June 2017
Rev.B

AEROSPACE and DEFENSE

SINCE 1920

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SINFONIA

SINFONIA TECHNOLOGY CO., LTD.

Former SHINKO ELECTRIC CO., LTD.

Company Profile

Founded	May, 1917
Incorporated	August, 1949
Capital	¥10.156 billion (Approx. US$ 82million as of March 2017)
Annual sales	¥84.2 billion (Approx. US$ 760million in FY2016)
No. of employees	Consolidated 3,663 (as of March 2017)
Head office	Shiba NBF Tower, 1-30, Shibadaimon 1-chome, Minato-ku, Tokyo, Japan
Production plants	Toyohashi, Ise and Toba
President	Kozo Furutani

Aerospace Equipment Division Outline

Established	1920
No. of employees	450
Sales offices	Tokyo, Nagoya
Manufacturing plant	Ise Plant

Aerospace Equipment Division History

1920 ▶ Windmill-type generator for aircraft use developed. (First in Japan)

1936 ▶ Engine-driven generator for aircraft use developed.

1937 ▶ Japanese aircraft 'Kamikaze' that flew between Tokyo and London equipped with SINFONIA TECHNOLOGY power generator.

1952 ▶ Production of aircraft equipment resumed after WW II.

1960 ▶ Began production of ground support equipment (GSE).

1967 ▶ New factory opened at Ise Works for production of aircraft equipment.

1979 ▶ Began development of the avionic products for F-15 aircraft.

1987 ▶ Prototype VSCF power system built.

1987 ▶ Power system developed for use in Space Shuttle experiments.

1988 ▶ Clean room facility built in Aircraft Equipment Division for thin-film integrated circuit production.

1991 ▶ New building opened for aerospace equipment/ systems production.

1995 ▶ TVC actuator for use in M-V rocket developed. VSCF power system development completed.

1998 ▶ First delivery of the production units of EPGS (including VSCF) and Data Transfer Equipment for F-2 aircraft.
▶ Development of a various on-board electrical equipment for OH-1 observation helicopter

1999 ▶ First delivery of TVC electro-mechanical actuators for H-IIA space rocket (SRB).

2000 ▶ VSCF electrical power generating system for use on US-2 aircraft developed.

2001 ▶ Starter-generation system for use on T-7 trainer aircraft developed.

2006 ▶ Development of a higher capacity EPGS for F-15J Modernization program.

2007 ▶ C-X/P-X equipment developed.

2008 ▶ Development of Ventilation Fan for HTV space transport vehicle .

Offices and Plants

SINFONIA TECHNOLOGY (SHANGHAI) CO., LTD.

Business Content
Sales of electromagnetic clutches and brakes, sales and procurement of vibrating equipment, after-sales service, and engineering

SINFONIA TECHNOLOGY (SHANGHAI) CO., LTD. Guangzhou Office

SINFONIA MICROTEC DONGGUAN FACTORY

Main Products
Micro-clutches for OA equipment

SINFONIA MICROTEC (VIETNAM) CO., LTD.

SINFONIA TECHNOLOGY (SHANGHAI) CO., LTD. Tianjin Sales Office

Tianjin Shinko Electric Co., Ltd.

Main Products
Clutches and brakes for general industrial machinery
Microclutches and brakes for OA equipment

TOKYO HEADQUARTERS

TOYOHASHI PLANT

Main Products
Electrical equipment for industrial and public service applications; cogeneration systems; metal thermal processors; semiconductor manufacturing equipment; vibratory conveyor systems; parts feeders; computer controllers

ISE PLANT

Main Products
Color printers; vending machines, prepaid card, machines; industrial vehicles; aerospace equipment; electromagnetic clutches / brakes; reciprocal motors

TOBA FACTORY

Main Products
AC / DC servomotors; small DC motors; small motors for special applications

SINFONIA TECHNOLOGY (AMERICA) INC.

JAPAN

CHINA

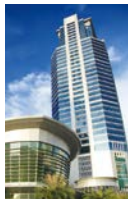
TAIWAN

SINFONIA ENGINEERING CO., LTD. TAIWAN BRANCH

THAILAND

SINFONIA TECHNOLOGY (THAILAND) CO., LTD.

PLANT



BANGKOK SALES OFFICE

Main Products
Parts Feeders, Vibrating Equipment, Controllers, Semiconductor-related Manufacturing Equipment

SINGAPORE

SINFONIA TECHNOLOGY (SINGAPORE) PTE. LTD.

Business Contents
Sales, after-sales service, engineering, etc. of electrical machine products

PT SINFONIA TECHNOLO INDONESIA

Business Contents
Sales, after-sales service, engineering, etc. of electrical machine products

INDONESIA

Core Business Unit

- Motion Control
- Industrial Vehicle
- Information Technology
- Semiconductor Manufacturing
- Automotive Testing Facility
- Renewable Energy
- Aerospace
  - Main products
    - ・Electrical Power Systems
    - ・Electro-Mechanical Actuation Systems
    - ・Stores Management Systems
    - ・Hoists & Winches
    - ・Aircraft/Airport Ground Support Equipment

Production Facilities

Aerospace Production Facilities	
Established:	December, 1991
Site area:	6,850m^2
Floor area:	20,720m^2
Layout:	Ground floor: Machinery; testing; shipping 2nd floor: Assembly; clean room manufacture; special processing 3rd floor: Administration; Engineering center
Main features:	Fully air-conditioned environment Anti-dust environment Isolated high-accuracy machining room Clean room facilities (class 100 & 10,000) Complete facilities for development tests

Certificate
for AEROSPACE GROUP

ISO9001, ISO14001, JISQ9100*, ISO27001

*JISQ9100 is equivalent to AS9100

Civil Aircraft
In process for;

RTCA DO-178

RTCA DO-254

Nadcap

Qualified Supplier For;
Japan Ministry of Defense

Prime Contractors

Aviation Authorities

Major Aircraft /
Engine Manufacturers Worldwide

Aerospace Facility
in Ise Plant

Products

Electrical Power Systems	AC systems DC systems Starter-generating systems Primary/secondary power management Power converters/inverters	IDG; VSCF, VF A/D, D/A, A/A
Avionics	Warning & monitoring equipment Stores management systems Data transfer equipment De-icing & anti-icing equipment Servo control equipment Sensors	
Actuation Equipment	Actuators Servo actuators Hoists & winches	Linear/rotary Linear/rotary Electrical/hydraulic
Engine Accessories	Sensors Recorders Electric starters Dedicated alternators Fuel shut-off valves	Speed detectors Event history recorders
Space Equipment	Servo actuators Power supply equipment Ventilation fan	Thrust vector control; canard fin control
Testing & Training Equipment.	LRU test equipment Maintenance training equipment	Generators; GCU; actuators; etc
Ground Support Equipment	Ground power vehicles Lifting trucks Frequency converters	 M-G; CVCF

Electrical Power System

Dominant source of electrical generation, distribution and conversion equipment for Japanese military aircraft

GENERATION

- AC GENERATOR
- DC GENERATOR
- LINE CONTACTOR
- OVER CURRENT PROTECTION UNIT
- BUS POWER CONTROL UNIT

DISTRUBUTION

- SECONDARY POWER DISTRIBUTION
  - -LOAD/ UTILITY MANAGEMENT CENTER
  - -SSPC MODULE

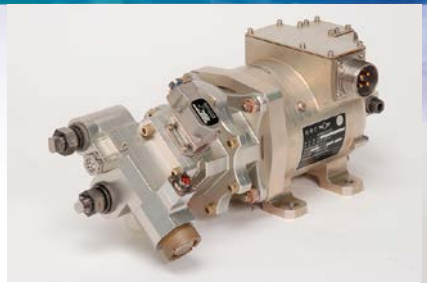
POWER CONVERSION

- INVERTER
- CONVERTER

Electrical Power System
Generation

AC GENERATOR

- Constant Frequency / Variable Frequency
- Power Range: 5~250kW (115/200 Vac)
- Input Speed Range: 6,000-24,000rpm
- R&D: Brushless Starter Generator:
  Target 200kW(115/200Vac)



C-2 5kVA
Hydraulic Generator

P-1/C-2 90kVA T-IDG

AC GENERATOR CONTROLLER

- High Performance of Protection by Analog/ Digital Control
- MIL-STD-1553/RS422/ARINC-429 Network
- Enhanced BIT by Digital Control Technology

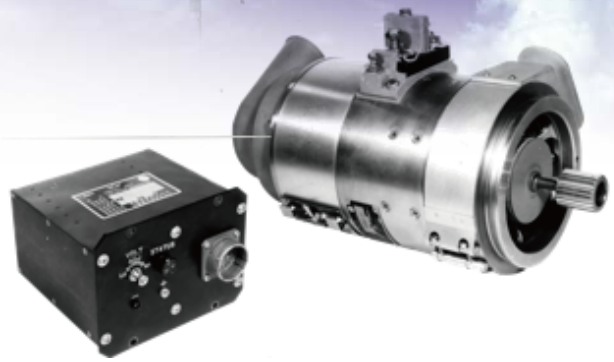
Brushless Starter Generator
(Concept)

US-2
40 kVA VSCF

Electrical Power System
Generation

DC GENERATOR

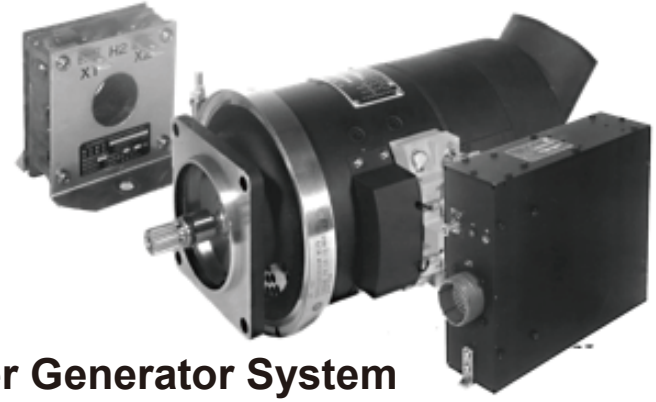
- Starter Generator (Brush Type)
- Power Range: 4.5~9kW (28Vdc)
- Input Speed Range: 4,000-12,000rpm
- R&D: Brushless Starter Generator: 28Vdc, 270Vdc



Starter Generator System
(28Vdc 300Amp)

DC GENERATOR CONTROLLER

- High Reliability Voltage Regulation
- Soft Start by Field Weak Control
- Parallel Operation (2 Gen average load)
  by Equalizing Function



Starter Generator System
(28Vdc 200Amp)

Electrical Power System
Generation

LINE CONTACTOR

- Bus Tie Relay Unit
  Rated point : 28Vdc 200A

Bus Tie Relay

OVER CURRENT PROTECTION UNIT

- Rated point : 200Vac 500A

BUS POWER CONTROL UNIT

- High Performance Protection
  by Analog/ Digital Control
- MIL-STD-1553/RS422/ARINC-429 Network
- High Performance Bit
  by Digital Control Technology

Over Current Protection Unit

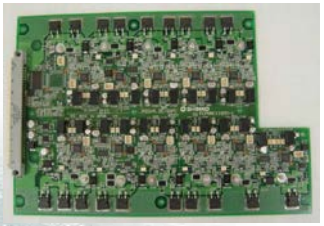
Bus Power Control Unit

Electrical Power System
Distribution

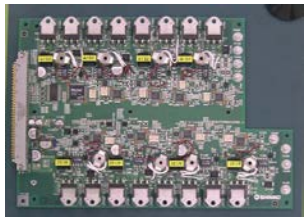
SECONDARY POWER DISTRIBUTION

- Load/Utility Management Center
  - -Indigenous SSPC
  - -Control Panel
  - -Arc Fault Detection
- SSPC Module
  - -MCPCM (Multi-Channel Power Controller Module)

P-1 / C-2 Load Management Center

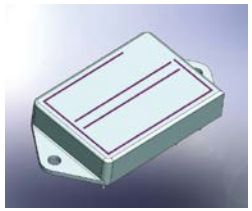


DC MCPCM
28Vdc 15Amp max

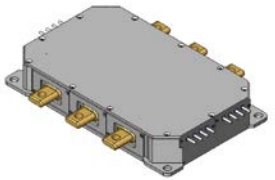


AC MCPCM
115Vac 15Amp max

- R&D: High Power SSPC
  - -Modular/Stand Alone
  - -High Voltage/Current:
    Target 270Vdc 70Amp max



Modular
(Concept)



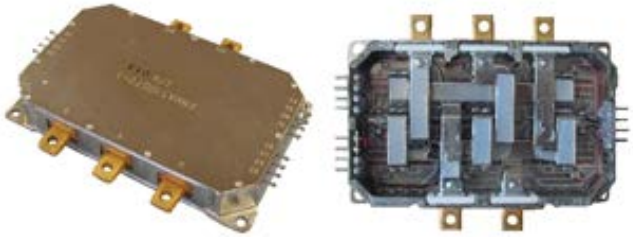
Stand Alone
(Concept)

Electrical Power System
Power Conversion

Inverters	Up to 750VA
Transformer Rectifier	Up to 4.5kVA
AC-AC Converter	Up to 3.5kVA
VSCF Converter	Up to 40kVA(120kVA R&D)
Motor-Controller	Up to 30kVA(R&D)
IGBT Power Module	Up to 400Amp

750 VA Inverter

40KVA VSCF Converter



400A IGBT Power Module

Electro Mechanical Actuation System

Most reliable source of Electro-Mechanical Actuation (EMA) System for Japanese launch vehicles, aircraft, missiles, torpedoes etc.

- Thrust Vector Control
- Fin Control
- Flight Surface Control

LNG Proto-Type

H-IIA/B 2nd Stage

HTV Ventilation Fan

JEM Lab Pump Motor

H-IIA/B SRB-A

Stores Manegement System

Dominant source of Store Management System for Japanese military aircraft

- MIL-STD-1760 compliance
- Typical stores include;
  AIM-7, AIM-9, AIM-120
  AAM-3, AAM-4, AAM-5
  ASM-1, ASM-2
  AGM-84, AGM-65
  MK-46, Type 97 Torpedo
  MK-84
  Hydra-70, Guns
  Sonobuoys, Mines, Life Saving Kit

F-15 Programmable Armament Control System
(Integral type)

P-1 Stores Management System
(Distribution type)

F-2 Data Transfer Equipment

Hoist & Winches

Leading manufacturer of Rescue Hoists and Cargo Winches for Japanese military aircraft

- Electrical
- Hydraulic
- Up to 250ft/min Reel-In Speed
- Up to 300ft Cable Length

Image courtesy of
Japan Maritime Self-Defense Force

Hoist and Winches

Integrated Motor/Controller Package

Aircraft / Airport Ground Support Equipment

Major source for Japanese military and airlines fleets for a various ground support equipment

Belt loader(EV)

Passenger Step

Ground Power Unit
for Aircraft Maintenance

High-Lift Loader