

A

AC/DC sensitive	7-20
Accessories contactors	5-30
Air circuit-breakers	7-3
Analog inputs, easy	1-23... 1-26
Analog output, easy	1-31
Approval authorities worldwide	9-6
AS-Interface® data bus	2-89
Asynchronous motor	2-2
ATEX approval	3-10
EMT6	8-12
Motor protection system ZEV	5-39
Overload relays	5-35
PKZM0, PKZM4	6-4
RMQ-Titan	3-10
Rotary switches, switch-disconnectors	4-17
Thermistor relay for machine protection EMT6	5-45
Automatic stator starters	
Engineering starting resistor	8-14
Engineering starting transformer	8-14
Example resistors	8-91
Example starting transformer	8-94
Auxiliary contact module	5-2
Auxiliary switch	
PKZ2	6-17
Auxiliary switches	
Early make	7-7
PKZM01, PKZM0, PKZM4	6-7
Standard, trip-indicating	7-6
Trip-indicating	7-6

B

Basic circuits	
Delta, star	2-4
easy	1-54... 1-59
Bimetal	
Motor protection	8-13
Motor-protective circuit-breakers	6-4
Overload relay	5-35
Braking oversynchronous	8-59
Braking resistance	2-84
Break-Down Service	0-9

Index

Bridging during starting	
Heavy starting duty	8-10
Motor contactor	8-9
Overload relays	8-26
Busbar system	0-22
C	
Cables	10-43
Cage Clamp	5-31
CANopen	1-39... 1-41
Capacitor	
Central compensation, use of reactors	8-17
Single, group compensation	8-16
Capacitor group compensation	8-17
Cascade control	2-52
Changeover circuit	1-56
Changeover contact	
Wattmeter	4-13
Changeover switch	
Ammeter	4-12
Voltmeter	4-12
Changeover switches	4-5
Circuit diagram auxiliary protection	5-6
Circuit diagram Internal circuit diagrams Circuit-breaker	7-8
Circuit documents general	8-18
Circuit documents wiring diagram	8-19
Circuit examples	
Bridging during starting	8-26
Contactors DIL	8-25
Circuit for overload relay 1-pole, 2-pole	8-5
Circuit-breaker	
Internal circuit diagrams	7-8
Meshed network circuit-breakers	7-17
Remote operation with motor operator	7-18
Residual current device	7-20
Switch position	7-15
Transformer switches	7-19
Circuit-breaker remote switching	7-11
Classification types of soft starters	2-17
Coil functions	1-52
Coils	1-50
COM-LINK connection	1-47
Compact circuit-breakers	7-2

Compact PLC, PS4	1-68
Compensated motor	8-11
Connecting examples	
DF51, DV51	2-74... 2-79
DF6	2-80... 2-81
DM4	2-56... 2-69
DS4	2-55
DS6	2-37... 2-39
DV6	2-82... 2-87
Connection RA-MO to AS-Interface®	2-92
Connection RA-SP to AS-Interface®	2-95
Contact module PKZ2	6-13
Contact protection relay	5-46
Contactor for capacitor	8-102
Contactor relays circuit diagrams	5-6
Contactor relays reference letters	5-3
Contactor, marking	8-24
Contactors	
DC operated	5-32
DILM	5-31
Overview	5-24... 5-25
SmartWire	5-10
Contacts	1-50
Control circuit devices	
For direct-on-line start	8-37
For multi-speed contactors	8-69... 8-73
For star-delta	8-51
RMQ	3-2
Control circuit supply motor	8-23
Control relays	
Basic circuits	1-54
Overview	1-12
Control relays → easyRelays	1-12
Co-ordination type motor protection	8-8
Core-balance transformer	5-38
Current Limiter	
→ Current limiter PKZ2	6-28
→ Current limiters PKZM0, PKZM4	6-5
Current limiter PKZ2	6-28
Current limiter PKZM0, PKZM4	6-5
Current monitoring relays	1-6
Current transformer-operated overload relays ZW7	8-8

Index

D

Darwin	0-11...0-13
DC motors	8-5
Degrees of protection for electrical equipment	10-28
Delta circuit, motor	2-78
Delta connection	2-4
Digital inputs, easy	
AC devices	1-21
DC devices	1-22
Direct-on-line starter	
Motor-protective circuit-breakers	6-3
Disconnect Control Unit	2-91
DOL starters	
Features	2-10
SmartWire	5-12
Three-phase asynchronous motors	2-5
With bypass	2-30
Double-frame terminal	5-31
Drives engineering basics	2-7

E

Early-make auxiliary switches	7-7
Earth-leakage circuit-breaker	7-22
easy	1-12
easy expansion	1-32...1-43
easy expansion units for networking	1-42
easy inputs	1-21...1-27
easy inputs, MFD	
Analog	1-23
easy local expansion	1-32
easy modem operation	1-49
easy outputs	1-28...1-31
easy power supply	1-20
easy printer connection	1-48
easy remote expansion	1-32
easy system overview	1-12...1-19
easyControl	1-16
easyHMI	1-14
easyNet	1-34...1-38
easyRelay	1-12
EE e motors	
Overload relays	5-35
PKZM0, PKZM4	6-4

Index

Electrical connector	6-4
Electrical isolation	5-2
Electronic Catalogue	0-8
Electronic safety relays	1-10
Electronic timing relays	1-2
EMC compliant connection	2-21
EMC measures frequency inverters	2-22
Emergency-Stop function	7-12
EMR4 measuring and monitoring relays	1-6
Encoder	2-84
Engineering	
easy	1-20... 1-49
EM4, LE4	1-78
Motor	8-14... 8-17
PS4	1-75
Switching of capacitors	8-16
Three-phase automatic starters	8-14
XC100, XC200	1-79
Ethernet module	1-46
Explosive atmospheres	4-17
F	
Fault current	5-38
Fault indication, differential	6-10
Flat band conductor	2-89
Floor-standing enclosure	0-21
Free-wheel diode suppressor	5-4
Frequency generators	1-27
Frequency inverters, features	2-70
FU → Frequency inverter	2-7
Function blocks	1-50
Functions easy	1-18
Fuseless, Reversing contactor DIUL	8-29
G	
German Trade Association	3-22
Graphic operator panel	1-72
Group compensation	8-16
Group protection Motor-protective circuit-breakers	6-6
H	
Hamburg circuit, off position interlock	8-110
Hazard reduction	1-10

Index

Heater switches	4-14
Heavy starting duty	
Bridging during starting	8-10
Example	8-27
Motor protection	8-8
High-capacity compact starters	6-18
High-speed counter	1-27
HMI systems	1-72
Housing	0-18, 0-21

I

Impulse relays	1-57
Incremental encoders	1-27
In-delta circuit	2-35
Indication of tripping circuit-breaker	7-15
Individual compensation	8-16
In-line circuit	2-35
Insulation monitoring relays	1-8
Interface assignment, XC100/XC200 RS	1-80
Interlock circuits, rotary switches	4-11
I2M terminal assignment	7-26

L

Labeleditor	3-9
Let-through energy	2-91
Level monitoring relay	1-7
Load-shedding contact	4-4
Low-voltage switchgear systems	0-14

M

Main switches	7-12
Main transfer switch	8-111
Maintenance switches, rotary switches	4-4
Markings, contactor	8-24
Master switch, off position interlock	8-111
Mechanical interlock	5-32
Mesh network circuit-breaker	7-17
MFD-Titan	1-12
Mirror contact	5-34
Modular PLC	1-70

Moeller	0-4
Electronic Catalogue	0-8
Field Service	0-9
Low-voltage switchgear systems	0-14
Support Portal	0-4
Monitoring relays	1-6
Motor	
Circuit documents	8-18
Control circuit devices for direct-on-line start	8-37
Control circuit supply	8-23
Engineering	8-14... 8-17
Mains changeover	8-111
Motor windings	8-56
Multi speed switch PKZ2	8-89
Multi-speed contactors	8-59
Pole-changing	8-53... 8-55
Power supply	8-20
Separate windings	8-53
Star-delta of three-phase motors	8-38... 8-47
Star-delta with PKZ2	8-48... 8-50
Starting with PKZ2	8-33... 8-36
Switching of capacitors	8-100... 8-103
Switching on three-phase motors	8-25... 8-32
Tapped winding	8-53
Motor connection	2-95
Motor Control Unit	2-92
Motor feeder	2-2
Motor full-load current	10-40
Motor operator circuit-breaker	7-18
Motor overload relay, motor protection	5-35
Motor power supply	8-20
Motor protection	8-3... 8-13
Motor protection system ZEV	5-38... 5-44
Motor rating	5-31
Motor windings	8-56
Motor-protective circuit-breaker	
Operating principle schematics PKZM01, PKZM0, PKZM4	6-9
Motor-protective circuit-breakers	
For starter combinations	6-5
Operating principle schematics PKZ2	6-18... 6-29
Operating principle schematics PKZM01, PKZM0, PKZM4	6-9... 6-11
Motor-protective circuit-breakers, overview	6-1

Index

Motor-starter combination MSC	6-4
SmartWire	5-10
Multi-function display	
Overview	1-12
Multi-function display → easyHMI	1-14
Multi-speed contactors	8-59
Control circuit devices	8-69...8-73
Star-delta	8-74
Multi-speed switch Bridging during starting	8-10
Multi-speed switch for three-phase motors	
Star-delta	8-74...8-88
Multi-speed switch of three-phase motors	8-61...8-68
Multi-speed switch with PKZ2	8-89
Multi-speed switches	
Rotary switches	4-7
Multi-speed switching, marking	8-24

N

Negation	1-54
Networking display and operating devices	1-74
Networking easy	1-32...1-43
Networking PS40 and XC series	1-73

O

Off-delayed undervoltage release	7-5
Off-position interlock	
Loads	8-110
Off-position interlock	
Hamburg circuit	8-110
Master switch	8-111
Ohm's Law	10-50
Operands	1-50
Operating frequency	8-4
Operating principle schematic PKZ2	6-18...6-29
Operating principle schematics PKZM01, PKZM0, PKZM4	6-9...6-11
Overload motor	5-38
Overload motor-protective circuit-breaker	6-2
Overload protection contactor	8-25
Overload protection, Rapid Link	2-90
Overload relay	
Tripping	8-4
Overload relay → Motor protection overload relay	5-35

Index

Overload relay function	6-12
Overload relay function PKZ2	6-29
Overload relay time-delayed	8-6
Overload relays	2-57
In delta circuit	8-39
In motor circuit, in mains line	8-38
Oversynchronous braking	8-59
Overvoltage	2-57
P	
Parallel circuit	1-55
Permanent contact	1-57
Personnel protection	
Enhanced	3-17
LS	3-16
LSR	3-21
Phase failure	5-38
Phase imbalance relay	1-7
Phase monitoring relays	1-6
Phase sequence relays	1-7
Phase-failure sensitivity	5-35
Point-to-point connection	1-47
Pole-changing motors	8-53... 8-55
Power bus	2-89
Power electronics	2-7
Process protection	3-19
Programmable contacts	5-39
Programming easy	1-50... 1-66
Protective measures	10-5
Proximity switches	3-27... 3-31
Pt100/Ni1000 inputs, easy	1-26
PTC Thermistor, Thermistor machine protection relay	5-45
PTC-Thermistor, motor protection	8-12
Pump control	2-50
Float switches	8-108
Pressure switches	8-106
Two pumps	8-104
Pushbutton control circuit devices	8-69
Push-through sensor ZEV	5-39
Q	
Quick-discharge resistor	8-100

Index

R

Rapid Link	2-88
RC suppressor	5-4
Reclosing lockout	8-4
Reference letter contactor relays	5-3
Reflected-light barrier, reflected-light beam	3-29
Relay outputs, easy	1-28
Remote display	1-44
Remote operator circuit-breaker	7-18
Remote operator PKZ2	6-14
Remote switch off PKZ2	6-25
Remote switch off PKZM01, PKZM0, PKZM4	6-11
Residual-current protection	7-20
Residual-current protection relays	7-22
Residual-current release circuit-breaker	7-20
Reversing combination → Reversing contactor	8-29
Reversing contactor	8-29
Reversing soft starter	2-45
Reversing star-delta	
2 directions of rotation	8-45
Direction change	8-46
Rotary switches	4-6
Reversing starter	
Motor-protective circuit-breakers	6-3
SmartWire	5-12
Soft starters	2-30
Reversing switches	4-5
Risk reduction	1-10, 10-26
Rogowski principle	5-38
Rogowski sensor	5-44
Root -3 circuit	2-65
Rotary switches	
ATEX approval	4-18
Changeover switches, reversing switches	4-5
Heater switches	4-14
Interlock circuits	4-11
Main switch, maintenance switch	4-3
Meter selector switches	4-12
Multi speed switches	4-7
Speed switching	8-59
Star-delta, reversing star-delta	4-6
Step switches	4-15
Use, mounting forms	4-2

Rotor automatic starter	
Engineering starting resistor	8-14
Properties of slipping rotor	8-15
Slipping rotor	8-96
Rotor-critical motors	8-12
S	
Safety category	5-19
Safety of machines	1-10
Safety position switches	3-15
Safety relays	1-10
Safety technology	1-10
SASY60	0-22
Screening measures	2-23... 2-25
Sealing power	5-31
Selectivity → time selectivity	7-16
Self-latching	1-56
Semiconductor contactors	2-7
Sensor belt ZEV	5-39
Separate windings	
Multi speed switch	8-65... 8-68
Speeds	8-53
Separation galvanic	5-2
Series circuit	1-55
Shift register	1-63
Short-circuit current, maximum	2-91
Short-circuit monitoring	5-43
Short-circuit protection	8-25
Short-circuit protection, RA-MO	2-90
Short-circuit rating	8-7
Short-circuit releases	6-4
Shunt releases	
Circuit-breaker remote tripping	7-4
Circuit-breakers	7-19
Operating principle schematics PKZ2	6-25
PKZM01, PKZM0, PKZM4	6-8
Remote switch off PKZ2	6-16
Remote switch-off	7-11
Single phase motors	8-5
Single-phasing sensitive	6-4
SL signal towers	3-11
Slipping rotor → Rotor automatic starter	8-96

Index

SmartWire	
Gateway easyNet/CANopen	1-43
Gateway PROFIBUS-DP	5-9
Modules	5-10
System	5-8...5-23
Soft starters	2-7
Classification types	2-17
DM4	2-33
DS4, DS6	2-29
Examples	2-13
Features	2-12
Soft starting → Soft starters	2-7
Special purpose relays	1-2
Speed Control Unit	2-95
Speeds, separate windings	8-53
Spring-loaded terminal	5-31
Stairwell lighting	1-60
Standard auxiliary contact, ON-OFF indication	7-15
Standard auxiliary switch	7-6
PKZ2	6-17
Star connection	2-4
Star connection, motor	2-79
Star-delta	
Bridging during starting	8-9
easy	1-58
Marking	8-24
Motor start	2-11
Multi-speed contactors	8-74
Rotary switches	4-6
SDAINL	8-40...8-44
Three-phase asynchronous motors	2-5
Three-phase motors	8-38...8-47
With PKZ2	8-48...8-50
Star-delta starters, with overload relays	8-38
Starting with PKZ2	8-33...8-36
Stator automatic starters	
Properties of squirrel cage rotor	8-15
Support Portal	0-5
Suppressor circuit	5-4
Suppressor circuit integrated, pluggable	5-31
Switch position indication	4-4
Switch position indication circuit-breaker	7-15
Switch-disconnectors Use, mounting forms	4-2
Switch-disconnectors with ATEX approval	4-18

Switching of capacitors	8-100... 8-103
Switching on three-phase motors	8-25... 8-32
System Range xEnergy	0-14
System-protective circuit-breakers	6-2

T

Tapped winding	8-10
Feed drive	8-31
Four speeds	8-55
Marking	8-24
Multi speed switch	8-61... 8-64
Multi speed switch star-delta	8-74... 8-88
Pole-changing motors	8-53
Rotary switches	4-7... 4-10
Three speeds	8-54
Temperature compensated	6-4
Temperature monitoring	8-12
Test authorities and approval stamps	9-10
Text display, easy	1-65
Text operator panel	1-72
Thermal overload relays	5-35
Thermistor	8-12
Thermistor motor protection	5-42
Thermistor overload relay for machine protection EMT6	5-45
Thermistor protection	5-42
Three-phase asynchronous motor	2-2
Three-phase automatic rotor starters	8-96... 8-99
Three-phase automatic starters	8-14
Three-phase automatic stator starters	8-91... 8-95
Three-phase current-automatic stator starters	8-91
Three-phase motors Multi speed switch	8-61... 8-68
Three-phase motors star-delta Multi speed switch	8-74... 8-88
Time selectivity circuit-breaker	7-16
Timing relay, on-delayed	1-57
Timing relays, functions	1-2
Transformer switch circuit-breaker	7-19
Transformer-protective circuit-breaker	6-5
Trip-indicating auxiliary contact circuit-breaker	7-6
Trip-indicating auxiliary contact PKZ2	6-17
Trip-indicating auxiliary contacts PKZM01, PKZM0, PKZM4	6-7
Tripping characteristics motor protection system	5-40
Tripping characteristics Overload relays	5-36
Tripping CLASS	5-38

Index

U

U/f inverters → Frequency inverters	2-7
Unbalanced current consumption	5-38
Undervoltage release	
Circuit-breakers	7-19
Interlocking of multiple switches	7-14
Off-delayed	7-5
PKZ2	6-16
PKZM01, PKZM0, PKZM4	6-8
Remote switch-off	7-11
Starting interlock	7-13
Switch-off	7-13
Use of reactor capacitor	8-17
Utilisation categories contactors, motor starters	10-34
Utilisation categories for switch-disconnectors	10-38

V

Varistor suppressor	5-4
Vector control	2-70
Visualisation, easyHMI	1-66
Voltage releases	
Interlock with undervoltage releases	7-14
Off-delayed undervoltage release	7-5
PKZ2	6-16
PKZM01, PKZM0, PKZM4	6-8
Remote switch-off	7-11
Shunt releases	7-4
Starting interlock Undervoltage releases	7-13
Undervoltage releases	7-5

W

Wall-mounting distribution system	0-21
Wall-mounting enclosure	0-18
Wiring examples for PS4	1-75... 1-77

X

xEnergy	0-14
XSoft	1-71

Z

ZEV motor protection system	5-38... 5-44
-----------------------------------	--------------

Notes

Notes

Moeller addresses worldwide:
www.moeller.net/address

E-mail: info@moeller.net
Internet: www.moeller.net
www.eaton.com

Issued by Moeller GmbH
Hein-Moeller-Str. 7-11
D-53115 Bonn

© 2008 by Moeller GmbH, Germany
Subject to alterations
FB0200-004EN_(02/08) ip/Ins/CPI
Printed in Germany (11/08)
Article No.: 119816



4 015081 176922

For service issues please contact
your Moeller representative or
the Moeller Field Service.

Hotline +49(0)180 5 228322 (de, en)
Tel. +49(0)228 602-3640
Fax +49(0)228 602-61400

E-Mail: fieldservice@moeller.net
Internet:
www.moeller.net/fieldservice



Powering Business Worldwide

Eaton's electrical business is a global leader in electrical control, power distribution, uninterruptible power supply and industrial automation products and services.

Eaton's global electrical brands, including Cutler-Hammer®, MGE Office Protection Systems™, Powerware®, Holec®, MEM®, Santak and Moeller, provide customer-driven PowerChain Management® solutions to serve the power system needs of the industrial, institutional, government, utility, commercial, residential, IT, mission critical and OEM markets worldwide.

www.eaton.com

MOELLER



An Eaton Brand