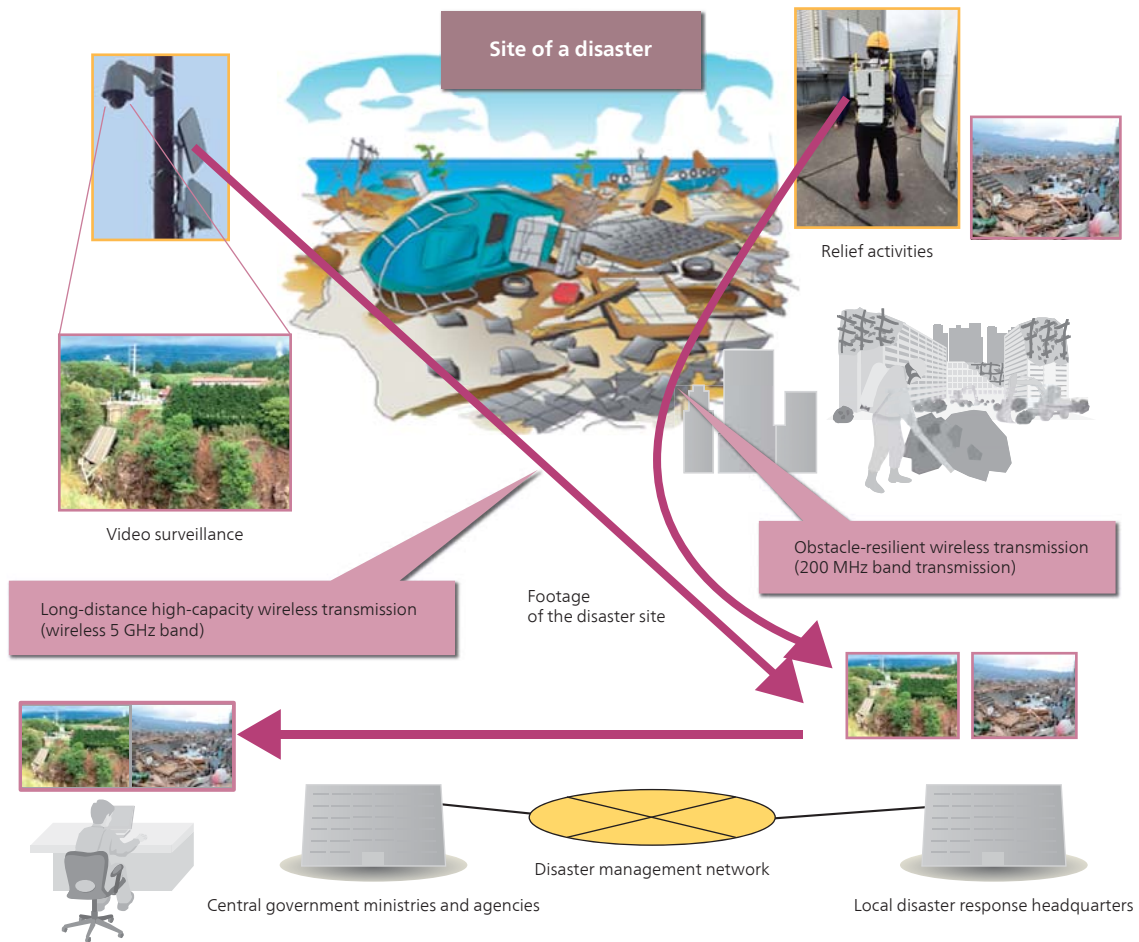


# Electronic Systems & Equipment



1 Wireless video surveillance network to monitor the situation across a disaster-stricken area

## 1 IoT High-reliability Wireless Solution

The rapid spread of the Internet of Things (IoT) has spurred demand for flexible and reliable communications. Hitachi offers the IoT high-reliability wireless solution to provide reliable and flexible connections over wireless communications and integrates optimum wireless networks catering to specific market needs and environments.

The main features are as follows.

(1) Optimum selection of frequency bands and type of wireless systems

(a) The appropriate wireless system is applied across the wide frequency range of 200 MHz to 60 GHz, depending on the presence of geographical features and obstacles, as well as the required transmission

speed.

(2) Technologies to provide increased reliability under severe environments

(a) Interference canceller and beam forming technologies that remove radio interference and other unwanted signals are employed.

(b) Wireless transmission technologies (automated re-transmission technologies, diversity technologies) adept at handling unstable environments.

In addition to disaster prevention and mitigation, the IoT high-reliability wireless solution can be applied as a means of communication across a wide range of social infrastructure and industrial scenarios, such as various rail, plant, construction sites and through the utilization of drones. For example, to prevent secondary disasters following a large earthquake, the 200 MHz band, which is suited to non-line-of-sight communications, and the

5 GHz band, which enables long-distance, high-capacity transmission, are used to build a wireless network for the purpose of transmitting surveillance footage. (Hitachi Kokusai Electric Inc.)

## 2 Ultrasonic Cleaning Equipment

Ultrasonic cleaning, which is generally known as a technique to powerfully clean items such as glasses and gemstones, is also widely used in the cleaning of semiconductor devices.

Semiconductor fabrication is an extremely lengthy task that involves more than one hundred processes from the constituent material stage to device layering and chip production, and cleaning must be performed between each process.

The cleaning requirements differ greatly depending on the process, and the further downstream the process goes, the greater the damage due to cleaning on chip yield and reliability. Given this, ultrasonic cleaning of semiconductors employs different frequencies depending on the process. As damage due to cleaning has little impact on product quality during the initial processes, low frequencies in the range of several dozen kilohertz are emitted for powerful cleaning, while the megahertz band—less likely to cause product damage—is used to perform fine cleaning during the final stages.



2 UO1200PMCX (1 MHz model for semiconductor) ultrasonic generator (top) and ultrasonic transducer (bottom)

The miniaturization of semiconductor devices is advancing each year, and damage due to cleaning is subject to close scrutiny. To respond to these needs, Hitachi will continue to contribute to the evolving field of semiconductor fabrication through ultrasonic cleaning that raises performance limits.

(Kokusai Electric Semiconductor Service Inc.)

## 3 W4SE and W5SE Board Drivers with Compact and Lightweight AC Brushless Motors

A board driver is a tool used when screw fastening drywall to a ceiling or wall.

This product is structured so that the tip of the tool only rotates when pressed against a surface. By pressing against drywall with the screw held on the driving bit at the tip, the rotation of the motor is transmitted to the bit through a clutch mechanism to perform screw fastening. As actual work in the field involves a lot of work facing upwards or to the side, products need to be lightweight and ease to handle in order to reduce fatigue.

Now a high-efficiency alternating current (AC) brushless motor specially developed by Hitachi Koki Co., Ltd. has been added to the multiple disk clutch mechanism, which is popular for its low-recoil and the lack of clutch engagement noise. This has enabled the development of a new product this is smaller, lighter and offers improved workability.

The main features are as follows.

(1) Industry-leading light weight and compact size\* with main unit weight of 0.9 kg (20% lighter than previous models) and a total main unit length of 263 mm (10 mm shorter than previous models), achieving an excellent balance of reduced fatigue and operability.

(2) Achieves comfortable operation with low recoil and



3 Color options for W4SE/W5SE board driver

the absence of clutch engagement noise thanks to the unique multiple disk clutch mechanism.

(3) Enables easy unscrewing through a unique reverse drill mechanism.

(Hitachi Koki Co., Ltd.)

\* Among power tool manufacturers in Japan. As of September 2016 according to the study undertaken by Hitachi Koki Co., Ltd.

#### 4 NT1865DMA, NT1865DM and NT1850DE Air Hose-free Next-generation Cordless Finish Nailers

Conventional pneumatic nailers used to fasten wooden materials in fields such as home construction have suffered from handling limitations because they are joined to an air compressor via an air hose. Meanwhile, gas nailers that harness the combustion energy of a gas can housed in the main unit as a source of power provide better handling, but have the demerit of running costs that come to around 8 USD per 1,000 nails due to the

consumable fuel cell.

Given these challenges, Hitachi Koki Co., Ltd. developed a compressed air-type cordless nailer. The product uses a high-efficiency brushless motor to compress the air contained within a sealed cylinder, and drives the nail with an instantaneous opening action. As the product uses a high-capacity lithium-ion battery as its source of power, no air hose is required. As well as offering excellent handling, it achieves stable nailing performance and an improved work rate.

The main features are as follows.

(1) Strikes a balance between light handling and low running costs with a structure that does not require an air hose or fuel cell.

(2) Employs a high-efficiency brushless motor for improved work rate (more than 1,100 nails can be driven when using a 3 Ah [10,800 (C)] rechargeable battery).

(Hitachi Koki Co., Ltd.)



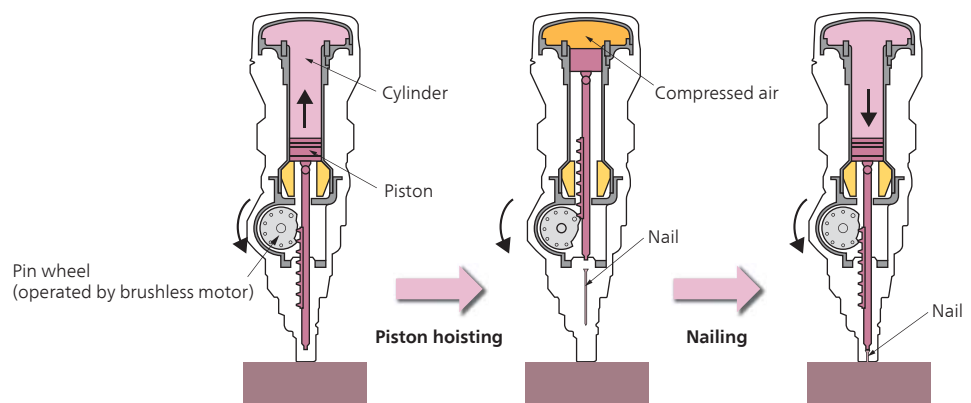
NT1865DMA  
(15-gauge)



NT1865DM  
(16-gauge)



NT1850DE  
(18-gauge)



4 Cordless finish nailer series (top) and operating diagrams (bottom)