

***UNIDO Seminar
Japan-UNIDO Multi-stakeholder
Cooperation Dialogue
“Africa and TICAD7”***

TAIYO

***Low Carbon and Climate Resilient
Industrial Development Project
in Kenya***

Company Profile & Products



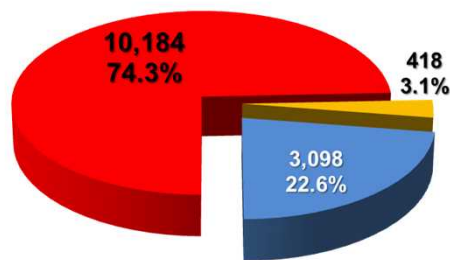
Inauguration:1917

Established :1943

- **Started manufacturing of Generator for Marine Use.**
- **Started manufacturing of Diesel Generator Set and Co-Generation System for Industrial Use since 1971.**

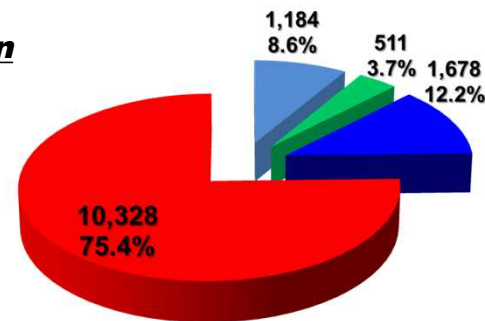
Since 1917, last year is 100 years anniversary.

Annual Turnover



- MERCHANT MARINE
- FISHERY
- INDUSTRY

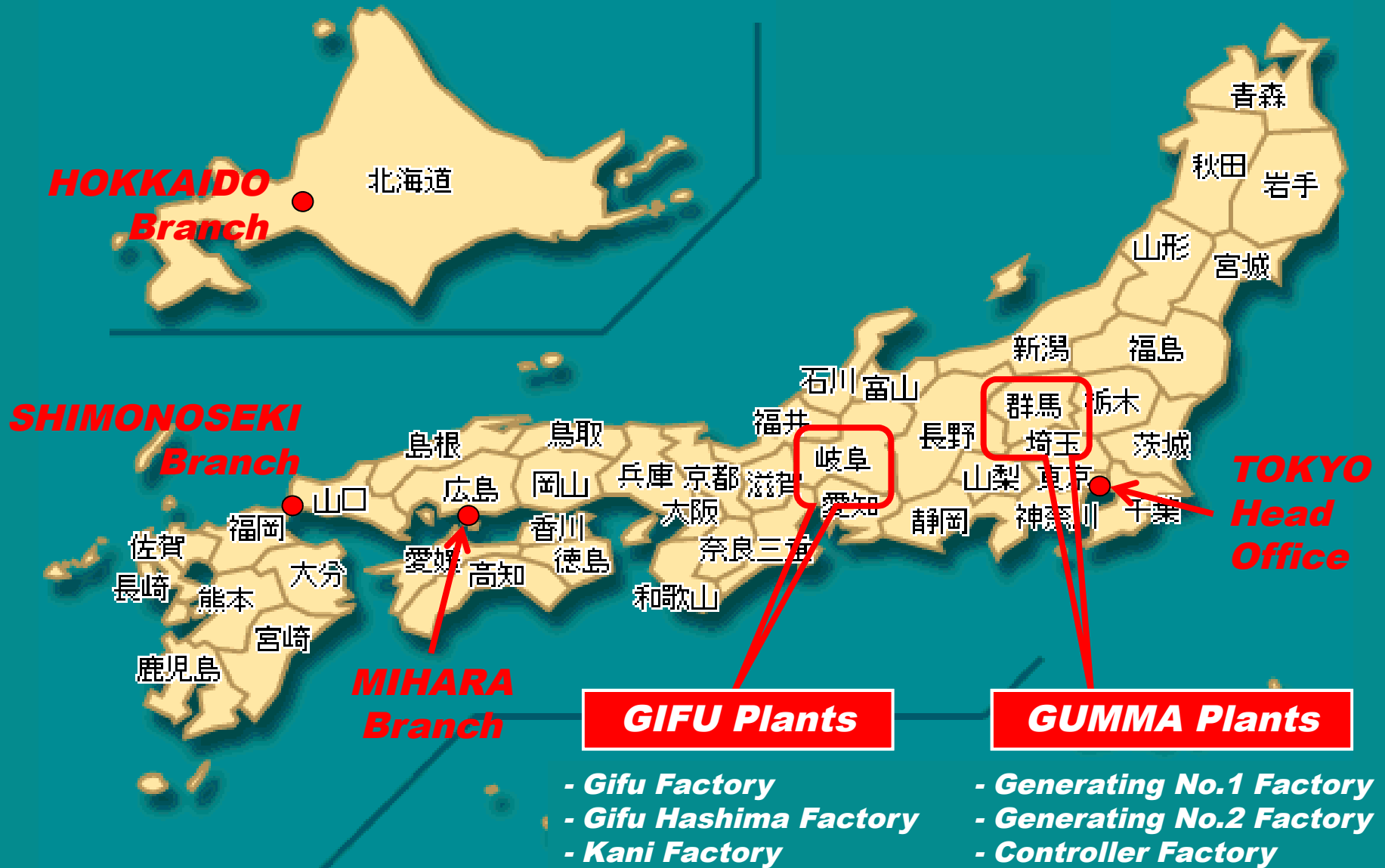
Production



- OTHERS
- FAN
- CONTROL EQUIP.
- ROTATING MACHINERY



Network in Japan



Gifu Plants

Gifu Factory : Large Capacity Generator, Motor & System Products



Kani Factory :
Small Generator Set &
Winding of Marine Generator



Gifu Hashima Factory : Ventilation Fan



Gunma Plants

Generating No.1 Factory : Small Capacity Generator & Motor



Generating No.2 Factory :
Diesel Generator Set ,
Medium Capacity Generator & Motor



Controller Factory : Switchboard & Console



Industrial use products

Taking advantage of our proprietary heavy electric technology, we provide electric machinery and equipment that meet a wide variety of industrial and societal needs.

At construction sites

Generators for road paving



Generators, control panels and generator sets for construction sites



Mobile and stationary type LED lighting tower



At stadiums and event venues

Generators for mobile power supply vehicles



In office buildings

Co-generation systems



Generators, control panels and generator sets for emergency use



In banks

Three-phase/single-phase multi-output generators



In hospitals

Generators, control panels and generator sets for emergency use



In mountainous regions

Geothermal generators and control panels



Near rivers (mountains)

Hydroelectric generators and control panels



In factories

Generators, control panels and generator sets for continuous use



Co-generation systems



On railroads

Generators and control panels for railroad cars



Ships (pleasure boats)

Generator sets for pleasure boats



At ports

Generators, control panels and generator sets for port cranes



Frequency conversion M-G sets



Marine use products

From small fishing boats to large vessels, passenger ships, to government vessels, we provide a stable supply of high quality products for marine use.

Lighting fixtures
(Sanshin Electric)



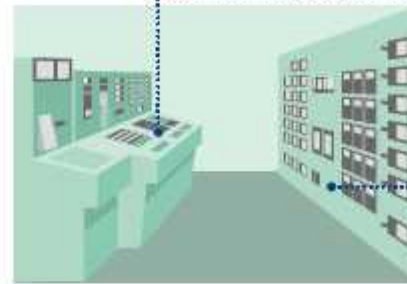
Ventilation fan



Engine auxiliary blower



Engine control room



Engine control console



Switchboard



Inverter panels for various applications



Motors for various applications



Starters for various applications



Electric motor for deck machinery



Bow thruster motor



Generator



Shaft generator



Requirements for Energy Saving

1. Energy, not used → Unreality & Impossibility

2. Energy, used efficiently → Possibility

Engine Maker,

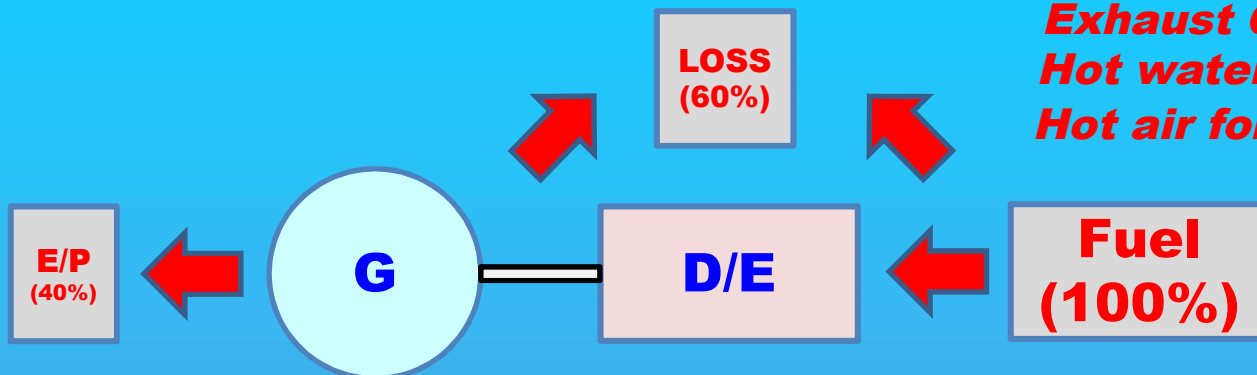
Developing engines good fuel economy

Generator Maker,

Developing generators good electric efficiency

Actually, difficulty to change 100% fuel energy into 100% engine power or electric power

Diesel Generator Set

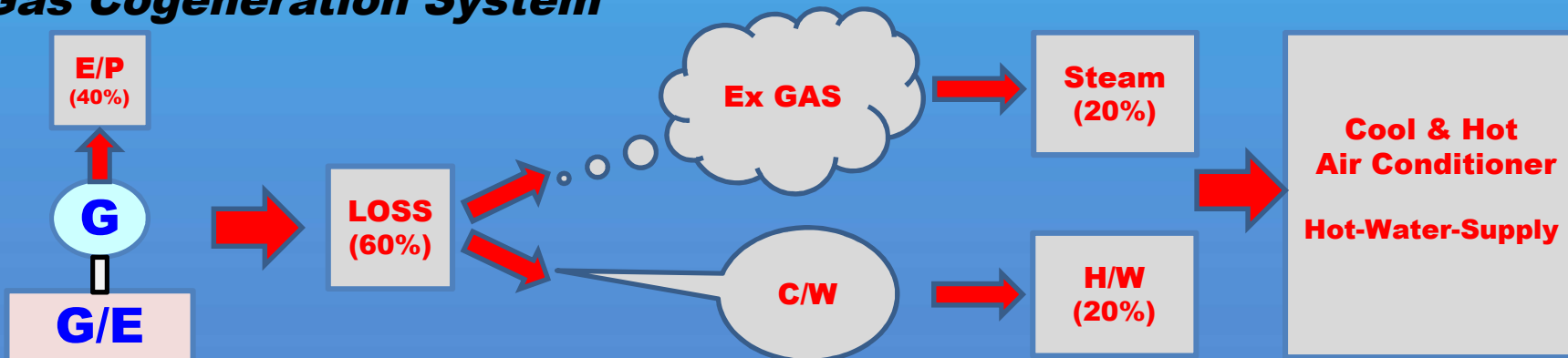


**Most loss is heat energy.
Heat energy, thrown away as**

**Exhaust Gas
Hot water for cooling engine
Hot air for cooling generator**

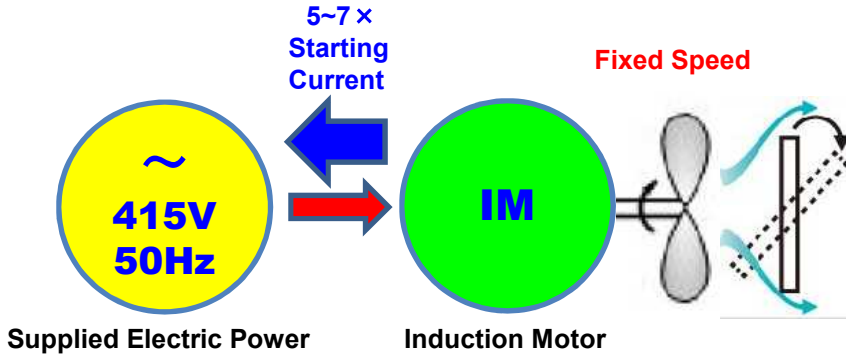
3. Loss Energy, reused or reduced Possibility

Gas Cogeneration System



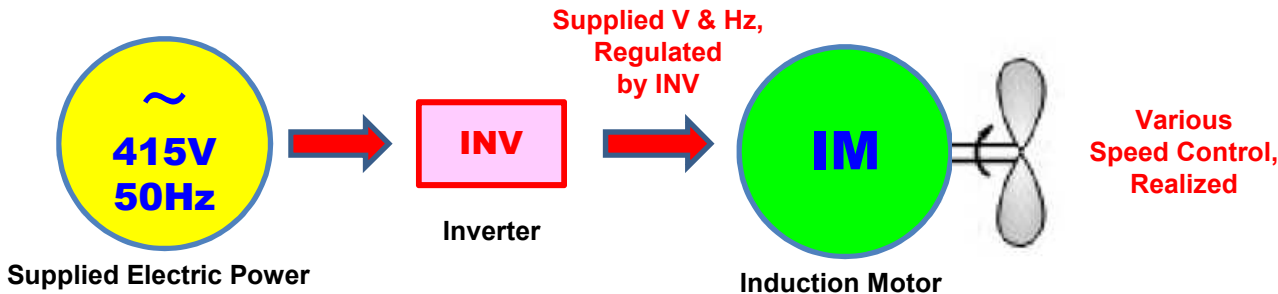
Speed Control System

➤ Conventional System



- (1) Starting current of fan motor is quite big.
5~7 times starting current of motor rated current dash into generator.
Therefore, generator capacity should be bigger.
In case of 3.7kW motor, 12.5kVA generator capacity be required due to starting current.
- (2) In this system, the user can not change motor speed.
Fan motor is driven by rated speed.
Therefore, energy saving can not be realized.
When the user want to reduce air volume, the user need to regulate air volume by using damper .
This is to throw away extra air, therefore anytime electric power consumption is max(Rated) kW.

➤ Speed Control System



- (1) Generator capacity -up is not required, because soft start method is available and starting current can be kept down.
- (2) Energy save can be realized, because power consumption of fan motor decreases in proportion to the revolution cubed.
- (3) Operation can be improved, because no mechanical actuating part, easy start & stop operation and smooth control from low speed to high speed are realized.
- (4) Automatic control can be easier, because the speed control is available.
- (5) High efficiency running can be realized, because loss of speed changing unit(gearbox or pulley) is nothing.

Actual Project In Kenya



Project Purpose : Electric Power Save for Tea Factory in Kenya

Factory Name : Kiamokama Tea Factory Co. Ltd.

Taiyo Supply Product : Fan Motor(4kW) & Inverter Panel × 4 Sets

Taiyo Supply Technology : Various Speed Control System

Delivery Date in Kenya : September 2018



Actual Project In Kenya



Kiamokama Tea Factory Co. Ltd.

Target Equipment : Fan Motor for Withering Tea Leaf

Total Number of Fan : About 90 units, Main Motor Output 4kW

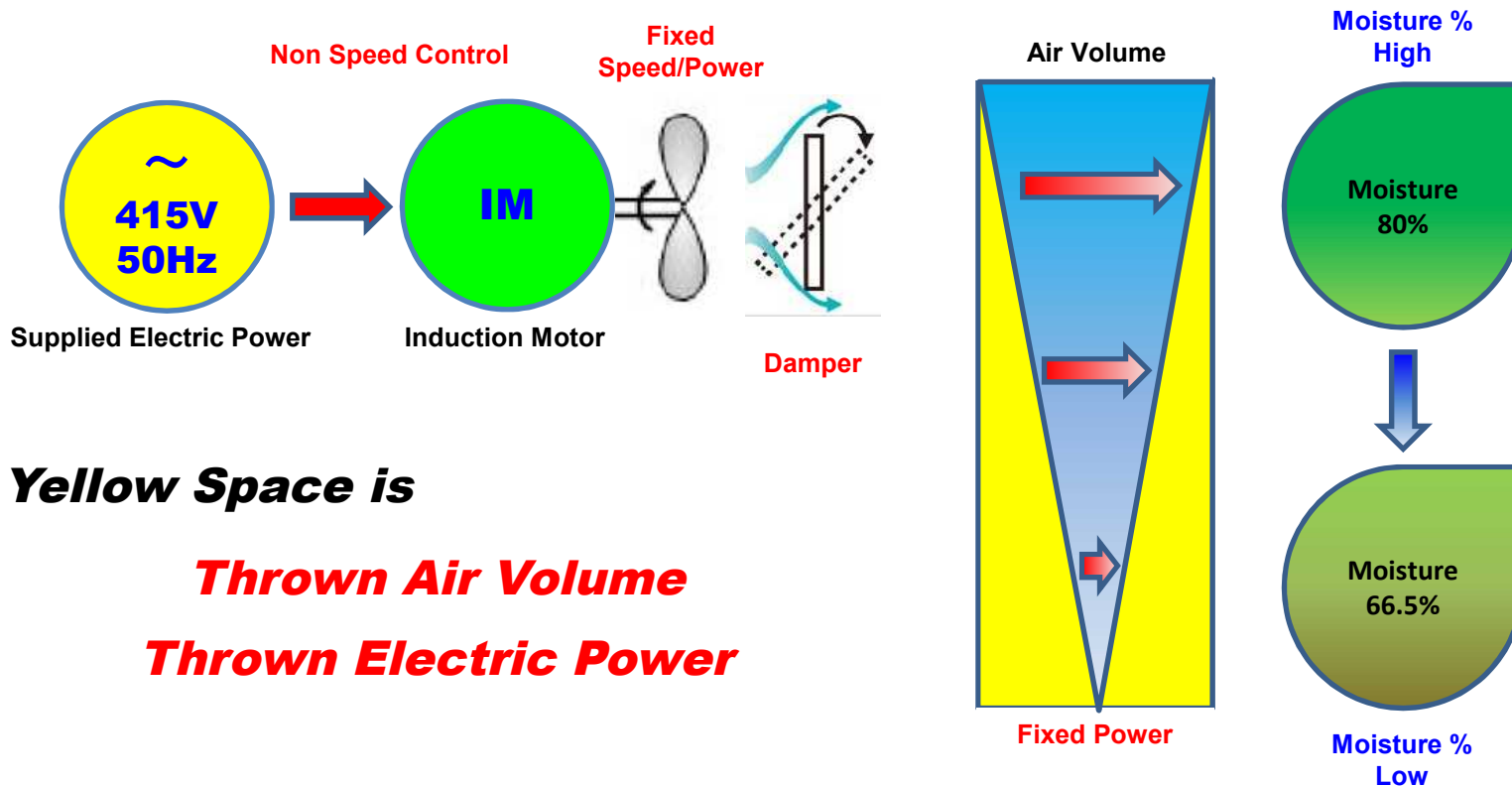
Total kW : 90 units × 4kW = 360kW



Current System : Non Speed Control & Fixed Speed / Power

Air Volume Regulation : Damper

Reason to regulate Air Volume : Regulating Air Volume According to Withering Condition of Tea Leaf



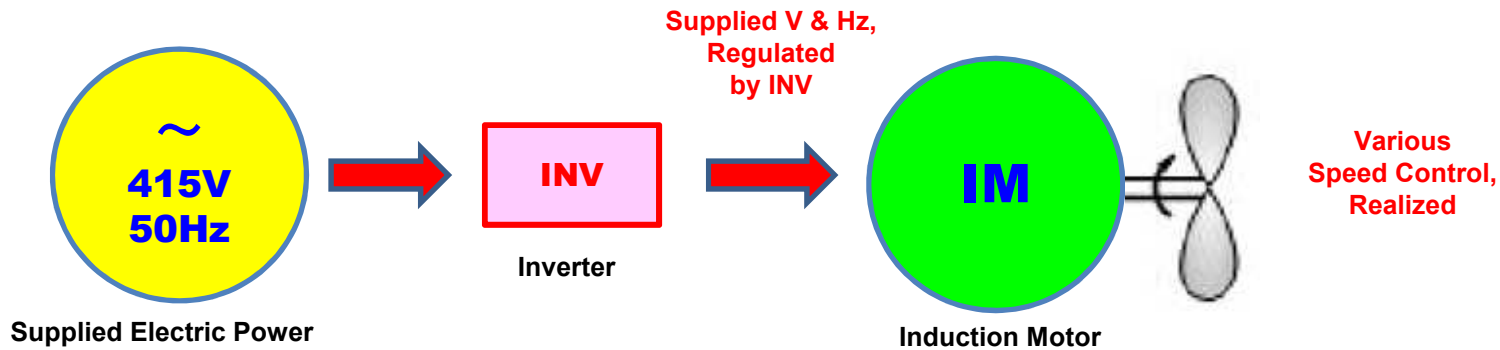
Yellow Space is

Thrown Air Volume

Thrown Electric Power

TAIYO Supply System : Various Speed / Power Control Air Volume Regulation : Inverter

TAIYO Speed Control System

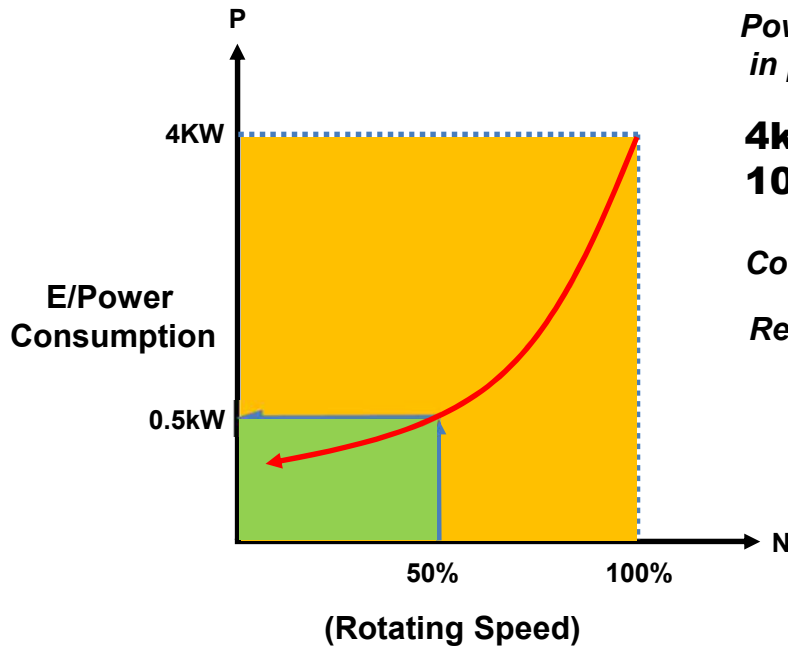
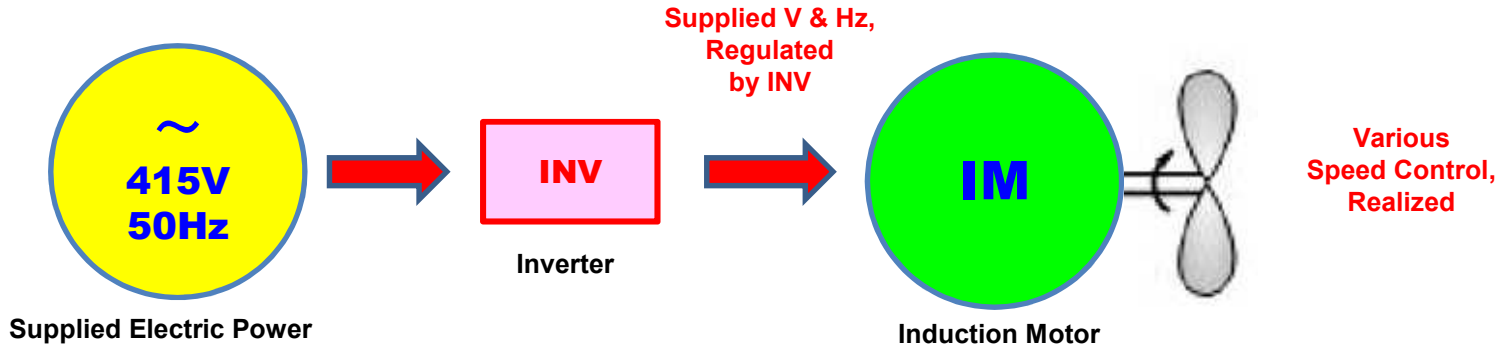


INV Panel



Fan Motor

TAIYO Speed Control System



Power consumption of fan motor decreases in proportion to the revolution cubed

4kW Fan(1 unit)

100% speed \Rightarrow 50% speed Operating

$$\text{Consumption (kW)} = 4 \text{ (kW)} \times (50\%/100\%)^3 = 0.5\text{kWh/unit}$$

$$\text{Reduce (kW)} = 4 \text{ (kW)} - 0.5 \text{ (kW)} = -3.5\text{kWh/unit}$$

50% speed Operating : 2h/day, 25units

$$\text{Reduce (kW)} = -3.5 \text{ (kW)} \times 25 \text{ (unit)} \times 2\text{h} = -175\text{kWh/day}$$

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TAIYO

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