Nipron
GAZE into the future

Nipron Wave
Vol.79

Highlights

1 **PV Maximizer**
Benefits and use cases of PV Maximizer
[New product] Simple & cost-effective PV Maximizer!

2 **Nipron Factory**
Introducing Nipron's evolving factory with new equipment and digital transformation

April 2025
The Osaka-Kansai Expo 2025 opened

Features of PV Maximizer

Essential for solar power generation: PV Maximizer

1. **Minimize power generation efficiency loss**
2. **Reduce replacement costs for solar cell failure**
3. **Mixed use of old and new solar cells**
4. **Voltage matching during PCS replacement**

Minimize power generation efficiency loss

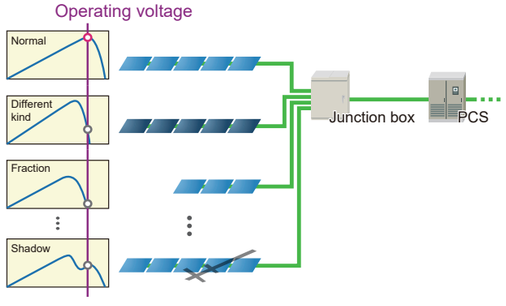
In power conditioners that perform centralized control, power generation is managed based on the overall average. As a result, it is not possible to optimize each string individually, which leads to power generation losses when strings have different characteristics. The PV Maximizer, however, controls power on a per-string basis, enabling maximum power generation even when different characteristics are present.

PV Maximizer controls solar power generation on a string basis

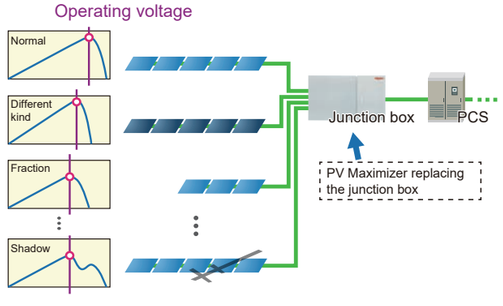
When a solar module malfunctions, its power generation characteristics change. If the issue is not addressed, the overall output decreases. Frequent replacement of faulty modules leads to costly and time-consuming construction work. Another option is to remove the faulty module, but this creates a voltage imbalance with the other strings and prevents sufficient power extraction.

The PV Maximizer controls power on a per-string basis. This allows it to compensate for the voltage shortfall when a module malfunctions and enables continued operation, even with incomplete strings.

Power conditioners Batch control

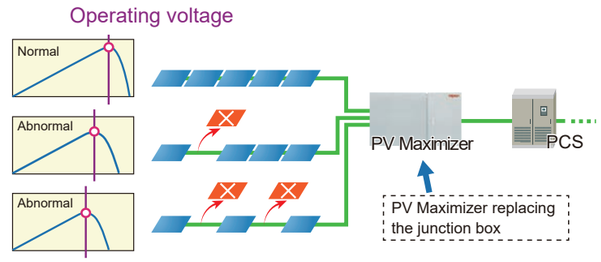


PV Maximizer Individual control



Reduce replacement costs for solar cell failure

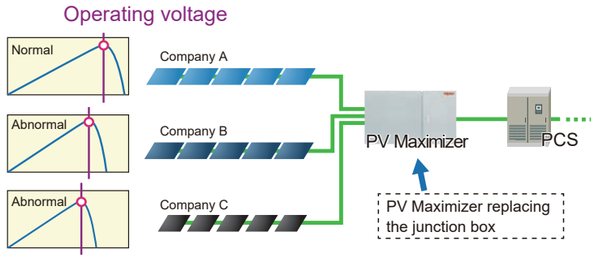
The PV Maximizer controls power on a per-string basis, enabling maximum power generation, even when different types of strings are mixed. It also allows faulty modules to be replaced collectively at a later time, which significantly reduces the frequency and cost of maintenance.



Mixed use of old and new solar cells

As more solar modules become faulty and require replacement, it may be difficult to find the same model. Using different types of modules in a system causes variations in string characteristics, resulting in reduced power generation efficiency.

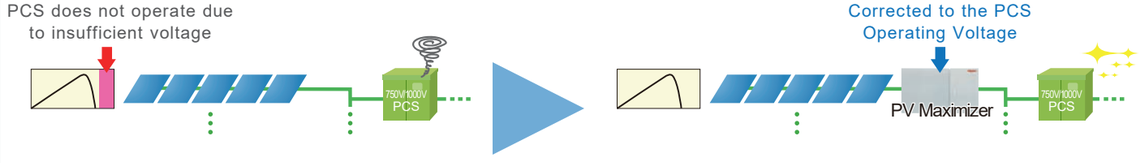
The PV Maximizer compensates for these variations, enabling the installation of a mix of new and old modules. Since normal modules can continue to be used, the PV Maximizer also helps reduce module waste.



Voltage matching during PCS replacement

After around 10 years of operation, it is generally time to replace the PCS. Solar power systems installed a decade ago were typically designed for 600 V, but today's PCS models are mainly high-efficiency 750 V or 1,000 V types. This often results in a voltage mismatch with existing strings.

Using the PV Maximizer allows the voltage to be converted to match the PCS, enabling the use of the latest models without extensive rewiring.

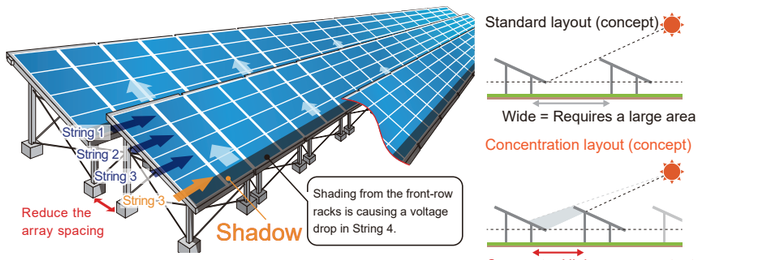


Concept of PV Maximizer Application

PV Maximizer for a wide range of applications

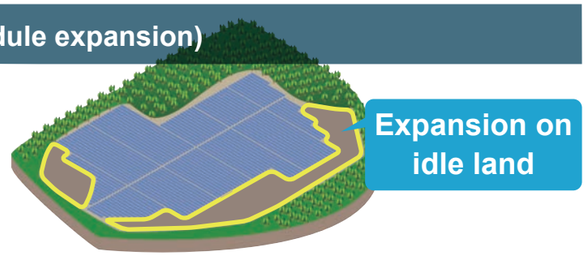
Power generation improvement in densely arranged PV plants

Reducing the spacing between solar panels can cause shadows to fall on certain panels at specific times of day, resulting in a drop in their voltage. This can lower the voltage of other normal strings in turn, reducing the overall power output. The PV Maximizer increases the voltage of affected strings to the level of other strings while maintaining their maximum power point operation. By eliminating voltage differences between strings, the PV Maximizer enables maximum power extraction from all operational panels.



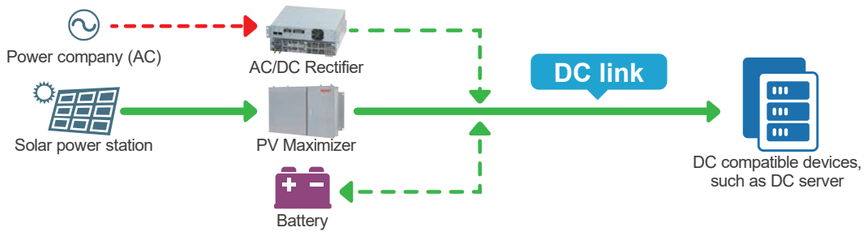
Utilization of idle land in PV plants (module expansion)

Panels can be installed in narrow spaces that were previously unused or in areas affected by shadows from trees or hills while still achieving sufficient power generation. Increasing the number of panels in the same area increases the power output per unit area.



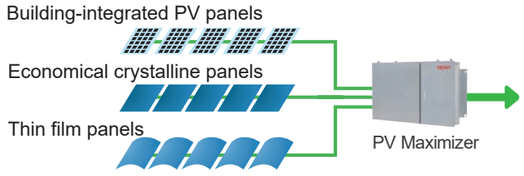
Converter for DC link and DC power supply

The PV Maximizer stabilizes fluctuating solar power generation.
This allows for the construction of DC link systems that use solar power with simple equipment.



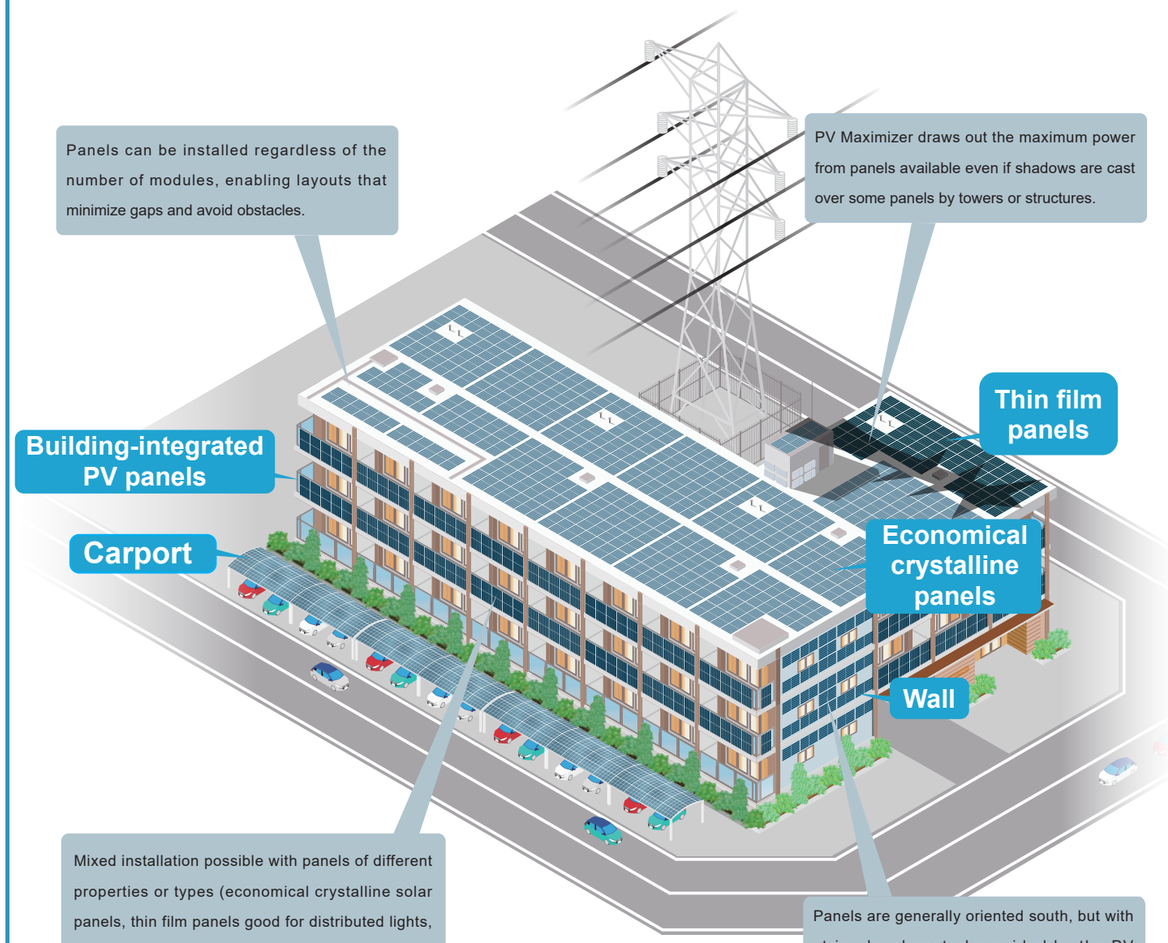
Hybrid module configuration, including building-integrated PV panels

Depending on the installation site, it is possible to mix panels with different characteristics and types, such as low-cost crystalline modules, thin-film modules optimized for diffuse light, and solar carport panels. Since the PV Maximizer controls power generation on a per-string basis, there is no need to install a separate PCS for each panel type. This allows for maximum utilization of available space.



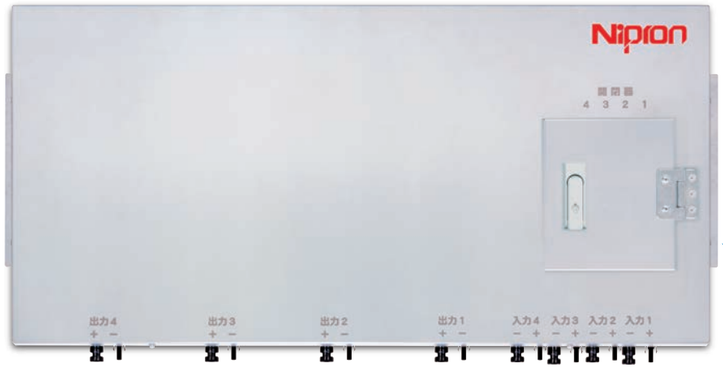
*For each string, the same type of module is recommended.

Concept



New product

Simple PV Maximizer



Model 4STR100-14A750V

With inspection port

Simplicity in both function and price

1 Low Cost
Simple design,
excellent cost performance

2 Easy to Install
Easy installation with
MC4-type connectors
Ideal for repowering

3 Compact Design

Achieving low cost by focusing on essential functions

This model line maintains the key features of PV Maximizer,
such as long life and high efficiency, while reducing costs
by omitting functions like monitoring.

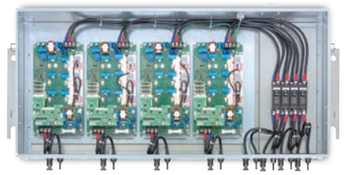
Long-life design without limited-life components

No electrolytic capacitors, cooling fans, or other limited-life components used

Expected life: over 25 years

High efficiency and low-level heat generation

Nipron proprietary multi-boost circuit enables a compact design and high efficiency

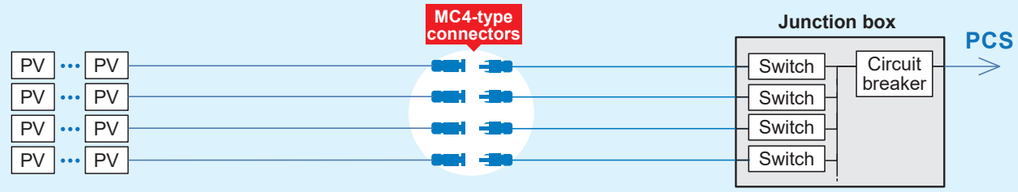


Long service life
Capacitor-Free and Fanless Design

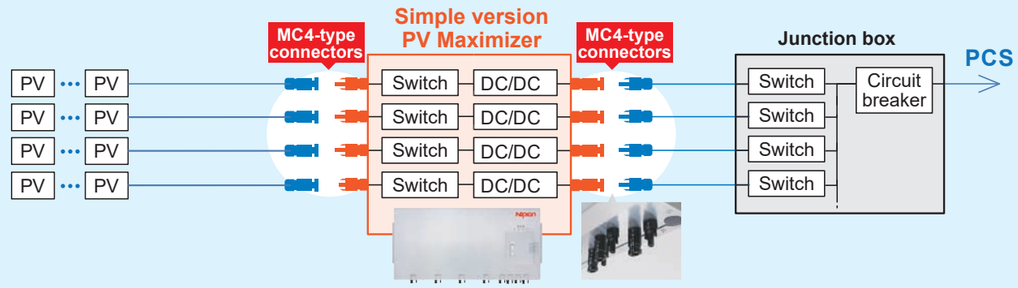
Max. 99%
Industry-Leading High Efficiency

Easy installation at existing PV plants

The Simple PV Maximizer can be easily installed in existing PV plants by connecting it with MC4-type connectors between the solar modules and the junction box. This allows the system to be added without major modifications to the existing wiring.



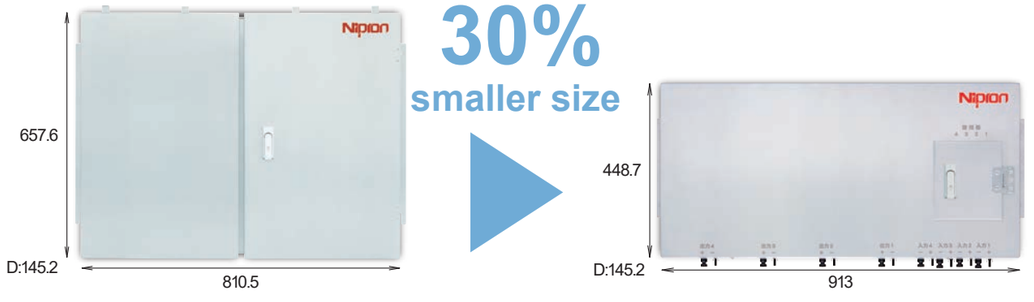
The Simple PV Maximizer can be easily installed by connecting it with MC4-type connectors between the solar modules and the junction box. No major modifications to the existing wiring are necessary.



Light-blue MC4-type connectors for the wiring side are also included (fit guaranteed).
Note: If connectors other than the included ones are used, fit is not guaranteed.

Compact design

This model is approximately 30% smaller than the full-featured 4-string PV Maximizer, providing greater flexibility during installation.



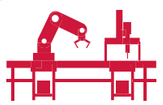
Uncompromising quality
Made in Japan

While much of Japan's manufacturing industry has moved overseas, Nipron is highly focused on ensuring our products deliver Made in Japan quality. Our development, design, and manufacturing processes are all integrated, and we believe such a system is essential to achieve high levels of productivity and quality.

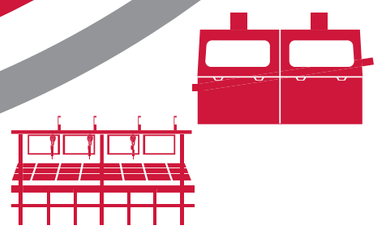
Production flow ▶▶▶

1. Material warehouse

2. Machine processing



3. Pre-stage of manual processing

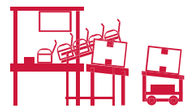


4. Manual insertion

5. In-circuit test

6. Assembly

7. Final inspection



8. Packing and storage

9. Shipment

Proactive introduction of new technologies in pursuit of higher-quality, more efficient manufacturing

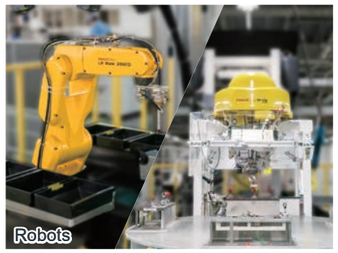
Hanshin Factory

AMAGASAKI

Main products: PC PSUs, large PSUs, products related to renewable energy

Core factory advancing automation and BCP measures

Our core factory is implementing automation in pre- and post-assembly processes by using automated warehouses and AGVs for parts delivery, pickup, and storage. In the pre-processing stage, tasks such as soldering and fin processing are performed by robots to enhance production efficiency. To strengthen our BCP and reduce production lead time, we are internalizing and automating metal processing operations. We are also committed to improving the working environment by introducing equipment such as vacuum grippers to reduce the physical strain on our workers.



Robots

Metal processing

Vacuum gripper

Mie Smart Factory

TAKI

Main products: Board-type single-output PSUs, products related to renewable energy

Packed with automation technologies, this smart factory exemplifies digital transformation

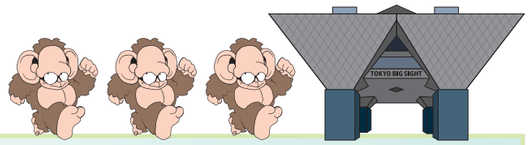
Processes before and after assembly have been automated by the introduction of automatic sorting equipment and AGVs. And, by linking our in-house developed production system with an automatic sorting device, we have built a system that automatically supplies the required parts to the production line quickly and accurately, at the necessary time and in the required quantity, in accordance with the production plan. In this way, we have achieved a digital transformation.

Automatic sorting equipment

AGV

Machine processing

Invitation to Exhibition



We will participate in Power Supply Japan.

40th Power Supply Japan
Participated in the 40th TECHNO-FRONTIER

Period: Wednesday, July 23 – Friday, July 25, 2025
Venue: Tokyo Big Sight, West Hall

We will be exhibiting at the 40th Power Supply Japan, held at Tokyo Big Sight from July 23 to 25.
At the Nipron booth, under the theme “Reducing Power Consumption with Nipron Power Supplies,” we will showcase products that contribute to energy saving and efficiency improvement, including high-efficiency power supplies, regenerative/absorbing power supplies, and power-saving models for light loads.
New products on display include the compact, high-efficiency single-output board-type power supply “FZP-025” and the compact, high-capacity 2 kW unit-type standard power supply “GPRA-2000.”

Scenes from last year

Featured Exhibits

NEW

Small, high-efficiency, board-type power supply
FZP-025 Series
Continuous: 13.2-26.4 W
Peak: 16.5-31.5 W
Output voltage: 3.3 / 5 / 12 / 15 / 24 V

NEW

Small size and large capacity 2kW unit type power supply
GPRA-2000 Series
Rated: 2000 W typ.
Output voltage: 24 / 48 / 100 V

Use regenerative energy efficiently Digital bidirectional DC-DC converter
dTBRS Series

Step-up
Continuous: 2.0 kW
Peak: 3.5 kW

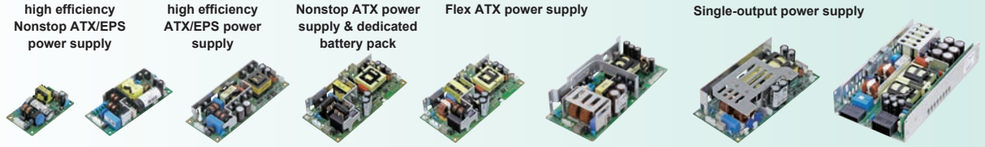
Step-down
Continuous: 2.0 kW
Peak: 5.5 kW

We will also be holding a demonstration to showcase the other features of Nipron power supplies!

Demonstration

Other standard power supplies will also be on display!

Large capacity & high efficiency Nonstop ATX/EPS power supply
Large capacity & high efficiency ATX/EPS power supply
Medical standard certified Nonstop ATX power supply & dedicated battery pack
1U size power supply Flex ATX power supply
Single-output power supply



Board-type single-output power supplies

DIN-rail-compatible power supplies

We are looking forward to seeing you at our booth!

New Employees Joined Nipron!

16 new employees joined Nipron this year.

In April 2025, Nipron welcomed new members. Six university graduates and ten high school graduates, totaling 16 new employees who bear the future, joined our company, each of them taking their first step as a member of society.
At the initiation ceremony, congratulatory addresses were given by Chairman and CEO Sakai, President and COO Futami, Executive Vice Presidents, and other Executives. The new employees listened intently with serious expressions. Afterwards, each new employee declared their determination and expressed their enthusiasm for pursuing growth.

Going forward, the newcomers will play an active role in their respective departments while improving their skills through training and on-the-job training. With these new talents, Nipron will continue striving to provide products and services of value.

The Nipron Story, as told by our Chairperson

Now is the time for introducing PV Oasis to spread EVs powered by 100% renewable energy.

On April 1, 2025, an initiation ceremony for new graduates, six university graduates and ten high school graduates, was held.
Every newcomer is full of energy! Joined by new talents who will forge the future of Nipron, it was a day filled with high expectations.

This April, the announcement of reciprocal tariffs by the 47th US President Donald Trump kept rattling the world. Japan faced a 24% tariff rate on its exports (automobiles and steel products) imposed unilaterally.
This will particularly hit the automotive industry, which has a significant impact on the domestic economy. Japan reportedly exported approximately 1.35 million units of automobiles to the United States in a single year of 2024, and it will be difficult to immediately find new export destinations.
It's just how I think about it, but Japan could take advantage its position as the country lagging most behind in the penetration of EVs. Japanese car manufactures could focus on manufacturing and promoting EVs to increase domestic demand to substitute for the U.S. demand and mitigate the impact. The slow adoption of EVs is due partly to the delay in the development of charging infrastructure. As a breakthrough solution, the government has set a target of installing 300,000 charging stations by 2030.
Nipron has a suggestion; how about utilizing our PV Oasis & EV Charging System which enables EVs to run entirely on renewable energy (solar power)? Through solar power generation combined with storage batteries, this system has realized EV charging at zero energy cost (only solar power), providing great economic benefits to users. Moreover, since the system does not use commercial power (to be supplemented with commercial power when solar power generation is low), it will contribute to decarbonization (CO_2 reduction) and align with the national policy of promoting carbon neutrality. If it helps alleviate the Trump tariff shock mentioned earlier, I would be very pleased.

Another special thing about this April is that the curtain rose on Expo 2025 Osaka, Kansai, Japan. Fifty-five years ago in 1970, Japan hosted its first Expo in Suita, Osaka, and in the same year Nipron was founded. I look forward to enjoying the Expo with the hope that something good might happen. Well then, see you all in the next issue.

Setsuo Sakai
April 2025

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