



POWER ELECTRIC
Switchboards PTY LTD

A.C.N. 052 204 118

Manufacturers of Engineered Switchboards for Mining, Industrial and Commercial Projects

Telephone: (07) **274 3922** • Facsimile: (07) **274 3929**

70 Flanders Street, Salisbury, Qld 4107

PO Box 6176, Fairfield Gardens, Brisbane, Queensland 4103, Australia

MAINTENANCE MANUAL

BRISBANE CITY COUNCIL

Q. 54/95/96

WACOL WASTE WATER TREATMENT PLANT

IRRIGATION PUMP MCC



SECTION 1

MAINTENANCE INSTRUCTIONS

TEST REPORTS

SECTION 2

EQUIPMENT CATALOGUES

SECTION 3

M.C.C. DRAWINGS

PREVENTATIVE MAINTENANCE INSTRUCTIONS1. MAINS CONNECTIONS:

The mains must be checked annually to ensure:

- All bolted connections are tight, dust and corrosion free;
- All fixings and cable supports etc. are positive.

2. MOTOR CONTROL CENTRE

The M.C.C must be checked annually. Firstly, remove all access panels and clean all accumulated dust out of the enclosure, and then check:

- All bolted connections;
- All incoming and outgoing terminations;
- Operations of all C.F.S units, isolators, contactors, controls etc..
- All instruments and instrument connections;
- All labelling and schedules are in place and up to date;
- Main earth connections and continuity;
- Load Balance;
- All fixings are tight and in place;
- Paintwork for blemishes and for any signs of corrosion;
- All hinges, locks, keys, handles, etc. to ensure that they are secure and function properly;
- All gaskets create a good seal;
- Automatic operation of control circuits.

3. Cleaning of Equipment

The equipment should be cleaned with a soft, dry paint brush, feather duster or equivalent, according to the circumstances and if possible with a jet of clean, dry air taking care to avoid damage to the components.

If it should happen that a component such as a relay is not working properly owing to dirt on its moving parts, its immediate replacement by a spare is to be recommended. In the case of grommets, connectors, contactors, etc., cleaning of the contact area can be done in place, using a cloth moistened with a solvent such as benzine or trichorethylene plus a dab of vaseline. All due care should be taken to de-energize the circuits associated with the location being serviced.

Visual Inspection

Visual inspection should be quite frequent. To verify the perfect functioning of the signalling system is to guarantee the immediate indication of any abnormal occurrence in the equipment or its components.



POWER ELECTRIC Switchboards PTY LTD

ACN 032 204 113

Manufacturers of Engineered Switchboards for Mining, Industrial and Commercial Projects

FINAL CHECKING PROCEDURE FOR ALL SWITCHBOARDS

SWITCHBOARD TITLE:

B.C.C. IRRIGATION PUMP... (WACOL)

JOB NUMBER:

.....

1. Check Switchboard has been built as per the approved drawing. (KA Rating, IP Rating, Form of Segregation.)
2. Check all Control Functions. (By B.C.C.)
3. Check all Connections.
4. Check all Clearance's.
5. Check hinges, locks, keys, handles etc, to ensure that they are secure and function properly.
6. Check operations of all CFS units, Circuit Breakers, Isolators, Contactors etc.
7. Check Main Earth connections and continuity.
8. Check that all neutrals are accessible.
9. Check that all labeling and schedules are in place.
10. Check general condition of Switchboard (Paintwork etc).
11. Check Switchboard has been cleaned out.
12. Meger Switchboard.

COMMENTS: _____

CHECKED BY: B. J. Leach

CIRCUIT	RESULT 1000V MEGER
R-E	2000 n/r
W-E	"
B-E	"
R-W	"
R-B	"
W-B	"
NEUT-E	"

Z SERIES MICRO CONTROLLER E

— 48 × 48mm —

DATA SHEET

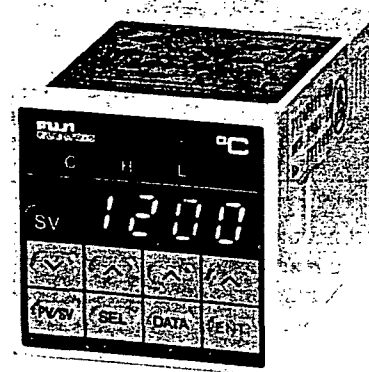
PYZ4

Micro Controller E is a small, economical temperature controller having a built-in micro-processor, and measures only 48mm square in accordance with DIN standard.

It accepts input from thermocouples, resistance bulbs, and voltage/current, and incorporates numerous control functions for on-off control and PID control.

FEATURES

- Multiple input, easily programmable range**
The micro controller E accepts inputs from 6 different types of thermocouples and resistance bulbs. Alterations of input range can readily be made at the site. Voltage/current input type is also available.
- Wide range of power supply**
The micro controller E operates on AC voltage ranging from 85 to 265V.
- Standard type with PID auto-tuning function**
Auto-tuning function is provided to obtain PID parameters suited for process.
- Dust/drip-proof front panel**
Front panel is dust/drip-proof complying with IEC IP55.
- Compactness**
Instrument depth is only 100mm or less, allowing installation in a limited space.



SPECIFICATIONS

1. Control functions

- (1)PID control: Proportional band (P): 0 to 999.9%
Integral time (I): 0 to 9999 sec
Derivative time (D): 0 to 3600 sec
(2-position action at P, I, D=0, proportional action at I, D=0)

(2)PID auto-tuning

(3)Proportional cycle:

1 to 150 sec (contact; SSR / SSC drive output)

(4)Hysteresis width:

0 to 20% (2-position action)

(5)Anti-reset windup :

0 to 100% variable

(6)Control cycle: 0.5 sec

2. Input

(1)PV input signal:

Type	Input	Remarks
I	Thermocouple input J K R T N (Nichrosil-Nisil) PL-II (Platinel)	• Cold junction compensating function built in • Burnout circuit built in • Influence of external wiring resistance is approx. 0.5μV/Ω
	Resistance bulb input Pt100 (IEC Pub 751-1983)	• Burnout circuit built in • Influence of external wiring resistance is 0.015% /Ω (per wire) of reading
II	Voltage input 1 to 5V DC	Input resistance, 400kΩ
	Current input 4 to 20mA DC	Input resistance, 250Ω

- Remarks: (1) Selection between thermocouple input and resistance bulb input in Type I is made by using the select pin in the instrument.
(2) For 4 to 20mA DC input in Type II, a 250Ω resistor is supplied for connection to the input terminal.
(3) For selection between 4 to 20mA and 1 to 5V DC, remove the 250Ω resistor.
(4) Instrument using B, E and S thermocouple inputs is also available as non-standard item.

(2) Input range (): Decimal point acceptable range

Input	°C	°F		
	Range	Min. range	Range	Min. range
Pt100	-150 to 400 (-150.0 to 300.0)	50 (100.0)	-238 to 752	90
J	0 to 1000 (0.0 to 300.0)	200	32 to 1832	360
K	0 to 1200 (0.0 to 300.0)	200	32 to 2192	360
R	0 to 1600	1000	32 to 2912	1800
T	-200 to 400 (-200.0 to 300.0)	200	-328 to 752	360
N (Nichrosil- Nisil)	0 to 1300 (0.0 to 300.0)	200	32 to 2372	360
PL-II (Platinel)	0 to 1300 (0.0 to 300.0)	200	32 to 2372	360
4 to 20mA DC	-1999 to 3000 (engineering value setting)			
1 to 5V DC	Decimal point acceptable optional			

(3) Burnout

Control output is held at upper/lower maximum value when temperature sensor open.

For resistance bulb input, detection is allowed even if any of the three wires is discontinued.

3. Output

Control output signal:

Output selectable from the following

Current output	4 to 20mA DC	Allowable load resistance 600Ω max. Ripple approx. 1.5%FS(*), 2Hz
Contact output	SPDT contact	Electrical expect life 220V AC, 3A, resistive load 10 ⁵ cycle Mechanical expect. life 10 ⁷ cycle
SSR / SSC driver output	Transistor	ON 60mA max. / 24V DC OFF 0.3V max.

4. Setting and indication

- (1) Accuracy: $\pm 0.5\%FS \pm 1$ digit
 $\pm 5\%FS \pm 1$ digit
 (R thermocouple 0 to 400°C)

(2) Setting method:

Key operation

(3) Indication method:

Numerical indication; PV/SV changeover indication (red), 7-segment LED, 4 digits

(4) Status indication:

Control output
 High/low alarm (option)

5. Alarm (option)**(1) High/low alarm:**

One type of alarm can be selected from those in Fig. 1 by using the front panel key.

Alarm output: High/low common alarm

Relay contact output	SPST contact	Resistive load; 220V AC, 1A
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Note: * FS: Full scale

6. Power failure processing

Set values, PID parameters are retained in nonvolatile memory and restarts automatically.

7. Self-diagnosis function

Monitoring of program failure by watchdog timer

8. Operating and storage condition**(1) Ambient temperature:**

-10 to +50°C

(2) Ambient humidity:

90%RH or less (no condensation is required)

(3) Storage temperature:

-20 to +60°C

9. General specifications**(1) Power supply:** 85 to 265V AC, Free power supply**(2) Power consumption:**

Approx. 10VA/100V AC, approx. 18VA/220V AC

(3) Dielectric strength:

1500V AC (power supply to relay output,
 power supply to alarm output)
 500V AC (other)

(4) Insulation resistance:

50MΩ or more (500V DC)

10. Structure**(1) Mounting method:**

Panel flush mounting or wall mounting

(2) Enclosure: Plastic housing**(3) Terminal configuration:**

Socket type

(4) External dimensions:

48 (H) x 48 (W) x 93 (D) mm

(5) Mass(weight): Approx. 150g**(6) Finish color:** Munsell 5Y 8/1 (front panel frame and case)**11. Scope of delivery**

Controller, panel mounting frame, socket when specified

CODE SYMBOLS

1	2	3	4	5	6	7	8	9	10	Description
P	Y	Z	4			Y	2		V	
										Input signal
										Thermocouple [°C]
										Thermocouple [°F]
										Resistance bulb, Pt100Ω, 3-wire (IEC) [°C]
										Resistance bulb, Pt100Ω, 3-wire (IEC) [°F]
										4 to 20mA DC
										1 to 5V DC
										Control output
										Contact (reverse action)
										Contact (direct action)
										SSR / SSC driver output (reverse action)
										SSR / SSC driver output (direct action)
										4 to 20mA DC (reverse action)
										4 to 20mA DC (direct action)
										Additional functions
										None
										With high/low common alarm

Notes: Symbols of resistance bulbs are as follows.
Pt100... IEC Pub 751-1983
(Pt100 changeover is possible with front key.)

Note: Socket is needed to order by the parts number showing under.

Mounting socket ordering

Code	Type	Mounting	Application
A	ATX2PSB	Panel flush mounting	For non alarm type
B	ATX1NS (US socket)		
C	TP28S		
D	TP28X		
E	TP311SB	Panel flush mounting	For alarm type
F	11GB		
G	TP311S		
H	TK7A5807P9		

Fig. 1 Kinds of alarms:

	Function	Action
Deviation alarm	High/low alarm, without low alarm hold	
	High alarm	
	Low alarm, without low alarm hold	
	High/low alarm, with low alarm hold	
	Low alarm, with low alarm hold	
Absolute value alarm	High/low alarm, without low alarm hold	
	High alarm	
	Low alarm, without low alarm hold	
	High/low alarm, with low alarm hold	
	Low alarm, with low alarm hold	

	Function		Action
Absolute value + Deviation alarm	Absolute value	Deviation	
	High alarm	Low alarm	
	Low alarm	High alarm	
	Low alarm, with hold	High alarm	
	High alarm	Low alarm, with hold	
Zone of alarm	Low alarm	High alarm	
	Absolute value	Absolute value	
	Deviation	Absolute value	
	Absolute value	Deviation	
	Deviation	Deviation	

- Remarks: (1) Low alarm hold is a function to turn OFF the lower limit alarm when temperature is below the set value at ON of instrument power source, and when the temperature rises above the set value of AL and then lower again, the lower limit alarm is turned ON.
(2) Alarm output in the shaded area turns ON.
(3) Only one alarm output is provided, either high or low.
(4) Alarm type at shipping is deviation high/low alarm with low alarm hold in the area.

PYZ4**Parameter function**

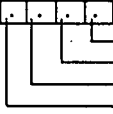
- This instrument incorporates primary (setpoint) and secondary (system) parameters so that setting operation can be made by using the front panel keys according to operating conditions. (By pressing the SEL key for about 5 seconds, secondary parameter is selected. By pressing the same key for about 5 seconds again, primary parameter is selected.)

- Primary (setpoint) menu**

Display	Item	Description
SV	Main setpoint	Settable within the input range
P	Proportional band	Setting range: 0.0 to 999.9% For on/off control set to "0"
I	Integral time (reset)	Setting range: 0 to 9999 sec. Integral action is off when set to "0"
D	Derivative time (rate)	Setting range: 0 to 3600 sec. Derivative action is off when set to "0"
AL(*1)	Low alarm setpoint	Settable within the input range Not indicated without the alarm output option
AH(*1)	High alarm setpoint	Settable within the input range Not indicated without the alarm output option
TC	Cycle time (output 1)	Setting range: 1 to 150 sec. Not indicated within current output
HYS	Hysteresis (output 1)	Setting range: 0.0 to 20.0% FS
AT	Auto-tuning	Sets P,I,D parameters internally (Reverse or direct) 0: Auto-tuning off 1: Standard auto-tuning 2: Below setpoint auto-tuning (10%FS below setpoint)
LOC	Lock-up	Program data lock-up: (code) 0: All data is selectable 1: All data is locked-up 2: All data except for main setpoint is locked-up

Note: *1 is displayed only when the controller is provided with alarm function.

- Secondary (system) menu**

Display	Item	Description
P-n1	Control action	Setting control action: (code) Reverse or direct Setting sensor break protection: (code) Upscale or downscale
P-n2	Input type	Setting input type: Thermocouple or RTD Current or voltage
P-dF	Digital filter	Setting: (code) 0 to 201 1/2 of setting=63% response time
P-SL	Low limit of input range	Set the lower limit of input range Setting range: -1999 to 3000
P-SU	High limit of input range	Set the higher limit of input range Setting range: -1999 to 3000
P-Ab	Alarm type	Setting: (code) Choices of deviation, absolute, and combination type alarm configurations
P-An	Alarm hysteresis	Setting range: 0 to 255 (engineering unit)
P-dP	Decimal point position (resolution)	Select the decimal point position for PV/SV indication 
P-48		Not to be changed.
PVOF	Process variable offset	Setting range: -1999 to 2000 Indicated process variable is changed Measured process variable is unchanged
SVOF	Setpoint variable offset	Setting range: -1999 to 2000 Indicated setpoint variable is unchanged Measured setpoint variable is changed
P-F	C/F selection	Setting: (code) 0: °C 1: °F
dSP1	Primary parameter skip	Setting of presence or absence of any parameter display P, I, D, AL, AH, TC or HYS.
dSP2	Primary parameter skip	Setting of presence or absence of any parameter display AT.
dSP3	Primary parameter skip	Not to be changed.

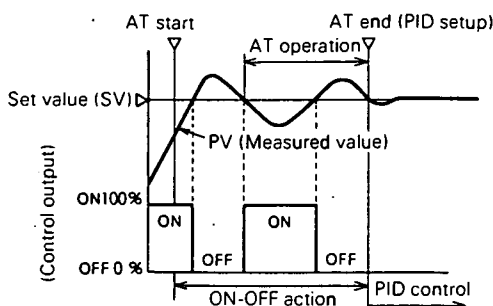
Functions

(1) Auto-tuning

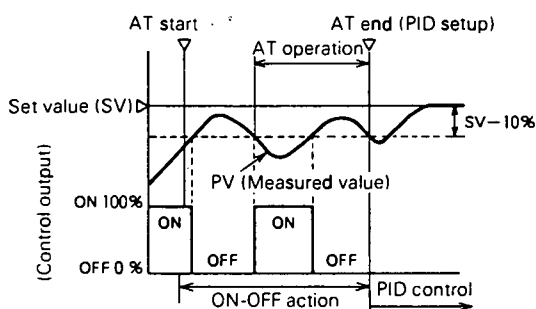
PID parameters are automatically set by controller's measurement and operation function.

This instrument provides 2 types of auto-tuning functions; the standard type (auto-tuning, with SV used as reference) and the low SV type (auto-tuning, with the value 10% below SV used as reference).

(a) Standard type



(b) Low PV type



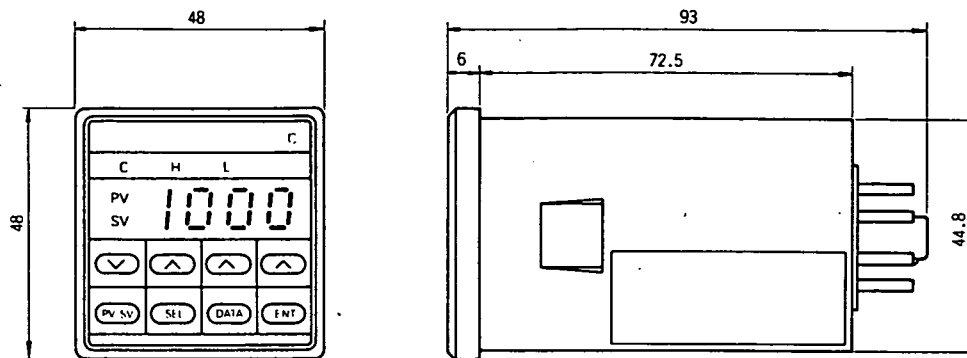
- Remarks:
- (1) PID parameter which has been automatically set at the completion of auto-tuning is saved even when the power is turned OFF, eliminating the need for auto-tuning for succeeding operations.
 - (2) During auto-tuning, control output turns ON and OFF, which largely changes the value of PV depending on process. Do not use the auto-tuning function if such a phenomenon is not allowed.
 - (3) Do not use the auto-tuning function for a process having a quick response, such as pressure control, flow control, etc.

(2) Fault display

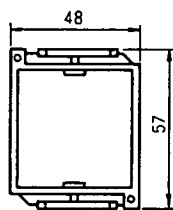
This instrument provides fault display functions.

Display	Cause
U U U U	(1) Thermocouple sensor burnout (when burnout direction is up scale) (2) Resistance bulb sensor burnout (when burnout direction is up scale) (3) PV display value in excess of 30% above the max. value in measurement range
L L L L	(1) Thermocouple sensor burnout (when burnout direction is down scale) (2) Resistance bulb sensor burnout (when burnout direction is down scale) (3) Resistance bulb sensor short-circuit (between A and B) (4) PV display value declined 30% below the min. value in measurement range

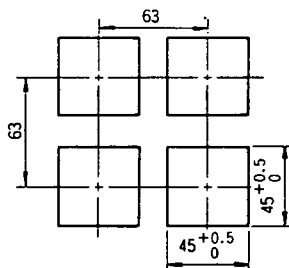
Note: The above display may not be obtained depending on input type and input range.

OUTLINE DIAGRAM (Unit:mm)

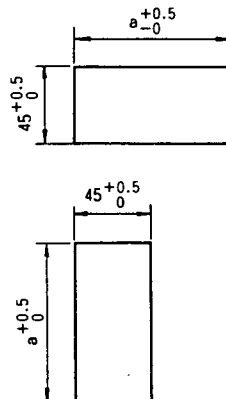
Panel fixing frame (inserted from rear of instrument and fixed with screws)

**Panel cutout**

Mounting of "n" units



Mounting multiple "n" units (2≤n≤6) (not available when 11-pin TP311SB socket is used for horizontal mounting and available when ATX1NS and 11GB socket is used for vertical mounting.)



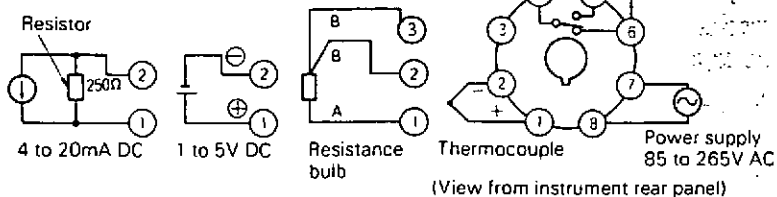
Quantity	2	3	4	5	6
a	93	141	189	237	285

Note: For close mounting of instruments with 200V system power source, it is recommended to install a cooling fan for dissipating heat.

CONNECTION DIAGRAM (Without alarm)

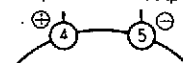
— Socket type —
(8-pin)

< Measured value input >

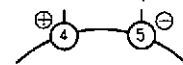


< Control output >

SSR/SSC drive output



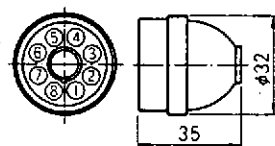
Current output



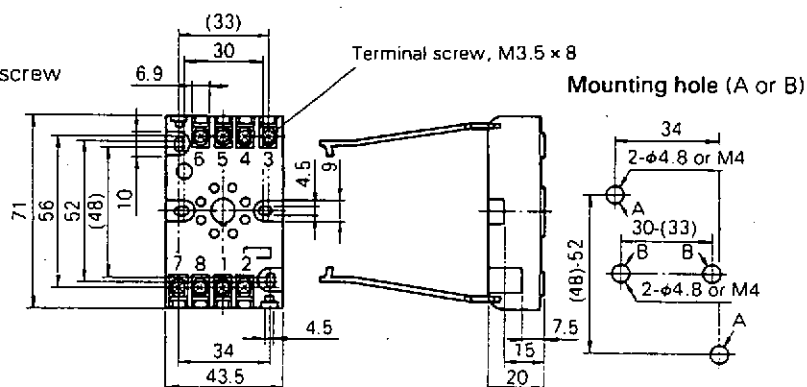
Remark: SSR/SSC drive output and 4 to 20mA DC output are not electrical-ly isolated from the internal circuit. Use a non-grounded type sensor.

Usable socket (Unit: mm)

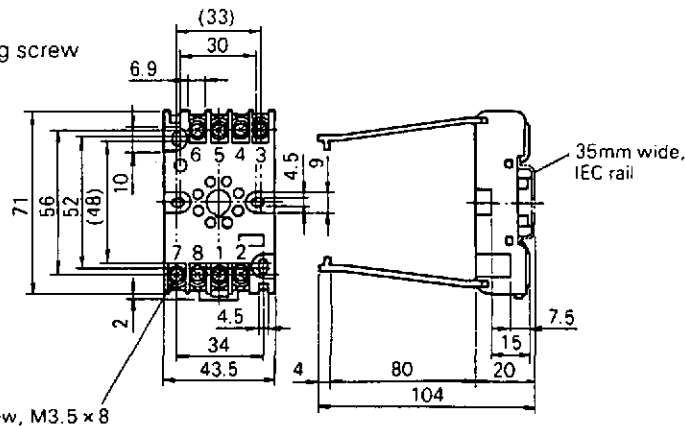
ATX1NS type
(US socket)



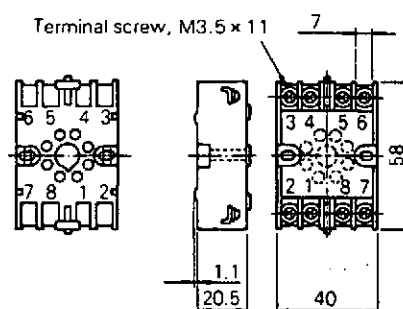
TP28S type
(for front panel screw terminal wiring)



TP28X type
(for rail mounting screw terminal wiring)

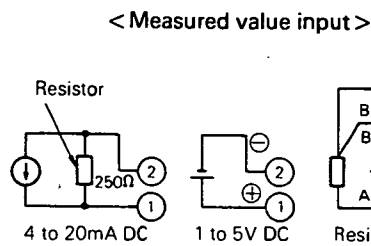


ATX2PSB type
(for rear panel screw terminal wiring)



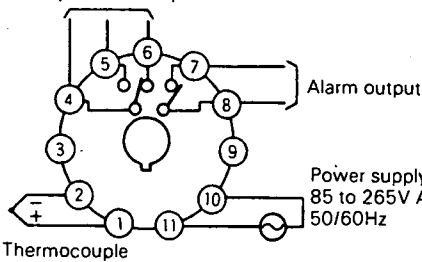
CONNECTION DIAGRAM (With alarm)

— Socket type —
(11-pin)



< Control output >

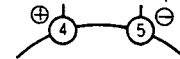
Relay contact output



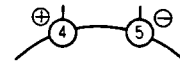
(View from instrument rear panel)

< Control output >

SSR/SSC drive output



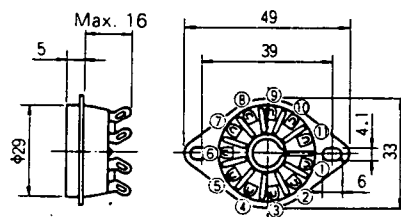
4 to 20mA DC output



Remark: SSR/SSC drive output and 4 to 20mA DC output are not electrically isolated from the internal circuit. Be sure to use non-grounded type sensor.

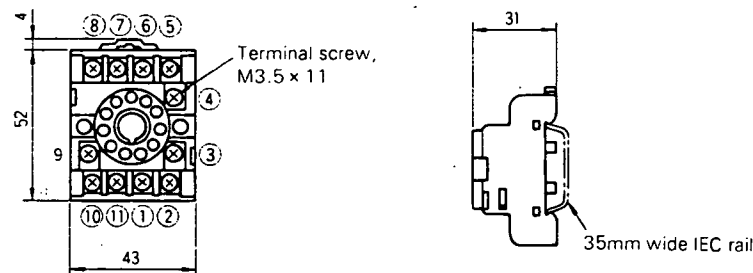
Usable socket (Unit: mm)

11GB socket



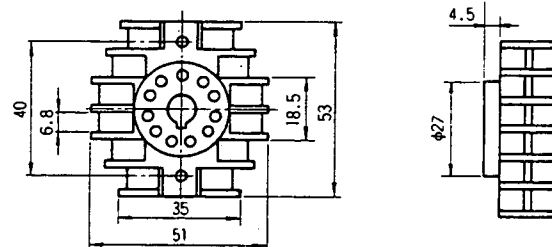
TK7A5807P9

(for rail mounting screw terminal wiring)

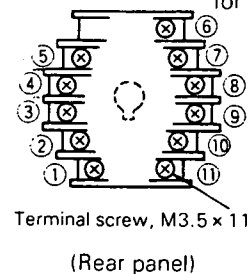


TP311SB

(for rear panel screw terminal wiring)



Panel mounting size is the same as that for TP311S.



Brisbane:

185 Moggill Road, Taringa, Qld. 4068

P.O. Box 744, Indooroopilly 4068.

Tel: (07) 870 3331 Fax: (07) 870 3202

LOOP POWERED ISOLATOR

Technical Data

POWER SUPPLY

INPUT **DC Current** **4-20mA**

Volt drop:

100 ohm load @ 4mA ≤ 4V

100 ohm load @ 20mA ≤ 9.5V

250 ohm load @ 4mA ≤ 4V

250 ohm load @ 20mA ≤ 10V

400 ohm load @ 4mA ≤ 4.5V

400 ohm load @ 20mA ≤ 12.5V

OUTPUT **DC Current** **4-20mA**

Load **400 ohms**

Monitor Points **40-200mV**

ISOLATION **2500 Vrms**

LINEARITY **±0.1%**

ACCURACY **±0.1%**

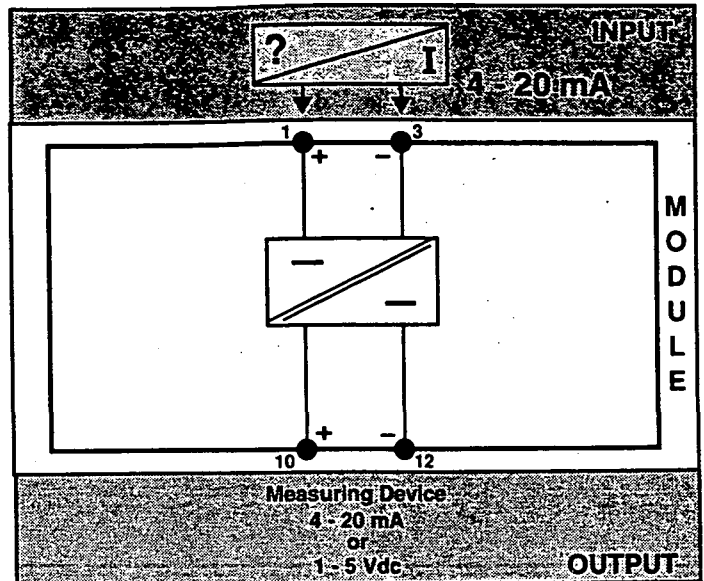
COMMON MODE REJECTION **—**

INPUT IMPEDANCE **Load +125 ohms**

RESPONSE TIME **250mSec (20 - 80%)**

Special Features

Also available with 1-5 Vdc output.



General Description

The KHD2-LPI is a fully floating 4-20mA signal isolator that provides up to 2500Vrms isolation between input and output. Furthermore the KHD2-LPI can act as a reducer of common mode noise.

The KHD2-LPI may be field adjusted to compensate for any loop loading effects. Adjustments are from the front by way of "Trim" and "Set" multi-turn potentiometers.

General Specifications

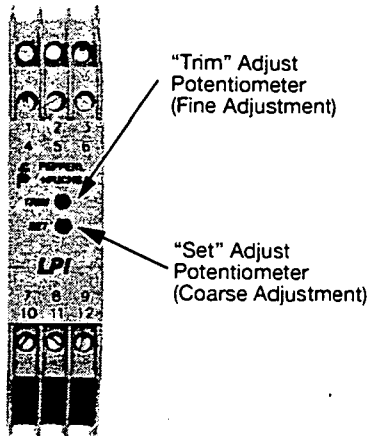
OPERATING TEMP, RANGE **0-60°C**

HOUSING MATERIAL **MAKROLON**

MOUNTING **35mm DIN RAIL**

WEIGHT **approx. 90 grams**

HOUSING STYLE **A - see page 9.1**

KHD2-LPI**LOOP POWERED ISOLATOR****Operating Controls and Indicators****Front View****Ordering Information****EXAMPLE:****Model No. KHD2-LPI**

This device is a current isolator. It isolates the 4-20mA input to the 4-20mA output.

EXAMPLE:**Model No. KHD2-LPI/1-5**

This device is a 4-20mA current isolator with a 1-5VDC output.

KEY To Model Numbers:

KHD2-LPI
 Loop Powered Isolator
 4-20mA input
 4-20mA output

KHD2-LPI/1-5
 Loop Powered Isolator
 4-20mA input
 1-5Vdc output

Calibrations & Connections

1. **ADJUST THE "TRIM" ADJUST POTENTIOMETER FULLY CLOCKWISE.**
2. **MONITOR THE INPUT AND OUTPUT**
via the monitoring terminals.
Input pins 4+ and 6- and output pins 7+ and 9-.
3. **WITH THE INPUT CURRENT LOOP**
at 20mA adjust the "Set" potentiometer until the output monitor reads 200mV. For fine adjusting use the "Trim" potentiometer.
4. **THE MONITORING POINTS WILL READ**
40-200mV for the 4-20mA input respectively.



NHP

**sprecher +
schuh**



Touch by touch better

Q-Pulse Id TMS779

Active 29/01/2014

**New and improved
The most important Control
and Indicating Units \varnothing 22 mm**

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easy to select – fast to install – reliable in operation

Complete Standard Units¹⁾



Multi - Function Pushbuttons

Design Contacts	Type Reference Order Number
Pos. C green I — B — A red O —	DM 3 P-B-01/10
Pos. C green I — B — A red O — (raised)	DM 3 P-C-01/10
Pos. C green I — B red O — (raised) A green II —	DM 3 P-H-10/01/10



Multi - Function Pushbuttons
with Signal Lamp

Design Contacts	Type Reference Order Number
BA 9s, max. 250 V, without lamp, for lamps 2 W Pos. C green I — B lamp — A red O —	DML 3 P-F-E-01/10
BA 9s, max. 250 V, without lamp, with diode and resistor for supply voltage 240 V AC, for lamps 130 V Pos. C green I — B lamp — A red O —	DML 3 P-F-C-01/10



Signal Lamps

Design	Type Reference
BA 9s, max. 250 V, without lamp, for lamps max. 2.6 W ● Green — ● Red ○ White ● Blue ○ Yellow	DL 3 R-G-E DL 3 R-R-E DL 3 R-W-EM DL 3 R-B-EM DL 3 R-Y-E



Rotary Switches with Short
Operator

Design Contacts	Type Reference
O - I — 90° — —	DS K B3 P-A-10M
— — —	DSK 3 P-A-11
I - O - II — 2 x 90° — —	DSK 3 P-D-10/10M
O - I — 45° — —	DSK 3 P-B-10



Rotary Switches with Long
Operator

Design Contacts	Type Reference
O - I — 90° — —	DSH 3 P-A-10
— — —	DSH 3 P-A-11
O - I — 45° — —	DSH 3 P-B-10

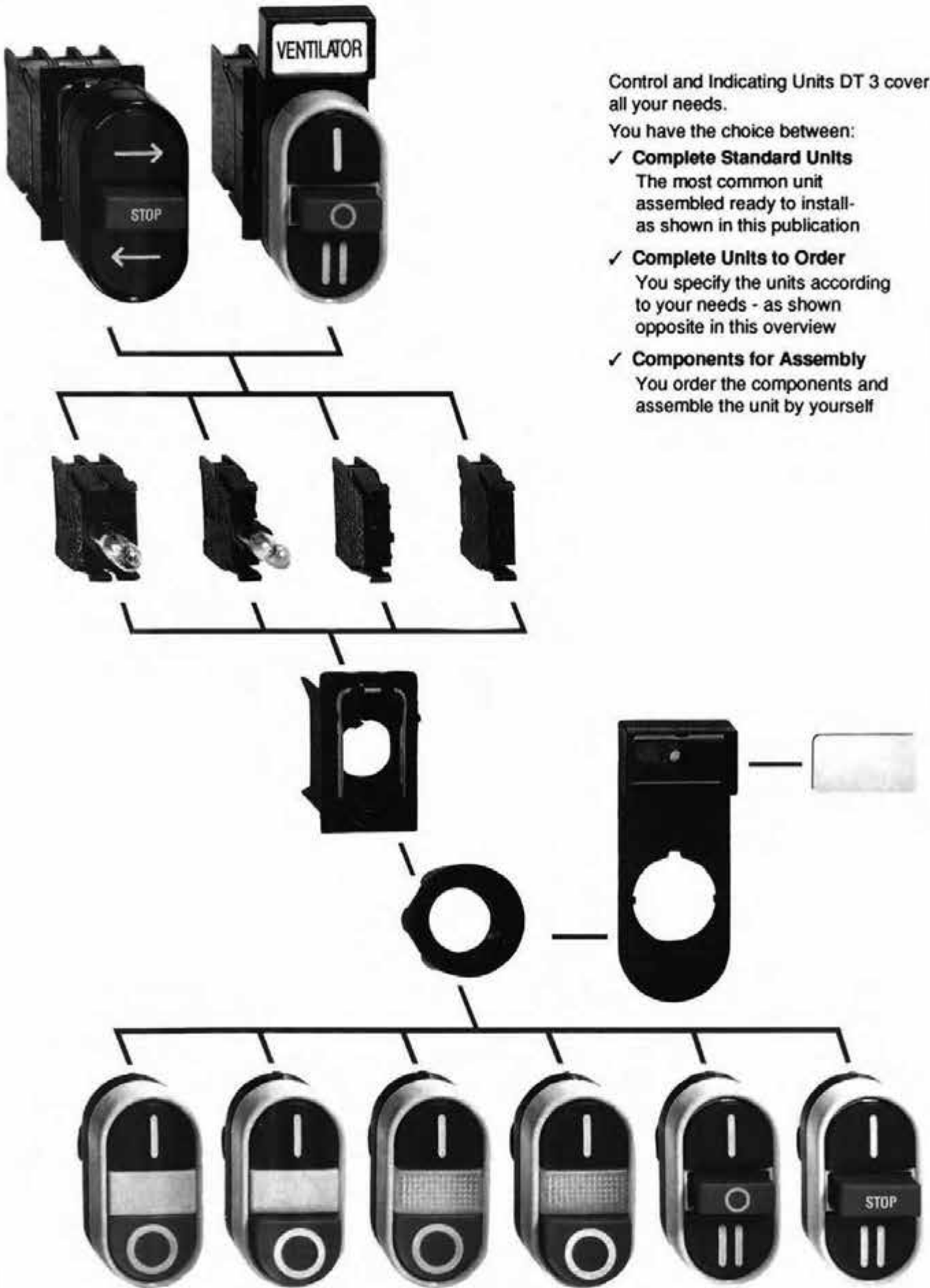


Key Operated Rotary
Switches

Design Contacts	Type Reference
O - I — 90° — —	DSS 3 P-AF-10M
— — —	DSS 3 P-AF-11
O - I — 45° — —	DSS 3 P-BD-10

All with same key no. EG 0021
Key withdrawable in «O» and «I» position

combined to your needs



Contact Blocks, Lamp Units and Accessories



Contact Blocks

Front Mounting

Contacts	Type Reference	Order Number
	DE 3-10	
	DA 3-01	
	DA 3-L01	



Lamp Units

Front Mounting

Type Ref.	Type Ref..
Order Number	Order Number
With central lamp test	
BA 9s, max 250 V, without lamp, for signal lamps max. 2.6 W	
DEL 3	DELK 3
With series diode and resistor, supply 220 V AC, for lamps 130 V	
DELD 3	DELDK 3
supply 240 V AC	
DELD 3	DELDK 3



Transformers

Front Mounting

Type Reference: DU 3	
For mounting onto lamp units	
Secondary: 6V, 1.2 VA, 50 / 60Hz	
Primary:	Order Number
110...120 V	DU3-110
220...240 V	DU3-240
380...415 V	DU3-415



Transformers

Front Mounting

Type Reference: DLU 3	
BA 9s, without lamp, for signal lamps max. 2.6 W	
Secondary: 6V, 1.2 VA, 50 / 60 Hz	
Primary:	Order Number
110...120 V	DLU3-110
220...240 V	DLU3-240
380...415 V	DLU3-415



Clear Lamps

Voltage [V]	Rating [W]	(BA 9s) Order Number
6	1.2	BA 9 SI3...V
12	1.2	
24	1.2	
36	1.2	
48	1.2	
60	1.2	
110/130	1.9/2.4	

Miniature Neon Lamps

Voltage [V]	(BA 9s) Order Number
110...127	BA 9 S-CN-110V
220...240	BA 9 S-CN-240V

Blanking Plugs

Order Number
round BT 3 R-BP



Mounting Tool

Order Number
For fixing nut DT 3-FT

Lock Nut

Order Number
(as replacement part) D3-LN



Nameplate Holder

Black plastic, for 30 x 48 mm nameplates,	Order Number
For DT 3	DT 3-30-LC
For DM 3	DM3-LC

Nameplates

Aluminized plastic, blank, 30 x 48 mm	Order Number
	DT 3-30LP



Refer NHP Catalogue for our range of Opaque Inscription caps.

- neutral
- white
 - yellow
 - red
 - blue
 - green
 - black

This selection is only a part of our range of products. You will find the complete range in our NHP catalogue, which we will be pleased to send you - at your request.

for years

Complete Standard Units



EMERGENCY STOP Pushbuttons

Reset by Twisting Type Reference
Contacts Order Number

Operator ø 30 mm DN 3-30-01

Operator ø 40 mm DN 3-40-01

Operator ø 50 mm DN 3-50-01

EMERGENCY STOP Pushbuttons

Reset with Key Type Reference
Contacts Order Number

Operator ø 30 mm DNS 3-30-01

Operator ø 40 mm DNS 3-40-01

Operator ø 50 mm DNS 3-50-01

Enclosures with EMERGENCY STOP Pushbutton

Contacts Type Reference
Order Number

Surface mounting enclosure, yellow plastic,
operator ø 40 mm, reset by twisting
DYA 3 N-40-01

Reset with key DYA 3 NS-40-01

Surface mount. enclosure, yellow aluminium,
operator ø 40 mm, reset by twisting
DZA 3 N-40-01

Reset with key DZA 3 NS-40-01



Surface Mounting Pushbutton Enclosures⁴⁾

Vertical Use

Design	Contacts	Type Reference
Enclosure in grey plastic, protection IP 65 - water and dust tight,		
Pos. B green I		DYA 3 V-A-201
A red O		
Pos. C green I		DYA 3 V-A-301
B red O		
A green II		
Enclosure in grey aluminium, protection IP 65 - water and dust tight,		
Pos. B green I		DZA 3 V-A-201
A red O		
Pos. C green I		DZA 3 V-A-301
B red O		
A green II		



Surface Mounting Pushbutton Enclosures⁴⁾

Horizontal Use

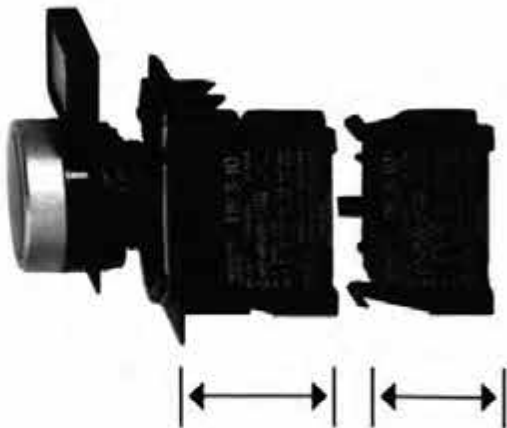
Design	Contacts	Type Reference
Enclosure in grey plastic, protection IP 65 - water and dust tight,		
Pos. B green I		DYA 3 H-A-201
A red O		
Pos. C green I		DYA 3 H-A-301
B red O		
A green II		
Enclosure in grey aluminium, protection IP 65 - water and dust tight,		
Pos. B green I		DZA 3 H-A-201
A red O		
Pos. C green I		DZA 3 H-A-301
B red O		
A green II		

NOTE: 4) Assembled to Special Order. For stock types refer NHP Catalogue

touch by touch better...

...in dimensions

- smaller behind-panel depth
 - only 48 mm for the first contact layer
 - only 70 mm for the second contact layer
- = saves valuable space
 - = reduces enclosure depth
 - = minimum space requirement for a second layer



...in mounting

- only one person necessary
 - central fixing
 - easy snap-on contact blocks
 - designed for fast and simple wiring
- = saves personnel and time
 - = simplifies the job
 - = faster mounting and wiring
 - = efficient assembly: less mistakes



...in technology

- self-wiping H-type contacts
 - secure function guaranteed up to 85°C (test mark 85+++)
 - Emergency STOP pushbuttons with positive actuation
 - materials with no asbestos or cadmium additives
- = electronic-compatible
 - = guarantees reliable operation even under severe conditions
 - = maximum safety for personnel and plant
 - = environmentally compatible and recyclable materials



...in design

- most elegant line on the market
 - Three different front rings available (metal, grey, black)
 - Control and load switches in the same design
- = enhances the value of your machines and plants
 - = for every kind of front panel - to meet all your requirements
 - = uniform and elegant design for all applications



...in customer service

- short delivery times
 - obliging service
 - complete support
- = you get your units faster
 - = you get «first class» treatment
 - = we are always ready to serve you



The most important Control and Indicating Units – Complete Standard Units¹⁾



Momentary Pushbuttons

Design Contacts	Type Reference
Green	DT 3 P-MG-10M
Green	DT 3 L-MG-10M ²⁾
Green START	DT 3 P-MG-166-10M
Green START	DT 3 L-MG-166-10M

Momentary Pushbuttons

Design Contacts	Type Reference
Red	DT 3 P-MR-01M
Red	DT 3 L-MR-01M
Red STOP	DT 3 P-MR-167-01M
Red STOP	DT 3 L-MR-167-01M

Latched Pushbuttons

Design Contacts	Type Reference
Green	DTV 3 P-G-10
Green	DTV 3 P-G-11
Red	DTV 3 P-R-10
Red	DT 3 P-R-11



Illuminated Momentary Pushbuttons

Design Contacts	Type Reference
BA 9s, max. 250 V, without lamp, for lamps max. 2 W	
GRB	DTL 3 P-GRB-10M ³⁾
GRB	DTL 3 L-GRB-E-10M ^{2) 3)}
BA 9s, max. 250 V, without lamp, with diode and resistor for supply voltage 220 V AC, for lamps 130 V	
Green	DT 3 P-G-C-10M
Green	DT 3 L-G-C-10M ²⁾

Illuminated Momentary Pushbuttons

Design Contacts	Type Reference
BA 9s, max. 250 V, without lamp, for lamps max. 2.6 W	
GRB	DTL 3 P-GRB-01M ³⁾
GRB	DTL 3 L-GRB-01M ^{2) 3)}
BA 9s, max. 250 V, without lamp, with diode and resistor for supply voltage 220 V AC, for lamps 130 V	
Red	DTL 3 P-R-C-01M
Red	DTL 3 L-R-C-01M ²⁾

Illuminated Latched Pushbuttons

Design Contacts	Type Reference
BA 9s, max. 250 V, without lamp, with diode and resistor for supply voltage 220 V AC, for lamps 130 V	
Green	DTLV 3 P-G-D-10
Green	DTLV 3 P-G-D-11
Red	DTLV 3 P-R-D-01
Red	DTLV 3 P-R-D-11

NOTE: 1) M denotes standard packaged units-
assembled to order

2) With metal front ring

3) Supplied with 3 colour caps green/red/blue

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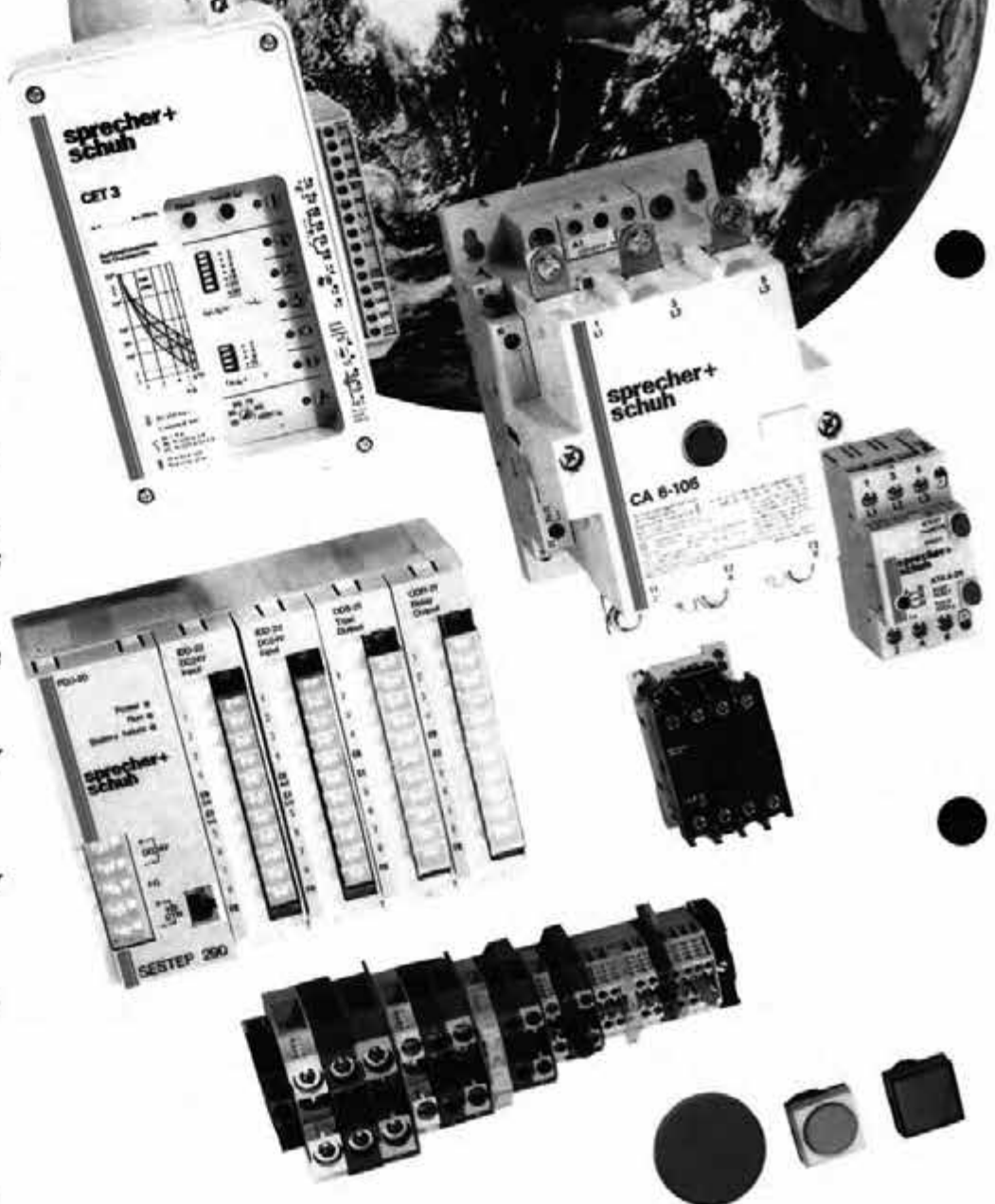
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- Contactors
- Electronic motor protection relays
- Control and load switches
- Pushbuttons
- Auxiliary relays, control relays, plug-in relays and timers
- Terminals
- Equipment enclosures
- SESTEP programmable logic controllers

Sprecher + Schuh's low-voltage equipment with quality according to ISO 9001.


NHP - TERASAKI Din-T

Catalogue
DIN-SG

September 1993

Miniature circuit breakers and Residual current devices

DIN rail mounting system

- 
- Loadcentres
 - Panelboards
 - Chassis
 - Accessories

selection
guide

NHP ELECTRICAL ENGINEERING PRODUCTS PTY LTD
A.C.N. 004 304 812

NHP TERA SAKI Din-T circuit breakers

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General features

Advantages of the Din-T series miniature circuit breakers

- Short-circuit breaking capacity of 6, 9, 10 and 14 kA at 415V AC.
- Increased rating to 50 kA when backed up with a 200A HRC fuse, (9 kA, 10kA & 14 kA only.) (Max. back-up fuse of 125 amp to 50 kA for 6 kA MCBs).
- Rated current range from 0.5A up to 125A.
- Silver graphite (AgC) contacts.
- Input connection by lifting terminal with capacity of up to 35 mm² giving fast and practical connection.
- Output terminals offer finger and hand protection with a capacity of up to 25 mm².
- A new design of snap fixing with two stop locations, for normal DIN rail mounting.
- Approval number V87382 - 11/1987.
- Complies to AS 3111 and AS 2184.

Brief description

The Din-T series miniature circuit breakers have inverse time delayed thermal and instantaneous magnetic trips, and are suitable for mounting in distribution boards or in switchgear panels and consumer units.

Operation

Protection against overheating of electrical conductors, against excess currents due to overload and short circuit or earth fault.

Application

In switching, control, distribution and measurement systems for domestic, commercial and industrial installations.

Tripping characteristic

Characteristics are as required by Australian standards (following IEC type 'U'), for cable and equipment protection in commercial and industrial applications. See technical data page.

Handle

Sealable and padlockable with quick-make and quick-break type mechanism. The Handle is sealable in ON and OFF position. Due to the free tripping mechanism, the MCB contacts open through overload or short circuit even when the handle is sealed in the ON position on all types.

Input terminal

Box type terminal with lifting screw for copper and aluminium conductors: max. capacity 1 x 35mm² or 2 x 16mm². When unscrewing the screw, the head lifts; however, on pushing the screw head, the box terminal opens. This system enables the MCBs to be linked with a non-insulated wire or a connection strip very easily. The MCB is delivered with a half open box terminal and a lifted screw head. A protection cap is fixed onto the MCB in order to obtain IP20 protection against finger contact. (Standard for 9 and 14kA only)

Output terminal

Box type terminal with captive terminal screw for copper and aluminium conductors: max. 1 x 25mm² or 2 x 10 mm². The box terminals are always delivered in the open position. Output terminals are always supplied with IP20 protection against direct finger contact by means of an insulating cover.

Arc chamber

Contains arc extinction plates, de-ionising type, designed to break up and dissipate the arc which is generated during interruption of all types of fault.

Electromagnet

Operating the plunger which opens the contacts instantaneously.

Arc magnetic blowout system

Short-circuit currents do not flow through the bimetal but are directed by the blowout magnet, in such a way that the arc is transferred to a special arc runner, therefore taking the bimetal out of the circuit which ensures the trip characteristics remain unchanged.

- The combination of the electromagnet (with a plunger rapidly opening the contacts), the blowout magnet and the arc chamber, results in an extremely high short circuit breaking capacity, and very low let through energy.

Snap-on clip for DIN rail mounting

This special flexible system gives ease of mounting and positioning of the MCB on DIN rail.

NHP TERASAKI Din-T series 6, 9, 10 and 14kA

NHP Terasaki offers an unparalleled choice of DIN rail mounted miniature circuit breakers (MCBs).

This comprehensive selection is based on the 6", 9, 10 and 14kA series and the accessories which convert the ranges into a flexible system for protection, control, switching and monitoring. These are high performance devices using the latest developments in the technology of circuit protection and capable of dealing with the most difficult problems involving high short circuit

currents and selectivity with feeder or back-up protection.

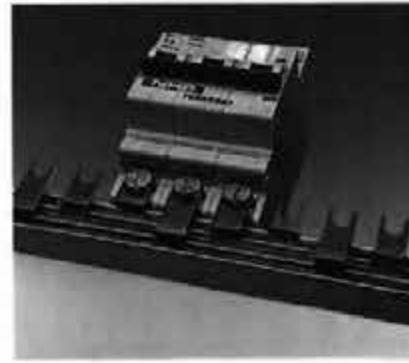
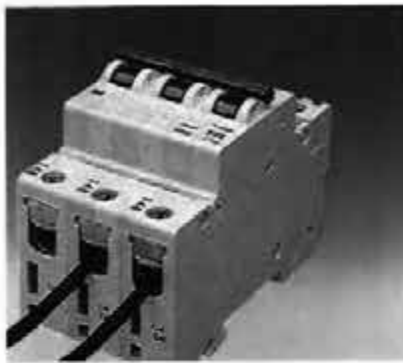
The MCBs are designed for and certified to many international and national specifications including IEC, CEE, NBN, VDE, BS, AS in particular AS3111 and AS 2184.

A truly international range of high performance devices from a group with an international reputation for high quality and technical innovation.

Note: Some accessories not available for use with 6kA MCBs refer pages 20 & 21 for details.



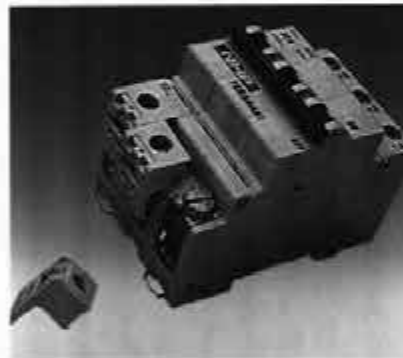
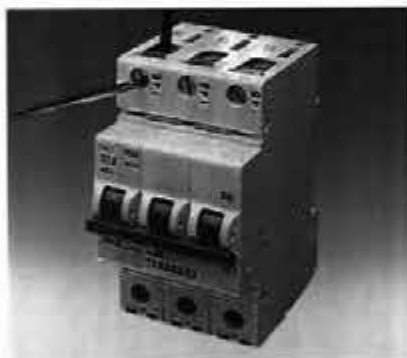
Some of the advantages



Input terminal

The newly developed input box terminal which is designed as a "lift terminal" is suitable for busbar as well as conductor connection. It is delivered already opened so that loosening of the terminal screws is not necessary. The screw heads are held in the upper position so that busbars can be located directly and without any problems. However it is first necessary to remove the standard IP20 protection cap. For the connection of single or multiple-wire conductors

the terminal box is moved down by pressing the screw head and is opened approximately 5mm. This means conductors up to 10mm² can be inserted without further opening. For thicker conductors up to maximum 1 x 35mm² or 2 x 16mm² the terminal box needs only to be unscrewed a little. In the same way a combined connection of busbar and feeding line is possible without additional terminals.



Output terminal

The output terminal is designed as a box terminal with captive terminal screw and is finger and hand safe. The terminal already opened in the delivery state receives multiple-wire conductors with cross sections of up to 1 x 25mm² or 2 x 10mm².

Protection cap

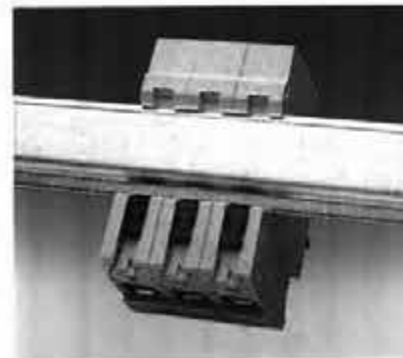
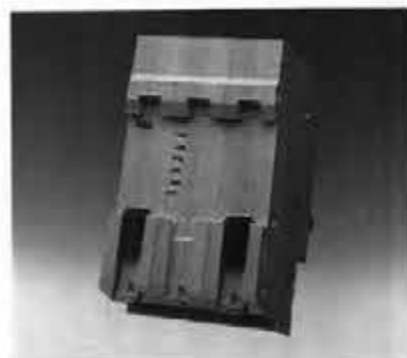
Simple snap-on cap for the "lift terminal" can be fixed on to the MCB in order to obtain the IP20 protection against finger contact. For the Australian market these are supplied as standard.

Sealing

In both switching positions the handles can be protected against manual switching by means of sealing. Interruption in case of faults is guaranteed by means of a trip free mechanism.

Snap-on fixing

The newly developed snap-on fixing has an additional stop location which permits slight movement and alignment of the MCB during assembly on the rail. A further advantage is the easy changing of the MCB in this stop location as the spring device is disengaged when it is taken off the sectional rail. For fixing of the MCB on the sectional rail the spring device is engaged by simply pressing the projecting spring clip.



New products in the DIN rail mounting system



Din-Modula loadcentres are flexible, easy to install, cost effective and high quality.

These loadcentres are suitable for installation in domestic, commercial and light industrial areas such as office building and the food industry.

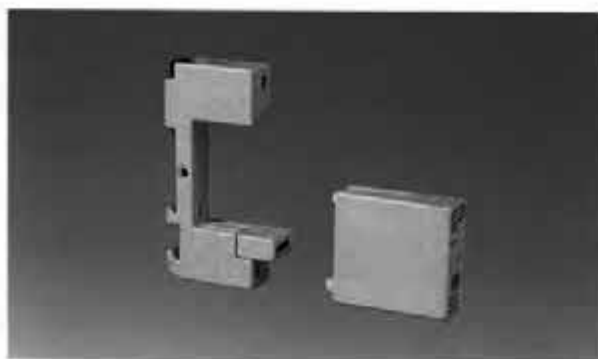
The Din-Modula-150 has an IP40 rating and is available in 36, 54 and 72 pole.

Din-Modula weatherproof has an IP55-6 rating. They are available in 12, 24 and 36 pole. All loadcentres are fitted with earth and neutral bars. Accessories such as locks and busbars are available refer to page 17.



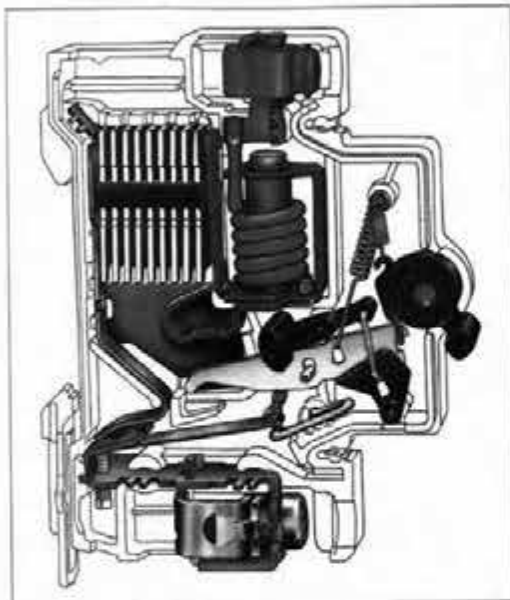
Din-T 10 is the 80, 100 and 125 amp DIN type miniature circuit breaker. Din-T 10 has a short circuit rating of 10kA and has been tested to IEC 947-2. These circuit breakers can be fitted to ND250 chassis on request refer page 9 for further details. Technical details are found in the rear of this catalogue.

Din-Surge diverters are becoming an essential part of every electrical installation. The protection they offer against voltage spikes is essential to modern day electronic and electrical equipment. Voltage spikes can be caused by various conditions in the electrical network. Examples are grid switching, lightning strikes and when a car collides with a power pole. Refer to page 24.



Din-T series 6 kA MCBs

6 kA interrupting capacity to AS3111



The 6000 series offers unparalleled choice of DIN rail mounted miniature circuit breakers. This high performance device uses all the latest developments and technology of circuit breaker protection and is capable of dealing with the most difficult problems. These include high short circuit currents and selectivity with a feeder, or back-up protection. The Din-T6 series is designed and certified to many international and national specifications, including AS3111. Truly an international range of high performance miniature circuit breakers.

Mounting:

Suitable for quick mounting (snap-on) symmetric DIN rail.

Ratings:

Rated voltages from 240/415 volts AC. Rated currents from 2 amps to 40 amps. Available in 1 pole, 2 pole and 3 pole. The Din-T6 series is of the highest quality and, as standard with the entire Din-T system, finger protected to IP20.

Amps	Cat. No.	Amps	Cat. No.
Single pole 6kA		Single pole 6kA	
2	Din-T 6 102	20	Din-T 6 120
4	Din-T 6 104	25	Din-T 6 125
6	Din-T 6 106	32	Din-T 6 132
10	Din-T 6 110	40	Din-T 6 140
16	Din-T 6 116	50	Din-T 9 150
		63	Din-T 9 163
Double pole 6kA		Double pole 6kA	
2	Din-T 6 202	20	Din-T 6 220
4	Din-T 6 204	25	Din-T 6 225
6	Din-T 6 206	32	Din-T 6 232
10	Din-T 6 210	40	Din-T 6 240
16	Din-T 6 216	50	Din-T 9 250
		63	Din-T 9 263
Triple pole 6kA		Triple pole 6kA	
2	Din-T 6 302	20	Din-T 6 320
4	Din-T 6 304	25	Din-T 6 325
6	Din-T 6 306	32	Din-T 6 332
10	Din-T 6 310	40	Din-T 6 340
16	Din-T 6 316	50	Din-T 9 350
		63	Din-T 9 363

Note: Din-T series 6kA suitable for mounting side attached accessories AUX and ALT. Not suitable for mounting SHT.
Din-Safe-M6 refer NHP.


Din-T series 9 kA MCBs**9 kA Interrupting capacity to AS3111**

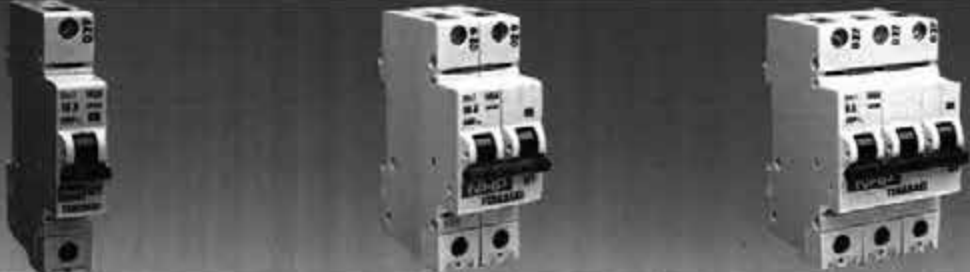
Amps	Cat. No.	Amps	Cat. No.
Single pole 9kA		Double pole 9kA	
0.5	Din-T 9 105	0.5	Din-T 9 205
1	Din-T 9 101	1	Din-T 9 201
2	Din-T 9 102	2	Din-T 9 202
3	Din-T 9 103 ¹	3	Din-T 9 203 ¹
4	Din-T 9 104	4	Din-T 9 204
6	Din-T 9 106	6	Din-T 9 206
10	Din-T 9 110	10	Din-T 9 210
16	Din-T 9 116	16	Din-T 9 216
20	Din-T 9 120	20	Din-T 9 220
25	Din-T 9 125	25	Din-T 9 225
32	Din-T 9 132	32	Din-T 9 232
40	Din-T 9 140	40	Din-T 9 240
50	Din-T 9 150	50	Din-T 9 250
63	Din-T 9 163	63	Din-T 9 263
Triple pole 9kA		Four pole 9kA	
0.5	Din-T 9 305		
1	Din-T 9 301		
2	Din-T 9 302		
3	Din-T 9 303 ¹		
4	Din-T 9 304		
6	Din-T 9 306	6	Din-T 9 406
10	Din-T 9 310	10	Din-T 9 410
16	Din-T 9 316	16	Din-T 9 416
20	Din-T 9 320	20	Din-T 9 420
25	Din-T 9 325	25	Din-T 9 425
32	Din-T 9 332	32	Din-T 9 432
40	Din-T 9 340	40	Din-T 9 440
50	Din-T 9 350	50	Din-T 9 450
63	Din-T 9 363	63	Din-T 9 463

¹ Available on indent only.

IP20 finger protection cover standard on input terminal.
Refer page 31 for dimensions.

Din-T series 10 & 14kA MCBs

 <p>Interrupting capacity to IEC 947-2</p>			
Amps	Cat. No.	Amps	Cat. No.
Single pole 10kA		Double pole 10kA ¹	
80	Din-T 10 180	80	Din-T 10 280
100	Din-T 10 1100	100	Din-T 10 2100
125	Din-T 10 1125	125	Din-T 10 2125
Triple pole 10kA		Four pole 10kA ¹	
80	Din-T 10 380	80	Din-T 10 480
100	Din-T 10 3100	100	Din-T 10 4100
125	Din-T 10 3125	125	Din-T 10 4125

 <p>Interrupting capacity to AS3111 and 2184</p>			
Amps	Cat. No.	Amps	Cat. No.
Single pole 14kA		Double pole 14kA	
6	Din-T 14 106	6	Din-T 14 206
10	Din-T 14 110	10	Din-T 14 210
16	Din-T 14 116	16	Din-T 14 216
20	Din-T 14 120	20	Din-T 14 220
25	Din-T 14 125	25	Din-T 14 225
32	Din-T 14 132	32	Din-T 14 232
40	Din-T 14 140	40	Din-T 14 240
50	Din-T 14 150	50	Din-T 14 250
63	Din-T 14 163	63	Din-T 14 263
Triple pole 14kA		Four pole 14kA ¹	
6	Din-T 14 306	6	Din-T 14 406
10	Din-T 14 310	10	Din-T 14 410
16	Din-T 14 316	16	Din-T 14 416
20	Din-T 14 320	20	Din-T 14 420
25	Din-T 14 325	25	Din-T 14 425
32	Din-T 14 332	32	Din-T 14 432
40	Din-T 14 340	40	Din-T 14 440
50	Din-T 14 350	50	Din-T 14 450
63	Din-T 14 363	63	Din-T 14 463

¹ Available on indent only
IP20 finger protection cover standard on input terminal.

3 pole + N available on indent only.
Refer page 31 for dimensions.

Din-Safe safety switches

Residual current devices (RCDs)

Refer catalogue RCD

Safety switches are electrical safety devices that provide protection against earth faults. Overcurrent devices such as fuses and miniature circuit breakers do not protect human beings from electrocution, they only protect equipment against faults of higher magnitude. Because residual current (or earth leakage) flows at such a low level an overcurrent device may take minutes to

operate or it may not operate at all. By using a safety switch, dangerous earth leakage currents are prevented from flowing, hence protection from electrocution, equipment damage and fire is greatly enhanced.

Din-Safe features

- Current ratings 40, 63, 80Amp
- 2 and 4 Pole 50/60 Hz
- 2 pole for single phase protection 240 volt
- 4 pole for multi circuit or three phase protection 415/240 volt
- Complies to AS 3190 - 1990
- Certificate of suitability C/S N11649
- Din-Safe safety switches are suitable for surface mounting on 35 mm DIN rail

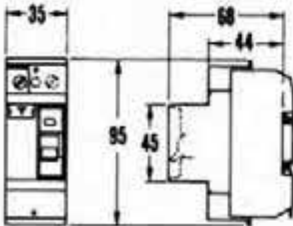


Cat. No.	Poles	Amp rating	Trip Voltage	Phase	sensitivity
Din-Safe 2-40-30	2	40	240	1 + N	30 mA
Din-Safe 2-40-100 ¹	2	40	240	1 + N	100 mA
Din-Safe 2-63-30	2	63	240	1 + N	30 mA
Din-Safe 2-63-100	2	63	240	1 + N	100 mA
Din-Safe 2-80-30	2	80	240	1 + N	30 mA
Din-Safe 2-80-100	2	80	240	1 + N	100 mA
Din-Safe 4-40-30	4	40	415	3 + N	30 mA
Din-Safe 4-63-30	4	63	415	3 + N	30 mA
Din-Safe 4-63-100 ¹	4	63	415	3 + N	100 mA
Din-Safe 4-80-100	4	80	415	3 + N	100 mA

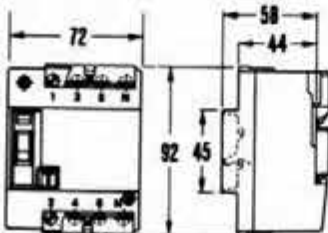
¹ Available on indent only

Dimensions (mm)

2 pole

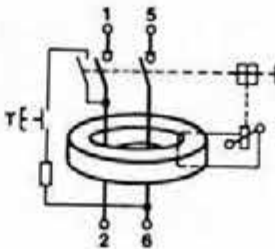


4 pole

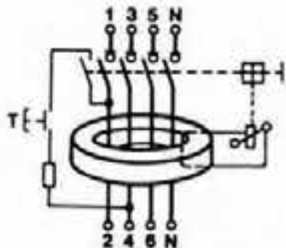


Connection diagrams

2 pole



4 pole



Din-Safe-M modules with MCB combination units

Residual current devices (RCDs)

Refer catalogue RCD



Safety switch modules and circuit breaker combinations offer the following functions:

- protection against overloads
- protection against short-circuit faults
- protection against earth-leakage faults thus protecting against:
 - (a) indirect contact
 - (b) direct contact
 - (c) fire
 - (d) earthing through corrosion

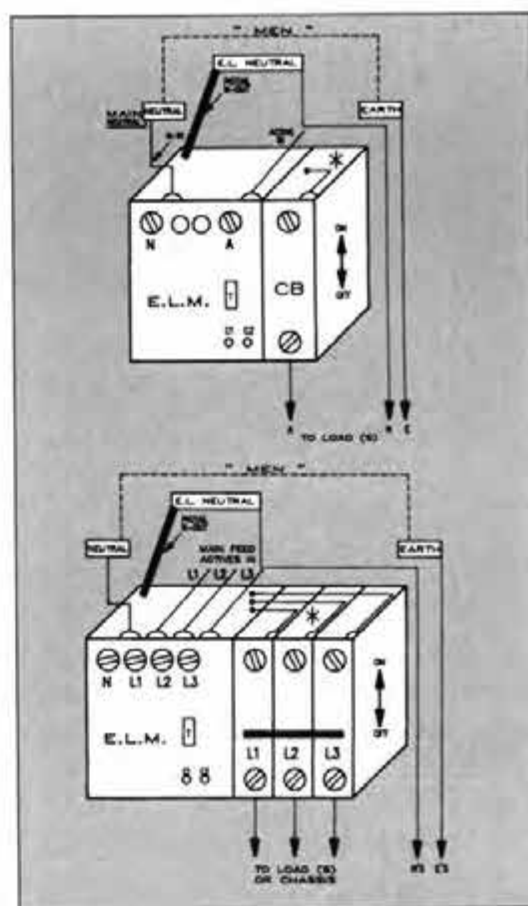
- Residual current sensitivity:
 - 30 mA and 100 mA
 - 300 mA or 500 mA available on request.
- Tripping characteristics
 - 0.5I_{Δn} no tripping
 - I_{Δn} t ≤ 0.2s
 - 5I_{Δn} t ≤ 0.03s

The tripping time depends upon the point in the cycle at which the earth leakage fault occurs.

Remote tripping

All Din-Safe-M modules have remote tripping facilities. Terminals marked C1 and C2 when connected through a switch, pushbutton or auxiliary contact, allow tripping from a remote location.

- Din-Safe-M module is an earth leakage relay only and needs to be used with a circuit breaker attached. Connection from Din-Safe-M module to circuit breaker is by copper links.
- If pigtail and N are reversed, breaker will trip as soon as load is energised.
- Din-Safe-M module space requirement with MCB. Single pole & neutral - 3 modules (54 mm). Triple pole & neutral 32 amp - 5 modules (90 mm). Triple pole & neutral 63 amp - 6 modules (108 mm).
- Check unit operation with test button provided on Din-Safe-M module.
- **Reset Din-Safe-M module before switching circuit breaker on.**
- If unit is feeding motor do not connect pigtail.
- To enable test function to operate neutral is required on incoming neutral terminal.



Connection diagram

Function checking

The MCB/Din-Safe-M module must be connected with the load at the incoming side of MCB. After connection the MCB/Din-Safe-M module should be tested before use by switching the Din-Safe-M module ON and then the MCB.

When the test knob T is pressed, both handles should trip.

Operation

The MCB/Din-Safe-M modules are two handles, each handle indicates the cause of trip.

- If an overload or short-circuit fault occurs the handle of the MCB only moves to the trip position.
- If an earth leakage fault occurs, both handles trip.
- The trip free mechanism of the MCB/Din-Safe-M module ensures the tripping of the contacts even if both handles are held in their ON position.

Din-Safe-M modules with MCB combination units

Residual current devices (RCDs)

Din-Safe-M modules (clip on) to suit Din-T 9 + 14kA MCBs

Sensitivity	Poles	Modules	Cat. No.
30 mA	1P+N	3	Din-Safe - M 1-32/30mA
		3	Din-Safe - M 1-63/30mA
	3P+N	5	Din-Safe - M 3-32/30mA
		6	Din-Safe - M 3-63/30mA
100mA	1P+N	3	Din-Safe - M 1-32/100mA
		3	Din-Safe - M 1-63/100mA
	3P+N	5	Din-Safe - M 3-32/100mA
		6	Din-Safe - M 3-63/100mA
300mA	1P+N	3	Din-Safe - M 1-32/300mA
		3	Din-Safe - M 1-63/300mA
	3P+N	5	Din-Safe - M 3-32/300mA
		6	Din-Safe - M 3-63/300mA

Note 1): For 2 pole application use.

In the above part No's 32 and 63 refers to the max MCB size the module can be fitted to.
In both 1P + N and 3P + N types the Neutral is conducted by a "pigtail" cable.
Add 9 kA or 14 kA circuit breaker to above for complete unit.



Din-Safe-M6 Modules (clip-on) to suit Din-T6 MCBs

Sensitivity	Poles	Modules	Cat. No.
30 mA	1P+N	2	Din-Safe - M6 1-32/30mA
	3P+N	2	Din-Safe - M6 3-32/30mA
100mA	1P+N	2	Din-Safe - M6 1-32/100mA
	3P+N	2	Din-Safe - M6 3-32/100mA
300mA	1P+N	2	Din-Safe - M6 1-32/300mA
	3P+N	2	Din-Safe - M6 3-32/300mA

Note : For 40, 50 and 63A requirements use Din-T 9 plus Din-Safe-M.

Din-Safe protection in action

Residual current devices (RCDs)

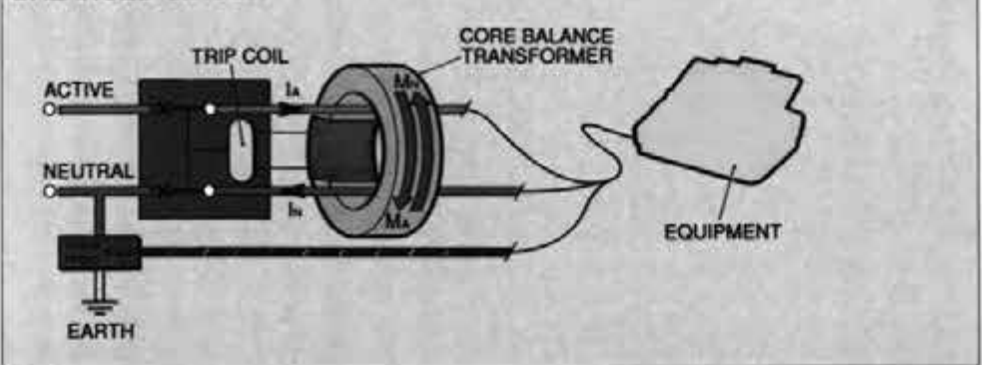
Safe condition

- No residual current
- Single phase
- 240V connection
- Magnetic field is balanced and is zero
- No output from secondary winding to signal trip circuit

$$I_A = I_N$$

$$M_A = M_N$$

BALANCED CIRCUIT



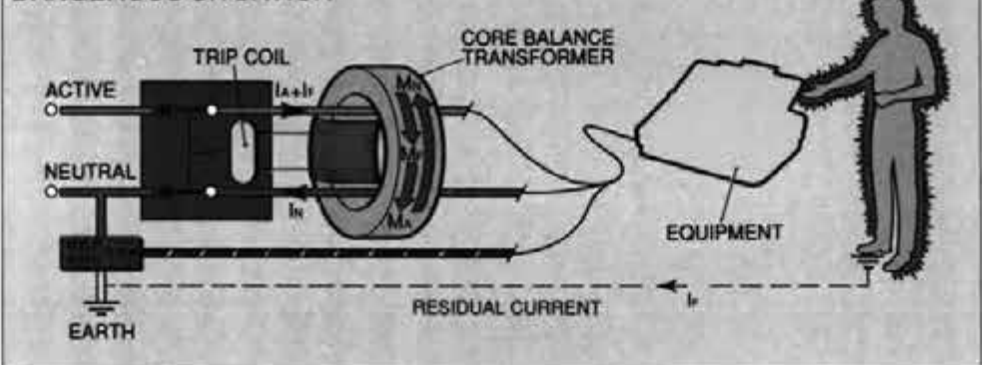
Unsafe condition

- Residual current is flowing
- Resultant magnetic field produces current in secondary winding
- Trip coil is energised

$$I_A + I_f \text{ is greater than } I_N$$

$$M_A + M_f \text{ is greater than } M_N$$

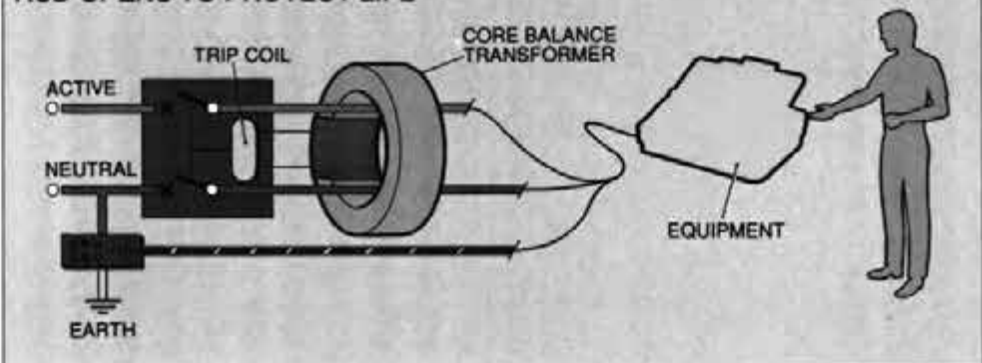
DANGEROUS SITUATION



Trip circuit activated

- Safety switch opens
- Electrocuting is avoided

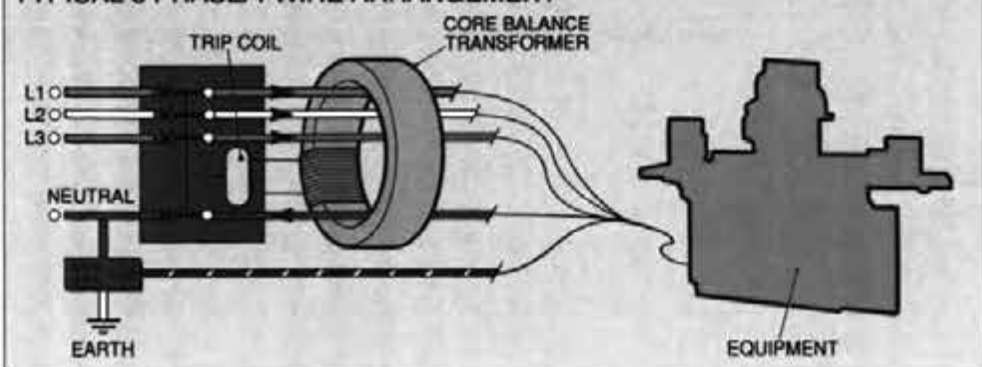
RCD OPENS TO PROTECT LIFE



3 phase 415 volt connection

- Principle of operation is the same as single phase

TYPICAL 3 PHASE/4 WIRE ARRANGEMENT



Din-Safe protection in action

Residual current devices (RCDs)

How Din-Safe provides the protection solution

Both the speed with which the RCD responds, and its tripping sensitivity to a dangerous level of residual current, are critical specifications. This is because the severity of an electric shock is directly related to (a) the duration of the contact with a live appliance, and (b) the current's path through the body. The closer this path is to the heart, the worse the result.

Din-Safe RCDs operate on the electromagnetic principle of a balanced circuit. Through a toroidal transformer, the RCD continually monitors the magnetic field of the active conductor and the magnetic field of the neutral conductor as current passes through the protected circuit.

Under the normal conditions of a balanced circuit, these magnetic fields are equal. But under abnormal conditions, such as when a fault causes current to flow from the active conductor to earth,

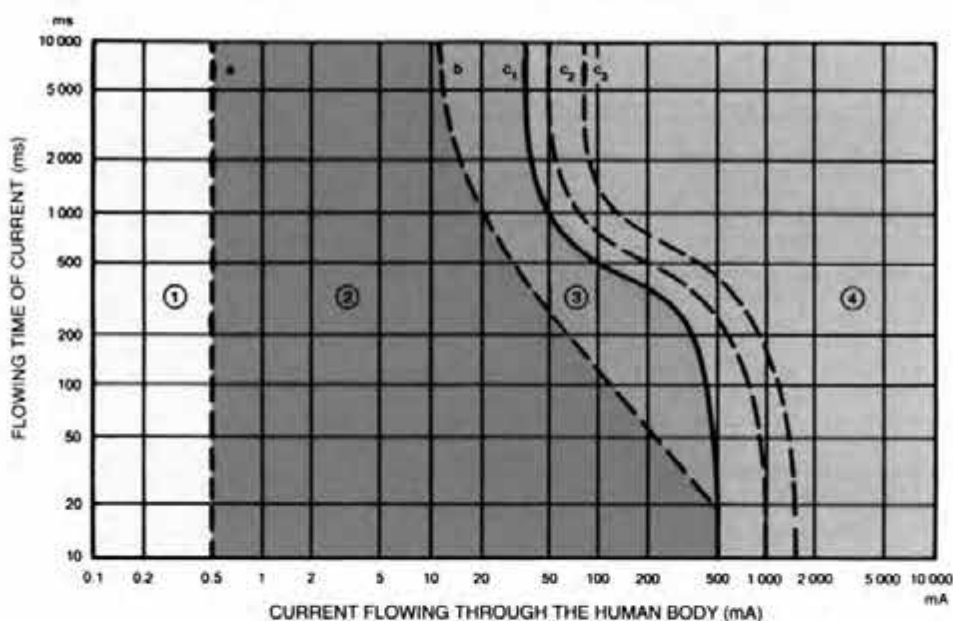
the residual current will increase the magnetic field of the active conductor.

The Din-Safe RCD detects the unbalanced circuit through the toroidal transformer and automatically cuts off the electricity supply to the protected circuit.

In terms of saving life and protecting equipment, that's why Din-Safe RCDs are regarded as the protection solution.

Fast operation

Din-Safe RCDs operate well within the safe operating time preventing any dangerous physical consequences. The table below shows the four zones of physiological effects on the human body when subjected to increasing residual current with increasing flowing time of that current. Therefore fast operation time as well as sensitivity of the RCD is significant in preventing injury.



TIME/CURRENT ZONE OF ALTERNATE CURRENT EFFECTS ON PEOPLE (15 TO 100Hz)

Zones of physiological effects

Zone 1: Normally no effect or consequences.

Zone 2: Normally no dangerous physical consequences.

Zone 3: Normally no organic damage. Possibility of muscle contraction, breathing difficulties and perturbation of heart beat including auricular fibrillation with temporary lack of cardiac pulsation without ventricular fibrillation. This increases with the current rating and time of exposure.

Zone 4: In addition to Zone 3 effects, probable ventricular fibrillation increasing to 5% (C1) up to 50% (C2) and above (C3) increasing with current rating and time of exposure which can stop breathing function and heart beat and cause severe burns.

Din- Safe-R Core balance earth leakage relays

Din-Safe-R relays are for the protection of electrical distribution systems and equipment. The relays must be used in conjunction with a current transformer as listed below.

Technical data

- ☐ Control voltage: 110, 240V and 415V 50/60Hz (440V to order)
- ☐ Tripping current $I_{\Delta n}$: Adjustable 30milli Amps to 10 amp
- ☐ Time delay: Adjustable 0.025milli seconds to 2.5 seconds
- ☐ Output: Changeover contact 250V 4 amps ($\cos\phi=0.4$) with normally de-energised relay
- ☐ Indication: Supply healthy - green LED
Relay tripped - red LED
- ☐ Reset: Remote or local by pushbutton
- ☐ Test: Tests all functions including CT wiring
- ☐ Power consumption: <10VA at 240V AC
- ☐ Operating temperature: -5°C to +40°C
- ☐ For 400Hz applications refer NHP
- ☐ Din-Safe-R relays are designed and manufactured according to IEC publication 755

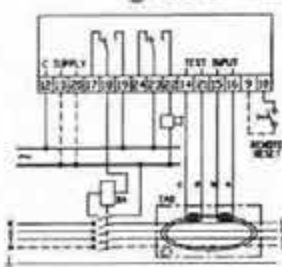


Relay type	Features	
Din-Safe -R4RD Cat. No. DSR4RD	DIN rail mounting Adjustable time 0.025 to 2.5sec Adjustable trip current 0.025 to 10amp	One changeover and one N/O contact Remote and local reset Status indicating lights (LED)
Din-Safe -R72 Cat. No. DSR72	Panel mounting 72mm Adjustable time 0.025 to 2.5 sec Adjustable trip current 0.025 to 10amp	Two changeover contacts Remote and local reset Status indicating lights (LED)
Din-Safe -R961P Cat. No. DSR961P	Panel mounting 96mm Adjustable time 0.025 to 2.5 sec Adjustable trip current 0.025 to 10amp Alarm preset at 50% of trip current	Two changeover contacts Remote and local reset Status indicating lights (LED)
Din-Safe -R96D Cat. No. DSR96D	Panel mounting 96mm Adjustable time 0.025 to 2.5 sec. Adjustable trip current 0.025 to 10amps Digital indication of residual current	Two changeover contacts Remote and local reset Status indicating lights LED

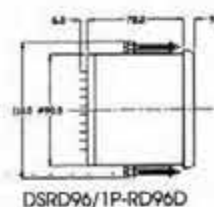
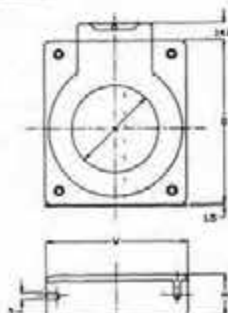
Din-Safe-R CTs are to be used with Din-Safe-R relays. Care should be taken to select a size closest to the diameter of the cables in order to maintain maximum accuracy.

Cat. No.	Max. $I_{\Delta n}$	Max. In (A)	Internal diameter	Overall dimensions		
DSR35CT	0.03	200	35	115	92	34
DSR70CT	0.03	400	70	148	115	34
DSR105C	0.1	800	105	191	159	34
DSR140C	0.2	1200	140	234	200	34
DSR210C	0.3	1800	210	325	290	44

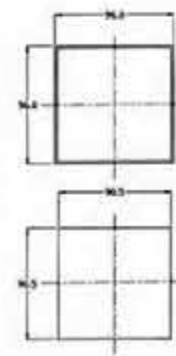
Overall dimensions and general wiring diagrams



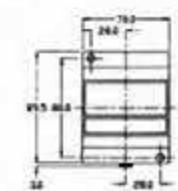
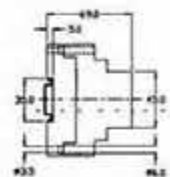
Note: DSR4RD has one changeover (17,18,19) and one normally open (23,22) contacts only.



DSRD96/1P-RD96D



Cut-out



Din-Safe R4RD

Insulated loadcentres Type ILC

ILC range

The NHP ILC consumer unit range offers a number of options suitable for most applications.

They are designed for indoor use and accept any of the modular Din-T 6 kA MCB range, as well as Din-Safe safety switches, Din-Safe-M modules, time switches, main switches and contactors.

The moulded plastic ILC range is available in 5 different sizes, 4, 8, 10, 14 and 18 way.

Technical data

Maximum load 100amp. Maximum operating voltage 415 VAC.
 Material : Self extinguishing halogen free polystyrene.
 Degree of protection: ILC 4 & 8 IP44
 ILC 10, 14 & 18 IP40
 Colour: grey base, clear door.

Cat. No.	No. of mods	Neutral bars	
		Protected	Unprotected
ILC 4S 1)	4	—	—
ILC 8S 1)	8	—	—
ILC10SSN	10	4	9
ILC14SSN	14	8	9
ILC18SSN	18	12	9

Note: 1) Enclosure without earth & neutral bars
 Order earth and neutral bars separately



Accessories supplied

- Single phase comb type busbar
- Full DIN rail
- Circuit Identification label
- Hinged lid
- Earth and neutral bars. (Neutral bars can be split for Din-Safe module installation on 10, 14, and 18 way enclosures.)

Dimensions (mm)

	ILC 4S	ILC 8S	ILC 10S	ILC14S	ILC 18S
Height	175	175	208	208	208
Width	90	170	218	292	370
Depth	100	120	108	108	108

Main switch

DIN-mount	Amps	Cat. No.
Single pole	63A	DTMS631
Single pole	63A	DTMS633
Triple pole	80A	DTMS801
Single pole	100A	DTMS1001
Triple pole	100A	DTMS1003

Additional accessories available

- Three phase comb busbar (refer below)
- Flush surround kit. All screws and wall brackets supplied to mount unit semi-flush in brick and brick-veneer walls

Flush Mount Kit

Dimensions (mm)	ILC10	ILC14	ILC18
Cavity height	212	212	212
Cavity width	223	298	212
Cavity depth	67	67	67
Flange height	264	264	264
Flange width	274	349	426
Flange depth	6	6	6

Three phase link bars Accessories

ICL 12
 ICL 15
 ICL 18
 ICL 21
 ICL 57
 ICL end cap



Note: Two and four pole link bars available - refer NHP.
 Current carrying capacity 120Amp

Insulated loadcentres Type Din-Modula 150

The NHP range of Din-Modula 150 consumer units have design features previously unavailable in consumer unit construction. With a wide range available from 36, 54 and 72 module space, the Din-Modula 150 is the most versatile consumer unit currently on the market. The Din-Modula 150 was designed

with ease of wiring in mind, as the name suggests, the distance between the DIN rail is an ample 150mm allowing for greater space in making connections to the MCBs. The aesthetic qualities of the Din-Modula 150 consumer units are so pleasing they are ideally suitable for domestic, commercial and industrial applications.

Technical data

Material – Self extinguishing halogen free polystyrene
Colour of Enclosures: grey Base, light grey Cover
IP rating: IP40

Flush mount
available

Accessories supplied

- Hinged door. Can be left or right hinged. (left hand hinged is standard).
- Full DIN rail
- Earth and neutral bars with split neutral
- Pole fillers
- Circuit identification labels

Accessories

- Door lock complete with two (2) keys.
 - A range of 1, 2 & 3 phase insulated busbar combs and connection lugs.
- See page 15 and 21.

Cat. No.	No. of modules	No. of rows	Consumer unit dimensions (mm)		
			Height	Width	Depth
DM15036	36	2	450	355	142
DM15054	54	3	600	355	142
DM15072	72	4	750	355	142



Din-Modula weatherproof enclosures

The Din-Modula weatherproof consumer unit maintains the modern styling and attractive appearance but offers a higher protection rating of IP55-6. The Din-Modula weatherproof was designed with maximum flexibility in mind. Using the connection set, two or more enclosures can be joined together - maintaining the IP55-6 protection rating. A further feature of flexibility is that of the adjustable height DIN rail. Din-Modula weatherproof was designed for use with the Din-T6, 9 and 14kA MCB range in wet area applications, out of direct sunlight. Split neutral and earth bars are provided. A range of accessories including three phase insulated busbar combs and terminal lugs are available for applications up to 100 amp.

Technical data

Maximum load: 100 amp
Max. operating volt.: 415V
Material: impact resistant polystyrene base polycarbonate door
Degree of protection: IPP 55-6
Colour: Grey base / clear door

Accessories

- Circuit identification labels.
- Split neutral and earth bars
- Clear hinged door - left or right side
- Weatherproof sealing caps for mounting screws.
- Polefillers
- Connection set for joining enclosures together at extra cost.
- Locking device
- Connection set

New
Product



Cat. No.	No. of rows	No. of modules	Neutral bar	Earth bar
DMWP12	1	12	8/4	8
DMWP24	2	24	18/6	18
DMWP36	3	36	24/12	18

Dimensions (mm)

Cat. No.	H	W	D
DMWP12	250	285	138
DMWP24	375	285	138
DMWP36	500	285	138

Notes: Neutral and earth bars rated at 90 amps.
Neutral bar indicated as eg. 8/4 split.

Metal panelboards Type NDB

Designed for commercial and industrial installations, NDB panelboards are complete with type tested busbar systems (to 18 kA) neutral and earth bars, identification label and circuit schedule card.

The steel escutcheon is cut out to suit breakers and is punched to accept IPA studs. All Terasaki NDB panelboards have concealed hinges and are made from 1.6 mm zinc annealed steel. NDB

panel boards are generously sized to provide cabling room and will accept contactors up to Sprecher + Schuh size CA3-72N.

Standard colour is N42 storm grey per AS 2700-1985 (other colours to special order). Busbar ratings: 18-78 poles 250A, 300A available to special order. Type tests to AS 1136: 250A bar 18 kA 0.3 sec. 300A bar 20 kA 1.0 sec. Neutral bar tested: 10 kA - 1 sec.

Modular box size	Pole capacity	Surface mounting standard with door Cat. No. ')	Box height (mm)
0	18	NDB18SDR	500
1	24	NDB24SDR	610
1	30	NDB30SDR	610
2	36	NDB36SDR	685
3	42	NDB42SDR	835
3	48	NDB48SDR	835
3	54	NDB54SDR	835
4	60	NDB60SDR	1060
4	72	NDB72SDR	1060
4	78	NDB78SDR	1060

Note: ') Space available in top of box for accessories inc. contactors, main switches and time clocks.

Dimensions

Height – shown for box only.

Width – 485 mm for all sizes.

Depth – 125 mm for all sizes.

Lockable door – add 23 mm to depth.

Doors

Doors R.H.S. hinged as standard and fitted with a lockable lifting latch. Readily converted to L.H.S. hinging.

Optional accessories and extras:

1. Flush additional kit supplied loose. Order as **1 x NDB-18SDR** and **1 x SPBFK size X**.
2. Dustproof doors for all sizes. Insert **P** after **D** in catalogue number, example: **NBD 18SDPR**. At extra charge.
3. If door is not required, **delete DR** from catalogue number.
4. For left hand hinged door, **replace R with L**.
5. Special colours. White interior. Additional charge applies.
6. I.P.A. identity studs supplied loose. Additional charge applies.
7. Split tariff chassis. Additional charge applies.
8. Accessory mounting plates – for main switches, contactors, time clocks or earth leakage relays available on request.
9. Standard main switch is non-auto.
10. 300 amp busbar. Specify by description.
11. P.V.C. duct. Additional charge applies.
12. N.S.W. P.W.D. 'E1 type Lock'. Available on request.
13. Pole Fillers.
14. Fitting of circuit breakers on request. Additional charge applies.

Main switches for NDB series

160A Din-T 160A M/S kit

225A Din-T 225A M/S kit

Note: Field fittable. Additional charge for factory fitting. Other main switch sizes available on request.



Metal loadcentres Type NLC

Suitable for commercial and industrial installations

Each loadcentre is supplied with earth bar and neutral link. (Standard numbers and labels).

Surface and flush mounting available with and without drop down lockable door as standard. Colours: N42 Storm Grey. Special colours available on application at extra cost.

Pole cap	Surface mount Cat. No.	Flush escutcheon Cat. No.	Door ¹⁾ Cat. No.
8	NLC8S	NLC8FE	LD6/8
12	NLC12S	NLC12FE	LD9/12
15	NLC15S	NLC15FE	LD12/15
18	NLC18S	NLC18FE	LD15/18
21	NLC21S	NLC21FE	LD18/21

Note: ¹⁾ Door is lockable as standard. Lock and lock bracket optional extra.

Dimensions (mm)

Poles	Height	Width	Depth
8	205	250	192
12	205	325	267
15	205	400	342
18	205	475	417
21	205	550	492

- Add 23 mm to dimension D for door.
- Add 50 mm to dimension H and W for flush cover.

- Link bars and circuit designation label provided as standard.
- Door supplied loose. Order as per **1 x NLC 12S and 1 x LD 9/12.**
- Flush escutcheons supplied loose. Order as per following example: **1 x NLC 12S and 1 x NLC 12FE.**
- Flush escutcheons and door can be supplied fitted. Fitting charge applies. Please specify when ordering.

Accessories and extras:

Spare pole fillers (set of 4). Traffolite labels and numbers. Special paint colours. 3 phase insulated link bars available – Type ICL refer page 15. Split neutral available – refer NHP.

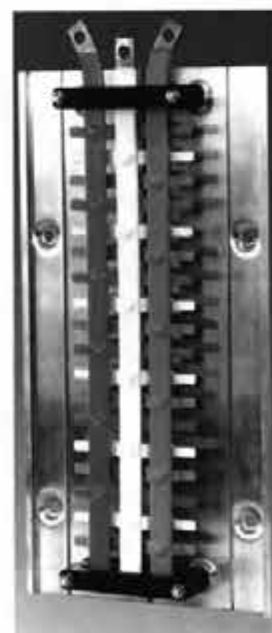
Three phase pan assembly

The 3 phase distribution chassis has been designed for distribution networks where substantial prospective fault levels exist and where good engineering practices need to be rigidly observed.

Suitable for any combination of single pole (1P + N) or three pole (3P+ N) earth leakage modules which can be fitted within the boards.

Technical data

- Current rating 250A. 300A available on request.
- Voltage rating 440 VAC
- Type tested for 18 kA 0.1 second without back-up protection



Electrical accessories

Electrical accessories are supplied as a kit for simple fitting to MCBs.

Shunt trip — **SHT**

For remote electrical tripping of MCB.

Auxiliary switch — **H**

Electrically indicates MCB status, ON or OFF.

Alarm switch — **S**

Electrically indicates tripped state of MCB.

Combination of auxiliary and alarm switches


Front indications with (H) and/or (S)



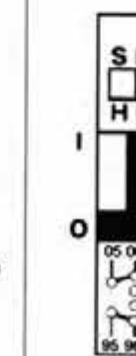
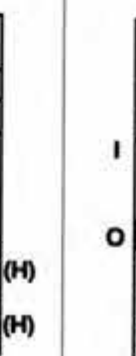
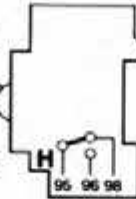
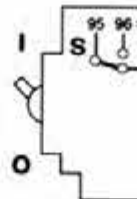
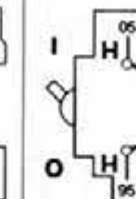
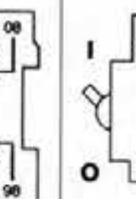

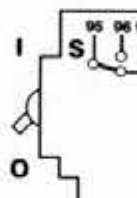

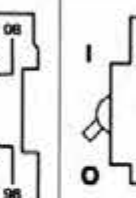

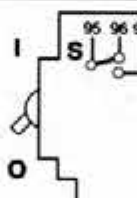
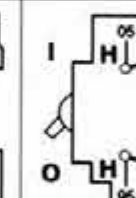
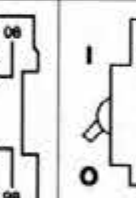
H : Auxiliary switch, 1c

S H : Alarm switch, 1c

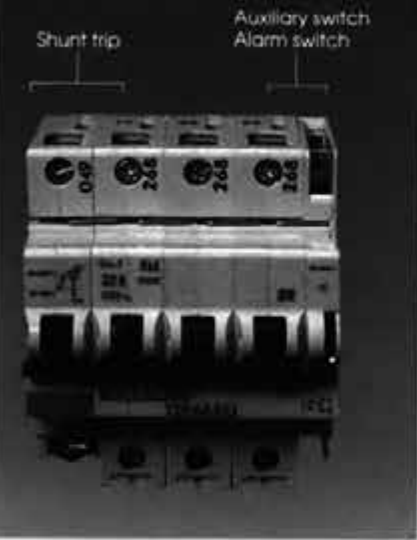
S H : Auxiliary switch, 2c

H H : Auxiliary switch, 1c
Alarm switch, 1c



		Auxiliary switch (H) 1c Din-T H	Alarm switch (S) 1c Din-T S	Auxiliary switch (HH) 2c Din-T H/S	Auxiliary switch (SH) each 1c Din-T H+H/S Din-T 10H+H/S
					
Position of auxiliary and alarm switch	MCB ON				
	MCB OFF				
	MCB TRIPPED				

Front indications with (SHT)



Auxiliary contacts for MCBs

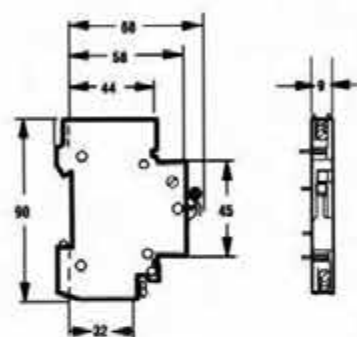
When coupling an auxiliary element to the side of an MCB both handles must be in identical position.

Bring the MCB and auxiliary function side by side carefully. Fix together by means of the two spring clips provided. When opening the spring clip again, the auxiliary element can be removed.

Attention: Always open spring on MCB side.

Maximum contact ratings

Volts	AC-11	DC-11
240V AC	5amp	—
415V AC	3amp	—
24V DC	—	4 amp
48V DC	—	2 amp
60V DC	—	1 amp
110V DC	—	0.7 amp
220V DC	—	0.5 amp



Shunt trip for MCBs

Shunt trip for remote tripping of Din-T MCBs

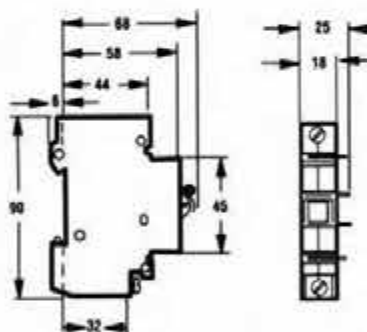
The shunt module makes it possible to remotely switch off the MCB to which it is coupled by energising the terminals of the module. An inbuilt contact in series with the coil prevents burnout damage if the voltage remains.

Characteristics

- Simply coupled to the left side of the MCB series 9kA & 14kA only
- Modular width of 18 mm
- Material of shells is thermosetting, self extinguishing and tropicalised.

Applications

- Emergency stop
- Isolation of industrial socket outlets



Cat. No.	Rated voltage	Closing current	Operating time	Coil impedance
Din - T SHT 110-415V AC	110 to 415V~ 110 to 125V—	at 110V —0.3A 240V—0.6A 415V —1A	10 mS 3 mS 2 mS	ca. 29 Ohm
Din - T SHT 24-48V DC	24 to 48V— 24 to 60V~	at 24V—1A 48V—2A	10 mS 4 mS	ca. 24 Ohm

Note: Not available for 6kA and 10kA MCBs.

Accessories for Din-T circuit breakers



2 pole cover
4 pole cover



Pole filler
(strip of 4)



T-off cap
(strip of 3)



Lateral pin terminal
35mm² (long type)



Lateral pin terminal
35mm² (short type)



Din-T lock dog



Lateral spade terminal
25mm² (short type)



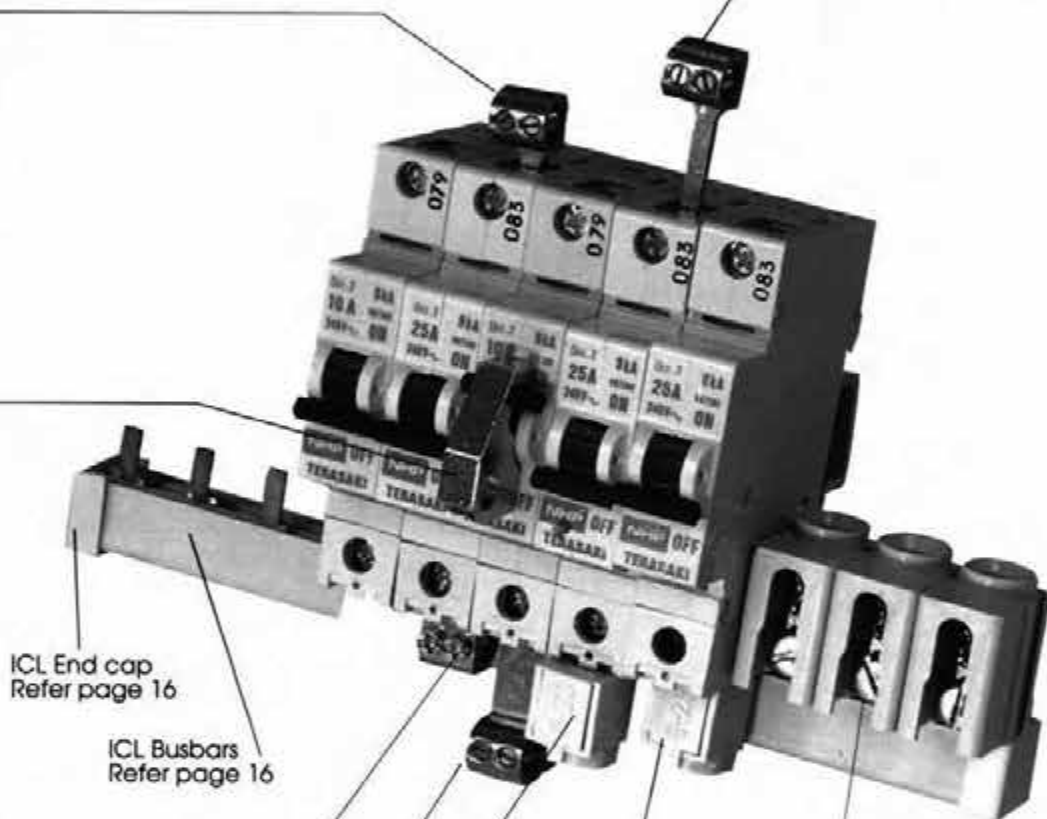
Lateral spade terminal
35mm² (extra long type)



Axial pin terminal
25mm²



Axial spade terminal
25mm² (Insulated)



ICL End cap
Refer page 16

ICL Busbars
Refer page 16

35mm² main terminals
Type DTCF

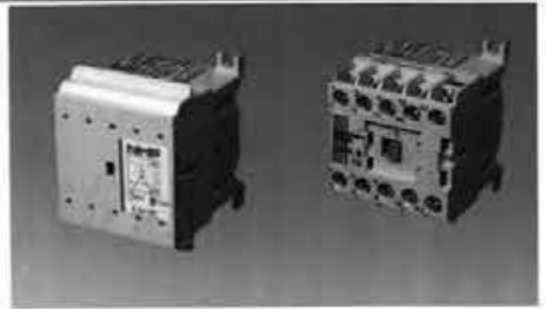
Note:
Catalogue
search
code DTT...

Sprecher + Schuh contactors

Sprecher + Schuh CA 4 contactors

Features

- Ideally suited for heating, lighting, hot water and storage heating applications.
- DIN rail mounting.
- Contactors can be mechanically interlocked
- Large range of snap on accessories ¹⁾.
- Protection cover allows mounting adjacent to DIN circuit breakers utilising a 2.5 module width.
- Conforms to AS 1202 and IEC 158 with world wide approvals.



Maximum current rating (amps) at 415 volt								
Cat No. ¹⁾	CA 4-5-10 ²⁾			CA 4-9-10 ²⁾			CA 4-9-M40 ²⁾	
Poles in parallel ³⁾	1	2	3	1	2	3	1	4
Heating loads AC1								
Amps per phase 40°C	20	34	50	20	34	50	20	64
Amps per phase 60°C	16	27	40	16	27	40	16	51
Lighting loads								
Tungsten per phase	4	-	-	7	-	-	7	-
Fluorescent 40°C	18	30	45	18	30	45	18	57
Fluorescent 60°C	14	24	35	14	24	35	14	45
Motor loads								
Amps 415 volt AC 3	4.8			8.2			8.2	
kW 60°C	2.2			4.0			4.0	

Accessories	
Description	Cat. No.
Bridging link 2 pole	CB4-2
Bridging link 3 pole	CB4-3
Bridging link 4 pole	CB4-4
Protection cover	CA 4-PC

- Notes:** ¹⁾ For further information refer to Part A catalogue.
²⁾ Supplied with 1 N/O auxiliary contact.
 For 1 N/C auxiliary contact, specify 01 instead of 10 when ordering.
³⁾ M40 denotes 4 pole contactor.
⁴⁾ Single pole contactor using bridging links.

Din-T contactors

Din-T contactors are electro-magnetically operated load-break devices with 1 stable position.

General features

- Rated current In: 20A, 40A, 63A.
- Rated voltage Un: 240/415V, 50Hz.
- Coil voltage: 24V, 240V - 50 Hz.
- DIN rail mounting.

Technical data

- Manufactured in accordance with the following standards: NBN C63-158-1, IEC-158-1, NF C63-110, CEE 14, VDE 0660, BS 775 pt. 1.
- If two contacts are connected in parallel the maximum AC 1 rating of that arrangement is 0.8 x 21 the ie 1.6 times the AC 1 rating of one contact.
- To ensure current thermal distribution, when a number of contactors are mounted together, a half module spacer should be inserted between each group of 3.
- Internal loss: 2W
- Operating limits of coil between - 15% and + 10% of nominal coil voltage.

Max. operating loads (kW)			
	20A 2P	40A 2P	63A 4P
AC 1 - resistive			
240V single phase	4	8.5	13.5
415 three phase	-	25	40
Lighting filament lamps			
240V fluorescent	1.5	4	5.5
- compensated	3	6.1	8.4
- uncompensated	2.2	3.2	4.4
AC 3 - motors			
Single phase + capacitor	1.1	-	-
415V three phase	-	7.5	15
Power required			
on closing (VA)	8	50	50
when closed (VA)	4	7	7
Closing time at Un (ms)	11	12	12
Opening time at Un (ms)	11	6	6

Characteristic of the load switching		
	20A	40A
Rated voltage	415V	415V
Maximum connection	2 x 4 mm ²	1 x 16 mm ²
Mechanical life (ops)	1,000,000	1,000,000
Electrical life AC 1 (ops)	70,000	50,000
Electrical life AC 3 (ops)	800,000	120,000

Cat. No.	No. of poles	No. of modules	Coil voltage
DC 202024	2	1	24V
DC 202240	2	1	240V
DC 402240	2	3	240V
DC 403240 ¹⁾	3	3	240V
DC 634240	4	3	240V

Note: ¹⁾ Available on indent only

Pulsar – impulse switch

Impulse switches 16A

For DIN rail mounting - depth 68 mm, 1 module width
Din-T 511: Impulse switch complete with normally open contact (1 N/O)
Din-T 512: Impulse switch complete with two normally open contacts (2 N/O)
Din-T 711: Impulse switch complete with one changeover contact (1N/C) □

Cat. No.	In	Poles	Mods	Coil voltages		Diagram
				AC	DC	
Din - T 511	16A	1	1	240V	110V	
Din - T 512	16A	2	1	240V	110V	



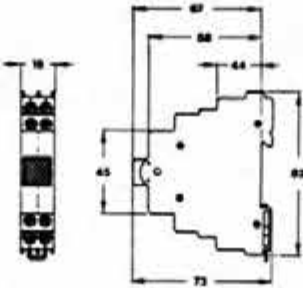
Notes: Special voltage models available on indent.
Voltages 12, 24, 48 AC, 6, 12, 24 DC.
□ Available on indent only.

Din-T pilot light & Din-T pushbuttons

Modular style pushbutton with illuminated indication circuit and pilot lights.
Lenses in red, green or orange ordered separately.
Pushbutton contact rating 16 amp.

Description	Cat. No.
Pilot light	DTPL
Lens red	DTLRD
Lens green	DTLGR
Lens orange	DTLOR
Lens clear	DTLCL
Lamp 240V	DTLP240
Lamp 24V	DTLP24
Pushbutton (ILL)	DTPB771
Pushbutton	DTPB691

Dimensions (mm)



Notes: Illuminated pushbutton 240V only.

Surge diverters

Surge diverters offer affordable protection against over-voltage spikes. Using a zinc oxide varistor with a high discharge capacity the modular design permits compact installation features. The varistor module can easily be replaced without interrupting the mains supply. A signal contact to remote indicate the 'healthy' and 'tripped' status of the varistor is available.

Technical data		Cat. No.	
		DTSD 230	DTSD 500
Rated voltage		230-250V	500V
Maximum operational voltage	AC	275V	550V
Maximum operational voltage	DC	350V	745V
Rated impulse current	I _{sn}	15kA	15kA
Maximum impulse current	I _{s max.}	40kA	40kA
Residual voltage	U _r	≤1.3kV	≤2.5kV
Response time	t _a	25ns	25ns
Cable connection size		4-25mm ²	4-25mm ²
Maximum fuse back-up		100A	100A
Temperature range		-40°C to +60°C	
Standard		IEC99-1	
Auxiliary module 250V 2A (optional)		1 C/O	1 C/O
Cable connection (auxiliary models)		1.5mm ² max	1.5mm ² max



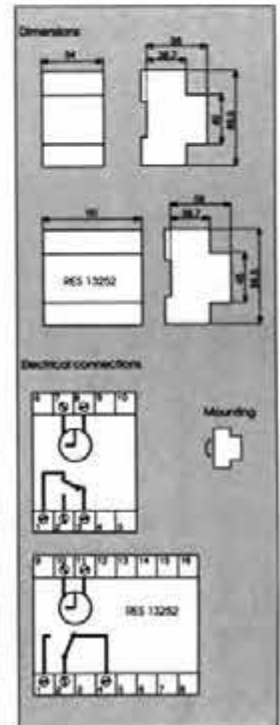
Flash time switches

Micromat

Day or week and combined day/week cycle time switches for DIN rail mounting.

Characteristics

Movement	Quartz
Supply - voltage	240V~
- frequency	50-60Hz
- consumption	0.5VA
Contacts	1 changeover
Resistive load	16A/250V~ (AC 1)
Degree of protection	IP20
Operating temperature	from -10°C to +45°C
Terminals	1-4mm ²
Programming steps	- day dial 15 minute - week dial 2 hour
Minimum interval	- day dial 15 minute - week dial 2 hour
Accuracy (switching)	- day dial 1 minute 30 seconds - week dial 10 minute
Manual override	yes
Battery reserve	72 hours



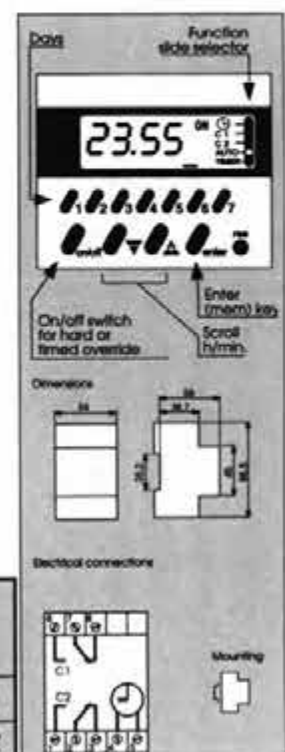
Cycle	Reserve	Programming interval	Minimum interval between 2 actions	Rating	Contact	Cat. No.
24 hr. ec.	-	15 minute	15 minute	16A	— =	QSR 13003
24 hr.	-	15 minute	15 minute	16A	— =	QSR 13001
24 hr.	72 hour	15 minute	15 minute	16A	— =	RES 13002
7 days	72 hour	2 hr	2 hr	16A	— =	RES 13702
24hr.+7 days	72 hour	15 min. + 2 hr.	15 minute + 2 hr.	16A	— =	RES 13252

Monotron 200

Electronic weekly cycle time switch in 1 or 2 channel versions for DIN rail mounting.

Characteristics

Supply	240V~
- voltage	50-60Hz
- frequency	1VA
- consumption	1 or 2 changeover
Contacts	16A/250V~ (AC 1)
Resistive load	IP20
Degree of protection	from -10°C to +50°C
Operating temperature	1-4mm ²
Terminals	1 minute
Programming steps	1 minute
Minimum interval	1 minute
Operating precision	1 second/24 hour
Timed override	1 hour to 27 days
Battery reserve	10 years (programme)
Programming capacity	10 on & 10 off per day or 140 per week by grouping commands.



Cycle	Reserve	Programming interval	Minimum interval between 2 actions	Rating	Contact	Cat. No.
7d/1chan	72 hr.	1 minute	1 minute	16A	— =	RES 23701
7d/2chan	72 hr.	1 minute	1 minute	16A	— = — =	RES 23702

Modular switches

General features

Din-Modular switches have the same profile as Din-T MCB. These switches have double break contacts and comply to IEC408 with regard to isolating duty. The switch housing self extinguishing material has very high mechanical strength and allows operation in 50°C ambient with a 95% relative humidity.



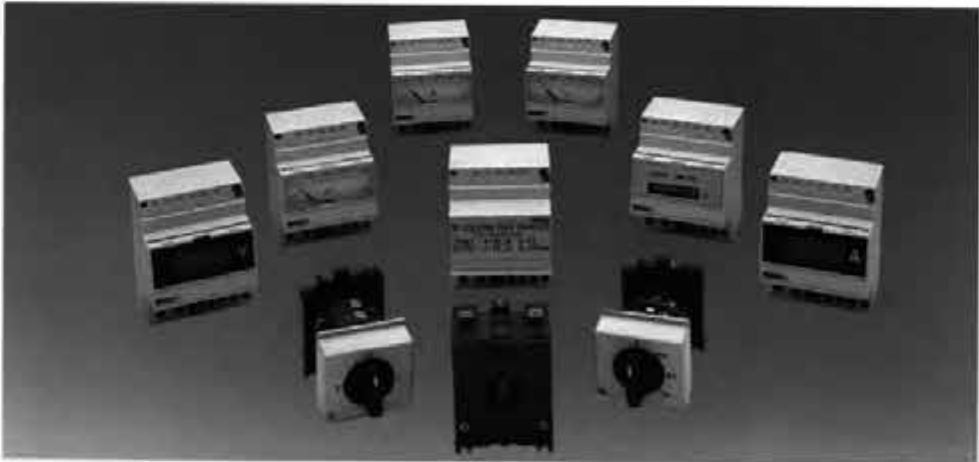
Modular switches

Cat. No.	In	Poles	Modules
Without off-position			
Din-T C0321	32A	1	1
Din-T C0322	32A	2	2
Cat. No.	In	Poles	Modules
With off-position			
Din-T C0321/0	32A	1	1
Din-T C0322/0	32A	2	2

RAIL DIN instruments

IME RAIL DIN Instruments are an exciting new concept in instrumentation which gives a choice of conventional analogue, or digital display, in a DIN rail mounted housing. The IME concept of RAIL DIN equipment occupies four DIN modules (e.g. same space as four Din-T 1 pole circuit breakers), and offers an economical

and convenient system for applications such as metering in starters and distribution centres. The RAIL DIN equipment is simple to install and has an inherent IP52 degree of casing protection.



RAIL DIN instruments

RAIL DIN analogue meters AC and DC

- Accuracy class 1.5
- Working voltage 600V
- Test voltage 2kV
- Self extinguishing housing

Overload withstand

Ammeters: 10 x rated current for 1 sec.
1.2 x rated current indefinitely
Voltsmeters: 2 x rated voltage for 1 sec.
1.2 x rated voltage indefinitely

RAIL DIN analogue meters (AC)

Range	Cat. No.
Direct connect ammeters D4E-AAC - 2 times overscale	
0-1A	D4E-AAC 1A
0-2.5A	D4E-AAC 2.5A
0-5A	D4E-AAC 5A
0-10A	D4E-AAC 10A
0-15A	D4E-AAC 15A
0-20A	D4E-AAC 20A
0-25A	D4E-AAC 25A
0-30A	D4E-AAC 30A
0-40A	D4E-AAC 40A
0-50A	D4E-AAC 50A
0-60A	D4E-AAC 60A
CT operated ammeters D4E-ACT	
5A 5 times overscale	D4E-ACT 5A 5X ')
5A 2 times overscale	D4E-ACT 5A 2X ')
1A 5 times overscale	D4E-ACT 1A 5X ')
1A 2 times overscale	D4E-ACT 1A 2X ')
Direct connect voltmeters D4E-VAC	
0-50V	D4E-VAC 50V
0-150V	D4E-VAC 150V
0-300V	D4E-VAC 300V
0-500V	D4E-VAC 500V
VT operated voltmeters D4E-VVT	
For use with 110V VT	D4E-VVT 110V
Frequency meter D4FI	
Range 45-55Hz 240V	D4FI

Note: Standard scales - C.T. operated meters comprise of the following scale ranges and their decade multiples - 10/20A, 12/24A, 15/30A, 20/40A, 25/50A, 30/60A, 40/80A, 50/100A, 60/120A, 75/150A, 80/160A
) Include range scale to suit chosen transformer ratio.
eg. A 2 times overscale ammeter operating from a 800/5A CT will have a Cat. No. D4E-ACT 5A 2X 800A.

RAIL DIN analogue meters (DC)

Range	Cat. No.
Direct connect ammeters D4M-ADC	
0-1mA to 0-8mA	D4M-ADC M1 ')
0-10mA to 0-800mA	D4M-ADC M2 ')
1, 5, 10, 15, 25, 40A	D4M-ADC ')
Shunt connected ammeters D4M-ADC	
0-10A to 0-1000A 50mV	D4M-ADC 5 ')
0-20A to 0-1000A 75mV	D4M-ADC 7 ')
Direct connect DC voltmeters D4M-VDC	
0-0.5V to 0-600V	D4M-VDC V ')
Direct connect AC (rectified) voltmeters D4M-VAC	
0-10V to 0-600V	D4M-VAC V ')

Notes: Standard scales - Moving coil meters comprise the following scale ranges and their decade multiples - 0 - 10, 12, 15, 20, 25, 30, 40, 50, 60, 75, 80
) Please include range required at the end of the Cat. No. eg. A 0-150V DC voltmeter in a RAIL DIN housing will have a Cat. No. D4M-VDC V/150.
) Price does not include a shunt (shunt ordered separately).

Non standard caption

For meter scale requiring non standard captions, please add the suffix 'S' to the Cat. No. followed by the range required.

eg. A 0-10mA ammeter in a RAIL DIN housing, scaled 0-500 RPM will have Cat. No. D4M-ADC M2 S / Input 0-10mA scale 0-500RPM.



RAIL DIN instruments

Digital ammeters

Overload withstand

2 x In constant

10 x In for 5 seconds

RAIL DIN digital meters

Range	Connection	Max. display	Cat. No.
AC voltmeter DG3-4VAC			
0-100V	Direct	99.9V	DG3-4VAC 100V
0-600V	Direct	600V	DG3-4VAC 600V
0-1000V	VT	999V	□ DG3-4VAC 1000/100V
AC ammeter DG3-4AAC			
0-1A ¹⁾	CT	999A	DG3-4ACT 1A
0-5A ¹⁾	CT	999A	DG3-4ACT 5A
0-10A	Direct	9.99A	DG3-4AAC 10A
0-20A	Direct	20.0A	DG3-4AAC 20A
DC voltmeter DG3-4VDC			
0-100V	Direct	99.9V	DG3-4VDC 100V
0-600V	Direct	600V	DG3-4VDC 600V
DC ammeter DG3-4ADC			
0-50mV ¹⁾	Shunt ²⁾	999A	DG3-4ADC 50mV
0-75mV ¹⁾	Shunt ²⁾	999A	□ DG3-4ADC 75mV
Frequency meter DG3-4FI			
40-80Hz	Direct	40-80Hz	DG3-4FI 80
200-800Hz	Direct	200-800Hz	DG3-4FI 800
Temperature meter DG3-4 Pt2			
-10 to +100°C	PT 100 ³⁾ thermistor	-9.9 to 99.9°C	DG3-4Pt2 100
-20 to +400°C	PT 100 ³⁾ thermistor	-20 to 400°C	DG3-4Pt2 400

Notes: All digital meters require auxiliary supply.

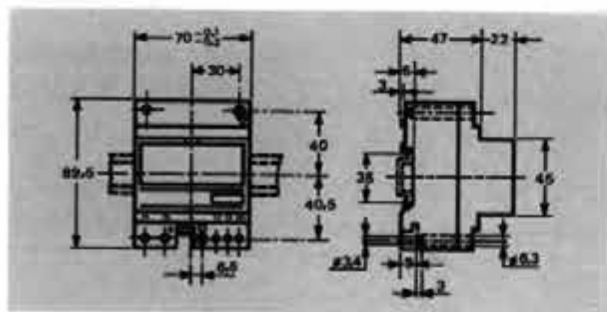
- ¹⁾ The instrument can be used for 10 ranges which may be selected to suit the current transformer or shunt value in use.

Range selections are made by switches located under the front cover of the instrument (refer to page 33).

- ²⁾ Price does not include shunt (shunt ordered separately).

- ³⁾ PT 100 thermistor not supplied.

- Available on indent only.

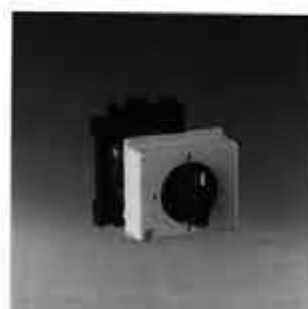
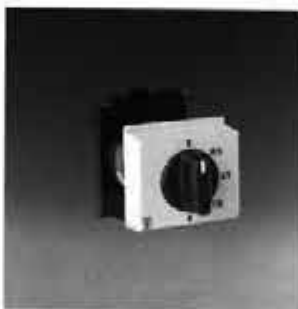


RAIL DIN supplementary types

Range	Cat. No.
Hour run meter D4.0	
5 digital + 2 decimal 110V	D4.0 - 110
5 digital + 2 decimal 240V	D4.0 - 240
Phase fail/rotation indicator D4S-E	
100-415V	D4S-E

RAIL DIN metering switches

Range	Cat. No.
Ammeter switch D4A	
For use with CTs only	D4A
Voltmeter switch D4V	
3 position phase-phase	D4V-3
7 position phase/phase	D4V-7
phase/neutral	



How to set the range

1. Remove the front as shown on figure A.
2. The instrument is calibrated to display 99.9 (1st switch on position 'x1', then switch on position 99.9 - figure B).
3. Move the switch from position '0' to the desired range (15.0, 25.0 or 40.0 or 60.0 or 99.9). All other switches must be placed on '0'.
4. With the first switch on position 'x10', the display is multiplied by 10. (eg. switch on position 'x10' and on '99.9', instrument set to read 999).
5. Connect the instrument through CT or shunt having the primary range equal to the set range.
6. The full scale (SPAN) and beginning scale (0) calibrations are already made by the manufacturer and therefore it is not necessary to adjust any potentiometers.

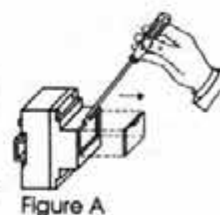


Figure A

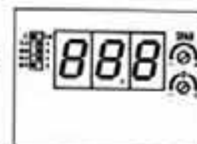
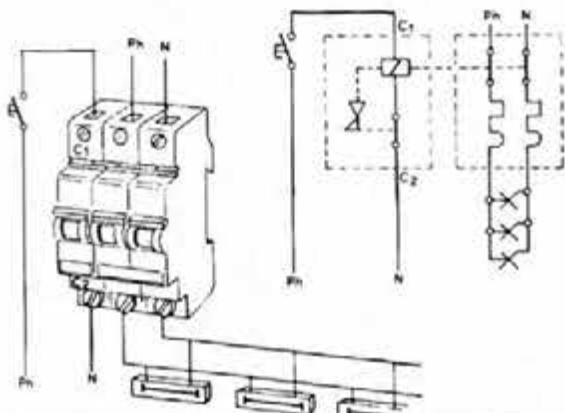


Figure B

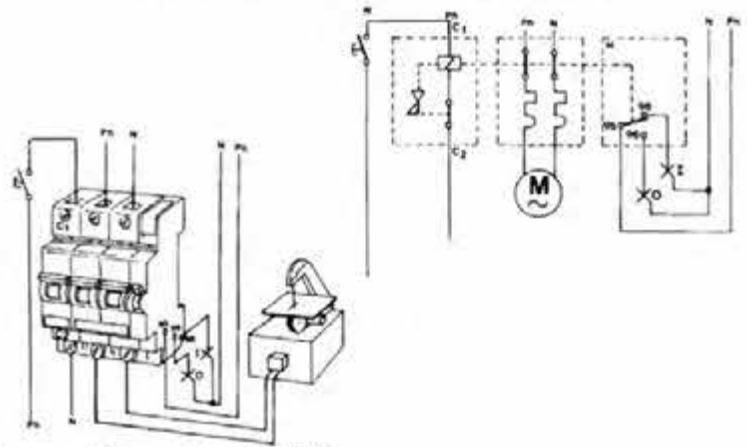
Shunt trip for MCBs

Connection schematics

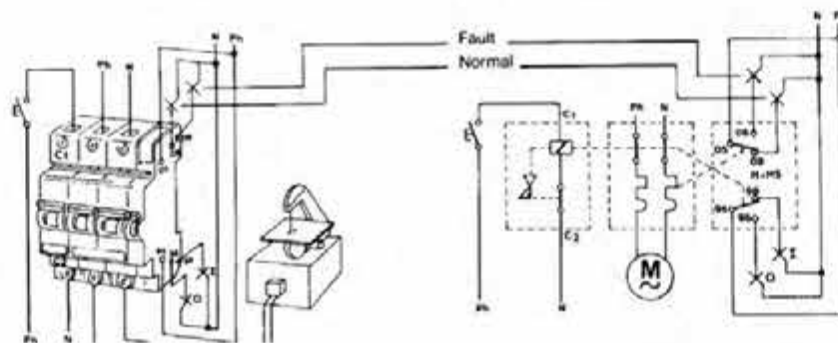
Shunt trip + MCB



Shunt trip + MCB + auxiliary contact H

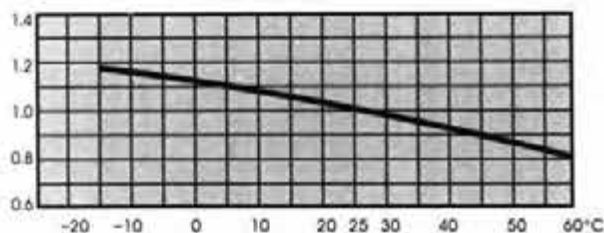


Shunt trip + MCB + auxiliary contact H-H/S

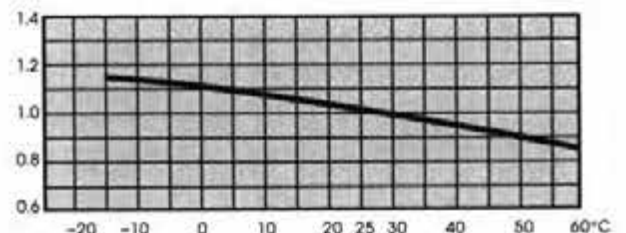


Temperature compensation

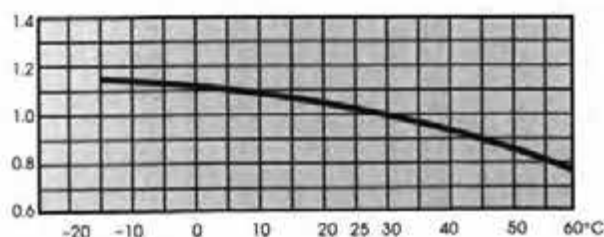
Temperature derating chart 6-32 amp
K = correction factor



Temperature derating chart 0.5-4 amp
K = correction factor



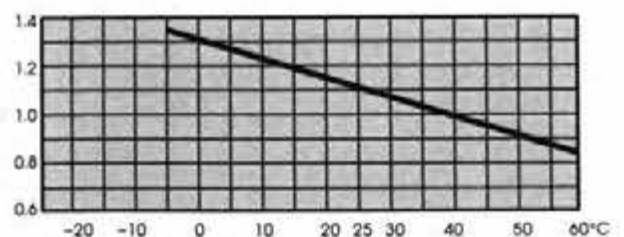
Temperature derating chart 40-63 amp
K = correction factor



Din-T 10

Influence of Ambient Temperature

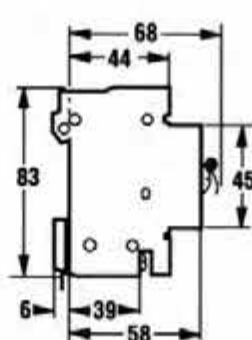
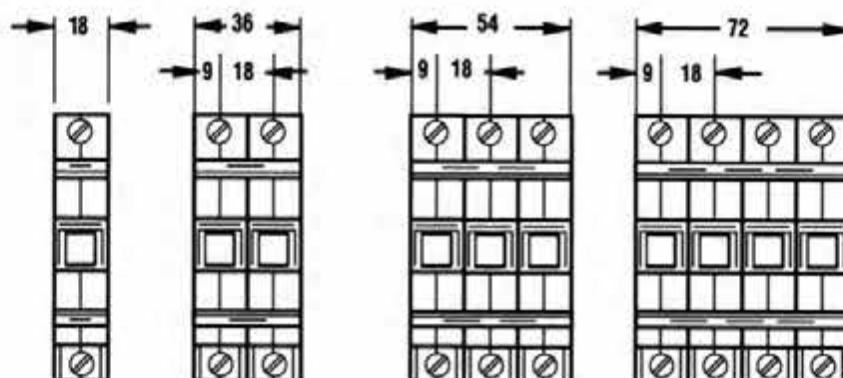
The normal thermal setting of the MCB's are done at an ambient temperature of 40°C. A variation of the ambient results in that the MCB will react at either a lower or higher continuous current.



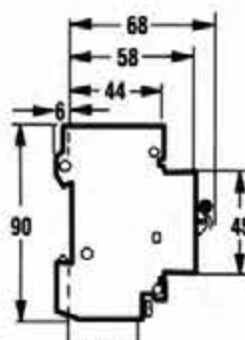
Din-T series 6kA, 9 kA, 14kA & 10kA

Dimensions

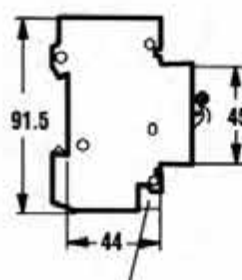
Width remains constant with all ranges



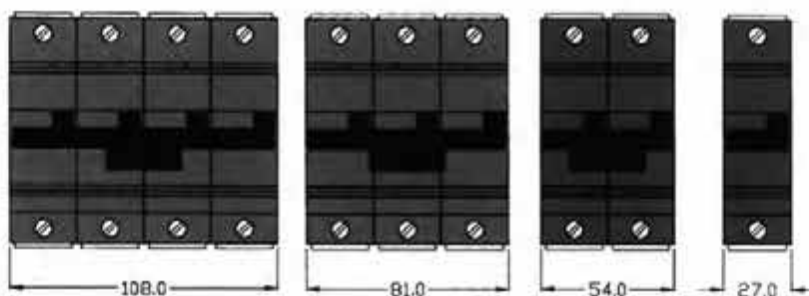
6 kA



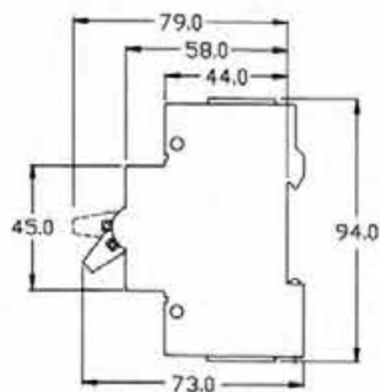
9 kA & 14kA



To ensure IP20 finger touch proof protection this cap is supplied as standard



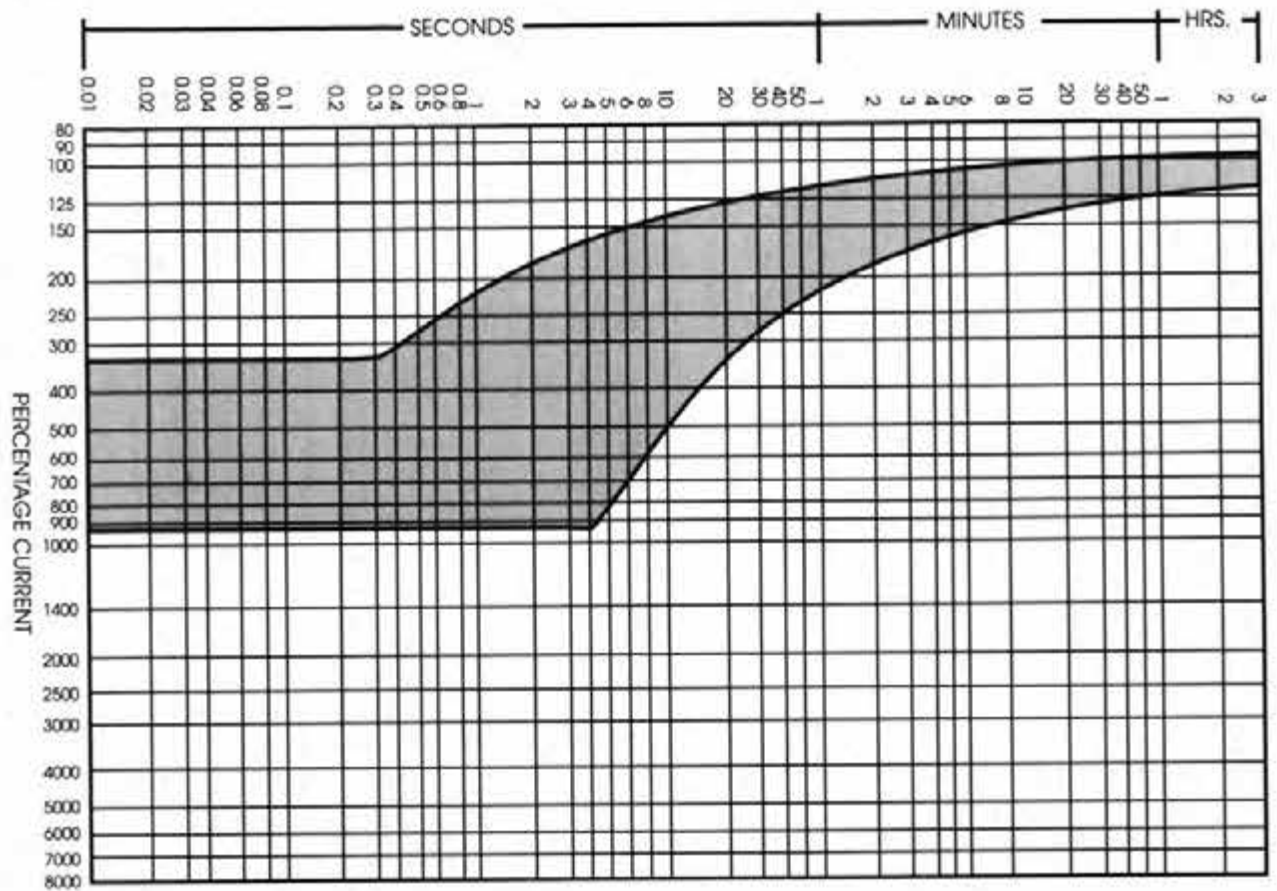
10 kA



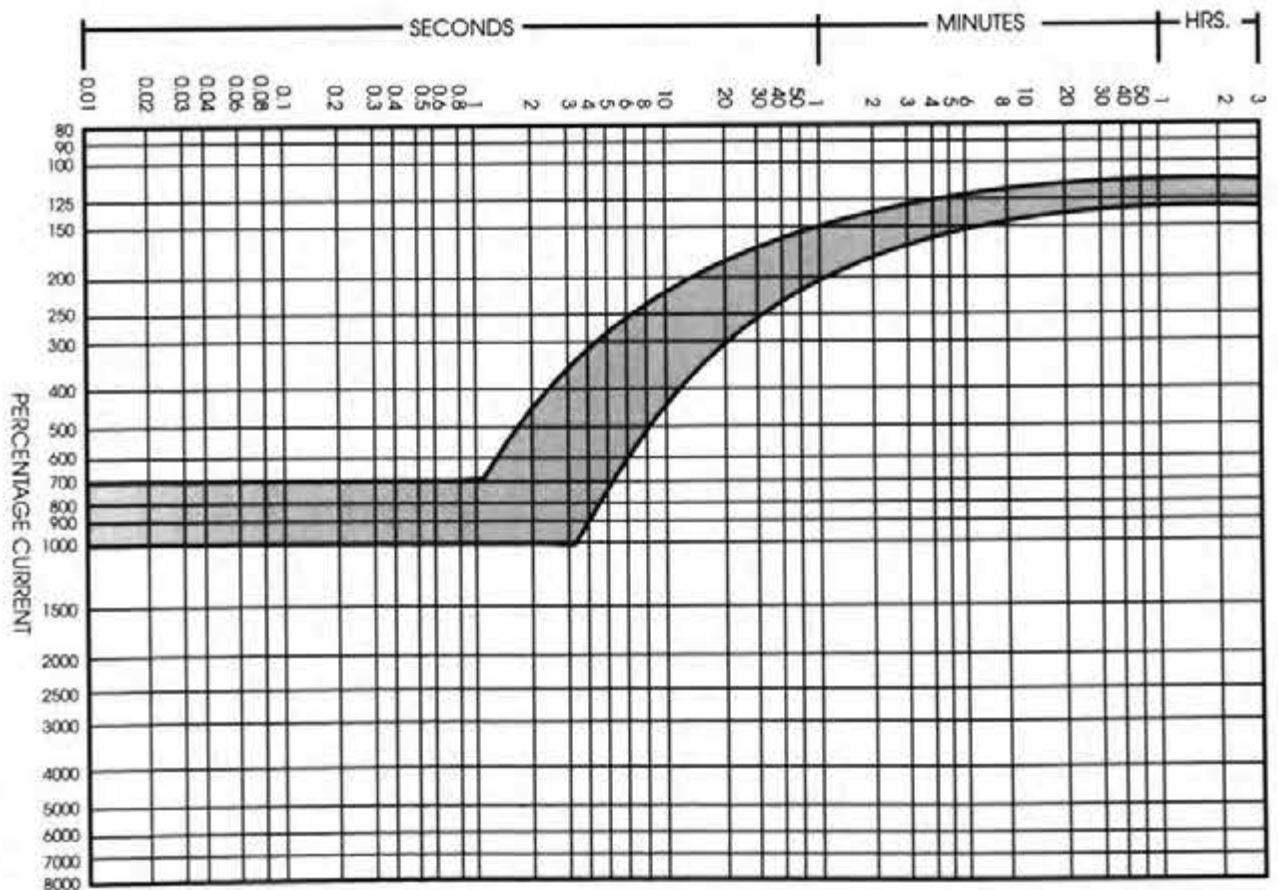
Dimensions (mm)

Din-T time current curves

6kA

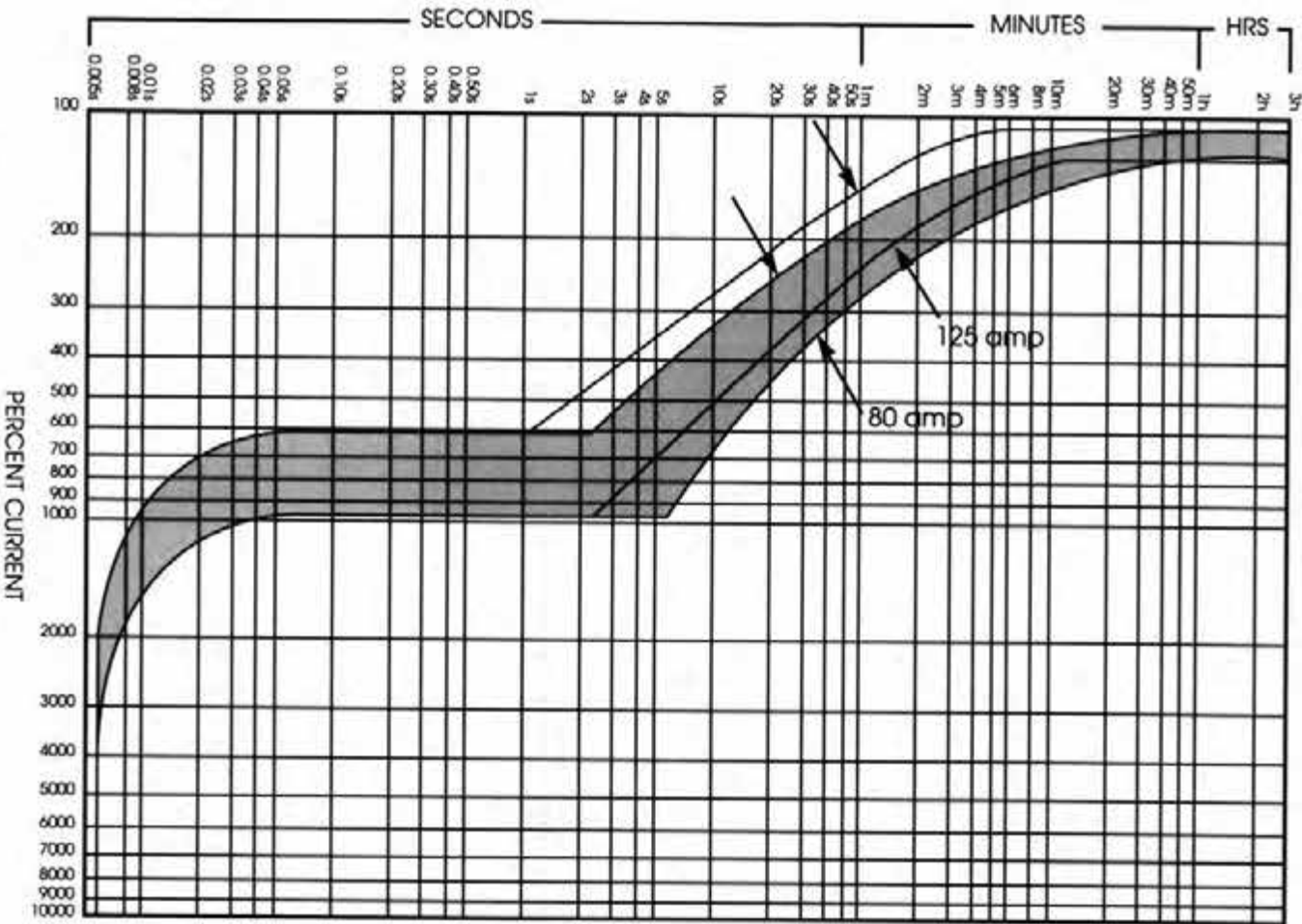


9kA & 14kA

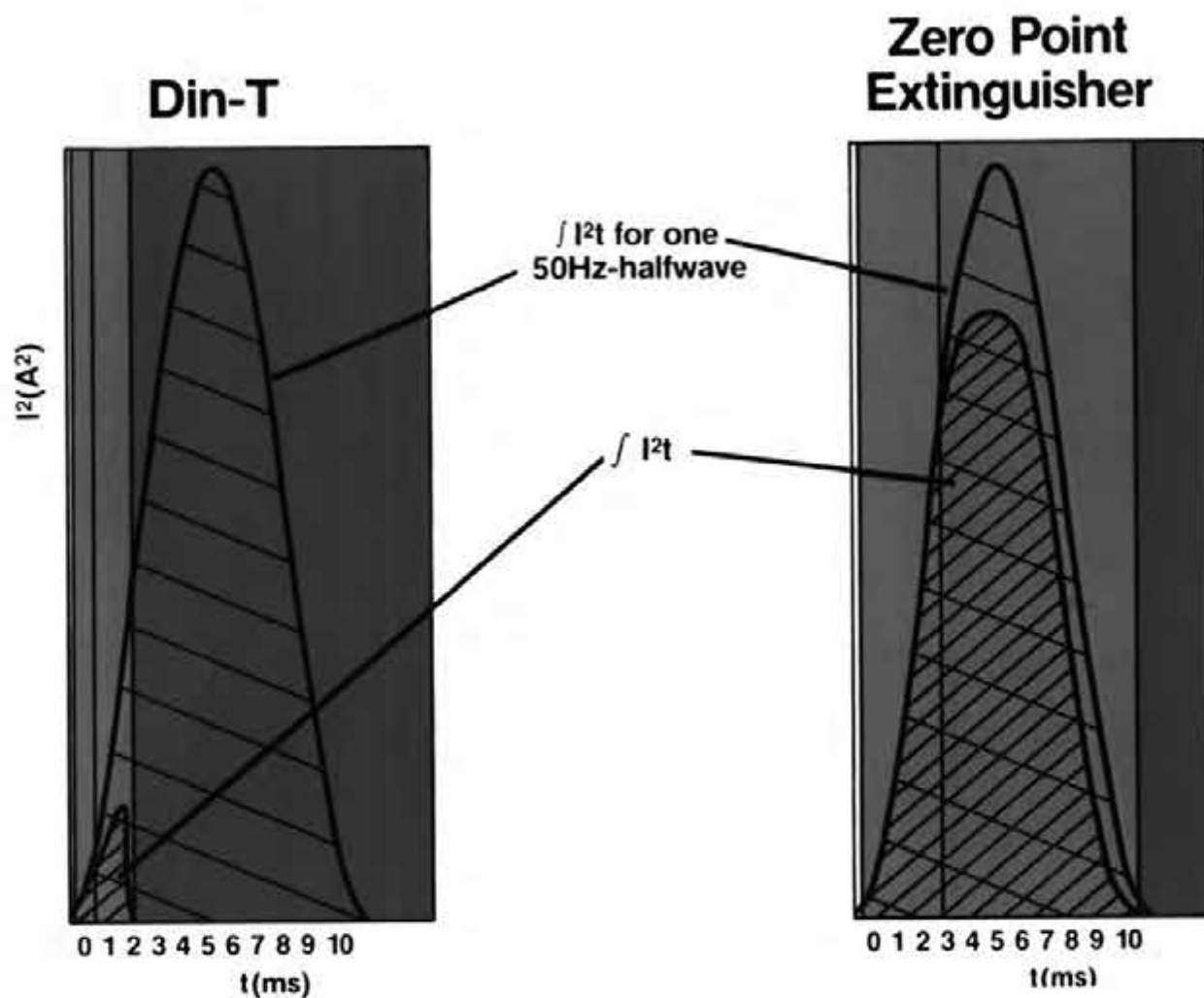


Din-T time current curves

10kA



Din-T I²t let-through



Comparison of current capabilities between Din-T MCBs and Nema style MCBs.

Above graph indicates 3 stages of arc formation, to arc extinction and I²t let-through values.

1. Instantaneous trip time (yellow stage) indicates fault current levels just prior to magnetic trip mechanism response. (7-10 In).
2. Magnetic response time (red stage) from time of magnetic trip operation to time of arc being formed.
Din-T 1 ms Nema style 3 ms.
3. Arc extinction time (orange stage) from arc formation to complete arc extinction.
Din-T 2 ms Nema style 10 ms.

Because total operating time of Din-T is much faster than Nema style MCB, the level of let-through energy in MCB is dramatically reduced as can be compared between cross hatched sections above.

Motor starting selection

Table 415 volt 3 phase D.O.L. starting
Motor rating

KW.	H.P.	MAX.FLC AMPS	Din-T	SAFE-T	XS125CJ XS125NJ XH125NJ	XE250NS XS250NJ XH250NJ	XS400CJ XS400NJ XS400NE XH400NE
0.12	0.17	0.95	4				
0.18	0.25	1.5	4				
0.25	0.33	1.7	4				
0.37	0.5	1.05	4				
0.55	0.75	1.44	4				
0.75	1	1.76	6				
1.1	1.5	2.6	10				
1.5	2	3.4	16				
2.2	3	4.7	16				
3	4	6.4	20				
3.75	5	8.1	25				
5.5	7.5	10.7	32				
7.5	10	14.3	40	40	32		
11	15	20.2	63	63	50		
15	20	26.7	63	80			
18.5	25	35	80 ')	100	75		
22	30	40	100 ')	100	100		
25	35	47	125 ')		125		
30	40	55	125 ')		125		
37	50	66					
45	60	79				125	
55	75	95				160	
75	100	128				225	
90	125	155				250	
110	150	188				250	
132	180	224					300
160	220	266					350
200	270	335					400

Note: The above table is based on holding 125% continuously and 600% for 10 seconds. For average 3-phase 4 pole 415 volt AC motors
) 80,100 and 125A are type Din-T10

Table 415 volt 3 phase assisted start
Motor rating

K.W.	H.P.	MAX.FLC AMPS	Din-T	SAFE-T	XS125CJ XS125NJ XH125NJ	XE250NS XS250NJ XH250NJ	XS400CJ XS400NJ XS400NE XH400NE
0.37	0.5	1.05	4				
0.55	0.75	1.44	4				
0.75	1	1.76	4				
1.1	1.5	2.6	6				
1.5	2	3.4	10				
2.2	3	4.7	10				
3	4	6.4	16				
4	5.5	8.1	20				
5.5	7.5	10.7	25				
7.5	10	14.3	32				
11	15	20.2	50				
15	20	26.7	63	63			
18.5	25	35	80 ')	63			
22	30	40	80 ')	80			
25	35	47	80 ')	100	75		
30	40	55	80 ')	100	85		
37	50	66	100 ')		125		
45	60	79	125 ')		125		
55	75	95				125	
75	100	128				175	
90	125	155				200	
110	150	188				250	
132	180	224					300
160	220	266					350

Note: The above table is based on holding 125% continuously and 350% for 20 seconds. For average 3-phase 4 pole motors
) 80,100 and 125A are type Din-T10

Motor starting selection and Cascade co-ordination chart

Table 415 volt 3 phase D.O. L. starting for fire pump

Motor rating

kw.	H.P.	MAX.FLC AMPS	Din-T	SAFE-T	XS125CJ XS125NJ XH125NJ	XE250NS XS250NJ XH250NJ	XS400CJ XS400NJ XS400NE XH400NE
0.37	0.5	1.05	4				
0.55	0.75	1.44	6				
0.75	1	1.9	10				
1.1	1.5	2.5	10				
1.5	2	3.45	16				
2.2	3	4.7	16				
3	4	6.2	20				
4	5.5	8.1	25				
5.5	7.5	10.9	40				
7.5	10	14.8	50	50	32		
11	15	20.5	80 ')	63	50		
15	20	28	80 ')	80	63		
18.5	25	34.5	100 ')	100	100		
22	30	40	125 ')		125		
25	35	47	125 ')		125		
30	40	55				125	
37	50	66				150	
45	60	79				175	
55	75	95				225	
75	100	128					300
90	125	155					350
110	150	188					
132	180	224					
160	220	266					

Note: The above table is based on holding 125% continuously and 600% for between 20 and 50 seconds. For average 3-phase 415 volt AC '))80, 100 and 125A are type Din-T10

Din-T Cascade co-ordination chart

Rated breaking capacity kA	Back-up breaker							
		XS125CJ	XS125NJ	XH125NJ	XS250NJ	XH250NJ	XS400CJ	XS400NE XS400NJ
Load-side breaker		18	30	50	35	50	35	50
Din-T6 2-40 amp	6	18	25	25	25	25	-	-
Din-T9 0.5-25 amp	9	18	30	50	35	50	35	50
Din-T9 32-63 amp	9	18	25	25	25	25	25	25
Din-T14 0.5-25 amp	14	18	30	50	35	50	35	50
Din-T14 32-63 amp	14	18	25	25	25	25	25	25
Din-T10 80-125 amp	10	18	25	25	15	15	10	10

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P.O. Box 259, ERMINGTON 2115
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LAUNCESTON:

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Telephone: (003) 44 881 Fax: (003) 44 4069

DARWIN:

J. BLACKWOOD & SON LTD. (Inc. Tesco Pearce), MATARAM STREET, WINNELLIE, 0820
Telephone: (089) 84 4255 Fax: (089) 84 3945

NHP

Proudly Australian

Standard Series

High-fault Level Series

Motor Protection Series

Non-automatic Series

TemBreak

Total Protection, Complete Control



Selection Guide

NHP

ELECTRICAL ENGINEERING PRODUCTS PTY LTD

TemBreak

THREE SERIES, TWO TYPES

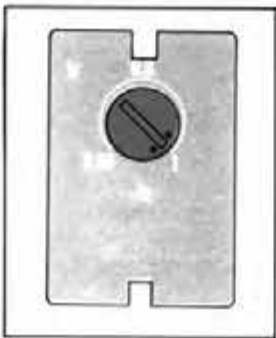
A new generation of MCCB's. Procuring a major evolution in Low Voltage Distribution Systems. Offering a choice of 3 series (economical, standard and high fault) and two types. **Adjustable thermal magnetic** or **microprocessor** based **solid state O.C.R.** Both types have common construction features and interchangeable plug-in accessories. TemBreak thermal magnetic types offer the widest adjustment range and more flexibility than with 63% – 100% base current adjustment each MCCB is individually calibrated to ensure precision tripping on overcurrent.

TemBreak.
Widest choice, most flexibility.



Adjustable Rated Current

Adjustable Thermal Magnetic Range



TemBreak (Thermal-magnetic trip type)

The rated current is continuously adjustable from 63% to 100% of the nominal rated current. The scale is marked at three positions; 63%, 80% and 100%.

Microprocessor Range

TemBreak (Electronic type)

The rated current of the electronic type TemBreak is adjustable in 15 steps from 50% to 100% of the nominal rated current, using the base current [I₀] select switch and the rated current [I_n] setting dial.

The rated current of a single breaker is adjustable in 15 steps from 50% to 100%. This is one of the essential features for precise protection co-ordination and for upgrading low-voltage distribution systems.

Base current		63	80	100
Current dial		80 85 90 95 100	80 85 90 95 100	80 85 90 95 100
Breaker rated current	72% in this example	50 54 57 60 63	64 68 72 76 80	80 85 90 95 100

1 Selection Co-ordination

Standard Protective Characteristics

The electronic type TemBreak incorporates an adjustable long time-delay, short time-delay and instantaneous trips, enabling co-ordination with fuses on the high voltage side and down stream breakers.

Adjustable LTD

Essential for general industrial plants and generator protection

Ramp Characteristic [Ft], STD

The ramp characteristic [Ft] enables precise co-ordination with thermal magnetic MCCBs or fuses.

The ramp characteristic or the definite time-delay characteristic can be used by operating the OFF-ON switch (on for [Ft] ramp characteristic).

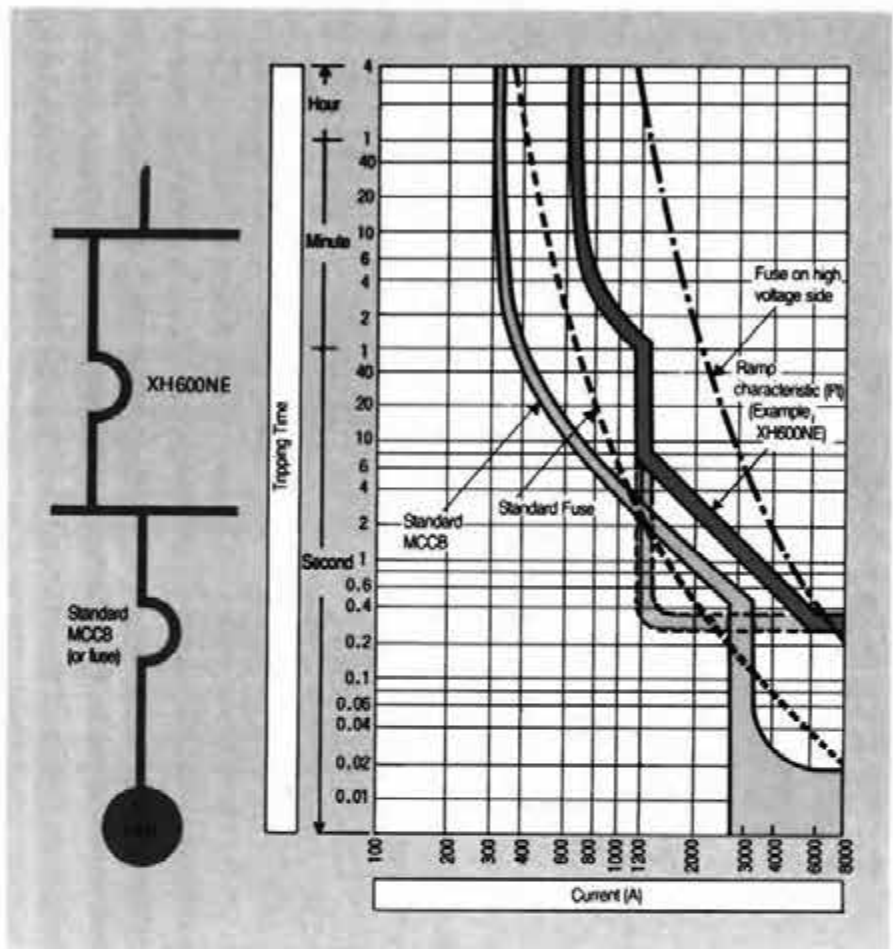
The definite time-delay characteristic is 1000% of the rated current [I]



2 Adjustable rated current in 5 steps from 50-100%.

Optimum protection co-ordination is attainable depending on increase/decrease of the load.

NOTE: A cover is provided and sealed to prevent unauthorised changing of the settings.



Rated Current Adjustment Dial (Example)



3 TemBreak Electronic type) True r.m.s. value control system

Semi-conductor controlled power equipment in a distribution system can be a source of harmonic currents which may cause malfunctioning in other equipment within the system.

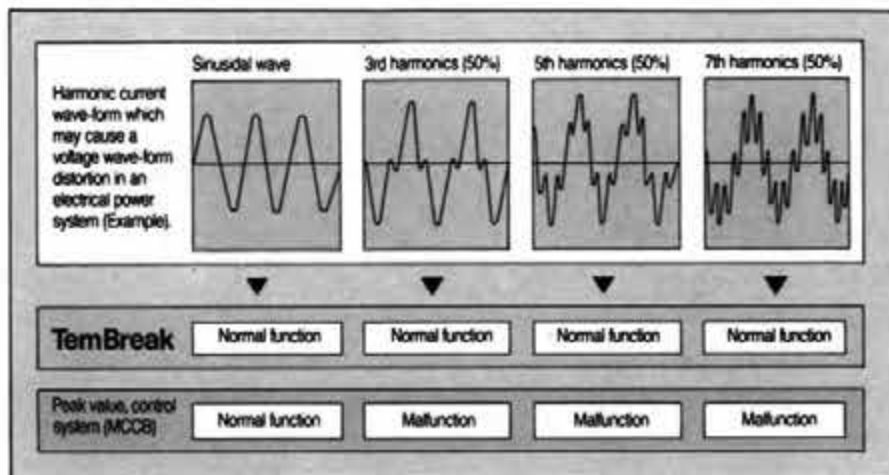
TemBreak's electronic protective device detects the true r.m.s. value of the load current, therefore, remaining unaffected by harmonics.

4 Pre-trip alarm function (optional)

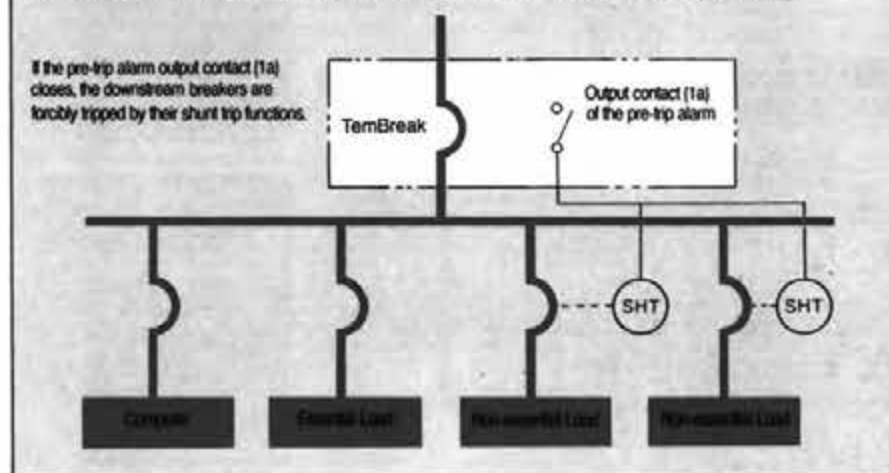
Electronic office equipment is being increasingly used in today's buildings and factories.

The power demand at peak time can reach overload levels of the breakers installed in the system. If such a situation continued a sudden trip may be generated by the long time-delay trip function of the breaker.

The pre-trip alarm prevents this "sudden trip" enabling uninterrupted power to computers and other important loads.



A forced trip system of a non-essential circuit due to a pre-trip alarm (example).



5 Fitted with Ground fault trip (GFT) (Optional)

The set current is continuously adjustable from 10%-40% of the C.T. rated current of the overcurrent trip device.

6 Fitted with Trip Indicators (Optional)

LED indication of which function tripped the breaker, Long time-delay (LTD), Short time-delay (STD), instantaneous (INST.) or ground fault trip (GFT).

7 Field checking of the trip functions

The OCR checker is an easy-to-use instrument for field testing the trip functions of TemBreak (Electronic type). It checks the pick-up current and tripping time values of the functions **independently** (LTD, STD, INST. and GFT).

The values are indicated digitally on a 3-digit LED display.

Power Source 100-110V AC or 220-240V AC, single phase; 50/60 Hz 30V A.

Dimension 200mm (W) x 84mm (H) x 130mm (D).

8 Electronic type TemBreak (E.M.C.) conformity

The electronic range of TemBreak MCCBs are "electromagnetic compatible" (E.M.C.) within a switchgear environment.

TemBreak

Common features of a construction

1 FBM Fast Break Mechanism

**HIGH SPEED,
HIGHLY-EFFICIENT
BREAKING ACHIEVED!!**

U-shaped Conductors
Dual Resilient Contacts
Quick-break Arc Chutes



2 Internal accessories are "plug-in type" for easy exchange

Shunt trip	Undervoltage trip
Auxiliary switches	Alarm switches

- The shunt trip device is equipped with anti-burnout switches.
- For 3-pole types the shunt trip or undervoltage trip, auxiliary switch and alarm switch can be installed.

3 All types of Tembreak are fitted with Push-To-Trip buttons



4 Contact status indication

IEC defined international symbols are used for Contact status indication I (ON) Red, (Trip) White, (OFF) Green.



5 Reliable indication mechanism for safety

The operating handle indicates the O (OFF) position **only** when the required isolating distance, between the fixed and moving contact is achieved (No other indication is necessary).

6 Plug-in mounting blocks, IP20 (Optional)

The degree of protection provided by the mounting blocks for plug-in type TemBreak breakers (for switchboard and distribution board use) is IP20 as defined in IEC Pub. 529.

7 Unified dimensions simplifies distribution board design

TemBreak frame sizes up to 400A, a range most often used in distribution boards, are unified in dimensions of two panel cut-out heights (64mm and 102mm).

● 102mm



● 64mm



For further details please refer to Ratings and Specifications pages 6-10

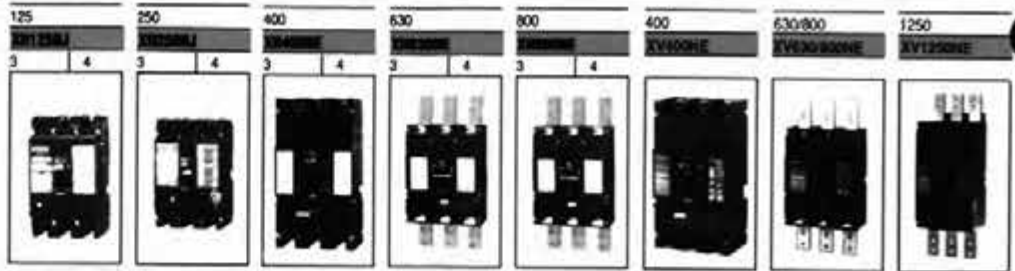


High-fault Level and Mining Series

Ampere Frame

Type
Number of Poles
3
4

3-Phase View



Rated Current (A) (A)

(Calibrated at 45°C
50°C, available on request).

125	250	400	630	800	400	630/800	1250
NRC	ASR	NRC	ASR	NRC	ASR	NRC	ASR
20	12.5	20	100	160	250	125	250
32	20	32	250	160	250	315	630
50	32	50	400	200	400	400	800
63	40	63					
100	63	100					
125	80	125					

AC RATED INSULATION VOLTAGE (UI)


AC RATED BREAKING CAPACITY sym r.m.s. (kA)

IEC 947-2 (low) / IEC 947-2 (lcs)
BS 5742-1(P-1)
CEI 17.5 / AS 3858

AS 2184	1100V	690	690	690	690	690	1150	1150	1150
440V	50	50	65	65	65	65	12.5	12.5	20
415V	50	50	65	65	65	65			
600V	25	25	42	42	42	42			
480V	42	42	65	65	65	65			
240V	85	85	85	85	85	85			
without inst.	240-690V	—	—	—	—	—	—	—	—
DC RATED BREAKING	250V	40	40	—	—	—	—	—	—
CAPACITY (kA)	125V	40	40	—	—	—	—	—	—

DC RATED SHORT TIME CURRENT r.m.s. (kA) (sec)

DC SHORT TIME CURRENT (kA)

	a	90	120	105	140	140	185	210	280	210	280	140	210	210
	b	155		165		260		273		273		260	273	370
	c	86		103		103		103		103		103	103	120
	d	104		124		131		145		145		131	145	171
Weight (kg) Ⓢ marked standard type		1.3	1.56	2.1	2.6	4.8	6.2	9.6	12.0	9.7	12.5	4.8	9.7	22

Weight (kg) (marked standard type)

CONNECTIONS AND MOUNTING

front

connect (FC)

rear

connect (FC)

plug-in (PM)

draw-out (DO)

STANDARD FEATURES

PROTECTIVE FUNCTIONS

Electronic type

Adjustable LTD, STD & INST.

Adjustable GFT or Adjustable PTA (option)

trip indicators (option)

Thermal-magnetic type

thermal and fixed magnetic trips

thermal and adjustable magnetic trips

adjustable thermal and fixed magnetic trips

adjustable thermal and magnetic trips

Accessories (option)

internally mounted

externally mounted

motor operator

external panel mounted type

operating breaker mounted type

handle variable depth type

extension handle

mechanical front type

interlock rear type

handle holder

handle lock

terminal front connect type

cover rear/plug-in type

interpole barrier

accessory lead terminal

door flange

CODE

AX, AXE

AL, ALE

SHT

UVT

MOT

OHE

OHG

OHH

EHA

MIF

MIB

HH

HL

TCF

TCR

TBA

LTF

D.F

④ Standard. This configuration used unless otherwise specified.

⑤ Optional standard. Specify when ordering.

● 'yes' or 'available'

① DC rating available on request.

② Thermally Adjustable.

③ The UVT controller is installed externally with A.C. U.V.T.



Motor Protection Series

Amperes Frame

725

Number of Poles

Outside View

50

TP 50

3



50

XM30PS

3



RATINGS

Voltage for motor

Motor output and rated current (Calibrated at 40°C or 45°C, please specify, 50°C available on request.)

400–

440V

(A) ②

1.6

2.5

4.0

6.3

8.0

10.0

16

25

40

50

(A)

0.8

1.4

2.6

4.2

7.4

10

1.25

2.0

3.6

5.0

8.0

12

AC RATED INSULATION VOLTAGE (UI)

AC RATED BREAKING CAPACITY sym r.m.s. (kA)

IEC 947-2(10) / IEC 947-2 (10)

690V

660V

500V

440V

415V

400V

380V

240V

AS2184

440V

415V

NEMA AB-1

600V

480V

240V

without inst.

240-690V

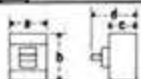
DC RATED BREAKING CAPACITY

250V

125V

RATED SHORT TIME CURRENT r.m.s. (kA) (1 sec)

DIMENSIONS (mm)



a

b

c

d

90/105

130

90

109

1.5

78

147

90

109

1.7

Weight (kg) ① marked standard type

CONNECTIONS AND MOUNTINGS

front	terminal screw	•	○
connect (FC)	attached flat bar	—	—
	solderless terminal (PWC)	—	—
rear	bolt stud	○	○
connect (RC)	flat bar stud	—	—
plug-in (PM)	for switchboard	—	○
	for distribution board	—	—
draw-out (DO)		—	—

STANDARD FEATURES

contact indicator	○	○	⑤
trip button	○	•	—
over current trip type	Adj Therm Fa mag	Fixed	—

PROTECTIVE FUNCTIONS

Thermal-magnetic type
adjustable thermal and fixed magnetic trips
adjustable thermal and magnetic trips

ACCESSORIES (optional) CODE

internally ②	auxiliary switch	AX, AXE	○ (AXE)	○
mounted	alarm switch	AL, ALE	○ (ALE)	○
	shunt trip	SHT	○	○
	undervoltage trip	① UVT	○	—
externally ③	motor operator	MOT	—	—
mounted	external panel mounted type	OHE	—	—
	operating breaker mounted type	OHO	—	—
	handle variable depth type	OHH	○	•
	mechanical front type	MIF	—	•
	interlock rear type	MIB	—	—
	handle holder	HH	—	—
	handle lock	HL	—	—
	terminal front connect type	TCF	○	—
	cover rear/plug-in type	TCR	○	—
	interpole barrier	TBA	○	—
	accessory lead terminal	LTF	○	•

① Standard. This configuration used unless otherwise specified.

② Optional standard. Specify when ordering.

③ 'no' or 'not available'

④ UVT controller is installed externally with AC UVT.

⑤ Complies with IECs-292 - Overload Relay optional.

⑥ Accessory Chassis optional.

⑦ Accessory Chassis optional.

⑧ Indication by handle only.

⑨ Contact NHP for details.



Non-automatic Series

Time

Number of Poles

① Outside View

NOTE: 2-pole breaker is a 3-pole breaker with the centre pole omitted

Structure

3 4



RATINGS

Rated Current (A)

Rated Voltage (V)

125

690

250

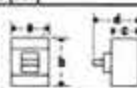
3.5

2.5

RATED SHORT CIRCUIT MAKING CAPACITY Peak/kA

RATED SHORT TIME CURRENT r.m.s./kA 1 sec.

DIMENSIONS (mm)



a

b

c

d

60

90

120

155

86

86

Weight (kg) ① marked standard type

0.78

1.1

1.4

CONNECTIONS & MOUNTINGS

front	terminal screw	○
connected (FC)	attached flat bar	—
	solderless terminal (PWC)	○
rear	bolt stud	○
connected (RC)	flat bar stud	—
plug-in (PM)	for switchboard	○
	for distribution board	○
draw-out (DO)		—

STANDARD FEATURES

contact indication	•
trip button	•

ACCESSORIES (optional) CODE

internally	auxiliary switch	AX, AXE	• (AXE)
mounted	alarm switch	AL, ALE	• (ALE)
	shunt trip	SHT	•
	undervoltage trip	UVT	•
externally mounted	motor operator	MOT	— •
	external panel mounted type	OHE	•
	operating breaker mounted type	OHO	— •
	handle variable depth type	OHH	— •
	extension handle	EHA	—
	mechanical front type	MIF	— •
	interlock rear type	MIB	— •
	handle holder	HH	•
	handle lock	HL	•
	terminal front-connect type	TCF	•
	cover rear connect/plug-in type	TCR	•
	interpole barrier	TBA	•
	accessory lead terminal	LTF	•
	door flange	D F	•

BACK-UP BREAKER ①

Max. Switching Current	AC	XS250NJ
	DC	750
Endurance	No. of Ops. w/out Current	313
	No. of Ops. with Current	7000
		1000

1100V Mining Breakers

TemBreak Mining Breakers

The Terasaki range of TemBreak 1100V Mining Breakers cover the range of 100A-1250A and are fully tested to IEC and Australian standards.

High Interrupting Capacities

Enhancements have been made to the existing TemBreak mining breakers 630A-800A frames. The interrupting capacity of the enhanced models has been increased to 18kA.

The microprocessor based OCR provides a multiple of protective functions incorporating adjustable pick up and time delay settings. The adjustability of the Base Current setting (50-100%) reduces the inventory of spares required.



Non-automatic Series

Type	XS200N	XS400N	XS630N	XS800N	XS1250N	XS1600N	XS2000N	XS2600N
Number of Poles	3 4	3 4	3 4	3 4	3 4	3 4	3 4	3 4
NOTE: 2-pole breaker is a 3-pole breaker with the centre pole omitted.								
RATING								
Rated Current (A)	250	400	630	800	1250	1600	2000	2600
Rated Voltage (V)	690	690	690	690	690	690	690	690
	DC	DC	DC	DC	DC	DC	DC	DC
RATED SHORT CIRCUIT MAKING CAPACITY	Peak/kA	Peak/kA	Peak/kA	Peak/kA	Peak/kA	Peak/kA	Peak/kA	Peak/kA
RATED SHORT TIME CURRENT i_{ms}/kA	1 sec.	1 sec.	1 sec.	1 sec.	1 sec.	1 sec.	1 sec.	1 sec.
DIMENSIONS (mm)								
	a	b	c	d	e	f	g	h
Weight (kg) (marked standard type)								
CONNECTIONS & MOUNTINGS								
front	terminal screw	terminal screw	terminal screw	terminal screw	terminal screw	terminal screw	terminal screw	terminal screw
connected (FC)	attached flat bar	attached flat bar	attached flat bar	attached flat bar	attached flat bar	attached flat bar	attached flat bar	attached flat bar
	solderless terminal (PWC)	solderless terminal (PWC)	solderless terminal (PWC)	solderless terminal (PWC)	solderless terminal (PWC)	solderless terminal (PWC)	solderless terminal (PWC)	solderless terminal (PWC)
rear	bolt stud	bolt stud	bolt stud	bolt stud	bolt stud	bolt stud	bolt stud	bolt stud
connected (RC)	flat bar stud	flat bar stud	flat bar stud	flat bar stud	flat bar stud	flat bar stud	flat bar stud	flat bar stud
plug-in (PM)	for switchboard	for switchboard	for switchboard	for switchboard	for switchboard	for switchboard	for switchboard	for switchboard
	for distribution board	for distribution board	for distribution board	for distribution board	for distribution board	for distribution board	for distribution board	for distribution board
draw-out (DO)								
STANDARD FEATURES								
contact indication								
trip button								
ACCESSORIES (pages)								
internally mounted	auxiliary switch	AX, AXE	AX, AXE	AX, AXE	AX, AXE	AX, AXE	AX, AXE	AX, AXE
	alarm switch	AL, ALE	AL, ALE	AL, ALE	AL, ALE	AL, ALE	AL, ALE	AL, ALE
	shunt trip	SHT	SHT	SHT	SHT	SHT	SHT	SHT
	undervoltage trip	UVT	UVT	UVT	UVT	UVT	UVT	UVT
externally mounted	motor operator	MOT	MOT	MOT	MOT	MOT	MOT	MOT
	external panel mounted type	QHE	QHE	QHE	QHE	QHE	QHE	QHE
	operating breaker mounted type	QHG	QHG	QHG	QHG	QHG	QHG	QHG
	handle variable depth type	QHH	QHH	QHH	QHH	QHH	QHH	QHH
	extension handle	EHA	EHA	EHA	EHA	EHA	EHA	EHA
	mechanical front type	MIF	MIF	MIF	MIF	MIF	MIF	MIF
	interlock rear type	MIB	MIB	MIB	MIB	MIB	MIB	MIB
	handle holder	HHH	HHH	HHH	HHH	HHH	HHH	HHH
	handle lock	HL	HL	HL	HL	HL	HL	HL
	terminal front-connect type	TCF	TCF	TCF	TCF	TCF	TCF	TCF
	cover rear-connect/plug-in type	TCR	TCR	TCR	TCR	TCR	TCR	TCR
	interpole barrier	TBA	TBA	TBA	TBA	TBA	TBA	TBA
	accessory lead terminal	LTF	LTF	LTF	LTF	LTF	LTF	LTF
	door flange	D.F	D.F	D.F	D.F	D.F	D.F	D.F
BACK-UP BREAKER								
Max. Switching Current	AC	AC	AC	AC	AC	AC	AC	AC
	DC	DC	DC	DC	DC	DC	DC	DC
Endurance	No. of Ops. w/out Current	No. of Ops. w/out Current	No. of Ops. w/out Current	No. of Ops. w/out Current	No. of Ops. w/out Current	No. of Ops. w/out Current	No. of Ops. w/out Current	No. of Ops. w/out Current
	No. of Ops. with Current	No. of Ops. with Current	No. of Ops. with Current	No. of Ops. with Current	No. of Ops. with Current	No. of Ops. with Current	No. of Ops. with Current	No. of Ops. with Current

- Standard. This configuration used unless otherwise specified.
- Optional standard. Specify when ordering.
- 'yes' or 'available'
- 'no' or 'not available'
- ④ One is supplied with every 5 MCCB's.

- ⑤ Applicable to the rear-connect type.
- ⑥ Contact NHP for details.

Remote tripping is possible with switches without automatic tripping element and with approximately six times the rated current switching capacity, when equipped with shunt trip and undervoltage trip. Auxiliary switches can also be used.

For details on specifications please refer to the appropriate breaker.

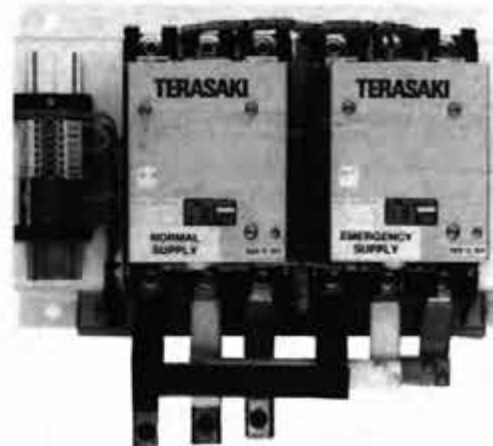
Automatic Transfer Switches

Power Interruptions affect your productivity and cost dollars

An uninterrupted power supply is vital in today's highly competitive environment. Modern buildings and industrial complexes have critical loads such as essential lighting, computers and continuously operating industrial equipment.

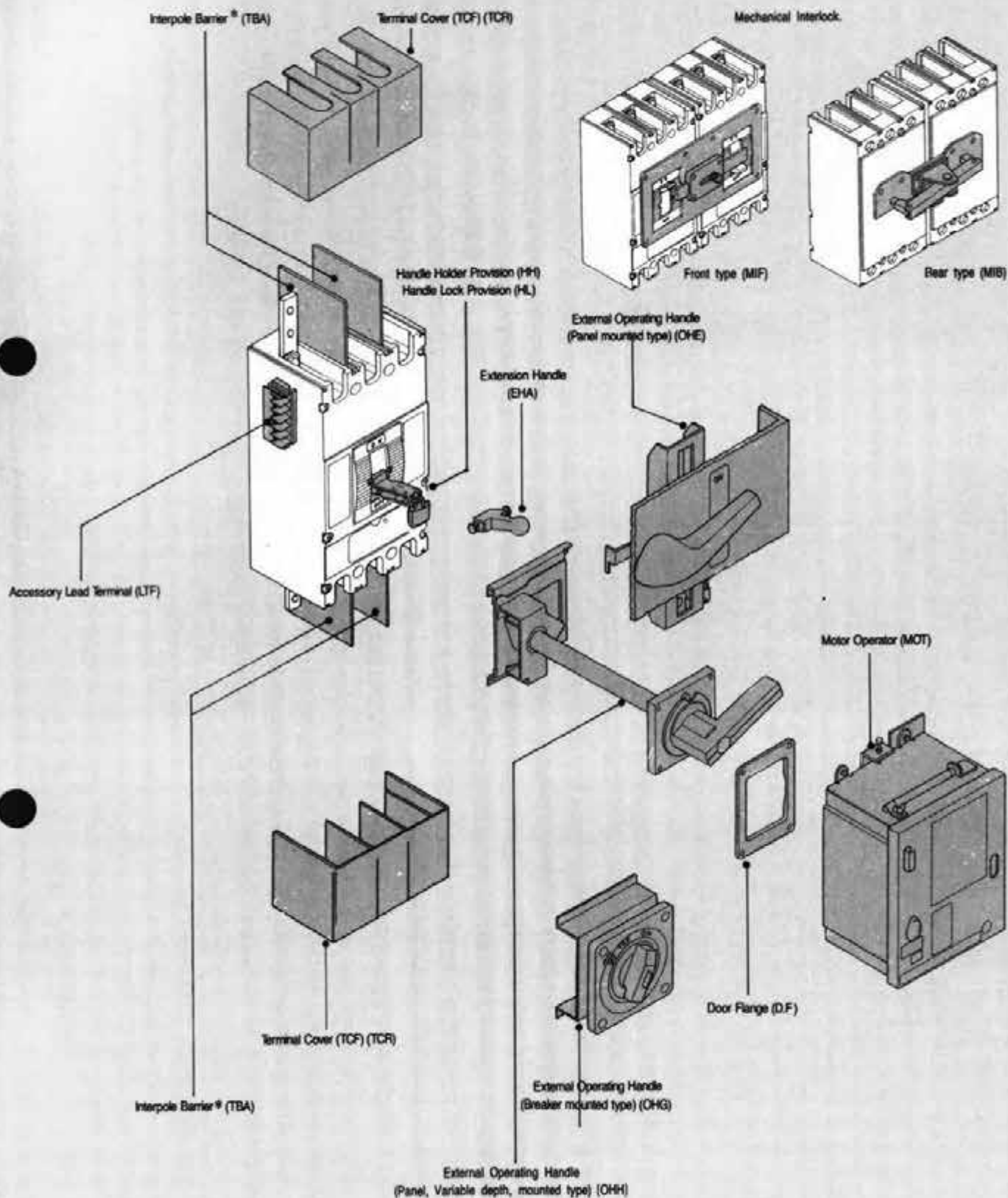
The Terasaki automatic transfer switch comprises a basic transfer switch for actual switching and a logic control panel, so when the mains voltage drops below 85% of a nominal line voltage, the logic controller signals the emergency source engine to start, then automatically transfers the load to the emergency source by activating the motor driven circuit breakers in the BTS (basic transfer switch).

NHP provides a complete listing of the widest selection of transfer switches available and the development of the SLine model with rod interlock has greatly enhanced the range. So don't let a power supply interruption affect your productivity, install an automatic transfer switch and emergency supply source. For further details on Automatic Transfer Switches please contact your nearest NHP office.





Versatile Accessories

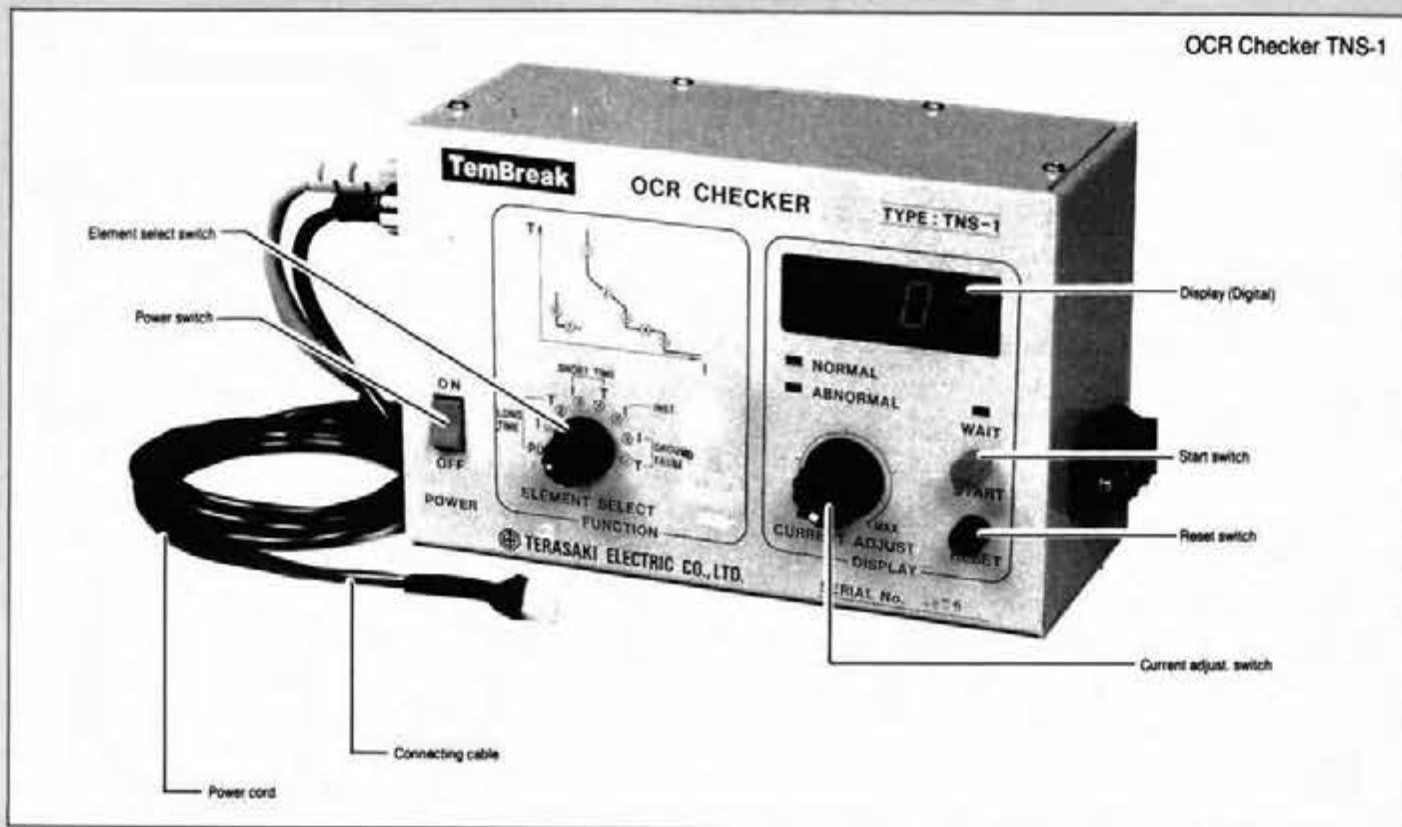


NOTE: #1 for 2-pole, 2 for 3-pole
3 for 4-pole



OCR Checker, Inspection and Maintenance

OCR Checker TNS-1



The TemBreak (Electronic) OCR Checker, Type TNS-1, is a portable easy-to-use instrument for field testing the trip functions.

It checks the pick-up current and tripping time values of the LTD, STD, INST. and GFT functions.

Ratings and Specifications

Power Source	100-110V, 220-240V AC Single Phase 50/60Hz
Power Consumption	30 VA
Application	LTD function check (Set current and trip time values) STD function check (Set current and trip time values) INST function check (Set current value) GFT function check (set current and trip time values)
Measurement of set current values	Display 3-digit digital display Range 0-900mA
Measurement of tripping time values	Display 3-digit digital display Range 0.00-99.9 seconds
Outline dimensions	200mm (W) x 84mm (H) x 130mm (D)
Weight	2.7kg
Accessories	Power cord 3-core with grounding pole 2.4m one pc Connecting cable 2m one pc

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PO Box 259 Ermington, 2115

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BRISBANE: 25 Turbo Drive, Coorparoo, Qld. 4151
PO Box 1127, Coorparoo DC, 4151

Phone: (07) 891 6008 **Fax:** (07) 891 6139

ADELAIDE: 50 Croydon Road, Keswick, S.A. 5035
Phone: (08) 297 9055 **Fax:** (08) 371 0962

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AGENTS:

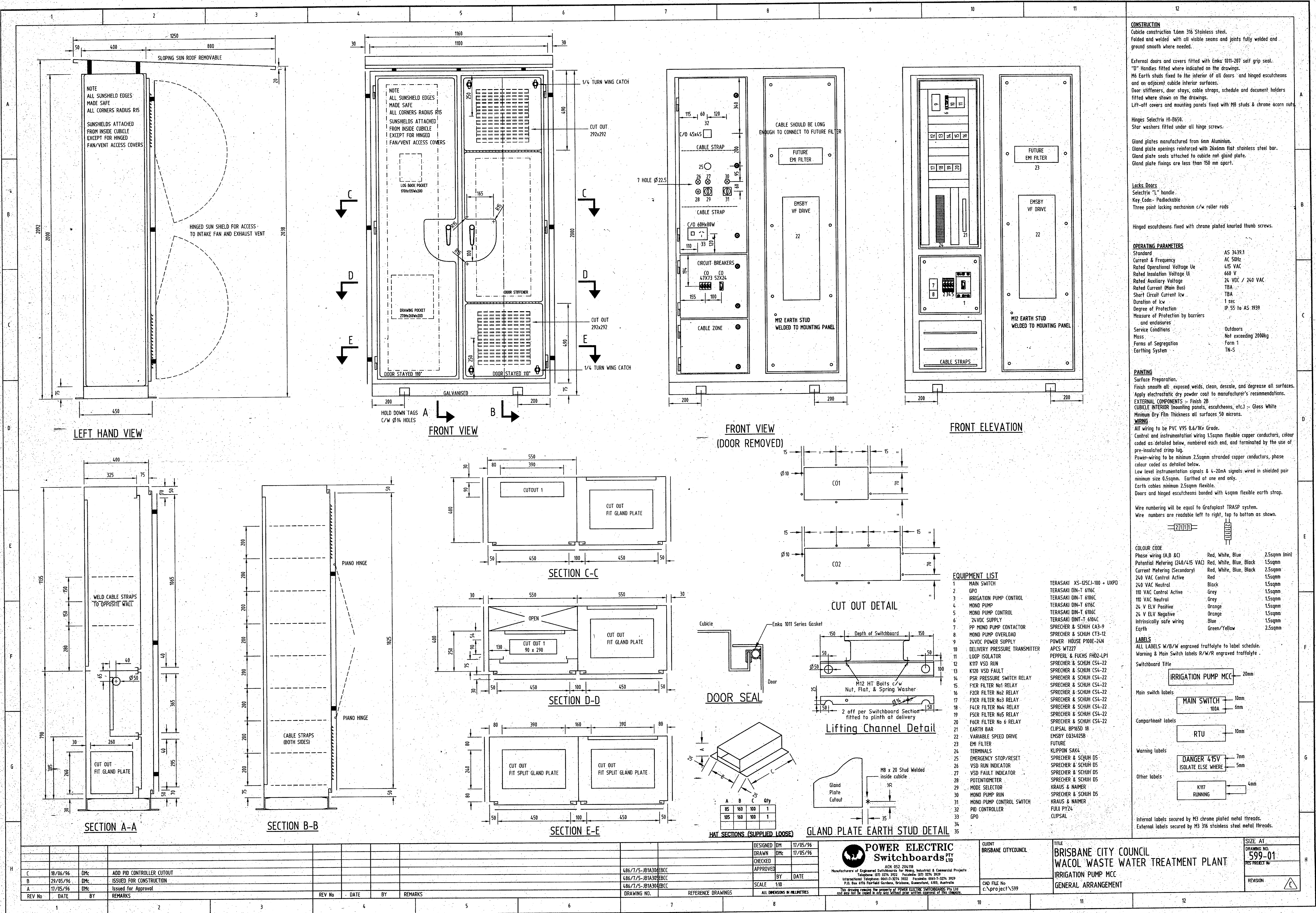
HOBART: H.M. Bamford (Hobart), 199 Harrington Street, Hobart, Tas. 7000 **Phone:** (002) 34 9299 **Fax:** (002) 31 1693

LAUNCESTON: H.M. Bamford (Launceston), 59 Garfield Street, Launceston, Tas. 7250 **Phone:** (003) 44 8811 **Fax:** (003) 44 4069

DARWIN: J. Blackwood & Son Ltd.,
Mataram Street, Winnellie N.T. 0820
Phone: (089) 84 4255 **Fax:** (089) 84 3945

NHP

Proudly Australian



Sprecher + Schuh

CA 3 contactors and overloads



**Australia's leading
contactor range**

NHP ELECTRICAL ENGINEERING PRODUCTS PTY LTD

A.C.N. 004 304 812



Melbourne Premises



Sydney Premises



Brisbane Premises

NHP was formed in 1968 for the purpose of manufacturing, importing and merchandising a wide range of specialised electrical switchgear, motor control gear and other technical electrical products for Australian industry.

NHP is a wholly Australian owned company and exclusively represents a considerable number of overseas companies which manufacture complementary equipment to the NHP programme, which includes locally manufactured products in Melbourne.

The head office and Melbourne sales organisation is situated at Richmond, with branch offices in Sydney, Brisbane, Adelaide, Perth, Newcastle, Townsville, Rockhampton, Toowoomba and Darwin.

The company is also represented by agents in Hobart and Launceston. NHP products are stocked and distributed through more than 600 centres Australia wide.

Due to this extensive national sales and service network, the company is able to continue a policy of supplying an extensive

range of technical electrical equipment, supported by substantial stocks and competent service on a national basis.

All branch offices and agents are connected to the on-line computer network centred in Melbourne. Experienced engineers are also available to assist customers, throughout Australia and to advise on all technical aspects and application requirements of equipment.

NHP are suppliers to the full spectrum of industry which uses industrial type electrical equipment, including mining and general industries, electrical contractors and government departments.

It is the continuing policy of the company to improve both the range and quality of products and services available for the Australian market. Experienced engineering and management personnel continually visit world centres to ensure that the organisation keeps pace with technological advances, research and development and modern marketing techniques.

Rockwell Automation

Sprecher+Schuh



Sprecher + Schuh administrative building at Aarau



Part of the low voltage factory at Aarau

Sprecher + Schuh has been one of the leading manufacturers of high quality electrical equipment in Europe for many years. The company was founded by Carl Sprecher in 1900 at Aarau, Switzerland, where the head office of the company is still situated.

Since its formation Sprecher + Schuh has developed into one of the leading low voltage motor control and switchgear companies in the world. It is now an important international company established in many countries within Europe, North and South America, South Africa, Asia and Australasia. The company has concentrated on developing and manufacturing a limited programme of products to a high degree of excellence backed by the world renowned Swiss engineering and precision standards.

In 1968 NHP was appointed the exclusive Australian agents for Sprecher + Schuh low voltage motor control gear products which were primarily manufactured at the head office of the company in Aarau, Switzerland.

Since 1966 when Sprecher + Schuh equipment was introduced into the Australian market it has received remarkable acceptance by Australian industry. This has largely been due to the technical superiority of the products produced to traditional exacting standards of precision

engineering. These high standards are the result of strict manufacturing controls and testing and by the use of the latest high quality materials available. This high quality has resulted in remarkable reliability ensuring long life and excellent performance.

Sprecher + Schuh invests more than ten per cent of its total turnover each year in research and development, which has resulted in such technically advanced products as the Sprecher + Schuh contactors, CSI relays, the remarkable and comprehensive range of thermal overload relays and state-of-the-art electronic motor protection devices.

The full range of Sprecher + Schuh equipment is freely available throughout Australia from the NHP organisation or NHP's agents and distributors.

The Ultimate in Motor Control

NHP



NHP Policy statement

NHP is a team of people, committed to the advancement of our business, and the business of our customers, in every respect.

We are a wholly Australian owned corporate citizen marketing a wide range of quality low-voltage industrial motor control, distribution switchgear and protection equipment.

We develop, manufacture and distribute a range of quality Australian made products.

NHP is dedicated to continually improving the quality of life of our customers, our suppliers and our staff through leadership, dedication, innovation and excellent service.



NHP's switchgear can be found in a variety of applications across Australia:

1. Switchboards for large industrial applications.
2. Sydney's mono-rail system.
3. Pump-starting of water systems in outback Australia.
4. Distribution-boards for Australian industry.
5. Refinery plants.
6. High rise city buildings controlling lighting, power and providing a safe environment.
7. Providing switchgear for the building industry to safely and cost-effectively complete construction.

**sprecher+
schuh**

Co-ordination with circuit breakers

KTA3 circuit breakers co-ordination



sprecher+
schuh

Short circuit co-ordination
the choice is yours



The NHP catalogue on motor starter co-ordination C-CO, provides information on Type-1 and Type-2 co-ordination. C-CO explains that it is usually assumed that provided a component of switchgear is chosen on the basis of its kW or current rating and according to its utilisation category, then all will be well.

However there is an increasing awareness that this is incorrect and that additional consideration is necessary, namely "How will the components work together under all possible situations."

This is where catalogue C-CO will guide you to choose the correct components, to suit the application.

KTA3-25

Starting from the planning phase, the correct co-ordination of short circuit and overload protection basically simplifies planning. As a multi-function device the KTA3-25 is moreover substantially simpler to use.

KTA3-100

Commencing at 25amps the new KTA3-100 motor curve circuit breakers provide high current limiting capabilities due to the fast opening of the contacts motor sizes between 15 and 37kW and at prospective short circuit current $I_q = 65kA$.

KA2

Modular Connection and Mounting System

The KA2 modular mounting system consists of a busbar support system and KA2 plug-on modules. The KA2 modules can accommodate both motor circuit breakers and contactors for construction of compact and co-ordinated starters.

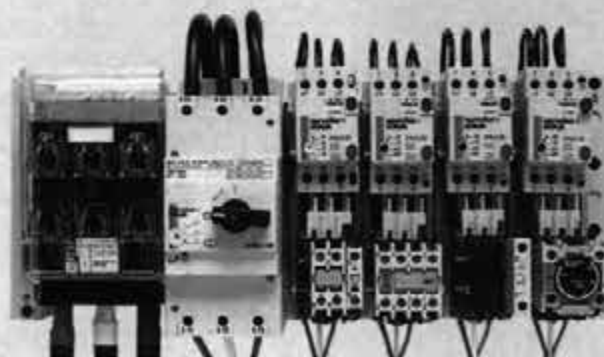
Using easy to assemble basic components the KA2 system gives a professional finish to customised motor control



KTA3-25

The KTA3-25 provides four functions in the one unit.

- Short circuit protection
- Thermal protection
- Switching
- Signalling



For motor starter Co-ordination ask for your free copy of catalogue C-CO.

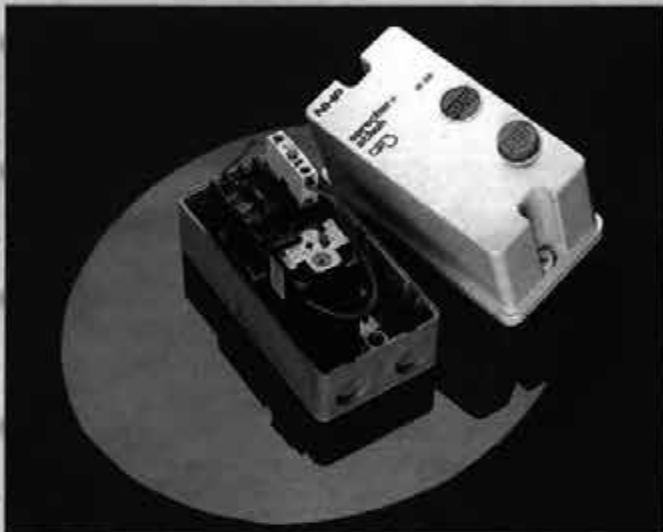
NHP**Contents**

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sprecher+schuh

CA 3 contactors and overloads

Australia's leading contactor range



Not only does the CA 3 range conform to IEC 947, but independent tests have confirmed this compliance!

The CA 3 range meets the latest international standard IEC 947. Independent testing verified by KEMA confirmed the quality of the CA 3 contactors which allowed new and improved ratings to be applied. In addition, the contactors are now verified for operation for up to 690 volts.

NHP technically trained engineers provide the necessary support for the Sprecher + Schuh range of products.

CA 3 contactors and overloads

The Sprecher + Schuh CA 3 range of contactors and overloads were introduced by NHP into the Australian market over 10 years ago.

During this time the CA 3 range of contactors and overloads has been established as Australia's leading brand of motor starters. This position has not been reached by accident but is the result of years of reliable service in all types of industries.

Technical support

Sprecher + Schuh products are well supported by NHP in all major centres. Technical back-up by trained engineers is always available to help with special application requirements. Assistance in the design aspects of motor starting control panels is also available.



Australian content

NHP is an all Australian company providing direct employment for over 400 people. A large percentage of the company's profits are reinvested in improving the products and services offered to the electrical industry.

The local manufacture of standard motor starters to suit local conditions has long been part of the operation in Melbourne while workshops in the various offices can manufacture special assemblies to customer specifications.

Locally produced coils

As well as winding contactor coils for special customer requirements the NHP coil winding facilities are kept busy producing coils for the whole contactor range. Both AC and DC coils are wound in the Melbourne factory.



▲ NHP's extensive coil winding factory.

New look for a proven contactor range

A number of improvements to the CA 3 range has occurred over the years to ensure that the range keeps pace with changing technology and international standards. New accessories such as PLC interface adaptors and new protection covers improve flexibility and enhance the safety aspects of the range.

Front cover

Over two million sold in Australia NHP has now sold over two million CA 3 contactors in Australia. This position has been achieved through NHP's marketing expertise, back-up support and constant consultation with Sprecher + Schuh to provide the most suitable contactor range for Australia and the world. NHP has backed up the CA 3 range by having large stocks available and Sprecher + Schuh has ensured reliable motor protection is available by consistent and accurate calibration of every CT 3 thermal overload relay.

NHP

Three frame sizes cover the most important motor ratings ¹⁾

Size 1

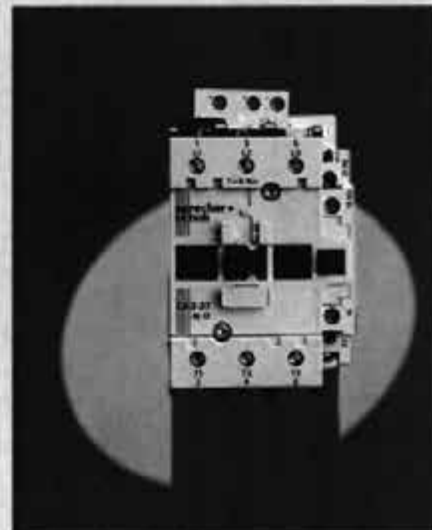
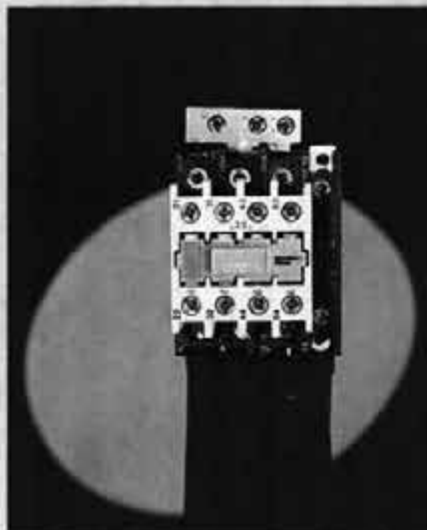
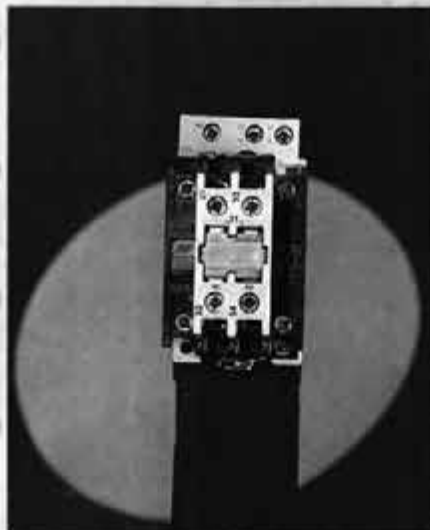
4kW - CA 3-9.
5.5kW - CA 3-12.
7.5kW - CA 3-16.

Size 2

11kW - CA 3-23.
15kW - CA 3-30.

Size 3

18.5kW / 22kW - CA 3-37N.
22kW - CA 3-43N.
30kW - CA 3-60N.
37kW - CA 3-72N.



Ideal starter

The ideal starter is easily assembled by simply combining the contactor and overload. This is the basic building block for industrial applications which can be further enhanced by the addition of a large range of accessories as detailed in the following pages.

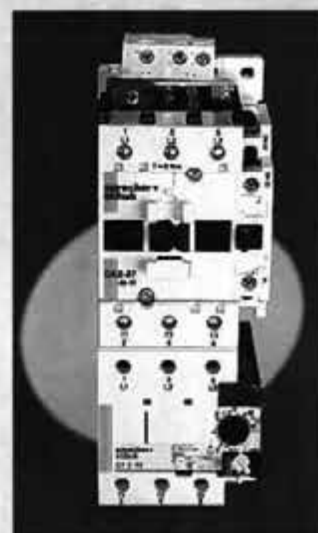
Accessories include:

- Mechanical interlocks.
- Clip-on one, two or four pole auxiliary contact blocks.
- PLC interface adaptors.
- Coil suppressors.
- Mechanical latches.
- Remote electrical reset magnets for thermal overloads.
- On delay / off delay timing heads.

Importance of quality

Sprecher + Schuh has always placed a great deal of importance in the quality of their thermal overload range. Each relay is individually calibrated to ensure consistent motor protection quality.

Only two thermal overload frame sizes cover the entire CA 3 contactor range and it is always possible to fit lower current rated overloads onto the next size contactor. This feature allows larger contactors to be used where oversizing is required for heavy duty applications.



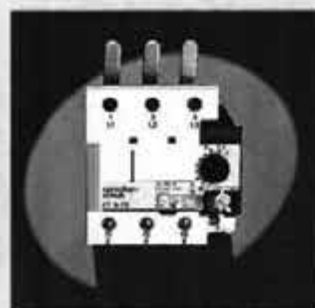
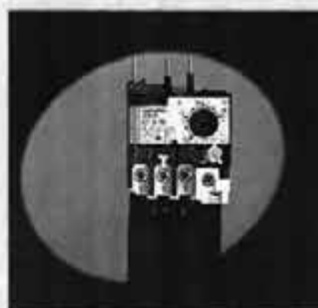
Compact starters complete the picture

The size three starter incorporates an overall cover giving protection against accidental contact with live parts.

For Size 1 + 2 contactors
CT 3-12 up to 12.5A.
CT 3-17 12 to 17.5A.
CT 3-23 16 to 23A.
CT 3-32 23 to 32A.

Note:

¹⁾ The kW ratings nominated are standard motor sizes, generally CA 3 ratings exceed these. Refer ratings chart pages 10 and 11.



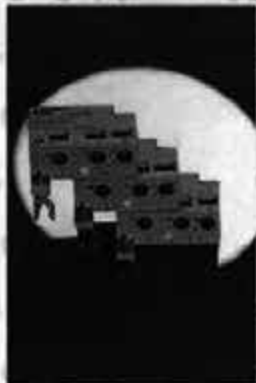
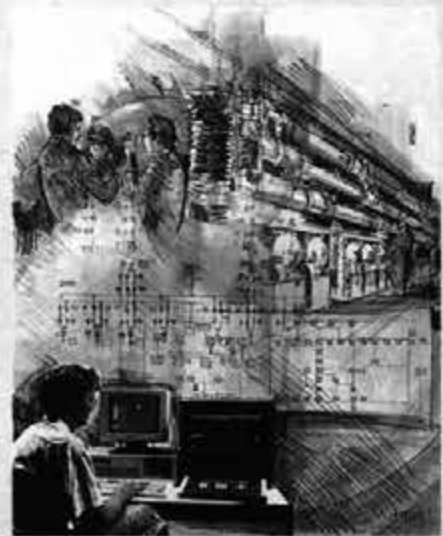
For Size 3 contactors
CT 3-42 25 to 32A.
CT 3-42a 32 to 42A.
CT 3-52 40 to 52A.
CT 3-63 52 to 63A.
CT 3-72 58 to 72A.

**sprecher+
schuh**

CA 3 contactors

A powerful contactor system with impressive advantages

○ *Sprecher + Schuh contactors are suitable for use in all industries and climates.*



PLC interface

The CRI 3 PLC interface module takes up no additional room at the top or side of the contactor. It operates from a 24V DC source to switch the control voltage of 110V AC or 240V AC to the coil circuit.

Rugged performance for Australian conditions

Time after time the Sprecher + Schuh CA 3 range has proved to be a reliable component in a wide range of Australian industries. They are used in all parts of Australia and the standard versions are resistant to climatic changes without special measures.

Many Sprecher + Schuh contactors are being used in tropical climates and provided they are installed in suitable enclosures and switchboards no special requirements need be specified.



High contact pressure and low bounce contacts allow the contactors to handle high motor starting currents without effecting performance.

Clip-on auxiliary contacts with electronic compatibility

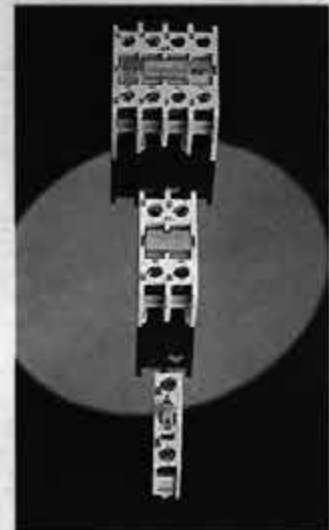
The silver auxiliary contacts of the CA 3 range are "cross stamped" providing a four way current path. This improves contact reliability with low currents. Tests have proved compliance with the DIN-19240 standard that specifies a rating of 5mA at 17 volts with a 10⁶ Mean Time Between Failures (MTBF).

The same auxiliary contact blocks are used with the whole CA 3 range therefore reducing spares inventory.

Open terminals save time

All contactors, overloads, auxiliary contacts and accessories are supplied with the terminals already open. This time saving feature speeds up assembly as the terminal screws need only be tightened.

◀ *Auxiliary contacts provide increased reliability for switching low currents and PLC signals.*



▲ *The same contact blocks are used with all the CA 3 contactors.*

Improved safety

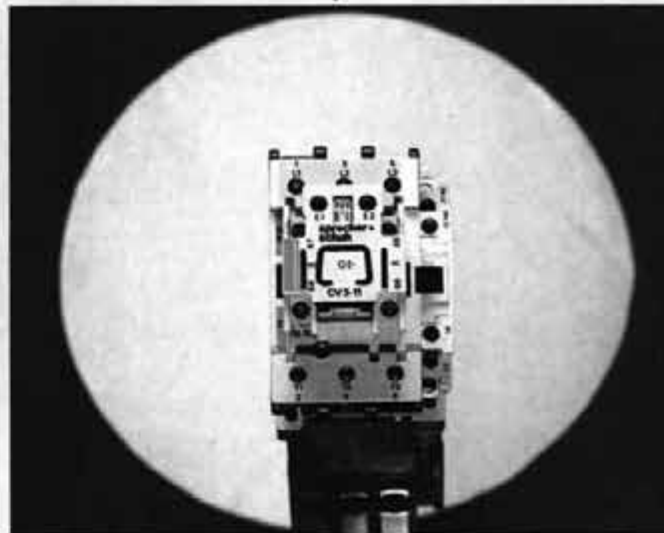
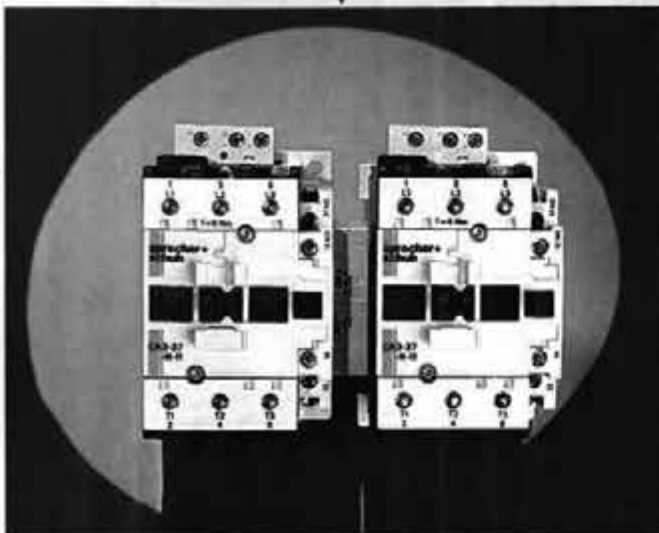
All main and auxiliary terminals for the contactors and accessories are designed to be safe against accidental contact. With the frame size three, this is achieved by the use of an overall protection cover between the contactor and overload.



Accessories provide more performance in less space

○ The CM 3 mechanical interlock requires minimal space.

○ One mechanical latch suits all CA 3 contactors.



Suppressors for contactor coils

For use in electronic environments the CA 3 coil suppressors minimise voltage spikes that could endanger sensitive electronic equipment.

No additional mounting space is required as they simply clip onto the contactor.

Mechanical interlocks require minimal space

The mechanical interlock type CM 3 fits neatly between the two contactors adding only 10mm to the width of the two contactors. The complete assembly is held together with the dovetail joints provided. This allows prewiring before the combination is mounted in the panel.

The same mechanical interlock is used for all CA 3 contactors which means that it is possible to interlock contactors of different frame sizes.

Timing heads extend applications

The simple addition of the Sprecher + Schuh CZE and CZA pneumatic timing heads allows both on and off delays to be added without additional panel area.

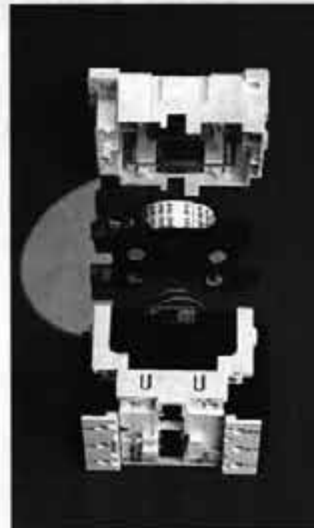
These are ideal for reduced voltage starter applications such as star delta or for process control applications.

One mechanical latch for all

The mechanical latch CV3 simply clips onto the top of any CA 3 contactor. The contactor is released by applying the required voltage to the latch coil.

Specially delayed contacts

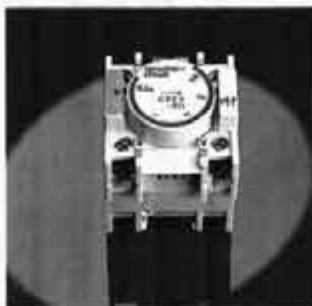
The CA 3-P-Z-01 and CA 3-P-Z-10 auxiliary contacts are designed to give a 40ms delay function. These unique elements are ideal for interlocking of reversing combinations or to solve special control circuit applications.



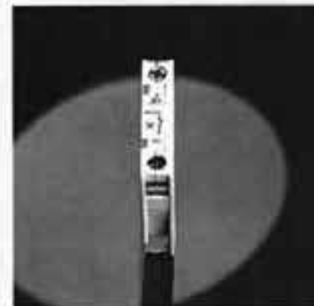
Easy coil change

Simple and rapid coil changes are possible without tools on the frame sizes one and two, while only two screws must be loosened on the frame size three.

CZE on-delay and CZA off-delay timers mount on top of the contactors.



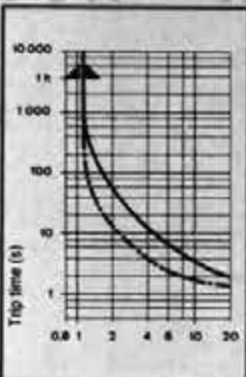
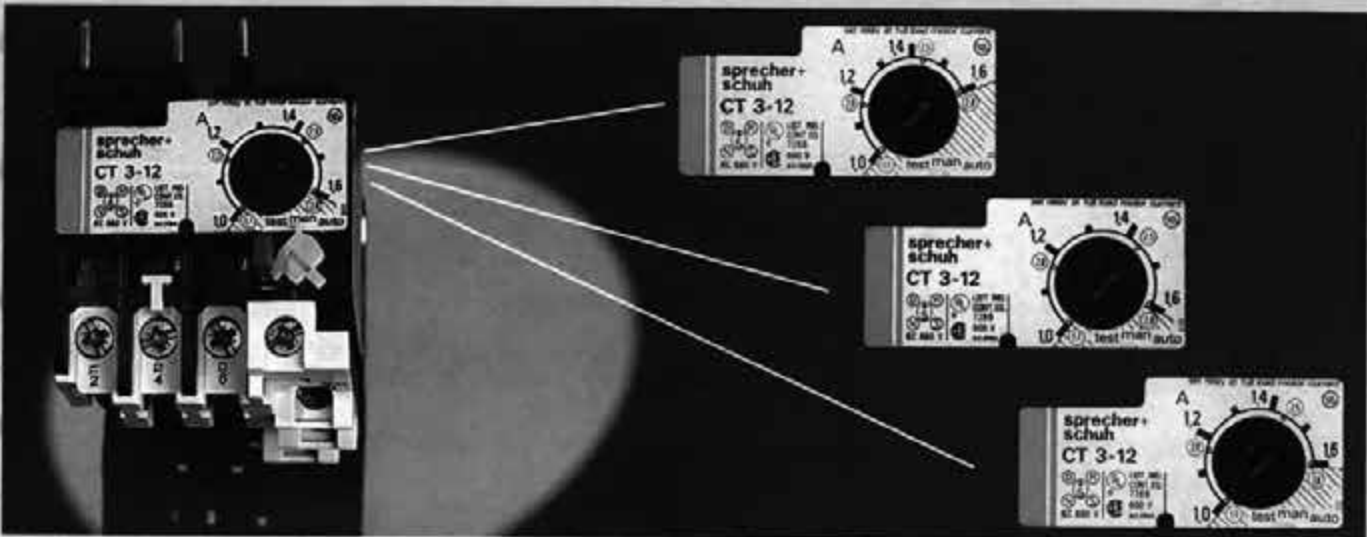
Unique delayed contacts.



sprecher+schuh

CT 3 thermal overloads

The difference is the calibration



Tripping class to IEC 947

The CT 3 overloads conform to the tripping class 10 and have been tested for use up to system voltages of 690

Individual calibration the key to reliable motor protection

Each thermal overload is calibrated to ensure that the scale lengths correspond to the accuracy required of the current setting dial. This is achieved by first preheating the overload five percent above its normal rating at the lower end of the scale. The current is then increased to 1.2 times its normal rating to check the tripping time. Tripping times outside the limits require an adjustment and then the calibration screw is sealed.

End scale calibration is checked by a similar system. The current is set at five percent above the upper setting for 30 minutes. If during this time the relay trips, the unit will be scrapped.

Dial-scale labelling is determined by increasing the current to 1.2 times its nominal rating. Depending on the trip time, one of three dial scales (labels) is selected. For a trip time of 0.1 to 1.5 minutes the long scale is used. A trip time of 1.6 to 6.5 minutes involves the normal scale. In this case no correction is required. For a trip time above 6.6 minutes adjustments are made until the relay trips.

The short scale is then used. When the current is switched off the relay should reset after a period of 10 minutes. Any relay not fulfilling the above criteria is automatically scrapped.

Dual scales for star delta applications

The large rotary dial allows easy setting of the current to the name plate full load current of the motor. In this case the bold figures on the dial are used.

In star delta starter applications only $1/\sqrt{3}$ of current flows through the thermal overload. It is then necessary to divide the motor full load current by 1.732 to arrive at the correct setting for the overload.

With the CT 3 thermal overloads this calculation is not necessary as long as the circled figures are used.

Ambient temperature compensation and differential tripping

The CT 3 overload relays include ambient temperature compensation as standard. The overload continuously adjusts to surrounding temperatures between -25°C to $+70^{\circ}\text{C}$. This is achieved by the use of an additional bi-metal strip that compensates for the changes in ambient temperatures.

A differential tripping mechanism ensures that under single phasing conditions the device will trip at 85% of the three phase tripping current. This ensures further protection for motors under loss of phase conditions.

Dual scale markings are standard on CT 3 thermal overloads.

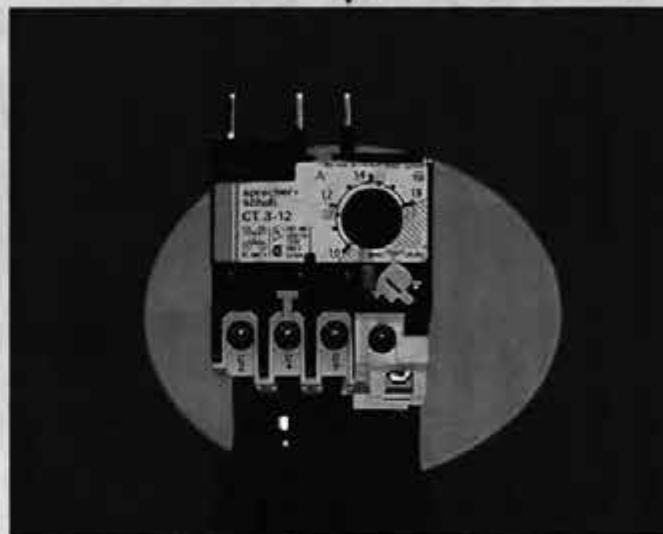


NHP**Accessories to suit the application**

○ Overload sizes up to the CT 3-72 are available for separate mounting.



○ CT 3 thermal overloads are designed for use with CA 3 contactors.

**Separate mounting overloads**

For overload sizes up to the CT 3-32 a separate mounting base is available as an attachment for the direct mounting of thermal overloads. This accessory enables the overload to be mounted separately on DIN rail alongside the contactor. Separate overload mounting is particularly useful where space does not permit normal mounting. Overload sizes up to the CT 3-72 are available for separate mounting.

Electric remote reset magnets

The CMR 3 remote reset magnet attachment can be used where it is necessary to reset the overload from a remote location.

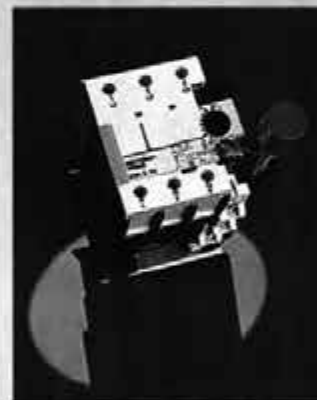
For example via a PLC, a pushbutton at the operators control panel, or some other location away from the switchboard.



Separate mounting bracket CT 3-1A.

Extension reset rods

For deep switchboards, extended reset rods can be fitted to the CT 3 overloads to enable reset by standard pushbutton operators.



CT 3 overloads can be fitted with reset rods for deep switchboards.

Thermal overload selection chart

CT 3 Cat. No. 1)	Frame size	Setting range amps	Approx. kW
CT 3-12	1 and 2	0.16 - 0.16	-
CT 3-12	1 and 2	0.15 - 0.24	-
CT 3-12	1 and 2	0.24 - 0.38	-
CT 3-12	1 and 2	0.38 - 0.62	0.15
CT 3-12	1 and 2	0.62 - 1.00	0.15 - 0.35
CT 3-12	1 and 2	1.00 - 1.60	0.35 - 0.60
CT 3-12	1 and 2	1.60 - 2.50	0.60 - 1.10
CT 3-12	1 and 2	2.50 - 4.00	1.10 - 1.70
CT 3-12	1 and 2	3.80 - 6.00	1.70 - 2.75
CT 3-12	1 and 2	6.00 - 9.50	2.75 - 4.50
CT 3-12	1 and 2	8.50 - 12.50	4.00 - 6.00
CT 3-17	1 and 2	12.00 - 17.50	6.00 - 8.00
CT 3-23	1 and 2	16.00 - 23.00	8.00 - 12.00
CT 3-32	1 and 2	23.00 - 32.00	12.00 - 17.00
CT 3-42	3	25.00 - 32.00	13.00 - 17.00
CT 3-42a	3	32.00 - 42.00	17.00 - 23.00
CT 3-52	3	40.00 - 52.00	22.00 - 28.00
CT 3-63	3	52.00 - 63.00	28.00 - 35.00
CT 3-72	3	58.00 - 72.50	32.00 - 40.00

Notes: 1) All CT 3 thermal overloads are available as separate mounting types (CTA 3).

CONTACTOR RATINGS CHART

Ratings

To: AS 3947
IEC 947
AS 1029
BS 5424
IEC 158
Tested to IEC 947

Cat. No.



CA 3-9

CA 3-12

CA 3-16

CA 3-23

CA 3-30

Rated voltage

CURRENT RATINGS AT OPERATIONAL VOLTAGE 415V *) 1000 VOLT RATINGS ()

40°C I _{th}	AC 1	Amps	25	25	25	45	45
	AC 1	Amps	16	16	16	30	30
60°C	AC 2, AC 3		9	12	16	23	30
	AC 4		8	11	14	21	28

MOTOR STARTER RATINGS AT OPERATIONAL VOLTAGE 415V. ALL kW RATINGS APPROXIMATE *)

AC 2, AC 3	Slip-ring motors and cage motors	kW@415V	4.5	6.1	8.4	12	16
		kW@1000V	-	-	-	-	-
AC 4 *)	Inching/plugging	kW@415V	4	5.5	7.5	11	15
Star delta *)	Line/delta	kW	8.2	11	15	22	29
	Star point Y		12.5	17.5	22	32	48
	Star point Δ		18.5	25	32	47	70
Auto transformer *) and liquid resistance *)	Line	kW	-	-	8.4	12	16
	Transformer		-	-	11	16	22
	Star point Y		-	15	16.5	27	37
	Star point Δ		-	23	30	45	60

CAPACITOR AND LAMP SWITCHING AT OPERATIONAL VOLTAGE 415V

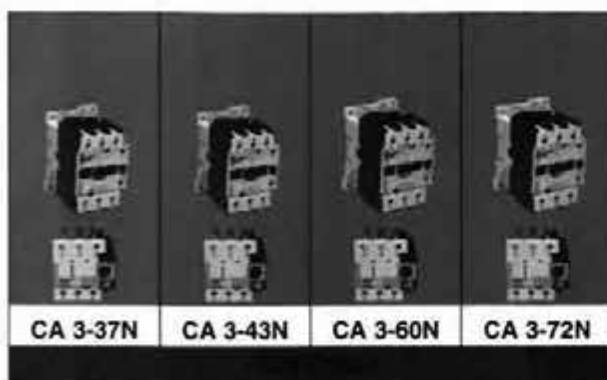
Single capacitors	40/60°C *)	KVAR	12.5/8	12.5/8	12.5/8	22.5/15	22.5/15
Variable capacitors	40/60°C *)	KVAR	5/5	7.5/7.5	7.5/7.5	15/15	15/15
Tungsten per phase	40°C	Amps	12	12	12	25	25
Fluorescent *) (compensated)	40/60°C		22.5/14.5	22.5/14.5	22.5/14.5	40/27	40/27
Maximum switching capacity *)		Amps	200	200	200	375	375

MECHANICAL, ELECTRICAL AND COIL DATA

Mechanical life		OPS	15 mill	15 mill	15 mill	10 mill	10 mill
Electrical life at AC 3, 415V		OPS	1.2 mill	1.2 mill	1.2 mill	1.2 mill	1.2 mill
Contactor operations (Max no load)		OPS/HR	6000	6000	6000	5000	5000
Switching delay	Make	mSEC	10-20	10-20	10-20	10-20	10-20
AC coil	Break		8-18	8-18	8-18	8-18	8-18
Coil data AC	Pick-up	VA	59	59	59	90	90
		W	46	46	46	65	65
	Hold	VA	7.2	7.2	7.2	8.6	8.8
		W	2.2	2.2	2.2	2.5	2.5
Coil data DC	Pick-up	W	7.4	7.4	7.4	150	160
	Hold		7.4	7.4	7.4	3.8	3.8
Auxiliary contacts	Available	Std/Max	1/5	1/5	1/5	1/6	1/6
Integral auxiliary	enclosed @ 60°C	Amps	16	16	16	16	16
Contact ratings	AC 15, 415V	Amps	4	4	4	4	4
Add-on auxiliary	@ 60°C	Amps	12	12	12	12	12
block ratings	AC 15, 415V	Amps	2.5	2.5	2.5	2.5	2.5

MOTOR PROTECTION SELECTION

For use with contactors listed above	Types *)						
Thermal overloads to AS 1023		CT 3K-12 CT 3-12 KT 3- *)	CT 3K-12 CT 3-12 KT 3- *)	CT 3K-17 CT 3-12 CT 3-17 KT 3- *)	CT 3-12 CT 3-17 CT 3-23 KT 3- *)	CT 3-12 CT 3-17 CT 3-23 CT 3-32	
Overload range available	Amps	0.1-12.5	0.1-12.5	0.1-17.5	0.1-23	0.1-32	



- Notes:**
- *) Star delta to AS 1202 part 2 class 0.3.
 - *) Auto-transformer to AS 1202 part 3 class 0.1 on load factor 60%. Ratings based on 80% tapping. Higher ratings for lower taps available.
 - *) CA 3-9/16 at PF 0.65 (415V). CA 3-23 and above at PF 0.35 (415V).
 - *) For liquid resistance starters use line and transformer contactor.
 - *) For 2 parallel paths 1.7 x Ie. For 3 parallel paths 2.5 x Ie.
 - *) CT 3 series 0.1 amps to 72 amps. CEF 1 series 0.5 amps to 180 amps.
 - *) All switching ratings are at 50/60Hz. May also be suitable for 400Hz.
 - *) For KT 3 MPCB selection refer separate brochure.
 - *) Based on reduced contact life.
 - *) Single 3 phase capacitors switched onto a network.
 - *) Parallel switched capacitors, min 8μH inductance between switched capacitors.

	63	63	90	90
	45	45	75	75
	38	45	60	72
	37	40	60	66

	22	25	34	41
	20	22	33	37
	38	44	55	67
	63	65	90	110
	90	95	132	160
	22	25	34	41
	33	37	55	67
	55	60	75	90
	85	90	125	150

	32/22	32/22	45/38	45/38
	22/22	22/22	40/38	40/38
	35	35	60	60
	57/40	57/40	81/67	81/67
	850	850	1000	1000

	10 mill	10 mill	10 mill	10 mill
	1 mill	1 mill	1 mill	1 mill
	4000	4000	3000	3000
	10-26	10-26	10-26	10-26
	6-14	6-14	6-14	6-14
	190	190	190	190
	103	103	103	103
	17	17	17	17
	5	5	5	5
	350	350	350	350
	5.5	5.5	5.5	5.5
	2/7	2/7	2/7	2/7
	16	16	16	16
	4	4	4	4
	12	12	12	12
	2.5	2.5	2.5	2.5

	CEF 1	CEF 1	CEF 1	CEF 1
	CT 3-42	CT 3-42	CT 3-42	CT 3-42
	CT 3-42a	CT 3-42a	CT 3-42a	CT 3-42a
	25-42	25-42	25-63	25-72.5

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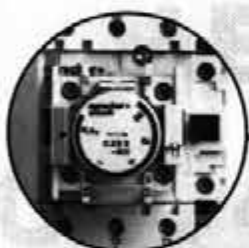
Contactor control with the CRI 3 PLC interface



CRC coil suppressor, conveniently mounted.



Shrouded terminals increase safety.



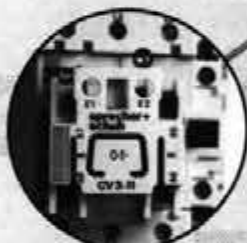
On and off delay pneumatic timer provided time delay operation.



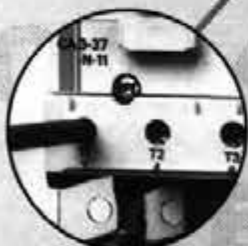
CA3 contactors are supplied with open terminal for convenience.



Auxiliary contactors provide increased reliability for low current switching.



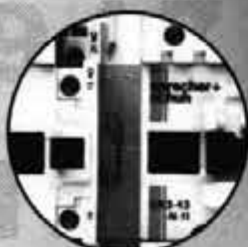
CV3 latch mounted on CA3 contactor



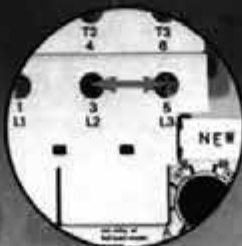
Allen screw terminals allows uniform tensioning.



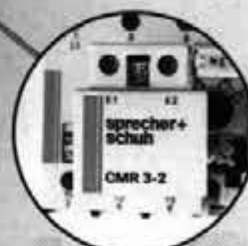
All CT3 thermal overloads are individually calibrated.



CM3 mechanical interlock requires minimal space.



Terminal shrouds on larger overload provide test holes for metering.



Electrical reset of overloads using the CMR-3 magnet reset.

NHP**Sub Index**

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**sprecher+
schuh**

CA5 and CA6 contactors extend the range to 700kW

The latest in switching technology up to 1000 volts

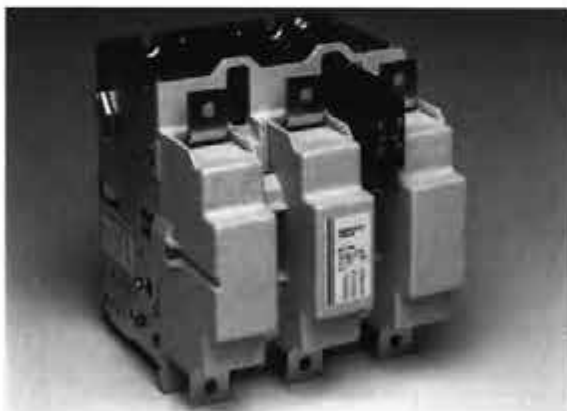
The CA3 series of contactors is the most popular range of contactors in Australia and provides 9 sizes up to 41kW. However an extension of this range has been made, which is the new Sprecher + Schuh CA5 and CA6 series of contactors.

The CA6 Sprecher + Schuh contactors offer the latest in switching technology of up to 1000 volts. The first four contactors to be released in the CA6 range are the CA6-85 to CA6-170, which cover both 415 and 1000 volt ratings and provide AC3 switching capacities for 1000 volt motors up to 90kW.

The development of the CA6 range has also now been extended to the CA6-420, the complete range now covers 1000 volts, AC3 ratings up to 200kW with 415 volt ratings up to 250kW. The special design features of these contactors include a unique Electronically Controlled Mechanism (ECM) which is a standard feature for the CA6-105 up to the CA6-420 range of contactors.



Rated to IEC 947



Contactor Catalogue No.	AC1 Amps 40°C	AC2/AC3 approx. kW @ 415V	AC2/AC3 approx kW @ 1000V
CA6-85-11	160	55	45
CA6-105-11	160	75	55
CA6-105-EI-11	160	75	55
CA6-140-EI-11	250	90	75
CA6-170-EI-11	250	100	90
CA6-210-EI-11	350	132	111
CA6-250-EI-11	350	150	133
CA6-300-EI-11	500	185	163
CA6-420-EI-11	500	250	206
CA5-370	500	190	185
CA5-450	600	255	280
CA5-550	760	315	355
CA5-700	900	400	500
CA5-860	1100	500	550
CA5-1000	1200	600	—
CA5-1200	1350	700	—

High current contactors CA5

The CA5-370...CA5-860 high current contactors combine high switching currents up to 1000 volts together with low coil consumption due to a specially designed coil and magnet system. These rugged and reliable contactors extend the 1000 volt switching capacities of Sprecher + Schuh contactors up to 550kW as well as being suitable for AC3 415 volt applications up to 500kW.

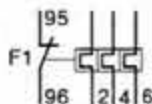
Ask for your free copy of the CA5 and CA6 catalogue for more details.



Thermal overload relays CT 3K, CT 3

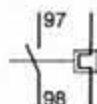
Thermal overload relay CT 3K for fitting onto contactor CA 3 with 1 N/C (95-96)

Type	Setting range for direct-on-line starting [A]	Setting range for star-delta contactor combinations [A]	For fitting onto contactor CA ...	Cat. No.	Weight [g] 1 off
CT 3K-12	0.1 ... 0.15	0.17 ... 0.26	3-9 ... 3-16	CT 3K-12 - 0.15	130
	0.15 ... 0.23	0.26 ... 0.40	3-9 ... 3-16	CT 3K-12 - 0.23	130
	0.23 ... 0.35	0.40 ... 0.61	3-9 ... 3-16	CT 3K-12 - 0.35	130
	0.35 ... 0.55	0.61 ... 0.95	3-9 ... 3-16	CT 3K-12 - 0.55	130
	0.55 ... 0.80	0.95 ... 1.40	3-9 ... 3-16	CT 3K-12 - 0.80	130
	0.80 ... 1.20	1.40 ... 2.10	3-9 ... 3-16	CT 3K-12 - 1.20	130
	1.20 ... 1.80	2.10 ... 3.10	3-9 ... 3-16	CT 3K-12 - 1.80	130
	1.80 ... 2.70	3.10 ... 4.70	3-9 ... 3-16	CT 3K-12 - 2.70	130
	2.70 ... 4	4.70 ... 6.90	3-9 ... 3-16	CT 3K-12 - 4	130
	4 ... 6	6.90 ... 10.40	3-9 ... 3-16	CT 3K-12 - 6	130
CT 3K-17	6 ... 9	10.40 ... 15.60	3-9 ... 3-16	CT 3K-12 - 9	130
	9 ... 12.50	15.60 ... 21.60	3-9 ... 3-16	CT 3K-12 - 12.50	130
	12.50 ... 17.50	21.60 ... 30.30	3-9 ... 3-16	CT 3K-17 - 17.50	130



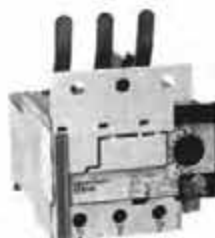
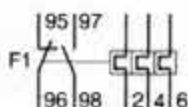
Auxiliary contact block CT 3K-P-10 fitted onto thermal overload relay CT 3K with 1 N/O 97-98 (signalling contact)

	Auxiliary contact block CT 3K-P-10	CT 3K-P-10	15
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Thermal overload relay CT 3 for fitting onto contactor CA 3 with electrically separated tripping and signalling contacts ¹⁾

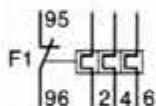
CT 3-12	0.1 ... 0.16	0.17 ... 0.28	3-9 ... 3-16	CT 3-12 - 0.16	155
	0.15 ... 0.24	0.26 ... 0.42	3-9 ... 3-16	CT 3-12 - 0.24	155
	0.24 ... 0.38	0.42 ... 0.66	3-9 ... 3-16	CT 3-12 - 0.38	155
	0.38 ... 0.62	0.66 ... 1.07	3-9 ... 3-16	CT 3-12 - 0.62	155
	0.62 ... 1	1.07 ... 1.7	3-9 ... 3-16	CT 3-12 - 1	155
	1 ... 1.6	1.7 ... 2.8	3-9 ... 3-16	CT 3-12 - 1.6	155
	1.6 ... 2.5	2.8 ... 4.3	3-9 ... 3-16	CT 3-12 - 2.5	155
	2.5 ... 4	4.3 ... 6.9	3-9 ... 3-16	CT 3-12 - 4	155
	3.8 ... 6	6.6 ... 10.4	3-9 ... 3-16	CT 3-12 - 6	155
	6 ... 9.5	10.4 ... 16.5	3-9 ... 3-16	CT 3-12 - 9.5	155
CT 3-17	8.5 ... 12.5	14.7 ... 21.7	3-9 ... 3-16	CT 3-12 - 12.5	155
	12 ... 17.5	20.8 ... 30.3	3-16 ... 3-30	CT 3-17 - 17.5	155
CT 3-23	16 ... 23	27.7 ... 39.8	3-23 and 3-30	CT 3-23 - 23	180
CT 3-32	23 ... 32	39.8 ... 55.5	3-30	CT 3-32 - 32	180
CT 3-42	25 ... 32	43.3 ... 55.5	3-37...3-72-N	CT 3-42 - 32	380
CT 3-42a	32 ... 42	55.5 ... 72.5	3-37...3-72-N	CT 3-42a - 42	380
CT 3-52	40 ... 52	70 ... 90	3-60-N	CT 3-52 - 52	380
CT 3-63	52 ... 63	90 ... 110	3-72-N	CT 3-63 - 63	380
CT 3-72	58 ... 72.5	100 ... 125	3-72-N	CT 3-72 - 72.5	380



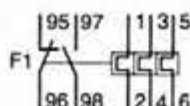
Notes: ¹⁾ Differential tripping mechanism.

**sprecher+
schuh****Thermal overload relays CTA 3K, CTA 3**Thermal overload relay CTA 3K with socket for separate mounting ¹⁾

	Type	Setting range for direct-on-line starting [A]	For star-delta contactor combinations [A]	Cat. No.	Weight [g] 1 off
(For separate mounting)	CTA 3K-12	0.1 ... 0.15	0.17 ... 0.26	CTA 3K-12 - 0.15	175
		0.15 ... 0.23	0.26 ... 0.40	CTA 3K-12 - 0.23	175
		0.23 ... 0.35	0.40 ... 0.61	CTA 3K-12 - 0.35	175
		0.35 ... 0.55	0.61 ... 0.95	CTA 3K-12 - 0.55	175
		0.55 ... 0.80	0.95 ... 1.40	CTA 3K-12 - 0.80	175
		0.80 ... 1.20	1.40 ... 2.10	CTA 3K-12 - 1.20	175
		1.20 ... 1.80	2.10 ... 3.10	CTA 3K-12 - 1.80	175
		1.80 ... 2.70	3.10 ... 4.70	CTA 3K-12 - 2.70	175
		2.70 ... 4	4.70 ... 6.90	CTA 3K-12 - 4	175
		4 ... 6	6.90 ... 10.40	CTA 3K-12 - 6	175
		6 ... 9	10.40 ... 15.60	CTA 3K-12 - 9	175
		9 ... 12.50	15.60 ... 21.60	CTA 3K-12 - 12.50	175
	CTA 3K-17	12.50 ... 17.50	21.60 ... 30.30	CTA 3K-17 - 17.50	175

Thermal overload relay CTA 3 with socket for separate mounting ²⁾

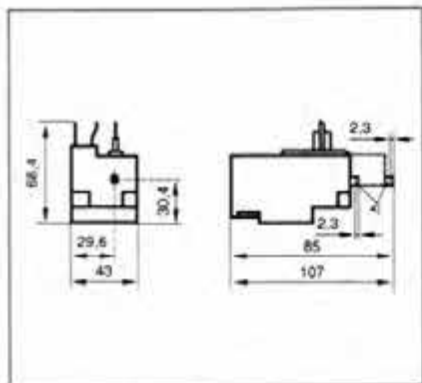
(For separate mounting)	CTA 3-12	0.1 ... 0.16	0.17 ... 0.28	CTA 3-12 - 0.16	200
		0.15 ... 0.24	0.26 ... 0.42	CTA 3-12 - 0.24	200
		0.24 ... 0.38	0.42 ... 0.66	CTA 3-12 - 0.38	200
		0.38 ... 0.62	0.66 ... 1.07	CTA 3-12 - 0.62	200
		0.62 ... 1	1.07 ... 1.7	CTA 3-12 - 1	200
		1 ... 1.6	1.7 ... 2.8	CTA 3-12 - 1.6	200
		1.6 ... 2.5	2.8 ... 4.3	CTA 3-12 - 2.5	200
		2.5 ... 4	4.3 ... 6.9	CTA 3-12 - 4	200
		3.8 ... 6	6.6 ... 10.4	CTA 3-12 - 6	200
		6 ... 9.5	10.4 ... 16.5	CTA 3-12 - 9.5	200
		8.5 ... 12.5	14.7 ... 21.7	CTA 3-12 - 12.5	200
	CTA 3-17	12 ... 17.50	20.8 ... 30.3	CTA 3-17 - 17.5	200
	CTA 3-23	16 ... 23	27.7 ... 39.8	CTA 3-23 - 23	240
	CTA 3-32	23 ... 32	39.8 ... 55.5	CTA 3-32 - 32	240
	CTA 3-42a	32 ... 42	55.5 ... 72.5	CTA 3-42a - 42	420
	CTA 3-52	42 ... 52	70 ... 90	CTA 3-52 - 52	420
	CTA 3-63	52 ... 63	90 ... 100	CTA 3-63 - 63	420
	CTA 3-72	58 ... 72.5	100 ... 125	CTA 3-72 - 72.5	420

**Notes:** ¹⁾ CT 3K has N/O contact only - refer CT 3K-P-10 for N/O contact.²⁾ Differential tripping mechanism.

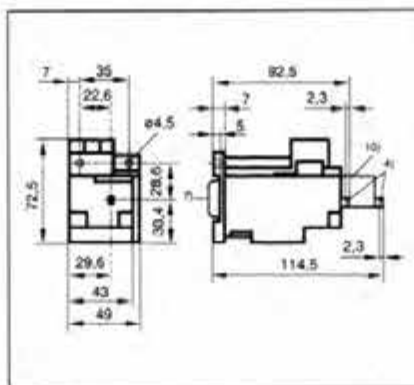


Dimensions (mm) - thermal overload relays CTA 3K, CTA 3

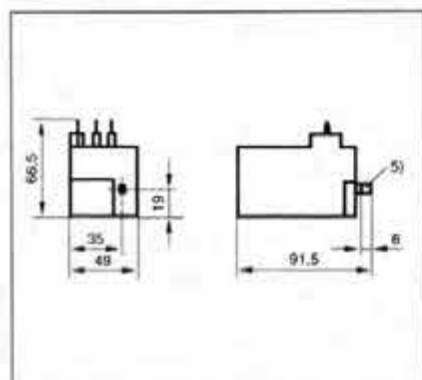
CT 3K-12 and CT 3K-17



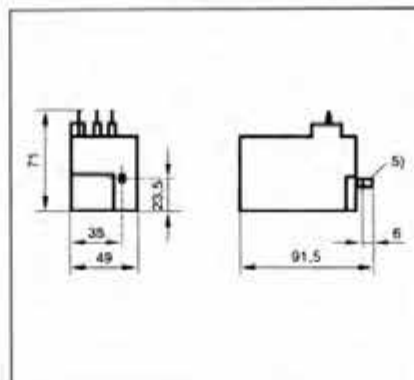
CTA 3K-12 and CTA 3K-17



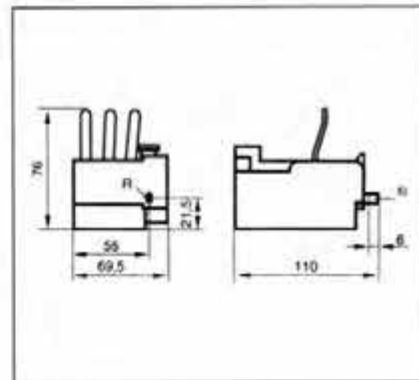
CT 3-12 and CT 3-17



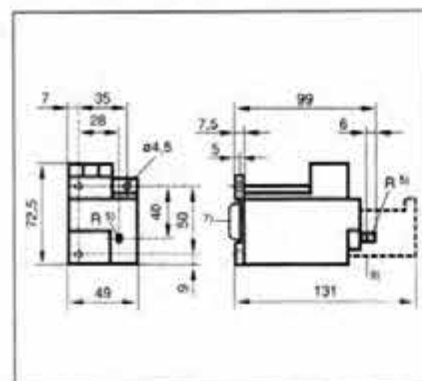
CT 3-23 and CT 3-32



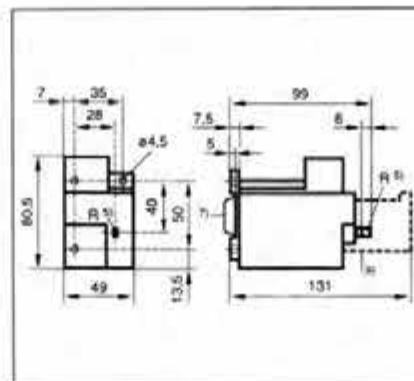
CT 3-42 ... CT 3-72



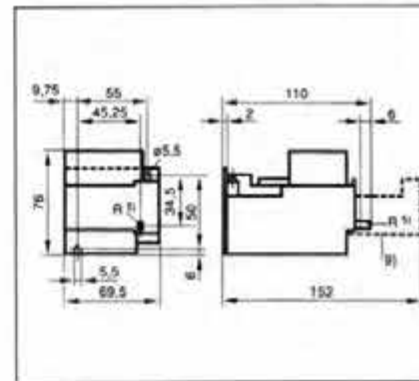
CTA 3-12 and CTA 3-17



CTA 3-23 and CTA 3-32



CTA 3-42 ... CTA 3-72



- Notes:**
- ¹⁾ CT 3K has N/O contact only - refer CT 3K-P-10 for N/O contact.
 - ²⁾ Differential tripping mechanism.
 - ³⁾ Reset pushbutton, 2.3mm travel = reset.
 - ⁴⁾ Reset buttons: 3.5mm away = reset, 6mm away = test.
 - ⁷⁾ Possibility of mounting CTA onto DIN 35mm rail.
 - ⁸⁾ With reset magnet CMR 3.
 - ¹⁰⁾ With auxiliary contact CT 3K-P-10.

**sprecher+
schuh****Contactors CA 3, Starters CA 3 + CT 3K****Contactor CA 3-9 ... CA 3-72-N** 3 main contacts auxiliary contact : 1 N/O

Thermal rated current I_m enclosed [A]	3 phase motors at 415V AC 3 [kW]	EN ref. no. contactor	Cat. No.	No. of aux. contacts	Thermal overload relay [A]	Weight [g] 1 off
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CA 3-9



Auxiliary contact: 1 N/O

16	4.5	10	CA 3-9-	... -10 ... V ...		310
16	6.1	10	CA 3-12-	... -10 ... V ...		310
16	8.4	10	CA 3-16-	... -10 ... V ...		315
30	12	10	CA 3-23-	... -10 ... V ...		440
30	16	10	CA 3-30-	... -10 ... V ...		440



CA 3-30

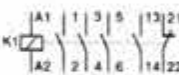


Auxiliary contact: 1 N/C

16	4.5	01	CA 3-9-	... -01 ... V ...		310
16	6.1	01	CA 3-12-	... -01 ... V ...		310
16	8.4	01	CA 3-16-	... -01 ... V ...		315
30	12	01	CA 3-23-	... -01 ... V ...		440
30	16	01	CA 3-30-	... -01 ... V ...		440



CA 3-72N

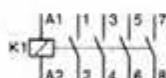


Auxiliary contact: 1 N/O + 1 N/C

45	22	11	CA 3-37-N-	... -11 ... V ...		990
45	25	11	CA 3-43-N-	... -11 ... V ...		990
75	34	11	CA 3-60-N-	... -11 ... V ...		1050
75	41	11	CA 3-72-N-	... -11 ... V ...		1050

Contactor CA 3-9-M, CA 3-16-M 4 main contacts

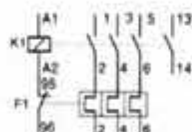
16	4.5		CA 3-9-M40	... V ...		310
16	8.4		CA 3-16-M40	... V ...		570

**Starter CA 3-9 + CT 3K ... CA 3-16 + CT 3K** contactor with thermal overload relay CT 3K 3 main contacts

Switching of 3 phase motors at 380/415V AC 3 [kW]	Thermal overload relay range [A]	EN ref. no. contactor	Cat. No.	No. of aux. contacts	Thermal overload relay [A]	Weight [g] 1 off
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CA 3-9 + CT 3K





0.02	0.1 ... 0.15	10	CA 3-9-	... -10 ... V ...	+ CT 3K/0.15	460
0.04	0.15 ... 0.23	10	CA 3-9-	... -10 ... V ...	+ CT 3K/0.23	460
0.06	0.23 ... 0.35	10	CA 3-9-	... -10 ... V ...	+ CT 3K/0.35	460
0.09 0.12	0.35 ... 0.55	10	CA 3-9-	... -10 ... V ...	+ CT 3K/0.55	460
0.18	0.55 ... 0.80	10	CA 3-9-	... -10 ... V ...	+ CT 3K/0.80	460
0.25 0.37	0.80 ... 1.2	10	CA 3-9-	... -10 ... V ...	+ CT 3K/1.2	460
0.55	1.2 ... 1.8	10	CA 3-9-	... -10 ... V ...	+ CT 3K/1.8	460
0.75	1.8 ... 2.7	10	CA 3-9-	... -10 ... V ...	+ CT 3K/2.7	460
1.1 1.5	2.7 ... 4	10	CA 3-9-	... -10 ... V ...	+ CT 3K/4	460
2.2	4 ... 6	10	CA 3-9-	... -10 ... V ...	+ CT 3K/6	460
3 4	6 ... 9	10	CA 3-9-	... -10 ... V ...	+ CT 3K/9	460
5.5	9 ... 12.5	10	CA 3-12-	... -10 ... V ...	+ CT 3K/12.5	460
7.5	12.5 ... 17.5	10	CA 3-16-	... -10 ... V ...	+ CT 3K/17.5	460










Starters CA 3+ CT 3, Auxiliary contact for CA 3

Starter CA 3-9 + CT 3 ... CA 3-72-N + CT 3 contactor with thermal overload relay fitted 3 main contacts

	Switching of 3 phase motors at 380/415V AC 3 [kW]	Thermal overload relay range [A]	EN ref. no. contactor	Cat. No.	No. of aux. contacts	Thermal overload relay [A]	Weight
							[g] 1 off
 CA 3-9 + CT 3	0.02	0.1 ... 0.16	10	CA 3-9-	... -10 ... V ... + CT 3/0.16	460	
	0.04	0.16 ... 0.24	10	CA 3-9-	... -10 ... V ... + CT 3/0.24	460	
	0.06	0.24 ... 0.38	10	CA 3-9-	... -10 ... V ... + CT 3/0.38	460	
	0.09 0.12	0.38 ... 0.62	10	CA 3-9-	... -10 ... V ... + CT 3/0.62	460	
	0.18 0.25	0.62 ... 1	10	CA 3-9-	... -10 ... V ... + CT 3/1	460	
	0.37 0.55	1 ... 1.6	10	CA 3-9-	... -10 ... V ... + CT 3/1.6	460	
	0.75	1.6 ... 2.5	10	CA 3-9-	... -10 ... V ... + CT 3/2.5	460	
	1.1 1.5	2.5 ... 4	10	CA 3-9-	... -10 ... V ... + CT 3/4	460	
	2.2	3.8 ... 6	10	CA 3-9-	... -10 ... V ... + CT 3/6	460	
	3 4	6 ... 9.5	10	CA 3-9-	... -10 ... V ... + CT 3/9.5	460	
 CA 3-60 + CT 3-63	5.5	8.5 ... 12.5	10	CA 3-12-	... -10 ... V ... + CT 3/12.5	460	
	7.5	12 ... 17.5	10	CA 3-16-	... -10 ... V ... + CT 3/17.5	490	
	11	16 ... 23	10	CA 3-23-	... -10 ... V ... + CT 3/23	620	
	15	23 ... 32	10	CA 3-30-	... -10 ... V ... + CT 3/32	620	
	18.5	32 ... 32	11	CA 3-37-N	... -11 ... V ... + CT 3/42	1390	
	22	32 ... 42	11	CA 3-43-N	... -11 ... V ... + CT 3/42	1390	
	26	40 ... 52	11	CA 3-60-N	... -11 ... V ... + CT 3/54	1450	
	30	52 ... 63	11	CA 3-60-N	... -11 ... V ... + CT 3/63	1450	
	33 37	58 ... 72.5	11	CA 3-72-N	... -11 ... V ... + CT 3/72	1450	

Auxiliary contact block for contactors CA 3¹⁾

	Description	Cat. No.	Weight [g]
 CA 3-P-01	Auxiliary contact block 01 1 N/C	CA 3-P-01	20
	Auxiliary contact block H10 also as a start button 1 N/O	CA 3-P-H10	20
 CA 3-P-Z01	40mS delayed contact 01 1 N/C	CA 3-P-Z01	25
	40mS delayed contact 10 1 N/O	CA 3-P-Z10	25
 CA 3-P-L01	Late break auxiliary 01 contact block 1 N/C	CA 3-P-L01	20
	Auxiliary contact block 01 1 N/C	CA 3-P-S01	20
 CA 3-P-S01	Auxiliary contact block 10 1 N/O	CA 3-P-S10	20
	Auxiliary contact block 02 2 N/C	CA 3-P-02	30
 CA 3-P-11	Auxiliary contact block 11 1 N/O + 1 N/C	CA 3-P-11	30
	Auxiliary contact block 11 1 N/O + 1 N/C	CA 3-P-S11	30
 CA 3-P-22	Auxiliary contact block 22 2 N/O + 2 N/C	CA 3-P-22	50
	Auxiliary contact block 31 3 N/O + 1 N/C	CA 3-P-31	50
 CA 3-P-S22	Auxiliary contact block 22 2 N/O + 2 N/C	CA 3-P-S22	50
	Auxiliary contact block 31 3 N/O + 1 N/C	CA 3-P-S31	50

Notes: ¹⁾ 1 pole and 2 pole auxiliary contact blocks can be fitted on together.
²⁾ 1 pole and 4 pole auxiliary contact blocks or 1 pole and timing element with CA 3-23 ... CA 3-72-N can be fitted on together.
³⁾ Forcibly actuated N/O and N/C contacts with respect to each other.

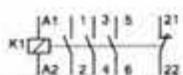
**sprecher+
schuh****DC controlled contactors****Contactors CA 3-9C ... CA 3-16C** complete with DC control

Thermal current [A]	3 phase motors [kW] 380/415V	EN ref. no. contactor	Auxiliary contact contactor	Weight [g] 1 off
		Cat. No.	Control voltage	



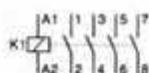
Auxiliary contact: 1 N/O

16	4.5	10	CA 3-9C- ... -10 ... V DC	570
16	6.1	10	CA 3-12C- ... -10 ... V DC	570
16	8.4	10	CA 3-16C- ... -10 ... V DC	570



Auxiliary contact: 1 N/C

16	4.5	10	CA 3-9C- ... -01 ... V DC	570
16	6.1	10	CA 3-12C- ... -01 ... V DC	570

Contactors CA 3-9C-M, CA 3-16C-M complete with DC control 4 main contacts

16	4.5	CA 3-9C-M40	V DC	310
16	6.1	CA 3-16C-M40	V DC	570

Contactors CA 3-23C ... CA 3-30NC complete with DC control

30	12	CA 3-23C	-10 ... V DC	460
30	16	CA 3-30C	-10 ... V DC	460
30	12	CA 3-23C	-L01 ... V DC	460
30	16	CA 3-30C	-L01 ... V DC	460

Contactors CA 3-37NC ... CA 3-72NC complete with DC control

45	22	CA 3-37NC	-L11 ... V DC	1010
45	25	CA 3-43NC	-L11 ... V DC	1010
75	34	CA 3-60NC	-L11 ... V DC	1070
75	41	CA 3-72NC	-L11 ... V DC	1070

Direct current control

With direct current control, there is a basic difference between

- actual direct current magnets and
- modified alternating current magnets.
- Actual direct current magnets are symbolised by their high permissible frequency of operation and long life. They are thus specially suited for control relay functions.
- Actual direct current magnet systems are available for smaller types (CS 3C, CA 3-9C ... CA 3-16C).

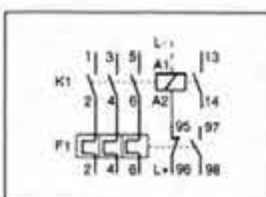
These have the same base area and fixing dimensions as their alternating current counterparts.

- The holding current must be reduced when an AC magnet is controlled by DC, a situation which is realised with an economy resistor or a specially tapped coil having a low ohmic pull-in and a high ohmic holding winding. A late break contact is needed in both cases to switch from the high pull-in to the low holding current consumption.

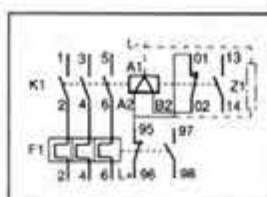
Direct current coils having pull-in and holding windings are available for the CA 3-23 ... CA 3-72-N contactors.

Space requirements and fixings are the same as for AC control.

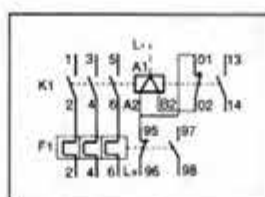
- Immediately after energisation, the contactor coil of latched contactors is disconnected from the supply by contact (65-66) on the latch. There is thus no holding current. The latch can be used with all alternating current contactor types (alternating current coil).



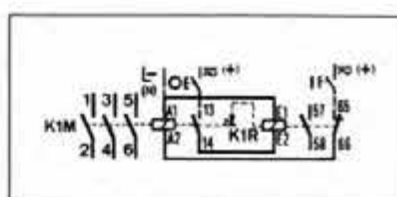
DC control
CA 3-9C + CT 3 ...
CA 3-16C + CT 3.



DC control
CA 3-23 + CT 3 ...
CA 3-30 + CT 3
ZI = voltage limiting element.



DC control
CA 3-37-N + CT 3 ...
CA 3-72-N + CT 3
Voltage limiting element built in.

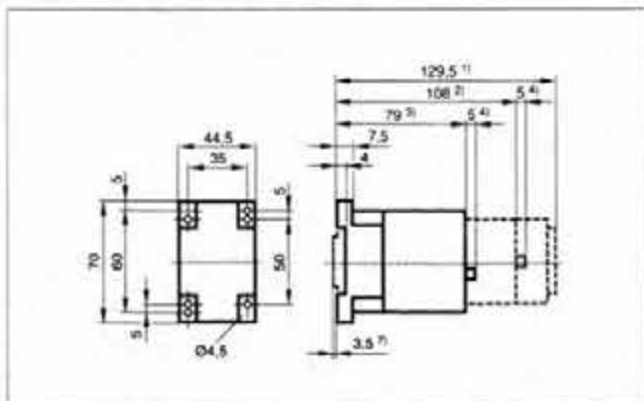


With CV 3 latch
CS 3 + CV 3
CA 3-9 + CV 3 ...
CA 3-72-N + CV 3

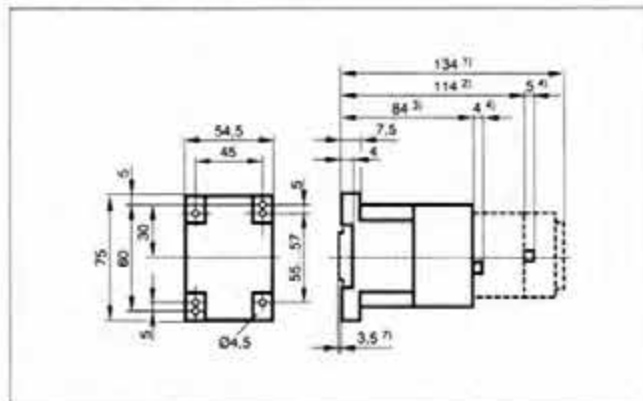


Contactors and open starters dimensions (mm)

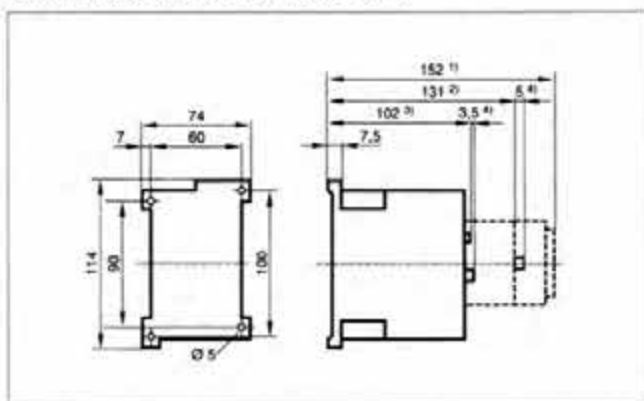
Contactors CA 3-9 ... CA 3-16



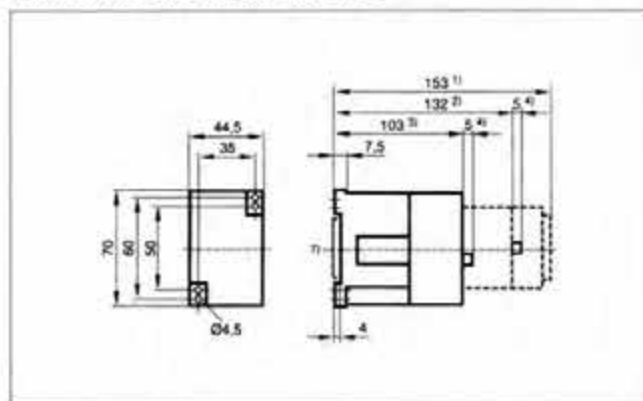
Contactors CA 3-23 / CA 3-30



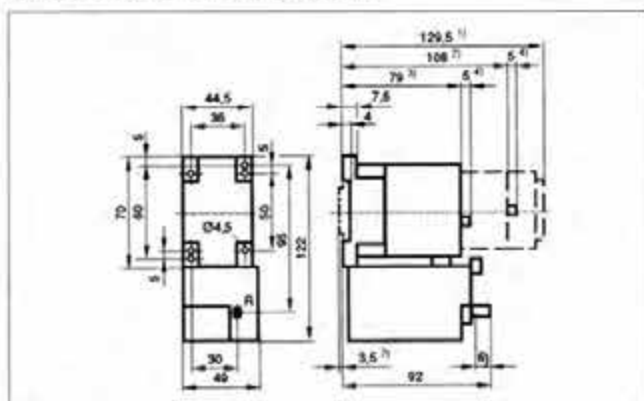
Contactors CA 3-37-N ... CA 3-72-N



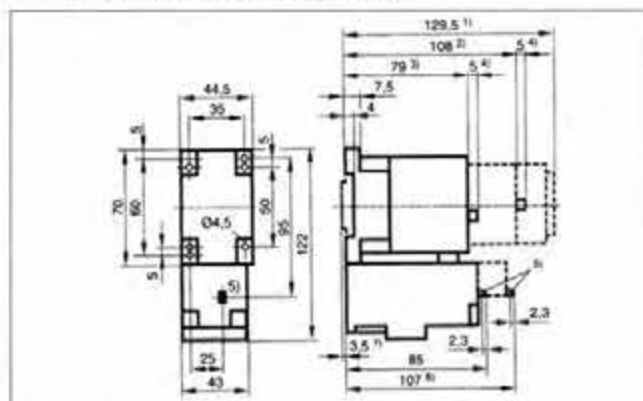
Contactors CA 3-9C ... CA 3-16C



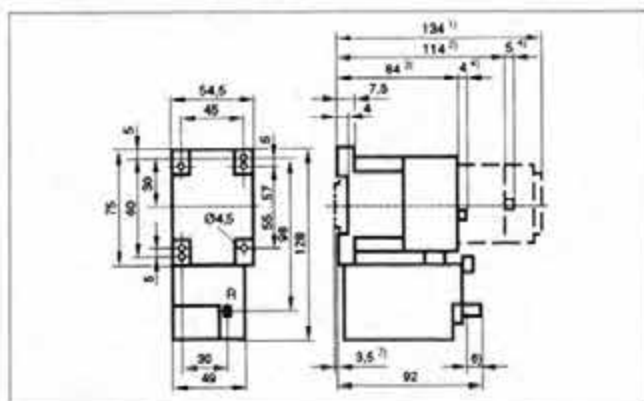
CA 3-9 + CT 3 ... CA 3-16 + CT 3



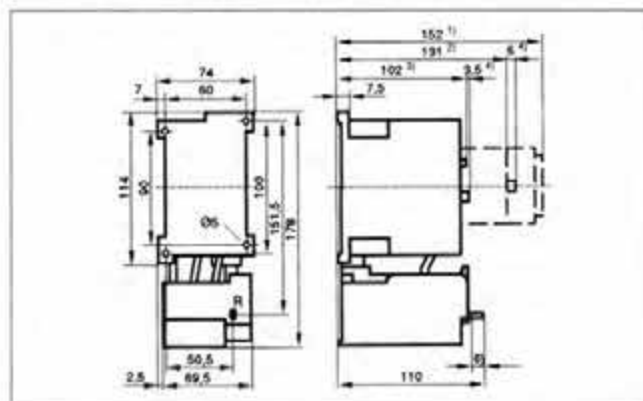
CA 3-9 + CT 3K ... CA 3-16 + CT 3K



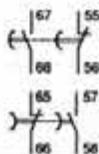
CA 3-23 + CT 3, CA 3-30 + CT 3



CA 3-37-N + CT 3, CA 3-72-N + CT 3



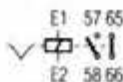
- Notes:**
- ¹⁾ With timing block CZ 3 or latch CV 3 or with briefly delayed auxiliary switch block.
 - ²⁾ With auxiliary switch block.
 - ³⁾ Basic unit without components.
 - ⁴⁾ With label supports.
 - ⁵⁾ Reset button 2.3mm travel = reset.
 - ⁶⁾ Reset button 3.5mm travel = reset; 6mm travel = test.
 - ⁷⁾ Suitable for fixing to DIN rail EN 50 022-35.
 - ⁸⁾ With auxiliary switch block CT 3K-P-10.

sprecher+schuh**Accessories for CA 3 contactors****Clip-on timing element CZ 3** (suits all CA 3 contactors)

Description	Setting range	Cat. No.	Weight [g]
Delay on pick-up CZE 3	0.3 ... 30s	CZE 3-R11-30S	70
pneumatic type	1.8 ... 180s	CZE 3-R11-180S	70
Delay on drop-out CZA 3	0.3 ... 30s	CZA 3-R11-30S	70
pneumatic type	1.8 ... 180s	CZA 3-R11-180S	70

In-line delayed pick-up timer

Electronic type	0.1 ... 3s	CRZE 4-3S	42
110 ... 240V	1 ... 30s	CRZE 4-30S	42

Mechanical latch CV 3

Clips onto all CA 3 contactors	CV 3-11 ... V¹⁾	125
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Interface module CRI 3

Clips onto coil of all CA 3 contactors	CRI 3	20
Input voltage DC	18 ... 30V	
Output voltage AC	110 ... 250V	

Coil suppressor elements

Clips onto coil of all CA 3

RC elements

AC 24 ... 48V 50/60Hz	CRC 3-48	20
AC 110 ... 280V 50/60Hz	CRC 3-280	20
AC 380 ... 480V 50/60Hz	CRC 3-480	20

Diode elements

DC 12 ... 250V	CRD-250	20
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New varistor elements can be used on AC and DC circuits

Varistor elements

AC 12 ... 55V	/ DC 12 ... 77V	CRV 3-55	20
AC 56 ... 136V	/ DC 78 ... 180V	CRV 3-136	20
AC 137 ... 277V	/ DC 181 ... 350V	CRV 3-277	20
AC 278 ... 575V	/ -	CRV 3-575	20

Mechanical interlock CM 3

Interlocks contactors of any CA 3 size	CM 3	20
--	-------------	----

Dovetail joint DJ 3

For joining CA 3 contactor assemblies	DJ 3	2
---------------------------------------	-------------	---

Note: ¹⁾ Standard control voltages, 12, 24, 32, 48, 60, 110, 240, 415, 440 AC/DC.



Accessories for CA 3 contactors and thermal overloads

Description	Cat. No.	Weight [g]
-------------	----------	------------

Main terminal CA 3-P-K

For increasing allowable cable size on CA 3 contactors

For CA 3-9 ... CA 3-16	10mm	CA 3-P-K10	7
For CA 3-23 ... CA 3-30	25mm	CA 3-P-K25	17

3 pole bridging link

For AC 1 applications (resistive)

3 poles in parallel = 2.5 x AC 1 single pole rating

For CA 3-12/16		CB 3-A	15
For CA 3-23/30		CB 3-B	24

Neutral terminals

For CA 3 contactors	10mm	CA-P-N10	20
Dovetail to side	16mm	CA-P-N16	28

Tag carrier TGC 4

Uses terminal markers to identify contactors and overloads	TGC 4	-
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Connection and reversing links IP 20 ¹⁾

Link for CA 3-9 ... 16 to KTA 3	max 16 amps	KCD 3-16	16
Link for CA 3-23 ... 30 to KTA 3	max 25 amps	KCD 3-30	19
Reversing link set for CA 3-9 ... 16	max 16 amps	KCR 3-16	41
Reversing link set for CA 3-23 ... 30	max 25 amps	KCR 3-30	66
Star delta link set for CA 3-9 ... 16	max 16 amps	KCSD 3-16	48
Star delta link set for CA 3-23 ... 30	max 25 amps	KCSD 3-30	66

Separate mounting base

For CT 3 (K) overloads DIN rail mountable

For CT 3-12/17K	CT 3-17-P-A	45
For CT 3-23/32	CT 3-32-P-A	60

Extension reset rods

For fitting on thermal overloads (can be cut to length)

For CT 3-12 ... 32	300mm long	CT 3-32-R300	20
	500mm long	CT 3-32-R500	30
For CT 3-42 ... 72	300mm long	CT 3-72-R300	20
	500mm long	CT 3-72-R500	30

Remote reset magnet CMR

For CT 3 thermal overloads

For CT 3-12 ... 32	CMR 3-1 ... V ²⁾	78
For CT 3-42 ... 72	CMR 3-2 ... V ²⁾	78

Spare coils

Refer technical data for voltages available

AC for CA 3-9 ... 16	CAC 3-16 ... V AC	60
AC for CA 3-23 / 30	CAC 3-30 ... V AC	65
AC for CA 3-37 ... 72	CAC 3-72 ... V AC	120
DC for CA 3-9C ... 16C	CAC 3-16 ... V DC	200
DC for CA 3-23 / 30	CAC 3-30 ... V DC	66
DC for CA 3-37 ... 72	CAC 3-72 ... V DC	110

Notes: ¹⁾ Voltage rating = 690V AC. Isolation U_{iso} = 8kV.

²⁾ Standard voltages 12, 24, 32, 48, 60, 110, 240, 415, 440V AC/DC.



CA 3-P-K10



CB 3



CA-P-N10



TGC 4



KCD 3



CT 3-17-P-A



CT 3-32-R300



CMR 3



CAC 3-16 coil

sprecher+schuh**Reliable operation**

- In any desired position.
- Operationally reliable under vibration and shock conditions, suitable for use in vehicles and ships.
- Unaffected by climate, encapsulated standard design under tropical conditions.
- Unaffected by pollution, suitably encapsulated.
- On and off switching operation in one movement (tumbler charac).
- High in-rush current permissible due to bounce-free contact system and high contact pressure.
- High permissible operating frequency.

**Coil control voltages for contactors****Standard voltages**

AC 24, 32, 110, 240, 415, 440 50Hz.

DC 12, 24, 48, 110, 220, 240.

Special voltages

AC ranges from 12 ... 550 volts

40 ... 60Hz wound to order.

DC ranges from 12 ... 250 volts wound to order.

Contactors - General technical information**Rated insulation voltage**

IEC, AS, BS, ASE, VDE 0660

UL, NEMA, CSA, EEMAC

Test voltage 1 minute**Operating frequency load****Operational voltage range**

Pick up voltage CA 3-9 ... CA 3-30 x Us

Pick up voltage CA 3-37 ... CA 3-72 x Us

Drop out voltage CA 3-9 ... CA 3-16 x Us

Drop out voltage CA 3-23 ... CA 3-72 x Us

Ambient temperature

Storage transport

Operation AC 1 encapsulated AC 2 ... AC 4

with rated operating current

with 85% rated operating current

AC 1 open

Resistant to climatic conditions

Damp heat

40°C / 95% relative humidity

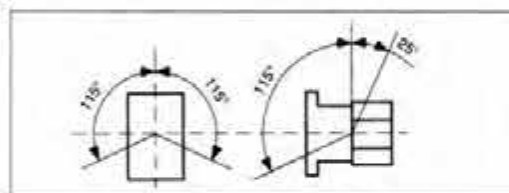
Changing climatic conditions

23°C, 83% / 40°C, 93%

Mounting positions:

As required within the given angle without limitation.

(Full pull-up voltage - and ambient temperature range, any auxiliary contact blocks, timing element and latch).



CA 3-9...CA 3-72-N

Worldwide usage

As far as possible, and as they are compatible, various national and international specifications have been taken into consideration. The standard versions also fulfil the stringent North American requirements (with the same or slightly reduced performance characteristics, see pages 8 ... 12). Worldwide usage is made possible by compliance with the following specifications.

IEC 947, IEC 158-1, 292-1, 292-2

AS 3947

AS 1023, 1029, 1202

BS 4941, 5424

CEI 17-3, 17-7, 17-8

VDE 0660

UTE NFC 63 110

SEV 1025

Australia

Great Britain

Italy

Germany

France

Switzerland

Approvals

SEV

Switzerland



CSA

Canada



UL listed

USA



UL recognised

USA

Electrical
inspectorate
Finland

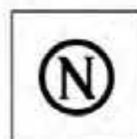
CEBEC

Belgium



DEMKO

Denmark



NEMKO

Norway



SEMKO

Sweden

Germanischer
Lloyd
FRGLloyd's Reg.
of Shipping
UKRINA
ItalyBureau
Veritas
France

USSR Reg.

For contactors, thermal overload relays and starters, the necessary approval has been obtained from those countries with comprehensive test, partial test and compulsory labelling, CSA and UL listed.

Most devices have been approved for use on ships by Bureau Veritas, Lloyds of Germany and Registro Italiano Navale (nominal values in accordance with IEC); USA Marine and Lloyds Register of Shipping (nominal values as per CSA) and UL Marine (nominal values as per UL).



Technical information - termination - auxiliary contact ratings - accessory ratings

Termination of cables (max. sizes)

Contactors	Main poles	Auxiliary contacts	Coil terminals
CA 3-9 ... CA 3-16	2 x 4mm ²	2 x 4mm ²	2 x 4mm ²
CA 3-23 ... CA 3-30	1 x 10 + 1 x 6mm ²	2 x 4mm ²	2 x 4mm ²
CA 3-37N ... CA 3-72N	1 x 50 + 1 x 10mm ²	2 x 4mm ²	2 x 4mm ²
Thermal overloads	Input (CTA)	Output	Control terminals
CT 3K-12/17, CT 3-12/17	1 x 6mm ²	2 x 4mm ²	2 x 2.5mm ²
CT 3-23/32	1 x 10mm ²	2 x 10mm ²	2 x 2.5mm ²
CT 3-42 ... CT 3-72	1 x 50mm ² + 1 x 10mm ²	1 x 50mm ² + 1 x 10mm ²	2 x 2.5mm ²

Auxiliary contact ratings (contactors)

IEC load capacity		Within contactors CA 3-9 ... CA 3-72-N						Auxiliary contact blocks for contactors CA 3-9 ... CA 3-72-N						
Switching AC		220		380		660		220		380		660		
Operating voltage AC		[V]	230	240	400	415	500	690	230	240	400	415	500	690
AC 1 I _{th}	@ 40°C	[A]	20	20	20	20	20	20	16	16	16	16	16	16
	@ 60°C	[A]	16	16	16	16	16	16	12	12	12	12	12	12
AC 15 (AC 11)		[A]	12	10	5	4	2.5	1.5	5.5	5	3	2.5	1.6	1
Switching DC														
Operating voltage DC		[V]	24	48	110	220	440		24	48	110	220	440	
L/R < 1ms control of resistive load		[A]	16	9	3.5	0.55	0.2		12	9	3.5	0.55	0.2	
L/R < 15ms control of inductive load with economy resistor in series		[A]	9	5	2	0.4	0.16		9	5	2	0.4	0.16	
DC 15 control of electromagnets		[A]	5	2	0.7	0.25	0.12		12	2	0.7	0.25	0.12	
Back-up fuse														
CA 3-9 ... CA 3-16		[A]	20		16				10					
CA 3-23 ... CA 3-72		[A]	25						10					
Electronic compatibility		To DIN 19240 min 17 volts @ 5mA MT BF = 10 ⁴ cycles												

Auxiliary contact ratings for timing elements, latches and thermal overload relays

Switching AC	[V]	48	110	220	240	380	415	440	500	600	I _{th}
CZE/A and CV 3 AC 15	[A]	8	6.5	6	5.5	3	2.5	2	1.7	1	12
CA 3-P-Z contacts AC 15	[A]	4	3.5	3	2.5	1.6	1.4	1.25	1	0.15	6
CT 3, CT 3K contacts											
AC 15	[A]	4	3.5	3	2.5	1.6	1.4	1.25	1	0.15	4

CA3 -P-Z delayed contact

Service life	5 million operations	
Switching delay	on	40ms
	off	40ms

Mechanical latch CV 3

Service life	3 million operations	
Pick-up power	45VA AC, 25W DC	
Signal duration	0.03s min, 15s max ¹⁾	
Pick-up voltage	0.6 ... 1.1 x U _s	
Switching frequency	30 ops/Hr 15 second signal	
	3000 ops/Hr 30mS signal	

Timing elements CZE 3 / CZA 3

Service life	5 million operations	
Repeatability (-5 ... +55°C)	0.3 ... 30s ± 6%	
	1.8 ... 180s ± 10%	
Ambient temperature	storage	-40 ... +80°C
	operation	+25 ... +60°C

Reset magnet CMR 3

Pick-up power	90VA AC, 30W DC	
Pick-up voltage	0.85 ... 1.1 x U _s	
Signal duration ¹⁾	0.04s min, 10s max	



CA 3-P-01



CA 3-P-11



CA 3-P-22



CA 3-P-Z01



CV 3



CRZE 4



CM 3

Technical information - accessories and power dissipation

Interface module CRI 3

Voltage range input	DC 18 ... 30V
Voltage range output	AC 110 ... 240V
Max current	0.8 amps
Max make [VA]	200
Max break [VA]	20



CRI 3

CRZE 4 timing element

Function	on-delay in line timer	
Voltage range	110 ... 250V	-23% +10%
Voltage drop	5V max	
Min load current	10mA	
Reset time	≥ 200ms	
Time interval start command	1.4 x set time	
Ambient temperature	-20 ... +55°C	operation
	-40 ... +80°C	storage
Repetition accuracy	± 1% @ constant temperature	



CRZE 4

Coil suppressor elements

Description	CRC 3 RC element	CRV 3 varistor element	CRD 3 diode
Overvoltage factor U _{max} / U _n	1 ... 2	1.2 ... 2.5	0.2 ... 0.8
Switch off delay	no effect	unchanged use on AC/DC	30 ... 100ms ¹⁾



CRV 3

Power dissipation and resistances for contactors and overloads

Contactor	Resistance of main contacts [m ohm] ¹⁾	Power loss all 3 phases at le AC 3 [W]	Coil power losses		Total power loss	
			AC [W]	DC [W]	AC [W]	DC [W]
CA 3-9	2.7	0.6	2.2	7.4	2.8	8
CA 3-12	2.7	1.2	2.2	7.4	3.4	8.6
CA 3-16	2.7	2.1	2.2	7.4	4.3	9.5
CA 3-23	2.1	3.3	2.5	3.8	5.8	7.1
CA 3-30	2.1	5.7	2.5	3.8	8.2	9.5
CA 3-37	1.9	7.8	5.0	5.0	12.8	12.8
CA 3-43	1.9	10.5	5.0	5.0	15.5	15.5
CA 3-60	1.4	15	5.8	5.5	20.8	20.5
CA 3-72	1.4	21	5.8	5.5	26.8	26.5

Thermal overload	Resistance of each pole Ω	Power loss all 3 phases ¹⁾ [W]	Thermal overload	Resistance of each pole [m Ω]	Power loss all 3 phases [W] ¹⁾
CT 3-12-0.16	85	6.5	CT 3-17	7.5	5.8
CT 3-12-0.24	37	6.4	CT 3-23	5.2	8.3
CT 3-12-0.38	14.1	6.1	CT 3-32	3.3	10.2
CT 3-12-0.62	5.6	6.5	CT3 -42	3.4	10.5
CT 3-12-1.0	2.16	6.5	CT 3-42a	2.8	15
CT 3-12-1.6	0.87	6.7	CT 3-52	1.7	14
CT 3-12-2.5	0.36	6.7	CT 3-63	1.2	15
CT 3-12-4	0.14	6.6	CT 3-72	1.0	16
CT 3-12-6	0.066	7.2	-	-	-
CT 3-12-9.5	0.029	7.8	-	-	-
CT 3-12-12.5	0.018	8.3	-	-	-

Notes: ¹⁾ CA 3-9 ... CA 3-16 60 ... 100mS.
CA 3-23 ... CA 3-72N 30 ... 40mS.

²⁾ These values apply to aged contacts. For new contacts values will be smaller.

³⁾ Power loss at upper current setting.



Technical information contactor loading

Short term current withstand currents

For short periods, the contactors may be loaded with currents according to the chart. However, the current paths will heat up considerably, and the heat dissipate mainly to insulating parts and adjacent conductors during the cooling periods. To avoid premature aging of insulating material, such loads may only be applied temporarily.

If the transient mode is applied regularly or frequently, the tabulated values for the permissible load current should be multiplied by the factor 0.6.

Contactor loading verses ambient temperature

The catalogue specifications "thermal rated current open" and "switching of active-power load AC 1 open" refer to an ambient air temperature of 40°C (= temperature of the air surrounding the switchgear). This temperature limit with a maximum mean value of 35°C over 24 hours forms the basis for the specification of the most important type tests. In the field, such favourable conditions are only rarely found (eg. if the contactors are mounted in an open rack).

If the component load is reduced, it can be used at correspondingly higher temperatures. The admissible temperature range in which proper function is still assured is -25°C ... 70°C.

Transformer switching

When transformers are switched on, a short but high magnetisation current appears. Under special circumstances, such as idling, it may exceed the rated transformer current up to 30 times. This should be taken into account when selecting switching devices.

The factor 'n' is to be indicated by the transformer supplier. If no indication is available, the following standard values for 'n' shall be applied:

Transformers up to about
1 KVA at 240V: $n \approx 20$
at 415V: $n \approx 15$

Larger transformers
at 415V: $n \approx 15 \dots 30$.

Permissible voltage for rotor contactors

Since the rotor contactors are live only for a short time during the run-up period, the rated operational voltage of the rotor U_{er} (rotor standstill voltage) may, according to IEC 292-3, 4.4.1.4, exceed the rated insulating voltage U_i of the contactor by 100%. Sprecher + Schuh contactors for 690V can therefore be used for rotor standstill voltages up to 1380 volts.

Permissible transient current for infrequent loads, ambient temperature 60°C, reduction factor for frequent or regular loads = 0.6.

Contactor	Permissible transient current during						Minimum cooling period [min]
	1 s [A]	4 s [A]	15 s [A]	1 min [A]	4 min [A]	15 min [A]	
CA 3-9	190	140	80	50	30	27	3
CA 3-12	190	140	80	50	30	27	3
CA 3-16	190	140	80	50	30	27	3
CA 3-23	400	300	150	90	55	50	6
CA 3-30	400	300	150	90	55	50	6
CA 3-37	800	600	315	180	120	105	12
CA 3-43	800	600	315	180	120	105	12
CA 3-60	800	600	315	180	120	105	12
CA 3-72	1050	850	430	230	150	125	12

Admissible contactor load verses ambient air temperature

Thermal rated current I_{th} and rated operational current for switching an active-power load I_{eAC1} at ambient air temperatures of

Contactor	40°C [A]	45°C [A]	50°C [A]	55°C [A]	60°C [A]	65°C [A]	70°C [A]
CA 3-9	25	23	20.5	18	16	14.5	13
CA 3-12	25	23	20.5	18	16	14.5	13
CA 3-16	25	23	20.5	18	16	14.5	13
CA 3-23	45	41	38	34	30	28	25
CA 3-30	45	41	38	34	30	28	25
CA 3-37	63	58	54	49	45	42	38
CA 3-43	63	58	54	49	45	42	38
CA 3-60	90	86	82	78	75	70	64
CA 3-72	90	86	82	78	75	70	64

Contactor	Max. permissible closing current I_{maxT} [A]	Rated operational current for switching transformers I_{eT} with a closing current factor of		
		$n = 15$ [A]	$n = 20$ [A]	$n = 30$ [A]
CA 3-9	108	10	8	5
CA 3-12	144	14	10	7
CA 3-16	192	16 ')	13	9
CA 3-23	276	26	20	13
CA 3-30	360	34	25	17
CA 3-37	444	45 ')	31	21
CA 3-43	516	45 ')	36	24
CA 3-60	720	68	51	34
CA 3-72	864	75 ')	60	41

Selection of contactors for slip ring motors (stator switching) are made on the basis of AC 2 (see rating charts). For switching in the rotor circuit selection of stage contactors is made based on the rotor voltage, current, number of stages and starting conditions.

Further details available on request.

sprecher+schuh**Technical information - switching of DC currents****Switching direct currents with standard contactors**

DC equipment is usually operated on low voltages and can therefore be switched by standard contactors since virtually the same as in AC applications.

Above 60V, the switching capacity of the standard contactors rapidly decreases. This threshold can be doubled or tripled by connecting two or three poles in series.

Arc quenching devices designed for AC are not very efficient for DC, and the arc will not be expelled from the space between the contacts.

DC 1

Switching of non-inductive or slightly inductive loads, resistance furnaces.

Contactors encapsulated (internal temperature 60°C). Electrical life: approx. 1 million operating cycles.

Single pole

Contactors type	Rated operational current [A] at rated voltage (DC) ¹⁾				
	24V	48 V	110V	220V	440V
CA 3-9, CS 3	9 (25)	9 (12)	3.5	0.55 (0.6)	0.2
CA 3-12	12 (25)	12 (14)	4.3	0.65 (0.8)	0.2
CA 3-16	16 (25)	16 -	5.2	0.8 (1)	0.2
CA 3-23	23 (45)	20 (28)	7	1 (1.2)	0.3
CA 3-30	30 (45)	25 (30)	8 (9)	1.2 (1.4)	0.3
CA 3-37	37 (63)	30 (40)	10 (11)	1.6	0.4
CA 3-43	45 (63)	37 (45)	12 (13)	2	0.4
CA 3-60	60 (90)	48 (60)	14 (18)	-	-
CA 3-72	75 (90)	60 -	16 (18)	-	-

2 poles in series

CA 3-9, CS 3	9 (25)	9 (25)	8 (10)	3.5	0.55 (0.6)
CA 3-12	12 (25)	12 (25)	11 (12)	4.3	0.65 (0.8)
CA 3-16	16 (25)	16 (25)	15	5.2	0.8 (1)
CA 3-23	23 (45)	23 (45)	18 (23)	7	1 (1.2)
CA 3-30	30 (45)	30 (45)	22 (25)	8 (9)	1.2 (1.4)
CA 3-37	37 (63)	37 (63)	28 (35)	10 (11)	1.6
CA 3-43	45 (63)	45 (63)	35 (40)	12 (13)	1.6
CA 3-60	60 (90)	60 (90)	45 (55)	14 (18)	-
CA 3-72	75 (90)	75 (90)	55	16 (18)	-

3 poles in series

CA 3-9, CS 3	9 (25)	9 (25)	9 (17)	6	2
CA 3-12	12 (25)	12 (25)	12 (20)	8	2.5
CA 3-16	16 (25)	16 (25)	16 (20)	10	3
CA 3-23	23 (45)	23 (45)	23 (36)	13 (15)	4
CA 3-30	30 (45)	30 (45)	30 (36)	16 (18)	4.5
CA 3-37	37 (63)	37 (63)	37 (55)	20 (22)	6
CA 3-43	45 (63)	45 (63)	45 (55)	25 (27)	7
CA 3-60	60 (90)	60 (90)	55 (75)	32 (40)	8
CA 3-72	75 (90)	75 (90)	70 (75)	40	8

Notes: ¹⁾ The values in parentheses are max. permissible rated currents in **open arrangement** (ambient temperature 40°C) or encapsulated with intermittent operation, maximum duty cycle 15% (max. 10 min. cycle duration time), electrical life 0.2 ... 0.6 million operating cycles.

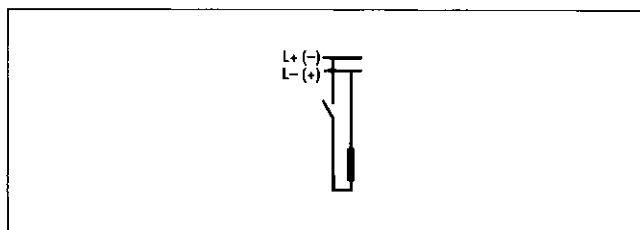
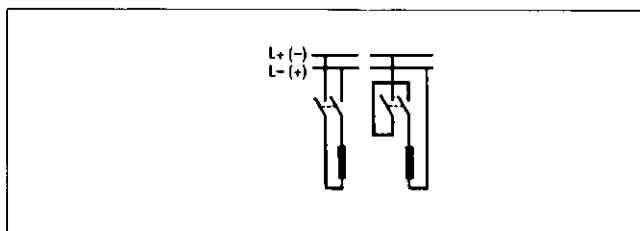
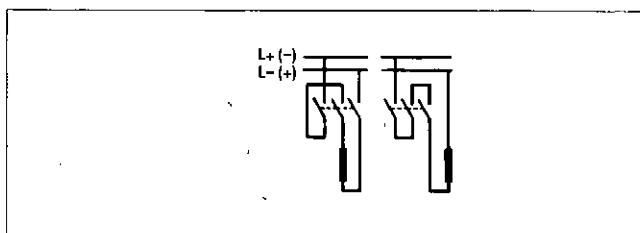
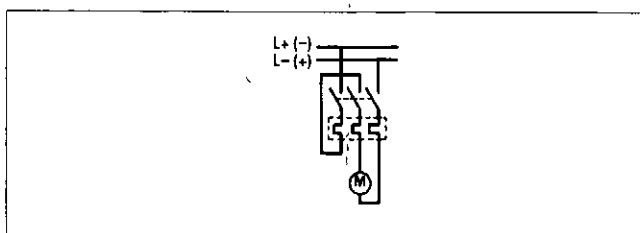
Its energy must therefore be shunted off along the contact gap and at the bases. The arc voltage remains low. In contrast to AC switching, the arc is not automatically killed in current zero passages.

The load also influences the switching capacity to a greater extent than under AC conditions. The energy stored in the load inductance must be dissipated mainly in the arc. As a result, if the time constant of the load (L/R) is high, the permissible switching frequency is much lower than under resistive loads (assuming identical electrical lives).

Wiring diagrams for DC loads

Since three main current poles are available in standard contactors, they are usually series-connected into the circuit, especially for DC motors and high voltages.

Note: The series connection of 2 (3) poles results in the same rated operational current at about double (triple) the basic voltage. Example: For DC 150V and 3 poles in series, the same rated operational current is permissible as for DC 48V, single pole.

*Single pole**Two poles in series**Three poles in series**Starter - Three poles in series*



Technical information - switching of DC currents

DC 2

Shunt-wound motors: starting switching off while running.

Encapsulated contactor (internal temperature 60°C), electrical life approx. 0.5 million operating cycles.

3 poles in series

Contactor type	Rated operational current [A] at rated voltage (DC)				
	24V	48 V	110V	220V	440V
CA 3-9	9	9	9	5	0.6
CA 3-12	12	12	12	6	0.8
CA 3-16	16	16	16	7	1
CA 3-23	23	23	23	12	1.5
CA 3-30	30	30	30	14	1.8
CA 3-37	37	37	37	17	2
CA 3-43	45	45	45	20	2
CA 3-60	60	60	60	25	2.5
CA 3-72	75	75	75	30	2.5

DC 4

Series-wound motors: starting, switching off while running.

Encapsulated contactor (internal temperature 60°C), electrical life approx. 0.3 million operating cycles.

3 poles in series

Contactor type	Rated operational current [A] at rated voltage (DC)				
	24V	48 V	110V	220V	440V
CA 3-9	9	9	5	1.8	0.4
CA 3-12	12	12	6	2.2	0.55
CA 3-16	16	16	7	2.5	0.65
CA 3-23	23	23	17	7.5	1
CA 3-30	30	30	22	9	1.2
CA 3-37	37	37	27	12	1.8
CA 3-43	45	45	32	14	2
CA 3-60	60	60	45	18	2.2
CA 3-72	75	75	55	22	2.4

DC 3

Shunt-wound motors: starting braking by reversal, reversing, inching.

Encapsulated contactor (internal temperature 60°C), electrical life approx. 0.5 million operating cycles.

3 poles in series

Contactor type	Rated operational current [A] at rated voltage (DC)				
	24V	48 V	110V	220V	440V
CA 3-9	9	9	4.5	1.8	0.4
CA 3-12	12	12	5.5	2.2	0.55
CA 3-16	16	16	6.5	2.5	0.65
CA 3-23	23	23	17	6	1
CA 3-30	30	30	22	9	1.2
CA 3-37	37	37	27	12	1.8
CA 3-43	45	45	32	14	2
CA 3-60	60	60	40	18	2.4
CA 3-72	75	75	48	22	2.8

DC 5

Series-wound motors: starting, braking by reversal, reversing, inching.

Encapsulated contactor (internal temperature 60°C), electrical life approx. 0.3 million operating cycles.

3 poles in series

Contactor type	Rated operational current [A] at rated voltage (DC)				
	24V	48 V	110V	220V	440V
CA 3-9	9	5	2	0.8	0.3
CA 3-12	12	6.5	2.5	1	0.35
CA 3-16	16	8	3	1.2	0.4
CA 3-23	23	12	4.5	2	0.7
CA 3-30	30	16	6	2.5	0.85
CA 3-37	37	22	8	3.5	1.1
CA 3-43	45	26	10	4	1.3
CA 3-60	60	36	14	5.5	1.7
CA 3-72	75	44	17	6.5	2

Parallel wiring

Thermal load capacity

Parallel connections of current paths in switchgear increase their thermal load ratings. It should be noted, however, that the resistances of the individual current paths may vary due to contact burn, contamination, etc. The current is therefore not uniformly distributed among the parallel paths but in proportion to their resistance.

To avoid overloading of a contact point, the product of rate current I_e x number of current paths should be replaced by the following factors to obtain the permissible total current.

For 3 parallel current paths: $2.5 \times I_e$.

For 2 parallel current paths: $1.7 \times I_e$.

Contactor current paths may only be wired in parallel for switching active loads (utilisation category AC 1). The limited switching capacity and short circuit resistance of the contactor makes it inadvisable to use this scheme for switching motors with greater rated currents than those for which the contactor has been designed.

Compared with the standard application, the making and breaking capacities in parallel connections remain unchanged because in many cases, one contact is closed or opened first and thus assumes the major part of the switching load.

Wherever possible, contactor current paths should be connected in parallel with copper bars with central current routing. This will result in good heat dissipation and current distribution. Such connecting bridges are available for the smaller contactors.

Permissible back-up fuses:

- for 3 parallel paths: 2 rating steps higher.
- for 2 parallel paths: 1 rating step higher.

sprecher+ schuh**Thermal overloads tripping characteristics**

Time/current characteristics of thermal overload relay (thermally delayed overload relay)

Mean value of tolerance bands three-phase heated. — curves relate to relay cold — — curves relate to relay at operating temperature (at set current load). Tolerance: trip time $\pm 20\%$ ($\pm 10\%$ for current). Function limits and temperature compensation from -25°C ... $+70^{\circ}\text{C}$.

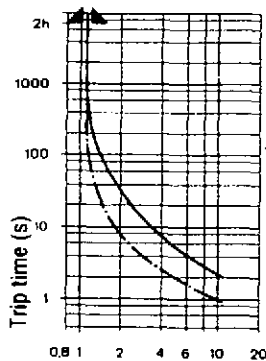
Tripping limits specified in IEC 292-1 for -5°C ... $+40^{\circ}\text{C}$ are satisfied in range -20°C ... $+60^{\circ}\text{C}$.



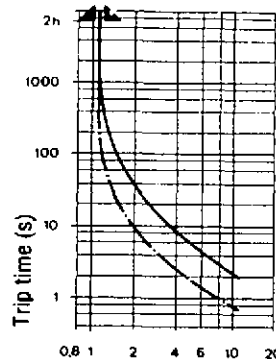
Specified points relative to operating temperature state in compliance with IEC 292-1 (type 1) and SEV publication 138.

Two phase loading (phase failure):

Trip limits 1.05 ... 1.32 of set current I_{eF} in accordance with IEC 292-1. For motors up to 10 kW, the two phase trip at max. $1.25 I_{\text{eF}}$ guarantees heat build up limitation to the value which occurs on a three phase trip at $1.2 I_{\text{eF}}$.

CT 3 K-12, 0.1...4A

Multiples of current setting I_e

**CT 3 K-12, 4...12, 5A
CT 3 K-17, 12,5...17, 5A**

Multiples of current setting I_e

Thermal overload relay time/current characteristic (thermally delayed over-current relay)

Mean value of tolerance bands, heated in three phases. Curves — from cold state, curves — — in operationally warm state (loaded with the set current). Tolerance: trip time $\pm 20\%$ ($10\pm\%$ for current).

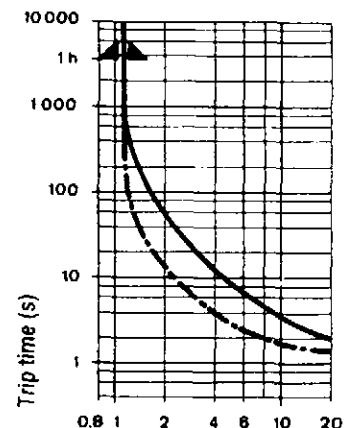
Function limits and temperature compensation from -25°C ... $+70^{\circ}\text{C}$. Tripping limits specified in IEC 292-1 for -5°C ... $+40^{\circ}\text{C}$ are satisfied in range -20°C ... $+60^{\circ}\text{C}$.

Two phase loading (single phase failure)

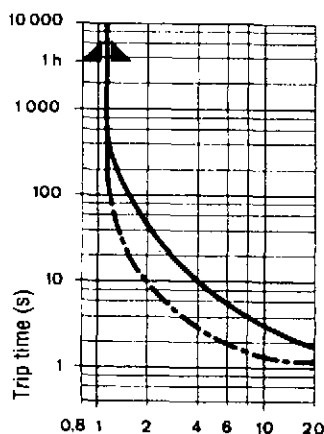
Trip limiting current approx. 85% of the 3 phase trip limiting current.



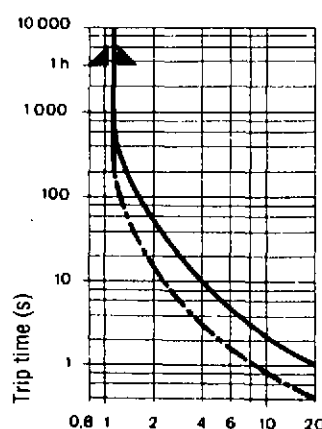
Specified points from the cold state in compliance with SEV publication No 138 (quality sign).

CT 3-12, 0.1...0.16 to 3.8...6A

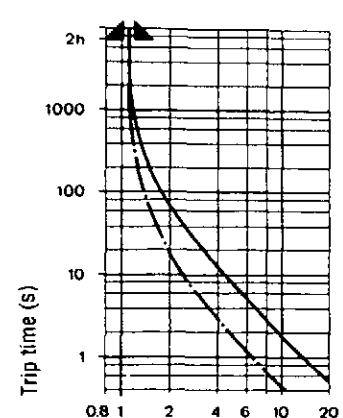
Multiples of current setting I_e

CT 3-12, 6...9.5A, 8.5...12.5A

Multiples of current setting I_e

CT 3-17, CT 3-23, CT 3-32

Multiples of current setting I_e

**CT 3-42, CT 3-52, CT 3-63,
CT 3-72**

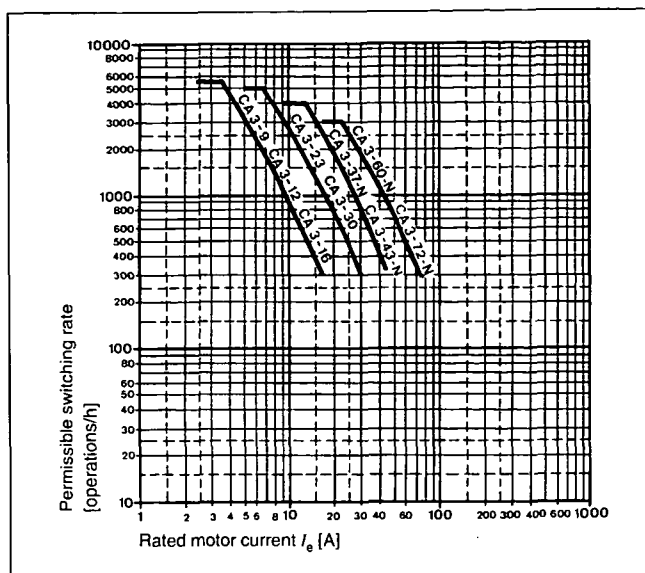
Multiples of current setting I_e



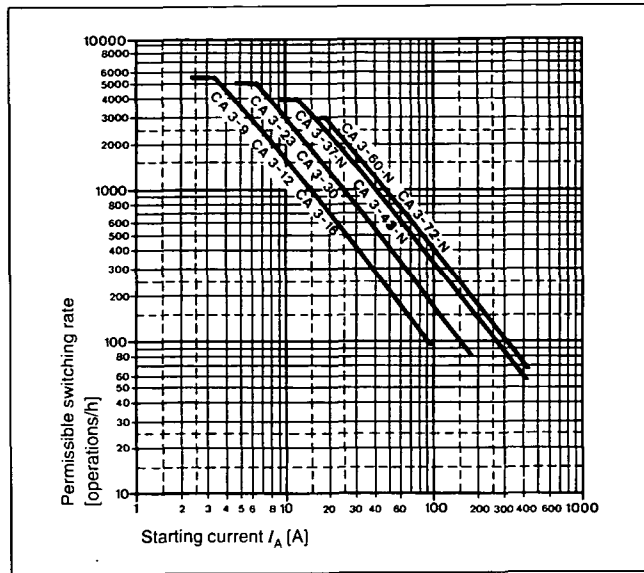
Technical information - contactor switching frequency

Permissible contactor switching frequency

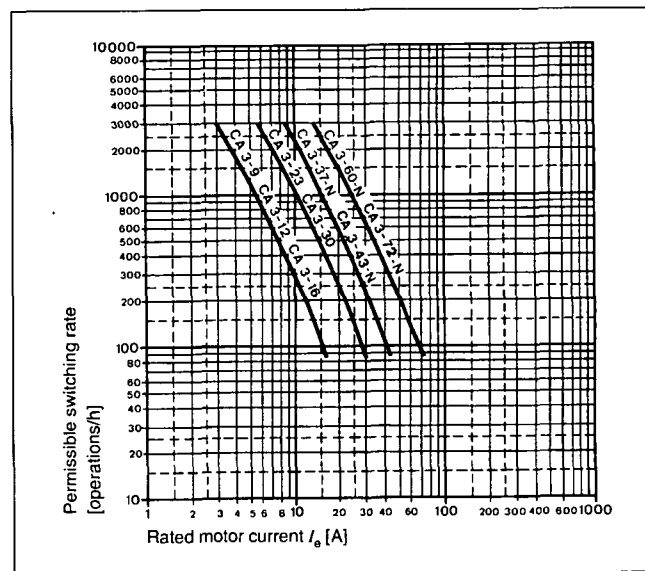
Interruption of running squirrel cage motors (AC 3)
run-up time $t_A = 0.25\text{sec}$; relative duty cycle 40%



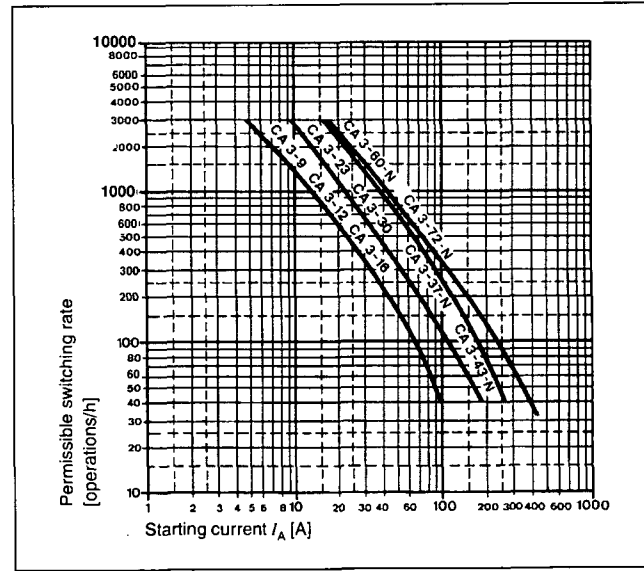
Interruption of motors during starting (AC 2 and AC 4)
duty cycle $t_{ED} = 0.25\text{s} (< t_A)$



Interruption of running squirrel cage motors (AC 3)
run-up time $t_A = 1\text{sec}$



Interruption of motors during starting (AC 2 and AC 4)
duty cycle $t_{ED} = 1\text{s} (< t_A) < t_A$

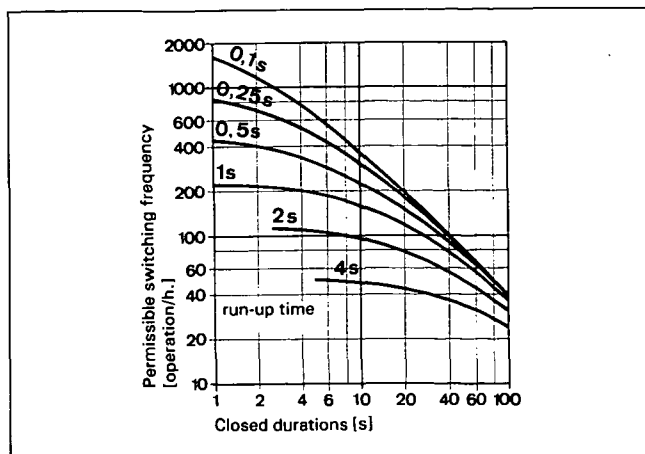


Permissible switching frequency of the thermal overload relays
(no tripping: for starters check contactors according to above diagrams.)

Starting current $I_A = 4 I_e$

eg. direct-on-line starting of IEC standard motors up to 0.75kW

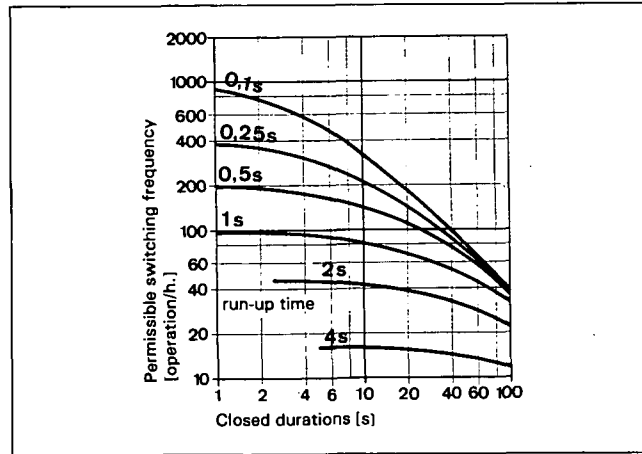
$I_A = 2.3 I_e$ with CTY relay, with the star delta starting)



Starting current $I_A = 6 I_e$

eg. direct-on-line starting of IEC standard motors larger than 1.1kW

$I_A = 3.5 I_e$ with CTY relay, with increased star delta starting)



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Electrical life

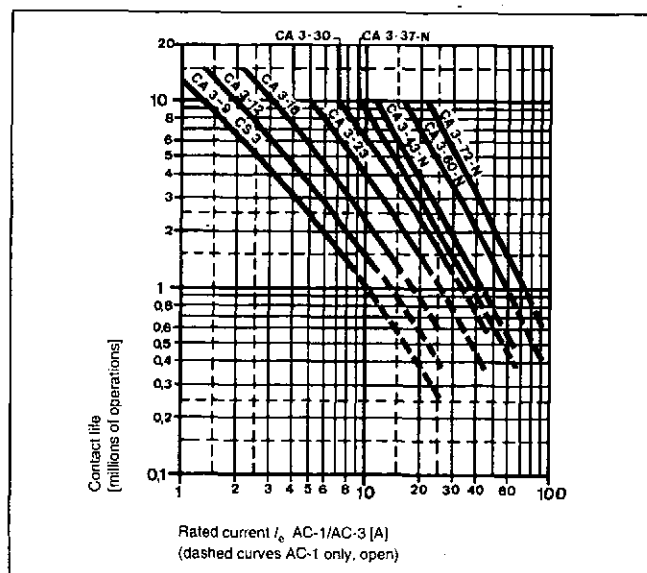
The diagrams below are valid for the operating of the duty classification AC 1 ... AC 4 at 380/415V, 50/60Hz defined in IEC 158-1.

- I_e Rated operation current.
 I Making current.
 I_c Breaking current.
 U_e Rated operational voltage.
 U Voltage before make.
 U_r Recovery voltage.

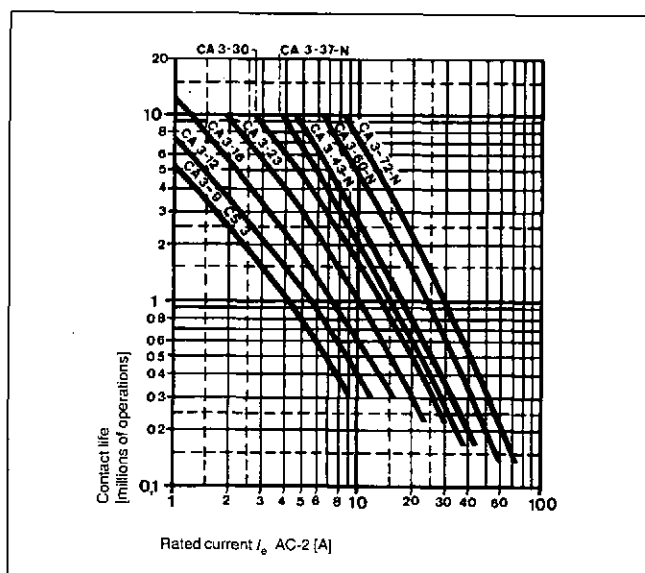
Switching conditions for proof of electrical life (number of operations under load) in compliance with 158-1 (AC 2 in compliance with UTE, NF C 63-110).

Duty Classification	Make I/I_e	U/U_e	$\cos\varphi$	Break I_c/I_e	U_r/U_e	$\cos\varphi$
AC 1	1	1	0.95	1	1	0.95
AC 2	2.5	1	0.65	2.5	1	0.65
AC 3	$I_e \leq 17A$	6	1	0.65	1	0.17
	$I_e > 17A$	6	1	0.35	1	0.17
AC 4	$I_e \leq 17A$	6	1	0.65	6	1
	$I_e > 17A$	6	1	0.35	6	1

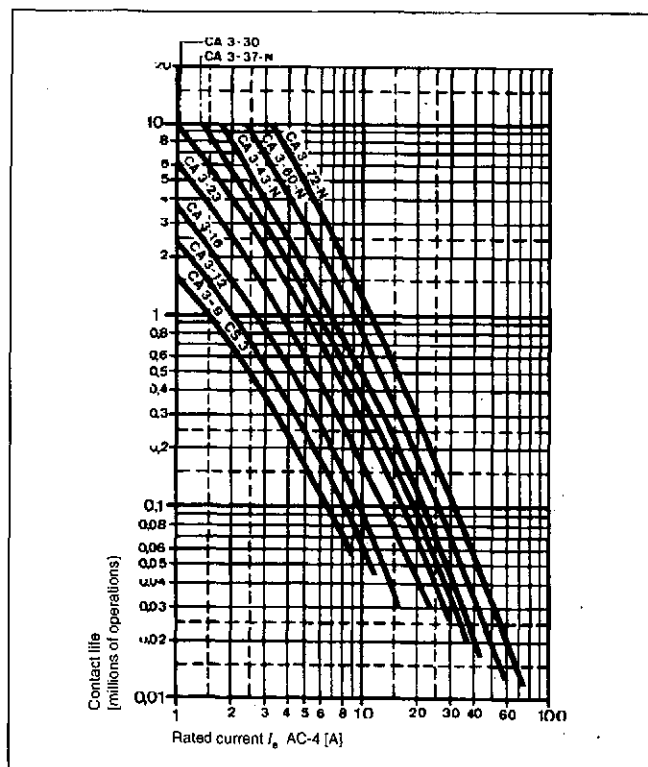
AC 1 non, or lightly inductive loads, resistance furnaces
 AC 3 interrupting of running squirrel cage motor



AC 2 inching (jogging) of slip-ring motors.

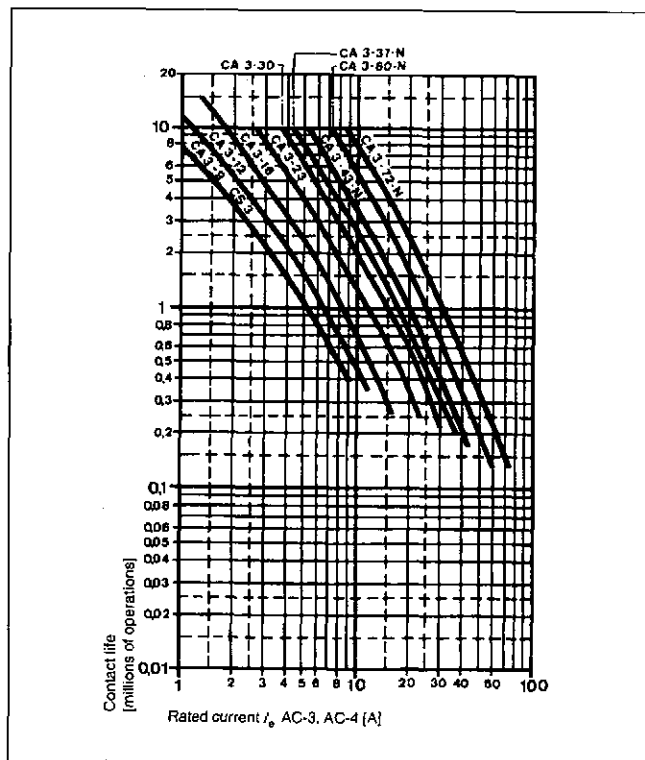


AC 4 inching (jogging) of slip-ring motors.



Mixed duty with squirrel cage motors

AC 3 90% interruption of running squirrel cage motors
 AC 4 10% inching (jogging)



NHP

CA 3 contactors for Australian industry

Contactor ratings

○ Contactor ratings to IEC 947
@ 415 volts.

Contactor Cat. No.	Frame size	Amps 40°C	AC 1 60°C	AC 2, AC 3 Amps	AC 2, AC 3 kW ¹⁾	Thermal overload relay Cat. No.	Amps	Notes
CA 3-9	1	25	16	9	4.5	CT 3-12	0.1 to 9.0	A
CA 3-12 ¹⁾	1	25	16	12	6.1	CT 3-12	8.5 to 12	
CA 3-16 ¹⁾	1	25	16	16	8.4	CT 3-17	12 to 17.5	
CA 3-23 ¹⁾	2	45	30	23	12	CT 3-23	16 to 23	
CA 3-30 ¹⁾	2	45	30	30	16	CT 3-32	25 to 32	
CA 3-37N-11	3	63	45	39	22	CT 3-42/42a	25 to 42	B
CA 3-43N-11	3	63	45	45	25	CT 3-42a	32 to 42	
CA 3-60N-11	3	90	75	60	34	CT 3-52/63	40 to 63	
CA 3-72N-11	3	90	75	72	41	CT 3-63/72	52 to 72.5	

- Notes: **A** Overloads in this group can be fitted to contactors CA 3-9 to CA 3-30.
B Overloads in this group can be fitted to contactors CA 3-37 to CA 3-72.
¹⁾ These contactors available with 1 N/O or 1 N/C auxiliary contact as standard.
Frame size 3 contactors have 1 N/O + 1 N/C as standard.
²⁾ AC 3 ratings are at 60°C.
Co-ordination with circuit breakers.

Co-ordination with circuit breakers



Proudly Australian
Serving Australia's
industry

"Type 1" or "Type 2" Co-ordination.

With CA 3 contactors you have a choice of either Type 1 or Type 2 Co-ordination. Our tests both in Australia and overseas confirmed the use of fuses or circuit breakers with the CA 3 contactors. Our solutions include a choice of GEC Type T fuses, Terasaki TemBreak and Din-T circuit breakers as well as the Sprecher + Schuh KTA 3 range of motor protection circuit breakers.

Ask for publication C-CO
for more details



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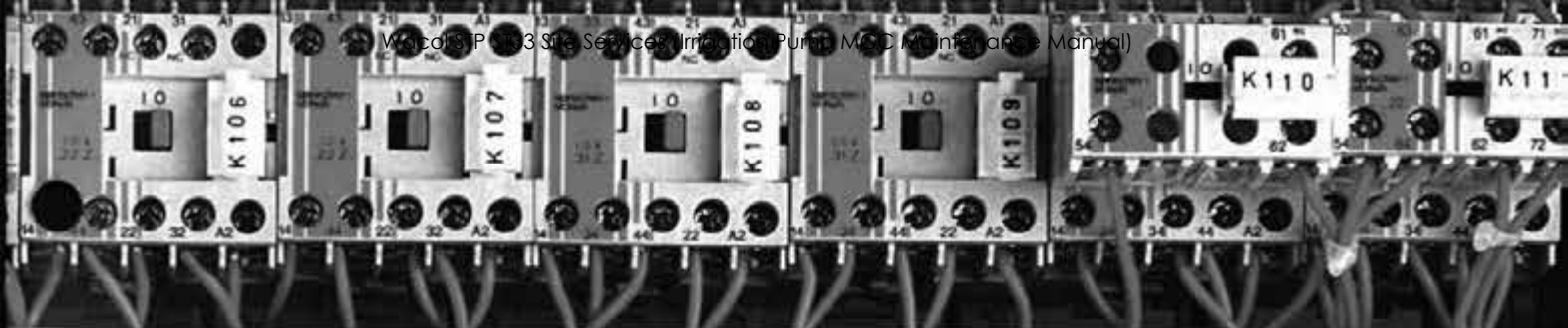
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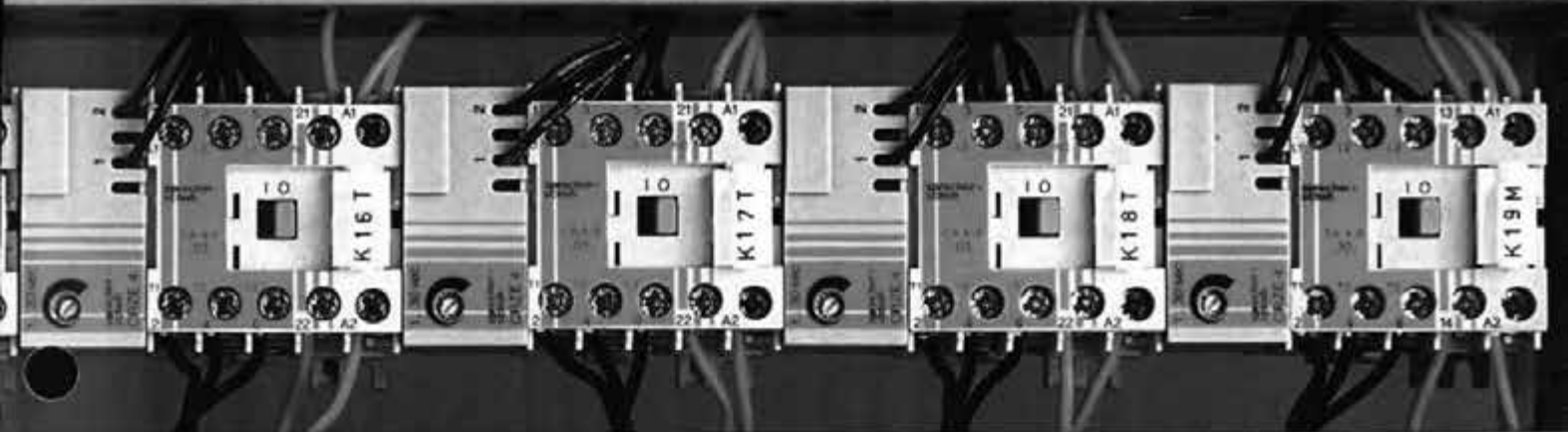
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Proudly Australian



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22 04 CA 4 Compact Contactor System



A com- prehensive system

CA 4 Compact

Set to win with the comprehensive CA 4 compact contactor system:

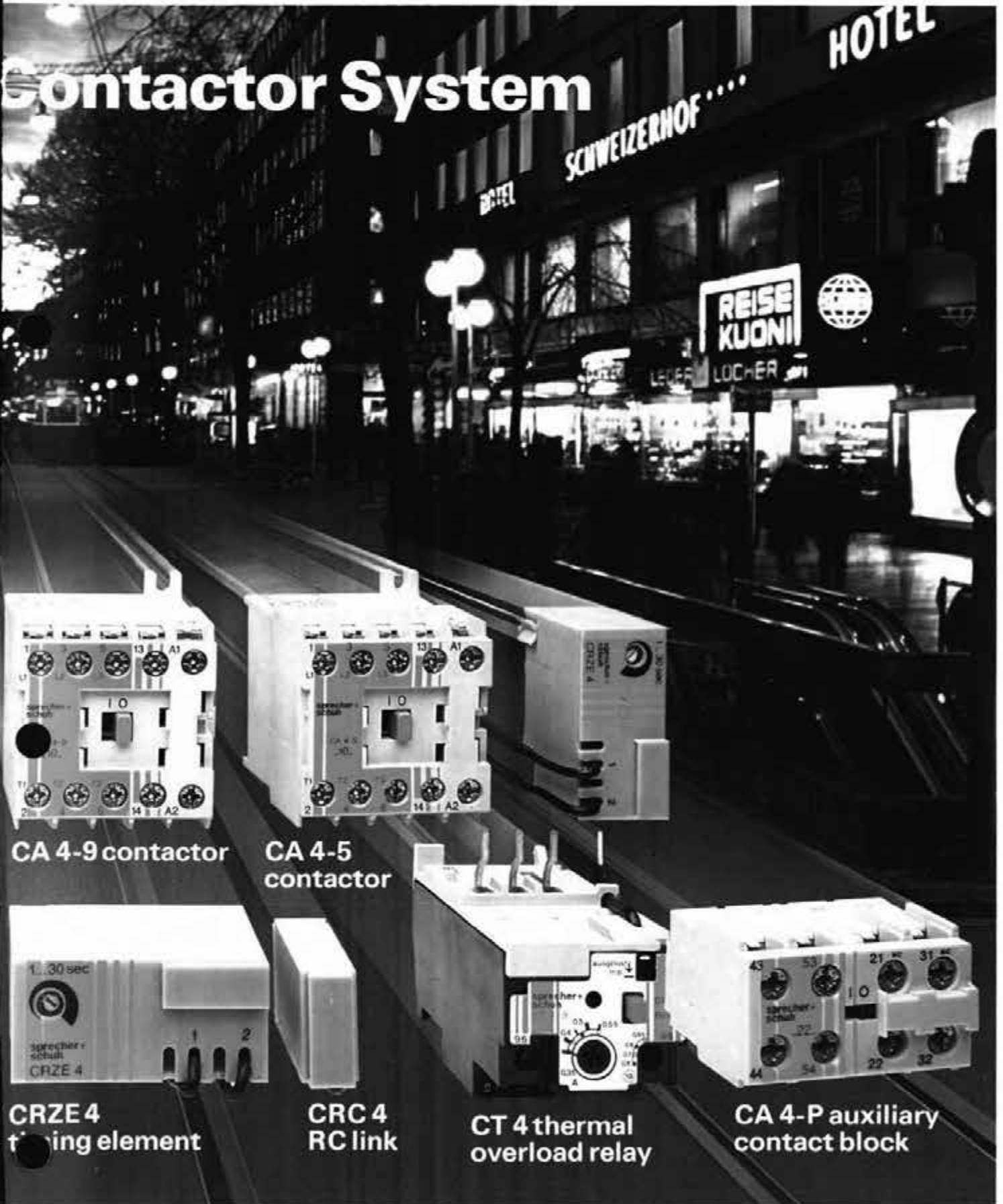
- Fewer modules
- Smaller stocks
- Designs planned swiftly
- Control systems easily assembled



CS 4 control relay



**CS 4-P auxiliary
contact block**




**Assets in
every respect**

- Compact and rugged
- Designs and assemblies carried out swiftly
- Long-term reliability

The CA 4 contactor to your


CA 4 is compact

You get higher performance in less space: smaller dimensions result in more compact control systems.

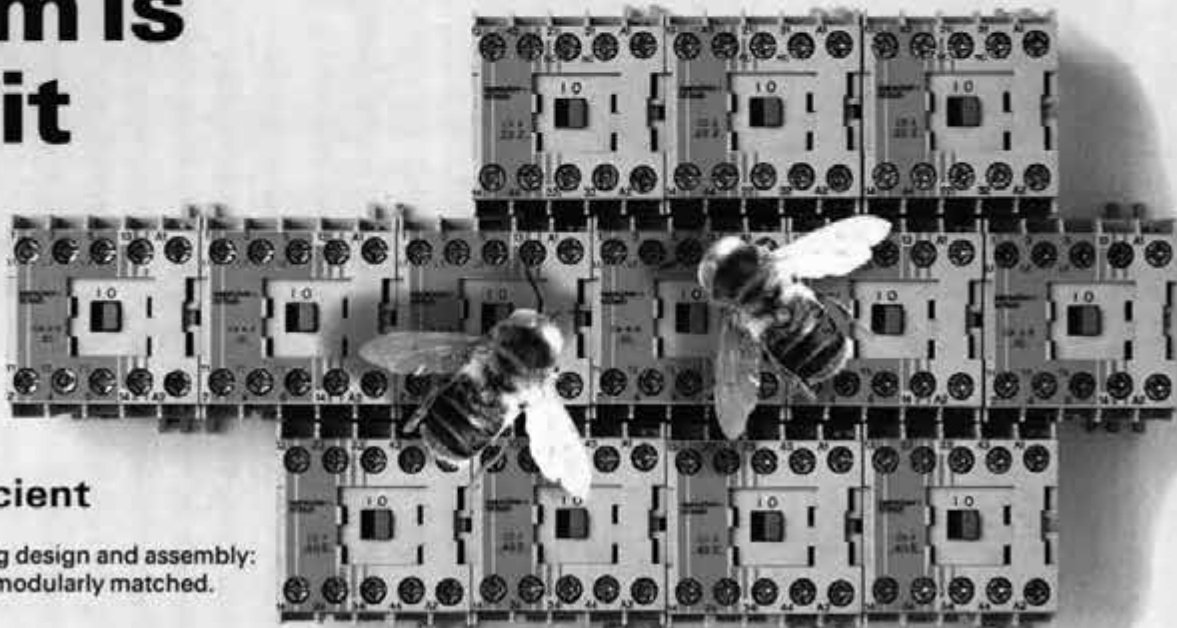


CA 4 is robust

You have a wider range of applications: the modules are robust and their high ratings easily fulfil all requirements.

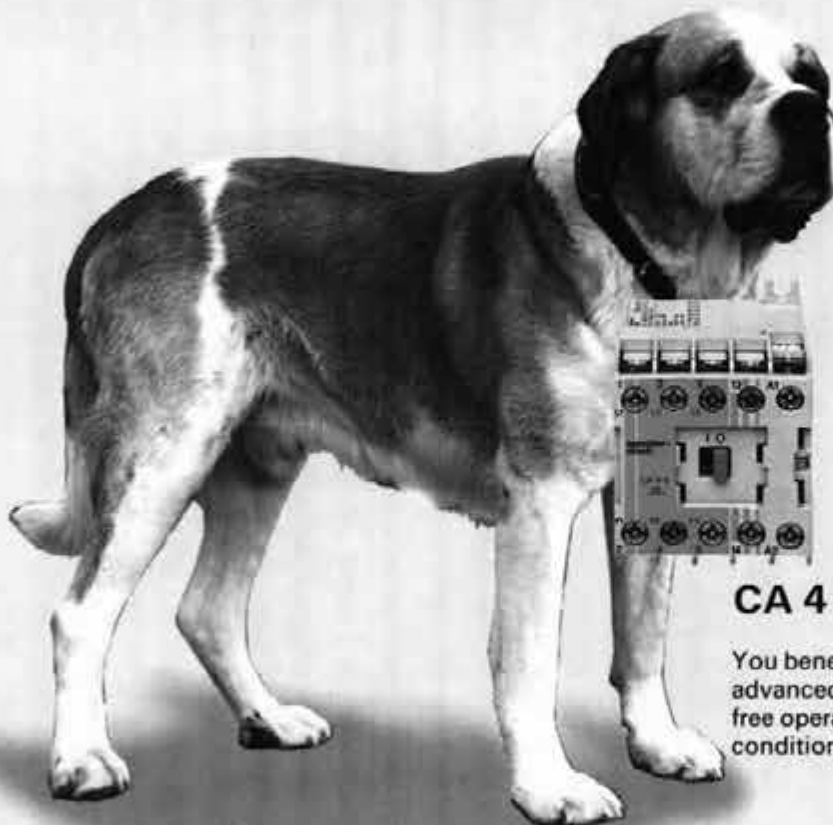


compact system is benefit



CA 4 is efficient

You save time during design and assembly:
all components are modularly matched.



CA 4 is reliable

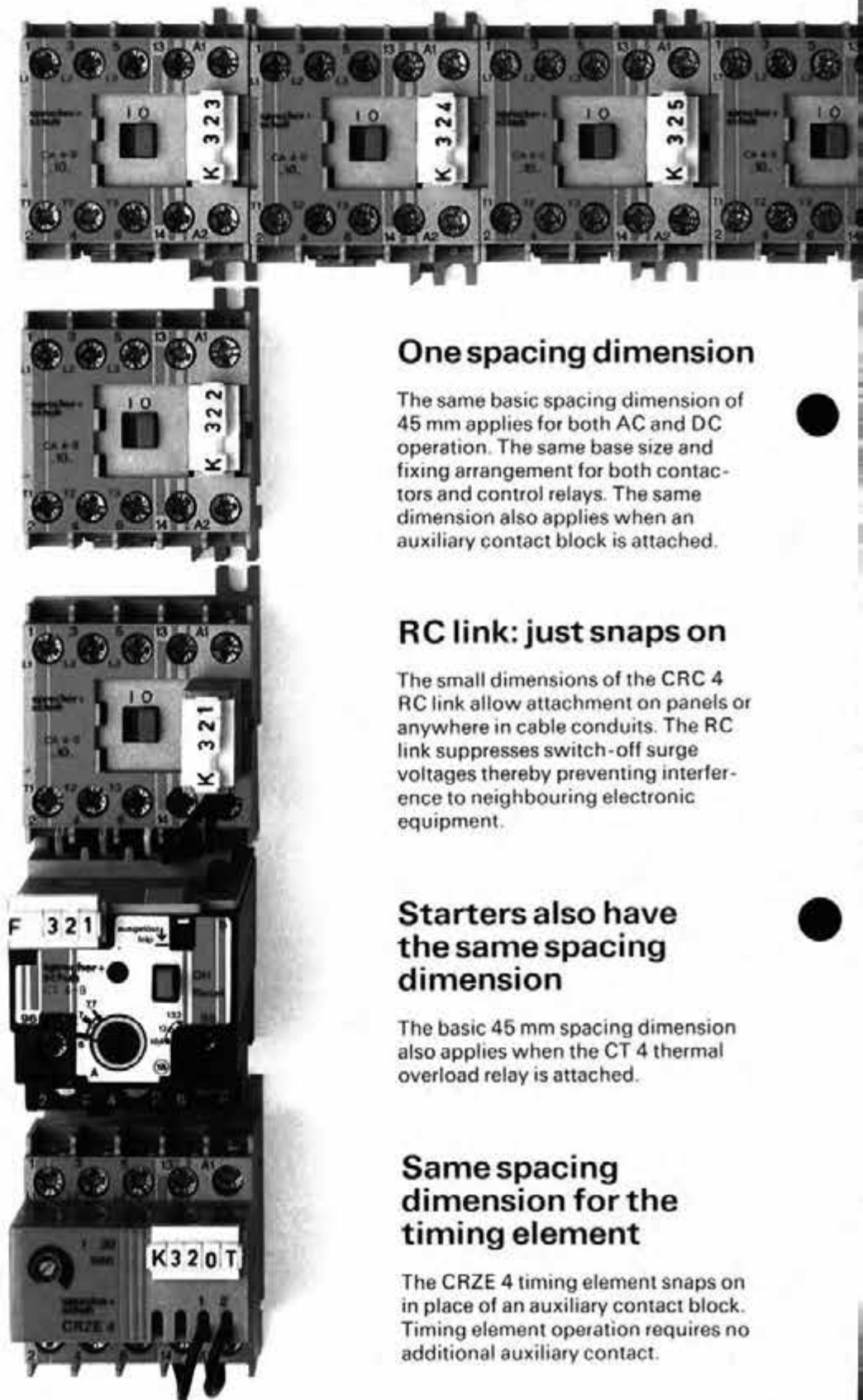
You benefit from greater reliability:
advanced technology assures interruption-
free operation even under extreme
conditions.

Compact dimensions



You can assemble more compact control systems with the CA 4 compact contactor system: all modules require only a minimum of space.

A closer look at



One spacing dimension

The same basic spacing dimension of 45 mm applies for both AC and DC operation. The same base size and fixing arrangement for both contactors and control relays. The same dimension also applies when an auxiliary contact block is attached.

RC link: just snaps on

The small dimensions of the CRC 4 RC link allow attachment on panels or anywhere in cable conduits. The RC link suppresses switch-off surge voltages thereby preventing interference to neighbouring electronic equipment.

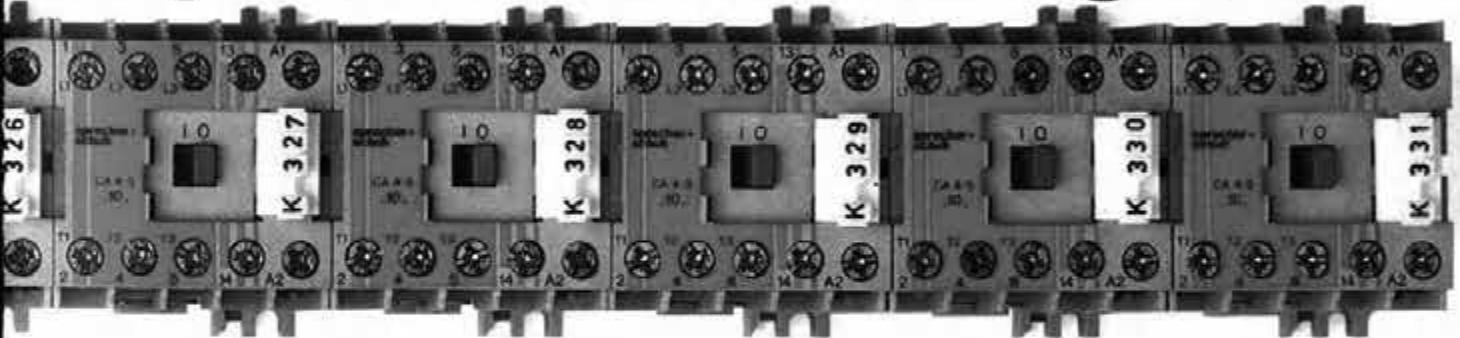
Starters also have the same spacing dimension

The basic 45 mm spacing dimension also applies when the CT 4 thermal overload relay is attached.

Same spacing dimension for the timing element

The CRZE 4 timing element snaps on in place of an auxiliary contact block. Timing element operation requires no additional auxiliary contact.

the profitable advantages

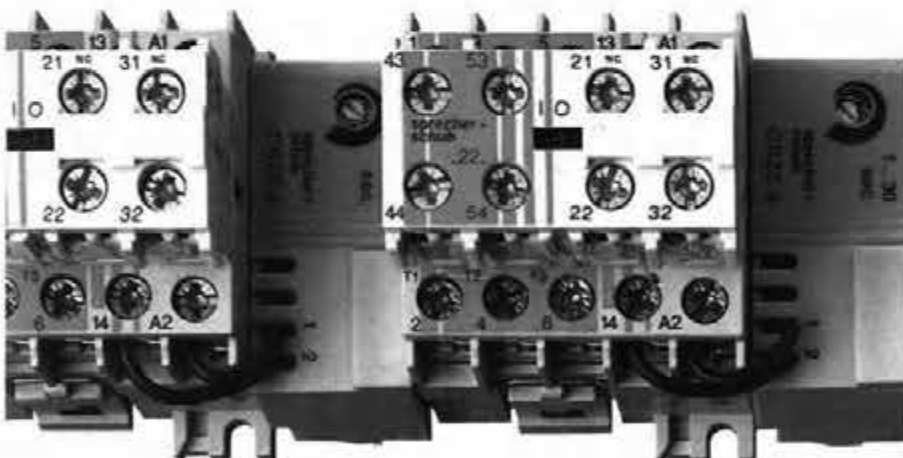


Minimum mounting depths

Due to the sideways switching movement, the basic contactor has only the same low mounting depth irrespective of whether an AC or a DC operating magnet is used.

But not only the 4pole contactor or control relay—the 8pole arrangement including the easily snap-fitted auxiliary contact block also has a low mounting depth.

This permits fitting into enclosures having shallow mounting depths—as is so often required by numerous applications.



Minimum space requirement for timing element

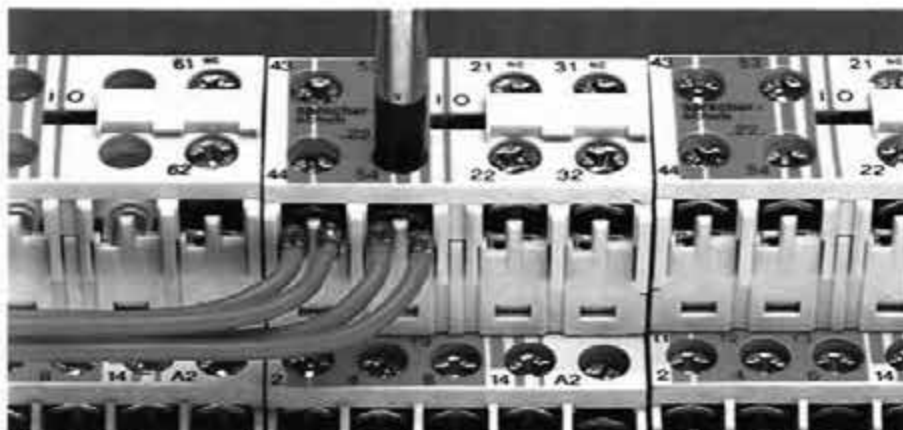
The timing element is plugged onto the side of contactors fitted with auxiliary contact blocks. Due to its narrow profile, it requires only a minimum of space.

Robust design



The CA 4 is a compact contactor system of full industrial quality: ruggedness is built-in to the basic concept.



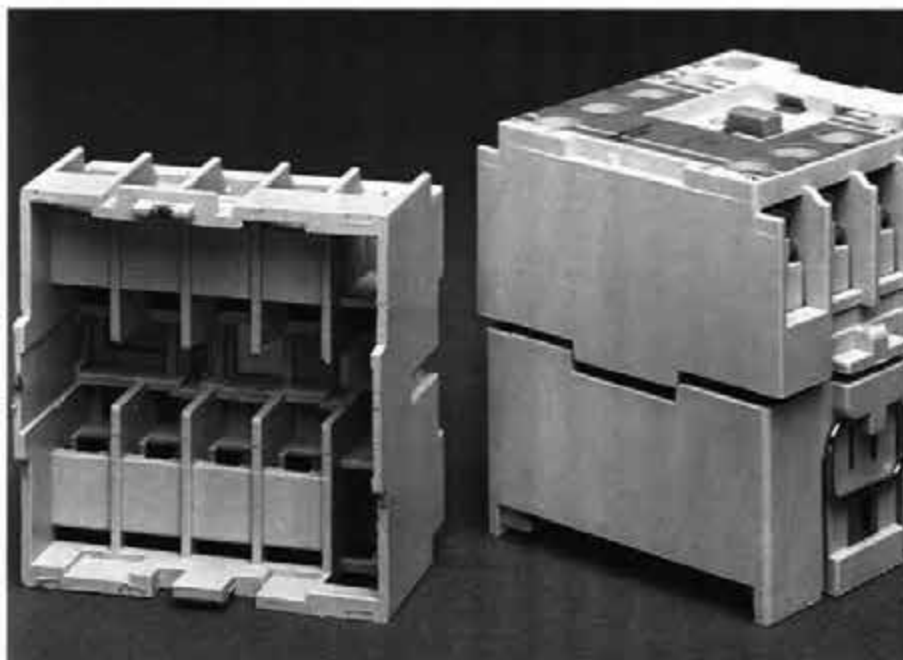


Terminals for tough service

Using high-strength M 3.5 terminal screws, the termination concept has been designed for time-saving wiring with automatic power screwdrivers.

Just right for manual wiring as well

The screwdriver guides also permit the use of the most suitable size of screwdriver for the task on hand.



A rugged housing

The front section, containing the screwdriver bit guides and the phase partitions, is manufactured in one piece. Front section and base section are joint fitted together. This stable design resists mechanical stresses applied during connecting operations.



Simple and reliable connection

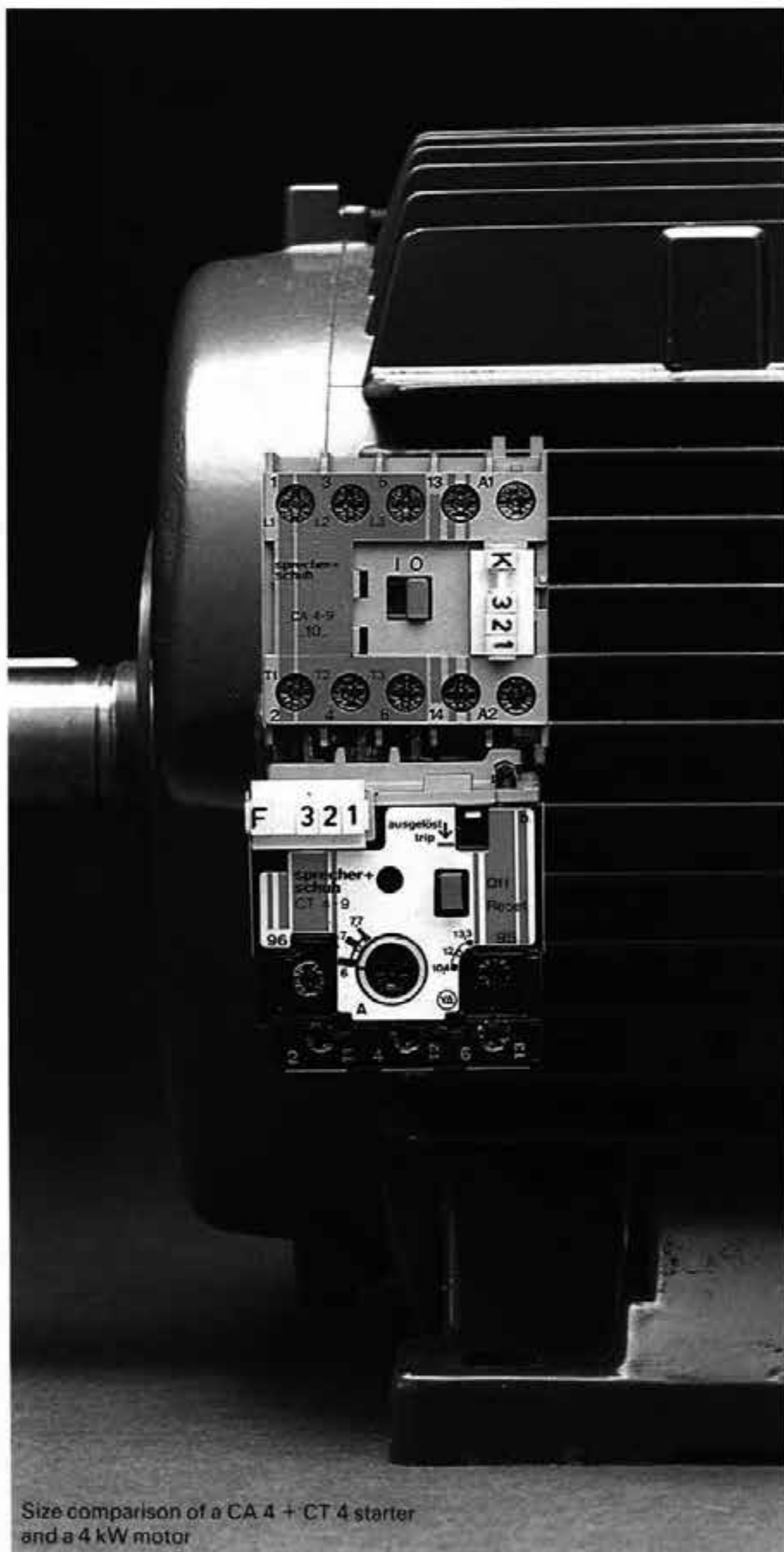
The supadrive screw terminals are easily and firmly tightened with all commercially available screwdrivers:

- ☐ Manual screwdriver bits
 - Flat blades Sizes 3 and 2
 - Cross-type blades
 - Pozidrive Sizes 2 and 1
 - Philips Sizes 2 und 1
- ☐ Power screwdrivers
 - Electric and pneumatic models

Robust design



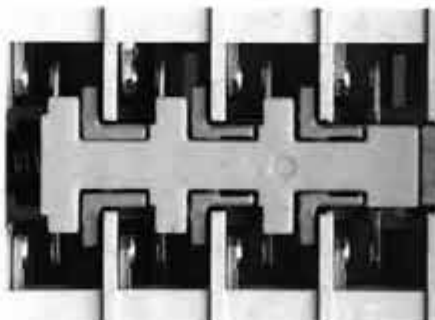
Greater sturdiness means higher switching capacities, even with AC 4 duty requirements. Hence, you now have contactors to hand fully capable of switching 2.2 kW and 4 kW motors, or—with star-delta starting—3.7 kW and 7.5 kW.



Size comparison of a CA 4 + CT 4 starter and a 4 kW motor

Takes punishment

CA4 is a compact contactor system having generously designed insulation and conducting parts. It has sufficient reserves for operation under extreme conditions.



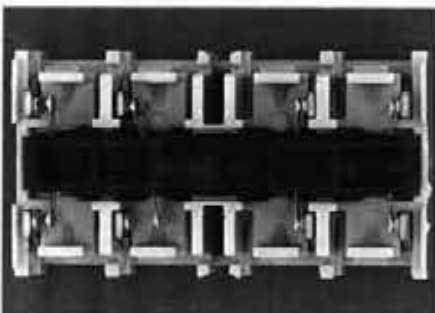
High switching capacity

This is mainly due to the thermally stable contact bridge carrier.



Absolute undervoltage reliability

The coil is designed for total undervoltage reliability. Undervoltages that do not cause the contactor to close can be withstood indefinitely without damage.



Coupled and controlled actuation

N/o and n/c contacts on the basic unit are coupled and controlled as are also the n/o and n/c contacts on the auxiliary contact block. This permits their use in safety interlock circuits.



Moulded housing ruggedness

The electronic components in the CRZ 4 timing element and in the CRC 4 RC link are moulded to provide effective protection.

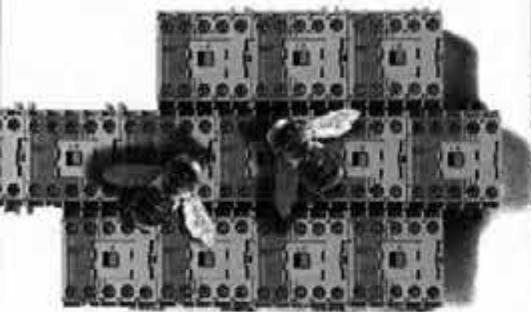


Robust thermal overload relay for greater reliability

Provides protection in any environment. The outstanding temperature compensation of the CT 4 thermal overload relay is demonstrated under extreme ambient conditions. It operates with high and constant reliability and precision in a temperature range from -25°C ... $+70^{\circ}\text{C}$.



System efficiency



Smaller inventories cut costs

The few but ingeniously designed modules permit small identifiable

inventories which yield the most suitable and cost-effective component combination for all applications.

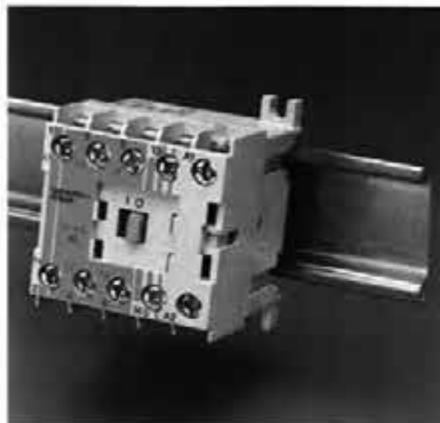


The entire CA 4 compact contactor system is logic engineered and identifiable: this applies to both stock control, planning as well as assembly.

Instant identification

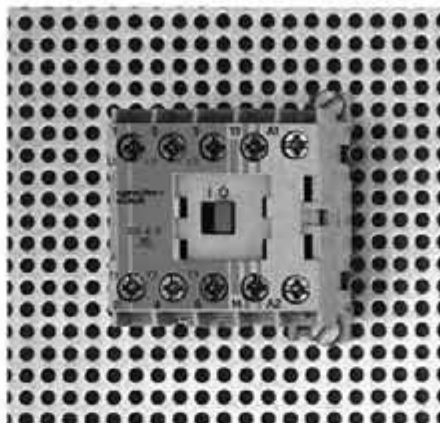
Simple classification of the modules makes planning an easy matter. Efficient planning is also possible

since the CA 4 compact contactor system corresponds to international standards and operates under any climatic condition.



Snap fastening

The integral snap fastening feature permits simpler and more rapid attachment to the DIN mounting rail (European Norm EN 50022 35).



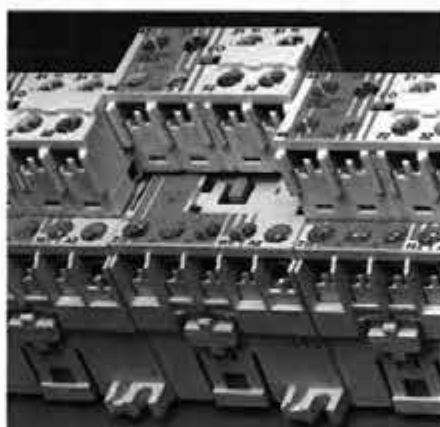
Simple drilling plan

Only two vertical holes 50 mm apart (EN preferred dimension) required. The fixing screws are also easily accessible.

Colour coding for quick identification

The colouring of the modules is not only attractive, it is also an identification and handling aid.

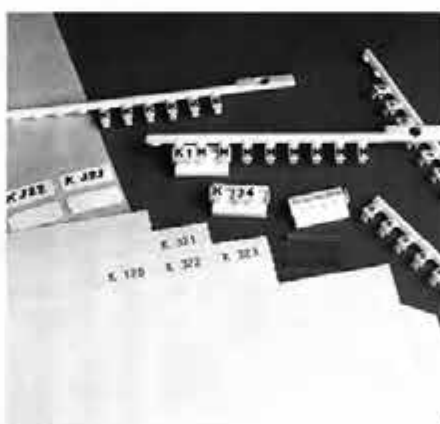
- ☐ Bright orange stripes identify the main contacts.
- ☐ Narrow orange stripes identify control relays and auxiliary contact blocks.
- ☐ All colour stripes are on the left and this aids rapid fitting of auxiliary contact blocks and timing elements.



Unique CS 4 control relay

Because of the snap-on auxiliary contact blocks, the CS 4 is the only 4-, 6- and 8-pole control relay in this size class.

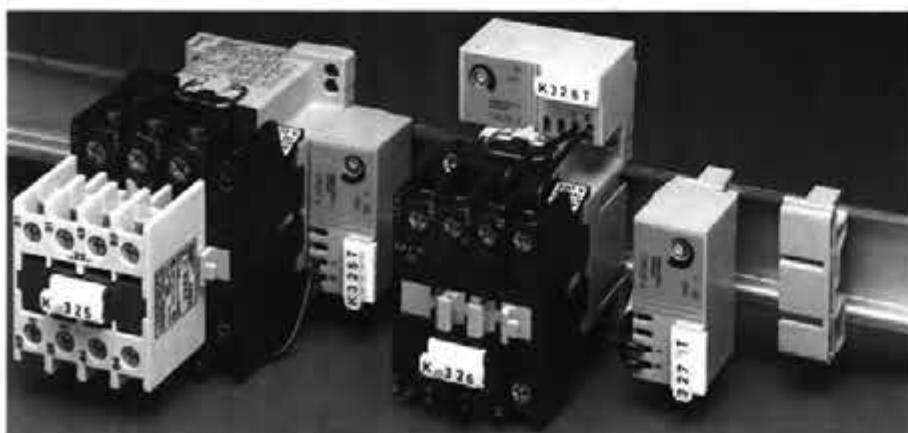
The auxiliary contact blocks can be snapped on and removed without changing any existing wiring—even when the contactors are arranged in line.



Marking with system

All modules can be identified with self-adhesive labels, paper tags or clip-on tags. The adhesive labels are resistant to temperature and ageing.

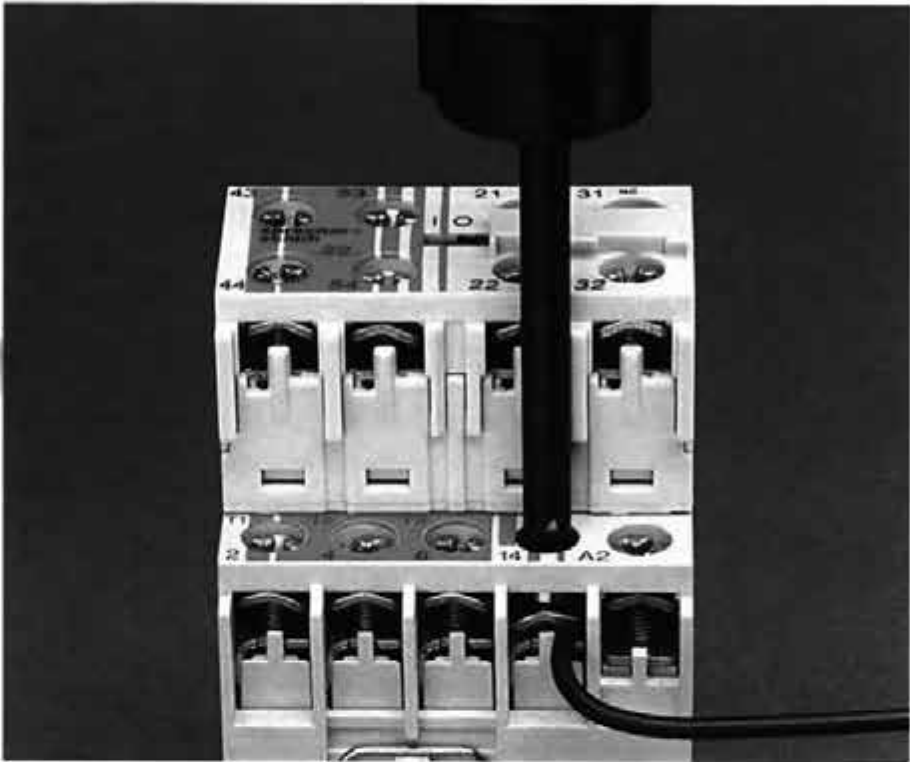
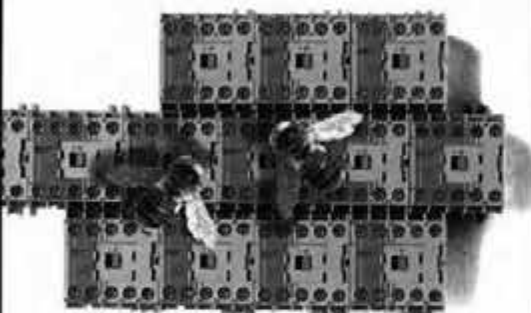
For added convenience, the sheets of self-adhesive labels and paper tags are compatible with typewriter line spacing.



Universal timing element

The CRZ 4 timing element can be used with any contactor up to about 37 kW. An adapter permits space-saving mounting on either DIN or G rails. With the CA 3 contactors, it is more easily inserted into the dove-tail grooves.

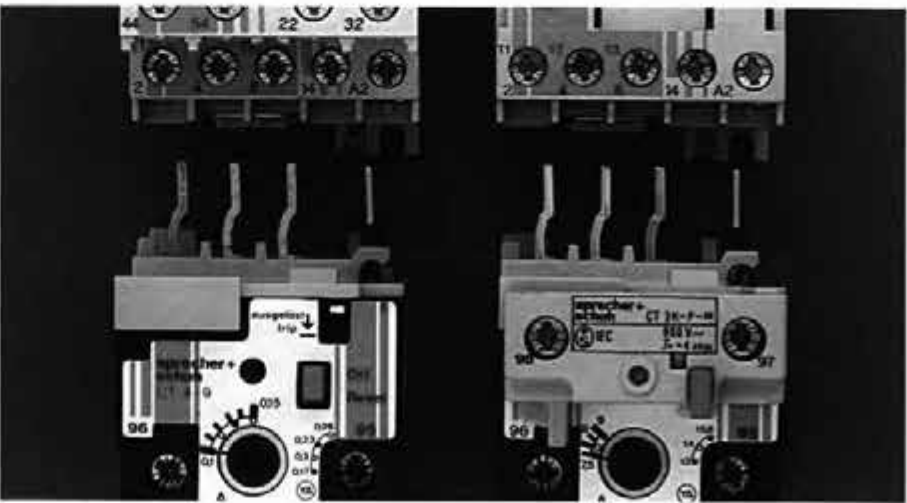
System efficiency



Efficiency with wiring

The CA 4 compact contactor system has been systematically designed for speedy wiring. All components have:

- ☐ Easily accessible connections
- ☐ Open terminals
- ☐ Universal slot screws
- ☐ Same size screw guides as on larger units. Both manual as well as power screwdrivers can be used; no toolbit changing is necessary.

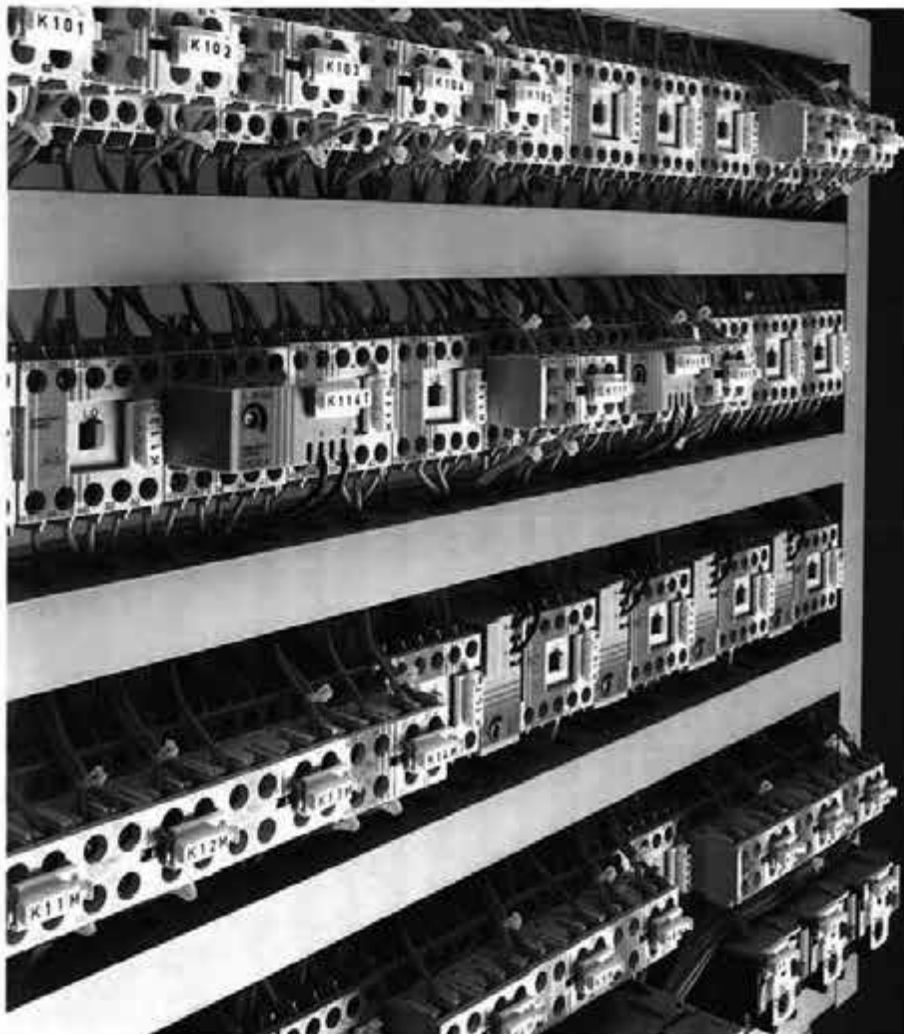


Costly time is saved when you use the CA 4 compact contactor system since the CA 4 is also easier to wire and put into operation.

Rapid assembly with integrated connectors

Fixed main and control connections permit rapid and reliable assembly of contactors and thermal overload

relays without additional wiring. The CT 3K-P-10 auxiliary contact block, an electrically isolated signal contact, can also be attached to the CT 4 thermal overload relay.



Efficient and versatile with initial operation and system expansion

The CA 4 compact contactor system permits modifications without structural changes during the initial operation phase or with subsequent system extension.

Low heat losses

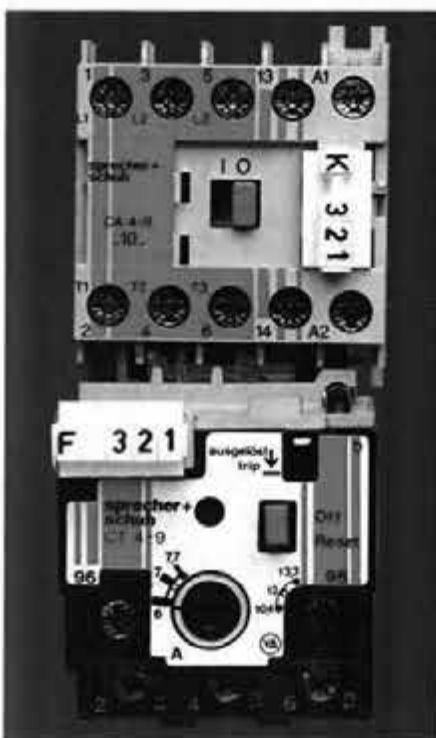
The low power consumption required for control purposes also contributes to efficiency:

AC pickup	= 22 VA
AC hold	= 1.4 W
DC pickup and hold	= 2.5 W

The result is significantly reduced heat losses which in turn permits even more compact installations and a noticeable reduction in power consumption.

No unnecessary noise

The switch-on and switch-off noise level is very low, particularly for DC operation.

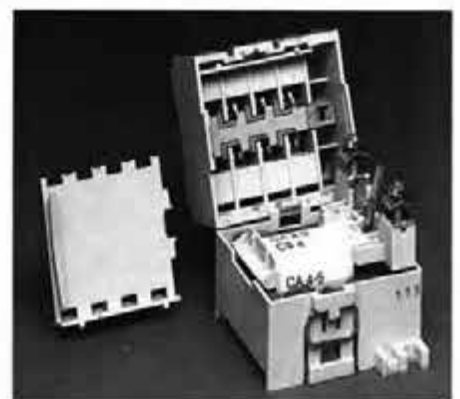


Simple testing

Testing procedures are considerably simplified due to manual operation of the contactors and through clear indication of the switched status—even when an auxiliary contact block is fitted.

Direct disconnect without separate control contact

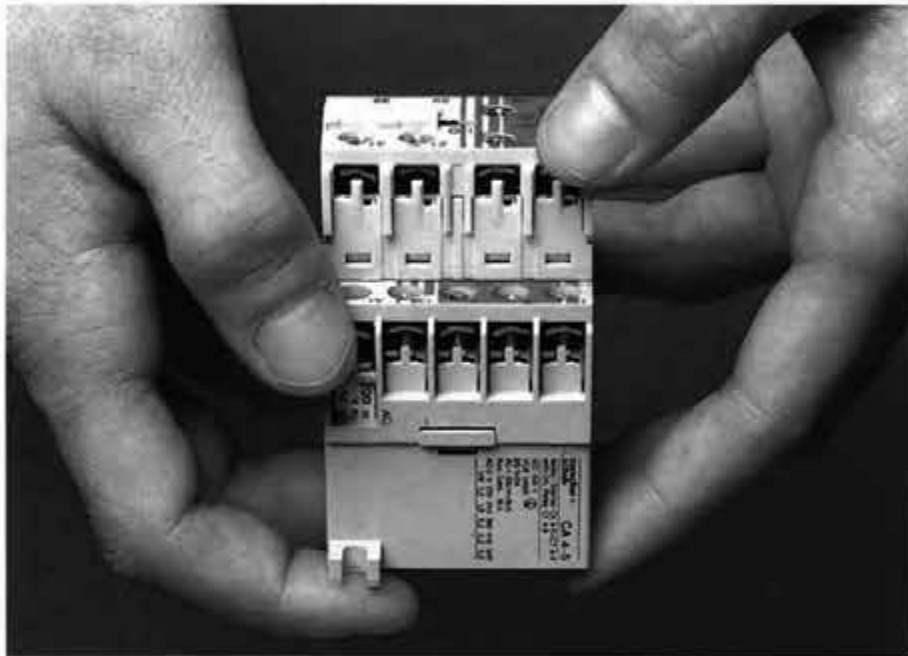
The red O/R button permits a direct disconnection of the load at the thermal overload relay without the need of a separate control contact. The O/R button is also used for test tripping and resetting.



Inspection possible

The contacts and the magnetic systems can be inspected after a simple disassembly procedure; even possible when the contactors are mounted in-line.

Reliable, hazard-free modules



All-round safety

All live components in the CA 4 compact contactor system are safety protected to avoid accidental human

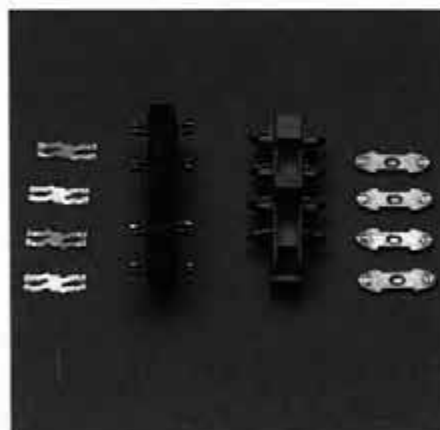
contact. All components are safe against back-of-hand and finger contact according to VBG 4 regulations.



Endurance tests passed with ease

All modules have demonstrated their reliability during stringent endurance tests. The AC magnet system and movement has a service life of 10 million operations—the DC magnet-system, 20 million. At the maximum permissible KW rating with AC 3 operation, the main contacts have an electrical life of 700,000 operations.

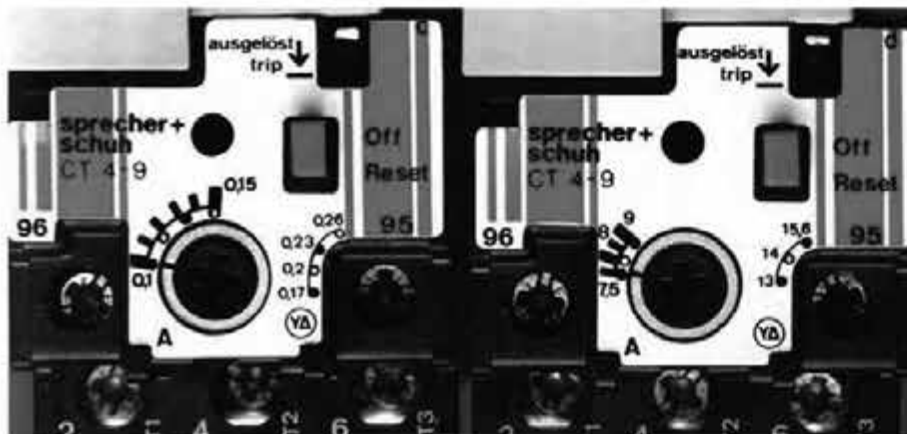
The components of the CA 4 compact contactor system complement each other to form a hazard-free system with long-term dependability.



High contact reliability

The CA 4 contactor system can also handle low voltages. Excellent encapsulation and special contact design are major factors for the high degree of contact reliability:

- ☐ On the basic unit: contacts with indentation
- ☐ On the auxiliary contact block: H-contact bridges with non-wear, self-aligning wiping contacts having a 4-way current path feature.



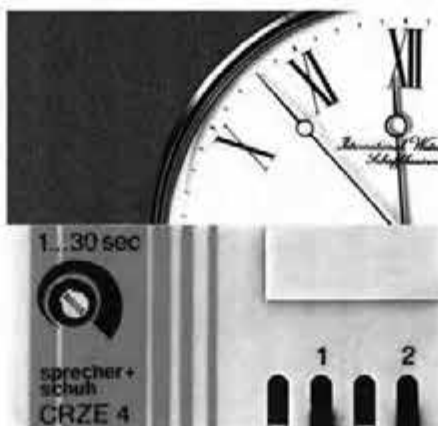
Correct setting made easy

Clear-to-see setting scales for direct and star-delta starting ensure correct and accurate current settings. The trip flag indicator on the thermal overload relay is also clear-to-see and simplifies trouble-shooting. The CT 4 thermal overload relay corresponds technically to the tested and proven CT 3-K. The only difference is the connecting lugs arranged to permit connection to the CA 4.



Motors accurately protected

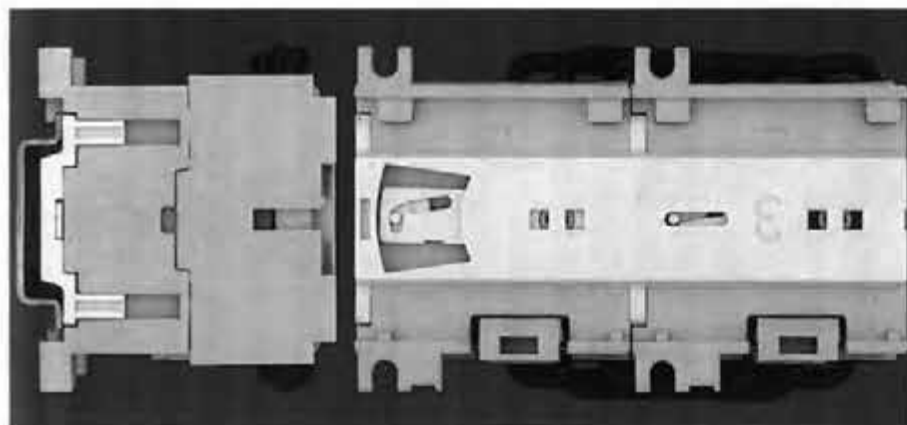
Every CT 4 thermal overload relay is individually calibrated for the highest and lowest current settings in accordance with a complex, prolonged heat-up period. This and the extensive experience of Sprecher + Schuh in the design and manufacture of thermal overload relays ensure a precise and reliable tripping response even after many years of operation.



Time under control

The innovative CRZ 4 timing element with its 0.1...3 s and 1...30 s adjustment range is totally convincing. It is simply connected in series with the coil and offers excellent repeatability and consistency characteristics.

The time scale is completely accessible in all mounting positions and contributes thus to adjustment reliability.



Dependable latching

The latching system causes an interlock to become effective prior to the contacts making.

Versatility

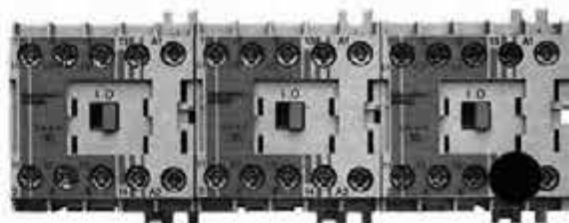
Whether the application is to switch and protect single- or multi-speed reversible motors up to 4 kW or up to 7.5 kW with star-delta starting, or to switch illumination and heating loads,

or to act as efficient and reliable logic switching elements in all kinds of control systems—the compact CA 4 contactor system is always the right choice.



Office technology and household

For controlling office machines, copiers and sorting installations. Swimming pool and sauna control systems, electric heating systems, refrigerators, household appliances, contact breakers.

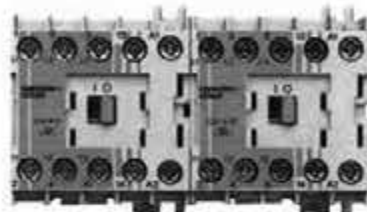


The CA 4 is a compact contactor system with a very wide application range: switching and protection actuation from any type of signal from any location.



Industry and mechanical engineering

Automated production plants, conveyor systems, filling plants, lifting equipment, process engineering, mixers, all types of manufacturing machinery, packing machinery.



Trade and agriculture

Conveyors, elevating platforms, refrigeration plants, compressors, meat processing and laundry machinery, commercial kitchen equipment, construction site lifts, sprinkling and irrigation, hay driers and live-stock buildings.



Environmental protection and building technology

Heat pumps, water pumps, waste water pumps, air-conditioning installations, heating control systems, lighting systems, operation of roller blinds, barriers, doors.



Worldwide application



The CA 4 compact contactor system is backed by decades of experience

For over eighty years, Sprecher + Schuh has been developing and manufacturing electrical equipment for protection and control purposes.

Sprecher + Schuh is active throughout the world

The worldwide service network and customer-oriented support offered by Sprecher + Schuh ensure reliability and a high level of product availability. The know-how and experience of the Sprecher + Schuh Group is available to customers everywhere.

Sprecher + Schuh—the right contact

Direct contact with a competent specialist who can analyze and provide a practical and economic approach to a specific customer problem, has always been part of the Sprecher + Schuh customer service.

Sprecher + Schuh equipment is approved worldwide

The CA 4 compact contactor system fully complies with the IEC recommendations as well as equivalent national standards and regulations. The system also complies with the stringent CSA and UL specifications. The requirements of countries having compulsory termination marking codes are also complied with.

Meeting all major international specification, the CA 4 compact contactor system is available worldwide.





Four requirements of the compact And the replies from

1

Despite increasing complexity, control systems and installations must become increasingly compact.

The CA 4 compact contactor system packs a maximum of performance into a minimum of space.



2

A contactor system is competitive only when it can reliably withstand the rigors of assembly, wiring and operation.

The superiority and industrial quality of all components in the CA 4 compact contactor system are demonstrated under grueling operating conditions.



t contactor system of the future. **n Sprecher + Schuh.**



3

Competitiveness also means being cost-effective: in stock control management, planning, assembly, wiring and in subsequent maintenance.

CA 4 is the compact contactor system that has been systematically designed for efficiency down to the last detail.



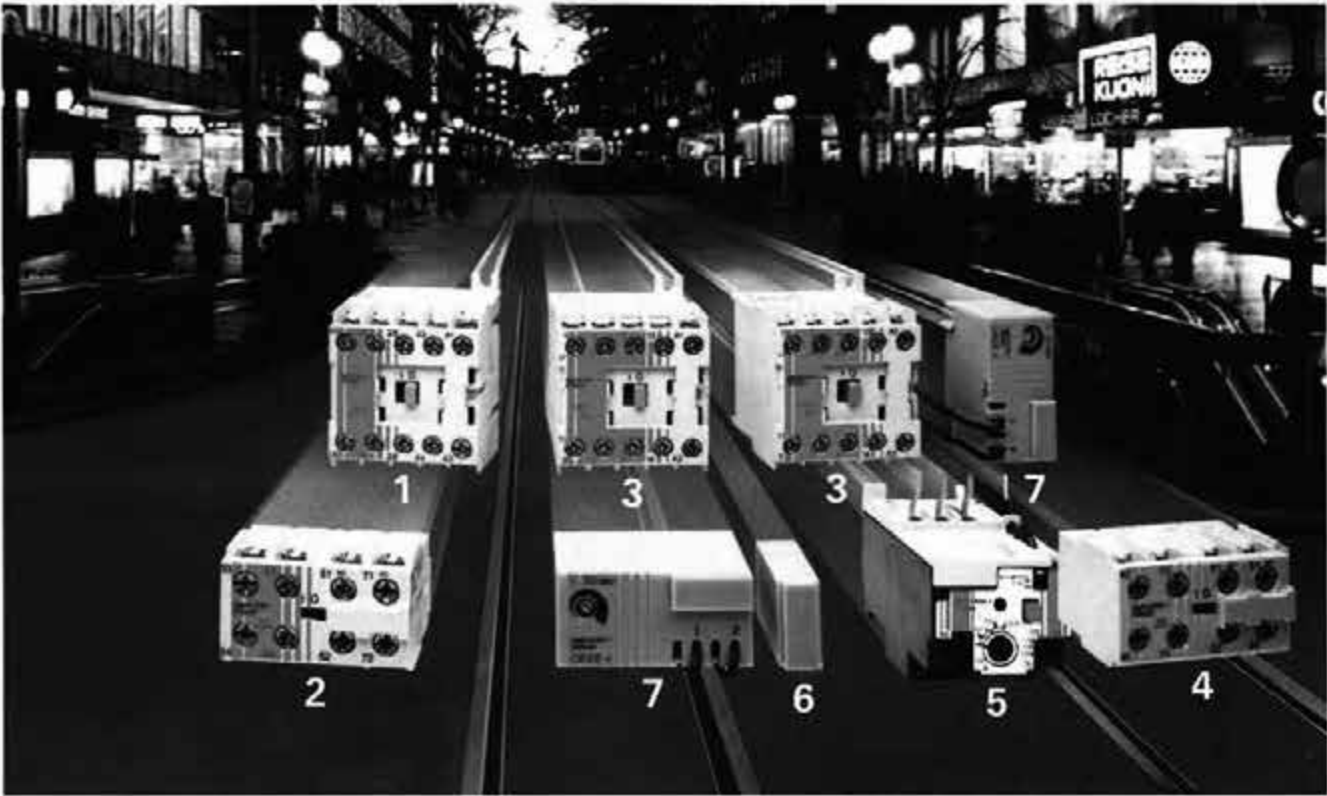
4











The control system of the future can be used worldwide. It has a long service life and provides interruption-free operation under the most stringent conditions.

The CA 4 compact contactor system complies with international specifications and standards. The high quality of all components assures trouble-free operation and long-term reliability.



Modules



1		<p>Control relay CS 4 Terminal markings in compliance with EN 50011 Integrated snap-on fastener for EN 50022-25 rail (DIN mounting rail). Fixing hole distance 50 mm</p>	6		<p>RC link CRC 4 For damping circuits of coils and contacts; for fitting on all labelling spaces or arbitrarily in cable channels.</p>
2		<p>Auxiliary contact blocks CS 4-P Terminal markings in compliance with EN 50011. Can be snap fitted onto the CS 4 control relay in a 2- or a 4pole form.</p>	7		<p>Timing elements CRZE 4 and CRZY 4 For time delay circuits, snap fitted onto an auxiliary contact location, on the right hand side of a contactor, or with aid of adapter on mounting rails.</p>
3		<p>Contactor CA 4-5 (2.2 kW) Contactor CA 4-9 (4 kW) Terminal markings in compliance with EN 50012. Assembly as for control relay CA 4.</p>			<p>Adapter CR 4-P For mounting timing element CRZ.. 4 on EN 50022-35 (DIN) mounting rails and G rails.</p>
4		<p>Auxiliary contact blocks CA 4-P Terminal markings in compliance with EN 50012. Can be snap fitted onto the contactor CA 4 in a 2- or a 4pole form.</p>			<p>Auxiliary contact block CT 3K-P-10 Attachable to front of thermal overload relay CT 4 as an independent signalling contact.</p>
5		<p>Thermal overload relay CT 4 Terminal markings in compliance with EN 50005. Can be fitted to contactors CA 4.</p>			<p>Mechanical interlock CM 4 Requires no additional space. Fitting from rear and recessed in end rails.</p>

Overview

Selection table

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Ordering information

Control relays CS 4
for AC and DC control



9

Contactors CA 4
for AC and DC control

Thermal overload relays CT 4

Auxiliary contact blocks CT 3K-P-10
Signal contact for thermal overload relay CT 4



10

Starters CA 4 + CT 4
for AC and DC control



11

Auxiliary contact blocks for CS 4

Auxiliary contact blocks for CA 4

Timing elements CRZE 4 and CRZY 4



12

Control voltage

Accessories



13

Reversing contactors



14

Reversing starters



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Dimensions

16...17

Technical information

18...23

Control relay, Contactors, Starters, Thermal overload relays

Selection table

Contactor

CS4 Control relay



CA 4-5



CA 4-9



Operating voltage	V	220	240	380	415	500	220	240	380	415	500	220	240	380	415	500
$I_{th}^{*)}$ open	^{*)} A	16	16	16	16	16	20	20	20	20	20	20	20	20	20	20
AC-1²⁾ open	kW	6	6.7	10.5	11.5	14	7.5	8.3	13.1	14.3	17.3	7.5	8.3	13.1	14.3	17.3
enclosed	^{*)} A	12	12	12	12	12	16	16	16	16	16	16	16	16	16	16
	kW	4.5	5	7.9	8.6	10	6	6.7	10.5	11.5	14	6	6.7	10.5	11.5	14
Switching of 3-phase motors																
AC-2 Slip ring motors	^{*)} A	5	4.5	3.7	3.4	2.8	6.5	6	5.3	4.8	4	12	11	9	8.2	7
AC-3 Squirrel cage mot.	^{*)} kW	1.1	1.1	1.5	1.5	1.5	1.5	1.5	2.2	2.2	2.2	3	3	4	4	4
Normal loading	HP	1.5	1.5	2	2	2	2	2	3	3	3	4	4	5.5	5.5	5.5
AC-4 Squirrel cage mot.	A	5	4.6	3.7	3.4	2.8	6.5	6	5.3	4.8	4	12	11	9	8.2	7
Heavy-duty-oper.	^{*)} kW	1.1	1.1	1.5	1.5	1.5	1.5	1.5	2.2	2.2	2.2	3	3	4	4	4
Inching	HP	1.5	1.5	2	2	2	2	2	3	3	3	4	4	5.5	5.5	5.5
	A						9	8	8.5	7.8	6.5	15	14	16	14	12
Star-delta starting	^{*)} kW						2.2	2.2	3.7	3.7	3.7	4	4	7.5	7.5	7.5
	HP						3	3	5	5	5	5.5	5.5	10	10	10
Rated insulation voltage																
according to IEC 158-1	V	500					500					500				
Test voltage 1 minute	V	3000					3000					3000				
Back-up fuse ^{*)}																
without ther. overl. relay	A	16					20					20				
Auxiliary contacts																
Aux. AC-11	A	2	2	1	1	0.6	2	2	1	1	0.6	2	2	1	1	0.6
contact I_{th} open	^{*)} A	10					10					10				
block I_{th} encapsul.	^{*)} A	6					6					6				
Back-up fuse ^{*)}	A	10					10					10				
Contactor AC-11	A	6	5	2.5	2	1.25	6	5	2.5	2	1.25	6	5	2.5	2	1.25
I_{th} open	^{*)} A	16					16					16				
I_{th} encapsul.	^{*)} A	12					12					12				
Back-up fuse ^{*)}	A	16					16					16				
Number of aux. contacts		4...8					1...5					1...5				
Coil burden																
AC pickup	VA(W)	22 (20)					22 (20)					22 (20)				
holding	VA(W)	4 (1.4)					4 (1.4)					4 (1.4)				
DC pickup	W	2.5					2.5					2.5				
holding	W	2.5					2.5					2.5				
Switching delay																
closing	ms	15...40 (AC); 18...40 (DC)					15...40 (AC); 18...40 (DC)					15...40 (AC); 18...40 (DC)				
opening	ms	15...25 (AC); 6...12 (DC)					15...25 (AC); 6...12 (DC)					15...25 (AC); 18...40 (DC)				
Service life																
mech. mill. ops.		10 (AC); 20 (DC)					10 (AC); 20 (DC)					10 (AC); 20 (DC)				
Main contacts	AC-3 mill. ops.	0.7					0.7					0.7				
Approvals UL (USA), CSA (Canada)																
Rated insul. voltage	V	300 (up to 1 HP = 600)					300 (up to 1 HP = 600)					300 (up to 1 HP = 600)				
Size												00 for ≤ 300 V				
Contin. rated curr.	300 V A	12					12					12				
	600 V A	5					5					5				
Voltage	AC V ^{*)}	300 600					115 200 230 460 575					115 200 230 460 575				
Mot. load (with/without therm. overl. relay)	HP 3 ph	- -					1 1.5 1 1					2 2 1 1				
	HP 1 ph						% %					% 1				
Contact class NEMA		A 600, Q 600					Aux. contacts A 600, Q 600					Aux. contacts A 600, Q 600				

Thermal overload relays

CT 4-9



Direct on-line setting range (see page 21)

Star-delta setting range (see page 21)

Thermal overload relay

for add-on fitment to contactor

Back-up fuse, max. rated current

¹⁾ I_{th} according to IEC, AS, BS, SEV. Corresponds to continuous current I_{th2} according to VDE.					
²⁾ Rated operational capacity according to IEC, AS, BS, DEMKO, NEMKO, SEMKO, Finland, SEV, VDE when switching 3 ~ resistive load 50-60 Hz.					
AC1 and I_{th} according to approval					
Contactor	CS 4 (C) CA 4-5 (C)	500 V 16 A	380 V 10 A		
	CA 4-9 (C)	500 V 16 A	380 V 12 A		
Auxiliary contact blocks	CS 4-P, CA 4-P	500 V 10 A	380 V 2 A		

min 0.1 max. 9A

min 0.17 max. 15.6 A

CT 4

CA 4-5, CA 4-9

see page 21

³⁾ "Open" values are in respect of an ambient temperature of 40°C. "enclosed" values are for 60°C.⁴⁾ Rated operational current and rated operational capacity for 50/60 Hz according to IEC, AS, BS, SEV, VDE 0660.⁵⁾ See page 9.⁶⁾ Motors—Nominal voltages. The corresponding supply voltages are: 220...240 V, 440...480 V, 550...660 V.

Arrangement
Order no.
Index no.

Control relays CS 4

For AC control
For DC control

Control relay CS 4, complete unit
Preferred arrangement according
to EN 50011

Contact diagram

Arrangement

EN
ref.

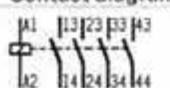
No.
14

Control

Order no.

Index no.

Weight [g]



40 E

4 0

AC

CS 4 ...V.. -40 E

001

151

DC

CS 4 C-...VDC-40 E

002



31 Z

3 1

AC

CS 4 ...V.. -31 Z

003

DC

CS 4 C-...VDC-31 Z

004



22 Z

2 2

AC

CS 4 ...V.. -22 Z

005

DC

CS 4 C-...VDC-22 Z

006



40 E + 02

42 E

4 2

AC

CS 4 ...V.. -42 E

007

176

DC

CS 4 C-...VDC-42 E

008



22 Z + 20

42 X

4 2

AC

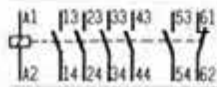
CS 4 ...V.. -42 X

009

DC

CS 4 C-...VDC-42 X

010



40 E + 11

51 E

5 1

AC

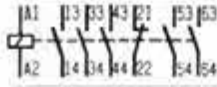
CS 4 ...V.. -51 E

011

DC

CS 4 C-...VDC-51 E

012



31 Z + 20

51 X

5 1

AC

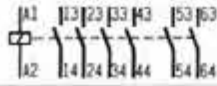
CS 4 ...V.. -51 X

013

DC

CS 4 C-...VDC-51 X

014



40 E + 20

60 E

6 0

AC

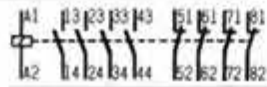
CS 4 ...V.. -60 E

015

DC

CS 4 C-...VDC-60 E

016



40 E + 04

44 E

4 4

AC

CS 4 ...V.. -44 E

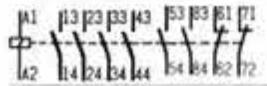
017

184

DC

CS 4 C-...VDC-44 E

018



40 E + 22

62 Z

6 2

AC

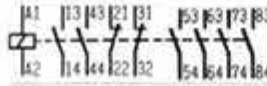
CS 4 ...V.. -62 Z

019

DC

CS 4 C-...VDC-62 Z

020



22 Z + 40

62 X

6 2

AC

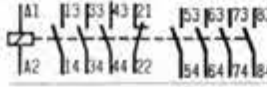
CS 4 ...V.. -62 X

021

DC

CS 4 C-...VDC-62 X

022



31 Z + 40

71 X

7 1

AC

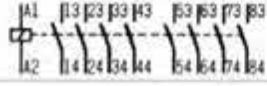
CS 4 ...V.. -71 X

023

DC

CS 4 C-...VDC-71 X

024



40 E + 40

80 E

8 0

AC

CS 4 ...V.. -80 E

025

DC

CS 4 C-...VDC-80 E

026

Order no. supplement

For AC control (see page 13)

For DC control (see page 13)

Dimensions (see page 16-17)

...V..

...VDC

*) N/o and n/c contacts reciprocally coupled.

Do not use auxiliary contact blocks with n/c contacts.

*) Coordination type "c" according to IEC 292-1A: short-circuit protection for contactor/contactor with thermal overload relay, easily partible contact welding permissible. Time x current characteristic curve remains unchanged, no other damage.
Coordination type "a" according to IEC 292-1A: in event of high short-circuit currents interruptions at thermal overload relay and possible contact welding.
Auxiliary contacts: short-circuit protection without contact welding (IEC 337-1B): Low voltage and HRC fuses in compliance with IEC 269-2 and -3, gl, gll; VDE 0636/2/3, gL; SEV 1010, T; SEV 1018, T2; SEV 1066, gl; e.g. Sprecher + Schuh type SM and SN 2, Siemens type 3 NA 1; GEC-Engelsh electric types T and GTF ... slow-acting screw type fuses (DT). One rated current stage higher is permissible for fast-acting screw type fuses (D). Backup fuses for full-line short-circuit current and routing system protection on request.

For AC control
For DC control

Arrangement
Order no.
Index no.

3 main contacts
1 auxiliary contact



Rated thermal current I_{th} enclosed	Three-phase motors at 380/415 V AC-3	EN ref. con-tactor	Con-trol	Order no.	Control voltage	EN ref. con-tactor	Index no.	Weight [g]
16 A	2.2 kW	10	AC	CA 4-5	...V..	-10	001	152
		01	AC	CA 4-5	...V..	-01	002	
		10	DC	CA 4-5 C-...	VDC	-10	003	196
		01	DC	CA 4-5 C-...	VDC	-01	004	
16 A	4 kW	10	AC	CA 4-9	...V..	-10	005	153
		01	AC	CA 4-9	...V..	-01	006	
		10	DC	CA 4-9 C-...	VDC	-10	007	196
		01	DC	CA 4-9 C-...	VDC	-01	008	

Order no. supplement

For AC control (see page 13)

For DC control (see page 13)

Dimensions (see page 16)

...V..
...VDC

Additional auxiliary contacts (see page 12)

Permissible alternatives

Contactor CA 4...-10		Aux. contact block CA 4-P-02		CA 4-P-11		CA 4-P-22	
----------------------	--	------------------------------	--	-----------	--	-----------	--

All aux. contact blocks CS 4-P-... (see page 12)

Contactor CA 4...-01		Aux. contact block CS 4-P-20		CS 4-P-11		CS 4-P-40	
----------------------	--	------------------------------	--	-----------	--	-----------	--

Thermal overload relay CT 4 for attachment to Contactor CA 4

Adjustment range

Direct starting	Star-delta starting	For attachment to contactor CA ...	Max. rated curr. for back-up fuse [A] Coordin. type ¹⁾	Order no.	Index no.	Weight [g]
0.1 ... 0.15 A	0.17 ... 0.26 A ⁴⁾	4-5, 4-9	25 ²⁾ 0.63 ²⁾	CT 4-0.15 A	009	135
0.15 ... 0.23 A	0.26 ... 0.40 A ⁴⁾		25	CT 4-0.23 A	010	
0.23 ... 0.35 A	0.40 ... 0.61 A ⁴⁾		25	CT 4-0.35 A	011	
0.35 ... 0.55 A	0.61 ... 0.95 A		25	CT 4-0.55 A	012	
0.55 ... 0.80 A	0.95 ... 1.40 A		25	CT 4-0.80 A	013	
0.80 ... 1.20 A	1.40 ... 2.10 A		25	CT 4-1.20 A	014	
1.20 ... 1.80 A	2.10 ... 3.10 A		25	CT 4-1.80 A	015	
1.80 ... 2.70 A	3.10 ... 4.70 A		25	CT 4-2.70 A	016	
2.70 ... 4 A	4.70 ... 6.90 A		25	CT 4-4 A	017	
4 ... 6 A	6.90 ... 10.40 A		25	CT 4-6 A	018	
6 ... 7.7 A	10.40 ... 13.30 A		25	CT 4-7.70 A	019	
7.5 ... 9 A	13 ... 15.60 A		25	CT 4-9 A	020	



Auxiliary contact block CT 3K-P-10



Auxiliary contact block CT 3K-P-10

CT 3K-P-10

021

15

Footnotes ¹⁾ ... ⁴⁾ see page 21

Dimensions (see pages 16 ... 17)

²⁾ Normally open and normally closed contacts reciprocally coupled.

Arrangement
Order no.
Index no.

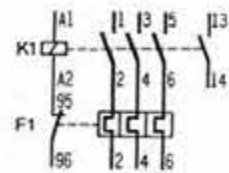
Starters CA 4 + CT 4

For AC control
For DC control

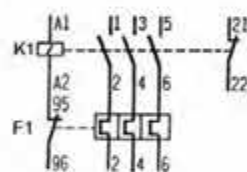
Starters CA 4-5 (C) + CT 4, CA 4-9 (C) + CT 4

Contactor with thermal
overload relay fitted
3 main contacts

EN ref. no. 10



EN ref. no. 01



Switching of 3-phase motor at 380/415 V	AC-3 [kW]	Thermal overl. relay range [A]	EN ref. no contac- tor	Con- trol	Order no.	Index no.	Weight [g]
0.02	0.1 ... 0.15		10	AC	CA 4-5 -...V.. -10 + CT 4/0.15 A	001	288
			01	AC	CA 4-5 -...V.. -01 + CT 4/0.15 A	002	
0.04	0.15 ... 0.23		10	DC	CA 4-5 C-...VDC-10 + CT 4/0.15 A	003	
			01	DC	CA 4-5 C-...VDC-01 + CT 4/0.15 A	004	
			10	AC	CA 4-5 -...V.. -10 + CT 4/0.23 A	005	
			01	AC	CA 4-5 -...V.. -01 + CT 4/0.23 A	006	
			10	DC	CA 4-5 C-...VDC-10 + CT 4/0.23 A	007	
			01	DC	CA 4-5 C-...VDC-01 + CT 4/0.23 A	008	
0.06 1/2	0.23 ... 0.35		10	AC	CA 4-5 -...V.. -10 + CT 4/0.35 A	009	
			01	AC	CA 4-5 -...V.. -01 + CT 4/0.35 A	010	
			10	DC	CA 4-5 C-...VDC-10 + CT 4/0.35 A	011	
			01	DC	CA 4-5 C-...VDC-01 + CT 4/0.35 A	012	
0.09 %	0.35 ... 0.55		10	AC	CA 4-5 -...V.. -10 + CT 4/0.55 A	013	
			01	AC	CA 4-5 -...V.. -01 + CT 4/0.55 A	014	
			10	DC	CA 4-5 C-...VDC-10 + CT 4/0.55 A	015	
			01	DC	CA 4-5 C-...VDC-01 + CT 4/0.55 A	016	
0.18 %	0.55 ... 0.80		10	AC	CA 4-5 -...V.. -10 + CT 4/0.80 A	017	
			01	AC	CA 4-5 -...V.. -01 + CT 4/0.80 A	018	
			10	DC	CA 4-5 C-...VDC-10 + CT 4/0.80 A	019	
			01	DC	CA 4-5 C-...VDC-01 + CT 4/0.80 A	020	
0.37 %	0.80 ... 1.20		10	AC	CA 4-5 -...V.. -10 + CT 4/1.20 A	021	
			01	AC	CA 4-5 -...V.. -01 + CT 4/1.20 A	022	
			10	DC	CA 4-5 C-...VDC-10 + CT 4/1.20 A	023	
			01	DC	CA 4-5 C-...VDC-01 + CT 4/1.20 A	024	
0.55 %	1.20 ... 1.80		10	AC	CA 4-5 -...V.. -10 + CT 4/1.80 A	025	
			01	AC	CA 4-5 -...V.. -01 + CT 4/1.80 A	026	
			10	DC	CA 4-5 C-...VDC-10 + CT 4/1.80 A	027	
			01	DC	CA 4-5 C-...VDC-01 + CT 4/1.80 A	028	
0.75 1	1.80 ... 2.70		10	AC	CA 4-5 -...V.. -10 + CT 4/2.70 A	029	
			01	AC	CA 4-5 -...V.. -01 + CT 4/2.70 A	030	
			10	DC	CA 4-5 C-...VDC-10 + CT 4/2.70 A	031	
			01	DC	CA 4-5 C-...VDC-01 + CT 4/2.70 A	032	
1.1 1.5	2.70 ... 4		10	AC	CA 4-5 -...V.. -10 + CT 4/4 A	033	
			01	AC	CA 4-5 -...V.. -01 + CT 4/4 A	034	
			10	DC	CA 4-5 C-...VDC-10 + CT 4/4 A	035	
			01	DC	CA 4-5 C-...VDC-01 + CT 4/4 A	036	
2.2 3	4 ... 6		10	AC	CA 4-5 -...V.. -10 + CT 4/6 A	037	
			01	AC	CA 4-5 -...V.. -01 + CT 4/6 A	038	
			10	DC	CA 4-5 C-...VDC-10 + CT 4/6 A	039	
			01	DC	CA 4-5 C-...VDC-01 + CT 4/6 A	040	
3 4	6 ... 7.70		10	AC	CA 4-9 -...V.. -10 + CT 4/7.70 A	041	
			01	AC	CA 4-9 -...V.. -01 + CT 4/7.70 A	042	
			10	DC	CA 4-9 C-...VDC-10 + CT 4/7.70 A	043	
			01	DC	CA 4-9 C-...VDC-01 + CT 4/7.70 A	044	
4 5.5	7.50 ... 9		10	AC	CA 4-9 -...V.. -10 + CT 4/9 A	045	
			01	AC	CA 4-9 -...V.. -01 + CT 4/9 A	046	
			10	DC	CA 4-9 C-...VDC-10 + CT 4/9 A	047	
			01	DC	CA 4-9 C-...VDC-01 + CT 4/9 A	048	

Order no. supplement

For AC control (see page 13)

For DC control (see page 13)

Dimensions (see pages 16 ... 17)

...V..

...VDC

Auxiliary contact block for CS 4, CA 4

Timing element CRZE 4, Timing element CRZY 4

Arrangement
Order no.
Index no.

Auxiliary contact blocks for control relay CS 4

Arrangements according to EN 50 005
and DIN 46 199

Contact diagram		No. of con- tacts	No. of	Order no.	Index no.	Weight [g]
	Aux. contact block 02	2	– 2	CS 4-P-02	001	25
	Aux. contact block 11	2	1 1	CS 4-P-11	002	
	Aux. contact block 20	2	2 –	CS 4-P-20	003	
	Aux. contact block 04	4	– 4	CS 4-P-04	004	33
	Aux. contact block 22	4	2 2	CS 4-P-22	005	
	Aux. contact block 40	4	4 –	CS 4-P-40	006	

Auxiliary contact blocks for CA 4 contactors

Contact diagram		EN ref. no.	Aux. contact block control Control	Order- no.	Control voltage	No. of aux. contacts	Index no.	Weight [g]
	Auxiliary contact block 02							
	attached to CA 4-... -10	10 + 02	AC	CA 4-... -...V.. -12		007		177
	attached to CA 4-... C-10	10 + 02	DC	CA 4-...C-...VDC-12		008		
	separately supplied	02		CA 4-P-02		009		+ 25
	Auxiliary contact block 11							
	attached to CA 4-... -10	10 + 11	AC	CA 4-... -...V.. -21		010		177
	attached to CA 4-... C-10	10 + 11	DC	CA 4-...C-...VDC-21		011		
	separately supplied	11		CA 4-P-11		012		+ 25
	Auxiliary contact block 22							
	attached to CA 4-... -10	10 + 22	AC	CA 4-... -...V.. -32		013		188
	attached to CA 4-... C-10	10 + 22	DC	CA 4-...C-...VDC-32		014		
	separately supplied	22		CA 4-P-22		015		+ 33

Order no. supplement

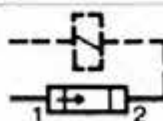
For AC control (see page 13)

For DC control (see page 13)

...V..

...VDC

Timing element CRZE 4



Timing element CRZE 4

setting time 1 ... 30 s

setting time 0.1 ... 3 s

response delay AC/DC 110 ... 250 V

CRZE 4-30 s

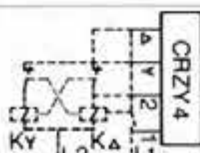
016

42

CRZE 4-3 s

017

Timer CRZY 4



Timer CRZY 4

Setting time 1 ... 30 s

For delayed switchover
with fixed switching interval

AC only 110 ... 120 V

AC only 220 ... 250 V

CRZY 4-30 s-120 V

018

50

CRZY 4-30 s-250 V

019

²⁾ Normally open and normally closed contacts reciprocally coupled.

Arrangement
Order no.
Index no.

Control voltages Accessories

Control voltage

Order no. supplement for AC control

Possible control voltages:
min. 12 V, 50 Hz/60 Hz
max. 575 V ... 600 V, 60 Hz

Intermediate values

Normal control voltages

24 V, 50 Hz/60 Hz 110 V, 50 Hz, 110 ... 120 V, 60 Hz
48 V, 50 Hz/60 Hz 220 V, 50 Hz, 220 ... 240 V, 60 Hz
240 V, 50 Hz/60 Hz
380 V, 50 Hz/60 Hz

Normal control voltage

Special control voltage

Order no.

Index no.

Weight [g]

... V..

001

On request

Order no. supplement for DC control

Possible control voltages
Min. DC 12 V, max. DC 250 V

Intermediate values

Normal control voltages:

DC 12 V

DC 24 V

DC 48 V

DC 110 V

DC 125 V

DC 220 V

Normal control voltage

Special control voltage

... VDC

003

On request

Accessories



Adapter CR 4-P in packets of 10
for mounting CRZ... 4 timing element blocks
on EN 50022-35 cap rails and G-rails

25.950.207

009

5

RC Links

Snap-on attachment to contactors CS 4, CA 4-5, CA 4-9
Thermal overload relay CT 4-9
Auxiliary contact blocks CA 4-P, CS 4-P



For limitation of surge voltages when coil
circuits are broken (coil itself provides
sufficient limitation at voltages over 240 V)

RC Link CRC 4

24 V ... 48 V 50/60 Hz

25.950.111-01

010

11

110 V ... 240 V 50/60 Hz

25.950.111-02

011

Diode link CRD 4 DC 12 ... 250 V

25.950.113-01

013

Varistor link CRV (use CRV 3 catalog 22 02)



Mechanical interlock CM 4 (in packets of 10)
For 2 Contactors CA 4 or CS 4
only with AC control

25.951.301-01

021

8



Neutral link 16 mm²

with insulated part for sliding onto contactor

Neutral link 10 mm²

with insulated part for sliding onto contactor

Neutral link 10 mm²

without insulated part for attachment to baseplate

On request



Label sheet

with 105 self-adhesive paper labels

22.145.223-01

017



Marking tag sheet

perforated, with 160 paper tags

22.145.203-01

018



Transparent cover (in packets of 100)
for paper tags

22.145.202-01

019



Tag carrier (in packets of 100)
for marking with clip-on tags
(see catalog 1900)

22.145.201-01

020

Reversing contactors CAU(M) 4

For AC control
For DC control

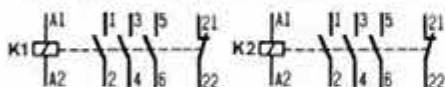
Arrangement
Order no.
Index no.

Reversing contactor CAU 4

Combination of 2 contactors
with main and connection,
control connection
and electrical interlock

For maintained contact control P

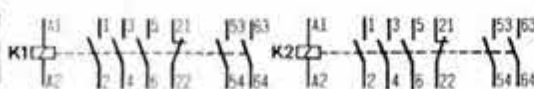
Without spare auxiliary contacts:



Arrangement	AC-3 at 380/415 V 2.2 kW	Control	Order no.	Control voltage	Control method (Aux. contact)	Index no.	Weight [g]
CA 4-5-01		AC	CAU..4-5	...V..	-01 P	001	202
		DC	CAU..4-5C	...VDC	-01 P	002	
CA 4-9-01	4 kW	AC	CAU..4-9	...V..	-01 P	003	204
		DC	CAU..4-9C	...VDC	-01 P	004	

For impulse contact control D

With spare auxiliary contacts:
each 1 n/o 63-64



Arrangement	AC-3 at 380/415 V 2.2 kW	Control	Order no.	Control voltage	Control method (Aux. contact)	Index no.	Weight [g]
CA 4-5-01		AC	CAU..4-5	...V..	-21 D	005	252
		DC	CAU..4-5C	...VDC	-21 D	006	
CA 4-9-01	4 kW	AC	CAU..4-9	...V..	-21 D	007	264
		DC	CAU..4-9C	...VDC	-21 D	008	

Additional auxiliary contacts

With impulse contact control
1 n/o occupied for function



Auxiliary contact block
CS4-P-11

CS 4-P-11

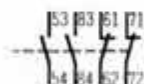
009 + 25



Auxiliary contact block
CS4-P-20

CS 4-P-20

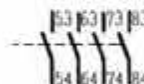
010 + 25



Auxiliary contact block
CS4-P-22

CS 4-P-22

011 + 33



Auxiliary contact block
CS4-P-40

CS 4-P-40

012 + 33

Order no. supplement

For mechanical interlock (only with AC control)

For AC control (see page 13)

For DC control (see page 13)

CAU..4-...

M

...V..

...VDC

013 (+) + 10

Dimensions (see pages 16...17)

Arrangement
Order no.
Index no.

Reversing starter CAU(M) 4 + CT 4

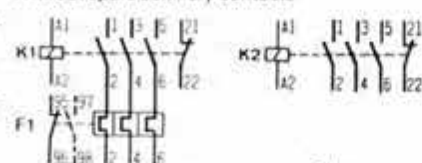
For AC control
For DC control

Reversing starters CAU 4 + CT 4

Combination of 2 contactors, 1 thermal overload relay with main connection, control connection and electrical interlock

For maintained current control P

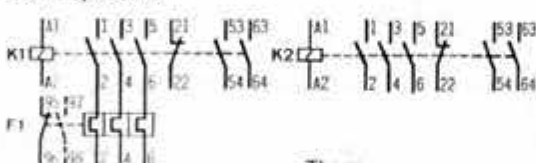
Without spare auxiliary contacts



Arrangement	AC-3 at 380/415 V	Therm. overload relay adjustm. range	Control	Order no.	Control volt.	Control method Aux. contact	Thermal overload relay	Index no.	Weight [g]
CA 4-5-01	2.2 kW	4...6 A ¹⁾	AC	CAU..4-5	...V..	-01 P +	CT 4/6 A	001	437
			DC	CAU 4-5C	...VDC	-01 P +	CT 4/6 A	002	
CA 4-9-01	4 kW	7.5...9 A ¹⁾	AC	CAU..4-9	...V..	-01 P +	CT 4/9 A	003	439
			DC	CAU 4-9C	...VDC	-01 P +	CT 4/9 A	004	

For impulse contact control D

With spare auxiliary contacts, each 1 n/o 63-64



Arrangement	AC-3 at 380/415 V	Therm. overload relay adjustm. range	Control	Order no.	Control volt.	Control method Aux. contact	Thermal overload relay	Index no.	Weight [g]
CA 4-5-01	2.2 kW	4...6 A ¹⁾	AC	CAU..4-5	...V..	-21 D +	CT 4/6 A	005	462
			DC	CAU 4-5C	...VDC	-21 D +	CT 4/6 A	006	
CA 4-9-01	4 kW	7.5...9 A ¹⁾	AC	CAU..4-9	...V..	-21 D +	CT 4/9 A	007	464
			DC	CAU 4-9C	...VDC	-21 D +	CT 4/9 A	008	

Additional auxiliary contacts

With impulse contact control:
1 n/o occupied for function



	Auxiliary contact block CS 4-P-11	CS 4-P-11	009	+ 25
--	-----------------------------------	-----------	-----	------



	Auxiliary contact block CS 4-P-20	CS 4-P-20	010	+ 25
--	-----------------------------------	-----------	-----	------



	Auxiliary contact block CS 4-P-22	CS 4-P-22	011	+ 33
--	-----------------------------------	-----------	-----	------



	Auxiliary contact block CS 4-P-40	CS 4-P-40	012	+ 33
--	-----------------------------------	-----------	-----	------

Order no. supplement

For mechanical interlock (only with AC control)

For AC control (see page 13)

For DC control (see page 13)

CAU..4-..

M

013 (+)

...V..

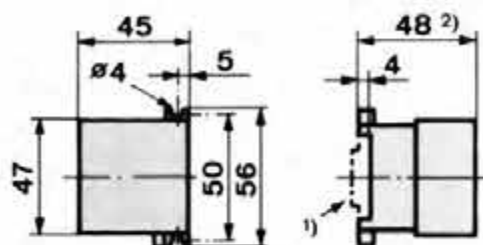
...VDC

Dimensions (see pages 16...17)

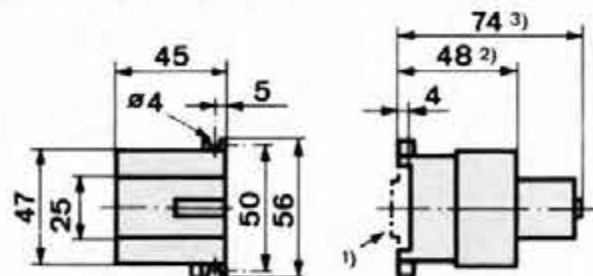
¹⁾ See page 10 for further adjustment ranges

Dimensions [mm]

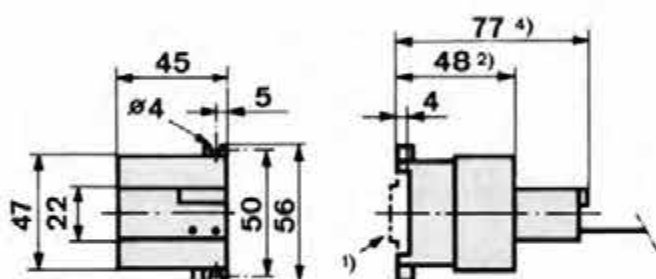
Control relay CS 4, Contactors CA 4-5 and CA 4-9



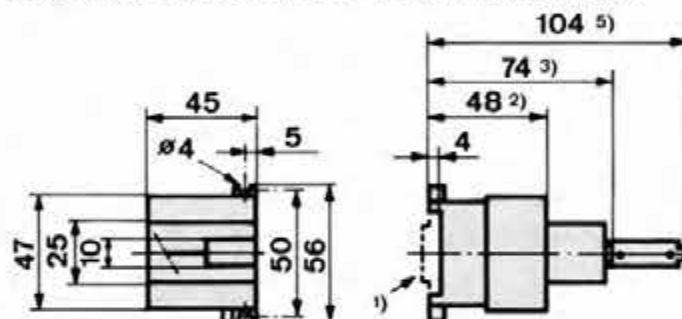
Control relay CS 4, Contactors CA 4-5 and CA 4-9 with auxiliary block CS 4-P or CA 4-P



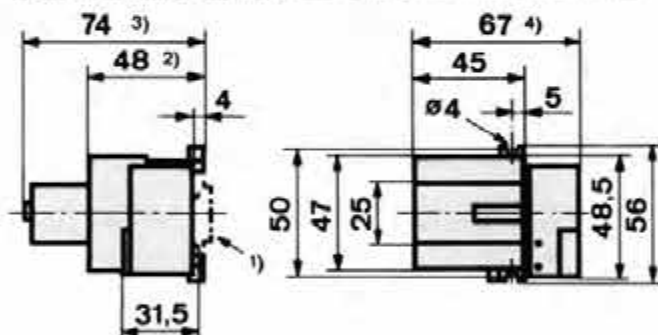
Control relay CS 4, Contactors CA 4-5 and CA 4-9 with timing elements CRZE 4 and CRZY 4



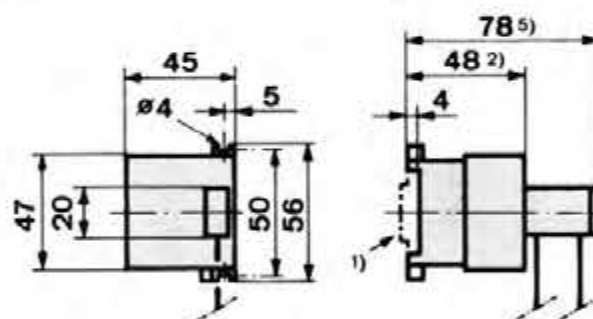
Control relay CS 4, Contactors CA 4-5 and CA 4-9 with auxiliary contact block CS 4-P or CA 4-P and RC link CR 4



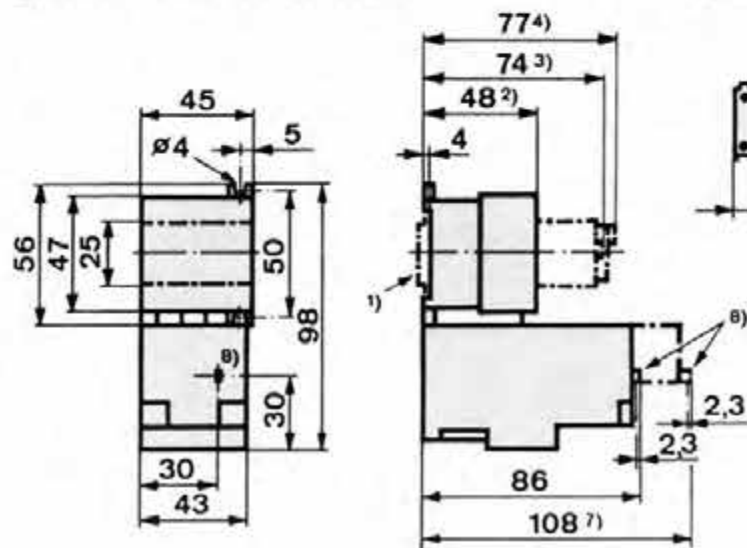
Control relay CS 4, Contactors CA 4-5 and CA 4-9 with auxiliary contact block CS 4-P or CA 4-P mounted in front and timing elements CRZE 4 and CRZY 4 mounted on side



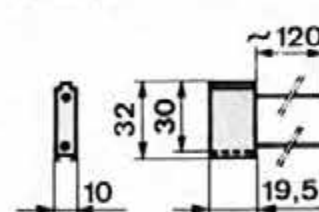
Control relay CS 4, Contactors CA 4-5 and CA 4-9 with RC links CR 4



Starters CA 4-5 + CT 4 and CA 4-9 + CT 4



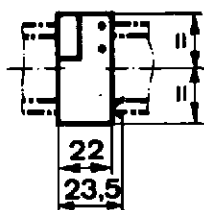
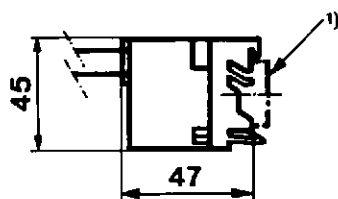
RC link CR 4



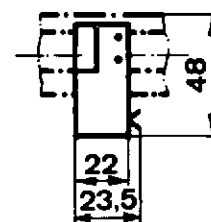
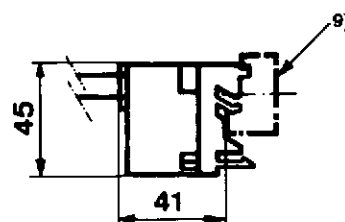
See page 17 for footnotes

Dimensions [mm]

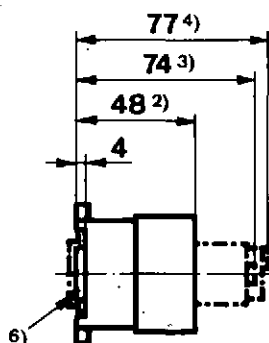
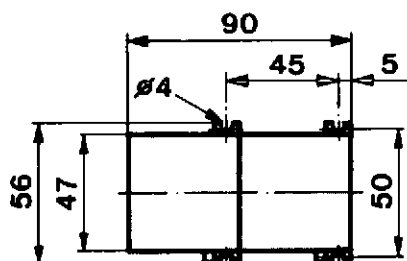
Timing elements CRZE 4 and CRZY 4
with CR 4-P adapter on EN 50022-35 DIN rail



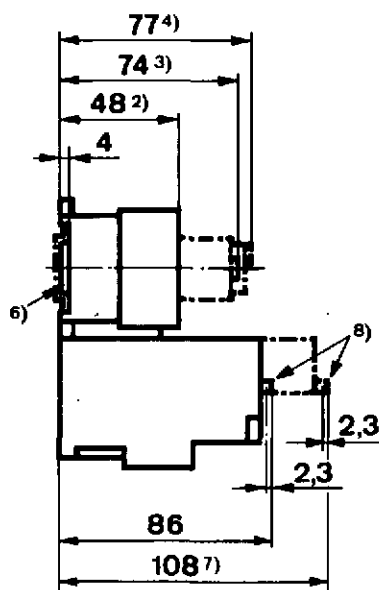
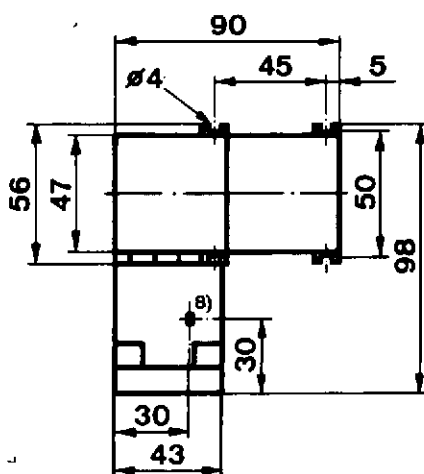
Timing elements CRZE 4 and CRZY 4
with CR 4-P adapter on EN 50022-35 G-rail



Reversing contactor CAU(M) 4-5
CAU(M) 4-9



Reversing starter CAU(M) 4-5 + CT 4
CAU(M) 4-9 + CT 4



1) Possibility of attachment to EN 50022-35 DIN rail.

2) Basic unit without modules.

3) With auxiliary contact block CS 4-P, CA 4-P.

4) With timing elements CRZE 4 and CRZY 4.

5) With CR...4 RC link.

6) Mechanical interlock: fixing by means of continuous even surface or DIN rail EN 50022-35 (combined DIN/G-rail can not be used).

7) With auxiliary contact CT 3-P-10 on thermal overload relay.

8) O/L button: 2,3 mm min travel = off, also reset.

9) Possibility of attachment to DIN 46277 G-rail.

Auxiliary contactors CS 4

Contactors CA 4

Technical information

Specifications

IEC 337-1, 292-1, 158-1
BS 5424, 4794
CEE 24
CEI 17-3, 17-7
CSA C22.2 No. 0, C22.2 No. 14

SEV 1025
UTE NF C63-110
UL 508
VDE 0660

Approvals

SEV, CSA, UL,
DEMKO, NEMKO, SEMKO, Finland,
Germ. Lloyd, Büro Veritas, USSR register

Ambient temperature

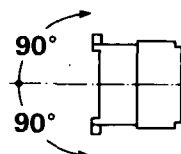
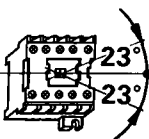
In store, transport	-55°C ... +80°C
In operation AC-1, encapsulated CA-2 ... AC-4	
at rated operational current	-50°C ... +60°C
at 85% rated operational current	-50°C ... +70°C
In operation AC-1, open	-50°C ... +40°C

Tropicalisation

Humid heat	
40°C/95% relative humidity	56 days
Alternating climatic conditions	
23°C, 83%/40°C, 93%	56 cycles

Mounting position

No restrictions
(maximum pull-in voltage and temperature range
with all permissible auxiliary contact blocks)
Direct current operation DC
Alternating current operation AC



Working range

Safe pull-in CA 4-...	0.85 U_s
CS 4	0.8 U_s
Continuous	1.1 U_s
Drop out Alternating current AC	0.35 ... 0.65 U_s
Direct current DC	0.1 ... 0.25 U_s

Protection against accidental contact

Protection against finger and back of the hand contact

According to VBG 4
(Professional Association for Precision and Electrical Engineering,
Fed. Rep. Ger.)

Terminals

Screw terminals

Wire 2×0.75 ... 2.5 mm²
Stranded lead 2×1.0 ... 2.5 mm² without connector sleeve
2×0.75 ... 1.5 mm² with connector sleeve

Control relays CS 4

Contactors CA 4

Technical information

Electrical life

Duty classification and actuation conditions for electrical service life verification (number of actuations under load in accordance with IEC 158-1, AC-2 in accordance with UTE, NF C 63-110)

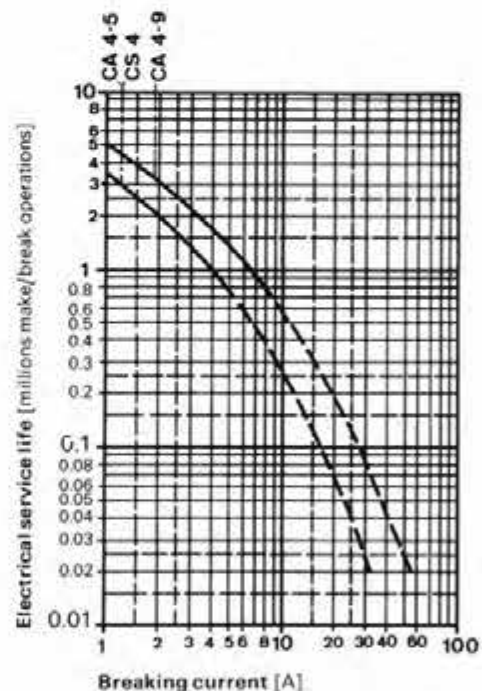
Duty classification		Test conditions			Breaking		
		Making I/I_e	U/U_e	$\cos. \varphi$	I_c/I_e	U_r/U_e	$\cos. \varphi$
AC-1	Non-inductive or slightly inductive loads, resistance furnaces	1	1	0.95	1	1	0.95
AC-2	Slip ring motors: starting, switching off running motors	2.5	1	0.65	1	0.4	0.65
AC-2	Slip ring motors: starting and reversing	2.5	1	0.65	2.5	1	0.65
AC-3	Squirrel cage motors: starting, switching off running motors	$I_e \leq 17 \text{ A}$	6	1	0.65	1	0.17
AC-4	Squirrel cage motors: starting, reversing, jogging	$I_e \leq 17 \text{ A}$	6	1	0.65	6	1
AC-11	Electromagnets for contactors, valves, lifting magnets	10	1	0.7	1	1	0.4

U_e	Rated operational voltage	I_e	Rated operational current
U	Voltage before make	I	Making current
U_r	Recovery voltage	I_c	Breaking current

Electrical service life of contactors CA 4 and CS 4 as a function of breaking current

The graph is valid up to 380/415 V, 50/60 Hz, for switching of motors of any type and under any operating conditions including duty classifications AC-2...AC-4 as well as for ohmic and slightly inductive loads (AC-1).

The electrical service life established under the above test conditions for the various duty classifications is shown in the adjacent graph as a function of breaking current. In general, these values can be used without hesitation for contact selection purposes. Under actual operating conditions, any deviations of the main factor (the current to be interrupted) always lies on the safe side. The value of the current in a running motor is usually smaller than the rated operating current; the case of prolonged jogging conditions the in-rush current will have already dropped back. The influence of unfavourable and unnoticed conditions tends thus to be compensated for.



Permissible frequency of operations for contactors CA 4 and CS 4

Switching of running squirrel-cage motors (AC-3)

Relative duty cycle 40%

Starting time $t_A = 0.25 \text{ s}$

Motor rated current I_e [A]	1.25	2.5	5	9
Operations/h	8000	2500	1200	600

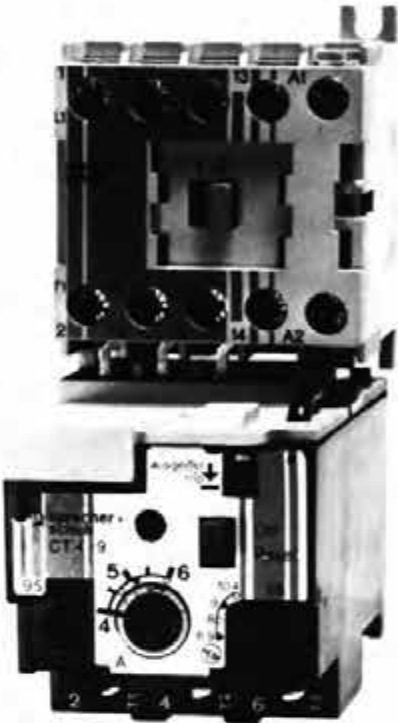
Switching of motors during start-up (AC-2 and AC-4)

Duty cycle $t_{EP} = 0.25 \text{ s} (< t_A)$

Starting current I_A [A]	1.25	6	20	36
Operations/h	8000	1200	300	120

Thermal overload relay CT 4

Technical information



Contactor with add-on thermal overload relay CT 4



Auxiliary contact block CT 3K-P-10 for snapping onto thermal overload relay as a separate auxiliary contact

Assured motor protection under all service conditions

The CT 4 thermal overload relay is a simple and inexpensive unit. Nevertheless, in normal duty applications it ensures the reliable protection of the motor against overload regardless of installation location, installation position and ambient temperature. Above all, it features high tripping accuracy and constancy.

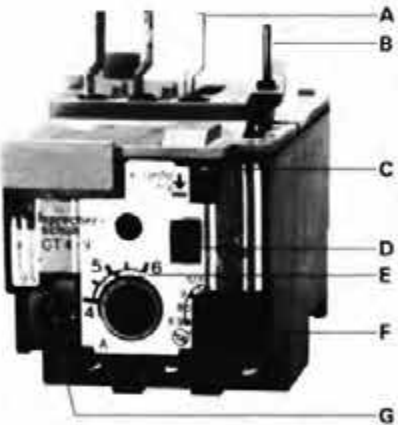
As is the case for all Sprecher + Schuh thermal overload relays, the consistent high quality of the CT 4 is ensured by a prolonged limiting current calibration procedure in which every thermal overload relay is individually calibrated for the highest and lowest current. The accurate time/current characteristic curve obtained in this manner guarantees reliable motor protection to the user who needs only to check that the wiring and the adjustment are correct.

Accurate motor protection even in the event of phase failure

For motors rated up to 10 kW, the single-phasing trip at max. 1.25 I_{eF} guarantee a heat buildup limitation to the value which occurs in the event of a 3-phase trip at 1.2 I_{eF} (maximum permissible tripping current according to IEC 292-1).

This conclusion can be drawn from a study of the numerous published articles dealing with this topic and from our own extensive practical experience.

Although the CT 4 thermal overload relays possess no differential single-phasing protection, they nevertheless trip under single-phasing conditions at a maximum of 1.25 \times set current (I_{eF}) IEC specifies a permissible value of 1.32 I_{eF}). This is achieved by the precise direct current calibration procedure: after a prolonged heating-up period until stable temperature relationships between all elements are established, the thermal overload relay is adjusted to trip under 3-phase conditions at 1.3 to 1.4 I_{eF} . In this manner, the CT 4 thermal overload relays guarantee perfect motor protection even in the event of a phase failure.



Thermal overload relay CT 4



With snap on auxiliary contact block

- A Electrical connection/mechanical attachment pins for direct attachment to contactors CA 4-5 and CA 4-9
- B Built-in wire connection from tripping contact (95) to coil (82). Can be removed if required
- C Flag indicator (thermal overload relay ready for operation or tripped)
- D Red O/L button: an integral off button for test tripping and resetting
- E Direct start current setting scale with setting knob
- F Auxiliary scale current setting for star delta starting
- G Front mounted trip contact connections
- H Signal contact connections

Technical information

Thermal overload relay CT 4

Time/current characteristics of thermal overload relay

(thermally delayed overload relay)

Mean value of tolerance bands 3-phase heated. Full line curves relate to cold relay — — — — — curves relate to relay at operating temperature (at set current load).

Tolerance: trip time $\pm 20\%$ $\pm 10\%$ for current.Function limits and temperature compensation from -25°C ... $+75^{\circ}\text{C}$.Tripping limit specified in IEC 292-1 for -5°C ... $+40^{\circ}\text{C}$ are included in the -20°C ... $+60^{\circ}\text{C}$ range.

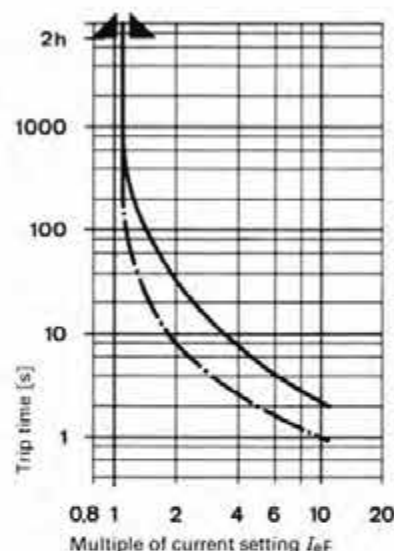
Specified points relative to operating temperature condition: in compliance with IEC 292-1 (type 1) and SEV publication no. 138

Single phasing (phase failure):

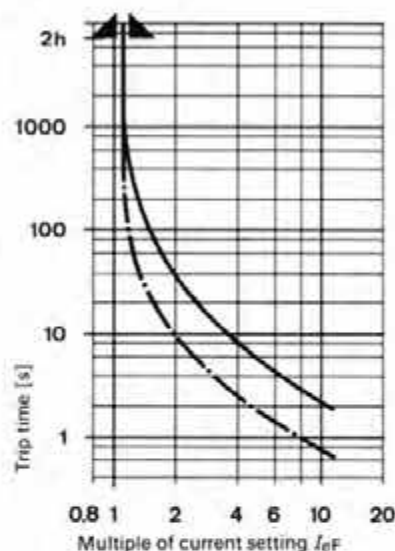
Trip limits 1.05...1.32 of set current I_{eF} (1.05...1.32 I_{eF} is permissible according to IEC 292-1).

For motors up to 10 kW, the 2-phase trip at 1.25 I_{eF} max. guarantees heat buildup limitation to the value which occurs in the event of a 3-phase trip at 1.2 I_{eF} .

CT 4 0,1...2,7 A



CT 4 2,7...9 A



Coordination with short-circuit protection

Setting range		For attachm. to contact. CA	Max. current rating of backup fuse [A] Coordination type ¹⁾	
Direct on-line starting CT 4	Star-delta starting		«a»	«c»
0.1 ... 0.15 A ¹⁾	0.17 ... 0.26 A ¹⁾	4-5	25	0.63 ²⁾
0.15 ... 0.23 A ¹⁾	0.26 ... 0.40 A ¹⁾	4-9	25	1 ²⁾
0.23 ... 0.35 A ¹⁾	0.40 ... 0.61 A ¹⁾		25	2
0.35 ... 0.55 A	0.61 ... 0.95 A		25	2
0.55 ... 0.80 A	0.95 ... 1.40 A		25	2
0.80 ... 1.20 A	1.40 ... 2.10 A		25	4
1.20 ... 1.80 A	2.10 ... 3.10 A		25	4
1.80 ... 2.70 A	3.10 ... 4.70 A		25	6
2.70 ... 4 A	4.70 ... 6.90 A		25	10
4 ... 6 A	6.90 ... 10.40 A		25	16
6 ... 7.70 A	10.40 ... 13.30 A		25	20
7.50 ... 9 A	13 ... 15.60 A		25	20

Installation and current settings

- Mounted on vertical surface, any position:
Setting current I_{eF} = rated operating current I_N
- Mounted on horizontal surface with scale facing up:
Setting current I_{eF} = 0.91 I_N

Rated insulation voltage

Main and control circuit	IEC CSA/UL	AC AC	660 V 600 V
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Auxiliary contacts

Therm. overl. relay CT 4	Aux. cont. block CT 3K-P-10
Tripp. contact	Signal contact

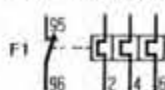
Rated thermal current I_{th}	4 A	4 A
AC 11 at 220 V	3 A	3 A
AC 11 at 380 V	1.6 A	1.6 A
Backup fuse ¹⁾	10 A	6 A

Connections

Main connections	[mm ²]	2 × 4
Control circuit	[mm ²]	2 × 2.5

Contacts

Terminal marking as per EN 50005



¹⁾ Auxiliary contacts: short-circuit protection without contact welding in accordance with IEC 337-1B.

Contactor with thermal overload relay:

- Short-circuit coordination type "a" according to IEC 292-1A contact welding or open-circuit on thermal overload relay possible in event of high shorting currents.
- Short circuit coordination type "c" according to IEC 292-1A, easily defeated contact welding possible. Thermal overload time/current characteristic remains unchanged. No other damage.



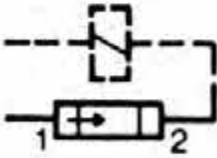
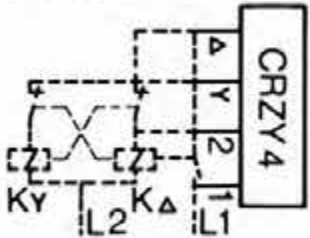







Low-voltage and HRC fuses in accordance with IEC 269-2 and -3, gl. gl; VDE 0636/2 and /3, gl; SEV 101, T; SEV 1018, T2; SEV 1066, gl; example Sprecher + Schuh type SM and SN 2, GEC English Electric type T and GTF ... Siemens type 3 NA 1, slow-acting screw-type fuses (DT). One current rating setting higher is permissible in each case (max. 1.6 I_N) for fast-acting screw-type fuses (D). Back-up fuses for full line short-circuit current and welding system protection on request.

²⁾ Not permissible according to SEV-HV.

³⁾ Not permissible according to DEMKO.

Supplementary elements

Technical Information

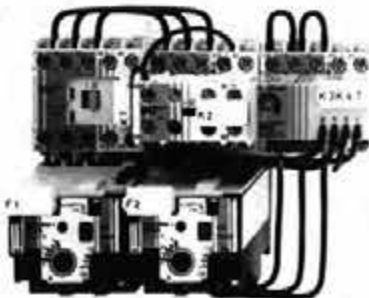
	Timers		
	Functional description	CRZE 4 After the expiry of the set time, the timer completes the circuit and switches on the series connected contactor.	CRZY 4 After the set time has expired, contactor KY is switched off, and after the fixed switching interval of 90 ± 30 ms. contactor K Δ is switched on
	Circuit diagrams		
	Time setting	The 0.1 ... 3 s and 1 ... 30 s delay period is preset by means of the seconds marking and then corrected according to the process sequence or by checking with a stop-watch.	
	Permissible voltage	AC or DC 110 V -23% ... 250 V +10%	AC only 110 V -23% ... 120 V +10% 220 V -20% ... 250 V +10%
	Voltage drop	5 V max.	5 V max.
	Load current for reliable function	10 mA min.	10 mA min.
	Load current at 20°C 40°C 55°C	600 mA 440 mA 320 mA max.	600 mA 440 mA 320 mA
	Leakage current at 220 V	5 mA	Y 17 mA, Δ 6 mA
	Time range (delayed operation)	0.1 s ... 3 s 1 s ... 30 s	1 s ... 30 s
	Reversing time Y/ Δ	-	$90 \text{ ms} \pm 30 \text{ ms}$
	Reset time	$\geq 200 \text{ ms}$	$\geq 200 \text{ ms}$
	Voltage failure duration having no influence on time sequence	$\leq 15 \text{ ms}$	20 ms
	Repetition accuracy with fixed time setting	$\pm 5\%$	$\pm 5\%$
	Time interval for start commands	1.4 × set time	2 × set time
	Ambient temperature in operation in store	-20°C...+55°C -40°C...+80°C	-20°C...+55°C -40°C...+80°C
	Terminals: 0.8 mm² (AWG 18)	2 free cable ends, each 250 mm long	4 free cable ends, each 250 mm long

Protection element CRC 4
for alternating current



Overvoltage factor	$n = U_{\text{max}} / U_n = 0.8 \dots 2.5$
Terminals: 2 free cable ends	0.75 mm², each 130 mm long

Star-delta starters CAY 4 + CT 4 + CT 4
Timer CRZY 4

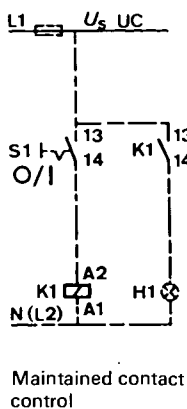
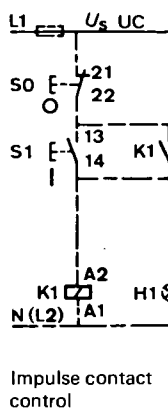
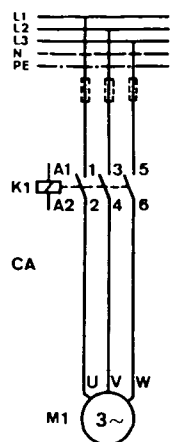


Connection diagrams

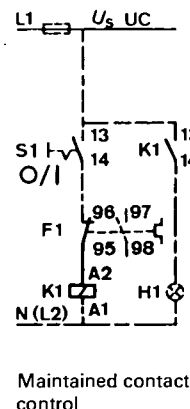
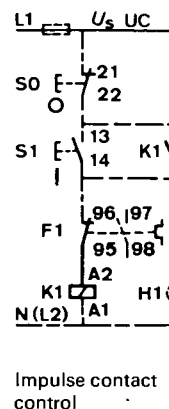
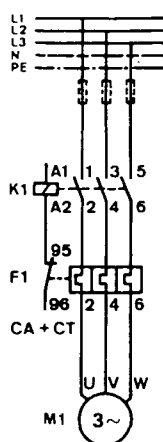
AC or DC control
(UC: AC or DC)

Connection diagram no. **S 15142**

Contactors CA 4



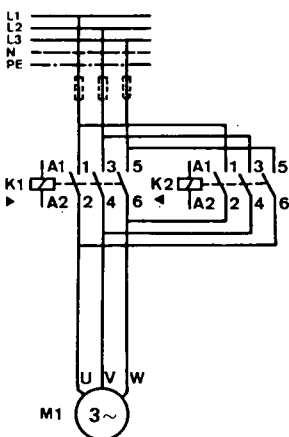
Starters CA 4 + CT 4



Connection diagram no. **S 45140**

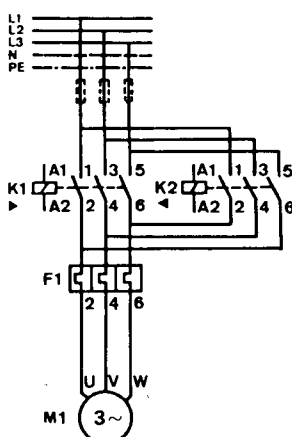
Reversing contactor CAU 4

2 rotation directions, 1 rotary speed

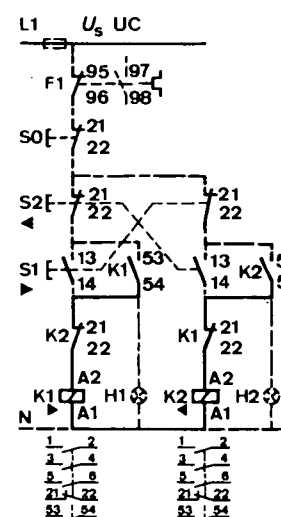


Reversing starters CAU 4 + CT 4

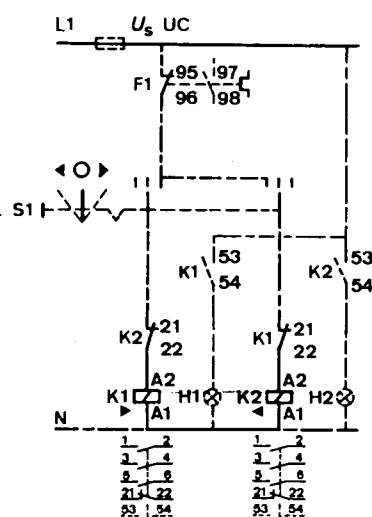
2 rotation directions, 1 rotary speed



Impulse contact control



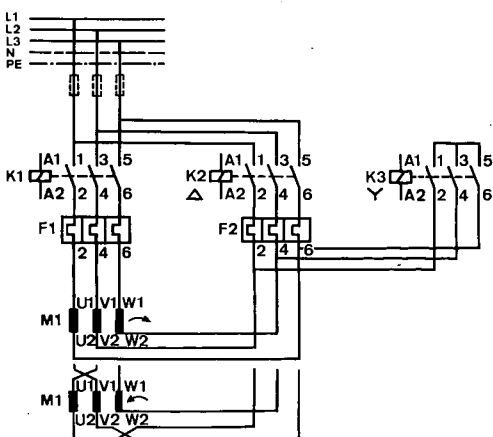
Maintained contact control



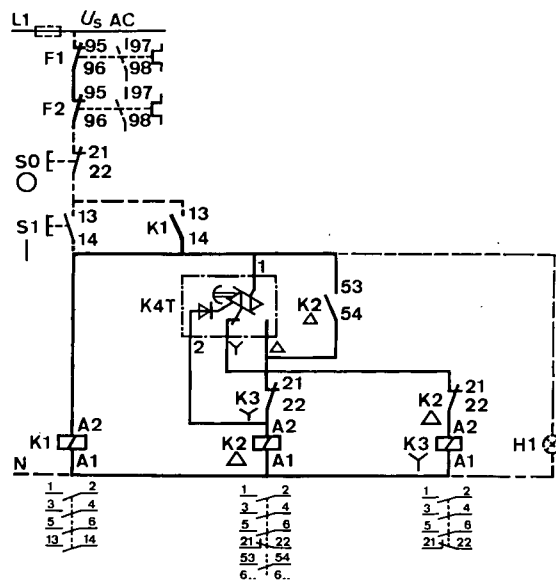
Connection diagram no. **S 55131**

Star-delta starters CAY 4 + CT 4 + CT 4

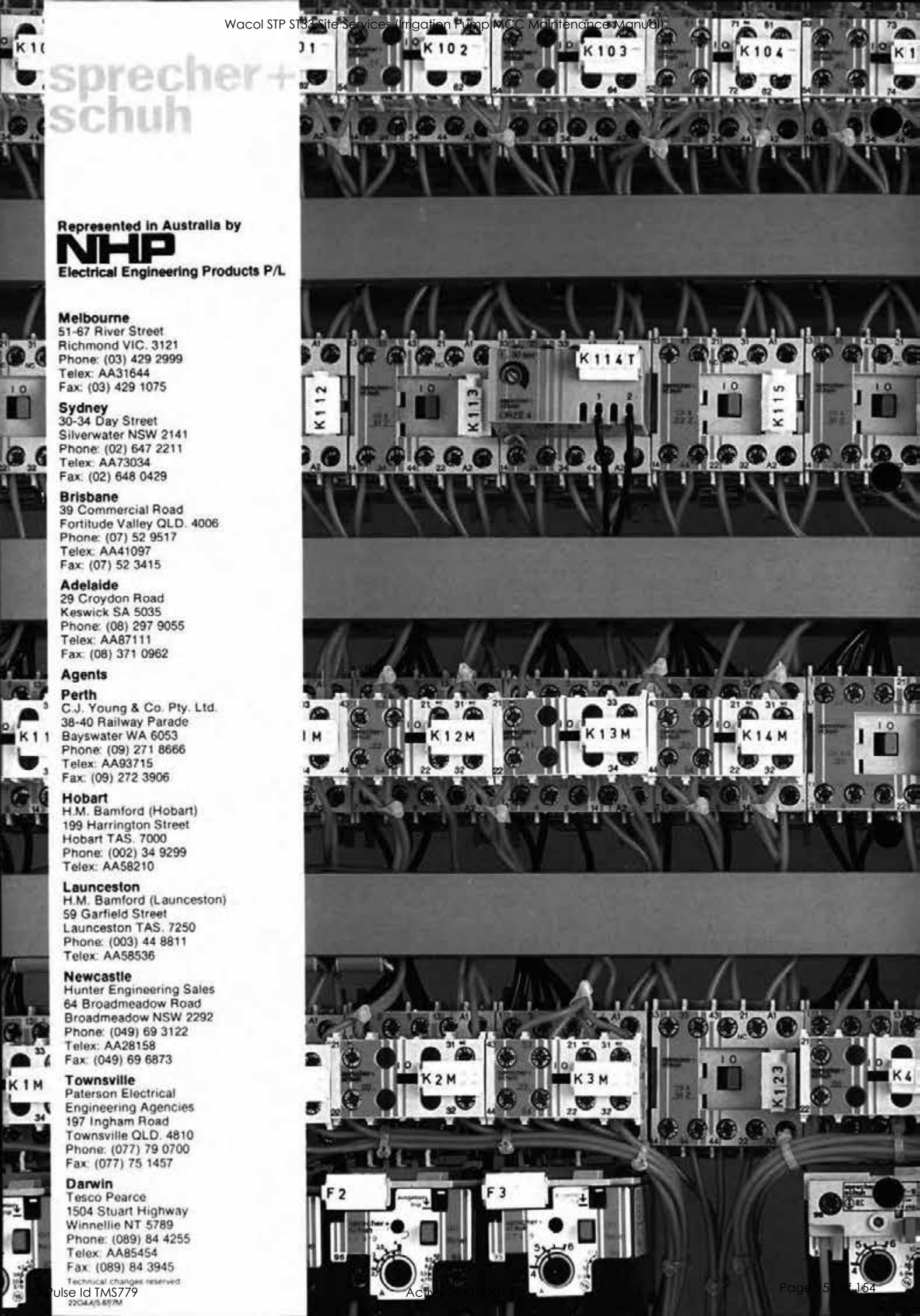
with Timer CRZY 4



Maintained contact control



Sketches



sprecher +
schuh

Represented in Australia by

NHP

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Telex: AA58210

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Telex: AA85454
Fax: (089) 84 3945

Technical changes reserved
pulse Id TMS779
220A/5.6/7M

KRAUS & NAIMER

BLUE LINE SWITCHGEAR



Switch Types

CA4, CA4-1, CA10, CA11, CA20,
CA10B, CA11B, CA20B

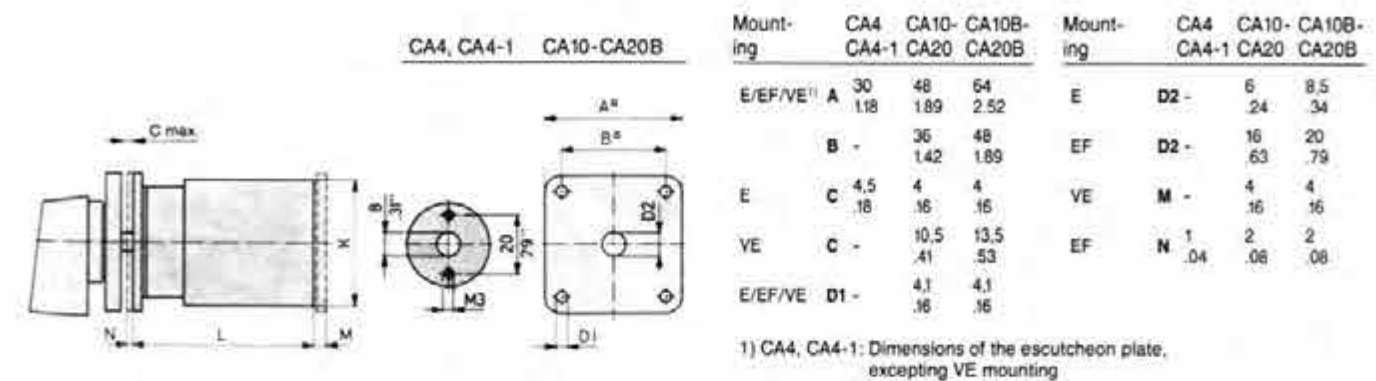


- compact design with the smallest escutcheon plate size of 30 x 30 mm (1.181" x 1.181")
- finger-proof according to VDE 0106, part 100 and VBG 4
- open terminals which are accessible from both sides
- captive plus-minus screws and screwdriver guide
- high switching capability
- contacts with gold plating (switch type CA4 and CA4-1)

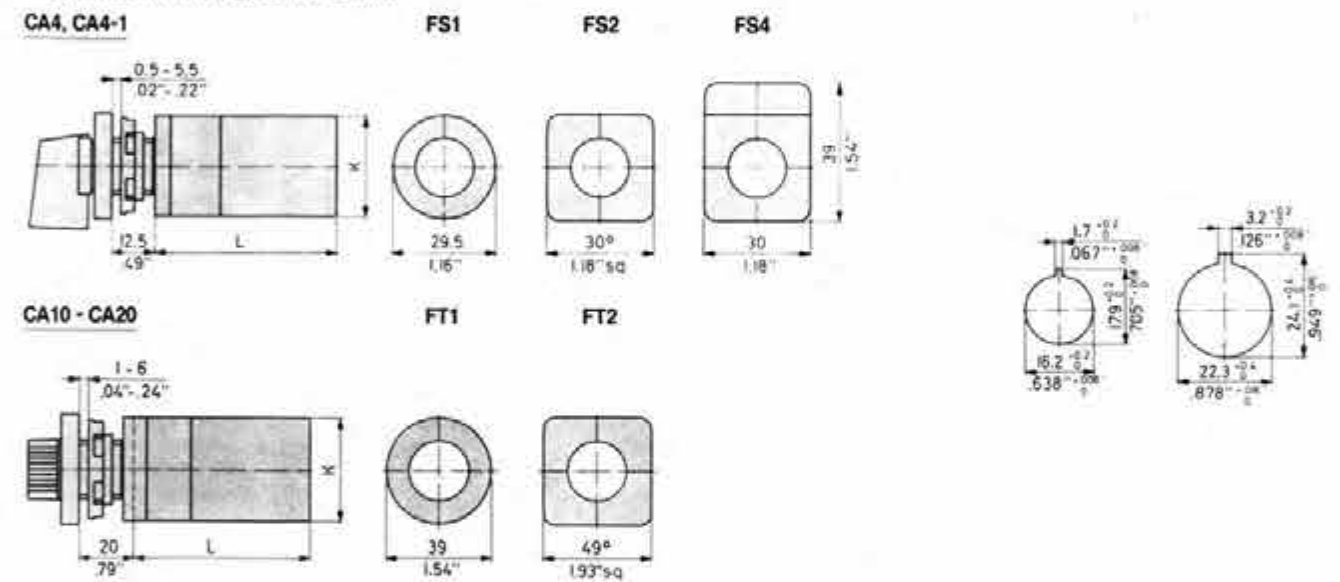
DIMENSIONS

mm
inch

Panel mounting and base mounting



Single hole mounting 16 and 22 mm



Dimensions L and K

Type	No. of stages/Dimensions L												K
	1	2	3	4	5	6	7	8	9	10	11	12	
CA4, CA4-1	30 1.18	38 1.50	46 1.81	54 2.13	62 2.44	70 2.76	78 3.07	86 3.39	94 3.70	-	-	-	28 1.1
CA10	31.7 1.25	41.2 1.62	50.7 2.0	60.2 2.37	69.7 2.74	79.2 3.12	88.7 3.49	98.2 3.87	107.7 4.24	117.2 4.61	126.7 4.99	136.2 5.36	43 1.69
CA11	34.9 1.37	47.6 1.87	60.3 2.37	73.0 2.87	85.7 3.37	98.4 3.87	111.1 4.37	123.8 4.87	136.5 5.37	149.2 5.87	161.9 6.37	174.6 6.87	43 1.69
CA20	35.9 1.41	48.6 1.91	61.3 2.41	74 2.91	86.7 3.41	99.4 3.91	112.1 4.41	124.8 4.91	137.5 5.41	150.2 5.91	162.9 6.41	175.6 6.91	45 1.77
CA10B	37.9 1.49	47.4 1.87	56.9 2.24	66.4 2.61	75.9 2.99	85.4 3.36	94.9 3.74	104.4 4.11	113.9 4.48	123.4 4.86	132.9 5.23	138.4 5.45	56 2.2
CA11B	41.1 1.62	53.8 2.12	66.5 2.62	79.2 3.12	91.9 3.62	104.6 4.12	117.3 4.62	130 5.12	142.7 5.62	155.4 6.12	168.1 6.62	180.8 7.12	58 2.2
CA20B	42.1 1.66	54.8 2.16	67.5 2.66	80.2 3.16	92.9 3.66	105.6 4.16	118.3 4.66	131 5.16	143.7 5.66	156.4 6.16	169.1 6.66	181.8 7.16	56 2.2

australian solenoid co. pty. ltd

(Registered in N. S. W.)
HEAD OFFICE

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TELEPHONE: (02) 797-7333 FAX: (02) 797-0092 CABLE ADDRESS: AUSTRASOL SYDNEY





The terminals of the CA series cam switches are accessible from both sides. This is an advantage in cases where the switch is prewired for installation or in cases where the terminal wiring cannot be done in the sequence of the stage. The compact design, the excellent switching capabilities under AC-15, AC-3 and AC-23A and the obviously unlimited number of switch developments are characteristic for the CA switches and exceed the requirements of IEC 947-3 and VDE 0660, part 101.

CA switches of this series are supplied with open terminals and protected against accidental finger contact in accordance with VDE 0106, section 100 (VBG 4). Captive plus-minus terminal screws and integrated screwdriver guides facilitate wiring.

The CA 4 and CA4-1 switches offer maximum space saving benefits. A CA 4 or a CA4-1 switch in E mounting 1 stage long and 2 contacts fits into 30 x 30 x 30 mm cubicle. The additional length of any further stage is 8 mm. CA 4 and CA4-1 contacts are supplied standard with gold plating (CA4 = 1 µ, CA4-1 = 35 µ).

Single hole mounting according to EN 50007 with protection IP65 is suitable for either 16/22 mm (CA4, CA4-1) or 22 mm (CA10 - CA20) diameter holes and is available with key operator, if required.

Switching angle of CA switches may be 30°, 45°, 60° or 90°. Switch types CA4 and CA4-1 are available with up to 18 contacts. CA 10 up to CA20B switches are available with up to 24 contacts.

A wide range of optional extras and enclosures is available.

Your order should include the following data:

1. Switch type (selection according to the following tables)
2. Switching program (order a prescribed form for special programs)
3. Mounting type
4. Escutcheon plate
5. Handle
6. Optional extras

SWITCH TYPES				CA4 CA4-1	CA10 CA10B	CA11 CA11B	CA20 CA20B
Rated Insulation Voltage U_i		IEC 947-3 ¹⁾ VDE 0660, part 107 ¹⁾ SEV ³⁾ UL/CSA CEE NEMKO	V V V V	440 380 300 400/380	690 660 300 400	690 660 600 400	690 660 600 400
Rated Impulse Withstand Voltage U_{imp}			kV	4	6	6	6
Rated Thermal Current I_{th}		IEC 947-3 VDE 0660, part 107/12.92	A	10	20	20	25
Thermal Current I_{th}		IEC 408/BS VDE 0660, part 107/09.82 SEV ³⁾ 380 V/600 V UL/CSA	A A A A	10 10/- 10	20 16/12 16	20 16/12 16	32 25/25 30
Rated Operational Current I_e							
AC-21A	Switching of resistive loads including moderate overloads	IEC 947-3 VDE 0660, part 107/12.92	A	10	20	20	25
AC-21		IEC 408/BS VDE 0660, part 107/09.82	A	10	20	20	32
AC-1	Resistive or low inductive loads	SEV ³⁾ 380 V 660 V	A A	10 -	16 12	16 12	25 20
AC-15	Switching of control devices, contactors, valves etc.	IEC 947-3 220 V - 240 V VDE 0660, 380 V - 440 V part 107	A A	2,5 1,5	5 4	5 4	8 5
Pilot Duty		UL/CSA ³⁾ Heavy	VAC	300	300	600	600
Ampere Rating							
	Resistive or low inductive loads	UL/CSA ³⁾	A	10	16	16	30
	Resistive load/Motor load	CEE NEMKO	A A	4/2 6/4 ²⁾	10/6 10/6	10/6 -	16/10 20/10
Short Circuit Protection							
	Max. fuse size (gl-characteristic)		A	10	25	25	35
	Rated conditional short-circuit current		kA _{en}	3	5	5	10
	Rated short-time withstand current (1s-current)		A	60	140	140	280
Rated Utilization Category							
AC-3	Direct-on-line starting	IEC 947-3 VDE 0660, part 107 3 phase 220 V - 240 V 3 pole 380 V - 440 V 500 V 660 V - 690 V	kW	1,5 2,2 - -	3 5,5 5,5 5,5	3 5,5 5,5 5,5	4 7,5 7,5 7,5
		1 phase 110 V 2 pole 220 V - 240 V 380 V - 440 V	kW	0,3 0,55 0,75	0,6 2,2 3	0,6 2,2 3	1,5 3 3,7
AC-23A	Frequent switching of motors or other high inductive loads (selection criterion for main switches)	3 phase 220 V - 240 V 3 pole 380 V - 440 V 500 V 660 V - 690 V	kW	1,8 3 - -	3,7 7,5 7,5 7,5	3,7 7,5 7,5 7,5	5,5 11 11 11
		1 phase 110 V 2 pole 220 V - 240 V 380 V - 440 V	kW	0,37 0,75 1,1	0,75 2,5 3,7	0,75 2,5 3,7	1,5 3 5,5
Ratings UL/CSA ³⁾							
	Standard motor load	120 V		1	1,5	1,5	3
	DOL-Rating	3 phase 240 V	HP	1	3	3	7,5
	(similar AC-3)	3 pole 480 V		-	-	5	10
		600 V		-	-	5	10
Max. Permissible Wire Gage							
	Single-core or stranded wire		mm ² AWG	2x 1,5 14	2x 2,5 12	2x 2,5 12	2x 4 10
	Flexible wire (sleeving in accordance with DIN 46228)		mm ² AWG	2x 1,5 (-) 16	2x 2,5 (2,5) 14	2x 2,5 (2,5) 14	2x 4 (2,5) 12

1) Valid for lines with grounded common neutral termination, overload category III, pollution degree 3. Other values on request.
2) Valid for CA4 only. 3) International Standards and Approvals see Catalog 100, page 39.

ESSENTIAL MOUNTING				
	Code	IP front	for type	
	E EF	40 65	CA4 CA4-1 CA10 CA11 CA20 CA10B CA11B CA20B	Panel mounting with shaft seal
	VE	40	CA10 CA11 CA20 CA10B CA11B CA20B	Base mounting
	FS1	65		Single hole mounting combined with 16 and 22 mm without escutcheon plate
	FS2	65	CA4 CA4-1	with escutcheon plate 30 x 30 mm
	FS4	65		with escutcheon plate 30 x 39 mm
	FT1	65		Single hole mounting 22 mm without escutcheon plate
	FT2	65	CA10 CA11 CA20	with escutcheon plate 49 x 49 mm

PLANS

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