td>China</td>
<td>Hyundai Motors, Kia Motors, Jinbei, Shanghai GM, Geely Automobile Holdings Ltd, Beijing Automotive Industry Holding Co., Ltd</td>
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**Introduction to Automated Body In White Assembly Line Design, Manufacture and Implementation**

**Major Clients**

**Automotive Body Welding Assembly System**

- Main Body Line | Side Line and Floor Line | Moving Line
- Body In White Assembly Line Technical Specification
- Main Buck System Layout
- Checking Fixture

**Body In White & Door Assembly Hemming System**

- Press Hemming Experience
- Tabletop Hemming Experience
- Robot Roller Hemming Experience
- Servo Hemming Experience

**Project Experience**

- Phone: +1 416-901-5591
- Email: info@lprglobal.com
- Website: www.lprglobal.com
- Website: https://www.uskoreahotlink.com/products/factory-automation/automotive-body-in-white-chassis-assembly-system/
Automotive Body Welding Assembly System

Main Body Line
(Key line of Auto body production line for complete under body and upper body including left and right side frames, cowl & dash, package trays) and a pre-buck and main buck being the key facility of the main body line)

Side Line and Floor Line
(Upper body processed and assembled separately in two parts in inner and outer panels, and put together. LH and RH on each side are symmetrical excluding specific parts that are different.)

Moving Line
(Door, Hood-Bonnet, Trunk Lid, Fender, etc. Completed through welding, sealing and hemming.)
<table>
<thead>
<tr>
<th>Classification</th>
<th>Contents</th>
<th>Specification</th>
<th>Remark</th>
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<tbody>
<tr>
<td>Welding System</td>
<td>Robot Welding</td>
<td>• Robot servo gun with interlock panel / IT Gun/ST Gun</td>
<td>Note: robot only used for ergonomic problem or for cycle time</td>
</tr>
<tr>
<td></td>
<td>Manual Welding - Auto Gun</td>
<td>• Resistance spot welding and portable spot welding</td>
<td></td>
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<td>Transfer System</td>
<td>Sub-Lines</td>
<td>Manual</td>
<td></td>
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<td>(In-Line)</td>
<td>Main Line - Under Body - Side Assembly</td>
<td>Shuttle System &amp; Manual</td>
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<td></td>
<td>Metal Finish Line</td>
<td>Roller bed</td>
<td></td>
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<tr>
<td>Transfer System</td>
<td>Sub-Line → Main Line</td>
<td>Hoist &amp; Hanger</td>
<td>AFM: auto feeding machine</td>
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<tr>
<td>(Between Line)</td>
<td>Side Assembly → Main Line</td>
<td>AFM</td>
<td></td>
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<td></td>
<td>Front Body → Main Line</td>
<td>EMS</td>
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<tr>
<td></td>
<td>Main Line → Metal Finish</td>
<td></td>
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<tr>
<td>Moving Parts Line</td>
<td>Jig &amp; Fixtures – Welding Equipment – Hemming Equipment</td>
<td>Roller Hemming</td>
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<td>QC Tools</td>
<td>Manual</td>
<td>Aperture Gauge – C/F – CMM (Panel Gauge )</td>
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<tr>
<td>Clamping System</td>
<td>Sub-Line</td>
<td>Air</td>
<td>Manual clamp is not allowed.</td>
</tr>
<tr>
<td></td>
<td>Main Line</td>
<td>Air &amp; Electric</td>
<td></td>
</tr>
<tr>
<td>Production Method</td>
<td>Main Line - Under Body - Side Assembly</td>
<td>N/B</td>
<td>3 Models</td>
</tr>
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<td></td>
<td>– Front Chassis</td>
<td>H/B</td>
<td>Common</td>
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<td></td>
<td>Mini SUV</td>
<td>Mix Flexible</td>
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<td>Metal Finish Line</td>
<td>Setting Jig / Manipulator</td>
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<td>Main Line - Under Body - Side Assembly</td>
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<tr>
<td>Welds Type</td>
<td>Spot - Stud - CO2 Welding</td>
<td>Robot &amp; Manually &amp; auto gun</td>
<td></td>
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<tr>
<td>Sealing Types</td>
<td>Sealer - Mastic</td>
<td>Manually</td>
<td></td>
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Body In White Assembly Line Technical Specification

E.G. Main Body-In-White Assembly System Layout

Robot Welding Gun

Bus Bar

Dummy Gun
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<td>Tabletop Hemming Experience</td>
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<td>Robot Roller Hemming Experience</td>
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<td>Servo Hemming Experience</td>
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<td>04</td>
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![Image of automated assembly system]
Hemming technology is used to hem the inner and outer panels on doors, and hoods of automobiles and appliances through the following hemming technologies: press hemming system, table top hemming, roller robotics hemming, servo hemming system.

**Press Hemming**
- Short cycle time
- Hemming process in two steps: Pre-Hemming and Final-Hemming
- High volume production
- Suitable for large panel hemming
- Produce different parts in the same operation

**Table Top Hemming**
- Optimum Panel Quality: Hemming principle of closed ring
- Medium to High Volume Production, Short Cycle Time
- Hemming process in two steps: Pre-Hemming and Final-Hemming
- Suitable for high-mix, low-production, and most complex geometries
- Small floor space used, Highly Adaptable Process

**Robotic Roller Hemming**
- Flexibility
  - No limitation on the flange angles, rollers can adjust up to 130°
  - No limitation on part shape, changeable roller hemming heads and system to accommodate to different parts.
  - Re-programmability; quick program changes
- Suitable for any size of production through implementation of multiple robots and rollers.
- Simplified and compact design lowers investment cost and floor space used
- Environmentally Friendly
- Absence of hydraulic driving source
- Less Noise
- Constant hemming pressure maintained using pneumatic pressure | monitored and recorded using embedded sensor and PC connection.
Hemming Technologies Used

Servo Motor Hemming System

Sammi Precision’s patented servo motor hemming system uses enabling production lines to implement roller hemming system even for a high quantity mass production. This system ensures that the process time is efficient, and that there is no quality dispersion from the differences in robots’ operation skills. These servo hemming system are widely used by global vehicle makers.

- Hemming quality maintained by controlling pressure force and pressing time
- System can be designed to pre-punch and main punch in 1 step to shorten cycle time, or separate into 2 steps depending on the panel characteristics
- System uses minimal floor space for efficient line configuration
- Eliminating hydraulic use improves noise control, work environment and lowers running cost
- Configuration mechanism is simplified, and the top section of the machine is open for easier and safe maintenance and repair
- Hemming units are standardized – future recycling and replacements are available

Servo Hemming Unit

Automotive Hemming Application
Hemming Technologies Used

**Hybrid Hemming System**

Hybrid hemming system combines mechanical (table top or press) hemming and roller hemming to accommodate use of roller hemming system for precision while fulfilling a large volume production.

**Optimized Hemming Quality**

Hemming quality can be controlled by sequential operation of each units, and controlling the pressing speed, pressing power and position, and pressing time. In servo hemming system, we can set up the acceleration, deceleration, speed, position, time and torque by using HMI in the expert mode.

9 Hemming Technology Patents

**Hemming System Cycle Time Comparison Chart**

(Excludes loading and unloading)

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<th>Press Hemming</th>
<th>Die Lift</th>
<th>Clinching</th>
<th>Robotics Roller Hemming</th>
<th>Servo Hemming</th>
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<td>Time (Seconds)</td>
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<td>27</td>
<td>18</td>
<td>14</td>
<td>60</td>
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<td>Main Body Line</td>
<td>Side Line and Floor Line</td>
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<td>Tabletop Hemming Experience</td>
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<td>Project Experience</td>
<td>Main Body Line</td>
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<td>Floor and Side Line</td>
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<td>Front Floor Line</td>
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<td>Side Outer Line</td>
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<td>Door Line</td>
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<td>Main Buck System</td>
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<td>Hemming System Projects</td>
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</tbody>
</table>
Global Project Experience

Automotive Body Welding Assembly System

MAIN BODY LINE

✓ Installed in Global Vehicle Maker H**’s S.Korean Production Plant

Application Model:
✓ 4 Car models assembled on this line. Tool change allows switch between models.

✓ 40 Stations
  • Body Build Line – 20 Stations
  • Body Respot Line – 20 Stations

Main Equipment:
✓ Skid : Wind Mill unit (multi-model production capable skids)
✓ Main Buck : 4 face-Rotary
✓ Roof Buck : 4 face-Rotary
✓ Forward/backward System
✓ Servo Motor Drive
✓ Robot : 68 sets

✓ Cycle Time : 55 sec

Automotive Body Welding Assembly System

FLOOR & SIDE LINE

- Installed in Global Vehicle Maker H**'s Korean Plant

Application Model:
- 4 Car models assembled on this line. Tool change allows switch between models

- 11 stations (Linear Cell : 7 STN)

Main Equipment:
- Vehicle type Geo-pallet
- Linear Motor System
- Placed housing type
- Linear Cell
Global Project Experience

Automotive Body Welding Assembly System

FRONT FLOOR LINE

✓ Installed in Global Vehicle Maker H**’s Korean Plant

Application Model:
✓ 4 Car models assembled on this line. Tool change allows switch between models

Main Equipment:
- Vehicle Type Geo-pallet
- Linear Motor System
- Placed Housing Type
- Linear Cell

✓ Robot: 28 sets
✓ Cycle Time: 64 sec
Automotive Body Welding Assembly System

SIDE OUTER LINE

- Installed in Global Vehicle Maker G**’s Korean Plant

Application Model:
- 3 Car models assembled on this line. Tool change allows switch between models

Main Equipment:
- Manifold Cylinder
- Index Turn Table System
- Robot: 8/8 sets
- Cycle Time: 54 sec
Installed in Global Vehicle Maker H**'s Korean Plant

Application Model:
- 4 Car models assembled on this line. Tool change allows switch between models

Main Equipment:
- Hemming Press Body
- Key Jig
- Robot Roller Hemming Used

Automotive Body Welding Assembly System

Global Project Experience
Automotive Body Welding Assembly System

**GLOBAL PROJECT EXPERIENCE**

- **Installed in Global Vehicle Maker K**’s Korean Plant

**Application Model:**
- 1 Car models

**Main Equipment:**
- Turn table Key Jig
- Marriage Jig
- Roller hemming
- Unloading Jig
- Sealing
- 3 Sets of Stationary Spot Welding
- Press Type Hemming
- Robot 8/8 Sets
- Cycle Time 600 sec
Global Project Experience

Automotive Body Welding Assembly System

MAIN BUCK SYSTEM

✔ Installed in Global Vehicle Maker TATA's Indian Plant

Application Model:
✔ 1 Car models

Main Equipment:
✔ Slide Side Gate Buck
✔ Under Shuttle

✔ Cycle Time 1800 sec
Global Project Experience

**Press Hemming Systems**

1. Installed in Global Auto Makers Plants:

2. Main Equipment:
   - Hemming Die
   - Hemming Press Body
   - Hemming Die Change
   - Hydraulic System

3. Auto Models:
   - FD 5DR, K2, BK F/L, BETA, FDH, LC, LC F/L, NF, XMA, SLC, HM, TD, JB, UN, SM3, H2L, AO, GSC

**Robot Roller Hemming System**

1. Installed in Global Auto Makers Plants:

2. Main Equipment:
   - Robot
   - Roller Hemming Head
   - Hemming Die
   - Hemming Pad

3. Model:

**Table Top Hemming System**

1. Installed in Global Auto Makers Plants: H**, G**, R**
   - N**, T**

2. Main Equipment:
   - Hemming Die
   - Hemming Punch
   - C-Frame
   - Hydraulic System
   - Hemming Pad

3. Model:

**Servo Hemming System**

1. Installed in Global Auto Makers Plants: H**, K**, G**, R**

2. Main Equipment:
   - Hemming Die
   - Hemming Punch
   - Servo Hemming Unit
   - Servo-Motor
   - Hemming Pad

3. Model:
   - M2XX, U*, P32R
Your connection to Korean manufacturing and industrial equipment

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