**POWER ELECTRONICS TRAINING KIT**

Model Number : GOTT-PET-588A

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**DESCRIPTION**

The Power Electronics Training Kit has been designed to control electrical energy with the greatest efficiency possible. In fact, it allows the implementation of theoretical-practical courses, for the study of power electronics. The individual units of an experimental set-up are connected via 4mm safety sockets which are arranged in large, synoptically graphical symbols and current flow diagrams. Due to the vertical arrangement of the experimental panels, the experimental set-up can be seen from a far distance and can be adapted step by step to the course of the lessons or lectures.

The experiments permit practice-oriented, hands-on training to be carried out, thus assuring the trainees of the proficiency needed to handle the tasks and the equipment found in this field. The training panels and functional units with block circuit diagrams and signal diagrams permit clear and understandable assembly of the experiment circuits.

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### PRODUCT MODULES

<table>
<thead>
<tr>
<th>AC POWER SUPPLY</th>
<th>CODE 588-001</th>
<th>THREE PHASE TRANSFORMER</th>
<th>CODE 588-101</th>
<th>FOUR CHANNELS ISOLATION AMPLIFIER</th>
<th>CODE 588-021</th>
<th>CONTROL UNIT SIX PULSE</th>
<th>CODE 588-006</th>
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</thead>
<tbody>
<tr>
<td>FCCB x 1 unit</td>
<td>Mains Control Lamps x 3 units</td>
<td>Protection Fuse 3A x 3</td>
<td>Input : 415v 3phase</td>
<td>Channels can be switched on or off individually</td>
<td>Frequency Range: DC ... 80kHz</td>
<td>Single pulse or pulse train operation Phase shift can be set for various natural commutating points: 0°, 30°, 60°</td>
<td></td>
</tr>
<tr>
<td>Mains Control Lamps x 3 units</td>
<td>4mm safety sockets</td>
<td>Input : 415, 50Hz 3 Phase</td>
<td>Output: AC: 3 x 90V/1.5A with 3 center taps 45V</td>
<td>Overdrive indication with LEDs 4mm Safety Sockets</td>
<td>Input: AC 240V, 50Hz 1-Phase</td>
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</tr>
</tbody>
</table>

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**CONTROL UNIT TWO PULSE**

**CODE 588-005**

Single pulse or pulse train operation Phase shift can be set for various natural commutating points: 0°, 30° Output:
- Synchronize Voltage: 1...250VAC
- Control Voltage: 0 ... +10VDC
Input: ±15VDC

**THYRISTOR WITH TURN OFF CIRCUIT**

**CODE 588-016**

Main Thyristor and Turn-off Thyristor:
- \( V_{DRM} \): Max 800V
- \( I_{AV} \): Max 13A
- \( T_{Q} \): 35\( \mu \)s
Free-wheeling Diode:
- \( V_{BR} \): Max 1000V
- \( I_{AV} \): Max 8A
Shunts: 4 x 0.1 ohm, 1%
Turn-off Capacitor: 4\( \mu \)F, 450V
Ring-around reactor: 1mH

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**CONTROL UNIT PWM / PFM**

**CODE 588-007**

Operation can be selected with the following control modes: Pulse Width Modulation (PWM) and Pulse Frequency Modulation (PFM)
Control voltage: 0 ... +10VDC
Pulse Width Modulator:
- Frequency Ranges: 20 ... 200Hz / 0.2 ... 2kHz / 2 ... 20kHz
- Pulse Duty Factor \( t_{ON} / T_{Q} \): 0 ... 0.95
Pulse Frequency Modulator:
- Pulse Duration Ranges: 5 ... 50\( \mu \)s / 50 ... 500\( \mu \)s / 0.5 ... 5ms
- Frequency: 20Hz ... 20kHz
Output Amplifier:
- Sustained short-circuit proof
- Indication of switching state via 2 LEDs
- INHIBIT input
Input: ±15VDC
# POWER ELECTRONICS TRAINING KIT

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<table>
<thead>
<tr>
<th>Component</th>
<th>Code</th>
<th>Description</th>
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<tr>
<td><strong>REFERENCE VARIABLE GENERATOR</strong></td>
<td>588-003</td>
<td>Output: (selectable using bridging plug) - 0 ... +10VDC -10VDC ... +10VDC Input: ±15VDC</td>
</tr>
<tr>
<td><strong>TRIGGER POINT LIMITER</strong></td>
<td>588-004</td>
<td>LED indication for overlap Rectifier Stability Limit: 0° ... 180° Inverter Stability Limit: 180° ... 0° Input: ±15VDC</td>
</tr>
<tr>
<td><strong>IGBT</strong></td>
<td>588-014</td>
<td>$V_{CES}$: Max 1000V $I_{CES}$: Max 10A $V_{CEO}$: 3.5V $C_{GE}$ : 1.8Nf</td>
</tr>
<tr>
<td><strong>SINGLE PHASE RECTIFIER</strong></td>
<td>588-029</td>
<td>Periodic Repetitive Peak Reverse Voltage: 500V On-State Current: 10A Protection: Fast Acting Fuse With R-C-D suppressor circuit</td>
</tr>
<tr>
<td><strong>FUSE</strong></td>
<td>588-009</td>
<td>Rated voltage : 415VAC Protection Fuse 2A x 3 units</td>
</tr>
<tr>
<td><strong>POWER DIODE</strong></td>
<td>588-010</td>
<td>$V_{BRM}$: Max 1000V $I_{FAMS}$: Max 10A</td>
</tr>
<tr>
<td><strong>TRIAC</strong></td>
<td>588-015</td>
<td>$V_{RMS}$: 800V</td>
</tr>
<tr>
<td><strong>CAPACITOR UNIT</strong></td>
<td>588-018</td>
<td>Nominal Capacitance: 2 x 1000µF Nominal Voltage : 415V</td>
</tr>
<tr>
<td><strong>RECTIFIER</strong></td>
<td>588-011</td>
<td>Nominal Voltage: 3 x 400V Nominal Current: 10A Surge Forward Current: 300A</td>
</tr>
<tr>
<td><strong>MOSFET</strong></td>
<td>588-013</td>
<td>$V_{DS}$: Max 500V $I_{D}$: Max 10A $R_{DSON}$: 0.6Ω 4 Each</td>
</tr>
<tr>
<td><strong>BULB SOCKET</strong></td>
<td>588-020</td>
<td>Incandescent Lamp x 3 units Input: AC 240V, 50Hz 1-Phase</td>
</tr>
<tr>
<td><strong>RESISTOR LOAD</strong></td>
<td>588-017</td>
<td>Resistor 1000 x 3 units Protection Fuse 1A x 3 units</td>
</tr>
<tr>
<td><strong>DC POWER SUPPLY</strong></td>
<td>588-002</td>
<td>Two red LED (Voltage monitor) 4 mm Sockets Output: ±15VDC &amp; +5VDC Input: AC 240V, 50Hz 1-Phase</td>
</tr>
<tr>
<td><strong>THYRISTOR</strong></td>
<td>588-012</td>
<td>Thyristor x 6 units Protection Fuse 1.5A x 6 units $V_{BRM}$: Max 1000V $I_{FAMS}$: Max 12A</td>
</tr>
<tr>
<td><strong>ELECTRICAL METER</strong></td>
<td>588-038</td>
<td>Voltmeter range: 0...500VAC Ammeter range: 0...5A Input: AC 230V, 50Hz 1-Phase 2 Each</td>
</tr>
<tr>
<td><strong>DC MEASUREMENT UNIT</strong></td>
<td>159-008</td>
<td>Voltmeter range: 0...500VDC Ammeter range: 0...5A Output: 230VDC Input: AC 230V, 50Hz 1-Phase 2 Each</td>
</tr>
</tbody>
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POWER ELECTRONICS TRAINING KIT
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ORDERING INFORMATION :

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<th>ITEM</th>
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<td>GOTT-PET-588A</td>
<td>590-000</td>
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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

EXPERIMENT TOPICS :
The Power Electronics Training Kit makes it possible to build up straightforward experimental circuits in keeping with practical requirements. Groups of experiments on basic power electronic circuits are presented, demonstrated and explained on the basis of rectifiers in a tried-and-tested didactic manner and sequence.

- Single-Phase Half-Wave Half Controlled Rectifier Circuit
- Single-Phase Full-Wave Controlled Rectifier Circuit
- Single-Phase Bridge-Type Controlled Rectifier Circuit
- Single-Phase AC Booster Circuit
- Three-Phase Bridge-Type Controlled Rectifier Circuit
- Quenching Circuit Step-Down DC Chopper Module
- MOSFET Step-Down DC Chopper Circuit
- IGBT Step-Down DC Chopper Circuit
- Passive Inverter Circuit
- Fault Simulator
- Connection Diagram

ADDITIONAL MODULE:
Please refer to page “Advanced Power Electronics Training Kit Additional Module”.

RLC LOAD
Resistor 1kΩ
Inductor 50mH 2.5A with tap at 12.5mH
Capacitors 4/8/16µF, 450VAC

SAFETY U-LINK
A unit which is wed to link the unit together

SAFETY CONNECTING LEAD
4mm connecting leads

FAULT SIMULATOR PHASE CONTROL
A total of 20 faults from the following categories can be switched on:
- Faulty components
- Interruption
- Faulty assembly
- Short-circuit
Input: AC 240V, 50Hz 1-Phase

U-LINK
A unit which is wed to link the unit together

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

EXPERIMENT MANUAL

WARRANTY :
2 Years

(Proposed design only, subject to changes without any notice.)