Static Frequency Converter
TMP-TS370 Series
the Compact 7MW SFC
SFC is a load commutated inverter (LCI), which drives a gas turbine generator like a synchronous motor, and accelerates up to the gas turbine’s self-sustaining speed. Our new compact SFC, TMP-TS370 series, accumulates all major components in a single compact package. This contributes easy site work and space-saving for install.

**Preface**

1. High Reliability

TMEIC has over 3 decades experience and more than 170 SFC units with a total capacity more than 900MW in all over the world. We are continually developing SFC based on well-proven technology. This increases the reliability, safety and efficiency.

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<tbody>
<tr>
<td>1980</td>
<td>Old type SFC</td>
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<tr>
<td>1990</td>
<td>New type SFC</td>
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</table>
2. High Efficiency : **98.2%**

High efficiency approx. 98.2% is achieved. This contributes the energy saving and reduces the demand on air conditioner.

3. Compact Footprint : **4.3m²**

Space reduction to **51%** of our conventional model achieved.

4. Easy Install

TMP-TS370 accommodates all circuits, including power converters, dc reactor and controls, in one package. No re-wiring work and no re-assembling work are required at site.
5. 12pulsed Rectifier (Option)

12pulsed rectifier can be chosen to suit the particular requirements. 12pulsed rectifier decreases the harmonic distortion on the supply line.

6. Man-machine interface

Large LCD touch panel provided for excellent operability and maintainability.

7. Trace Monitoring (Option)

“SFC Trace Monitoring” software indicates some useful wave data memorized just before and just after the failure on the PC screen.

This contributes the trouble shooting, and increase the reliability.

Sample images of “SFC Trace Monitoring” software
SFC consists of four main components, and they all are accommodated in one package.

**Rectifier / Inverter DC Reactor Control**

**Static Frequency Converter**

- **Input:** System frequency
- **Output:** Frequency synchronized with generator rotation

Line transformer → To main transformer → Generator

- **Rectifier**
  Converts the AC power to DC and controls the DC current by phase control of thyristors.

- **DC Reactor**
  Smooths the DC current.

- **Inverter**
  Converts the DC to AC synchronizing with generator motor rotation by phase control of thyristors.

- **Control**
  Controls and monitors the devices.
SFC is started, stopped, and operated by external requests as follows.

(1) **GT/SFC SELECTED REQUEST**
   Activates the cooling fan for ready to start-up.

(2) **SFC START REQUEST**
   Starts in the constant current control and the pulse mode. Then, SFC operation mode switches to the load commutation mode when the rotational speed and the generator voltage is increased enough.

(3) **SFC HIGH SPEED KEEP REQUEST**
   Switches to the speed control and maintains the rotational speed of the gas turbine in constant (at the purge speed).

(4) **SFC HIGH SPEED SPIN REQUEST OFF**
   Gradually reduces the rotational speed of the gas turbine.

(5) **SFC LOW SPEED KEEP REQUEST**
   Maintains the rotational speed of the gas turbine in constant (at firing speed).

(6) **SFC ACCELERATION REQUEST**
   Reaccelerates the gas turbine when firing is completed. SFC increases the output current to the current set value.

(7) **SFC OFF REQUEST**
   Gradually reduces the output current to zero. SFC stops after the output current gets down to zero.

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**Diagram Description:**
- **External request**
- **Turbine rotational speed**
- **Output current**
- **Control mode**
- **Operation mode**

- SFC START REQUEST
- SFC HIGH SPEED SPIN REQUEST OFF
- SFC LOW SPEED KEEP REQUEST
- SFC ACCELERATION REQUEST
- SFC OFF REQUEST

- Current control
- Speed control
- Current control
- Pulse mode
- Load commutation mode

- Firing

Dimensions

Unit: mm
Weight: 7200kg TS370 (6pulse) type
7400kg TS370T (12pulse) type

Circuit configurations

TMP-TS370 (6pulse) type

TMP-TS370T (12pulse) type
## Specifications

<table>
<thead>
<tr>
<th>Standard Model</th>
<th>TMP-TS370-60</th>
<th>TMP-TS370T-60</th>
<th>TMP-TS370-70</th>
<th>TMP-TS370T-70</th>
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<tr>
<td><strong>System Rating</strong></td>
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<tr>
<td>Output power (MW)</td>
<td>6</td>
<td>7</td>
<td>2.8</td>
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<tr>
<td>DC voltage (kV)</td>
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<tr>
<td>DC current (A)</td>
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<td>2,500</td>
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<tr>
<td>Output voltage (kV)</td>
<td>2.6 (50 Hz area) / 2.7 (60 Hz area)</td>
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<tr>
<td>Output voltage variation (%)</td>
<td>+ / –4</td>
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<td>Output current (Arms)</td>
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<td>2,041</td>
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<tr>
<td>Output frequency (Hz)</td>
<td>0.05 to 33 (50 Hz area) / 0.05 to 40 (60 Hz area)</td>
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<td>Input voltage (kV)</td>
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<td>1.45 × 2</td>
<td>2.9</td>
<td>1.45 × 2</td>
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<td>Input capacity (kVA)</td>
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<td>4400 × 2</td>
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<td>5150 × 2</td>
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<td>Input frequency (Hz)</td>
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<td>Incoming voltage variation (%)</td>
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<td><strong>Rectifier/Inverter</strong></td>
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<td>Inverter 1S1P6A</td>
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<td><strong>DC Reactor</strong></td>
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<td>Installation location</td>
<td>Indoors, altitude 1,000 m max.</td>
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<td>Ambient temperature (℃)</td>
<td>0 to 40 / 50 (Option)</td>
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### Output voltage characteristics (Controlled by excitation system)

**50Hz area**

- **Output voltage**
  - V/f constant.
  - 2.6kV

- **AVR**
  - Voltage constant.

- **Rated voltage of generator**
  - 2.6kV × 50Hz

- **Frequency**
  - 33Hz

**60Hz area**

- **Output voltage**
  - V/f constant.
  - 2.7kV

- **AVR**
  - Voltage constant.

- **Rated voltage of generator**
  - 2.7kV × 60Hz

- **Frequency**
  - 40Hz