

# Electrical System



Welcome.

Established in 2001, NOW E&S Co., Ltd. has manufactured a variety of products for industrial areas of Electricity and electronics, such as the automated control systems of large construction machines, PLANT equipment, and switchboard. With the development of a semi-permanent centrifugal-type cleaning system for an industrial purpose, our company has also developed products and technologies in general industries and environmental industries. By expanding product items, our company contributes to the growth and development of domestic Electrical and mechanical industries.

These days, based on the experiences and technologies having been accumulated in the areas of Electricity, machine, and construction since the establishment, our company has developed the automated equipment and products for making GFRP Rebar and CFRP Rebar. Such developed products serve their roles in the development projects of high-strength and low-weight structures without corrosion in order to improve the quality and lifespan of building concrete structures in the domestic construction and civil engineering market. To grow as one of main enterprises in the 4th industry, our company continues to develop products and conduct R&D for new products.

In order to achieve the quality improvement goal for the development of national industries and customer impression, all executives and employees of NOW E&S Co., Ltd. promise to make ceaseless efforts to serve society and grow as a reliable enterprise by performing ESG management.

Thank you.

CEO

Challenge,  
Creativity,  
Efficiency!

## ➤ 2021

- Patent Switchboard Having Earthquake Proof Device
- CE Manual Centrifugal Separator
- Establishment of a corporate research institute

## ➤ 2020

- Applied for the patent Drilling Automation System and Method of Trench Cutter

## ➤ 2019

- Applied for the patent Apparatus and Method for Manufacturing Glass Fiber Reinforced Polymer (GFRP) Rebar

## ➤ 2018

- Newly constructed a factory (in the Gimhae Techno Valley Industrial Complex)
- Supplied Centrifuge to Samsung Electronics Vietnam
- Made construction projects Hong Kong and Singapore

## ➤ 2011

- Acquired Venture Business
- Established the joint corporation of NOW Electricity and E&S (NOW E&S Co., Ltd.)
- Acquired 05ISO 9001
- Acquired Certificate of R&D Dept. (Korea Industrial Technology Association)

## ➤ 2010

- Established NOW E&S Co., Ltd.

## ➤ 2009

- Registered in Public Procurement Service (switchboard and automatic control panel)

## ➤ 2007

- Changed the business name of Now Electricity
- Registered as Electrical Construction Business (construction license no. 01218)

## ➤ 2006

- Registered the patent Excavator operation method and control system

## ➤ 2001

- Established NOW Electrical Power

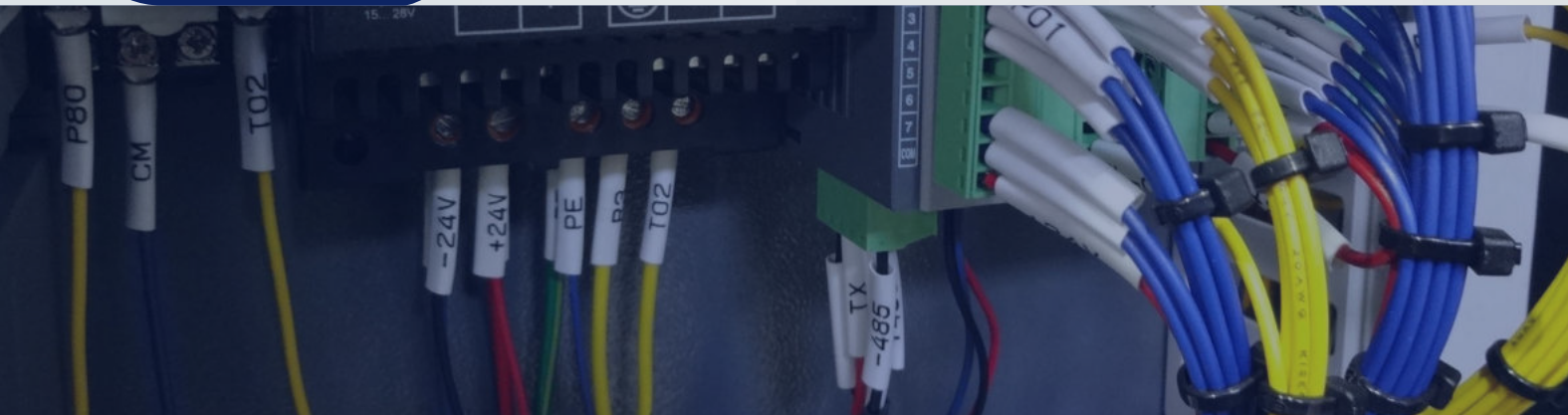


## Electricity Division

More specifically, the company manufactures the low-voltage switchboard and distribution system applied to Drill-Ship, FPSO, etc. in the shipbuilding and marine areas; the automatic control panel system with Bridge Control Console, and Engine Control Console, which is installed in Wheel House, Engine Control Room, etc.; switchboard systems used in the power plant, a variety of industrial plants, water treatment, and other areas, such as high voltage switchboard, low voltage switch board, motor control center, and distribution board; PLC / DCS Panel, auto control panel, relevant systems, SCADA, TM / TC, central monitoring system, and other kinds of switchboard and automatic control board and system.



➤ Electricity Division  
Certificates and patents





# Switchboard

This is the advanced-technology based switchboard equipment with the high-performance device whose reliability is already approved. It was developed to provide quality power safely for customers who need electricity.



## Integrated Switchboard

This product is equipped with high-performance device and parts that secure reliability. It pursues reliability and safety of power supply in order to give stable supply of extra-high voltage and high voltage power to customers.

- Commodity Identification Number:24126731

### System Specification

Applied spec	IEC, ANSI, IEEE, KS, KEMC
Rated current	200/400/630/800/1200/1600/2000/2500/3200/4000
Rated frequency(Hz)	50/60Hz
Protection degree	IP4X, Other Order Specifications
Rated voltage	24/25.8kv, 7.2Kv 3.6kv
Rated short circuit breaking current (1S)	MAX, 25kA
Rated frequency	AC 200V/110V, Other Order Specifications

## Motor Control Center

Motor Control Center (MCC) performs the best performance in protecting and controlling a low-voltage motor in the industrial equipment, and has a drawer type or assembly-type.

- Commodity Identification Number:24126732

### System Specification

Applied spec	IEC, ANSI, IEEE, KS, KEMC
Rated current	~800A, Other Order Specifications
Rated frequency(Hz)	50/60Hz
Protection degree	IP4X, Other Order Specifications
Rated voltage	690V
Rated short circuit breaking current (1S)	MAX, 25kA
Rated frequency	AC 200V/110V, Other Order Specifications

Industrial plant, factory, water supply & drainage treatment plant, building, etc./  
Public offices, private construction sites, etc./ For offshore vessels



Safety design



Responsible construction



Follow-up management

## Distribution Panel

A variety of distribution panels that distribute power appropriately depending on load are immediately manufactured and delivered in line with customers' request.

- Commodity Identification Number:24126733

### System Specification

Applied spec	IEC, ANSI, IEEE, KS, KEMC
Rated current	~800A, Other Order Specifications
Rated frequency(Hz)	50/60Hz
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## Local Operation Panel (LOP)

By installing the product in the facility to manage, it is possible to control operation state directly and conveniently. In addition, the device can be operated in central control room.

### System Specification

Applied spec	IEC, ANSI, IEEE, KS, KEMC
Rated current	—
Rated frequency(Hz)	50/60Hz
Protection degree	IP4X, Other Order Specifications
Rated voltage	—
Rated short circuit breaking current (1S)	—
Rated frequency	AC 200V/110V, Other Order Specifications

Integrated Switchboard



Motor Control Center



Distribution Panel



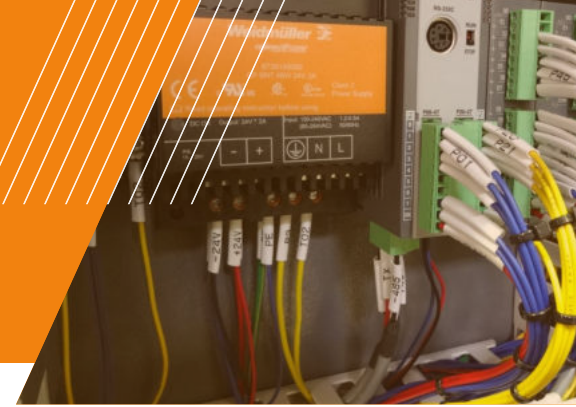
Local Operation Panel (LOP)





## Electrical Equipment Construction

The electricity division of NOW E&S Co., Ltd. has the technology and know-how that have been accumulated through electrical work and construction experiences in diverse areas over the last two decades, in order to provide the best quality for customers. (Gyeongnam Electrical construction business registration no. 01218)



Industrial plant, factory, water supply & drainage treatment plant, building, etc./  
Public offices, private construction sites,  
etc./ For offshore vessels



Technical



Quality



Service

### ➤ Electrical Equipment Construction

#### Applied Areas and Cases



Ship Electrical Corporation



Ship Electrical Corporation



Street light construction



Drainage sludge system



Land Electric Corporation



Land Electric Corporation(POSCO)



Overhead crane  
installation construction



Electrical construction of  
switchboard



## Automatic Control Panel

Automatic Control



Sequence control means the control made in the given cycle on the basis of PLC and HMI communications. By receiving input signals of the sequence control from sensors or local devices, it is possible to establish the automatic control system for load of a motor or valve.



Automatic control system is capable of controlling the PID based feedback control more accurately and smoothly with the uses of PLC and HMI, and of saving and visualizing data with a file format (text, excel, or graph).



The system is applied to field sites through the design and programming that fits each one of industries. Our company continues to do the best to improve technology and product quality.

### ➤ Inclinometer

#### Two-Axis Inclination Sensor



- Name Inclinometer
- Input Voltage 16~30VDC
- Output 4~20mA
- X-axis -5.75 ~ 5.75
- Y-axis -5.65 ~ 5.75

#### Current Proportional Output Controller (ACS)



- Name ACS CONTROLLER
- Input Voltage 18~30Vdc
- Control Channel Proportional valve 4CH
- Communication RS485
- Digital Input S/W Type
- Analog Input Type 0~10Vdc / 4~20mA
- Output 0~3000mA

#### Data Collector (DAQ)



- Name DAQ CONTROLLER
- Input Voltage 18~30Vdc
- Communication RS232C, RS485
- High Speed Counter 3CH
- Analog Input Type 4~20mA 9CH

#### Digital Weight Display Indicator (Indicator)



- Name DIGITAL INDICATOR
- Input Voltage AC85~265V
- Communication RS232C, S485
- Output Relay, Print, Load Cells 5PIN Connector type

### ➤ Applied Areas and Cases



Industry



Construction



Offshore

#### Centrifugal Separator



#### Filter Press



#### Mixer Plant



#### Vending Machine Automation System



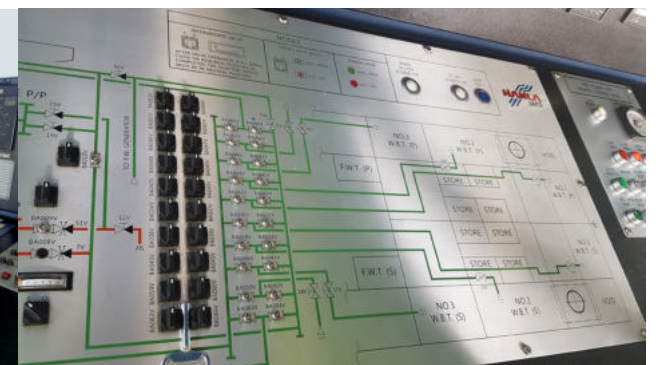
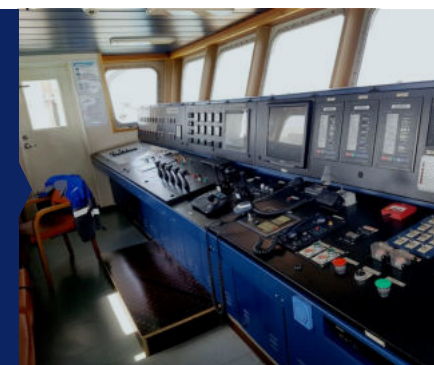
#### Dry Oven Furnace



#### DCM SYSTEM



#### BARGE SYSTEM







Equipment shift to an excavation position

Excavation - Access to the ground

Excavation - Ground drilling

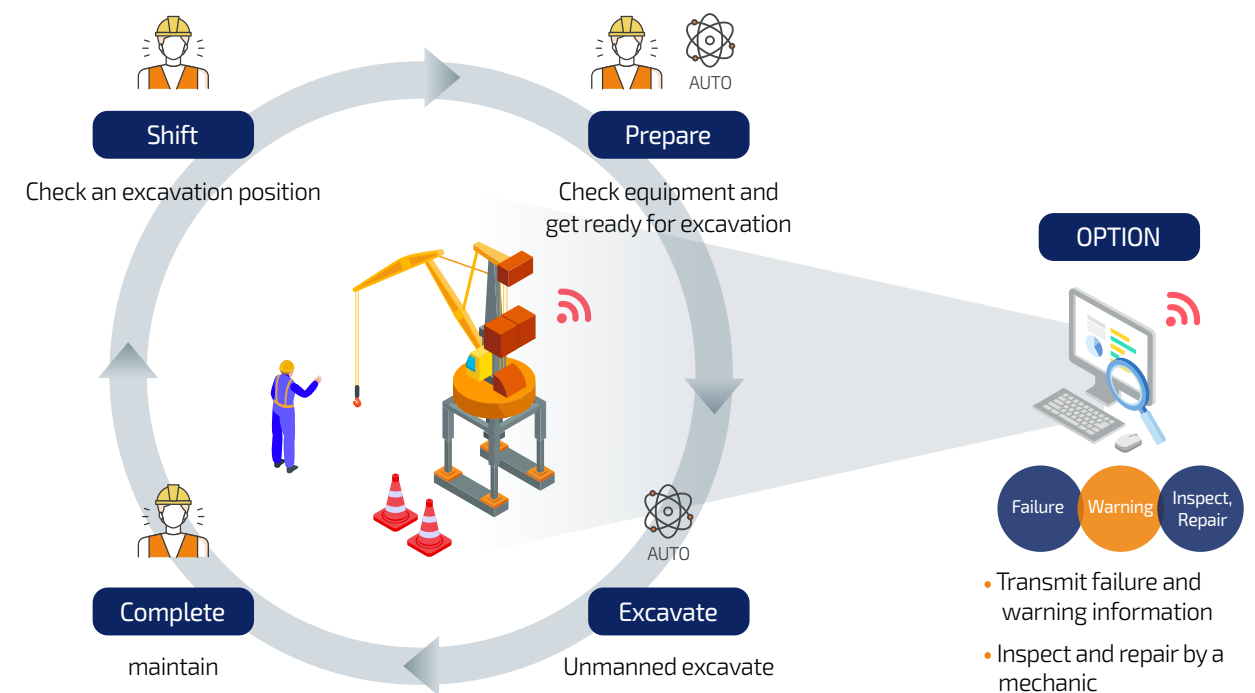
## specializes in automation and autonomous operation system

leading, the 4th industry in the large construction machine control system for special purposes.

By developing the control system for large construction machines for special purposes and the operation system of ground excavation construction machines, NOW E&S Co., Ltd. contributes to improve market competitiveness through the quality standardization of construction equipment, the saving of construction cost, and improvements in equipment operating efficiency. With the continuous R&D, our company leads the smart construction equipment industry in the 4th industrial era by automating construction machines, such as BC cutter based on slurry wall method, hydraulic groover, and auger.



### Conceptual diagram of autonomous operation



### Flow Chart of Autonomous Operation

Auto Diagnosis	Check a construction position	Preparation for Auto Operation	Auto excavation start	AUTO Excavation
<ul style="list-style-type: none"><li>Check hydraulic power</li><li>Run Main Winch</li><li>Run Mud Drum</li><li>Run HYD Drum</li><li>Zero Winch</li><li>Analyze Cutter Body</li><li>Display the analysis result on screen</li></ul>	<ul style="list-style-type: none"><li>Move operator equipment</li><li>Align Cutter Body</li></ul>	<ul style="list-style-type: none"><li>Auto excavation condition setting</li><li>Auto condition satisfaction ready</li></ul>	<ul style="list-style-type: none"><li>Run X-Y-Z gradients compensation FLAPS</li><li>FLAPS Operation</li><li>Stop if exceeding the allowable ranges of gradients</li></ul> <p>Transmit information if warning or failure occurs</p>	<ul style="list-style-type: none"><li>Stratum change</li><li>change excavation conditions according to set stratum change</li><li>X-Y-Z gradients compensation</li><li>Complete excavation if reaching the set depth</li></ul> <p>Transmit information if warning or failure occurs</p>

### Features and Advantages of BC Cutter Autonomous Operation System

Manual and autonomous operation comparison of BC Cutter

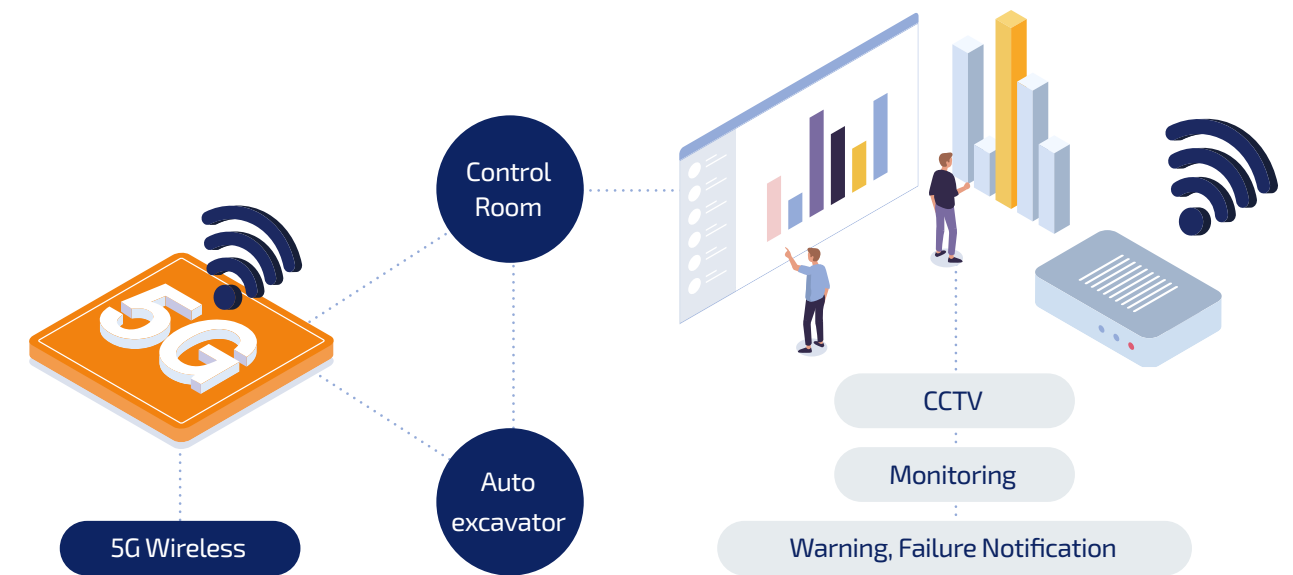
Manual operation	Autonomous operation
A skilled operator is needed	A unskillful worker can run the equipment
Quality depends on a skilled operator's ability	A unskillful worker can provide accurate and equal quality of excavation
Construction cost increase	Construction cost saving
Maintenance cost increase	Maintenance cost saving
Construction data depends on a skilled worker's experience	Construction data is accumulated automatically and is applicable
Solo equipment operation (an operator is required)	Multiple equipment operation (Control Room)



# Autonomous Operation System of Construction Equipment

Our company continues to develop the auto excavation control and autonomous operation system of large construction machines for special purposes, such as hydraulic groover and auger, establishes the data communication network to connect the equipment for autonomous excavation control and autonomous operation, such as BC Cutter in order to develop the integrated monitoring system and remote control system of excavation equipment.

## > Auto excavation remote control system



## > Autonomous Operation System of Construction Equipment Applied Areas



Onshore construction sites (BC Cutter)



Hydraulic grooves



Mixer Plant



Orgadril



Offshore construction sites(CSM)



Offshore construction sites(DCM)



SEMI SHIELD



R.C.D

## > The introduction effect of auto excavation operation system



Sensor based equipment diagnosis / Hydraulic, Load, & RPM monitoring/ Efficient equipment management



Operable even by unskilful workers / Quality standardization and high quality construction/ One-person operation for multiple equipment / Equipment value & competitiveness improvement



PC & mobile information transmission /Efficient equipment operation/ Integrated management of construction reports



Work accuracy  
Work efficiency  
Work stability  
Work standardization





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