

Nipron Wave

Vol.53 2018 Autumn

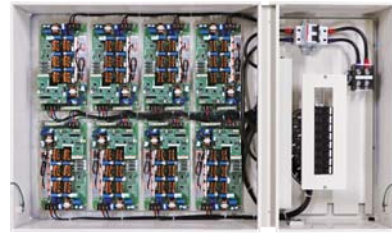
This is the highlight!

- 1 Special feature on GP power supply**
Introduction of Nipron's Perfect-full O&M Service, the first of its kind in Japan.
- 2 Special feature on new product UZP-600 series**
High reliability and long life with fanless construction realized.
Appearance of a PCB type switching power supplies with 600 W continuous/1200 W peak output.

Maximize the power generation amount of solar power stations



Draws out the maximum power from deteriorated panels and those in various conditions



PV Maximizer features

- Individual control of each string (MPPT control)
- Boost the string voltage
- Voltage and current measurement
- I-V characteristics measurement

Increased power generation amount is now possible

PV Maximizer

Benefits of PV Maximizer

Limits the drop in power generation amount caused by various reasons

- ▶ Uneven number of panels
- ▶ Fluctuation in the panel characteristics
- ▶ Shadows & dirt
- ▶ Mixing of different panels
- ▶ Aging of panels
- ▶ Panel failures

Daily remote monitoring/diagnosis and taking actions



It is possible to obtain real-time I-V and P-V characteristics on the Internet and diagnose the power generation status.

- ### High-precision string monitoring

Common monitoring can only capture problems for the system as a whole

Deviations in voltage on each string cannot be captured

PCS

The power can be monitored on each string, extremely accurate

High accuracy due to the monitoring of string power (current and voltage)

PCS
- ### Panels' characteristics curves can be obtained in real-time

The power station can be inspected every day and in a single operation
- ### Power generation problem diagnosis feature with AI

Daily and automatic in-depth inspections based on the obtained data

Upper limit

Lower limit

Actual measurements

Error

Normal range

A string where a power generation problem is detected
- ### Power generation problem diagnosis on the Internet

Panels

PV Maximizer

I-V

P-V

Power generation status

Internet

Browsing

It is also highly effective in realizing the RE100 & ESG management

A solar lighting system that maximizes the power generation capacity of a PV panel

<http://www.nipron.com>

Voices of customers using PV Maximizer



Interview

Enhanced efficiency of power generation with PV Maximizer
High-precision string monitoring with PV Guardmyan

Kowa Incorporated operates a racing circuit in Nara Prefecture, Meihan Sports Land. In their second and third phases of power station construction, where the space for installation was limited, they have adopted the PV Maximizer and PV Guardmyan. We interviewed them on the effects of those products.

Kowa Inc.

Mr. Hiroaki Nakatsuka,
Representative Director and President

Backgrounds of introduction

What was the first impression of PV Maximizer?

Because a power station of 1 MW was already in operation, I was making a research on panel characteristics for the purpose of maintenance. In the process, I became interested in finding out how much power loss we would face if one of the series connected panels failed. Since I was also looking for a product that offers a neat solution for such a problem, I got an impression that your company was producing a very interesting product when I learned about your product.

Tell us why you chose PV Maximizer.

Although it was a main reason that we thought we could benefit from PV Maximizer, the deciding factor was that we could entrust the entire operation of PV system to Nipron including the monitoring system.



Did you have any anxiety or doubt in the introduction?

We considered the introduction of PV Maximizer/PV Guardmyan because there would be some trouble in the PV system as long as it is a mechanical installation. However, there is no sense in installing a supporting system if doing so would have a negative impact on the system and the power generation. So we were most concerned if your machine would have any negative impact. Second, because we were told they were Nipron's proprietary products, we were a bit worried how we could maintain the system if, excuse me for saying this but if Nipron went bankrupt.

Were you relieved of those anxieties and doubts after the introduction?

We learned, from an acquaintance who is an expert in PC, that Nipron is a good manufacturer of switching power supplies and has a long history of success and, by visiting your head office and the factory in person, we were really convinced of your financial resources and credibility. Your credibility was especially big in relieving us of anxieties and doubts.

Effects of the introduction

Were the power generation amount and profit after the introduction as expected?

Although it is difficult to make a simple comparison because the conditions are different in each year, the power generation has been better than the simulation. As a whole, we have a feeling that the power output has surpassed our expectation.

We know that you have also introduced the remote monitoring system PV Guardmyan. How does it help you?

About two years ago, a lightning struck our power station. At the time, we were able to find out how bad each string was immediately. If the same thing happens in the future, the fact that the status of power generation can be monitored string by string is huge compared to conventional power stations. In conventional power stations, we doubt if problems could be found because monitoring can only be done for the total power generated. We have a feeling that the difference would be even bigger in five or ten years from now, when the power station would suffer the effects of aging.



For the future

Do you have any idea about the power station operation after the completion of the FIT electricity sales?

The best way to utilize the facility is to consume the power in-house. We have a little thought in building vegetable factories as a way to consume the power. It may not be so simple because, if we do that, storage of power may be required. As proposed by Nipron, data-mining and rendering utilizing the solar power generation may be one of the possibilities.

Contributing to the emergence of a sustainable society by promoting public trust in solar power stations

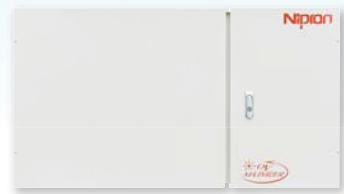
<http://www.nipron.com>

New services

Perfect-full and 100% power sustained O&M Enabled by PV Maximizer and PV Guardmyan

100% power generation amount sustained O&M

Solar power stations will suffer a drop in their performance as they age. Leaving them in a poor working condition would have a significant impact on the revenue from the electricity sales. The term "100% power sustained O&M" refers to a brand new service aiming at maintaining and even increasing the average power amount from the time of signing the O&M contract, in addition to detecting problems in the power generation at an early stage and taking prompt actions to restore the system while taking advantage of the monitoring and analysis features of PV Guardmyan.



PV Guardmyan

Maximizes the power generation

Accurate remote monitoring service

Realize a power station that constantly maximizes its power generation amount

"Aging of power station" ... a risk that cannot be overlooked for a PV system

In general, PV panels are guaranteed for the output with an assumption of **20%** deterioration in 20 years

In a power station of 1 MW, this could lead to a loss of about **100 million yen** in twenty years (FIT: 40 yen).

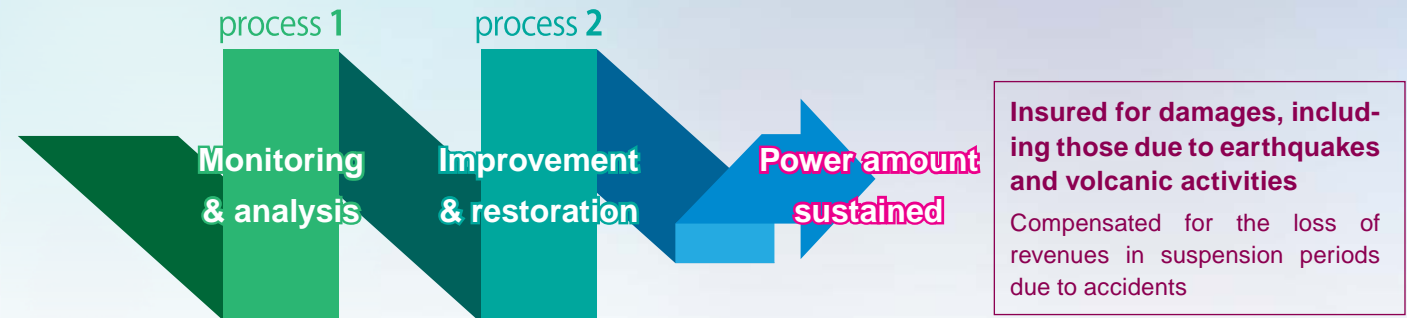
This means ...

Based on the output guarantee, annual panel deterioration and loss of power generation amount of about **1%** is expected



Japan's first Perfect-full O&M service <http://www.nipron.com>

The 100% power sustained O&M maintains the level of power generation in two processes

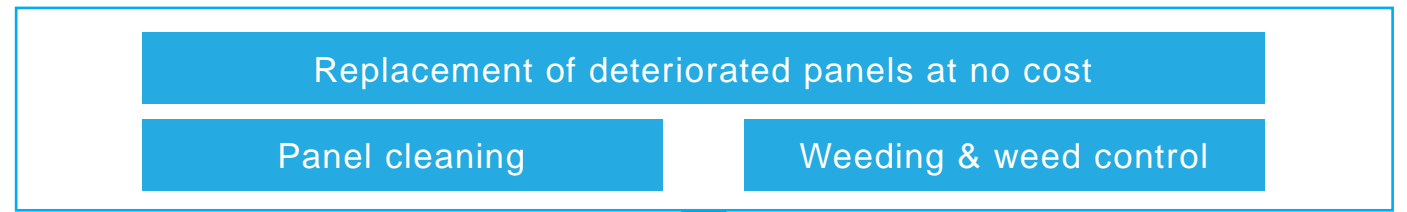


process 1 Utilization of a higher order string monitoring using PV Guardmyan

Multitudes of data items measured

Multitudes of data items measured	Automatic & remote acquisition of panels' characteristic curves	Fully automated power generation analysis with AI (under development)
<ul style="list-style-type: none"> Power Current Voltage String data Characteristic curves 		
It is possible to detect minor changes (= loss in the electricity sales)!		

process 2 Replacement of deteriorated panels at no cost



Power stations getting old each year

Also effective in maintaining the asset value in the secondary market

Enhance the value of power station and maintain it with Nipron O&M

Maintains electricity generation at 100% with aging-resistant power stations. <http://www.nipron.com>

All-in-one package from the control of power to the control of communication

NEW For medium to large-scale power storage systems

Neo eXpander

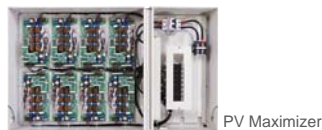
Indoor stand-alone charging/discharging DC/DC converter system rack
With BMU/BMS communication interface

Significant reduction in the development time and cost of power storage systems

- Cooperative control with rechargeable batteries (BMU/BMS) implemented
- Confirmation of operation enabled immediately after the connection of supported models
- Incorporated data logger useful for failure analysis

Easy combination of PV systems and batteries

By using the system with PV Maximizer, it is possible to connect the PV system to the battery efficiently in DC without DC-AC power conversion



Wide range of applications including the sale of surplus power from the PV system, in-house power consumption/ZEB, emergency power supply/BCP, off-the-grid systems, etc.

Large number of medium to large-scale power storage systems implemented in the market
(Many installations throughout Japan from Hokkaido to Kyushu)

Nipron, who has a proven track record, will support the power storage construction by the customer
(Technical support with FAE and provision of application notes are also negotiable)
Please do not hesitate to consult us.



External view of the power storage system container



Interior installations in the container

[Supported batteries (as of July 2018)]

- Toshiba lithium-ion batteries
 - LG Chem lithium-ion batteries
- Supported models will be added as appropriate
(Consult us for further information on the models)

Especially recommendable to ...

- Developers with specific business ideas for the power storage systems
- System integrators who cannot afford the time, cost and manpower required for the development of BMU/BMS
- Rechargeable battery vendors who are planning to expand the sale of batteries to medium to large-scale systems

Neo eXpander is an easy-to-construct power storage system. <http://www.nipron.com>

Example specifications for the Neo eXpander series products

Type	Quick-charging type		General-purpose type	
	Rated charging power	75.0 kW	112.5 kW	50.0 kW
Rated discharging power	25.0 kW	37.0 kW	50.0 kW	75.0 kW
Major applications	Low-voltage grid connection PV power storage, off-the-grid systems		ZEB, in-house PV power consumption	
Battery voltage range	250 - 512 VDC			
Max. DC link voltage	750 VDC			
I/O insulation	Not insulated			
External dimensions (WxDxH)	700 x 781 x 2200 + 50 mm base			
Installation environment	Indoor stand-alone (anchor bolt secured), 0 - 40 °C			

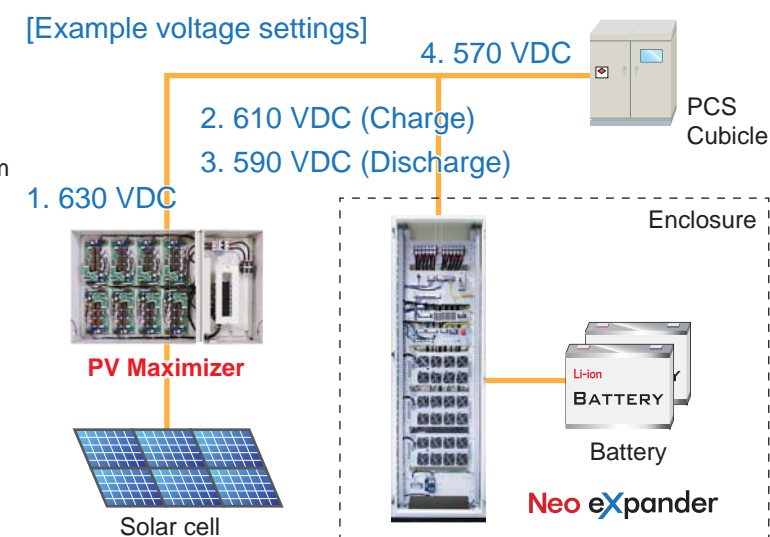
DC link voltage priority control

This is a very efficient system as solar cells and batteries, which are both sources of DC power, are connected directly without DC-AC power conversion.

Since the DC voltage has a property to be output from the higher voltage to the lower voltage, a variety of operational patterns can be implemented by the voltage setting.

Because of its autonomous distributed operation with shared DC voltage information, communication between devices is not necessary, leading to the superior workability and scalability.

(For further information, please contact us.)



Application examples

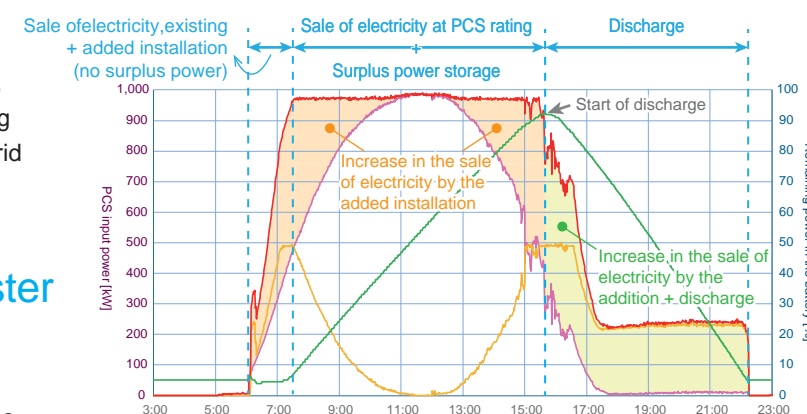
Surplus power storage

When the generated power exceeded the PCS power, store the surplus power and discharge it in the evening and at night. This can be utilized for the low-voltage grid connection electricity sales at FIT and actions to suppress the output power.

ZEB/off-the-grid systems/disaster prevention

While supplying the solar power to the load during the day, store the surplus power and keep on supplying the power after the sunset without relying on the electricity grid, whenever possible. In an event of a blackout, the minimum levels of communication devices and air conditioning are maintained to provide a refuge.

There are a wide variety of applications including **data centers/base stations, DC grids, output fluctuation control**, etc.



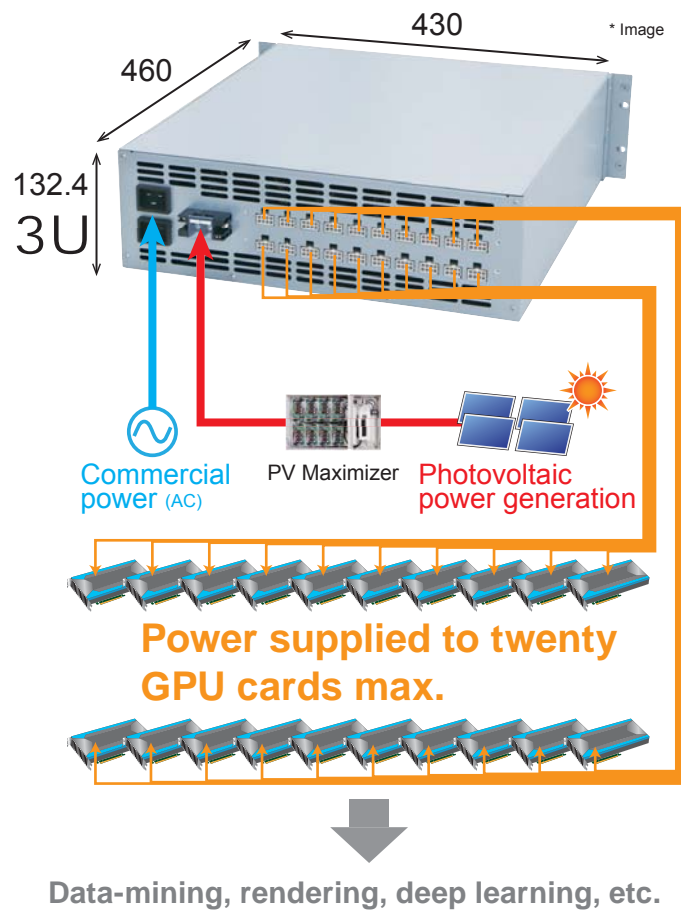
A power storage system that dramatically reduces the development period <http://www.nipron.com>

For GPUs that accept solar power DC + AC hybrid power supply

DC + AC hybrid input PSU for GPUs with in-house solar power consumption

The DC+AC hybrid input PSU is a power supply unit designed for the use of power obtained by the solar power generation for the computing applications of data-mining, rendering and deep learning, in which a large number of GPUs are employed. By adopting the method to supply the DC power from the PV system directly to the load without the DC-AC conversion, the efficiency has been improved significantly. In addition, the power generation amount can be maximized by the PV Maximizer, while the monitoring function of PV Guardmyan will reduce the cost of O&M. If the electric power is sold, it is also possible to propose the use of surplus power from overloading.

Operational concept



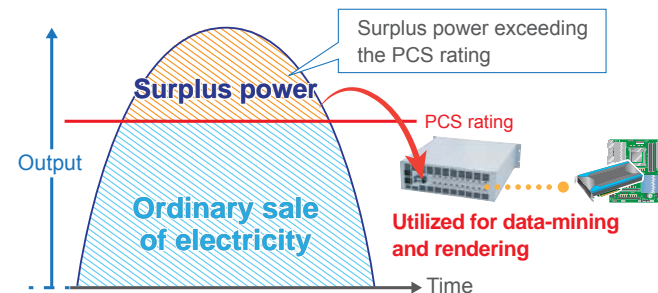
Specifications

- Output
 - Output voltage: 12 VDC
 - Max. continuous: 2700 W
 - Max. peak: 3000 W
- Input
 - DC: 400 V
 - AC: 100 / 200 V

- External dimension (W×H×D)
430 × 132.4 (3U) × 460 mm [19-inch rack, 3U chassis]

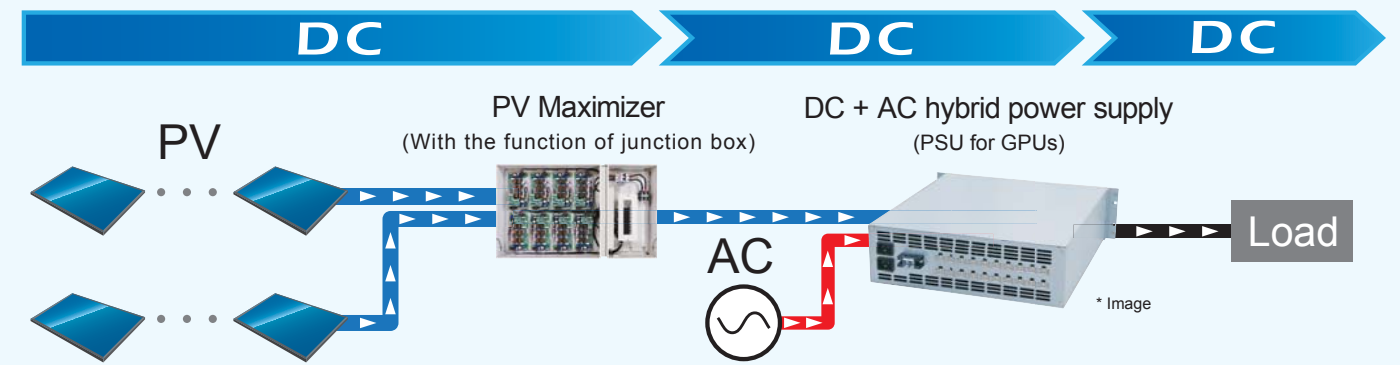
Features

- Approx. 5% increase in the efficiency with solar power generation compared to conventional methods
- Increased power generation by an optimum string-by-string control with the PV Maximizer
- Using the remote monitoring and diagnosis feature of PV Guardmyan, which is introduced in the PV Maximizer, reduce the O&M cost
- The PCS is unnecessary, the cost is reduced and the discussion for grid connection is not required.
- The DC+AC hybrid power supply unit can operate when there is no sunlight
- Switching can be made seamlessly
- If the electric power is sold, it is also possible to propose the use of surplus power from overloading for data-mining and rendering.



Nipron

Increase in the efficiency compared to conventional methods!



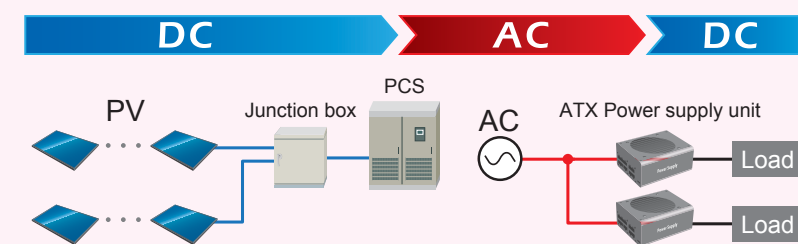
By using Nipron's PV Maximizer and the DC+AC hybrid input support PSU (for GPU) being proposed here, it is possible to supply the DC power from the photovoltaic panels to the load without power conversion and improve the efficiency. This eliminates the need for PCS and enables a cost reduction. Also, since the AC grid connection is not made, the discussion for grid connection is not necessary.

Nipron method

	Efficiency
PV Maximizer efficiency	99% typ (Max. efficiency)
Hybrid power supply efficiency	93% typ (Efficiency with the solar power input)
Total efficiency	92% typ



Conventional method



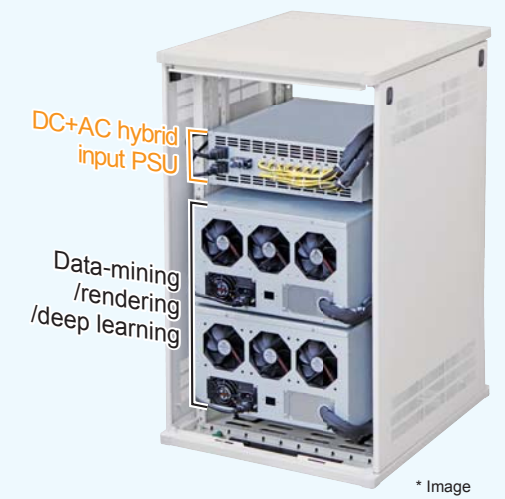
If the photovoltaic power generation energy is supplied to a load, it is common to convert the DC power from the PV panel to AC with a PCS and then converted to the DC power for the AC used at the load. Because of repeated AC-DC power conversion, the efficiency drops.

Conventional method (an example)

	Efficiency
PCS conversion efficiency	96% typ (Junction box included)
ATX conversion efficiency	91% typ (With a high load)
Total efficiency	87% typ



19" rack installation



* Since the product is under development, the specifications and the design shown here may change without a notice.

The GPU power supply also receives sunlight.

<http://www.nipron.com>

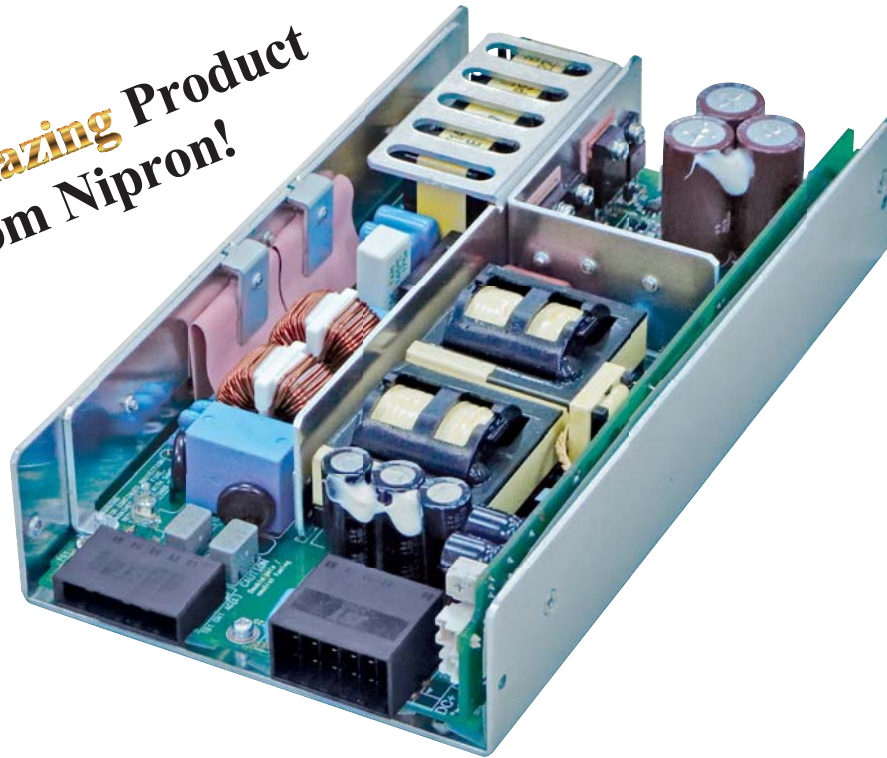
A high-efficiency system utilizing direct current feed

<http://www.nipron.com>

A PSU supporting the peak power of 1200 W, inconceivable for conventional fanless PSUs

PCB type AC-DC switching power supplies, the UZP-600 series, will be introduced in spring, 2019. Building on the features of conventional models, such as ultra-high efficiency and low noise, an astonishing output level of 600 W continuous/1200 W peak has been realized for a fanless power supplies. The peak power twice as high as the continuous output power makes it an ideal PSU for motors. Its fanless construction reduces the risk of sucking in foreign matters and eliminates the need for maintaining the fan, ultimately enhancing the reliability of the device.

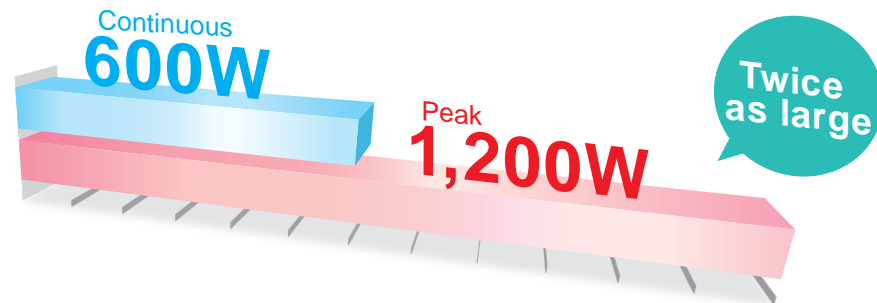
Amazing Product from Nipron!



UZP-600 Series | Continuous: **600W**
 | Output voltage: **24V/48V** | Peak: **1,200W**

UZP High peak power supported

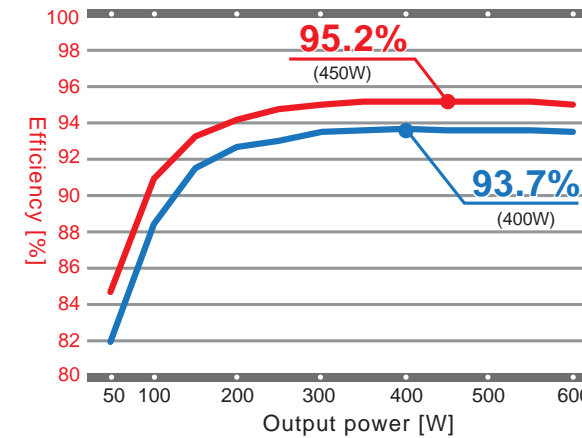
The unit is capable of supplying 200% of the continuous power (1200 W) for a limited period (10s) if a large power (peak power) was required by the load temporarily, e.g. in starting up machines. This eliminates the need for selecting a continuous rated power supply by matching the peak load, making it possible to reduce the power supply capacity, space and cost of installation.



UZP Ultra-high efficiency of 95% achieved



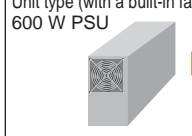
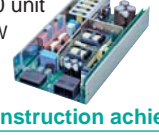
An astonishingly high level of efficiency 95%typ has been achieved for a 24 V output model. This makes it possible to save energy and reduce the CO2 emission significantly.

Efficiency graph (An example of measurement)
 [Measurement condition: — 100 VAC — 230 VAC input]



UZP Advantages brought about by the replacement

It is a large capacity fanless PSU boasting the continuous power of 600 W and peak output of 1200 W and even makes it possible to support the continuous power output of 800 W by applying the forced air cooling. It is also possible to replace medium-scale unit type power supplies, bringing about numbers of advantages, including the elimination of fan in the unit.

Competitors' products	UZP-600
PCB type 300 W PSU x 2 units 	Single UZP-600 unit Continuous: 600W Peak: 1200W 
Price and space for two units	➤ Cost reduction and miniaturization enabled
Unit type (with a built-in fan) 600 W PSU 	Single UZP-600 unit Continuous: 600W Peak: 1200W 
	➤ Fanless construction achieved

UZP Other features

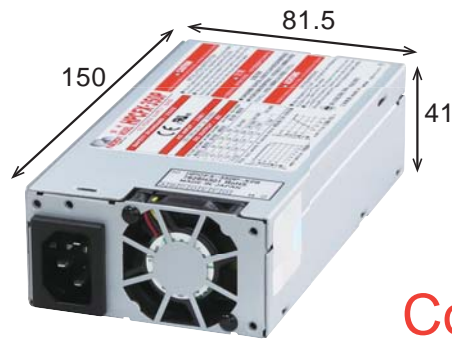
- ▶ Blackout/instantaneous power failure backup supported (with a connection of capacitor pack)
- ▶ Comes with a +12 V standby output linked to the AC input
- ▶ Comes with a +12 V output for the fan linked to the Remote ON/OFF operation (optional)
- ▶ Enhanced reliability by the reduced risk of sucking in foreign matters
- ▶ Miniature size of 5 x 9 inches
- ▶ Blackout detection signal and Remote ON/OFF feature incorporated

UZP Output specifications

	UZP-600-24	UZP-600-48	Common output	
			+12VSB	+12V FAN (optional)
Output voltage	+24V	+48V		
Continuous current /continuous power (Natural air cooling)	25A 600W	12.5A 600W	0.25A 3W	0.25A 3W
Continuous current /continuous power (Forced air cooling)	33.4A 801.6W	16.7A 801.6W	-	-
Peak current/peak power (within 10 s)	50A 1200W	25A 1200W	-	-
Input voltage	85 - 264 VAC (with PFC, global input)			
Size (WxHxD)	127x44x228.6 mm			

* The product is under development. For this reason, the specifications and appearance may change without notice.

HPCFX-350P-X2B



Make a secure and safe system with a nonstop PSU that does not stop even in a blackout

Even in an event of a blackout, the backup power can be supplied without a damage to the system by switching to the battery power without an interruption.

Continuous **245 W** Peak **346 W**

I/O specifications

Input voltage	85 ⁻ - 264 VAC (Global input)				
Output voltage	+3.3V	+5V	+12V	-12V	+5VSB
	12A	12A	20A	0.5A	1A
Max continuous current/power	66.4W				5W
	240W				
Peak current/power (within 5 s)	240W				10W
	245W				
	336W				
Min. current	0A	0A	0A	0A	0A

* Derating required

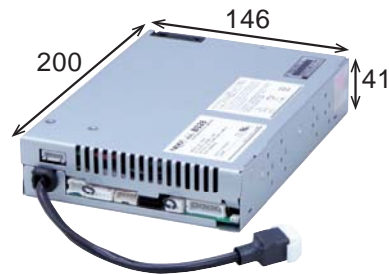
Features

- ▶ Low noise design with a temperature controlled variable-speed fan
- ▶ Minimum load current 0A for all outputs specification
- ▶ The output cable configuration can be modified with the plug-in system (the main power excluded)
- ▶ The use of through-hole plated double-sided circuit board
- ▶ A fan monitoring signal available in the standard model

Compatible battery pack

Fixed type Nickel metal hydride battery pack for 5-inch bay installation

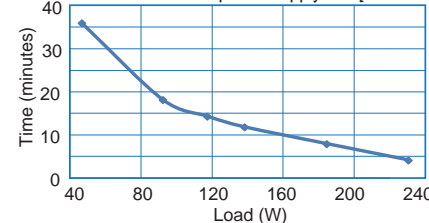
BS28A-H350/2.5L



- Status outputs (remaining capacity/battery life notification) available for the battery package
- Prevents the drop in the capacity at low temperature with a built-in heater
- Low standby power specification

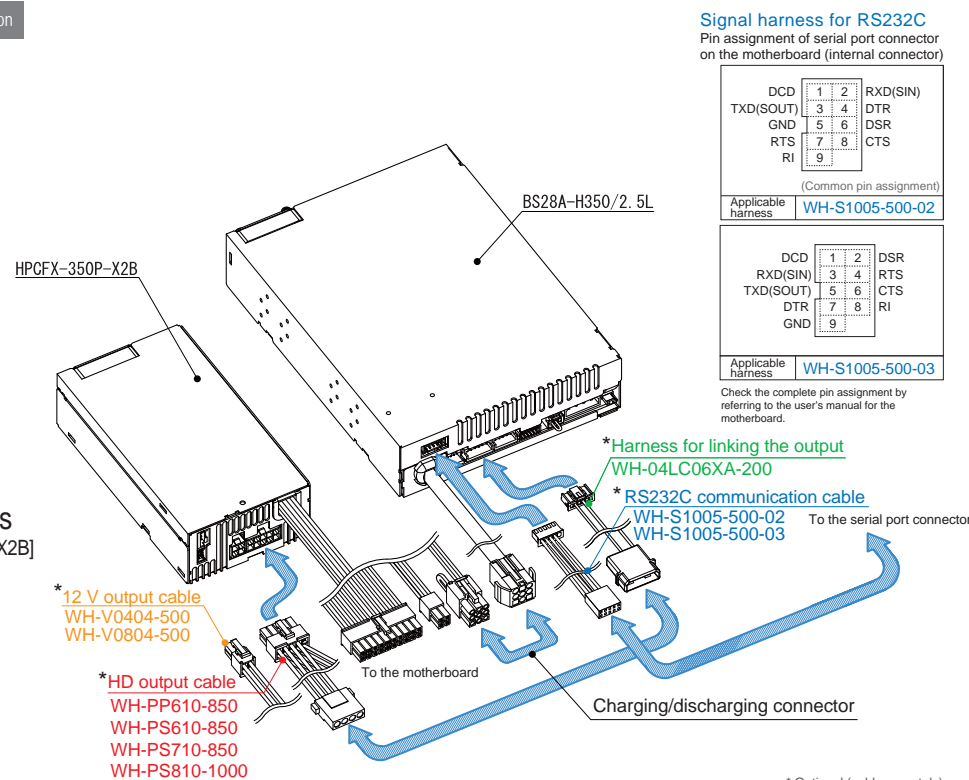
Battery backup discharge characteristics

Combined power supply unit [HPCFX-350P-X2B]



* The chart is for the purpose of reference only and the values shown are not guaranteed.

Connection



Signal harness for RS232C
Pin assignment of serial port connector on the motherboard (internal connector)

DCD	1	2	RXD(SIN)
TXD(SOUT)	3	4	DTR
GND	5	6	DSR
RTS	7	8	CTS
RI	9		

(Common pin assignment)

Applicable harness: WH-S1005-500-02

DCD	1	2	DSR
RXD(SIN)	3	4	RTS
TXD(SOUT)	5	6	CTS
DTR	7	8	RI
GND	9		

Applicable harness: WH-S1005-500-03

Check the complete pin assignment by referring to the user's manual for the motherboard.

*Harness for linking the output
WH-04LC06XA-200

*RS232C communication cable
WH-S1005-500-02
WH-S1005-500-03

To the serial port connector

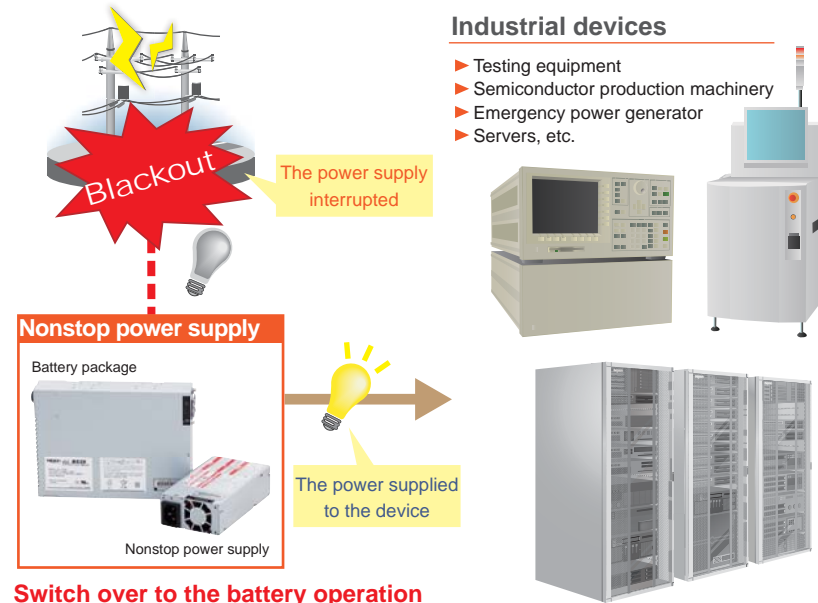
To the motherboard

Charging/discharging connector

* Optional (sold separately)

What is a nonstop power supply?

Nonstop PSU enables a secure backup system even with a blackout.



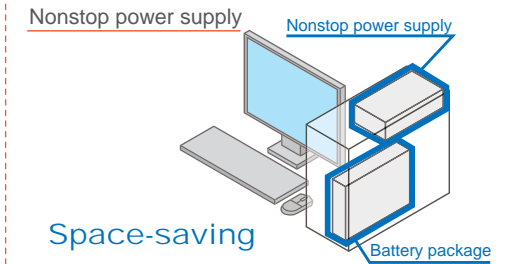
Switch over to the battery operation

Industrial devices

- ▶ Testing equipment
- ▶ Semiconductor production machinery
- ▶ Emergency power generator
- ▶ Servers, etc.

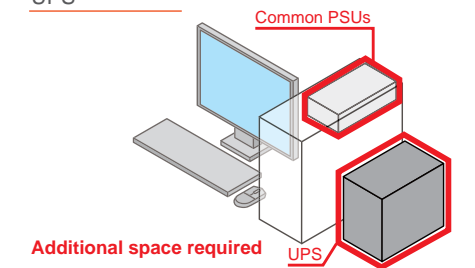
Space-saving

Because the battery package can be contained in the PC housing, more space can be saved compared to commonly found UPS.



Space-saving

UPS



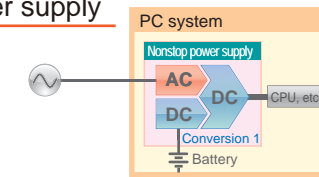
Additional space required

High efficiency

With an on-line inverter type UPS, three power conversions are performed in normal operation and, during a blackout, the power conversion is performed twice. With a nonstop power supply, the number of power conversion is one both in the normal operation and blackout and, hence, it is possible to save energy in comparison with UPS.

Nonstop power supply

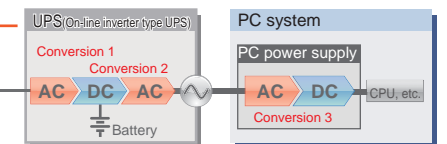
Typical system



Number of power conversion: 1

UPS

On-line inverter type UPS



Number of power conversion: 3

Nonstop power supply lineup

HPCSF-400P-X2B+BS28A

Continuous **310W**
Peak **400W**

Size 125(W)×63.5(H)×125(D)
Input voltage 85 - 264 VAC (Global)
Backup period Approx. 4.7 minutes for a 200W load
Connected battery pack: BS28A-H350/2.5L(Nickel metal-hydrate battery)

HPCFL-400P-X2S+BS28A*

Continuous **170W**
Peak **400W**

Size 106(W)×37(H)×225(D)
Input voltage 85 - 264 VAC (Global)
Backup period Approx. 8.3 minutes for a 150W load
Connected battery pack: BS28A-H350/2.5L(Nickel metal-hydrate battery)

HNSP4-1000P series+BS25A

Continuous **820W**
Peak **1000W**

Size 150(W)×85(H)×190(D)
Input voltage 85 - 264 VAC (Global)
Backup period Approx. 5 minutes for a 700W load
Connected battery pack: BS25A-H350/2.5L(Nickel metal-hydrate battery)

HNSP9-520P series+BS10A

Continuous **400W**
Peak **520W**

Size 150(W)×86(H)×140(D)
Input voltage 85 - 264 VAC (Global)
Backup period Approx. 5 minutes for a 300W load
Connected battery pack: BS10A-H24/2.0L(Nickel metal-hydrate battery)

eNSP3-450P series+BS10A

Continuous **350W**
Peak **450W**

Size 150(W)×86(H)×140(D)
Input voltage 85 - 264 VAC (Global)
Backup period Approx. 5 minutes for a 300W load
Connected battery pack: BS10A-H24/2.0L(Nickel metal-hydrate battery)

eNSP4-500P series+BS13A

One second backup to address an instantaneous power failure
Continuous **350W**
Peak **500W**

Size 150(W)×86(H)×140(D)
Input voltage 85 - 264 VAC (Global)
Backup period Approx. 1 second for a 180W load
Connected capacitor pack: BS13A-EC400/422F(Capacitor pack)

* In connecting the battery pack and the PSU, a separate conversion harness is required. Contact us for further information.

Report of exhibition

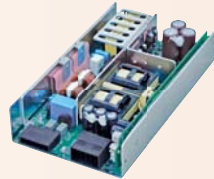
Participated in the Logis-Tech Tokyo 2018

Nipron participated in the Logis-Tech Tokyo 2018 held at the Tokyo Big Sight for four days from the 11th to 14th of September.

The main features of the Nipron's booth were the GPSA series and OZP series, which have been used by many conveyor manufacturers. In the conveyor demonstration utilizing the OZP-120, a comparison was made between the OZP-120, which supports the peak power requirement of the system and a competitor's model that does not support the peak power to appeal the strength of Nipron PSU against the peak power requirement to many visitors. In this exhibition, the UZP-600 series, supporting the peak power of 1200 W making it an optimum PSU for motive load and is featured in this volume, and another new product, the step-up DC-DC converter 100TBFS-2500-280 (provisional), which is ideal for battery powered AGVs, were introduced. Both products attracted the attention of many visitors, leading to a number of inquiries, and the exhibition turned out to be a success.



NEW 100TBFS-2500-280 (Provisional)



NEW UZP-600



Conveyor demonstration



Nipron booth

Participated in the 5th INT'L SMART GRID EXPO Osaka

Nipron participated in the 5th INT'L SMART GRID EXPO Osaka, which was held at INTEX Osaka from the 26th to 28th of September.

At the Nipron's booth, the Perfect-full and 100% power sustained O&M, which is the first of its kind in Japan was introduced for the first time. Also featured was Neo eXpander, the charging/discharging rack for medium to large-scale power storage systems that may also be used for storing surplus power and disaster prevention, along with the demonstration of "solar power x GPU power supply unit," in which a 3DCG rendering server, which uses a large number of GPUs and is often used in the movie production, was run by the power obtained in the solar power generation. Presentations that have been well-received in previous exhibitions were also given in this exhibition and the booth was filled with many visitors who were interested in the products. With Neo eXpander attracting a special attention of the visitors, we were successful in appealing Nipron products to the solar power business, in which the power storage and in-house power consumption are getting trendy.



A scene of Neo eXpander presentation

The 200th Sales Meeting & Presentation Commemorating the Achievement of 6 Billion yen Sales

All employees participated in a training session!

At Nipron, a monthly meeting called the Corporate Sales Meeting, in which every department involved in the sales activity congregates, reports the progress of activities and follows them up, is held for the purpose of improving the quality of services to the customers. As the 200th Sales Meeting was to be held in September 2018 and also to commemorate the achievement of the 6 billion yen contract and sales target in the previous term, all employees from all business establishments gathered at a hotel overlooking Lake Biwa to have a convention for the TQC presentation along with the 200th Sales Meeting.

In the event, various departments producing products at Hanshin Dream Factory and Matsuzaka Dream Factory, which is in Mie Prefecture, made presentations on their routine quality improvement efforts and approaches they take in improving the work efficiency and exchanged ideas. After the TQC presentation, there was a banquet in which employees of different offices and factories, who knew each other only over the telephone, met face to face and enjoyed conversations over delicious foods and tasteful sake, making the banquet a meaningful event.



TQC presentation



General assessment of the TQC presentation by President Sakai



A scene of the banquet

A wide range of power supply units is available. Call us to find out more.

<http://www.nipron.com>

President talks! TOP sales corner.

No. 29 Incorporating Natural Energy into the Electrical Grid

On October 13 and 14, 2018, the Kyushu Electric Power Company implemented the first "suppression of output" for photovoltaic power producers, marking the first time this policy has been put in place in Japan (apart from the special case of isolated islands).

"Suppression of output" is a means of avoiding the extensive blackouts that could occur if the power supply were to exceed power demand, triggering an imbalance in the supply/demand situation. In light of the restart of four of Japan's nuclear power plants, many have opined that the government policy of expanding renewable energy sources with the goal of having them serve as the main sources of power would prove to be a mistake that would shackle the industry.

As we have seen in the blackout resulting from the 2018 Hokkaido Eastern Iburi Earthquake, even when renewable energy sources such as solar or wind power are generating power during a grid outage, this power cannot be transmitted to users. In that situation, the renewable power proved useless, even though it was being generated.

In order to solve these problems, fluctuating and unstable sources of renewable energy such as solar power must be employable as a stable source of electric power. Achieving this requires the use of large-scale storage batteries.

When the supply of power exceeds the demand (and output suppression is implemented), the excess power could be used to charge the storage batteries; when power demand exceeds supply, power discharged from the storage batteries could supplement the supply.

The Hokkaido Eastern Iburi Earthquake occurred around 3:00 a.m. during a period of minimal power demand. The output of thermal power plants had been throttled to a low level, but if energy stored in storage batteries were available for use during the roughly 30-minute period until the thermal power plants could achieve maximum output, the situation could have been handled easily. Perhaps the blackout could have been avoided, even if the power levels were suddenly fluctuating.

It is quite possible that Virtual Power Plants, or VPPs, will eventually develop as stable elements of the power grid to provide solar power and other forms of renewable energy. In order to meet its social responsibility as a maker of power supplies, Nipron is developing power supply products for implementation by power storage systems. For example, we have developed the Neo eXpander DC/DC converter rack system for charging and discharging. This innovation can greatly reduce the cost and development period of electricity storage systems.

Our Neo eXpander is equipped with a BMU/BMS communication interface, which is essential for the development of power storage systems. This product can provide immediate confirmation of operation with the simple connection of suitable storage batteries.

We have already established a solid track record by supplying surplus electricity storage systems for photovoltaic power generation and for use as emergency power supplies.

We also offer our PV Maximizer, which maximizes the amount of power generated by a photovoltaic system, and our PV Guardmyan, which can be remotely monitored and diagnosed. Both of these innovations serve to enhance the value of photovoltaic power plants. As Japan's first Perfect-full O&M service provider, we seek to maintain outage-free power generation. Our products and services are demonstrating their benefits in achieving the goals of RE 100 and ESG management, which have been significant corporate issues in recent years. We invite prospective customers to contact us for more detailed information.

Please refer to pages 1 to 6 of this report for an introduction to the respective products and services.



Neo eXpander

Setsuo Sakai
Representative Director & President, Sales General Manager



External view of the power storage system container



Interior installations in the container

When you are having trouble with your power supply, look to Nipron.

<http://www.nipron.com>

The Nipron Story, by Our President

Our Situation: “A Tiger at the Front Gate, a Wolf at the Rear”

On November 8, 2018, we will hold our 15th Management Policy Presentation as well as a completion ceremony for our new Hanshin Dream Factory. This large and magnificent factory addition was recently completed. Encompassing a total area of 17,234 m², this factory adds a new building (7,682 m²) to the existing structure (9,552 m²). Together with our Matsuzaka Dream Factory (3,026 m²), we have assembled a factory and production system that can easily achieve outstanding annual production and 10 billion yen in sales.

After we marked the completion ceremony for the existing building of the Hanshin Dream Factory in October 2008, we experienced a tumultuous November and December when the credit crisis shook the world, and I recall this incident quite clearly. Economies around the world toppled sequentially into a great period of stagnation; for its part, Japan experienced a serious situation from the beginning of 2009 as a result. The difficult circumstances that prevailed after that incident remain a powerful memory. Strangely, as the completion ceremony for the new building is about to take place on November 8, exactly a decade later, I am experiencing an uncomfortable sense of déjà vu.

Nipron, however, has already achieved several of its goals: record high sales of 6.1 billion yen for the first half of the fiscal year (June 2018) and strong profitability with operating income exceeding 600 million yen. Furthermore, our financial structure and management system are very different from what they were ten years ago.

Going forward, regardless of the kinds of global crises that arise, nations, businesses, and people must find ways of surviving. If we become fearful and tentative or become too conservative in our approach, we will be left behind as the world changes, missing out on major historical transformations rather than finding safety. We could, in fact, fall into an even worse stagnation.

This is exactly what is meant by the situation expressed in the Japanese expression, “a tiger at the front gate, a wolf at the rear” (or more colloquially in English, “caught between the devil and the deep blue sea”).

My suggestions are that we continually question what we are doing in order to further strengthen Nipron, and that we always prepare ourselves as if we are entering battle so that we do not miss globally shifting trends in technology, politics, and the economy. I contend we have no choice but to proceed with confidence in order to achieve effective progress.

Clearly, the world of energy, the world of electricity, is in the early stages of the kind of major revolution that occurs once every 100 years or so. What’s more, the spread of AI along with the digital revolution driven by information and communications technology, as well as future changes in society, the world, and the economy, cannot be readily foreseen. That’s why I feel that Japan’s traditional approach to decision-making can be risky, as misreading a significant shift in any of these areas could prove fatal. Delays and stagnation can lead to omissions, which in some cases can lead to death. Because I am older, one could suspect me of falling prey to an attitude of “I don’t really have to do this,” but for someone in a top leadership position, this type of thinking is simply not acceptable. We must keep fighting as long as we can with the goal of ensuring Nipron remains an enduring “going concern.” A nation that becomes lethargic will fall into decline, along with its people and industries, leaving our descendants to deal with the unfortunate aftermath.

Of course, difficult situations present opportunity as well as risk, and now is the time to institute strong management and firm control; we must do our best to proactively strengthen our offensive abilities and continue to invest without fear.

All employees must strive to forge relationships of trust and unite to work together while maintaining this feeling and attitude.

We remain committed to supporting our customers as well as society, and we look forward to a meaningful 15th Management Policy Presentation and inspiring completion ceremony for our new building.

I thank you for your support of these endeavors.

Setsuo Sakai
October 2018



Head office/Hanshin Dream Factory (HDF)



Nipron Co., Ltd.

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