Doosan Robotics

PRESS KIT 2019

COMPANY OVERVIEW

The New Generation of Collaborative Robots

Doosan Robotics is a leading manufacturer of collaborative robots (cobots), which are robots designed to work side by side with humans without fences, allowing human workers and robots to perform their tasks in the most efficient way, and increasing productivity.

Launched by Doosan Group, Korea's oldest and one of the most prominent conglomerates, Doosan Robotics was founded in 2015 with its head office in South Korea. Since then, Doosan Robotics has been developing its cobot system based on its own technology, incorporating the professional knowledge of the industry's leading researchers. Doosan Robotics has its production site in Suwon with an annual capacity of 10,000 units and operates its Innovation Lab and Prototyping Lab along with R&D center.

Doosan robots are capable of world-class performances, demonstrated by a working radius of 900 to 1,700 millimeters, a load capacity of 6 to 15 kilograms, and sensitive collision detection sensors that ensure the safety of nearby workers. They are equipped with their own torque sensors on all six-joints, providing the industry's best collision sensitivity and carrying out more highly sophisticated tasks that previously required the dexterity of human hands. In recognition of their excellent user experience (UX) and sophisticated, superior product design, Doosan robots received the Red Dot Design Award for two consecutive years – in the "Interface & User Experience" category in 2017 and in the "Product Design" category in 2018.

Doosan Robotics is firmly committed to establishing a leading position in the market through its continuous R&D efforts, spearheading the growth of the industry.

ABOUT DOOSAN GROUP

Member of the Doosan Group

Founded in 1896 and currently led by the chairman and CEO Jeongwon Park, Doosan Group is one of the most renowned global companies in Korea, with a 123-year history. While having gone through many changes and significant growth over the years, Doosan started to make bolder, innovative moves in the late 1990s and expanded into new territories at an unprecedented rate and achieved remarkable growth through business acquisitions. As a result, Doosan has been able to establish itself as a world-class infrastructure support business (ISB) provider, with about 40,000 employees in 37 countries, showing an annual growth of 9% for the previous 20 years.

Comprised of over 50 affiliates and subsidiaries such as Doosan Heavy Industries, Doosan Infracore, Doosan Industrial Vehicle, and Doosan Bobcat, Doosan Group has been recognized as the best provider of technological advancements in various industries including machinery, component material, heavy industries, energy and consumer and services.

Most recently, Doosan Group has begun accelerating its digital transformation in line with the Fourth Industrial Revolution. Foreseeing substantial growth in the collaborative robot market in the coming years, the group established Doosan Robotics in 2015, and Doosan Robotics successfully released its first robots after three years of tireless R&D efforts.

As a subsidiary of Doosan Group, Doosan Robotics benefits from Doosan Group's global network and combines the group's international market know-how with the state-of-the-art technologies for cobot development and innovation. Doosan Group supports Doosan Robotics in international sourcing and manufacturing capabilities while maintaining and ensuring compliance with laws, regulatory guidelines and internal control procedures.

Now leading one of Doosan Group's key business areas, Doosan Robotics has the biggest market share of collaborative robots in the Republic of Korea and is showing rapid growth throughout various global markets, including Germany, France, United Kingdom, Italy and China.

DOOSAN ROBOTICS AT A GLANCE

Founded	2015
Headquarters	Republic of Korea
Management	CEO Byungseo Lee
Areas of Activity	Collaborative robots
Target Group	All-sized enterprises
Vertical Markets	Automotive, electronics, metal and machinery, consumer goods, furniture, pharma and chemistry, plastic and polymers, F&B, etc.
Reference Clients	Hyundai Motor Group, POSCO, LG Electronics, LG Chemistry, Continental, etc.
Employees	130 *Around 50% of the employees are dedicated to R&D efforts
Sales Channel	Europe, North America and China *Plans to enter Japan, Oceania and Middle East in 2019
Annual Production Capability	10,000 units
Key Products: M-Series Cobots	M0609: 6kg payload, 900mm reach M0617: 6kg payload, 1,700mm reach M1013: 10kg payload, 1,300mm reach M1509: 15kg payload, 900mm reach
Product Principal Values	Safe Dexterous Easy Flexible
Applications	CNC machine tending Pick and place Inspection Assembly (screw, gear) Polishing and deburring Gluing and bonding Plastic injection assistance Packaging and palletizing Press forming assistance
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COMPANY MILESTONES

2014	**Doosan Group enters the collaborative robot market** In December, Doosan Group launches its project to develop robots to drive its future growth in line with the Fourth Industrial Revolution.
2015	**Doosan Group establishes Doosan Robotics** In July, Doosan Robotics is founded.
2017	**Doosan Robotics wins the Red Dot Design Award** In August, Doosan Robotics is awarded as the Winner in the Interface and User Experience category of Communication Design sector at Red Dot Design Award 2017. **Doosan Robotics launches cobots in Korea at 2017 Robotworld** In September, Doosan Robotics participates in 2017 Robotworld Exhibition, the biggest robot exhibition in Korea, and presents its four cobot models to the market for the first time. **Doosan Robotics establishes the robot manufacturing facility** In December, Doosan Robotics begins the first mass production of robots at the smart manufacturing site within Suwon Industrial Complex, where cobots assist in manufacturing other cobots.
2018	**Doosan Robotics receives the Red Dot Design Award in Product Design category** In April, Doosan Robotics wins the Red Dot Design Award in the Product Design category. **Doosan Robotics launches robots in Europe at Automatica 2018** In June, Doosan Robotics first enters the overseas markets after successfully launching its robots at Europe's biggest robotics and automation exhibition, Automatica 2018, held in Germany. **Doosan Robotics enters Chinese robot market** In December, Doosan Robotics advances to Chinese cobot market by signing a distribution agreement with Bozhon Group's Linkhou, China's largest industry automation solution specialist based in Suzhou, China, to supply its collaborative robots in China.
2019	**Doosan Robotics attends Automate 2019 and enters North America** In April, Doosan Robotics showcases its robots at Automate 2019, North America's largest automation solutions event.

CEO/EXECUTIVE BIO

Mr. Byungseo Lee, Chief Executive Officer of Doosan Robotics, was appointed to his position after serving several roles within Doosan Group. As a founding member of Doosan Robotics, he brings a wealth of expertise from his previous career at Doosan's affiliates, particularly Doosan Heavy Industries. He has been with Doosan Group for more than 25 years and now leads Doosan Robotics based on Doosan group's core values, aiming for the world-class technology and innovation.

PRODUCTS AT A GLANCE

Robot Arm

Longest reach: 1.7m
Highest payload: 15kg
Four models
Torque Sensors on all six axes
Repeatability: ±0.1mm
Tool Control Point (TCP) Speed: 1m/s

Teach Pendant

Full-Glass Type (Gorilla Glass)
10.1in Capacitive Touch Screen
8mm Slim Cable
Size: 264 x 218 x 42mm
Weight: 0.8kg

Controller

Size: 490 x 390 X 287mm
Weight: 9kg
Convenient connectivity: Ethernet, Modbus, RS232
*Other protocols (e.g. Profinet, Profibus, cc link, etc.)
are available with gateway devices.
I/O: 32 Digital I/O, 4 Analog I/O
Flange: 12 Digital I/O

PRODUCT LINEUP

Doosan Robotics offers the world's most diversified lineup of robots with a load capacity of 6 to 15 kilograms and a working radius of 900 to 1,700 millimeters. Customers can select the most optimal solution for their work environments among the various products Doosan provides.

M0609

Optimized to perform repetitive tasks at a high speed within limited space

Payload: 6kg
Reach: 900mm

M1509

Supports highest payload capacity for effective handling of heavier objects

Payload: 15kg
Reach: 900mm

M1013

Standard, versatile model suitable for various applications

Payload: 10kg
Reach: 1,300mm

M0617

Most ideal and effective for operating multiple tasks or carrying out applications that require long reach

Payload: 6kg
Reach: 1,700mm

▶ Detailed product information and technical specifications can be found at:
https://www.doosanrobotics.com/en/html/Products/LineupOptions

VALUE-ADDING ENHANCERS

Customers can maximize the performance and production efficiency of their Doosan robots by adding various options.

Direct Control Unit

The Direct Control Unit maximizes user experience as it lets users select a wide range of teaching modes and save coordinates with a simple five-button operation.

Mobile Base

Mobile Base integrates the robot, Controller and Teach Pendant to allow flexible relocation and movement.

Various apparatuses such as pallet and laser scanner can be installed, and various storage spaces allow convenient storage and usage.

Smart Vision Module (SVM)

Smart Vision Module is an on-board type vision system that can be mounted at the end of the robot. SVM offers inspection of object presence and measurement of position, angle, diameter and length.

All settings are managed in Teach Pendant with an intuitive user interface for easy use.

Stain-Resistant Model

Stain-Resistant Model includes an enhanced anti-stain finish enabling easy maintenance against dirt and stain. (Navy color)

Robot Jacket

Robot Jacket protects Doosan robots from contamination by liquids used during cutter support work, etc.

PU coating forms a 2-stage water barrier which ensures Doosan robot to maintain optimum operation conditions.

Dress Pack

Dress Pack organizes various cables connected to the end tools of Doosan robots allowing efficient operation.

Integrated conduit bracket and holder ensure convenient organization, and they are easy to attach/detach and relocate on the robot.

PRODUCT PRINCIPAL VALUES

Safe

Doosan robots are capable of providing high-quality work skills as proficient as human workers with Doosan's torque sensors on all six joints of the robots. These six joint torque sensors can easily detect and control force with a high sensitivity of 0.2N. In addition, the work area between the robot and the worker can be set to five categories, prioritizing the safety of the worker. Doosan robots are certified with International Safety Standard (ISO) 13849-1, which grants them the highest level of Performance level e & Category 4 (Emergency stop). Doosan robots have also secured NRTL (USA), CE (Europe) and KCS (Korea) certifications.

Dexterous

With their high performance torque sensors, Doosan robots are capable of precise and sophisticated work that was not possible with conventional position control alone. In particular, advanced control algorithms, such as force control and compliance control, allow Doosan robots to perform sophisticated tasks such as screwing, polishing and gluing. In addition, they detect minor weight changes (as small as 20g) and perform delicate tasks that require human dexterity through 0.1mm repeatability precision.

Easy

Doosan robots have created a simple Skill App that includes various robot actions and enables easy programming for inexperienced users. The Workcell Manager function on the Teach Pendent allows users to control complicated work places easily. The Direct Control Unit and Cockpit equipped on the robot allow users to easily and simply control the robots. Doosan Robotics won the Red Dot Design Award for its intuitive user interface design in 2017 and for its product design in 2018.

Flexible

Doosan robots are extremely flexible and can be easily installed with the company's Smart Setup technology, which measures inclination angles, tool weight and location of the end point. Users can also maximize usage with Doosan's new open platform Doosan Mate, created this year by Doosan Robotics. At Doosan Mate, products from leading partners, ranging from grippers to power tools, machines, sensors and software are all registered. As all registered products are compatible with Doosan robots, they can quickly and easily be installed and implemented on-site. Doosan robots, with a load capacity of 6 to 15 kilograms and a working radius of 900 to 1,700 millimeters, offer customers the most optimal solutions, as they can be adopted in various work environments.

APPLICATIONS

Doosan robots can be applied in a wide range of processes and tailored to meet various customer needs. Some of the manufacturing processes that currently integrate Doosan robots include but are not limited to:

Assembly (Screw, Gear)

Traditionally manual assembly tasks such as screw locking and gear assembly

Pick & Place

Simple loading/unloading work such as moving objects between tasks

Polishing & Deburring

Burr removal and surface polishing after processing

CNC Machine Tending

Placing material on pallet after injection into/removal from CNC machine

Inspection

Inspection of parts for internal defects and confirmation of parts assembly

Gluing & Bonding

Spraying of consistent amount of adhesive for gluing and bonding

Plastic Injection Assistance

Detaching item from mold of injection molding machine and loading onto/unloading from pallet

Packaging & Palletizing

Product packaging and palletizing, including transportation and loading of packaged products (e.g. electronics/F&B industries)

Press Forming

Picking up panel for loading onto/unloading from press machine

SELECTED CLIENTS

With a successful history of working for major brands in the automotive industry, Doosan Robotics is now rapidly expanding its application of robots to other industries including consumer and industrial goods.

Automotive Industry

HYUNDAI MOTOR GROUP
MAHLE Driven by performance
Infinity Works
UNICK
EATON
ILJIN BEARING
Continental
HYUNDAI WIA
MOODEUNG
(주)세영산업

Industrial Goods

posco
Navien The Leader in Condensing Technology
BêKJO
PANASIA
DOOSAN
POONGSAN
DINE Tooling Systems
Atlas Copco
KORLOY
SAMICK

Electronics/Chemicals Consumer Goods & Etc.

LG Electronics
SFA SEMICON
HARNICS
OMK OSUNG MIDICOM
LG Chem
PoteNit
HANTECH
HYUNDAI 현대리바트
BHflex (주)비에이치
DAESHIN Faucet & Bathroom Accessories
서울대학교
PARKLAND
WATERWORKS YUJIN
L'ORÉAL PARIS