

**2018 Results**  
**Orders, Production and Shipments of Manipulators and Robots by Applications**  
**[JARA Members and Non-members]**

Number of units, ( ) : million yen

| CY         | 2017                 | 2018                 | Change from 2017 |
|------------|----------------------|----------------------|------------------|
| Orders     | 235,268<br>(944,702) | 248,283<br>(962,384) | 5.5%<br>(1.9%)   |
| Production | 233,981<br>(877,657) | 240,339<br>(911,609) | 2.7%<br>(3.9%)   |

| Shipments<br>Applications        | 2017               |                  |                  | 2018               |                  |                  | Change from 2017   |                 |                 | 2017<br>(percentage distribution) |                 |                 | 2018<br>(percentage distribution) |                 |                 |
|----------------------------------|--------------------|------------------|------------------|--------------------|------------------|------------------|--------------------|-----------------|-----------------|-----------------------------------|-----------------|-----------------|-----------------------------------|-----------------|-----------------|
|                                  | Domestic shipments | Exports          | Total            | Domestic shipments | Exports          | Total            | Domestic shipments | Exports         | Total           | Domestic shipments                | Exports         | Total           | Domestic shipments                | Exports         | Total           |
| <b>Plastic moulding</b>          | <b>3,354</b>       | <b>5,536</b>     | <b>8,890</b>     | <b>4,896</b>       | <b>6,397</b>     | <b>11,293</b>    | <b>46.0%</b>       | <b>15.6%</b>    | <b>27.0%</b>    | <b>6.8%</b>                       | <b>3.0%</b>     | <b>3.8%</b>     | <b>8.3%</b>                       | <b>3.5%</b>     | <b>4.7%</b>     |
| Arc welding                      | 3,939              | 17,527           | 21,466           | 4,944              | 18,586           | 23,530           | 25.5%              | 6.0%            | 9.6%            | 8.0%                              | 9.5%            | 9.2%            | 8.4%                              | 10.2%           | 9.7%            |
| Spot welding                     | 3,985              | 23,403           | 27,388           | 4,535              | 18,028           | 22,563           | 13.8%              | -23.0%          | -17.6%          | 8.1%                              | 12.7%           | 11.7%           | 7.7%                              | 9.8%            | 9.3%            |
| Laser welding                    | 26                 | 37               | 63               | 7                  | 21               | 28               | -73.1%             | -43.2%          | -55.6%          | 0.1%                              | 0.0%            | 0.0%            | 0.0%                              | 0.0%            | 0.0%            |
| Others                           | 48                 | 354              | 402              | 70                 | 47               | 117              | 45.8%              | -86.7%          | -70.9%          | 0.1%                              | 0.2%            | 0.2%            | 0.1%                              | 0.0%            | 0.0%            |
| <b>Welding</b> Units             | <b>7,998</b>       | <b>41,321</b>    | <b>49,319</b>    | <b>9,556</b>       | <b>36,682</b>    | <b>46,238</b>    | <b>19.5%</b>       | <b>-11.2%</b>   | <b>-6.2%</b>    | <b>16.3%</b>                      | <b>22.4%</b>    | <b>21.1%</b>    | <b>16.2%</b>                      | <b>20.0%</b>    | <b>19.1%</b>    |
| (million yen)                    | <b>(39,702)</b>    | <b>(103,125)</b> | <b>(142,827)</b> | <b>(42,930)</b>    | <b>(94,517)</b>  | <b>(137,447)</b> | <b>(8.1%)</b>      | <b>(-8.3%)</b>  | <b>(-3.8%)</b>  | <b>(16.1%)</b>                    | <b>(15.9%)</b>  | <b>(15.9%)</b>  | <b>(15.7%)</b>                    | <b>(14.3%)</b>  | <b>(14.7%)</b>  |
| <b>Painting</b>                  | <b>716</b>         | <b>2,042</b>     | <b>2,758</b>     | <b>546</b>         | <b>2,252</b>     | <b>2,798</b>     | <b>-23.7%</b>      | <b>10.3%</b>    | <b>1.5%</b>     | <b>1.5%</b>                       | <b>1.1%</b>     | <b>1.2%</b>     | <b>0.9%</b>                       | <b>1.2%</b>     | <b>1.2%</b>     |
| Loading/unloading                | 2,589              | 9,318            | 11,907           | 2,704              | 8,590            | 11,295           | 4.4%               | -7.8%           | -5.1%           | 5.3%                              | 5.1%            | 5.1%            | 4.6%                              | 4.7%            | 4.7%            |
| Mechanical cutting               | 14                 | 10               | 24               | 9                  | 9                | 9                | -35.7%             | -100.0%         | -62.5%          | 0.0%                              | 0.0%            | 0.0%            | 0.0%                              | 0.0%            | 0.0%            |
| Grinding/deburring               | 311                | 891              | 1,202            | 312                | 114              | 426              | 0.3%               | -87.2%          | -64.6%          | 0.6%                              | 0.5%            | 0.5%            | 0.5%                              | 0.1%            | 0.2%            |
| Others                           | 50                 | 16               | 66               | 41                 | 26               | 67               | -18.0%             | 62.5%           | 1.5%            | 0.1%                              | 0.0%            | 0.0%            | 0.1%                              | 0.0%            | 0.0%            |
| <b>Machining</b> Units           | <b>2,964</b>       | <b>10,235</b>    | <b>13,199</b>    | <b>3,066</b>       | <b>8,730</b>     | <b>11,797</b>    | <b>3.4%</b>        | <b>-14.7%</b>   | <b>-10.6%</b>   | <b>6.0%</b>                       | <b>5.6%</b>     | <b>5.7%</b>     | <b>5.2%</b>                       | <b>4.8%</b>     | <b>4.9%</b>     |
| (million yen)                    | <b>(13,215)</b>    | <b>(15,897)</b>  | <b>(29,113)</b>  | <b>(11,069)</b>    | <b>(14,880)</b>  | <b>(25,949)</b>  | <b>(-16.2%)</b>    | <b>(-6.4%)</b>  | <b>(-10.9%)</b> | <b>(5.4%)</b>                     | <b>(2.4%)</b>   | <b>(3.3%)</b>   | <b>(4.1%)</b>                     | <b>(2.3%)</b>   | <b>(2.8%)</b>   |
| <b>Surface Mount Technology</b>  | <b>1,660</b>       | <b>12,418</b>    | <b>14,078</b>    | <b>1,620</b>       | <b>13,501</b>    | <b>15,121</b>    | <b>-2.4%</b>       | <b>8.7%</b>     | <b>7.4%</b>     | <b>3.4%</b>                       | <b>6.7%</b>     | <b>6.0%</b>     | <b>2.7%</b>                       | <b>7.4%</b>     | <b>6.2%</b>     |
| General Assembly                 | 7,153              | 32,415           | 39,567           | 8,725              | 37,505           | 46,230           | 22.0%              | 15.7%           | 16.8%           | 14.5%                             | 17.6%           | 17.0%           | 14.8%                             | 20.5%           | 19.1%           |
| Other Assembly                   | 903                | 4,473            | 5,376            | 1,572              | 4,853            | 6,425            | 74.0%              | 8.5%            | 19.5%           | 1.8%                              | 2.4%            | 2.3%            | 2.7%                              | 2.7%            | 2.7%            |
| Bonding                          | 644                | 3,229            | 3,873            | 893                | 4,015            | 4,908            | 38.7%              | 24.3%           | 26.7%           | 1.3%                              | 1.8%            | 1.7%            | 1.5%                              | 2.2%            | 2.0%            |
| Soldering                        | 2                  | 2                | 2                | 3                  | 3                | 3                | 50.0%              |                 | 50.0%           | 0.0%                              |                 | 0.0%            | 0.0%                              |                 | 0.0%            |
| Sealing/glueing                  | 87                 | 725              | 812              | 57                 | 405              | 462              | -34.5%             | -44.1%          | -43.1%          | 0.2%                              | 0.4%            | 0.3%            | 0.1%                              | 0.2%            | 0.2%            |
| Screwing                         | 7                  | 17               | 24               | 58                 | 4                | 62               | 728.6%             | -76.5%          | 158.3%          | 0.0%                              | 0.0%            | 0.0%            | 0.1%                              | 0.0%            | 0.0%            |
| Others                           | 163                | 502              | 665              | 561                | 429              | 990              | 243.4%             | -14.5%          | 48.8%           | 0.3%                              | 0.3%            | 0.3%            | 0.9%                              | 0.2%            | 0.4%            |
| <b>Assembly</b> Units            | <b>8,056</b>       | <b>36,888</b>    | <b>44,944</b>    | <b>10,296</b>      | <b>42,358</b>    | <b>52,654</b>    | <b>27.8%</b>       | <b>14.8%</b>    | <b>17.2%</b>    | <b>16.4%</b>                      | <b>20.0%</b>    | <b>19.3%</b>    | <b>17.4%</b>                      | <b>23.1%</b>    | <b>21.7%</b>    |
| (million yen)                    | <b>(26,207)</b>    | <b>(64,232)</b>  | <b>(90,439)</b>  | <b>(34,886)</b>    | <b>(76,093)</b>  | <b>(110,979)</b> | <b>(33.1%)</b>     | <b>(18.5%)</b>  | <b>(22.7%)</b>  | <b>(10.6%)</b>                    | <b>(9.9%)</b>   | <b>(10.1%)</b>  | <b>(12.8%)</b>                    | <b>(11.5%)</b>  | <b>(11.9%)</b>  |
| <b>Palletizing/depalletizing</b> | <b>1,747</b>       | <b>2,026</b>     | <b>3,772</b>     | <b>1,975</b>       | <b>2,389</b>     | <b>4,364</b>     | <b>13.0%</b>       | <b>17.9%</b>    | <b>15.7%</b>    | <b>3.6%</b>                       | <b>1.1%</b>     | <b>1.6%</b>     | <b>3.3%</b>                       | <b>1.3%</b>     | <b>1.8%</b>     |
| <b>Material handling</b>         | <b>8,109</b>       | <b>50,578</b>    | <b>58,687</b>    | <b>9,924</b>       | <b>46,820</b>    | <b>56,744</b>    | <b>22.4%</b>       | <b>-7.4%</b>    | <b>-3.3%</b>    | <b>16.5%</b>                      | <b>27.5%</b>    | <b>25.1%</b>    | <b>16.8%</b>                      | <b>25.6%</b>    | <b>23.4%</b>    |
| FPD                              | 1,295              | 4,857            | 6,152            | 1,106              | 3,245            | 4,351            | -14.6%             | -33.2%          | -29.3%          | 2.6%                              | 2.6%            | 2.6%            | 1.9%                              | 1.8%            | 1.8%            |
| Semiconductor                    | 9,622              | 14,874           | 24,496           | 11,193             | 15,320           | 26,514           | 16.3%              | 3.0%            | 8.2%            | 19.6%                             | 8.1%            | 10.5%           | 18.9%                             | 8.4%            | 11.0%           |
| Others                           | 6                  | 4                | 10               | 2                  | 2                | 4                | -66.7%             | -50.0%          | -60.0%          | 0.0%                              | 0.0%            | 0.0%            | 0.0%                              | 0.0%            | 0.0%            |
| <b>Cleanroom</b> Units           | <b>10,923</b>      | <b>19,735</b>    | <b>30,658</b>    | <b>12,301</b>      | <b>18,568</b>    | <b>30,869</b>    | <b>12.6%</b>       | <b>-5.9%</b>    | <b>0.7%</b>     | <b>22.2%</b>                      | <b>10.7%</b>    | <b>13.1%</b>    | <b>20.8%</b>                      | <b>10.1%</b>    | <b>12.7%</b>    |
| (million yen)                    | <b>(53,260)</b>    | <b>(112,606)</b> | <b>(165,866)</b> | <b>(51,703)</b>    | <b>(87,797)</b>  | <b>(139,500)</b> | <b>(-2.9%)</b>     | <b>(-22.0%)</b> | <b>(-15.9%)</b> | <b>(21.6%)</b>                    | <b>(17.3%)</b>  | <b>(18.5%)</b>  | <b>(18.9%)</b>                    | <b>(13.3%)</b>  | <b>(15.0%)</b>  |
| <b>Other applications</b>        | <b>3,644</b>       | <b>3,437</b>     | <b>7,081</b>     | <b>4,782</b>       | <b>5,362</b>     | <b>10,144</b>    | <b>31.2%</b>       | <b>56.0%</b>    | <b>43.3%</b>    | <b>7.4%</b>                       | <b>1.9%</b>     | <b>3.0%</b>     | <b>8.1%</b>                       | <b>2.9%</b>     | <b>4.2%</b>     |
| <b>Total</b> Units               | <b>49,171</b>      | <b>184,215</b>   | <b>233,386</b>   | <b>59,068</b>      | <b>183,059</b>   | <b>242,127</b>   | <b>20.1%</b>       | <b>-0.6%</b>    | <b>3.7%</b>     | <b>100.0%</b>                     | <b>100.0%</b>   | <b>100.0%</b>   | <b>100.0%</b>                     | <b>100.0%</b>   | <b>100.0%</b>   |
| (million yen)                    | <b>(246,222)</b>   | <b>(649,381)</b> | <b>(895,603)</b> | <b>(273,304)</b>   | <b>(658,991)</b> | <b>(932,294)</b> | <b>(11.0%)</b>     | <b>(1.5%)</b>   | <b>(4.1%)</b>   | <b>(100.0%)</b>                   | <b>(100.0%)</b> | <b>(100.0%)</b> | <b>(100.0%)</b>                   | <b>(100.0%)</b> | <b>(100.0%)</b> |

Note)

Data includes dedicated type (Surface Mount Technology / Bonding).

Data is collected in unit of 10,000 yen. However, the results are shown in unit of million yen by rounding the figures of 100,000 yen.

**2018 Results**  
**Shipments of Manipulators and Robots by Industries**  
**[JARA Members and Non-members]**

Number of units, ( ) : million yen

| Industries  | 2017             | 2018             | Change<br>from 2017 | Percentage distribution |                 |
|---|------------------|------------------|---------------------|-------------------------|-----------------|
|   |                  |                  |                     | 2017                    | 2018            |
| <b>Metal products</b>                                 | <b>2,571</b>     | <b>3,544</b>     | <b>37.8%</b>        | <b>5.2%</b>             | <b>6.0%</b>     |
| Construction and mining machinery                     | 79               | 106              | 34.2%               | 0.2%                    | 0.2%            |
| Metalworking machinery                                | 613              | 748              | 22.0%               | 1.2%                    | 1.3%            |
| Other machinery and equipment                         | 3,203            | 4,133            | 29.0%               | 6.5%                    | 7.0%            |
| <b>Machinery and equipment</b> Units                  | <b>3,895</b>     | <b>4,987</b>     | <b>28.0%</b>        | <b>7.9%</b>             | <b>8.4%</b>     |
| (million yen)   | <b>(18,582)</b>  | <b>(22,677)</b>  | <b>(22.0%)</b>      | <b>(7.5%)</b>           | <b>(8.3%)</b>   |
| Electronic computers                                  | 29               | 38               | 31.0%               | 0.1%                    | 0.1%            |
| Consumer electrical machinery                         | 1,759            | 1,686            | -4.1%               | 3.6%                    | 2.9%            |
| Industrial electrical machinery                       | 917              | 1,371            | 49.5%               | 1.9%                    | 2.3%            |
| Communication equipment                               | 1,964            | 1,338            | -31.9%              | 4.0%                    | 2.3%            |
| Video and audio equipment                             | 6                | 28               | 366.7%              | 0.0%                    | 0.0%            |
| Electronic components/devices/circuits                | 10,745           | 12,151           | 13.1%               | 21.9%                   | 20.6%           |
| Other electrical machinery                            | 3,287            | 4,007            | 21.9%               | 6.7%                    | 6.8%            |
| <b>Electrical machinery</b> Units                     | <b>18,707</b>    | <b>20,619</b>    | <b>10.2%</b>        | <b>38.0%</b>            | <b>34.9%</b>    |
| (million yen)   | <b>(97,710)</b>  | <b>(100,951)</b> | <b>(3.3%)</b>       | <b>(39.7%)</b>          | <b>(36.9%)</b>  |
| <b>Precision instruments</b>                          | <b>523</b>       | <b>751</b>       | <b>43.6%</b>        | <b>1.1%</b>             | <b>1.3%</b>     |
| Motor vehicles  | 5,275            | 5,119            | -3.0%               | 10.7%                   | 8.7%            |
| Auto parts  | 9,375            | 12,770           | 36.2%               | 19.1%                   | 21.6%           |
| <b>Motor vehicles and auto parts</b> Units            | <b>14,650</b>    | <b>17,889</b>    | <b>22.1%</b>        | <b>29.8%</b>            | <b>30.3%</b>    |
| (million yen)   | <b>(65,376)</b>  | <b>(76,501)</b>  | <b>(17.0%)</b>      | <b>(26.6%)</b>          | <b>(28.0%)</b>  |
| <b>Other transport equipment</b>                      | <b>236</b>       | <b>286</b>       | <b>21.2%</b>        | <b>0.5%</b>             | <b>0.5%</b>     |
| <b>Food products, beverages, and tobacco products</b> | <b>865</b>       | <b>1,243</b>     | <b>43.7%</b>        | <b>1.8%</b>             | <b>2.1%</b>     |
| <b>Chemical products</b>                              | <b>319</b>       | <b>441</b>       | <b>38.2%</b>        | <b>0.6%</b>             | <b>0.7%</b>     |
| <b>Plastic products</b>                               | <b>1,264</b>     | <b>1,418</b>     | <b>12.2%</b>        | <b>2.6%</b>             | <b>2.4%</b>     |
| <b>Other industries</b>                               | <b>5,854</b>     | <b>7,466</b>     | <b>27.5%</b>        | <b>11.9%</b>            | <b>12.6%</b>    |
| <b>Non-manufacturing industry</b>                     | <b>287</b>       | <b>318</b>       | <b>10.8%</b>        | <b>0.6%</b>             | <b>0.5%</b>     |
| <b>Total domestic shipments</b> Units                 | <b>49,171</b>    | <b>59,068</b>    | <b>20.1%</b>        | <b>100.0%</b>           | <b>100.0%</b>   |
| (million yen)   | <b>(246,222)</b> | <b>(273,304)</b> | <b>(11.0%)</b>      | <b>21.1%</b>            | <b>24.4%</b>    |
|   |                  |                  |                     | <b>(100.0%)</b>         | <b>(100.0%)</b> |
|   |                  |                  |                     | <b>(27.5%)</b>          | <b>(29.3%)</b>  |
| <b>Export</b> Units                                   | <b>184,215</b>   | <b>183,059</b>   | <b>-0.6%</b>        | <b>78.9%</b>            | <b>75.6%</b>    |
| (million yen)   | <b>(649,381)</b> | <b>(658,991)</b> | <b>(1.5%)</b>       | <b>(72.5%)</b>          | <b>(70.7%)</b>  |
| <b>Grand total</b> Units                              | <b>233,386</b>   | <b>242,127</b>   | <b>3.7%</b>         | <b>100.0%</b>           | <b>100.0%</b>   |
| (million yen)   | <b>(895,603)</b> | <b>(932,294)</b> | <b>(4.1%)</b>       | <b>(100.0%)</b>         | <b>(100.0%)</b> |

Note)

Data includes dedicated type (Surface Mount Technology / Bonding).

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