



AUTOMOTIVE SOLUTION

**MACHINE
GREATNESS™**

DN SOLUTIONS

DN Solutions Turn-key System Solutions

The DN Solutions System Business offers integrated and expert solutions for machining processes.

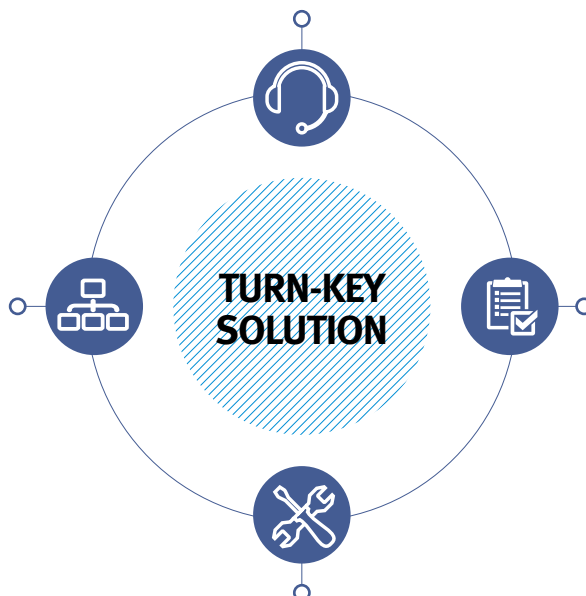
DN SOLUTIONS System Business

Extensive Knowledge and Experience

Our turn-key solution provisioning processes are continuously and systematically managed by the database established by DN Solutions system engineers equipped with decades of experience and a wealth of knowledge

Customer First

DN Solutions's Customer First management philosophy provides customers with differentiated solutions and the best performance whatever the conditions.



International Expert Groups

DN Solutions's differentiated and systemized system solutions group provides customers with more efficient solutions by offering the correct technical approach and project processes, establishing a sound basis for technological development, and working in a system where duties and responsibilities are finely distributed.

Total Management Service

Identifying customers' requirements through close consultation from project planning to commissioning, strict project schedule management, and reliable after-sales service are just a few features of the DN Solutions System.

DN Solutions System

Solution for Automation



Robots for automation



Gantry loader



LPS (Linear Pallet System)



Automotive Industry

An automobile largely consists of an engine, powertrain, suspension, steering system, and brake system. The average number of parts in a car is between 20,000 to 30,000.

POWER GENERATION (ENGINE) / POWER TRANSFER (POWERTRAIN)

The engine generates power and the powertrain transmits the power to the wheels in order for the car to drive.

Engine, Clutch, Transmission, Propeller shaft, Gearbox, Axle, Wheels, etc.



STEERING SYSTEM

Controls the direction of travel.

Steering wheel, steering shaft, steering gear, pitman arm, drag link, tie rod, steering knuckle arm, etc.



SUSPENSION

Absorbs shock generated by irregularities on the road surface to the tyres.

Coil spring, shock absorber, suspension arm, etc.



BRAKE SYSTEM

Controls traveling speed or stops the car.

Brake pedal, brake booster, drum brake, disc brake, brake line, master cylinder, parking brake, etc.



Complementary Devices for Automation



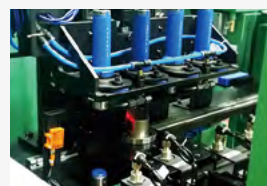
Bar feeder & stocker



Special chucks



Rotary table



Automatic measurement system



Centralized coolant system



PROJECT
Cylinder Block and
Cylinder Head
– Customer 'N'

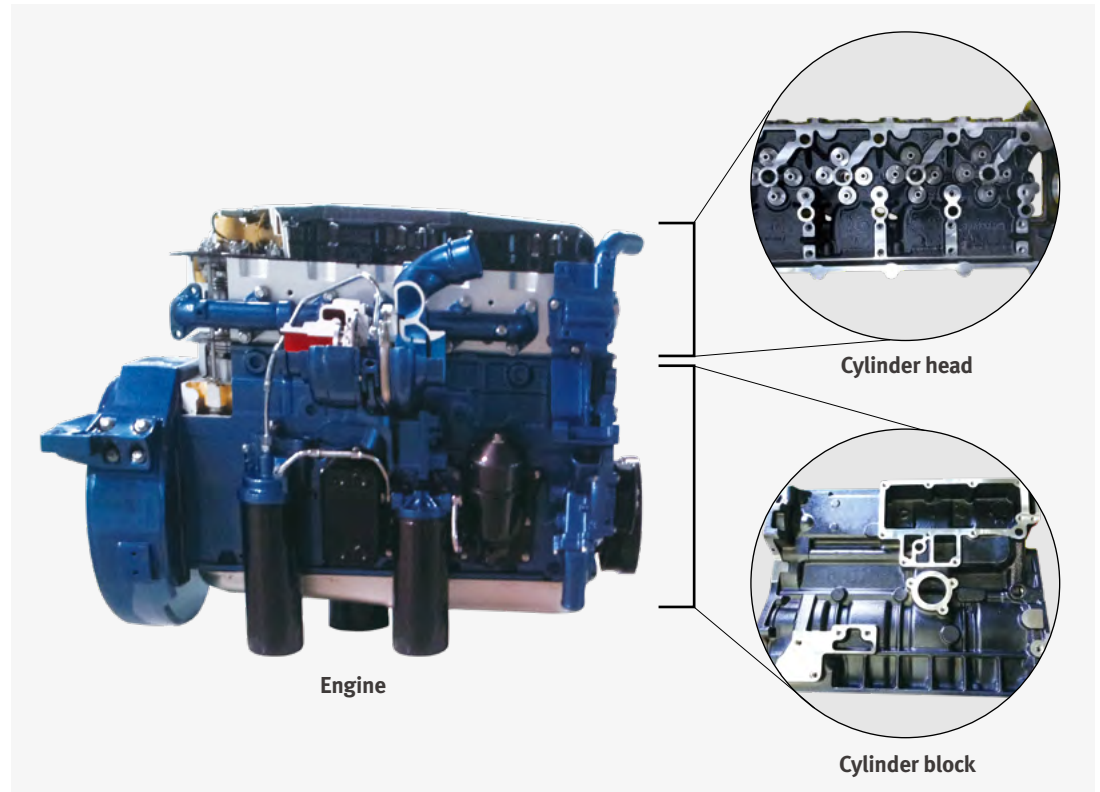
Customer: Company 'N'

A diesel engine manufacturer

Application

Cylinder block, cylinder head

An automation turn-key system based on NHP 5500 and NHP 8000 horizontal machining centers to provide total processing capability from roughing and semi-finishing of cylinder blocks to finishing of cylinder heads for diesel engines.

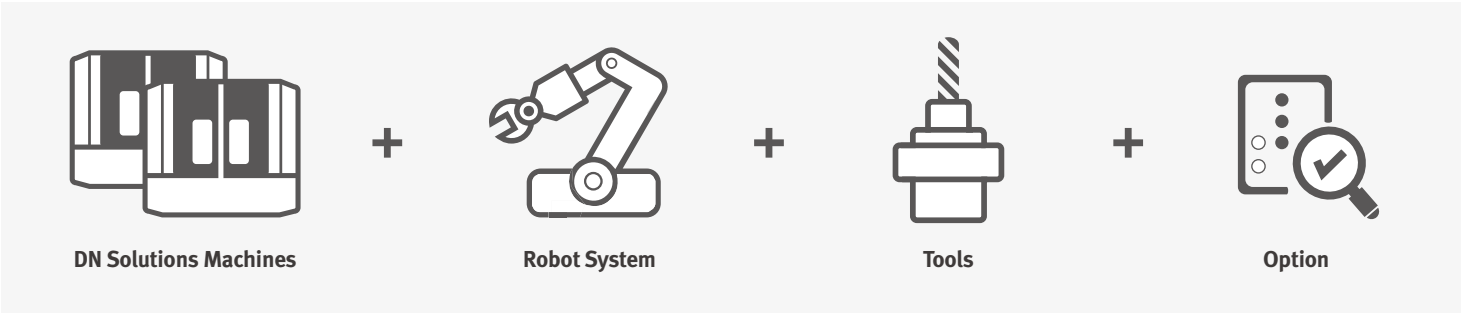


DN Solutions Turn-key System Solution

MCT Loading Station is complemented with coolant and pneumatic lines to stabilize the robot automation interface and to further improve machining stability. Chiller, linear scale, OMP60 spindle probe and other options are provided to achieve higher cutting accuracy. In addition, the machine tools include diversified tooling to suit various workpiece materials, and process proving/pass-off service to satisfy the customer's needs.

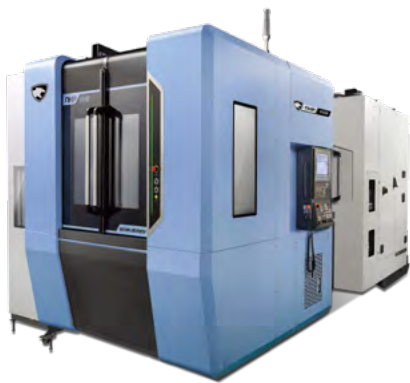


NHP 5500S, NHP 5500, 25 units of NHP 8000 + Robot System



DN Solutions's Machine Tools

NHP 5500S, NHP 5500, 25 units of NHP 8000



Model	Travel distance (X / Y / Z) mm (inch)	Table size mm (inch)	Max. spindle speed r/min	Tool storage capacity ea	Spindle motor kW (Hp)
NHP 5500	800 / 750 / 850 (31.5 / 29.5 / 33.5)	500 x 500 {630 x 630} (19.7 x 19.7 {24.8 x 24.8})	10000 {6000 / 15000}	40 {60, 90, 120, 150, 196, 256, 316, 376}	45 / 25 {37 / 25, 37 / 30} (60.3 / 33.5 {49.6 / 33.5, 49.6 / 40.2})
NHP 5500S	800 / 750 / 750 (31.5 / 29.5 / 29.5)	500 x 600 {630 x 630} (19.7 x 23.6 {24.8 x 24.8})	10000 {6000 / 15000}	40 {60, 90, 120, 150, 196, 256, 316, 376}	45 / 25 {37 / 25, 37 / 30} (60.3 / 33.5 {49.6 / 33.5, 49.6 / 40.2})
NHP 8000	1400 / 1200 / 1370 (55.1 / 472.4 / 53.9)	800 x 800 {800 x 1000} (31.5 x 31.5 {31.5 x 39.4})	10000 {6000 / 15000}	40 {60, 90, 120, 150, 196, 256, 316, 376}	45 / 25 {37 / 25, 37 / 30} (60.3 / 33.5 {49.6 / 33.5, 49.6 / 40.2})

{ } : Option

System

Robot System



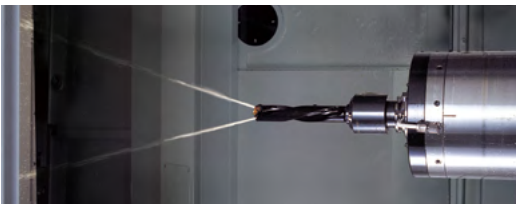
Tool

Offered a high-precision finishing tool to meet the precision requirements for finish cutting of the cylinder head.



Options

TSC 70bar



Tool length
measuring
system



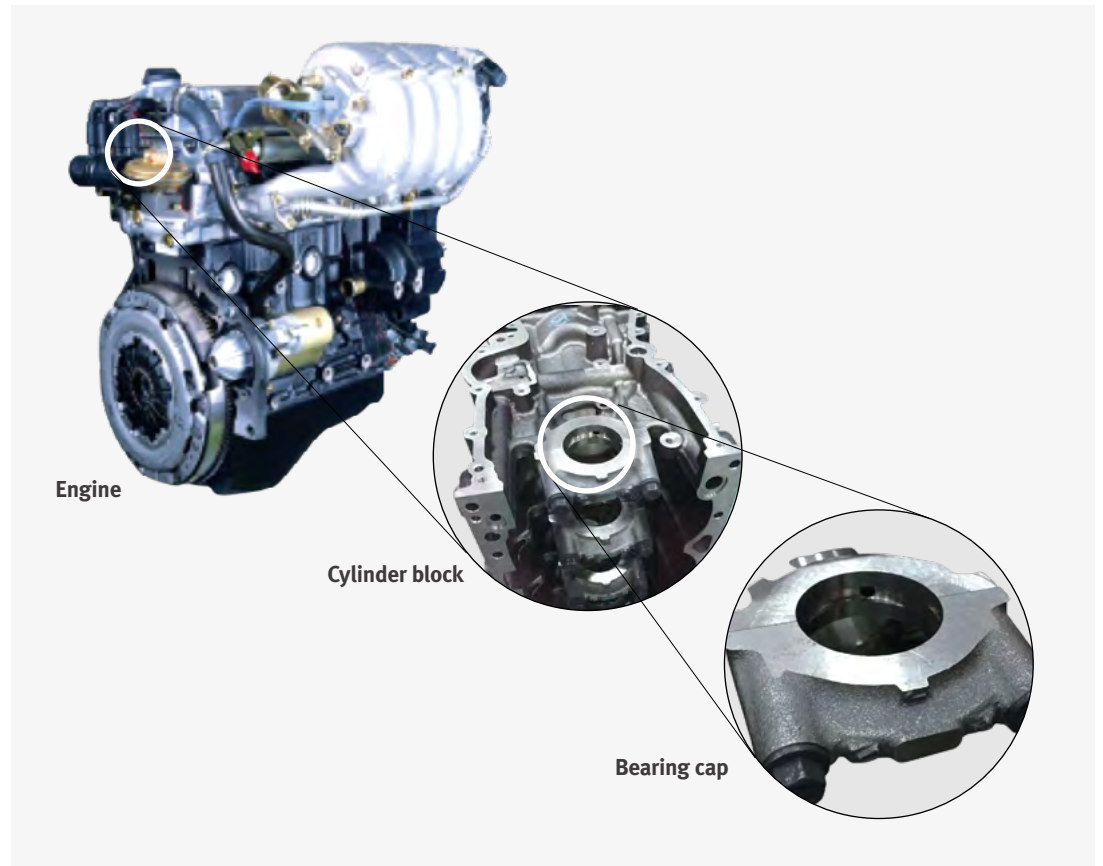


PROJECT Bearing caps of Customer 'K'

A turn-key project to supply the machining lines for manufacturing main bearing caps assembled to cylinder blocks of gasoline engines that has an annual capacity of 250,000 pieces.

Customer: Company 'K'
An engine manufacturer

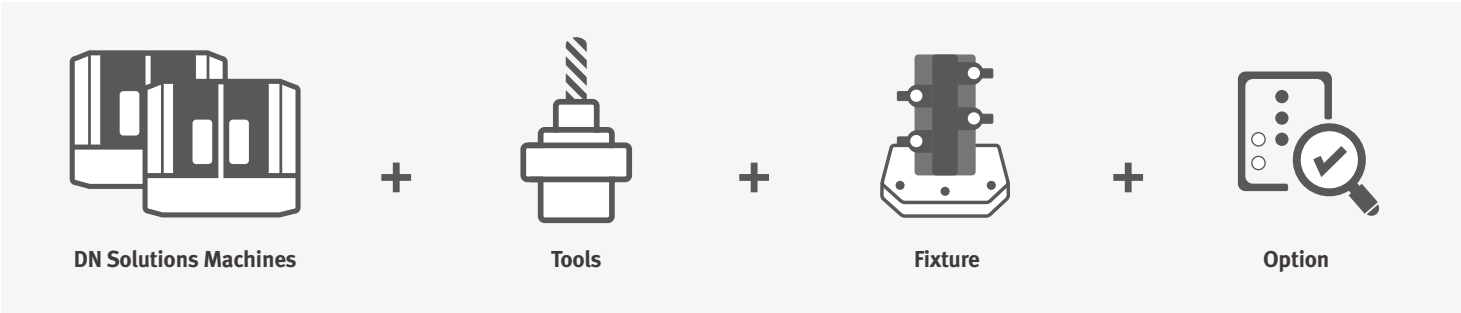
Application
Bearing cap



DN Solutions Turn-key System Solution

The productivity has been improved by 7.9% on average compared to the customer's target productivity.





DN Solutions's Machine Tools

NHP 5000 2 units

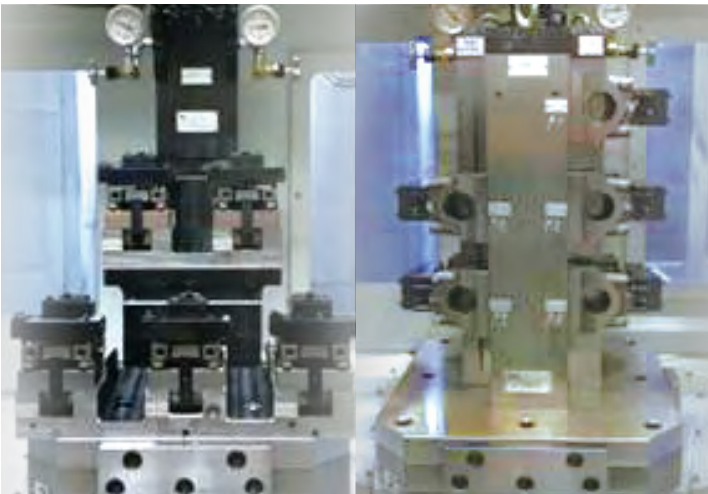


Model	Travel distance (X / Y / Z) mm (inch)	Table size mm (inch)	Max. spindle speed r/min	Tool storage capacity ea	Spindle motor kW (Hp)
NHP 5000	730 / 730 / 880 (28.7 / 28.7 / 34.6)	500 x 500 (19.7 x 19.7)	15000 {20000}	40 {60, 80, 120, 170, 262}	30 / 18.5 {37 / 18.5 (40.2 / 24.8 (49.6 / 24.8))

{ } : Option

Fixture

Two process solutions with an optimal time balance and a special fixture have been provided to enhance productivity and cutting quality.



Tool

Used a tool with RUNOUT adjustment feature to ensure the highest level of rotational accuracy.



Options

TSC 70bar



Coolant chiller





PROJECT
DN Solutions
Engine BG
Crankshaft End
Hole Cutting

With the machining capability of roughing and semi-finishing engine crankshafts, the shaft end holes are cut with NHP 6300S horizontal machining centres to the highest-level of accuracy by applying RMP60 spindle probe.

Customer: DN Solutions Infracore E/G BG

A diesel engine manufacturer

Application

Crankshaft

- Crankshaft (DL08 & DE08) for 8 L engines
- Crankshaft (DE12 & DX12model) for 12 L engines

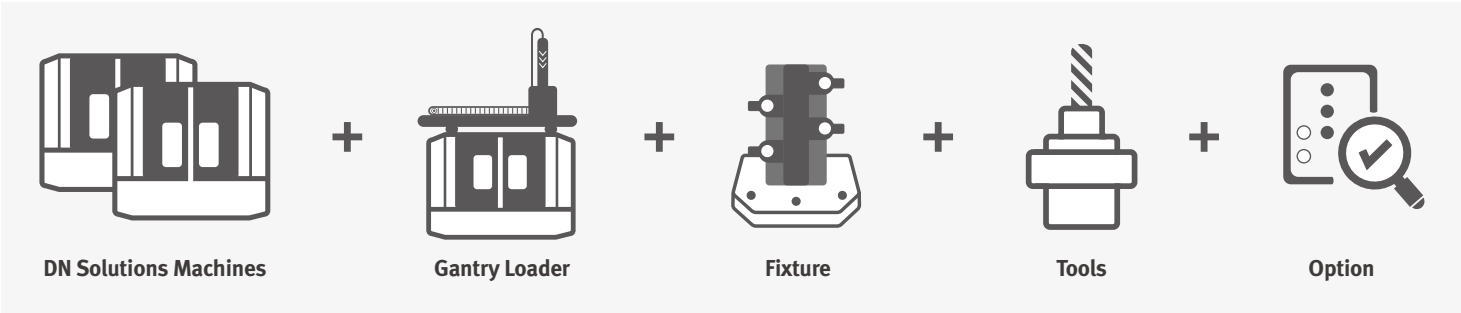


DN Solutions Turn-key System Solution

The automation line included an Auto Loader System achieved roughly 2% higher productivity than the customer's demand, with a process capacity of CPK 1.67. To achieve CPK 1.67, an RMP60 spindle probe was employed to further improve accuracy. The ATC Door Open, spindle orientation, coolant off, and PMC logic were adopted to enhance productivity.



NHP 6300S + Special gantry loader system



DN Solutions's Machine Tools
NHP 6300S

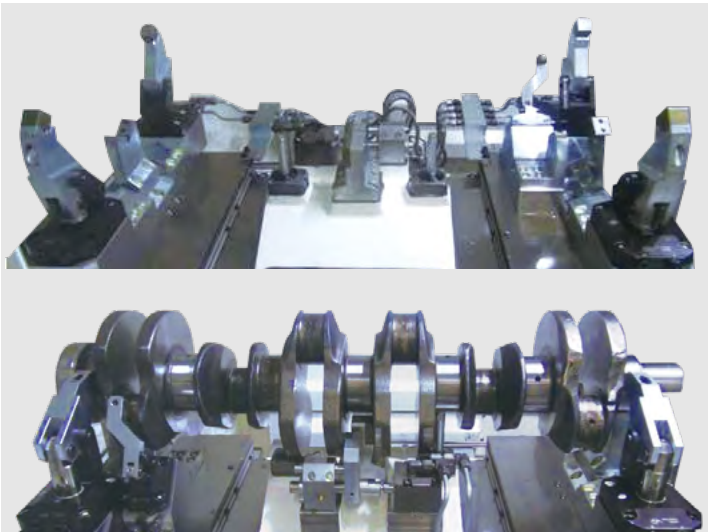


Model	Travel distance (X / Y / Z) mm (inch)	Table size mm (inch)	Max. spindle speed r/min	Tool storage capacity ea	Spindle motor kW (Hp)
NHP 6300S	850 / 750 / 750 (33.5 / 29.5 / 29.5)	630 x 630 (24.8 x 24.8)	10000 {6000 / 15000}	40	45 / 25 {37 / 25, 37 / 30} (60.3 / 33.5 {49.6 / 33.5, 49.6 / 40.2})

{ } : Option

Fixture

A specially designed fixture was added to enable manual processing of four types of workpiece in order to improve productivity and meet customer demands for a diversified production environment.

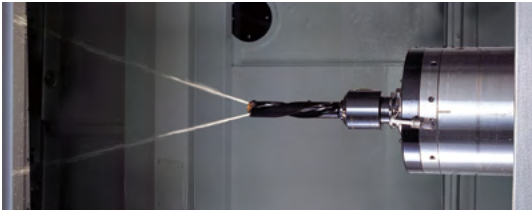


System
Special gantry system



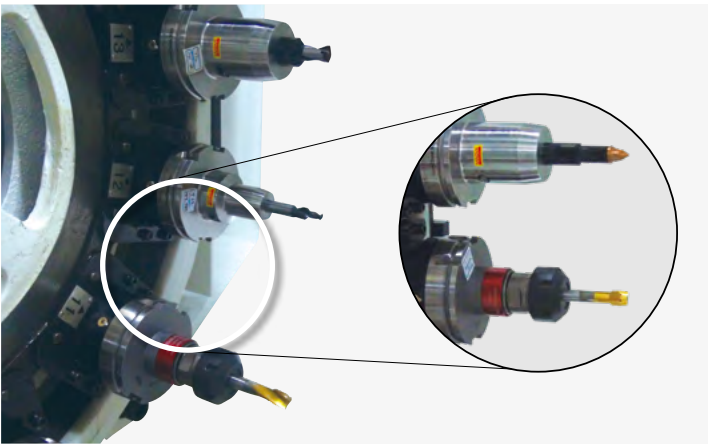
Options

TSC 70bar



Tool

Special drill tip and blade tooling was used to enhance productivity





PROJECT Processing Pistons of Customer 'H'

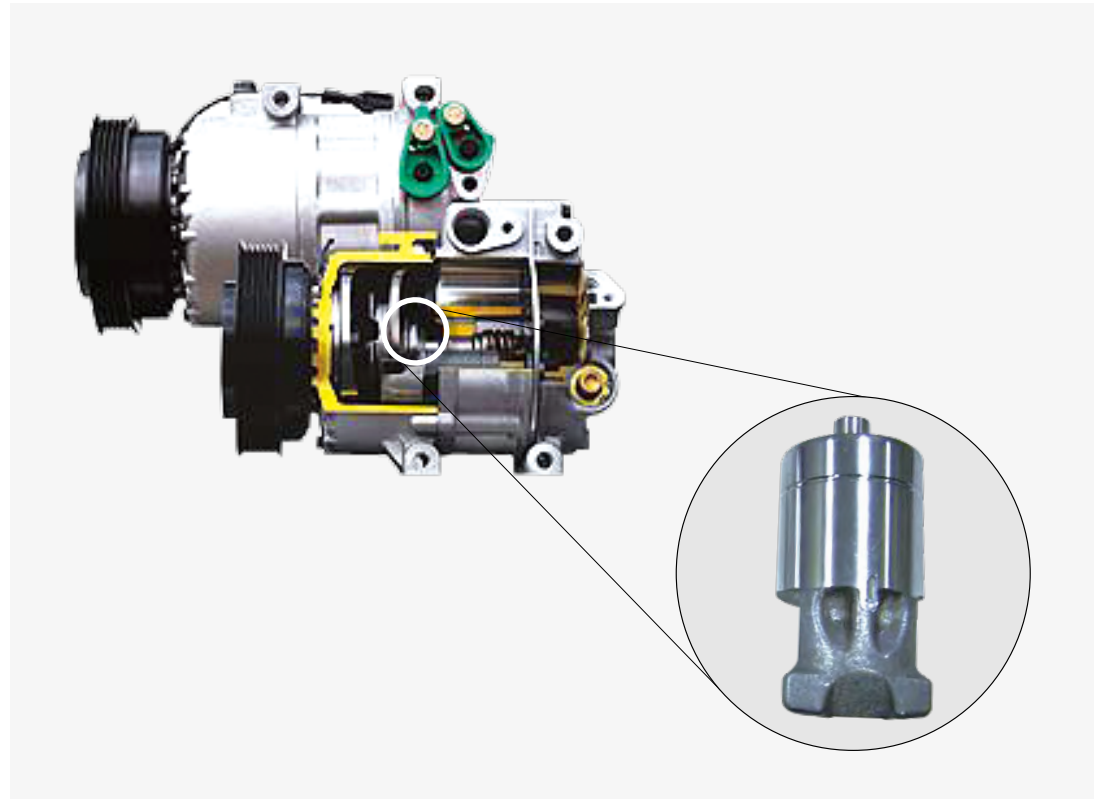
For the project to cut the outer diameter of a piston for an automobile air conditioner, two spindles and a gantry loader system were adopted to enhance productivity.

Customer: Company 'H'

Automobile air conditioning system manufacturer

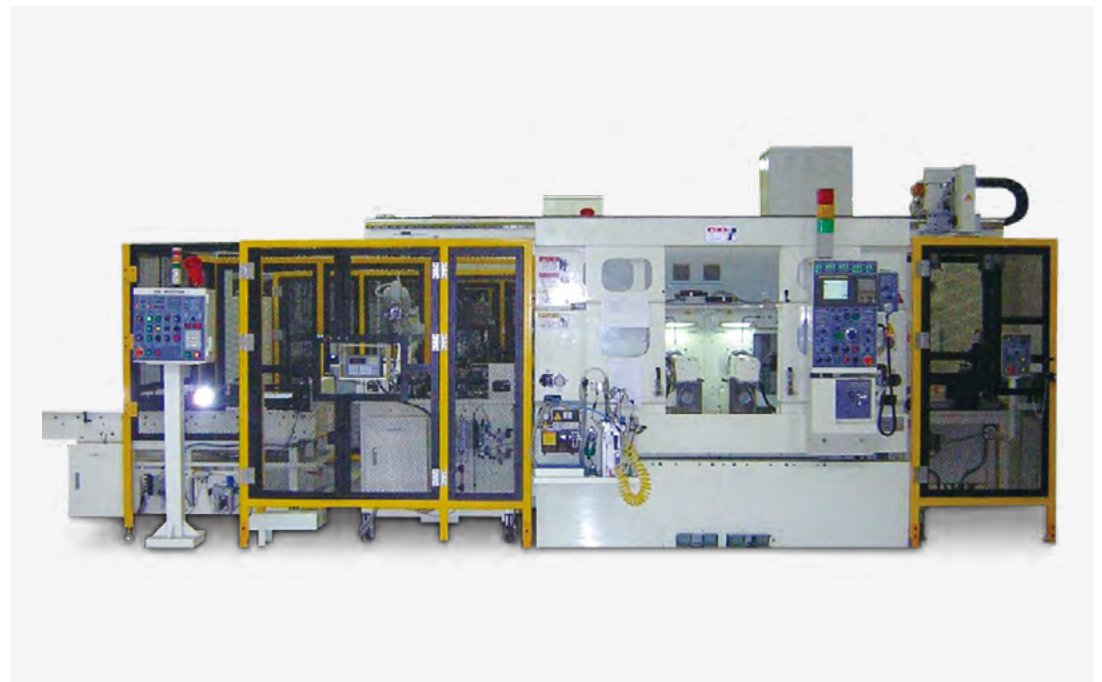
Application

Variable compressor

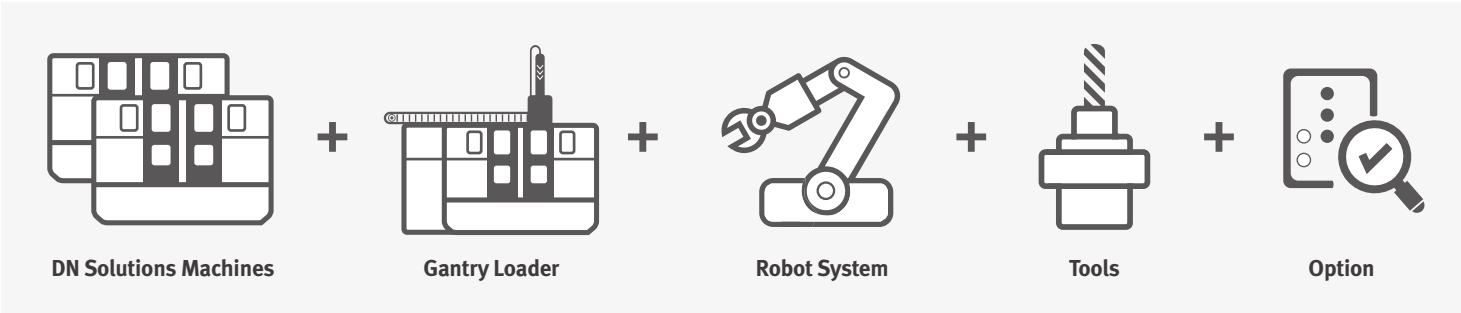


DN Solutions Turn-key System Solution

For an automation project to construct an unmanned line to process the variable compressor for automobile air conditioners, a gantry loader and an automatic measurement and correction system were employed.



PUMA QL200H twin spindle chucker 1 unit + Special gantry loader system



DN Solutions's Machine Tools

PUMA TW2100/M

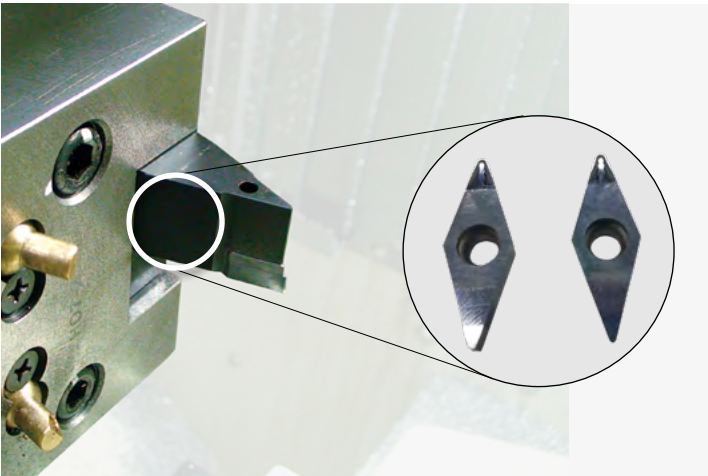


Model	Recommended turning diameter mm (inch)	Recommended turning length mm (inch)	Recommended turning weight kg (lb)	Std. Loading Time s	Max. traverse of jaw mm (inch)
PUMA QL200H	130 (5.1)	65 (2.6)	3 (6.6)	5.7	Ø16 (Ø0.6)

{ } : Option

Tool

A special insert was developed to enhance tool life security, accuracy, and productivity.



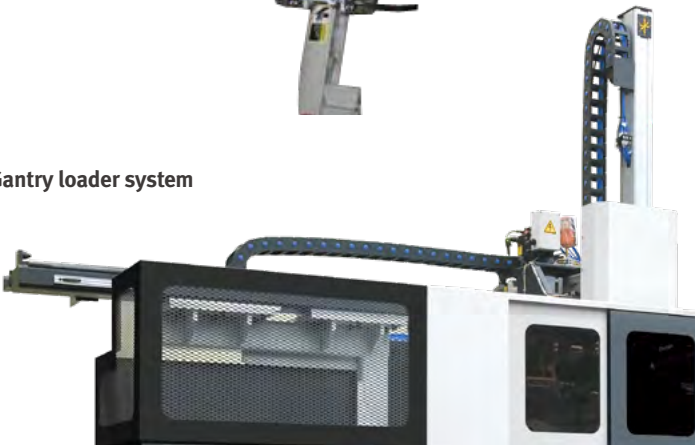
System

Gantry loader system + robot system

Robot system



Gantry loader system



Options

Automatic measurement system



The adoption of a special chuck significantly reduced the cycle time by 8 seconds.



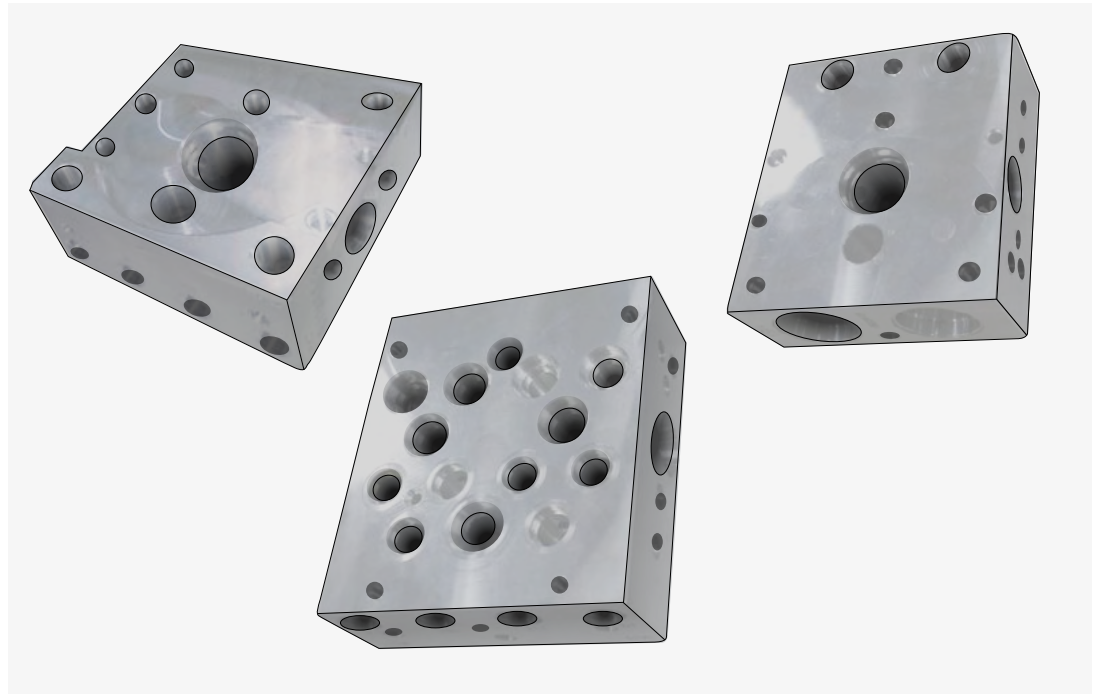


PROJECT
**Valve Block
processing line of
Customer 'M'**

The RGV robot automation line is based on DN Solutions's HP 4000 horizontal machining center.

Customer: Company 'M'
Automotive parts manufacturer

Application
Valve block

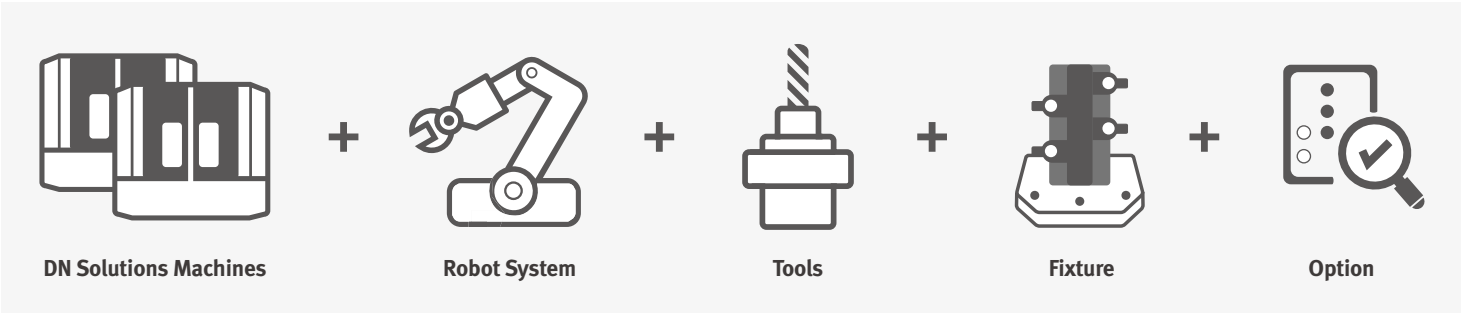


DN Solutions Turn-key System Solution

Centralized coolant and independent coolant systems are employed in this automation line whereby one operator monitors and operates 14 machine tools.



HP 4000 14 units, RGV robot, automation robot



DN Solutions's Machine Tools

NHP 4000 14 units



Model	Travel distance (X / Y / Z) mm (inch)	Table size mm (inch)	Max. spindle speed r/min	Tool storage capacity ea	Spindle motor kW (Hp)
NHP 4000	560 / 640 / 660 (22.0 / 25.2 / 26.0)	400 x 400 (15.7 x 15.7)	15000 {20000}	40 {60, 80, 120, 170, 262}	30 / 18.5 {37 / 18.5} (40.2 / 24.8 {49.6 / 24.8})

{ } : Option

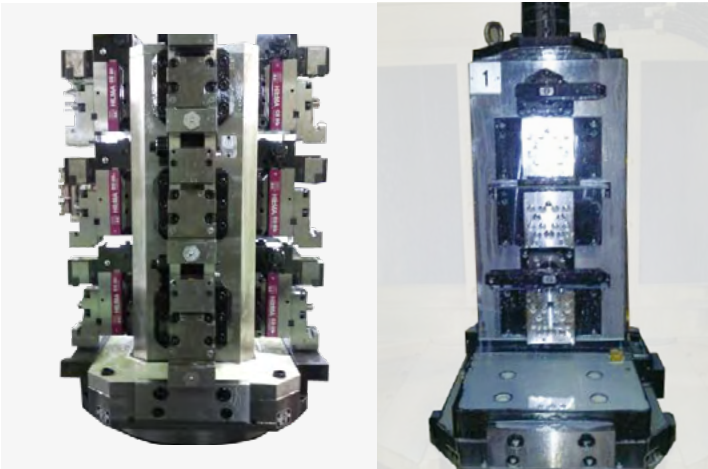
System

RGV robot + automation robot



Fixture

Productivity was maximized by mounting 12 workpieces per fixture. For the automation line, vice-type fixtures were employed to reduce work changing time and for standardization. The reliable location and clamping of the workpieces was ensured by the Air Catcher Sensor system.



Tool

Multi-purpose tools and other tools to raise accuracy were used for even higher productivity.





PROJECT Impeller Processing Line of Customer 'M'

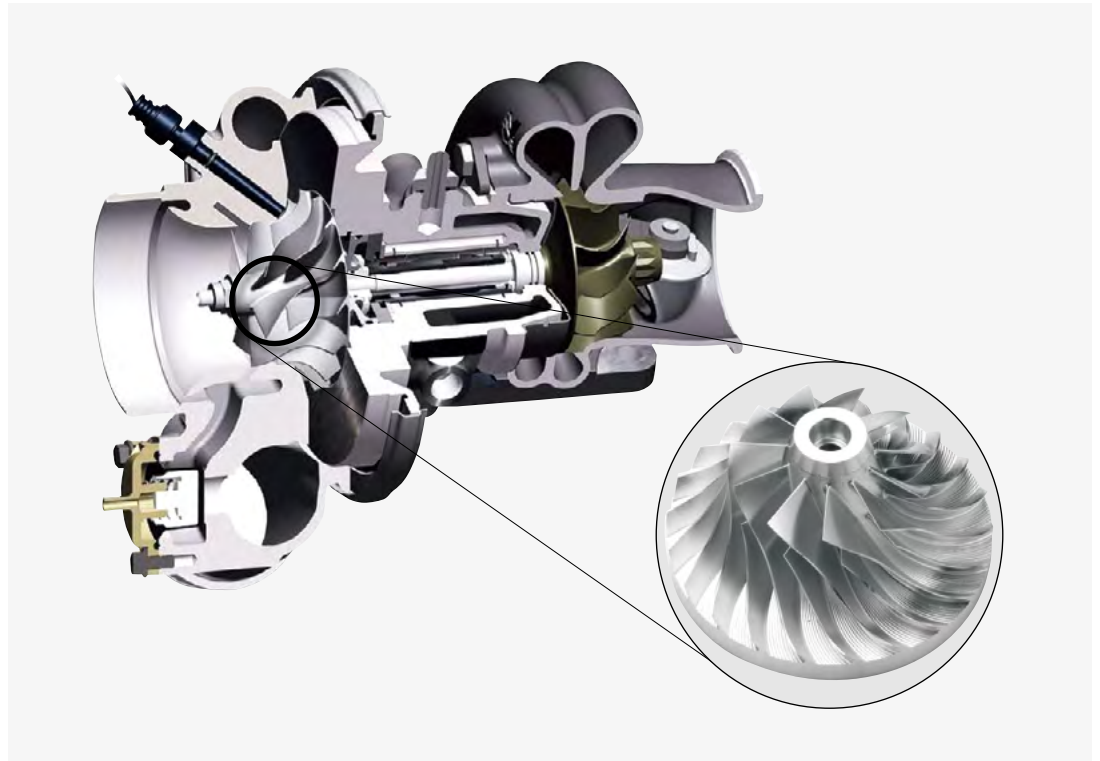
An unmanned 24/7 system comprising of FM 200/5AX, a super-high speed/high accuracy 5 axis machining center and gantry loader system.

Customer: Company 'M'

Automotive parts manufacturer

Application

Impeller

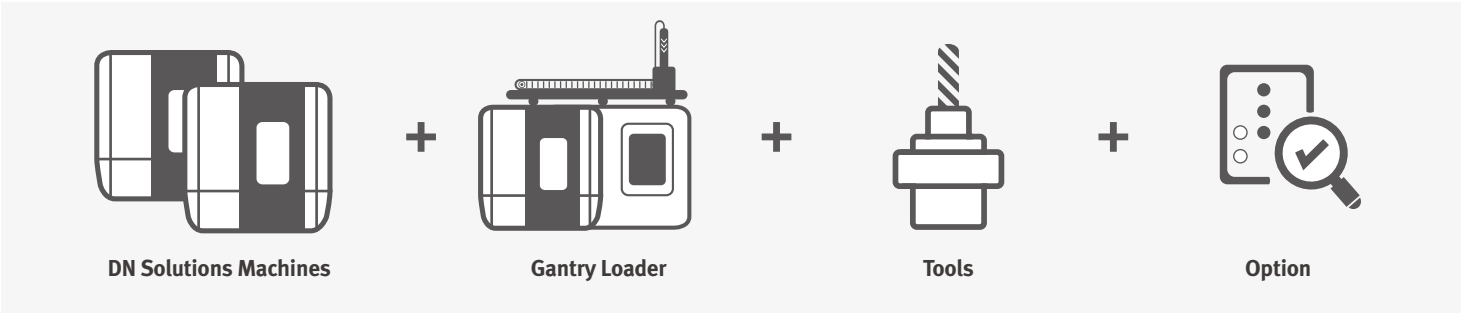


DN Solutions Turn-key System Solution

In the market of milled impeller wheels for auto turbo charger where technological capability and high-performance machine tools are required, the customer could set up a full automation line by adopting the FM200-5AX equipped with linear motors and respond to the market with enhanced competitiveness in price and quality.



FM 200/5AX + Gantry loader system



DN Solutions's Machine Tools

FM 200/5AX



Model	Travel distance (X / Y / Z) mm (inch)	Table size mm (inch)	Max. spindle speed r/min	Tool storage capacity ea	Spindle motor kW (Hp)
FM 200 / 5AX linear	200 / 340 / 300 (7.9 / 13.4 / 11.8)	Ø200 (Ø7.9)	40000	24	12.6 (16.9)

{ } : Option

System

Gantry loader system





Robot System for Brake Discs

Application

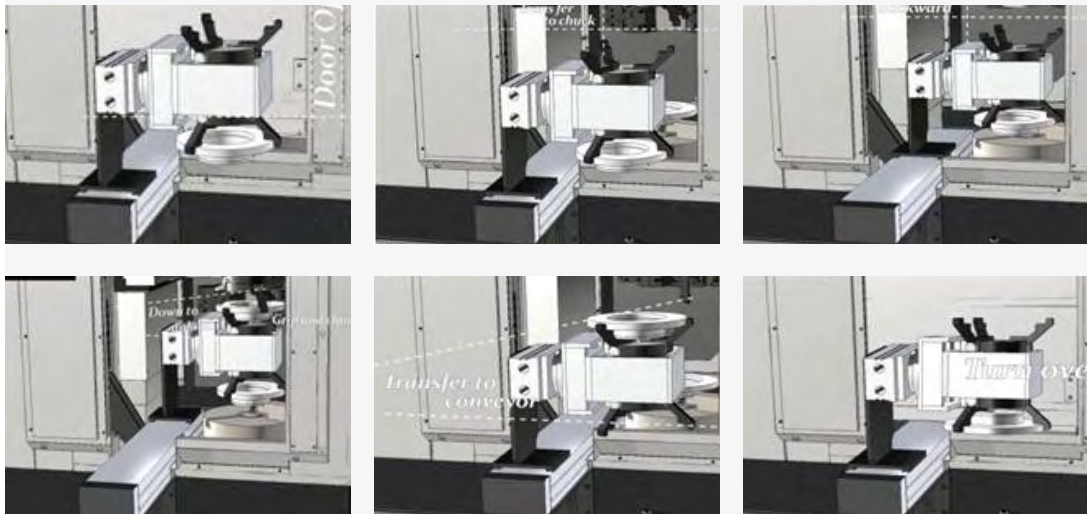
Brake discs

The easy-to-operate system further improves line productivity by reducing the time for work loading and unloading.



DN Solutions Turn-key System Solution

Line performance is enhanced with simultaneous loading and unloading operation in less than 10 seconds. The solution also offers greatly improved maintainability and diverse layout options to maximize the use of space, at a price 40% lower than other rival robot systems currently on the market.



PUMA V400P, T 4000 + Gantry loader system



DN Solutions's Machine Tools

PUMA V400P



Model	Chuck size inch	Max. turning diameter mm (inch)	Max. turning length mm (inch)	Max. spindle speed (spindle/milling) r/min	Spindle motor kW (Hp)
PUMA V400P	12	496 (19.5)	461 (18.1)	3000	22 / 18.5 (29.5 / 24.8)

T 4000



Model	Travel distance (X / Y / Z) mm (inch)	Table size mm (inch)	Max. spindle speed r/min	Tool storage capacity ea	Spindle motor kW (Hp)
T 4000	520 / 400 / 350 (20.5 / 15.7 / 13.8)	650 x 400 (25.6 x 15.7)	12000 {24000}	21	13 / 7.5 / 5.5 / 3.7 (17.4 / 10.1 / 7.4 / 5.0)

{ } : Option

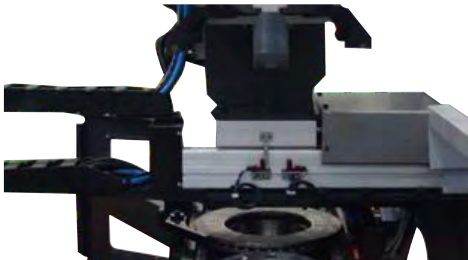
System

Gantry loader system



Options

Additional X-axis
sliding unit
(external)



Gripper unit
(internal)



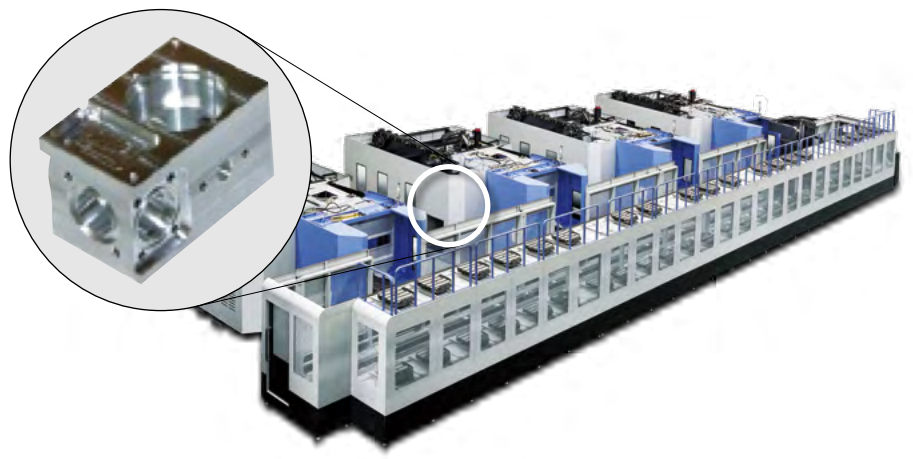
Major Customers in The Automotive Industry



Customer Success Story

Maximized Efficiency with Minimized Labor Customer 'A' (USA)

“DN Solutions's LPS System selected by HYPI is a linear pallet system providing maximized productivity and quality with minimized labor. The 12-pallet LPS is suitable for S&M businesses as well as large factories. One of the greatest benefits is the perfect after-sales services that are offered after design, building, and installation of the system. One more advantage of the HP 5100 is that it helps us respond to frequent design changes.”

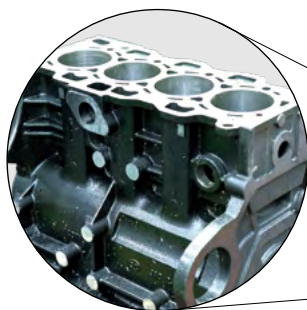




Reliability Based on "Customer First" Philosophy

Customer 'B' (China)

“DN Solutions's machine tools are highly respected in the industry for their high efficiency and durability. This new systemized line is the fourth project carried out with DN Solutions. They provide us with all the technical support we need and pour their full efforts to meet the additional requirements arising from new regulations.”



DN Solutions in the World

In an effort to provide solutions that fit each partners' unique needs, we constantly innovate our thinking, processes, and the way we do business. These optimal solutions lay the foundation for the success of our partners, which adds value to our partners' businesses.

Global Sales and Service Support Network

Corporations	Dealer Networks	Technical Centers	Service Post	Factories
4	155	51	200	3

Technical Center: Sales Support, Service Support, Parts Support



Supplying Parts

- Supplying parts without charges
- Supplying parts with charges
- Parts repair

Technical Support

- Supporting machining technology
- Responding to technical inquiries
- Providing technical materials

Field Services

- On-site services
- Installment and trials
- Scheduled maintenance/ Preventive maintenance
- Repairs with/without charges

Training

- Programming / Machine operation
- Maintenance
- Application engineering



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* For more details, please contact DN Solutions.

* Specifications and information contained within this catalogue may be changed without prior notice.