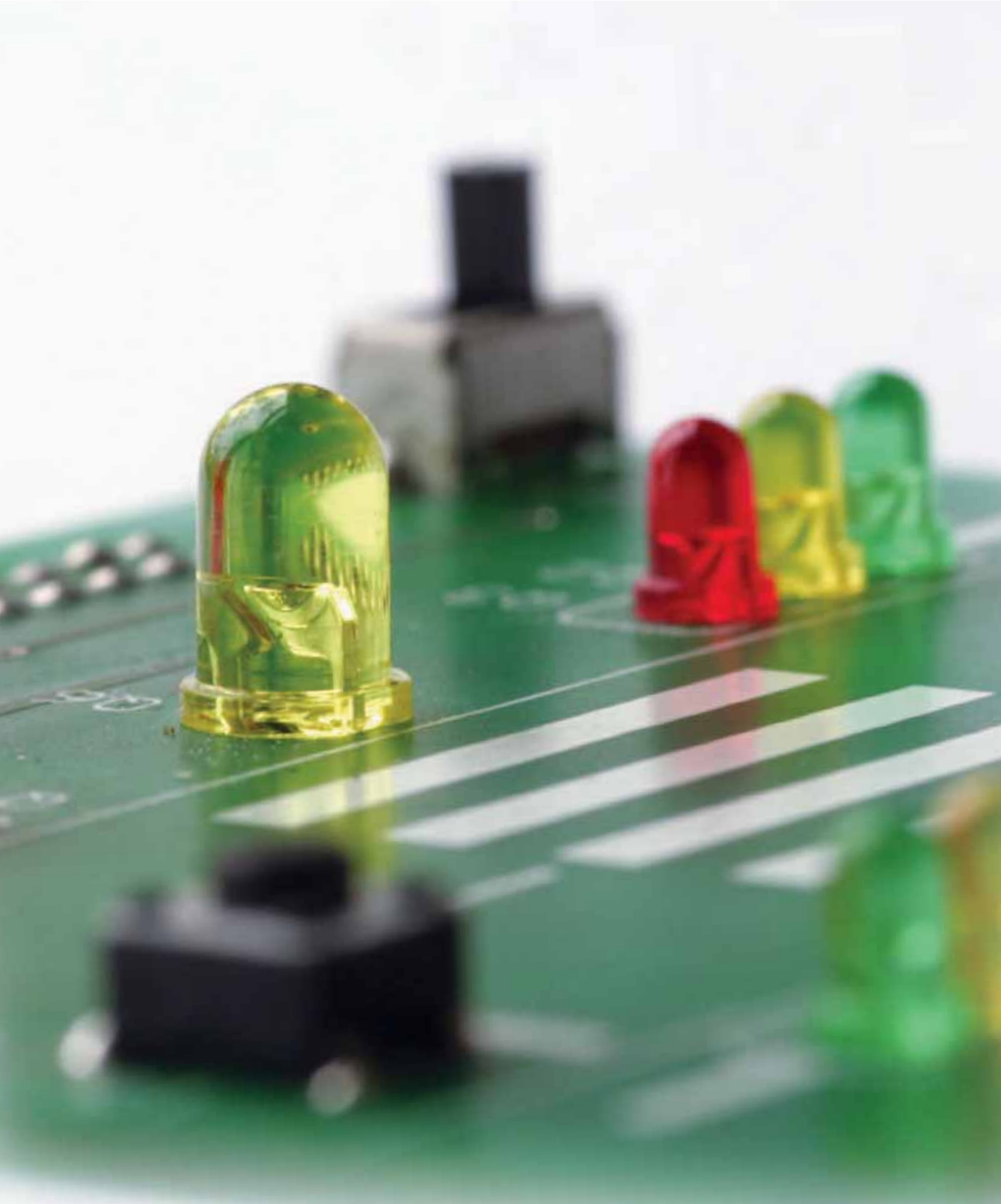




Control Technology



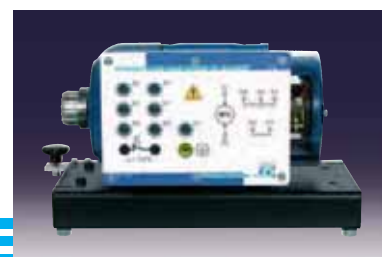
www.elabo-ts.com

Hand-operated Switches



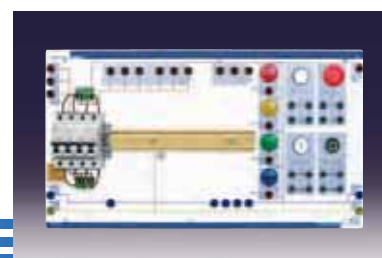
Page 4

Electrical Machines



Page 6

Contactor, Control and Installation Circuits 230 V



Page 8-16

Industrial Instrumentation



Page 17

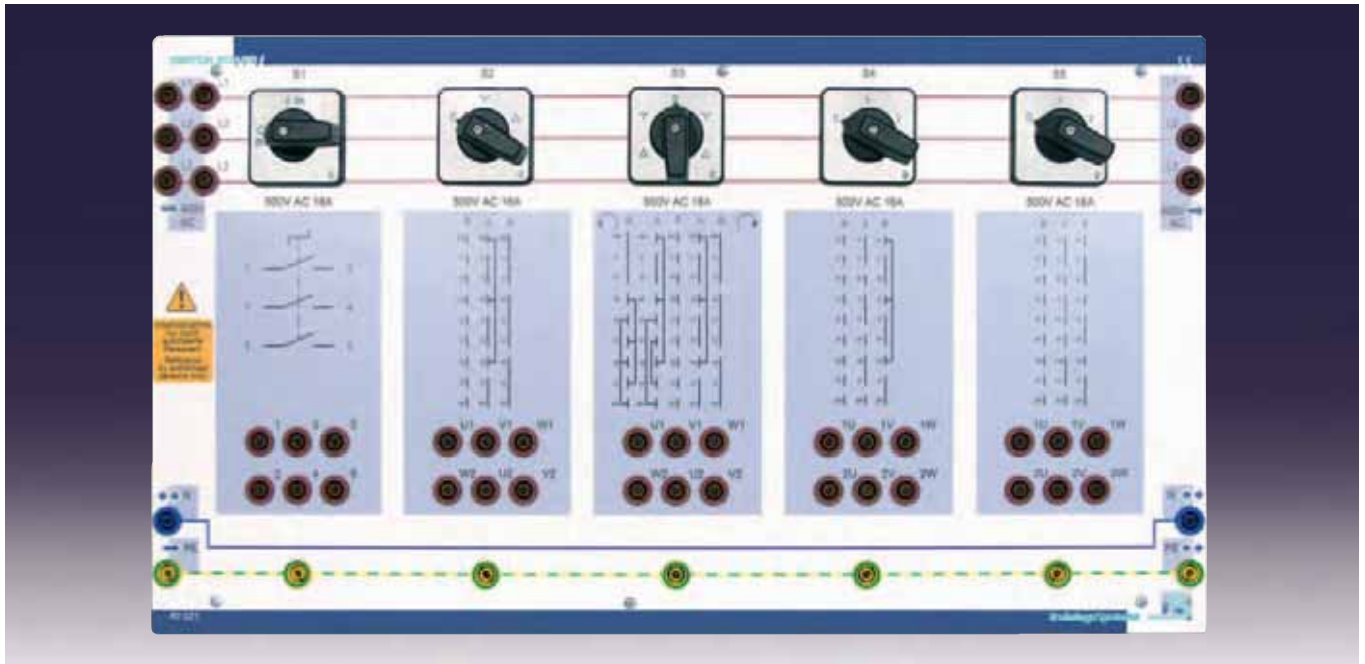
Contactor, Control and Installation Circuits 24 V



Page 18-25

Hand-operated Switches

Switch Board I



40 021 Switch Board I

Learning Objectives:

- ✓ Connecting hand-operated industrial low-voltage switching devices
- ✓ Function test of start, reversing and step circuits
- ✓ Troubleshooting and maintenance

Features

- 1 on/off switch, 3-pole
- 1 star-delta switch
- 1 star-delta reversing switch
- 1 pole-changing switch for Dahlander circuits
- 1 pole-changing switch for separate windings

Technical Data

Rated voltage	230 - 400 V AC
Rated current	10 A
Frequency	50/60 Hz
Breaking capacity	6 kVA



Electrical Machines



Other voltages and frequencies on request!

57 109 Variable Compound Wound DC Machine

Three-phase induction motor 0.25 kW 57 100

Circuit type	star/delta
Voltage	692/400 V AC
Frequency	50 Hz
Speed	1500 rpm

Three-phase induction motor 0.18/0.25 kW 57 101

Circuit type	Dahlander
Voltage	400 V AC
Frequency	50 Hz
Speed	1500/3000 rpm

Three-phase induction motor 0.25 kW 57 102

Circuit type	slipring rotor
Voltage	400 V AC
Frequency	50 Hz
Speed	1500 rpm

Three-phase induction motor 0.12/0.25 kW 57 103

Circuit type	separate windings
Voltage	400 V AC
Frequency	50 Hz
Speed	750/1500 rpm

Three-phase induction motor 0.25 kW 57 104

Circuit type	star/delta
Voltage	400/230 V AC
Frequency	50 Hz
Speed	1500 rpm

Three-phase induction motor 0.25 kW, with EMC-compliant connection cable, for operation with a frequency converter 57 105

Circuit type	star/delta
Voltage	400/230 V AC
Frequency	50 Hz
Speed	1500 rpm

Series-wound DC machine 0.3 kW 57 106

Voltage	205 V DC
Speed	2000 rpm

Shunt-wound DC machine 0.3 kW 57 107

Voltage	205 V DC
Speed	2000 rpm

Compound-wound DC machine 0.3 kW 57 108

Voltage	220 V DC
Speed	1500 rpm

Variable compound-wound DC machine 0.3 kW 57 109

Voltage	205 V DC
Speed	2000 rpm

Universal motor AC/DC 0.2 kW 57 110

DC voltage	140 V DC
AC voltage	230 V AC / 50 Hz
Speed	3000 rpm

Synchronous machine Smooth-core rotor 0.3 kW 57 111

Circuit type	star/delta
Voltage	400/230 V AC
Frequency	50 Hz

Synchronous machine Salient-pole rotor 0.3 kW 57 112

Voltage	400 V AC
Frequency	50 Hz
Speed	1500 rpm

Multifunction machine 0.27 kW Slipring rotor, synchronizable 57 113

Circuit type	star/delta
Voltage	400/230 V AC
Frequency	50 Hz

Three-phase reluctance motor 0.25 kW 57 114

Circuit type	star/delta
Voltage	400/230 V AC
Frequency	50 Hz
Speed	1500 rpm

Repulsion motor 0.25 kW 57 115

Voltage	230 V AC
Frequency	50 Hz
Speed	2100 rpm

Single-phase motor 0.18 kW with running capacitor 57 116

Voltage	230 V AC
Frequency	50 Hz
Speed	1500 rpm

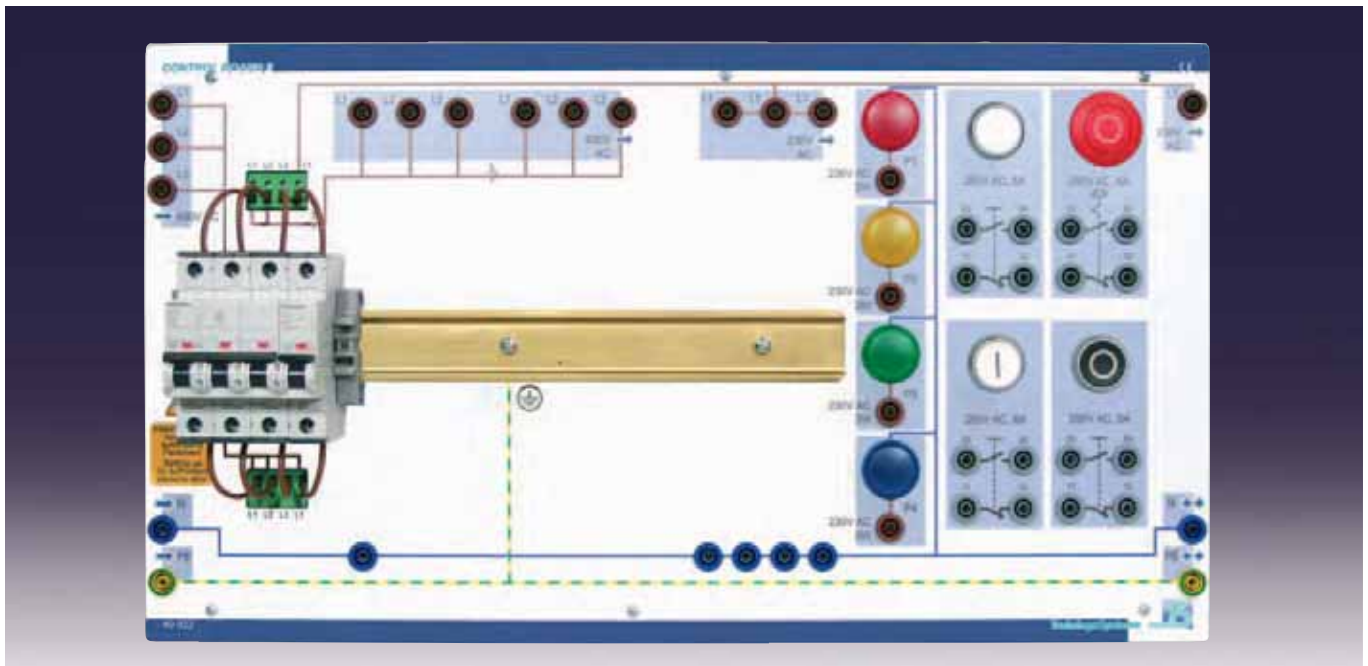
Single-phase motor 0.25 kW with starting and running capacitor 57 117

Voltage	230 V AC
Frequency	50 Hz
Speed	1500 rpm



Contactor, Control and Installation Circuits 230 V

Control Board II



40 022 Control Board II

Learning Objectives:

- ✓ Basic circuits with series circuits, parallel circuits, self-holding function and lock
- ✓ Applied circuits with star/delta start, reversing, Dahlander and step circuit functions
- ✓ Arrangement of main and auxiliary current circuits, application of line and device protection switches
- ✓ On-delay and off-delay switching with automatic step and sequence controls

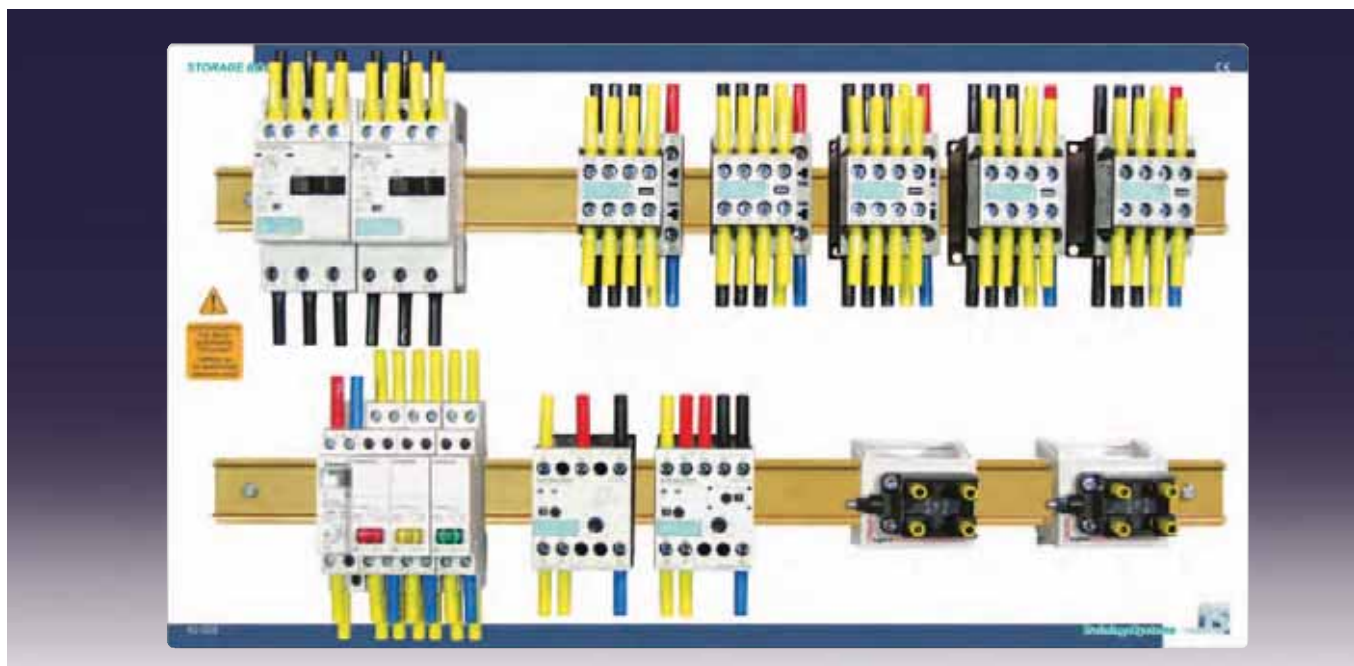
Features

- 1 circuit breaker, 3-pole, B 10 A
- 1 circuit breaker, 1-pole, B 6 A
- 1 signal lamp, 230 V, red
- 1 signal lamp, 230 V, yellow
- 1 signal lamp, 230 V, green
- 1 signal lamp, 230 V, blue
- 1 Emergency-Stop button
- 1 control button

Technical Data

Main circuit voltage	690 V AC max.
Main circuit current	10 A max.
Frequency	50/60 Hz
Breaking capacity	7 kVA
Control circuit voltage	230 V AC

Set of Components



40 009 Storage Board

40 210 Contactor, control and installation circuits 230 V DC

Features

40 210 Contactor, control and installation circuits

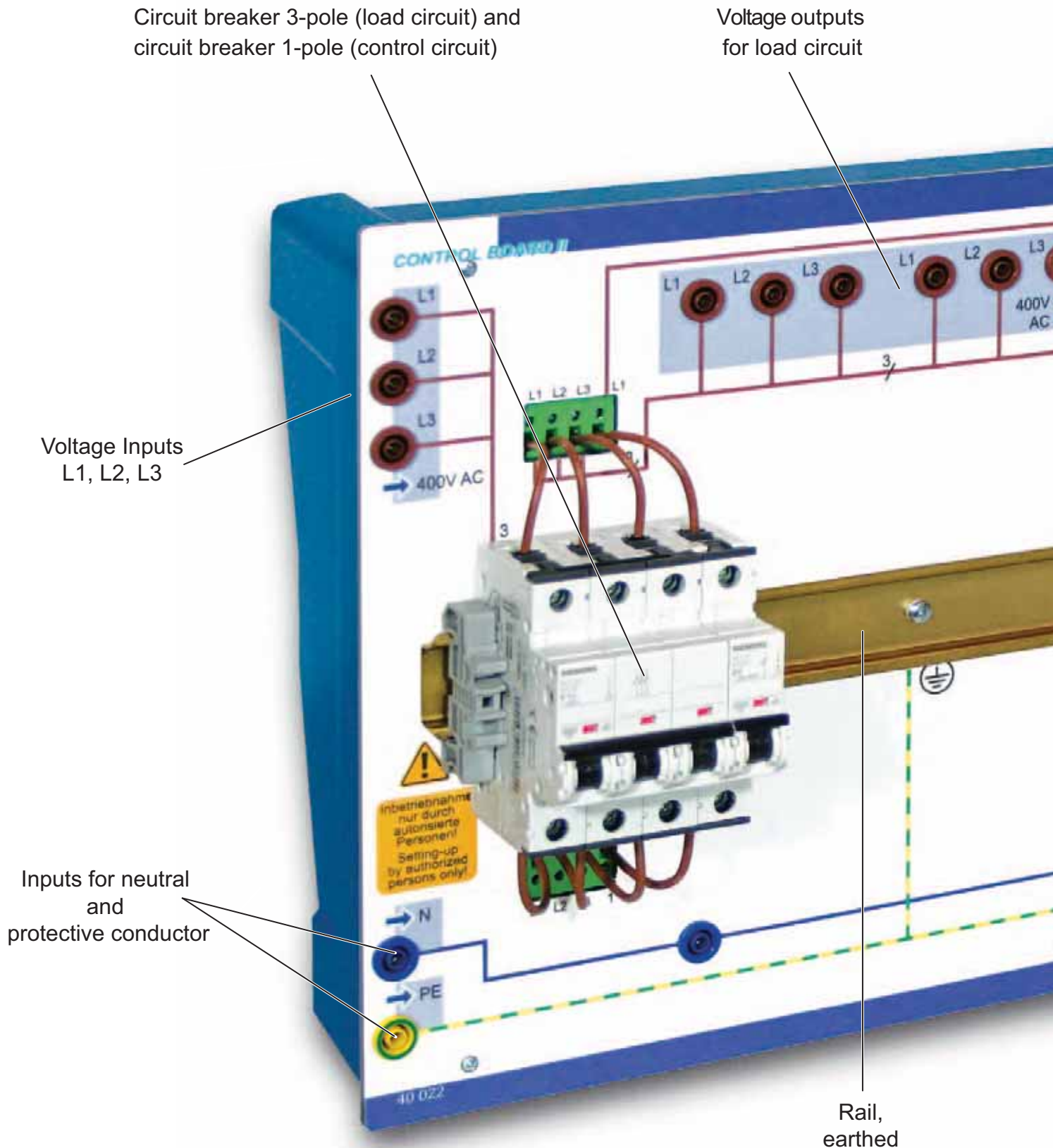
- 2 motor protection switches 0.6...1 A with auxiliary switch
- 3 push/lock-in switches, 1 NC /1 NO, with red pilot lamp, 230 V
- 1 set of handling hoods for push/lock-in switches red, yellow, green
- 1 impulse switch, 1 NO, 230 V coil
- 5 main contactors, 3 kW/400 V, 1 NO, 230 V coil
- 5 auxiliary contact sets, 2 NC, 2 NO
- 1 time relay, analog, 1 NO/NC, on delay
- 1 multifunction time relay, 1 NO/NC
- 2 limit switches, 1 NC, 1 NO
- all components equipped with 4 mm safety sockets
- completely mounted on Storage Board

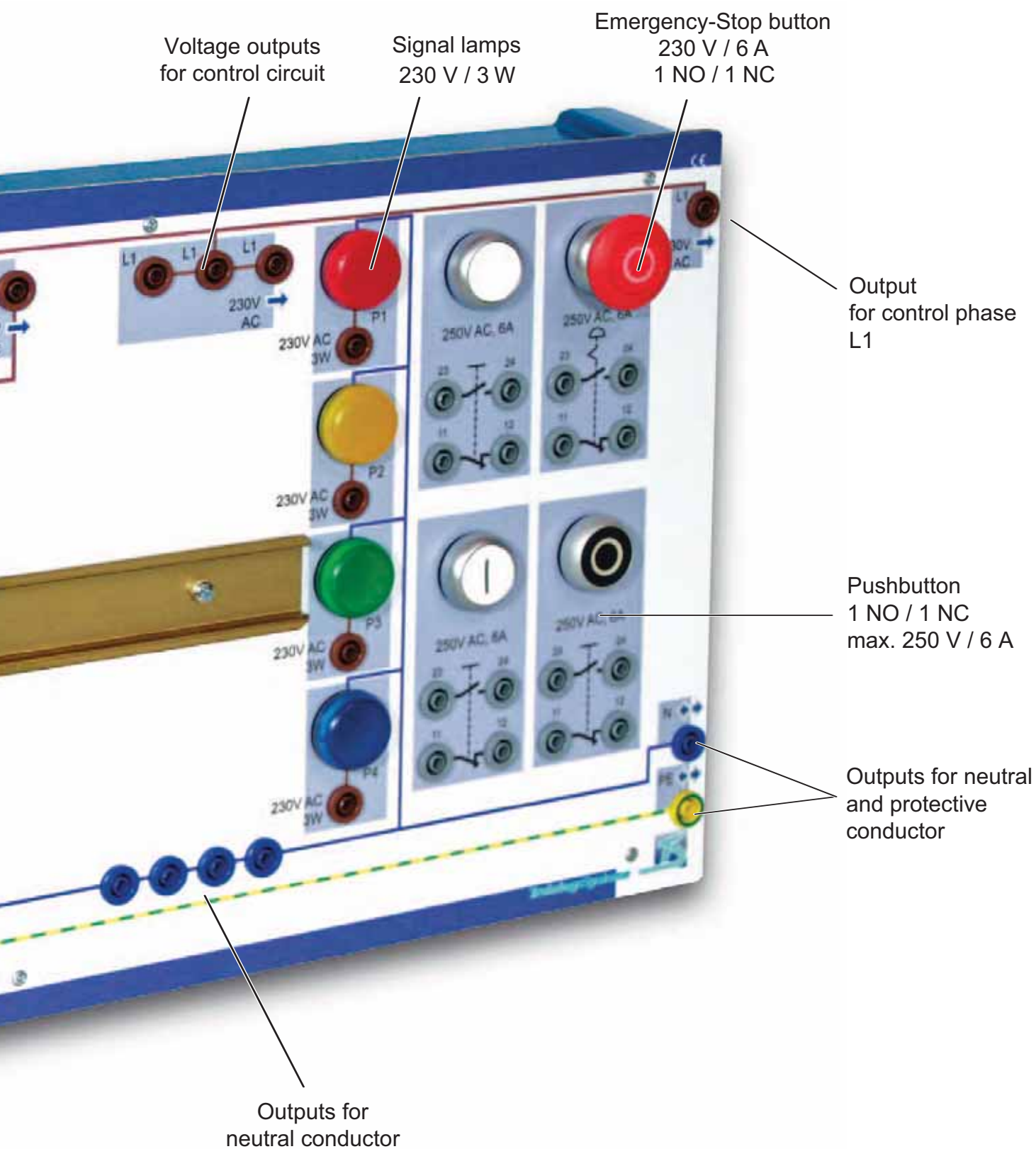
Functions of the multifunction time relay

- on delay
- off delay
- on/off delay
- flasher
- impulse on
- impulse off
- pulse shaping

Contactor, Control and Installation Circuits 230 V

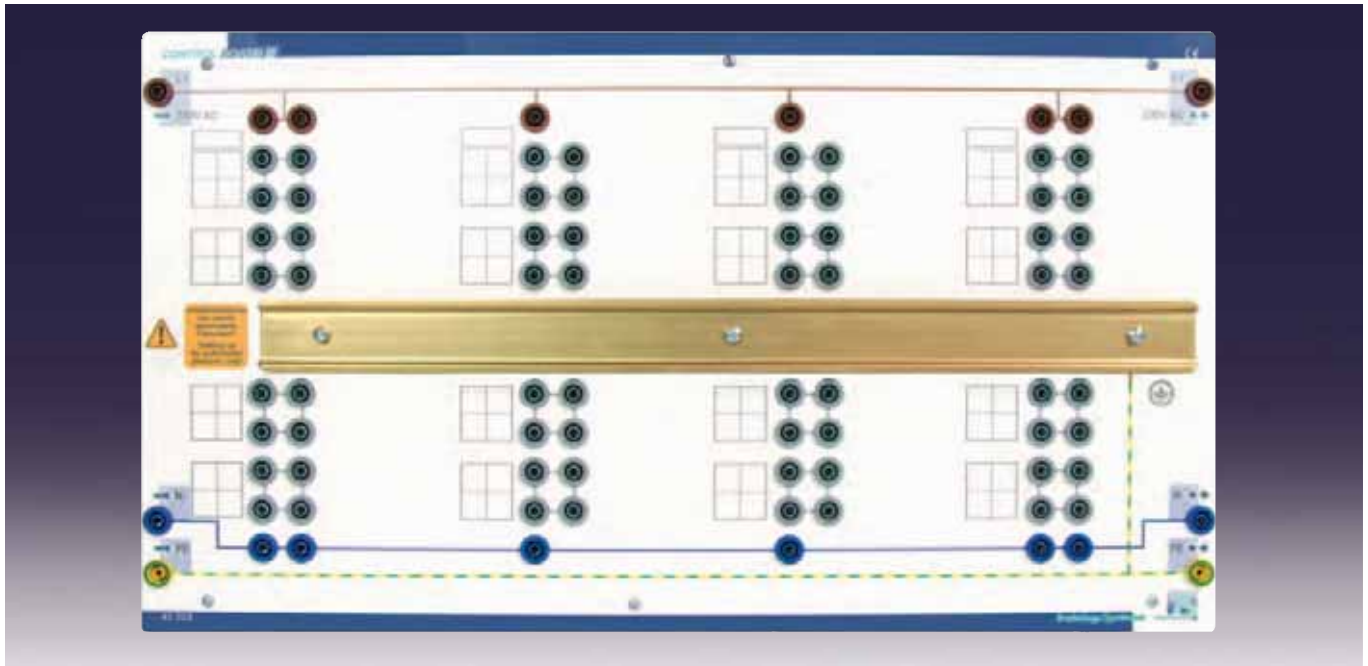
Control Board II





Contactor, Control and Installation Circuits 230 V

Control Board III



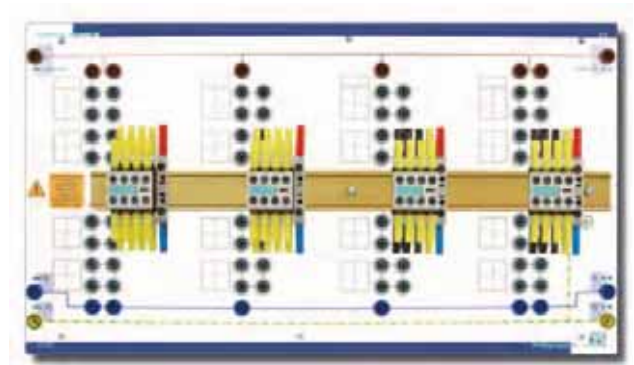
40 003 Control Board III

Learning Objectives:

- ✓ Practice-oriented setting up and commissioning of contactor, control and installation circuits
- ✓ Standard arrangement of main and auxiliary current circuits
- ✓ Systematic terminal labelling, function test and troubleshooting

Technical Data

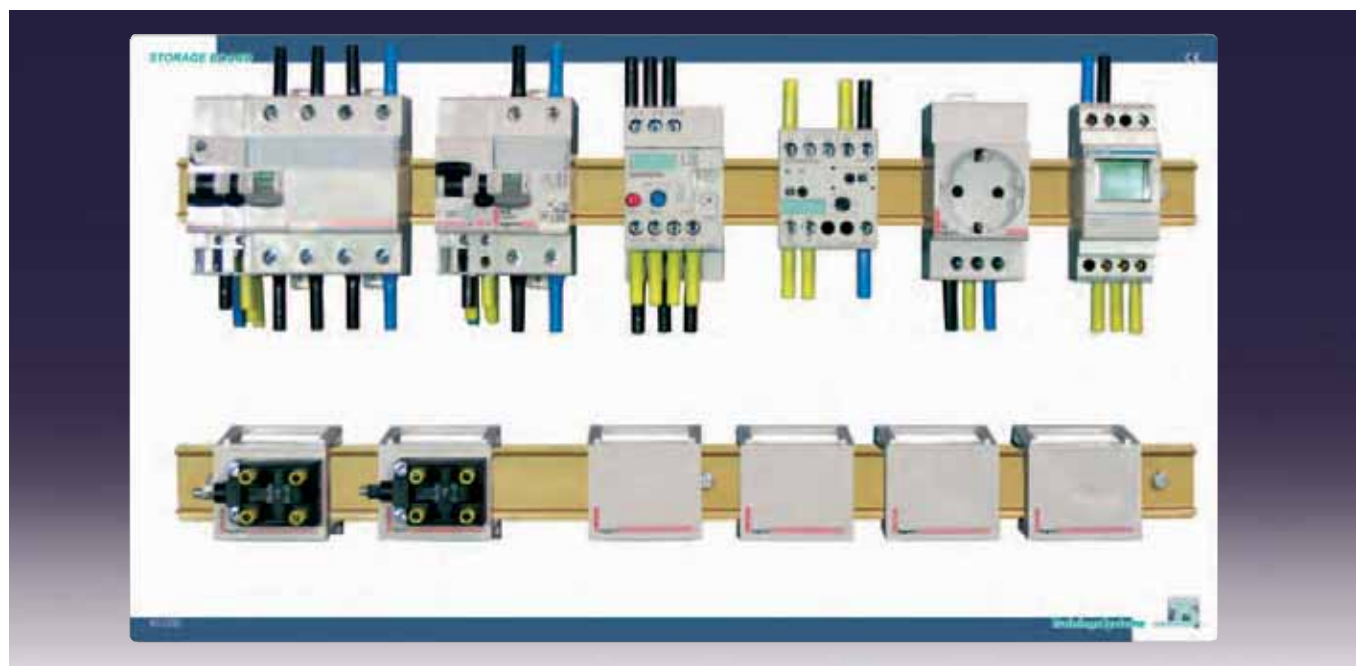
Main circuit voltage	690 V AC max.
Main circuit current	10 A max.
Frequency	50/60 Hz
Breaking capacity	7 kVA
Control circuit voltage	230 V AC



40 003

Control Board III mounted

Expert Circuits



40 009 Storage Board

40 300 Expert Circuit s

Learning Objectives:

- ✓ Control and installation circuits with extended protective and tripping functions
- ✓ Control and installation circuits with extended timer functions
- ✓ Configuring, setting up and commissioning control and installation circuits

Features

40 300 Expert Circuit s

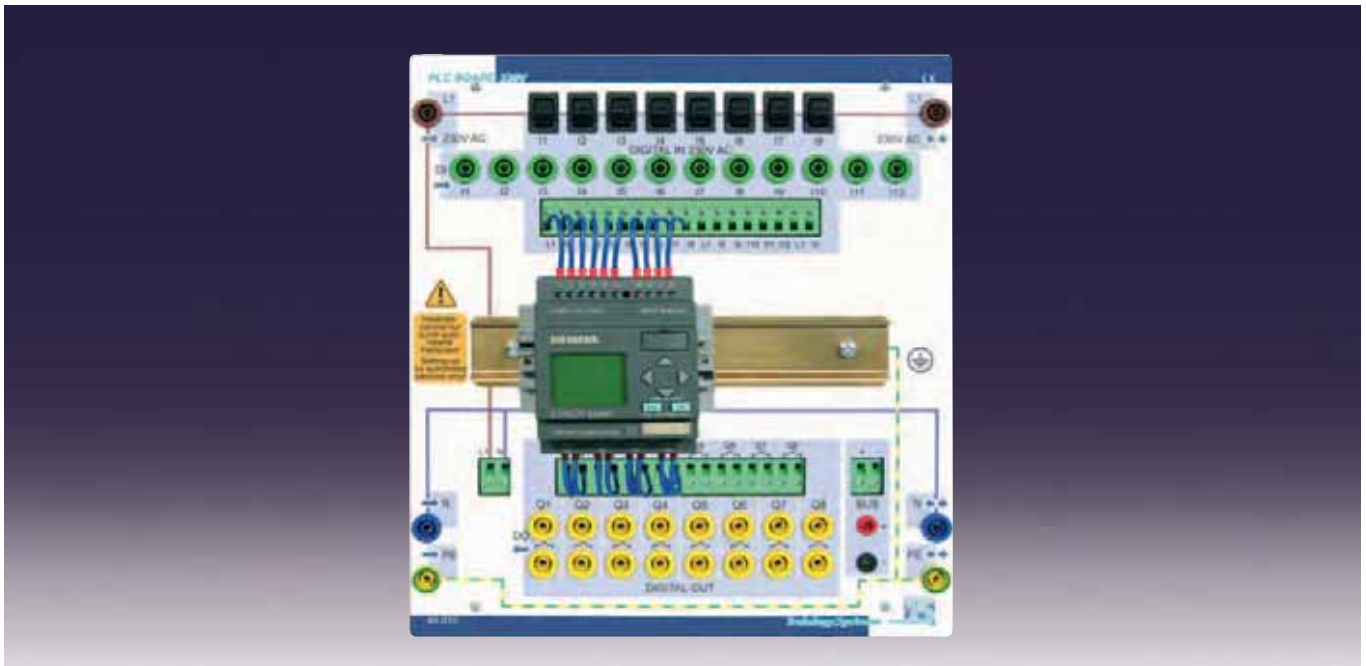
- 1 RCD circuit breaker, 4-pole, 30 mA
- 1 RCD circuit breaker, 2-pole, 10 mA
- 1 overload relay, 0.45...0.63 A
- 2 RCD auxiliary switches
- 1 operating current trigger
- 1 undervoltage trigger
- 2 limit switches, 1 NC, 1 NO
- 1 digital week timer, coil 230 V
- 1 multifunction relay, coil 230 V
- 4 system housings for front-mounted devices
- 1 consumer socket
- 1 Storage Board

Functions of the multifunction relay

- on delay
- off delay
- on/off delay
- flasher
- impulse on
- impulse off
- pulse shaping

Contactor, Control and Installation Circuits 230 V

LOGO! 230 V



40 017 PLC Board 230 V with LOGO! 230RC **V6.0**

Learning Objectives:

- ✓ Connecting logical modules and testing basic functions
- ✓ Generating function plans from circuit diagrams
- ✓ PC programming, visualizing and documenting the application

Features

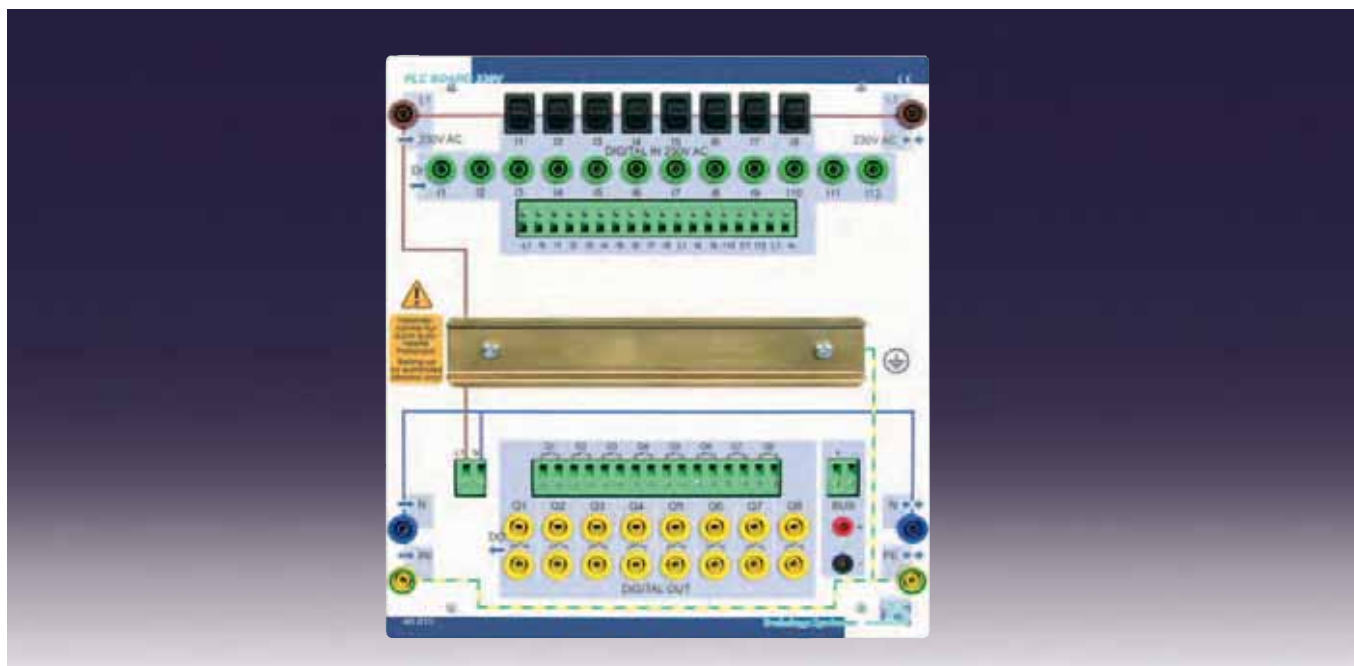
- Integrated backlit display field and operator control panel
- Integrated EEPROM memory for control program and internal setpoint values
- 8 inputs
- 4 relay outputs 10 A max.
 - 10 A (with resistive load)
 - 3 A (with inductive load)
- Short circuit protection by external fusing
- 8 integrated time switches
- 8 push/lock-in switches for input simulation

Expansion

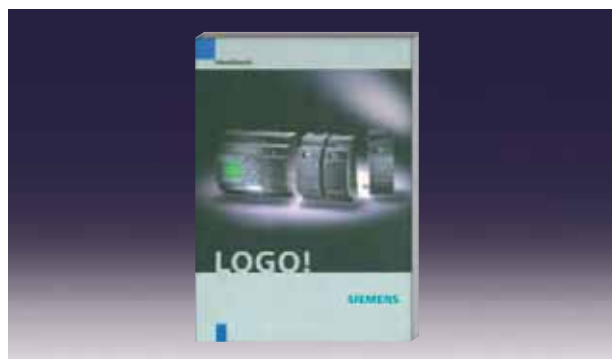


40 019 230 V relay 4DI /4DO

LOGO! 230 V



40 015 PLC Board 230 V



40 804 User manual LOGO!



40 808 Software LOGO! Soft Comfort **V6.0**



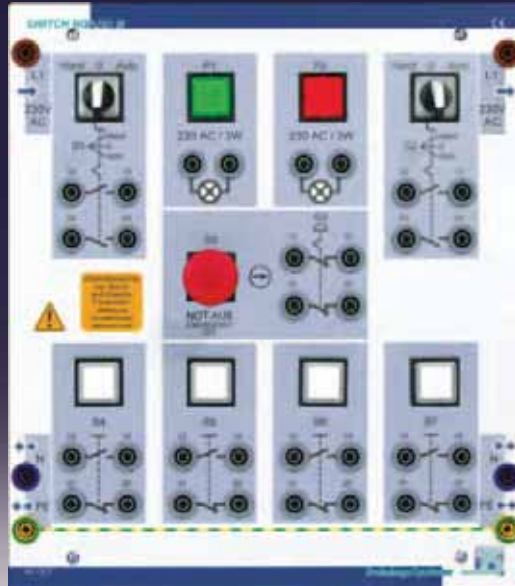
40 041 Text display LOGO! TD with connecting cable 2.5 m



40 029 LOGO! PC cable **USB**

Contactor, Control and Installation Circuits 230 V

Switch Board III



40 007 Switch Board III

Learning Objectives:

- ✓ Connecting hand-operated industrial low-voltage switching devices
- ✓ Function test of start, reversing and step circuits
- ✓ Troubleshooting and maintenance

Features

- 1 Emergency-Stop button (2 NC)
- 4 control pushbuttons (NC, NO)
- 2 control switches (hand, 0, automatic, 2 NO)
- 1 signal lamp, 230 V AC, red
- 1 signal lamp, 230 V AC, green

Technical Data

Rated voltage	230 V AC
Rated current	5 A

Industrial Measuring Instruments

Industrial measuring instruments



40 009 Storage Board

40 400 Industrial Measuring Instruments

Learning Objectives:

- ✓ Connecting measuring instruments for current, voltage, consumption and working hours
- ✓ Using current transformers for extension of measuring range / galvanic isolation
- ✓ Installing remote measuring points, expanded function with selector switches

Features

- 1 ammeter, analog
- 3 current transformers
- 1 current selector switch
- 1 voltmeter, digital
- 1 voltage selector switch
- 1 frequency meter
- 1 three-phase current meter
- 1 AC meter
- 1 operating hours counter

Technical Data

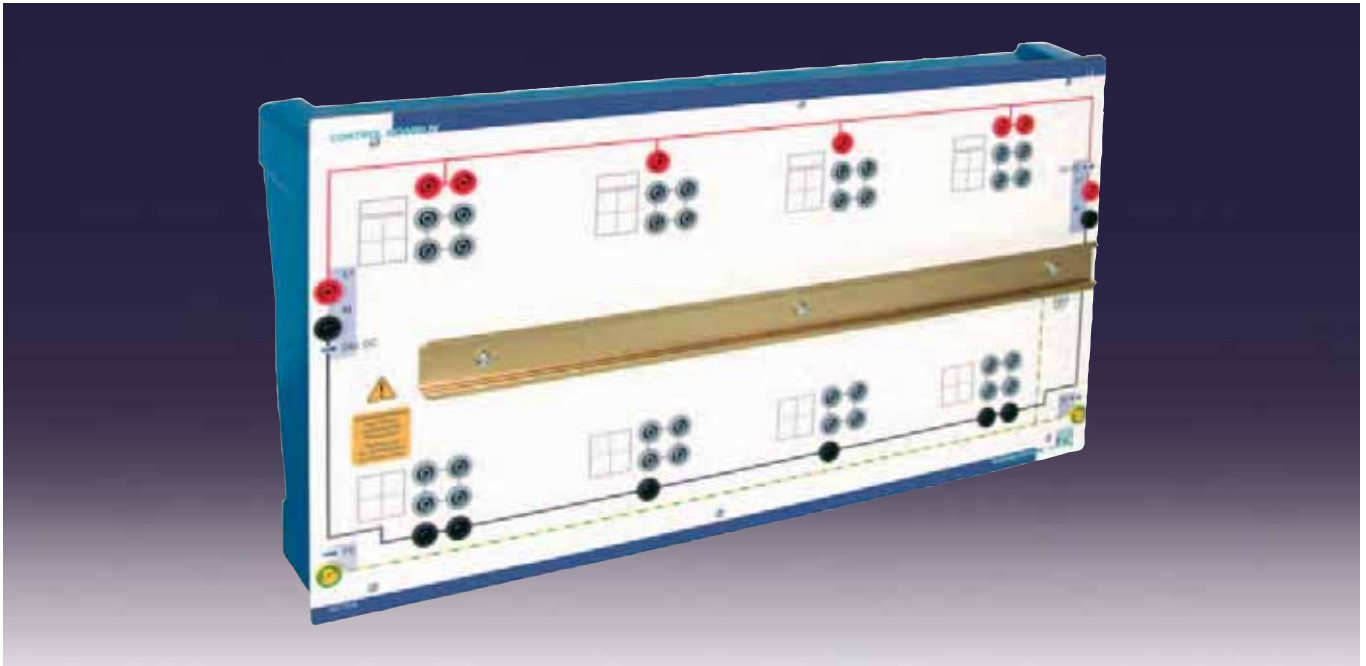
Main circuit voltage	690 V AC max.
Main circuit current	10 A max.
Frequency	50/60 Hz
Breaking capacity	7 kVA
Control circuit voltage	230 V AC

Measuring Ranges

Voltage	0 ... 600 V
Frequency	40 ... 80 Hz
Current	0 ... 5 A directly, 0 ... 50 A via current transformer

Contactor, Control and Installation Circuits 24 V

Control Board IV



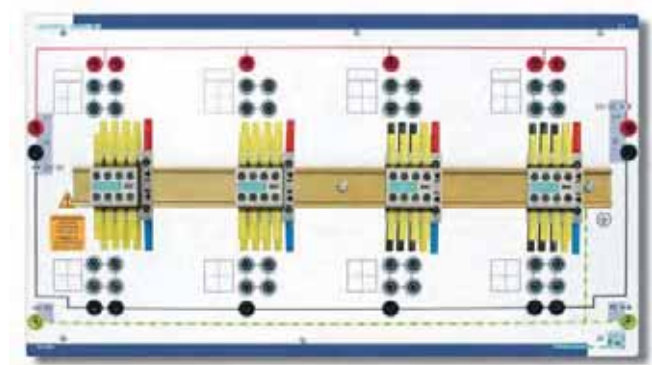
40 004 Control Board IV

Learning Objectives:

- ✓ Practice-oriented setting up and commissioning of contactor, control and installation circuits
- ✓ Standard arrangement of main and auxiliary current circuits
- ✓ Systematic terminal labelling, function test and troubleshooting
- ✓ Setting up safety circuits of all categories with contactors
- ✓ Standard arrangement of control, release and load current circuits

Technical Data

Main circuit current	6 A max.
Control circuit current	24 V DC

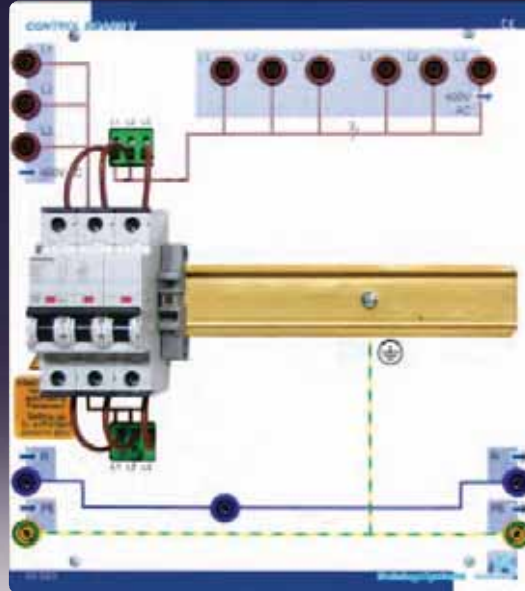


Control Board IV mounted with 4 contactors



Contactor, Control and Installation Circuits 24 V

Control Board V



40 023 Control Board V

Learning Objectives:

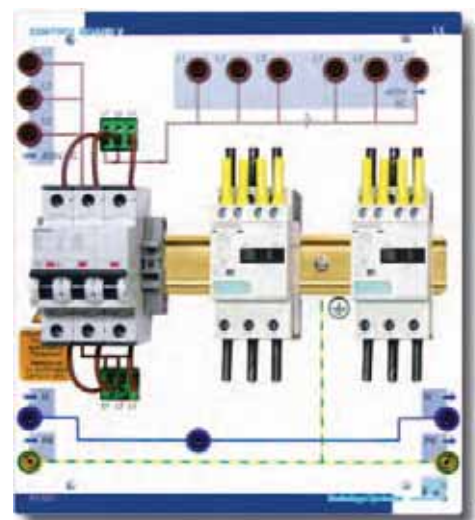
- ✓ Standard arrangement of a load circuit in a 24 V control circuit
- ✓ Getting familiar with line protection devices
- ✓ Getting familiar with motor protection devices
- ✓ Load circuit structure
- ✓ Commissioning and troubleshooting

Features

- 1 circuit breaker, 3-pole, B 10 A
- 2 motor protection switches, 0.6 ... 1 A with auxiliary switch

Technical Data

Main circuit voltage	230 - 400 V AC
Main circuit current	10 A max.
Frequency	50/60 Hz
Breaking capacity	6 kVA



Control Board V
with 2 motor protection switches

Switch Board II - 24 V



40 000 Switch Board II - 24 V

Learning Objectives:

- ✓ Setting up and testing a control current circuit
- ✓ Superordinate command devices, control buttons, control switches and Emergency-Stop buttons
- ✓ Signal lamps

Technical Data

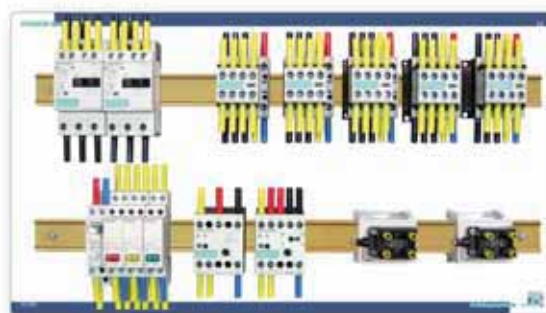
Rated voltage	24 V DC
Rated current	5 A

Features

- 1 Emergency-Stop button (2 NC)
- 4 control pushbuttons (NC, NO)
- 2 control switches (hand, 0, automatic, 2 NO)
- 1 signal lamp, 24 V DC, red
- 1 signal lamp, 24 V DC, green

40 205 Contactor, control and installation circuits (24 V DC)

- 2 motor protection switches 0.6...1A with auxiliary switch
- 3 push/lock-in switches, 1 NC/1 NO, with red pilot lamp, 24V
- 1 set of handling hoods for push/lock-in switches red, yellow, green
- 1 impulse switch, 1 NO, 24 V coil
- 5 main contactors, 3 kW/400 V, 1 NO, 24 V coil
- 5 auxiliary contact sets, 2 NC, 2NO
- 1 time relay, analog, 1 NO/NC, on delay
- 1 multifunction time relay, 1 NO/NC
- 2 limit switches, 1 NC, 1 NO
- all components equipped with 4 mm safety sockets
- completely mounted on Storage Board



40 205

Contactor, Control and Installation Circuits 24 V

Contactor, Control and Installation Circuits 24 V

LOGO! 24 V



40 016 PLC Board 24 V with LOGO! 12/24RC **V6.0**

Learning Objectives:

- ✓ Connecting logical modules and testing basic functions
- ✓ Generating function plans from circuit diagrams
- ✓ PC programming, visualizing and documenting the application

Features

- Integrated backlit display field and operator control panel
- Integrated EEPROM memory for control program and internal setpoint values
- 8 inputs (4 of which apt for analogue use)
- 4 relay outputs 10 A max.
 - 10 A (with resistive load)
 - 3 A (with inductive load)
- Short circuit protection by external fusing
- 8 integrated time switches
- 8 push/lock-in switches for input simulation

Expansions



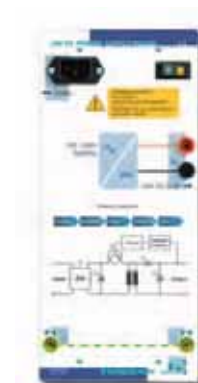
40 018 LOGO! expansion:
12/24 relay with 4 DI/4 DO



40 025 AS-i expansion
module

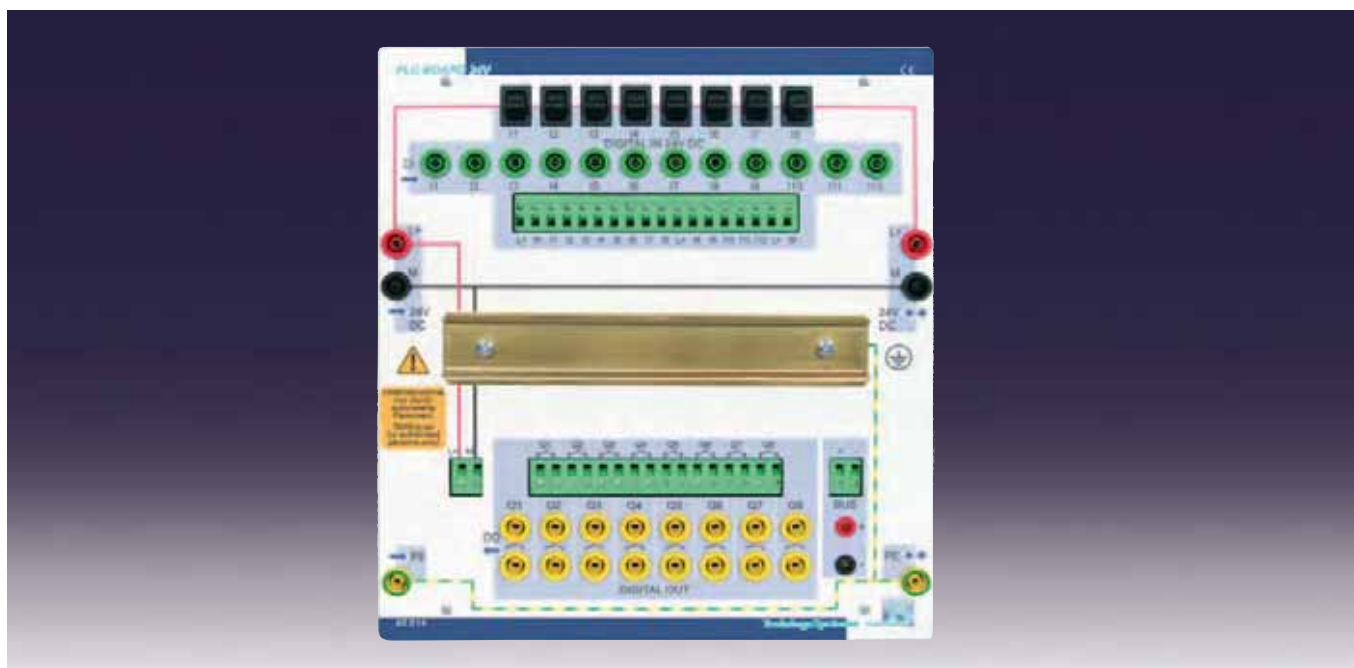


40 026 KNX/EIB
expansion module



63 524 24V DC
Power Supply Board 2.5 A

LOGO! 24 V



40 014 PLC Board 24 V



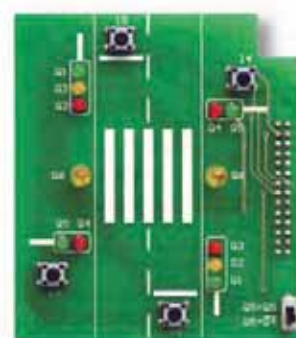
M60 007 LOGO! Trainer without LOGO!



with 30 process module cards and power supply pack



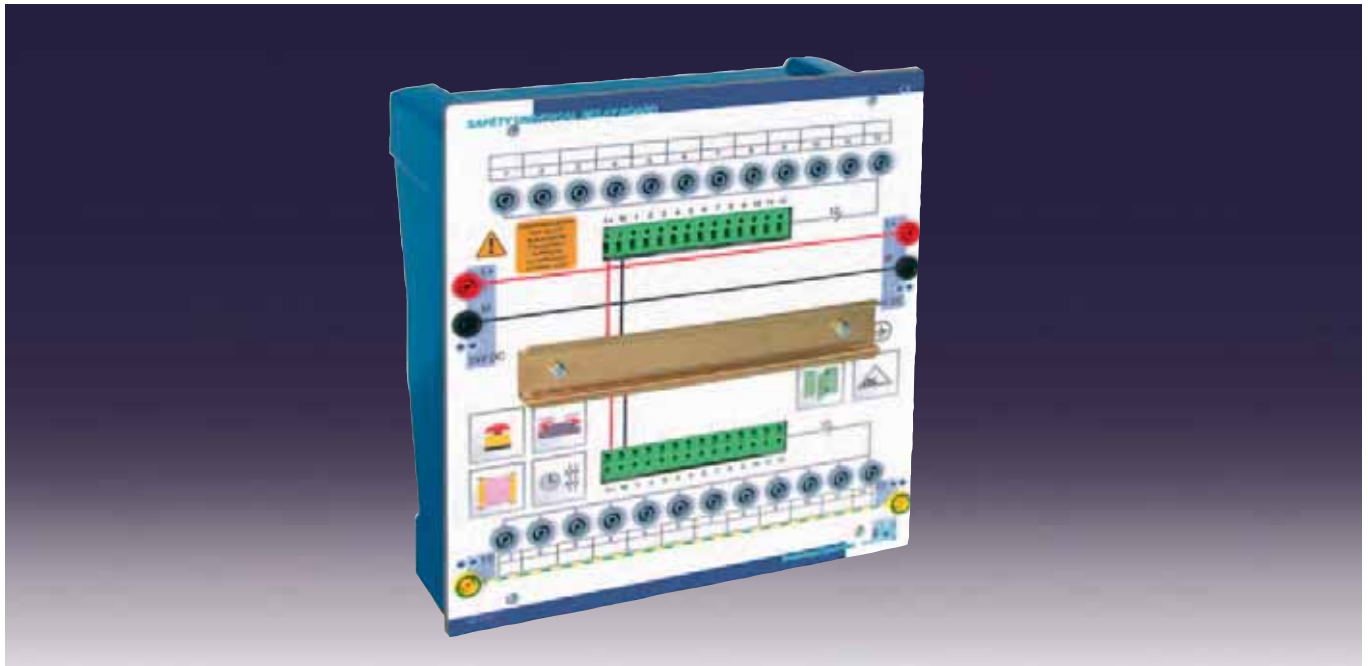
40 033 LOGO! Trainer with mounted traffic light module and expansion 40 018



40 034 Traffic light module

Contactor, Control and Installation Circuits 24 V

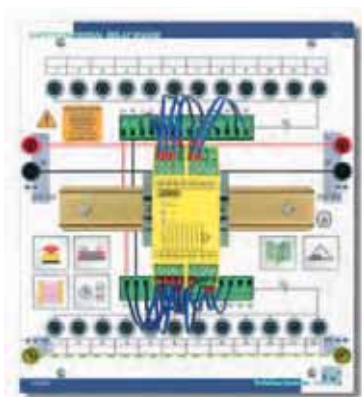
Safety Relays



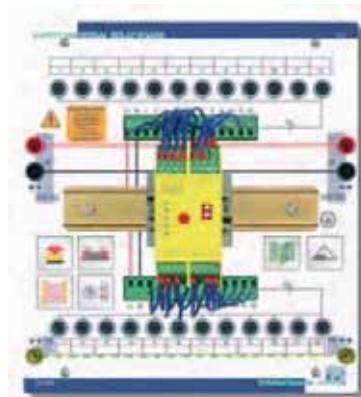
40 050 Safety Universal Relay Board

Learning Objectives:

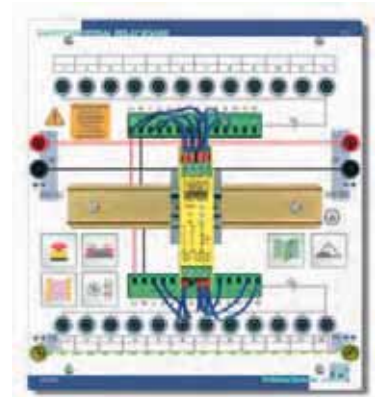
- ✓ Setting up and testing safety circuits with safety relays
- ✓ Systematic terminal labelling, function test and troubleshooting
- ✓ Arrangement in main, release and auxiliary current circuits
- ✓ Commissioning different safety relays such as Emergency-Stop monitoring, safety door monitoring or two-hand operation
- ✓ AOPD evaluation for opto-electronic safety systems



40 053 Universal Relay
Emergency-Stop
Safety door monitoring



40 054 Universal Relay
Emergency-Stop
Safety door monitoring
Safe time function



40 055 Relay for
Two-Hand Operation

Safety Position Switches



40 052 Safety Position Switch Board

Learning Objectives:

- ✓ Setting up control circuits in the control categories 1-4
- ✓ Installation circuits with control guards
- ✓ Redundant setup of safety circuits
- ✓ Control guards with interlocking
- ✓ Indication of installation states by signal lamps

Features

- 1 safety position switch with interlocking
- 1 safety position switch with separate actuator - cat. 2
- 2 safety position switches with roll lever
- 1 signal lamp, red 24 V DC
- 1 signal lamp, green 24 V DC

Technical Data

Control circuit voltage	24 V DC
Rated current	5 A
Operating voltage of lamps	24 V DC

Measuring and Test Instruments

Digital multimeters



90 280 Digital multimeter



90 281 True-rms digital multimeter

Technical Data

90 280 Digital multimeter	
DC voltage	0.001 V - 600 V
AC voltage	0.001 V - 600 V
DC current	0.001 A - 10 A
AC current	0.001 A - 10 A
Resistance	0.1 Ω - 40 MΩ
Capacitance	1 nF - 10,000 μF
Frequency	0.01 Hz - 50 kHz
Display	6,000 counts Analog bargraph with 33 segments
Diode test	range/resolution: 2.00 V/0.001 V

Technical Data

90 281 True-rms digital multimeter	
DC voltage	0.1 mV - 1000 V
AC voltage	0.1 mV - 1000 V
DC current	0.01 mA - 10 A
AC current	0.01 mA - 10 A
Resistance	0.1 Ω - 50 MΩ
Capacitance	1 nF - 10,000 μF
Frequency	0.01 Hz - 100 kHz
Temperature	-40°C - 400°C
Display	6,000 counts Analog baragraph with 33 segments
Diode test	range/resolution: 2.00 V/0.001 V
Audible continuity tester	



90 282 True-rms logging multimeter

Technical Data

90 282 True-rms logging multimeter with PC interface and software

DC voltage	1 μ V - 1000 V
AC voltage	1 μ V - 1000 V
DC current	0.01 μ A - 10 A
AC current	0.01 μ A - 10 A
Resistance	0.01 Ω - 500 M Ω
Capacitance	1 pF - 50,000 μ F
Frequency	0.01 Hz - 1 MHz
Temperature	-200.0 $^{\circ}$ C to 1350.0 $^{\circ}$ C
Conductance	0.01 nS - 500 nS
Display	50,000 counts 320 x 240 dot LCD
Logging memory	180 hours



Accessories included!



Courseware

Manual



On paper and on CD!

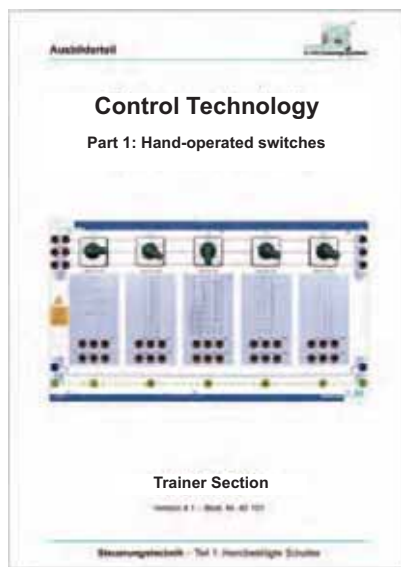
Contents of manual

Introduction

- 1.1 Controlling with control switch ON/OFF
- 1.2 Controlling with direction of rotation switch
- 1.3 Controlling with star/delta switch
- 1.4 Controlling with star/delta reversing switch
- 1.5 Controlling with pole changing switch
- 1.6 Controlling with pole changing switch for two separate windings

Contents of transparencies set

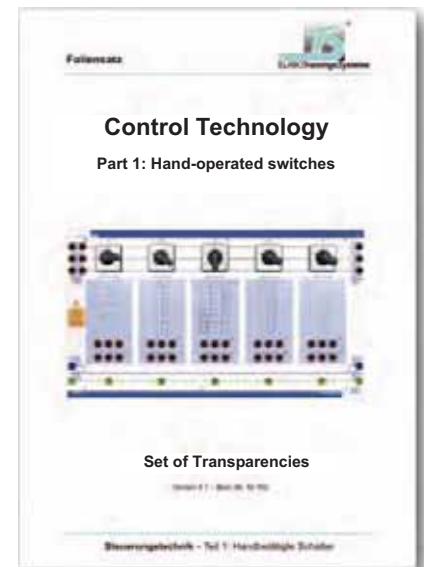
- Switch Board I
- Cam switches
- Load disconnecting switches: definition, function and application
- Load disconnecting switches: device structure and switch types
- Star-delta switches
- Star-delta reversing switches
- Pole-changing switches for Dahlander circuits
- Pole-changing switches for separate windings
- Control and indicating devices
- Mushroom-head buttons



E40 101CD Manual Trainer Section
Part 1: Hand-operated Switches



E40 100CD Manual
Practical Experiments
Part 1: Hand-operated Switches

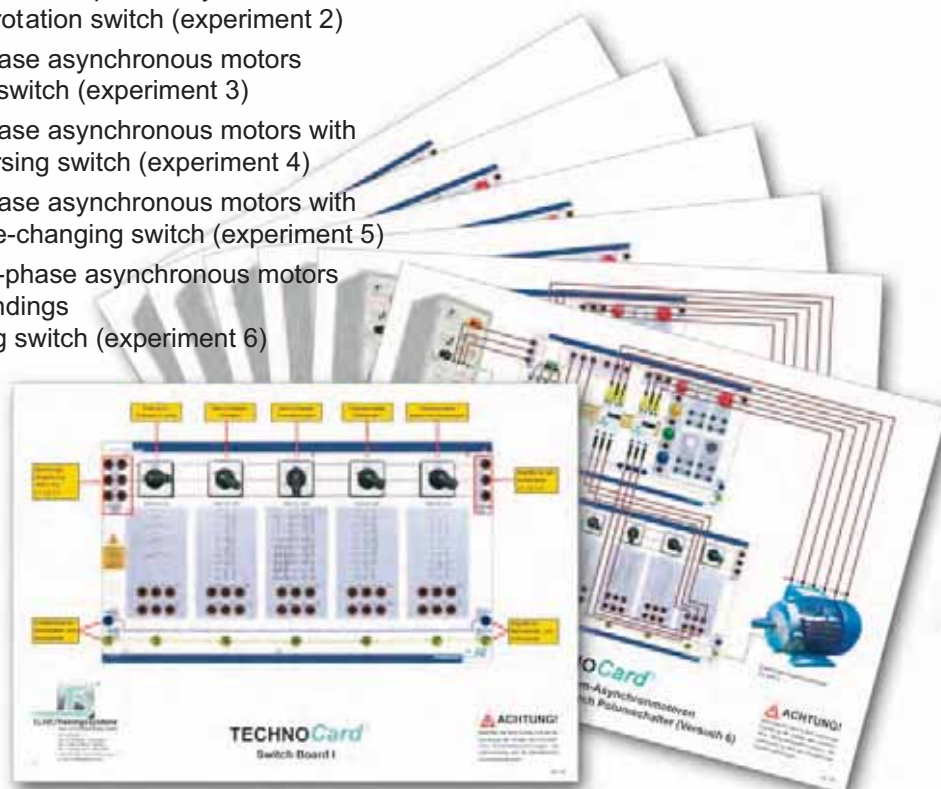


E40 102CD Set of Transparencies
Part 1: Hand-operated Switches

E40 120 Set of TechnoCards

consisting of

- E40 113** Direct switching of three-phase asynchronous motors with control switch ON/OFF (experiment 1)
- E40 114** Direct switching of three-phase asynchronous motors with direction of rotation switch (experiment 2)
- E40 115** Starting three-phase asynchronous motors with a star-delta switch (experiment 3)
- E40 116** Starting three-phase asynchronous motors with a star-delta reversing switch (experiment 4)
- E40 117** Starting three-phase asynchronous motors with speeds via a pole-changing switch (experiment 5)
- E40 118** Controlling three-phase asynchronous motors with separate windings via pole-changing switch (experiment 6)
- E40 119** Switch Board I



Transparencies Sets



E40 301CD Set of Transparencies
Part 3: Expert Circuits

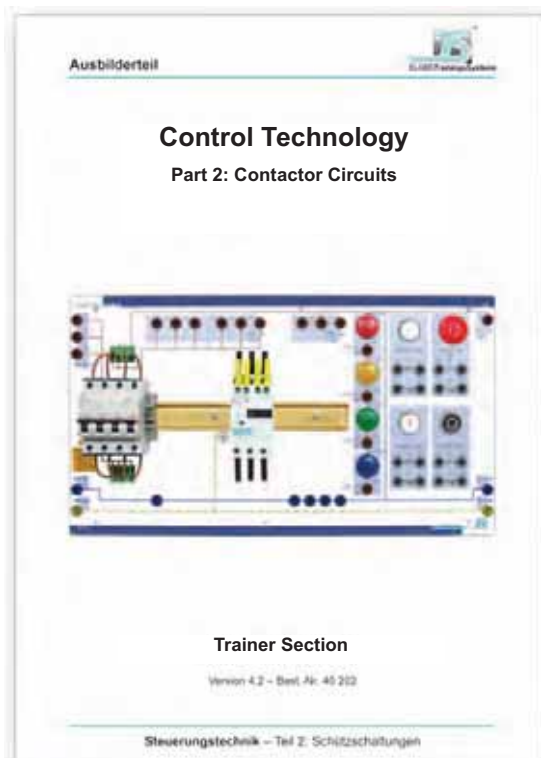


E40 401CD Set of Transparencies
Part 4: Industrial Measuring Instruments

Manual



On paper and on CD!



E40 202CD

*Manual T rainer Section
Part 2: Contactor Circuits*

Contents of manual

1. Task
2. Circuit diagram
3. Equipment list
4. Function description
5. Additional task
6. Question

Experiment 1:

Direct switching of three-phase asynchronous motors

Experiment 2:

Delayed switching of three-phase asynchronous motors

Experiment 3:

Switching of three-phase asynchronous motors for optional feed-in from two different power supplies

Experiment 4:

Changing of the direction of rotation of a three-phase asynchronous motor (reversing control)

Experiment 5:

Changing of the direction of rotation of a three-phase asynchronous motor (reversing control) with limit switch

Experiment 6:

Starting of a three-phase asynchronous motor with a hand-operated star-delta contactor sequence circuit

Experiment 7:

Starting of a three-phase asynchronous motor with an automatic star/delta contactor sequence circuit

Experiment 8:

Controlling of a three-phase asynchronous motor with current impulse relay - impulse control ON/OFF

Experiment 9:

Starting of a three-phase asynchronous motor with a hand-operated star-delta contactor sequence circuit for two directions of rotation

Experiment 10:

Starting of a two-speed three-phase asynchronous motor with a contactor controlled pole changing circuit - Dahlander circuit



E40 201CD

Manual
Practical Experiments
Part 2: Contactor Circuits



E40 203CD

Set of Transparencies
Part 2: Contactor Circuits

E40 242 Set of TechnoCards

consisting of

- E40 233 ref. to experiment 1
- E40 234 ref. to experiment 2
- E40 235 ref. to experiment 3
- E40 236 ref. to experiment 4
- E40 237 ref. to experiment 5
- E40 238 ref. to experiment 6
- E40 239 ref. to experiment 7
- E40 240 Control Board II
- E40 241 ref. to experiment 8
- E40 243 ref. to experiment 9
- E40 244 ref. to experiment 10



Courseware

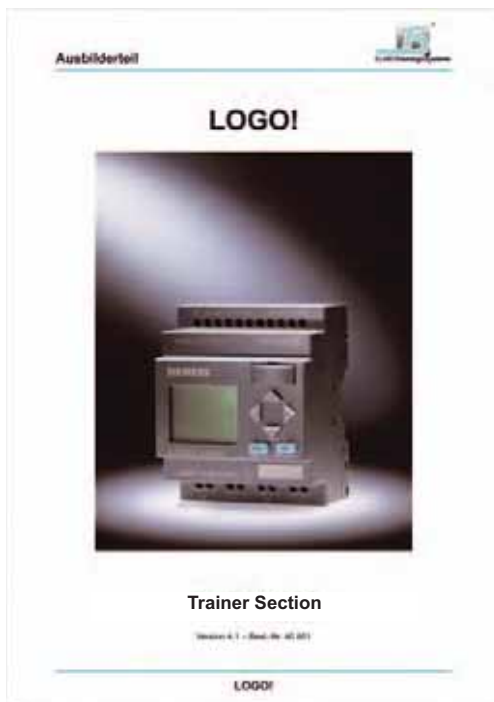
Manual



On paper and on CD!

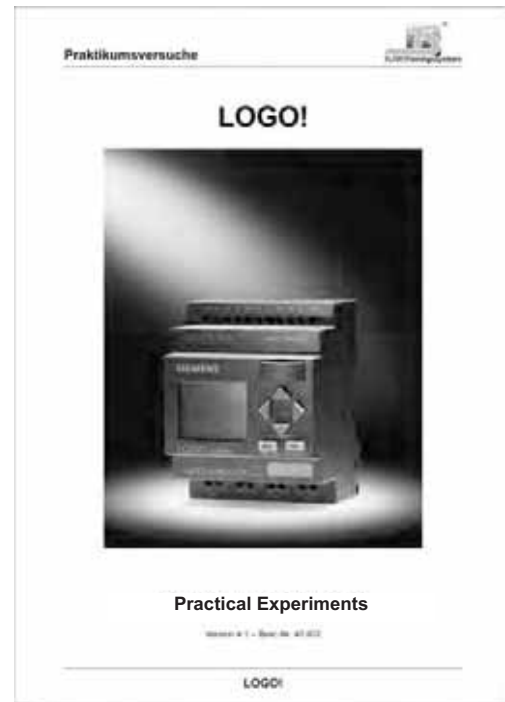
Contents of manual

1. Main switch - switches - consumers
2. Hall lighting with surge relay
3. Stairway lighting with automatic control
4. Setting the time and clock operation
5. Stairway lighting:
linking with the PC



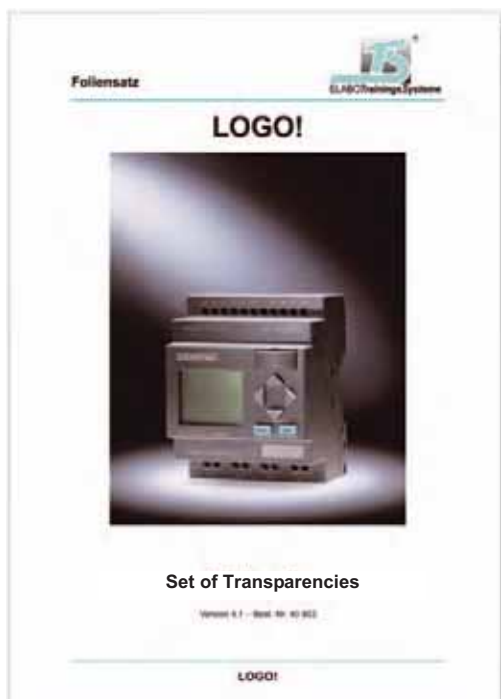
E40 801CD

Manual T rainer Section
LOGO!



E40 802CD

Manual Practical Experiment s
LOGO!

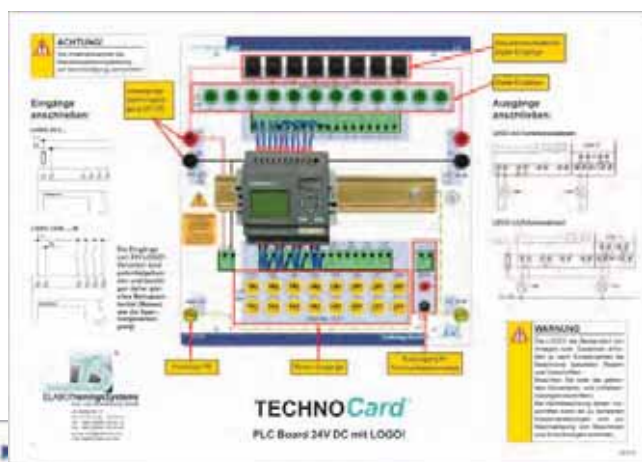


E40 803CD Set of Transparencies LOGO!

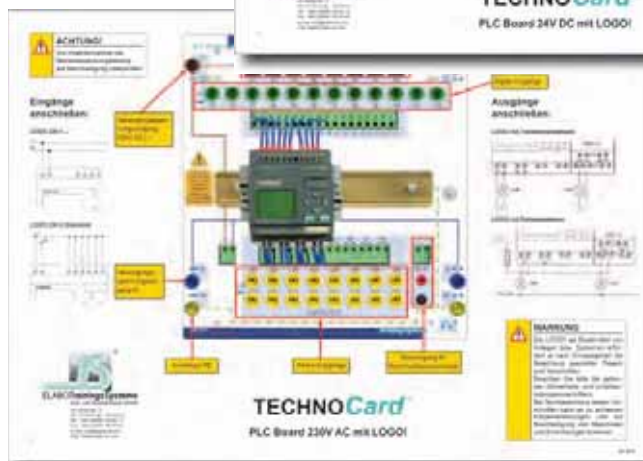
Contents of transparencies set

LOGO!
 Areas of application and advantages of LOGO!
 Connections, input - output
 connect LOGO!
 Important terms
 Abbreviations used
 Basic functions (BF)
 Special functions (SF)
 Conversion circuit diagram - LOGO! program
 Input and output boxes
 Programming rules
 Programming menus
 Program and wiring
 Entering the program
 Parameterizing LOGO!
 The integrated clock
 Link LOGO! - PC
 The software LOGO! Soft Comfort
 Program editing with LOGO! Soft Comfort
 Survey circuit and comments in LOGO! Soft Comfort
 LOGO! with AS interface

E40 813
 TechnoCard
 PLC Board 24V DC with LOGO!



E40 814
 TechnoCard
 PLC Board 230V AC with LOGO!



Courseware

Manual



On paper and on CD!

Contents of manual

Introduction:

"Safety technology for protection of man and machine; applicable standards and directives; four-point measure catalogue; risk assessment; risk evaluation; implementation of standards and directives; functions for safety achievement; general principles for the design of interlocking devices; Emergency-stop requirements for devices; stop category"

Circuits for the following control categories:

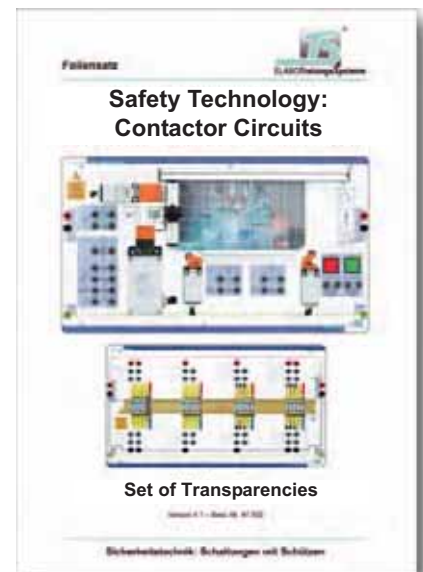
- Control category 1
- Control category 2
- Control category 3
- Control category 4
- Control category 2 with interlocking
- Control category 4 with interlocking



*E40 500CD Manual Trainer Section
Safety Technology: Contactor Circuits*



*E40 501CD Manual
Practical Experiments
Safety Technology: Contactor Circuits*



*E40 502CD Set of Transparencies
Safety Technology: Contactor Circuits*



E40 503CD

Set of Transparencies
General Information

Contents of transparencies set

Safety of machines: What for?
Applicable standards
Machine Directive
Term „Machine“
Types of standards
From where do dangers originate?
How can hazards be prevented?
Planning phase
Design of a machine
Process for achieving the safety
Risk assessment / Risk analysis
Risk estimation EN 954-1/ EN1050
Evaluation software
The risk assessment
Process for achieving the safety
Risk minimisation
Residual risk?
Category B
Category 1 / Category 2 / Category 3 / Category 4
Safety relay
Emergency-Stop circuit
The EN 418
The STOP categories
Opto-electronic protective device
Fail-safe bus system AS-i
Examples

E40 570 Set of TechnoCards

consisting of

- E40 571** TechnoCard: Emergency shutdown (SC 1)
- E40 572** TechnoCard: Emergency shutdown (SC 2)
- E40 573** TechnoCard: Emergency shutdown when safety door is opened (SC 3)
- E40 574** TechnoCard: Protective circuit with Emergency-Stop monitoring
- E40 575** TechnoCard: Emergency-Stop in the control current circuit when safety door is opened (SC 4)
- E40 576** TechnoCard: Control category 2 with interlocking
- E40 577** TechnoCard: Control category 4 with interlocking



Teachware

Manual



On paper and on CD!

Contents of manual

Introduction

Experiments with safety relays for Emergency-Stop monitoring:

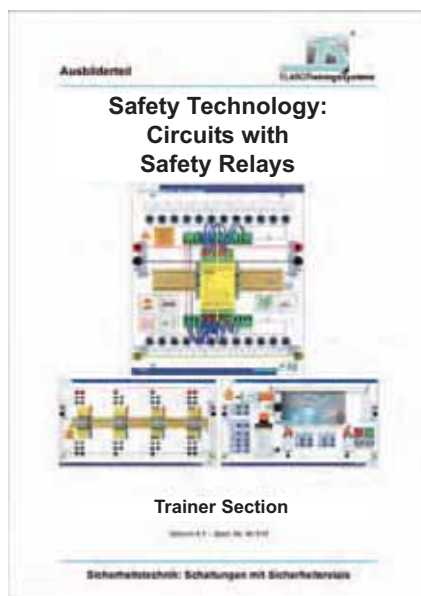
1. Emergency-Stop monitoring - control category 2
2. Emergency-Stop monitoring - control category 4
3. Emergency-Stop monitoring - control category 4, with reset button
4. Safety door monitoring - control category 4

Experiments with two-hand operating element:

1. Two-hand operation
2. Safety door monitoring - control category 4

Experiments with safety relay "safe time function":

1. Safety interlocking - control category 2
2. Safe time function with reset switch
3. Safety door opening after definite time
4. Safety door opening after definite time with reset button



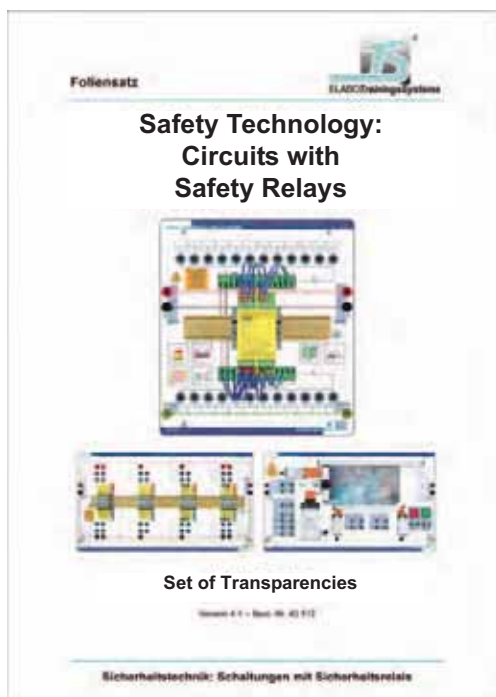
E40 510CD

Manual
Trainer Section
Safety Technology: Circuits with Safety Relays



E40 511CD

Manual
Practical Experiments
Safety Technology: Circuits with Safety Relays



E40 512CD Set of Transparencies
Safety Technology: Circuits with Safety Relays

Contents of transparencies set

Safety relay "Emergency-Stop and safety door monitoring"
Safety relay "two-hand operating element"
Safety relay "safe time function"

Legend

Principles

Applications

Schematic diagram of a safety relay

Safe isolation

Positively driven operation

Safety relay for Emergency-Stop monitoring

Safety relay for two-hand operation

Safety relay with time function

Experiments with safety relay for Emergency-Stop and safety door monitoring:

Emergency-Stop monitoring - control category 2

Emergency-Stop monitoring - control category 4

Emergency-Stop monitoring - control category 4,
with reset button

Safety door monitoring - control category 4

Experiments with two-hand operating element:

Two-hand operation

Safety door monitoring - control category 4

Experiments with safety relay "safe time function":

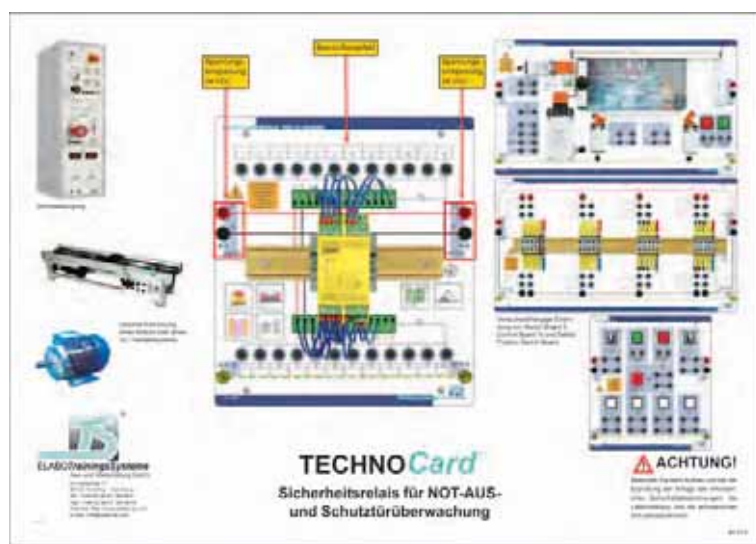
Safety interlocking - control category 2

Safe time function with reset switch

Safety door opening after definite time

Safety door opening after definite time with reset button

E40 513
Technocard
Safety relay for
Emergency-Stop and
safety door monitoring



Information and advice



We will help you ...

- ▶ in all questions concerning the equipment for vocational technical education
- ▶ on site
- ▶ over the telephone

Contact:

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Your enquiry

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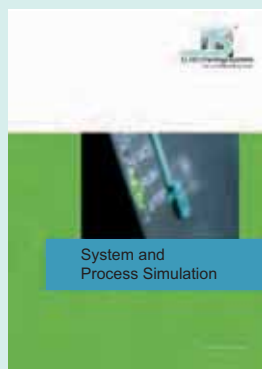
Postcode, Town / City, Country

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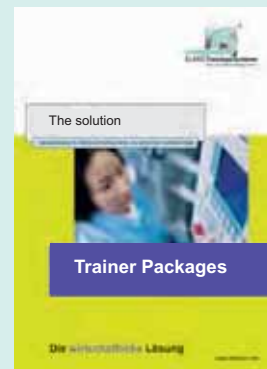
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the following
catalogue(s):



☐ System and
Process Simulation



☐ Safety of Electric
Installations and Devices



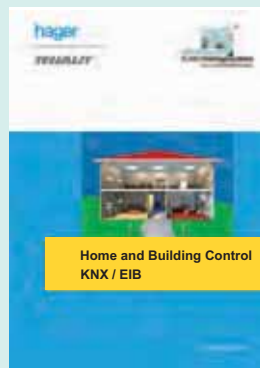
☐ Trainer Packages
The solution



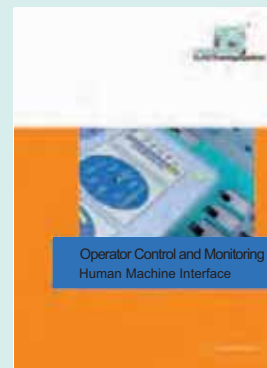
☐ Practical Training
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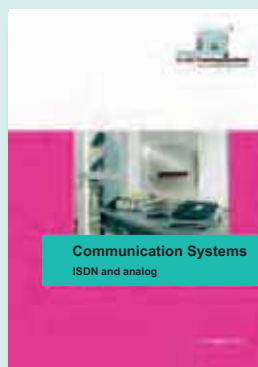
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