ALTERNATOR & PARALLEL OPERATION EXPERIMENT SYSTEM
Model Number: GOTT-APOE-01

PRODUCT DESCRIPTION
- The alternator will convert mechanical energy into electrical energy, by electro-magnetic induction.
- This system provides a better understanding on the relations between the field excitation, rotor speed, the open circuit armature voltage and the short circuit current and also allows student to indicate whether two periodic motions are synchronous.
- This module support large numbers of alternators in parallel and additional alternators must be switched in when demand rises.
- It is a very versatile and complete training system for performing various experiments in electrical parallel operation.
- Various components and equipment are assembled to suit the training purpose.

PRODUCT MODULES

<table>
<thead>
<tr>
<th>Module Description</th>
<th>Code</th>
<th>Code</th>
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<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOUBLE VOLTMETER</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
</tr>
<tr>
<td>Type: Moving Coil</td>
<td>190-001</td>
<td>190-002</td>
<td>190-003</td>
<td>190-004</td>
<td></td>
</tr>
<tr>
<td>Mode: AC / DC</td>
<td></td>
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</tr>
<tr>
<td>Range: 0...250V, 0...500V</td>
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<tr>
<td>MOVING COIL AMMETER</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
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</tr>
<tr>
<td>Type: Moving Iron</td>
<td>190-005</td>
<td>190-006</td>
<td>190-007</td>
<td>190-008</td>
<td></td>
</tr>
<tr>
<td>Mode: AC / DC</td>
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</tr>
<tr>
<td>Range: 0...1A</td>
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<tr>
<td>MOVING IRON AMMETER</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
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</tr>
<tr>
<td>Type: Moving Iron</td>
<td>190-009</td>
<td>190-010</td>
<td>190-014</td>
<td>190-013</td>
<td></td>
</tr>
<tr>
<td>Mode: AC / DC</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Range: 0...1A</td>
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<td></td>
</tr>
<tr>
<td>POWER FACTOR METER</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
</tr>
<tr>
<td>Range: 0.5 (Lag) ... 0.5 (Lead)</td>
<td>190-003</td>
<td>190-006</td>
<td>190-014</td>
<td>190-013</td>
<td></td>
</tr>
<tr>
<td>ELECTRONIC TACHOMETER</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
</tr>
<tr>
<td>RPM Range: 0...9999rpm</td>
<td>190-009</td>
<td>190-010</td>
<td>190-014</td>
<td>190-013</td>
<td></td>
</tr>
<tr>
<td>Input: AC 240V, 50Hz 1-Phase</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>RESISTIVE LOAD</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
</tr>
<tr>
<td>Resistance: 0Q, 200Q, 350Q, 500Q, 650Q, 800Q, 1kΩ</td>
<td>190-009</td>
<td>190-010</td>
<td>190-014</td>
<td>190-013</td>
<td></td>
</tr>
<tr>
<td>No. of resistive load: 3</td>
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<td></td>
</tr>
<tr>
<td>INDUCTIVE LOAD</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
</tr>
<tr>
<td>Inductance: 0.15H, 0.3H, 0.45H, 0.6H, 0.75H, 0.9H, 1H</td>
<td>190-009</td>
<td>190-010</td>
<td>190-014</td>
<td>190-013</td>
<td></td>
</tr>
<tr>
<td>No. of inductive load: 3</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>VARIABLE DC POWER SUPPLY</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
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<tr>
<td>Output: 0...250VDC</td>
<td>190-009</td>
<td>190-010</td>
<td>190-014</td>
<td>190-013</td>
<td></td>
</tr>
<tr>
<td>Input: AC 240V, 50Hz 1-Phase</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>SYNCHRONIZATION INDICATOR</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
</tr>
<tr>
<td>Indicator Light 240VAC x 6 units Color: Red</td>
<td>190-009</td>
<td>190-010</td>
<td>190-014</td>
<td>190-013</td>
<td></td>
</tr>
<tr>
<td>PHASE SEQUENCE INDICATOR</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
</tr>
<tr>
<td>To determine the phase sequence of three phase voltages</td>
<td>190-009</td>
<td>190-010</td>
<td>190-014</td>
<td>190-013</td>
<td></td>
</tr>
<tr>
<td>POWER CIRCUIT BREAKER</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
<td>CODE</td>
</tr>
<tr>
<td>Contact: NO &amp; NC</td>
<td>190-009</td>
<td>190-010</td>
<td>190-014</td>
<td>190-013</td>
<td></td>
</tr>
<tr>
<td>Coil Voltage: 240VAC</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

PRODUCT CONTENTS

- ELECTRONICS & ELECTRICITY
- www.gott.com.my
- ALTERNATOR & PARALLEL OPERATION EXPERIMENT SYSTEM
- Model Number: GOTT-APOE-01
- YOUR SOLUTION TO EDUCATION TRAINING SYSTEM
- E-20 www.gott.com.my
ELECTRONICS & ELECTRICITY

ALTERNATOR & PARALLEL OPERATION EXPERIMENT SYSTEM

Model Number : GOTT-APOE-01

THREE PHASE AC POWER SUPPLY
Pilot Lamps L1, L2 & L3
Fault Current Circuit Breaker 3 Poles
Motor Protection Switch 25A
Output: 0...240VAC x 3 units
0...415VAC
Input: AC 415V, 50Hz 3-Phase

THREE PHASE SUPPLY MODULE
Pilot Lamps L1, L2 & L3
Fault Current Circuit Breaker 3 Poles
Motor Protection Switch 25A
Output: L1-N, L2-N, L3-N 240VAC
L1-L2, L2-L3, L1-L3 415VAC
Input: AC 415V, 50Hz 3-Phase

CAPACITIVE LOAD
Capacitance: 1μF, 2μF, 4μF, 8μF, 12μF, 14μF, 16μF
No. of capacitive load: 3

EXPERIMENT TRANSFORMER
Output: 0...42VAC/DC
0...24VAC/DC
0...12VAC/DC
Input: AC 240V, 50Hz 1-Phase

SYNCHRONOSCOPE
To measure and display the frequency difference and phase angle between two power systems

DC COMPOUND MOTOR
Power: 240W
Voltage: 240VDC
Current: 1A
Speed: 1500rpm
Excitation Voltage: 240VDC
Excitation Current: 0.5A

TACHO GENERATOR
Speed: 2000rpm
Output: Max. 20VDC

WOUND ROTOR INDUCTION MACHINE
Power: 100W
Voltage: 415VAC
Current: 0.55A
Excitation Voltage: 12VDC
Speed: 1400rpm
Connection: Δ & Y

THREE PHASE SYNCHRONOUS GENERATOR
Power: 170W
Voltage: 415VAC
Current: 0.43A
Excitation Voltage: 12VDC
Excitation Current: 1.4A
Speed: 1500rpm
Connection: Star

DC SEPARATELY EXCITED MACHINE
Power: 240W
Voltage: 240VDC
Current: 1.0A
Excitation Voltage: 240VDC
Excitation Current: 1.0A
Speed: 1500rpm

ROTATE SPEED SENSOR
Used with DC Motor Control Unit/ Tachometer

SAFETY CONNECTING LEAD
4mm connecting leads

VERTICAL FRAME
High Level: Din Standard A4 with two shelves
Material: Aluminium
Side Frame: T shape
Size: 3-Layer 1450mm Length

EXPERIMENT TOPICS:
• Effective Resistance of an Alternator
• Mechanical & Iron Losses of a Synchronous Generator
• Synchronous Generator Parameters & Open Circuit
• Ohmic & Stray losses of a Synchronous Generator
• Synchronous Generator Parameters & Short Circuit
• Synchronous Reactance of Open & Short Circuit
• Conventional Efficiency of Open & Short Circuit
• Synchronize the Three-phase alternators by using lamp method & synchronoscope
• Response of the alternator on a constant voltage constant frequency system

ORDERING INFORMATION:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALTERNATOR &amp; PARALLEL OPERATION EXPERIMENT SYSTEM</td>
<td>GOTT-APOE-01</td>
</tr>
</tbody>
</table>

Manuals:
(1) All manuals are written in English
(2) Model Answer
(3) Teaching Manuals

General Terms:
(1) Accessories will be provided where applicable
(2) Manuals & Training will be provided where applicable
(3) Designs & Specifications are subject to change without notice
(4) We reserve the right to discontinue the manufacturing of any product

Warranty:
2 Years

* Proposed design only, subject to changes without any notice.