



# POWER ELECTRIC Switchboards PTY LTD

ACN 052 204 118

**Manufacturers of Engineered Switchboards for Mining Industrial and Commercial Projects**

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## MAINTENANCE MANUAL



BRISBANE CITY COUNCIL  
DEPARTMENT OF WATER SUPPLY AND SEWERAGE

SP 252 BOGNOR STREET  
SEWAGE SUBMERSIBLE PUMP STATION

ORDER NO: 474482 EF  
DATE: 1993

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**MAINTENANCE INSTRUCTIONS**

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**M.C.C. DRAWINGS**

## PREVENTATIVE MAINTENANCE INSTRUCTIONS

### 1. 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.



Standard Series

High-fault Level Series

Motor Protection Series

Non-automatic Series

# TemBreak

## *Total Protection, Complete Control*

**Selection Guide**

# TemBreak

## THREE SERIES, TWO TYPES

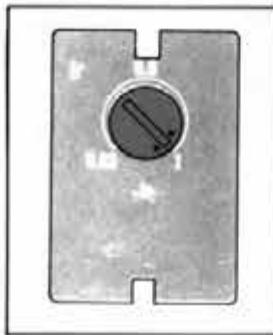
A new generation of MCCB's. Procuring a major evolution in Low Voltage Distribution Systems. Offering a choice of 3 series (economical, standard and high fault) and two types. **Adjustable thermal magnetic or microprocessor based solid state O.C.R.** Both types have common construction features and interchangeable 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)

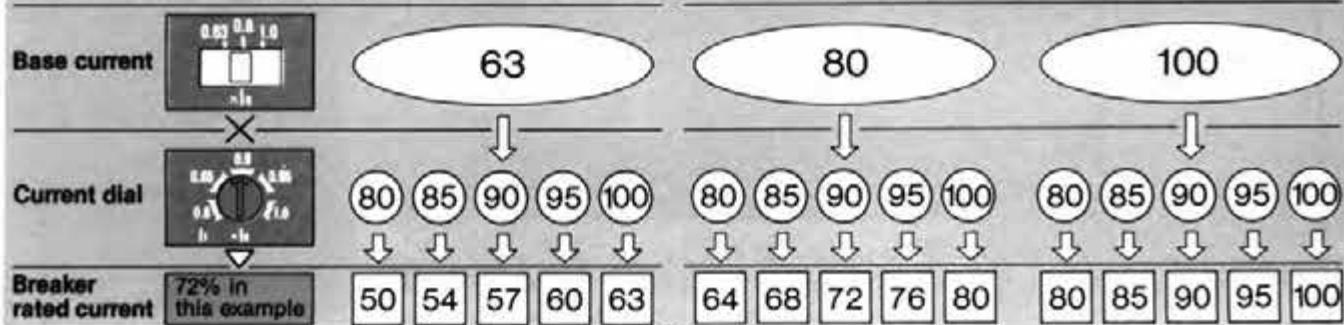
The rated current is continuously adjustable from 63% to 100% of the nominal rated current. The scale is marked at three positions; 63%, 80% and 100%.

### 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 [ $I_0$ ] select switch and the rated current [ $I_r$ ] 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.



## 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 downstream breakers.

### Adjustable LTD

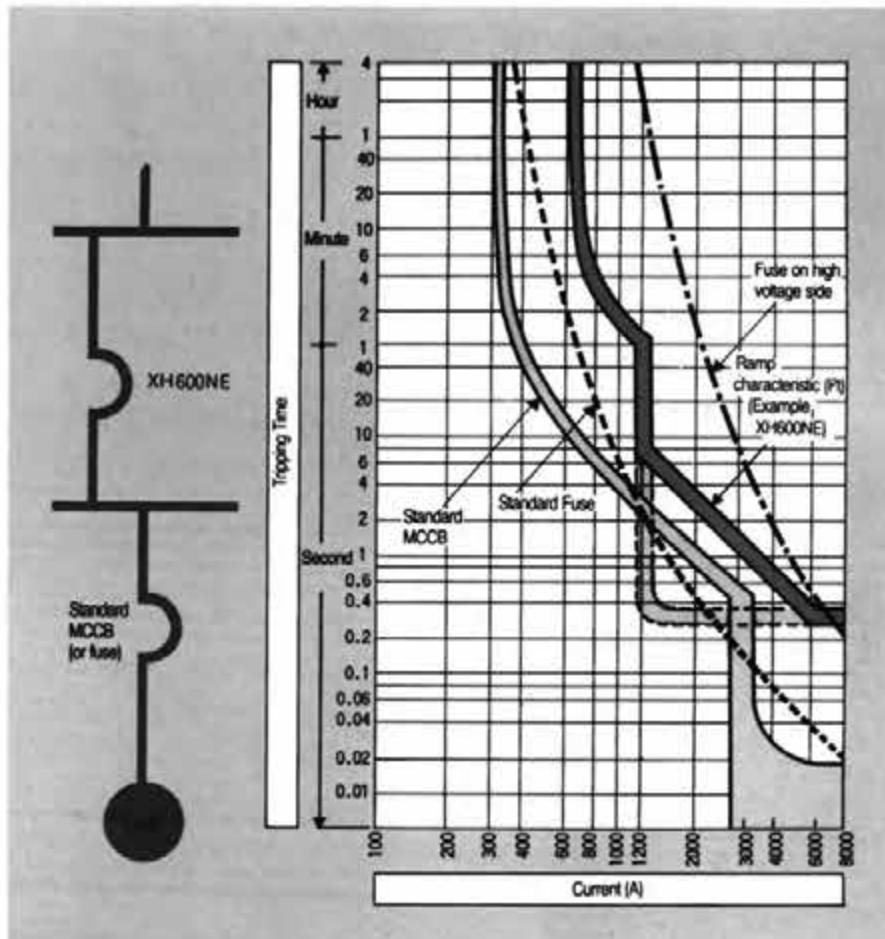
Essential for general industrial plants and generator protection

### Ramp Characteristic [ $I^2t$ ], STD

The ramp characteristic [ $I^2t$ ] 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 [ $I^2t$ ] ramp characteristic).

The definite time-delay characteristic is 1000% of the rated current [ $I_r$ ].



## 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.

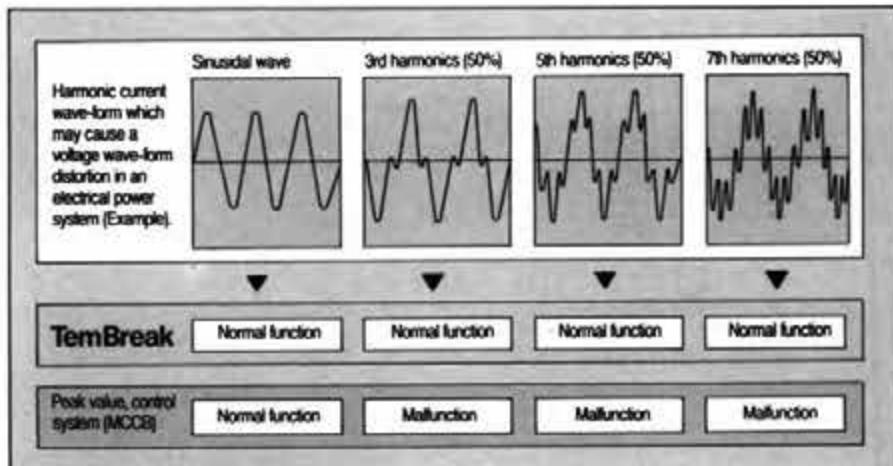
TemBreak's electronic protective device detects the true r.m.s. value of the load current, therefore, remaining unaffected by harmonics.

### **4** Pre-trip alarm function (optional)

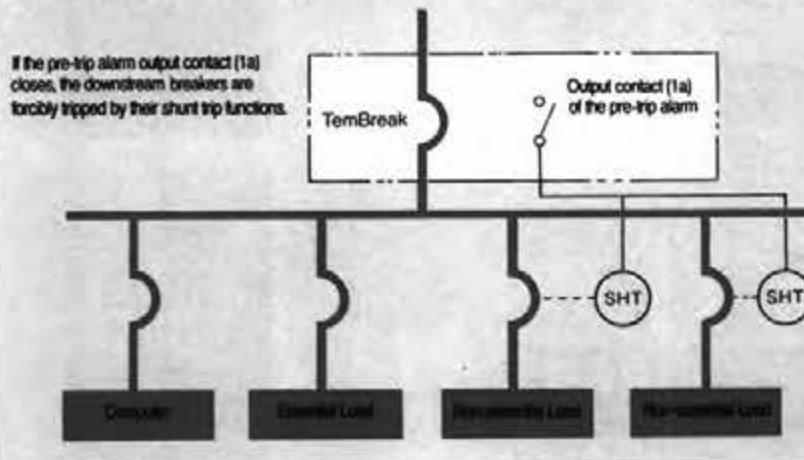
Electronic office equipment is being increasingly used in today's buildings and factories.

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).

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

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

### **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).

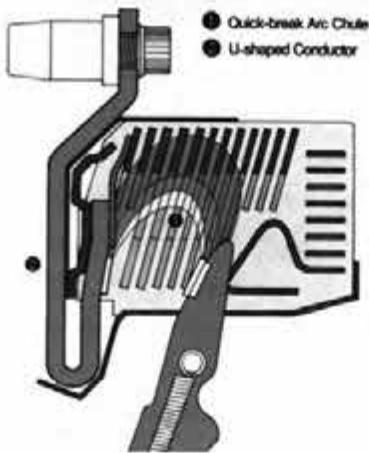
# TemBreak

## 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.

I(ON)



TRIP



O(OFF)



### 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



- 64 mm



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



## **Standard Series**

Ampere Frame	125	125	225	250	400	400	400	630
Type	XSI25CS	XSI25NS	XSI25NS	XSI25NS	XSI400CS	XSI400NS	XSI400NS	XSI630CS
Number of Poles	1	3	4	1	3	4	3	4
<b>Outside View</b>								
*1-Pole breaker only, XSI25CS and XSI25NS respectively. NOTE: 2-pole breaker is a 3-pole breaker with the centre pole omitted.								
<b>N Rated Current (A) In</b>	(Calibrated at 45°C 50°C, available on request).	NRC ASB min max	NRC ASB min max	NRC ASR min max				
16 50 20 125 20	16 50 20 125 20	16 50 20 125 20	160 100 160	250 160 250	250 160 250	250 125 250	400 250 400	400 250 400
20 63 32 20 32	20 63 32 20 32	20 63 32 20 32	250 160 250	400 250 400	400 250 400	400 200 400	630 400 630	630 400 630
25 80 50 32 50	25 80 50 32 50	25 80 50 32 50	250 160 250	400 250 400	400 250 400	400 200 400	630 400 630	630 400 630
32 100 63 40 63	32 100 63 40 63	32 100 63 40 63	125 200	250 160 250	250 160 250	250 125 250	400 250 400	400 250 400
40 125 100 63 100	40 125 100 63 100	40 125 100 63 100	150 225	250 160 250	250 160 250	250 125 250	400 250 400	400 250 400
125 60 125	125 60 125	125 60 125	175	250 160 250	250 160 250	250 125 250	400 250 400	400 250 400
<b>AC RATED INSULATION VOLTAGE (Ui)</b>								
<b>AC RATED BREAKING CAPACITY sym r.m.s. (kA)</b>								
IEC 947-2(lcu) BS 4752-1 (P-1) CEI 17-5	600V	-	-	5/2.5	-	5/2.5	-	5/2.5
	660V	-	-	5/2.5	-	5/2.5	-	5/2.5
	500V	7.5/3.8	-	12/6	10/5	15/7.5	22/11	30/15
	440V	10/5 (5)	10/5	22/11 (5)	22/11	25/13	30/15	42/21
	415V	14/7 (5)	14/7	25/13 (5)	25/13	15/7.5	25/13	30/15
	400V	18/9 (5)	18/9	25/13 (5)	25/13	18/9	25/13	30/15
	380V	18/9 (5)	18/9	30/15 (5)	30/15	18/9	35/18	50/25
	240V	14/7	25/13	25/13	25/13	25/13	50/25	50/25
AS 2184	440V	14 (5)*1)	25 (5)*1)	15	30	35	50	50
	415V	18 (5)*1)	30 (5)*1)	18	35	36	50	45
NEMA AB-1	600V	-	-	12	22	22	30	25
	480V	-	10	22	15	25	42	35
	240V	14	25	25	50	50	85	50
without Inst.	240-690V	-	-	-	-	-	5	-
<b>DC RATED BREAKING CAPACITY (kA)</b>	250V	-	10	15	10	40	40	40
	125V	-	15	20	15	40	40	40
<b>N RATED SHORT TIME CURRENT I<sub>NTS</sub> (mA) [low]</b>								
<b>Dimensions (mm)</b>								
		d a c b e f g	30 90 120	30 90 120	105 140	140 185	140 165	210 260
			155	155	165	260	260	273
			86	86	86	103	103	103
			104	104	107	131	131	145
Weight (kg) @ marked standard type	0.51	1.3	1.58	0.51	1.3	1.58	1.85	2.4
<b>Connections and Mountings</b>								
front	terminal screw	●	●	●	●	●	●	●
connect (FC)	attached flat bar	-	-	○(BAR)	○(BAR)	○(BAR)	○(BAR)	○(BAR)
	solderless terminal (PWC)	○	○	○	○	○	○	○
rear	bolt stud	○	○	-	-	-	-	-
connect (RC)	flat bar stud	-	-	○	○	○	○	○
plug-in (PM)	for switchboard	-	○	○	○	○	○	○
	for distribution board	-	○	○	-	-	-	-
draw-out (DO)	-	-	-	-	-	-	-	-
<b>Standard Features</b>								
contact indicator	●	●	●	●	●	●	●	●
trip button	●	-	●	●	●	●	●	●
<b>Protective Functions</b>								
Electronic type	-	-	-	-	-	-	-	-
Adjustable LTD, STD & INST.	-	-	-	-	-	-	-	-
Adjustable GFT or Adjustable PTA (option)	-	-	-	-	-	-	-	-
trip indicators (option)	-	-	-	-	-	-	-	● (PTA only)
Thermal-magnetic type	-	-	-	-	-	-	-	-
thermal and fixed magnetic trips	●	-	●	-	●	-	-	-
thermal and adjustable magnetic trips	-	-	-	-	-	-	-	-
adjustable thermal and fixed magnetic trips	-	●	-	●	-	●	-	-
adjustable thermal and magnetic trips	-	-	-	-	-	●	-	●
<b>Accessories (option)</b>								
internally mounted	auxiliary switch	AX, AXE	● (AXE)	● (AXE)	● (AXE)	● (AXE)	● (AX)	● (AX)
	alarm switch	AL, ALE	● (ALE)	● (ALE)	● (ALE)	● (ALE)	● (AL)	● (AL)
	shunt trip	SHT	●	●	●	●	●	●
	undervoltage trip	UVT	●	●	●	●	●	●
externally mounted	motor operator	MOT	●	●	●	●	●	●
	external panel mounted type	OHE	●	●	●	●	●	●
	operating breaker mounted type	OHG	●	●	●	●	●	●
	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 plug-in type	TCR	●	●	●	●	●	●
	interpole barrier	TBA	●	●	●	●	●	●
	accessory lead terminal	LTF	●	●	●	●	●	●
	door range	D.F	●	●	●	●	●	●

- Standard. This configuration used unless otherwise specified.

- Optional standard. Specify when ordering.

- 'yes' or 'available'

• 1d TMS700

**(3) DC rating available on request.**

#### Thermally Adjustable

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

④ One is supplied with every 5 MCCB's

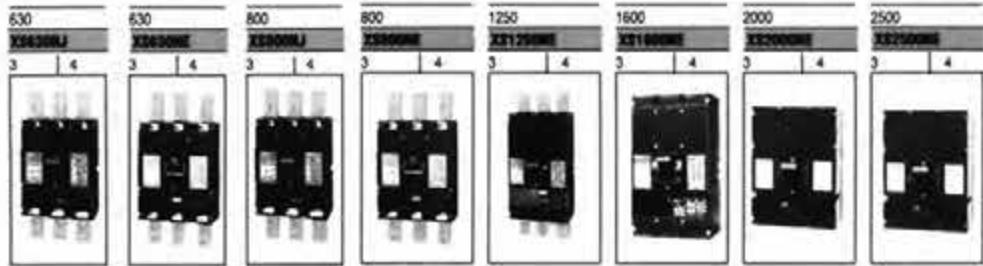
⑤ Applicable to the rear-connect type.

④ Value at  $1/\sqrt{3}$  times stated voltage.



## Standard Series

Ampere Frame
Type
Number of Poles
Ex Outside View



## ■ Rated Current (A) (in)

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

NRC	ASR	NRC	ASR	NRC	ASR															
min	max	min	max	min	max															
400	250	400	630	315	630	800	500	800	1000	500	1000	1600	800	1600	2000	1000	2000	2500	1250	2500
630	400	630				800	400	800	1250	630	1250									

## AC RATED INSULATION VOLTAGE (Ui)

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

IEC 647-2 (Icu) / IEC 647-2 (Ics)

BS 4752-1(P-1)

CEI 17-5

690	690	690	690	690	690	690	690	690	690	690	690	690
ICU/ICS												
20/10	20/10	20/10	20/10	20/10	20/10	20/10	20/10	20/10	25/19	45/34	45/42	45/42
660V	45/34	45/34	45/42	45/42								
35/18	35/18	35/18	35/18	35/18	35/18	35/18	35/18	35/18	45/34	65/49	65/49	65/49
50/25	50/25	50/25	50/25	50/25	50/25	50/25	50/25	50/25	65/49	85/64	85/64	85/64
415V	50/25	50/25	50/25	50/25	50/25	50/25	50/25	50/25	65/49	85/64	85/64	85/64
400V	50/25	50/25	50/25	50/25	50/25	50/25	50/25	50/25	65/49	85/64	85/64	85/64
380V	50/25	50/25	50/25	50/25	50/25	50/25	50/25	50/25	65/49	85/64	85/64	85/64
240V	50/25	50/25	50/25	50/25	50/25	50/25	50/25	50/25	100/75	100/75	100/75	100/75

AS 2164

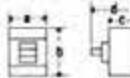
440V	50	50	50	50	50	50	50	50	65	65	65	65
415V	65	65	65	65	65	65	65	65	100	100	100	100
600V	30	30	30	30	30	30	30	30	42	65	65	65
480V	50	50	50	50	50	50	50	50	65	85	85	85
240V	85	85	85	85	85	85	85	85	125	125	125	125

without inst.

240-690V	—	—	—	—	—	—	—	—	—	—	—	—
DC RATED BREAKING CAPACITY	250V	40	40	40	40	40	40	40	—	—	—	—
CAPACITY (kA)	125V	—	—	—	—	—	—	—	—	—	—	—

## ■ RATED SHORT TIME CURRENT r.m.s. (kA) (Icw)

## ■ DIMENSIONS (mm)



210	260	210	260	210	260	210	260	210	260	320	429	320	429		
273	273	273	273	273	273	273	273	273	370	370	450	450	450		
103	103	103	103	103	103	103	103	103	120	140	185	185	185		
145	145	145	145	145	145	145	145	145	171	191	245	245	245		
9.0	11.5	9.8	12.0	9.4	12.2	9.7	12.5	22.0	28.0	27.0	35.0	54.0	67.0	62.5	78.2

Weight (kg) (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	●	●	●	●	●	●	●	●	●	●	●	●	●
trip button	●	●	●	●	●	●	●	●	●	●	●	●	●

## ■ 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 auxiliary switch	AX, AXE	●(AX)											
mounted alarm switch	AL, ALE	●(AL)											
shunt trip	SHT	●	●	●	●	●	●	●	●	●	●	●	●
undervoltage trip	UVT	●	●	●	●	●	●	●	●	●	●	●	●
externally motor operator	MOT	●	●	●	●	●	●	●	●	●	●	●	●
operating handle	OHE	●	●	●	●	●	●	●	●	●	●	●	●
variable depth type	OHG	●	●	●	●	●	●	●	●	●	●	●	●
extension handle	EHA	●	●	●	●	●	●	●	●	●	●	●	●
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	●	●	●	●	●	●	●	●	●	●	●	●
door flange	DF	●	●	●	●	●	●	●	●	●	●	●	●

① Standard. This configuration used unless otherwise specified.

② Optional standard. Specify when ordering.

③ 'yes' or 'available'

④ not available

① DC rating available on request.

② Thermally Adjustable.

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

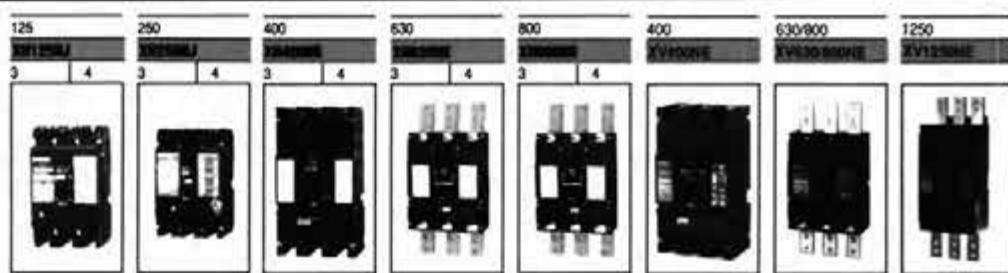
④ One is supplied with every 5 MCCB's.

⑤ Applicable to the rear-connect type.



## High-fault Level Series

Ampere Frame
Type
Number of Poles
In Switch View



## In Standard Current (A) (a)

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

NRC	ASR	NRC	ASR	NRC	ASR	NRC	ASR	NRC	ASR	NRC	ASR	NRC	ASR
min	max	min	max	min	max	min	max	min	max	min	max	min	max
20	12.5	20	160	100	160	250	125	250	630	315	630	800	125
32	20	32	250	160	250	400	200	400	800	400	800	400	400
50	32	50											
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 (low)	690V
BS 5742-1(P.1)		660V
CEI 17-5	AS 3858	500V
		440V
		415V
		400V
		380V
		1100V
AS 2184		440V
		415V
NEMA AB-1		600V
		480V
		240V
without Inst.		240-600V
DC RATED BREAKING CAPACITY (kA)		250V
		125V

## DC RATED BREAKING CURRENT (r.m.s. [mA] [Inst])

Front	a
connect (FC)	b
	c
rear	d
connect (RC)	
plug-in (PM)	
draw-out (DO)	



## Weight (kg) (● marked standard type)

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)	
front	contact indicator
	trip button
rear	
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	

internally mounted	auxiliary switch	AX, AXE	● (AXE)	● (AXE)	● (AX)							
	alarm switch	AL, ALE	● (ALE)	● (ALE)	● (AL)							
	shunt trip	SHT	●	●	●	●	●	●	●	●	●	●
	undervoltage trip	③ UVT	●	●	●	●	●	●	●	●	●	●
externally mounted	motor operator	MOT	●	●	●	●	●	●	●	●	●	●
	external panel mounted type	OHE	●	●	●	●	●	●	●	●	●	●
	operating breaker mounted type	OHG	●	●	●	●	●	●	●	●	●	●
	handle variable depth type	OHV	●	●	●	●	●	●	●	●	●	●
	extension handle	EHA	—	—	—	●	●	●	●	●	●	●
	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	●	●	●	●	●	●	●	●	●	●
	door flange	D.F	●	●	●	●	●	●	●	●	●	●

● Standard. This configuration used unless otherwise specified.

○ 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****Non-automatic Series**

Ampere Frame	50	50
Type	TP.50	XMS6PS
Number of Poles	3	3
<b>■ Details View</b>		

**■ RATINGS**

Voltage for motor	400-440V
Motor output and rated current (Calibrated at 40°C or 45°C, please specify 50°C available on request.)	(A) ② (A)
1.6	0.8 1.25
2.5	1.4 2.0
4.0	2.6 3.6
6.3	4.2 5.0
8.0	7.4 8.0
10.0	10 12
16	
25	
40	
50	

**AC RATED INSULATION VOLTAGE (Ui)**

AC RATED BREAKING CAPACITY sym r.m.s. (mA)	660	660
IEC 947-2(lcl) / IEC 947-2 (cls)	690V	
660V		
500V	50	
440V	50	
415V	50/42	50
400V	50/42	50
380V	50/42	
240V		

**AS2184**

440V	50	-
415V	50	-

**NEMA AB-1**

600V		
480V		
240V		

**without Inst.**

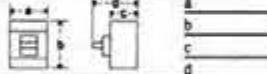
240-690V	-	-
----------	---	---

**DC RATED BREAKING CAPACITY**

250V	-	-
------	---	---

**CAPACITY**

125V	-	-
------	---	---

**■ RATED SHORT TIME CURRENT r.m.s. (kA) (see)****■ DIMENSIONS (mm)****Weight (kg) (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	○	○	③
trip button	○	●	
over current trip type	Adj Therm Fix mag	Fixed	

**■ PROTECTIVE FUNCTIONS****Thermal-magnetic type**

adjustable thermal and fixed magnetic trips

adjustable thermal and magnetic trips

**■ ACCESSORIES (option)**

Internally ② mounted	auxiliary switch	AX, AXE	○ (AXE)
	alarm switch	AL, ALE	○ (ALE)
	shunt trip	SHT	
	undervoltage trip ①	UVT	○
externally mounted ③	motor operator	MOT	-
	external panel mounted type	OHE	-
	operating breaker mounted type	OHG	-
	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 Not available.

④ UVT controller is installed externally with AC UVT.

⑤ Complies with IEC-292 - Overload Relay optional.

⑥ Accessories refer to page 10.

⑦ Accessory Chassis optional.

⑧ Indication by handle only.

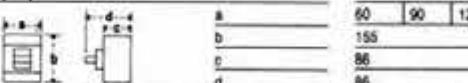
⑨ Contact NHP for details.

Number of Poles	3	4
<b>■ Details View</b>		

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



Rated Current (A)	125
Rated Voltage (V)	AC 690 DC 250
RATED SHORT CIRCUIT MAKING CAPACITY	Peak/kA 3.5
RATED SHORT TIME CURRENT r.m.s./kA	1 sec. 2.5
DIMENSIONS (mm)	

**■ Weight (kg) (marked standard type)****■ Components**

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)		-
contact indication		-
trip button		-
internally mounted	auxiliary switch	AX, AXE
	alarm switch	AL, ALE
	shunt trip	SHT
	undervoltage trip	UVT
externally mounted	motor operator	MOT
	panel mounted type	OHE
	breaker mounted type	OHG
	variable depth type	OHH
	front type	MIF
	rear type	MIB
	handle holder	HH
	handle lock	HL
	front connect type	TCF
	rear/plug-in type	TCR
	interpole barrier	TBA
	accessory lead terminal	LTF

**■ SWITCHING CAPACITIES****■ Max. Switching Current**

AC	750
DC	313

**Endurance**

No. of Ops. without Current	7000
No. of Ops. with Current	1000

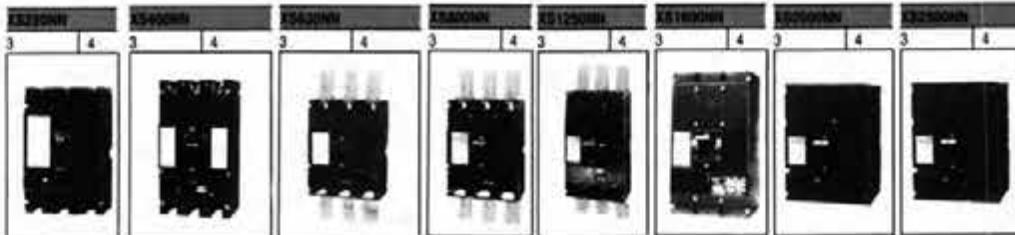
XS250NJ



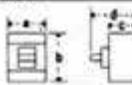
## Non-automatic Series

Type
Number of Poles

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



Dimensions	
Rated Current (A)	
Rated Voltage (V)	AC
	DC
RATED SHORT CIRCUIT MAKING CAPACITY	Peak/kA
RATED SHORT TIME CURRENT r.m.s./kA	1 sec.
DIMENSIONS (mm)	



250	400	630	600	1250	1600	2000	2600
690	690	690	690	690	690	690	690
250	250	250	250	250	250	250	250
6	9	15	15	32	45	90	90
4	5	9	9	15	20	35	35
105	140	140	185	210	280	210	280
165	260	260	273	273	370	370	450
86	103	103	103	120	140	225	185
107	131	145	145	171	191	285	245

Weight (kg) (marked standard type)

1.85	2.4	4.7	6.1	9.0	11.5	9.4	12.2	20.4	26.4	24.9	32.9	51.8	64.8	60	75.7
------	-----	-----	-----	-----	------	-----	------	------	------	------	------	------	------	----	------

## EXTRADIMENTAL FEATURES

contact indication

●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

trip button

●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

## ACCESSORIES (optional)

COD

internally mounted	auxiliary switch	AX, AXE	● (AX)	● (AX)	● (AX)	● (AX)	● (AX)	● (AX)	● (AX)	● (AX)	● (AX)	● (AX)	● (AX)	● (AX)	● (AX)	● (AX)
	alarm switch	AL, ALE	● (ALE)	● (AL)												
	shunt trip	SHT	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	undervoltage trip	UVT	●	●	●	●	●	●	●	●	●	●	●	●	●	●
externally mounted	motor operator	MOT	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	external operating	panel mounted type DHE	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	handle	breaker mounted type OHG	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	extension handle	variable depth type OHH	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	mechanical interlock	front type MIF	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	handle holder	rear type MIB	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	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.	●	●	●	●	●	●	●	●	●	●	●	●	●	●

## BACKUP BREAKER

Max. Switching Current

AC	X5400NJ	X5630NJ	X5800NJ	X5800NJ	—	—	—	—	—	—	—	—	—	—	—	—
DC	1500	2400	3780	4800	7500	9600	12000	15000	—	—	—	—	—	—	—	—
	625	1000	1575	2000	3125	4000	5000	6250	—	—	—	—	—	—	—	—
Endurance	No. of Ops. w/out Current	7000	4000	4000	2500	2500	2500	2500	500	500	500	500	500	500	500	500
	No. of Ops. with Current	1000	1000	1000	500	500	500	500	500	500	500	500	500	500	500	500

• 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.

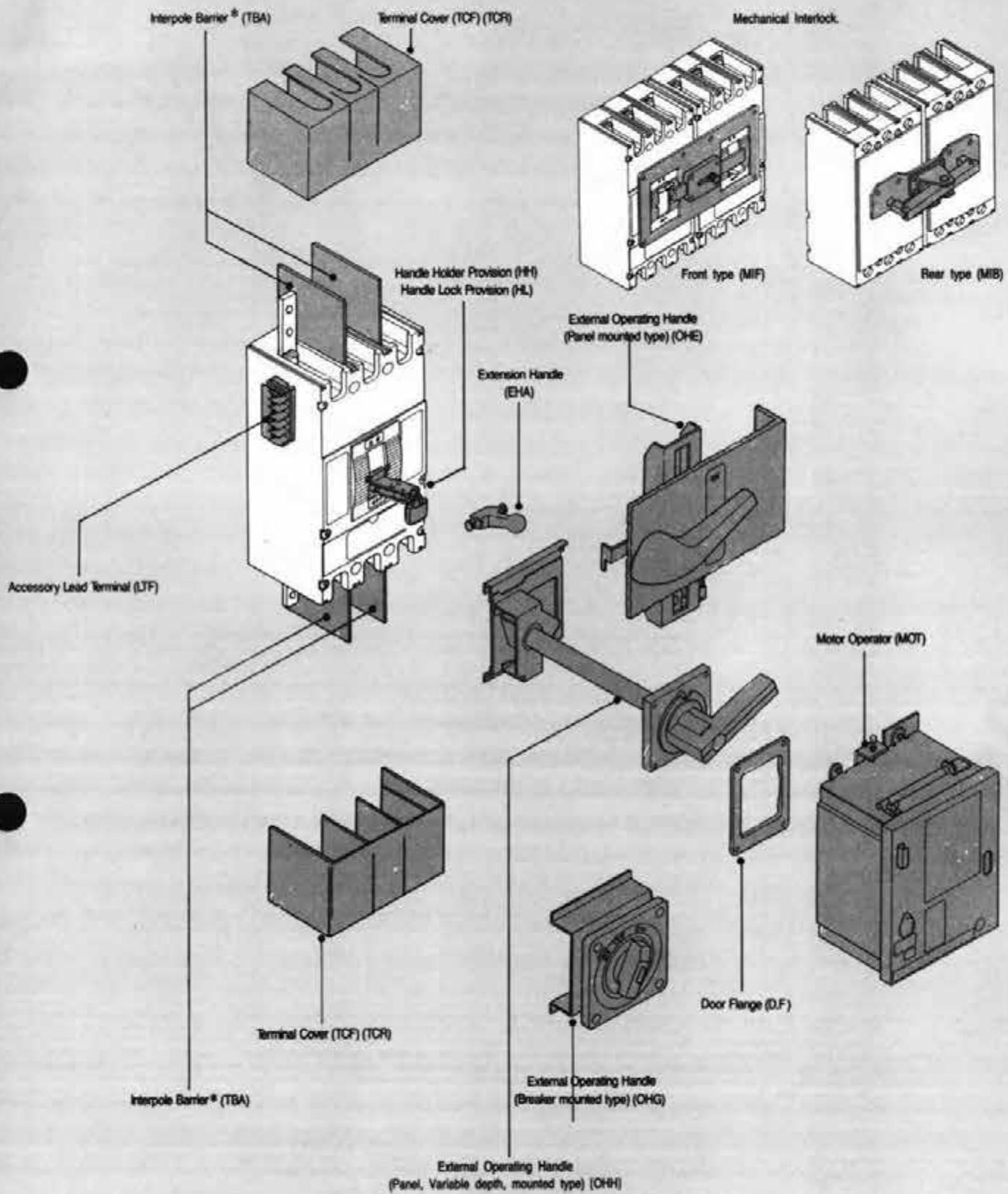
(6) Contact NHP for details.

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.



## Versatile Accessories

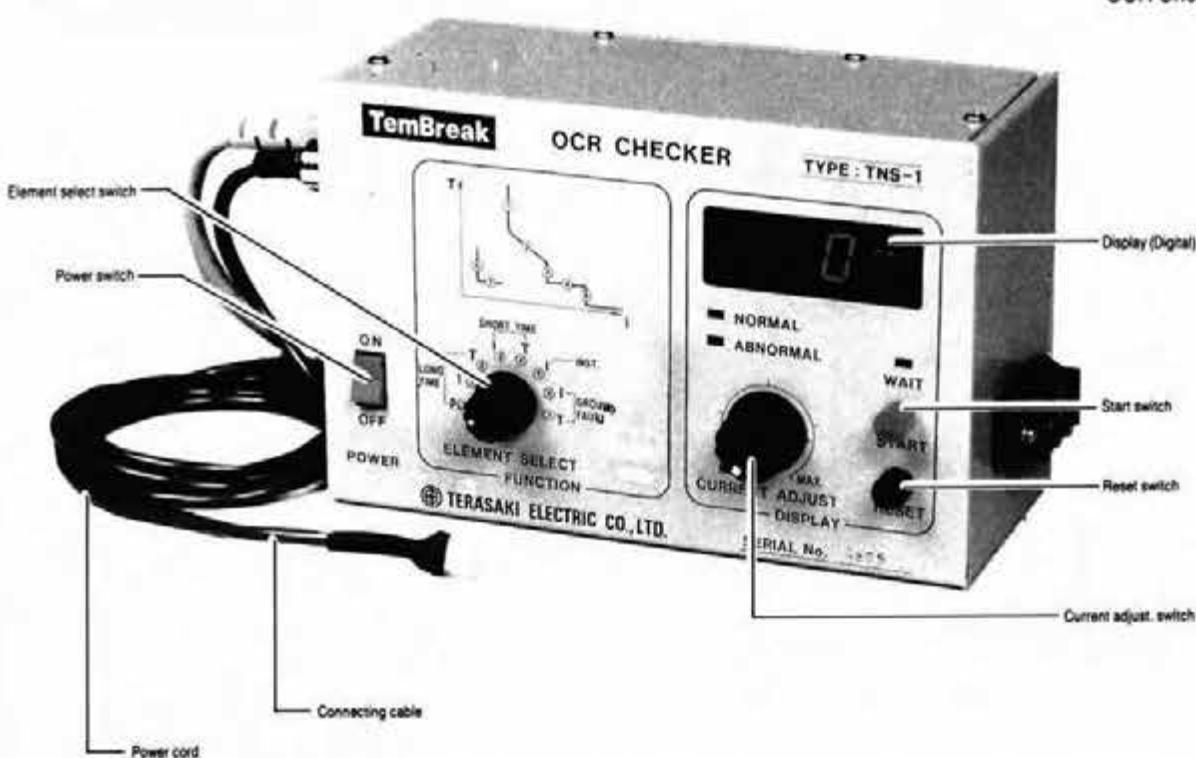


NOTE: \*1 for 2-pole, 2 for 3-pole  
3 for 4-pole



# 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 0.000mA
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

# NHP ELECTRICAL ENGINEERING PRODUCTS PTY LTD

ACN 004 304 812

**Melbourne:** 43-67 River Street, Richmond, Vic. 3121.  
P.O. Box 199, Richmond 3121. Telephone: (03) 429 2999  
Facsimile: (03) 429 1075. Telex: AA31644.

**Sydney:** 30-34 Day Street North, Silverwater, N.S.W. 2141.  
P.O. Box 259, Ermington 2115. Telephone: (02) 748 3444  
Facsimile: (02) 648 4353

**Brisbane:** 25 Turbo Drive, Coorparoo, Qld. 4151.  
P.O. Box 1127, Coorparoo DC, 4151. Telephone: (07) 891 6008  
Facsimile: (07) 891 6139

**Adelaide:** 50 Croydon Road, Keswick, S.A. 5035.  
Telephone: (08) 297 9055. Facsimile: (08) 371 0962

**Newcastle:** 57 Crescent Road, Waratah, N.S.W. 2298.  
Telephone: (049) 60 2220. Facsimile: (049) 60 2203

**Rockhampton:** 208 Denison Street, Rockhampton, Qld. 4700.  
Telephone: (079) 27 2277. Facsimile: (079) 22 2947

**Townsville:** 62 Leyland Street, Garbutt, Qld. 4814.  
Telephone: (077) 79 0700. Facsimile: (077) 75 1457

**Toowoomba:** Cnr Carroll St. & Struan Crt, Toowoomba, Qld. 4350.  
Telephone: (076) 34 4799. Facsimile: (076) 33 1796

**Perth:** Trading as C.J. Young & Co  
38-42 Railway Parade, Bayswater, W.A. 6053.  
Telephone: (09) 271 8666. Facsimile: (09) 272 3906

## AGENTS:

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

**Launceston:** H.M. Bamford (Launceston), 59 Garfield Street, Launceston, Tas. 7250. Telephone: (003) 44 8811. Facsimile: (003) 44 4069

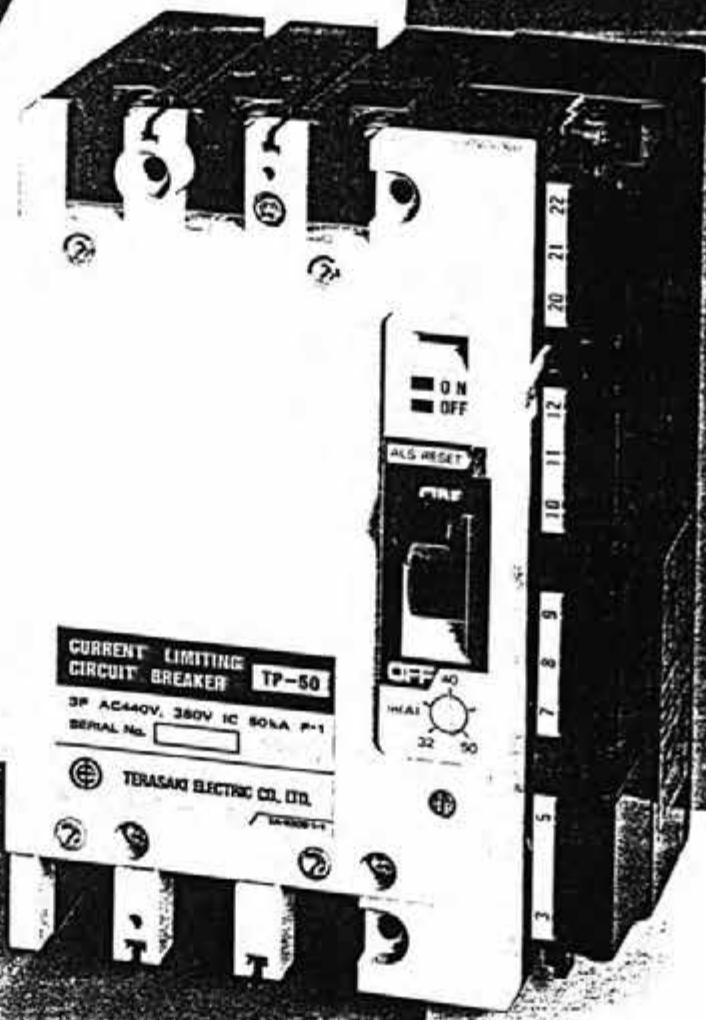
**Darwin:** J.Blackwood & Son Ltd. (inc. Tesco Pearce), Mataram Street, Winnellie N.T. 0820. Telephone: (089) 84 4255. Facsimile: (089) 84 3945. Telex: AA85454

**NHP***Proudly Australian*

TERASAKI

Current-limiting circuit breakers

CAPLET 50



Catalogue '87-J09K

Your Terasaki Sales Agent

# Highly efficiently breaking system

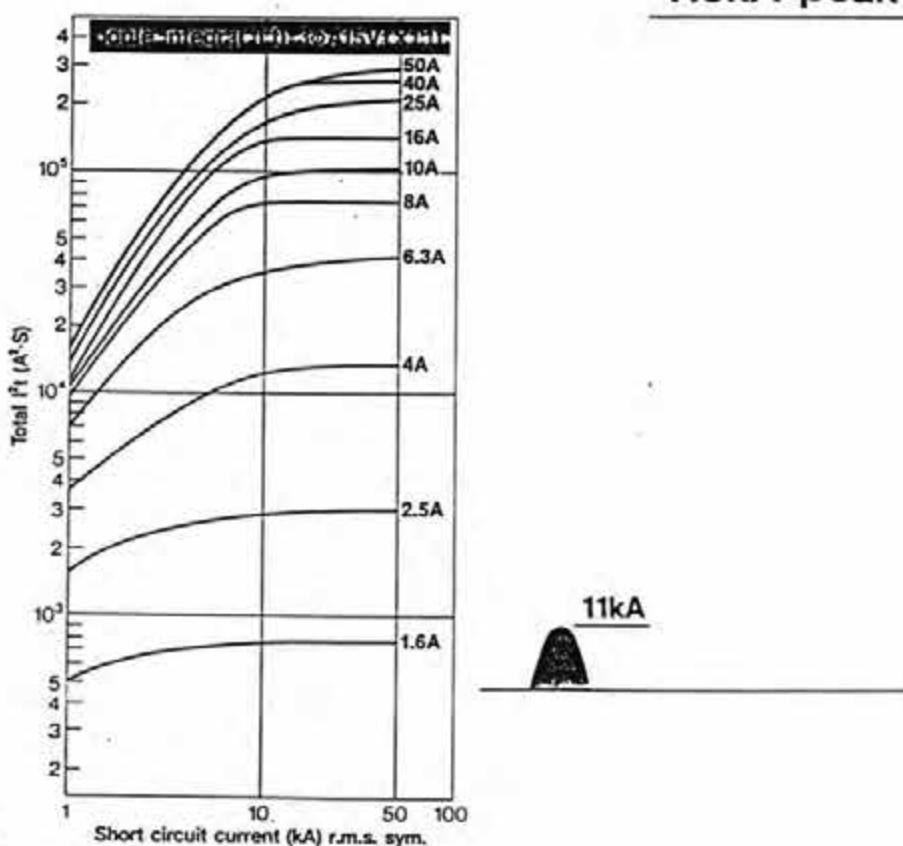
★ for the best modern motor protection...

## 1 Very small joule integral ( $I^2t$ ) and peak let-through current.

The joule integral ( $I^2t$ ) and peak let-through current at the time of short-circuit fault interruption are limited to very low values, and coordination of short-circuit protection with magnetic contactor is readily obtained. An ideal short-circuit protective device (SCPD) for motor starters.

## 2 High breaking capacity: 50kA at 440V AC, 3-phase.

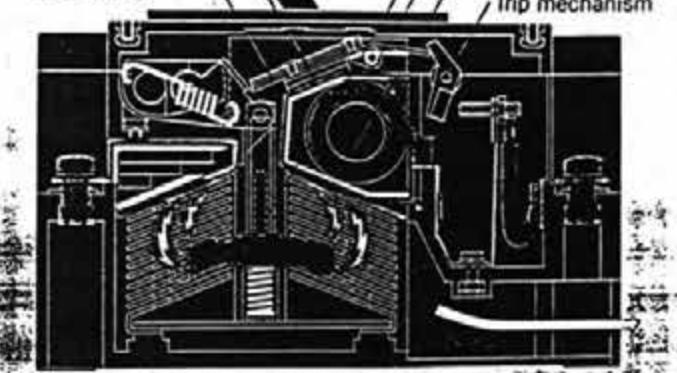
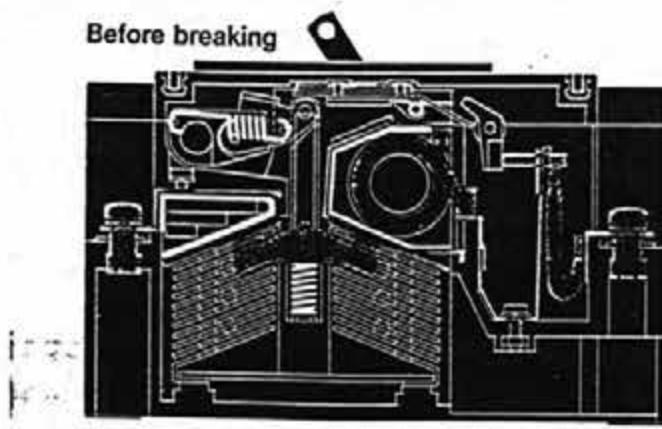
The rated breaking capacity of the CAPLET 50 is 50kA at 440V AC, making it readily applicable to large motor control centers.



## Highly efficiently breaking system

When large fault current starts to flow through the circuit breaker, an electromagnetic repulsive force develops between the moving and stationary contacts and contact separation starts. At the same time, a coil in series of each pole develops a strong magnetic attraction to actuate two moving cores: one (striker) to move the moving contact toward the open position and the other (trip core) to trigger the trip mechanism.

The series coil also works to blow out the arc between the moving and stationary contacts, achieving a high-speed interruption of the fault current. Another effect of the series coil is to limit the fault current by its impedance.



# Many useful advantages

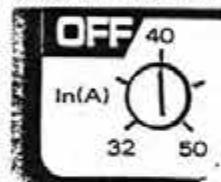
★ for the best modern motor protection...

## 3 A wide range of applications from small to large motors.

The frame size of the CAPLET 50 is 50A to cover motors up to 22kW for 400V class, 18.5kW for 380V class, and 11kW for 200V class.

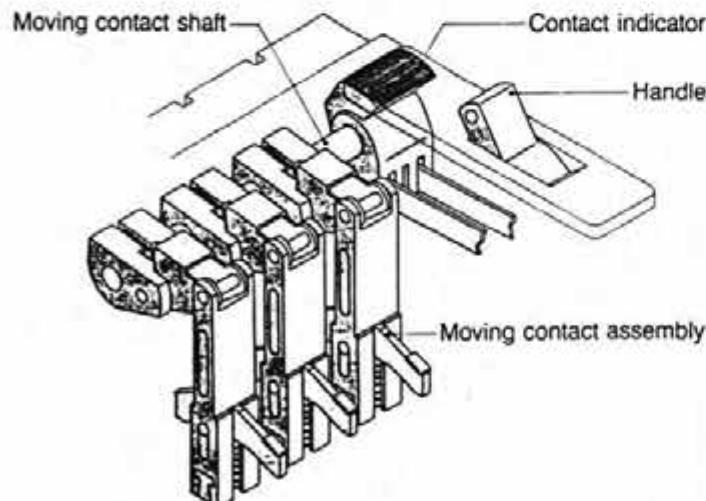
## 4 Adjustable rated current.

The rated current setting is adjustable from 63% to 100% of the nominal rated current.



## 5 Clear contact indicator fitted for positive indication of contact status.

A contact indicator ganged to the switching mechanism indicates the contact on/off status.



## 6 Overcurrent characteristics based on IEC 292.

The overcurrent characteristics of the CAPLET 50 are based on IEC 292, which is ideal for motor protection. It eliminates the use of a separate overload relay.

## 7 No arcing clearance is required from the top of the breaker.

The contacts are centrally located in the breaker and the top of the breaker is sealed. Arcs produced are guided to the bottom and emitted. No arcing clearance is required for the top of the breaker.

## 8 Increased safety.

The breaker handle has a double-insulation construction for higher safety factor.

## 9 Field-installable accessories.

Accessories, such as a shunt trip and auxiliary switches, may be readily installed or replaced in the field.

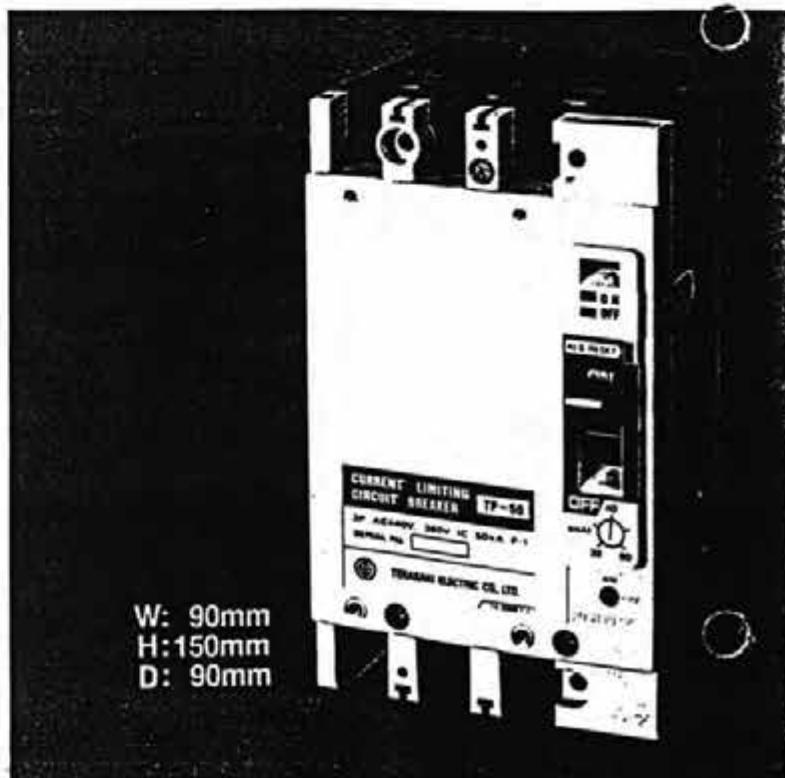
## 10 Complete isolation of accessories from main circuit.

The accessory devices, such as a shunt trip and auxiliary switches, are completely isolated from the main circuit of the breaker.

## 11 Many advantages over fuses.

1. No single-phasing.
2. Reliable performance with no secular deterioration.
3. Reclosable immediately after an interruption.
4. No need for element replacement for reclosure after interruption.

## 12 Approved by LR Lloyd's Register of Shipping



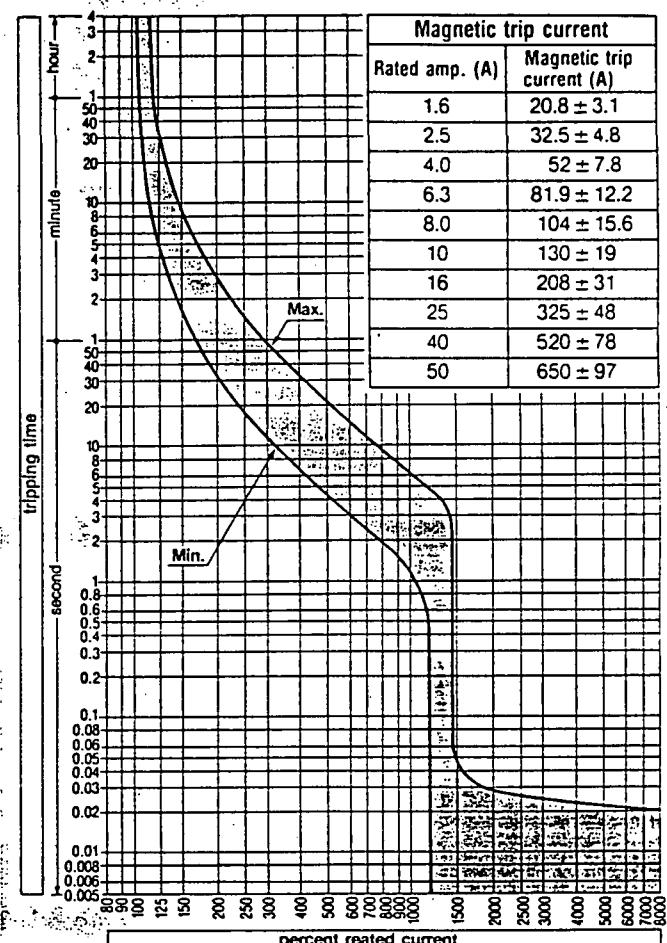
# Ratings, Specifications and Characteristics

Stelair Drive Castle Park S.S. SP252 Switchboard Maintenance Manual

## Ratings and Specifications

<b>TYPE</b>	TP-50	
<b>AMPERE FRAME (A)</b>	50	
<b>POLES</b>	3	
<b>RATINGS</b>		
Nominal rated current, In (A)	1.6 (1.6-1.0)	
Adjustable range in ( )	2.5 (2.5-1.6)	
	4 (4-2.5)	
	6.3 (6.3-4)	
	8 (8-5)	
	10 (10-6.3)	
	16 (16-10)	
	25 (25-16)	
	40 (40-25)	
	50 (50-32)	
Voltage, Ue (V)	440AC	
Insulation voltage, Ui (V)	660AC	
Frequency (Hz)	50/60	
<b>A.C. RATED BREAKING CAPACITY</b>		
• Sym. r.m.s. [kA]		
IEC 157-1 BS 4752-1	P1	440V 50
		415V 50
		380V 50
		220V 100
IEC 157-1 BS 4752-1 VDE 660	P2	440V 35
		415V 42
		380V 50
		220V 100
<b>TRIPPING CHARACTERISTICS</b>		
IEC 292		
105%-2h non trip		
120%-2h trip		
<b>CONNECTIONS</b>	Front	●
	Rear stud	●
<b>CLOSING OPERATION</b>		
MAX. APPLICABLE	Dependent manual	
MOTOR	AC400-440V	22kW
	AC380V	18.5kW
	AC200-220V	11kW
<b>OPTIONAL ACCESSORIES</b>		
Shunt trip (AC or DC), or Undervoltage trip (AC)		●
Auxiliary switch	Max. 4C	
Alarm switch	1C	
External operating handle		●
Terminal cover		●
Interpole barrier		●
Door flange		●

## Time-current characteristic curves



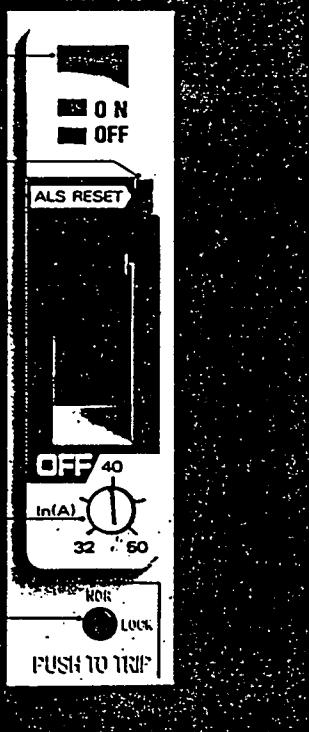
Contact indicator  
(ON: Red, OFF: Green)

Alarm switch reset

(When alarm switch installed, push to reset after operation.)

Rated current setting dial

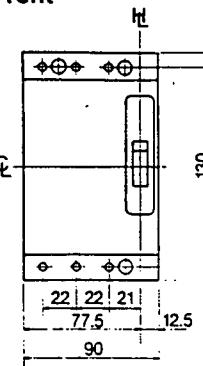
Trip button (Lockable)



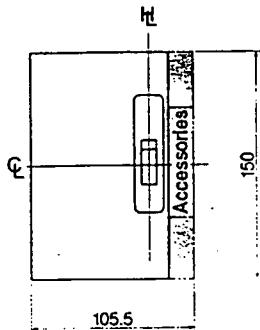
# Outline dimensions

## CAPTE-T50: Outline dimensions (mm)

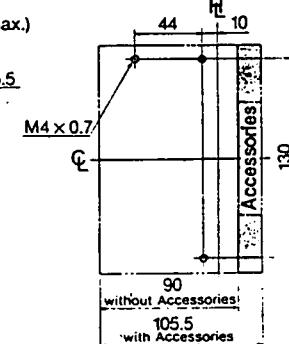
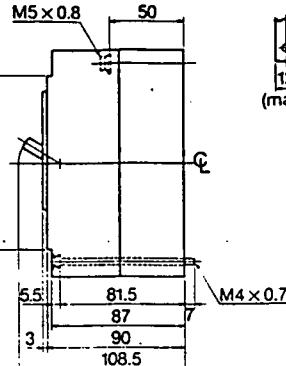
Front



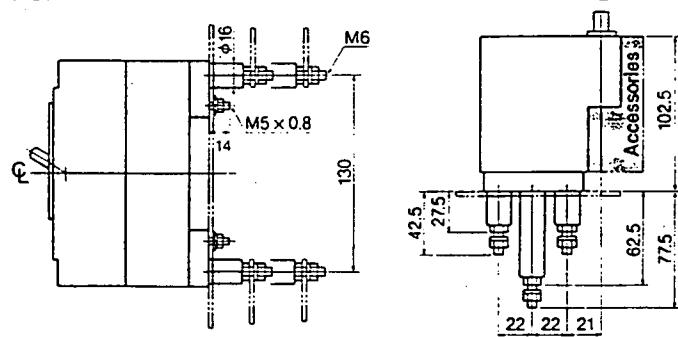
with Accessories



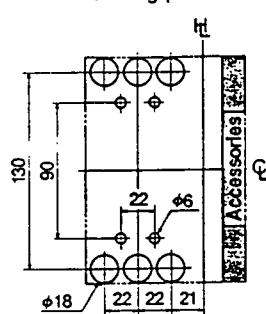
Drilling plan



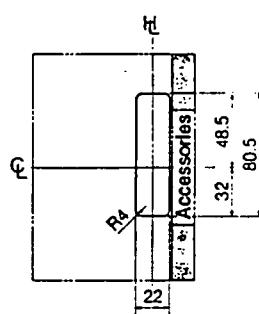
Rear stud



Drilling plan



Panel-Cutout



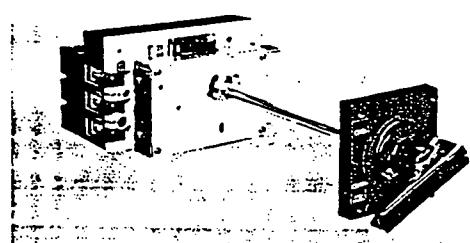
H : Handle frame Center Line  
F : Center Line

## External operating handle: Outline dimensions (mm)

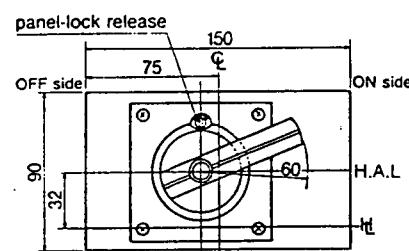
External operating handle has following valiations.

Please designate on ordering.

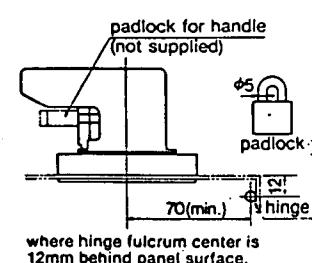
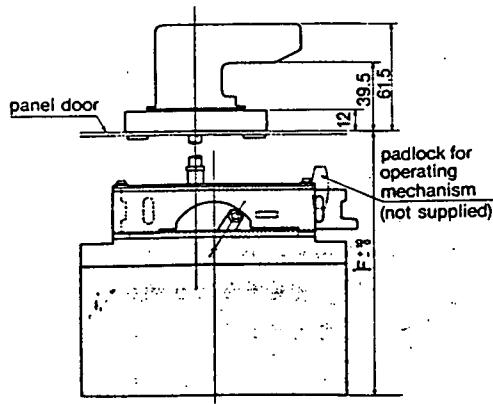
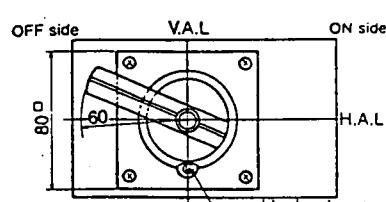
1. Directions Counter-clockwise  
Clockwise
2. Mounting Depth 220mm  
\*Dimension-F  
320mm  
420mm  
520mm
3. Name plate ON-OFF  
I - O



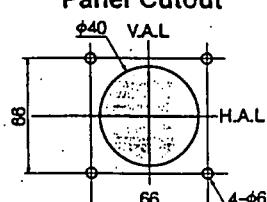
Counterclock wise "ON"



Clock wise "ON"



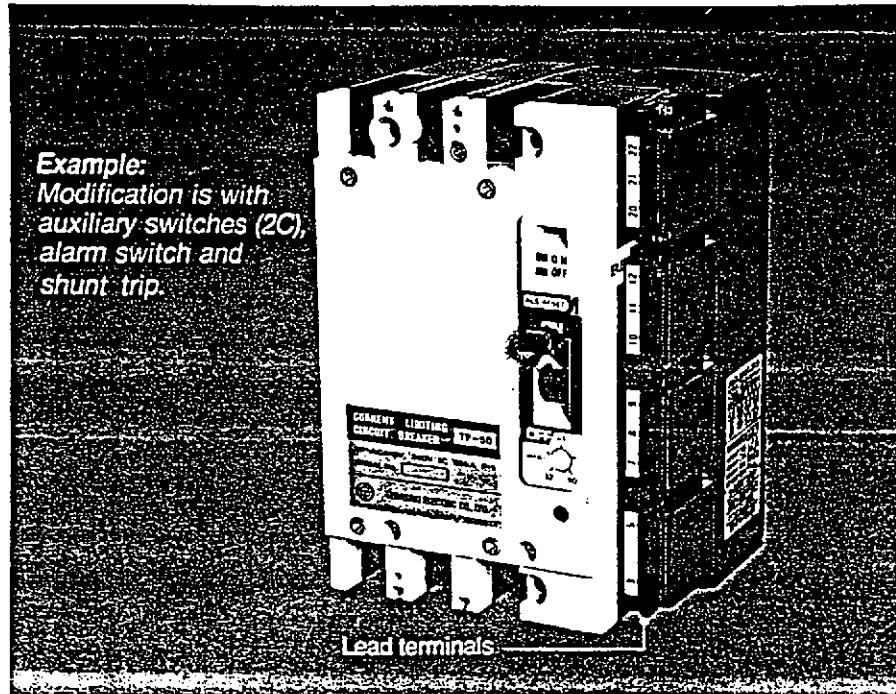
Panel Cutout



V.A.L: Vertical Arrangement Line  
H.A.L: Horizontal Arrangement Line

# Ratings of side mounted accessories

## “Field-installable”



### S Shunt trip

Rated voltage (V)	Exciting coil current [peak (A)]
AC 100 to 115	2.6
200 to 480	1.6
DC 24	2.6
48	1.2
100 to 115	0.77

### U Undervoltage trip

Rated voltage (V)	Exciting coil current [r.m.s. (mA)]
AC 100 to 115 (116 to 125)	30.7
50Hz 200 to 230 (231 to 250)	17.1
400 to 460 (440 to 500)	8.7
AC 100 to 115 (90 to 99)	33.4
60Hz 200 to 230 (180 to 199)	18.6
380 to 439 (342 to 399)	9.9

**notes**

- The breaker is tripped automatically when voltage for undervoltage trip drops below 70% to 20% of the voltage rating of trip coil, and pick up below 85% of rated voltage.
- Rated voltage range in ( ) in AC 50Hz column applies to 60Hz operation.
- Rated voltage range in ( ) in AC 60Hz column applies to 50Hz operation.

### AX Auxiliary switch and AL Alarm switch

Switch type	V-10			
AC	Voltage (V)	480	250	125
	Current (A)	resistive 1	5	5
		lamp 0.2	1.5	2
		inductive 1	5	5
		motor 0.3	2	3
DC	Voltage (V)	250	125	30
	Current (A)	resistive 0.3	0.6	5
		lamp 0.05	0.1	3
		inductive 0.3	0.6	5
		motor 0.05	0.1	3

### Modification of side mounted accessories

Modification	Mounted position
Auxiliary switch • max. 4C	<input checked="" type="checkbox"/> AX <input type="checkbox"/> AX <input type="checkbox"/> AX <input type="checkbox"/> AX
Alarm switch	<input type="checkbox"/> AL
Shunt trip	<input type="checkbox"/> S
Undervoltage trip	<input type="checkbox"/> U
Auxiliary switch • max. 3C	<input type="checkbox"/> AX <input type="checkbox"/> AX
Alarm switch	<input type="checkbox"/> AL <input type="checkbox"/> AL <input type="checkbox"/> AL
Auxiliary switch • max. 3C	<input type="checkbox"/> AX <input type="checkbox"/> AX
Shunt trip	<input type="checkbox"/> S
Auxiliary switch • max. 3C	<input type="checkbox"/> AX <input type="checkbox"/> AX <input type="checkbox"/> AX
Undervoltage trip	<input type="checkbox"/> U
Alarm switch	<input type="checkbox"/> AL
Shunt trip	<input type="checkbox"/> S <input type="checkbox"/> AL
Alarm switch	<input type="checkbox"/> AL
Undervoltage trip	<input type="checkbox"/> U <input type="checkbox"/> AL
Auxiliary switch • max. 2C	<input type="checkbox"/> AX <input type="checkbox"/> AX
Alarm switch	<input type="checkbox"/> AL
Shunt trip	<input type="checkbox"/> S
Auxiliary switch • max. 2C	<input type="checkbox"/> AX <input type="checkbox"/> AX
Alarm switch	<input type="checkbox"/> AL
Undervoltage trip	<input type="checkbox"/> U

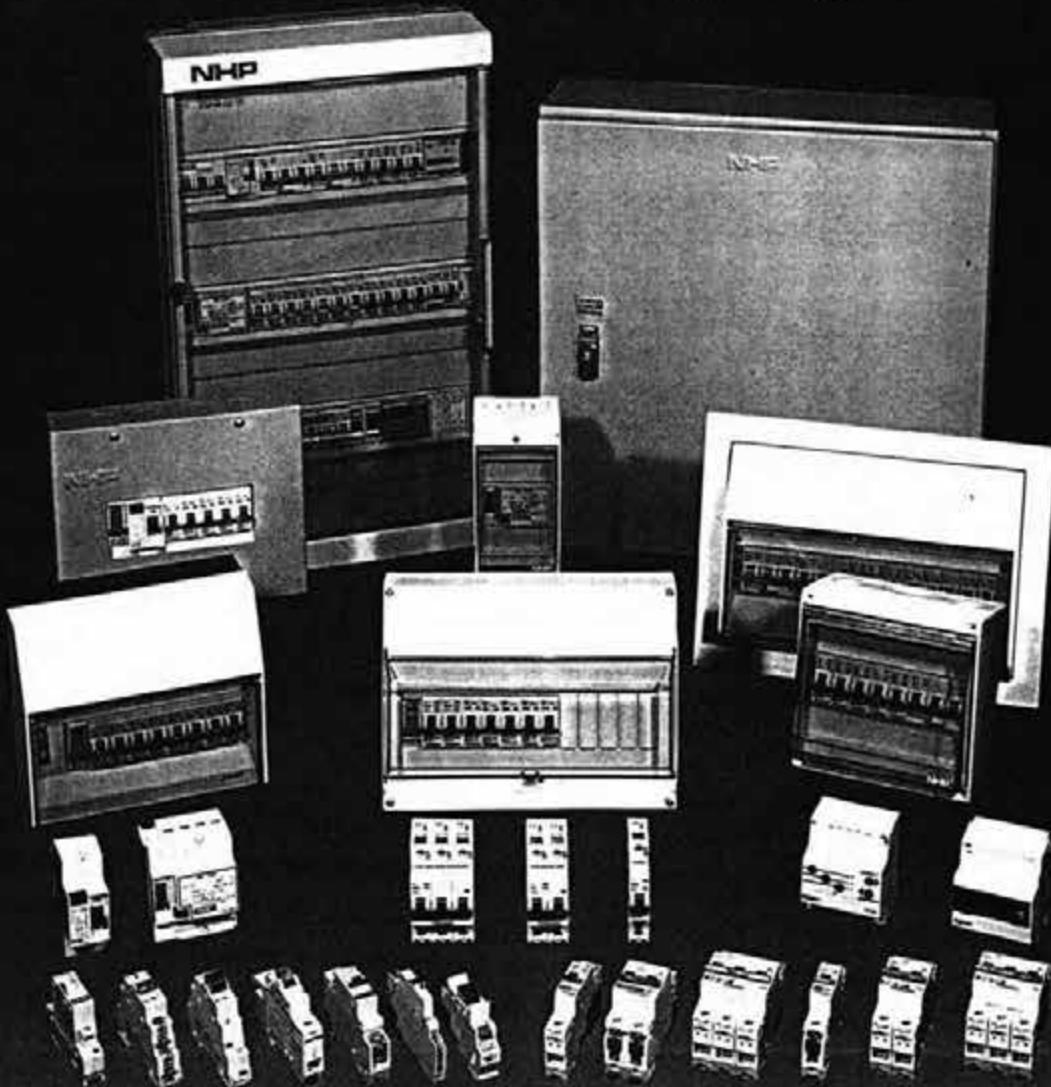
# NHP - TERASAKI

Catalogue  
DIN-SG

February 1992

## Din-T

### DIN rail mounting system



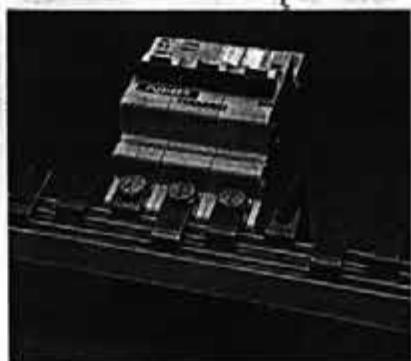
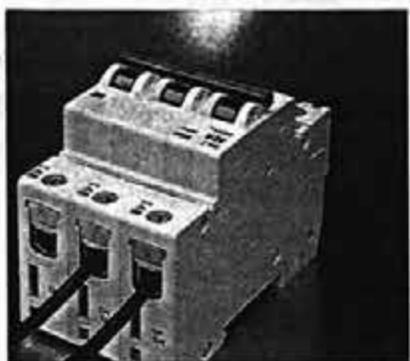
### Miniature circuit breakers and Residual current devices

- Loadcentres
- Panelboards
- Chassis
- Accessories

## selection guide

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

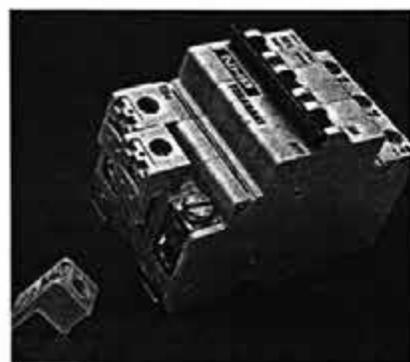
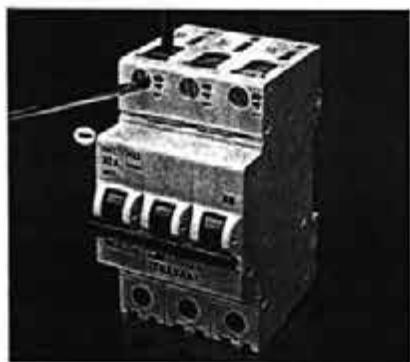
## Some of the advantages



### **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 10mm<sup>2</sup> can be inserted without further opening. For thicker conductors up to maximum 1 x 35mm<sup>2</sup> or 2 x 16mm<sup>2</sup> 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 25mm<sup>2</sup> or 2 x 10mm<sup>2</sup>.

### **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.

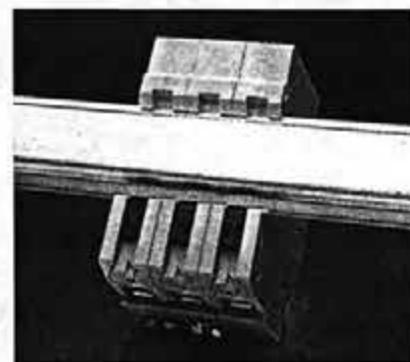
### **Sealing**

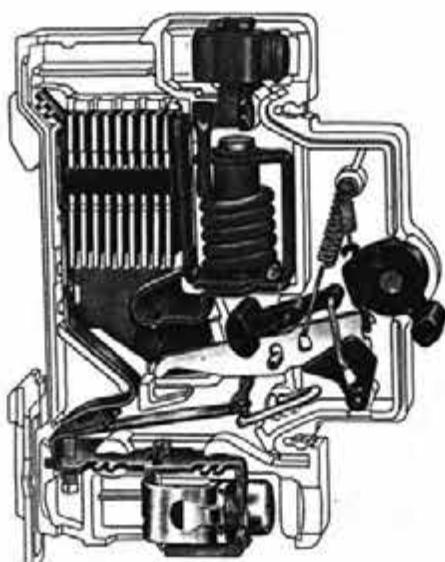
In both switching positions the handles can be protected against manual switching by means of sealing. Interruption in case of faults is guaranteed by means of a trip free mechanism.

### **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.



**Din-T series 6 kA MCBs****6 kA interrupting capacity to AS3111**

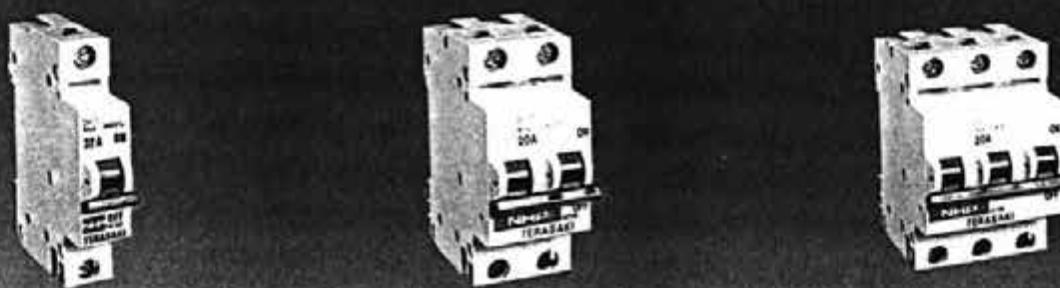
The 6000 series offers unparalleled choice of DIN rail mounted miniature circuit breakers. This high performance device uses all the latest developments and technology of circuit breaker protection and is capable of dealing with the most difficult problems. These include high short circuit currents and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

**Mounting:**

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

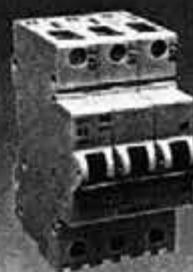
**Ratings:**

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 6000 series is of the highest protection and, as standard with the entire Din-T system, finger protected to IP20.



Amps	Cat. No.	Amps	Cat. No.
<b>Single pole 6kA</b>		<b>Single pole 6kA</b>	
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
<b>Double pole 6kA</b>		<b>Double pole 6kA</b>	
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
<b>Triple pole 6kA</b>		<b>Triple pole 6kA</b>	
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.

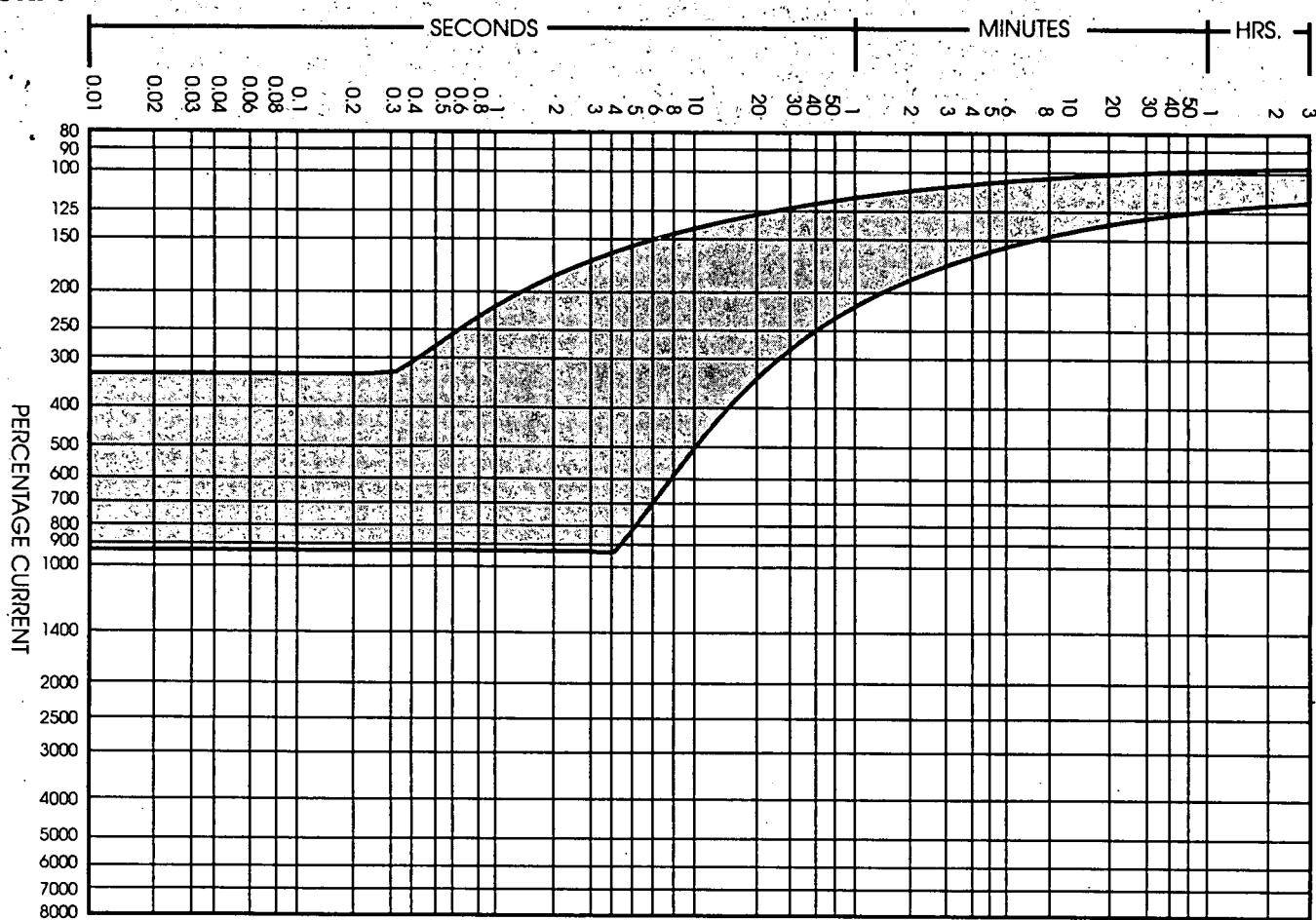
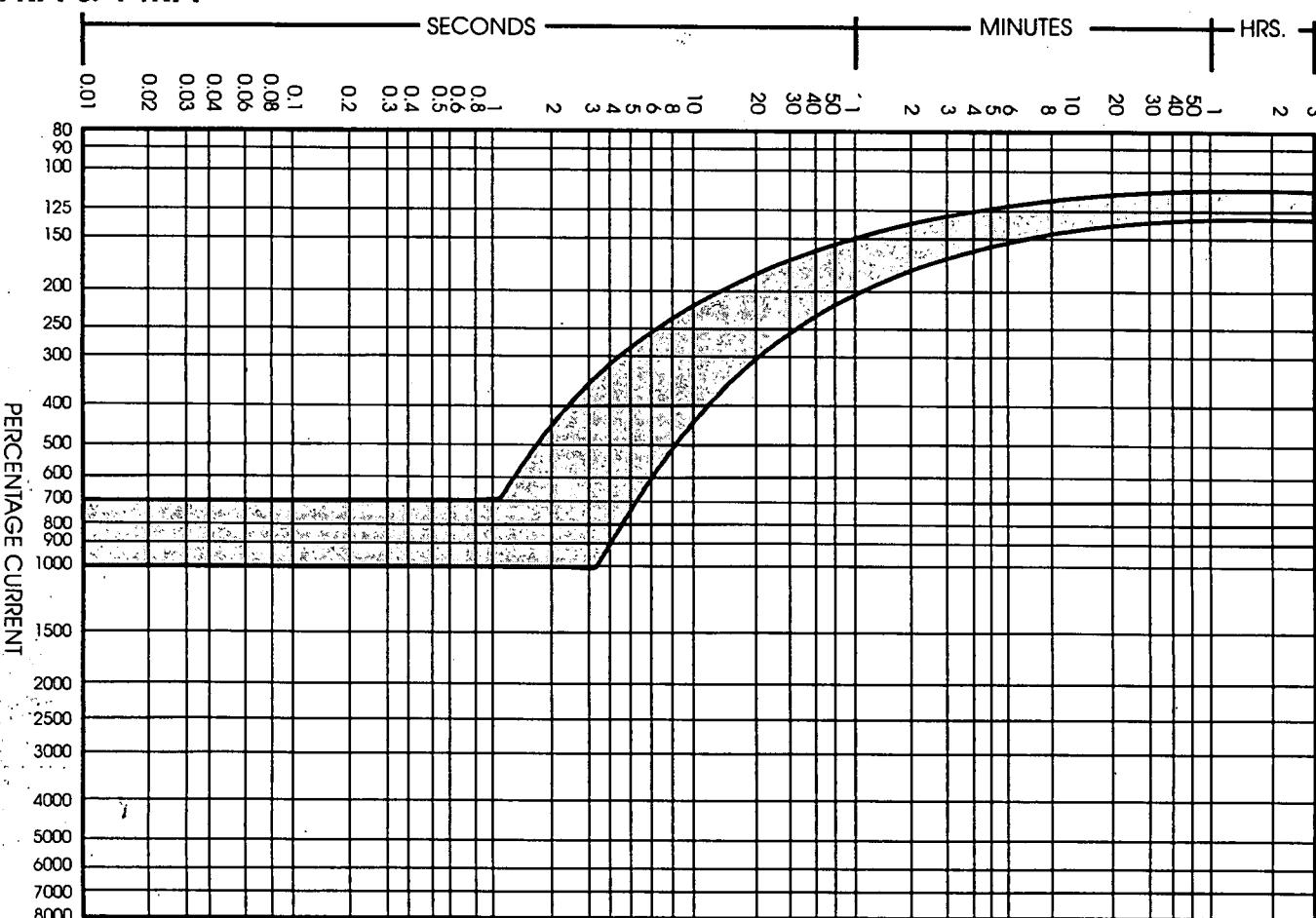
**Din-T series 9 kA MCBs****9 kA Interrupting capacity to AS3111**

Amps	Cat. No.	Amps	Cat. No.
<b>Single pole 9kA</b>		<b>Double pole 9kA</b>	
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 □	3	Din-T 9 203 □
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
<b>Triple pole 9kA</b>		<b>Four pole 9kA</b>	
0.5	Din-T 9 305		
1	Din-T 9 301		
2	Din-T 9 302		
3	Din-T 9 303 □		
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



3 amp available on Incent only

Note: IP20 finger protection cover available, see accessories page 21.

**Din-T time current curves****6kA****9kA & 14kA**

**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			
11	15	20.2	63	50			
15	20	26.7	63	60			
18.5	25	35		80			
22	30	40		100			
25	35	47			75		
30	40	55			75		
37	50	66			100		
45	60	79			100	125	
55	75	95			125	150	
75	100	128				200	
90	125	155				225	
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

**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	50			
18.5	25	35	63	80			
22	30	40		80			
25	35	47		100	60		
30	40	55		100	75		
37	50	66			100		
45	60	79			100	125	
55	75	95			125	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

# 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			
11	15	20.5	63	63			
15	20	28		80	60		
18.5	25	34.5		100	75		
22	30	40			75		
25	35	47			75		
30	40	55			75		
37	50	66			100	125	
45	60	79			125	150	
55	75	95				175	
75	100	128				225	
90	125	155					250
110	150	188					250
132	180	224					300
160	220	266					350

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

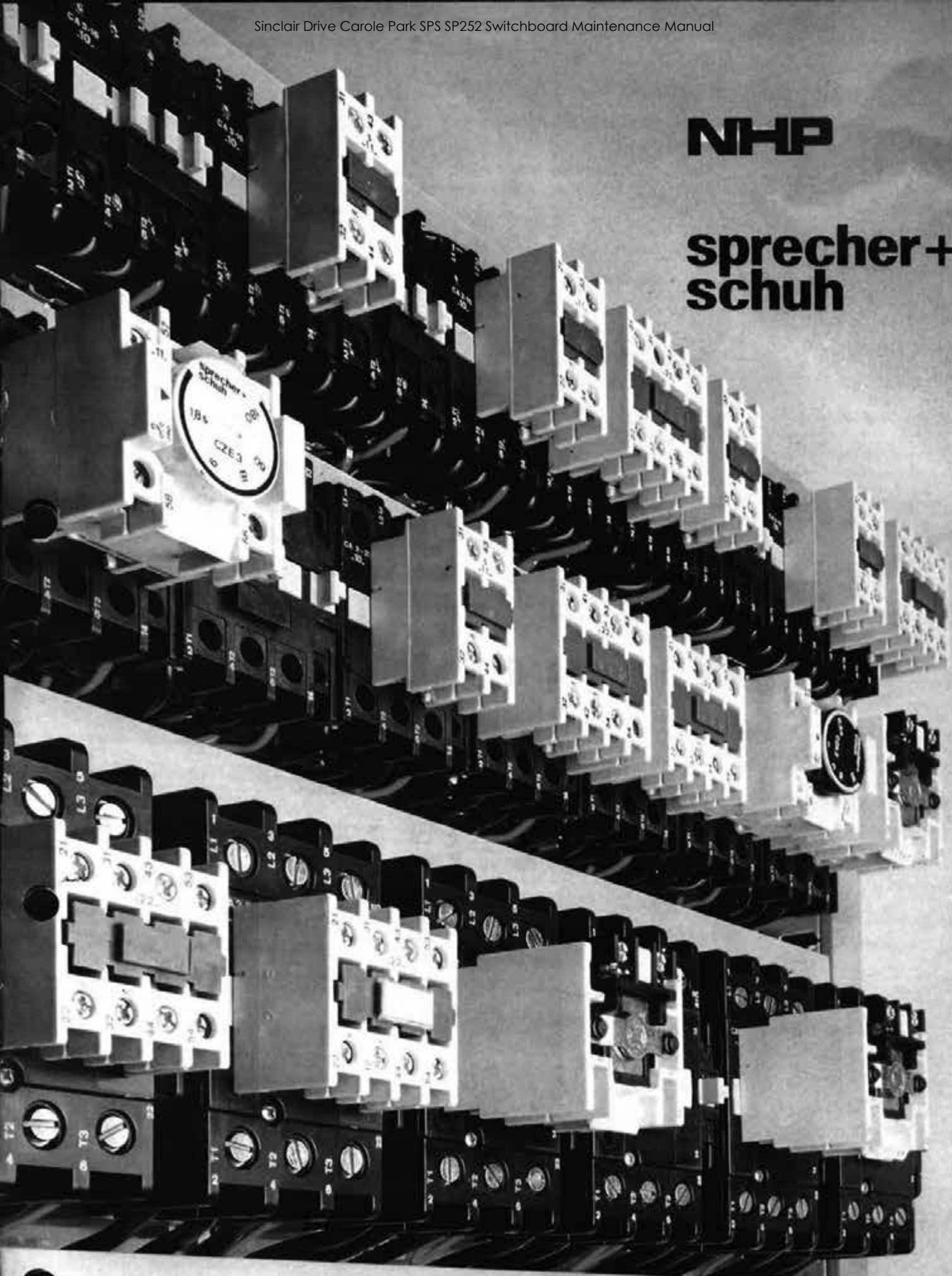
## Din-T Cascade co-ordination chart

RATED BREAKING CAPACITY kA	BACK-UP BREAKER	XS125CJ		TL225B	XS250NJ	XH250NJ	XS400CJ	XS400NE	XS400NJ
		XH125NJ	*18/30						
LOAD-SIDE BREAKER				50	180	35	50	35	50
Din-T 4-40 A	6kA	10	-	-	-	-	-	-	-
Din-T 0.5-25 A	9kA	*18/30	50	180	35	43	22	35	
Din-T 0.5-25 A	14kA	30	50	180	35	43	22	35	

\* applies to XS125CJ

NHP

sprecher+  
schuh



22 02

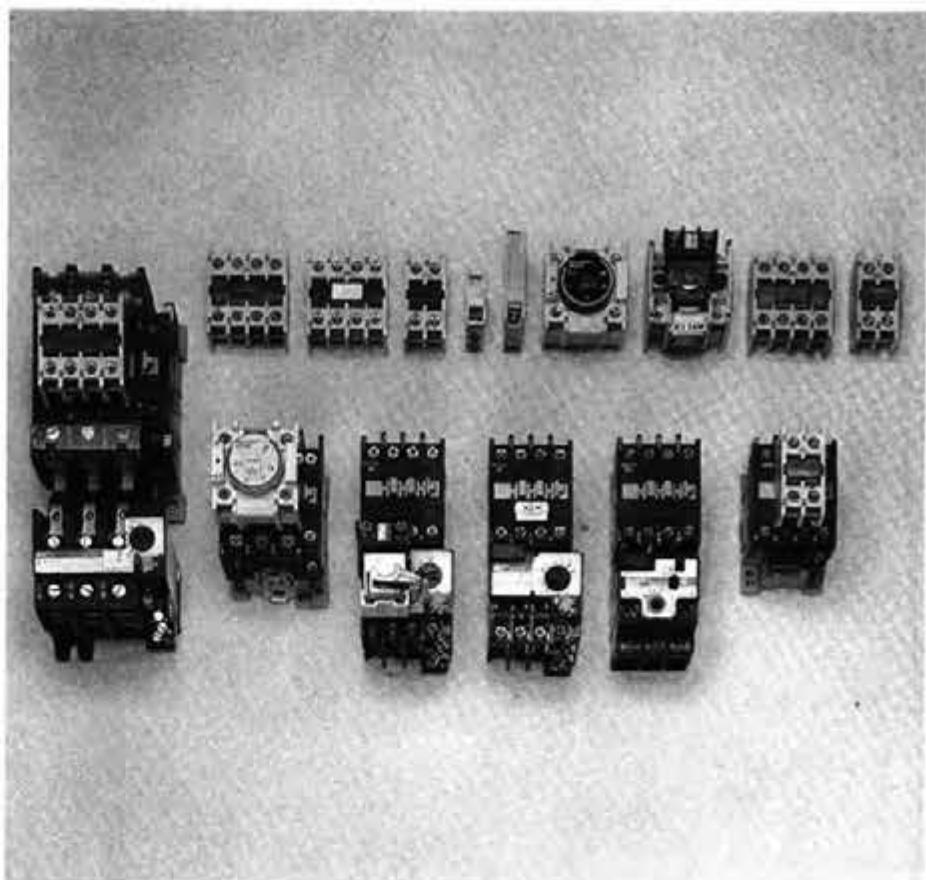
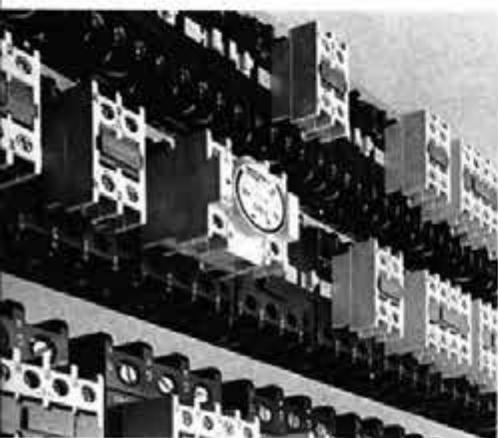
CA 3 contactor system

## A powerful contactor system with decisive advantages

CA 3 is well-engineered contactor system in which modules for small and large ratings are integrated. There are 9 power contactors in only 3 different sizes covering a range from 4...37 kW.

The matching thermal overload relays in only 2 sizes are designed to provide protection from 0.1...72.5 A.

These components together with a universal range of accessories provides more performance in less space.



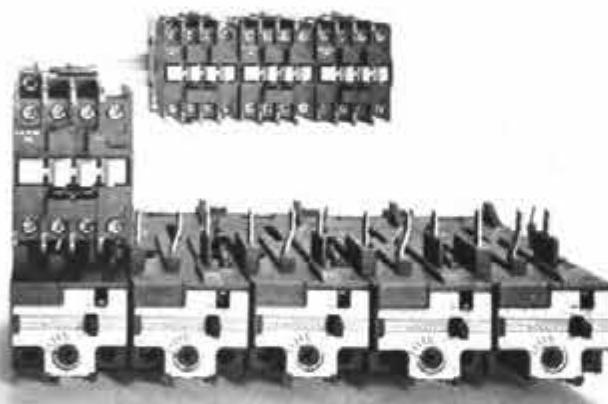
### User compatible

The clearly visible switching status of the contactors, auxiliary contacts and thermal overload relays simplify installation supervision.

Three options are available for equipment inscription purposes.

Clear connection designations and code number according to European standards (EN) as well as an integrated snap-on device for EN 50 022-35 cap rails permit worldwide use.

**CA 3 solves all control problems with very few components.**



### Compact

With a spacing of 45 mm, the compact thermal overload relay CT 3 K exactly matches the contactors CA 3-9... CA 3-16 and permit the space-saving assembly of switching cabinets and combinations.



### Convenient

The easily readable current scales of the thermal overload relays allow simple, accurate adjustment for both direct and star-delta starting. A complex limiting current calibration procedure for each individual item of equipment enables outstanding tripping accuracy to be achieved.

### Operationally reliable

Independent of position, high vibration and shock-resistance, positively guided contacts and phase failure protection guarantee safety and reliability.

### Completely modular

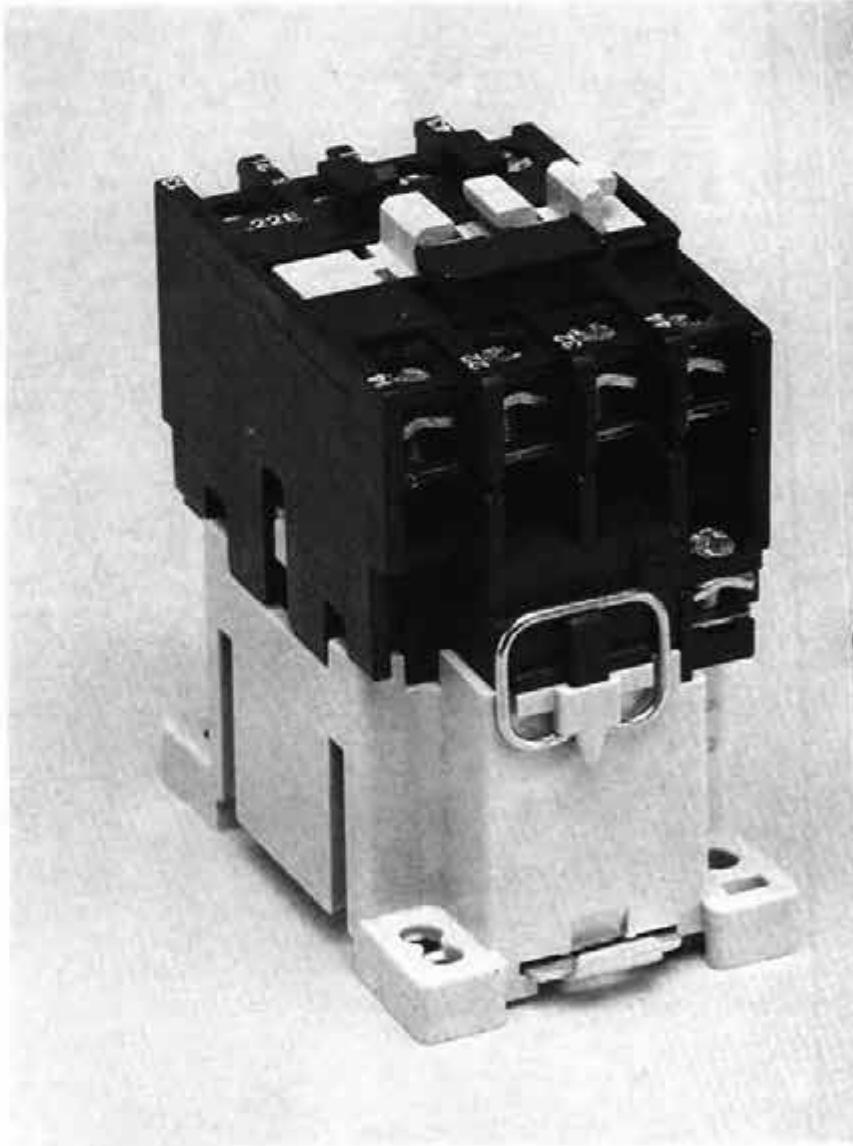
The comprehensive selection of modules and standard boxes permit the construction of any combination of contactors and miniature control systems, i.e. the items are available:

- Connection keys for screwless, efficient subassembly
- Attachable interlock to mechanically inhibit the simultaneous switching of 2 contactors
- Single enclosure for cost-effective starter construction
- Protective elements for limiting voltage surges when the contactors are switched off

Contactor type	CA 3-9	3-12	3-16	3-23	3-30	3-37	3-43	3-60	3-72
AC-1, open	[A]	25	25	25	45	45	63	63	90
For switching motors AC-2, AC-3, AC-4 at 380/415 V	[kW]	4	5,5	7,5	11	15	18,5	22	30

## Versatile contactor system for rapid assembly and effortless upgrading

A series of useful items considerably simplify the assembly of the CA 3 contactor system. During commissioning or during subsequent expansion of the installation, the modular system accommodates numerous modifications without the need for structural alterations.



The compact and easily assembled elements of the CA 3 system save time and space.

### Safe to handle

A terminal cover protects against inadvertent contact while acting as a screwdriver guide (safe for back of hand and fingers according to VBG 4).

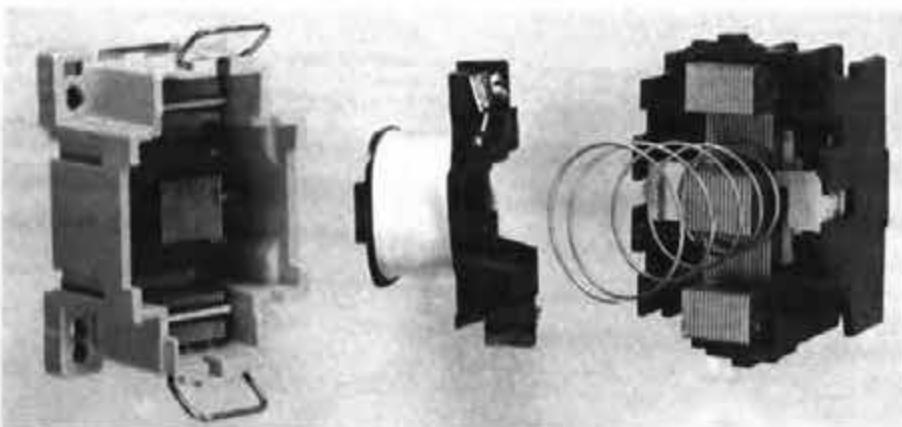
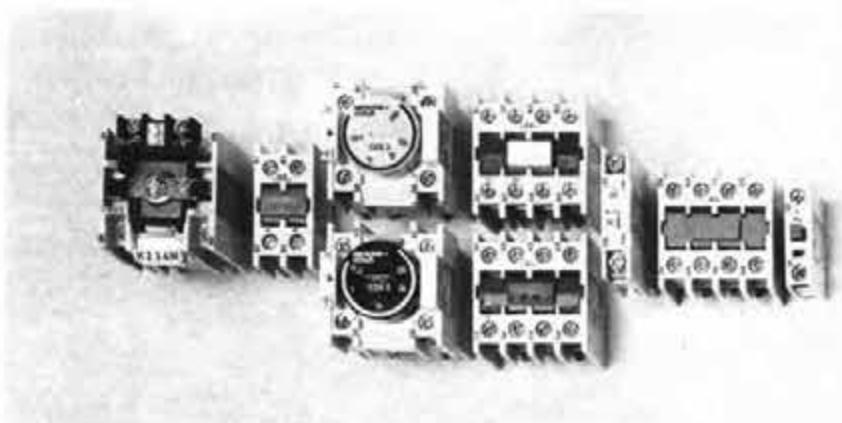
### Time saving

All contactors and thermal overload relays are supplied with opened terminals. Thus, an operation is saved for every screw and valuable time is saved. Captive screws ( $\pm$ /pozidrive) for all types of manual and powered screwdrivers.



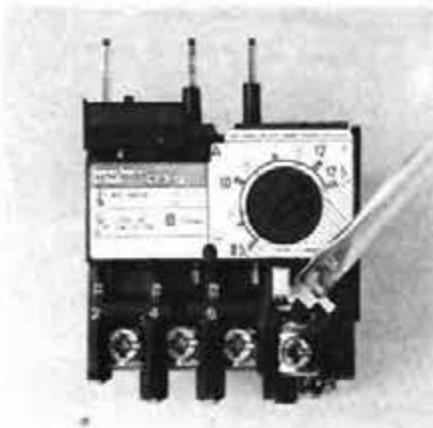
### User-friendly

Simplified inventory management through upgradeable and retrofittable, attachable elements. A standard version of which can be used for all types from 4...37 kW.



### Exclusive

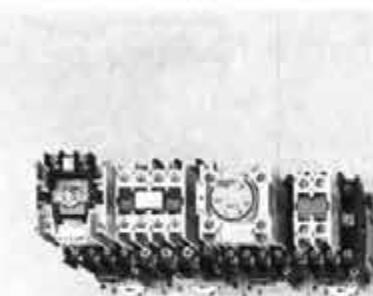
Simple, rapid exchanging of coils without tools even on mounted and wired contactors. Trouble-free coil changing is also possible for reset solenoids and latches (no loose small components).



### Versatile

The programmable reset button of the CT 3 thermal overload relay permits any one of 3 reset options to be chosen: test, manual and automatic modes. The uniformly attachable magnetic remote reset up to 660 V and the shortenable reset rod permit flexibility in the solution of special reset problems.

## Well-engineered protection system for simple planning



### Well-engineered

Time-saving design aids simplify design work. The following items are available:

- Base plate or appliance drawings, scale 1:1
- Templates, scale 1:10
- Adhesive films for efficient circuit diagram preparation

**CA 3 simplifies design thanks to the unified and universally applicable system.**

Simple planning with the CA 3 contactor system that can be used all over the world. The standard version corresponds to the European-international and to the special North American codes. The auxiliary circuits are also approved for up to 660 V according to IEC and to 600 V according to CSA and UL. CA 3 components function perfectly under any climatic conditions. As well as under unfavorable environmental and operating conditions. For example, the thermal overload relays are compensated from  $-25^{\circ}\text{C}...+70^{\circ}\text{C}$ .

### Uniformity

Simple job planning thanks to uniform site grid for:

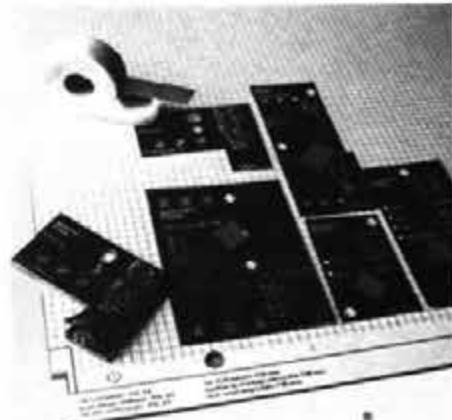
- Auxiliary contactors and contactors up to 7.5 kW
- Contactors between 18.5...37 kW DC and AC controlled.

### Space saving

No extra space required for all function alternatives:

- Auxiliary contacts with 1...4 poles
- Timing element (time delay relay)
- Mechanical latch (latched contactor)
- DC operation

Therefore, the CA 3 offers more performance in less space.



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# Control Relays

## Contactors

### Thermal Overload Relays

Selection Table

**Contactor****CS 3 Control Relay****CA 3-9**

Operating voltage	V	220	240	380	415	500	660	220	240	380	415	500	660
$I_{th}^{(1)}$ open	A	20	20	20	20	20	20	25	25	25	25	25	25
AC-1 <sup>(2)</sup>	kW	7,6	8,3	13	14,5	17,5	23	9,5	10,5	16,5	18	21,5	28,5
enclosed	A	16	16	16	16	16	16	16	16	16	16	16	16
	kW	6	6,7	10,5	11,5	14	18	6	6,7	10,5	11,5	14	18
<b>Switching of 3-phase motors</b>													
AC-2 Slip-ring motors	A	12	11	9	8,2	7	5,2	12	11	9	8,2	7	5,2
AC-3 Squirrel-cage motors <sup>(3)</sup>	kW	3	3	4	4	4	4	3	3	4	4	4	4
normal loading	PS	4	4	5,5	5,5	5,5	5,5	4	4	5,5	5,5	5,5	5,5
AC-4 Squirrel-cage motors	A	12	11	9	8,2	7	5,2	12	11	9	8,2	7	5,2
Heavy-duty, plugg. <sup>(3)</sup>	kW	3	3	4	4	4	4	3	3	4	4	4	4
inch	PS	4	4	5,5	5,5	5,5	5,5	4	4	5,5	5,5	5,5	5,5
	A							15	14	16	14	12	9
Star-delta starting <sup>(3)</sup>	kW							4	4	7,5	7,5	7,5	7,5
	PS							5,5	5,5	10	10	10	10
<b>Switching of 3-phase capacitor banks</b>													
Single capacitors <sup>(4)</sup> , open	kVar							6,7	7,3	11,5	12,6	15	20
Single capacitors <sup>(4)</sup> , encl.	kVar							4,3	4,7	7,5	8	10	12,5
Variable capac. <sup>(5)</sup> , open	kVar							5	5	5	5	5	5
Variable capac. <sup>(5)</sup> , encl.	kVar							4,3	4,7	5	5	5	5
Back-up fuse (without th. over. rel.) <sup>(12)</sup>	A							25					
Aux. switching <sup>(6)</sup>	A	5,5	5	3	2,5	1,6	1	5,5	5	3	2,5	1,6	1
contacts AC-11	A	(12)	(10)	(5)	(4)	(2,5)	(1,25)	(12)	(10)	(5)	(4)	(2,5)	(1,25)
of Block,													
$I_{th}$ open	A	16	(20)					16	(20)				
in () of													
Contactor	Back-up fuse A <sup>(4)</sup>	12	( $\sim$ 20; $\rightarrow$ 16)					12	( $\sim$ 20; $\rightarrow$ 16)				
No. of aux. contacts		4...8						1...5					
UL Approval (USA), CSA (Canada) <sup>(34)</sup>													
Size		00						00					
Continuous open	A	20						25					
current rating enclosed	A	18						24					
Voltage	VAC <sup>(5)</sup>	600						200	230	460	575		
Motor load (with and without thermal overload relay)	PS (HP, 3 ph)	-						2	2	5	7,5		
Coil burden	pick-up VA (W)	59 (46)						59 (46)					
Alternat. current holding	VA (W)	7,2 (2,2)						7,2 (2,2)					
Direct current	pick-up W	7,4						7,4					
holding W		7,4						7,4					
Switching delay	closing ms	10...20 (CS 3 C: 20...60)						10...20 (CA 3-9 C: 20...60)					
	opening ms	8...18 (CS 3 C: 12...25)						8...18 (CA 3-9 C: 12...25)					
Life	Mech. Mill. Ops.	15 (CS 3 C: 30)						15 (CA 3-9 C: 30)					
Contactor contacts AC-11	Mill. Ops.	3 (220 V, 2 A)											
Main contacts AC-3	Mill. Ops.	1,2 (380/415 V)						1,2 (380/415 V)					
Aux. contact blocks AC-11	Mill. Ops.	3 (220 V, 2 A)						3 (220 V, 2 A)					

**Thermal Overload Relay****CT 3K-12 CT 3-12**

Setting range direct-on-line	see page 47	see page 49
Setting range star-delta	see page 47	see page 49
Thermal overload relay for fitting to contactor	CT 3 K-12	CT 3-12
Back-up fuse, max. rated current coordination type «C» <sup>(12)</sup>	(Back-up fuse as for fitting to contactor, see page 47, 49)	
Thermal overload relay for separate mounting	CTA 3-12	

- <sup>(1)</sup>  $I_{th}$  in accordance with IEC, AS, BS SEV. Corresponds to the continuous current rating  $I_{th2}$  according to VDE.
- <sup>(2)</sup> Rated power according to IEC, AS, BS, DEMKO, NEMKO, SEMKO, Finland, SEV, VDE for 3-phase non-inductive loads.
- <sup>(3)</sup> Rated current and power for 60-60 Hz in accordance with IEC, AS, BS, SEV, VDE. Same data as AC-3 if only occasional inching (plugging) (AC-4).
- <sup>(4)</sup> Co-ordination type «C» in compliance with IEC 292-1 A:
- short circuit protection, slight contact welding possible, no other damage.
  - Low voltage and HRC fuses in compliance with IEC 269-2 and -3, gl. g II, VDE 0636/2 and /3, gl; SEV 1010 T, SEV 1018, T2; SEV 1060 gl, e.g., Sprecher + Schuh types SM and SN 2, GEC English Electric types T and GTF..., Siemens type 3 NA 1, Slow acting screw type (DT) fuse.
- <sup>(5)</sup> Short circuit protection without contact welding according to IEC 337-1 B, one rated current setting higher permissible for fast-acting screw fuses (DI).
- <sup>(6)</sup> Rated motor voltages. The corresponding mains network voltages are 220...240, 440...480, 550...600 V.
- <sup>(7)</sup> Control of AC electro-magnets.
- <sup>(8)</sup> Connecting single capacitors or capacitors as a basic load to the mains.
- <sup>(9)</sup> Parallel switching to capacitors already connected (resulting inductance in the supply line to each condenser stage min. 6  $\mu$ H).
- <sup>(10)</sup> Also Lloyds Register of Shipping

# Contactors

## Thermal Overload Relays

Selection Table

**Contactor****CA 3-12****CA 3-16**

Operating voltage	V	220	240	380	415	500	660	220	240	380	415	500	660
$I_{th}^{(1)}$ open	A	25	25	25	25	25	25	25	25	25	25	25	25
AC-1 <sup>(2)</sup>	kW	9,5	10,5	16,5	18	21,5	28,5	9,5	10,5	16,5	18	21,5	28,5
enclosed	A	16	16	16	16	16	16	16	16	16	16	16	16
kW		6	6,7	10,5	11,5	14	18	6	6,7	10,5	11,5	14	18
<b>Switching of 3-phase motors</b>													
AC-2 Slip-ring motors	A	15	14	12	11	9	7	16	16	16	14	12	9
AC-3 Squirrel-cage motors <sup>(3)</sup>	kW	4	4	5,5	5,5	5,5	5,5	4,5	4,8	7,5	7,5	7,5	7,5
normal loading	PS	5,5	5,5	7,5	7,5	7,5	7,5	6	6,5	10	10	10	10
AC-4 Squirrel-cage motors <sup>(4)</sup>	A	15	14	12	11	9	7	16	16	16	14	12	9
Heavy-duty, plugg. <sup>(5)</sup>	kW	4	4	5,5	5,5	5,5	5,5	4,5	4,8	7,5	7,5	7,5	7,5
inch	PS	5,5	5,5	7,5	7,5	7,5	7,5	6	6,5	10	10	10	10
Star-delta starting <sup>(6)</sup>	A	21	19	21	21	16	12	28 <sup>(7)</sup>	25 <sup>(7)</sup>	28 <sup>(7)</sup>	28 <sup>(7)</sup>	20 <sup>(7)</sup>	15
kW		5,5	5,5	10	11	10	10	7,5	7,5	14	16	13	13
PS		7,5	7,5	13,5	15	13,5	13,5	10	10	19	20	17,5	17,5
<b>Switching of 3-phase capacitor banks</b>													
Single capacitors <sup>(8)</sup> , open	kVar	6,7	7,3	11,5	12,5	15	20	6,7	7,3	11,5	12,5	15	20
Single capacitors <sup>(9)</sup> , encl.	kVar	4,3	4,7	7,5	8	10	12,5	4,3	4,7	7,5	8	10	12,5
Variable capac. <sup>(10)</sup> , open	kVar	6,7	7,3	7,5	7,5	7,5	7,5	6,7	7,3	7,5	7,5	7,5	7,5
Variable capac. <sup>(10)</sup> , encl.	kVar	4,3	4,7	7,5	7,5	7,5	7,5	4,3	4,7	7,5	7,5	7,5	7,5
Back-up fuse (without th. over. rel.) <sup>(11)</sup>	A	25						35					
Aux. contacts	Switching <sup>(12)</sup>	A	5,5	5	3	2,5	1,6	1	5,5	5	3	2,5	1,6
of Block,	AC-11	A	(12)	(10)	(5)	(4)	(2,5)	(1,25)	(12)	(10)	(5)	(4)	(2,5)
$I_{th}$ open	A	16 (20)						16 (20)					
In () of	$I_{th}$ enclosed	A	12 (16)					12 (16)					
Contactor	Back-up fuse A <sup>(13)</sup>		12 (→ 20; ← 16)					12 (→ 20; ← 16)					
No. of. aux. contacts			1...5					1...5					
<b>UL Approval (USA), CSA (Canada)<sup>(14)</sup></b>													
Size		00+						0+					
Continuous current rating	open	A	25					25					
current rating	enclosed	A	24					24					
Voltage	VAC <sup>(15)</sup>	200	230	460	575			200	230	460	575		
Motor load (with and without thermal overload relay)	PS	3	3	7,5	10			5	5	10	15		
Coil burden	pick-up VA (W)	59 (46)						59 (46)					
Alternat. current	holding VA (W)	7,2 (2,2)						7,2 (2,2)					
Direct current	pick-up W	7,4						7,4					
	holding W	7,4						7,4					
Switching delay	closing ms	10...20 (CA 3-12 C: 20...60)						10...20 (CA 3-16 C: 20...60)					
	opening ms	8...18 (CA 3-12 C: 12...25)						8...18 (CA 3-16 C: 12...25)					
Life	Mech Mill. Ops.	15 (CA 3-12 C: 30)						15 (CA 3-16 C: 30)					
Main contacts	AC-3 Mill. Ops.	1,2 (380/415 V)						1,2 (380/415 V)					
Aux. contact blocks AC-11	Mill. Ops.	3 (220 V, 2 A)						3 (220 V, 2 A)					

**Thermal Overload Relay CT3K-12 CT 3-12****CT3K-17 CT 3-16**

Setting range direct-on-line	9...12,5 A	8,5...12,5 A	12,5...17,5 A	12...16 A
Setting range star-delta	15,6...21,6 A	14,7...21,7 A	21,6...30,3 A	20,8...27,7 A
Thermal overload relay for fitting to contactor	CT 3 K-12	CT 3-12	CT 3 K-17	CT 3-16
CA 3-9	CA 3-12	CA 3-16	CA 3-16	CA 3-23
Back-up fuse, max. rated current coordination type $\mu\text{CH}$ <sup>(16)</sup>	25 A	25 A	35 A <sup>(17)</sup>	40 A <sup>(17)</sup>
Thermal overload relay for separate mounting		CTA 3-12		CTA 3-16

<sup>(1)</sup>  $I_{th}$  in accordance with IEC, AS, BS, SEV. Corresponds to the continuous current rating  $I_{th}$  according to VDE.

<sup>(2)</sup> Rated power according to IEC, AS, BS, DEMKO, NEMKO, SEMKO, Finland, SEV, VDE for 3-phase non-inductive loads.

<sup>(3)</sup> Rated current and power for 50...60 Hz in accordance with IEC, AS, BS, SEV, VDE. Same data as AC-3 if only occasional inching (plugging) (AC-4).

<sup>(4)</sup> Co-ordination type  $\mu\text{CH}$  in compliance with IEC 292-1 A:

- short circuit protection, slight contact welding possible, no other damage.
- Low voltage and HRC fuses in compliance with IEC 269-2 and -3, gl. g. II; VDE 0636/2 and -3, gl. II; SEV 1010 T; SEV 1018, T2; SEV 1066 gl. e.g. Sprecher + Schuh types SM and SN 2, GEC English Electric types T and GTF, Siemens type 3 NA 1, Slow acting screw type (DT) fuse.

<sup>(15)</sup> Short circuit protection without contact welding according to IEC 337-1 B, one rated current setting higher permissible for fast-acting screw fuses (D).

<sup>(16)</sup> Rated motor voltages. The corresponding mains network voltages are 220...240, 440...480, 550...600 V.

<sup>(17)</sup> Control of AC electro magnets.

<sup>(18)</sup> Connecting single capacitors or capacitors as a basic load to the mains.

<sup>(19)</sup> Parallel switching to capacitors already connected (resulting inductance in the supply line to each condenser stage min. 6  $\mu\text{H}$ ).

<sup>(20)</sup> Dependent on cross-section of supply line, contactor may need to be fitted with larger main current terminals.

<sup>(21)</sup> Max. 35 A. In accordance with SEMKO, DEMKO, NEMKO, Finland.

<sup>(22)</sup> Also Lloyds Register of Shipping.

# Contactors

## Thermal Overload Relays

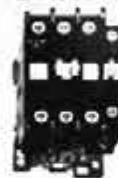
Selection Table

### Contactor

### CA 3-23



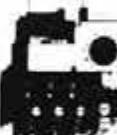
### CA 3-30



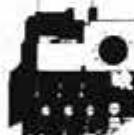
Operating voltage	V	220	240	380	415	500	660	220	240	380	415	500	660
$I_{th}^{(1)}$ open	A	45	45	45	45	45	45	45	45	45	45	45	45
AC-1 <sup>(2)</sup>	kW	17	19	30	32	39	51	17	19	30	32	39	51
enclosed	A	30	30	30	30	30	30	30	30	30	30	30	30
kW		11,5	12,5	20	21,5	26	34	11,5	12,5	20	21,5	26	34
<b>Switching of 3-phase motors</b>													
AC-2 Slip-ring motors	A	23	22	23	21	23	17	28	25	30	28	28	21
AC-3 Squirrel-cage motors <sup>(3)</sup> kW		6,3	6,3	11	11	15	15	7,5	7,5	15	15	18,5	18,5
normal loading	PS	8,5	8,5	15	15	20	20	10	10	20	20	25	25
AC-4 Squirrel-cage motors A		23	22	23	21	17	13	28	25	30	28	23	17
Heavy-duty, plugg. <sup>(4)</sup> kW		6,3	6,3	11	11	11	11	7,5	7,5	15	15	15	15
inch	PS	8,5	8,5	15	15	15	15	10	10	20	20	20	20
A		39 <sup>(5)</sup>	36 <sup>(5)</sup>	37 <sup>(5)</sup>	37 <sup>(5)</sup>	38 <sup>(5)</sup>	29 <sup>(5)</sup>	45 <sup>(5)</sup>	48 <sup>(5)</sup>	50 <sup>(5)</sup>	46 <sup>(5)</sup>	45 <sup>(5)</sup>	34 <sup>(5)</sup>
Star-delta starting <sup>(5)</sup>	kW	11	11	18,5	20	25	25	13	15	25	25	30	30
PS		15	15	25	27	34	34	17,5	20	34	34	40	40
<b>Switching of 3-phase capacitor banks</b>													
Single capacitors <sup>(6)</sup> , open	kVar	12	13	20	22,5	27	36	12	13	20	22,5	27	36
Single capacitors <sup>(6)</sup> , encl.	kVar	8	9	13,5	15	18	25	8	9	13,5	15	18	25
Variable capac. <sup>(7)</sup> , open	kVar	12	13	15	15	15	15	12	13	15	15	15	15
Variable capac. <sup>(7)</sup> , encl.	kVar	8	9	13,5	15	15	15	8	9	13,5	15	15	15
Back-up fuse (without th. overf. rel.) <sup>(8)</sup>	A	50						50					
Aux. contacts	Switching <sup>(9)</sup>	A	5,5	5	3	2,5	1,6	1	5,5	5	3	2,5	1,6
of Block.	AC-11	A	(12)	(10)	(5)	(4)	(2,5)	(1,25)	(12)	(10)	(5)	(4)	(2,5)
in () of	$I_{th}$ open	A	16	(20)					16	(20)			
Contactor	Back-up fuse A <sup>(10)</sup>		12	(16)					12	(16)			
No. of. aux. contacts		12 (25)						12 (25)					
UL Approval (USA), CSA (Canada) <sup>(11)</sup>		1...	6					1...	6				
Size		1						1½					
Continuous current rating	open	A	40					40					
current rating	enclosed	A	36					36					
Voltage	VAC <sup>(12)</sup>	200	230	460	575			200	230	460	575		
Motor load (with and without thermal overload relay)	PS	7,5	7,5	15	20			10	10	20	25		
Coil burden	pick-up VA (W)	90 (65)						90 (65)					
Alternat. current holding	VA (W)	8,6 (2,5)						8,6 (2,5)					
Direct current	pick-up W	150						150					
	holding W	3,8						3,8					
Switching delay	closing ms	10...	20					10...	20				
	opening ms	8...	18					8...	18				
Life	Mech. Mill. Ops.	10						10					
Main contacts	AC-3 Mill. Ops.	1,2 (380/415 V)						1,2 (380/415 V)					
Aux. contact blocks	AC-11 Mill. Ops.	3 (220 V, 2 A)						3 (220 V, 2 A)					

### Thermal Overload Relay

### CT 3-23



### CT 3-32



Setting range direct-on-line	16...	23 A	23...	32 A <sup>(13)</sup>
Setting range star-delta	27,7...	39,8 A	39,8...	55,5 A
Thermal overload relay for fitting to contactor	CT 3-23	CA 3-23	CA 3-30	CA 3-30
Back-up fuse, max. rated current coordination type «C» <sup>(14)</sup>	50 A	(50 A)	50 A <sup>(15)</sup>	50 A <sup>(15)</sup>
Thermal overload relay for separate mounting	CTA 3-23		CTA 3-32	

- <sup>(1)</sup>  $I_{th}$  in accordance with IEC, AS, BS SEV. Corresponds to the continuous current rating  $I_{th}$  according to VDE.
- <sup>(2)</sup> Rated power according to IEC, AS, BS, DEMKO, NEMKO, SEMKO, Finland, SEV, VDE for 3-phase non-inductive loads.
- <sup>(3)</sup> Rated current and power for 50...60 Hz in accordance with IEC, AS, BS, SEV, VDE. Same data as AC-3 if only occasional inching (plugging) (AC-4).
- <sup>(4)</sup> Co-ordination type «C» in compliance with IEC 292-1 A: short circuit protection, slight contact welding possible, no other damage.
- <sup>(5)</sup> Low voltage and HRC fuses in compliance with IEC 269-2 and -3, gl, g II; VDE 0636/2 and -3, gl; SEV 1010 T; SEV 1018 T; SEV 1066 gl, e.g., Sprecher + Schuh types SM and SN 2, GEC English Electric types T and GTF, Siemens type 3 NA 1, Slow acting screw type (DT) fuse.
- <sup>(6)</sup> Short circuit protection without contact welding according to IEC 337-1 B, one rated current setting higher permissible for fast-acting screw fuses (D).
- <sup>(7)</sup> Rated motor voltages. The corresponding mains network voltages are 220...240, 440...480, 550...600 V.
- <sup>(8)</sup> Control of AC electro-magnets.
- <sup>(9)</sup> Connecting single capacitors or capacitors as a basic load to the mains.
- <sup>(10)</sup> Parallel switching to capacitors already connected (resulting inductance in the supply line to each condenser stage min. 6 µH).
- <sup>(11)</sup> For Finland 63 A
- <sup>(12)</sup> Also Lloyds Register of Shipping
- <sup>(13)</sup> Not approved by UL and CSA

# Contactors

## Thermal Overload Relays

## Selection Table

**Contactor****CA 3-37****CA 3-43**

Operating voltage	V	220	240	380	415	500	660	220	240	380	415	500	660
$I_{th}^{(1)}$ open	A	63	63	63	63	63	63	63	63	63	63	63	63
AC-1 <sup>(2)</sup>	kW	24	26	41	45	55	72	24	26	41	45	55	72
enclosed	A	45	45	45	45	45	45	45	45	45	45	45	45
kW		17	18,5	30	32	39	51	17	18,5	30	32	39	51
<b>Switching of 3-phase motors</b>													
AC-2 Slip-ring motors	A	39	36	37	37	33	30	45	42	43	40	43	34
AC-3 Squirrel-cage motors <sup>(3)</sup> kW		11	11	18,5	20	22	26	12,5	13	22	22	30	30
normal loading	PS	15	15	25	27	30	35	17	17,5	30	30	40	40
AC-4 Squirrel-cage motors A		39	36	37	37	33	30	45	42	43	40	43	34
Heavy-duty, plugg. <sup>(4)</sup> kW		11	11	18,5	20	22	26	12,5	13	22	22	30	30
inch	PS	15	15	25	27	30	35	17	17,5	30	30	40	40
Star-delta starting <sup>(5)</sup>	A	64	63	65	66	55	45	75	70	72	72	72	55
kW		18,5	20	33	37	37	40	22	22	37	40	50	50
PS		25	27	44	50	50	55	30	30	50	55	67	67
<b>Switching of 3-phase capacitor banks</b>													
Single capacitors <sup>(6)</sup> , open	kVar	17	18	29	32	38	50	17	18	29	32	38	50
Single capacitors <sup>(6)</sup> , encl.	kVar	12	12,5	20	22	26	35	12	12,5	20	22	26	35
Variable capac. <sup>(7)</sup> , open	kVar	17	18	22	22	22	22	17	18	22	22	22	22
Variable capac. <sup>(7)</sup> , encl.	kVar	12	12,5	20	22	22	22	12	12,5	20	22	22	22
Back-up fuse (without th. over. rel.) <sup>(8)</sup>	A	80						100					
Aux. contacts	Switching <sup>(9)</sup>	A	5,5	5	3	2,5	1,6	1	5,5	5	3	2,5	1,6
of Block,	$I_{th}$ open	A	(12)	(10)	(5)	(4)	(2,5)	(1,25)	(12)	(10)	(5)	(4)	(2,5)
in (1) of	$I_{th}$ enclosed	A	16 (20)						16 (20)				
Contactor	Back-up fuse A <sup>(10)</sup>		12 (25)						12 (25)				
No. of. aux. contacts			2...7						2...7				
<b>UL Approval (USA), CSA (Canada)<sup>(11)</sup></b>													
Size			1 P					2					
Continuous current rating	open	A	50					50					
current rating	enclosed	A	45					45					
Voltage	VAC <sup>(12)</sup>		200	230	460	575		200	230	460	575		
Motor load (with and without thermal overload relay)	PS		10	10	25	30		10	15	30	40		
Coil burden	pick-up VA (W)		130 (90)					130 (90)					
Alternat. current	holding VA (W)		17 (5)					17 (5)					
Direct current	pick-up W		220					220					
	holding W		5					5					
Switching delay	closing ms		15...25					15...25					
	opening ms		10...20					10...20					
Life	Mech. Mill. Ops.		10					10					
Main contacts	AC-3 Mill. Ops.		1 (380/415 V)					1 (380/415 V)					
Aux. contact blocks	AC-11 Mill. Ops.		3 (220 V, 2 A)					3 (220 V, 2 A)					

**Thermal Overload Relay CT 3-42**

Setting range direct-on-line	25...32 A	32...42 A
Setting range star-delta	43,3...55,5 A	55,5...72,5 A
Thermal overload relay for fitting to contactor	CT 3-42	CT 3-42
CA 3-37, CA 3-43, CA 3-60, CA 3-72	CA 3-37, CA 3-43, CA 3-60, CA 3-72	CA 3-37, CA 3-43, CA 3-60, CA 3-72
Back-up fuse, max. rated current coordination type <math>ICR</math> <sup>(13)</sup>	80 A    80 A    80 A    80 A	100 A    100 A    100 A    100 A
Thermal overload relay for separate mounting	CTA 3-42	CTA 3-42

<sup>(1)</sup> $I_{th}$ in accordance with IEC, AS, BS, SEV. Corresponds to the continuous current rating $I_{th}$ according to VDE.	<sup>(11)</sup> Short circuit protection without contact welding according to IEC 337-1 B, one rated current setting higher permissible for fast-acting screw fuses (ID).
<sup>(2)</sup> Rated power according to IEC, AS, BS, DEMKO, NEMKO, SEMKO, Finland, SEV, VDE for 3-phase non-inductive loads.	<sup>(12)</sup> Rated motor voltages. The corresponding mains network voltages are 220...240, 440...480, 550...600 V.
<sup>(3)</sup> Rated current and power for 50-60 Hz in accordance with IEC, AS, BS, SEV, VDE. Same data as AC-3 (only occasional inching (plugging) (AC-4)).	<sup>(13)</sup> Control of AC electro-magnets.
<sup>(4)</sup> Co-ordination type <math>ICR</math> in compliance with IEC 292-1 A. short circuit protective, slight contact welding possible, no other damage.	<sup>(14)</sup> Connecting single capacitors or capacitors as a basic load to the mains.
Low voltage and HRC fuses in compliance with IEC 269-2 and -3, cl. g II; VDE 0636-2 and -3, gl; SEV 1010 T; SEV 1018 T; SEV 1066 gl, e.g. Sprecher + Schuh types SM and SN 2, GEC English Electric types T and GTF ... Siemens type 3 NA 1, Slow acting screw type (DT) fuse.	<sup>(15)</sup> Parallel switching to capacitors already connected. Resulting inductance in the supply line to each condenser stage min. 6 $\mu$ H.
	<sup>(16)</sup> Dependent on cross-section of supply line, contactor may need to be fitted with larger main current terminals.
	<sup>(17)</sup> Also Lloyds Register of Shipping.

# Contactors

## Thermal Overload Relays

Selection Table

### Contactor



CA 3-60



CA 3-72

Operating voltage	V	220	240	380	415	500	660	220	240	380	415	500	660	
$I_{th}^{(1)}$ open	A	90	90	90	90	90	90	90	90	90	90	90	90	
AC-1 <sup>(2)</sup>	kW	34	37	59	65	78	103	34	37	59	65	78	103	
enclosed	A	75	75	75	75	75	75	75	75	75	75	75	75	
kW		29	31	50	54	65	85	29	31	50	54	65	85	
<b>Switching of 3-phase motors</b>														
AC-2 Slip-ring motors	A	64	59	59	60	49	37	68	70	72	66	55	42	
AC-3 Squirrel-cage motors <sup>(3)</sup>	kW	18,5	18,5	30	33	33	33	20	22	37	37	37	37	
normal loading	PS	25	25	40	44	44	44	27	30	50	50	50	50	
AC-4 Squirrel-cage motors	A	64	59	59	60	49	37	69	70	72	66	55	42	
Heavy-duty, plugg. <sup>(4)</sup>	kW	18,5	18,5	30	33	33	33	20	22	37	37	37	37	
inch	PS	25	25	40	44	44	44	27	30	50	50	50	50	
A		107	105	105	100	80	60	125	125	120	110	92	70	
Star-delta starting <sup>(5)</sup>	kW	31,5	33	55	55	55	55	37	40	63	63	63	63	
PS		42	44	75	75	75	75	50	55	85	85	85	85	
<b>Switching of 3-phase capacitor banks</b>														
Single capacitors <sup>(6)</sup> , open	kVar	24	26	41	45	55	72	24	26	41	45	55	72	
Single capacitors <sup>(6)</sup> , encl.	kVar	20	22	35	38	45	60	20	22	35	38	45	60	
Variable capac. <sup>(7)</sup> , open	kVar	24	26	40	40	40	40	24	26	40	40	40	40	
Variable capac. <sup>(7)</sup> , encl.	kVar	20	22	35	38	40	40	20	22	35	38	40	40	
Backup fuse (without th. overv. ref.) <sup>(12)</sup>	A	125						125						
Aux. contacts	Switching <sup>(8)</sup>	A	5,5	5	3	2,5	1,6	1	5,5	5	3	2,5	1,6	1
of Block,	AC-11	A	(12)	(10)	(5)	(4)	(2,5)	(1,25)	(12)	(10)	(5)	(4)	(2,5)	(1,25)
$I_{th}$ open	A	16(20)						16(20)						
in () of			12(16)					12(16)						
Contactor	Back-up fuse A <sup>(14)</sup>		12(25)					12(25)						
No. of. aux. contacts			2...7					2...7						
<b>UL Approval (USA), CSA (Canada)<sup>(15)</sup></b>														
Size		2½						2½						
Continuous current rating	open	A	80					80						
current rating	enclosed	A	72					72						
Voltage	VAC <sup>(16)</sup>	200	230	460	575			200	230	460	575			
Motor load (with and without thermal overload relay)	PS	15	20	40	50			20	20	50	60			
(HP, 3 ph)														
Coil burden	pick-up	VA (W)	155(100)					155(100)						
Alternat. current holding	VA (W)		19(5,8)					19(5,8)						
Direct current	pick-up	W	350					350						
	holding	W	5,5					5,5						
Switching delay	closing	ms	15...25					15...25						
	opening	ms	10...20					10...20						
Life	Mech	Mill. Ops.	10					10						
Main contacts	AC-3	Mill. Ops.	1 (380/415 V)					1 (380/415 V)						
Aux. contact blocks	AC-11	Mill. Ops.	5,5 (220 V, 2 A)					5,5 (220 V, 2 A)						

### Thermal Overload Relay



CT 3-52



CT 3-60



CT 3-64



CT 3-68

CT 3-72<sup>(17)</sup>

Setting range direct-on-line	40...52 A	52...60 A	58...64 A	64...68 A	64...72,5 A
Setting range star-delta	70...90 A	90...104 A	100...110 A	110...118 A	110...125 A
Thermal overload relay for fitting to contactor	CT 3-52	CT 3-60	CT 3-64	CT 3-68	CT 3-72
CA 3-60, CA 3-72	CA 3-60, CA 3-72	CA 3-60, CA 3-72	CA 3-60, CA 3-72	CA 3-72	CA 3-72
Back-up fuse, max. rated current coordination type «C» <sup>(13)</sup>	125 A	125 A	125 A	125 A	125 A
Thermal overload relay for separate mounting	CTA 3-52	CTA 3-60	CTA 3-64	CTA 3-68	CTA 3-72

<sup>1)</sup>  $I_{th}$  in accordance with IEC, AS, BS, SEV. Corresponds to the continuous current rating  $I_{th2}$  according to VDE.

<sup>2)</sup> Rated power according to IEC, AS, BS, DEMKO, NEMKO, SEMKO, Finland, SEV, VDE for 3-phase non-inductive loads.

<sup>3)</sup> Rated current and power for 50...60 Hz in accordance with IEC, AS, BS, SEV, VDE. Same data as AC-3 if only occasional inching (plugging) (AC-4).

<sup>4)</sup> Co-ordination type «C» in compliance with IEC 292-1 A: short circuit protection, slight contact welding possible, no other damage.

Low voltage and HRC fuses in compliance with IEC 269-2 and -3, gl. g II, VDE 0836/2 and /3, gl. SEV 1010 T; SEV 1018, T2; SEV 1066 gl. e.g. Sprecher + Schuh types SM and SN 2, GEC English Electric types T and GTF..., Siemens type 3 NA 1, Slow acting screw type (DT) fuse.

<sup>5)</sup> Short circuit protection without contact welding according to IEC 337-1 B, one rated current setting higher permissible for fast-acting screw fuses (D).

<sup>6)</sup> Rated motor voltages. The corresponding mains network voltages are 220...240, 440...480, 550...600 V.

<sup>7)</sup> Control of AC electro-magnets.

<sup>8)</sup> Connecting single capacitors or capacitors as a basic load to the mains.

<sup>9)</sup> Parallel switching to capacitors already connected (resulting inductance in the supply line to each condenser stage min. 6  $\mu$ H).

<sup>10)</sup> Not permissible to CSA, UL.

<sup>11)</sup> Also Lloyds Register of Shipping.

# Starters CA 3 + CT 3 Order Number Arrangement Connections

Example: Starter CA 3 + CT 3

Contactor

Main Contact System Alternating current

**Enclosure:** without control, without reset button  
with reset button  
with impulse contact control and reset button  
with maintained contact control and reset button

IP 65 instead of IP 42  
with neutral link

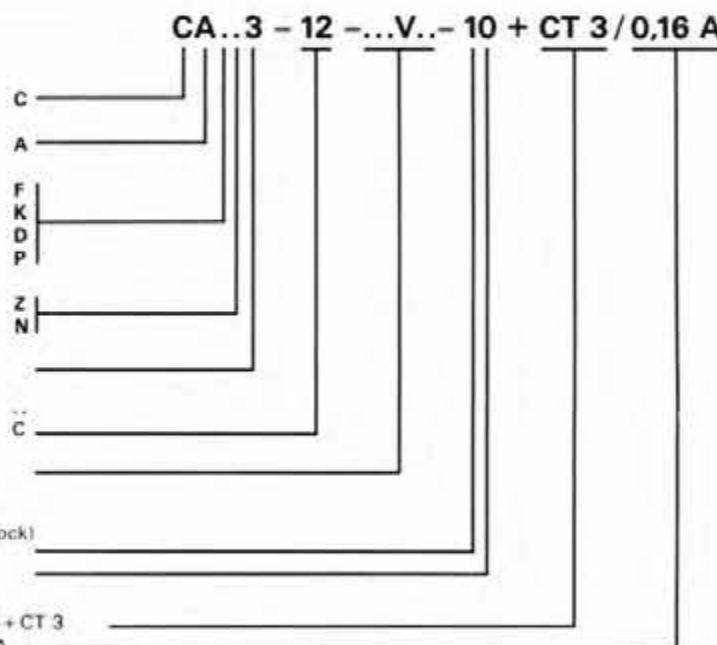
Design Range

**Contactor Reference** Size  
with DC operation

**Control Voltage and frequency..V..**  
or with DC ..VDC

**Auxiliary Contacts<sup>1)</sup>** (Contactor and auxiliary contact block)  
total no. of n/o contacts  
total no. of n/c contacts

**Thermal Overload Relay** (fitted onto contactor, range 3) + CT 3  
max. setting value  $f_{\text{A}}$



Example: Star-Delta Starter CAY 3 + CT 3

Contactor

Main Contact System Alternating current

**Operating Function:** Star-delta  
Reversing  
Two stage Dahlander  
Two stage separate winding  
Heating

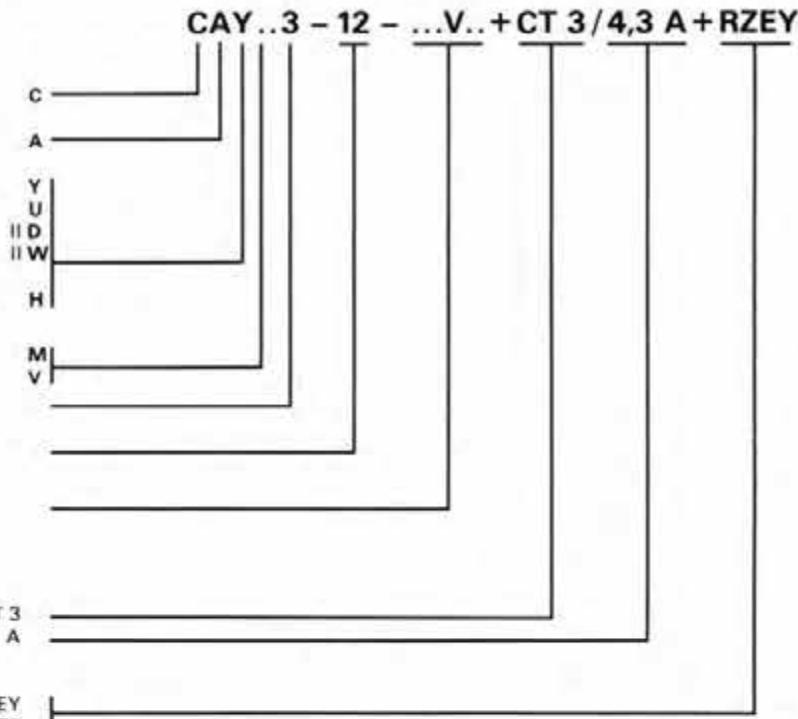
Mechanical Interlock  
Mechanical Latch  
Design Range

Contactor Reference

**Control Voltage and frequency..V..**  
or with DC ..VDC

**Thermal Overload Relay**  
(fitted onto appropriate contactor)  
range 3  
max. setting value  $f_{\text{A}}$

**Timing Element:**  
RZEY 2, 1.5...30 s  
Timing element block CZE 3,  
0.3...30 s



<sup>1)</sup> Only given with contactors. With starters and contactor combinations, the auxiliary contacts (as well as any spare auxiliary contacts) necessary for internal switching are included in the ordering number without reference. With some contactor combinations, the method of control is determined with the auxiliary contact reference marking and any supplementary lettering (e.g., 11 D).

**Connections**Cross sectional area in mm<sup>2</sup> of round wire connectors, wire with cable-end shoes is correspondingly less.

Contactors CA	3-9 (C) 3-12 (C)	3-16 (C)	3-23	3-30	3-37...3-72
<b>Control Relay</b>	<b>CS 3 (C)</b>				
Main contacts	2 x 4	2 x 4	1 x 10 + 1 x 6	1 x 10 + 1 x 6	1 x 50 + 1 x 10
Auxiliary contacts	2 x 4	2 x 4	2 x 4	2 x 4	2 x 4
Coil connections	2 x 4	2 x 4	2 x 4	2 x 4	2 x 4

Thermal Overload Relays CT	CT 3-12	CT 3-16	CT 3-23	CT 3-32	CT 3-42...3-72
Input (CTA)	1 x 6	1 x 6	1 x 10	1 x 10	1 x 50 + 1 x 10
Output	2 x 4	2 x 4	1 x 10	1 x 10	1 x 50 + 1 x 10
Auxiliary control circuit	2 x 2,5				

# Control Relay CS 3

Arrangement  
Order No.  
Index No.

Control Relay CS 3 complete <sup>1)</sup> Preferred Arrangement to EN 50 011	Diagram	Arrange- ment ref.	EN ref.	No. of con- tacts	No. of con- tacts	Order No.	Index No.	Weight (g) 1 off
		04 E	04 E	4	0 4	CS 3-...V..-04 E	001	310
		13 E	13 E	4	1 3	CS 3-...V..-13 E	002	
		22 E	22 E	4	2 2	CS 3-...V..-22 E	003	
		31 E	31 E	4	3 1	CS 3-...V..-31 E	004	
		40 E	40 E	4	4 0	CS 3-...V..-40 E	005	
		22 E+11	33 Y	6	3 3	CS 3-...V..-33 Y	007	340
		40 E+02	42 E	6	4 2	CS 3-...V..-42 E	008	
		31 E+11	42 Y	6	4 2	CS 3-...V..-42 Y	009	
		40 E+11	51 E	6	5 1	CS 3-...V..-51 E	010	
		40 E+20	60 E	6	6 0	CS 3-...V..-60 E	011	
		40 E+04	44 E	8	4 4	CS 3-...V..-44 E	012	360
		22 E+22	44 Y	8	4 4	CS 3-...V..-44 Y	013	
		40 E+13	53 E	8	5 3	CS 3-...V..-53 E	014	
		31 E+22	53 Y	8	5 3	CS 3-...V..-53 Y	015	
		40 E+22	62 E	8	6 2	CS 3-...V..-62 E	016	
		40 E+31	71 E	8	7 1	CS 3-...V..-71 E	017	
		40 E+40	80 E	8	8 0	CS 3-...V..-80 E	018	

## Order no. supplement

For AC control (see page 40)

...V..

For DC control CS 3 C (see page 18)

...VDC

For control relays in enclosures (see page 23)

For auxiliary contactors with clamped-type terminals (see page 23)

<sup>1)</sup> Dimensions as CA 3-9 see page 19

<sup>2)</sup> Forcibly actuated n/o and n/c contacts with respect to each other.

# Auxiliary Contact for CS 3 Timing Element CZ 3 Mechanical Latch CV 3

Arrangement  
Order No.  
Index No.

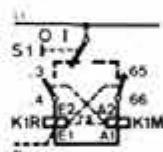
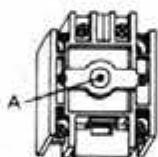
Auxiliary Contact Blocks for Control Relay CS 3 <sup>1)</sup>	No. of contacts	No. 1457	Order No.	Index No.	Weight [g] 1 off
	Auxiliary contact block 02	2	- 2 --	CS 3-P- 02	001 30
	Auxiliary contact block 11	2	1 1 --	CS 3-P- 11	002
	Auxiliary contact block 20	2	2 - - -	CS 3-P- 20	003
	Auxiliary contact block 04	4	- 4 --	CS 3-P- 04	004 50
	Auxiliary contact block 13	4	1 3 --	CS 3-P- 13	005
	Auxiliary contact block 22	4	2 2 --	CS 3-P- 22	006
	Auxiliary contact block L 22	4	1 1 1 1	CS 3-P- L 22	007
	Auxiliary contact block LL 22	4	- - 2 2	CS 3-P-LL 22	008
	Auxiliary contact block 31	4	3 1 --	CS 3-P- 31	009
	Auxiliary contact block 40	4	4 - - -	CS 3-P- 40	010

## Timing element CZ 3

	Timing element CZE 3 delay on energization setting range 0.3...30 s 1.8...180 s	CZE 3-30 s CZE 3-180 s	011 70 012
	Timing element CZA 3 delay on de-energization setting range 0.3...30 s 1.8...180 s	CZA 3-30 s CZA 3-180 s	013 70 014

Mechanical latch CV 3<sup>1)</sup>

	Mechanical latch CV 3...VAC-11 fitted onto contactor (including connections) supplied separately	C.3-...-V...+CV 3-...VAC-11 <sup>2)</sup> CV 3-...VAC-11 <sup>2)</sup>	015 + 125 016 125
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\*1) Not suitable for continuous operation.  
See page 6 for technical details.  
During assembly and disassembly of the latch, the magnet armature A must be depressed.

Accessories see pages 22...23

## Possible combinations of contactors and auxiliary contact blocks

All auxiliary contact blocks as listed on page 15 and 17 can be attached to the control relays CS 3 as well as the contactors CA 3-9...CA 3-72. All combinations may be used if the (partly) overlapping terminal markings is of no importance, or if the terminals are to be renumbered. A functional security is ensured with all mounting variants.

<sup>1)</sup> 1-pole and 2-pole auxiliary contact blocks can be fitted on together.  
1-pole and 4-pole auxiliary contact blocks or 1-pole and timing element with CA 3-23...CA 3-72 can be fitted on together.

<sup>2)</sup> Forcibly actuated n/o and n/c contacts with respect to each other.  
<sup>3)</sup> Control voltages, see page 40.

# Contactors CA 3

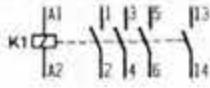
## Starters CA 3 + CT 3

Arrangement  
Order No.  
Index No.

### Contactor CA 3-9...CA 3-72

3 Main contacts

Auxiliary contact: 1 n/o. Diagram



Thermal rated current $I_{th}$	3-phase motors at 380/415 V enclosed AC-3	EN ref. number Contactor Order No.	Control voltage	No. of aux. contacts	Index No.	Weight [g] 1 off
<b>Auxiliary contact: 1 n/o</b>						
9 A	4 kW	10	CA..3-9...V..-10		001	310
16 A	5.5 kW	10	CA..3-12...V..-10		002	
16 A	7.5 kW	10	CA..3-16...V..-10		003	315
30 A	11 kW	10	CA..3-23...V..-10		004	440
30 A	15 kW	10	CA..3-30...V..-10		005	
<b>Auxiliary contact: 1 n/c</b>						
9 A	4 kW	01	CA..3-9...V..-01		006	310
16 A	5.5 kW	01	CA..3-12...V..-01		007	
16 A	7.5 kW	01	CA..3-16...V..-01		008	315
30 A	11 kW	01	CA..3-23...V..-01		009	440
30 A	15 kW	01	CA..3-30...V..-01		010	



Auxiliary contact: 1 n/o + 1 n/c						
37 A	18.5 kW	11	CA..3-37...V..-11		011	990
45 A	22 kW	11	CA..3-43...V..-11		012	
60 A	30 kW	11	CA..3-60...V..-11		013	1050
72 A	37 kW	11	CA..3-72...V..-11		014	

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

Contactor with thermal overload relay CT 3 K

3 main contacts

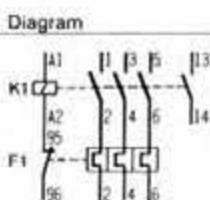


Diagram	AC-3 [kW]	Range	Order No.	Index No.	Weight [g]
	0.02	0.1 ... 0.15 A <sup>6)</sup>	10 CA..3-9...V..-10+CT 3 K/0.15 A	015	460
	0.04	0.15...0.23 A <sup>6)</sup>	10 CA..3-9...V..-10+CT 3 K/0.23 A	016	
	0.06	0.23...0.35 A <sup>6)</sup>	10 CA..3-9...V..-10+CT 3 K/0.35 A	017	
	0.09 0.12	0.35...0.55 A	10 CA..3-9...V..-10+CT 3 K/0.55 A	018	
	0.18	0.55...0.80 A	10 CA..3-9...V..-10+CT 3 K/0.80 A	019	
	0.25 0.37	0.80...1.2 A	10 CA..3-9...V..-10+CT 3 K/1.2 A	020	
	0.55	1.2...1.8 A	10 CA..3-9...V..-10+CT 3 K/1.8 A	021	
	0.75	1.8...2.7 A	10 CA..3-9...V..-10+CT 3 K/2.7 A	022	
	1.1 1.5	2.7...4 A	10 CA..3-9...V..-10+CT 3 K/4 A	023	
	2.2	4...6 A	10 CA..3-9...V..-10+CT 3 K/6 A	024	
	3 4	6...9 A	10 CA..3-9...V..-10+CT 3 K/9 A	025	
	5.5	9...12.5 A	10 CA..3-12...V..-10+CT 3 K/12.5 A	026	
	7.5	12.5...17.5 A	10 CA..3-16...V..-10+CT 3 K/17.5 A	027	

### Starter CA 3-9 + CT 3...CA 3-72 + CT 3

Contactor with thermal overload relay fitted

3 main contacts

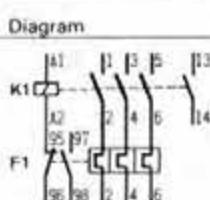
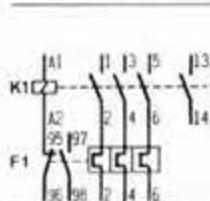


Diagram	AC-3 [kW]	Range	Order No.	Index No.	Weight [g]
	0.02	0.1...0.16 A <sup>6)</sup>	10 CA..3-9...V..-10+CT 3 K/0.16 A	028	460
	0.04	0.16...0.24 A <sup>6)</sup>	10 CA..3-9...V..-10+CT 3 K/0.24 A	029	
	0.06	0.24...0.38 A <sup>6)</sup>	10 CA..3-9...V..-10+CT 3 K/0.38 A	030	
	0.09 0.12	0.38...0.62 A	10 CA..3-9...V..-10+CT 3 K/0.62 A	031	
	0.18 0.25	0.62...1 A	10 CA..3-9...V..-10+CT 3 K/1 A	032	
	0.37 0.55	1...1.6 A	10 CA..3-9...V..-10+CT 3 K/1.6 A	033	
	0.75	1.6...2.5 A	10 CA..3-9...V..-10+CT 3 K/2.5 A	034	
	1.1 1.5	2.5...4 A	10 CA..3-9...V..-10+CT 3 K/4 A	035	
	2.2	3.8...6 A	10 CA..3-9...V..-10+CT 3 K/6 A	036	
	3 4	6...9.5 A	10 CA..3-9...V..-10+CT 3 K/9.5 A	037	
	5.5	8.5...12.5 A	10 CA..3-12...V..-10+CT 3 K/12.5 A	038	
	7.5	12.5...16 A	10 CA..3-16...V..-10+CT 3 K/16 A	039	490
	11	16...23 A	10 CA..3-23...V..-10+CT 3 K/23 A	040	620
	15	23...32 A	10 CA..3-30...V..-10+CT 3 K/32 A	041	



	18.5 20	25...32 A	11	CA..3-37...V..-11+CT 3/32 A	042	1390
	22	32...42 A	11	CA..3-43...V..-11+CT 3/42 A	043	
	26	40...52 A	11	CA..3-60...V..-11+CT 3/52 A	044	1450
	30	52...60 A	11	CA..3-60...V..-11+CT 3/60 A	045	
	33	58...64 A	11	CA..3-72...V..-11+CT 3/64 A	046	
	37	64...72.5 A <sup>6)</sup>	11	CA..3-72...V..-11+CT 3/72.5 A	047	

Dimensions see page 19

Order No. supplement

For AC control, see page 40

For DC control: CA 3-9 C, CA 3-12 C, CA 3-16 C see page 18

CA 3-23, CA 3-72 see page 40

<sup>6)</sup> Not permissible to CSA, UL, DEMKO and Finland

<sup>7)</sup> For UL/CSA with thermal overload relay CT 3-63 see page 20

Arrangement  
Order No.  
Index No.

## Auxiliary Contact for CA 3

Auxiliary contact block <sup>1)</sup> for contactors CA 3	Diagram	En ref. contac-tor	aux. contact block	Order No.	No. of auxiliary contacts		Index No.	Weight kg/ 1 off
					1	1		
			Auxiliary contact block 01					
			fitted onto CA 3...-10	10 + 01	CA.. 3...-...V...-11	001 (+)	+ 20	
			supplied separately	01	CA 3-P-01	002	20	
			Auxiliary contact block H 10					
			also for marking contact					
			fitted onto CA 3...-10	10 +H10	CA.. 3...-...V...-H20	003 (+)	+ 20	
			supplied separately	H10	CA 3-P-H10	004	20	
			Auxiliary contact block Z 01 (delayed)					
			fitted onto CA 3...-01	01 +Z01	CA.. 3...-...V...-Z02	005 (+)	+ 25	
			fitted onto CA 3...-10	10 +Z01	CA.. 3...-...V...-Z11	006 (+)		
			fitted onto CA 3...-11	11 +Z01	CA.. 3...-...V...-Z12	007 (+)		
			supplied separately	Z01	CA 3-P-Z01	008	25	
			Auxiliary contact block Z 10 (delayed)					
			fitted onto CA 3...-10	10 +Z10	CA.. 3...-...V...-Z20	009 (+)	+ 25	
			fitted onto CA 3...-11	11 +Z10	CA.. 3...-...V...-Z21	010 (+)		
			supplied separately	Z10	CA 3-P-Z10	011	25	
			Auxiliary contact block L 01 (late break)					
			fitted onto CA 3...-01	01 +L01	CA.. 3...-...V...-L02	012 (+)	+ 20	
			fitted onto CA 3...-10	10 +L01	CA.. 3...-...V...-L11	013 (+)		
			fitted onto CA 3...-11	11 +L01	CA.. 3...-...V...-L12	014 (+)		
			supplied separately	L01	CA 3-P-L01	015	20	
			Auxiliary contact block S 01					
			fitted onto CA 3...-01	01 +S01	CA.. 3...-...V...-S02	016 (+)	+ 20	
			fitted onto CA 3...-11	11 +S01	CA.. 3...-...V...-S12	017 (+)		
			supplied separately	S01	CA 3-P-S01	018	20	
			Auxiliary contact block S 10					
			fitted onto CA 3...-01	01 +S10	CA.. 3...-...V...-S11	019 (+)	+ 20	
			fitted onto CA 3...-11	11 +S10	CA.. 3...-...V...-S21	020 (+)		
			supplied separately	S10	CA 3-P-S10	021	20	
			Auxiliary contact block 02					
			fitted onto CA 3...-10	10 + 02	CA.. 3...-...V...-12	022 (+)	+ 30	
			supplied separately	02	CA 3-P-02	023	30	
			Auxiliary contact block 11					
			fitted onto CA 3...-10	10 + 11	CA.. 3...-...V...-21	024 (+)	+ 30	
			supplied separately	11	CA 3-P-11	025	30	
			Auxiliary contact block S 11					
			fitted onto CA 3...-01	01 +S11	CA.. 3...-...V...-S12	026 (+)	+ 30	
			fitted onto CA 3...-11	11 +S11	CA.. 3...-...V...-S22	027 (+)		
			supplied separately	S11	CA 3-P-S11	028	30	
			Auxiliary contact block 22					
			fitted onto CA 3...-10	10 + 22	CA.. 3...-...V...-32	029 (+)	+ 50	
			supplied separately	22	CA 3-P-22	030	50	
			Auxiliary contact block 31					
			fitted onto CA 3...-10	10 + 31	CA.. 3...-...V...-41	031 (+)	+ 50	
			supplied separately	31	CA 3-P-31	032	50	
			Auxiliary contact block S 22					
			fitted onto CA 3...-01	01 +S22	CA.. 3...-...V...-S23	033 (+)	+ 50	
			fitted onto CA 3...-11	11 +S22	CA.. 3...-...V...-S33	034 (+)		
			supplied separately	S22	CA 3-P-S22	035	50	
			Auxiliary contact block S 31					
			fitted onto CA 3...-01	01 +S31	CA.. 3...-...V...-S32	036 (+)	+ 50	
			fitted onto CA 3...-11	11 +S31	CA.. 3...-...V...-S42	037 (+)		
			supplied separately	S31	CA 3-P-S31	038	50	

Timing element CZ 3 see page 15

Mechanical latch CV see page 15

Accessories see page 22...23

<sup>1)</sup> 1-pole and 2-pole auxiliary contact blocks can be fitted on together  
1-pole and 4-pole auxiliary contact blocks or 1-pole and timing element with  
CA 3-23...CA 3-72 can be fitted on together

<sup>2)</sup> Forcibly actuated n/o and n/c contacts with respect to each other

# DC Control

## Control Relay CS 3 C

### Contactors CA 3-9 C, CA 3-12 C, CA 3-16 C, CA 3

Arrangement  
Order No.  
Index No.

Control Relay CS 3 C complete with DC control  
to EN 50 011



Diagram	EN Ref.	No. of contacts	Number	Order No.	Control voltage	Index No.	Weight [g]
	04 E	4	0 4	CS 3 C-04 E...VDC		001	on request
	13 E	4	1 3	CS 3 C-13 E...VDC		002	on request
	22 E	4	2 2	CS 3 C-22 E...VDC		003	570
	31 E	4	3 1	CS 3 C-31 E...VDC		004	
	40 E	4	4 0	CS 3 C-40 E...VDC		005	

Possible EN arrangements:

33 Y, 42 E, 42 Y, 44 E, 44 Y, 53 E, 51 E,  
53 Y, 60 E, 62 E, 71 E, 80 E

Auxiliary contact blocks

Same as for control relay CS 3  
with AC control

(see pages 14 and 15)

Contactors CA 3-9...CA 3-16 C complete  
With DC control, 1 n/o auxiliary contact

Diagram	Type	Three-Phase Motors			EN Ref.	Control Auxiliary voltage contact contactor	Order No.	Index No.
		Thermal Current [A]	380/415 V	AC-3				
	CA 3- 9 C	9	4 kW	10	CA 3- 9 C...VDC-10		006	570
	CA 3-12 C	12	5,5 kW	10	CA 3-12 C...VDC-10		007	
	CA 3-16 C	16	7,5 kW	10	CA 3-16 C...VDC-10		008	
<hr/>								
1 n/o aux. contact								
	CA 3- 9 C	9	4 kW	01	CA 3- 9 C...VDC-01		009	570
	CA 3-12 C	12	5,5 kW	01	CA 3-12 C...VDC-01		010	
	CA 3-16 C	16	7,5 kW	01	CA 3-16 C...VDC-01		011	

Contactors CA 3-23...CA 3-72, see page 16 and 40

Starter CA 3-9 C + CT 3 (K)...CA 3-16 + CT 3 (K)<sup>1)</sup>

With DC control (see page 19)

Diagram	Switching of 3-phase motors			Thermal overload relay Type	Setting range	Control contact Order No.	Aux. voltage contactor	Thermal overload	Index No.
	380/415 V	as page 20	AC-3						
	CT 3 K	as page 20	AC-3	CT 3 K	as page 20	CA 3- 9 C...VDC-10+CT 3 K/A	012	710	
	CT 3			CT 3		CA 3- 9 C...VDC-10+CT 3/A	013	725	
	CT 3 K	9	12,5 A	CT 3 K	9...12,5 A	CA 3-12 C...VDC-10+CT 3 K/12,5 A	014	710	
	CT 3	8,5	12,5 A	CT 3	8,5...12,5 A	CA 3-12 C...VDC-10+CT 3/12,5 A	015	725	
	CT 3 K	12,5	17,5 A	CT 3 K	12,5...17,5 A	CA 3-16 C...VDC-10+CT 3 K/17,5 A	016	710	
	CT 3	12,5	16 A	CT 3	12,5...16 A	CA 3-16 C...VDC-10+CT 3/16 A	017	725	

Starter CA 3-23 + CT 3...CA 3-72 + CT 3 see page 16

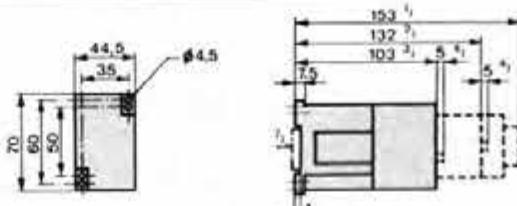
Diagrams see page 19

Order No. supplement

For DC control voltages, see page 40

For contactors with CV 3 latch, see page 40

Dimensions [mm] for CS 3 C, CA 3-9 C, CA 3-12 C, CA 3-16 C



<sup>1)</sup> With timing element CZ 3 or CV 3 latch, or time delayed aux. contact

<sup>2)</sup> With aux. contact block

<sup>3)</sup> Basic device without adder elements

<sup>4)</sup> With marking tag carrier

<sup>5)</sup> Fixing possibility onto mounting rail EN 50 022-35 for CA 3-9 C...CA 3-30 C

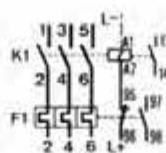
<sup>6)</sup> Thermal-overload relay CT 3 K without auxiliary contact 97-98

**Diagrams**  
**Dimensions**

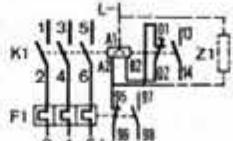
# DC operating mechanism Dimensions

## Direct current control

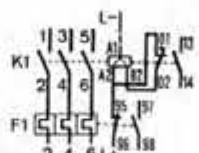
- With direct current control, there is a basic difference between
- actual direct current magnets and
  - modified alternating current magnets.
  - Actual direct current magnets are symbolized by their high permissible frequency of operation and long life. They are thus specially suited for control relay functions.
  - Actual direct current magnet systems are available for the smaller types (CS 3 C, CA 3-9 C...CA 3-16 C). 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 realized 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 contactors.
- Space requirements and fixings are the same as for AC control.
- Immediately after energization, 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).



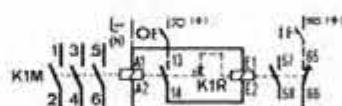
DC control  
CA 3-9 C + CT 3...  
CA 3-16 C + CT 3



DC control  
CA 3-23 + CT 3...  
CA 3-30 + CT 3  
Z1 = Voltage limiting element



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



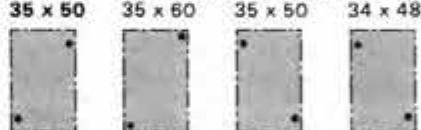
with CV 3 latch  
CS 3 + CV 3  
CA 3-9 + CV 3...  
CA 3-72 + CV 3

## Drilling plan

Two of the fixing holes conform to the preferred vertical distance between holes of 50 mm complying with EN 50 002/EN 50 003. The horizontal distance between fixing holes on the CS 3 control relay and the CA 3-9...CA 3-16 contactors conforms with the widely used measurement of 35 mm. Further holes permit the use of other frequently used drilling plans.

## CS 3, CA 3-9, CA 3-12, CA 3-16

Further possibilities



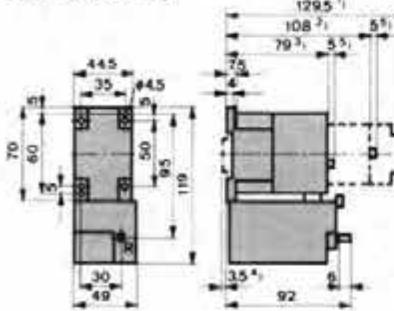
CA 3-23/3-30 Further possibilities  
45x50 45x60 45x55...57



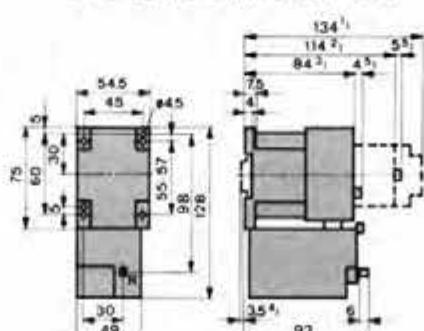
CA 3-37...3-72  
60x90 60x100

## Dimensions (mm)

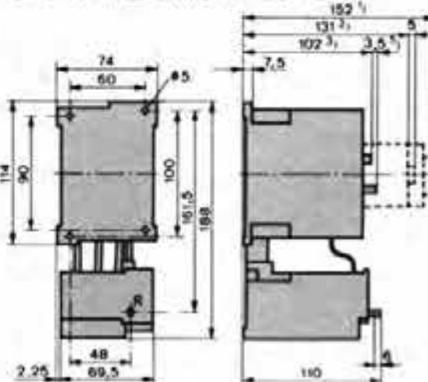
CA 3-9 (+ CT 3) CA 3-12 (+ CT 3)  
CA 3-16 (+ CT 3)



CA 3-23 (+CT 3) CA 3-30 (+CT 3)



CA 3-37 (+CT 3)...CA 3-72 (+CT 3)



In enclosure see page 25

- \*1 With timing element CZ or CV 3 latch, or time delayed aux. contact  
\*2 With aux. contact block  
\*3 Basic device without adder elements

- \* Fixing possibility onto mounting rail EN 50 002-35 for CA 3-9 C...CA 3-30 C  
† With marking tag carrier  
‡ Not permissible to CSA, UL, DEMKO and Finland  
§ For UL/CSA with Thermal overload relay CT 3-63 see page 16

# Thermal Overload Relay CT 3 K

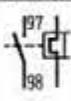
## Thermal Overload Relay CT 3

Arrangement  
Order No.  
Index-Nr.

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

Diagram	Type	Setting range for direct-on-line starting [A]	Setting range for star-delta contactor combinations [A]	For fitting onto contactor CA...	Order No.	Index No.	Weight [g] 1 off
F1	CT 3 K-12	0.17...0.26 0.26...0.40 0.40...0.61 0.61...0.95 0.95...1.40 1.40...2.10 2.10...3.10 3.10...4.70 4.70...6.90 6.90...10.40 10.4...15.60 15.6...21.60	0.1...0.15 0.15...0.23 0.23...0.35 0.35...0.55 0.55...0.80 0.80...1.20 1.20...1.80 1.80...2.70 2.70...4 4...6 6...9 9...12.50	3-9 3-16	CT 3 K-12-0.15 A CT 3 K-12-0.23 A CT 3 K-12-0.35 A CT 3 K-12-0.55 A CT 3 K-12-0.80 A CT 3 K-12-1.20 A CT 3 K-12-1.80 A CT 3 K-12-2.70 A CT 3 K-12-4 A CT 3 K-12-6 A CT 3 K-12-8 A CT 3 K-12-12.50 A	001 002 003 004 005 006 007 008 009 010 011 012	130
	CT 3 K-17	12.5...17.50	21.6...30.30	3-16...3-30	CT 3 K-17-17.50 A	013	

Auxiliary contact block CT 3 K-P-10  
fitted onto Thermal overload relay CT 3 K -  
with 1 n/o 97-98 (signalling contact)

		Auxiliary contact block CT 3 K-P-10	CT 3 K-P-10	014	15
--	---	-------------------------------------	-------------	-----	----

Thermal overload relay CT 3 for fitting onto contactor CA 3  
with electrically separated tripping and signalling contacts

Diagram	Type	Setting range for direct-on-line starting [A]	Setting range for star-delta contactor combinations [A]	For fitted onto contactor CA...	Order No.	Index No.	Weight [g] 1 off
F1	CT 3-12	0.1...0.16 0.15...0.24 0.24...0.38 0.38...0.62 0.62...1 1...1.6 1.6...2.5 2.5...4 3.8...6 6...9.5 8.5...12.5	0.17...0.28 0.28...0.42 0.42...0.66 0.66...1.07 1.07...1.7 1.7...2.8 2.8...4.3 4.3...6.9 6.6...10.4 10.4...16.5 14.7...21.7	3-9... 3-16	CT 3-12-0.16 A CT 3-12-0.24 A CT 3-12-0.38 A CT 3-12-0.62 A CT 3-12-1 A CT 3-12-1.6 A CT 3-12-2.5 A CT 3-12-4 A CT 3-12-6 A CT 3-12-9.5 A CT 3-12-12.5 A	015 016 017 018 019 020 021 022 023 024 025	155
	CT 3-16	12...16	20.8...27.7	3-16... 3-30	CT 3-16-16 A	026	
	CT 3-23	16...23	27.7...39.8	3-23 and 3-30	CT 3-23-23 A	027	180
	CT 3-32	23...32	39.8...55.5	3-30	CT 3-32-32 A	028	
	CT 3-42	25...32	43.3...55.5	3-37... 3-72	CT 3-42-32 A	029	380
		32...42	55.5...72.5	3-37... 3-72	CT 3-42-42 A	030	
	CT 3-52	40...52	70...90	3-60	CT 3-52-52 A	031	
	CT 3-60	52...60	90...104	3-72	CT 3-60-60 A	032	
	CT 3-64	58...64	100...110		CT 3-64-64 A	033	
	CT 3-68	64...68	110...118	3-72	CT 3-68-68 A	034	
	CT 3-72 <sup>1)</sup>	64...72,5	110...125	3-72	CT 3-72-72,5 A	035	

Dimensions [mm] see page 21

<sup>1)</sup> Not permissible to CSA, UL

Arrangement  
Order No.  
Index No.  
Dimensions

## Thermal Overload Relay CTA 3 K Thermal Overload Relay CTA 3

**Thermal overload relay CTA 3 K**  
with socket for separate mounting

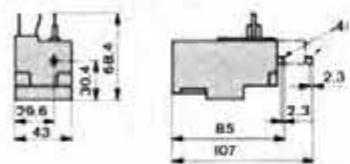
Diagram	Type	Setting range direct-on-line starting [A]	For star-delta contactor combinations [A]	Order No.	Index No.	Weight [g] 1 off
	CTA 3 K-12	0,1 ... 0,15 0,15 ... 0,23 0,23 ... 0,35 0,35 ... 0,55 0,55 ... 0,80 0,80 ... 1,20 1,20 ... 1,80 1,80 ... 2,70 2,70 ... 4 4 ... 6 6 ... 9 9 ... 12,50	0,17 ... 0,26 0,26 ... 0,40 0,40 ... 0,61 0,61 ... 0,95 0,95 ... 1,40 1,40 ... 2,10 2,10 ... 3,10 3,10 ... 4,70 4,70 ... 6,90 6,90 ... 10,40 10,4 ... 15,60 15,6 ... 21,60	CTA 3 K-12-0,15 A CTA 3 K-12-0,23 A CTA 3 K-12-0,35 A CTA 3 K-12-0,55 A CTA 3 K-12-0,80 A CTA 3 K-12-1,20 A CTA 3 K-12-1,80 A CTA 3 K-12-2,70 A CTA 3 K-12-4 A CTA 3 K-12-6 A CTA 3 K-12-9 A CTA 3 K-12-12,50 A	022 023 024 025 026 027 028 029 030 031 032 033 034	175
	CTA 3 K-17	12,5 ... 17,50	21,6 ... 30,30	CTA 3 K-17-17,50 A		

**Thermal overload relay CTA 3**  
with socket for separate mounting

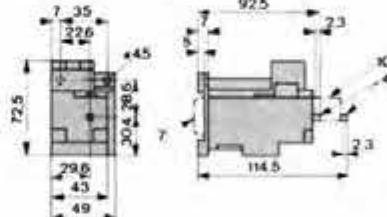
Diagram	Type	Setting range direct-on-line starting	For star-delta contactor combinations	Order No.	Index No.	Weight [g] 1 off
	CTA 3-12	0,1 ... 0,16 A <sup>1)</sup> 0,15 ... 0,24 A <sup>1)</sup> 0,24 ... 0,38 A <sup>1)</sup> 0,38 ... 0,62 A 0,62 ... 1 A 1 ... 1,6 A 1,6 ... 2,5 A 2,5 ... 4 A 3,8 ... 6 A 6 ... 9,5 A 8,5 ... 12,5 A	0,17 ... 0,28 A 0,26 ... 0,42 A 0,42 ... 0,66 A 0,66 ... 1,07 A 1,07 ... 1,7 A 1,7 ... 2,8 A 2,8 ... 4,3 A 4,3 ... 6,9 A 6,6 ... 10,4 A 10,4 ... 16,5 A 14,7 ... 21,7 A	CTA 3-12-0,16 A CTA 3-12-0,24 A CTA 3-12-0,38 A CTA 3-12-0,62 A CTA 3-12-1 A CTA 3-12-1,6 A CTA 3-12-2,5 A CTA 3-12-4 A CTA 3-12-6 A CTA 3-12-9,5 A CTA 3-12-12,5 A	001 002 003 004 005 006 007 008 009 010 011	200
	CTA 3-16	12 ... 16 A	20,8 ... 27,7 A	CTA 3-16-16 A	012	
	CTA 3-23	16 ... 23 A	27,7 ... 39,8 A	CTA 3-23-23 A	013	240
	CTA 3-32	23 ... 32 A	39,8 ... 55,5 A	CTA 3-32-32 A	014	
	CTA 3-42	25 ... 32 A 32 ... 42 A	43,3 ... 55,5 A 55,5 ... 72,5 A	CTA 3-42-32 A CTA 3-42-42 A	015 016	420
	CTA 3-52	40 ... 52 A	70 ... 90 A	CTA 3-52-52 A	017	
	CTA 3-60	52 ... 60 A	90 ... 104 A	CTA 3-60-60 A	018	
	CTA 3-64	58 ... 64 A	100 ... 110 A	CTA 3-64-64 A	019	
	CTA 3-68	64 ... 68 A	110 ... 118 A	CTA 3-68-68 A	020	
	CTA 3-72	64 ... 72,5 A <sup>2)</sup>	110 ... 125 A	CTA 3-72-72,5 A	021	

**Dimensions (mm)**

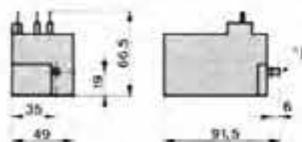
**CT 3 K-12 and CT 3 K-17**



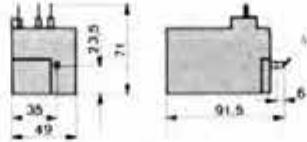
**CTA 3 K-12 and CTA 3 K-17**



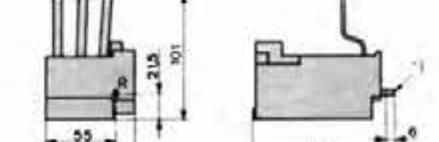
**CT 3-12 and CT 3-16**



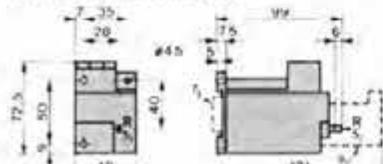
**CT 3-23 and CT 3-32**



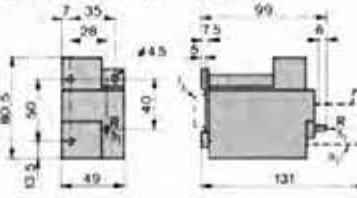
**CT 3-42 ... CT 3-72**



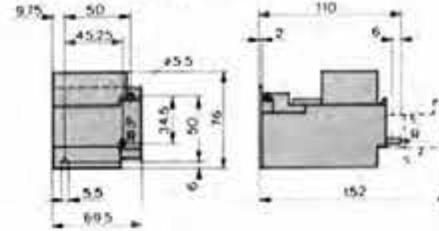
**CTA 3-12 and CTA 3-16**



**CTA 3-23 and CTA 3-32**



**CTA 3-42 ... CTA 3-72**



<sup>1)</sup> Not permissible to CSA, UL, DEMCO and Finland  
<sup>2)</sup> Not permissible to CSA, UL

<sup>3)</sup> Reset pushbutton, 2,3 mm travel = reset

<sup>1)</sup> Reset buttons: 3,5 mm away = reset, 6 mm away = test  
<sup>2)</sup> Possibility of mounting CTA onto mounting rail EN 50 022-35  
<sup>3)</sup> With reset Magnet CMR

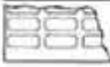
Arrangement  
Order No.  
Index No.

## Accessories

Accessories	Order No.	Index No.	Weight [g]
<b>Coils for alternating current</b>			
see page 40 for normal control voltages			
to CS 3, CA 3-9, CA 3-12, CA 3-16	22.122.304-...V..	001	60
to CA 3-23, CA 3-30	22.601.304-...V..	002	65
to CA 3-37 and 3-43	22.701.308-...V..	003	120
to CA 3-60 and CA 3-72	22.701.304-...V..	004	
for reset magnet CMR 3	25.943.321-...V..	005	40
for latch CV 3	25.943.321-...V..	006	
for alternating current, special control voltages			
to CS 3, CA 3-9, CA 3-12 C, CA 3-16	22.122.304-...V..	007	60
to CA 3-23, CA 3-30	22.601.304-...V..	008	65
to CA 3-37 and CA 3-43	22.701.308-...V..	009	120
to CA 3-60 and CA 3-72	22.701.304-...V..	010	
for reset magnet CMR 3	25.943.321-...V..	011	40
for latch CV 3	25.943.321-...V..	012	
for direct current, normal control voltages			
to CS 3 C, CA 3-9 C, CA 3-12 C, CA 3-16 C	22.601.304-...VDC	013	200
to CA 3-23, CA 3-30	22.601.305-...VDC	014	66
to CA 3-37 and CA 3-43 (with diode)	22.701.309-...VDC	015	110
to CA 3-60 and CA 3-72 (with diode)	22.701.308-...VDC	016	
for reset magnet CMR 3	25.943.321-...VDC	017	40
for latch CV 3	25.943.321-...VDC	018	
for direct current, special control voltages			
to CS 3 C, CA 3-9, CA 3-12 C, 3-16 C	22.601.304-...VDC	019	200
to CA 3-23, CA 3-30	22.601.305-...VDC	020	66
to CA 3-37 and CA 3-43 (with diode)	22.701.309-...VDC	021	110
to CA 3-60 and CA 3-72 (with diode)	22.701.308-...VDC	022	
for reset magnet CMR 3	25.943.321-...VDC	023	40
for latch CV 3	25.943.321-...VDC	024	
<b>Protection links</b>			
snap-on attachment to contactors CA 3-9...CA 3-72			
for contact wiring protection			
<b>RC link CRC 3</b> DC 24...240 V	25.946.101-04	025	20
For limitation of over voltages (surge voltages)			
with coil disconnection			
<b>RC link CRC 3</b> 24 V... 48 V 50/60 Hz	25.946.101-01	026	20
110 V... 240 V 50/60 Hz	25.946.101-02	027	
250 V... 440 V 50/60 Hz	25.946.101-03	028	
<b>Diode link CRD 3</b> DC 12...250 V	25.946.102-01	029	
<b>Varistor link CRV 3</b> DC 24 V	25.946.103-01	030	
DC 36... 48 V	25.946.103-02	031	
DC 110...150 V	25.946.103-03	032	
DC 220...250 V	25.946.103-04	033	
<b>Reset magnet CMR 3-1</b>	25.947.101-...V..	034	78
for thermal overload relays CT 3-12...CT 3-32			
<b>Reset magnet CMR 3-2</b>	25.947.103-...V..	035	80
for thermal overload relays CT 3-42...CT 3-72			
Order No. supplement for control voltages, see page 40	...V..		
Only operate with early make/late break contact in series			
<b>Reset rod</b>			
for extending reset button:			
on thermal overload CT 3-12...32 300 mm long	25.947.102-01	036	20
relays 500 mm long	25.947.102-02	037	30
on thermal overload CT 3-42...72 300 mm long	25.947.102-03	038	20
relays 500 mm long	25.947.102-04	039	30
The reset rod can be easily shortened			
<b>Mechanical interlock CM 3</b>			
For contactors CA 3-12...CA 3-72	22.143.101-01	040	20
<b>Neutral link 10 mm<sup>2</sup></b>			
with insulated part for sliding onto contactor	25.945.105-01	041	20
<b>Neutral link 16 mm<sup>2</sup></b>			
with insulated part for sliding onto contactor	25.945.105-02	042	28
<b>Neutral link 10 mm<sup>2</sup></b>			
with ou insulated part for mounting in enclosures KS 3-2	25.945.201-01	043	16
<b>Neutral link 6 mm<sup>2</sup></b>			
Pluggable onto enclosure base plate KS 3 or onto earthing (grounding) bracket	22.141.203-03	044	7
<b>Earthing (grounding) bracket</b>			
for fitting onto perforated plates	22.141.202-01	045	14
<b>Main current terminals CA 3-P-K..</b>			
10 mm <sup>2</sup> 1-pole for CA 3-9...CA 3-16 contactors	25.945.101-01	046	7
25 mm <sup>2</sup> 1-pole for CA 3-23 and CA 3-30 contactors	25.945.102-01	047	17
<b>Dovetail Joint 6 and 16 mm</b>			
for the connection of contactors to contactor combinations for mean distance between centres of 50 or 60 mm	25.944.201-01	048	2
<b>Protection cover</b>			
for main contact to CA 3-37...CA 3-72	22.701.209-01	049	

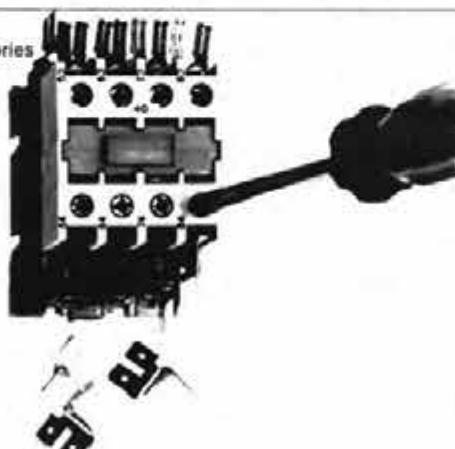
Arrangement  
Order No.  
Index No.

## Accessories Enclosures

Accessoires	Order No.	Index No.	Weight [g]
	<b>Double spade connector 2 x 6.3 x 0.8</b> <b>Single spade connector 1 x 6.3 x 0.8</b> for fitting to the main contacts, auxiliary contacts and coil connections can also be used as a soldering terminal	<b>22.115.249-01</b> <b>25.945.207-01</b>	(100 pces) 001 1,5 (100 pces) 002 1
	<b>Connecting bridge</b> for the parallel connection of the 3 main terminals (e.g., for the operation as a single-phase contactor) For contactors CA 3-12 and CA 3-16 For contactors CA 3-23 and CA 3-30	<b>22.141.209-01</b> <b>22.801.209-01</b>	003 15 004 30
	<b>Upper part of contactor with contacts</b> to CA 3-23-10 CA 3-23-01 CA 3-30-10 CA 3-30-01 CA 3-37-11 CA 3-43-11 CA 3-60-11 CA 3-72-11 Contactor to compact starter CA 3 K Contactor CA 3-9 K Contactor CA 3-12 K Contactor CA 3-16 K	<b>22.601.231-02</b> <b>22.601.233-02</b> <b>22.601.232-02</b> <b>22.601.234-02</b> <b>22.701.210-01</b> <b>22.701.211-01</b> <b>22.701.212-01</b> <b>22.701.213-01</b> <b>CA 3-9 K-...V..</b> <b>CA 3-12 K-...V..</b> <b>CA 3-16 K-...V..</b>	005 140 006 007 008 009 480 010 011 012 013 310 014 310 015 315
	<b>Label sheet</b> with 105 self-adhesive paper labels	<b>22.145.223-01</b>	016 -
	<b>Marking tag sheet</b> perforated, with 160 paper tags	<b>22.145.203-01</b>	017 -
	<b>Transparent cover</b> (in packets of 100) for paper tags	<b>22.145.202-01</b>	018 -
	<b>Tag carrier</b> (in packets of 100) for marking with clip-on tags (see catalogue 19 00)	<b>22.145.201-01</b>	019 1
	<b>Enclosure KS 3-1</b> from grey plastic with earthing (grounding) terminal Protection class to IEC 144 (DIN 40 050)	<b>KS 3-1 F</b> <b>KS 3-1 FZ</b>	020 280
	Without push buttons IP 42 IP 65	<b>KS 3-1 K</b> <b>KS 3-1 KZ</b>	022 290
	With reset buttons IP 42 IP 65	<b>KS 3-1 D</b> <b>KS 3-1 DZ</b>	023 300
	With START-STOP-buttons STOP-button also reset button IP 42	<b>KS 3-1 P</b>	024 290
	With maintained contact control IP 65	<b>KS 3-1 PZ</b>	026 300
	<b>Enclosure KS 3-2</b> from grey plastic with earthing (grounding) terminal Protection class to IEC 144 (DIN 40 050)	<b>KS 3-2 FZ</b> <b>KS 3-2 KZ</b>	028 500
	Without push buttons IP 65	<b>KS 3-2 DZ</b>	029 520
	With reset buttons IP 65	<b>KS 3-2 PZ</b>	030
	With START-STOP-buttons STOP-button also reset button IP 65		031

Dimensions to enclosures KS 3-1, enclosures KS 3-2 see page 24, 25

Spade connectors  
Order No. see Accessories



All devices and accessories with terminals up to 2 x 4 mm<sup>2</sup> can be fitted with removable spade connectors

Control relay CS 3, CS 3 C  
(Main- and auxiliary contacts, coil connections)

Contactor CA 3-9...CA 3-16, CA 3-9 C...CA 3-16 C  
(Main- and auxiliary contactors and coil connections)

Thermal overload relay CT 3-12 and CT 3-16  
(Main- and auxiliary contacts)

Auxiliary contact blocks CS 3-P and CA 3-P  
Timing elements CZ 3  
Mechanical latch

Contactor CA 3-23...CA 3-72  
Auxiliary contacts and coil connections

Arrangement

Order No.

Index No.

Diagrams, Dimensions

# Compact Starter CA 3 K

**Contactor CA 3 K + thermal overload relay CT 3 K**

for impulse contact control  
in enclosure KS 3-1 K  
with earthing (grounding) terminal  
and recessed pushbuttons

Rated thermal current / $I_m$   
encapsula. AC-3  
with O pushbutton (OFF/reset)  
IP 42

Order No.	Control voltage	Thermal overload relay	Weight [g]
			Index No. 1 off

16 A	4 kW	9 A	CAK ..3- 9 ...V...+CT 3 K/A	001	775
16 A	5,5 kW	12 A	CAK ..3-12 ...V...+CT 3 K/A	002	
16 A	7,5 kW	12 A	CAK ..3-18 ...V...+CT 3 K/A	003	

with O pushbutton (OFF/reset) IP 65					
16 A	4 kW	9 A	CAKZ..3- 9 ...V...+CT 3 K/A	004	785
16 A	5,5 kW	12 A	CAKZ..3-12 ...V...+CT 3 K/A	005	
16 A	7,5 kW	16 A	CAKZ..3-18 ...V...+CT 3 K/A	006	

**Contactor CA 3 K + thermal overload relay CT 3 K**

for impulse contact control  
in enclosure KS 3-1 K  
with earthing (grounding) terminal  
and recessed pushbuttons

Impulse contact control  
with START-STOP-buttons  
IP 42

16 A	4 kW	9 A	CAD ..3- 9 K...V...+CT 3 K/A	007	795
16 A	5,5 kW	12 A	CAD ..3-12 K...V...+CT 3 K/A	008	
16 A	7,5 kW	16 A	CAD ..3-18 K...V...+CT 3 K/A	009	

Impulse contact control  
with START-STOP-buttons  
IP 65

16 A	4 kW	9 A	CADZ..3- 9 K...V...+CT 3 K/A	010	807
16 A	5,5 kW	12 A	CADZ..3-12 K...V...+CT 3 K/A	011	
16 A	7,5 kW	16 A	CADZ..3-18 K...V...+CT 3 K/A	012	

**Order No. supplement**

For recessed START and raised STOP pushbutton

..SR

013

For additional neutral link

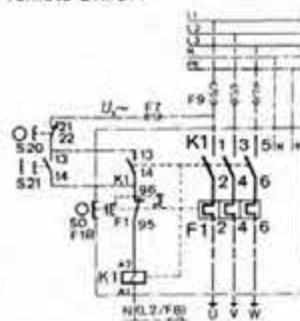
..N

014

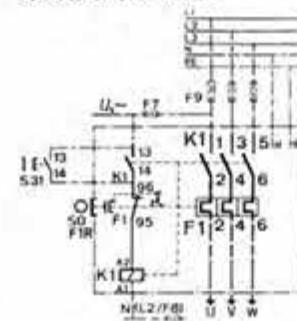
For thermal overload relay setting range (see page 47)

..A

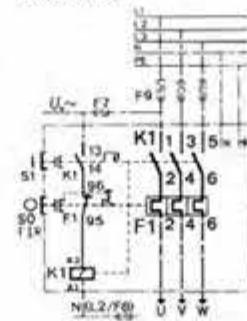
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**Diagrams**
**CAK 3 K + CT 3 K**  
impulse contact control  
remote ON/OFF


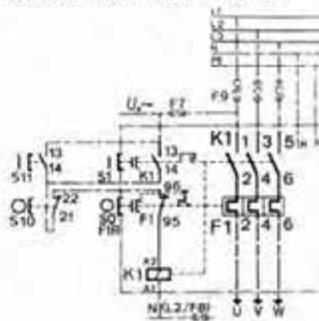
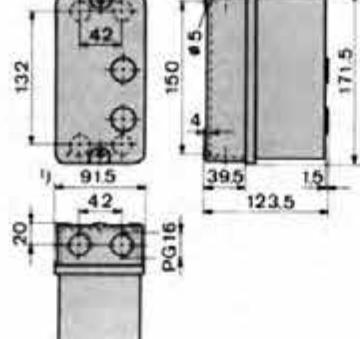
- remote ON pushbutton S21
- remote OFF pushbutton F1R
- local OFF pushbutton doubles as relay reset pushbutton SO/F1R

**CAK 3 K + CT 3 K**  
impulse contact control  
remote ON, local OFF


- remote ON pushbutton S31
- local OFF pushbutton doubles as relay reset pushbutton SO/F1R

**CAD 3 K + CT 3 K**  
impulse contact control  
local ON/OFF


- The ratings correspond to those of the standard contactors CA 3-9...CA 3-16.
- 2-pole auxiliary contact blocks CA 3-P can also be fitted to the compact contactor CA 3-K.

**CAD 3 K + CT 3 K**  
impulse contact control local,  
with additional remote ON/OFF

**Dimensions [mm]**  
Single enclosure KS 3-1 K


1) 4 20 mm dia. knockouts

**Technical data**

- Also available with mushroom "stop" button

Arrangement  
Order No.  
Index No.  
Dimensions

## Starters in Enclosures

### Starters CA 3 + CT 3

3 main cont.  
in enclosure KS 3-1  
with earthing (grounding) terminal  
and recessed pushbuttons



Rated thermal current  $I_{th}$   
encapsula.

Three-phase motors at 380 V AC-3

Control Order No. Thermal overload relay

Weight (g)  
Index No. 1 off

without buttons

IP 42

9 A 4 kW  
12 A 5.5 kW  
16 A 7.5 kW

CAF ..3- 9...V.. + CT 3/.A  
CAF ..3-12...V.. + CT 3/.A  
CAF ..3-16...V.. + CT 3/.A

001 790  
002 795  
003 795

without buttons

IP 65

9 A 4 kW  
12 A 5.5 kW  
16 A 7.5 kW

CAFZ ..3- 9...V.. + CT 3/.A  
CAFZ ..3-12...V.. + CT 3/.A  
CAFZ ..3-16...V.. + CT 3/.A

004 790  
005 795  
006 795

with reset button (blue)

IP 65

9 A 4 kW  
12 A 5.5 kW  
16 A 7.5 kW

CAKZ ..3- 9...V.. + CT 3/.A  
CAKZ ..3-12...V.. + CT 3/.A  
CAKZ ..3-16...V.. + CT 3/.A

007 800  
008 805  
009 805

with START-STOP-buttons (with maintained contact control)

IP 65

9 A 4 kW  
12 A 5.5 kW  
16 A 7.5 kW

CAPZ ..3- 9...V.. + CT 3/.A  
CAPZ ..3-12...V.. + CT 3/.A  
CAPZ ..3-16...V.. + CT 3/.A

010 820  
011 825  
012 825

#### Order No. supplement

For recessed START and raised STOP pushbutton

.SR

013

For additional neutral link

.N

014

For thermal overload relay setting range (see page 49)

.A

### Starters CA 3 + CT 3

3 main cont.  
in enclosure KS 3-2  
with earthing (grounding) terminal  
and recessed pushbuttons



without buttons

IP 65

23 A 11 kW  
30 A 15 kW

CAFZ ..3-23...V.. + CT 3/.A  
CAFZ ..3-30...V.. + CT 3/.A

015 940  
016

with reset button (blue)

IP 65

23 A 11 kW  
30 A 15 kW

CAKZ ..3-23...V.. + CT 3/.A  
CAKZ ..3-30...V.. + CT 3/.A

017 960  
018

with START-STOP-buttons (with maintained contact control)

IP 65

23 A 11 kW  
30 A 15 kW

CAPZ ..3-23...V.. + CT 3/.A  
CAPZ ..3-30...V.. + CT 3/.A

019 970  
020

with START-STOP-buttons (with impulse contact control)

IP 65

23 A 11 kW  
30 A 15 kW

CADZ ..3-23...V.. + CT 3/.A  
CADZ ..3-30...V.. + CT 3/.A

021 970  
022

#### Order No. supplement

For recessed START and raised STOP pushbutton

.SR

023

For additional neutral link

.N

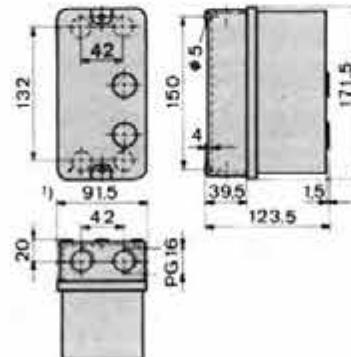
024

For thermal overload relay setting range (see page 49)

.A

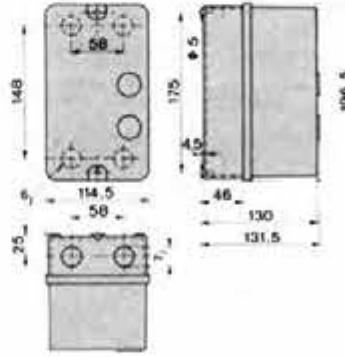
#### Dimensions [mm]

Single enclosure KS 3-1



1) 4 20 mm dia. knockouts  
2) 4 23/29 mm dia. knockouts

Single enclosure KS 3-2



Arrangement  
Order No.  
Index No.  
Dimensions

## Reversing Contactors CAU (M) 3

### Reversing contactor CAU 3

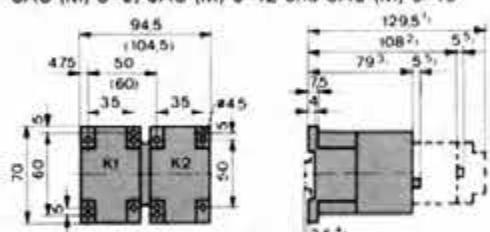
Contactor combination from 2 contactors with main and control connections, and electrical interlock

Arrangement	AC-3	Order No.	Control voltage	Method control (aux. contact)	Index No.	Weight (kg) 1 off
<b>For maintained contact control</b>						
	CA 3- 9 4 kW	CAU.3- 9...V...-01 P			001	710
	CA 3-12 5.5 kW	CAU.3-12...V...-01 P			002	
	CA 3-16 7.5 kW	CAU.3-16...V...-01 P			003	720
	CA 3-23 11 kW	CAU.3-23...V...-01 P			004	1050
	CA 3-30 15 kW	CAU.3-30...V...-01 P			005	
Free auxiliary contacts: each one 1 n/o (13-14)						
	CA 3-37 18.5 kW	CAU.3-37...V...-11 P			006	2000
	CA 3-43 22 kW	CAU.3-43...V...-11 P			007	
	CA 3-60 30 kW	CAU.3-60...V...-11 P			008	2050
	CA 3-72 37 kW	CAU.3-72...V...-11 P			009	
<b>For impulse contact control</b>						
	CA 3- 9 4 kW	CAU.3- 9...V...-11 D			013	760
	CA 3-12 5.5 kW	CAU.3-12...V...-11 D			014	
	CA 3-16 7.5 kW	CAU.3-16...V...-11 D			015	770
	CA 3-23 11 kW	CAU.3-23...V...-11 D			016	1075
	CA 3-30 15 kW	CAU.3-30...V...-11 D			017	
	CA 3-37 18.5 kW	CAU.3-37...V...-11 D			018	2030
	CA 3-43 22 kW	CAU.3-43...V...-11 D			019	
	CA 3-60 30 kW	CAU.3-60...V...-11 D			020	2070
	CA 3-72 37 kW	CAU.3-72...V...-11 D			021	
<b>For maintained contact control with momentary changeover with electrical interlock delayed</b>						
	Free auxiliary contacts per contactor 1 n/o (13-14)					
	CA 3- 9 4 kW	CAU.3- 9...V...-Z 11 P			024	760
	CA 3-12 5.5 kW	CAU.3-12...V...-Z 11 P			025	
	CA 3-16 7.5 kW	CAU.3-16...V...-Z 11 P			026	770
	CA 3-23 11 kW	CAU.3-23...V...-Z 11 P			027	1075
	CA 3-30 15 kW	CAU.3-30...V...-Z 11 P			028	
Free auxiliary contacts: each one 1 n/o + 1 n/c						
	CA 3-37 18.5 kW	CAU.3-37...V...-Z 12 P			029	1100
	CA 3-43 22 kW	CAU.3-43...V...-Z 12 P			030	
	CA 3-60 30 kW	CAU.3-60...V...-Z 12 P			031	2050
	CA 3-72 37 kW	CAU.3-72...V...-Z 12 P			032	
<b>Order number supplement</b>						
For mechanical interlock	CAU.3...		M		035 (+)	+20
For AC control, see page 40	...V...					
For DC control:	CA 3- 9 C, CA 3-12 C, CA 3-16 C see page 18	...VDC				
	CA 3-23...CA 3-72 see page 40	...VDC				

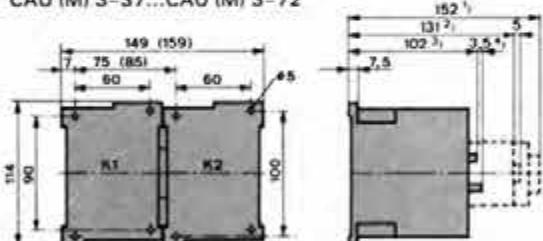
Additional auxiliary contacts see page 38

Dimensions [mm]

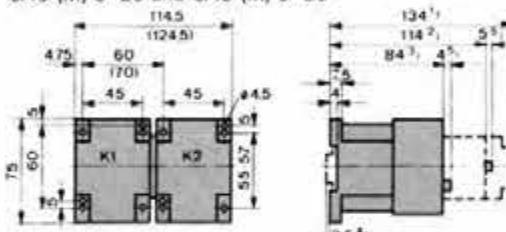
CAU (M) 3-9, CAU (M) 3-12 and CAU (M) 3-16



CAU (M) 3-37...CAU (M) 3-72



CAU (M) 3-23 and CAU (M) 3-30



Dimensions in () with mechanical interlock

<sup>1)</sup> Time delayed auxiliary contact

<sup>2)</sup> With auxiliary contact block

<sup>3)</sup> Basic device without adder elements

<sup>4)</sup> Fixing possibility onto mounting rail EN 50 022-35 for CA 3-12...CA 3-30

<sup>5)</sup> With marking tag carrier

Arrangement  
Order No.  
Index No.  
Dimensions

## Reversing Starters CAU (M) 3 + CT 3

With Fitted Thermal Overload Relay  
Electrical (and Mechanical) Interlock

### Reversing starter CAU 3 + CT 3

Contactor combination from 2 contactors, 1 thermal overload relay with main and control connections and electrical interlock

Arrangement	Switching of motors at 380/415 V	Thermal overload relay Type	Setting range	Order No.	Control voltage	Method of control (aux. contact)	Thermal overload relay	Index No.	Weight kg 1 off
<b>For maintained contact control</b>									
CA 3- 9	4 kW	CT 3 K 6	... 9 A <sup>1)</sup>	CAU..3- 9...V..-01	P+CT 3 K/9 A			001	860
		CT 3 6	... 9,5 A <sup>1)</sup>	CAU..3- 9...V..-01	P+CT 3/9,5 A			002	
CA 3-12	5,5 kW	CT 3 K 9	... 12,5 A	CAU..3-12...V..-01	P+CT 3 K/12,5 A			003	
		CT 3 8,5	... 12,5 A	CAU..3-12...V..-01	P+CT 3/12,5 A			004	
CA 3-16	7,5 kW	CT 3 K 12,5	... 17,5 A	CAU..3-16...V..-01	P+CT 3 K/17,5 A			005	
		CT 3 12	... 16 A	CAU..3-16...V..-01	P+CT 3/16 A			006	
CA 3-23	11 kW	CT 3 16	... 23 A	CAU..3-23...V..-01	P+CT 3/23 A			007	1130
CA 3-30	15 kW	CT 3 23	... 32 A	CAU..3-30...V..-01	P+CT 3/32 A			008	
<b>Free auxiliary contacts per contactor 1 n/o (13-14)</b>									
CA 3-37	18,5 kW	CT 3 25	... 32 A <sup>1)</sup>	CAU..3-37...V..-11	P+CT 3/32 A			009	2400
CA 3-43	22 kW	CT 3 32	... 42 A <sup>1)</sup>	CAU..3-43...V..-11	P+CT 3/42 A			010	
CA 3-60	30 kW	CT 3 40	... 52 A <sup>1)</sup>	CAU..3-60...V..-11	P+CT 3/52 A			011	2450
CA 3-72	37 kW	CT 3 64	... 72,5 A <sup>1)</sup> <sup>2)</sup>	CAU..3-72...V..-11	P+CT 3/72,5 A			012	
<b>For impulse contact control</b>									
CA 3- 9	4 kW	CT 3 K 6	... 9 A <sup>1)</sup>	CAU..3- 9...V..-11	D+CT 3 K/9 A			013	860
		CT 3 6	... 9,5 A <sup>1)</sup>	CAU..3- 9...V..-11	D+CT 3/9,5 A			014	
CA 3-12	5,5 kW	CT 3 K 9	... 12,5 A	CAU..3-12...V..-11	D+CT 3 K/12,5 A			015	910
		CT 3 8,5	... 12,5 A	CAU..3-12...V..-11	D+CT 3/12,5 A			016	
CA 3-16	7,5 kW	CT 3 K 12,5	... 17,5 A	CAU..3-16...V..-11	D+CT 3 K/17,5 A			017	920
		CT 3 12	... 16 A	CAU..3-16...V..-11	D+CT 3/16 A			018	
CA 3-23	11 kW	CT 3 16	... 23 A	CAU..3-23...V..-11	D+CT 3/23 A			019	1170
CA 3-30	15 kW	CT 3 23	... 32 A	CAU..3-30...V..-11	D+CT 3/32 A			020	
CA 3-37	18,5 kW	CT 3 25	... 32 A <sup>1)</sup>	CAU..3-37...V..-11	D+CT 3/32 A			021	2430
CA 3-43	22 kW	CT 3 32	... 42 A <sup>1)</sup>	CAU..3-43...V..-11	D+CT 3/42 A			022	
CA 3-60	30 kW	CT 3 40	... 52 A <sup>1)</sup>	CAU..3-60...V..-11	D+CT 3/52 A			023	2470
CA 3-72	37 kW	CT 3 54	... 72,5 A <sup>1)</sup> <sup>2)</sup>	CAU..3-72...V..-11	D+CT 3/72,5 A			024	
<b>For maintained contact control with momentary changeover with electrical interlock delayed</b>									
<b>Free auxiliary contacts per contactor 1 n/o (13-14)</b>									
CA 3- 9	4 kW	CT 3 K 6	... 9 A <sup>1)</sup>	CAU..3- 9...V..-Z 11+CT 3 K/9 A				025	860
		CT 3 6	... 9,5 A <sup>1)</sup>	CAU..3- 9...V..-Z 11+CT 3/9,5 A				026	
CA 3-12	5,5 kW	CT 3 K 9	... 12,5 A	CAU..3-12...V..-Z 11+CT 3 K/12,5 A				027	910
		CT 3 8,5	... 12,5 A	CAU..3-12...V..-Z 11+CT 3/12,5 A				028	
CA 3-16	7,5 kW	CT 3 K 12,5	... 17,5 A	CAU..3-16...V..-Z 11+CT 3 K/17,5 A				029	920
		CT 3 12	... 16 A	CAU..3-16...V..-Z 11+CT 3/16 A				030	
CA 3-23	11 kW	CT 3 16	... 23 A	CAU..3-23...V..-Z 11+CT 3/23 A				031	1170
CA 3-30	15 kW	CT 3 23	... 32 A	CAU..3-30...V..-Z 11+CT 3/32 A				032	
<b>Free auxiliary contacts per contactor 1 n/o + 1 n/c</b>									
CA 3-37	18,5 kW	CT 3 25	... 32 A <sup>1)</sup>	CAU..3-37...V..-Z 12+CT 3/32 A				033	2450
CA 4-43	22 kW	CT 3 32	... 42 A <sup>1)</sup>	CAU..3-43...V..-Z 12+CT 3/42 A				034	
CA 3-60	30 kW	CT 3 40	... 52 A <sup>1)</sup>	CAU..3-60...V..-Z 12+CT 3/52 A				035	2600
CA 3-72	37 kW	CT 3 64	... 72,5 A <sup>1)</sup> <sup>2)</sup>	CAU..3-72...V..-Z 12+CT 3/72,5 A				036	

### Order No. addition

For mechanical interlock

CAU..3...

M

037 + + 20

For AC control, see page 40

...V..

For DC control: CA 3-9 C, CA 3-12 C, CA 3-16 C see page 18

...VDC

CA 3-23...CA 3-72 see page 40

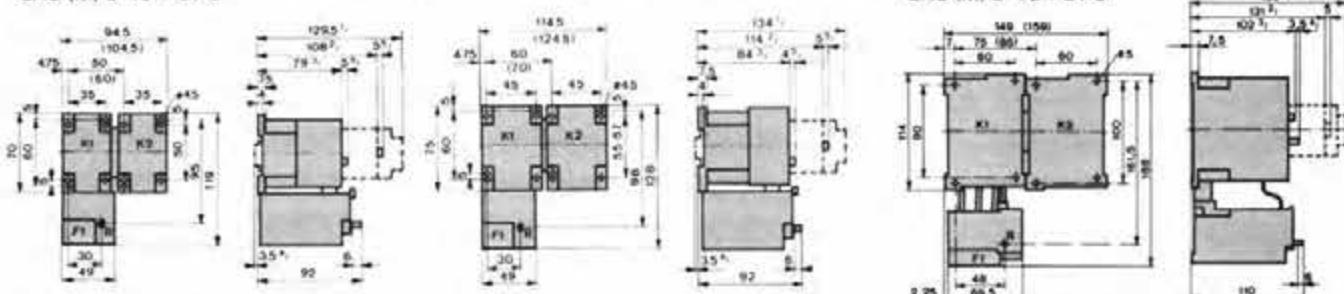
...VDC

Additional auxiliary contacts see page 38

### Dimensions (mm)

CAU (M) 3-9 + CT 3, CAU (M) 3-12 + CT 3, CAU (M) 3-16 + CT 3, CAU (M) 3-23 + CT 3, CAU (M) 3-30 + CT 3, CAU (M) 3-37 + CT 3...

CAU (M) 3-72 + CT 3



Dimensions in ( ) with mechanical interlock

<sup>1)</sup> Time delayed auxiliary contact

<sup>2)</sup> With auxiliary contact block

<sup>3)</sup> Basic device without adder elements

<sup>4)</sup> Fixing possibility onto mounting rail EN 50 022-35 for CA 3-12...CA 3-30  
EN 50 022-35

<sup>1)</sup> With marking tag carrier

<sup>2)</sup> Further setting ranges such as starters (see page 16)

<sup>3)</sup> For UL/CSA with Overload relay CT 3-63 (see page 20)

# Two-Step Contactors CA II W 3

(Without Thermal Overload Relays)

Arrangement  
Order No.  
Index No.  
Dimensions

**Two-step contactor CA II W 3**For motors with 2 separate windings<sup>1)</sup>

2 speeds, 1 direction of rotation

Contactor combinations consisting of 2 contactors with main and control wiring and electrical interlock

Arrangement AC-3	Switching of 3-phase motors at 380/415 V	Order No.	Control voltage	Method of control	Index No.	Weight [g]
					1 off	
<b>For maintained contact control</b>						
	CA 3- 9 4 kW CA 3-12 5,5 kW CA 3-16 7,5 kW CA 3-23 11 kW CA 3-30 15 kW	CA II W..3- 9...V...-01 P CA II W..3-12...V...-01 P CA II W..3-16...V...-01 P CA II W..3-23...V...-01 P CA II W..3-30...V...-01 P			001 002 003 004 005	620
	Spare contacts: 1 n/o per contactor					
	CA 3-37 18,5 kW CA 3-43 22 kW CA 3-60 30 kW CA 3-72 37 kW	CA II W..3-37...V...-11 P CA II W..3-43...V...-11 P CA II W..3-60...V...-11 P CA II W..3-72...V...-11 P			006 007 008 009	1980 2100
<b>For impulse contact control</b>						
	CA 3- 9 4 kW CA 3-12 5,5 kW CA 3-16 7,5 kW CA 3-23 11 kW CA 3-30 15 kW CA 3-37 18,5 kW CA 3-43 22 kW CA 3-60 30 kW CA 3-72 37 kW	CA II W..3- 9...V...-11 D CA II W..3-12...V...-11 D CA II W..3-16...V...-11 D CA II W..3-23...V...-11 D CA II W..3-30...V...-11 D CA II W..3-37...V...-11 D CA II W..3-43...V...-11 D CA II W..3-60...V...-11 D CA II W..3-72...V...-11 D			010 011 012 013 014 015 016 017 018	660 920 2030 2150

**Order No. supplement**

For mechanical interlock between stage 1 and network contactor

For AC control, see page 40

For DC control: CA 3-9 C, CA 3-12 C, CA 3-16 C see page 18

CA 3-23...CA 3-72 see page 40

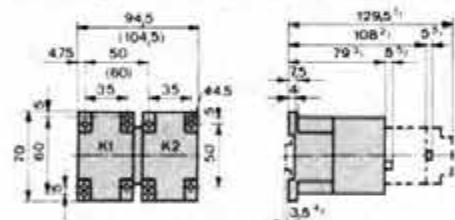
CA II W..3-M

019 (+) + 20

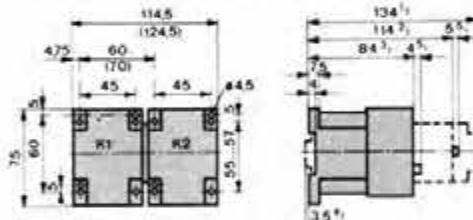
Additional auxiliary contacts see page 38

**Dimensions [mm]**

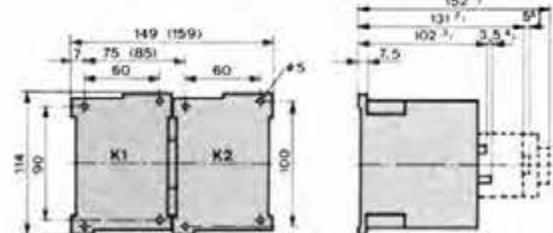
CA II W (M) 3-9, CA II W (M) 3-12, CA II W (M) 3-16



CA II W (M) 3-23, CA II W (M) 3-30



CA II W (M) 3-37...CA II W (M) 3-72



Dimensions in ( ) with mechanical interlock.

<sup>1)</sup> Time delayed auxiliary contact<sup>2)</sup> With auxiliary contact block<sup>3)</sup> Basic device without adder elements<sup>4)</sup> Fixing possibility onto mounting rail EN 50 022-35 for CA 3-9...3-30<sup>5)</sup> With marking tag carrier<sup>1)</sup> 2 rotational speeds with similar torques, 1 direction of rotation.  
On request: Dahlander connection Y/YY, 2 speeds, higher speed with higher torque (ventilator and pump drivers).

Arrangement  
Order No.  
Index No.  
Dimensions

## Two-Step Starter CA II W 3 + CT 3 + CT 3 (With 2 fitted Thermal Overload Relays)

**Two-step starter CA II W 3 + CT 3 + CT 3**

For motors with 2 separate windings

2 speeds, 1 direction of rotation

Contactor combinations consisting of 2 contactors, 2 thermal overload relays with main and control wiring and electrical interlock

Arrange- ment	Switching of 3-phase motors at			Control voltage Method of control	Thermal overload relay F 1	Thermal overload relay F 2	Index No.	Weight kg   1 off
	AC-3	Type	setting range					
<b>For maintained contact control</b>								
CA 3- 9 4 kW	CT 3 K	6 ... 9 A <sup>1)</sup>	CA II W.3- 9...V...-01 P+CT 3 K/9 A	+CT 3 K/9 A	001	930		
	CT 3	6 ... 9,5 A <sup>1)</sup>	CA II W.3- 9...V...-01 P+CT 3/9,5 A	+CT 3/9,5 A	002			
CA 3-12 5,5 kW	CT 3 K	9 ... 12,5 A	CA II W.3-12...V...-01 P+CT 3 K/12,5 A	+CT 3 K/12,5 A	003			
	CT 3	8,5 ... 12,5 A	CA II W.3-12...V...-01 P+CT 3/12,5 A	+CT 3/12,5 A	004			
CA 3-16 7,5 kW	CT 3 K	12,5 ... 17,5 A	CA II W.3-16...V...-01 P+CT 3 K/17,5 A	+CT 3 K/17,5 A	005			
	CT 3	12 ... 16 A	CA II W.3-16...V...-01 P+CT 3/16 A	+CT 3/16 A	006			
CA 3-23 11 kW	CT 3	16 ... 23 A	CA II W.3-23...V...-01 P+CT 3/23 A	+CT 3/23 A	007	1240		
CA 3-30 15 kW	CT 3	23 ... 32 A	CA II W.3-30...V...-01 P+CT 3/32 A	+CT 3/32 A	008			
Spare contacts: 1 n/o per contactor								
CA 3-37 18,5 kW	CT 3	25 ... 32 A <sup>1)</sup>	CA II W.3-37...V...-11 P+CT 3/32 A	+CT 3/32 A	009	2780		
CA 3-43 22 kW	CT 3	32 ... 42 A <sup>1)</sup>	CA II W.3-43...V...-11 P+CT 3/42 A	+CT 3/42 A	010			
CA 3-60 30 kW	CT 3	40 ... 52 A <sup>1)</sup>	CA II W.3-60...V...-11 P+CT 3/52 A	+CT 3/52 A	011	2900		
CA 3-72 37 kW	CT 3	64 ... 72,5 A <sup>1)</sup>	CA II W.3-72...V...-11 P+CT 3/72,5 A	+CT 3/72,5 A	012			
<b>For impulse contact control</b>								
CA 3- 9 4 kW	CT 3 K	6 ... 9 A <sup>1)</sup>	CA II W.3- 9 ...V...-11 D+CT 3 K/9 A	+CT 3 K/9 A	013	950		
	CT 3	6 ... 9,5 A <sup>1)</sup>	CA II W.3- 9 ...V...-11 D+CT 3/9,5 A	+CT 3/9,5 A	014			
CA 3-12 5,5 kW	CT 3 K	9 ... 12,5 A	CA II W.3-12...V...-11 D+CT 3 K/12,5 A	+CT 3 K/12,5 A	015			
	CT 3	8,5 ... 12,5 A	CA II W.3-12...V...-11 D+CT 3/12,5 A	+CT 3/12,5 A	016			
CA 3-16 7,5 kW	CT 3 K	12,5 ... 17,5 A	CA II W.3-16...V...-11 D+CT 3 K/17,5 A	+CT 3 K/17,5 A	017			
	CT 3	12 ... 16 A	CA II W.3-16...V...-11 D+CT 3/16 A	+CT 3/16 A	018			
CA 3-23 11 kW	CT 3	16 ... 23 A	CA II W.3-23...V...-11 D+CT 3/23 A	+CT 3/23 A	019	1260		
CA 3-30 15 kW	CT 3	23 ... 32 A	CA II W.3-30...V...-11 D+CT 3/32 A	+CT 3/32 A	020			
CA 3-37 18,5 kW	CT 3	25 ... 32 A <sup>1)</sup>	CA II W.3-37...V...-11 D+CT 3/32 A	+CT 3/32 A	021	2780		
CA 3-43 22 kW	CT 3	32 ... 42 A <sup>1)</sup>	CA II W.3-43...V...-11 D+CT 3/42 A	+CT 3/42 A	022			
CA 3-60 30 kW	CT 3	40 ... 52 A <sup>1)</sup>	CA II W.3-60...V...-11 D+CT 3/52 A	+CT 3/52 A	023	2900		
CA 3-72 37 kW	CT 3	64 ... 72,5 A <sup>1)</sup>	CA II W.3-72...V...-11 D+CT 3/72,5 A	+CT 3/72,5 A	024			

**Order No. supplement**

For mechanical interlock between stage 1 and network contactor

**CA II W.3...**

M 025 (+) + 20

For AC control, see page 40

...V..

For DC control: CA 3- 9 C, CA 3-12 C, CA 3-16 C s. p. 18

...VDC

CA 3-23..CA 3-72 see page 40

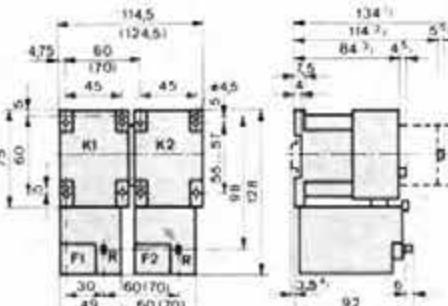
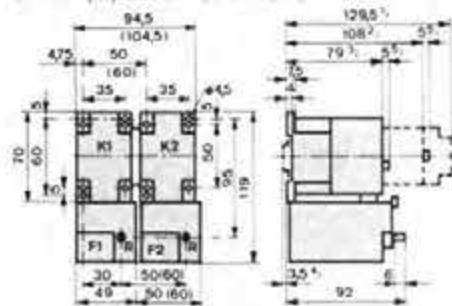
...VDC

Additional auxiliary contacts see page 38

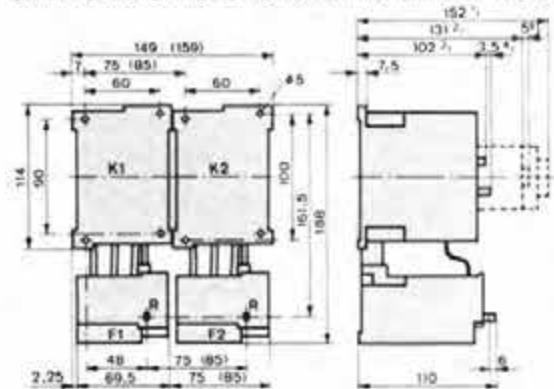
Dimensions (mm)

CA II W (M) 3- 9 + CT 3 + CT 3, CA II W (M) 3-12 + CT 3 + CT 3,  
CA II W (M) 3-16 + CT 3 + CT 3

CA II W (M) 3-23 + CT 3 + CT 3, CA II W (M) 3-30 + CT 3 + CT 3



CA II W (M) 3-37 + CT 3 + CT 3..CA II W (M) 3-72 + CT 3 + CT 3



(Dimensions in () with mechanical interlock)

- <sup>1)</sup> Time delayed auxiliary contact
- <sup>2)</sup> With auxiliary contact block
- <sup>3)</sup> Basic device without adder elements
- <sup>4)</sup> Fixing possibility onto mounting rail EN 50 022-35 for CA 3- 9 .. CA 3-30
- <sup>5)</sup> With marking tag carrier
- <sup>6)</sup> Further setting ranges such as starters (see page 16)
- <sup>7)</sup> For UL-CSA with thermal overload relay CT 3-63 (see page 20)

# Two-Step Starters

## CA II D 3 + CT 3 + CT 3 for Continuance Contact Control

Arrangement  
Order No.  
Index No.  
Dimensions

### Two-step starters CA II D 3 + CT 3 + CT 3 complet

(for pole changing Dahlander connected motors △/YY<sup>1)</sup>)

Contactor combination consisting of 3 contactors, 2 thermal overload relays

main and control wiring, electrical interlock and neutral link

Switching of 3-phase motors at					Control voltage	Method of control	Thermal overload relay	Index Weight No. (g) 1 off
Arrange- ment	380/415 V 2 thermal overload relays	AC-3	Type	setting range	Order No.	F 1	F 2	
CA 3-	9 4 kW	CT 3 K 6	... 9 A <sup>4)</sup>	CA II D..3- 9-...V..-01 P+CT 3 K/9 A +CT 3 K/9 A	001	1470		
		CT 3	6 ... 9,5 A <sup>4)</sup>	CA II D..3- 9-...V..-01 P+CT 3/9,5 A +CT 3/9,5 A	002			
CA 3-12	5,5 kW	CT 3 K 9	... 12,5 A	CA II D..3-12-...V..-01 P+CT 3 K/12,5 A +CT 3 K/12,5 A	003			
		CT 3	8,5 ... 12,5 A	CA II D..3-12-...V..-01 P+CT 3/8,5 A +CT 3/12,5 A	004			
CA 3-16	7,5 kW	CT 3 K 12,5	... 17,5 A	CA II D..3-16-...V..-01 P+CT 3 K/17,5 A +CT 3 K/17,5 A	005			
		CT 3	12 ... 16 A	CA II D..3-16-...V..-01 P+CT 3/16 A +CT 3/16 A	006			
CA 3-23	11 kW	CT 3	16 ... 23 A	CA II D..3-23-...V..-01 P+CT 3/23 A +CT 3/23 A	007	1695		
CA 3-30	15 kW	CT 3	23 ... 32 A	CA II D..3-30-...V..-01 P+CT 3/32 A +CT 3/32 A	008			

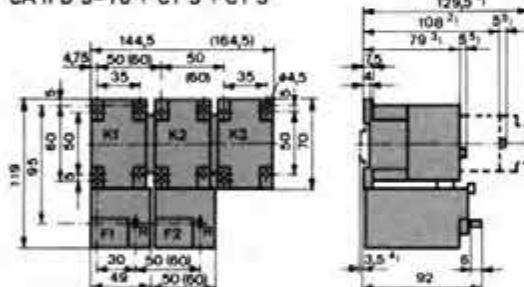
Spare auxiliary contacts on K 1, 1 n/c (21-22) on K 3 1 n/o (13-14)						
CA 3-37 18,5 kW	CT 3	25 ... 32 A <sup>4)</sup>	CA II D..3-37-...V..-11 P+CT 3/32 A +CT 3/32 A	009	2780	
CA 3-43 22 kW	CT 3	32 ... 42 A <sup>4)</sup>	CA II D..3-43-...V..-11 P+CT 3/42 A +CT 3/42 A	010		
CA 3-60 30 kW	CT 3	40 ... 52 A <sup>4)</sup>	CA II D..3-60-...V..-11 P+CT 3/52 A +CT 3/52 A	011	2900	
CA 3-72 37 kW	CT 3	64 ... 72,5 A <sup>4)</sup> <sup>12)</sup>	CA II D..3-72-...V..-11 P+CT 3/72,5 A +CT 3/72,5 A	012		

Additional auxiliary contacts see page 38

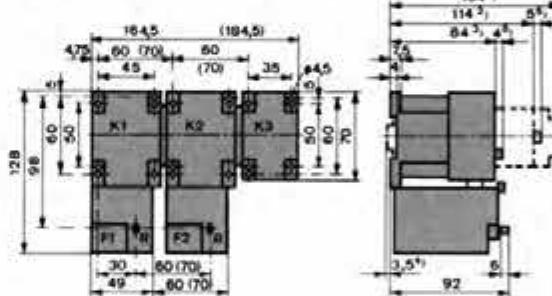
Order No. supplement	CA II D..3-...	
For mechanical interlock between stage 1 and network contactor	M	013(+)+20
For AC control, see page 40	V..	
For DC control: CA 3-9 C, CA 3-12 C, CA 3-16 C s. p. 18 CA 3-23...CA 3-72 see page 40	...VDC	

### Dimensions (mm)

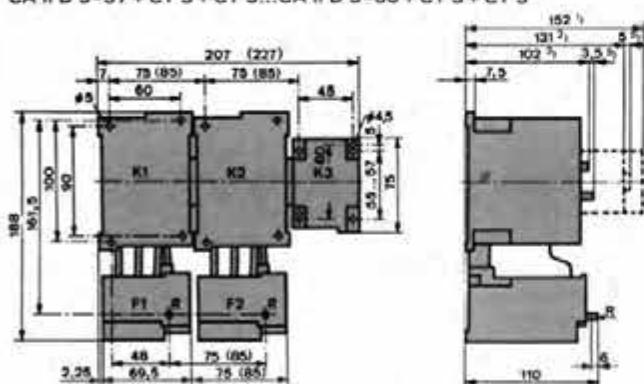
CA II D 3- 9 + CT 3 + CT 3, CA II D 3-12 + CT 3 + CT 3  
CA II D 3-16 + CT 3 + CT 3



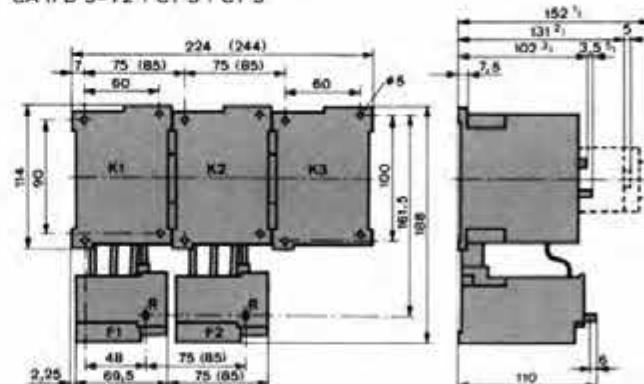
CA II D 3-23 + CT 3 + CT 3, CA II D 3-30 + CT 3 + CT 3



CA II D 3-37 + CT 3 + CT 3...CA II D 3-60 + CT 3 + CT 3



CA II D 3-72 + CT 3 + CT 3



(Dimensions in () with mechanical interlock)

<sup>1)</sup> With timing element CZE, with latch mechanism, with short time delay auxiliary contact

<sup>2)</sup> With auxiliary contact block

<sup>3)</sup> Basic device without adder elements

<sup>4)</sup> Fixing possibility onto mounting rail EN 50 022-35 for CA 3-9...CA 3-30

<sup>5)</sup> With marking tag carrier

<sup>6)</sup> Further setting ranges, see page 16

<sup>7)</sup> 2 rotational speeds with similar torques, 1 direction of rotation.

On request: Dahlander connection Y/YY, 2 speeds, higher speed with higher torque (ventilator and pump drives).

<sup>12)</sup> See page 20 for UL/CSA with CT 3-6B thermal overload relay.

# Two-Step Starters CA IID 3 + CT 3 + CT 3 for Impulse Contact Control

**Arrangement**  
**Order No.**  
**Index No.**  
**Dimensions**

**Two-step starters CA IID 3 + CT 3 + CT 3 complet**  
(for pole changing Dahlander connected motors  $\Delta/Y\bar{Y}^{11}$ )  
Contactor combination consisting of 3 contactors, 2 thermal overload relays  
main and control wiring, electrical interlock and neutral link

Switching of 3-phase motors at				Control voltage	Method of control	Thermal overload relay		Index Weight No. [g] 1 off
Arrange- ment	380/415 V 2 thermal overload relays	Type	setting range <sup>*)</sup>			Order No.	F 1	
CA 3- 9 4 kW	CT 3 K 6 ... 9 A	CT 3 K 6 ... 9.5 A	CA IID.3- 9...V..-11D+CT 3 K/9 A +CT 3 K/9 A	001	1520			
CA 3-12 5.5 kW	CT 3 K 9 ... 12.5 A	CT 3 8.5 ... 12.5 A	CA IID.3-12...V..-11D+CT 3 K/12.5 A +CT 3 K/12.5 A	003				
CA 3-16 7.5 kW	CT 3 K 12.5 ... 17.5 A	CT 3 12 ... 16 A	CA IID.3-16...V..-11D+CT 3 K/17.5 A +CT 3 K/17.5 A	005				
CA 3-23 11 kW	CT 3 16 ... 23 A	CA IID.3-16...V..-11D+CT 3 K/17.5 A +CT 3 K/17.5 A	006					
CA 3-30 15 kW	CT 3 23 ... 32 A	CA IID.3-30...V..-11D+CT 3/32 A +CT 3/32 A	008					
Spare auxiliary contacts on K 1, n/c (21-22) on K 3 1 n/o (13-14)								
CA 3-37 18.5 kW	CT 3 25 ... 32 A	CA IID.3-37...V..-11D+CT 3/32 A +CT 3/32 A	009	2780				
CA 3-43 22 kW	CT 3 32 ... 42 A	CA IID.3-43...V..-11D+CT 3/42 A +CT 3/42 A	010					
CA 3-60 30 kW	CT 3 40 ... 52 A	CA IID.3-60...V..-11D+CT 3/52 A +CT 3/52 A	011	2900				
CA 3-72 37 kW	CT 3 64 ... 72.5 A <sup>12)</sup>	CA IID.3-72...V..-11D+CT 3/72.5 A +CT 3/72.5 A	012					

Additional auxiliary contacts see page 32

**Order No. supplement**

For mechanical interlock between stage 1 and network contactor

For AC control, see page 40

For DC control: CA 3-9 C, CA 3-12 C, CA 3-16 C see p. 18  
CA 3-23...CA 3-72 see page 40

**CA IID.3-...**  
**M**

026(+)+20

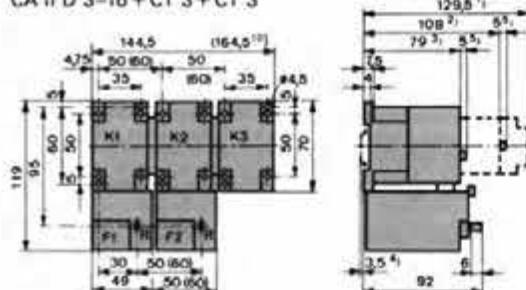
...V..

...VDC

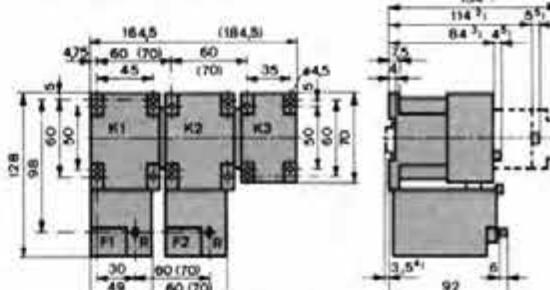
...VDC

**Dimensions (mm)**

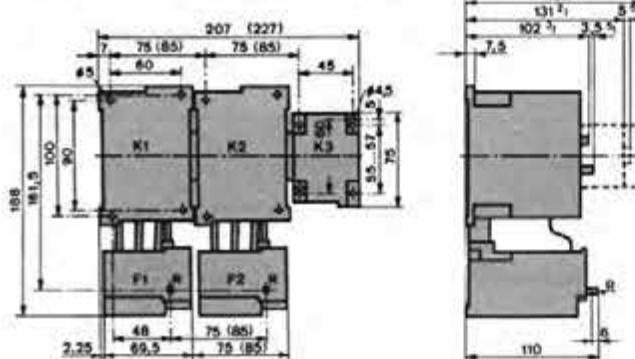
CA IID 3-9 + CT 3 + CT 3, CA IID 3-12 + CT 3 + CT 3  
CA IID 3-16 + CT 3 + CT 3



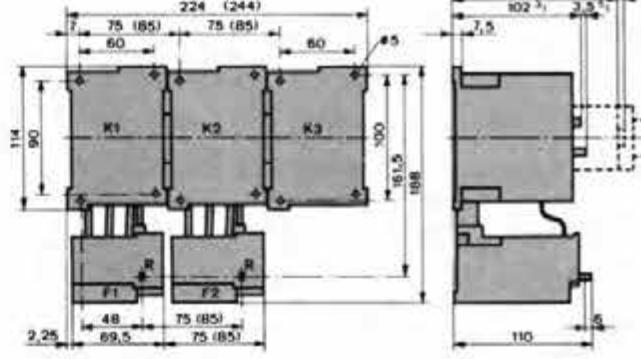
CA IID 3-23 + CT 3 + CT 3, CA IID 3-30 + CT 3 + CT 3



CA IID 3-37 + CT 3 + CT 3...CA IID 3-60 + CT 3 + CT 3



CA IID 3-72 + CT 3 + CT 3



(Dimensions in () with mechanical interlock)

<sup>1)</sup> With timing element C2E, with latch mechanism, with short time delay auxiliary contact

<sup>2)</sup> With auxiliary contact block

<sup>3)</sup> Basic device without adder elements

<sup>4)</sup> Fixing possibility onto mounting rail EN 50 022-35 for CA 3-9...CA 3-30

<sup>5)</sup> With marking tag carrier

<sup>6)</sup> Further setting ranges, see page 16

<sup>7)</sup> 2 rotational speeds with similar torques, 1 direction of rotation.

On request: Dahlander connection Y/YY, 2 speeds, higher speed with higher torque (ventilator and pump drives).

<sup>8)</sup> See page 20 for UL/CSA with CT 3-68 thermal overload relay.

# Star-Delta Starter

## CAY 3 + CT 3

With Timing Element CZE 3

Arrangement  
Order No.  
Index No.  
Dimensions

**Star-delta starter CAY 3 + CT 3**

With timing element CZE 3, 0.3...30 sec.

Contactor combination from 3 contactors, 1 thermal overload relay  
with main and control wiring

Rated power of motor at 380/415 V AC 3 [kW]	Thermal overload relay Type	setting range [A] F 1	Order No.	Thermal voltage F 1	Control overload relay	Timing element	Index No.	Weight [g] 1 off
1 spare aux. contact on contactor K 3M: 1 n/o (13-14) with maintained contact control, 1 additional n/o contact (13-14) on contactor K 1M								
1.5	CT 3 K	3.1 ... 4.7 <sup>(1)</sup>	CAY..3-9...V..-+CT 3 K/4,7 A +CZE	001	1285			
	CT 3	2.8 ... 4.3 <sup>(1)</sup>	CAY..3-9...V..-+CT 3/4,3 A +CZE	002				
2.2	CT 3 K	4.7 ... 6.9	CAY..3-9...V..-+CT 3 K/6,9 A +CZE	003				
	CT 3	4.3 ... 6.9	CAY..3-9...V..-+CT 3/6,9 A +CZE	004				
3 4	CT 3 K	6.9 ... 10.4	CAY..3-9...V..-+CT 3 K/10,4 A +CZE	005				
	CT 3	6.6 ... 10.4	CAY..3-9...V..-+CT 3/10,4 A +CZE	006				
5.5 7.5	CT 3 K	10.4...15.6	CAY..3-9...V..-+CT 3 K/15,6 A +CZE	007				
	CT 3	10.4 ... 16.5	CAY..3-9...V..-+CT 3/16,5 A +CZE	008				
10	CT 3 K	15.6 ... 21.6	CAY..3-12...V..-+CT 3 K/21,6 A +CZE	009				
	CT 3	14.7 ... 21.7	CAY..3-12...V..-+CT 3/21,7 A +CZE	010				
11 15	CT 3 K	21.6 ... 30.3	CAY..3-16...V..-+CT 3 K/30,3 A +CZE	011				
	CT 3	20.8 ... 27.7	CAY..3-16...V..-+CT 3/27,7 A +CZE	012				
15 18,5	CT 3	27.7 ... 39.8	CAY..3-23...V..-+CT 3/39,8 A +CZE	013	1685			
22 25	CT 3	39.8 ... 55.5	CAY..3-30...V..-+CT 3/55,5 A +CZE	014				
Spare contacts: on K 1 n/o (21-22) on K 2 1 n/o (13-14) on K 3 1 n/o (13-14), 1 n/o (21-22) with maintained contact control, 1 spare auxiliary contact 1 n/o (13-14) on contactor K 1M								
25	CT 3	43,3 ... 55,5	CAY..3-37...V..-+CT 3/55,5 A +CZE	015	3580			
30	CT 3	55,5 ... 72,5	CAY..3-37...V..-+CT 3/72,5 A +CZE	016				
37	CT 3	55,5 ... 72,5	CAY..3-43...V..-+CT 3/72,5 A +CZE	017				
45	CT 3	70 ... 90	CAY..3-60...V..-+CT 3/90 A +CZE	018	3650			
50	CT 3	90 ... 104	CAY..3-60...V..-+CT 3/104 A +CZE	019				
55	CT 3	100 ... 110	CAY..3-60...V..-+CT 3/110 A +CZE	020				
63	CT 3	110 ... 125	CAY..3-72...V..-+CT 3/125 A +CZE	021				

Additional auxiliary contacts see page 38

## Order No. supplement

For mechanical interlock between star 1 and delta contactor

For AC control, see page 40

For DC control:

CA 3-9 C, CA 3-12 C, CA 3-16 C see p. 18

CA 3-23...CA 3-72 see page 40

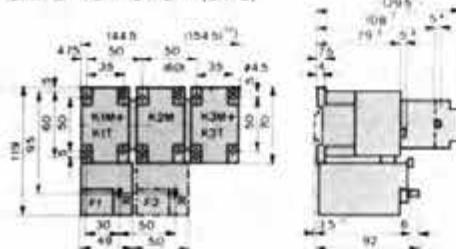
## CAY..3...

M

022 + + 20

...V..

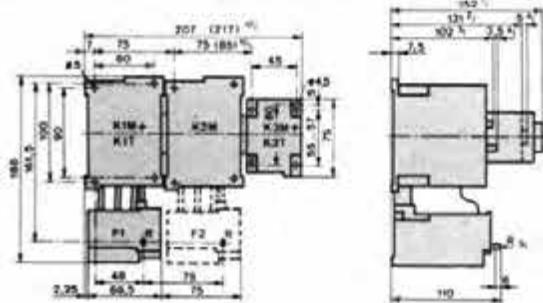
## Dimensions [mm]

CAY 3- 9 + CT 3 + (CT 3), CAY 3-12 + CT 3 (+ CT 3)  
CAY 3-16 + CT 3 + (CT 3)

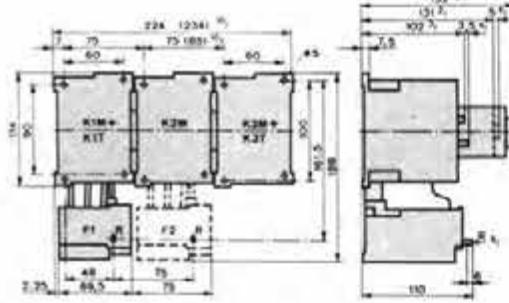
CAY 3-23 + CT 3 (+ CT 3), CAY 3-30 + CT 3 (+ CT 3)



CAY 3-43 + CT 3 + (CT 3)...CAY 3-60 + CT 3 (CT 3)



CAY 3-72 + CT 3 (+CT 3)

<sup>(1)</sup> With timing element CZE<sup>(2)</sup> With auxiliary contact block<sup>(3)</sup> Basic device without adder element<sup>(4)</sup> With marking tag carrier<sup>(5)</sup> Reset buttons: 3.5 mm away = reset, 6 mm away = test<sup>(1)</sup> Fixing possibility onto mounting rail EN 50 022-35 for CA 3-30<sup>(2)</sup> With timing relay RZEY<sup>(3)</sup> Dimensions in () with mechanical interlock<sup>(4)</sup> Further setting ranges, see page 16<sup>(5)</sup> See page 20 for UL/CSA with CT 3-68 thermal overload relay

# Star-Delta Starter CAY 3 + CT 3 + CT 3

With Timing Element CZE 3

**Arrangement**  
**Order No.**  
**Index No.**

**Star-delta starter CAY 3 + CT 3 + CT 3**

with timing element CZE 3, 0.3...30 sec.

Contactor combination from 3 contactors, 2 thermal overload relays with main and control connections

For reduced cross-sectional area of the supply line to motor

and for heavy duty starting, dependent on the setting of the thermal overload relays

Cross-sec (kW)	Heavy duty starting	Thermal overload relay setting range (A)		Control Order No.	Thermal overload relay F 1	Thermal overload relay F 2	Timing element	Index No.	Weight 1 off
		Type	F 1						
<b>1 spare auxiliary contact on contactor K 3M: 1 n/o (13-14) with maintained contact control, 1 additional n/o contact (13-14) on contactor K 1M</b>									
1.5	1.1	CT 3 K	3.1 ... 4.7	3.1 ... 4.7 <sup>1)</sup>	CAY..3- 9...V...+CT 3 K/4.7 A +CT 3 K/4.7 A +CZE	001	1450		
		CT 3	2.8 ... 4.3	2.8 ... 4.3 <sup>1)</sup>	CAY..3- 9...V...+CT 3/4.3 A +CT 3/4.3 A +CZE	002			
-	1.5	CT 3 K	4.7 ... 6.9	3.1 ... 4.7	CAY..3- 9...V...+CT 3 K/6.9 A +CT 3 K/6.9 A +CZE	003			
		CT 3	4.3 ... 6.9	2.8 ... 4.3	CAY..3- 9...V...+CT 3/6.9 A +CT 3/6.9 A +CZE	004			
2.2	2.2	CT 3 K	4.7 ... 6.9	4.7 ... 6.9	CAY..3- 9...V...+CT 3 K/6.9 A +CT 3 K/6.9 A +CZE	005			
		CT 3	4.3 ... 6.9	4.3 ... 6.9	CAY..3- 9...V...+CT 3/6.9 A +CT 3/6.9 A +CZE	006			
3	4	3	CT 3 K	6.9 ... 10.4	6.9 ... 10.4	CAY..3- 9...V...+CT 3 K/10.4 A +CT 3 K/10.4 A +CZE	007		
			CT 3	6.6 ... 10.4	6.6 ... 10.4	CAY..3- 9...V...+CT 3/10.4 A +CT 3/10.4 A +CZE	008		
-	4		CT 3 K	10.4 ... 15.6	6.9 ... 10.4	CAY..3- 9...V...+CT 3 K/15.6 A +CT 3 K/15.6 A +CZE	009		
			CT 3	10.4 ... 16.5	6.6 ... 10.4	CAY..3- 9...V...+CT 3/16.5 A +CT 3/16.5 A +CZE	010		
5.5	7.5	5.5	CT 3 K	10.4 ... 15.6	10.4 ... 15.6	CAY..3- 9...V...+CT 3 K/15.6 A +CT 3 K/15.6 A +CZE	011		
			CT 3	10.4 ... 16.5	10.4 ... 16.5	CAY..3- 9...V...+CT 3/16.5 A +CT 3/16.5 A +CZE	012		
-	7.5		CT 3 K	15.6 ... 21.6	10.4 ... 15.6	CAY..3- 9...V...+CT 3 K/21.6 A +CT 3 K/21.6 A +CZE	013		
			CT 3	14.7 ... 21.7	10.4 ... 16.5	CAY..3- 9...V...+CT 3/21.7 A +CT 3/21.7 A +CZE	014		
10	-		CT 3 K	15.6 ... 21.6	15.6 ... 21.6	CAY..3- 12...V...+CT 3 K/21.6 A +CT 3 K/21.6 A +CZE	015		
			CT 3	14.7 ... 21.7	14.7 ... 21.7	CAY..3- 12...V...+CT 3/21.7 A +CT 3/21.7 A +CZE	016		
11	11		CT 3 K	21.6 ... 30.3	21.6 ... 30.3	CAY..3- 16...V...+CT 3 K/30.3 A +CT 3 K/30.3 A +CZE	017		
			CT 3	20.8 ... 27.7	20.8 ... 27.7	CAY..3- 16...V...+CT 3/27.7 A +CT 3/27.7 A +CZE	018		
15	18.5	15	CT 3	27.7 ... 39.8	27.7 ... 39.8	CAY..3- 23...V...+CT 3/39.8 A +CT 3/39.8 A +CZE	019	1740	
-	18.5		CT 3	39.8 ... 55.5	27.7 ... 39.8	CAY..3- 30...V...+CT 3/55.5 A +CT 3/55.5 A +CZE	020		
22	25	22	CT 3	39.8 ... 55.5	39.8 ... 55.5	CAY..3- 30...V...+CT 3/55.5 A +CT 3/55.5 A +CZE	021		
<b>Spare contacts:</b> on K 1 1 n/c (21-22) on K 2 1 n/o (13-14) on K 3 1 n/o (13-14), 1 n/c (21-22) with maintained contact control, 1 additional n/o contact (13-14) on contactor K 1M									
30	30	CT 3	55.5 ... 72.5	55.5 ... 72.5	CAY..3-37...V...+CT 3/72.5 A +CT 3/72.5 A +CZE	022	3990		
37	-	CT 3	55.5 ... 72.5	55.5 ... 72.5	CAY..3-43...V...+CT 3/72.5 A +CT 3/72.5 A +CZE	023			
-	37	CT 3	70 ... 90	55.5 ... 72.5	CAY..3-43...V...+CT 3/90 A +CT 3/72.5 A +CZE	024			
45	-	CT 3	70 ... 90	70 ... 90	CAY..3-60...V...+CT 3/90 A +CT 3/90 A +CZE	025	4170		
-	45	CT 3	100 ... 110	70 ... 90	CAY..3-60...V...+CT 3/110 A +CT 3/90 A +CZE	026			
55	-	CT 3	90 ... 104	90 ... 104	CAY..3-60...V...+CT 3/104 A +CT 3/104 A +CZE	027			
-	55	CT 3	110 ... 125	90 ... 104	CAY..3-60...V...+CT 3/125 A +CT 3/104 A +CZE	028			
63	-	CT 3	110 ... 125	110 ... 125 <sup>1)</sup>	CAY..3-72...V...+CT 3/125 A +CT 3/125 A +CZE	029			

**Order No. supplement**

For mechanical interlock between star 1 and delta contactor

For AC control, see page 40

For DC control: CA 3-9 C, CA 3-12 C, CA 3-16 C see p. 18

CA 3-23...CA 3-72 see page 40

**CAY..3-..****M**

030 + 20

...V...

...VDC

...VDC

**Additional auxiliary contacts** see page 38**Dimensions [mm]** see page 32<sup>1)</sup> See page 16 for other setting ranges.<sup>1)</sup> For UL/CSA with thermal overload relay CT 3-63 (see page 20)

# Star-Delta Starter

## CAY 3 + CT 3 + (CT 3)

With Timing Relay

Arrangement  
Order No.  
Index No.  
Dimensions

**Star-delta starter CAY 3 + CT 3**

Contactor combination from 3 contactors, 1 thermal overload relay with main and control wiring

with timing relay KOG 1.5...30 sec. ( $V_c$  max. AC 440 V) or timing relay RZEY 2, 1.5...30 sec. ( $V_c$  max. AC 440 V)

Rated power of motor at 380/415 V AC-3 [kW]	Thermal overload relay Type	setting range [A] F 1	Order No.	Control voltage F 1	Thermal overload relay Timing relay	Index No.	Weight [g] 1 off
with maintained contact control, 1 spare auxiliary contact 1 n/o (13-14) on contactor K 1M							
1,5	CT 3 K	3,1 ... 4,7 <sup>1)</sup>	CAY..3- 9...V...+ CT 3 K/4,7 A +...			001	1475
	CT 3	2,8 ... 4,3 <sup>1)</sup>	CAY..3- 9...V...+ CT 3/4,3 A +...			002	
2,2	CT 3 K	4,7 ... 6,9	CAY..3- 9...V...+ CT 3 K/6,9 A +...			003	
	CT 3	4,3 ... 6,9	CAY..3- 9...V...+ CT 3/6,9 A +...			004	
3 ... 4	CT 3 K	6,9 ... 10,4	CAY..3- 9...V...+ CT 3 K/10,4 A +...			005	
	CT 3	6,6 ... 10,4	CAY..3- 9...V...+ CT 3/10,4 A +...			006	
5,5 ... 7,5	CT 3 K	10,4 ... 15,6	CAY..3- 9...V...+ CT 3 K/15,6 A +...			007	
	CT 3	10,4 ... 16,5	CAY..3- 9...V...+ CT 3/15,6 A +...			008	
10	CT 3 K	15,6 ... 21,6	CAY..3- 12...V...+ CT 3 K/21,6 A +...			009	
	CT 3	14,7 ... 21,7	CAY..3- 12...V...+ CT 3/21,7 A +...			010	
11 ... 15	CT 3 K	21,6 ... 30,3	CAY..3- 16...V...+ CT 3 K/30,3 A +...			011	
	CT 3	20,8 ... 27,7	CAY..3- 16...V...+ CT 3/27,7 A +...			012	
15 ... 18,5	CT 3	27,7 ... 39,8	CAY..3- 23...V...+ CT 3/39,8 A +...			013	1695
22 ... 25	CT 3	39,8 ... 55,5	CAY..3- 30...V...+ CT 3/55,5 A +...			014	

Spare contacts:

on K 1 1 n/c (21-22) on K 2 1 n/o (13-14) on K 3 1 n/o (13-14), 1 n/o (21-22)

with maintained contact control, 1 additional n/o contact (13-14) on contactor K 1M

25	CT 3	43,3 ... 55,5	CAY..3- 37...V...+ CT 3/66,5 A +...	015	3690
30	CT 3	55,5 ... 72,5	CAY..3- 37...V...+ CT 3/72,5 A +...	016	
37	CT 3	55,5 ... 72,5	CAY..3- 43...V...+ CT 3/72,5 A +...	017	
45	CT 3	70 ... 90	CAY..3- 60...V...+ CT 3/90 A +...	018	3870
50	CT 3	90 ... 104	CAY..3- 60...V...+ CT 3/104 A +...	019	
55	CT 3	100 ... 110	CAY..3- 60...V...+ CT 3/110 A +...	020	
63	CT 3	110 ... 125 <sup>2)</sup>	CAY..3- 72...V...+ CT 3/125 A +...	021	

**Order No. supplement**

For mechanical interlock between star 1 and delta contactor

For AC control, see page 40

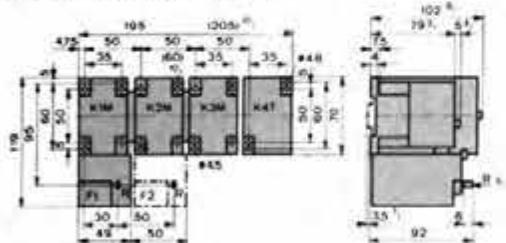
For DC control: CA 3-9 C, CA 3-12 C, CA 3-16 C see p. 18

CA 3-23...CA 3-72 see page 40

For timing relay KOG 1.5...30 sec. ( $V_c$  max. AC 440 V)For timing relay RZEY 2, 1.5...30 sec. ( $V_c$  max. AC 440 V)

Additional auxiliary contacts see page 38

Dimensions [mm] with timing relay RZEY 2

CAY 3- 9 + CT 3 (+ CT 3), CAY 3-12 + CT 3 (+ CT 3)  
CAY 3-16 + CT 3 (+ CT 3)

Arrangement  
Order No.  
Index No.

# Star-Delta Starter CAY 3 + CT 3 + CT 3

With Timing Relay

**Star-delta starter CAY 3 + CT 3 + CT 3**

Contactor combination from 3 contactors, 2 thermal overload relays. With main and control wiring for reduced motor conductor cross section with timing relay KOG 1.5...30 sec. (V<sub>c</sub> max. AC 440 V)  
with timing relay RZEY 2, 1.5...30 sec. (V<sub>c</sub> max. AC 440 V)

**Overload relay settings with CAY 3 + CT 3 + CT 3**

Red cross-sect. area: therm. over. rel. F1 and F2 set to motor current  
Heavy duty starting: Thermal overload relay F1 set to motor current  
Thermal overload relay F2 should not trip with normal motor run-up

Cross-sectional area [kW]	Starting [kW]	Heavy duty thermal overload relays setting range [A]		Order No.	Control voltage	Thermal overload relays		Timing relay	Index No.	Weight [g] 1 off
		Type	F1			F1	F2			
Spare contact on contactor K 3M: 1 n/o (13-14) with maintained contact control, 1 additional n/o contact (13-14) on contactor K 1M										
1.5	1.1	CT 3 K	3.1 ... 4.7	3.1 ... 4.7 <sup>1)</sup>	CAY..3- 9...V...+CT 3 K/4.7 A +CT 3 K/4.7 A +...			001	1630	
		CT 3	2.8 ... 4.3	2.8 ... 4.3 <sup>1)</sup>	CAY..3- 9...V...+CT 3/4.3 A +CT 3/4.3 A +...			002		
-	1.5	CT 3 K	4.7 ... 6.9	3.1 ... 4.7	CAY..3- 9...V...+CT 3 K/6.9 A +CT 3 K/4.7 A +...			003		
		CT 3	4.3 ... 6.9	2.8 ... 4.3	CAY..3- 9...V...+CT 3/6.9 A +CT 3/4.3 A +...			004		
2.2	2.2	CT 3 K	4.7 ... 6.9	4.7 ... 6.9	CAY..3- 9...V...+CT 3 K/6.9 A +CT 3 K/6.9 A +...			005		
		CT 3	4.3 ... 6.9	4.3 ... 6.9	CAY..3- 9...V...+CT 3/6.9 A +CT 3/6.9 A +...			006		
3	4	3	CT 3 K	6.9 ... 10.4	6.9 ... 10.4	CAY..3- 9...V...+CT 3 K/10.4 A +CT 3 K/10.4 A +...		007		
		CT 3	6.6 ... 10.4	6.6 ... 10.4	CAY..3- 9...V...+CT 3/10.4 A +CT 3/10.4 A +...			008		
-	4	CT 3 K	10.4 ... 15.6	6.9 ... 10.4	CAY..3- 9...V...+CT 3 K/15.6 A +CT 3 K/10.4 A +...			009		
		CT 3	10.4 ... 16.5	5.6 ... 10.4	CAY..3- 9...V...+CT 3/16.5 A +CT 3/10.4 A +...			010		
5.5	7.5	5.5	CT 3 K	10.4 ... 15.6	10.4 ... 15.6	CAY..3- 9...V...+CT 3 K/15.6 A +CT 3 K/15.6 A +...		011		
		CT 3	10.4 ... 16.5	10.4 ... 16.5	CAY..3- 9...V...+CT 3/16.5 A +CT 3/16.5 A +...			012		
-	7.5	CT 3 K	15.6 ... 21.6	10.4 ... 15.6	CAY..3- 9...V...+CT 3 K/21.6 A +CT 3 K/15.6 A +...			013		
		CT 3	14.7 ... 21.7	10.4 ... 16.5	CAY..3- 9...V...+CT 3/21.7 A +CT 3/16.5 A +...			014		
10	-	CT 3 K	15.6 ... 21.6	15.6 ... 21.6	CAY..3- 12...V...+CT 3 K/21.6 A +CT 3 K/21.6 A +...			015		
		CT 3	14.7 ... 21.7	14.7 ... 21.7	CAY..3- 12...V...+CT 3/21.7 A +CT 3/21.7 A +...			016		
11	11	CT 3 K	21.6 ... 30.3	21.6 ... 30.3	CAY..3- 16...V...+CT 3 K/30.3 A +CT 3 K/30.3 A +...			017		
		CT 3	20.8 ... 27.7	20.8 ... 27.7	CAY..3- 16...V...+CT 3/27.7 A +CT 3/27.7 A +...			018	1850	
15	18.5	15	CT 3	27.7 ... 39.8	27.7 ... 39.8	CAY..3- 23...V...+CT 3/39.8 A +CT 3/39.8 A +...		019		
-	18.5	CT 3	39.8 ... 55.5	27.7 ... 39.8	CAY..3- 30...V...+CT 3/55.5 A +CT 3/39.8 A +...			020		
22	25	22	CT 3	39.8 ... 55.5	39.8 ... 55.5	CAY..3- 30...V...+CT 3/55.5 A +CT 3/55.5 A +...		021		

## Spare contacts:

on K 1 1 n/c (21-22) on K 2 1 n/o (13-14) on K 3 1 n/o (13-14), 1 n/c (21-22)

with maintained contact control, 1 additional n/o contact (13-14) on contactor K 1M

30	30	CT 3	55.5 ... 72.5	55.5 ... 72.5	CAY..3- 37...V...+CT 3/72.5 A +CT 3/72.5 A +...		022	4090
37	-	CT 3	55.5 ... 72.5	55.5 ... 72.5	CAY..3- 43...V...+CT 3/72.5 A +CT 3/72.5 A +...		023	
-	37	CT 3	70 ... 90	55.5 ... 72.5	CAY..3- 43...V...+CT 3/90 A +CT 3/72.5 A +...		024	
45	-	CT 3	70 ... 90	70 ... 90	CAY..3- 60...V...+CT 3/90 A +CT 3/90 A +...		025	4270
-	45	CT 3	100 ... 110	70 ... 90	CAY..3- 60...V...+CT 3/110 A +CT 3/90 A +...		026	
55	-	CT 3	90 ... 104	90 ... 104	CAY..3- 60...V...+CT 3/104 A +CT 3/104 A +...		027	
-	55	CT 3	110 ... 125	90 ... 104	CAY..3- 60...V...+CT 3/125 A +CT 3/104 A +...		028	
63	-	CT 3	110 ... 125	110 ... 125 <sup>2)</sup>	CAY..3- 72...V...+CT 3/125 A +CT 3/125 A +...		029	

**Order No. supplement:**

For mechanical interlock between star 1 and delta contactor

**CAY..3...****M**

030(+1+20)

For AC control, see page 40

**V...**

For DC control: CA 3- 9 C, CA 3- 12 C, CA 3- 16 C see page 18

**VDC**

CA 3- 23...CA 3- 72 see page 40

**VDC**For timing relay KOG 1.5...30 sec. (V<sub>c</sub> max. AC 440 V)**+KOG** 031For timing relay RZEY 2, 1.5...30 sec. (V<sub>c</sub> max. AC 440 V)**+RZEY** 032**Additional auxiliary contacts see page 38****Dimensions [mm] see page 34**<sup>1)</sup> See page 16 for other setting ranges.<sup>2)</sup> For UL/CSA with thermal overload relay CT 3-63 (see page 20).

Arrangement  
Order No.  
Index No.  
Dimensions

# 1-Phase Active Power Contactors CAH

**1-phase active power contactors CAH complete**  
contactor CA 3 with 2 connection bridges for connecting  
the 3 main current paths in parallel

Arrangement	$I_{th}$ and $I_e$ AC-1 up to 600 V in [A]	Max. rated current of stock-up type [A]	EN ref. contactor	Order No.	Control voltage Auxiliary contact	Index No.	Weight [g] 1 off
<b>Auxiliary contact: 1 n/o (13-14)</b>							
CA 3-9	40	40	40	10	<b>CAH 3-9...V...-10</b>	001	335
CA 3-12	40	40	40	10	<b>CAH 3-12...V...-10</b>	002	
CA 3-16	50	40	50	10	<b>CAH 3-16...V...-10</b>	003	350
CA 3-23	80	75	80	10	<b>CAH 3-23...V...-10</b>	004	500
CA 3-30	100	75	80	10	<b>CAH 3-30...V...-10</b>	005	
<b>Auxiliary contact: 1 n/c (21-22)</b>							
CA 3-9	40	40	40	01	<b>CAH 3-9...V...-01</b>	006	335
CA 3-12	40	40	40	01	<b>CAH 3-12...V...-01</b>	007	
CA 3-16	50	40	50	01	<b>CAH 3-16...V...-01</b>	008	350
CA 3-23	80	75	80	01	<b>CAH 3-23...V...-01</b>	009	500
CA 3-30	100	75	80	01	<b>CAH 3-30...V...-01</b>	010	
<b>Additional auxiliary contacts CA 3-P... see page 17</b>							

Additional auxiliary contacts CA 3-P... see page 17

## Order No. supplement

For AC control, see page 40

For DC control:

CA 3-9 C, CA 3-12 C, CA 3-16 C see page 18

...V<sub>xx</sub>

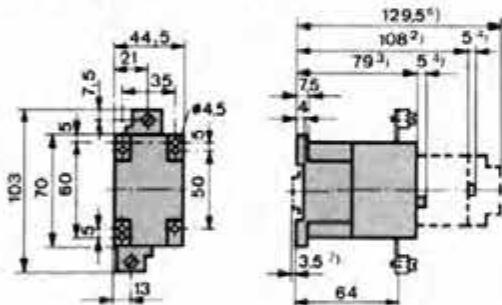
CA 3-23...CA 3-72 see page 40

...V<sub>DC</sub>

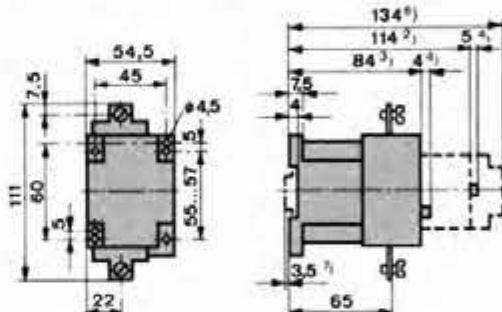
...V<sub>DC</sub>

## Dimensions [mm]

CAH 3-9, CAH 3-12, CAH 3-16



CAH 3-23 and CAH 3-30



\* With auxiliary contact block

† Basic device without adder element

‡ With marking tag carrier

§ With time delayed auxiliary contact

|| Fixing possibility onto mounting rail EN 50 022-35 for CA 3-9...CA 3-30

Arrangement  
Order No.  
Index No.  
Dimensions

## 3-Phase Active Power Contactors CAYH

### 3-phase active power contactors CAYH complete

(For heating in star-delta circuits)

Contactor combination consisting of 3 contactors, main and control wiring, electrical interlock and neutral link.

$I_{th}$  and  $I_o$  AC-1

up to 660 V in [A]

open      enclosed

Max. rated current

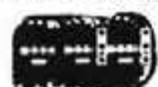
of back-up fuse [A]

Order No.

Index No.

Weight (kg) 1 off

#### For maintained contact control



Spare auxiliary contacts: on contactor K 1, 1 n/o (21-22)

CA 3-9	8,3	14,5	8,3	14,5	25
CA 3-12	8,3	14,5	8,3	14,5	25
CA 3-16	11,7	20,2	9,2	16	35
CA 3-23	16,7	28,9	16,7	29	50
CA 3-30	16,7	28,9	16,7	29	50

CAYH 3-9...V..	001	1050
CAYH 3-12...V..	002	
CAYH 3-16...V..	003	1100
CAYH 3-23...V..	004	1200
CAYH 3-30...V..	005	

Spare auxiliary contacts: on contactor K 1, 1 n/o (21-22)  
1 n/c (13-14)

CA 3-37	26,7	46,1	26	45	80
CA 3-43	26,7	46,1	26	45	80
CA 3-60	41,7	72,1	41,7	72,1	125
CA 3-72	41,7	72,1	41,7	72,1	125

CAYH 3-37...V..	006	3070
CAYH 3-43...V..	007	
CAYH 3-60...V..	008	3350
CAYH 3-72...V..	009	

#### Order No. supplement

For AC control, see page 40

...V..

For DC control:

CA 3-9 C, CA 3-12 C, CA 3-16 C see page 18

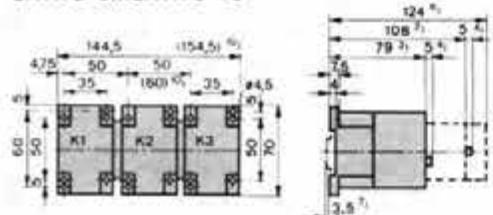
...VDC

CA 3-23...CA 3-72 see page 40

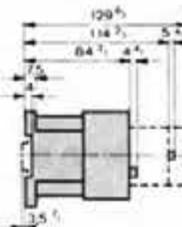
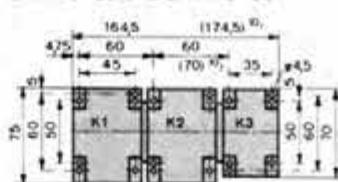
...VDC

#### Dimensions (mm)

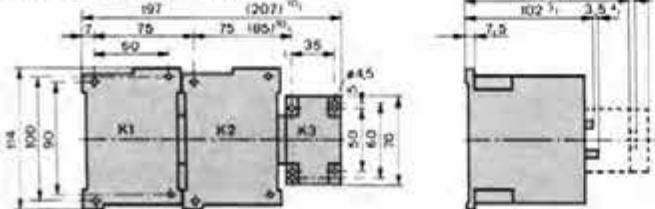
CAYH 3-9...CAYH 3-16



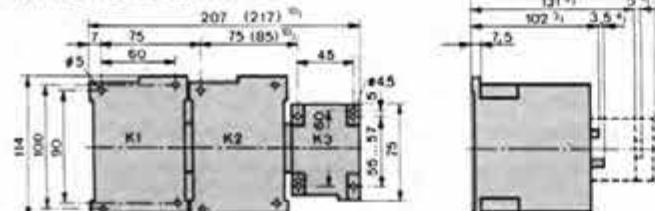
CAYH 3-23 and CAYH 3-30



CAYH 3-37 and CAYH 3-43

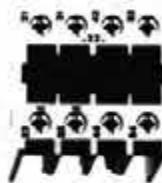
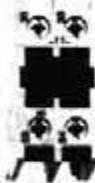


CAYH 3-60 and CAYH 3-72



- ① With auxiliary contact block
- ② Basic device without adder element
- ③ With marking tag carrier
- ④ With time delayed auxiliary contact
- ⑤ Fixing possibility onto mounting rail EN 50 022-35 for CA 3-9...CA 3-30
- ⑥ Dimension H (I) with mechanical interlock

## Additional Auxiliary Contacts for Contactor Combinations

Order No.  
Index No.

## Additional auxiliary contacts

Index Weight [g]  
No. 1 off

## Reversing contactor CAU 3

Reversing starter CAU 3 + CT 3  
For maintained contact controlon contactor K 1 or K 2  
with CAU 3-9...CAU 3-72

1 n/o (23-24)

1 n/c (31-32)

2 n/c (31-32, 41-42)

1 n/o (43-44)

2 n/o (53-54, 63-64)

CA 3-P-H 10 001 + 25  
CA 3-P-S 11 002 + 30  
CA 3-P-S 22 003 + 50

## For impulse contact control

on contactor K 1 or K 2

with CAU 3-9...CAU 3-72

1 n/c (31-32)

with CAU 3-32...CAU 3-72

2 n/c (31-32, 41-42)

1 n/o (43-44)

2 n/o (53-54, 63-64)

CA 3-P-S 11 004 + 30  
CA 3-P-S 22 005 + 50

## For maintained contact control

## with momentary changeover

on contactor K 1 or K 2

with CAU 3-9...CAU 3-72

1 n/c (21-22)

with CAU 3-23...CAU 3-72

2 n/c (21-22, 31-32)

1 n/o (33-34)

2 n/o (43-44, 53-54)

CA 3-P-11 006 + 30  
CA 3-P-22 007 + 50

## Two-step contactor CA II W 3

## Two-step starter CA II W 3 + CT 3 + CT 3

## For maintained contact control

on contactor K 1 or K 2

with CA II W 3-9...CA II W 3-72

1 n/o (23-34)

1 n/c (31-32)

2 n/c (31-32, 41-42)

1 n/o (43-44)

2 n/o (53-54, 63-64)

CA 3-P-H 10 008 + 25  
CA 3-P-S 11 009 + 30  
CA 3-P-S 22 010 + 50

## For impulse contact control

on contactor K 1 or K 2

with CA II W 3-9...CA II W 3-72

1 n/o (23-34)

1 n/c (31-32)

2 n/c (31-32, 41-42)

1 n/o (43-44)

2 n/o (53-54, 63-64)

CA 3-P-H 10 011 + 25  
CA 3-P-S 11 012 + 30  
CA 3-P-S 22 013 + 50

## Two-step starter CA II D 3 + CT 3 + CT 3

## For maintained contact control

on contactor K 1

with CA II D 3-9...CA II D 3-30

1 n/c (21-22)

1 n/o (23-24)

2 n/c (21-22, 31-32)

1 n/o (33-34)

2 n/c (21-22, 31-32)

1 n/c (21-22)

CA 3-P-01 014 + 25  
CA 3-P-H 10 015  
CA 3-P-02 016  
CA 3-P-11 017 + 30  
CA 3-P-22 018 + 50  
CA 3-P-31 019

3 n/o (33-34, 43-44, 53-54)

1 n/o (33-34)

2 n/c (31-32)

1 n/o (43-44)

3 n/o (43-44, 53-54, 63-64)

2 n/o (53-54, 63-64)

1 n/o (43-44, 53-54, 63-64)

CA 3-P-S 01 020 + 25  
CA 3-P-S 10 021  
CA 3-P-S 11 022 + 30  
CA 3-P-S 22 023 + 50  
CA 3-P-S 31 024

on contactor K 2 and/or contactor K 3

with CA II D 3-9...CA II D 3-72

1 n/c (31-32)

1 n/o (33-34)

1 n/c (31-32)

2 n/c (31-32, 41-42)

1 n/o (43-44)

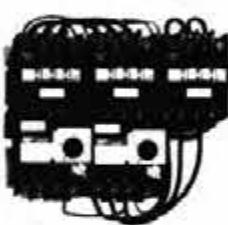
2 n/c (31-32, 41-42)

1 n/o (43-44, 53-54, 63-64)

1 n/o (43-44)

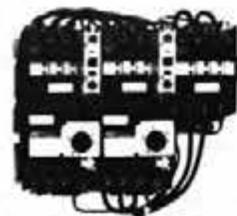
2 n/o (53-54, 63-64)

1 n/o (43-44, 53-54, 63-64)

CA 3-P-S 01 025 + 25  
CA 3-P-S 10 026  
CA 3-P-S 11 027 + 30  
CA 3-P-S 22 028 + 50  
CA 3-P-S 31 029

Order No.  
Index No.

## Additional Auxiliary Contacts for Contactor Combinations

**Additional auxiliary contacts****Two-step starter CA II D 3 + CT 3 + CT 3****For impulse contact control**

on contactor K 1

with CA II D 3-9...CA II D 3-16

2 n/c (21-22, 31-32)

1 n/c (31-32)

with CA II D 3-23...CA II D 3-30

1 n/c (21-22)

2 n/c (21-22, 31-32)

1 n/c (31-32)

with CA II D 3-37...CA II D 3-72

1 n/c (31-32)

2 n/c (31-32, 41-42)

1 n/c (31-32)

with CA II D 3-9...CA II D 3-16

1 n/c (31-32)

with CA II D 3-23...CA II D 3-72

1 n/c (31-32)

2 n/c (31-32, 41-42)

1 n/c (31-32)

with CA II D 3-37...CA II D 3-72

1 n/c (31-32)

2 n/c (31-32, 41-42)

1 n/c (31-32)

with CA II D 3-9...CA II D 3-16

1 n/o (23-24)

on contactor K 2 and/or contactor K 3

with CA II D 3-9...CA II D 3-16

1 n/o (31-32)

with CA II D 3-23...CA II D 3-72

1 n/o (31-32)

2 n/o (53-54, 63-64)

1 n/o (31-32)

with CA II D 3-37...CA II D 3-72

1 n/o (31-32)

2 n/o (53-54, 63-64)

1 n/o (31-32)

with CA II D 3-9...CA II D 3-16

1 n/o (23-24)

on contactor K 2 M

with CAY 3-9...CAY 3-72

1 n/o (31-32)

1 n/o (43-44)

2 n/o (31-32, 41-42)

2 n/o (53-54, 63-64)

on contactor K 3 M

with CAY 3-9...CAY 3-72

1 n/o (21-22)

1 n/c (33-34)

with CAY 3-9...CAY 3-72

1 n/o (31-32)

1 n/o (43-44)

2 n/o (31-32, 41-42)

2 n/o (53-54, 63-64)

1 n/o (31-32)

3 n/o (43-44, 53-54, 63-64)

With time delay relay RZEY 2 or KOG

on contactor K 1 M

with CAY 3-9...CAY 3-30

1 n/c (21-22)

1 n/o (23-24)

2 n/c (21-22, 31-32)

1 n/c (31-32)

1 n/o (43-44)

2 n/o (31-32, 41-42)

2 n/o (53-54, 63-64)

with CAY 3-37...CAY 3-72

1 n/o (23-24)

1 n/c (31-32)

1 n/o (43-44)

2 n/o (31-32, 41-42)

2 n/o (53-54, 63-64)

with CAY 3-37...CAY 3-72

1 n/o (23-24)

1 n/c (31-32)

1 n/o (43-44)

2 n/o (31-32, 41-42)

2 n/o (53-54, 63-64)

1 n/o (31-32)

3 n/o (43-44, 53-54, 63-64)

Order No.

Index No. Weight  
(g) 1 off

<b>CA 3-P-02</b>	<b>001</b>	+ 30
<b>CA 3-P-S 11</b>	<b>002</b>	
<b>CA 3-P-01</b>	<b>003</b>	+ 25
<b>CA 3-P-02</b>	<b>004</b>	+ 30
<b>CA 3-P-S 11</b>	<b>005</b>	
<b>CA 3-P-S 22</b>	<b>006</b>	+ 50
<b>CA 3-P-S 31</b>	<b>007</b>	
<b>CA 3-P-S 11</b>	<b>008</b>	+ 30
<b>CA 3-P-S 22</b>	<b>009</b>	+ 50
<b>CA 3-P-S 31</b>	<b>010</b>	
<b>CA 3-P-S 11</b>	<b>011</b>	+ 30
<b>CA 3-P-S 11</b>	<b>012</b>	
<b>CA 3-P-S 22</b>	<b>013</b>	+ 50
<b>CA 3-P-S 31</b>	<b>014</b>	

**Star-delta starter CAY 3 + CT 3****Star-delta starter CAY 3 + CT 3 + CT 3****With timing element CZE 3**

on contactor K 1 M

with CAY 3-23...CAY 3-72

1 n/o (23-24)

on contactor K 2 M

with CAY 3-9...CAY 3-72

1 n/o (31-32)

1 n/o (43-44)

2 n/o (31-32, 41-42)

2 n/o (53-54, 63-64)

on contactor K 3 M

with CAY 3-9...CAY 3-72

1 n/o (21-22)

1 n/c (33-34)

with CAY 3-9...CAY 3-72

1 n/o (31-32)

1 n/o (43-44)

2 n/o (31-32, 41-42)

2 n/o (53-54, 63-64)

1 n/o (31-32)

3 n/o (43-44, 53-54, 63-64)

<b>CA 3-P-H 10</b>	<b>015</b>	+ 25
<b>CA 3-P-S 11</b>	<b>016</b>	+ 30
<b>CA 3-P-S 22</b>	<b>017</b>	+ 50
<b>CA 3-P-11</b>	<b>018</b>	+ 30
<b>CA 3-P-S 11</b>	<b>019</b>	
<b>CA 3-P-S 22</b>	<b>020</b>	+ 50
<b>CA 3-P-S 31</b>	<b>021</b>	

**With time delay relay RZEY 2 or KOG**

on contactor K 1 M

with CAY 3-9...CAY 3-30

1 n/c (21-22)

1 n/o (23-24)

2 n/c (21-22, 31-32)

1 n/c (31-32)

1 n/o (43-44)

2 n/o (31-32, 41-42)

2 n/o (53-54, 63-64)

with CAY 3-37...CAY 3-72

1 n/o (23-24)

1 n/c (31-32)

1 n/o (43-44)

2 n/o (31-32, 41-42)

2 n/o (53-54, 63-64)

with CAY 3-37...CAY 3-72

1 n/o (23-24)

1 n/c (31-32)

1 n/o (43-44)

2 n/o (31-32, 41-42)

2 n/o (53-54, 63-64)

1 n/o (31-32)

3 n/o (43-44, 53-54, 63-64)

<b>CA 3-P-H 10</b>	<b>022</b>	+ 25
<b>CA 3-P-H 10</b>	<b>023</b>	
<b>CA 3-P-02</b>	<b>024</b>	+ 30
<b>CA 3-P-11</b>	<b>025</b>	
<b>CA 3-P-22</b>	<b>026</b>	+ 50
<b>CA 3-P-H 10</b>	<b>027</b>	+ 25
<b>CA 3-P-11</b>	<b>028</b>	+ 30
<b>CA 3-P-S 22</b>	<b>029</b>	+ 50
<b>CA 3-P-S 31</b>	<b>030</b>	
<b>CA 3-P-H 10</b>	<b>031</b>	+ 25
<b>CA 3-P-S 11</b>	<b>032</b>	+ 30
<b>CA 3-P-S 22</b>	<b>033</b>	+ 50
<b>CA 3-P-H 10</b>	<b>034</b>	+ 25
<b>CA 3-P-11</b>	<b>035</b>	+ 30
<b>CA 3-P-S 22</b>	<b>036</b>	+ 50
<b>CA 3-P-S 31</b>	<b>037</b>	



# Control Voltage

Alternating and Direct Current Control

Arrangement  
Order No.  
Index No.

Arrangement	Order No.	Index No.
<b>Order No. addition for AC control</b>	<b>CA..3...-...V...</b>	
Possible control voltage:	Min. 12 V, 50Hz/14 V, 60Hz	
	Max. 550 V, 50Hz/630 V, 60Hz	
<b>Normal control voltages</b>		
24 V, 50 Hz/ 28 V, 60 Hz		
32 V, 50 Hz/ 37 V, 60 Hz		
110 V, 50 Hz/127 V, 60 Hz		
240 V, 50 Hz/277 V, 60 Hz		
415 V, 50 Hz/480 V, 60 Hz		
440 V, 50 Hz/508 V, 60 Hz		
For CS 3, CA 3-9, CA 3-12, CA 3-16	...V...	-
CA 3-23, CA 3-30	...V...	-
CA 3-37, CA 3-43	...V...	-
CA 3-60, CA 3-72	...V...	-
Reset magnet CMR 3	...V...	-
Latch CV 3	...V...	-
<b>Special control voltages</b>		
For contactor CA 3	...V...	001 (+)
For reset magnet CMR 3	...V...	002 (+)
For latch CV 3	...V...	003 (+)
Indicate rated control voltage at 50 Hz or rated control voltage at 60 Hz	...V50 ...V60	
<b>Order No. addition for DC control</b>		
Possible control voltages: Min. DC 12 V max. DC 250 V		
<b>Normal control voltages</b>		
DC 12 V	DC 11... 14 V	
DC 24 V	DC 22... 28 V	
DC 48 V	DC 44... 55 V	
DC 110 V	DC 110...140 V	
DC 220 V	DC 220...280 V	
For CS 3 C, CA 3-9 C, CA 3-12 C, CA 3-16 C (with DC magnet system)	...VDC	-
For CA 3-23, CA 3-30 up to DC 110 V (incl. auxiliary contact L01 and connections)	...VDC	004 (+)
> DC 110 V (incl. Varistor) <sup>2)</sup>	...VDC	005 (+)
For CA 3-37, CA 3-43 <sup>1)</sup> incl. aux. contact L01 and connections	...VDC	006 (+)
For CA 3-60, CA 3-72 <sup>1)</sup> incl. aux. contact L01 and connections	...VDC	007 (+)
For reset magnet CMR 3	...VDC	-
For latch CV 3	...VDC	-
<b>Special control voltages</b>		
For CS 3 C, CA 3-9 C, CA 3-12 C, CA 3-16 C (with DC magnet system see page 33)	...VDC	008 (+)
For CA 3-23, CA 3-30 up to DC 110 V (incl. aux. contact L01 and connections)	...VDC	009 (+)
> DC 110 V (incl. varistor) <sup>2)</sup>	...VDC	010 (+)
For CA 3-37, CA 3-43 <sup>1)</sup> , coil with integral diode, incl. aux. contact L01 and connections	...VDC	011 (+)
For CA 3-60, CA 3-72 <sup>1)</sup> , coil with integral diode, incl. aux. contact L01 and connections	...VDC	012 (+)
For reset magnet CLMR 3	...VDC	013 (+)
For latch CV 3	...VDC	014 (+)
<b>Contactors with Latch CV 3 for DC control</b>		
CS 3, CA 3-9...CA 3-72		
are to be ordered with AC operating mechanism and AC coil (same voltage 50 Hz), e.g. contactor equipped with CV 3; closing control voltage DC 220 V		
contactor CA 3-12-220 V 50		

<sup>1)</sup> 1 auxiliary contact used<sup>2)</sup> Necessary for coil protection, also limitation of overvoltages (spikes) when switching off

# Auxiliary Contactor CS 3

## Contactors CA 3

## Technical information

**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

Rated insulation voltage  $U_r$  according to:

IEC, AS, BS, SEV, BDE, 0660	V 660
UL, NEMA, CSA, EEMAC	V 600
Test voltage, 1 minute	V 3000
Max. supply voltage	n· $U_r$ 1,1

## Min. pull-up voltage

CS 3 (8 n/o ... 4 n/o/4 n/c)

CA 3-9...CA 3-16

AC and DC voltage

n· $U_r$  0,8

Remaining AC and DC voltage

n· $U_r$  0,85

## Dropout voltage

AC voltage

n· $U_r$  0,35...0,65

DC voltage

n· $U_r$  0,1...0,25

## Ambient temperature

Storage/transport

-25°C...+80°C

Operation AC-1 encapsulated AC-2...AC-4

25°C...60°C

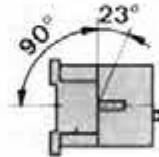
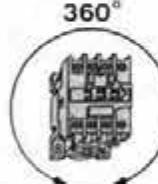
with rated operating current

+70°C

with 85% rated operating current

+40°C

AC-1 open

Mounting position:  
with no performance data limitations**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 fulfill 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.



SEV

Switzerland



CSA

Canada



UL listed

U.S.A.



UL recognized

U.S.A.



Electrical inspectorate Finland



DEMKO

Denmark



NEMKO

Norway



SEMKO

Sweden

West Germany  
Lloyd  
BROLloyd's Reg.  
of Shipping  
UK

RINA

Italy

Bureau  
Veritas

France

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

AS 1023, 1029, 1202

Australia

BS 4941, 5424

Great Britain

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

Italy

VDE 0660

Germany

UTE NF C 63 110

France

SEV 1025

Switzerland

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 approval for use on ships by Bureau Veritas, Lloyds of Germany and Registro Italiano Navale (nominal values in accordance with IEC); U.S.A. Marine and Lloyds Register of Shipping (nominal values as per CSA) and UL Marine (nominal values as per UL).

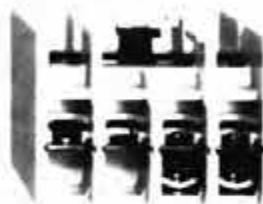
# Control Relay CS 3

## Contactors CA 3

Technical Information

**Open terminals**

The terminals are opened at the factory in order to save an operation. Unused open terminals are seated firmly in the unit and cannot fall out. The universal slot screws can be tightened with conventional or cross slot screwdrivers. Guides simplify the insertion of machine screws.

**Limit stop**

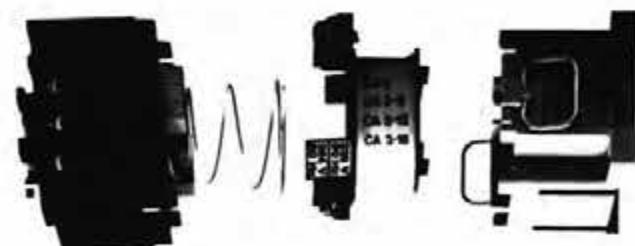
Widely opened terminals permit trouble-free conductor insertion. A limit stop prevents the contactor from being pushed into the contact space when connecting.

**Touch protection**

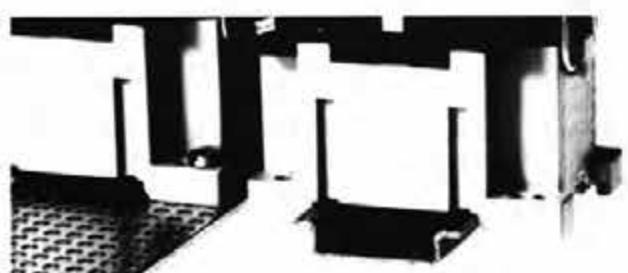
The live parts of the unit are protected against accidental touching and correspond to specification VBG 4.



	Finger protected	Back of hand protected
<b>Contactors</b>		
CS 3 (C), CA 3-9 (C)...CA 3-30	●	●
CA 3-37...CA 3-72 (without cover)		●
with cover (see page 22)	●	●
<b>Auxiliary contact blocks, accessories</b>		
CS 3-P..., CA 3-P...	●	●
CV 3, CZE 3, CZA 3	●	●
<b>Thermal overload relays</b>		
CT 3 K-12, CT 3 K-17	●	●
CT 3-12...CT 3-72	●	●

**Rapid coil change**

Special coil voltages are often required with export orders which necessitate a subsequent modification to the contactor. The contactor coils of contactors up to CA 3-30 can be changed in a few seconds without the need of tools. Two screws need to be loosened with the CA 3-43...CA 3-72 contactors.

**Mounting**

Numerous possibilities on base plates or perforated plates with 5 mm grid.  
Integrated snap fitting onto mounting rail EN 50 022-35 to CA 3-30.  
Restraint against sideways movement during operation.

# Control Relay CS 3

## Contactors CA 3

## Starter CA 3 + CT 3

## Technical Information



## To international standards

Terminal markings, number and type of auxiliary contacts as well as fixing dimensions comply with the European Standard.

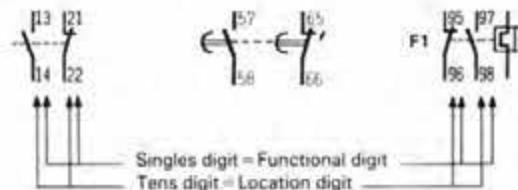
## European Standards

In the European Standard EN 50 005, CENELEC (the European Committee for Electro-Technical Standards) has laid down uniform terminal markings and references for industrial low voltage switchgear.

## Main contacts for contactors and starters

The main contact terminal are designated with single digit numbers.

Non-delayed auxiliary contact elements      Delayed auxiliary contact elements      Overload protection device auxiliary contact elements

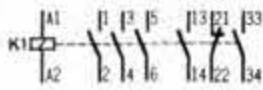


## Auxiliary contacts for contactors and starters

Auxiliary contacts are designated with two digit numbers. The two terminals of a contact always display the same location digit.

Example:  
Contactor CA 3-12-21

Reference numbers



Reference  
Contactors

The number and type of auxiliary contacts is given with a reference:

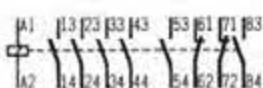
First digit: number of n/o contacts

Second digit: number of n/c contacts

The European Standard EN 50 012 also specifies the terminal markings of n/o and n/c contacts of each reference for contactors having up to 5 auxiliary contacts.

Example:  
Control relay CS 3-62-E

Reference numbers



## Control relays

On control relays complying with the European Standard EN 50 011, the reference can be extended by a reference letter.

The reference letters E and Y refer to preferred arrangements through which the location of the contacts and terminal markings are clearly specified. The arrangement digit is also the location digit.

The CS 3 control relay arrangements shown in this catalogue at the present time having references with no reference letters, correspond to the contact arrangement most often used. The terminal markings comply with EN 50 005.

## CS 3, CA 3-9, CA 3-12, CA 3-16

Further possibilities

35 x 50



34 x 48



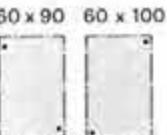
## CA 3-23/3-30

Further possibilities

45 x 50



57



60 x 100

## Drilling plan

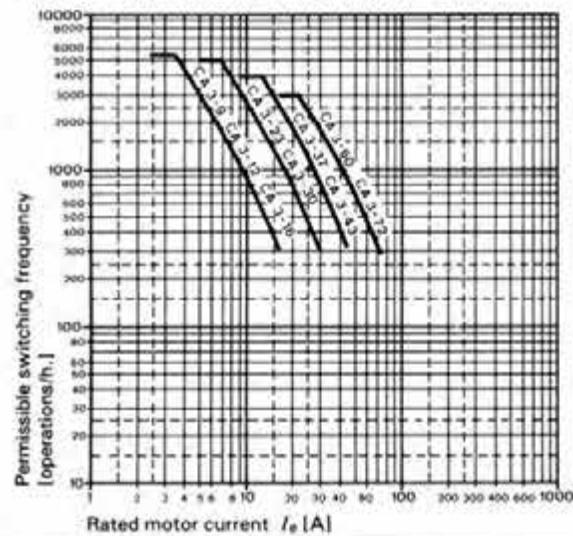
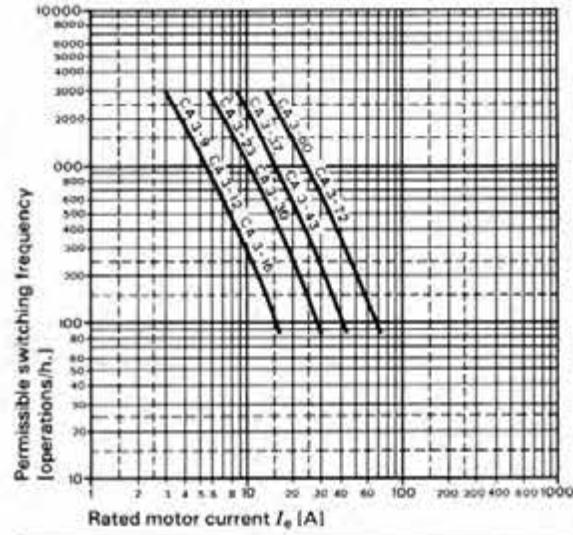
Two of the fixing holes conform to the preferred vertical distance between holes of 50 mm complying with EN 50 002/EN 50 003. The horizontal distance between fixing holes on the CS 3 control relay and the CA 3-9...CA 3-16 contactors conforms with the widely used measurement of 35 mm. Further holes permit the use of other frequently used drilling plans.

# Contactor CA 3

Technical Information

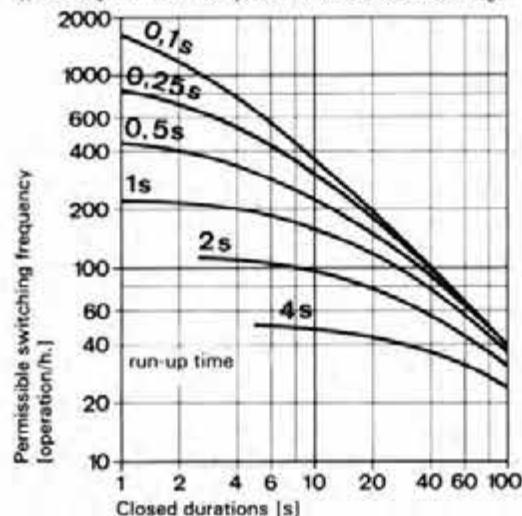
## Permissible contactor switching frequency

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

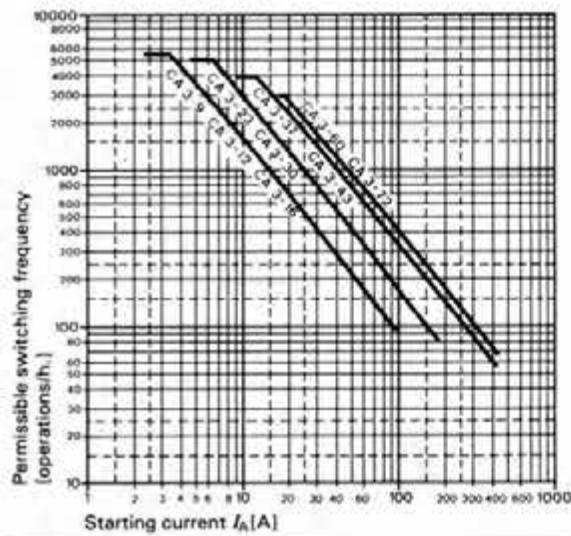
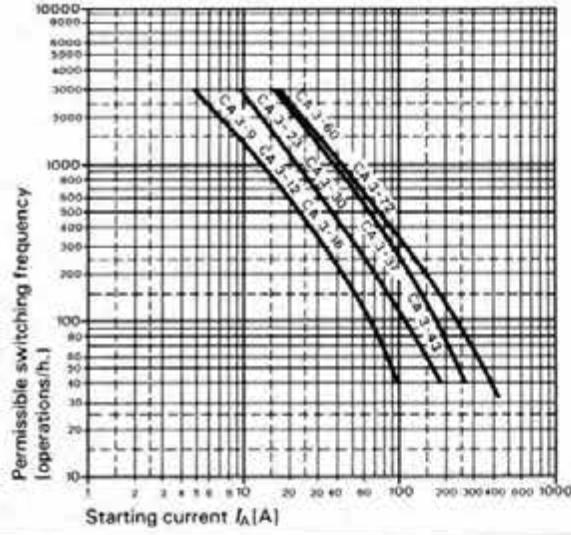
run-up time  $t_A = 1$  s

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

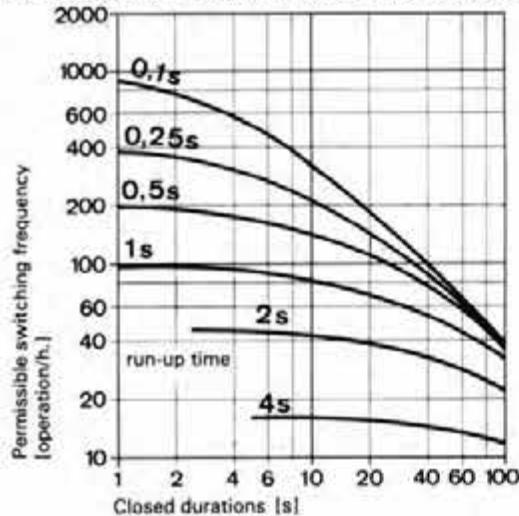
**Starting current  $I_A = 4 I_e$**   
e.g. direct-on-line starting of IEC standard motors up to 0.75 kW  
 $I_A = 2.3 I_e$  with CTY relay, with the star-delta starting)



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

duty cycle  $t_{ED} = 1$  s ( $< t_A < t_A$ )

**Starting current  $I_A = 6 I_e$**   
e.g. direct-on-line starting of IEC standard motors larger than 1.1 kW  
 $I_A = 3.5 I_e$  with CTY relay, with increased star-delta starting)



## Technical Information

## Contactor CA 3

## Electrical life

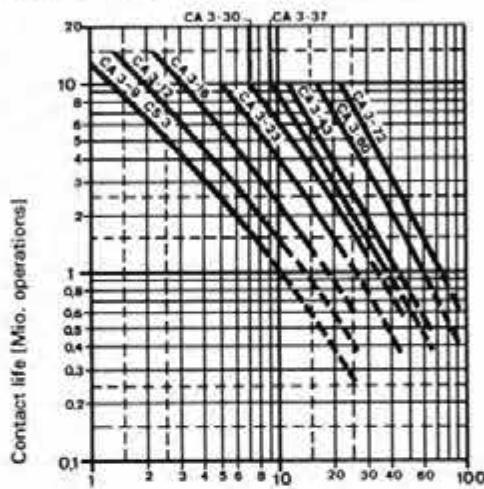
The diagrams below are valid for the operating conditions of the duty classifications AC-1...AC-4 at 380/415 V, 50/60 Hz defined in IEC 158-1.

$I_e$  Rated operational current       $U_e$  Rated operational voltage  
 $I_m$  Making current       $U$  Voltage before make  
 $I_c$  Breaking current       $U_r$  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).

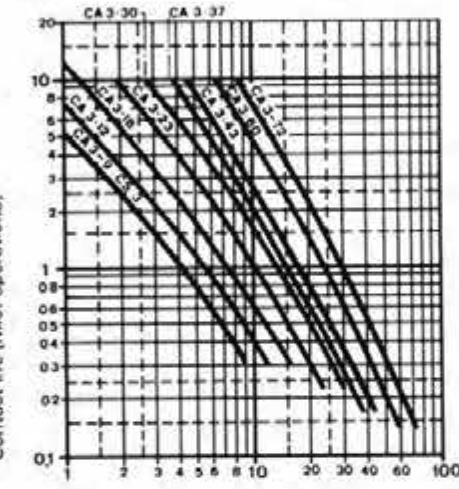
Duty Classification	Make $I/I_e$	Breaker $I_c/I_e$	Make $U/U_e$	Breaker $U_r/U_e$	cos $\phi$	cos $\phi$	
AC-1	1	1	0,95	1	1	0,95	
AC-2	2,5	1	0,65	1	0,4	0,65	
AC-2	2,5	1	0,65	2,5	1	0,65	
AC-3	$I_e \leq 17\text{ A}$	6	1	0,65	1	0,17	0,65
AC-3	$I_e > 17\text{ A}$	6	1	0,35	1	0,17	0,35
AC-4	$I_e \leq 17\text{ A}$	6	1	0,65	6	1	0,65
AC-4	$I_e > 17\text{ A}$	6	1	0,35	6	1	0,35

AC-1 Non, or lightly inductive loads, resistance furnaces  
 AC-3 Interruption of running squirrel cage motors  
 AC'-2 Interruption of running slip motors



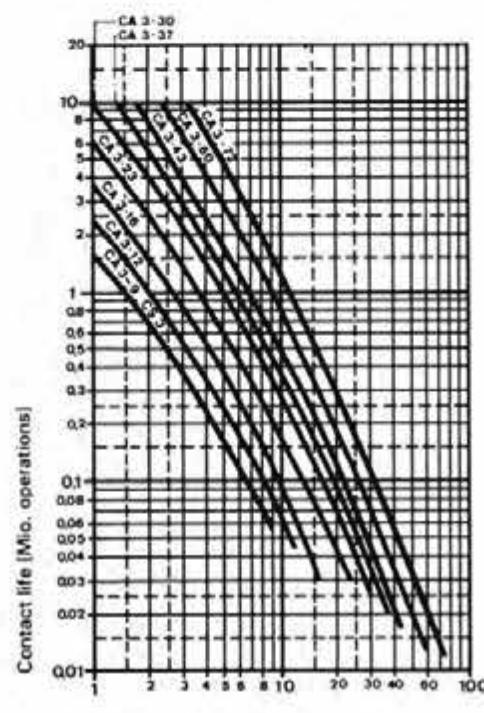
Rated operating current  $I_e$  AC-1,  $I_e$  AC-3,  $I_e$  AC'-2 [A]  
 (Curves ---- only for AC-1 enclosure)

AC-2 Inching (jogging) of slip-ring motors



Rated operating current  $I_e$  AC-2 [A]

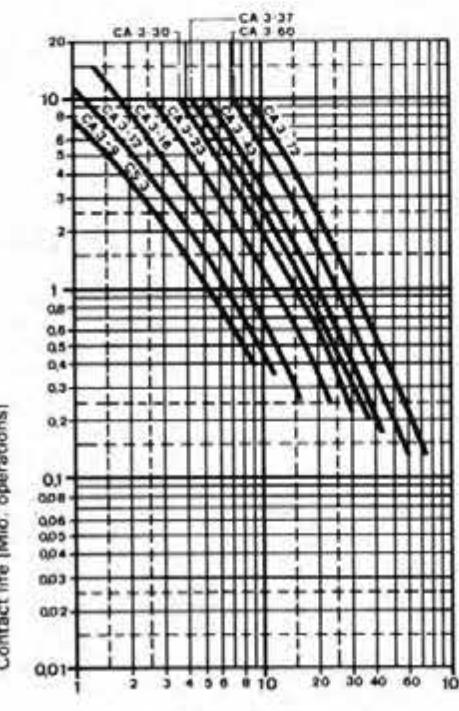
AC-4 Inching (jogging) of squirrel cage motors



Rated operating current  $I_e$  AC-4 [A]

Mixed duty with squirrel cage motors

AC-3 90% Interruption of running squirrel cage motors  
 AC-4 10% Inching (jogging)



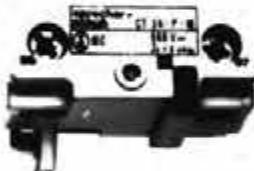
Rated operating current  $I_e$  [A]

# Thermal Overload Relay CT 3 K

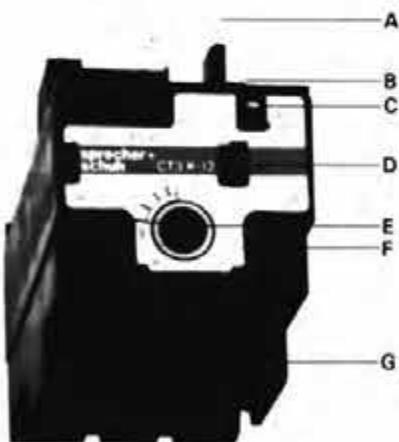
Technical Information



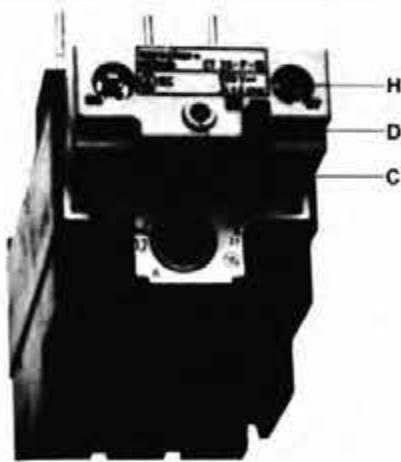
Contactor with CT 3 K thermal overload relay attached



CT 3 K-P-10 auxiliary contact block pluggable onto thermal overload relay as an isolated auxiliary contact



CT 3 K thermal overload relay



With plugged on auxiliary contact block

- A Electrical connection/mechanical attachment pins for direct attachment to contactors CA 3-9 (C), CA 3-12 (C), CA 3-16 (C)
- B Built-in wire connection from triggering contact (95) to coil (82). Can be removed if required.
- C Switch setting indicator (thermal overload relay ready for operation or tripped)
- D Raed O/R button: an integral off button for test tripping and resetting
- E Direct start current adjustment scale with setting knob
- F Auxiliary scale for adjusting current for star delta starting
- G Front mounted trigger contact connections
- H Signal contact connections

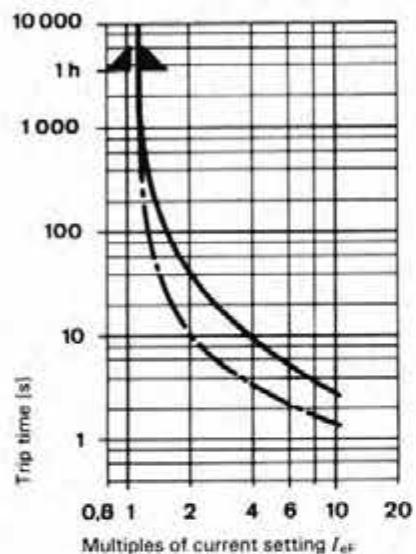
## Technical Information

## Thermal Overload Relay CT 3 K

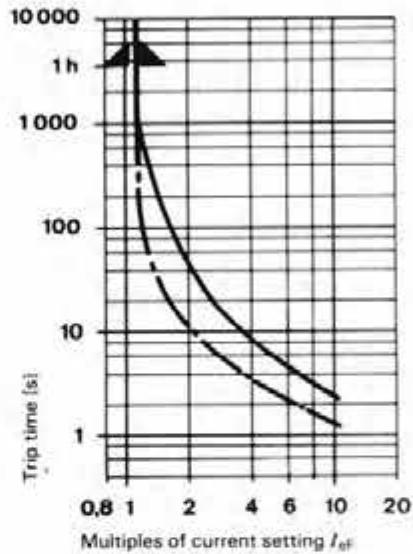
Time/current characteristics of thermal overload relay  
(thermally delayed overload relay)

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

CT 3 K-12, 0,1...4 A



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



## Coordination with short-circuit protection

Setting range		For fitting to contactor coordination type CA... *a*      *c*	Max. current rating of backup fuse in (A) <sup>1)</sup>	
Direct on-line starting	Star-delta starting		*a*	*c*
<b>CT 3 K-12<sup>2)</sup></b>				
0,1 ... 0,15 A <sup>4)</sup>	0,17 ... 0,26 A <sup>4)</sup>	3-9 (C)	25	0,63 <sup>2)</sup>
0,15 ... 0,23 A <sup>4)</sup>	0,26 ... 0,40 A <sup>4)</sup>	3-12 (C)	25	1 <sup>2)</sup>
0,23 ... 0,35 A <sup>4)</sup>	0,40 ... 0,61 A <sup>4)</sup>	3-16 (C)	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 ... 9 A	10,40 ... 15,60 A		25	20
9 ... 12,50 A	15,60 ... 21,60 A	12(C), 16(C) 40 <sup>3)</sup>	25	

CT 3 K-17 <sup>3)</sup>		3-18 (C) 40 <sup>3)</sup>	36
12,5 ... 17,5 A	21,6 ... 30,3 A	3-23 40 <sup>3)</sup>	40 <sup>3)</sup>
		3-30 40 <sup>3)</sup>	40 <sup>3)</sup>

## Installation and current settings

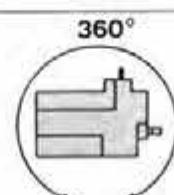
- Mounted on vertical surface, any orientation: setting current  $I_{eF}$  = rated operating current  $I_e$  of motor.
- Mounted on horizontal surface with scale facing up: setting current  $I_{eF} = 0,91 I_e$ .

<sup>1)</sup> Aux. contacts: short-circuit protection without contact welding, in accordance with IEC 337-1 B.

## Contactor with thermal overload relay:

- short circuit coordination type «a» according to IEC 292-1 A, contact welding or open-circuit on thermal overload relay possible at high shorting currents.
- short circuit coordination type «c» according to IEC 292-1 A, easily defeated contact welding possible. Thermal overload relay time/current characteristic remains unchanged, no other damage.

Main and control circuit	Rated insulation voltage	IEC	AC	660 V
Auxiliary contacts	Overload relay	CSA/UL	AC	600 V
	CT 3 K		CT 3 K-P-10	
	Tripping cont.		Signal contact	
Rated thermal current	4 A		4 A	
AC 11 at 220 V	3 A		3 A	
AC 11 at 380 V	1,6 A		1,6 A	
Back-up fuse <sup>4)</sup>	10 A		6 A	
Connections	Main connections	mm <sup>2</sup>	2 x 4	
	Control circuit	mm <sup>2</sup>	2 x 2,5	
Contacts	Terminal markings in accordance with EN 50 005			
	F1	[95] C C C [96]	[2 4 5]	



Low voltage and HRC fuses in accordance with IEC 269-2 and -3, gl, gli; VDE 0636/2 and /3, gl; SEV 1010, T; SEV 1018, T 2; SEV 1066, GI; e.g. S + S types SM and SN 2, GEC English Electric types 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  $I_e$ ) for fast acting screw-type fuses (D). Backup fuses in function of unaffected mains short-circuit current and welding protection available on request.

<sup>2)</sup> Not admissible according to SEV-HV

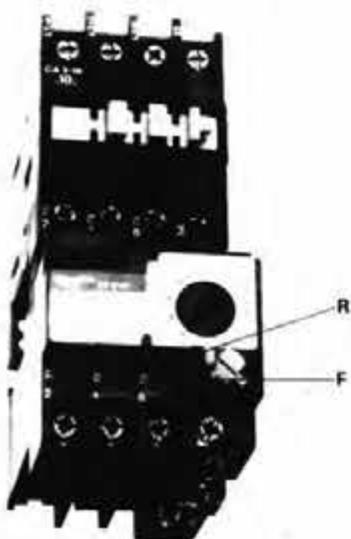
<sup>3)</sup> Max. 36 A according to SEMKO, DEMKO, NEMKO, Finland

<sup>4)</sup> Not approved by CSA, UL, DEMKO, Finland

<sup>5)</sup> According to DEMKO being tested

# Thermal Overload Relay CT 3

Technical Information



CA 3-16 contactor with CT 3-16 thermal overload relay attached



CA 3-12 thermal overload relay with reset magnet



Base for separate mounting

## Thermal overload relay for universal application

Thermal overload relays with special characteristics and additional equipment are required for specific applications: differential tripping, selectable automatic reset, attachable accessories such as reset rod, reset magnet and base for separate mounting.

The CT 3 thermal overload relays fulfill all these requirements. When necessary, they are used in place of the CT 3 K thermal overload relays up to 12.5 A. Above this value, all thermal overload relays are of the universally useable type CT 3.

## Differential tripping for motor protection in the event of phase failure

Differential tripping must be provided for motor rated above 7.5 kW for reliable motor protection. This results in accelerated tripping in the even of a phase failure.

Motors rated below 7.5 kW are reliably protected by the CT 3 thermal overload relay (without differential tripping). The more complex CT 3 thermal overload relays should be used only when «has differential triggering», «special thermal overload relay sensitive to phase failure» or «accelerated tripping in the event of phase failure» are expressly requested.

## Top-quality trip action

The CT 3 thermal overload relays are also subjected to a protracted limiting current calibration. Every thermal overload relay is individually calibrated for the lowest and highest current. The accurate time/current characteristic curve obtained in this manner guarantees reliable motor protection for the user who needs only check for correct wiring and adjustment.

The CT 3 thermal overload relays possess high tripping accuracy and constancy. Tripping is in no way dependent on the installation location, the mounting position or the ambient temperature.

## Completely equipped

- Function selection knob for the manual or automatic selection reset mode
- Third setting for test tripping with reset button
- Slider for checking the snap-action contact manually
- 3 labelling options: self-adhesive paper labels, paper tags or clip-on tags
- Integrated signal contact

## Operational selector-setting knob (F)

Set to required operation	test	man.	auto.
Automatic reset	No	No	Yes
Depressing button (R) gives rise to	Relay reset	Yes	Yes
	Contactor switch-off	Yes	No

## Isolated signal contact

The integral signal contact (n/o) is isolated from the tripping contact (n/c). This permits the selection of trip signal voltage other than that of the control voltage.

## Simple module system

- Can be directly attached to a number of contactors
- Base for separate mounting with input terminals and integrated snap-action attachment for EN 50 022-35 cap rails
- Attachable reset rod for reset button extention
- Attachable reset magnet for remote reset

## Technical Data

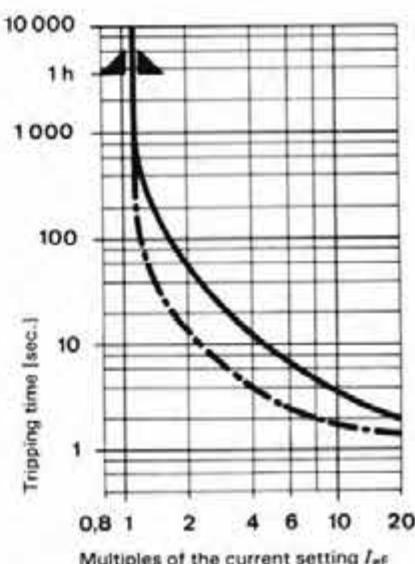
## Thermal Overload Relay CT 3

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

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

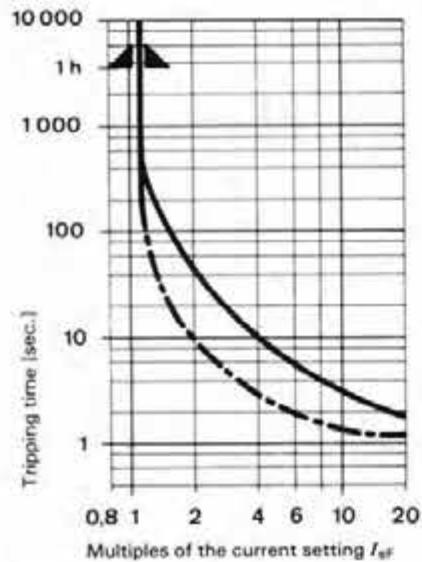
Mean value of tolerance bands, heated in three phases. Curves — from cold state, curves - - - in operationally warm state (loaded with the set current). Tolerance: tripping time  $\pm 20\%$  or current  $\pm 10\%$ .

**Two-phase loading (single phase failure)**  
Trip limiting current approx. 85% of the 3-phase trip limiting current

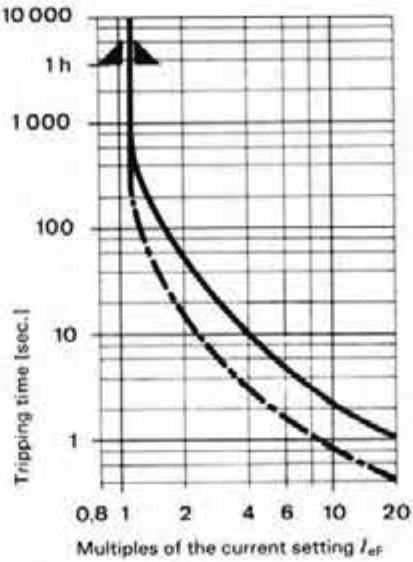


Specified points from the cold state in compliance  
with SEV-Publication no. 138 (quality sign)

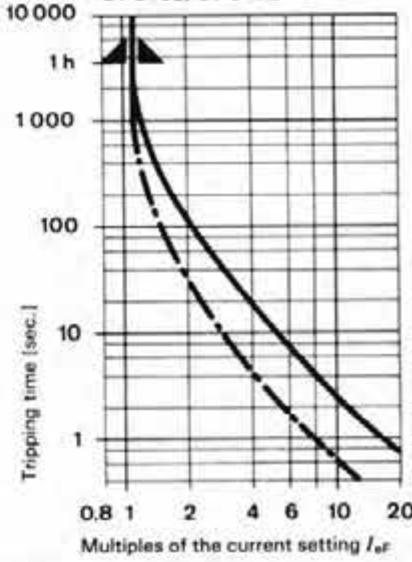
CT 3-12, 6...9.5 A, 8.5...12.5 A



CT 3-16, CT 3-23, CT 3-32



CT 3-42, CT 3-52, CT 3-60, CT 3-64  
CT 3-68, CT 3-72



Setting range		For fitting	Max. rated current of back-up fuse in [A] <sup>1)</sup>	
Direct-on-line starting	Star-delta starting	to contactor co-ordination type CA...	<sup>&lt;C&gt;</sup>	<sup>&lt;C&gt;</sup>
<b>CT 3-12</b>				
0.1 ... 0.16 A <sup>4)</sup>	0.17...0.28 A	9 (C)	25	0.63 <sup>2)</sup>
0.15...0.24 A <sup>4)</sup>	0.26...0.42 A	12 (C)	25	1
0.24...0.38 A <sup>4)</sup>	0.42...0.66 A	16 (C)	25	2
0.38...0.62 A	0.66...1.07 A	25	25	2
0.62...1 A	1.07...1.7 A	25	25	4
1 ... 1.6 A	1.7 ... 2.8 A	25	25	4
1.6 ... 2.5 A	2.8 ... 4.3 A	25	25	6
2.5 ... 4 A	4.3 ... 6.9 A	25	25	10
3.8 ... 6 A	6.6 ... 10.4 A	25	25	20
6 ... 9.5 A	10.4 ... 16.5 A	25	25	25
8.5 ... 12.5 A	14.7 ... 21.7 A	12 (C), 16 (C) 40	25	
<b>CT 3-16</b>				
12 ... 16 A	20.8 ... 27.7 A	16 (C) 40	40 <sup>3)</sup>	
		23	40 <sup>3)</sup>	
		30	40	
<b>CT 3-23</b>				
16 ... 23 A	27.7 ... 39.8 A	23	50	
		30	50	
<b>CT 3-32</b>				
23 ... 32 A <sup>4)</sup>	39.8 ... 55.5 A	30	50	

Setting range		For fitting	Max. rated current of back-up fuse in [A] <sup>1)</sup>	
Direct-on-line starting	Star-delta starting	to contactor co-ordination type CA...	<sup>&lt;C&gt;</sup>	<sup>&lt;C&gt;</sup>
<b>CT 3-42</b>				
25 ... 32 A	43.3 ... 55.5 A	37, 43, 60, 72	80	
32 ... 42 A	55.5 ... 72.5 A	37, 43, 60, 72	100	
<b>CT 3-52</b>				
40 ... 52 A	70 ... 90 A	43, 60, 72	125	
<b>CT 3-60</b>				
52 ... 60 A	90 ... 104 A	60, 72	125	
<b>CT 3-64</b>				
58 ... 64 A	100 ... 110 A	60, 72	125	
<b>CT 3-68</b>				
64 ... 68 A	110 ... 118 A	72	125	
<b>CT 3-72 A<sup>4)</sup></b>				
64 ... 72.5 A	110 ... 125 A	72	125	

Mounting position: any

Current adjustment:

adjustment current  $I_{ref}$  = rated current motor  $I_e$

Certification in accordance with PTB

The CT 3-12 and CT 3-16 thermal overload relays are suitable for the protection of explosion-proof motors and can be used for electrical installations in hazardous locations as specified by VDE 0660/8.69 and VDE 0165/6.80.

Foot notes see page 47

# Additional Elements

## Switching Capacity of Auxiliary Contacts

Technical Information

**CS 3 control relay and CA 3 contactor with CV 3 mechanical latch**


Pick-up power AC	same as for contactor without CV	(see pages 8...12)
CS 3, CA 3-9...CA 3-16	W	85
CA 3-23...CA 3-30	W	130
CA 3-37...CA 3-72	W	on request
Pick-up voltage (on signal)		min./max.
CS 3, CA 3-9...CA 3-16	n · U <sub>s</sub>	0,80...1,1
CA 3-23...CA 3-30	n · U <sub>s</sub>	0,85...1,1
CA 3-37...CA 3-72	n · U <sub>s</sub>	0,85...1,1
Control voltage		AC/DC
Signal duration (on signal) max./min.	s	0,05 0,15-15
Switching frequency with 50 ms signal duration	Act./hr	3000 600
at 15 s signal duration	Act./hr	240 30
Switching delay (contacts on contactor)		
on signal	ms	10...25
off signal	ms	14...10

**Timing elements CZE 3, CZA 3**


Mechanical service life	mill. of act.	5
Repeatability of set value and 1 mill. actuations under constant ambient conditions		
Adjustment range	s	0,3...30 ± 6%
	s	1,8...180 ± 10%
Under changing ambient temperature conditions	per 1 K	0,5%

**CV 3 mechanical latch**


Mechanical service life	mill. of act.	3
Pick-up power (off signal)	AC VA (W)	45 (40)
	DC W	25
Pick-up voltage (off signal)	min./max.	n · U <sub>s</sub> 0,6...1,1
Signal duration (off signal)	min./max.	s 0,03...15
Switching frequency	30 ms signal duration	Act./hr 3000
	15 s signal duration	Act./hr 30
Switching delay (contacts 57, 58, 65...68)		
on signal	ms	24...45
off signal	ms	6...10

**CMR 3 reset magnet**


Pick-up power	AC	VA (W)	90 (80)
	DC	W	30
Pick-up voltage	min./max.	n · U <sub>s</sub>	0,85...1,1
Signal duration	min./max.	s	0,03...10

Operate in series only with early make/late break

**CA 3-P-Z time-delayed auxiliary contact blocks**


Mechanical service life	mill. of act.	5
Delay ON	approx.	ms 40
OFF	approx.	ms 40

**RC voltage limiter links**


For alternating current	RC link	CRC-3	
	Surge factor	n = U <sub>max</sub> / U <sub>n</sub>	1 ... 2
For direct current	Diode link	CRD-3	
	Voltage limitation	n	0,2...0,8
	Switch-off delay		
CS 3 C, CA 3-9 C			
CA 3-12 C, CA 3-16 C		ms	60...100
CA 3-23, CA 3-30			
CA 3-37, CA 3-43			
CA 3-60, CA 3-72		ms	30...40
Varistor link CRV-3			
Voltage limitation		n	1,2...2,5

**Switching capacity of auxiliary contacts (auxiliary contact blocks timing elements, mechanical latch, thermal overload relays)**

Auxiliary contacts of	max. permissible $I_{th}$ en-	Switching of AC solenoids
	back-up fuse caps.	
Auxiliary contact blocks (aux. cont. on contactor, s.p. 8...12)	[A]	[A]
Timing elements CZ..3	12	12
Mechanical latch CV 3		
Auxiliary contact block, time-delayed CA 3-P-Z	10	6
Thermal overload relays CT 3, CT 3 K, cont. 95-96	10	4
cont. 97-98	6	4

**Notes**

# sprecher+schuh

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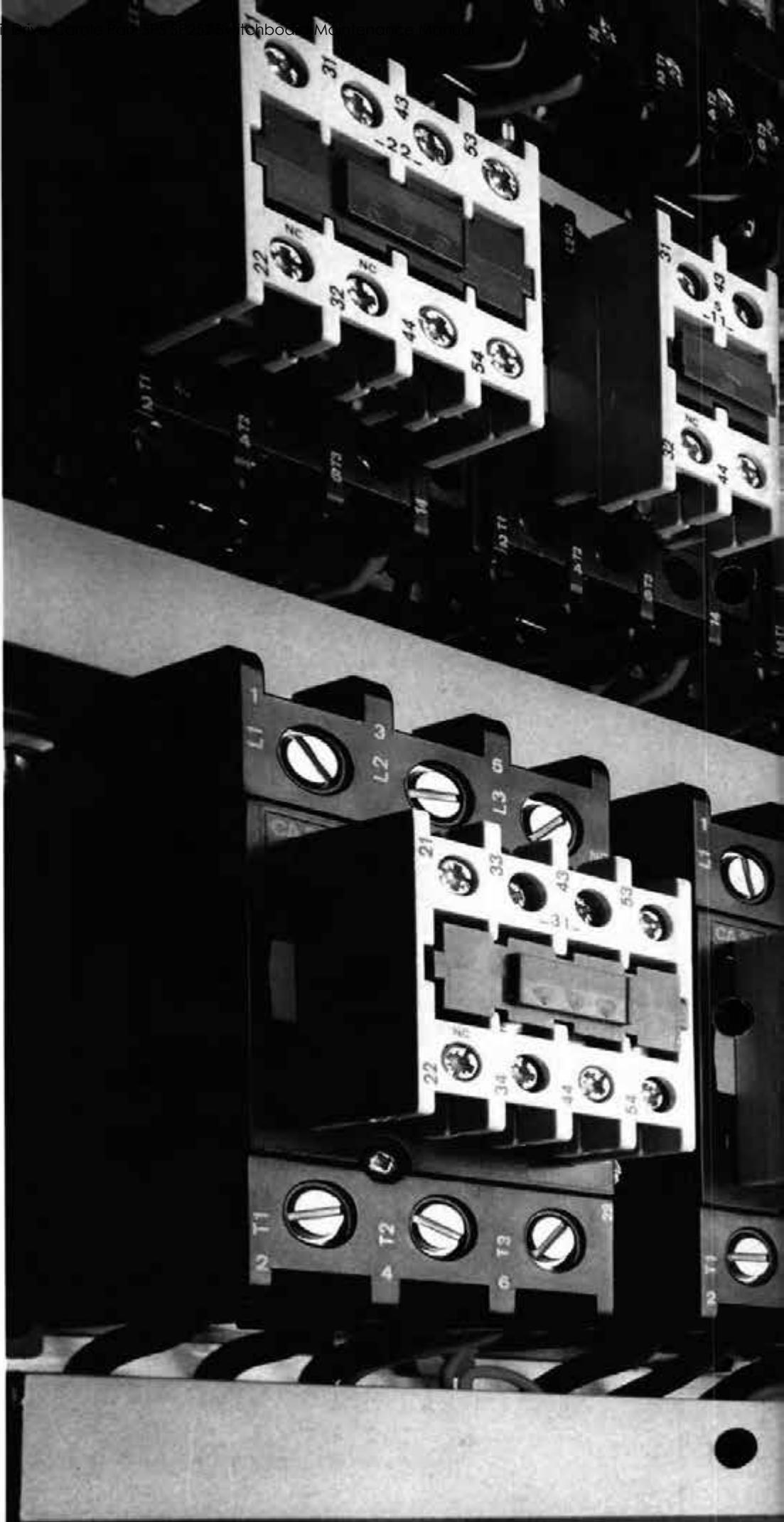
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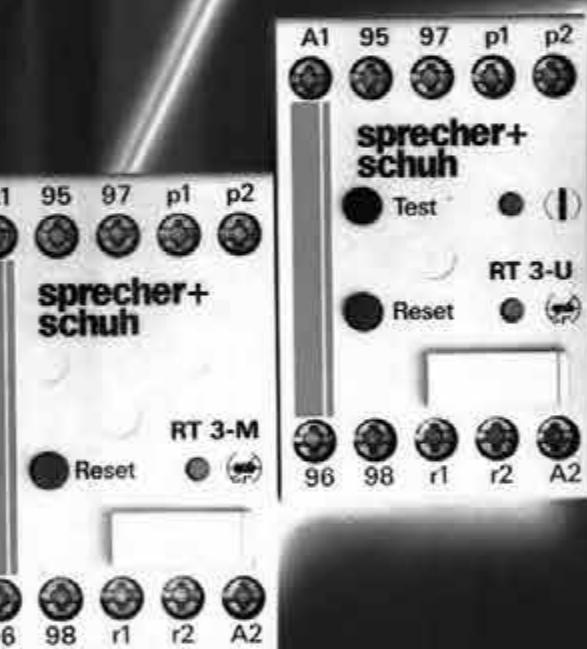
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2263/10.88

Q-Pulse Id TMS700

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22 63

## Thermistor Protection Relay RT 3

For direct temperature monitoring

# Thermistor Protection Relay RT 3: direct, precise, dependable



## The right device for each application

Thermistor protection relays RT 3 are employed in all those applications where accurate temperature monitoring is of crucial importance:

- motors and transformers
- bearings and machines
- heating systems
- gases and liquids

The RT 3 takes fully into account extraneous influences such as increased ambient temperature, ventilation system breakdown and obstructed cooling. Three models permit optimal selection according to application.

## Maximum safety for systems and personnel

The RT 3 does not only trip reliably in the event of over-temperature but also in the case of a short-circuit or an open-circuit in the sensor measuring circuit. Additionally two models give safeguards against supply failure, storing their switching state for more than three hours.

All voltage carrying parts of the RT 3 are protected against inadvertent contact according to VBG 4.

## Convenient operation

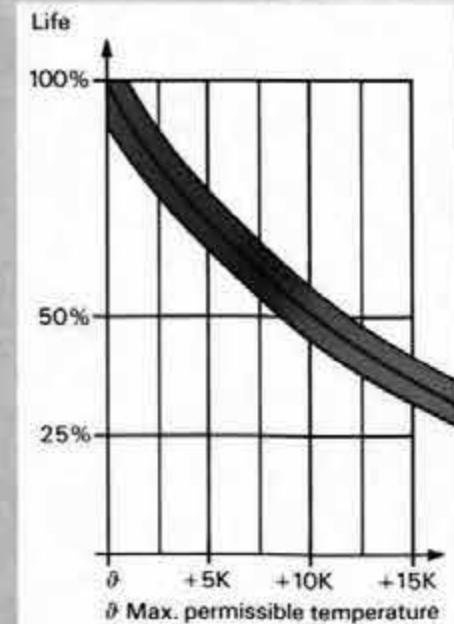
The RT 3 is designed arranged clearly and logically. Tripping is distinctly indicated by a red LED. Two models have a «Reset» button for manual reset and terminals for remote reset up to 1000 m. The model RT 3-U has a «Test» button for checking operating readiness and a green LED to indicate the supply-on state.

## Trouble-free installation

Nothing is simpler than installing an RT 3. No settings have to be made on the relay itself.

## Additional protective functions possible

For the very highest protection requirements the RT 3 can be used in combination with thermal overload relay CT, circuit breaker KT 3 or the electronic motor protection unit CET 3. In this way further protective functions can be achieved permitting a reduction in the motor feeder line cross-section.



Direct temperature sensing at critical locations with thermistor sensors and its evaluation by the thermistor protection relay RT 3 provides a first-rate safeguard for motors and other temperature-critical devices.

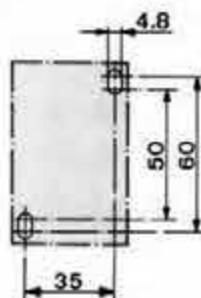
## Temperature monitoring is no luxury

Observance of the maximum permissible temperature as stipulated by the manufacturer is especially important with motors. Just a constant increase of the maximum temperature by 10 degrees will halve the motor life. This is why most variable speed or large motors are equipped as standard with thermistor sensors in their windings. The RT 3 reacts with precision to the over-temperature signalled by the sensors, thus preventing damage by accurate and fast tripping.

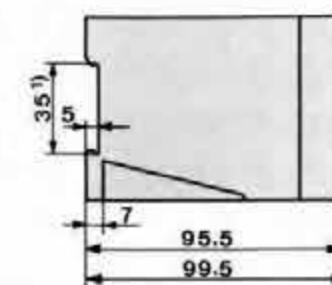
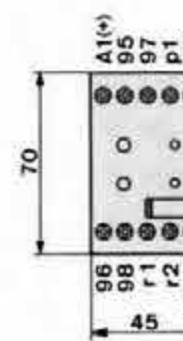
Reduction of the average motor life with over-temperature.

## Dimensions [mm] Mounting, circuit diagrams

Hole plan RT 3



Position of terminals

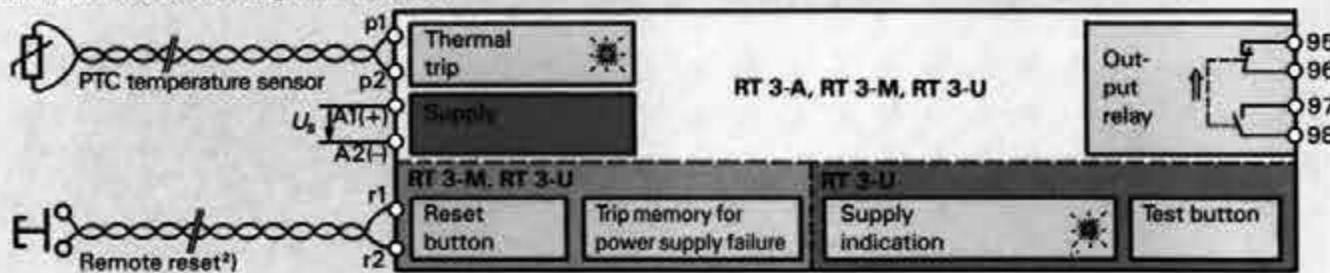


### Installation

The thermistor protection relay RT 3 is designed for surface mounting with screw fixing according to hole plan EN 50 002 or for snap-on fixing to a top hat rail EN 50 022-35 x 7.5.

Arrangement, assignment and marking of terminals in accordance with EN 50 005. The mounting position of the RT 3 does not influence its function.

Terminal and block circuit diagram of the RT 3



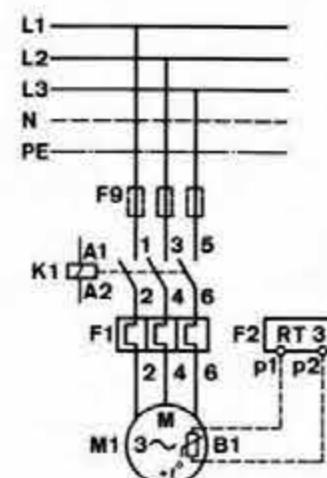
An application example  
Starter CA + CT with additional RT 3

The contacts are drawn in their power-on position corresponding to those of a standard thermal overload relay in its ready to operate state.

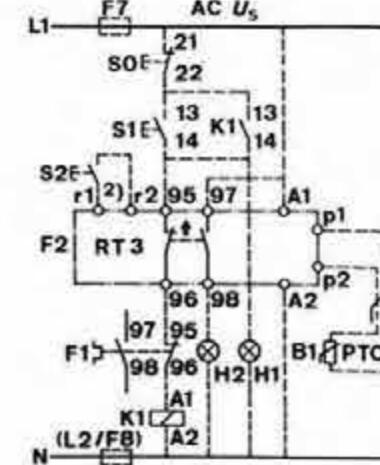
### Legend

- K1 Contactor CA
- F1 Thermal overload relay CT
- F2 Thermistor protection relay RT 3
- S1 ON button
- S0 OFF button
- S2 Remote reset button
- U<sub>s</sub> Supply voltage
- H1 Signal lamp «Contactor ON»
- H2 Signal lamp «RT 3 tripped»
- B1 Thermistor in protected object

Circuit diagram  
Main circuit

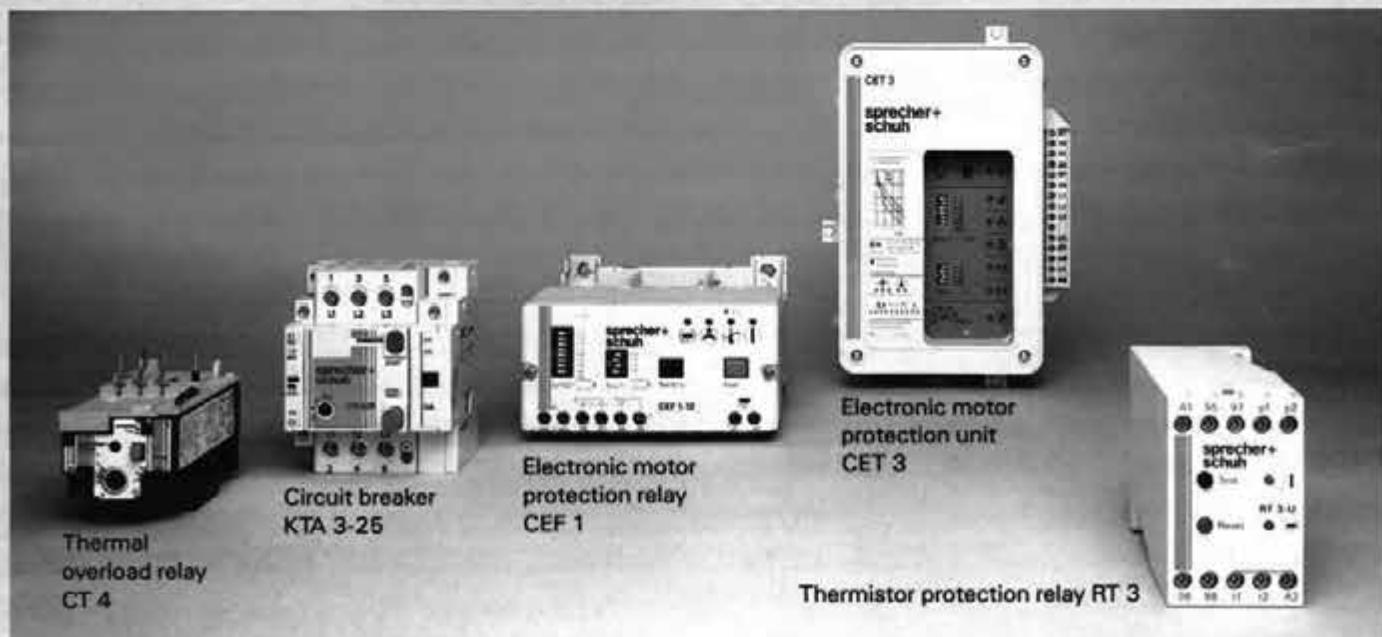
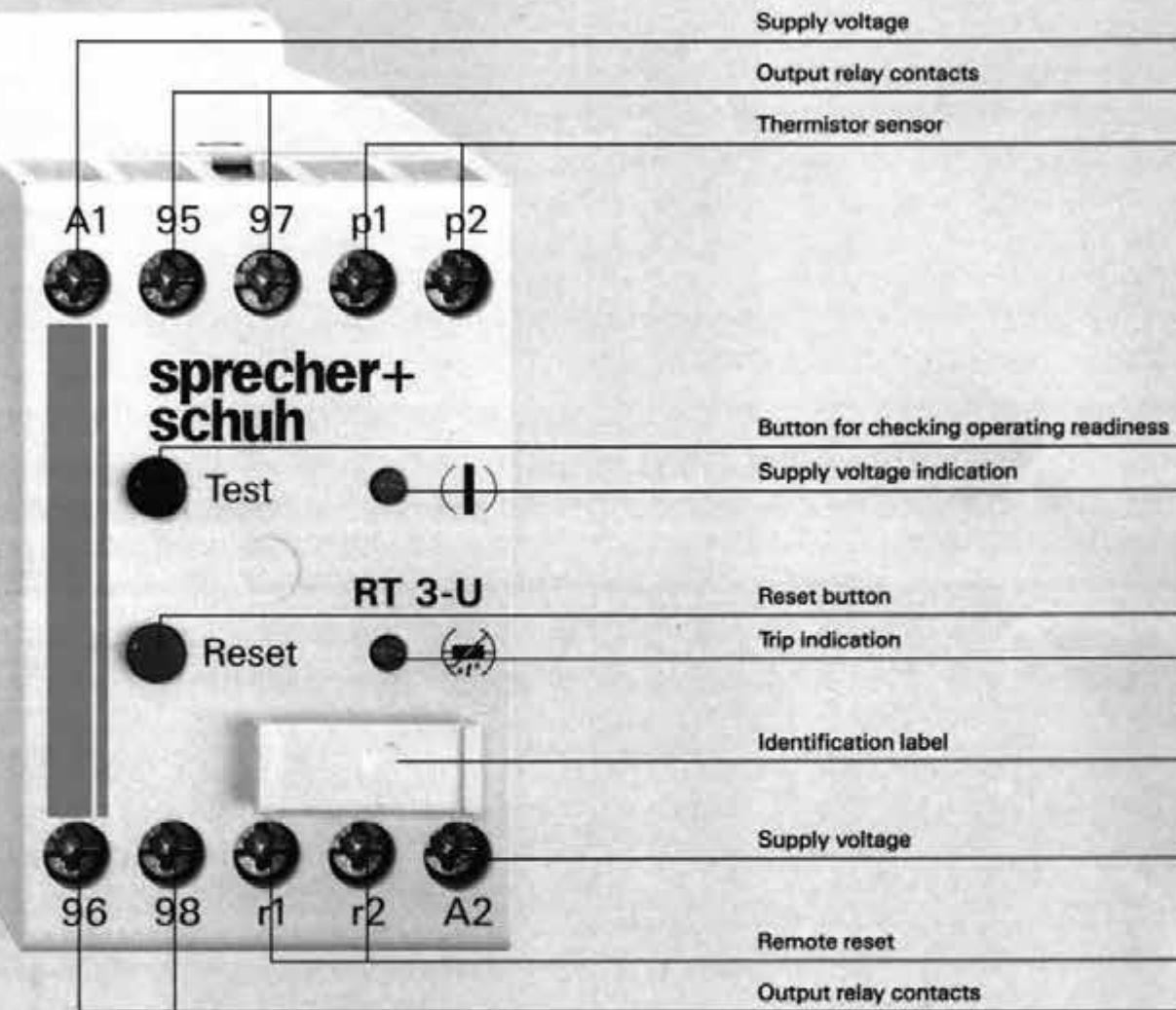


Control circuit  
Impulse contact control



<sup>1)</sup> For top hat rail 35 mm, EN 50 022.

<sup>2)</sup> For automatic reset with RT 3-M and RT 3-U: connect r1-r2.



The thermistor protection relay RT 3 is an essential constituent of the comprehensive Sprecher+Schuh motor protection concept. Its combination possibilities with other motor protection devices enables the very highest demands to be satisfied.

## Selection table

### Ordering information

#### Thermistor protection relay RT 3

- for surface mounting
- with inadvertent contact protection to IP 67
- output relay (with 1 normally open and 1 normally closed contacts) in closed circuit connection



Model	RT 3-A	RT 3-M	RT 3-U
Thermal overload protection	•	•	•
Short-circuit and open-circuit protection for sensor measuring circuit	•	•	•
Trip indication (red LED)	•	•	•
Automatic reset	•	•	•
Manual reset		•	•
Remote reset (external button)		•	•
Storage of status in event of power failure		•	•
for more than 3 hours at +25 °C		•	•
unlimited (not temperature-dependent)			•
«Test»-button			•
Power-on indication (green LED)			•

Order No. structure	Example:	RT 3-A-240V AC	Wiring Diagram
Model:	RT3 - A (Automatic Reset) RT3 - M (Manual Reset) RT3 - U (Unlimited Memory)		
Control voltage and frequency: With direct current:	...V AC ...V DC		Wiring Diagram

Ordering information	Model	Order No.	Weight [g] 1 item
Thermistor protection relay	RT 3-A	RT 3-A - ...V...	260
	RT 3-M	RT 3-M - ...V...	265
	RT 3-U	RT 3-U - ...V...	270
Order No. supplement			
Supply voltage:	AC 24, 48, 110, 240, 415, 440V	- ...V	-
	DC 24, 48 V	- ...V DC	-65

## Technical information

General  
Functions  
Approvals



### General

Thermistors are installed in the thermally critical localities of the object to be protected. For motors this is the stator winding.

The resistance of the thermistors has a positive temperature coefficient (PTC).

The resistance of the PTC sensor increases immediately the rated response temperature is exceeded. In this way the thermistor protection relay RT 3 initiates the switching off of the protected object – eg. a motor – and indicates the fault.

### Functions

#### Tripping

The RT 3 trips in the event of a **thermal overtemperature** in the protected object also with a short-circuit and an open-circuit in the sensor measuring circuit. The red LED lights.

#### Test button

An overtemperature is simulated on the RT 3 by pressing the **Test** button. This is for checking the operational readiness of the device.

#### Reset

The RT 3-A is **automatically reset** once the resistance of the sensor measuring circuit falls back below the reset value on cooling down. The red LED trip indication goes out.

To prevent undesirable starting of the motor, automatic reset should only be provided with impulse contact control. The RT 3-M and RT 3-U have an optional reset facility of either manual (with the integrated «Reset» button or external remote reset button) or automatic.

#### Loss of supply voltage

In the event of a power supply failure the green LED on the RT 3-U goes out. On the RT 3-M and RT 3-U the switching status is **stored** for the manual reset. After restoration of the supply the output relay and the LED trip indicator revert to the status existing before the failure.

#### Temperature prewarning

If the manufacturer installs additional PTC sensors having a lower response temperature, a second RT 3 can be used to provide a preliminary temperature warning. This will permit the early detection of an impending fault and can prevent an operating interruption.

### Approvals

The thermistor protection relay RT 3 complies with all important regulations.

The following approvals have been applied for:

SEV, CSA, UL-recognized, NEMKO, Finland.

Approval is being sought from the PTB (Physical and Technical Institute, Federal Republic of Germany) for the protection of motors in zones with a fire and explosion hazard (EEx e).



SEV  
Switzerland



CSA  
Canada



UL-recognized  
USA



NEMKO  
Norway



Electrical  
Inspectorate  
Finland

## Technical data

<b>Rated insulation voltage</b>	acc. to IEC 255-8 acc. to SEV	440 V 380 V	acc. to AS, BS, VDE 0660 acc. to CSA, UL	250 V 240 V
<b>Test voltage</b> between separated circuits	alternating current acc. to IEC 292-1 surge voltage acc. to IEC 255-4 and SEN 36 1503 interference voltage acc. to ANSI/I C 37.90 a-1974, IEC 255-6 and SEN 36 1503		2.5 kV, 50/60 Hz, 1 min 5 kV, 1.2/50 µs	
<b>Ambient temperature</b>	normal operation storage (in dry rooms)		-25°C...+60°C -40°C...+60°C	
<b>Climatic classification</b>	acc. to IEC 68-2-3 humid heat		40°C, 92% rel. humidity, 56 days	
<b>Protection class acc. to IEC 529</b>	device (less terminals) IP 30		terminals (acc. to VBG 4) IP 20	
<b>Vibration resistance</b>	acc. to IEC 68 (10...150 Hz)		3 g	
<b>Impact resistance</b>	acc. to IEC 68-2-27 or DIN 40 046/7		12 g, shock duration 18 ms, semi-sinusoidal in the 3 directions x, y and z	
<b>Supply</b>	rated supply voltage $U_s$	AC 24, 48, 110, 240, 415, 440 V AC DC 24, 48 V		
	permissible fluctuations	AC 0.8...1.1 $U_s$ , 50/60 Hz DC 0.9...1.2 $U_s$		
	power consumption	AC 1.5 VA (1.2 W) DC 1.2 W		
<b>Output relay contact data</b>	contacts (electrically isolated)		1 make and 1 break	
<b>Operating voltage</b>	[V]	24 48	110 240 415	440
Continuous thermal current	[A]	4 4	4 4	4 4
<b>Rated operational current with AC</b>	AC-11 [A]	4 4	4 3	2 1.5
Rated operational current with DC	DC-11 [A]			
without protection circuit, L/R=35 ms	[A]	0.6 0.3	0.15 0.05	- -
with protection circuit <sup>2)</sup> , L/R=100 ms	[A]	0.6 0.6	0.5 0.5	- -
<b>Max. perm. make/break current</b>	[A]	44 44	44 33	22 16.5
Rated current of back-up fuse:	max. fast-acting (D) 16 A; slow-blow (DT) 10 A			
<b>Terminals</b>	open terminals connection wire cross-sections		(captive) 2 × 2.5 mm <sup>2</sup> single wire or 2 × 1.5 mm <sup>2</sup> with end ferrule	
<b>Sensor measuring circuit</b>				
4000	Max. cold resistance of PTC sensor chain	1500 Ω		
1330	Max. number of series connected			
550	PTC sensors acc. to IEC/TC2 proposal	6		
250	Response level $\vartheta_A = -25^\circ\text{C} \dots +60^\circ\text{C}$	3300 Ω ± 100 Ω		
100	Reset level $\vartheta_A = -25^\circ\text{C} \dots +60^\circ\text{C}$	1650 Ω ± 100 Ω		
20	Response level with short circuit in sensor circuit $\vartheta_A = -25^\circ\text{C} \dots +60^\circ\text{C}$	≤ 15 Ω		
10	Measuring voltage acc. to IEC 34-11	DC < 2.5 V		
	Measuring line			
	Minimum cross-section [mm <sup>2</sup> ]	0.5 0.75 1 1.5 2.5		
	Maximum length <sup>3)</sup> [m]	200 300 400 600 1000		
	Reset	RT 3-A RT 3-M RT 3-U	automatic manual or automatic <sup>4)</sup> manual or automatic <sup>4)</sup>	
	PTC sensor characteristic acc. to IEC/TC2 proposal		TNF: Rated response temperature	
	Storage time	RT 3-M RT 3-U	at 25°C > 3h at 40°C > 1h at 60°C > 15 min unlimited (not temperature-dependent)	
<b>Trip memory</b> in event of power supply failure (zero-voltage safeguard)				
<b>Remote reset with RT 3-M, RT 3-U</b>	External contact at r1-r2 Max. line length for remote reset		potential-free make contact up to 300 m twisted up to 1000 m screened	

<sup>1)</sup> American National Standards Institute<sup>2)</sup> RT 3 to motor; installation:

(DC 220...250 V) or

up to 20 m parallel,

RC link CRC 3 (DC 24...240 V)

up to 100 m twisted,

see catalogue 22 02.

longer than 100 m screened.

<sup>4)</sup> For automatic reset: connect r1-r2.

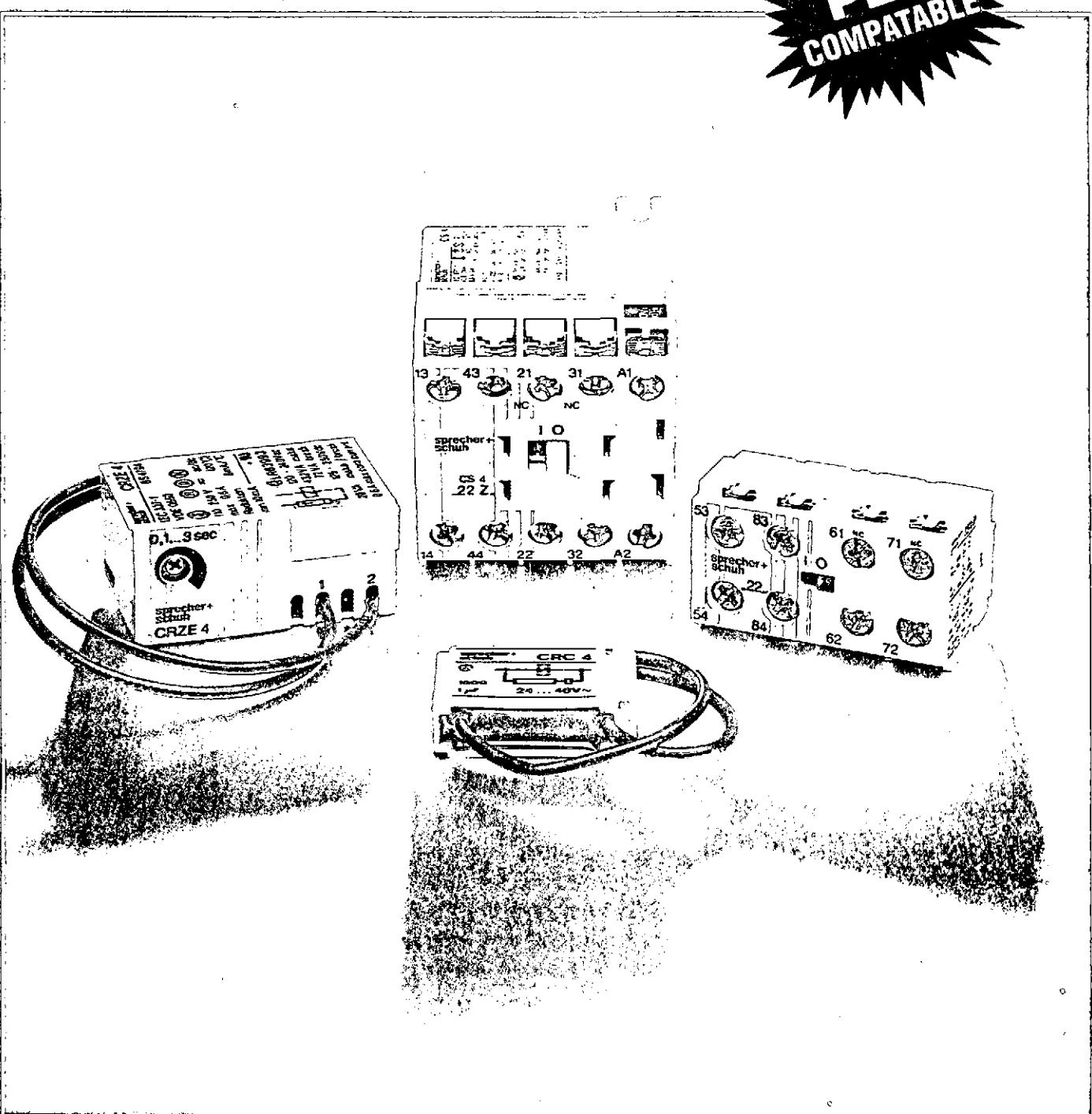
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PUBLICATION  
**RCS-1**  
ISSUE 2  
APRIL 1990

# Control Relay

## CS4

**PLC  
COMPATABLE**



**NHP**

ELECTRICAL ENGINEERING PRODUCTS PTY LTD

## CONTROL RELAY CS4

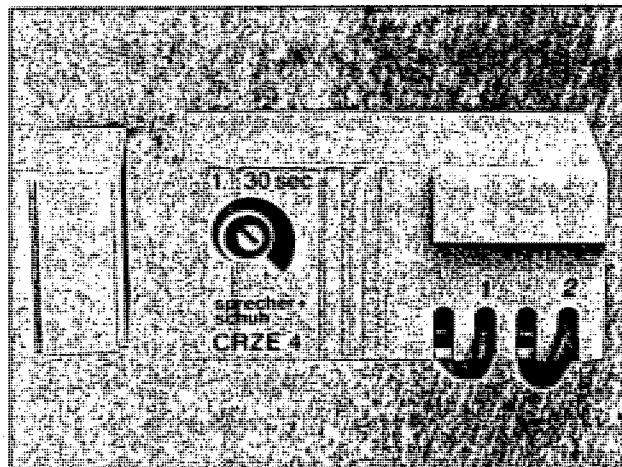
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Refer Bulletin 2204

# A closer look at CS4

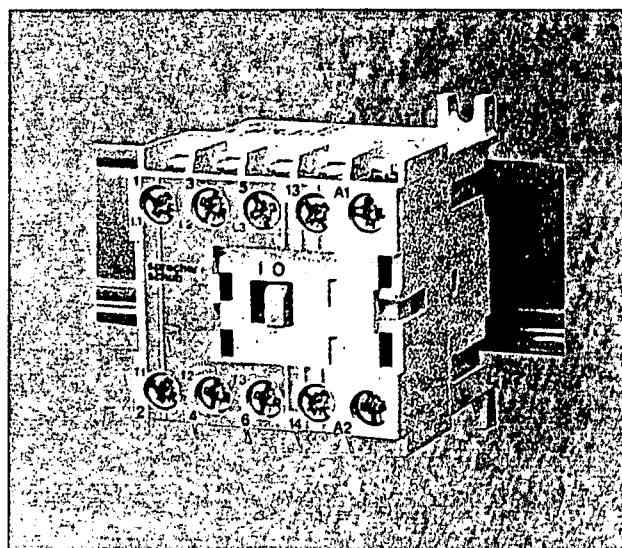
- **Compact design**  
AC and DC operated relays have the same mounting dimensions of 45mm.
- **Shallow mounting depth of only 48mm**  
Ideal for use in small enclosures.
- **Simple and reliable connection**  
Terminal screws suitable for use with manual or power screwdrivers.
- **High contact reliability**  
Special contact design provides high reliability even with low voltages and currents such as encountered with PLC interfacing.
- **Time and cost savings -**  
Through modern compact design with features offering full flexibility in ordering and application.
- **Fully compatible**  
With other equipment in the CA4 compact system ie. CA4 contactors, CRZ timers and CRC surge suppressors.
- **Absolute undervoltage protection**  
The coil is designed for total undervoltage reliability. Undervoltages below that required to close the control relay can be withstood indefinitely without damage.
- **Snap-on auxiliary contacts**  
Provide the smallest 4, 6 or 8 pole relay of its type available.
- **Absolute undervoltage protection**  
The coil is designed for total undervoltage reliability. Undervoltages below that required to close the control relay can be withstood indefinitely without damage.

- **Simple panel layout**  
Due to modular design of relays and accessories.



**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.*



- **Snap-on mounting**  
To 35mm DIN mounting rail or screw mounting if preferred.
- **Clear easy to read terminal identification**  
plus colour coding for relays and other CS4 modules.

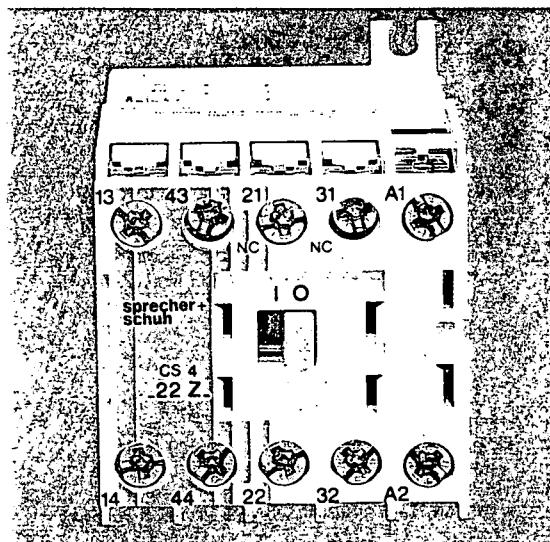
**“Ideal for trouble-free PLC interfacing”**

# CONTROL RELAY

## CS4

**sprecher + schuh**

Refer Bulletin 2204



### Control relay CS4

Terminal markings in compliance with EN 50 011  
Integrated snap-on fastener for EN 50 022-25 rail  
(DIN mounting rail)

Fixing hole distance 50 mm

<b>Operating voltage</b>	V	240	415
/th <sup>1)</sup> open	<sup>2)</sup> A	16	18
AC-1 <sup>2)</sup>	kW	6.7	11.5
enclosed	<sup>2)</sup> A	12	12
	kW	5	8.6
<b>Switching of 3-phase motors</b>			
AC-2	Slip ring motors <sup>3)</sup> A	4.5	3.4
AC-3	Squirrel cage motors <sup>3)</sup> kW	1.1	1.5
	Normal loading HP	1.5	2
AC-4	Squirrel cage motors A	4.6	3.4
	Heavy-duty operation <sup>3)</sup> kW	1.1	1.5
	Inching HP	1.5	2
<b>Rated insulation voltage</b>			
according to IEC 158-1	V	500	
<b>Test voltage 1 minute</b>			
	V	3000	
<b>Back-up fuse<sup>4)</sup></b>			
without thermal overload relay	A	16	
<b>Auxiliary contacts</b>			
Auxiliary	AC-11	2	1
contact	/th open <sup>2)</sup> A	10	
block	/th encapsulated <sup>2)</sup> A	6	
	Back-up fuse <sup>3)</sup> A	10	
Contactor AC-11	A	5	2
	/th open <sup>2)</sup> A	16	
	/th encapsulated <sup>2)</sup> A	12	
	Back-up fuse <sup>3)</sup> A	16	
Number of auxiliary contacts		4...8	
<b>Coil burden</b>			
AC	pickup VA(W)	22(20)	
	holding VA(W)	4 (1.4)	
DC	pickup W	2.5	
	holding W	2.5	
<b>Switching delay</b>			
closing mS	15...40 (AC); 18...40 (DC)		
opening mS	15...25 (AC); 6...12 (DC)		
<b>Service life</b>			
Main contacts	mechanical mill.ops.	10 (AC); 20 (DC)	
	AC-3 mill.ops.	0.7	
<b>Approvals UL (USA), CSA (Canada)</b>			
Rated insulated voltage	V	300 (up to 1 Hp = 600)	
<b>Size</b>			
Continuous	300V A	12	
rated current	600V A	5	
Voltage	AC V')	300 600	
Motor load (with/without thermal overload relay)	HP 3 ph		
	HP 1 ph		
Contact class NEMA		A 600, Q 600	

<sup>1)</sup> /th according to IEC, AS, BS, SEV. Corresponds to continuous current  
<sup>2)</sup> /th 2 according to VDE.

<sup>3)</sup> Rated operational capacity according to IEC, AS, BS, DEMKO, NEMKO, SEMKO, Finland, SEV, VDE when switching 3 resistive load 50-60 Hz.

<sup>4)</sup> See page 9.  
<sup>5)</sup> Motors — Nominal voltages. The corresponding supply voltages are: 220...240 V, 440...480 V, 550...660 V.

AC 1 and /th according to approval	(D)	(N)	(FI)	(S)
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

### Basic Relay - 4 Pole

Contact diagram	N/O	N/C	AC or DC	Catalogue No. <sup>1)</sup>
	4	—	AC	CS4-40E
			DC	CS4C-40E
	3	1	AC	CS4-31Z
			DC	CS4C-31Z
	2	2	AC	CS4-22Z
			DC	CS4C-22Z

<sup>1)</sup> NOTE: Do not use auxiliary blocks with N/C contacts on basic relay.

<sup>2)</sup> Add coil voltage:- AC24, 32, 110, 240 or 415V  
(to catalogue number when ordering)

### Technical Data

Rated thermal current (AC-1)  
40°C 16 amps      60°C 12 amps

Auxiliary contact blocks  
40°C 10 amps  
60°C 6 amps

AC-11 240V — 5 amps (2 amps for add on blocks)

AC-11 415V — 2 amps (1 amp for add on blocks)

Mechanical service life  
10 million ops (AC coil)  
20 million ops (DC coil)

Coil consumption  
AC — Pick up 22VA; hold 4VA  
DC — Pick up and hold 2.5W

<sup>3)</sup> N/O and N/C contacts coupled

<sup>4)</sup> Not to be used with basic relays 31Z and 22Z

# CONTROL RELAY CS4

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Refer Bulletin 2204

## Timing element CRZE4

		Timing element CRZE 4 setting time 1...30s	CRZE 4-30s
		setting time 0.1...3s	CRZE 4-3s

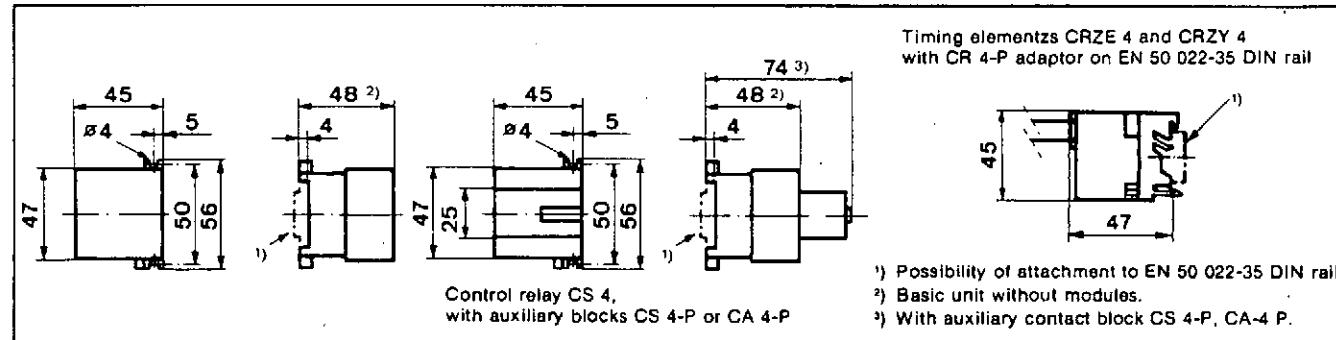
## Auxiliary Contact Blocks

Contact diagram	Contacts N/O N/C	Catalogue No.	AUXILIARY CONTACT BLOCKS
	— 2	CS4-P-02 <sup>1)</sup>	Six types of auxiliary contact blocks can be added to the basic relay. For the 40 E relay versions any type of block can be used. For the versions 31 Z and 22 Z it is recommended to use only the blocks with N/O contacts. The auxiliary blocks have a special contact design making them particularly suitable for switching low voltages and currents such as required with PLC's.
	1 1	CS4-P-11	
	2 —		
	— 4	CS4-P-04 <sup>1)</sup>	
	2 2	CS4-P-22 <sup>1)</sup>	
	4 —		

### NOTE:

- <sup>1)</sup> Not to be used with basic relays 31 Z and 22 Z.
- <sup>2)</sup> N/O and N/C contacts are coupled.
- Do not use auxiliary blocks with N/C contacts on basic relay.
- Add coil voltage:- AC 24, 32, 110, 240 or 415V (to catalogue number when ordering).
- DC 12, 24, 48 or 110V.
- N/O and N/C contacts coupled.

Accessories					
					Neutral Links 16mm <sup>2</sup> , 10mm <sup>2</sup>
Catalogue No.	LS3	MS3	TRC3	TGC3	On request
	Adaptor	RC Link	Diode Link	Varistor Link	Mechanical Interlock
Catalogue No.	CR 4-P	CRC-4	CRD-4	CRV	CM 4



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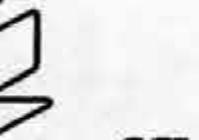
208 DENISON STREET, ROCKHAMPTON, QLD. 4700

PHONE: 27 2277

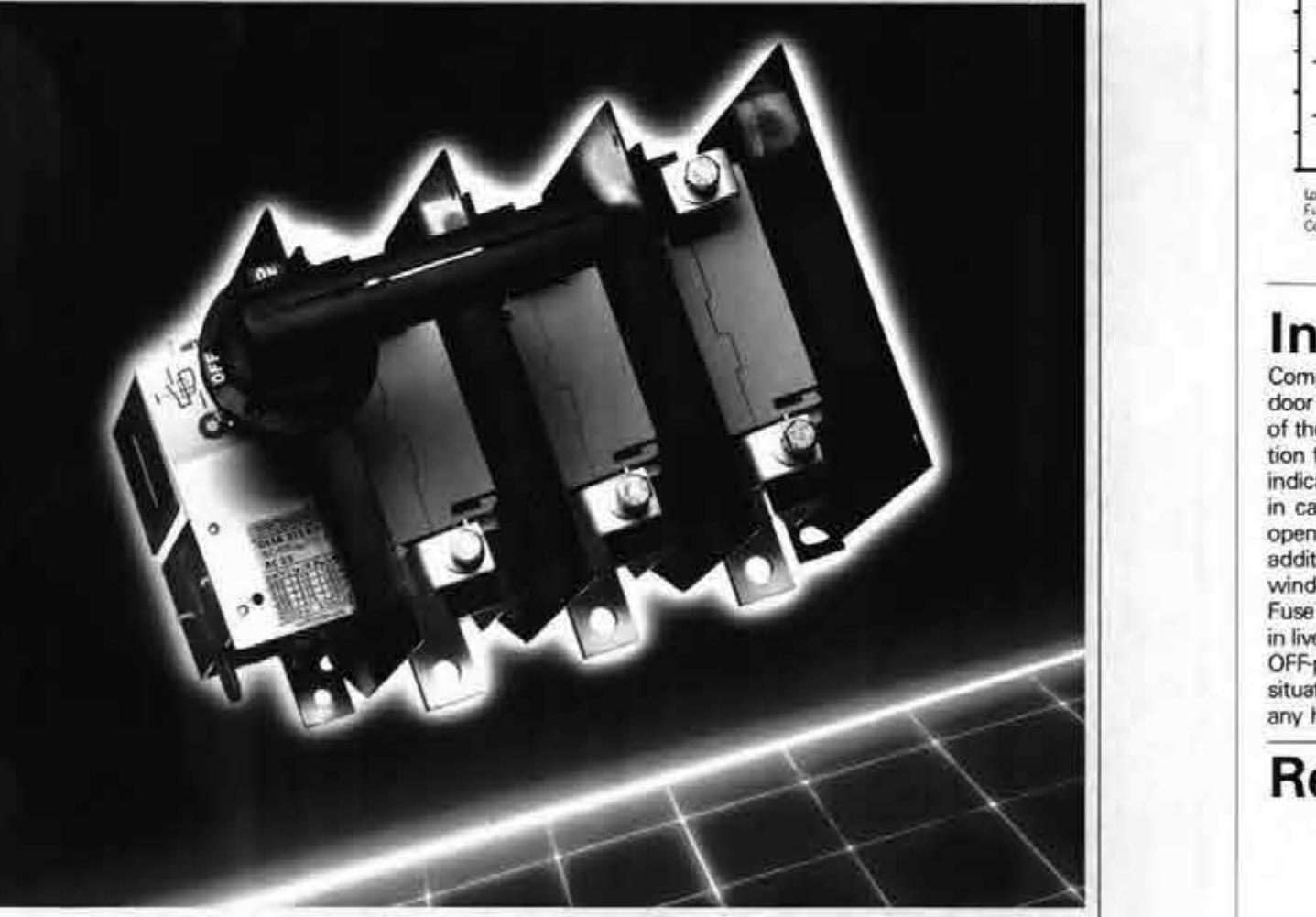
# Switch Fuses OESA/BS 32 A...800 A, 660 V

2

- Reduced Panel size
- Reduced Assembly Costs
- Safety for Personnel
- Versatile Range



## Overall cost efficiency



Brochure OESA/BS 3 GB 86-12/87-11

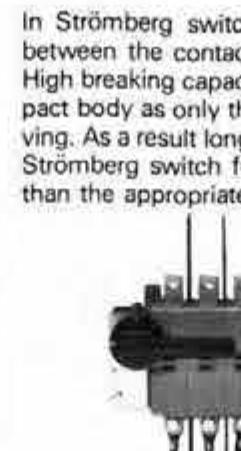
STRÖMBERG

Q-Pulse Id TMS700

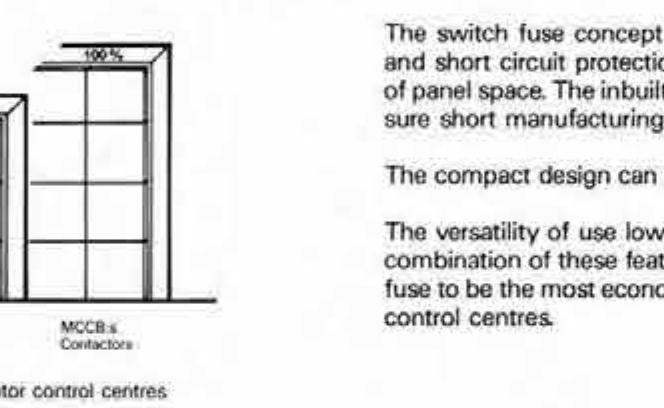
## Complete range from the leading manufacturer

Strömborg is the largest manufacturer of switch fuses in Europe. The large manufacturing volume based on modular techniques guarantees reliable delivery and versatility in special applications. The kit techniques adopted on the accessories and special switches result in low stocks, thus keeping costs to a minimum.

Strömborg's switch fuse range is now exported everywhere in the world. It complies with the major international standards and has a comprehensive list of approvals. Strömborg's low voltage apparatus has gained international acknowledgement and customers have come to rely on Strömborg's service.

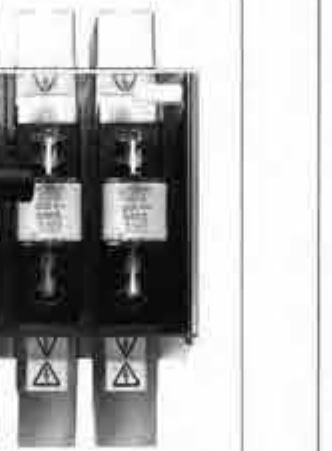


## The overall cost efficiency of the switch fuse



## Inbuilt safety features

Complete safety during fuse change is achieved through door interlocking of the handle and the contacts on both side of the fuses. Thus any hazard even in case of back connection from the consumer side is eliminated. Reliable position indication in the handle and mechanism eliminates risks even in case of contacts welded. The switches include positive opening operation of the contacts and visible contacts as an additional safety feature for the sizes from 200 A through window enabling contact inspection after operation. Fuse cover interlock in the ON-position prevents fuse change in live switch fuses, and padlocking of the mechanism in the OFF-position eliminates closing the circuit in maintenance situations on site. Thus Strömborg's switch fuses eliminate any hazard to personnel.



## Reduced assembly costs

Close consultation with the customers together with flexible design has brought many valuable assembly features to the Strömborg switch fuses. The switch fuses can be easily installed in enclosures of different depths because the length of the telescopic shaft can be adjusted. The installation of heavy switches which is normally difficult to install is made easier by key hole fixing. The mounting of the terminal shrouds is quickly done by snap-on mounting.

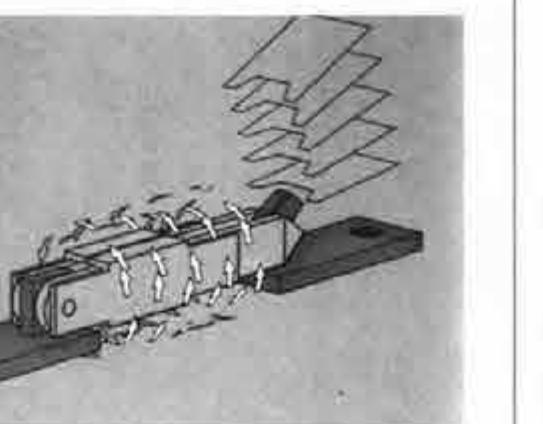
## Track resistant material

The frame parts are of track resistant material and the construction are designed to stand the heat and humidity of the tropics as well as the extreme cold of arctic countries and the polluted environment of any process industry.

Telescopic shaft

## Compact size

In Strömborg switch fuses the fuse links are stationary between the contacts on the supply and consumer side. High breaking capacity can be achieved within a very compact body as only the mass of the moving contacts is moving. As a result long electrical life time is achieved and the Strömborg switch fuses occupy hardly more panel space than the appropriate fuse.



## Patented contact construction

Strömborg switch fuses from 200 A to 800 A have a patented (USA) wiping type knife contact on both side of the fuse. The contact uses magnetic attraction forces in an innovative iron circuit in fault level situations. High breaking and making capacity even at 660 V is achieved and thus the de-rating on motor duty is minimum. The wiping effect of the contacts guarantees long thermal stability in the chemical industry and moisture tropical climates. Thus, the Strömborg switch fuse achieves maintenance free operation and long electrical life time however harsh the circumstances.



A switch fuse compared to a load break switch plus a fuse base in a draw out system allows one unit for switching, interlocking, testing and short circuit protection.

## Complete handle

The switch fuses include as standard black handle with either 0-1 or ON-OFF indication. Protection degree for the standard handle IP54. Red-yellow emergency handle and metallic handles are optional extra. Protection degree up to IP65.

The door is interlocked in the ON-position. This can be defeated to allow authorized personnel access for inspection. The door is easy to close again. The handle can be padlocked in the OFF-position, thus preventing door opening and closing the circuit in maintenance situations.



In the case of contact welding the handle deviates from ON-position less than 45°

## Flexibility in customer applications

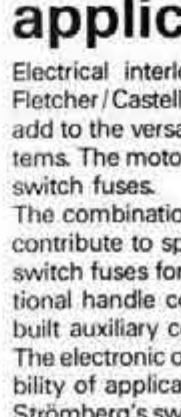
Electrical interlocks, mechanical interlocks, plus Lowe+Fletcher/Castell interlocks together with auxiliary contacts add to the versatility of Strömborg's switch fuses large systems. The motor operator allows remote control of the large switch fuses.

The combination switches and side operated switch fuses contribute to space saving applications. The side operated switch fuses for draw-out design can be equipped with optional handle conversion kit providing test position for built-in auxiliary contacts.

The electronic or mechanical fuse monitor improve the reliability of applications. Strömborg's switch fuses improve the overall cost efficiency and safety of customers' systems.

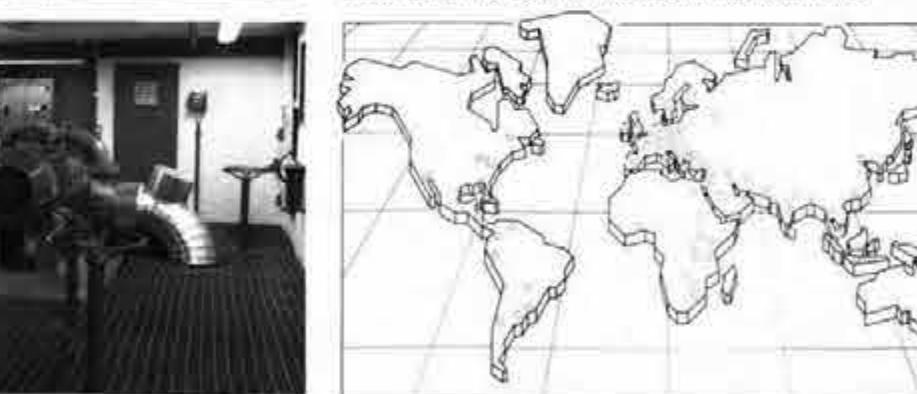


Electrical interlock



Padlockable switch mechanism

# STRÖMBERG means quality in all environments



STRÖMBERG

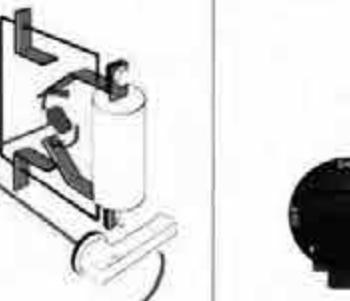
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## The complete range...

**Switch fuse range OESA (BS-pattern)**  
32 A to 800 A, 660 V



- Main switches
- Motor circuit switches (AC 23 ratings up to 1000 V)
- Isolator switches
- Local safety switches
- Special switches

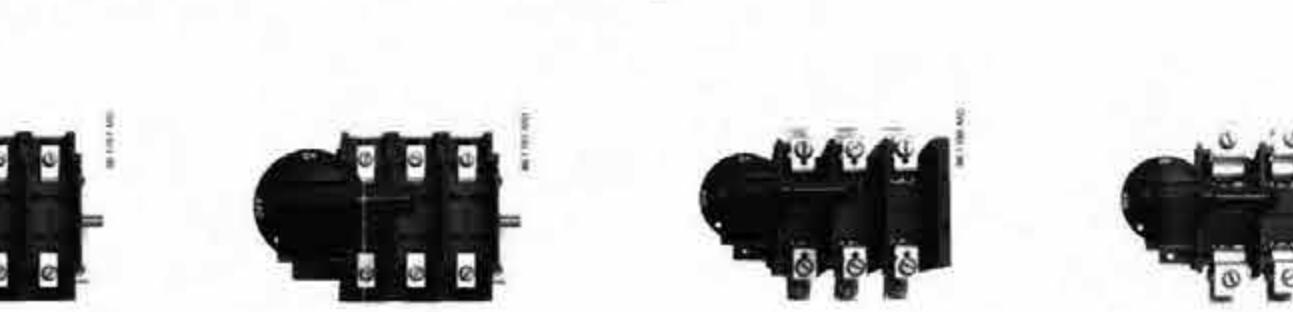
**Standard switch fuse delivery includes:**

- Terminal bolts (sizes 32...63 have protected tunnel terminals)
- Black IP 54 handle with ON-OFF indication for BS-pattern (in United Kingdom handle with 1-0 indication) and for North-American market, 1-0 indication for DIN- and NFC-pattern.
- Adjustable 6 mm square shaft in sizes 32...160 and 12 mm square shaft in sizes 200...800

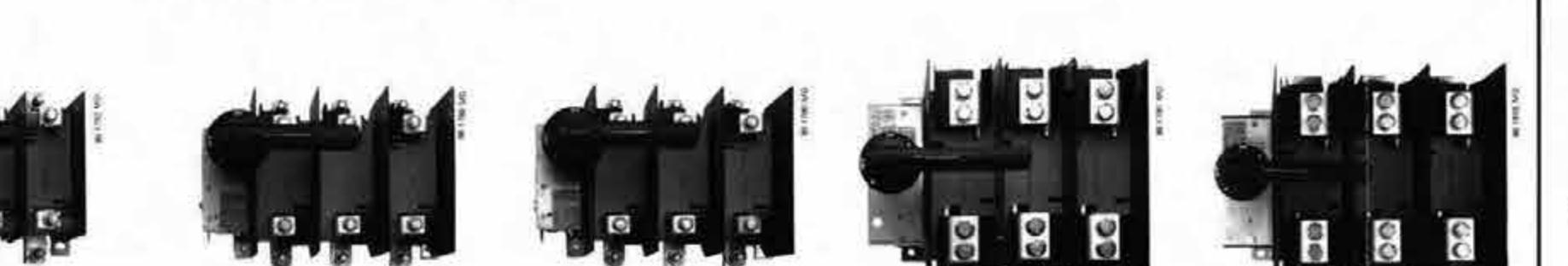
Size	32	63	125	160	200	315	400	630	800
<b>Technical data (for BS-pattern)<sup>4)</sup></b>									
Rated operational voltage	V	500	660	660	660	660	660	660	660
Rated thermal current and operational current AC 23	A	32	63	125	160 <sup>5)</sup>	200	315	630	800
In free air 660V (ambient 40°C)	A	32	63	115	135 <sup>6)</sup>	200	345	560	720
Enclosed 660V	A	32	63	115	125	200	315	630	800
Rated operational current AC 23	A	32	63	115	125	200	315	630	800
380V-500V	A	32	63	115	125	200	315	630	800
660V	A	—	40	63	200	315	400	720	720
Rated breaking capacity AC 23 pf. 0.35	A	300	500	800	800	3200	3200	5000	5000
Fused short circuit current in closed position (RMS)	kA	100	100	100	100	100	100	100	100
Rated fused short circuit making capacity (RMS)	kA	80	50	100	50	100	100	80	80
660V	kA	80	50	100	50	100	100	50	50
with back up fuses of size	A	35	63	125	160	200	315	630	800
Weight 3-pole/4-pole	kg	1,6/1,9	1,6/1,9	1,8/2,3	1,8/2,3	6,9/7,9	7,3/8,3	15,5/19,0	17,0/21,0
Overall dimensions 3-pole/4-pole	H mm	112/112	112/12	142/142	144/144	200/200	200/200	290/290	290/290
	W mm	167/199	167/199	190/230	216/250	260/306	284/330	343/423	373/463
	D mm	117/117	117/117	133/133	120/120	185/185	193/193	238/238	238/238
<b>Switch fuse types and ordering information<sup>4)</sup></b>									
(other types, see our brochure OESA 1 GB)									
BS-pattern	3-pole	OESA 32 G1	OESA 63 G1	OESA 100 G1	OESA 160 B3	OESA 200 B3	OESA 315 B3	OESA 400 B3	OESA 630 B3
	4-pole <sup>1)</sup>	OESA 32 G4	OESA 63 G4	OESA 100 G4	OESA 160 B4	OESA 200 B4	OESA 315 B4	OESA 400 B4	OESA 800 B4
	3-pole, side operated <sup>2)</sup>	OESA 32 BM3	OESA 63 BM3	—	—	OESA 200 BM3 <sup>3)</sup>	OESA 315 BM3 <sup>3)</sup>	OESA 400 BM3 <sup>3)</sup>	—
	4-pole, side operated <sup>2)</sup>	—	—	—	—	OESA 200 BM4 <sup>3)</sup>	OESA 315 BM4 <sup>3)</sup>	OESA 400 BM4 <sup>3)</sup>	—
DIN-pattern	3-pole	OESA 00-32	OESA 00-63	OESA 00	OESA 00-160	OESA 250 D3	—	OESA 400 D3	OESA 630 D3
NFC-pattern	3-pole	—	OESA 00-63	OESA 00	—	—	—	OESA 400 D3	OESA 800 D3
Switch Fuses for North-American market.	3-pole	OESA-F30	OESA-F60	OESA-F100	OESA-F200	—	—	OESA-F400	OESA-F600
Rated operational power in categories AC 23 and AC 3 <sup>10)</sup>	kW	7,5/11	15/22	37/55	37/60	57/100	90/160	110/210	180/315
220V/380V	kW	415V/500V	15/15	30/30	60/75	110/140	180/220	230/380	340/400
600V	kW	—	—	55	55	180	290	330	540
<b>Accessories (for BS-pattern)<sup>4)</sup></b>									
Auxiliary contacts/Shrouds for auxiliary contacts	1 NO + 1 NC	OESAZX 46 / OESAZX 34	OESAZX 16 / OESAZX 19	OESAZX 33 / OESAZX 36	OETLZX 33 / OESAZX 76	OESAZX 6 / OESAZX 20	OESAZX 103 / OESAZX 104	OESAZX 105 / OESAZX 106	—
	2 NO + 2 NC	OESAZX 32 / OESAZX 34	OESAZX 16 / OESAZX 19	OESAZX 41 / OESAZX 44	OETLZX 34 / OESAZX 77	OESAZX 15 / OESAZX 20	OESAZX 102	—	—
Thermal shrouds	not required	—	—	OESAZX 3 / OESAZX 38	OESAZX 75 / OESAZX 81	OESAZX 119	—	—	—
Fuse cover	3-pole/4-pole	OESAZX 31 / OESAZX 37	OESAZX 66	OESAZX 68	OESAZX 52	YASDB 52	YASDB 53	YASDB 55	—
Standard and special handles	— 32A...160A, suitable for 6 mm square shaft.	YASDB 51	Block 1-0	YASDB 52	Black 1-0	Black ON-OFF	Red-yellow 1-0	Red-yellow 1-0	—
	— 200A...800A, suitable for 12 mm square shaft.	YASDB 50	Black ON-OFF	YASDB 53	Black ON-OFF	Red-yellow 1-0	Red-yellow 1-0	Red-yellow 1-0	—
	Door drilling Ø 45 mm, for OETLZX 74	YASDB 49	Red-yellow 1-0	YASDB 54	Black 1-0	Black ON-OFF	Red-yellow 1-0	Red-yellow 1-0	—
	Door drilling Ø 18 mm.	YASDB 10	Black 1-0	YASDB 13	Black 1-0	Black ON-OFF	Red-yellow 1-0	Red-yellow 1-0	—
	Door interlock in ON-position	YASDB 20	Black ON-OFF	YASDB 14	Black 1-0	Black ON-OFF	Red-yellow 1-0	Red-yellow 1-0	—
	Padlockable (with 3 padlocks in OFF-position)	YASDB 8	Red-yellow 1-0	YASDB 15	Black 1-0	Black ON-OFF	Red-yellow 1-0	Red-yellow 1-0	—
	IP 54	YASDB 31	Black 1-0	YASDB 16	Black 1-0	Black ON-OFF	Red-yellow 1-0	Red-yellow 1-0	—
	Door interlock defeatable	YASDB 32	Black ON-OFF	YASDB 17	Black 1-0	Black ON-OFF	Red-yellow 1-0	Red-yellow 1-0	—
	IP65	YASDB 33	Red-yellow 1-0	YASDB 18	Black 1-0	Black ON-OFF	Red-yellow 1-0	Red-yellow 1-0	—
Standard shaft/Shaft length	—	YASDB 31	YASDB 32	YASDB 33	YASDB 34	YASDB 35	YASDB 36	YASDB 37	YASDB 38
Detachable neutral link/Thermal current	OESAZX 25 / 210 mm	OESAZX 87 / 63 A	OESAZX 86 / 160 A	OESAZX 85 / 400 A	OESAZK 41 / 255 mm	OESAZX 6 / OESAZX 20	OESAZX 103 / OESAZX 104	OESAZX 105 / OESAZX 106	—
Change-over attachment kit/Shaft distance <sup>7)</sup>	OESAZW 1 / 90 mm + (0...10) × 15 mm	—	—	OESAZW 12 / 210 mm + (0...10) × 20 mm, 4-pole: OETLZW 12 / 210 mm + (0...20) × 20 mm	OESAZX 88 / 800 A	OESAZX 15 / OESAZX 20	OESAZX 102	—	—
Mechanical interlock kit/Shaft distance <sup>7)</sup>	—	—	—	OETLZW 14 / 250 mm, OETLZW 3 / 300 mm, OETLZW 15 / 500 mm	—	—	—	—	—
Electrical interlock <sup>8)</sup>	—	—	—	OETLZT 80 A/coil voltage, OETLZT 80 L/coil voltage	OESAZX 88 / 800 A	OESAZX 15 / OESAZX 20	OESAZX 102	—	—
Tunnel terminal sets/Cable cross section <sup>9)</sup>	—/2,5...25 mm <sup>2</sup>	OZXA 5 / 1,5...35 mm <sup>2</sup>	OZXA 22 / 5...50 mm <sup>2</sup>	OZXA 11 / 70...120 mm <sup>2</sup>	OZXA 14 / 95...240 mm <sup>2</sup>	OZXA 15 / OESAZX 20	OZXA 103 / OESAZX 104	OZXA 105 / OESAZX 106	—

**Remarks:**  
 1) The fourth pole in OESA 32...160 and OESA 630...800 is provided with a solid link which can be replaced by a fuse link. OESA 200...400 have switched neutral only.  
 2) Including auxiliary contacts 2 NO + 2 NC.  
 3) Handle has to be ordered separately (metallic handle OETLZX 74 (incl. the shaft) or plastic handles YASDB 52, YASDB 53, YASDB 55, the shaft OETLZA 23 has to be ordered separately).  
 4) For further information, see our brochure OESA 1 GB.  
 5) Max. power dissipation of fuse link 16 W  
 6) In sizes OESA 125...200, full protection of the terminals is reached with two shrouds. In sizes OESA 315...800, the shroud type consists of a snap-on shroud for one terminal only. Full protection is reached with 6 or 8 shrouds.  
 7) The interlock attachment prevent one switch from closing to ON-position, if the other is not in OFF-position. The shaft distance is not adjustable.  
 8) Closed circuit principle, for interlocking the switch movement. When the coil circuit is dead, A-types can't be operated to ON-position and L-types to ON- or OFF-position. Coil voltages: 110V AC, 220V AC, 24V DC, 48V DC, 60V DC, 110V DC, 220V DC.  
 9) The terminal set type includes 6 pcs of clamp terminals.  
 10) Time interval between operations 20 s in AC 3. Some fuse links limit these figures further. Starting current characteristics must be considered separately.

## Increased performance ratings...



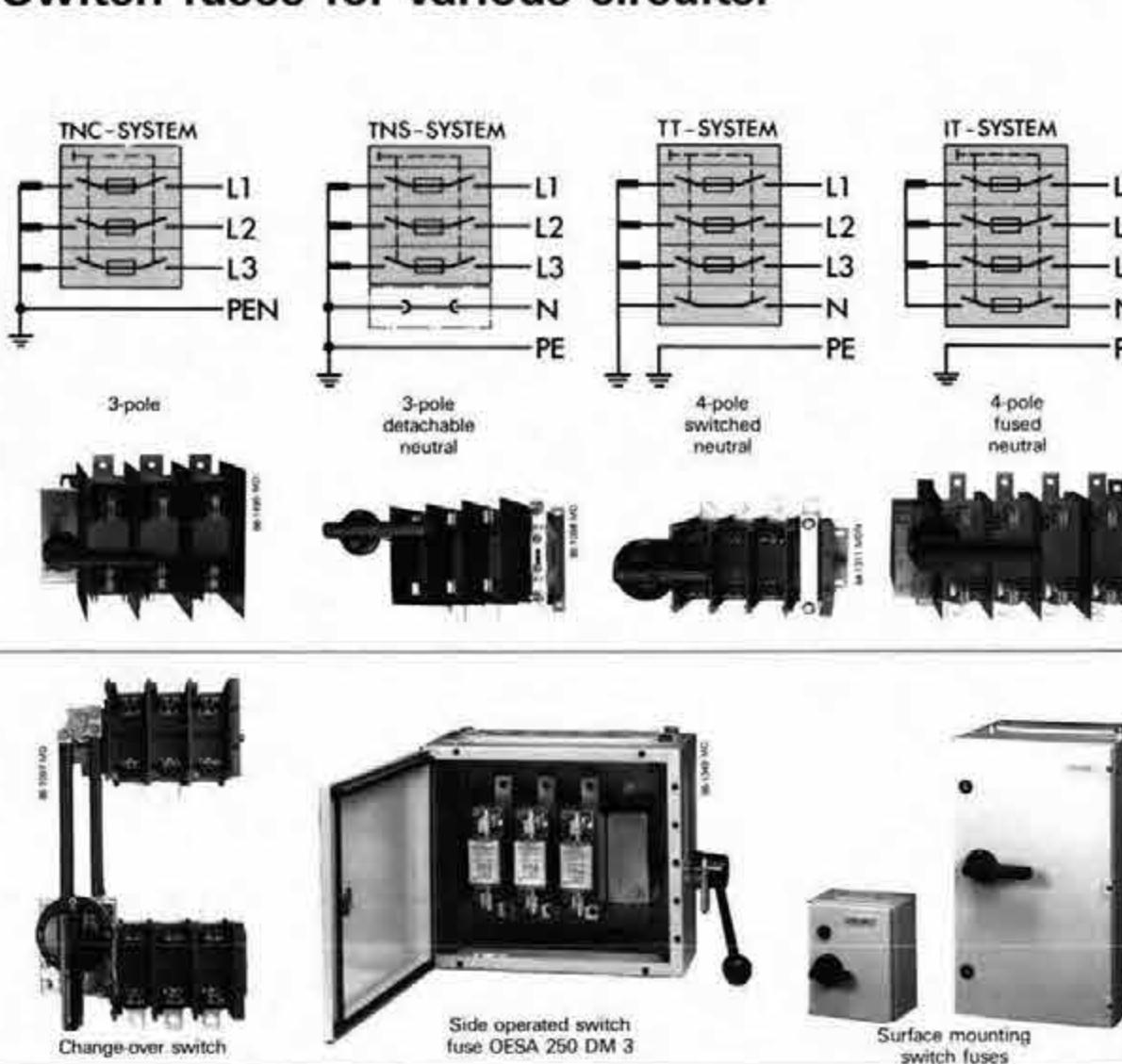
## ASTA tested...



## Versatile in use...



## Switch fuses for various circuits:



# EASY SELECTION... FOR THE BEST PROTECTION



**g&c**  
**Fusegear**

# FUSE LINK/FUSE HOLDER SELECTION TABLE AND MOTOR START RECOMMENDATIONS



## CLIP-IN HRC FUSE LINKS AND HOLDERS - 415V.A.C.

Fuse Fitting	Connections Available	Associated Fuse Link	Kw	HP	FLC	Standard Fuse
SC20	H,P,BW	NS2-20A	.37	0.5	1	NS4
			.55	0.75	1.5	NS6
			.75	1	1.9	NS10
			1.1	1.5	2.5	NS10
			1.5	2	3.4	NS16
			2.2	3	4.8	NS16
SC32	H,P,BW	NS2-32A	3	4	6.4	NS20
			4	5.5	8.1	NS25
SC63	H,BW	* NS2-32 ES40-63	5.5	7.5	11.6	NS32
			7.5	10	14.4	ES40
			11	15	21.1	ES50
			15	20	28	ES63

## BOLT-IN HRC FUSE LINKS AND HOLDERS - 415V.A.C.

Fuse Fitting	Connections Available	Associated Fuse Links	† "DIRECT ON LINE MOTOR START RECOMMENDATIONS (415V AC)"				
			Kw	HP	FLC	Standard Fuse	Motor Fuse
RS20	H,P,PH,BW	NIT2-20A	0.37	0.5	1	NIT4	—
			0.55	0.75	1.5	NIT6	—
			0.75	1	1.9	NIT10	—
			1.1	1.5	2.5	NIT10	—
			1.5	2	3.4	NIT16	—
			2.2	3	4.8	NIT16	—
		NIT20M25 NIT20M32	3	4	6.4	NIT20	—
			4	5.5	8.1	—	NIT20M25
			5.5	7.5	11.6	—	NIT20M32
			7.5	10	14.4	—	—
RS32	H,P,PH,BW	TIA2-32A	0.37	0.5	1	TIA4	—
			0.55	0.75	1.5	TIA6	—
			0.75	1	1.9	TIA10	—
			1.1	1.5	2.5	TIA10	—
			1.5	2	3.4	TIA16	—
			2.2	3	4.8	TIA16	—
			3	4	6.4	TIA20	—
			4	5.5	8.1	TIA25	—
			5.5	7.5	11.6	TIA32	—
		TIA32M35 TIA32M50 TIA32M63	7.5	10	14.4	—	TIA32M35
			11	15	21.1	—	TIA32M50
			15	20	28	—	TIA32M63
RS63	H,P,PH,BW	TIA2-32A TIS35-63A	7.5	10	14.4	TIS35	—
			11	15	21.1	TIS50	—
			15	20	28	TIS63	—
			18.5	25	35	—	TIS63M80
			22	30	41	—	TIS63M80
		TIS63M100	30	40	55	—	TIS63M100
RS100	H,P,PH,BW	TCP80 TCP100 TCP100M125 TCP100M160 TCP100M200	22	30	41	TCP80	—
			30	40	55	TCP100	—
			37	50	69	—	TCP100M125
			45	60	83	—	TCP100M160
			55	75	99	—	TCP100M200
RS200	H,P,PH	TBC2-63A TCB80-100A TF125-200A TF200M250 TF200M250	37	50	69	TF125	—
			45	60	83	TF160	—
			55	75	99	TF200	—
			75	100	136	—	TF200M250
			90	120	162	—	TF200M250
RS400	H,P,PH	TKM250/315 TKM355/400 TKM355/400 TM400M450	110	150	200	TM355	—
			132	175	231	TM355	—
			150	200	263	TM400	—
			160	215	281	TM400	—
			185	250	324	—	TM400M450
			200	270	350	—	TM400M450

A FULL RANGE OF HRC FUSE LINKS ARE AVAILABLE FROM 2 AMP TO 1600 AMP

Refer publication IEF401 for technical details.

Asta 20 certified and complying with AS 2005 & BS88.

†D.O.L start based upon 7 x FLC for 10 seconds

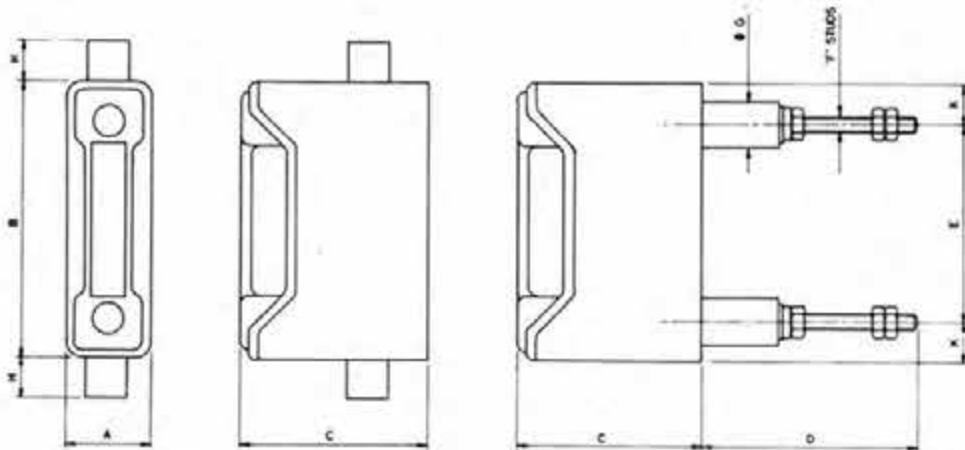
\*To accommodate the 'NS' fuselink additional fuse carrier list No: SCA63 is required. This must be specified at the time of ordering.

# 'RED SPOT'

## HRC FUSE HOLDERS

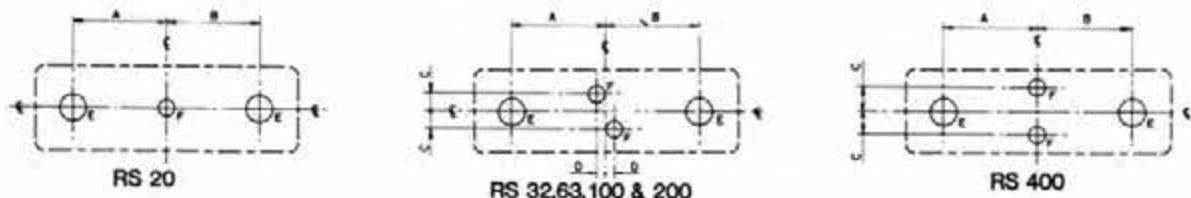


### Dimensions



Type	Rating Amp	A	B	C	D P.PH ONLY	E	F P.PH ONLY	G DIA P.PH ONLY	H	K	Max Cable Size
RS20	20	27	80	54	63	35	M6	13,5	15	22,2	10mm <sup>2</sup>
RS32	32	32	103	70	81	73	M6	17,5	15	15,1	16mm <sup>2</sup>
RS63	63	35	110	75	84	78	M8	17,5	15	15,9	50mm <sup>2</sup>
RS100	100	51	140	100	87	94	M10	22,2	15	23	70mm <sup>2</sup>
RS200	200	70	216	136,5	95	171,5	M12	25,4	22	22,2	120mm <sup>2</sup>
RS400	400	98,5	254	192	114	140	M16	31,8	32	57,2	240mm <sup>2</sup>

### PANEL DRILLING DIMENSIONS

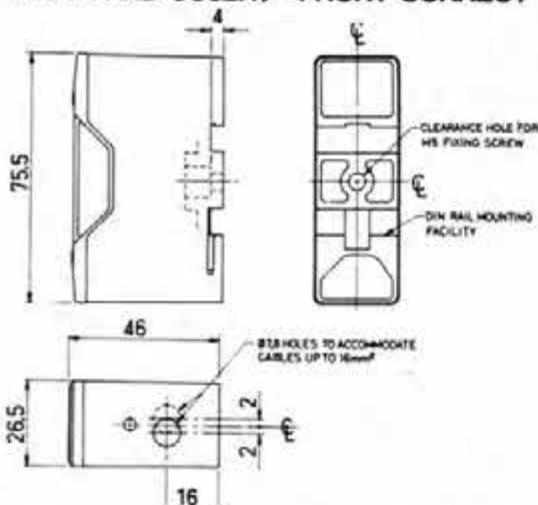


DIM	FUSE HOLDER TYPE																					
	20 H	20 P	20 PH	20 BW	32 H	32 P	32 PH	32 BW	63 H	63 P	63 PH	63 BW	100 H	100 P	100 PH	100 BW	200 H	200 P	200 PH	400 H	400 P	400 PH
A	-	17,5	17,5	17,5	-	36,5	36,5	36,5	-	36,5	36,5	36,5	-	46,8	46,8	46,8	-	85,7	85,7	-	69,9	69,9
B	-	17,5	-	17,5	-	36,5	-	36,5	-	41,3	-	41,3	-	46,8	-	46,8	-	85,7	-	-	69,9	-
C	-	-	-	-	6,4	6,4	6,4	6,4	6,4	6,4	6,4	6,4	11,1	11,1	11,1	11,1	19,1	19,1	19,1	27	27	27
D	-	-	-	-	3,2	3,2	3,2	3,2	3,2	3,2	3,2	3,2	9,5	9,5	9,5	9,5	28,6	28,6	28,6	-	-	-
E	-	Ø15	Ø15	Ø8	-	Ø20	Ø20	Ø8	-	Ø20	Ø20	Ø8	-	Ø24	Ø24	Ø16	-	Ø27	Ø27	-	Ø35	Ø35
F	HOLES TO SUIT M5 SCREWS										HOLES TO SUIT M6 SCREWS.											

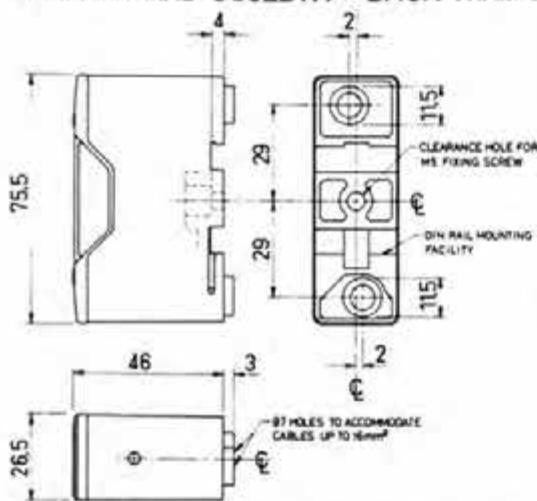
# 'SAFECLIP'

## Dimensions

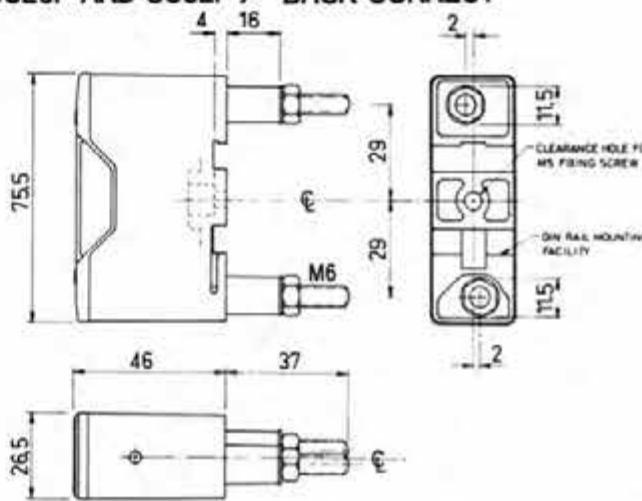
### SC20H AND SC32H; - FRONT CONNECT



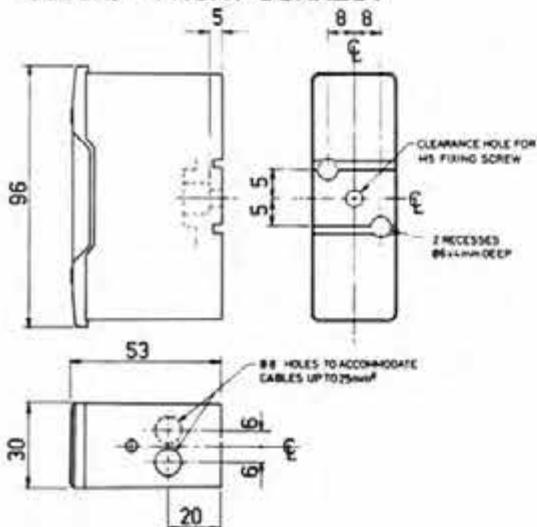
### SC20BW AND SC32BW; - BACK WIRING



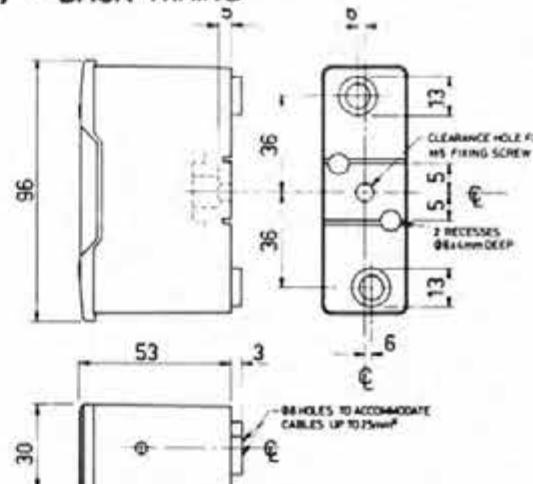
### SC20P AND SC32P; - BACK CONNECT



### SC63H; - FRONT CONNECT



### SC63BW; - BACK WIRING



(DIMENSIONS IN MILLIMETRES)

# GEC

**GEC Industrial Products**

A Division of GEC Australia Limited  
Incorporated in New South Wales

Q-Pulse Id TMS700

25 Princes Road, Regents Park, N.S.W. 2143  
P.O. Box 22, Regents Park, N.S.W. 2143  
Telex 20729. Phone 645 0777

Branches in Sydney: (02) 645 0777 Brisbane: (07) 846 1122

Newcastle: (049) 24 883 Melbourne: (03) 561 2566

Hobart: (002) 34 5133 Adelaide: (08) 272 3100 Perth: (09) 277 4844

SBP0017

Active 29/01/2014

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**KRAUS & NAIMER**  
BLUE LINE SWITCHGEAR



## Switch Types **CA4, 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 acc. 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)

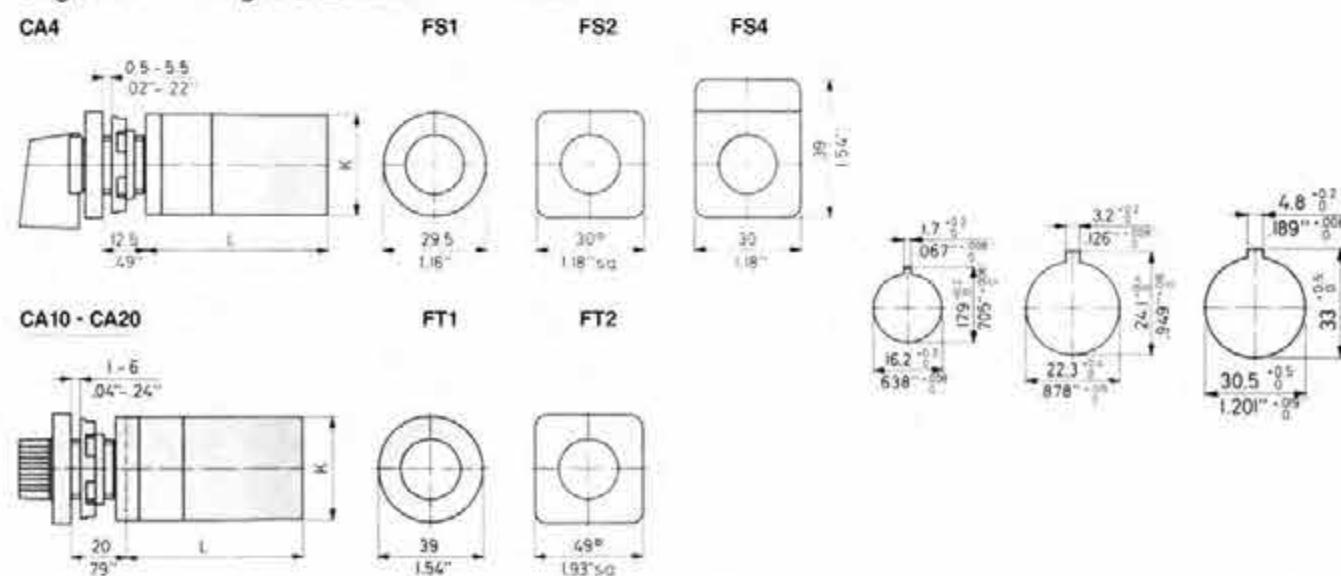
**DIMENSIONS** mm inch

Panel mounting and base mounting

	CA4	CA10-CA20B			Mounting	CA4	CA20	CA20B	Mounting	CA4	CA20	CA20B
		CA4	CA20	CA20B								
E/EF/VE	A 30 118	48 189	64 252		E	D2	6 24	8.5 34				
	B	36 142	48 189		EF	D2	16 63	20 79				
E	C 4.5 18	4 16	4 16		VE	M	4 16	4 16				
VE	C	10.5 41	13.5 53		EF	N	2 04	2 08	2 08			
E/EF/VE	D1	4.1 16	4.1 16									

1) CA4: Dimensions of the escutcheon plate, excepting VE mounting

Single hole mounting 16 or 22 mm and 22 or 30 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	30 118	38 150	46 181	54 210	62 244	70 276	78 307	86 339	94 370	-	-	-	28 11
CA10	31.7 125	41.2 162	50.7 20	60.2 237	69.7 274	79.2 312	88.7 349	98.2 387	107.7 424	117.2 461	126.7 499	136.2 536	43 169
CA11	34.9 137	47.6 187	60.3 237	73.0 287	85.7 337	98.4 387	111.1 437	123.8 487	136.5 537	149.2 587	161.9 637	174.6 687	43 169
CA20	35.9 141	48.6 191	61.3 241	74 291	86.7 341	99.4 391	112.1 441	124.8 491	137.5 541	150.2 591	162.9 641	175.6 691	45 177
CA10B	37.9 149	47.4 187	56.9 224	66.4 261	75.9 299	85.4 336	94.9 374	104.4 411	113.9 448	123.4 486	132.9 523	138.4 545	56 22
CA11B	41.1 162	53.8 212	66.5 262	79.2 312	91.9 362	104.6 412	117.3 462	130 512	142.7 582	155.4 612	168.1 662	180.8 712	56 22
CA20B	42.1 166	54.8 216	67.5 266	80.2 316	92.9 366	105.6 416	118.3 466	131 516	143.7 566	158.4 616	169.1 666	181.8 716	56 22

a u s t r a l i a n s o l e n o i d c o . p t y . l t d .

(Registered in N.S.W.)  
HEAD OFFICE

379 LIVERPOOL ROAD ASHFIELD N.S.W. 2131 P.O. BOX 109  
TELEPHONE (02) 797-7333 FAX (02) 797-0092 TELEX ASOLSYD AA23029 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 AC11, AC3 and AC23 and the obviously unlimited number of switch developments are characteristic for the CA switches.

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 CA4 switches offer maximum space saving benefits. A CA4 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. CA4 contacts are supplied standard with gold plating of 1  $\mu$ .

Single hole mounting according to EN 50007 with protection IP65 is suitable for either 16 or 22 and 22 or 30 mm diameter holes and is available with key operator, if required.

Switching angle of CA switches may be 30°, 45°, 60° or 90°. Switch type CA4 is available with up to 18 contacts. CA10, CA11 and CA20 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	CA10	CA11	CA20	ESSENTIAL MOUNTING		
		CA4	CA10B	CA11B	CA20B	Code	IP front	for type
<b>Nominal voltage</b>		V	500	660	660	660		Panel mounting
IEC/VDE/BS		V	300	300	600	600		
UL/CSA		V	380	660	660	660		
SEV		V	380	380	380	380		
CEE 24		V	380	380	380	380		
<b>Main switch characteristic</b>		V	250	380	380	380		
Isolator conditions are met up to:								
<b>Thermal current <math>I_{th}</math></b>		A	10	20	20	32		Base mounting
IEC/VDE/BS		A	10	16	16	30		
UL/CSA		A	10	16	16	25		
SEV								
	max.							
<b>Nominal current <math>I_n</math></b>		A	10	20	20	32		
AC 21 IEC/VDE/BS		A	10	16	16	30		
AC 1 SEV	380 V	A	-	12	12	20		
	660 V	A						
AC 11 IEC/VDE	220-240 V	A	2,5	6	6	8		
	380-440 V	A	1,5	4	4	5		
UL/CSA								
Pilot Duty — Contact Rating Code		A300	A300	A600	A600			
Ampere Rating		A	10	16	16	30		
CEE 24								
Resistive/Motor load		A	4	10	10	16		
		A	2	7	7	10		
<b>Motor rating</b>								
AC 2 IEC/VDE/BS	3 phase	220-240 V	kW	2,5	4	4	5,5	
	3 pole	380-440 V	kW	4,5	7,5	7,5	11	
		500 V	kW	5,5	10	10	15	
		660 V	kW	-	10	10	13	
AC 3 IEC/VDE/BS	3 phase	220-240 V	kW	1,5	3	3	4	
	3 pole	380-440 V	kW	2,2	5,5	5,5	7,5	
		500 V	kW	3	5,5	5,5	7,5	
		660 V	kW	-	5,5	5,5	7,5	
	1 phase	110 V	kW	0,3	0,6	0,6	1,5	
	2 pole	220 V	kW	0,55	2,2	2,2	3	
		380-440 V	kW	0,75	3	3	3,7	
AC 23 IEC/VDE/BS	3 phase	220-240 V	kW	1,8	3,7	3,7	5,5	
	3 pole	380-440 V	kW	3	7,5	7,5	11	
		500 V	kW	3,7	7,5	7,5	11	
		600 V	kW	-	7,5	7,5	11	
	1 phase	110 V	kW	0,37	0,75	0,75	1,5	
	2 pole	220-240 V	kW	0,75	2,5	2,5	3	
		380-440 V	kW	1,1	3,7	3,7	5,5	
UL/CSA								
Standard motor load	3 phase	120 V	HP	1	1,5	1,5	2	
	3 pole	240 V	HP	1	3	3	5	
		480-600 V	HP	-	-	5	10	
	1 phase	120 V	HP	0,33	0,5	0,5	1	
	2 pole	240 V	HP	0,75	1	1	2	
		277 V	HP	0,75	2	2	3	
		480-600 V	HP	-	-	2	5	
<b>Max. fuse size (gL-characteristic)</b>		A	10	25	25	35		
Rated conditional short-circuit current		KA	3	5	5	10		
<b>Max. permissible wire gage</b>		mm²	1,5	2,5	2,5	4		
stranded wire 2 x		AWG	14	12	12	10		
flexible (with sleeve) 2 x		mm²	1,5	2,5	2,5	4		
		AWG	14	12	12	10		

LED  
ILLUMINATED  
DEVICES  
FOR EXCEPTIONAL  
SHOCK  
RESISTANCE  
AND RELIABILITY.



**ALLEN-BRADLEY**  
A ROCKWELL INTERNATIONAL COMPANY

*800T NEMA Type 4/13  
Illuminated Devices*



The full line of Allen-Bradley LED (Light Emitting Diode) illuminated operators and pilot lights is designed to meet your needs in applications where shock, vibration or accessibility make ordinary incandescent lamps impractical. Our LED cluster construction provides enhanced resistance to shock and vibration, plus up to ten times the life of comparable incandescent lamps. And our prismatic lens optics improves visibility from all angles.

**WINNING ANSWERS**

These devices are available with amber, green or red lamps and use a standard bayonet style T-3 1/4 lamp base. Clear or matching color lenses are available. (Where visibility or on-state indication is a major concern, clear lenses are recommended.) Full voltage units are available in 24, 32 and 120 volts AC/DC.

Transformer units are available in 120, 240, 480 and 600 volts AC.

LED illuminated devices and pilots lights are available in a variety of configurations:

- ◆ 800H NEMA Type 4/4X units are used for many corrosive environments.
- ◆ 800T NEMA Type 4/13 units are for use in the presence of most non-corrosive oils, coolants and other industrial liquids.

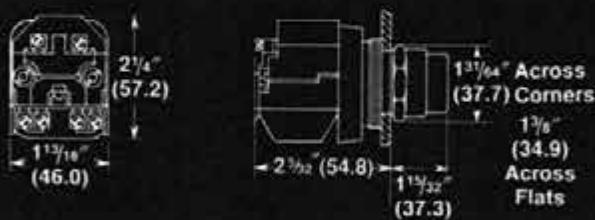
Enclosures and assembled stations in the 800H line are available in stainless steel for NEMA Type 4 applications and non-metallic glass polyester for NEMA Type 4X applications. In the 800T line, cast enclosures and assembled stations are available for NEMA Type 4/13 applications. 800H NEMA Type 7 & 9 stations and devices are also available with LEDs.



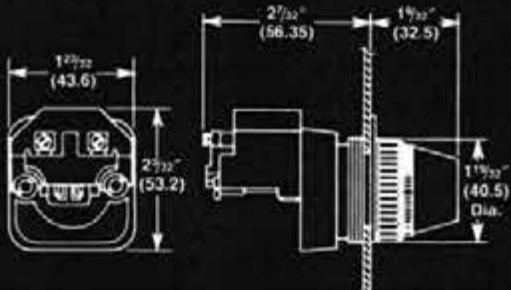
**APPROXIMATE DIMENSIONS**

Dimensions are shown in inches (millimeters)

Transformer Type: LED Push-To-Test Pilot Light And Illuminated Push Button



Transformer Type: LED Pilot Light

**PRODUCT SPECIFICATIONS**

**Operating Voltage:** 7 Volts AC (transformer)  
9 Volts AC/DC (full voltage)

**Operating Current:** 50 mA (max.) (transformer)  
50 mA (max.) (full voltage)

**Temperature Range:** Operating: 0°C to +55°C (+32°F to +131°F)  
Storage: -40°C to +85°C (-40°F to +185°F)

**DESIGN SPECIFICATIONS/TEST REQUIREMENTS**

**Vibration:** 10-2000 Hz 0.76mm displacement (peak-to-peak)  
Max. 5G

**Shock:** 1/2 cycle sine wave for 11 msec. ≥ 25G (contact fragility) and no damage at 100G

**Degree of Protection:** IEC 529, IP66, 800H NEMA Type 4, 4X  
IEC 529, IP65, 800T NEMA Type 13

**CONSTRUCTION****LED Colors:** Amber, Red or Green**Brightness:**

Amber LED - 90 mcd at 20 mA  
Green LED - 80 mcd at 20 mA  
Red LED - 200 mcd at 20 mA

**LED Lamp Base Type:** Miniature Bayonet, T-3-1/4 size**Lens Colors:** Transparent, Amber, Green and Red

With offices in major cities worldwide.

**WORLD HEADQUARTERS**  
1201 South Second Street  
Milwaukee, WI 53204 USA  
Tel: (414)382-2000  
Telex: 43 11 016  
FAX: (414)382-4444

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1422 AC Uithoorn  
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FAX: (44)2975/60222

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FAX: (519)623-8930

**LATIN AMERICA HEADQUARTERS**  
1201 South Second Street  
Milwaukee, WI 53204 USA  
Tel: (414)382-2000  
Telex: 43 11 016  
FAX: (414)382-2400

Publication 800T-1.1 - August, 1989  
Supersedes Publication 800T-1.1 Dated October, 1985



## FEATURES

- ◆ LED lamps use a cluster of four high-intensity, wide-angle light emitting diodes for brightness.
- ◆ A specially designed lens optic pattern improves light dispersion for better visibility at all angles.
- ◆ Nylon lenses are compatible with most water-based coolants and cutting solvents that can attack polycarbonate and many acrylic plastics.
- ◆ Solid state reliability promotes extended service and low maintenance.
- ◆ Available to retrofit a standard transformer pilot light.



*Front Left;  
Full Voltage  
Power  
Module*

*Right;  
Transformer  
Power  
Module*

*Below Photo;  
Full Voltage  
Style LED  
Lamps*

## APPLICATIONS

- ◆ On sites where shock and vibration are a concern, such as near punch presses or stamping operations.
- ◆ When the reliability of the lamp is critical, such as "Power On" indicators, LED lamps provide up to ten times the life of incandescent versions.
- ◆ In installations where access is difficult or costly, LED lamps can reduce the maintenance costs associated with bulb changes.
- ◆ When mounted in a suitable enclosure, LED lamps are U.L. listed for Class I and II, Division 2 Groups A, B, C, D, F and G. (Illuminated operators must be used with our sealed switch or logic reed contact blocks.) This avoids the expense of costly NEMA Type 7 & 9 enclosures.



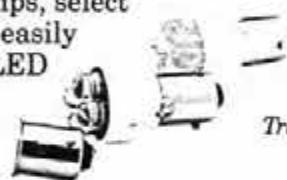
*800H NEMA Type 4/4X  
Illuminated Devices*

## FULL VOLTAGE STYLES

Full voltage power modules use a resistor to drop the voltage supplied to the lamps. Full voltage power supplies are available in a wide range of voltages and operate on both AC and DC current.

## TRANSFORMER STYLES

Transformer power modules are available for AC current from 120 to 600 volts. Transformer coils are protected from heat, moisture and vibration by pressure molded resin. The same transformer power module is used with incandescent lamps. So, if a facility is standardized on incandescent lamps, select applications can easily be converted to LED lamps.

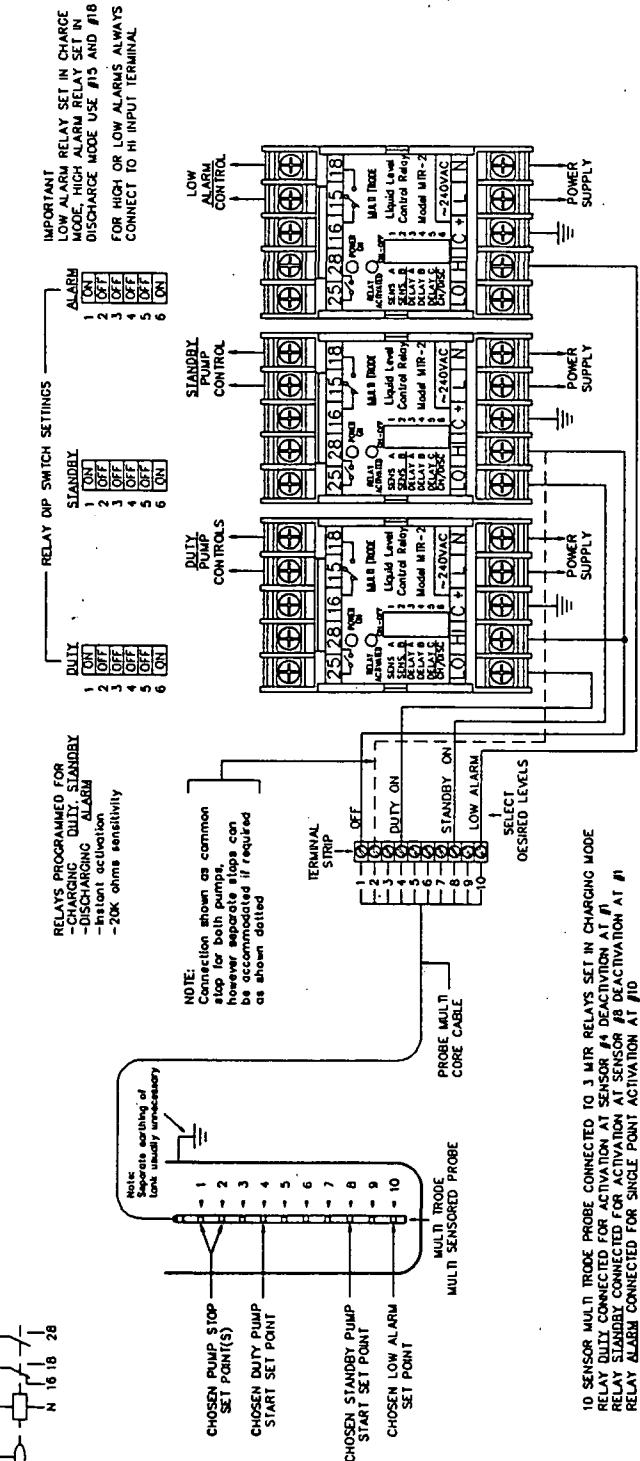


*Transformer Style  
LED Lamps*

## RELAY PROGRAM FUNCTIONS

SWITCH NO.	SETTING	SENSITIVITY
1	2	
OFF	OFF	1k $\Omega$ Concentrated Acids, Minerals, Alkalines
ON	OFF	1k $\Omega$ Acids-Alkalines, Diluted brine, Sea water
OFF	ON	4k $\Omega$ Sullage-Sewage effluent
ON	OFF	20k $\Omega$ Low conductive liquids, Town water...
ON	ON	80k $\Omega$ Low Purified water
3	4	DELAY ON ACTIVATION
OFF	OFF	Zero Seconds
OFF	ON	2.5 Seconds
OFF	OFF	5 Seconds
OFF	ON	10 Seconds
OFF	OFF	20 Seconds
ON	ON	40 Seconds
ON	OFF	80 Seconds
ON	ON	160 Seconds
6		MODE
OFF		Discharge
ON		Charge

## CONTROL OF THREE APPLIANCES IN A CHARGING SITUATION



## CONTROL OF THREE APPLIANCES IN A DISCHARGING SITUATION

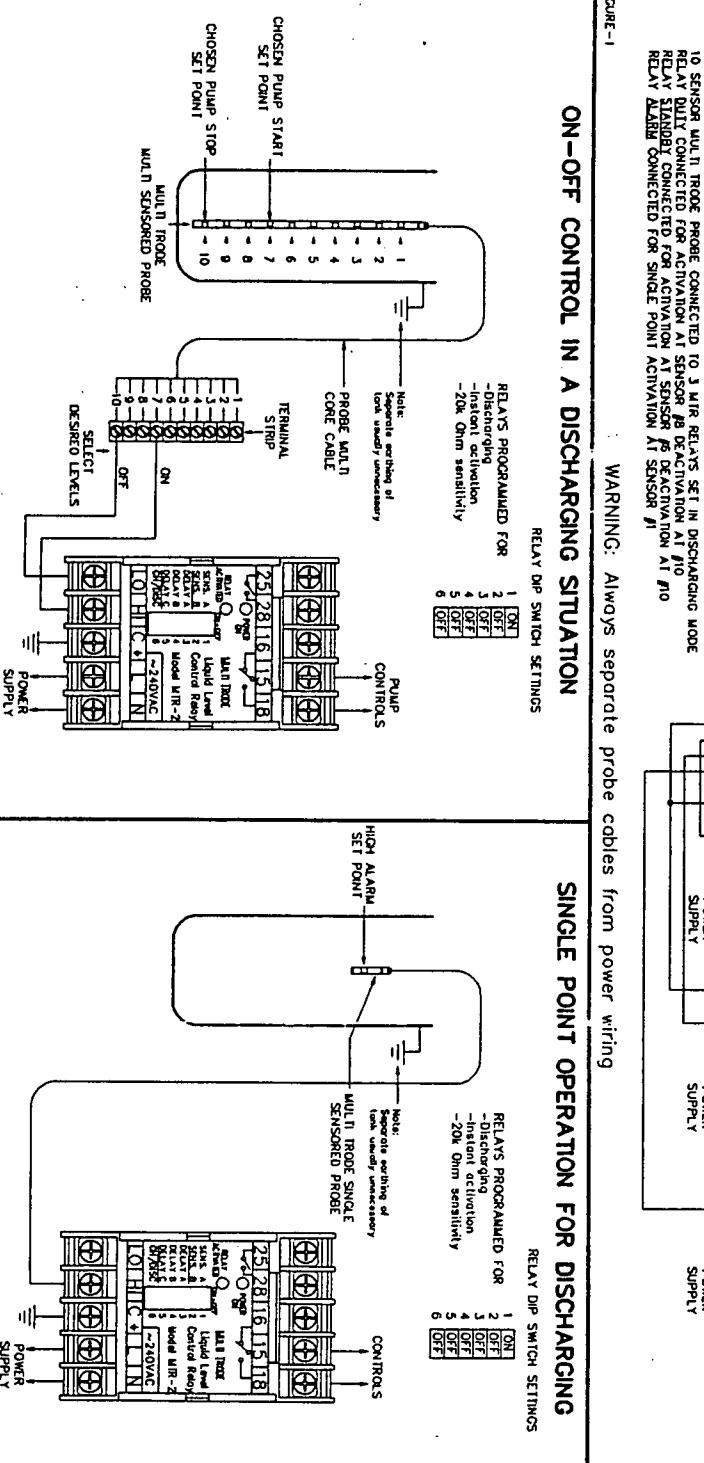
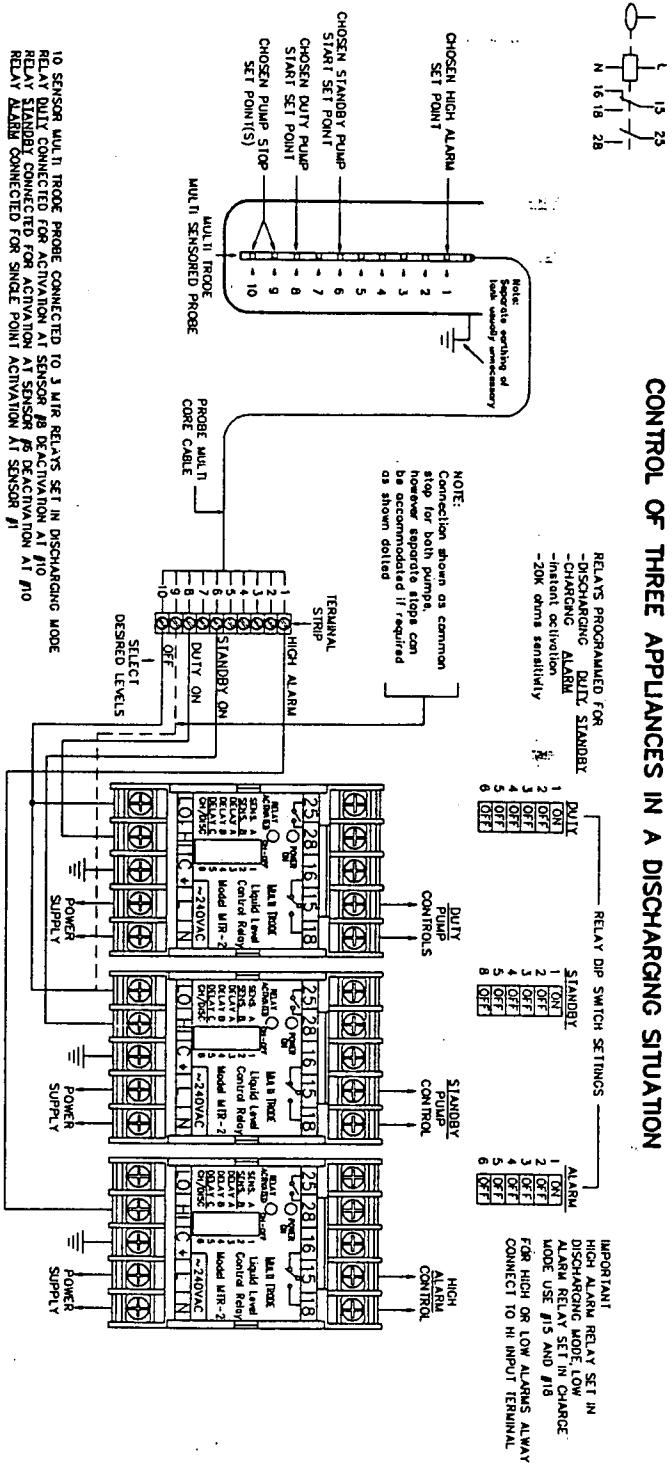


FIGURE-1

WARNING: Always separate probe cables from power wiring

10 SENSOR MULTI TRODE PROBE CONNECTED TO 3 MTR RELAYS SET IN DISCHARGING MODE.  
RELAY DUTY CONNECTED FOR ACTIVATION AT SENSOR #8 DEACTIVATION AT #10  
RELAY STANDBY CONNECTED FOR ACTIVATION AT SENSOR #5 DEACTIVATION AT #10  
RELAY ALARM CONNECTED FOR SINGLE POINT ACTIVATION AT SENSOR #1

1 SINGLE SENSOR PROBE CONNECTED TO SINGLE MTR RELAY SET IN DISCHARGING MODE:  
ACTIVATION AND DEACTIVATION AT SAME POINT

FIGURE-2

FIGURE-3

SWITCH NO	SENSITIVITY
1	NOMINAL
2	12VAC NOMINAL
3	2 SETS, 1 NO & 1 CHANGE OVER
4	5 AMP 250VAC RESISTIVE
5	10 <sup>9</sup> OPERATIONS
6	3.4VA (MAX)
7	X 174(2.28) X 445(1.77) X D14(4.5)
8	240, 110, 240VAC, 50/60Hz
9	24, 12VDC
10	2 X 2.5mm <sup>2</sup> (0.64 <sup>2</sup> INCH)
11	DIN RAIL OR 24mm SCREWS (3/16")
12	GREEN - POWER ON RED - ACTIVATION
13	SELECTABLE VIA SWITCHES
14	1K, 4K, 20K, 80K
15	SELECTABLE VIA SWITCHES CHARGE/DISCHARGE
16	2.5, 5, 10, 20, 40, 80, 160
17	MINUS 10° C (+14° F) PLUS 60° C (140° F)

**MULTI TRODE**

PHONE (07) 508-4011

FAX (07) 508-0011

TITLE MTR - WIRING DIAGRAMS

DRAWN BY S. SWART

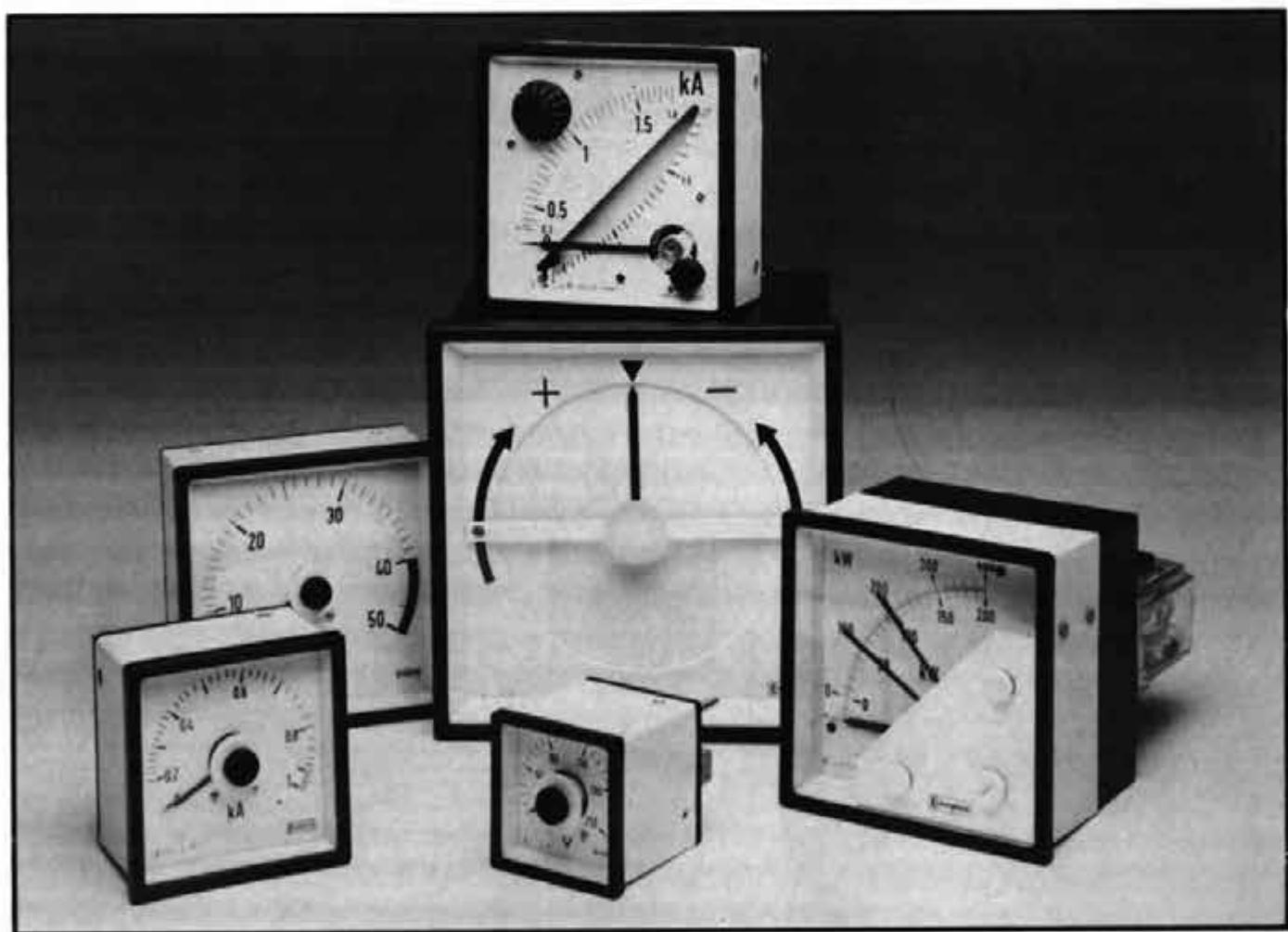
CHECKED BY P. HOWELL

DRAWN BY S. SWART

# CROMPTON



Quadratic  
240 Series



# Quadratic 240 Series


**Selection table**

Symbol	Movement	Page	□				○			
			242	243	244	246	242	243	244	246
Ⓐ Ⓑ Ⓒ Ⓓ	A V A V A A	Moving Iron Moving Coil Maximum Demand Indicators Moving Iron + MDI	4	● ● — —	● ● ● ●	● ● ● ●	● ● — —	● ● — —	● ● — —	● ● — —
Ⓐ Ⓑ Ⓒ Ⓓ	W VAR $\cos\phi$ $\cos\phi$ Hz	Wattmeter Varometer Phase Angle meter Power Factor meter, 360° scale Frequency meter - pointer type	5	* * — ●	* * — ●	● ● — ●	● ● — ●	* * — *	* * — *	● ● ● ●
Hz	V	Frequency meter - reed type Synchronising Voltmeter Synchroscope, 360° scale Phase Sequence Indicator	6	— — — —	● — — ●	● — — ●	— — — —	— — — —	— — ● —	— — ● —
Ⓐ Ⓑ Ⓒ Ⓓ	A V rev/min °C	Moving Coil Rectifier Position Indicator Speed Indicator Temperature Indicators	7	● * ● *	● * ● *	● * ● *	● * ● *	● * ● *	● * ● *	● ● ● ●
⌚ ⌚	h	Elapsed Time Meter Meter Relay	8	● —	● —	● ●	— —	— —	— —	— —
		Current Transformers, Shunts, Transducers,	8	● self-contained * with separate transducer — not presently in range						
		Connection diagrams Dimensions	9-11 12							

## Features

- ★ Shock-resistant taut band suspension
- ★ Vibration-proof Hi-Q damping
- ★ Suitable for tropical climates
- ★ Customised options & extras
- ★ Complementary transducers, current transformers, shunts, tachogenerators
- ★ 90° and 240° scale
- ★ Slide in dials for 90° volts amp frequency

## Standards

All instruments comply with the following specifications:

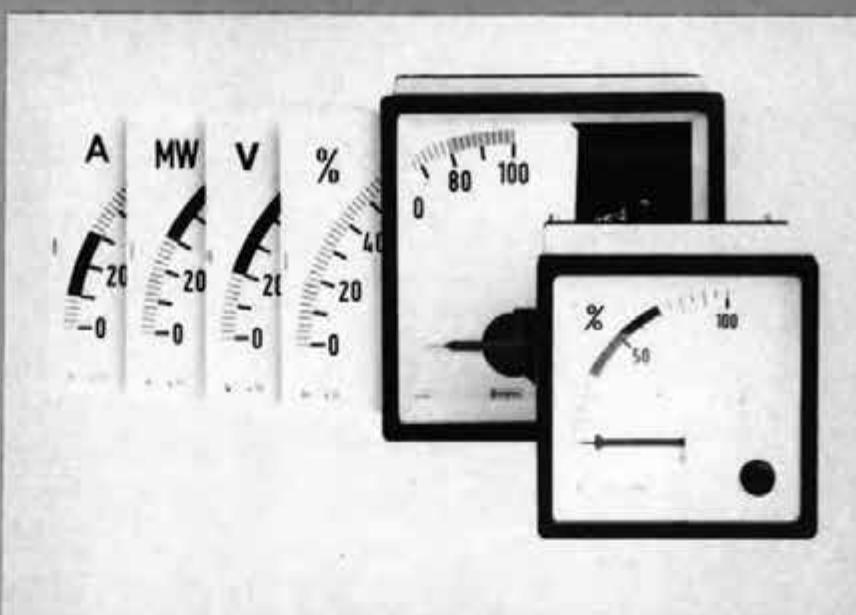
Case dimensions	DIN43700
Benzels (slim)	DIN43718
Scale markings	DIN43802
Magnetic influence	DIN43780

Performance	IEC 51
Accuracy	

Overloads	
Measuring ranges	DIN43701
Safety requirements	IEC414
Dial symbols	IEC51
Enclosure	IEC529

Optional compliance on request

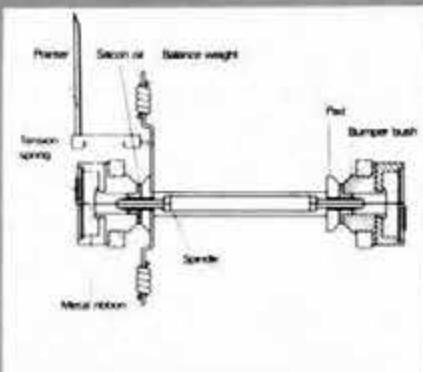
Lloyds Marine  
National Area Boards  
Spec ES141 - 26 + 50 + 8



# Quadratic 240 Series



## Hi - Q Taut Band Suspension



In the Crompton world-patented 'Hi-Q' taut band suspension (see diagram) all the delicate parts of the traditional instruments are eliminated. There are no pivots, no jewel bearings, no hair-springs, no air damping vane. Instead, a tough metal ribbon suspends the moving element between front and rear tension springs.

Specially contoured pads are fitted to the ends of the spindle and the working gap at each end is filled with a high quality silicon fluid. The pads, together with the fluid reservoir, form a system which acts as resilient built-in shock absorbers. This provides both rotational and longitudinal damping as the moving element floats on oil with no bearing friction and is effectively cushioned against shock and vibration.

360° synchrosopes and power factor meters have robust pivot and jewel bearings.

All movements are self-shielded against external magnetic fields as defined in BS89, IEC51 and DIN 43780.

## Construction

Models 242, 243 and 244 have cases, bezels and terminal plates injection moulded in flame retardant engineering thermoplastic recognised by Underwriters Laboratory (UL).

Model 244 Meter Relay and all model 248 have pressed steel cases.

All instruments have glass windows, with zero adjusters where necessary. Non-reflecting glass or polycarbonate shatterproof windows are available.

## Enclosure

The cases comply with enclosure code IP54 to IEC 529. They are suitable for use in tropical conditions.

## Specification

### Performance

Instruments comply with IEC51.

### Accuracy

Class 1.5 is standard. Frequency meters offer Class 0.5 or 0.2. Maximum demand indicators are Class 3. Synchrosopes and 360° power factor meters are Class 2.5 (2° electrical).

### Overload withstand

1.2 times rated current or voltage for 2 hours. Ammeters 10 times rated current, voltmeters and frequency meters 2 times rated voltage for 5 seconds. Power instruments accept similar overloads.

### Dielectric test

2kV a.c. for 1 minute.

### Ambient Temperature

Instruments have a working ambient range of -20°C to 60°C (70°C Lloyds) with relative humidity up to 90%. They are calibrated for other temperatures within the working range can be specified.  
(Lloyds Shipping at 35°C)

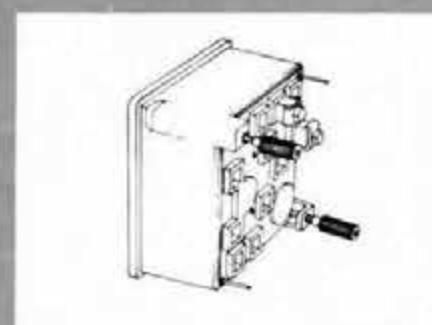
### Damping time

≤ 3 seconds is usual. More heavily damped movements are available on request.

## Illumination

Internally illuminated dials are available for Models 243, 244 and 246, 240° moving coil. The replaceable rear mounted lamps are supplied for 6, 12 or 24V.

## Mounting Clamps



Models 242, 243 and 244 are provided with two corner fixing clamps and tensioning thumb screws.

## Dials and Scales

Standard dials are acrylic matt white with black printed scales and bar pointers.

They are scaled in accordance to DIN 43802. Interchangeable slide-in dials are used on models 243 and 244 short scale moving iron and moving coil.

360° Instruments have platform dials.

Black dials with white or yellow scales and pointers are available.

General options include red supplementary pointers, red indexes (quadrant scales), red, green or blue lines, bands or segments, finely spaced divisions, multi-scales and special scales and captions to customers' requirements.

All 243 and 244 90° scale voltmeters, ammeters and frequency meters have slide in dial, offering the benefit of low stock costs as only the basic instrument types need to be stocked together with ranges of dials. Other dials can be obtained rapidly from our local sales and service centres or agents.

## Mounting Angle

Standard instruments are calibrated for mounting on a vertical panel.

Special calibration for other mounting positions can be provided on request. Specify the angle of inclinations required in degrees, ° from the horizontal.

## World Patents

Crompton indicators incorporate features covered by one or more of the following patents:

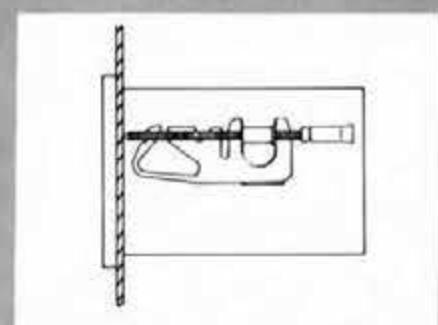
**GREAT BRITAIN:** 1,124,667; 1,295,935; 1,212,245; 29,466/77

**AUSTRALIA:** 415,321.

**CANADA:** 792,902; 846,338

**GERMANY:** 1,591,864; PI.591,864,6; P 2747965.8; G 7732975.0.

**U.S.A.:** 3,439,273; 3,590,375; 845032



Model 246 and Meter Relay model 244-30, have two side fixing spring clips.

# Quadratic 240 Series



A&amp;V~



A&amp;V



A



A



## Moving Iron

Designed to measure a.c. current or voltage, these rugged movements indicate true r.m.s. values substantially independent of system wave form. Scales are calibrated down to 20%. Ammeters can have overload scales  $\times 2$  or  $\times 6$  for motor start duty. Heavy damping is available. Ammeters are scaled for use with  $-1A$  or  $-5A$  current transformers for high ratings or remote indication. Calibration for d.c. can be arranged on  $90^\circ$  ratings.

### Accuracy

Class 1.5 (Class 2 model 242  $90^\circ$  scale)

### Ratings

Ammeters:

0.5A to 100A direct connected (25A for 242-90° & 240° scales)

Ratings for use with C.T.s:

Scales with  $\times 2$  or  $\times 6$  overload.

Low load scales (max 10A).

Voltmeters:

6V to 600V direct connected.

100, 133, 140, 150V for use with V.T.s.

Frequency 50 or 60 Hz, 400 Hz on request.

### Burden at 50Hz

Ammeters:  $90^\circ$  - 0.5VA, 240° - 1.5VA.

Voltmeters: 4.5VA max.

## Moving Coil

These self-shielded high-torque movements are suitable for all d.c. systems. The linear scale is calibrated down to zero and accuracy maintained down to 10%. High current ratings are measured with separate shunts and suitably scaled indicators. Suppressed, centre or off-set zero models are available and indicators can be calibrated for use with tachogenerators, transducer outputs, process signals and similar electrical sensors. Model 242 -  $90^\circ$  scale has a pivoted movement and eddy current damping.

### Accuracy

Class 1.5

### Ratings

Ammeters:

100mA to 25A direct connected.

4/20mA suppressed zero.

Voltmeters:

60mV to 600V direct connected.

1/5V suppressed zero.

60, 75, 150mV for use with shunts.

### Impedance

Voltmeters:  $1000\Omega/V$  above 1V.

Ammeters: 75mV internal shunt above 60mA.

For values see publication T118.

## Maximum Demand Indicator

The thermal/time characteristic of MDIs monitors the most economic use of cable, fusegear and transformers. The directly heated bimetal element indicates mean r.m.s. current over 8, 15 or 20 mins. A red slave pointer shows highest value reached and has a wire sealable reset knob. The optional saturating C.T. limits the power into the MDI and is used where a protection relay is connected in series from the same C.T. Scales are calibrated to match the C.T. plus 20% overload (e.g. 0-5-6A).

### Accuracy Class 3

### Ratings

5A for use with separate C.T.

5/5A saturating C.T. (dim. 'C' page 12 becomes 83mm).

### Burdens 50/60Hz

MDI - 2.5VA, CT - 2VA.

### Overload withstand

Standard: 5 x FL for 5 sec

10 x FL for 1 sec

With saturating C.T.: 10 x FL for 3 sec

20 x FL for 1 sec

### Frequency 50/60Hz

Models 243, 244,  $90^\circ$  scale.

## Moving Iron + MDI

Where the instantaneous and maximum demand currents are required, this instrument combines both movements in one case. It can replace an existing M.I. ammeter.

The scales are calibrated to match the C.T. primary plus 20% overload. End values are selected from: 1.2 1.8 2.4 3 3.6 4.8 6 7.2 9 and their multiples of 10 and 100.

### Accuracy

Bimetal element

Class 3

Moving iron ammeter

Class 1.5

### Ratings

5A for use with separate C.T.

5/5A saturating C.T. (dim. 'C' page 12 becomes 83mm).

### Burdens 50/60Hz

MDI - 2.5VA, CT - 2VA, MI - 0.5VA.

### Overload withstand

Standard: 5 x FL for 5 sec

10 x FL for 1 sec

With saturating C.T.: 10 x FL for 3 sec

20 x FL for 1 sec

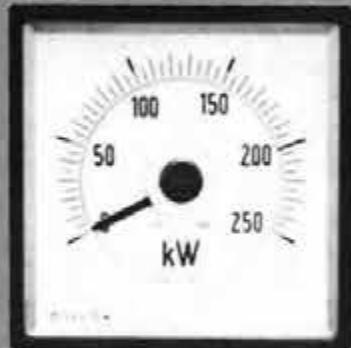
### Frequency 50/60Hz

Model 244,  $90^\circ$  scale only.

# Quadratic 240 Series



## W&VAR



## Wattmeters / Varmeters

Watt and Var meters are available in all models of the Quadratic range for the following a.c. systems:

- single phase
- 3 phase balanced load, 3 or 4 wire
- 3 phase unbalanced load, 3 or 4 wire

The measuring system comprises a moving coil indicator and power converting transducer.

Scales are linear down to zero. Centre and off-set zero scales are available for reverse power and Import/Export indication.

### Accuracy Class 1.5

#### Ratings

Current: 0.2A to 10A direct connected.

1A or 5A for C.T.s.

Voltage: 100/125, 200/250, 380/450V.

100—110 for V.T. use.

Frequency: 50Hz, 60Hz, 400Hz.

Power Factor: UPF assumed (range 0.5/1/0.5)

#### Burdens at 50Hz

Current: 1VA each cct.

Voltage: 4VA each cct.

#### Models

244, 246 self-contained or with separate transducer. 242, 243 with separate transducer.

## cos φ



## Phase Angle Meter

These meters indicate the phase displacement between current and voltage. Ideal value is unity power factor ( $\cos \phi = 1.0$  on the meter scale). Systems operating at lower values are using wattless power.

- single phase
- 3 phase 3 wire balanced load
- 3 phase 4 wire balanced load

The measuring system comprises a moving coil indicator and phase angle transducer.

### Accuracy Class 2.5 (2° electrical)

#### Ratings

Current: 1A or 5A for C.T.s.

Voltage: 100/125, 200/250, 380/450V.

100—110V for V.T. use.

Frequency: 50Hz, 60Hz, 400Hz.

#### Burdens at 50Hz

Current: 1VA

Voltage: 4VA

Current range 20% to 125%.

#### Models

244, self-contained or with separate transducer.

242, 243, 246 with separate transducer.

## cos φ 360°



## Power Factor Meter

For 3 phase 3 or 4 wire unbalanced load systems. These meters are suitable for generators or supplies operating in parallel.

The four quadrant 360° scale calibrated 0-1-0-1-0 cos φ indicates forward (export) and reverse (import) power flow for inductive and capacitive loads.

The rotating iron vane movement has spring-loaded bearings and silicon fluid damping.

### Accuracy Class 2.5 (2° electrical)

#### Ratings

Current: -1A or -5A for C.T.s.

Voltage: 100/125, 200/250V,

380/450V

100—110V for V.T. use.

Frequency: 50Hz, 60Hz, 400Hz.

#### Burdens at 50Hz

Current: 2VA per coil.

Voltage: 4VA per coil.

(7.5VA above 250V)

#### Models

244, 246 only.

## Hz



## Frequency Meter

### Pointer type

Pointer type frequency meters are the most accurate and easy to read instrument of their type. Resolutions of 0.1 Hz can be observed.

The instrument comprises a moving coil indicator with a frequency transducer.

### Accuracy Class 0.2, Class 0.5

#### Ratings

Voltage: 100-125, 200-250, 380-440V.

100—110V for V.T. use.

#### Frequency spans

Class 0.5: 45/55, 55/65, 45/65,

360/440Hz.

Class 0.2: 47/53, 57/63Hz.

#### Burdens Voltage: 4VA max.

#### Models

242, 243, 244, 246-90° scale self-contained.

244, 246 - 240° scale self-contained.

242, 243 - 240° scale with separate transducer.

# Quadratic 240 Series



1 Hz



## Frequency Meters Vibrating reed

In this meter, frequency is indicated by vibrating reeds. Each reed is tuned to a different value in the frequency span.

For synchronising purposes, two reed assemblies are mounted adjacently in one case.

Reed frequency meters are suitable for situations where exact values are not required. Readings are unaffected by waveform.

### Accuracy Class 0.5

#### Ratings

Voltage: 100-125, 200-250, 380-440V.  
100 - 110 for V.T. use.

#### Frequency spans

13 reed: 47/43, 57/63 Hz  
21 reed: 45/55, 55/65 Hz  
2 x 13 reed: 47/53, 57/63 Hz  
2 x 21 reed: 45/55, 55/65 Hz

#### Burdens 2.5VA max.

#### Models

243: 13 reed.

244: 13, 2 x 13, 2 x 21 reed

## Dual Frequency Volt and Amp Meters

The two instruments contained in the 96 x 96 mm case have 90° scale length and can be used to measure a wide range of frequency, Volts and Ampere parameters. These dual instruments save both space and time by only requiring one panel cut.

These products are ideal for Synchronising application. When an ac generator is to be connected to another generator or to mains voltage, phase and frequency must coincide. The 244-80L allows measurement of two independent voltages and 244-41D two independent frequencies.

Accuracy 244-41D Frequency Class 0.5. 244-80E/L Voltmeter and 244-80M/c Ammeter. Class 1.5

#### Ratings

244-41D 100-125, 200-250 380-440 volts 244-80E D.C. volts 60mV to 600V 1/5 volt suppressed zero 60, 75, 150mV for use with shunts. 244-80L A.C. volts 6 to 600 volts 25Hz to 3KHz (rectified) 50Hz standard 244-80M D.C. Amps 100µA to 25A direct connected 4-20mA suppressed zero 244-80F A.C. Amps 250µA-1Amp 25Hz to 3KHz (50Hz standard) Rectified.

#### Frequency:

255-41D 45/55, 55/65, 45/65, 360/440 Hz

#### Burden

244-41D 4VA max

#### Impedance

244-80E 1000Ω/volt above 1volt. 244-80M 75mV internal shunt above 60mA

## Synchroscope

Where non-automatic paralleling of two a.c. systems is necessary, phase displacement, phase rotation and frequency of both systems can be monitored by a synchroscope.

The systems are synchronised when the pointer is stationary at the 12 o'clock position.

The continuously rated rotating iron vane movement has spring-loaded bearings and silicon fluid damping.

Accuracy  
Class 2.5 (2° electrical)

#### Ratings

Voltage: 100/125, 200/250, 380/450V. 100-110V for V.T. use.

#### Frequency: 50, 60, 400Hz.

#### Burdens at 50Hz

5VA maximum

#### Models

244, 246

## Phase Sequence Indicator

Incorrect phase connection may cause motors to run in reverse resulting in serious damage to pumps, compressors, separators, ventilation etc.

Shore to ship supplies, mobile generators and remote installations are particularly vulnerable to this hazard.

The electronic phase sequence indicator both ensures correct phase rotation and the presence of all 3 phase supplies.

#### Ratings

Voltage: 100/550V

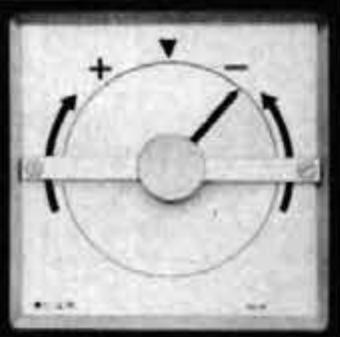
Frequency: 50/60Hz

Burden 2.5VA

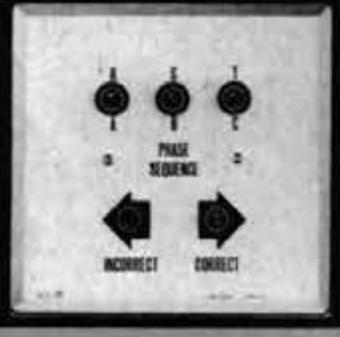
#### Model

244.

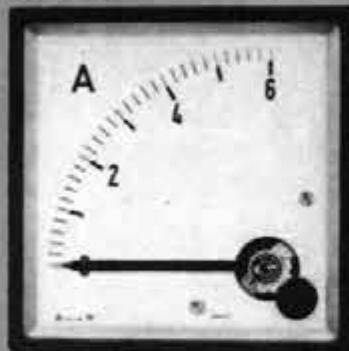
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# Quadratic 240 Series

**A&V~**

## Moving Coil Rectifier

For high frequency or linear full scale a.c. measurements.

These instruments measure average values of sinusoidal waveforms and are scaled in r.m.s. values.

The high quality silicon bridge rectifier gives a linear scale down to zero, except on low voltage where some compression occurs.

For ratings 1A to 100A use a 10mA instrument with a 770 Series miniature CT.

**Accuracy Class 1.5 down to 10%.**

### Ratings

**Ammeters:**

250 $\mu$ A to 1A direct connected.

1A for use with C.T.s.

**Voltmeters:** 6V to 600V direct connected.

### Frequency

50/60Hz. Other single frequencies 25-3000Hz on request.

**Impedance** see publication T118.

### Models

242, 243, 244, 246, 90° and 240° scales.

**Ω**

## Position Indicator

The measuring system comprises a moving coil indicator, stabilised power source transducer and remote potentiometer or resistance thermometer sensor (supplied by customer).

The Position Indicator monitors transformer tap position, hoist or valve position, etc. It employs a 3 wire system, 11-18 positions can be provided using 400 $\Omega$  steps.

**Accuracy Class 1.5 overall**

### Auxiliary supply

a.c. 50/60Hz, 45/55Hz, 100/125, 200/250V, 380/440V.

d.c. : 50, 110, 220V, ±15%

### Burden 2VA

### Models

244, 246 self-contained or with separate power source transducer.

242, 243 with separate Paladin power source transducer, see publication SW250T

**Ω rev/min**

## Speed Indicator

These moving coil indicators can be calibrated for any d.c. or rectified a.c. tachogenerator or voltage/current signal source.

They can be scaled in any speed function where the relationship of output signal to speed is specified.

A suitable range of rectified 3 phase tachogenerators is available with foot or flange mounting options - see publication SW840.

### Accuracy

Class 1.5

### Models

242, 243, 244, 246

### Tachogenerator speed ranges

0/30 to 0/45 rev/min

0/46 to 0/50

0/51 to 0/85

0/86 to 0/120

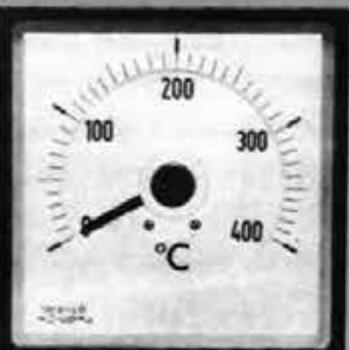
0/121 to 0/180

0/181 to 0/200

0/201 to 0/350

0/351 to 0/10000

Nominal output 1mA

**Ω °C**

## Temperature Indicators

These indicators read temperature values, usually remotely, with RTD or Thermocouple sensors supplied by customer.

RTD (resistance thermometer) indicators measure the change in resistance of the sensor. A 2 or 3 wire system may be used.

Thermocouple indicators accept standard millivolt input signals. Cold junction compensation is provided and high scale thermocouple break indication is incorporated.

**Accuracy Class 1.5—Indicator only**

### RTD indicator -45RG

Suitable for 10 $\Omega$  Copper or 100 $\Omega$  Platinum sensors.

Power in RTD 100 $\mu$ W approx.

### Thermocouple indicator -45TG

Suitable for standard thermocouple outputs 10-50 mV full scale value. 50 $\Omega$  max. cct resistance.

### Auxiliary supply

-45RG 50, 110 or 220V a.c. 50/60Hz

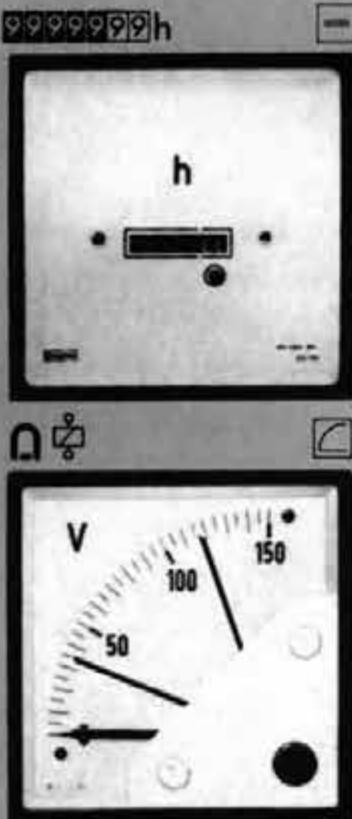
-45TG 110 or 220V a.c. 50/60Hz

**Burden** -45RG 2VA, -45TG 3VA

### Models

244, 246 self-contained. All models available with separate transducer. See SW250T.

# Quadratic 240 Series



Combining a highly accurate indicator with High and Low set-point relays, this robust unit is available in case sizes 96 x 96mm.

The relays can operate alarm and control circuits when the monitored signal value moves outside the set-point limits indicated by adjustable red index pointers.

#### Models

244-301G: 1 relay, 1 set-point for High, upscale energising.

244-307G: 1 relay, 1 set-point for Low, downscale energising.

244-302G: 2 relay, 2 set-points for High and Low energising.

244-30TG: 2 relay, 2 set-points for thermocouple operation; CJC and thermocouple break protection are provided.

244-300G: 1 relay, 2 set-points for level control. Low energising, High de-energising.

## Elapsed Time Meter

These synchronous motor driven cyclo-meters register in increments of 0.01 h up to 99999.99 h after which they re-commence from zero.

A running indicator is provided. Hand reset not available.

Production efficiency, cost estimating and service periods are typical uses.

#### Ratings

Voltage: 100/125, 200/250, 380/440V

Frequency: 50Hz, 60Hz.

Burden 2.5VA max.

#### Models

242, 243, 244

## Meter Relay

- ★ Monitors and controls any variable parameter which can be converted into a d.c. or a.c. signal.
- ★ Indicator, relays and power unit in one housing.
- ★ Control function continues should indicator become damaged.
- ★ Stable electronic switching circuit does not use lamps, photocells, indicators or capacitors.
- ★ LED switching mode indication.
- ★ Isolated input signal.
- ★ Rugged shock and vibration resistant design.
- ★ Optional time delay relay.

#### Accuracy

Indicator: Class 1.5

Set-point: Class 1.5

Repeatability: 0.5%

Differential: 1% of span

Set-point adjustment: 98% of scale

Minimum span: 2% between set-points.

#### Auxiliary supply

a.c.: dual rating 100/125V and 200/250V, 50/60Hz.

d.c.: 12V or 24V

Other voltages to special order.

Burden: 3VA max.

#### Fixing Clips

Side fixing spring clips are provided.

#### Input signals

Volts d.c.: 20mV to 500V (10kΩ/V)

Volts a.c.: 6V to 500V (1000Ω/V)

50/60Hz, 25 – 3000Hz on request.

Current d.c.: 10μA to 15A (20mV drop).

Current a.c.: 100nA to 1A (1V drop)

50/60 Hz, 25 – 3000Hz on request.

-/1A or -/5A C.T. operation (0.5VA).

Thermocouples: Standard outputs.

Motor start duty with 1A/10mA or 5A/10mA internal C.T. permitting 1.2 times overload continuously and 10 times for 10s.

#### Output relay

Octal base plug-in relay

Type: SPDT contacts, each set-point.

Rating: 5A or 250V or 1000W non-inductive.

Operating time: 250ms overall

Optional time delay adjustable 1 – 10s

Relay contact position with input signal in zone indicated by meter pointer.



## Shunts

A comprehensive range of high quality shunts to meet IEC51, BS89, AS1042, DIN43703, DIN43780.

DEF66-13, British PO CD746, USA MIL-S-618 and most specialised designs can be complied with.

Send for SW 820

## Current Transformers

Designed to IEC185, VDE 0414:70 and BS3938:73, and offering a full range of styles, ratings, outputs and accuracies to meet International Standards.

Ask for publications SW CT

## Transducers

These a.c. power to d.c. signal converters provide a complete measuring system when used with suitably calibrated 1mA moving coil indicators, close coupled or remote mounted.

Publication SW250IT details converting transducers for frequency, watts, vars. Current, voltage, position, temperature, resistance, etc are described in the SW250T series.



# Quadratic

## 240 Series

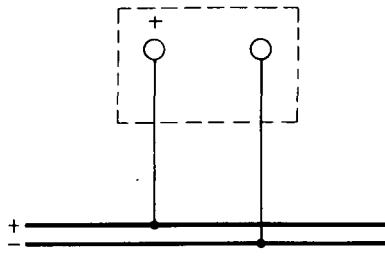


Symbols based on DIN43 807. Transformer terminal markings to BS3938/3941.

### VOLTMETER d.c.

- 89VG
- 01VG
- 10VG
- 05VG

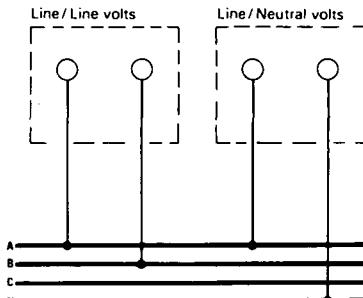
Direct connected (max. 600V)



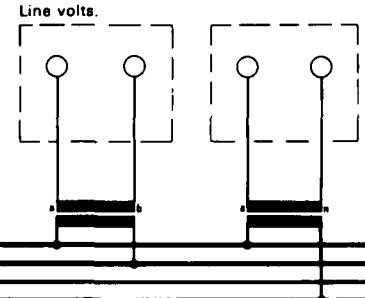
### VOLTMETER a.c.

- 02VG, -07VG, -03VG, -78VG
- 89WG, -01WG, -10WG, -05WG

Direct connected (max. 600V)



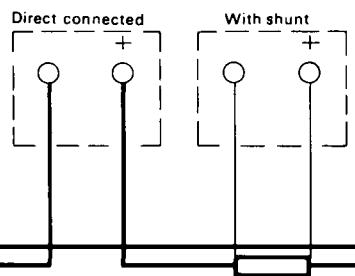
With voltage transformer



### AMMETER d.c.

- 89AG
- 01AG
- 10AG
- 05AG

Direct connected



With shunt

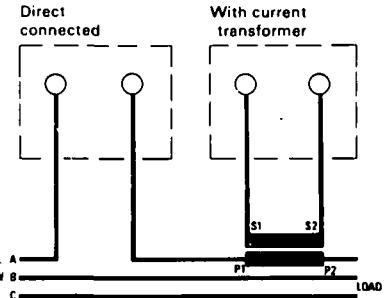
### AMMETER a.c.

- Moving iron
- 02AG, -022G, -026G
- 07AG, -072G, -076G
- 03AG, -032G, -036G
- 78G

- Moving Coil Rectifier
- 89BG, -01BG, -10BG, -05BG

- MDI and MDI plus MI
- 16AG, -16BG
- 16CG, -16DG

Direct connected

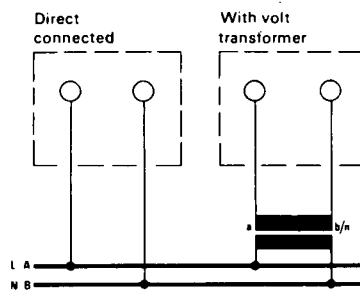


With current transformer

### FREQUENCY AND ELAPSED TIME METERS

- 41SG, -197G, -19RG
- 41LG, -199G, -19SG
- 155G, -156GG

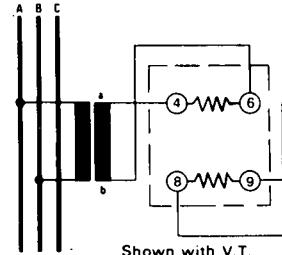
Direct connected



With volt transformer

- Double vibrating reed
- 19TG

No.1 Supply

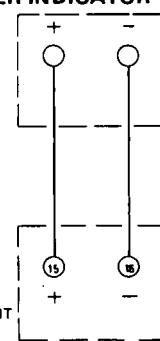


No.2 Supply

Shown with V.T.

### TRANSDUCER INDICATOR

- 89
- 01
- 10
- 05



Separate 250 series transducer. See SW250IT & SW250T for Watts, Vars, Frequency, Amps Volts, Phase angle, Resistance, Temperature, Position etc.

### POSITION INDICATOR

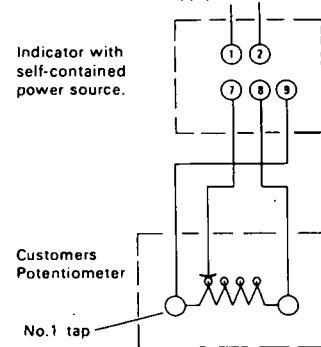
- 45QB
- 45PB

Aux. supply N- L+

Indicator with self-contained power source.

Customers Potentiometer

No.1 tap

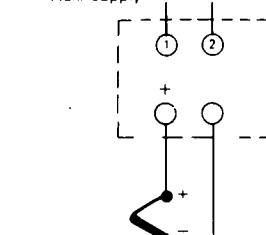


### TEMPERATURE INDICATORS

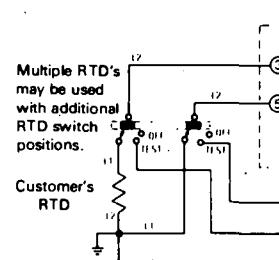
- 45TG

Aux. supply N- L+

Customer's Thermocouple



-45RG



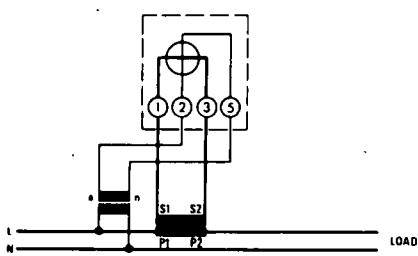
Minimum Resistance Change 2 Ω Cu, 20 Ω Pt.

All L<sub>1</sub> leads must be within 0.02 ohms of the same resistance.  
L<sub>1</sub> leads should not exceed 3 ohms each.  
L<sub>2</sub> leads should not exceed 0.02 ohms each.

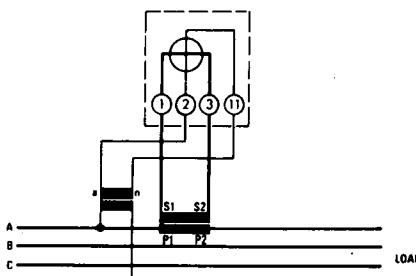
# Quadratic 240 Series

## WATTMETERS

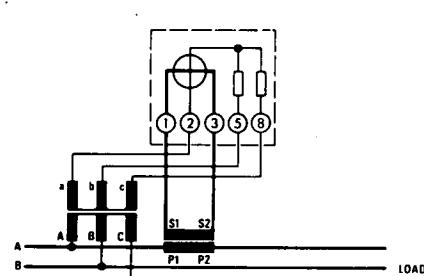
-210G & -215G  
Single Phase a.c.



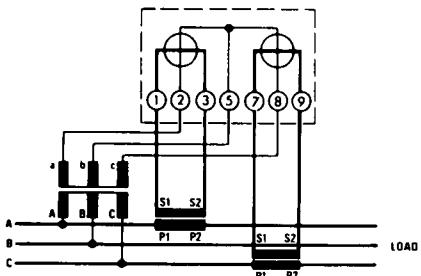
21CG & 21DG  
3 Phase, 4-wire, balanced load



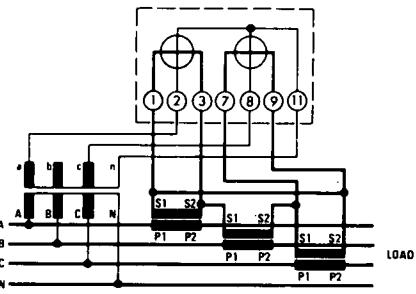
-211G & -216G  
3-phase, 3-wire, balanced load



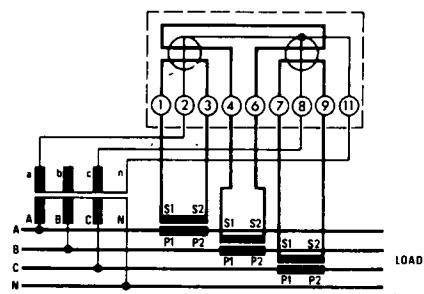
-213G & -218G  
3-phase, 3-wire, unbalanced load



-21EG & -21FG  
3-phase, 4-wire, unbalanced load  
with delta connected C.T.s.



-214G & -219G  
3-phase, 4-wire, unbalanced load  
with star connected C.T.s

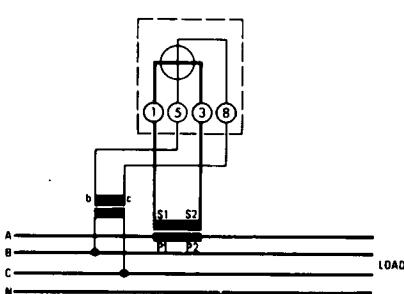


## VARMETERS

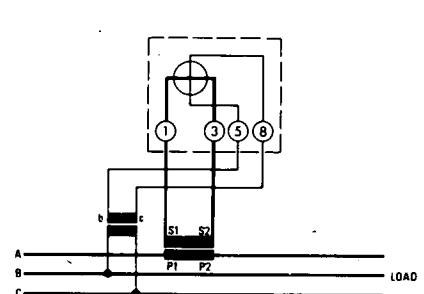
Single phase VAR meters are available using a Paladin type 256 TXKW transducer and transducer indicator.

See Publication SW250T

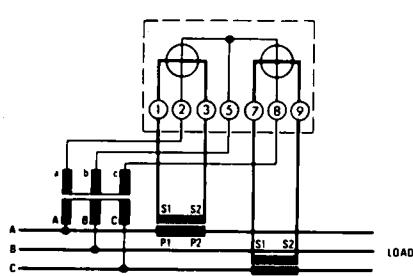
-310G & -315G  
3-phase, 4-wire, balanced load



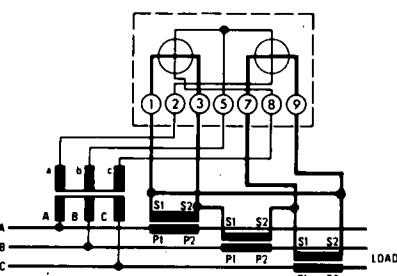
-310G & -315G  
3-phase, 3-wire, balanced load



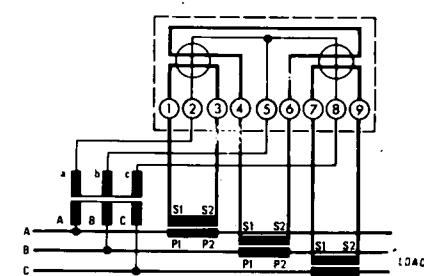
-31SG & -31LG  
3-phase, 3-wire, unbalanced load



-31EG & -31FG  
3-phase, 4-wire, unbalanced load  
with delta connected C.T.s



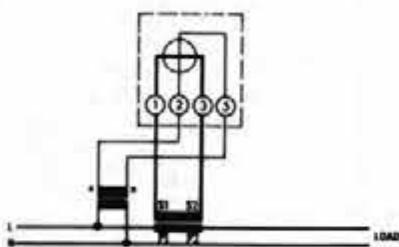
-314G & -319G  
3-phase, 4-wire, unbalanced load  
with star connected C.T.s



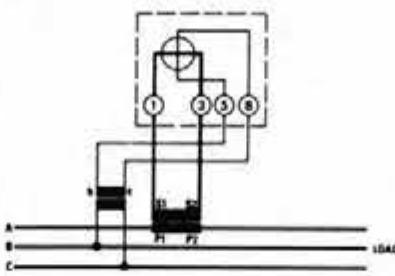
# Quadratic 240 Series

**PHASE ANGLE METER**

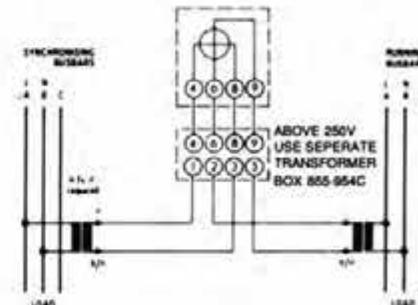
- 42BG
- 425G
- Single Phase
- Spans 0.5/1/0.5 or 0.8/1/0.2

**PHASE ANGLE METER**

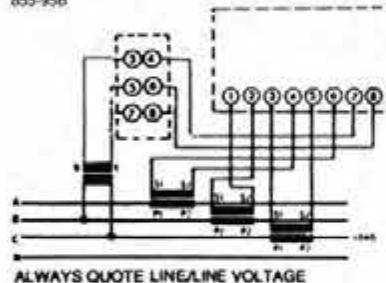
- 42AG
- 427G
- 3-phase, 3-wire, or 4-wire, balanced load
- Span 0.5/1/0.5 or 0.8/1/0.2

**SYNCHROSCOPE**

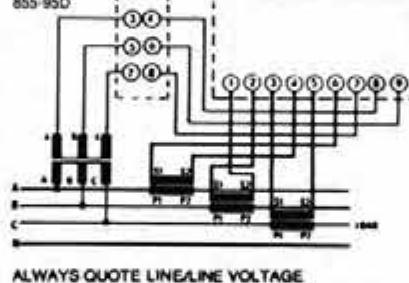
- 145G
- 146G
- Single or 3-phase systems

**360° POWER FACTOR METER**

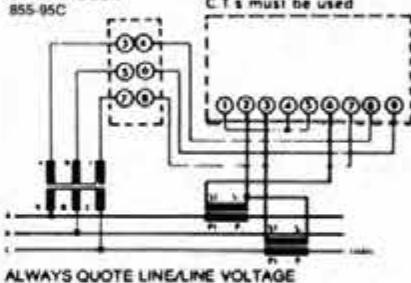
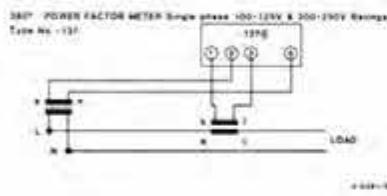
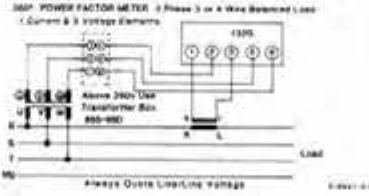
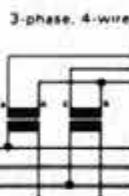
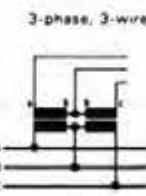
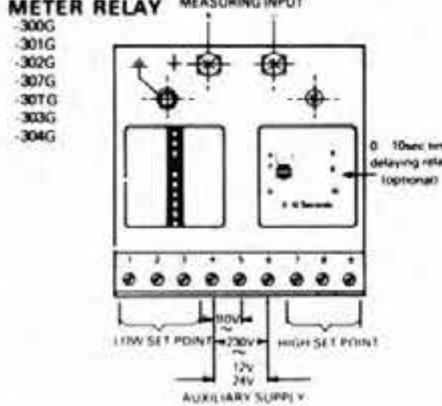
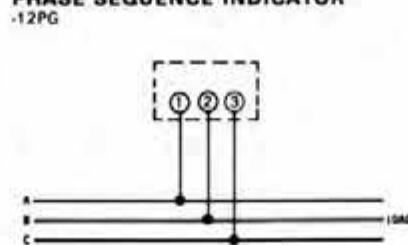
- 13IG
- 3-phase, 3 or 4-wire, balanced load
- 3 current and 1 voltage element
- span 0/1/0
- ABOVE 250V USE
- TRANSFORMER BOX
- 855-95B

**360° POWER FACTOR METER**

- 136G
- 3-phase, 3 or 4-wire, unbalanced load
- 3 current and 3 voltage elements
- span 0/1/0
- ABOVE 250V USE
- SEPERATE BOX
- 855-95D

**360° POWER FACTOR METER**

- 136G (Alternative connection)
- 3-phase, 3-wire unbalanced load
- 2 current and 3 voltage elements
- span 0/1/0
- ABOVE 250V USE
- SEPERATE BOX
- 855-95C

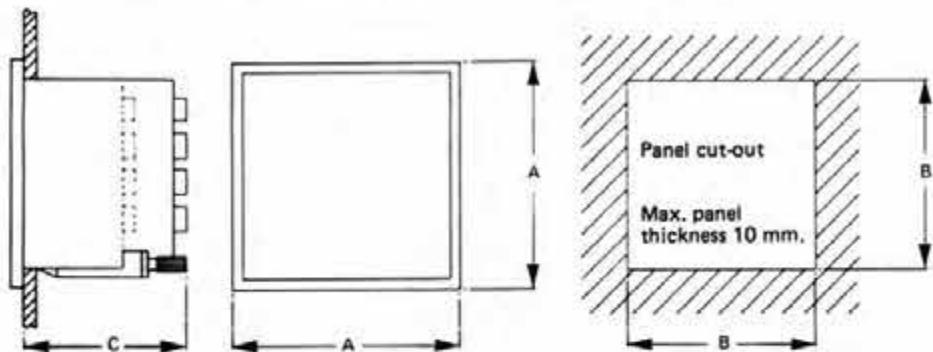
**360° Power Factor Meter****360° Power Factor Meter****ALTERNATIVE V.T. CONNECTIONS****METER RELAY****PHASE SEQUENCE INDICATOR****NOTES**

Where practical, all circuits should be earthed at one point.  
 Voltaged circuits should be fused.  
 C.T. circuits must not be open-circuited on load.  
 Connection diagrams are shown with current and voltage transformers, which are subject to separate order.  
 Direct connected ratings are usually available for voltages up to 600V and currents up to 10A.  
 Calculate watt scales as follows:  
 single phase =  $V \times A \times PF$   
 3 phase =  $3 \times V \text{ phase} \times A \times PF$   
 or =  $V \sqrt{3} \times V \text{ line} \times A \times PF$   
 round off upwards, allowing for overloads.

# Quadratic 240 Series

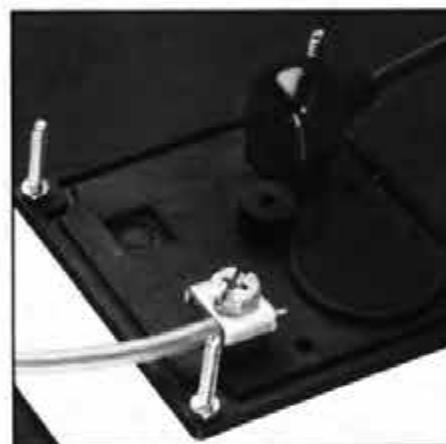


**Dimensions** Case sizes to DIN43700. Narrow bezels to DIN43718.



Base cover available for 243 and 244 Slide - in dial instruments only.

Model	242	243	244	246
Bezel 'A'	48 x 48	72 x 72	96 x 96	144 x 144
Panel cut-out 'B'	45 x 45	68 x 68	92 x 92	138 x 138
Scale length: 90°	42	65	94	145
" " 240°C	72	112	150	230
<b>Maximum overall depth 'C'</b>	<b>242</b>	<b>243</b>	<b>244</b>	<b>246</b>
Ammeter and Voltmeter	75	78	78	95
Maximum Demand Indicator		78	78	95
Wattmeter, VArmetre	— 90°	★	★	87
	— 240°	★	★	145
Phase Angle, Power Factor Meter	— 90°	★	★	65
	— 240°	★	★	126
Frequency Meter	— 90°	★	78	78
	— 240°	★	★	95
* M.C. Indicator with separate transducer	75	78	78	95
Reed Frequency Meter	—	78	78	—
Synchronising Voltmeter	—	—	78	—
Synchroscope, 360° Power Factor Meter	—	—	140	131
Phase Sequence Indicator	—	—	78	—
Position Indicator	★	★	140	131
Speed Indicator	75	78	78	95
Temperature Indicators	—	—	140	131
Elapsed Time Meter	—	78	78	—
Meter Relay	—	—	120	—



Terminal Boot available for all Quadratic Instruments.

Terminals: Voltage and current up to 30A — M5 screw clamps. Current above 30A — M8 studs with nuts.

\* Dimensions of external transducers for use with moving coil indicators are given in publication SW250IT or SW250T.

*The information contained in this specification is correct at the time of publication, but the right is reserved to supply instruments differing in construction and appearance from those illustrated and described.*

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### BRANCH OFFICES:

S.A. 350 Torrens Road, Croydon Park, S.A. 5008 ..... Ph: 08 347 1522 Fax: 08 347 3094

VIC. 3 Chesterville Road, Cheltenham, Vic. 3192 ..... Ph: 03 584 8844 Fax: 03 584 1042

W.A. Suite 1, 929 Wellington Street, West Perth, W.A. 6005 ..... Ph: 09 321 4387 Fax: 09 321 8901

### QUEENSLAND AGENTS:

Bartlett Marketing Co. Pty. Ltd., Underwood, Qld. 4119 ..... Ph: 07 841 1586 Fax: 07 841 1676

Industrial & Marine Electrics, Cairns, Qld. 4870 ..... Ph: 070 35 2722 Fax: 070 35 2723

Marcon Agencies Pty. Ltd., Garbutt, Qld. 4818 ..... Ph: 077 25 4499 Fax: 077 25 4511

### N.S.W. AGENTS:

Excell Control Pty. Ltd., Unanderra, N.S.W. 2526 ..... Ph: 042 72 1922 Fax: 042 72 1833

Borg Electrical Wholesalers Pty. Ltd., Broadmeadow, N.S.W. 2292 ..... Ph: 049 52 4366 Fax: 049 52 7490

### TASMANIAN AGENTS:

George Harvey Electric Pty. Ltd., Hobart, Tas. 7000 ..... Ph: 002 34 2233 Fax: 002 31 1347

George Harvey Electric Pty. Ltd., Launceston, Tas. 7250 ..... Ph: 003 31 6533 Fax: 003 34 1899

### NORTHERN TERRITORY AGENT:

I.S.A.S., Winnellie, N.T. 0820 ..... Ph: 089 47 2313 Fax: 089 47 0149

### SOUTH PACIFIC ISLANDS:

Export Procurement Pty. Ltd., Northgate, Qld. ..... Ph: 07 260 5499 Fax: 07 260 5546

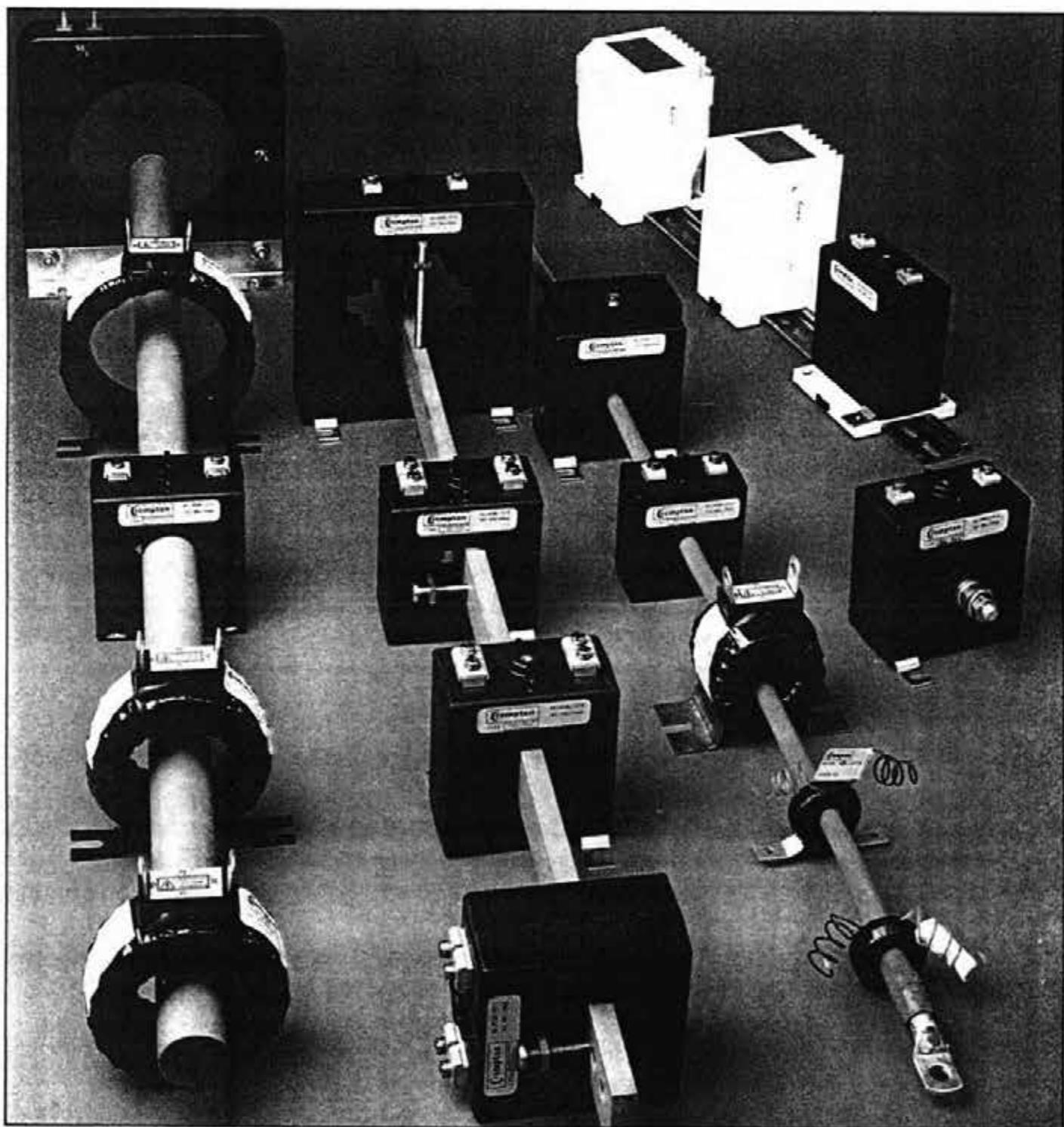
### NEW ZEALAND AGENT:

Electrade Limited, Auckland. ..... Ph: 09 525 1031 Fax: 09 525 1756

# CROMPTON



## CURRENT TRANSFORMERS



# Current Transformers

## Contents Guide

CASE STYLE	MODEL REFERENCE	PRIMARY CURRENT	SECONDARY CURRENT	SERVICE DUTY	PAGE
	Series 780 Moulded Case	1A — 2500A	1A & 5A	Metering Protection	4 — 7
	Series 770 Tape Insulated	1A — 100A	10mA — 100mA	Distance Metering Galvanic Isolation	8
	Single Phase Model 252-94 Three Phase Model 253-94 DIN Case	1A — 5A 1A — 5A	10mA 1A — 5A	Distance Metering Galvanic Isolation	9
	Series 810 Tape Insulated	40A — 3000A 100A — 3000A Specials	1A & 5A 5A & 1A Specials	Metering Protection Specials	10 — 14
	Model 809 Moulded Case	500A — 4000A	1A & 5A	Metering	15

## Multi-Ratio, Summation, Interposing, Core-Balance and Earth Leakage Current Transformers

These special duty current transformers can be supplied to customers' requirements. Please supply details of primary and secondary current ratios required, VA output and accuracy class.

## C.T's with alternative specifications

Customers special requirements can usually be met. Please supply full details.

## Low Current Ratios

Lower ratios than those listed can be obtained by passing the primary conductor through the ring more than once as specified below.

STANDARD CT RATIO	PRIMARY INSERTED TURNS TO OBTAIN REQUIRED RATIO.								
	5/5	10/5	15/5	20/5	25/5	30/5	40/5	50/5	60/5
40/5	8	4	—	2	—	—	1	—	—
50/5	10	5	—	2	—	—	1	—	—
60/5	12	6	4	3	—	2	—	—	1
75/5	15	—	5	—	3	—	—	—	—
80/5	16	8	—	4	—	—	2	—	—
100/5	20	10	—	5	4	—	—	2	—
120/5	24	12	8	6	—	4	3	—	2

# Current Transformers



## Measuring Duty Current Transformers

### Accuracy selection

Class 0.2	Available on request. Designed to individual customer requirements, energy metering, micro control systems.
Class 0.5	Transducers, pay integration meters, test equipment, control systems.
Class 1	Watt/VAr/Phase Angle meters, recording meters, protection devices, instrument transducers.
Class 3	Industrial ammeters, maximum demand indicators

### VA Burden Guide

0.5	Short scale moving iron ammeters
0.75—1.5	240° scale moving iron ammeters
0.2—1	Rectified moving coil ammeters
1—1.25	Watt/VAr/Phase Angle meters
2—4	Recording ammeters
2—3.5	Maximum Demand Indicators
3—3.5	Combined MDI & MI
0.5—4	Paladin transducers
0.5—4	Protector modules
5—10	Electronic control systems

## Protection Duty Current Transformers

Protection duty current transformers are supplied to accuracy classes 5P or 10P. The figures 5 or 10 define the maximum composite errors in percentage permitted at the specified overload value. Letter 'P' indicates a protection duty.

The rated accuracy limit factor (or overload multiple) is specified by a further figure added to the code. 5, 10 and 15 satisfy most applications and indicate overload values x5, x10 and x15. For more detailed information, see BS3938: 1973.

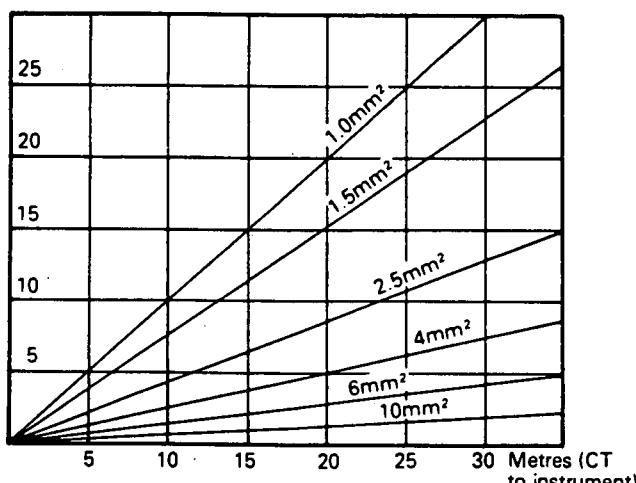
Rated outputs available in VA are 2.5, 5, 7.5, 10, 15. Correct selection requires reference to relay manufacturers recommendations.

The secondary circuit must not be open-circuited when primary is energised since a dangerously high voltage can build up in certain conditions. Terminals are not insulated against physical contact.

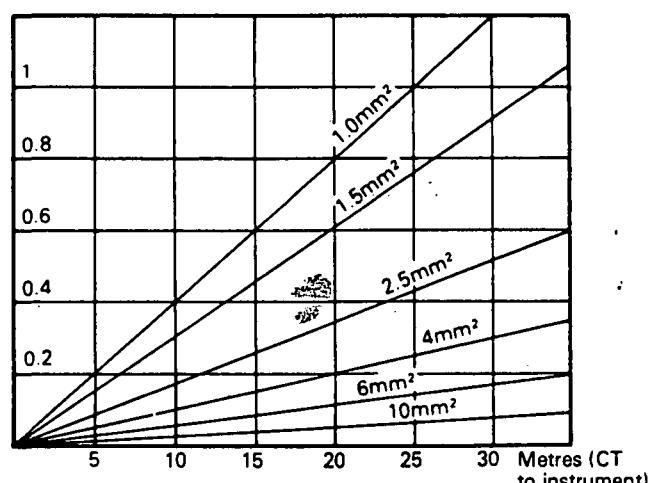
## Secondary Lead Burden

The resistance of the secondary lead circuit can be significant and must be taken into account when the current transformer burden is chosen. Where the current transformer is mounted remotely a 1 amp secondary should be used.

VA Burden for 5A C.Ts.



VA Burden for 1A C.Ts.



# 780 Series

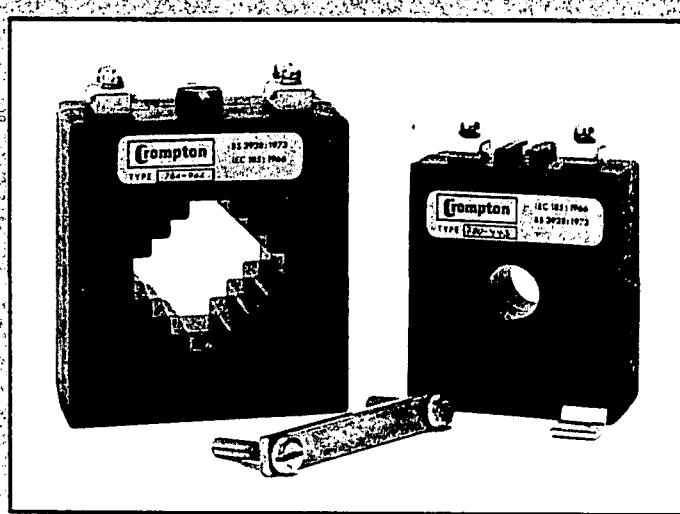


The Crompton 780 Series offers current ratios, VA outputs and accuracy classes to suit the requirements of modern electrical and electronic installations.

The tough moulded cases are designed for appropriate busbar or cable sizes and incorporate alternative foot or busbar fixing options.

They comply with most international standards for ring current transformers.

A major feature is the ease of installation with several base and busbar mounting arrangements!



## Features

- ★ high impact, flame-retardant moulded cases (classification UL94V-1)
- ★ secondary currents for 1A or 5A
- ★ primary currents 1A to 2500A
- ★ cable or busbar styles
- ★ simple busbar clamp or push-in fixing feet
- ★ alternative DIN rail mounting adaptor
- ★ single or twin screw terminals
- ★ alternative terminations with integral 600mm leads
- ★ wire sealable terminal cover

## Standards Compliance

Designed to International standards, the 780 Series complies with the following specifications.  
BS3938: 1973 (1982), IEC 185: 1966.

## Secondary Terminals

All models can be supplied with single or double M4 screw shell clamp terminals eliminating the use of cable shoes or tags.  
When specified insulated flexible leads (600mm) can be provided in place of screw terminals.

## Performance

System voltage	= 660V max
Test voltage	= 3kV for 1m
System frequency	= 50/60Hz (400Hz available on request)
Short circuit thermal current (I <sub>th</sub> )	= 60 x rated primary current for 1 second
Rated dynamic current (I <sub>dyn</sub> )	= 2.55 x I <sub>th</sub>
Saturation co-efficient	= <5 for plain ring <10 for wound primary
Service temperature	: -20°C to 85°C
Insulation class BS2757	: Class A (max 105°C)
Enclosure code	: IP40

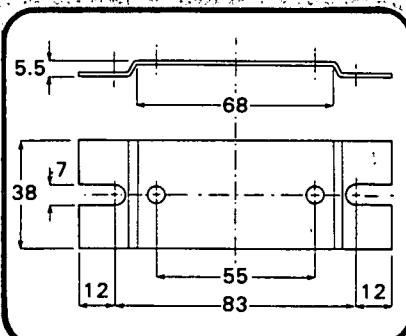
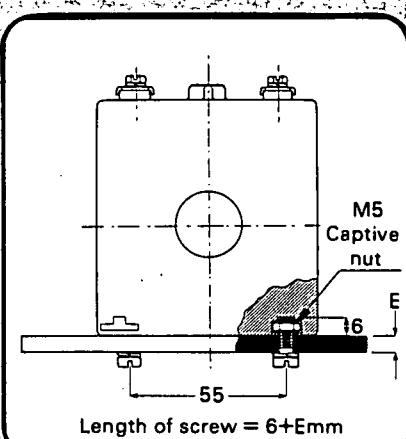
## Installation

A set of push-in fixing feet or busbar clamp, as necessary, are supplied with each CT.

In-line primary busbar inserts and centre insert are available for some models.

A 35mm DIN rail mounting adaptor is available for all models except 788.

Models 781, 782, 783, 784, 785, 786 have two M5 screw fixings in the base.

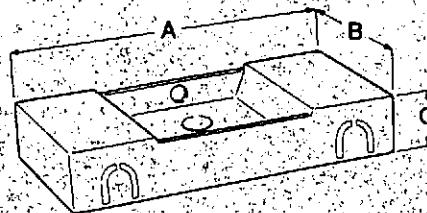


# 780 Series



## Terminal cover

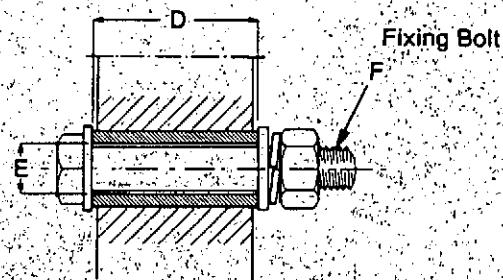
A wire sealable cover is available to insulate the secondary terminals.



Type No.	DIMENSIONS mm		
	A	B	C
780	56	31	14
All other Types	71	38	14

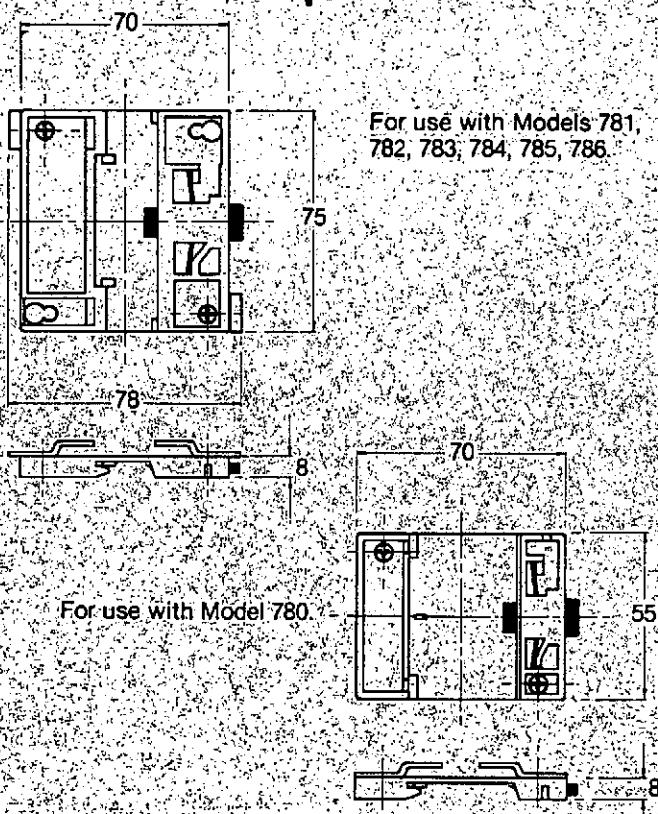
## Fixing between 2 conductors

A centre insert, designed for types 780 and 781 allows clamping between two bar or cable primary conductors.

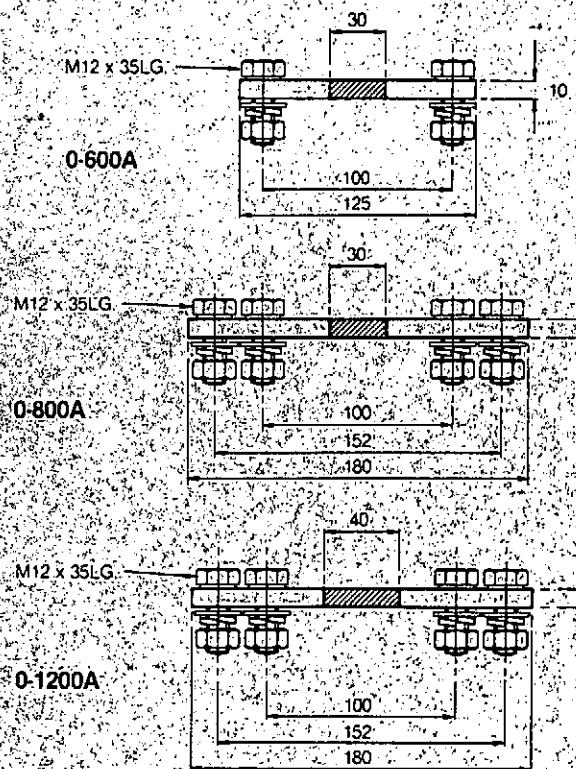


Type No.	DIMENSIONS mm		
	D	E	F
780	36	8.2	M8x50
781	46	14	M12x75

## DIN Rail Adaptor



## Primary Busbars

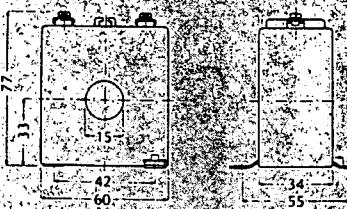


# 780 Series

Accuracies comply with BS3938 and IEC 185.

All measurements in millimetres

## Type 780—943



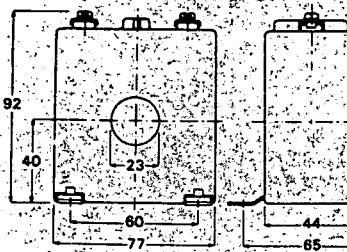
Supplied with 2 fixing feet.

Max cable Ø = 15mm.

1A secondaries are available for all ratings.

CT Ratio	VA at Class		
	5	3	1
30/5	1.5	—	—
40/5	2	1.5	—
50/5	2.8	2.5	—
60/5	3.5	3	—
75/5	5	4	—
80/5	5	4	—
100/5	—	5	2.5
120/5	—	5	2.5
125/5	—	5	2.5
150/5	—	5	2.5
200/5	—	6	3
250/5	—	7.5	4

## Type 781—943



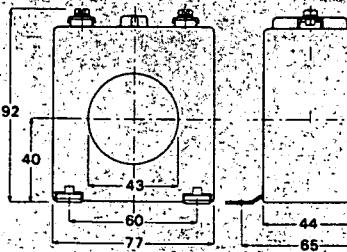
Supplied with 4 fixing feet.

Max cable Ø = 23mm.

1A secondaries are available for all ratings.

CT Ratio	VA at Class		VA at Class		VA at Class		
	3	1	3	1	3	1	0.5
40/5	2.5	—	—	—	—	—	—
50/5	2.5	—	—	—	—	—	—
60/5	2.5	—	—	—	—	—	—
75/5	2.5	—	5	2.5	—	—	—
80/5	2.5	—	5	2.5	—	—	—
100/5	5	—	7.5	5	—	—	—
120/5	5	—	7.5	5	—	—	—
125/5	5	—	7.5	5	—	—	—
150/5	5	—	7.5	5	15	10	5
200/5	5	—	7.5	5	15	10	7.5
250/5	5	2.5	7.5	5	20	15	10
300/5	5	2.5	7.5	5	20	15	10
400/5	5	2.5	10	5	30	15	15
500/5	5	2.5	10	5	30	15	15

## Type 782—943



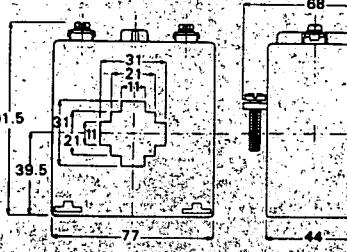
Supplied with 4 fixing feet.

Max cable Ø = 43mm.

1A secondaries are available for all ratings except 1200A.

CT Ratio	VA at Class 3		VA at Class		VA at Class		
	3	1	3	1	3	1	0.5
100/5	2.5	—	—	—	—	—	—
120/5	2.5	5	2.5	—	—	—	—
125/5	2.5	5	2.5	—	—	—	—
150/5	2.5	7.5	4.5	—	5 or 3	—	—
200/5	2.5	7.5	5	—	10	6	2.5
250/5	5	7.5	5	—	10	7.5	5
300/5	5	7.5	5	—	10	7.5	5
400/5	5	7.5	5	—	15	7.5	5
500/5	—	—	—	—	10	7.5	5
600/5	—	—	—	—	12	10	7.5
750/5	—	—	—	—	15	10	10
800/5	—	—	—	—	15	10	10
1000/5	—	—	—	—	20	15	15
1200/5	—	—	—	—	20	15	15

## Type 783—944



Supplied with busbar clamp.

For busbar 30 x 10, 20 x 20mm and cable Ø 25mm.

1A secondaries are available for all ratings.

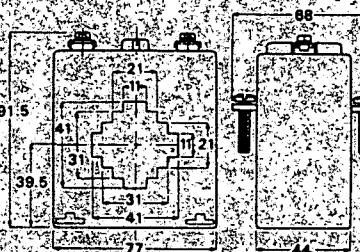
CT Ratio	VA at Class		VA at Class		VA at Class		
	3	1	3	1	3	1	0.5
75/5	2.5	—	—	—	—	—	—
80/5	2.5	—	—	—	—	—	—
100/5	2.5	—	5	2.5	—	—	—
120/5	2.5	—	5	5	—	—	—
125/5	2.5	—	5	5	—	—	—
150/5	2.5	—	5	5	—	—	—
200/5	5	—	7.5	5	15	10	5
250/5	5	2.5	10	7.5	20	15	10
300/5	5	2.5	15	10	20	15	10
400/5	5	2.5	15	10	20	15	10
500/5	—	—	—	—	30	15	10
600/5	—	—	—	—	30	15	15
750/5	—	—	—	—	30	15	15
800/5	—	—	—	—	30	15	15

# 780 Series



Accuracies comply with BS3938 and IEC 185.

## Type 784—944



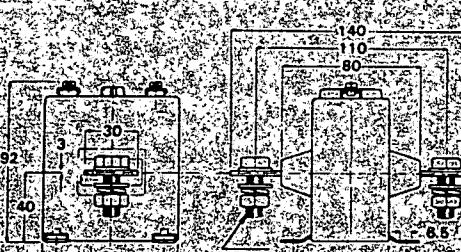
Supplied with busbar clamp

For busbar 40 x 10, 30 x 20mm and cable Ø 32mm

1A secondaries are available for all ratings  
except 1200A

CT Ratio	VA at Class 3		VA at Class 3		VA at Class 3		
	3	1	3	1	3	1	0.5
100/5	2.5	—	5	2.5	—	—	—
120/5	2.5	—	5	2.5	—	—	—
125/5	2.5	—	6	4.5	—	—	—
150/5	2.5	—	7.5	5	10	6	2.5
200/5	2.5	—	7.5	5	10	7.5	5
250/5	5	—	7.5	5	10	7.5	5
300/5	5	—	7.5	5	10	7.5	5
400/5	5	—	7.5	5	15	7.5	5
500/5	—	—	—	—	10	7.5	5
600/5	—	—	—	—	12	10	7.5
750/5	—	—	—	—	15	10	10
800/5	—	—	—	—	15	10	10
1000/5	—	—	—	—	20	15	15
1200/5	—	—	—	—	20	15	15

## Type 785—946

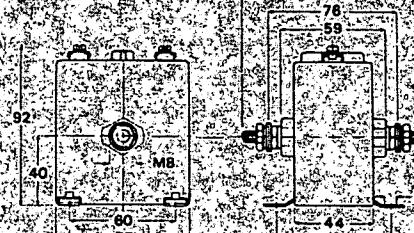


Supplied with 4 fixing feet

1A secondaries are available for all ratings

CT Ratio	VA at Class 3		VA at Class 3		VA at Class 3		
	3	1	3	1	3	1	0.5
1/5	5	—	7.5	5	18	15	7.5
5/5	5	—	7.5	5	18	15	7.5
7.5/5	5	—	7.5	5	18	15	7.5
10/5	5	—	7.5	5	18	15	7.5
15/5	5	—	7.5	5	18	15	7.5
20/5	5	—	7.5	5	18	15	7.5
25/5	5	—	7.5	5	18	15	10
30/5	5	—	7.5	5	18	15	10
40/5	5	—	7.5	5	18	15	10
50/5	5	—	7.5	5	18	15	10
60/5	5	—	7.5	5	15	15	10
75/5	5	—	7.5	5	18	15	10
80/5	5	—	7.5	5	18	15	10
100/5	5	—	7.5	5	18	15	10
120/5	5	—	7.5	5	20	15	10
125/5	5	—	7.5	5	20	15	10
150/5	5	—	7.5	5	20	15	10
200/5	5	—	7.5	5	20	15	10
250/5	5	—	7.5	5	20	15	10

## Type 786—946

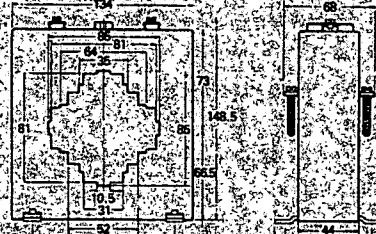


Supplied with 4 fixing feet

1A secondaries are available for all ratings

CT Ratio	VA at Class 3			VA at Class 3			VA at Class 3		
	3	1	0.5	3	1	0.5	3	1	0.5
1/5	5	—	7.5	5	18	15	7.5	—	—
5/5	5	—	7.5	5	18	15	7.5	—	—
7.5/5	5	—	7.5	5	18	15	7.5	—	—
10/5	5	—	7.5	5	18	15	7.5	—	—
15/5	5	—	7.5	5	18	15	7.5	—	—
20/5	5	—	7.5	5	18	15	7.5	—	—
25/5	5	—	7.5	5	18	15	7.5	—	—
30/5	5	—	7.5	5	18	15	7.5	—	—
40/5	5	—	7.5	5	18	15	7.5	—	—
50/5	5	—	7.5	5	18	15	7.5	—	—

## Type 788—944



Supplied with busbar clamp

4 fixing feet are an optional extra

For busbar 80 x 30, 64 x 35, 50 x 50mm and cable Ø 63mm

1A secondaries are available for all ratings  
except 2500A

CT Ratio	VA at Class 3			VA at Class 3			10P10 VA		
	3	1	0.5	3	1	0.5	3	1	0.5
200/5	7.5	2.5	—	10	5	—	—	—	—
250/5	10	5	—	15	10	5	—	—	—
300/5	15	10	5	20	15	10	—	—	—
400/5	15	10	7.5	25	15	10	—	—	—
500/5	20	15	10	30	20	15	5	—	—
600/5	15	10	5	30	20	15	5	—	—
750/5	15	10	5	40	25	15	5	—	—
800/5	20	15	7.5	40	30	20	5	—	—
1000/5	25	20	10	50	40	30	5	—	—
1200/5	30	20	15	50	40	30	5	—	—
1500/5	30	20	15	50	40	30	5	—	—
1600/5	40	30	20	—	—	—	5	—	—
2000/5	50	40	30	—	—	—	5	—	—
2500/5	50	40	30	—	—	—	5	—	—

# Phase Balance Relay

The Crompton Protector Phase Balance module provides continuous surveillance of a 3-phase, 3 or 4 wire system and protects against:

- ★ Phase Loss
- ★ Phase Reversal
- ★ Sequence
- ★ Phase Unbalance
- ★ System Under Voltage

The module de-energizes a relay should any one of the above faults occur. It is fitted with an adjustable time delay to eliminate premature operation on short duration supply fluctuations.

A red LED indicates that the supply is within limits and that the output relay is energized. N.B. the relay will not energize if the supply is connected in the wrong sequence.

The phase unbalance feature protects motors of any size, from full-load to no-load, against excessive temperature rise due to unbalanced supplies, e.g. a 10% unbalanced supply can increase the temperature rise by 150%. In addition, this also protects against the phantom voltage generated during a single phase failure when running at low load.

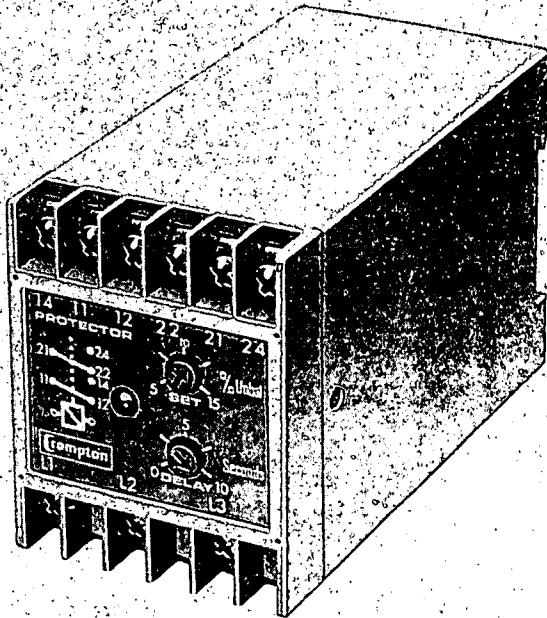
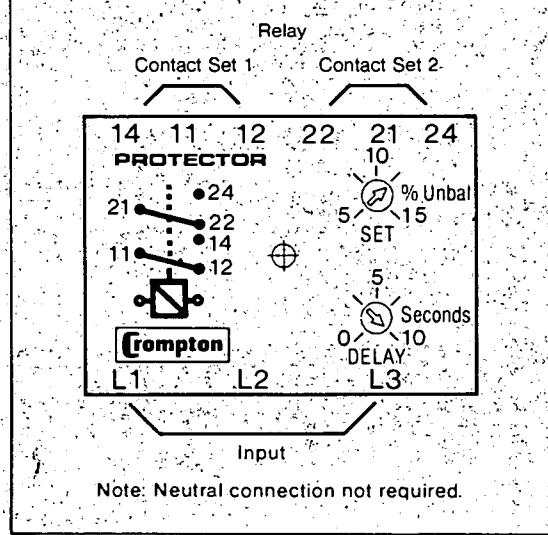
## Principle of Operation

The module comprises monitoring circuits for voltage phase reversal and phase unbalance. Outputs from these circuits are fed to a comparator which changes state under fault conditions.

When the comparator switches, the output relay will de-energize after a pre-set time delay and the red LED will also de-energize in series.

The relay and LED will automatically energize again when all the supply parameters have returned to safe and acceptable limits.

## Connection Diagram



## Specification

This model is CSA approved

Type No:

252-PSFW. Phase loss and unbalance only  
252-PSGW. Phase loss, unbalance and undervoltage.

Input System:

3 phase, 3 or 4 wire, 50 or 60Hz (specify)

100-125V, 200-250V or 380-450V (nominal voltage to be specified when ordering)

3VA

1.2 times continuous  
1.5 times for 10 x 10s  
To B.S. 6253

Set Points

Unbalance:  
Time Delay:  
  
Adjustable 5% to 15%  
Up to 10s adjustable (not operative if voltage falls below 70% of nominal or set point or type 252-PSGW)  
Internally preset at -15%

Under Voltage:

(Type 252-PSGW only): nominal voltage (other values between -10% and -30% available on request)

Output Relay

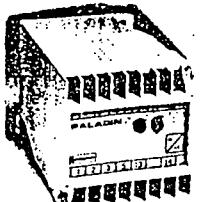
Type:  
Rating ac:  
dc:  
Operations:  
Reset:  
Weight:

DP changeover  
240V, 5A non-inductive  
24V, 5A resistive  
2 x 10<sup>5</sup> at above load  
Automatic  
Approx. 0.3kg

## Ordering Information

When ordering please refer to publication and specify:-

1. Type number and function.
2. System voltage and frequency.



# INSTALLATION SHEET

## IW250TA/V PALADIN, CURRENT & VOLTAGE TRANSDUCERS



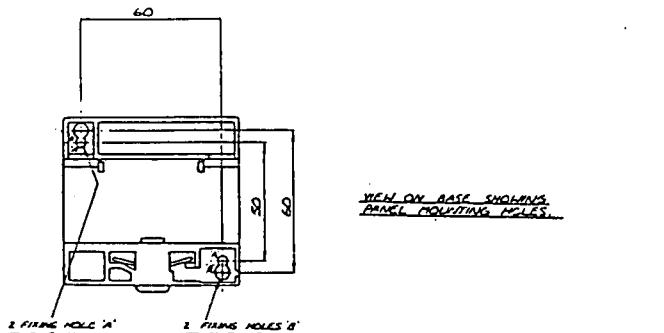
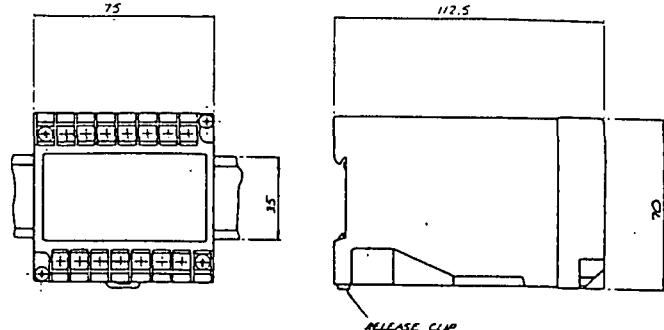
Edition 5 October 1992

### Products Covered

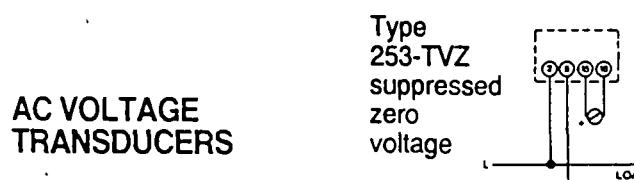
Waveform	Current	Voltage	Aux Supply	Output
Sinusoidal		253-TVZ	No	All listed
Sinusoidal	253-TAA	253-TVA	No	Other than 4-20mA
Sinusoidal	253-TAL	253-TVL	Yes	4-20mA only
Non-sinus.	253-TAR	253-TVР	Yes	All listed

The 253-TVZ, TAA, TAL, TVA & TVL are average sensing & are calibrated on sinusoidal supplies. 253-TAR & TVR have an rms detector which will tolerate waveforms with up to 30% 3rd harmonic content.

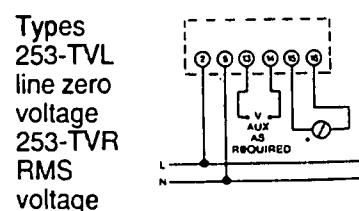
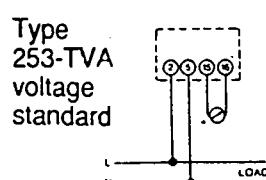
### Dimensions



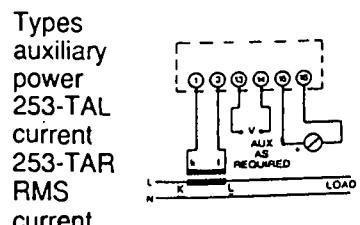
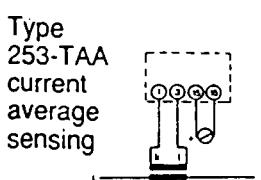
### Connection Instructions



#### AC VOLTAGE TRANSDUCERS



### CURRENT TRANSDUCERS



### Introduction

A range of current & voltage transducers capable of accepting a variety of ac voltage or current inputs and producing a dc current output directly proportional to the input.

### Installation

Units should be installed in a dry position, not in direct sunlight and where the ambient temperature is reasonably stable and will not be outside the range 0 to 60 degrees celsius during operation. Mounting will normally be on a vertical surface but other positions will not affect operation. Vibration should be kept to a minimum. 253 case types are designed for mounting on a DIN rail to DIN 46277. Units may also be screw fixed. To mount a unit on a DIN rail, the top edge of the cutout on the back is hooked over one edge of the rail and the bottom edge carrying the release clip clicked into place. Check that the unit is firmly fixed. Removal or repositioning may be achieved by levering down the release clip and lifting the unit up and off the rail.

Connection wires should be sized to comply with applicable regulations or code of practice. Input cables must be routed away from high voltages & heavy current carrying cables. Note that dc auxiliary versions contain a square wave inverter & should not be located near any radio receiving equipment that may be susceptible to RFI.

Labels affixed to the unit show full connection information and data including, auxiliary supply, input, class index and output as applicable.

### Setting Up

Units are adjusted before despatch and therefore no adjustments are normally required. However, a zero adjuster and span adjuster are located under cover bungs on the front panel, should trimming to local conditions be found necessary. (Not applicable to 253-TAA & TVA)

## SPECIFICATION

See sales brochure SW250T for complete details.

### INPUT

Voltage	63.5-480V Standard ranges 63.5, 110, 120, 220, 240, 380 & 415V
Current	0.2-10A direct or via CT secondary. Standard ranges 1A & 5A

### AUXILIARY SUPPLY

Voltage ac	63.5V, 110V, 220V, 240V, 380V, 415V $\pm 20\%$ 50/60Hz
Voltage dc	12V, 24V $\pm 15\%$ (other dc auxiliaries are available)
Burden	3VA, 3Wdc

### OUTPUT

Span	0 to 1mA into 0 to 10 k $\Omega$ 0 to 20mA into 0 to 500 $\Omega$	0 to 5mA into 0 to 20k $\Omega$ 4 to 20mA into 0 to 500 $\Omega$	0 to 10mA into 0 to 1k $\Omega$
Ripple	<0.5% of rated output		
Zero adjustment	$\pm 2\%$ minimum not applicable to 253 TAA & TVA		
Span adjustment	$\pm 10\%$ minimum		
Accuracy class	0.5%		
Accuracy range	0 to 125% of span, except TVA & TAA		

### GENERAL

Safety requirements	BS5458, IEC 414
Temperature range	0 to +60°C operational, -20 to +70°C storage. Coefficient 0.03%/°C
Humidity	Up to 95% RH non condensing
Enclosure	Flame retardant plastic case. Code IP50 to BS5490, IEC529. Weight 0.4kg maximum
Performance	Designed to comply with BS 6253 & IEC688
Response Time	<400ms to 99% of rated output
Electrical	Electrical stress surge withstand & non maloperation to IEEE std 472, ANSI C37 90a, SEN 361503 isolation. Input/output. Dielectric test voltage 2kV rms to ANSI C37

### **WARNING**

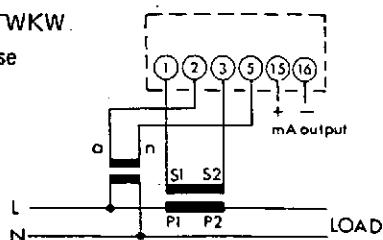
Voltages dangerous to human life may be present at some of the terminal connections of this unit.  
 Ensure all supplies are de-energised before attempting any connection/disconnection. It is necessary to make adjustments with the power connected then exercise extreme caution.  
 Ensure that any protective cover provided is properly fitted after installation or adjustment of this unit.  
 Our policy is one of continuous development and although the information is correct at the time of publication, we reserve the right to supply products differing in construction, dimensions or specification from those illustrated and described.

## Connection Diagrams

### Active Power – WATTS

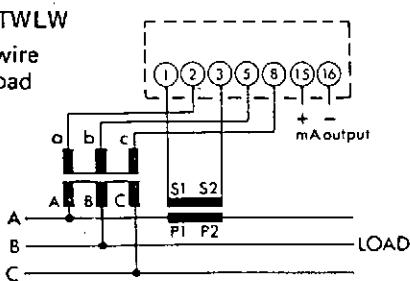
#### Type 256-TWKW

Single phase



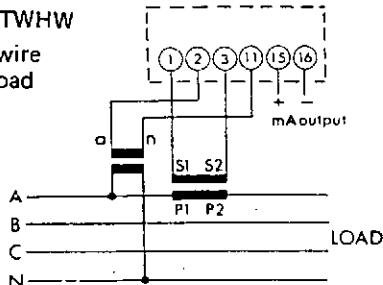
#### Type 256-TWLW

3 phase 3 wire balanced load



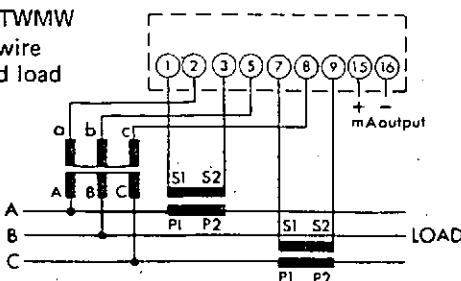
#### Type 256-TWHW

3 phase 4 wire balanced load



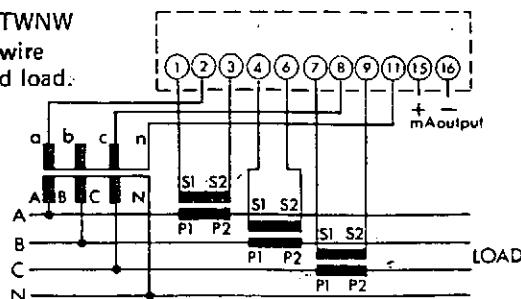
#### Type 256-TWMW

3 phase 3 wire unbalanced load



#### Type 256-TWNW

3 phase 4 wire unbalanced load

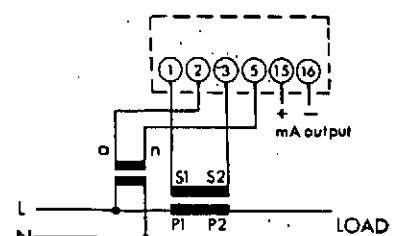


Star connected C.Ts must be used.

### Reactive Power – VARS

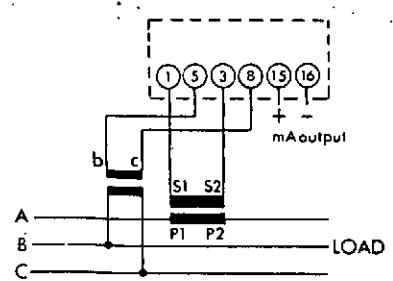
#### Type 256-TXKW

Single phase



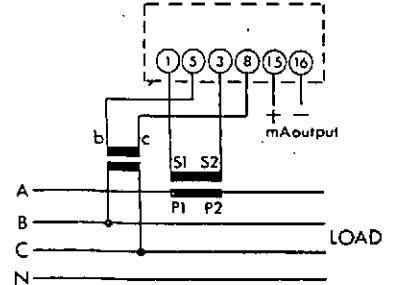
#### Type 256-TXGW

3 phase 3 wire balanced load



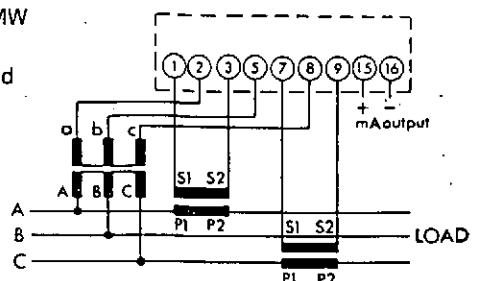
#### Type 256-TXHW

3 phase 4 wire balanced load



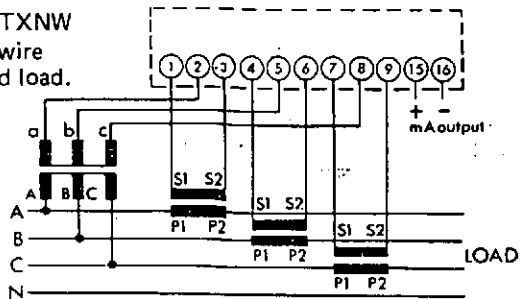
#### Type 256-TXMW

3 phase 3 wire unbalanced load



#### Type 256-TXNW

3 phase 4 wire unbalanced load



Star connected C.Ts must be used.

Note: When the auxiliary powered option is required, additional terminals 13 (L) and 14 (N) are fitted.

# Paladin Watt & Var Transducers

## Specification

For general details, see publication SW 250T.

### Input

Input voltage: 100-120V, 200-250V, 380-450V, 600V.  
Specify exact voltage.

Voltage range:  $\pm 20\%$  (0 - 120% with auxilliary supply).

Input current: 1A, 5A for C.T. outputs. 0.2A to 10A direct connected.

Current range: 0-125%

Frequency: 50Hz, 60Hz.

Voltage burden: 4VA.

Current burden: 1VA.

### Power factor

range: watts: 0.1 lag to 0.1 lead  
vars: 0.9 lag to 0.9 lead

### Output

Nominal d.c. output/load resistance.

mA	0-1	0-5	0-10	0-20	4-20
kΩ	10	2	1	0.5	0.5

Accuracy range: 0-125%

Ripple (peak to peak): 0.5% at full load output.

### General

Accuracy class: 0.5.

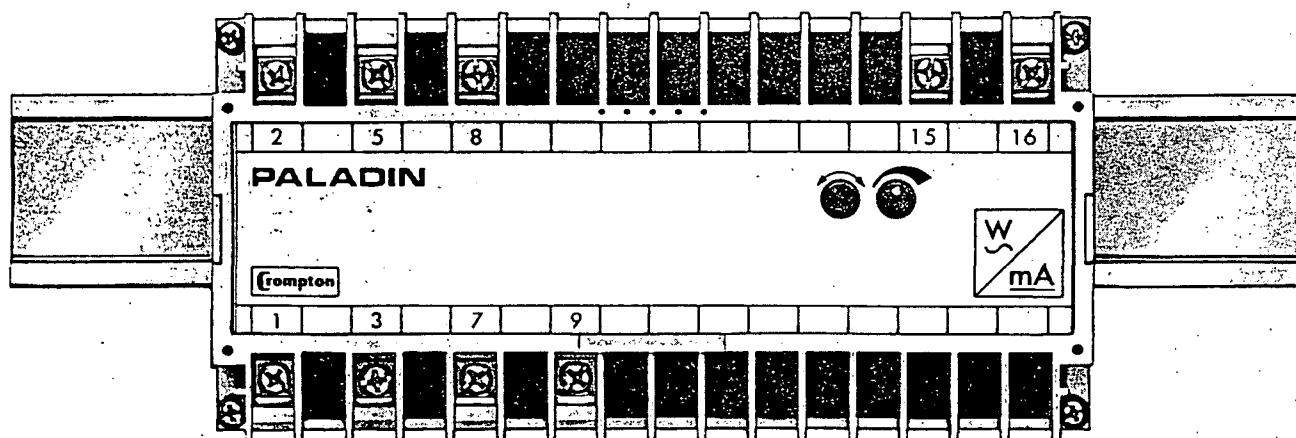
Response time: 0.99% in 300ms.

Temperature coefficient:  $\pm 0.03\%/\text{°C}$ .

Frequency coefficient:  $\pm 0.05\%/\text{Hz}$ .

Approx. weight: 1 kg.

Type Numbers	Balanced Load				Unbalanced Load	
SYSTEM	Single Phase	3 Phase 3 Wire	3 Phase 4 Wire	3 Phase 3 Wire	3 Phase 4 Wire	
WATTS	256-TWKW		256-TWLW	256-TWHW	256-TWMW	256-TWNW
VARS	256-TXKW		256-TXGW	256-TXHW	256-TXMW	256-TXNW



Model 256-TWMW 3 Phase 3 Wire unbalanced load Paladin watts transducer mounted on a 35mm symmetrical rail.

NHP

PRICE LIST  
CATALOGUE  
**1803-P**  
MAY 1989

**sprecher + schuh**

**PRICES INVALID**

This publication is for  
technical reference only,  
**FOR CURRENT PRICES  
PLEASE REFER TO THE  
LATEST EDITION.**

18 03

**3 Control and Indicating Units, 22 mm Ø**

©Fuse 10 TMS700

Forward looking in technology and design

## DT 3 range: Better in design and operation

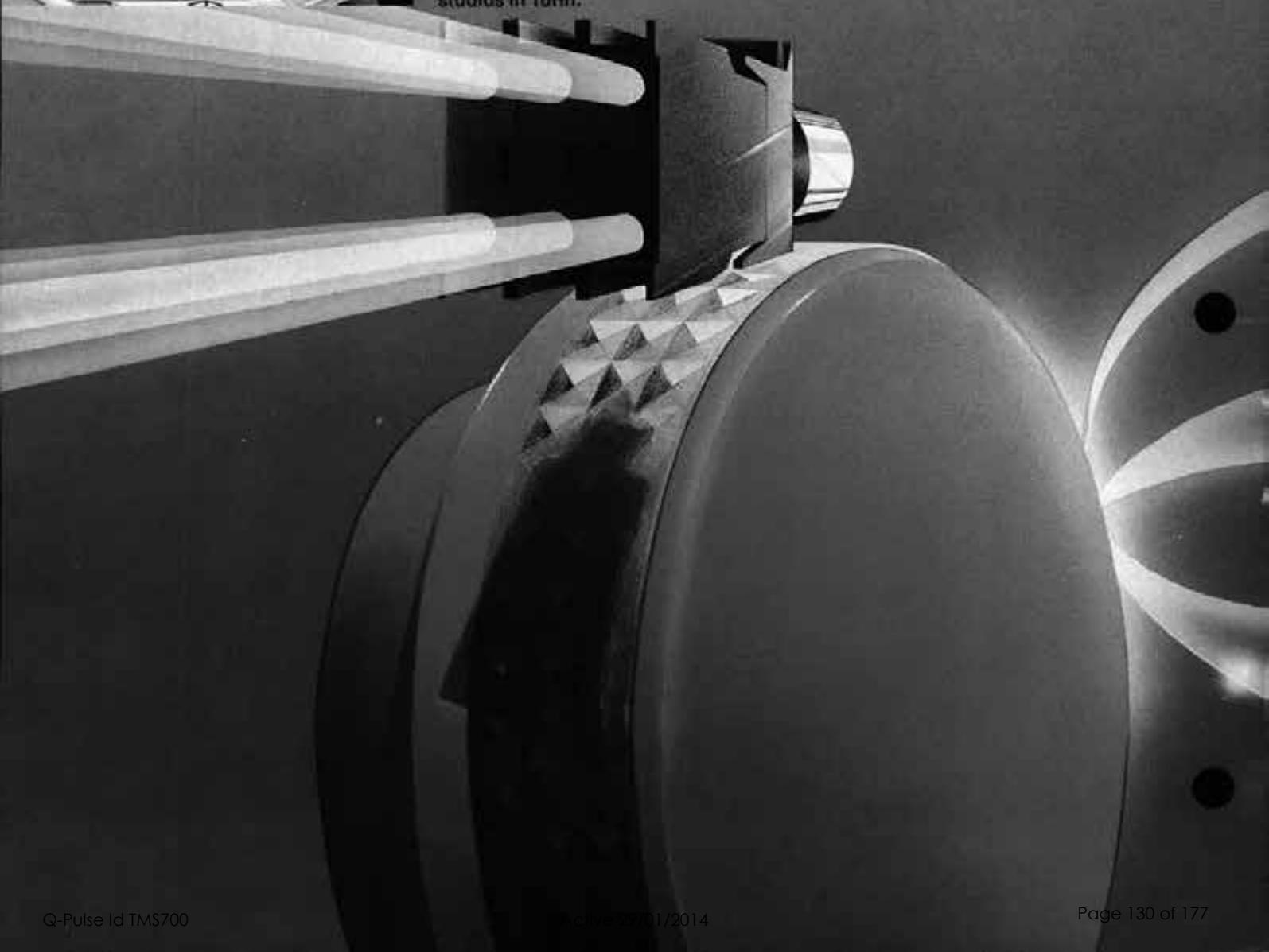
DT 3 brings together the technical solutions of Sprecher + Schuh engineers and the creativity of Italian designers.

### Added value for your leading products

Control and indicating units should and must be attractive. The control panel is what catches the eye in every installation. It should thus meet the highest aesthetic demands, and demonstrate externally what is hidden within: the high quality and reliability of your control system.



The creators of the DT 3 format:  
a design team at the famous I.D.E.A.  
studios in Turin.



## A successful combination of design and function

Perfect design is at the same time functional and attractive. DT 3 control and indicating units demonstrate this in many ways: they are not only elegant, but also ergonomic.

The two colour front sections not only enhance the appearance of every front panel, but also improve recognition by the user.

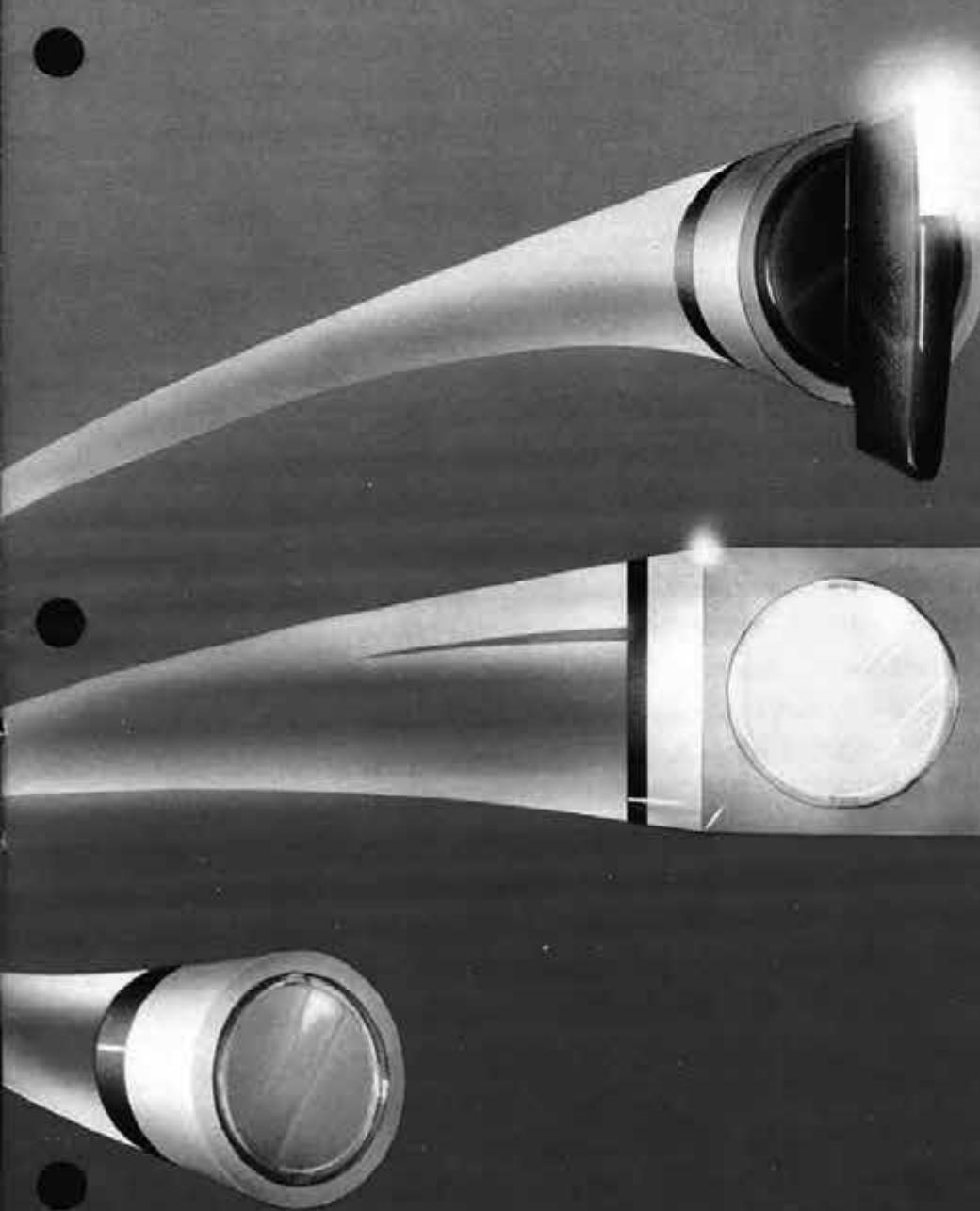
## Flexible in planning and application

Advanced technology provides a much wider selection of units, and allows unrestricted combination of front and rear elements. The harmony between design and technology leads to ease of use and functional integrity even under difficult conditions such as damp, dust, slurry or operation with gloves.

## Economy and security, through thoughtful application of technology

Technology with better design brings economy. For example: problem free compatibility with various inscription types.

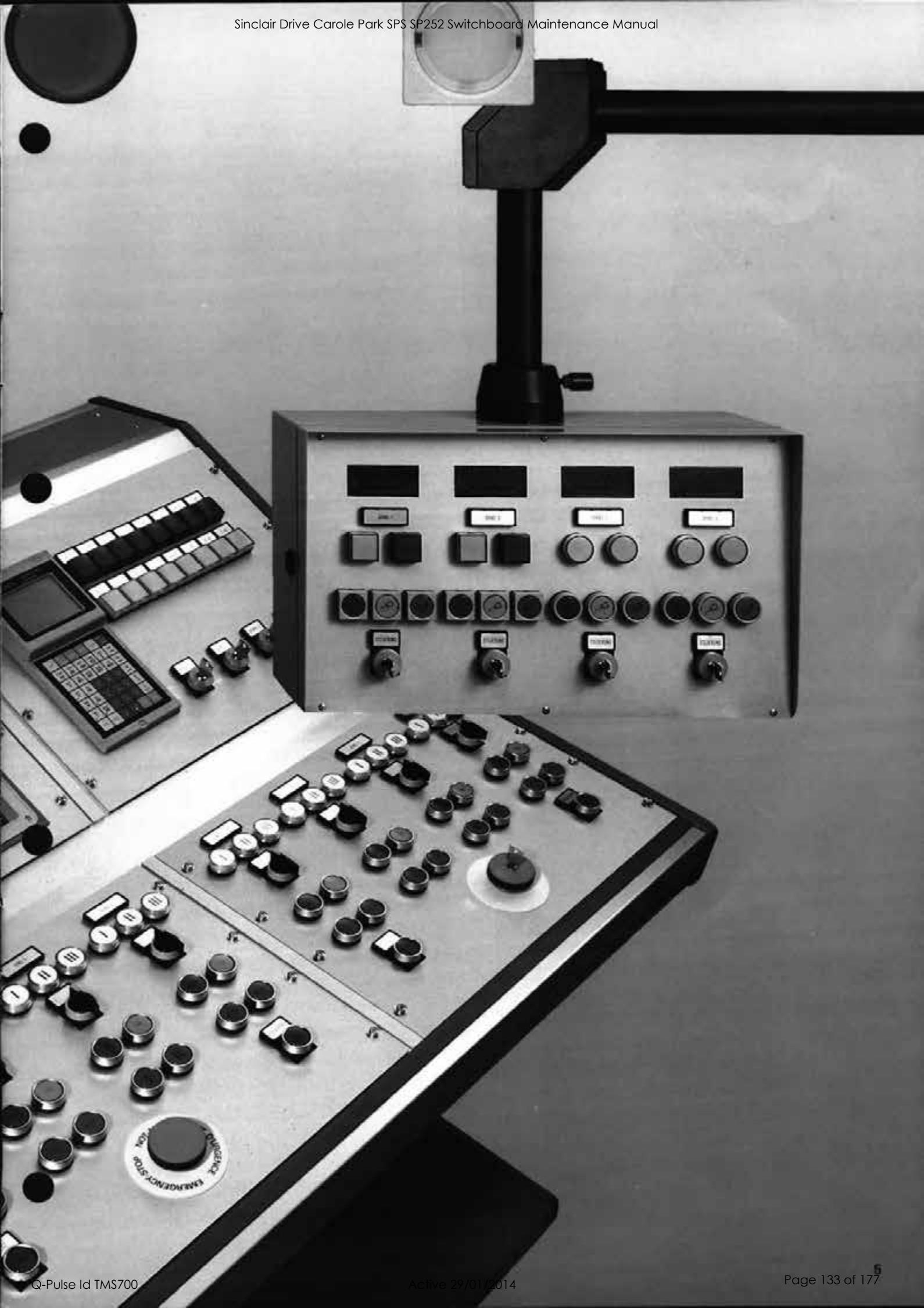
Design with better technology equals security, as in the design of the front rings to prevent unauthorised tampering, or the foolproof emergency stop pushbutton with two step reset «turn and pull».



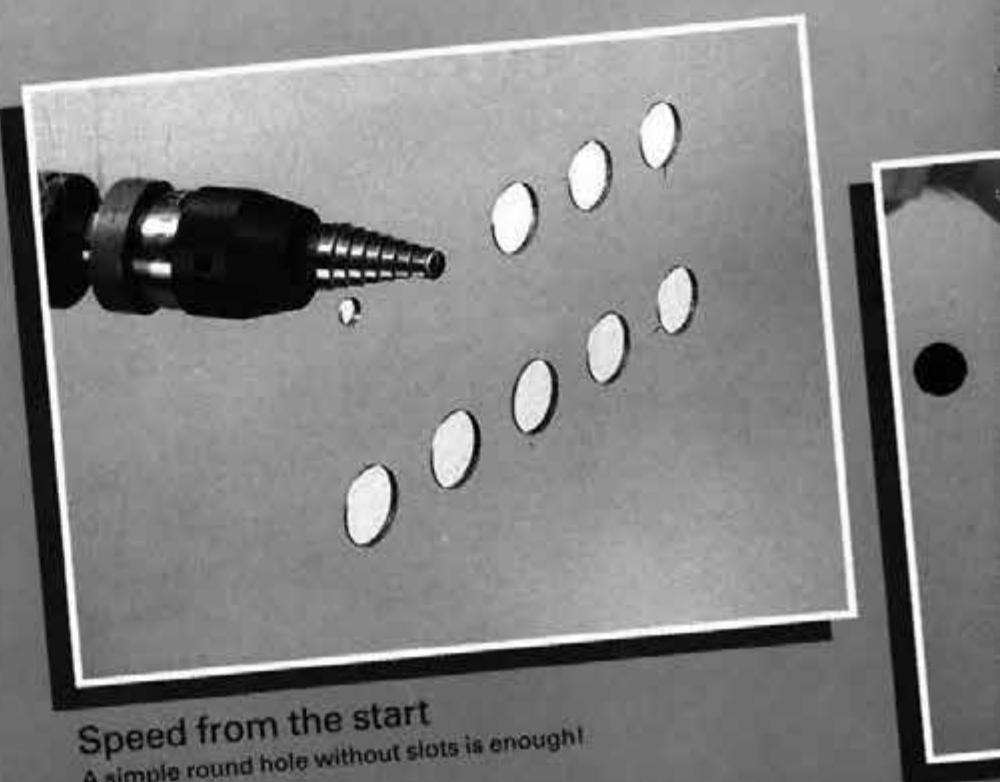
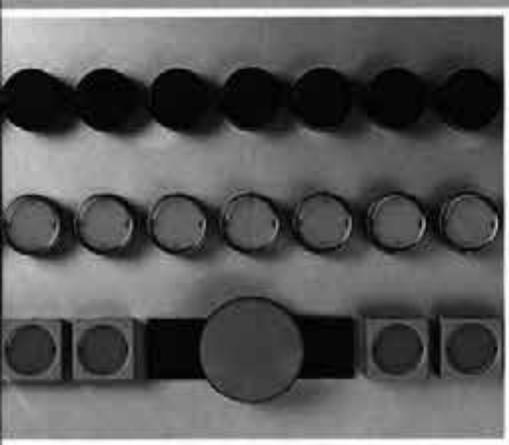
## The DT 3 range: created for practicality



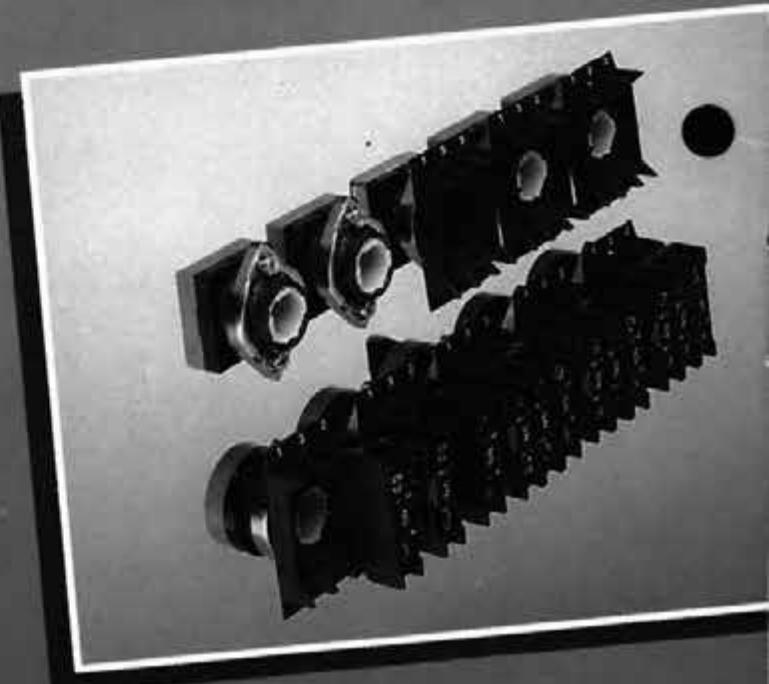
For effortless and economical solution of all control and signalling problems DT 3 is the choice.



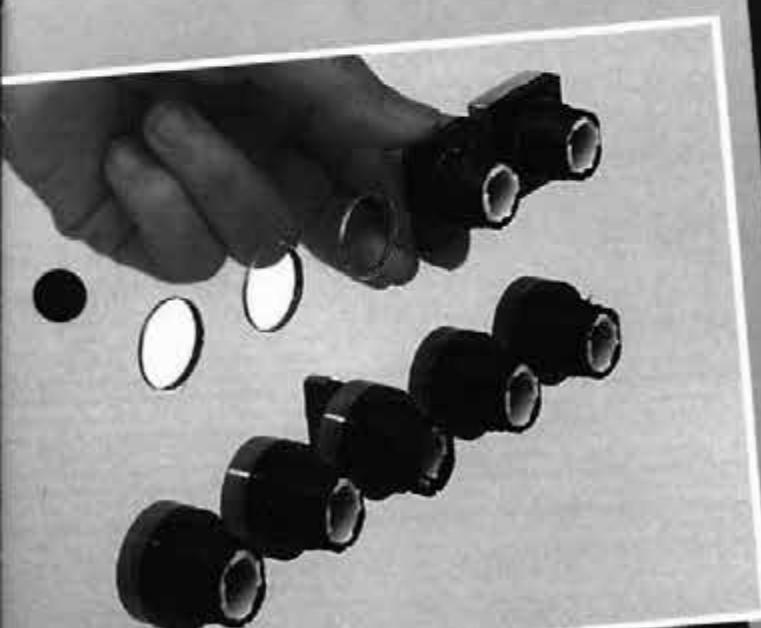
## The DT 3 range: modular, dependable, economical



From innovative modular construction to reliability of function, from time saving mounting to simple wiring: DT 3 is in every respect the best solution.



**Compact variety**  
The depth required by the simply attached rear element is in every case 50 mm whether contact block, lamp or transformer.



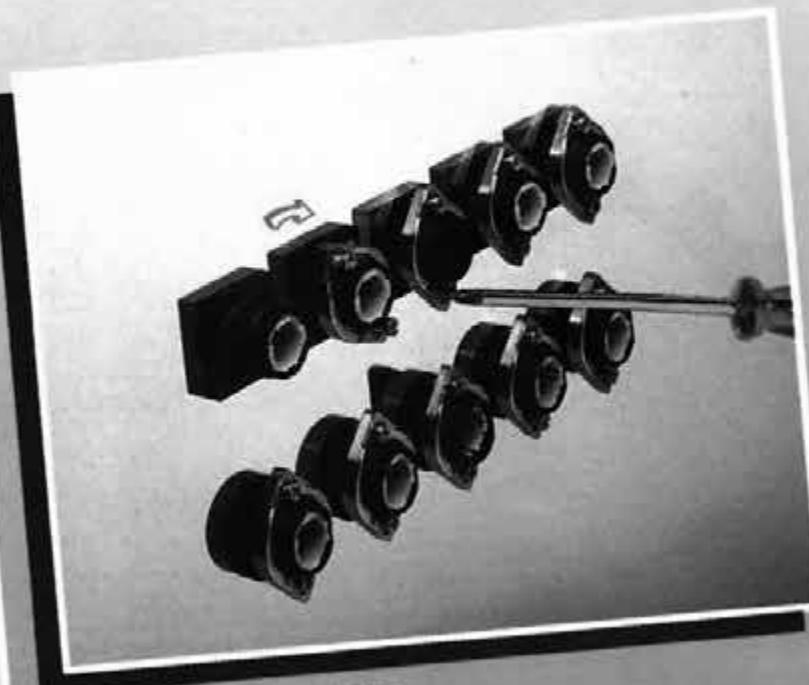
### Secure positioning

Front insertion front elements are held securely in place.



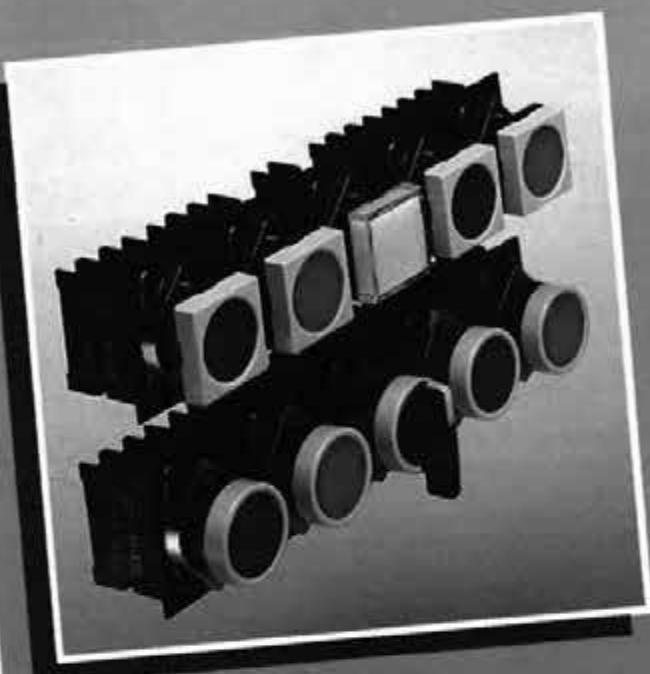
### Modular flexibility

The consistent modular construction allows additional elements to be fitted in one or two levels to meet even the most special requirements.



### Effortless mounting

Mounting needs only one person, even when the front of the panel is out of reach.



### Reliable operation

Reliability through and through: from the central lamp test to the electronics compatible H-bridge contacts.

# The DT 3 range: systematic ordering



## Ordering system 1 simple system

## Complete standards units

Right at the beginning you will find a list of the most common complete units with the corresponding short form order numbers.

## Ordering system 2 comprehensive system

## Complete units to your requirements

This system also needs only one order number per unit:  
To the type number you add details for round or rectangular front, colour, legend, contact and lamp elements.  
(The completed order numbers will be the same as for ordering system 1).

## Ordering system 3 fully flexible system

## Components for self assembly

Diagrams give a clear overview of all individual components and the way which they fit together.  
The index number refers to the description, variants and the order number.

## Enclosures

## Complete or empty

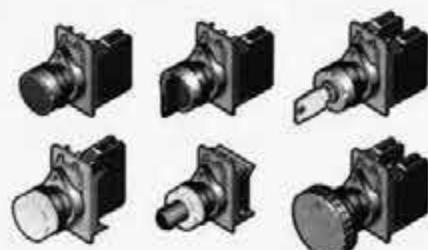
**Required arrangement:**  
Copy and complete the order form on page 23.



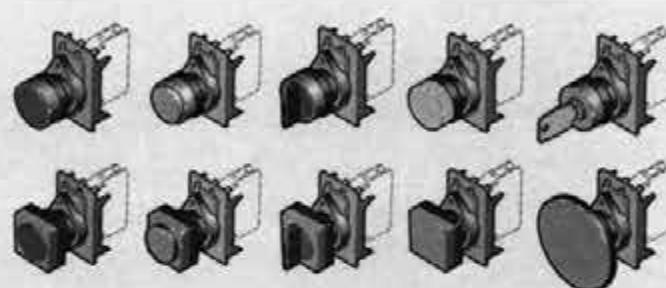
Three ordering systems to exactly match your specific requirements. Savings already – of selection time.

## Accessories, Elements for mounting, Legends, Technical information

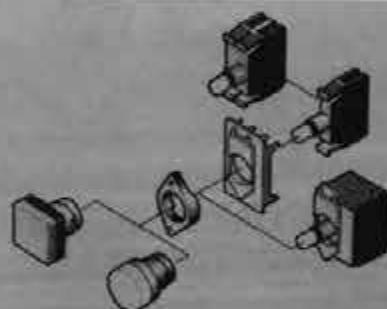
Comprehensive modular system of legends and accessories to suit even the most unusual needs.



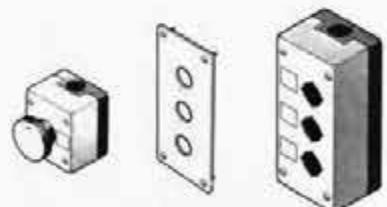
	Page
Pushbuttons DT 3	10
Illuminated pushbuttons DTL 3	10
Rotary switches DS 3	10
Rotary switches with key DSS 3	10
Indicator lamps DL 3	11
Emergency stop pushbutton DN 3	11
Potentiometer dial DR 3	11



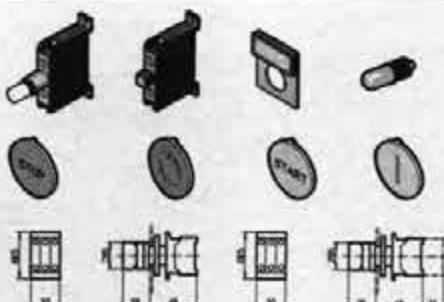
Pushbuttons DT 3	12
Latched pushbuttons DTV 3	12
Illuminated pushbuttons DTL 3	13
Latched illuminated pushbuttons DTLV 3	13
Mushroom pushbuttons DP 3	12
Latched mushroom pushbuttons DPV 3	12
Rotary switches DS 3	14
Illuminated rotary switches DSL 3	15
Rotary switches with key DSS 3	16
Indicator lamps DL 3	17



Indicator lamps DL 3	18
Pushbuttons DT 3	19
Illuminated pushbuttons DTL 3	19
Latched pushbuttons DTV 3	19
Latched illuminated pushbuttons DTLV 3	19
Mushroom pushbuttons DP 3	19
Latched mushroom pushbuttons DPV 3	19
Rotary switches DS 3	20
Illuminated rotary switches DSL 3	20
Rotary switches with key DSS 3	20



Enclosures, empty	22
Enclosures with emergency stop pushbutton	22
Front plates, empty	22
Enclosures, fully fitted	23
Front plates, fully fitted	23



Accessories: Bulbs, small components	24
Contact and lamp blocks	25
Legend plates	25
Legends: Standard legends	26/27
Symbols for text-free legends	28/29
Special legends	34
Technical information	30/31
Dimensions	32/33
Mounting instructions	35

## Complete standard units



Design (for front mounting)	Contact	Order No.	Price \$
<b>DT 3 pushbuttons</b> with flush operator and contact blocks			
green	/—	DT 3 P-G-10	10.80
red	/—	DT 3 P-R-01	10.80
green (START) red (STOP)	/—	DT 3 P-G-166-10 DT 3 P-R-167-01	12.10 12.10



<b>DTL 3 illuminated pushbuttons</b> with contact blocks and BA 9s bulb holder, max. 250 V (without bulb) <sup>1)</sup>			
for filament bulbs, max. 2 W or neon bulbs			
green	/—	DTL 3 P-G-E-10	15.60
red	/—	DTL 3 P-R-E-01	15.60
with series diode and resistor for operating voltage AC 220 V (use 130 V filament bulb, see page 24)			
green	/—	DTL 3 P-G-C-10	19.40
red	/—	DTL 3 P-R-C-01	19.40

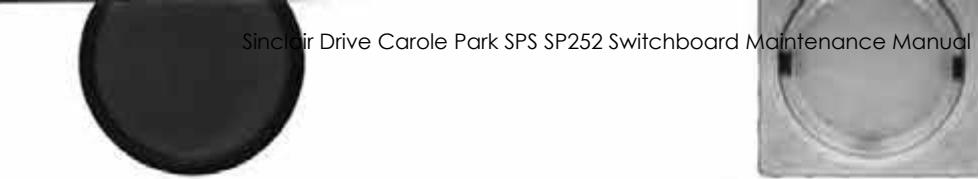


<b>DSK 3 rotary switch with knob operator</b> with contact blocks			
A	stay-put switching angle 90°		
0	.....	/—	DSK 3 P-A-10 20.40
O-I			
D	stay-put switching angle 2×90°		
0	.....	/— /—	DSK 3 P-D-10/10 23.70
I-O-II			



<b>DSS 3 rotary switch with key</b> with contact blocks, all with same key - no. EG 0021			
A	stay-put switching angle 90°		
0	.....	/—	DSS 3 P-AF-10 50.40
O-I			
key withdrawable in positions 0 and I			
D	stay-put switching angle 2×90°		
0	.....	/— /—	DSS 3 P-DT-10/10 53.70
I-O-II			
key withdrawable in positions I, O, II			

<sup>1)</sup>Bulbs - see page 24.



Design (for front mounting) Contact	Order No.	Price \$
<b>DL 3 indicator lamp</b> with BA 9s bulb holder, max. 250 V (without bulb) <sup>1)</sup>		
for filament bulb, max. 2.6 W or neon bulbs		
green	DL 3R-G-E	11.75
red	DL 3R-R-E	11.75
white (clear)	DL 3R-W-E	11.75
yellow	DL 3R-Y-E	11.75
blue	DL 3R-B-E	11.75



with series diode and resistor  
for operating voltage AC 240 V  
(use 130 V filament bulb, see page 24)

green	DL 3R-G-C	17.90
red	DL 3R-R-C	17.90
white (clear)	DL 3R-W-C	17.90
yellow	DL 3R-Y-C	17.90
blue	DL 3R-B-C	17.90



**DN 3 emergency stop pushbutton**<sup>2)</sup>  
colour red,  
complete with 1 N/C contact

reset by turning clockwise		
Ø 30 mm	DN 3-30-01	-
Ø 40 mm:	DN 3-40-01	-
Ø 50 mm	DN 3-50-01	-



**DNS 3 emergency stop pushbutton**<sup>2)</sup>  
colour red,  
complete with 1 N/C contact

release by key		
reset by turning clockwise		
Ø 30 mm	DNS 3-30-01	-
Ø 40 mm	DNS 3-40-01	-
Ø 50 mm	DNS 3-50-01	-



**DR 3 potentiometer dial**  
scale divisions 0...12, 360°  
legend size 2.5 mm  
(without potentiometer)

for potentiometers with 6 mm spindles  
spindle length 50 mm

**DR 3**

**26.20**

<sup>1)</sup>Bulbs - see page 24.  
<sup>2)</sup>Legend rings - see page 24.

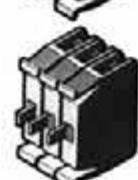
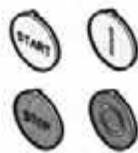
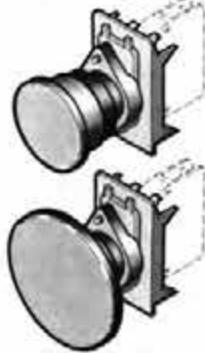
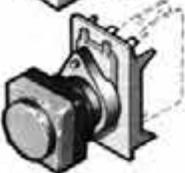
# Complete units to specification

## Pushbuttons

round



square



Design (for front mounting)	Order No. Type	front ring	colour cap	Inscription cap	contact block	Weight [g]
<b>DT 3 pushbutton</b>	<b>DT 3</b>	-	-	-	-	44
<b>DTH 3 raised pushbutton<sup>1)</sup></b>	<b>DTH 3</b>	-	-	-	-	45
<b>DTV 3 latched pushbutton</b>	<b>DTV 3</b>	-	-	-	-	44
<b>DTVH 3 raised latched pushbutton<sup>1)</sup></b>	<b>DTVH 3</b>	-	-	-	-	45
<b>DP 3 mushroom pushbutton 42 mm Ø</b>	<b>DP 3</b>	-	-	-	-	44
<b>DPV 3 latched mush. pushbutton<sup>1)</sup> 42 mm Ø</b>	<b>DPV 3</b>	-	-	-	-	44
<b>DPG 3 mushroom pushbutton 68 mm Ø</b>	<b>DPG 3</b>	-	-	-	-	49
<b>DPGV 3 latched mush. pushbutton<sup>1)</sup> 68 mm Ø</b>	<b>DPGV 3</b>	-	-	-	-	49
<b>Order No. suffix</b>						
<b>Front ring</b>						
round	PB	Raised PB	Mush. P			
grey plastic	P	P	P			2
black plastic	N	N	N			8
metal	L	L	L			10
metal extended	M	—	—			18
metal sealed	F	—	—			11
<b>square</b>						
grey plastic	OP					
black plastic	ON					
<b>Colour</b>						
green	G	G	G	G		
red	R	R	R	R		
yellow	Y	Y	Y	—		
blue	B	—	—	—		
with	W	—	—	—		
black	N	—	N	—		
<b>Inscription cap</b>						
white		blank			101	
	I				369	0.5
other text and symbols see pages 26...29	O				370	
	START				166	
	STOP				187	
black		blank			106	
<b>DE 3 Contact blocks<sup>2)</sup></b>						
none					00	
1 contact block					01	
					10	10
2 contact blocks					02	
					11	
					20	20
					1L	
3 contact blocks					03	
					12	
					21	
					30	30
					2L	

1) Legend caps cannot be used.

2) For operation of Contact block  
in centre position Operating bridge  
DT3-OB is required (see pages 24 and 35).2) Further contact blocks can be fitted at second level. Contact blocks  
for base mounting (separate mounting) see page 25.  
Legend carriers and legend inserts, see pages 25 and 27.

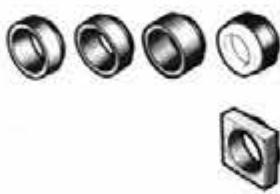
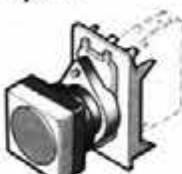


## Illuminated pushbuttons

round



square



### Design (for front mounting)

**DTL 3 illuminated pushbutton**

Order No. Typ	front ring	colour cap	inscription cap	lamp element	contact block	transformer block	Weight [g]
------------------	------------	------------	-----------------	--------------	---------------	-------------------	------------

**DTL 3**

44

**DTLV 3 illuminated latched pushbutton****DTLV 3**

44

### Order No. suffix

#### Front ring

round	grey plastic	P	2
	black plastic	N	8
	metal	L	10
	metal extended	M	18
	metal sealed	F	11
square	grey plastic	SP	6
	black plastic	SN	12

#### Colour cap

green	G
red	R
yellow	Y
blue	B
white	W

#### Inscription cap

white blank	101
other text	369
and symbols	370
see pages	166
26...29	167
START	
STOP	

0.5

#### DEL 3 Lamp elements<sup>1)</sup>

with BA 9s bulb holder, max. 250V, 2W  
(without bulbs)**E**

10

with diode and resistor  
for operating voltageAC 220 V<sup>2)</sup> \***D**

10

AC 240 V<sup>2)</sup>**C**

#### DELK 3

with central lamp test

**K**

20

with central lamp test  
with diode and resistor  
for operating voltageAC 220 V<sup>2)</sup> \***DK**

20

AC 240 V<sup>2)</sup>**DC**

#### Contact blocks<sup>3)</sup>



none

**00**

10

1 contact  
block**01**

10

2 contact  
blocks**02**

20

**11**

20

**20****1L**

20

#### DU 3 Transformer blocks



secondary: 6 V, 1.2 VA, 50/60 Hz

**U110**

78

primary: 110...120 V

**U220**

220...240 V

**U380**

380...415 V

.../... V

**U..**<sup>1)</sup>Bulbs see page 24.<sup>2)</sup>Use 130 V bulbs. See page 24.

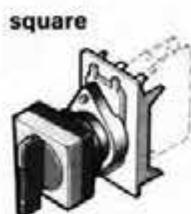
Legend carriers and legend inserts, see pages 25 and 27.

\*Further contact blocks can be fitted to illuminated push-buttons at the second level if no transformer block is used.  
Contact and lamp blocks for base (sep. mounting) see page 25.

\* Please enquire

# Complete units to specification

## Rotary switches



**Design**  
(for front mounting)

**DSH 3 rotary switch**  
with long operator

**Order No.**  
**Type**

**DSH 3**

front ring  
switch positions  
contact block

**Weight**  
**[g]**

46

**DSK 3 rotary switch**  
with short operator

**DSK 3**

47

### Order No. suffix



#### Front ring

round

grey plastic  
black plastic  
metal

P  
N  
L

2  
8  
10

square

grey plastic  
black plastic

OP  
ON

6  
12

#### Switch positions

**A**

0  
I  
II  
stay-put  
O—I switching angle 90°

**A**

**B**

0  
I  
II  
momentary  
O—I switching angle 45°

**B**

**D**

0  
I  
II  
stay-put  
I—O—II switching angle 2×90°

**D**

**E**

I  
O  
II  
momentary  
I—O—II switching angle 2×45°

**E**

**G**

I  
O  
II  
right stay-put  
switching angle 90°  
left momentary  
switching I—O—II angle 45°

**G**



#### DE 3 Contact blocks<sup>1)(2)</sup>

none

00/00

switch pos.	left	right		
1 contact block			01	10
2 contact blocks			01/01	10/01
			10/10	01/10
3 contact blocks			20/10	10/20
			20/01	10/11
			01/20	01/11

10

20

30

<sup>1)</sup>Further contact blocks can be fitted at level 2.  
Contact blocks for base (separate) mounting,  
see page 25.

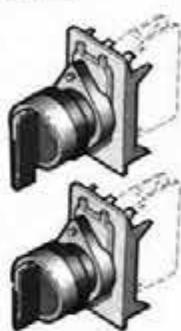
<sup>2)</sup>Legend carriers and legend inserts, see pages 25 and 27.

2) For operation of Contact block in centre position  
Operating bridge DT3-OB is required  
(see pages 24 and 35).

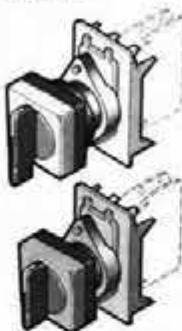
Active 29/01/2014

## Illuminated rotary switches

round



square



### Design (for front mounting)

**DSHL 3 illuminated rotary switch**  
with long operator

Order No. Type	front ring	switch positions	lamp element	contact block	transf. block	Weight [g]
-------------------	------------	------------------	--------------	---------------	---------------	------------

DSHL 3

46

**DSKL 3 illuminated rotary switch**  
with short operator

DSKL 3

47

### Order No. suffix

#### Front ring

round grey plastic metal

P  
L2  
10

square grey plastic

Q

3

#### Switch positions

**A** 0 stay-put  
O-I sw. angle 90°

A

**B** 0 momentary  
O-I sw. angle 45°

B

**D** 0 stay-put  
I-O-II sw. angle 2×90°

D

**E** 0 momentary  
I-O-II sw. angle 2×45°

E

**G** right stay-put  
sw. angle 90°  
left momentary  
I-O-II sw. angle 45°

G

**DEL 3 Lamp elements**  
with BA 9s bulb holder, max. 250V, 2W  
(without bulbs<sup>1)</sup>)

E

10

with diode and resistor  
for operating voltage AC 220 V<sup>2)</sup>

please enquire

D

10

**DELD 3** AC 240 V<sup>2)</sup>

C

10

**DELK 3**  
with central lamp test

K

20

with central lamp test  
with diode and resistor  
for operating voltage AC 220 V<sup>2)</sup>

please enquire

DK

20

**DELDK 3** AC 240 V<sup>2)</sup>

DC

20

**DE 3 Contact blocks<sup>3)</sup>**  
none

00

10

switch pos. left  
1 contact block

01  
10

10

2 contact blocks

01/01  
10/01  
10/10  
01/10

20

**Transformer blocks**  
see page 13

U...

78

<sup>1)</sup> Bulbs see page 24.

<sup>2)</sup> Use 130 V bulbs, see page 24.

<sup>3)</sup> Further contact blocks can be fitted at the second level if no transformer block is used.

Legend carriers and inserts, see pages 25 and 27.  
Contact and lamp blocks for base (separate) mounting,  
see page 26.

# Complete units to specification

## Key operated rotary switches



Key-operated rotary switches

Order No. suffix

Switching and key removal positions

**A**      O      stay-put  
          |  
          |      switching angle 90°  
key removable at pos.: Kaba-Micro type

O      1707-D      AD

O—I      1707-F      AF

**B**      O      momentary  
          |  
          |      switching angle 45°  
key removable at pos.: Kaba-Micro type

O      1707-D      BD

O      1707-Z      DZ

O and II      1707-F      DF

O and I and II      1707-T      DT

**E**      I      O      II      momentary  
          |  
          |      sw. angle 2×45°  
key removable at pos.: Kaba-Micro type

O      1707-D      ED

**G**      I      O      II      right stay-put  
          |  
          |      switching angle 90°  
left momentary  
switching angle 45°  
key removable at pos.: Kaba-Micro type

O      1707-D      GD

O and II      1707-F      GF

Contact blocks<sup>1)</sup>

none      00

switch pos.      left      right

1 contact block      01      10

2 contact blocks      01/01      20

3 contact blocks      01/10      30

Legend carriers and legend inserts, see pages 25 and 27.

1) For operation of Contact blocks in centre position

Operating bridge DT3-OB is required

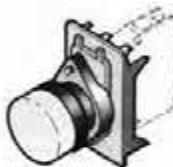
(see pages 24 and 35).



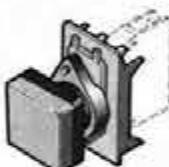
Contact blocks

**Indicator lamps**

round



square


**Design**  
(for front mounting)

**Order No.**  
**Type**

lens cap

colour

inscription cap

transformer

lamp

element

**Weight**  
(g)**DL 3 indicator lamp****DL 3**

25

**Order No. suffix**
**Lens cap**  
round  
square
R  
Q
**Colour**  
green  
red  
yellow  
blue  
white
G  
R  
Y  
B  
W**Legend cap<sup>3)</sup>**
**round**  
white blank  
I  
O
—  
669  
670
**square**  
white blank  
I  
O
—  
869  
870
**DEL 3 Lamp elements**  
with BA 9s bulb holder, max. 250V, 2W  
(without bulbs<sup>1)</sup>)

E

10

**DELD 3** with diode and resistor  
for operating voltage AC 220 V<sup>2)</sup> \*  
AC 240 V<sup>2)</sup>
D  
C

10

**DELK 3**  
with central lamp test

K

20

**DELDK 3**  
with central lamp test  
with diode and resistor AC 220 V<sup>2)</sup> \*  
for operating voltage AC 240 V<sup>2)</sup>
DK  
DC

20

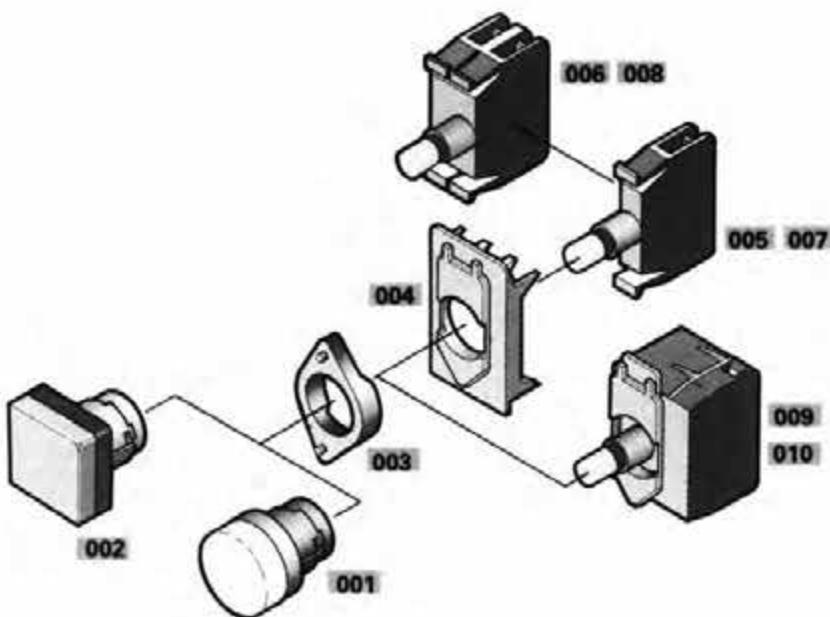
**DLU 3**  
**Transformer blocks**  
with BA 9s bulb holder  
(without bulbs<sup>1)</sup>)  
secondary: 6 V, 1.2 VA, 50/60 Hz  
primary: 110...120 V  
220...240 V  
380...415 V  
.../... V
U110  
U220  
U380  
U...

78

<sup>1)</sup>Bulbs see page 24.  
<sup>2)</sup>Use 130 V bulbs, see page 24.  
**Please enquire**
<sup>3)</sup>Legends and symbols see pages 26...29.  
Legend carriers and legend inserts, see pages 25 and 27.

# Components for self assembly

## DL 3 indicator lights



**Index No.**  
**Price \$**

**Front elements**

with blank inscription cap  
and colour cap

**-DL 3 R round**

- |  |           |
|--|-----------|
|  | green -G  |
|  | red -R    |
|  | yellow -Y |
|  | blue -B   |
|  | white -W  |

**-DL 3 Q square**

- |  |           |
|--|-----------|
|  | green -G  |
|  | red -R    |
|  | yellow -Y |
|  | blue -B   |
|  | white -W  |

**D 3-BR fixing ring**

- |  |                    |
|--|--------------------|
|  | for front elements |
|--|--------------------|

**D 3-KE coupling plate**

- |  |                                  |
|--|----------------------------------|
|  | for attachment<br>of lamp blocks |
|--|----------------------------------|

**DEL 3 lamp elements**

with BA 9s bulb holder, max. 250 V  
(without bulbs<sup>1)</sup>)

**001**

for filament bulbs, max. 2.6 W  
or neon bulbs

**002**

with central lamp test  
for filament bulbs, max. 2.6 W  
or neon bulbs

**003**

-K  
with diode and resistor  
for operating voltage

**004**

-D AC 220 V  
-C AC 240 V

130 V filament bulbs, s. page 24

with central lamp test  
with diode und resistor  
for operating voltage  
**DK** AC 220V  
**DC** AC 240V

130 V filament lamps, s. page 24

**DUL 3 transformer blocks**

with BA 9s bulb holder, max. 250 V  
(without bulbs<sup>1)</sup>)

**005****006****007****008****009****010**

secondary:

6 V, 1.2 VA, 50/60 Hz

primary:

110...120 V

220...240 V

380...415 V

**009**

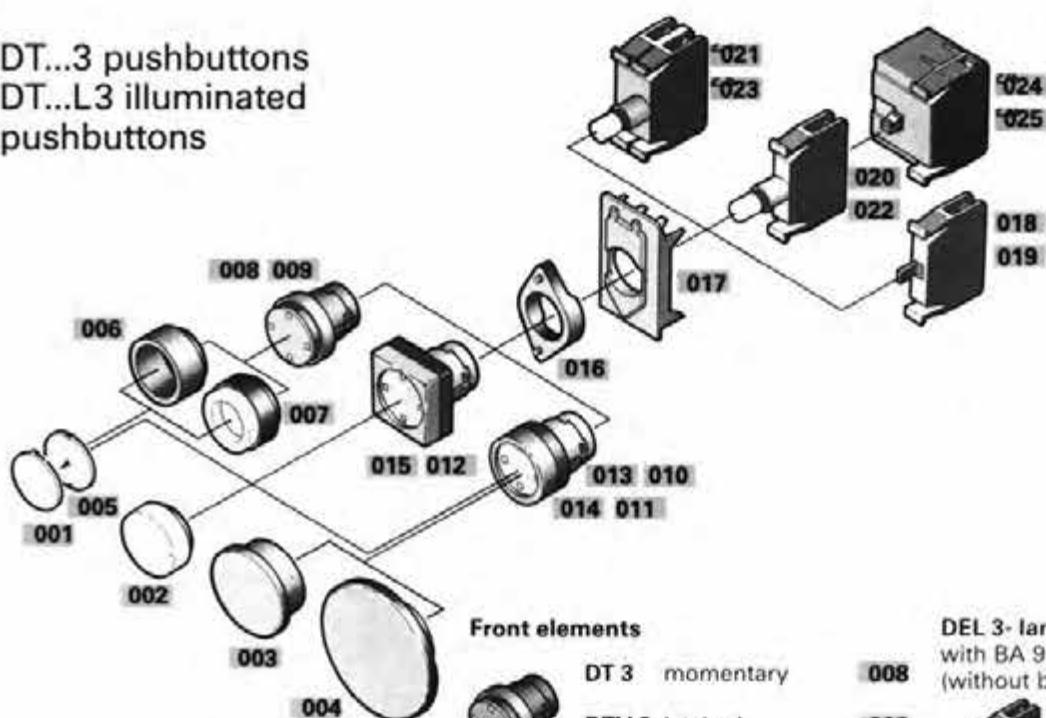
**29.00**

**010**

**please enquire**

Bulbs, see page 24.

DT...3 pushbuttons  
DT...L3 illuminated  
pushbuttons



**Index No.**  
**Price \$**

#### Operators

D 3- colour caps	<b>001</b>
green -G	
red -R	<b>0.28</b>
yellow -Y	
blue -B	
white -W	

D3-H Raised button <sup>1)</sup>	<b>002</b>
green -G	<b>4.24</b>
red -R	
yellow -Y	

Mushroom 42 mm Ø <sup>1)</sup>	<b>003</b>
DP 3	
green -G	
red -R	<b>5.00</b>
yellow -Y	
black -B	

Mushroom 68 mm Ø <sup>1)</sup>	<b>004</b>
DPG-3	
green -G	
red -R	<b>7.00</b>

Inscription cap	<b>005</b>
D3-101 white blank	
D3-106 black blank	<b>0.35</b>

Front rings	
DT 3-MFR extended front ring metal	<b>006</b>
DT 3-FFR sealed front ring metal	<b>007</b>

#### Front elements

DT 3 momentary

**008**

DTV 3 latched

**009** **13.05**

momentary

with plastic front ring

-P grey

-N black

**010** **3.53**

with metal front ring

-L

**011** **—**

with square front ring

-QP grey

-QN black

**012** **3.53**

latched

with plastic front ring

-P grey

-N black

**013** **13.50**

with metal front ring

-L

**014** **—**

with square front ring

-QP grey

-QN black

**015** **13.50**

D 3-BR fixing ring

for front elements

**016** **1.69**

D 3-KE coupling plate

for attachment

of contact

and lamp blocks

**017** **1.50**

DE 3 contact blocks

10

**018** **3.25**

01

**019** **3.25**

OL

**019** **11.00**

#### DEL 3- lamp elements

with BA 9s bulb holder, max. 250 V  
(without bulbs<sup>2)</sup>)

**020** **4.90**

for filament bulbs, max. 2 W  
or neon bulbs

**020** **—**

-E **4.90**

with central lamp test  
for filament bulbs, max. 2 W  
or neon bulbs

**021** **9.50**

-K **—**

with diode  
and resistor for  
operating voltage

-D AC 220 V

-C AC 240 V

**022** **—**

130 V filament lamps, s. page 24

with central lamp test  
with diode  
and resistor for  
operating voltage

-DK AC 220 V

-DC AC 240 V

**023** **—**

130 V filament lamps, s. page 24

#### DU 3- transformer blocks

for addition

to lamp blocks

secondary:  
6 V, 1.2 VA, 50/60 Hz

**024** **—**

primary:  
110..120 V  
220..240 V  
380..415 V

**024** **29.00**

.....V

**025** **please inquire**

Nut suitable for illuminated pushbuttons

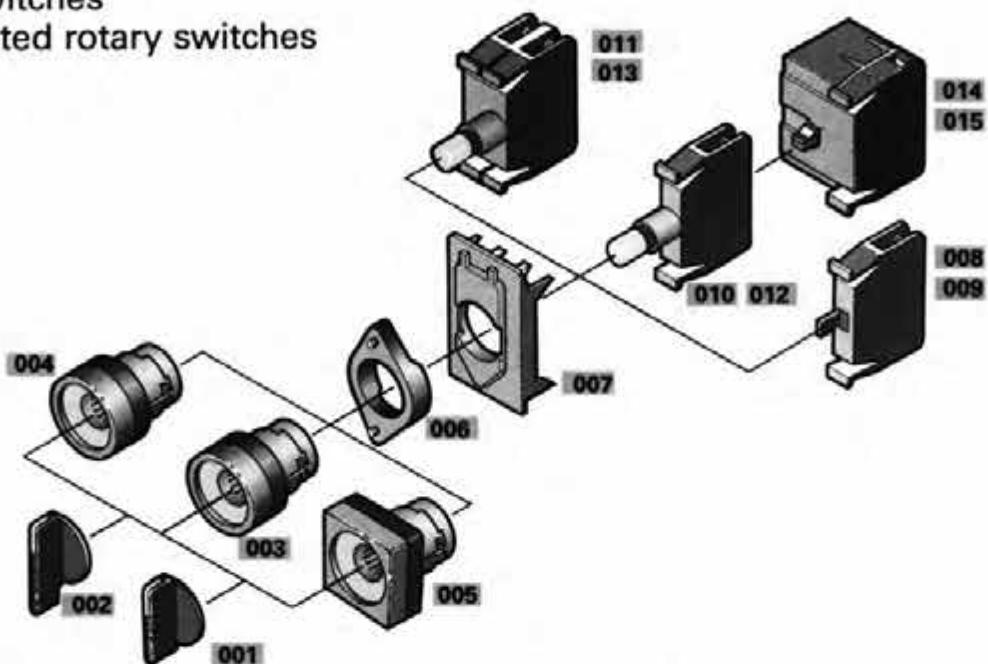
<sup>1)</sup> For bulbs see page 24

<sup>2)</sup> For bulbs see page 24

# Components for self assembly

DS 3 rotary switches

DSL 3 illuminated rotary switches



**Index No.**  
**Price \$**

## Operating elements

**DSK 3-** short operator

**001**  
2.00

**DSH 3-** long operator

**002**  
2.00

## Round front elements

**DS 3P-** with plastic front ring

**003**

## Switch positions:

**A**    grey black    12.00

**B**    grey black    12.00

**D**    grey black    12.00

**E**    grey black    12.00

**G**    grey black    12.00

**DS 3L-** with metal front ring

**004**

**A**    12.00

**B**    12.00

**D**    12.00

**E**    12.00

**G**    12.00

## Square front elements



**DS 3Q-** with plastic front ring

**005**

## Switch positions:

**A**    grey black    12.00

**B**    grey black    12.00

**D**    grey black    12.00

**E**    grey black    12.00

**G**    grey black    12.00

## D 3-BR fixing ring



for front elements

## DEL 3- lamp elements

with BA 9s bulb holder, max. 250 V  
(without bulbs<sup>1)</sup>)



for filament bulbs, max. 2 W or neon bulbs

**010**  
4.90



with central lamp test for filament bulbs, max. 2 W or neon bulbs

**011**  
9.50



with diode and resistor for operating voltage

**012**  
8.60

-D AC 220 V  
-C AC 240 V

130 V filament bulbs, s. page 24



with central lamp test with diode and resistor for operating voltage

**013**  
—

-DK AC 220 V  
-DC AC 240 V

130 V filament lamps, s. page 24

**DU 3 transformer blocks**  
for addition to lamp blocks

secondary:  
6 V, 1.2 VA, 50/60 Hz

primary:  
110...120 V  
220...240 V

380...415 V

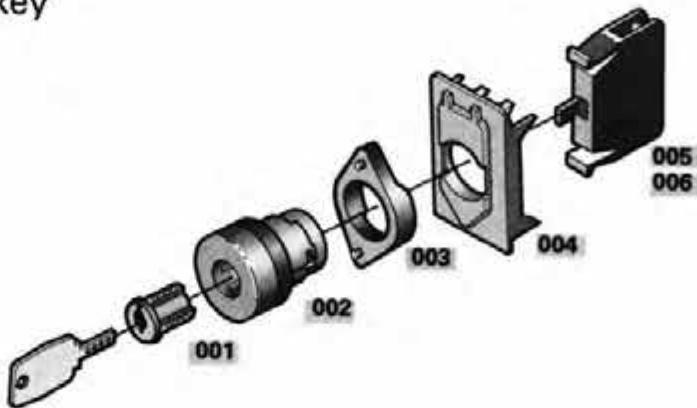
**014**  
29.00

...V

**015**  
please enquire

<sup>1)</sup>For bulbs see page 24.

## DSS 3 rotary switch with key



## Warning:

During assembly ensure that the lock and front element are **correctly positioned** before fitting together.

For security reasons it is not possible to repeat this operation.

**Index No.**  
**Price \$**

**Kaba-micro 1707 lock  
with 2 keys**

all with same  
key no. EG 1707<sup>1)</sup>



switch removal  
positions: positions:

A	0	O (1707D)	<b>34.00</b>
	.....I	O I (1707F)	<b>34.00</b>

B	0	O (1707D)	<b>34.00</b>
	Y	I (1707Z)	<b>34.00</b>

D	0	O (1707D)	<b>34.00</b>
	.....II	O II (1707T)	<b>34.00</b>

E	0	O (1707D)	<b>34.00</b>
	Y	I II (1707T)	<b>34.00</b>

G	0	O (1707D)	<b>34.00</b>
	.....II	O II (1707F)	<b>34.00</b>

**001 DSS 3 front elements**

switch positions: colour

A	0	grey black
	.....I	—

B	0	grey black
	Y	—

D	0	grey black
	.....II	—

E	0	grey black
	Y	—

G	0	grey black
	.....II	—

**002 D 3-BR fixing ring**

for front elements

10.00	—
10.00	—

**003****D 3-KE coupling plate**

for attachment of contact blocks

**004****1.50****DE 3 contact blocks**

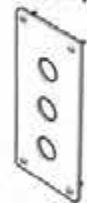
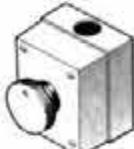
-10 -01 -0L

**3.25****3.25****006****11.00**

1) Other key number available on request

# Enclosures

**Enclosures**

**Front plates**

**Enclosures with emergency stop pushbutton**

**Accessories**
**Legend plates**
**Dimensions**

	<b>Design</b>	<b>Total control positions</b>	<b>Order No.</b>	<b>Price \$</b>
grey plastic degree of protection IP 65 to IEC 529. Water jet protected to SEV 3047				
empty with 22.5 mm Ø mounting holes, and 2 cable entries 21.5 mm Ø, top with knock out, bottom with cable sleeve	1 2 3 5		DYA 3-1A DYA 3-2A DYA 3-3A DYA 3-5A	22.00 26.00 32.00 46.00
aluminium grey painted degree of protection IP 65 to IEC 529 water jet protected to SEV 3047				
empty with 22.5 mm Ø mounting holes	1 2 3 5		DZA 3-1A DZA 3-2A DZA 3-3A DZA 3-5A	45.00 50.00 62.00 84.00
empty without mounting holes	1 2 3 5		DZB 3-1A * DZB 3-2A * DZB 3-3A * DZB 3-5A *	— — — —
anodised aluminium plate with tight fitting rubber gasket and 4 captive fixing screws				
empty with 22.5 mm Ø mounting holes	1 2 3 4 5		DZE 1-1A * DZE 1-2A * DZE 1-3A * DZE 1-4A * DZE 1-5A *	— — — — —
yellow plastic complete with 1 N/C contact				
reset by turning clockwise			DYA 3-N-40-01	—
release by key reset by turning clockwise			DYA 3-NS-40-01	—
yellow aluminium complete with 1 N/C contact				
reset by turning clockwise			DZA 3-N-40-01	—
release by key reset by turning clockwise			DZA 3-NS-40-01	—
cable glands PG 16 mm with fixing nut	plastic brass		+P +M *	7.20
blanking plug PG 16 mm plastic, with fixing nut			+K	3.10
blank, page 23 with legend, page 27				
see page 33				

\*Please enquire

**Fully equipped enclosures**  
**Fully equipped front plates**

Assembled  
in plastic  
or aluminium enclosure

Positions:



Assembled on anodized  
aluminium front plate

Positions:


**Order sheet  
for copying**

Customer:

**Order details  
for specially equipped enclosure  
or front plate**

Originator:

Date:

**Design**

Enclosure

plastic

	total	total positions	horizontal	vertical	top	bottom	Price
plastic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
aluminium	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			

Cable gland

plastic

plastic	<input type="checkbox"/>	<input type="checkbox"/>
brass	<input type="checkbox"/>	<input type="checkbox"/>

Blanking plugs

plastic

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Front plate

anodised alum.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

## Position Order No.

E  
D  
C  
B  
A

total

## Ordering example

**Design**

Plastic enclosure with 5 control positions.

- Pos. E: Indicator lamp<sup>1)</sup>  
DL 3-R-Y-582-E      (page 17)
- Pos. D: Pushbutton  
DT 3L-G-369-21      (page 12)
- Pos. C: Pushbutton  
DT 3L-R-370-11      (page 12)
- Pos. B: Rotary switch  
with key  
DSS 3-AD-01      (page 16)
- Pos. A: Round blanking plug  
18.104.207-51      (page 24)

Front elements  
(see pages 12...17).

Contact and lamp blocks for base  
mounting (see page 25).

Please order legend plates separately  
(see pages 25 and 27).

**Design**

Enclosure

plastic

	total	total positions	horizontal	vertical	top	bottom	Price
plastic	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
aluminium	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			

Cable gland

plastic

plastic	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
brass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Blanking plugs

plastic

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Front plate

anodised alum.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

## Position Order No.

E      DL 3-R-Y-582-E<sup>1)</sup>  
D      DT 3L-G-369-21  
C      DT 3L-R-370-11  
B      DSS 3-AD-01  
A      18.104.207-51

total

<sup>1)</sup>Lamp blocks E, D or C may be specified (see page 25).

# Accessories, small components



Design		Order No.	Price \$
<b>Miniature filament bulbs, clear (BA 9s)</b>			
voltage [V]	max. rating [W]		
6	1.2	<b>BA 9-6</b>	<b>3.00</b>
12	1.4	<b>BA 9-12</b>	
24	1.4	<b>BA 9-24</b>	
36	1.4	<b>BA 9-36</b>	
48	1.4	<b>BA 9-48-02</b>	
60	1.5	<b>BA 9-60-02</b>	
130	2.6	<b>BA 9-130</b>	<b>3.00</b>
for lamp blocks with diodes and resistors for operation from AC 220 V or 240 V			
<b>Miniature neon bulbs (BA 9s)</b>			
110 V...127 V clear		<b>BA 9N-110</b>	<b>5.20</b>
220 V...240 V clear		<b>BA 9N-240</b>	
<b>Lamp extractor</b>			
for BA 9s filament and neon lamps		<b>DT 3-LE</b>	<b>2.00</b>
<b>Emergency stop ring</b>			
yellow Ø 90 mm without legend		<b>DN 3-B</b>	<b>2.00</b>
with legend: EMERGENCY—STOP / NOT—AUS/ARRET D'URGENCE		<b>DN 3-E</b>	<b>2.50</b>
<b>Blanking plug</b>			
round		<b>DT 3R-BP</b>	<b>2.00</b>
square		<b>DT 3Q-BP</b>	<b>2.00</b>
<b>Operating bridge</b>			
for operating contacts in position 3		<b>DT 3-OB</b>	<b>0.25</b>
<b>Locking tab</b>			
for securing front ring (use 2, 90° apart)		<b>DT 3-LT</b>	<b>0.20</b>
<b>Replacement key</b>			
Kaba-Micro 1700		<b>DSS 3</b>	<b>6.00</b>
<b>Front rings for pushbuttons</b>			
round	plastic grey	<b>DT 3-PFR</b>	<b>0.45</b>
	plastic black	<b>DT 3-NFR</b>	<b>0.45</b>
	metal	<b>DT 3-LFR</b>	<b>1.00</b>
square	plastic grey	<b>DT 3Q-PFR</b>	<b>0.45</b>
	plastic black	<b>DT 3Q-NFR</b>	<b>0.45</b>
<b>Lens caps</b>	for indicator lamps		
round	green	<b>DT 3G-LC</b>	<b>1.00</b>
	red	<b>DT 3R-LC</b>	
	yellow	<b>DT 3Y-LC</b>	
	blue	<b>DT 3B-LC</b>	
	white	<b>DT 3W-LC</b>	
square	green	<b>DT 3Q-GLC</b>	<b>1.00</b>
	red	<b>DT 3Q-RLC</b>	
	yellow	<b>DT 3Q-YLC</b>	
	blue	<b>DT 3Q-BLC</b>	
	white	<b>DT 3Q-WLC</b>	
<b>Legend caps<sup>1)</sup></b>			
round		<b>DT 3-LC</b>	<b>0.55</b>
square		<b>DT 3Q-LC</b>	<b>0.55</b>
<b>Reset Rod</b>			
for resetting overload relays		<b>DT 3-RR150</b>	<b>3.00</b>

1) With legends or symbols, see page 26-29

## Base mounting elements, legend plates



Design	Order No.	Price \$
<b>DA 3 contact blocks for base mounting</b>		
-10	<b>DA 3-10</b>	<b>5.50</b>
-E 10	<b>DA 3-E10</b>	<b>10.50</b>
-01	<b>DA 3-01</b>	<b>5.50</b>
-OL	<b>DA 3-L01</b>	<b>10.50</b>
<b>DAL 3 lamp elements for base mounting with BA 9s bulb holder, max. 250 V (without bulb<sup>1)</sup>)</b>		
for filament bulbs max. 2 W for DTL max. 2.6 W for DL or neon bulb		
-E	<b>DAL 3-E</b>	<b>6.50</b>
<b>Legend carriers</b>		
black plastic for use with legend inserts size 30×48 mm secured by front element	<b>DT 3-30-LC</b>	<b>0.60</b>
size 48×48 mm secured by front element	<b>DT 3-48-LC</b>	<b>1.00</b>
size 48×18 mm secured by double sided adhesive tape or by 2 screws	<b>DT 3-18-LC</b>	<b>1.00</b>
<b>Legend plates<sup>2)</sup></b>		
for legend carrier size 30×48 mm aluminised plastic without legend (10 pieces)	<b>DT 3-30-LP</b>	<b>0.50</b>
for legend carriers size 48×48 mm and 48×18 mm aluminised plastic without legend (10 pieces)	<b>DT 3-48-LP</b>	<b>0.50</b>
<b>Legend plates<sup>2)</sup></b>		
for enclosures size 19×19 mm aluminised plastic without legend (10 pieces)	<b>DT 3-19-LP</b>	<b>0.60</b>

<sup>1)</sup>For bulbs, see page 24.<sup>2)</sup>For legend plates with legends see page 27.

# Standard legends

## To DIN 30 640 E

German  
English<sup>1)(2)(3)</sup>  
French

	Inscription caps for pushbuttons				Legend caps for indicator lamps			
	white black characters		black white characters		round		square	
	Order No.	Price \$	Order No.	Price \$	Order No.	Price \$	Order No.	Price \$
EIN ON MARCHE	DT3-151 -168• -183	1.30	DT3- -268•	1.30	DT3-551 -568•	1.30	DT3-751 -768• -783	1.30
AUS OFF ARRET	-152 -169• -184	1.30	-269•	1.30	-552 -569• -584	1.30	-752 -769• -784	1.30
AUF UP OUVRIR	-153 -170• -185	1.30	DT3-253 -270• -285	1.30	-570•	1.30	-770•	1.30
AB DOWN Descendre	-154 -171• -188	1.30	-254 -271•	1.30	-571•	1.30	-771•	1.30
ZU CLOSE FERMER	-155 -172 -186		-255 -272 -286					
HEBEN RAISE Monter	-156 -173• -187	1.30	-273•	1.30	-573•	1.30	-773•	1.30
SENKEN LOWER Descendre	-157 -174• -188	1.30	-274•	1.30	-574•	1.30	-774•	1.30
RECHTS RIGHT DROITE	-158 -175 -189							
LINKS LEFT GAUCHE	-159 -176 -190							
VOR FORWARD AVANT	-160 -177• -191	1.30	-260 -277• -291	1.30	-577•	1.30	-777•	1.30
ZURUECK REVERSE ARRIERE	-161 -178• -192	1.30	-261 -278• -292	1.30	-578•	1.30	-778•	1.30
SCHNELL FAST RAPIDE	-162 -179 -193		-262 -279 -293					
LANGSAM SLOW LENT	-163 -180 -194		-263 -280 -294					
Einrichten SET-UP Regler	-164 -181 -195		-264 -281 -295					
Betrieb RUN En service	165 -182 -196		-265 -282 -296		-565 -582 -596		-765 -782 -796	
START START MARCHE	-166 -166• -183	1.30	-266•	1.30	-566• -583	1.30	-766•	1.30
STOP STOP ARRET	-167 -167• -184	1.30	-267•	1.30	-567• -584	1.30	-767•	1.30
HAND HAND MANUEL	-197 -197 -199		-297 -297 -299		-597 -597 -599		-797 -797 -799	
AUTO AUTO AUTO	-198 -198 -198		-298 -298 -298		-598 -598 -598		-798 -798 -798	
RESET	-149		-249					

1) • NOTE: Stocked Labels - others on request

2) Lettering 4mm 3) Special legends ~~10.50~~ per letter

**Legend inserts**  
aluminised plastic  
size 30×18 mm  
for legend carrier 18.104.424-51

I-O-II

**Legend plates**  
aluminised plastic  
size 19×19 mm  
for enclosures

STOP

Legend	Order No.	Price
	1)2)3)	\$
II	<b>DT3-973</b>	<b>1.30</b>
O	-972	
I	-971	
FAILURE	-970	
STOP	-967 •	1.30
START	-966 •	1.30
RUN	-965	
SLOW	-963	
FAST	-962	
REVERSE	-961 •	1.30
FORWARD	-960 •	1.30
LEFT	-959	
RIGHT	-958	
DOWN	-954 •	1.30
UP	-953 •	1.30
OFF	-952 •	1.30
ON	-951 •	1.30
O • I	<b>DT3-998</b>	
FORW. OFF REV.	-997 •	1.30
I O AUTO	-996	
ON OFF AUTO	-995	
MAN. O AUTO	-994 •	1.30
HAND O AUTO	-993	
← O I	-992	
← O →	-991	
I O II	-990 •	1.30
MAN. AUTO	-987 •	1.30
HAND AUTO	-986	
SET-UP RUN	-985	
FORW. REV.	-984 •	1.30
UP DOWN	-983 •	1.30
OFF ON	-982 •	1.30
STOP START	-981	
FORWARD REVERSE	-980	
LEFT RIGHT	-979	
OFF ON	-978 •	1.30
I II	-977 •	1.30
O →	-976	
O I	<b>-975</b>	

1) • NOTE - Stock Legends - others on request.

2) Lettering 4mm 3) Special Legends \$0.55 per letter.

# Symbols for text free legends

To DIN 30 600

To ISO R 369

Symbols for motion	Inscription caps <sup>1)</sup> for pushbuttons		Legend caps <sup>1)</sup> for indicator lamps	
	white black characters	black white characters	round	square
	Order No.	Order No.	Order No.	Order No.
→ DIN ISO 1 direction of continuous linear motion	DT 3-351	DT 3-451	DT 3-651	DT 3-851
↔ DIN ISO 2 linear motion in two directions	-352	-452	-652	-852
→ DIN ISO 4 direction of limited linear motion	-353	-453	-653	-853
↔ DIN ISO 5 limited linear movement and return	-354	-454	-654	-854
↷ DIN 100 ISO 7A continuous clockwise rotation	-355	-455	-655	-855
↶ DIN 7B continuous anti-clockwise rotation	-356	-456	-656	-856
↔ DIN ISO 16 feed		-457	-657	-857
↔ DIN ISO 26 rapid traverse		-458	-658	-858
⊕ DIN ISO 28 increase a value	-359	-459	-659	-859
⊖ DIN ISO 29 decrease a value	-360	-460	-660	-860
Equipment symbols				
■ DIN ISO 41 electric motor		-461	-661	-861
○ DIN ISO 48 pump (general symbol)		-462	-662	-862
Operational symbols				
↶ DIN ISO 61 continuous regulation	-363		-663	-863
↗ DIN ISO 62 adjustable	-364		-664	-864
✳ DIN ISO 63A lock or tighten	-365	-465		
↔ DIN ISO 64A unlock, unclamp	-366	-466		
☛ DIN ISO 65 brake on	-367			
☛ DIN ISO 66 brake off	-368			
⟳ DIN ISO 267 automatic or semi-automatic cycle	-376		-676	-876
↷ DIN ISO 35 hand-control	-375		-675	-875
DIN ISO 69 on	-369	-469	-669	-869
○ DIN ISO 70 off	-370		-670	-870
① DIN ISO 71 on-off	-371			
② DIN 168 ISO 72 on, whilst pushbutton depressed	-372			
↑ DIN ISO 46 engaging	-373	-473		
↑ DIN ISO 45 disengaging	-374	-474		

<sup>1)</sup> These Legend and inscription caps are available on indent only.

To DIN 30 600  
To ISO R 369

Inscription caps<sup>1)</sup>  
for pushbuttons

white  
black characters

Order  
No.

black  
white characters

Order  
No.

Legend caps<sup>1)</sup>  
for indicator lamps

round

square

**Safety and miscellaneous symbols**

	DIN 91	shear pin construction				DT 3-683	DT 3-883
	DIN 131	danger high voltage				-684	-884
	ISO 92						
	DIN 93	caution				-685	-885
	DIN 94	main switch				-686	-886
	DIN 986	set up	DT 3-382	DT 3-482			
	DIN 155	audible signal				-687	-887
	DIN 101	coolant	-388				
	DIN 139	light	-389				
	ISO 102						
	DIN 256	filling aperture	-390			-690	-890
	ISO 104						
	DIN 258	full level	-391			-691	-891
	ISO 105						
	DIN 257	drain	-392			-692	-892
	ISO 106						
	DIN 175	lubricant		493		-693	-893
	ISO 107						
	DIN 263	blowing unit		-494		-694	-894
	ISO 108						
	DIN 264	suction unit		-495		-695	-895
	ISO 109						
II		step 2	-377	-477			
III		step 3	-378	-478			
IV		step 4	-379				
V		step 5	-380				
R		reset	-381				

1) These Legend and inscription caps are available on indent only.

# Technical information



SEV  
Switzerland



CSA  
Canada



UL Listed  
USA



DEMKO  
Denmark



NEMKO  
Norway



SEMKO  
Sweden



Electrical  
inspectorate  
Finland



CEBEC  
Belgium



Germanischer  
Lloyd  
FRG

## Standards

IEC 204-1, 337; SEV 1005, 1093; VDE 0113, 0660 part 201;  
BS 4794; CEE 24; CSA 22.2, No. 0, No. 14; UL 508, 486 E

## Approvals

SEV, CSA, UL, CEBEC, Germ. Lloyd,  
DEMKO, NEMKO, SEMKO, Finland,  
Buro Veritas, USSR Reg.

in preparation

## Rated insulation voltage $U_i$

IEC 337, VDE 0110, insulation group C	660 V
CSA, UL	600 V

## Test voltage

phase—phase	3 kV, 1s
phase—earth	4 kV, 1s

## Life

mechanical	million operations	DT/DP	DS	DTV/DPV	DSS/DN/DNS
------------	--------------------	-------	----	---------	------------

10	0.5	0.5	0.05
----	-----	-----	------

## UL utilisation category

heavy pilot duty	AC A 600
light pilot duty	DC Q 600

## Ambient temperature

AC-1, AC-11 operation	— 25 °C...+60 °C (T85) (inside and outside the enclosure. For illuminated pushbuttons and switches max. external temperature 40 °C)
-----------------------	--

## storage, transport

— 40 °C...+80 °C

## Climatic resistance

damp heat	40 °C/95% rel. humidity	56 days
-----------	-------------------------	---------

humidity cycling	23 °C, 83%, 40 °C, 93%	20 cycles
------------------	------------------------	-----------

## Degree of protection

to IEC 529, DIN 40050	IP 65 except rotary switch with key and emergency stop pushbutton with key (DSS 3, DNS 3) IP 54 DSS 3, DNS 3 IP 20 contact and lamp blocks
-----------------------	--

## Protection against accidental contact to

VDE 0106, part 100

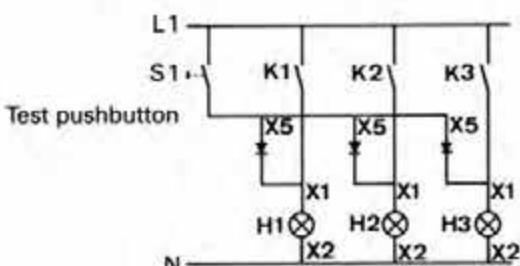
## Shock withstand

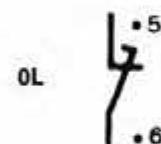
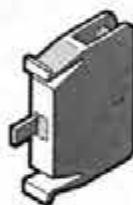
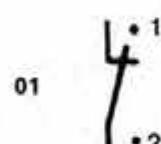
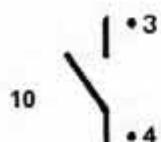
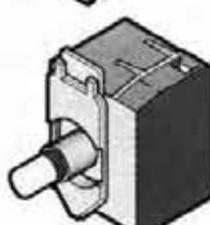
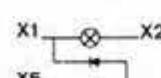
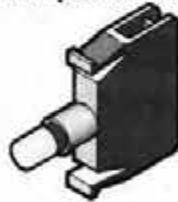
to IEC 68-2-27	30 g
----------------	------

## Mounting orientation

as required

## Example of central lamp test



**Contact blocks****Lamp elements****Rated thermal current  $I_{th}$** 

open (ambient 40 °C)  
enclosed (ambient 60 °C)

10 A

6 A

**Nominal operating voltage  $U_n$** 

AC 660 V

**Nominal operating current  $I_n$** 

AC-1	10 A
AC-11	220 V 240 V 380 V 415 V 500 V 600 V 3 A 3 A 2.5 A 2.2 A 1.5 A 0.75 A
DC-11	24 V 48 V 110 V 220 V 440 V
DE 3 10/DE 3 01	
DA 3 10/DA 3 01	2 A 0.6 A 0.2 A 0.1 A 0.04 A
DE 3 L01/DA 3 L01	1.3 A 0.4 A 0.13 A 0.065 A 0.026 A

**Short circuit withstand**

without welding 10 A slow

**Back up fusing**

permissible rated current fast (D, gF)  
slow (DT, gL) 16 A  
10 A

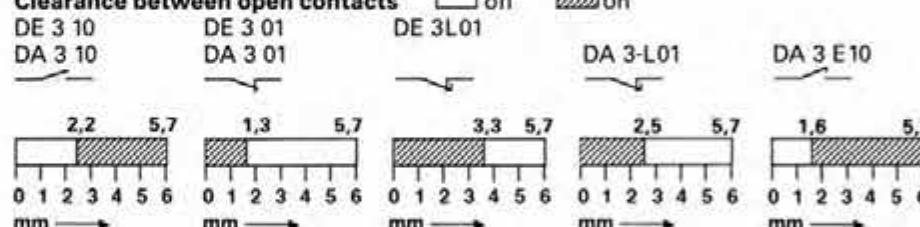
**Switching frequency**

6000 ops/h

Electrical life (AC-11)	$I_s$ mill. ops.	0.1 A	1 A	2 A	3 A
		10	3	1	0.5

**Contact security**

reliable for switching electronic circuits

**Clearance between open contacts****Terminal markings**

to DIN EN 50013

**Connections**0.75...2.5 mm<sup>2</sup> 18÷12 AWG**Lamp elements**

max. permissible

indicator lamps 2.6 W

illuminated pushbuttons

and illuminated switches 2 W

**Standard element**

with BA 9s bulb holder

for filament or neon bulbs max. 250 V (28 mm long, 10 mm Ø)

**Special elements**

with BA 9s bulb holder

with series diode and resistor  
for operating voltage  
for filament bulbs

AC 220 V or 240 V  
130 V (see page 24)

with central lamp test for filament  
or neon bulbs

max. 250 V (28 mm long, 10 mm Ø)

with series diode and resistor  
with central lamp test  
for operating voltage  
for filament bulbs

AC 220 V or 240 V  
130 V (see page 24)

with transformer for filament bulbs

6 V, max. 1.2 W

secondary: voltage

6 V

load

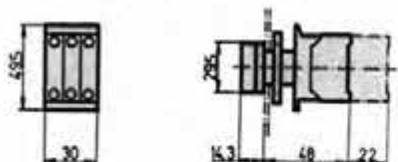
max. 1.2 VA, 50/60 Hz

primary: voltage

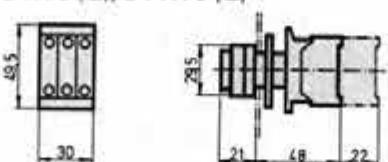
110...120 V, 220...240 V, 380...415 V

# Dimensions [mm]

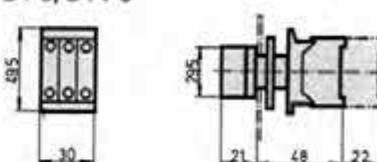
Pushbuttons DT 3 (Q), DTV 3 (Q)



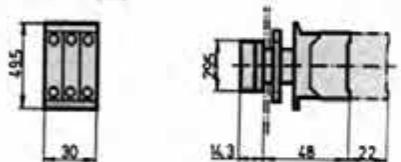
Pushbuttons with raised operator DTH 3 (Q), DTVH 3 (Q)



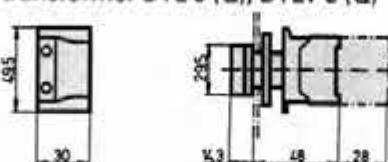
Pushbuttons with extended front ring DT 3, DTV 3



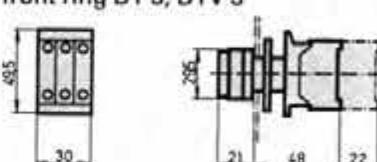
Illuminated pushbuttons DTL 3 (Q), DTLV 3 (Q)



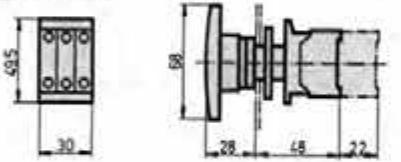
Illuminated pushbuttons with transformer DTL 3 (Q), DTLV 3 (Q)



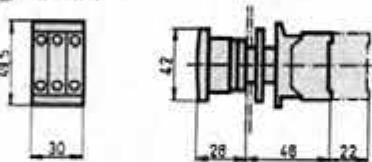
Illuminated pushbuttons with sealed front ring DT 3, DTV 3



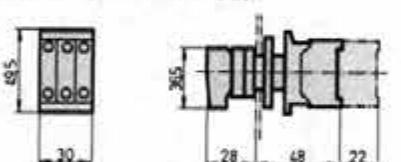
Mushroom pushbuttons DPG 3, DPGV 3 Ø 68 mm



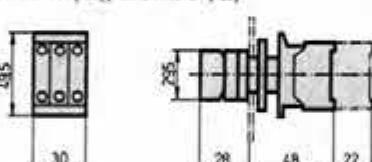
Mushroom pushbuttons DP 3, DPV 3 Ø 42 mm



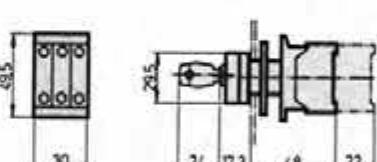
Rotary switch with long operator DSH 3 (Q), DSHL 3 (Q)



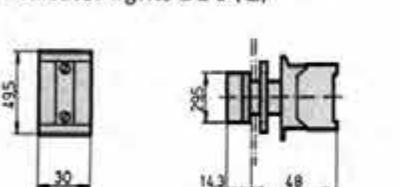
Rotary switch with short operator DSK 3 (Q), DSKL 3 (Q)



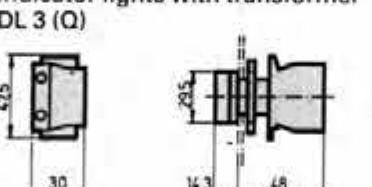
Rotary switch with key DSS 3



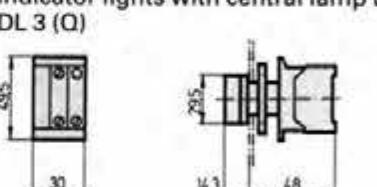
Indicator lights DL 3 (Q)



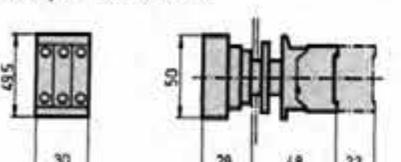
Indicator lights with transformer DL 3 (Q)



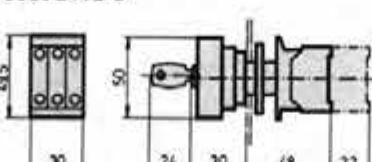
Indicator lights with central lamp test DL 3 (Q)



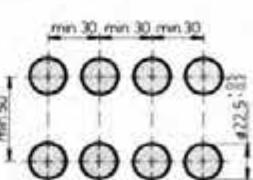
Emergency stop pushbutton with turn and pull reset DN 3



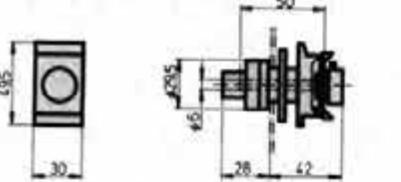
Emergency stop pushbutton with key reset DNS 3



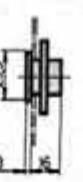
Drilling detail



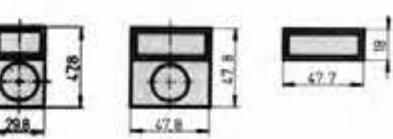
Potentiometer dial DR 3 spindle length 50 mm



Blanking plugs round and square

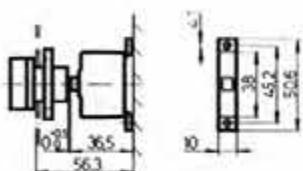


Legend plates

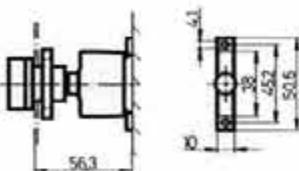


**Base mounting components**

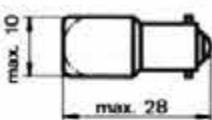
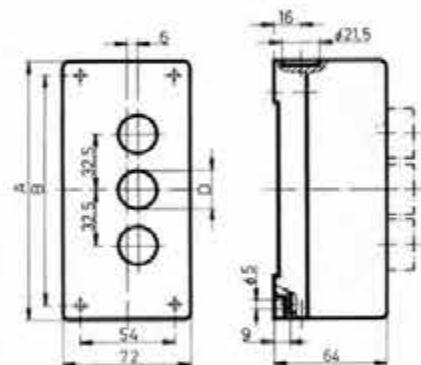
## Pushbuttons



## Indicator lamps

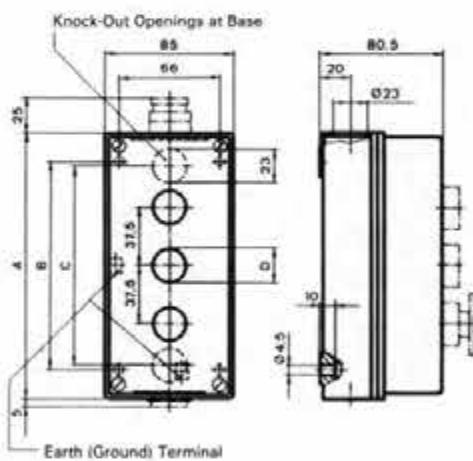


## Bulbs for DL 3, DTL 3, DSL 3

**Plastic enclosure DYA 3<sup>1)</sup>**

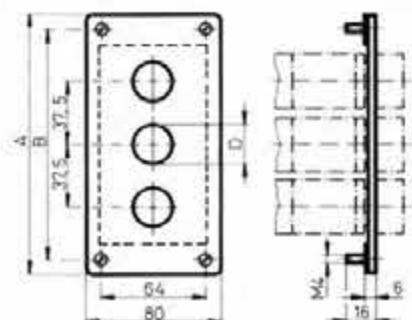
## Design      Total control positions

Design	Total control positions	A	B	D
DYA 3-1 A	1	84	67	22.5
DYA 3-2 A	2	117	100	22.5
DYA 3-3 A	3	150	133	22.5
DYA 3-5 A	5	215	198	22.5

<sup>1)</sup> Knock out opening at top, cable sleeve at bottom.**Aluminium enclosure DZA 3**

## Design      Total control positions

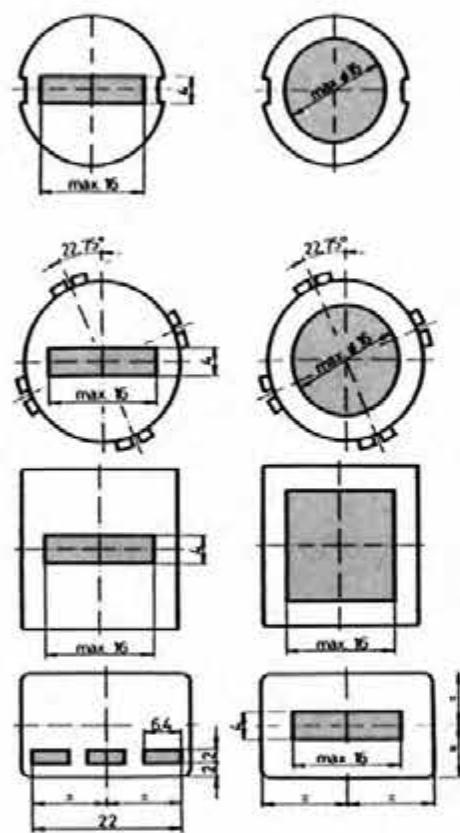
Design	Total control positions	A	B	C	D
DZA 3-1 A	1	99	62	56	22.5
DZA 3-2 A	2	137	100	94	22.5
DZA 3-3 A	3	174	137	131	22.5
DZA 3-5 A	5	249	212	206	22.5

**Front plate DZE 1**

## Design      Total control positions

Design	Total control positions	A	B	D
DZE 1-1 A	1	80	64	22.5
DZE 1-2 A	2	110	94	22.5
DZE 1-3 A	3	147	131	22.5
DZE 1-4 A	4	185	169	22.5
DZE 1-5 A	5	232	206	22.5

# Special legends



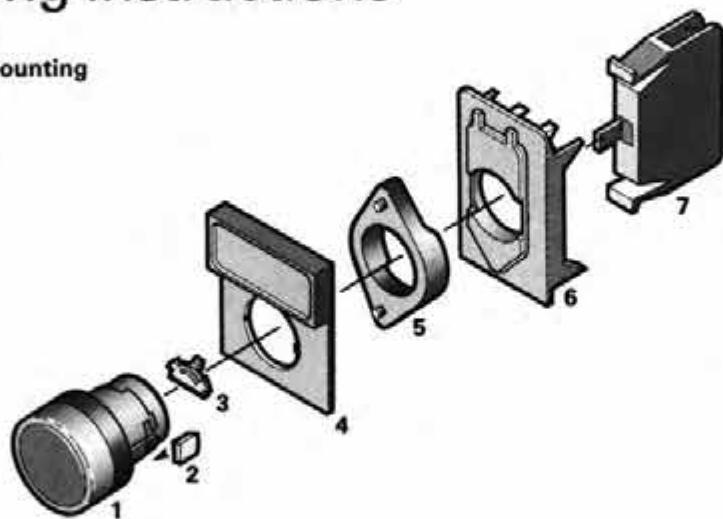
Process hot stamping	Price \$
<b>Details of requirements</b> clear drawing scale 2:1 provided by customer	
<b>Special symbols and text</b> for first order only, charge for stamp, which remains our property	<b>P.O.A.</b>
set up (per text and order)	<b>P.O.A.</b>
stamping charge per letter	<b>0.55</b>
<b>Inscription caps</b> for DT 3 pushbuttons	
standard legends see page 26 ISO symbols see pages 27/28 legend area: 4x16 mm or 16 mm Ø legend height: 4mm line spacing: as drawing	
<b>Legend caps</b> for DL 3 indicator lamps	
round standard legends see page 26 legend area: 4x16 mm or 16 mm Ø legend height: 4mm line spacing: as drawing	
square standard legends see page 26 ISO symbols see pages 27/28 legend area: 4x16 mm or 16x16 mm legend height: 4mm line spacing: as drawing	
<b>Legend inserts</b> for 30x48 mm legend carriers	
standard legends: see page 27 legend area: 4x16 mm or 3x2x6.4 mm legend height: 4mm	
for enclosures	
standard legends: see page 27 legend area: legend height: 3 mm	

# Mounting instructions

## Single person mounting

Front 1...4

Rear 5...7



### 1 Front element

round or square, push, with the markings at the top, into the 22.5 mm hole in the mounting plate.

### 2 Locking tabs

for securing the front section against unauthorised removal.  
From the rear insert 2 of these 90° apart into the front element.

### 3 Bridge

for operating contacts at position 3 (centre position).

Fit to front element from the rear.  
Recommended with contact blocks on second level. (2 bridges required).

### 4 Legend carrier

for legend additional to that on front element. Insert tabs into slots in front element.

### 5

#### Fixing ring

engage bayonet with a slight twist to the right, and fix with 2 screws to prevent rotation.

### 6

#### Coupling plate

with securing clip to snap onto front element.

Not required for base mounting.

### 7

#### Contact blocks and lamp elements

snap onto coupling plate, or the rear of an existing contact block (2 levels of contacts).

For base mounting use elements with fixing feet (see page 23).

## Permissible combinations of contact blocks and lamp elements

pushbuttons DT 3, DTH 3, DTV 3, DTVH 3, DP 3, DPV 3, DPG 3, DPGV 3  
rotary switches DSH 3, DSK 3, DSS 3



illuminated pushbuttons DTL 3, DTLV 3

illuminated rotary switches DSHL 3, DSKL 3

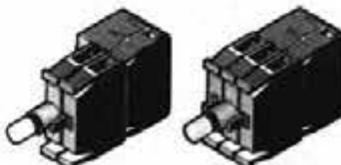
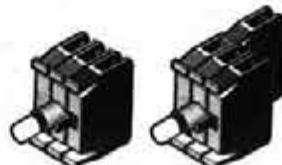
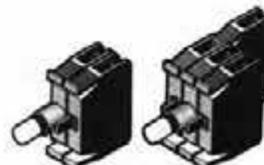
for filament bulbs 6...110 V

for filament bulbs with central lamp test 6...110 V

for filament bulbs with series diode 130 V, 2.6 W

for filament bulbs with series diode and resistor and central lamp test 130 V, 2.6 W

with transformer element



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Mataram Street,

Winnellie NT 5789

**Phone: (089) 84 4255**

**Telex: AA85454**

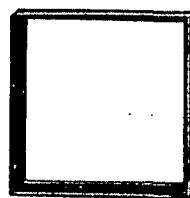
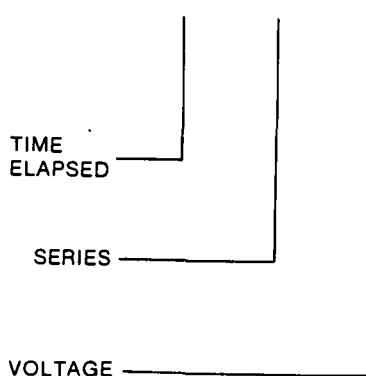
**Fax: (089) 84 3945**

**TIME ELAPSED METERS****L&H**

HOUR METER	HOUR METER	DC HOUR METER
Minute indicating Meter	Hour Meter without reset	DC Hour Meter
<b>TH50</b>	<b>TH63</b>	<b>TH70</b>
0-9999.9 Min	0-99999.9 Hrs	0-99999.9 Hrs
AC Motor	AC Motor	DC Quartz Motor
<b>Refer Ordering Details opposite</b>		
Addition Type	Addition Type	Addition Type
Synchronised with supply frequency	Synchronised with supply frequency	Quartz oscillation
0.1 Min (6 sec)	0.1 Hour (6 min)	0.1 Hour (6 min)
Pushbutton	—	—
—	—	—
—	—	—
—	—	—
1.5W	1.5W	1.5W
50/60 Hz Common	50/60 Hz Common	
Flush mounting with bracket (45 x 45mm)	Flush mounting with spring	Flush mounting with bracket (45 x 45mm)
187QC	187QC	UL approved lead wire

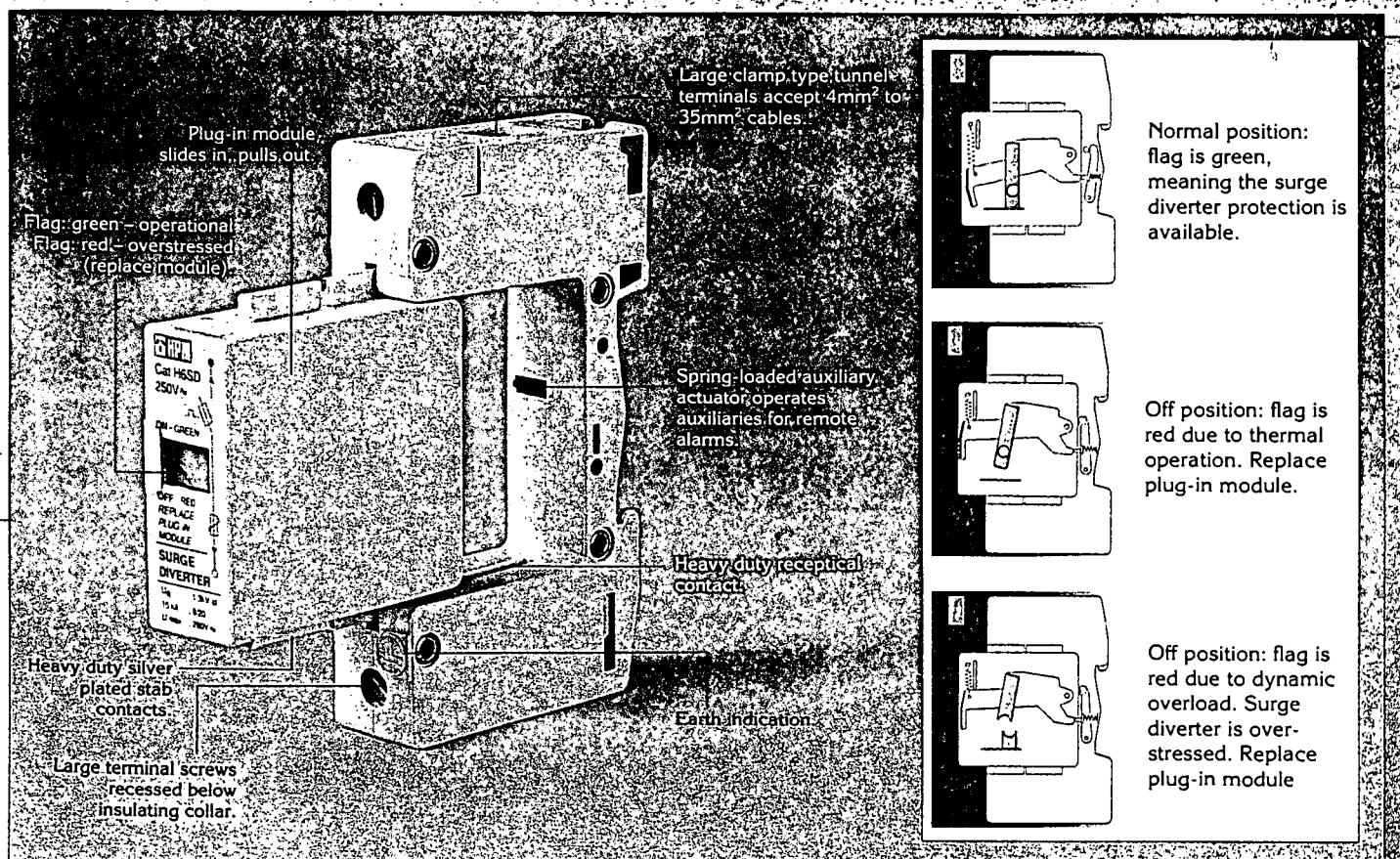
**ACCESSORIES****TIME ELAPSED METERS**

## Mounting Frame

TH140-0020  
(For TH14, 24, 40, 50, 70)**ORDERING DETAILS****SERIES      VOLTAGES**

14	3	12V
24	4	24V
30	7	115-120V
40	9	240V
50		
63		
*70		

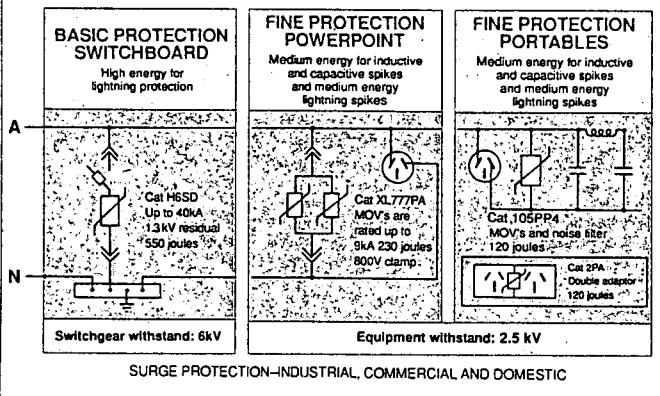
\*TH70 Available in 12V or 24V DC only.



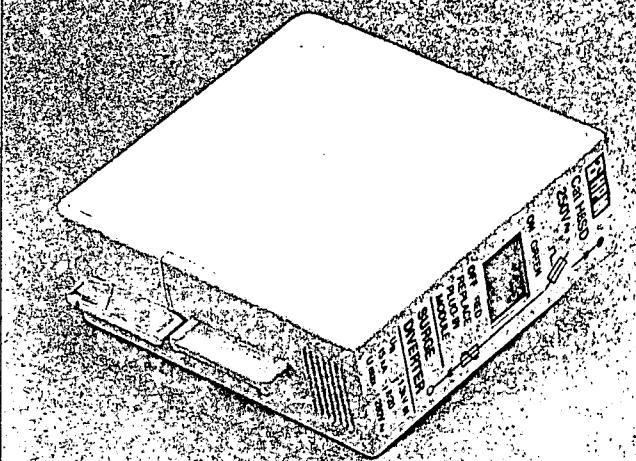
## Technical details: HPM H6SD

Rated voltage	$U_N$ 220 to 250V
Max permissible operational voltage	$U_{max}$ 280, 350V DC
Capacitance	C 4000pF
Rated discharge current	$I_{SN}$ 15kA (8/20μS)
Max impulse current	$I_g$ max 40kA (8/20μS)
$U_r$ Residual voltage	$I_s$ Impulse Amps 8/20μS
0.8kV	1kA- $I_s$
1.0kV	5kA- $I_s$
1.2kV	10kA- $I_s$
1.3kV	15kA- $I_s$
1.9kV	40kA- $I_s$ max
Longwave (2000μs) impulse	$I_{SN}$ -200A
Response time	$t_a < 25ns$
Operating temp range	T -40°C to +80°C
Max back-up fuse	A 100A
Operation of internal fuse at	$I_s > 40kA$

## Integrated Surge Protection



## Module Replacement



If the MOV should ever become defective the complete unit does not need to be replaced, only the defective MOV module. This should be carried out only by authorised personnel. While this is being done there is no need to interrupt the power supply, thus avoiding interrupting data processing, instrumentation and control operations.

CAT NO	TRADE	RETAIL
H6SD	\$68.80	\$86.00
H6SD/M	\$48.00	\$60.00

## Surge Diverter Cat H6SD For 'basic protection'

The Surge Diverter protects low voltage installations from overvoltages high in energy (up to 40kA, impulse current 8/20 $\mu$ s). The extremely low leakage current, at normal mains voltage, dispenses with the need for a spark gap.

The diverter therefore provides all the advantages of MOV technology:

- Fast response even in the event of extreme impulse waves.
- Stable protection level even after frequent and heavy loading.
- High impulse current discharge capacity and long service life.
- No follow-on current after decay of the overvoltage.

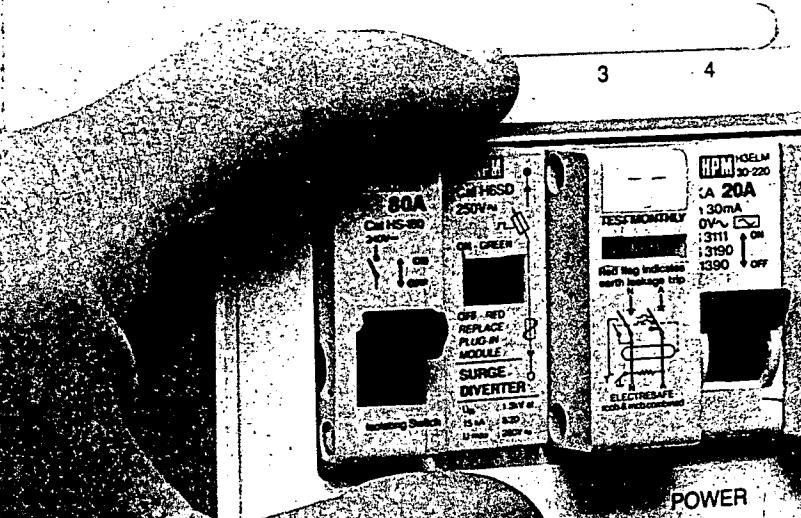
If, in an exceptional case, the surge diverter should ever be stressed beyond its capabilities, e.g. in the event of more than 40kA (8/20 $\mu$ s), the fuse disconnects the diverter from the mains within a few milliseconds. The diverter fuse also has a soft solder point which isolates it from the mains in the event of thermal decay of the metal oxide varistor.

The green indicator flag will change to red when the metal oxide varistor fails through decay (thermal) or is overstressed and must be replaced. The red flag is a visual alarm. Audible alarms can be provided by the use of auxiliary equipment (Cat H6S1 and H6S2).

**Note:** the loss of protection does not affect the power flow to the equipment. The rating of the H6SD is termed as 'basic' protection. The unit does not contain noise filters and is designed for voltage protection.

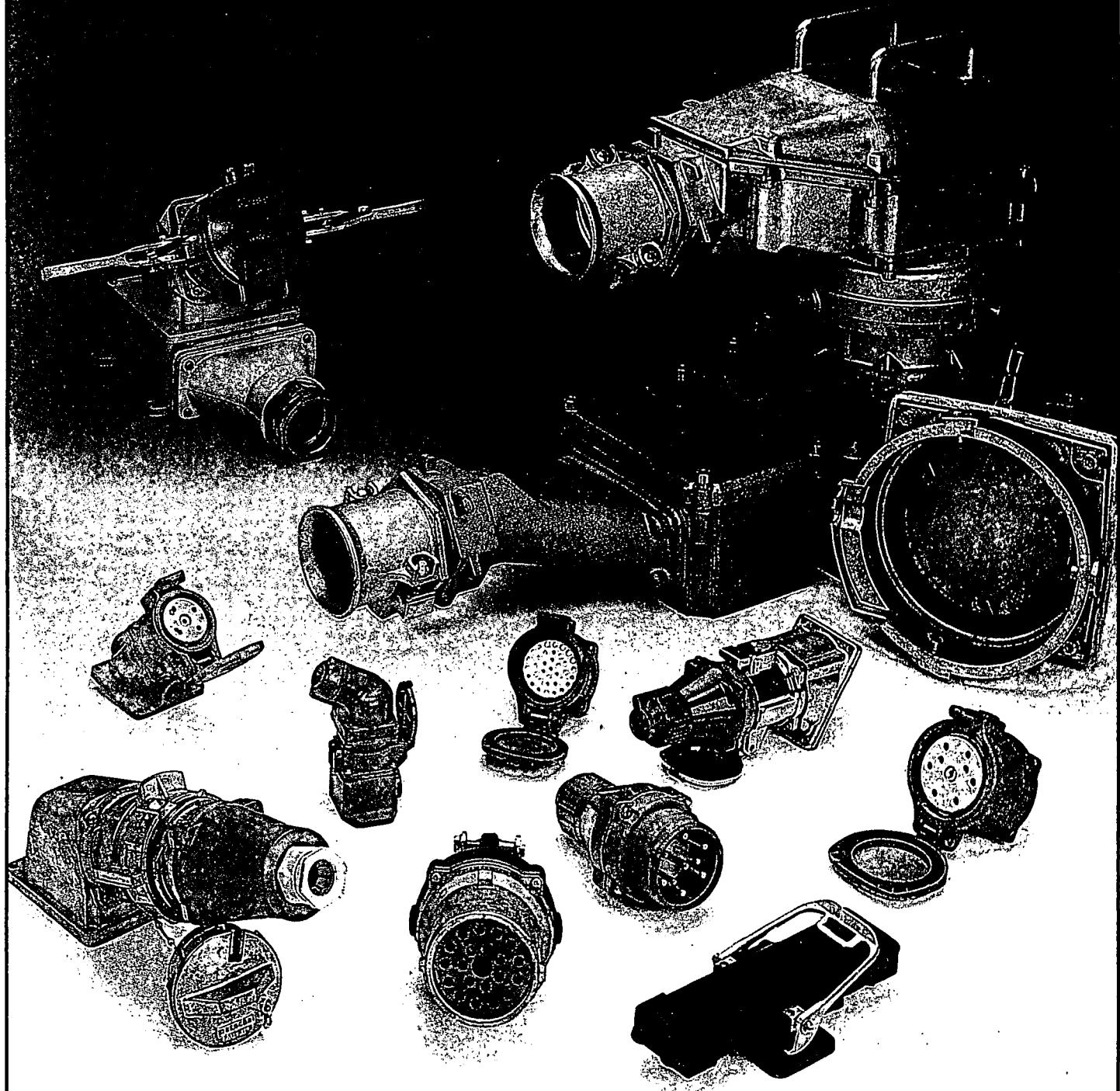
### Why you need 'basic protection'.

At the main switchboard the surge has an extremely high energy discharge current typically from 5kA upwards. High capacity surge diverters such as HPM's Cat H6SD are required on the low voltage mains. To protect, absorb and divert these high energy surges usually generated by direct and indirect lightning strikes. It is not sufficient to rely on the HV system lightning arrester. The Cat H6SD is recommended for the 'basic protection' application.



Cutler-Hammer

maréchal



Connecting Equipment

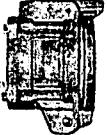
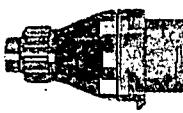
Doing it Better!

# DS Polyester Housings

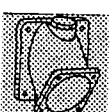
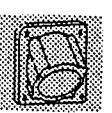
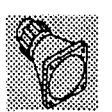
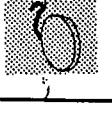
RATINGS	16 , 32, 63 and 100 Amp 440 V AC
CONTACTS	3 Pin, 4 Pin, 5 Pin and 6 Pin
HOUSINGS	Polyester
PROTECTION	IP54
KEY POSITIONS	24 Locations
INTERIORS	Non-Reversible
TERMINALS	Elastic Screw
COVER	Spring Close Standard Spring Open on Request

## Maximum Cable and Conductor Sizes \*

Type	Conductors		Cable dia	
	Stranded	Flexible	Min.	Max.
DS1	6 mm sq	6 mm sq	10 mm	18 mm
DS3	16	10	10	22
DS6	35	25	11	29
DS9	70	50	25	45
Pilot pins	6	4	-	-

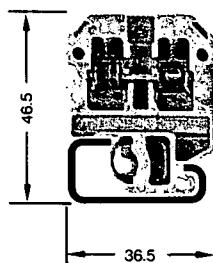
DS Module	Pins	Polarity	DS1 (DS16) 16 Amp	DS3 (DS32) 32 Amp	DS6 (DS63) 63 Amp	DS9 (DS100) 100 Amp
<b>Decontactor Panel Mounting</b>						
	3	1P+N+E	31-14015	31-34015	31-64015	31-94015
	4	3P+E	31-14013	31-34013	31-64013	31-94013
	5	3P+N+E	31-14017	31-34017	31-64017	31-94017
	6	3P+E + 2 Pilot pins	---	31-34013-172	---	31-94013-172
<b>Plug with Gland</b>						
	3	1P+N+E	31-11015	31-31015	31-61015	31-91015
	4	3P+E	31-11013	31-31013	31-61013	31-91013
	5	3P+N+E	31-11017	31-31017	31-61017	31-91017
	6	3P+E+2P	---	31-31013-172	---	31-91013-172
<b>Plug less Gland (Appliance Inlet)</b>						
	3	1P+N+E	31-11015-002	31-31015-002	31-61015-002	31-91015-002
	4	3P+E	31-11013-002	31-31013-002	31-61013-002	31-91013-002
	5	3P+N+E	31-11017-002	31-31017-002	31-61017-002	31-91017-002
	6	3P+E+2P	---	31-31013-172-002	---	31-91013-172-002

## Accessories

Wall Box	Polyamide Angled	31-10000-023	31-30000-023	31-60000-023	39-90000-023 (metal)
	Polyamide Straight	31-10000-025	31-30000-025	---	---
	Entry	20mm	25mm	40mm	40mm
<b>Angled Adaptor</b>					
	Polyamide	31-10000-027	31-30000-027	31-60000-027	31-90000-027
<b>Standard Glands *</b>					
	Polyamide	31-10000-013	31-30000-013	31-60000-013	31-90000-013
	Neoprene	19-80000-013	19-10000-013	19-30000-013	19-90000-013
	Metal	---	---	---	19-90000-913
<b>Plug Cap with Chain</b>					
	Neoprene	31-10000-126	31-30000-126	31-60000-126	31-90000-126

\* Refer to page 12 for alternative glands.

**ORDERING INFORMATION** Unit Catalogue Reference

**SAK 2.5**  
**750V 27A**
**Thickness 6mm**

0.5-4	0.5-6	0.5-10
0.5-4	0.5-4	0.5-6

9	12	12
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**Cat. No.****Cat. No.****Cat. No.**

027966	012836	019326
027968	012838	019328
027962	012832	019322
027967	012837	019327

BASEEFA-Ex	CEGB	®	PL	N	D	S	W	BASEEFA-Ex	CEGB	®	PL	N	D	S	W	BASEEFA-Ex	CEGB	®	PL	N	D	S	W
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Type	Cat. No.	Type	Cat. No.	Type	Cat. No.
TS32	012280	TS32	012280	TS32	012280
TS32	067610	TS32	067610	TS32	067610
SST 3	015270	SST 3	015270	SST 3	015270
EWK1 (8.5)	020616	EWK1 (8.5)	020616	EWK1 (8.5)	020616

AP (1.5)	027956	AP (1.5)	011796	AP (1.5)	011796
AP (1.5)	027958	AP (1.5)	011798	AP (1.5)	011798
AP (1.5)	027952	AP (1.5)	011792	AP (1.5)	011792
AP (1.5)	027957	AP (1.5)	011797	AP (1.5)	011797

TW (1.5)	030286	TW (1.5)	013016	TW (1.5)	013016
TW (1.5)	030288	TW (1.5)	013018	TW (1.5)	013018
TW (2.5)	030282	TW (2.5)	013012	TW (2.5)	013012
		TW (2.5)	013017	TW (2.5)	013017
TW (1.0)	029710	TW (0.5)	019710	TW (0.5)	019710

QL 2	015590	QL 2	013060	QL 2	019430
QL 3	015600	QL 3	013070	QL 3	019440
QL 4	015610	QL 4	013080	QL 4	019450
QL 10	033810	QL 10	033820	QL 10	033830
VH 8	026670	VH 13.5	024850	VH 12	024900
BS (M3 x 15)	035900	BS (M3 x 20)	030300	BS (M3 x 20)	030300
Captive on screw		Captive on screw		Captive on screw	
DQS2 (See Section T6)		QS2	021270	QS2	027096

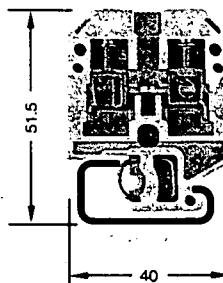
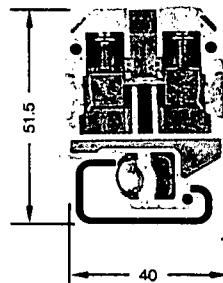
VL 2	019700	VL 2	019700
VH 19	028510	VH 19	028510
BS (M3 x 25)	029250	BS (M3 x 25)	029250
SS	016440	SS	016440

PS (2.3Ø)	018040	PS (2.3Ø)	018040	PS (4Ø)	029960
StB 8.5	021570	StB 8.5	021570	StB 14	016990

AD 4	037560	AD 4	037610	AD 4	037600
BSK (M3 x 22)	012890	BSK (M3 x 22)	012890	BSK (M3 x 22)	012890

ADP 1	048520	ADP 2	048530	ADP 2	048530
HP 1	048556	HP 2	048566	HP 2	048566

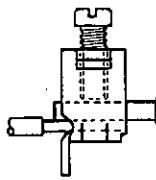
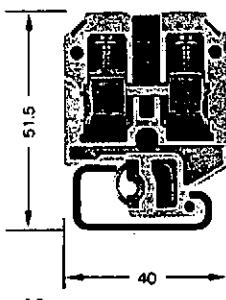
DEKAFIX — Section T6	DEKAFIX — Section T6	DEKAFIX — Section T6
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**SAK 4**  
**750V 36A**
**Thickness 6.5mm**
**SAK 6N**  
**750V 47A**
**Thickness 8mm**

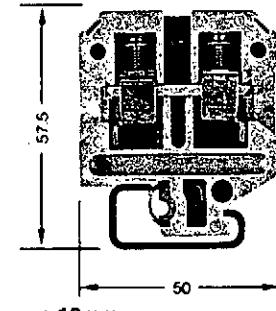
# Feed-through Terminals

## Type SAK

### Screw Clamp Connections


**SAK 10**  
**750V 65A**


Thickness 10mm

**SAK 16**  
**750V 87A**


Thickness 12mm

**Technical Data**

Conductor size	Solid (mm <sup>2</sup> )	2.5-16	4-16
	Stranded (mm <sup>2</sup> )	2.5-10	6-16

Insulation stripping length (mm)	12	16
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<b>Ordering Data</b>		<b>Cat. No.</b>	<b>Cat. No.</b>
Moulding material	Polyamide	011006	027106
When ordering EEx'e' and Ex'N'	Polyamide	011008	027108
terminals, add suffix 'e' or 'N' to the	Melamine	011002	027102
catalogue number	Melamine	011007	

<b>Approvals</b>			
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All Approvals are listed in Approvals Guide	BASEEFA - Ex	(G) (UL) (N) (D) (S) (F)	BASEEFA - Ex	(G) (UL) (N) (S) (F)
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<b>Terminal Rail (2m)</b>	<b>Type</b>	<b>Cat. No.</b>	<b>Type</b>	<b>Cat. No.</b>
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Steel	TS 32	012280	TS 32	012280
Steel (M6 Slots)	TS 32	067610	TS 32	067610

Locking pin (1m) — optional	Steel	SST 3	015270	SST 3
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<b>End Bracket (thickness mm)</b>	<b>Type</b>	<b>Cat. No.</b>	<b>Type</b>	<b>Cat. No.</b>
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	EWK 1 (8.5)	020616	EWK 2 (15)	019936
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<b>End Plate (thickness mm)</b>				
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	Polyamide	AP (1.5)	011796	AP (1.5)
	Polyamide	AP (1.5)	011798	AP (1.5)
	Melamine	AP (1.5)	011792	AP (3)
	Melamine c	AP (1.5)	011797	

<b>Partition (thickness mm)</b>				
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	Polyamide	TW (1.5)	013016	TW (1.5)
	Polyamide	TW (1.5)	013018	TW (1.5)
	Melamine	TW (2.5)	013012	TW (3)
	Melamine c	TW (2.5)	013017	
	Resin bonded paper	TW (0.5)	019710	

<b>Cross Connections</b>				
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	2 way	QL 2	047030	QL 2
	3 way	QL 3	047040	QL 3
	4 way	QL 4	047050	QL 4
	10 way	QL 10	047060	QL 10
Q unit (See Section T6)	Sleeve	VH 12	024900	VH 12
	Screw	BS (M3 x 20)	030300	BS (M3 x 20)
	Washer	Captive on Screw		Captive on Screw
	Bi-pole plug	QS 2	027086	QS 2

<b>Switching Link</b>				
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	2 way	VL 2	013590	VL 2
	Sleeve	VH 19	028510	VH 19
	Screw	BS (M3 x 25)	029250	BS (M3 x 25)
	Washer	SS	016440	SS

<b>Test Plug</b>				
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	Plug	PS (4Ø)	029960	PS (4Ø)
	Plug bolt	SIB 14	016990	SIB 14

<b>Warning Label</b>				
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	Label	AD 4	037580	AD 4
	Plastic screw	BSK (M3 x 22)	012890	BSK (M3 x 22)

<b>Cover (1m)</b>				
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	Transparent cover	ADP 2	048530	ADP 3
	Support bracket	HP 2	048566	HP 3

<b>Marking Tags</b>				
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All marking systems are shown in Section T6	DEKAFIX — Section T6	DEKAFIX — Section T6
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For additional accessories see Section T6

Active 29/01/2014



## Fuse Terminals

### Type ASK 1

#### SAKS 1 KSK

In accordance with the appropriate regulations, all electrical equipment needs to be protected against overload and short circuits. In general, fuses are placed at the input of a circuit, at each point where current ratings are reduced, or where short circuit capability is reduced in order to protect against short-circuit or overload. The fuse terminal range has been designed to accommodate high-rupturing capacity fuses in the G-type, Diazed and Neozed ranges, as follows:-

#### ASK 1, SAKS 1, KSK

G-type fuses with or without indicator to DIN 41660 (5 x 20mm). Fuse range 0.08 Amps to 6.3 Amps (250V).

#### SAKS 2

D-fuse inserts E16 to DIN 49360 Diazed System fuse range 2 Amps to 25 Amps (500V).

#### KS 2, KSK 3

Fuses to BS1362 (1" x 1/4") range from 1 Amp to 13 Amps (250V) Fuses to DEF 59-96 Size O (1 1/4" x 1/4") range from 0.25 Amps to 10 Amps (440V). Bussman (1 1/4" x 1/4") type ABC range from 0.25 Amps to 15 Amps (250V).

#### SAKS 4

D-fuse inserts D01 to DIN 49522, Neozed System, range from 6 Amps to 16 Amps (380/415V).

#### SAKS 5

D-fuse inserts D02 to DIN 49522, Neozed System, range from 20 Amps to 63 Amps (440V).

Cross Connection Links QL provide the facility to build fuse distribution assemblies. Ideally, input supply should be at the centre of the assembly with the highest fuse load adjacent to the input terminal.

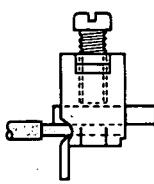
Guage rings are available as an option for the SAKS 2, SAKS 4 and SAKS 5. When fitted into the fuse terminal these prevent a higher rated fuse being inserted than that originally selected for that circuit.

Characteristic curves for fuses are available on request.

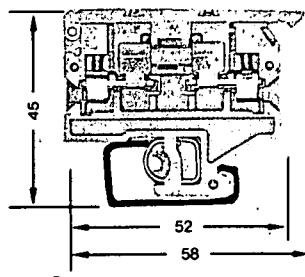
**NOTE:** The removal or insertion of fuses should not be undertaken without the mains supply being isolated beforehand.

Suitability of fuses for the envisaged application must be checked with the fuse manufacturer.

## Screw Clamp Connections



## ASK 1 With hinged Cartridge Fuse Housing 250V 6.3A (max. fuse size available)



Thickness 8mm

### Technical Data

Conductor size	Solid (mm <sup>2</sup> )	0.5-4	Cat. No.
	Stranded (mm <sup>2</sup> )	0.5-4	
Insulation stripping length (mm)		9	
Fuse size		20 x 5mm	

### Ordering Data

Moulding material			Cat. No.
When ordering EEx'e' and Ex'N' terminals, add suffix 'e' or 'N' to the catalogue number	Polyamide	037676	

### Approvals

All Approvals are listed in Approvals Guide

Terminal Rail (2m)	Type	Cat. No.
	Steel TS 32	012280
	Steel (M6 Slots) TS 32	067610

### Locking pin (1m) — optional

End Bracket (thickness mm)	Steel	SST 3	015270
		EWK 1 (8.5)	020616

### End Plate (thickness mm)

	AP (1.5)	038036

### Partition (thickness mm)

	Resin bonded paper	TW (0.5)	047470
		SBL (25 x 5)	044600

### Solid Brass Link


### Cross Connections

	2 way		
	3 way		
	4 way		
	10 way		
	Screw		
	Insulated comb 2 way	QB 2	046110
	Insulated comb 3 way	QB 3	046120
	Insulated comb 4 way	QB 4	046130

### Fuse

A list of all fuses stocked is shown at the end of this section

### Hinged Fuse Holder (Spare)

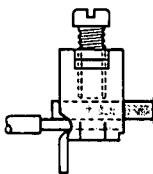
	TH	037706

### Cover (1m)

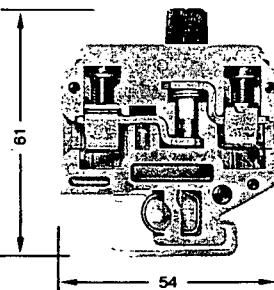
	Transparent cover		
	Support bracket		

### Marking Tags

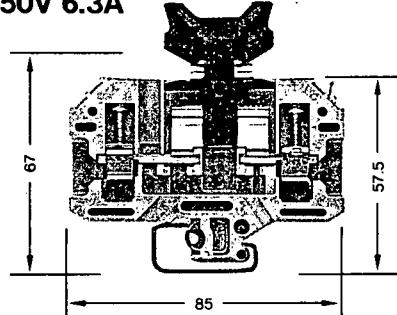
All marking systems are shown in Section T6	DEKAFIX — Section T6

**Fuse Terminals****Type ASK 1****SAKS 1****KSK****Screw Clamp Connection****SAKS 1**

250V 6.3 (max. fuse size available)

**KSK 1**

250V 6.3A

**Technical Data**

Conductor size	Solid (mm <sup>2</sup> )	0.5-10	0.5-16
	Stranded (mm <sup>2</sup> )	0.5-10	0.5-10
Insulation stripping length	(mm)	12	12
Fuse size		25 x 5mm with indicator	20 x 5mm

**Ordering Data**

Moulding material	Melamine	Cat. No.	Cat. No.
When ordering EEx'e' and Ex'N' terminals, add suffix 'e' or 'N' to the catalogue number	Polyamide		389742

**Approvals**

All Approvals are listed in Approvals Guide	(N) (D)
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Terminal Rail (2m)	Type	Cat. No.	Type	Cat. No.
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	Steel	TS 32	TS 32	012280
	Steel (M6 Slots)	TS 32	TS 32	067610

Locking pin (1m) — optional	Steel	SST 3	SST 3	015270
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<b>End Bracket</b> (thickness mm)				
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		EWK 1 (8.5)	EWK 1 (8.5)	020616
--	--	-------------	-------------	--------

<b>End Plate</b> (thickness mm)				
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		AP (3)	AP (3)	389822
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<b>Partition</b> (thickness mm)				
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<b>Solid Brass Link</b>				
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<b>Spare Fuse Cap</b>				
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<b>Cross Connections</b>				
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	2 way	QL 2	QL 2	019140
	3 way	QL 3	QL 3	019150
	4 way	QL 4	QL 4	019160
	10 way	QL 10	QL 10	033880
	Screw	BS (M3 x 7)	BS (M3 x 7)	019970

<b>Fuse</b>				
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A list of all fuses stocked is shown at the end of this section				
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<b>Cover (1m)</b>				
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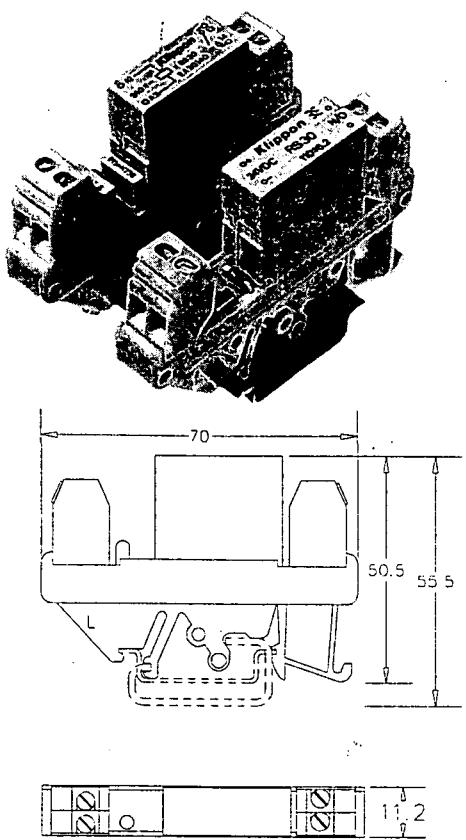
<b>Marking Tags</b>				
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All marking systems are shown in Section T6	DEKAFIX — Section T6	DEKAFIX — Section T6
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For additional accessories see Section T6

**Q.E.D.****INTERFACE MODULES****Weidmüller****Klippon Products****RS 30**

Slim single relay modules, 1N/O or 1 N/C contact

**Specifications**

Input:	see ordering data
Output: Max. voltage	250V ac
Max. current	see ordering data
Max. power(ac load)	2000VA
dc load	100W
Isolation: Input to output	4kV ac eff.
Terminals: Type	GSE5
Conductor size:solid	0.5-4.0mm <sup>2</sup>
flexible;	0.5-2.5mm <sup>2</sup>

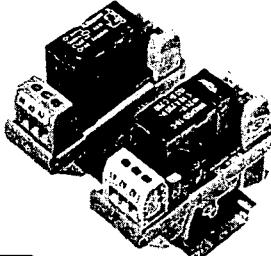
**Ordering Data**

Input Voltage	Input Power	Switching Current(max)	Cat. No.
12Vdc	0.45W	5A	11294.2
24V dc	0.45W	5A	11016.2
48V dc	0.45W	5A	11018.2
110V dc	0.45W	5A	11551.2
12Vdc	0.45W	5A	11295.2
24V dc	0.45W	5A	11009.2
48V dc	0.45W	5A	11011.2
110V dc	0.45W	5A	11552.2
110V ac	0.7VA	5A	11021.2
240V ac	1.2VA	3A	EA20140
110V ac	0.7VA	5A	11014.2
240V ac	1.2VA	3A	EA20141

Other types featuring plug/socket inputs and outputs, and changeover contacts are also available. Contact your Klippon representative for details.

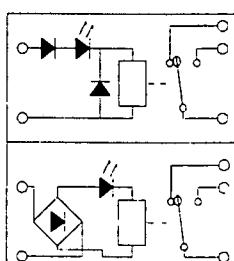
**RS 31**

Compact high power single C/O relay modules

**Specifications**

Input:	see ordering data
Output: Max. voltage	250V
Max. current	16A
Max. power(res. load); ac	3500VA
dc	480W
Min. switch current/power	1W/100mA
Isolation: Input to output	4kV ac eff.
Terminals:	
Type	GSE5
Conductor size;	
solid	0.5-4.0mm <sup>2</sup>
flexible	0.5-2.5mm <sup>2</sup>

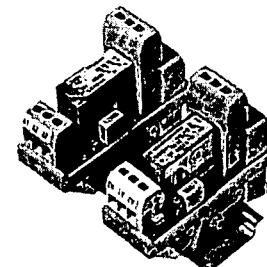
Insulation stripping length 7mm



Ordering Data	Input voltage	Input power	Cat. No.
	24V dc	1W	11283.6
	48V dc	1W	11507.6
	110V dc	1W	11503.6
	110V ac	1.2VA	11504.6
	240V ac	1.4VA	EA20142

**RS 32**

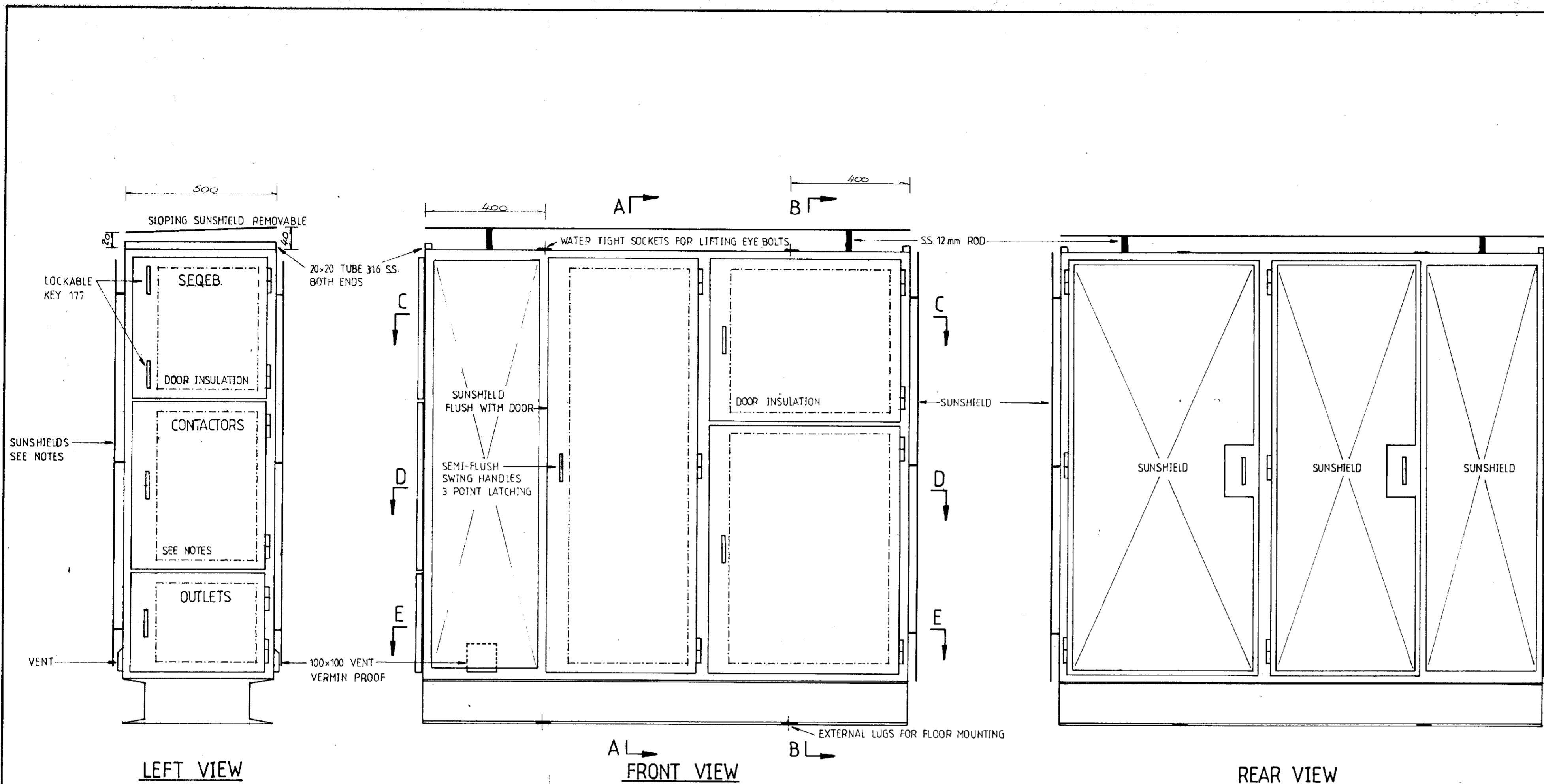
Compact 2 C/O relay modules

**Specifications**

Input:	see ordering data
Output: Max. voltage	250Vac
Max. current	4A
Max. power;	1400VA
Isolation: Input to output	2.5kV eff.
Terminals: Type	GSED5
Conductor size:solid	0.5-4.0mm <sup>2</sup>
flexible	0.5-2.5mm <sup>2</sup>

Insulation stripping length 7mm

Ordering Data	Input voltage	Input power	Cat. No.
	24/48Vac/dc	0.9/1.5VA	11226.6
		0.6/1.3W	
	110/220Vac/dc	0.75/1.45VA	11227.6
		0.7/1.4W	
	240Vac	1.6VA	EA20143

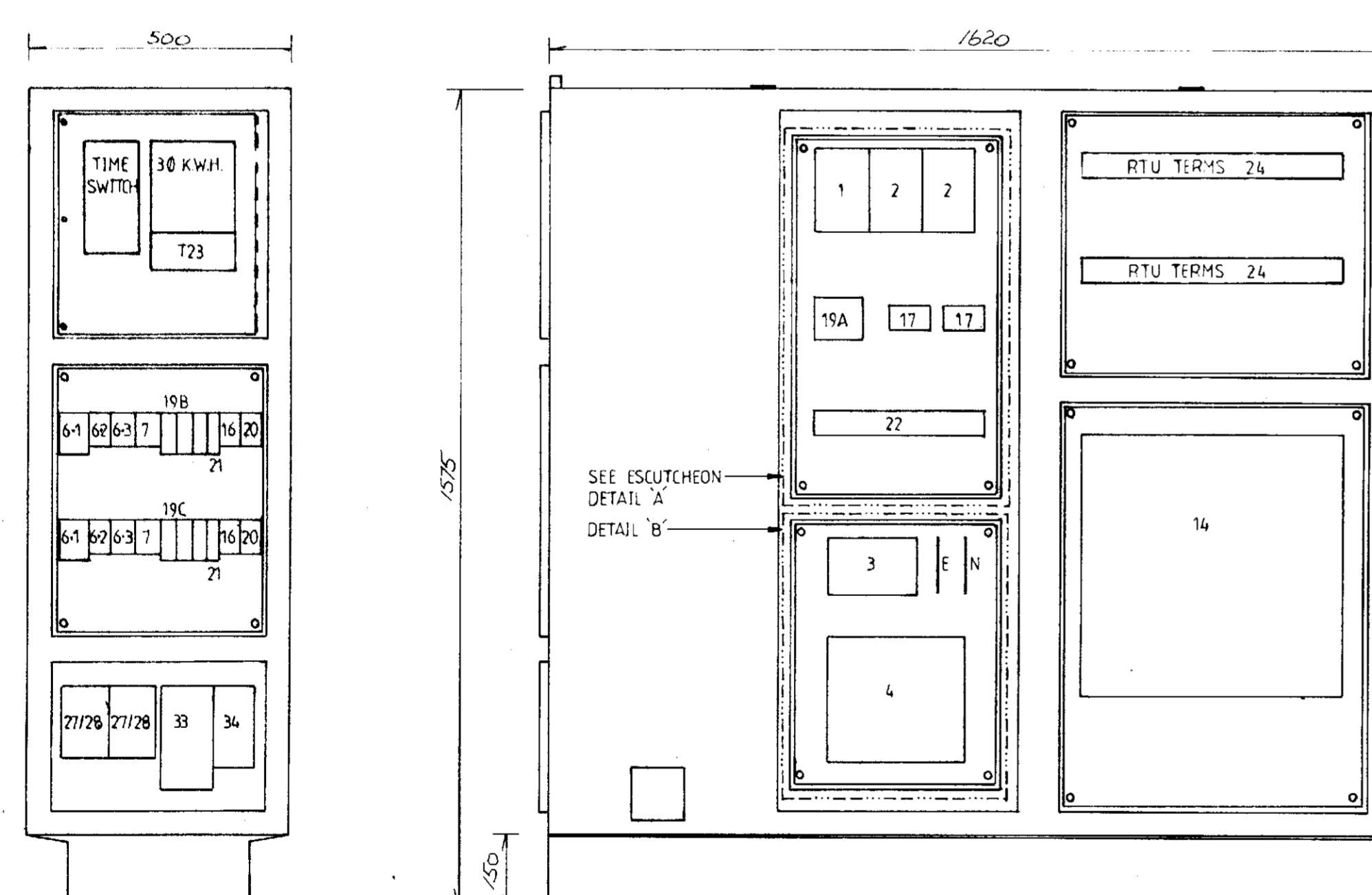
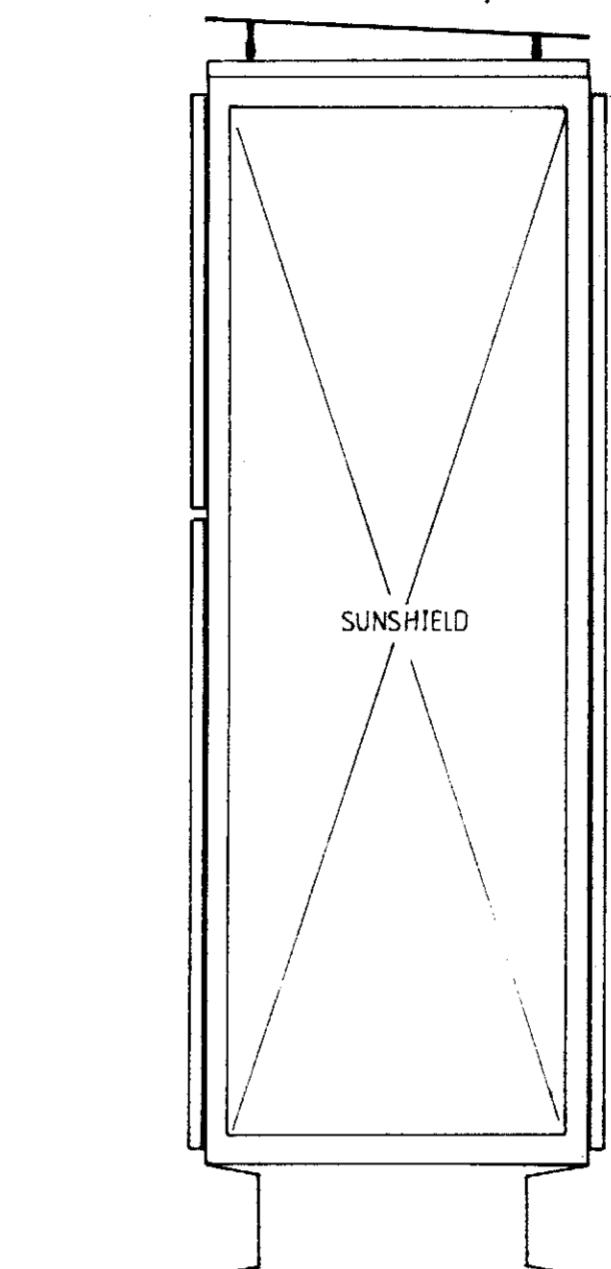


LEFT VIEW

A FRONT VIEW

REAR VIEW

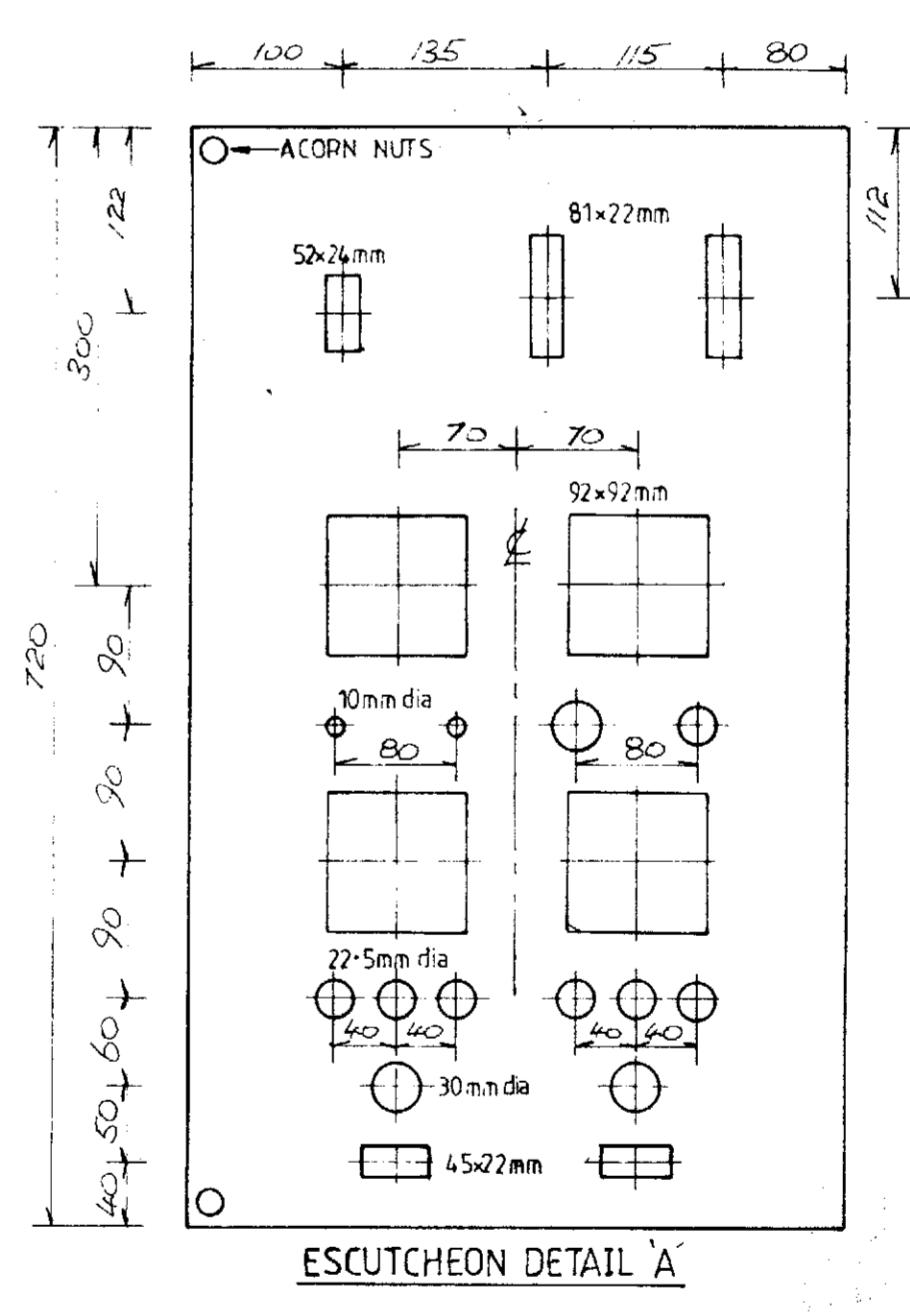
RIGHT VIEW



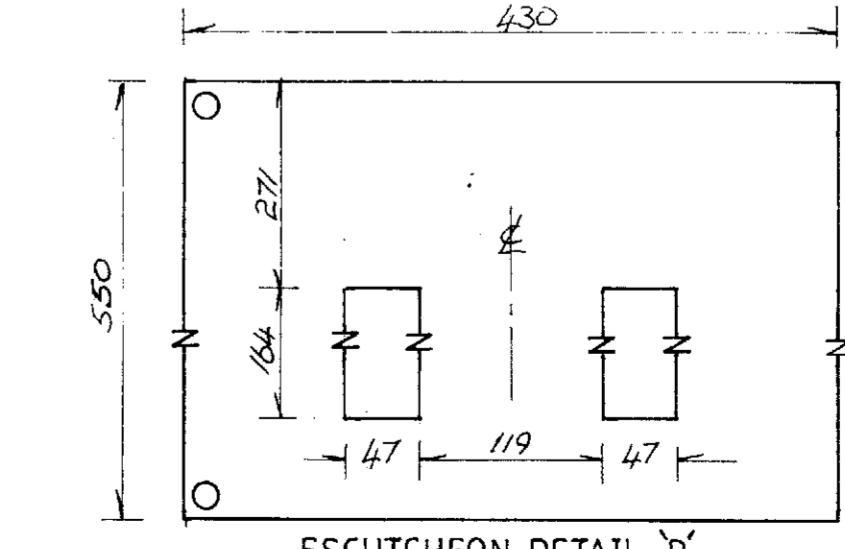
LEFT ELEVATION

## FRONT ELEVATION

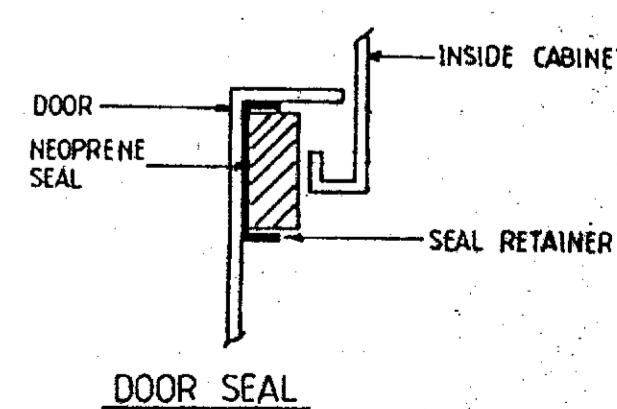
REAR ELEVATION



**ESCUTCHEON DETAIL 'A'**



SCUTCHEON DETAIL 'B'



DOOR SEAL

BRISBANE CITY COUNCIL

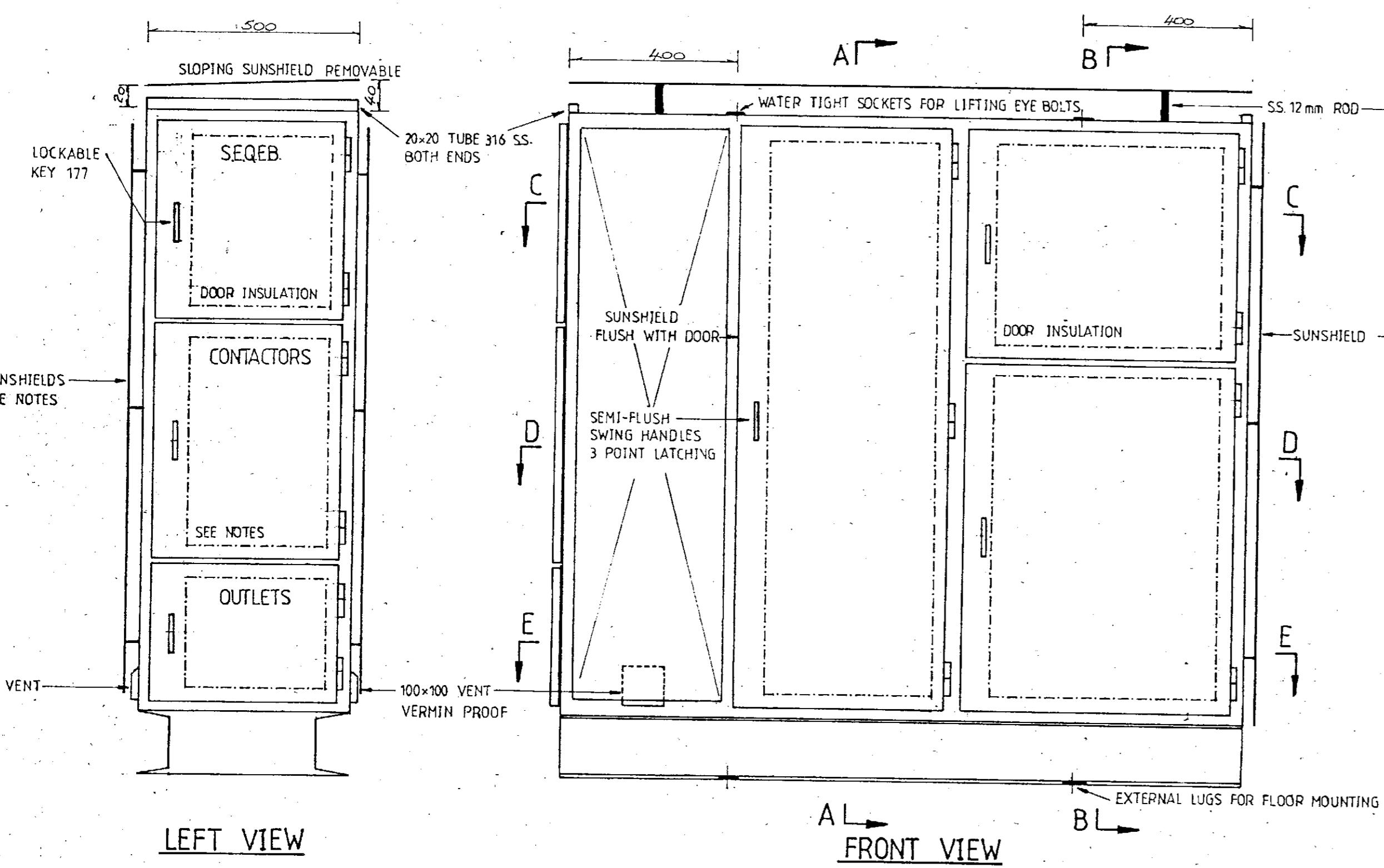
**SP252 BOGNOR ST.  
SEWAGE SUBMERSIBLE PUMP STATION  
GENERAL ARRANGEMENT**



# **POWER ELECTRIC Switchboards**

ACN 052 204 118  
Manufacturers of Engineered Switchboards for Mining, Industrial and Commercial Projects  
Telephone: (07) 274 3922 Facsimile: (07) 274 3929  
P.O. Box 6176, Fairfield Gardens, Brisbane, Queensland, 4108, Australia

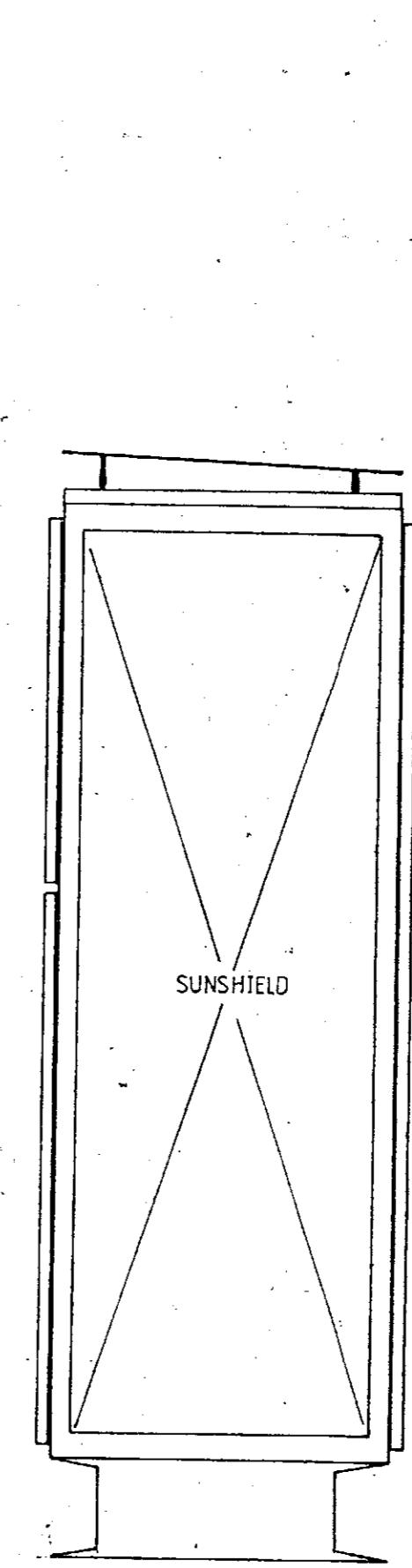
Scale	1:10	Drawing No	
Date	3-8-93	346-01	
Drawn	JM	REV	X B
Checked	<i>SP</i>	Job No	346



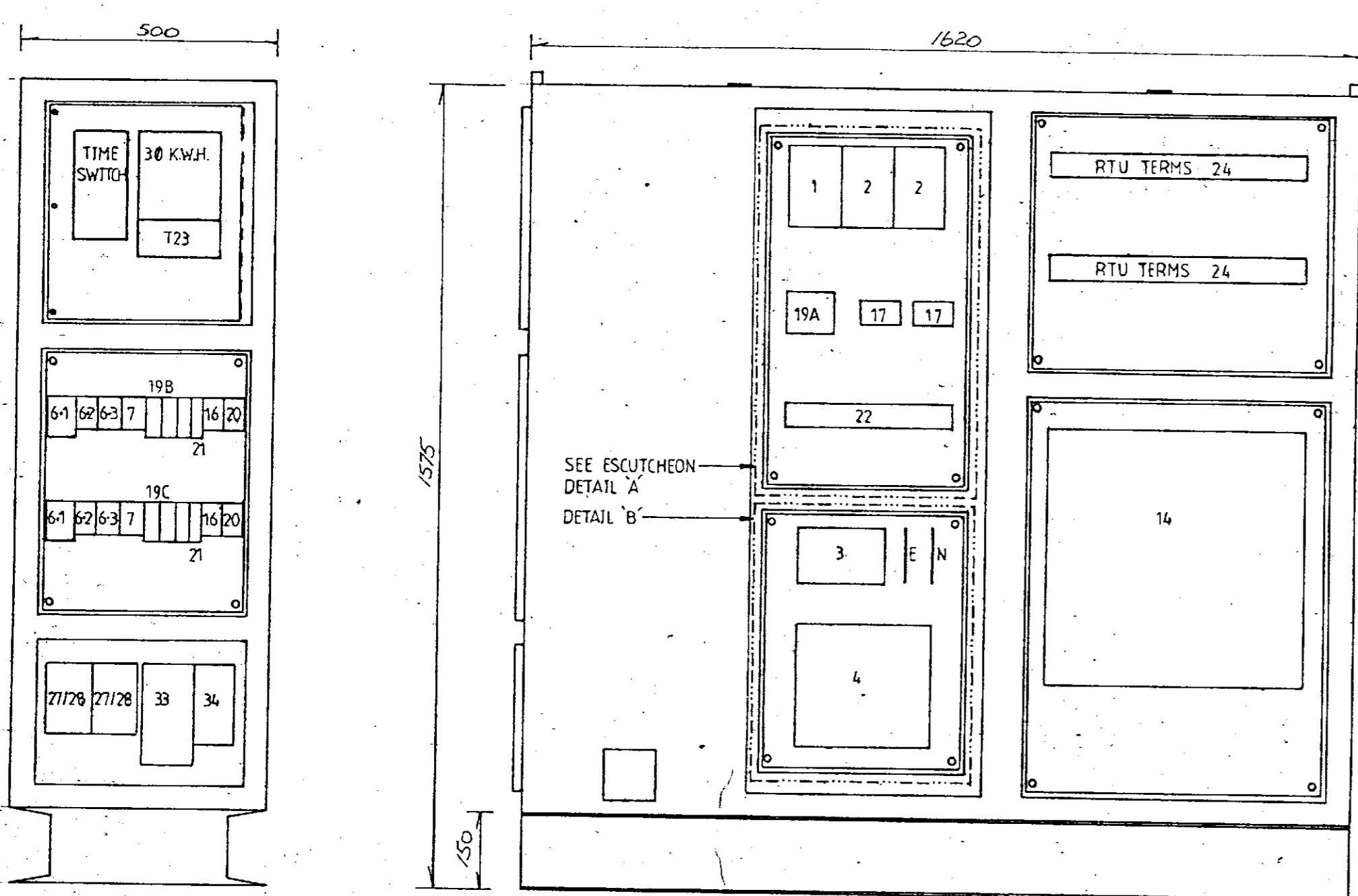
LEFT VIEW

FRONT VIEW

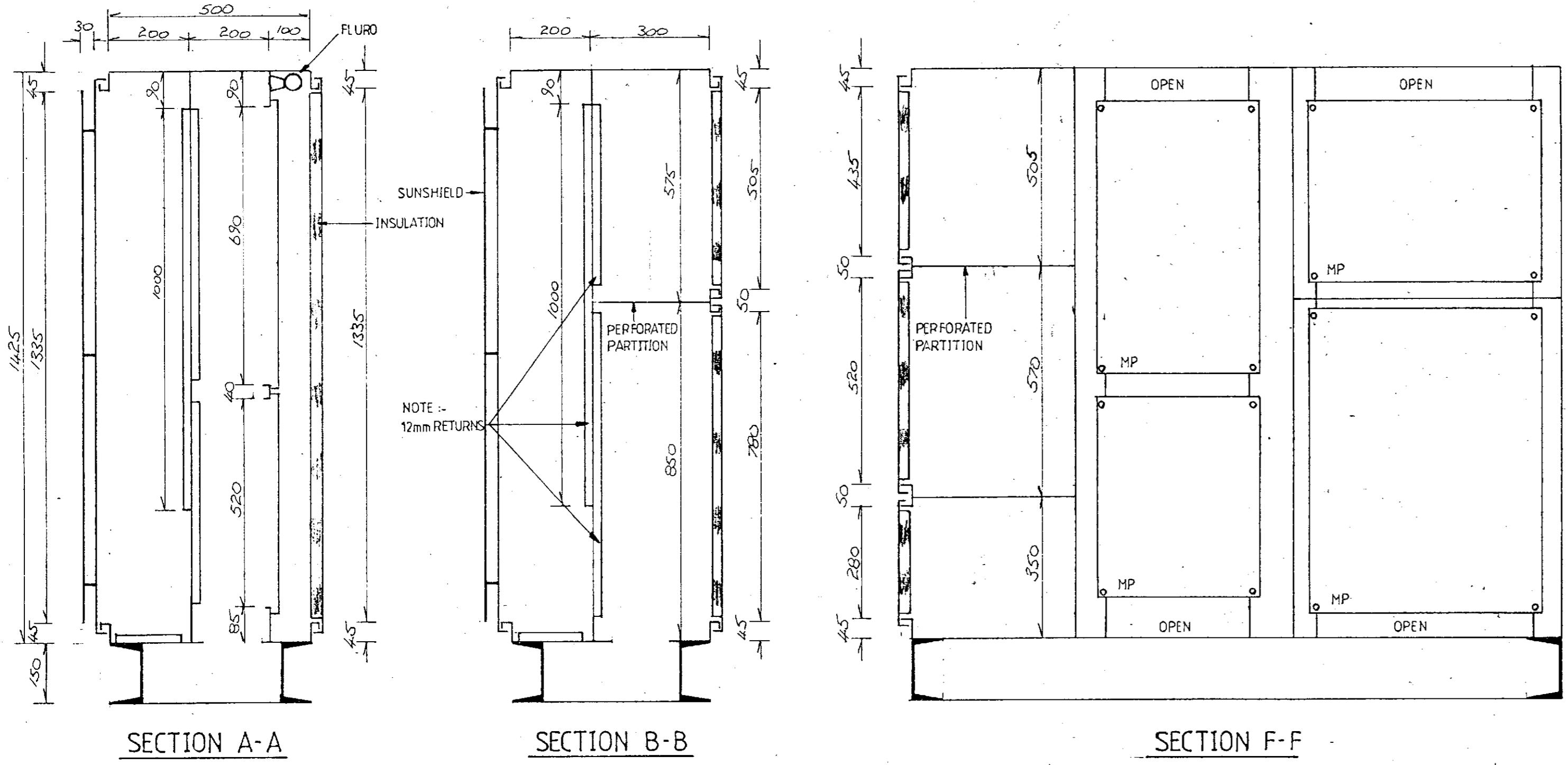
REAR VIEW



RIGHT VIEW



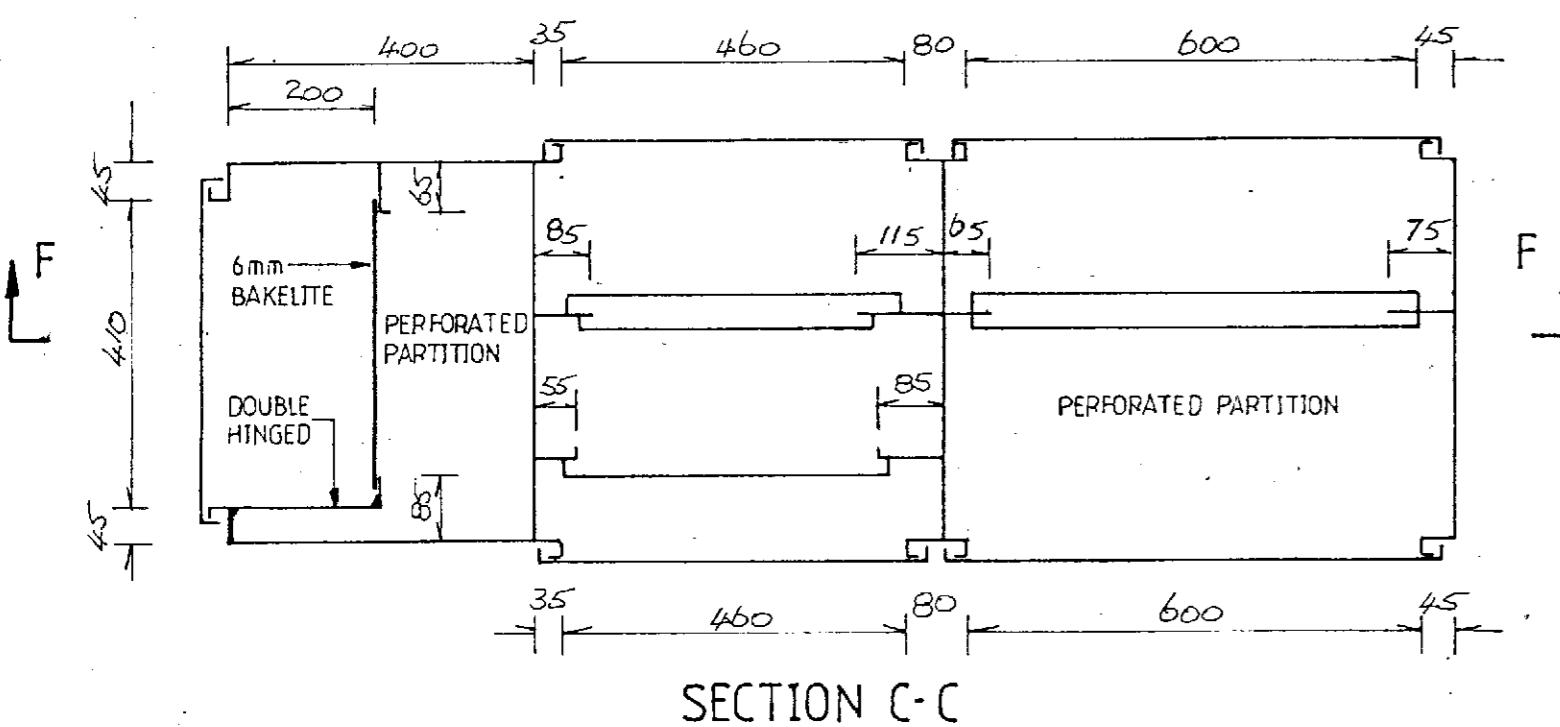
## Notes



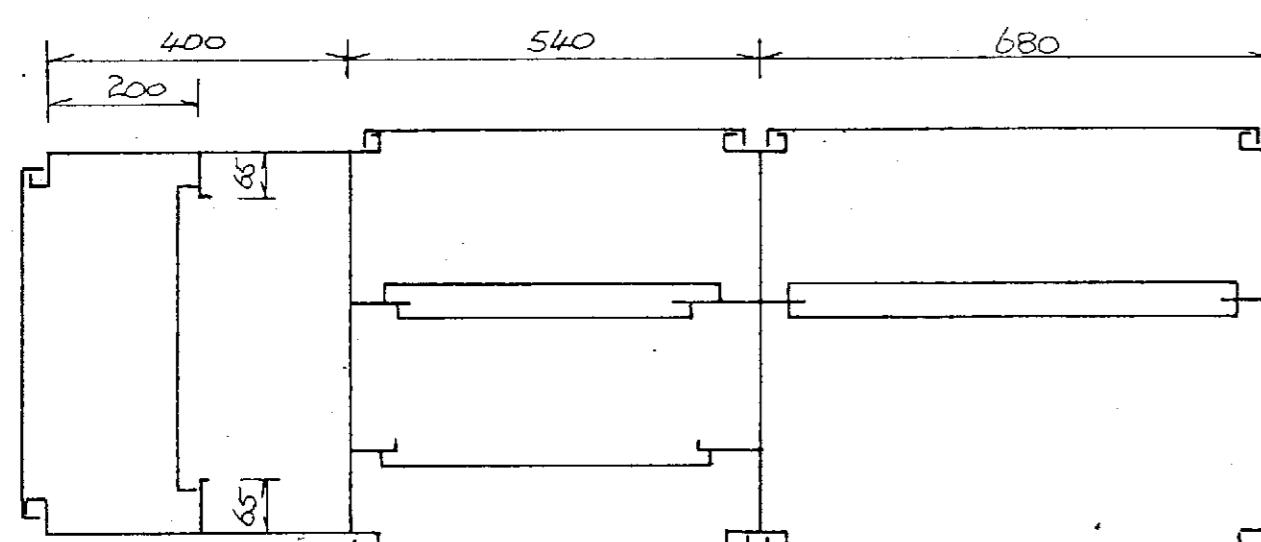
SECTION A-A

SECTION B-B

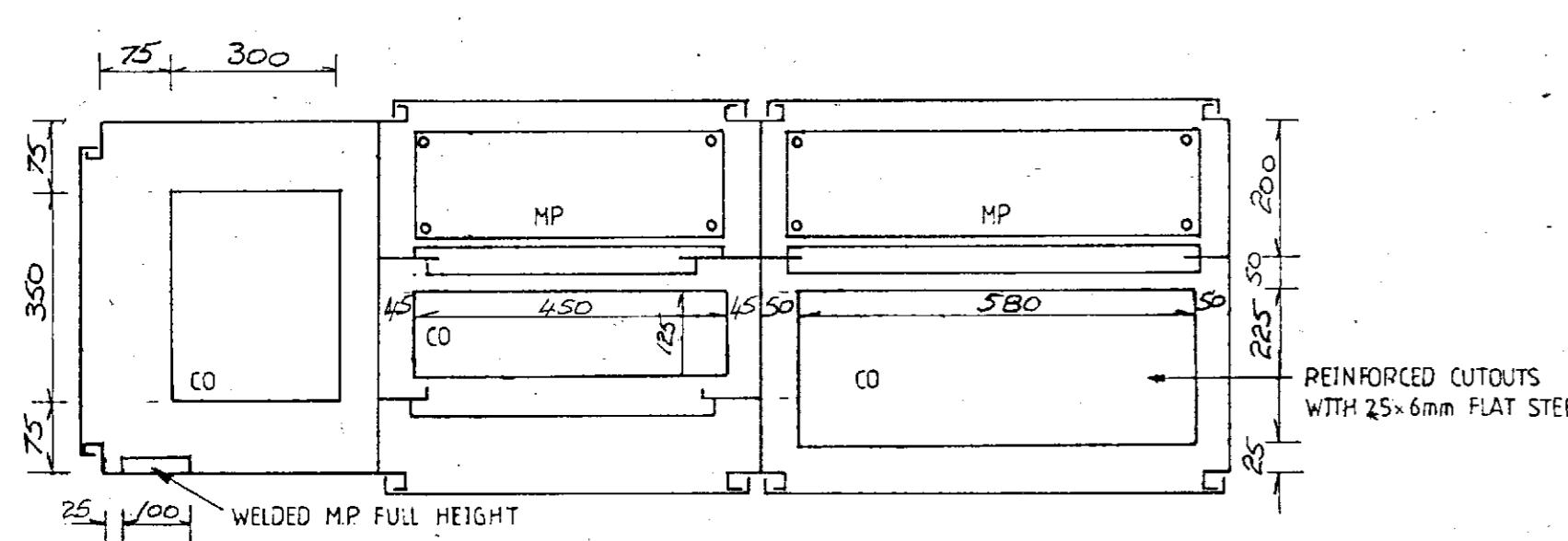
SECTION F-F



SECTION C-C



SECTION D-D



SECTION E-E

BRISBANE CITY COUNCIL

SP252 BOGNOR ST.  
SEWAGE SUBMERSIBLE PUMP STATION  
SECTIONAL VIEWS



# POWER ELECTRIC Switchboards PTY LTD

ACN 052 204 118  
Manufacturers of Engineered Switchboards for Mining, Industrial and Commercial Projects  
Telephone: (07) 274 3922 • Facsimile: (07) 274 3929  
P.O. Box 6176, Fairfield Gardens, Brisbane, Queensland, 4103, Australia

Scale	1:10	Drawing No
Date	3-8-93	346-02
Drawn	JM	REV A
Checked	<i>ef</i>	Job No 346

SUPPLY HAT SECTIONS LOOSE