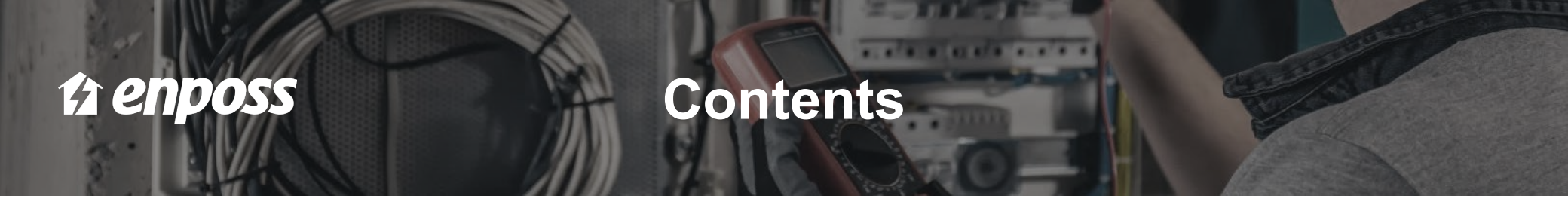
enposs

POWER SAVING SYSTEM

FORCE

Business Introduction



Contents

1. Introduction

Manufacturing Company

Company Name	ENPOSS
Year of Establishment	January 2008
Product	Power Saving System(FORCE) Manufacturing & Sales
Location	416, 10th Floor, Room 1031, Hwagok-ro, Gangseo, Seoul Gayang Station The Sky Valley 5th Knowledge Industry Center
Homepage	www.enposs.com

2022 - Updated UL certification

2019 - Acquisition of site for factory establishment (Otama Village Sales Office, Adachi-ku, Fukushima Prefecture, Japan)

2018 - KR classification certification
- Establishment of a local corporation in the United States
- Establishment of a local corporation in Japan
- Establishment of a joint venture in Vietnam

2017 - Launch of 2nd generation FORCE (Approximately 50% improvement in device efficiency compared to the 1st generation)

2016 - Registered a Korean patent related to harmonic distortion
- Passed KTL [High Potential Test of High Voltage], [Electro Magnetic Compatibility Test]

2015 - JQA (Japan) performance certification
- KTC (Korea) performance certification
- Establishment of a local corporation in China

2013 - SGS (Spain) performance certification
- Passed the withstand voltage test standards for high-voltage products

2012 - US patent registration

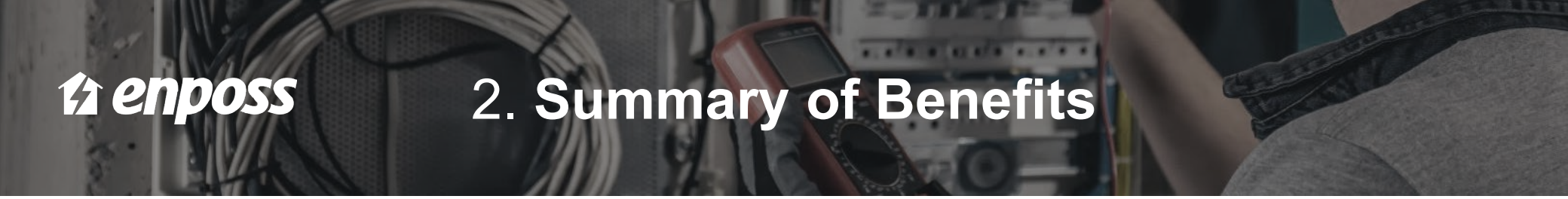
2011 - USA NLTC (MET) certification

2010 - Obtained CE certification (COC)
- KOREA patent registration (DOC)
- PCT patent registration
- All materials passed ROHS

2009 - ANCE (Mexico) safety certification
- ANCE (Mexico) performance certification
- KTL EML Test

2008 - Establishment of ENPOS Co., Ltd.
- Chinese patent registration
- Vietnam patent registration
- TUV (Spain) certification

2007 - Power improvement device KOREA patent application
- Power improvement device PCT International patent application
- Establishment of own production factory
- Commercialization of power improvement devices



2. Summary of Benefits

Ⅰ. **5~15% Electricity savings**

Ⅱ. **Loss Reduction** (Resistance, Impedance)

Ⅲ. **THD Reduction** (Total Harmonic Distortion)

Ⅳ. **10~20% Fuel Consumption Savings** (Payback Within 18 months)

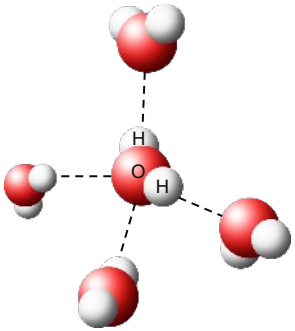
Ⅴ. **Extend the Lifetime Of Equipment**

Ⅵ. **No Changes to Existing System & Safety**

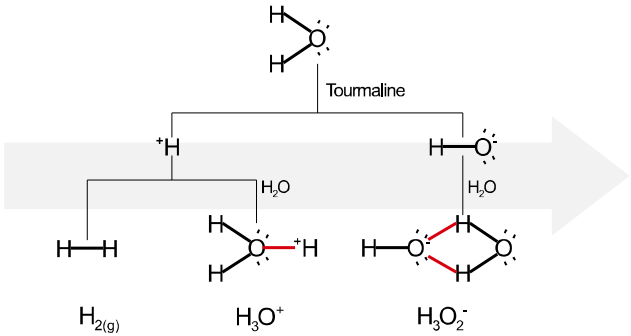
3. Fundamental Structure

Base	Tourmaline
Longevity	15 years
Specificity	A polar crystal with an asymmetric dipole that has the characteristic of being permanently electro-polarized, when highly heated both ends become positively charged. Under normal conditions, it is negatively charged.

Tourmaline Powder



Water



Negative charge generation
(Free Electrons Source)

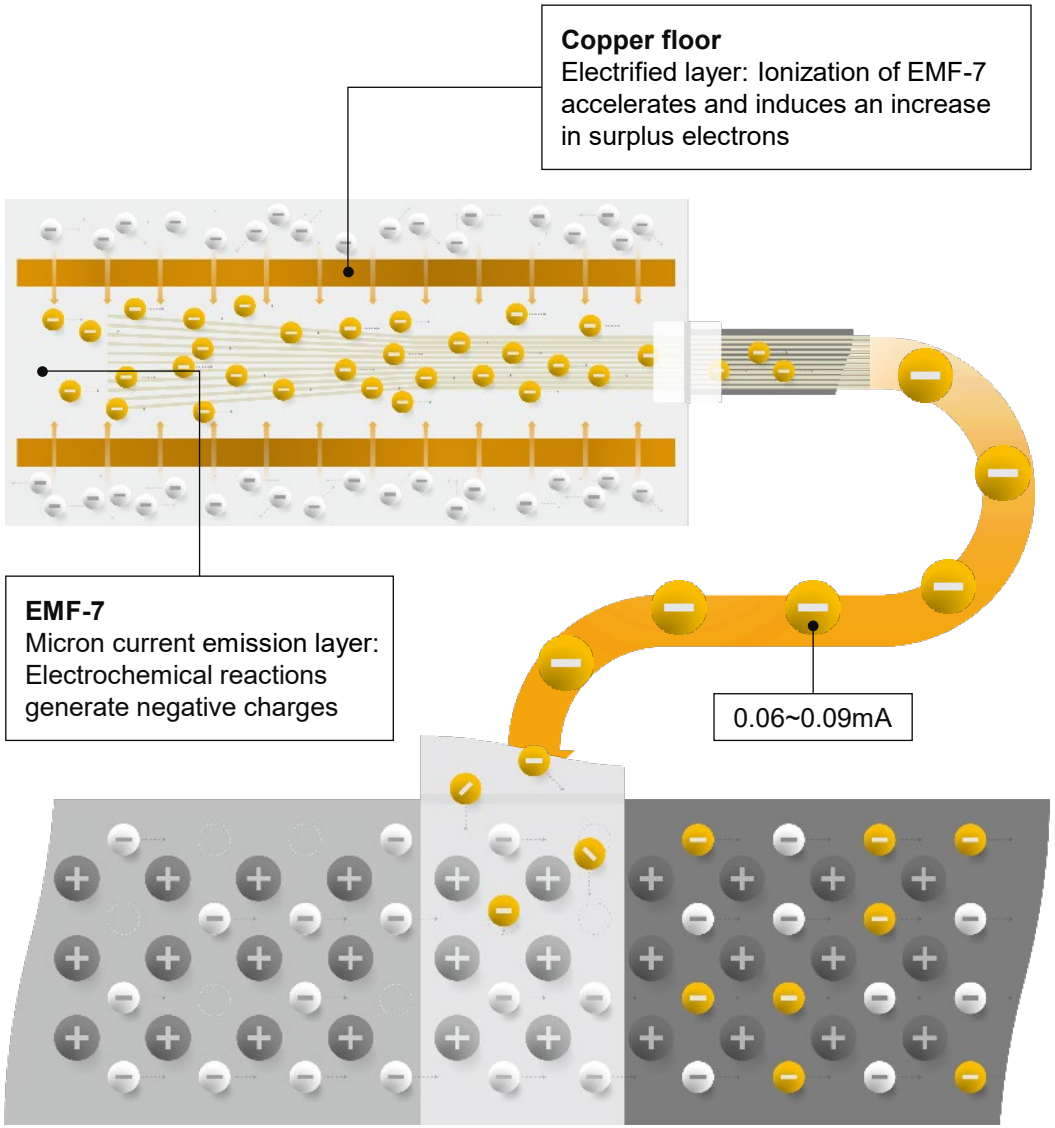
3. Fundamental Structure

- Electrochemical reactions of minerals Negatively charged (low current)
- By accelerating the accumulation of negative charges it creates surplus electrons

- An increase in surplus electrons creates improved conductivity, increased electron density, and increased free electrons
- Surplus electron transfer at 0.1~1mm/sec

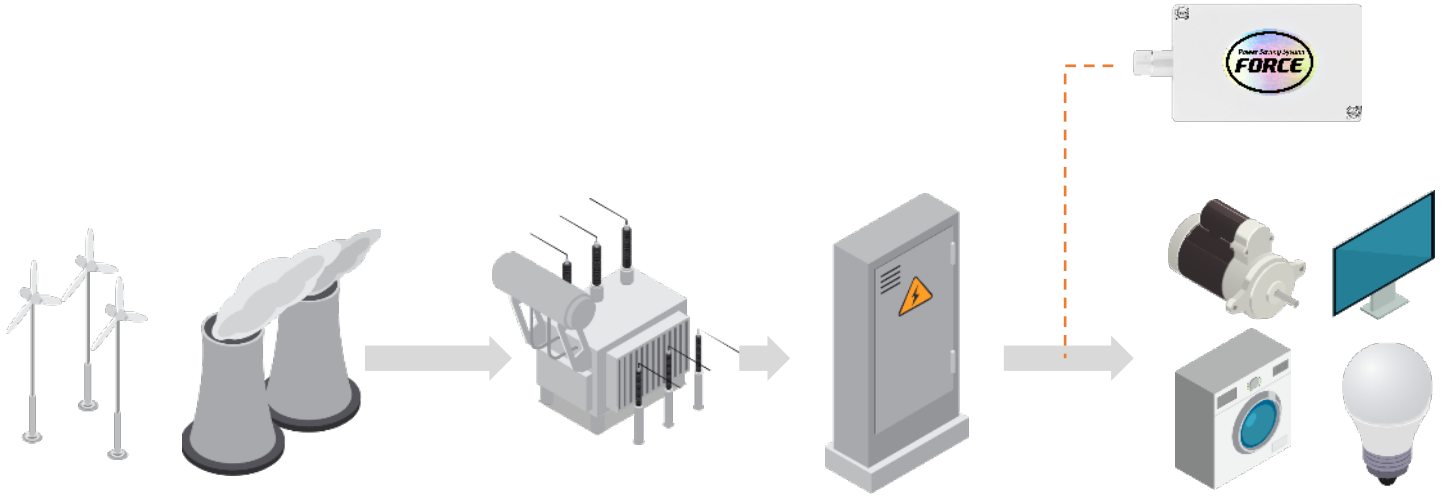
- Improved electrical energy with an increase in electrons, an increase in the delivery efficiency, improved current flow, and a reduction in electrical losses

Electric Power Saving
Reduced Impedance, Heat, Noise, Vibration and Harmonic Distortion



4. Theoretical Background

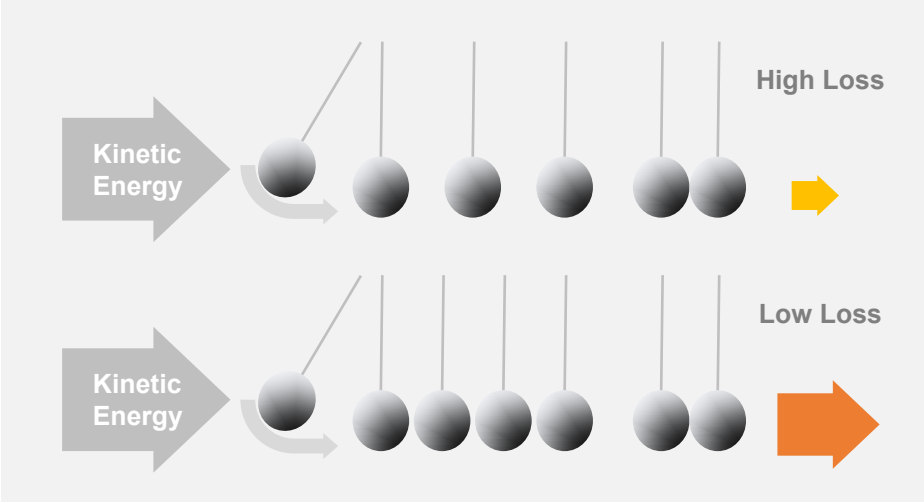
Process of Energy Saving



Power Supply & Meter		Transformer	Panel	Load	
Before Installing FORCE	100 kWh	93~98%	97~99%	80~95%	80 kWh
(Power Loss)	-	2~7%	1~3%	5~20%	-
After Installing FORCE	90 kWh	95~99%	98~99%	90~98%	80 kWh
(Power Loss)	-	1~5%	1~2%	2~10%	-

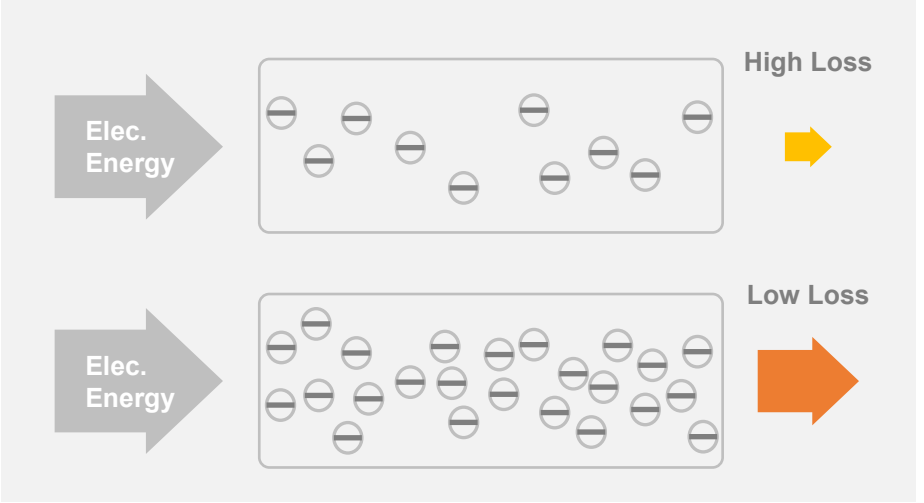
4. Theoretical Background

The efficiency of energy transfer is proportional to the density of mediators



Kinetic Energy Movement

The difference in the number of pendulums results in a difference in energy transfer efficiency



Electrical Energy Movement

The difference in the number of electrons is the difference in energy transfer efficiency

Therefore, the number of free electrons in a conductor increases the efficiency of electrical energy transfer

4. Theoretical Background

Definition of Power Saving Effects According to Impedance and Resistance Reduction

If we denote the total impedance as ***Z***, reactance as ***X***, complex representation of applied voltage as ***V***, effective value as ***Ve***, complex representation of flowing current as ***I***, and effective value as ***Ie***, the following equations hold.

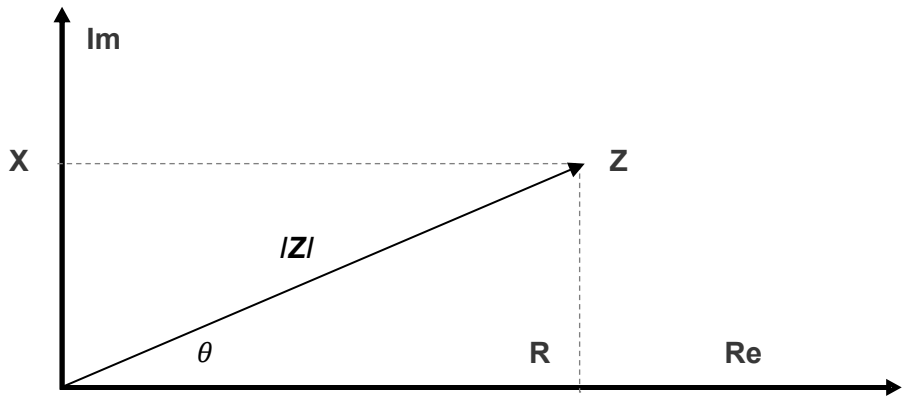
$$Z = R + j\omega L + \frac{1}{j\omega C} = R + jX$$

$$Ve = Ie \cdot Z$$

$$Ve = Ie \cdot (R + jX)$$

$$P = IV = I^2R = I^2|Z|$$

$$P_e = V_e \cdot I_e \cdot \cos\theta = I_e^2 \cdot Z$$



Power consumption before installation

P=(100A)²×1(Z) = 10,000 W

Power consumption after installation

P=(100A)²×0.9(Z) = 9,000 W

By reducing the impedance (Z) value, the effect of power savings becomes apparent.

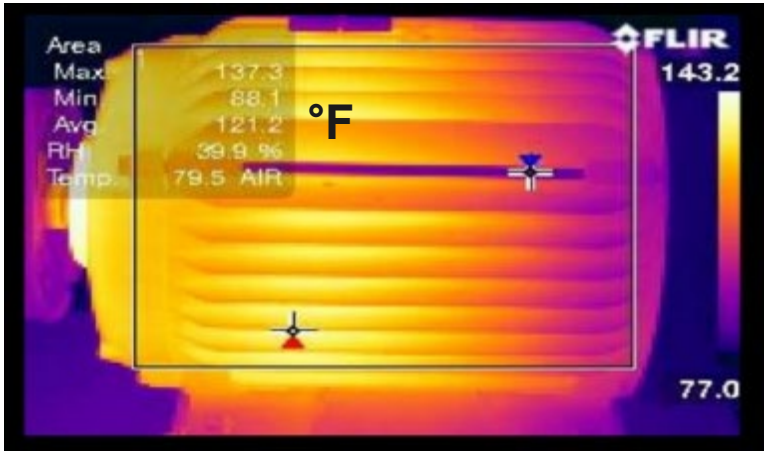
6. Examples of Applications

[Heat]

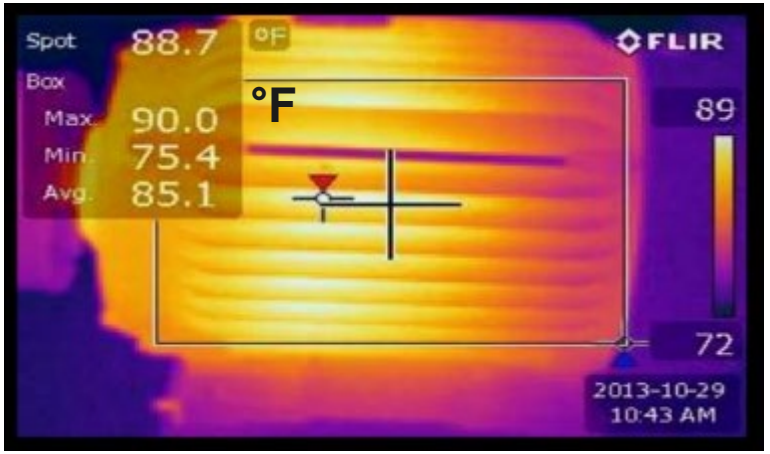
The temperature drop was observed on the surface of the pump motor

Average temperature was reduced from 49.6 °C to 29.5 °C by 29.8%

Before



After



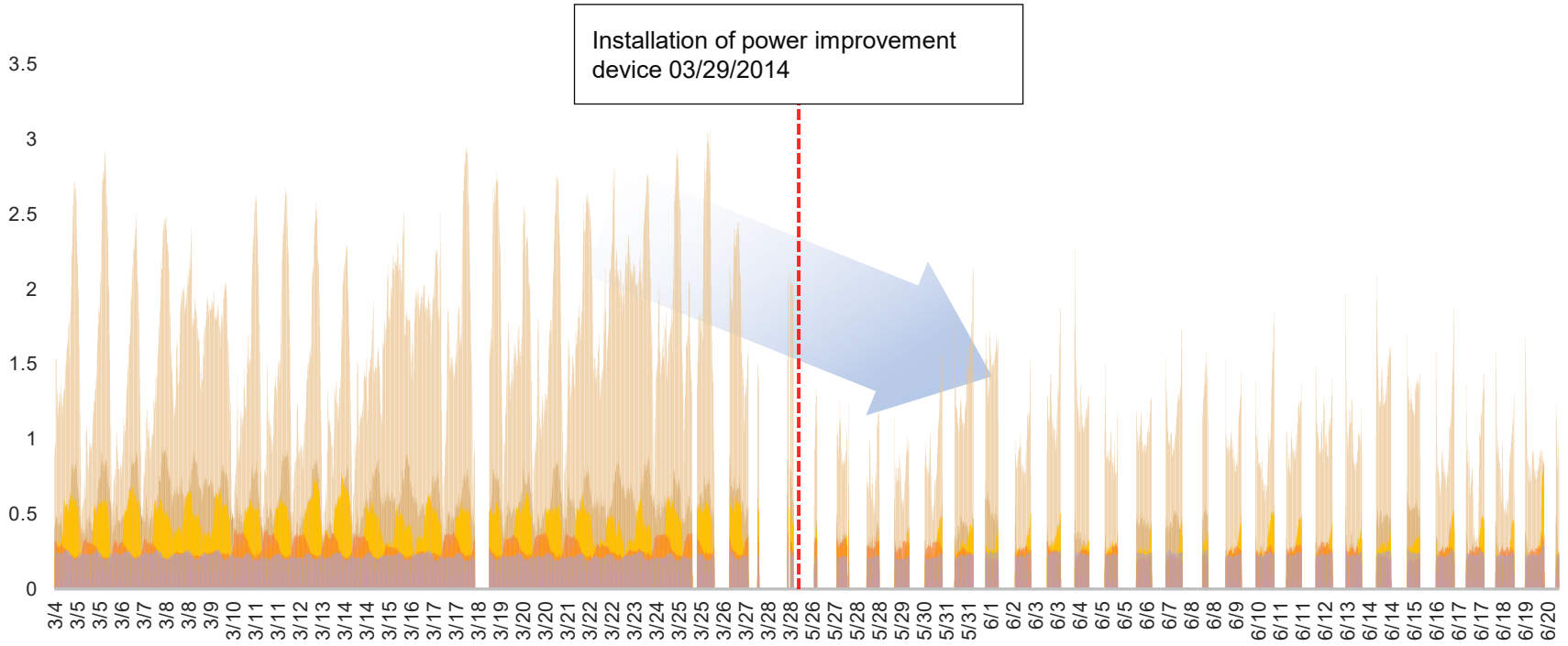
58.5 °C	Max	**34.4 °C** (34.5% Down)
31.2 °C	Min	**24.1 °C** (14.4% Down)
49.6 °C	Avg	**29.5 °C** (29.8% Down)

6. Examples of Applications

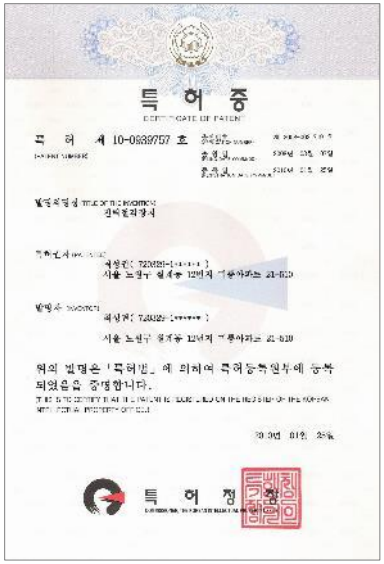
[Total Harmonic Distortion]

Comparison of circulation pump R-phase harmonics before and after installation

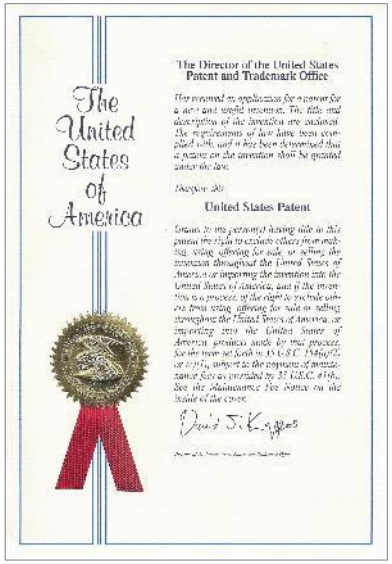
Minimizes losses by reducing power dissipation factors/THD



5. Patent Certification



Korea



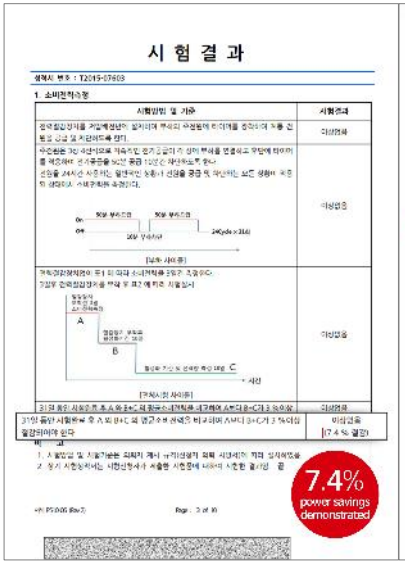
USA

China

Japan

Vietnam

5. Performance Certification

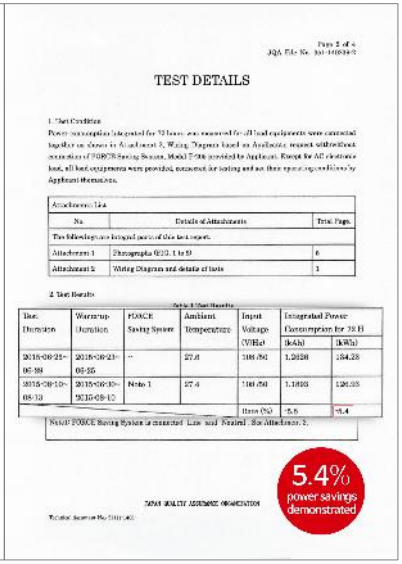


KTC

TUV

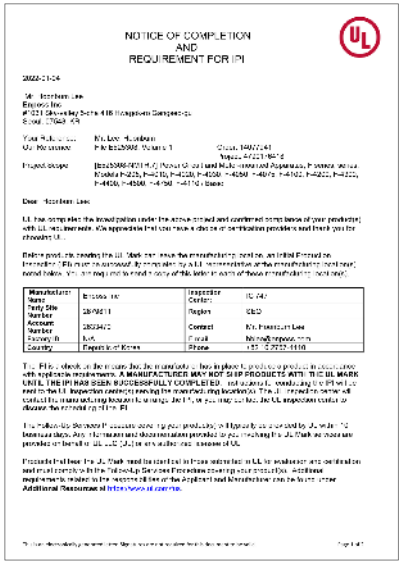
SGS

ANCE



JQA

5. Safety Certification


NOTICE OF COMPLETION
AND
REQUIREMENT FOR IPI

UL


EC Declaration of Conformity

Ref No: SLS-CE4999

Manufacturer: ENPOSS CO., LTD.

Product: Electricity Power Saving System

Model(s): Force

We herewith declare,

Date: March 28, 2018

CE


СИСТЕМА СЕРТИФИКАЦИИ ГОСТ Р
ГОССТАНДАРТ РОССИИ

СЕРТИФИКАТ СООТВЕТСТВИЯ

1164578

ПРОДУКЦИЯ

ГОСТ 12.2.007.0

POCC


Certificate of Designation of Excellent Product

Product: Seismic switchgears with improved power quality by reducing harmonics

Company: Ilkwon Co., Ltd.

Representative: Lee Ki Hyun

Validity of Certificate: June 30, 2017 ~ June 29, 2020

Certificate No. 2017115

This is to certify that the above mentioned product was designated as an Excellent Product in accordance with Article 9 Paragraph 2 of the Government Procurement Act and Article 18 of the Enforcement Decree thereof

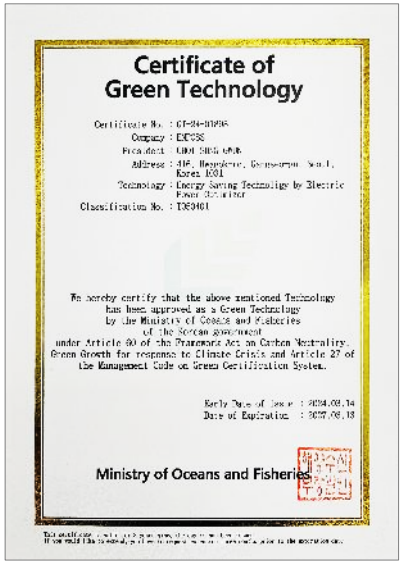
June 30, 2017

Administrator: Chung Yanghn

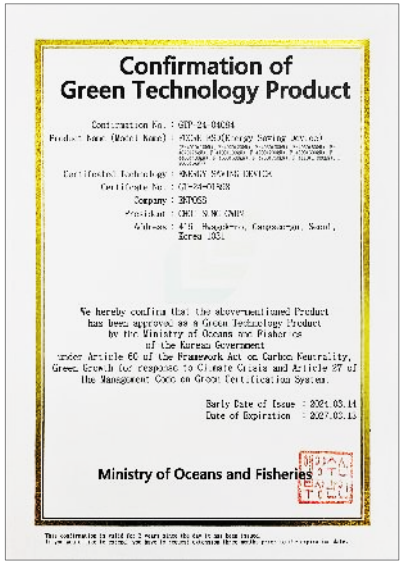
Public Procurement Service, Republic of Korea

PUBLIC PROCUREMENT SERVICE

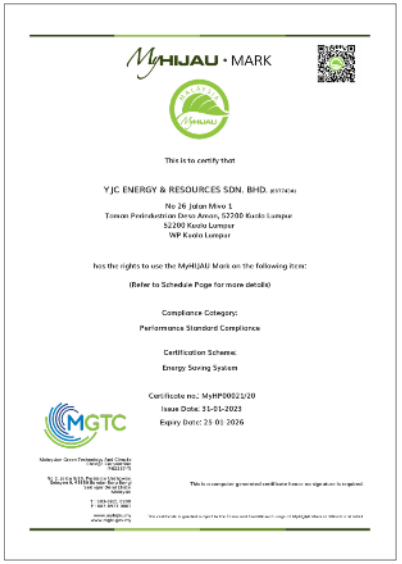
5. Green Certification



Korea Green Certification(1)

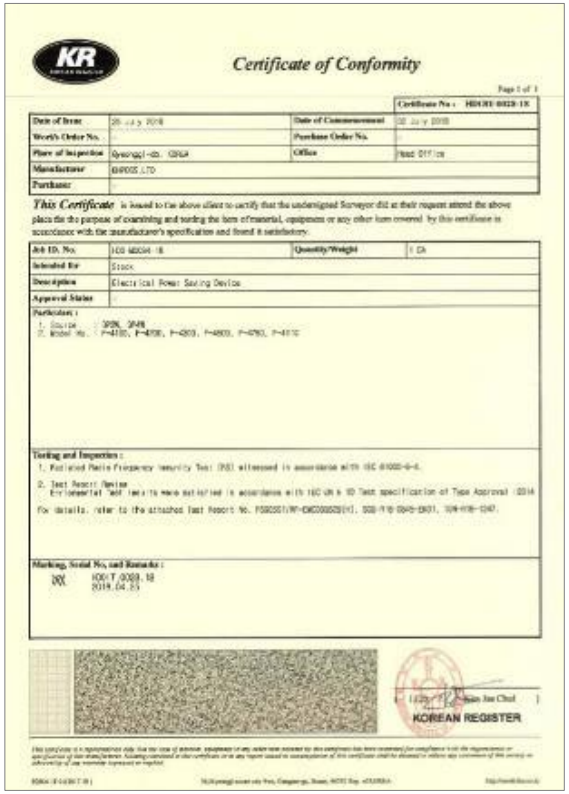


Korea Green Certification(2)



Malaysia Green Certification

5. Class Certificate



Certificate of Conformity

KOREAN REGISTER

- KR Certificate issued on July 2018
- Radiated Radio Frequency Immunity Test (RS) in accordance with IEC 61000-6-4
- Environment Test Standard: IACS UR E10 Test Specification for Type Approval
- Conducted Emission Test
- Radiated Emission Test
- Electrostatic Discharge Immunity Test
- Electromagnetic Field Immunity Test
- Electrical Fast Transient/Brust Immunity Test
- Surge Immunity Test
- Conducted Immunity Test
- Conducted Low Frequency Test
- Power Supply Variation Test
- Electrical Power Supply Failure Test
- Cold Test
- Dry Heat Test
- Damp Heat Test
- Insulation Resistance Test
- High Voltage Test

6. Examples of Applications

[Kyunghee Medical Center]

■ Installation points and capacity

- Kyunghee Medical Center / Circulation pump (ward temperature control)
- Point : Transformer ACB secondary side
- Installed Capacity : Total 1,000 kW (1,000 kW, 1 SET)

■ Methods of analysis

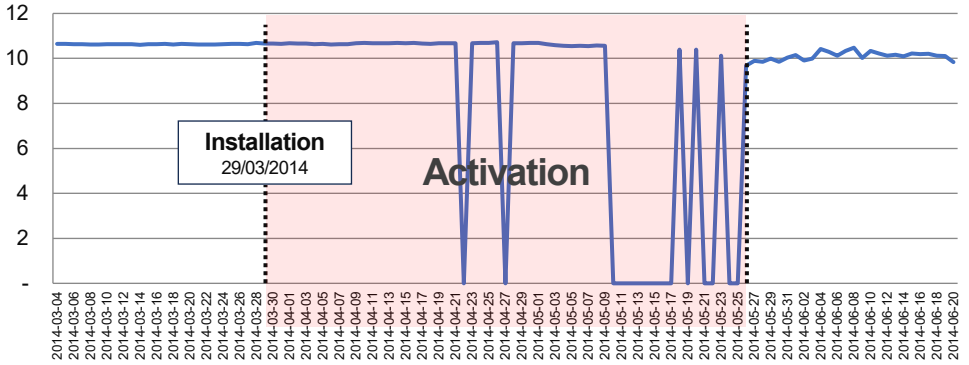
- Instrument : HIOKI 3169 (Wh/5min)
- Comparison of power consumption before and after installation

■ Installation results

- Objective : More than 5% less Power consumption than before installation
- Result : **7.63%** Reduction

	Before	After	Saving Ratio(%)
Average Power usage (W/15min)	10,632	9,821	**7.63**
Harmonics(A)	3.28	2.19	**33.11**

[Change in daily average power usage before and after installation]

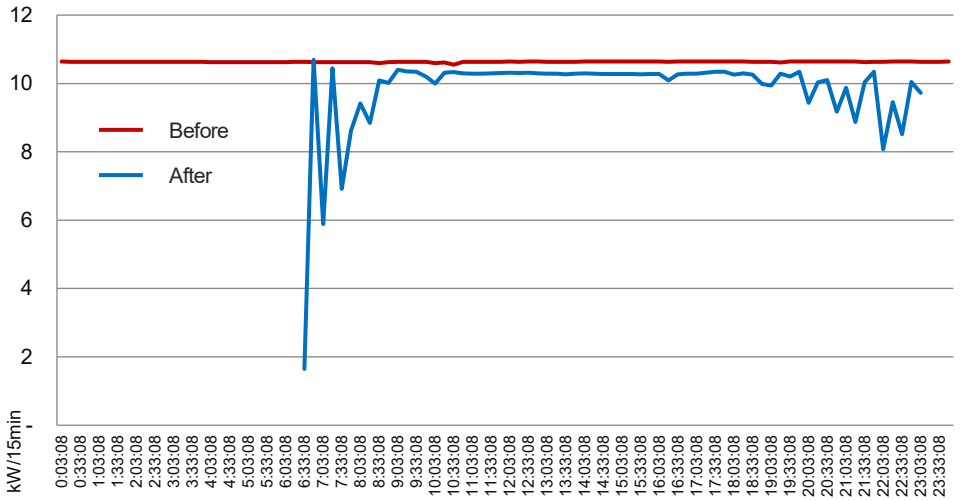


6. Examples of Applications

[Kyunghee Medical Center]

Compare	Standard	Average before installation	Average After installation	Ratio	Result
Average power usage	The more it decreases, the better	10,632W/15min	9,821W/15min	7.63%	Reduction
Reactive power		7,115W/15min	7,078W/15min	5.28%	Decrease
5 Harmonic	The lower the better	1.67A	1.04A	37.91%	Decrease
7 Harmonic		0.43A	0.28A	34.47%	Decrease
11 Harmonic		0.27A	0.25A	8.5%	Decrease
Harmonic Sum		3.28A	2.19A	33.11%	Decrease

[Change in average power usage by hour before and after installation]



[Change in minimum power usage by hour before and after installation]

6. Examples of Applications

[Samsung Fine Chemicals]

■ **Installation points and capacity**

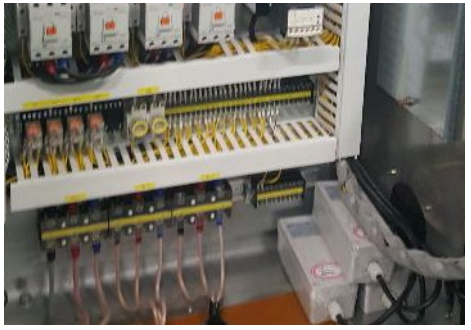
- Samsung Fine Chemicals / Lighting, electric heating
- Point : Transformer ACB secondary side
- Installed Capacity : Total 200 kW (200 kW, 1 SET)

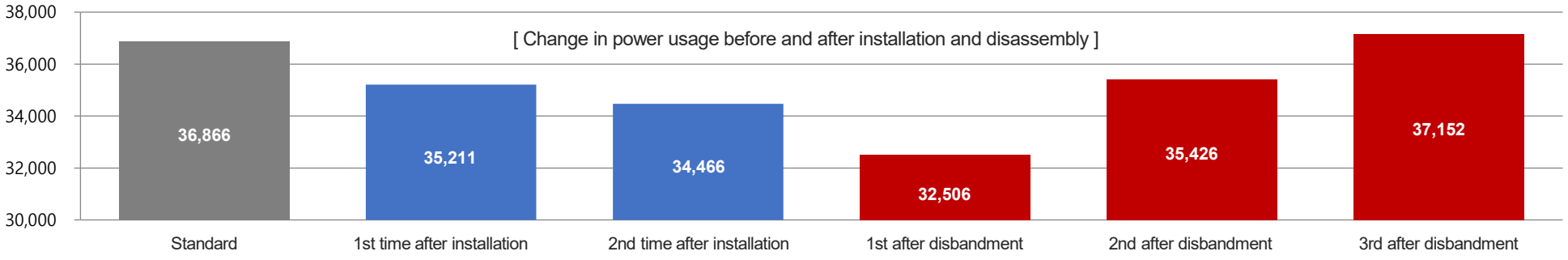
■ **Methods of analysis**

- Instrument : HIOKI 3169 (Wh/10min)
- Install FORCE → Confirm reduction in power usage → Dismantle FORCE → Confirm increase in power usage

■ **Installation results**

- Objective : More than 5% less Power consumption than before installation
- Result : **6.5%** Reduction

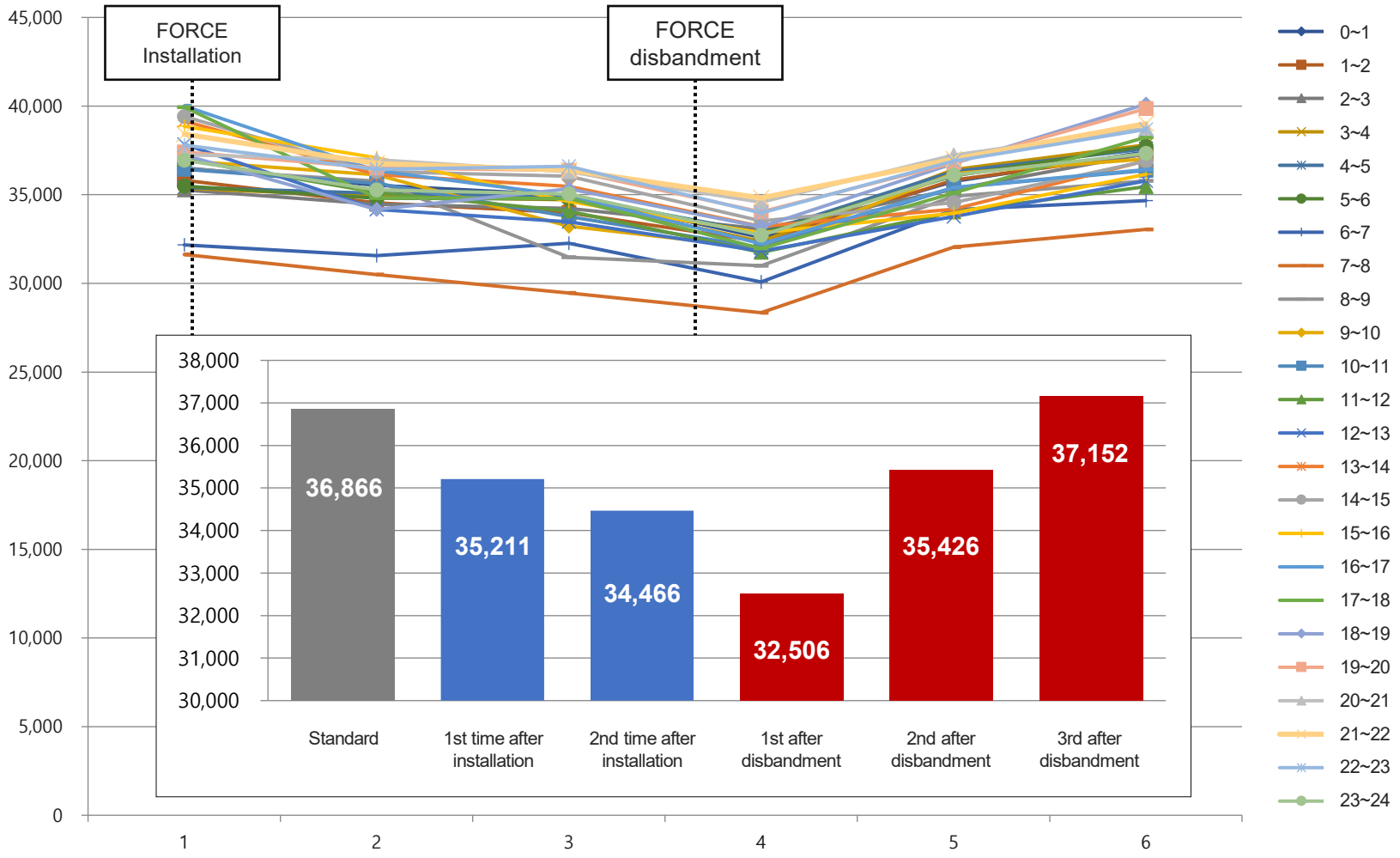




6. Examples of Applications

[Samsung Fine Chemicals]

[Change power usage before and after installation]



6. Examples of Applications

[Bitexco building]

■ **Installation points and capacity**

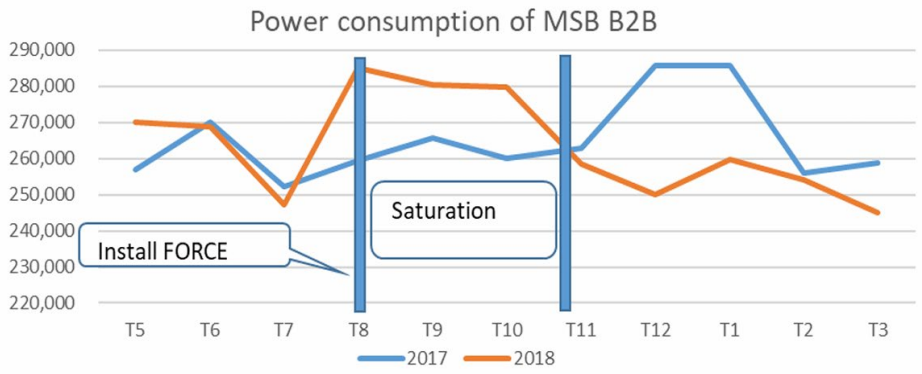
- The Bitexco building
- Point : Transformer ACB secondary side
- Installed Capacity : Total 1,000 kW

■ **Methods of analysis**

- Instrument : HIOKI 3169 (Wh/5min)
- Comparison of power consumption before and after installation

■ **Installation results**

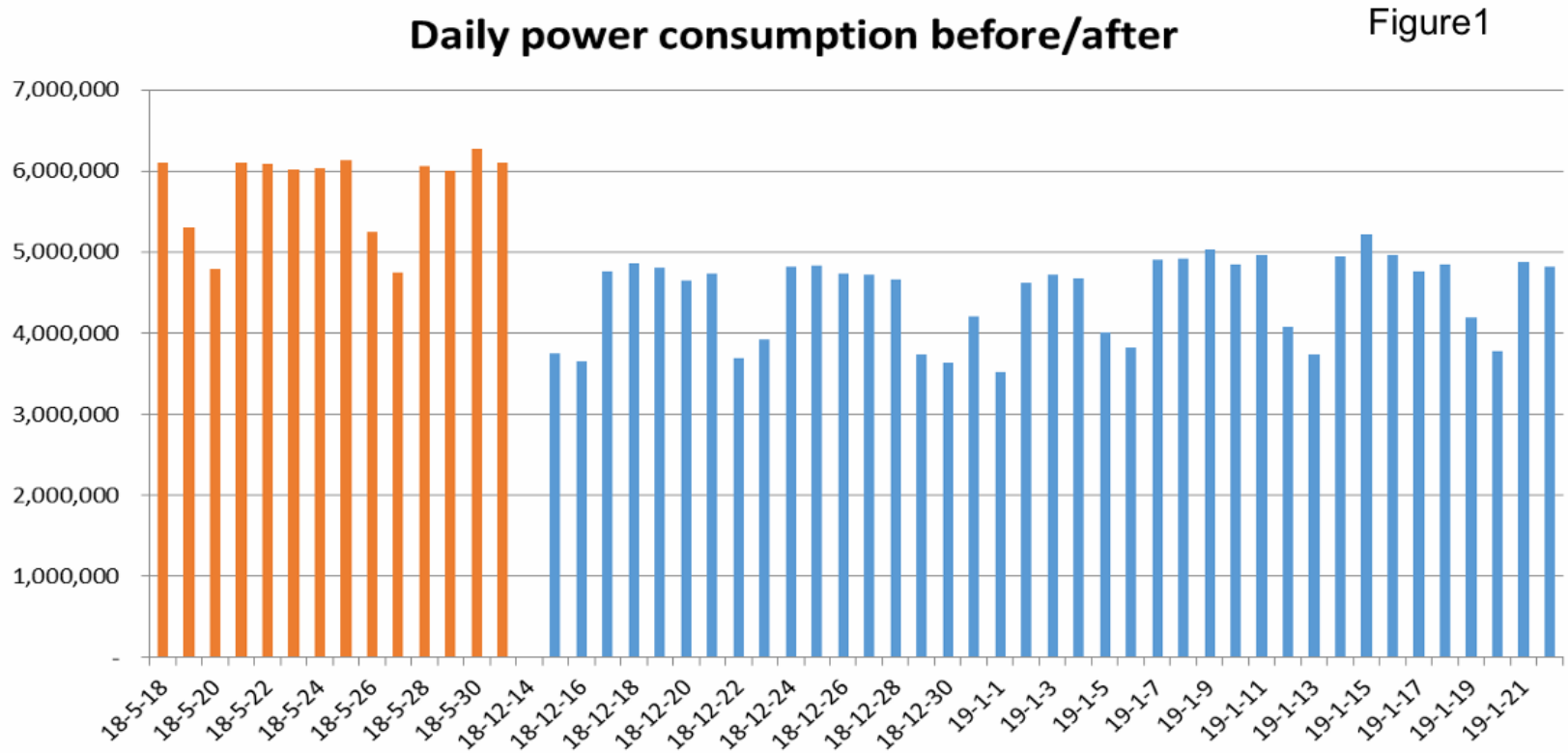
- Objective : More than 5% less Power consumption than before installation
- Result : **18.3%** Reduction



6. Examples of Applications

[Bitexco building]

Figure1



6. Examples of Applications

[Marriot Hotel in Hanoi]

■ **Installation points and capacity**

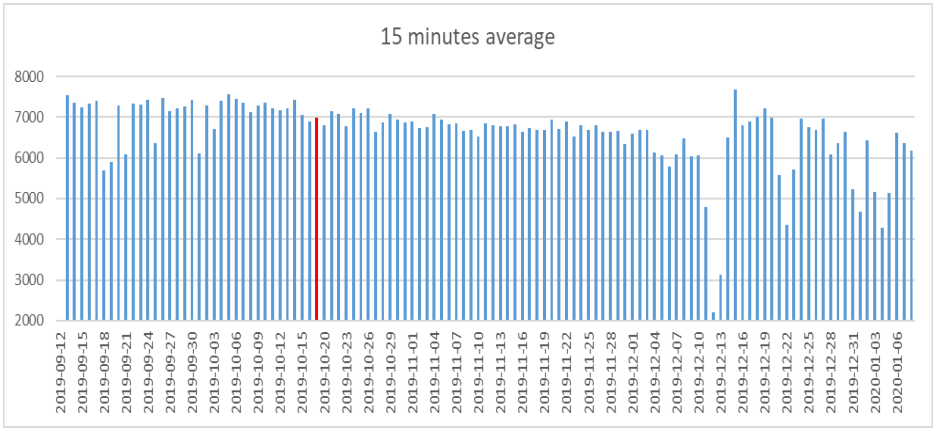
- Marriot Hotel in Hanoi Vietnam
- Point : Transformer ACB secondary side
- Installed Capacity : Total 200 kW

■ **Methods of analysis**

- Instrument : HIOKI 3169 (Wh/5min)
- Comparison of power consumption before and after installation

■ **Installation results**

- Objective : More than 5% less Power consumption than before installation
- Result : **9.5%** Reduction



7. Reduction in Operating Costs

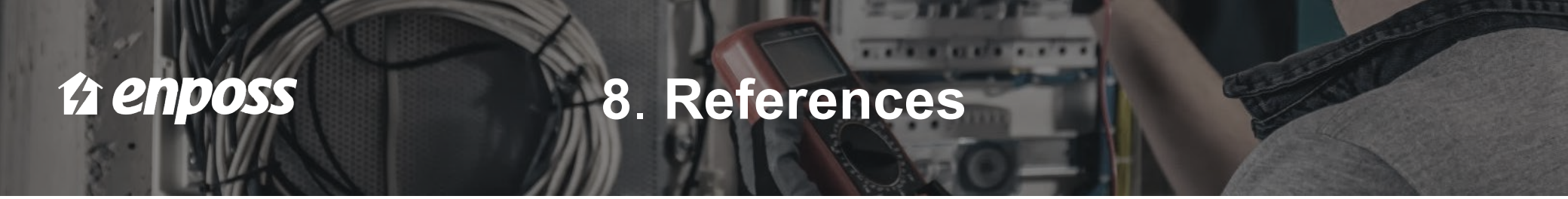
■ **FORCE specification calculation method**

- Vessel Generator capacity (1,000kw) x Power factor 80% (0.8) x Peak utilization percentage (80~90%)
  = Installed FORCE specification (about 1,500kw)

■ **Payback period examples based on fuel consumption of 1,000kw load, (1,500 kW FORCE) and average cost.**

- Reduction in fuel Usage per day of 8% x 365 days = $43,800.00 per month (Payback period about 23 months)
- Reduction in fuel usage per day of 10% x 365 days = $54,750.00 per month (Payback period about 18 months)
- Reduction in fuel usage per day of 12% x 365 days = $65,700 per year (Payback period about 16 months)

* B-C price : US600$/ton

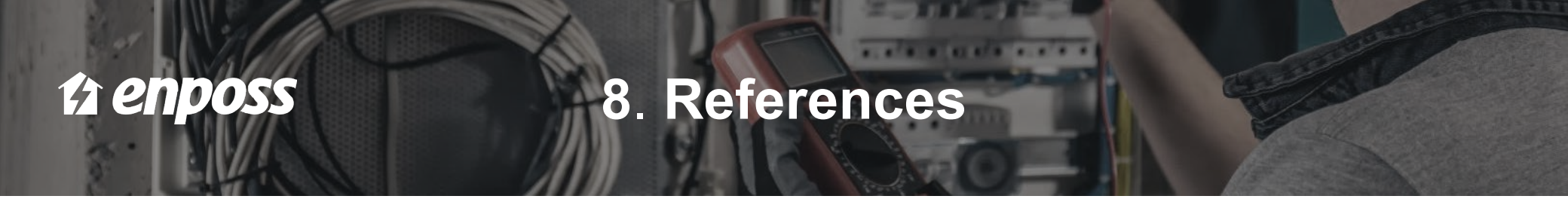


8. References

■ Commercial and Industrial installations

Company	Installed capacity (kW)
H-Line Shipping	62,900
HMM	1,000
KLCSM	1,200
Lotte Fine Chemicals	1,850
Ottogi Foods	13,550
Finite Kimberley	5,000
Taekwang Business	5,000
Hanwha Total	1,300
Kolon Life Sciences	2,000
Henkel Korea	1,200
Orange Dunes CC	2,000

Company	Installed capacity (kW)
Credulity wires	2,870
POSCO	10,550
Ilshin Industrial Metals	2,670
Limcheon Industry	1,200
KEPCO Industrial Development	1,500
Gyeongam Building	1,800
Shinhan Bank	2,500
Daejin Industry	1,000
DYM	1,700
Shinhan Industrial	1,750
Samsung Corning	1,000



8. References

■ Vessel installations

Vessel	Installed capacity (kW)	Vessel	Installed capacity (kW)	Vessel	Installed capacity (kW)	Vessel	Installed capacity (kW)
HL SUCCESS	1,350	HYUNDAI HADONG	1,100	HL BORYEONG	1,200	HL AQUAMARINE	2,000
HL SALDANHA BAY	1,350	SAMCHEONPO	1,100	HL BRAZIL	2,000	SAO PEARL	2,000
HL TUBARAO	2,000	HL PASSION	1,200	HL TAEAN	1,100	HL NAMBU1	2,000
HL IBT	1,100	HL PIONEER	1,200	SAO LOUIS	2,000	HL NAMBU2	2,000
HYUNDAI KOMIPO	1,100	HL PORT WALCOTT	1,200	SAO MASTER	2,000	SK. K TANAN	1,500
HL HARMONY	1,100	HL VENUS	2,000	HL DIAMOND	2,000	FEG SUCCESS	1,000
HL HADONG	1,200	HYUNDAI LEADER	1,000	SAO NEPTUNE	2,000	HL BALIKPAPAN	1,200
HL GLADSTONE	1,100	HL MERCURY	2,000	HL EMERALD	2,000	WP BRAVE	1,200
HL BALTIMORE	900	HL ESPERANCE	1,350	HL ECO	2,000	PAN COSMOS	1,500
HL VISION	1,350	HL DALRYMPLE BAY	1,200	HL PEARL	2,000	Lake Shihwa Ferry	300
HL SHINBORYEONG	1,200	HL PRIDE	1,200	HL GREEN	2,000	-	-
HL SINES	1,350	HL DANGJIN	1,200	SAO OASIS	2,000	-	-
HL PORT HEADLAND	1,350	HL SAMARINDA	1,200	HL SAPPHIRE	2,000	-	-

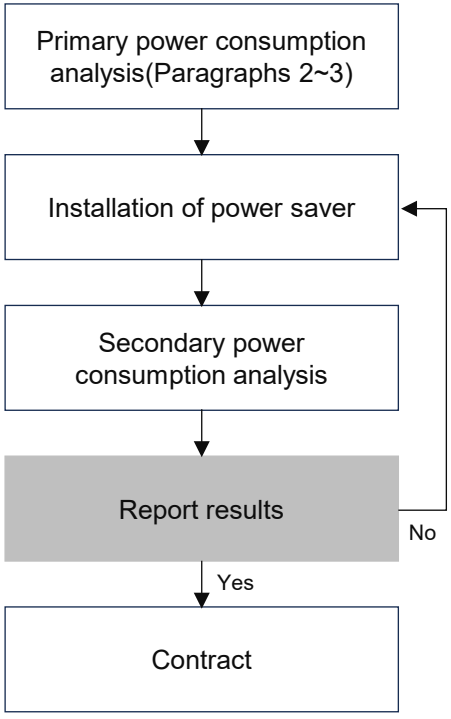
9. Installation Process

[If tested]

Customer	ENPOSS	Main Activities
Provides historical energy/fuel consumption data	Basic Investigation	▪ TEST Scope and timeline consultation ▪ Survey of basic data ▪ Installation of the power analyzer (HIOKI 3169) ▪ Flowmeter utilization
	Power usage analysis	▪ Power Analyzer Analysis ▪ Evaluation of TEST method and condition adequacy through primary analysis results
PRE-TEST is Free of Charge	Product Installation	
	Report Generation and Contract	▪ Savings through secondary analysis results ▪ Effect analysis and result report (~3rd term) ▪ Submit a quotation and sign a contract
	Construction	
FORCE removal	Follow-up	▪ Performance assurance and periodic effect analysis ▪ 5-year free of charge for investment facilities ▪ Carry out maintenance

※ The collection method is negotiated separately

Power Consumption analysis procedure



- Power Analyzer (HIOKI-3169) use primary and secondary power consumption
- Conduct analysis

10. Installation Overview

■ **Power System Location / Power Saving Rate**

1. ACB Switch

1. MCCB | 2. MCCB | 3. MCCB

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

Transformer

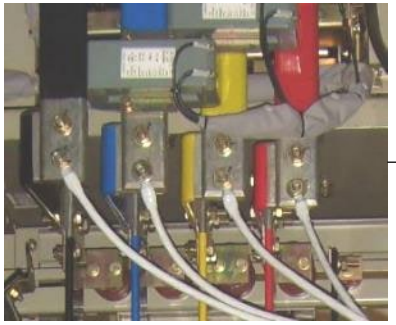
A Point
(Power saving rate of 5% or more)

B Point
(Power saving rate is around 4%)

C Point
(Marginal power saving rate)

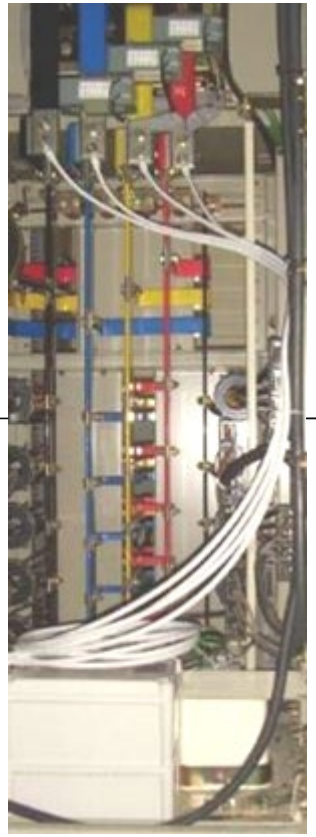
10. Installation Overview

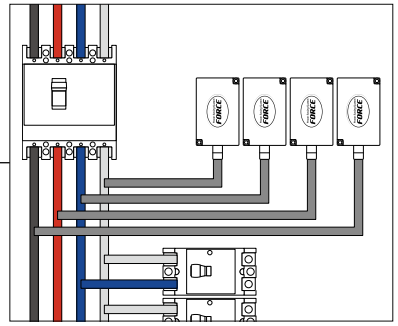
■ Switch Board

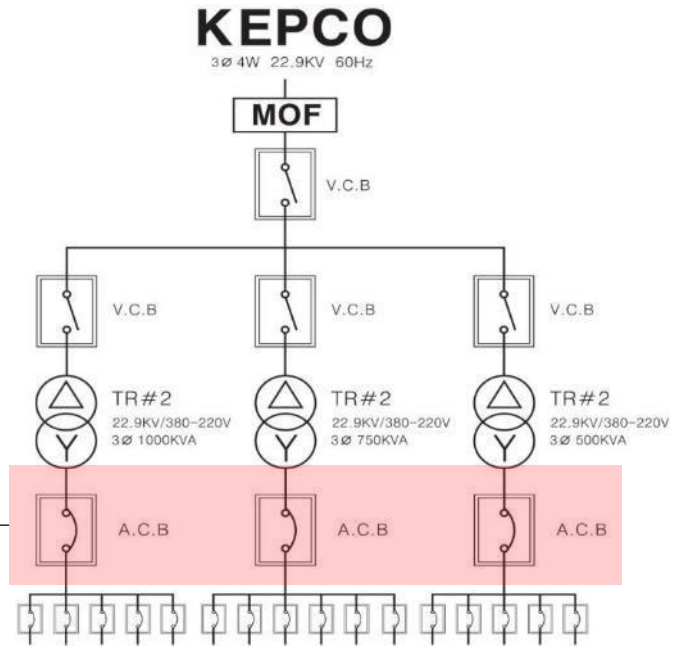


Connecting to R,S,T,N
angular phase easy to install

Ultra-small power improvement
device UNIT



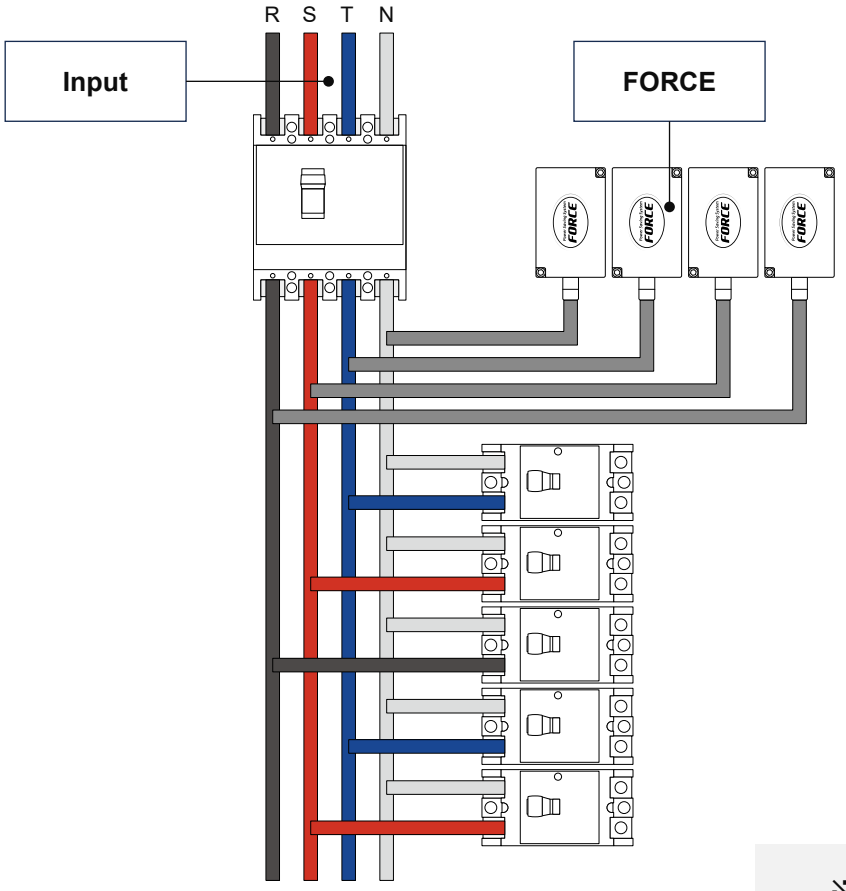




Installation Location
Main 2nd stage ACB (Air Circuit Breaker)
parallel connection to R, S, T, N phases

10. Installation Overview

■ Distribution Board



FORCE placement (inside switchboard cabinet)

One for each of the main 2nd stage breakers R, S, T, and N
Parallel connection makes installation very simple and fast

※ FORCE may be installed inside or outside the switchboard cabinet.

11. Product Specifications

Power	Capacity (kW)	Model	Wire	Size (W×L×H)	Weight (kg)
1P 2W	5	F-2005	8SQ	80×130×35	1.5
	10	F-2010		80×110×70	1.8
3P 3W	5	F-3005	14SQ	65×95×55	1.5
	10	F-3010		80×110×70	2.7
	20	F-3020		80×130×70	3.3
	30	F-3030		80×180×70	4.5
	50	F-3050		80×180×85	5.8
	75	F-3070	25SQ	130×175×75	8.6
	100	F-3100		130×175×100	11.0
	200	F-3200		140×230×100	16.6
	300	F-3300		150×245×100	18.8
	400	F-3400		150×250×130	24.7
	500	F-3500		190×280×130	30.9
	750	F-3750		190×380×130	45.8

Power	Capacity (kW)	Model	Wire	Size (W×L×H)	Weight (kg)
3P 4W	10	F-4010	14SQ	65×95×55	2.0
	20	F-4020		80×110×70	3.6
	30	F-4030		80×130×70	4.5
	50	F-4050		80×180×70	6.1
	75	F-4070		80×180×85	7.8
	100	F-4100	25SQ	130×175×75	11.5
	200	F-4200		130×175×100	14.6
	300	F-4300		140×230×100	22.2
	400	F-4400		150×245×100	25.1
	500	F-4500		150×250×130	33.0
	750	F-4750		190×280×130	41.3
	1,000	F-4110		190×380×130	61.1

- Products with a capacity of less than 5kW and more than 750kW are customized as per client's request.
- Depending on the length and thickness of the wire, size/weight may differ from the table.

Thank you

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