TERCO

Basic Power Electronics

Contents

Guarantee & Terms

All overseas deliveries are dispatched in special, made to order wooden crates, extremely sturdy and damage resistant.

The guarantee is valid for 24 months from delivery and covers repair or exchange of parts, defective due to faulty design or workmanship at our factory. Detailed conditions of guarantee are specified in our Terms of Guarantee.

Spare parts for 2-5 years of normal operation can be offered on request.

Regular after-sales service is performed by the worldwide network of Terco representatives, along with the advice and support of our engineers.

Commissioning and training is normally offered separately. Special training can be arranged on request either in Sweden or on site.

Terco is ISO 9001 certified.

Terco reserves the right to make changes in the design and modifications or improvements of the products at any time without incurring any obligations.

Power Electronics

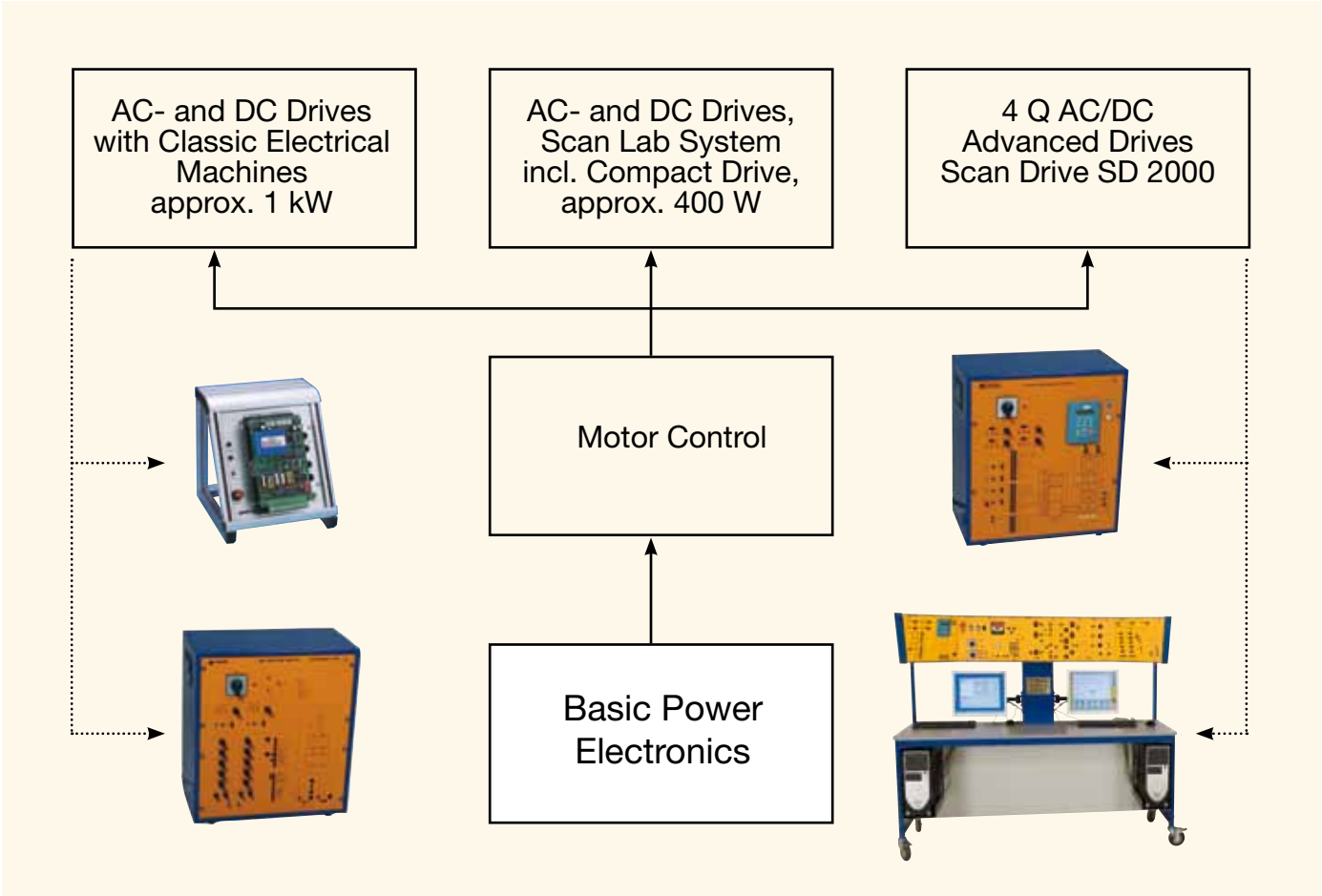
Power Electronics is a very important field within the industry worldwide.
It is of utmost importance that students in the engineering branch have access to good laboratory equipment.

Within Power Electronics, Terco has a complete set of educational equipment, covering different components e.g. diode, thyristor, triac, diac, different transistors, amplifiers, etc., up to advanced AC- and DC drives.

Beyond the Basic Power Electronics Programme we present a package for traditional “Motor Control” covering Contactor Control, AC- and DC Converters, which also can be controlled by PLC.

Besides our Power Electronics we have more advanced AC- and DC drives complete with motors, generators, loads etc. Our most advanced system is the Scan Drive System SD 2000, which is a complete mobile system for teaching electrical machines to computerized 4-quadrant drive to induction motors.

Terco has different packages within advanced Drives for Electrical Machines:



The concept in our modern technical laboratory packages has become a decisive factor for our customers. We have modern products and a reliable service. The equipment is produced by a technically highly competent staff to conform to the highest standards.

Basic Power Electronics

This Power Electronics Laboratory Package is a complete educational set, consisting of 6 Lab Cards IK 1 – IK 6, slotting into the Base Unit 2000. The package also includes AC and DC Motors for studying AC- and DC Drives. It also gives knowledge in electronic power components in drives, and how the drives are built up.

The HK 1 Help Function Card, available as an accessory, serves as additional power supply and as function generator.

This laboratory package helps the student's ability to analyse electronic apparatus as a whole and determines it's function. It also provides knowledge and experience of measuring techniques for location and rectifying faults in industrial or power production electronic systems.

ELE102000 Base Unit 2000

The start line of the laboratory system is Base Unit 2000, a control box containing power supply, circuit box and PCB-holder.

The Base Unit is to be equipped with laboratory cards which have been carefully designed to suit each particular area of study.

The Lab Cards put in slots and are automatically powered via a D-sub connector.

Technical data:

Supply voltage 230 V 50 – 60 Hz 1-phase

The unit has 6 outputs with following data:
Output 1 - 3: DC 12 V / 3 A with LED indication and fuse
Output 4 - 6: AC 12 V / 3 A with LED indication and fuse

Size: 390 x 260 x 115 mm
Weight: 4 kg

Lab Cards

ELE 102221 Lab Card IK 1 Power Regulator

The topics covered by Lab Card IK 1 Power Regulator, are the following exercises and experiments.

- Rectification, half bridge and full bridge
- Ripple Smoothing
- Voltage Stabilising with Zener Diode and IC
- Thyristor parameters
- Triac and Diac regulation with a lamp

Technical data:

4 mm panel sockets
Powered from Base Unit 2000 via connector

Size: 220 x 140 mm
Weight: 0.2 kg

ELE 102222 Lab Card IK 2 Transistors

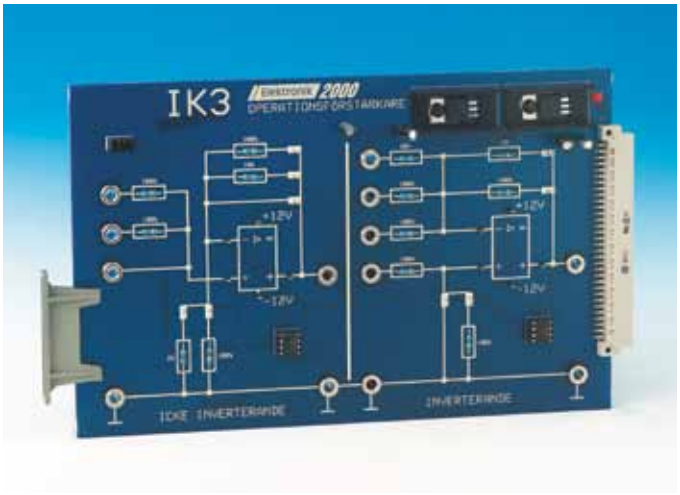
The topics covered by Lab Card IK 2 Transistors, are the following exercises and experiments.

- Power Transistors
- Bipolar Transistor
- MOSFET
- MOSFET Bridge
- IGBT
- Filters

Technical data:

Output P1: DC 0 – 24 V
Output P2: PWM Amplitude 24 V / Modulation 0 – 95%
4 mm panel sockets
Powered from Base Unit 2000 via connector

Size: 220 x 140 mm
Weight: 0.2 kg



ELE 102223 Lab Card IK 3 Operational Amplifier

The topics covered by Lab Card IK 3 Operational Amplifier, are the following exercises and experiments.

- Operational Amplifier
- Voltage Follower
- Comparator
- Inverting Amplifier
- Non Inverting Amplifier
- Inverting Adder
- Non Inverting Adder
- Different Amplifiers

Technical data:

4 mm panel socket
Powered from Base Unit 2000 via connector

Size: 220 x 140 mm
Weight: 0.2 kg

Lab Cards

ELE 102224 Lab Card IK 4 Static Converter

The topics covered by Lab Card IK 4 Static Converter, are the following exercises and experiments.

- Current Converter
- Fault finding
- DC Motor Drive
- Speed Control
- Opto Switch

Lab Card IK 4 will also be used together with the IK DC-Motor

Technical data:

4 mm panel sockets
Powered from Base Unit 2000 via connector

Size: 220 x 140 mm
Weight: 0.2 kg

ELE 102225 Lab Card IK 5 AD/DA Converter

The topics covered by Lab Card IK 5 AD/DA Converter, are the following exercises and experiments.

- Resolution 8 bits
- AD/DA Converter Reference Voltage 5 V

Technical data:

4 mm panel sockets
Powered from Base Unit 2000 via connector

Size: 220 x 140 mm
Weight: 0.2 kg

ELE 102228 Lab Card IK 6 Frequency Converter

Lab Card IK 6 Frequency Converter is a single phase frequency converter, to be used together with the IK AC-Motor.
It covers the following exercises and experiments.

- Frequency speed control of an AC-Motor
- Regulation
- Distortion
- Fault finding

Technical data:

Output Voltage 12 V, 2 A
Adjustable 10 – 90 Hz
4 mm panel sockets
Powered from Base Unit 2000 via connector

Size: 220 x 140 mm
Weight: 0.2 kg

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DC- and AC Motors for Lab Cards IK 4 and IK 6

ELE 102227 IK DC-Motor

DC-Motor with tachometer generator and rpm meter.
The motor can be connected to IK 4 Static Converter.
This DC-motor shall be slot into the Base Unit
ELE 102000 when doing experiments together with
the Static Converter ELE 102224 (DC-motor Drive).
For these experimets two Base Units are needed.

Technical data:

DC-Motor 24V / 10 W

Size: 270 x 140 x 60 mm
Weight: 0.5 kg

ELE 102229 IK AC-Motor

AC-Motor with tachometer generator and rpm meter.
The motor can be connected to IK 6 Frequency
Converter.
This AC-motor shall be slot into the Base Unit
ELE 102000 when doing experiments together with the
Frequency Converter ELE 102228 (AC-motor Drive).
For these experiments two Base Units are needed.

Technical data:

AC-Motor 12 V / 10 W

Size: 270 x 140 x 60 mm
Weight: 0.5 kg

Laboratory Equipment

Code No	Equipment	Code No	Equipment
ELE 102000	Base Unit 2000	ELE 102227	IK DC Motor
ELE 102221	Lab Card IK 1 – Power Regulator	ELE 102229	IK AC Motor
ELE 102222	Lab Card IK 2 - Transistors	ELE 102001	HK1 Help Function Card
ELE 102223	Lab Card IK 3 – Operational Amplifier	ELE 102226	Component Set
ELE 102224	Lab Card IK 4 – Static Converter	ELE 102002	IK Lab Card Storage Rack
ELE 102225	Lab Card IK 5 – AD/DA Converter	STO 170000	IK Laboratory Flex Set
ELE 102228	Lab Card IK 6 – Frequency Converter	BOK 112050	Experiments Book

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Accessories

ELE 102001 HK 1 Help Function Card

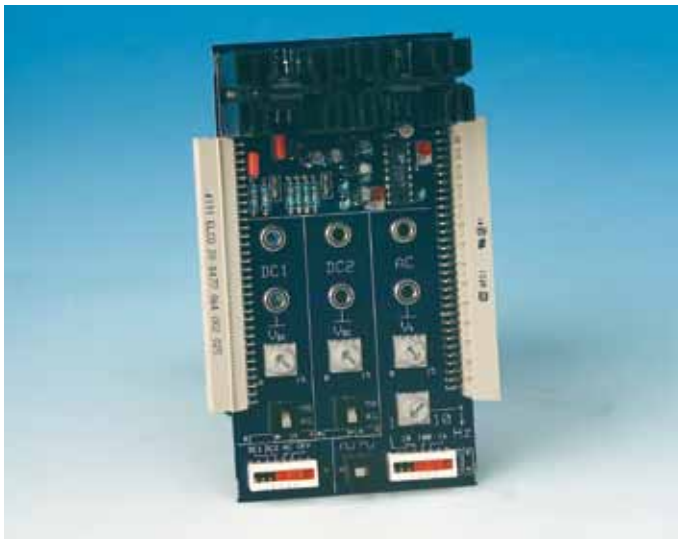
The HK 1 Help Function Card, serves as additional power supply and function generator. The HK 1 slots into the Base Unit 2000, and the Lab Card IK 1 to 6 slots into HK 1.

Technical data:

DC Output 1: 0 - +15 V, (5 V/1.6 A 10V/1.0 A 15 V/0,1 A)
DC Output 2: 0 - -15 V, (5 V/1.6 A 10V/1.0 A 15 V/0,1 A)

Sinus wave 1Hz to 10 kHz in 4 steps
Square wave 1Hz to 10 kHz in 4 steps
Amplitude 0-15 V / 8 Watt

Size: 140 x 75 mm
Weight: 0.2 kg



ELE 102226 IK Component Set

This Load Module consists of potentiometer, resistors, inductor and lamp holder with four lamps.

Size: 100 x 140 mm
Weight: 0.2 kg

STO170000 IK Laboratory Flex Set

The Laboratory Flex Set includes the flexes needed for all the experiments.

3 pcs red	25 cm	3 pcs red	50 cm
3 pcs black	25 cm	3 pcs black	50 cm
1 Test clip	red		
1 Test clip	black		

ELE 102004 IK Storage Rack

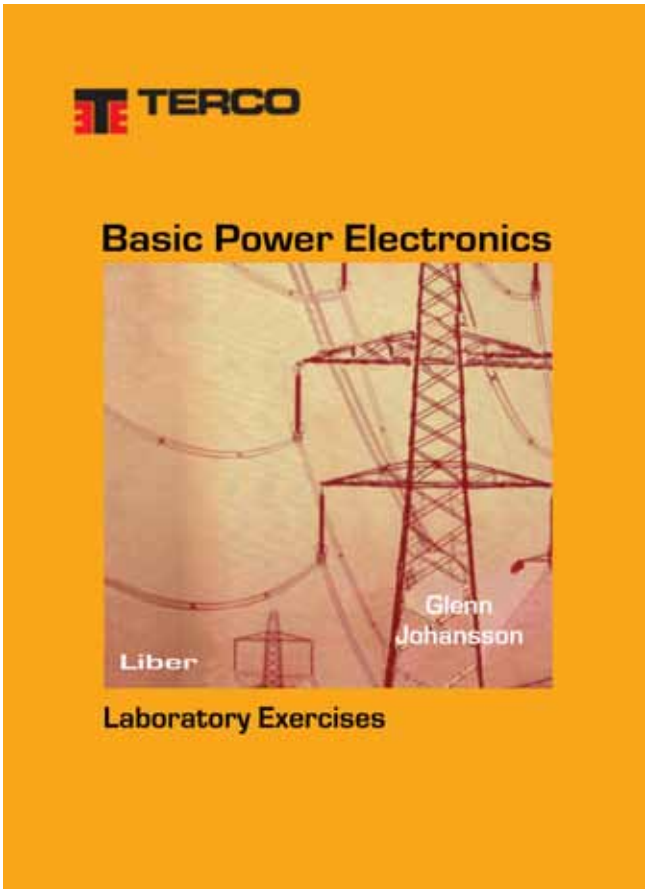
A system storage rack for IK 1 to IK 6 and HK 1. The storage rack will protect the Lab Card against electrical and mechanical damage.

Size: 340 x 180 x 355 mm
Weight: 2 kg

Experiments Book

Industry- and Power Electronics Circuits

This teaching aid provides basic knowledge about the electronics used within the industry and within Power Electronics. To start with, different application fields are studied, followed by recognition of different components and general connections. As examples of systems the current rectifier and the frequency rectifier are described. Measuring experiments may be performed with a voltage lower than 50 V when using equipment specified in this brochure. The fault searching training is done with help of the laboration card IK 4.



The power electronics courseware consists of a comprehensive Experiments Book**. (BOK 112050)**

Contents:

Rectifications

Smoothing

Voltage Stabilising

Thyristors

Triac and Diac

Transistors

Filters

Opto Switches

Operation Amplifiers

Static Current Converter

AD/DA Transducers

Measuring Semiconductors with a Digital Multimeter

Measuring Components with an Oscilloscope

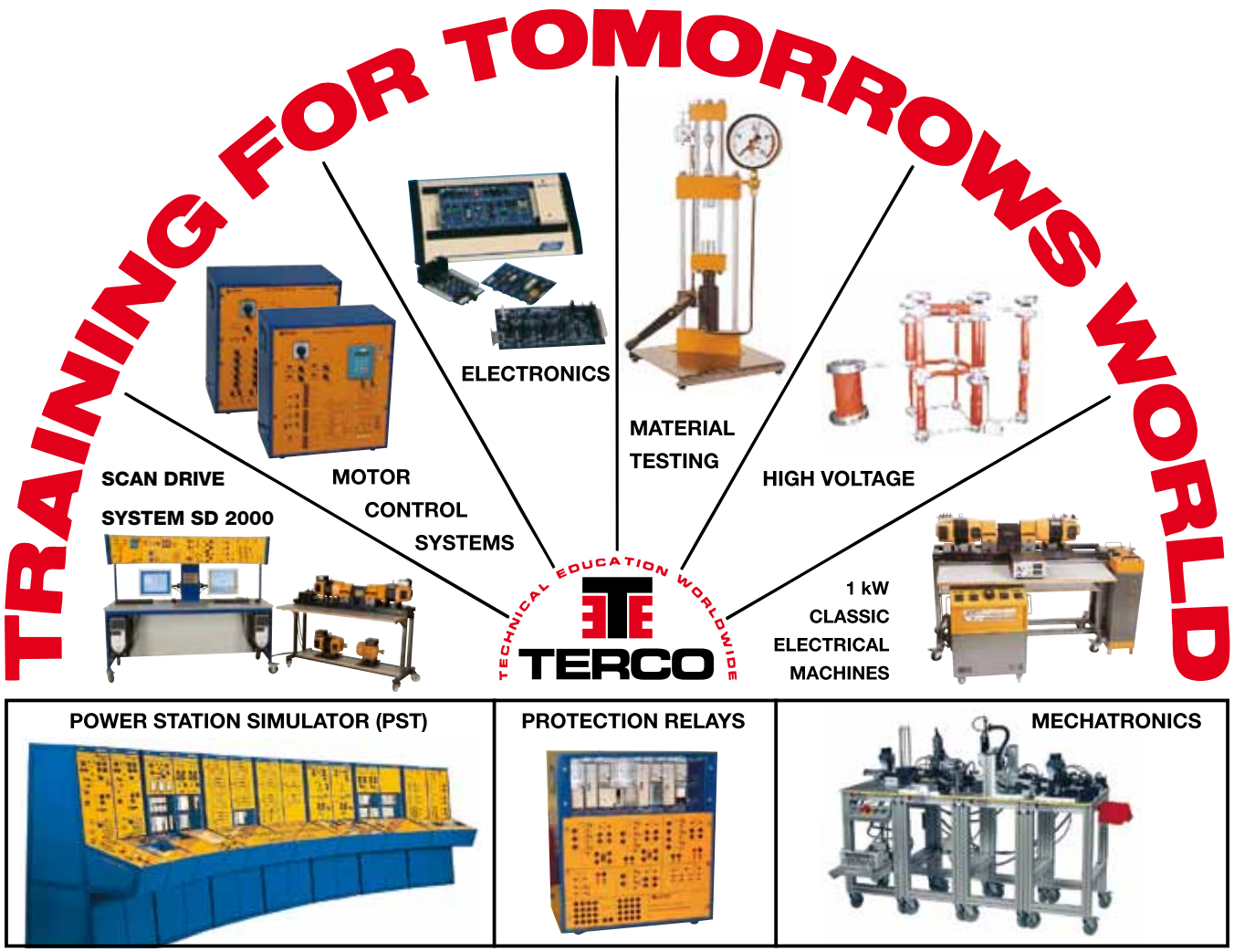
Trouble shooting

After the course the student should be able to:

- Locate and write down PCB faults in an electronic system.
- Measure voltage and signals to and from circuit boards as applied in industrial- and/or power electronic systems.
- Interpret and use connection diagrams as they occur in electronic systems within production.
- Explain the principles of rectification, filtering and stabilization and perform simple trouble shooting in a power supply.
- Describe operation amplifiers and thyristor functions and their use in different industrial applications.
- Measure Semi-conductors with a Digital Multimeter.
- Measure Components with an Oscilloscope.

Terco Headoffice

Terco headoffice and factory outside Stockholm, Sweden.



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