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■ Renault Nissan Automotive India Pvt Ltd., India

# International Benchmark

At the new greenfield automotive plant of Renault Nissan Automotive India Pvt Ltd., a standardized automation solution based on proven Simatic technology helps set benchmarks in terms of production quality and performance.

**W**hen Renault and Nissan announced plans for a joint venture to manufacture vehicles in India in February 2008, the new automotive production plant in Chennai was presented as a key milestone in the companies' strategy for the Indian automotive market. "With the establishment of our plant, Renault-Nissan will make major investments in India, reaffirming the growing bilateral economic ties between our respective countries," said Nissan president and CEO Carlos Ghosn at the plant inauguration in March 2010. Representing an investment of 45 billion rupees (US\$990 million) and with the capacity to produce 400,000 units per year at full capacity, the new Chennai plant initially employed 2,000 workers at the start of production in May 2010.

The plant is the first dedicated Renault-Nissan alliance vehicle manufacturing plant. The first vehicle to be produced at the plant will be the new Nissan Micra, a global subcompact. The Micra, which is also the first vehicle derived from the new V-platform, is destined for the Indian market as well as for export to over 100 countries in Europe, the Middle East, and Africa. In 2011, the plant will start production of the Renault Koleos and Fluence, both destined for the Indian market.

### A versatile plant

Intended to manufacture a variety of car models, the new plant must be able to operate flexibly and quickly adapt to changes in model lineup and production capacities. While the production equipment for the new plant was delivered by line builders from all over the world, Renault-Nissan opted for a highly standardized solution in terms of production automation. In several of its plants, such as in Batilly in France, Renault had already implemented automation solutions based on the SCUBE concept (see sidebar) developed in coordination with Siemens, and had achieved good results with this approach. So consequently, Renault-Nissan also opted for SCUBE as the basis of the automation technology to be deployed in the new Chennai facility. Siemens provided state-of-the-art standardized automation solutions for all its shops in vehicle operation and powertrain assembly lines. The result was a plant that not only was rapidly built, but quickly produced a high-quality product.

### One standard for automation

Siemens manufactured and delivered the standardized cabinets to the line builders in Korea, Italy, and China that were contracted for the Chennai facility. Consequently, all shops in the new plant use a uniform automation architecture that greatly simplifies both the training of staff and the maintenance of the production technology. The reduced product variety requires lower spare parts inventory and this also leads to lower training effort for the maintenance staff.

The automation architecture is based on Siemens products throughout: Simatic controllers at the pro-

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Paul Morris, Head of Maintenance Department,  
Renault Nissan Automotive India Pvt Ltd., Chennai



### SCUBE

The SCUBE concept is based on a structured and modular automation concept and also integrates fail-safe functions into one uniform architecture. SCUBE uses standardized software and hardware:

- ▶ Simatic S7-300 PLCs
- ▶ Simatic HMI devices
- ▶ Simatic Industrial PCs
- ▶ Microbox PCs for embedded control
- ▶ Sinamics G120/G120 D as standard motor converters
- ▶ Safety Integrated

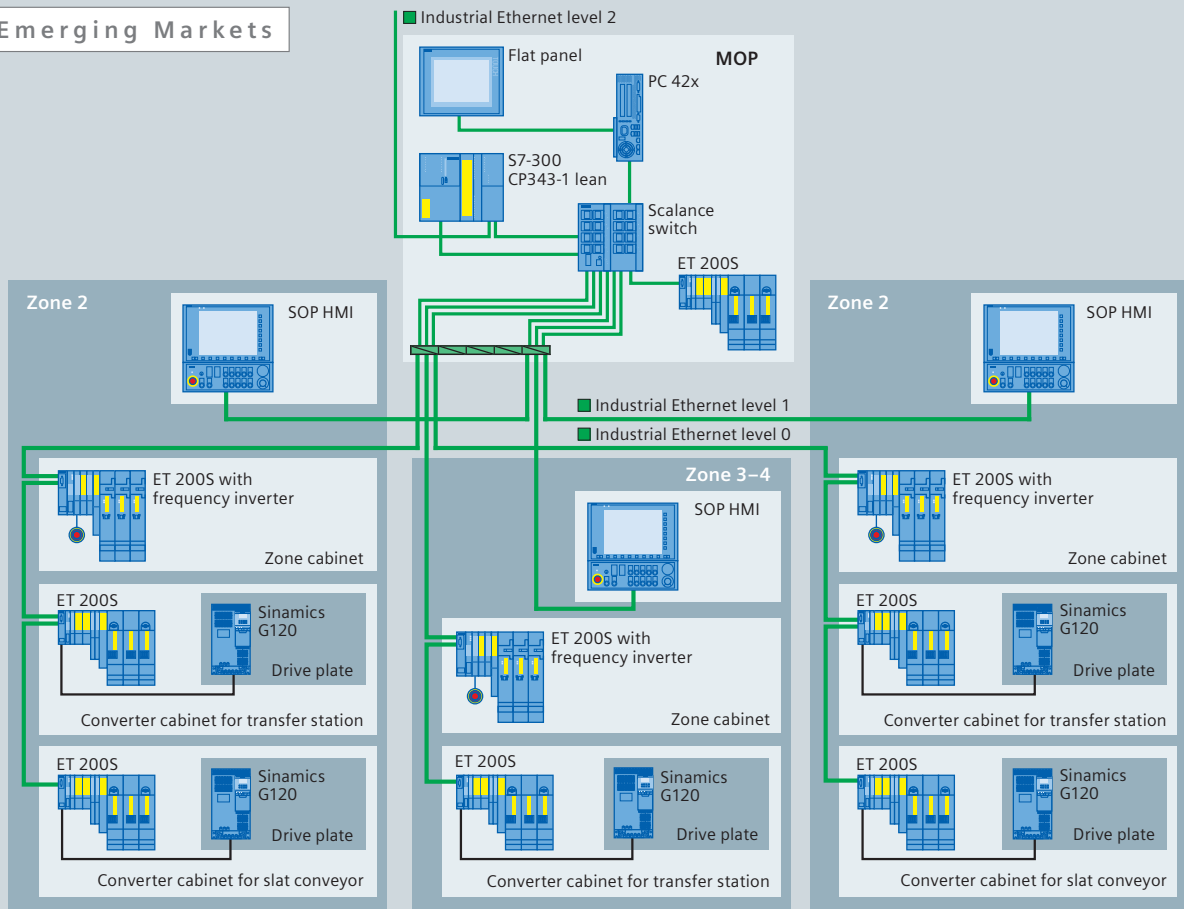
Additional standard components:

- ▶ Sirius circuit breakers for standard and specific handling applications
- ▶ Simatic RFID read/write devices and data tags
- ▶ Scalance components for networking and communication

The automation and HMI units are all contained in standardized cabinets, always using identical interfaces, installation, and design. Depending on the extent of the required functionality, every manufacturing unit or zone is equipped with suitable versions of the specified operator panels.

grammable logic controller (PLC) level, Simatic panels for operation and monitoring, Sinamics and Simotion drive systems, Sirius switching products, and Scalance communication devices. Simatic WinCC flexible is used for visualization tasks. The communication in the plant is based on Industrial Ethernet and Profinet, with Profisafe for safety communication. All shops use Siemens cabinets built to the SCUBE standards – Siemens delivered more than 100 of them. These include control cabinets, which Siemens installed. Siemens also delivered the line builders.

The body shop in the plant is a good example of how the automation standard is deployed. The entire body shop is controlled through a main operating panel (MOP) as defined in the SCUBE standard, »»



► which utilizes a Simatic S7-300 fail-safe PLC. This PLC controls all processes in the body shop and connects to the drive control system via Ethernet, I/O modules in a Siemens Microbox PC 42x, a Siemens Scalance Switch, and an ET 200S distributed I/O system.

Each zone within the body shop can be controlled with an HMI suboperator panel (SOP). All cabinets are supplied by Siemens according to the SCUBE standard. Each zone cabinet contains an ET 200S with a frequency inverter. Each zone also has a converter cabinet for the transfer station, which contains an ET 200S, and a Sinamics G120 frequency converter for the drive plate. Zones 1 and 2 also have a converter cabinet for the slat conveyor, which also contains an ET 200S and Sinamics G120.

### Excellent position for a growing market

Thanks to the standardization achieved by using the SCUBE approach, both the project execution and the commissioning of the equipment in Chennai were completed in a very tight time frame, speeding up overall project execution. The uniform architecture simplifies training, and systems are easier to maintain. Moreover, the standardized architecture also has significant benefits in terms of future modifications and expansion projects: because the entire structure is modular, it can be easily expanded.

Renault-Nissan was pleased with the plant build time and local support from Siemens, as Paul Morris, head of the maintenance department at Renault Nissan Automotive India Pvt Ltd. in Chennai confirms: "The service and support we have received in India from the local Siemens team has been excellent."

After just 20 months, the greenfield automotive plant has started production. It is one of the most advanced facilities in India in terms of automation, and consequently in terms of performance and productivity quality. At the plant inauguration ceremony on March 17, 2010, Chairman Ghosn said, "This is the first Renault-Nissan alliance plant, and using Renault's production method. The plant will be a clear benchmark for the future." Renault-Nissan is already benefiting from the mature technology of Siemens and the SCUBE standard: a proven, state-of-the-art automation solution, successfully deployed at Renault in several plants and now also at Renault-Nissan in India, that offers operational benefits and can easily be expanded to serve the growing automotive market in India. ■

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